



# Element Suwon

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## PART 22 MEASUREMENT REPORT

**Applicant Name:**

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

**Date of Testing:**

9/6/2022 – 11/7/2022

**Test Report Issue Date:**

11/22/2022

**Test Site/Location:**

Element Lab. Yongin-Si, Gyeonggi-do, South Korea

**Test Report Serial No.:**

1M2209010096-01.A3L

**FCC ID:**

**A3LSMS911U**

**Applicant Name:**

**Samsung Electronics Co., Ltd.**

**Application Type:**

Certification

**Model:**

SM-S911U

**Additional Model(s):**

SM-S911U1

**EUT Type:**

Portable Handset

**FCC Classification:**

PCS Licensed Transmitter Held to Ear (PCE)

**FCC Rule Part:**

22

**Test Procedure(s):**

ANSI C63.26-2015, KDB 648474 D03 v01r04

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.

Prepared by

Reviewed by

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<b>Test Report S/N:</b> 1M2209010096-01.A3L	<b>Test Dates:</b> 9/6/2022 – 11/7/2022	<b>EUT Type:</b> Portable Handset	Page 1 of 101

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Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	ERP		EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]	
GSM/GPRS	N/A	GMSK	824.2 - 848.8	0.977	29.90	1.604	32.05	243KGXW
EDGE	N/A	8-PSK	824.2 - 848.8	0.257	24.10	0.422	26.25	237KG7W
WCDMA	N/A	Spread Spectrum	826.4 - 846.6	0.154	21.88	0.253	24.03	4M17F9W
LTE Band 26/5	15MHz (Band 26 only)	QPSK	831.5 - 841.5	0.161	22.08	0.265	24.23	13M6G7D
		16QAM	831.5 - 841.5	0.129	21.12	0.212	23.27	13M6W7D
	10 MHz	QPSK	829.0 - 844.0	0.171	22.34	0.281	24.49	9M05G7D
		16QAM	829.0 - 844.0	0.139	21.44	0.228	23.59	9M05W7D
	5 MHz	QPSK	826.5 - 846.5	0.167	22.23	0.274	24.38	4M55G7D
		16QAM	826.5 - 846.5	0.140	21.48	0.230	23.63	4M54W7D
	3 MHz	QPSK	825.5 - 847.5	0.163	22.13	0.268	24.28	2M72G7D
		16QAM	825.5 - 847.5	0.129	21.10	0.212	23.25	2M72W7D
	1.4 MHz	QPSK	824.7 - 848.3	0.158	21.98	0.259	24.13	1M11G7D
		16QAM	824.7 - 848.3	0.126	20.99	0.206	23.14	1M12W7D
NR Band n26/5	20 MHz	$\pi/2$ BPSK	834.0 - 839.0	0.107	20.28	0.175	22.43	18M0G7D
		QPSK	834.0 - 839.0	0.101	20.05	0.166	22.20	18M9G7D
		16QAM	834.0 - 839.0	0.087	19.39	0.143	21.54	18M9W7D
	15 MHz	$\pi/2$ BPSK	831.5 - 841.5	0.111	20.45	0.182	22.60	13M5G7D
		QPSK	831.5 - 841.5	0.110	20.40	0.180	22.55	14M2G7D
	16QAM	831.5 - 841.5	0.090	19.56	0.148	21.71	14M2W7D	
		$\pi/2$ BPSK	829.0 - 844.0	0.107	20.28	0.175	22.43	9M05G7D
	10 MHz	QPSK	829.0 - 844.0	0.102	20.07	0.167	22.22	9M37G7D
		16QAM	829.0 - 844.0	0.085	19.30	0.140	21.45	9M36W7D
	5 MHz	$\pi/2$ BPSK	826.5 - 846.5	0.103	20.12	0.169	22.27	4M54G7D
		QPSK	826.5 - 846.5	0.100	19.99	0.164	22.14	4M54G7D
	16QAM	826.5 - 846.5	0.082	19.16	0.135	21.31	4M51W7D	

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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 Element Test Location

These measurement tests were conducted at the Element Suwon Laboratory located at 13, Heungdeok 1-ro, Giheung-gu, Yongin-si, Gyeonggi-do, 16954, South Korea. 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 Element Materials Technology Suwon, Ltd. located in Yongin-si, Gyeonggi-do, 16954, South Korea.**

- Element Materials Technology Suwon, Ltd. is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation(A2LA) with Certificate number 2041.04 for Specific Absorption Rate (SAR), and Electromagnetic Compatibility (EMC) & Telecommunications testing for FCC and Innovation, Science, and Economic Development Canada rules.
- Element Materials Technology Suwon, Ltd. facility is accredited, designated, and recognized in accordance with the provision of Radio Wave Act and International Standard ISO/IEC 17025:2017 under the National Radio Research Agency.
  - Designation Number / CABID: KR0169
  - Test Firm Registration Number of FCC: 417945
  - Test Firm Registration Number of ISED: 26168

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## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMS911U**. The test data contained in this report pertains only to the emissions due to the EUT's licensed transmitters that operate under the provisions of Part 22.

**Test Device Serial No.:** 0221M, 0285M, 0286M, 0368M, 0374M, 0281M, 0371M

### 2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, Multi-band 5G NR (FR1 and FR2), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5GHz and 6GHz), Bluetooth (1x, EDR, LE), NFC, Wireless Power Transfer

This device uses a tuner circuit that dynamically updates the antenna impedance parameters to optimize antenna performance for certain bands and modes of operation. The tuner for this device was set to simulate a "free space" condition where the transmit antenna is matched to the medium into which it is transmitting and, thus, the power is at its maximum level.

### 2.3 Test Configuration

The EUT was tested per the guidance of ANSI C63.26-2015. 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) Model: 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 Software and Firmware

Testing was performed on device(s) using software/firmware version S911USQU0AVJM installed on the EUT.

### 2.5 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 “American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services” (ANSI C63.26-2015) were used in the measurement of the EUT.

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

### 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.

For radiated power measurements, substitution method is used per the guidance of ANSI C63.26-2015. For emissions below 1GHz, 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  $P_g \text{ [dBm]} - \text{cable loss [dB]}$ .

For radiated spurious emissions measurements, the field strength conversion method is used per the formulas in Section 5.2.7 of ANSI C63.26-2015. Field Strength (EIRP) is calculated using the following formulas:

$$E_{\text{[dB}\mu\text{V/m]}} = \text{Measured amplitude level}_{\text{[dBm]}} + 107 + \text{Cable Loss}_{\text{[dB]}} + \text{Antenna Factor}_{\text{[dB/m]}}$$

And

$$\text{EIRP}_{\text{[dBm]}} = E_{\text{[dB}\mu\text{V/m]}} + 20\log D - 104.8; \text{ where } D \text{ is the measurement distance in meters.}$$

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 414788 D01 v01r01.

Radiated power and radiated spurious emission levels are investigated with the receive antenna horizontally and vertically polarized per ANSI C63.26-2015.

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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
AAMCS	UDC	Directional Coupler	2022-07-05	Annual	2023-07-04	N/A
Agilent	N9030A	PXA Signal Analyzer	2022-07-04	Annual	2023-07-03	MY49432391
Anritsu	S820E	Cable and Antenna Analyzer	2022-07-06	Annual	2023-07-05	1839097
Anritsu	MA24106A	USB Power Sensor	2022-07-06	Annual	2023-07-05	1244512
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	2022-10-21	Biennial	2024-10-20	10160045
Com-Power	PAM-118A	Preamplifier	2022-07-06	Annual	2023-07-05	551042
Espec	SH-242	Environmental Chamber	2022-08-26	Annual	2023-08-25	93011064
Fairview Microwave	FM2CP1122-10	Coupler	2022-07-06	Annual	2023-07-05	1946
Keysight Technologies	N9030B	MXA Signal Analyzer	2022-05-10	Annual	2023-05-19	MY57142018
Mini-Circuits	BW-N10W5+	Attenuator	2022-05-09	Annual	2023-05-08	1607
Mini-Circuits	BW-N10W5+	Attenuator	2022-05-09	Annual	2023-05-08	1607
Rohde & Schwarz	TS-PR18	Preamplifier	2022-07-06	Annual	2023-07-05	102141
Rohde & Schwarz	SMB100A03	Signal Generator	2022-01-18	Annual	2023-01-17	182487
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	2022-02-18	Annual	2023-02-17	131453
Rohde & Schwarz	ESW	EMI Test Receiver	2022-07-04	Annual	2023-07-03	101761
Rohde & Schwarz	FSW43	Signal & Spectrum Analyzer	2022-01-18	Annual	2023-01-17	101250
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2022-02-18	Annual	2023-02-17	102131
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2022-03-28	Annual	2023-03-27	102151
Schwarzbeck	VULB9162	Broadband TRILOG Antenna	2021-07-13	Biennial	2023-07-12	9162-217
Schwarzbeck	UHA9105	Dipole Antenna	2022-07-19	Biennial	2024-07-18	91052522
Sunol	DRH-118	Horn Antenna	2021-07-14	Biennial	2023-07-13	A102416-1
Sunol	DRH-118	Horn Antenna	2021-01-12	Biennial	2023-01-11	A060215

**Table 5-1. Test Equipment**

**Notes:**

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

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## 6.0 SAMPLE CALCULATIONS

### GSM Emission Designator

#### **Emission Designator = 250KGXW**

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

### EDGE Emission Designator

#### **Emission Designator = 250KG7W**

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

### WCDMA Emission Designator

#### **Emission Designator = 4M16F9W**

WCDMA BW = 4.16 MHz  
 F = Frequency Modulation  
 9 = Composite Digital Info  
 W = Combination (Audio/Data)

### 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

#### **Example: Spurious emission at 3700.40 MHz**

The receive spectrum analyzer reading at 3 meters with the EUT on the turntable was  $-81.0$  dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of  $-81.0$  dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 3700.40 MHz. So 6.1 dB is added to the signal generator reading of  $-30.9$  dBm yielding  $-24.80$  dBm. The fundamental EIRP was 25.50 dBm so this harmonic was  $25.50$  dBm  $- (-24.80) = 50.3$  dBc.

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## 7.0 TEST RESULTS

### 7.1 Summary

Company Name: Samsung Electronics Co., Ltd.  
 FCC ID: A3LSMS911U  
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)  
 Mode(s): GSM/GPRS/WCDMA/NR/LTE

Test Condition	Test Description	FCC Part Section(s)	RSS Section(s)	Test Limit	Test Result	Reference
CONDUCTED	Transmitter Conducted Output Power	2.1046(a), 2.1046(c)	RSS-Gen(6.12)	N/A	PASS	Section 7.2
	Occupied Bandwidth	2.1049(h)	RSS-Gen(6.7)	N/A	PASS	Section 7.3
	Conducted Band Edge / Spurious Emissions	2.1051, 22.917(a)	RSS-Gen(6.13), RSS-132(5.5)	$\geq 43 + 10 \log (P[\text{Watts}])$ dB of attenuation below transmitter power	PASS	Sections 7.4, 7.5
	Frequency Stability	2.1055, 22.355	RSS-Gen(6.11), RSS-132(5.3)	The carrier frequency of the transmitter must be maintained within the 2.5ppm	PASS	Section 7.8
	Uplink Carrier Aggregation	22.917(a), 27.53(h)	RSS-199(4.5)	$\geq 43 + 10 \log (P[\text{Watts}])$ dB of attenuation below transmitter power	PASS	Section 7.5
RADIATED	Effective Radiated Power / Equivalent Isotropic Radiated Power	22.913(a)(5)	RSS-Gen(6.12), RSS-132(5.4)	< 7 Watts max. ERP	PASS	Section 7.6
	Radiated Spurious Emissions	2.1053, 22.917(a)	RSS-Gen(7.3), RSS-132(5.6)	$> 43 + 10 \log_{10} (P[\text{Watts}])$ 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) All conducted emissions measurements are performed with automated test software to capture the corresponding plots necessary to show compliance. The measurement software utilized is EMC Software Tool v1.0.

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## 7.2 Conducted Power Output Data

### Test Overview

All 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.

### Test Procedure Used

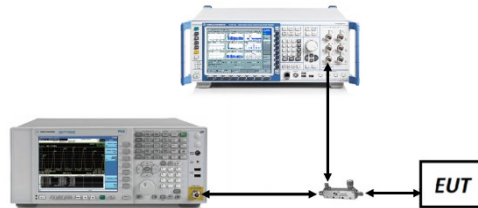
ANSI C63.26-2015 – Section 5.2

### Test Settings

1. Detector = RMS
2. Trace mode = trace average for continuous emissions, max hold for pulse emissions
3. Sweep time = auto couple
4. The trace was allowed to stabilize
5. 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**

### Test Notes

1. Uplink carrier aggregation is only supported in this EUT while operating in Power Class 3.
2. Conducted power 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.
3. 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.
4. All other conducted power measurements are contained in the RF exposure report for this filing.

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Power State	Band	Bandwidth (PCC + SCC)	PCC					SCC					ULCA Tx. Power [dBm]
			Modulation	UL Channel	UL Frequency	UL # RB	UL RB Offset	Modulation	UL Channel	UL Frequency	UL # RB	UL RB Offset	
Max	LTE B5	10MHz + 10MHz	QPSK	20450	829.0	1	49	QPSK	20549	838.9	1	0	24.47
				20475	831.5	1	49		20574	841.4	1	0	24.39
				20600	844.0	1	0		20501	834.1	1	49	24.52
			16-QAM	20600	844	50	0	QPSK	20501	834.1	50	0	22.67
				20600	844	50	0	16-QAM	20501	834.1	50	0	21.62
				20600	844	50	0	64-QAM	20501	834.1	50	0	21.63
				20600	844	50	0	256-QAM	20501	834.1	50	0	19.59

Table 7-2. Conducted Power Output Data (ULCA LTE Band 5)

NR (SCS 15kHz)						LTE						NR Conducted Power [dBm]	LTE Conducted Power [dBm]	EN-DC Total Tx. Power [dBm]	
NR Band	NR Bandwidth [MHz]	NR Channel	NR Frequency [MHz]	Mod.	NR RB#/Offset	LTE Band	LTE Bandwidth [MHz]	LTE Channel	LTE Frequency [MHz]	Mod.	LTE RB#/Offset				
n5 ANT A	20	Mid	836.5	QPSK	100/0	B2 ANT A	20	Mid	1880		QPSK	100/0	20.03	22.21	24.27
				QPSK	100/0						QPSK	1/50	19.04	22.93	24.42
				QPSK	1/53						QPSK	100/0	19.79	22.21	24.18
				QPSK	1/53						QPSK	1/50	18.88	22.78	24.26
				16Q	1/53						16Q	1/50	20.23	22.46	24.50

Table 7-3. Conducted Max Powers (EN-DC Combo NR n5 – LTE B2)

NR (SCS 15kHz)						LTE						NR Conducted Power [dBm]	LTE Conducted Power [dBm]	EN-DC Total Tx. Power [dBm]	
NR Band	NR Bandwidth [MHz]	NR Channel	NR Frequency [MHz]	Mod.	NR RB#/Offset	LTE Band	LTE Bandwidth [MHz]	LTE Channel	LTE Frequency [MHz]	Mod.	LTE RB#/Offset				
n5 ANT A	20	Mid	836.5	QPSK	100/0	B30 ANT F	10	Mid	2310		QPSK	50/0	22.52	19.19	24.18
				QPSK	100/0						QPSK	1/25	21.92	20.32	24.20
				QPSK	1/53						QPSK	50/0	22.40	19.23	24.11
				QPSK	1/53						QPSK	1/25	21.80	20.26	24.11
				16Q	100/0						16Q	1/25	22.53	19.61	24.32

Table 7-4. Conducted Max Powers (EN-DC Combo NR n5 – LTE B30)

NR (SCS 15kHz)						LTE						NR Conducted Power [dBm]	LTE Conducted Power [dBm]	EN-DC Total Tx. Power [dBm]	
NR Band	NR Bandwidth [MHz]	NR Channel	NR Frequency [MHz]	Mod.	NR RB#/Offset	LTE Band	LTE Bandwidth [MHz]	LTE Channel	LTE Frequency [MHz]	Mod.	LTE RB#/Offset				
n5 ANT A	20	Mid	836.5	QPSK	100/0	B48 ANT F	20	Mid	3625		QPSK	100/0	20.95	20.74	23.86
				QPSK	100/0						QPSK	1/50	19.32	21.71	23.69
				QPSK	1/53						QPSK	100/0	21.02	20.77	23.91
				QPSK	1/53						QPSK	1/50	19.59	21.71	23.79
				16Q	1/53						16Q	100/0	21.96	19.80	24.02

Table 7-5. Conducted Max Powers (EN-DC Combo NR n5 – LTE B48)

NR (SCS 15kHz)						LTE						NR Conducted Power [dBm]	LTE Conducted Power [dBm]	EN-DC Total Tx. Power [dBm]	
NR Band	NR Bandwidth [MHz]	NR Channel	NR Frequency [MHz]	Mod.	NR RB#/Offset	LTE Band	LTE Bandwidth [MHz]	LTE Channel	LTE Frequency [MHz]	Mod.	LTE RB#/Offset				
n5 ANT A	20	Mid	836.5	QPSK	100/0	B66 ANT F	20	Mid	1745		QPSK	100/0	20.12	21.64	23.96
				QPSK	100/0						QPSK	1/50	19.15	22.31	24.02
				QPSK	1/53						QPSK	100/0	20.19	21.73	24.04
				QPSK	1/53						QPSK	1/50	19.14	22.46	24.12
				16Q	1/53						16Q	1/50	20.53	22.21	24.46

Table 7-6. Conducted Max Powers (EN-DC Combo NR n5 – LTE B66)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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NR (SCS 15kHz)						LTE						NR	LTE	EN-DC
NR Band	NR Bandwidth [MHz]	NR Channel	NR Frequency [MHz]	Mod.	NR RB#/Offset	LTE Band	LTE Bandwidth [MHz]	LTE Channel	LTE Frequency [MHz]	Mod.	LTE RB#/Offset	Conducted Power [dBm]	Conducted Power [dBm]	Total Tx. Power [dBm]
n5	20	Mid	836.5	QPSK	100/0	B30 ANT A	10	Mid	2310	QPSK	50/0	21.33	21.40	24.38
				QPSK	100/0					QPSK	1/25	20.10	22.48	24.46
				QPSK	1/53					QPSK	50/0	21.20	21.44	24.33
				QPSK	1/53					QPSK	1/25	19.85	22.49	24.38
				16Q	1/53					16Q	1/25	21.70	21.52	24.62

**Table 7-7. Conducted Max Powers (EN-DC Combo NR 5 – LTE B30)**

<b>FCC ID:</b> A3LSMS911U	<b>PART 22 MEASUREMENT REPORT</b>		<b>Approved by:</b> Technical Manager
<b>Test Report S/N:</b> 1M2209010096-01.A3L	<b>Test Dates:</b> 9/6/2022 – 11/7/2022	<b>EUT Type:</b> Portable Handset	Page 13 of 101

## 7.3 Occupied Bandwidth

### 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

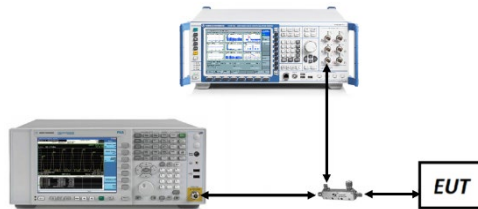
ANSI C63.26-2015 – Section 5.4.4

### 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 x 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.



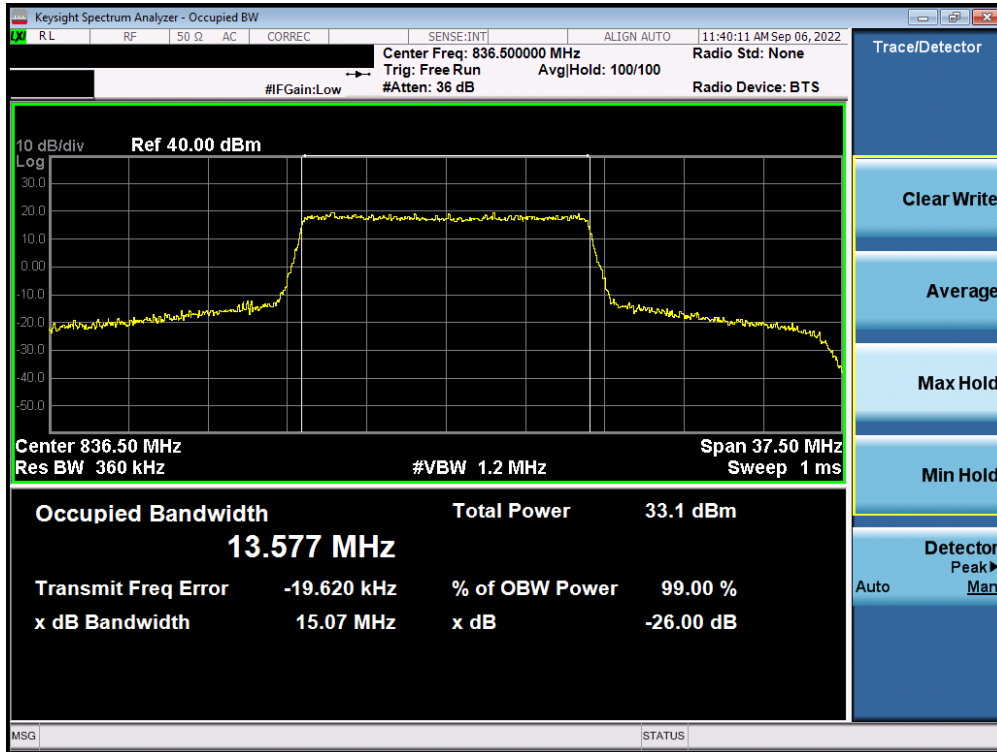
**Figure 7-2. Test Instrument & Measurement Setup**

### Test Notes

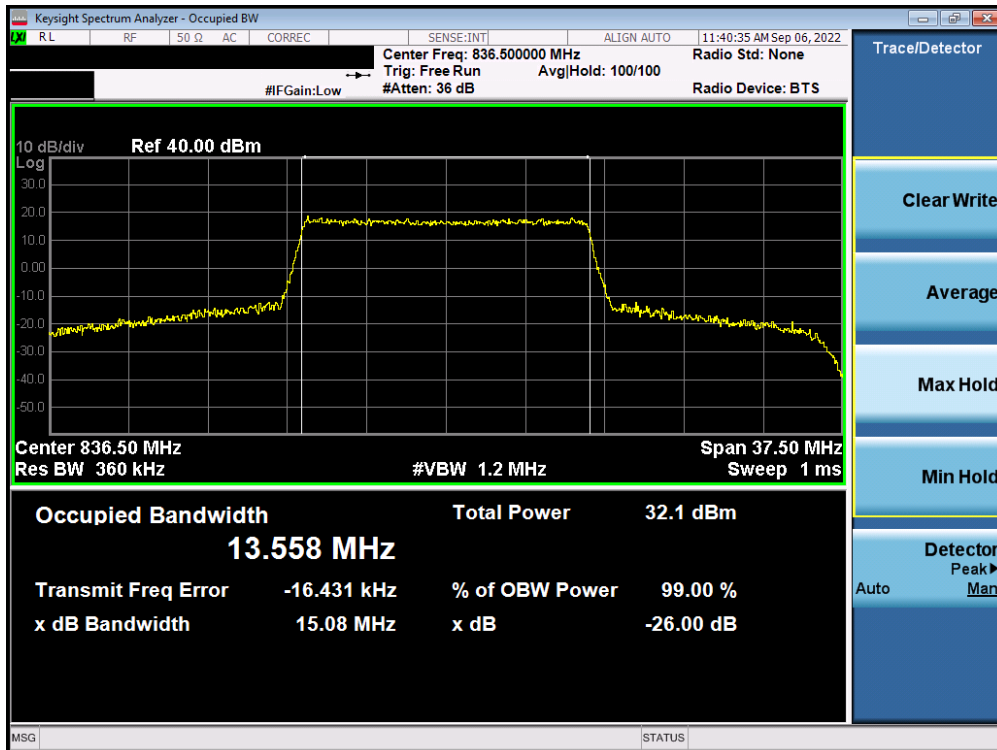
None.

