

PART 27 MEASUREMENT REPORT

Applicant Name:
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Date of Testing:
9/14 - 11/12/2021
Test Report Issue Date:
12/02/2021
Test Site/Location:
PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
1M2109090102-05-R1.A3L


FCC ID:	A3LSMS908U
Applicant Name:	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: 1M2109090102-05-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







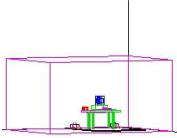
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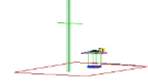
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Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
LTE Band 30	10 MHz	QPSK	2310.0	0.170	22.31	9M04G7D
		16QAM	2310.0	0.158	21.99	9M00W7D
	5 MHz	QPSK	2307.5 - 2312.5	0.177	22.47	4M55G7D
		16QAM	2307.5 - 2312.5	0.170	22.31	4M55W7D
LTE Band 7	20 MHz	QPSK	2510.0 - 2560.0	0.163	22.11	18M0G7D
		16QAM	2510.0 - 2560.0	0.142	21.52	18M0W7D
	15 MHz	QPSK	2507.5 - 2562.5	0.164	22.14	13M5G7D
		16QAM	2507.5 - 2562.5	0.145	21.60	13M5W7D
	10 MHz	QPSK	2505.0 - 2565.0	0.170	22.31	9M03G7D
		16QAM	2505.0 - 2565.0	0.151	21.79	9M04W7D
	5 MHz	QPSK	2502.5 - 2567.5	0.175	22.42	4M54G7D
		16QAM	2502.5 - 2567.5	0.153	21.85	4M54W7D
LTE Band 41(PC2)	20 MHz	QPSK	2506.0 - 2680.0	0.401	26.03	18M0G7D
		16QAM	2506.0 - 2680.0	0.357	25.53	18M0W7D
	15 MHz	QPSK	2503.5 - 2682.5	0.395	25.96	13M5G7D
		16QAM	2503.5 - 2682.5	0.359	25.55	13M6W7D
	10 MHz	QPSK	2501.0 - 2685.0	0.385	25.85	9M05G7D
		16QAM	2501.0 - 2685.0	0.306	24.85	9M03W7D
	5 MHz	QPSK	2498.5 - 2687.5	0.404	26.06	4M52G7D
		16QAM	2498.5 - 2687.5	0.383	25.83	4M55W7D
LTE Band 41(PC3)/38	20 MHz	QPSK	2506.0 - 2680.0	0.286	24.56	18M0G7D
		16QAM	2506.0 - 2680.0	0.187	22.72	18M0W7D
	15 MHz	QPSK	2503.5 - 2682.5	0.285	24.54	13M6G7D
		16QAM	2503.5 - 2682.5	0.179	22.53	13M6W7D
	10 MHz	QPSK	2501.0 - 2685.0	0.284	24.54	9M03G7D
		16QAM	2501.0 - 2685.0	0.187	22.72	9M04W7D
	5 MHz	QPSK	2498.5 - 2687.5	0.288	24.59	4M54G7D
		16QAM	2498.5 - 2687.5	0.205	23.12	4M54W7D
NR Band n30 ANT A	10 MHz	$\pi/2$ BPSK	2310.0	0.102	20.10	9M00G7D
		QPSK	2310.0	0.101	20.03	9M33G7D
		16QAM	2310.0	0.083	19.20	9M34W7D
	5 MHz	$\pi/2$ BPSK	2307.5 - 2312.5	0.104	20.18	4M54G7D
		QPSK	2307.5 - 2312.5	0.105	20.19	4M51G7D
		16QAM	2307.5 - 2312.5	0.087	19.39	4M52W7D
NR Band n30 ANT J	10 MHz	$\pi/2$ BPSK	2310.0	0.149	21.75	9M02G7D
		QPSK	2310.0	0.145	21.61	9M37G7D
		16QAM	2310.0	0.131	21.17	9M37W7D
	5 MHz	$\pi/2$ BPSK	2307.5 - 2312.5	0.154	21.86	4M55G7D
		QPSK	2307.5 - 2312.5	0.142	21.53	4M53G7D
		16QAM	2307.5 - 2312.5	0.125	20.98	4M53W7D

EUT Overview



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Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n7 ANT B	40 MHz	$\pi/2$ BPSK	2520.0-2550.0	0.207	23.16	38M8G7D
		QPSK	2520.0-2550.0	0.204	23.10	38M7G7D
		16QAM	2520.0-2550.0	0.169	22.28	38M7W7D
	30 MHz	$\pi/2$ BPSK	2515.0-2555.0	0.207	23.16	28M6W7D
		QPSK	2515.0-2555.0	0.199	22.98	28M7W7D
		16QAM	2515.0-2555.0	0.168	22.25	28M7G7D
	25 MHz	$\pi/2$ BPSK	2512.5-2557.5	0.221	23.44	23M1G7D
		QPSK	2512.5-2557.5	0.212	23.26	23M1G7D
		16QAM	2512.5-2557.5	0.179	22.52	23M0W7D
	20MHz	$\pi/2$ BPSK	2510.0 - 2560.0	0.194	22.89	17M9G7D
		QPSK	2510.0 - 2560.0	0.188	22.75	19M0G7D
		16QAM	2510.0 - 2560.0	0.156	21.94	19M1W7D
	15 MHz	$\pi/2$ BPSK	2507.5 - 2562.5	0.200	23.02	13M5G7D
		QPSK	2507.5 - 2562.5	0.192	22.83	14M2G7D
		16QAM	2507.5 - 2562.5	0.166	22.20	14M2W7D
	10MHz	$\pi/2$ BPSK	2505.0 - 2565.0	0.210	23.22	9M05G7D
		QPSK	2505.0 - 2565.0	0.198	22.97	9M37G7D
		16QAM	2505.0 - 2565.0	0.176	22.46	9M37W7D
	5 MHz	$\pi/2$ BPSK	2502.5 - 2567.5	0.212	23.26	4M54G7D
		QPSK	2502.5 - 2567.5	0.195	22.90	4M54G7D
		16QAM	2502.5 - 2567.5	0.172	22.34	4M54W7D

EUT Overview

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n41 PC2 ANT J	100 MHz	$\pi/2$ BPSK	2546.0 - 2640.0	0.276	24.41	97M1G7D
		QPSK	2546.0 - 2640.0	0.255	24.07	98M4G7D
		16QAM	2546.0 - 2640.0	0.240	23.80	98M3W7D
	90 MHz	$\pi/2$ BPSK	2541.0 - 2645.0	0.277	24.43	87M4G7D
		QPSK	2541.0 - 2645.0	0.261	24.17	88M3G7D
		16QAM	2541.0 - 2645.0	0.228	23.58	88M3W7D
	80 MHz	$\pi/2$ BPSK	2536.0 - 2650.0	0.277	24.43	77M8G7D
		QPSK	2536.0 - 2650.0	0.264	24.21	78M1G7D
		16QAM	2536.0 - 2650.0	0.255	24.06	78M0W7D
	70 MHz	$\pi/2$ BPSK	2531.0 - 2655.0	0.314	24.96	64M8G7D
		QPSK	2531.0 - 2655.0	0.274	24.37	67M9G7D
		16QAM	2531.0 - 2655.0	0.251	24.00	67M9W7D
	60 MHz	$\pi/2$ BPSK	2526.0 - 2660.0	0.277	24.42	58M6G7D
		QPSK	2526.0 - 2660.0	0.298	24.74	58M2G7D
		16QAM	2526.0 - 2660.0	0.233	23.68	58M3W7D
	50 MHz	$\pi/2$ BPSK	2521.0 - 2665.0	0.326	25.13	46M1G7D
		QPSK	2521.0 - 2665.0	0.293	24.67	47M8G7D
		16QAM	2521.0 - 2665.0	0.214	23.31	47M9W7D
	40 MHz	$\pi/2$ BPSK	2516.0 - 2670.0	0.323	25.09	35M9G7D
		QPSK	2516.0 - 2670.0	0.277	24.43	38M1G7D
		16QAM	2516.0 - 2670.0	0.244	23.87	38M1W7D
	30 MHz	$\pi/2$ BPSK	2511.0 - 2675.0	0.289	24.60	27M0G7D
		QPSK	2511.0 - 2675.0	0.296	24.71	28M1G7D
		16QAM	2511.0 - 2675.0	0.242	23.83	28M1W7D
	20 MHz	$\pi/2$ BPSK	2506.0 - 2680.0	0.270	24.32	18M0G7D
		QPSK	2506.0 - 2680.0	0.277	24.43	18M4G7D
		16QAM	2506.0 - 2680.0	0.209	23.20	18M4W7D

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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.: 1261M, 1167M, 0323M, 0341M, 1125M, 1158M, 1128M, 0283M, 0584M,

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.

The device has 1 Tx antenna for n41 data (Ant J) and 3 Rx antennas (Ant B, D, E). With SRS operations, all 4 antennas can transmit the SRS signal to check for the channel quality of n41. The antennas cannot simultaneously transmit. Only the single TX/RX antenna is used for Data transmission.

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.

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 “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:

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

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

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



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

And

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

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4-2014. Additionally, radiated emissions below 30MHz are also validated on an Open Area Test Site to assert correlation with the chamber measurements per the requirements of KDB 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
-	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
-	LTx1	Licensed Transmitter Cable Set	3/12/2021	Annual	3/12/2022	LTx1
-	LTx2	Licensed Transmitter Cable Set	3/12/2021	Annual	3/12/2022	LTx2
Agilent	N9030A	50GHz PXA Signal Analyzer	1/20/2021	Annual	1/20/2022	US51350301
Anritsu	MT8821C	Radio Communication Analyzer	N/A			6201381794
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	3117	1-18 GHz DRG Horn (Medium)	4/20/2021	Biennial	4/20/2023	00125518
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/12/2020	Biennial	3/12/2022	128337
Keysight Technologies	N9020A	MXA Signal Analyzer	12/22/2020	Annual	12/22/2021	MY54500644
Keysight Technologies	N9030A	PXA Signal Analyzer (44GHz)	7/21/2021	Annual	7/21/2022	MY49430494
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			100976
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	8/3/2021	Annual	8/3/2022	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	4/30/2021	Annual	4/30/2022	100348
Rohde & Schwarz	ESW44	EMI Test Receiver 2Hz to 44 GHz	1/21/2021	Annual	1/21/2022	101716
Rohde & Schwarz	FSW26	2Hz-26.5GHz Signal and Spectrum Analyzer	2/10/2021	Annual	2/10/2022	103187
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

QPSK Modulation

Emission Designator = 8M62G7D

LTE BW = 8.62 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

QAM Modulation

Emission Designator = 8M45W7D

LTE BW = 8.45 MHz

W = Amplitude/Angle Modulated



7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

Spurious Radiated Emission

Example: Spurious emission at 3700.40 MHz

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

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7.0 TEST RESULTS



7.1 Summary

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

Test Condition	Test Description	FCC Part Section(s)	Test Limit	Test Result	Reference
CONDUCTED	Transmitter Conducted Output Power*	2.1046(a), 2.1046(c)	N/A	PASS	Section 7.2
	Occupied Bandwidth	2.1049(h)	N/A	PASS	Section 7.3
	Conducted Band Edge / Spurious Emissions (LTE Band 30; NR Band n30)	2.1051, 27.53(a)(4)	Undesirable emissions must meet the limits detailed in 27.53(a)(4)	PASS	Sections 7.4, 7.5
	Conducted Band Edge / Spurious Emissions (LTE Band 7, 38, 41; NR Band n7, n38, n41)	2.1051, 27.53(m)	Undesirable emissions must meet the limits detailed in 27.53(m)	PASS	Sections 7.4, 7.5
	Frequency Stability	2.1055, 27.54	Fundamental emissions stay within authorized frequency block	PASS	Section 7.8
RADIATED	Equivalent Isotropic Radiated Power (LTE Band 30; NR Band n30)	27.50(a)(3)	≤ 250mW / 5MHz max. EIRP	PASS	Section 7.6
	Equivalent Isotropic Radiated Power (LTE Band 7, 38, 41; NR Band n7, n38, n41)	27.50(h)(2)	≤ 2 Watts max. EIRP	PASS	Section 7.6
	Radiated Spurious Emissions (LTE Band 30; NR Band n30)	2.1053, 27.53(a)(4)	Undesirable emissions must meet the limits detailed in 27.53(a)(4)	PASS	Section 7.7
	Radiated Spurious Emissions (LTE Band 7, 38, 41; NR Band n7, n38, n41)	2.1053, 27.53(m)	Undesirable emissions must meet the limits detailed in 27.53(m)	PASS	Section 7.7



* 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 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 v1.0.

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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.

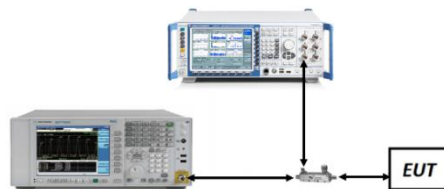




Figure 7-1. Test Instrument & Measurement Setup



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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]
10 MHz	$\pi/2$ BPSK	27710	2310.0	1 / 13	22.04
	QPSK	27710	2310.0	1 / 13	22.04
	16-QAM	27710	2310.0	1 / 13	21.43
5 MHz	$\pi/2$ BPSK	27685	2307.5	1 / 18	22.09
		27710	2310.0	1 / 6	21.92
		27735	2312.5	1 / 18	22.16
	QPSK	27685	2307.5	1 / 18	21.97
		27710	2310.0	1 / 6	21.75
		27735	2312.5	1 / 18	21.54
	16-QAM	27685	2307.5	1 / 18	21.25

Table 7-1. Conducted Power Output Data (n30 – ANT J)

FCC ID: A3LSMS908U	 PCTEST Proud to be part of 	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	509202	2546.0	1 / 204	25.30
		518598	2593.0	1 / 68	25.46
		528000	2640.0	1 / 68	25.73
	QPSK	509202	2546.0	1 / 204	25.60
		518598	2593.0	1 / 68	25.06
		528000	2640.0	1 / 68	25.74
16-QAM	528000	2640.0	1 / 68	24.86	
90 MHz	π/2 BPSK	508200	2541.0	1 / 183	25.61
		518592	2593.0	1 / 61	25.49
		529002	2645.0	1 / 61	25.75
	QPSK	508200	2541.0	1 / 183	25.35
		518592	2593.0	1 / 61	25.47
		529002	2645.0	1 / 61	25.72
16-QAM	529002	2645.0	1 / 61	24.64	
80 MHz	π/2 BPSK	507204	2536.0	1 / 162	25.44
		518598	2593.0	1 / 54	25.58
		529998	2650.0	1 / 54	25.74
	QPSK	507204	2536.0	1 / 162	25.41
		518598	2593.0	1 / 54	25.32
		529998	2650.0	1 / 54	25.87
16-QAM	529998	2650.0	1 / 54	25.12	
70 MHz	π/2 BPSK	506200	2531.0	1 / 40	25.38
		518598	2593.0	1 / 40	25.62
		531000	2655.0	1 / 40	26.28
	QPSK	506200	2531.0	1 / 40	25.05
		518598	2593.0	1 / 40	25.47
		531000	2655.0	1 / 40	26.04
16-QAM	531000	2655.0	1 / 40	25.06	
60 MHz	π/2 BPSK	505200	2526.0	1 / 121	25.43
		518598	2593.0	1 / 40	25.83
		531996	2660.0	1 / 81	25.60
	QPSK	505200	2526.0	1 / 121	25.45
		518598	2593.0	1 / 40	26.04
		531996	2660.0	1 / 81	25.72
16-QAM	531996	2660.0	1 / 81	24.74	
50 MHz	π/2 BPSK	504204	2521.0	1 / 33	25.32
		518598	2593.0	1 / 33	26.54
		532998	2665.0	1 / 33	25.83
	QPSK	504204	2521.0	1 / 33	25.31
		518598	2593.0	1 / 33	25.96
		532998	2665.0	1 / 33	25.56
16-QAM	532998	2665.0	1 / 33	24.37	
40 MHz	π/2 BPSK	503202	2516.0	1 / 53	25.69
		518598	2593.0	1 / 26	25.91
		534000	2670.0	1 / 53	26.41
	QPSK	503202	2516.0	1 / 53	26.17
		518598	2593.0	1 / 26	25.73
		534000	2670.0	1 / 53	24.83
16-QAM	534000	2670.0	1 / 53	24.93	
30 MHz	π/2 BPSK	502203	2511.0	1 / 19	25.70
		518598	2593.0	1 / 19	25.98
		534999	2675.0	1 / 19	25.92
	QPSK	502203	2511.0	1 / 19	25.53
		518598	2593.0	1 / 19	26.01
		534999	2675.0	1 / 19	25.98
16-QAM	534999	2675.0	1 / 19	24.89	
20 MHz	π/2 BPSK	501204	2506.0	1 / 13	25.63
		518598	2593.0	1 / 13	25.73
		535998	2680.0	1 / 13	25.22
	QPSK	501204	2506.0	1 / 13	25.97
		518598	2593.0	1 / 13	25.73
		535998	2680.0	1 / 13	25.17
16-QAM	518598	2593.0	1 / 13	24.86	

Table 7-2. Conducted Power Output Data (n41 PC2 – ANT J)

FCC ID: A3LSMS908U	 PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	510000	2550.0	1 / 68	20.48
		518598	2593.0	1 / 68	20.73
		528000	2640.0	1 / 204	18.61
	QPSK	510000	2550.0	1 / 68	20.65
		518598	2593.0	1 / 68	20.68
		528000	2640.0	1 / 204	18.37
16-QAM	510000	2550.0	1 / 68	19.43	



Table 7-3. Conducted Power Output Data (n41 PC2 - SRS1 – ANT E)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	510000	2550.0	1 / 204	22.91
		518598	2593.0	1 / 68	22.45
		528000	2640.0	1 / 204	21.98
	QPSK	510000	2550.0	1 / 204	22.99
		518598	2593.0	1 / 68	22.26
		528000	2640.0	1 / 204	22.04
16-QAM	510000	2550.0	1 / 204	22.10	

Table 7-4. Conducted Power Output Data (n41 PC2 – SRS2 – ANT B)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	510000	2550.0	1 / 204	20.92
		518598	2593.0	1 / 68	20.41
		528000	2640.0	1 / 204	19.42
	QPSK	510000	2550.0	1 / 204	20.99
		518598	2593.0	1 / 68	20.21
		528000	2640.0	1 / 204	19.46
16-QAM	510000	2550.0	1 / 204	20.15	

Table 7-5. Conducted Power Output Data (n41 PC2 - SRS3 – ANT D)



FCC ID: A3LSMS908U	 PCTEST <small>Proud to be part of element</small>	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 Bandwidth [MHz]	PCC (UL) channel	Mod.	PCC UL RB#/Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) channel	Mod.	SCC UL RB#/Offset			
n30	10	Mid	$\pi/2$ BPSK	1 / 13	n77	100	Mid	$\pi/2$ BPSK	1 / 68	19.73	21.33	23.61
			QPSK	50 / 0				QPSK	270 / 0	19.71	21.22	23.54
			QPSK	1 / 13				QPSK	1 / 68	19.83	21.39	23.69
			QPSK	1 / 26				QPSK	1 / 137	19.73	21.14	23.50
			QPSK	1 / 39				QPSK	1 / 205	19.66	21.19	23.50
			16Q	1 / 13				16Q	1 / 68	19.93	21.38	23.73

Table 7-6. Conducted Power Data (ULCA NR n30 – n77)



PCC					SCC					PCC Conducted Power [dBm]	SCC Conducted Power [dBm]	Inter-Band ULCA Total Tx. Power (dBm)
PCC Band	PCC Bandwidth [MHz]	PCC (UL) channel	Mod.	PCC UL RB#/Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) channel	Mod.	SCC UL RB#/Offset			
n41	100	Low	$\pi/2$ BPSK	1 / 205	n71	20	Low	$\pi/2$ BPSK	1 / 79	21.34	19.43	23.5
			QPSK	270 / 0				QPSK	100 / 0	20.98	19.42	23.28
			QPSK	1 / 68				QPSK	1 / 26	21.12	19.52	23.4
			QPSK	1 / 137				QPSK	1 / 53	21.25	19.35	23.41
			QPSK	1 / 205				QPSK	1 / 79	21.29	19.45	23.48
			16Q	1 / 205				16Q	1 / 79	21.56	19.21	23.55
		Mid	$\pi/2$ BPSK	1 / 68			$\pi/2$ BPSK	1 / 26	21.44	19.36	23.53	
			QPSK	270 / 0			QPSK	100 / 0	20.97	19.37	23.25	
			QPSK	1 / 68			QPSK	1 / 26	21.48	19.37	23.56	
			QPSK	1 / 137			QPSK	1 / 53	21.05	19.41	23.32	
			QPSK	1 / 205			QPSK	1 / 79	20.73	19.38	23.12	
			16Q	1 / 68			16Q	1 / 26	21.59	19.65	23.74	
		High	$\pi/2$ BPSK	1 / 68			$\pi/2$ BPSK	1 / 26	20.92	19.29	23.19	
			QPSK	270 / 0			QPSK	100 / 0	20.74	19.37	23.12	
			QPSK	1 / 68			QPSK	1 / 26	21.01	19.45	23.31	
			QPSK	1 / 137			QPSK	1 / 53	20.76	19.48	23.18	
			QPSK	1 / 205			QPSK	1 / 79	20.74	19.42	23.14	
			16Q	1 / 68			16Q	1 / 26	21.63	19.02	23.53	

Table 7-7. Conducted Power Data (ULCA NR n41 – n71)

FCC ID: A3LSMS908U	 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 Bandwidth [MHz]	PCC (UL) channel	Mod.	PCC UL RB#/Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) channel	Mod.	SCC UL RB#/Offset			
n41	100	Low	$\pi/2$ BPSK	1 / 205	n66	40	Low	$\pi/2$ BPSK	1 / 162	21.61	19.05	23.53
			QPSK	270 / 0				QPSK	216 / 0	21.45	19.05	23.42
			QPSK	1 / 68				QPSK	1 / 54	21.51	18.77	23.36
			QPSK	1 / 137				QPSK	1 / 108	21.61	19.01	23.51
			QPSK	1 / 205				QPSK	1 / 162	21.60	19.03	23.51
			16Q	1 / 205				16Q	1 / 162	21.89	19.33	23.81
		Mid	$\pi/2$ BPSK	1 / 68			Mid	$\pi/2$ BPSK	1 / 54	21.17	19.07	23.26
			QPSK	270 / 0				QPSK	216 / 0	21.49	19.11	23.47
			QPSK	1 / 68				QPSK	1 / 54	21.88	19.05	23.70
			QPSK	1 / 137				QPSK	1 / 108	21.37	19.21	23.43
			QPSK	1 / 205				QPSK	1 / 162	21.14	19.11	23.25
			16Q	1 / 68				16Q	1 / 54	21.38	19.41	23.52
		High	$\pi/2$ BPSK	1 / 137			High	$\pi/2$ BPSK	1 / 108	21.46	19.17	23.47
			QPSK	270 / 0				QPSK	216 / 0	21.08	19.11	23.22
			QPSK	1 / 68				QPSK	1 / 54	21.38	19.21	23.44
			QPSK	1 / 137				QPSK	1 / 108	21.52	19.11	23.49
			QPSK	1 / 205				QPSK	1 / 162	21.48	19.16	23.48
			16Q	1 / 137				16Q	1 / 108	21.21	19.38	23.40

Table 7-8. Conducted Power Data (ULCA NR n41 – n66)

FCC ID: A3LSMS908U	 PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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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 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

Test Setup

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

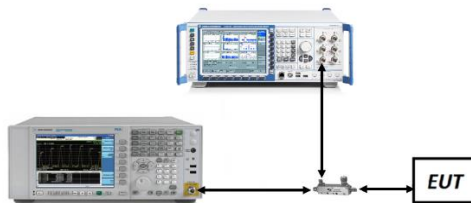




Figure 7-2. Test Instrument & Measurement Setup

Test Notes

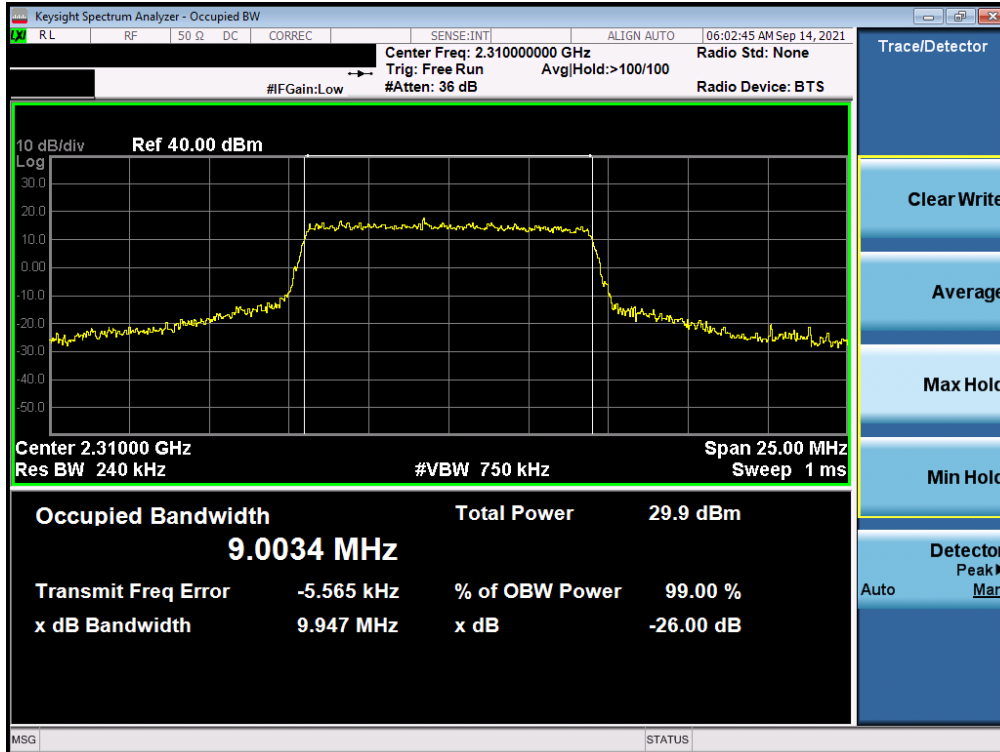
None.

