PCTEST
7185 Oakland Mills Road, Columbia, MD 21046 USA
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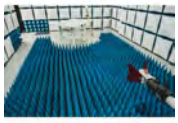

PART 27 MEASUREMENT REPORT

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

Date of Testing:
9/23 – 12/13/2020
Test Site/Location:
PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
1M2009230152-28.A3L

FCC ID:	**A3LSMG998U**
Applicant Name:	**Samsung Electronics Co., Ltd.**

Application Type:	Certification
Model:	SM-G998U
Additional Model(s):	SM-G998U1
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.

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

ACCREDITED
CERT #2041.01

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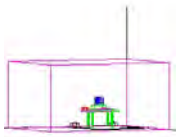
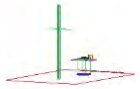


PART 27 MEASUREMENT REPORT



Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
LTE Band 30	10 MHz	QPSK	2310.0	0.184	22.65	8M98G7D
		16QAM	2310.0	0.164	22.15	8M94W7D
		64QAM	2310.0	0.117	20.70	8M98W7D
		256QAM	2310.0	0.060	17.82	8M94W7D
	5 MHz	QPSK	2307.5 - 2312.5	0.186	22.70	4M51G7D
		16QAM	2307.5 - 2312.5	0.165	22.19	4M49W7D
		64QAM	2307.5 - 2312.5	0.111	20.47	4M51W7D
		256QAM	2307.5 - 2312.5	0.062	17.92	4M50W7D
LTE Band 7	20 MHz	QPSK	2510.0 - 2560.0	0.196	20.80	18M0G7D
		16QAM	2510.0 - 2560.0	0.126	20.15	18M0W7D
		64QAM	2510.0 - 2560.0	0.098	18.58	18M0W7D
		256QAM	2510.0 - 2560.0	0.049	15.86	18M0W7D
	15 MHz	QPSK	2507.5 - 2562.5	0.193	20.74	13M5G7D
		16QAM	2507.5 - 2562.5	0.131	20.31	13M5W7D
		64QAM	2507.5 - 2562.5	0.097	18.78	13M5W7D
		256QAM	2507.5 - 2562.5	0.049	15.87	13M5W7D
	10 MHz	QPSK	2505.0 - 2565.0	0.193	20.74	9M04G7D
		16QAM	2505.0 - 2565.0	0.130	20.28	8M98W7D
		64QAM	2505.0 - 2565.0	0.086	18.77	9M01W7D
		256QAM	2505.0 - 2565.0	0.049	15.87	8M98W7D
	5 MHz	QPSK	2502.5 - 2567.5	0.195	20.78	4M52G7D
		16QAM	2502.5 - 2567.5	0.132	20.35	4M51W7D
		64QAM	2502.5 - 2567.5	0.095	18.44	4M53W7D
		256QAM	2502.5 - 2567.5	0.051	16.00	4M51W7D
LTE Band 41(PC2)	20 MHz	QPSK	2506.0 - 2680.0	0.330	25.18	17M9G7D
		16QAM	2506.0 - 2680.0	0.231	23.63	17M9W7D
		64QAM	2506.0 - 2680.0	0.173	22.37	17M9W7D
		256QAM	2506.0 - 2680.0	0.081	19.10	17M9W7D
	15 MHz	QPSK	2503.5 - 2682.5	0.380	25.79	13M5G7D
		16QAM	2503.5 - 2682.5	0.237	23.74	13M5W7D
		64QAM	2503.5 - 2682.5	0.189	22.76	13M5W7D
		256QAM	2503.5 - 2682.5	0.083	19.17	13M5W7D
	10 MHz	QPSK	2501.0 - 2685.0	0.355	25.50	8M99G7D
		16QAM	2501.0 - 2685.0	0.232	23.66	8M99W7D
		64QAM	2501.0 - 2685.0	0.185	22.67	9M00W7D
		256QAM	2501.0 - 2685.0	0.085	19.28	8M98W7D
	5 MHz	QPSK	2498.5 - 2687.5	0.403	26.05	4M51G7D
		16QAM	2498.5 - 2687.5	0.229	23.60	4M51W7D
		64QAM	2498.5 - 2687.5	0.193	22.85	4M53W7D
		256QAM	2498.5 - 2687.5	0.084	19.23	4M50W7D

Overview Table

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n30	10 MHz	π/2 BPSK	2310.0	0.244	23.88	8M98G7D
		QPSK	2310.0	0.236	23.72	8M99G7D
		16QAM	2310.0	0.176	22.45	8M99W7D
		64QAM	2310.0	0.125	20.97	8M96W7D
		256QAM	2310.0	0.089	19.52	8M95W7D
	5 MHz	π/2 BPSK	2307.5 - 2312.5	0.233	23.67	4M49G7D
		QPSK	2307.5 - 2312.5	0.238	23.77	4M51G7D
		16QAM	2307.5 - 2312.5	0.204	23.10	4M50W7D
		64QAM	2307.5 - 2312.5	0.164	22.15	4M52W7D
		256QAM	2307.5 - 2312.5	0.077	18.85	4M48W7D
NR Band n41 ANT E	100 MHz	π/2 BPSK	2546.0 - 2640.0	0.337	25.27	97M1G7D
		QPSK	2546.0 - 2640.0	0.189	22.77	98M3G7D
		16QAM	2546.0 - 2640.0	0.158	21.98	98M2W7D
		64QAM	2546.0 - 2640.0	0.122	20.85	98M7W7D
		256QAM	2546.0 - 2640.0	0.096	19.80	98M4W7D
	90 MHz	π/2 BPSK	2541.0 - 2645.0	0.337	25.27	87M6G7D
		QPSK	2541.0 - 2645.0	0.300	24.77	88M5G7D
		16QAM	2541.0 - 2645.0	0.230	23.62	88M2W7D
		64QAM	2541.0 - 2645.0	0.214	23.31	88M5W7D
		256QAM	2541.0 - 2645.0	0.074	18.71	88M4W7D
	80 MHz	π/2 BPSK	2536.0 - 2650.0	0.324	25.10	77M6G7D
		QPSK	2536.0 - 2650.0	0.281	24.49	77M7G7D
		16QAM	2536.0 - 2650.0	0.212	23.26	77M6W7D
		64QAM	2536.0 - 2650.0	0.195	22.89	77M5W7D
		256QAM	2536.0 - 2650.0	0.069	18.38	77M5W7D
	60 MHz	π/2 BPSK	2526.0 - 2660.0	0.301	24.78	58M3G7D
		QPSK	2526.0 - 2660.0	0.276	24.41	58M4G7D
		16QAM	2526.0 - 2660.0	0.207	23.15	58M1W7D
		64QAM	2526.0 - 2660.0	0.196	22.92	58M0W7D
		256QAM	2526.0 - 2660.0	0.070	18.45	58M1W7D
	50 MHz	π/2 BPSK	2521.0 - 2665.0	0.319	25.04	46M2G7D
		QPSK	2521.0 - 2665.0	0.279	24.46	47M9G7D
		16QAM	2521.0 - 2665.0	0.216	23.35	47M7W7D
		64QAM	2521.0 - 2665.0	0.202	23.06	47M9W7D
		256QAM	2521.0 - 2665.0	0.071	18.52	47M8W7D
	40 MHz	π/2 BPSK	2516.0 - 2670.0	0.270	24.32	35M8G7D
		QPSK	2516.0 - 2670.0	0.242	23.83	37M8G7D
		16QAM	2516.0 - 2670.0	0.185	22.67	38M0W7D
		64QAM	2516.0 - 2670.0	0.174	22.40	37M9W7D
		256QAM	2516.0 - 2670.0	0.066	18.17	38M0W7D
	30 MHz	π/2 BPSK	2511.0 - 2675.0	0.290	24.62	27M1G7D
		QPSK	2511.0 - 2675.0	0.258	24.12	28M0G7D
		16QAM	2511.0 - 2675.0	0.193	22.85	28M1W7D
		64QAM	2511.0 - 2675.0	0.185	22.68	28M2W7D
		256QAM	2511.0 - 2675.0	0.069	18.40	28M1W7D
	20 MHz	π/2 BPSK	2506.0 - 2680.0	0.277	24.43	18M0G7D
		QPSK	2506.0 - 2680.0	0.257	24.10	18M5G7D
		16QAM	2506.0 - 2680.0	0.199	22.98	18M5W7D
		64QAM	2506.0 - 2680.0	0.182	22.61	18M5W7D
		256QAM	2506.0 - 2680.0	0.068	18.33	18M3W7D
NR Band n41 ANTB	100 MHz	π/2 BPSK	2546.0 - 2640.0	0.306	24.85	96M6W7D
		QPSK	2546.0 - 2640.0	0.296	24.71	97M5W7D
		16QAM	2546.0 - 2640.0	0.249	23.95	97M4W7D
		64QAM	2546.0 - 2640.0	0.177	22.47	97M7W7D
		256QAM	2546.0 - 2640.0	0.148	21.70	97M5W7D
	90 MHz	π/2 BPSK	2541.0 - 2645.0	0.300	24.77	87M0W7D
		QPSK	2541.0 - 2645.0	0.299	24.76	87M6W7D
		16QAM	2541.0 - 2645.0	0.244	23.88	87M7W7D
		64QAM	2541.0 - 2645.0	0.174	22.41	87M3W7D
		256QAM	2541.0 - 2645.0	0.148	21.71	87M7W7D
	80 MHz	π/2 BPSK	2536.0 - 2650.0	0.306	24.85	77M1W7D
		QPSK	2536.0 - 2650.0	0.295	24.70	77M6W7D
		16QAM	2536.0 - 2650.0	0.246	23.92	77M6W7D
		64QAM	2536.0 - 2650.0	0.175	22.43	77M6W7D
		256QAM	2536.0 - 2650.0	0.147	21.66	77M5W7D
	60 MHz	π/2 BPSK	2526.0 - 2660.0	0.302	24.80	58M3W7D
		QPSK	2526.0 - 2660.0	0.295	24.70	58M2W7D
		16QAM	2526.0 - 2660.0	0.244	23.87	58M3W7D
		64QAM	2526.0 - 2660.0	0.175	22.43	58M1W7D
		256QAM	2526.0 - 2660.0	0.147	21.67	58M3W7D
	50 MHz	π/2 BPSK	2521.0 - 2665.0	0.305	24.84	46M1W7D
		QPSK	2521.0 - 2665.0	0.299	24.75	47M8W7D
		16QAM	2521.0 - 2665.0	0.250	23.98	47M7W7D
		64QAM	2521.0 - 2665.0	0.177	22.48	47M6W7D
		256QAM	2521.0 - 2665.0	0.151	21.80	47M7W7D
	40 MHz	π/2 BPSK	2516.0 - 2670.0	0.305	24.84	35M6W7D
		QPSK	2516.0 - 2670.0	0.306	24.85	35M7W7D
		16QAM	2516.0 - 2670.0	0.249	23.96	35M7W7D
		64QAM	2516.0 - 2670.0	0.187	22.72	35M9W7D
		256QAM	2516.0 - 2670.0	0.157	21.96	35M8W7D
	30 MHz	π/2 BPSK	2511.0 - 2675.0	0.298	24.74	27M0W7D
		QPSK	2511.0 - 2675.0	0.283	24.52	28M1W7D
		16QAM	2511.0 - 2675.0	0.270	24.31	27M9W7D
		64QAM	2511.0 - 2675.0	0.183	22.63	28M1W7D
		256QAM	2511.0 - 2675.0	0.162	22.09	27M9W7D
	20 MHz	π/2 BPSK	2506.0 - 2680.0	0.321	25.06	18M1W7D
		QPSK	2506.0 - 2680.0	0.303	24.81	18M8W7D
		16QAM	2506.0 - 2680.0	0.251	24.00	18M7W7D
		64QAM	2506.0 - 2680.0	0.180	22.54	18M8W7D
		256QAM	2506.0 - 2680.0	0.044	16.43	18M7W7D

Overview Table

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n77	100 MHz	π/2 BPSK	3750.0 - 3930.0	0.249	23.96	96M9G7D
		QPSK	3750.0 - 3930.0	0.214	23.31	97M8G7D
		16QAM	3750.0 - 3930.0	0.157	21.97	97M8W7D
		64QAM	3750.0 - 3930.0	0.120	20.79	97M7W7D
		256QAM	3750.0 - 3930.0	0.082	19.15	97M7W7D
	90 MHz	π/2 BPSK	3745.0 - 3935.0	0.243	23.85	86M7G7D
		QPSK	3745.0 - 3935.0	0.171	22.33	87M4G7D
		16QAM	3745.0 - 3935.0	0.158	21.99	87M3W7D
		64QAM	3745.0 - 3935.0	0.116	20.64	87M5W7D
		256QAM	3745.0 - 3935.0	0.083	19.17	87M5W7D
	80 MHz	π/2 BPSK	3740.0 - 3940.0	0.249	23.97	76M9G7D
		QPSK	3740.0 - 3940.0	0.217	23.36	77M4G7D
		16QAM	3740.0 - 3940.0	0.166	22.20	77M5W7D
		64QAM	3740.0 - 3940.0	0.112	20.48	77M3W7D
		256QAM	3740.0 - 3940.0	0.084	19.22	77M3W7D
	70 MHz	QPSK	3730.0 - 3950.0	0.174	22.41	67M7G7D
		16QAM	3730.0 - 3950.0	0.139	21.44	67M7W7D
		64QAM	3730.0 - 3950.0	0.089	19.50	67M7W7D
		256QAM	3730.0 - 3950.0	0.062	17.92	67M6W7D
	60 MHz	π/2 BPSK	3730.0 - 3950.0	0.248	23.95	57M8G7D
		QPSK	3730.0 - 3950.0	0.216	23.35	57M8G7D
		16QAM	3730.0 - 3950.0	0.172	22.36	57M9W7D
		64QAM	3730.0 - 3950.0	0.090	19.54	57M9W7D
		256QAM	3730.0 - 3950.0	0.088	19.44	57M9W7D
	50 MHz	π/2 BPSK	3725.0 - 3955.0	0.251	24.00	45M7G7D
		QPSK	3725.0 - 3955.0	0.220	23.42	47M5G7D
		16QAM	3725.0 - 3955.0	0.160	22.05	47M6W7D
		64QAM	3725.0 - 3955.0	0.107	20.31	47M7W7D
		256QAM	3725.0 - 3955.0	0.086	19.34	47M5W7D
	40 MHz	π/2 BPSK	3720.0 - 3960.0	0.249	23.96	35M7G7D
		QPSK	3720.0 - 3960.0	0.214	23.31	38M0G7D
		16QAM	3720.0 - 3960.0	0.149	21.74	38M0W7D
		64QAM	3720.0 - 3960.0	0.111	20.46	37M9W7D
		256QAM	3720.0 - 3960.0	0.089	19.49	37M9W7D
	30 MHz	π/2 BPSK	3715.0 - 3965.0	0.250	23.98	28M6G7D
		QPSK	3715.0 - 3965.0	0.213	23.29	29M6G7D
		16QAM	3715.0 - 3965.0	0.152	21.83	29M5W7D
		64QAM	3715.0 - 3965.0	0.117	20.67	29M5W7D
		256QAM	3715.0 - 3965.0	0.089	19.49	29M4W7D
	20 MHz	π/2 BPSK	3710.0 - 3970.0	0.249	23.96	18M0G7D
		QPSK	3710.0 - 3970.0	0.218	23.39	18M3G7D
		16QAM	3710.0 - 3970.0	0.153	21.84	18M3W7D
		64QAM	3710.0 - 3970.0	0.093	19.70	18M3W7D
		256QAM	3710.0 - 3970.0	0.085	19.30	18M3W7D

Overview Table

1.0 INTRODUCTION

1.1 Scope

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

1.2 PCTEST Test Location

These measurement tests were conducted at the PCTEST Engineering Laboratory, Inc. facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014.

1.3 Test Facility / Accreditations

Measurements were performed at PCTEST Engineering Lab located in Columbia, MD 21046, U.S.A.

- PCTEST is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.

- PCTEST TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).

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

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMG998U**. 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.: 0788M, 0722M, 0695M, 0706M, 0707M, 0752M, 0705M, 0144M

2.2 Device Capabilities

This device contains the following capabilities:

800/850/1900 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1, BC10), 850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 5G NR (n5, n71, n41, n66, n2, n12, n25, n30, n77, n260, n261), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5GHz and 6GHz), Bluetooth (1x, EDR, LE), NFC, Wireless Power Transfer, UWB

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.

Sub 6GHz NR Band n30 (2305 – 2315 MHz) operates using 15kHz Subcarrier Spacing with both CP-OFDM and DFT-s OFDM waveforms. The band supports π/2-BPSK, QPSK, 16QAM, 64QAM, and 256QAM modulation. The test data provided in this report represents the worst case configuration.

Sub 6GHz NR Band n41 (2496 – 2690 MHz) operates using 30kHz Subcarrier Spacing with both CP-OFDM and DFT-s OFDM waveforms. The band supports π/2-BPSK, QPSK, 16QAM, 64QAM, and 256QAM modulation. The test data provided in this report represents the worst case configuration.

Sub 6GHz NR Band n77 (3700 – 3980 MHz) operates using 30kHz Subcarrier Spacing with both CP-OFDM and DFT-s OFDM waveforms. The band supports π/2-BPSK, QPSK, 16QAM, 64QAM, and 256QAM modulation. The test data provided in this report represents the worst case configuration.

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 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.

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

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 $P_{g\ [dBm]}$ – 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

$$EIRP_{[dBm]} = E_{[dB\mu V/m]} + 20\log D - 104.8;$$ 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 474788 D01. Radiated power and radiated spurious emission levels are investigated with the receive antenna horizontally and vertically polarized per ANSI/TIA-603-E-2016.

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
-	LTx2	Licensed Transmitter Cable Set	4/9/2020	Annual	4/9/2021	LTx2
-	LTx4	Licensed Transmitter Cable Set	7/9/2020	Annual	7/9/2021	LTx4
-	LTx5	LIcensed Transmitter Cable Set	4/9/2020	Annual	4/6/2021	LTx5
Agilent	N9020A	MXA Signal Analyzer	8/4/2020	Annual	8/4/2021	US46470561
Agilent	N9030A	PXA Signal Analyzer (44GHz)	7/17/2020	Annual	7/17/2021	MY52350166
Agilent	N9030B	PXA Signal Analyzer, Multi-touch	9/17/2020	Annual	9/17/2021	MY57141001
Anritsu	MT8821C	Radio Communication Analyzer	N/A			6201381794
Anritsu	MT8821C	Radio Communication Analyzer	N/A			6200901190
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2019	Biennial	10/10/2021	121034
Emco	3115	Horn Antenna (1-18GHz)	6/18/2020	Biennial	6/18/2022	9704-5182
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/12/2020	Biennial	3/12/2022	128337
Mini Circuits	TVA-11-422	RF Power Amp	N/A			QA1317001
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			100976
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			112347
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	7/15/2020	Annual	7/15/2021	100342
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2/10/2020	Annual	2/10/2021	102134
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2/21/2020	Annual	2/21/2021	102133
Sunol	DRH-118	Horn Antenna (1-18GHz)	10/3/2019	Biennial	10/3/2021	A050307
Sunol	DRH-118	Horn Antenna (1-18 GHz)	8/27/2019	Biennial	8/27/2021	A042511
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107

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: A3LSMG998U

FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)

Mode(s): LTE/NR

Test Condition	Test Description	FCC Part Section(s)	RSS Section(s)	Test Limit	Test Result	Reference
CONDUCTED	Occupied Bandwidth	2.1049	RSS-139(2.3)	N/A	PASS	Section 7.3
	Conducted Band Edge / Spurious Emissions (LTE Band 30)	2.1051, 27.53(a)	RSS-195(5.6)	Undesirable emissions must meet the limits detailed in 27.53(a)	PASS	Sections 7.4, 7.5
	Conducted Band Edge / Spurious Emissions (LTE Band 7)	2.1051, 27.53(m)	RSS-199(4.5)	Undesirable emissions must meet the limits detailed in 27.53(m)	PASS	Sections 7.4, 7.5
	Conducted Band Edge / Spurious Emissions (LTE Band 41)				PASS	Sections 7.4, 7.5
	Conducted Band Edge / Spurious Emissions (NR Band n41)				PASS	Sections 7.4, 7.5
	Conducted Band Edge / Spurious Emissions (LTE Band 38)				PASS	Sections 7.4, 7.5
	Conducted Band Edge / Spurious Emissions (NR Band n77)	2.1051, 27.53(l)	RSS-199(4.5)	Undesirable emissions must meet the limits detailed in 27.53(l)	PASS	Sections 7.4, 7.5
	Transmitter Conducted Output Power	2.1046	RSS-199(4.4)	N/A	PASS	Section 7.2
	Frequency Stability	2.1055, 27.54	RSS-199(4.3)	Fundamental emissions stay within authorized frequency block	PASS	Section 7.9
RADIATED	Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 30)	27.50(a)(3)	RSS-195(5.5)	< 0.25 Watts max. EIRP	PASS	Section 7.7
	Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 7)	27.50(h)(2)	RSS-199(4.4)	< 2 Watts max. EIRP	PASS	Section 7.7
	Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 41)				PASS	Section 7.7
	Effective Radiated Power / Equivalent Isotropic Radiated Power (NR Band n41)				PASS	Section 7.7
	Effective Radiated Power / Equivalent Isotropic Radiated Power (LTE Band 38)				PASS	Section 7.7
	Effective Radiated Power / Equivalent Isotropic Radiated Power (NR Band n77)	27.53(l)	RSS-199(4.5)	< 1 Watts max. EIRP	PASS	Section 7.7
	Radiated Spurious Emissions (LTE Band 30)	2.1053, 27.53(a)	RSS-195(5.6)	> 70 + 10log10(P[Watts])	PASS	Section 7.8
	Radiated Spurious Emissions (LTE Band 7)	2.1053, 27.53(m)	RSS-199(4.5)	Undesirable emissions must meet the limits detailed in 27.53(m)	PASS	Section 7.8
	Radiated Spurious Emissions (LTE Band 41)				PASS	Section 7.8
	Radiated Spurious Emissions (NR Band n41)				PASS	Section 7.8
	Radiated Spurious Emissions (LTE Band 38)				PASS	Section 7.8

Table 7-1. Summary of Test Results

Notes:

1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
2) The analyzer plots were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
4) All conducted emissions measurements are performed with automated test software to capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST 2G/3G Automation Version 4.5, LTE Automation Version 5.3.

7.2 Conducted Power Output Data

Test Overview

The EUT is set up to transmit two contiguous LTE channels. The power level of both carriers is measured by means of a calibrated spectrum analyzer. 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

KDB 971168 D01 v03r01 – Section 6.0

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.

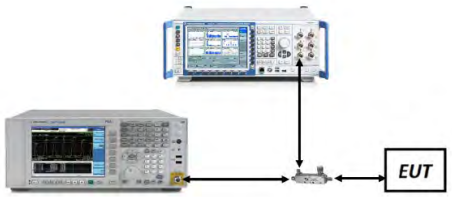


Figure 7-1. Test Instrument & Measurement Setup

Test Notes

1. Uplink carrier aggregation is only supported in this EUT while operating in Power Class 3.
2. For ULCA, 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.
3. For ULCA, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 100 kHz or greater for frequencies less than 1 GHz and 1 MHz or greater for frequencies greater than 1 GHz.
4. All other conducted power measurements are contained in the RF exposure report for this filing.

Bandwidth	Modulation	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	2546.0	1 / 273	26.02
		2593.0	1 / 0	26.18
		2640.0	1 / 137	26.04
	QPSK	2546.0	1 / 273	25.51
		2593.0	1 / 0	25.61
		2640.0	1 / 0	25.44
	16-QAM	2546.0	1 / 273	25.32
	64-QAM	2546.0	1 / 273	24.30
	256-QAM	2546.0	1 / 273	23.98
90 MHz	π/2 BPSK	2593.0	1 / 61	26.03
	QPSK	2593.0	1 / 61	26.12
	16-QAM	2593.0	1 / 61	25.93
	64-QAM	2593.0	1 / 61	24.90
	256-QAM	2593.0	1 / 61	23.92
80 MHz	π/2 BPSK	2593.0	1 / 54	26.04
	QPSK	2593.0	1 / 54	26.02
	16-QAM	2593.0	1 / 54	25.87
	64-QAM	2593.0	1 / 54	24.20
	256-QAM	2593.0	1 / 54	24.08
60 MHz	π/2 BPSK	2593.0	1 / 40	26.22
	QPSK	2593.0	1 / 40	26.05
	16-QAM	2593.0	1 / 40	25.77
	64-QAM	2593.0	1 / 40	25.82
	256-QAM	2593.0	1 / 40	23.63
50 MHz	π/2 BPSK	2593.0	1 / 33	25.65
	QPSK	2593.0	1 / 33	25.84
	16-QAM	2593.0	1 / 33	25.76
	64-QAM	2593.0	1 / 33	25.71
	256-QAM	2593.0	1 / 33	23.72
40 MHz	π/2 BPSK	2593.0	1 / 26	26.31
	QPSK	2593.0	1 / 26	26.41
	16-QAM	2593.0	1 / 26	26.05
	64-QAM	2593.0	1 / 26	25.00
	256-QAM	2593.0	1 / 26	23.30
30 MHz	π/2 BPSK	2593.0	1 / 19	26.27
	QPSK	2593.0	1 / 19	26.04
	16-QAM	2593.0	1 / 19	26.20
	64-QAM	2593.0	1 / 19	25.25
		2593.0	1 / 19	23.67
20 MHz	π/2 BPSK	2593.0	1 / 13	26.27
	QPSK	2593.0	1 / 13	26.04
	16-QAM	2593.0	1 / 53	26.20
	64-QAM	2593.0	1 / 53	25.25
	256-QAM	2593.0	1 / 53	23.67

Table 7-2. Conducted Max Powers (NR Band n41 - ANT E)

Bandwidth	Modulation	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	2546.0	1 / 68	24.00
		2593.0	1 / 68	24.03
		2640.0	1 / 68	23.96
	QPSK	2546.0	1 / 68	24.10
		2593.0	1 / 68	24.18
		2640.0	1 / 68	24.07
	16-QAM	2593.0	1 / 68	23.27
	64-QAM	2593.0	1 / 68	22.04
	256-QAM	2593.0	1 / 68	19.19
90 MHz	π/2 BPSK	2593.0	1 / 61	23.95
	QPSK	2593.0	1 / 61	24.23
	16-QAM	2593.0	1 / 61	23.20
	64-QAM	2593.0	1 / 61	21.98
	256-QAM	2593.0	1 / 61	19.19
80 MHz	π/2 BPSK	2593.0	1 / 162	24.03
	QPSK	2593.0	1 / 162	24.17
	16-QAM	2593.0	1 / 162	23.24
	64-QAM	2593.0	1 / 162	21.99
	256-QAM	2593.0	1 / 162	19.15
60 MHz	π/2 BPSK	2593.0	1 / 121	23.98
	QPSK	2593.0	1 / 121	24.17
	16-QAM	2593.0	1 / 121	23.19
	64-QAM	2593.0	1 / 121	21.99
	256-QAM	2593.0	1 / 121	19.16
50 MHz	π/2 BPSK	2593.0	1 / 99	24.13
	QPSK	2593.0	1 / 99	24.22
	16-QAM	2593.0	1 / 99	23.30
	64-QAM	2593.0	1 / 99	22.05
	256-QAM	2593.0	1 / 99	19.29
40 MHz	π/2 BPSK	2593.0	1 / 26	24.39
	QPSK	2593.0	1 / 26	24.50
	16-QAM	2593.0	1 / 26	23.28
	64-QAM	2593.0	1 / 26	22.28
	256-QAM	2593.0	1 / 26	19.44
30 MHz	π/2 BPSK	2593.0	1 / 19	24.42
	QPSK	2593.0	1 / 19	24.49
	16-QAM	2593.0	1 / 19	23.63
	64-QAM	2593.0	1 / 19	22.19
	256-QAM	2593.0	1 / 19	19.57
20 MHz	π/2 BPSK	2593.0	1 / 37	24.24
	QPSK	2593.0	1 / 37	24.28
	16-QAM	2593.0	1 / 37	23.32
	64-QAM	2593.0	1 / 37	22.11
	256-QAM	2593.0	1 / 37	19.21

Table 7-3. Conducted Max Powers (NR Band n41 - ANT B)

Bandwidth	Modulation	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	3750.00	1/68	26.48
		3840.00	1/68	26.41
		3930.00	1/68	26.47
	QPSK	3750.00	1/68	26.42
		3840.00	1/68	26.30
		3930.00	1/68	26.39
	16-QAM	3930.00	1/68	24.51
	64-QAM	3930.00	1/68	23.63
	256-QAM	3930.00	1/68	21.48
90 MHz	π/2 BPSK	3745.02	1/61	26.47
	QPSK	3745.02	1/61	26.40
	16-QAM	3934.98	1/122	24.53
	64-QAM	3934.98	1/122	23.48
	256-QAM	3934.98	1/122	21.50
80 MHz	π/2 BPSK	3740.01	1/54	26.43
	QPSK	3840.00	1/108	26.35
	16-QAM	3939.99	1/162	24.74
	64-QAM	3939.99	1/162	23.32
	256-QAM	3939.99	1/162	21.55
70 MHz (CP-OFDM only)	QPSK	3735.00	1/141	25.55
	16-QAM	3840.00	1/94	23.89
	64-QAM	3840.00	1/94	22.36
	256-QAM	3945.00	1/94	20.25
60 MHz	π/2 BPSK	3949.98	1/40	26.42
	QPSK	3949.98	1/40	26.36
	16-QAM	3840.00	1/40	24.81
	64-QAM	3730.02	1/40	22.52
	256-QAM	3949.98	1/40	21.77
50 MHz	π/2 BPSK	3840.00	1/66	26.45
	QPSK	3725.01	1/33	26.41
	16-QAM	3954.99	1/33	24.88
	64-QAM	3954.99	1/33	23.15
	256-QAM	3840.00	1/66	21.87
40 MHz	π/2 BPSK	3960.00	1/26	26.46
	QPSK	3960.00	1/26	26.45
	16-QAM	3840.00	1/26	24.86
	64-QAM	3960.00	1/26	23.30
	256-QAM	3960.00	1/26	21.82
30 MHz	π/2 BPSK	3715.02	1/19	26.46
	QPSK	3964.98	1/39	26.37
	16-QAM	3715.02	1/19	24.61
	64-QAM	3715.02	1/19	23.85
	256-QAM	3715.02	1/19	21.85
20 MHz	π/2 BPSK	3840.00	1/37	26.41
	QPSK	3840.00	1/37	26.38
	16-QAM	3969.99	1/13	24.60
	64-QAM	3710.01	1/25	22.87
	256-QAM	3969.99	1/13	21.63

Table 7-4. Conducted Max Powers (NR Band n77)

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 ≥ 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.

