

PART 27 MEASUREMENT REPORT

Applicant Name:
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Date of Testing:
 9/9/2021 - 11/16/2021
Test Report Issue Date:
 12/02/2021
Test Site/Location:
 PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
 1M2109090102-04-R1.A3L

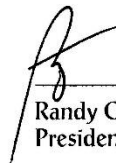
FCC ID:	A3LSMS908U
APPLICANT:	Samsung Electronics Co., Ltd.

Application Type: Certification
Model: SM-S908U
Additional Model(s): SM-S908U1
EUT Type: Portable Handset
FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part: 27
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.

Note: This revised Test Report (S/N: 1M2109090102-04-R1.A3L) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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


 Randy Ortanez
 President







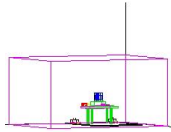
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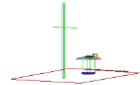
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Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	ERP		EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]	
LTE Band 71	20 MHz	QPSK	673.0 - 688.0	0.059	17.69	0.096	19.84	17M9G7D
		16QAM	673.0 - 688.0	0.052	17.14	0.085	19.29	17M9W7D
	15 MHz	QPSK	670.5 - 690.5	0.060	17.82	0.099	19.97	13M5G7D
		16QAM	670.5 - 690.5	0.051	17.06	0.083	19.21	13M5W7D
	10 MHz	QPSK	668.0 - 693.0	0.059	17.68	0.096	19.83	9M01G7D
		16QAM	668.0 - 693.0	0.050	17.03	0.083	19.18	9M00W7D
5 MHz	QPSK	665.5 - 695.5	0.062	17.95	0.102	20.10	4M54G7D	
	16QAM	665.5 - 695.5	0.052	17.19	0.086	19.34	4M53W7D	
LTE Band 12	10 MHz	QPSK	704.0 - 711.0	0.055	17.42	0.091	19.57	9M00G7D
		16QAM	704.0 - 711.0	0.045	16.55	0.074	18.70	8M97W7D
	5 MHz	QPSK	701.5 - 713.5	0.056	17.48	0.092	19.63	4M53G7D
		16QAM	701.5 - 713.5	0.045	16.57	0.074	18.72	4M53W7D
	3 MHz	QPSK	700.5 - 714.5	0.056	17.47	0.092	19.62	2M73G7D
		16QAM	700.5 - 714.5	0.045	16.51	0.073	18.66	2M72W7D
1.4 MHz	QPSK	699.7 - 715.3	0.054	17.35	0.089	19.50	1M11G7D	
	16QAM	699.7 - 715.3	0.046	16.64	0.076	18.79	1M11W7D	
LTE Band 13	10 MHz	QPSK	782.0	0.075	18.76	0.123	20.91	8M99G7D
		16QAM	782.0	0.060	17.78	0.098	19.93	9M01W7D
	5 MHz	QPSK	779.5 - 784.5	0.079	18.97	0.129	21.12	4M54G7D
16QAM		779.5 - 784.5	0.061	17.84	0.100	19.99	4M57W7D	
NR Band n71	20 MHz	$\pi/2$ BPSK	673.0 - 688.0	0.055	17.37	0.089	19.52	17M9G7D
		QPSK	673.0 - 688.0	0.054	17.32	0.089	19.47	18M9G7D
		16QAM	673.0 - 688.0	0.044	16.46	0.073	18.61	19M0W7D
	15 MHz	$\pi/2$ BPSK	670.5 - 690.5	0.057	17.54	0.093	19.69	13M4G7D
		QPSK	670.5 - 690.5	0.055	17.42	0.091	19.57	14M1G7D
		16QAM	670.5 - 690.5	0.046	16.61	0.075	18.76	14M2W7D
	10 MHz	$\pi/2$ BPSK	668.0 - 693.0	0.056	17.51	0.092	19.66	9M04G7D
		QPSK	668.0 - 693.0	0.054	17.33	0.089	19.48	9M37G7D
		16QAM	668.0 - 693.0	0.050	16.98	0.082	19.13	9M32W7D
	5 MHz	$\pi/2$ BPSK	665.5 - 695.5	0.058	17.61	0.095	19.76	4M50G7D
		QPSK	665.5 - 695.5	0.057	17.57	0.094	19.72	4M51G7D
		16QAM	665.5 - 695.5	0.049	16.86	0.080	19.01	4M51W7D
NR Band n12	15 MHz	$\pi/2$ BPSK	706.5 - 708.5	0.059	17.71	0.097	19.86	13M5G7D
		QPSK	706.5 - 708.5	0.061	17.83	0.099	19.98	14M2G7D
		16QAM	706.5 - 708.5	0.047	16.75	0.078	18.90	14M1W7D
	10 MHz	$\pi/2$ BPSK	704.0 - 711.0	0.057	17.58	0.094	19.73	8M99G7D
		QPSK	704.0 - 711.0	0.059	17.71	0.097	19.86	9M32G7D
	5 MHz	16QAM	704.0 - 711.0	0.044	16.47	0.073	18.62	9M34W7D
$\pi/2$ BPSK		701.5 - 713.5	0.056	17.50	0.092	19.65	4M55G7D	
5 MHz	QPSK	701.5 - 713.5	0.058	17.65	0.095	19.80	4M55G7D	
	16QAM	701.5 - 713.5	0.047	16.73	0.077	18.88	4M51W7D	

Overview Table (<1GHz Bands)

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Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator	
				Max. Power [W]	Max. Power [dBm]		
WCDMA1700	N/A	Spread Spectrum	1712.4 - 1752.6	0.270	24.32	4M15F9W	
LTE Band 66/4	20 MHz	QPSK	1720.0 - 1770.0	0.265	24.24	18M0G7D	
		16QAM	1720.0 - 1770.0	0.239	23.79	18M1W7D	
	15 MHz	QPSK	1717.5 - 1772.5	0.269	24.30	13M5G7D	
		16QAM	1717.5 - 1772.5	0.233	23.67	13M5W7D	
	10 MHz	QPSK	1715.0 - 1775.0	0.277	24.42	9M08G7D	
		16QAM	1715.0 - 1775.0	0.251	23.99	9M05W7D	
	5 MHz	QPSK	1712.5 - 1777.5	0.274	24.38	4M54G7D	
		16QAM	1712.5 - 1777.5	0.249	23.96	4M55W7D	
	3 MHz	QPSK	1711.5 - 1778.5	0.274	24.38	2M72G7D	
		16QAM	1711.5 - 1778.5	0.243	23.85	2M73W7D	
	1.4 MHz	QPSK	1710.7 - 1779.3	0.276	24.40	1M11G7D	
		16QAM	1710.7 - 1779.3	0.249	23.96	1M12W7D	
	NR Band n66 ANT A	40 MHz	$\pi/2$ BPSK	1730.0 - 1760.0	0.150	21.76	38M9G7D
			QPSK	1730.0 - 1760.0	0.160	22.04	38M8G7D
16QAM			1730.0 - 1760.0	0.130	21.15	38M8W7D	
30 MHz		$\pi/2$ BPSK	1725.0 - 1765.0	0.142	21.52	28M8G7D	
		QPSK	1725.0 - 1765.0	0.160	22.03	28M7G7D	
		16QAM	1725.0 - 1765.0	0.135	21.31	28M7W7D	
20 MHz		$\pi/2$ BPSK	1720.0 - 1770.0	0.146	21.63	18M0G7D	
		QPSK	1720.0 - 1770.0	0.165	22.17	19M1G7D	
		16QAM	1720.0 - 1770.0	0.133	21.25	19M0W7D	
15 MHz		$\pi/2$ BPSK	1717.5 - 1772.5	0.145	21.62	13M5G7D	
		QPSK	1717.5 - 1772.5	0.164	22.15	14M0G7D	
		16QAM	1717.5 - 1772.5	0.138	21.40	14M0W7D	
10 MHz		$\pi/2$ BPSK	1715.0 - 1775.0	0.146	21.65	9M04G7D	
		QPSK	1715.0 - 1775.0	0.163	22.13	9M35G7D	
		16QAM	1715.0 - 1775.0	0.134	21.28	9M34W7D	
5 MHz		$\pi/2$ BPSK	1712.5 - 1777.5	0.152	21.82	4M55G7D	
		QPSK	1712.5 - 1777.5	0.166	22.21	4M51G7D	
		16QAM	1712.5 - 1777.5	0.137	21.37	4M50W7D	
NR Band n66 ANT J		40 MHz	$\pi/2$ BPSK	1730.0 - 1760.0	0.208	23.18	38M9G7D
			QPSK	1730.0 - 1760.0	0.211	23.25	38M8G7D
			16QAM	1730.0 - 1760.0	0.170	22.30	38M9W7D
	30 MHz	$\pi/2$ BPSK	1725.0 - 1765.0	0.203	23.07	28M7G7D	
		QPSK	1725.0 - 1765.0	0.215	23.32	28M7G7D	
		16QAM	1725.0 - 1765.0	0.171	22.32	28M8W7D	
	20 MHz	$\pi/2$ BPSK	1720.0 - 1770.0	0.183	22.63	17M9G7D	
		QPSK	1720.0 - 1770.0	0.195	22.90	18M0G7D	
		16QAM	1720.0 - 1770.0	0.158	22.00	18M0W7D	
	15 MHz	$\pi/2$ BPSK	1717.5 - 1772.5	0.189	22.77	13M5G7D	
		QPSK	1717.5 - 1772.5	0.193	22.85	13M5G7D	
		16QAM	1717.5 - 1772.5	0.149	21.73	13M5W7D	
	10 MHz	$\pi/2$ BPSK	1715.0 - 1775.0	0.176	22.46	8M99G7D	
		QPSK	1715.0 - 1775.0	0.186	22.69	9M00G7D	
		16QAM	1715.0 - 1775.0	0.138	21.40	8M97W7D	
	5 MHz	$\pi/2$ BPSK	1712.5 - 1777.5	0.175	22.44	4M51G7D	
		QPSK	1712.5 - 1777.5	0.181	22.58	4M50G7D	
		16QAM	1712.5 - 1777.5	0.141	21.50	4M51W7D	

Overview Table (>1GHz Bands)

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1.0 INTRODUCTION

1.1 Scope

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



1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST Engineering Laboratory 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.

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMS908U**. 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 27.

Test Device Serial No.: 0100M, 0061M, 0097M, 0045M, 0044M, 0080M, 1218M, 0359M, 0364M, 0379M, 0361M

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 (FR1 and FR2), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5 and 6GHz), Bluetooth (1x, EDR, LE), NFC, UWB, Wireless Power Transfer

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

LTE Band 66 (1710 - 1780 MHz) overlaps the entire frequency range of LTE Band 4 (1710 - 1755 MHz). Therefore, test data provided in this report covers Band 4 as well as Band 66.

This EUT supports 2 antennas (Antenna A and Antenna J) for n66 operations. This report includes conducted and radiated data from both antennas to ensure compliance."

2.3 Test Configuration

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



This device supports wireless charging capability and, thus, is subject to the test requirements of KDB 648474 D03 v01r04. Additional radiated spurious emission measurements were performed with the EUT lying flat on an authorized wireless charging pad (WCP) 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.

2.5 Software and Firmware

The test was conducted with software/firmware version S908USQU0AUJK installed on the EUT.

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3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

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

3.2 Radiated Power and Radiated Spurious Emissions

The radiated test facilities consisted of an indoor 3 meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4-2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. For measurements below 1GHz, the absorbers are removed. A raised turntable is used for radiated measurement. The turn table is a continuously rotatable, remote-controlled, metallic turntable and 2 meters (6.56 ft.) in diameter. The turn table is flush with the raised floor of the chamber in order to maintain its function as a ground plane. An 80cm tall test table made of Styrodur is placed on top of the turn table. A Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

The equipment under test was transmitting while connected to its integral antenna and is placed on a wooden turntable 80cm above the ground plane and 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer. Radiated power levels are also investigated with the receive antenna horizontally and vertically polarized. The maximized power level is recorded using the spectrum analyzer “Channel Power” function with the integration band set to the emissions’ occupied bandwidth, a RMS detector, RBW = 100kHz, VBW = 300kHz, and a 1 second sweep time over a minimum of 10 sweeps, per the guidelines of KDB 971168 D01 v03r01.



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

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

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

For fundamental radiated power measurements, the guidance of KDB 971168 D01 v03r01 is used to record the EUT power level that is subsequently matched via the aforementioned substitution method given in ANSI/TIA-603-E-2016.



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.

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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
-	AP2	EMC Cable and Switch System	3/4/2021	Annual	3/4/2022	AP2
-	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
-	LTx2	Licensed Transmitter Cable Set	3/12/2021	Annual	3/12/2022	LTx2
-	LTx5	Licensed Transmitter Cable Set	3/3/2021	Annual	3/3/2022	LTx5
Agilent	E5515C	Wireless Communications Test Set	N/A			GB45360985
Agilent	N9030A	50GHz PXA Signal Analyzer	1/20/2021	Annual	1/20/2022	US51350301
Anritsu	MT8820C	Radio Communication Analyzer	N/A			6201300731
Anritsu	MT8821C	Radio Communication Analyzer	N/A			6201381794
Com-Power	AL-130R	Active Loop Antenna	10/29/2020	Biennial	10/29/2022	10160045
Emco	3115	Horn Antenna (1-18GHz)	6/18/2020	Biennial	6/18/2022	9704-5182
Emco	3116	Horn Antenna (18 - 40GHz)	7/20/2021	Biennial	7/20/2023	9203-2178
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/12/2020	Biennial	3/12/2022	128337
ETS Lindgren	3816/2NM	LISN	7/9/2020	Biennial	7/9/2022	00114451
Keysight Technologies	N9030A	3Hz-44GHz PXA Signal Analyzer	7/21/2021	Annual	7/21/2022	MY49430494
Agilent	N9030A	50GHz PXA Signal Analyzer	1/20/2021	Annual	1/20/2022	US51350301
Keysight Technologies	N9038A	MXE EMI Receiver	8/11/2020	Annual	12/11/2021	MY51210133
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
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)	8/3/2021	Annual	8/3/2022	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	5/25/2021	Annual	5/25/2022	100348
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	8/25/2021	Annual	8/25/2022	103200
Sunol	JB6	LB6 Antenna	11/13/2020	Biennial	11/13/2022	A082816

Table 5-1. Test Equipment

Notes:

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

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6.0 SAMPLE CALCULATIONS

Emission Designator

QPSK Modulation

Emission Designator = 8M62G7D

LTE BW = 8.62 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

QAM Modulation

Emission Designator = 8M45W7D

LTE BW = 8.45 MHz

W = Amplitude/Angle Modulated



7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

Spurious Radiated Emission - LTE Band

Example: Middle Channel LTE Mode 2nd Harmonic (1564 MHz)

The average spectrum analyzer reading at 3 meters with the EUT on the turntable was -81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -81.0 dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 1564 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm - (-24.80).

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7.0 TEST RESULTS



7.1 Summary

Company Name: Samsung Electronics Co., Ltd.
 FCC ID: A3LSMS908U
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 Mode(s): LTE/NR/WCDMA

Test Condition	Test Description	FCC Part Section(s)	Test Limit	Test Result	Reference
CONDUCTED	Transmitter Conducted Output Power*	2.1046	N/A	PASS	Section 7.2
	Occupied Bandwidth	2.1049(h)	N/A	PASS	Section 7.3
	Conducted Band Edge / Spurious Emissions (LTE Band 13)	2.1051, 27.53(c), 27.53(f)	Undesirable emissions must meet the limits detailed in sections 27.53(c) and 27.53(f)	PASS	Sections 7.4, 7.5
	Conducted Band Edge / Spurious Emissions (LTE Band 12, 17, 71; NR Band n12, n71)	2.1051, 27.53(g)	$\geq 43 + 10 \log (P[\text{Watts}])$ dB of attenuation below transmitter power	PASS	Sections 7.4, 7.5
	Conducted Band Edge / Spurious Emissions (WCDMA AWS; LTE Band 4, 66; NR Band n66)	2.1051, 27.53(h)	$\geq 43 + 10 \log (P[\text{Watts}])$ dB of attenuation below transmitter power	PASS	Sections 7.4, 7.5
	Peak-to-Average Ratio (WCDMA AWS; LTE Band 4, 66; NR Band n66)	27.50(d)(5)	≤ 13 dB	PASS	Section 7.6
	Frequency Stability	2.1055, 27.54	Fundamental emissions stay within authorized frequency block	PASS	Section 7.9
RADIATED	Effective Radiated Power (LTE Band 13)	27.50(b)(10)	≤ 3 Watts max. ERP	PASS	Section 7.7
	Effective Radiated Power (LTE Band 12, 17, 71; NR Band n12, n71)	27.50(c)(10)	≤ 3 Watts max. ERP	PASS	Section 7.7
	Equivalent Isotropic Radiated Power (WCDMA AWS; LTE Band 4, 66; NR Band n66)	27.50(d)(10)	≤ 1 Watt max. EIRP	PASS	Section 7.7
	Radiated Spurious Emissions (LTE Band 13)	2.1053, 27.53(c), 27.53(f)	Undesirable emissions must meet the limits detailed in sections 27.53(c) and 27.53(f)	PASS	Section 7.8
	Radiated Spurious Emissions (LTE Band 12, 17, 71; NR Band n12, n71)	2.1053, 27.53(g)	$\geq 43 + 10 \log (P[\text{Watts}])$ dB of attenuation below transmitter power	PASS	Section 7.8
	Radiated Spurious Emissions (WCDMA AWS; LTE Band 4, 66; NR Band n66)	2.1053, 27.53(h)	$\geq 43 + 10 \log (P[\text{Watts}])$ dB of attenuation below transmitter power	PASS	Section 7.8



* The only transmitter output conducted powers included in this report are those where the Pmax value, per the tune-up document, is higher than any of the DSI power levels. For the remaining conducted power measurements, see the **RF Exposure Report**.

Table 7-1. Summary of Test Results (FCC)

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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 shown in Section 7.0 were taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST EMC Software Tool v1.1.

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7.2 Conducted Power Output Data

§2.1046

Test Overview

The EUT is set up to transmit at maximum power for LTE. All power levels are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

Test Settings

1. Span = 2 x OBW to 3 x OBW
2. RBW = 1% to 5% of the OBW
3. Number of measurement points in sweep $\geq 2 \times \text{span} / \text{RBW}$
4. Sweep = auto-couple (less than transmission burst duration)
5. Detector = RMS (power)
6. Trigger was set to enable power measurements only on full power bursts
7. Trace was allowed to stabilize
8. Spectrum analyzer's "Channel Power" function was used to compute the power by integrating the spectrum across the OBW of the signal

Test Setup

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

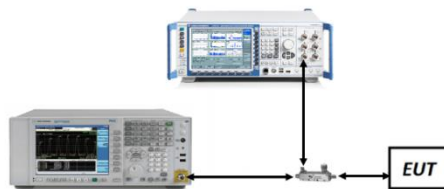


Figure 7-1. Test Instrument & Measurement Setup



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Test Notes:

1. Conducted power measurements were evaluated for the two contiguous channels using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device.



2. Conducted power measurements are also evaluated for simultaneous transmission of two NR FR1 carriers operating in different bands (interband NR FR1 ULCA). The powers were investigated while both bands are operating at their widest supported channel bandwidth.

3. All other conducted power measurements are contained in the RF exposure report for this filing.

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Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
40 MHz	π/2 BPSK	346000	1730.0	1 / 161	24.12
		349000	1745.0	1 / 54	24.15
		352000	1760.0	1 / 161	24.21
	QPSK	346000	1730.0	1 / 161	23.87
		349000	1745.0	1 / 54	23.78
		352000	1760.0	1 / 161	24.04
16-QAM	346000	1730.0	1 / 161	23.18	
30 MHz	π/2 BPSK	345000	1725.0	1 / 119	24.01
		349000	1745.0	1 / 119	24.24
		353000	1765.0	1 / 119	24.33
	QPSK	345000	1725.0	1 / 119	23.94
		349000	1745.0	1 / 119	24.09
		353000	1765.0	1 / 119	24.30
16-QAM	345000	1725.0	1 / 119	23.21	
20 MHz	π/2 BPSK	344000	1720.0	1 / 79	23.58
		349000	1745.0	1 / 26	23.67
		354000	1770.0	1 / 79	23.61
	QPSK	344000	1720.0	1 / 79	23.53
		349000	1745.0	1 / 26	23.48
		354000	1770.0	1 / 79	23.50
16-QAM	344000	1720.0	1 / 79	22.89	
15 MHz	π/2 BPSK	343500	1717.5	1 / 58	23.71
		349000	1745.0	1 / 58	23.67
		354500	1772.5	1 / 20	23.81
	QPSK	343500	1717.5	1 / 58	23.47
		349000	1745.0	1 / 58	23.47
		354500	1772.5	1 / 20	23.52
16-QAM	343500	1717.5	1 / 58	22.62	
10 MHz	π/2 BPSK	343000	1715.0	1 / 38	23.40
		349000	1745.0	1 / 38	23.76
		355000	1775.0	1 / 13	23.64
	QPSK	343000	1715.0	1 / 38	23.31
		349000	1745.0	1 / 38	23.66
		355000	1775.0	1 / 13	23.36
16-QAM	343000	1715.0	1 / 38	22.29	
5 MHz	π/2 BPSK	342500	1712.5	1 / 18	23.39
		349000	1745.0	1 / 18	23.54
		355500	1777.5	1 / 12	23.51
	QPSK	342500	1712.5	1 / 18	23.20
		349000	1745.0	1 / 18	23.31
		355500	1777.5	1 / 12	23.53
16-QAM	342500	1712.5	1 / 18	22.39	

Table 7-1. Conducted Power Output Data (n66 - ANT J)

FCC ID: A3LSMS908U	 PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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PCC							SCC							PCC Conducted Power [dBm]	SCC Conducted Power [dBm]	Inter-Band ULCA Total Tx. Power (dBm)
PCC Band	PCC Channel	PCC Frequency (MHz)	PCC Bandwidth [MHz]	PCC (UL) channel	Mod.	PCC UL RB#/Offset	SCC Band	SCC Channel	SCC Frequency (MHz)	SCC Bandwidth [MHz]	SCC (UL) channel	Mod.	SCC UL RB#/Offset			
n66	346000	1730	40	Low	$\pi/2$ BPSK	1/108	n77	650000	3750	100	Low	$\pi/2$ BPSK	1/136	20.06	20.91	23.52
					QPSK	216 / 0						QPSK	270 / 0	20.17	20.76	23.49
					QPSK	1 / 54						QPSK	1 / 68	20.09	20.62	23.37
					QPSK	1 / 108						QPSK	1 / 136	20.26	20.89	23.60
					QPSK	1 / 161						QPSK	1 / 204	20.23	20.76	23.51
					16Q	1/108						16Q	1/136	20.22	21.08	23.68
	349000	1745		Mid	$\pi/2$ BPSK	1 / 54		656000	3840		Mid	$\pi/2$ BPSK	1 / 68	20.22	20.41	23.33
					QPSK	216 / 0						QPSK	270 / 0	20.12	20.44	23.29
					QPSK	1 / 54						QPSK	1 / 68	20.01	20.67	23.36
					QPSK	1 / 108						QPSK	1 / 136	20.19	20.47	23.34
					QPSK	1 / 161						QPSK	1 / 204	20.12	20.36	23.25
					16Q	1 / 54						16Q	1 / 68	20.43	20.69	23.57
	352000	1760		High	$\pi/2$ BPSK	1 / 54		662000	3930		High	$\pi/2$ BPSK	1 / 68	20.21	20.72	23.48
					QPSK	216 / 0						QPSK	270 / 0	20.19	20.42	23.32
					QPSK	1 / 54						QPSK	1 / 68	20.20	20.66	23.45
					QPSK	1 / 108						QPSK	1 / 136	20.13	20.62	23.39
					QPSK	1 / 161						QPSK	1 / 204	20.09	20.65	23.39
					16Q	1 / 54						16Q	1 / 68	20.38	20.57	23.49

Table 7-2. Conducted Power Output Data (NR Bands n66 – n77)

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7.3 Occupied Bandwidth

Test Overview

The occupied bandwidth, that is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers radiated are each equal to 0.5 percent of the total mean power radiated by a given emission shall be measured. All modes of operation were investigated and the worst case configuration results are reported in this section.

Test Procedure Used

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.

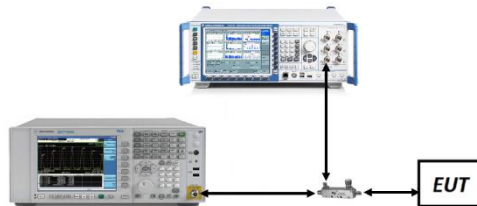


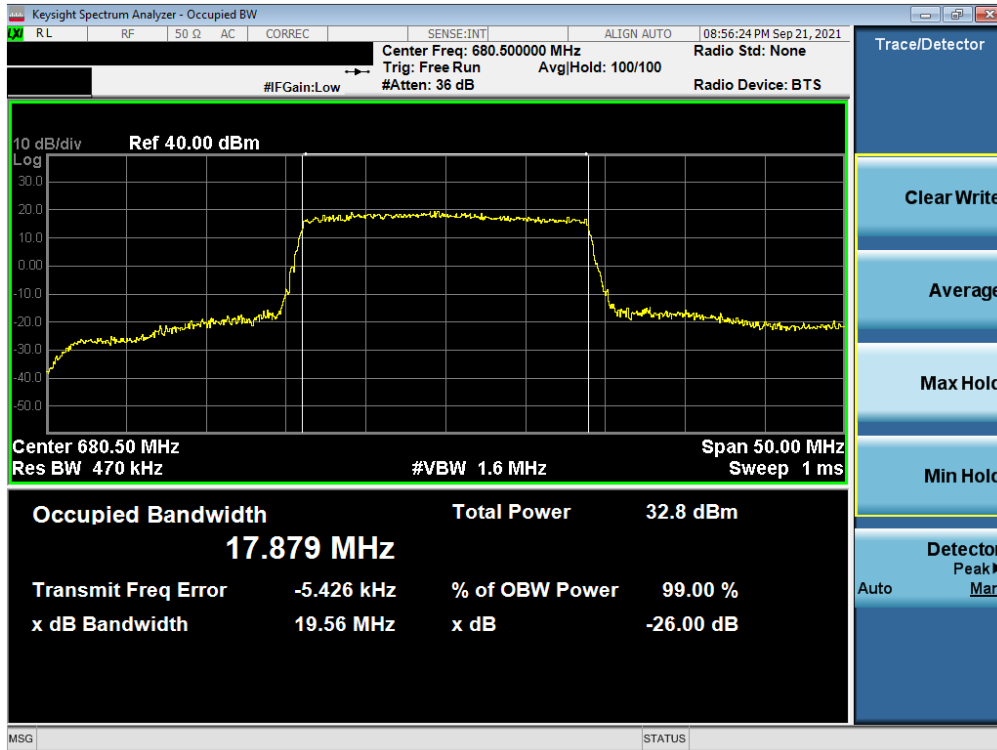
Figure 7-2. Test Instrument & Measurement Setup

Test Notes

None.

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LTE Band 71

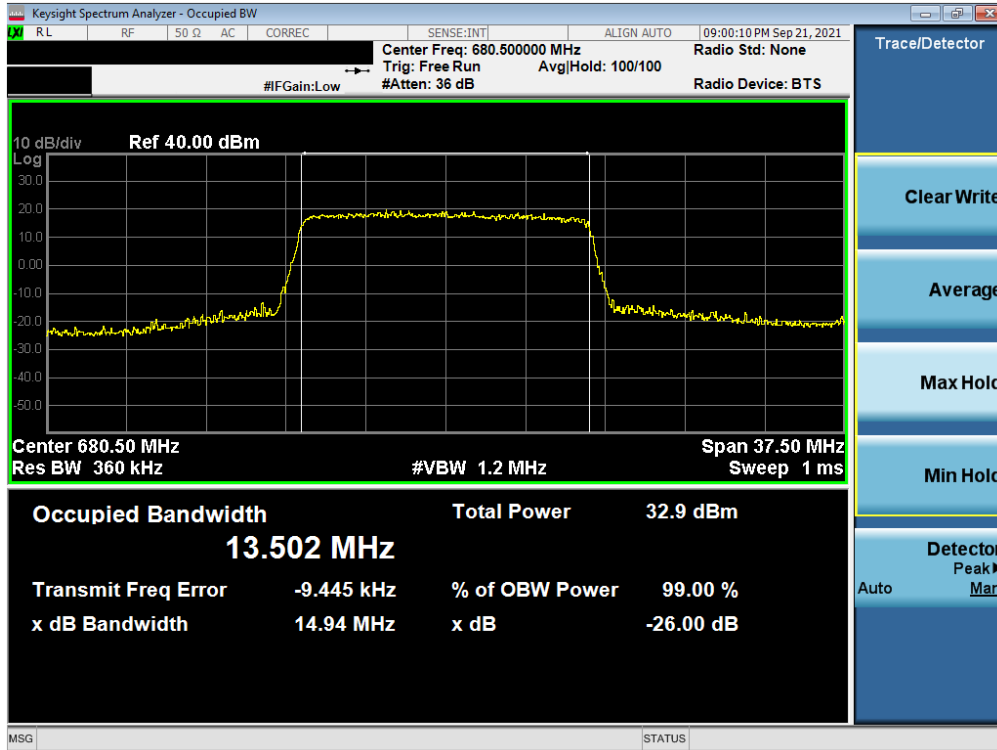


Plot 7-2. Occupied Bandwidth Plot (LTE Band 71 - 20MHz QPSK - Full RB)

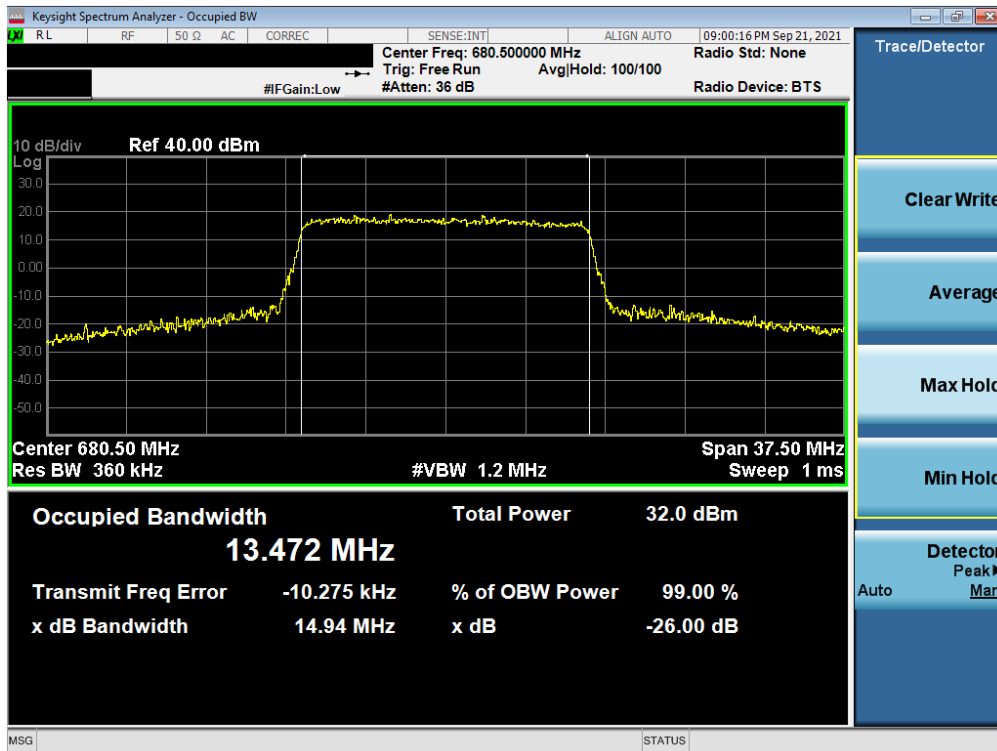


Plot 7-3. Occupied Bandwidth Plot (LTE Band 71 - 20MHz 16-QAM - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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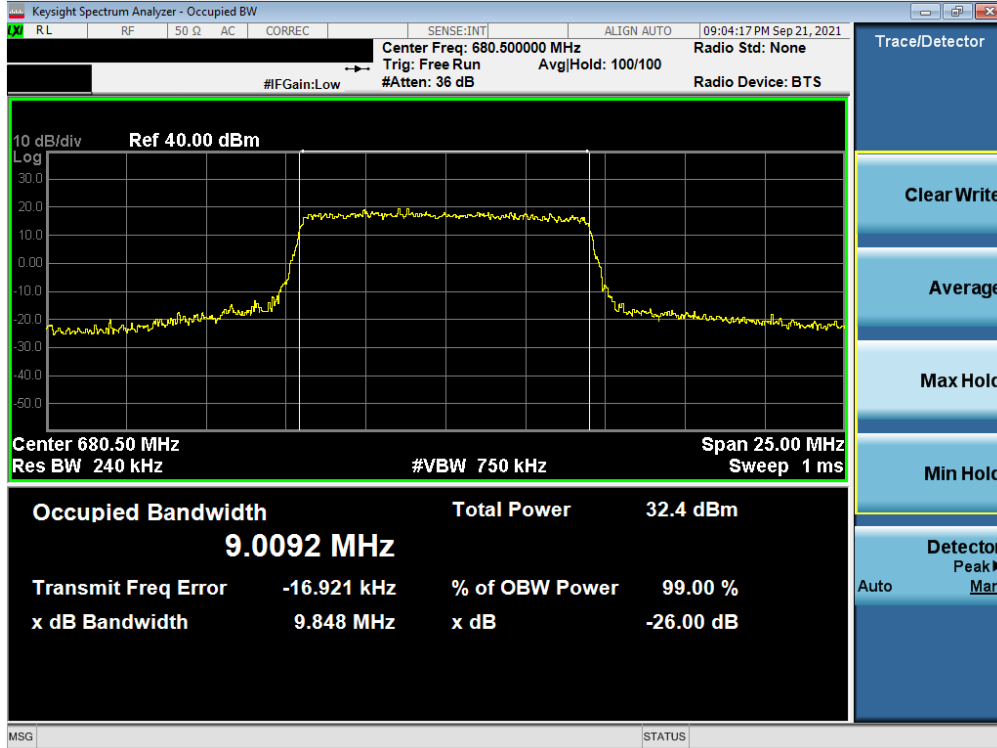


Plot 7-4. Occupied Bandwidth Plot (LTE Band 71 - 15MHz QPSK - Full RB)



Plot 7-5. Occupied Bandwidth Plot (LTE Band 71 - 15MHz 16-QAM - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Plot 7-6. Occupied Bandwidth Plot (LTE Band 71 - 10MHz QPSK - Full RB)

