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PART 27 MEASUREMENT REPORT

Applicant Name:
Samsung Electronics Co., Ltd.
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Yeongtong-gu, Suwon-si
Gyeonggi-do, 16677, Korea

Date of Testing:
4/1/2022 - 6/23/2022
Test Report Issue Date:
6/23/2022
Test Site/Location:
Element Lab., Columbia, MD, USA
Test Report Serial No.:
1M2204010046-05.A3L

FCC ID:	**A3LSMF936U**
Applicant Name:	**Samsung Electronics Co., Ltd.**

Application Type:	Certification
Model:	SM-F936U
Additional Model(s):	SM-F936U1
EUT Type:	Portable Handset
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part:	27
Test Procedure(s):	ANSI C63.26-2015, KDB 648474 D03 v01r04

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in §2.947. Test results reported herein relate only to the item(s) tested.

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

RJ Ortanez
Executive Vice President

ACCREDITED
CERT #2041.01

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Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
LTE Band 30 ANT B	10 MHz	QPSK	2310.0	0.194	22.87	9M05G7D
		16QAM	2310.0	0.170	22.30	9M05W7D
	5 MHz	QPSK	2307.5 - 2312.5	0.198	22.96	4M53G7D
		16QAM	2307.5 - 2312.5	0.170	22.30	4M54W7D
LTE Band 7 ANT B	20 MHz	QPSK	2510.0 - 2560.0	0.249	23.96	18M0G7D
		16QAM	2510.0 - 2560.0	0.193	22.86	18M1W7D
	15 MHz	QPSK	2507.5 - 2562.5	0.247	23.93	13M5G7D
		16QAM	2507.5 - 2562.5	0.181	22.57	13M6W7D
	10 MHz	QPSK	2505.0 - 2565.0	0.258	24.12	9M03G7D
		16QAM	2505.0 - 2565.0	0.192	22.83	9M04W7D
	5 MHz	QPSK	2502.5 - 2567.5	0.266	24.25	4M55G7D
		16QAM	2502.5 - 2567.5	0.196	22.93	4M56W7D
LTE Band 41(PC2) ANT B	20 MHz	QPSK	2506.0 - 2680.0	0.371	25.69	18M0G7D
		16QAM	2506.0 - 2680.0	0.319	25.03	18M1W7D
	15 MHz	QPSK	2503.5 - 2682.5	0.350	25.44	13M4G7D
		16QAM	2503.5 - 2682.5	0.333	25.23	13M5W7D
	10 MHz	QPSK	2501.0 - 2685.0	0.386	25.86	9M00G7D
		16QAM	2501.0 - 2685.0	0.362	25.59	9M01W7D
	5 MHz	QPSK	2498.5 - 2687.5	0.346	25.39	4M52G7D
		16QAM	2498.5 - 2687.5	0.343	25.36	4M49W7D
LTE Band 41(PC3)/38 ANT B	20 MHz	QPSK	2506.0 - 2680.0	0.300	24.77	18M0G7D
		16QAM	2506.0 - 2680.0	0.235	23.71	18M0W7D
	15 MHz	QPSK	2503.5 - 2682.5	0.256	24.09	13M5G7D
		16QAM	2503.5 - 2682.5	0.235	23.71	13M5W7D
	10 MHz	QPSK	2501.0 - 2685.0	0.290	24.62	8M98G7D
		16QAM	2501.0 - 2685.0	0.255	24.06	9M00W7D
	5 MHz	QPSK	2498.5 - 2687.5	0.311	24.93	4M50G7D
		16QAM	2498.5 - 2687.5	0.245	23.89	4M51W7D
NR Band n30 ANT B	10 MHz	π/2 BPSK	2310.0	0.141	21.48	9M04G7D
		QPSK	2310.0	0.139	21.44	9M36G7D
		16QAM	2310.0	0.105	20.19	9M37W7D
	5 MHz	π/2 BPSK	2307.5 - 2312.5	0.138	21.40	4M56G7D
		QPSK	2307.5 - 2312.5	0.162	22.09	4M51G7D
		16QAM	2307.5 - 2312.5	0.116	20.63	4M53W7D
NR Band n7 ANT B	40MHz	π/2 BPSK	2520.0 - 2550.0	0.256	24.08	38M8G7D
		QPSK	2520.0 - 2550.0	0.245	23.88	38M9G7D
		16QAM	2520.0 - 2550.0	0.208	23.17	38M8W7D
	30 MHz	π/2 BPSK	2515.0 - 2555.0	0.257	24.10	28M8G7D
		QPSK	2515.0 - 2555.0	0.244	23.88	28M7G7D
		16QAM	2515.0 - 2555.0	0.200	23.01	28M7W7D
	25 MHz	π/2 BPSK	2512.5 - 2557.5	0.258	24.12	23M0G7D
		QPSK	2512.5 - 2557.5	0.238	23.77	24M0G7D
		16QAM	2512.5 - 2557.5	0.198	22.96	23M9W7D
	20MHz	π/2 BPSK	2510.0 - 2560.0	0.246	23.91	18M0G7D
		QPSK	2510.0 - 2560.0	0.239	23.78	19M0G7D
		16QAM	2510.0 - 2560.0	0.210	23.21	19M1W7D
	15 MHz	π/2 BPSK	2507.5 - 2562.5	0.255	24.07	13M5G7D
		QPSK	2507.5 - 2562.5	0.240	23.80	14M2G7D
		16QAM	2507.5 - 2562.5	0.201	23.04	14M2W7D
	10MHz	π/2 BPSK	2505.0 - 2565.0	0.260	24.14	9M01G7D
		QPSK	2505.0 - 2565.0	0.244	23.88	9M34G7D
		16QAM	2505.0 - 2565.0	0.202	23.06	9M32W7D
	5 MHz	π/2 BPSK	2502.5 - 2567.5	0.261	24.16	4M53G7D
		QPSK	2502.5 - 2567.5	0.240	23.81	4M52G7D
		16QAM	2502.5 - 2567.5	0.212	23.25	4M49W7D
NR Band n41 ANT F	100 MHz	π/2 BPSK	2546.0 - 2640.0	0.197	22.94	96M9G7D
		QPSK	2546.0 - 2640.0	0.203	23.08	98M0G7D
		16QAM	2546.0 - 2640.0	0.162	22.10	98M0W7D
	90 MHz	π/2 BPSK	2541.0 - 2645.0	0.189	22.77	87M3G7D
		QPSK	2541.0 - 2645.0	0.217	23.37	87M8G7D
		16QAM	2541.0 - 2645.0	0.210	23.23	87M9W7D
	80 MHz	π/2 BPSK	2536.0 - 2650.0	0.207	23.15	77M3G7D
		QPSK	2536.0 - 2650.0	0.205	23.11	78M1G7D
		16QAM	2536.0 - 2650.0	0.154	21.86	77M8W7D
	70 MHz	π/2 BPSK	2531.0 - 2655.0	0.185	22.68	64M6G7D
		QPSK	2531.0 - 2655.0	0.212	23.27	67M9G7D
		16QAM	2531.0 - 2655.0	0.182	22.59	67M7W7D
	60 MHz	π/2 BPSK	2526.0 - 2660.0	0.225	23.53	58M1G7D
		QPSK	2526.0 - 2660.0	0.204	23.10	58M2G7D
		16QAM	2526.0 - 2660.0	0.182	22.60	58M1W7D
	50 MHz	π/2 BPSK	2521.0 - 2665.0	0.221	23.44	46M1G7D
		QPSK	2521.0 - 2665.0	0.213	23.28	47M8G7D
		16QAM	2521.0 - 2665.0	0.157	21.95	47M8W7D
	40 MHz	π/2 BPSK	2516.0 - 2670.0	0.214	23.30	35M9G7D
		QPSK	2516.0 - 2670.0	0.248	23.95	38M1G7D
		16QAM	2516.0 - 2670.0	0.195	22.91	38M0W7D
	30 MHz	π/2 BPSK	2511.0 - 2675.0	0.212	23.27	27M0G7D
		QPSK	2511.0 - 2675.0	0.270	24.32	28M0G7D
		16QAM	2511.0 - 2675.0	0.208	23.18	27M9W7D
	20 MHz	π/2 BPSK	2506.0 - 2680.0	0.229	23.59	18M1G7D
		QPSK	2506.0 - 2680.0	0.261	24.17	18M3G7D
		16QAM	2506.0 - 2680.0	0.198	22.96	18M4W7D

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
LTE Band 30 ANT F	10 MHz	QPSK	2310.0	0.114	20.58	9M05G7D
		16QAM	2310.0	0.085	19.32	9M03W7D
	5 MHz	QPSK	2307.5 - 2312.5	0.120	20.79	4M54G7D
		16QAM	2307.5 - 2312.5	0.094	19.72	4M54W7D
LTE Band 7 ANT F	20 MHz	QPSK	2510.0 - 2560.0	0.169	22.27	18M0G7D
		16QAM	2510.0 - 2560.0	0.146	21.63	17M9W7D
	15 MHz	QPSK	2507.5 - 2562.5	0.171	22.34	13M5G7D
		16QAM	2507.5 - 2562.5	0.145	21.61	13M6W7D
	10 MHz	QPSK	2505.0 - 2565.0	0.174	22.42	9M02G7D
		16QAM	2505.0 - 2565.0	0.152	21.83	9M03W7D
	5 MHz	QPSK	2502.5 - 2567.5	0.176	22.45	4M51G7D
		16QAM	2502.5 - 2567.5	0.151	21.79	4M51W7D
LTE Band 41(PC2) ANT F	20 MHz	QPSK	2506.0 - 2680.0	0.218	23.38	17M8G7D
		16QAM	2506.0 - 2680.0	0.196	22.93	17M9W7D
	15 MHz	QPSK	2503.5 - 2682.5	0.229	23.60	13M6G7D
		16QAM	2503.5 - 2682.5	0.204	23.10	13M5W7D
	10 MHz	QPSK	2501.0 - 2685.0	0.226	23.54	8M96G7D
		16QAM	2501.0 - 2685.0	0.239	23.78	8M99W7D
	5 MHz	QPSK	2498.5 - 2687.5	0.289	24.61	4M47G7D
		16QAM	2498.5 - 2687.5	0.253	24.04	4M45W7D
NR Band n30 ANT F	10 MHz	π/2 BPSK	2310.0	0.109	20.39	9M03G7D
		QPSK	2310.0	0.108	20.33	9M37G7D
		16QAM	2310.0	0.091	19.58	9M37W7D
	5 MHz	π/2 BPSK	2307.5 - 2312.5	0.108	20.35	4M54G7D
		QPSK	2307.5 - 2312.5	0.105	20.19	4M51G7D
		16QAM	2307.5 - 2312.5	0.090	19.56	4M50W7D
NR Band n7 ANT F	40MHz	π/2 BPSK	2520.0 - 2550.0	0.150	21.75	38M8G7D
		QPSK	2520.0 - 2550.0	0.146	21.65	38M8G7D
		16QAM	2520.0 - 2550.0	0.119	20.77	38M7W7D
	30MHz	π/2 BPSK	2515.0 - 2555.0	0.151	21.79	28M7G7D
		QPSK	2515.0 - 2555.0	0.151	21.79	28M7G7D
		16QAM	2515.0 - 2555.0	0.125	20.98	28M7W7D
	25 MHz	π/2 BPSK	2512.5 - 2557.5	0.152	21.83	23M0G7D
		QPSK	2512.5 - 2557.5	0.144	21.57	23M9G7D
		16QAM	2512.5 - 2557.5	0.122	20.87	23M9W7D
	20MHz	π/2 BPSK	2510.0 - 2560.0	0.146	21.65	18M0G7D
		QPSK	2510.0 - 2560.0	0.140	21.47	19M0G7D
		16QAM	2510.0 - 2560.0	0.120	20.79	19M1W7D
	15 MHz	π/2 BPSK	2507.5 - 2562.5	0.140	21.47	13M5G7D
		QPSK	2507.5 - 2562.5	0.139	21.42	14M2G7D
		16QAM	2507.5 - 2562.5	0.116	20.64	14M2W7D
	10MHz	π/2 BPSK	2505.0 - 2565.0	0.142	21.51	9M01G7D
		QPSK	2505.0 - 2565.0	0.140	21.45	9M34G7D
		16QAM	2505.0 - 2565.0	0.119	20.74	9M35W7D
	5 MHz	π/2 BPSK	2502.5 - 2567.5	0.142	21.52	4M50G7D
		QPSK	2502.5 - 2567.5	0.139	21.44	4M51G7D
		16QAM	2502.5 - 2567.5	0.118	20.73	4M50W7D

1.0 INTRODUCTION

1.1 Scope

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

1.2 Element Test Location

These measurement tests were conducted at the Element laboratory 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 Element lab located in Columbia, MD 21046, U.S.A.

- Element Washington DC LLC 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.

- Element Washington DC LLC 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).

- Element Washington DC LLC facility is a registered (2451B) test laboratory with the site description on file with ISED.

- Element Washington DC LLC is a Recognized U.S. Certification Assessment Body (CAB # US0110) for ISED Canada as designated by NIST under the U.S. and Canada Mutual Recognition Agreement.

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMF936U**. 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.: 0072M, 0061M, 0047M, 0060M, 1777M, 1817M, 1781M, 1774M

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, Multi-band 5G NR (FR1 and FR2), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5,6GHz), 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 F) and 3 Rx antennas (Ant B, E, C). 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.

This EUT supports 2 antennas (Ant B and Ant F) for multiple bands. 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 C63.26-2015. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

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

This device supports wireless charging capability and, thus, is subject to the test requirements of KDB 648474 D03 v01r04. Additional radiated spurious emission measurements were performed with the EUT lying flat on an authorized wireless charging pad (WCP) Model: EP-N5100 while operating under normal conditions in a simulated call or data transmission configuration. The worst case radiated emissions data is shown in this report.

2.4 Software and Firmware

Testing was performed on device(s) using software/firmware version F936USQU0AVEC installed on the EUT.

2.5 EMI Suppression Device(s)/Modifications

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

3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

The measurement procedures described in the "American National Standard for Compliance Testing of Transmitters Used in Licensed Radio Services" (ANSI C63.26-2015) were used in the measurement of the EUT**.**

Deviation from Measurement Procedure……..None

3.2 Radiated Power and Radiated Spurious Emissions

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

The equipment under test was transmitting while connected to its integral antenna and is placed on a turntable 3 meters from the receive antenna. The receive antenna height is adjusted between 1 and 4 meter height, the turntable is rotated through 360 degrees, and the EUT is manipulated through all orthogonal planes representative of its typical use to achieve the highest reading on the receive spectrum analyzer.

For radiated power measurements, substitution method is used per the guidance of ANSI C63.26-2015. For emissions below 1GHz, a half-wave dipole is substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

$$P_{d\ [dBm]} = P_{g\ [dBm]} - \text{cable loss}_{\ [dB]} + \text{antenna gain}_{\ [dBd/dBi]};$$

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 $P_{g\ [dBm]}$ – cable loss $_{[dB]}$.

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

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

And

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

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4-2014. Additionally, radiated emissions below 30MHz are also validated on an Open Area Test Site to assert correlation with the chamber measurements per the requirements of KDB 414788 D01 v01r01.

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

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 (±dB)
Conducted Bench Top Measurements	1.13
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

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
-	LTx1	Licensed Transmitter Cable Set	12/9/2021	Annual	12/9/2022	LTx1
-	LTx2	Licensed Transmitter Cable Set	12/19/2021	Annual	12/19/2022	LTx2
-	LTx3	LIcensed Transmitter Cable Set	8/18/2021	Annual	8/18/2022	LTx3
-	LTx4	Licensed Transmitter Cable Set	12/19/2021	Annual	12/19/2022	LTx4
-	LTx5	LIcensed Transmitter Cable Set	12/19/2021	Annual	12/19/2022	LTx5
Agilent	N9020A	MXA Signal Analyzer	3/4/2022	Annual	3/4/2023	US46470561
Agilent	N9038A	MXE EMI Receiver	1/21/2022	Annual	1/21/2023	MY51210133
Anritsu	MT8820C	Radio Communication Analyzer	N/A			6201300731
Anritsu	MT8821C	Radio Communication Analyzer	N/A			6201381794
Anritsu	MT8821C	Radio Communication Analyzer	N/A			6200901190
Emco	3115	Horn Antenna (1-18GHz)	6/18/2020	Biennial	6/18/2022	9704-5182
Espec	ESX-2CA	Environmental Chamber	5/25/2022	Annual	5/25/2023	17620
Keysight Technologies	N9030A	PXA Signal Analyzer (3Hz-26.5GHz)	2/14/2022	Annual	2/14/2023	MY54490576
Keysight Technologies	N9020A	MXA Signal Analyzer	3/15/2022	Annual	3/15/2023	MY54500644
Mini Circuits	TVA-11-422	RF Power Amp	N/A			QA1317001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11403100002
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			100976
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			112347
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			102060
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	DRH-118	Horn Antenna (1-18GHz)	2/14/2022	Biennial	2/14/2024	A050307
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107

Table 5-1. Test Equipment

Notes:

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

2. Equipment with a calibration date of “N/A” shown in this list was not used to make direct calibrated measurements.

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.

7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.

FCC ID: A3LSMF936U

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)(4)	Undesirable emissions must meet the limits detailed in 27.53(m)(4)	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**.

Notes:

1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
2) The analyzer plots were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
4) All conducted emissions measurements are performed with automated test software to capture the corresponding plots necessary to show compliance. The measurement software utilized is EMC Software Tool v1.1.

7.2 Conducted Output Power Data

Test Overview

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

A-MPR is implemented in this device when operating at Power Class 2 in LTE Band 41 per the A-MPR specification in 3GPP TS 36.101. The conducted powers are shown herein to cover the different A-MPR levels specified in the standard. Measurement equipment was set up with triggering/gating on the spectrum analyzer such that powers were measured only during the on-time of the signal.

Test Procedure Used

ANSI C63.26-2015 – Section 5.2

Test Settings

1. Span = 2 x OBW to 3 x OBW
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.

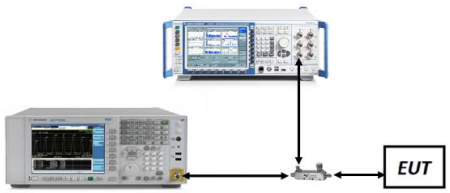


Figure 7-1. Test Instrument & Measurement Setup

Test Notes

1. Uplink carrier aggregation is only supported in this EUT while operating in Power Class 3.

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

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

NS	MCC	MNC	Channel BW [MHz]	Channel Number	Channel Frequency [MHz]	RB Size	RB Offset	A-MPR [dB]	Modulation	MPR [dB]	Measured Power [dBm]
01	312	530	15	39725	2503.5	1	0	5	QPSK	0	21.80
									16-QAM	1	19.60
									64-QAM	2	18.59
			15	39725	2503.5	20	0	2	QPSK	0	22.86
									16-QAM	1	21.96
									64-QAM	2	20.74
			15	39725	2503.5	75	0	4	QPSK	0	20.72
									16-QAM	1	19.86
									64-QAM	2	18.79
			15	39725	2503.5	50	15	3	QPSK	0	21.80
									16-QAM	1	20.70
									64-QAM	2	19.99
			15	39725	2503.5	1	60	0	QPSK	0	24.77
									16-QAM	1	23.98
									64-QAM	2	22.76
			20	39750	2506	1	0	5	QPSK	0	23.19
									16-QAM	1	22.53
									64-QAM	2	21.21
									256-QAM	4	18.29
			20	39750	2506	20	0	2	QPSK	0	22.81
									16-QAM	1	21.77
									64-QAM	2	20.81
									256-QAM	4	18.89
			20	39750	2506	100	0	4	QPSK	0	22.36
									16-QAM	1	21.26
									64-QAM	2	20.39
									256-QAM	4	18.22
			20	39750	2506	75	24	3	QPSK	0	22.29
									16-QAM	1	21.37
									64-QAM	2	20.41
									256-QAM	4	18.51
			20	39750	2506	1	77	0	QPSK	0	23.39
									16-QAM	1	22.73
									64-QAM	2	21.8
									256-QAM	4	18.5

Table 7-1. A-MPR Conducted Power Data (LTE Band 41(PC2) – Ant B)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
20 MHz	QPSK	20850	2510.0	1 / 50	23.92
		21100	2535.0	1 / 99	24.19
		21350	2560.0	1 / 50	24.41
	16-QAM	21100	2535.0	1 / 99	23.64
15 MHz	QPSK	20825	2507.5	1 / 37	24.05
		21100	2535.0	1 / 37	24.15
		21375	2562.5	1 / 74	24.46
	16-QAM	21100	2535.0	1 / 37	23.35
10 MHz	QPSK	20800	2505.0	1 / 25	24.15
		21100	2535.0	1 / 49	24.35
		21400	2565.0	1 / 0	24.59
	16-QAM	21100	2535.0	1 / 0	23.61
5 MHz	QPSK	20775	2502.5	1 / 12	24.10
		21100	2535.0	1 / 12	24.48
		21425	2567.5	1 / 12	24.76
	16-QAM	21100	2535.0	1 / 24	23.71

Table 7-2.Conducted Power Data (LTE Band 7 – Ant B)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
10 M	QPSK	27710	2310.0	1 / 0	23.06
	16-QAM	27710	2310.0	1 / 0	22.48
5 MHz	QPSK	27685	2307.5	1 / 24	23.14
		27710	2310.0	1 / 12	23.15
		27735	2312.5	1 / 12	23.14
	16-QAM	27685	2307.5	1 / 0	22.48

Table 7-3.Conducted Power Data (LTE Band 30 – Ant B)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
20 MHz	QPSK	39750	2506.0	1 / 50	25.69
		40620	2593.0	1 / 0	26.51
		41490	2680.0	1 / 50	25.99
	16-QAM	40620	2593.0	1 / 99	25.56
15 MHz	QPSK	39725	2503.5	1 / 0	26.19
		40620	2593.0	1 / 37	26.21
		41515	2682.5	1 / 0	26.30
	16-QAM	41515	2682.5	1 / 0	25.76
10 MHz	QPSK	39700	2501.0	1 / 25	25.49
		40620	2593.0	1 / 0	26.68
		41540	2685.0	1 / 0	26.29
	16-QAM	40620	2593.0	1 / 0	26.12
5 MHz	QPSK	39675	2498.5	1 / 12	26.36
		40620	2593.0	1 / 12	25.95
		41565	2687.5	1 / 0	26.23
	16-QAM	41565	2687.5	1 / 0	25.86

Table 7-4.Conducted Power Data (LTE Band 41 (PC2) – Ant B)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
20 MHz	QPSK	39750	2506.0	1 / 50	24.19
		40620	2593.0	1 / 50	24.66
		41490	2680.0	1 / 99	24.86
	16-QAM	40620	2593.0	1 / 50	23.27
15 MHz	QPSK	39725	2503.5	1 / 37	23.81
		40620	2593.0	1 / 37	24.06
		41515	2682.5	1 / 37	24.18
	16-QAM	41515	2682.5	1 / 37	23.02
10 MHz	QPSK	39700	2501.0	1 / 25	24.34
		40620	2593.0	1 / 25	24.53
		41540	2685.0	1 / 25	24.71
	16-QAM	41540	2685.0	1 / 25	23.37
5 MHz	QPSK	39675	2498.5	1 / 0	24.81
		40620	2593.0	1 / 0	24.89
		41565	2687.5	1 / 0	25.02
	16-QAM	41565	2687.5	1 / 12	23.20

Table 7-5.Conducted Power Data (LTE Band 41 (PC3)/38 – Ant B)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
40 MHz	π/2 BPSK	504000	2520.0	1 / 161	23.81
		507000	2535.0	1 / 161	23.77
		510000	2550.0	1 / 161	23.95
	QPSK	504000	2520.0	1 / 54	23.78
		507000	2535.0	1 / 161	23.74
		510000	2550.0	1 / 161	23.91
	16-QAM	504000	2520.0	1 / 54	23.11
30 MHz	π/2 BPSK	503000	2515.0	1 / 40	23.83
		507000	2535.0	1 / 119	23.61
		511000	2555.0	1 / 119	23.90
	QPSK	503000	2515.0	1 / 80	23.77
		507000	2535.0	1 / 40	23.56
		511000	2555.0	1 / 119	23.93
	16-QAM	503000	2515.0	1 / 80	22.94
25 MHz	π/2 BPSK	502500	2512.5	1 / 33	23.85
		507000	2535.0	1 / 99	23.53
		511500	2557.5	1 / 99	23.82
	QPSK	502500	2512.5	1 / 66	23.67
		507000	2535.0	1 / 99	23.48
		511500	2557.5	1 / 99	23.80
	16-QAM	502500	2512.5	1 / 33	22.90
20 MHz	π/2 BPSK	502000	2510.0	1 / 79	23.64
		507000	2535.0	1 / 53	23.49
		512000	2560.0	1 / 79	23.95
	QPSK	502000	2510.0	1 / 26	23.67
		507000	2535.0	1 / 79	23.20
		512000	2560.0	1 / 79	23.73
	16-QAM	502000	2510.0	1 / 26	23.15
15 MHz	π/2 BPSK	501500	2507.5	1 / 39	23.80
		507000	2535.0	1 / 20	23.40
		512500	2562.5	1 / 58	23.91
	QPSK	501500	2507.5	1 / 58	23.69
		507000	2535.0	1 / 39	23.19
		512500	2562.5	1 / 58	23.82
	16-QAM	501500	2507.5	1 / 20	22.98
10 MHz	π/2 BPSK	501000	2505.0	1 / 13	23.87
		507000	2535.0	1 / 38	23.36
		513000	2565.0	1 / 38	23.90
	QPSK	501000	2505.0	1 / 26	23.78
		507000	2535.0	1 / 26	23.16
		513000	2565.0	1 / 26	23.81
	16-QAM	501000	2505.0	1 / 13	23.00
5 MHz	π/2 BPSK	500500	2502.5	1 / 18	23.89
		507000	2535.0	1 / 18	23.41
		513500	2567.5	1 / 12	23.97
	QPSK	500500	2502.5	1 / 6	23.71
		507000	2535.0	1 / 18	23.24
		513500	2567.5	1 / 12	23.92
	16-QAM	500500	2502.5	1 / 6	23.19

Table 7-6. Conducted Power Data (NR Band n7 – Ant B)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
10 MHz	π/2 BPSK	27710	2310.0	1 / 38	22.62
	QPSK	27710	2310.0	1 / 26	22.11
	16-QAM	27710	2310.0	1 / 26	21.61
5 MHz	π/2 BPSK	27685	2307.5	1 / 18	22.46
		27710	2310.0	1 / 12	22.54
		27735	2312.5	1 / 18	22.39
	QPSK	27685	2307.5	1 / 18	22.44
		27710	2310.0	1 / 6	22.76
		27735	2312.5	1 / 6	22.46
	16-QAM	27710	2310.0	1 / 12	22.05

Table 7-7. Conducted Power Data (NR Band n30 – Ant B)

NR (SCS 15kHz)						LTE						NR Conducted Power [dBm]	LTE Conducted Power [dBm]	EN-DC Total Tx. Power [dBm]
NR Band	NR Bandwidth [MHz]	NR Channel	NR Frequency [MHz]	Mod.	NR RB#/Offset	LTE Band	LTE Bandwidth [MHz]	LTE Channel	LTE Frequency [MHz]	Mod.	LTE RB#/Offset			
n30	10	Mid	2310	QPSK	50/0	B12	10	Mid	707.5	QPSK	50/0	18.53	22.98	24.31
				QPSK	50/0					QPSK	1/25	18.54	23.02	24.34
				QPSK	1/26					QPSK	50/0	18.66	22.90	24.29
				QPSK	1/26					QPSK	1/25	18.67	23.05	24.40
				16Q	1/26					16Q	1/25	18.57	23.09	24.40

Table 7-8. Conducted Power Data (EN-DC NR n30 [Ant B] + LTE B12 [Ant A])

NR (SCS 15kHz)						LTE						NR Conducted Power [dBm]	LTE Conducted Power [dBm]	EN-DC Total Tx. Power [dBm]
NR Band	NR Bandwidth [MHz]	NR Channel	NR Frequency [MHz]	Mod.	NR RB#/Offset	LTE Band	LTE Bandwidth [MHz]	LTE Channel	LTE Frequency [MHz]	Mod.	LTE RB#/Offset			
n30	10	Mid	2310	QPSK	50/0	B5	10	Mid	836.5	QPSK	50/0	17.96	22.97	24.16
				QPSK	50/0					QPSK	1/25	18.03	23.19	24.35
				QPSK	1/26					QPSK	50/0	19.03	23.06	24.51
				QPSK	1/26					QPSK	1/25	18.64	23.22	24.52
				16Q	1/26					16Q	1/25	18.51	23.04	24.35

Table 7-9. Conducted Power Data (EN-DC NR n30 [Ant B] + LTE B5 [Ant A])

NR (SCS 15kHz)						LTE						NR Conducted Power [dBm]	LTE Conducted Power [dBm]	EN-DC Total Tx. Power [dBm]
NR Band	NR Bandwidth [MHz]	NR Channel	NR Frequency [MHz]	Mod.	NR RB#/Offset	LTE Band	LTE Bandwidth [MHz]	LTE Channel	LTE Frequency [MHz]	Mod.	LTE RB#/Offset			
n30	10	Mid	2310	QPSK	50/0	B2	20	Mid	1880	QPSK	100 / 0	13.98	22.11	22.73
				QPSK	50/0					QPSK	1 / 50	14.00	22.68	23.23
				QPSK	1/26					QPSK	100 / 0	14.01	22.06	22.69
				QPSK	1/26					QPSK	1 / 50	14.02	22.65	23.21
				16Q	50/0					16Q	1 / 50	13.93	22.15	22.76