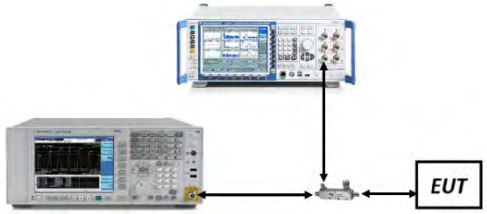
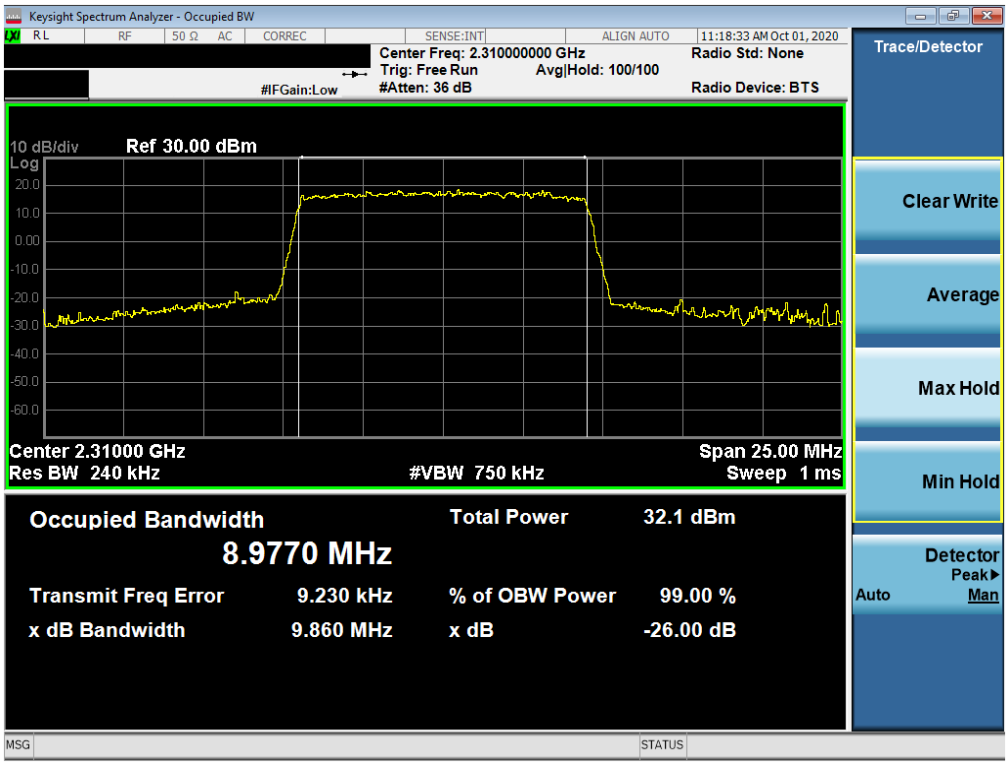


Figure 7-2. Test Instrument & Measurement Setup

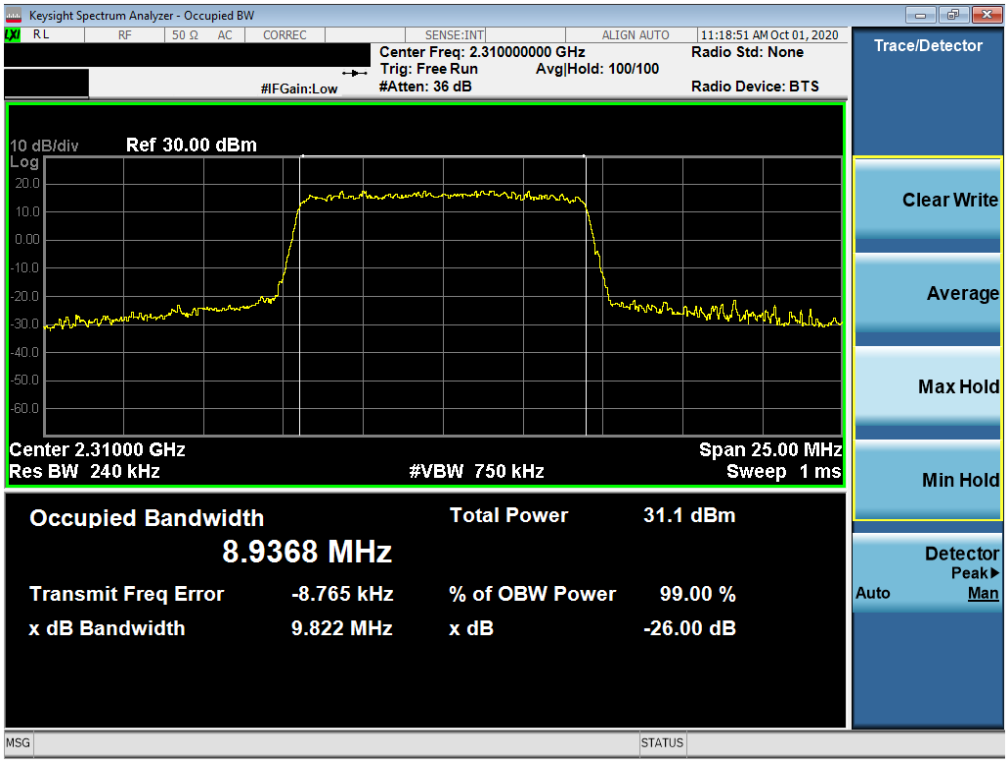
Test Notes

None.

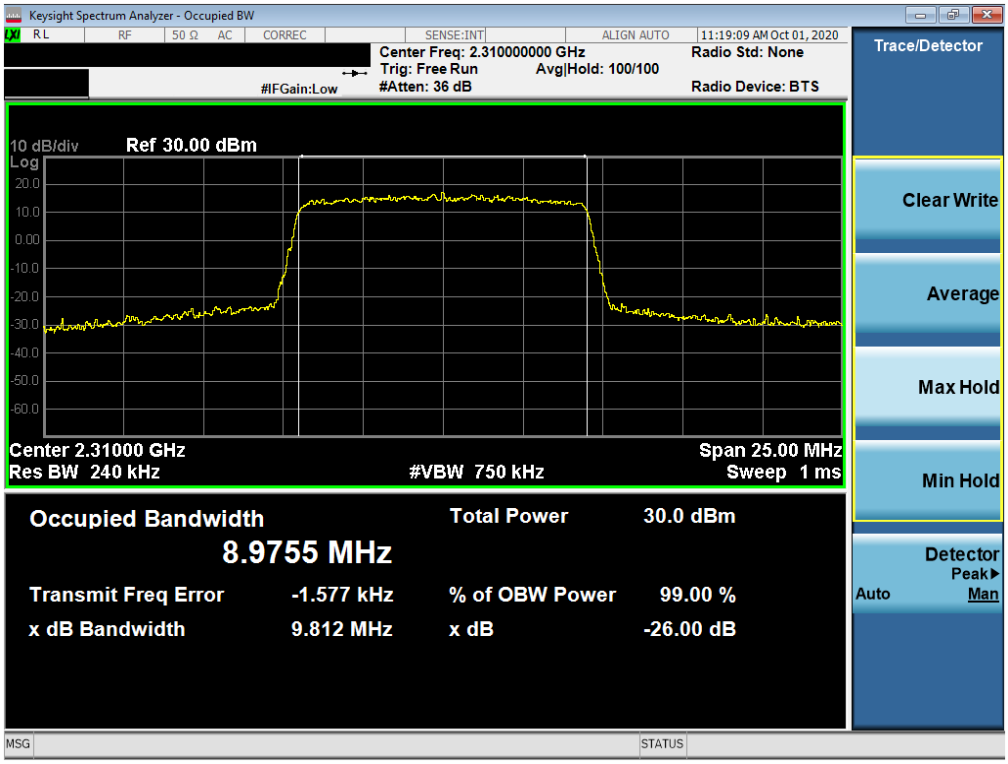
LTE Band 30



Plot 7-1. Occupied Bandwidth Plot (LTE Band 30 - 10MHz QPSK - Full RB Configuration)

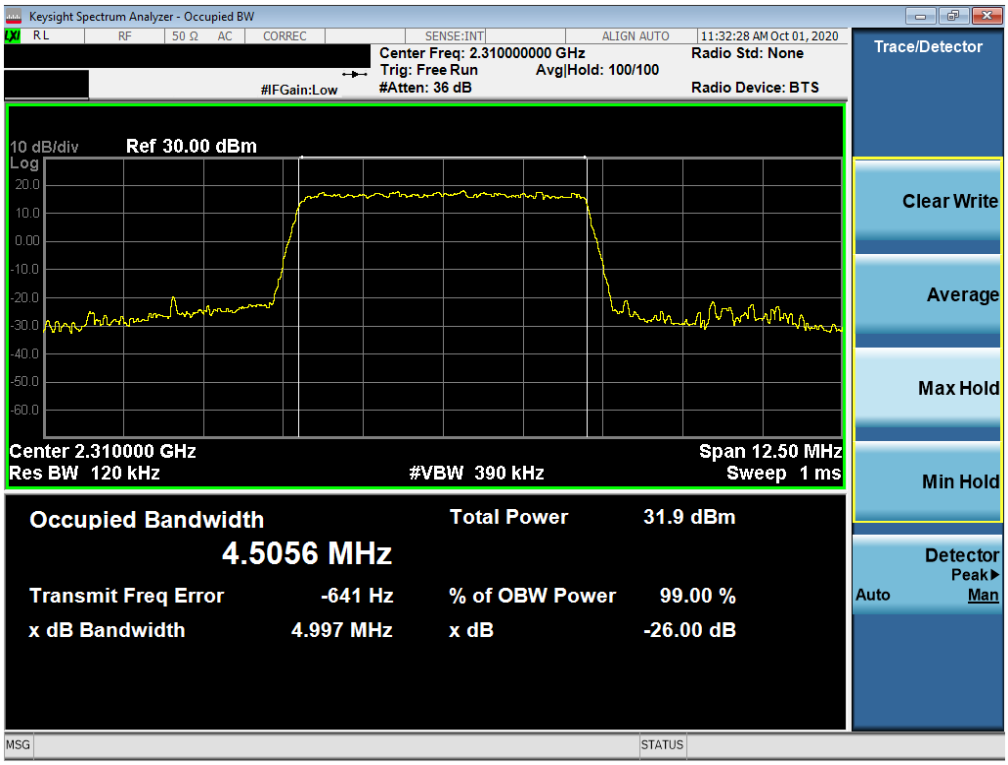


Plot 7-2. Occupied Bandwidth Plot (LTE Band 30 - 10MHz 16-QAM - Full RB Configuration)



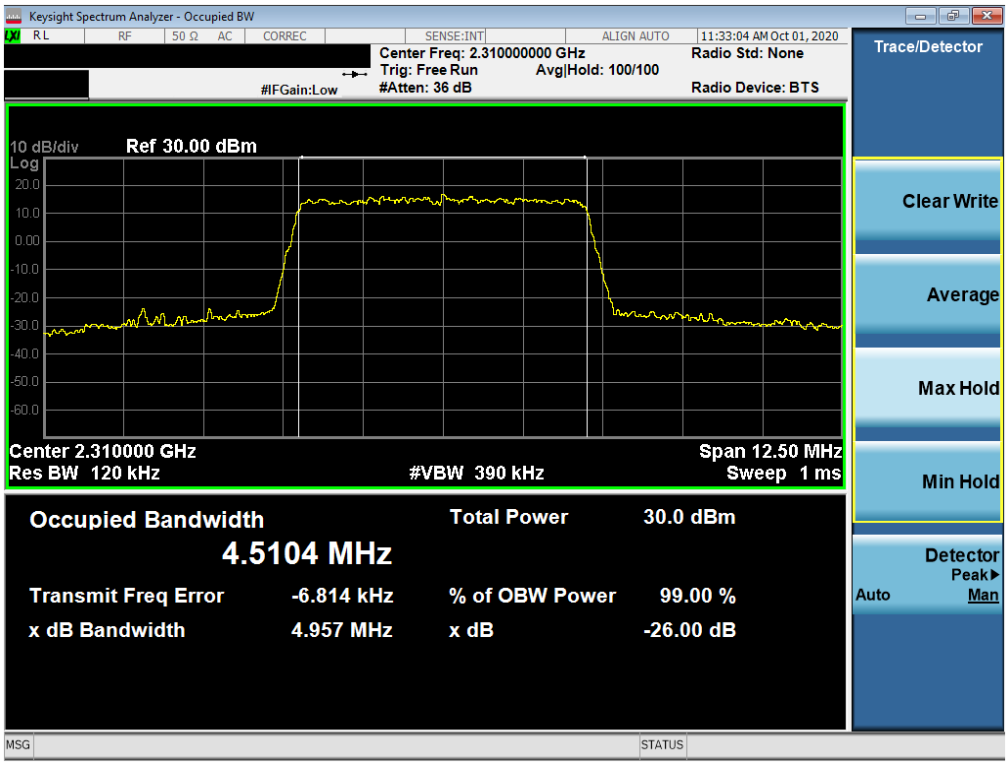
Plot 7-3. Occupied Bandwidth Plot (LTE Band 30 - 10MHz 64-QAM - Full RB Configuration)

Plot 7-4. Occupied Bandwidth Plot (LTE Band 30 - 10MHz 256-QAM - Full RB Configuration)

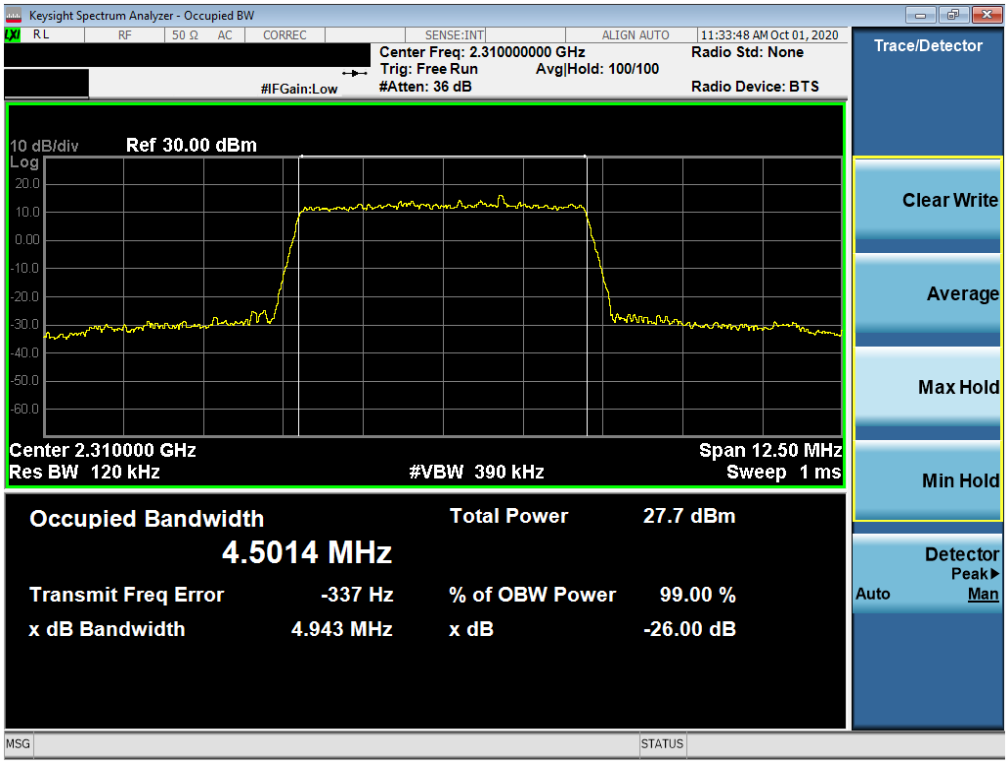


Plot 7-5. Occupied Bandwidth Plot (LTE Band 30 - 5MHz QPSK - Full RB Configuration)

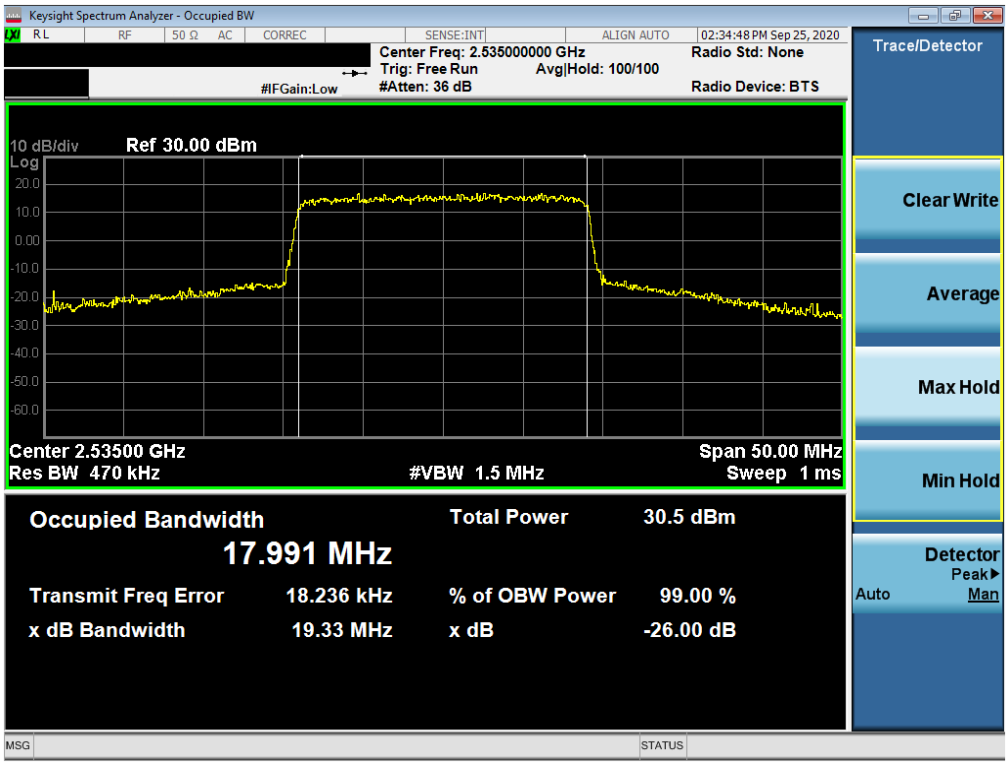
Plot 7-6. Occupied Bandwidth Plot (LTE Band 30 - 5MHz 16-QAM - Full RB Configuration)



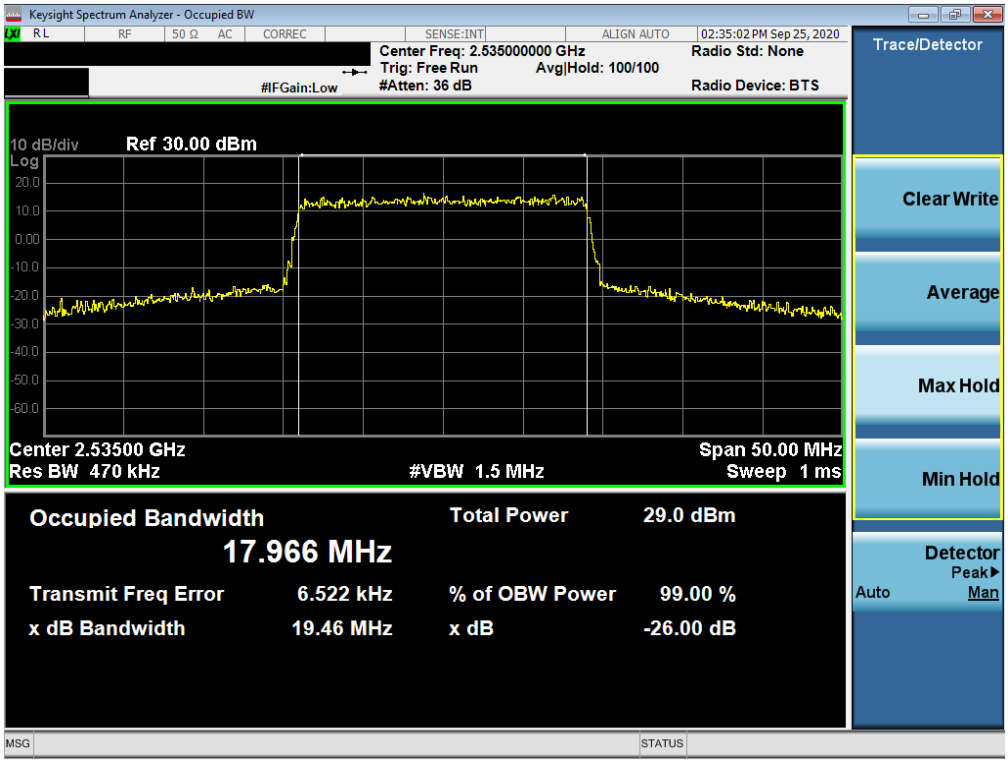
Plot 7-7. Occupied Bandwidth Plot (LTE Band 30 - 5MHz 64-QAM - Full RB Configuration)



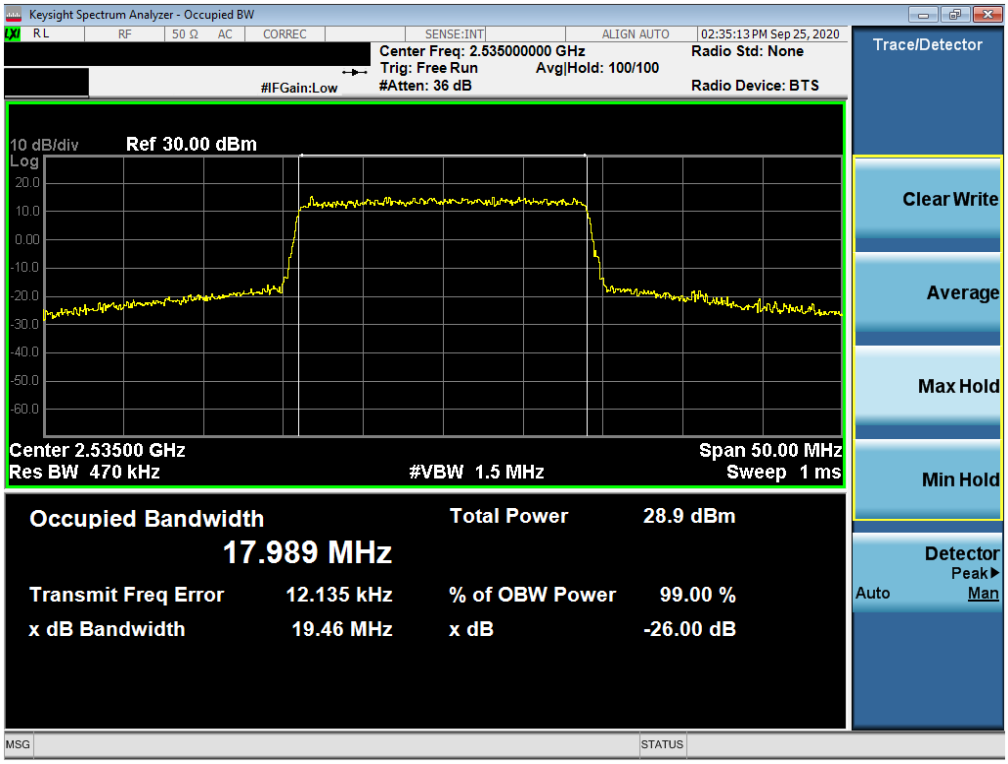
Plot 7-8. Occupied Bandwidth Plot (LTE Band 30 - 5MHz 256-QAM - Full RB Configuration)



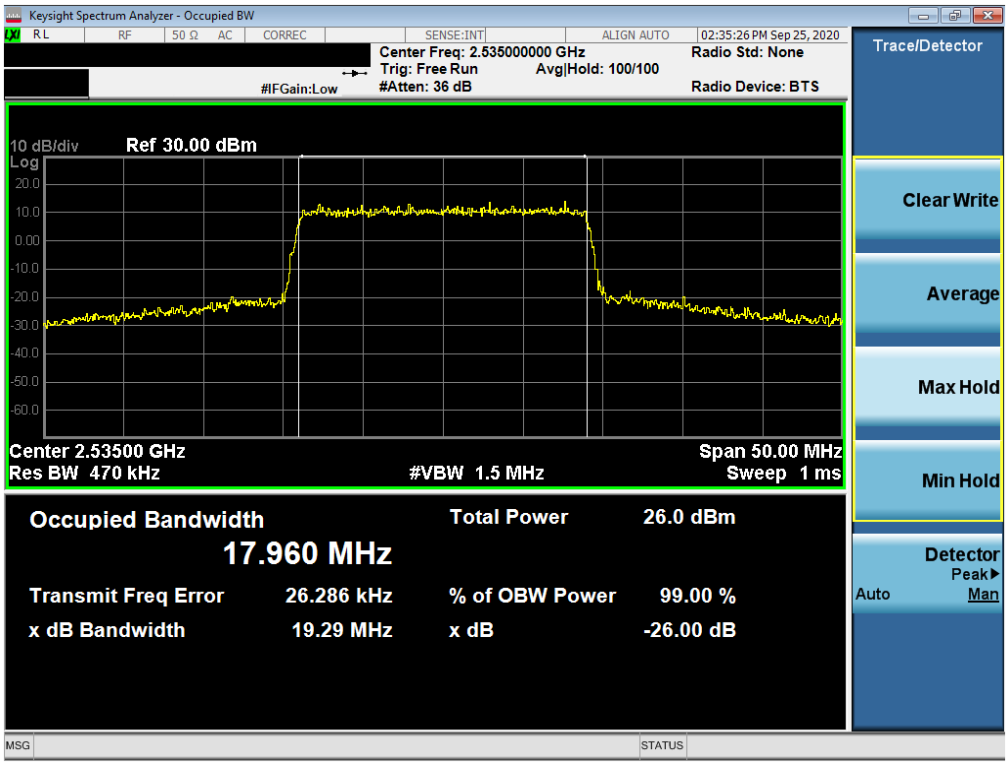
Plot 7-9. Occupied Bandwidth Plot (LTE Band 7 - 20MHz QPSK - Full RB Configuration)