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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# LTE Band 26/5



Plot 7-1. Occupied Bandwidth Plot (LTE Band 26 - 15MHz QPSK - Full RB)

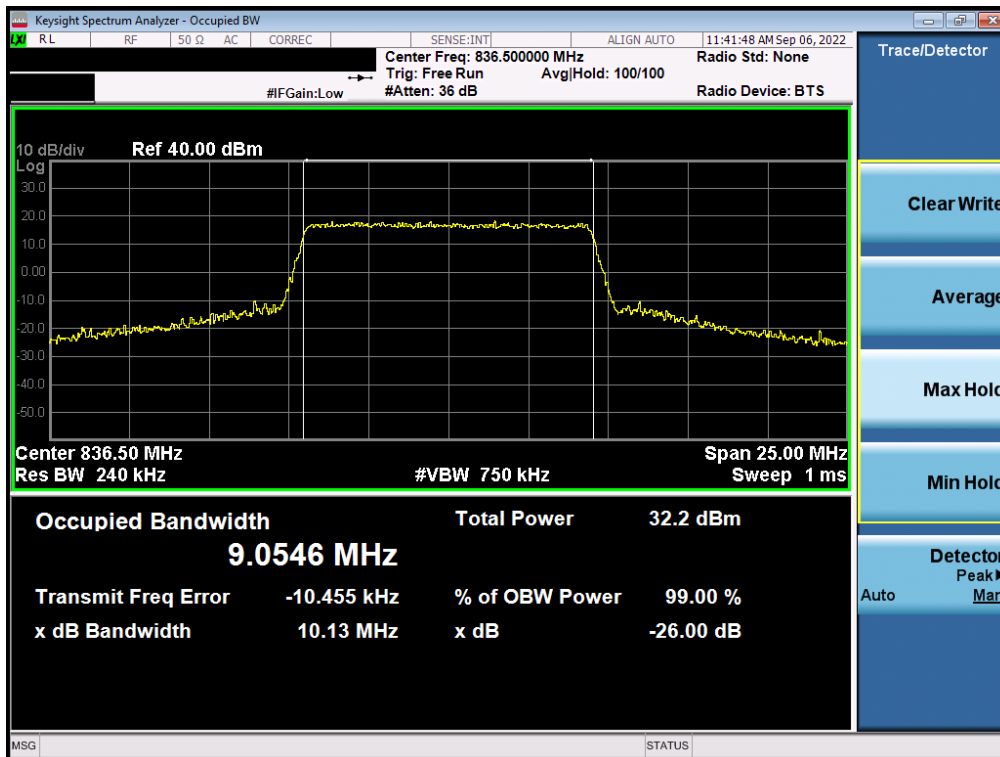


Plot 7-2. Occupied Bandwidth Plot (LTE Band 26 - 15MHz 16-QAM - Full RB)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 15 of 101



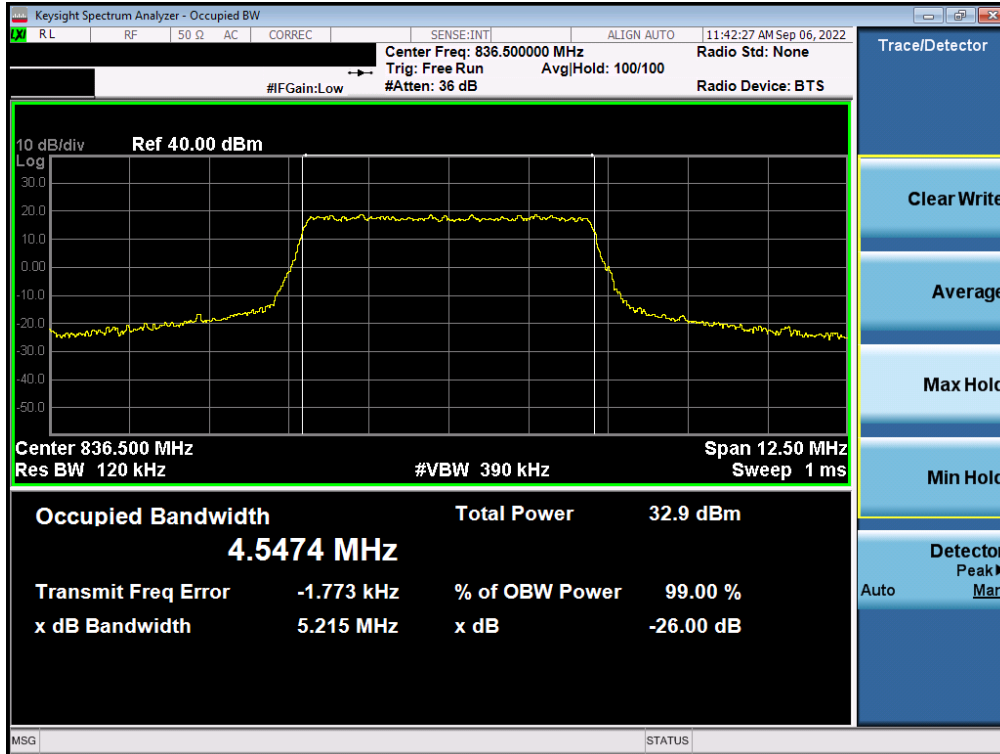
Plot 7-3. Occupied Bandwidth Plot (LTE Band 26/5 - 10MHz QPSK - Full RB)



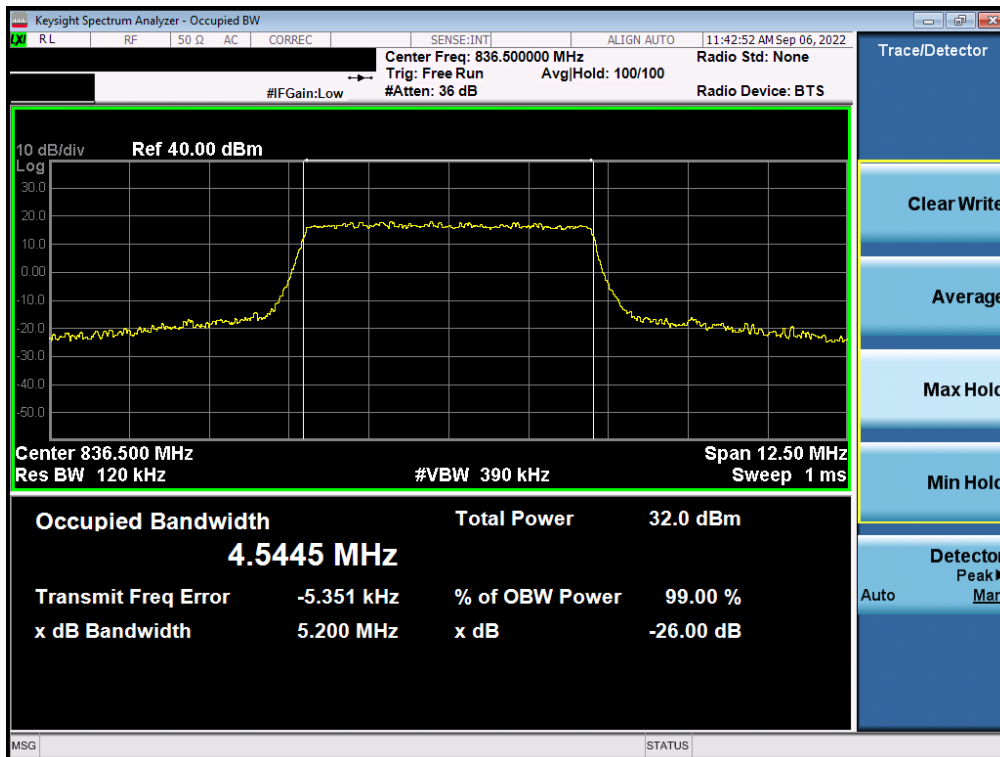
Plot 7-4. Occupied Bandwidth Plot (LTE Band 26/5 - 10MHz 16-QAM - Full RB)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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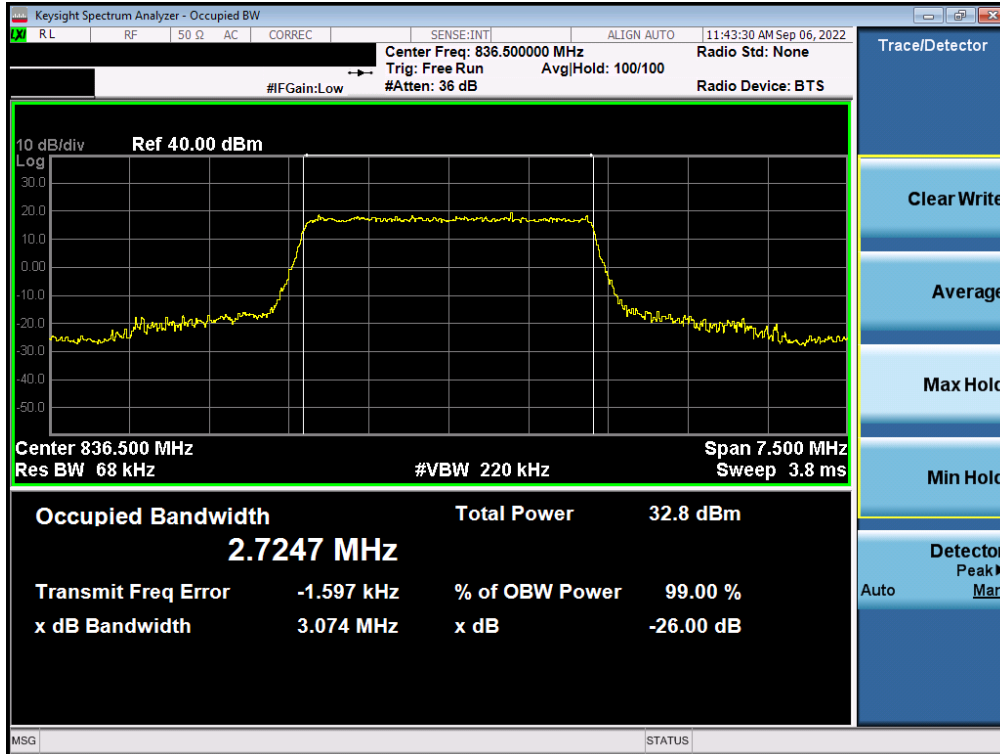


Plot 7-5. Occupied Bandwidth Plot (LTE Band 26/5 - 5MHz QPSK - Full RB)

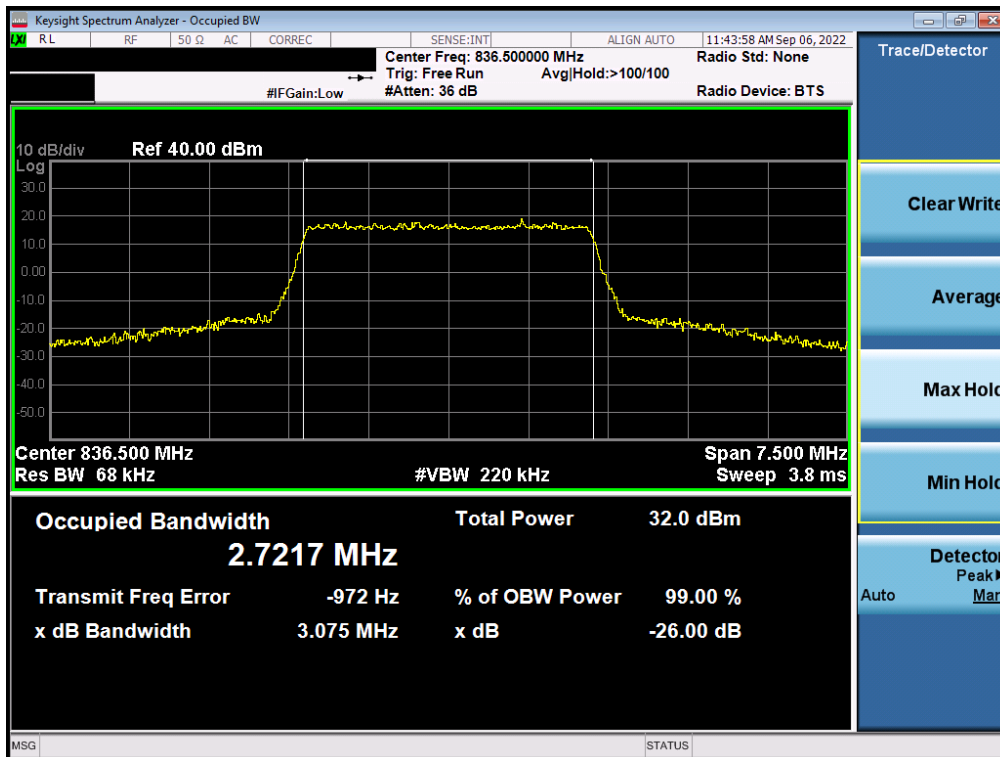


Plot 7-6. Occupied Bandwidth Plot (LTE Band 26/5 - 5MHz 16-QAM - Full RB)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 17 of 101

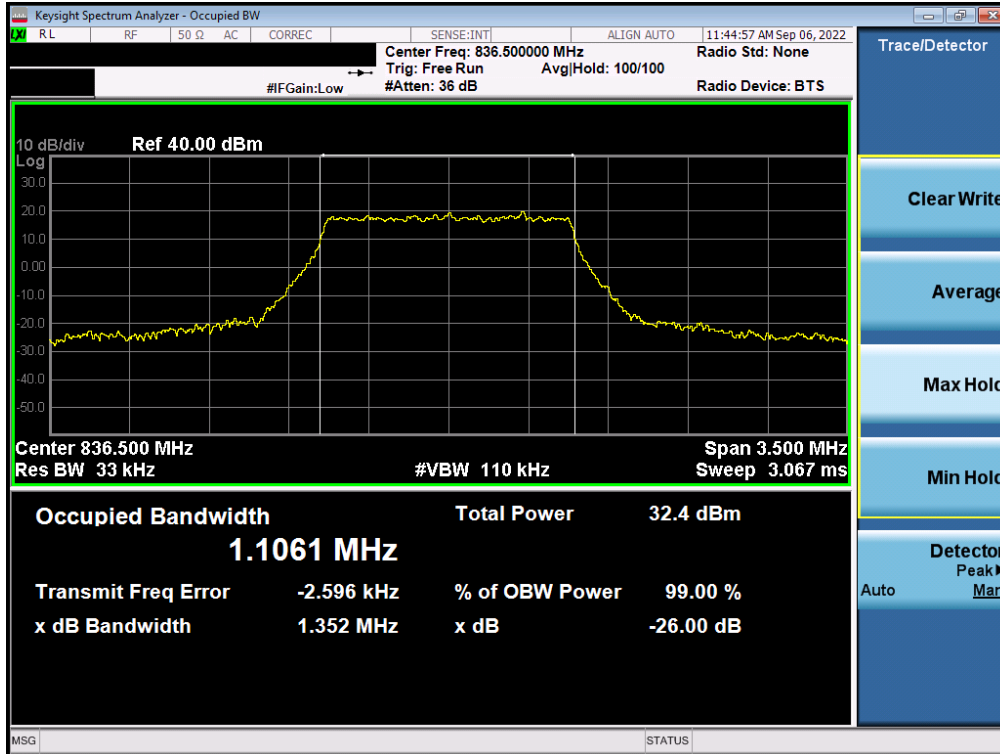


Plot 7-7. Occupied Bandwidth Plot (LTE Band 26/5 - 3MHz QPSK - Full RB)

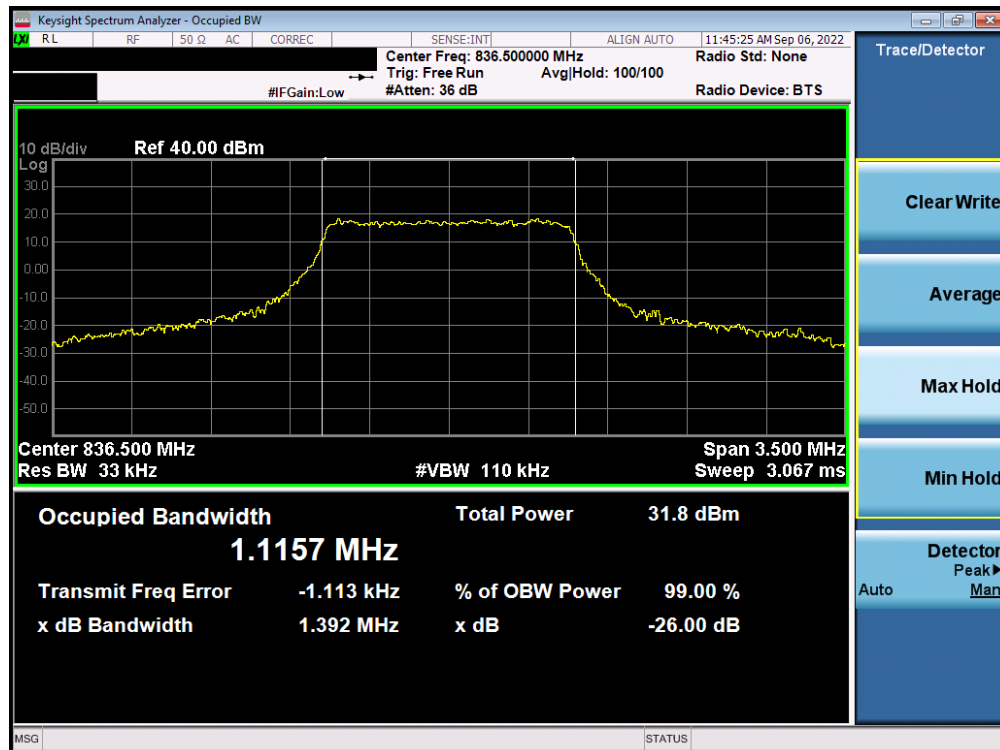


Plot 7-8. Occupied Bandwidth Plot (LTE Band 26/5 - 3MHz 16-QAM - Full RB)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-9. Occupied Bandwidth Plot (LTE Band 26/5 - 1.4MHz QPSK - Full RB)



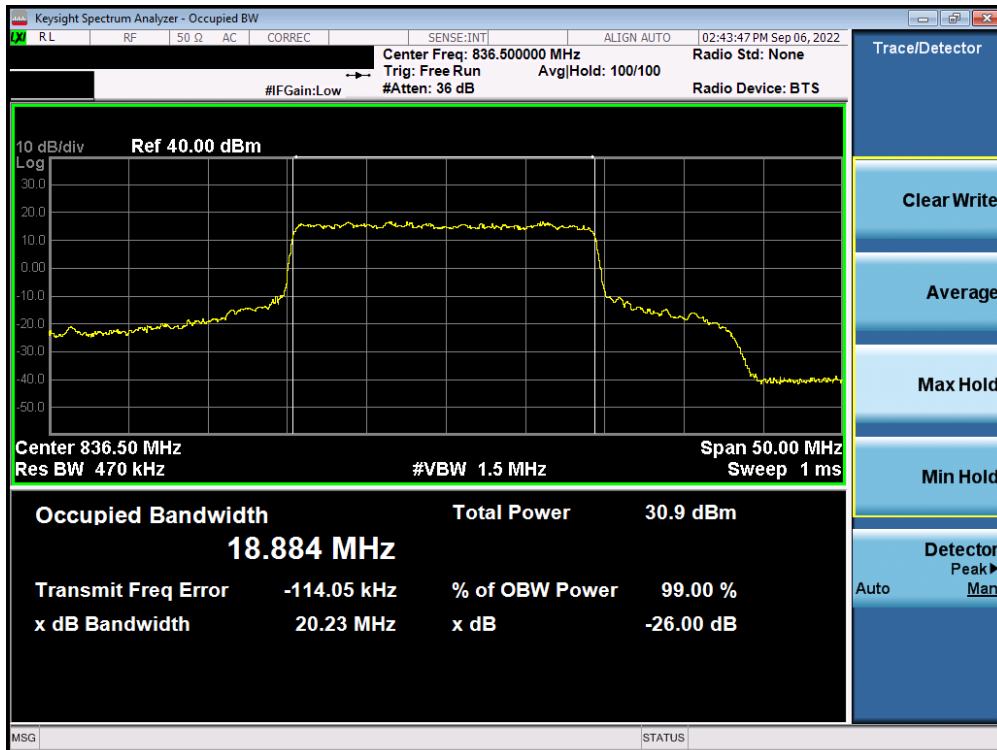
Plot 7-10. Occupied Bandwidth Plot (LTE Band 26/5 - 1.4MHz 16-QAM - Full RB)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 - 11/7/2022	EUT Type: Portable Handset	Page 19 of 101

NR Band n26/5



Plot 7-11. Occupied Bandwidth Plot (NR Band n26/5 - 20MHz  $\pi/2$  BPSK - Full RB)