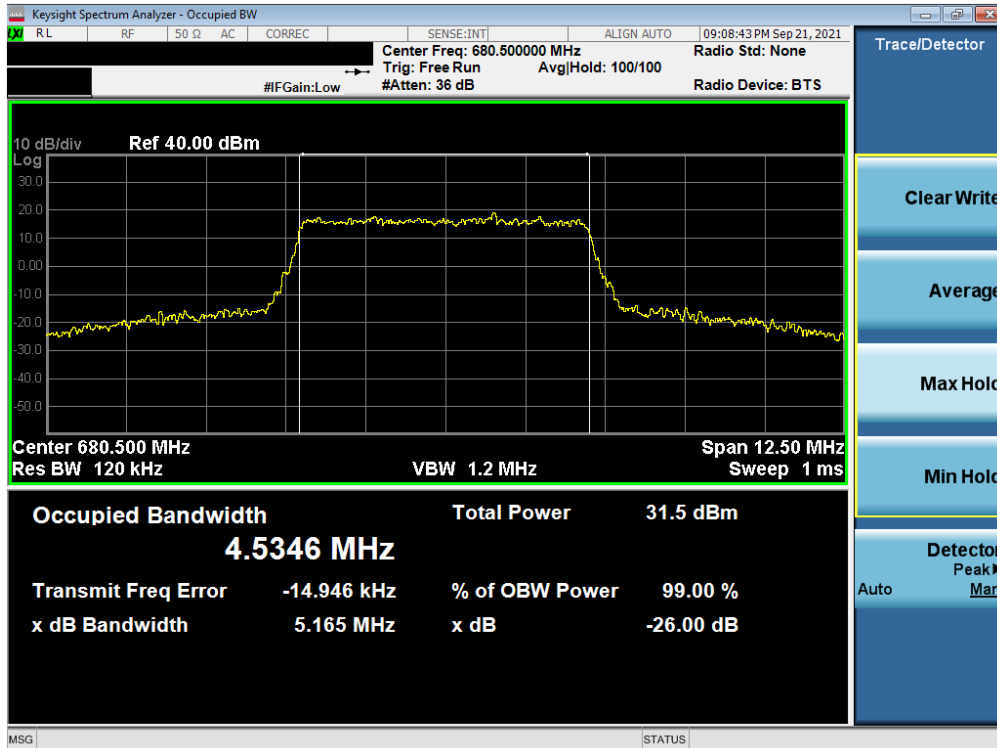


Plot 7-7. Occupied Bandwidth Plot (LTE Band 71 - 10MHz 16-QAM - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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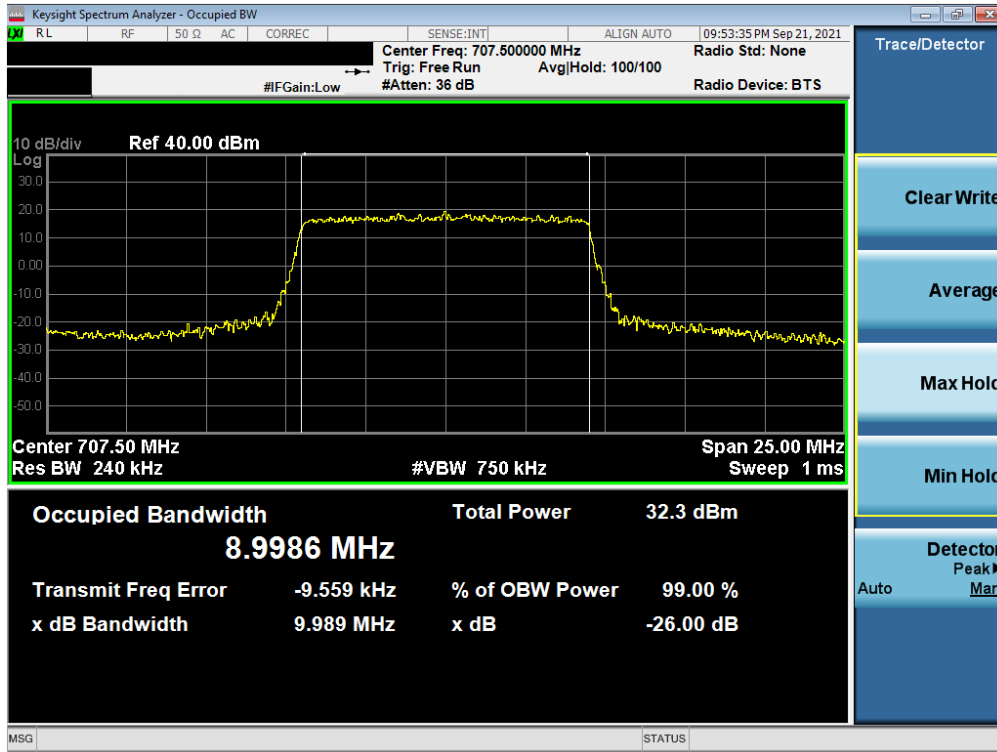
Plot 7-8. Occupied Bandwidth Plot (LTE Band 71 - 5MHz QPSK - Full RB)



Plot 7-9. Occupied Bandwidth Plot (LTE Band 71 - 5MHz 16-QAM - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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LTE Band 12

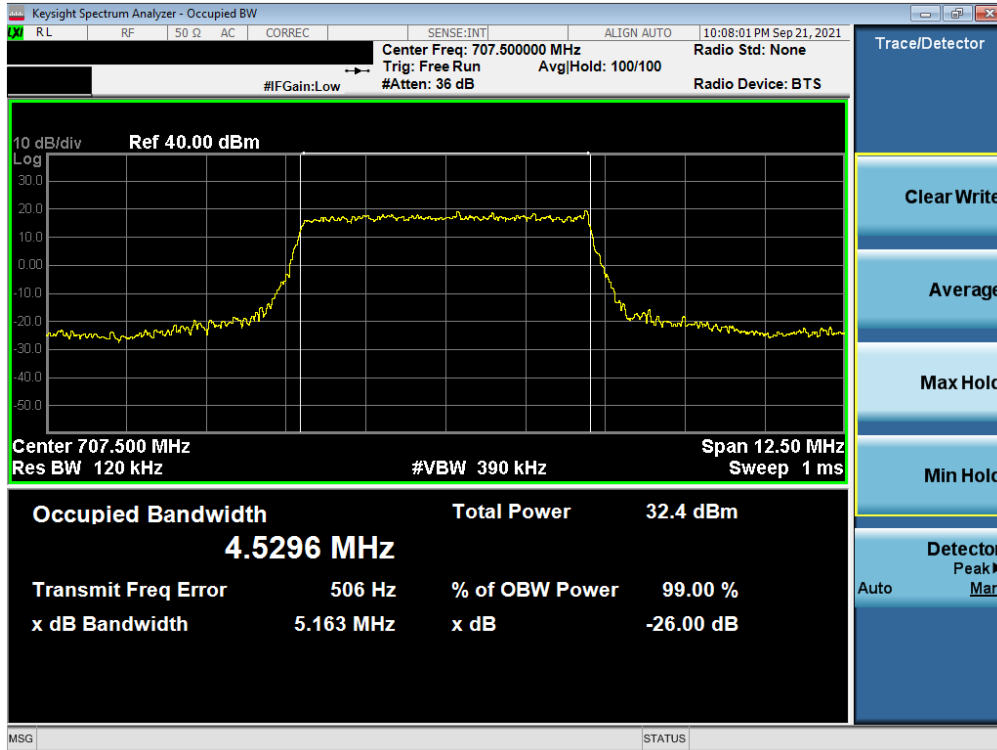


Plot 7-10. Occupied Bandwidth Plot (LTE Band 12 - 10MHz QPSK - Full RB)

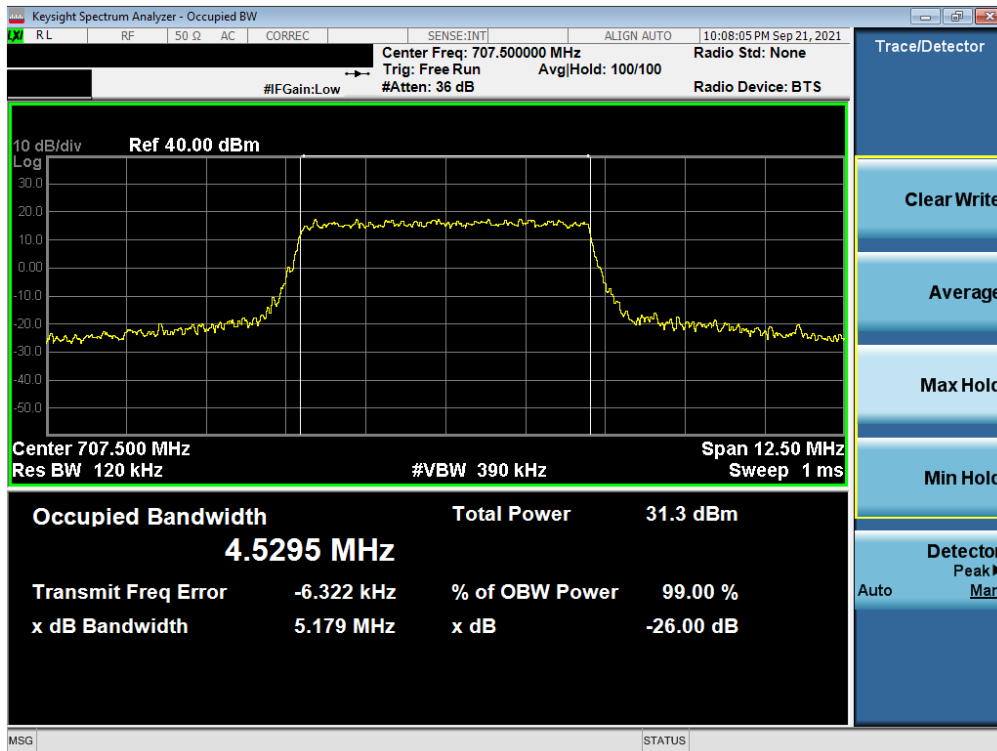


Plot 7-11. Occupied Bandwidth Plot (LTE Band 12 - 10MHz 16-QAM - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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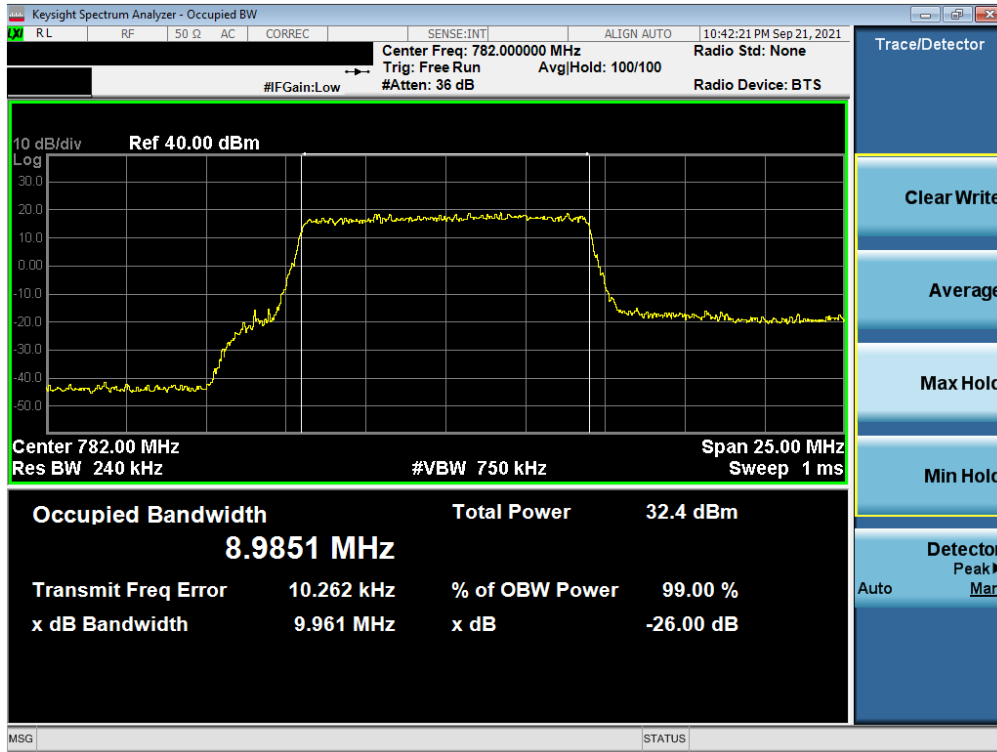
Plot 7-12. Occupied Bandwidth Plot (LTE Band 12 - 5MHz QPSK - Full RB)



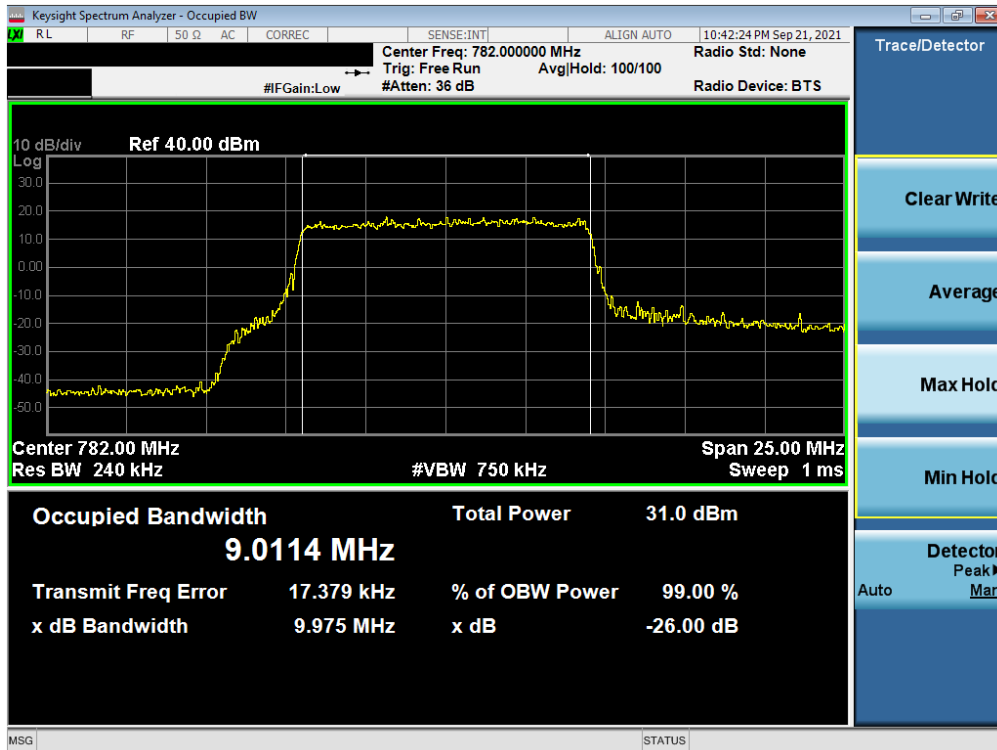
Plot 7-13. Occupied Bandwidth Plot (LTE Band 12 - 5MHz 16-QAM - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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LTE Band 13

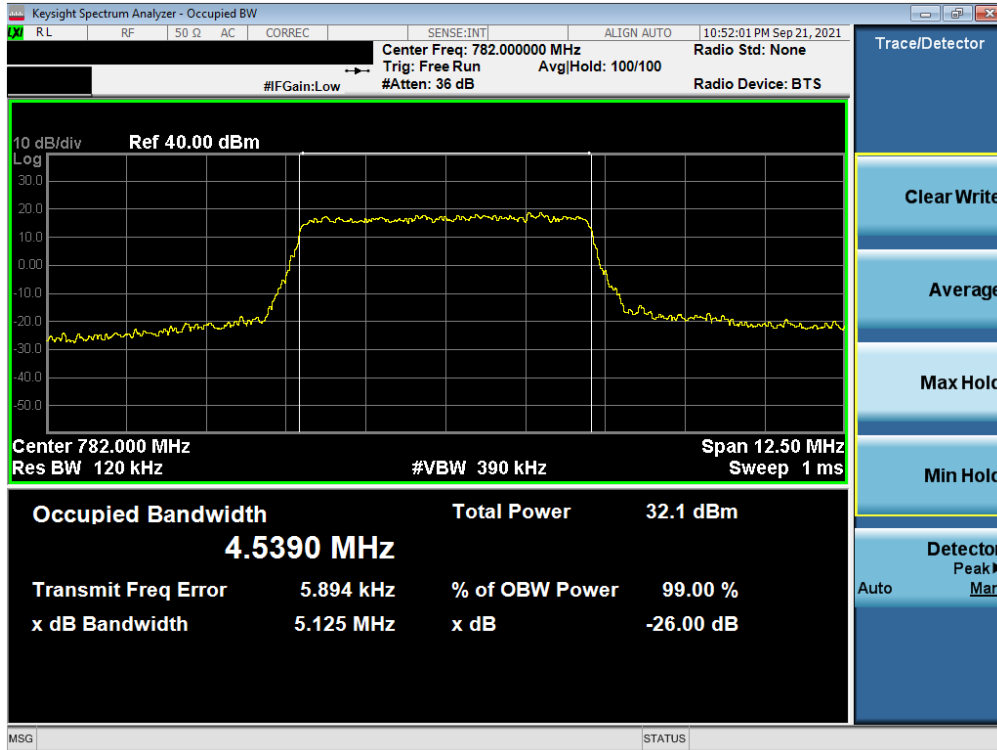


Plot 7-14. Occupied Bandwidth Plot (LTE Band 13 - 10MHz QPSK - Full RB)

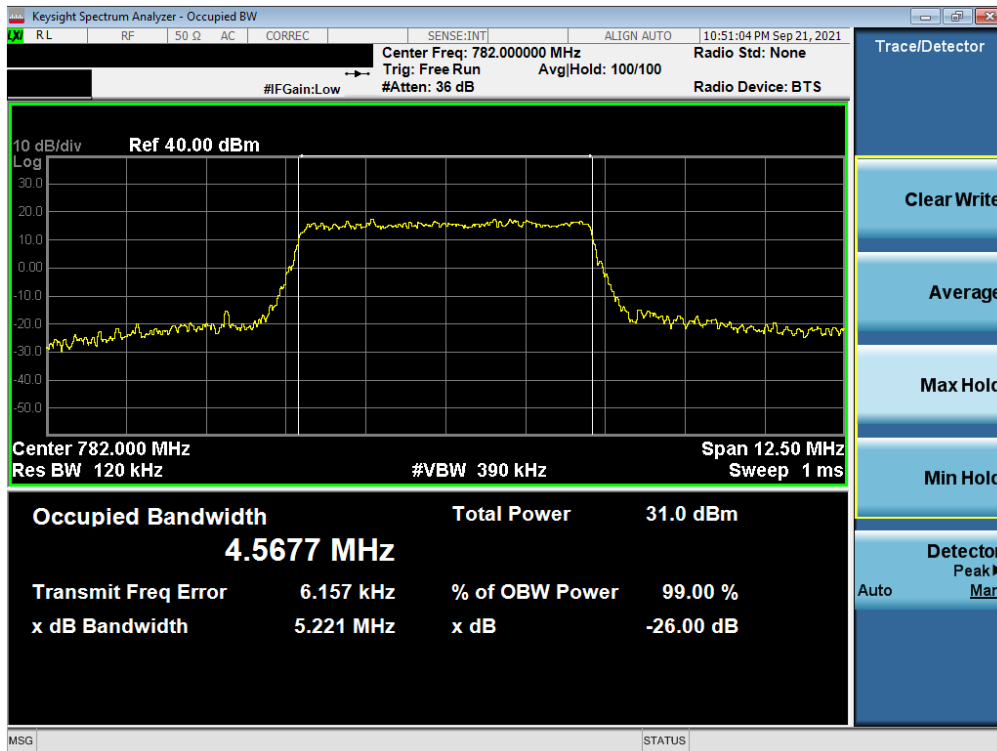


Plot 7-15. Occupied Bandwidth Plot (LTE Band 13 - 10MHz 16-QAM - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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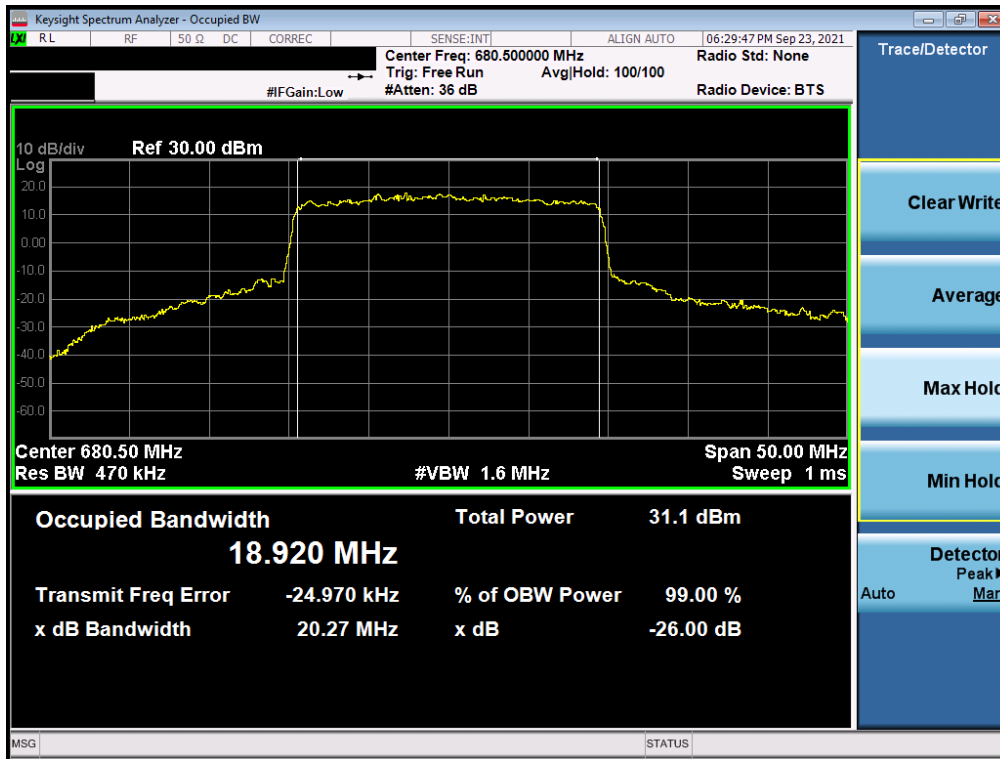
Plot 7-16. Occupied Bandwidth Plot (LTE Band 13 - 5MHz QPSK - Full RB)



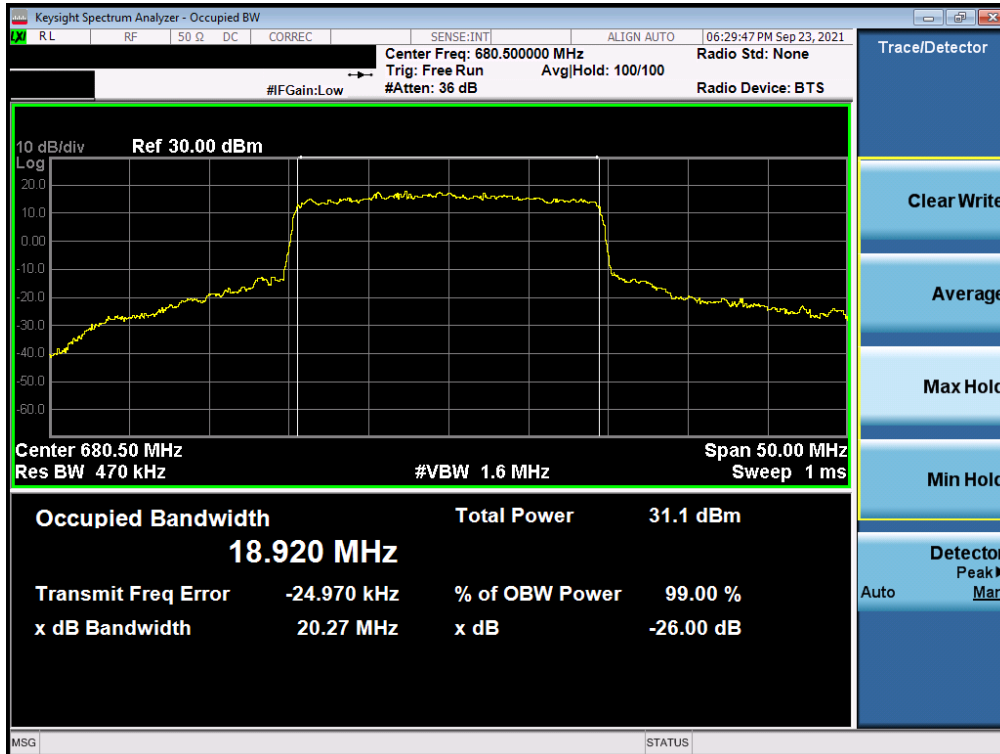
Plot 7-17. Occupied Bandwidth Plot (LTE Band 13 - 5MHz 16-QAM - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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NR Band n71

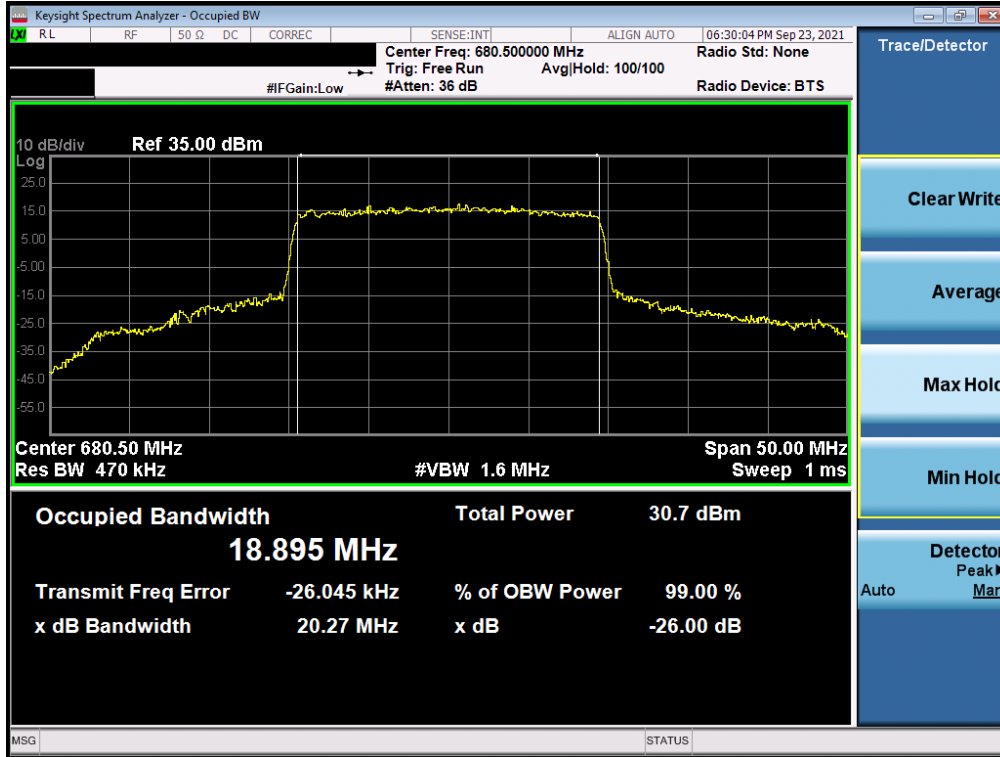


Plot 7-18. Occupied Bandwidth Plot (NR Band n71 - 20MHz DFT-s-OFDM BPSK - Full RB)



Plot 7-19. Occupied Bandwidth Plot (NR Band n71 - 20MHz CP-OFDM QPSK - Full RB)

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Plot 7-20. Occupied Bandwidth Plot (NR Band n71 - 20MHz CP-OFDM 16-QAM - Full RB)

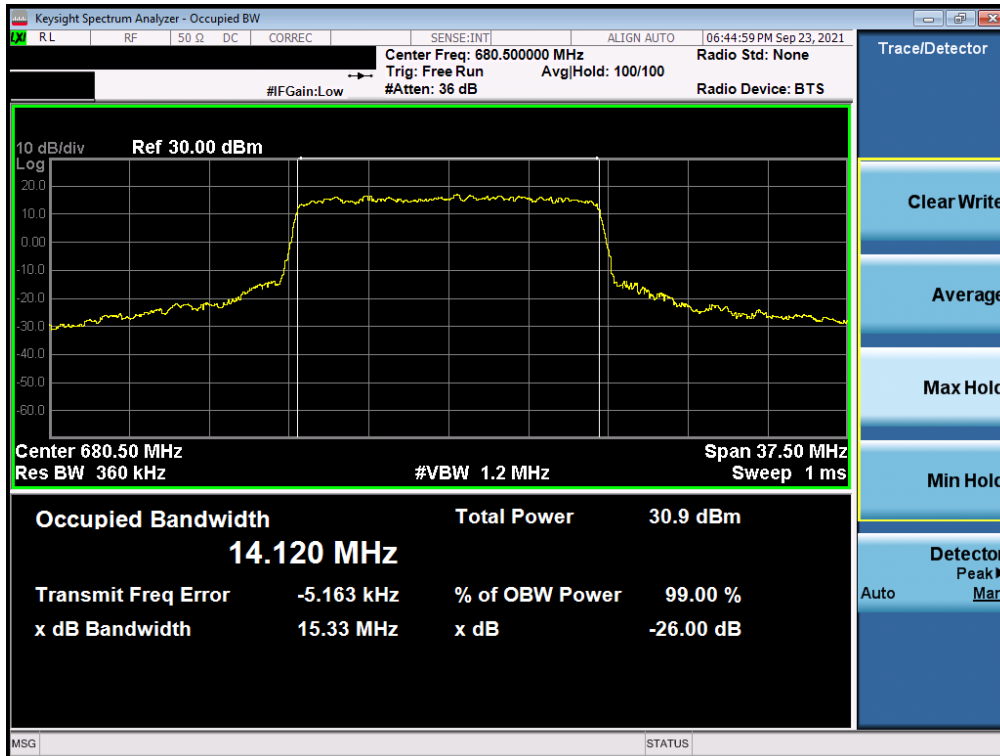


Plot 7-21. Occupied Bandwidth Plot (NR Band n71 - 15MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Plot 7-22. Occupied Bandwidth Plot (NR Band n71 - 15MHz QPSK - Full RB)

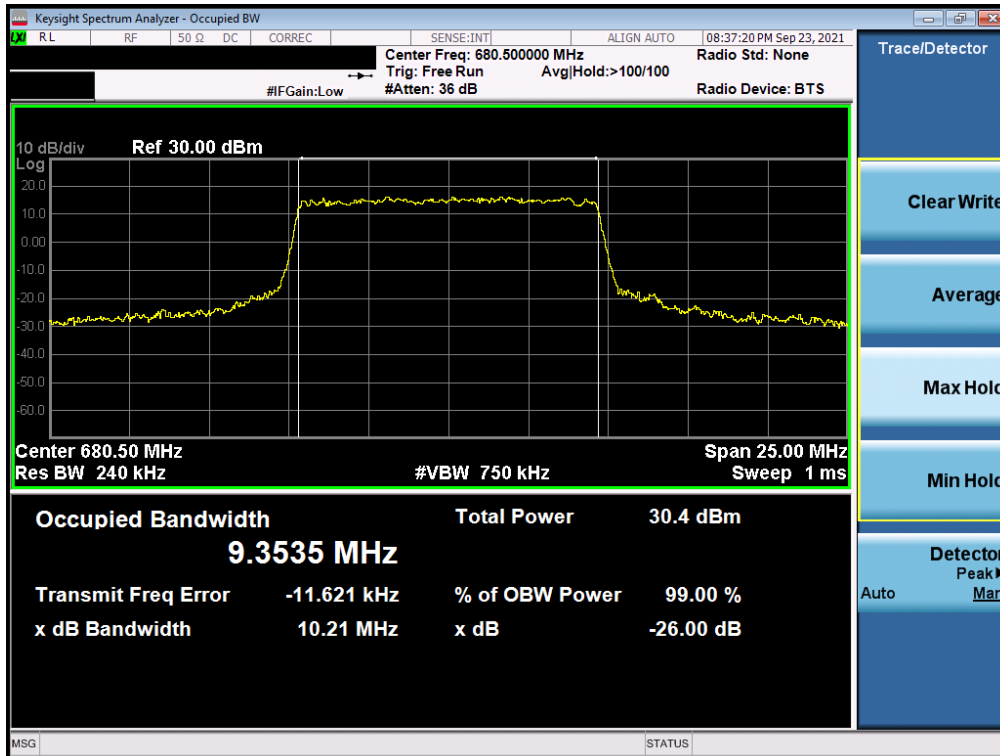


Plot 7-23. Occupied Bandwidth Plot (NR Band n71 - 15MHz CP-OFDM 16-QAM - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 28 of 214

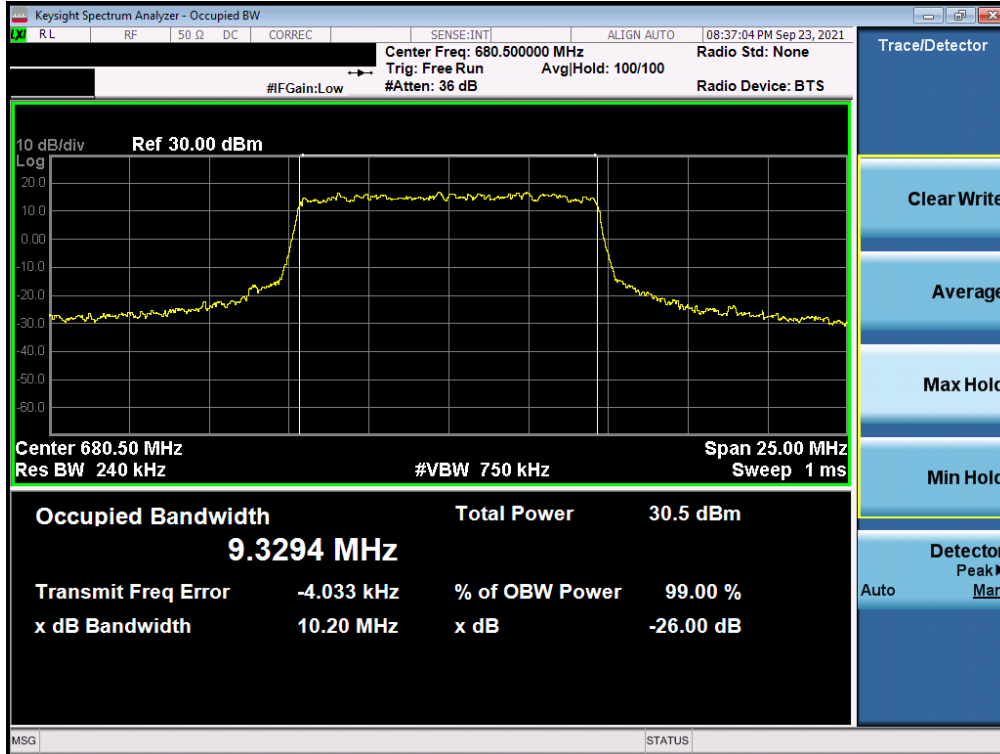


Plot 7-24. Occupied Bandwidth Plot (NR Band n71 - 10MHz DFT-s-OFDM BPSK - Full RB)

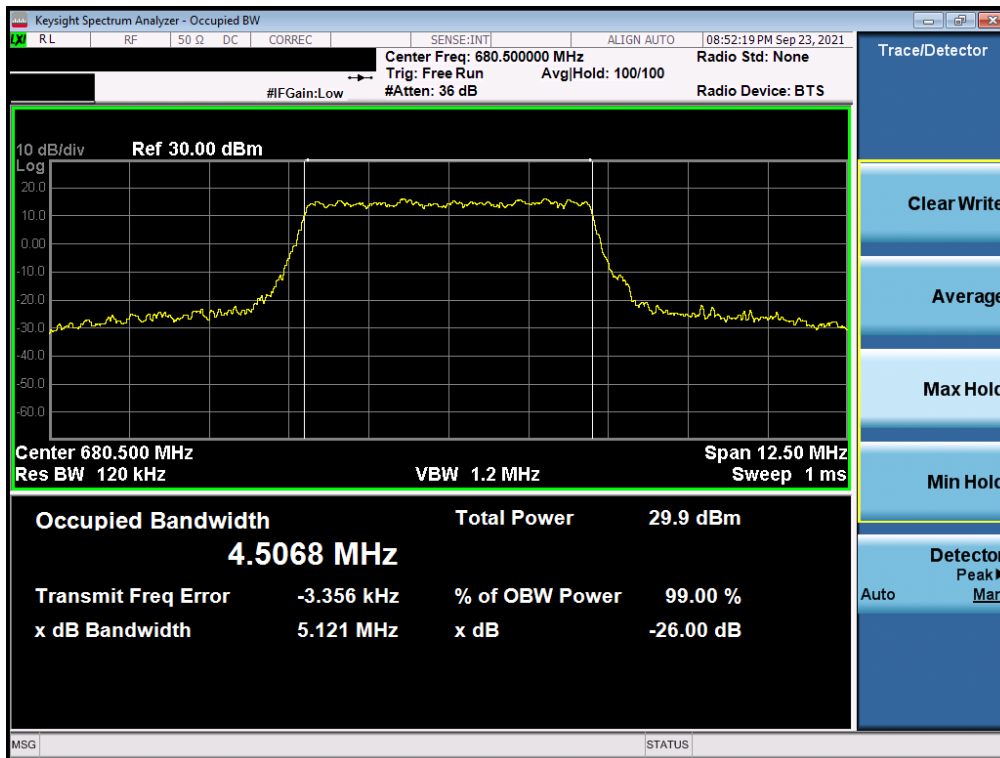


Plot 7-25. Occupied Bandwidth Plot (NR Band n71 - 10MHz CP-OFDM QPSK - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 29 of 214