Table 7-10. Conducted Power Data (EN-DC NR n30 [Ant F] + LTE B2 [Ant B])

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	509202	2546.0	1 / 204	26.01
		518598	2593.0	1 / 136	26.26
		528000	2640.0	1 / 136	25.94
	QPSK	509202	2546.0	1 / 204	25.66
		518598	2593.0	1 / 136	26.13
		528000	2640.0	1 / 136	26.51
	16-QAM	509202	2546.0	1 / 136	24.81
90 MHz	π/2 BPSK	508200	2541.0	1 / 183	25.82
		518592	2593.0	1 / 61	26.03
		529002	2645.0	1 / 122	25.91
	QPSK	508200	2541.0	1 / 183	25.95
		518592	2593.0	1 / 61	26.17
		529002	2645.0	1 / 61	26.19
	16-QAM	508200	2541.0	1 / 183	25.95
80 MHz	π/2 BPSK	507204	2536.0	1 / 54	25.95
		518598	2593.0	1 / 162	26.59
		529998	2650.0	1 / 54	26.29
	QPSK	507204	2536.0	1 / 162	25.69
		518598	2593.0	1 / 54	25.90
		529998	2650.0	1 / 108	25.87
	16-QAM	507204	2536.0	1 / 162	24.58
70 MHz	π/2 BPSK	506196	2531.0	1 / 121	25.54
		518598	2593.0	1 / 81	25.86
		531000	2655.0	1 / 81	25.81
	QPSK	506196	2531.0	1 / 121	25.85
		518598	2593.0	1 / 81	25.98
		531000	2655.0	1 / 121	26.30
	16-QAM	506196	2531.0	1 / 121	25.31
60 MHz	π/2 BPSK	505200	2526.0	1 / 40	26.16
		518598	2593.0	1 / 40	26.66
		531996	2660.0	1 / 40	26.66
	QPSK	505200	2526.0	1 / 121	25.68
		518598	2593.0	1 / 40	26.08
		531996	2660.0	1 / 40	26.12
	16-QAM	505200	2526.0	1 / 81	25.31
50 MHz	π/2 BPSK	504204	2521.0	1 / 33	26.18
		518598	2593.0	1 / 33	26.59
		532998	2665.0	1 / 33	26.58
	QPSK	504204	2521.0	1 / 33	25.86
		518598	2593.0	1 / 66	26.31
		532998	2665.0	1 / 33	26.18
	16-QAM	504204	2521.0	1 / 99	24.67
40 MHz	π/2 BPSK	503202	2516.0	1 / 26	26.19
		518598	2593.0	1 / 26	26.51
		534000	2670.0	1 / 26	26.44
	QPSK	503202	2516.0	1 / 26	26.53
		518598	2593.0	1 / 53	26.60
		534000	2670.0	1 / 26	26.68
	16-QAM	503202	2516.0	1 / 26	25.62
30 MHz	π/2 BPSK	502200	2511.0	1 / 19	26.35
		518598	2593.0	1 / 58	26.40
		534999	2675.0	1 / 39	26.24
	QPSK	502200	2511.0	1 / 19	26.90
		518598	2593.0	1 / 39	26.97
		534999	2675.0	1 / 39	26.86
	16-QAM	502200	2511.0	1 / 19	25.90
20 MHz	π/2 BPSK	501204	2506.0	1 / 37	25.97
		518598	2593.0	1 / 37	26.32
		535998	2680.0	1 / 13	26.73
	QPSK	501204	2506.0	1 / 13	26.75
		518598	2593.0	1 / 13	26.96
		535998	2680.0	1 / 25	26.55
	16-QAM	501204	2506.0	1 / 13	25.68

Table 7-11. Conducted Power Data (NR Band n41 (PC2) – Ant F)

NR (SCS 30kHz)						LTE						NR Conducted Power [dBm]	LTE Conducted Power [dBm]	EN-DC Total Tx. Power [dBm]
NR Band	NR Bandwidth [MHz]	NR Channel	NR Frequency [MHz]	Mod.	NR RB#/Offset	LTE Band	LTE Bandwidth [MHz]	LTE Channel	LTE Frequency [MHz]	Mod.	LTE RB#/Offset			
n41	100	Mid	2593	π/2 BPSK	1/136	B25	20	Mid	1882.5	QPSK	1/50	18.84	22.48	24.04
				QPSK	270/0					QPSK	100/0	18.91	22.14	23.83
				QPSK	270/0					QPSK	1/50	18.57	22.24	23.79
				QPSK	1/136					QPSK	100/0	18.61	22.14	23.73
				QPSK	1/136					QPSK	1/50	18.72	22.54	24.05
				16Q	1/136					16Q	1/50	18.81	22.31	23.91

Table 7-12. Conducted Power Data (EN-DC NR n41 (PC2) [Ant F] + LTE B25 [Ant B])

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
15 MHz	π/2 BPSK	515500	2577.5	1 / 39	24.96
		519000	2595.0	1 / 58	24.72
		522500	2612.5	1 / 39	24.68
	QPSK	515500	2577.5	1 / 39	24.92
		519000	2595.0	1 / 58	24.77
		522500	2612.5	1 / 39	24.69
	16-QAM	519000	2595.0	1 / 39	24.24
10 MHz	π/2 BPSK	515000	2575.0	1 / 26	24.15
		519000	2595.0	1 / 26	24.55
		523000	2615.0	1 / 38	24.24
	QPSK	515000	2575.0	1 / 26	24.90
		519000	2595.0	1 / 26	24.26
		523000	2615.0	1 / 26	24.21
	16-QAM	515000	2575.0	1 / 26	23.91

Table 7-13. Conducted Power Data (NR Band n38 – Ant F)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	509202	2546.0	1 / 68	18.36
		518598	2593.0	1 / 204	18.28
		528000	2640.0	1 / 204	17.84
	QPSK	509202	2546.0	1 / 68	18.21
		518598	2593.0	1 / 68	17.10
		528000	2640.0	1 / 204	16.49
	16-QAM	518598	2593.0	1 / 204	17.14

Table 7-14. Conducted Power Data (NR Band n41 (PC2) – Ant B)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	510000	2550.0	1 / 136	21.73
		518598	2593.0	1 / 68	21.25
		528000	2640.0	1 / 204	19.64
	QPSK	510000	2550.0	1 / 136	21.74
		518598	2593.0	1 / 68	21.16
		528000	2640.0	1 / 204	19.60
	16-QAM	510000	2550.0	1 / 68	21.34

Table 7-15. Conducted Power Data (NR Band n41 (PC2) – Ant E)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	509202	2546.0	1 / 68	16.67
		518598	2593.0	1 / 68	16.55
		528000	2640.0	1 / 68	15.37
	QPSK	509202	2546.0	1 / 136	15.67
		518598	2593.0	1 / 136	16.08
		528000	2640.0	1 / 68	14.61
	16-QAM	518598	2593.0	1 / 68	15.71

Table 7-16. Conducted Power Data (NR Band n41 (PC2) – Ant C)

7.3 Occupied Bandwidth

Test Overview

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

Test Procedure Used

ANSI C63.26-2015 – Section 5.4.4

Test Settings

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

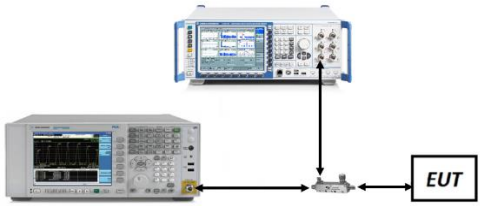
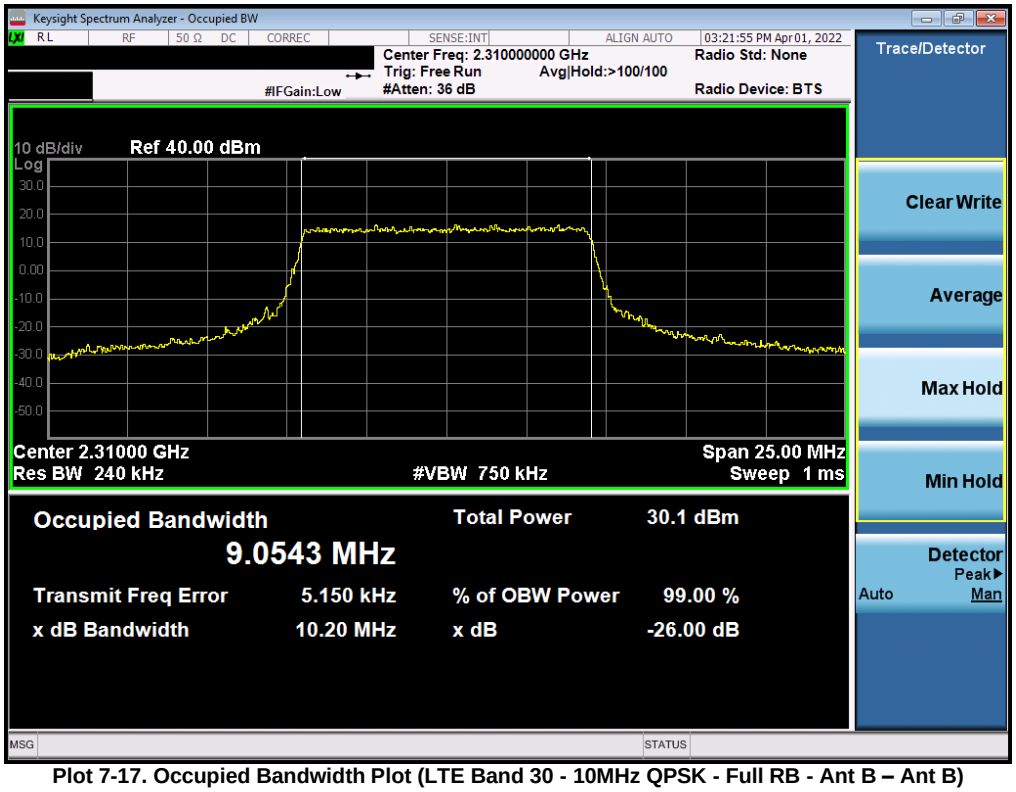


Figure 7-2. Test Instrument & Measurement Setup

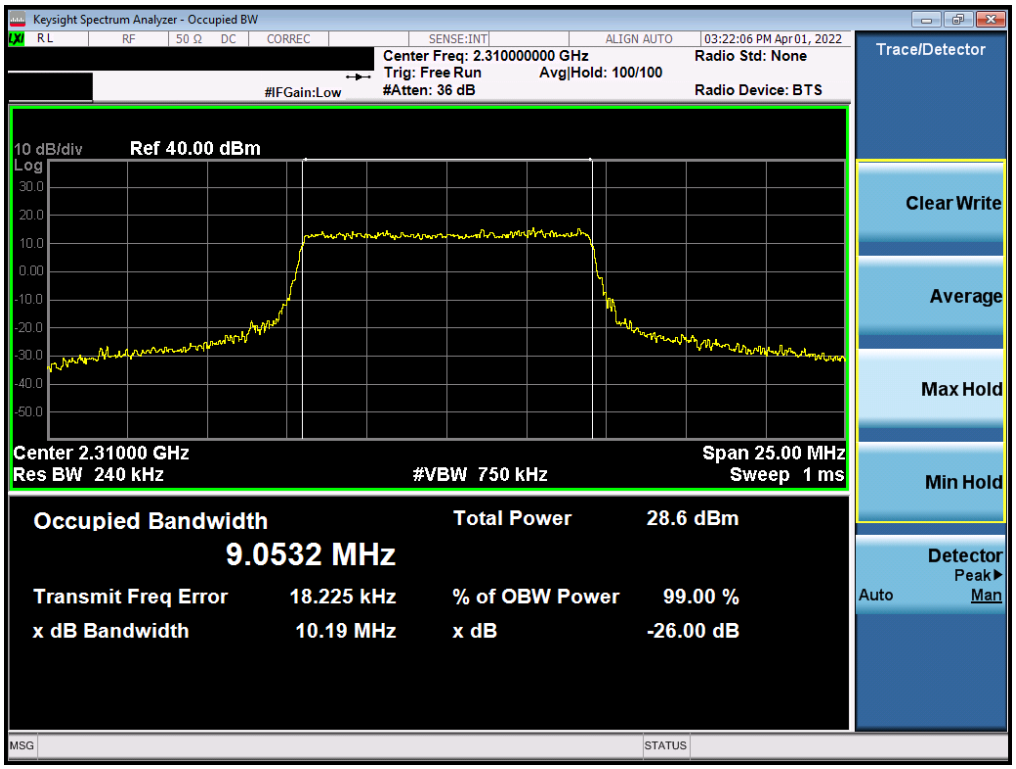
Test Notes

None.

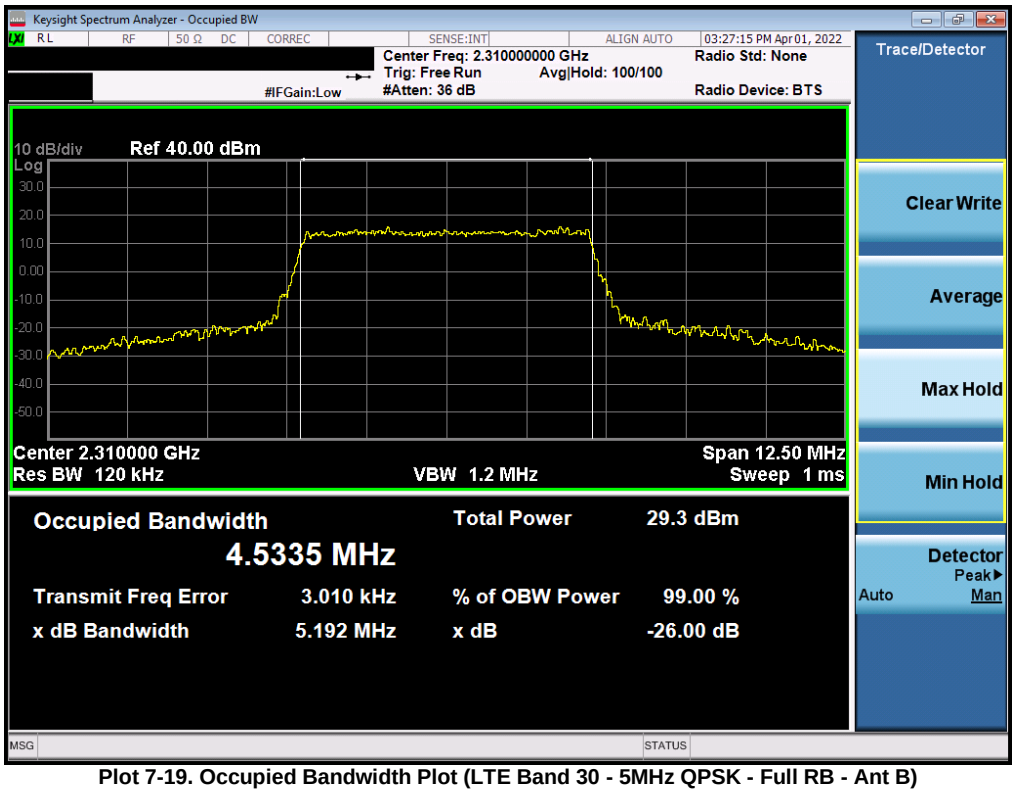
LTE Band 30 – Ant B



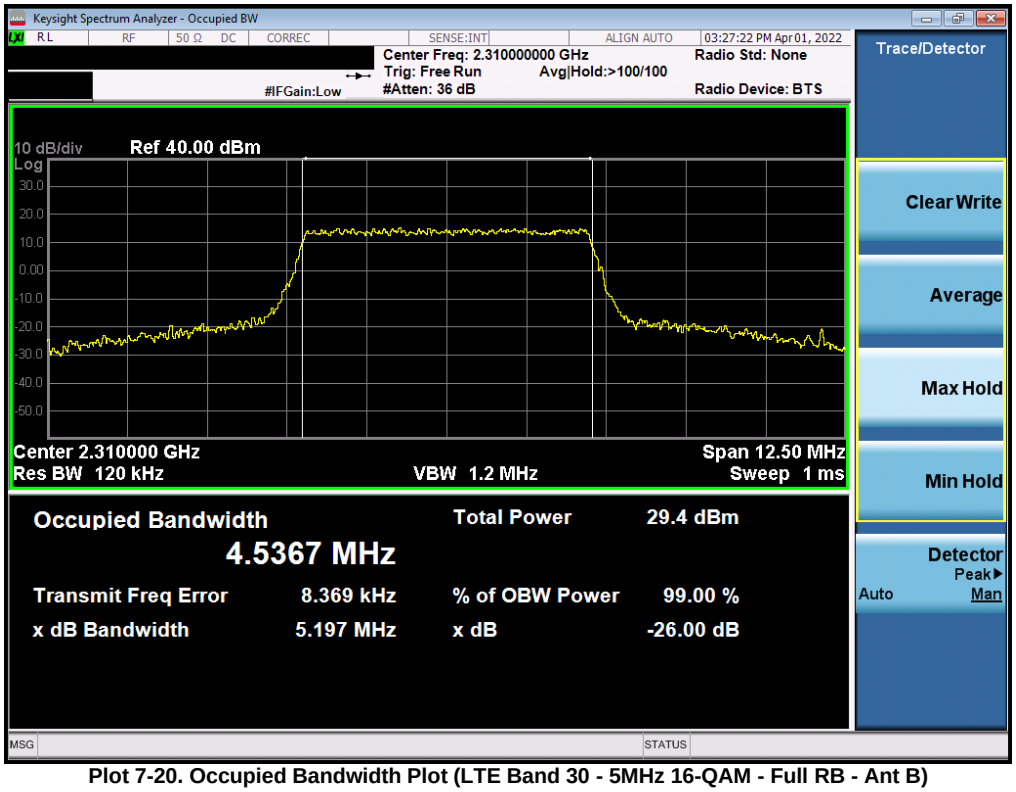
Plot 7-17. Occupied Bandwidth Plot (LTE Band 30 - 10MHz QPSK - Full RB - Ant B – Ant B)



Plot 7-18. Occupied Bandwidth Plot (LTE Band 30 - 10MHz 16-QAM - Full RB - Ant B)

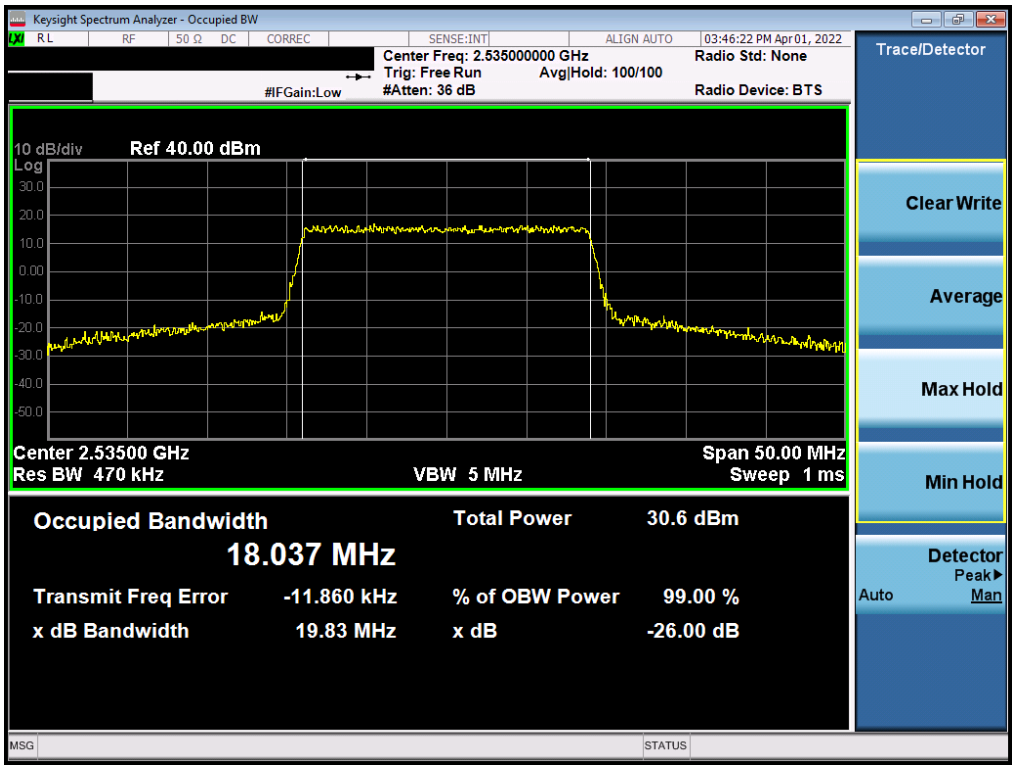


Plot 7-19. Occupied Bandwidth Plot (LTE Band 30 - 5MHz QPSK - Full RB - Ant B)

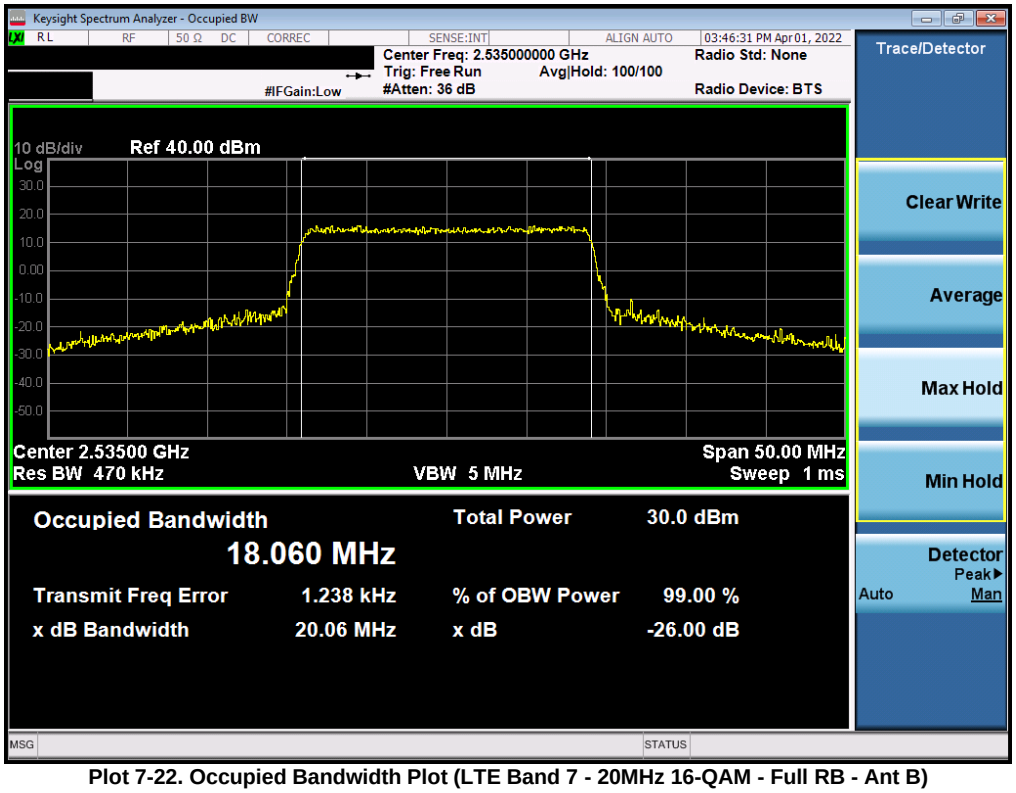


Plot 7-20. Occupied Bandwidth Plot (LTE Band 30 - 5MHz 16-QAM - Full RB - Ant B)

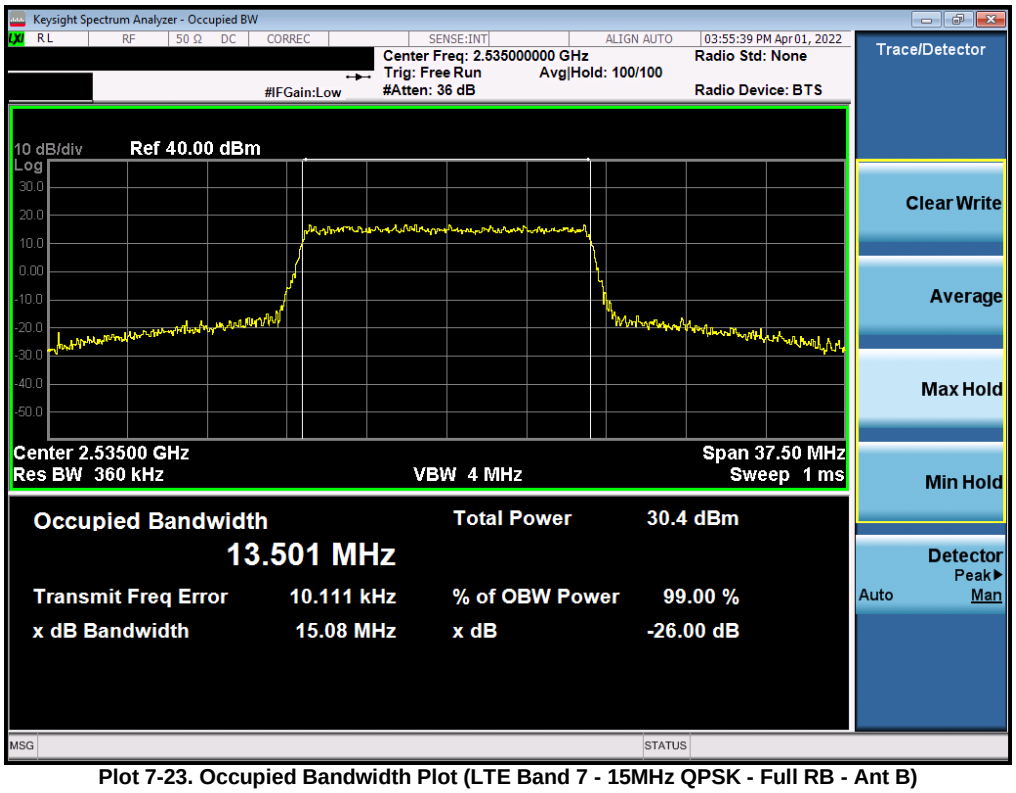
LTE Band 7 – Ant B



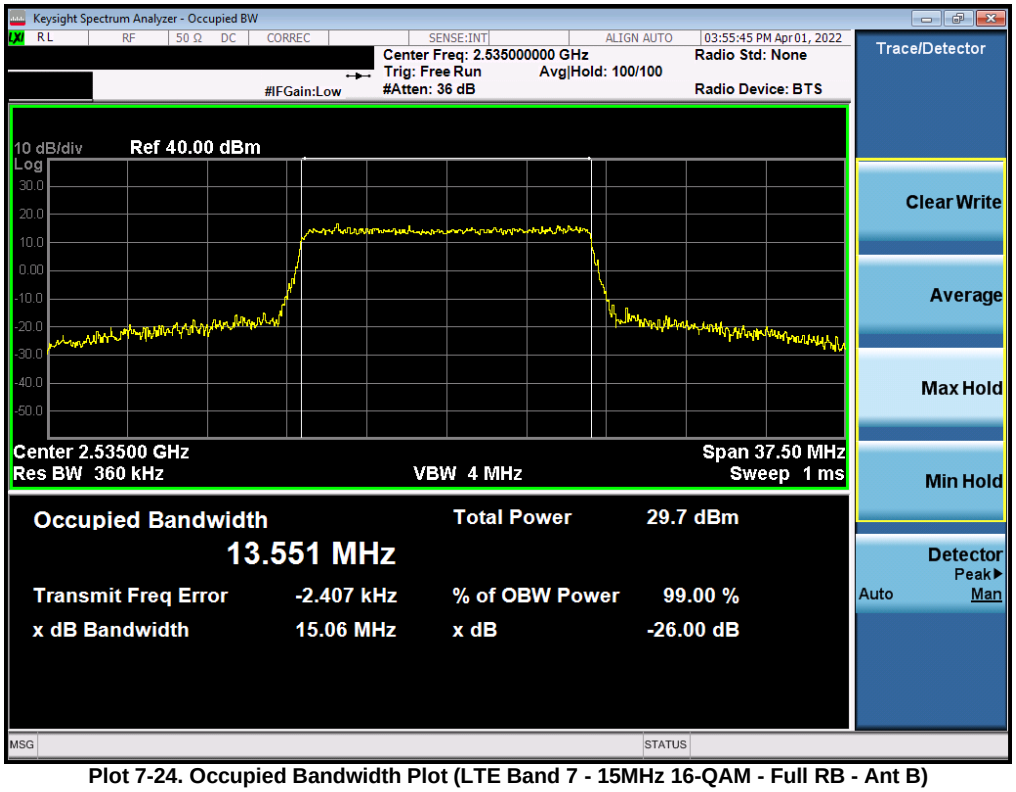
Plot 7-21. Occupied Bandwidth Plot (LTE Band 7 - 20MHz QPSK - Full RB - Ant B)



