

PART 24 MEASUREMENT REPORT

Applicant Name:

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

Date of Testing:

4/12/2021 – 6/11/2021

Test Site/Location:

PCTEST Lab. Columbia, MD, USA

Test Report Serial No.:

1M2104070032-03.A3L

FCC ID:

A3LSMF711U

Applicant Name:

Samsung Electronics Co., Ltd.

Application Type:

Certification

Model:

SM-F711U

Additional Model(s):

SM-F711U1

EUT Type:

Portable Handset

FCC Classification:

PCS Licensed Transmitter Held to Ear (PCE)

FCC Rule Part:

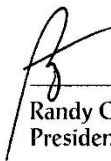
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Test Procedure(s):

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







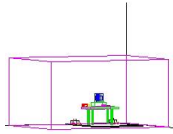
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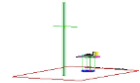
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Mode	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
			Max. Power [W]	Max. Power [dBm]	
GSM/GPRS	GMSK	1850.2 - 1909.8	0.994	29.97	241KGXW
EDGE	8-PSK	1850.2 - 1909.8	0.299	24.76	249KG7W
WCDMA	Spread Spectrum	1852.4 - 1907.6	0.232	23.65	4M19F9W
CDMA	Spread Spectrum	1851.25 - 1908.75	0.239	23.78	1M28F9W



Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
LTE Band 25/2	20 MHz	QPSK	1860 - 1905	0.259	24.13	18M1G7D
		16QAM	1860 - 1905	0.227	23.56	18M1W7D
	15 MHz	QPSK	1857.5 - 1907.5	0.260	24.14	13M6G7D
		16QAM	1857.5 - 1907.5	0.233	23.67	13M6W7D
	10 MHz	QPSK	1855 - 1910	0.243	23.85	9M02G7D
		16QAM	1855 - 1910	0.206	23.14	9M00W7D
	5 MHz	QPSK	1852.5 - 1912.5	0.241	23.82	4M52G7D
		16QAM	1852.5 - 1912.5	0.206	23.15	4M52W7D
	3 MHz	QPSK	1851.5 - 1913.5	0.248	23.94	2M72G7D
		16QAM	1851.5 - 1913.5	0.212	23.27	2M72W7D
	1.4 MHz	QPSK	1850.7 - 1914.3	0.243	23.86	1M09G7D
		16QAM	1850.7 - 1914.3	0.214	23.30	1M10W7D
NR Band n25 ANT A	40 MHz	$\pi/2$ BPSK	1870 - 1895	0.281	24.49	38M9G7D
		QPSK	1870 - 1895	0.253	24.03	38M9G7D
		16QAM	1870 - 1895	0.216	23.35	38M8W7D
	30 MHz	$\pi/2$ BPSK	1865 - 1900	0.251	24.00	28M9G7D
		QPSK	1865 - 1900	0.247	23.92	28M8G7D
		16QAM	1865 - 1900	0.214	23.31	28M9W7D
	25 MHz	$\pi/2$ BPSK	1862.5 - 1902.5	0.240	23.80	23M1G7D
		QPSK	1862.5 - 1902.5	0.249	23.96	23M1G7D
		16QAM	1862.5 - 1902.5	0.194	22.87	23M1W7D
NR Band n25/2 ANT A	20 MHz	$\pi/2$ BPSK	1860 - 1905	0.236	23.72	18M0G7D
		QPSK	1860 - 1905	0.252	24.01	18M0G7D
		16QAM	1860 - 1905	0.181	22.59	18M0W7D
	15 MHz	$\pi/2$ BPSK	1857.5 - 1907.5	0.245	23.89	13M5G7D
		QPSK	1857.5 - 1907.5	0.246	23.90	13M5G7D
		16QAM	1857.5 - 1907.5	0.191	22.80	13M5W7D
	10 MHz	$\pi/2$ BPSK	1855 - 1910	0.233	23.68	8M99G7D
		QPSK	1855 - 1910	0.239	23.78	9M00G7D
		16QAM	1855 - 1910	0.185	22.66	9M01W7D
	5 MHz	$\pi/2$ BPSK	1852.5 - 1912.5	0.234	23.69	4M53G7D
		QPSK	1852.5 - 1912.5	0.231	23.63	4M50G7D
		16QAM	1852.5 - 1912.5	0.177	22.48	4M55W7D

EUT Overview

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Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n25 ANT I	40 MHz	$\pi/2$ BPSK	1870 - 1895	0.270	24.32	38M7G7D
		QPSK	1870 - 1895	0.273	24.36	38M6G7D
		16QAM	1870 - 1895	0.201	23.03	38M7W7D
	30 MHz	$\pi/2$ BPSK	1865 - 1900	0.261	24.17	28M7G7D
		QPSK	1865 - 1900	0.264	24.21	28M7G7D
		16QAM	1865 - 1900	0.206	23.14	28M7W7D
	25 MHz	$\pi/2$ BPSK	1862.5 - 1902.5	0.260	24.16	23M0G7D
		QPSK	1862.5 - 1902.5	0.256	24.09	24M0G7D
		16QAM	1862.5 - 1902.5	0.194	22.89	23M9W7D
NR Band n25/2 ANT I	20 MHz	$\pi/2$ BPSK	1860 - 1905	0.262	24.18	18M0G7D
		QPSK	1860 - 1905	0.258	24.11	19M0G7D
		16QAM	1860 - 1905	0.200	23.02	19M0W7D
	15 MHz	$\pi/2$ BPSK	1857.5 - 1907.5	0.255	24.06	13M5G7D
		QPSK	1857.5 - 1907.5	0.260	24.14	14M2G7D
		16QAM	1857.5 - 1907.5	0.190	22.80	14M2W7D
	10 MHz	$\pi/2$ BPSK	1855 - 1910	0.250	23.99	8M98G7D
		QPSK	1855 - 1910	0.256	24.09	9M35G7D
		16QAM	1855 - 1910	0.197	22.96	9M35W7D
	5 MHz	$\pi/2$ BPSK	1852.5 - 1912.5	0.266	24.25	4M51G7D
		QPSK	1852.5 - 1912.5	0.258	24.12	4M51G7D
		16QAM	1852.5 - 1912.5	0.197	22.94	4M53W7D

EUT Overview

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1.0 INTRODUCTION

1.1 Scope

Measurement and determination of electromagnetic emissions (EMC) of radio frequency devices including intentional and/or unintentional radiators for compliance with the technical rules and regulations of the Federal Communications Commission and the Innovation, Science and Economic Development Canada.



1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST 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 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 ISSED Standards (RSS).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISSED.

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMF711U**. 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 24.

Test Device Serial No.: 0846M, 0130M, 0129M, 0151M, 0129M, 0880M, 0811M, 0859M, 0193M

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1), 850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 5G NR (n71, n12, n5, n66, n2, n25, n30, n41, n77, n260, n261), 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 3.4 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.

This device supports two configurations: one is with screen open, and one is with screen closed. Both configurations are tested, and the worst case radiated emissions data is shown in this report.

2.4 EMI Suppression Device(s)/Modifications

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



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3.0 DESCRIPTION OF TESTS

3.1 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

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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:

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

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 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:



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

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.



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

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4.0 MEASUREMENT UNCERTAINTY

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

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

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5.0 TEST EQUIPMENT CALIBRATION DATA



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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	E5515C	Wireless Communications Test Set	N/A			GB45360985
Agilent	E5515C	Wireless Communications Test Set	N/A			GB46310798
Anritsu	MT8820C	Radio Communication Analyzer	N/A			6201300731
Anritsu	MT8821C	Radio Communication Analyzer	N/A			6201381794
Anritsu	MT8821C	Radio Communication Analyzer	N/A			6200901190
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2019	Biennial	10/10/2021	121034
Emco	3115	Horn Antenna (1-18GHz)	6/18/2020	Biennial	6/18/2022	9704-5182
Espec	ESX-2CA	Environmental Chamber	8/27/2020	Annual	8/27/2022	17620
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/12/2020	Biennial	3/12/2022	128337
Keysight Technologies	N9020A	MXA Signal Analyzer	8/14/2020	Annual	8/14/2021	US46470561
Keysight Technologies	N9038A	MXE EMI Receiver	8/11/2020	Annual	8/11/2021	MY51210133
Keysight Technologies	N9030A	PXA Signal Analyzer (44GHz)	8/17/2020	Annual	8/17/2021	MY52350166
Keysight Technologies	N9020A	MXA Signal Analyzer	9/22/2020	Annual	9/22/2021	MY54500644
Keysight Technologies	N9030B	PXA Signal Analyzer, Multi-touch	9/17/2020	Annual	9/17/2021	MY57141001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11403100002
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			100976
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			112347
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	DRH-118	Horn Antenna (1-18GHz)	10/3/2019	Biennial	10/3/2021	A050307
Sunol	DRH-118	Horn Antenna (1-18 GHz)	8/27/2019	Biennial	8/27/2021	A042511
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107
-	AP2	EMC Cable and Switch System	9/9/2020	Annual	9/9/2021	AP2
-	AP1	EMC Cable and Switch System	9/10/2020	Annual	9/10/2021	AP1
-	LTx2	Licensed Transmitter Cable Set	9/16/2020	Annual	9/16/2021	LTx2
-	LTx3	Licensed Transmitter Cable Set	8/28/2020	Annual	8/28/2021	LTx3
-	LTx4	Licensed Transmitter Cable Set	9/16/2020	Annual	9/16/2021	LTx4
-	LTx5	Licensed Transmitter Cable Set	9/16/2020	Annual	9/16/2021	LTx5

Table 5-1. Test Equipment

Notes:

- For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.
- 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)

CDMA Emission Designator

Emission Designator = 1M25F9W

CDMA BW = 1.25 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

WCDMA Emission Designator

Emission Designator = 4M16F9W

WCDMA BW = 4.16 MHz

F = Frequency Modulation

9 = Composite Digital Info

W = Combination (Audio/Data)

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

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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: A3LSMF711U
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 Mode(s): GSM/GPRS/EDGE/WCDMA/CDMA/LTE/NR

Test Condition	Test Description	FCC Part Section(s)	RSS Section(s)	Test Limit	Test Result	Reference
CONDUCTED	Occupied Bandwidth	2.1049	RSS-Gen(6.7)	N/A	PASS	Section 7.2
	Conducted Band Edge / Spurious Emissions	2.1051, 24.238(a)	RSS-133(6.5)	> 43 + 10log10(P[Watts]) at Band Edge and for all out-of-band emissions	PASS	Sections 7.3, 7.4
	Peak-Average Ratio	24.232(d)	RSS-133(6.4)	< 13 dB	PASS	Section 7.5
	Transmitter Conducted Output Power	2.1046	RSS-133(4.1)	N/A	PASS	See RF Exposure Report
	Frequency Stability	2.1055, 24.235	RSS-133(6.3)	Fundamental emissions stay within authorized frequency block	PASS	Section 7.8
RADIATED	Effective Radiated Power / Equivalent Isotropic Radiated Power	24.232(c)	RSS-132(5.4)	< 7 Watts max. ERP	PASS	Section 7.6
	Radiated Spurious Emissions	2.1053, 24.238(a)	RSS-133(6.5)	> 43 + 10 log10 (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.

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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 $\geq 3 \times$ RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

Test Setup

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

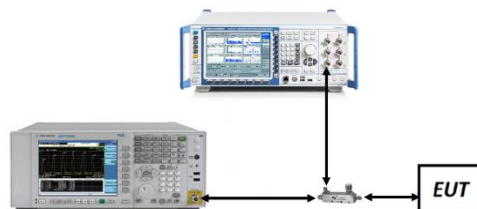


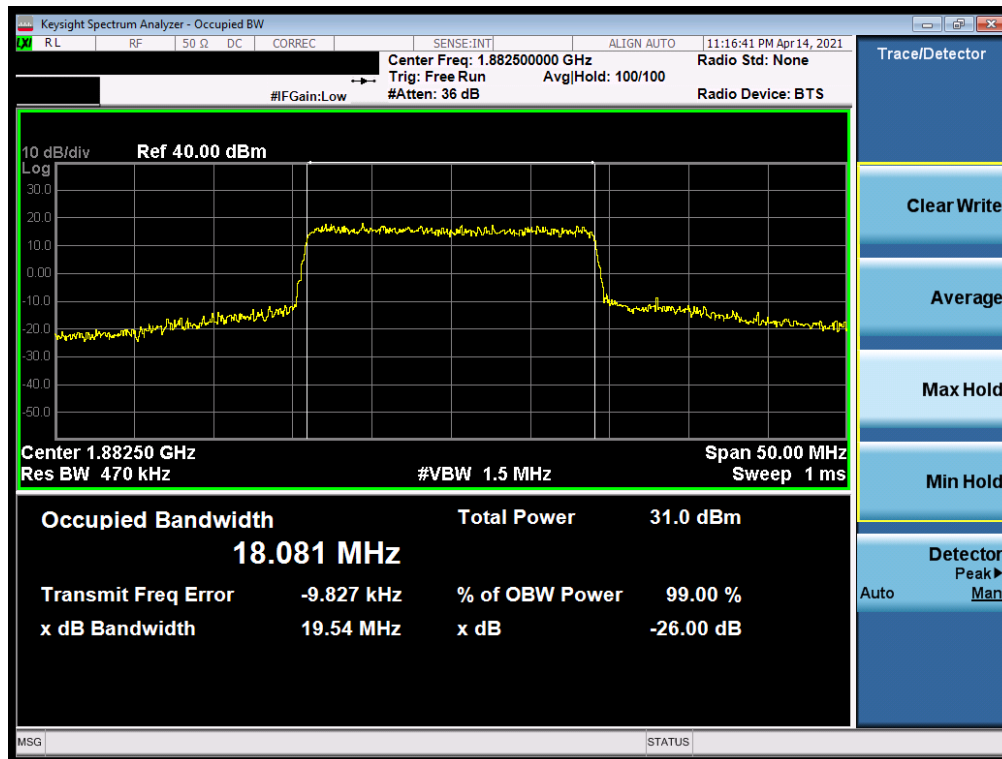
Figure 7-1. Test Instrument & Measurement Setup

Test Notes

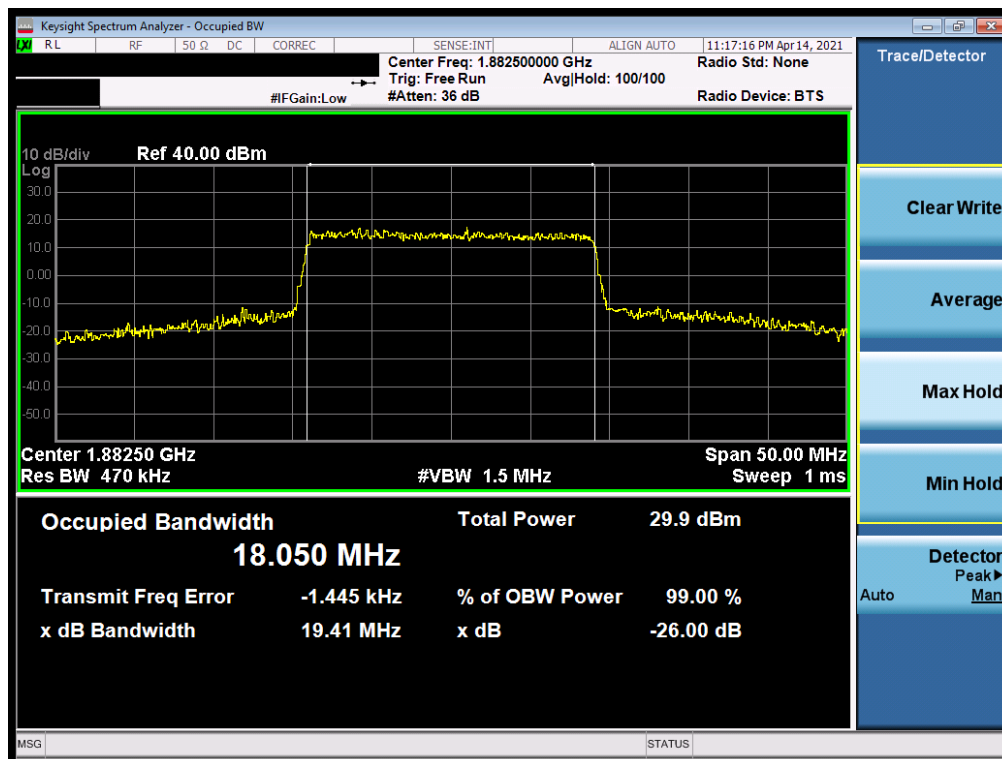
None.

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LTE Band 25/2



Plot 7-1. Occupied Bandwidth Plot (LTE Band 25/2 - 20MHz QPSK - Full RB)

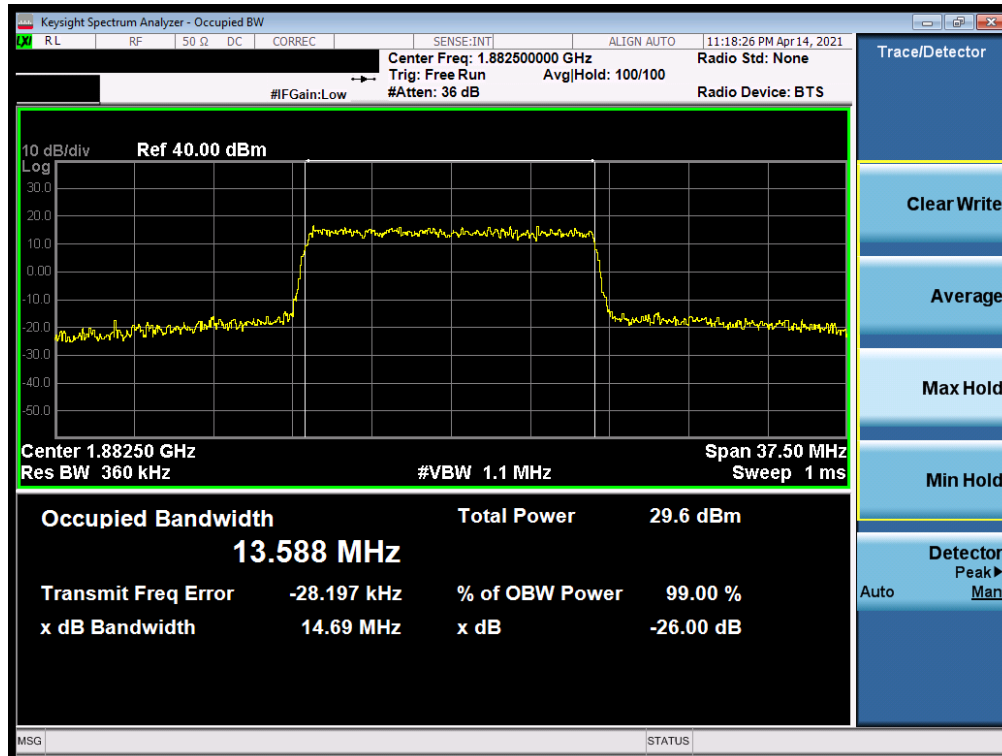


Plot 7-2. Occupied Bandwidth Plot (LTE Band 25/2 - 20MHz 16-QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Plot 7-3. Occupied Bandwidth Plot (LTE Band 25/2 - 15MHz QPSK - Full RB)



Plot 7-4. Occupied Bandwidth Plot (LTE Band 25/2 - 15MHz 16-QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 16 of 203

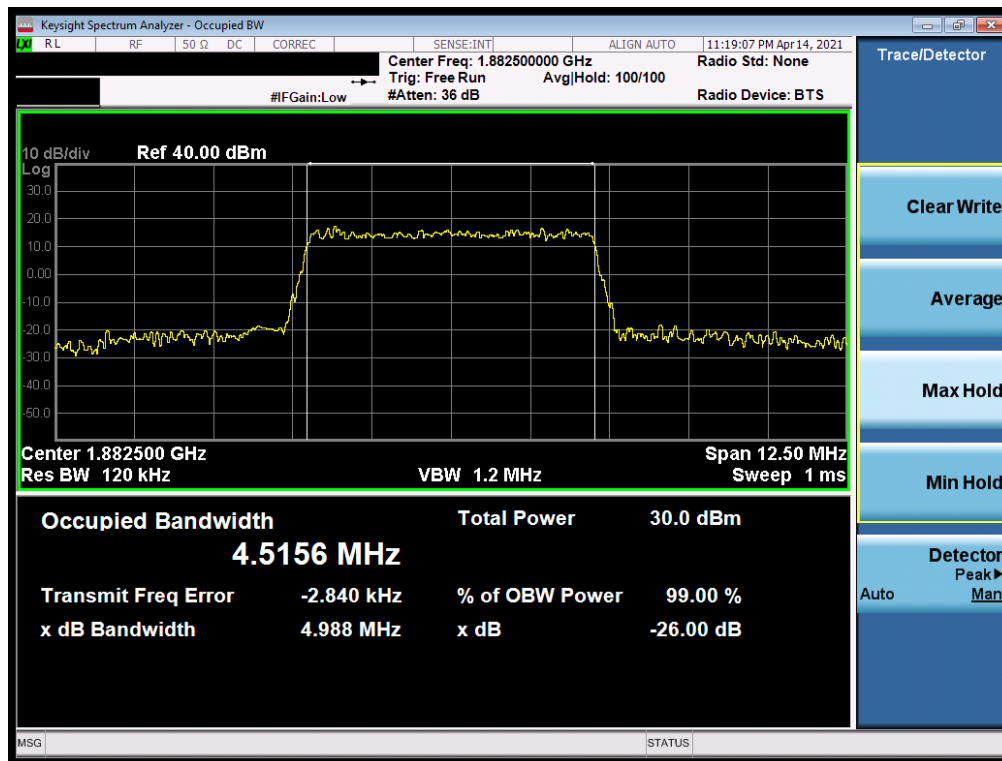


Plot 7-5. Occupied Bandwidth Plot (LTE Band 25/2 - 10MHz QPSK - Full R

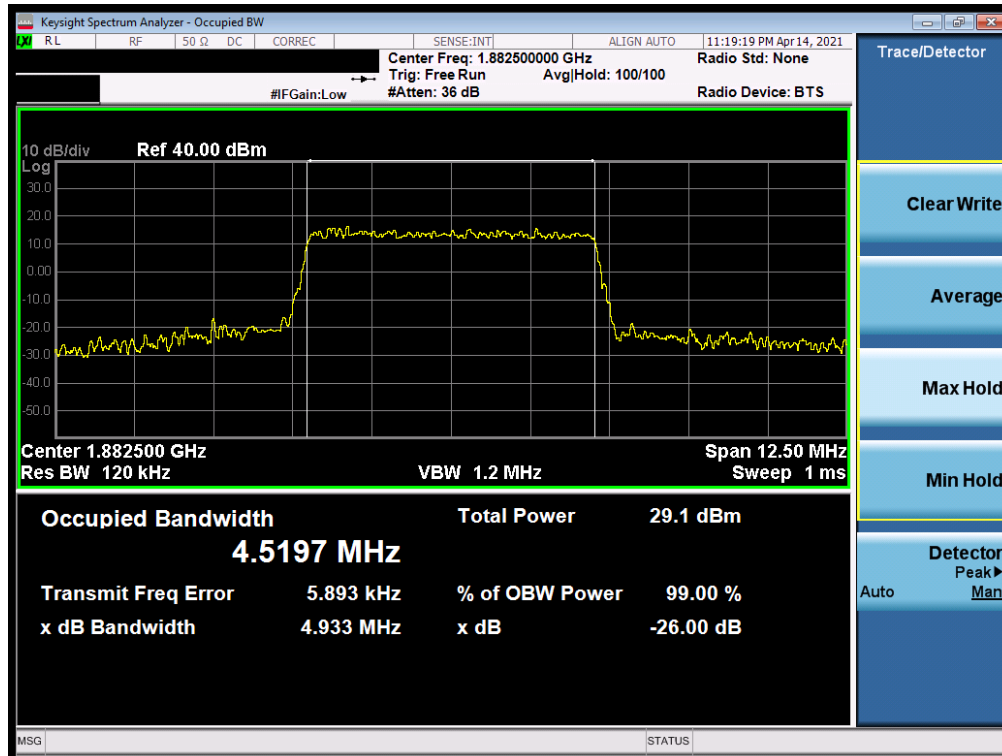


Plot 7-6. Occupied Bandwidth Plot (LTE Band 25/2 - 10MHz 16-QAM - Full RB

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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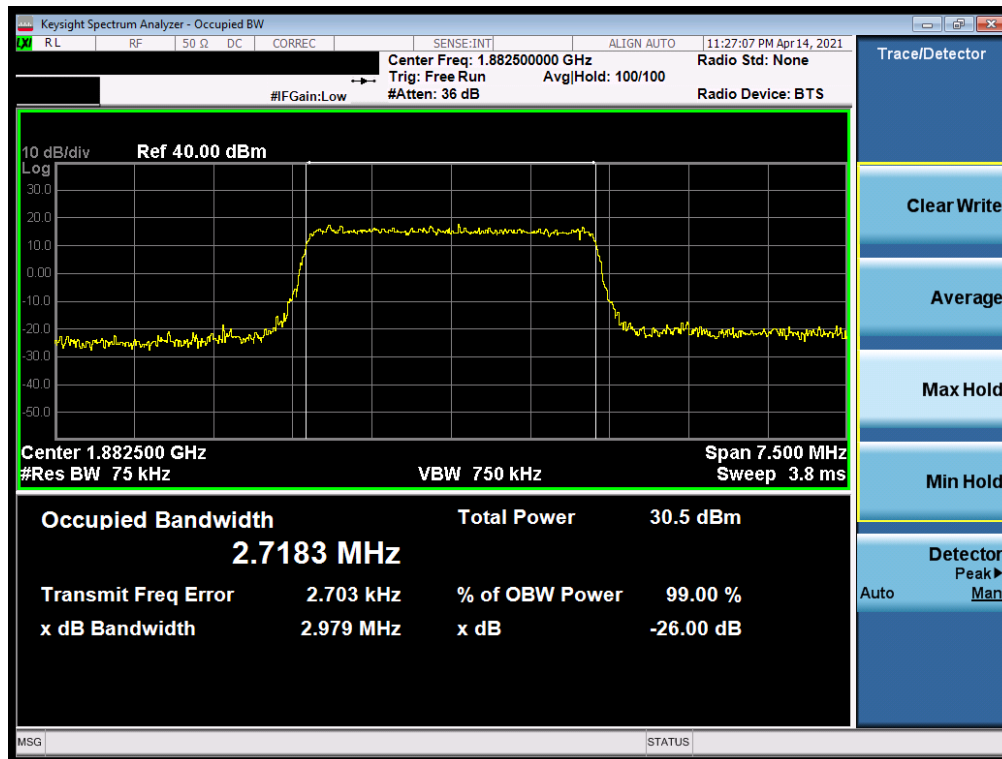


Plot 7-7. Occupied Bandwidth Plot (LTE Band 25/2 - 5MHz QPSK - Full RB)

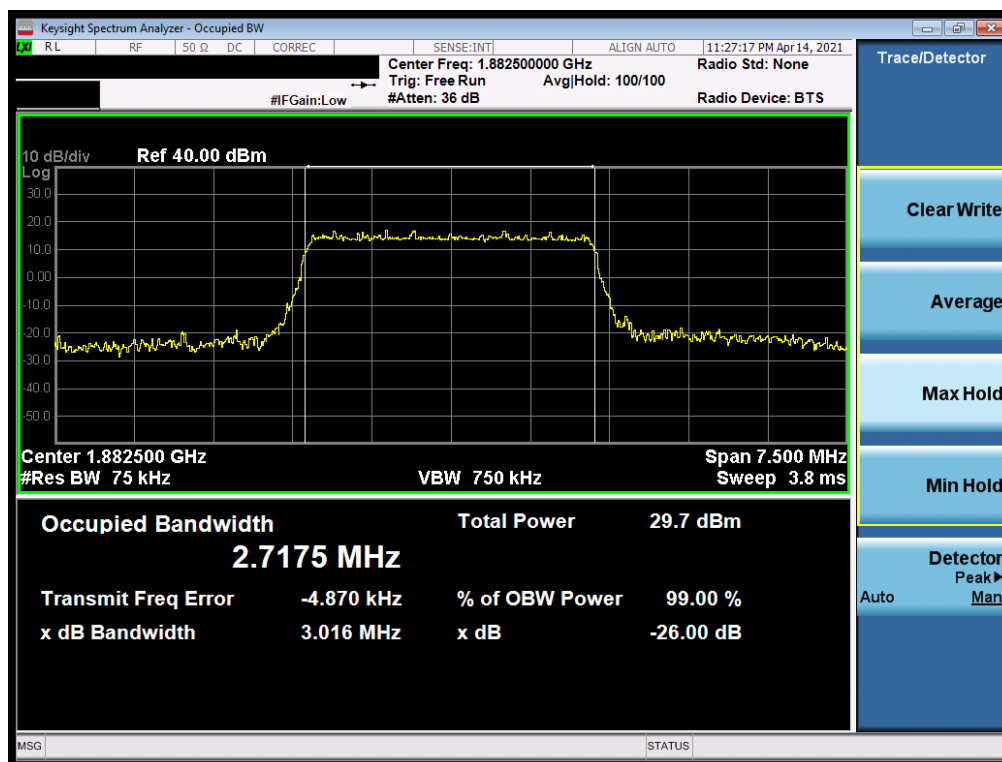


Plot 7-8. Occupied Bandwidth Plot (LTE Band 25/2 - 5MHz 16-QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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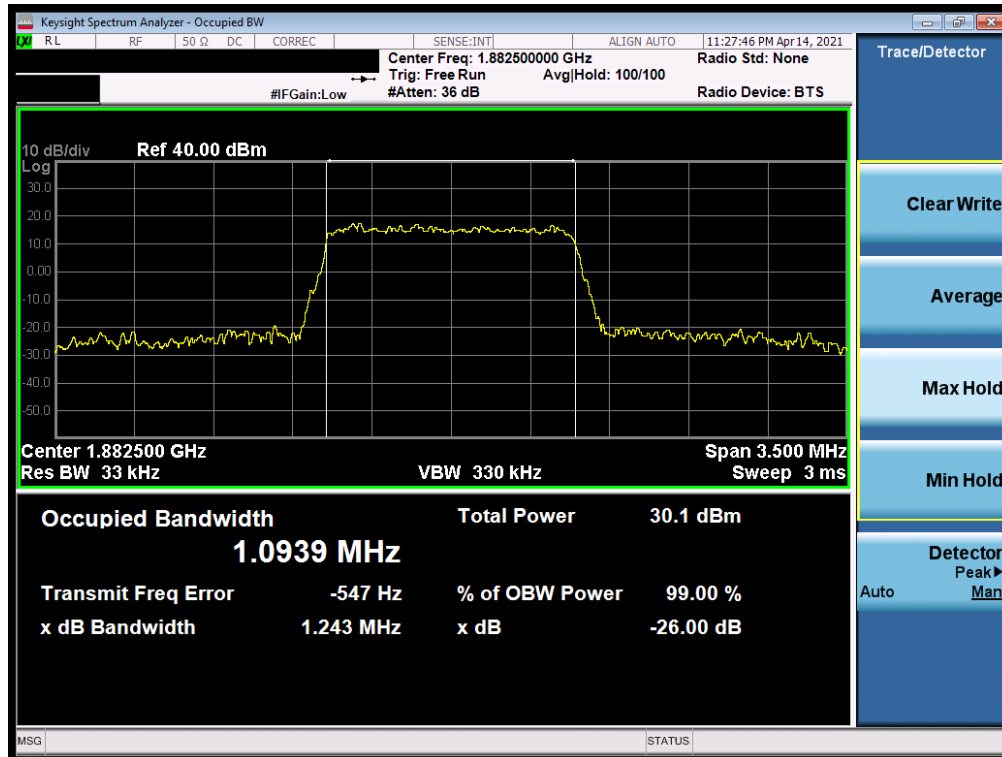