FCC ID: A3LSMS908U	 PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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LTE Band 30



Plot 7-9. Occupied Bandwidth Plot (LTE Band 30 - 10MHz QPSK - Full RB)

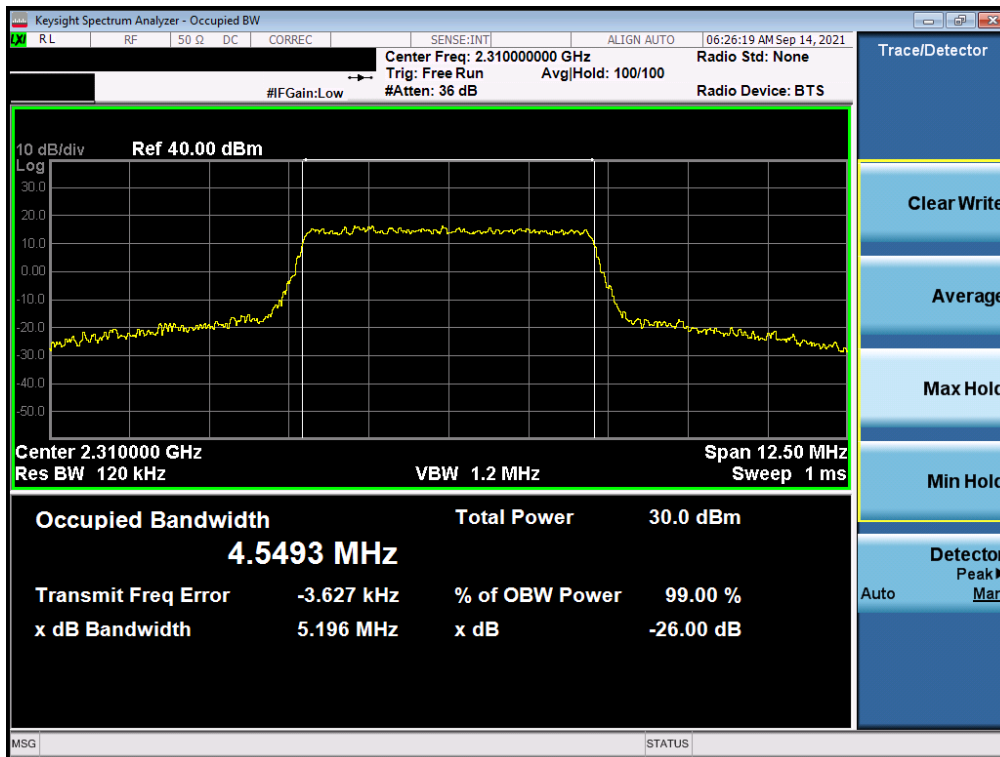


Plot 7-10. Occupied Bandwidth Plot (LTE Band 30 - 10MHz 16-QAM - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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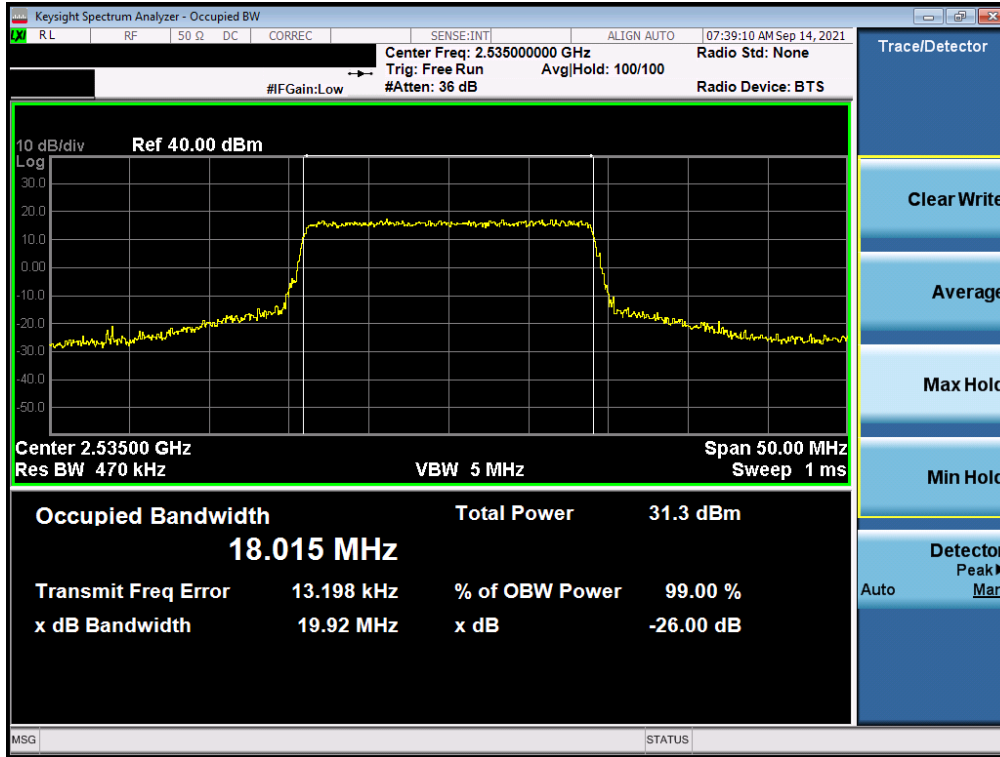
Plot 7-11. Occupied Bandwidth Plot (LTE Band 30 - 5MHz QPSK - Full RB)



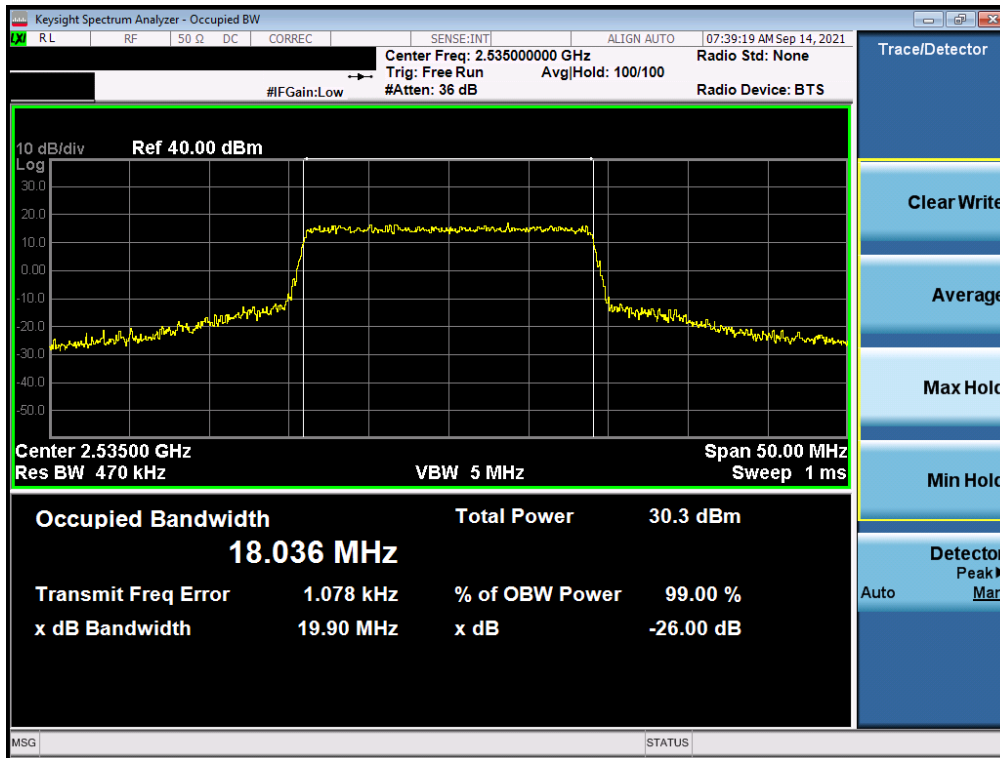
Plot 7-12. Occupied Bandwidth Plot (LTE Band 30 - 5MHz 16-QAM - Full RB)

LTE Band 7




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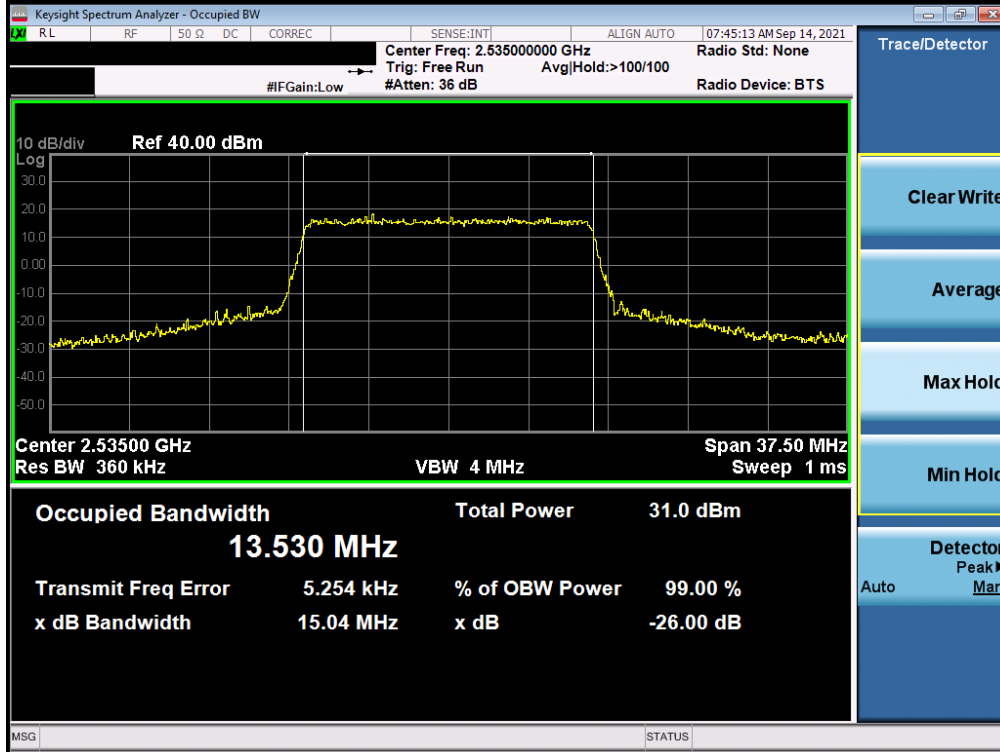


Plot 7-13. Occupied Bandwidth Plot (LTE Band 7 - 20MHz QPSK - Full RB)

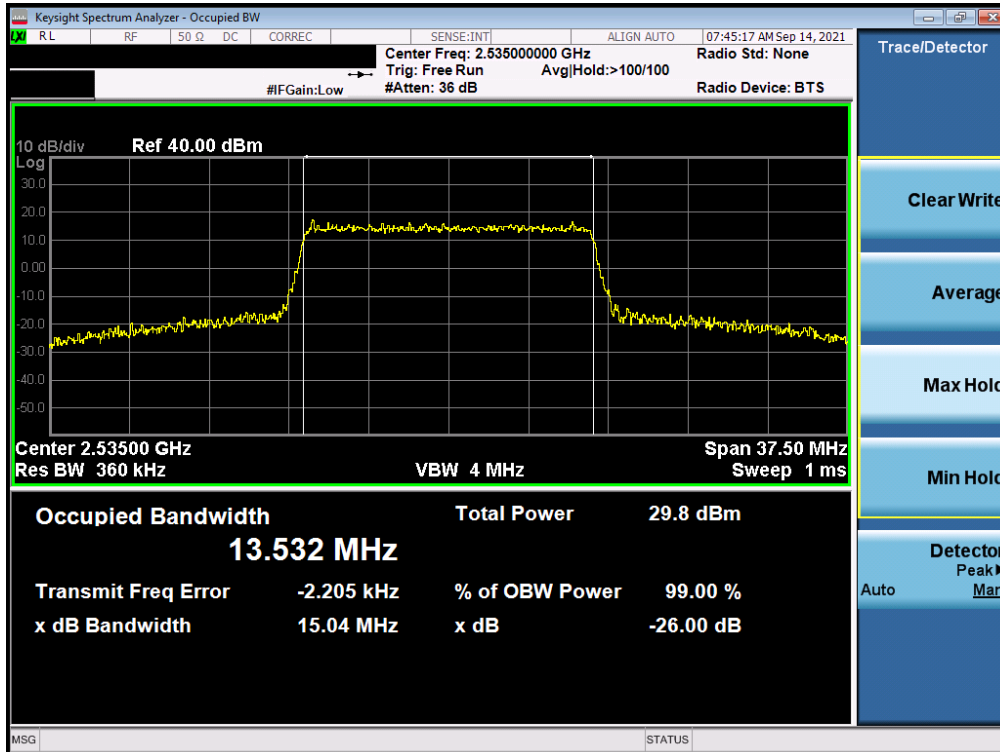


Plot 7-14. Occupied Bandwidth Plot (LTE Band 7 - 20MHz 16-QAM - Full RB)




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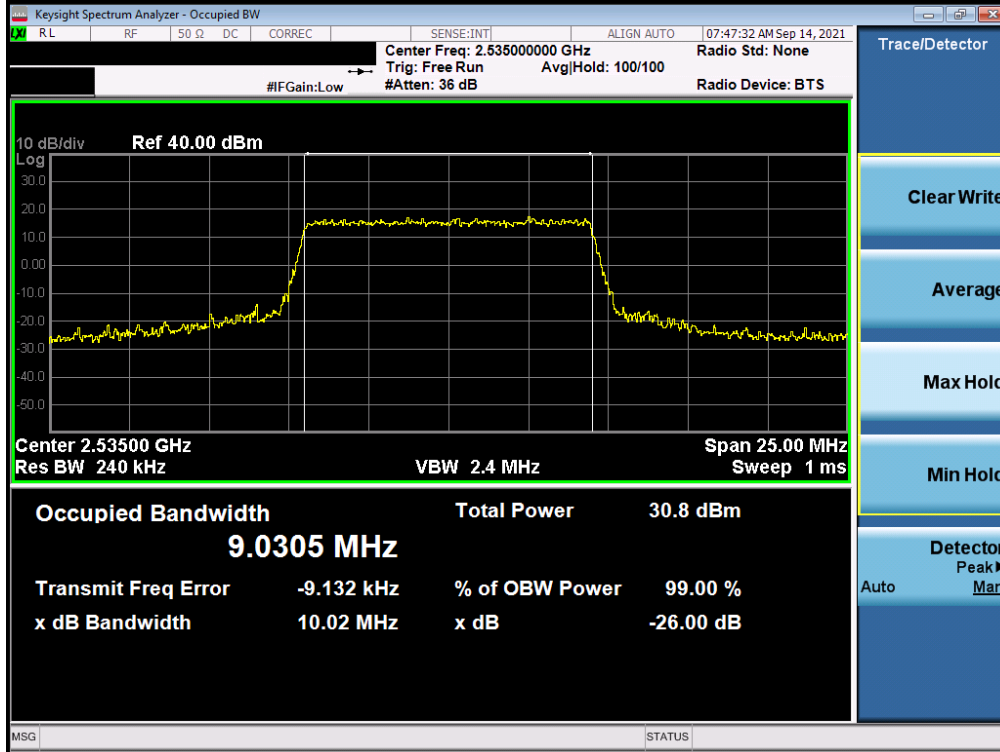


Plot 7-15. Occupied Bandwidth Plot (LTE Band 7 - 15MHz QPSK - Full RB)

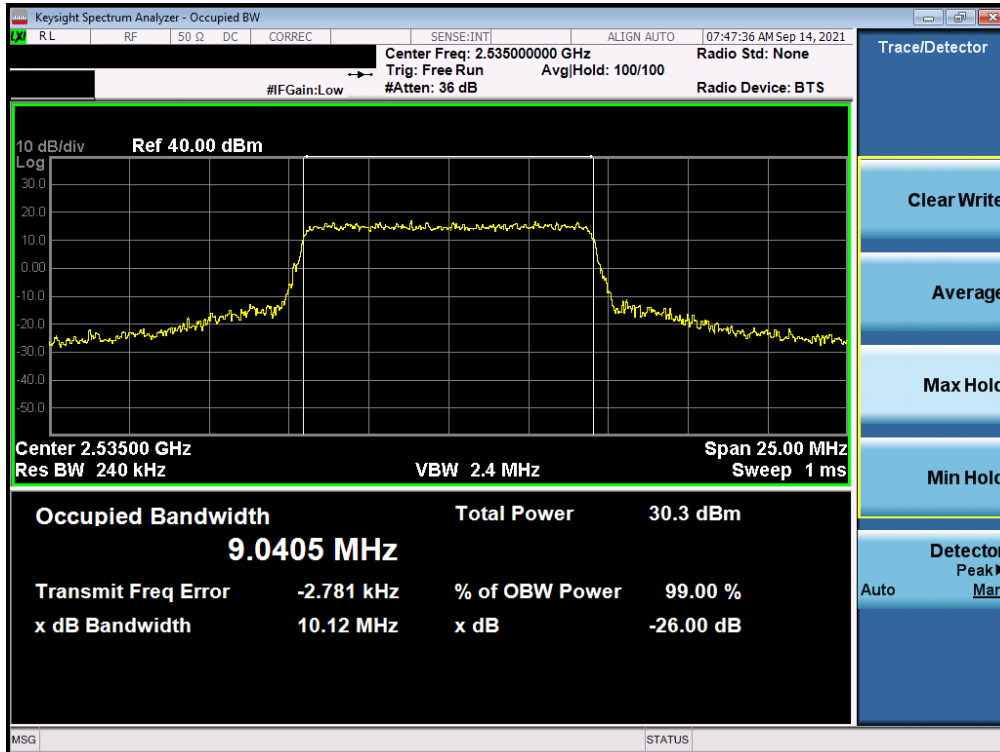


Plot 7-16. Occupied Bandwidth Plot (LTE Band 7 - 15MHz 16-QAM - Full RB)




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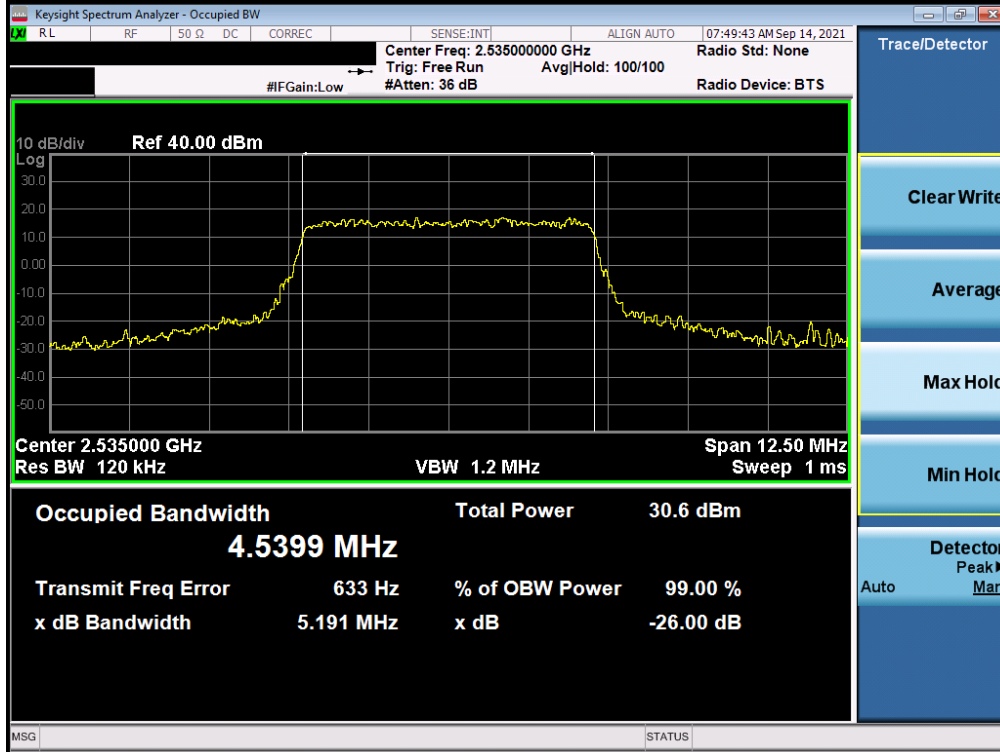


Plot 7-17. Occupied Bandwidth Plot (LTE Band 7 - 10MHz QPSK - Full RB)

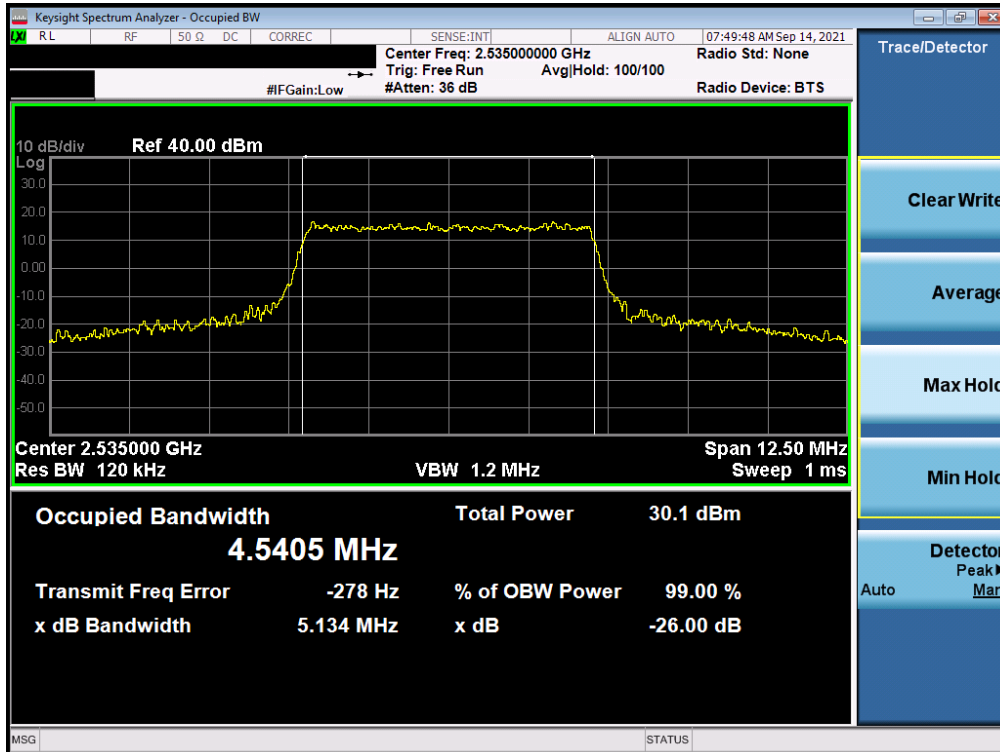


Plot 7-18. Occupied Bandwidth Plot (LTE Band 7 - 10MHz 16-QAM - Full RB)




FCC ID: A3LSMS908U	 PCTEST Proud to be part of 	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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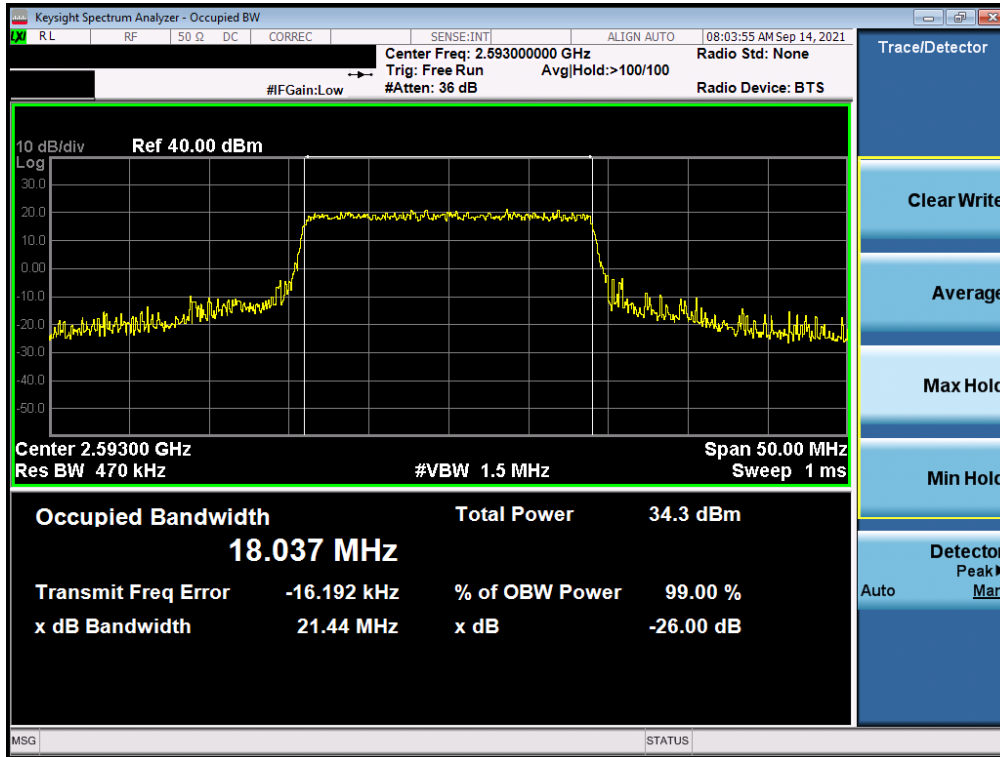
Plot 7-19. Occupied Bandwidth Plot (LTE Band 7 - 5MHz QPSK - Full RB)



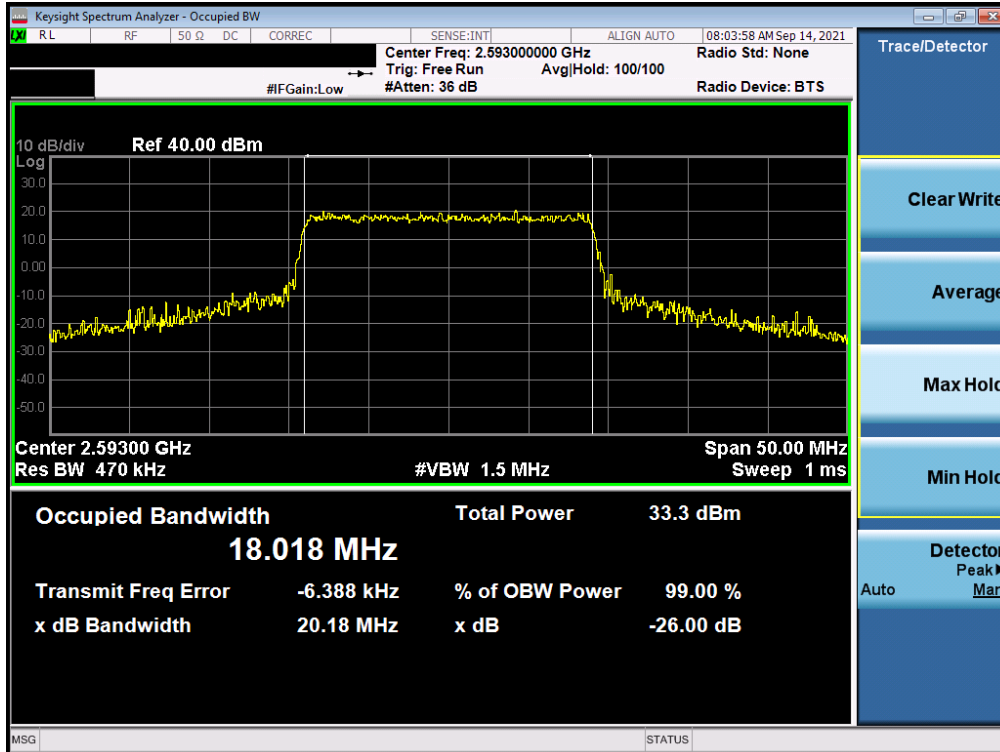
Plot 7-20. Occupied Bandwidth Plot (LTE Band 7 - 5MHz 16-QAM - Full RB)

FCC ID: A3LSMS908U	 PCTEST Proud to be part of 	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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LTE Band 41(PC2)

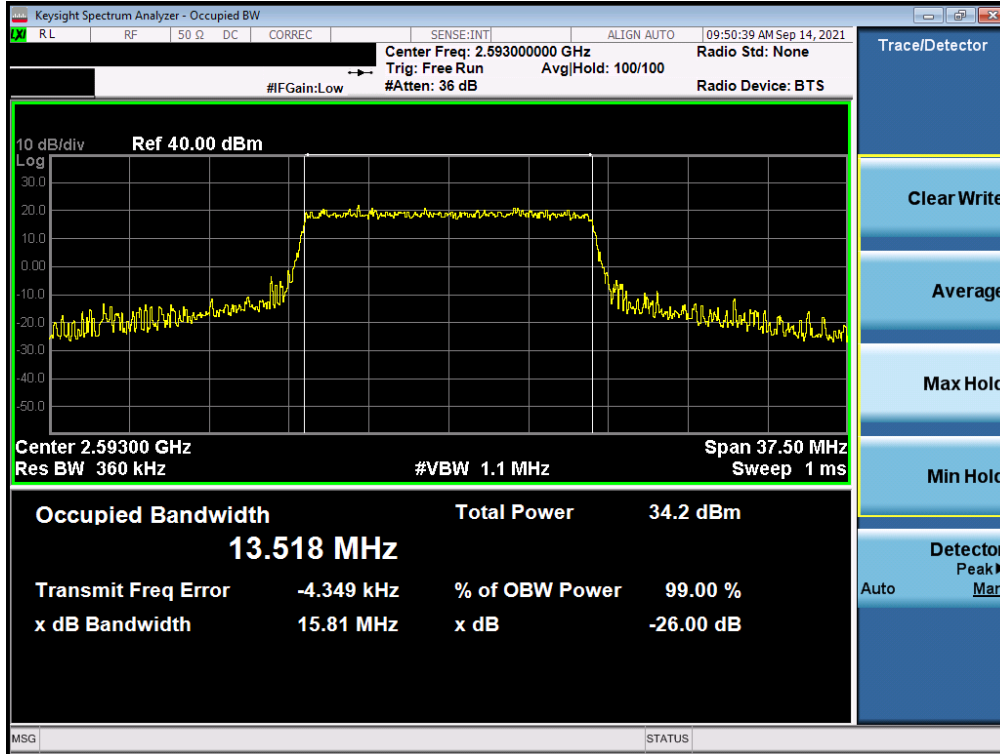


Plot 7-21. Occupied Bandwidth Plot (LTE Band 41(PC2) - 20MHz QPSK - Full RB)

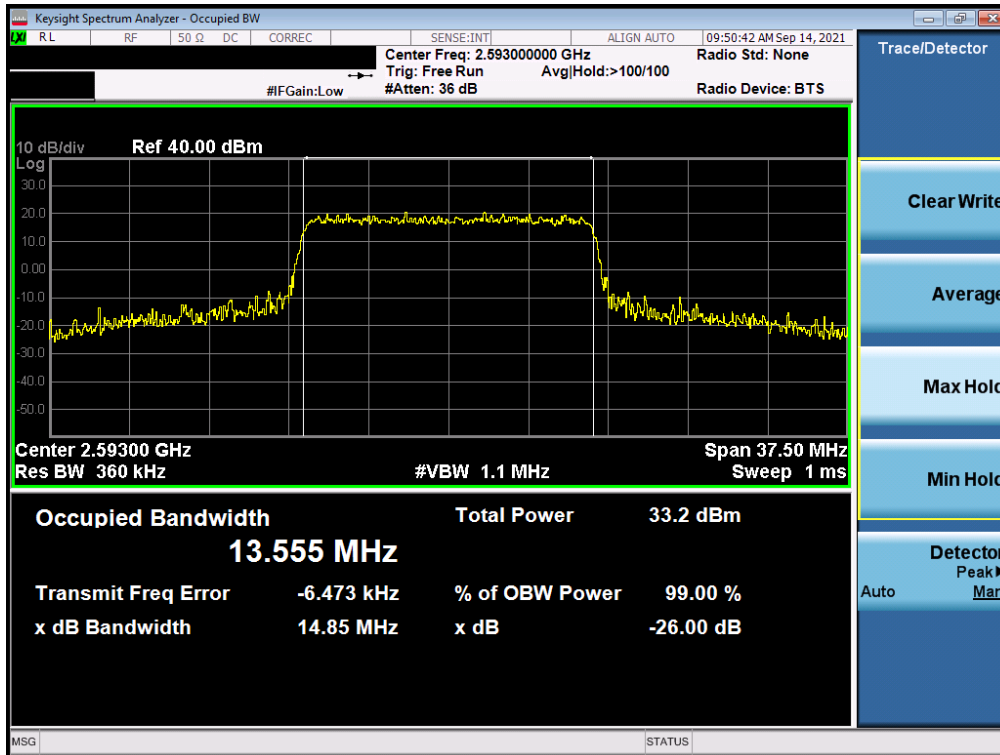


Plot 7-22. Occupied Bandwidth Plot (LTE Band 41(PC2) - 20MHz 16-QAM - Full RB)

