



**PART 22 MEASUREMENT REPORT**

**Applicant Name:**  
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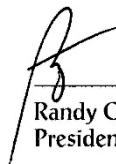
**Date of Testing:**  
 04/12/2021 - 06/01/2021  
**Test Site/Location:**  
 PCTEST Lab. Columbia, MD, USA  
**Test Report Serial No.:**  
 1M2104130035-02.A3L

<b>FCC ID:</b>	<b>A3LSMF711B</b>
<b>Applicant Name:</b>	<b>Samsung Electronics Co., Ltd.</b>



**Application Type:** Certification  
**Model:** SM-F711B  
**EUT Type:** Portable Handset  
**FCC Classification:** PCS Licensed Transmitter Held to Ear (PCE)  
**FCC Rule Part:** 22  
**Test Procedure(s):** ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01, 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.



  
 Randy Ortanez  
 President

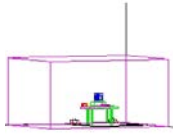


<b>FCC ID:</b> A3LSMF711B	 <b>PART 22 MEASUREMENT REPORT</b> 	<b>Approved by:</b> Technical Manager
<b>Test Report S/N:</b> 1M2104130035-02.A3L	<b>Test Dates:</b> 04/12/2021 - 06/01/2021	<b>EUT Type:</b> Portable Handset
		Page 1 of 78

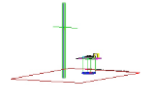
## TABLE OF CONTENTS

1.0	INTRODUCTION .....	4
1.1	Scope .....	4
1.2	PCTEST Test Location.....	4
1.3	Test Facility / Accreditations.....	4
2.0	PRODUCT INFORMATION.....	5
2.1	Equipment Description .....	5
2.2	Device Capabilities.....	5
2.3	Test Configuration .....	5
2.4	EMI Suppression Device(s)/Modifications .....	5
3.0	DESCRIPTION OF TESTS .....	6
3.1	Evaluation Procedure .....	6
3.2	Radiated Power and Radiated Spurious Emissions .....	7
4.0	MEASUREMENT UNCERTAINTY .....	8
5.0	TEST EQUIPMENT CALIBRATION DATA .....	9
6.0	SAMPLE CALCULATIONS .....	10
7.0	TEST RESULTS .....	12
7.1	Summary .....	12
7.2	Occupied Bandwidth .....	13
7.3	Spurious and Harmonic Emissions at Antenna Terminal .....	27
7.4	Band Edge Emissions at Antenna Terminal .....	45
7.5	Radiated Power (ERP) .....	58
7.6	Radiated Spurious Emissions Measurements .....	62
7.7	Frequency Stability / Temperature Variation .....	73
8.0	CONCLUSION.....	78

<b>FCC ID:</b> A3LSMF711B		<b>PART 22 MEASUREMENT REPORT</b>		<b>Approved by:</b> Technical Manager
<b>Test Report S/N:</b> 1M2104130035-02.A3L	<b>Test Dates:</b> 04/12/2021 - 06/01/2021	<b>EUT Type:</b> Portable Handset		Page 2 of 78





## PART 22 MEASUREMENT REPORT



Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	ERP		EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]	
LTE Band 26/5	15MHz (Band 26 only)	QPSK	831.5 - 841.5	0.085	19.28	0.139	21.43	13M5G7D
		16QAM	831.5 - 841.5	0.070	18.48	0.116	20.63	13M5W7D
	10 MHz	QPSK	829.0 - 844.0	0.091	19.57	0.149	21.72	9M02G7D
		16QAM	829.0 - 844.0	0.071	18.49	0.116	20.64	8M97W7D
	5 MHz	QPSK	826.5 - 846.5	0.087	19.38	0.142	21.53	4M51G7D
		16QAM	826.5 - 846.5	0.066	18.20	0.108	20.35	4M51W7D
	3 MHz	QPSK	825.5 - 847.5	0.087	19.40	0.143	21.55	2M71G7D
		16QAM	825.5 - 847.5	0.065	18.12	0.106	20.27	2M72W7D
	1.4 MHz	QPSK	824.7 - 848.3	0.090	19.56	0.148	21.71	1M10G7D
		16QAM	824.7 - 848.3	0.065	18.12	0.106	20.27	1M10W7D
NR Band n5	20 MHz	$\pi/2$ BPSK	834.0 - 839.0	0.066	18.20	0.108	20.35	17M9G7D
		QPSK	834.0 - 839.0	0.061	17.87	0.101	20.02	19M0G7D
		16QAM	834.0 - 839.0	0.046	16.58	0.075	18.73	19M0W7D
	15 MHz	$\pi/2$ BPSK	831.5 - 841.5	0.066	18.20	0.108	20.35	13M5G7D
		QPSK	831.5 - 841.5	0.063	18.01	0.104	20.16	14M2G7D
		16QAM	831.5 - 841.5	0.044	16.47	0.073	18.62	14M2W7D
	10 MHz	$\pi/2$ BPSK	829.0 - 844.0	0.066	18.19	0.108	20.34	9M03G7D
		QPSK	829.0 - 844.0	0.062	17.90	0.101	20.05	9M32G7D
		16QAM	829.0 - 844.0	0.045	16.53	0.074	18.68	9M33W7D
	5 MHz	$\pi/2$ BPSK	826.5 - 846.5	0.068	18.34	0.112	20.49	4M50G7D
		QPSK	826.5 - 846.5	0.059	17.71	0.097	19.86	4M50G7D
		16QAM	826.5 - 846.5	0.044	16.42	0.072	18.57	4M51W7D

Mode	Modulation	Tx Frequency Range [MHz]	ERP		Emission Designator
			Max. Power [W]	Max. Power [dBm]	
GSM/GPRS	GMSK	824.2 - 848.8	0.427	26.30	246KGXW
EDGE	8-PSK	824.2 - 848.8	0.105	20.23	243KG7W
WCDMA	Spread Spectrum	826.4 - 846.6	0.086	19.33	4M20F9W

FCC ID: A3LSMF711B	 PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 3 of 78

## 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 17025-2017 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 ISED Standards (RSS).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISED.

FCC ID: A3LSMF711B	 <b>PCTEST</b> Proud to be part of element	<b>PART 22 MEASUREMENT REPORT</b>		<b>Approved by:</b> Technical Manager
<b>Test Report S/N:</b> 1M2104130035-02.A3L	<b>Test Dates:</b> 04/12/2021 - 06/01/2021	<b>EUT Type:</b> Portable Handset		Page 4 of 78

## 2.0 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMF711B**. 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.:** 0089M, 0065M, 0050M, 0044M, 0069M

### 2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 5G NR (n5, n66), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5GHz), Bluetooth (1x, EDR, LE), NFC, 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 0 of this test report for a description of the radiated and antenna port conducted emissions tests.

The Equipment Under Test (EUT) can operate in one of three physical configurations – “Open”, “Half open” and “Closed”. All emissions are investigated in three modes for compliance.

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 EMI Suppression Device(s)/Modifications

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



FCC ID: A3LSMF711B	 <b>PART 22 MEASUREMENT REPORT</b> 	Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset
		Page 5 of 78

## 3.0 DESCRIPTION OF TESTS

### 3.1 Evaluation Procedure

The measurement procedures described in the “Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards” (ANSI/TIA-603-E-2016) and “Measurement Guidance for Certification of Licensed Digital Transmitters” (KDB 971168 D01 v03r01) were used in the measurement of the EUT.

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

FCC ID: A3LSMF711B	 <b>PART 22 MEASUREMENT REPORT</b> 		<b>Approved by:</b> Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset	Page 6 of 78

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

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

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

For radiated spurious emissions measurements and calculations, conversion method is used per the formulas in KDB 971168 Section 5.8.4. Field Strength (EIRP) is calculated using the following formulas:



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

And

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

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 474788 D01.



Radiated power and radiated spurious emission levels are investigated with the receive antenna horizontally and vertically polarized per ANSI/TIA-603-E-2016.

FCC ID: A3LSMF711B	 PART 22 MEASUREMENT REPORT 	Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset
		Page 7 of 78

## 4.0 MEASUREMENT UNCERTAINTY

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

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

FCC ID: A3LSMF711B	 PART 22 MEASUREMENT REPORT 	Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset
		Page 8 of 78



## 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
-	AP1	EMC Cable and Switch System	3/9/2021	Annual	3/9/2022	AP1
-	ETS	EMC Cable and Switch System	3/4/2021	Annual	3/4/2022	ETS
-	LTX3	Licensed Transmitter Cable Set	2/26/2021	Annual	2/26/2022	LTX3
-	LTX4	Licensed Transmitter Cable Set	3/12/2021	Annual	3/12/2022	LTX4
Agilent	E5515C	Wireless Communications Test Set	N/A			GB46310798
Agilent	N9030A	50GHz PXA Signal Analyzer	1/20/2021	Annual	1/20/2022	US51350301
Anritsu	MT8821C	Radio Communication Analyzer	N/A			6200901190
Anritsu	MT8821C	Radio Communication Analyzer	N/A			6201525694
Com-Power	AL-130R	Active Loop Antenna	8/22/2019	Biennial	8/22/2021	121085
Emco	3115	Horn Antenna (1-18GHz)	6/18/2020	Biennial	6/18/2022	9704-5182
Emco	3116	Horn Antenna (18 - 40GHz)	8/7/2018	Triennial	8/7/2021	9203-2178
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/12/2020	Biennial	3/12/2022	128337
Keysight Technologies	N9020A	MXA Signal Analyzer	9/22/2020	Annual	9/22/2021	MY54500644
Keysight Technologies	N9030A	PXA Signal Analyzer (44GHz)	8/17/2020	Annual	8/17/2021	MY52350166
Keysight Technologies	N9038A	MXE EMI Receiver	8/11/2020	Annual	8/11/2021	MY51210133
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			100976
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	7/15/2020	Annual	7/15/2021	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	9/9/2020	Annual	9/9/2021	100348
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	8/10/2020	Annual	8/10/2021	103200
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107

Table 5-1. Test Equipment

### Notes:

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

FCC ID: A3LSMF711B	 PART 22 MEASUREMENT REPORT 	Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset
		Page 9 of 78

## 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

FCC ID: A3LSMF711B	 PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 10 of 78

## Spurious Radiated Emission

### Example: Spurious emission at 3700.40 MHz

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

FCC ID: A3LSMF711B	 <b>PART 22 MEASUREMENT REPORT</b> 		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset	Page 11 of 78

## 7.0 TEST RESULTS

### 7.1 Summary



Company Name: Samsung Electronics Co., Ltd.  
 FCC ID: A3LSMF711B  
 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
<b>CONDUCTED</b>	Transmitter Conducted Output Power	2.1046	RSS-132(5.4)	N/A	PASS	See RF Exposure Report
	Occupied Bandwidth	2.1049	RSS-Gen(6.7)	N/A	PASS	Section 7.2
	Conducted Band Edge / Spurious Emissions	2.1051, 22.917(a)	RSS-132(5.5)	> 43 + 10log <sub>10</sub> (P[Watts]) at Band Edge and for all out-of-band emissions	PASS	Sections 7.3, 7.4
	Frequency Stability	2.1055, 22.355	RSS-132(5.3)	Fundamental emissions stay within authorized frequency block	PASS	Section 7.8
<b>RADIATED</b>	Effective Radiated Power / Equivalent Isotropic Radiated Power	22.913(a)(5)	RSS-132(5.4)	< 7 Watts max. ERP	PASS	Section 7.6
	Radiated Spurious Emissions	2.1053, 22.917(a)	RSS-132(5.5)	> 43 + 10 log <sub>10</sub> (P[Watts]) for all out-of-band emissions	PASS	Section 7.7

**Table 7-1. Summary of Test Results**

#### Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
- 4) All conducted emissions measurements are performed with automated test software to capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST EMC Software Tool Beta 8.

FCC ID: A3LSMF711B	 <b>PART 22 MEASUREMENT REPORT</b> 	Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset
Page 12 of 78		

## 7.2 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

KDB 971168 D01 v03r01 – Section 4.2

### Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW  $\geq$  3 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.

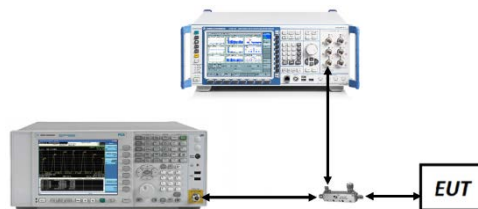




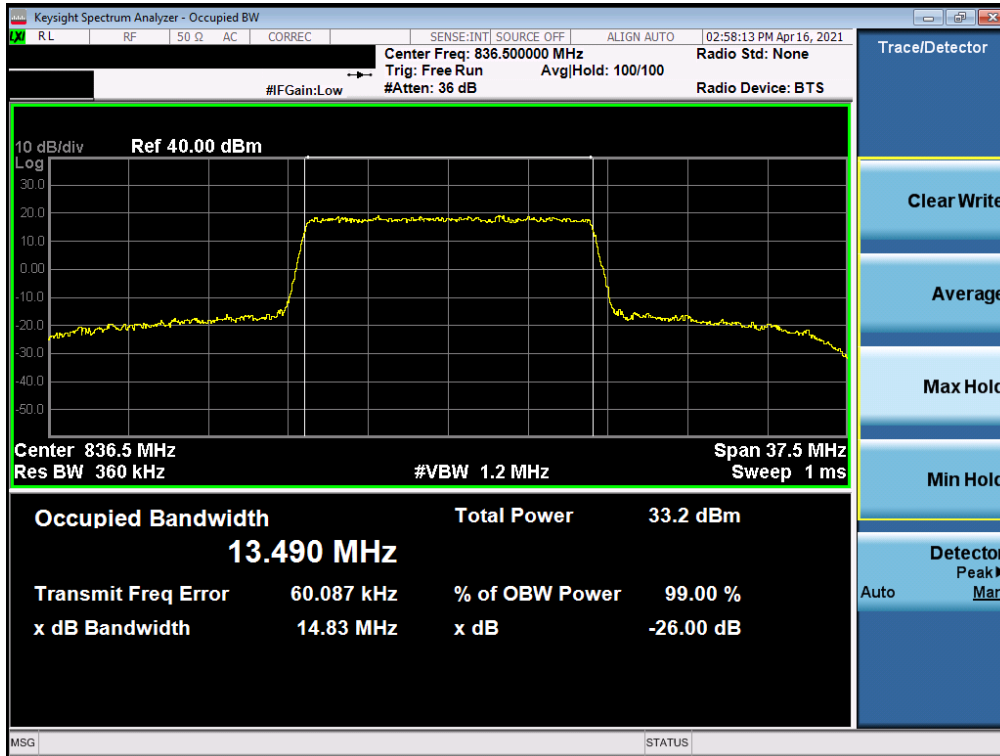
Figure 7-1. Test Instrument & Measurement Setup

### Test Notes

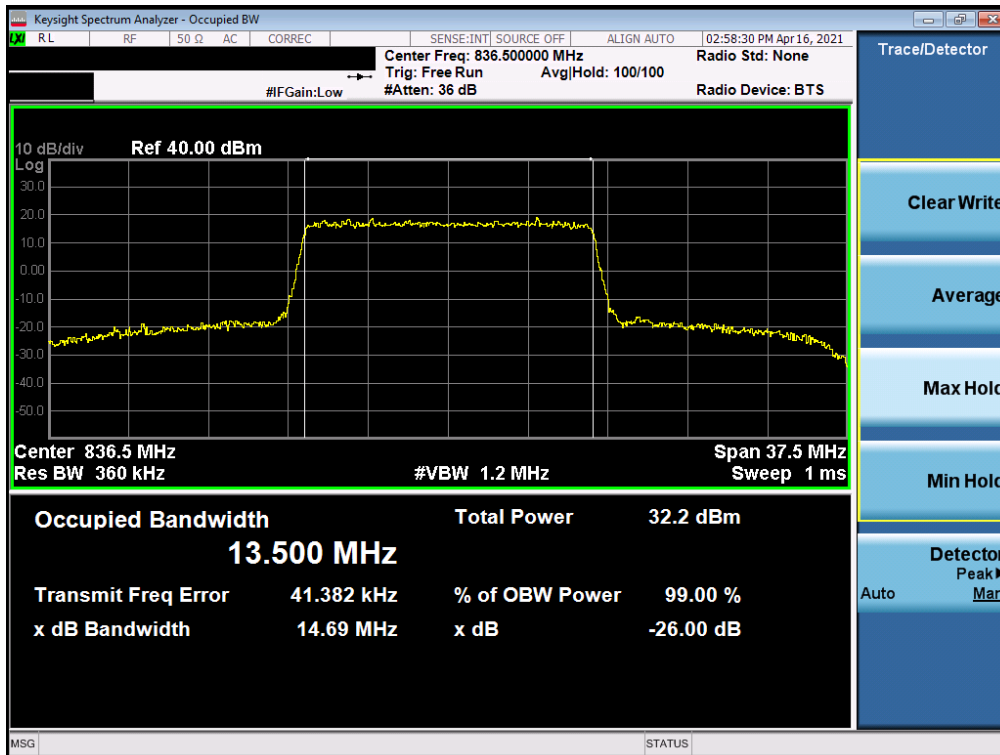
None.

FCC ID: A3LSMF711B	 PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset	Page 13 of 78

**LTE Band 26/5**

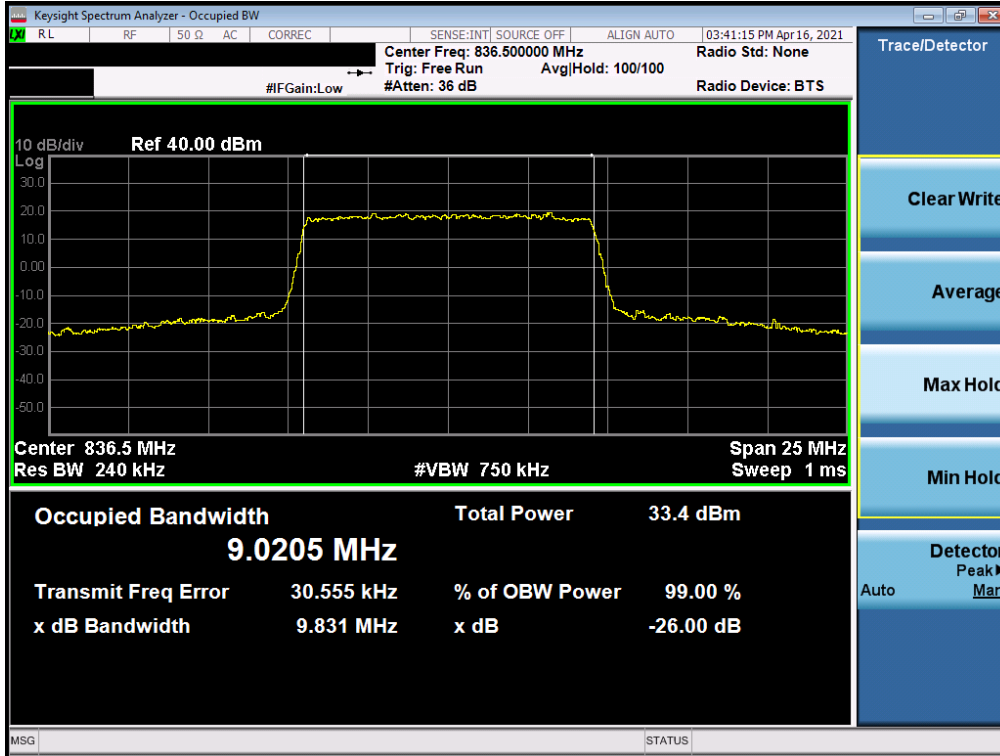


**Plot 7-1. Occupied Bandwidth Plot (LTE Band 26 - 15MHz QPSK - Full RB)**

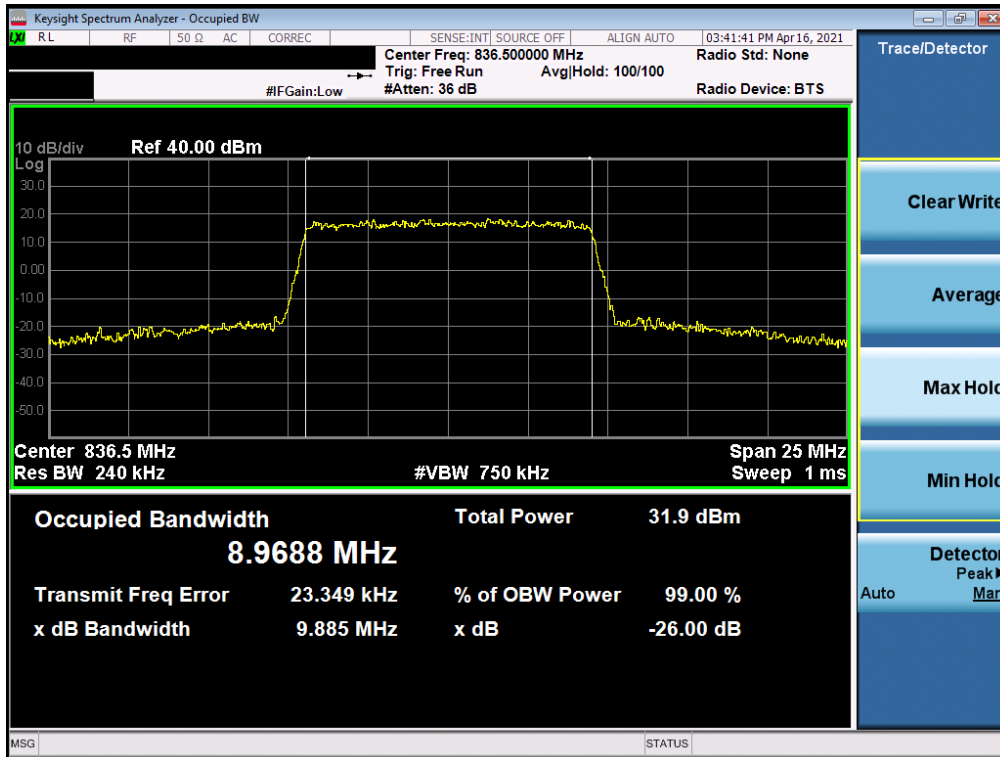


**Plot 7-2. Occupied Bandwidth Plot (LTE Band 26 - 15MHz 16-QAM - Full RB)**

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of element	<b>PART 22 MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 14 of 78

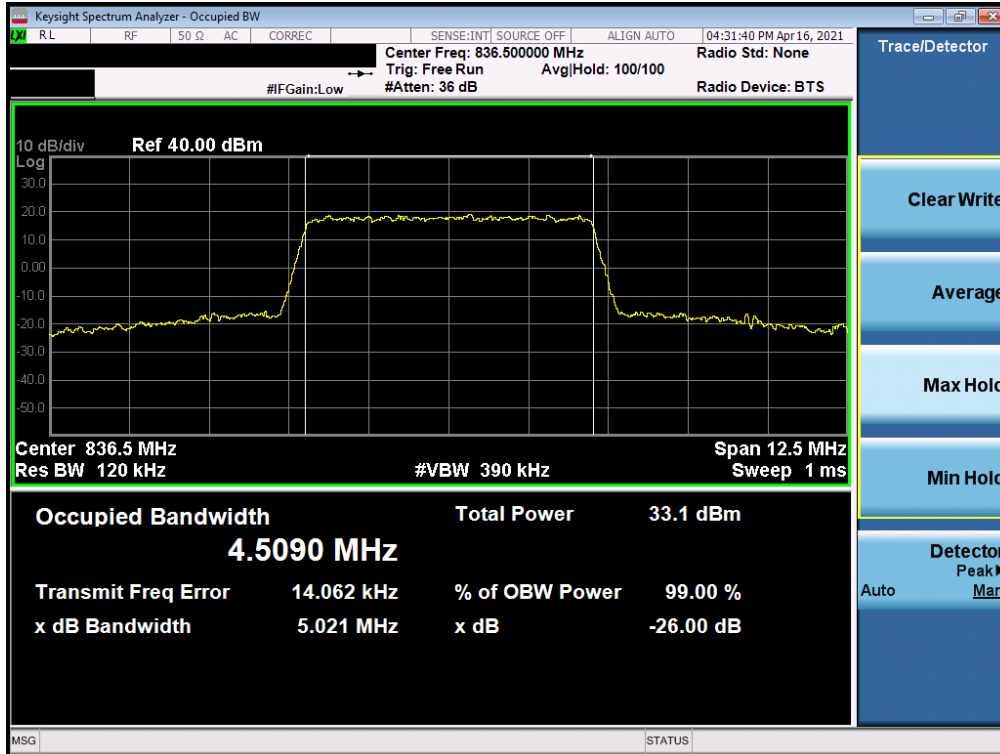


Plot 7-3. Occupied Bandwidth Plot (LTE Band 26/5 - 10MHz QPSK - Full RB)