Plot 7-9. Occupied Bandwidth Plot (LTE Band 25/2 - 3MHz QPSK - Full RB)

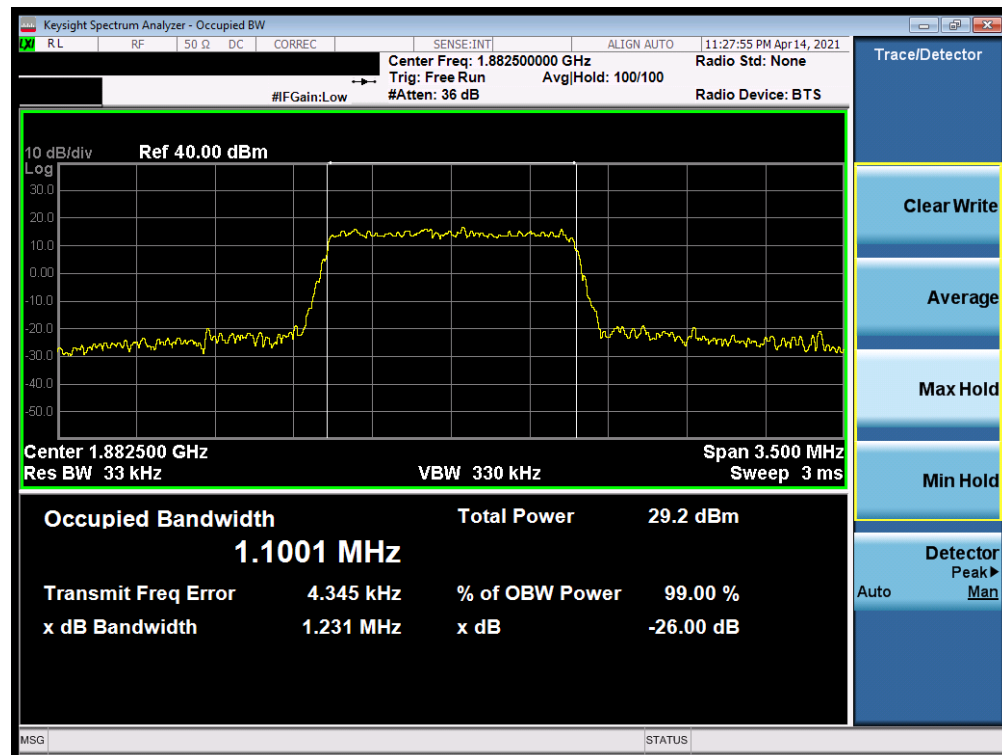


Plot 7-10. Occupied Bandwidth Plot (LTE Band 25/2 - 3MHz 16-QAM - Full R)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 19 of 203



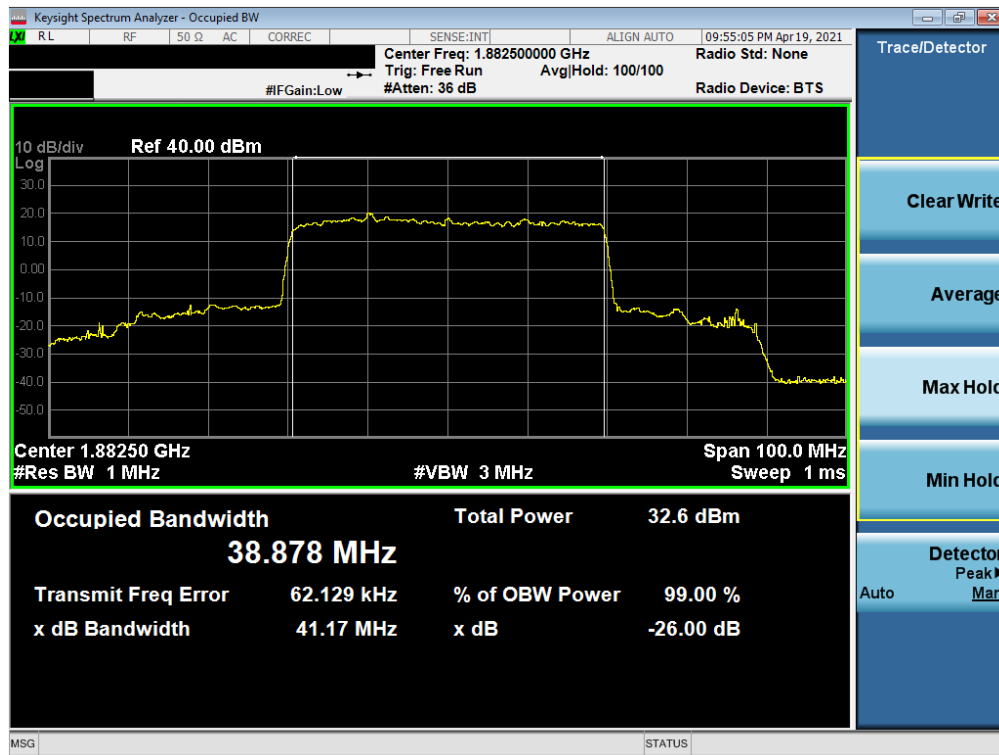
Plot 7-11. Occupied Bandwidth Plot (LTE Band 25/2 - 1.4MHz QPSK - Full RB)



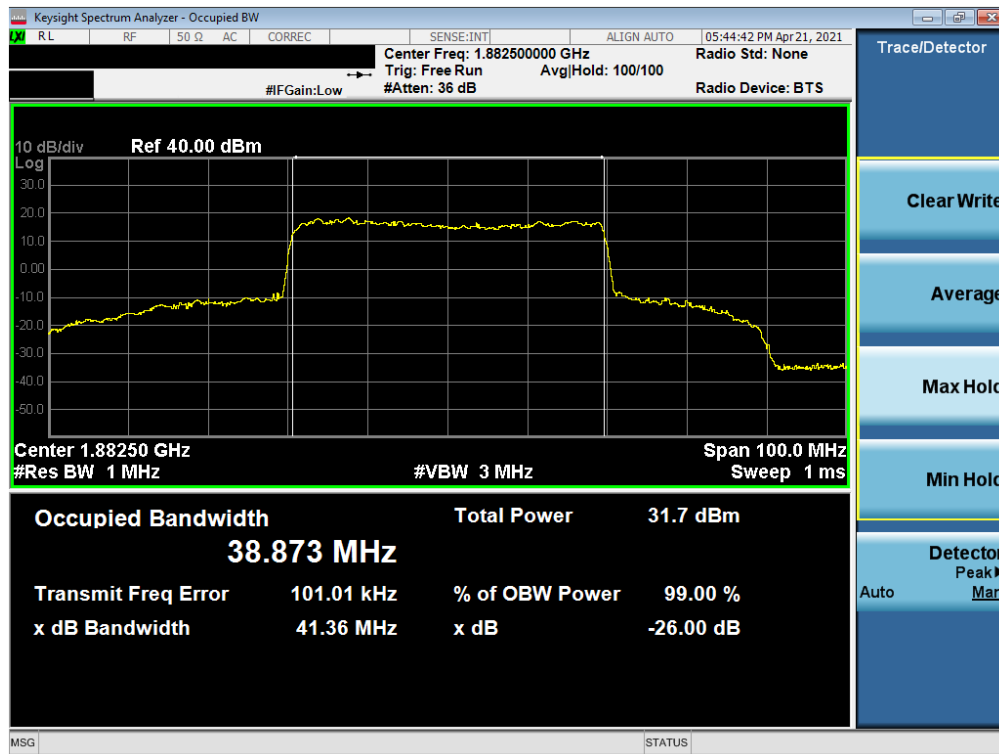
Plot 7-12. Occupied Bandwidth Plot (LTE Band 25/2 - 1.4MHz 16-QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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NR Band n25 – Ant A

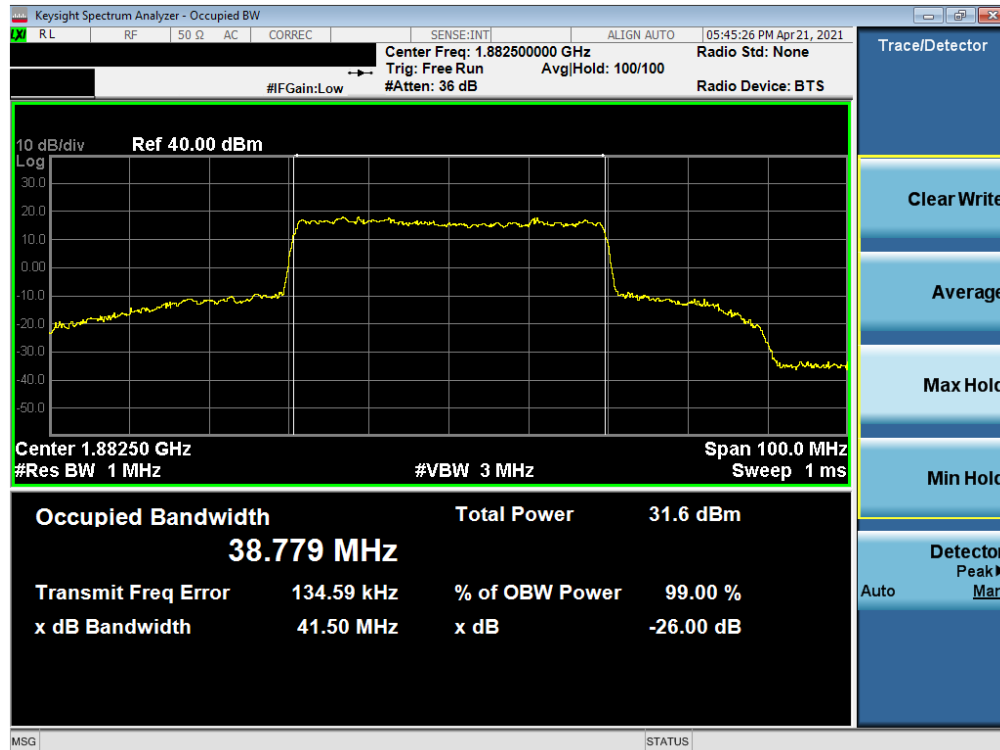


Plot 7-13. Occupied Bandwidth Plot (NR Band n25 - 40.0MHz DFT-s-OFDM BPSK - Full RB)

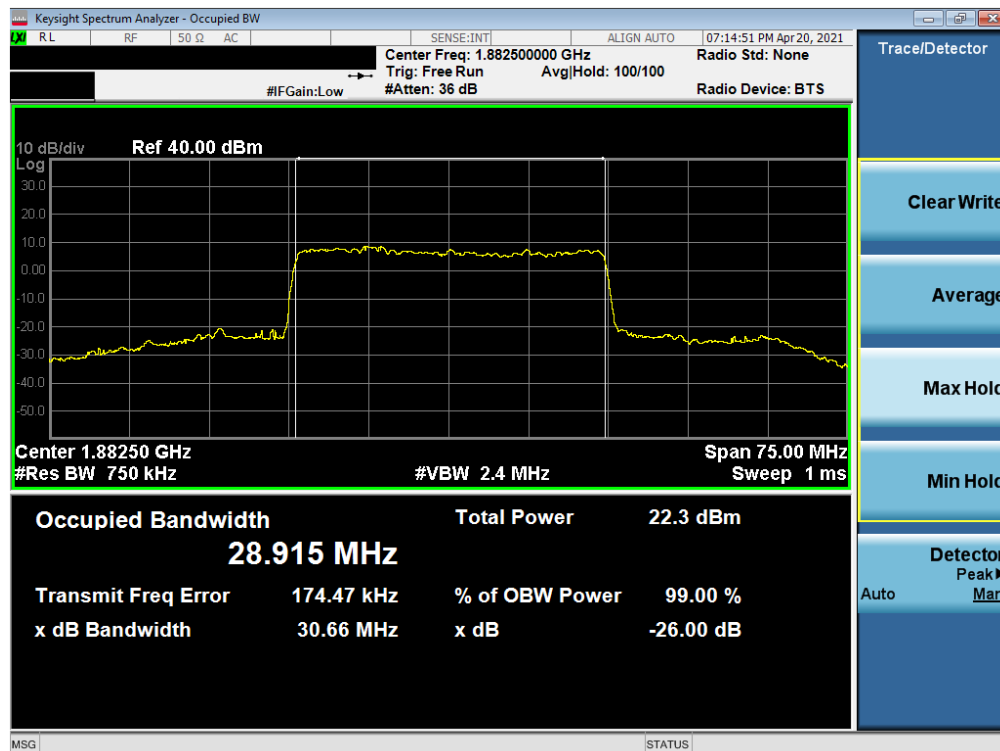


Plot 7-14. Occupied Bandwidth Plot (NR Band n25 - 40.0MHz CP-OFDM QPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 21 of 203

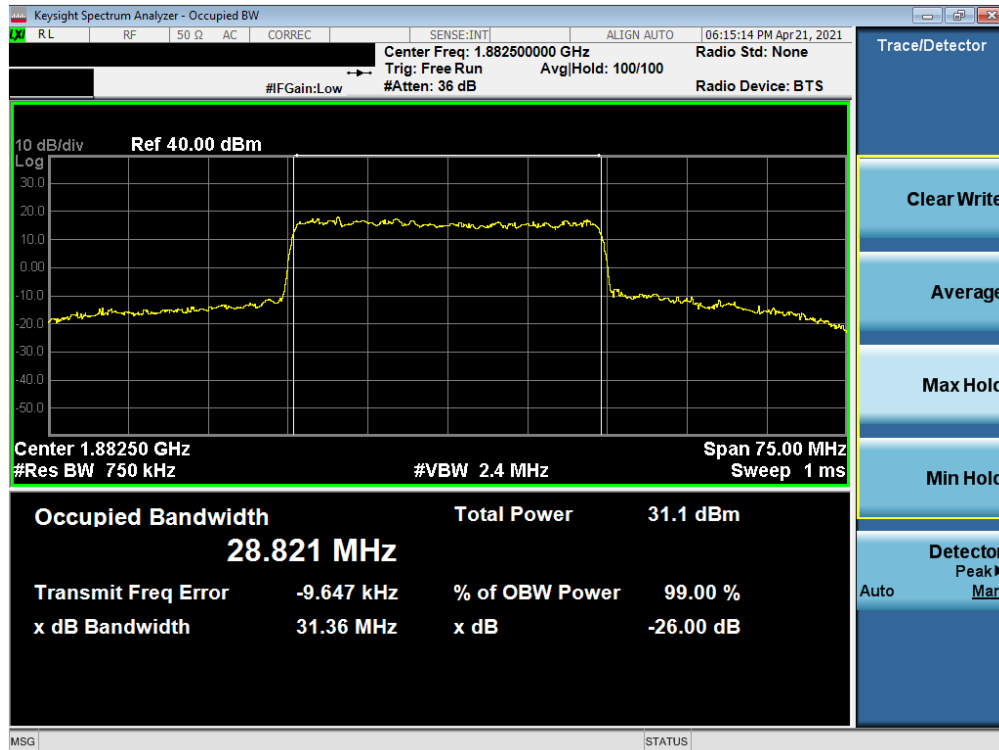


Plot 7-15. Occupied Bandwidth Plot (NR Band n25 - 40.0MHz CP-OFDM 16QAM - Full RB)

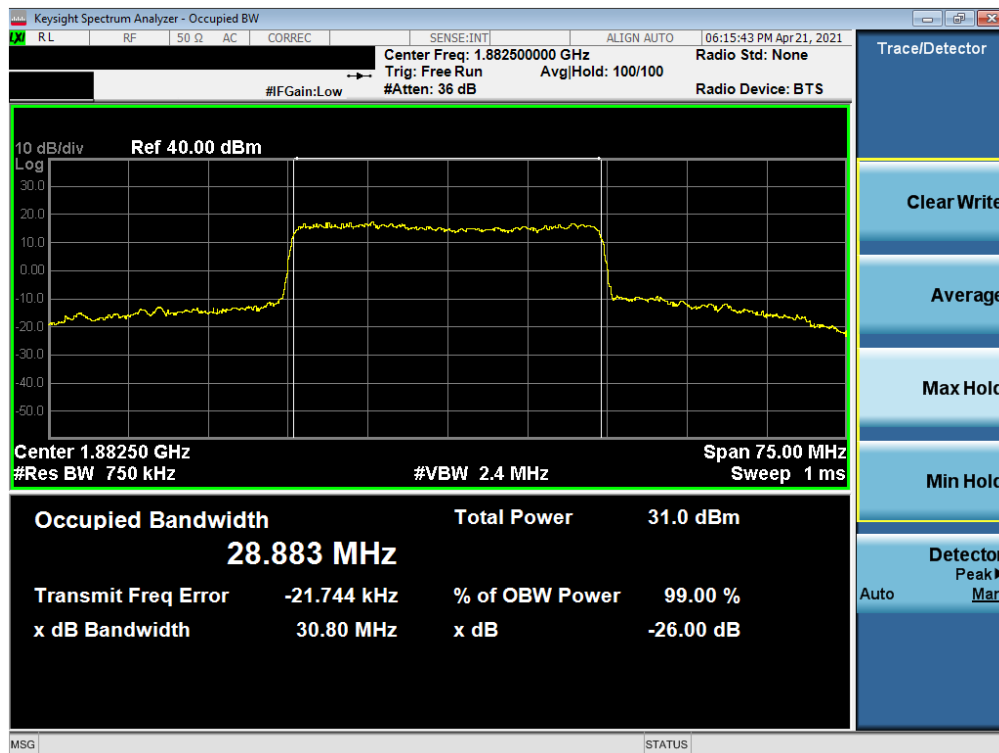


Plot 7-16. Occupied Bandwidth Plot (NR Band n25 - 30.0MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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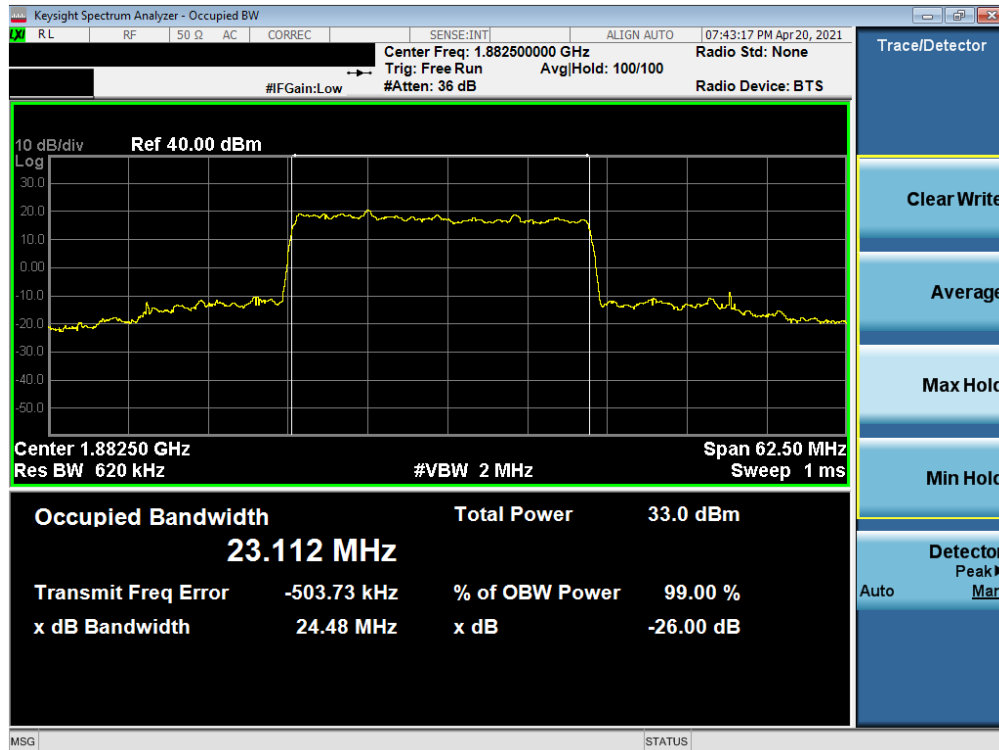


Plot 7-17. Occupied Bandwidth Plot (NR Band n25 - 30.0MHz CP-OFDM QPSK - Full RB)



Plot 7-18. Occupied Bandwidth Plot (NR Band n25 - 30.0MHz CP-OFDM 16QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Plot 7-19. Occupied Bandwidth Plot (NR Band n25 - 25.0MHz DFT-s-OFDM BPSK - Full RB)



Plot 7-20. Occupied Bandwidth Plot (NR Band n25 - 25.0MHz CP-OFDM QPSK - Full RB)

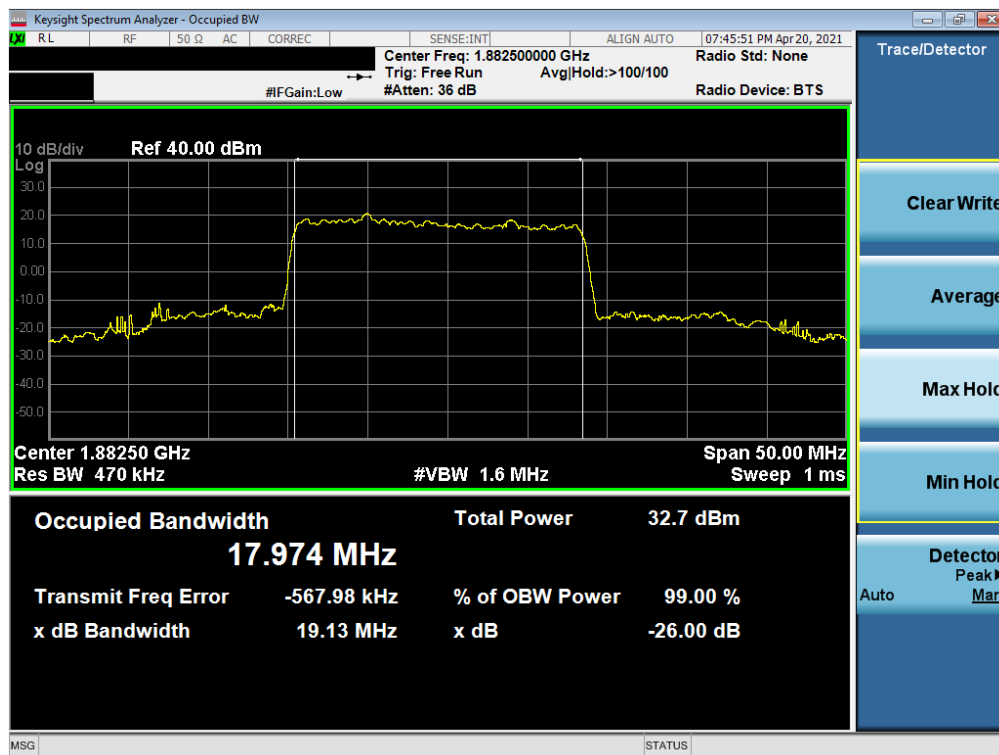
FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 24 of 203



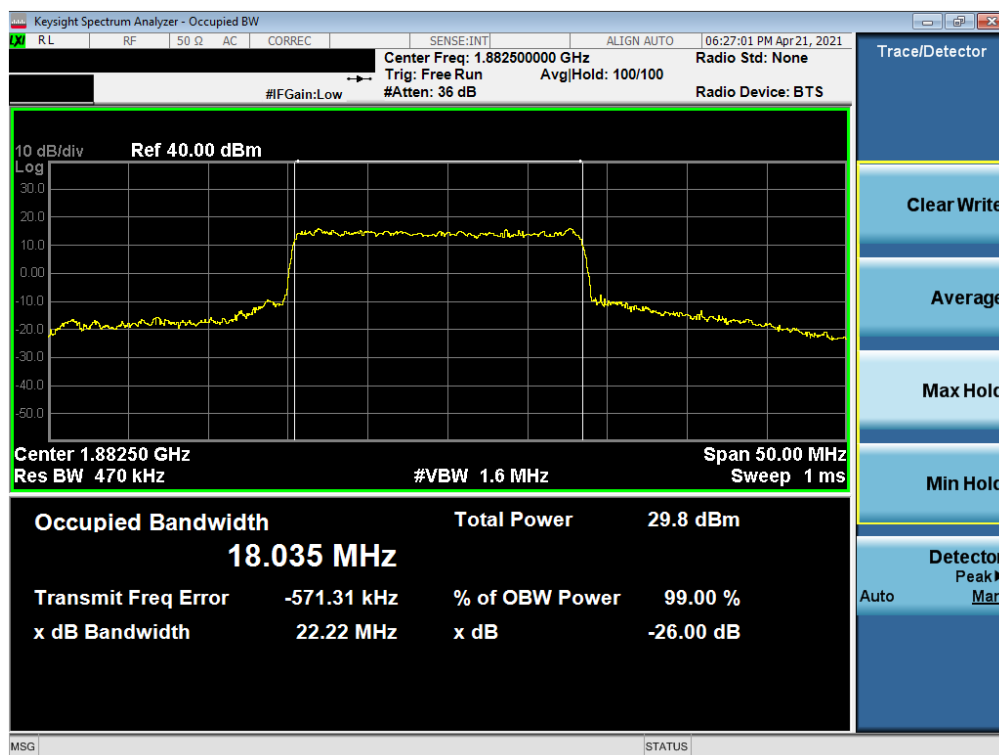
Plot 7-21. Occupied Bandwidth Plot (NR Band n25 - 25.0MHz CP-OFDM 16QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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n25/2 – Ant A

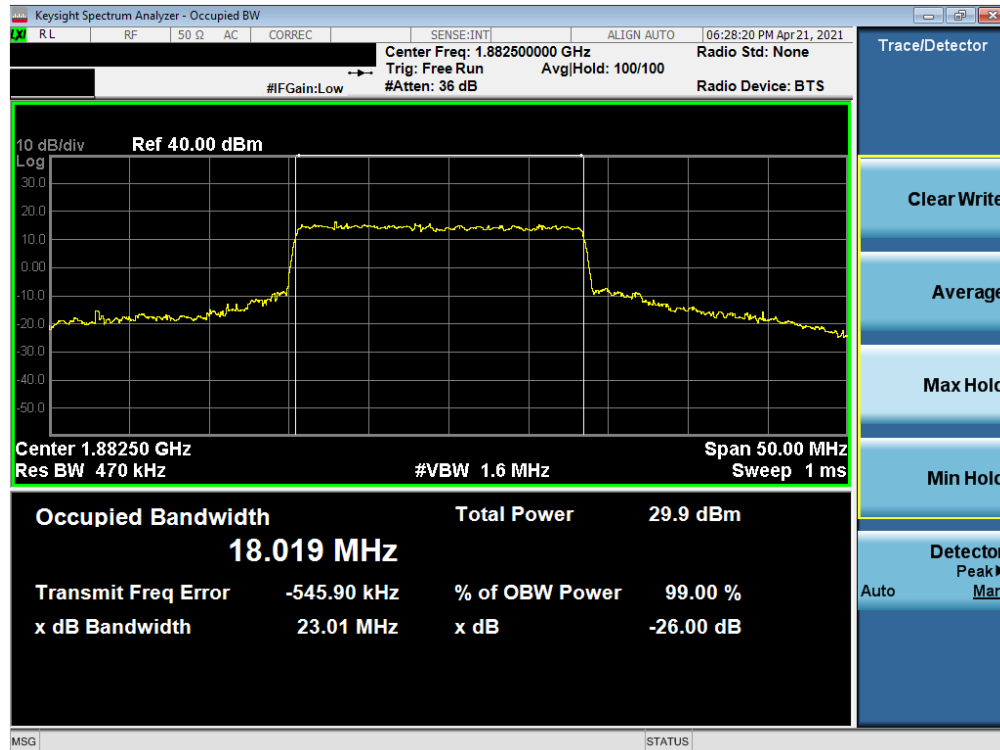


Plot 7-22. Occupied Bandwidth Plot (NR Band n25/2 - 20.0MHz DFT-s-OFDM BPSK - Full RB)

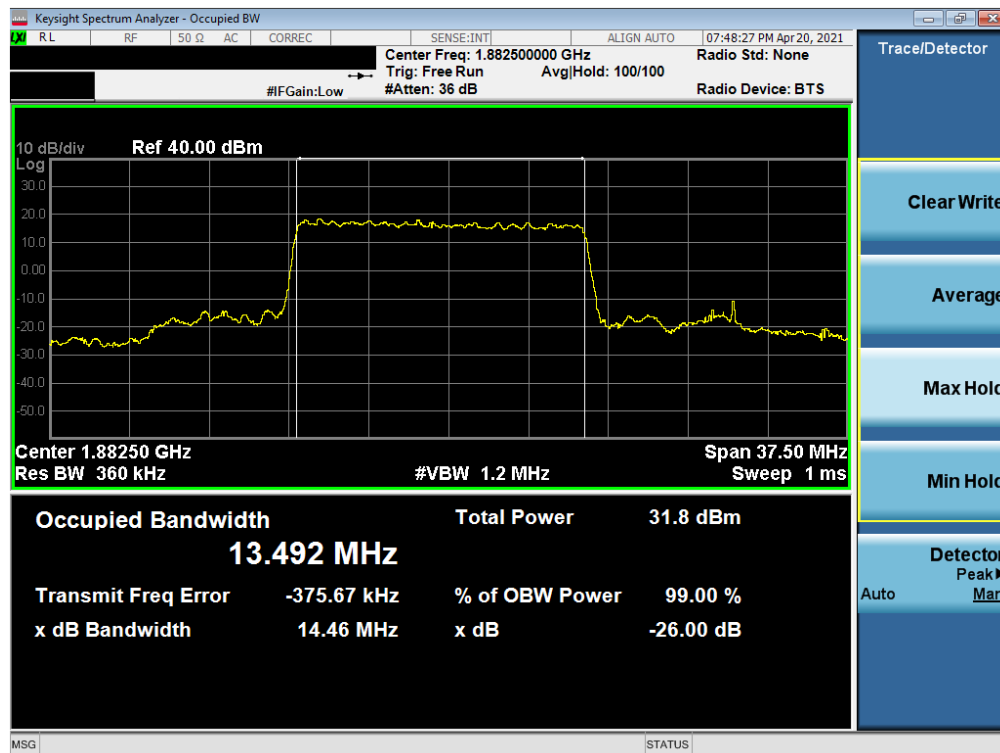


Plot 7-23. Occupied Bandwidth Plot (NR Band n25/2 - 20.0MHz CP-OFDM QPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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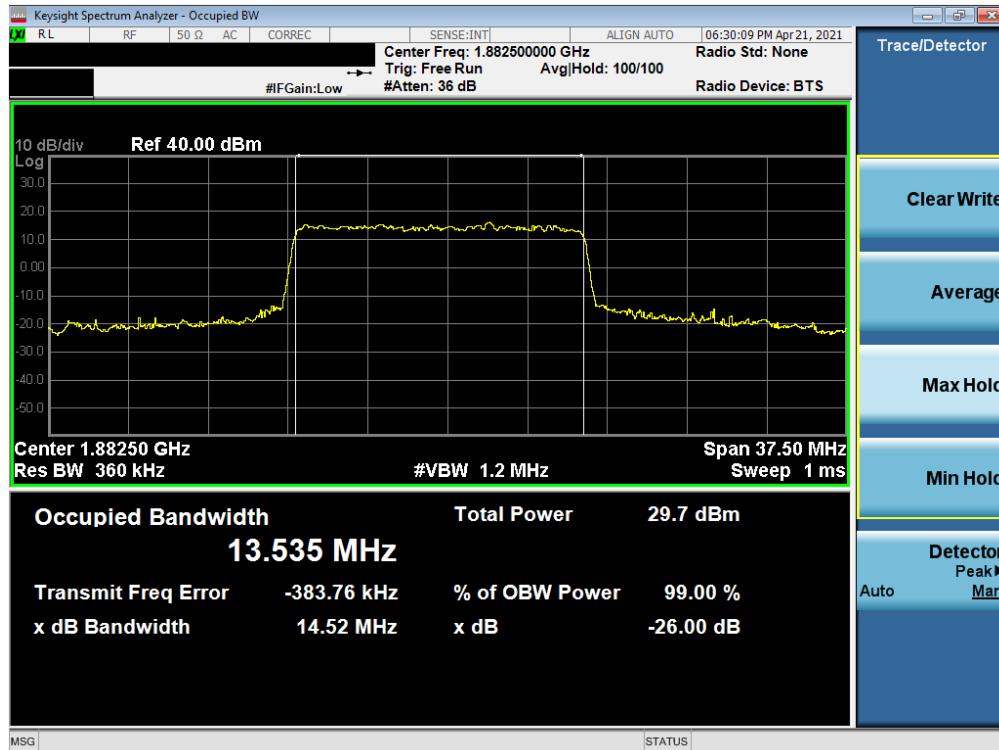