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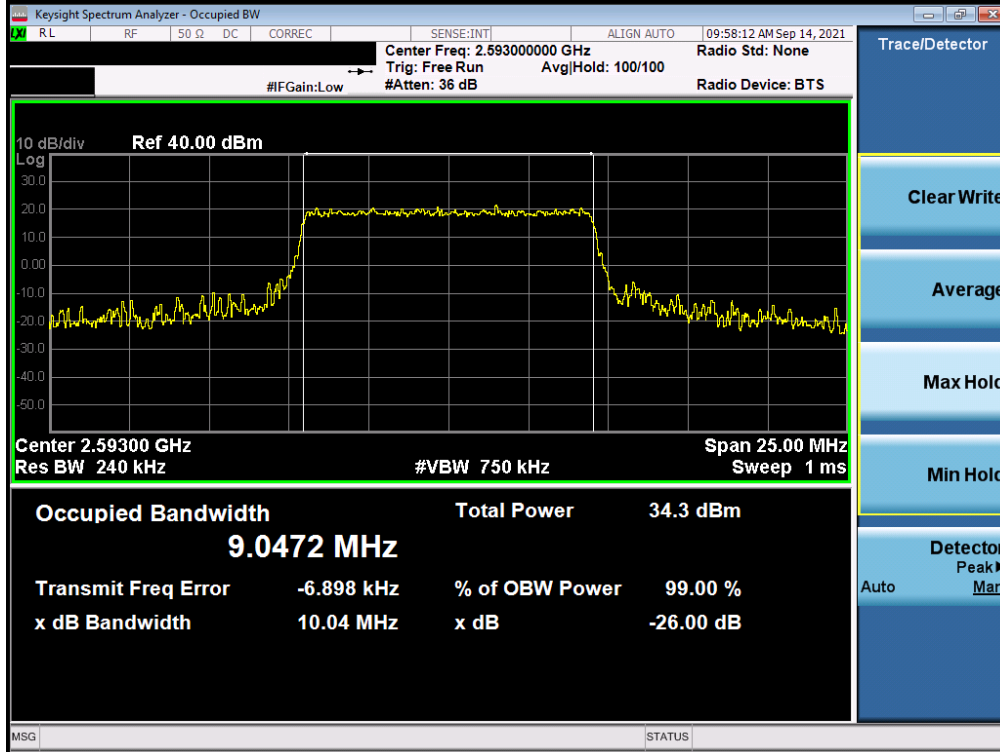


Plot 7-23. Occupied Bandwidth Plot (LTE Band 41(PC2) - 15MHz QPSK - Full RB)

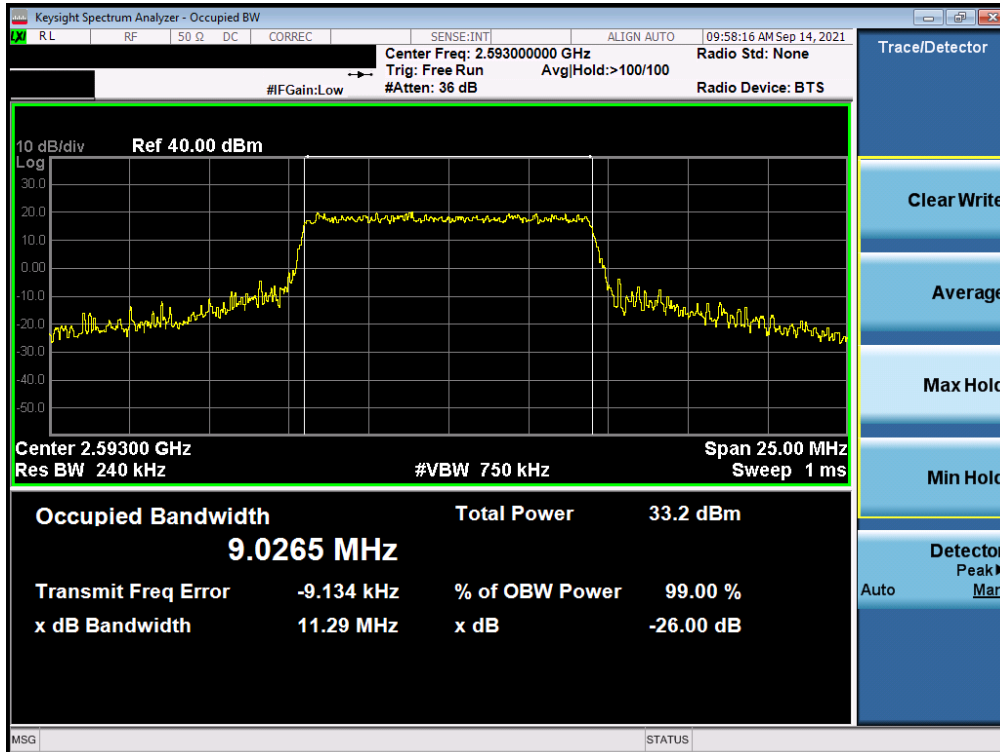


Plot 7-24. Occupied Bandwidth Plot (LTE Band 41(PC2) - 15MHz 16-QAM - Full RB)




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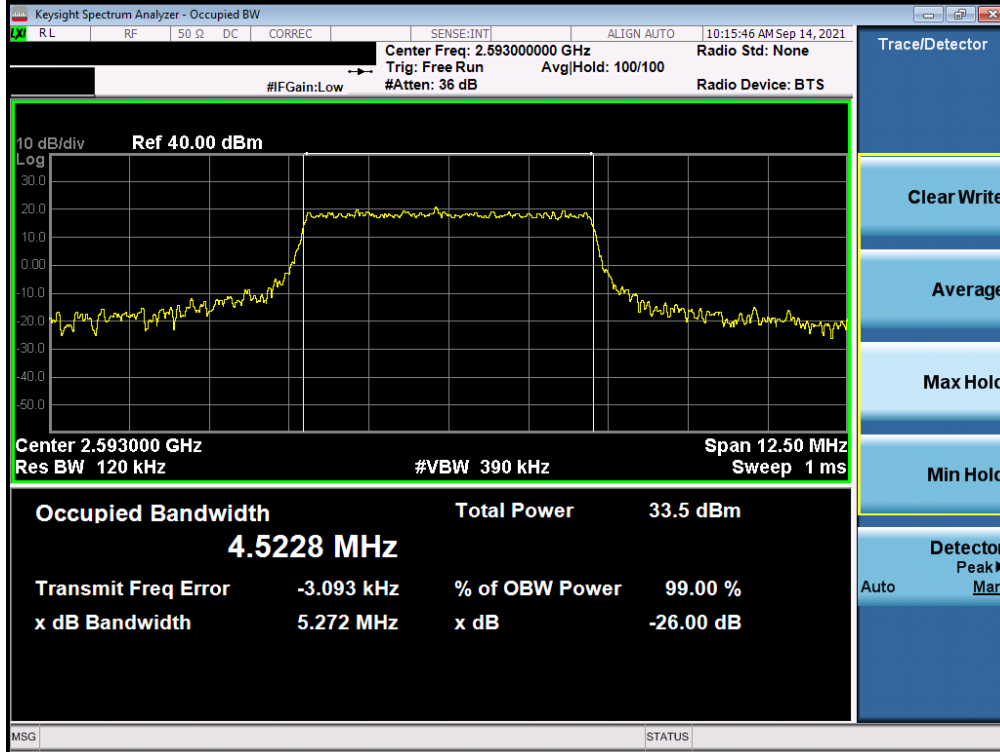


Plot 7-25. Occupied Bandwidth Plot (LTE Band 41(PC2) - 10MHz QPSK - Full RB)

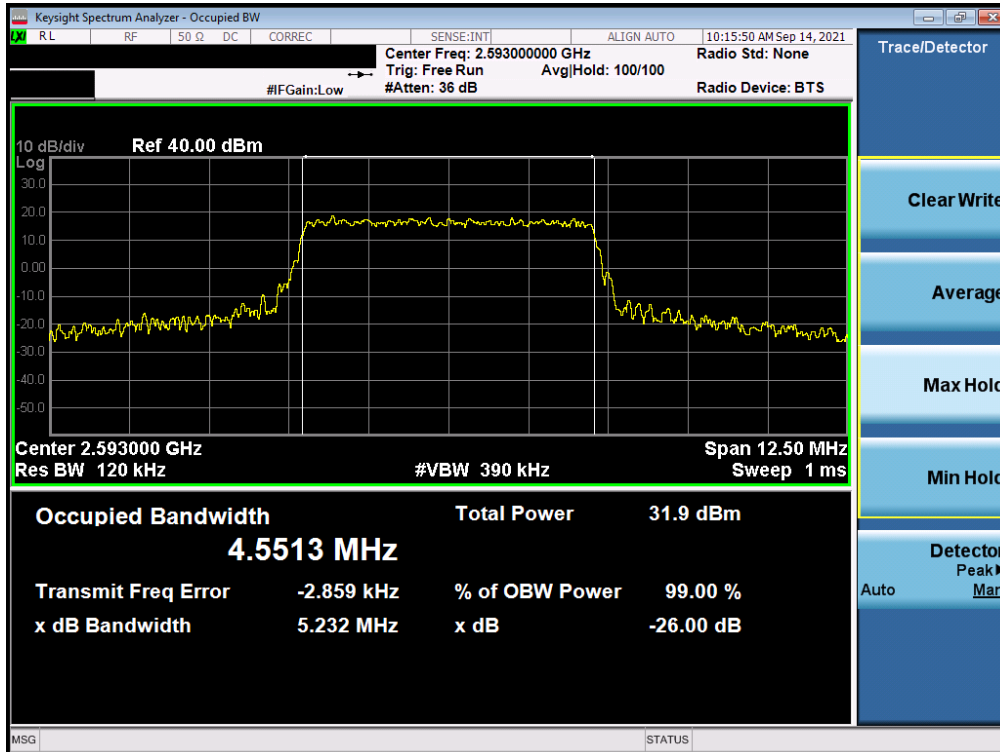


Plot 7-26. Occupied Bandwidth Plot (LTE Band 41(PC2) - 10MHz 16-QAM - Full RB)




FCC ID: A3LSMS908U	 PCTEST Proud to be part of 	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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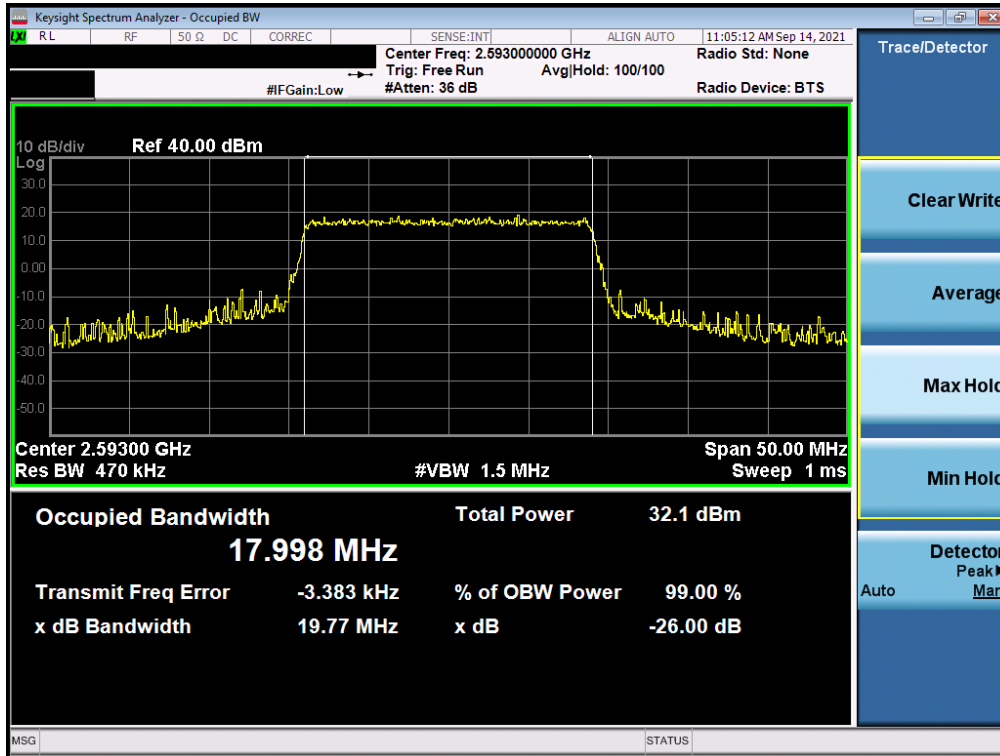
Plot 7-27. Occupied Bandwidth Plot (LTE Band 41(PC2) - 5MHz QPSK - Full RB)



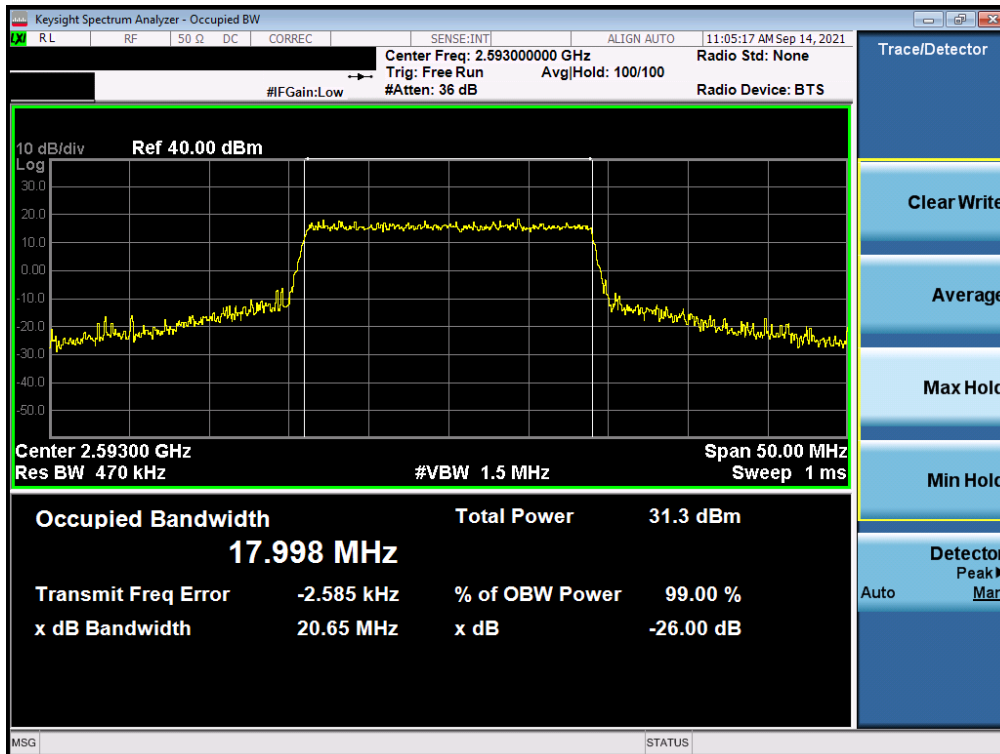
Plot 7-28. Occupied Bandwidth Plot (LTE Band 41(PC2) - 5MHz 16-QAM - Full RB)

FCC ID: A3LSMS908U	 PCTEST Proud to be part of 	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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LTE Band 41(PC3)/38

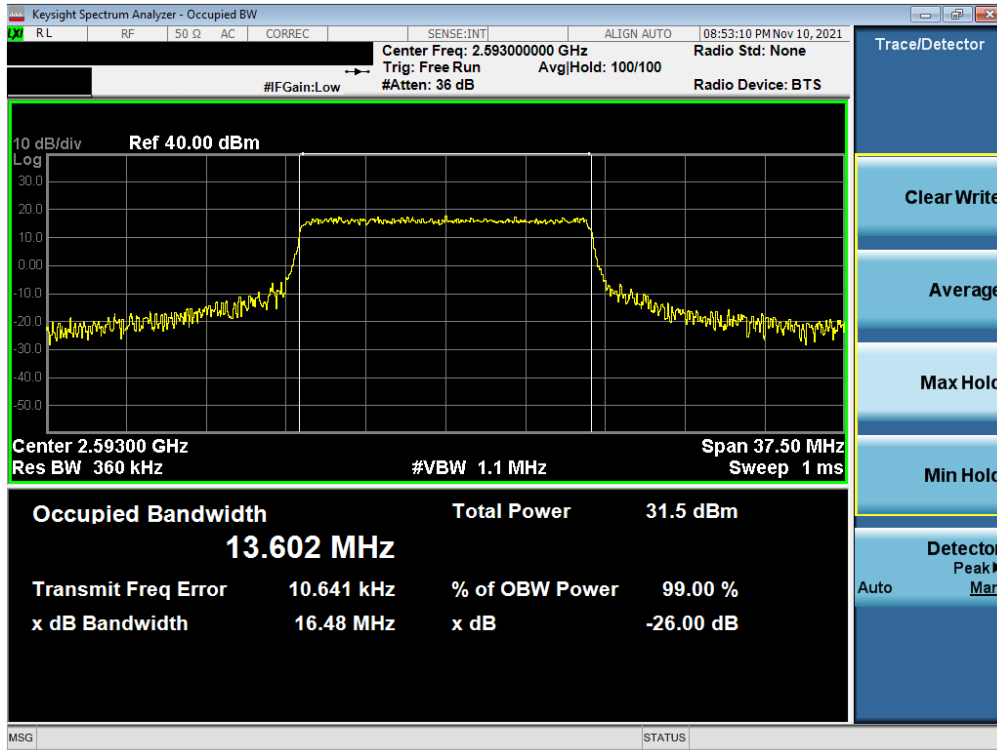


Plot 7-29. Occupied Bandwidth Plot (LTE Band 41(PC3)/38 - 20MHz QPSK - Full RB)



Plot 7-30. Occupied Bandwidth Plot (LTE Band 41(PC3)/38 - 20MHz 16-QAM - Full RB)

FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2109090102-05-R1.A3L	Test Dates: 9/14 - 11/12/2021	EUT Type: Portable Handset		Page 32 of 231

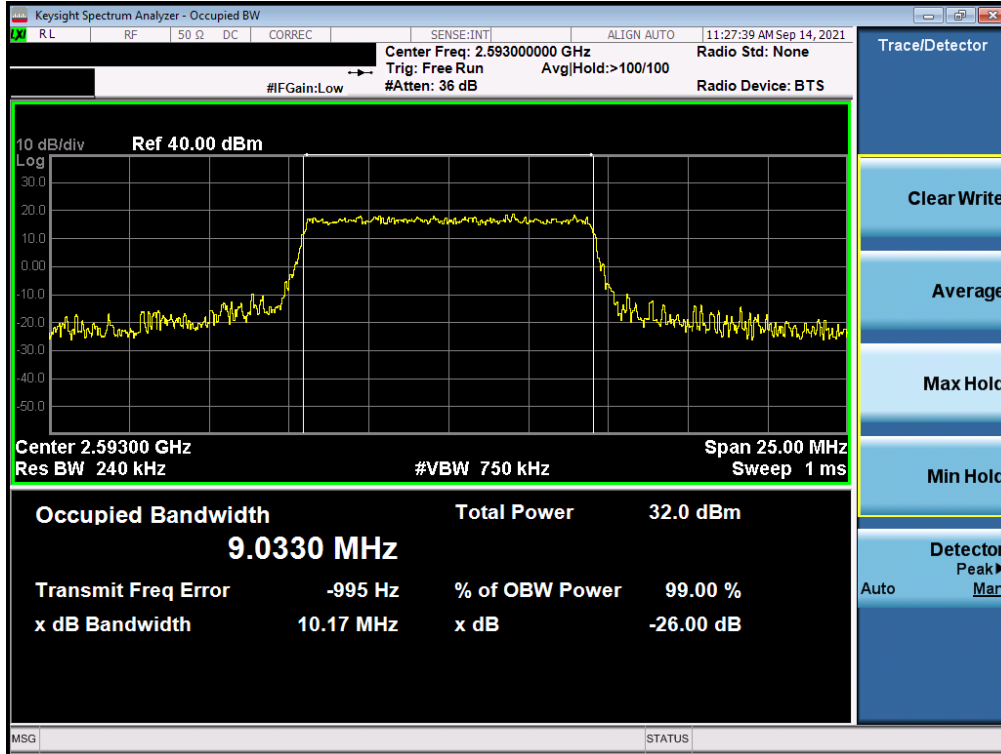


Plot 7-31. Occupied Bandwidth Plot (LTE Band 41(PC3)/38 - 15MHz QPSK - Full RB)

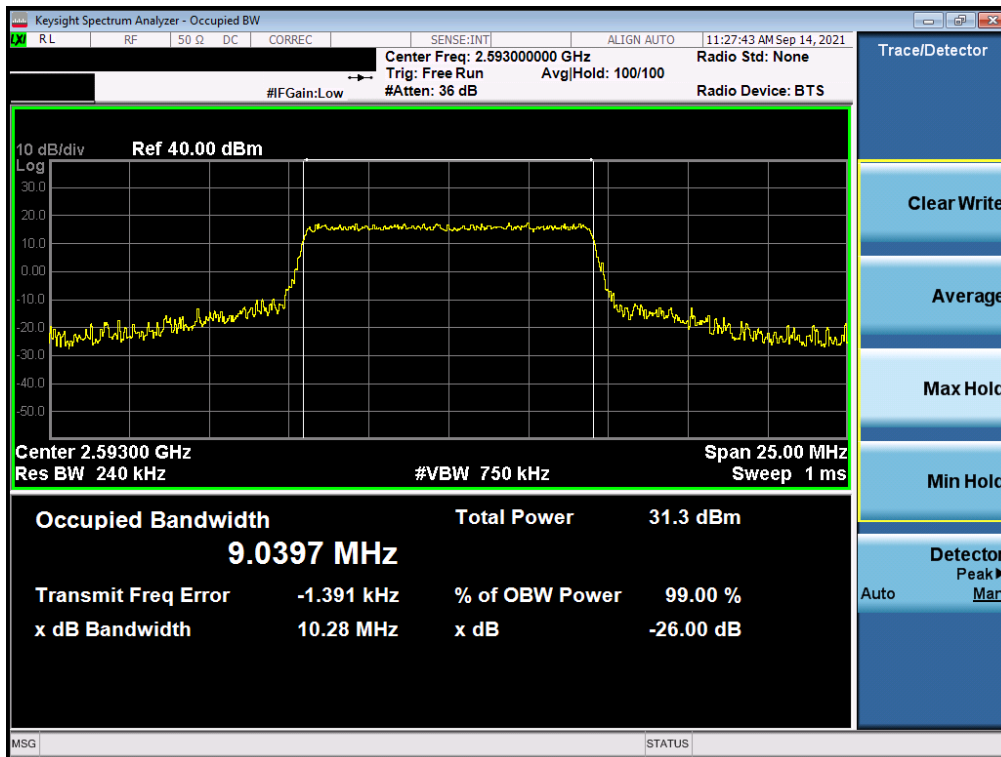


Plot 7-32. Occupied Bandwidth Plot (LTE Band 41(PC3)/38 - 15MHz 16-QAM - Full RB)




FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-05-R1.A3L	Test Dates: 9/14 - 11/12/2021	EUT Type: Portable Handset		Page 33 of 231

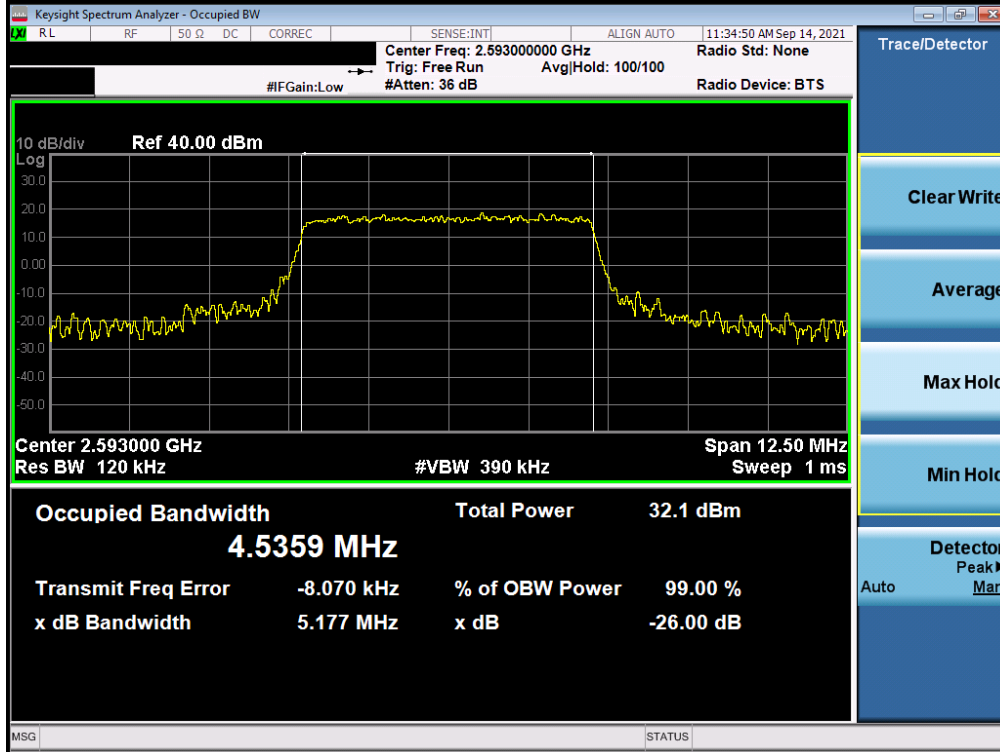


Plot 7-33. Occupied Bandwidth Plot (LTE Band 41(PC3)/38 - 10MHz QPSK - Full RB)

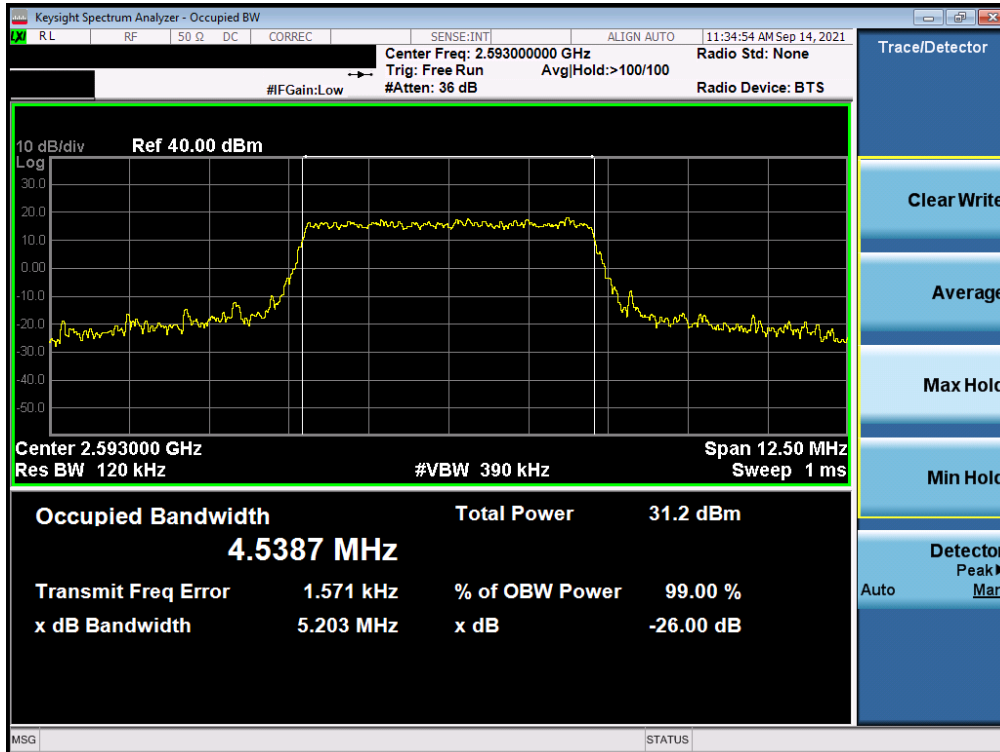


Plot 7-34. Occupied Bandwidth Plot (LTE Band 41(PC3)/38 - 10MHz 16-QAM - Full RB)