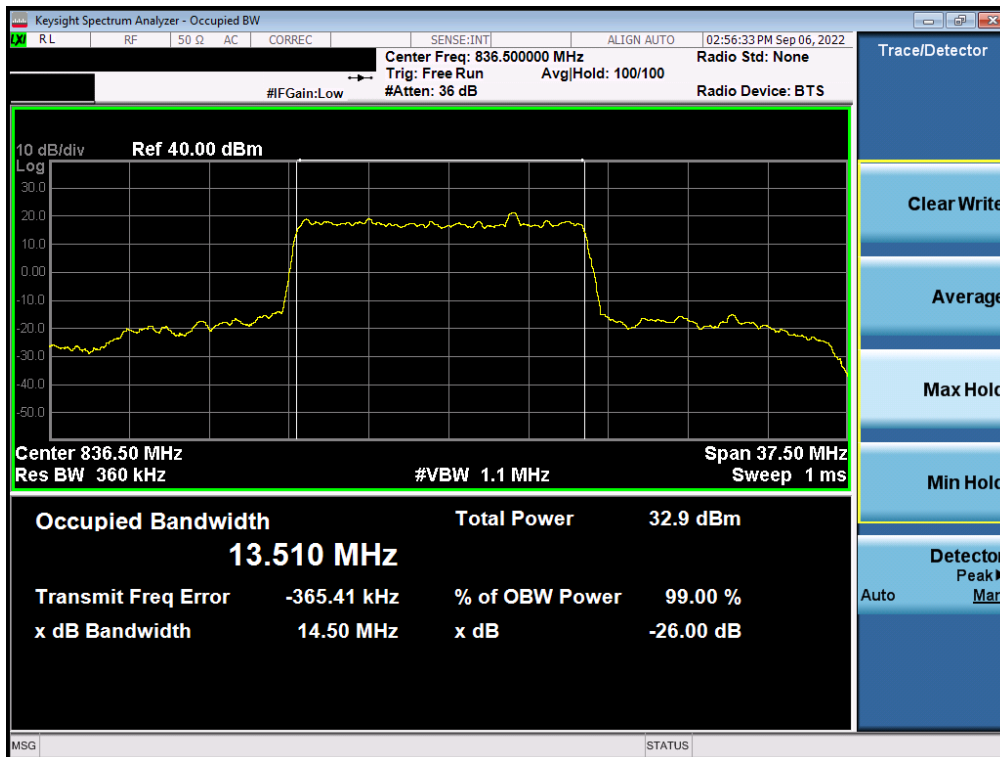


Plot 7-12. Occupied Bandwidth Plot (NR Band n26/5 - 20MHz QPSK - Full RB)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 20 of 101

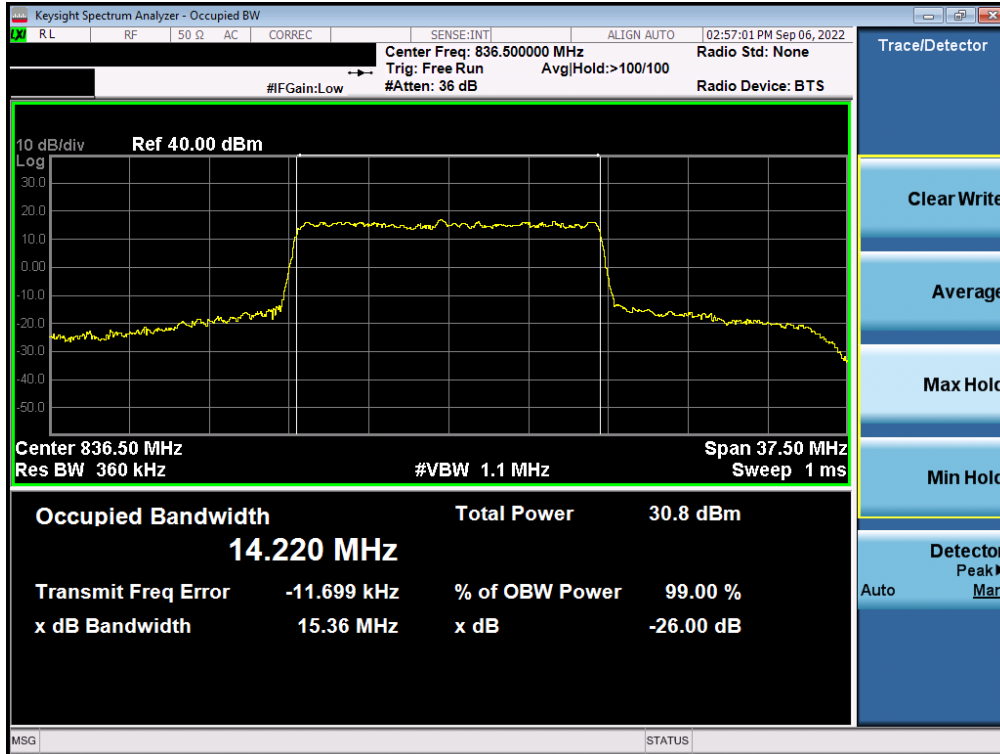


Plot 7-13. Occupied Bandwidth Plot (NR Band n26/5 - 20MHz 16-QAM - Full RB)



Plot 7-14. Occupied Bandwidth Plot (NR Band n26/5 - 15MHz  $\pi/2$  BPSK - Full RB)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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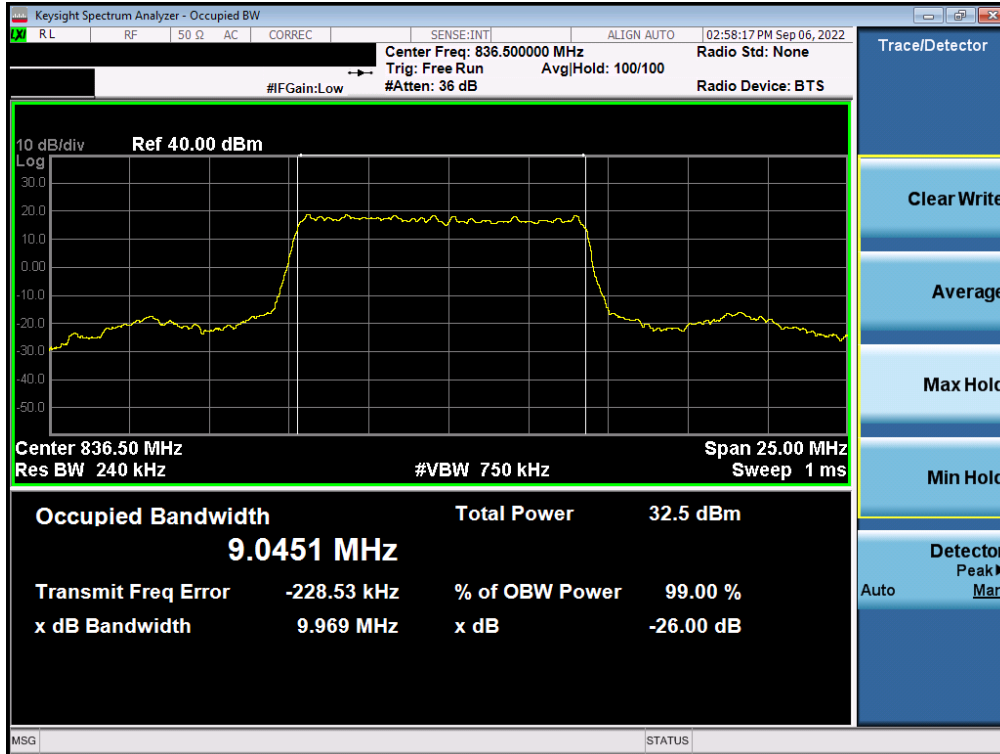


Plot 7-15. Occupied Bandwidth Plot (NR Band n26/5 - 15MHz QPSK - Full RB)

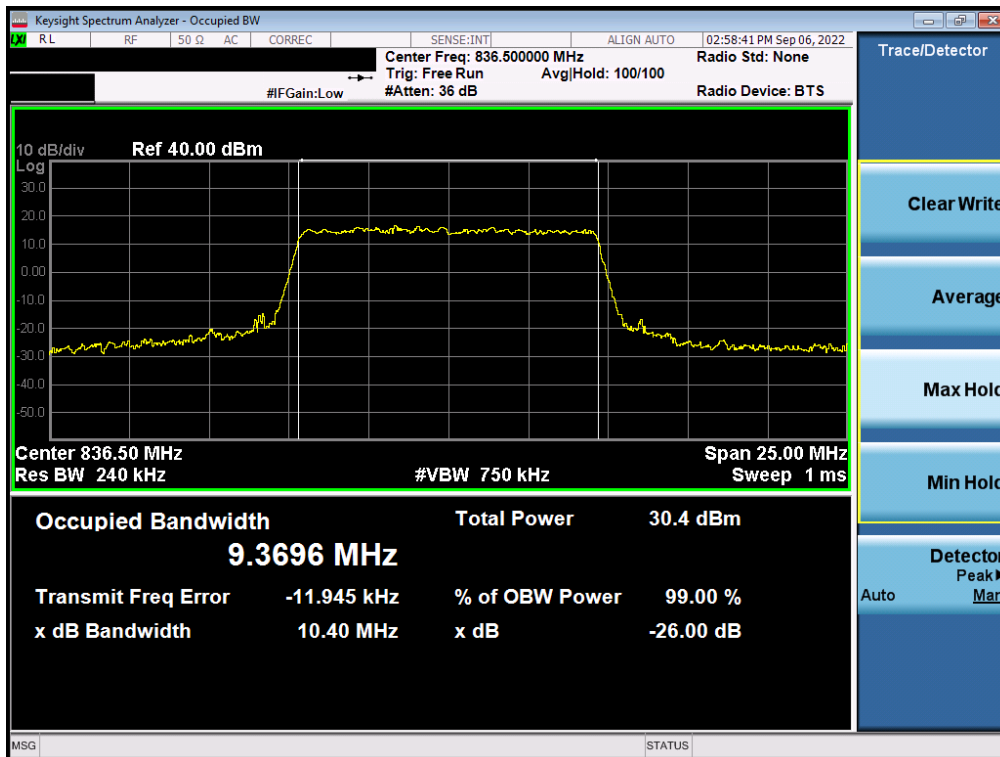


Plot 7-16. Occupied Bandwidth Plot (NR Band n26/5 - 15MHz 16-QAM - Full RB)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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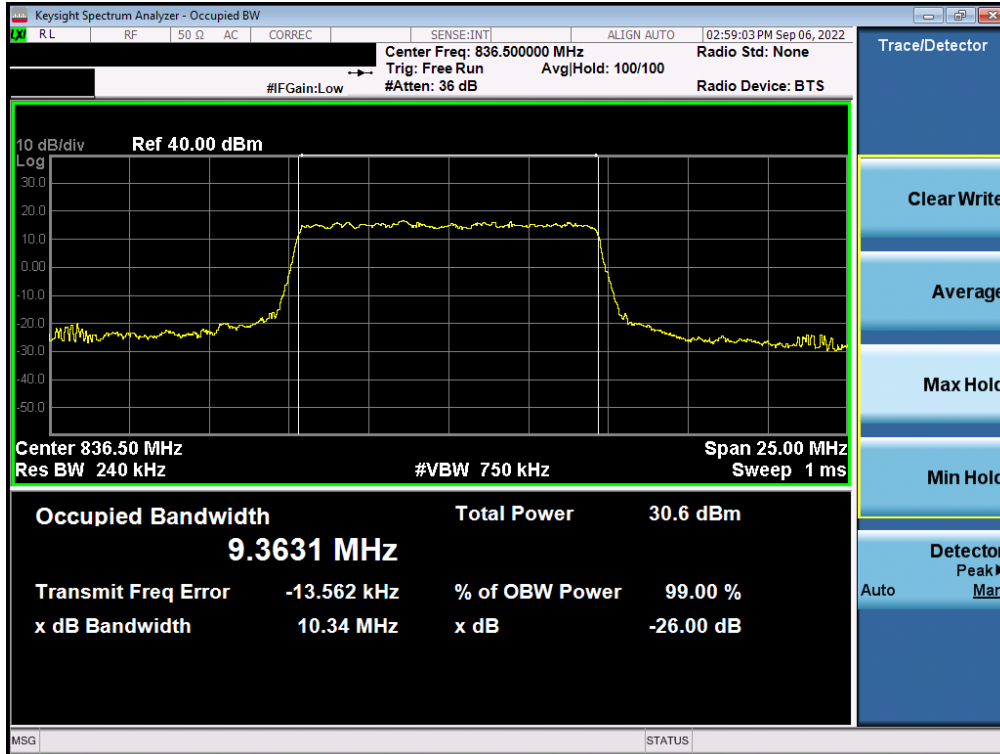
Plot 7-17. Occupied Bandwidth Plot (NR Band n26/5 - 10MHz  $\pi/2$  BPSK - Full RB)



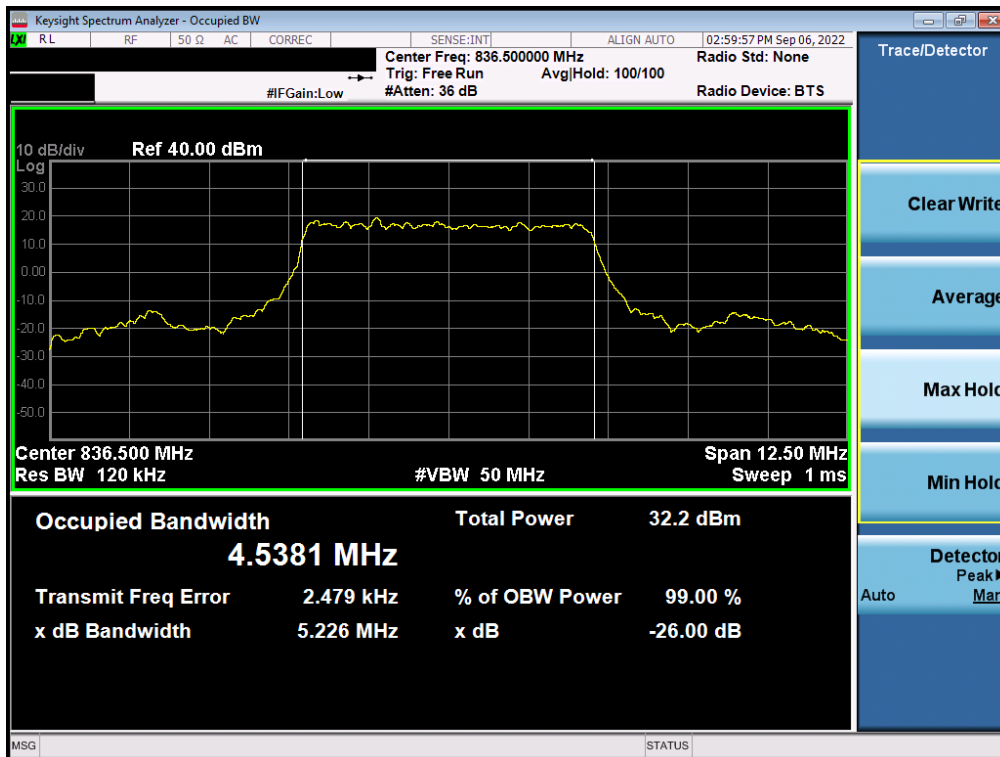
Plot 7-18. Occupied Bandwidth Plot (NR Band n26/5 - 10MHz QPSK - Full RB)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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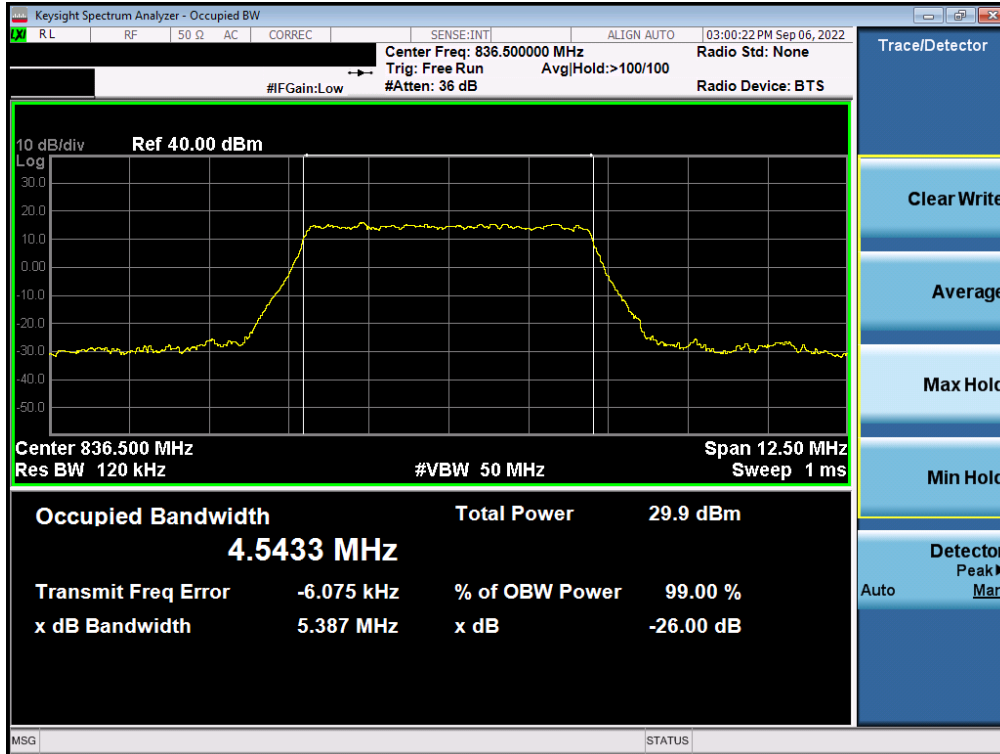
Plot 7-19. Occupied Bandwidth Plot (NR Band n26/5 - 10MHz 16-QAM - Full RB)



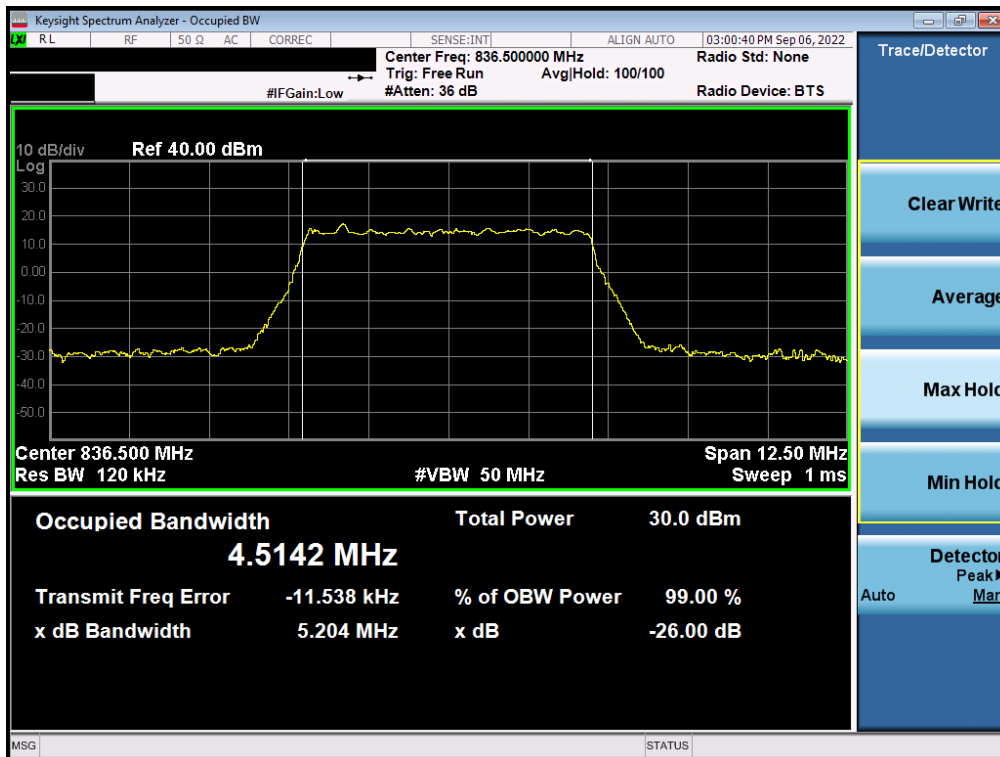
Plot 7-20. Occupied Bandwidth Plot (NR Band n26/5 - 5MHz  $\pi/2$  BPSK - Full RB)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-21. Occupied Bandwidth Plot (NR Band n26/5 - 5MHz QPSK - Full RB)



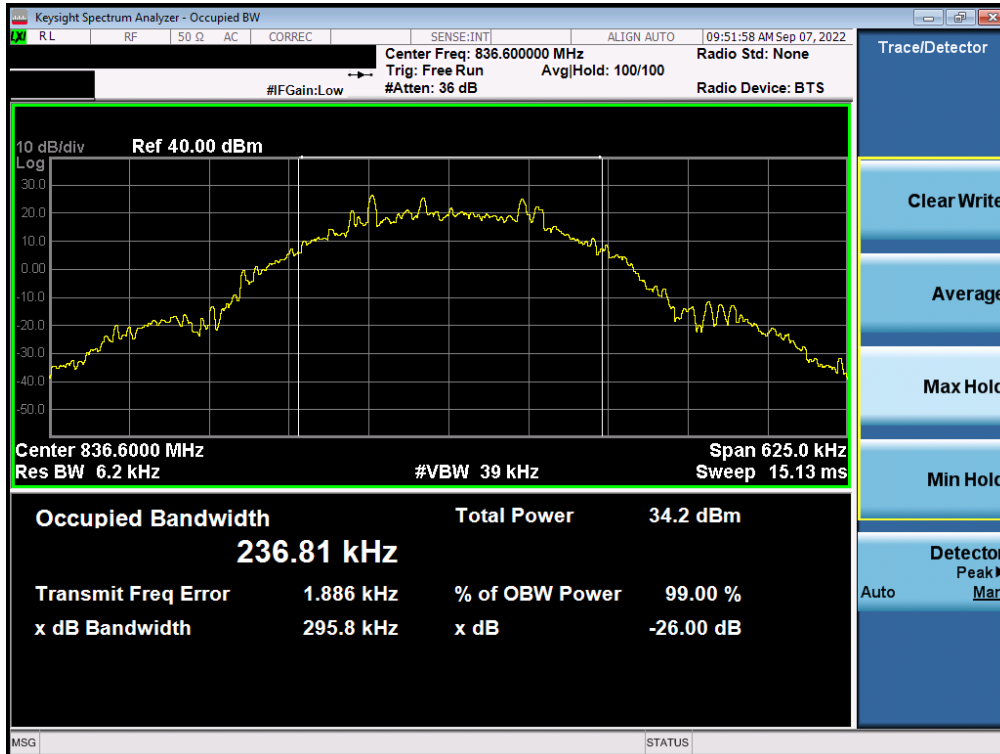
Plot 7-22. Occupied Bandwidth Plot (NR Band n26/5 - 5MHz 16-QAM - Full RB)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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# GPRS Cell



Plot 7-23. Occupied Bandwidth Plot (GPRS, Ch. 190)



Plot 7-24. Occupied Bandwidth Plot (EDGE, Ch. 190)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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## WCDMA Cell



Plot 7-25. Occupied Bandwidth Plot (WCDMA, Ch. 4183)

FCC ID: A3LSMS911U		PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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## 7.4 Spurious and Harmonic Emissions at Antenna Terminal

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

### Test Procedure Used

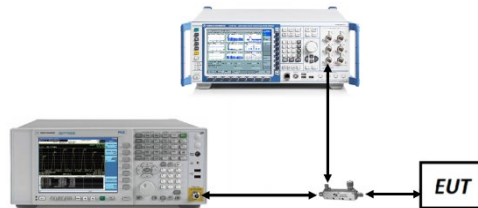
ANSI C63.26-2015 – Section 5.7.4

### Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to 10GHz (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.