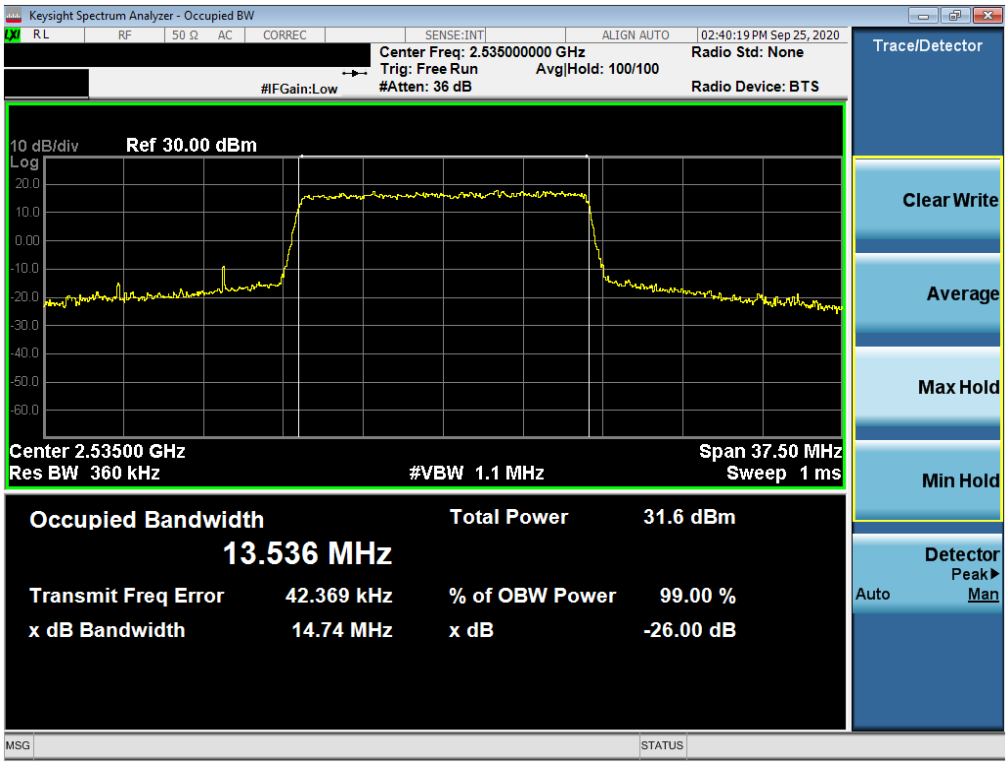
Plot 7-10. Occupied Bandwidth Plot (LTE Band 7 - 20MHz 16-QAM - Full RB Configuration)



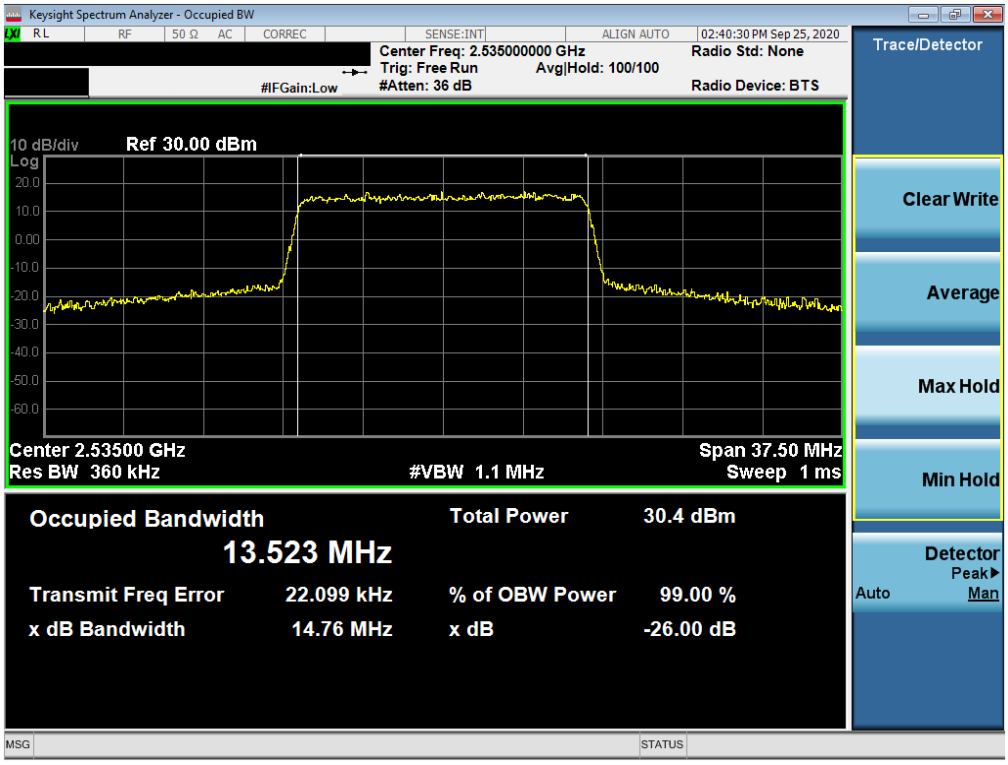
Plot 7-11. Occupied Bandwidth Plot (LTE Band 7 - 20MHz 64-QAM - Full RB Configuration)



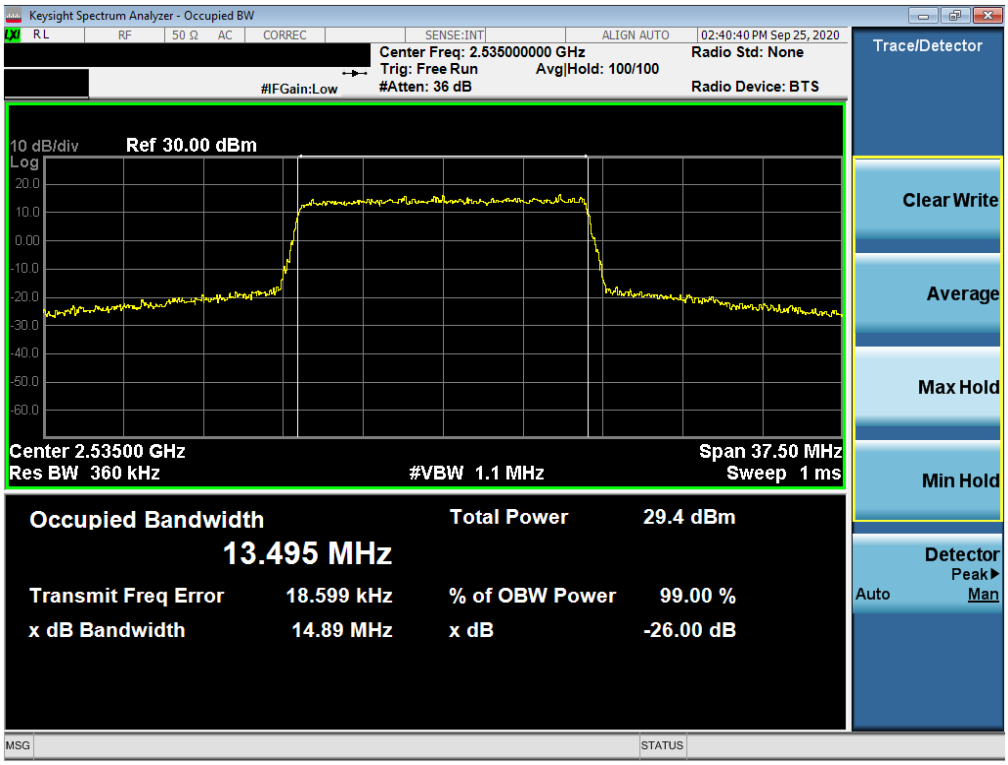
Plot 7-12. Occupied Bandwidth Plot (LTE Band 7 - 20MHz 256-QAM - Full RB Configuration)



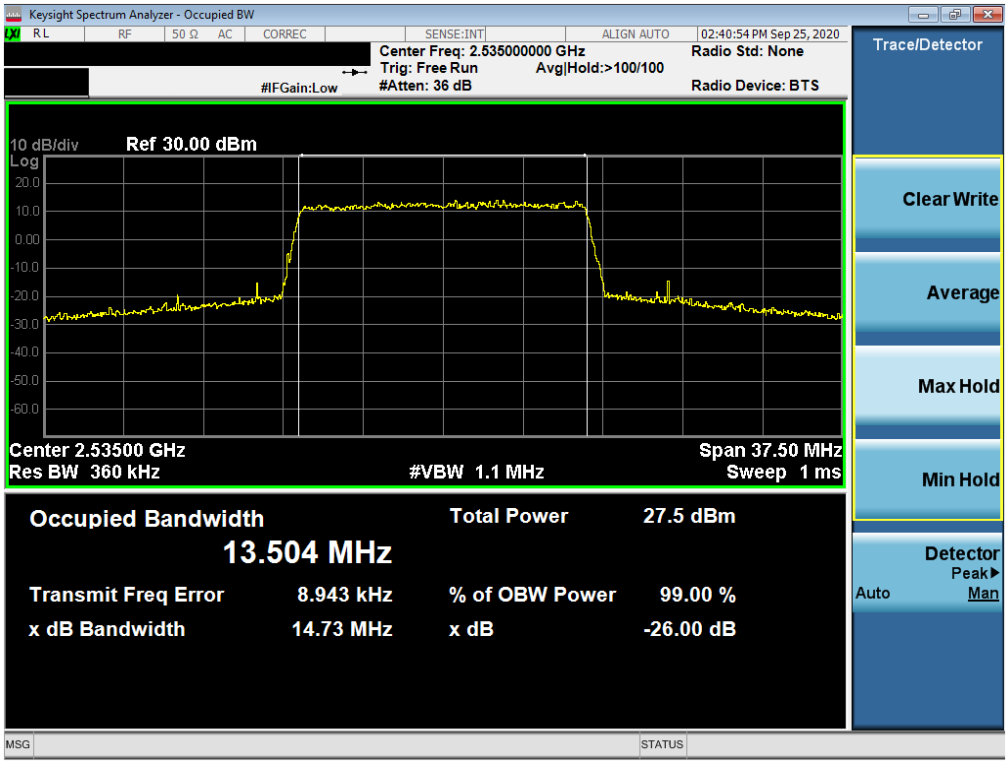
Plot 7-13. Occupied Bandwidth Plot (LTE Band 7 - 15MHz QPSK - Full RB Configuration)



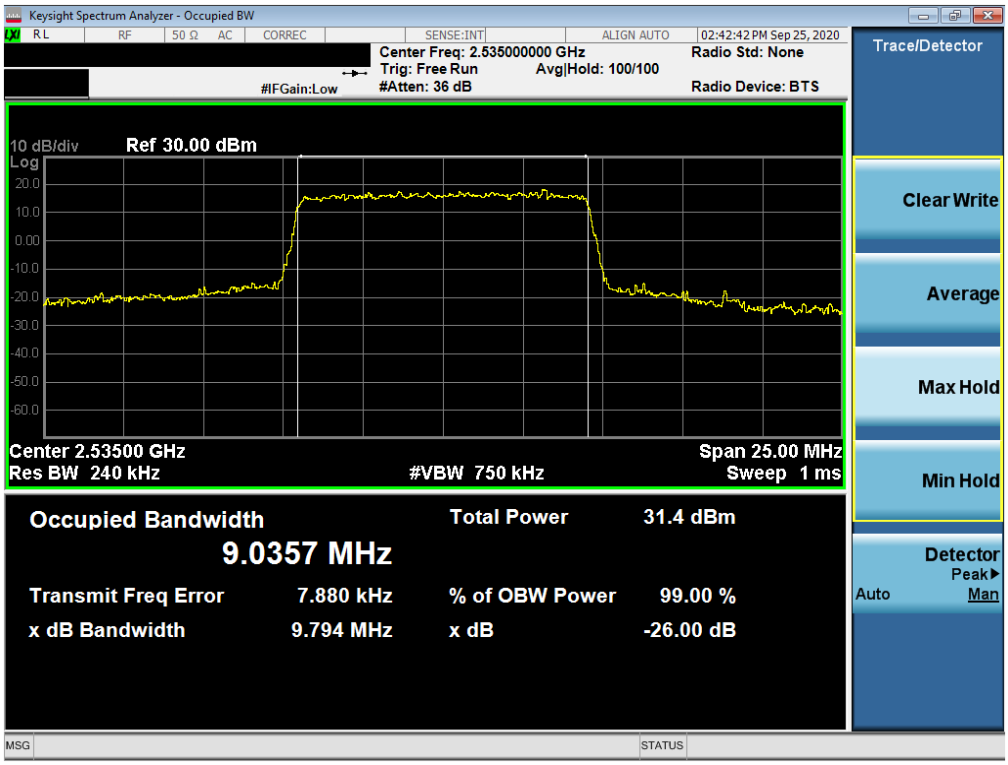
Plot 7-14. Occupied Bandwidth Plot (LTE Band 7 - 15MHz 16-QAM - Full RB Configuration)



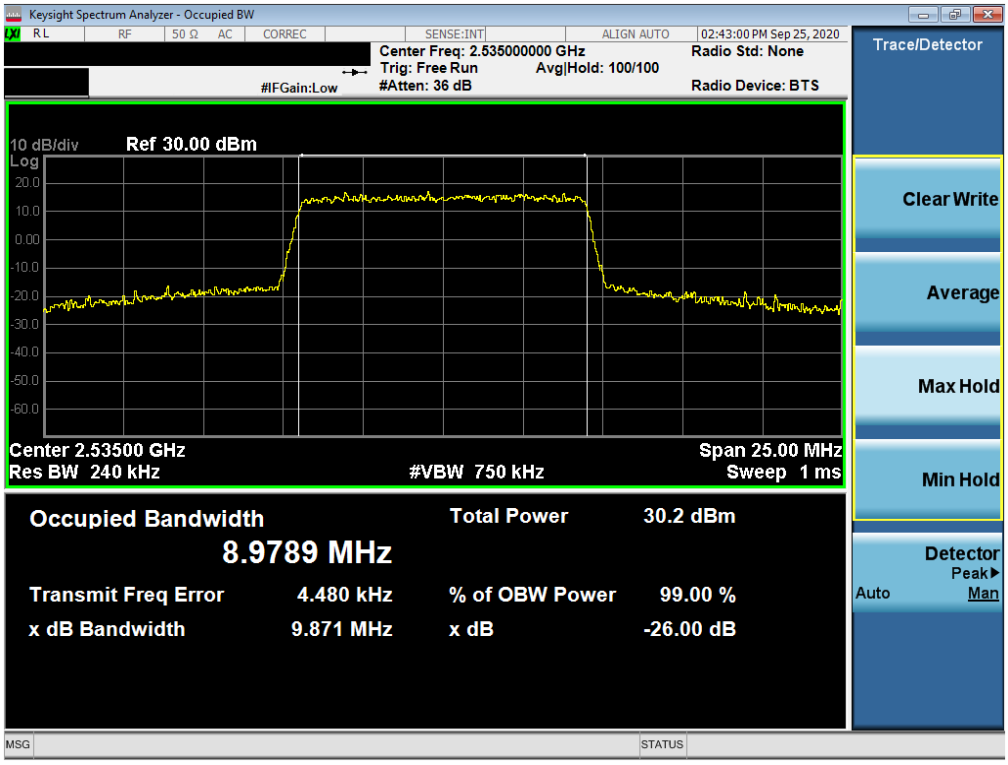
Plot 7-15. Occupied Bandwidth Plot (LTE Band 7 - 15MHz 64-QAM - Full RB Configuration)



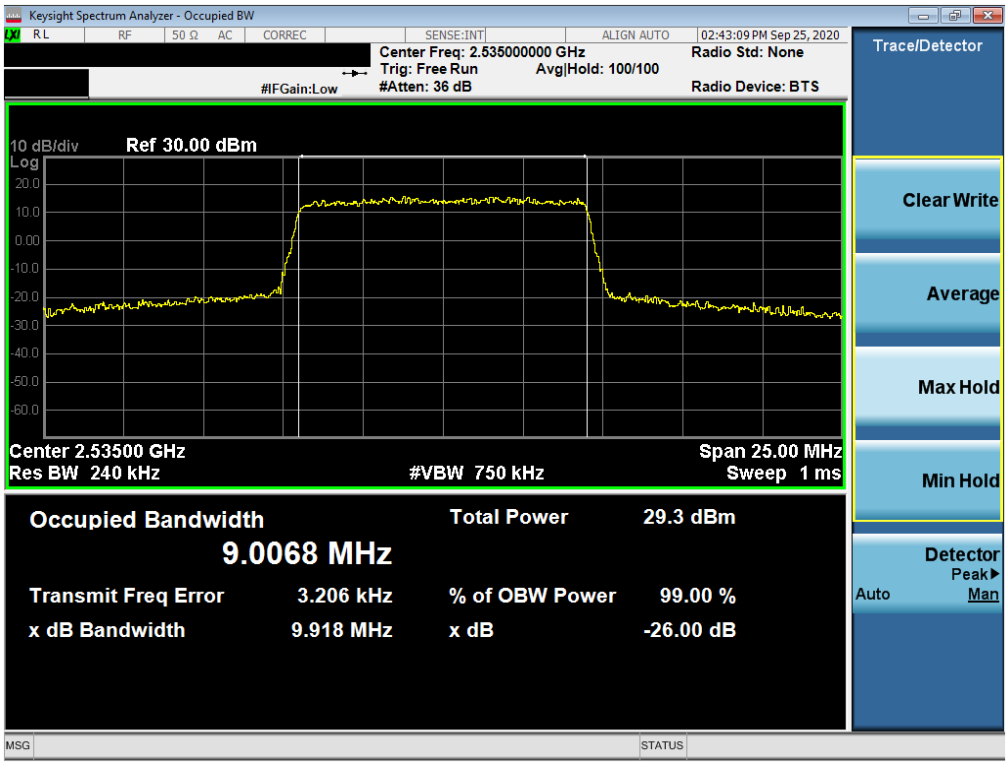
Plot 7-16. Occupied Bandwidth Plot (LTE Band 7 - 15MHz 256-QAM - Full RB Configuration)



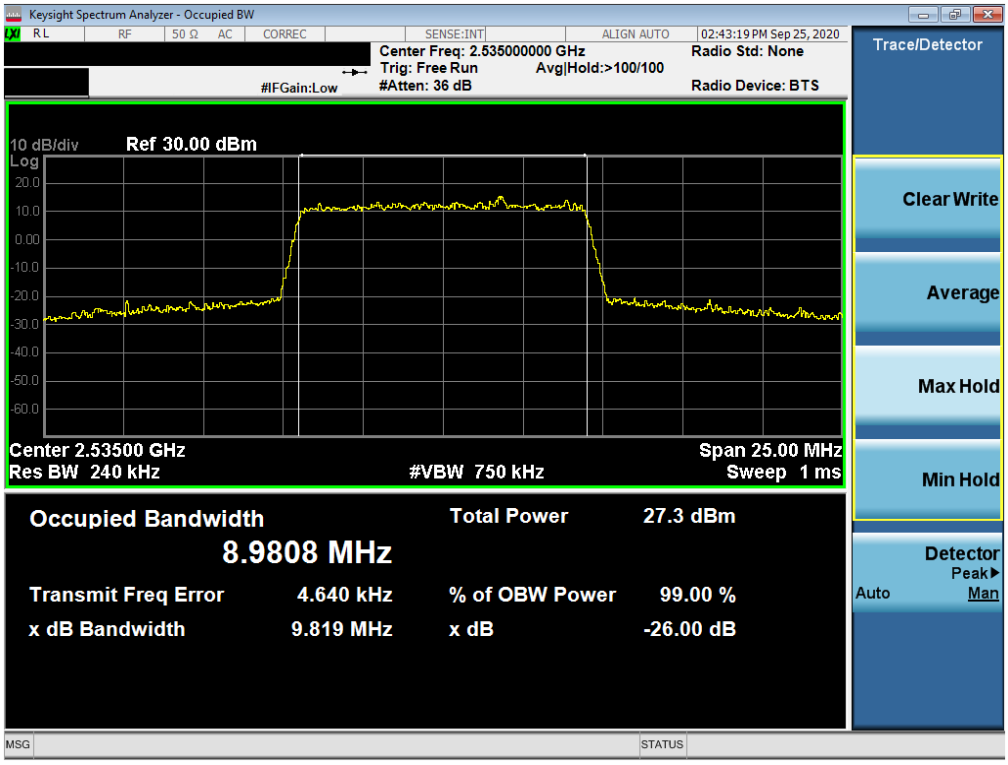
Plot 7-17. Occupied Bandwidth Plot (LTE Band 7 - 10MHz QPSK - Full RB Configuration)



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

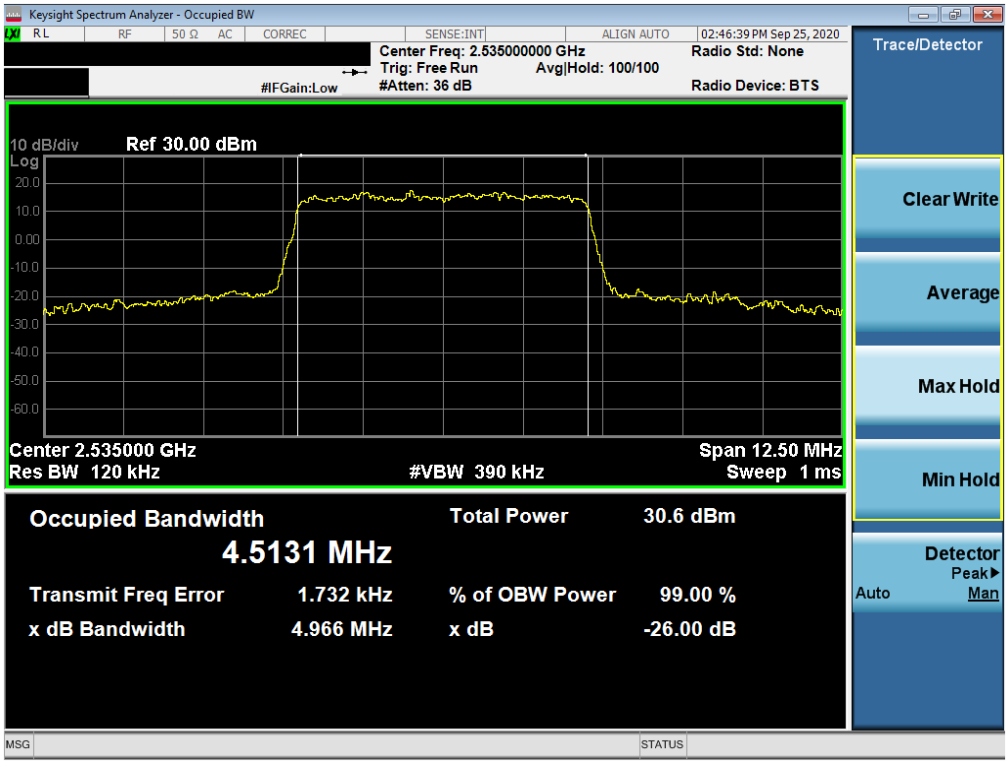


Plot 7-19. Occupied Bandwidth Plot (LTE Band 7 - 10MHz 64-QAM - Full RB Configuration)

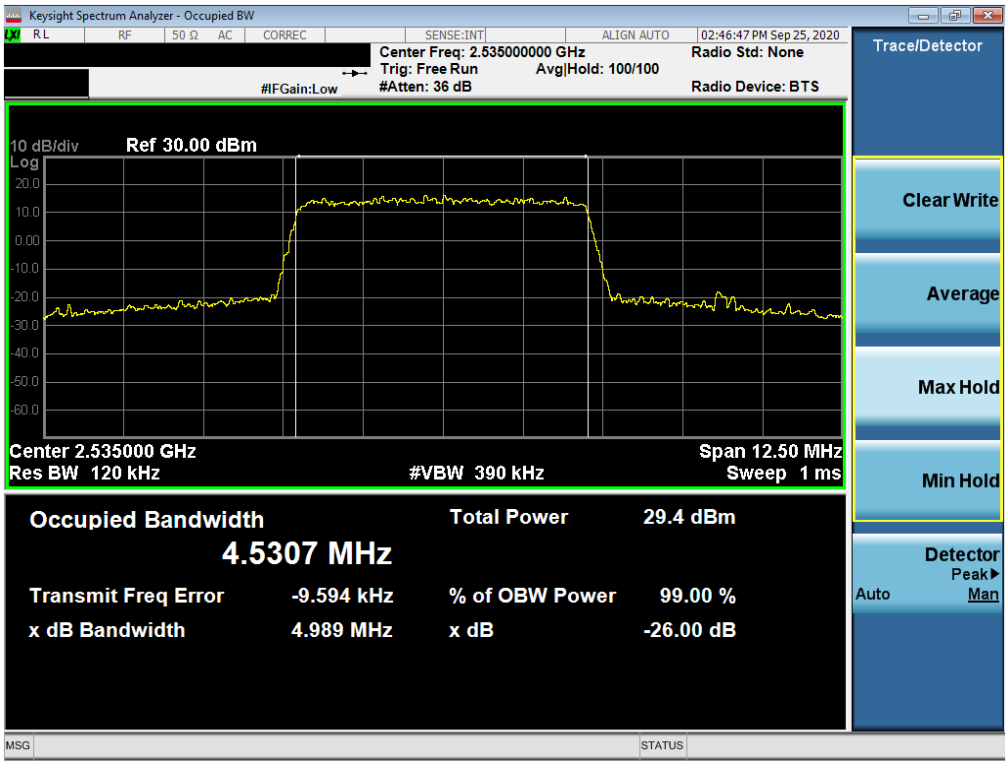


Plot 7-20. Occupied Bandwidth Plot (LTE Band 7 - 10MHz 256-QAM - Full RB Configuration)

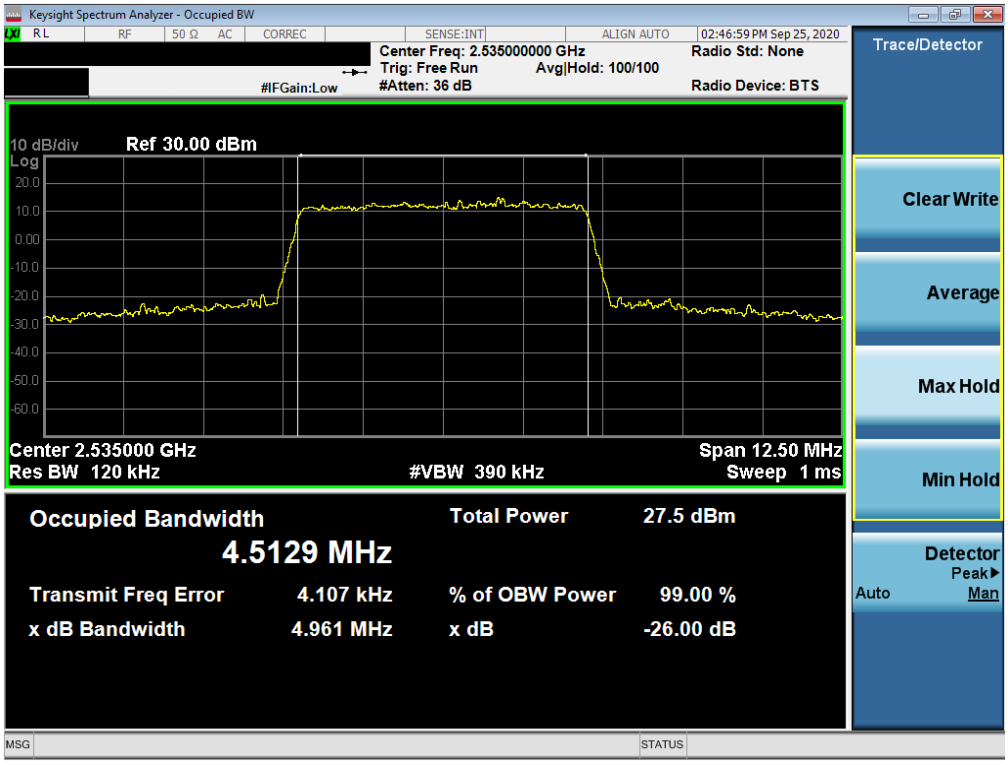
Plot 7-21. Occupied Bandwidth Plot (LTE Band 7 - 5MHz QPSK - Full RB Configuration)



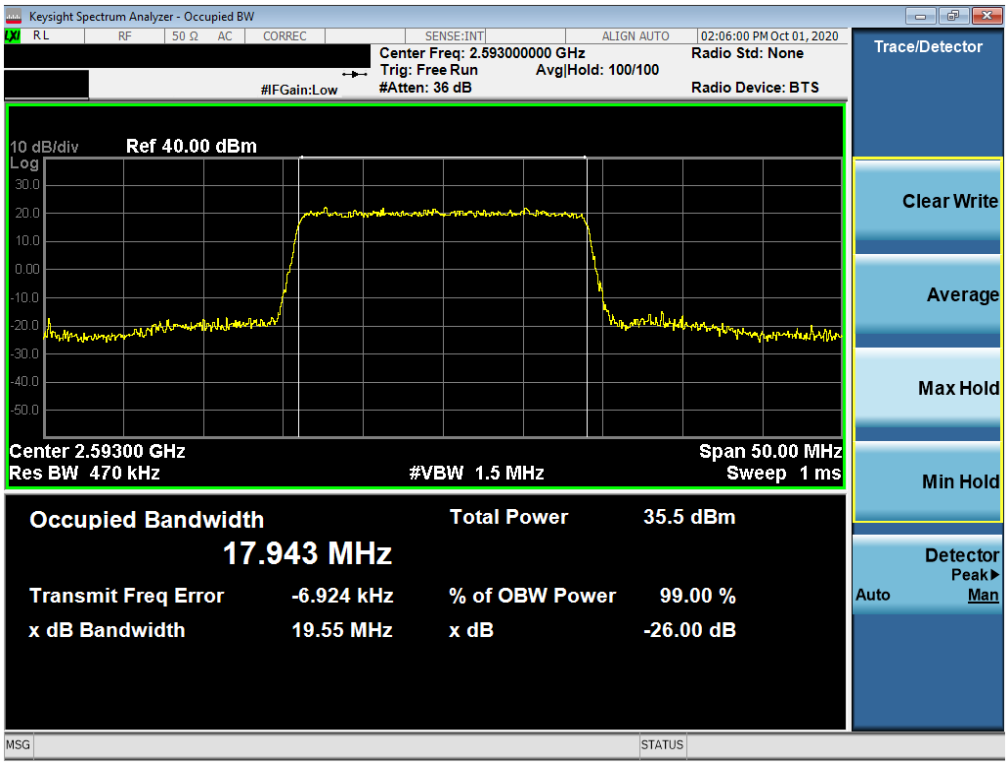
Plot 7-22. Occupied Bandwidth Plot (LTE Band 7 - 5MHz 16-QAM - Full RB Configuration)