FCC ID: A3LSMS908U	 PCTEST Proud to be part of 	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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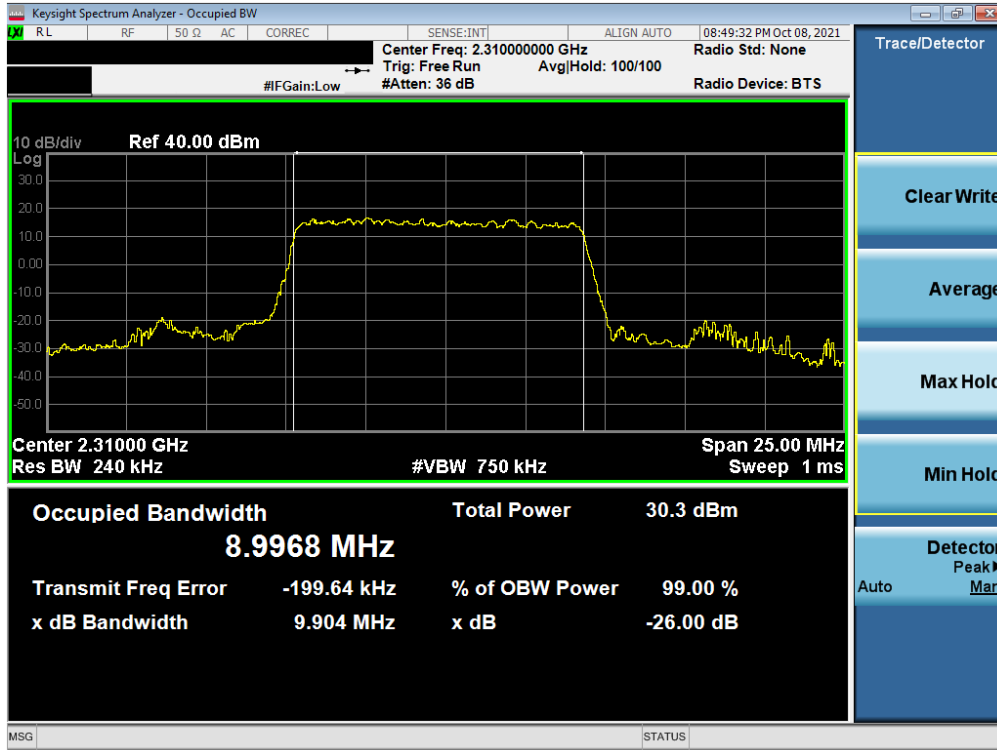
Plot 7-35. Occupied Bandwidth Plot (LTE Band 41(PC3)/38 - 5MHz QPSK - Full RB)



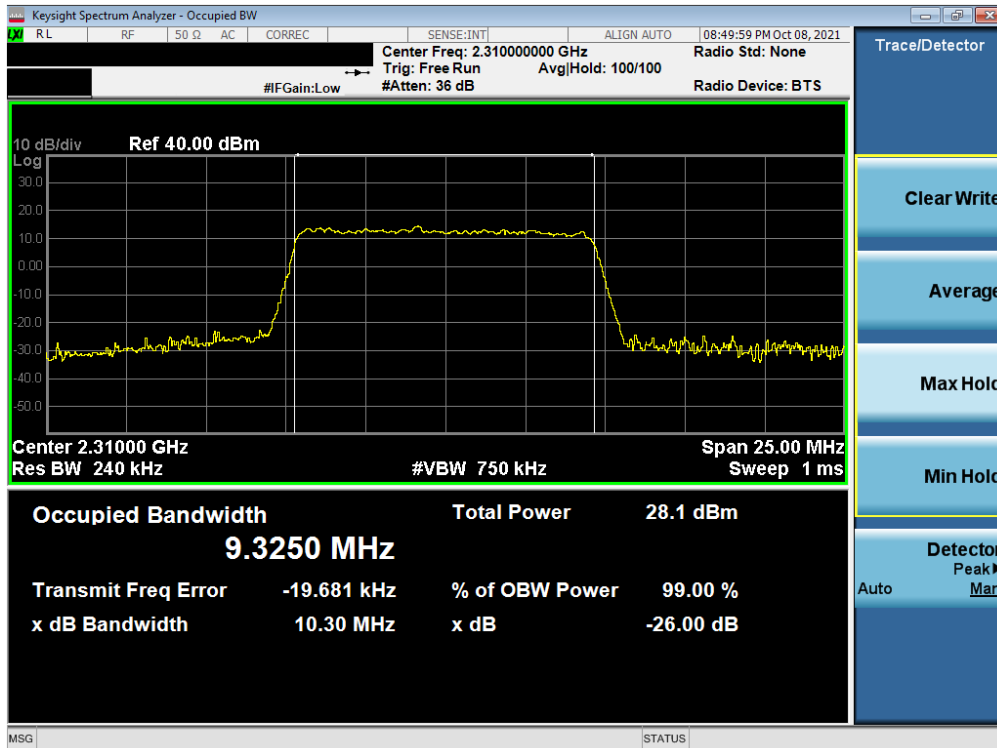
Plot 7-36. Occupied Bandwidth Plot (LTE Band 41(PC3)/38 - 5MHz 16-QAM - Full RB)

FCC ID: A3LSMS908U	 PCTEST Proud to be part of 	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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NR Band n30 - Ant A

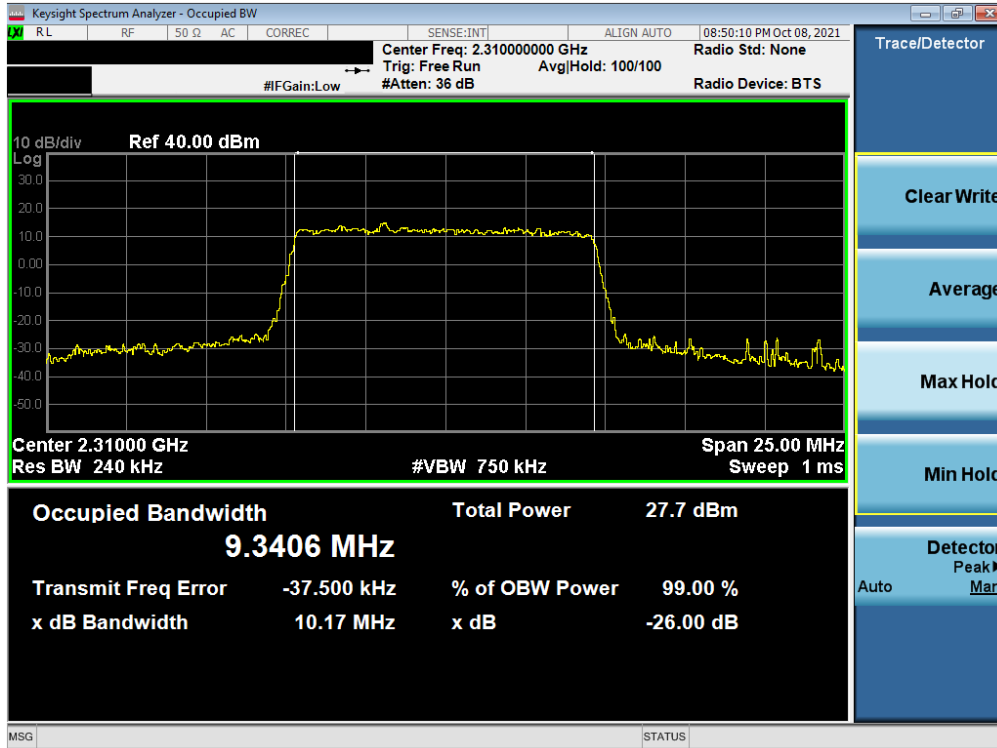


Plot 7-37. Occupied Bandwidth Plot (NR Band n30 - 10MHz $\pi/2$ BPSK - Full RB - Ant A)

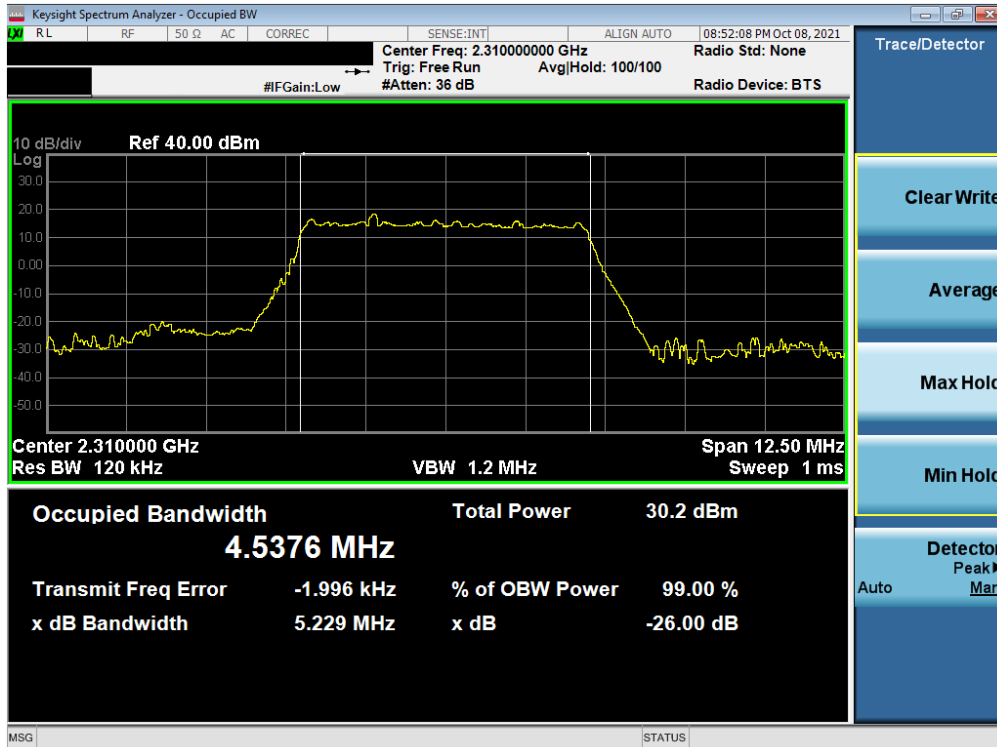


Plot 7-38. Occupied Bandwidth Plot (NR Band n30 - 10MHz QPSK - Full RB - Ant A)

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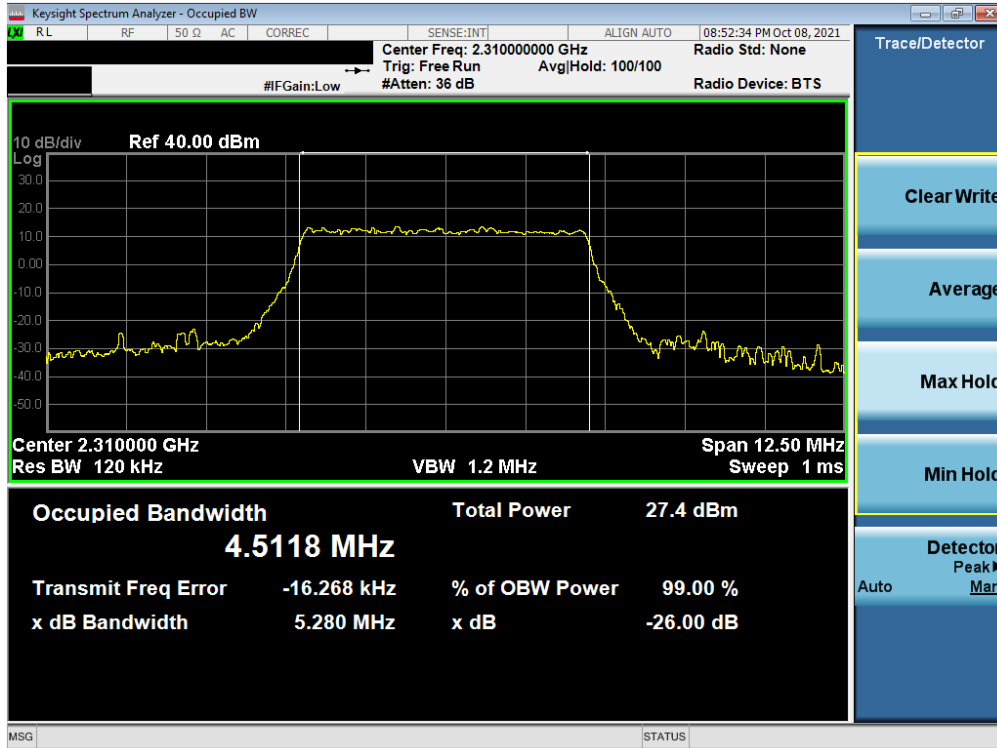


Plot 7-39. Occupied Bandwidth Plot (NR Band n30 - 10MHz 16-QAM - Full RB - Ant A)

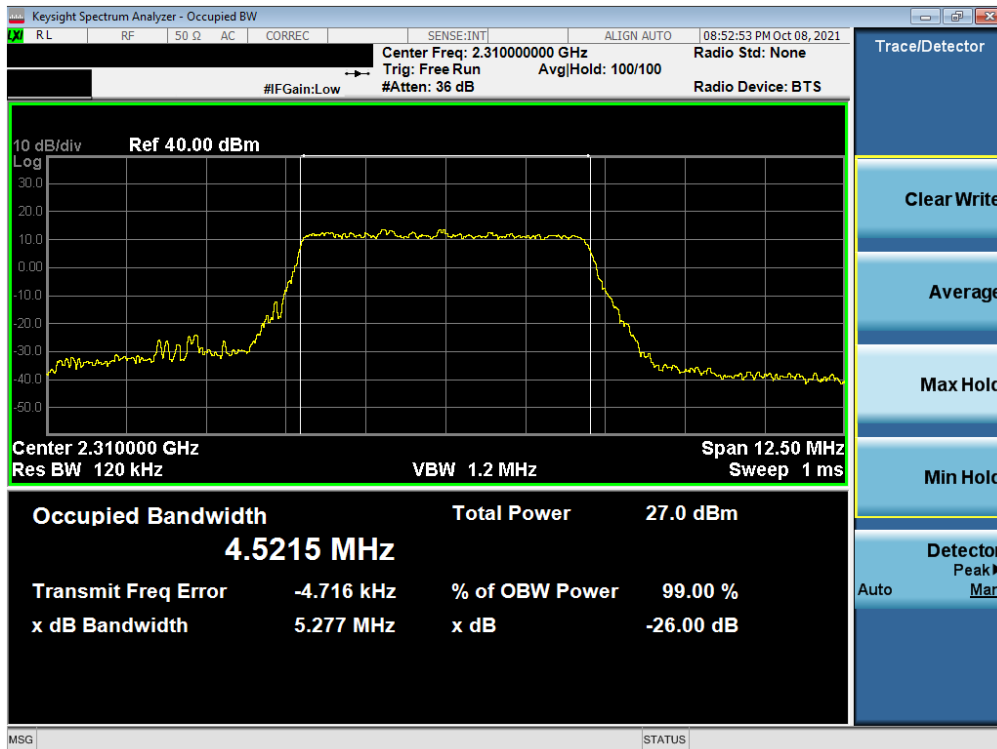


Plot 7-40. Occupied Bandwidth Plot (NR Band n30 - 5MHz $\pi/2$ BPSK - Full RB - Ant A)




FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
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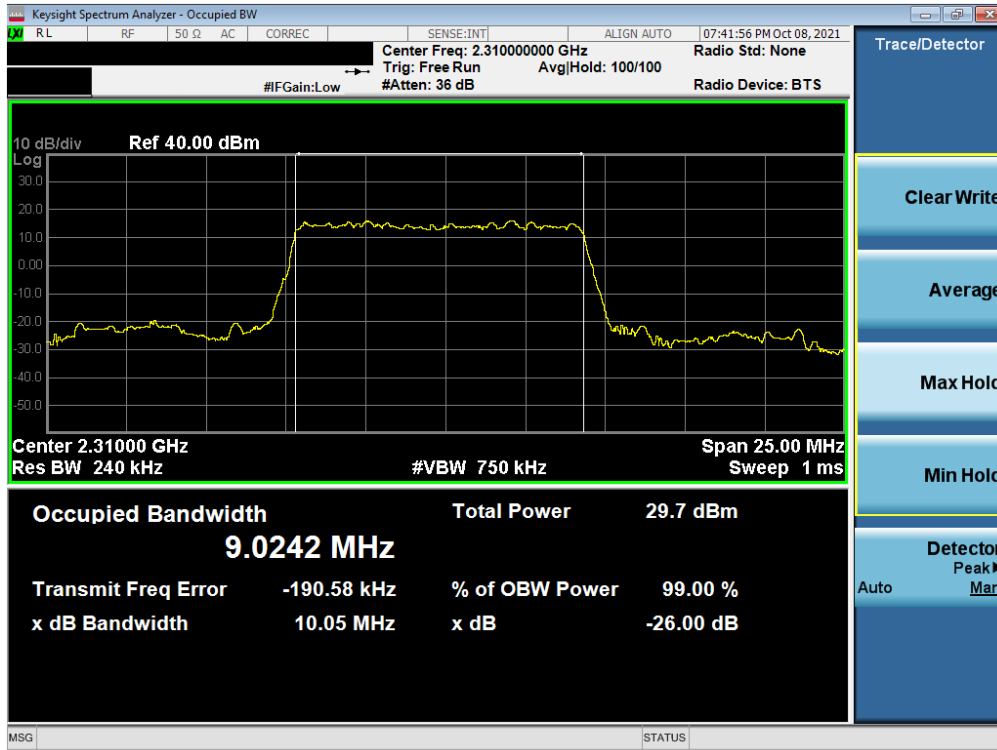
Plot 7-41. Occupied Bandwidth Plot (NR Band n30 - 5MHz QPSK - Full RB - Ant A)



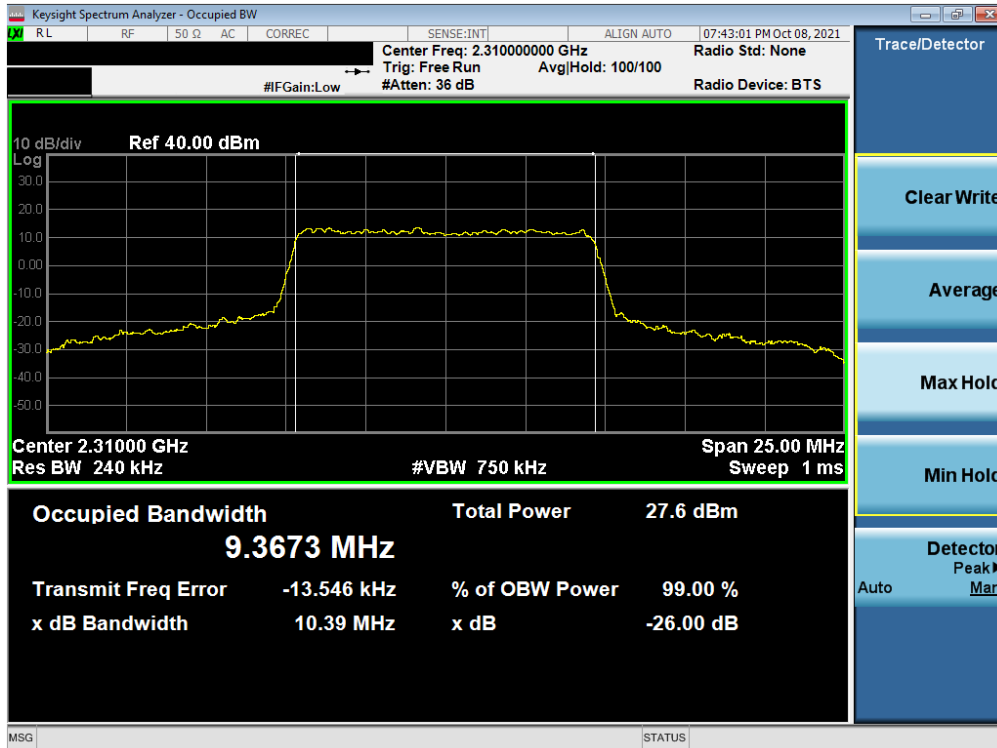
Plot 7-42. Occupied Bandwidth Plot (NR Band n30 - 5MHz 16-QAM - Full RB - Ant A)

FCC ID: A3LSMS908U	 PCTEST Proud to be part of 	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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NR Band n30 - Ant J

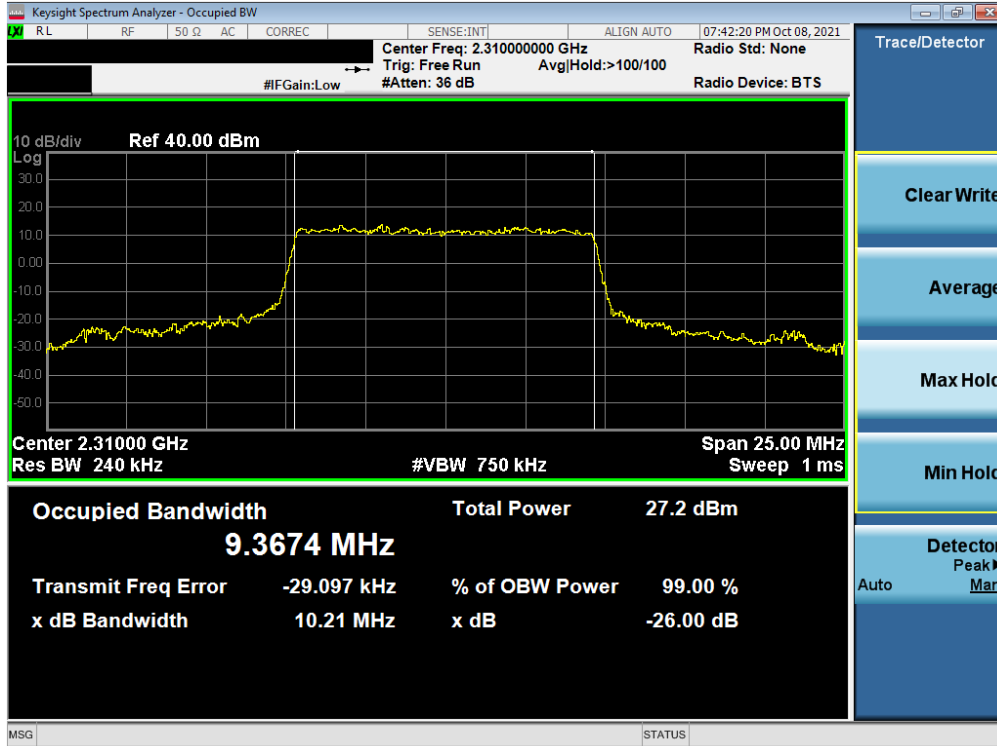


Plot 7-43. Occupied Bandwidth Plot (NR Band n30 - 10MHz $\pi/2$ BPSK - Full RB - Ant J)

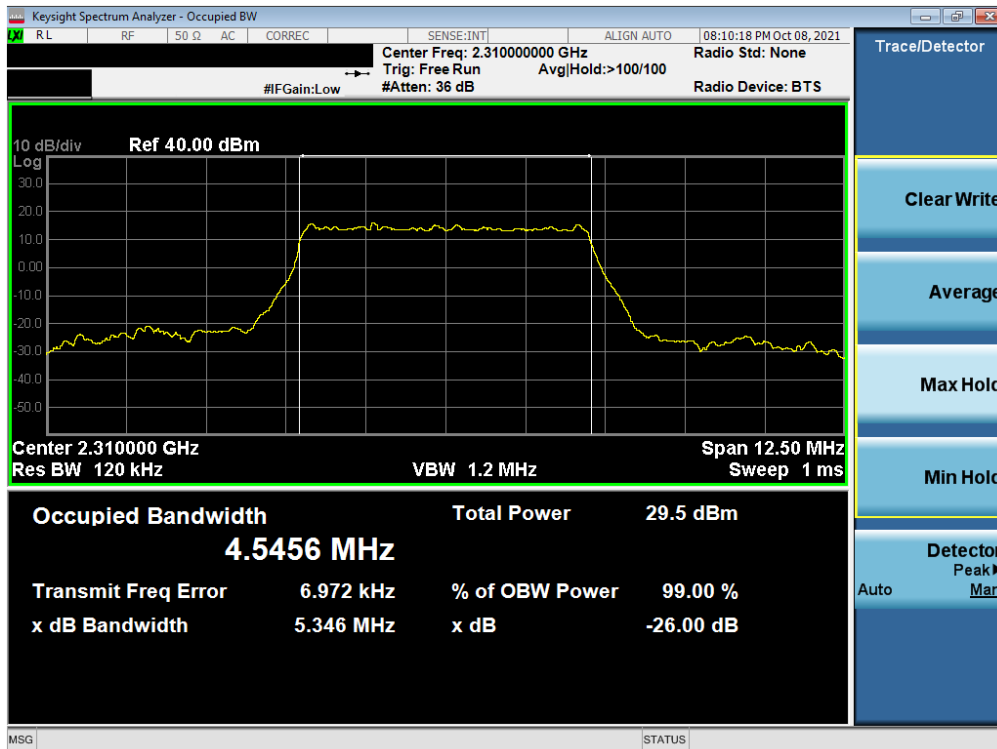


Plot 7-44. Occupied Bandwidth Plot (NR Band n30 - 10MHz QPSK - Full RB - Ant J)




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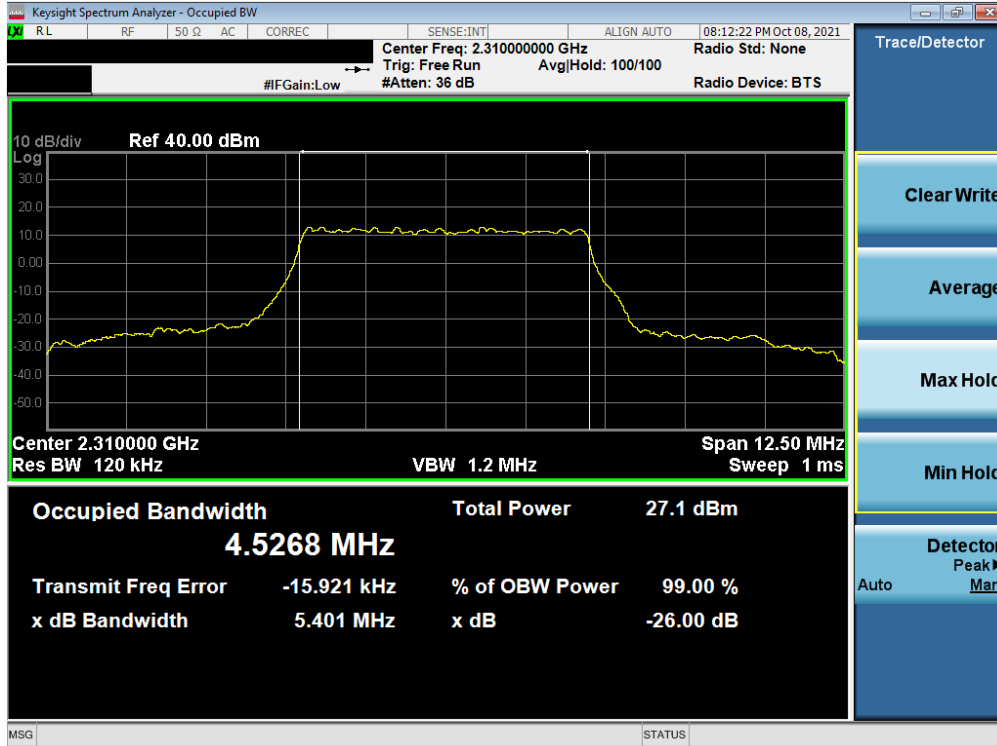


Plot 7-45. Occupied Bandwidth Plot (NR Band n30 - 10MHz 16-QAM - Full RB - Ant J)