Plot 7-24. Occupied Bandwidth Plot (NR Band n25/2 - 20.0MHz CP-OFDM 16QAM - Full RB)



Plot 7-25. Occupied Bandwidth Plot (NR Band n25/2 - 15.0MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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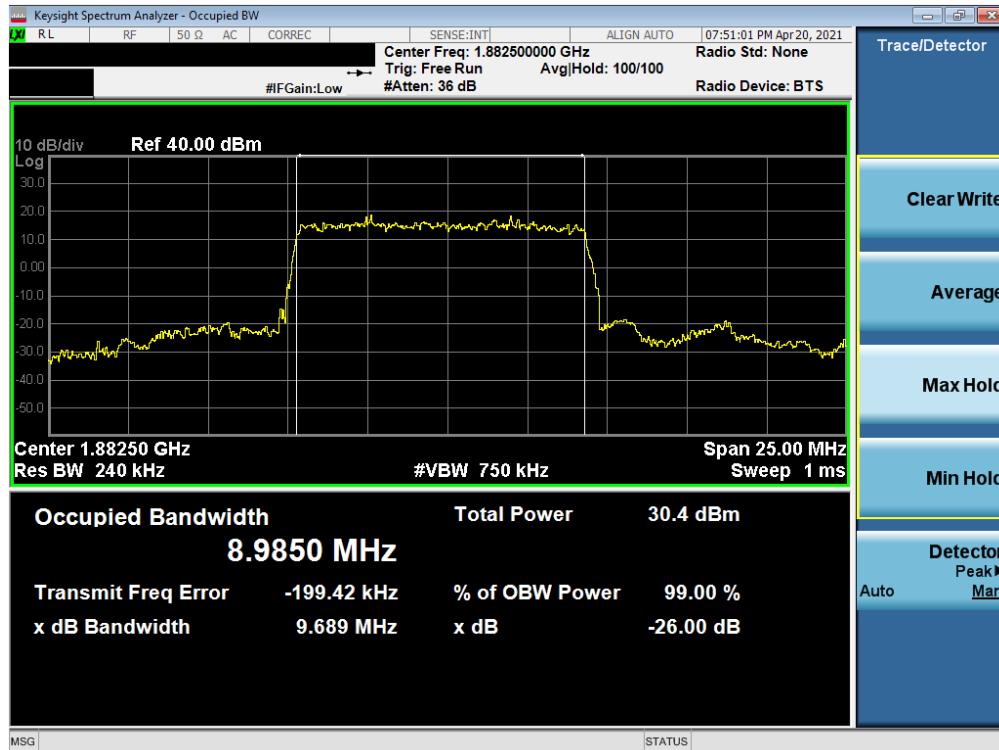


Plot 7-26. Occupied Bandwidth Plot (NR Band n25/2 - 15.0MHz CP-OFDM QPSK - Full RB)



Plot 7-27. Occupied Bandwidth Plot (NR Band n25/2 - 15.0MHz CP-OFDM 16QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Plot 7-28. Occupied Bandwidth Plot (NR Band n25/2 - 10.0MHz DFT-s-OFDM BPSK - Full RB)

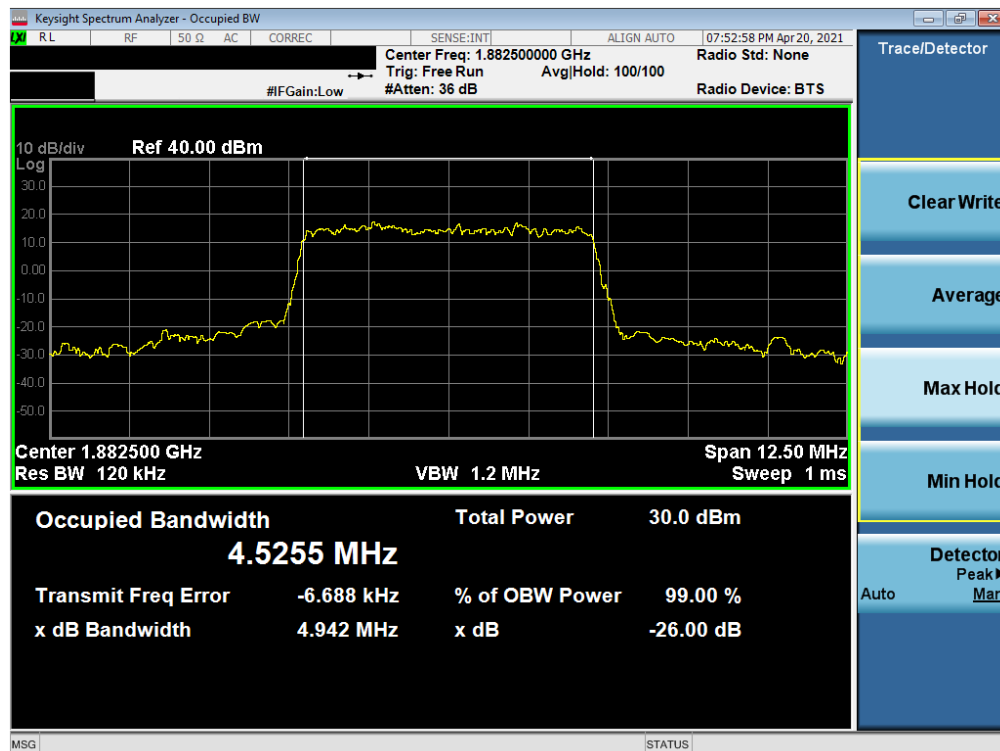


Plot 7-29. Occupied Bandwidth Plot (NR Band n25/2 - 10.0MHz CP-OFDM QPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 29 of 203

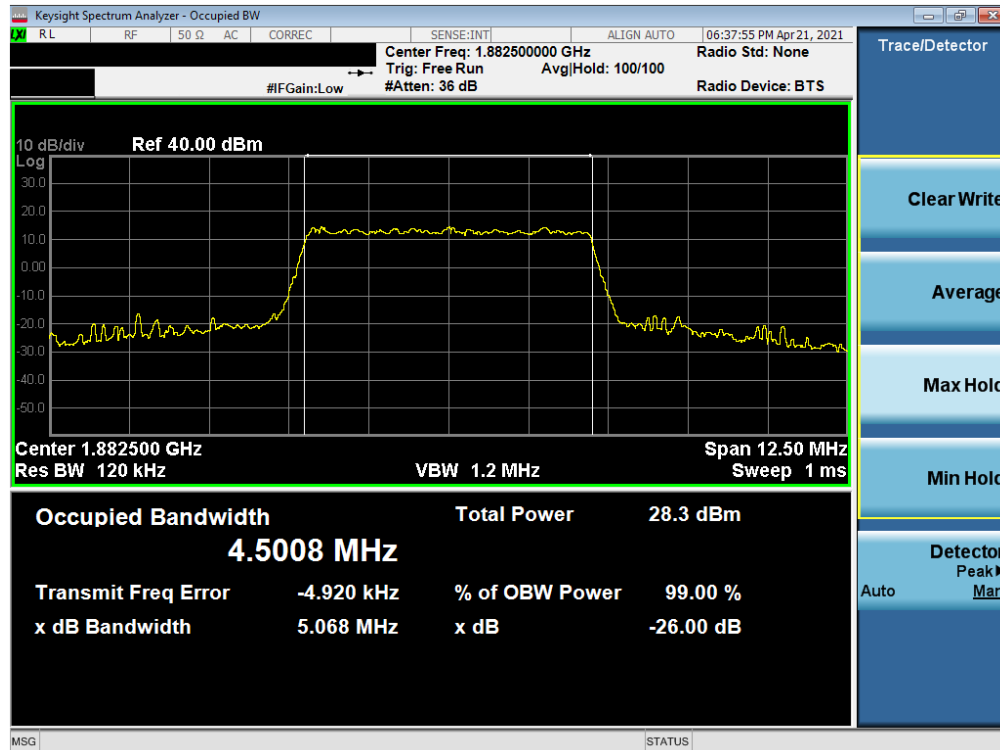


Plot 7-30. Occupied Bandwidth Plot (NR Band n25/2 - 10.0MHz CP-OFDM 16QAM - Full RB)

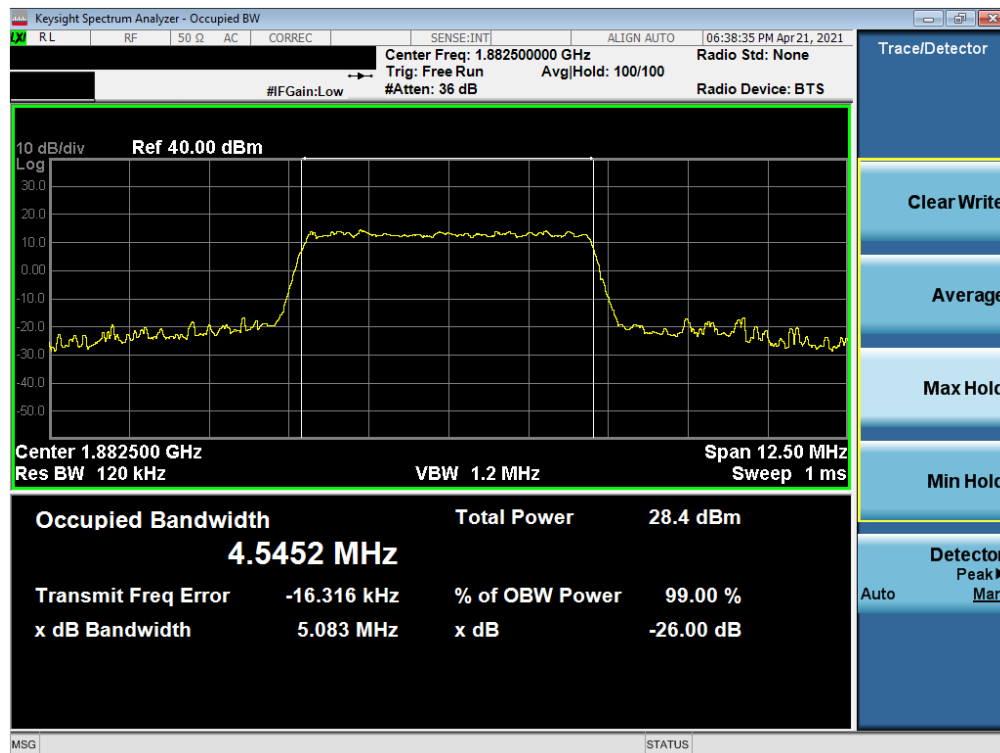


Plot 7-31. Occupied Bandwidth Plot (NR Band n25/2 - 5.0MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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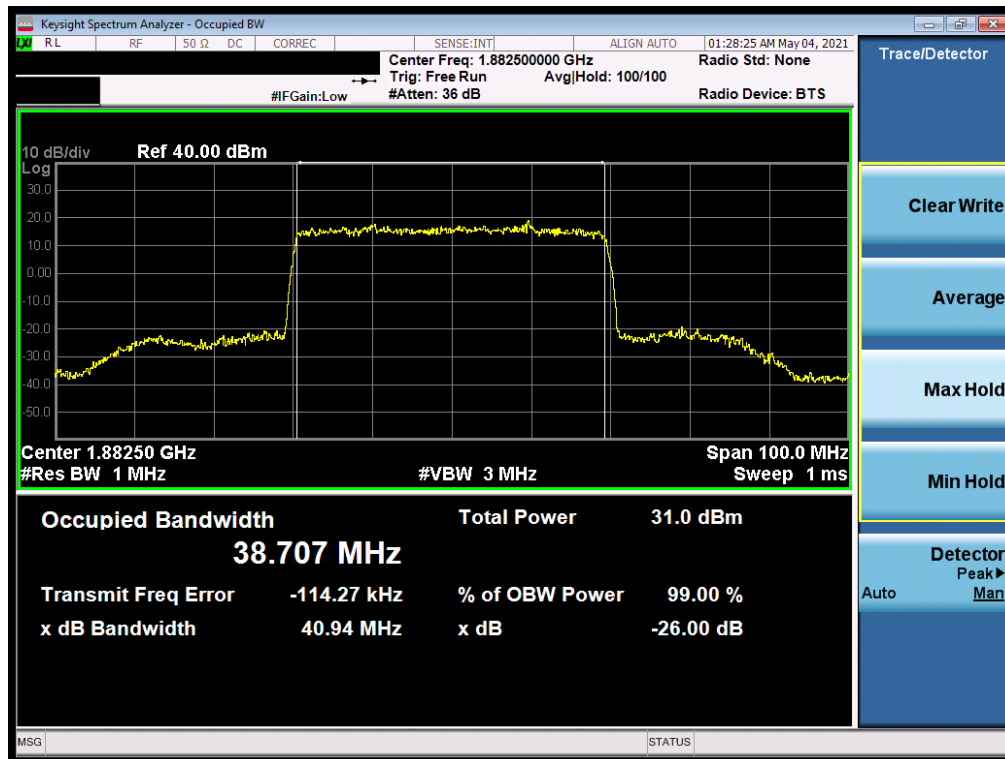
Plot 7-32. Occupied Bandwidth Plot (NR Band n25/2 - 5.0MHz CP-OFDM QPSK - Full RB)



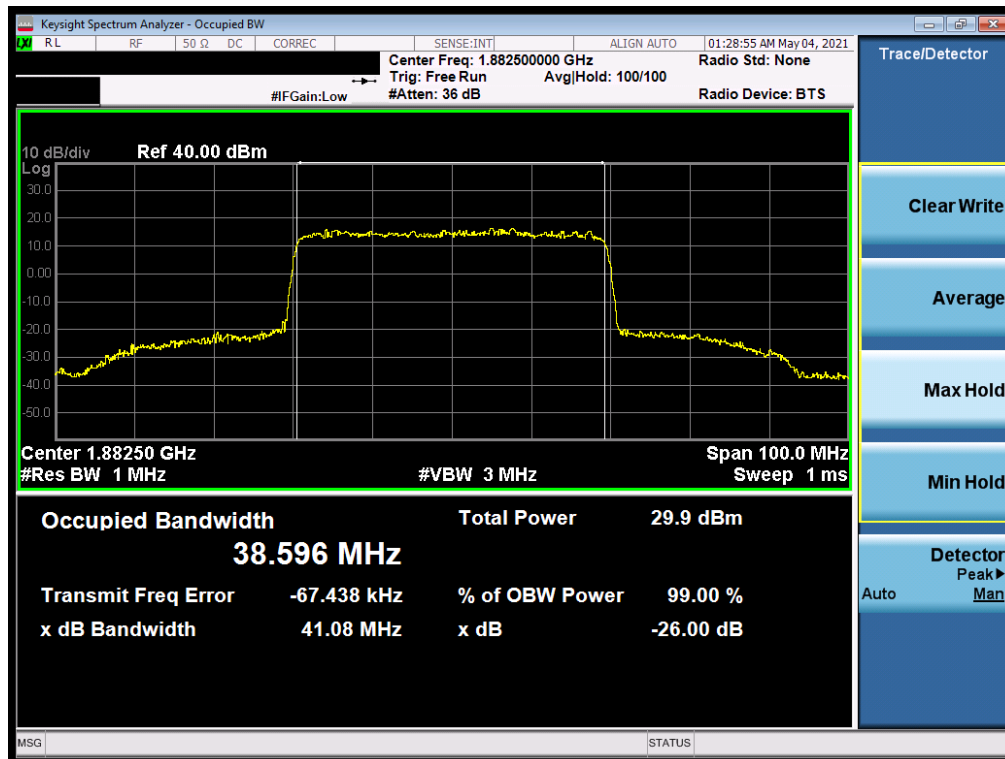
Plot 7-33. Occupied Bandwidth Plot (NR Band n25/2 - 5.0MHz CP-OFDM 16QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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NR Band n25 – Ant I

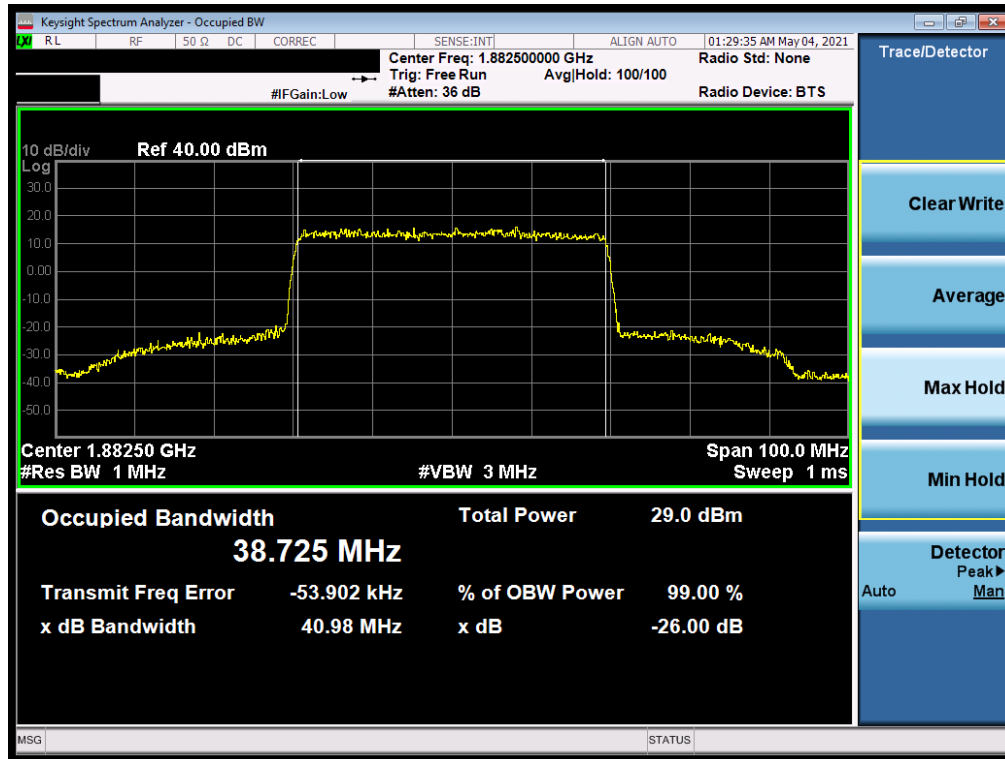


Plot 7-34. Occupied Bandwidth Plot (NR Band n25 - 40.0MHz DFT-s-OFDM BPSK - Full RB)

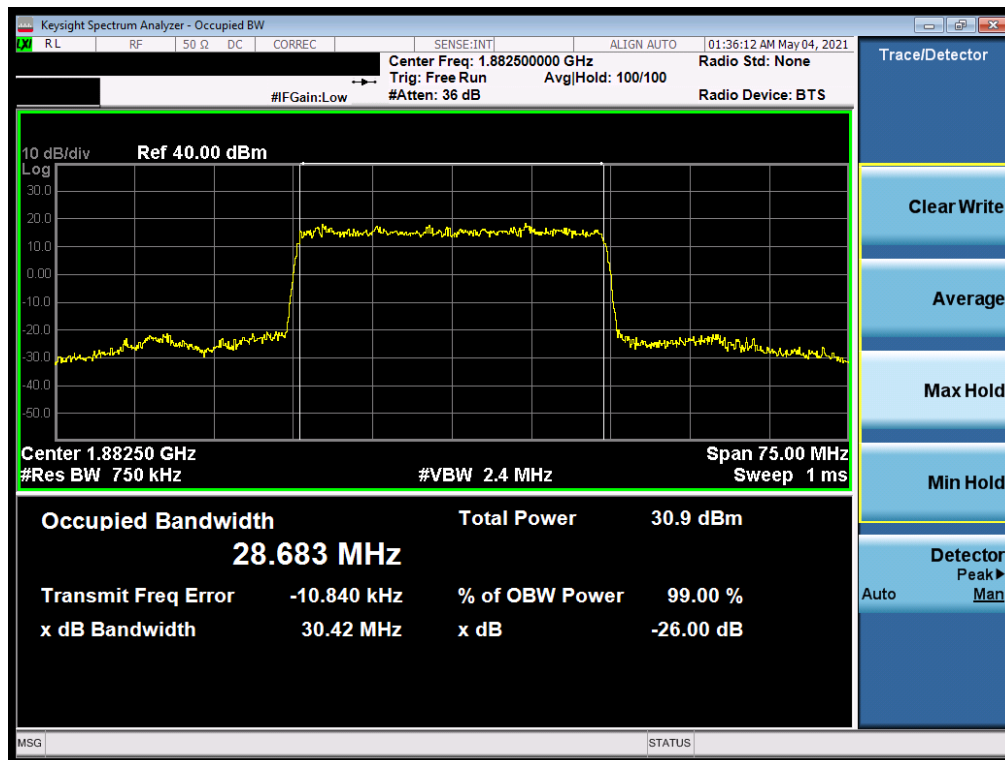


Plot 7-35. Occupied Bandwidth Plot (NR Band n25 - 40.0MHz CP-OFDM QPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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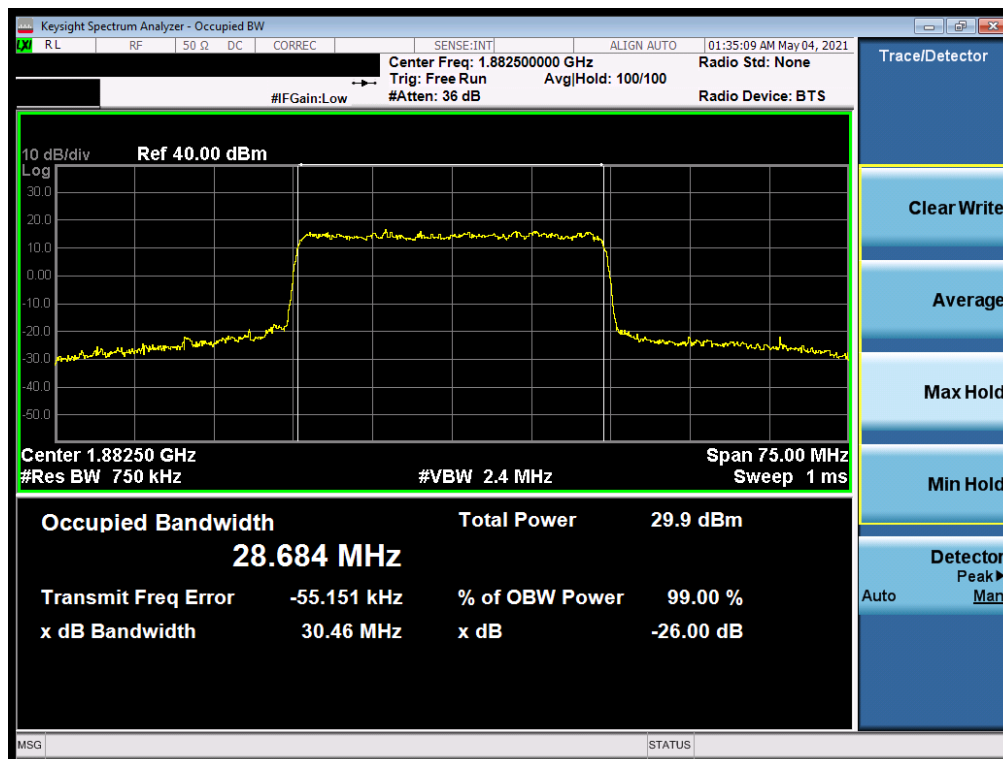


Plot 7-36. Occupied Bandwidth Plot (NR Band n25 - 40.0MHz CP-OFDM 16QAM - Full RB)

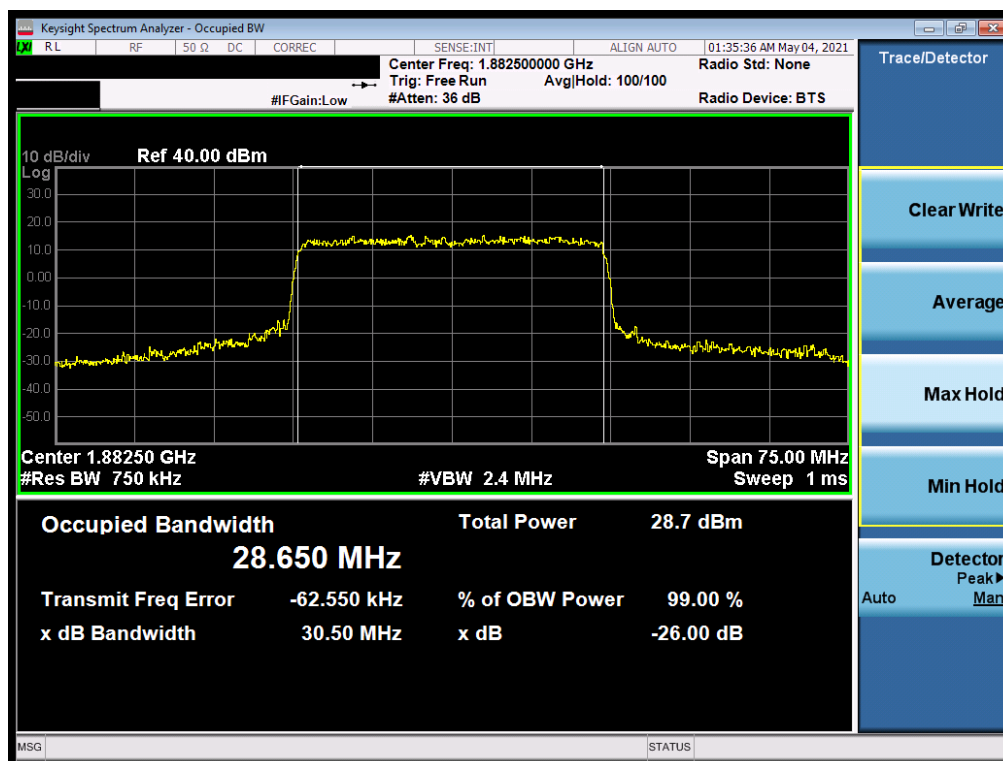


Plot 7-37. Occupied Bandwidth Plot (NR Band n25 - 30.0MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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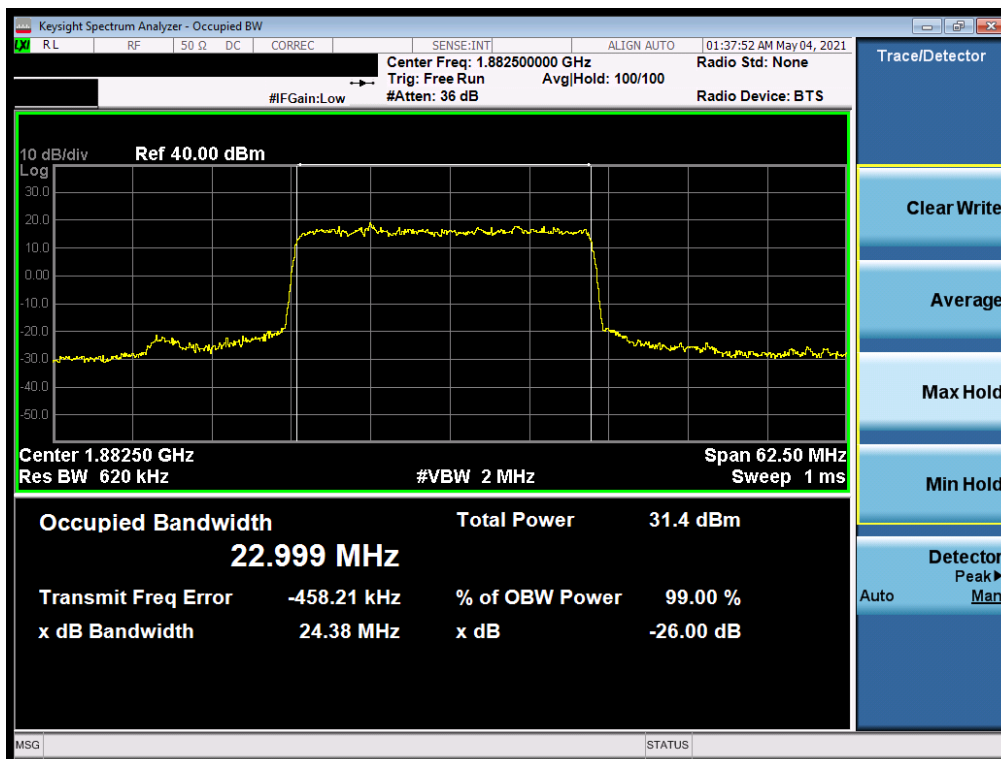


Plot 7-38. Occupied Bandwidth Plot (NR Band n25 - 30.0MHz CP-OFDM QPSK - Full RB)