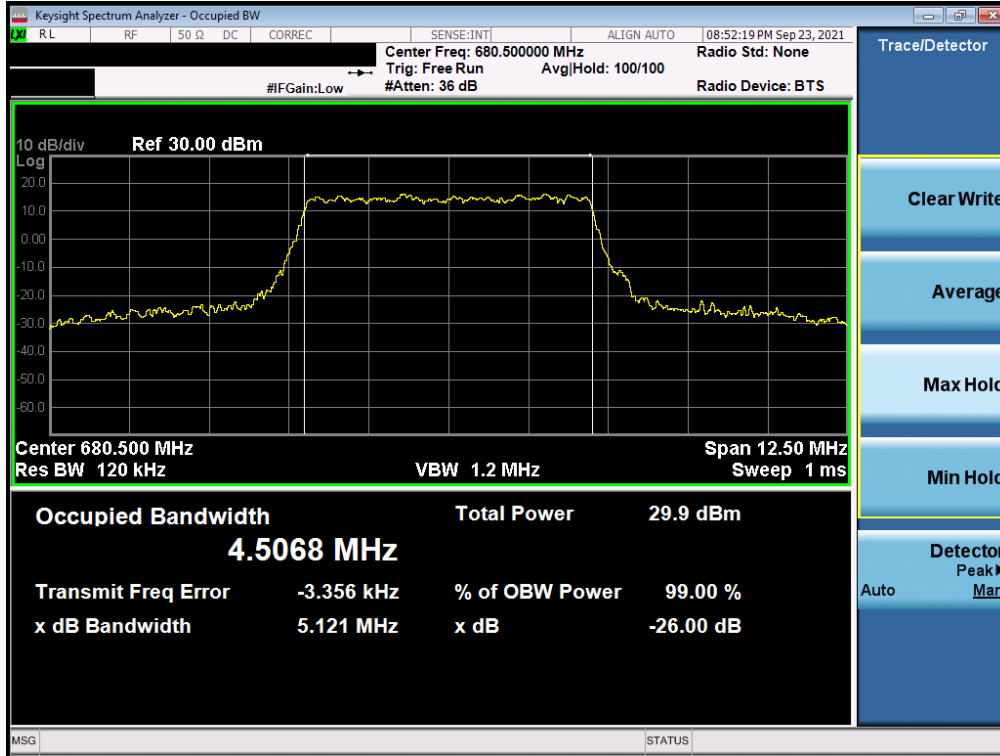


Plot 7-26. Occupied Bandwidth Plot (NR Band n71 - 10MHz CP-OFDM 16-QAM - Full RB)

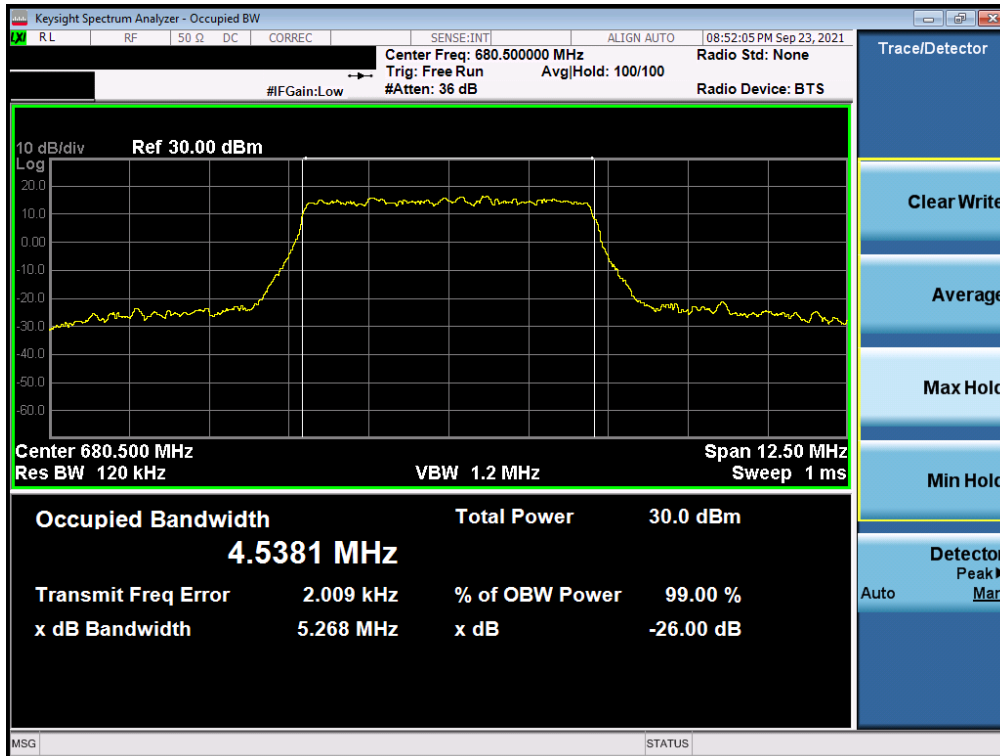


Plot 7-27. Occupied Bandwidth Plot (NR Band n71 - 5MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 30 of 214



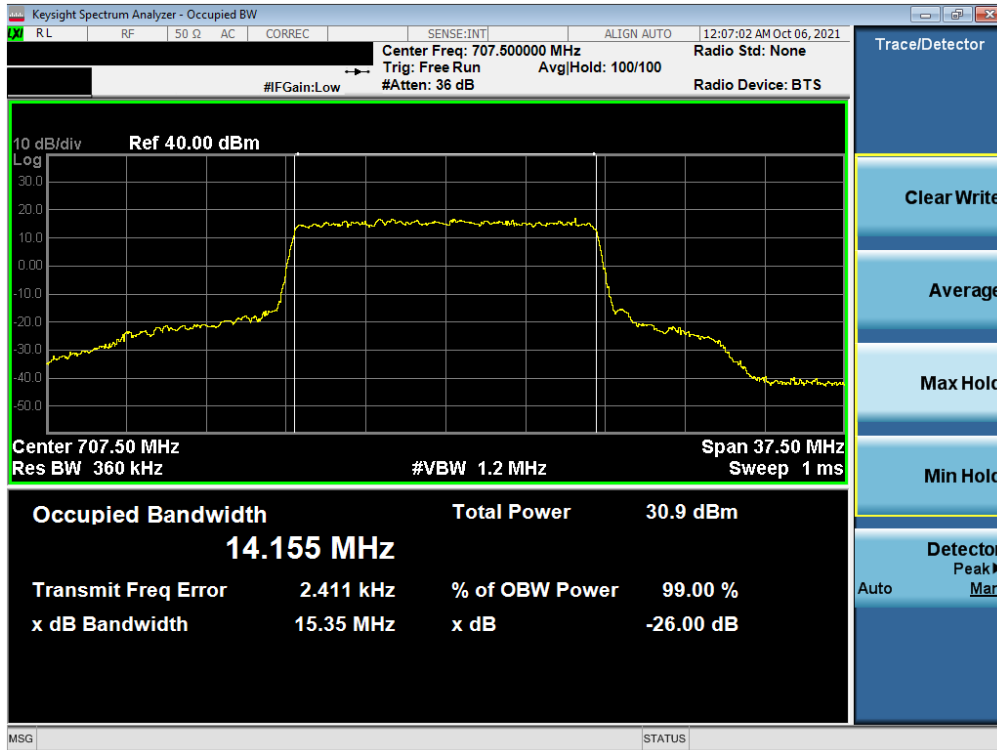
Plot 7-28. Occupied Bandwidth Plot (NR Band n71 - 5MHz CP-OFDM QPSK - Full RB)



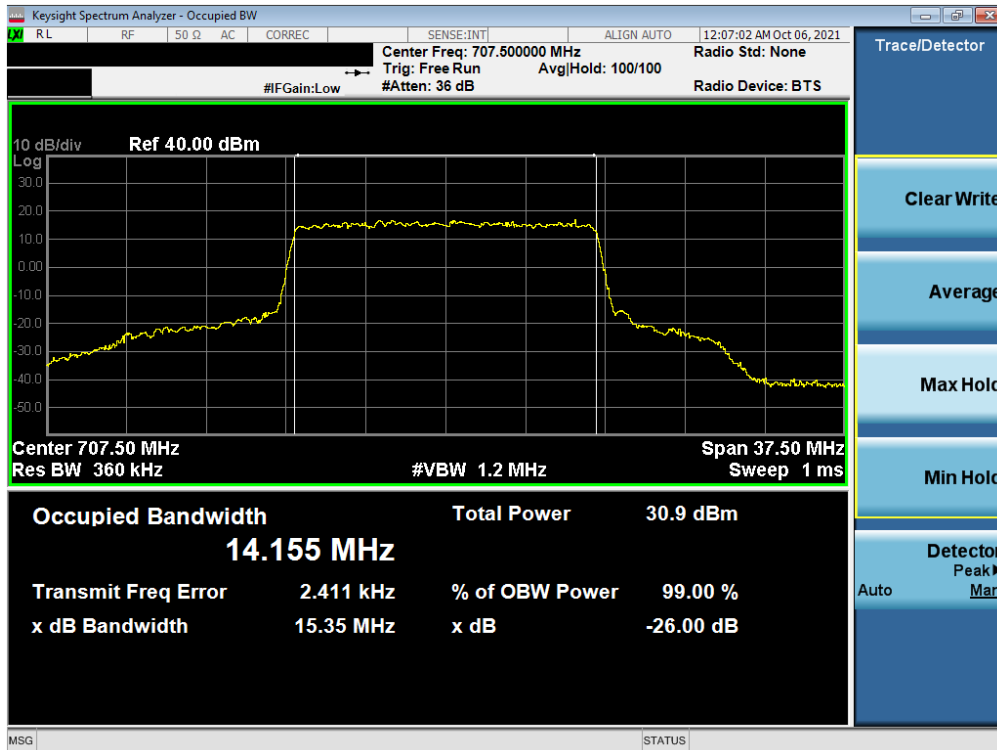
Plot 7-29. Occupied Bandwidth Plot (NR Band n71 - 5MHz CP-OFDM 16-QAM - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 31 of 214

NR Band n12

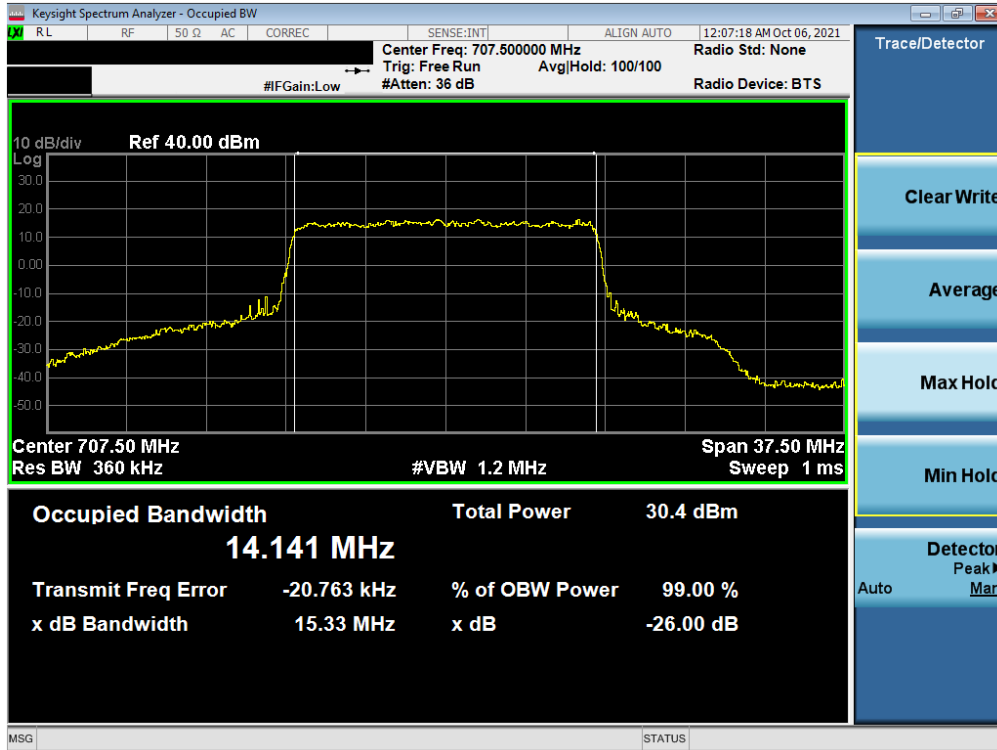


Plot 7-30. Occupied Bandwidth Plot (NR Band n12 - 15MHz DFT-s-OFDM BPSK - Full RB)

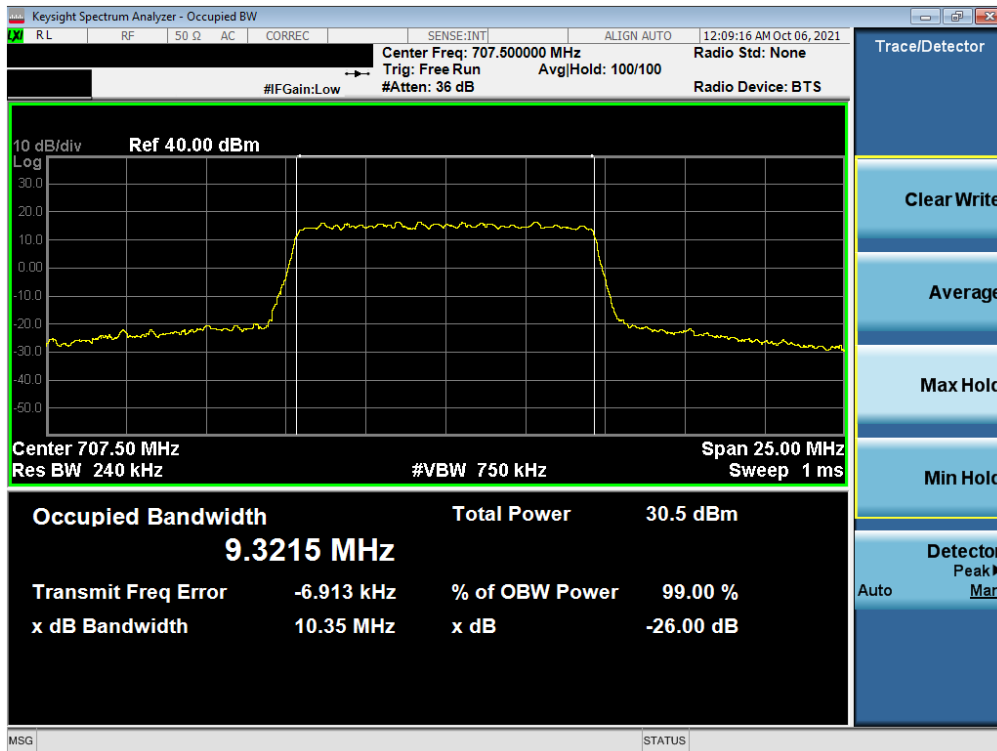


Plot 7-31. Occupied Bandwidth Plot (NR Band n12 - 15MHz CP-OFDM QPSK - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 32 of 214



Plot 7-32. Occupied Bandwidth Plot (NR Band n12 - 15MHz CP-OFDM 16-QAM - Full RB)

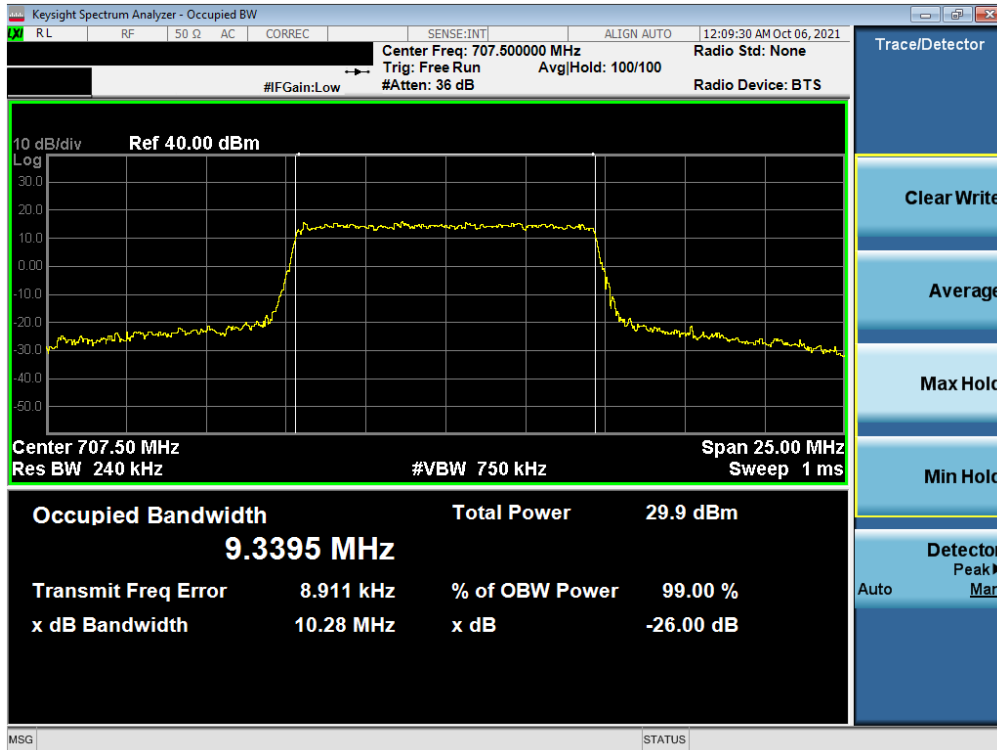


Plot 7-33. Occupied Bandwidth Plot (NR Band n12 - 10MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 33 of 214

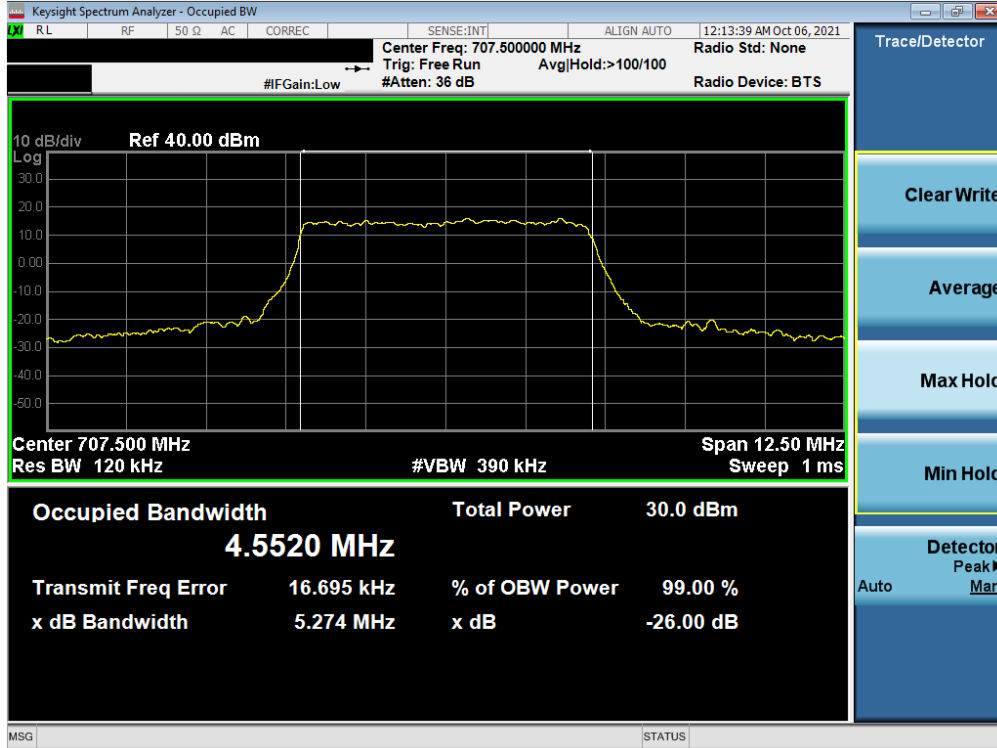


Plot 7-34. Occupied Bandwidth Plot (NR Band n12 - 10MHz CP-OFDM QPSK - Full RB)

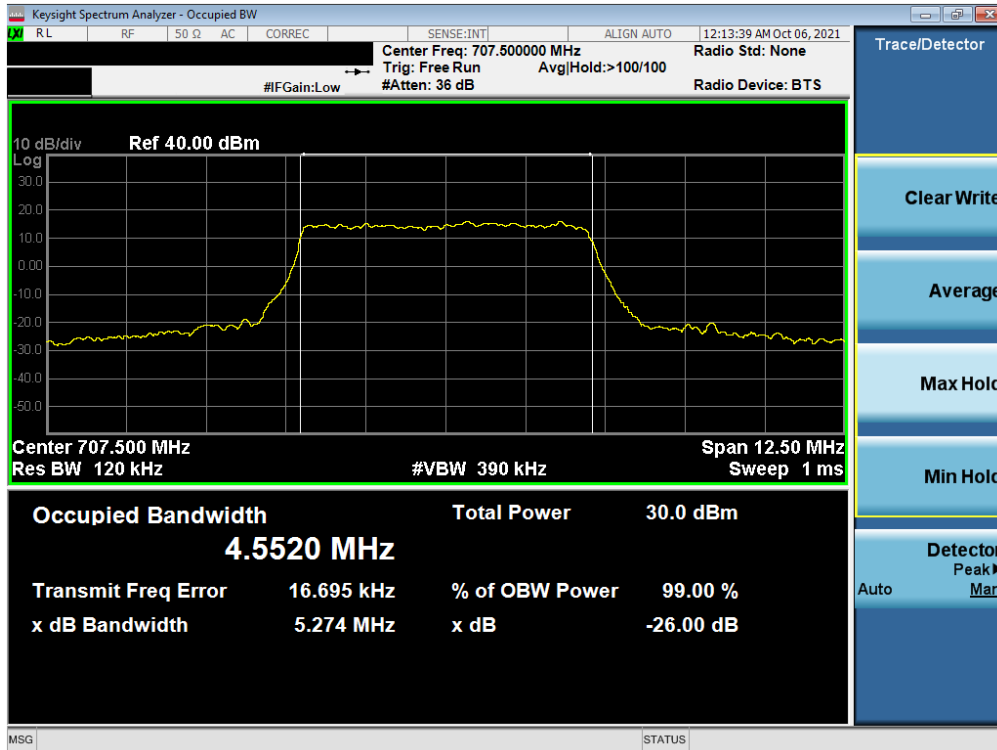


Plot 7-35. Occupied Bandwidth Plot (NR Band n12 - 10MHz CP-OFDM 16-QAM - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 34 of 214

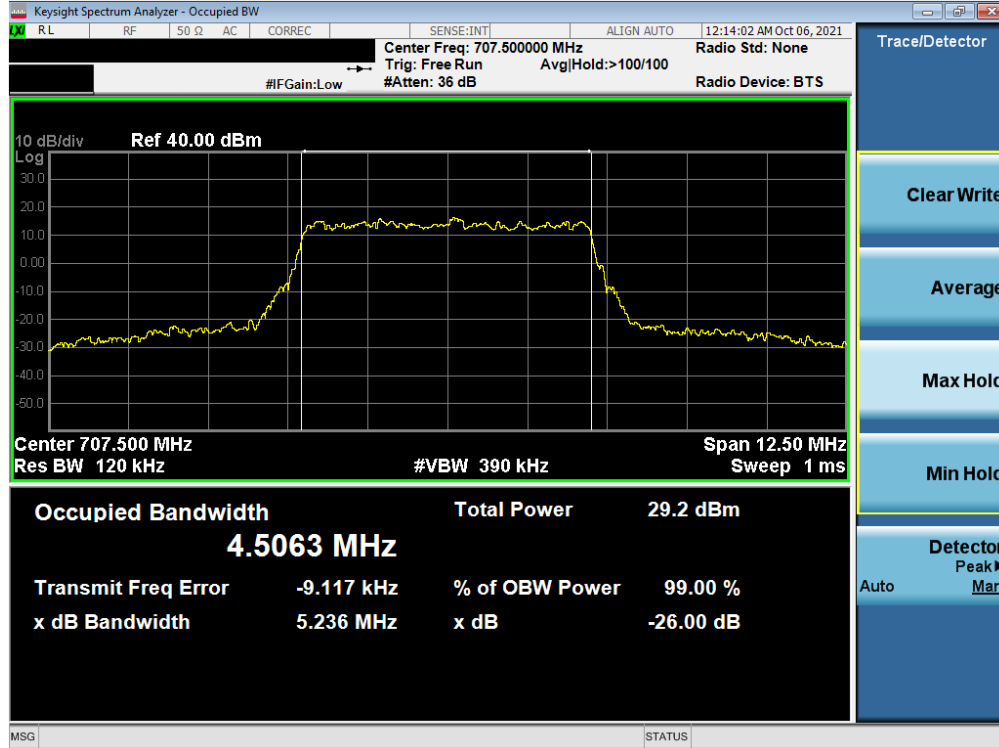


Plot 7-36. Occupied Bandwidth Plot (NR Band n12 - 5MHz DFT-s-OFDM BPSK - Full RB)



Plot 7-37. Occupied Bandwidth Plot (NR Band n12 - 5MHz CP-OFDM QPSK - Full RB)

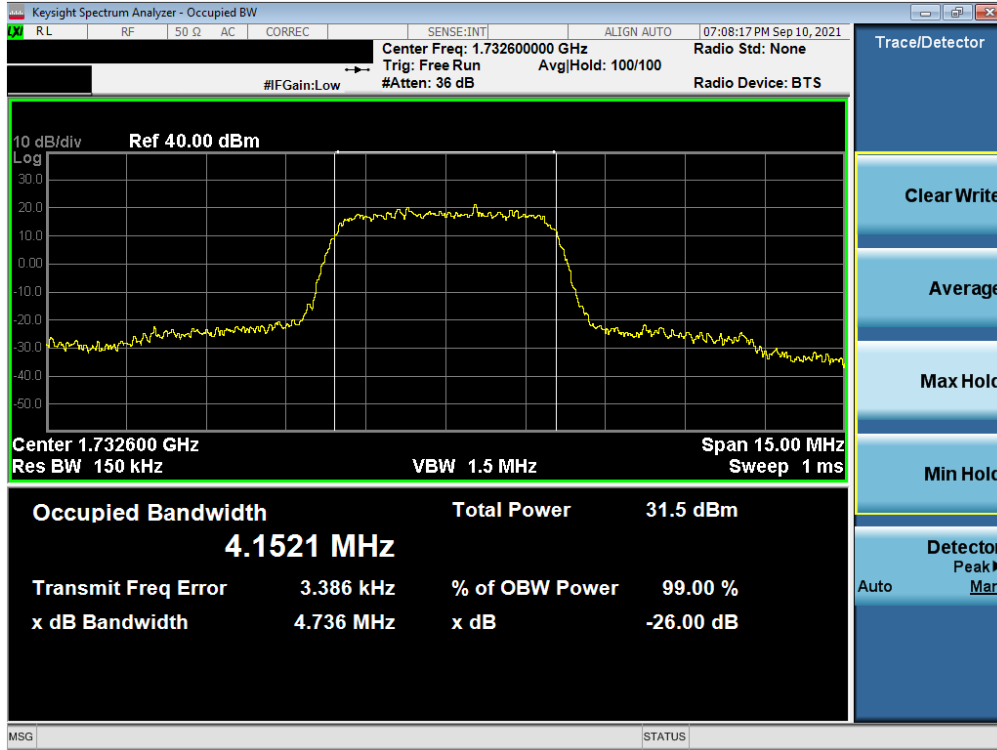
FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 35 of 214



Plot 7-38. Occupied Bandwidth Plot (NR Band n12 - 5MHz CP-OFDM 16-QAM - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 36 of 214

WCDMA AWS



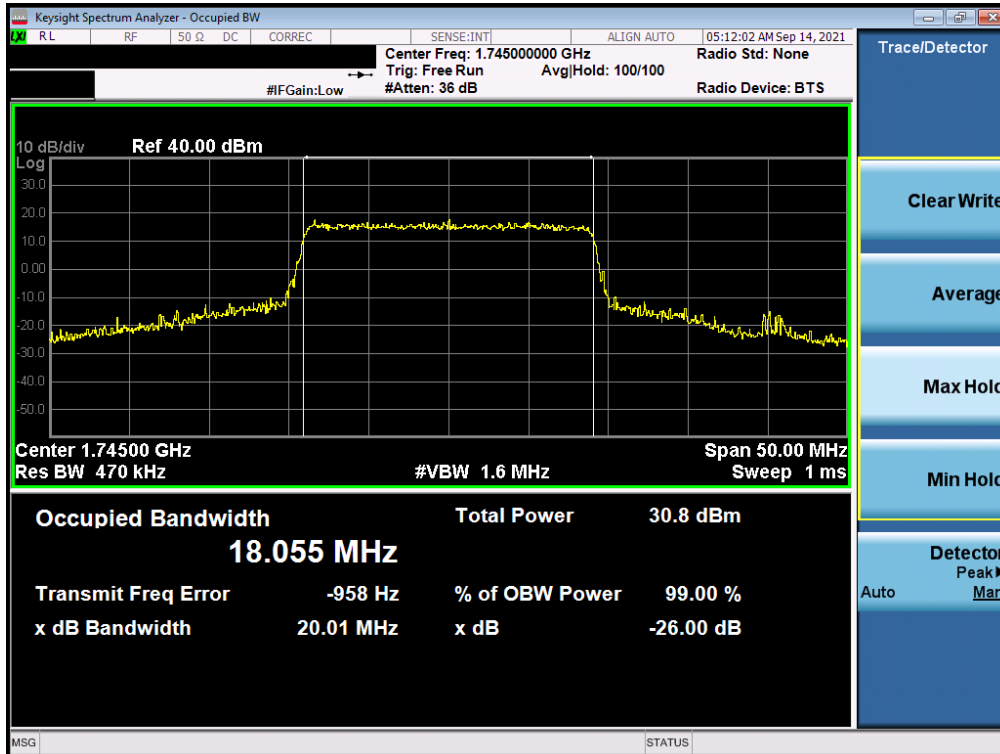
Plot 7-39. Occupied Bandwidth Plot (WCDMA, Ch. 1413)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 37 of 214

LTE Band 66/4

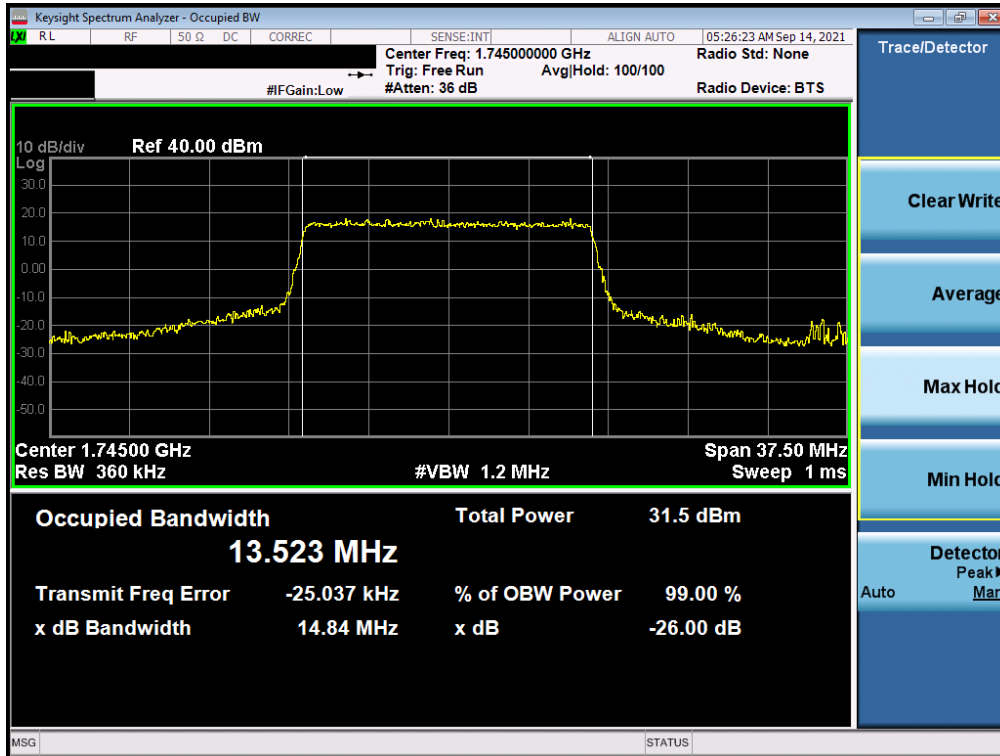


Plot 7-40. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz QPSK - Full RB)

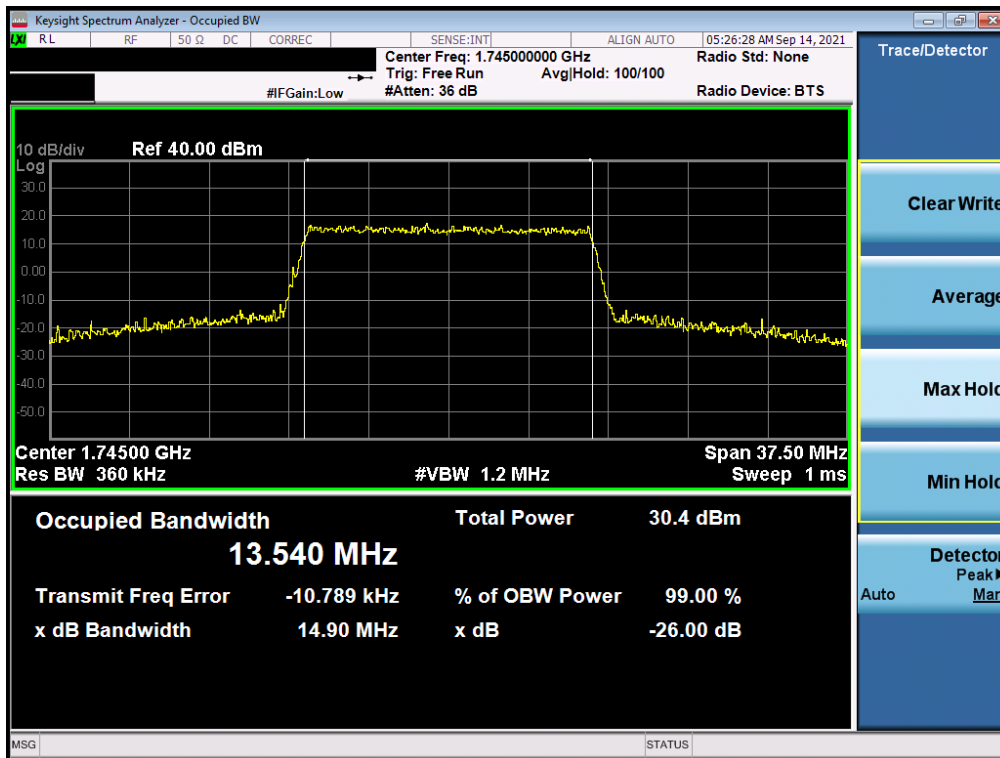


Plot 7-41. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz 16-QAM - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 38 of 214

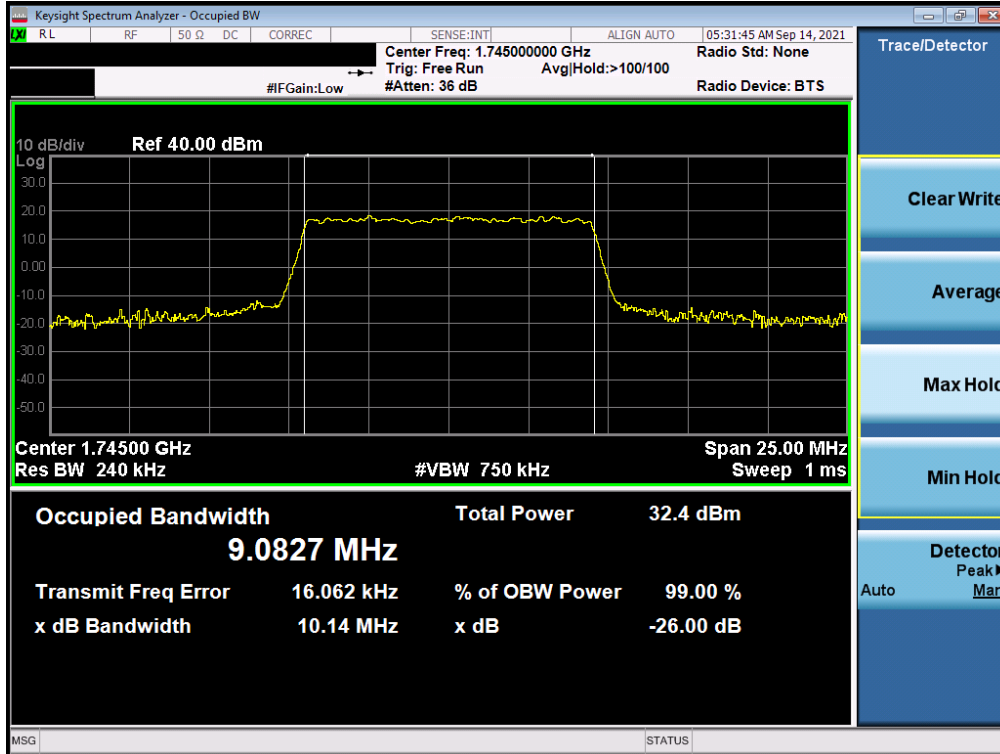


Plot 7-42. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz QPSK - Full RB)