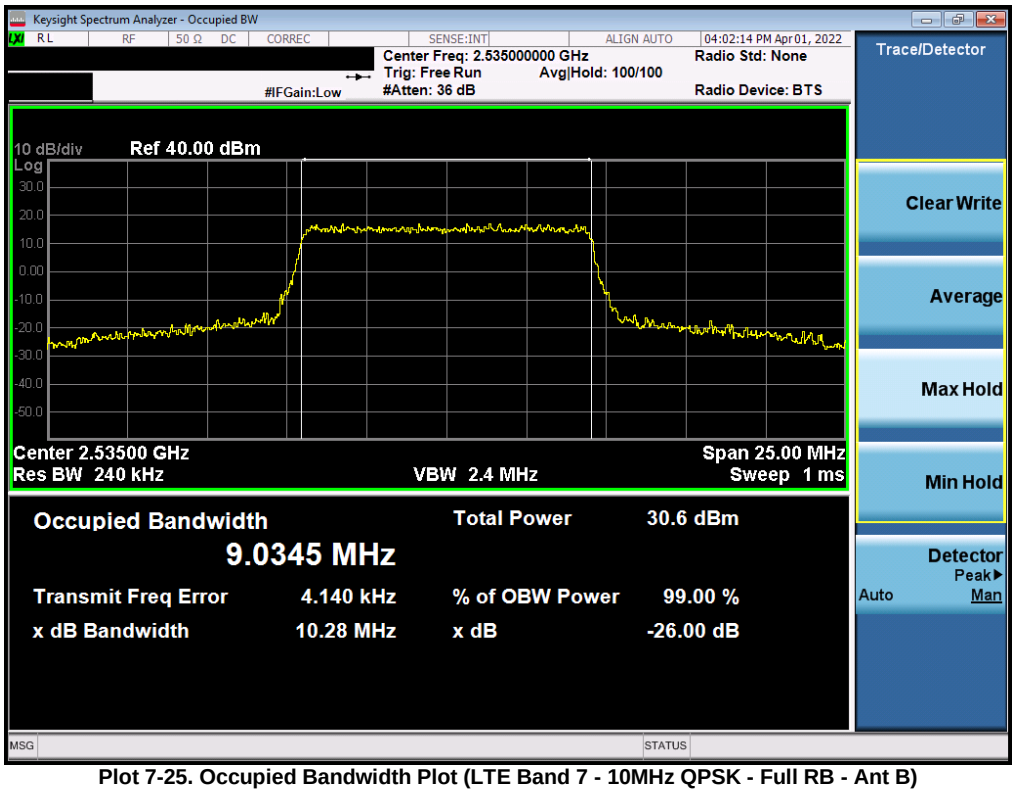
Plot 7-22. Occupied Bandwidth Plot (LTE Band 7 - 20MHz 16-QAM - Full RB - Ant B)



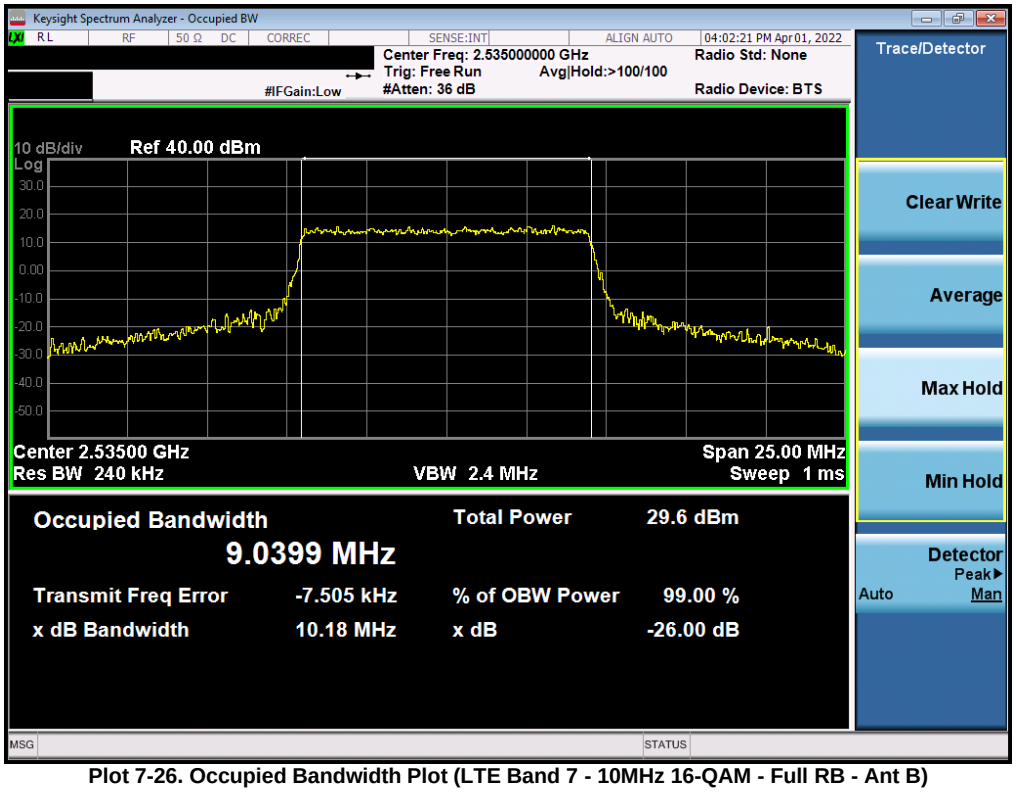
Plot 7-23. Occupied Bandwidth Plot (LTE Band 7 - 15MHz QPSK - Full RB - Ant B)



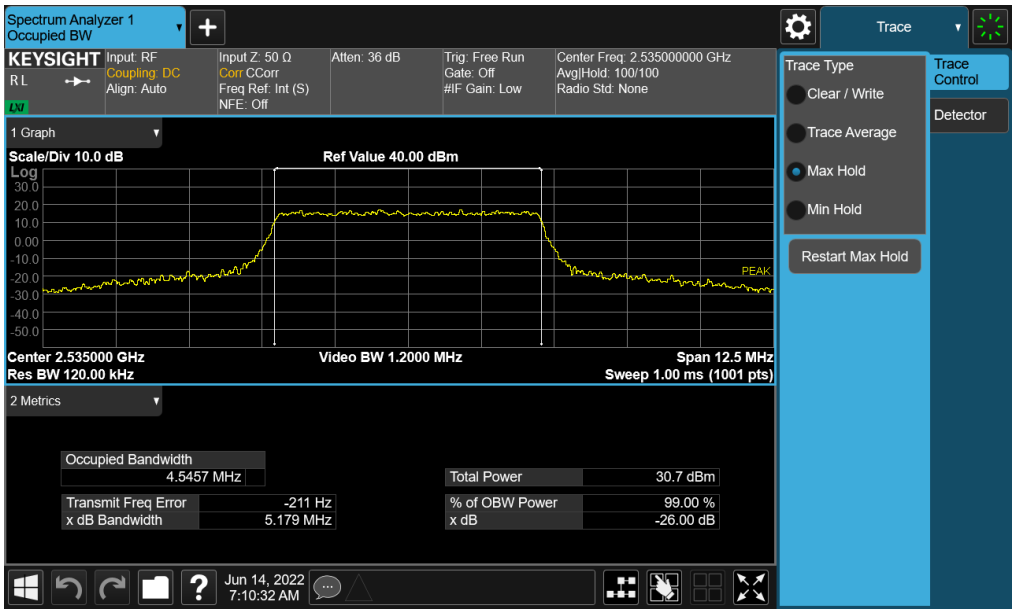
Plot 7-24. Occupied Bandwidth Plot (LTE Band 7 - 15MHz 16-QAM - Full RB - Ant B)



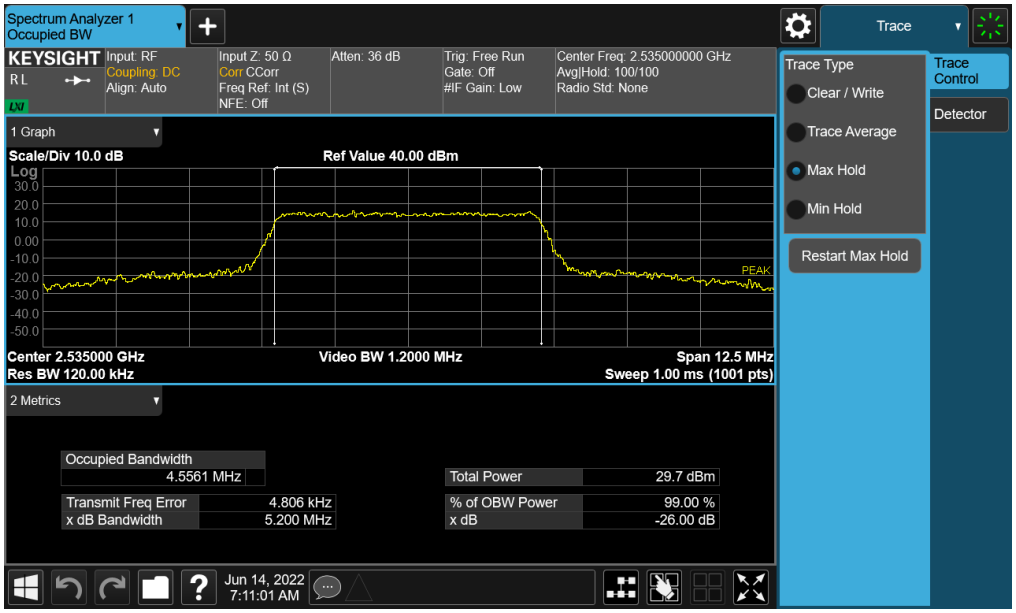
Plot 7-25. Occupied Bandwidth Plot (LTE Band 7 - 10MHz QPSK - Full RB - Ant B)



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

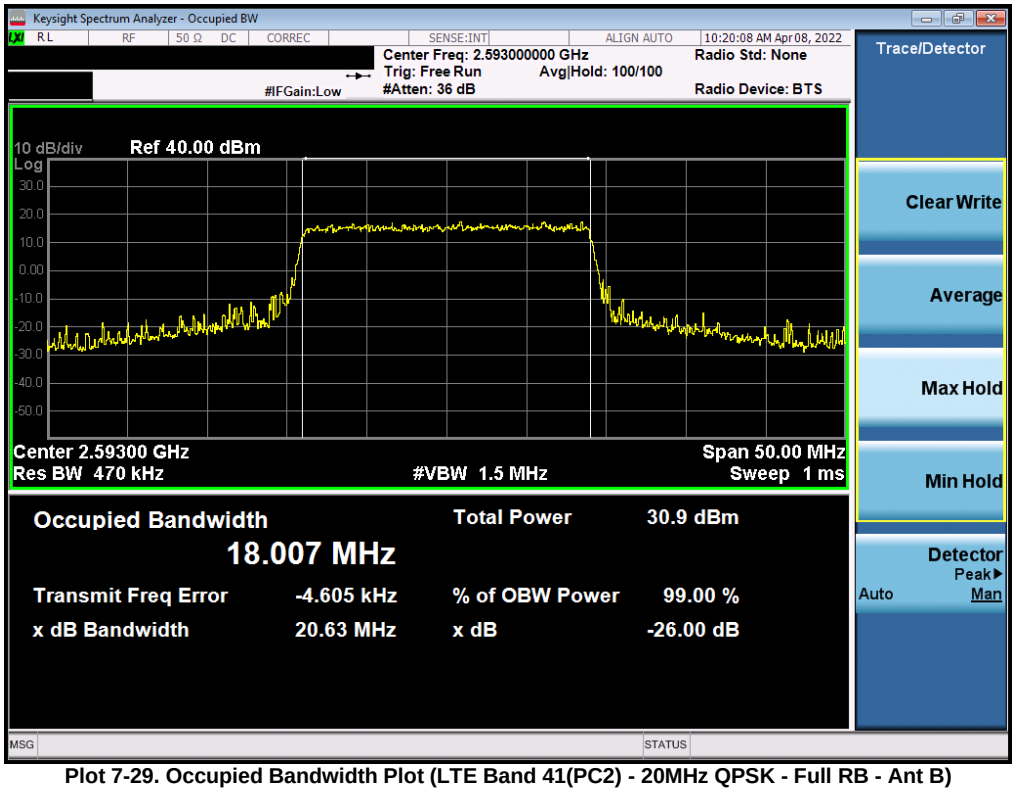


Plot 7-27. Occupied Bandwidth Plot (LTE Band 7 - 5MHz QPSK - Full RB - Ant B)



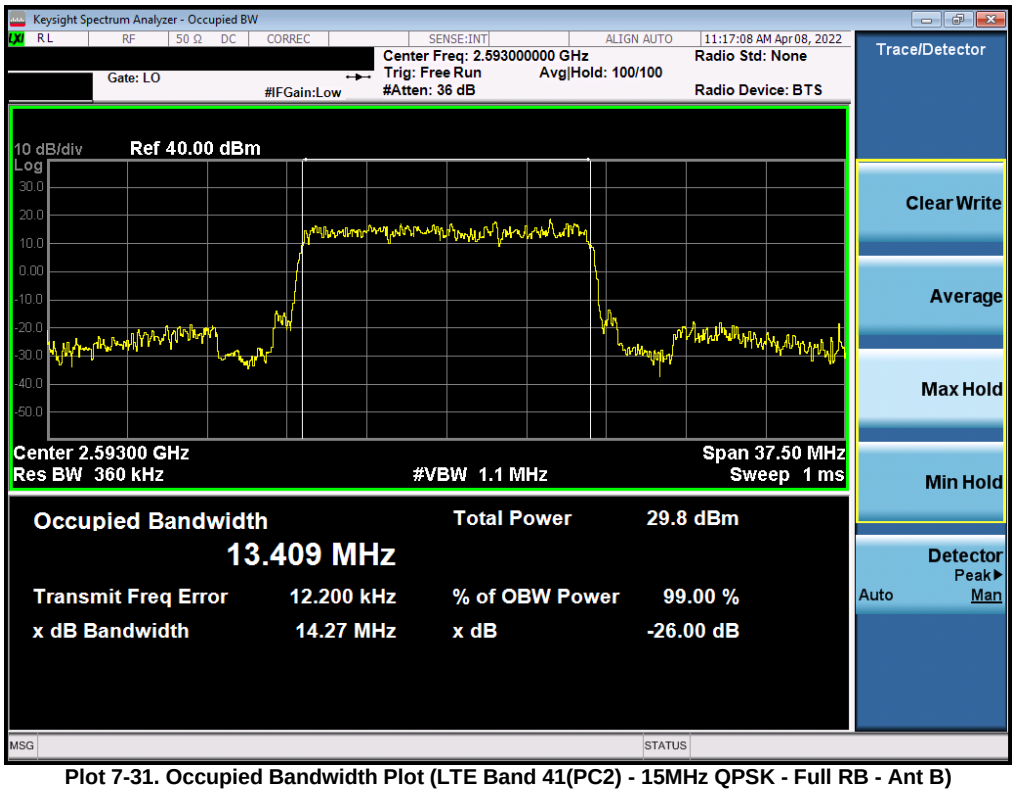
Plot 7-28. Occupied Bandwidth Plot (LTE Band 7 - 5MHz 16-QAM - Full RB - Ant B)

LTE Band 41(PC2) – Ant B

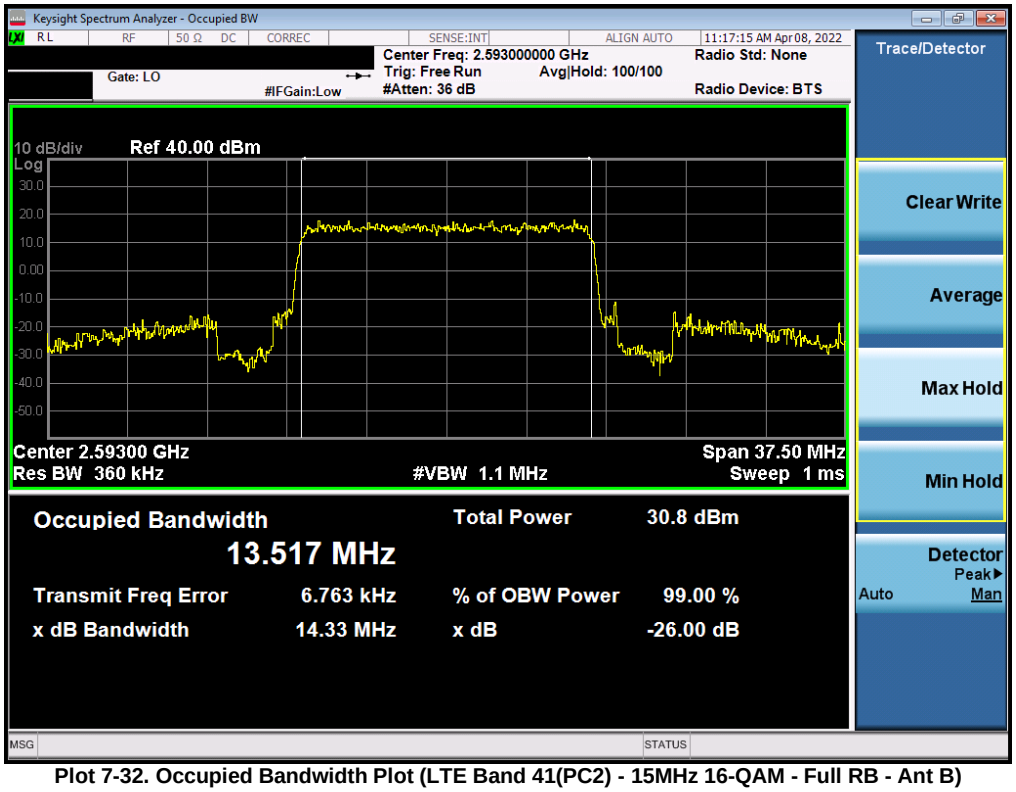


Plot 7-29. Occupied Bandwidth Plot (LTE Band 41(PC2) - 20MHz QPSK - Full RB - Ant B)

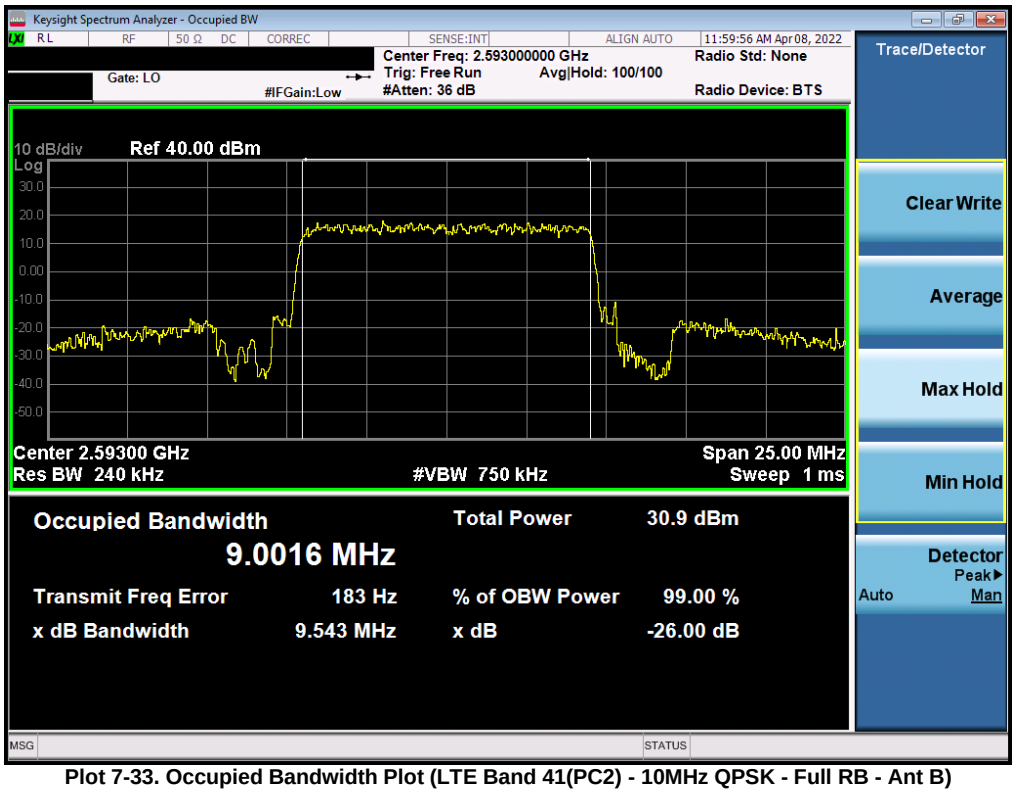
Plot 7-30. Occupied Bandwidth Plot (LTE Band 41(PC2) - 20MHz 16-QAM - Full RB - Ant B)



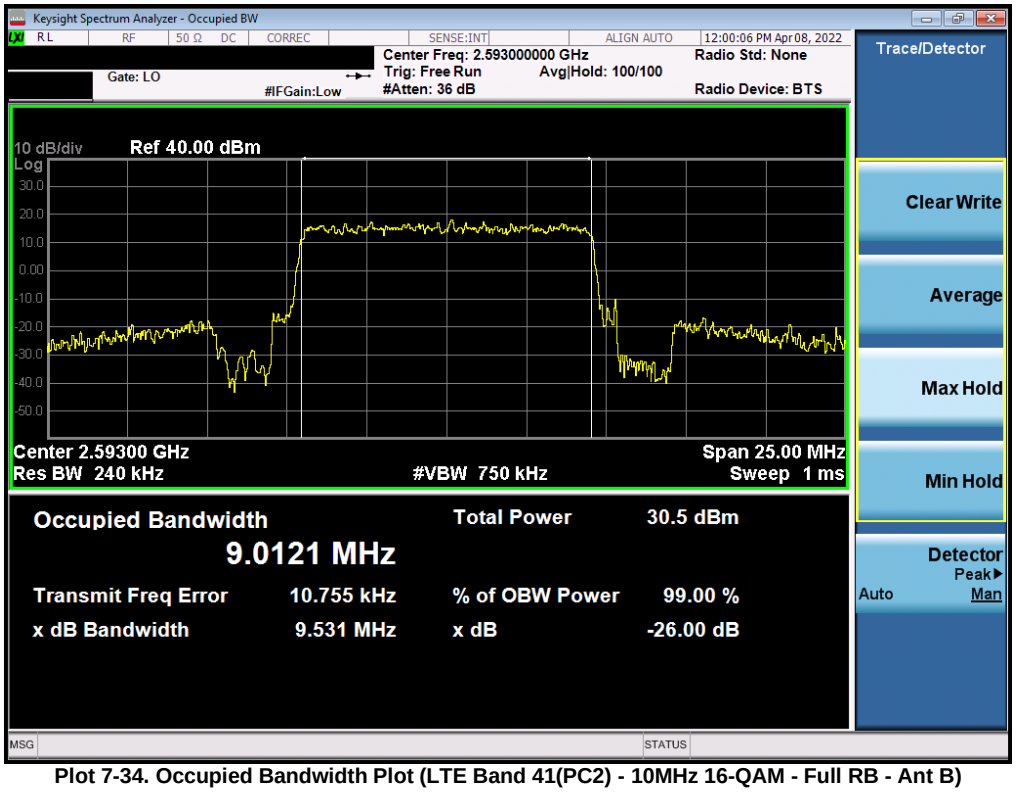
Plot 7-31. Occupied Bandwidth Plot (LTE Band 41(PC2) - 15MHz QPSK - Full RB - Ant B)



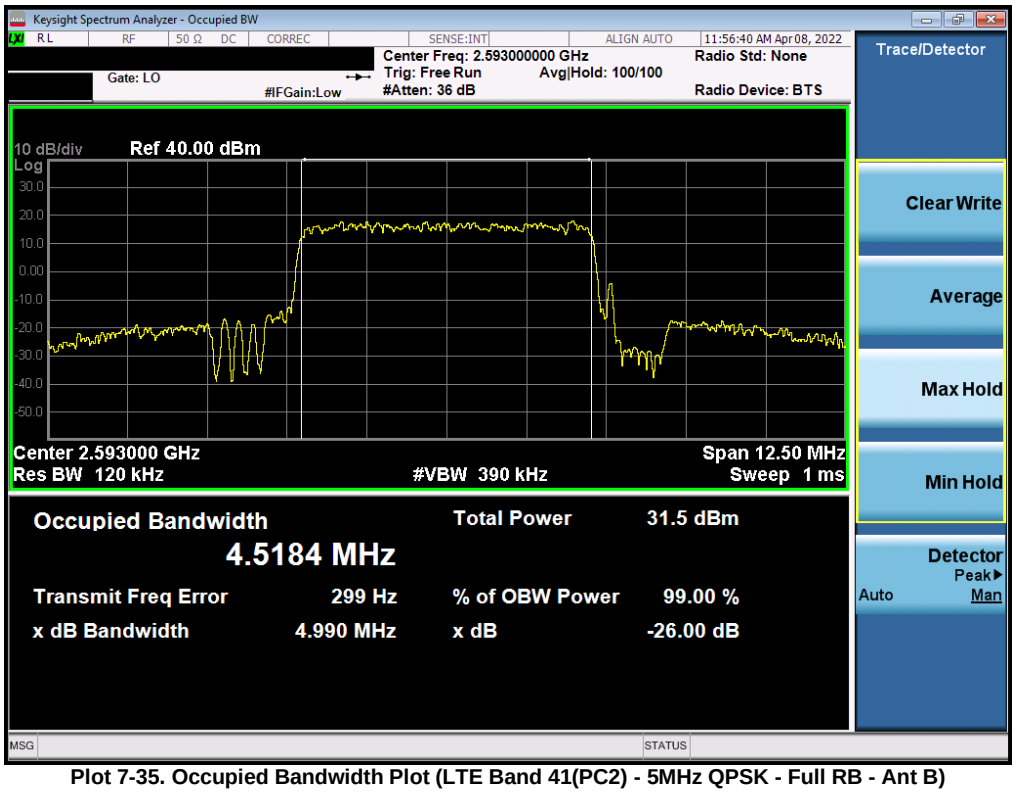
Plot 7-32. Occupied Bandwidth Plot (LTE Band 41(PC2) - 15MHz 16-QAM - Full RB - Ant B)



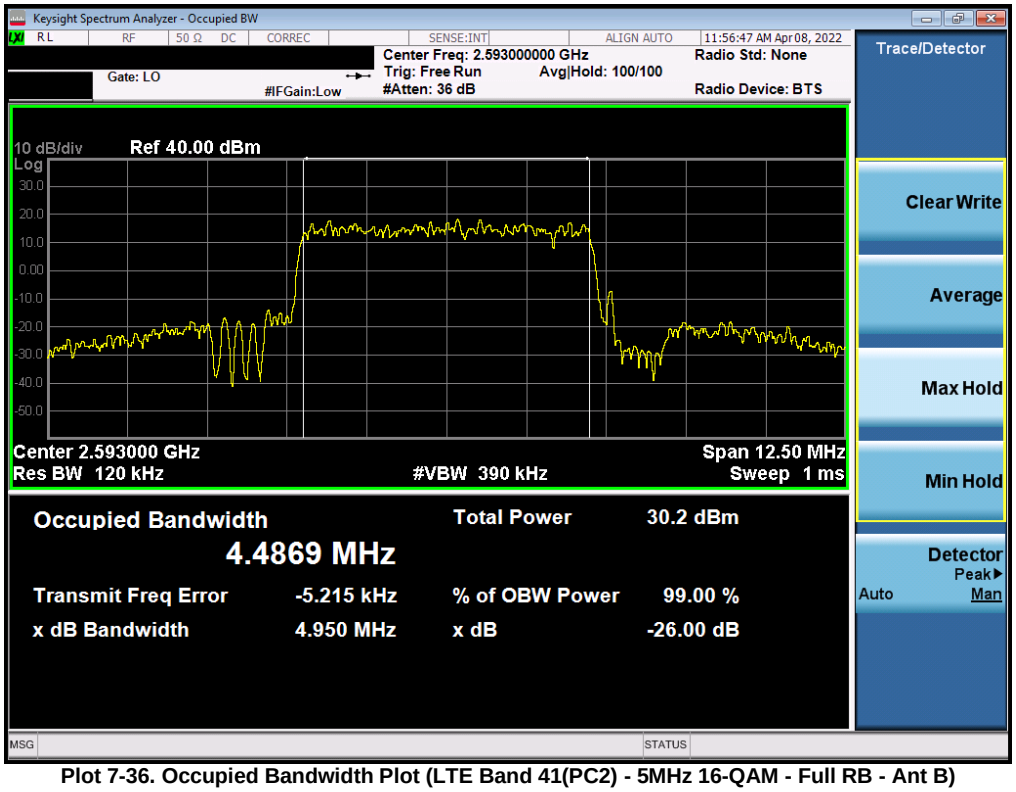
Plot 7-33. Occupied Bandwidth Plot (LTE Band 41(PC2) - 10MHz QPSK - Full RB - Ant B)



Plot 7-34. Occupied Bandwidth Plot (LTE Band 41(PC2) - 10MHz 16-QAM - Full RB - Ant B)

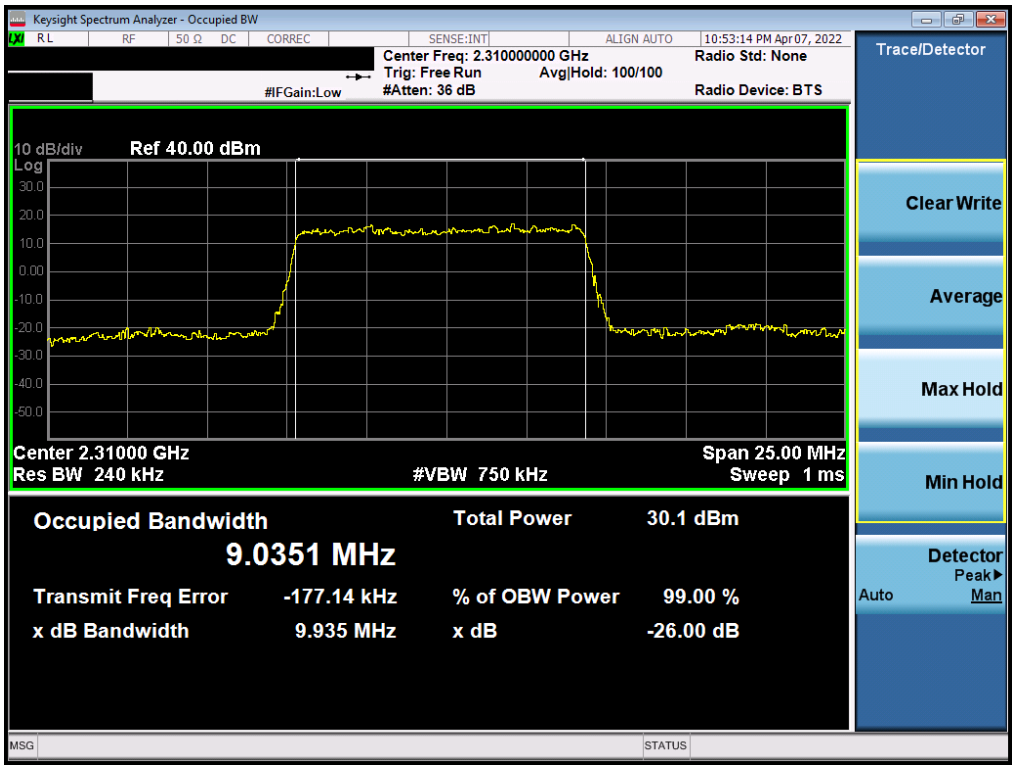


Plot 7-35. Occupied Bandwidth Plot (LTE Band 41(PC2) - 5MHz QPSK - Full RB - Ant B)