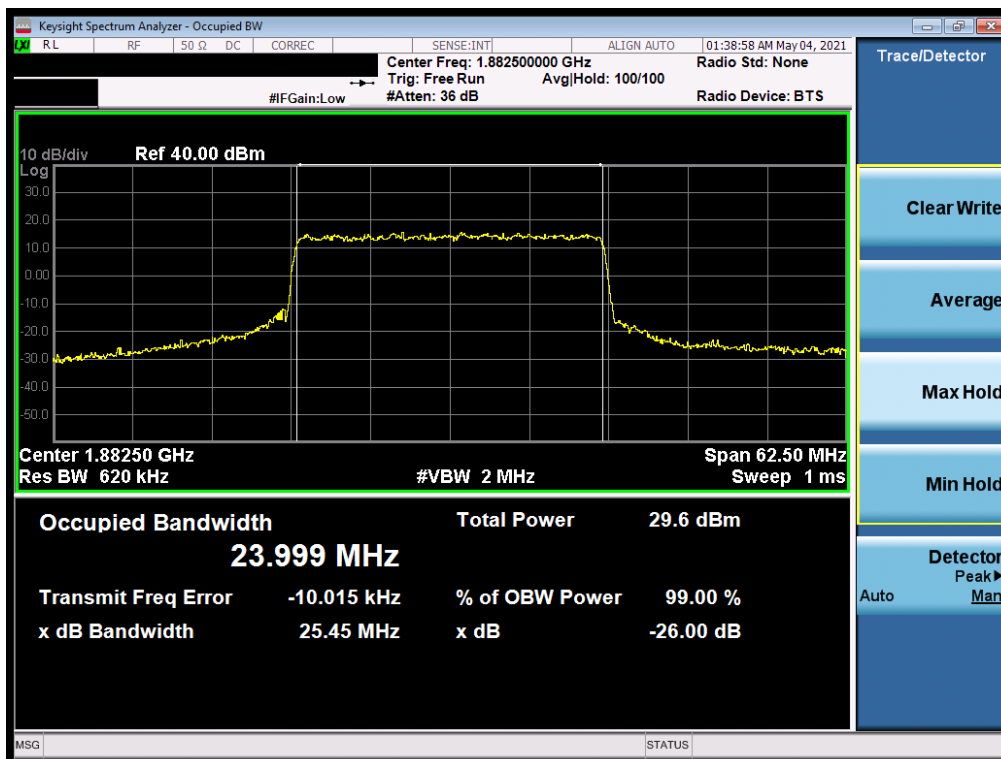


Plot 7-39. Occupied Bandwidth Plot (NR Band n25 - 30.0MHz CP-OFDM 16QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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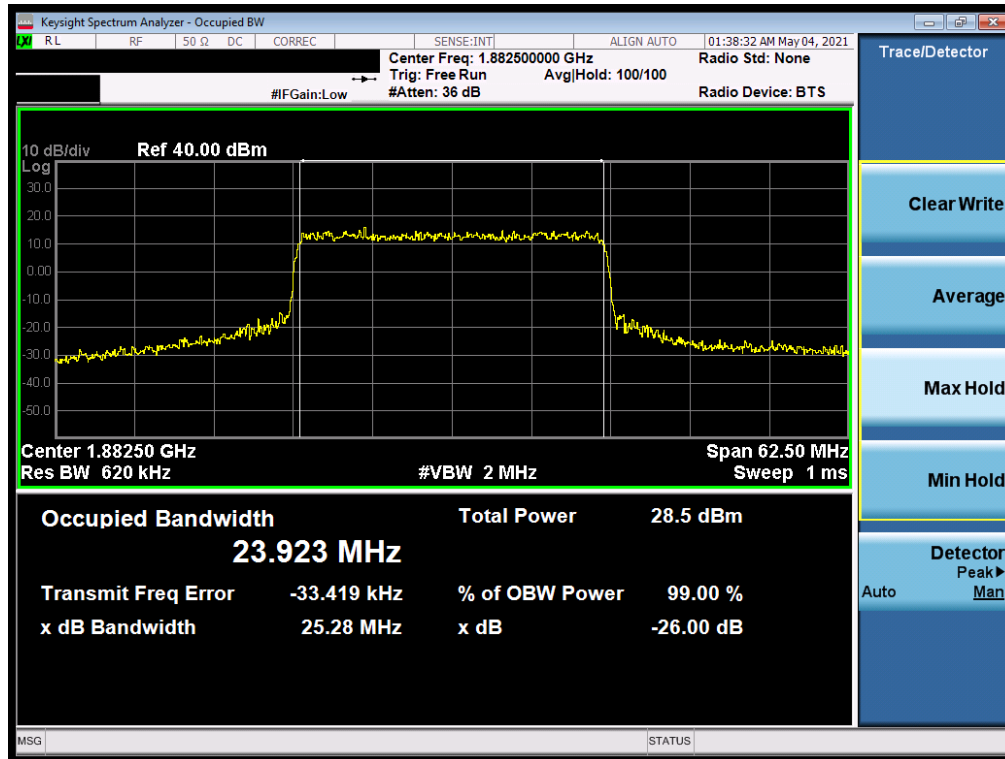


Plot 7-40. Occupied Bandwidth Plot (NR Band n25 - 25.0MHz DFT-s-OFDM BPSK - Full RB)



Plot 7-41. Occupied Bandwidth Plot (NR Band n25 - 25.0MHz CP-OFDM QPSK - Full RB)

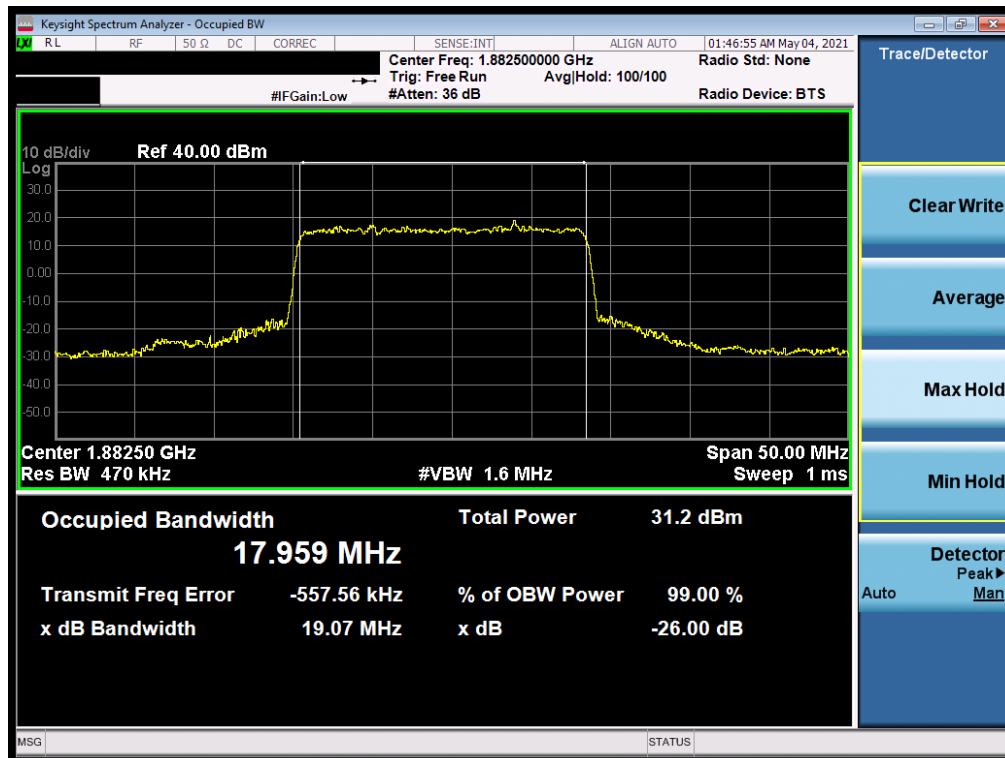
FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 35 of 203



Plot 7-42. Occupied Bandwidth Plot (NR Band n25 - 25.0MHz CP-OFDM 16QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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NR Band n25/2 – Ant I



Plot 7-43. Occupied Bandwidth Plot (NR Band n25/2 - 20.0MHz DFT-s-OFDM BPSK - Full RB)

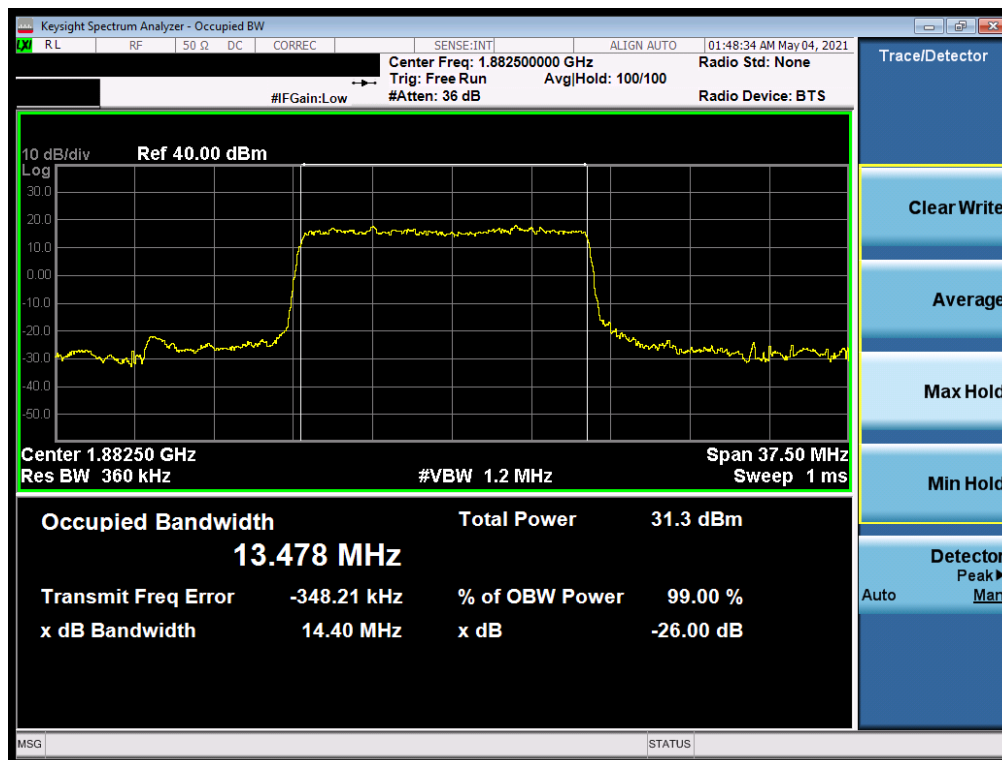


Plot 7-44. Occupied Bandwidth Plot (NR Band n25/2 - 20.0MHz CP-OFDM QPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 37 of 203



Plot 7-45. Occupied Bandwidth Plot (NR Band n25/2 - 20.0MHz CP-OFDM 16QAM - Full RB)

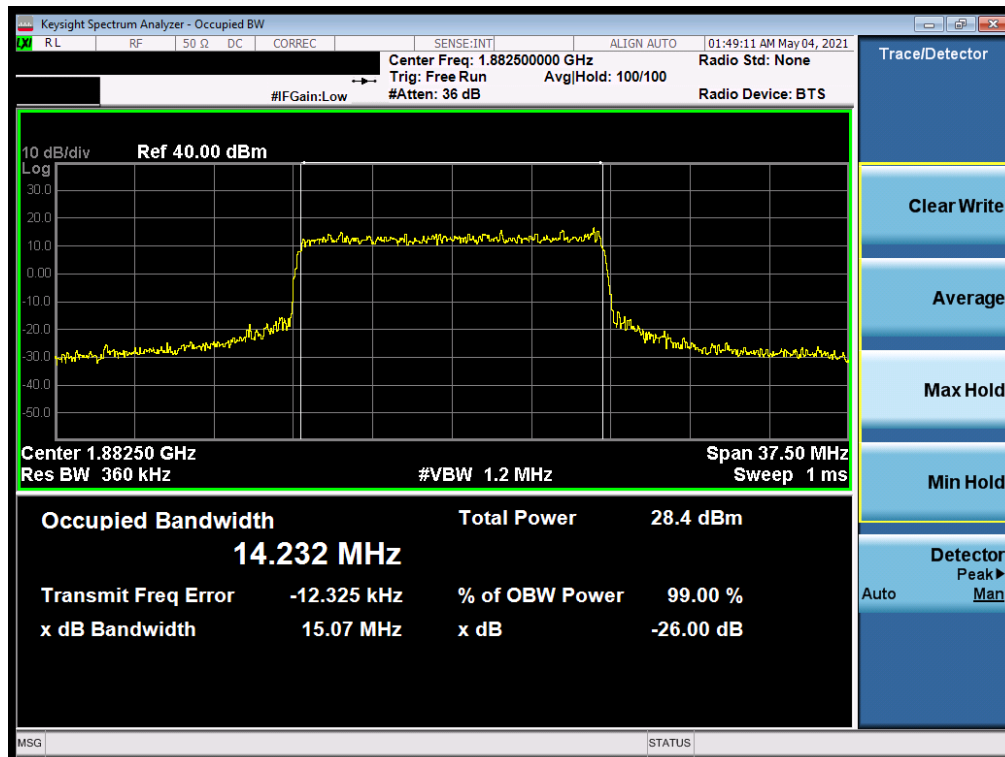


Plot 7-46. Occupied Bandwidth Plot (NR Band n25/2 - 15.0MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 38 of 203

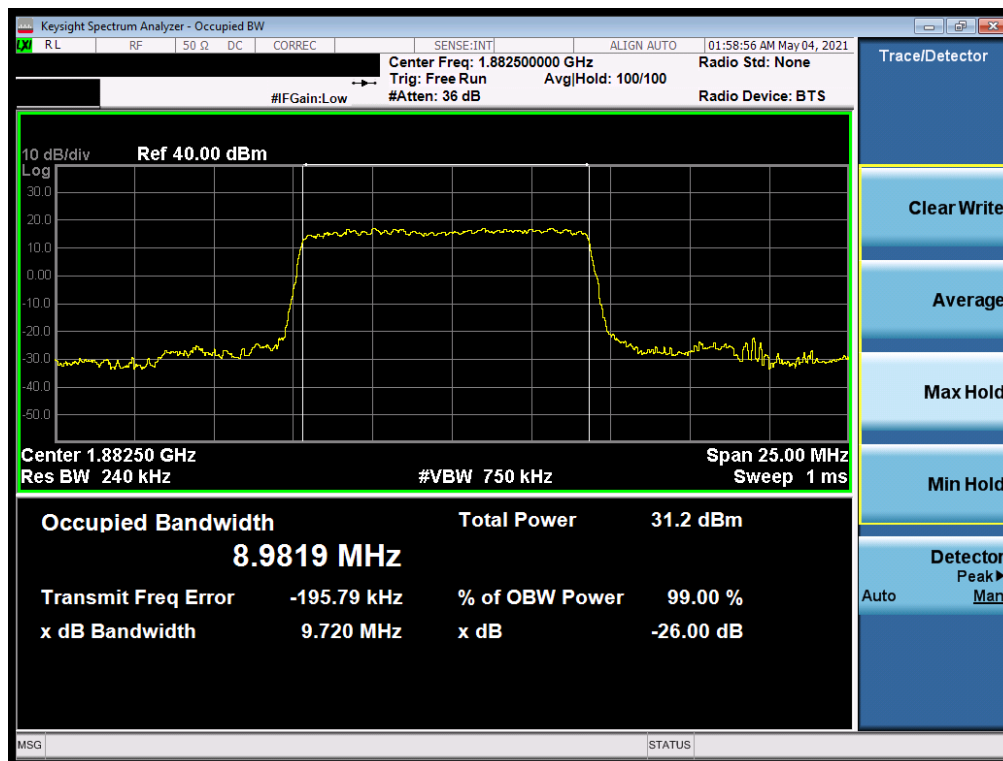


Plot 7-47. Occupied Bandwidth Plot (NR Band n25/2 - 15.0MHz CP-OFDM QPSK - Full RB)

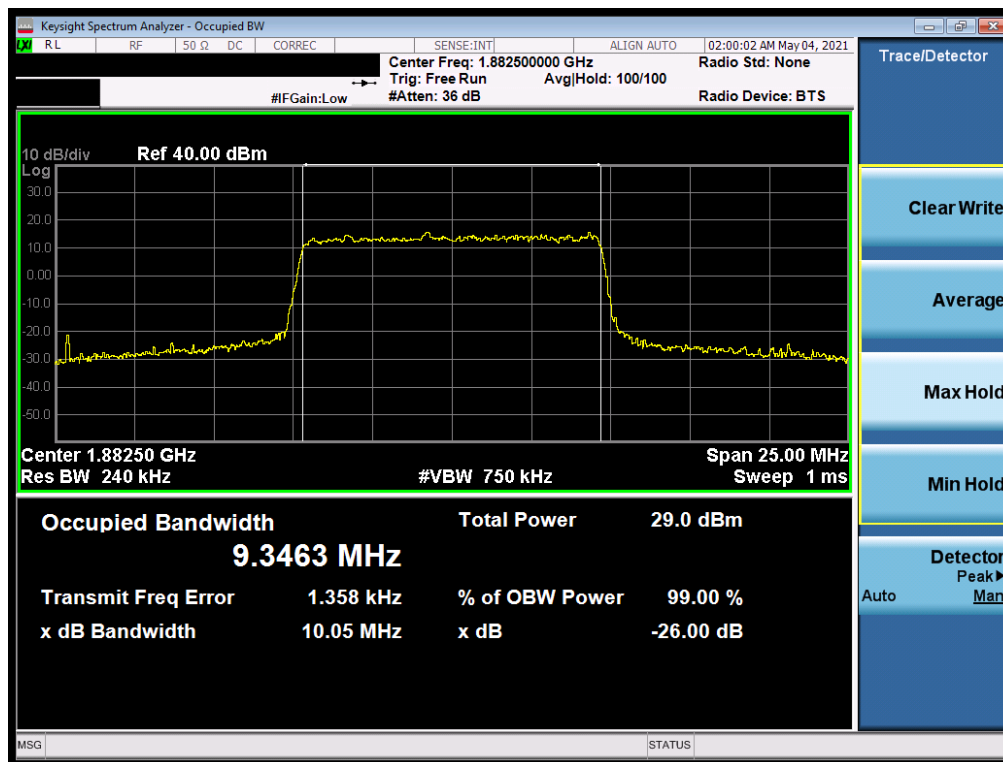


Plot 7-48. Occupied Bandwidth Plot (NR Band n25/2 - 15.0MHz CP-OFDM 16QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 39 of 203



Plot 7-49. Occupied Bandwidth Plot (NR Band n25/2 - 10.0MHz DFT-s-OFDM BPSK - Full RB)

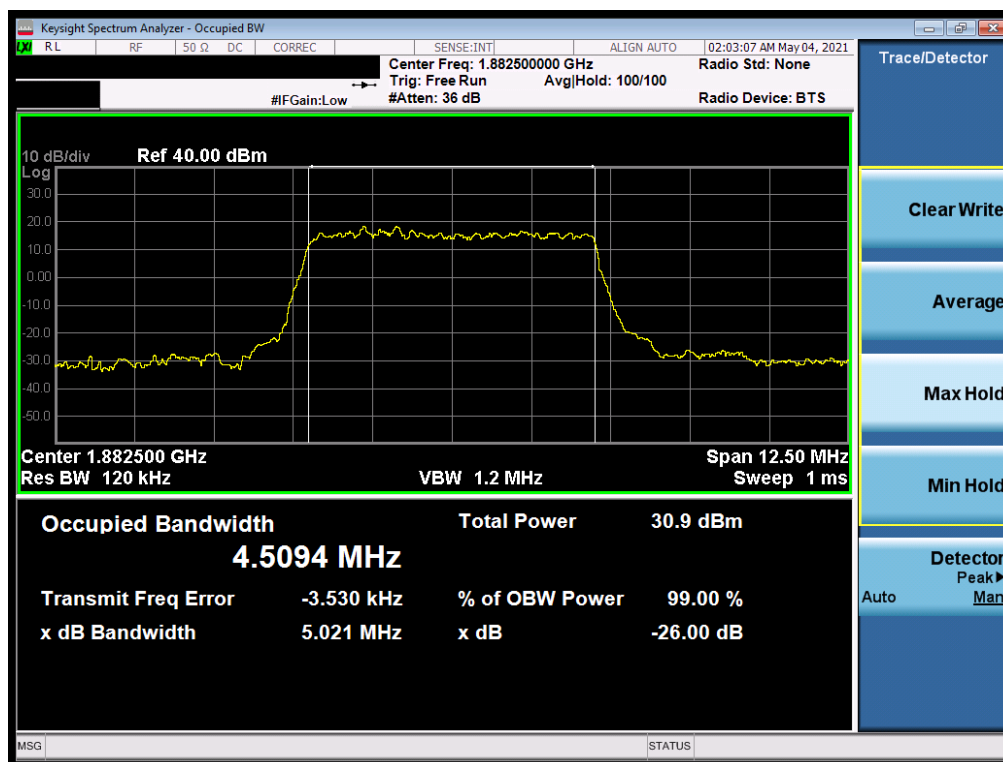


Plot 7-50. Occupied Bandwidth Plot (NR Band n25/2 - 10.0MHz CP-OFDM QPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 40 of 203

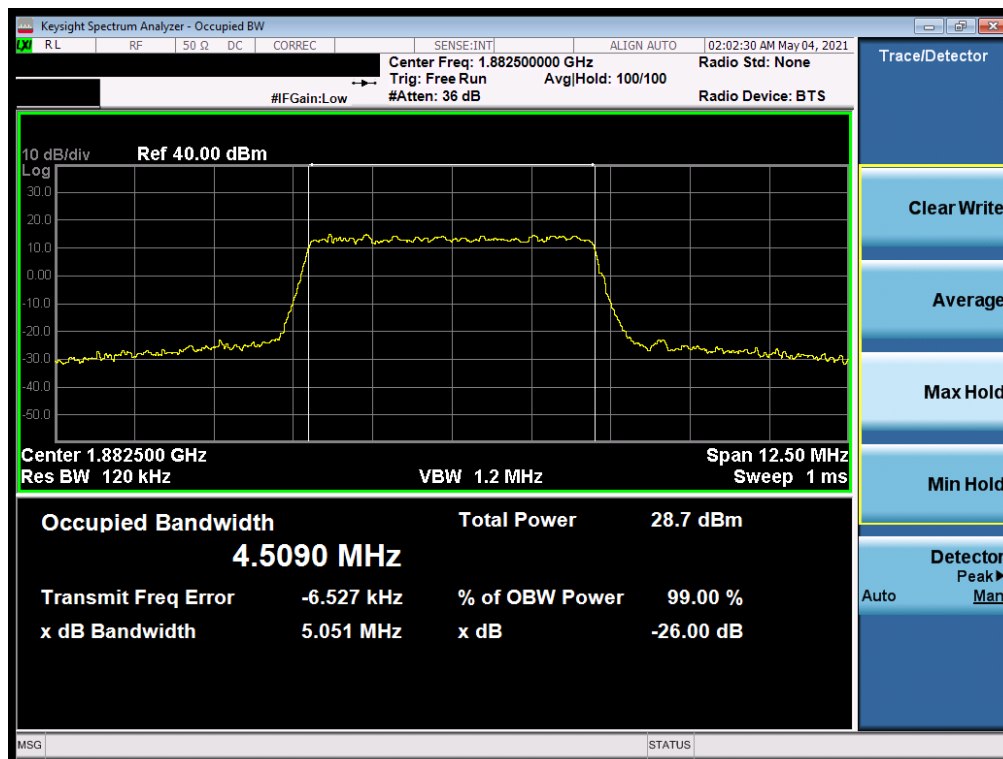


Plot 7-51. Occupied Bandwidth Plot (NR Band n25/2 - 10.0MHz CP-OFDM 16QAM - Full RB)

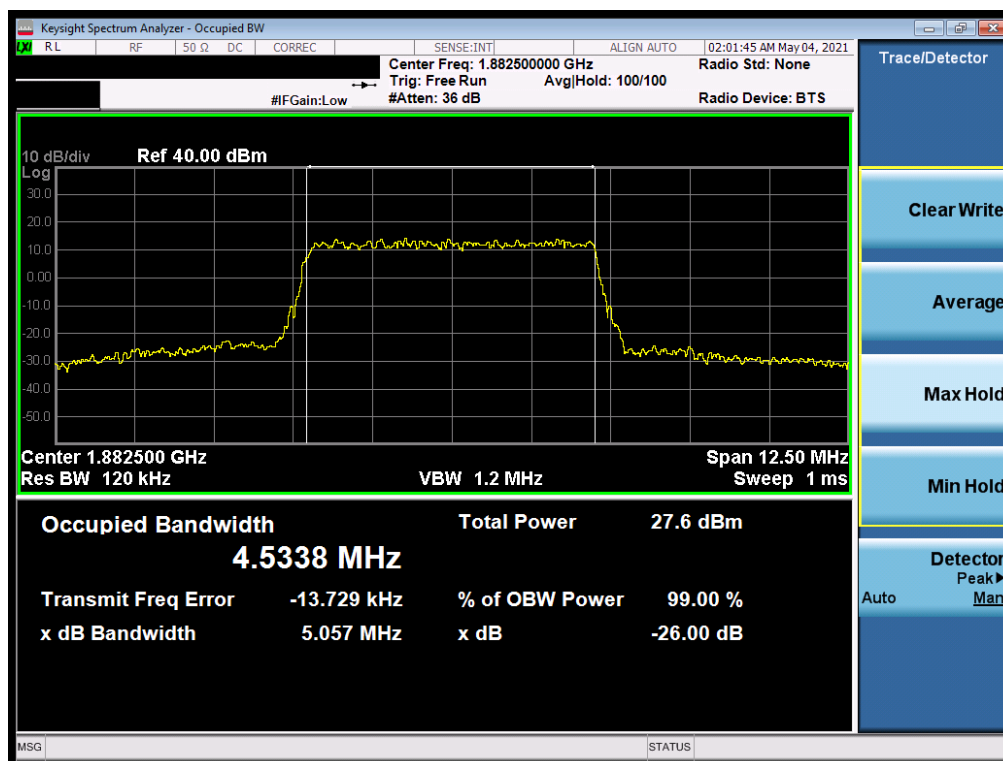


Plot 7-52. Occupied Bandwidth Plot (NR Band n25/2 - 5.0MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 41 of 203



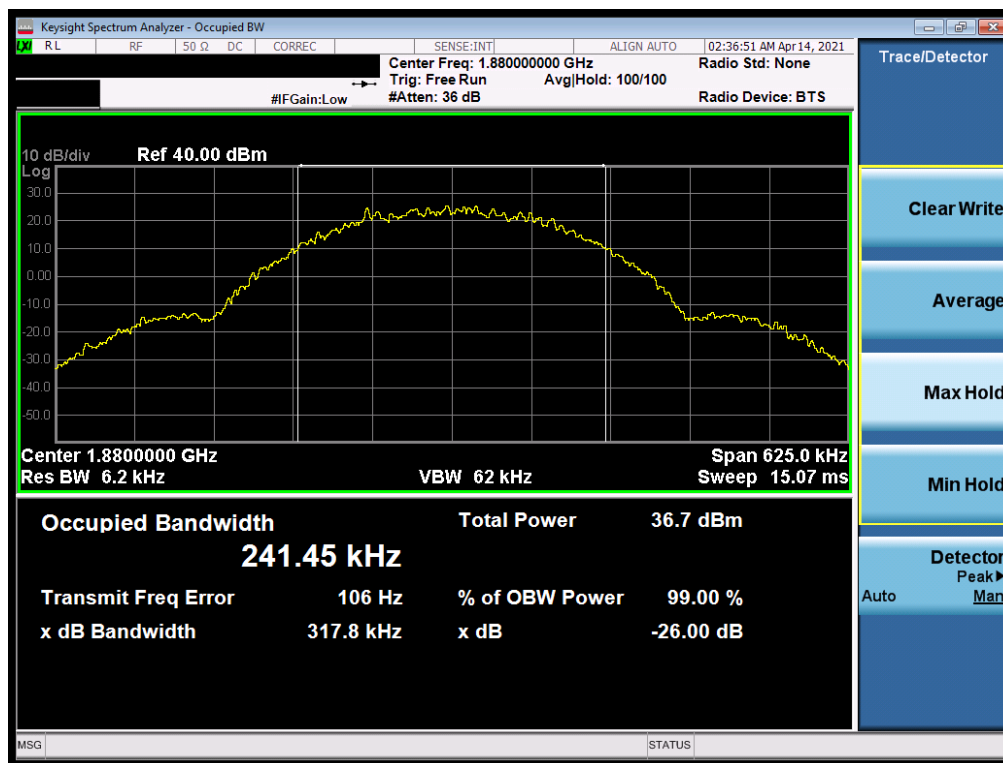
Plot 7-53. Occupied Bandwidth Plot (NR Band n25/2 - 5.0MHz CP-OFDM QPSK - Full RB)



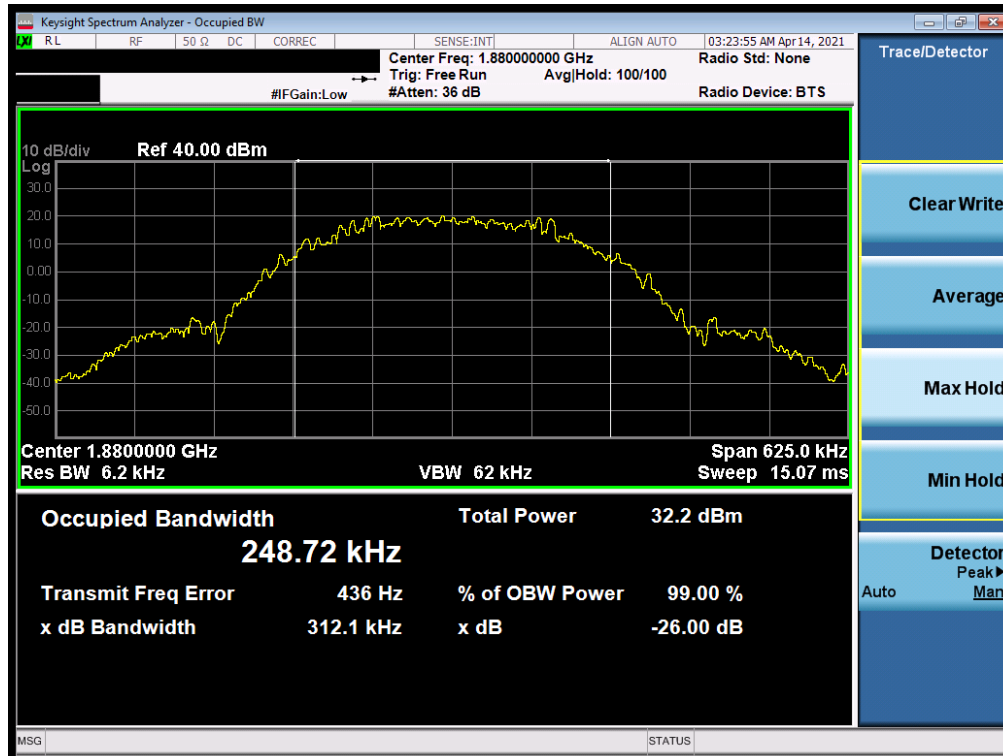
Plot 7-54. Occupied Bandwidth Plot (NR Band n25/2 - 5.0MHz CP-OFDM 16QAM - Full RB)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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GSM/GPRS PCS



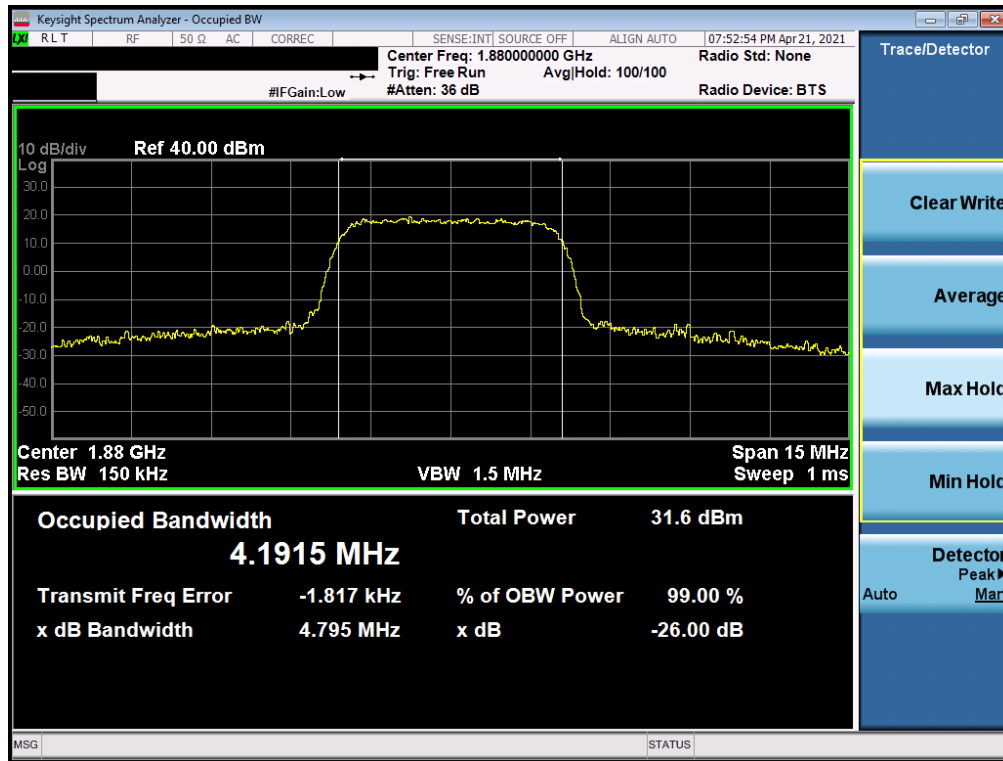
Plot 7-55. Occupied Bandwidth Plot (GPRS, Ch. 661)



Plot 7-56. Occupied Bandwidth Plot (EDGE, Ch. 661)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 43 of 203

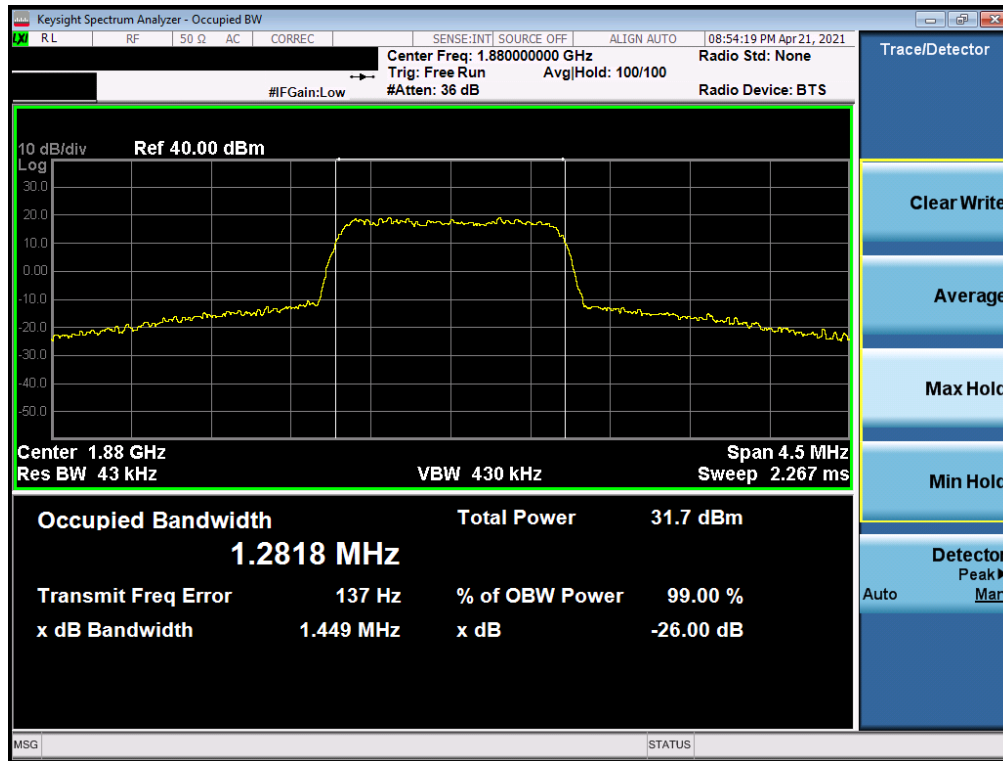
WCDMA PCS



Plot 7-57. Occupied Bandwidth Plot (WCDMA, Ch. 9400)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 44 of 203

CDMA PCS



Plot 7-58. Occupied Bandwidth Plot (CDMA, Ch. 600)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 45 of 203

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 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The minimum permissible attenuation level of any spurious emission is $43 + 10 \log_{10}(P_{\text{Watts}})$, 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 20GHz (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.