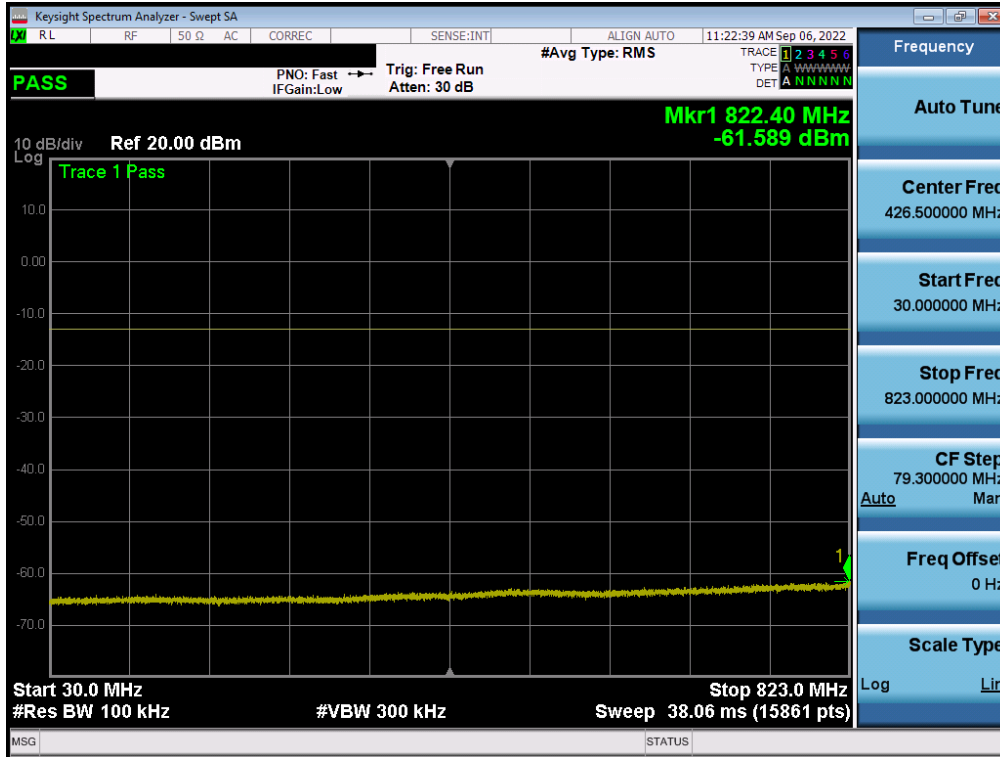
**Figure 7-3. Test Instrument & Measurement Setup**

### Test Notes

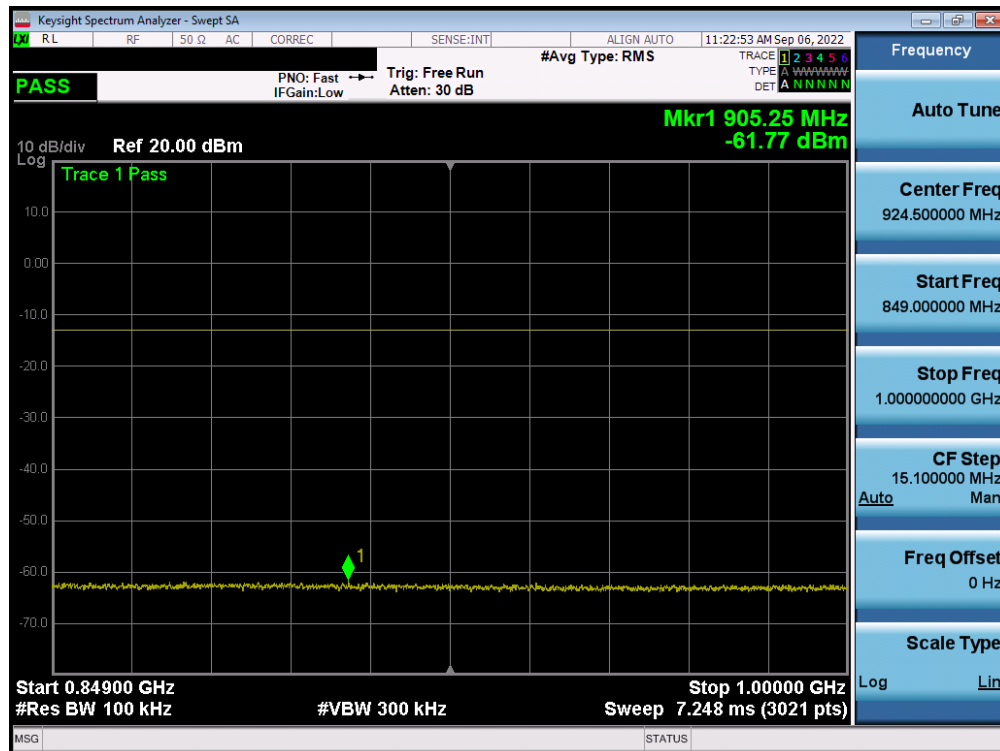
1. Per Part 22 and RSS-132, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth 100 kHz or greater for measurements below 1GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth 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.
2. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) 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.

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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# LTE Band 26/5



Plot 7-26. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK – 1 RB - Low Channel)

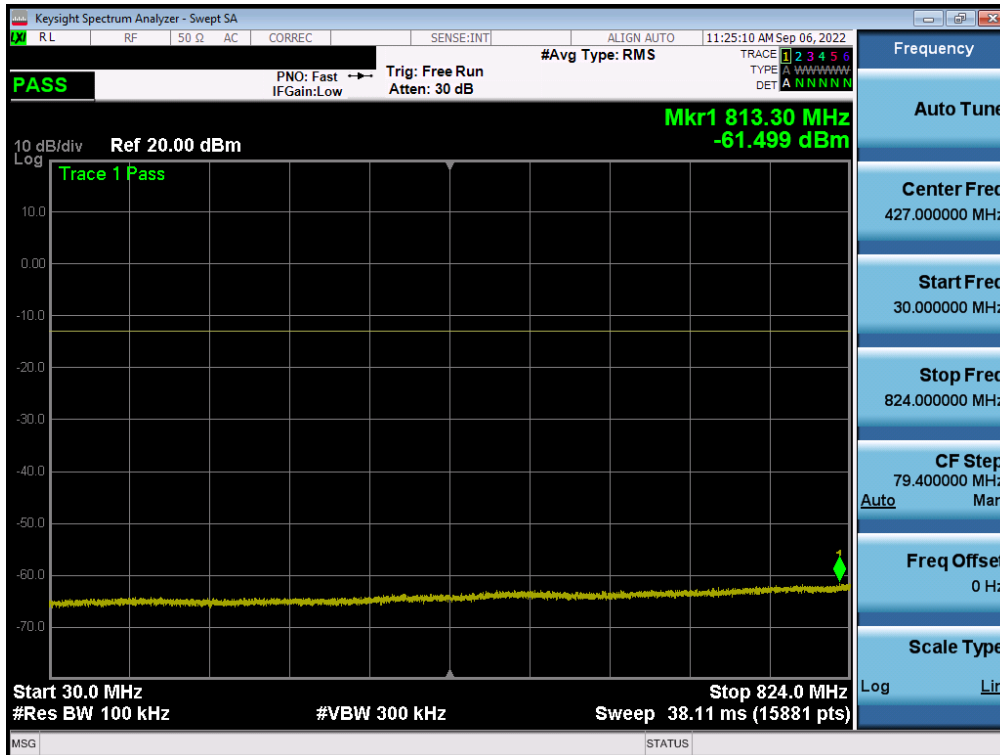


Plot 7-27. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Low Channel)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 29 of 101

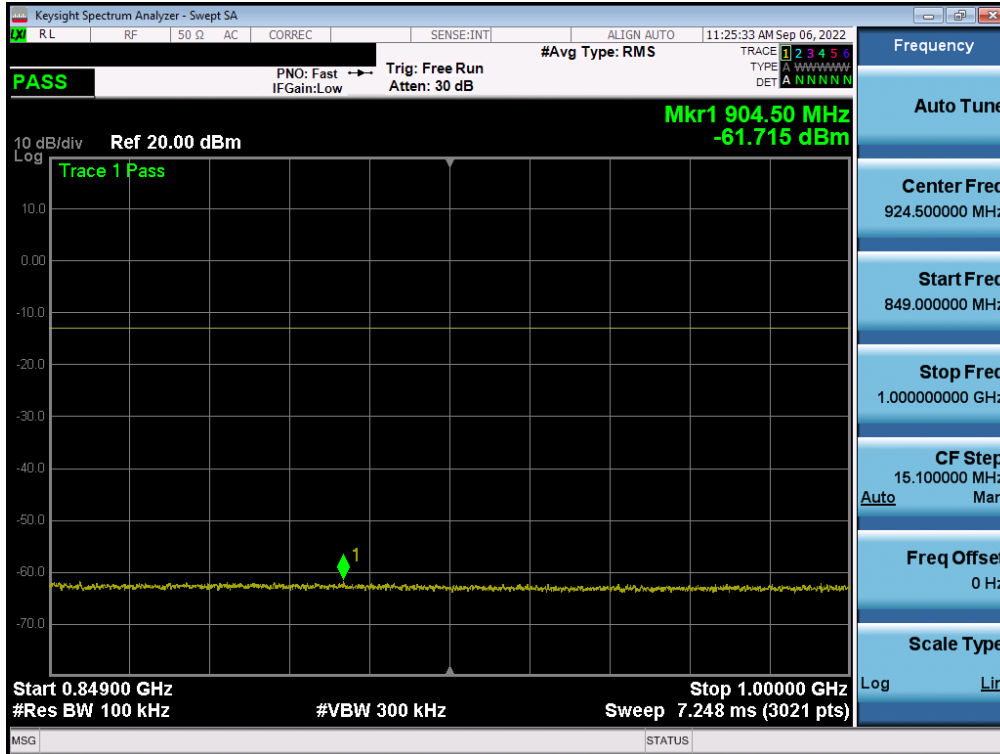


Plot 7-28. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Low Channel)

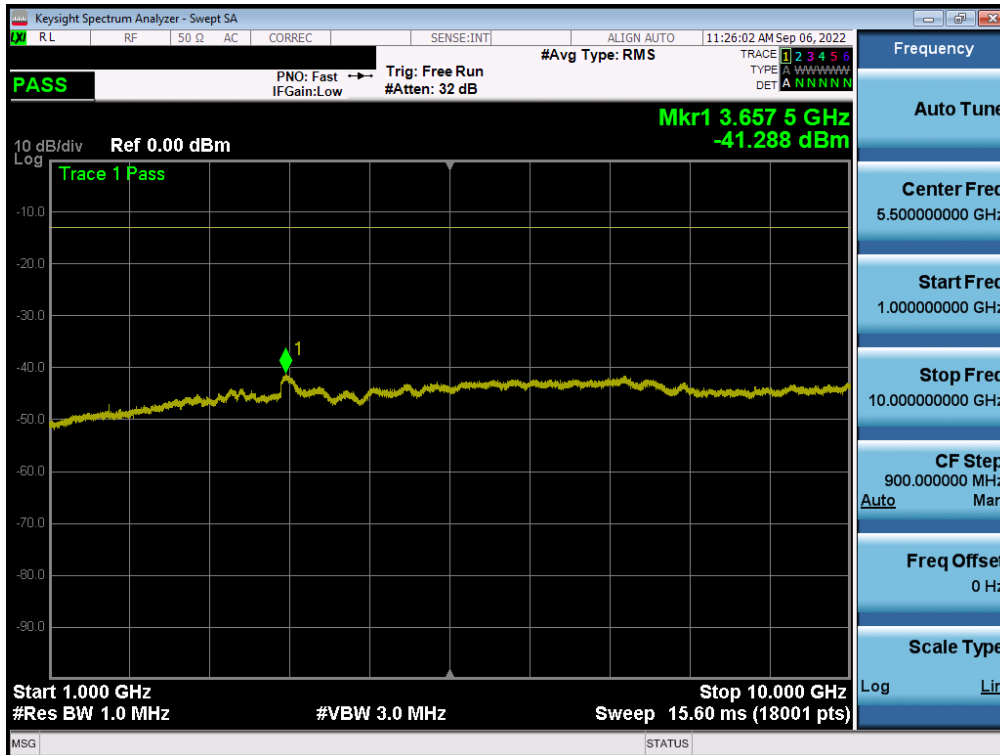


Plot 7-29. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Mid Channel)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 30 of 101



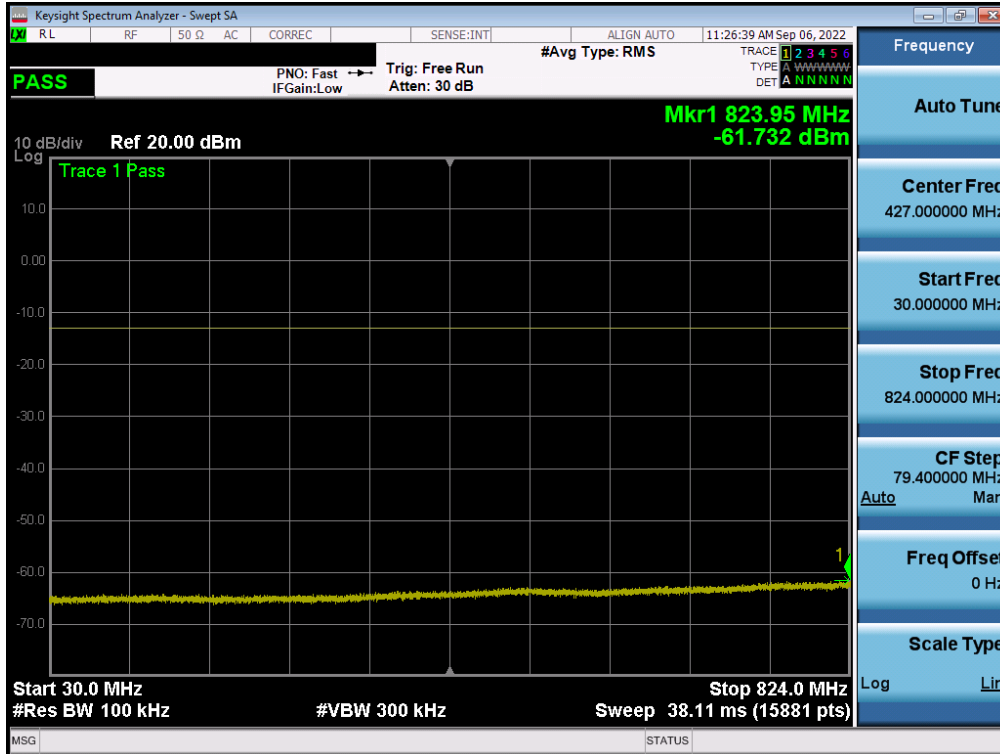
Plot 7-30. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Mid Channel)



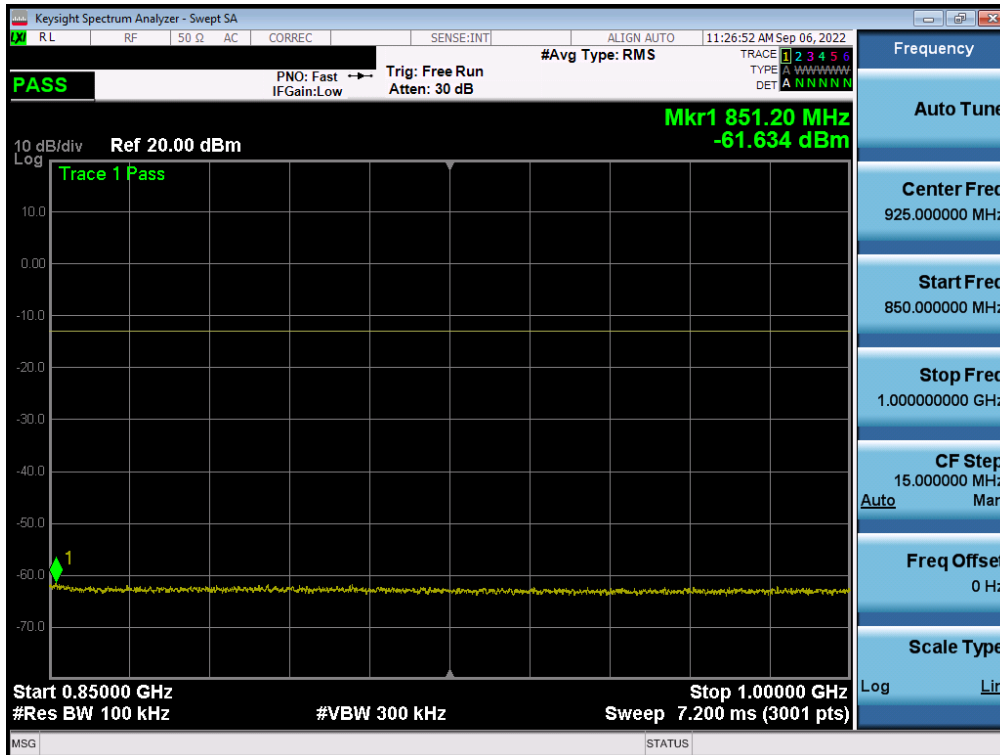
Plot 7-31. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Mid Channel)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 31 of 101





Plot 7-32. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - High Channel)



Plot 7-33. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - High Channel)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 32 of 101

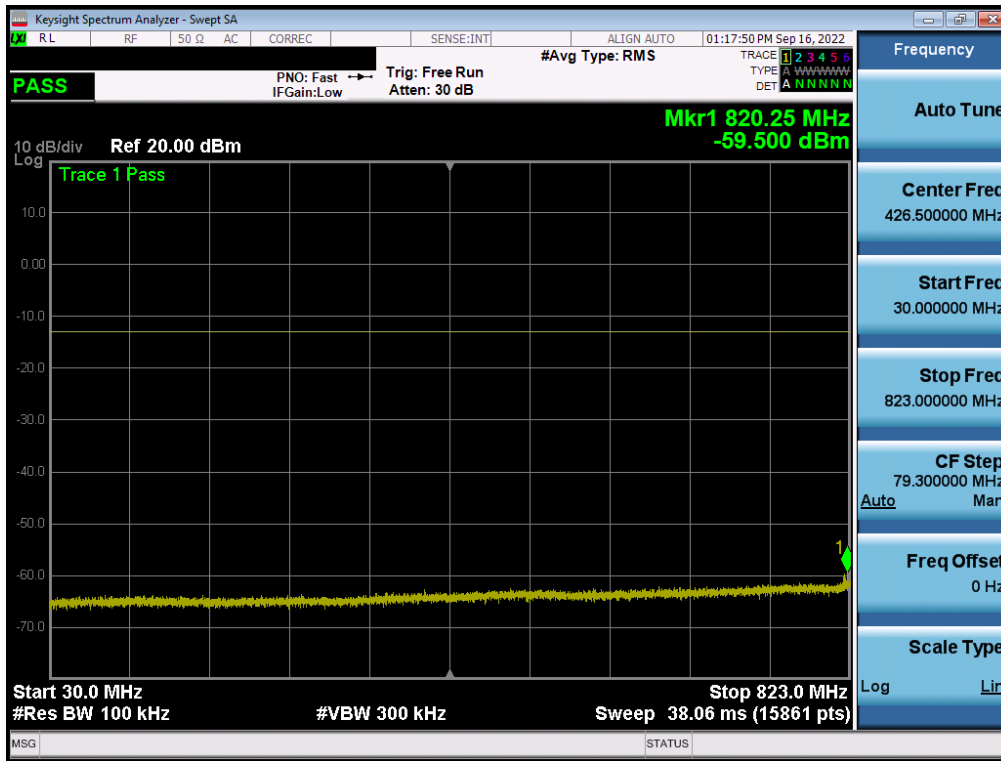




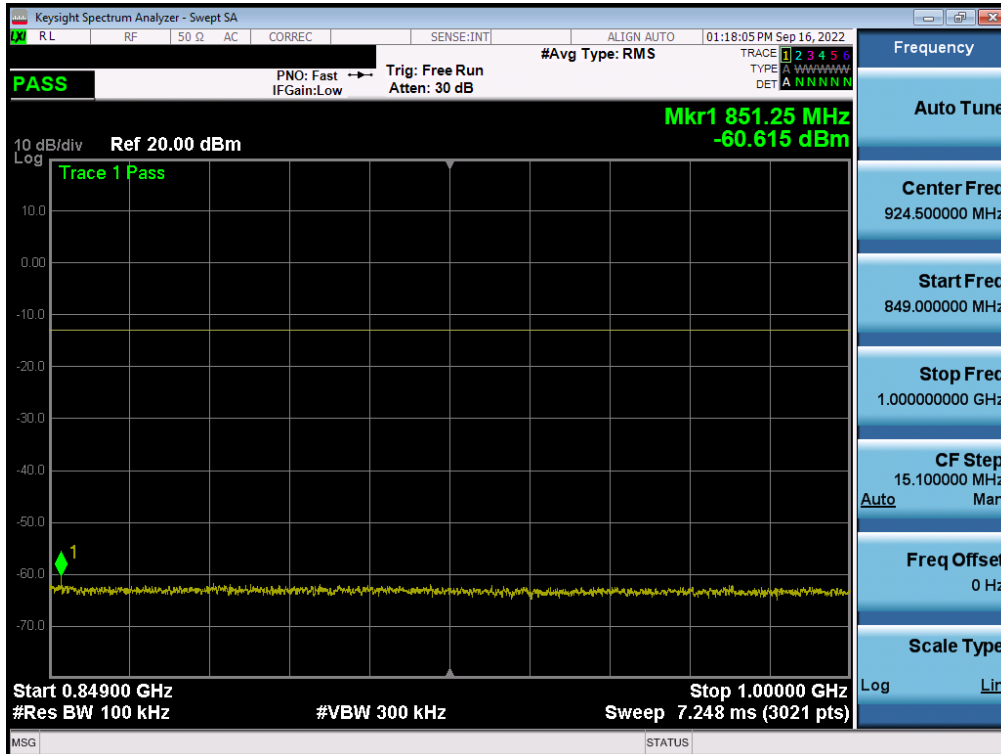
Plot 7-34. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - High Channel)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 33 of 101