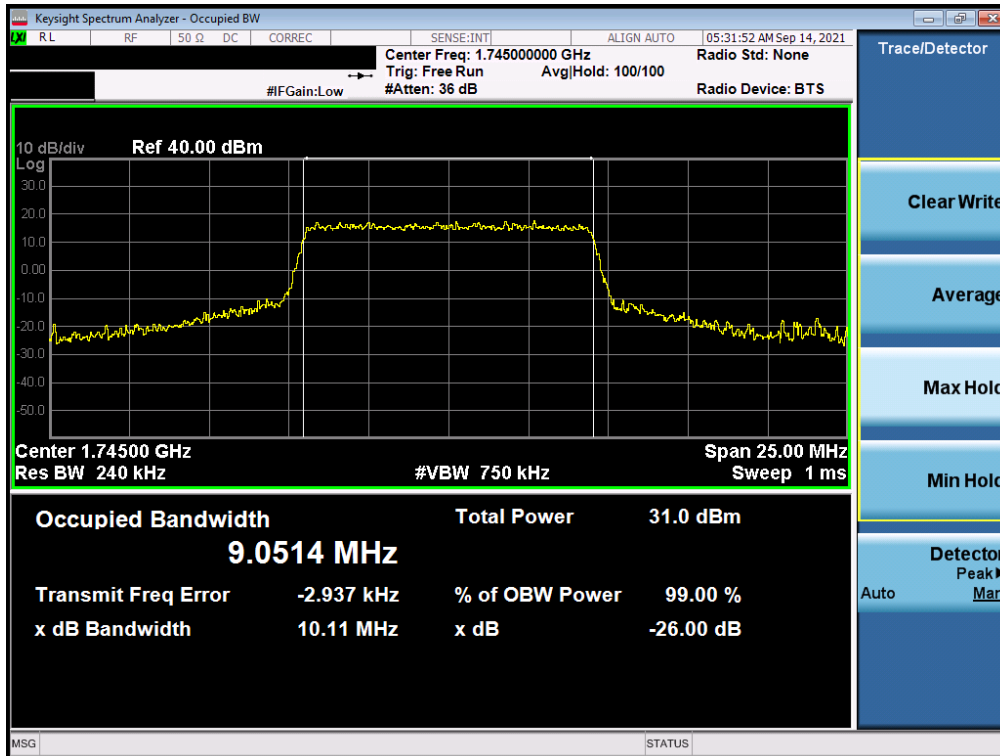


Plot 7-43. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz 16-QAM - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 39 of 214

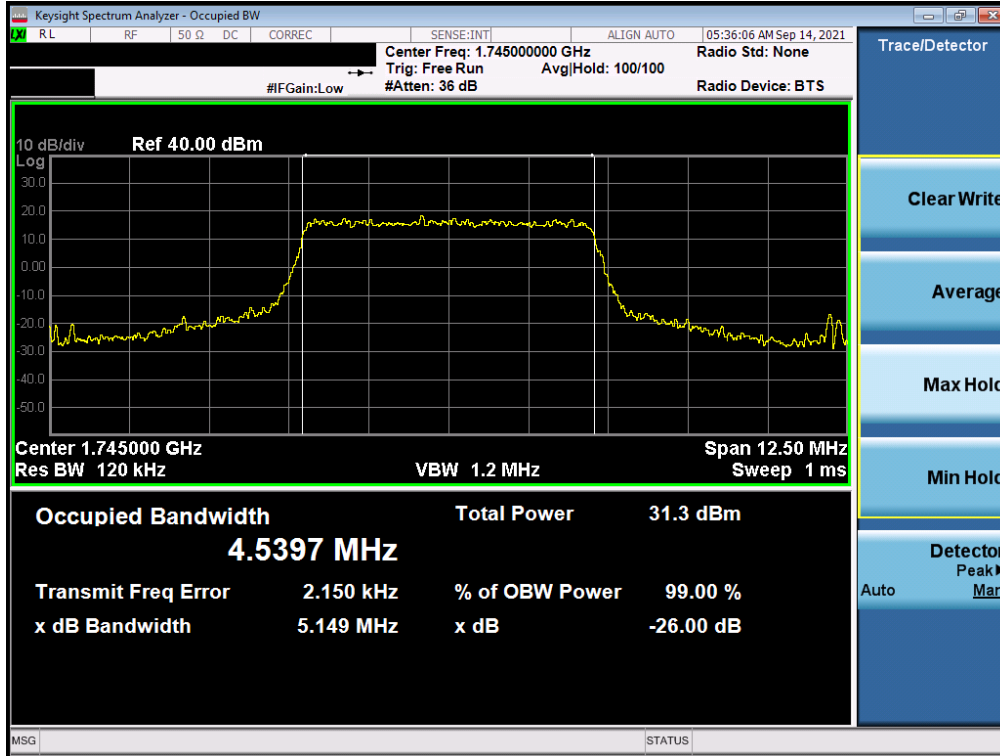


Plot 7-44. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz QPSK - Full RB)

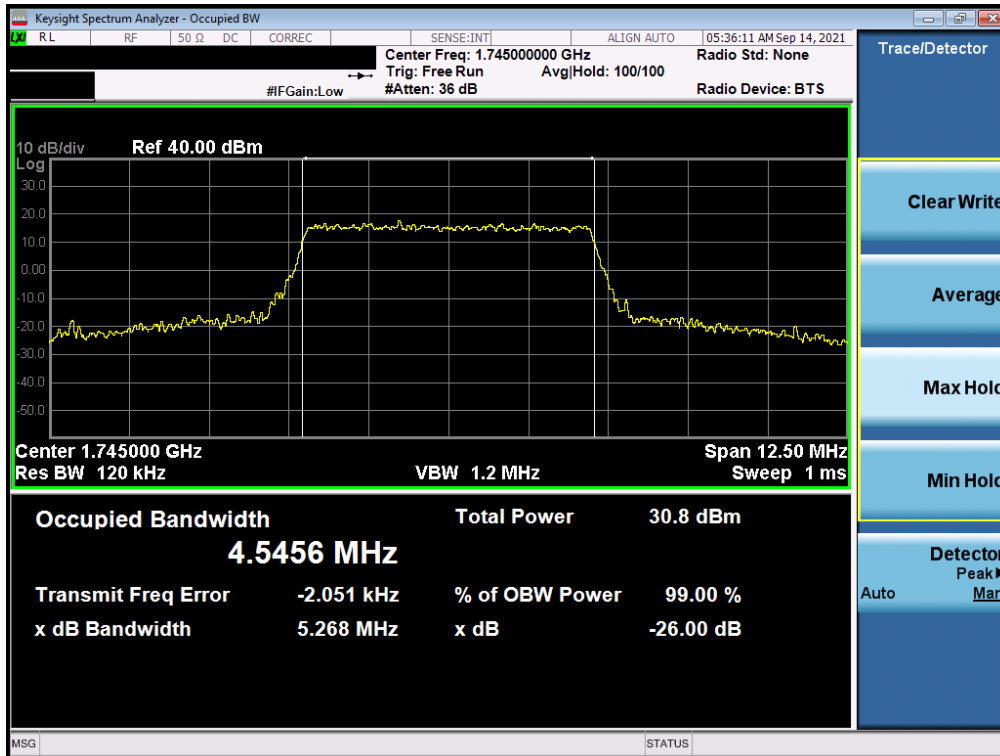


Plot 7-45. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz 16-QAM - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 40 of 214



Plot 7-46. Occupied Bandwidth Plot (LTE Band 66/4 - 5MHz QPSK - Full RB)

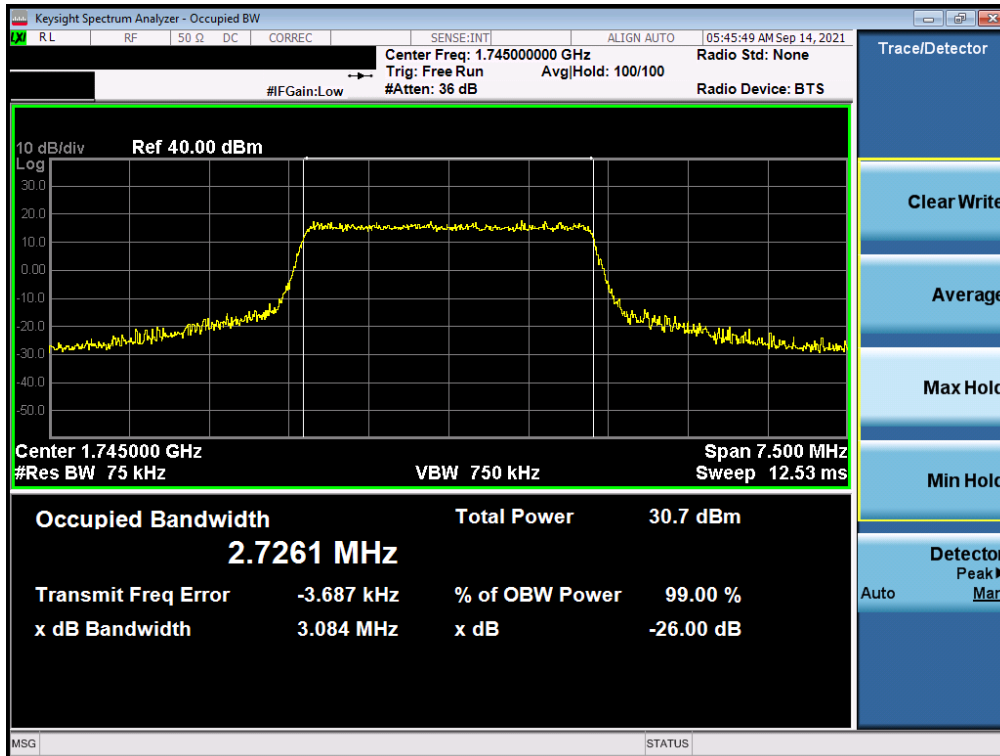


Plot 7-47. Occupied Bandwidth Plot (LTE Band 66/4 - 5MHz 16-QAM - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 41 of 214

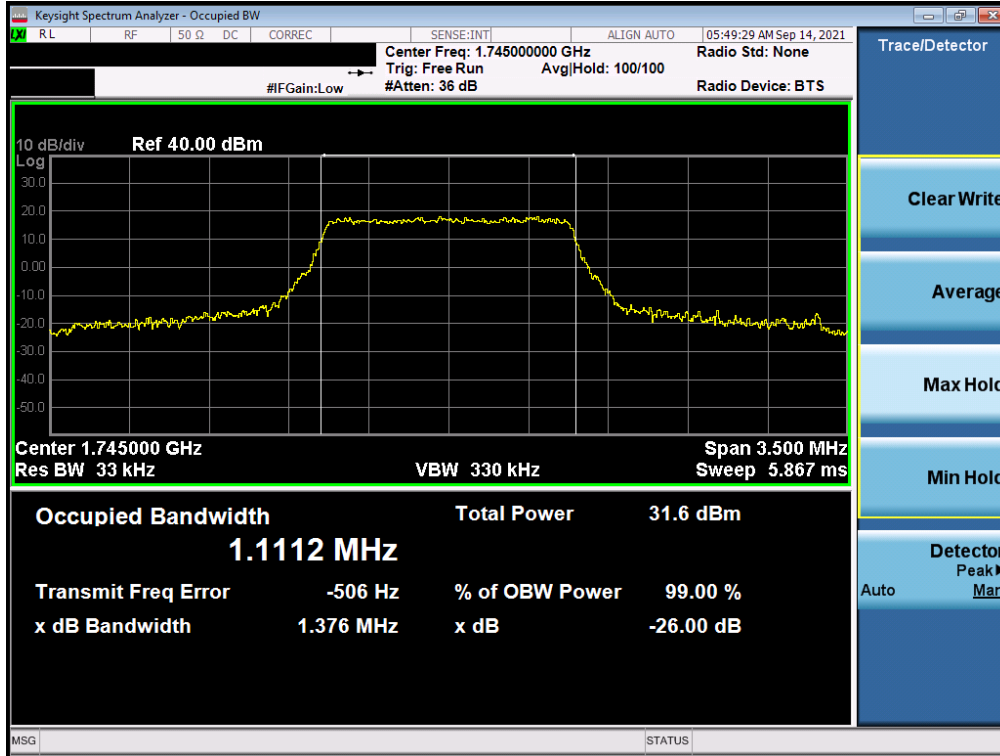


Plot 7-48. Occupied Bandwidth Plot (LTE Band 66/4 - 3MHz QPSK - Full RB)

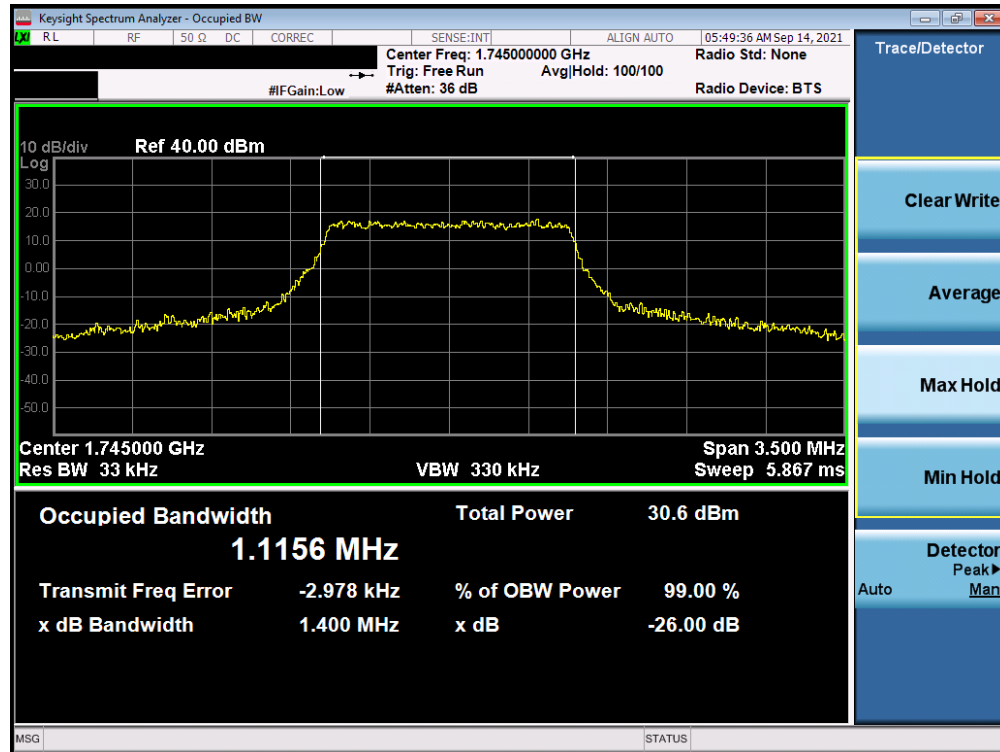


Plot 7-49. Occupied Bandwidth Plot (LTE Band 66/4 - 3MHz 16-QAM - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 42 of 214



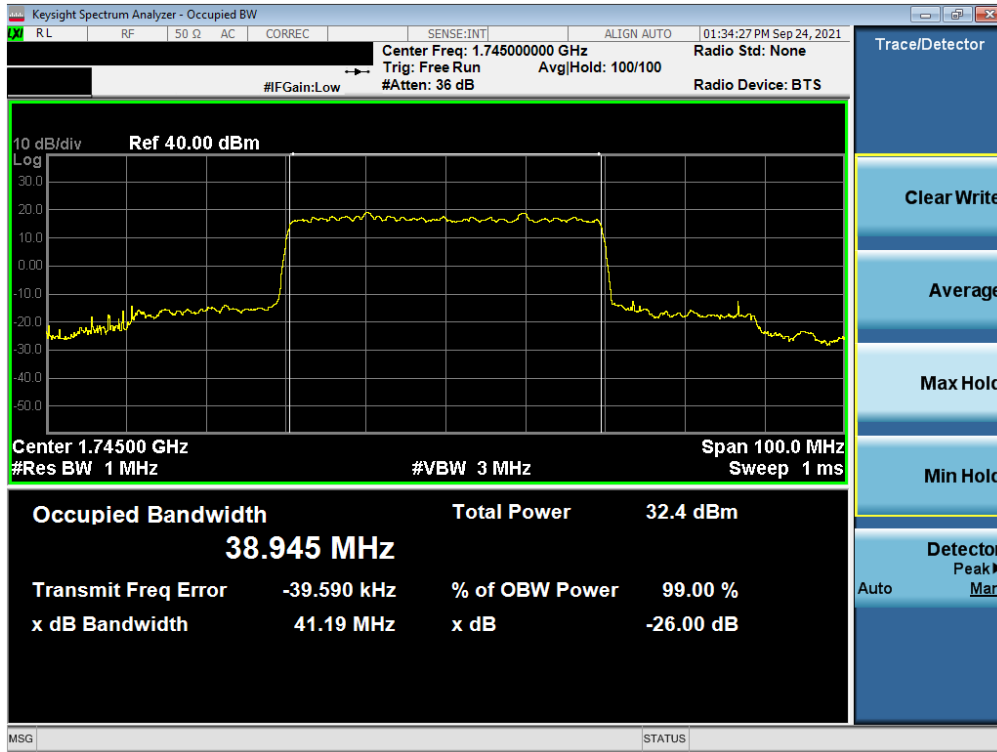
Plot 7-50. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz QPSK - Full RB)



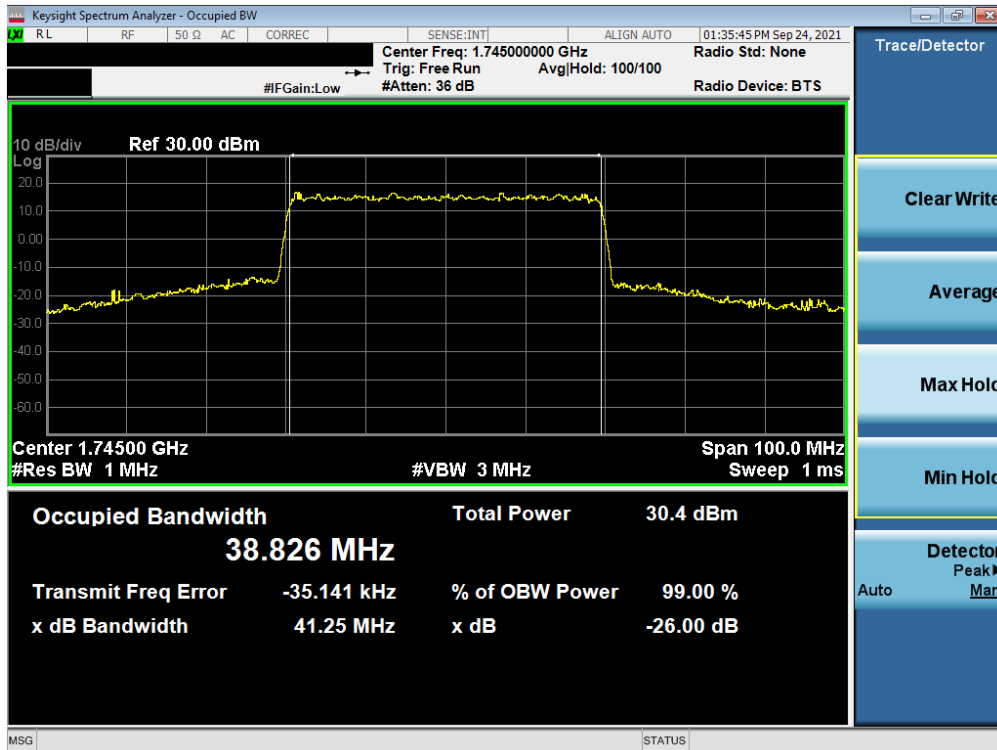
Plot 7-51. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz 16-QAM - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 43 of 214

NR Band n66

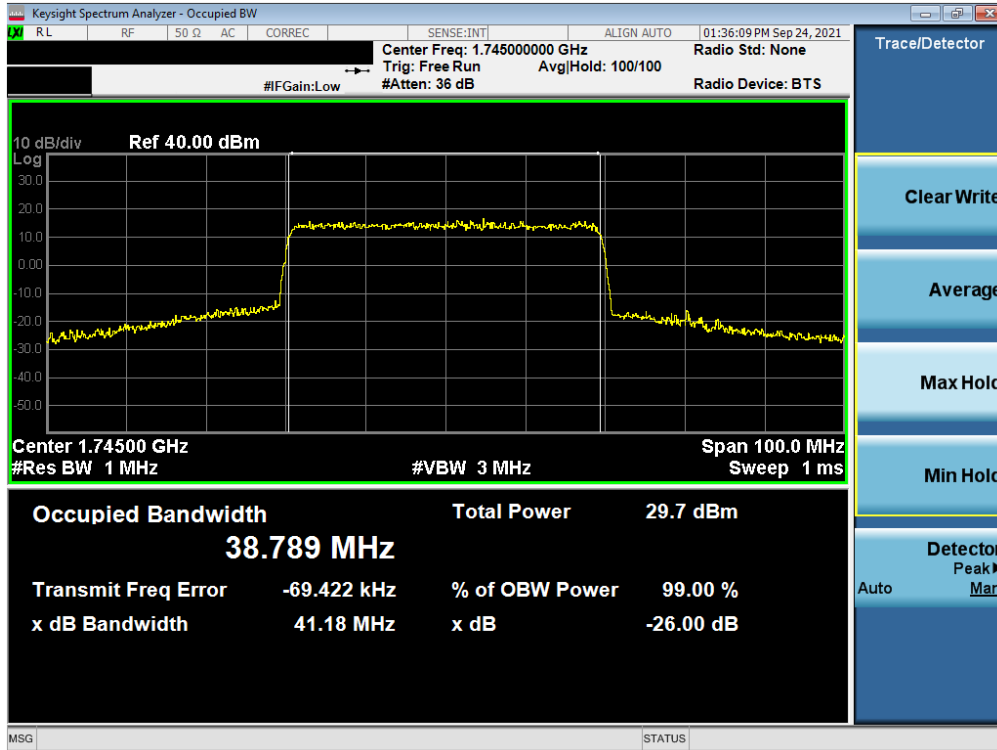


Plot 7-52. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz DFT-s-OFDM BPSK - Full RB)

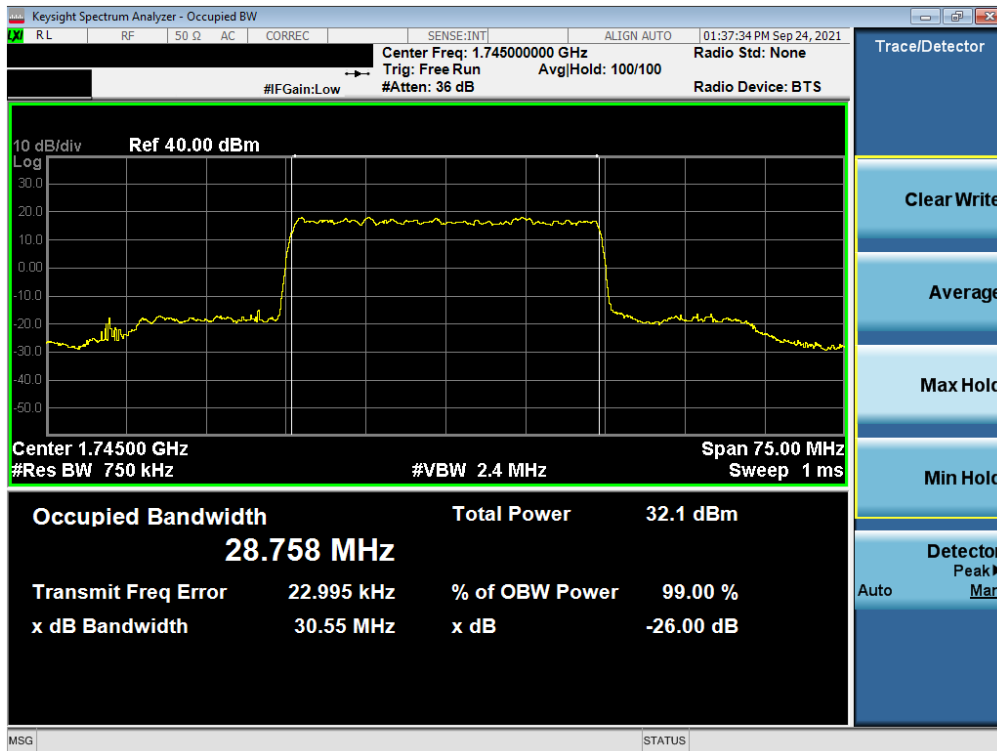


Plot 7-53. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM QPSK - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 44 of 214

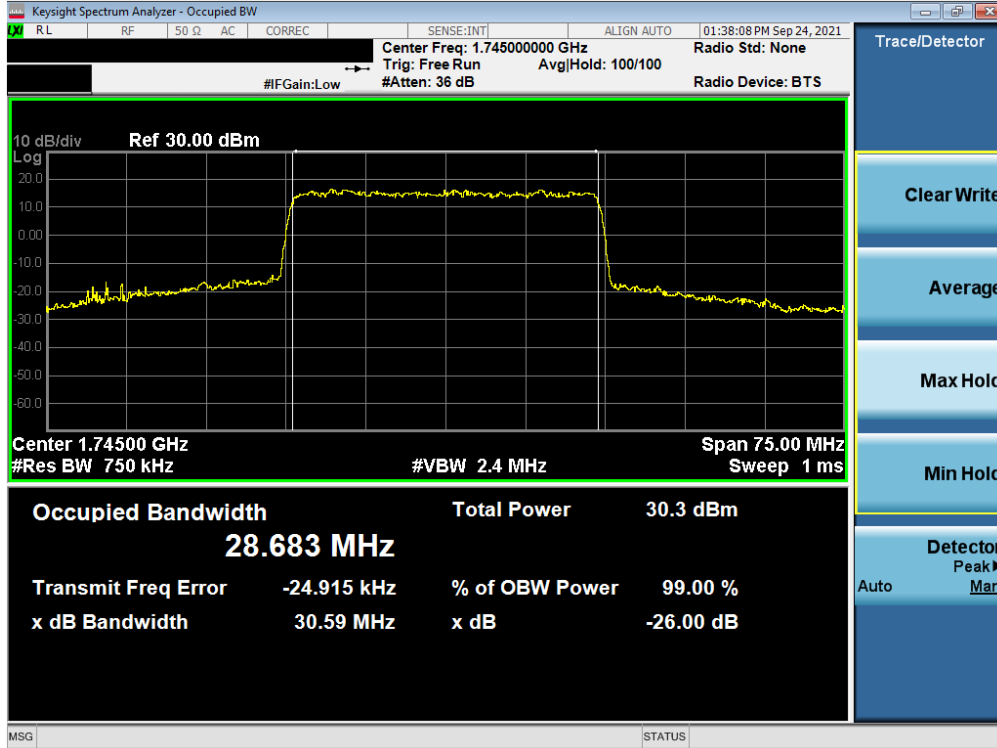


Plot 7-54. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM 16QAM - Full RB)

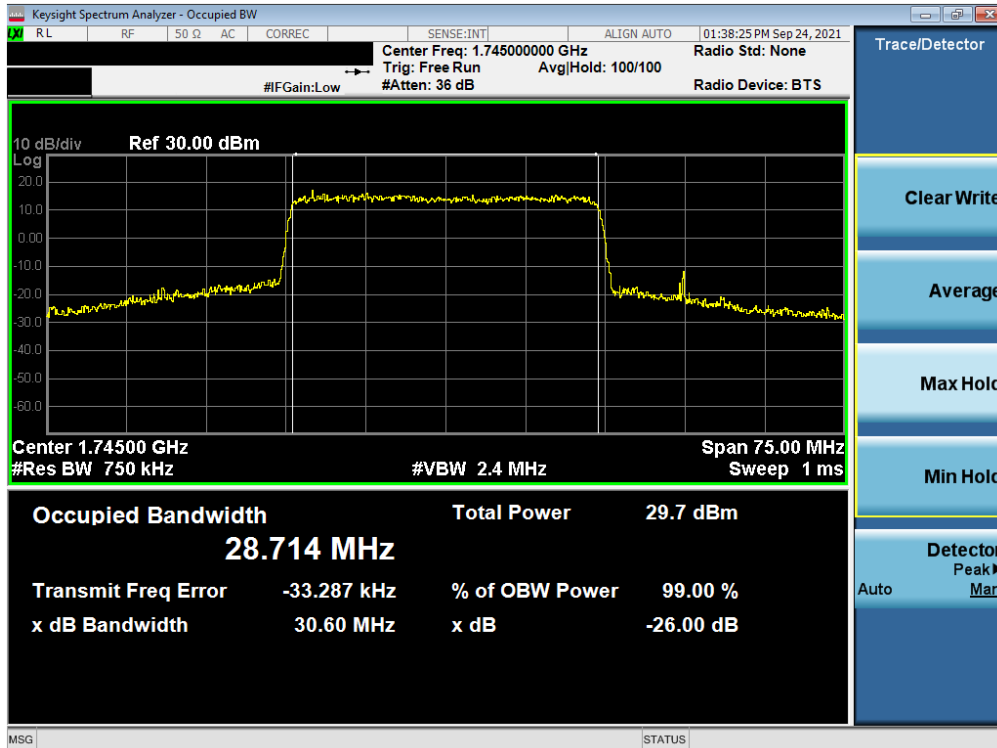


Plot 7-55. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 45 of 214

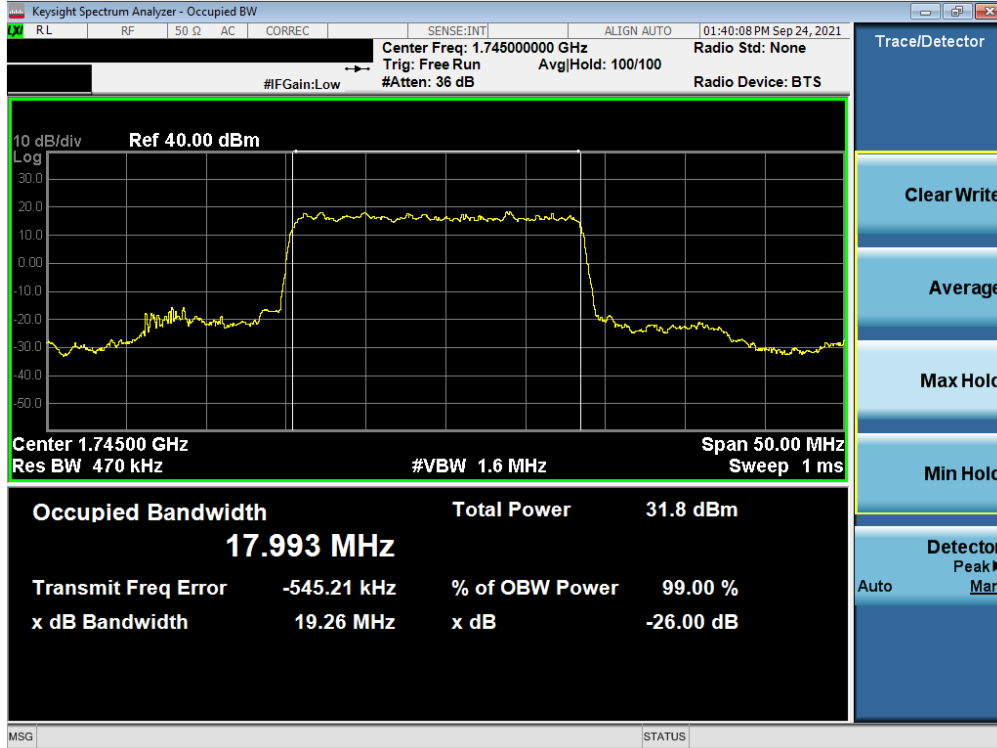


Plot 7-56. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM QPSK - Full RB)

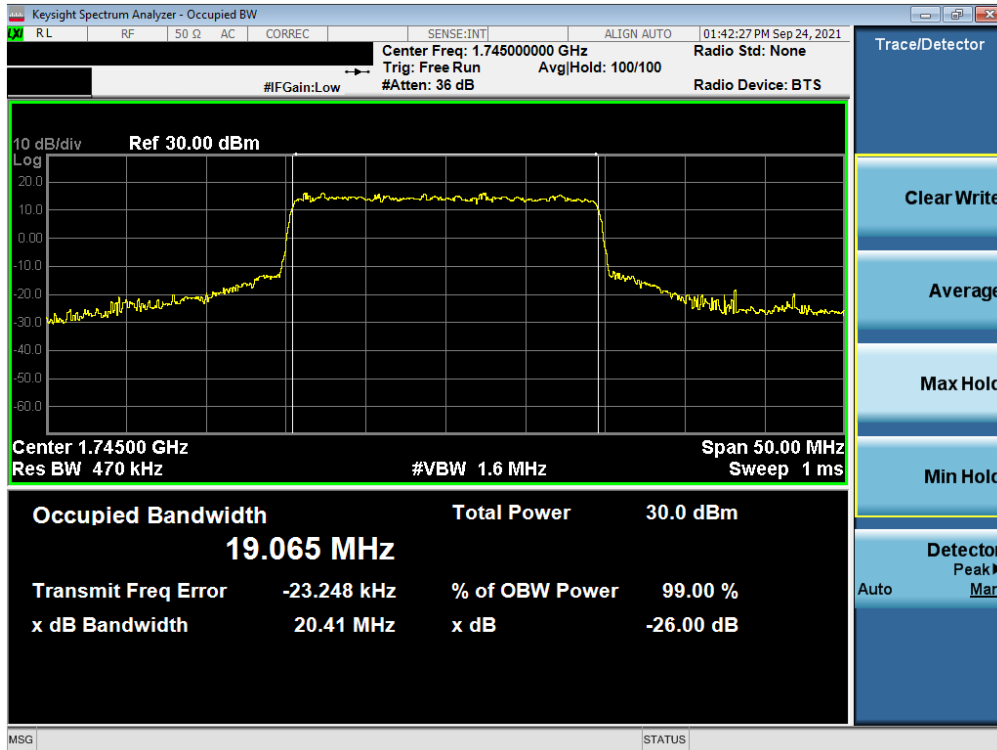


Plot 7-57. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM 16QAM - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 46 of 214

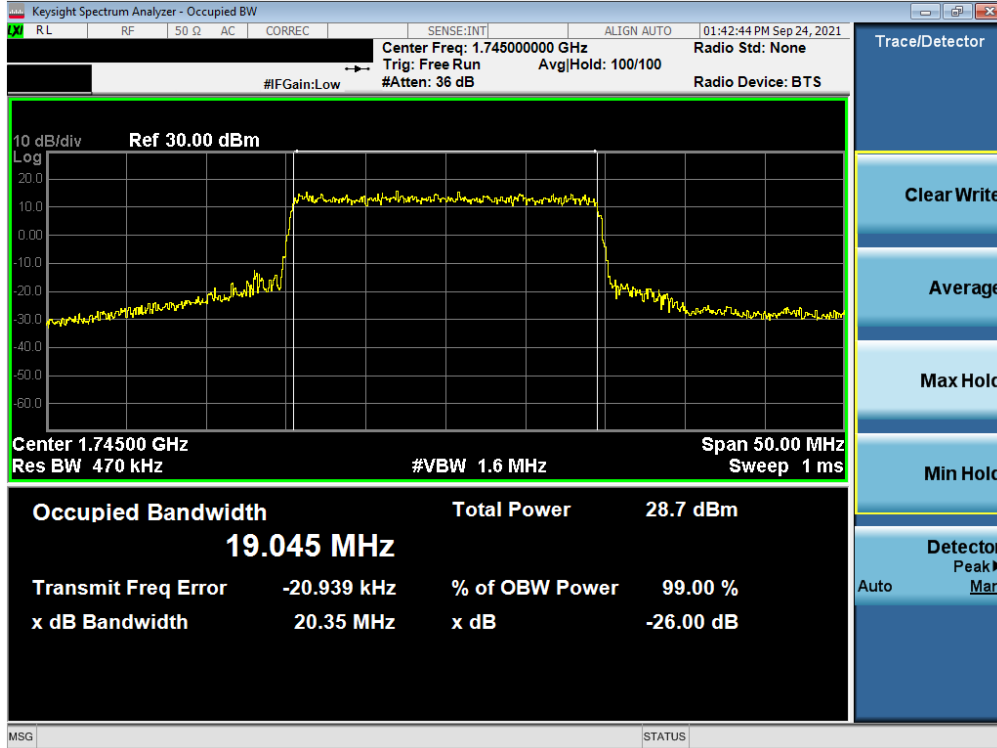


Plot 7-58. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz DFT-s-OFDM BPSK - Full RB)