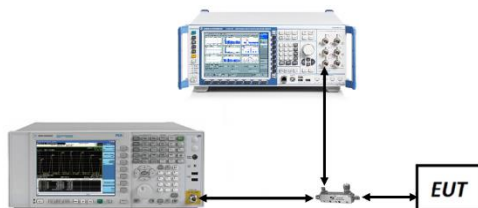


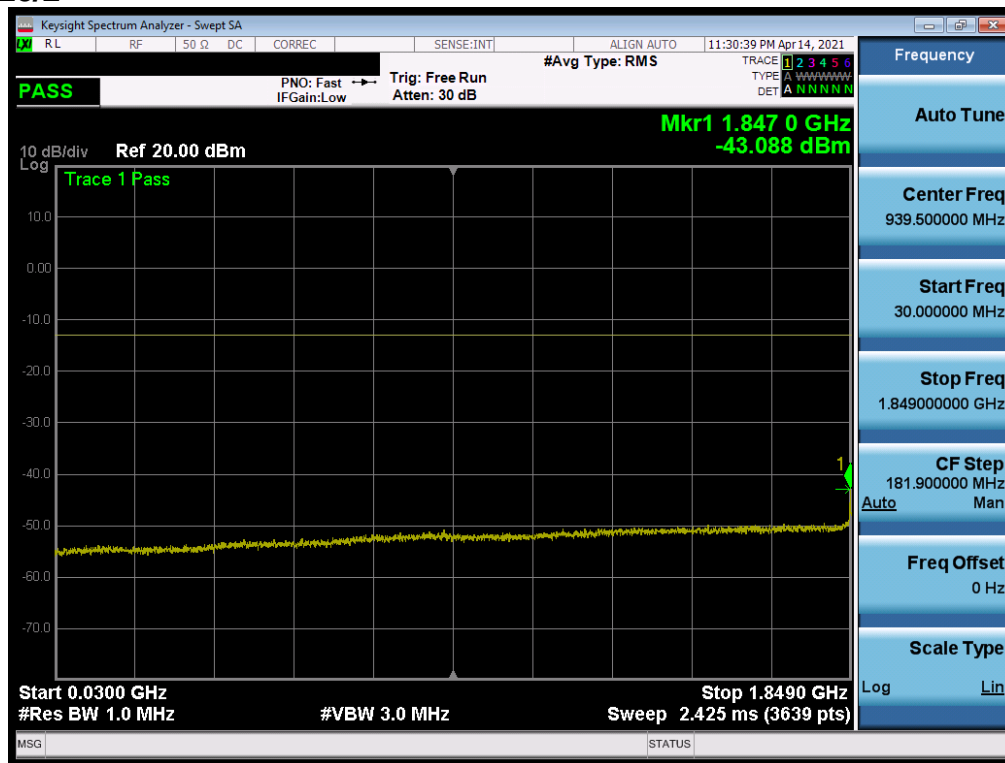
Figure 7-2. Test Instrument & Measurement Setup

Test Notes

1. Per Part 24 and RSS-133, 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: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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LTE Band 25/2

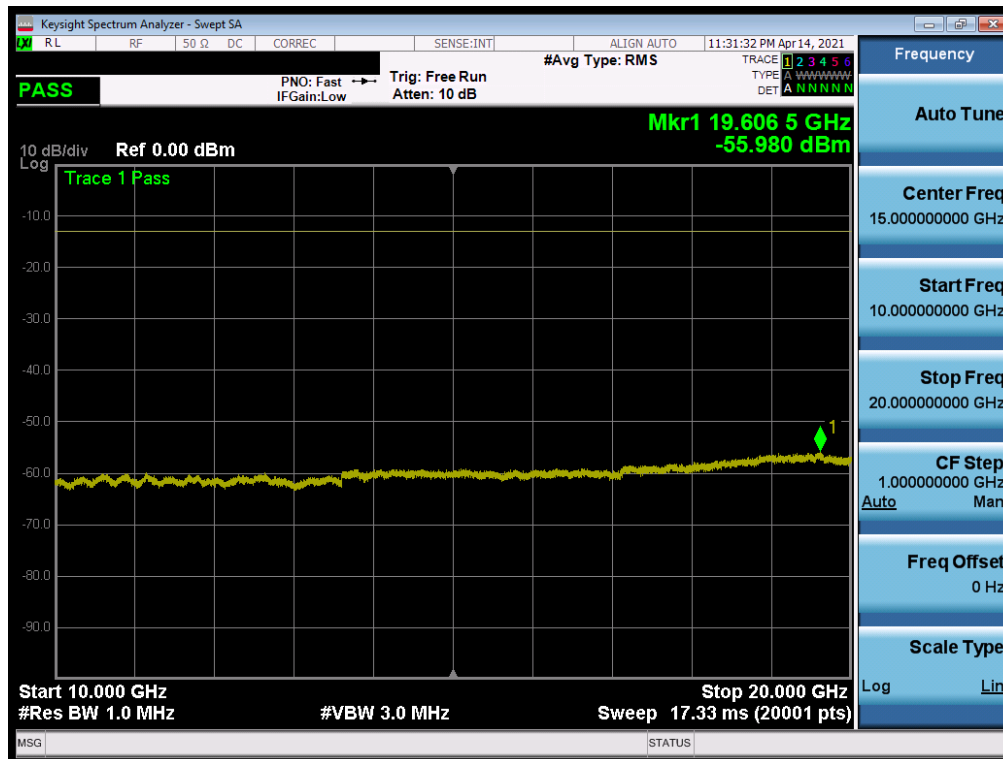


Plot 7-59. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - 1RB - Low Channel)

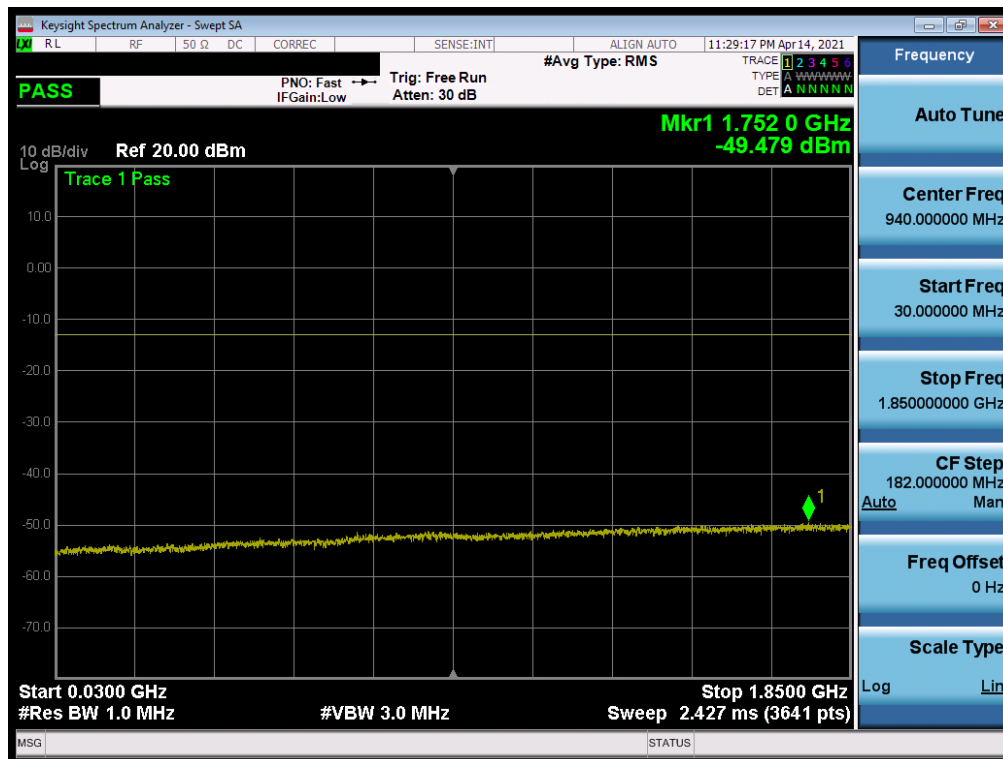


Plot 7-60. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - 1RB - Low Channel)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 47 of 203

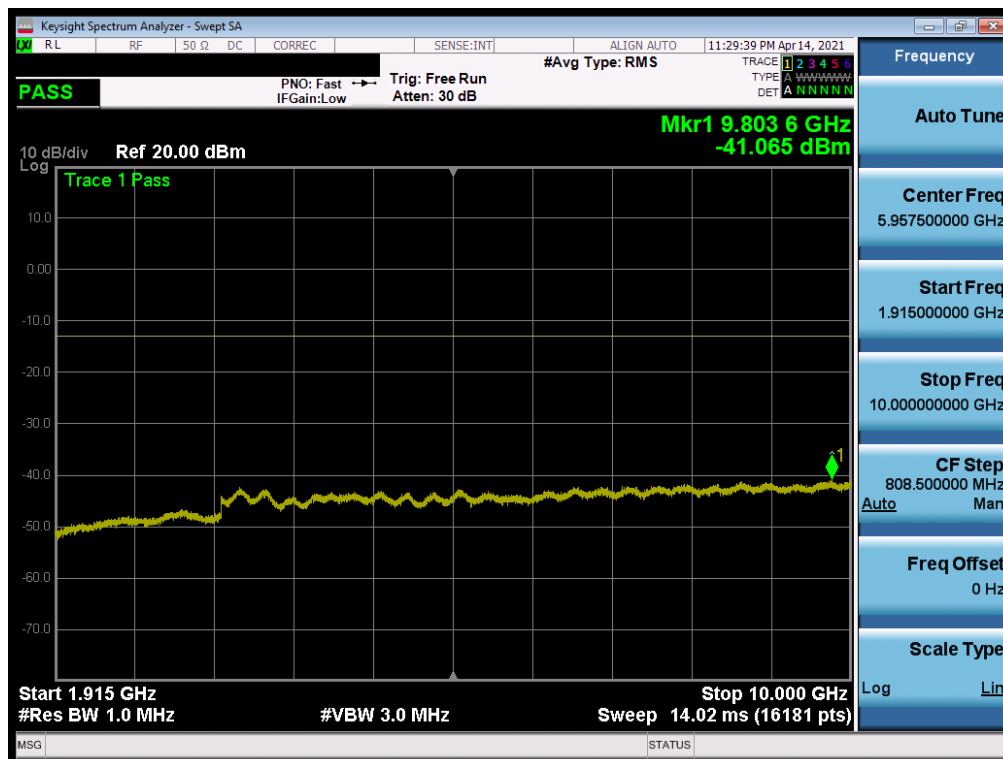


Plot 7-61. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - 1RB - Low Channel)

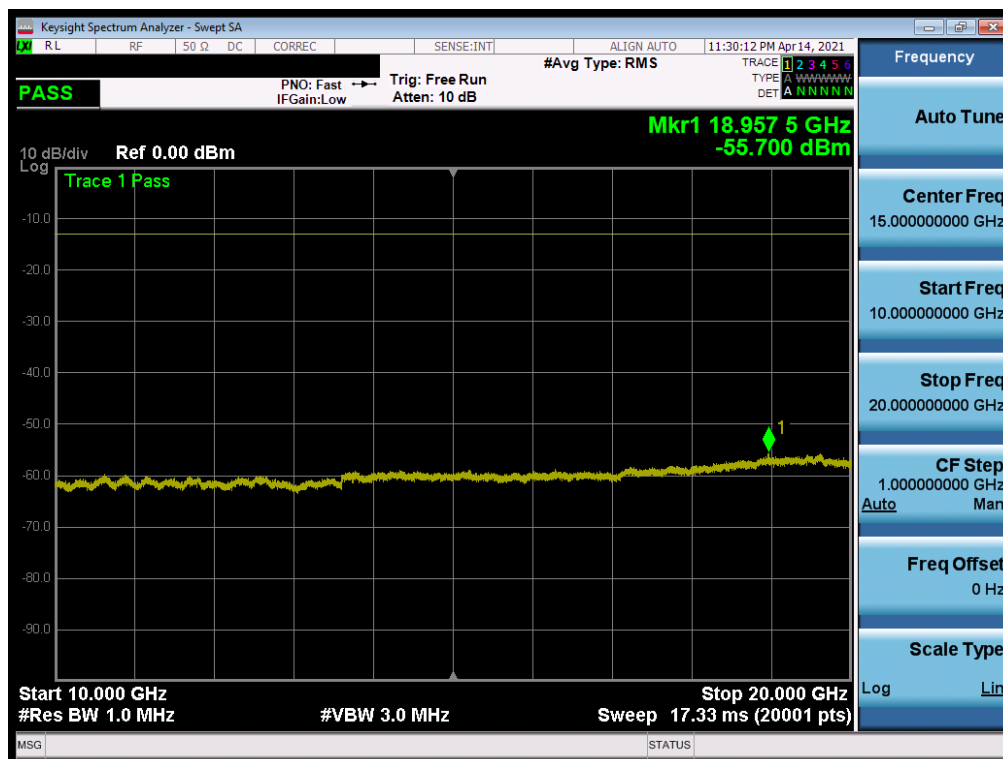


Plot 7-62. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - 1RB - Mid Channel)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 48 of 203

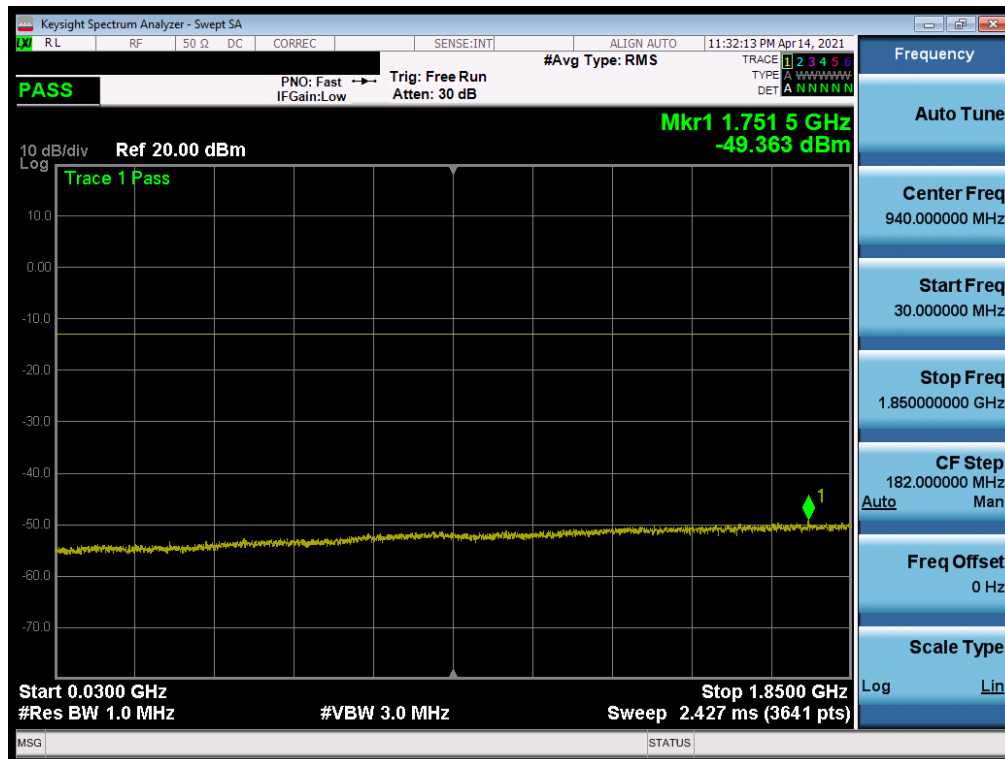


Plot 7-63. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - 1RB - Mid Channel)

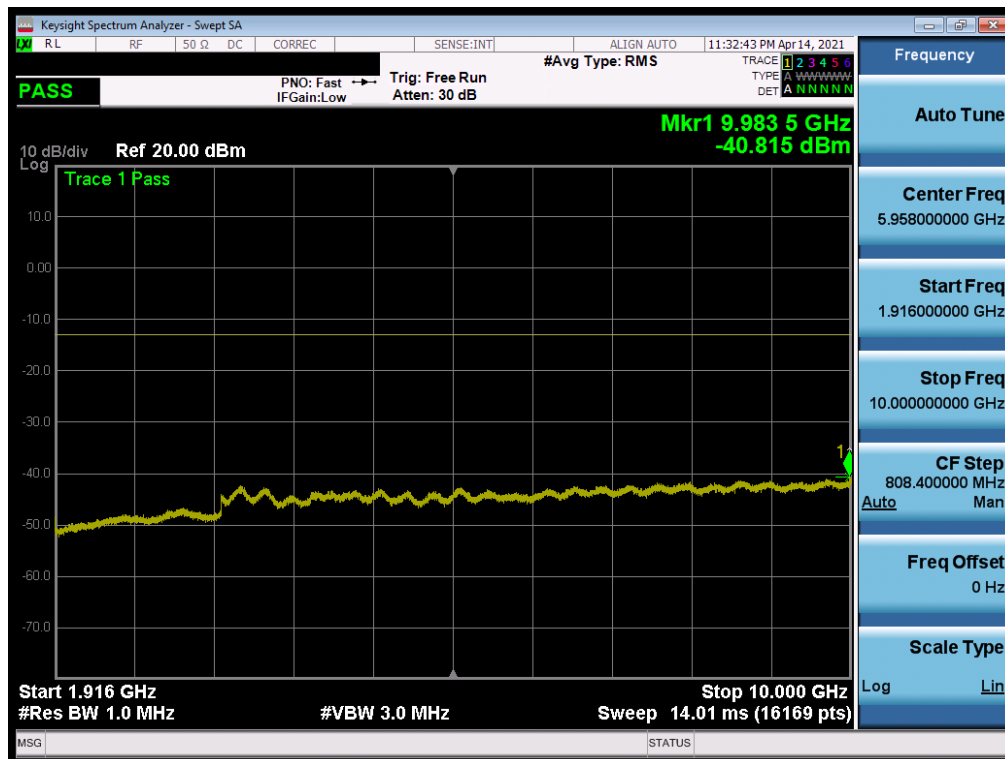


Plot 7-64. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - 1RB - Mid Channel)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 49 of 203

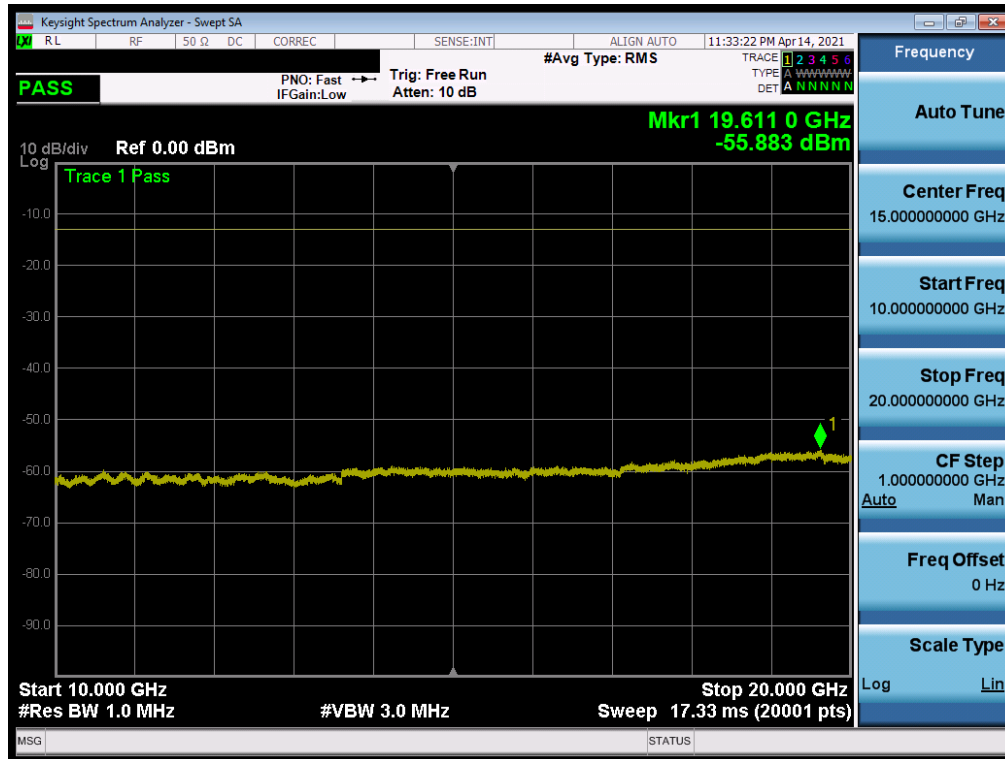


Plot 7-65. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - 1RB - High Channel)



Plot 7-66. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - 1RB - High Channel)

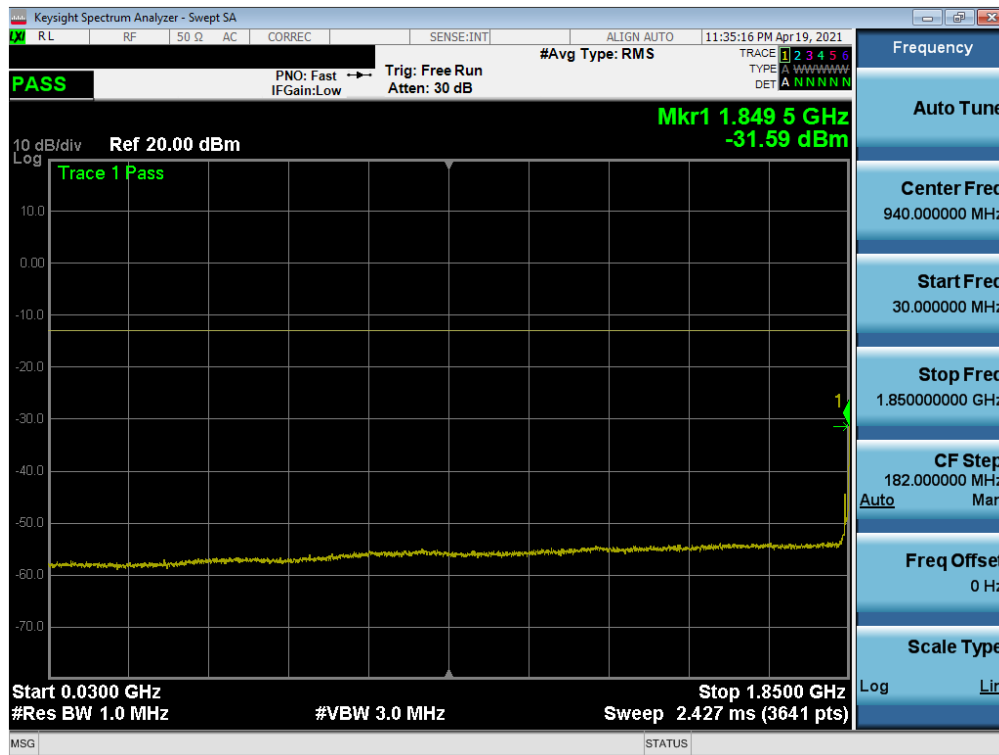
FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 50 of 203



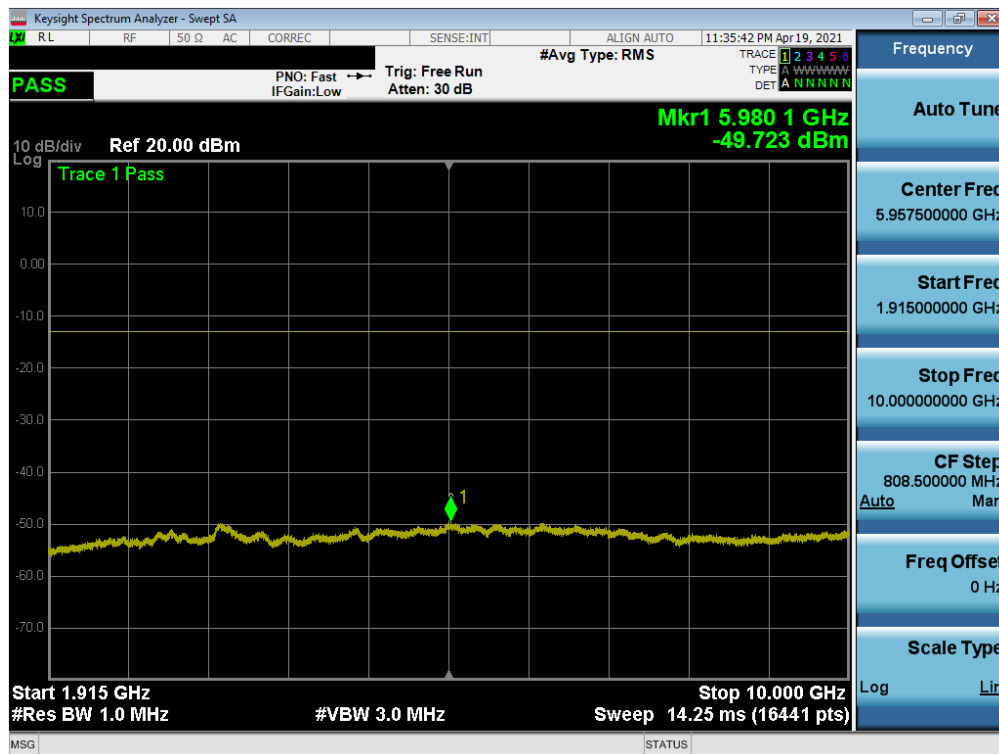
Plot 7-67. Conducted Spurious Plot (LTE Band 25/2 - 20MHz QPSK - 1RB - High Channel)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 51 of 203

NR Band n25/2 – Ant A

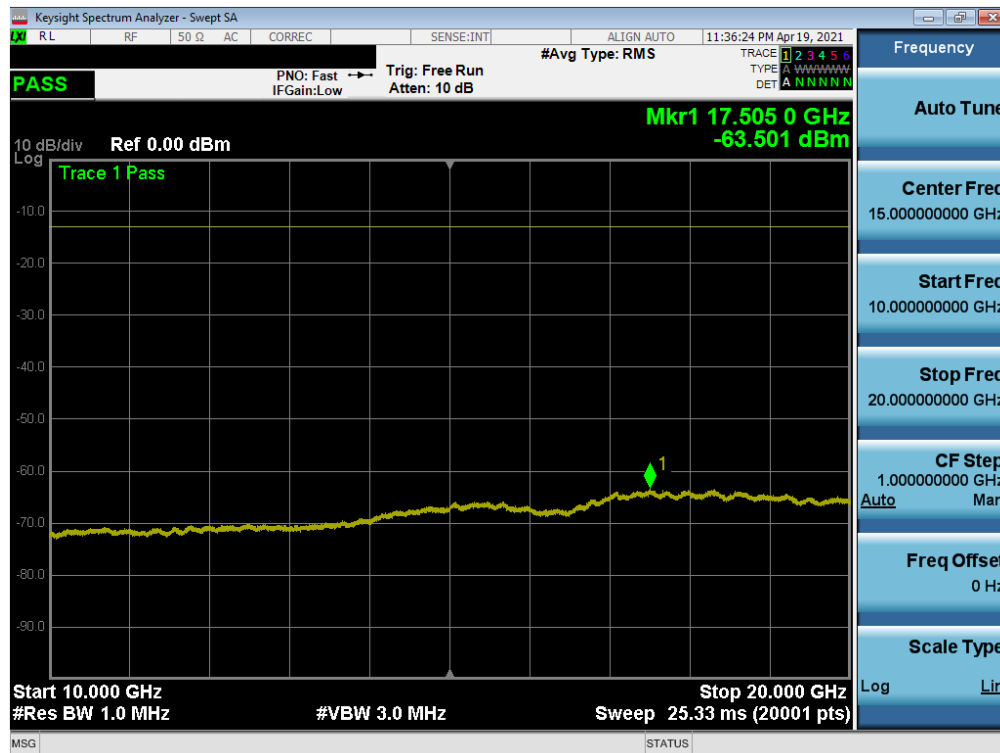


Plot 7-68. Conducted Spurious Plot (NR Band n25/2 -20.0MHz - 1RB - Low Channel)