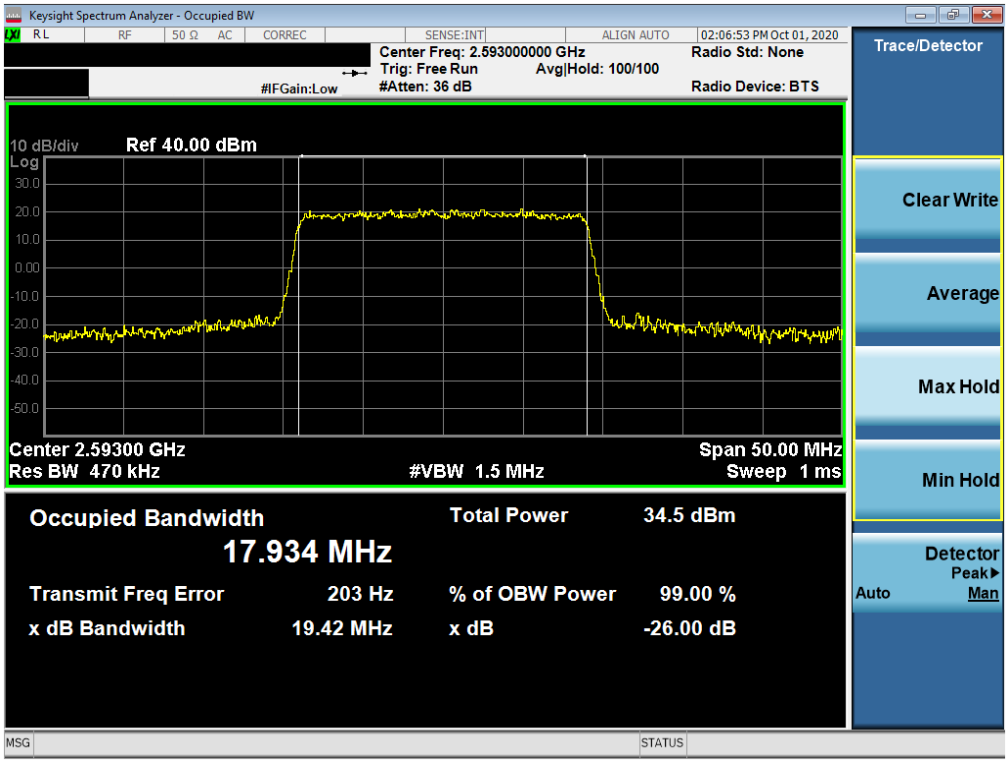
Plot 7-23. Occupied Bandwidth Plot (LTE Band 7 - 5MHz 64-QAM - Full RB Configuration)



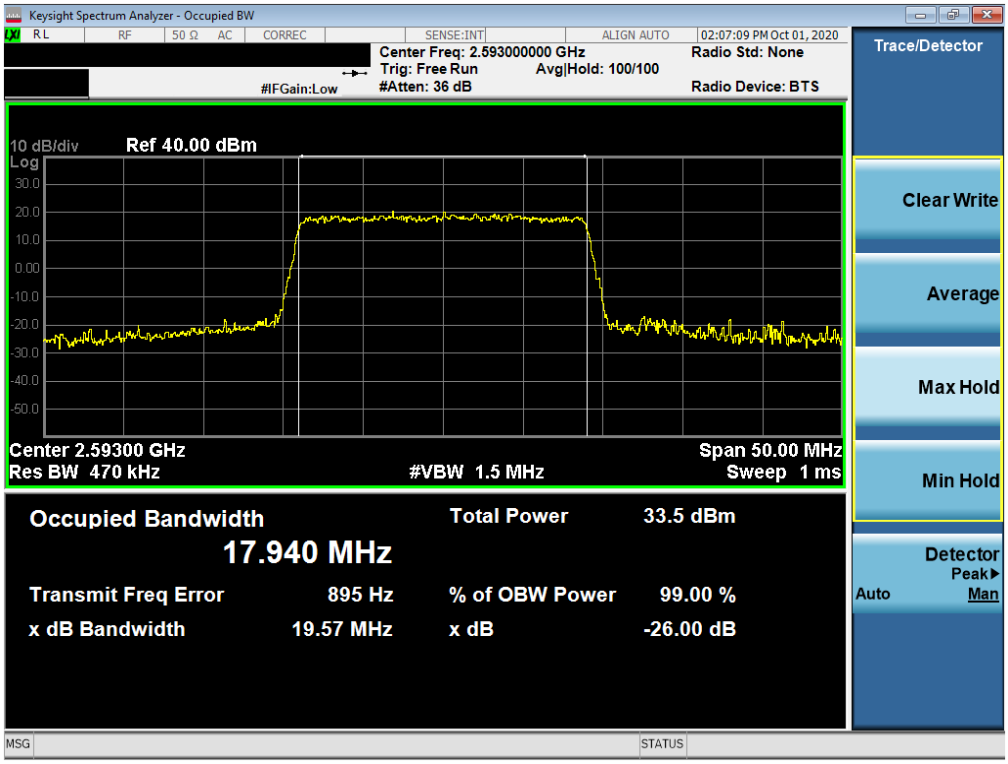
Plot 7-24. Occupied Bandwidth Plot (LTE Band 7 - 5MHz 256-QAM - Full RB Configuration)



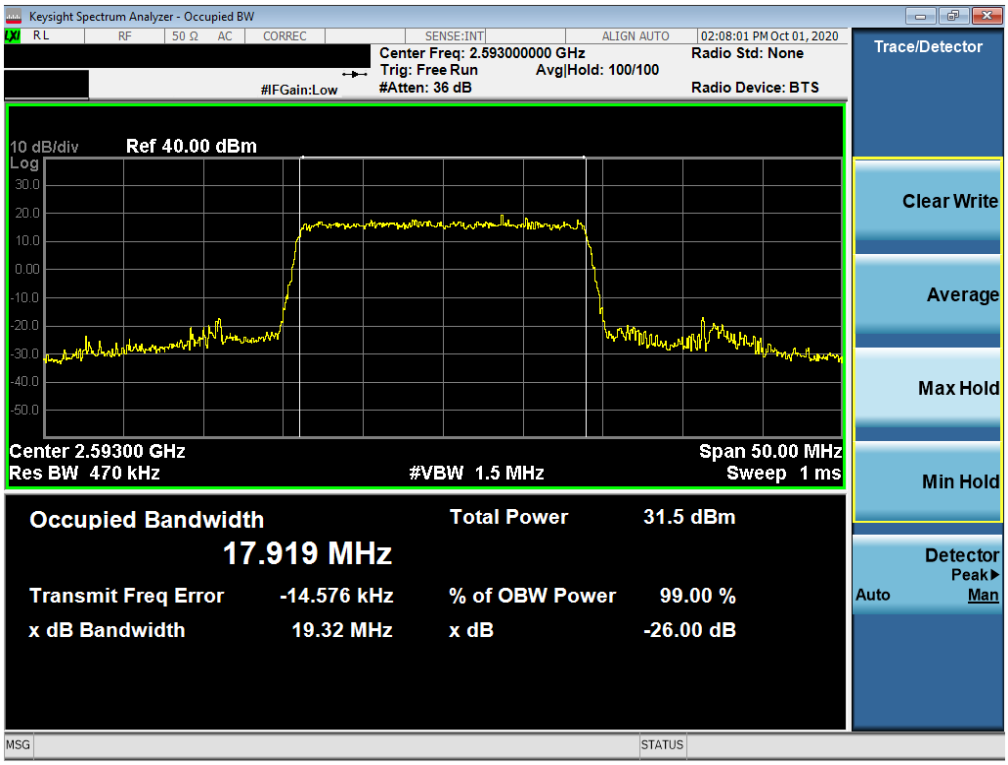
Plot 7-25. Occupied Bandwidth Plot (LTE Band 41(PC2) - 20MHz QPSK - Full RB Configuration)



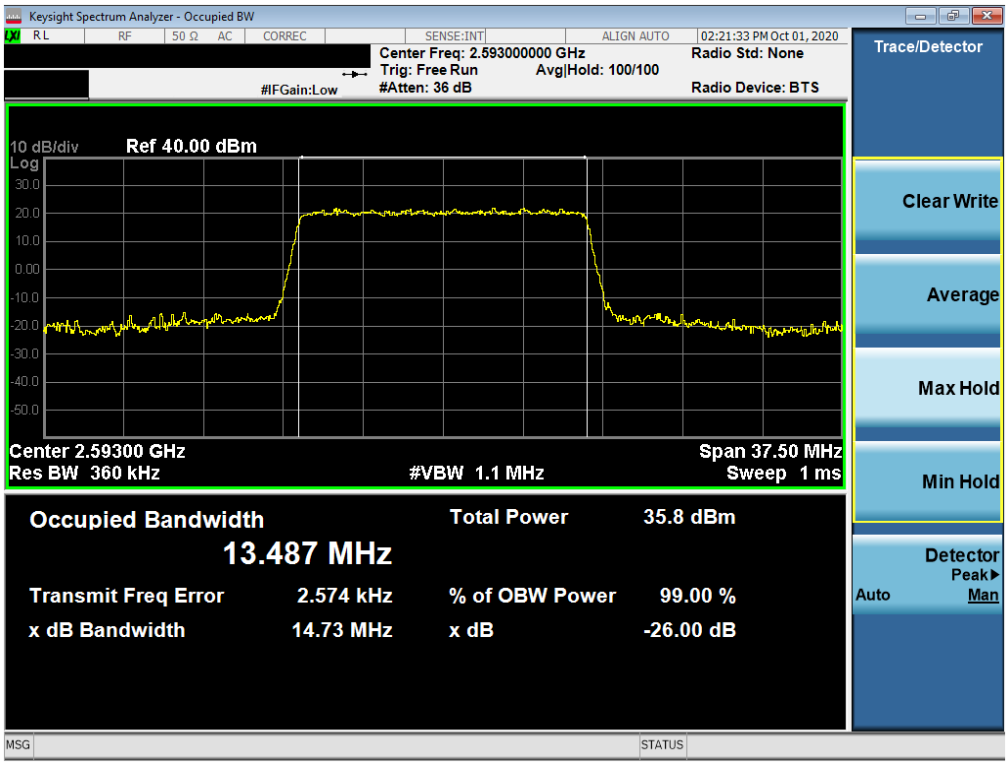
Plot 7-26. Occupied Bandwidth Plot (LTE Band 41(PC2) - 20MHz 16-QAM - Full RB Configuration)



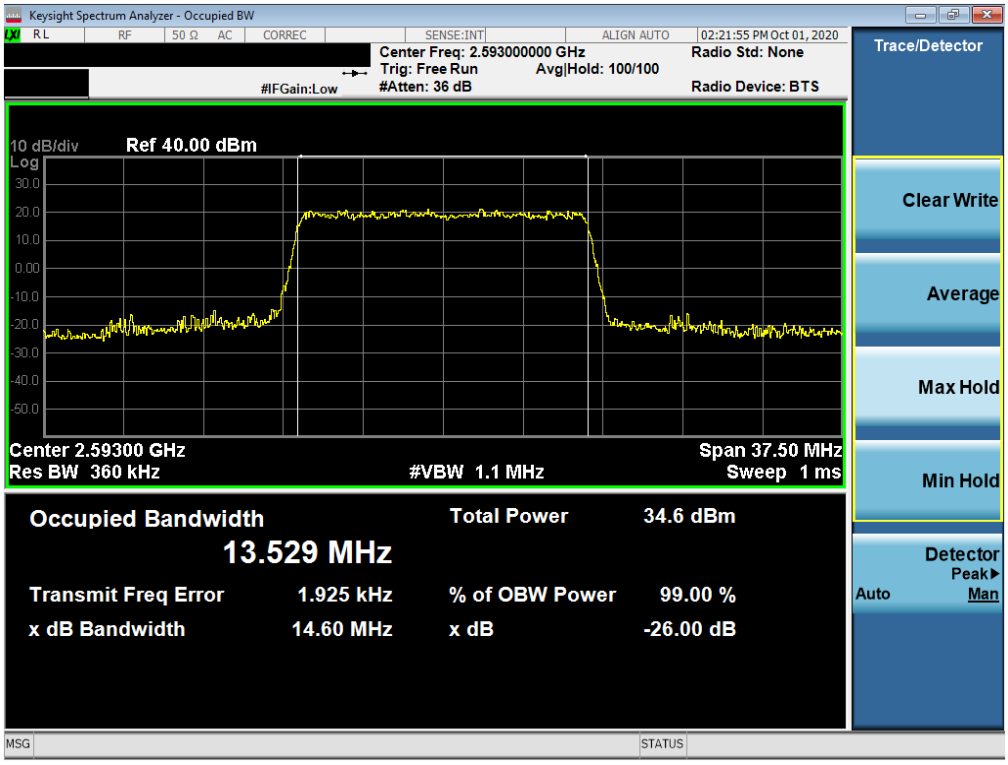
Plot 7-27. Occupied Bandwidth Plot (LTE Band 41(PC2) - 20MHz 64-QAM - Full RB Configuration)



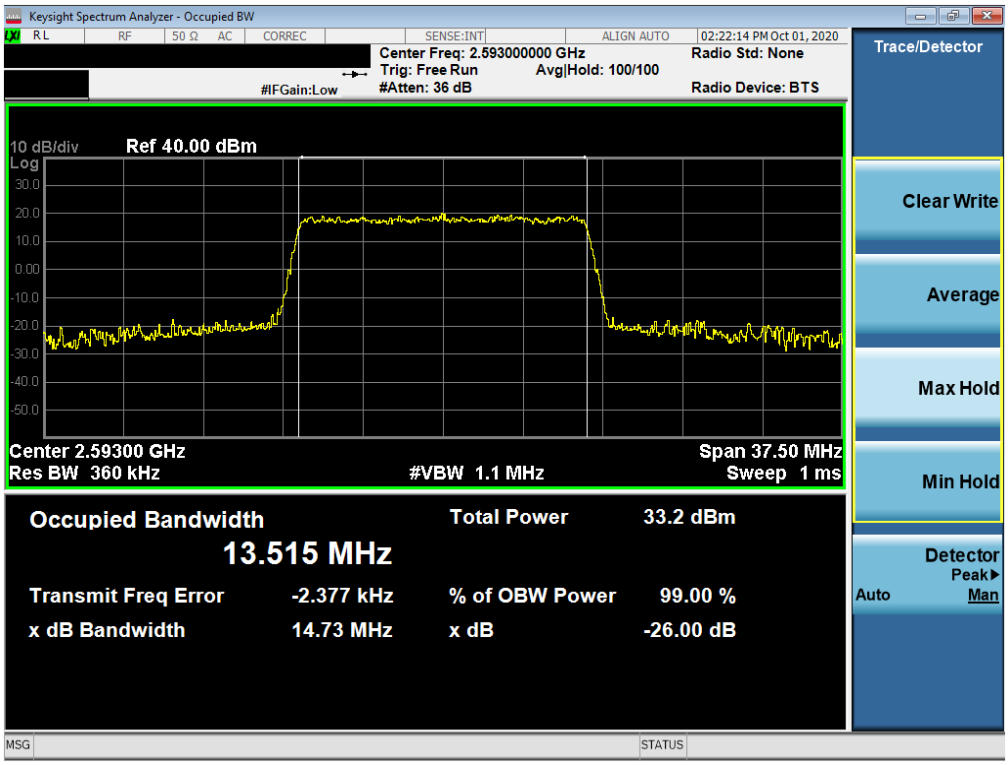
Plot 7-28. Occupied Bandwidth Plot (LTE Band 41(PC2) - 20MHz 256-QAM - Full RB Configuration)



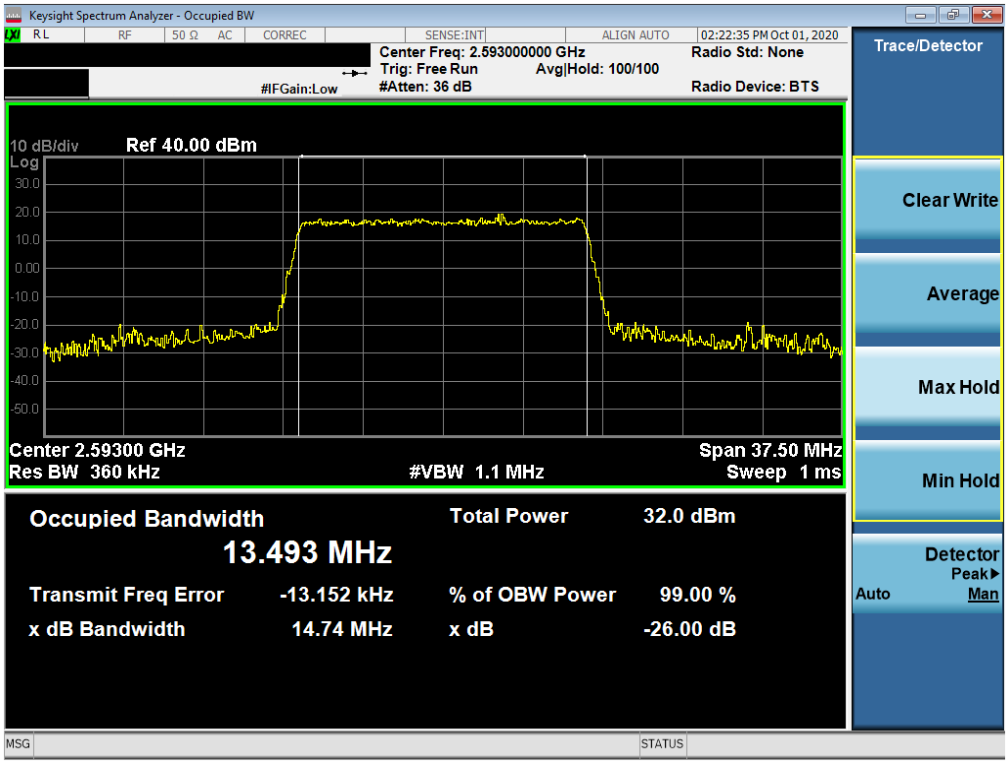
Plot 7-29. Occupied Bandwidth Plot (LTE Band 41(PC2) - 15MHz QPSK - Full RB Configuration)



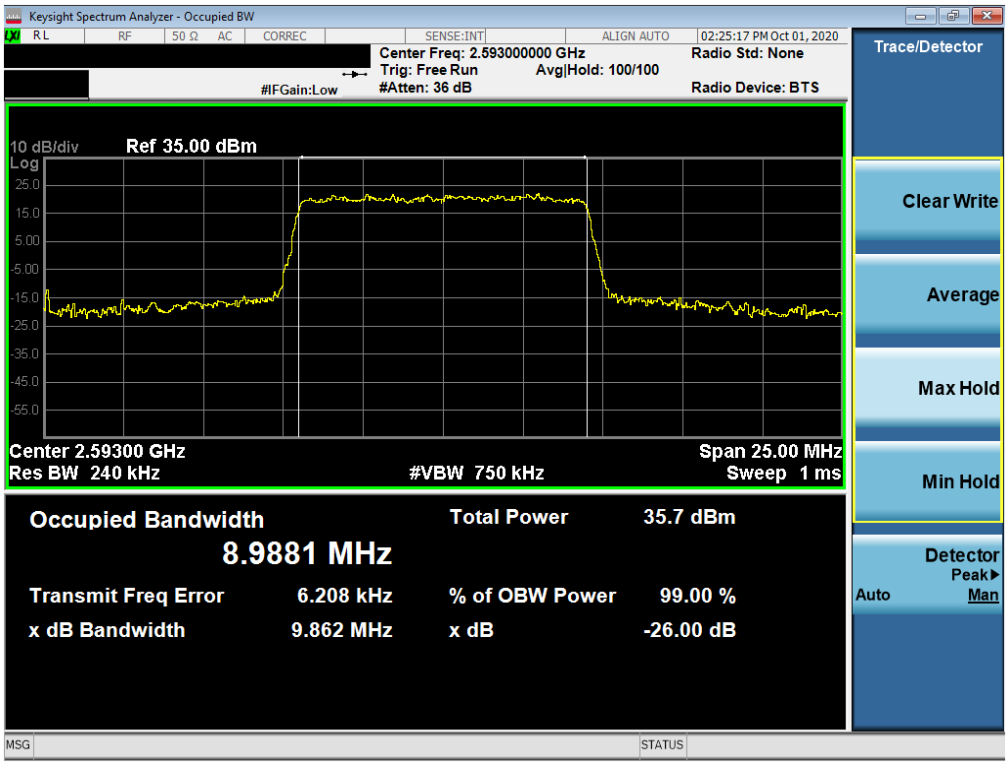
Plot 7-30. Occupied Bandwidth Plot (LTE Band 41(PC2) - 15MHz 16-QAM - Full RB Configuration)



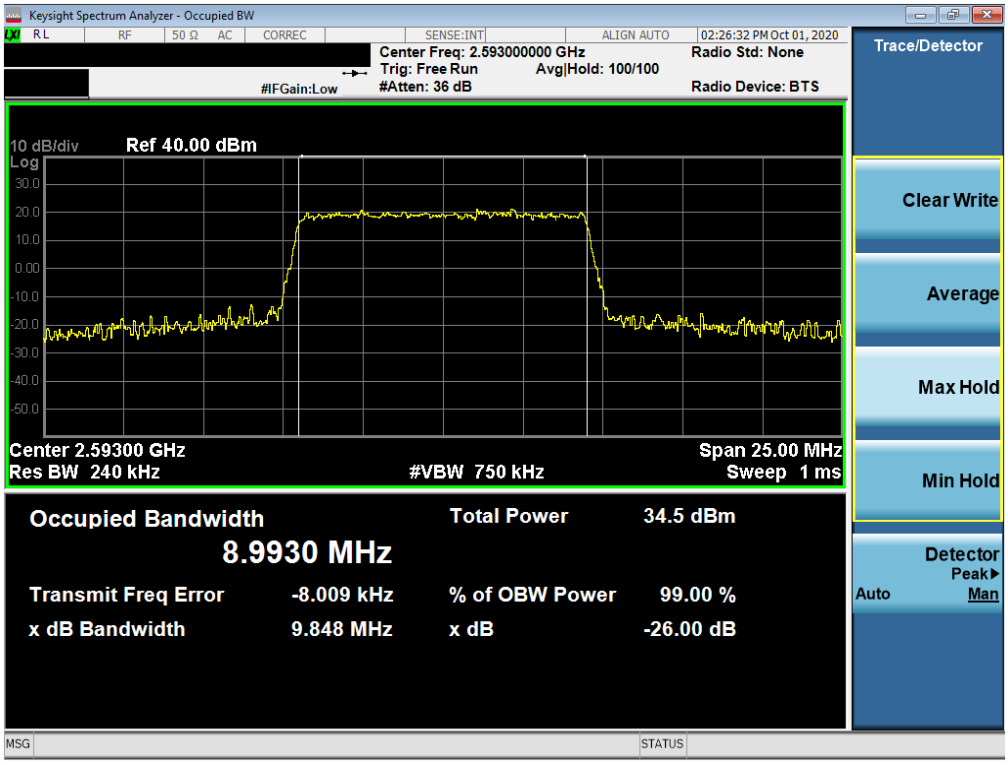
Plot 7-31. Occupied Bandwidth Plot (LTE Band 41(PC2) - 15MHz 64-QAM - Full RB Configuration)



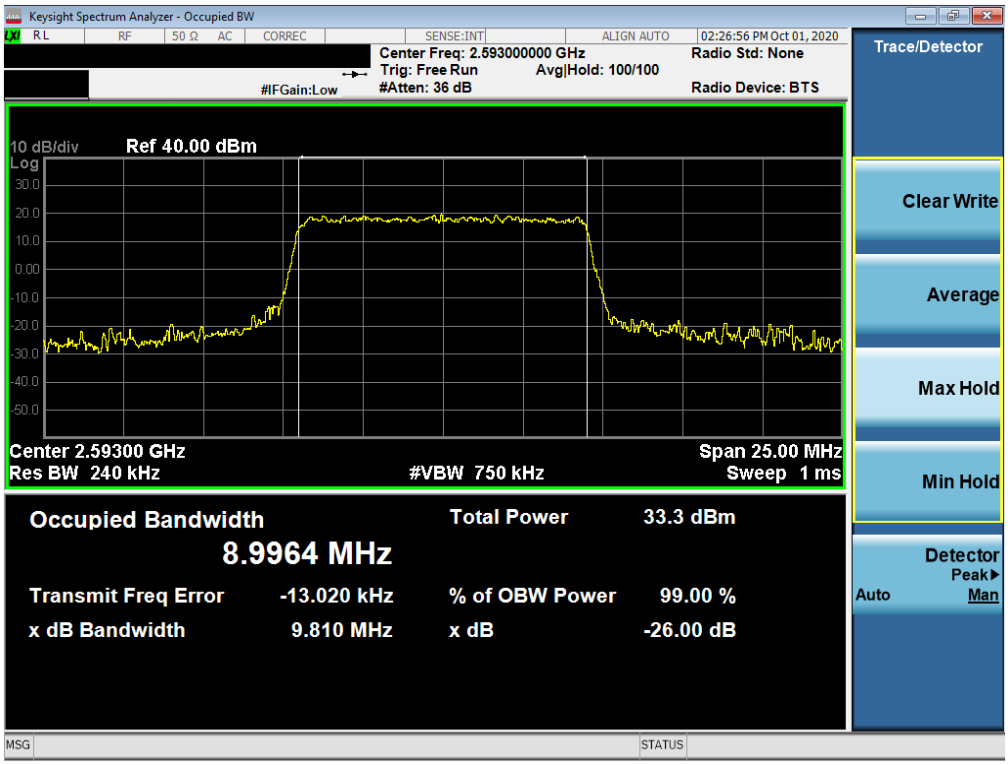
Plot 7-32. Occupied Bandwidth Plot (LTE Band 41(PC2) - 15MHz 256-QAM - Full RB Configuration)



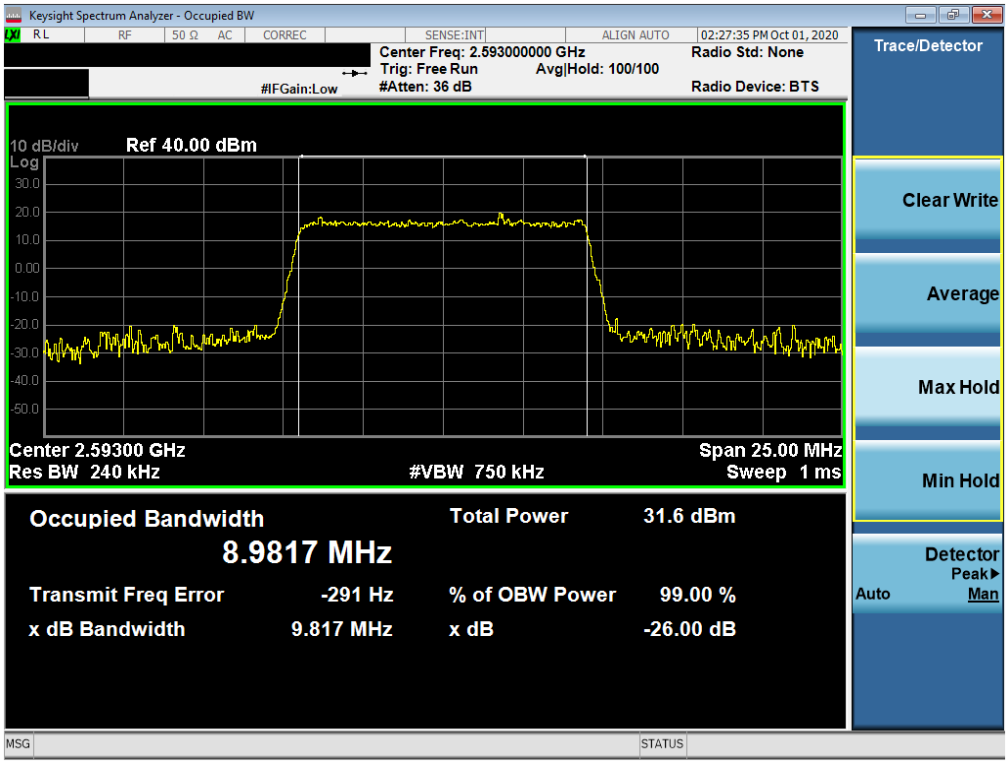
Plot 7-33. Occupied Bandwidth Plot (LTE Band 41(PC2) - 10MHz QPSK - Full RB Configuration)