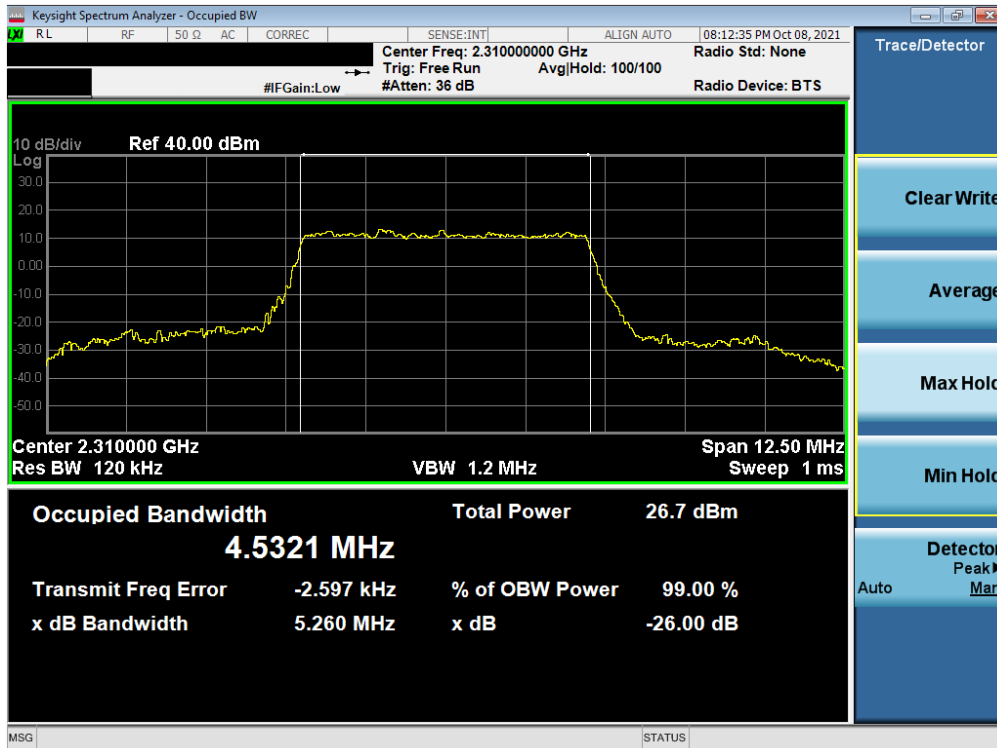


Plot 7-46. Occupied Bandwidth Plot (NR Band n30 - 5MHz $\pi/2$ BPSK - Full RB - Ant J)




FCC ID: A3LSMS908U	 PCTEST Proud to be part of 	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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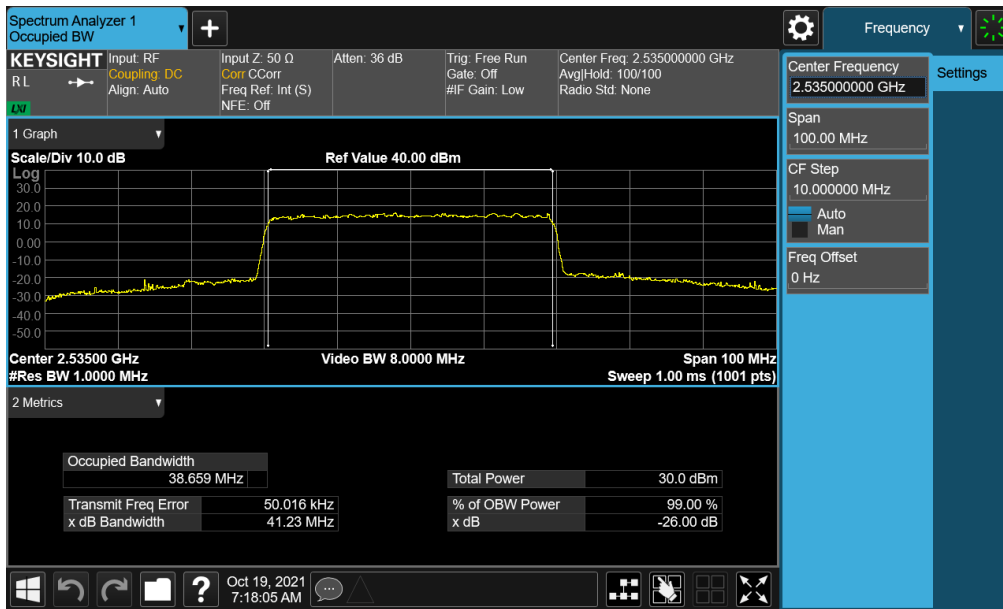
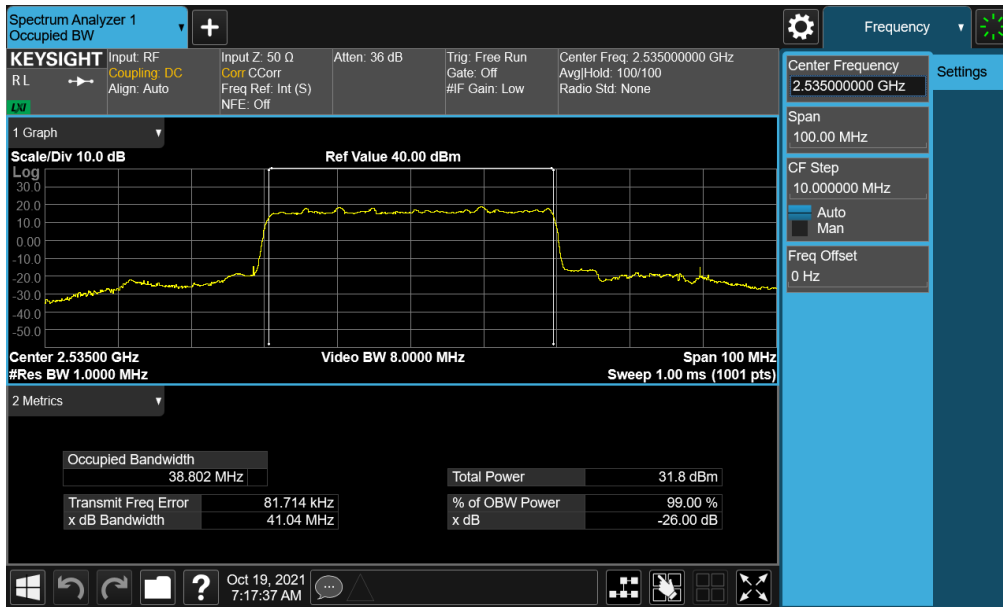
Plot 7-47. Occupied Bandwidth Plot (NR Band n30 - 5MHz QPSK - Full RB - Ant J)



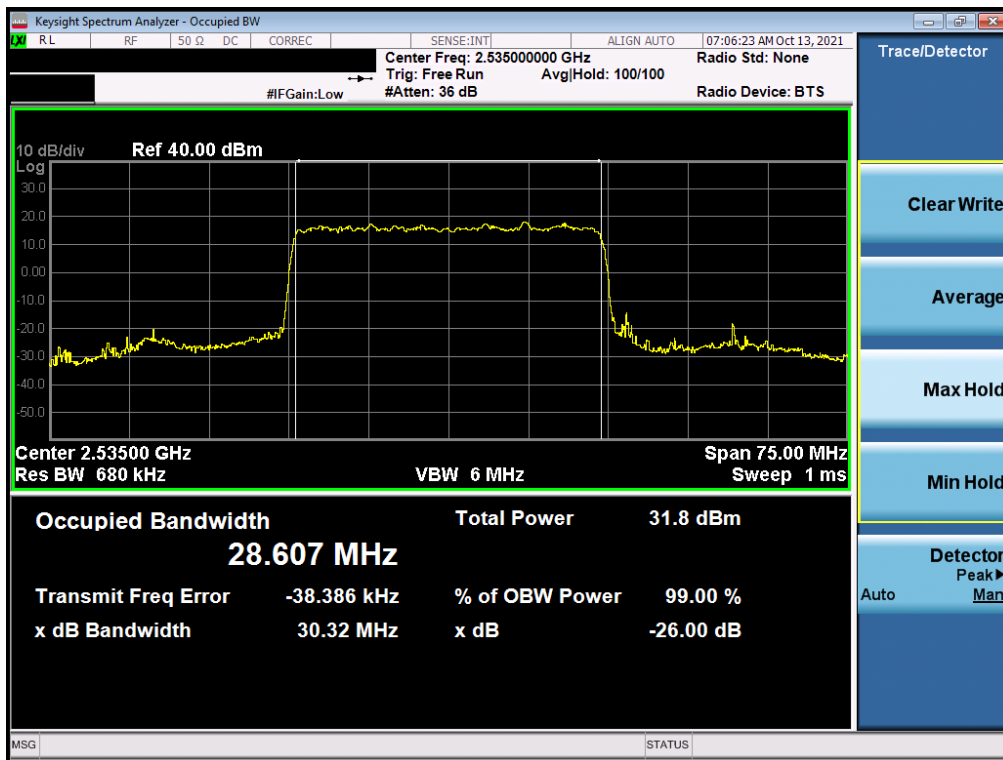
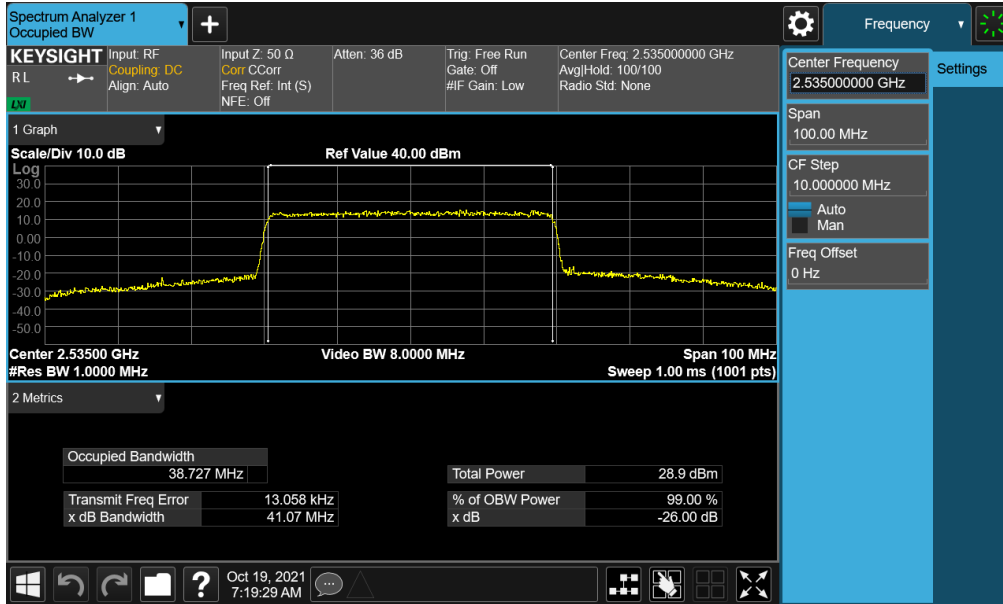
Plot 7-48. Occupied Bandwidth Plot (NR Band n30 - 5MHz 16-QAM - Full RB - Ant J)




FCC ID: A3LSMS908U	 PCTEST Proud to be part of 	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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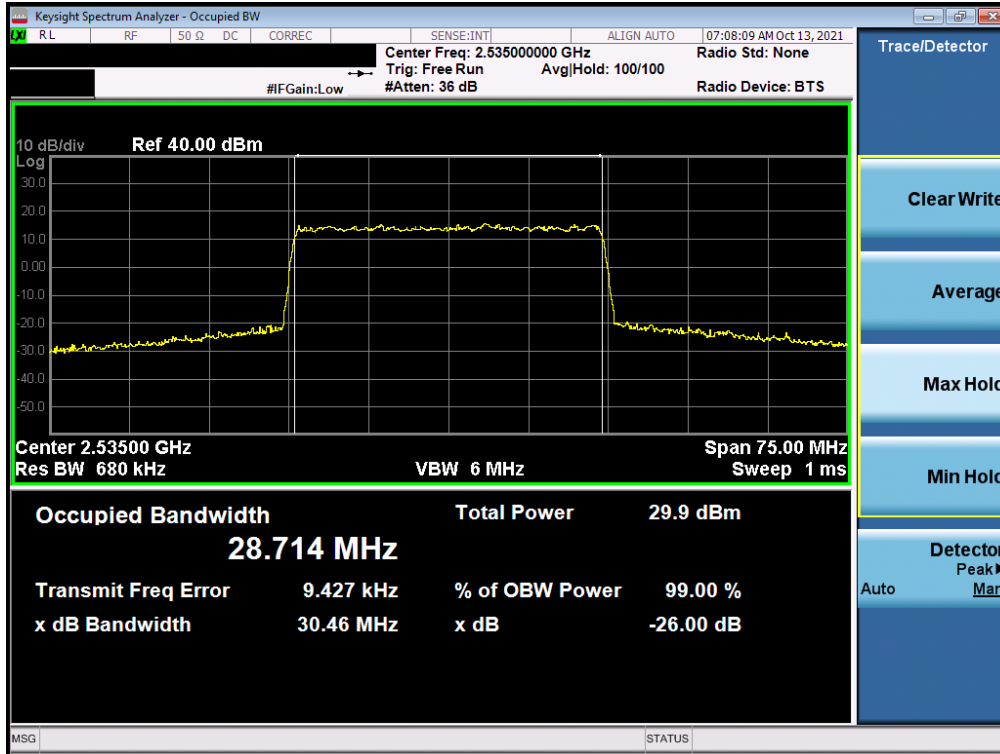
NR Band n7 - Ant B



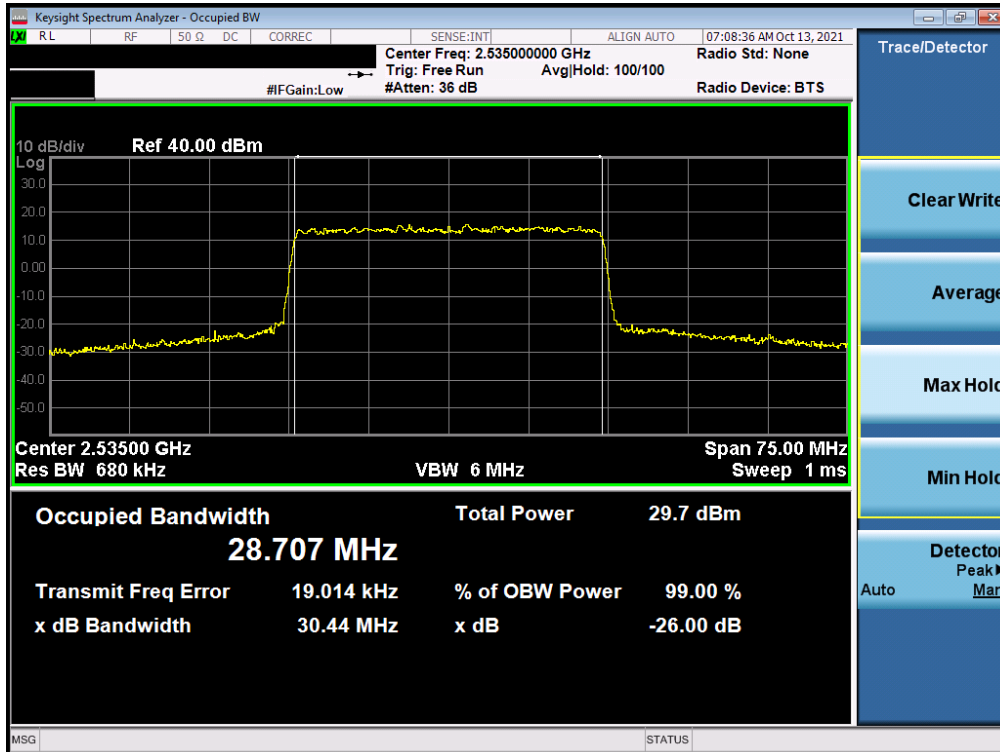
FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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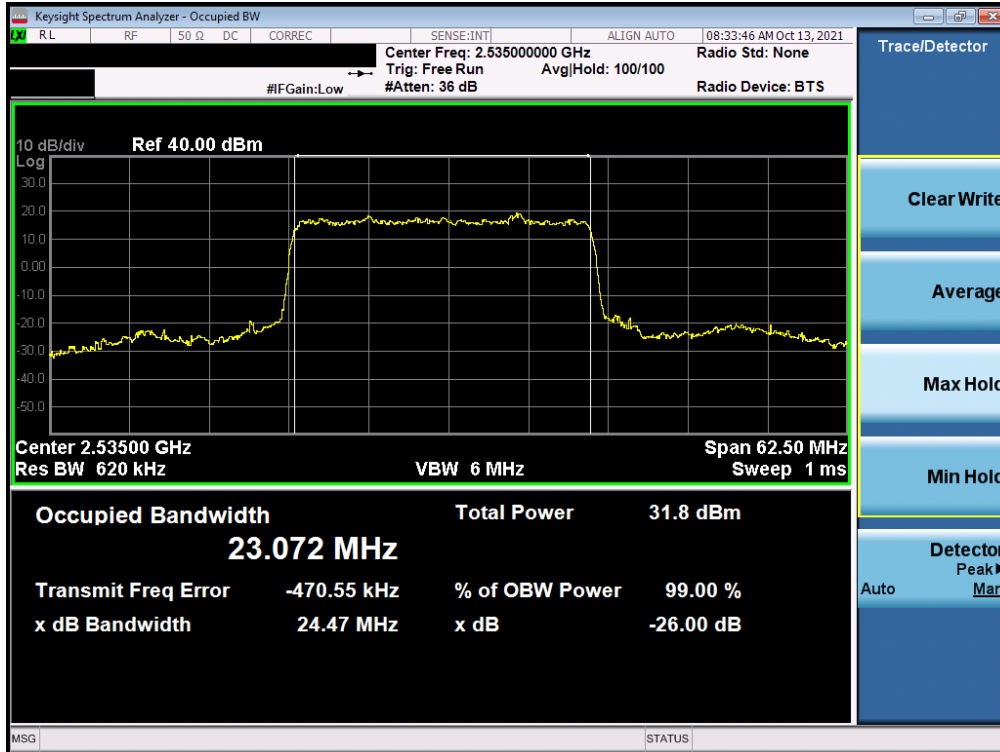


Plot 7-53. Occupied Bandwidth Plot (NR Band n7 - 30MHz QPSK - Full RB - Ant B)

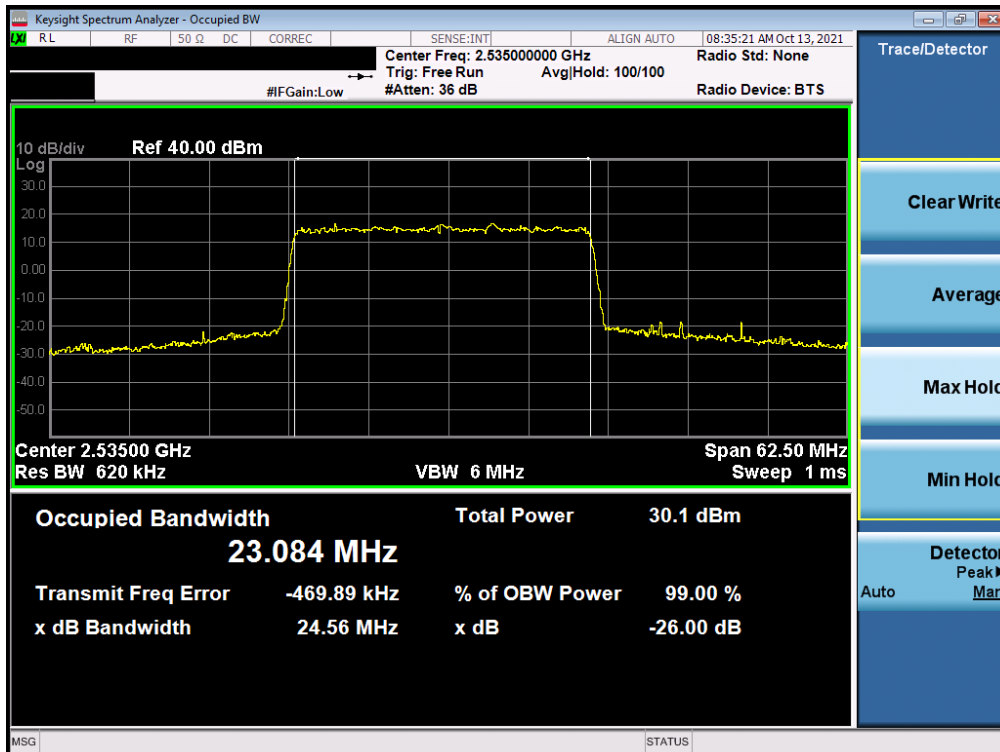


Plot 7-54. Occupied Bandwidth Plot (NR Band n7 - 30MHz 16-QAM - Full RB - Ant B)




FCC ID: A3LSMS908U	 PCTEST Proud to be part of 	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2109090102-05-R1.A3L	Test Dates: 9/14 - 11/12/2021	EUT Type: Portable Handset		Page 44 of 231

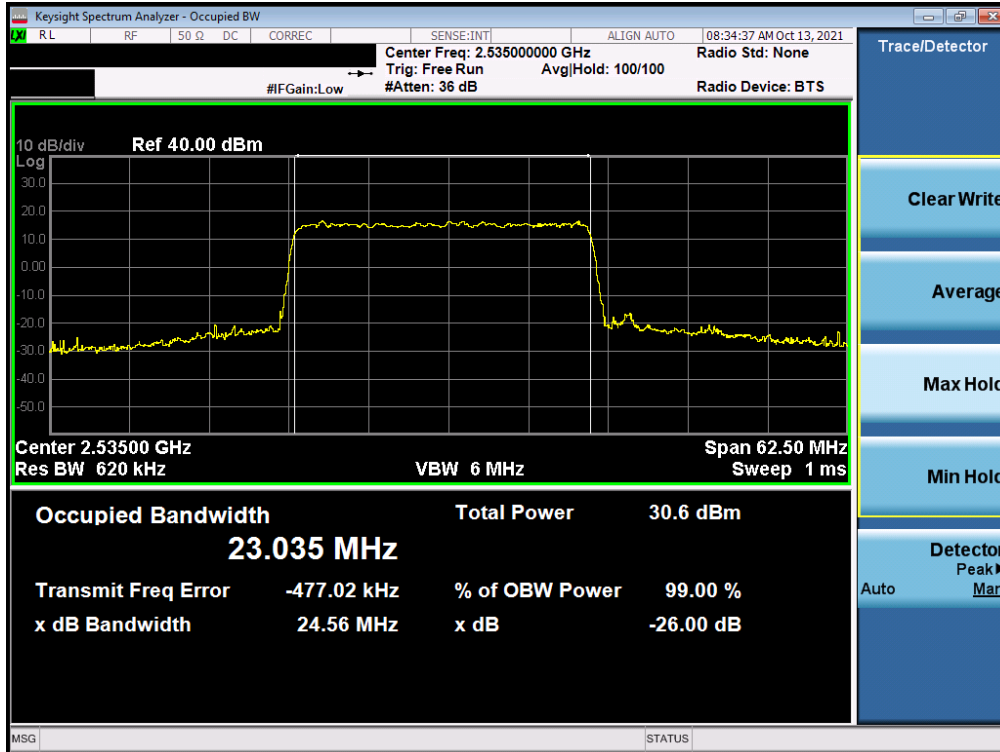


Plot 7-55. Occupied Bandwidth Plot (NR Band n7 - 25MHz $\pi/2$ BPSK - Full RB - Ant B)

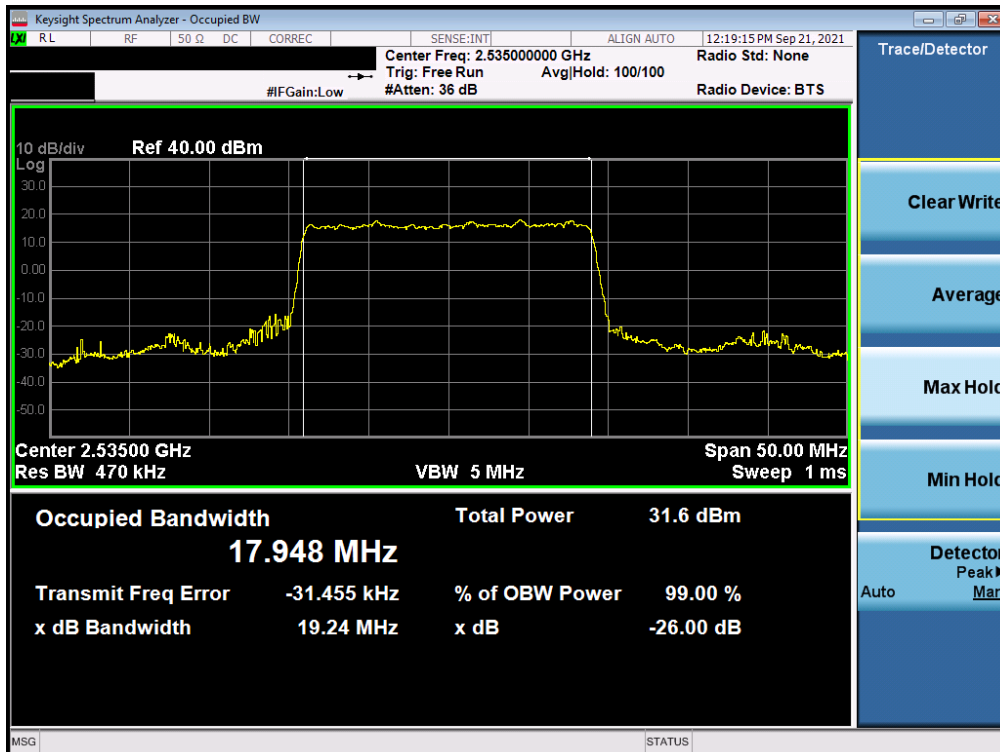


Plot 7-56. Occupied Bandwidth Plot (NR Band n7 - 25MHz QPSK - Full RB - Ant B)




FCC ID: A3LSMS908U	 PCTEST Proud to be part of 	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2109090102-05-R1.A3L	Test Dates: 9/14 - 11/12/2021	EUT Type: Portable Handset		Page 45 of 231

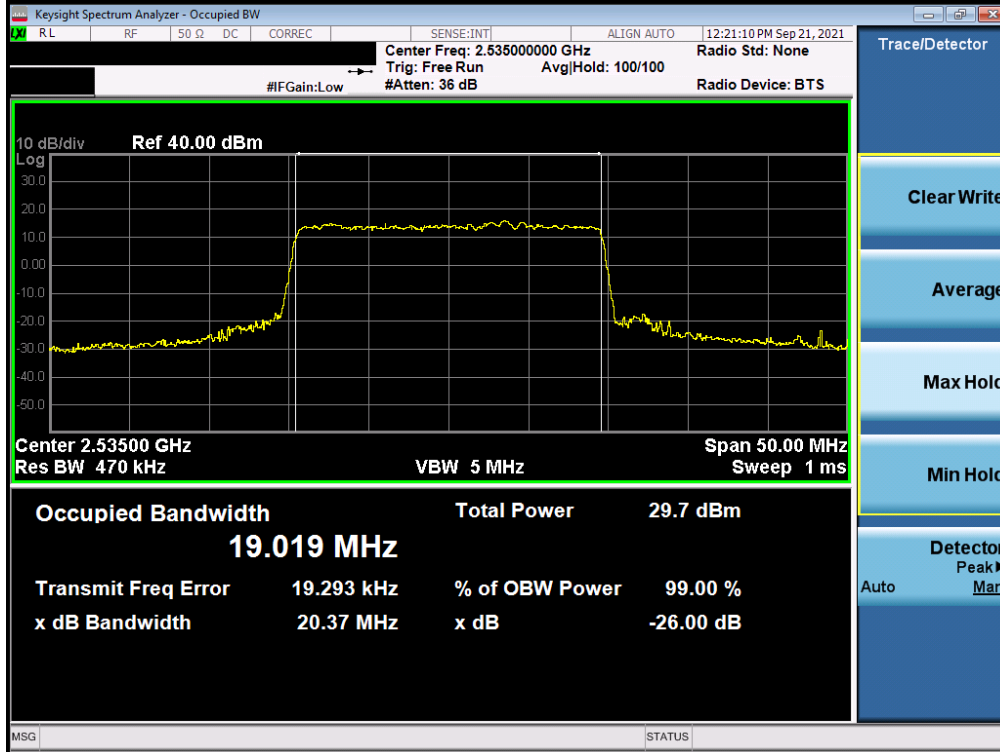


Plot 7-57. Occupied Bandwidth Plot (NR Band n7 - 25MHz 16-QAM - Full RB - Ant B)

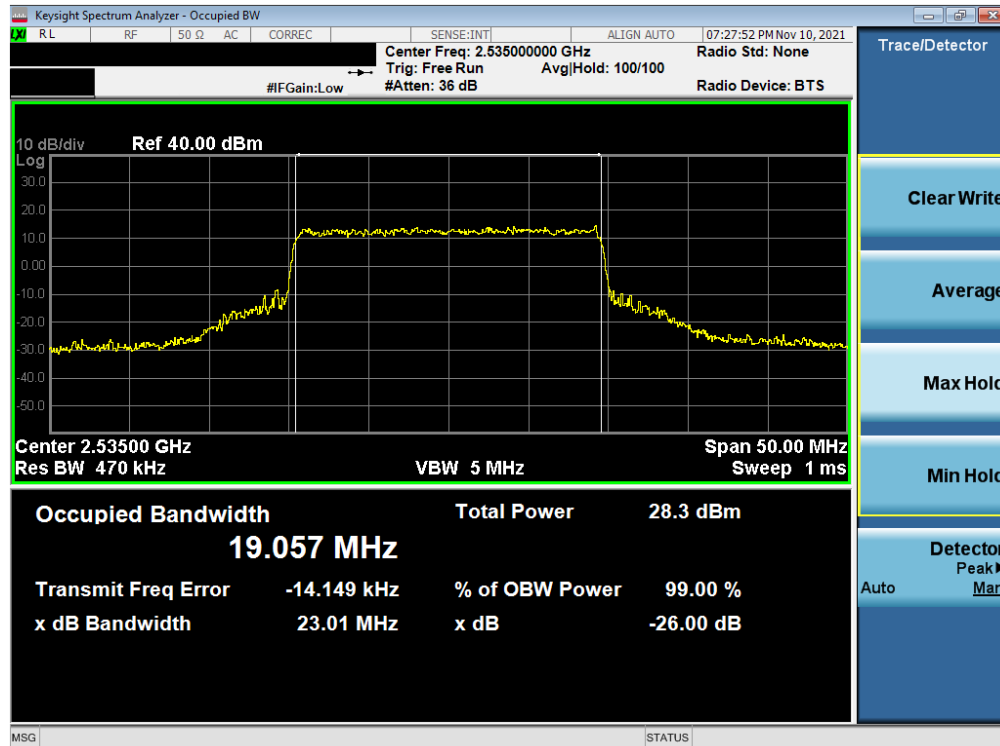


Plot 7-58. Occupied Bandwidth Plot (NR Band n7 - 20MHz $\pi/2$ BPSK - Full RB - Ant B)