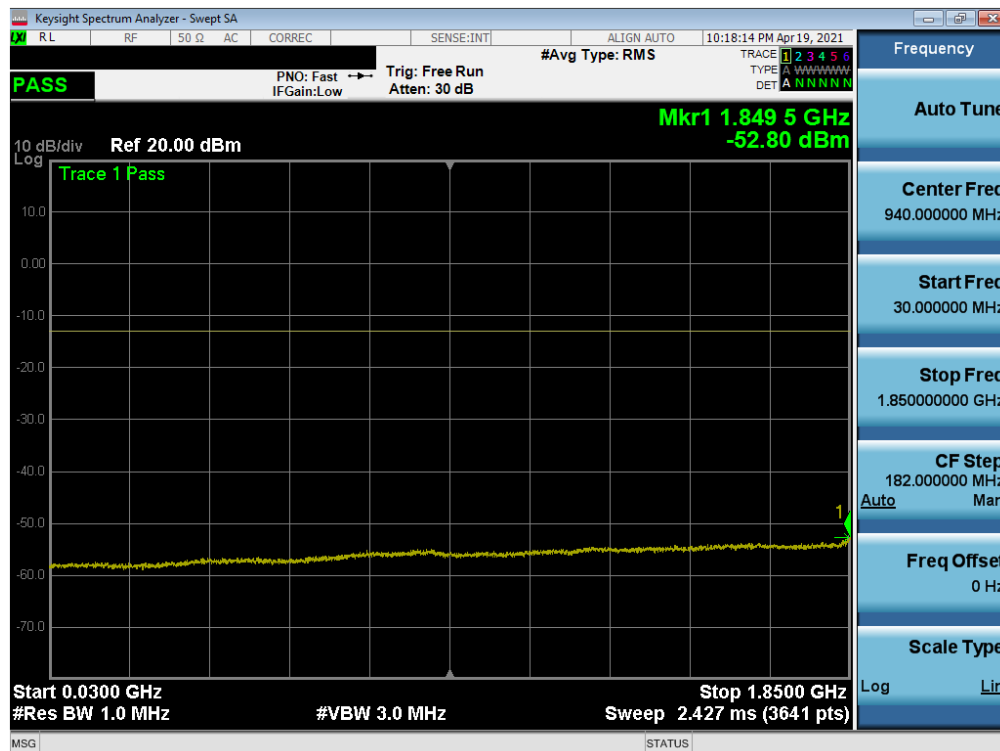


Plot 7-69. Conducted Spurious Plot (NR Band n25/2 - 20.0MHz - 1RB - Low Channel)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 52 of 203



Plot 7-70. Conducted Spurious Plot (NR Band n25/2 - 20.0MHz - 1RB - Low Channel)

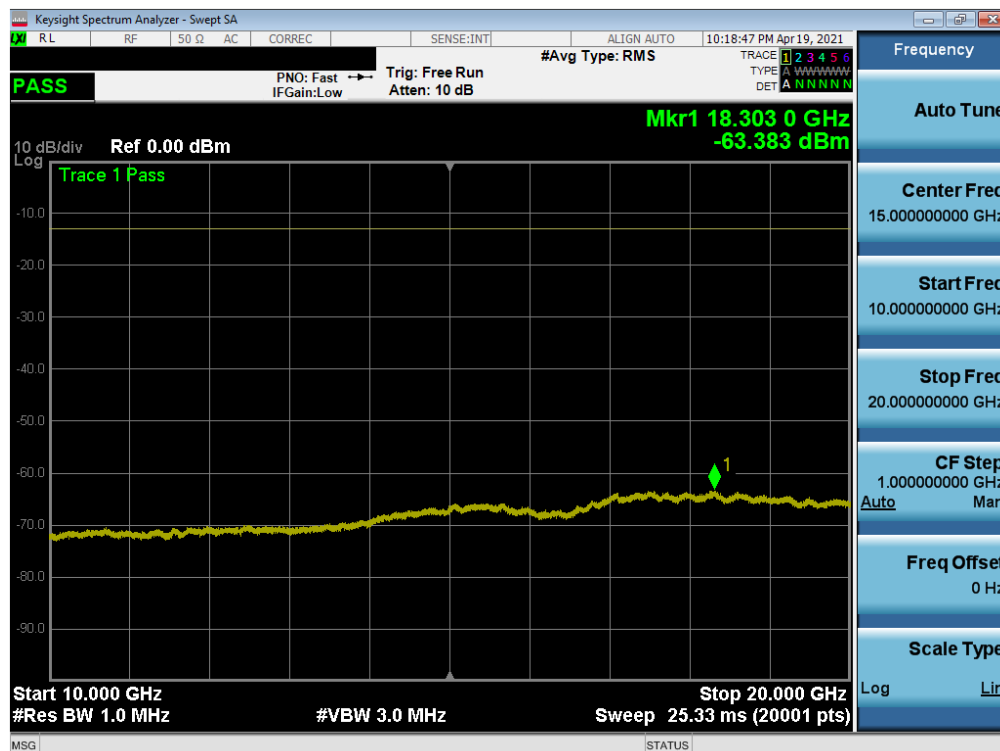


Plot 7-71. Conducted Spurious Plot (NR Band n25/2 - 20.0MHz - 1RB - Mid Channel)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 53 of 203

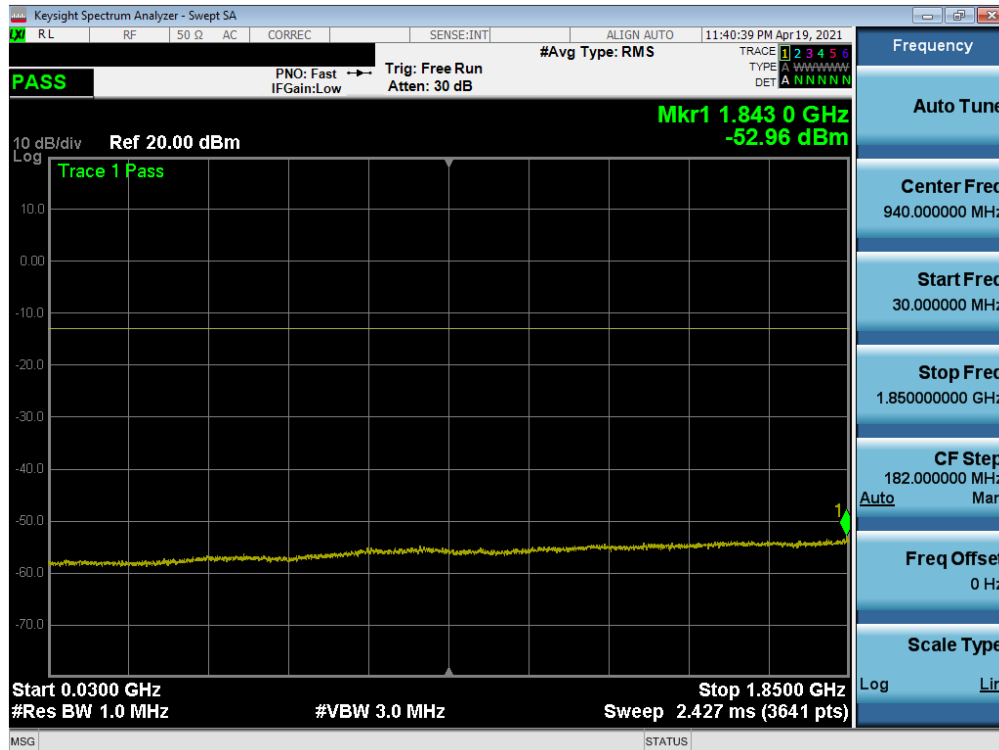


Plot 7-72. Conducted Spurious Plot (NR Band n25/2 - 20.0MHz - 1RB - Mid Channel)

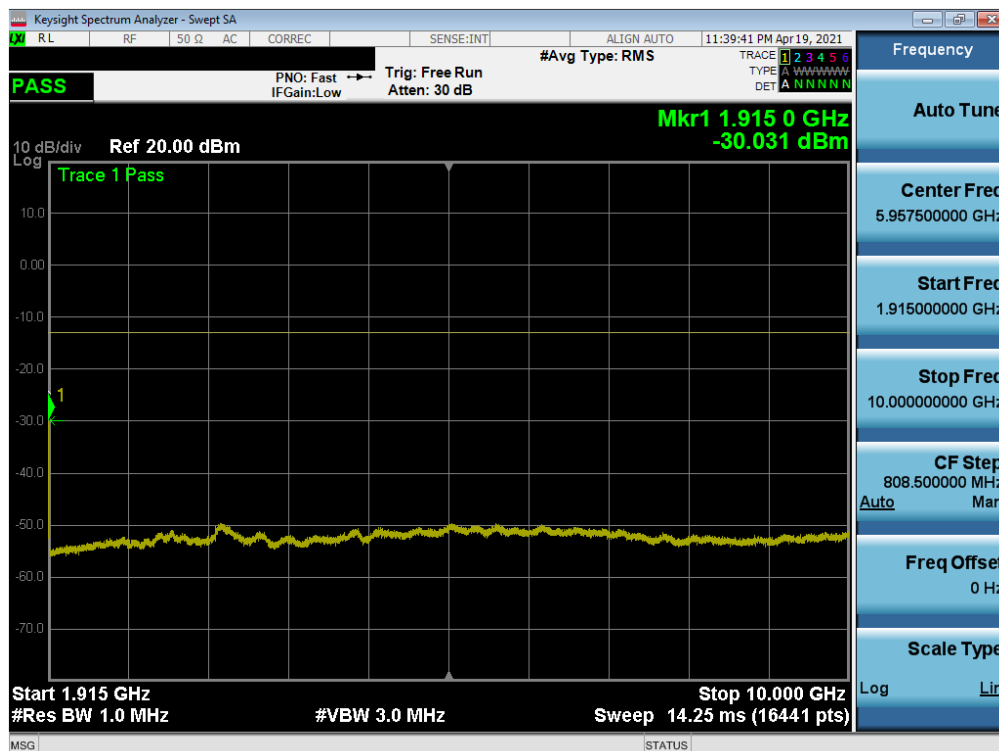


Plot 7-73. Conducted Spurious Plot (NR Band n25/2 - 20.0MHz - 1RB - Mid Channel)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 54 of 203

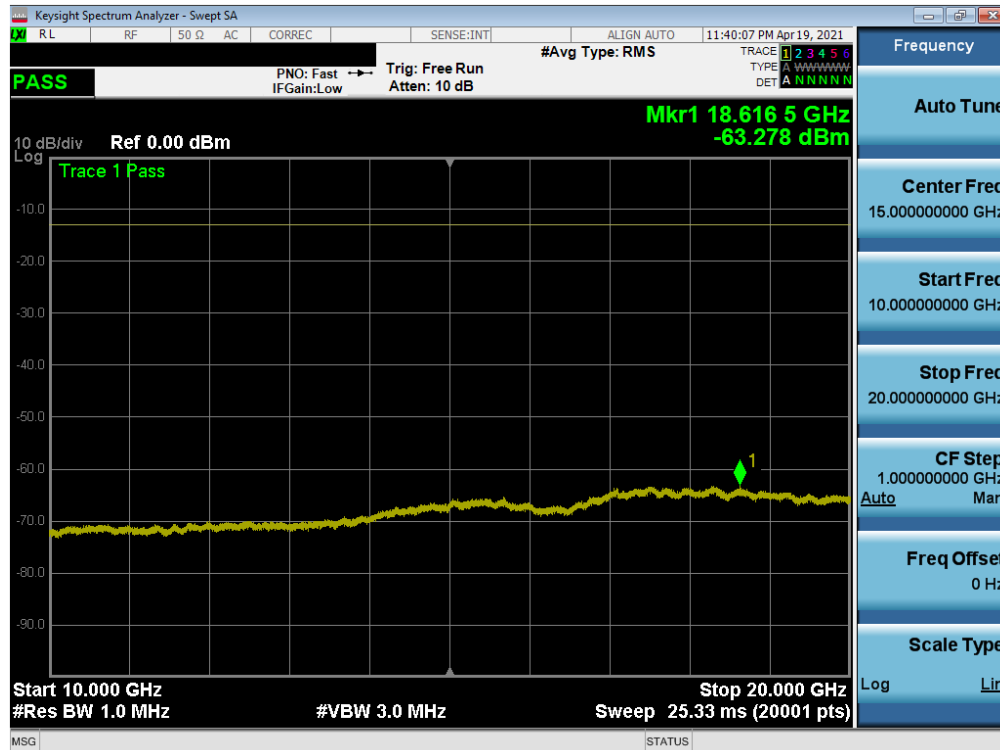


Plot 7-74. Conducted Spurious Plot (NR Band n25/2 - 20.0MHz - 1RB - High Channel)



Plot 7-75. Conducted Spurious Plot (NR Band n25/2 - 20.0MHz - 1RB - High Channel)

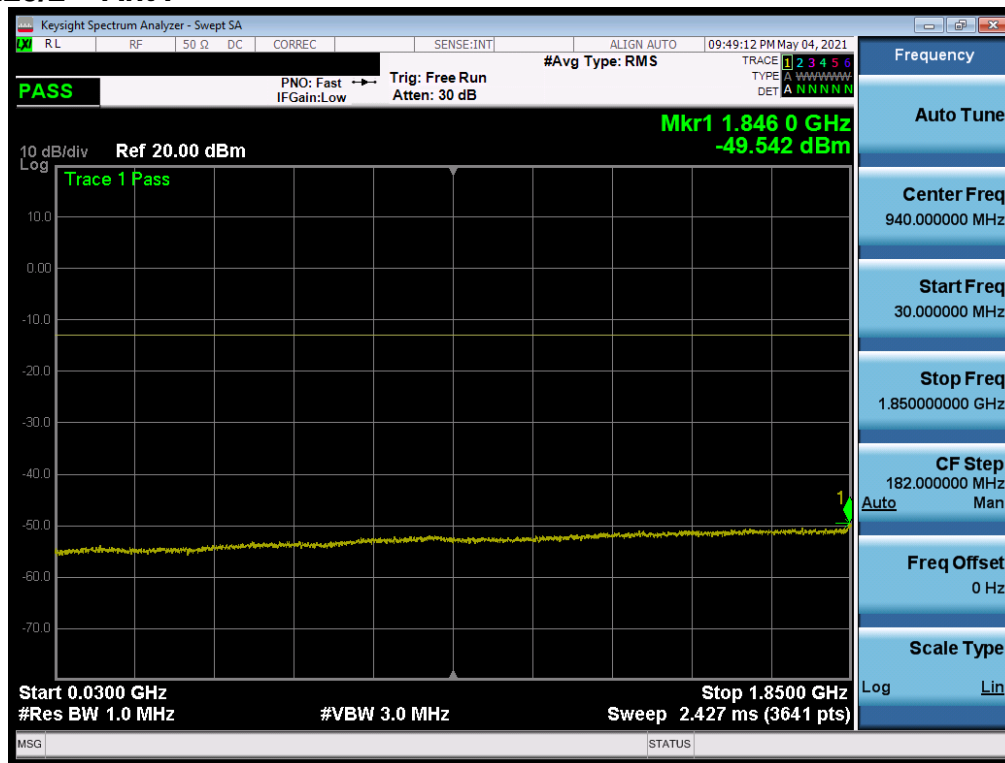
FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 55 of 203



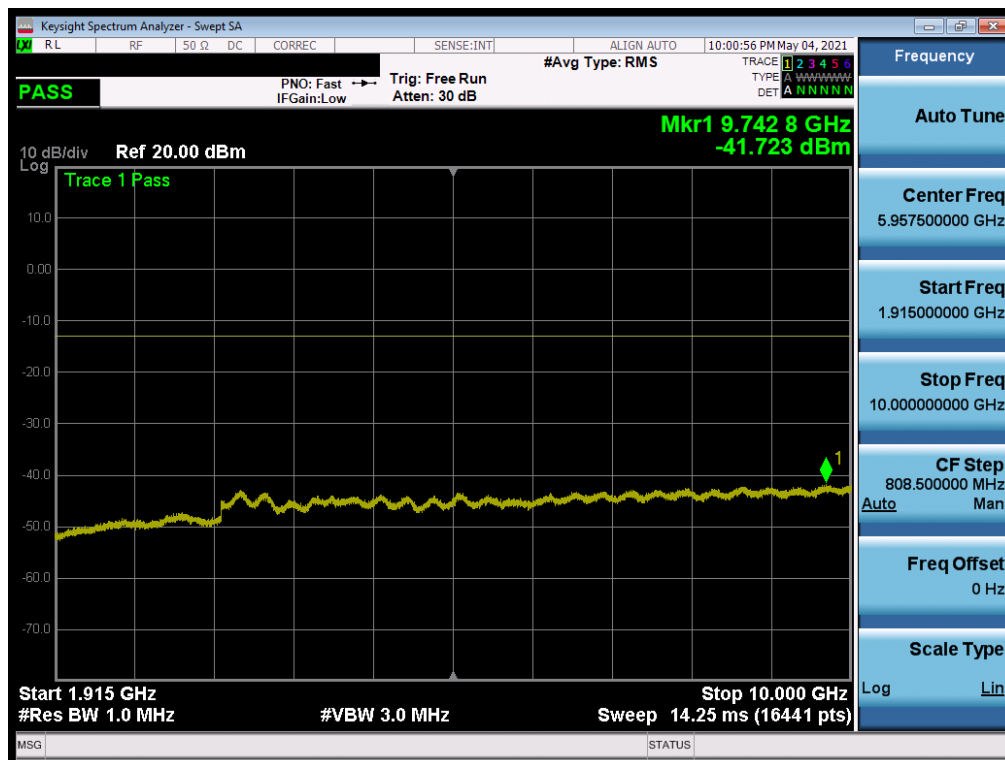
Plot 7-76. Conducted Spurious Plot (NR Band n25/2 - 20.0MHz - 1RB - High Channel)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 56 of 203

NR Band n25/2 – Ant I

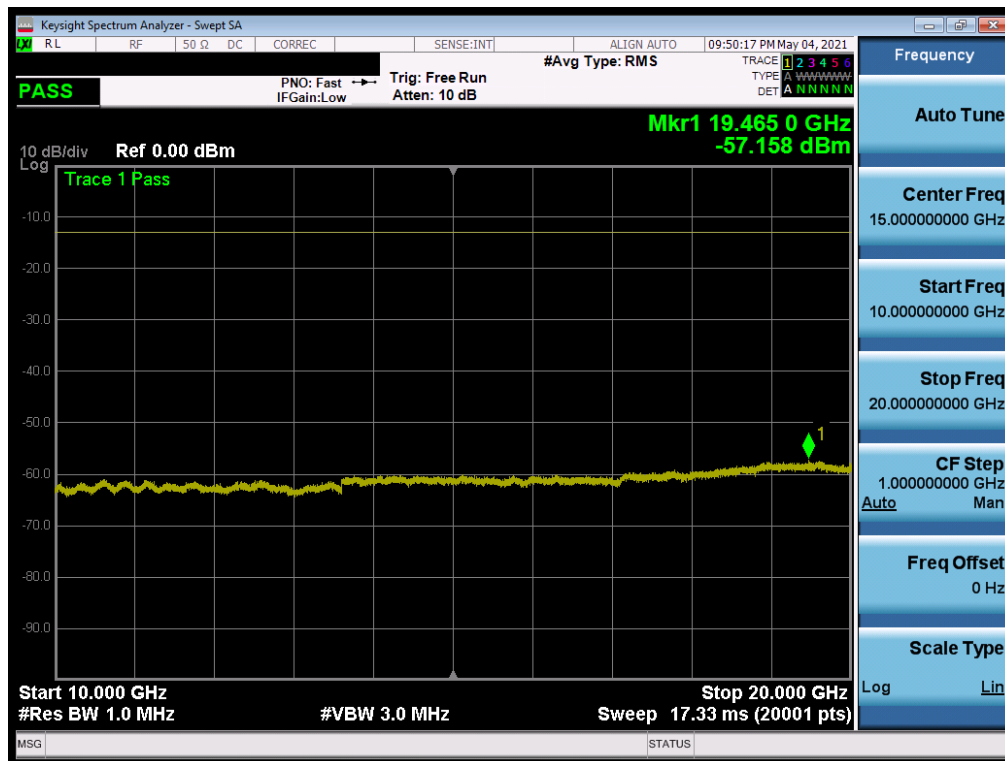


Plot 7-77. Conducted Spurious Plot (NR Band n25/2 -20.0MHz - 1RB - Low Channel)

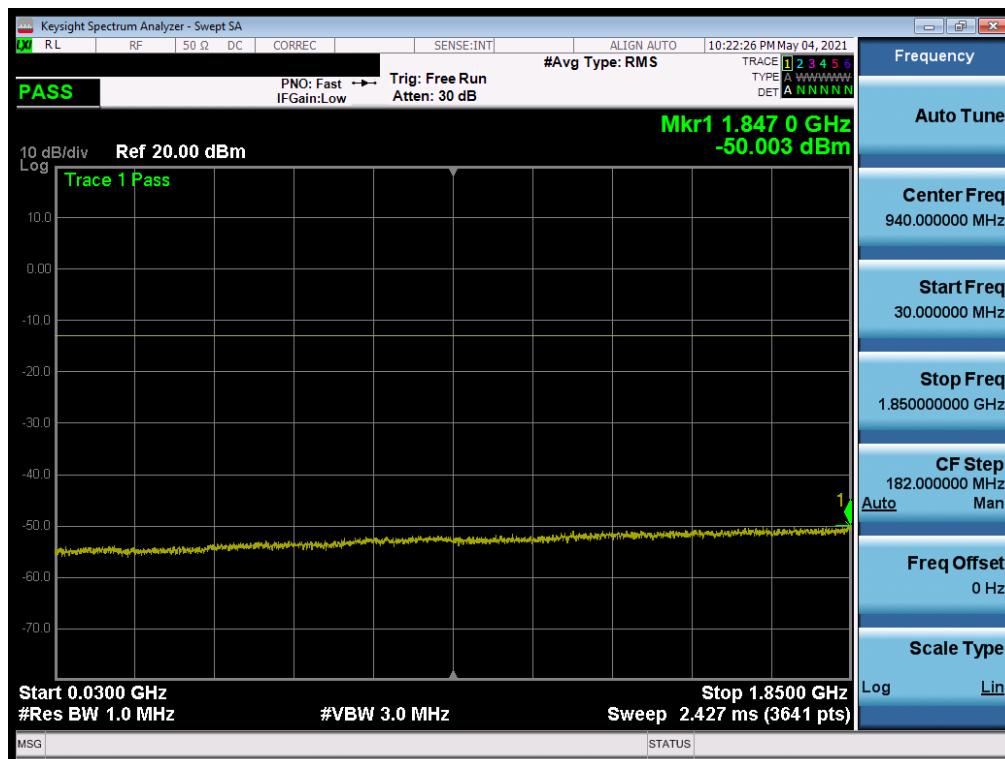


Plot 7-78. Conducted Spurious Plot (NR Band n25/2 - 20.0MHz - 1RB - Low Channel)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 57 of 203

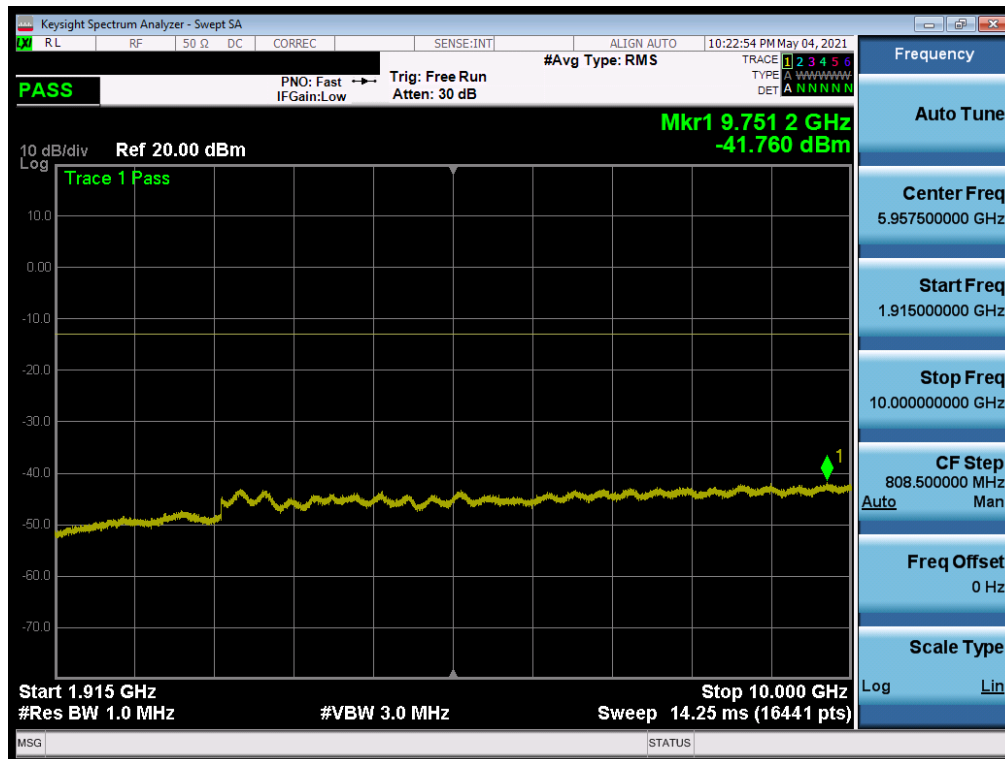


Plot 7-79. Conducted Spurious Plot (NR Band n25/2 - 20.0MHz - 1RB - Low Channel)

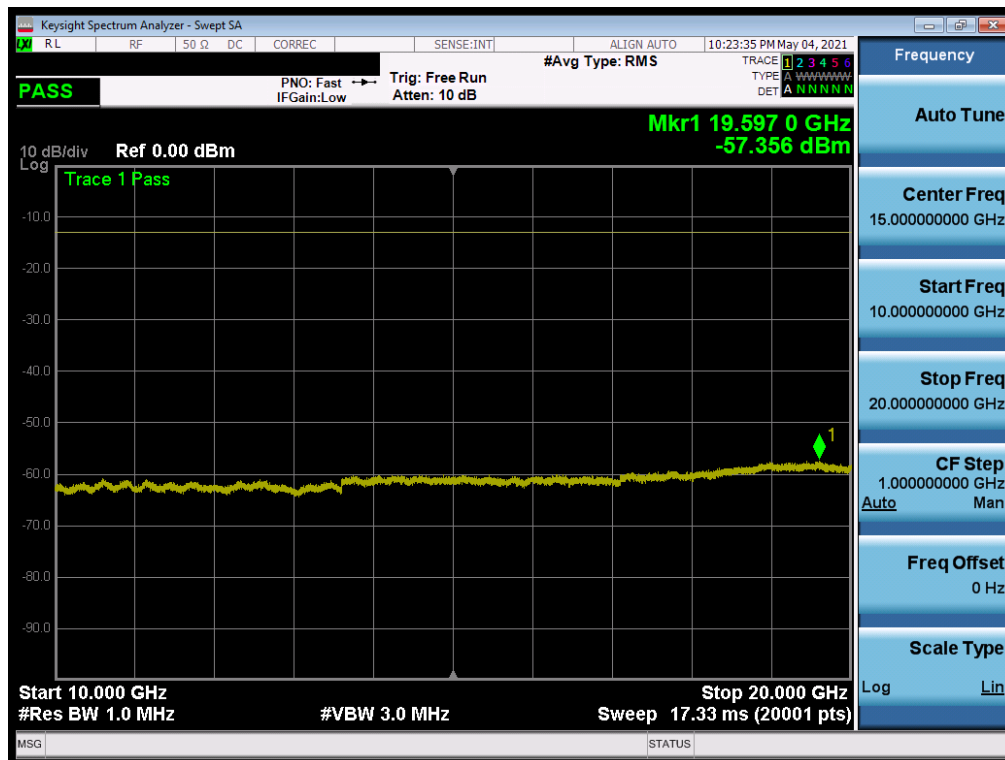


Plot 7-80. Conducted Spurious Plot (NR Band n25/2 - 20.0MHz - 1RB - Mid Channel)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 58 of 203

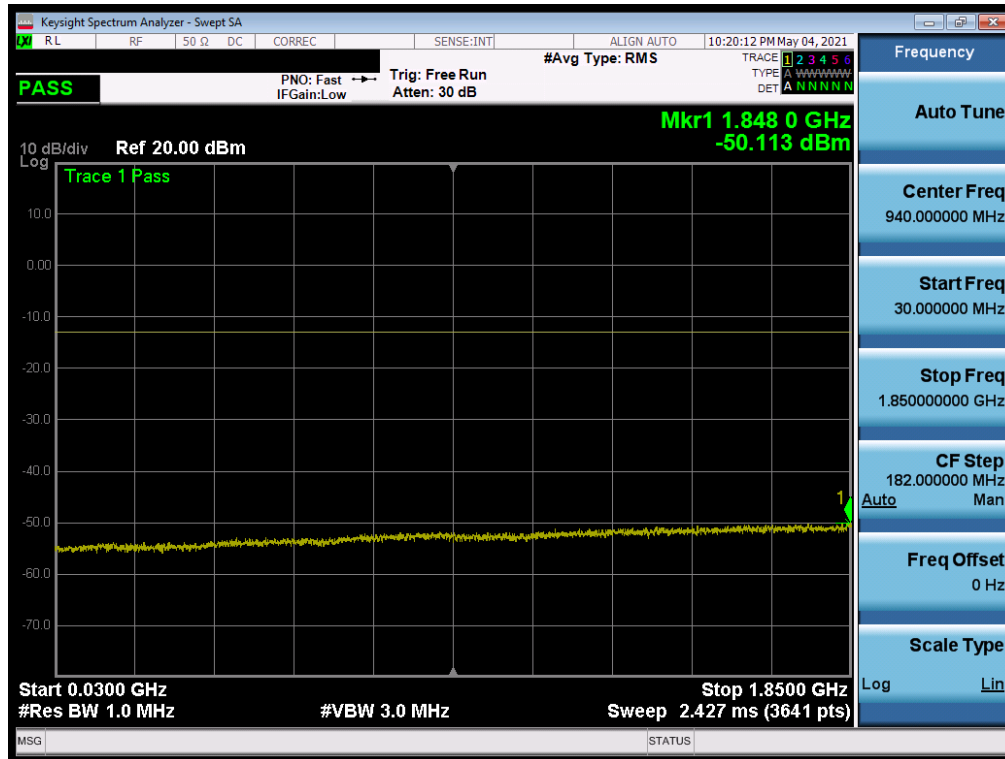


Plot 7-81. Conducted Spurious Plot (NR Band n25/2 - 20.0MHz - 1RB - Mid Channel)

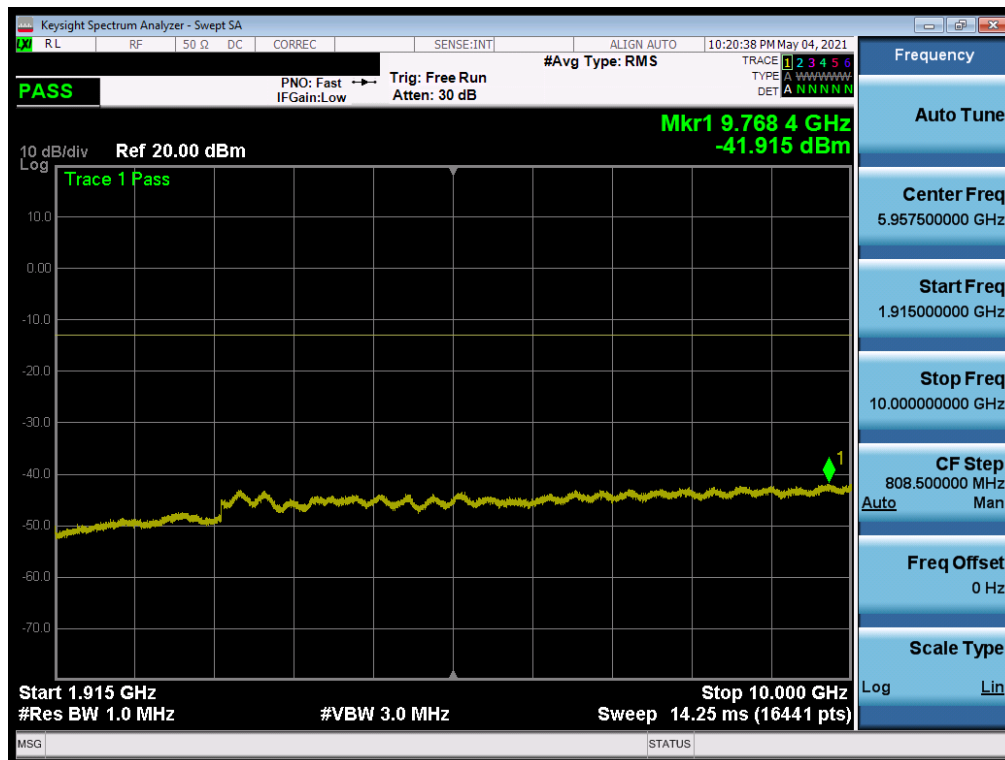


Plot 7-82. Conducted Spurious Plot (NR Band n25/2 - 20.0MHz - 1RB - Mid Channel)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 59 of 203