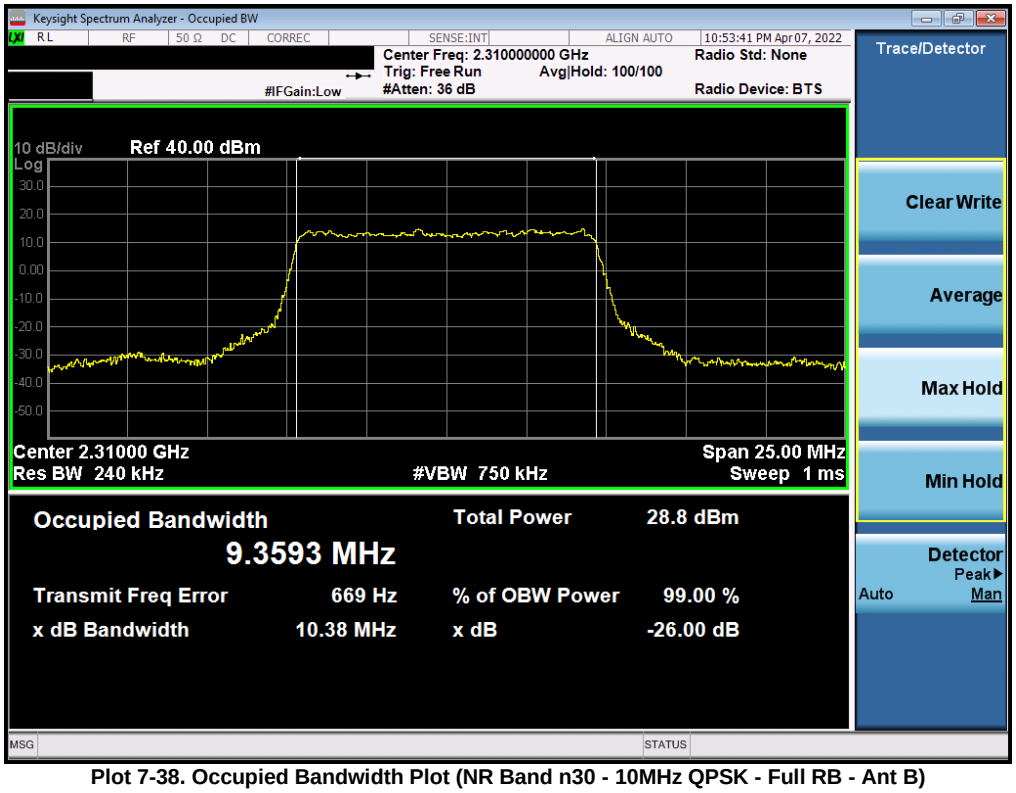


Plot 7-36. Occupied Bandwidth Plot (LTE Band 41(PC2) - 5MHz 16-QAM - Full RB - Ant B)

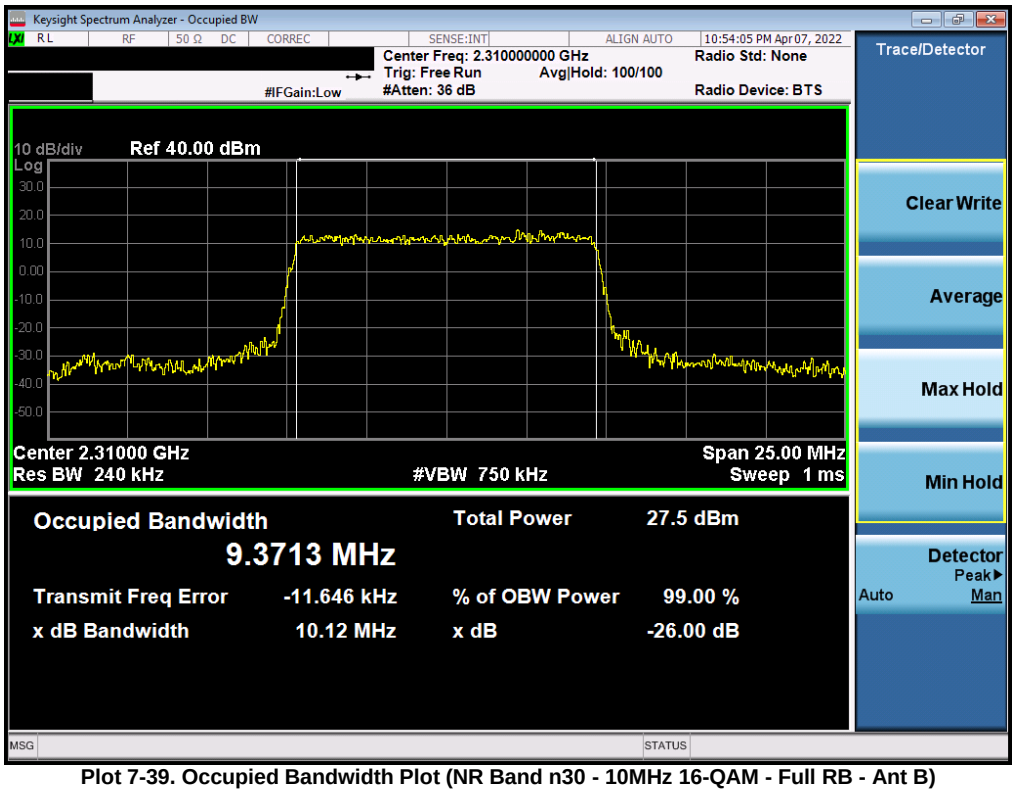
NR Band n30 – Ant B



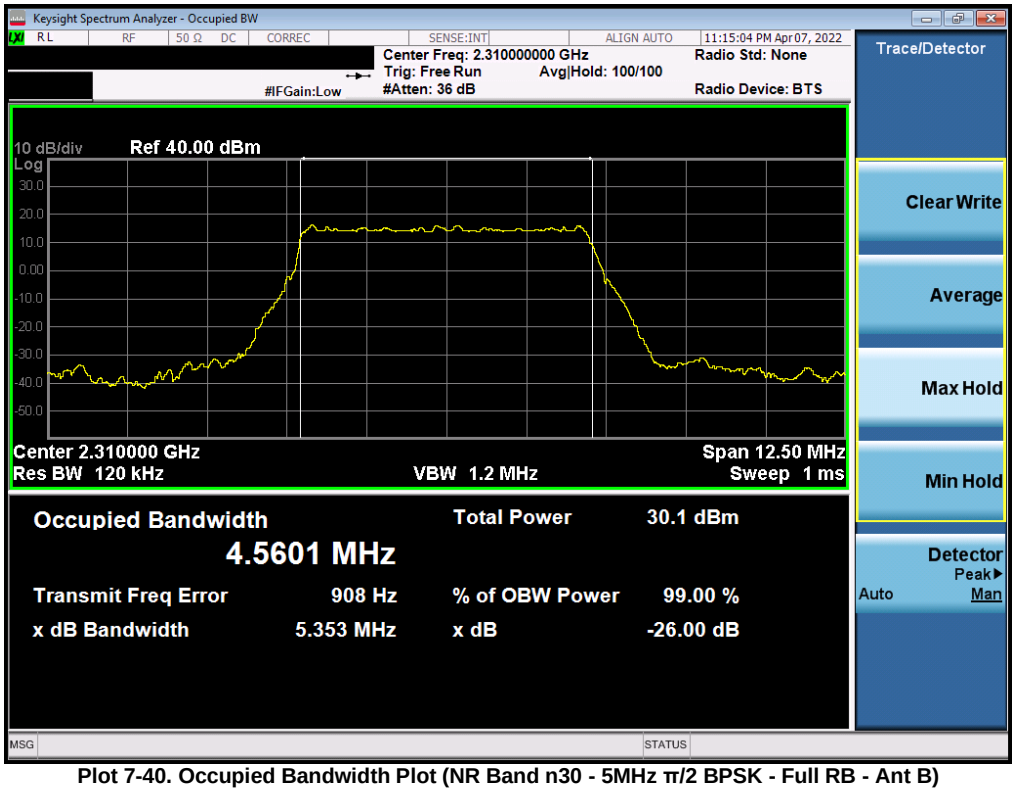
Plot 7-37. Occupied Bandwidth Plot (NR Band n30 - 10MHz π/2 BPSK - Full RB - Ant B)



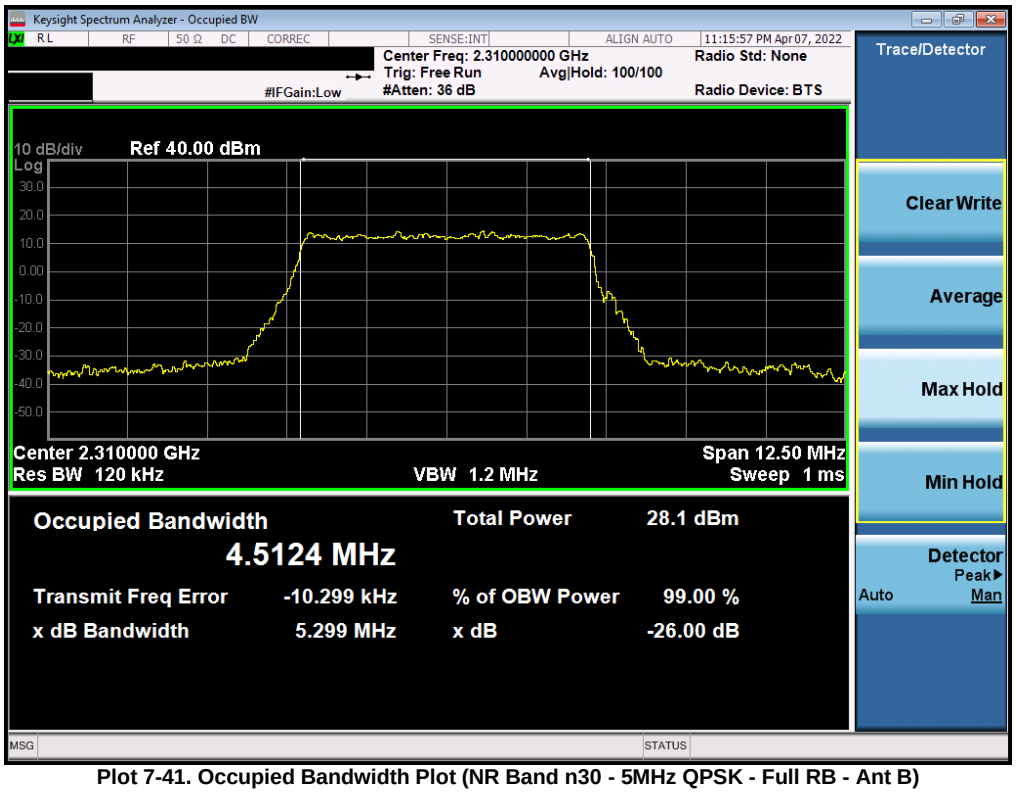
Plot 7-38. Occupied Bandwidth Plot (NR Band n30 - 10MHz QPSK - Full RB - Ant B)



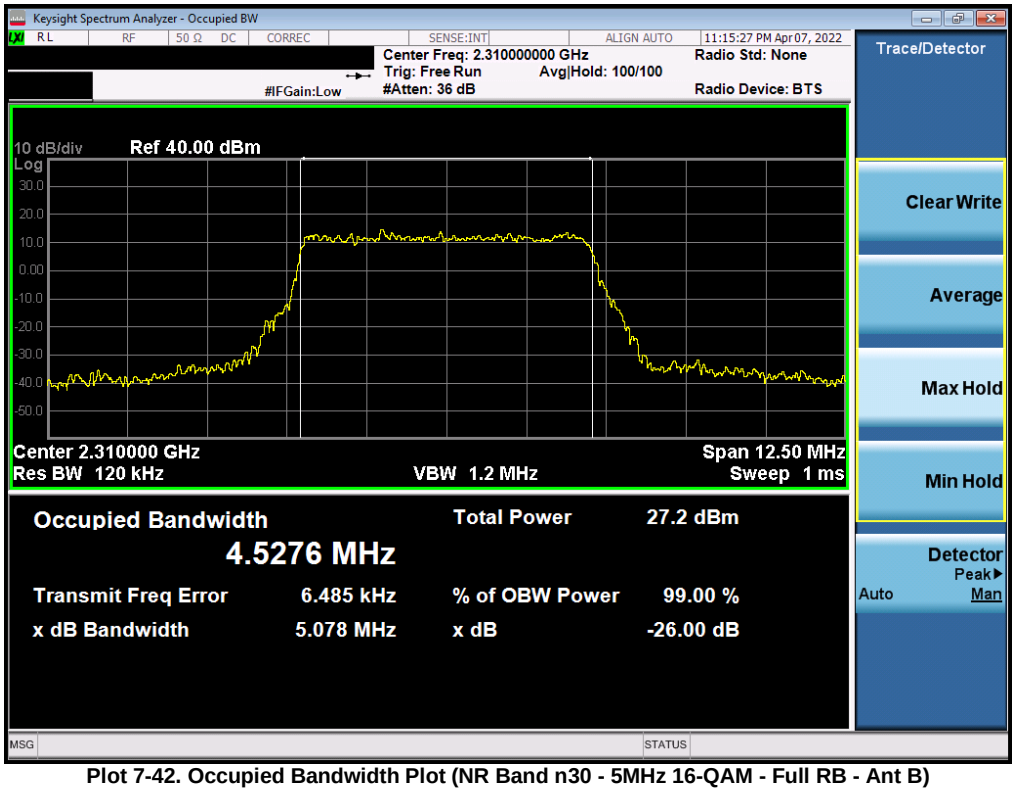
Plot 7-39. Occupied Bandwidth Plot (NR Band n30 - 10MHz 16-QAM - Full RB - Ant B)



Plot 7-40. Occupied Bandwidth Plot (NR Band n30 - 5MHz π/2 BPSK - Full RB - Ant B)

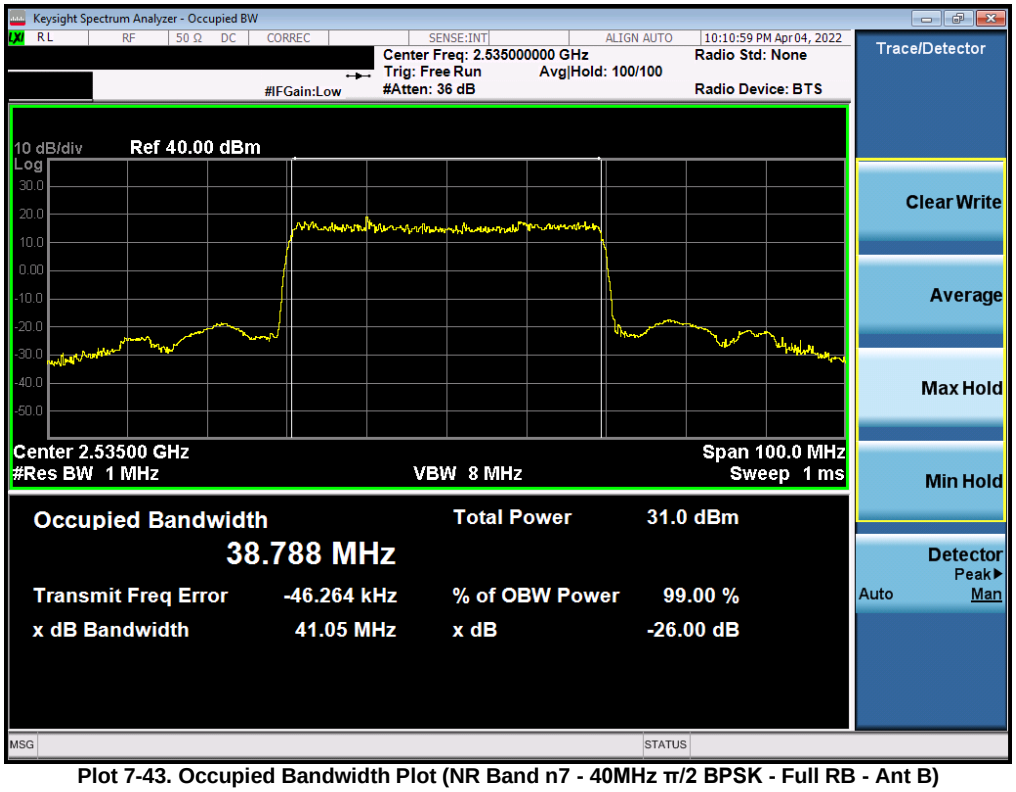


Plot 7-41. Occupied Bandwidth Plot (NR Band n30 - 5MHz QPSK - Full RB - Ant B)

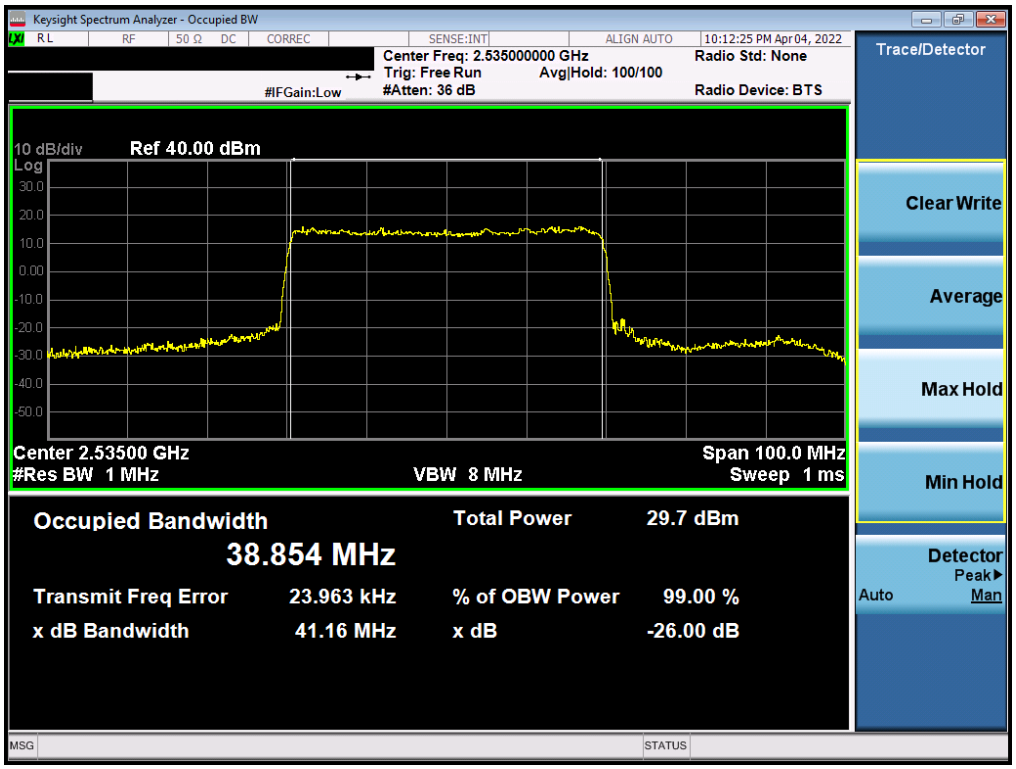


Plot 7-42. Occupied Bandwidth Plot (NR Band n30 - 5MHz 16-QAM - Full RB - Ant B)

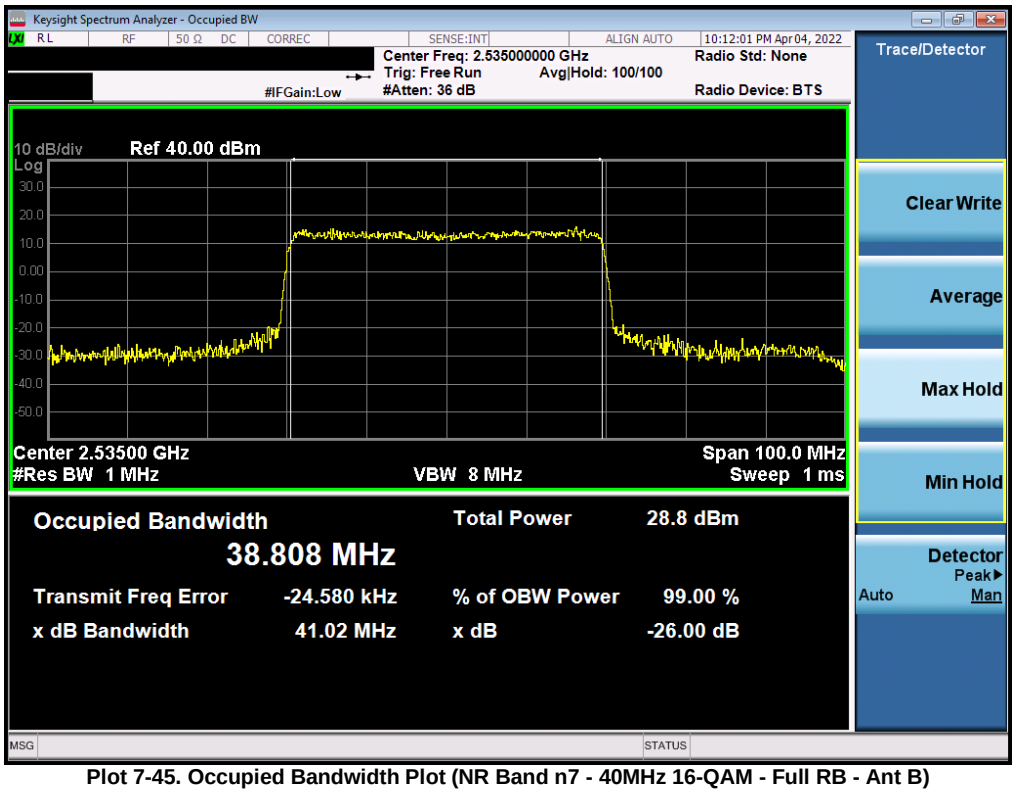
NR Band n7 – Ant B



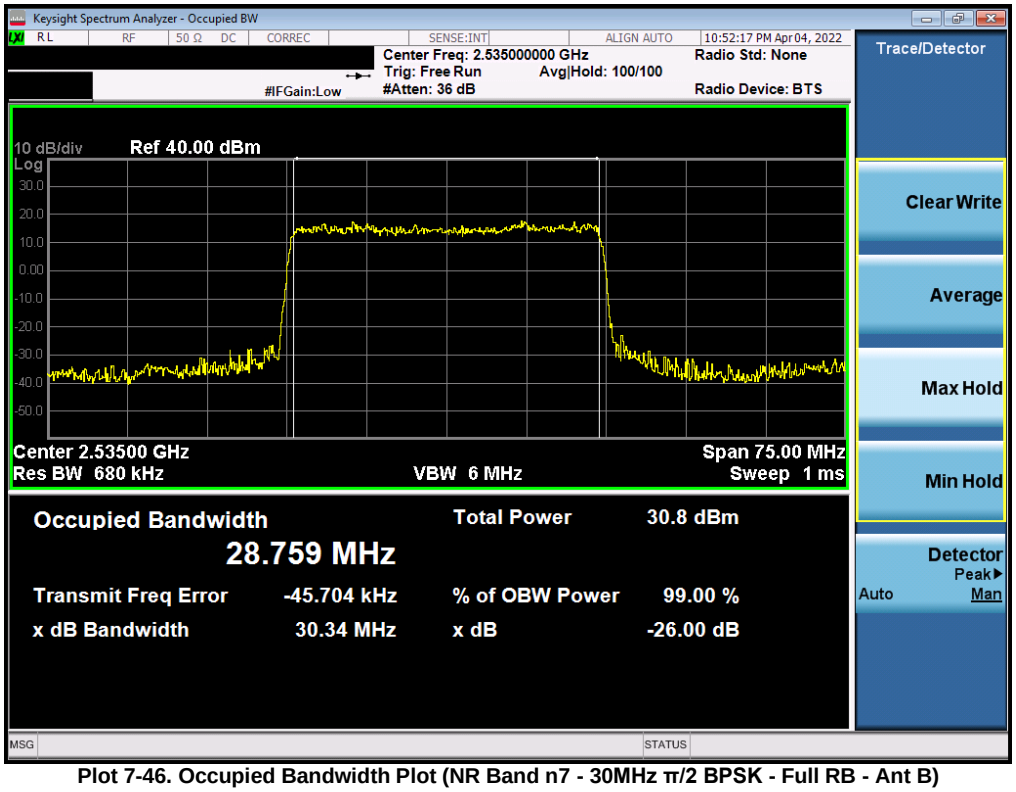
Plot 7-43. Occupied Bandwidth Plot (NR Band n7 - 40MHz π/2 BPSK - Full RB - Ant B)



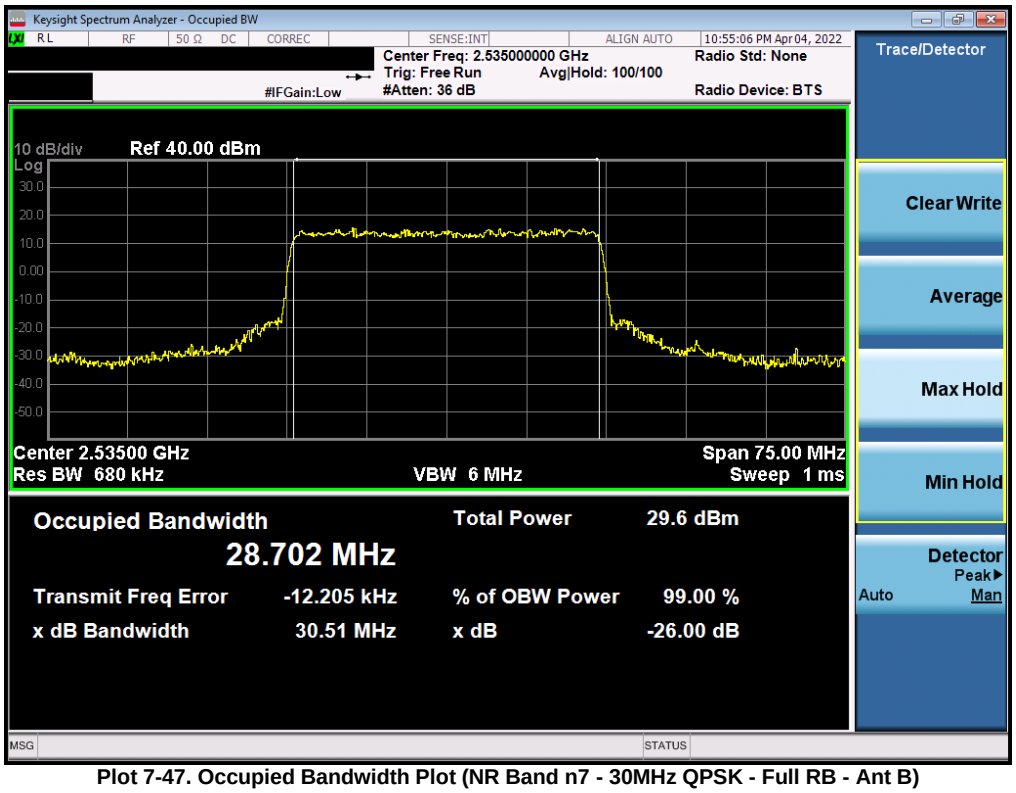
Plot 7-44. Occupied Bandwidth Plot (NR Band n7 - 40MHz QPSK - Full RB - Ant B)