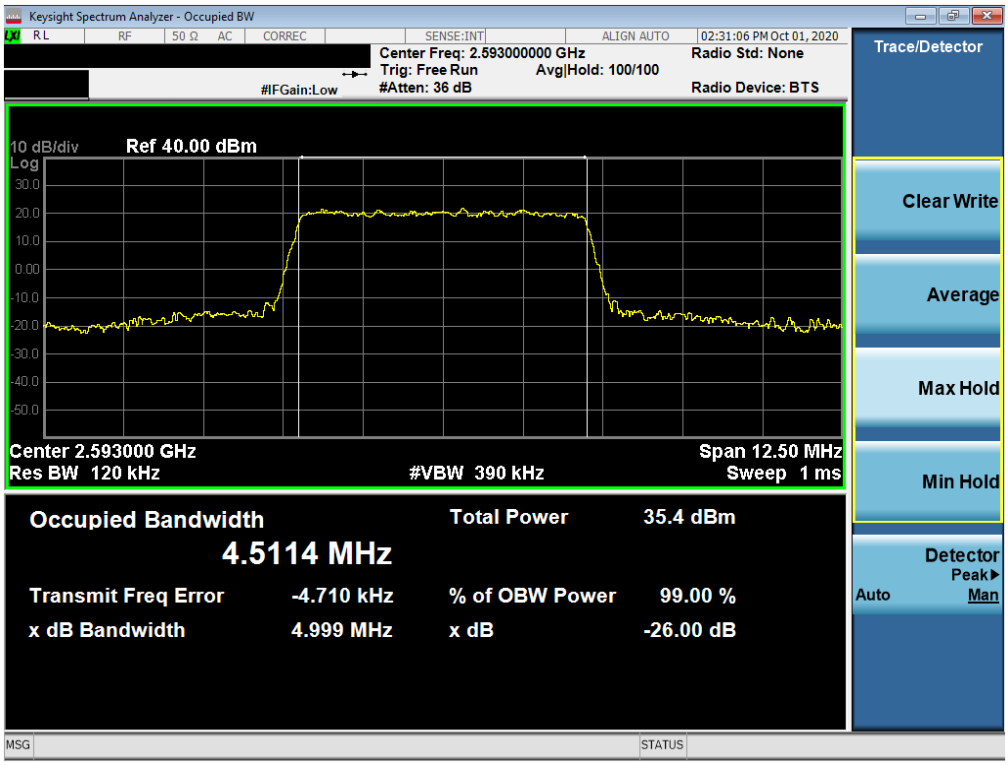
Plot 7-34. Occupied Bandwidth Plot (LTE Band 41(PC2) - 10MHz 16-QAM - Full RB Configuration)



Plot 7-35. Occupied Bandwidth Plot (LTE Band 41(PC2) - 10MHz 64-QAM - Full RB Configuration)

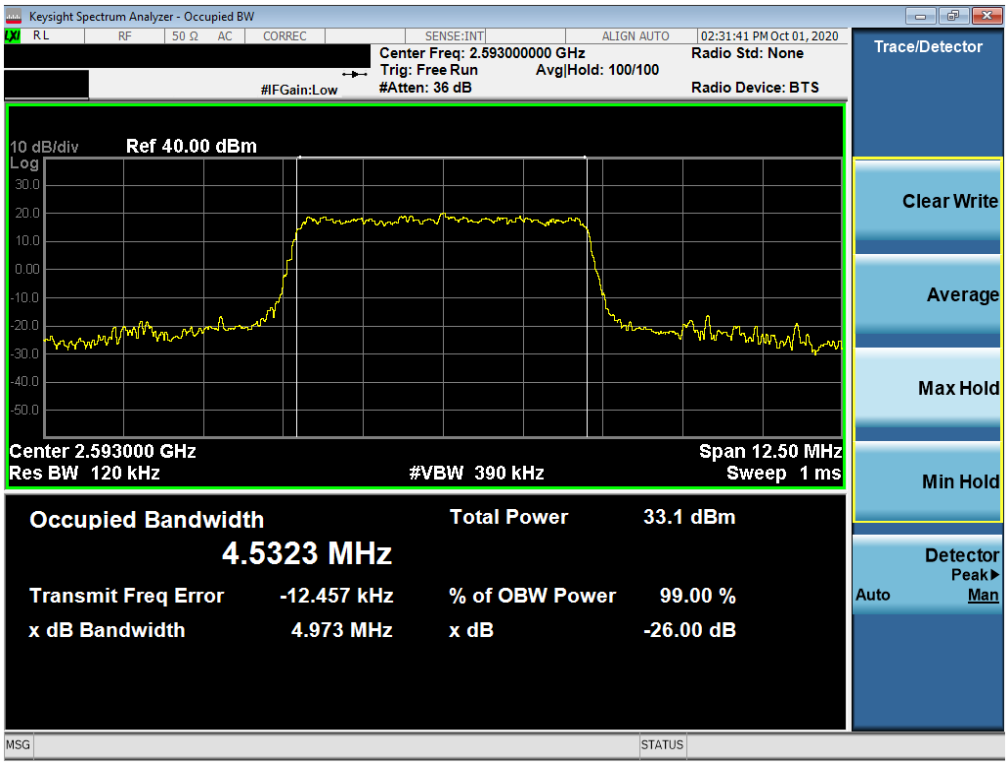


Plot 7-36. Occupied Bandwidth Plot (LTE Band 41(PC2) - 10MHz 256-QAM - Full RB Configuration)

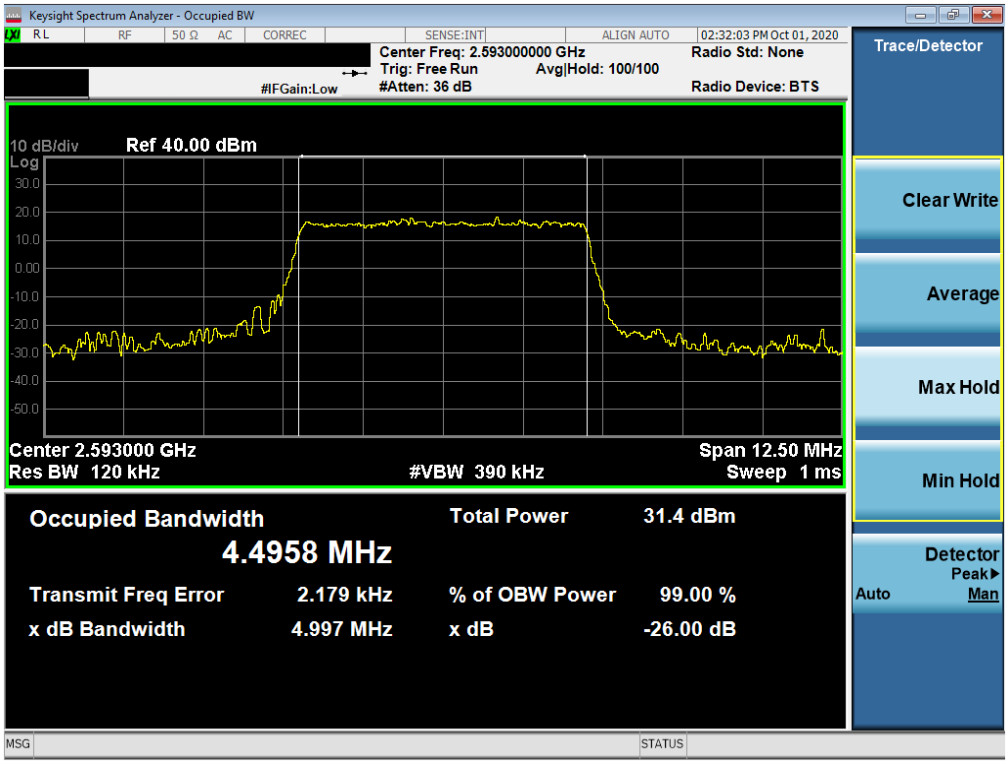


Plot 7-37. Occupied Bandwidth Plot (LTE Band 41(PC2) - 5MHz QPSK - Full RB Configuration)

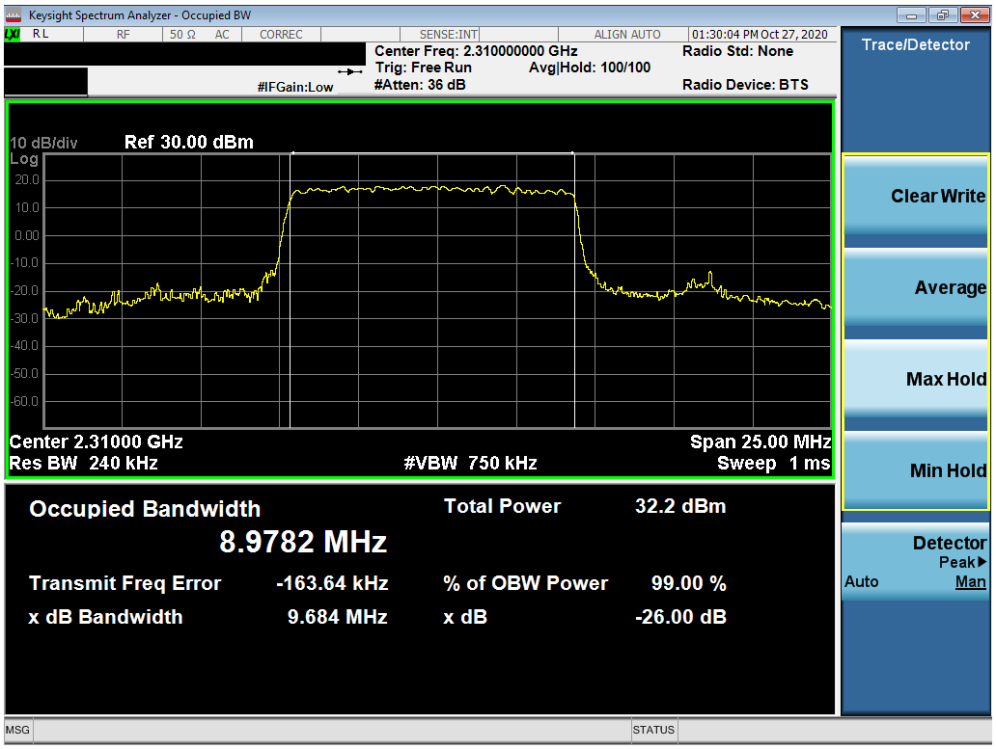
Plot 7-38. Occupied Bandwidth Plot (LTE Band 41(PC2) - 5MHz 16-QAM - Full RB Configuration)



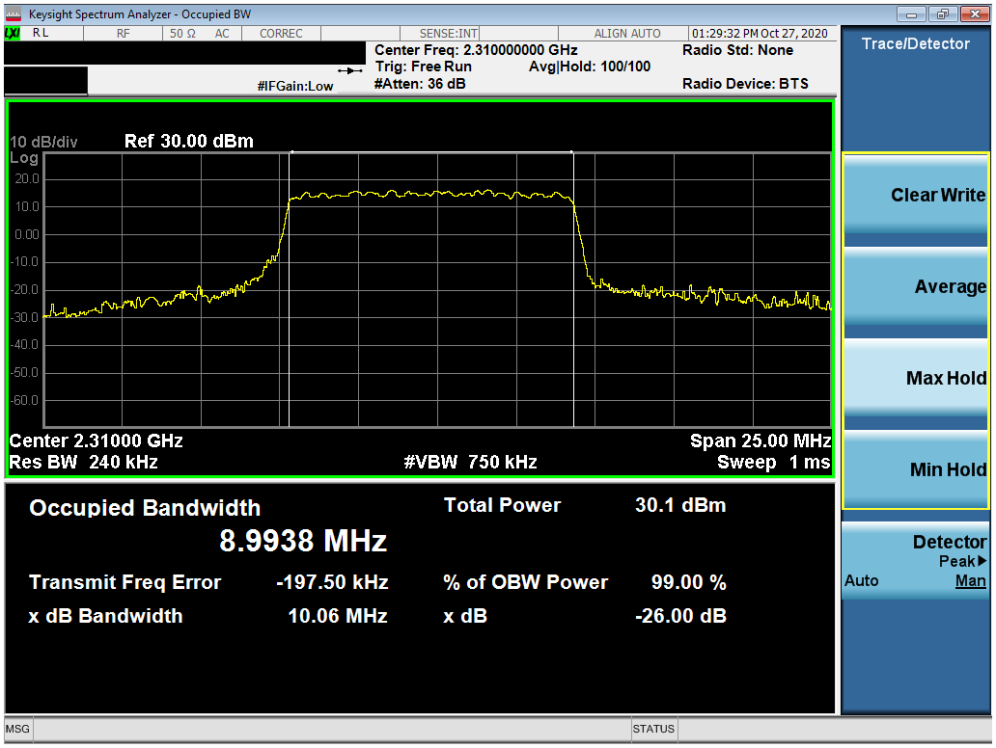
Plot 7-39. Occupied Bandwidth Plot (LTE Band 41(PC2) - 5MHz 64-QAM - Full RB Configuration)



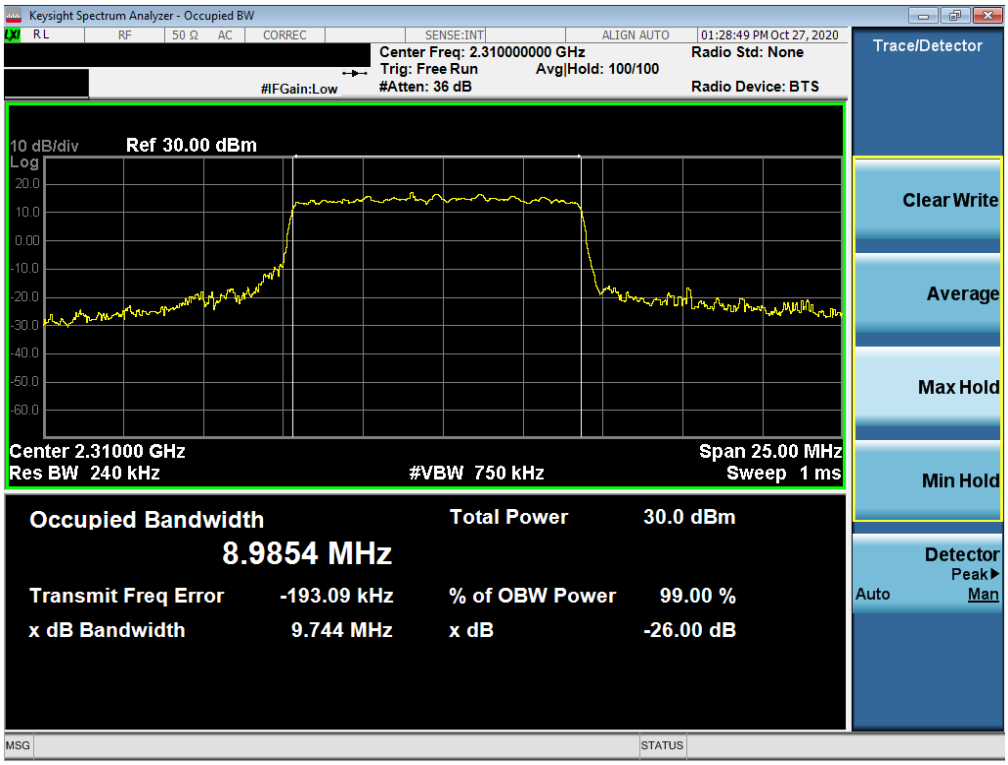
Plot 7-40. Occupied Bandwidth Plot (LTE Band 41(PC2) - 5MHz 256-QAM - Full RB Configuration)



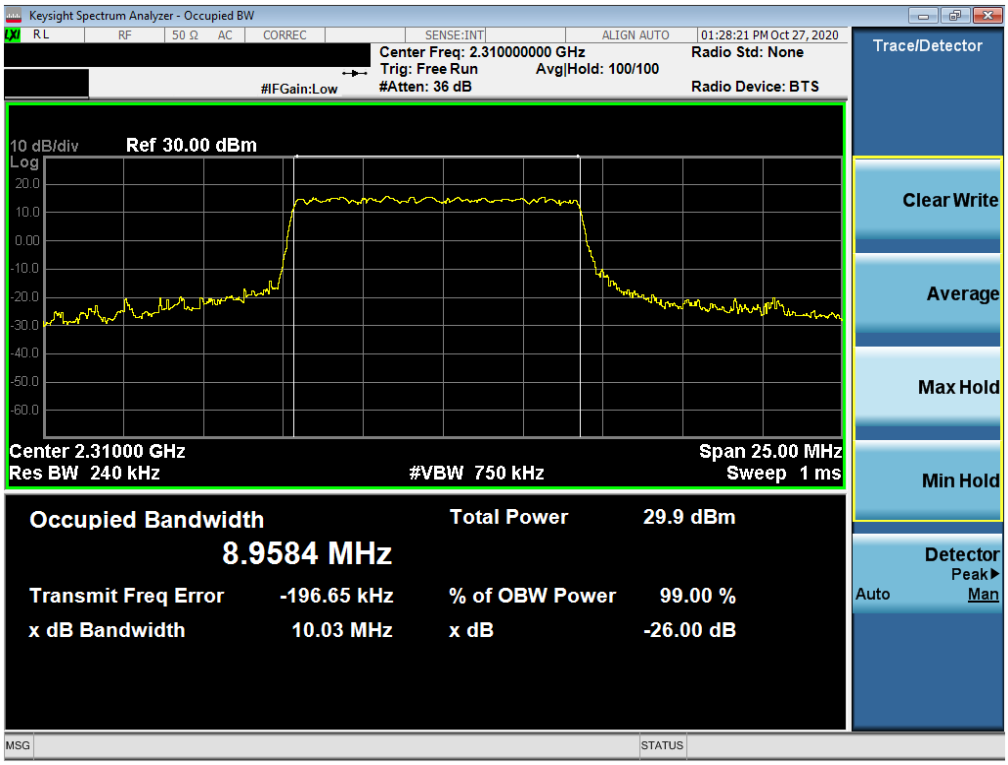
Plot 7-41. Occupied Bandwidth Plot (NR Band n30 - 10.0MHz DFT-s-OFDM BPSK - Full RB)



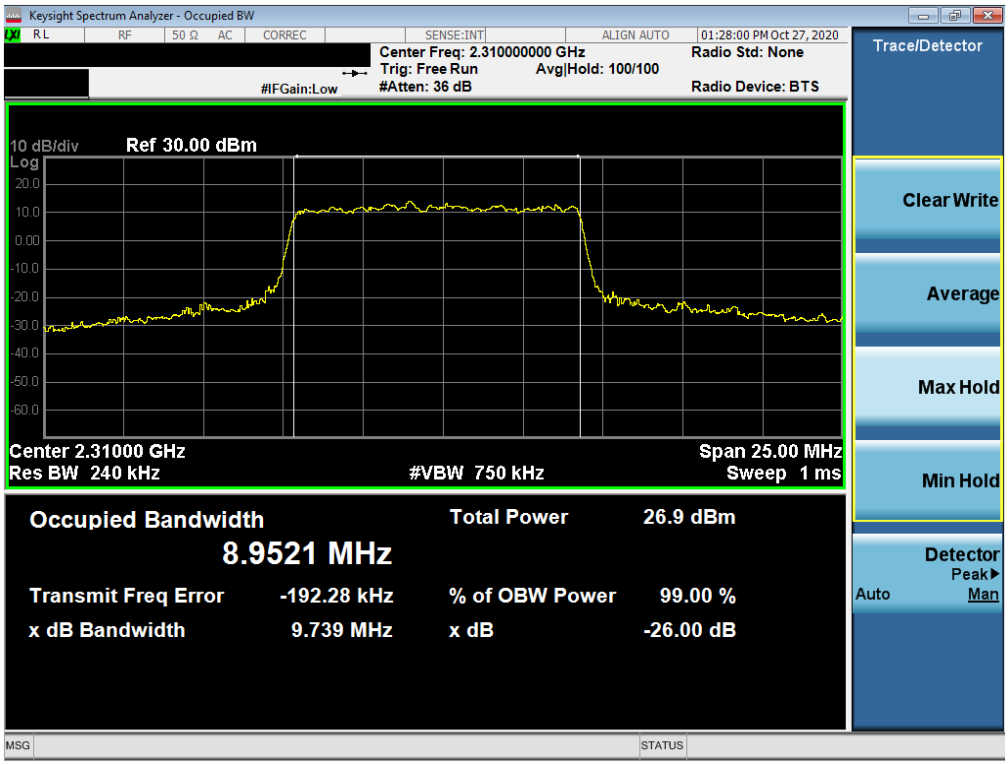
Plot 7-42. Occupied Bandwidth Plot (NR Band n30 - 10.0MHz CP-OFDM QPSK - Full RB)



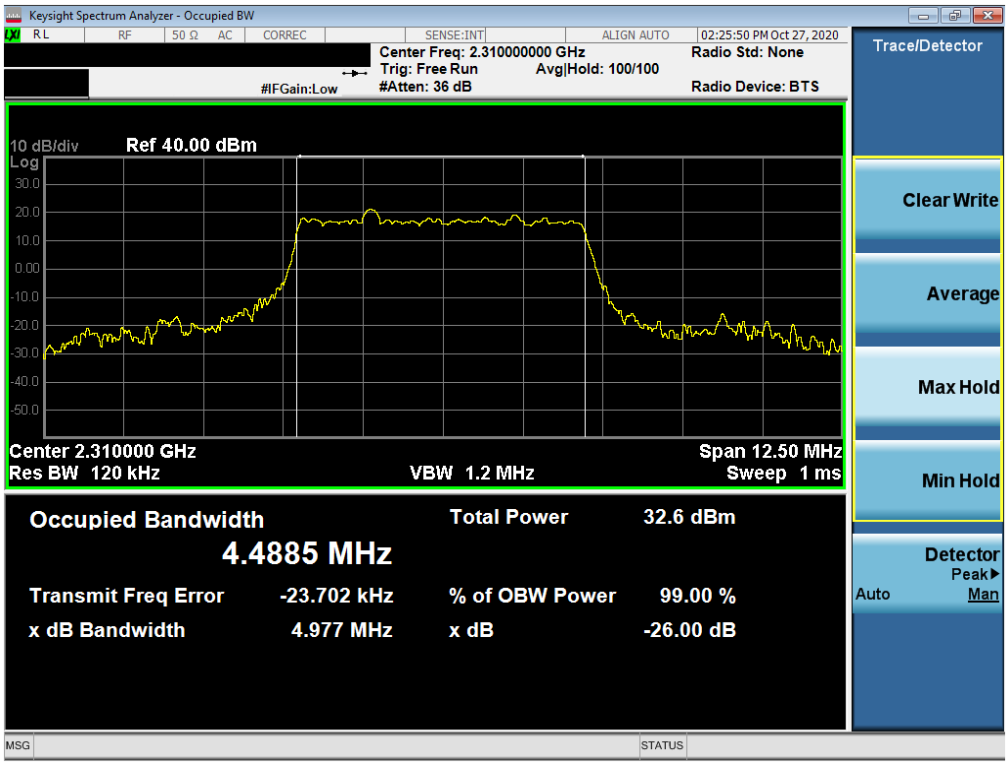
Plot 7-43. Occupied Bandwidth Plot (NR Band n30 - 10.0MHz CP-OFDM 16QAM - Full RB)



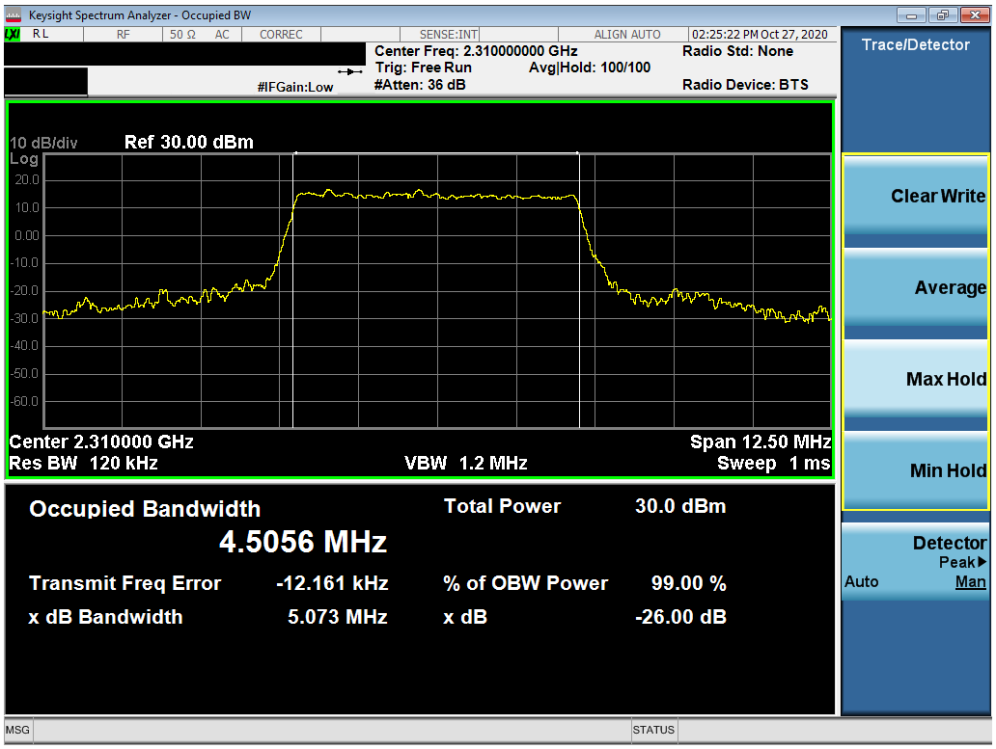
Plot 7-44. Occupied Bandwidth Plot (NR Band n30 - 10.0MHz CP-OFDM 64QAM - Full RB)



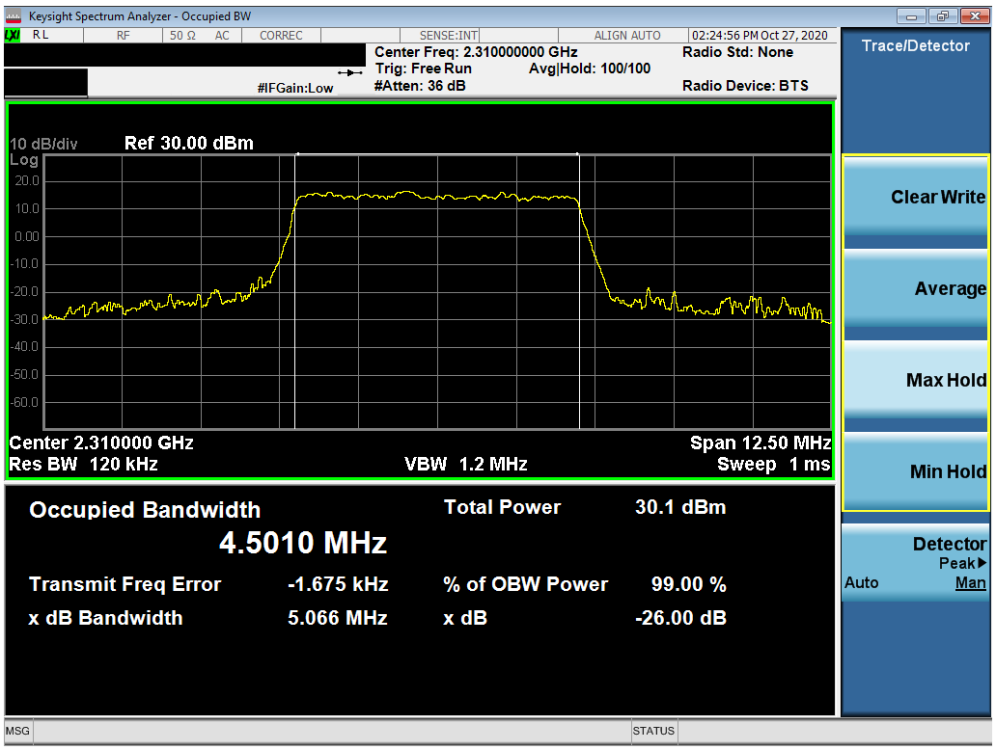
Plot 7-45. Occupied Bandwidth Plot (NR Band n30 - 10.0MHz CP-OFDM 256QAM - Full RB)