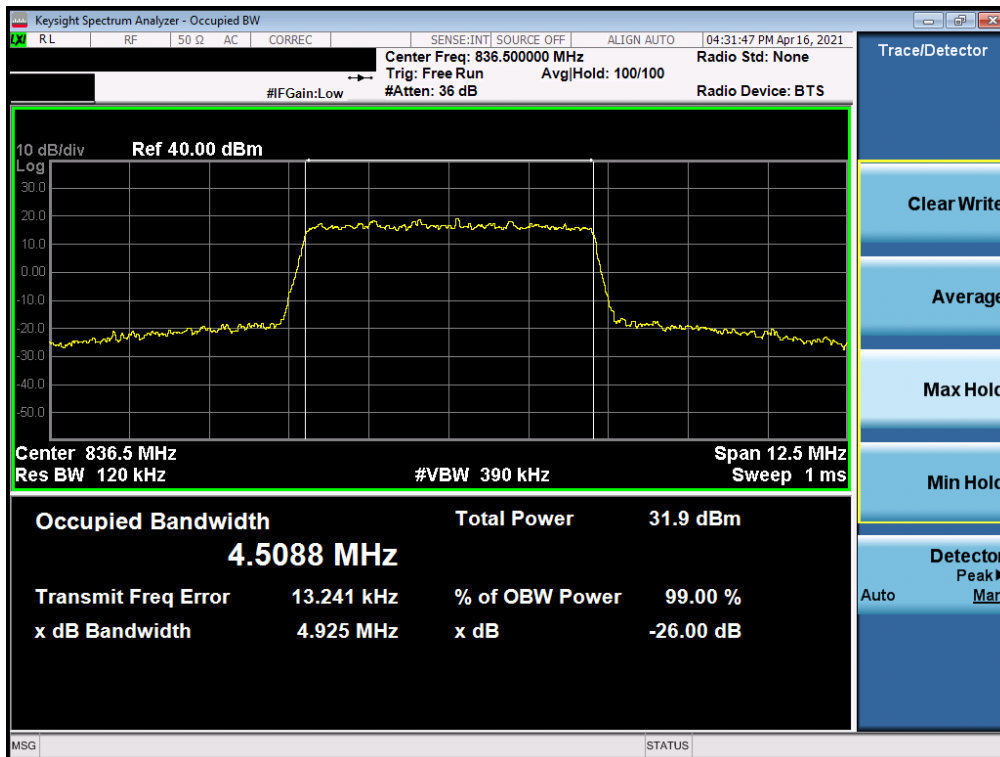


Plot 7-4. Occupied Bandwidth Plot (LTE Band 26/5 - 10MHz 16-QAM - Full RB)

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of elements	<b>PART 22 MEASUREMENT REPORT</b>	<b>Approved by:</b> Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset	Page 15 of 78



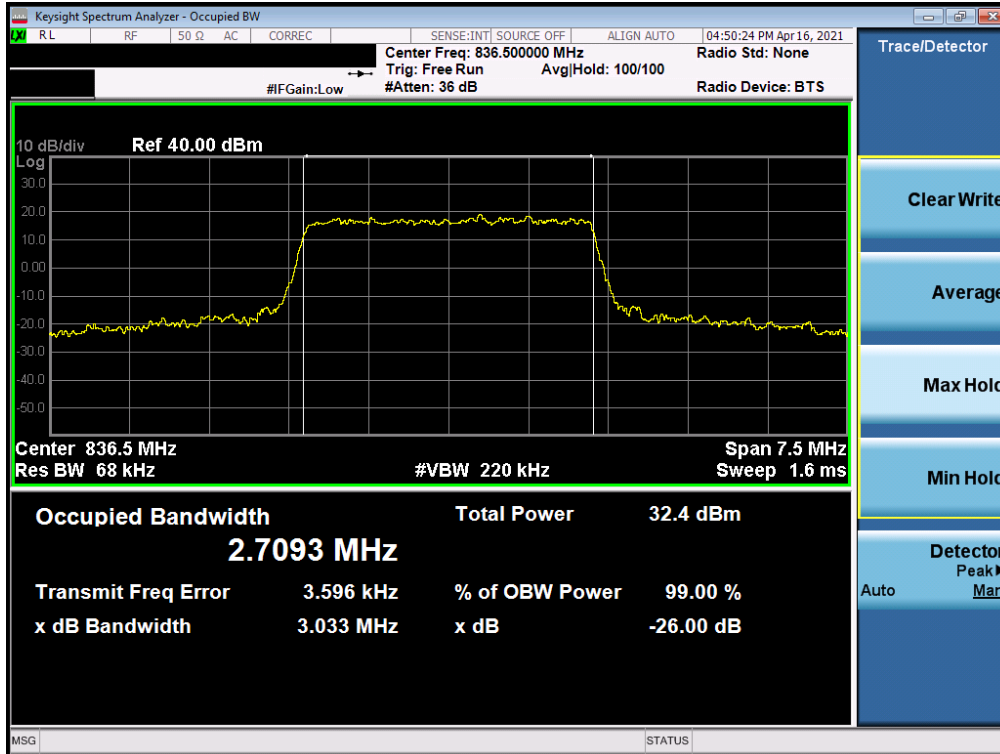
Plot 7-5. Occupied Bandwidth Plot (LTE Band 26/5 - 5MHz QPSK - Full RB)



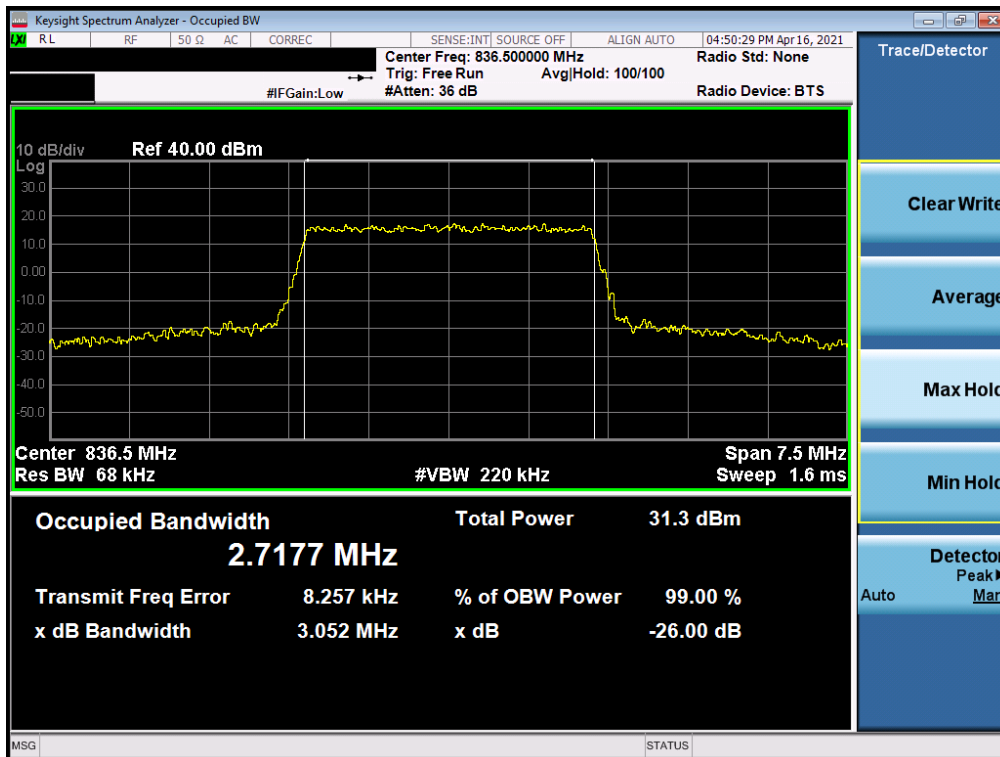
Plot 7-6. Occupied Bandwidth Plot (LTE Band 26/5 - 5MHz 16-QAM - Full RB)

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of elements	<b>PART 22 MEASUREMENT REPORT</b>	<b>Approved by:</b> Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset	Page 16 of 78



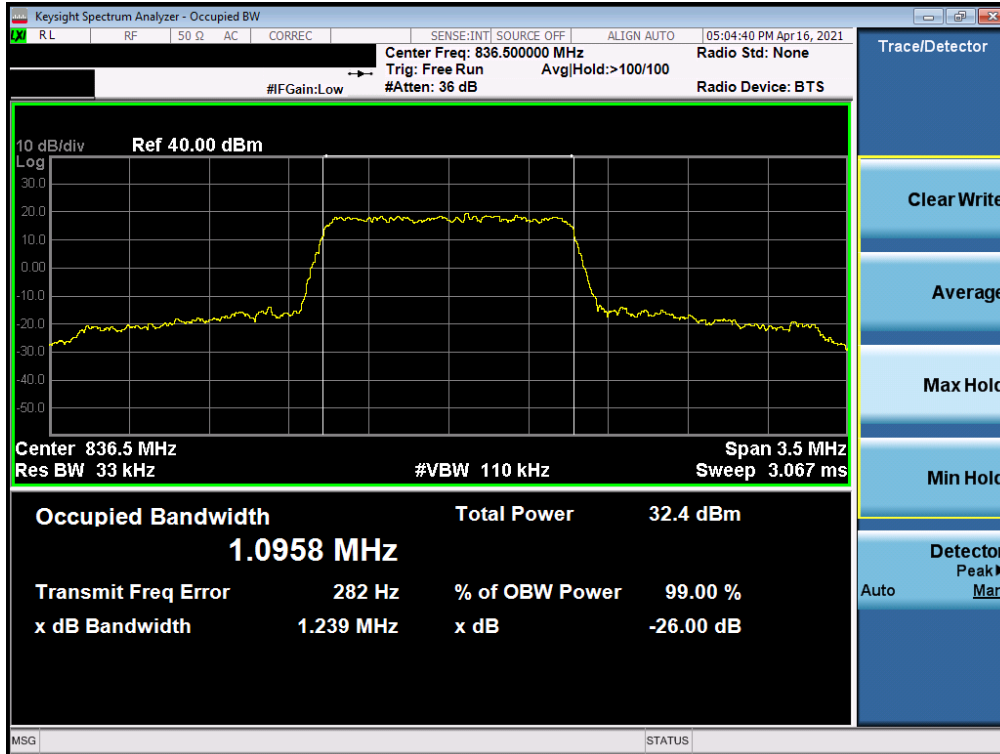


Plot 7-7. Occupied Bandwidth Plot (LTE Band 26/5 - 3MHz QPSK - Full RB)

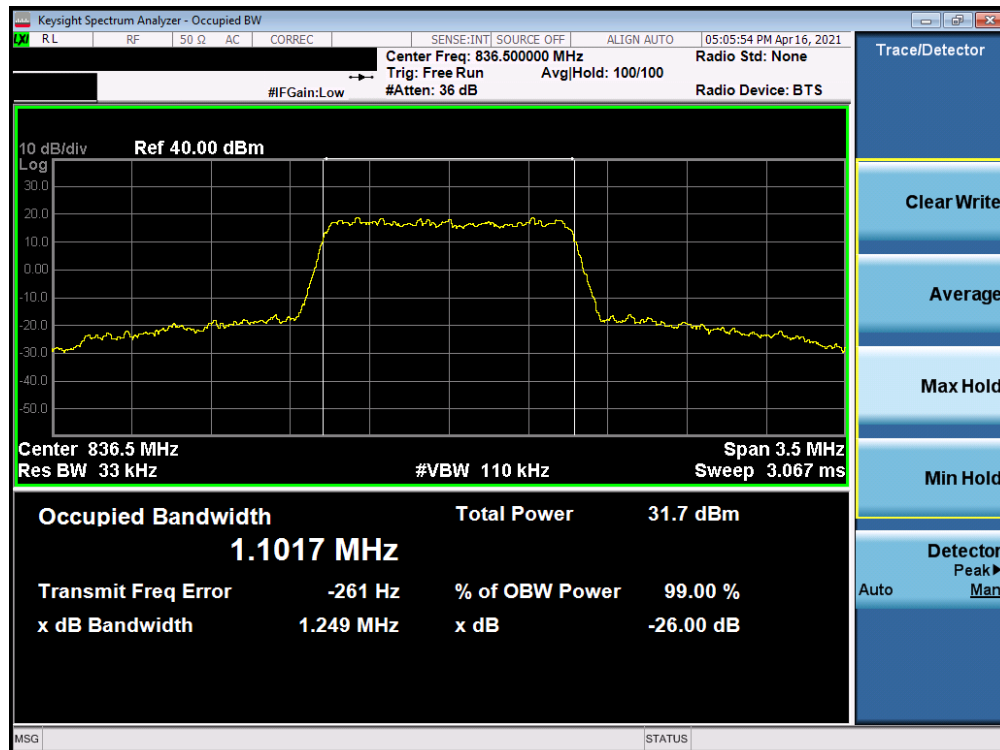


Plot 7-8. Occupied Bandwidth Plot (LTE Band 26/5 - 3MHz 16-QAM - Full RB)

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of Samsung	<b>PART 22 MEASUREMENT REPORT</b>	<b>Approved by:</b> Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset	Page 17 of 78



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: A3LSMF711B	<b>PCTEST</b> Proud to be part of elements	<b>PART 22 MEASUREMENT REPORT</b>	<b>Approved by:</b> Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset	Page 18 of 78

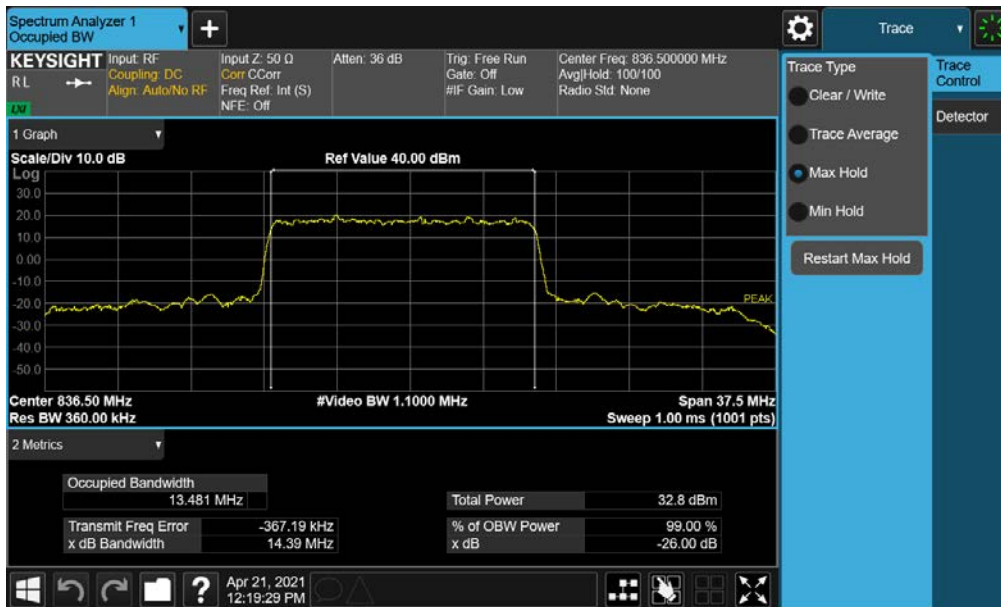
**NR Band n5**



FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of elements	<b>PART 22 MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 19 of 78



Plot 7-13. Occupied Bandwidth Plot (NR Band n5 - 20MHz 16-QAM - Full RB)



Plot 7-14. Occupied Bandwidth Plot (NR Band n5 - 15MHz  $\pi/2$  BPSK - Full RB)

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of Samsung	<b>PART 22 MEASUREMENT REPORT</b>	<b>Approved by:</b> Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset	Page 20 of 78



**Plot 7-15. Occupied Bandwidth Plot (NR Band n5 - 15MHz QPSK - Full RB)**

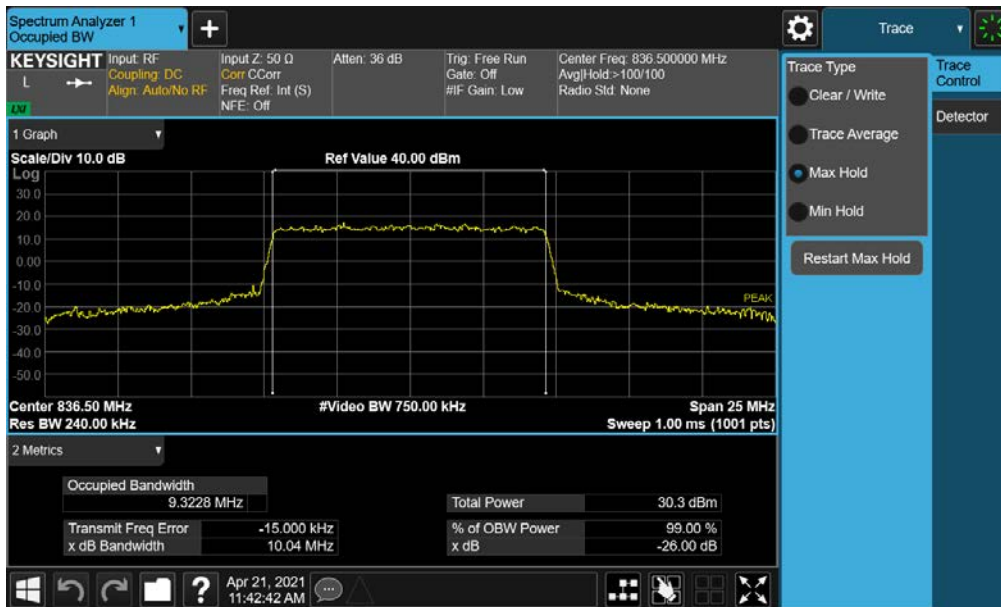


**Plot 7-16. Occupied Bandwidth Plot (NR Band n5 - 15MHz 16-QAM - Full RB)**

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of elements	<b>PART 22 MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 21 of 78

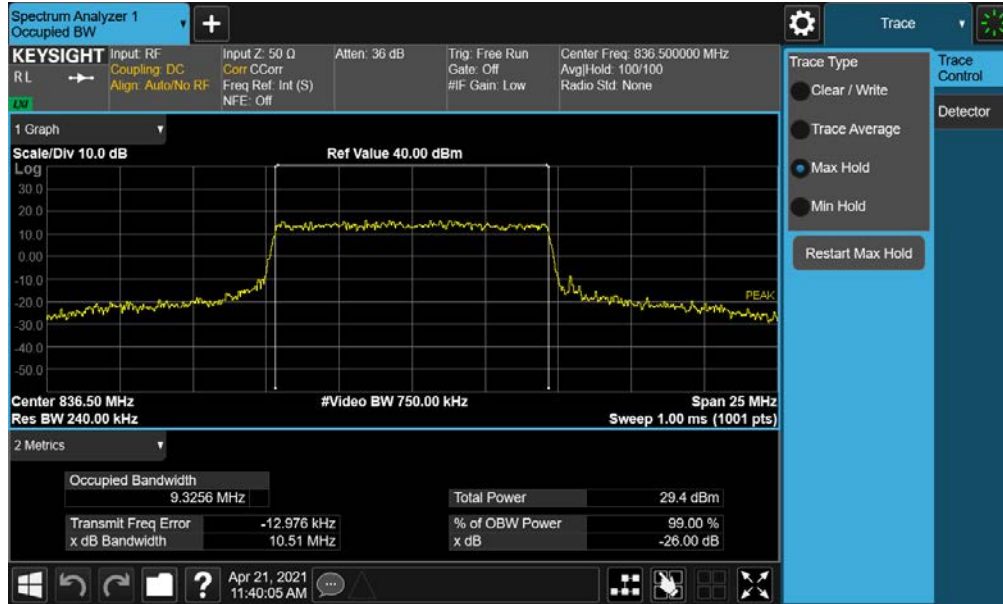


Plot 7-17. Occupied Bandwidth Plot (NR Band n5 - 10MHz  $\pi/2$  BPSK - Full RB)

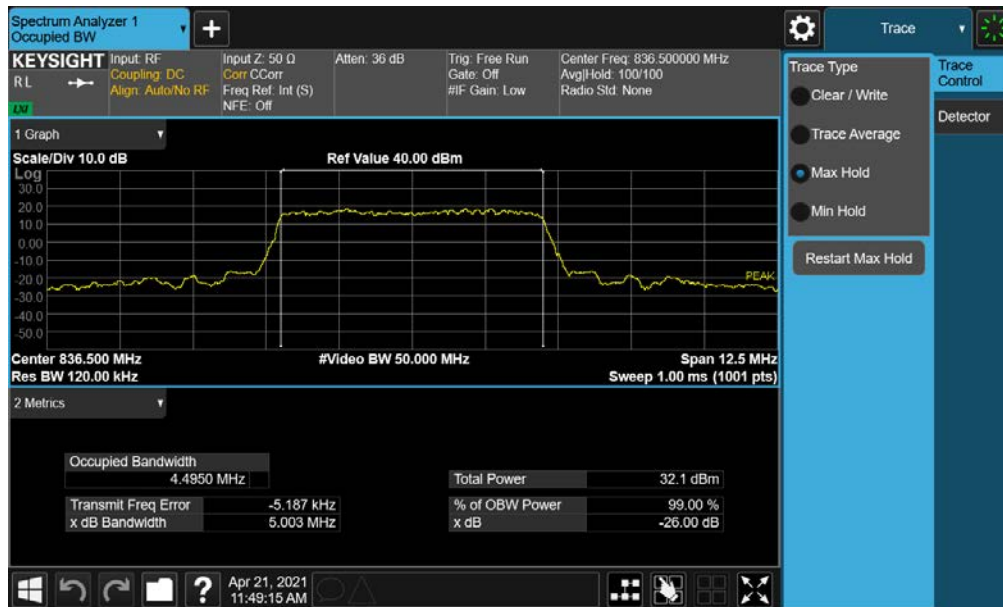


Plot 7-18. Occupied Bandwidth Plot (NR Band n5 - 10MHz QPSK - Full RB)

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of Samsung	<b>PART 22 MEASUREMENT REPORT</b>	<b>Approved by:</b> Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset	Page 22 of 78

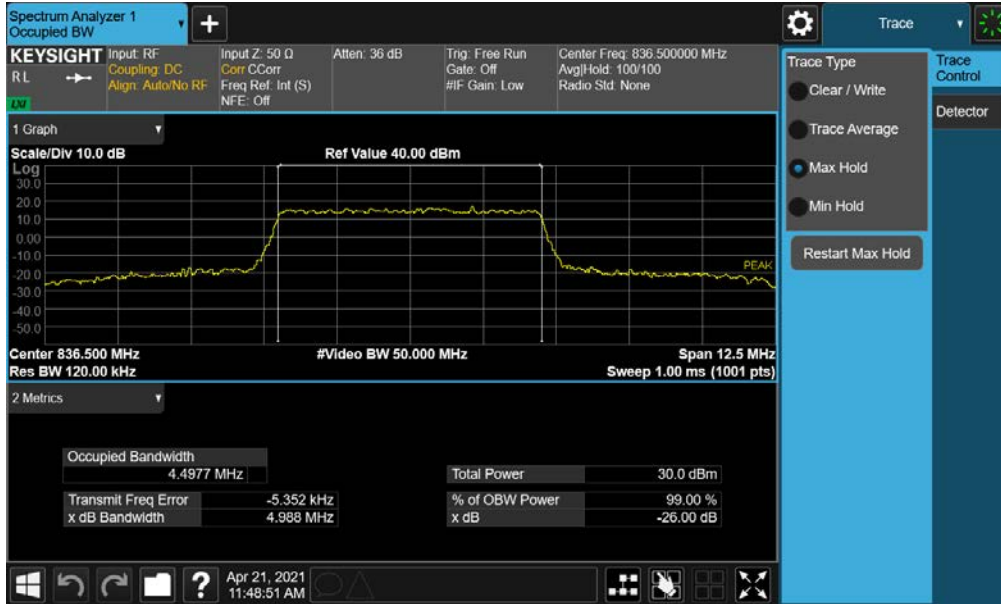


**Plot 7-19. Occupied Bandwidth Plot (NR Band n5 - 10MHz 16-QAM - Full RB)**

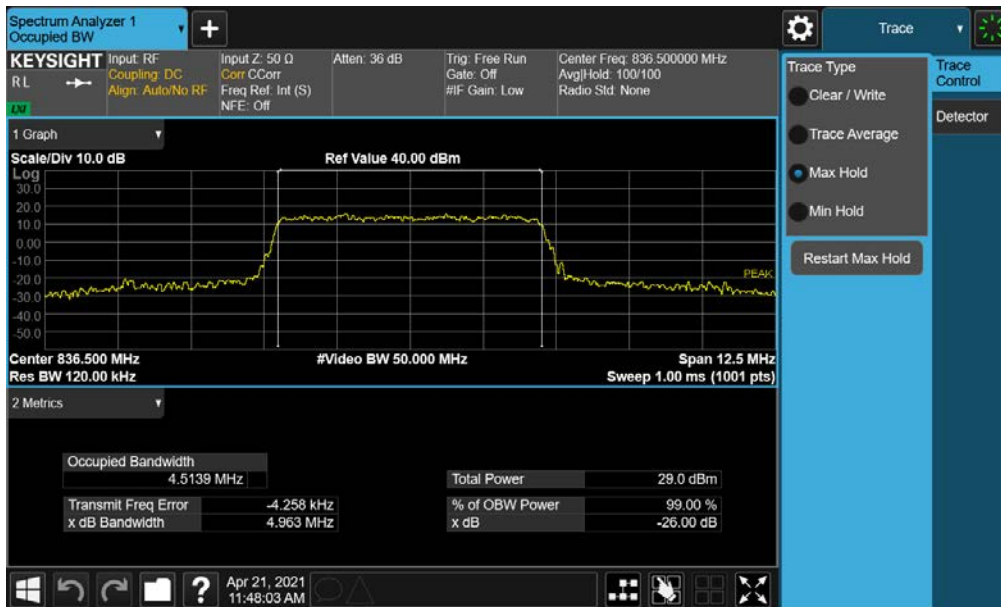


**Plot 7-20. Occupied Bandwidth Plot (NR Band n5 - 5MHz  $\pi/2$  BPSK - Full RB)**

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of elements	<b>PART 22 MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 23 of 78