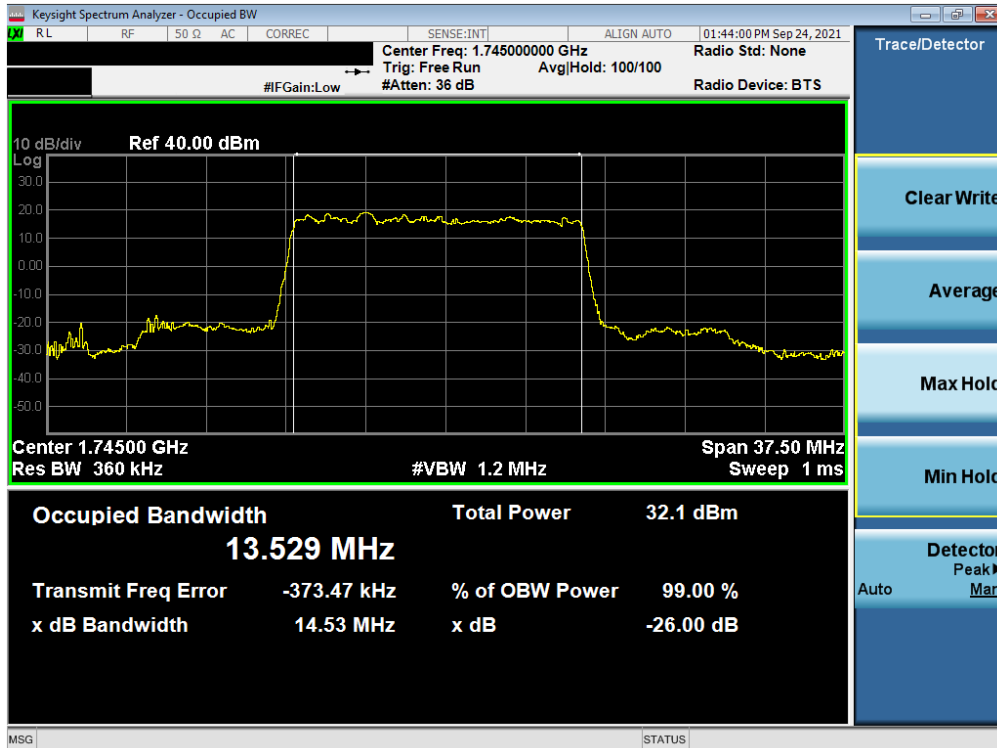


Plot 7-59. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM QPSK - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 47 of 214

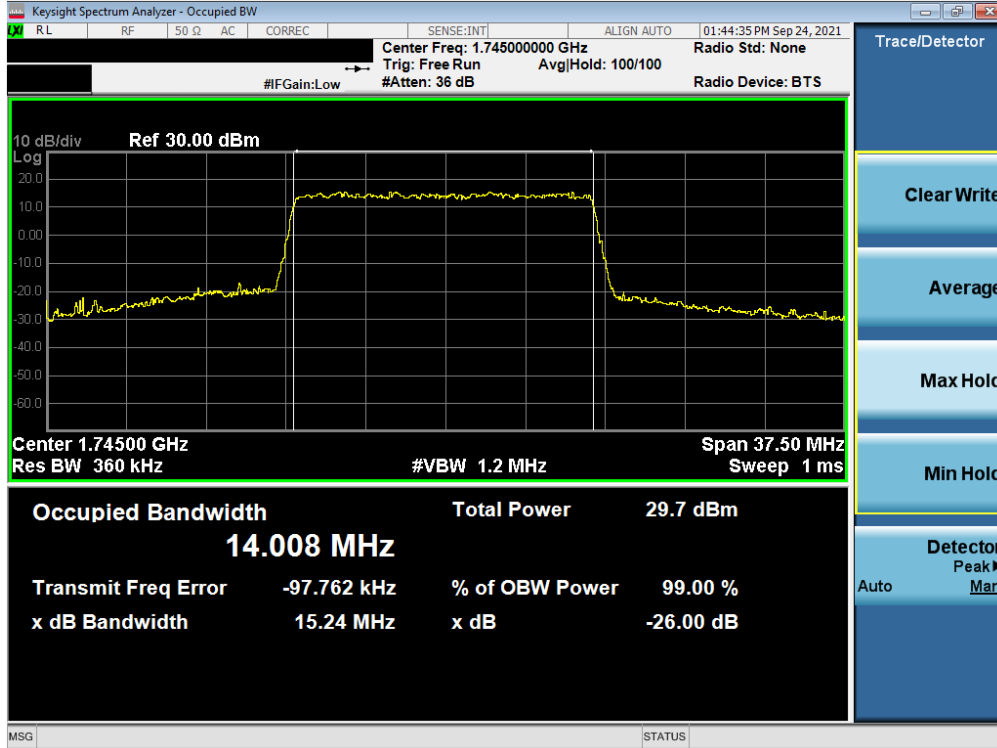


Plot 7-60. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM 16QAM - Full RB)

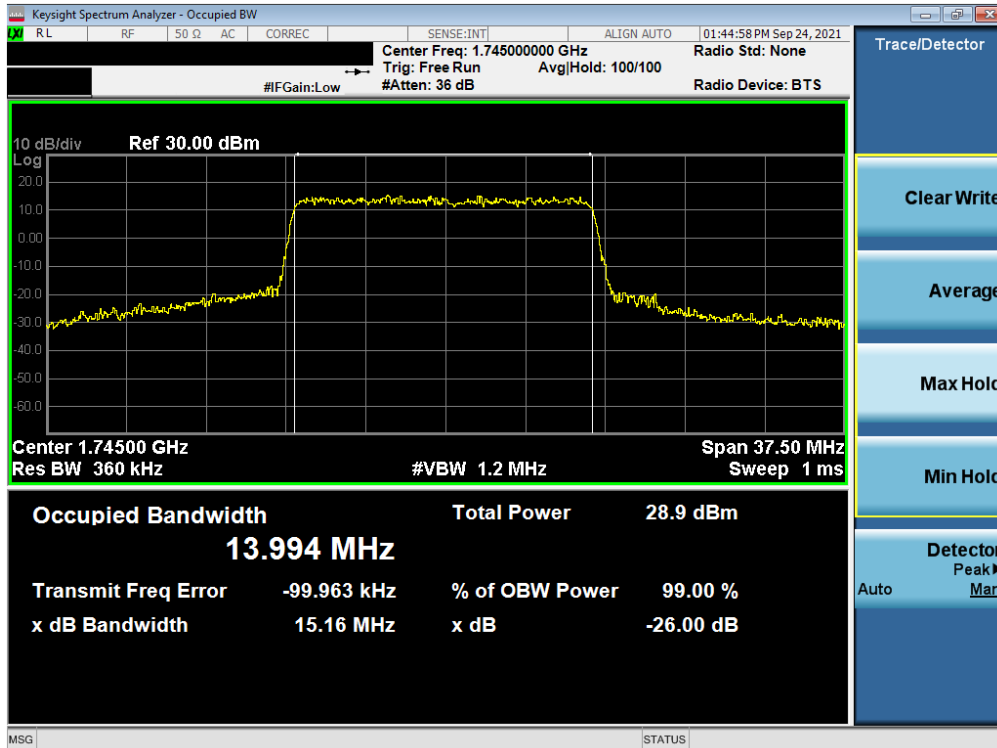


Plot 7-61. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 48 of 214

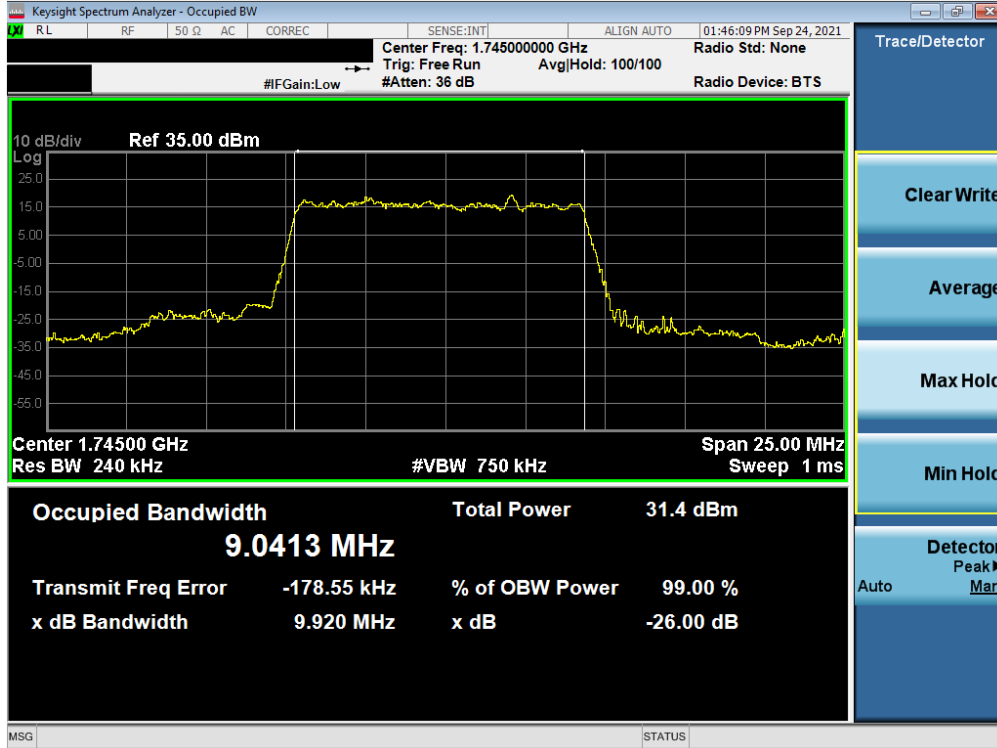


Plot 7-62. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz CP-OFDM QPSK - Full RB)

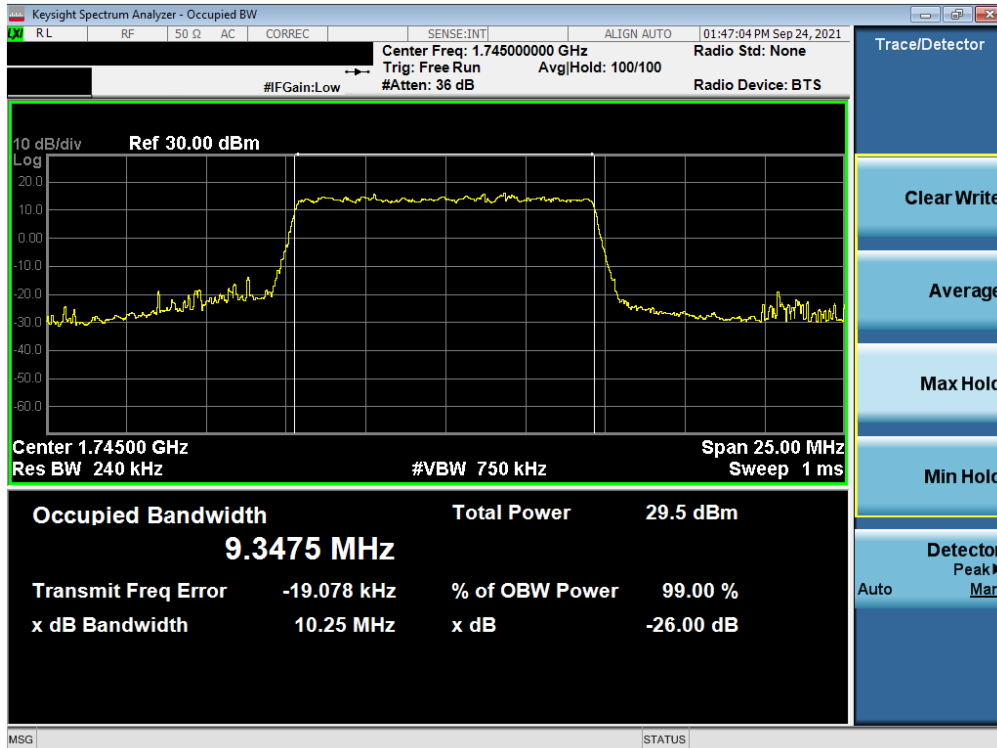


Plot 7-63. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz CP-OFDM 16QAM - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 49 of 214

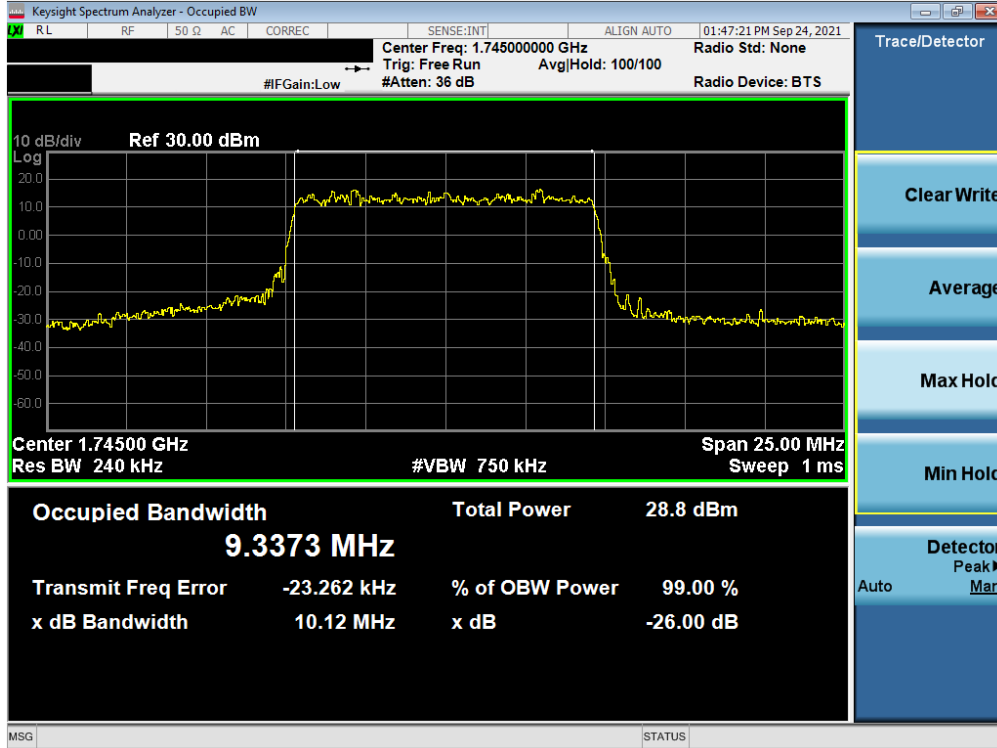


Plot 7-64. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz DFT-s-OFDM BPSK - Full RB)

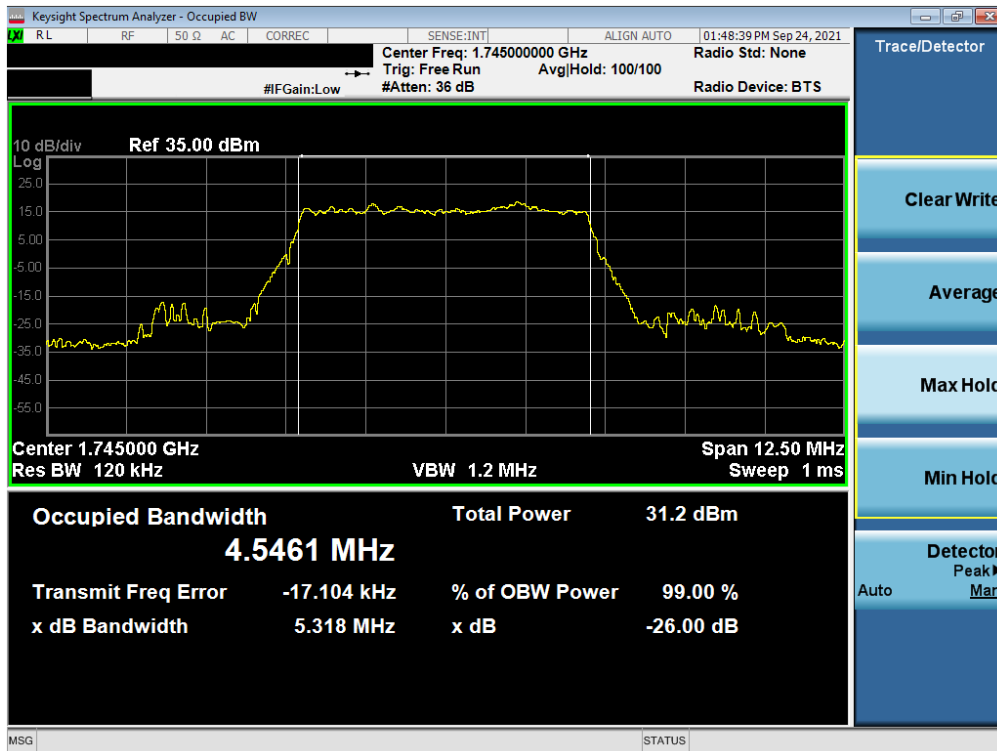


Plot 7-65. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz CP-OFDM QPSK - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 50 of 214

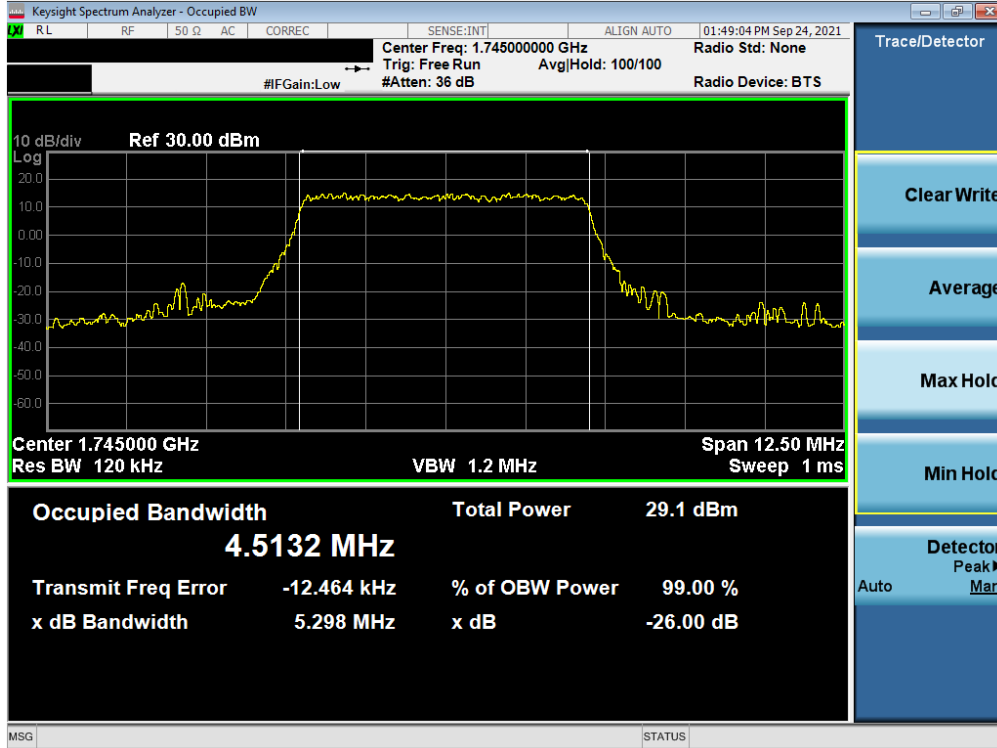


Plot 7-66. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz CP-OFDM 16QAM - Full RB)

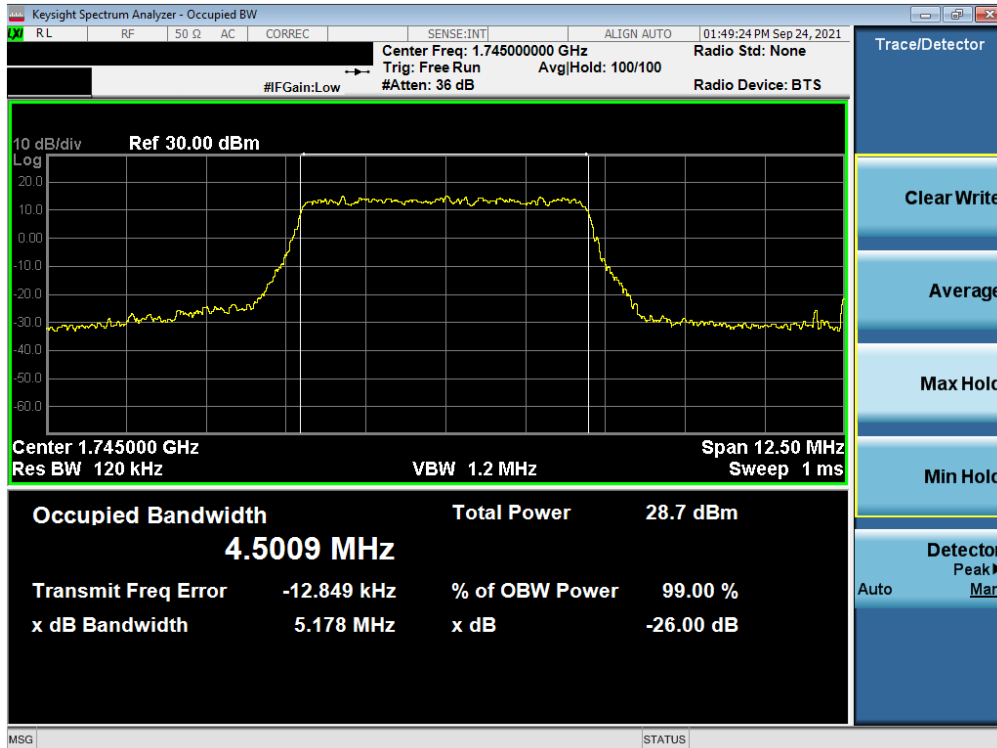


Plot 7-67. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz DFT-s-OFDM BPSK - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 51 of 214



Plot 7-68. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz CP-OFDM QPSK - Full RB)



Plot 7-69. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz CP-OFDM 16QAM - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 52 of 214

7.4 Spurious and Harmonic Emissions at Antenna Terminal

Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 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 $43 + 10 \log_{10}(P_{[Watts]})$, 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 18GHz (separated into at least two plots per channel)
2. RBW \geq 100kHz
3. VBW \geq 3 x RBW
4. Detector = RMS
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

Test Setup

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

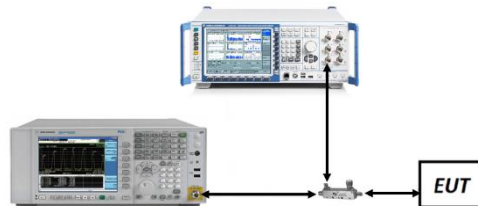


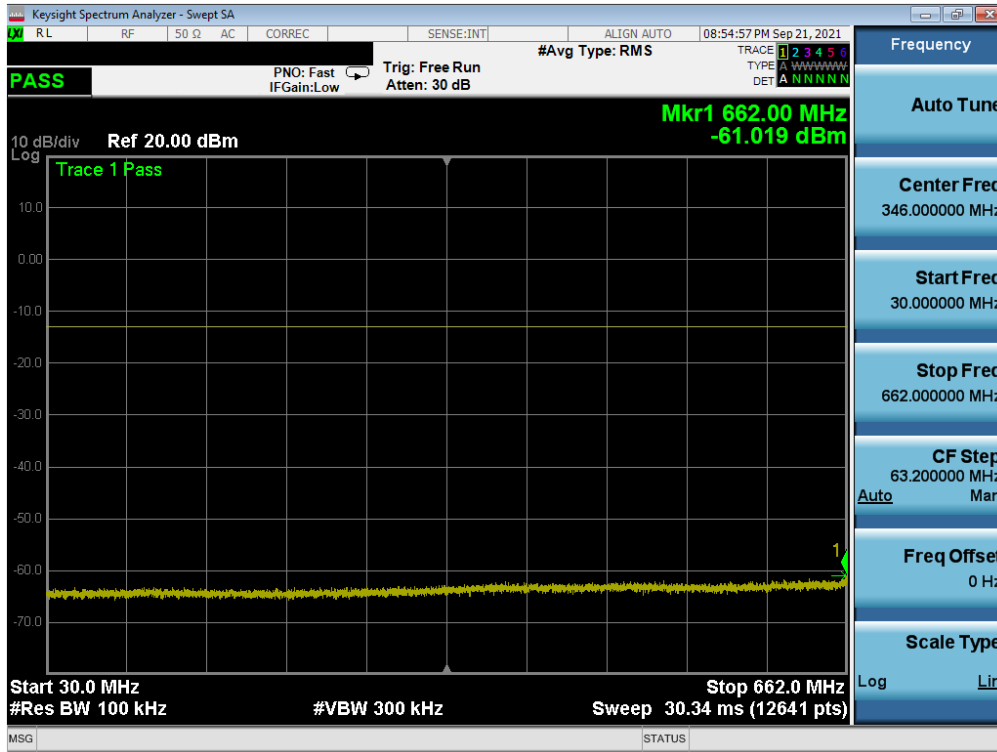
Figure 7-3. Test Instrument & Measurement Setup

Test Notes

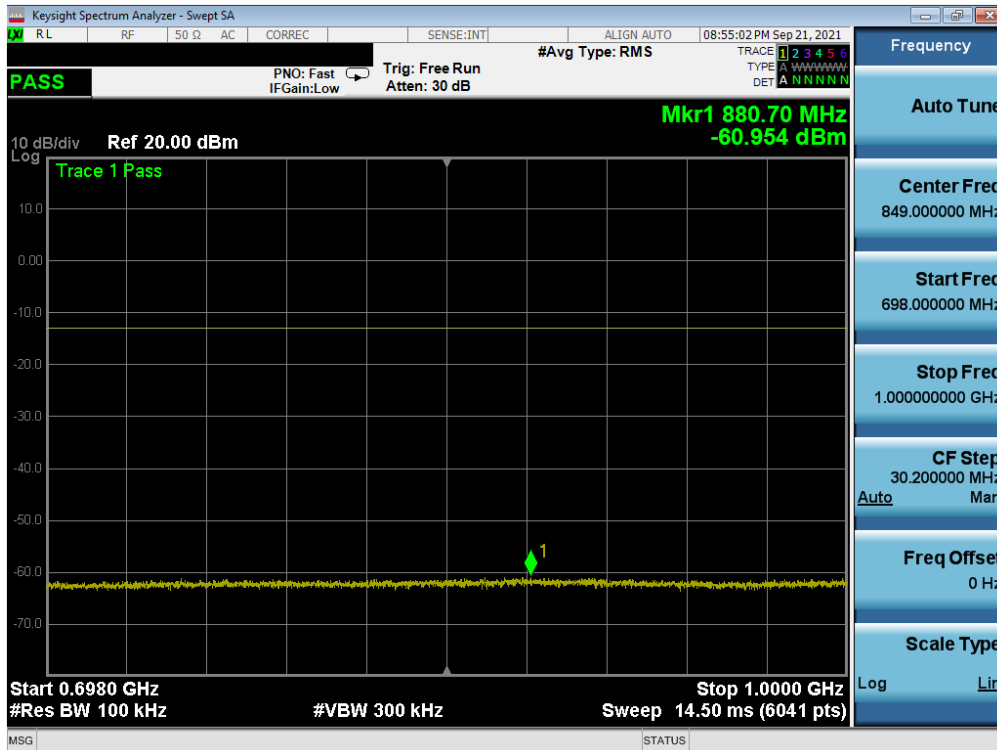
1. Per Part 27 and RSS-139, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth 100 kHz or greater for measurements below 1GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth 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.

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LTE Band 71

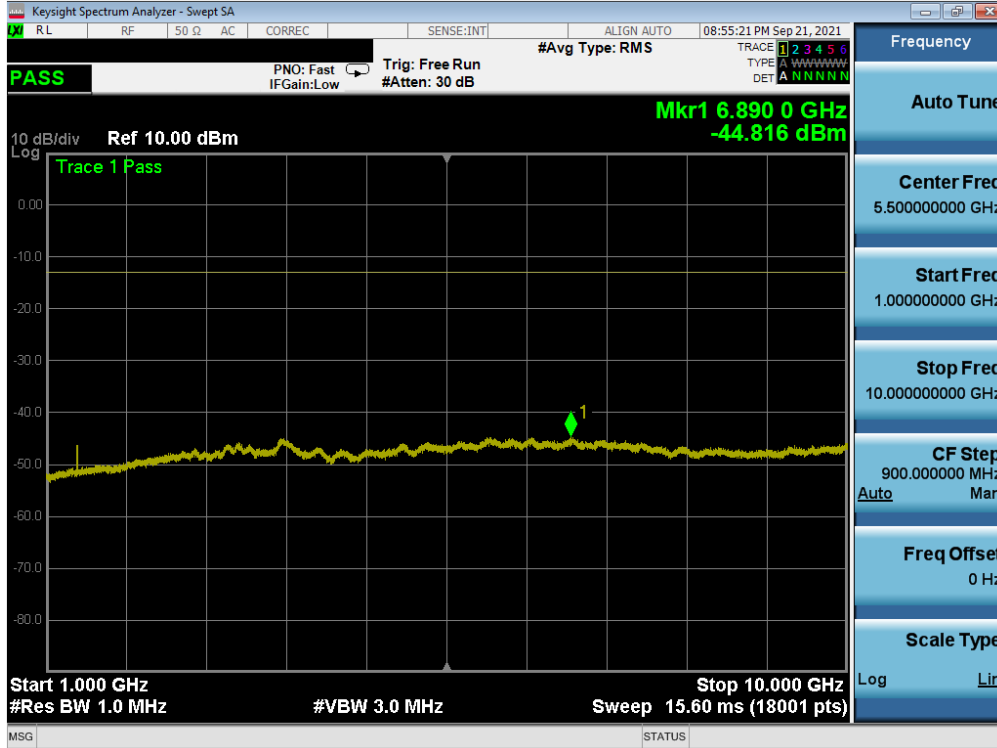


Plot 7-70. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Low Channel)

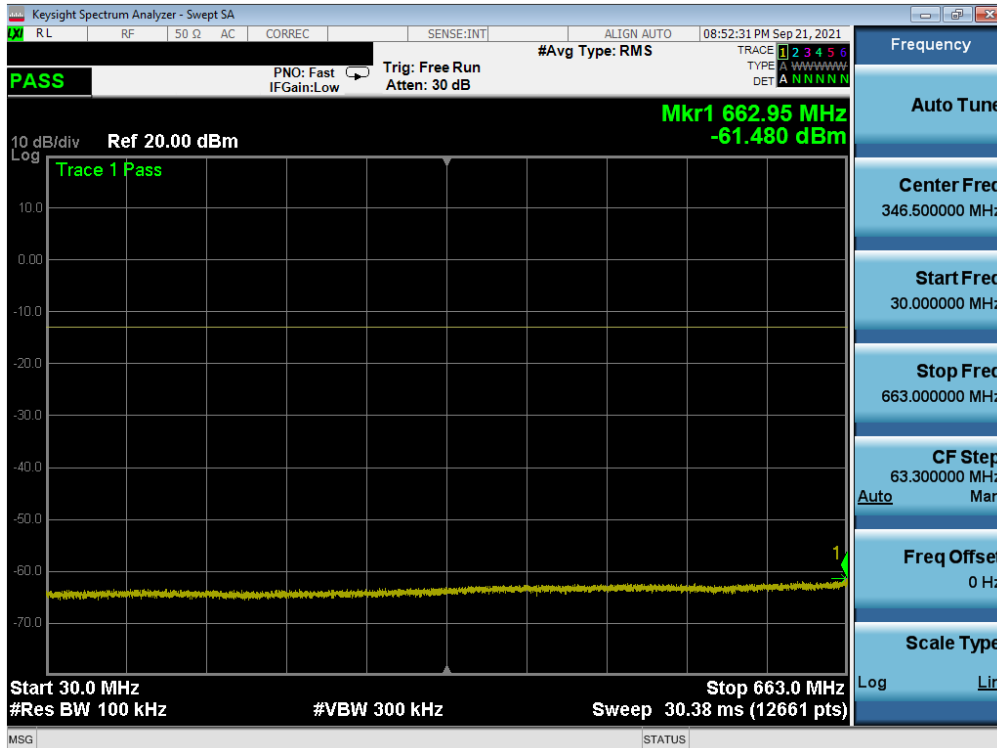


Plot 7-71. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Low Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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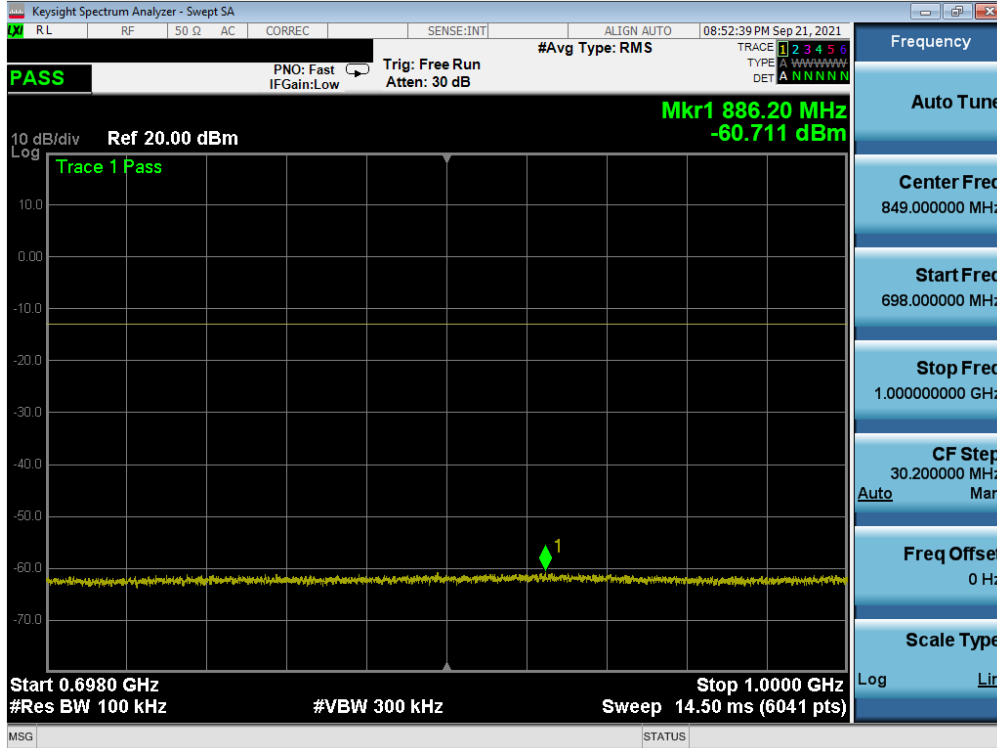


Plot 7-72. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Low Channel)