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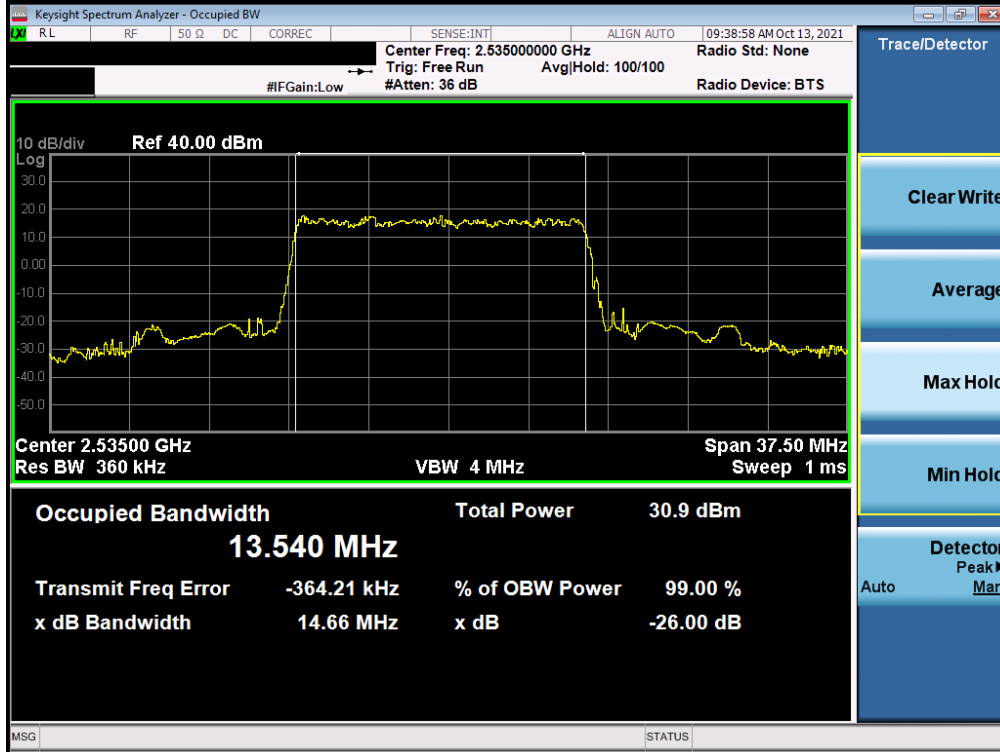


Plot 7-59. Occupied Bandwidth Plot (NR Band n7 - 20MHz QPSK - Full RB - Ant B)

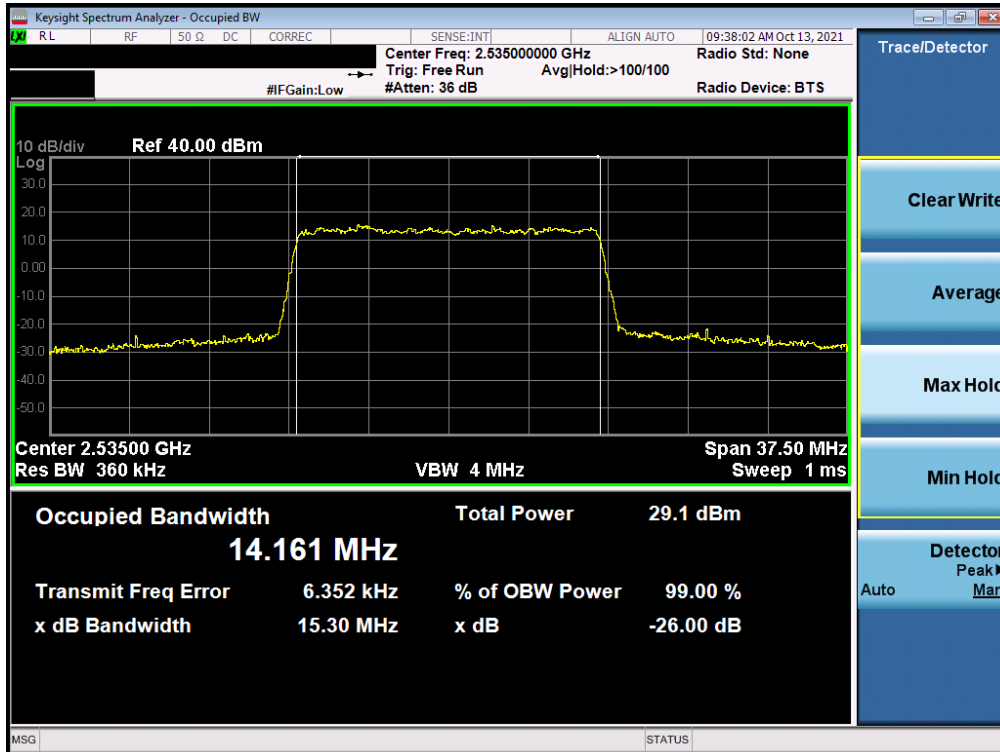


Plot 7-60. Occupied Bandwidth Plot (NR Band n7 - 20MHz 16-QAM - Full RB - Ant B)




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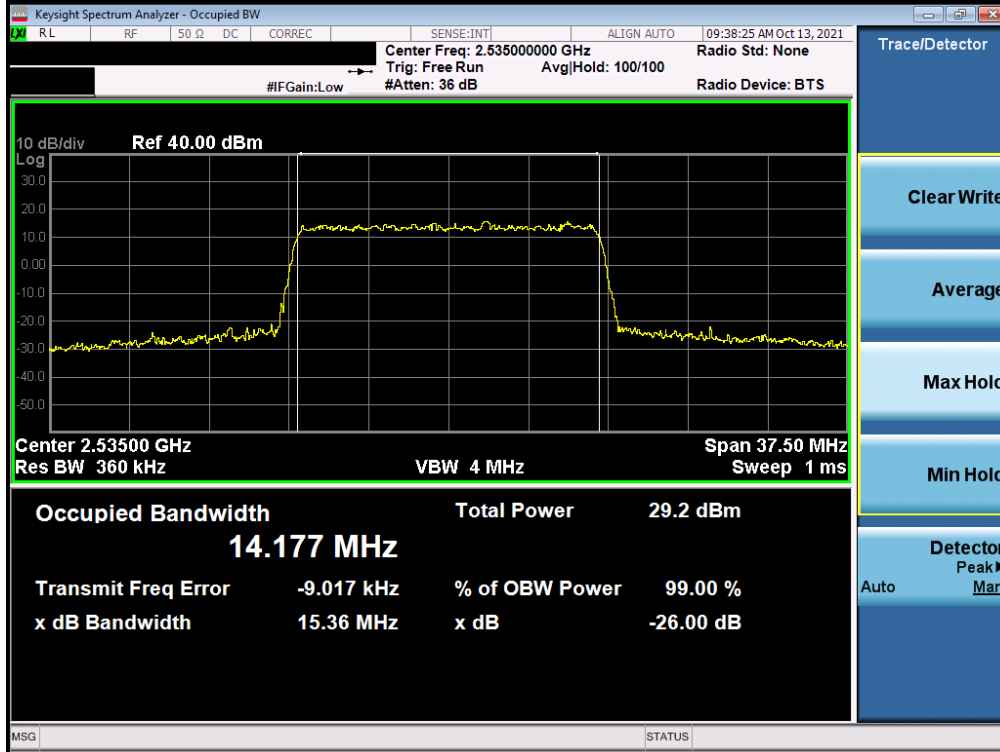


Plot 7-61. Occupied Bandwidth Plot (NR Band n7 - 15MHz $\pi/2$ BPSK - Full RB - Ant B)

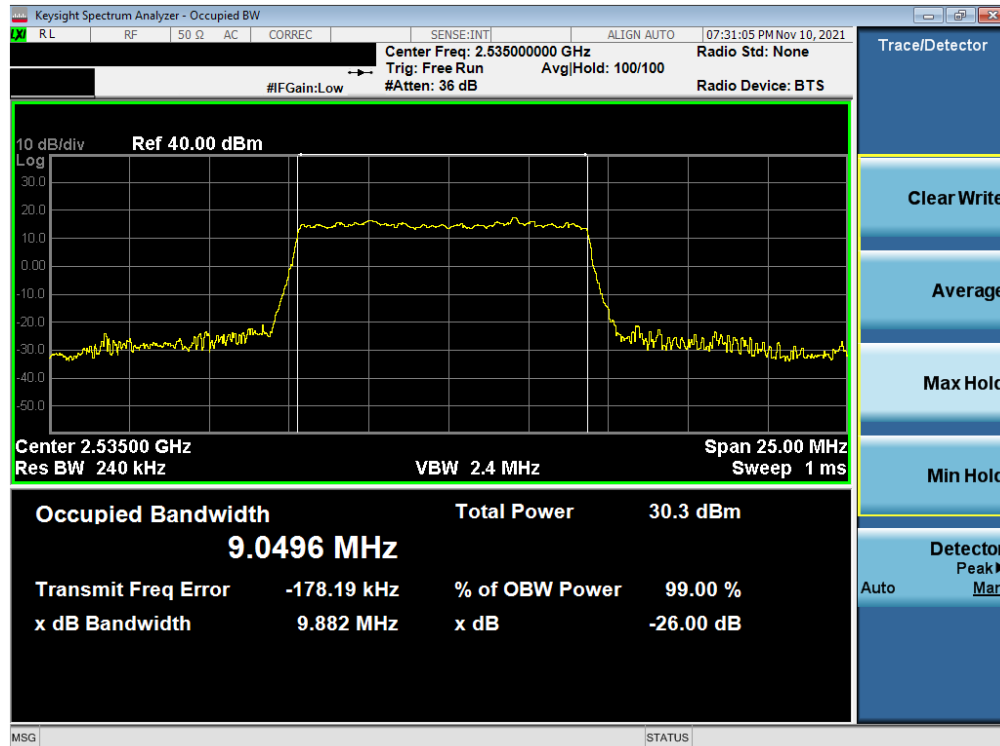


Plot 7-62. Occupied Bandwidth Plot (NR Band n7 - 15MHz QPSK - Full RB - Ant B)




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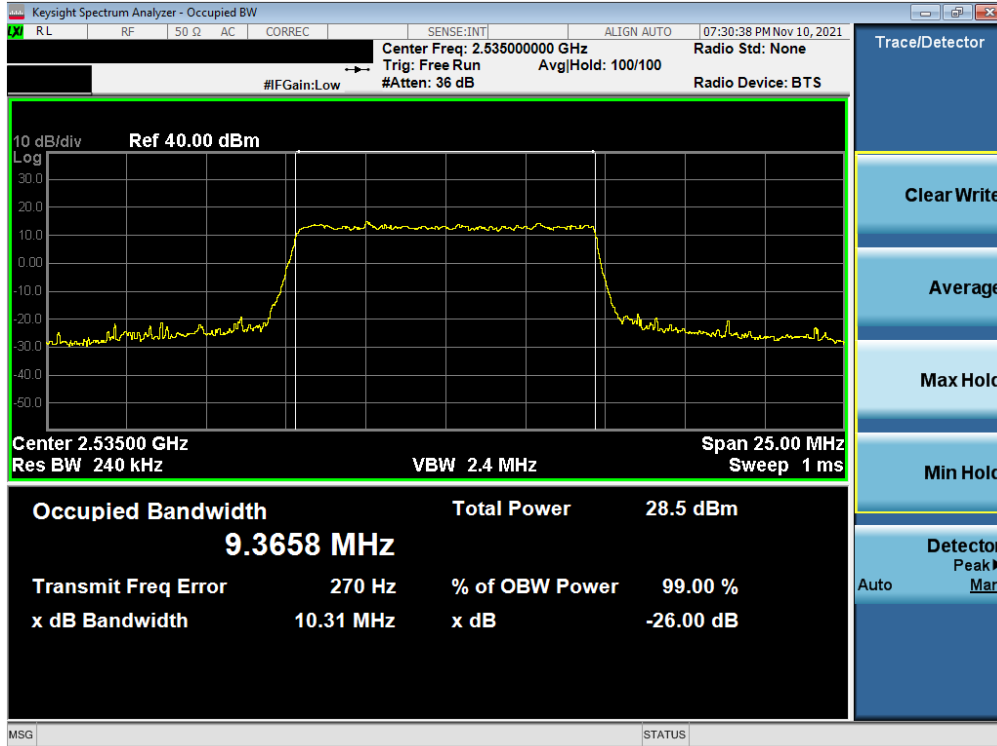


Plot 7-63. Occupied Bandwidth Plot (NR Band n7 - 15MHz 16-QAM - Full RB - Ant B)

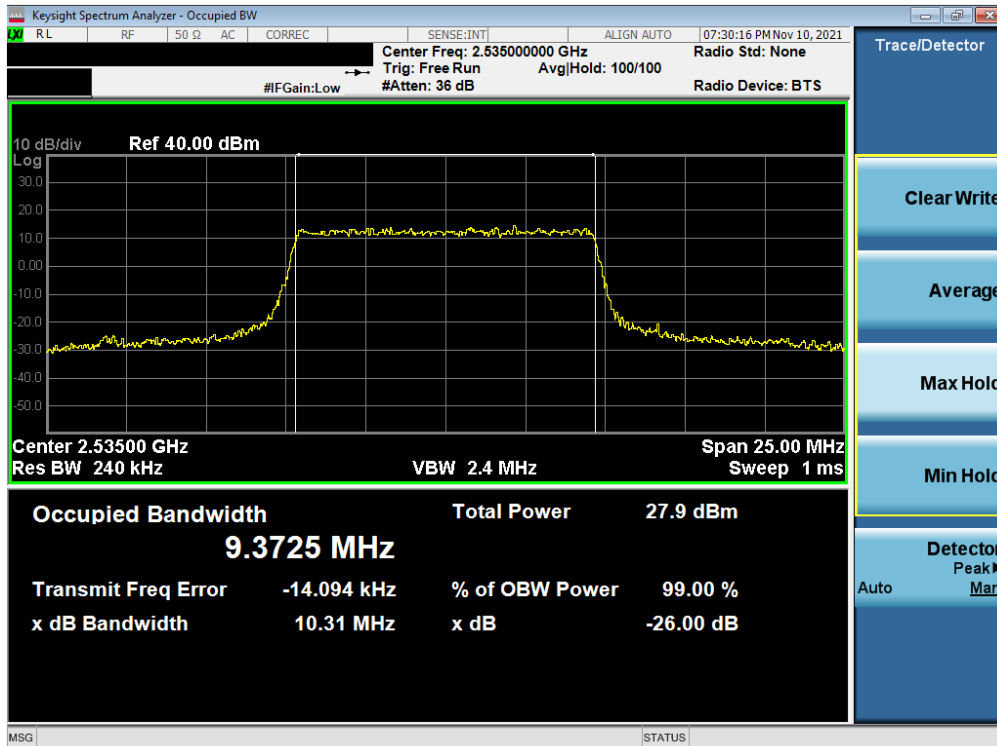


Plot 7-64. Occupied Bandwidth Plot (NR Band n7 - 10MHz $\pi/2$ BPSK - Full RB - Ant B)




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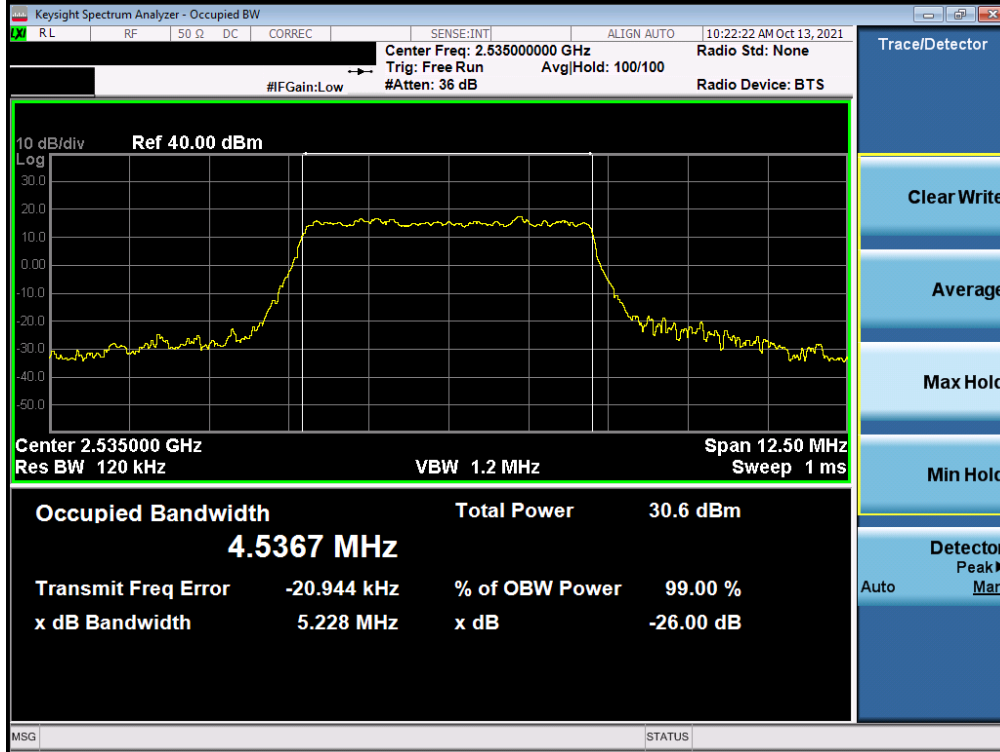


Plot 7-65. Occupied Bandwidth Plot (NR Band n7 - 10MHz QPSK - Full RB - Ant B)

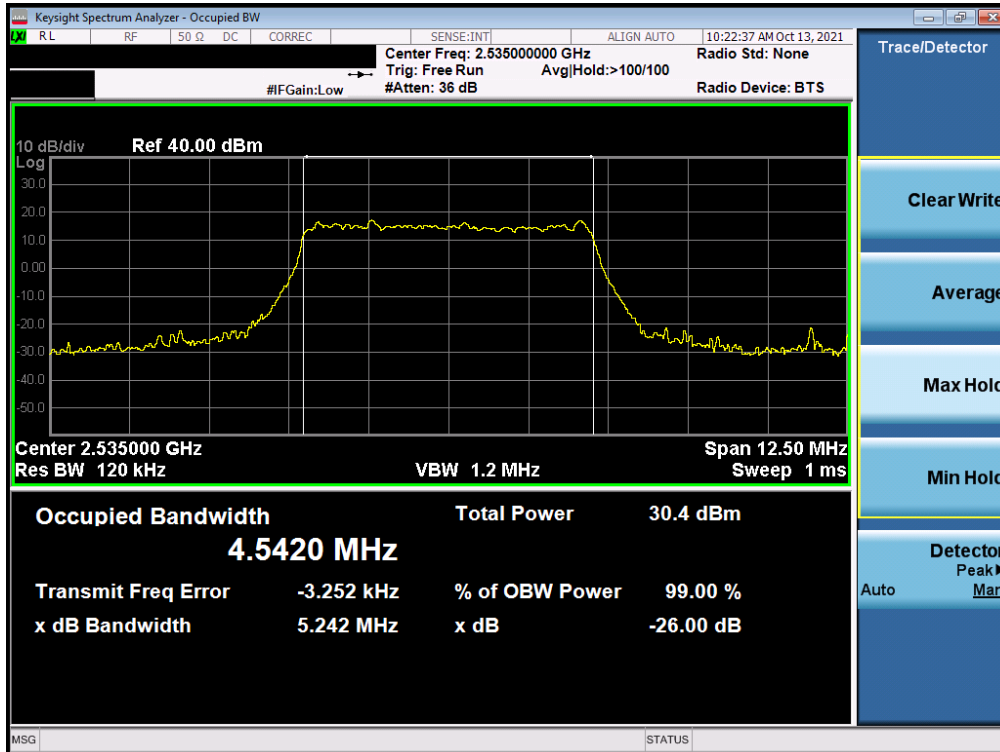


Plot 7-66. Occupied Bandwidth Plot (NR Band n7 - 10MHz 16-QAM - Full RB - Ant B)




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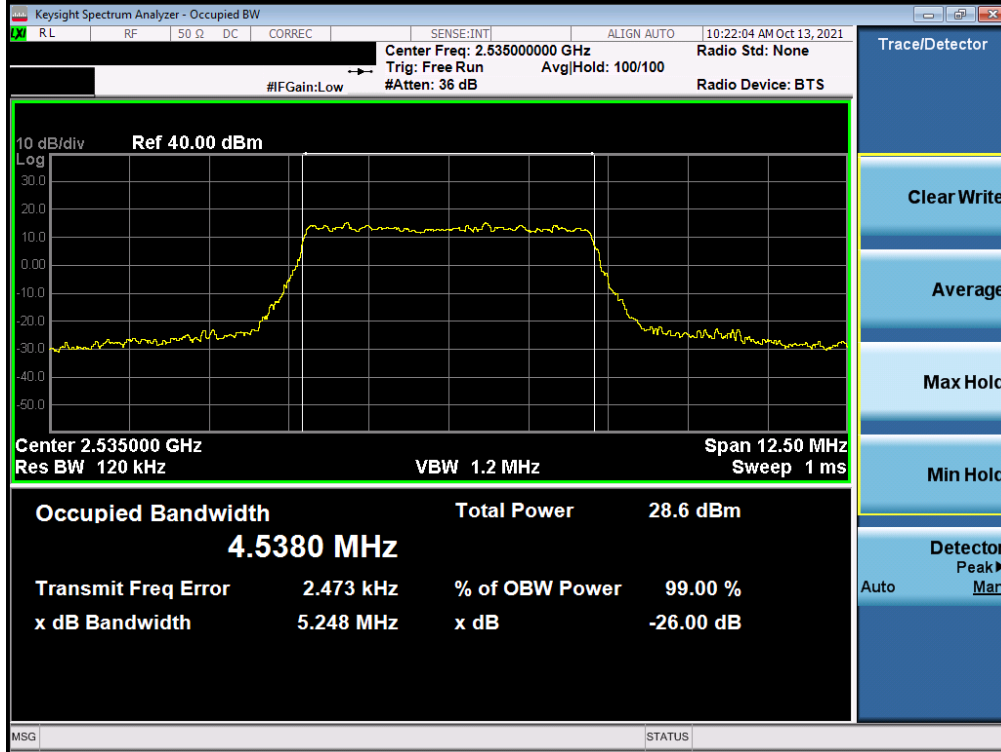


Plot 7-67. Occupied Bandwidth Plot (NR Band n7 - 5MHz $\pi/2$ BPSK - Full RB - Ant B)






Plot 7-68. Occupied Bandwidth Plot (NR Band n7 - 5MHz QPSK - Full RB - Ant B)

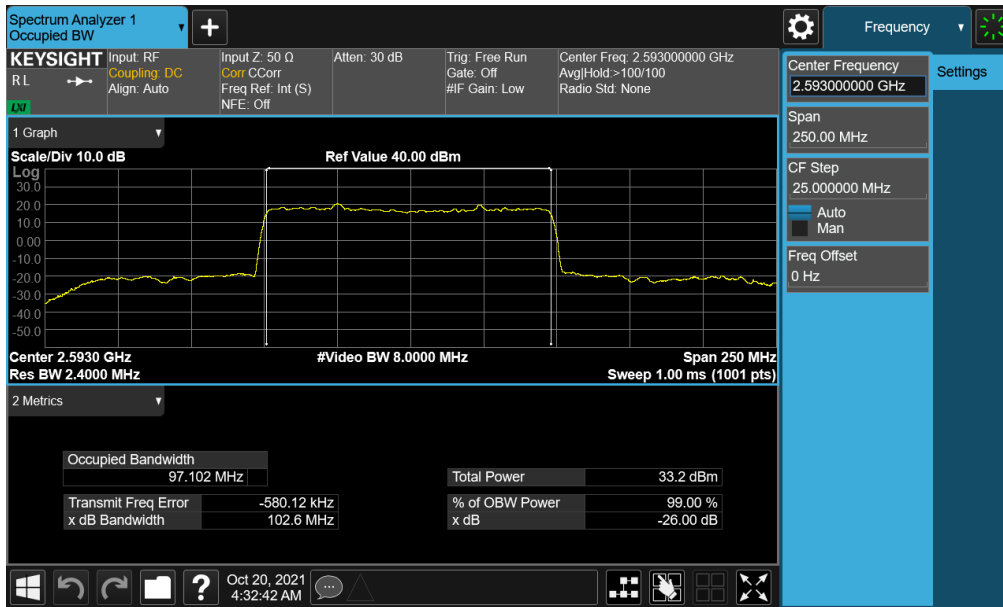
FCC ID: A3LSMS908U	 PCTEST Proud to be part of 	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2109090102-05-R1.A3L	Test Dates: 9/14 - 11/12/2021	EUT Type: Portable Handset		Page 51 of 231



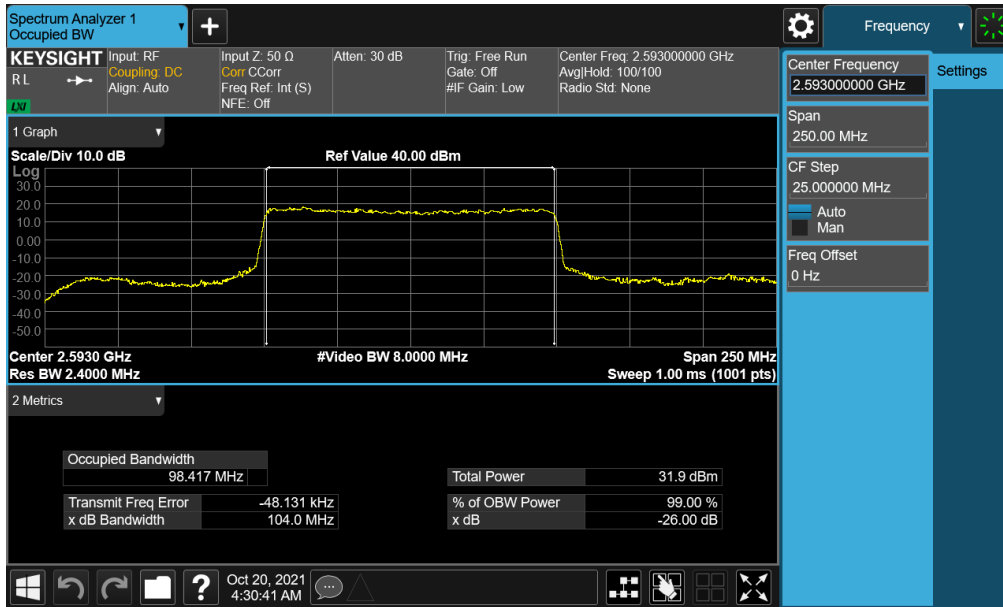
Plot 7-69. Occupied Bandwidth Plot (NR Band n7 - 5MHz 16-QAM - Full RB - Ant B)

FCC ID: A3LSMS908U	 PCTEST Proud to be part of 	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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NR Band n41 - Ant J

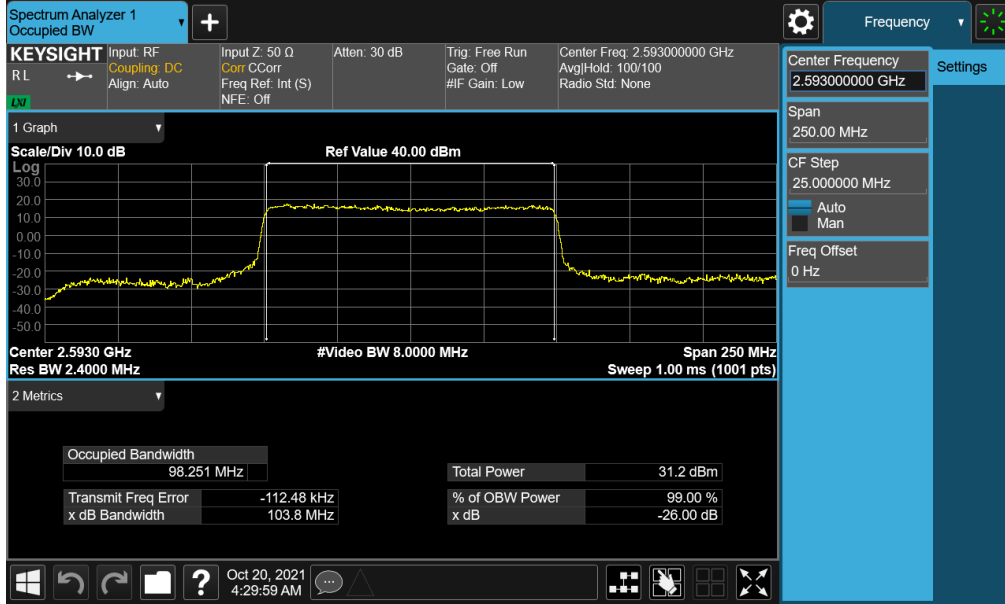


Plot 7-70. Occupied Bandwidth Plot (NR Band n41 - 100MHz $\pi/2$ BPSK - Full RB - Ant J)