**Plot 7-21. Occupied Bandwidth Plot (NR Band n5 - 5MHz QPSK - Full RB)**

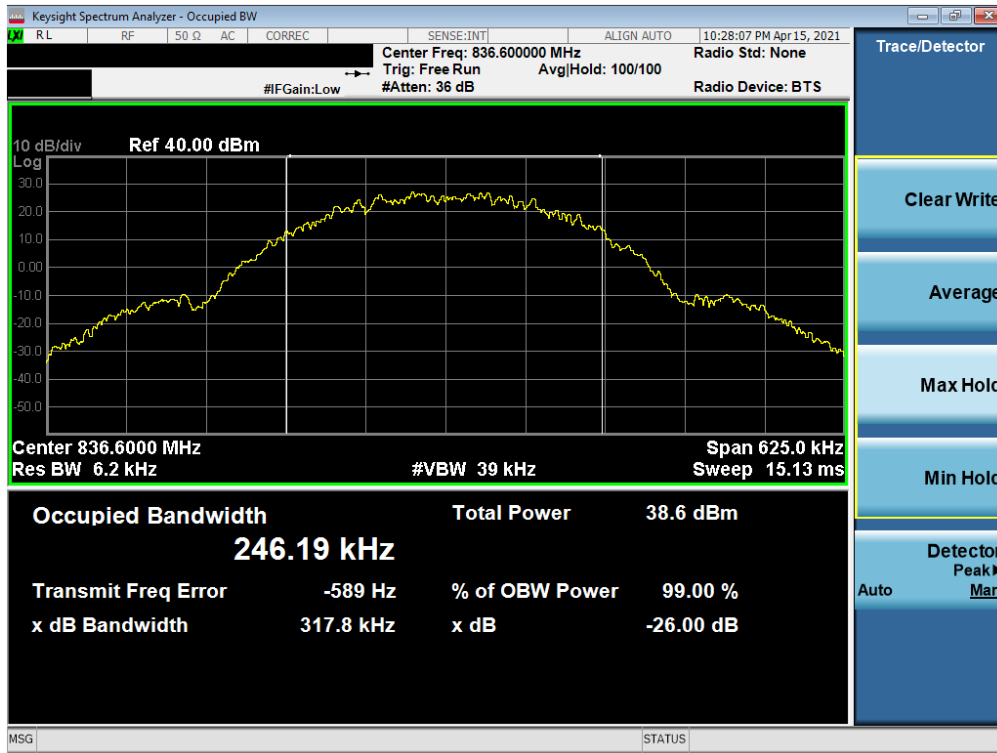


**Plot 7-22. Occupied Bandwidth Plot (NR Band n5 - 5MHz 16-QAM - Full RB)**

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of Samsung	<b>PART 22 MEASUREMENT REPORT</b>	<b>Approved by:</b> Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset	Page 24 of 78



## GPRS Cell



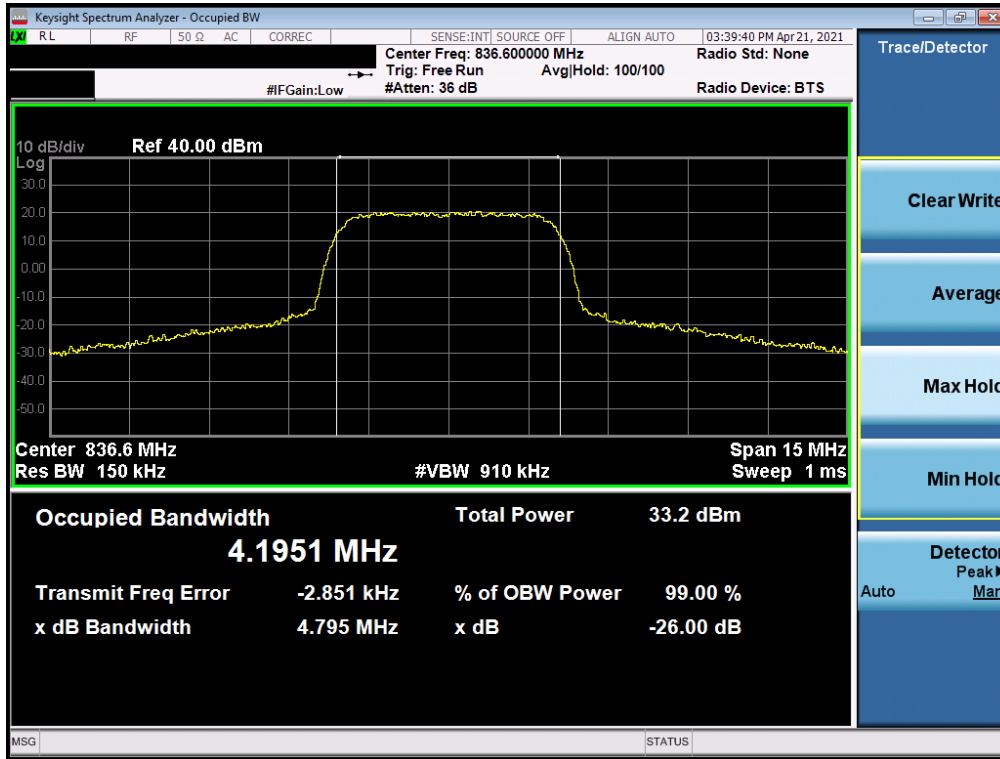
Plot 7-23. Occupied Bandwidth Plot (GPRS, Ch. 190)



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

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of element	PART 22 MEASUREMENT REPORT	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 25 of 78

## WCDMA Cell



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

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of element	<b>PART 22 MEASUREMENT REPORT</b>	<b>Approved by:</b> Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset	Page 26 of 78

## 7.3 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  $43 + 10 \log_{10}(P_{[Watts]})$ , where  $P$  is the transmitter power in Watts.***

### Test Procedure Used

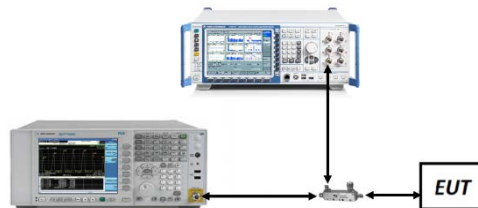
KDB 971168 D01 v03r01 – Section 6.0

### Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to 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.



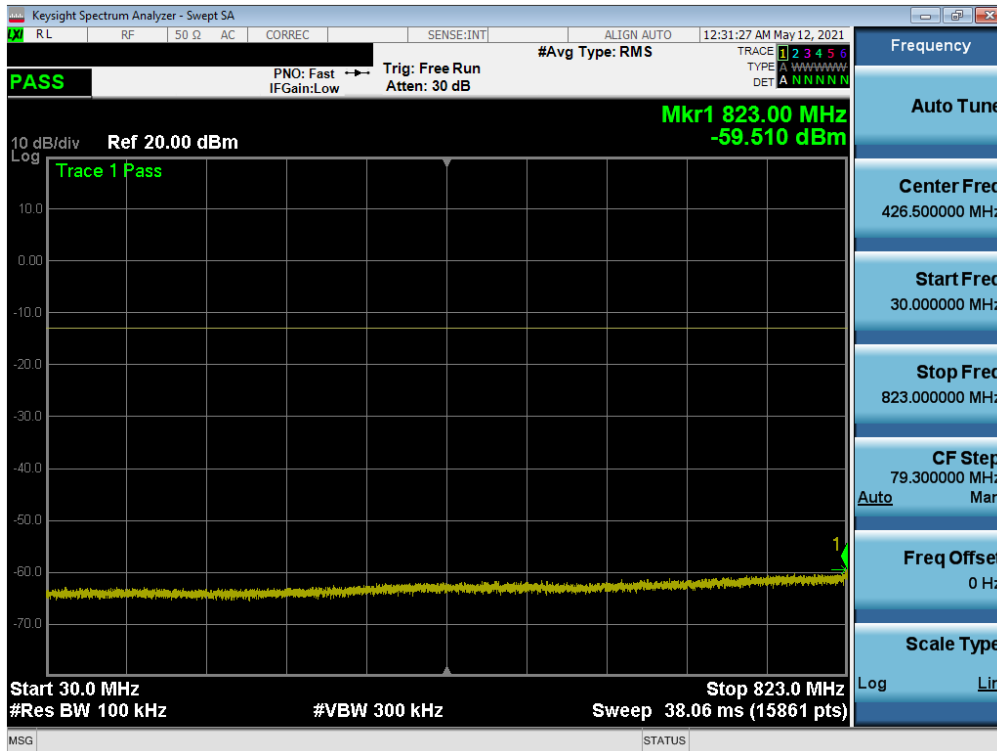
**Figure 7-2. Test Instrument & Measurement Setup**

### Test Notes

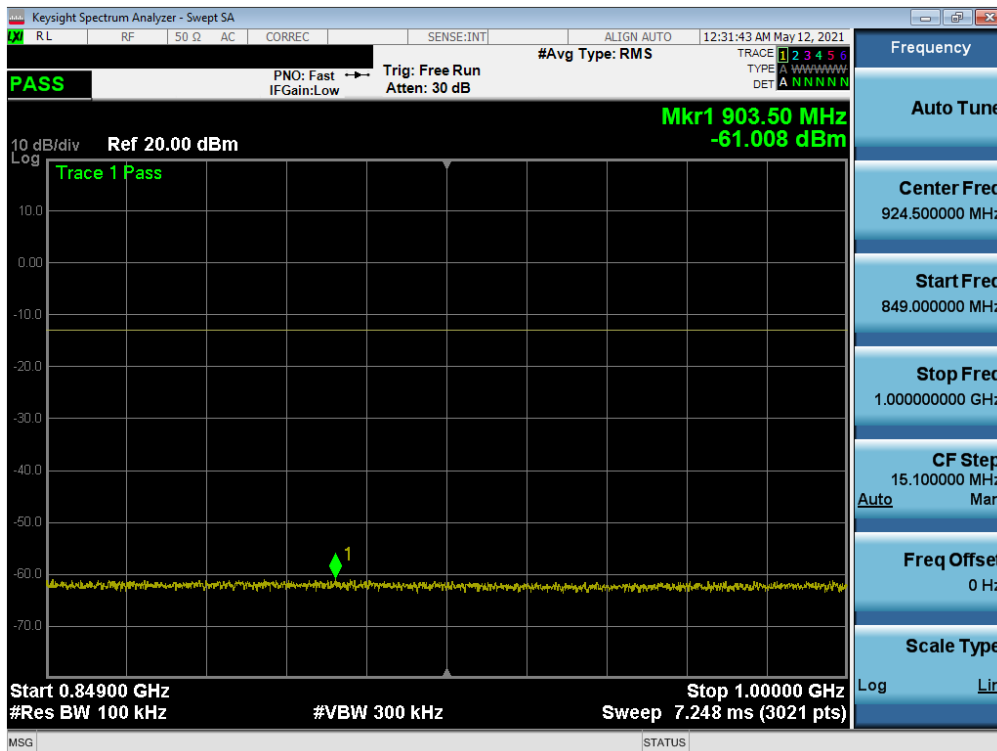
1. Per Part 22 and RSS-132, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth 100 kHz or greater for measurements below 1GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth 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: A3LSMF711B	 PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset	Page 27 of 78



## LTE Band 26/5

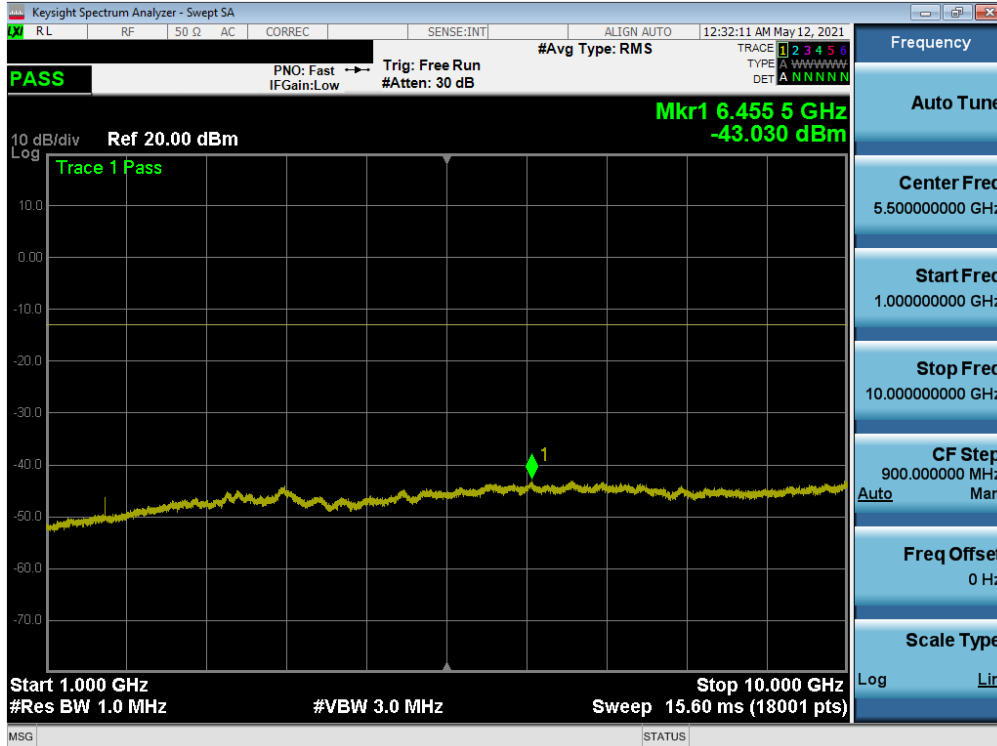


Plot 7-26. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK – 1 RB - Low Channel)

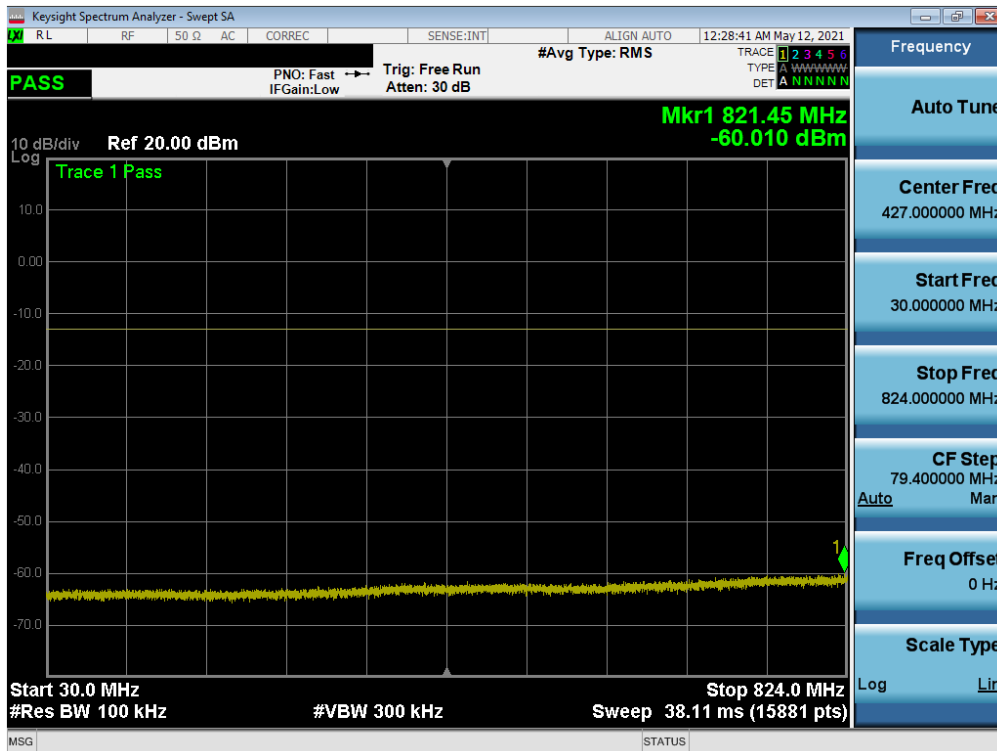


Plot 7-27. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Low Channel)

FCC ID: A3LSMF711B	 PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset	Page 28 of 78

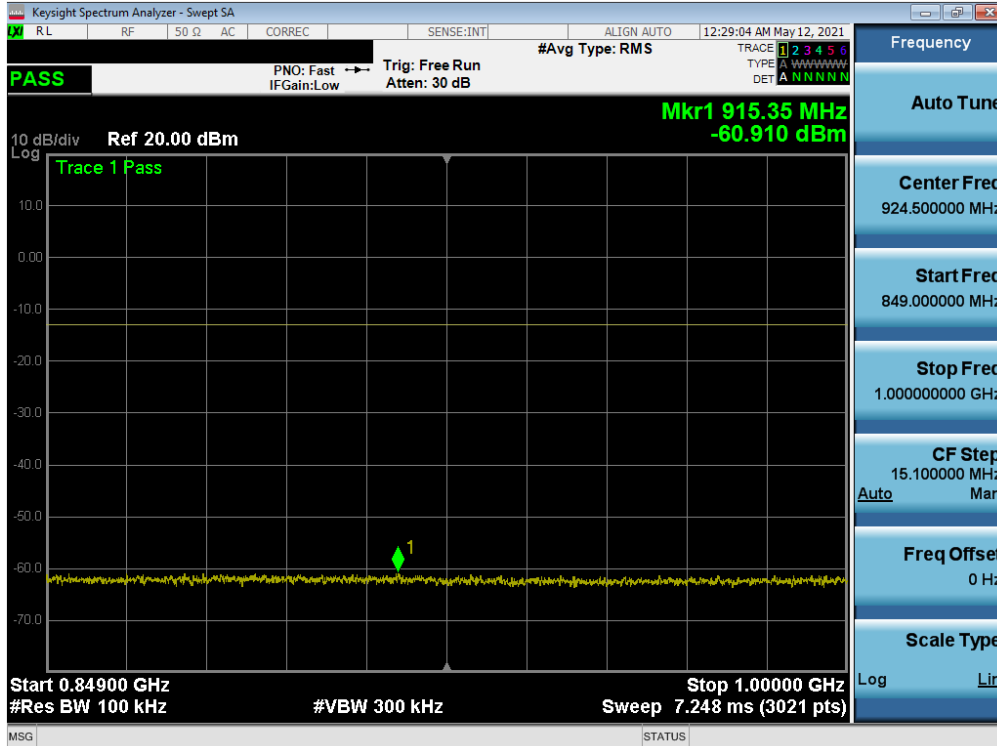


Plot 7-28. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Low Channel)

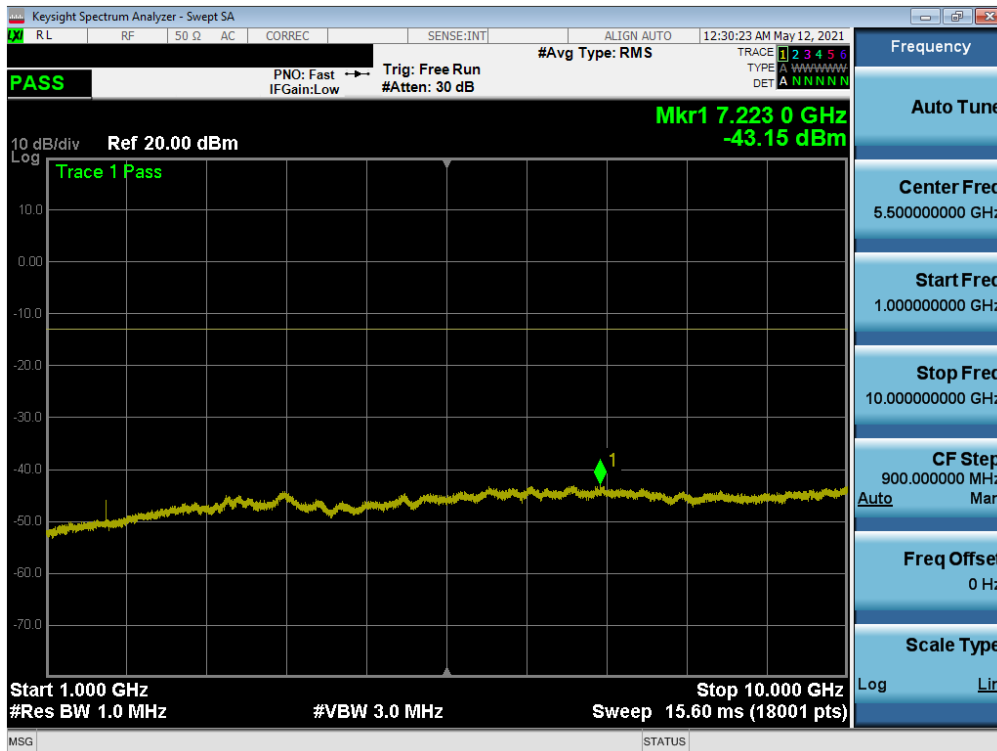


Plot 7-29. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Mid Channel)

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of elements	<b>PART 22 MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 29 of 78

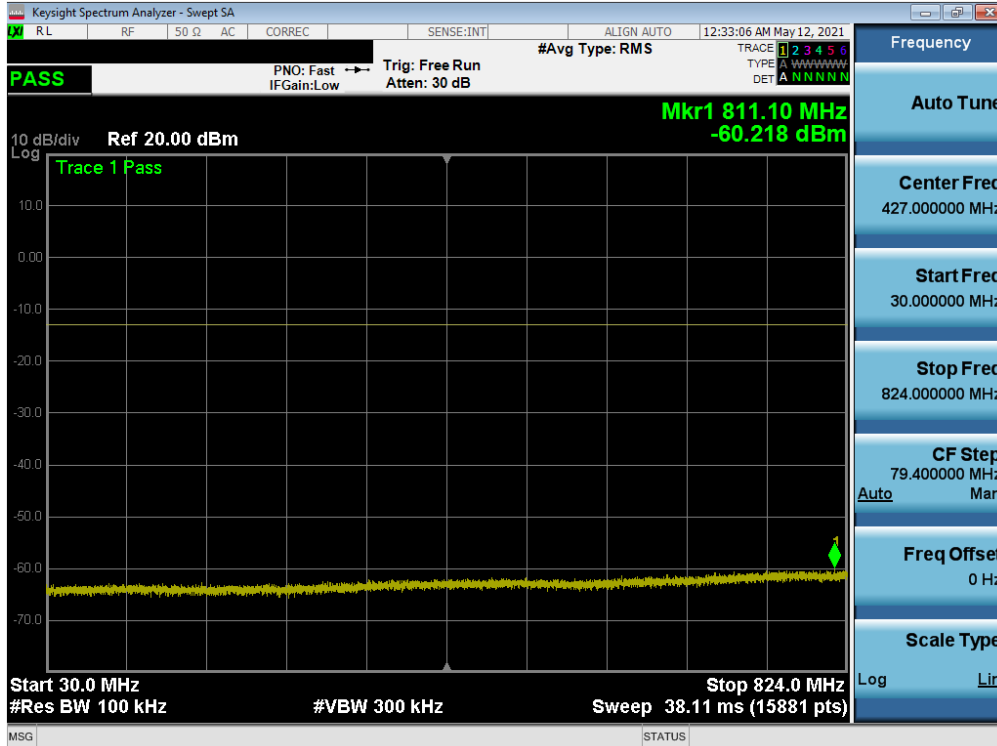


Plot 7-30. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Mid Channel)

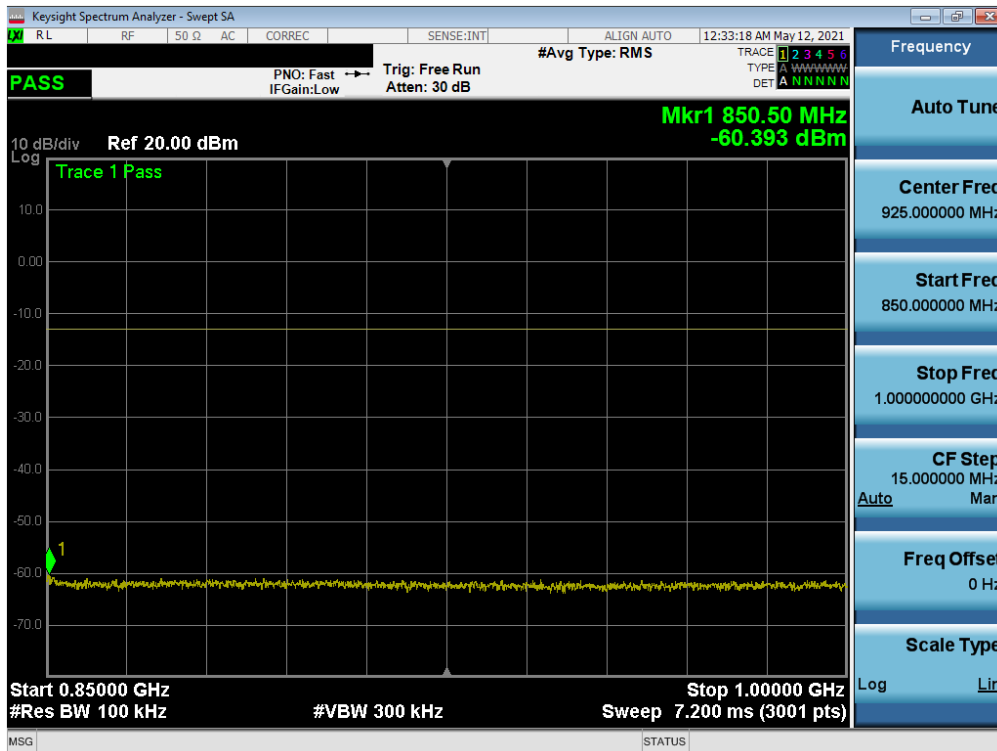


Plot 7-31. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - Mid Channel)

FCC ID: A3LSMF711B	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset	Page 30 of 78