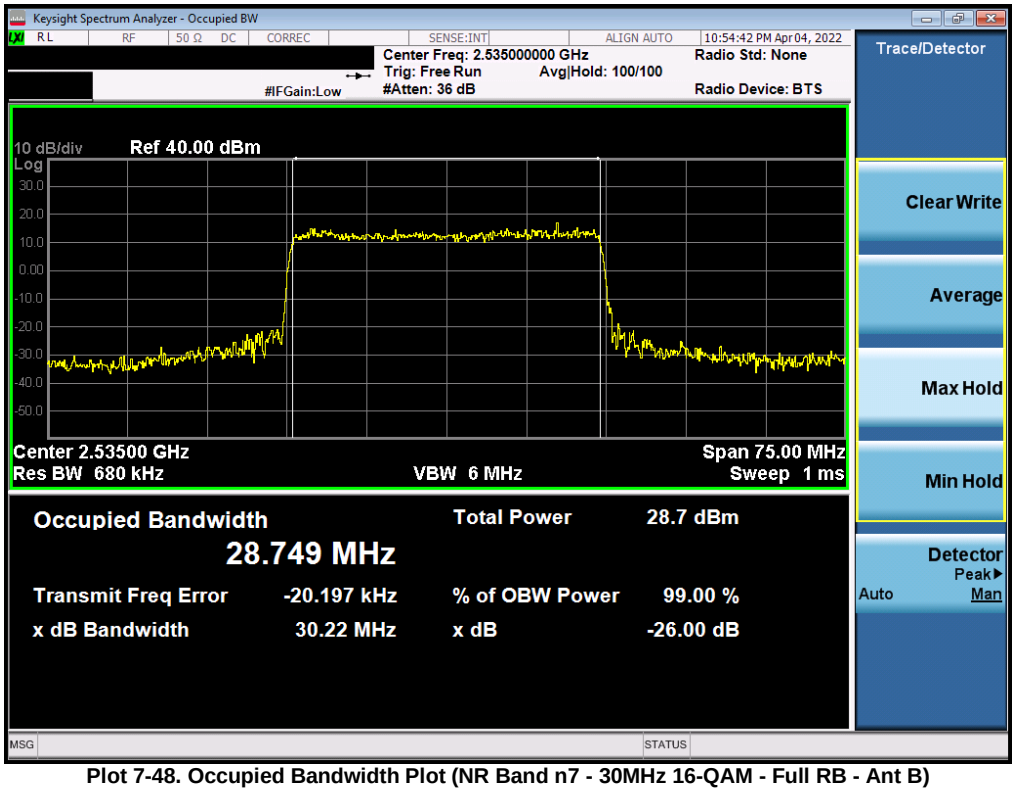
Plot 7-45. Occupied Bandwidth Plot (NR Band n7 - 40MHz 16-QAM - Full RB - Ant B)



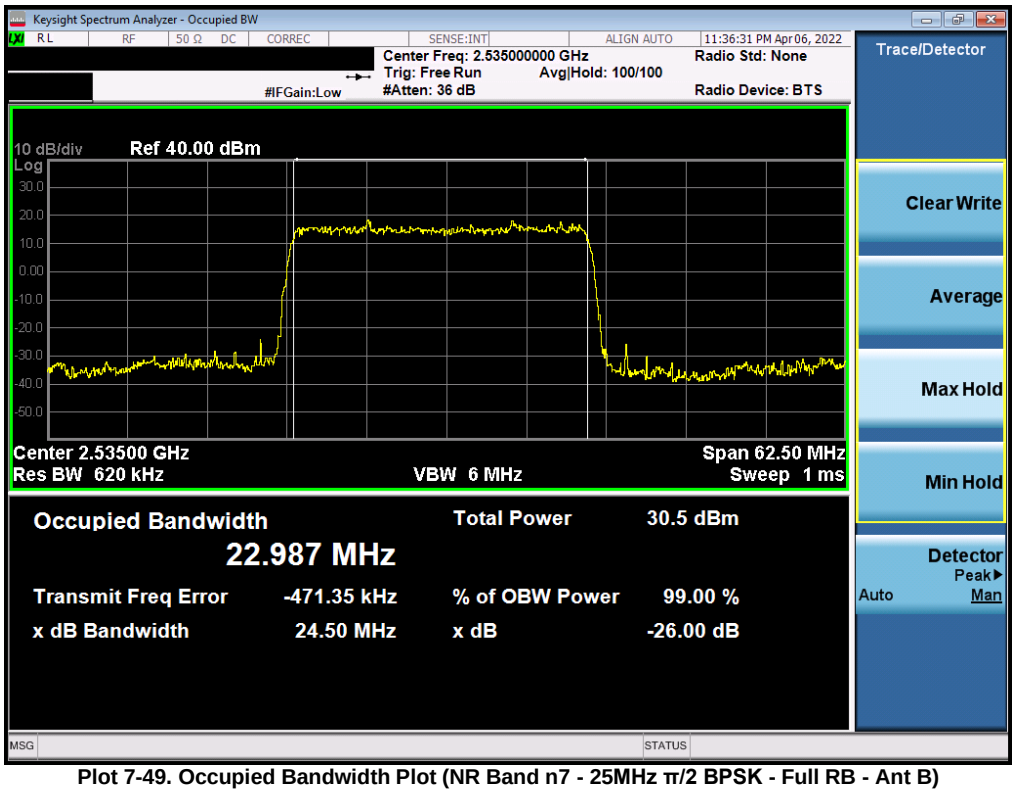
Plot 7-46. Occupied Bandwidth Plot (NR Band n7 - 30MHz π/2 BPSK - Full RB - Ant B)



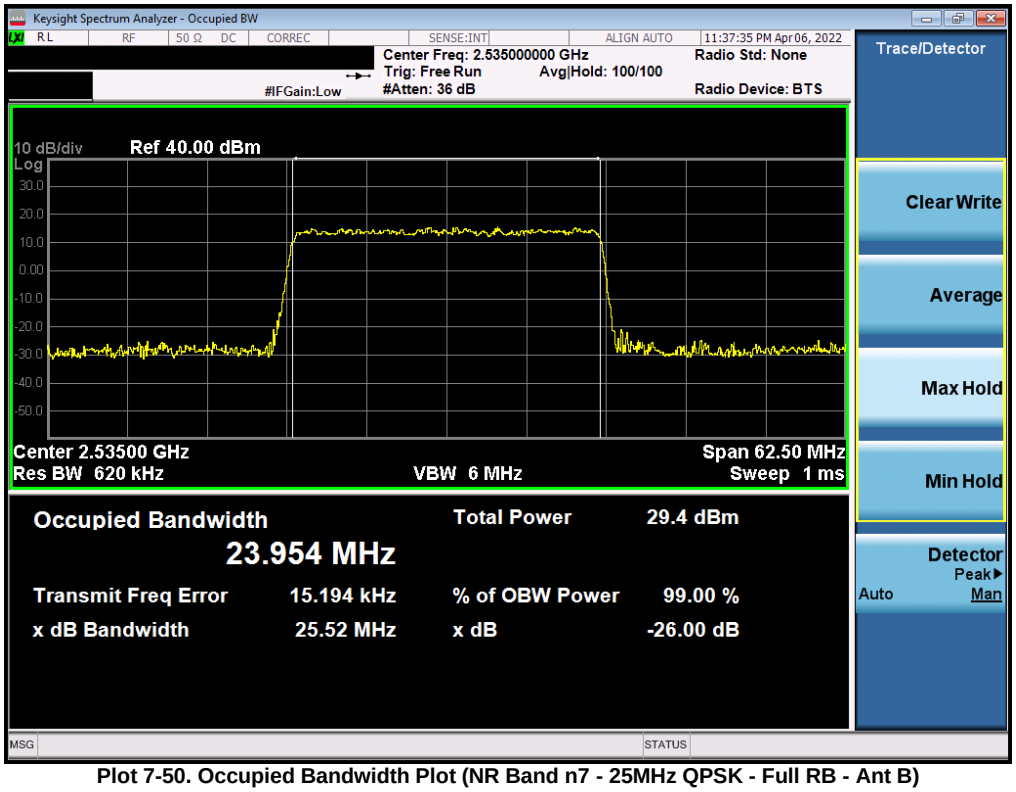
Plot 7-47. Occupied Bandwidth Plot (NR Band n7 - 30MHz QPSK - Full RB - Ant B)



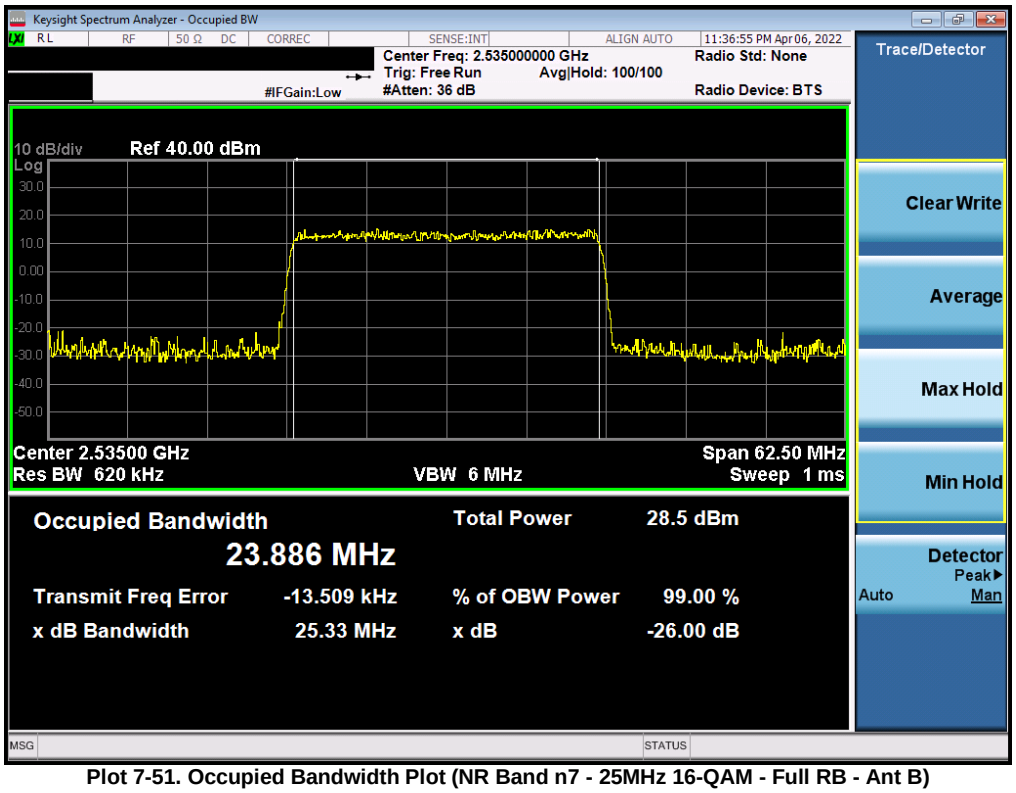
Plot 7-48. Occupied Bandwidth Plot (NR Band n7 - 30MHz 16-QAM - Full RB - Ant B)



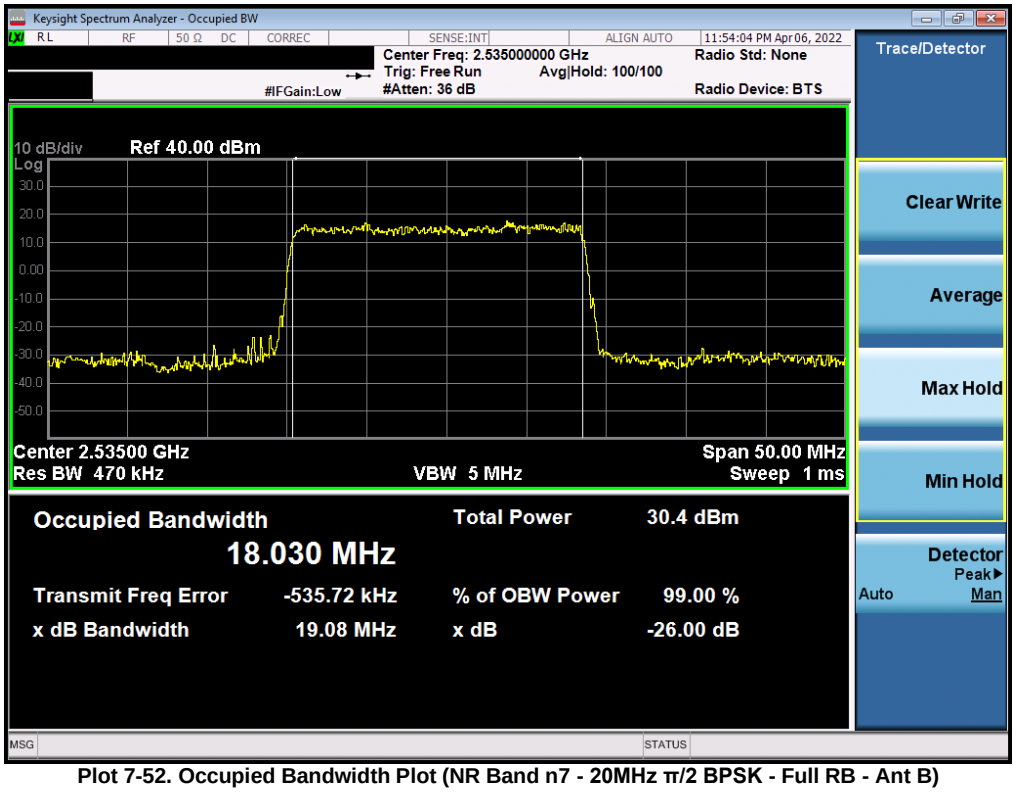
Plot 7-49. Occupied Bandwidth Plot (NR Band n7 - 25MHz π/2 BPSK - Full RB - Ant B)



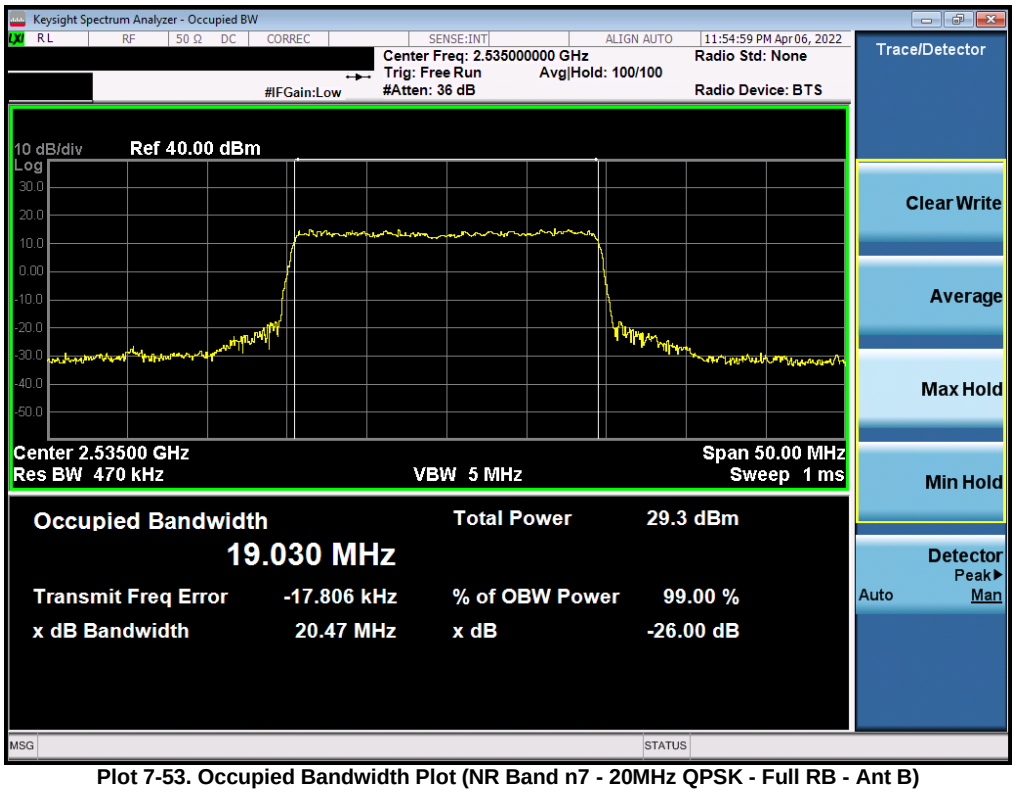
Plot 7-50. Occupied Bandwidth Plot (NR Band n7 - 25MHz QPSK - Full RB - Ant B)



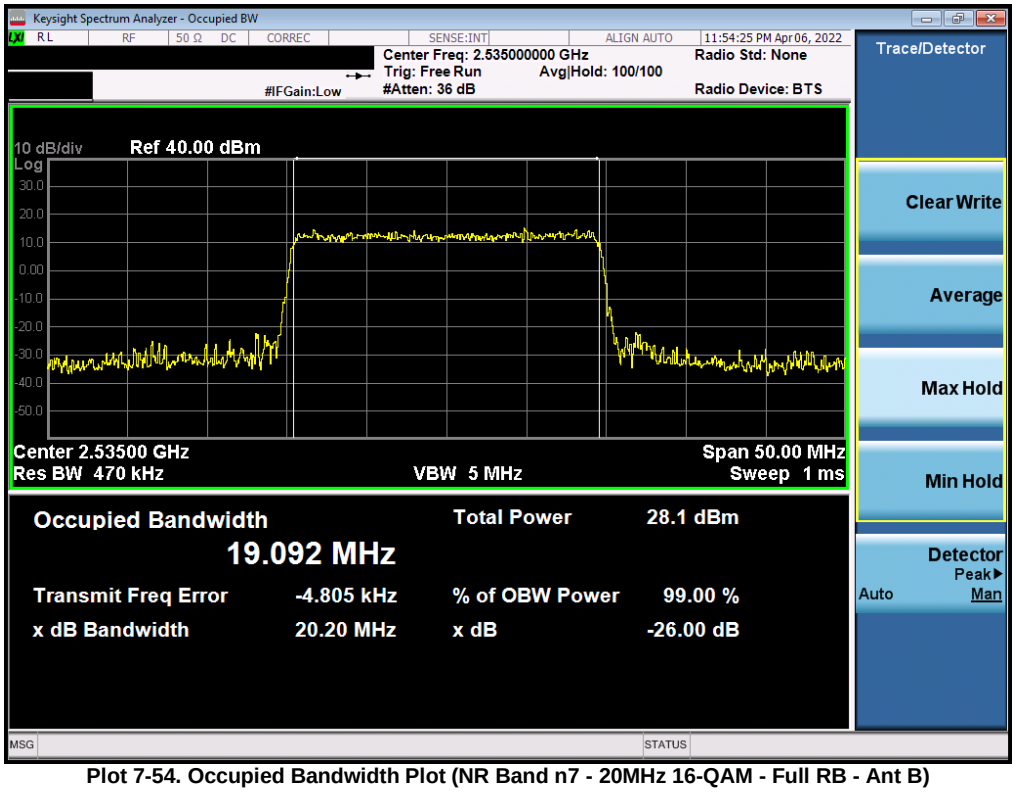
Plot 7-51. Occupied Bandwidth Plot (NR Band n7 - 25MHz 16-QAM - Full RB - Ant B)



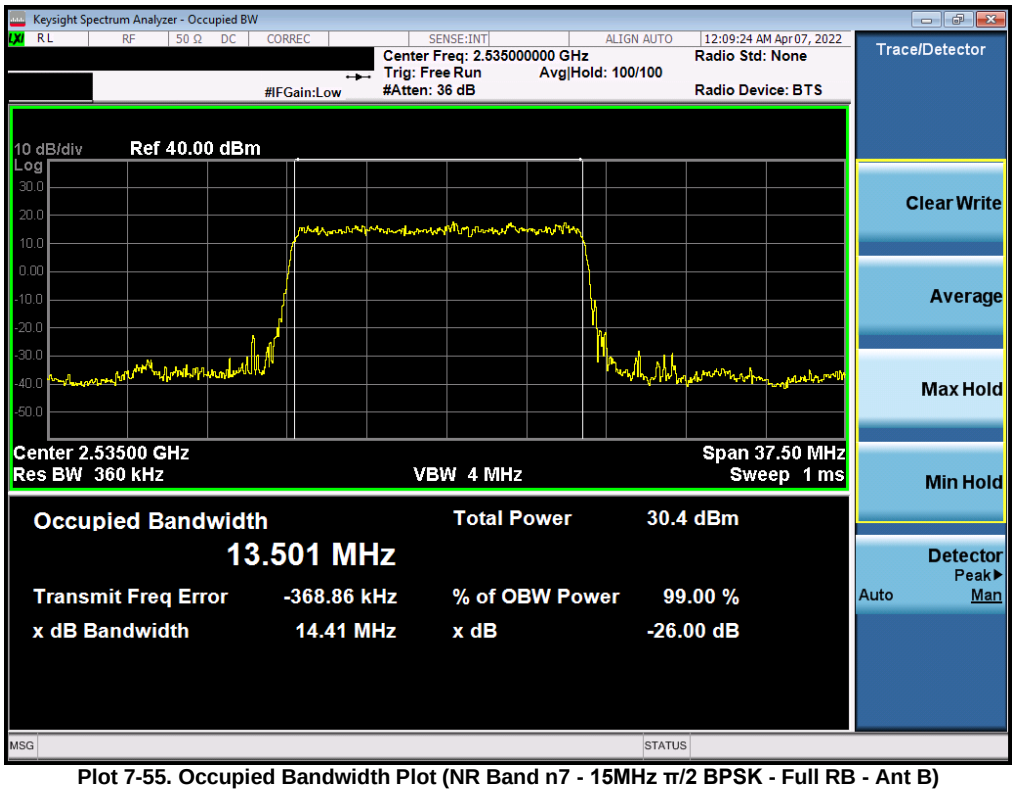
Plot 7-52. Occupied Bandwidth Plot (NR Band n7 - 20MHz π/2 BPSK - Full RB - Ant B)



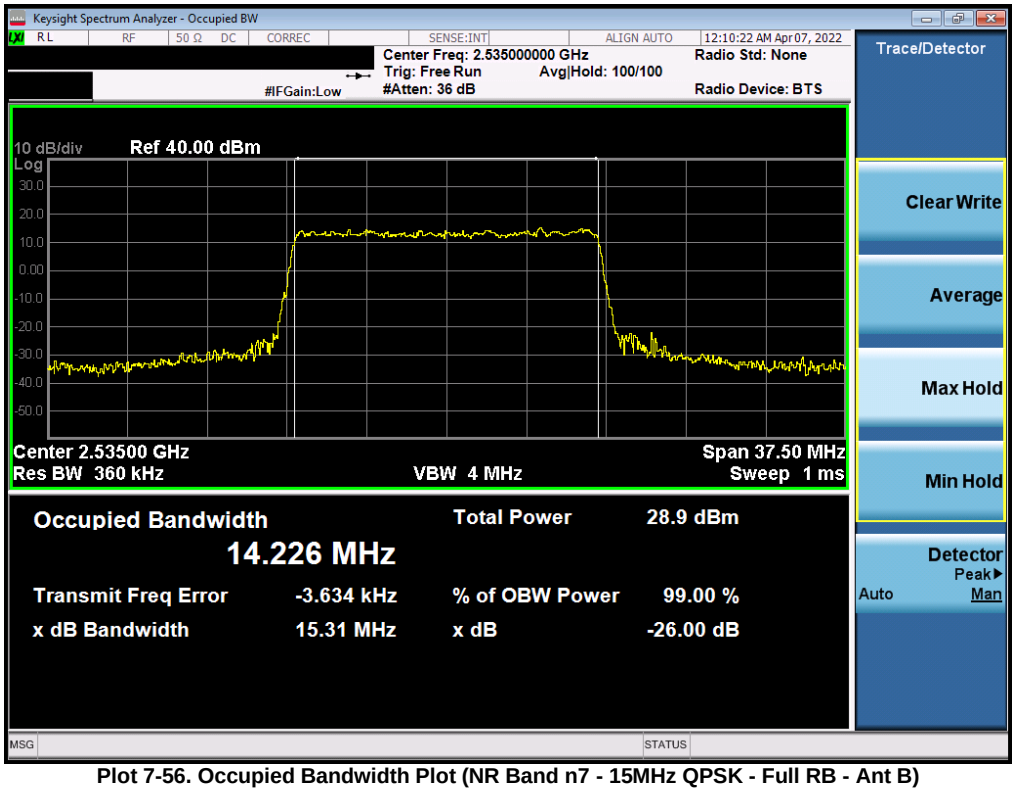
Plot 7-53. Occupied Bandwidth Plot (NR Band n7 - 20MHz QPSK - Full RB - Ant B)



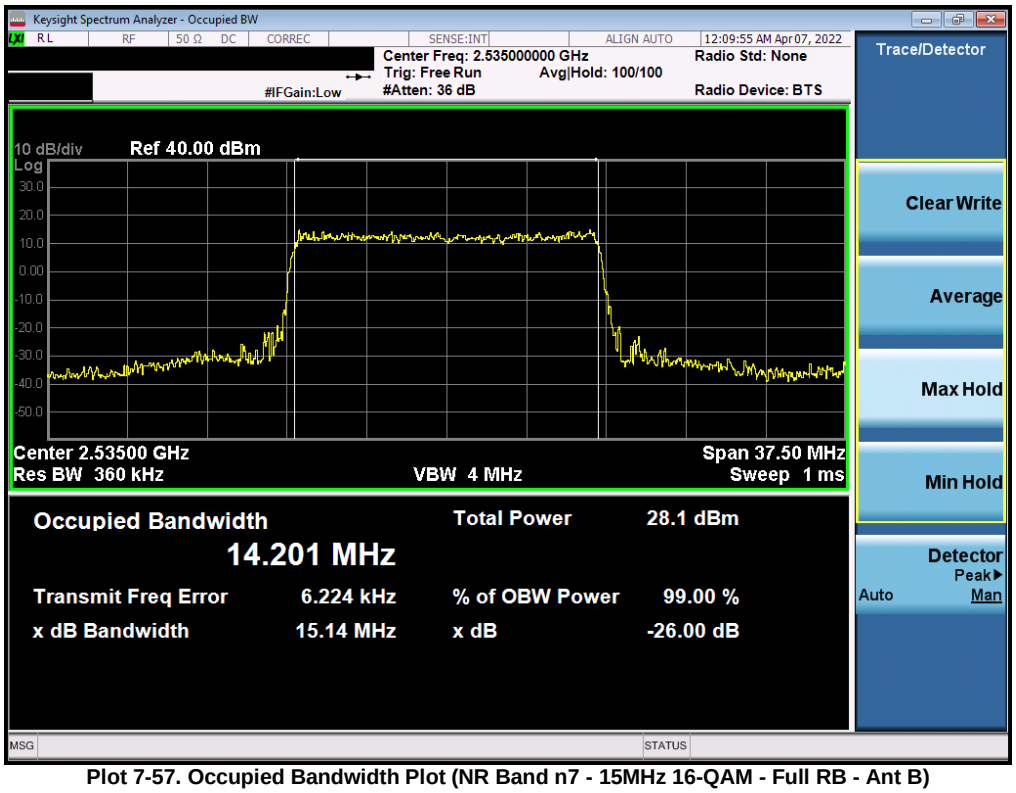
Plot 7-54. Occupied Bandwidth Plot (NR Band n7 - 20MHz 16-QAM - Full RB - Ant B)



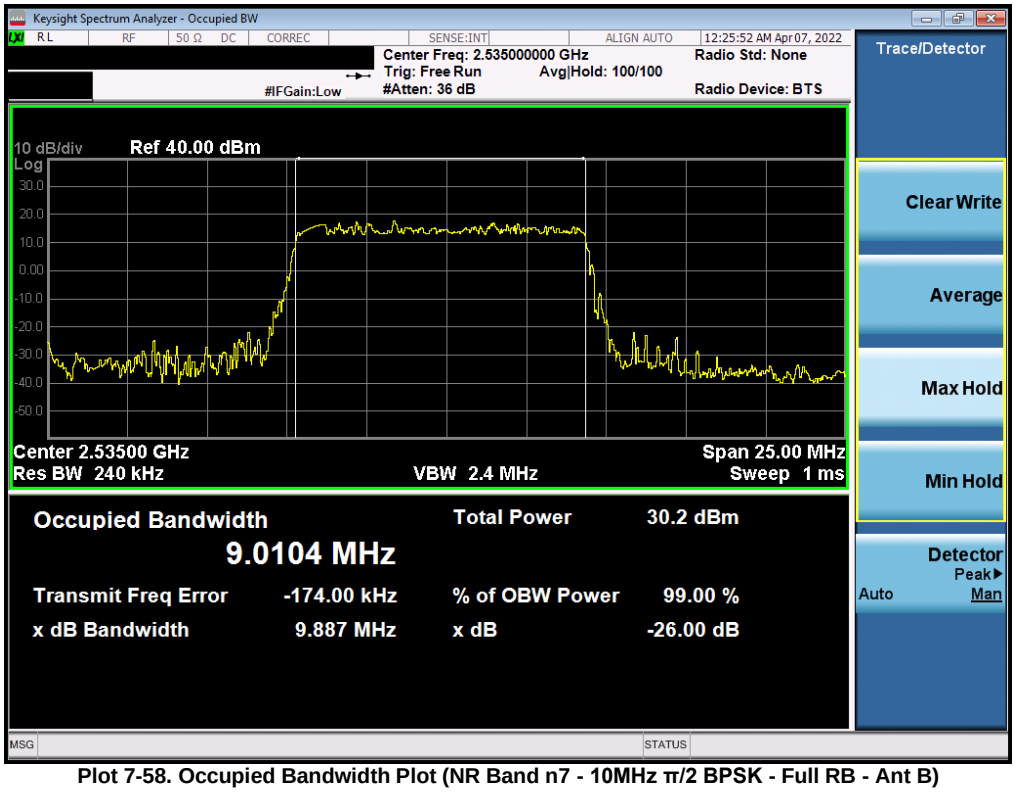
Plot 7-55. Occupied Bandwidth Plot (NR Band n7 - 15MHz π/2 BPSK - Full RB - Ant B)