### ULCA LTE Band 5

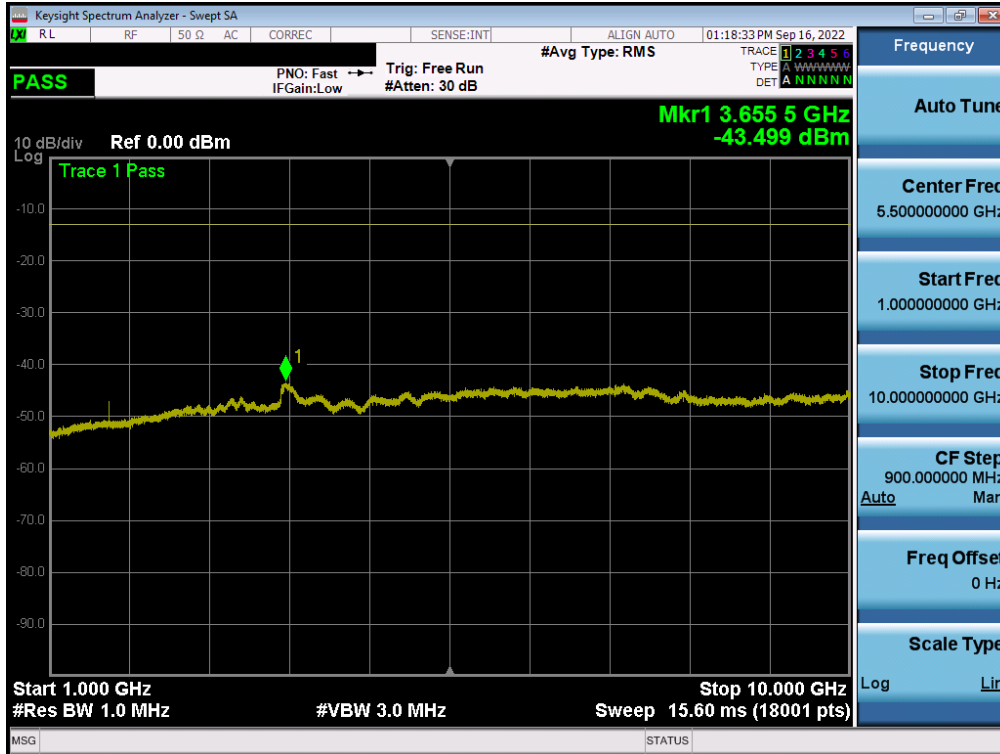


Plot 7-35. Conducted Spurious Plot (ULCA LTE Band 5 – 10+10MHz QPSK – PCC 1/49 SCC 1/0 - Low Channel)

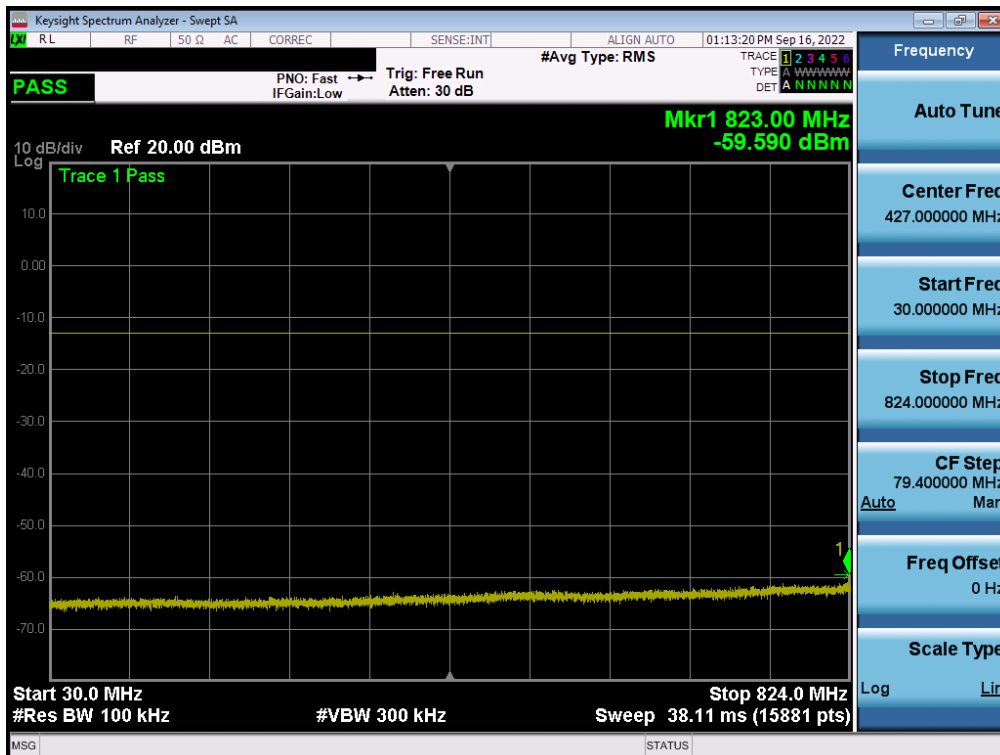


Plot 7-36. Conducted Spurious Plot (ULCA LTE Band 5 – 10+10MHz QPSK – PCC 1/49 SCC 1/0 - Low Channel)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 34 of 101

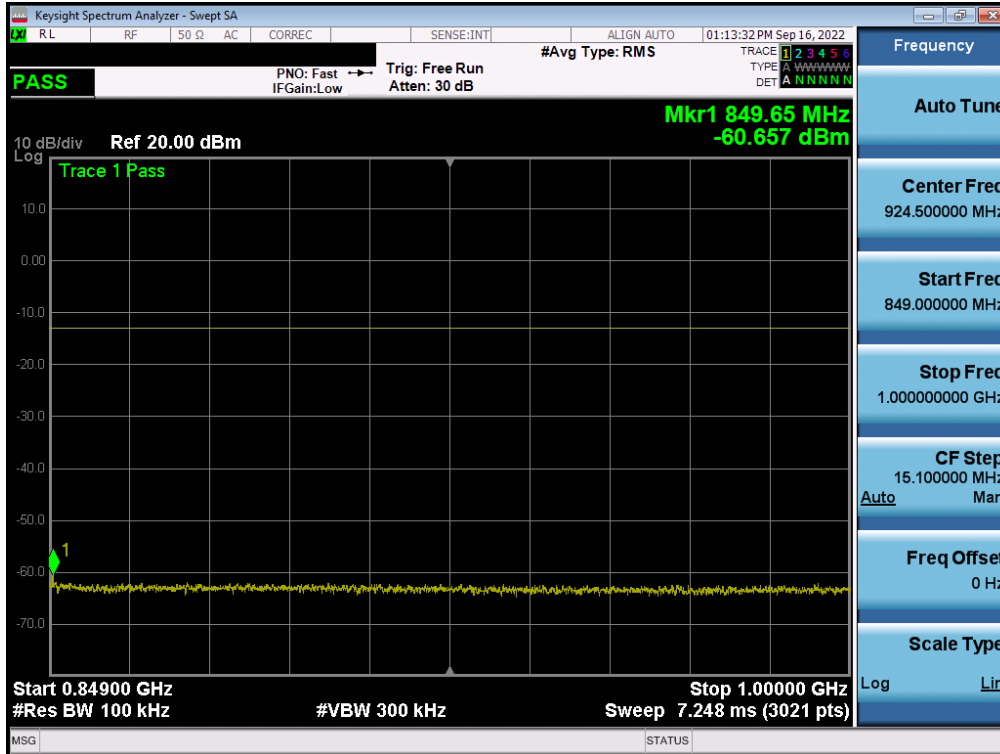


Plot 7-37. Conducted Spurious Plot (ULCA LTE Band 5 – 10+10MHz QPSK – PCC 1/49 SCC 1/0 - Low Channel)

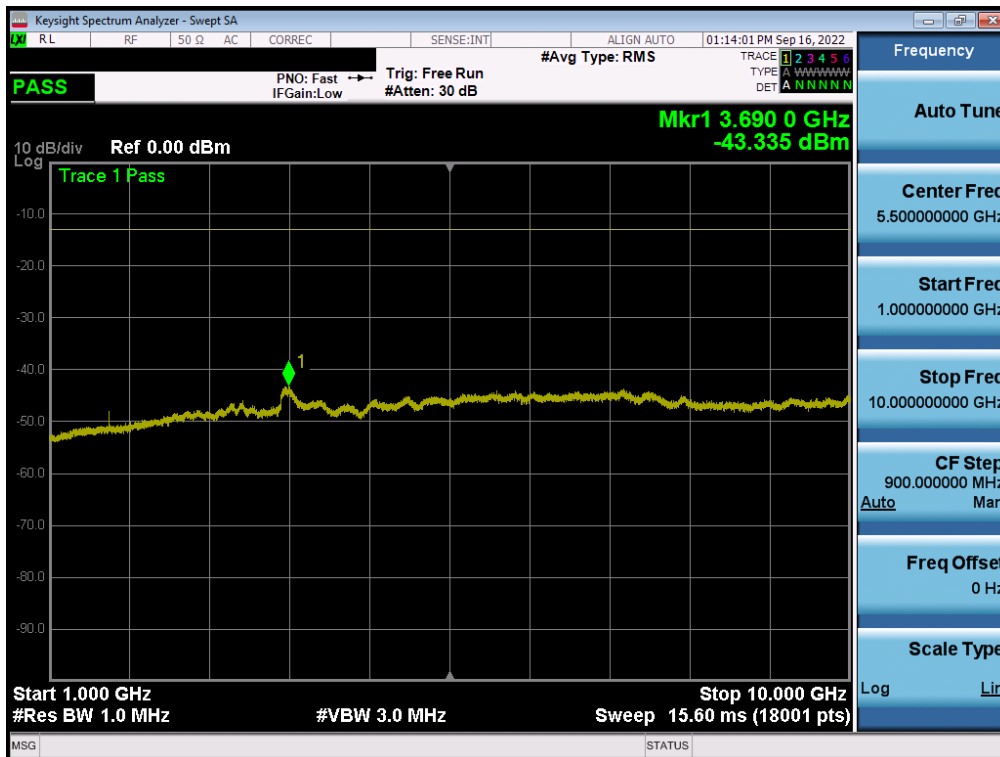


Plot 7-38. Conducted Spurious Plot (ULCA LTE Band 5 – 10+10MHz QPSK – PCC 1/49 SCC 1/0 - Mid Channel)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 35 of 101

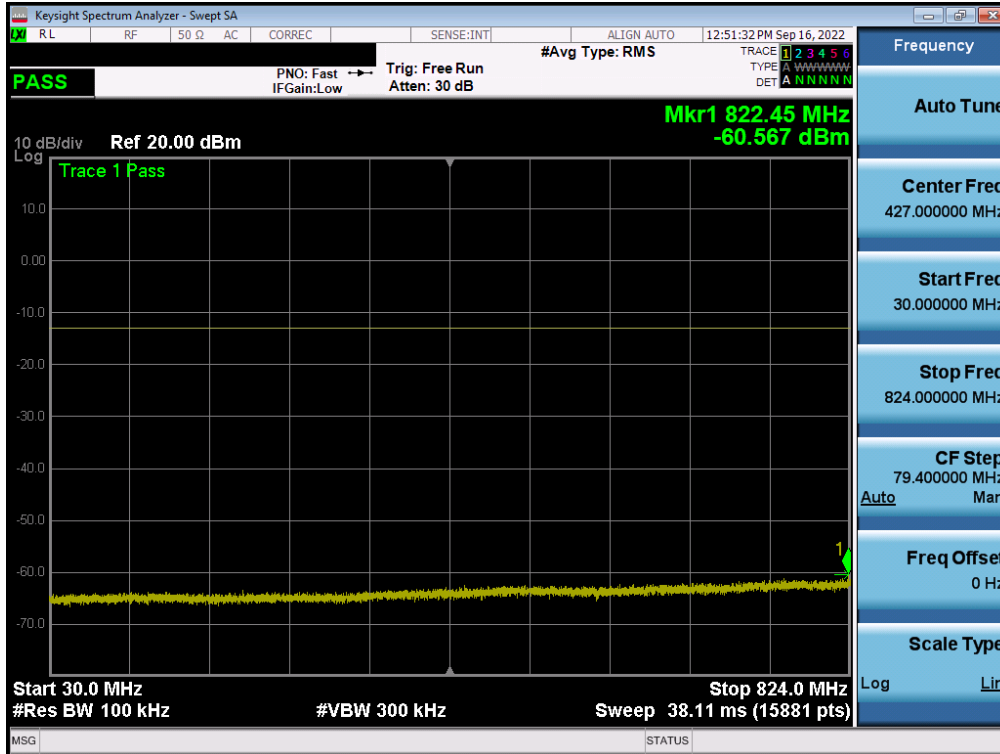


Plot 7-39. Conducted Spurious Plot (ULCA LTE Band 5 – 10+10MHz QPSK – PCC 1/49 SCC 1/0 - Mid Channel)

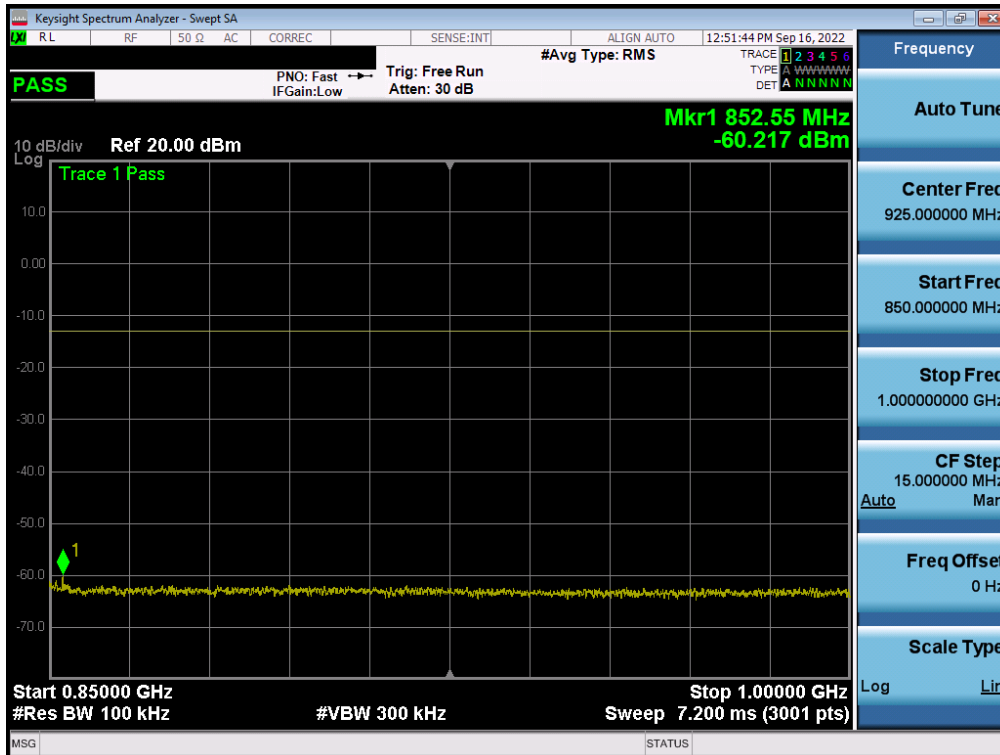


Plot 7-40. Conducted Spurious Plot (ULCA LTE Band 5 – 10+10MHz QPSK – PCC 1/49 SCC 1/0 - Mid Channel)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 36 of 101

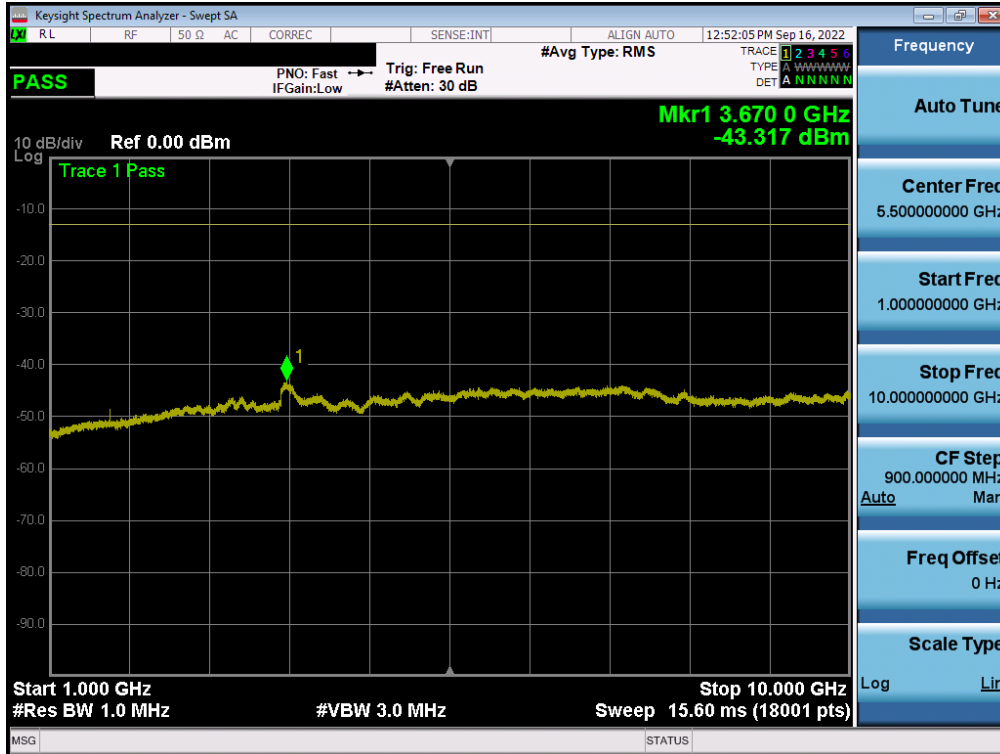


Plot 7-41. Conducted Spurious Plot (ULCA LTE Band 5 – 10+10MHz QPSK – PCC 1/0 SCC 1/49 - High Channel)



Plot 7-42. Conducted Spurious Plot (ULCA LTE Band 5 – 10+10MHz QPSK – PCC 1/0 SCC 1/49 - High Channel)

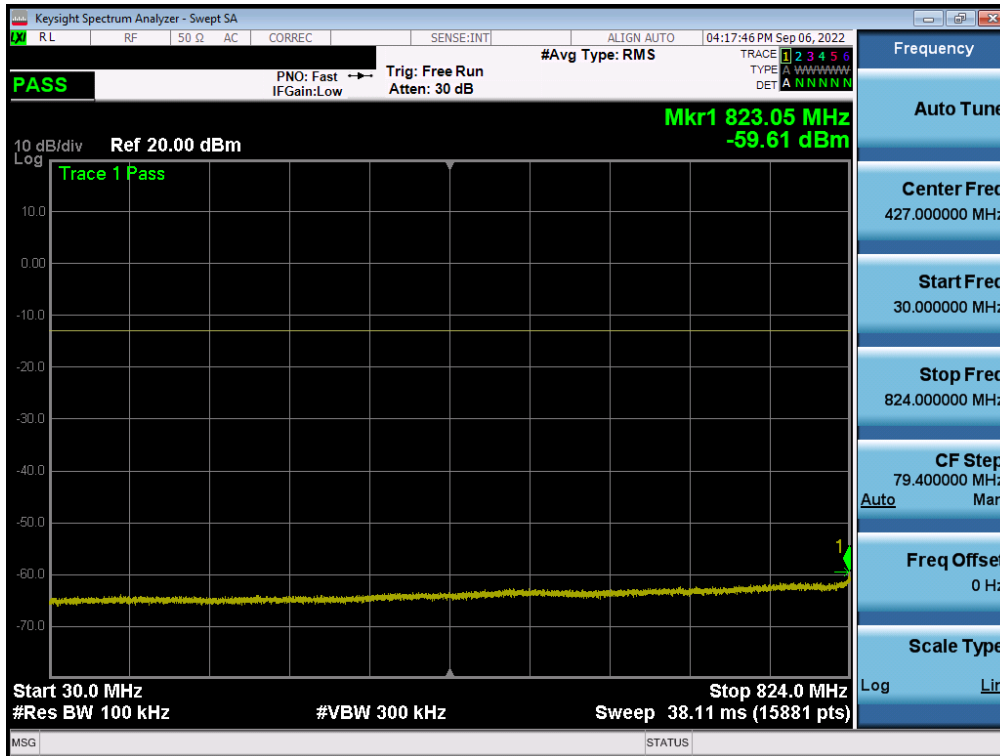
FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 37 of 101



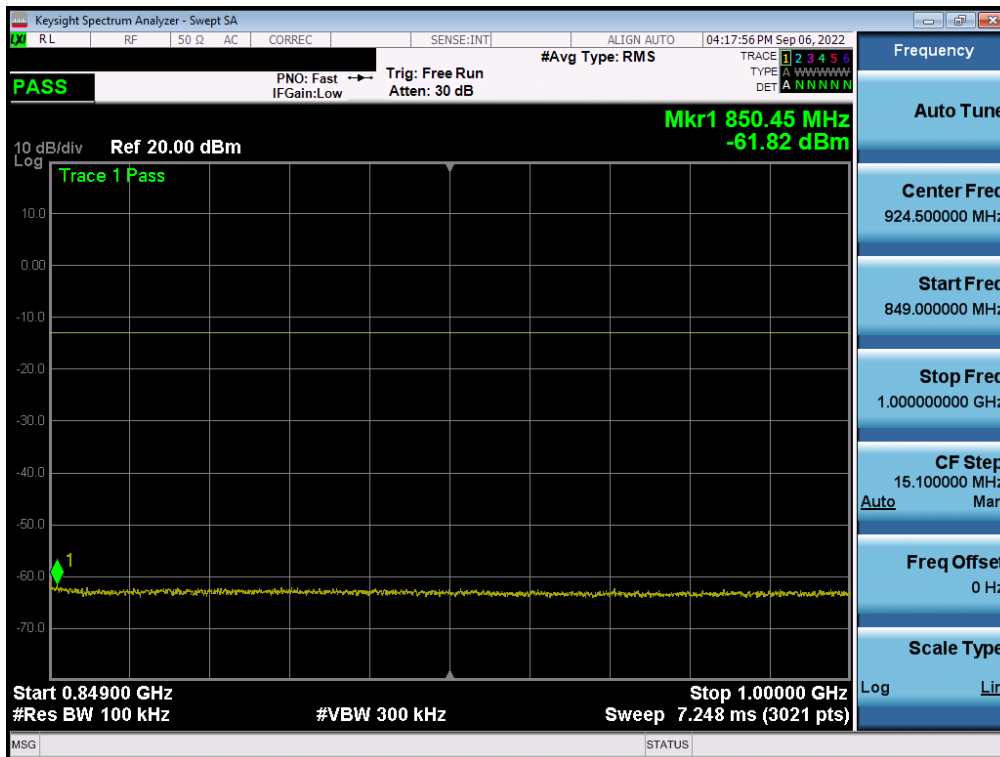
Plot 7-43. Conducted Spurious Plot (ULCA LTE Band 5 – 10+10MHz QPSK – PCC 1/0 SCC 1/49 - High Channel)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 38 of 101