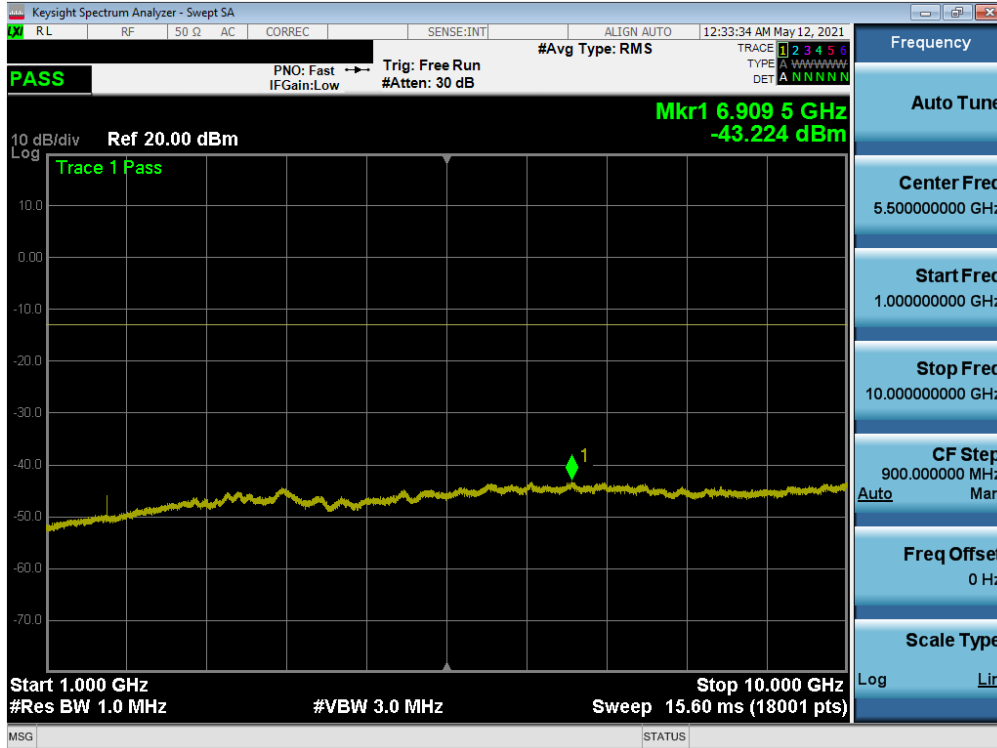


Plot 7-32. Conducted Spurious Plot (LTE Band 26/5 - 10MHz QPSK - 1 RB - High Channel)



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

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of elements	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 31 of 78



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

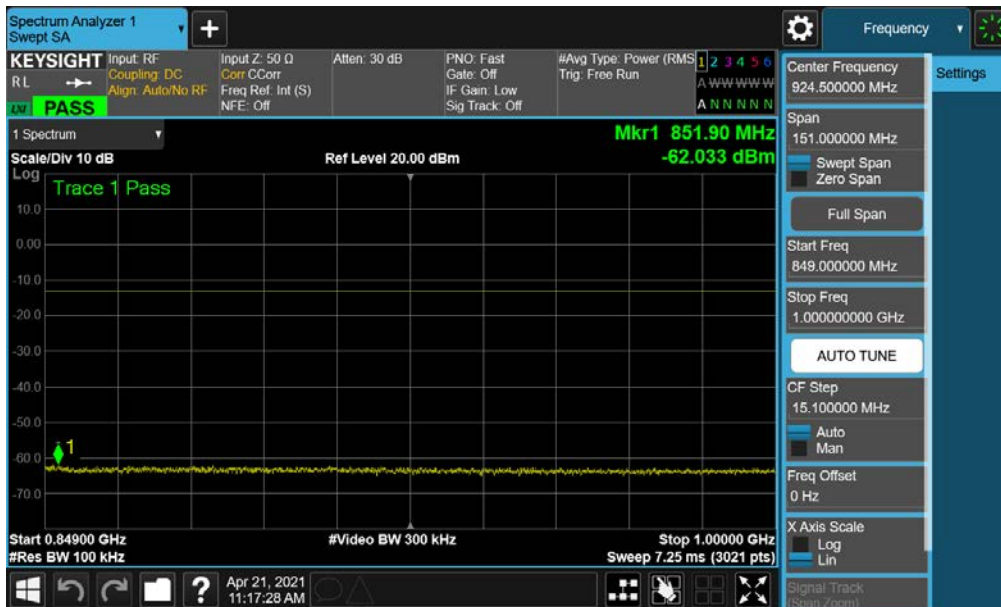
FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of element	<b>PART 22 MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 32 of 78



**NR Band n5**

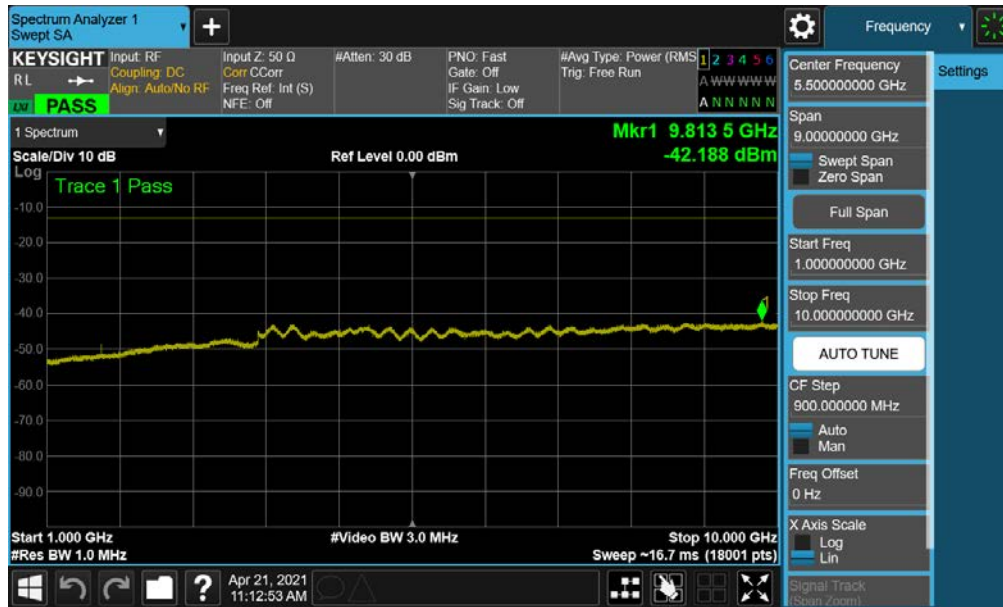


**Plot 7-35. Conducted Spurious Plot (NR Band n5 - 20.0MHz - 1 RB)**



**Plot 7-36. Conducted Spurious Plot (NR Band n5 - 20.0MHz - 1 RB)**

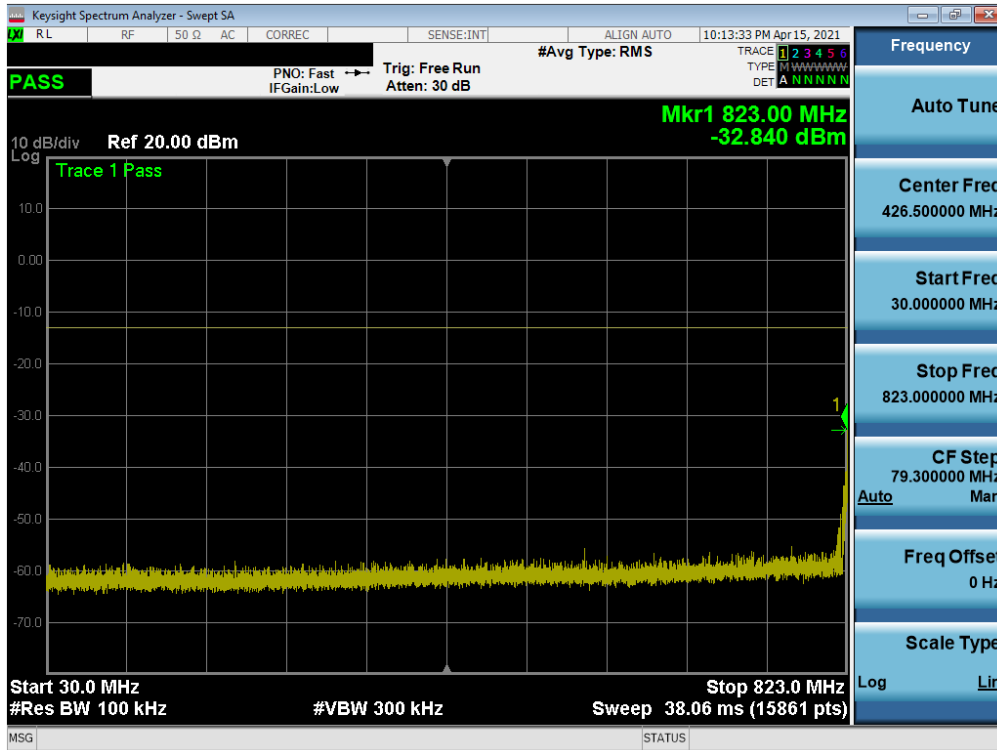
<p>FCC ID: A3LSMF711B</p>	<p><b>PCTEST</b> Proud to be part of element</p>	<p><b>PART 22 MEASUREMENT REPORT</b></p>	<p><b>Approved by:</b> Technical Manager</p>
<p>Test Report S/N: 1M2104130035-02.A3L</p>	<p>Test Dates: 04/12/2021 - 06/01/2021</p>	<p>EUT Type: Portable Handset</p>	<p>Page 33 of 78</p>



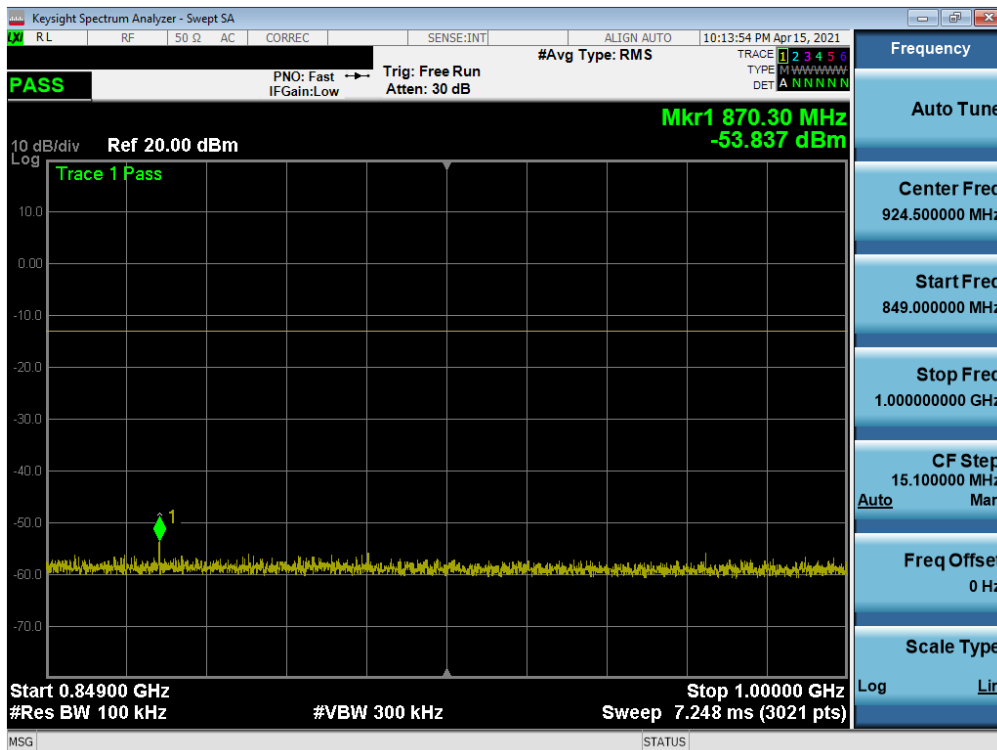
**Plot 7-37. Conducted Spurious Plot (NR Band n5 - 20.0MHz - 1 RB)**

<p>FCC ID: A3LSMF711B</p>		<p align="center"><b>PART 22 MEASUREMENT REPORT</b></p>	<p><b>Approved by:</b> Technical Manager</p>
<p><b>Test Report S/N:</b> 1M2104130035-02.A3L</p>	<p><b>Test Dates:</b> 04/12/2021 - 06/01/2021</p>	<p><b>EUT Type:</b> Portable Handset</p>	<p>Page 34 of 78</p>

# GSM/GPRS Cell

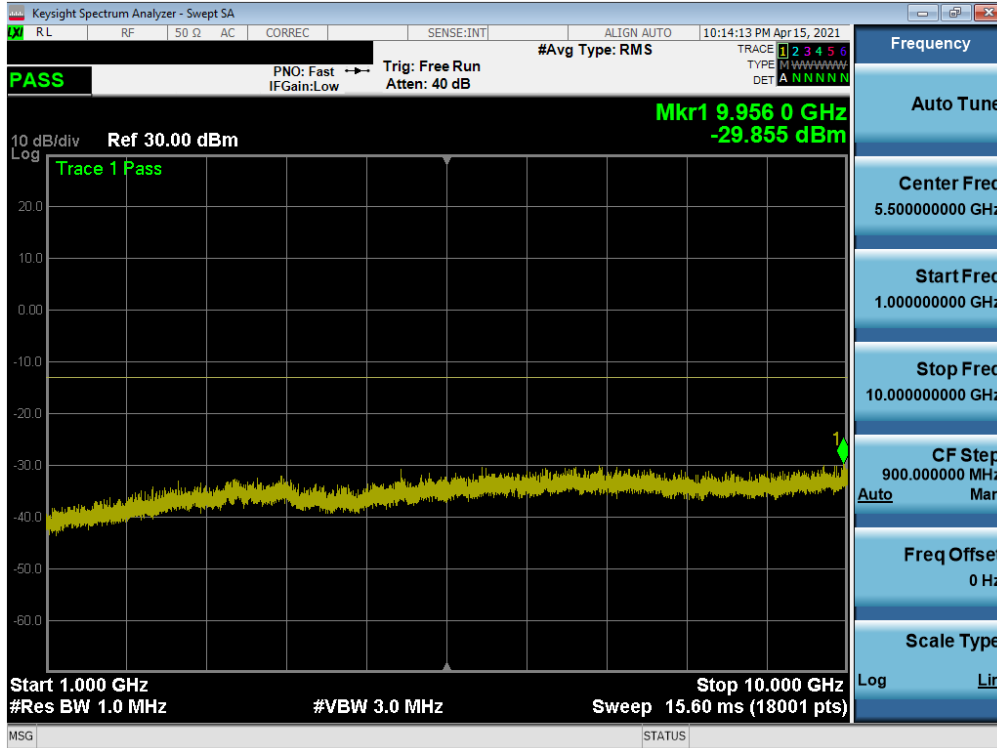


Plot 7-38. Conducted Spurious Plot (GPRS Ch. 128)

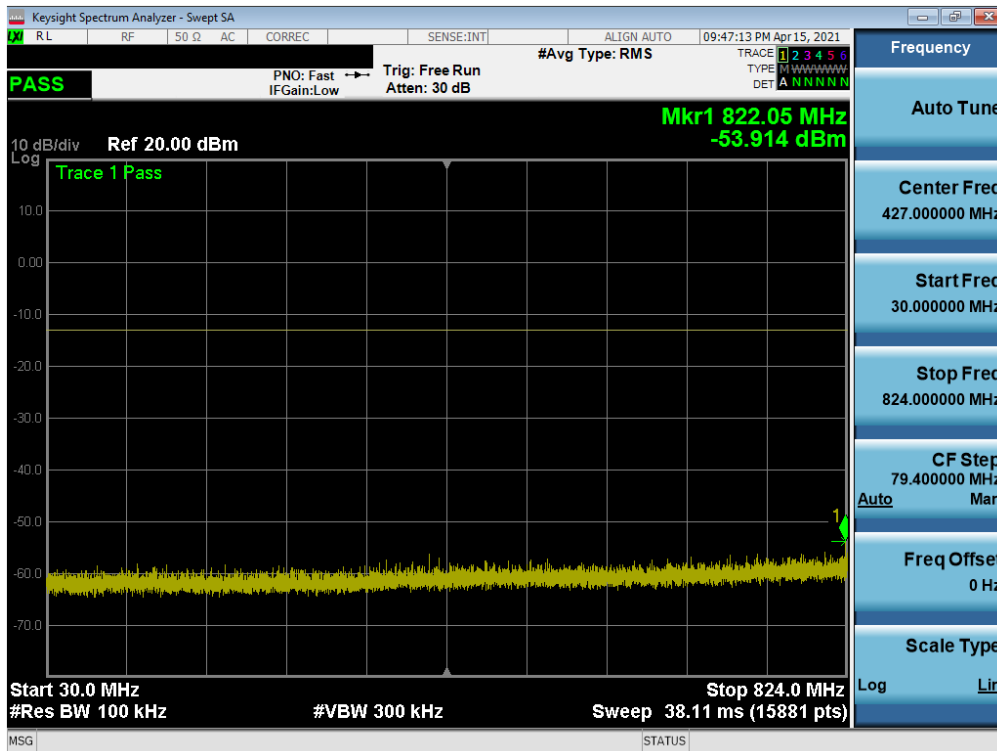


Plot 7-39. Conducted Spurious Plot (GPRS Ch. 128)

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of element	PART 22 MEASUREMENT REPORT	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 35 of 78

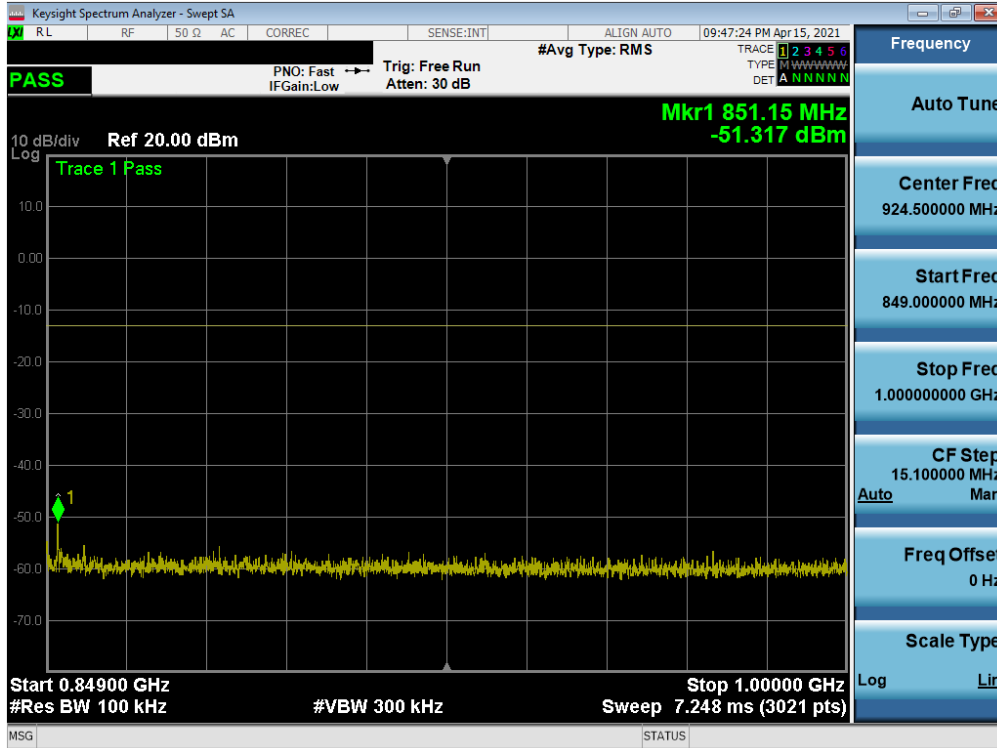


Plot 7-40. Conducted Spurious Plot (GPRS Ch. 128)

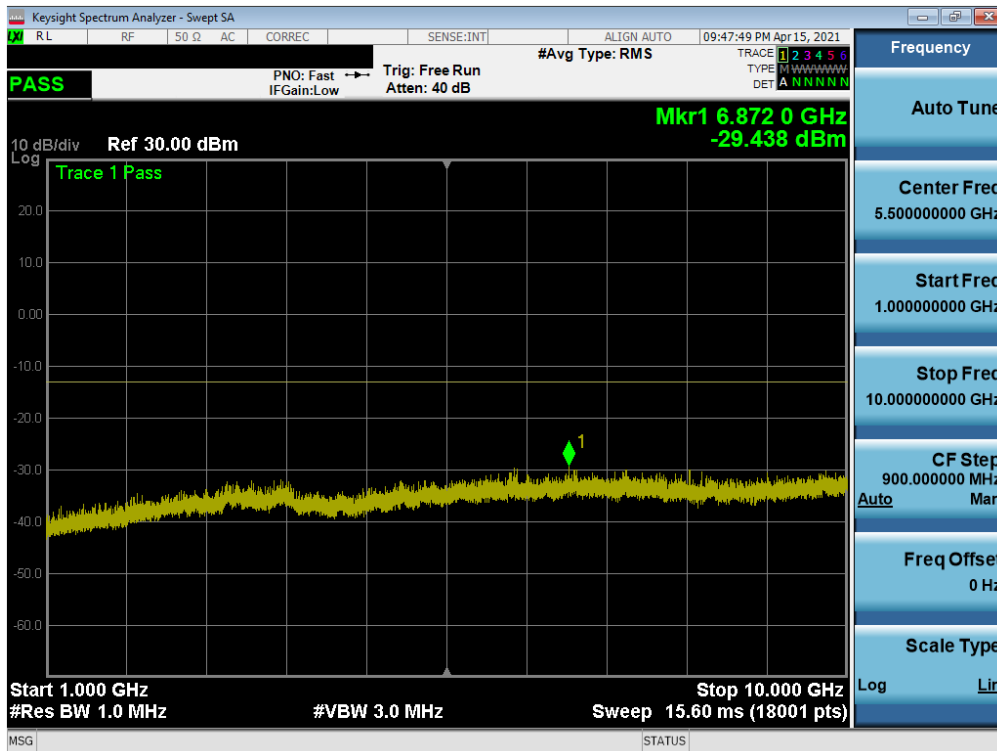


Plot 7-41. Conducted Spurious Plot (GPRS Ch. 190)

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of elements	<b>PART 22 MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 36 of 78

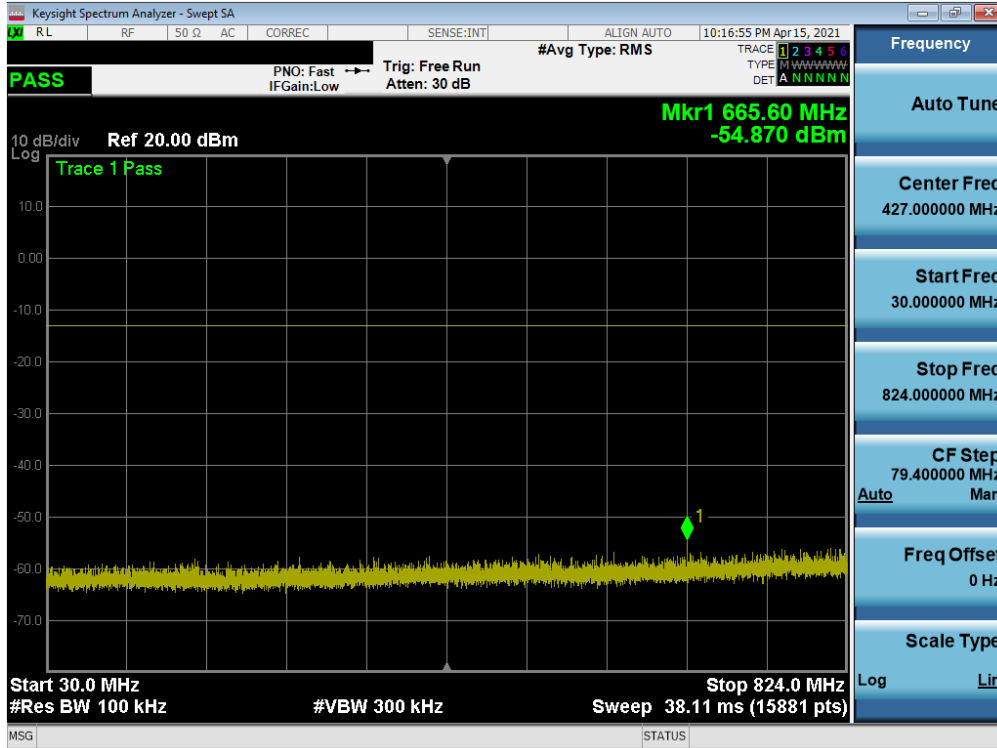


Plot 7-42. Conducted Spurious Plot (GPRS Ch. 190)

