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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:
09/09/2021 - 11/10/2021
Test Report Issue Date:
12/2/2021
Test Site/Location:
PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
1M2109090103-04-R1.A3L

FCC ID:	**A3LSMS906U**
APPLICANT:	**Samsung Electronics Co., Ltd.**

Application Type:	Certification
Model:	SM-S906U
Additional Model(s):	SM-S906U1
EUT Type:	Portable Handset
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part:	27
Test Procedure(s):	ANSI C63.26-2015, ANSI/TIA-603-E-2016, KDB 971168 D01 v03r01, KDB 648474 D03 v01r04

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

Note: This revised Test Report (S/N: 1M2109090103-04-R1.A3L) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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

Randy Ortanez
President

ACCREDITED
CERT #2041.01

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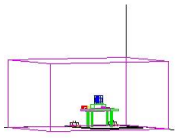
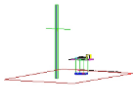


MEASUREMENT REPORT
FCC Part 27



Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	ERP		EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]	
LTE Band 71	20 MHz	QPSK	673.0 - 688.0	0.060	17.78	0.098	19.93	18M0G7D
		16QAM	673.0 - 688.0	0.050	17.01	0.082	19.16	17M9W7D
	15 MHz	QPSK	670.5 - 690.5	0.061	17.87	0.100	20.02	13M5G7D
		16QAM	670.5 - 690.5	0.049	16.89	0.080	19.04	9M00W7D
	10 MHz	QPSK	668.0 - 693.0	0.063	17.98	0.103	20.13	9M04G7D
		16QAM	668.0 - 693.0	0.050	16.95	0.081	19.10	9M00W7D
	5 MHz	QPSK	665.5 - 695.5	0.065	18.13	0.107	20.28	4M54G7D
		16QAM	665.5 - 695.5	0.052	17.12	0.085	19.27	4M53W7D
LTE Band 12	10 MHz	QPSK	704.0 - 711.0	0.068	18.35	0.112	20.50	9M01G7D
		16QAM	704.0 - 711.0	0.057	17.56	0.093	19.71	9M02W7D
	5 MHz	QPSK	701.5 - 713.5	0.070	18.47	0.115	20.62	4M56G7D
		16QAM	701.5 - 713.5	0.060	17.78	0.098	19.93	4M54W7D
	3 MHz	QPSK	700.5 - 714.5	0.068	18.30	0.111	20.45	2M72G7D
		16QAM	700.5 - 714.5	0.059	17.72	0.097	19.87	2M72W7D
	1.4 MHz	QPSK	699.7 - 715.3	0.067	18.28	0.110	20.43	1M10G7D
		16QAM	699.7 - 715.3	0.060	17.75	0.098	19.90	1M10W7D
LTE Band 13	10 MHz	QPSK	782.0	0.097	19.85	0.159	22.00	9M04G7D
		16QAM	782.0	0.081	19.08	0.133	21.23	9M02W7D
	5 MHz	QPSK	779.5 - 784.5	0.098	19.93	0.161	22.08	4M54G7D
		16QAM	779.5 - 784.5	0.081	19.08	0.133	21.23	4M54W7D
NR Band n71	20 MHz	π/2 BPSK	673.0 - 688.0	0.051	17.10	0.084	19.25	17M9G7D
		QPSK	673.0 - 688.0	0.052	17.14	0.085	19.29	18M9G7D
		16QAM	673.0 - 688.0	0.043	16.30	0.070	18.45	19M0W7D
	15 MHz	π/2 BPSK	670.5 - 690.5	0.052	17.12	0.085	19.27	13M4G7D
		QPSK	670.5 - 690.5	0.055	17.43	0.091	19.58	14M1G7D
		16QAM	670.5 - 690.5	0.039	15.91	0.064	18.06	14M2W7D
	10 MHz	π/2 BPSK	668.0 - 693.0	0.051	17.04	0.083	19.19	9M04G7D
		QPSK	668.0 - 693.0	0.055	17.43	0.091	19.58	9M37G7D
		16QAM	668.0 - 693.0	0.039	15.96	0.065	18.11	9M32W7D
	5 MHz	π/2 BPSK	665.5 - 695.5	0.056	17.45	0.091	19.60	4M50G7D
		QPSK	665.5 - 695.5	0.053	17.25	0.087	19.40	4M51G7D
		16QAM	665.5 - 695.5	0.039	15.88	0.063	18.03	4M51W7D
NR Band n12	15 MHz	π/2 BPSK	706.5 - 708.5	0.070	18.43	0.114	20.58	13M5G7D
		QPSK	706.5 - 708.5	0.068	18.33	0.112	20.48	14M1G7D
		16QAM	706.5 - 708.5	0.057	17.58	0.094	19.73	14M2W7D
	10 MHz	π/2 BPSK	704.0 - 711.0	0.071	18.54	0.117	20.69	9M00G7D
		QPSK	704.0 - 711.0	0.068	18.33	0.112	20.48	9M35G7D
		16QAM	704.0 - 711.0	0.063	17.97	0.103	20.12	9M34W7D
	5 MHz	π/2 BPSK	701.5 - 713.5	0.071	18.49	0.116	20.64	4M50G7D
		QPSK	701.5 - 713.5	0.070	18.44	0.115	20.59	4M51G7D
		16QAM	701.5 - 713.5	0.066	18.18	0.108	20.33	4M52W7D