NR Band n26/5

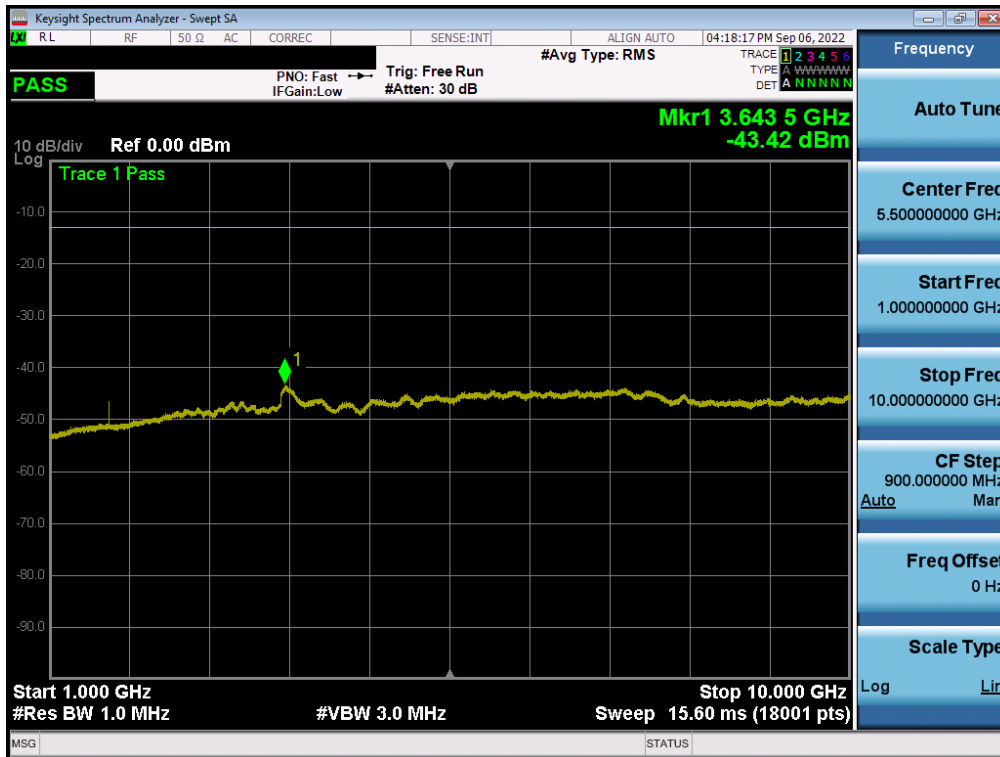


Plot 7-44. Conducted Spurious Plot (NR Band n26/5 - 20.0MHz - 1 RB - Low Channel)

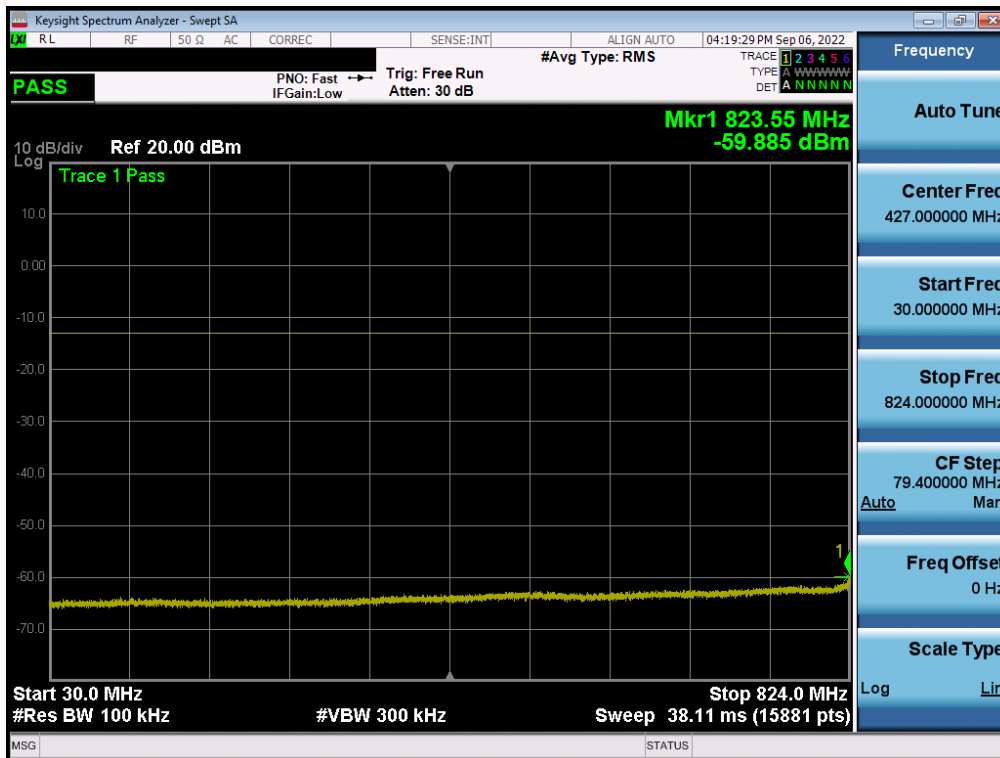


Plot 7-45. Conducted Spurious Plot (NR Band n26/5 - 20.0MHz - 1 RB - Low Channel)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 39 of 101



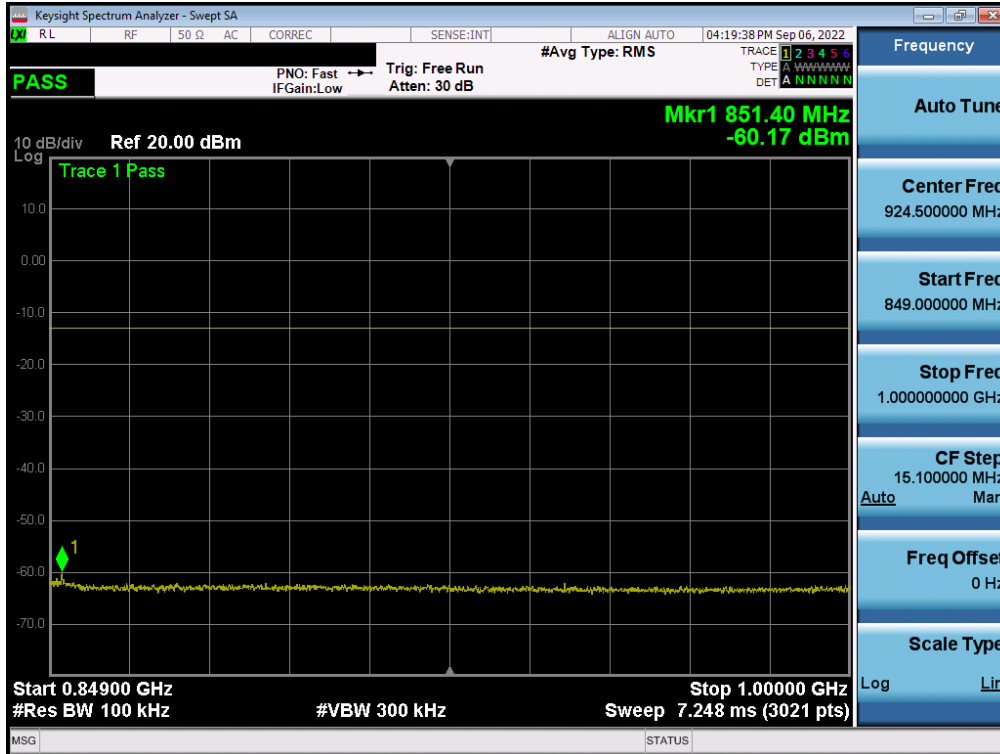
Plot 7-46. Conducted Spurious Plot (NR Band n26/5 - 20.0MHz - 1 RB - Low Channel)



Plot 7-47. Conducted Spurious Plot (NR Band n26/5 - 20.0MHz - 1 RB - Mid Channel)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 - 11/7/2022	EUT Type: Portable Handset	Page 40 of 101



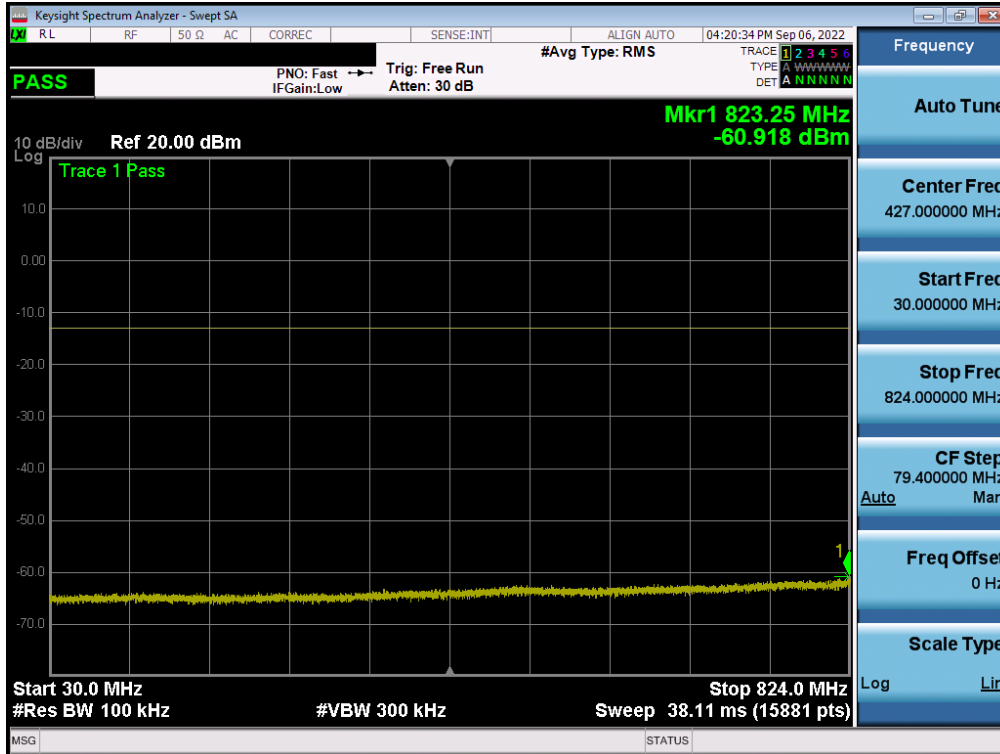


Plot 7-48. Conducted Spurious Plot (NR Band n26/5 - 20.0MHz - 1 RB - Mid Channel)

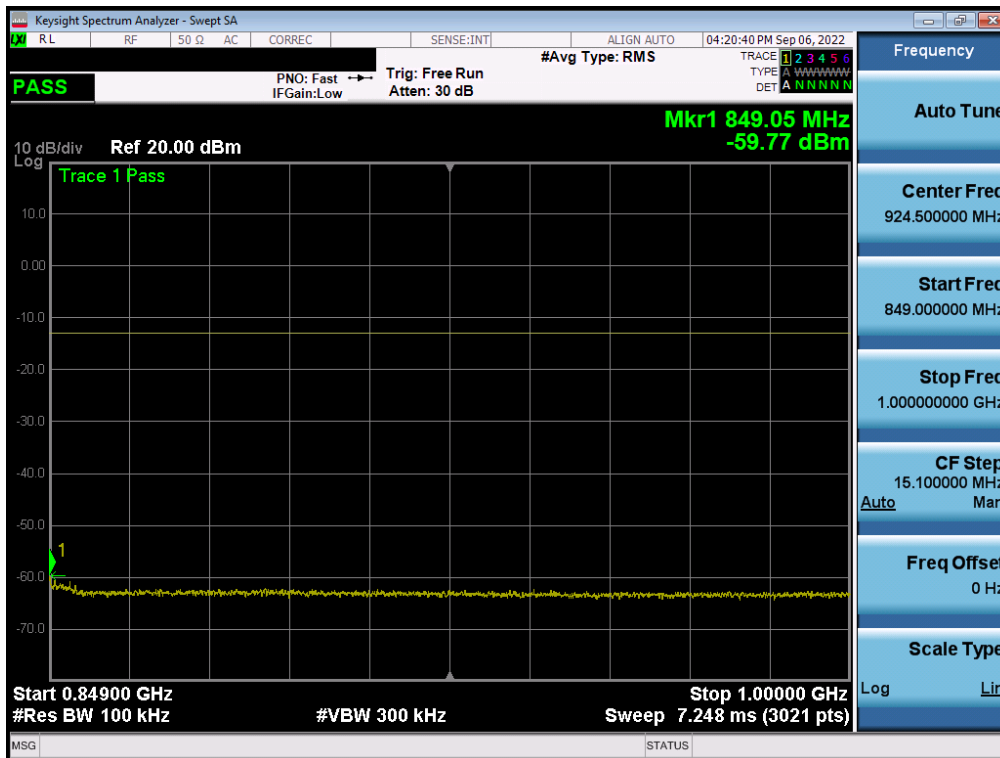


Plot 7-49. Conducted Spurious Plot (NR Band n26/5 - 20.0MHz - 1 RB - Mid Channel)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-50. Conducted Spurious Plot (NR Band n26/5 - 20.0MHz - 1 RB - High Channel)



Plot 7-51. Conducted Spurious Plot (NR Band n26/5 - 20.0MHz - 1 RB - High Channel)

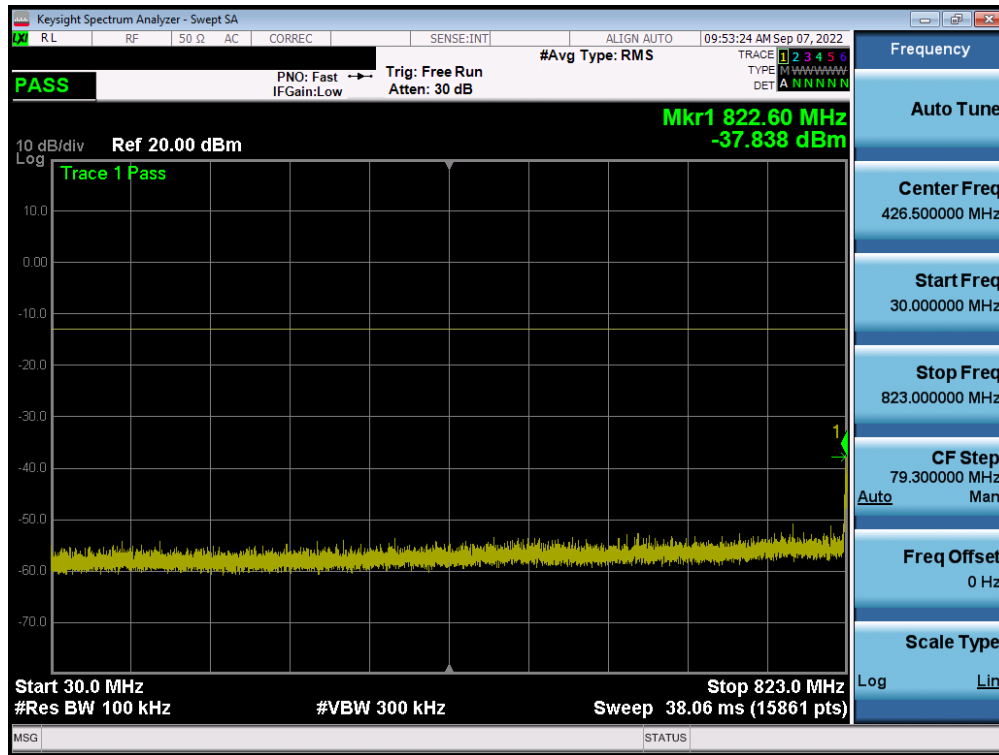
FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 - 11/7/2022	EUT Type: Portable Handset	Page 42 of 101



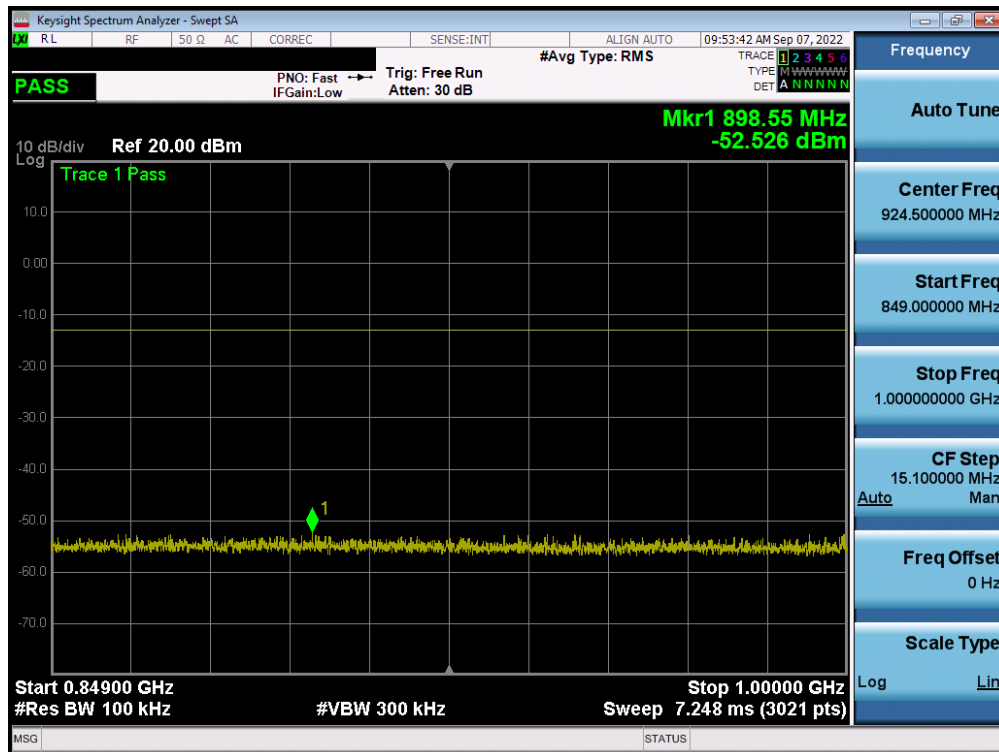
Plot 7-52. Conducted Spurious Plot (NR Band n26/5 - 20.0MHz - 1 RB - High Channel)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 43 of 101

## GSM/GPRS Cell

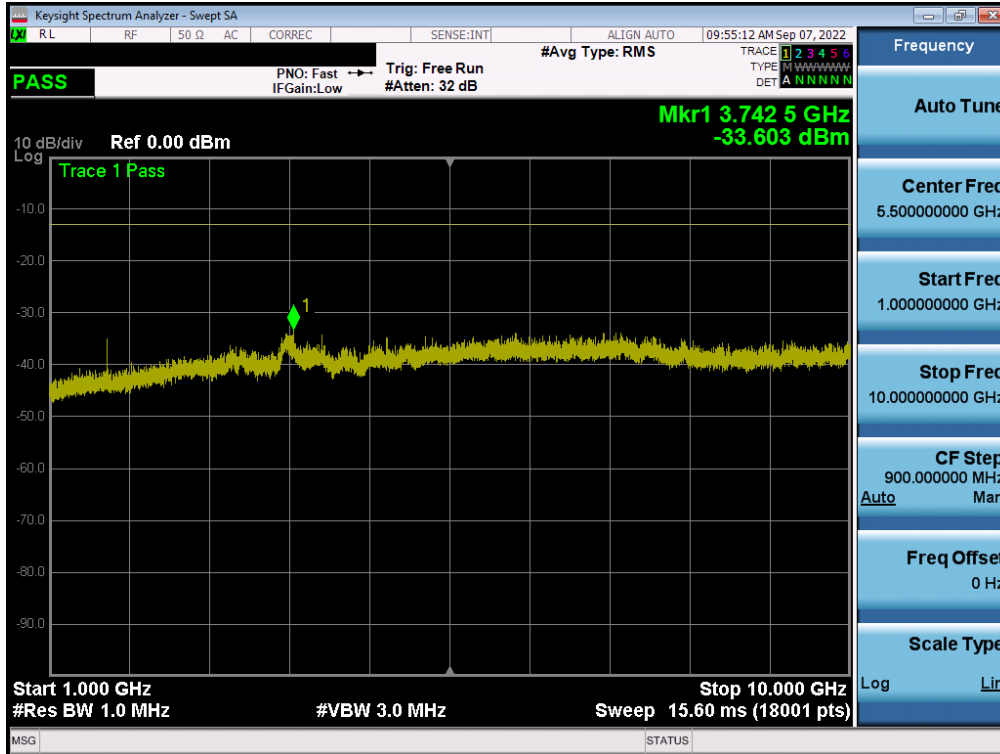


Plot 7-53. Conducted Spurious Plot (GPRS Ch. 128)

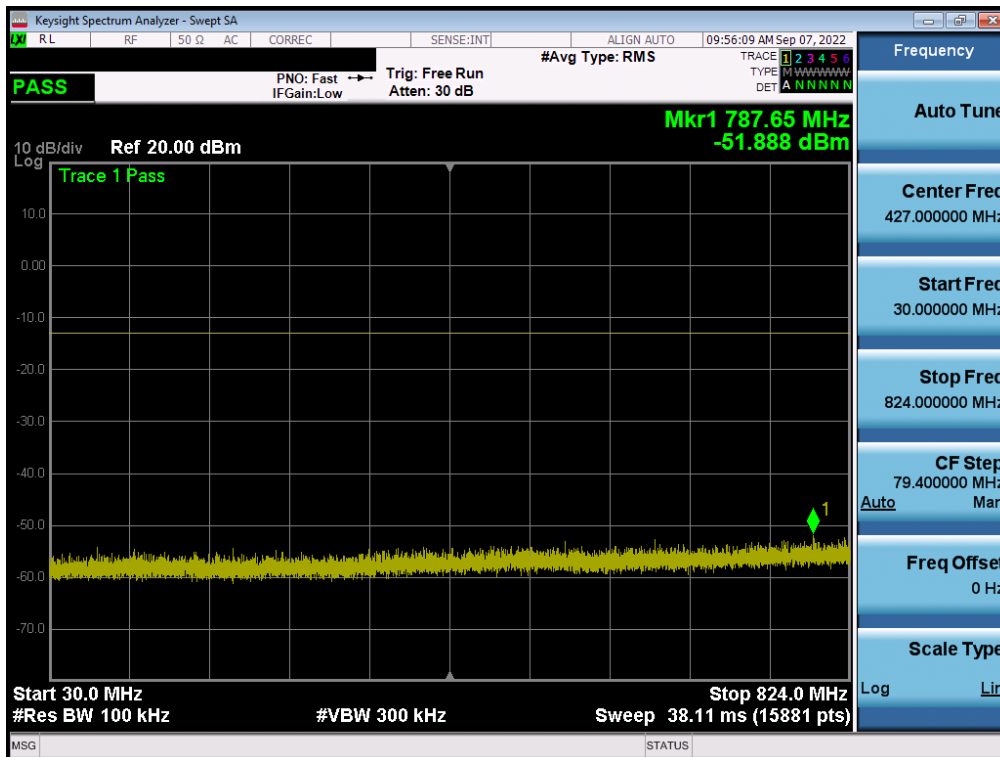


Plot 7-54. Conducted Spurious Plot (GPRS Ch. 128)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 44 of 101