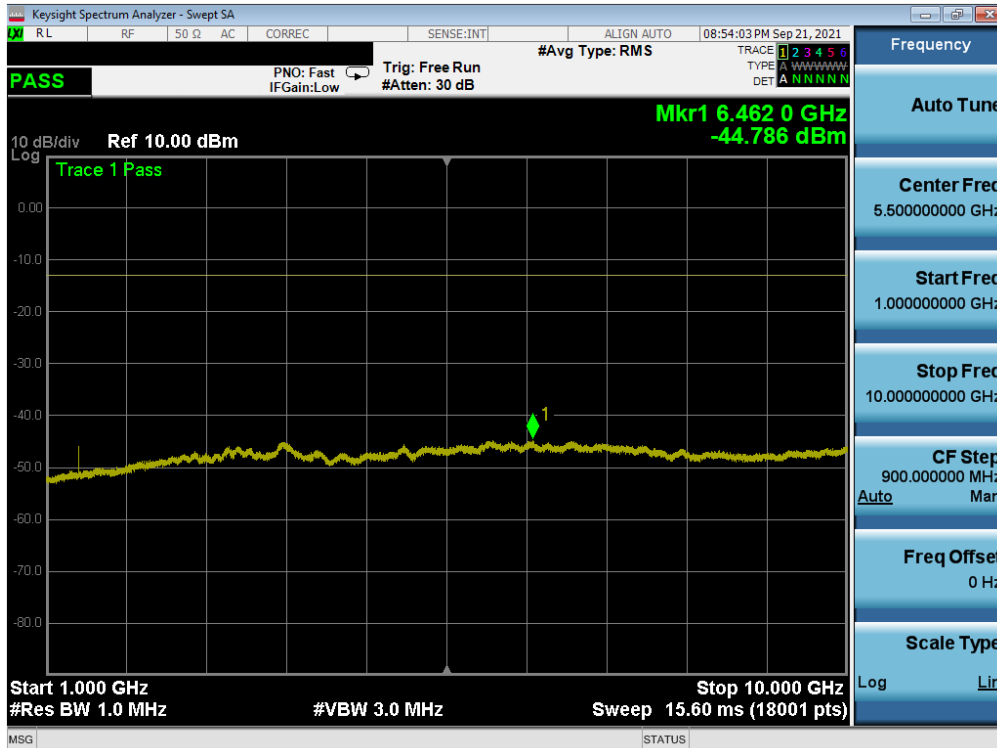


Plot 7-73. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Mid Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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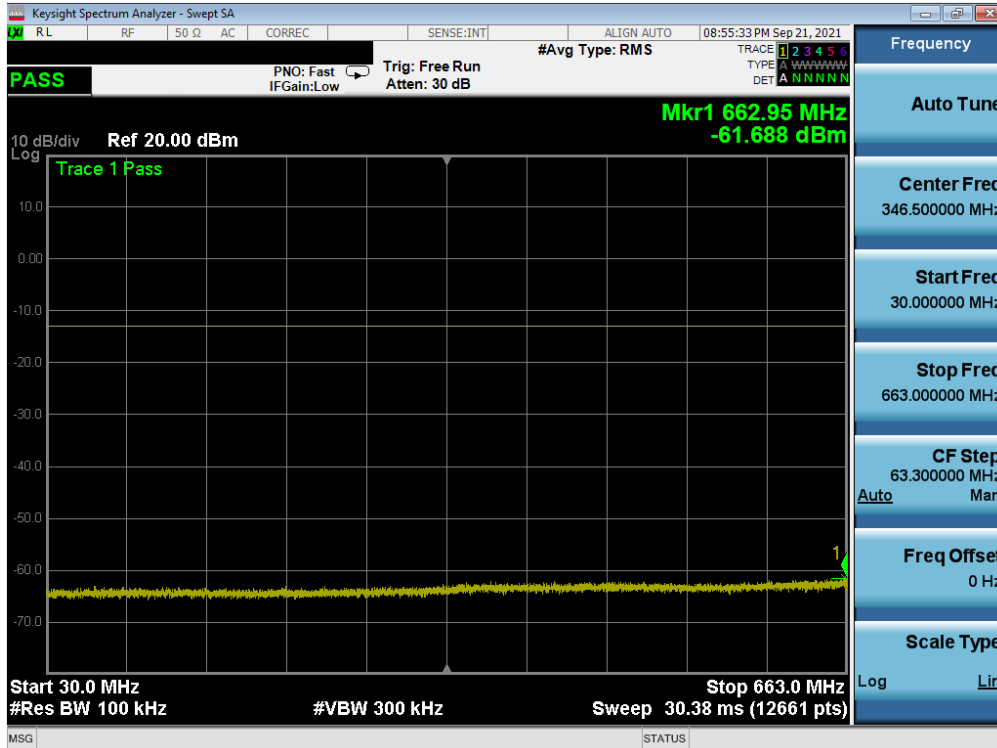


Plot 7-74. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Mid Channel)

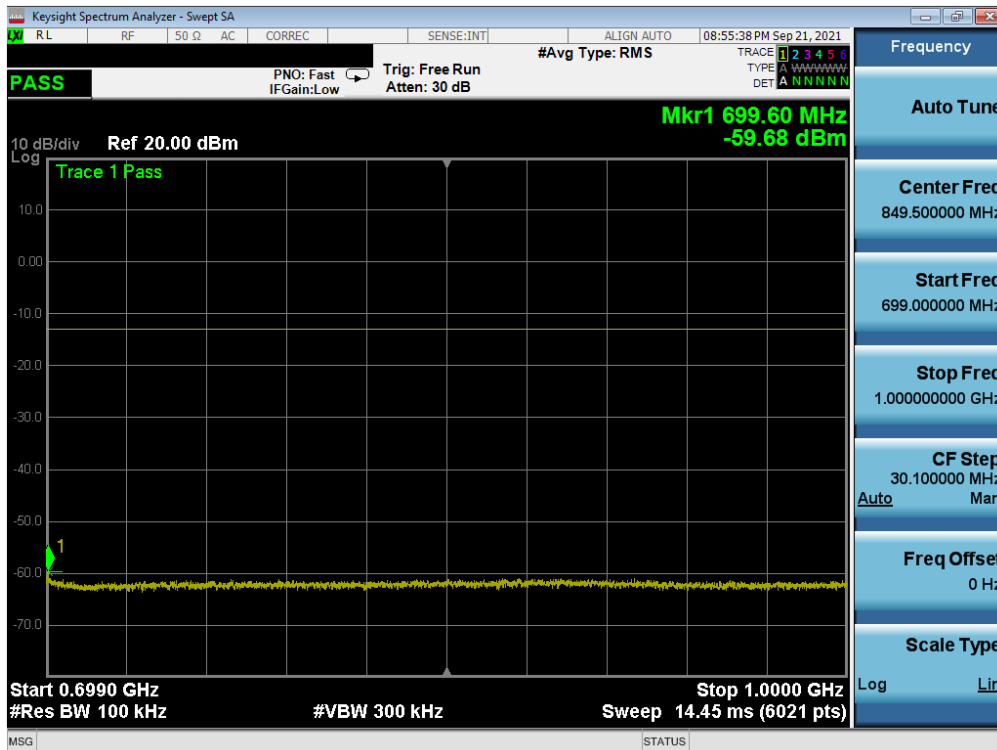


Plot 7-75. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Mid Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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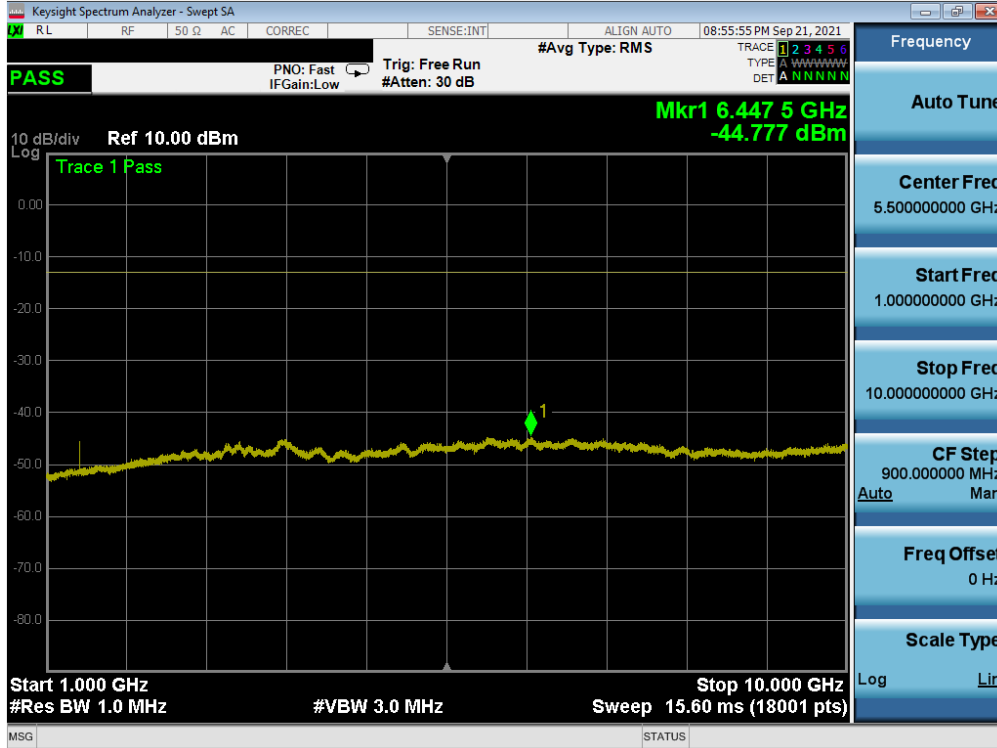


Plot 7-76. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - High Channel)



Plot 7-77. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - High Channel)

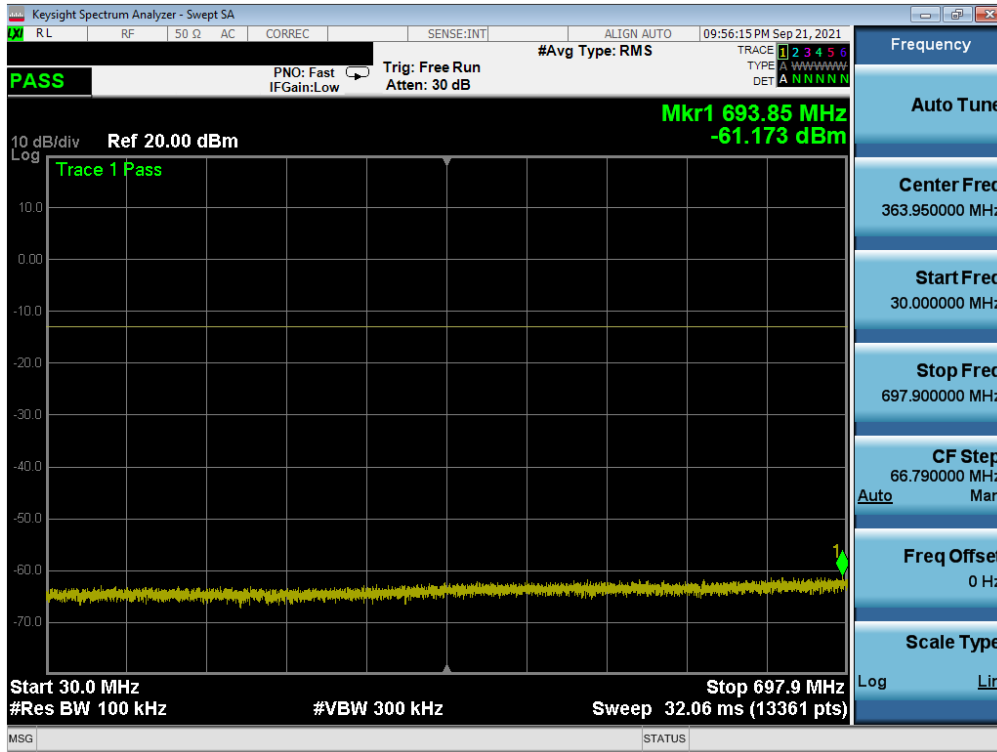
FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 57 of 214



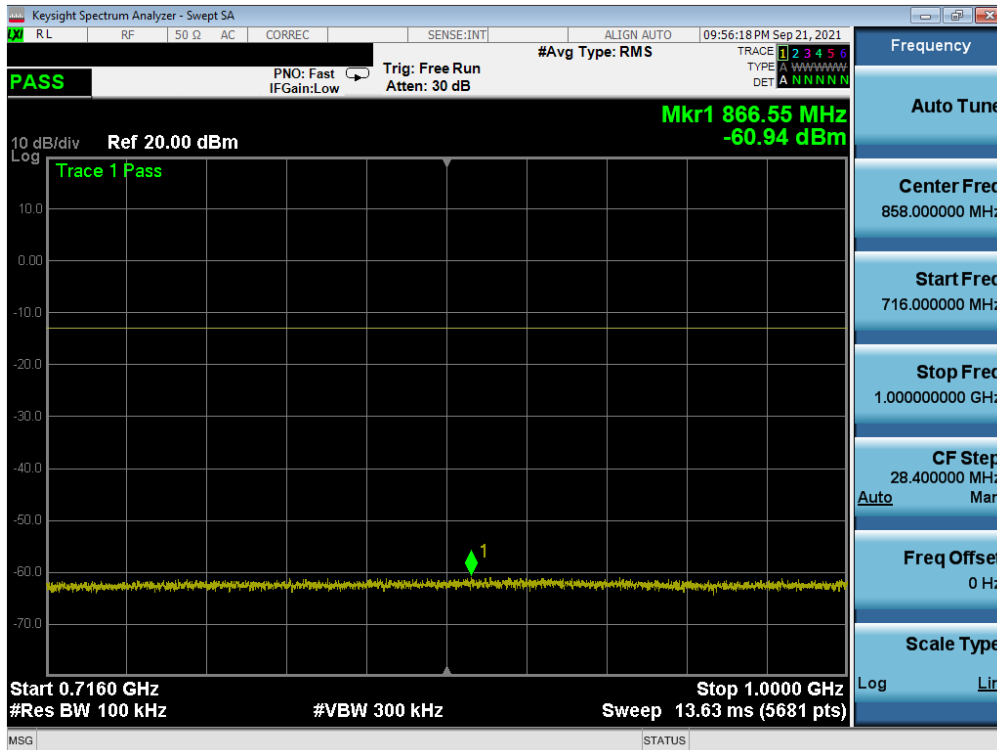
Plot 7-78. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - High Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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LTE Band 12

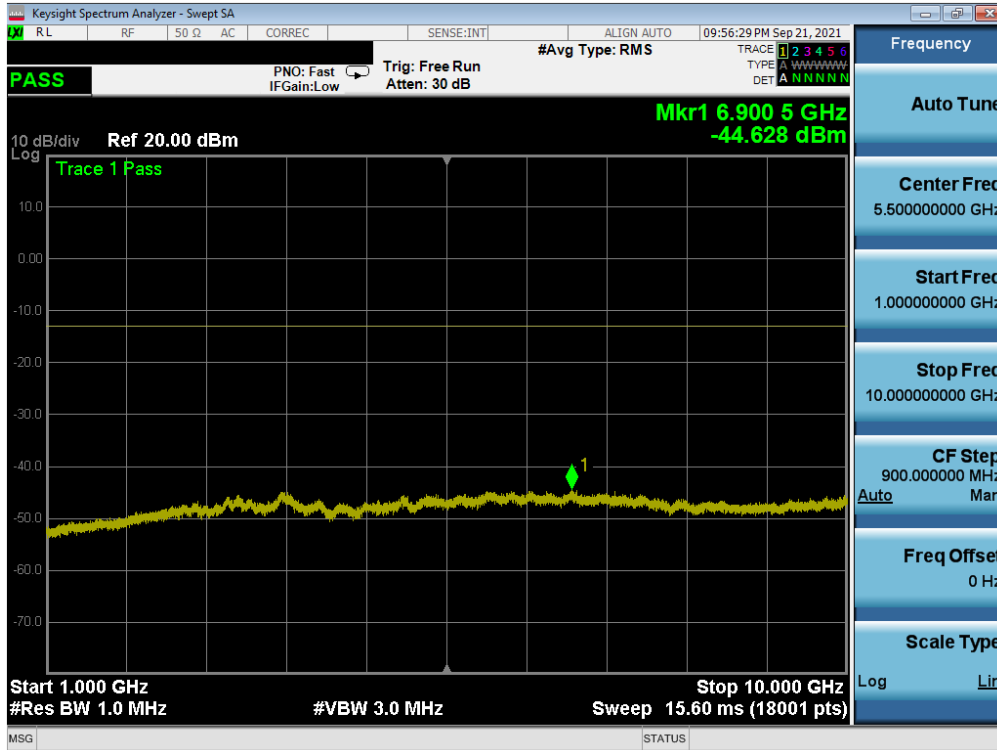


Plot 7-79. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - Low Channel)

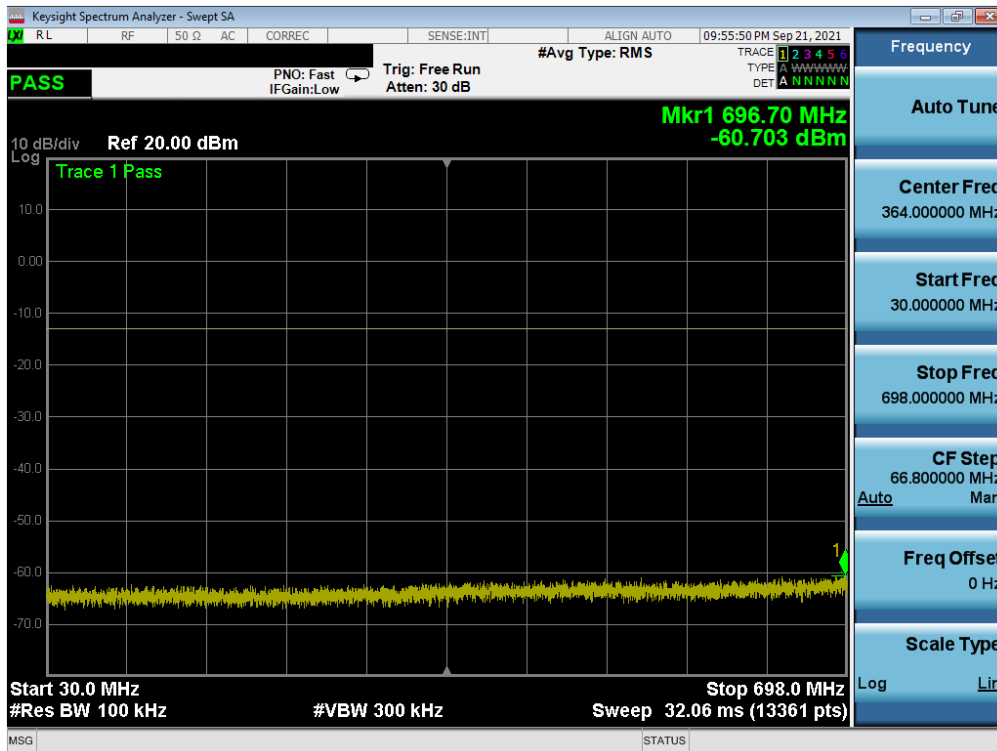


Plot 7-80. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - Low Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 59 of 214

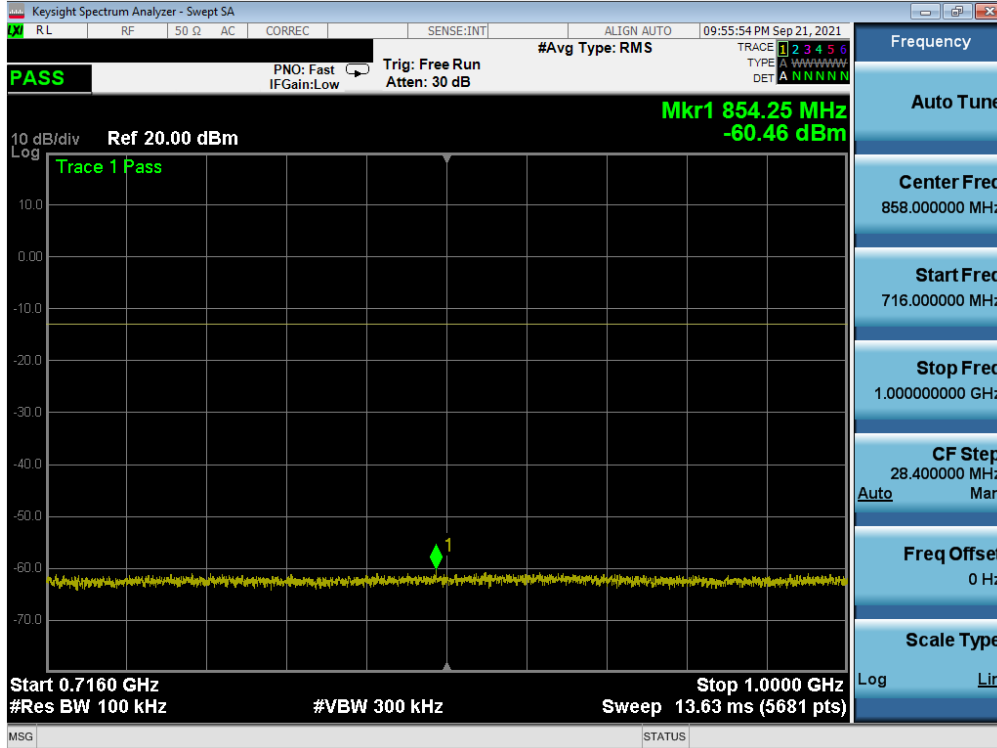


Plot 7-81. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - Low Channel)

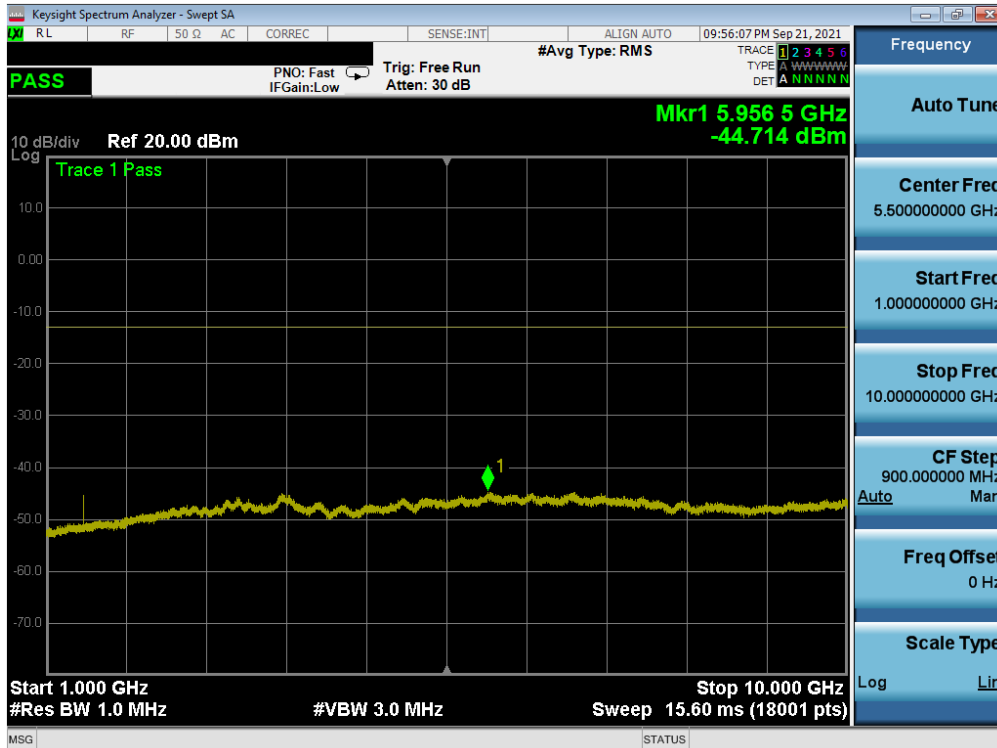


Plot 7-82. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - Mid Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 60 of 214

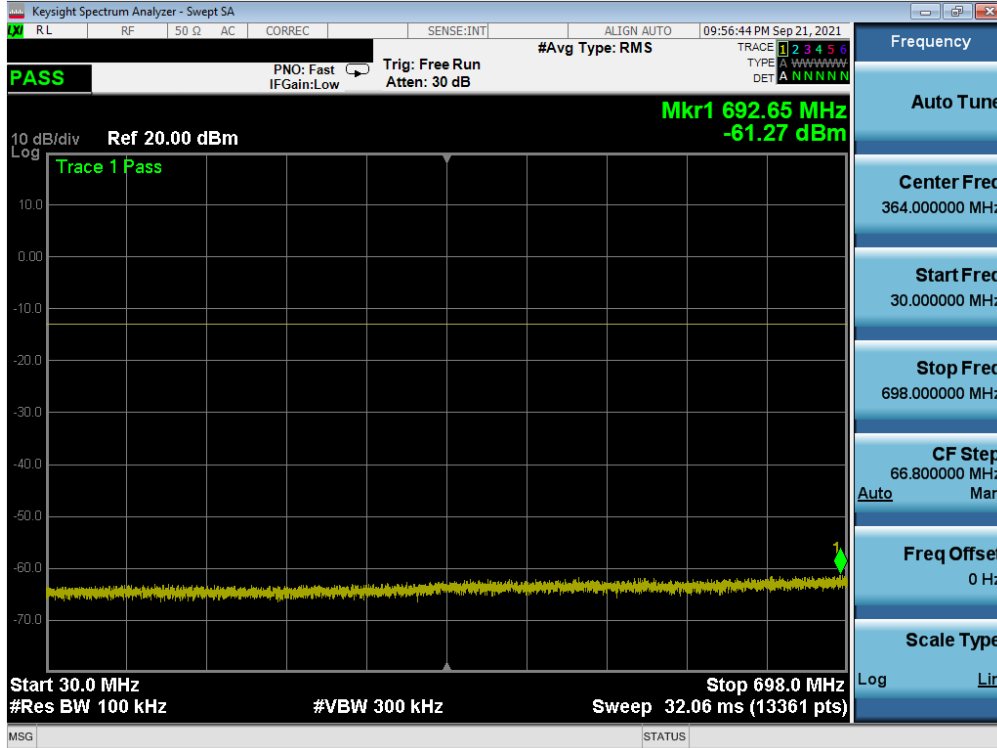


Plot 7-83. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - Mid Channel)

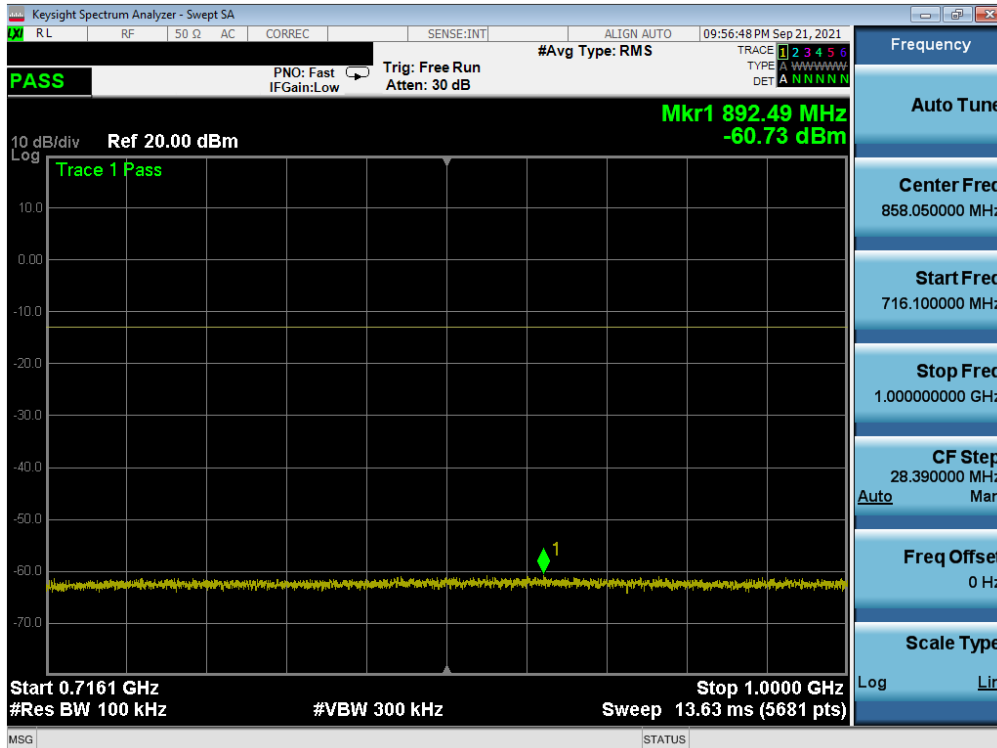


Plot 7-84. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - Mid Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 61 of 214

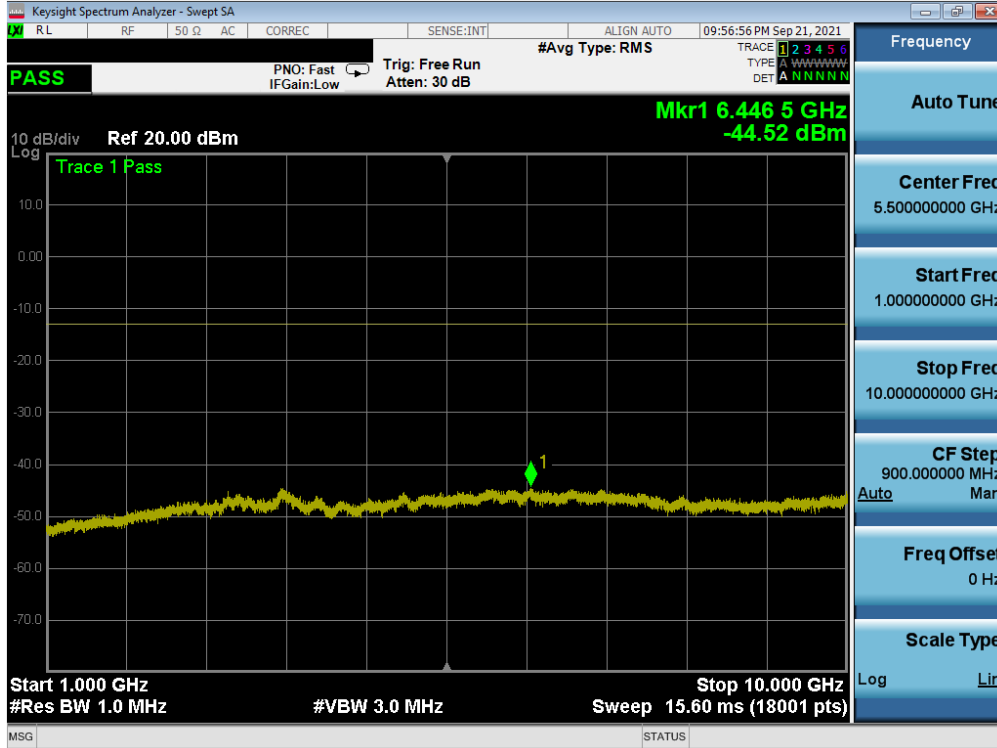


Plot 7-85. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - High Channel)



Plot 7-86. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - High Channel)

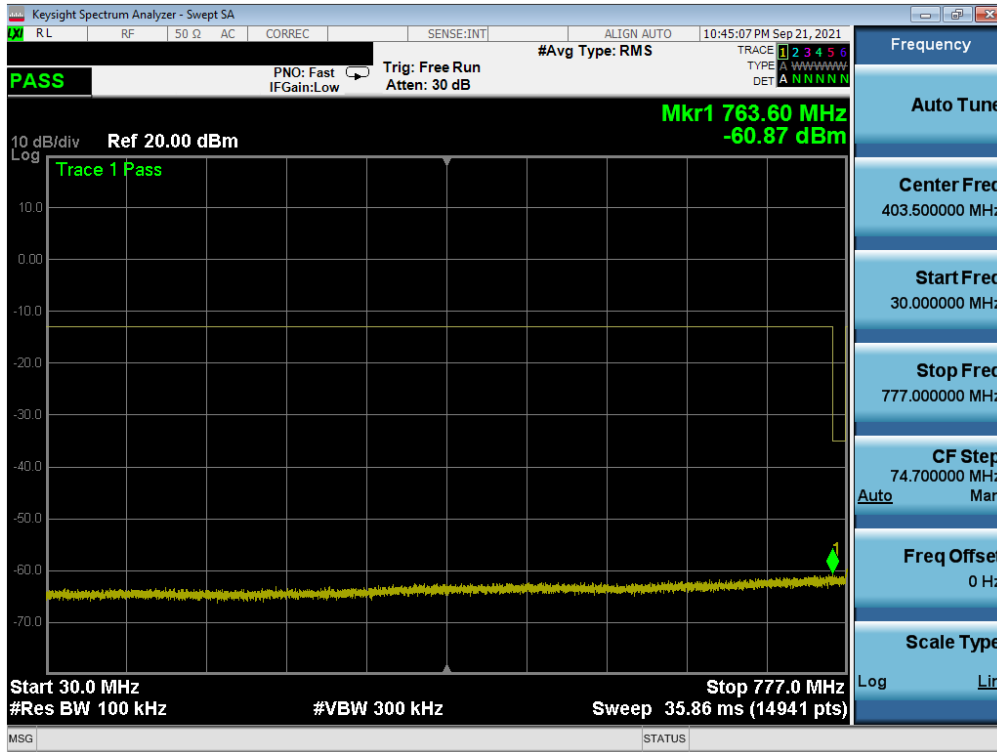
FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 62 of 214



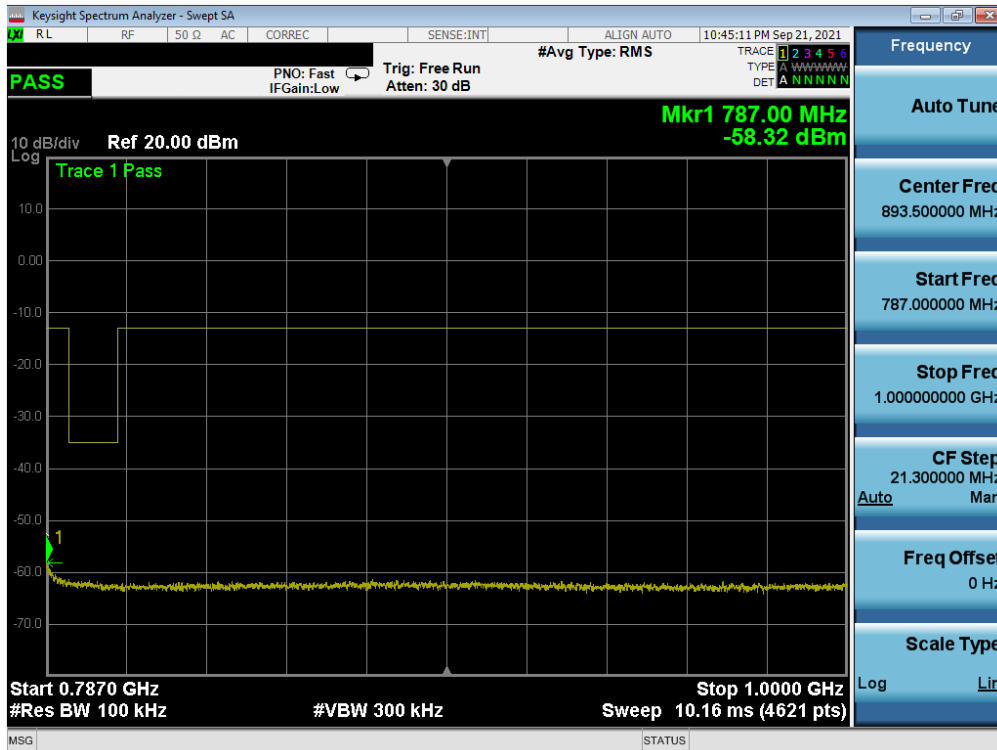
Plot 7-87. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - High Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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LTE Band 13

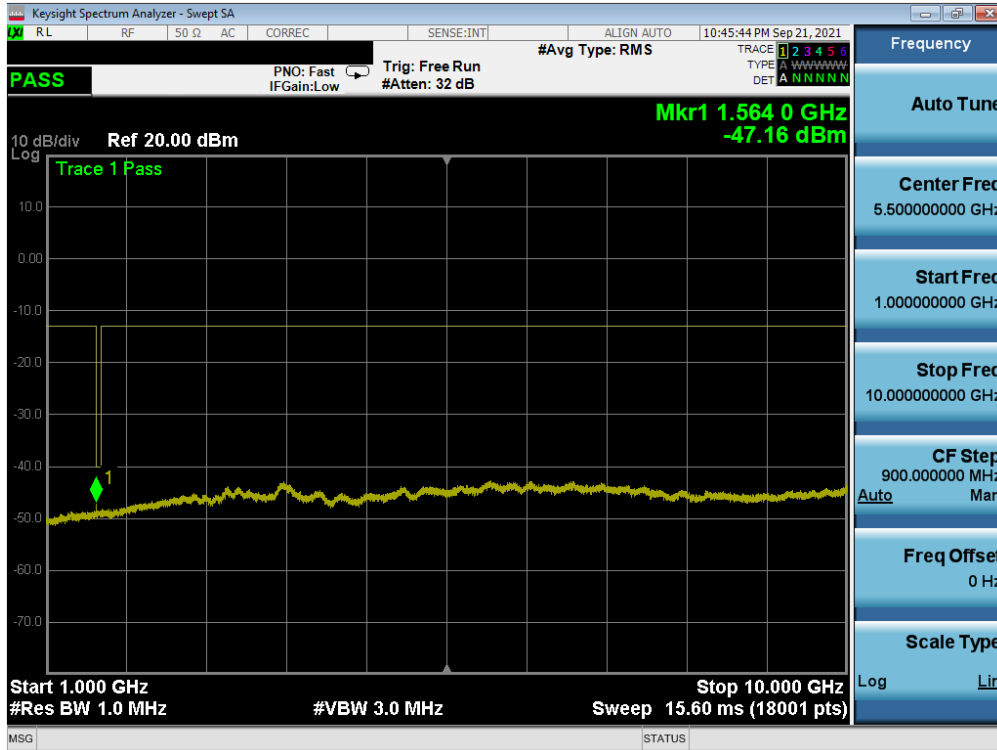


Plot 7-88. Conducted Spurious Plot (LTE Band 13 - 10MHz QPSK - 1 RB)