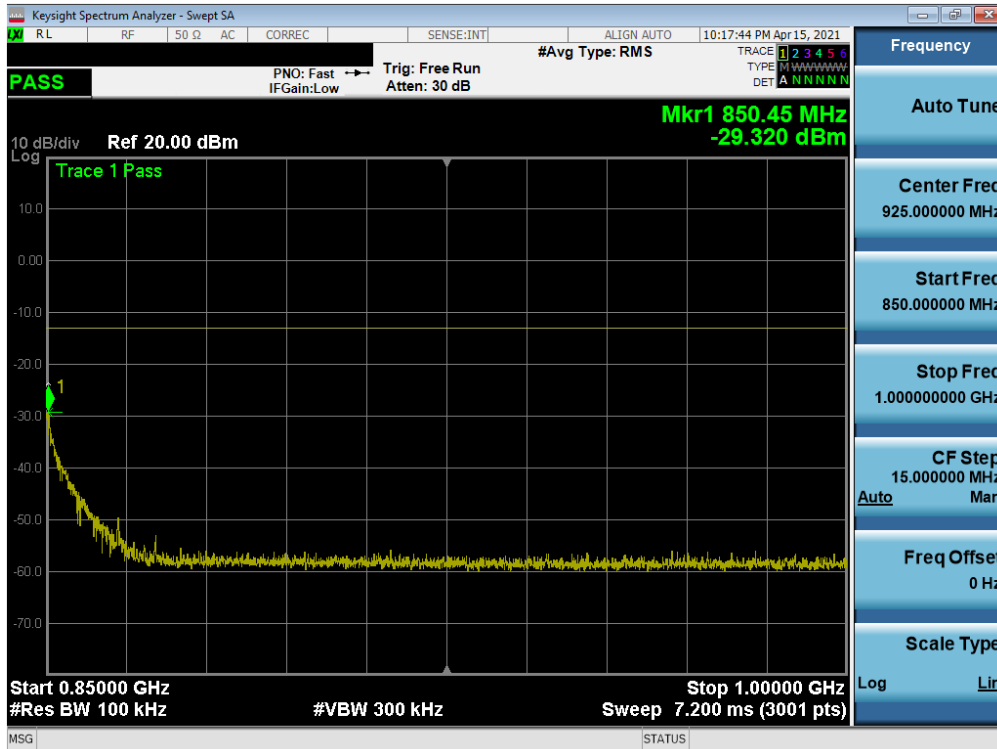


Plot 7-43. Conducted Spurious Plot (GPRS Ch. 190)

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of element	PART 22 MEASUREMENT REPORT	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 37 of 78

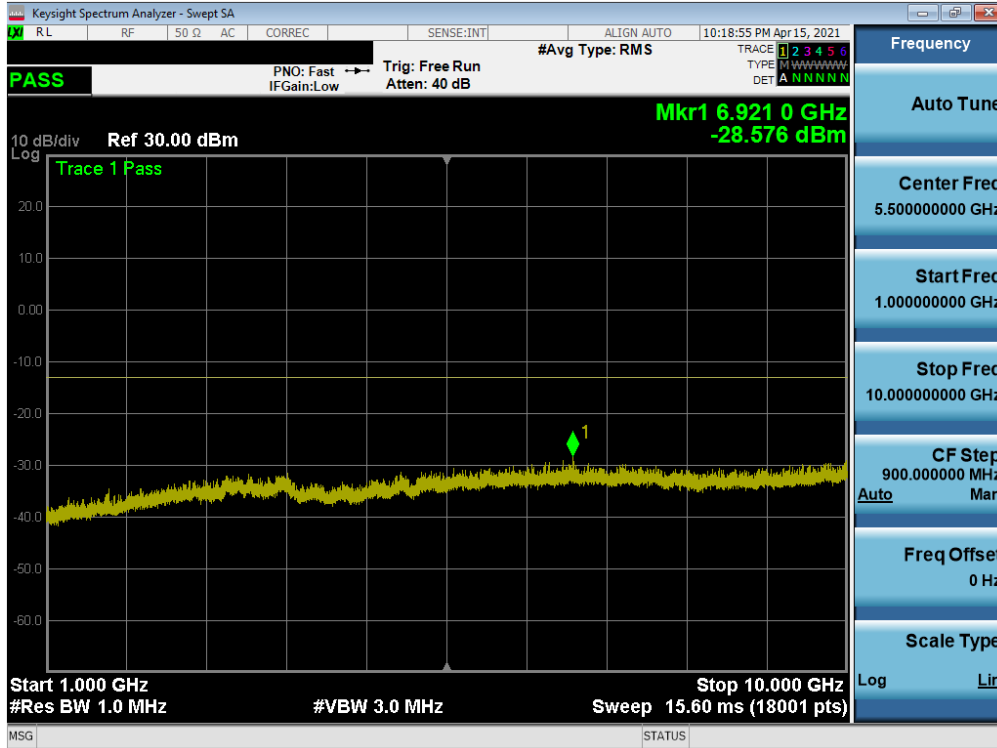


Plot 7-44. Conducted Spurious Plot (GPRS Ch. 251)



Plot 7-45. Conducted Spurious Plot (GPRS Ch. 251)

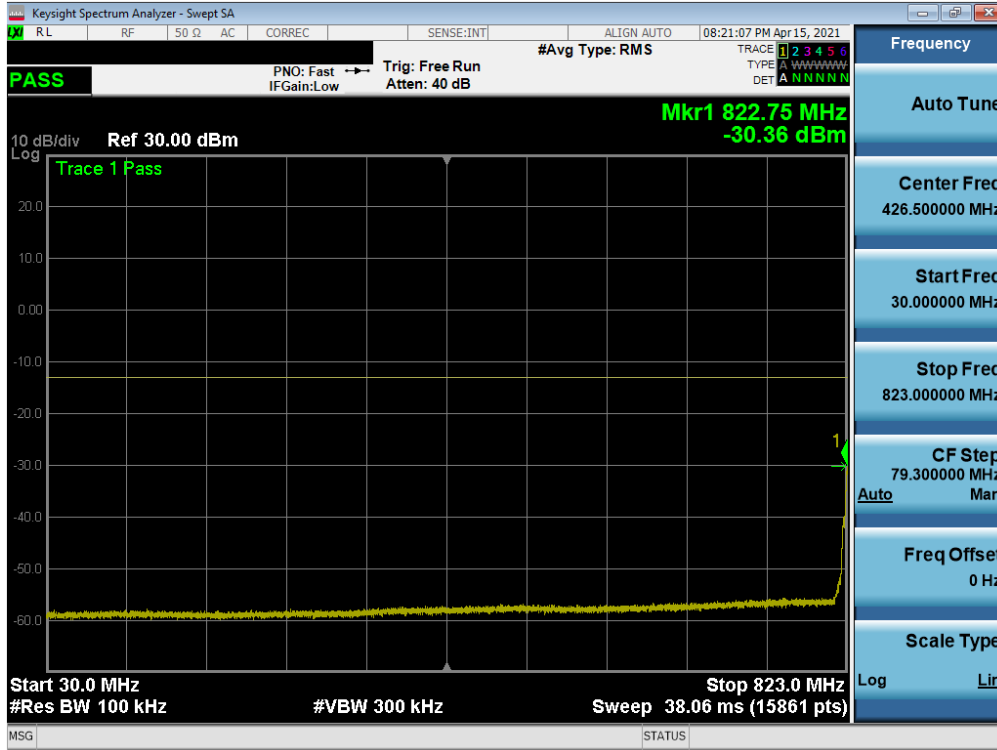
FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of elements	<b>PART 22 MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 38 of 78



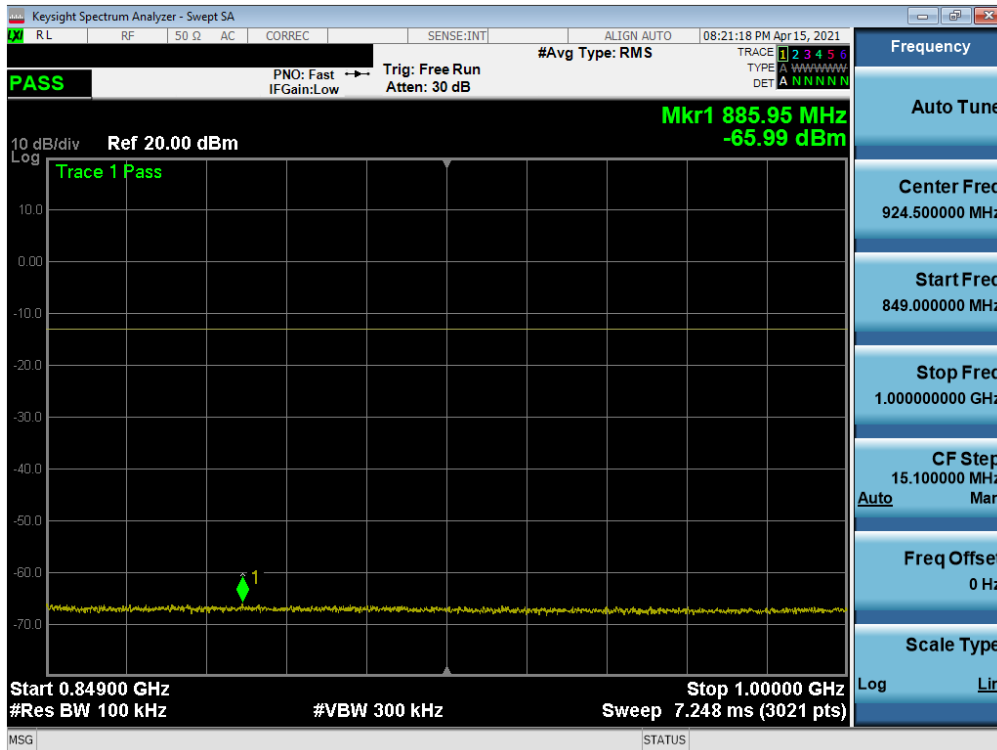
Plot 7-46. Conducted Spurious Plot (GPRS Ch. 251)

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of elements	<b>PART 22 MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 39 of 78

# WCDMA Cell



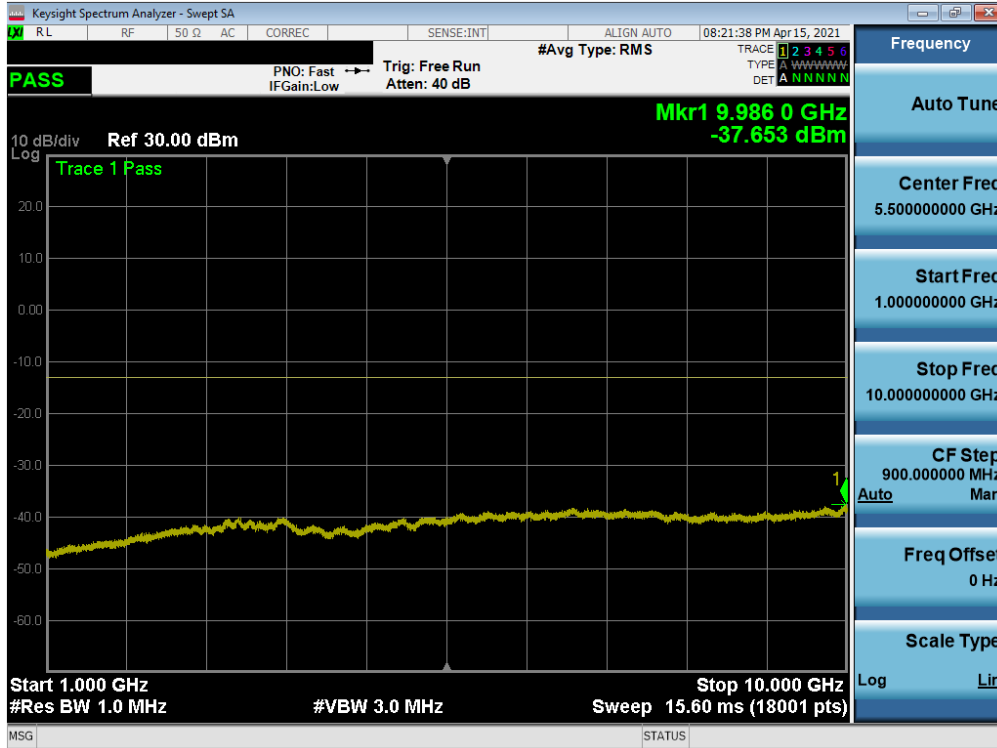
Plot 7-47. Conducted Spurious Plot (WCDMA Ch. 4132)



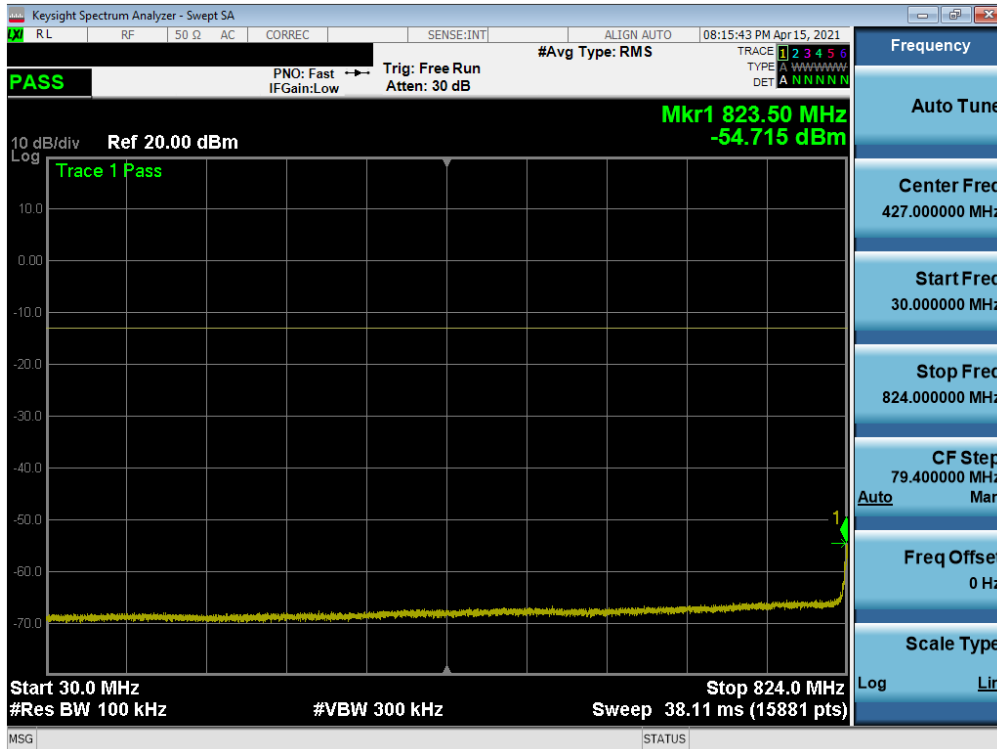
Plot 7-48. Conducted Spurious Plot (WCDMA Ch. 4132)

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of element	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 40 of 78



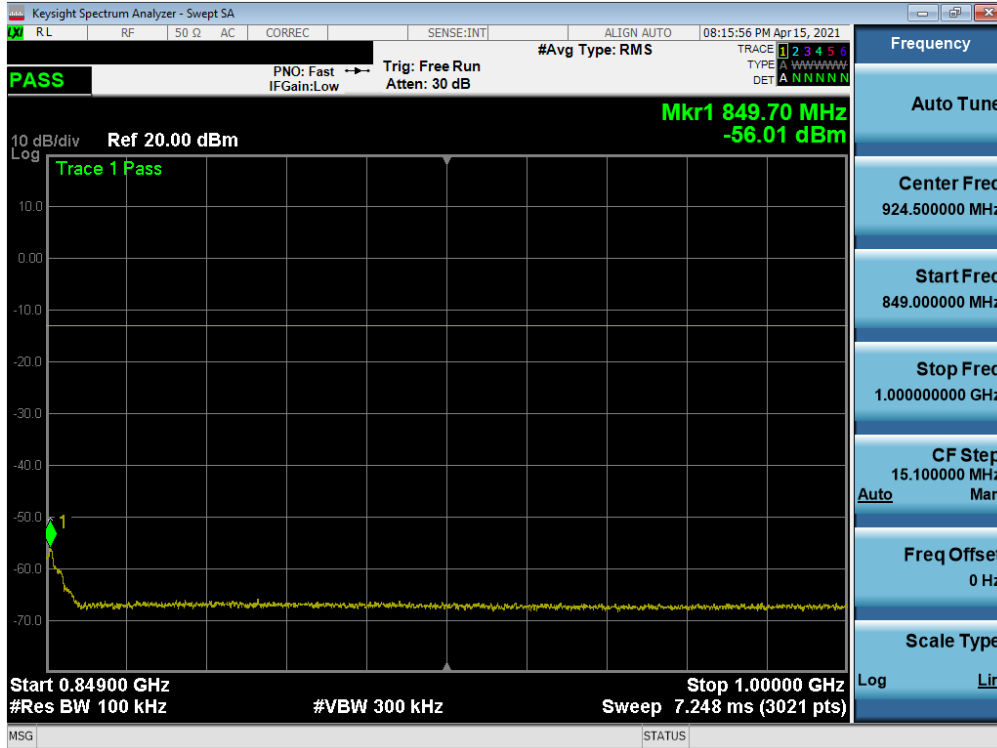


Plot 7-49. Conducted Spurious Plot (WCDMA Ch. 4132)

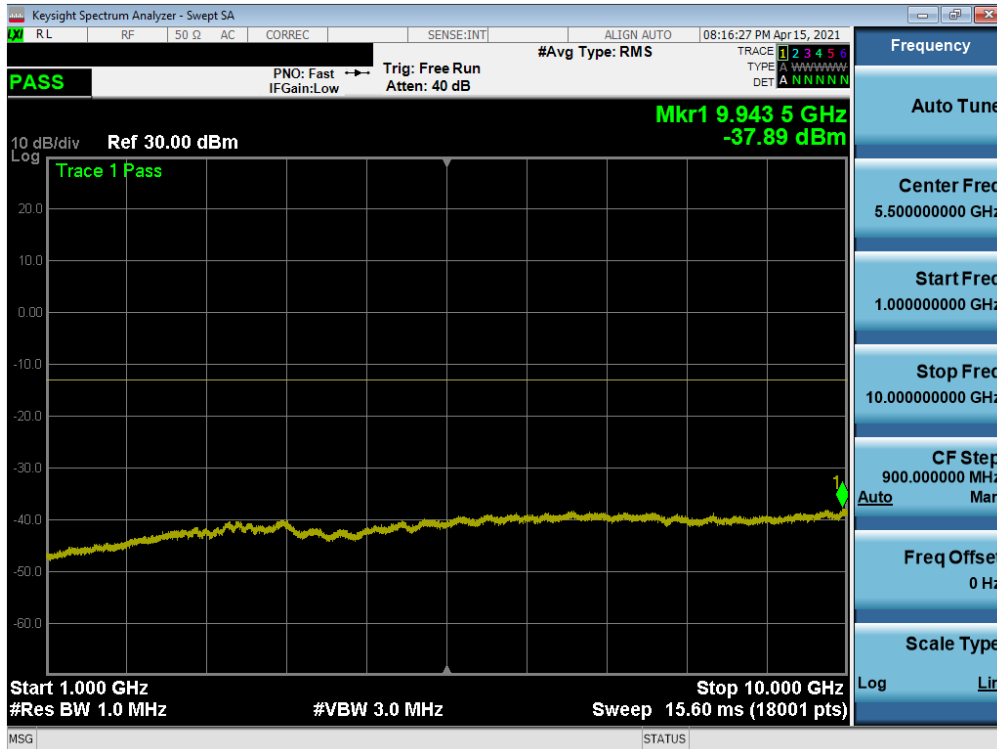


Plot 7-50. Conducted Spurious Plot (WCDMA Ch. 4183)

FCC ID: A3LSMF711B	PCTEST Proud to be part of elements	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 41 of 78

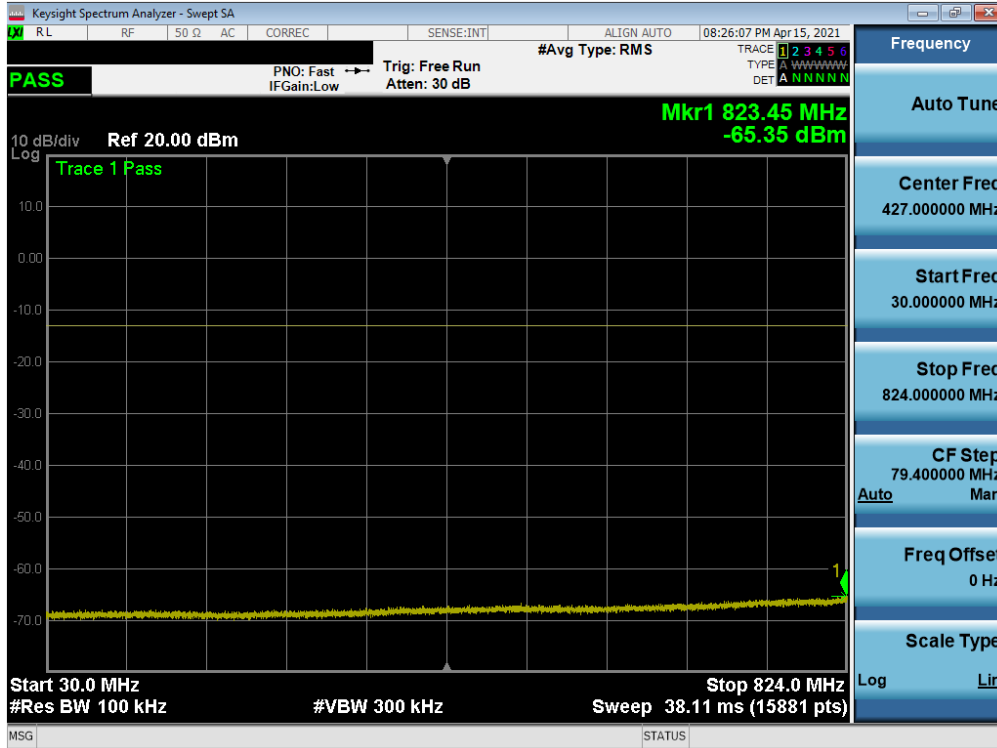


Plot 7-51. Conducted Spurious Plot (WCDMA Ch. 4183)

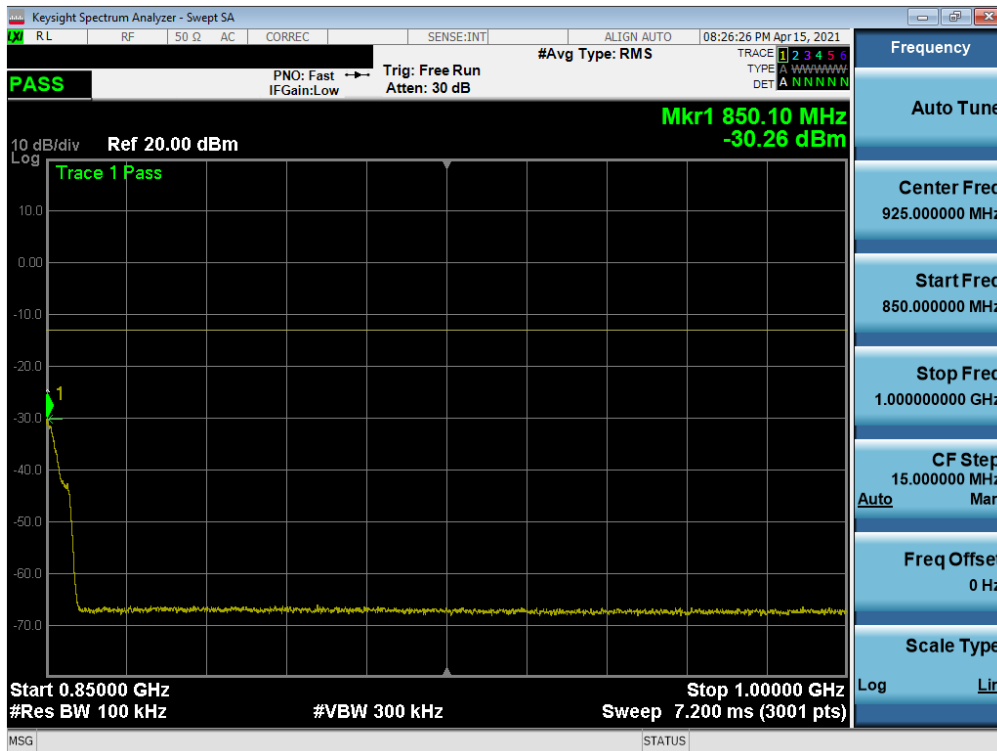


Plot 7-52. Conducted Spurious Plot (WCDMA Ch. 4183)

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of elements	PART 22 MEASUREMENT REPORT	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 42 of 78

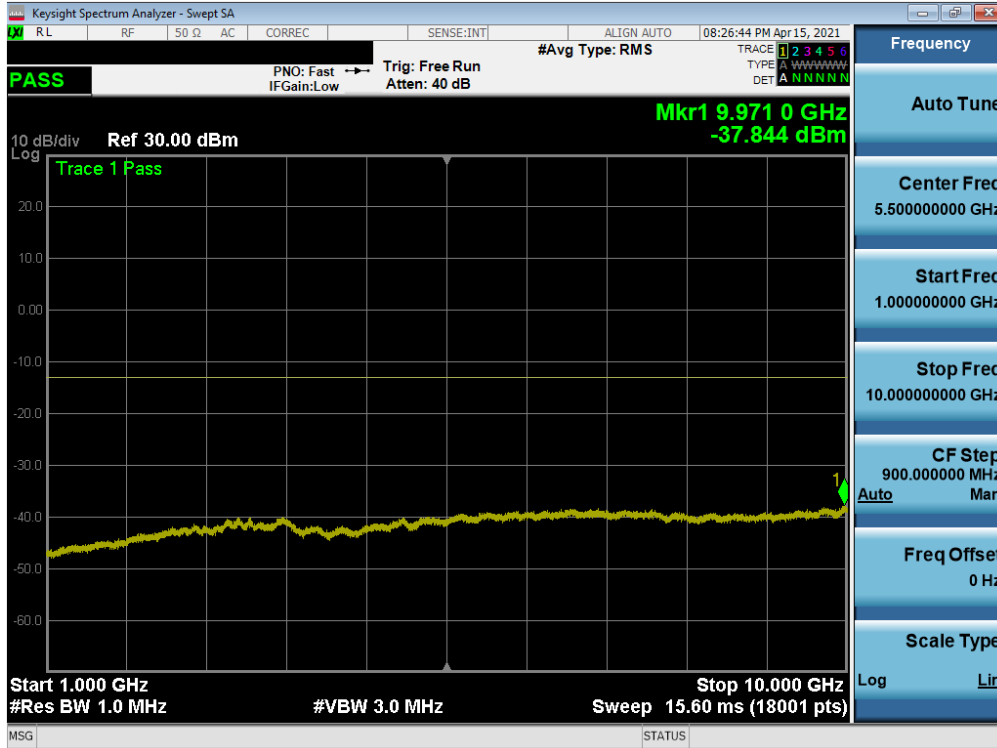


Plot 7-53. Conducted Spurious Plot (WCDMA Ch. 4233)