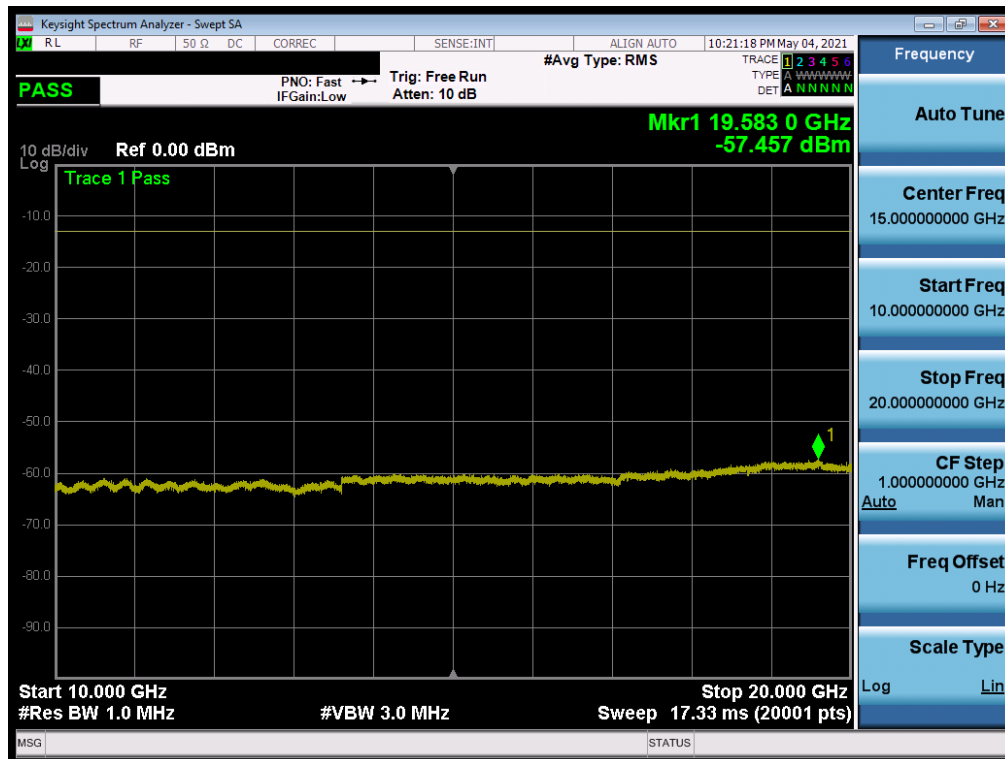


Plot 7-83. Conducted Spurious Plot (NR Band n25/2 - 20.0MHz - 1RB - High Channel)



Plot 7-84. Conducted Spurious Plot (NR Band n25/2 - 20.0MHz - 1RB - High Channel)

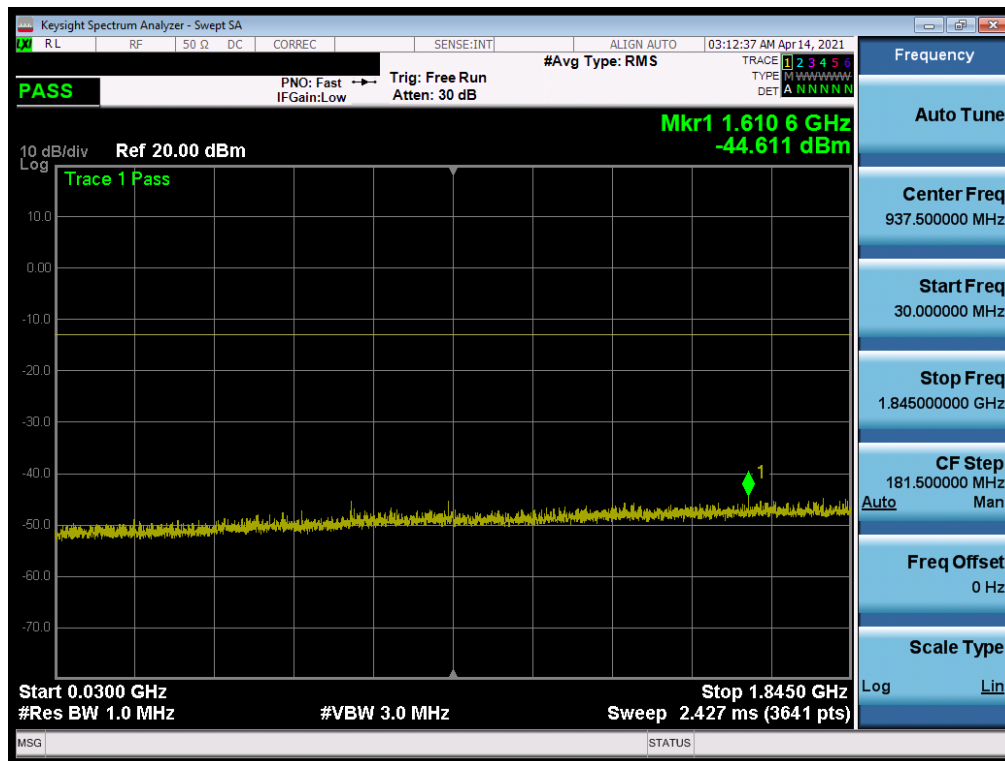
FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 60 of 203



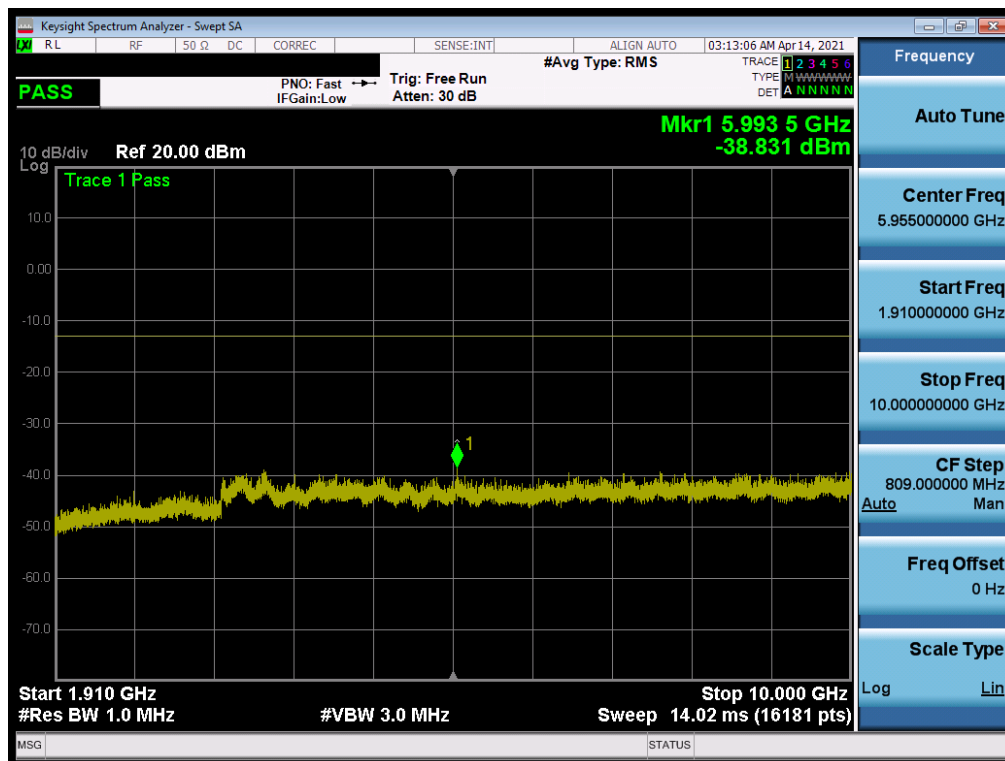
Plot 7-85. Conducted Spurious Plot (NR Band n25/2 - 20.0MHz - 1RB - High Channel)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 61 of 203

GSM/GPRS PCS

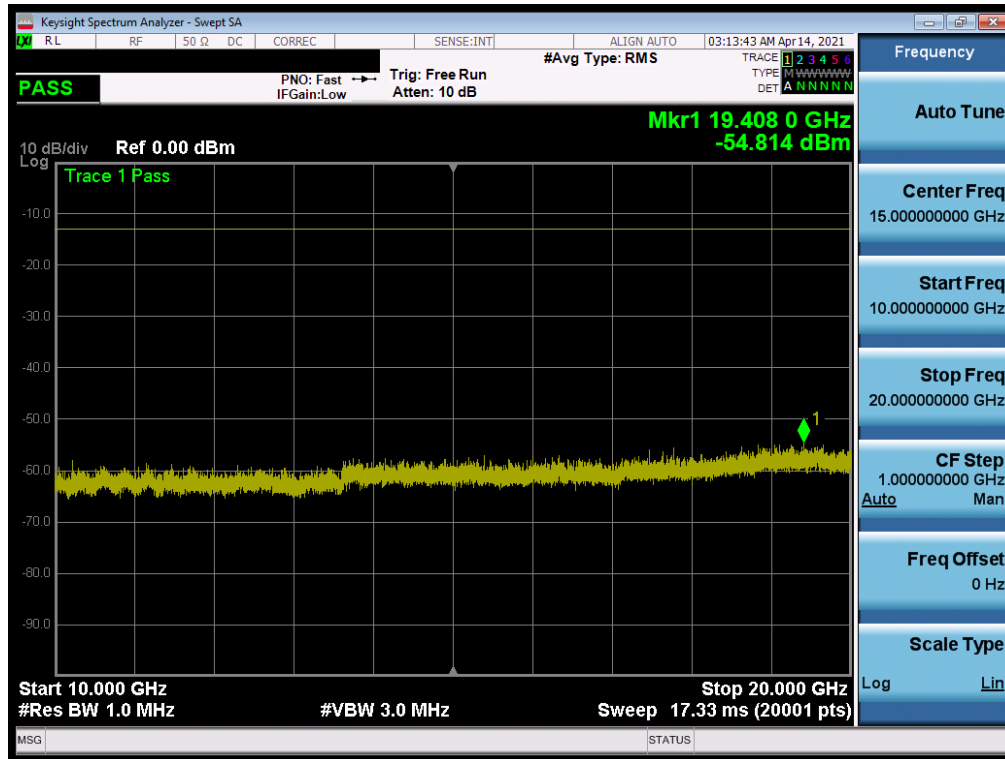


Plot 7-86. Conducted Spurious Plot (GPRS Ch. 512)

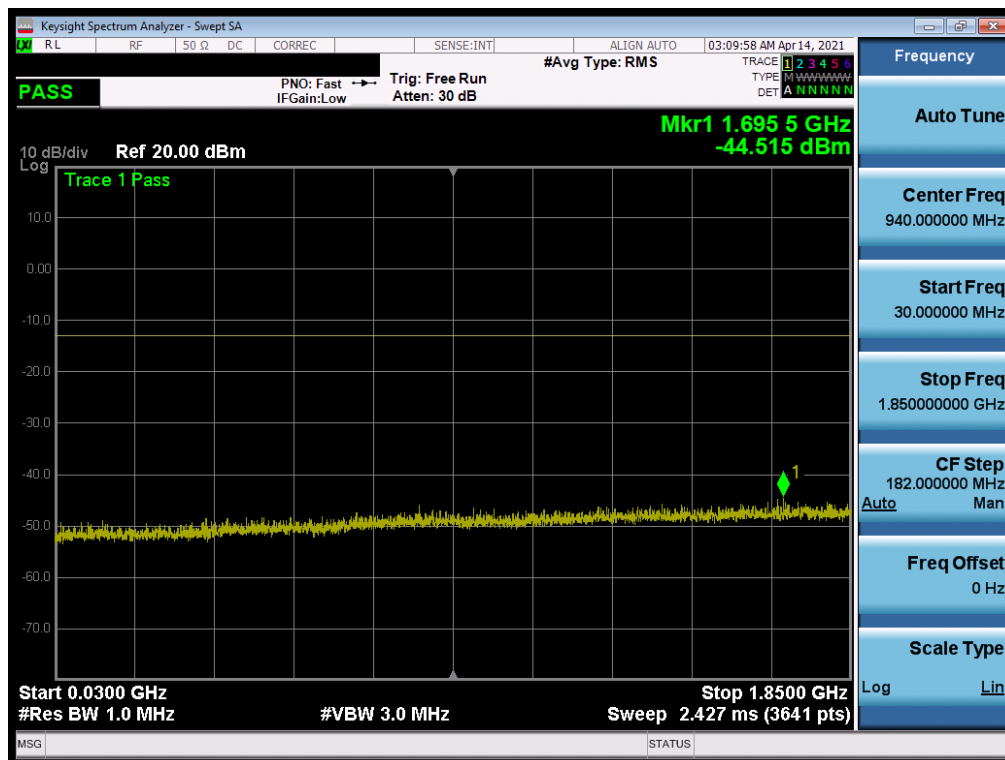


Plot 7-87. Conducted Spurious Plot (GPRS Ch. 512)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 62 of 203

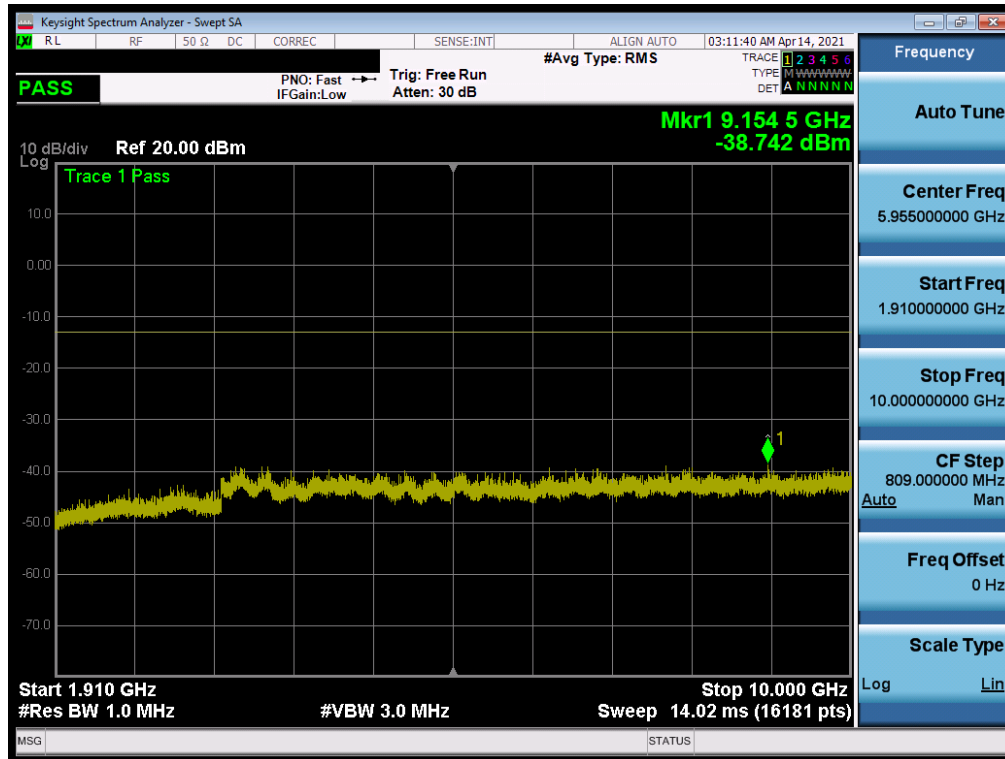


Plot 7-88. Conducted Spurious Plot (GPRS Ch. 512)

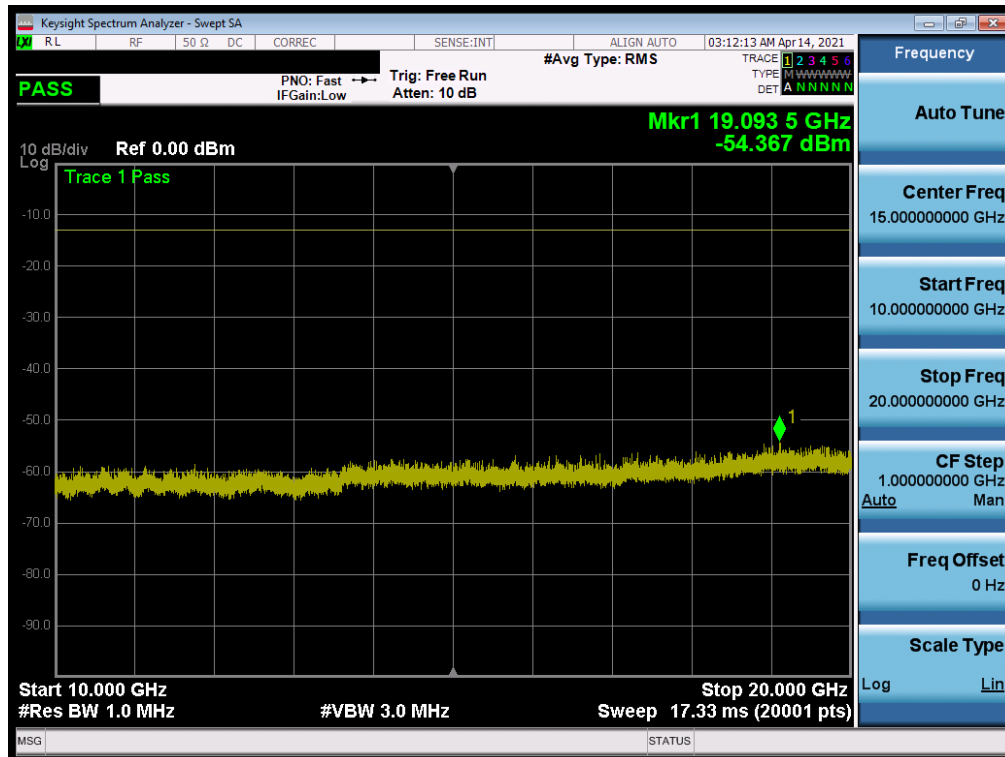


Plot 7-89. Conducted Spurious Plot (GPRS Ch. 661)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 63 of 203

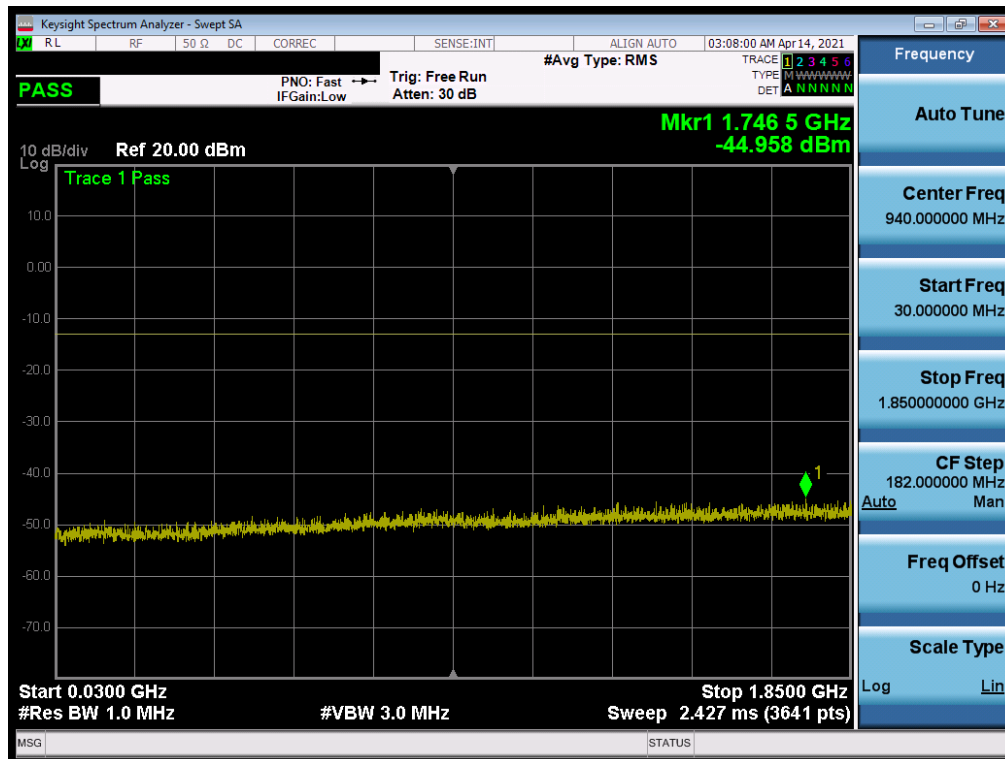


Plot 7-90. Conducted Spurious Plot (GPRS Ch. 661)

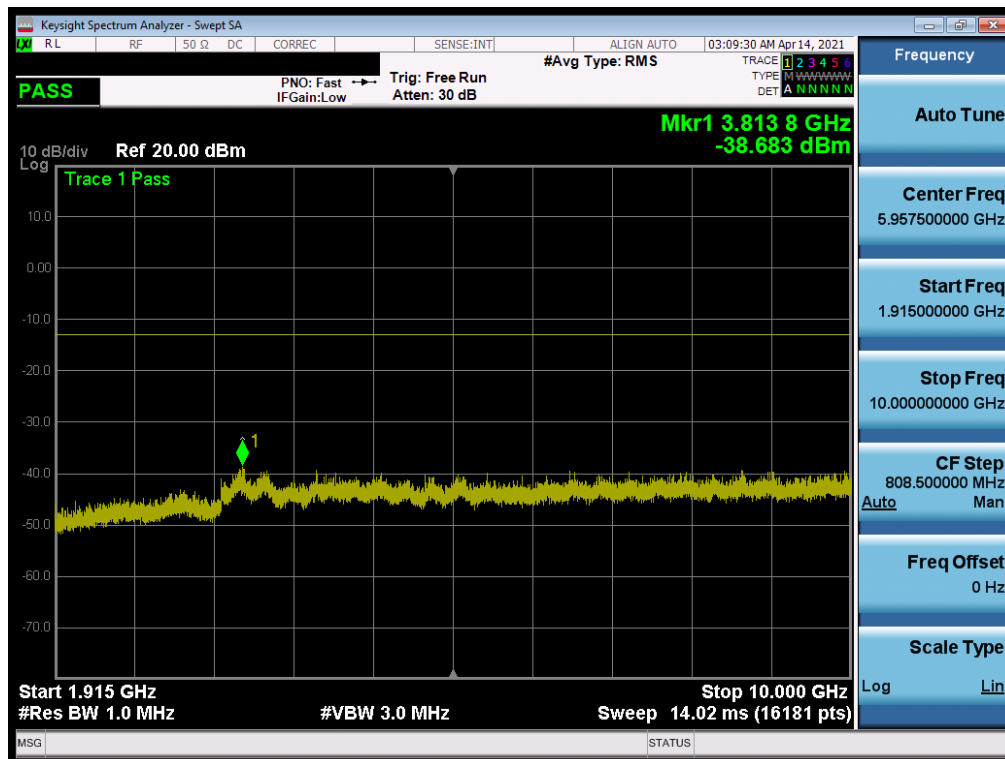


Plot 7-91. Conducted Spurious Plot (GPRS Ch. 661)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 64 of 203

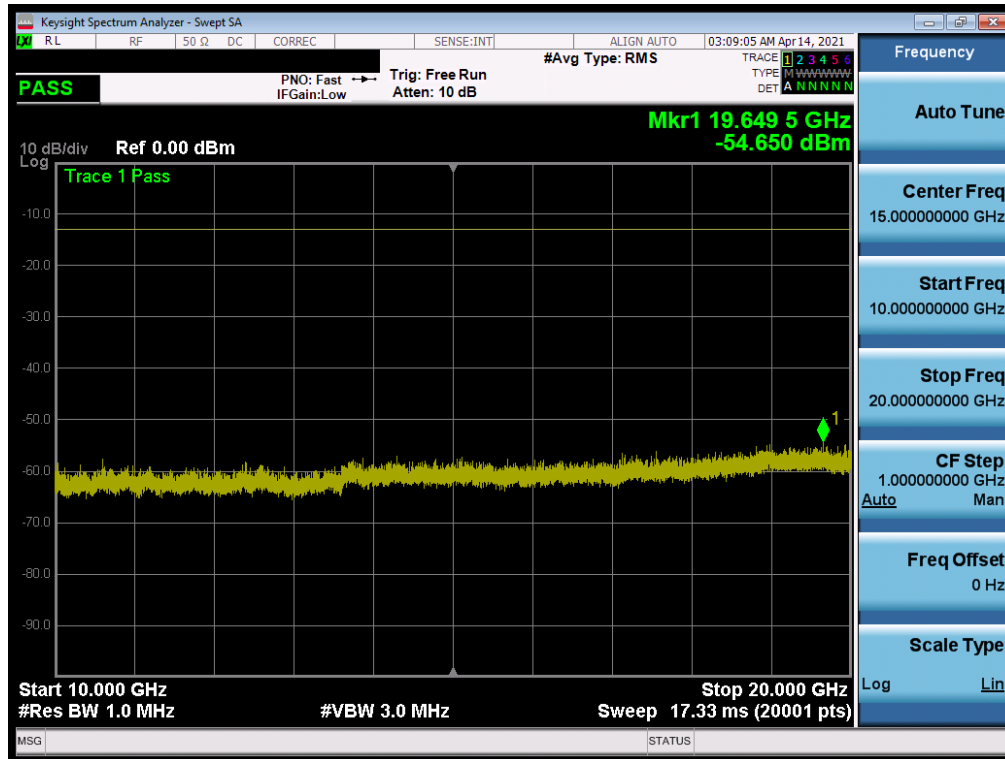


Plot 7-92. Conducted Spurious Plot (GPRS Ch. 810)



Plot 7-93. Conducted Spurious Plot (GPRS Ch. 810)

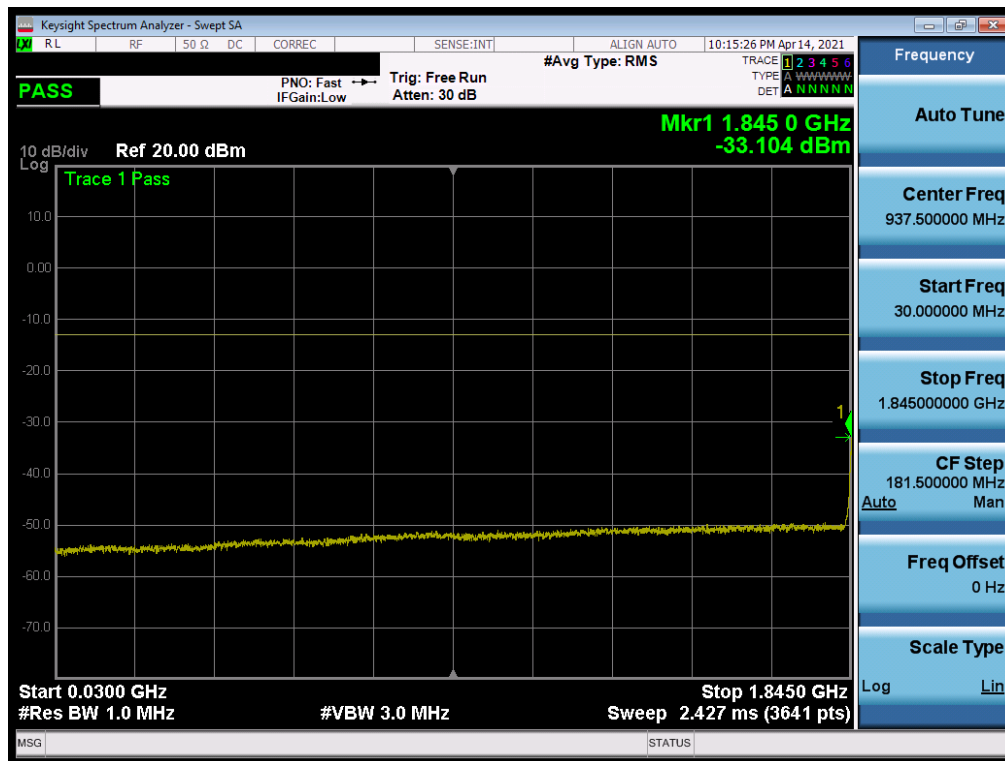
FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 65 of 203



Plot 7-94. Conducted Spurious Plot (GPRS Ch. 810)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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WCDMA PCS

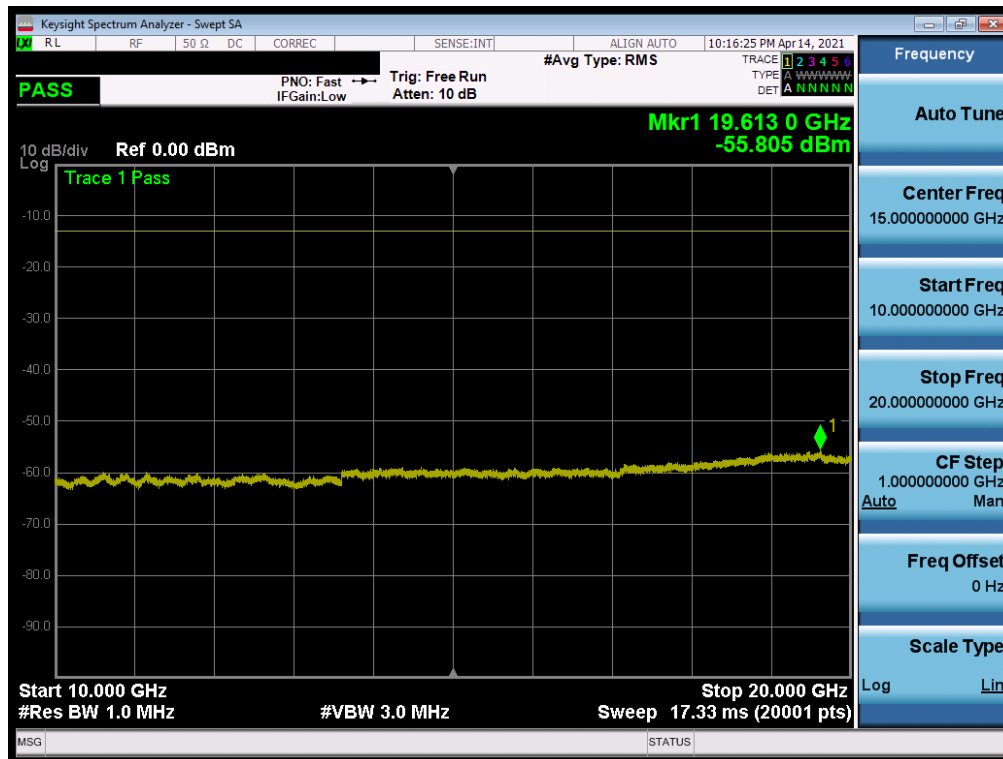


Plot 7-95. Conducted Spurious Plot (WCDMA Ch. 9262)