Plot 7-89. Conducted Spurious Plot (LTE Band 13 - 10MHz QPSK - 1 RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 64 of 214



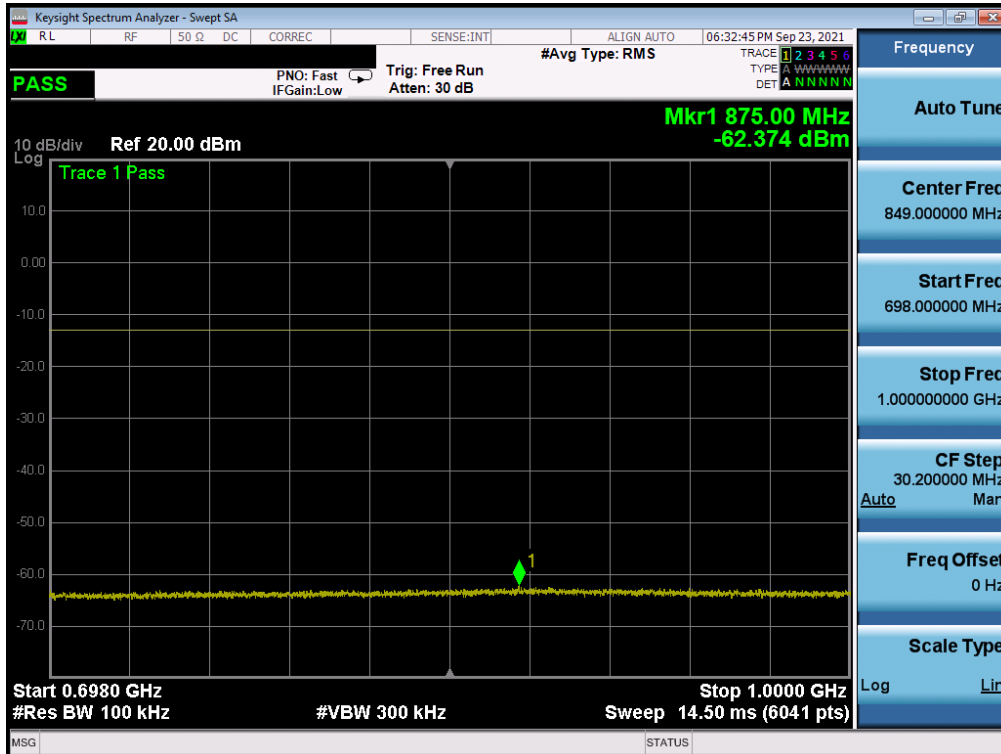
Plot 7-90. Conducted Spurious Plot (LTE Band 13 - 10MHz QPSK - 1 RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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NR Band n71

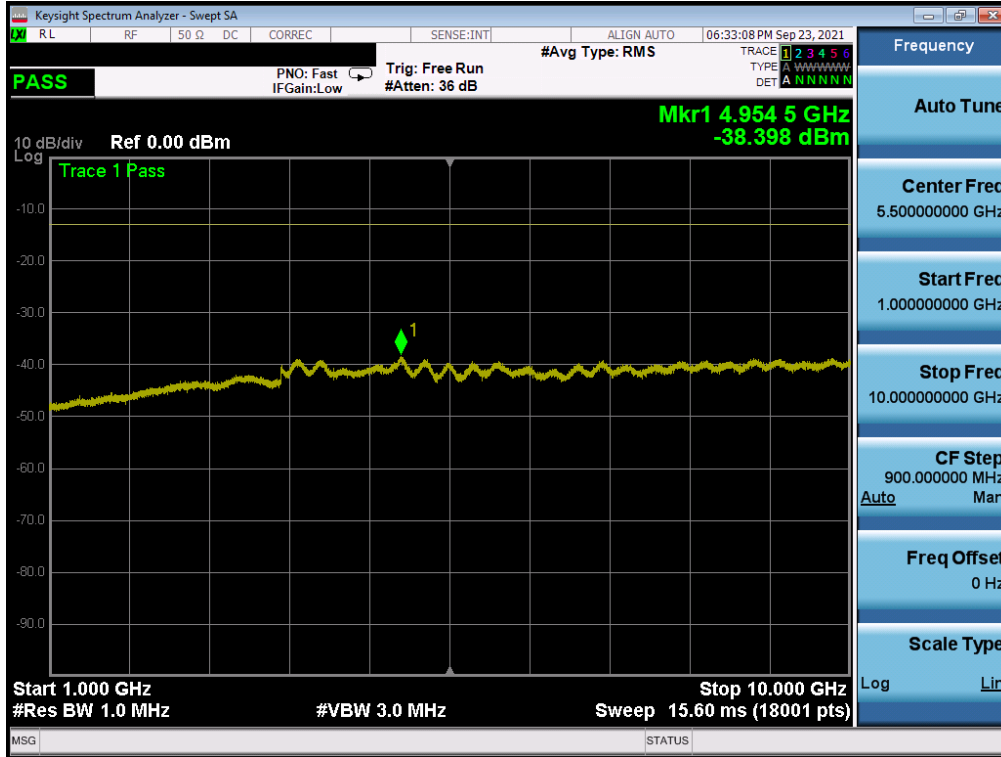


Plot 7-91. Conducted Spurious Plot (NR Band n71 -20.0MHz - 1 RB - Low Channel)



Plot 7-92. Conducted Spurious Plot (NR Band n71 - 20.0MHz - 1 RB - Low Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 66 of 214

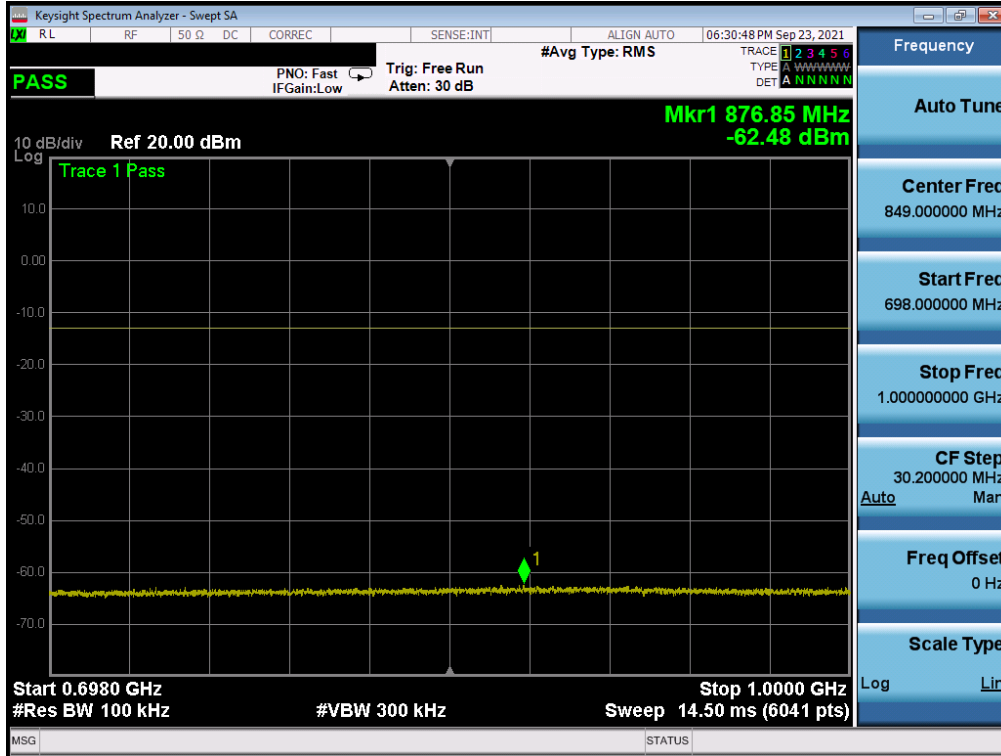


Plot 7-93. Conducted Spurious Plot (NR Band n71 - 20.0MHz - 1 RB - Low Channel)

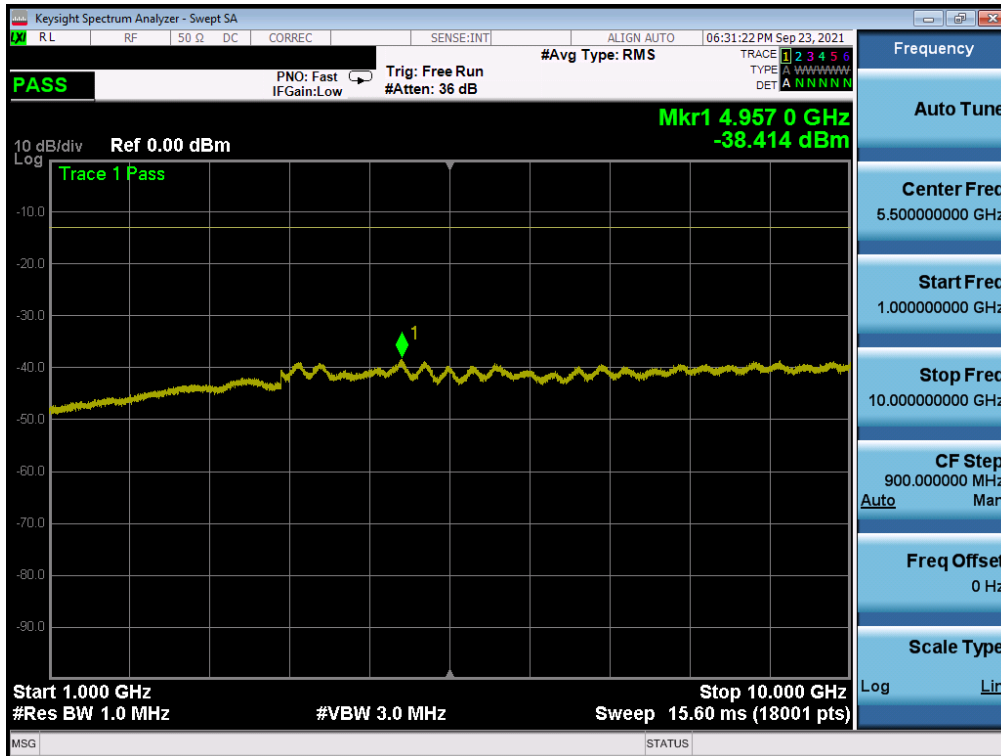


Plot 7-94. Conducted Spurious Plot (NR Band n71 - 20.0MHz - 1 RB - Mid Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 67 of 214

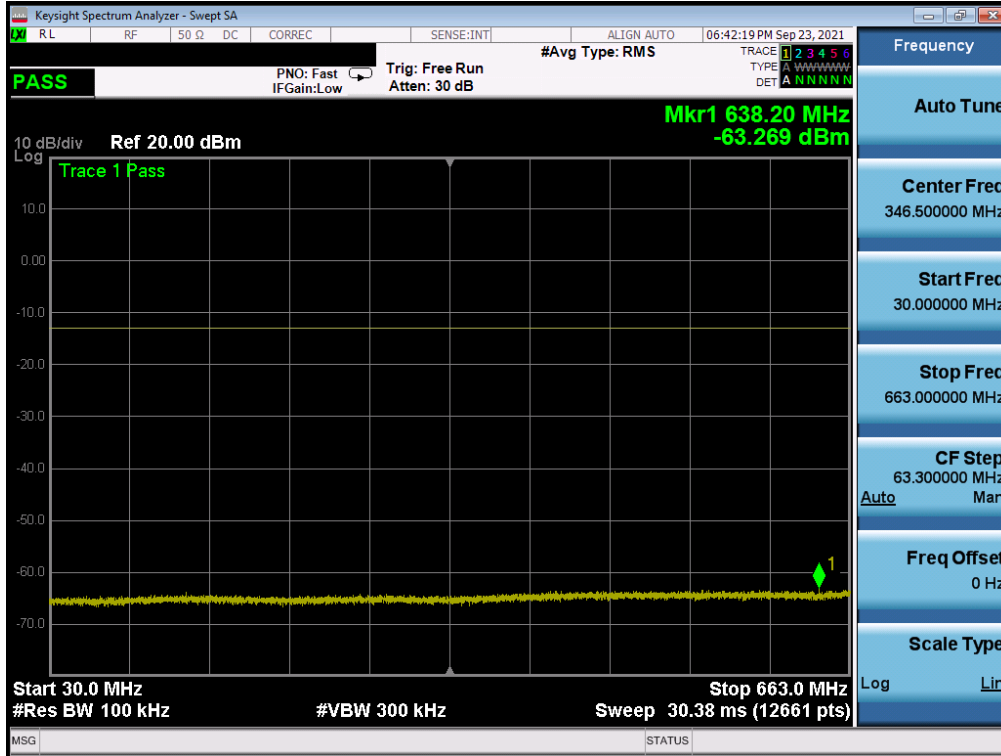


Plot 7-95. Conducted Spurious Plot (NR Band n71 - 20.0MHz - 1 RB - Mid Channel)

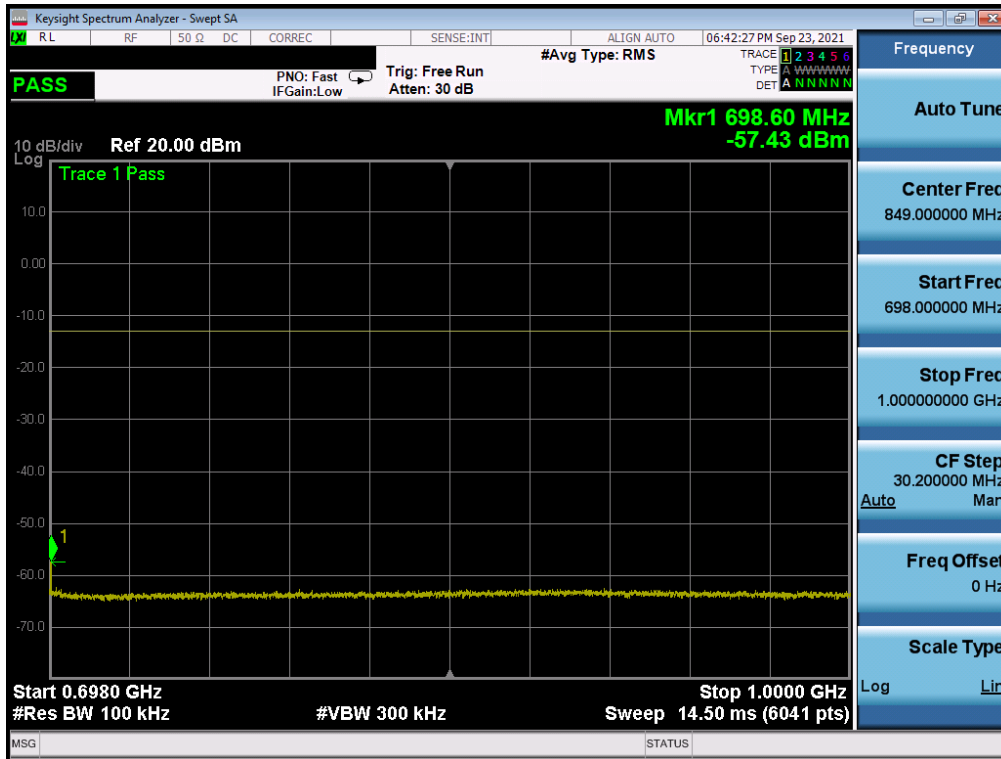


Plot 7-96. Conducted Spurious Plot (NR Band n71 - 20.0MHz - 1 RB - Mid Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 68 of 214

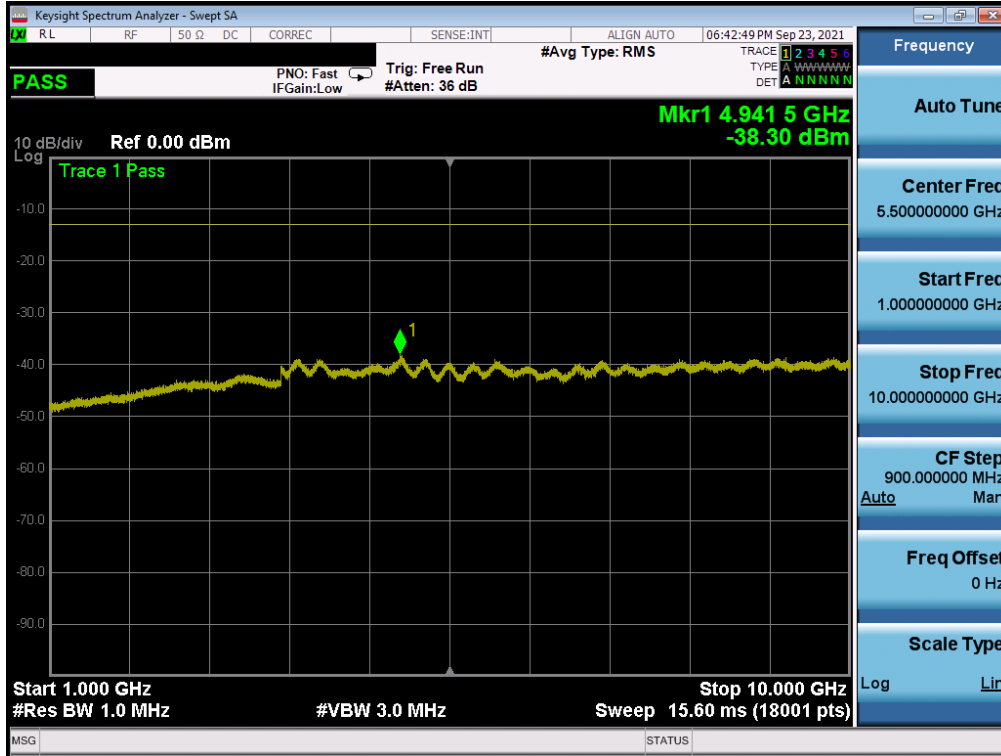


Plot 7-97. Conducted Spurious Plot (NR Band n71 - 20.0MHz - 1 RB - High Channel)



Plot 7-98. Conducted Spurious Plot (NR Band n71 - 20.0MHz - 1 RB - High Channel)

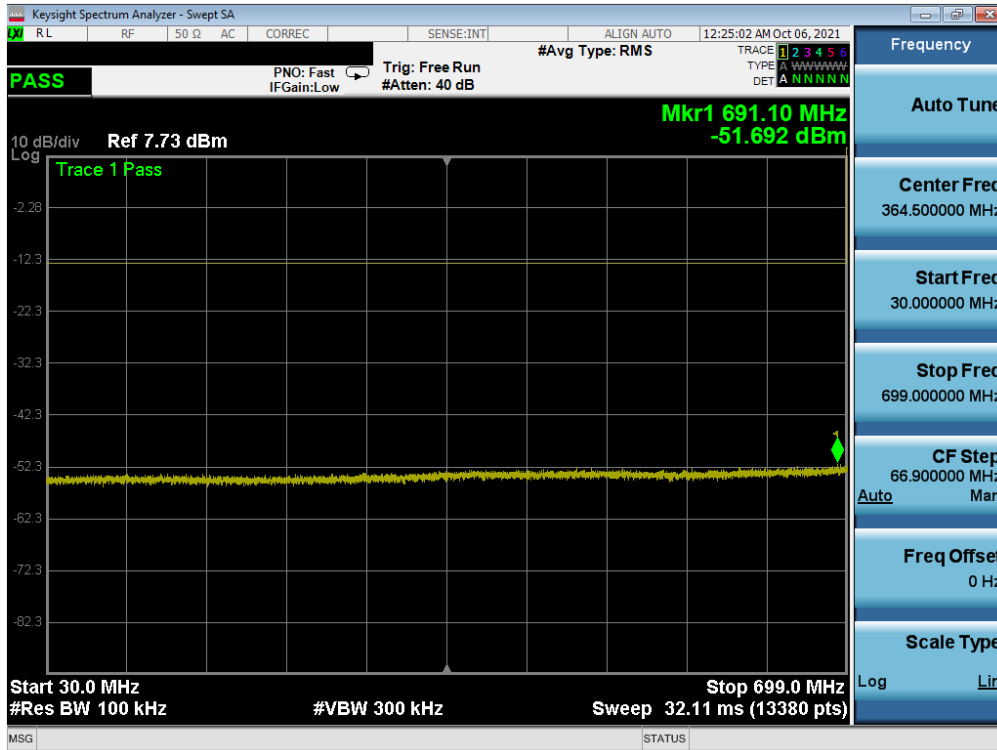
FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 69 of 214



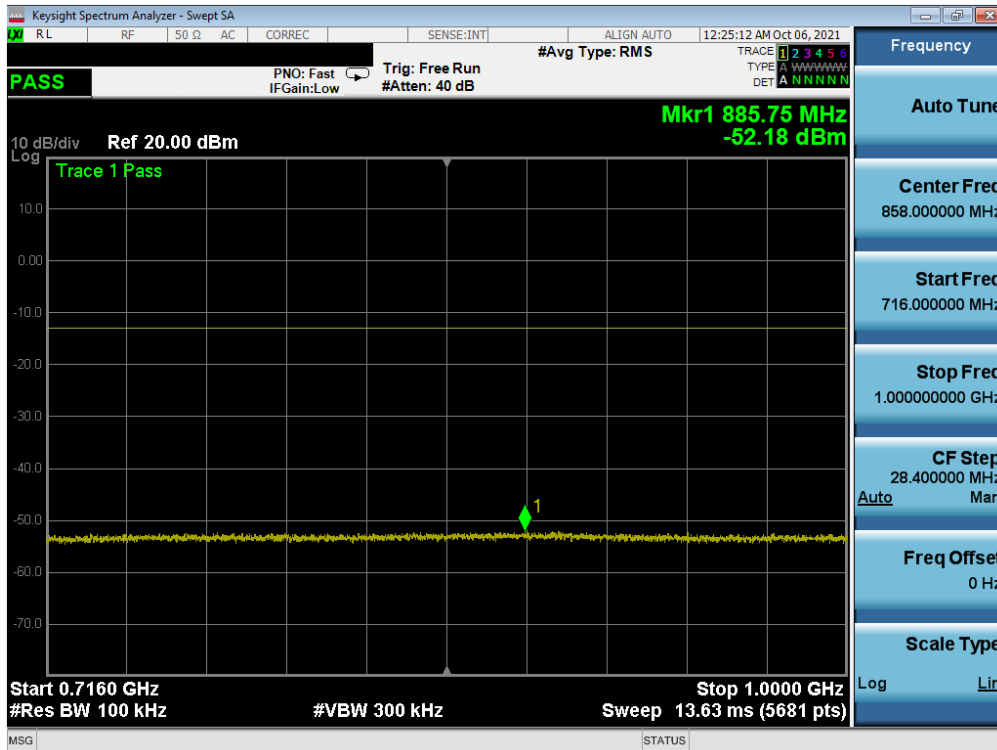
Plot 7-99. Conducted Spurious Plot (NR Band n71 - 20.0MHz - 1 RB - High Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 70 of 214

NR Band n12

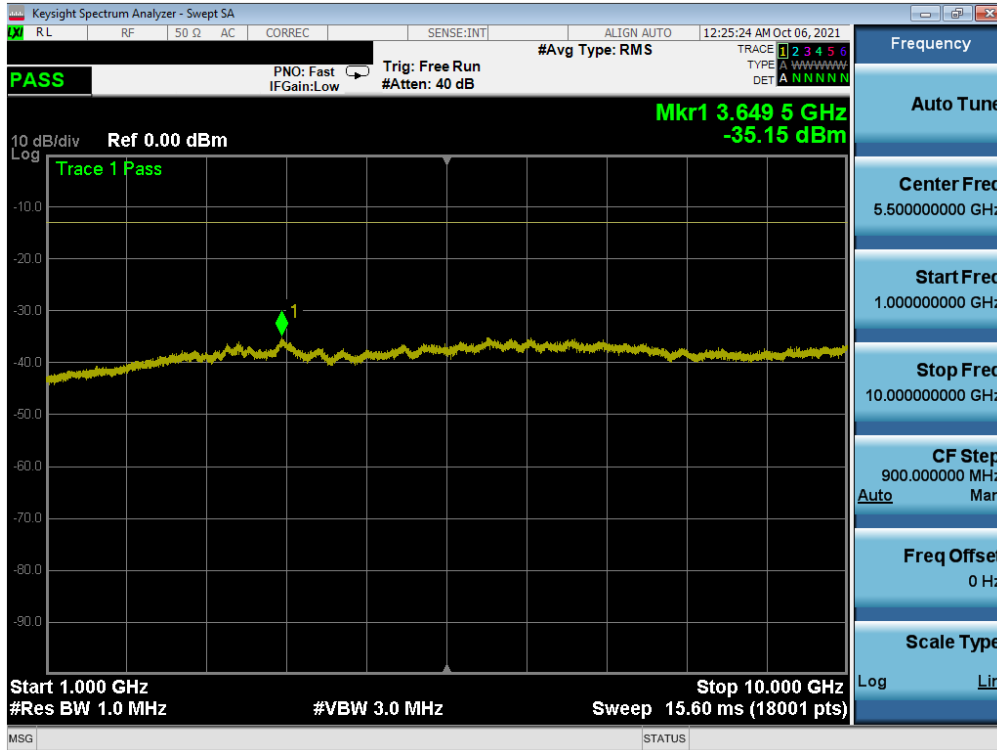


Plot 7-100. Conducted Spurious Plot (NR Band n12 -15.0MHz - 1 RB - Low Channel)

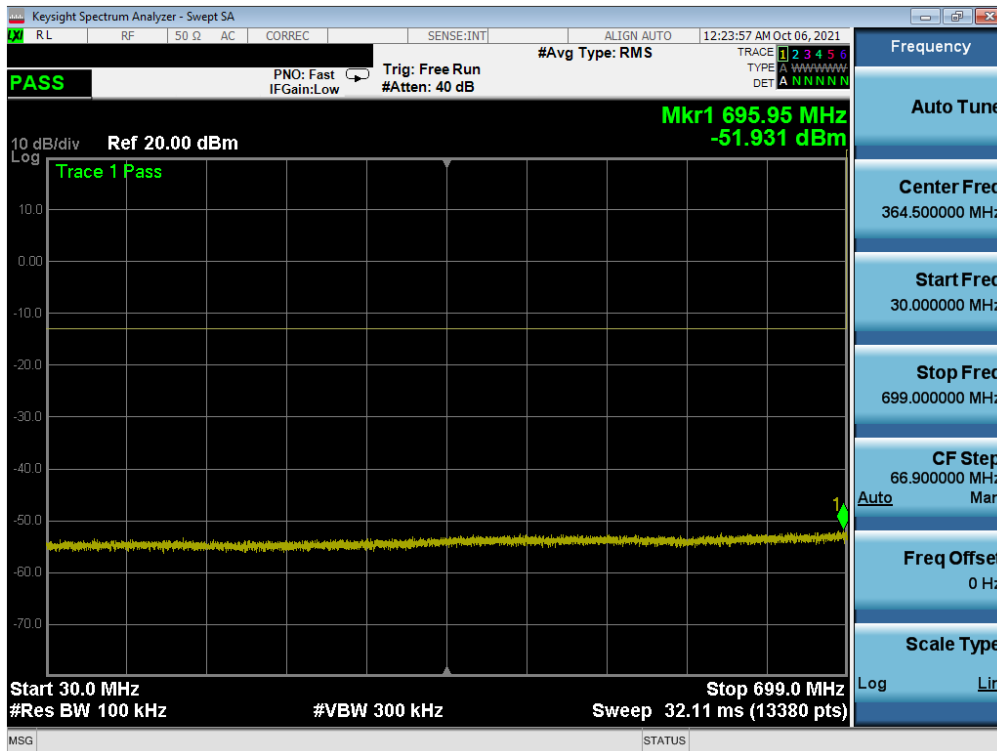


Plot 7-101. Conducted Spurious Plot (NR Band n12 - 15.0MHz - 1 RB - Low Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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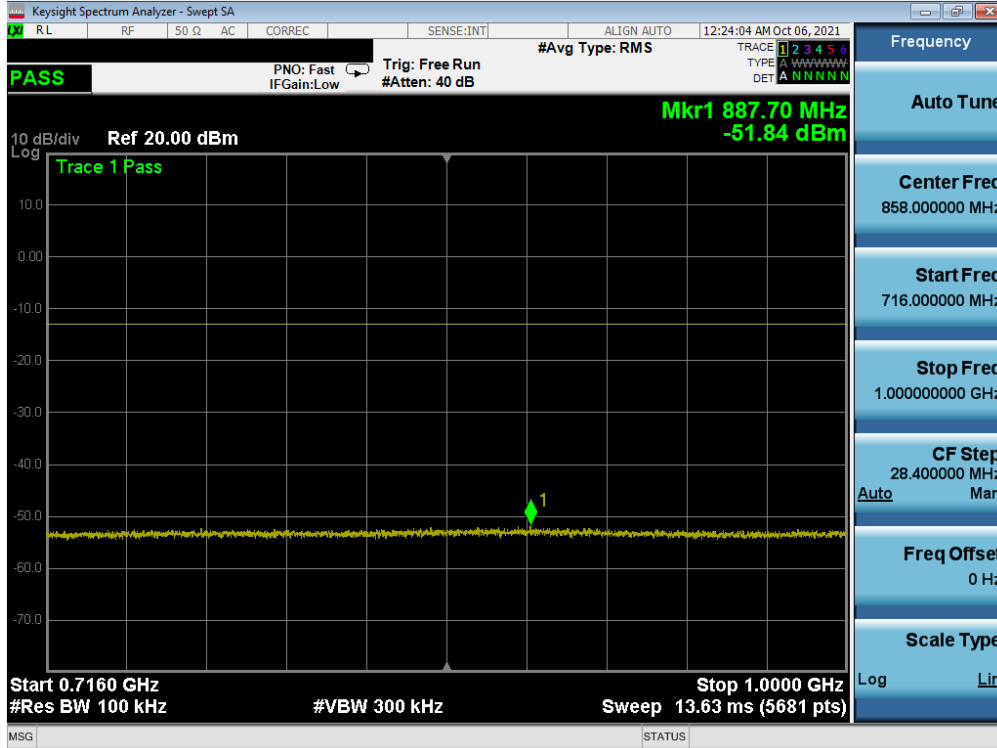


Plot 7-102. Conducted Spurious Plot (NR Band n12 - 15.0MHz - 1 RB - Low Channel)

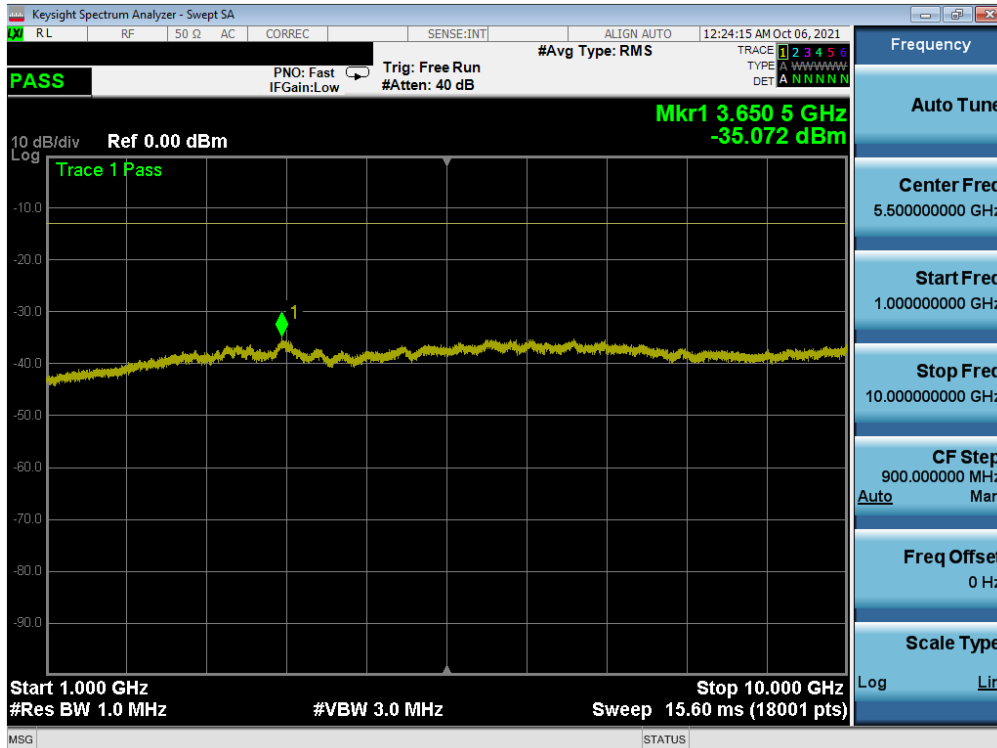


Plot 7-103. Conducted Spurious Plot (NR Band n12 - 15.0MHz - 1 RB - Mid Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 72 of 214

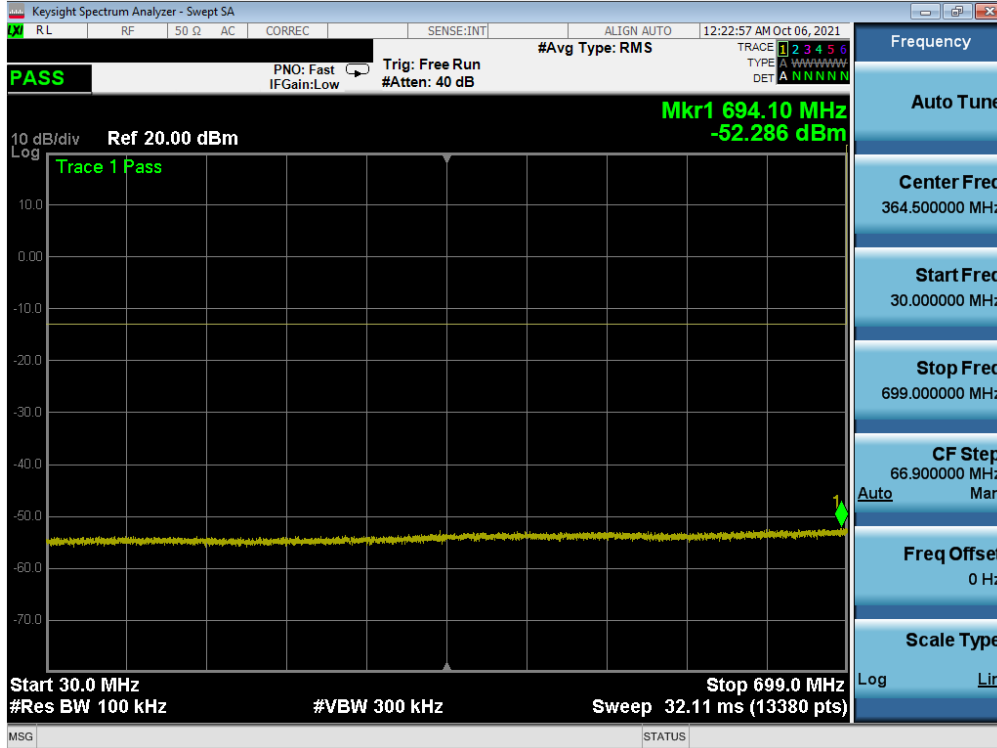


Plot 7-104. Conducted Spurious Plot (NR Band n12 - 15.0MHz - 1 RB - Mid Channel)