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

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of element	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 43 of 78



Plot 7-55. Conducted Spurious Plot (WCDMA Ch. 4233)

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of elements	<b>PART 22 MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 44 of 78

## 7.4 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

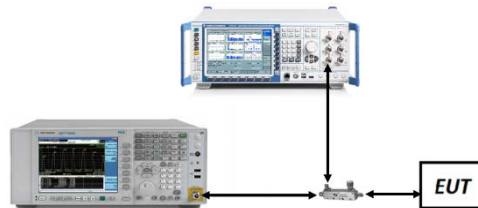
KDB 971168 D01 v03r01 – Section 6.0

### Test Settings



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

### Test Setup

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





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

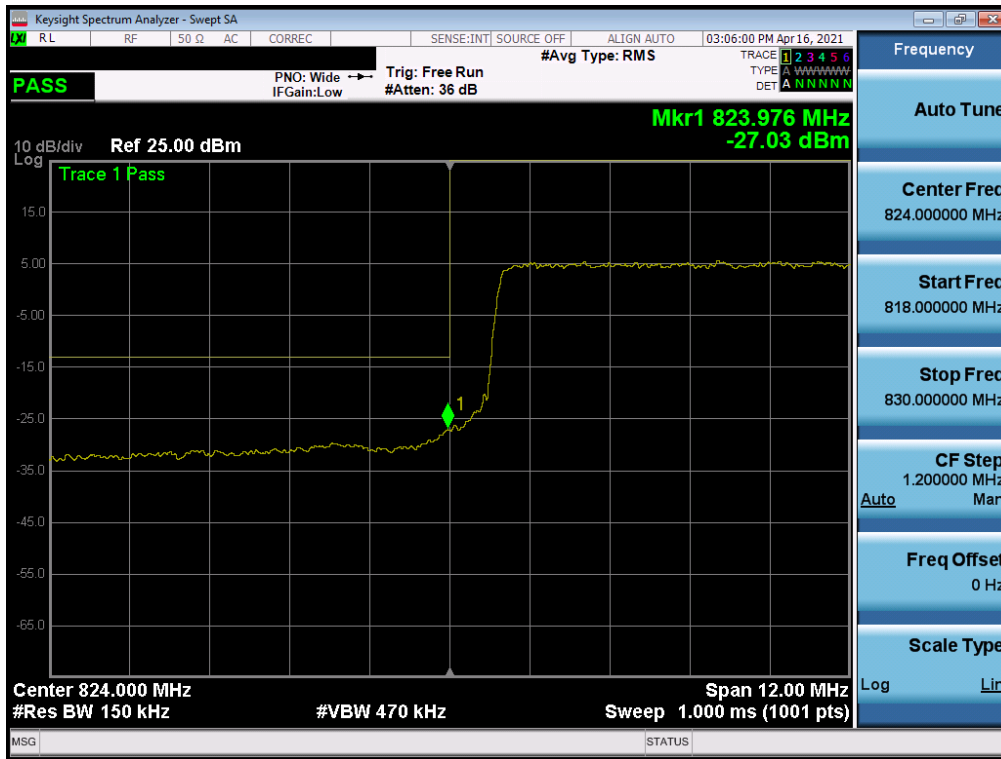
FCC ID: A3LSMF711B	 <b>PART 22 MEASUREMENT REPORT</b> 	Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset

## 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.

FCC ID: A3LSMF711B	 <b>PART 22 MEASUREMENT REPORT</b> 		<b>Approved by:</b> Technical Manager
<b>Test Report S/N:</b> 1M2104130035-02.A3L	<b>Test Dates:</b> 04/12/2021 - 06/01/2021	<b>EUT Type:</b> Portable Handset	Page 46 of 78

**LTE Band 26/5**

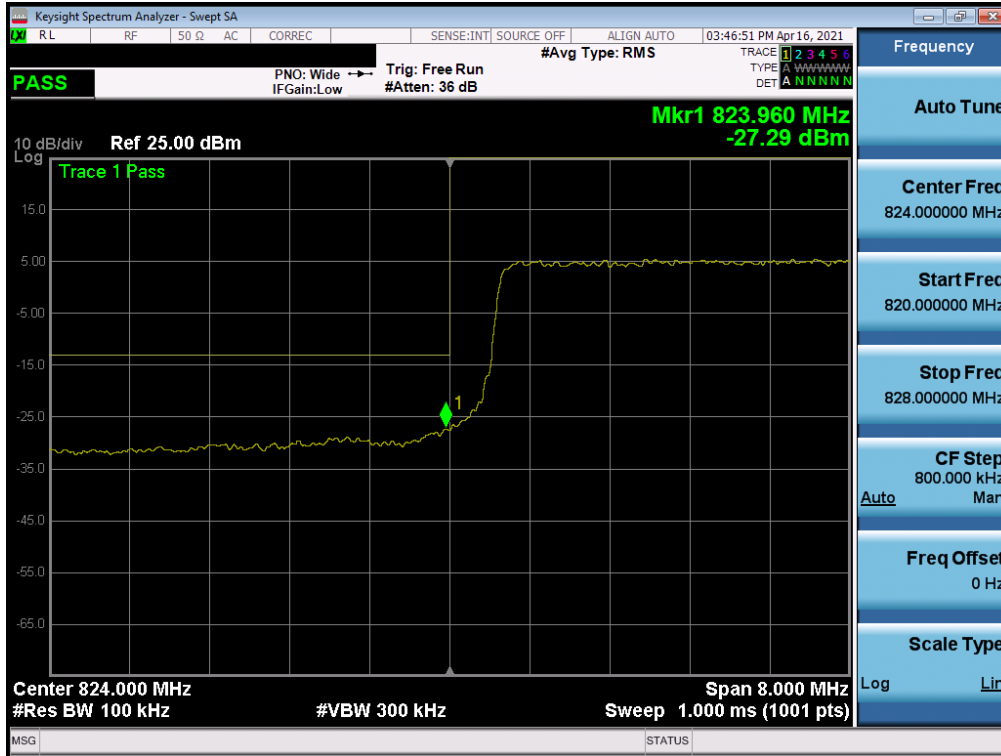


**Plot 7-56. Lower Band Edge Plot (LTE Band 26 - 15MHz QPSK – Full RB)**



**Plot 7-57. Upper Band Edge Plot (LTE Band 26 - 15MHz QPSK – Full RB)**

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of element	<b>PART 22 MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 47 of 78



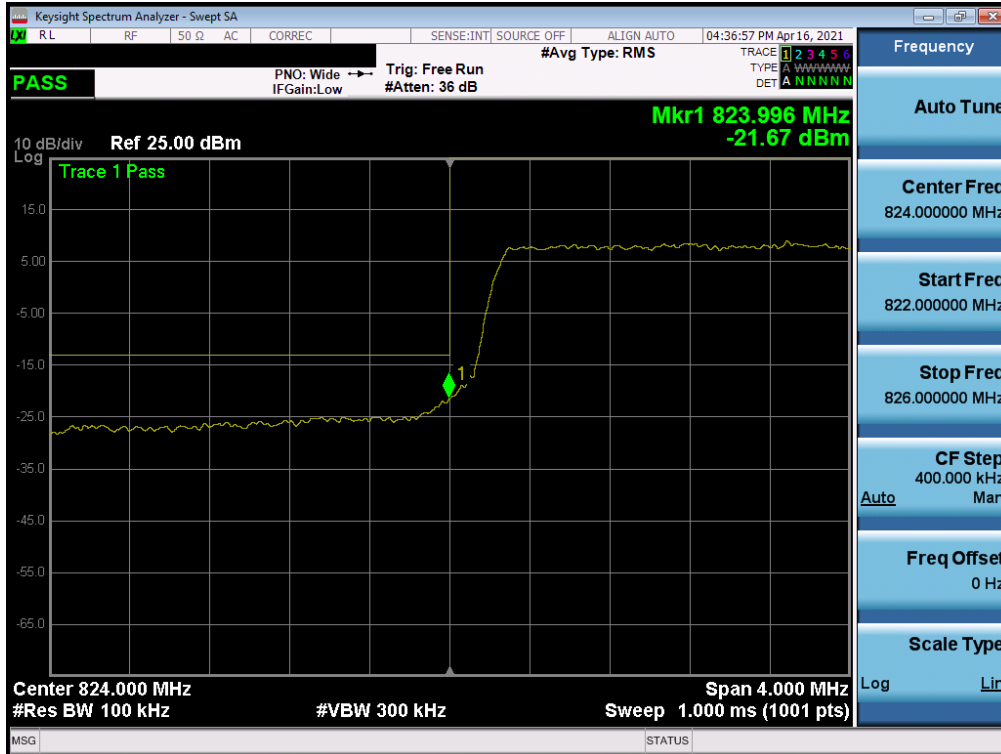
Plot 7-58. Lower Band Edge Plot (LTE Band 26/5 - 10MHz QPSK – Full RB)



Plot 7-59. Upper Band Edge Plot (LTE Band 26/5 - 10MHz QPSK – Full RB)

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of elements	PART 22 MEASUREMENT REPORT	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 48 of 78



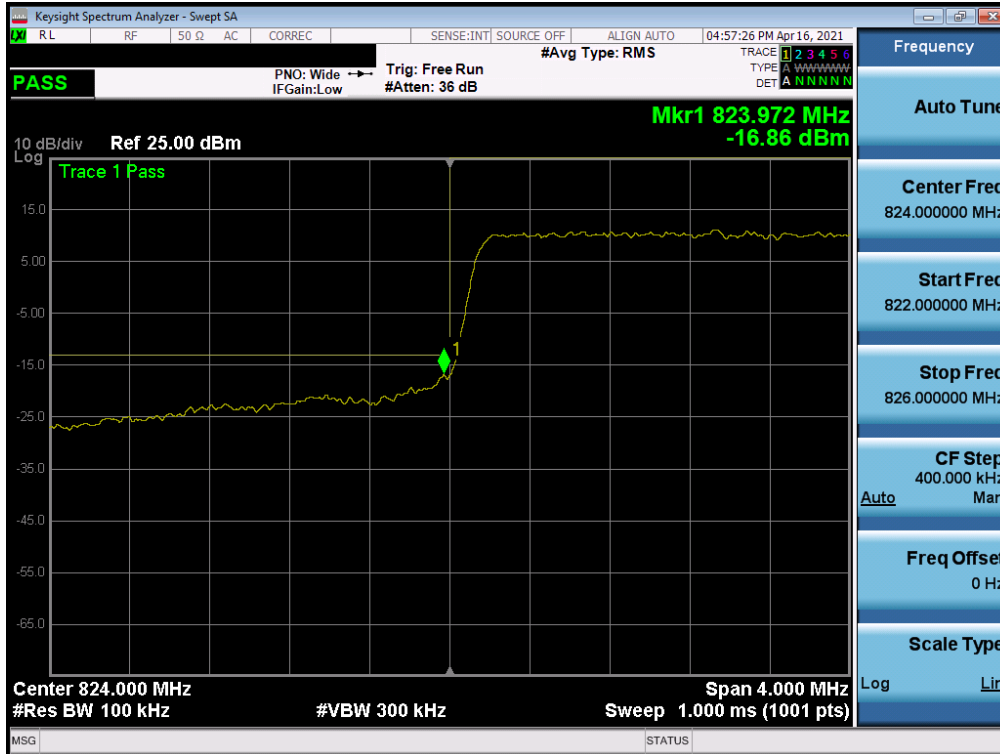


Plot 7-60. Lower Band Edge Plot (LTE Band 26/5 - 5MHz QPSK – Full RB)



Plot 7-61. Upper Band Edge Plot (LTE Band 26/5 - 5MHz QPSK – Full RB)

FCC ID: A3LSMF711B	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset	Page 49 of 78



Plot 7-62. Lower Band Edge Plot (LTE Band 26/5 - 3MHz QPSK – Full RB)



Plot 7-63. Upper Band Edge Plot (LTE Band 26/5 - 3MHz QPSK – Full RB)

FCC ID: A3LSMF711B	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset	Page 50 of 78



Plot 7-64. Lower Band Edge Plot (LTE Band 26/5 – 1.4MHz QPSK – Full RB)



Plot 7-65. Upper Band Edge Plot (LTE Band 26/5 – 1.4MHz QPSK – Full RB)

FCC ID: A3LSMF711B	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset	Page 51 of 78

**NR Band n5**



**Plot 7-66. Lower Band Edge Plot (NR Band n5 – 20.0MHz - Full RB)**



**Plot 7-67. Upper Band Edge Plot (NR Band n5 – 20.0MHz - Full RB)**

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of element	<b>PART 22 MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 52 of 78



Plot 7-68. Lower Band Edge Plot (NR Band n5 – 15.0MHz - Full RB)



Plot 7-69. Upper Band Edge Plot (NR Band n5 – 15.0MHz - Full RB)

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of elements	<b>PART 22 MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 53 of 78



FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of elements	<b>PART 22 MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 54 of 78



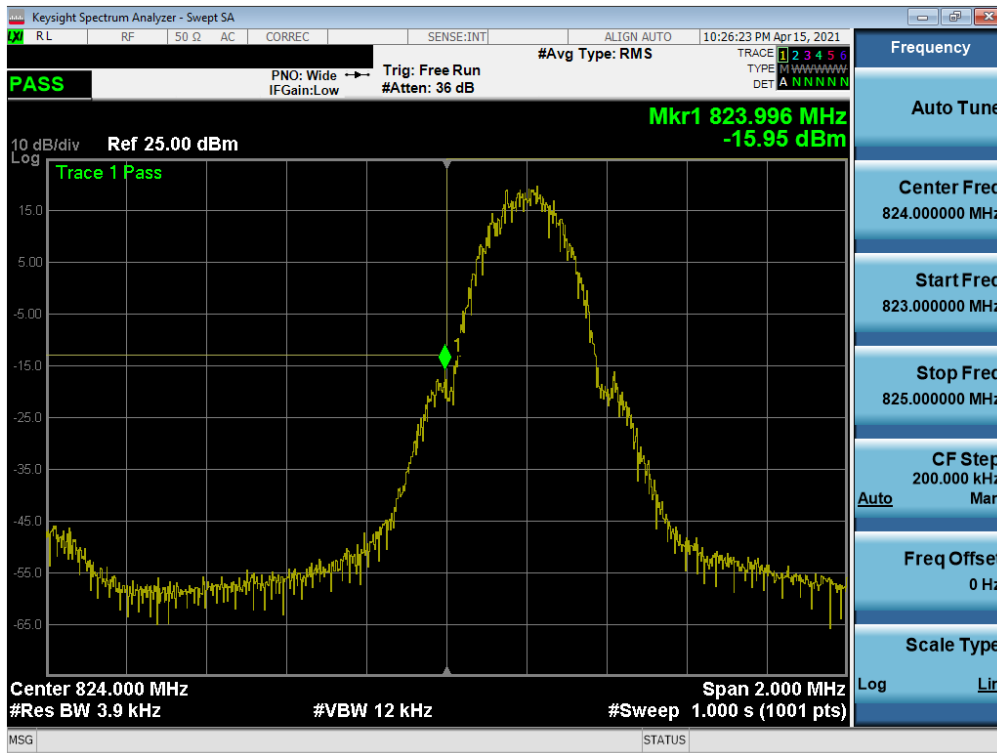
Plot 7-72. Lower Band Edge Plot (NR Band n5 – 5.0MHz - Full RB)



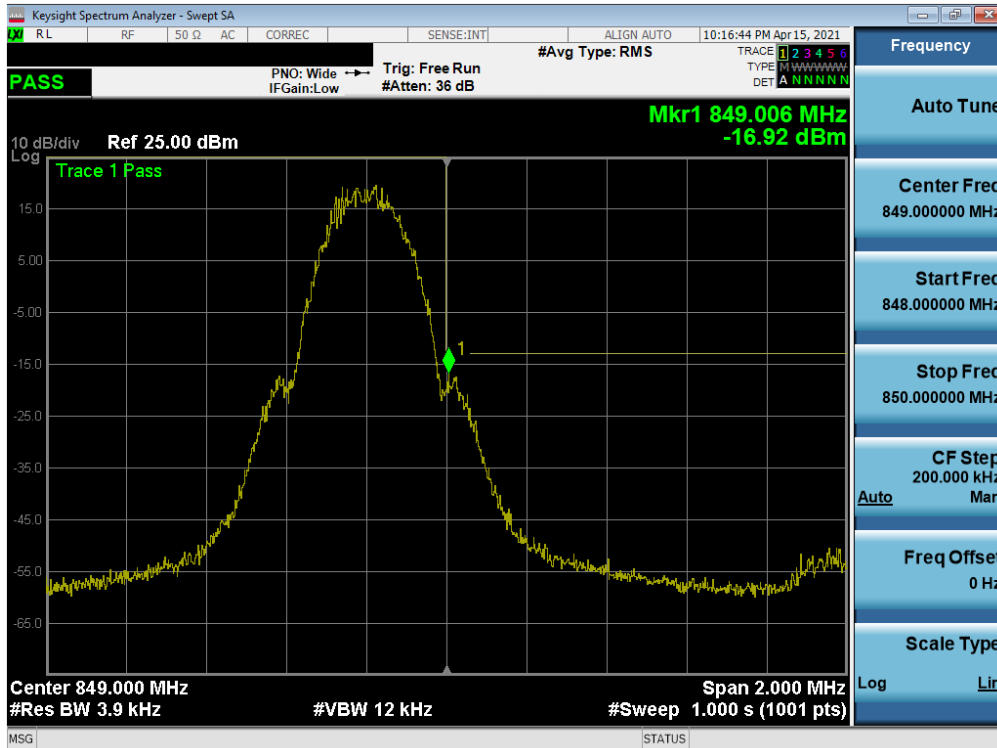
Plot 7-73. Upper Band Edge Plot (NR Band n5 – 5.0MHz - Full RB)

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of elements	<b>PART 22 MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 55 of 78

## GSM/GPRS Cell



Plot 7-74. Lower Band Edge Plot (GPRS Cell – Ch. 128)

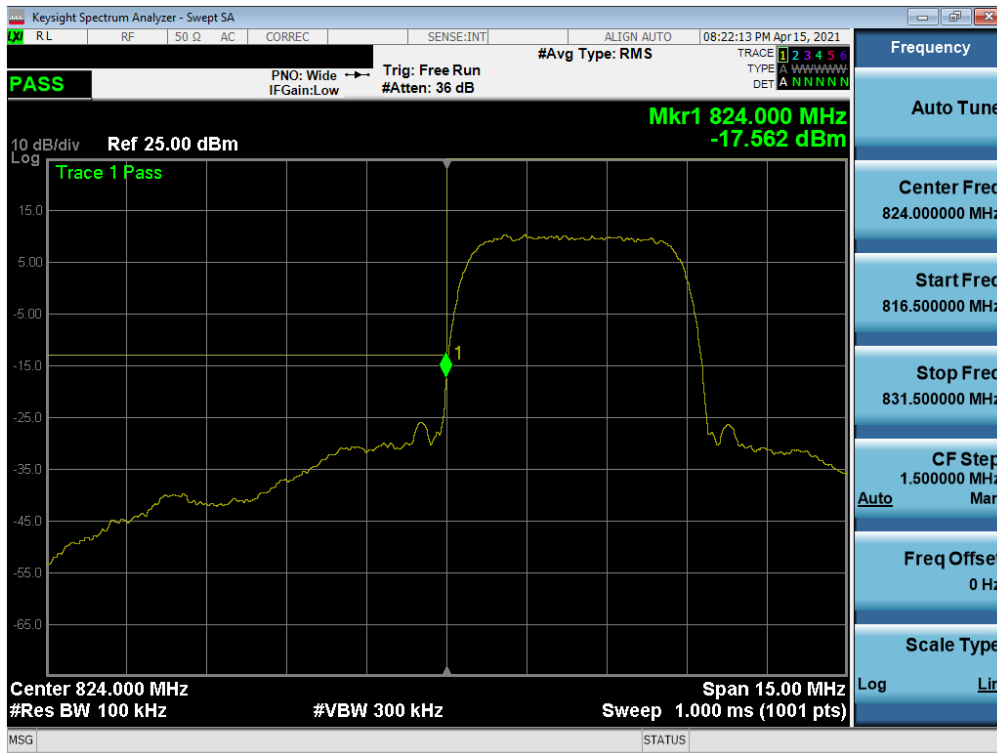


Plot 7-75. Upper Band Edge Plot (GPRS Cell – Ch. 251)

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of element	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 56 of 78



# WCDMA Cell



Plot 7-76. Lower Band Edge Plot (WCDMA Cell – Ch. 4132)



Plot 7-77. Upper Band Edge Plot (WCDMA Cell – Ch. 4233)

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of element	PART 22 MEASUREMENT REPORT	<b>SAMSUNG</b>	Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 57 of 78

## 7.5 Radiated Power (ERP)

### Test Overview

Effective Radiated Power (ERP) measurements are performed using the substitution method described in ANSI/TIA-603-E-2016 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using vertically and horizontally polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as RMS average measurements while the EUT is operating at maximum power, and at the appropriate frequencies.



### Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.2.1

ANSI/TIA-603-E-2016 – Section 2.2.17

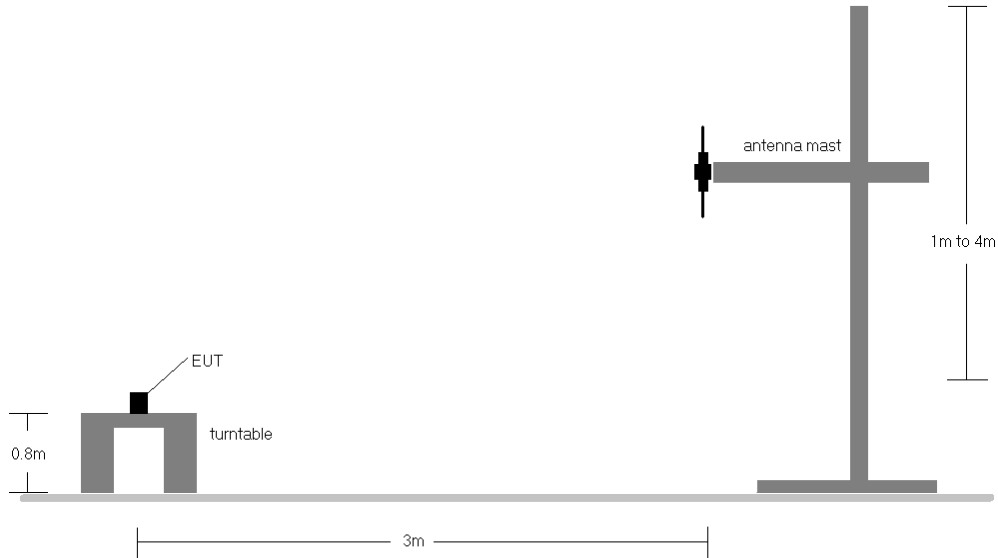
### Test Settings

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

FCC ID: A3LSMF711B	 <b>PCTEST</b> Proud to be part of element	<b>PART 22 MEASUREMENT REPORT</b>		<b>Approved by:</b> Technical Manager
<b>Test Report S/N:</b> 1M2104130035-02.A3L	<b>Test Dates:</b> 04/12/2021 - 06/01/2021	<b>EUT Type:</b> Portable Handset		Page 58 of 78

**Test Setup**

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



**Figure 7-4. Radiated Test Setup <1GHz**

**Test Notes**

- 1) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest powers is reported in GPRS mode while transmitting with one slot active.
- 2) This device employs UMTS technology with WCDMA (AMR/RMC) and HSDPA capabilities. The EUT was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA Inactive at 12.2 kbps RMC and TPC bits all set to "1".
- 3) 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.
- 4) This unit was tested with its standard battery.
- 5) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.
- 6) 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: A3LSMF711B	<b>PCTEST</b> Proud to be part of element	<b>PART 22 MEASUREMENT REPORT</b>		<b>Approved by:</b> Technical Manager
<b>Test Report S/N:</b> 1M2104130035-02.A3L	<b>Test Dates:</b> 04/12/2021 - 06/01/2021	<b>EUT Type:</b> Portable Handset		Page 59 of 78

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
15MHz (Band 26 only)	QPSK	831.5	H	199.0	288.0	6.73	1 / 0	14.52	19.10	0.081	38.45	-19.35	21.25	0.133	40.61	-19.36
		836.5	H	143.0	287.0	6.68	1 / 74	14.65	19.18	0.083	38.45	-19.27	21.33	0.136	40.61	-19.28
	16-QAM	841.5	H	141.0	287.0	6.63	1 / 37	14.80	<b>19.28</b>	0.085	38.45	-19.17	<b>21.43</b>	0.139	40.61	-19.18
		841.5	H	141.0	287.0	6.63	1 / 37	14.00	18.48	0.070	38.45	-19.97	<b>20.63</b>	0.116	40.61	-19.98
10 MHz	QPSK	829.0	H	199.0	288.0	6.80	1 / 25	14.52	19.17	0.083	38.45	-19.28	21.32	0.136	40.61	-19.28
		836.5	H	143.0	287.0	6.68	1 / 25	15.04	<b>19.57</b>	0.091	38.45	-18.88	<b>21.72</b>	0.149	40.61	-18.89
	16-QAM	844.0	H	141.0	287.0	6.66	1 / 25	14.92	19.43	0.088	38.45	-19.02	21.58	0.144	40.61	-19.03
		844.0	H	141.0	287.0	6.66	1 / 25	13.99	18.49	0.071	38.45	-19.96	20.64	0.116	40.61	-19.96
5 MHz	QPSK	826.5	H	199.0	288.0	6.77	1 / 12	14.55	19.17	0.083	38.45	-19.28	21.32	0.136	40.61	-19.28
		836.5	H	143.0	287.0	6.68	1 / 12	14.84	19.37	0.086	38.45	-19.08	21.52	0.142	40.61	-19.09
	16-QAM	846.5	H	141.0	287.0	6.68	1 / 12	14.85	<b>19.38</b>	0.087	38.45	-19.07	<b>21.53</b>	0.142	40.61	-19.07
		836.5	H	143.0	287.0	6.68	1 / 12	13.67	18.20	0.066	38.45	-20.25	20.35	0.108	40.61	-20.25
3 MHz	QPSK	825.5	H	199.0	288.0	6.76	1 / 7	14.58	19.19	0.083	38.45	-19.26	21.34	0.136	40.61	-19.26
		836.5	H	143.0	287.0	6.68	1 / 7	14.87	<b>19.40</b>	0.087	38.45	-19.05	<b>21.55</b>	0.143	40.61	-19.06
	16-QAM	847.5	H	141.0	287.0	6.69	1 / 7	14.72	19.26	0.084	38.45	-19.19	21.41	0.138	40.61	-19.19
		836.5	H	143.0	287.0	6.68	1 / 7	13.59	18.12	0.065	38.45	-20.33	<b>20.27</b>	0.106	40.61	-20.34
1.4 MHz	QPSK	824.7	H	199.0	288.0	6.76	1 / 3	14.43	19.04	0.080	38.45	-19.41	21.19	0.131	40.61	-19.42
		836.5	H	143.0	287.0	6.68	1 / 3	15.03	<b>19.56</b>	0.090	38.45	-18.89	<b>21.71</b>	0.148	40.61	-18.90
	16-QAM	848.3	H	141.0	287.0	6.70	1 / 3	14.83	19.38	0.087	38.45	-19.07	21.53	0.142	40.61	-19.08
		848.3	H	141.0	287.0	6.70	1 / 3	13.57	18.12	0.065	38.45	-20.33	20.27	0.106	40.61	-20.34
10 MHz	QPSK (Opposite Pol.)	841.5	V	212.0	269.0	6.43	1 / 37	14.90	19.18	0.083	38.45	-19.27	21.33	0.136	40.61	-19.28
	QPSK (Closed)	841.5	H	147.0	361.0	6.63	1 / 74	5.97	10.45	0.011	38.45	-28.00	12.60	0.018	40.61	-28.01
	QPSK (WCP)	841.5	H	136.0	291.0	6.63	1 / 37	12.87	17.35	0.054	38.45	-21.10	19.50	0.089	40.61	-21.11



Table 7-2. ERP Data (LTE Band 26/5)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]	EIRP [dBm]	EIRP [Watts]	EIRP Limit [dBm]	Margin [dB]
20 MHz	π/2 BPSK	834.0	V	136.0	277.0	7.52	1 / 79	12.83	<b>18.20</b>	0.066	38.45	-20.25	<b>20.35</b>	0.108	40.61	-20.26
		836.5	V	144.0	260.0	6.68	1 / 53	12.91	17.44	0.055	38.45	-21.01	19.59	0.091	40.61	-21.02
	16-QAM	839.0	V	137.0	291.0	6.70	1 / 53	13.32	17.87	0.061	38.45	-20.58	20.02	0.101	40.61	-20.58
		839.0	V	137.0	291.0	6.70	1 / 53	12.03	16.58	0.046	38.45	-21.87	18.73	0.075	40.61	-21.87
15 MHz	π/2 BPSK	831.5	V	136.0	277.0	6.73	1 / 58	13.63	<b>18.20</b>	0.066	38.45	-20.25	<b>20.35</b>	0.108	40.61	-20.26
		836.5	V	144.0	260.0	6.68	1 / 58	12.92	17.45	0.056	38.45	-21.00	19.60	0.091	40.61	-21.01
	16-QAM	841.5	V	137.0	291.0	6.63	1 / 58	13.53	18.01	0.063	38.45	-20.44	20.16	0.104	40.61	-20.45
		841.5	V	137.0	291.0	6.63	1 / 58	11.99	16.47	0.044	38.45	-21.98	18.62	0.073	40.61	-21.99
10 MHz	π/2 BPSK	829.0	V	136.0	277.0	6.80	1 / 13	13.54	<b>18.19</b>	0.066	38.45	-20.26	<b>20.34</b>	0.108	40.61	-20.27
		836.5	V	144.0	260.0	6.68	1 / 26	12.93	17.46	0.056	38.45	-20.99	19.61	0.091	40.61	-21.00
	16-QAM	844.0	V	137.0	291.0	6.66	1 / 13	12.98	17.48	0.056	38.45	-20.97	19.63	0.092	40.61	-20.97
		844.0	V	137.0	291.0	6.66	1 / 13	13.40	17.90	0.062	38.45	-20.55	20.05	0.101	40.61	-20.55
5 MHz	π/2 BPSK	829.0	V	136.0	277.0	6.77	1 / 6	13.71	<b>18.34</b>	0.068	38.45	-20.11	<b>20.49</b>	0.112	40.61	-20.12
		836.5	V	144.0	260.0	6.68	1 / 6	13.06	17.59	0.057	38.45	-20.86	19.74	0.094	40.61	-20.87
	16-QAM	844.0	V	137.0	291.0	6.68	1 / 12	12.97	17.50	0.056	38.45	-20.95	19.65	0.092	40.61	-20.96
		844.0	V	137.0	291.0	6.68	1 / 12	13.18	17.71	0.059	38.45	-20.74	19.96	0.097	40.61	-20.75
20 MHz	QPSK (CP-OFDM)	834.0	V	144.0	290.0	7.83	1 / 79	11.83	<b>17.51</b>	0.056	38.45	-20.94	19.66	0.092	40.61	-20.95
		834.0	V	136.0	305.0	7.83	1 / 53	9.91	15.59	0.036	38.45	-22.86	17.74	0.059	40.61	-22.87
	QPSK (WCP)	834.0	H	223.0	289.0	7.83	1 / 26	13.43	19.11	0.081	38.45	-19.34	21.26	0.134	40.61	-19.35
		834.0	V	136.0	321.0	7.83	1 / 26	8.64	14.32	0.027	38.45	-24.13	16.47	0.044	40.61	-24.14

Table 7-3. ERP Data (NR Band n5)



Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
824.20	GSM850	V	123	246	20.04	6.35	24.24	0.265	38.45	-14.21
836.60	GSM850	V	134	298	22.07	6.38	<b>26.30</b>	<b>0.427</b>	38.45	-12.15
848.80	GSM850	V	141	218	20.60	6.51	24.96	0.313	38.45	-13.50
836.60	GSM850	H	210	287	20.09	6.38	24.32	0.270	38.45	-14.13
836.60	EDGE850	V	143	212	16.00	6.38	<b>20.23</b>	0.105	38.45	-18.22
836.60	GSM850 (Half)	H	205	53	19.13	6.68	<b>23.66</b>	0.232	38.45	-14.79
836.60	GSM850 (WCP)	V	141	280	19.81	6.38	24.04	0.253	38.45	-14.41

Table 7-4. ERP Data (GPRS Cell)

FCC ID: A3LSMF711B		PART 22 MEASUREMENT REPORT			Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 60 of 78	

Frequency [MHz]	Mode	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Substitute Level [dBm]	Ant. Gain [dBi]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
826.40	WCDMA850	V	137	244	14.64	6.37	18.86	0.077	38.45	-19.59
836.60	WCDMA850	V	137	243	15.10	6.38	<b>19.33</b>	<b>0.086</b>	38.45	-19.12
846.60	WCDMA850	V	131	263	14.54	6.48	18.87	0.077	38.45	-19.58
836.60	WCDMA850	H	226	287	14.04	6.68	18.57	0.072	38.45	-19.88
836.60	WCDMA850 (Half)	H	352	47	12.39	6.68	16.92	0.049	38.45	-21.53
836.60	WCDMA850 (WCP)	V	151	210	13.75	6.38	17.98	0.063	38.45	-20.47

**Table 7-5. ERP Data (WCDMA Cell)**

FCC ID: A3LSMF711B	 PART 22 MEASUREMENT REPORT 	Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset
		Page 61 of 78

## 7.6 Radiated Spurious Emissions Measurements

### Test Overview



Radiated spurious emissions measurements are performed using the field strength conversion method described in KDB 971168 with the EUT transmitting into an integral antenna. Measurements on signals operating below 1GHz are performed using horizontally and vertically polarized tuned dipole antennas. Measurements on signals operating above 1GHz are performed using vertically and horizontally polarized broadband horn antennas. All measurements are performed as peak measurements while the EUT is operating at maximum power, and at the appropriate frequencies.

### Test Procedures Used

KDB 971168 D01 v03r01 – Section 5.8

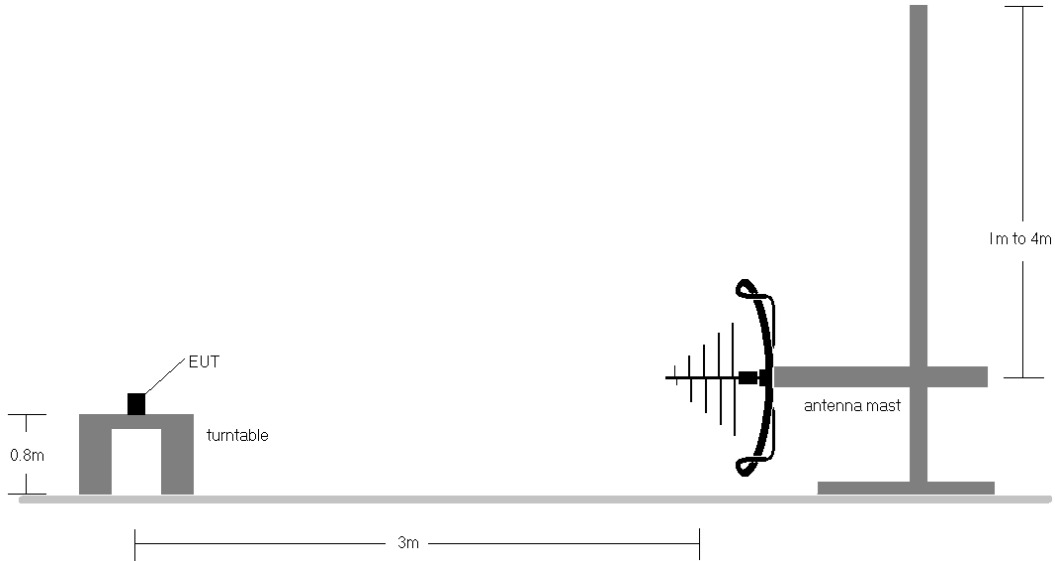
### Test Settings

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

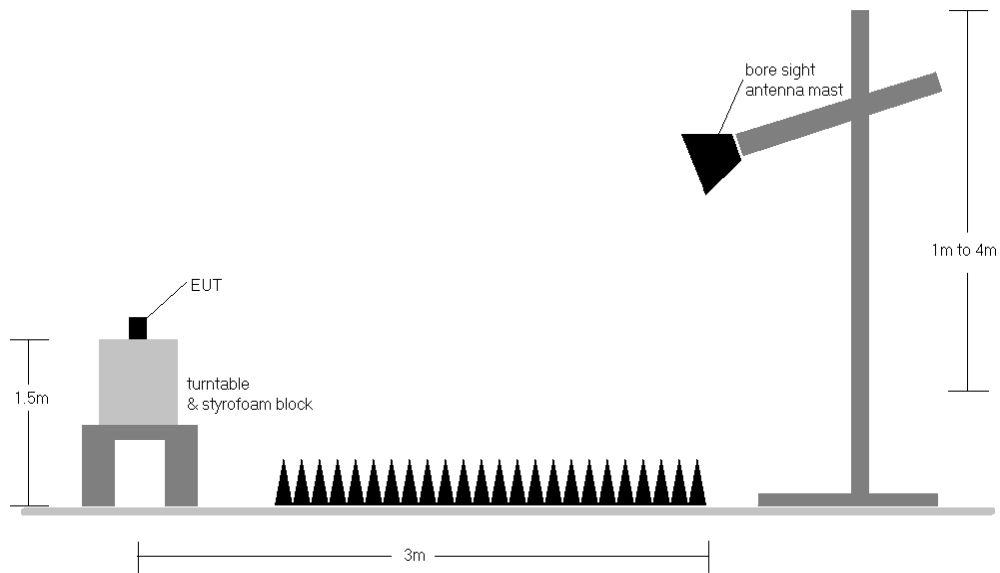
FCC ID: A3LSMF711B	 <b>PCTEST</b> Proud to be part of element	<b>PART 22 MEASUREMENT REPORT</b>		<b>Approved by:</b> Technical Manager
<b>Test Report S/N:</b> 1M2104130035-02.A3L	<b>Test Dates:</b> 04/12/2021 - 06/01/2021	<b>EUT Type:</b> Portable Handset		Page 62 of 78

**Test Setup**

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



**Figure 7-5. Test Instrument & Measurement Setup < 1GHz**





**Figure 7-6. Test Instrument & Measurement Setup >1 GHz**

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of element	<b>PART 22 MEASUREMENT REPORT</b>		<b>Approved by:</b> Technical Manager
<b>Test Report S/N:</b> 1M2104130035-02.A3L	<b>Test Dates:</b> 04/12/2021 - 06/01/2021	<b>EUT Type:</b> Portable Handset		Page 63 of 78

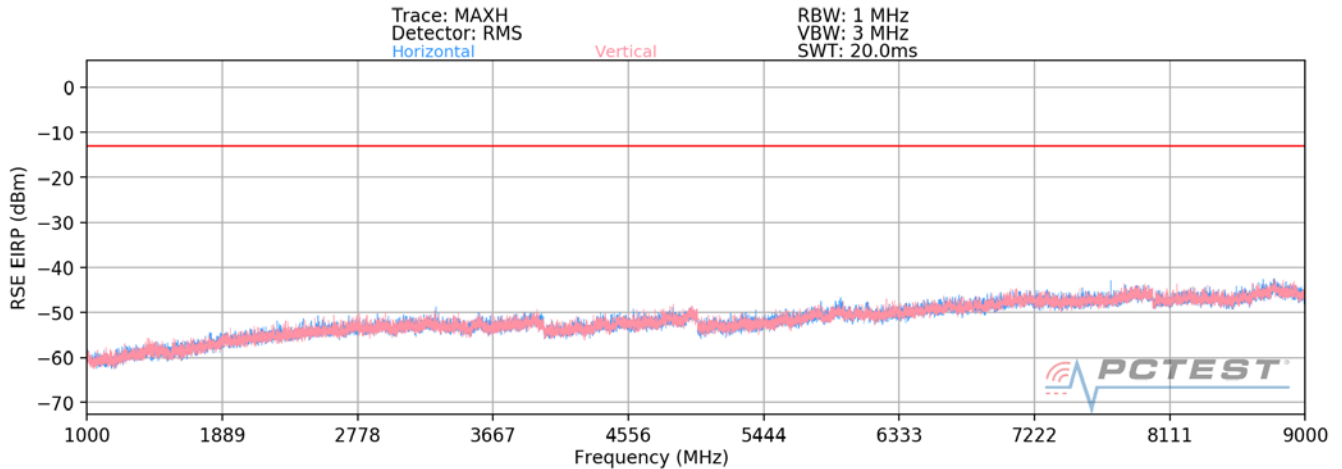
## Test Notes

- 1) Field strengths are calculated using the Measurement quantity conversions in KDB 971168 Section 5.8.4.
  - b)  $E(\text{dB}\mu\text{V}/\text{m}) = \text{Measured amplitude level (dBm)} + 107 + \text{Cable Loss (dB)} + \text{Antenna Factor (dB/m)}$
  - d)  $\text{EIRP (dBm)} = E(\text{dB}\mu\text{V}/\text{m}) + 20\log D - 104.8$ ; where D is the measurement distance in meters.
- 2) This device employs GSM, GPRS, and EDGE capabilities. The EUT was tested under all configurations and the highest powers is reported in GPRS mode while transmitting with one slot active.
- 3) This device employs UMTS technology with WCDMA (AMR/RMC) and HSDPA capabilities. The EUT was tested under all configurations and the highest power is reported in WCDMA mode with HSDPA Inactive at 12.2 kbps RMC and TPC bits all set to "1".
- 4) 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.
- 5) This unit was tested with its standard battery.
- 6) The EUT was tested in three orthogonal planes and in all possible test configurations and positioning. The worst case setup is reported in the tables below.
- 7) The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter. The worst-case emissions are reported.
- 8) 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.
- 9) The "-" shown in the following RSE tables are used to denote a noise floor measurement.
- 10) 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.
- 11) Spurious emissions shown in this section are measured while operating in EN-DC mode with Sub 6GHz NR carrier as well as an LTE carrier (anchor). Spurious emissions from the NR carrier device, is subject to the rules under which the NR carrier operates. Spurious emission caused by the LTE carrier must meet the requirements of the rules under which the LTE carrier operates.

FCC ID: A3LSMF711B	 PART 22 MEASUREMENT REPORT 	Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset
		Page 64 of 78



## LTE Band 26/5



Plot 7-78. Radiated Spurious Plot (LTE Band 26/5)

Bandwidth (MHz):	10
Frequency (MHz):	829.0
RB / Offset:	1 / 25

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1658.0	H	-	-	-78.49	-5.58	22.93	-72.33	-13.00	-59.33
2487.0	H	-	-	-79.28	-2.55	25.17	-70.09	-13.00	-57.09
3316.0	H	-	-	-79.92	0.54	27.62	-67.64	-13.00	-54.64

Table 7-6. Radiated Spurious Data (LTE Band 26/5 – Low Channel)

Bandwidth (MHz):	10
Frequency (MHz):	836.5
RB / Offset:	1 / 25



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.0	H	-	-	-78.59	-5.40	23.01	-72.25	-13.00	-59.25
2509.5	H	-	-	-79.37	-2.54	25.09	-70.17	-13.00	-57.17
3346.0	H	-	-	-79.95	0.30	27.35	-67.90	-13.00	-54.90

Table 7-7. Radiated Spurious Data (LTE Band 26/5 – Mid Channel)

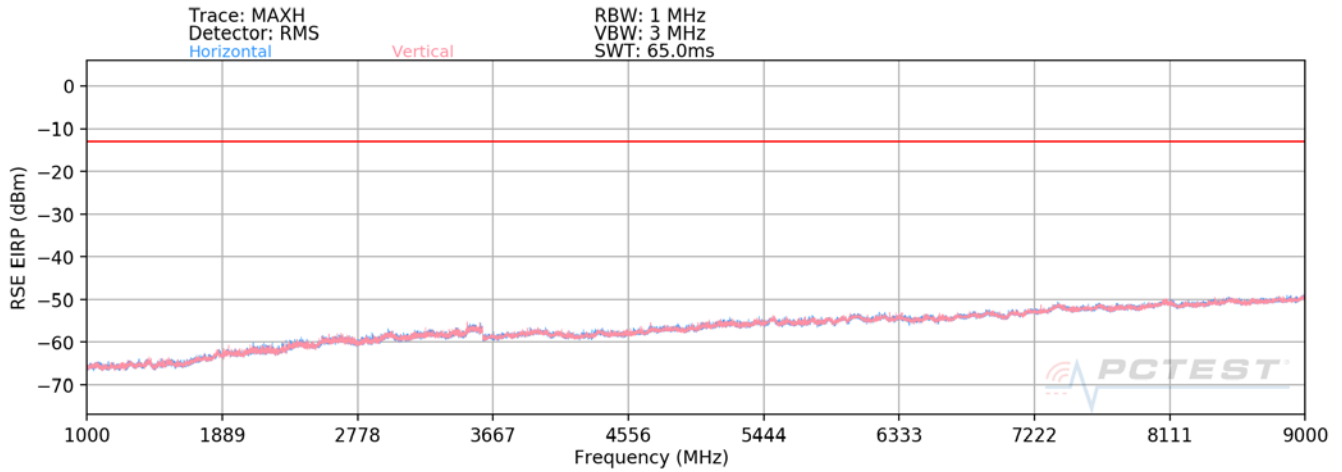
Bandwidth (MHz):	10
Frequency (MHz):	844.0
RB / Offset:	1 / 25

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1688.00	H	-	-	-78.53	-5.17	23.30	-71.96	-13.00	-58.96
2532.00	H	-	-	-79.44	-1.83	25.73	-69.53	-13.00	-56.53
3376.00	H	-	-	-80.41	0.30	26.89	-68.36	-13.00	-55.36

Table 7-8. Radiated Spurious Data (LTE Band 26/5 – High Channel)

FCC ID: A3LSMF711B	 PART 22 MEASUREMENT REPORT 	Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset
		Page 65 of 78

# NR Band n5



**Plot 7-79. Radiated Spurious Plot (NR Band n5)**

<b>Bandwidth (MHz):</b>	20
<b>Frequency (MHz):</b>	834.0
<b>RB / Offset:</b>	1 / 50
<b>Mode:</b>	SA
<b>Configuration</b>	HY CLOSED

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1668.0	H	-	-	-71.36	-5.47	30.17	-65.09	-13.00	-52.09
2502.0	H	-	-	-71.29	-2.60	33.11	-62.14	-13.00	-49.14
3336.0	H	-	-	-71.72	0.33	35.61	-59.64	-13.00	-46.64

**Table 7-9. Radiated Spurious Data (NR Band n5 – Low Channel)**

<b>Bandwidth (MHz):</b>	20
<b>Frequency (MHz):</b>	836.5
<b>RB / Offset:</b>	1 / 50
<b>Mode:</b>	SA
<b>Configuration</b>	HY CLOSED

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.0	H	-	-	-71.28	-5.40	30.32	-64.94	-13.00	-51.94
2509.5	H	-	-	-71.12	-2.54	33.34	-61.92	-13.00	-48.92
3346.0	H	-	-	-71.41	0.30	35.89	-59.36	-13.00	-46.36

**Table 7-10. Radiated Spurious Data (NR Band n5 – Mid Channel)**

<b>FCC ID:</b> A3LSMF711B		<b>PART 22 MEASUREMENT REPORT</b>		<b>Approved by:</b> Technical Manager
<b>Test Report S/N:</b> 1M2104130035-02.A3L	<b>Test Dates:</b> 04/12/2021 - 06/01/2021	<b>EUT Type:</b> Portable Handset	Page 66 of 78	

Bandwidth (MHz):	20
Frequency (MHz):	839.0
RB / Offset:	1 / 50
Mode:	SA
Configuration	HY CLOSED



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1678.0	H	-	-	-71.64	-5.33	30.03	-65.23	-13.00	-52.23
2517.0	H	-	-	-71.40	-2.33	33.27	-61.98	-13.00	-48.98
3356.0	H	-	-	-71.79	0.28	35.49	-59.77	-13.00	-46.77

Table 7-11. Radiated Spurious Data (NR Band n5 – High Channel)

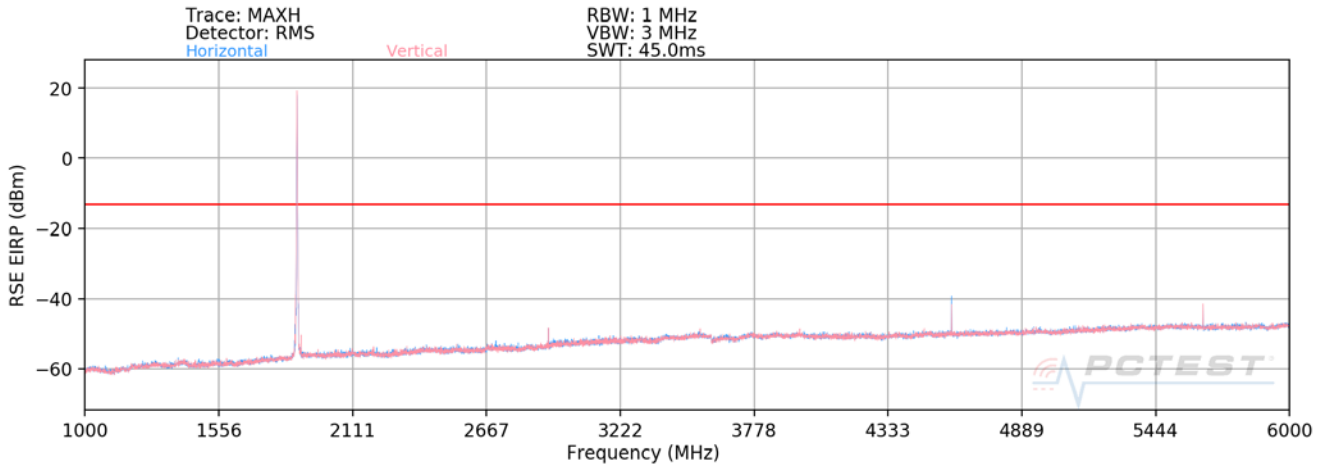
Bandwidth (MHz):	20
Frequency (MHz):	836.5
RB / Offset:	1 / 50
Mode:	SA
Configuration	HY CLOSED