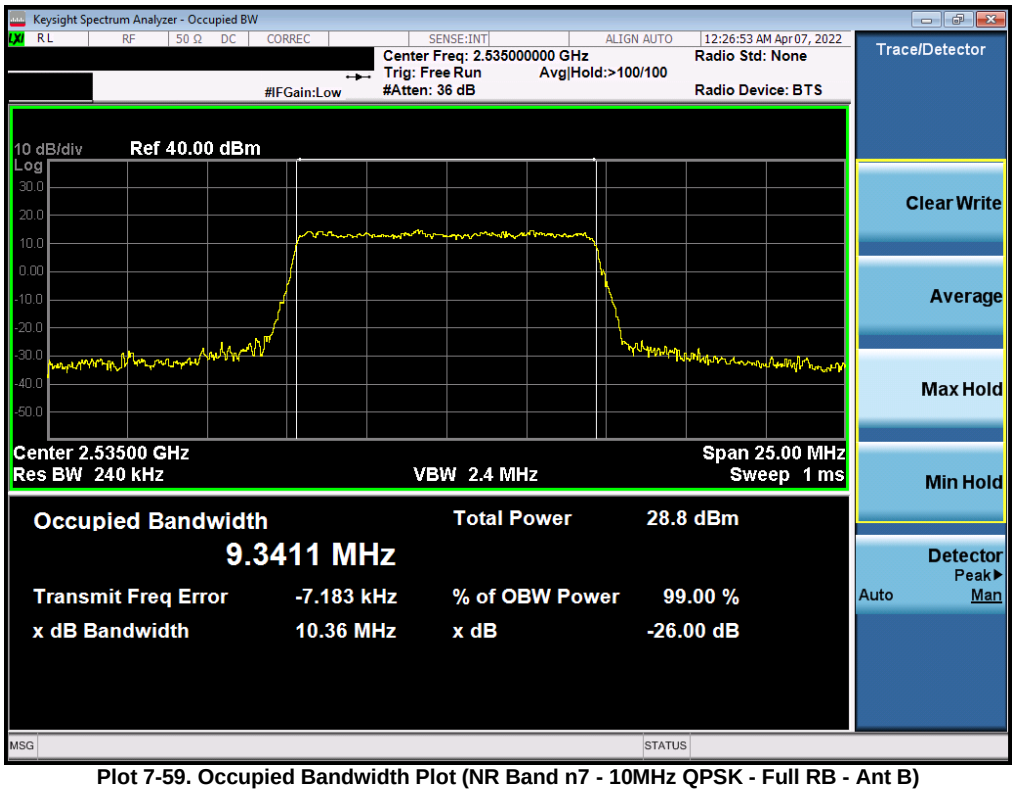
Plot 7-56. Occupied Bandwidth Plot (NR Band n7 - 15MHz QPSK - Full RB - Ant B)



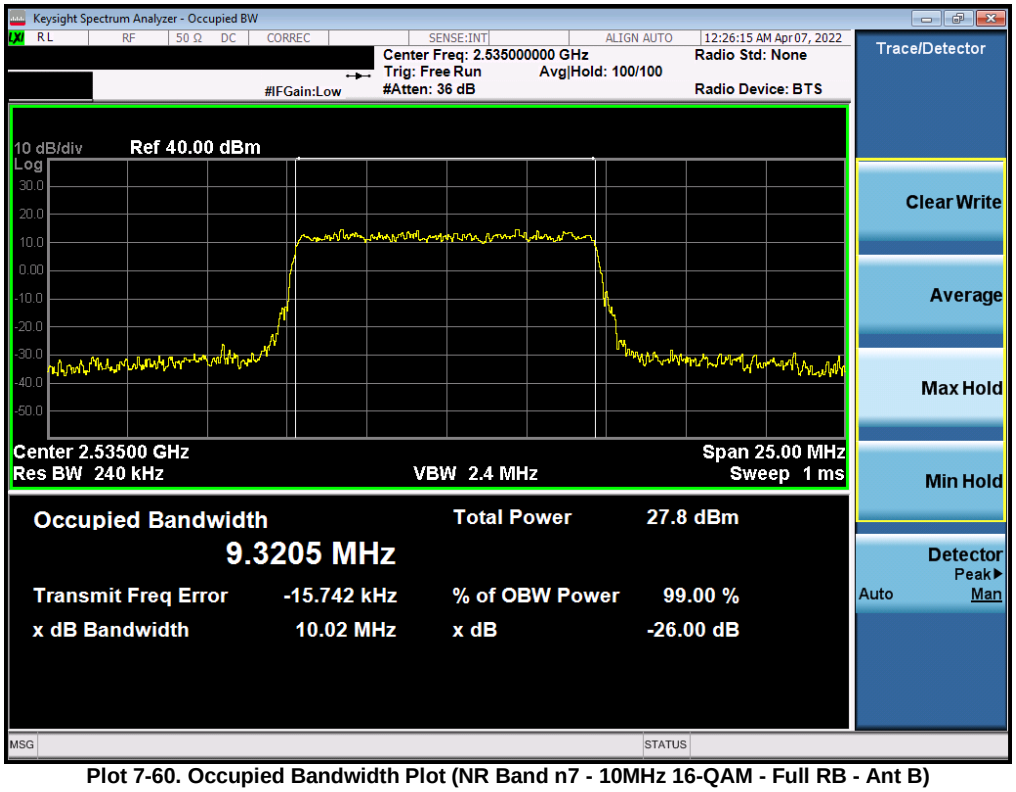
Plot 7-57. Occupied Bandwidth Plot (NR Band n7 - 15MHz 16-QAM - Full RB - Ant B)



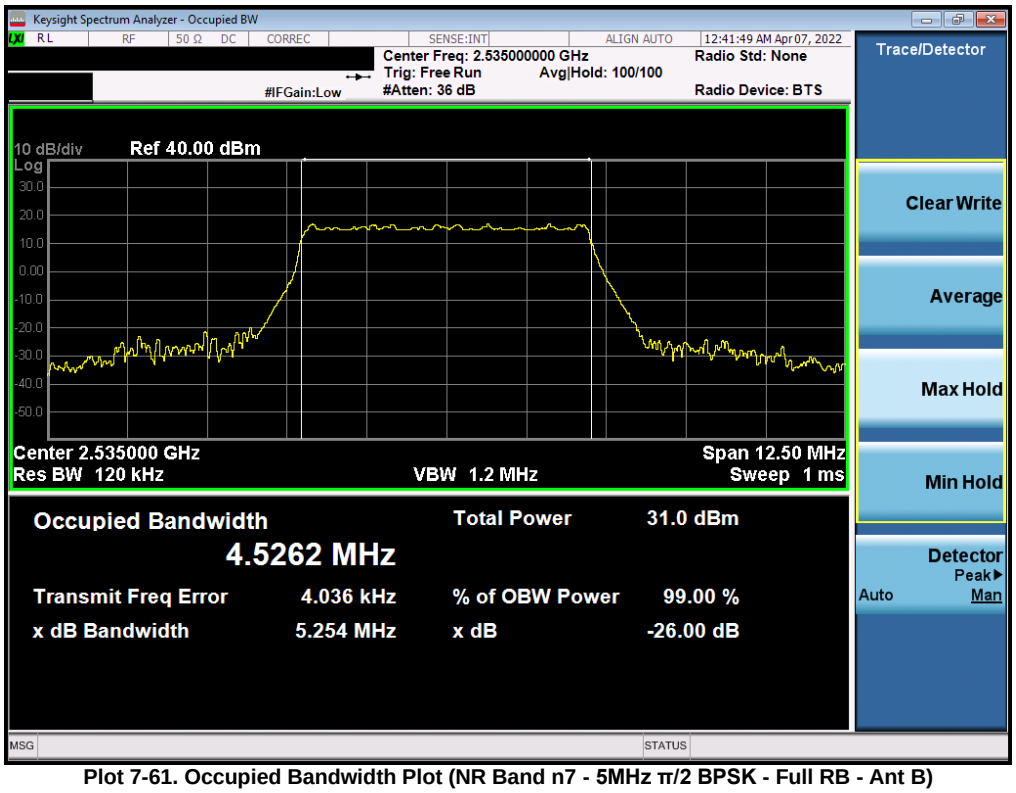
Plot 7-58. Occupied Bandwidth Plot (NR Band n7 - 10MHz π/2 BPSK - Full RB - Ant B)



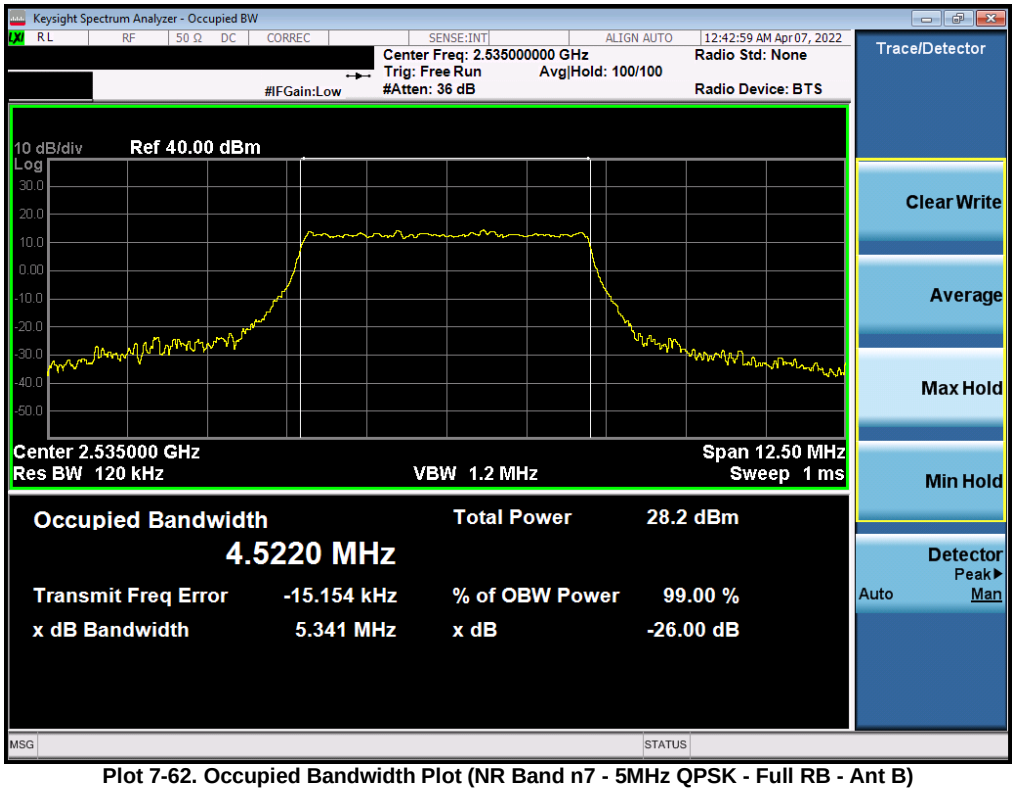
Plot 7-59. Occupied Bandwidth Plot (NR Band n7 - 10MHz QPSK - Full RB - Ant B)



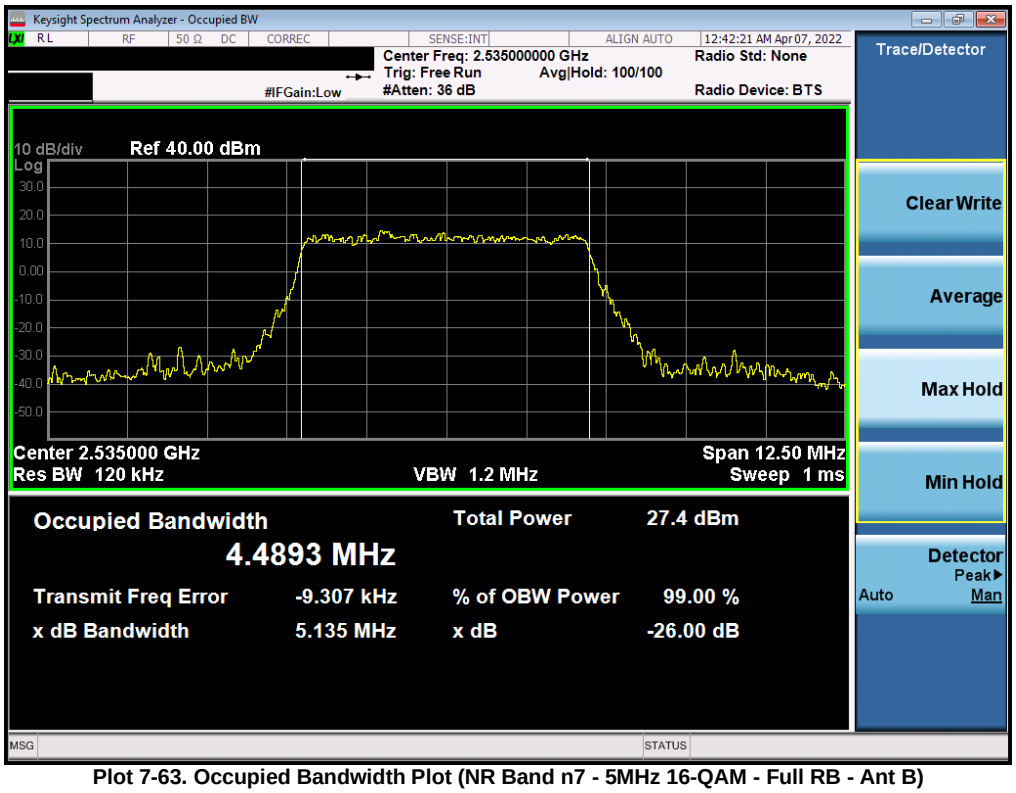
Plot 7-60. Occupied Bandwidth Plot (NR Band n7 - 10MHz 16-QAM - Full RB - Ant B)



Plot 7-61. Occupied Bandwidth Plot (NR Band n7 - 5MHz π/2 BPSK - Full RB - Ant B)

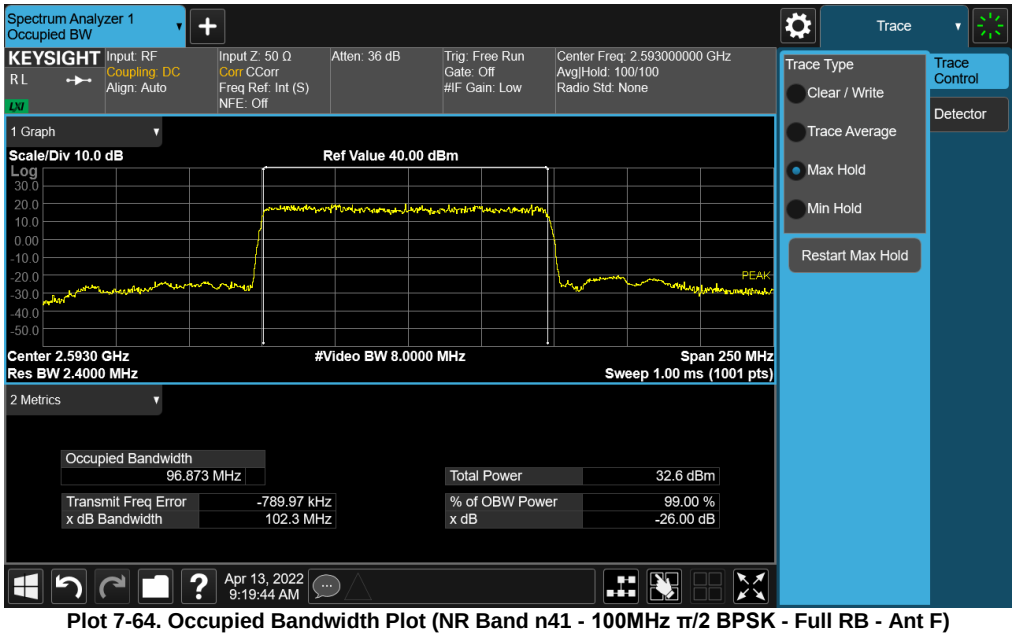


Plot 7-62. Occupied Bandwidth Plot (NR Band n7 - 5MHz QPSK - Full RB - Ant B)

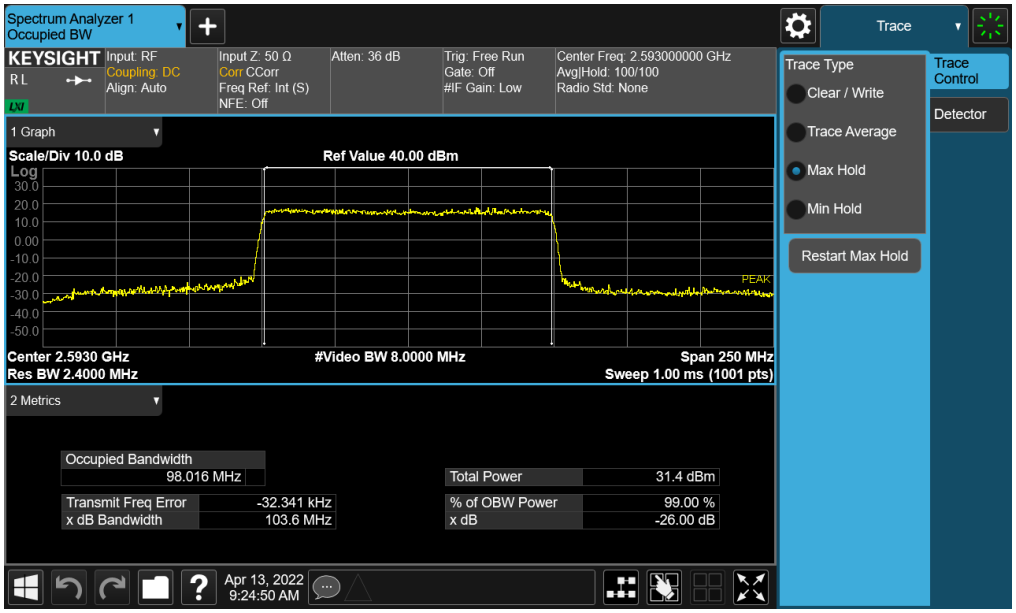


Plot 7-63. Occupied Bandwidth Plot (NR Band n7 - 5MHz 16-QAM - Full RB - Ant B)

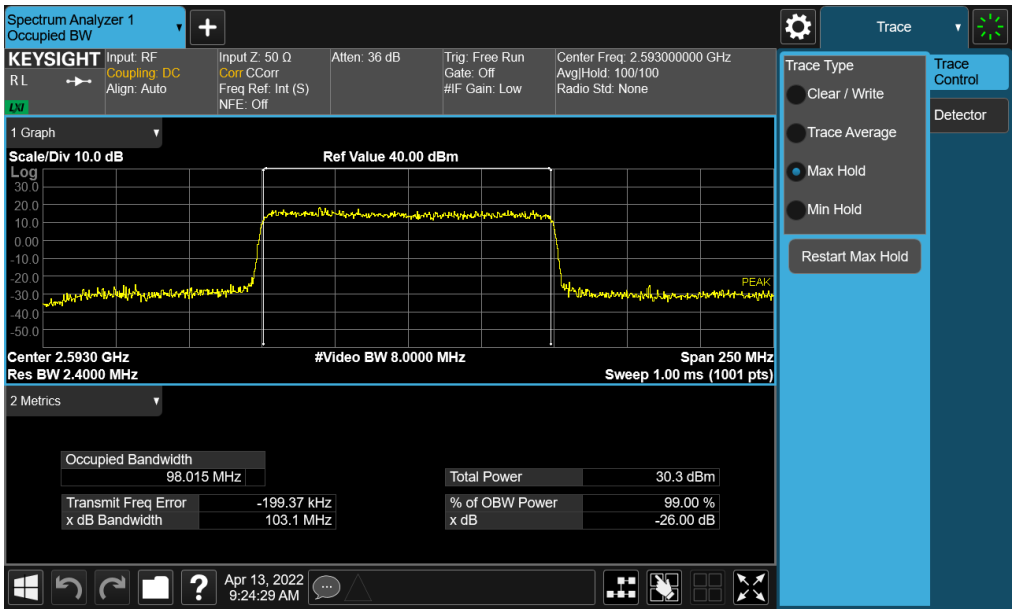
NR Band n41 – Ant F



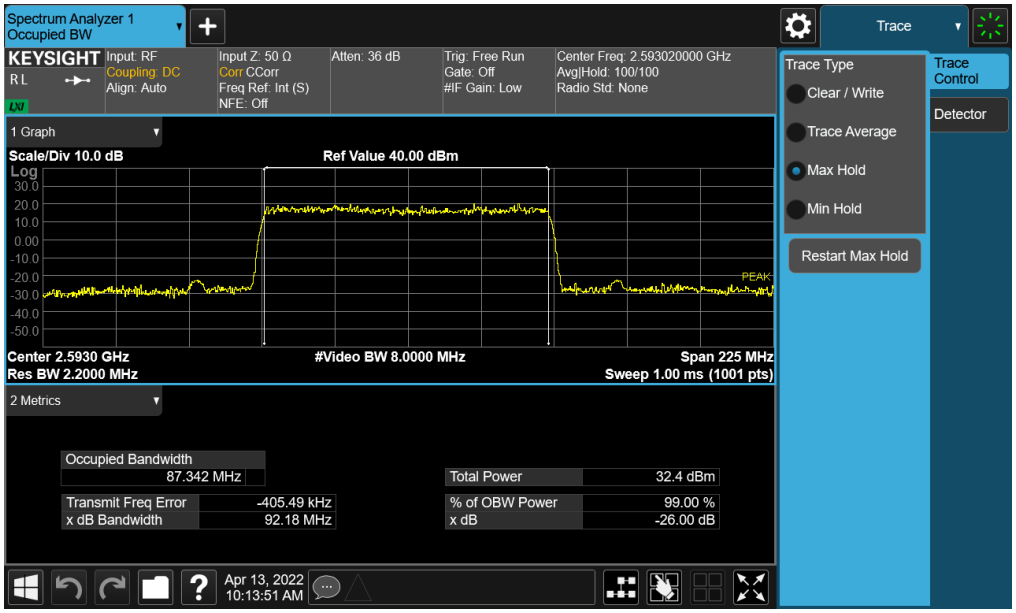
Plot 7-64. Occupied Bandwidth Plot (NR Band n41 - 100MHz π/2 BPSK - Full RB - Ant F)



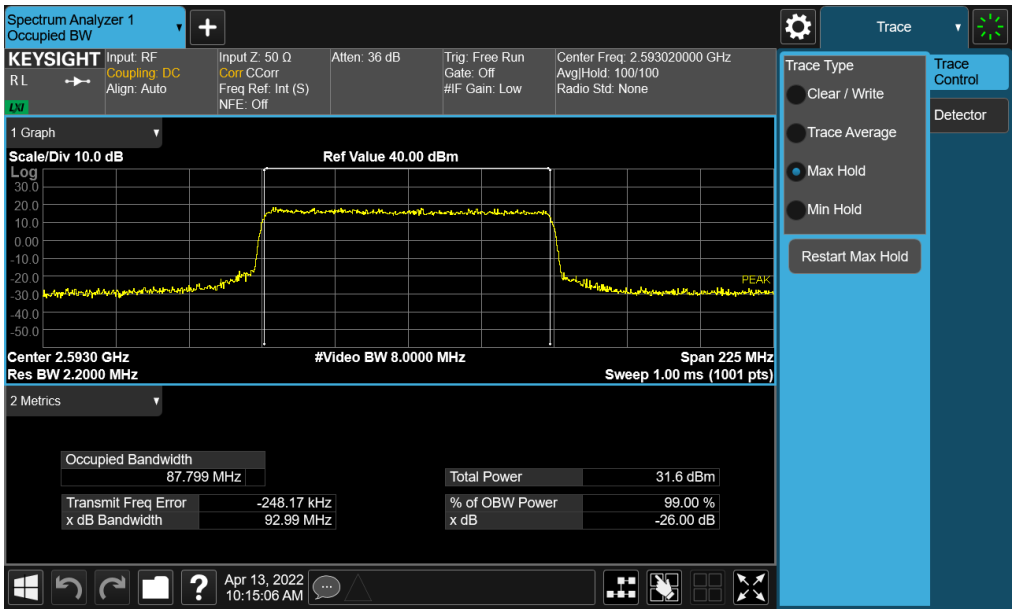
Plot 7-65. Occupied Bandwidth Plot (NR Band n41 - 100MHz QPSK - Full RB - Ant F)



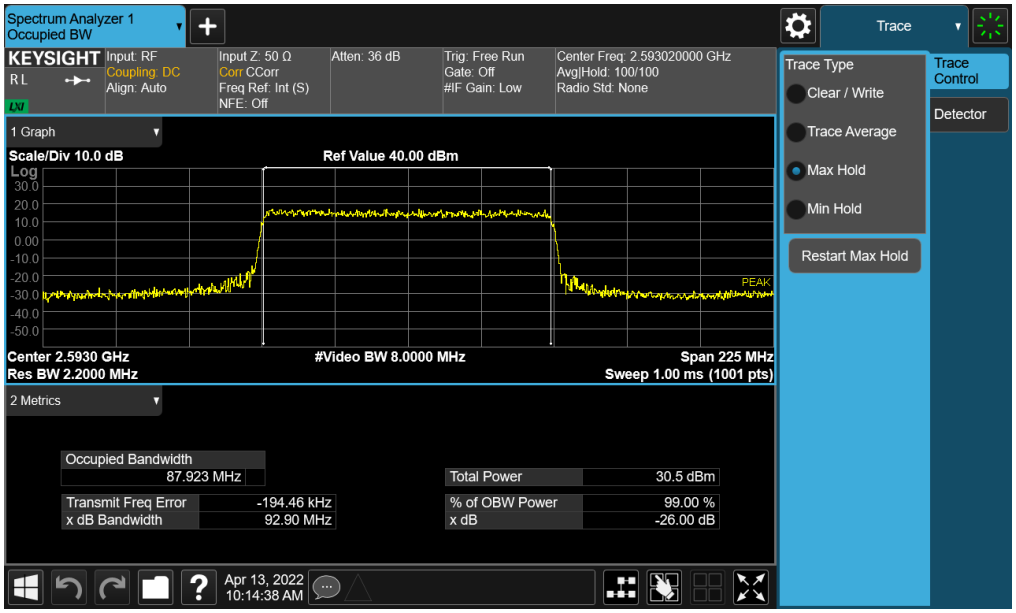
Plot 7-66. Occupied Bandwidth Plot (NR Band n41 - 100MHz 16-QAM - Full RB - Ant F)



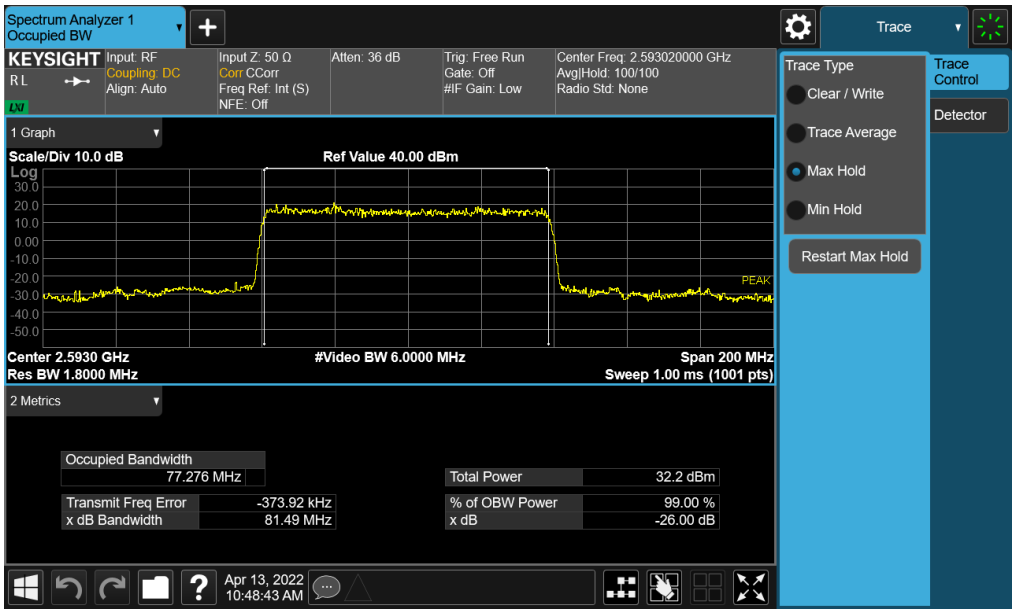
Plot 7-67. Occupied Bandwidth Plot (NR Band n41 - 90MHz π/2 BPSK - Full RB - Ant F)



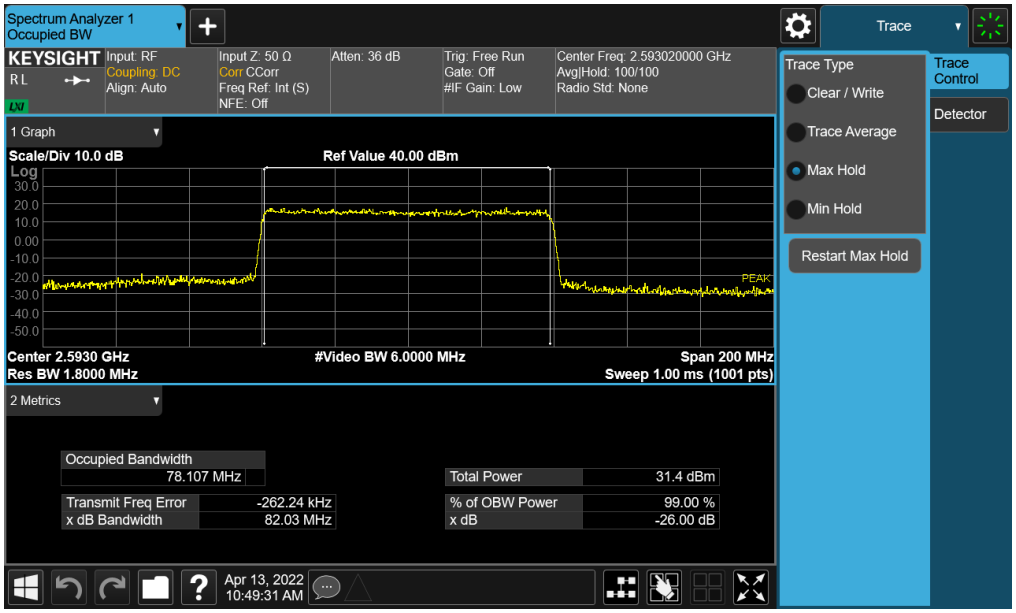
Plot 7-68. Occupied Bandwidth Plot (NR Band n41 - 90MHz QPSK - Full RB - Ant F)