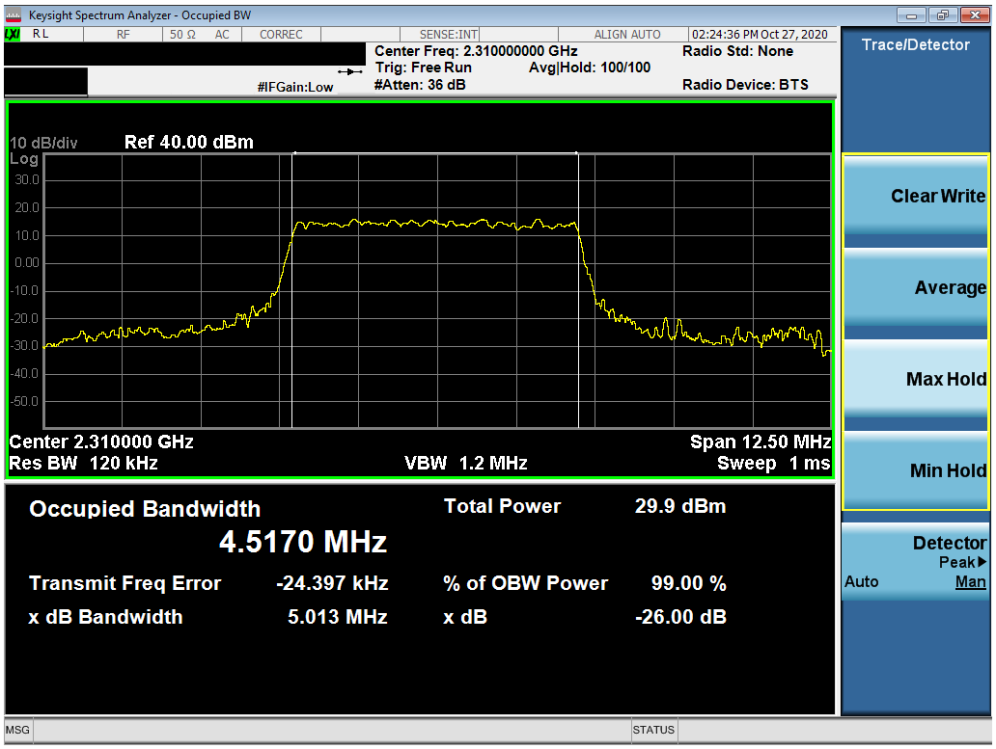
Plot 7-46. Occupied Bandwidth Plot (NR Band n30 - 5.0MHz DFT-s-OFDM BPSK - Full RB)



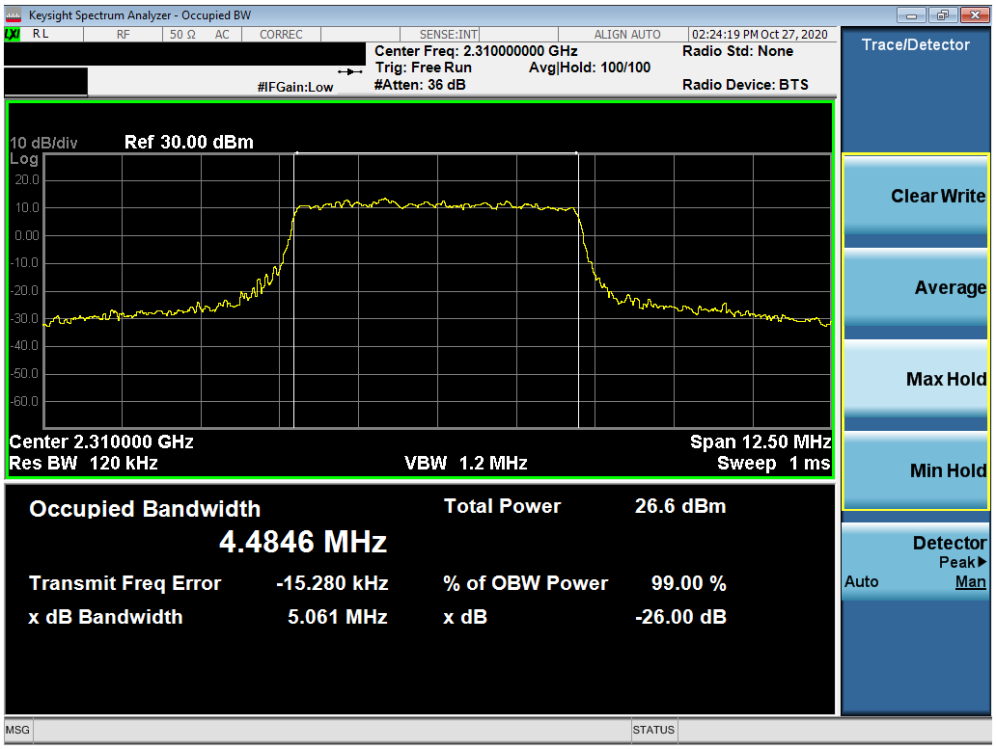
Plot 7-47. Occupied Bandwidth Plot (NR Band n30 - 5.0MHz CP-OFDM QPSK - Full RB)



Plot 7-48. Occupied Bandwidth Plot (NR Band n30 - 5.0MHz CP-OFDM 16QAM - Full RB)



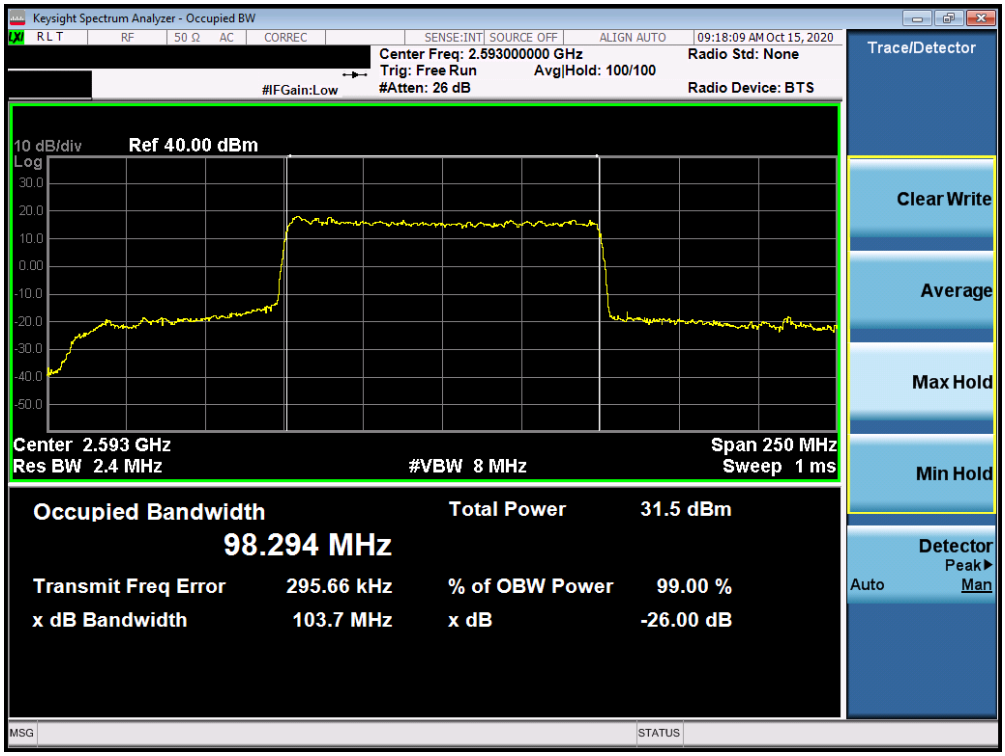
Plot 7-49. Occupied Bandwidth Plot (NR Band n30 - 5.0MHz CP-OFDM 64QAM - Full RB)



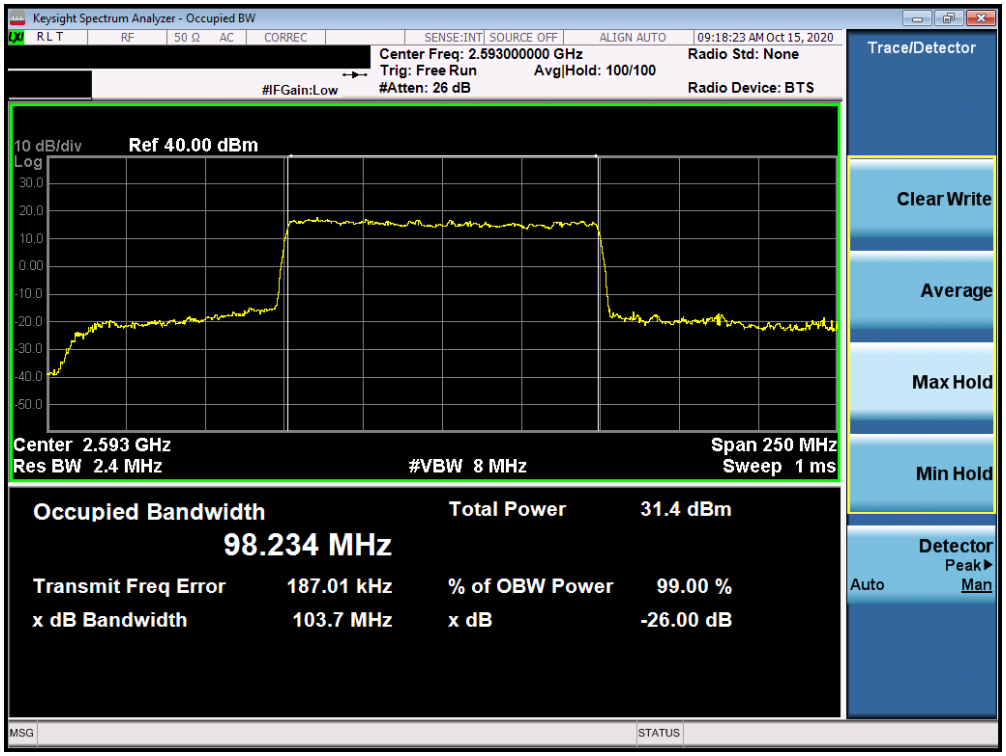
Plot 7-50. Occupied Bandwidth Plot (NR Band n30 - 5.0MHz CP-OFDM 256QAM - Full RB)

NR Band n41 ANT E

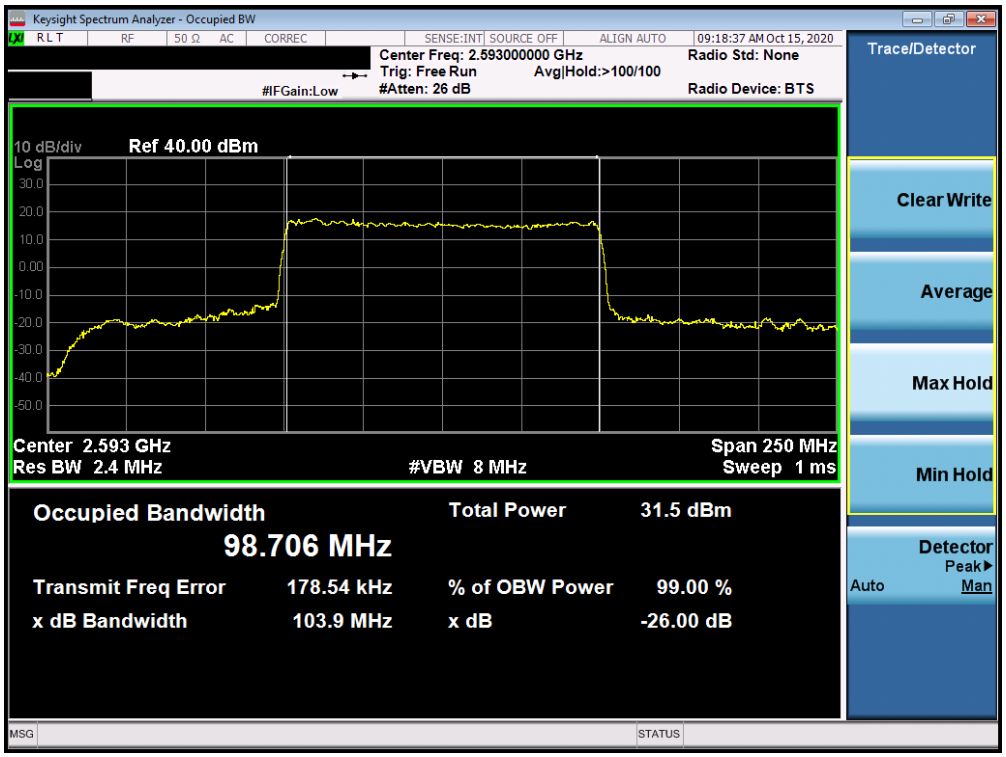
Plot 7-51. Occupied Bandwidth Plot (NR Band n41 - 100MHz π/2 BPSK - Full RB)



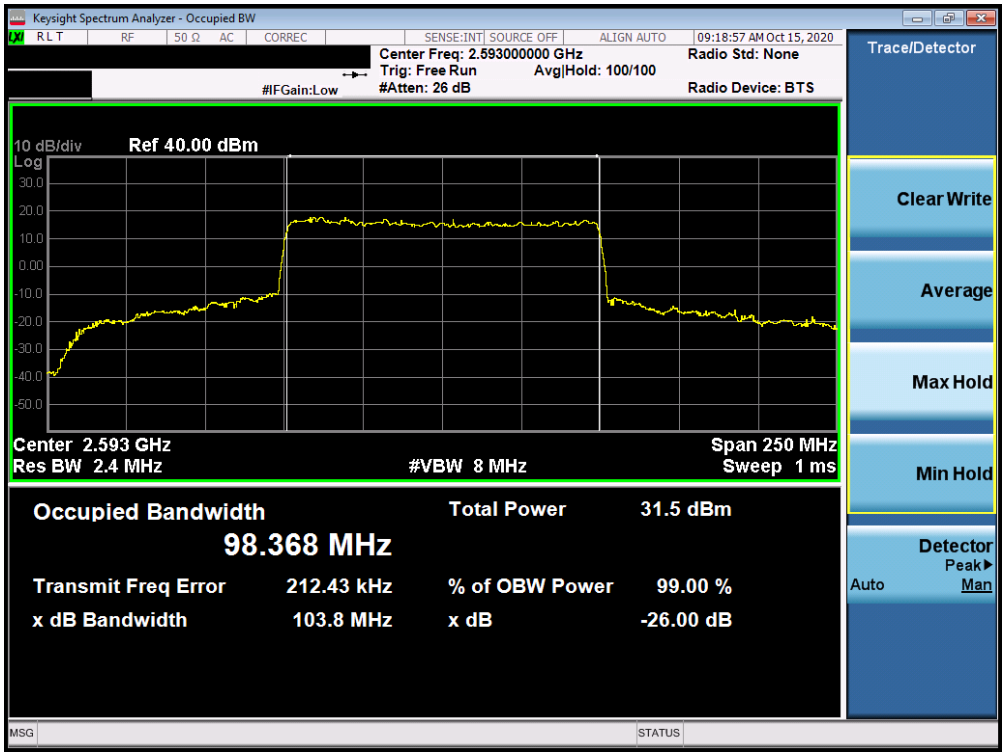
Plot 7-52. Occupied Bandwidth Plot (NR Band n41 - 100MHz CP-OFDM QPSK - Full RB)



Plot 7-53. Occupied Bandwidth Plot (NR Band n41 - 100MHz CP-OFDM 16-QAM - Full RB)

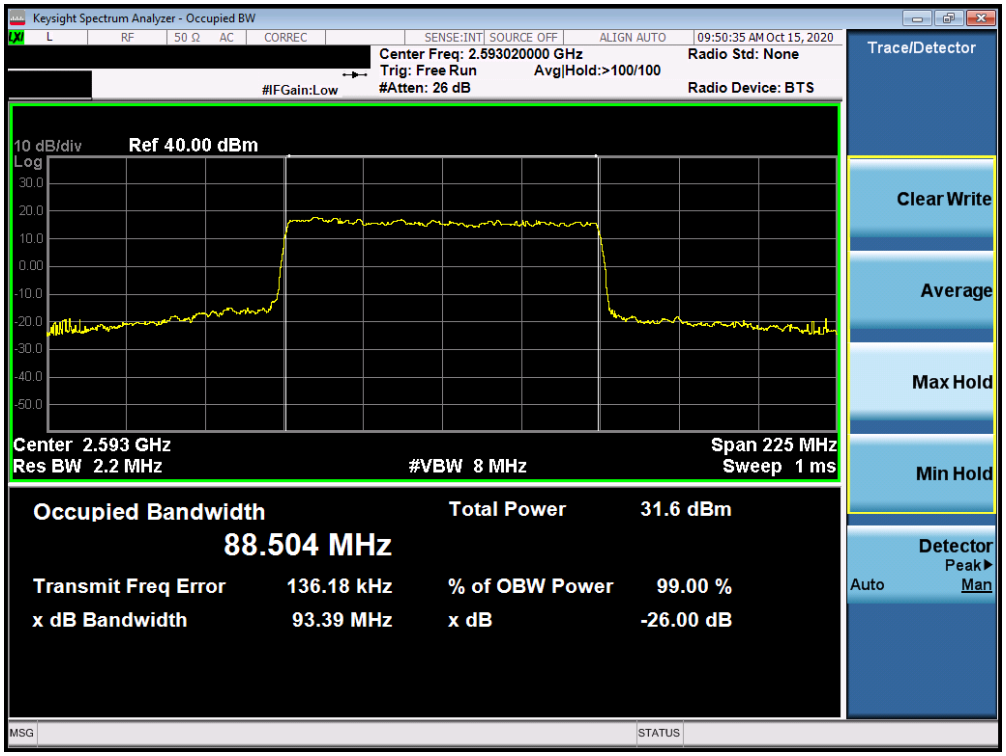


Plot 7-54. Occupied Bandwidth Plot (NR Band n41 - 100MHz CP-OFDM 64-QAM - Full RB)

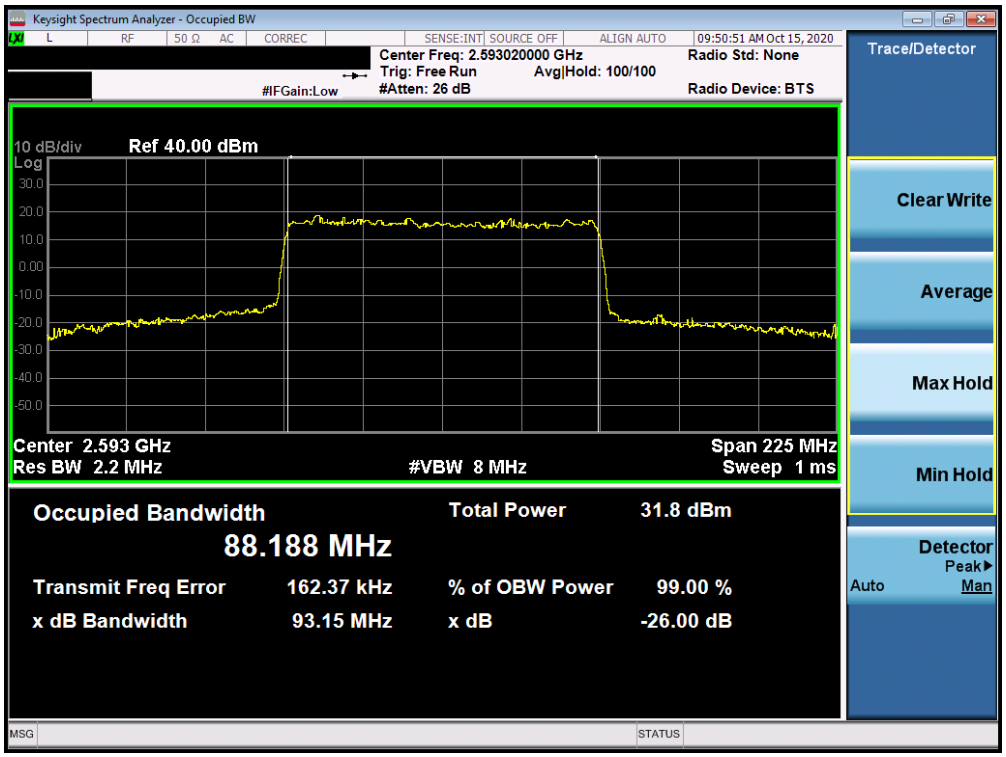


Plot 7-55. Occupied Bandwidth Plot (NR Band n41 - 100MHz CP-OFDM 256-QAM - Full RB)

Plot 7-56. Occupied Bandwidth Plot (NR Band n41 - 90MHz π/2 BPSK - Full RB)



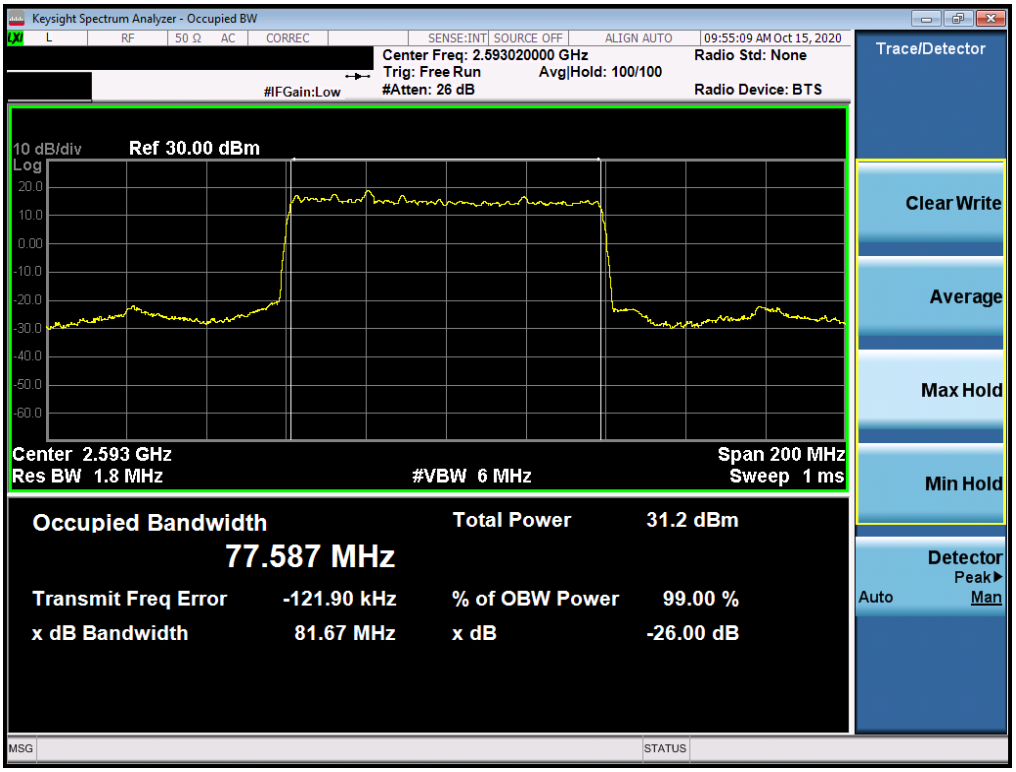
Plot 7-57. Occupied Bandwidth Plot (NR Band n41 - 90MHz CP-OFDM QPSK - Full RB)



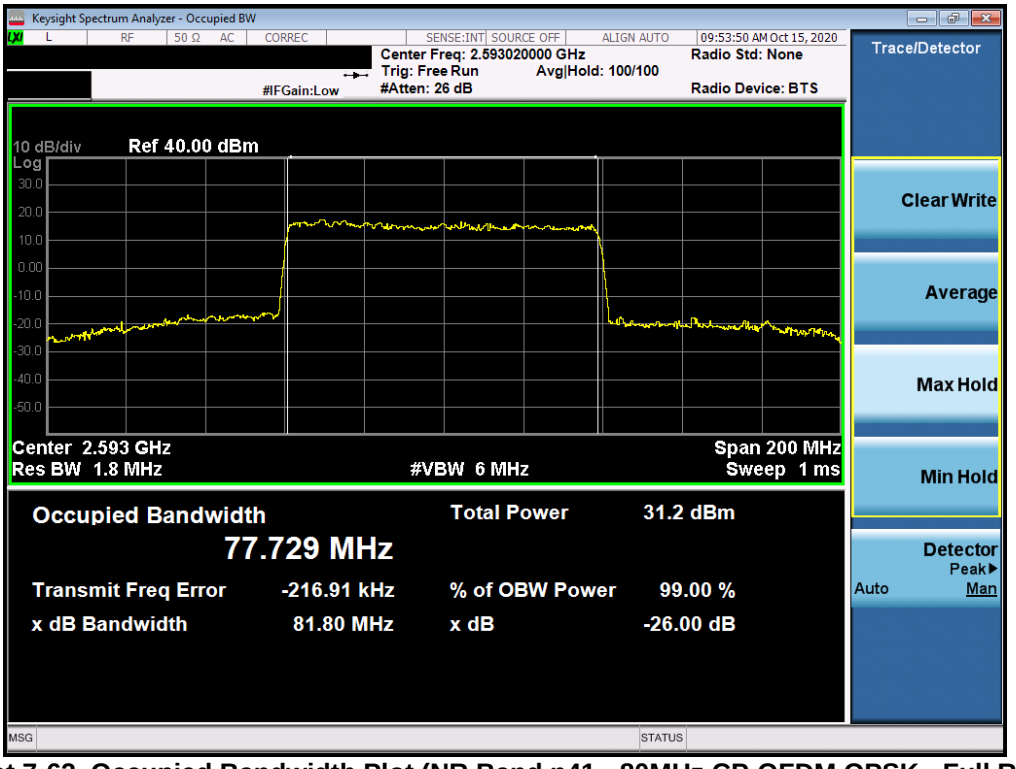
Plot 7-58. Occupied Bandwidth Plot (NR Band n41 - 90MHz CP-OFDM 16-QAM - Full RB)

Plot 7-59. Occupied Bandwidth Plot (NR Band n41 - 90MHz CP-OFDM 64-QAM - Full RB)

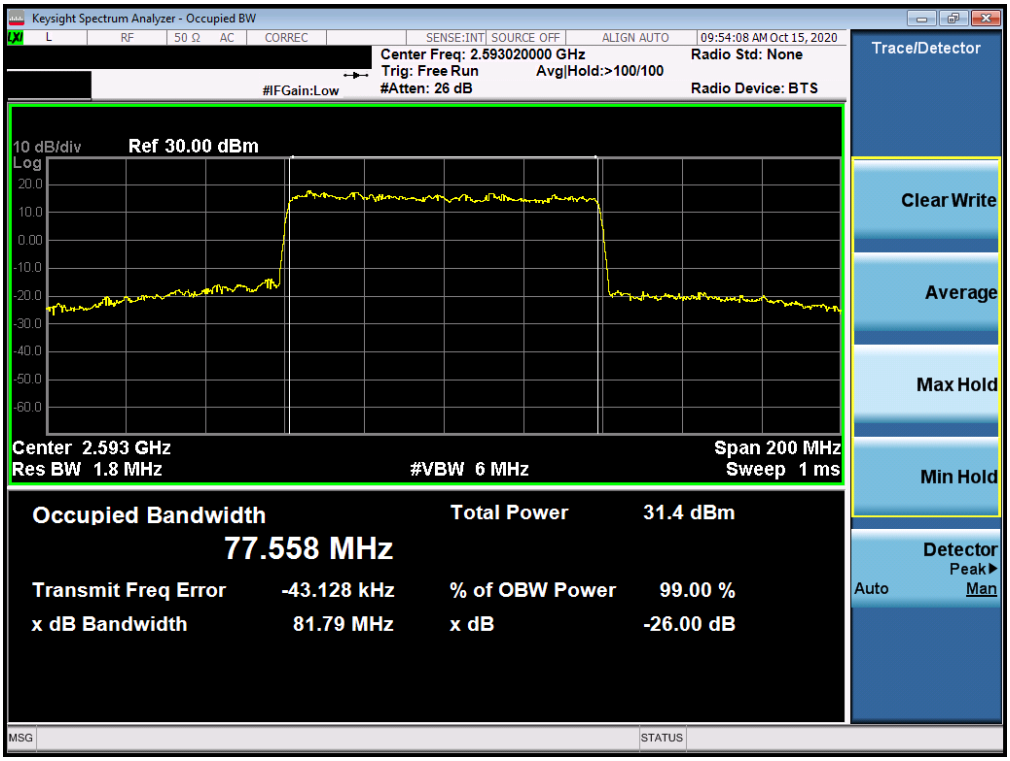
Plot 7-60. Occupied Bandwidth Plot (NR Band n41 - 90MHz CP-OFDM 256-QAM - Full RB)