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.0	H	-	-	-71.38	-5.40	30.22	-65.04	-13.00	-52.04
2509.5	H	-	-	-71.17	-2.54	33.29	-61.97	-13.00	-48.97
3346.0	H	-	-	-72.07	0.30	35.23	-60.02	-13.00	-47.02

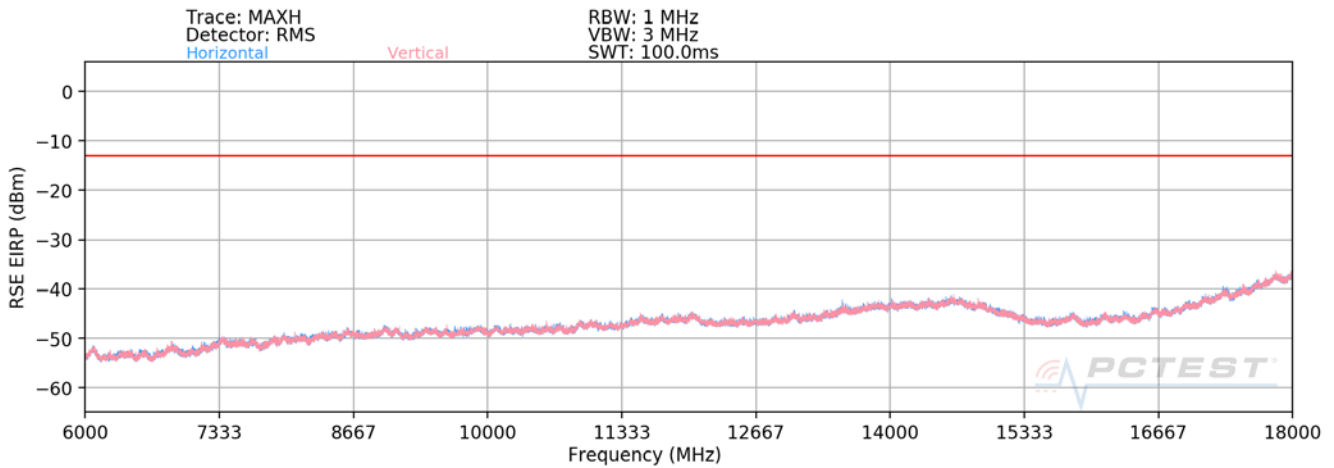
Table 7-12. Radiated Spurious Data (NR Band n5 – WCP)

FCC ID: A3LSMF711B	 PART 22 MEASUREMENT REPORT 	Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset
		Page 67 of 78

### EN-DC n5 + B2



**Plot 7-80. Radiated Spurious Plot 1 – 6 GHz (EN-DC n5 + B2)**



**Plot 7-81. Radiated Spurious Plot 6 – 18 GHz (EN-DC n5 + B2)**

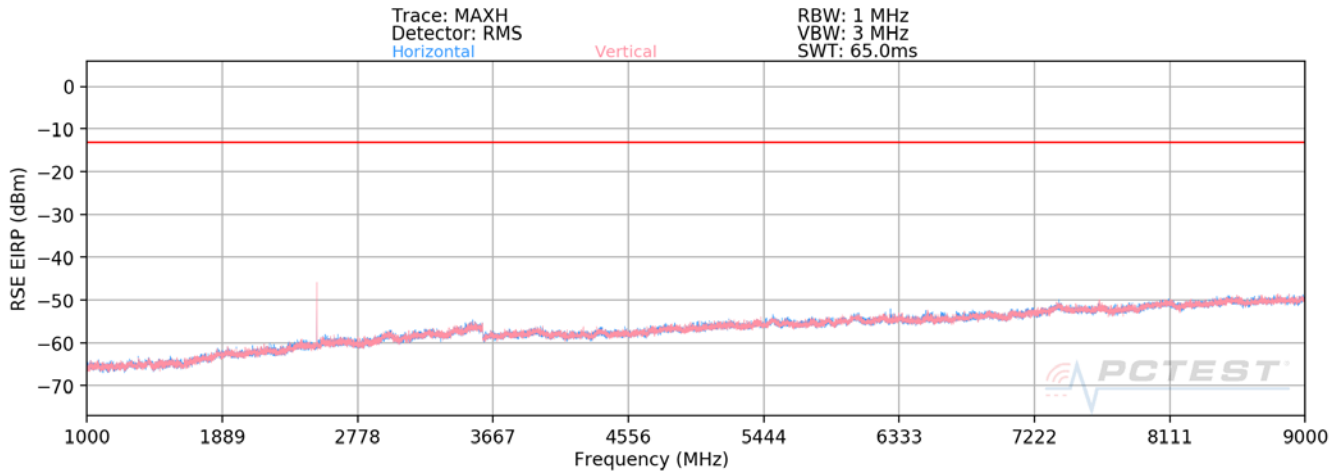
Bandwidth (MHz):	20
RB / Offset:	1/50
Mode:	EN-DC
Anchor Band:	Band 2

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turtable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
2717.0	H	-	-	-75.95	7.43	38.48	-56.78	-13.00	-43.78
2923.5	H	395	353	-68.74	8.27	46.53	-48.73	-13.00	-35.73
3553.5	H	291	318	-70.62	10.51	46.89	-48.36	-13.00	-35.36
3760.5	H	-	-	-77.26	11.87	41.61	-53.65	-13.00	-40.65
4597.0	H	264	213	-63.10	12.46	56.36	-38.90	-13.00	-25.90
5640.5	H	209	-2	-68.15	15.01	53.86	-41.40	-13.00	-28.40
10720.5	H	-	-	-79.38	21.91	49.53	-45.72	-13.00	-32.72
13524.5	H	-	-	-80.19	24.96	51.77	-43.48	-13.00	-30.48

**Table 7-13. Radiated Spurious Data (EN-DC n5 + B2)**

FCC ID: A3LSMF711B	PART 22 MEASUREMENT REPORT	Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset
		Page 68 of 78

## GSM/GPRS Cell



Plot 7-82. Radiated Spurious Plot (GPRS Cell)

Mode:	GPRS 1 Tx Slot
Channel:	128
Frequency (MHz):	824.2



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1648.4	H	146	195	-65.21	-5.66	36.13	-59.13	-13.00	-46.13
2472.6	H	115	306	-55.69	-2.31	49.00	-46.26	-13.00	-33.26
3296.8	H	113	217	-70.75	0.66	36.91	-58.34	-13.00	-45.34
4121.0	H	306	308	-72.96	2.01	36.05	-59.21	-13.00	-46.21
4945.2	H	-	-	-75.42	3.61	35.19	-60.06	-13.00	-47.06
5769.4	H	-	-	-76.21	5.88	36.67	-58.59	-13.00	-45.59
6593.6	H	-	-	-75.80	6.19	37.39	-57.86	-13.00	-44.86

Table 7-14. Radiated Spurious Data (GPRS Cell – Low Channel)

Mode:	GPRS 1 Tx Slot
Channel:	190
Frequency (MHz):	836.6

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.2	H	244	173	-66.01	-5.40	35.59	-59.66	-13.00	-46.66
2509.8	H	112	313	-54.63	-2.54	49.83	-45.43	-13.00	-32.43
3346.4	H	385	217	-71.28	0.30	36.02	-59.23	-13.00	-46.23
4183.0	H	304	318	-74.27	2.02	34.75	-60.51	-13.00	-47.51
5019.6	H	-	-	-76.01	4.16	35.15	-60.10	-13.00	-47.10
5856.2	H	-	-	-76.34	6.00	36.66	-58.59	-13.00	-45.59
6692.8	H	-	-	-76.49	6.61	37.12	-58.14	-13.00	-45.14



Table 7-15. Radiated Spurious Data (GPRS Cell – Mid Channel)

FCC ID: A3LSMF711B	 PART 22 MEASUREMENT REPORT 	Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset
		Page 69 of 78

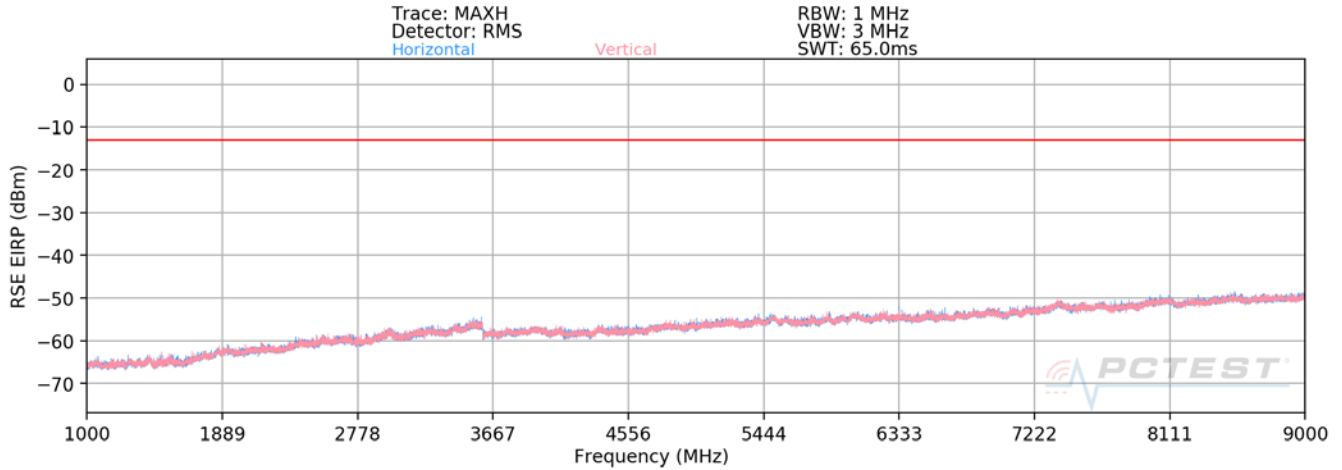
<b>Mode:</b>	GPRS 1 Tx Slot
<b>Channel:</b>	251
<b>Frequency (MHz):</b>	848.8

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1697.6	H	186	177	-70.52	-5.01	31.47	-63.79	-13.00	-50.79
2546.4	H	113	310	-50.24	-1.28	55.48	-39.77	-13.00	-26.77
3395.2	H	-	-	-71.43	0.46	36.03	-59.22	-13.00	-46.22
4244.0	H	-	-	-74.74	1.91	34.17	-61.08	-13.00	-48.08
5092.8	H	-	-	-76.24	4.62	35.38	-59.87	-13.00	-46.87

**Table 7-16. Radiated Spurious Data (GPRS Cell – High Channel)**

<b>FCC ID:</b> A3LSMF711B	 <b>PCTEST</b> Proud to be part of element	<b>PART 22 MEASUREMENT REPORT</b>		<b>Approved by:</b> Technical Manager
<b>Test Report S/N:</b> 1M2104130035-02.A3L	<b>Test Dates:</b> 04/12/2021 - 06/01/2021	<b>EUT Type:</b> Portable Handset		Page 70 of 78

## WCDMA Cell



Plot 7-83. Radiated Spurious Plot (WCDMA Cell)

Mode:	WCDMA RMC
Channel:	4132
Frequency (MHz):	826.4



Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1652.8	H	-	-	-71.65	-5.63	29.72	-65.54	-13.00	-52.54
2479.2	H	114	44	-68.67	-2.41	35.92	-59.34	-13.00	-46.34
3305.6	H	-	-	-72.36	0.62	35.26	-60.00	-13.00	-47.00
4132.0	H	-	-	-75.03	1.84	33.81	-61.45	-13.00	-48.45
4958.4	H	-	-	-75.50	3.69	35.19	-60.07	-13.00	-47.07

Table 7-17. Radiated Spurious Data (WCDMA Cell – Low Channel)

Mode:	WCDMA RMC
Channel:	4183
Frequency (MHz):	836.6

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1673.2	H	-	-	-71.61	-5.40	29.99	-65.26	-13.00	-52.26
2509.8	H	-	-	-71.75	-2.54	32.71	-62.55	-13.00	-49.55
3346.4	H	-	-	-71.87	0.30	35.43	-59.82	-13.00	-46.82
4183.0	H	-	-	-74.61	2.02	34.41	-60.85	-13.00	-47.85



Table 7-18. Radiated Spurious Data (WCDMA Cell – Mid Channel)

FCC ID: A3LSMF711B	 PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset	Page 71 of 78

<b>Mode:</b>	WCDMA RMC
<b>Channel:</b>	4233
<b>Frequency (MHz):</b>	846.6

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBμV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1693.2	H	-	-	-70.71	-5.09	31.20	-64.05	-13.00	-51.05
2539.8	H	169	219	-68.01	-1.51	37.48	-57.78	-13.00	-44.78
3386.4	H	-	-	-71.80	0.36	35.56	-59.69	-13.00	-46.69
4233.0	H	-	-	-75.01	1.78	33.77	-61.49	-13.00	-48.49
5079.6	H	-	-	-76.36	4.66	35.30	-59.96	-13.00	-46.96

**Table 7-19. Radiated Spurious Data (WCDMA Cell – High Channel)**

<b>FCC ID:</b> A3LSMF711B	 <b>PCTEST</b> Proud to be part of element	<b>PART 22 MEASUREMENT REPORT</b>		<b>Approved by:</b> Technical Manager
<b>Test Report S/N:</b> 1M2104130035-02.A3L	<b>Test Dates:</b> 04/12/2021 - 06/01/2021	<b>EUT Type:</b> Portable Handset		Page 72 of 78



## 7.7 Frequency Stability / Temperature Variation

### Test Overview and Limit

Frequency stability testing is performed in accordance with the guidelines of ANSI/TIA-603-E-2016. The frequency stability of the transmitter is measured by:

- a.) **Temperature:** The temperature is varied from -30°C to +50°C in 10°C increments using an environmental chamber.
- b.) **Primary Supply Voltage:** The primary supply voltage is varied from 85% to 115% of the nominal value for non hand-carried battery and AC powered equipment. For hand-carried, battery-powered equipment, primary supply voltage is reduced to the battery operating end point which shall be specified by the manufacturer.

***For Part 22 and RSS-132, the frequency stability of the transmitter shall be maintained within  $\pm 0.00025\%$  ( $\pm 2.5$  ppm) of the center frequency.***

### Test Procedure Used

ANSI/TIA-603-E-2016

### Test Settings



1. The carrier frequency of the transmitter is measured at room temperature (20°C to provide a reference).
2. The equipment is turned on in a “standby” condition for fifteen minutes before applying power to the transmitter. Measurement of the carrier frequency of the transmitter is made within one minute after applying power to the transmitter.
3. Frequency measurements are made at 10°C intervals ranging from -30°C to +50°C. A period of at least one half-hour is provided to allow stabilization of the equipment at each temperature level.

### Test Setup

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

### Test Notes

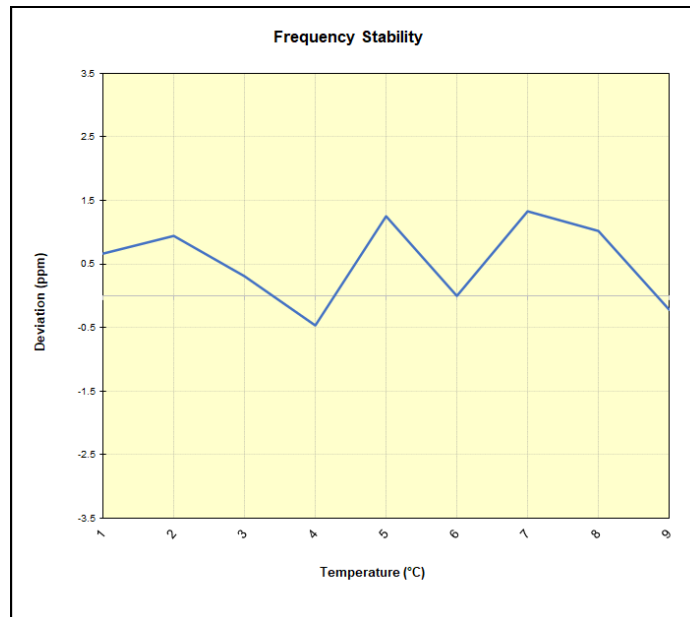
None

FCC ID: A3LSMF711B	 <b>PCTEST</b> Proud to be part of elements	<b>PART 22 MEASUREMENT REPORT</b>		<b>Approved by:</b> Technical Manager
<b>Test Report S/N:</b> 1M2104130035-02.A3L	<b>Test Dates:</b> 04/12/2021 - 06/01/2021	<b>EUT Type:</b> Portable Handset		Page 73 of 78

**LTE Band 26/5**

<b>LTE Band 26/5</b>					
Operating Frequency (Hz):		836,500,000			
Ref. Voltage (VDC):		4.32			
Deviation Limit:		± 0.00025% or 2.5 ppm			
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.32	- 30	836,501,566	559	0.0000668
		- 20	836,501,800	793	0.0000948
		- 10	836,501,272	265	0.0000316
		0	836,500,614	-393	-0.0000470
		+ 10	836,502,051	1,044	0.0001248
		+ 20 (Ref)	836,501,007	0	0.0000000
		+ 30	836,502,122	1,115	0.0001333
		+ 40	836,501,858	851	0.0001017
Battery Endpoint	3.51	+ 20	836,500,122	-885	-0.0001058

**Table 7-20. LTE Band 26/5 Frequency Stability Data**



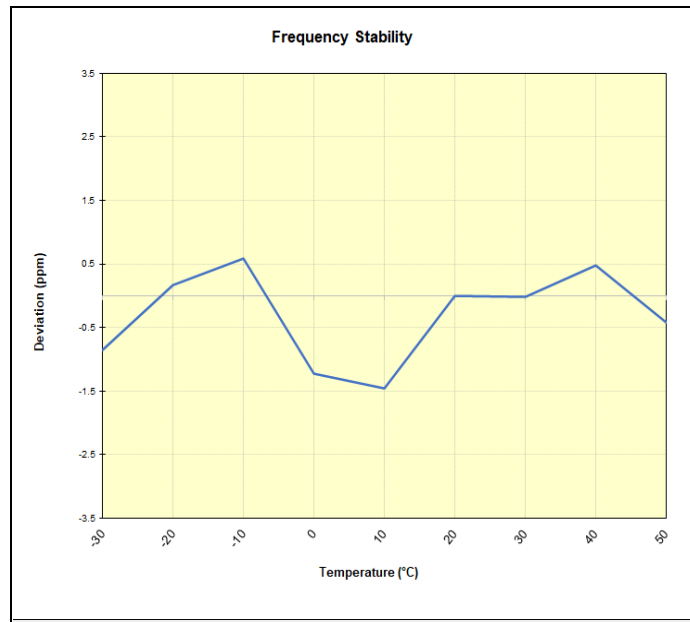
**Plot 7-84. LTE Band 26/5 Frequency Stability Chart**

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of Samsung	<b>PART 22 MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 74 of 78

**NR Band n5**

<b>NR Band n5</b>					
		Operating Frequency (Hz):		836,500,000	
		Ref. Voltage (VDC):		4.32	
		Deviation Limit:		± 0.00025% or 2.5 ppm	
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.32	- 30	835,949,657	-706	-0.0000844
		- 20	835,950,501	138	0.0000165
		- 10	835,950,858	495	0.0000592
		0	835,949,347	-1,016	-0.0001216
		+ 10	835,949,151	-1,212	-0.0001450
		+ 20 (Ref)	835,950,363	0	0.0000000
		+ 30	835,950,353	-10	-0.0000012
		+ 40	835,950,759	396	0.0000474
+ 50	835,950,009	-354	-0.0000424		
Battery Endpoint	3.51	+ 20	835,951,635	1,272	0.0001522

**Table 7-21. NR Band n5 Frequency Stability Data**



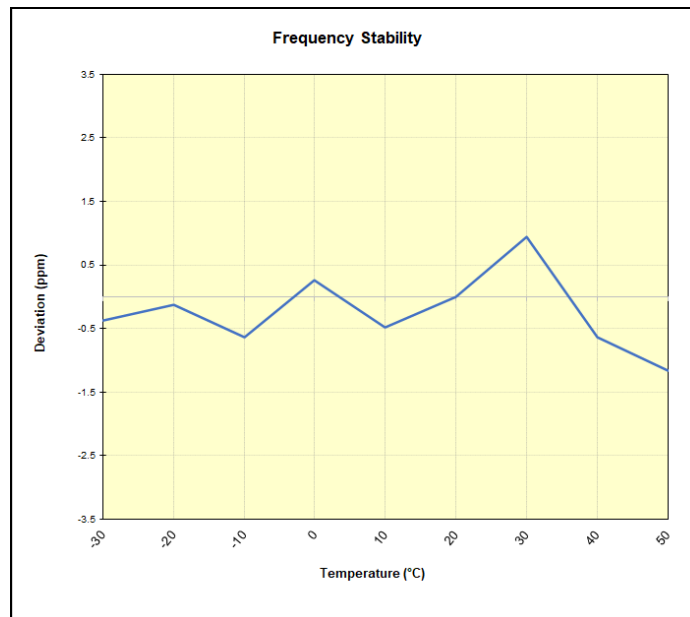
**Plot 7-85. NR Band n5 Frequency Stability Chart**

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of Samsung	<b>PART 22 MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 75 of 78

**GSM/GPRS Cell**

<b>GSM/GPRS Cellular</b>					
Operating Frequency (Hz):		836,600,000			
Ref. Voltage (VDC):		4.32			
Deviation Limit:		± 0.00025% or 2.5 ppm			
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.32	- 30	836,600,887	-308	-0.0000368
		- 20	836,601,089	-106	-0.0000126
		- 10	836,600,664	-531	-0.0000634
		0	836,601,409	214	0.0000256
		+ 10	836,600,790	-405	-0.0000484
		+ 20 (Ref)	836,601,195	0	0.0000000
		+ 30	836,601,989	794	0.0000949
		+ 40	836,600,665	-530	-0.0000633
Battery Endpoint	3.51	+ 20	836,600,992	-203	-0.0000242

**Table 7-22. GSM/GPRS Cell Frequency Stability Data**



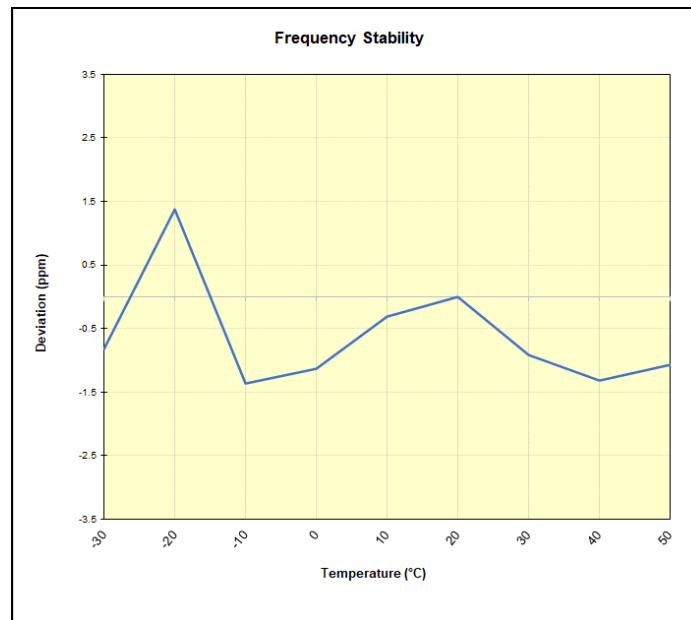
**Plot 7-86. GSM/GPRS Cell Frequency Stability Chart**

FCC ID: A3LSMF711B	<b>PCTEST</b> Proud to be part of element	<b>PART 22 MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 76 of 78



## WCDMA Cell

WCDMA Cellular					
Operating Frequency (Hz):		836,600,000			
Ref. Voltage (VDC):		4.32			
Deviation Limit:		± 0.00025% or 2.5 ppm			
Voltage (%)	Power (VDC)	Temp (°C)	Frequency (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	4.32	- 30	836,599,617	-689	-0.0000823
		- 20	836,601,461	1,155	0.0001381
		- 10	836,599,166	-1,140	-0.0001362
		0	836,599,355	-951	-0.0001137
		+ 10	836,600,050	-256	-0.0000306
		+ 20 (Ref)	836,600,306	0	0.0000000
		+ 30	836,599,542	-764	-0.0000914
		+ 40	836,599,205	-1,100	-0.0001315
Battery Endpoint	3.51	+ 20	836,601,163	857	0.0001025

Table 7-23. WCDMA Cell Frequency Stability Data





Plot 7-87. WCDMA Cell Frequency Stability Chart

FCC ID: A3LSMF711B	 PCTEST Proud to be part of element	PART 22 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2104130035-02.A3L	Test Dates: 04/12/2021 - 06/01/2021	EUT Type: Portable Handset		Page 77 of 78

## 8.0 CONCLUSION

The data collected relate only to the item(s) tested and show that the Samsung **Portable Handset** **FCC ID: A3LSMF711B** complies with all the requirements of Part 22 of the FCC rules.

FCC ID: A3LSMF711B	 <b>PART 22 MEASUREMENT REPORT</b> 		<b>Approved by:</b> Technical Manager
<b>Test Report S/N:</b> 1M2104130035-02.A3L	<b>Test Dates:</b> 04/12/2021 - 06/01/2021	<b>EUT Type:</b> Portable Handset	Page 78 of 78