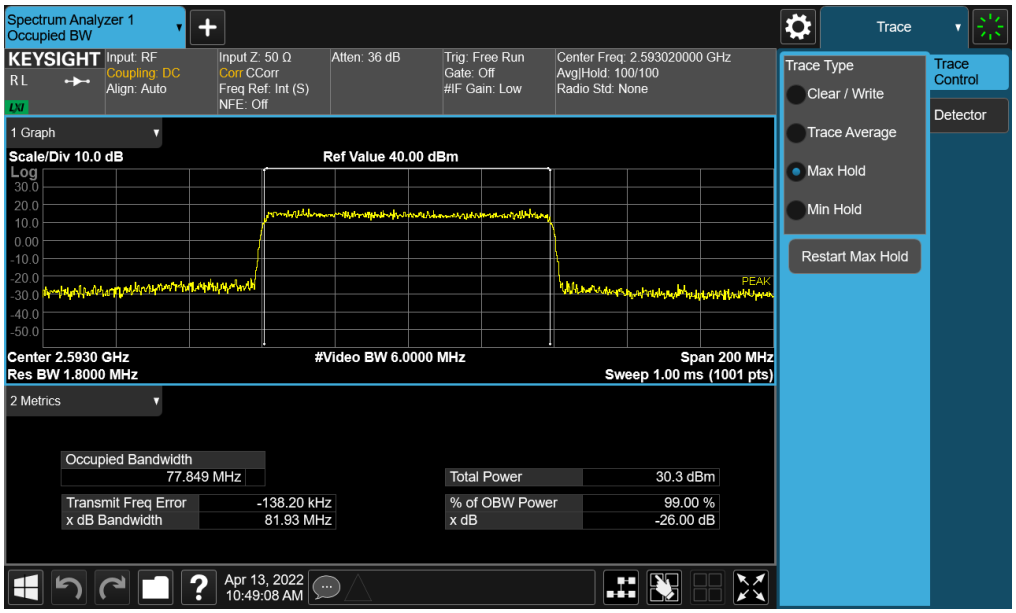
Plot 7-69. Occupied Bandwidth Plot (NR Band n41 - 90MHz 16-QAM - Full RB - Ant F)



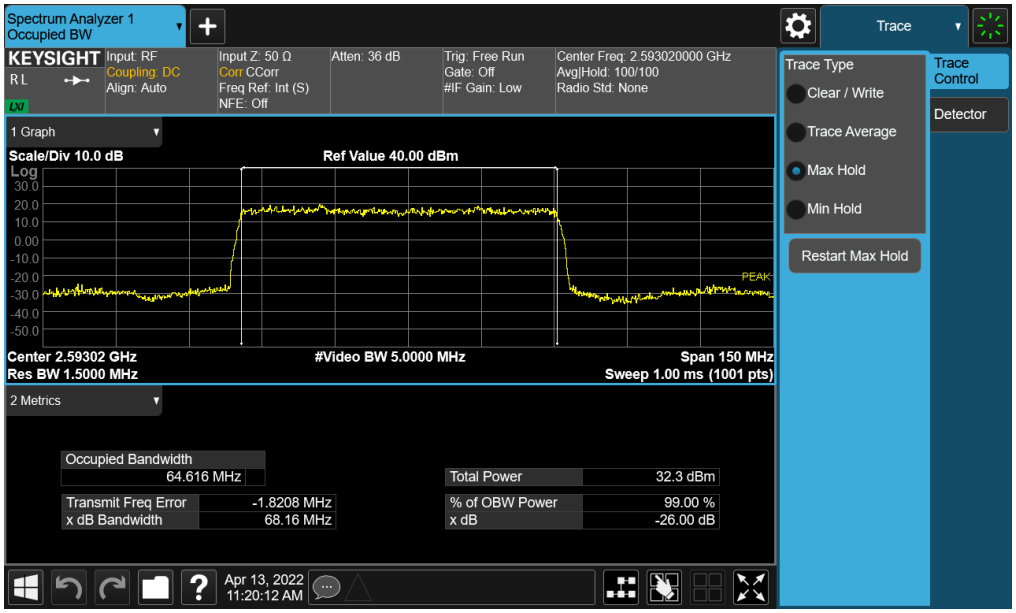
Plot 7-70. Occupied Bandwidth Plot (NR Band n41 - 80MHz π/2 BPSK - Full RB - Ant F)



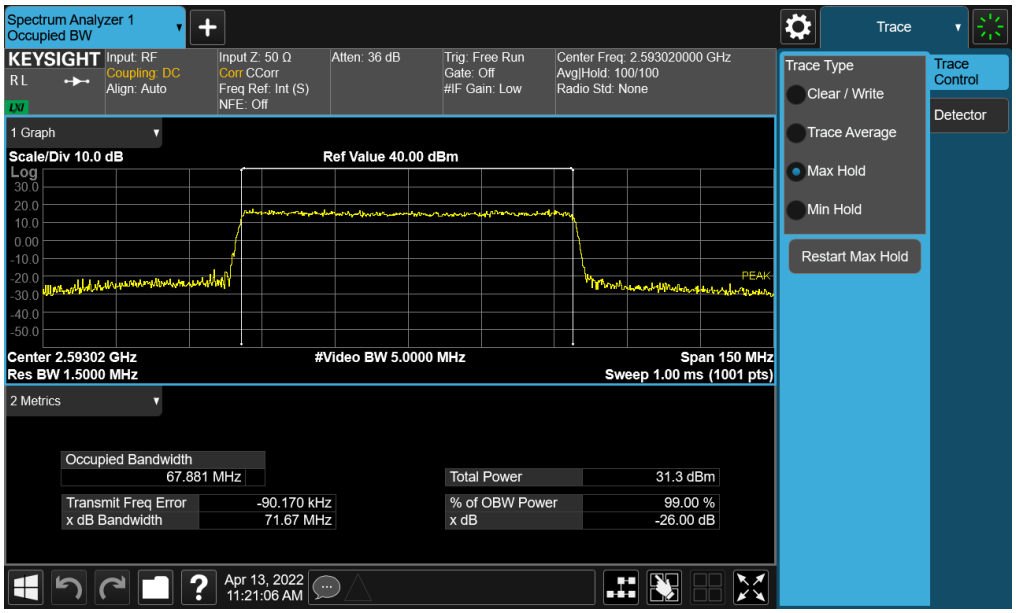
Plot 7-71. Occupied Bandwidth Plot (NR Band n41 - 80MHz QPSK - Full RB - Ant F)



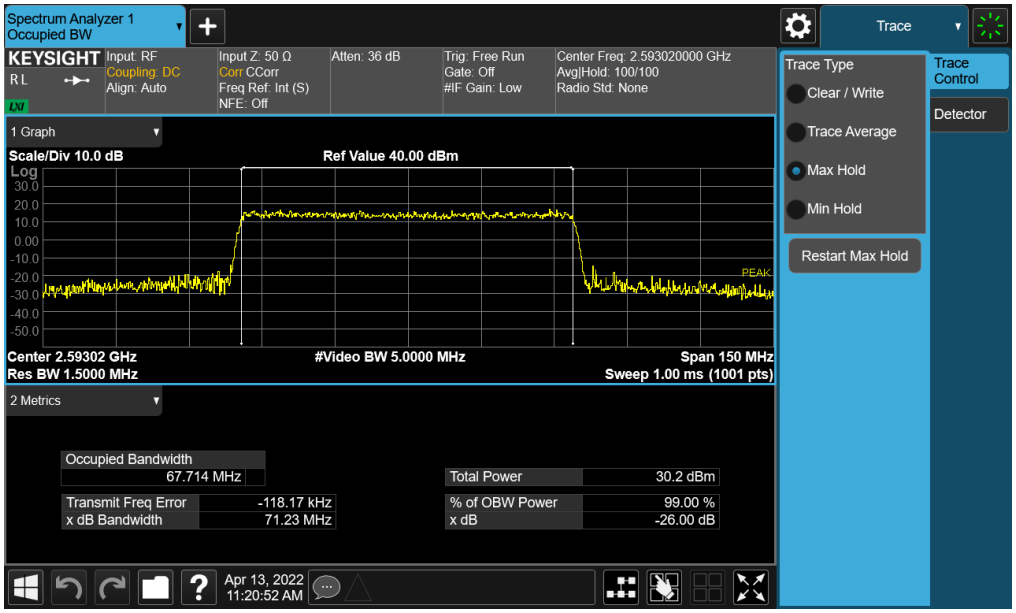
Plot 7-72. Occupied Bandwidth Plot (NR Band n41 - 80MHz 16-QAM - Full RB - Ant F)



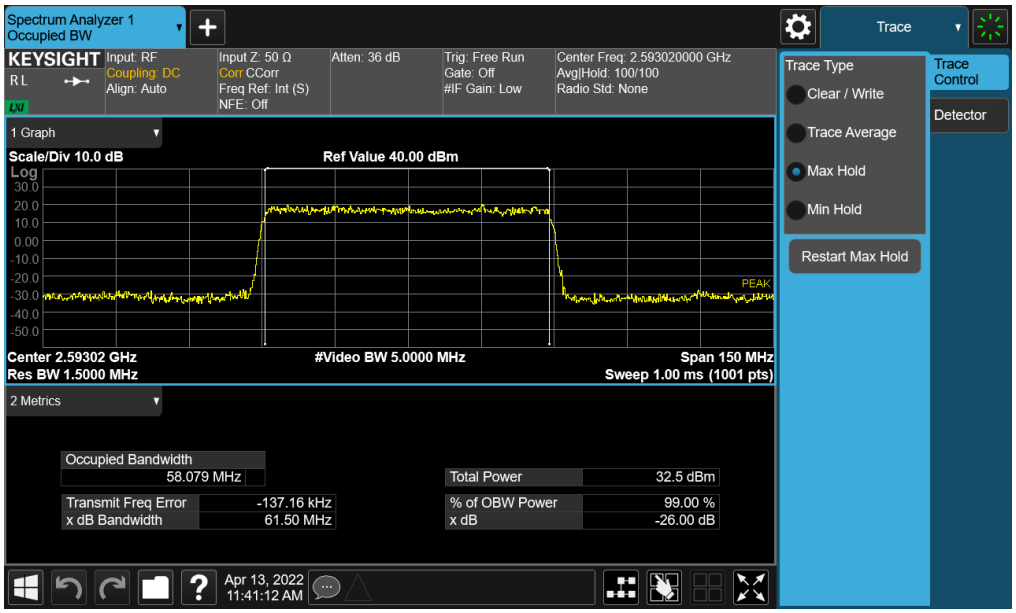
Plot 7-73. Occupied Bandwidth Plot (NR Band n41 - 70MHz π/2 BPSK - Full RB - Ant F)



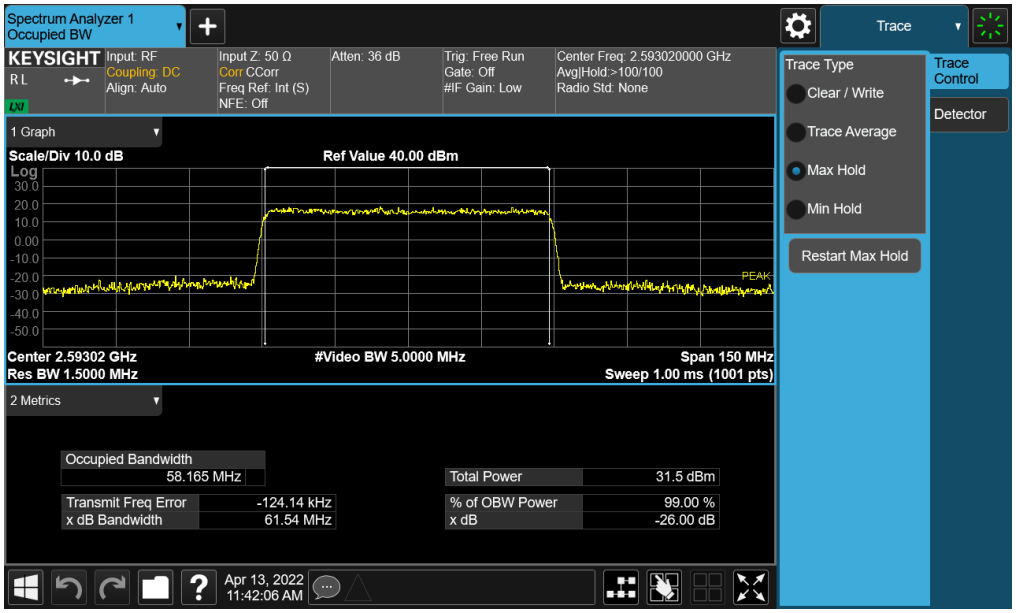
Plot 7-74. Occupied Bandwidth Plot (NR Band n41 - 70MHz QPSK - Full RB - Ant F)



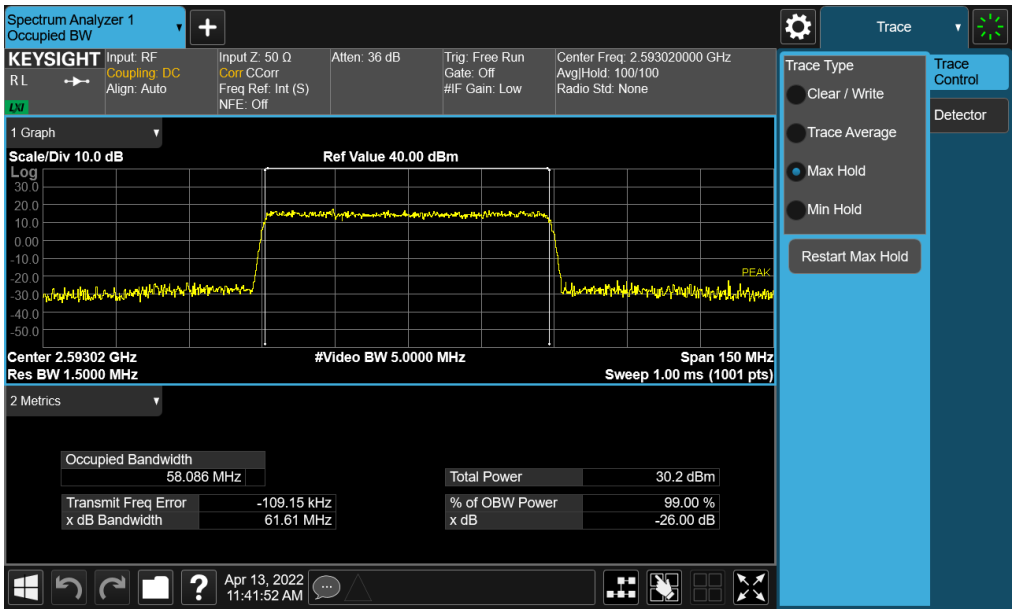
Plot 7-75. Occupied Bandwidth Plot (NR Band n41 - 70MHz 16-QAM - Full RB - Ant F)



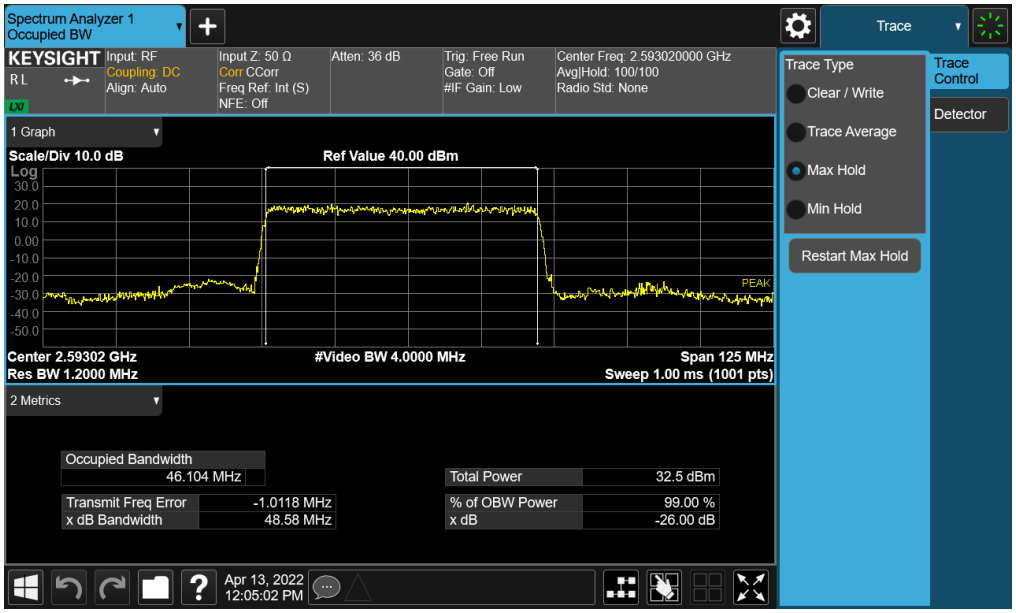
Plot 7-76. Occupied Bandwidth Plot (NR Band n41 - 60MHz π/2 BPSK - Full RB - Ant F)



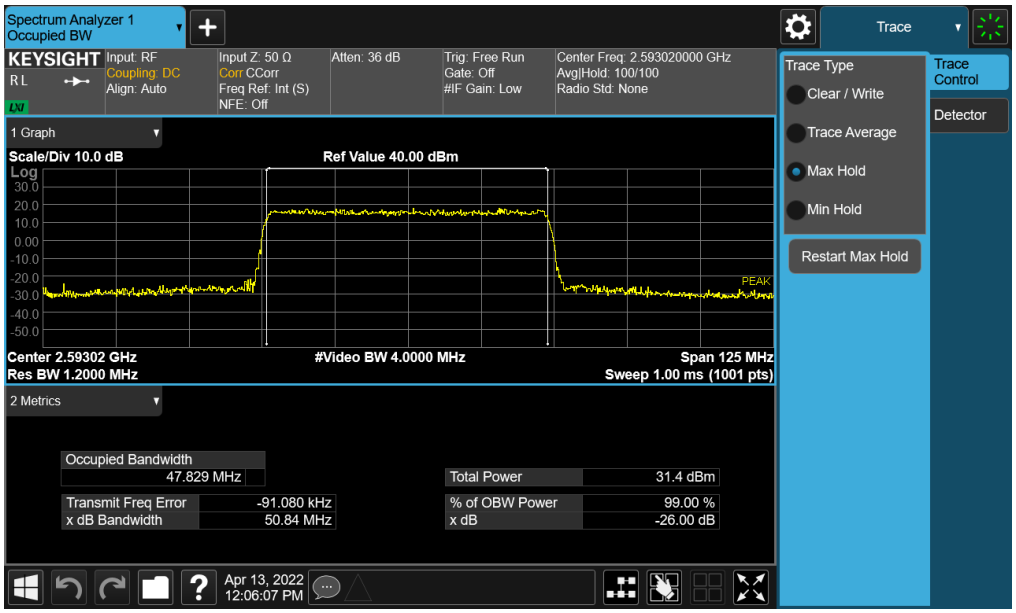
Plot 7-77. Occupied Bandwidth Plot (NR Band n41 - 60MHz QPSK - Full RB - Ant F)



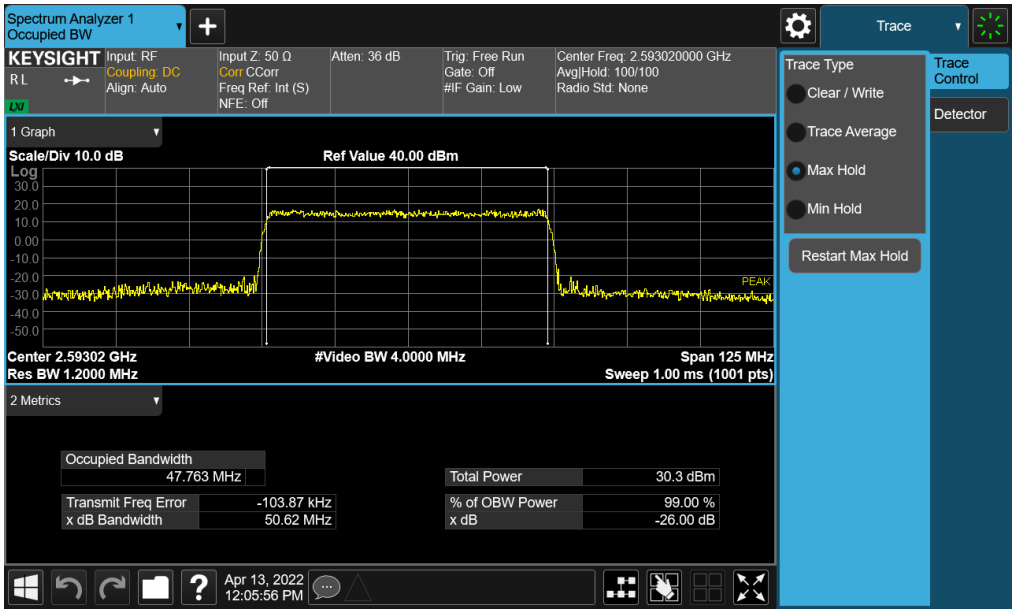
Plot 7-78. Occupied Bandwidth Plot (NR Band n41 - 60MHz 16-QAM - Full RB - Ant F)



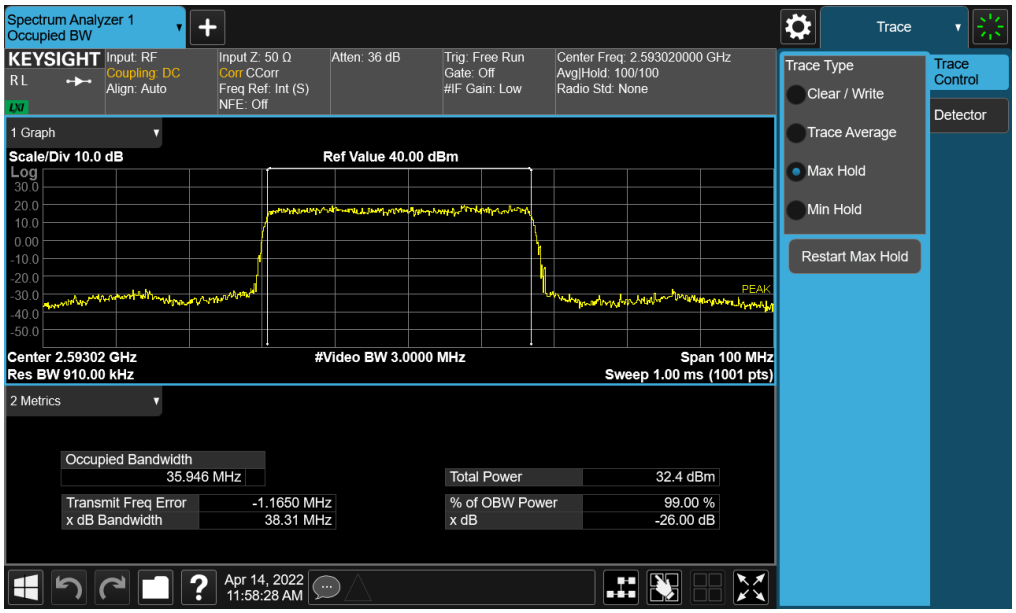
Plot 7-79. Occupied Bandwidth Plot (NR Band n41 - 50MHz π/2 BPSK - Full RB - Ant F)



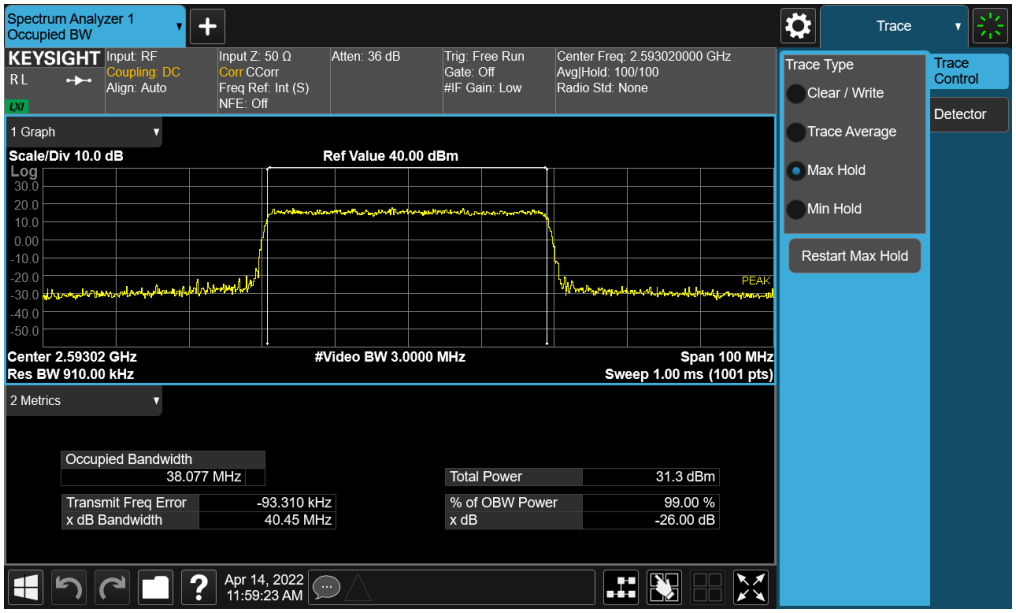
Plot 7-80. Occupied Bandwidth Plot (NR Band n41 - 50MHz QPSK - Full RB - Ant F)



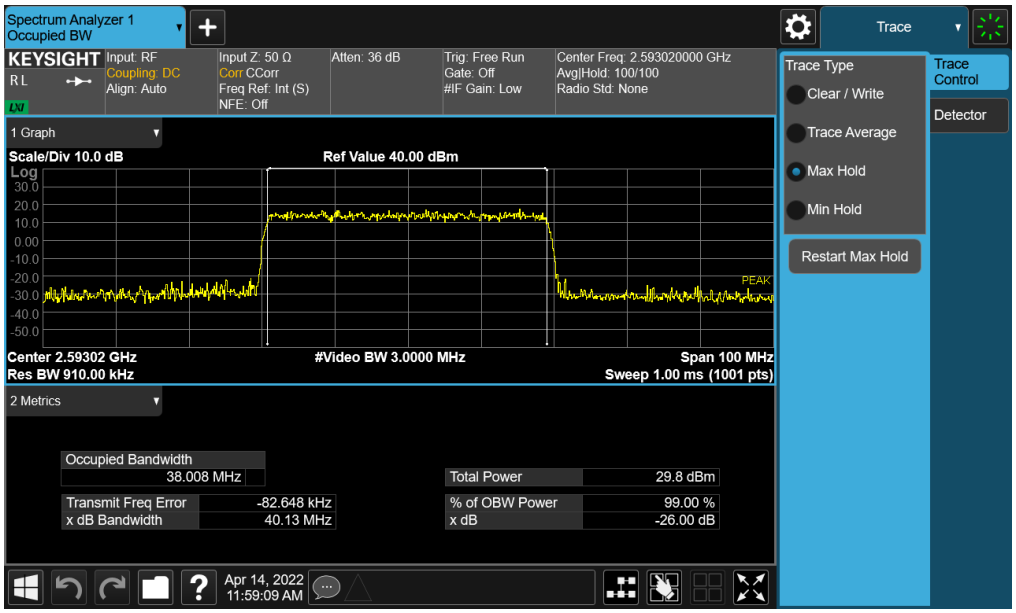
Plot 7-81. Occupied Bandwidth Plot (NR Band n41 - 50MHz 16-QAM - Full RB - Ant F)



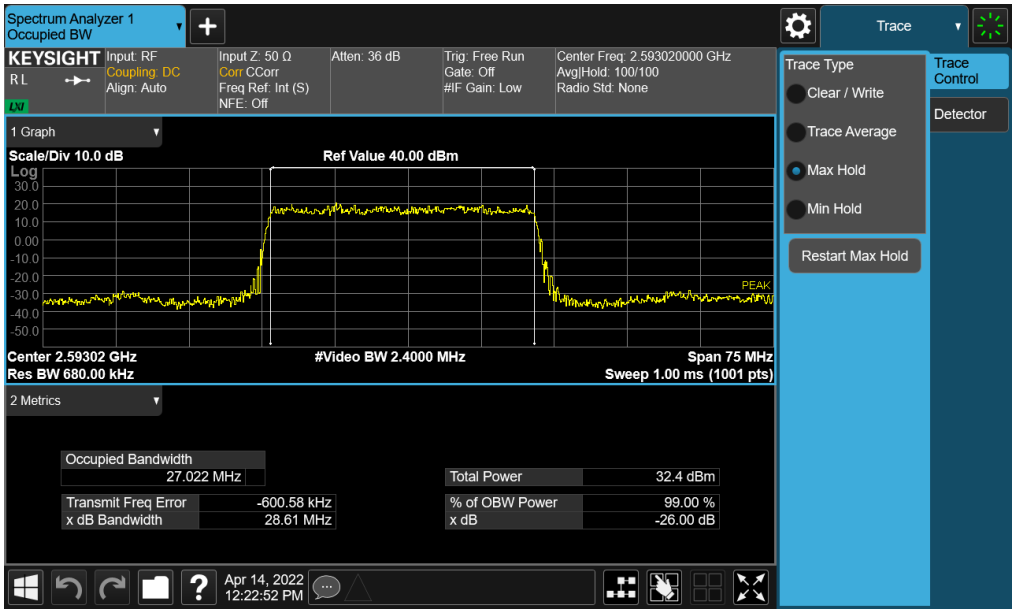
Plot 7-82. Occupied Bandwidth Plot (NR Band n41 - 40MHz π/2 BPSK - Full RB - Ant F)