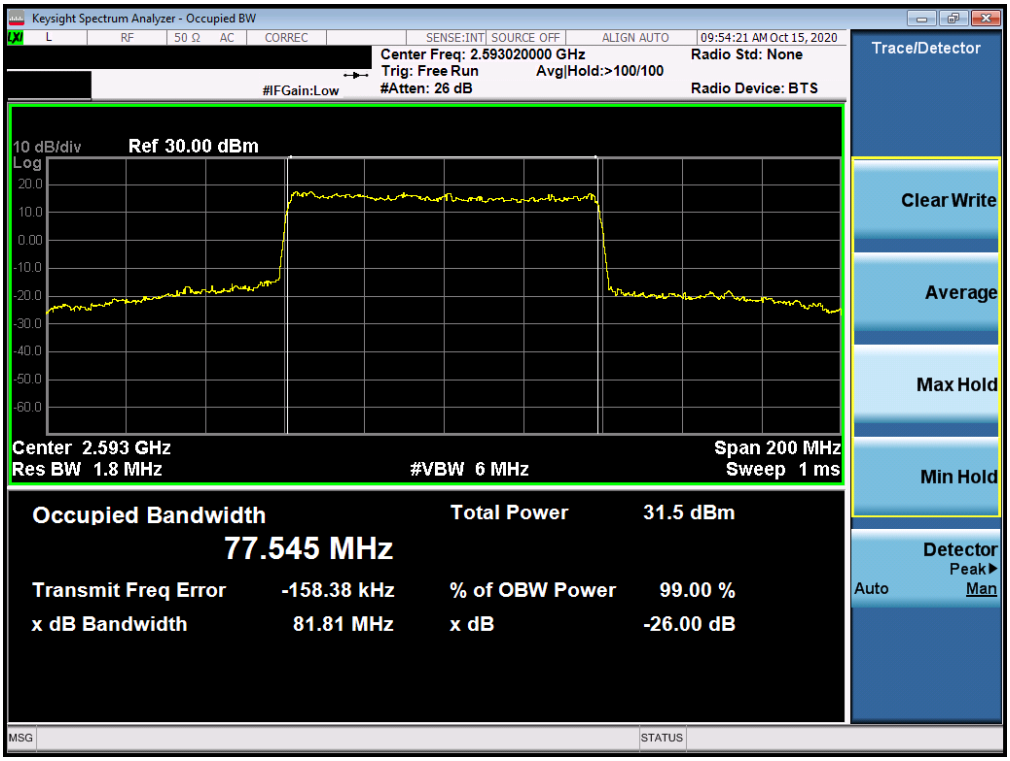
Plot 7-61. Occupied Bandwidth Plot (NR Band n41 - 80MHz π/2 BPSK - Full RB)



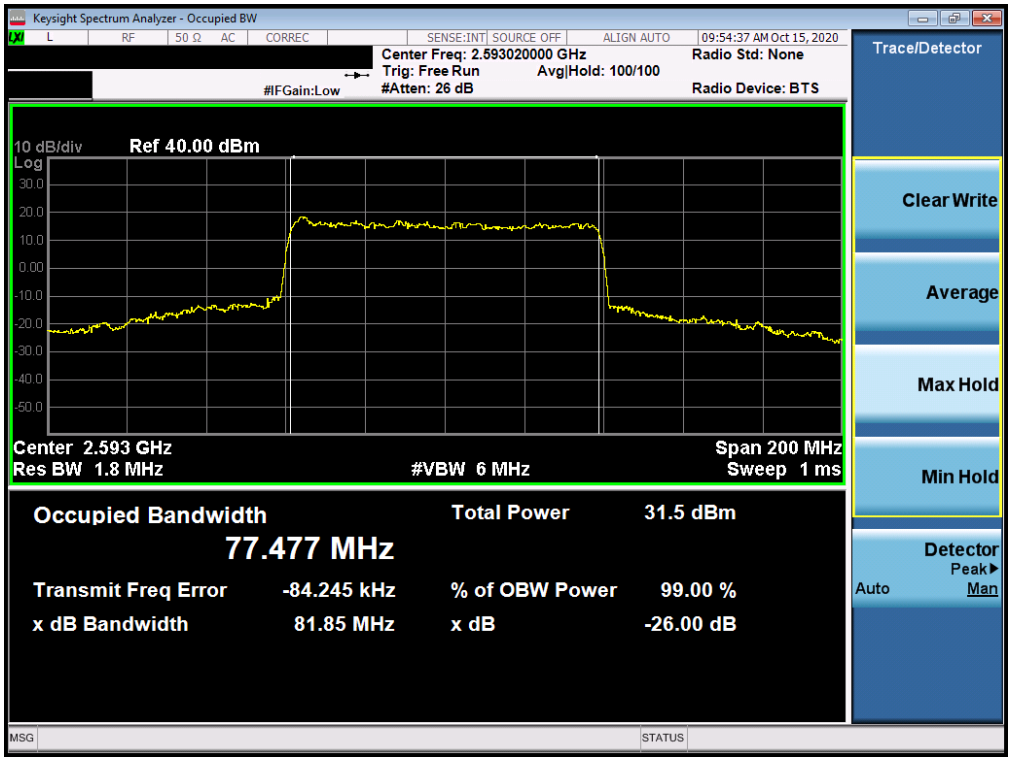
Plot 7-62. Occupied Bandwidth Plot (NR Band n41 - 80MHz CP-OFDM QPSK - Full RB)



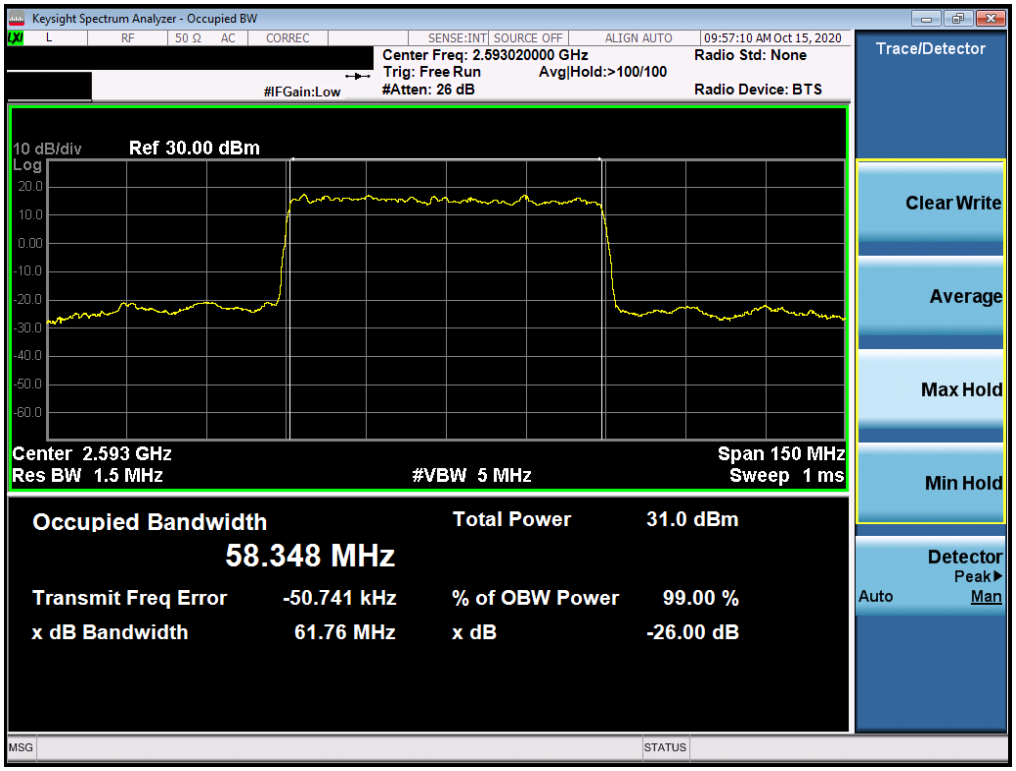
Plot 7-63. Occupied Bandwidth Plot (NR Band n41 - 80MHz CP-OFDM 16-QAM - Full RB)



Plot 7-64. Occupied Bandwidth Plot (NR Band n41 - 80MHz CP-OFDM 64-QAM - Full RB)

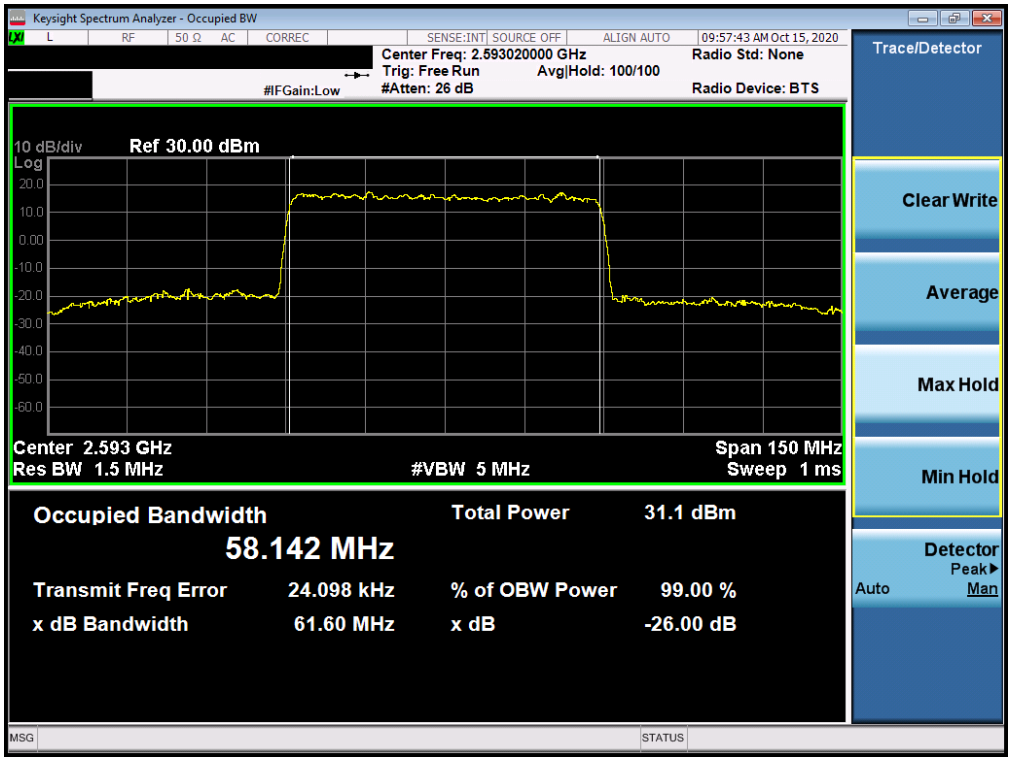


Plot 7-65. Occupied Bandwidth Plot (NR Band n41 - 80MHz CP-OFDM 256-QAM - Full RB)



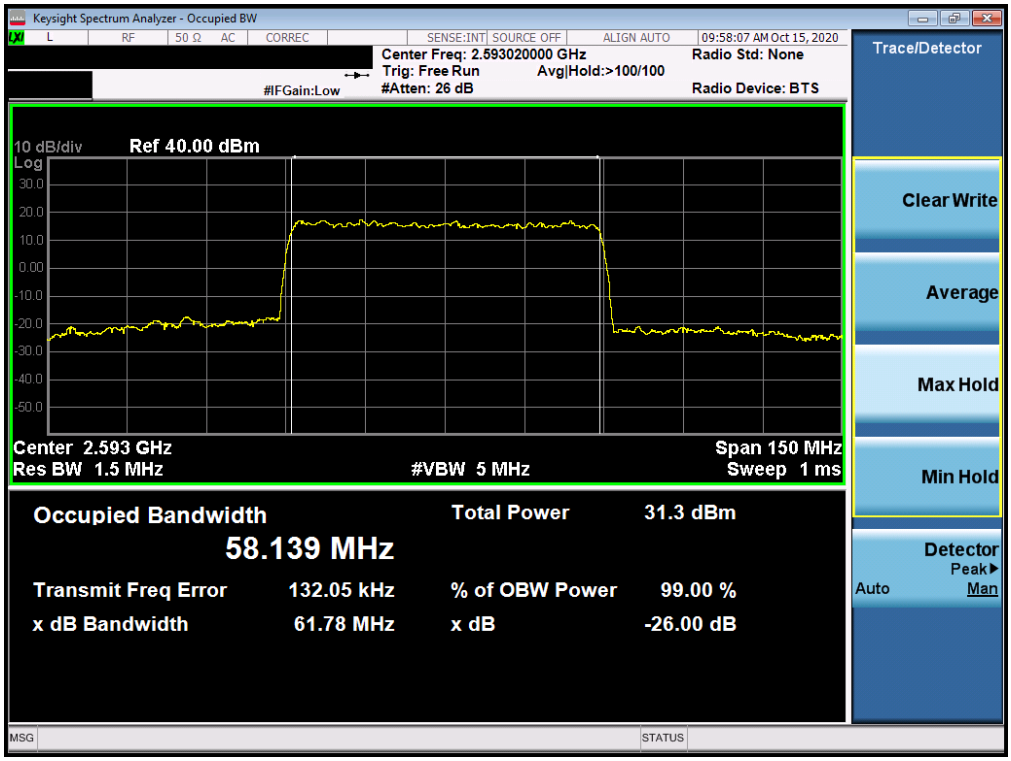
Plot 7-66. Occupied Bandwidth Plot (NR Band n41 - 60MHz π/2 BPSK - Full RB)

Plot 7-67. Occupied Bandwidth Plot (NR Band n41 - 60MHz DFT-s QPSK - Full RB)

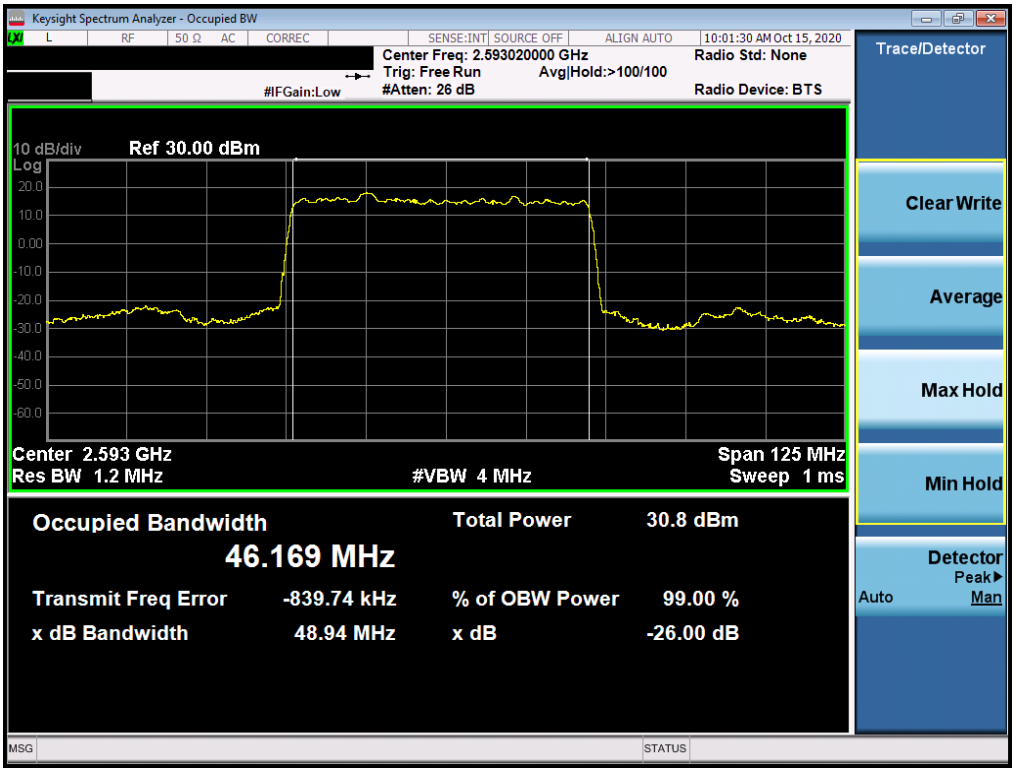


Plot 7-68. Occupied Bandwidth Plot (NR Band n41 - 60MHz DFT-s 16-QAM - Full RB)

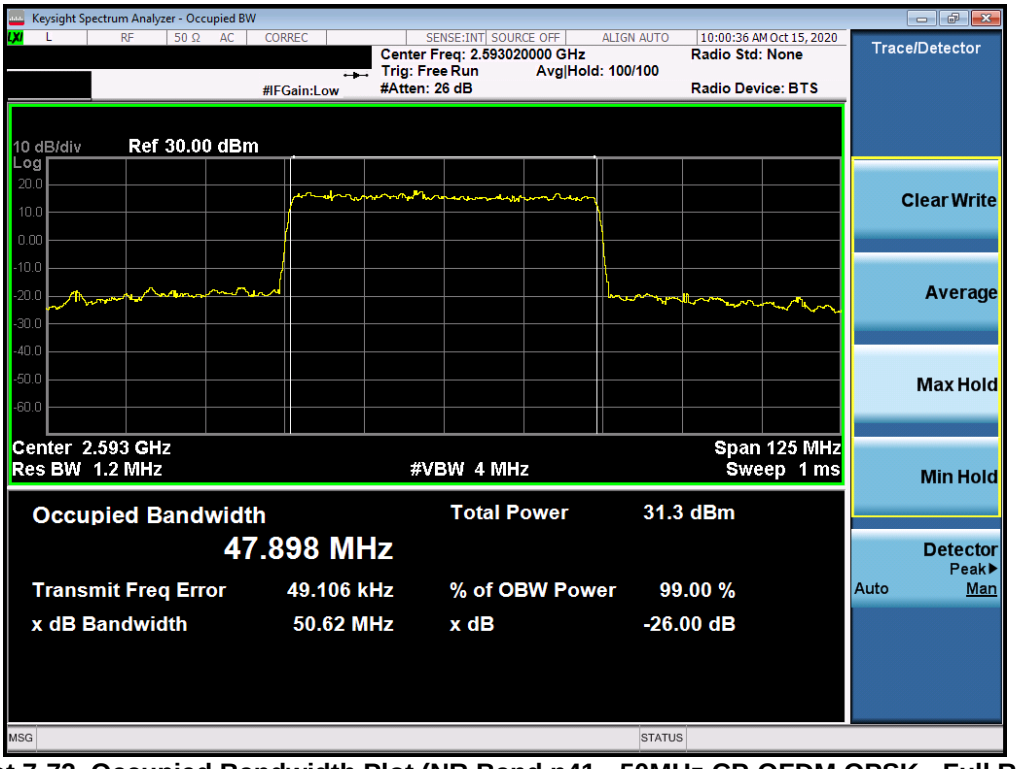
Plot 7-69. Occupied Bandwidth Plot (NR Band n41 - 60MHz DFT-s 64-QAM - Full RB)



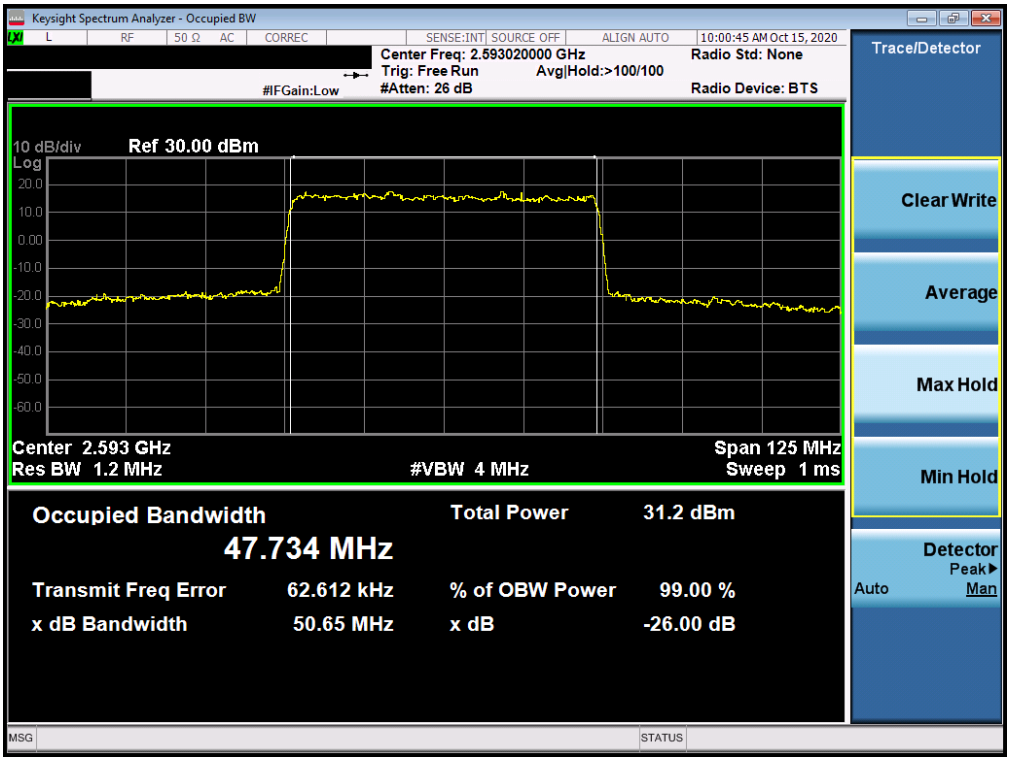
Plot 7-70. Occupied Bandwidth Plot (NR Band n41 - 60MHz DFT-s 256-QAM - Full RB)



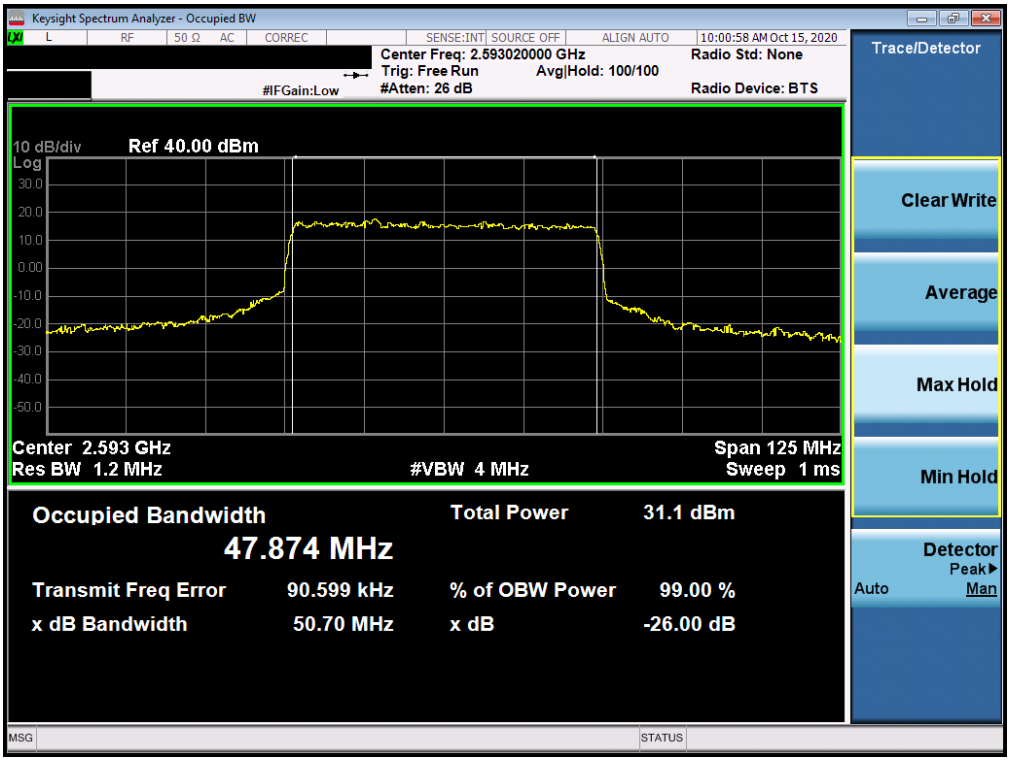
Plot 7-71. Occupied Bandwidth Plot (NR Band n41 - 50MHz π/2 BPSK - Full RB)



Plot 7-72. Occupied Bandwidth Plot (NR Band n41 - 50MHz CP-OFDM QPSK - Full RB)

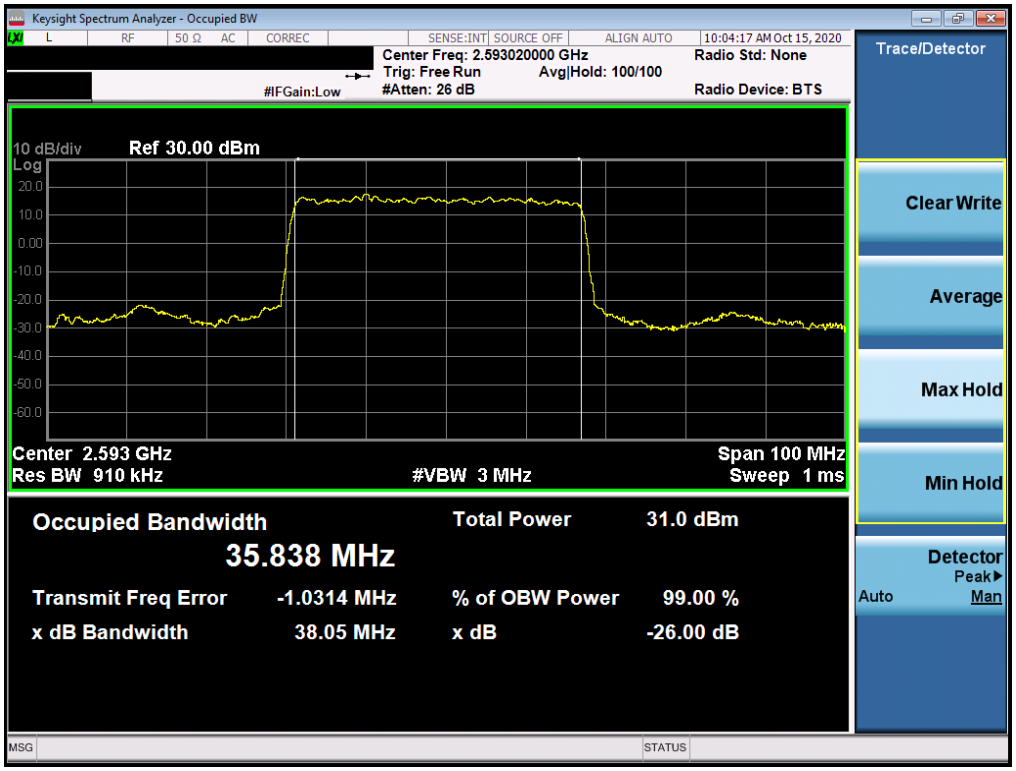


Plot 7-73. Occupied Bandwidth Plot (NR Band n41 - 50MHz CP-OFDM 16-QAM - Full RB)

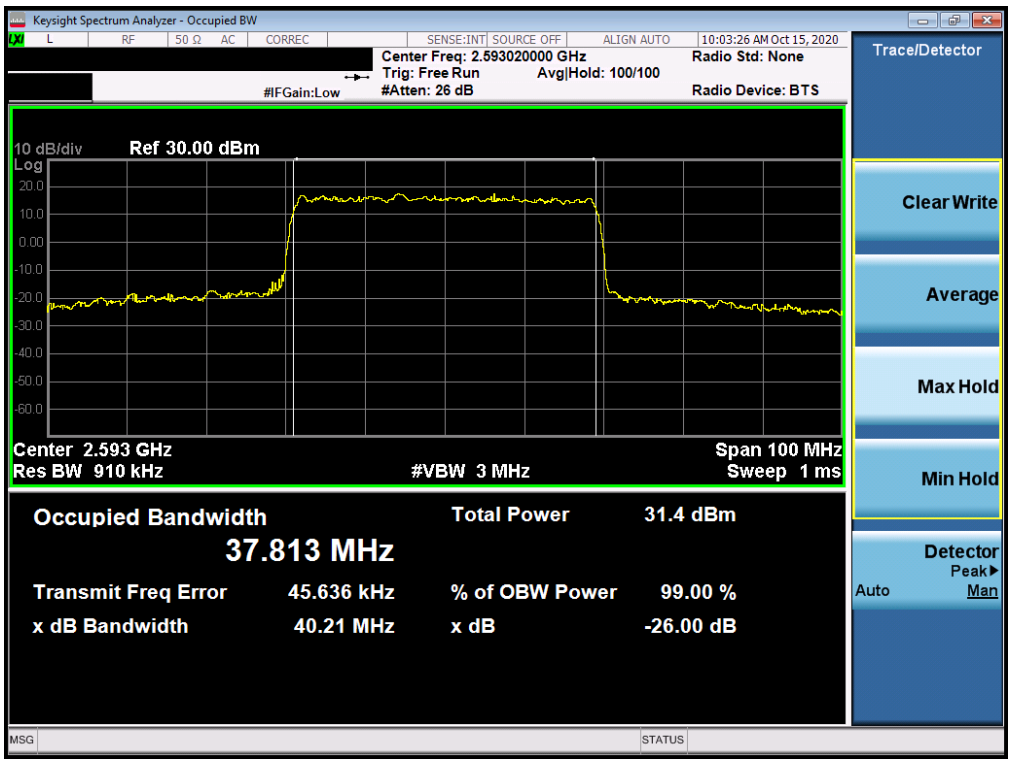


Plot 7-74. Occupied Bandwidth Plot (NR Band n41 - 50MHz CP-OFDM 64-QAM - Full RB)