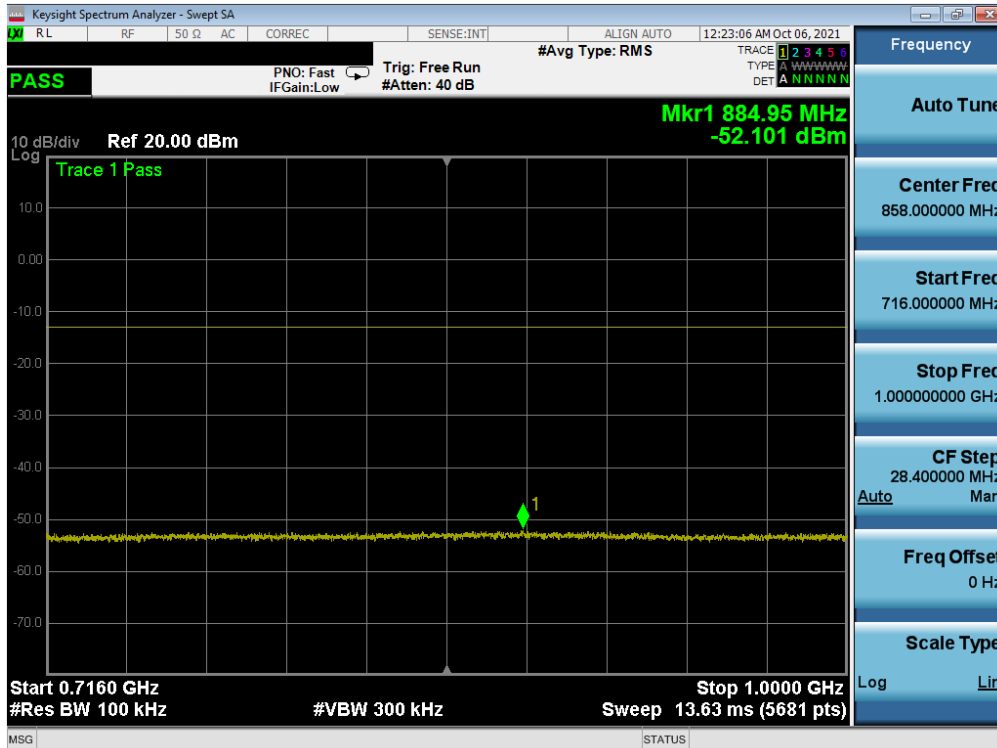


Plot 7-105. Conducted Spurious Plot (NR Band n12 - 15.0MHz - 1 RB - Mid Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 73 of 214

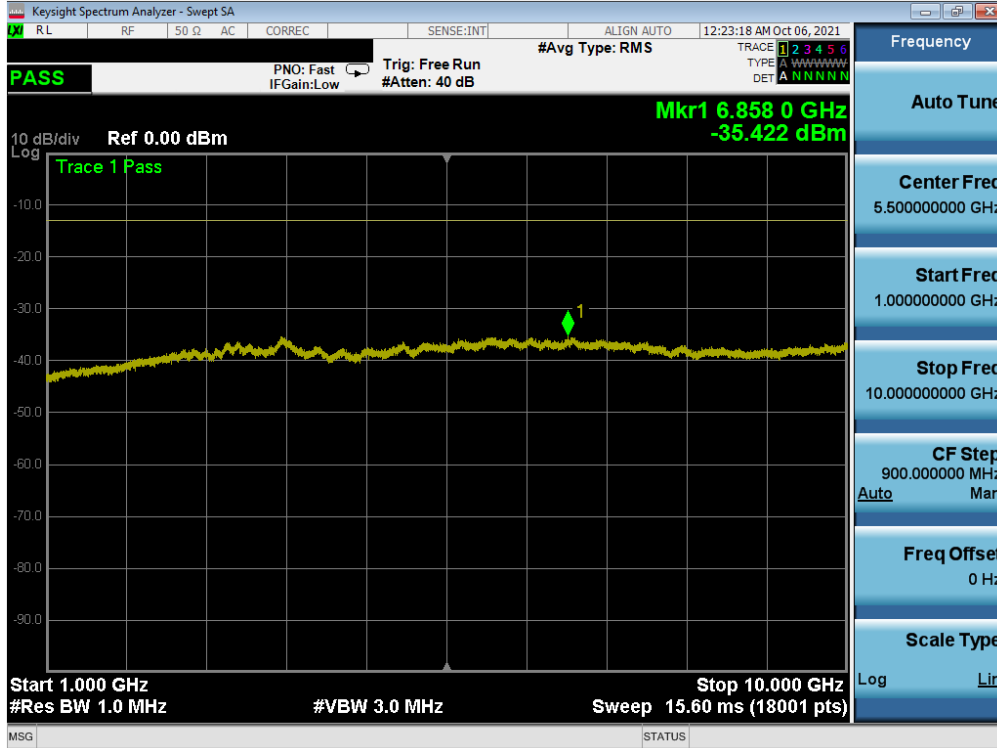


Plot 7-106. Conducted Spurious Plot (NR Band n12 - 15.0MHz - 1 RB - High Channel)



Plot 7-107. Conducted Spurious Plot (NR Band n12 - 15.0MHz - 1 RB - High Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 74 of 214



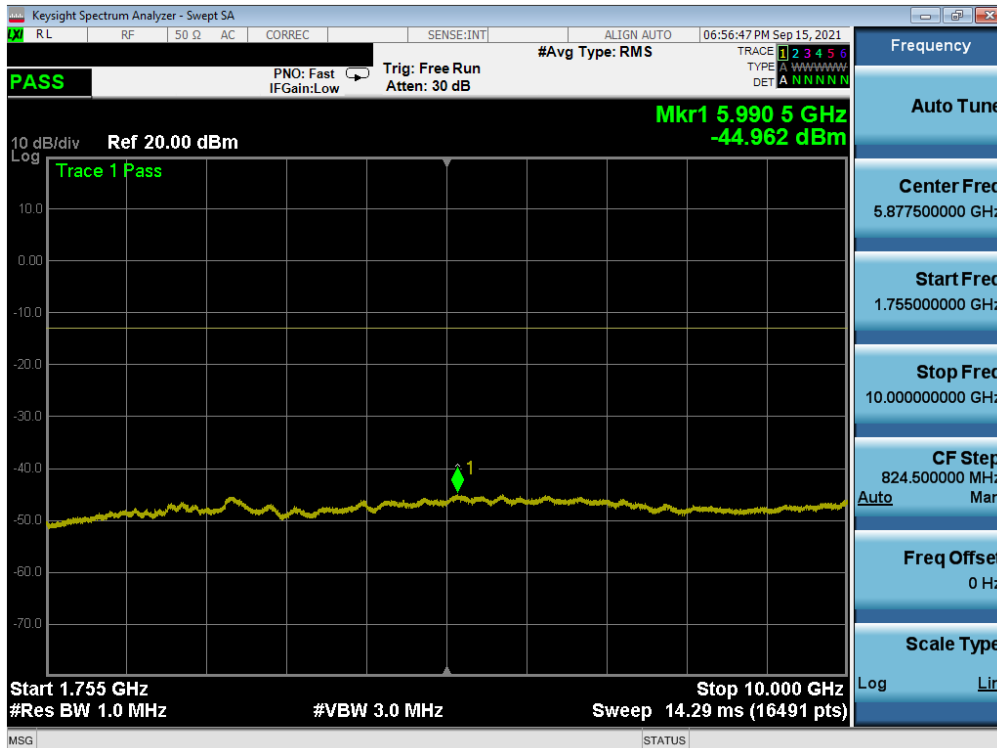
Plot 7-108. Conducted Spurious Plot (NR Band n12 - 15.0MHz - 1 RB - High Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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WCDMA AWS

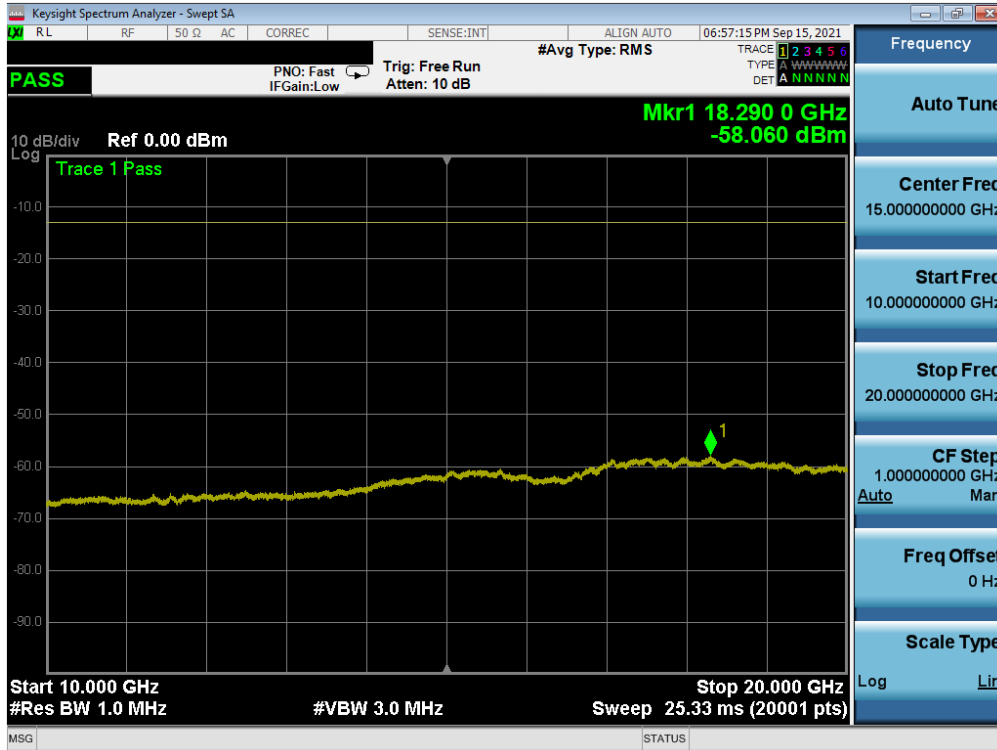


Plot 7-109. Conducted Spurious Plot (WCDMA Ch. 1312- Low Channel)

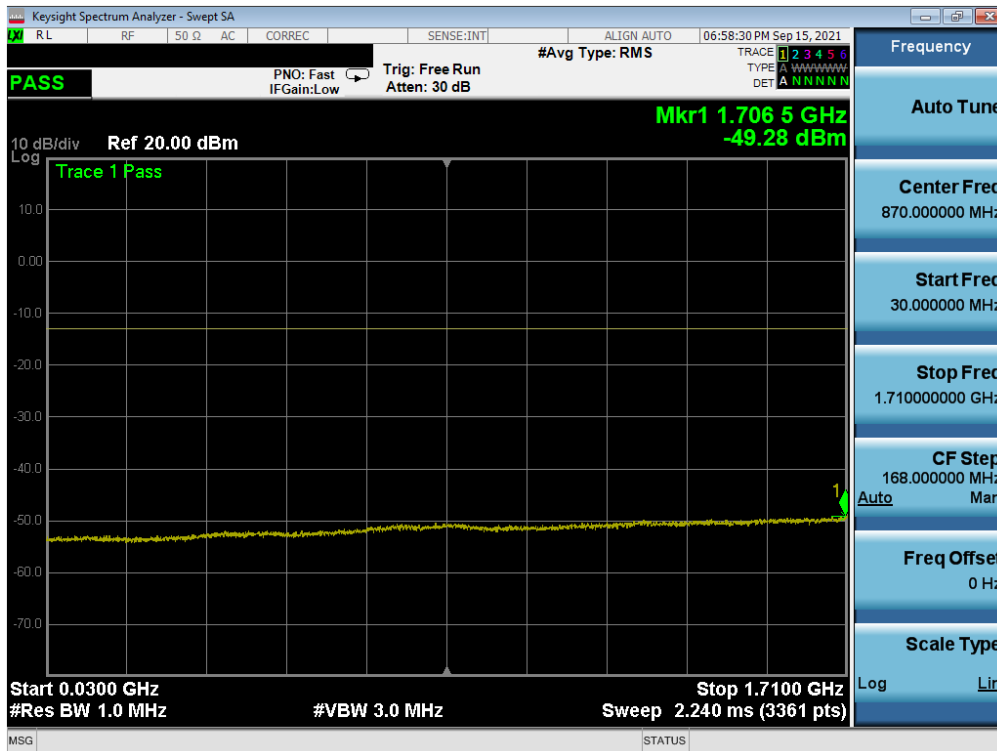


Plot 7-110. Conducted Spurious Plot (WCDMA Ch. 1312- Low Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 76 of 214

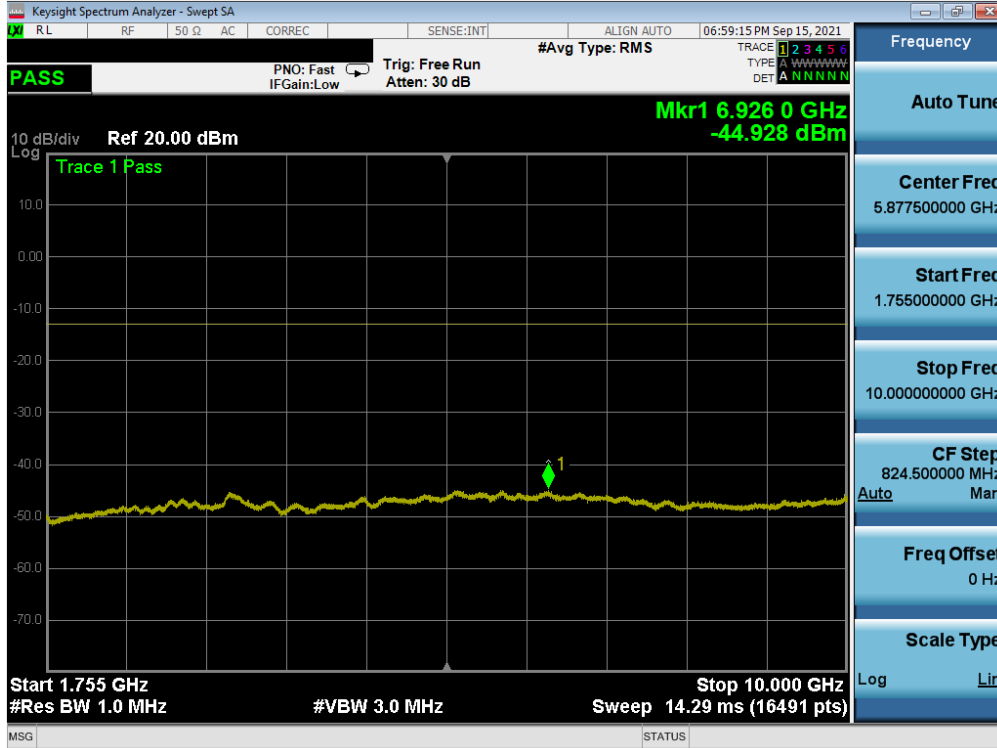


Plot 7-111. Conducted Spurious Plot (WCDMA Ch. 1312- Low Channel)

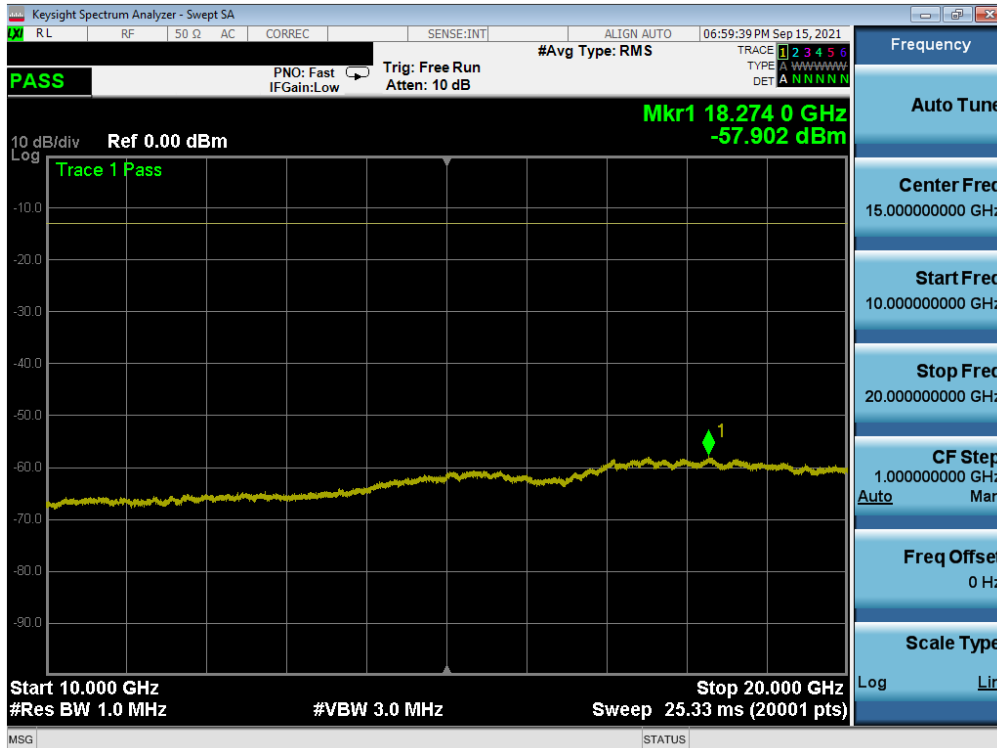


Plot 7-112. Conducted Spurious Plot (WCDMA Ch. 1413- Mid Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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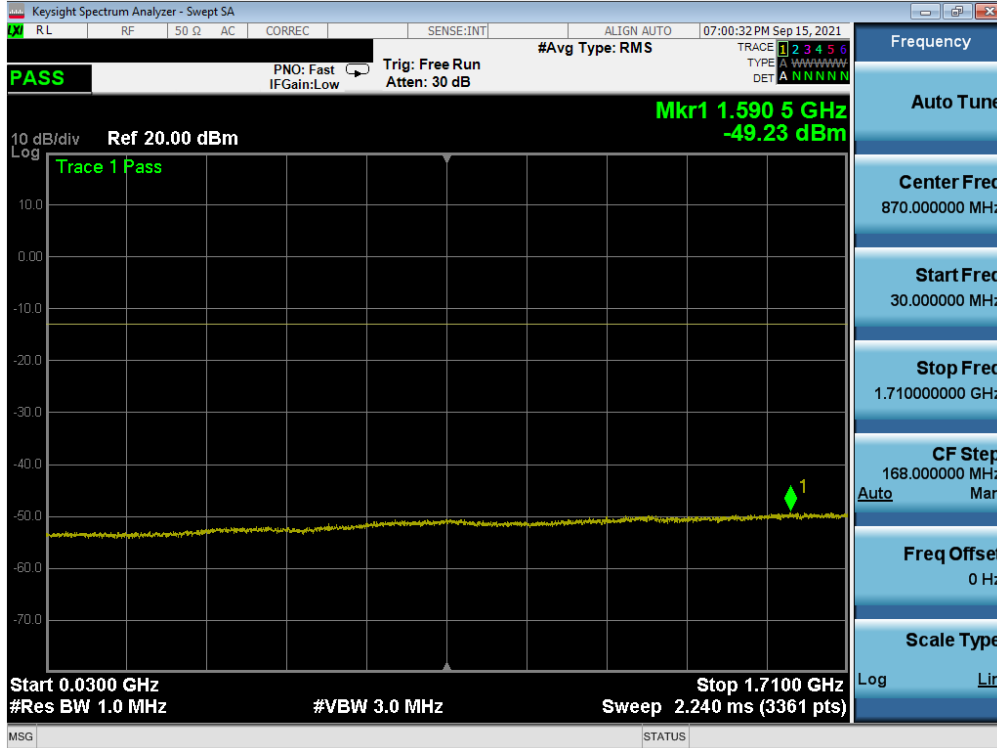


Plot 7-113. Conducted Spurious Plot (WCDMA Ch. 1413- Mid Channel)

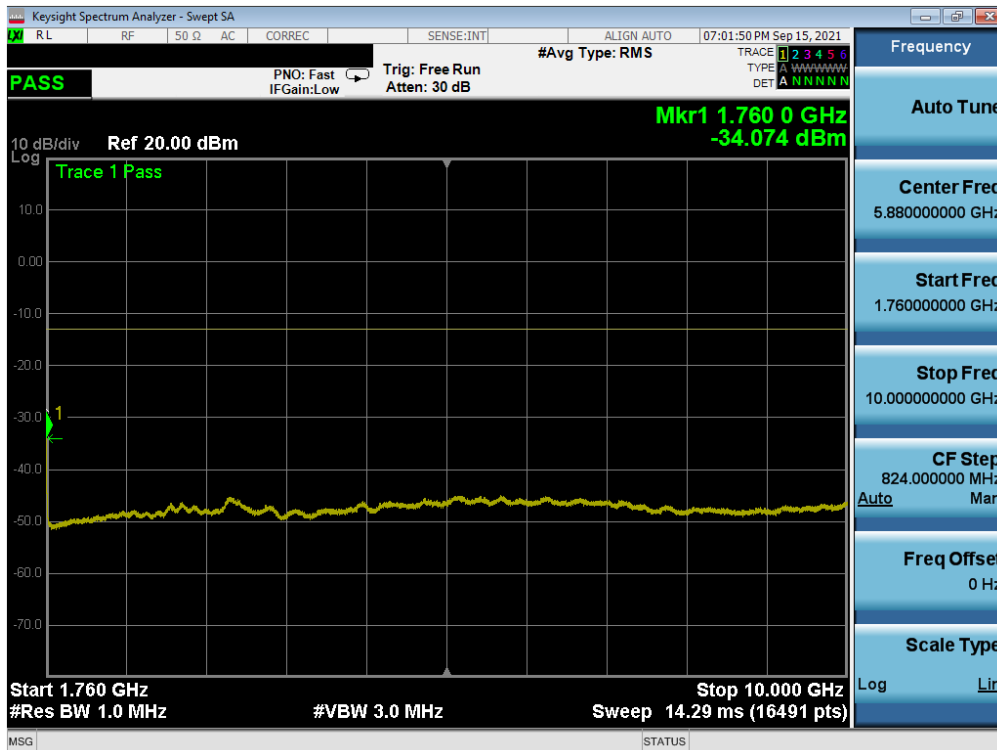


Plot 7-114. Conducted Spurious Plot (WCDMA Ch. 1413- Mid Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-04-R1.A3L	Test Dates: 9/9/2021 - 11/16/2021	EUT Type: Portable Handset		Page 78 of 214

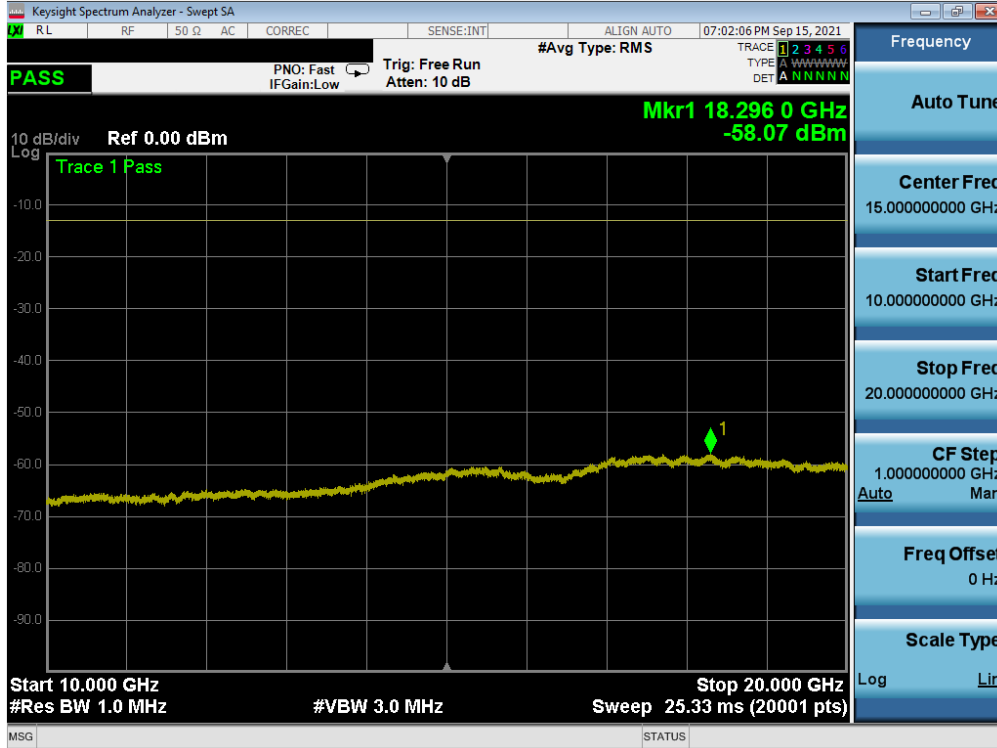


Plot 7-115. Conducted Spurious Plot (WCDMA Ch. 1513- High Channel)



Plot 7-116. Conducted Spurious Plot (WCDMA Ch. 1513- High Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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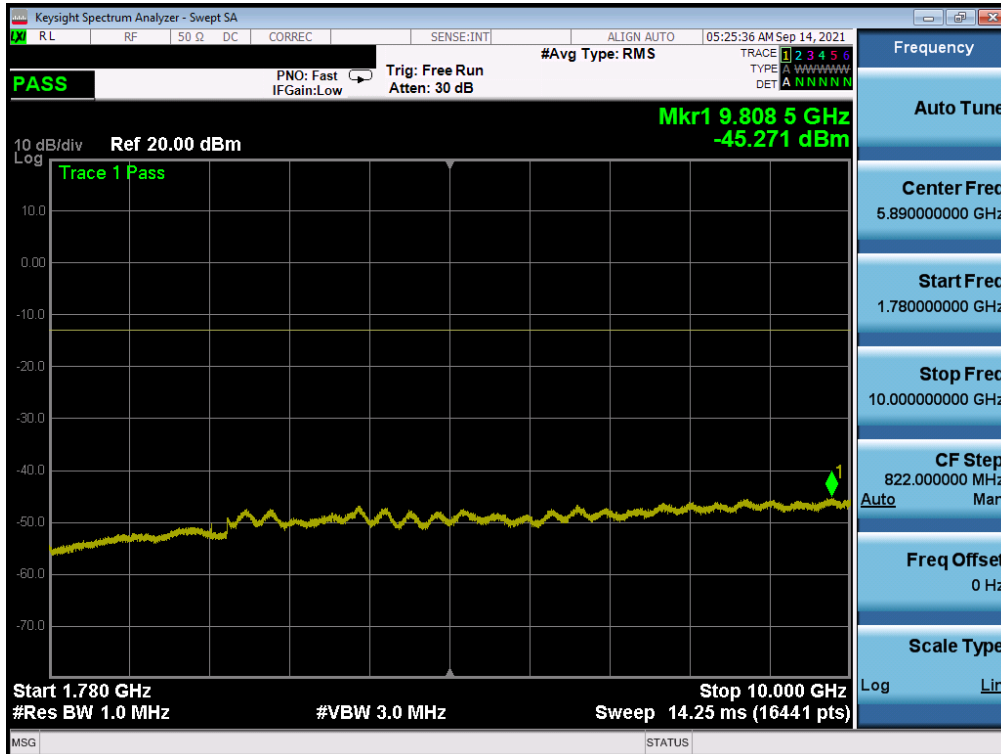
Plot 7-117. Conducted Spurious Plot (WCDMA Ch. 1513- High Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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LTE Band 66/4

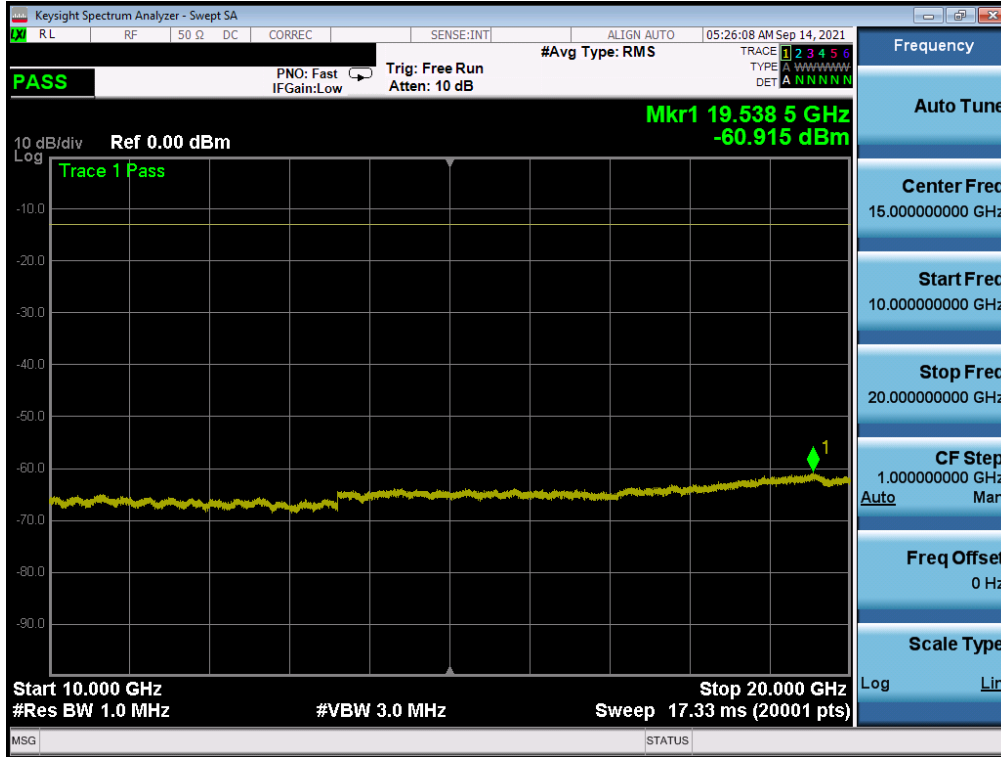


Plot 7-118. Conducted Spurious Plot (LTE Band 66/4 - 20MHz QPSK - 1 RB - Low Channel)

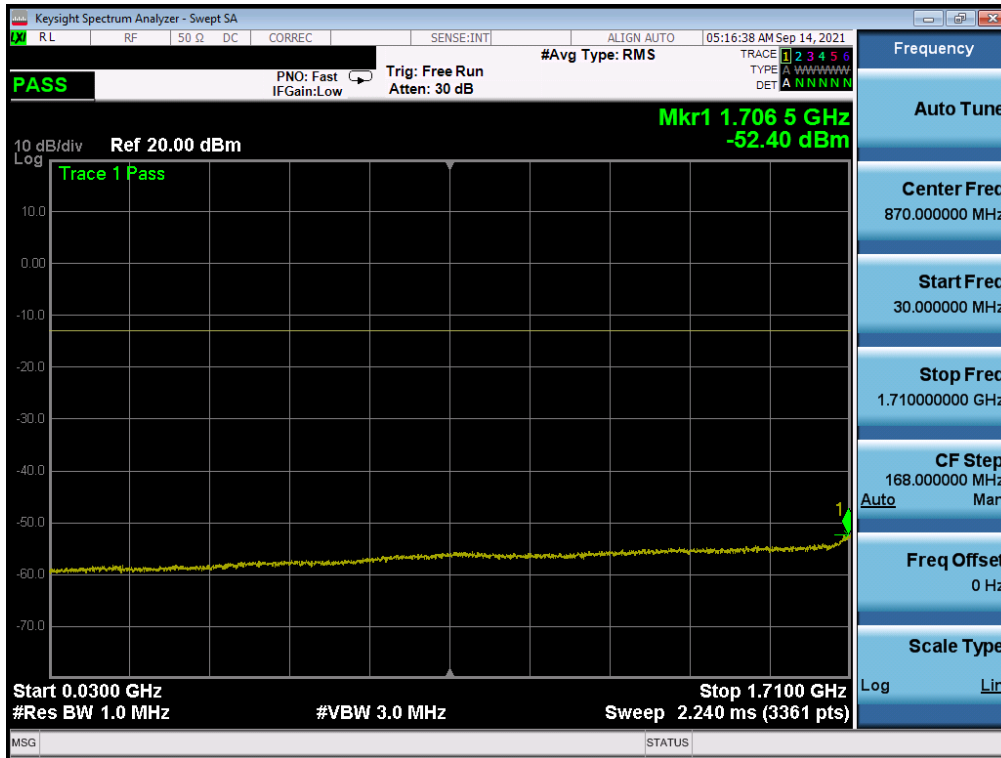


Plot 7-119. Conducted Spurious Plot (LTE Band 66/4 - 20MHz QPSK - 1 RB - Low Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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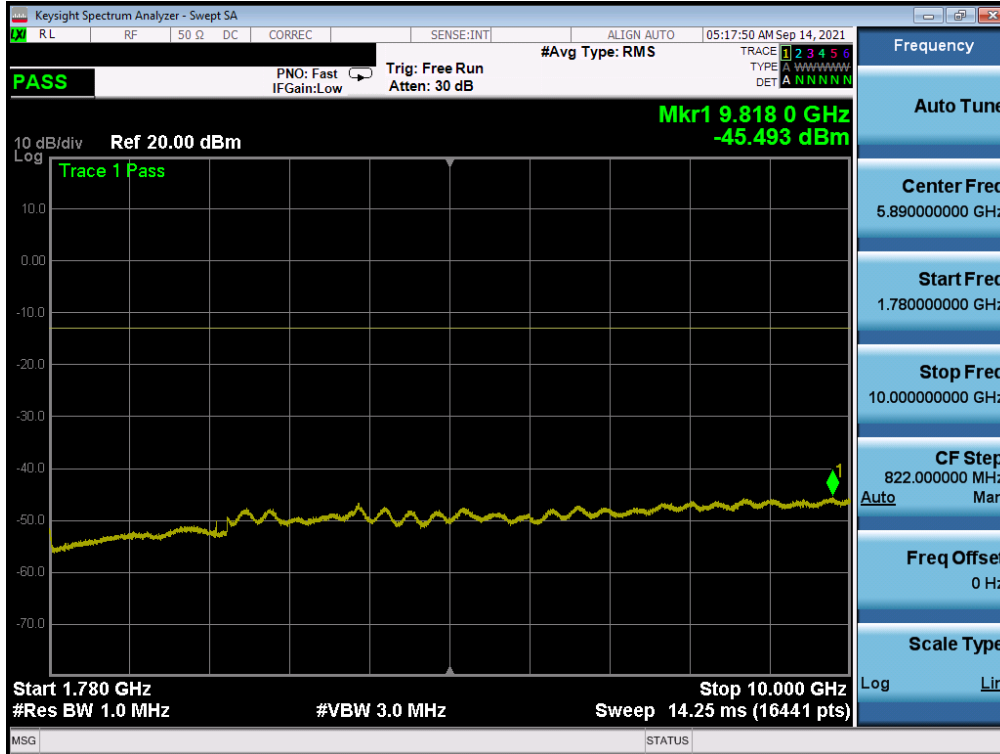


Plot 7-120. Conducted Spurious Plot (LTE Band 66/4 - 20MHz QPSK - 1 RB - Low Channel)

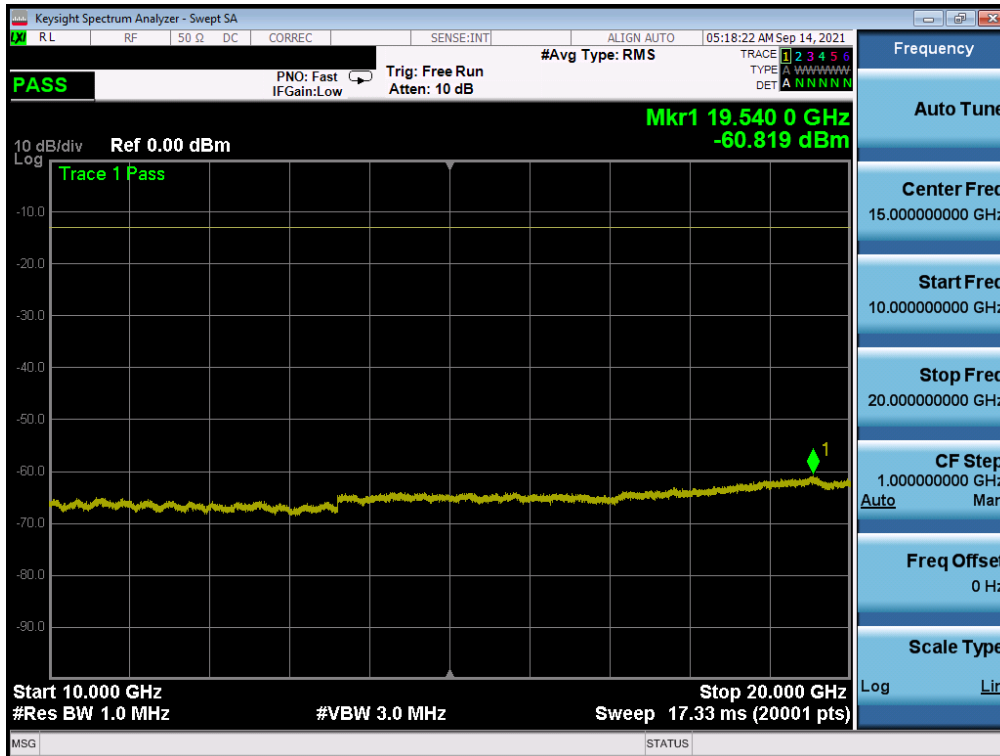


Plot 7-121. Conducted Spurious Plot (LTE Band 66/4 - 20MHz QPSK - 1 RB - Mid Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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Plot 7-122. Conducted Spurious Plot (LTE Band 66/4 - 20MHz QPSK - 1 RB - Mid Channel)



Plot 7-123. Conducted Spurious Plot (LTE Band 66/4 - 20MHz QPSK - 1 RB - Mid Channel)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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