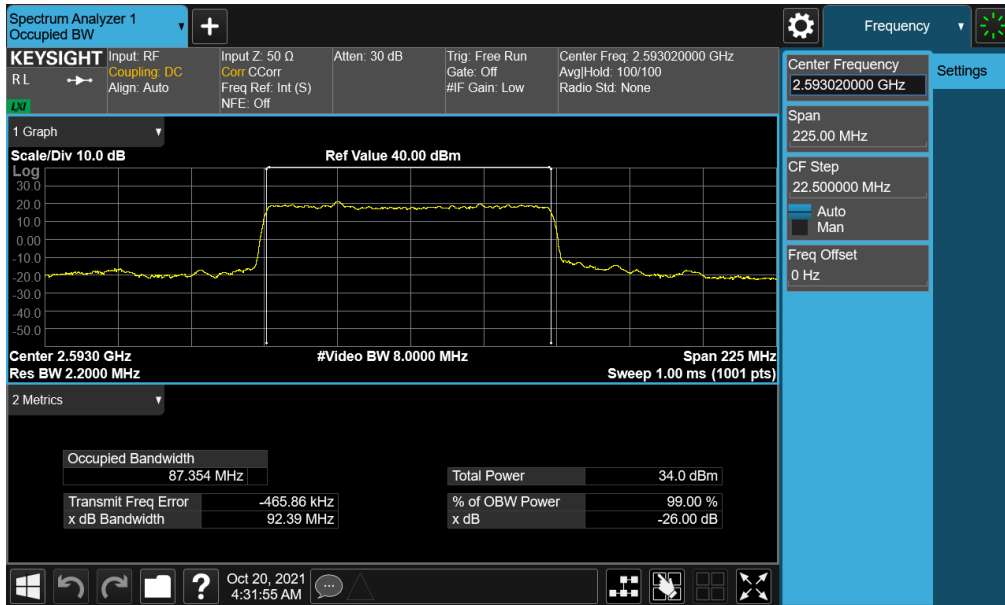


Plot 7-71. Occupied Bandwidth Plot (NR Band n41 - 100MHz QPSK - Full RB - Ant J)




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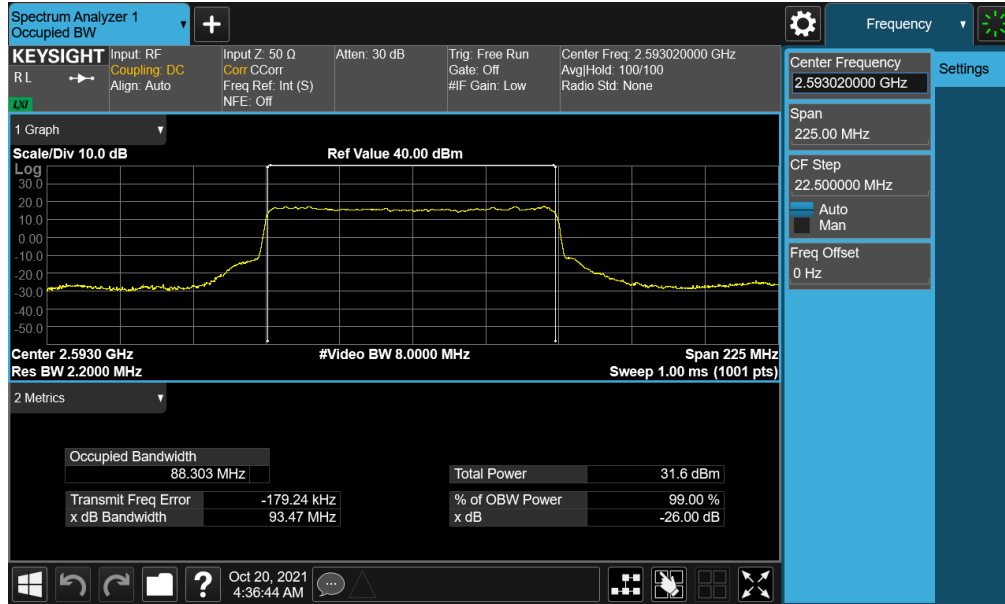


Plot 7-72. Occupied Bandwidth Plot (NR Band n41 - 100MHz 16-QAM - Full RB - Ant J)

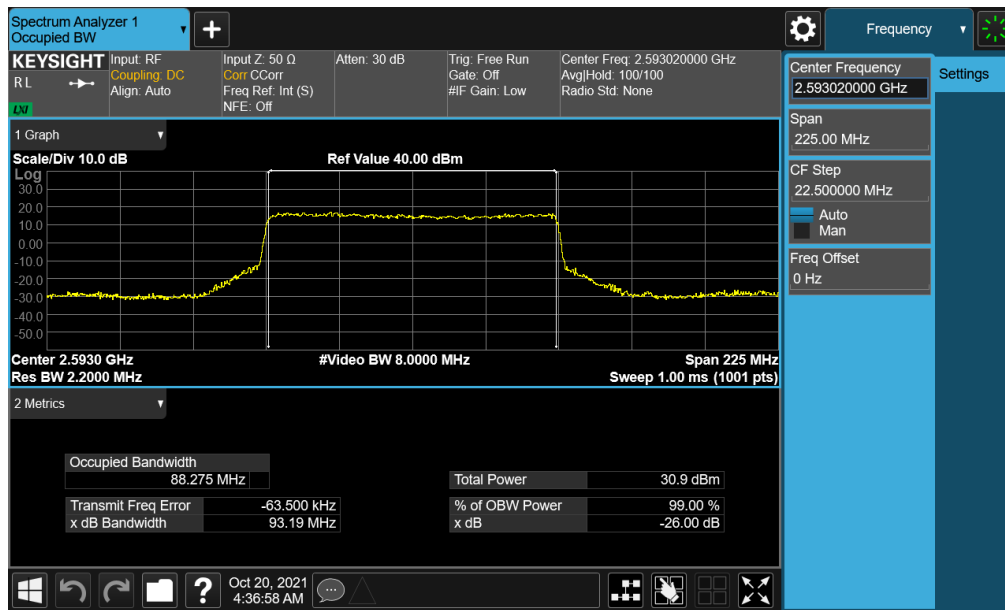


Plot 7-73. Occupied Bandwidth Plot (NR Band n41 - 90MHz $\pi/2$ BPSK - Full RB - Ant J)

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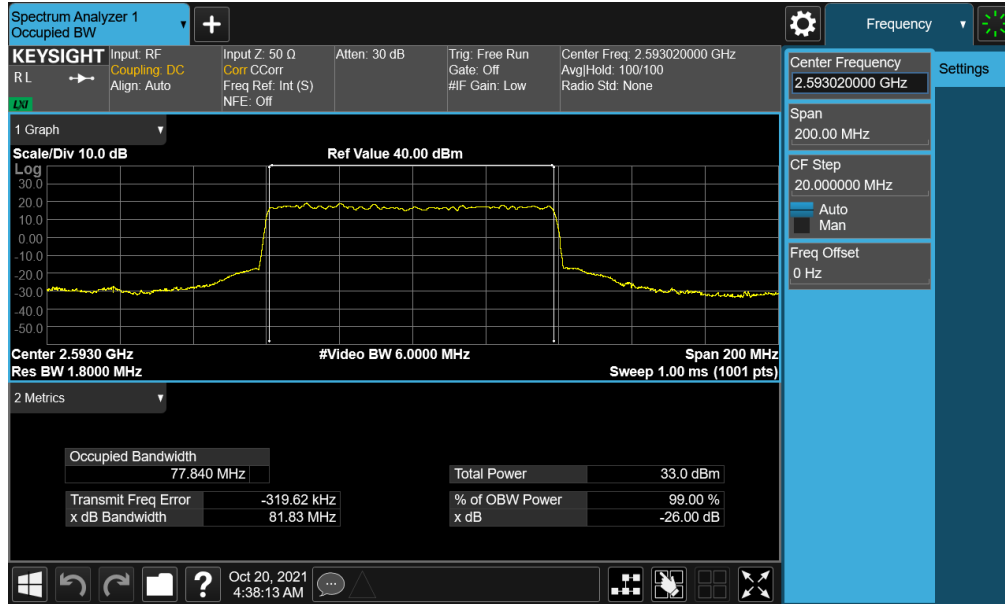


Plot 7-74. Occupied Bandwidth Plot (NR Band n41 - 90MHz QPSK - Full RB - Ant J)

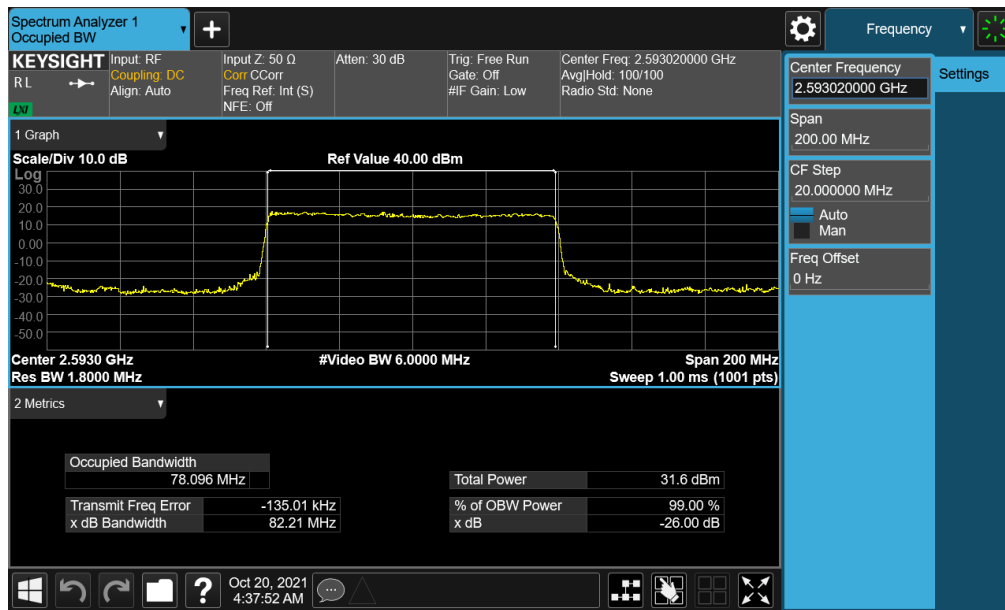


Plot 7-75. Occupied Bandwidth Plot (NR Band n41 - 90MHz 16-QAM - Full RB - Ant J)




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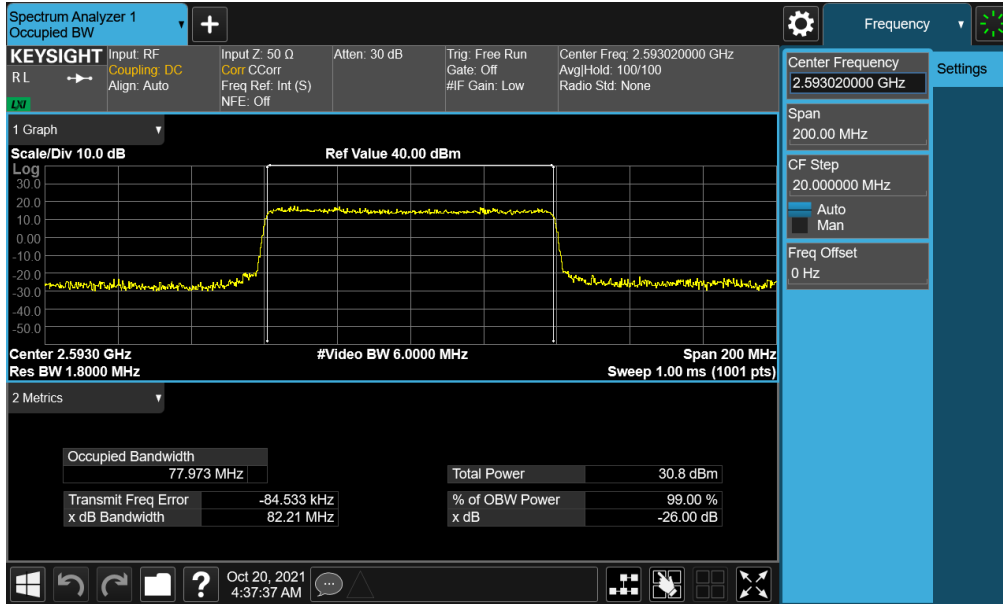


Plot 7-76. Occupied Bandwidth Plot (NR Band n41 - 80MHz $\pi/2$ BPSK - Full RB - Ant J)

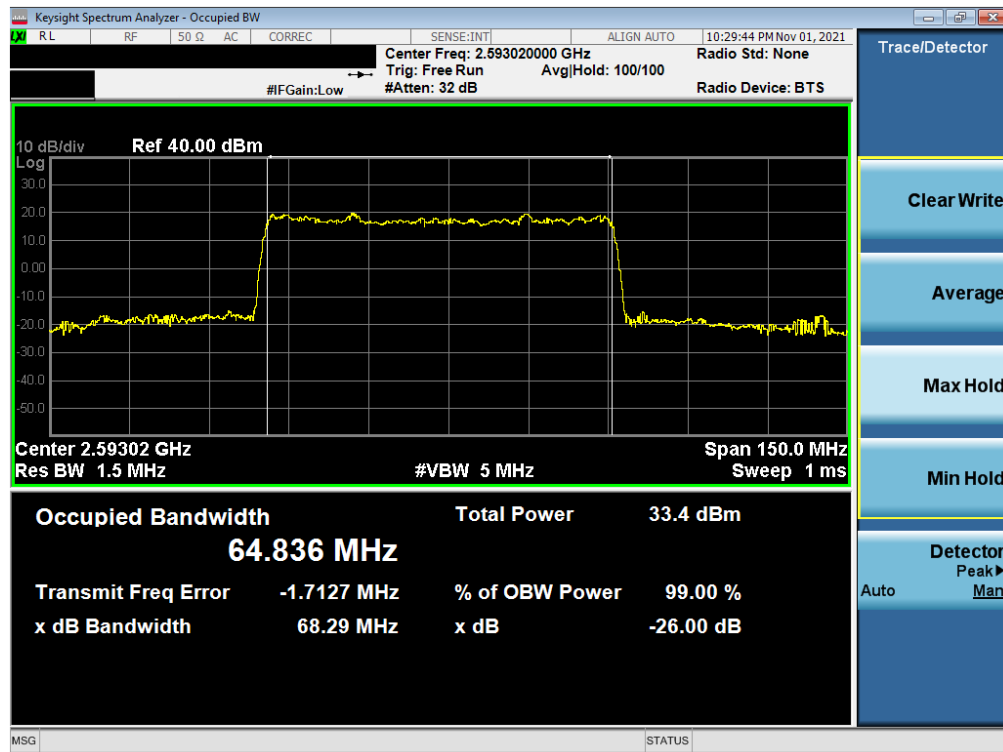


Plot 7-77. Occupied Bandwidth Plot (NR Band n41 - 80MHz QPSK - Full RB - Ant J)

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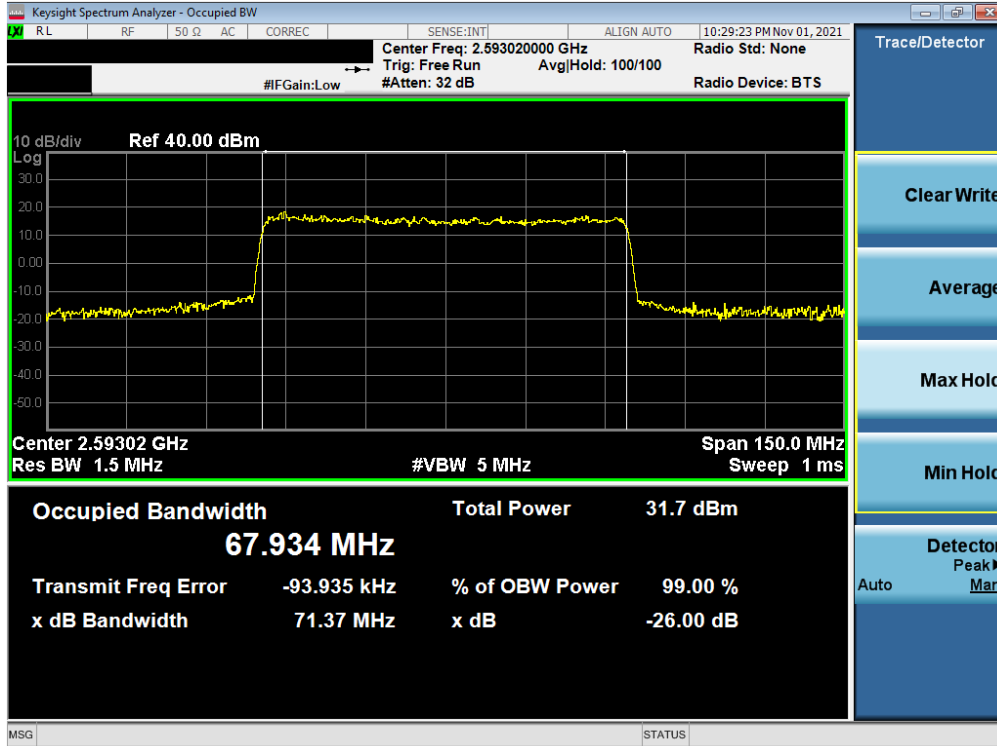


Plot 7-78. Occupied Bandwidth Plot (NR Band n41 - 80MHz 16-QAM - Full RB - Ant J)

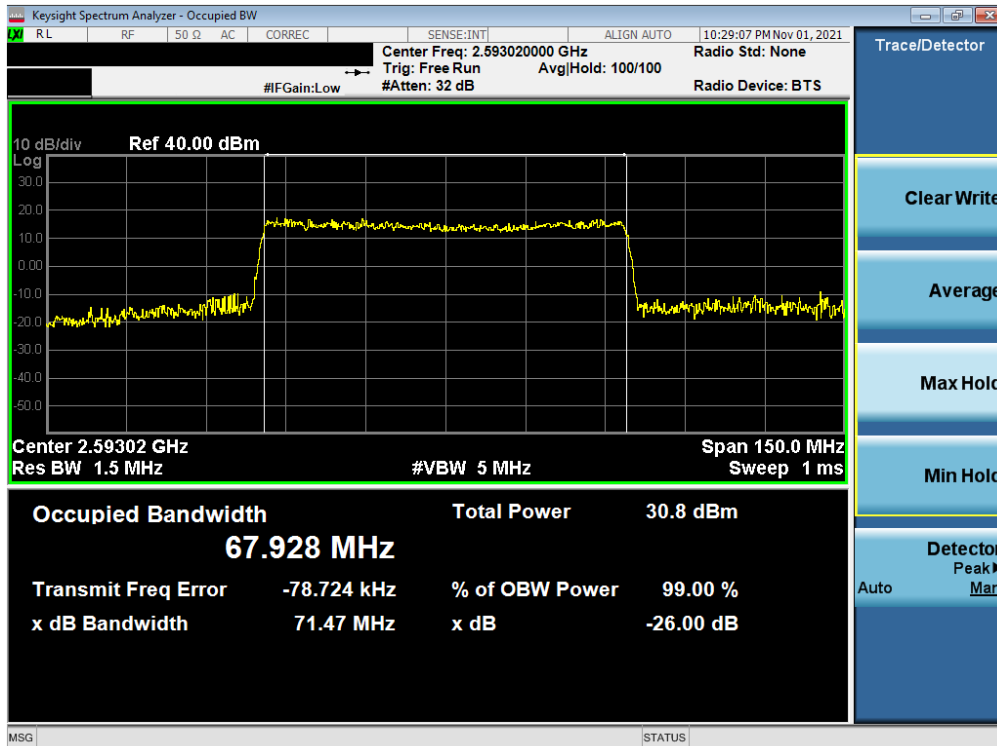


Plot 7-79. Occupied Bandwidth Plot (NR Band n41 - 70MHz $\pi/2$ BPSK - Full RB - Ant J)




FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2109090102-05-R1.A3L	Test Dates: 9/14 - 11/12/2021	EUT Type: Portable Handset		Page 57 of 231

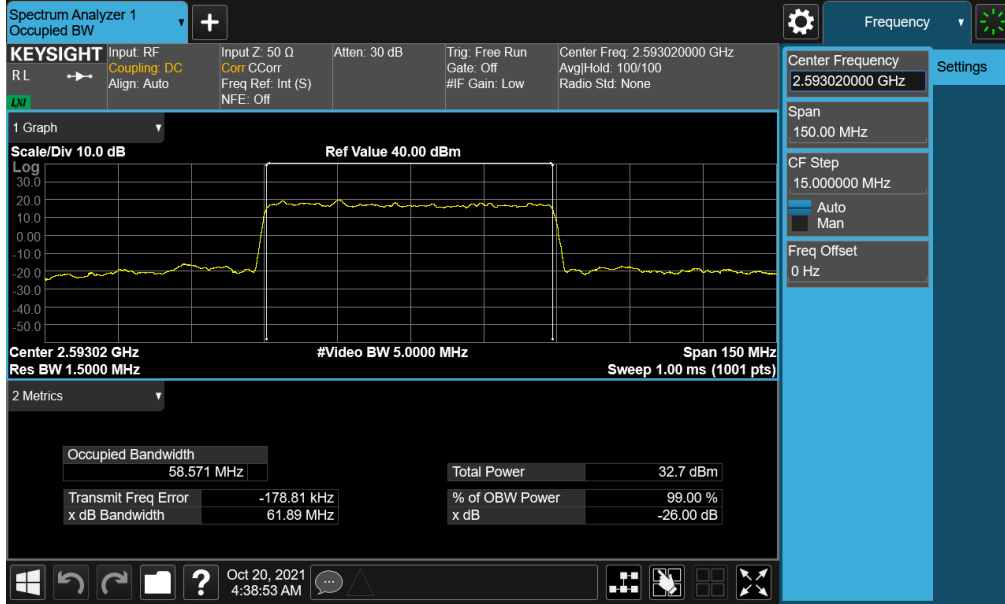


Plot 7-80. Occupied Bandwidth Plot (NR Band n41 - 70MHz QPSK - Full RB - Ant J)

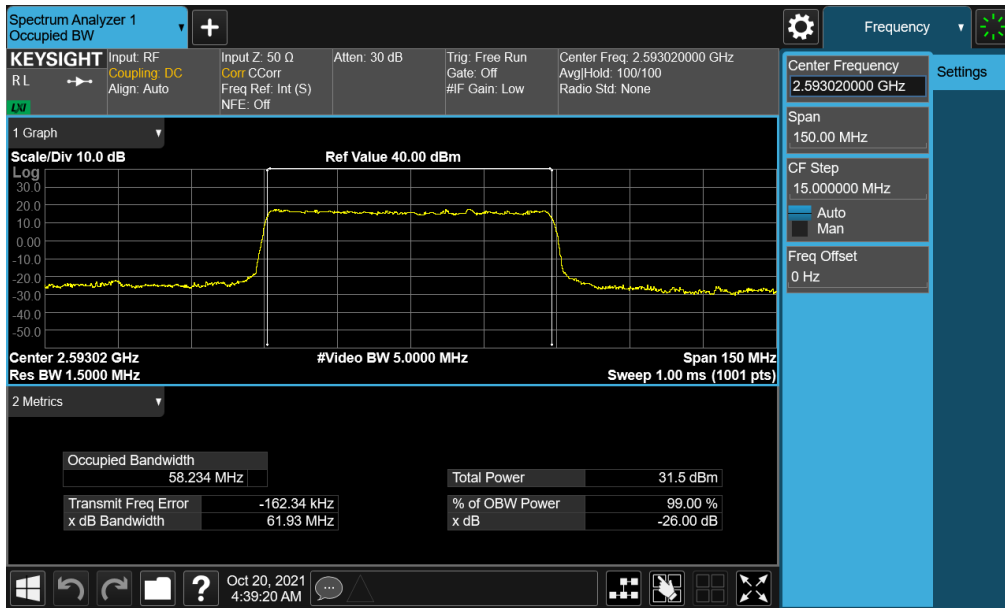


Plot 7-81. Occupied Bandwidth Plot (NR Band n41 - 70MHz 16-QAM - Full RB - Ant J)

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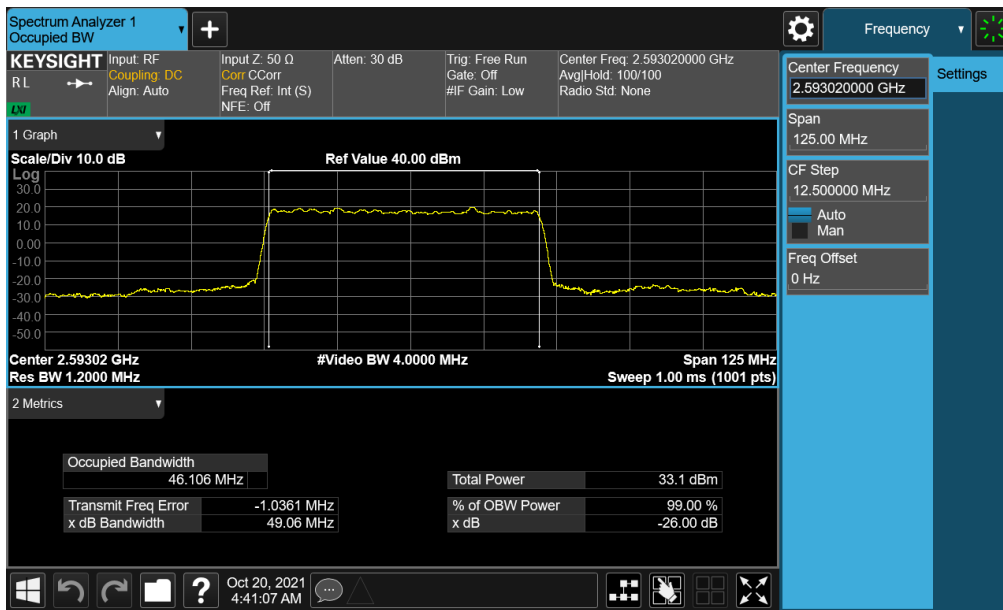
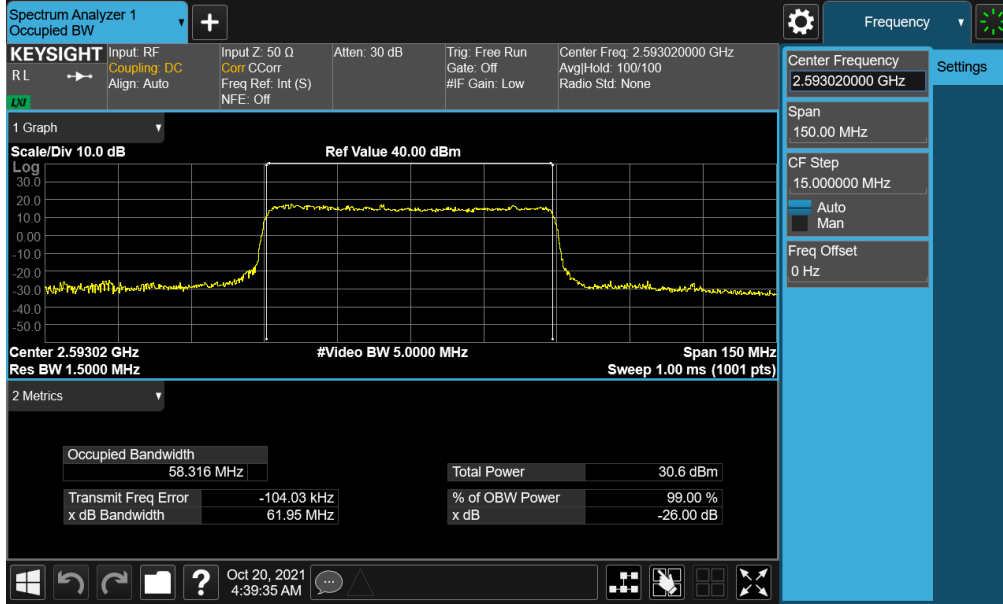


Plot 7-82. Occupied Bandwidth Plot (NR Band n41 - 60MHz $\pi/2$ BPSK - Full RB - Ant J)