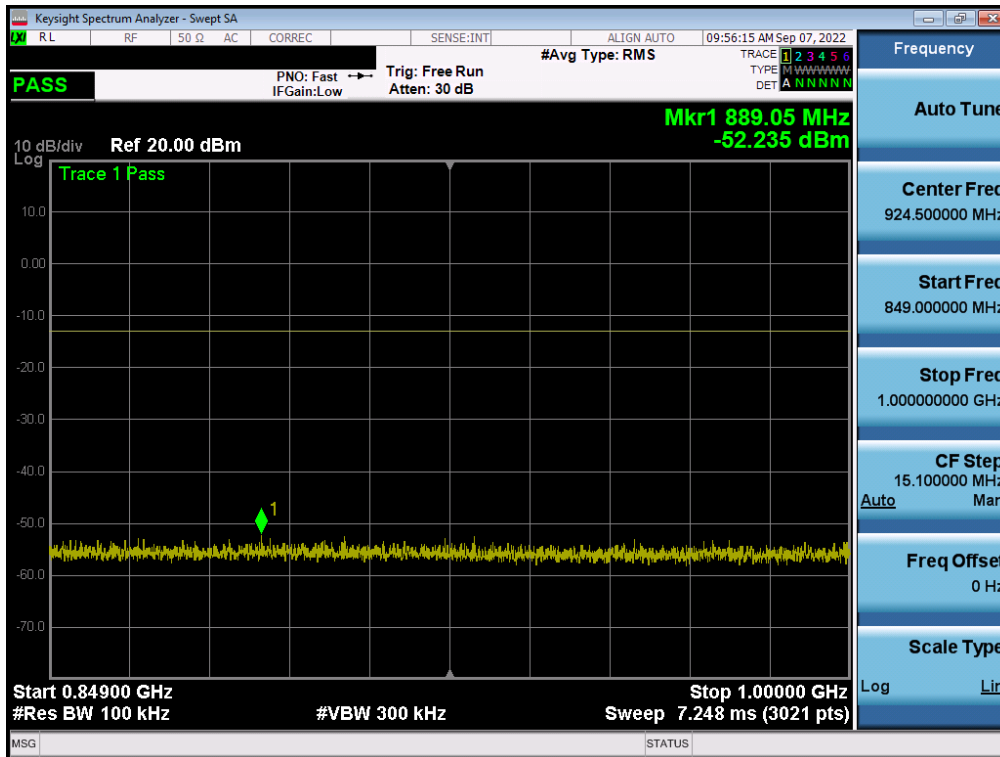


Plot 7-55. Conducted Spurious Plot (GPRS Ch. 128)

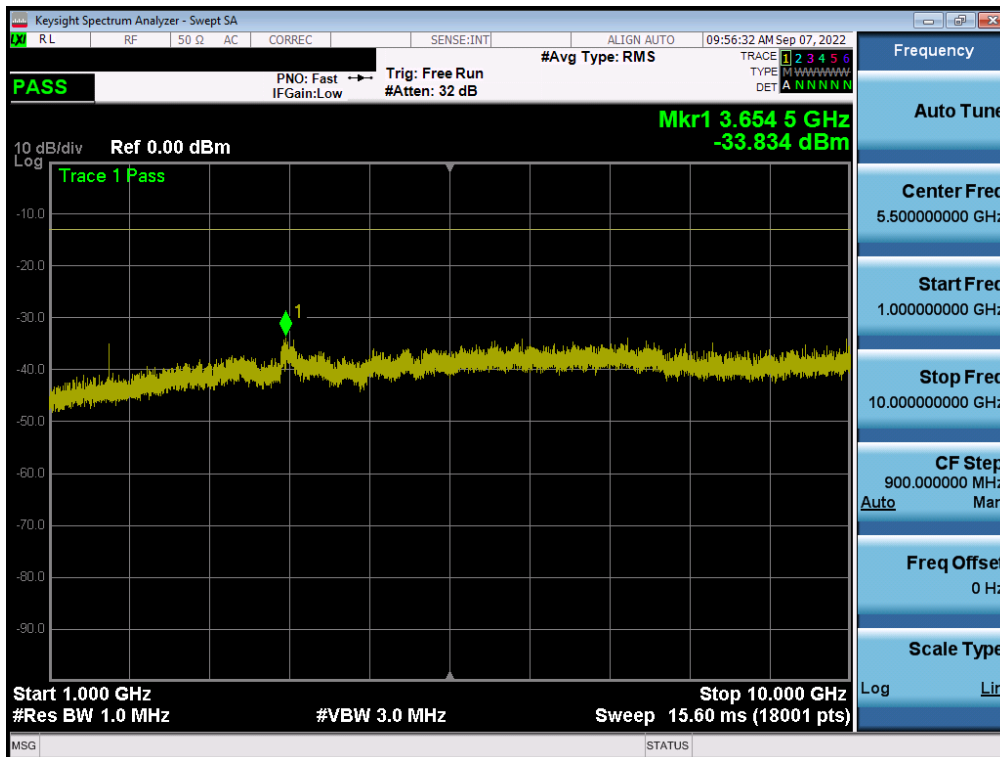


Plot 7-56. Conducted Spurious Plot (GPRS Ch. 190)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 45 of 101

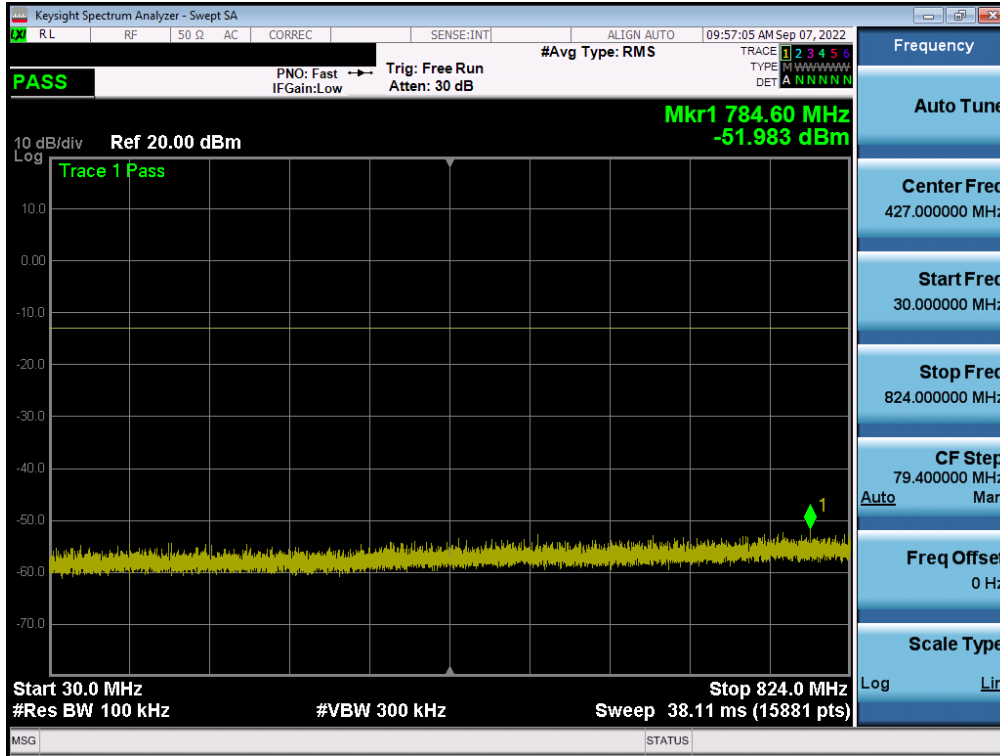


Plot 7-57. Conducted Spurious Plot (GPRS Ch. 190)

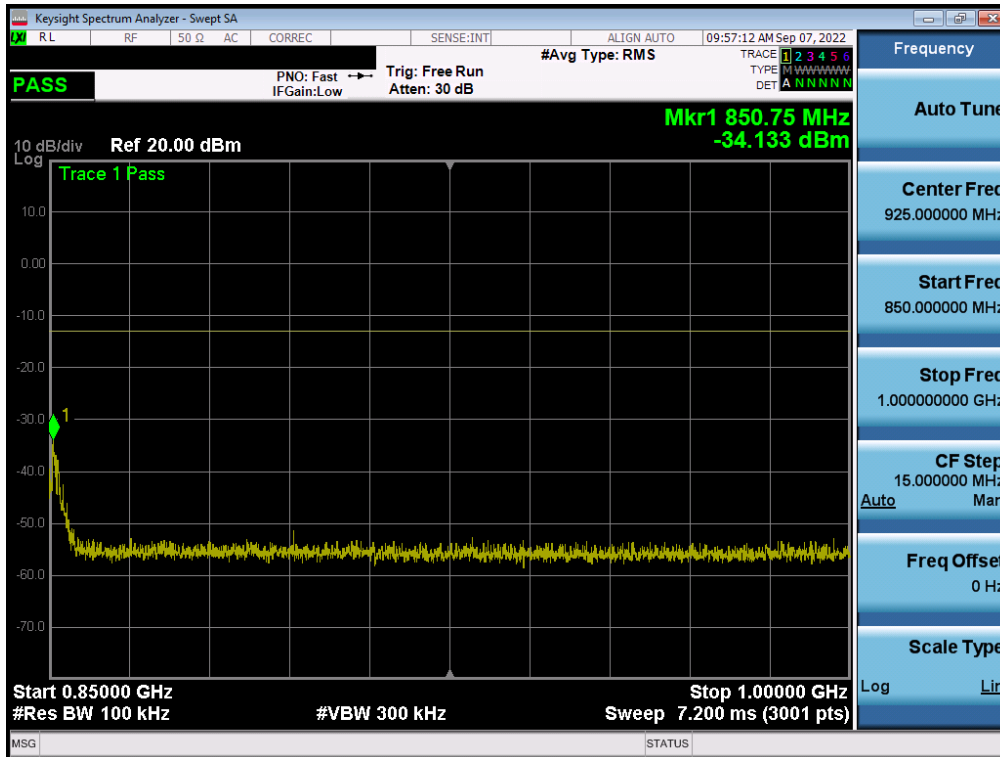


Plot 7-58. Conducted Spurious Plot (GPRS Ch. 190)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 46 of 101

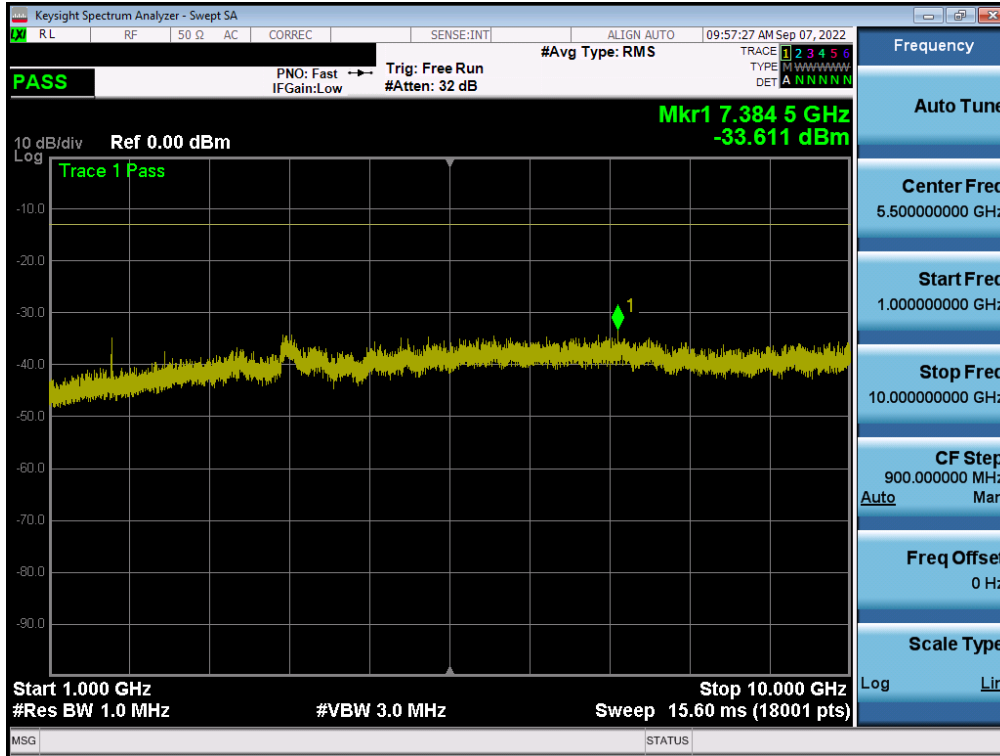


Plot 7-59. Conducted Spurious Plot (GPRS Ch. 251)



Plot 7-60. Conducted Spurious Plot (GPRS Ch. 251)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 47 of 101

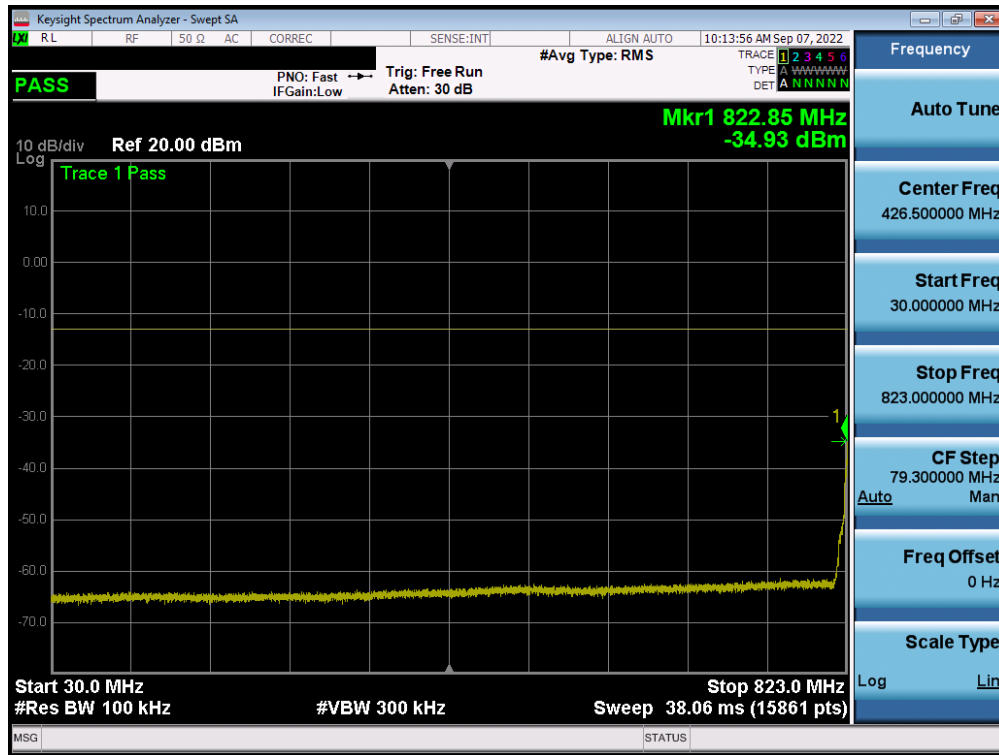


Plot 7-61. Conducted Spurious Plot (GPRS Ch. 251)

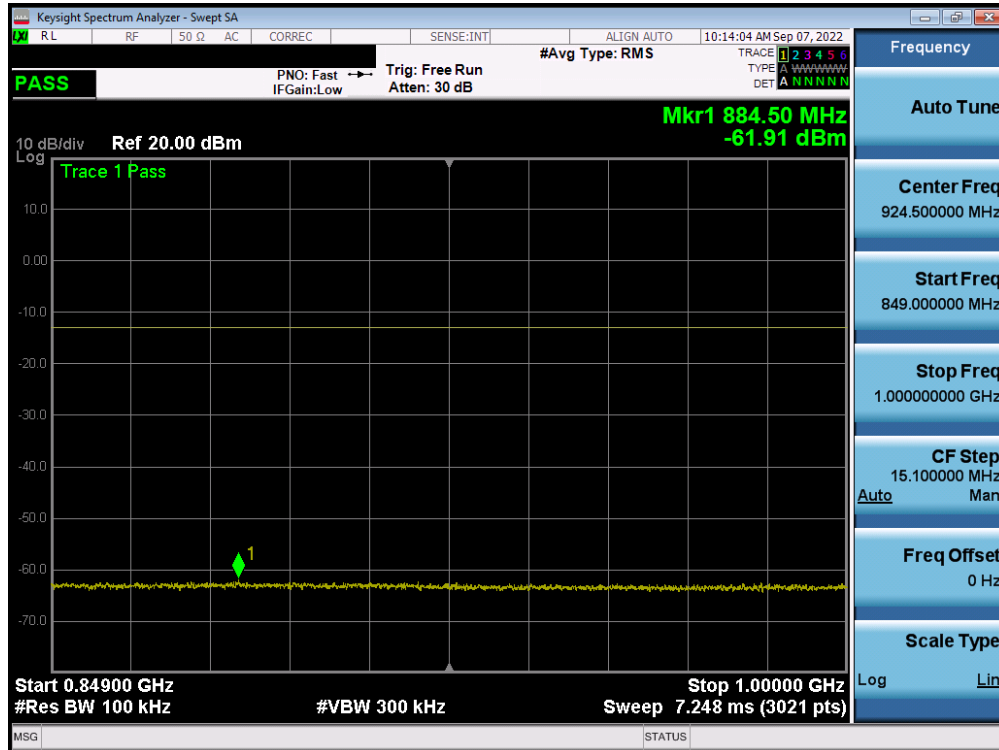
FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 48 of 101



# WCDMA Cell

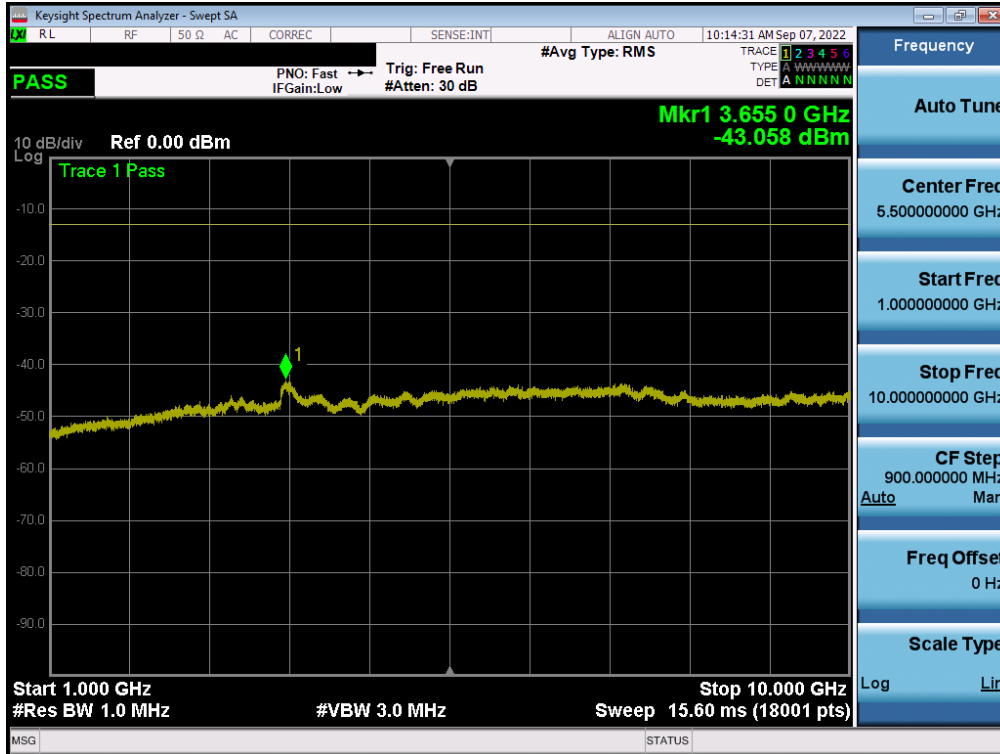


Plot 7-62. Conducted Spurious Plot (WCDMA Ch. 4132)

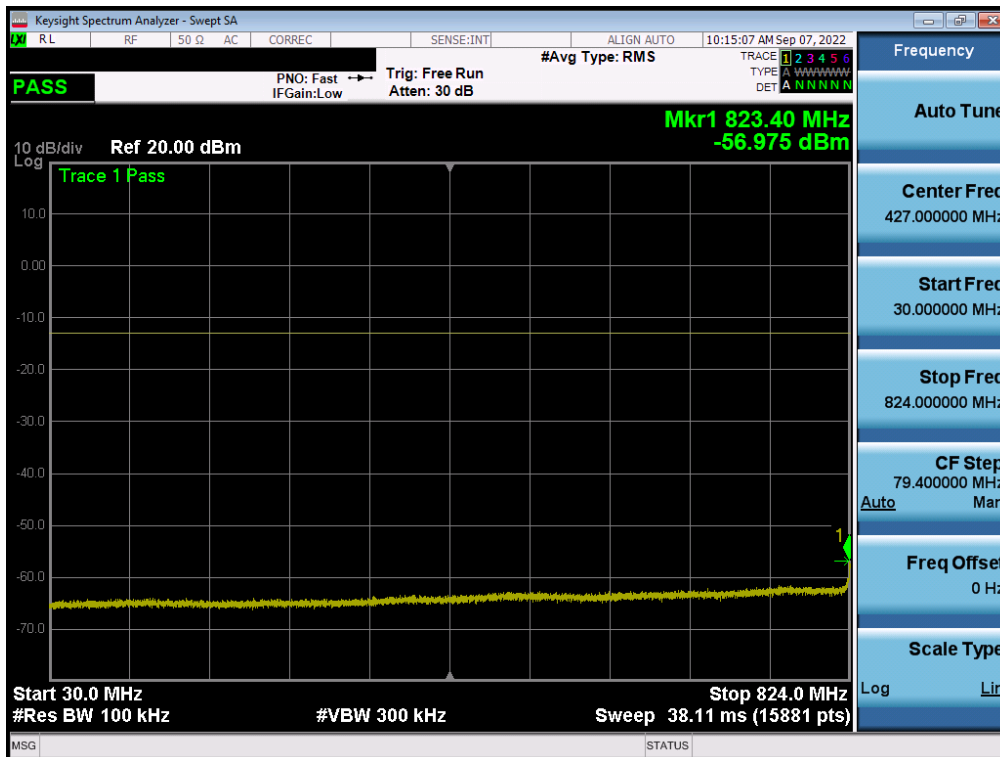


Plot 7-63. Conducted Spurious Plot (WCDMA Ch. 4132)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 49 of 101

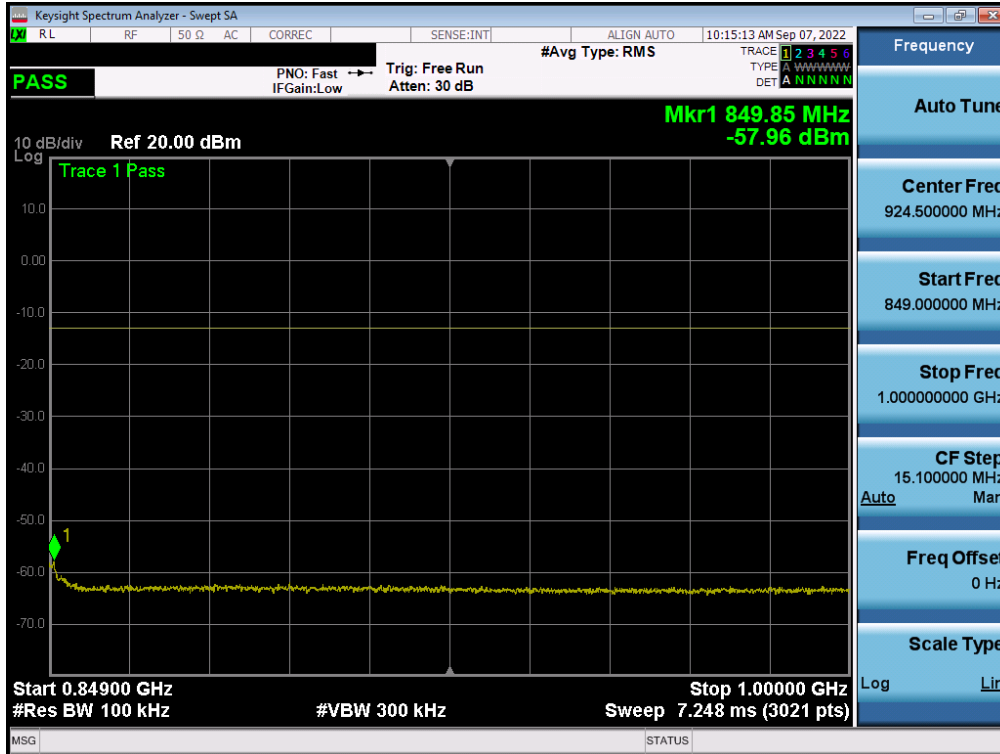


Plot 7-64. Conducted Spurious Plot (WCDMA Ch. 4132)