Plot 7-96. Conducted Spurious Plot (WCDMA Ch. 9262)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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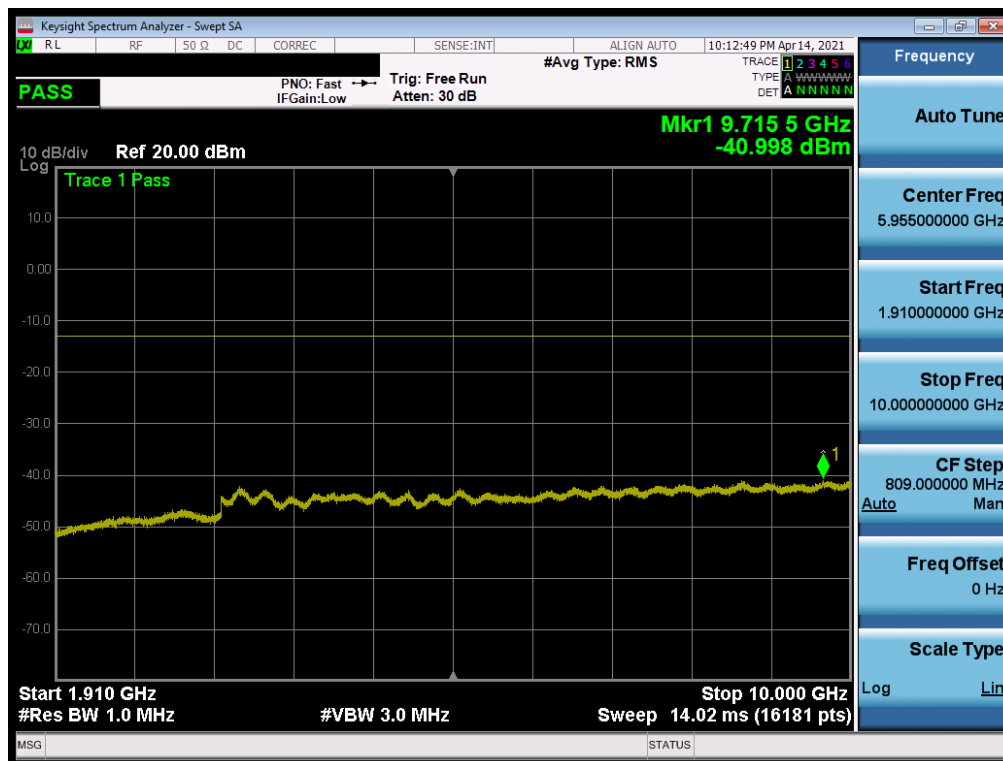


Plot 7-97. Conducted Spurious Plot (WCDMA Ch. 9262)

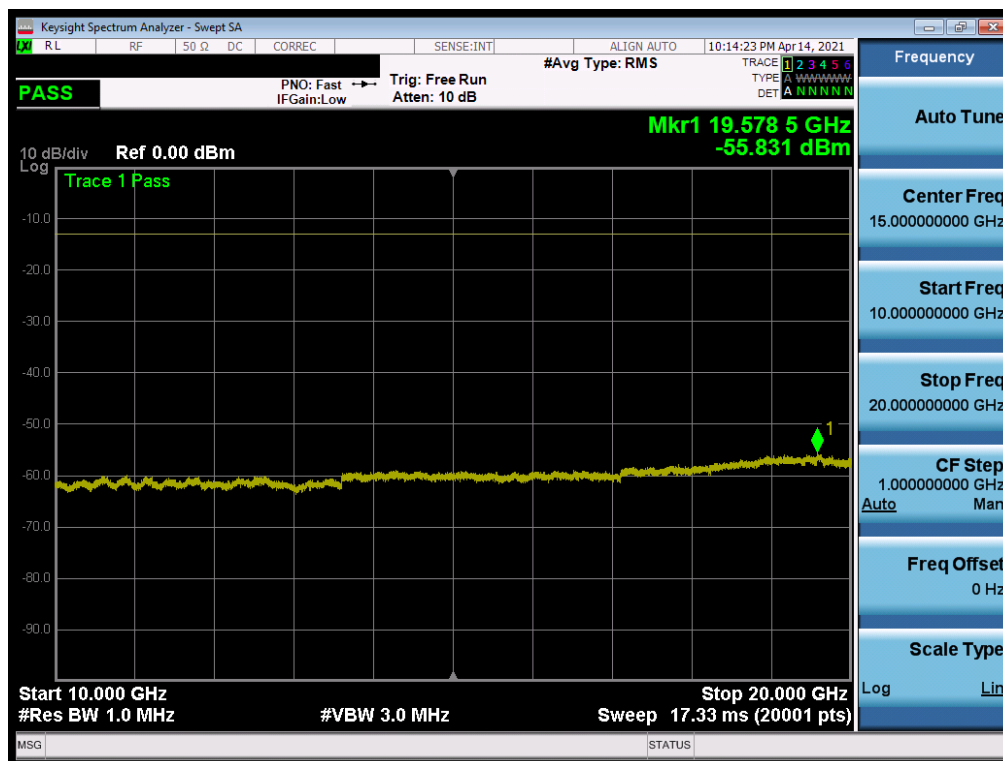


Plot 7-98. Conducted Spurious Plot (WCDMA Ch. 9400)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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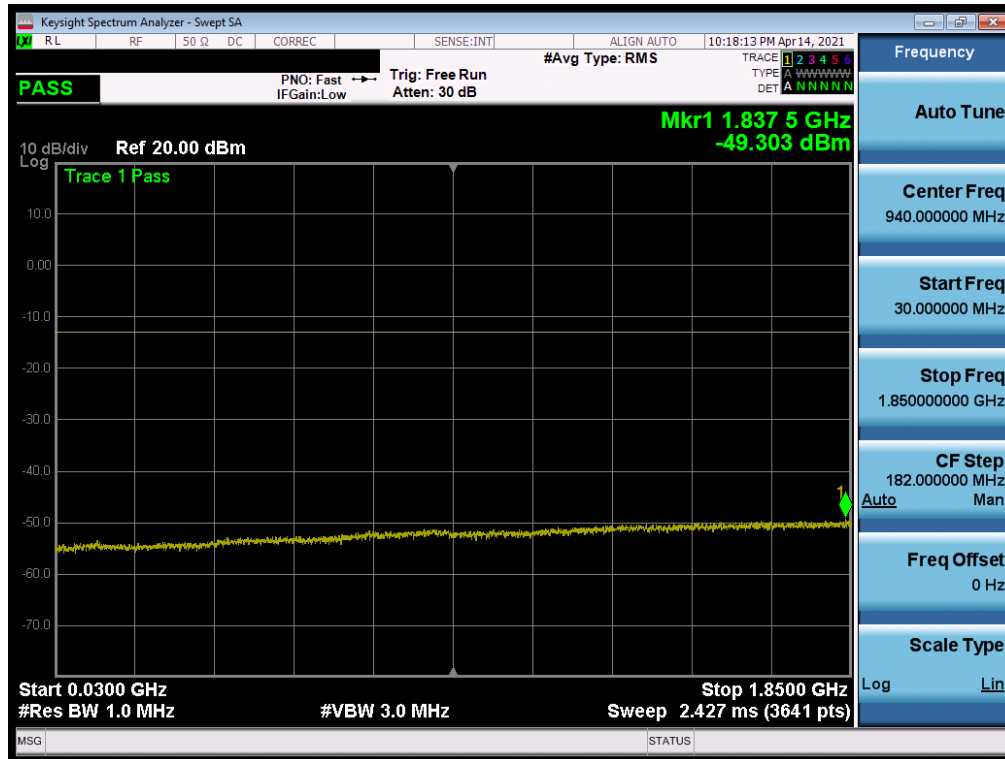


Plot 7-99. Conducted Spurious Plot (WCDMA Ch. 9400)

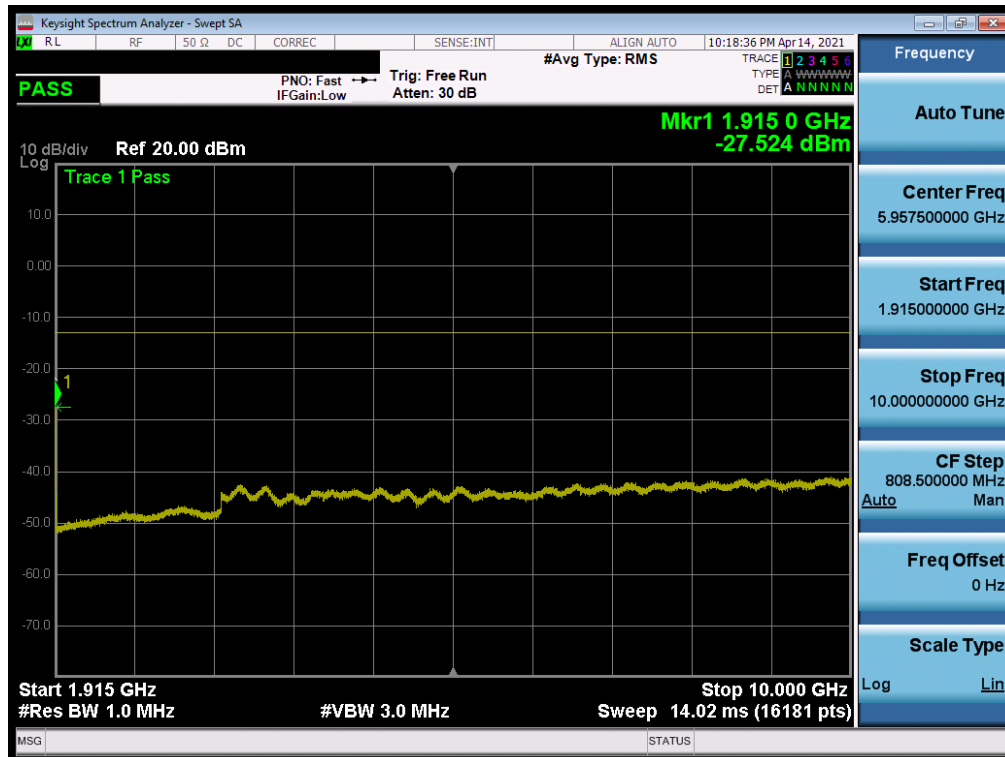


Plot 7-100. Conducted Spurious Plot (WCDMA Ch. 9400)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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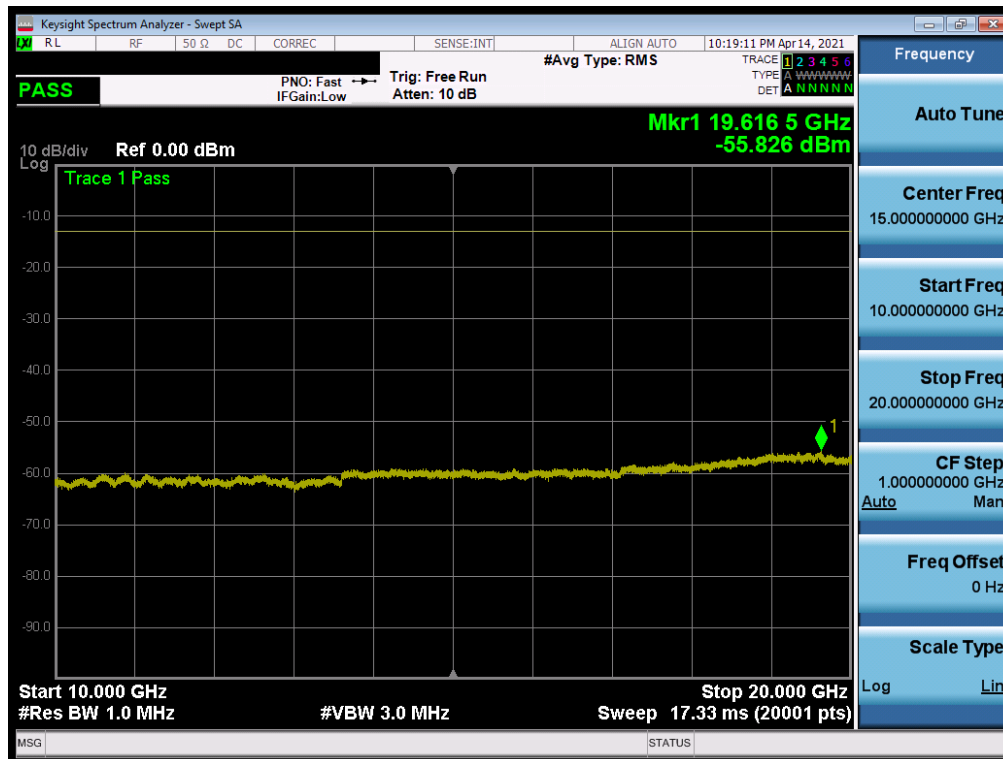


Plot 7-101. Conducted Spurious Plot (WCDMA Ch. 9538)



Plot 7-102. Conducted Spurious Plot (WCDMA Ch. 9538)

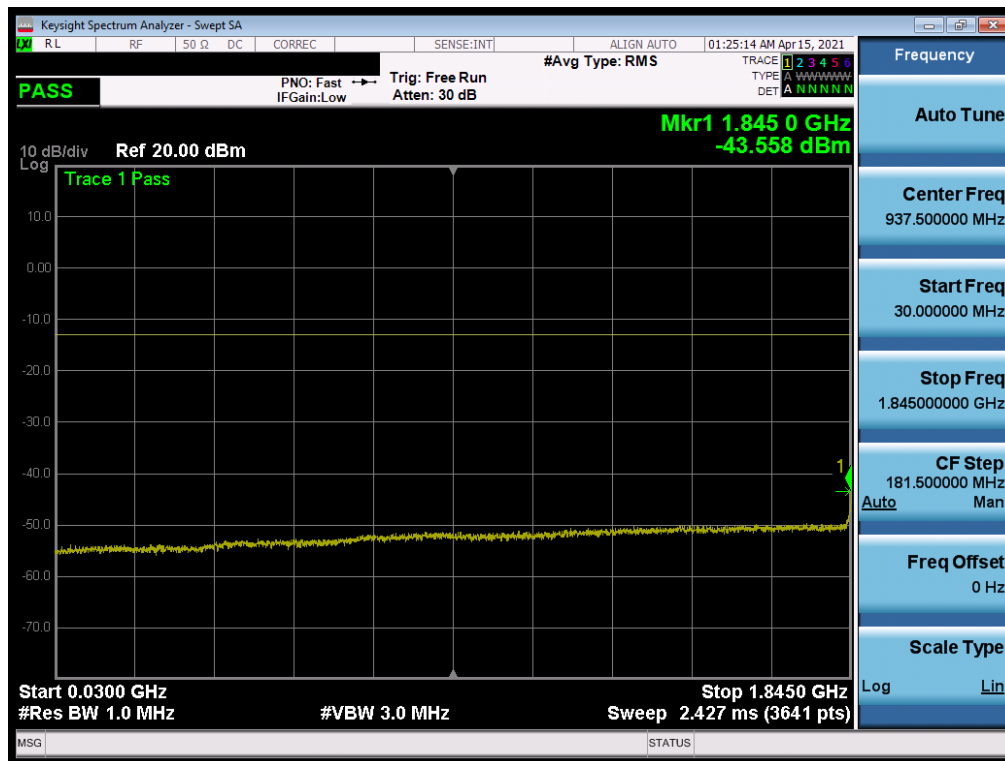
FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 70 of 203



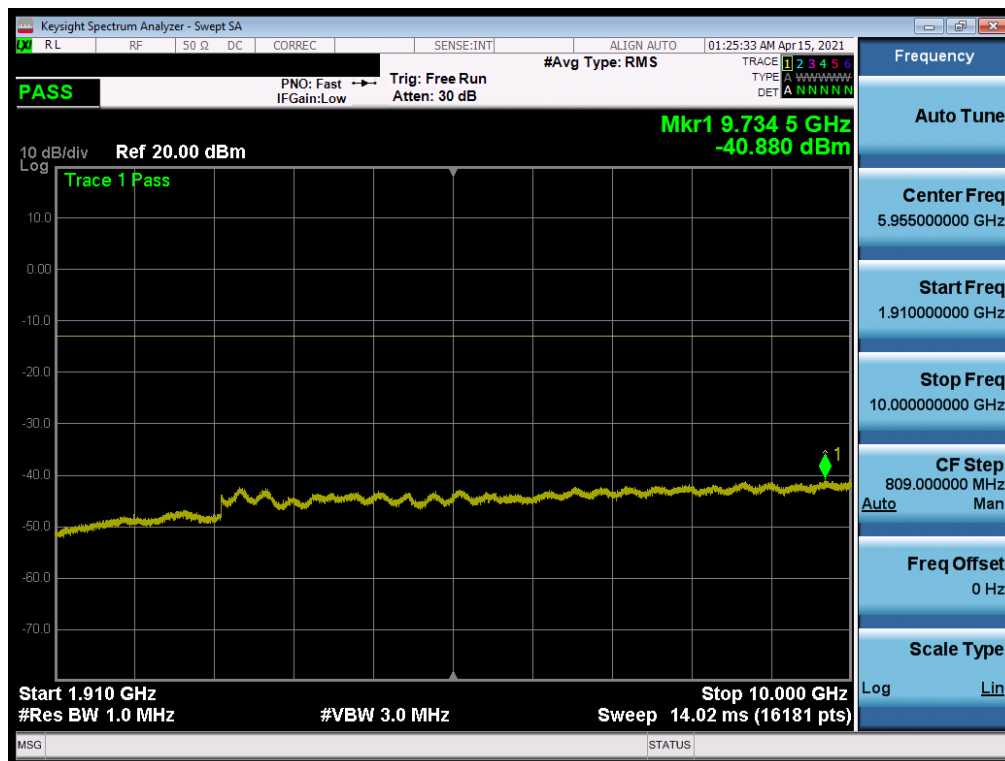
Plot 7-103. Conducted Spurious Plot (WCDMA Ch. 9538)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2104070032-03.A3L	Test Dates: 4/12/2021 – 6/11/2021	EUT Type: Portable Handset		Page 71 of 203

CDMA PCS

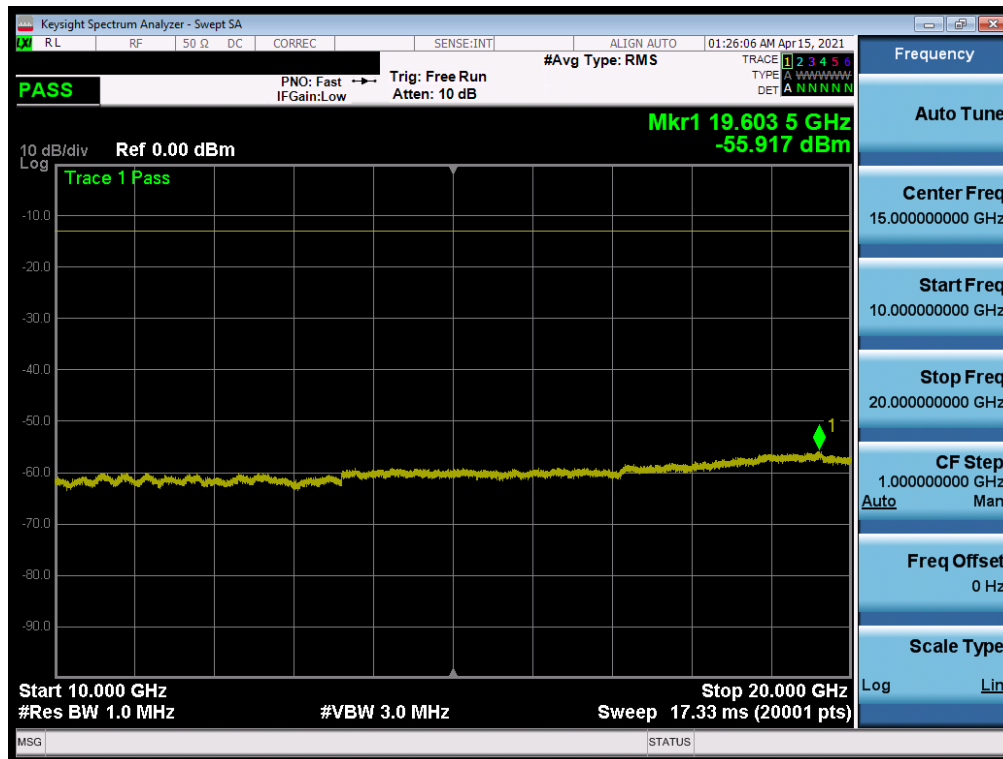


Plot 7-104. Conducted Spurious Plot (CDMA Ch. 25)



Plot 7-105. Conducted Spurious Plot (CDMA Ch. 25)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Plot 7-106. Conducted Spurious Plot (CDMA Ch. 25)

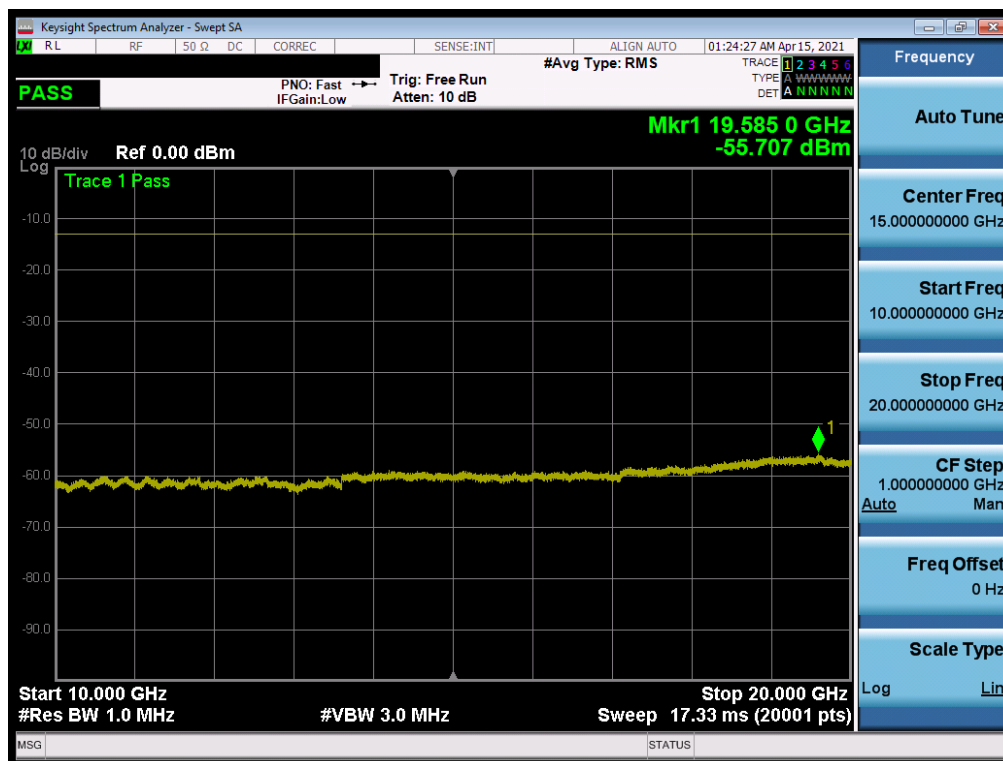


Plot 7-107. Conducted Spurious Plot (CDMA Ch. 600)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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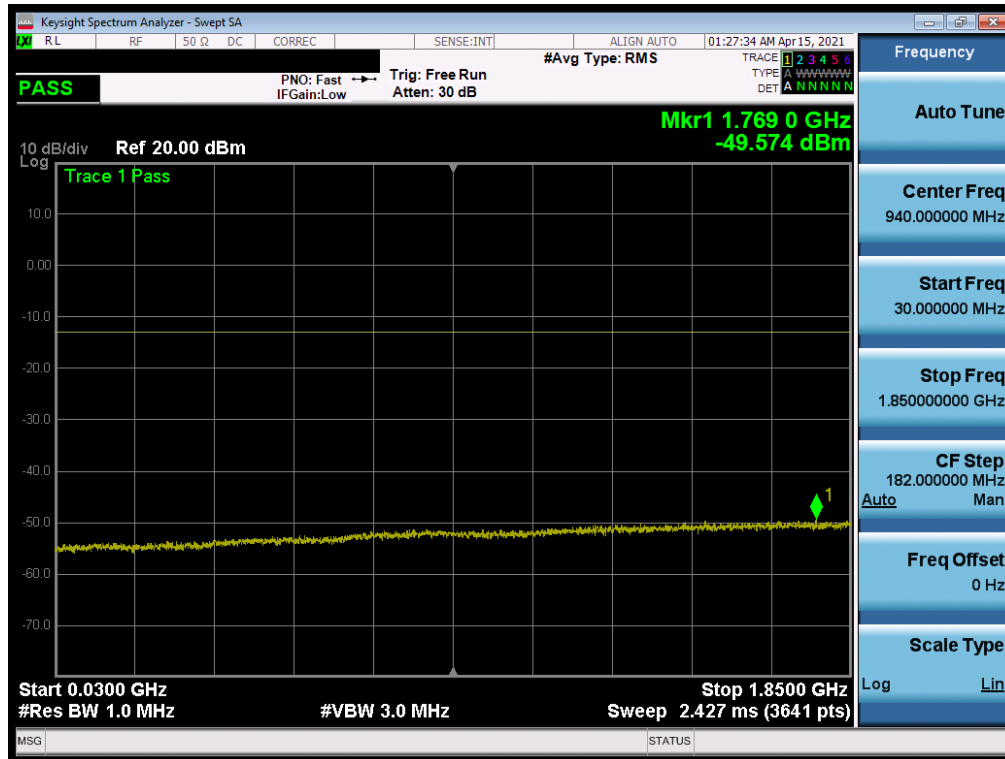


Plot 7-108. Conducted Spurious Plot (CDMA Ch. 600)

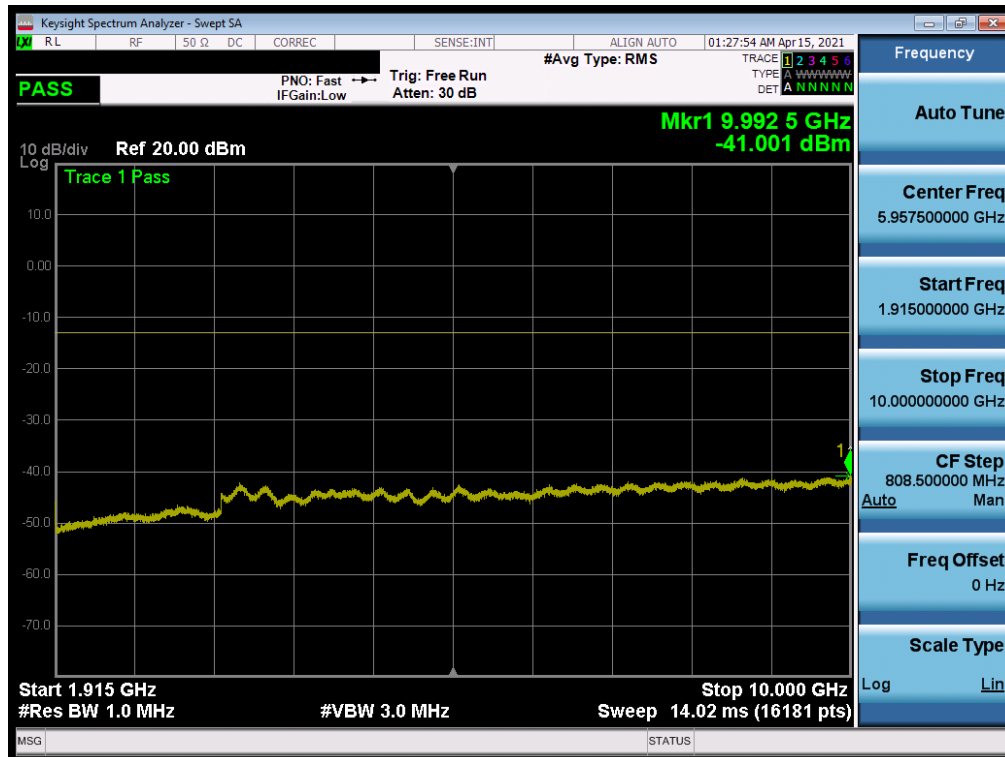


Plot 7-109. Conducted Spurious Plot (CDMA Ch. 600)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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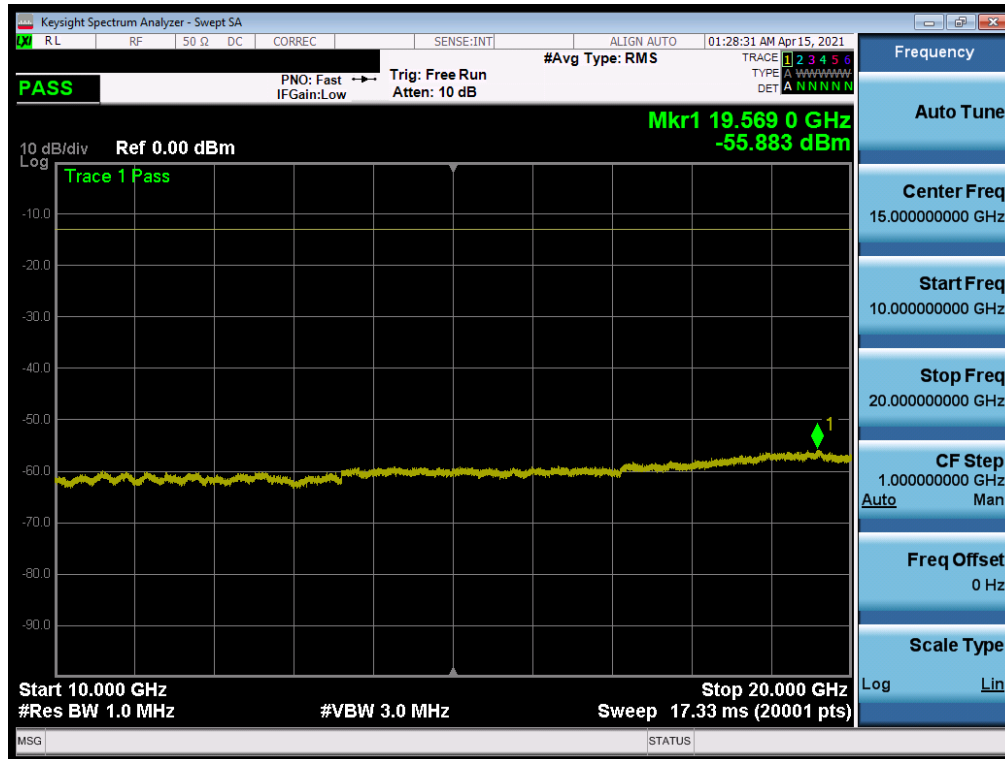


Plot 7-110. Conducted Spurious Plot (CDMA Ch. 1175)



Plot 7-111. Conducted Spurious Plot (CDMA Ch. 1175)

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Plot 7-112. Conducted Spurious Plot (CDMA Ch. 1175)

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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 $43 + 10 \log_{10}(P_{\text{Watts}})$, 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 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.

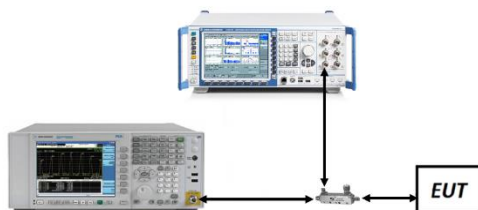




Figure 7-3. Test Instrument & Measurement Setup

FCC ID: A3LSMF711U	PCTEST Proud to be part of element	PART 24 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Test Notes

1. Per 24.238(a) and RSS-133(6.5), 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.
3. For CDMA, both CDMA and EVDO operation modes were investigated and the worst case configuration results are reported in this section.
4. For WCDMA, both WCDMA and HSUPA operation modes were investigated and the worst case configuration results are reported in this section.

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