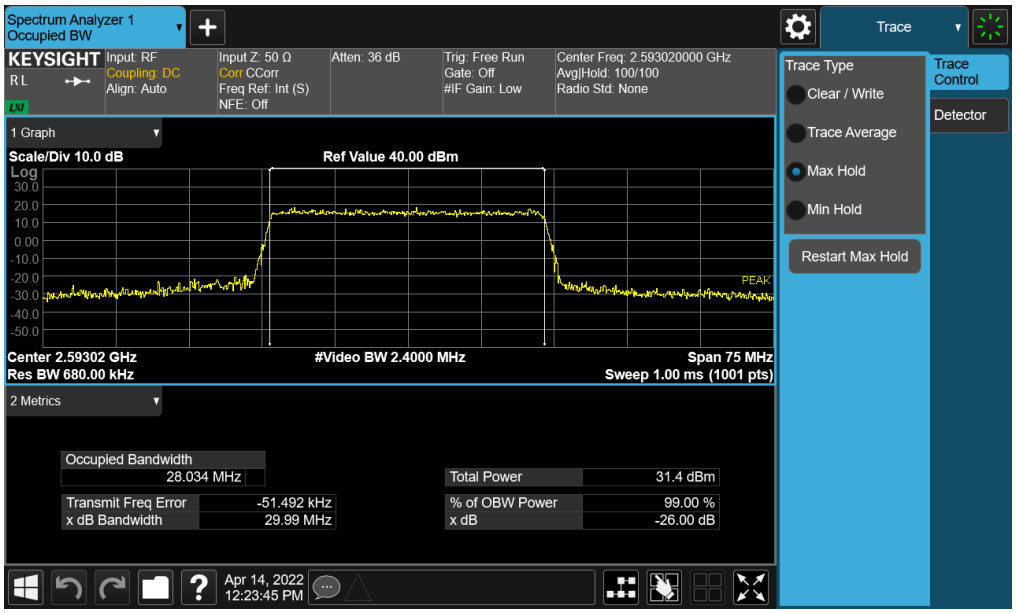
Plot 7-83. Occupied Bandwidth Plot (NR Band n41 - 40MHz QPSK - Full RB - Ant F)



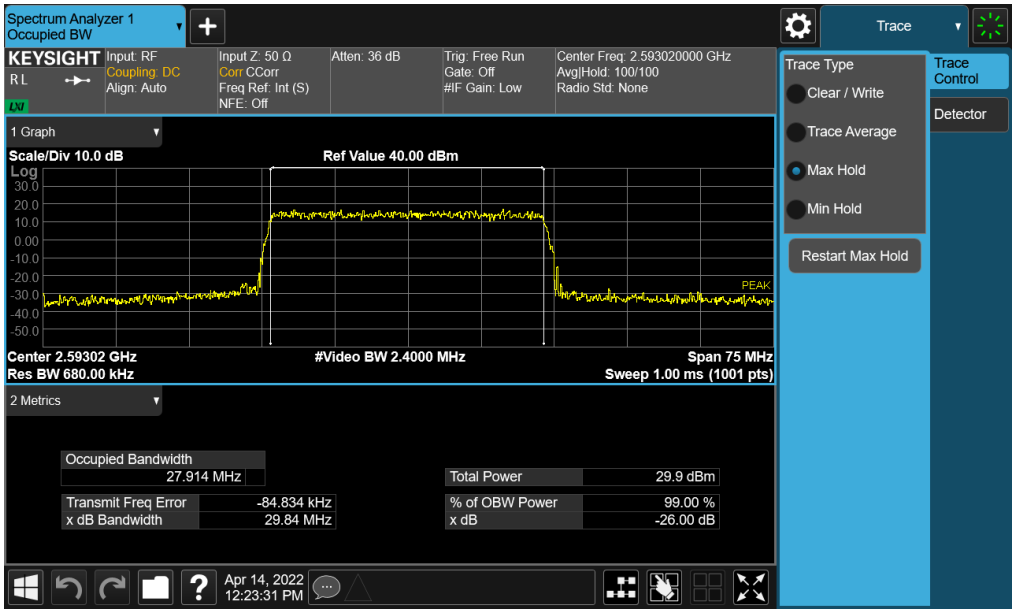
Plot 7-84. Occupied Bandwidth Plot (NR Band n41 - 40MHz 16-QAM - Full RB - Ant F)



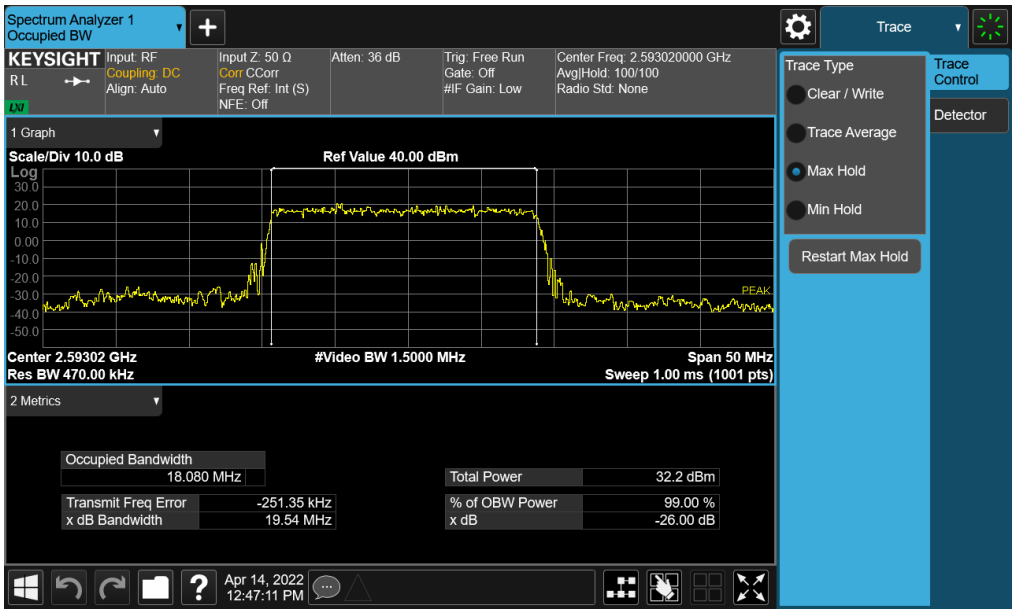
Plot 7-85. Occupied Bandwidth Plot (NR Band n41 - 30MHz π/2 BPSK - Full RB - Ant F)



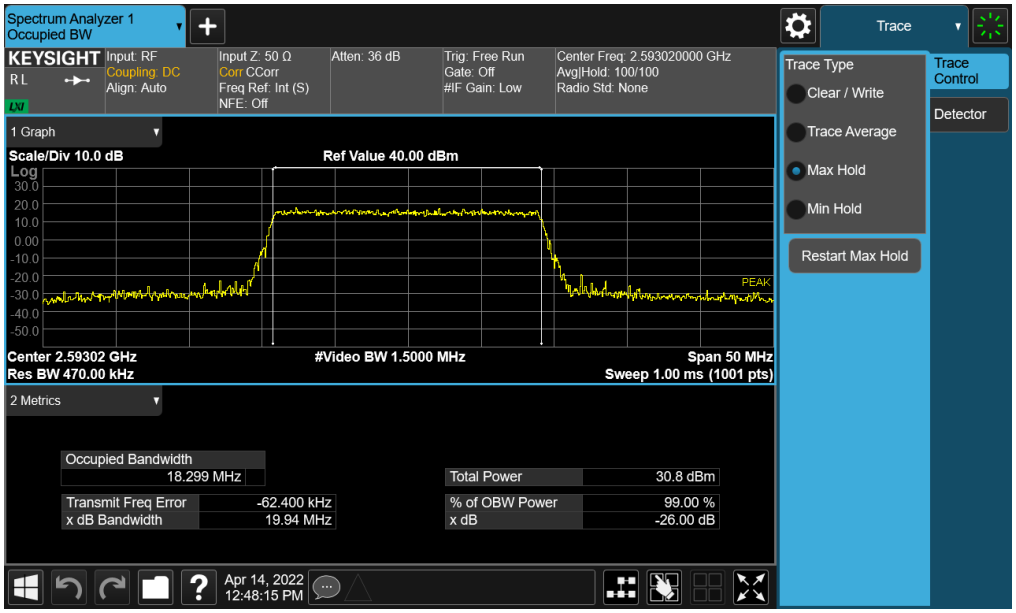
Plot 7-86. Occupied Bandwidth Plot (NR Band n41 - 30MHz QPSK - Full RB - Ant F)



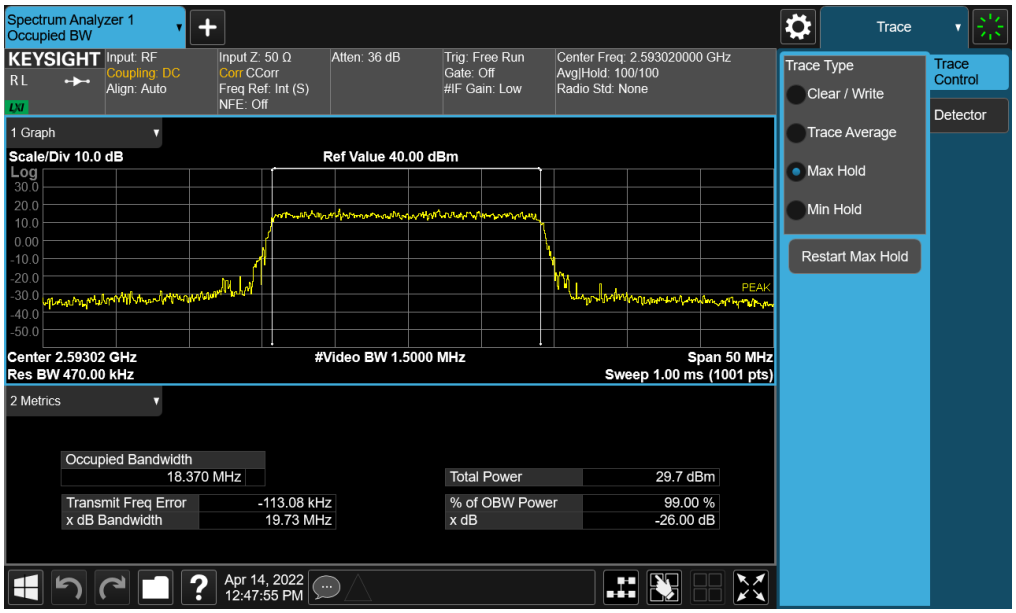
Plot 7-87. Occupied Bandwidth Plot (NR Band n41 - 30MHz 16-QAM - Full RB - Ant F)



Plot 7-88. Occupied Bandwidth Plot (NR Band n41 - 20MHz π/2 BPSK - Full RB - Ant F)

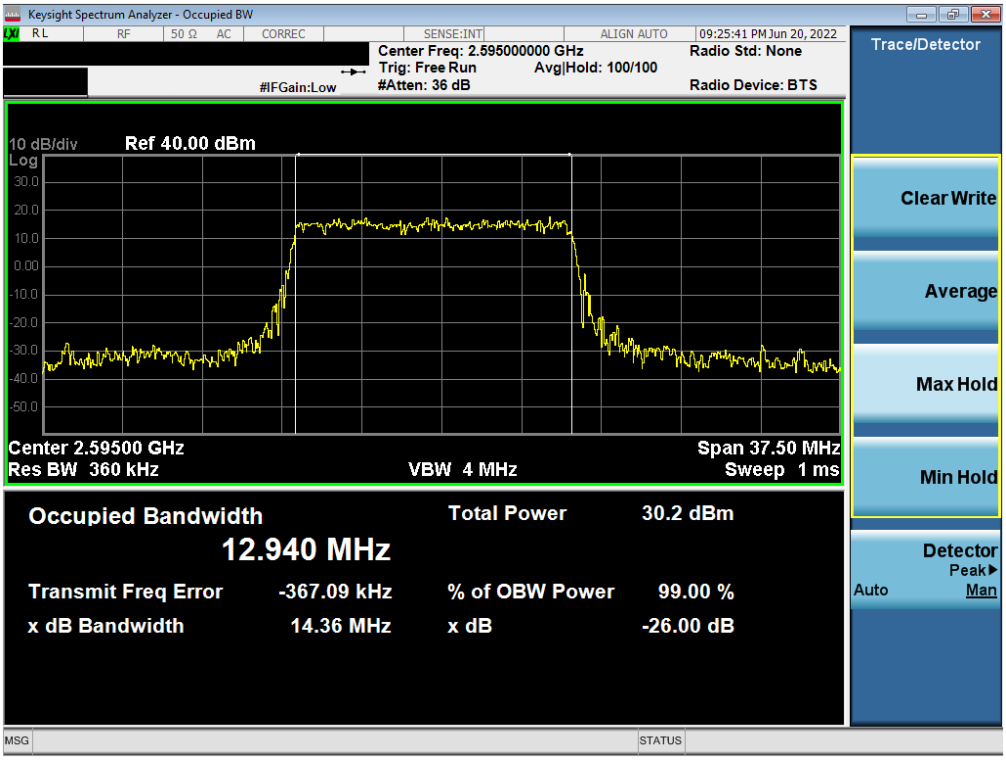


Plot 7-89. Occupied Bandwidth Plot (NR Band n41 - 20MHz QPSK - Full RB - Ant F)

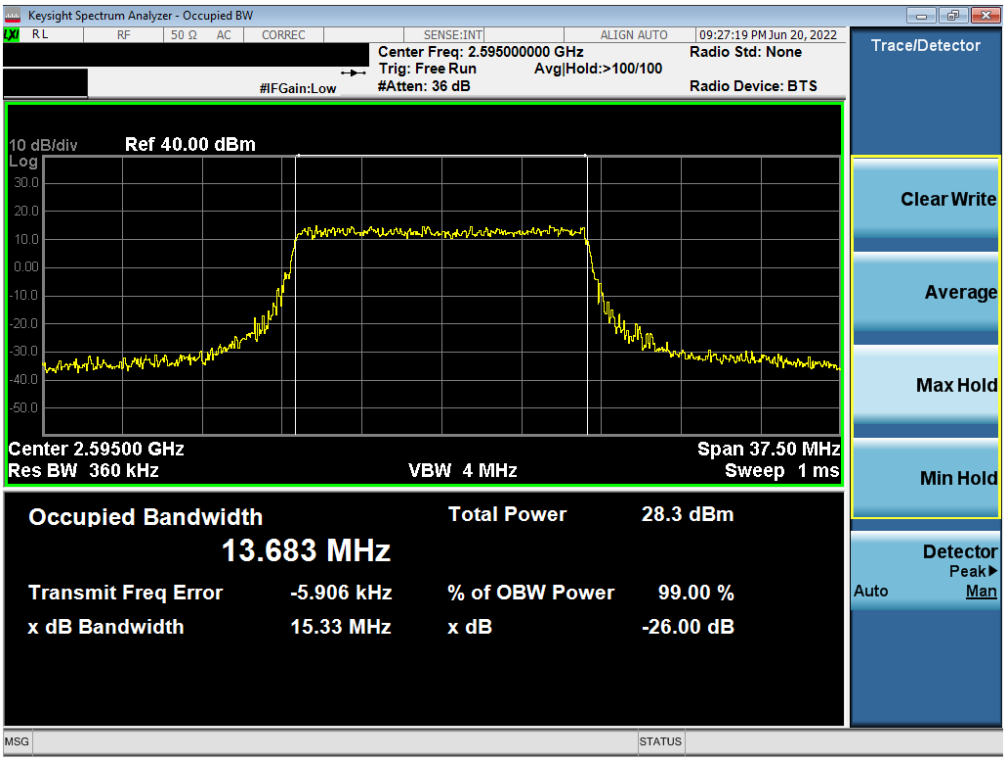


Plot 7-90. Occupied Bandwidth Plot (NR Band n41 - 20MHz 16-QAM - Full RB - Ant F)

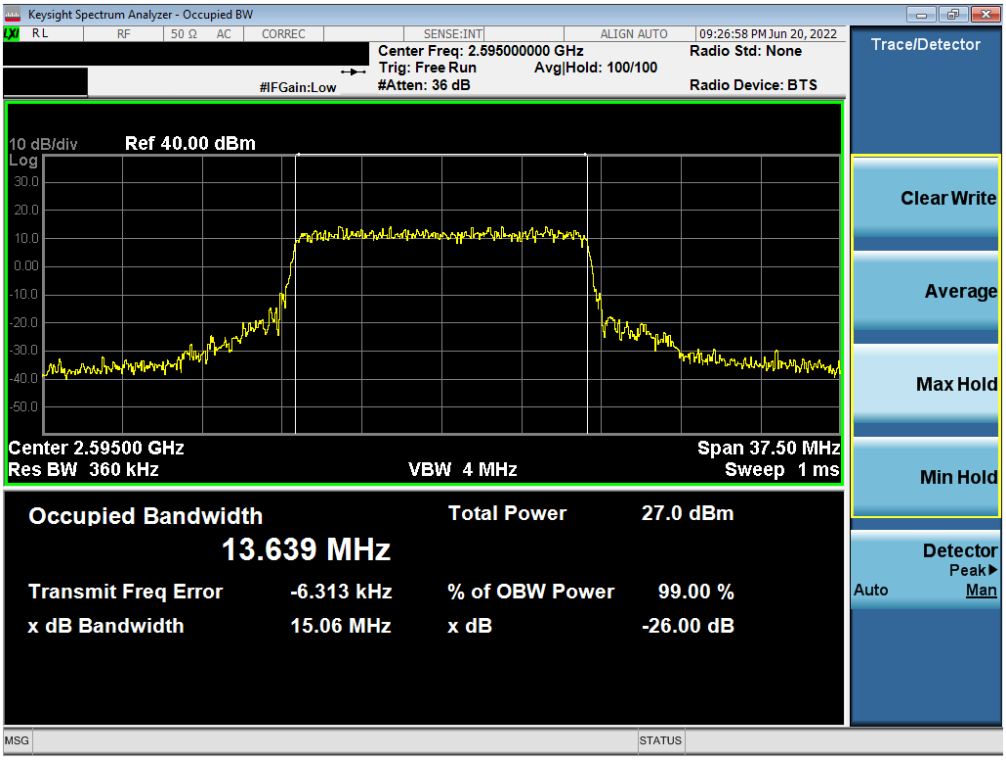
NR Band 38 – Ant F



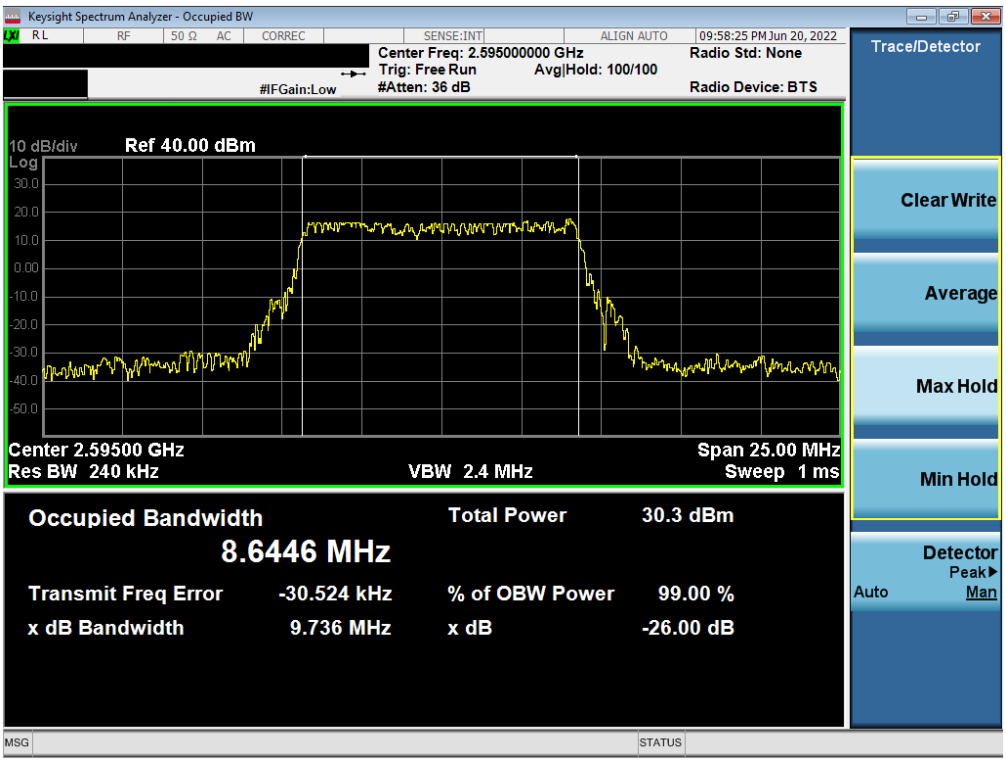
Plot 7-91. Occupied Bandwidth Plot (NR Band n38 - 15MHz π/2 BPSK - Full RB - Ant F)



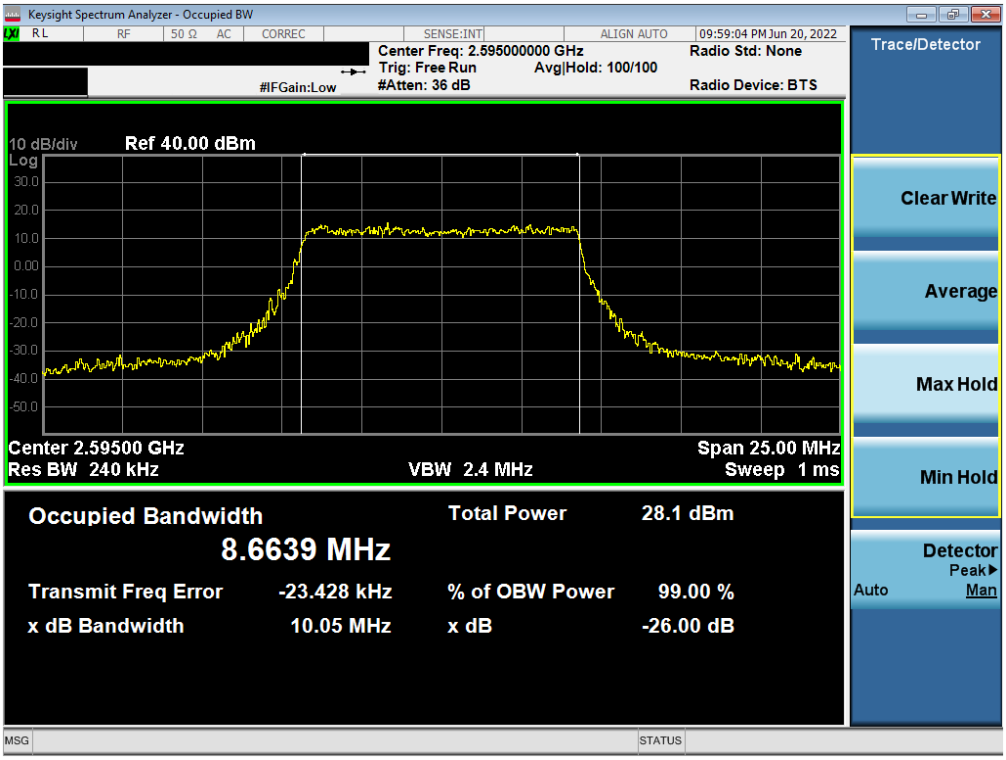
Plot 7-92. Occupied Bandwidth Plot (NR Band n38 - 15MHz QPSK - Full RB - Ant F)



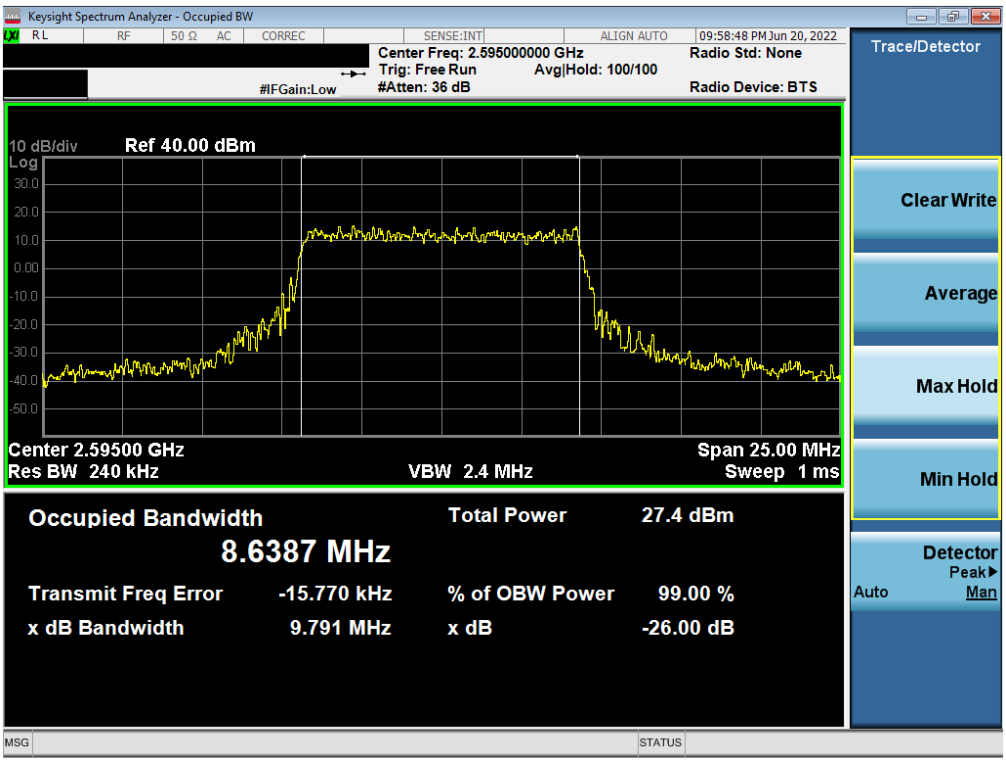
Plot 7-93. Occupied Bandwidth Plot (NR Band n38 - 15MHz 16-QAM - Full RB - Ant F)



Plot 7-94. Occupied Bandwidth Plot (NR Band n38 - 10MHz π/2 BPSK - Full RB - Ant F)



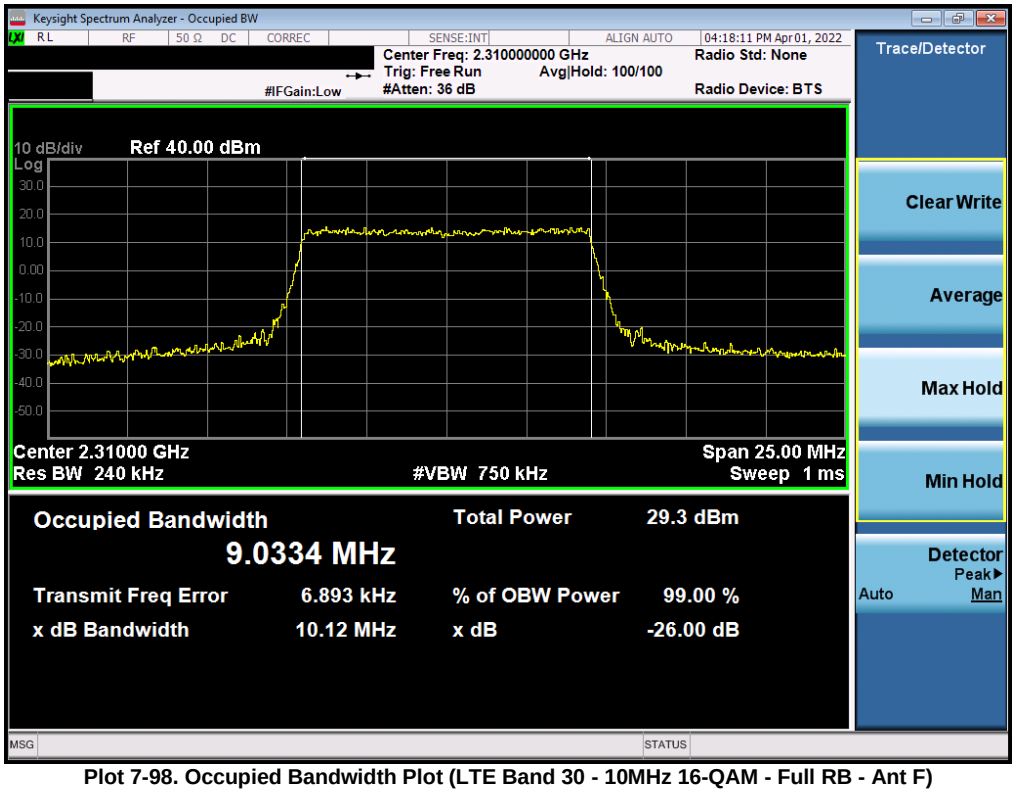
Plot 7-95. Occupied Bandwidth Plot (NR Band n38 - 10MHz QPSK - Full RB - Ant F)



Plot 7-96. Occupied Bandwidth Plot (NR Band n38 - 10MHz 16-QAM - Full RB - Ant F)

LTE Band 30 – Ant F

Plot 7-97. Occupied Bandwidth Plot (LTE Band 30 - 10MHz QPSK - Full RB - Ant F – Ant F)



Plot 7-98. Occupied Bandwidth Plot (LTE Band 30 - 10MHz 16-QAM - Full RB - Ant F)