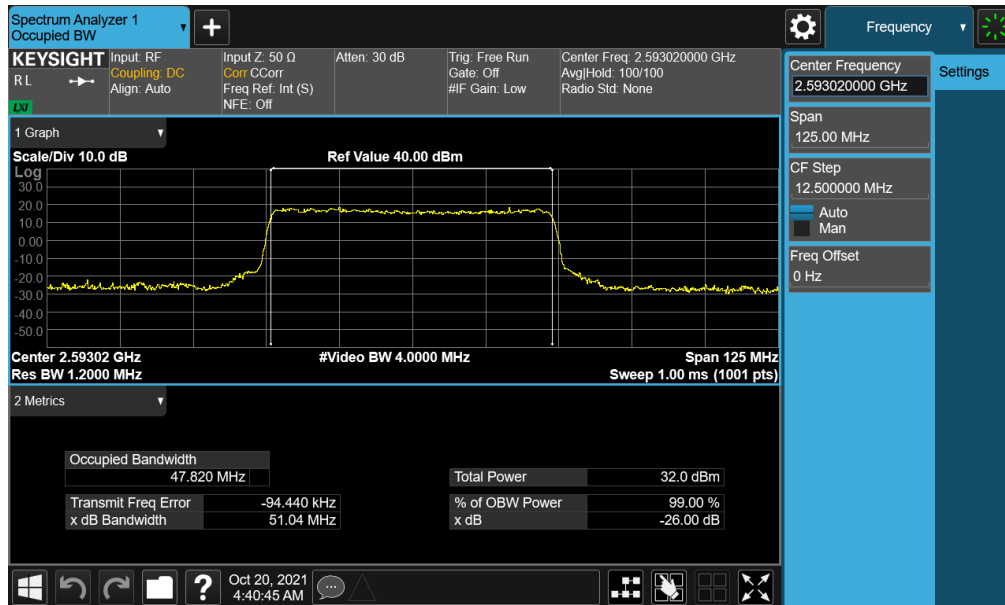


Plot 7-83. Occupied Bandwidth Plot (NR Band n41 - 60MHz QPSK - Full RB - Ant J)

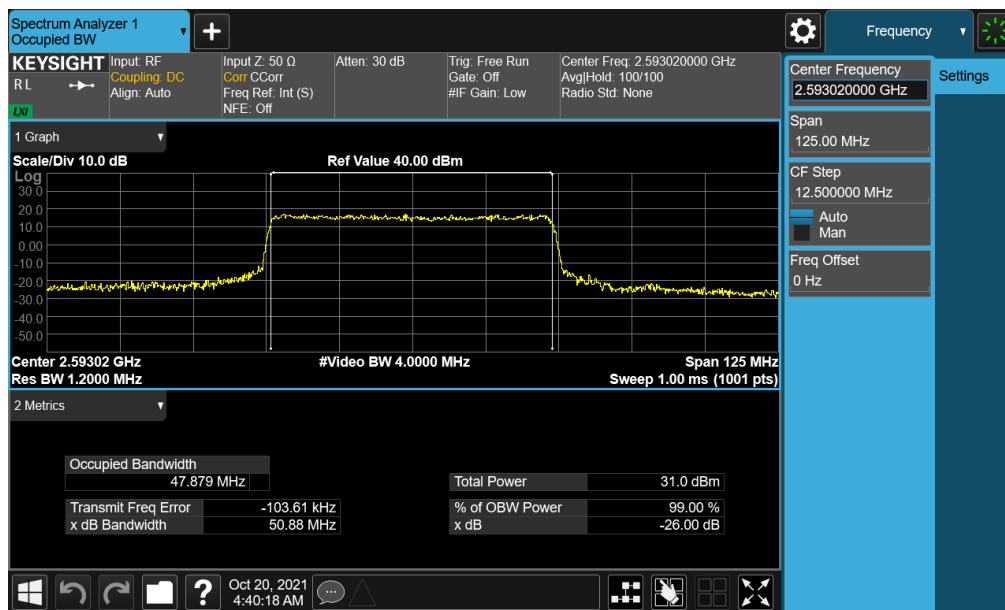
FCC ID: A3LSMS908U	PCTEST Proud to be part of element	PART 27 MEASUREMENT REPORT	SAMSUNG	Approved by: Technical Manager
Test Report S/N: 1M2109090102-05-R1.A3L	Test Dates: 9/14 - 11/12/2021	EUT Type: Portable Handset		Page 59 of 231






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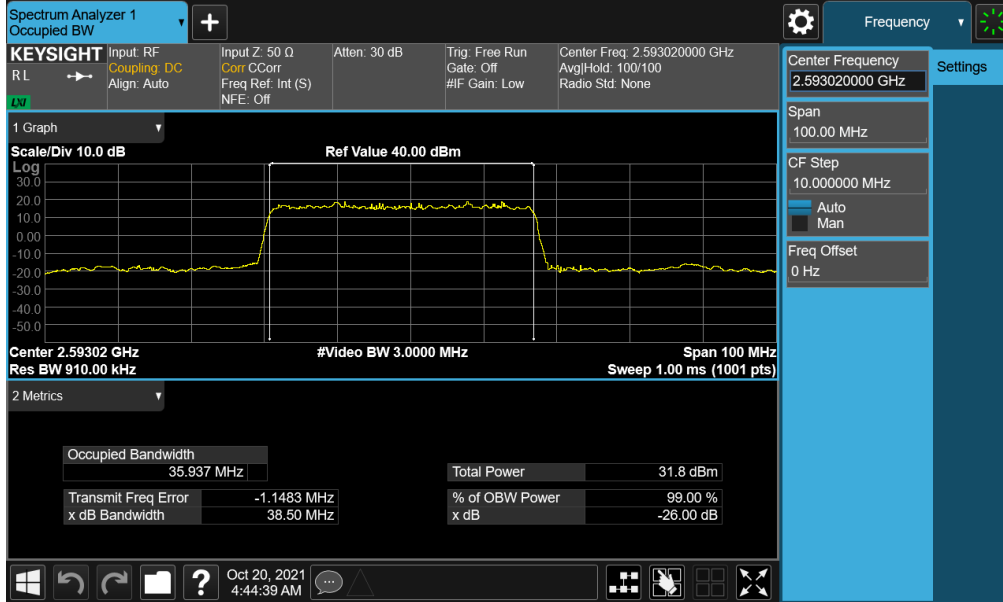


Plot 7-86. Occupied Bandwidth Plot (NR Band n41 - 50MHz QPSK - Full RB - Ant J)

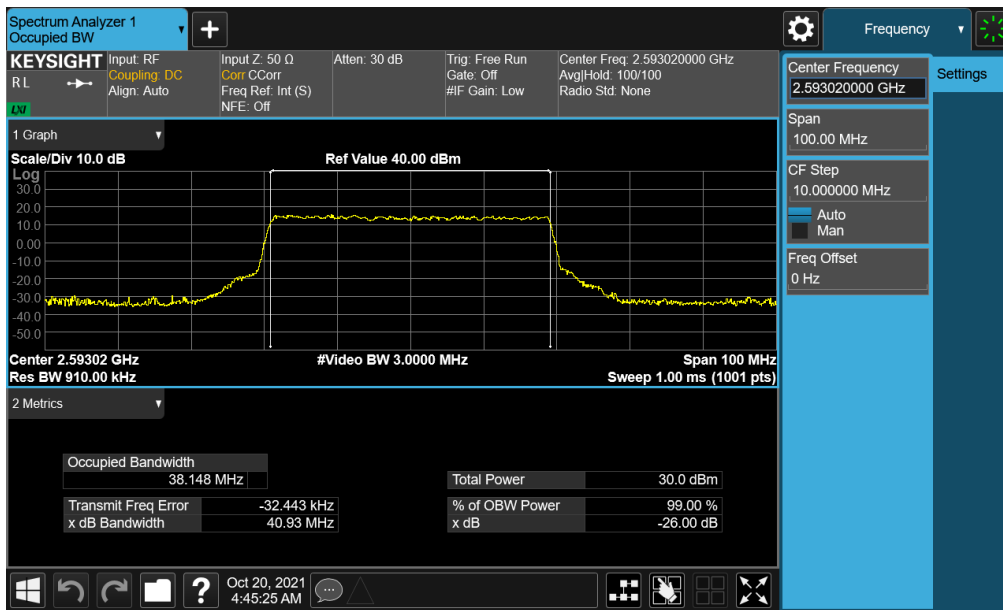


Plot 7-87. Occupied Bandwidth Plot (NR Band n41 - 50MHz 16-QAM - Full RB - Ant J)




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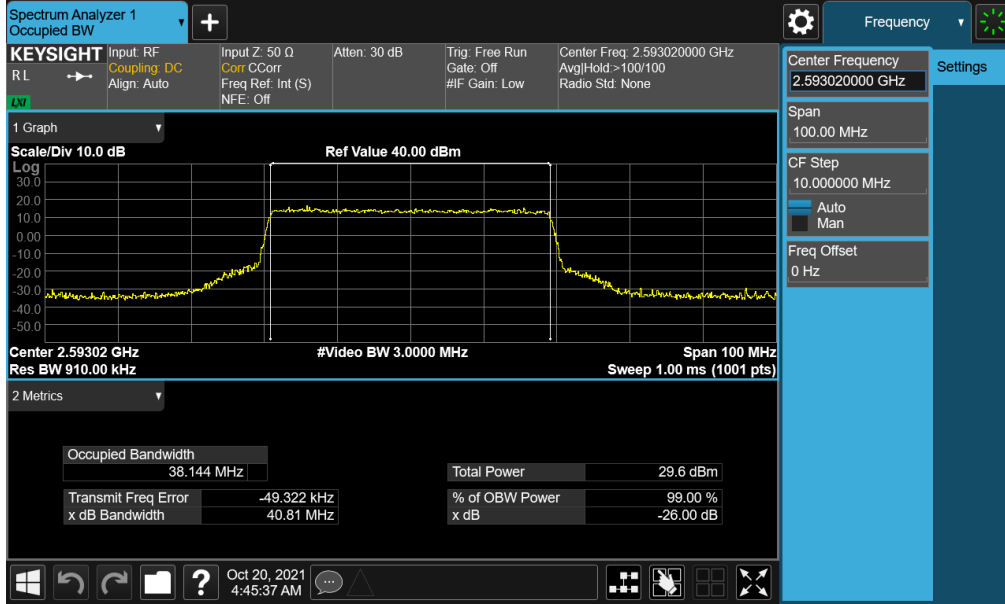


Plot 7-88. Occupied Bandwidth Plot (NR Band n41 - 40MHz $\pi/2$ BPSK - Full RB - Ant J)

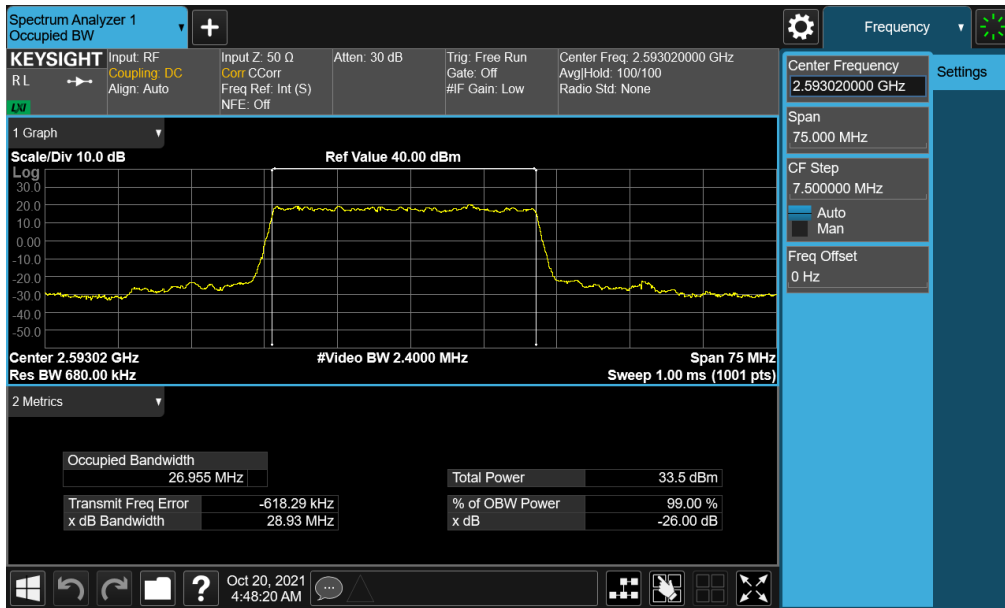


Plot 7-89. Occupied Bandwidth Plot (NR Band n41 - 40MHz QPSK - Full RB - Ant J)

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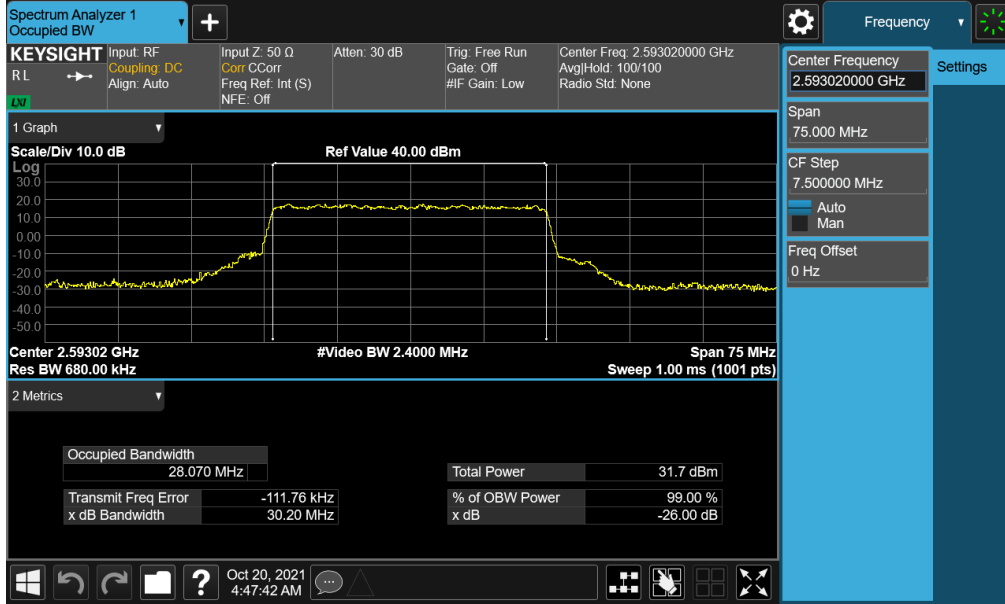


Plot 7-90. Occupied Bandwidth Plot (NR Band n41 - 40MHz 16-QAM - Full RB - Ant J)

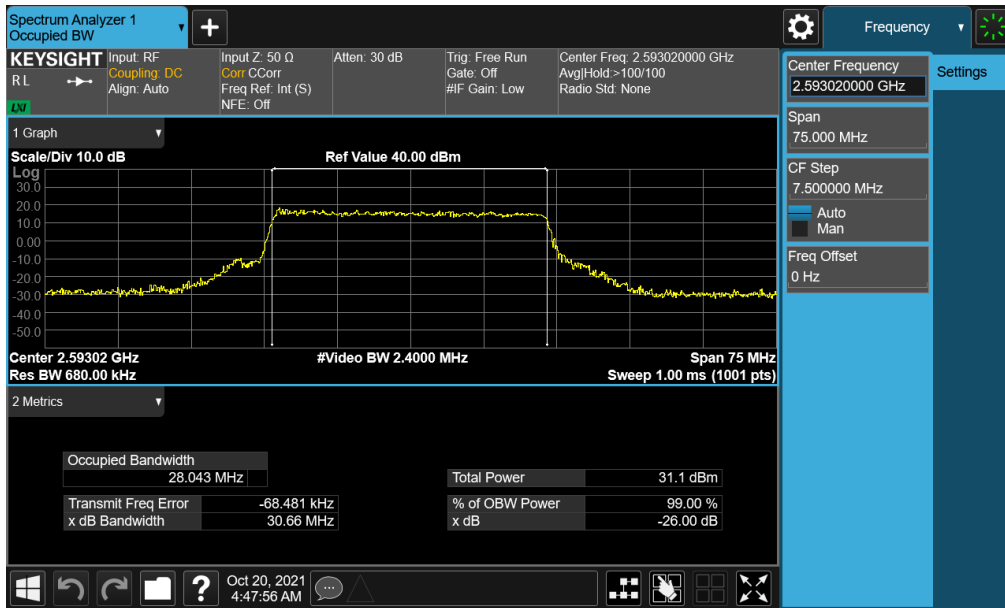


Plot 7-91. Occupied Bandwidth Plot (NR Band n41 - 30MHz $\pi/2$ BPSK - Full RB - Ant J)




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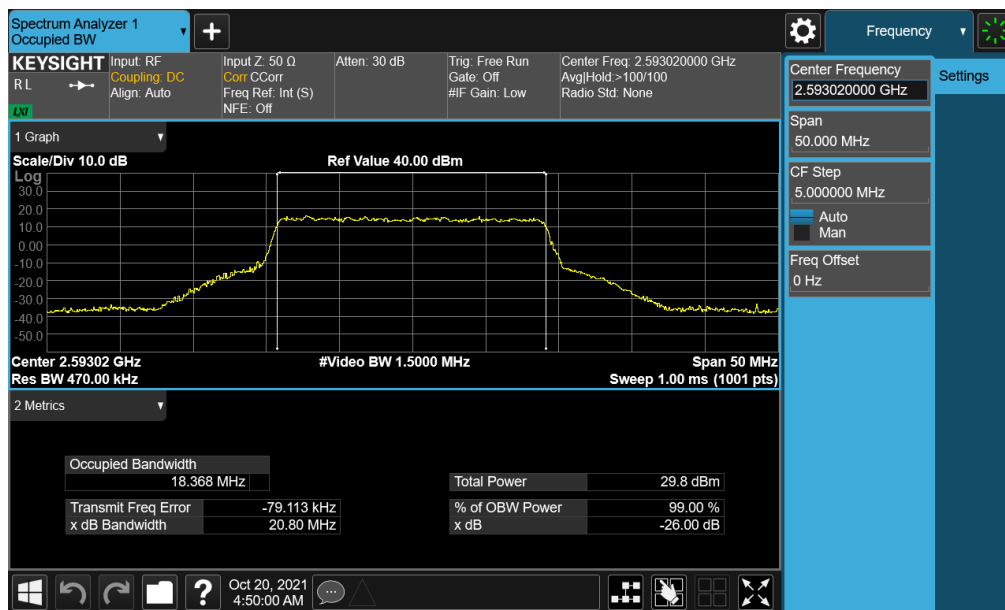
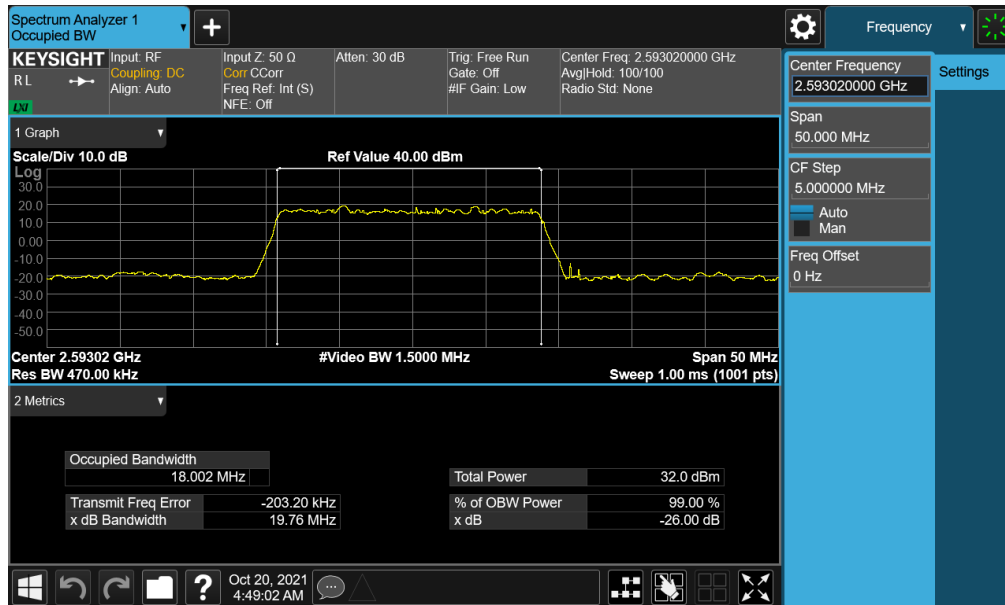


Plot 7-92. Occupied Bandwidth Plot (NR Band n41 - 30MHz QPSK - Full RB - Ant J)

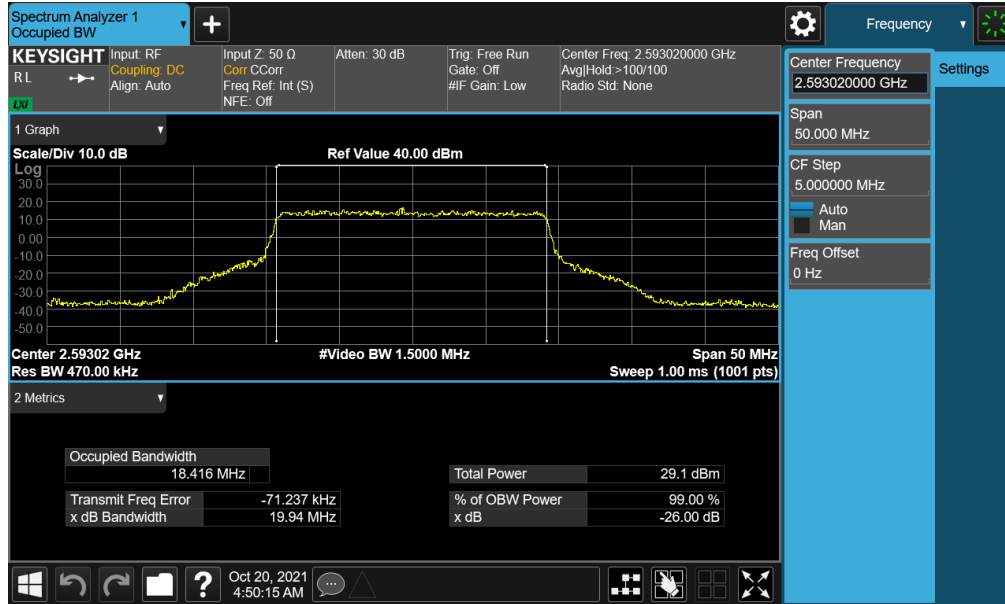


Plot 7-93. Occupied Bandwidth Plot (NR Band n41 - 30MHz 16-QAM - Full RB - Ant J)

FCC ID: A3LSMS908U	 PCTEST Proud to be part of 	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-96. Occupied Bandwidth Plot (NR Band n41 - 20MHz 16-QAM - Full RB - Ant J)

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7.4 Spurious and Harmonic Emissions at Antenna Terminal

Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 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.

For Band 30, the minimum permissible attenuation level of any spurious emission <2288MHz and >2365MHz is $70 + 10 \log_{10}(P_{[Watts]})$.

For Band 7 and 41, the minimum permissible attenuation level of any spurious emission is $55 + 10 \log_{10}(P_{[Watts]})$.

Test Procedure Used

KDB 971168 D01 v03r01 - Section 6.0

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to 10GHz (separated into at least two plots per channel)
2. Detector = RMS
3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
4. Sweep time = auto couple
5. The trace was allowed to stabilize
6. Please see test notes below for RBW and VBW settings

Test Setup

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

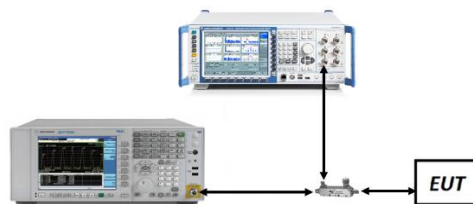




Figure 7-3. Test Instrument & Measurement Setup

Test Notes

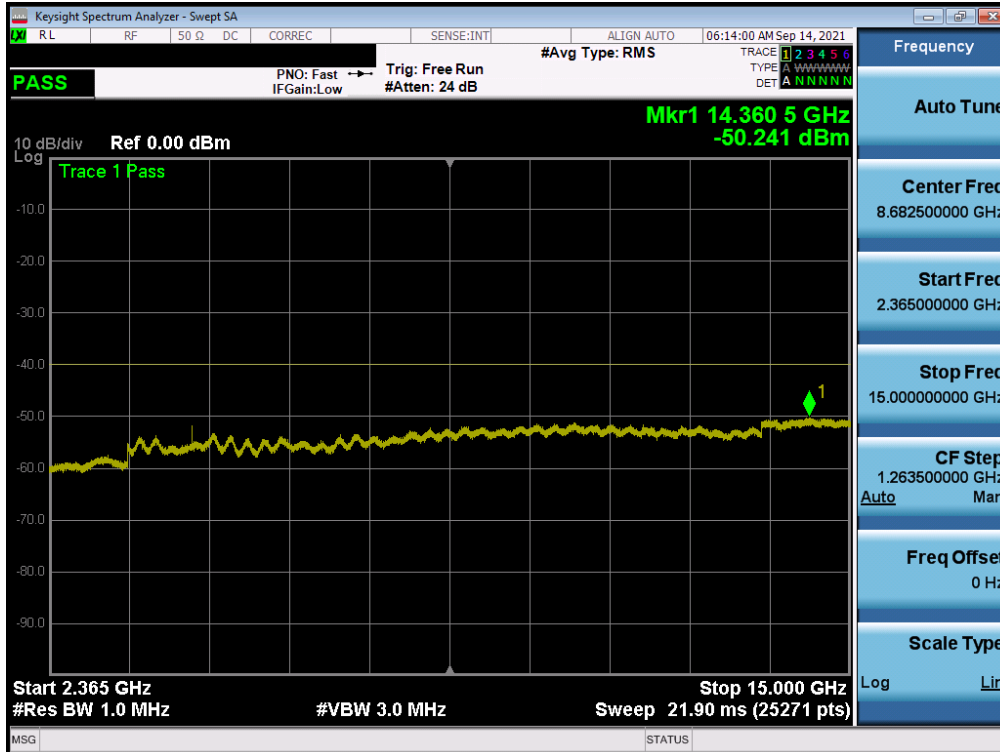
1. Per Part 27, RSS-195 and RSS-199, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth 100 kHz or greater for measurements below 1GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution 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 30

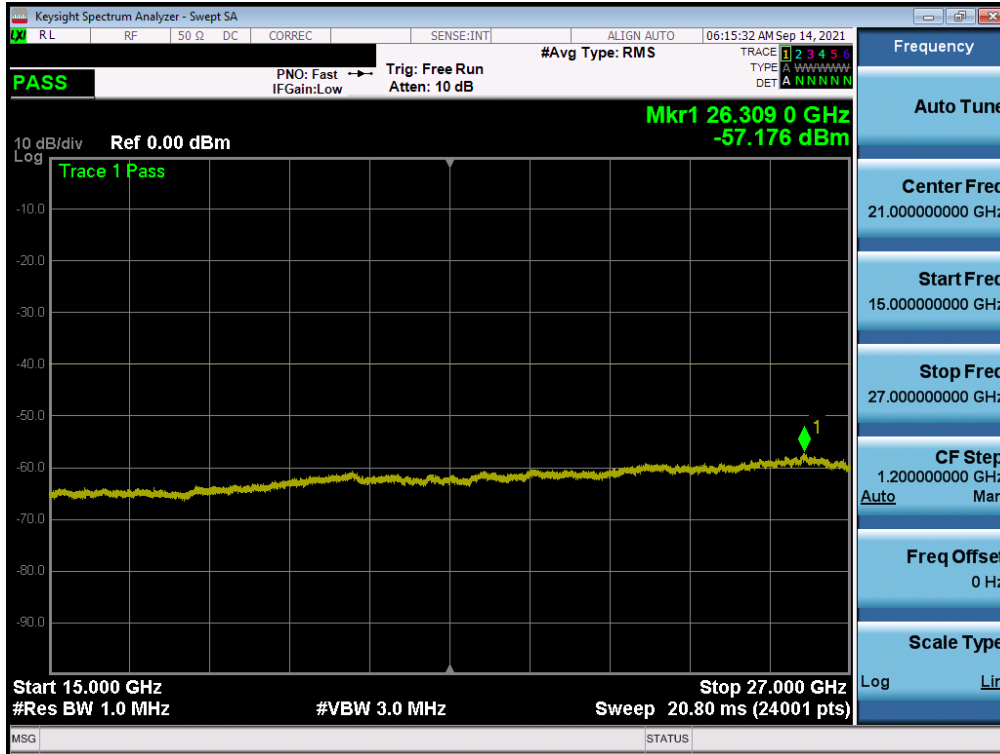


Plot 7-97. Conducted Spurious Plot (LTE Band 30 - 10MHz QPSK - RB Size 1, RB Offset 0)






Plot 7-98. Conducted Spurious Plot (LTE Band 30 - 10MHz QPSK - RB Size 1, RB Offset 0)

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Plot 7-99. Conducted Spurious Plot (LTE Band 30 - 10MHz QPSK - RB Size 1, RB Offset 0)

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