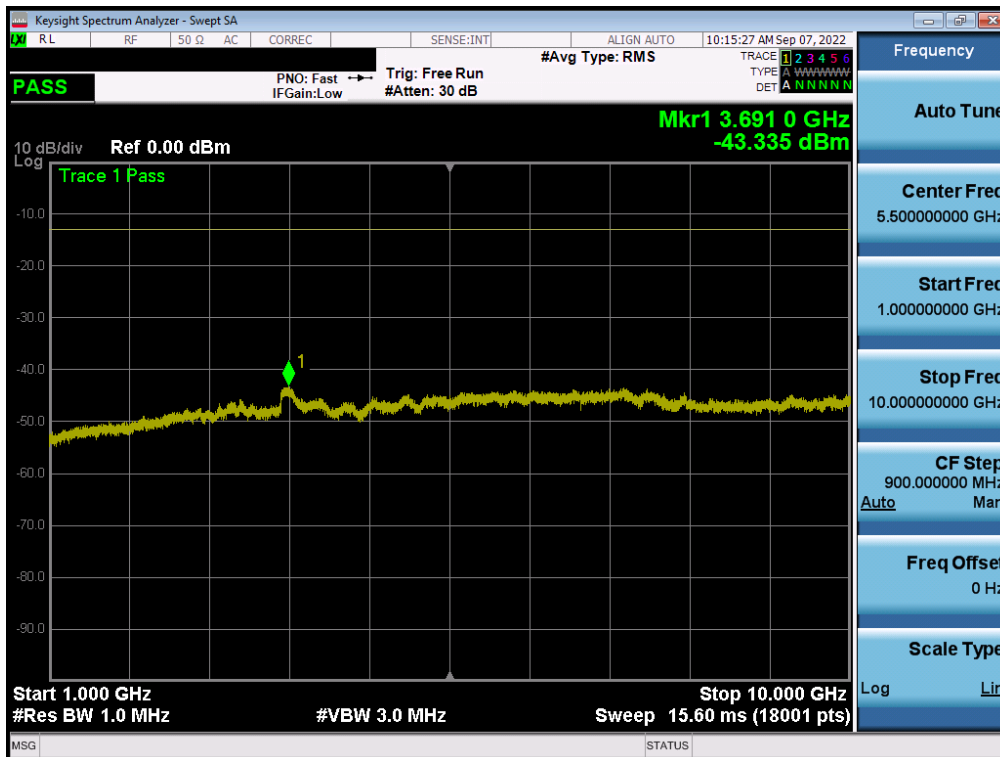


Plot 7-65. Conducted Spurious Plot (WCDMA Ch. 4183)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 50 of 101

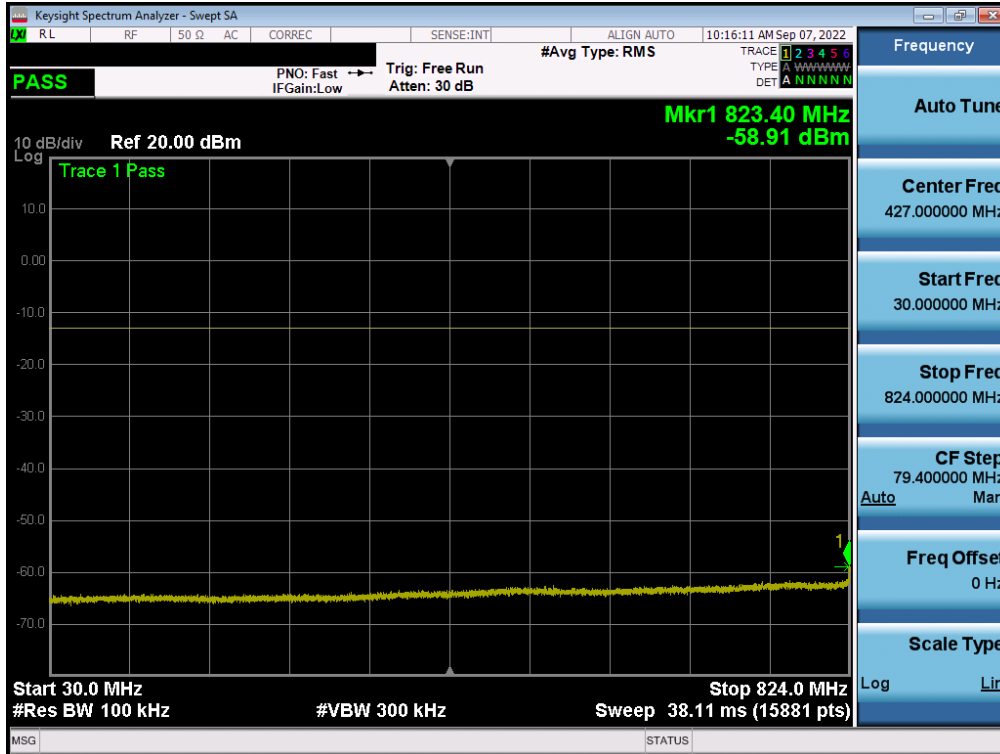


Plot 7-66. Conducted Spurious Plot (WCDMA Ch. 4183)

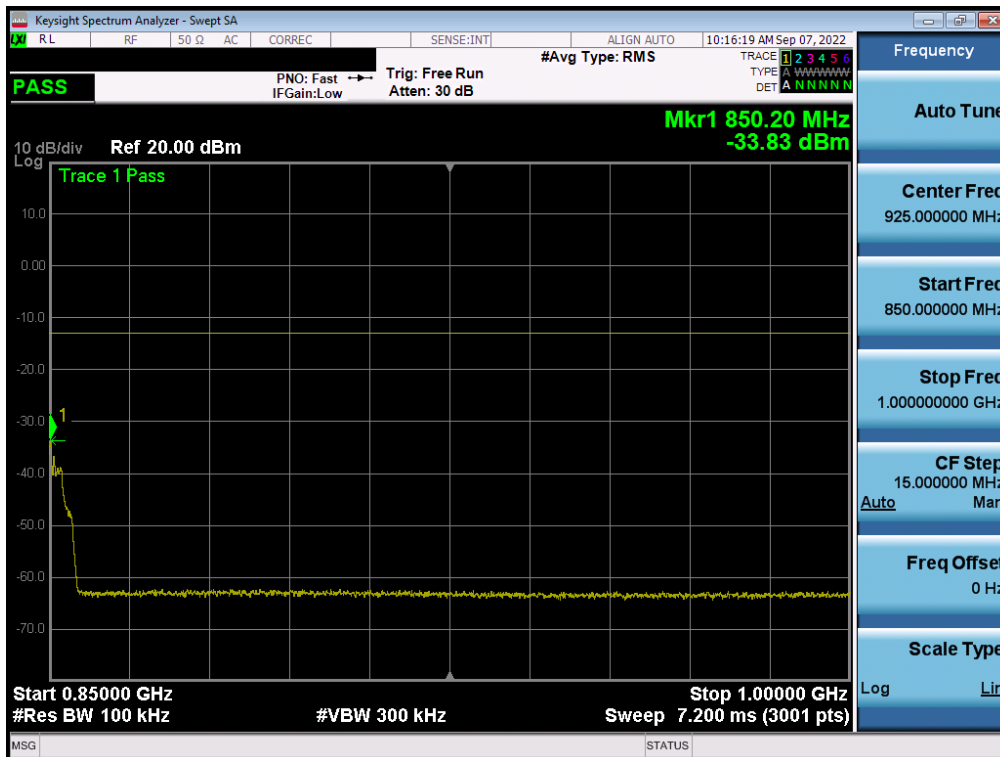


Plot 7-67. Conducted Spurious Plot (WCDMA Ch. 4183)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 51 of 101

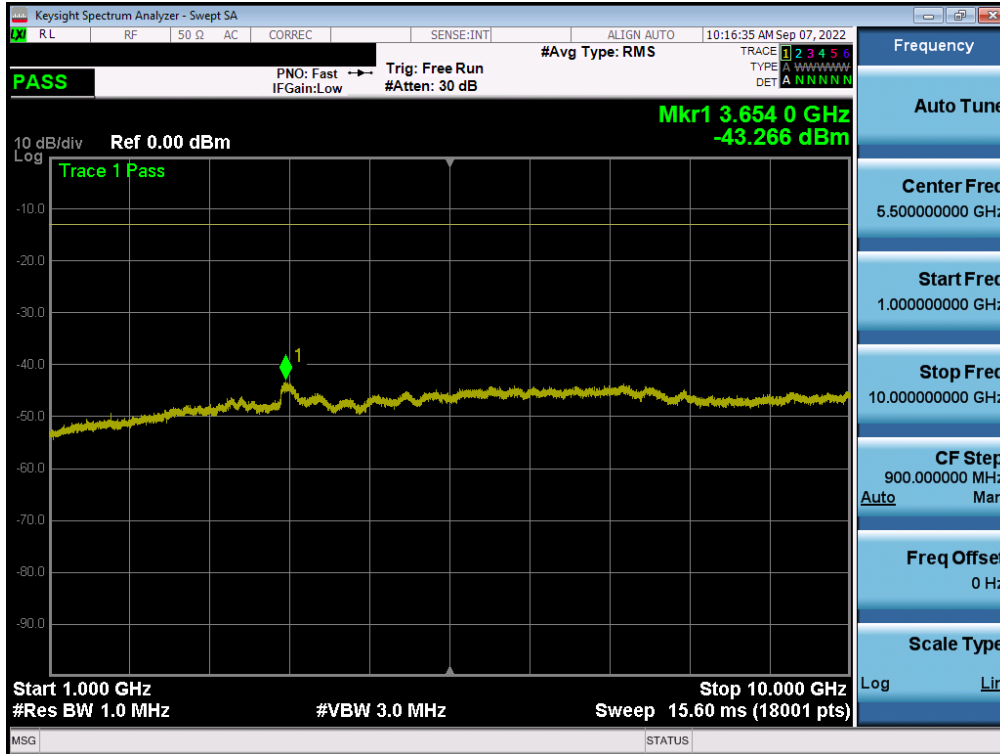


Plot 7-68. Conducted Spurious Plot (WCDMA Ch. 4233)



Plot 7-69. Conducted Spurious Plot (WCDMA Ch. 4233)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-70. Conducted Spurious Plot (WCDMA Ch. 4233)

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## 7.5 Band Edge Emissions at Antenna Terminal

### Test Overview

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

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

### Test Procedure Used

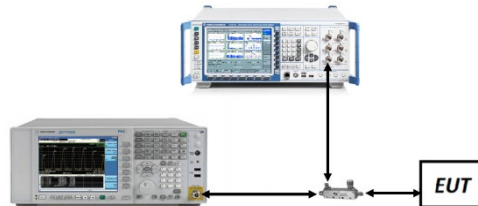
ANSI C63.26-2015 – Section 5.7.3

### Test Settings

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

### Test Setup

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



**Figure 7-4. Test Instrument & Measurement Setup**

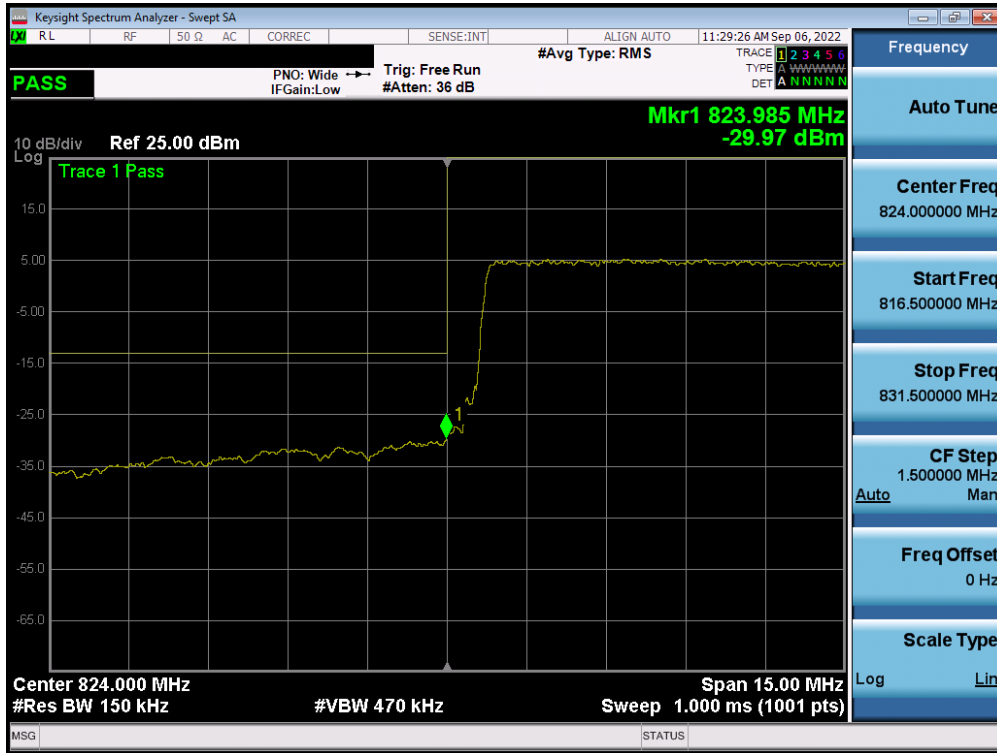
FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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**Test Notes**

1. Per 22.917(b) and RSS-132(5.5), in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed to demonstrate compliance with the out-of-band emissions limit. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.
  
2. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) 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.

<b>FCC ID:</b> A3LSMS911U	<b>PART 22 MEASUREMENT REPORT</b>		<b>Approved by:</b> Technical Manager
<b>Test Report S/N:</b> 1M2209010096-01.A3L	<b>Test Dates:</b> 9/6/2022 – 11/7/2022	<b>EUT Type:</b> Portable Handset	Page 55 of 101

### LTE Band 26/5



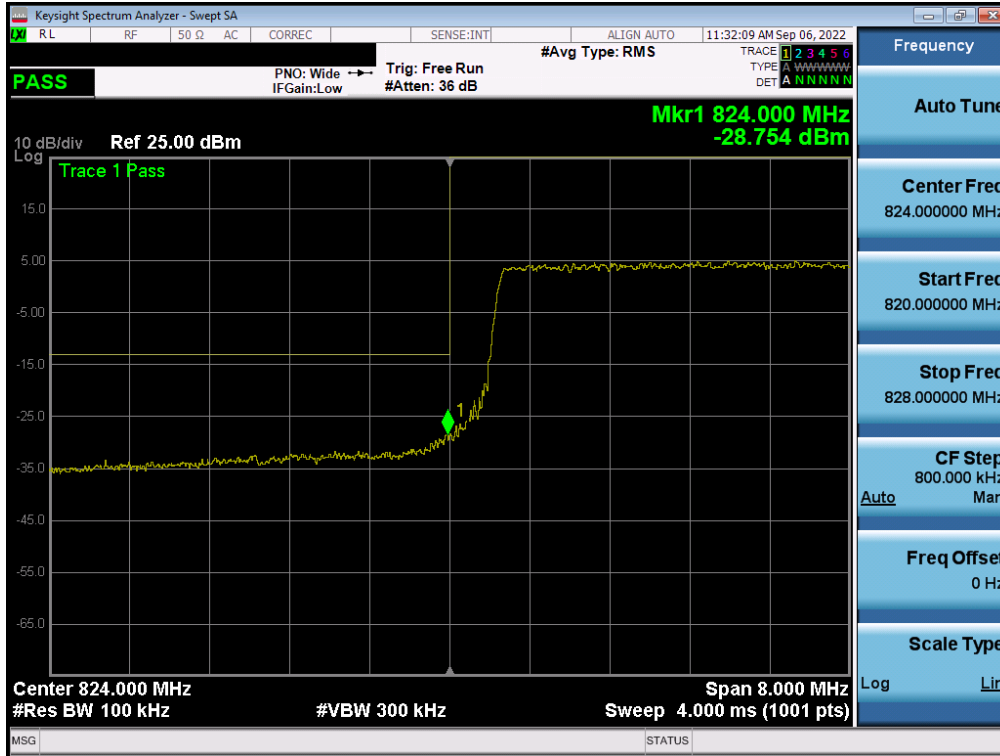
Plot 7-71. Lower Band Edge Plot (LTE Band 26 - 15MHz QPSK – Full RB)



Plot 7-72. Upper Band Edge Plot (LTE Band 26 - 15MHz QPSK – Full RB)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 56 of 101



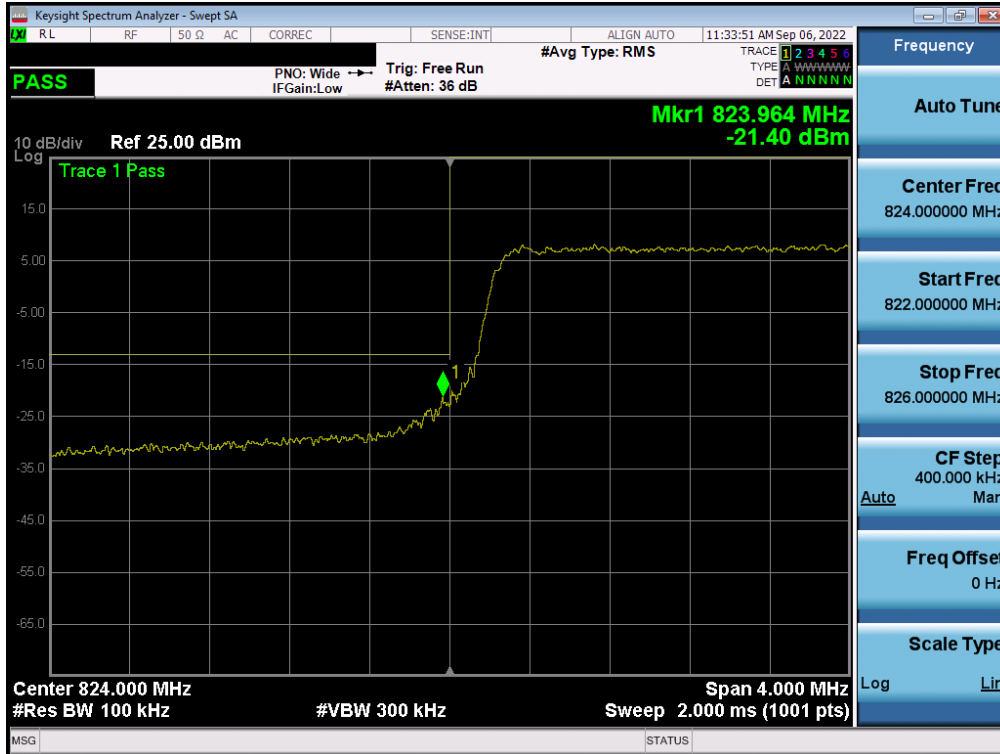


Plot 7-73. Lower Band Edge Plot (LTE Band 26/5 - 10MHz QPSK – Full RB)



Plot 7-74. Upper Band Edge Plot (LTE Band 26/5 - 10MHz QPSK – Full RB)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2209010096-01.A3L	Test Dates: 9/6/2022 – 11/7/2022	EUT Type: Portable Handset	Page 57 of 101

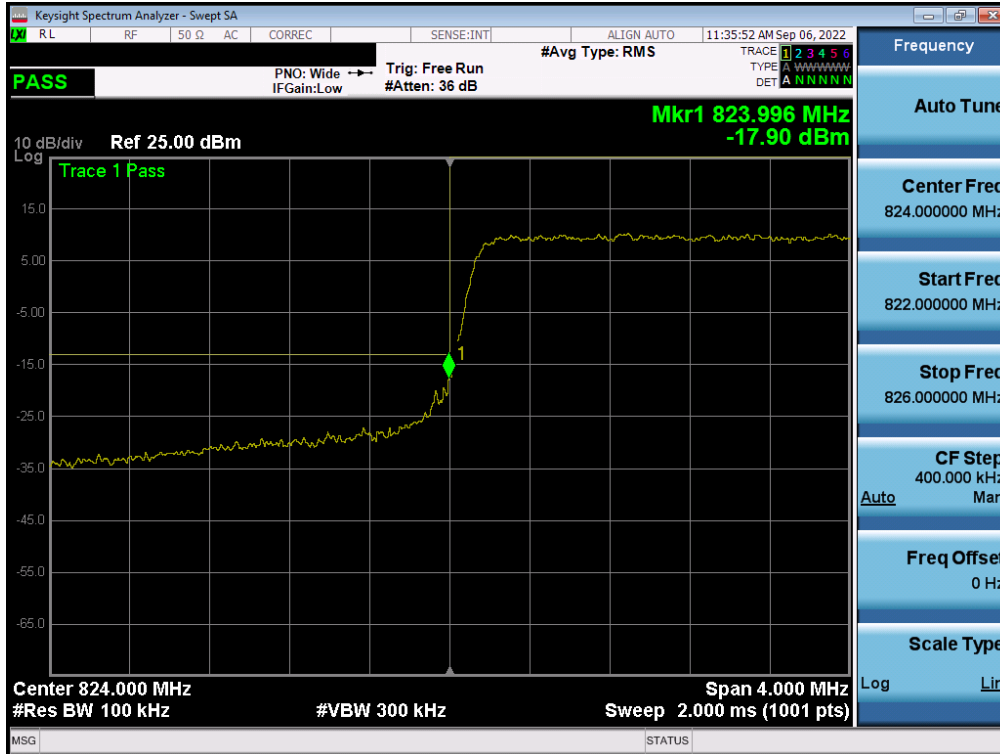


Plot 7-75. Lower Band Edge Plot (LTE Band 26/5 - 5MHz QPSK – Full RB)



Plot 7-76. Upper Band Edge Plot (LTE Band 26/5 - 5MHz QPSK – Full RB)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-77. Lower Band Edge Plot (LTE Band 26/5 - 3MHz QPSK – Full RB)



Plot 7-78. Upper Band Edge Plot (LTE Band 26/5 - 3MHz QPSK – Full RB)

FCC ID: A3LSMS911U	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
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