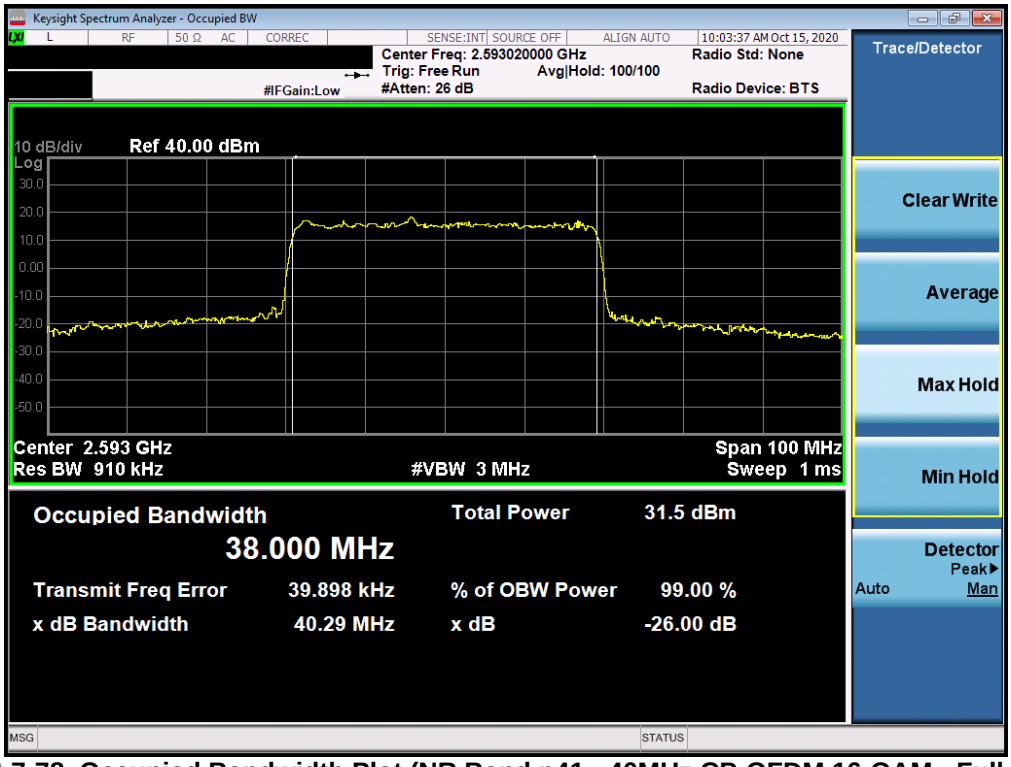
Plot 7-75. Occupied Bandwidth Plot (NR Band n41 - 50MHz CP-OFDM 256-QAM - Full RB)



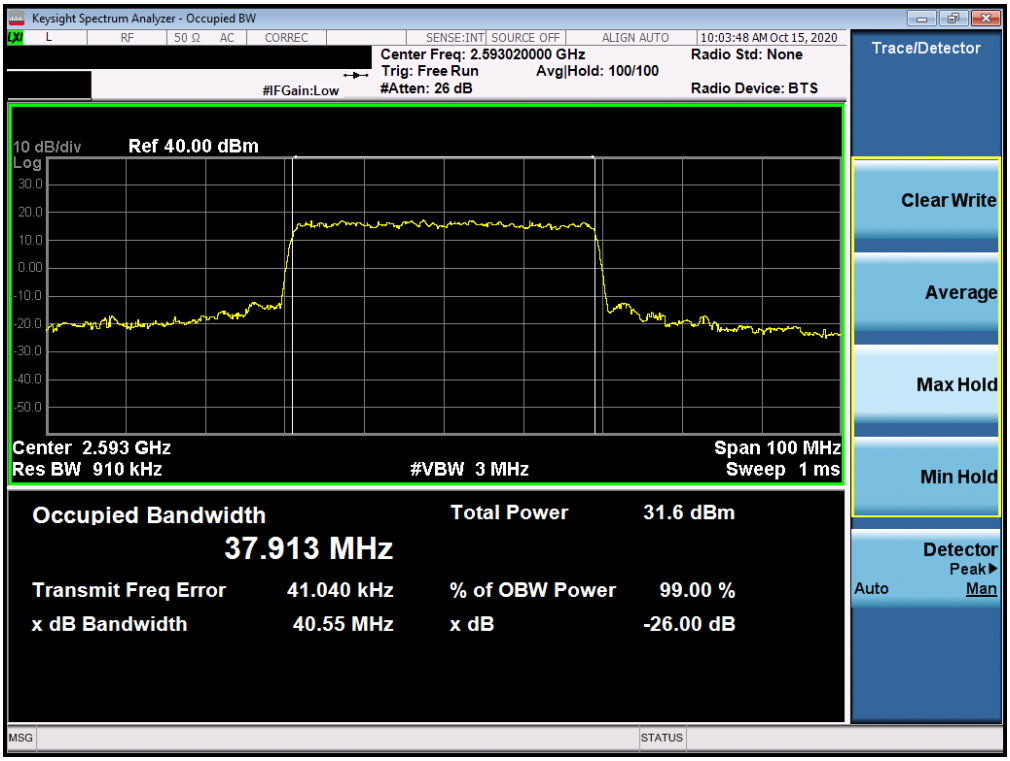
Plot 7-76. Occupied Bandwidth Plot (NR Band n41 - 40MHz π/2 BPSK - Full RB)



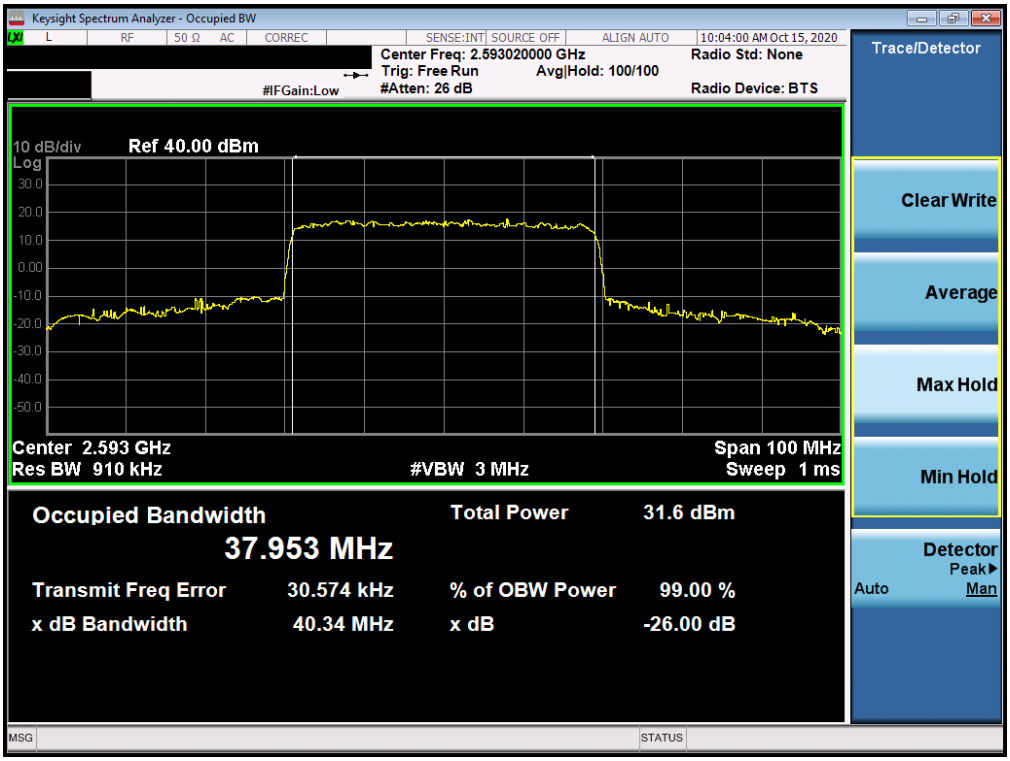
Plot 7-77. Occupied Bandwidth Plot (NR Band n41 - 40MHz CP-OFDM QPSK - Full RB)



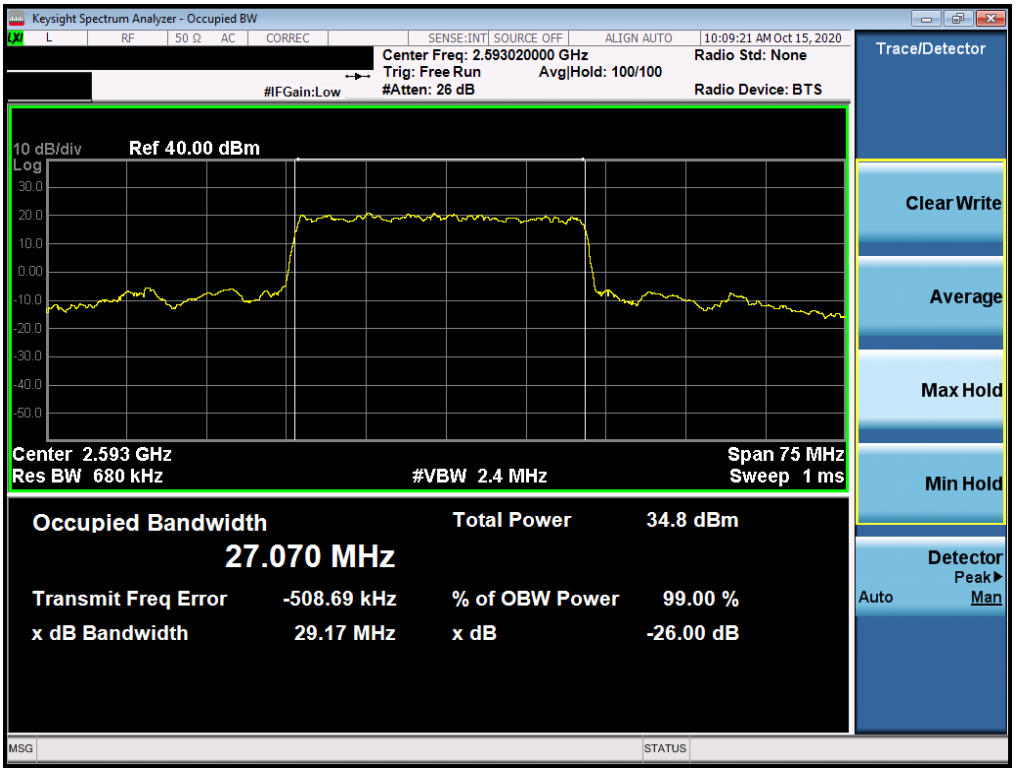
Plot 7-78. Occupied Bandwidth Plot (NR Band n41 - 40MHz CP-OFDM 16-QAM - Full RB)



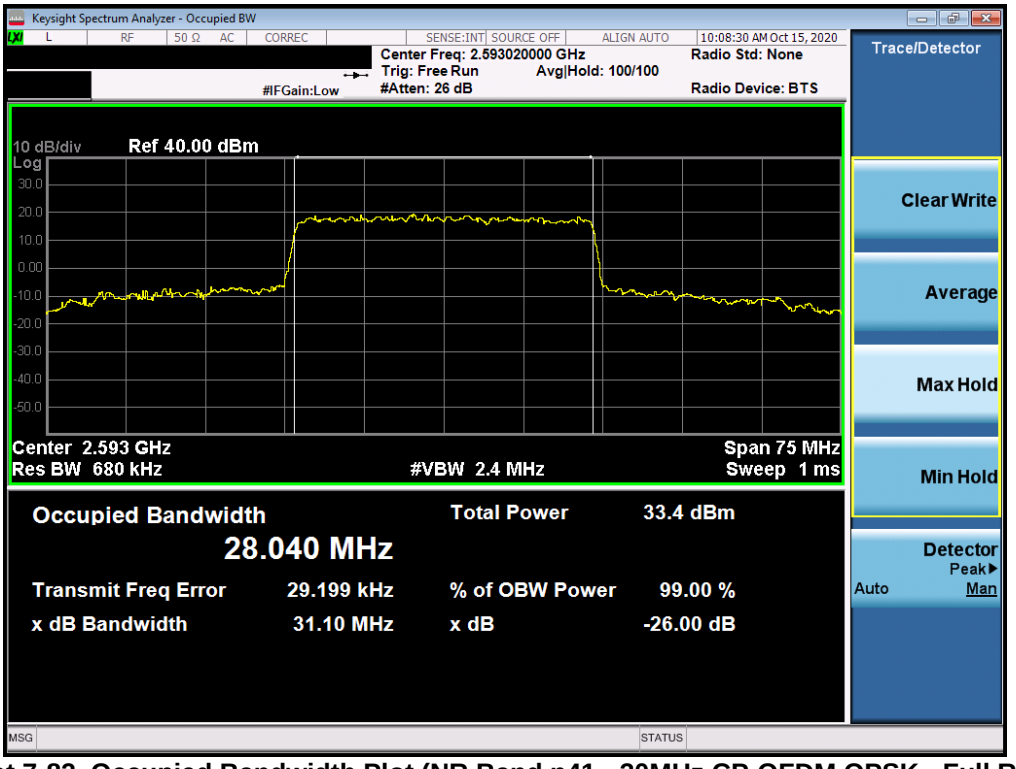
Plot 7-79. Occupied Bandwidth Plot (NR Band n41 - 40MHz CP-OFDM 64-QAM - Full RB)



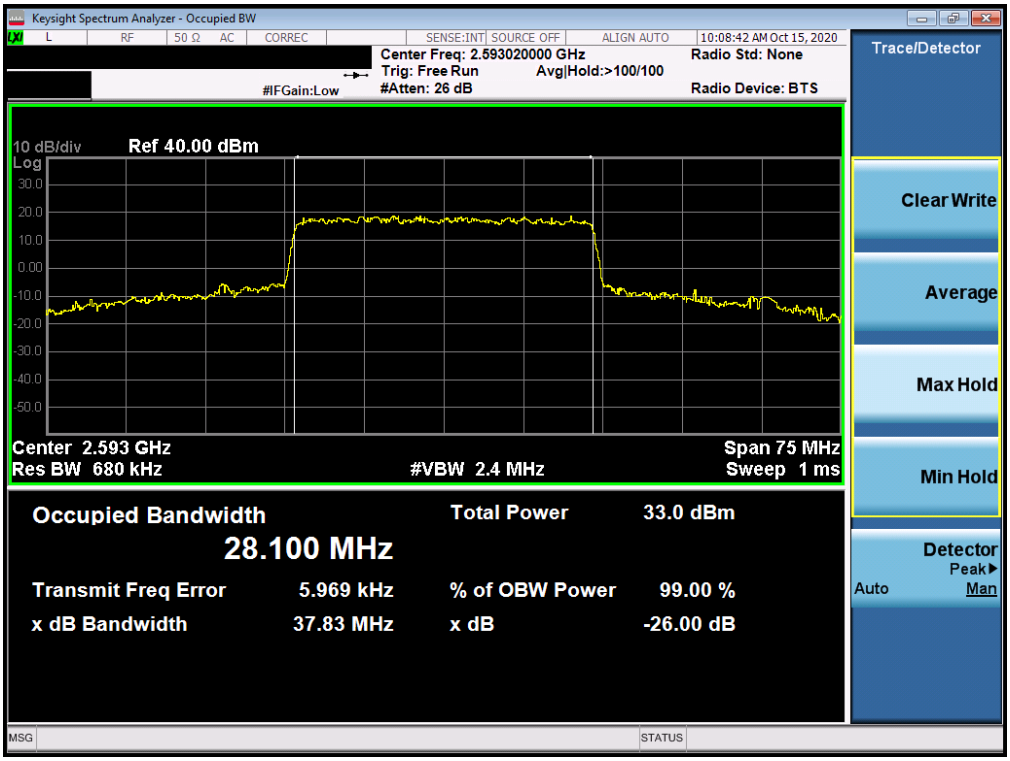
Plot 7-80. Occupied Bandwidth Plot (NR Band n41 - 40MHz CP-OFDM 256-QAM - Full RB)



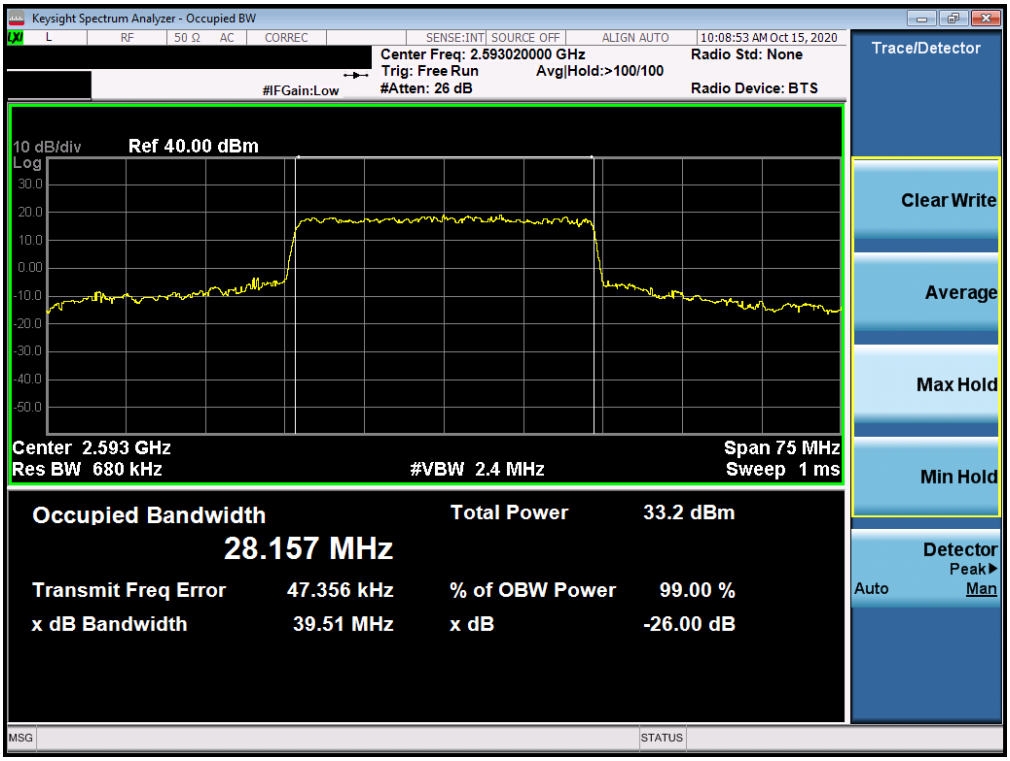
Plot 7-81. Occupied Bandwidth Plot (NR Band n41 - 30MHz π/2 BPSK - Full RB)



Plot 7-82. Occupied Bandwidth Plot (NR Band n41 - 30MHz CP-OFDM QPSK - Full RB)

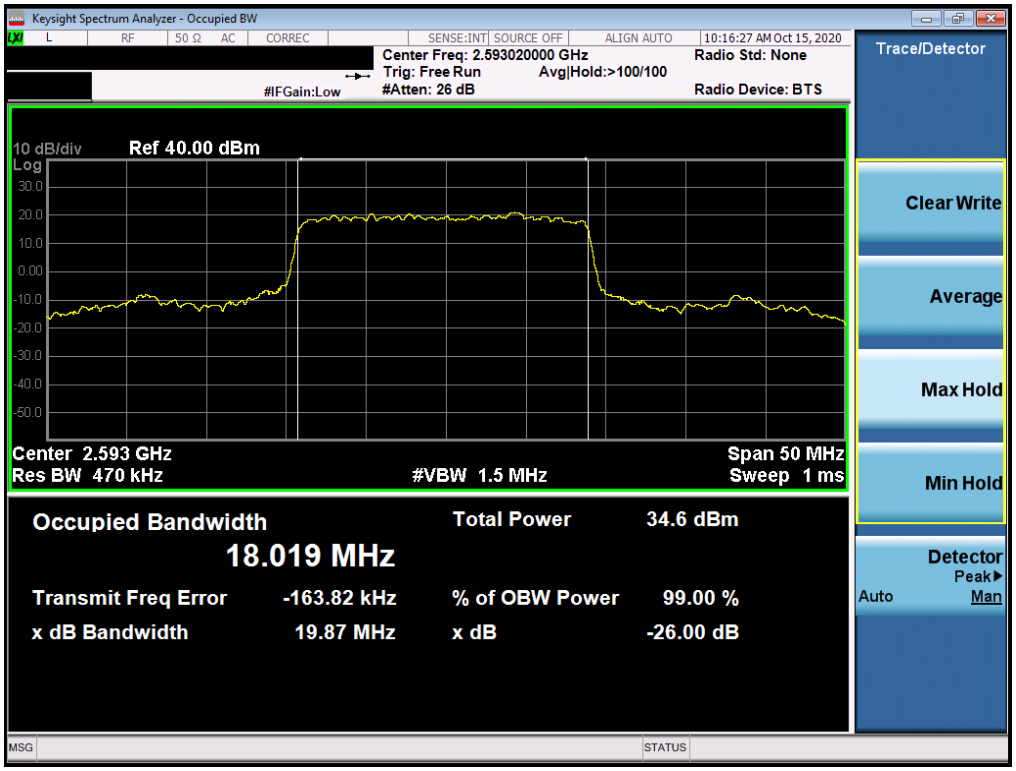


Plot 7-83. Occupied Bandwidth Plot (NR Band n41 - 30MHz CP-OFDM 16-QAM - Full RB)



Plot 7-84. Occupied Bandwidth Plot (NR Band n41 - 30MHz CP-OFDM 64-QAM - Full RB)

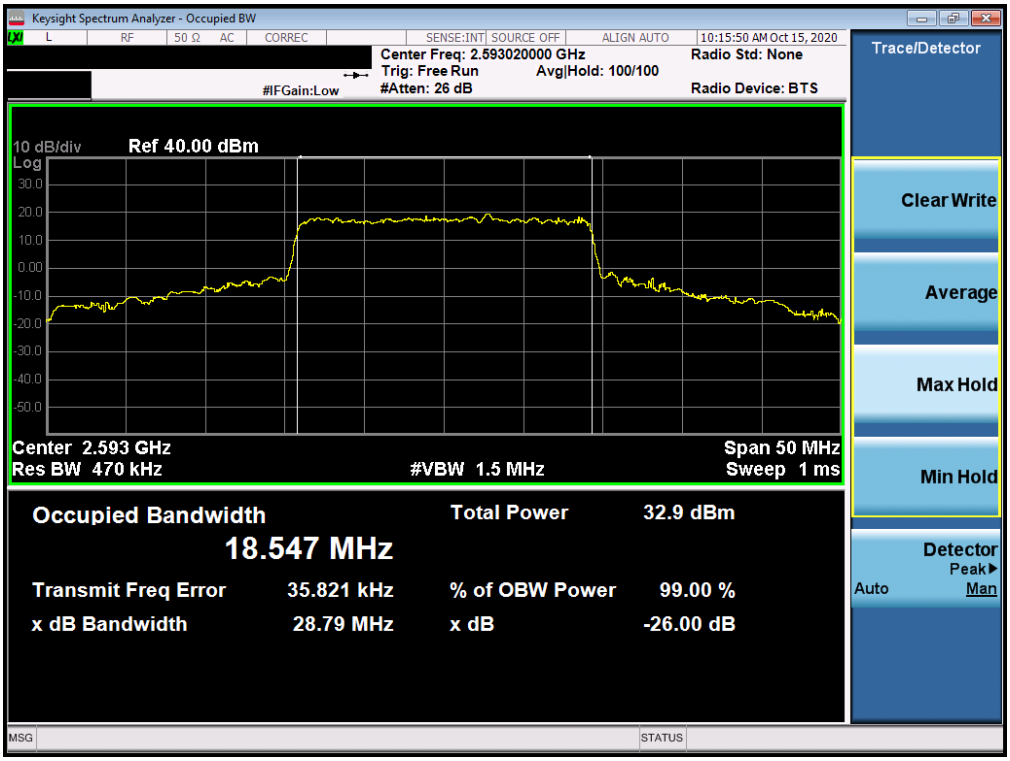
Plot 7-85. Occupied Bandwidth Plot (NR Band n41 - 30MHz CP-OFDM 256-QAM - Full RB)



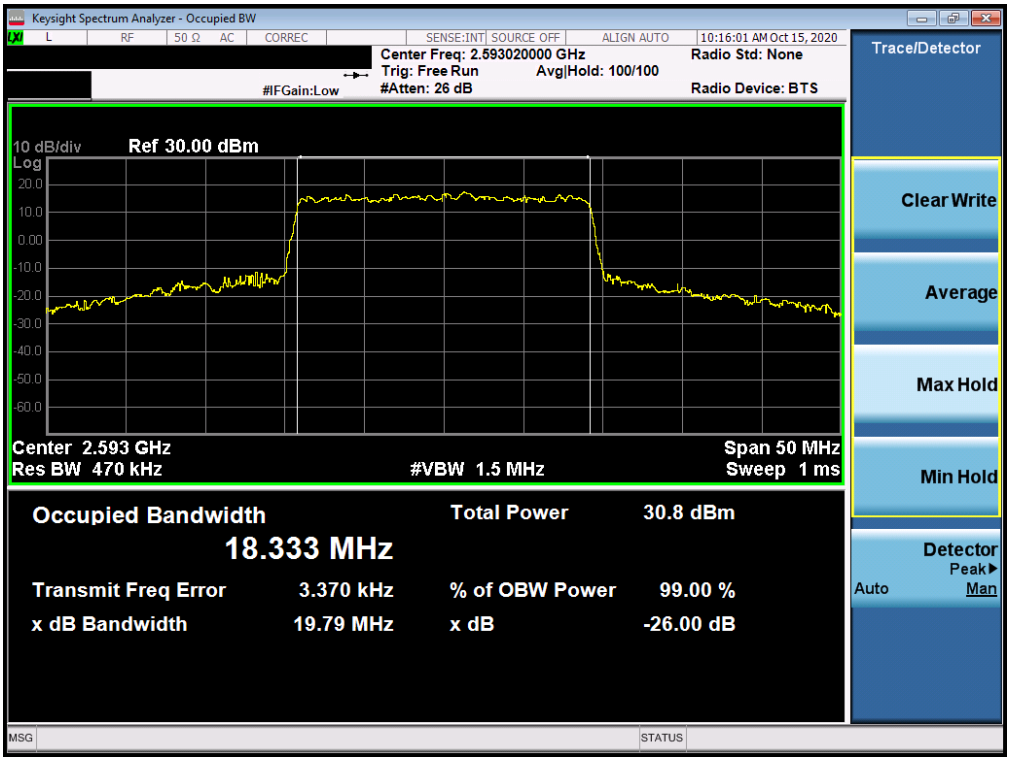
Plot 7-86. Occupied Bandwidth Plot (NR Band n41 - 20MHz π/2 BPSK - Full RB)

Plot 7-87. Occupied Bandwidth Plot (NR Band n41 - 20MHz CP-OFDM QPSK - Full RB)

Plot 7-88. Occupied Bandwidth Plot (NR Band n41 - 20MHz CP-OFDM 16-QAM - Full RB)



Plot 7-89. Occupied Bandwidth Plot (NR Band n41 - 20MHz CP-OFDM 64-QAM - Full RB)



Plot 7-90. Occupied Bandwidth Plot (NR Band n41 - 20MHz CP-OFDM 256-QAM - Full RB)

NR Band n41 – ANT B

Plot 7-91. Occupied Bandwidth Plot (NR Band n41 - 100MHz π/2 BPSK - Full RB)

Plot 7-92. Occupied Bandwidth Plot (NR Band n41 - 100MHz CP-OFDM QPSK - Full RB)

Plot 7-93. Occupied Bandwidth Plot (NR Band n41 - 100MHz CP-OFDM 16-QAM - Full RB)

Plot 7-94. Occupied Bandwidth Plot (NR Band n41 - 100MHz CP-OFDM 64-QAM - Full RB)

Plot 7-95. Occupied Bandwidth Plot (NR Band n41 - 100MHz CP-OFDM 256-QAM - Full RB)

Plot 7-96. Occupied Bandwidth Plot (NR Band n41 - 90MHz π/2 BPSK - Full RB)

Plot 7-97. Occupied Bandwidth Plot (NR Band n41 - 90MHz CP-OFDM QPSK - Full RB)

Plot 7-98. Occupied Bandwidth Plot (NR Band n41 - 90MHz CP-OFDM 16-QAM - Full RB)

Plot 7-99. Occupied Bandwidth Plot (NR Band n41 - 90MHz CP-OFDM 64-QAM - Full RB)

Plot 7-100. Occupied Bandwidth Plot (NR Band n41 - 90MHz CP-OFDM 256-QAM - Full RB)

Plot 7-101. Occupied Bandwidth Plot (NR Band n41 - 80MHz π/2 BPSK - Full RB)

Plot 7-102. Occupied Bandwidth Plot (NR Band n41 - 80MHz CP-OFDM QPSK - Full RB)

Plot 7-103. Occupied Bandwidth Plot (NR Band n41 - 80MHz CP-OFDM 16-QAM - Full RB)

Plot 7-104. Occupied Bandwidth Plot (NR Band n41 - 80MHz CP-OFDM 64-QAM - Full RB)

Plot 7-105. Occupied Bandwidth Plot (NR Band n41 - 80MHz CP-OFDM 256-QAM - Full RB)

Plot 7-106. Occupied Bandwidth Plot (NR Band n41 - 60MHz π/2 BPSK - Full RB)