Overview Table (<1GHz Bands)

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
WCDMA1700	N/A	Spread Spectrum	1712.4 - 1752.6	0.321	25.06	4M15F9W
LTE Band 66/4	20 MHz	QPSK	1720.0 - 1770.0	0.348	25.42	18M0G7D
		16QAM	1720.0 - 1770.0	0.305	24.84	18M0W7D
	15 MHz	QPSK	1717.5 - 1772.5	0.349	25.43	13M5G7D
		16QAM	1717.5 - 1772.5	0.273	24.36	13M5W7D
	10 MHz	QPSK	1715.0 - 1775.0	0.351	25.45	8M99G7D
		16QAM	1715.0 - 1775.0	0.271	24.34	9M03W7D
	5 MHz	QPSK	1712.5 - 1777.5	0.362	25.59	4M53G7D
		16QAM	1712.5 - 1777.5	0.289	24.60	4M50W7D
	3 MHz	QPSK	1711.5 - 1778.5	0.356	25.51	2M72G7D
		16QAM	1711.5 - 1778.5	0.294	24.68	2M72W7D
	1.4 MHz	QPSK	1710.7 - 1779.3	0.355	25.50	1M10G7D
		16QAM	1710.7 - 1779.3	0.275	24.39	1M10W7D
NR Band n66 Ant A	40 MHz	π/2 BPSK	1730.0 - 1760.0	0.265	24.24	38M8G7D
		QPSK	1730.0 - 1760.0	0.262	24.19	38M7G7D
		16QAM	1730.0 - 1760.0	0.222	23.47	38M9W7D
	30 MHz	π/2 BPSK	1725.0 - 1765.0	0.268	24.29	28M7G7D
		QPSK	1725.0 - 1765.0	0.261	24.16	28M8G7D
		16QAM	1725.0 - 1765.0	0.229	23.60	28M7W7D
	20 MHz	π/2 BPSK	1720.0 - 1770.0	0.269	24.30	18M0G7D
		QPSK	1720.0 - 1770.0	0.268	24.28	19M1G7D
		16QAM	1720.0 - 1770.0	0.226	23.54	19M0W7D
	15 MHz	π/2 BPSK	1717.5 - 1772.5	0.269	24.30	13M6G7D
		QPSK	1717.5 - 1772.5	0.268	24.29	14M2G7D
		16QAM	1717.5 - 1772.5	0.228	23.58	14M1W7D
	10 MHz	π/2 BPSK	1715.0 - 1775.0	0.267	24.27	9M03G7D
		QPSK	1715.0 - 1775.0	0.261	24.17	9M37G7D
		16QAM	1715.0 - 1775.0	0.247	23.92	9M37W7D
	5 MHz	π/2 BPSK	1712.5 - 1777.5	0.269	24.29	4M54G7D
		QPSK	1712.5 - 1777.5	0.269	24.30	4M51G7D
		16QAM	1712.5 - 1777.5	0.252	24.01	4M51W7D

Overview Table (>1GHz Bands)

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n66 Ant I	40 MHz	π/2 BPSK	1730.0 - 1760.0	0.169	22.27	38M9G7D
		QPSK	1730.0 - 1760.0	0.167	22.21	38M8G7D
		16QAM	1730.0 - 1760.0	0.129	21.10	38M9W7D
	30 MHz	π/2 BPSK	1725.0 - 1765.0	0.168	22.26	28M7G7D
		QPSK	1725.0 - 1765.0	0.170	22.30	28M7G7D
		16QAM	1725.0 - 1765.0	0.121	20.81	28M8W7D
	20 MHz	π/2 BPSK	1720.0 - 1770.0	0.169	22.28	17M9G7D
		QPSK	1720.0 - 1770.0	0.164	22.16	18M0G7D
		16QAM	1720.0 - 1770.0	0.112	20.50	18M0W7D
	15 MHz	π/2 BPSK	1717.5 - 1772.5	0.166	22.19	13M5G7D
		QPSK	1717.5 - 1772.5	0.169	22.27	13M5G7D
		16QAM	1717.5 - 1772.5	0.121	20.83	13M5W7D
	10 MHz	π/2 BPSK	1715.0 - 1775.0	0.165	22.17	8M99G7D
		QPSK	1715.0 - 1775.0	0.161	22.06	9M00G7D
		16QAM	1715.0 - 1775.0	0.111	20.46	8M97W7D
	5 MHz	π/2 BPSK	1712.5 - 1777.5	0.168	22.25	4M51G7D
		QPSK	1712.5 - 1777.5	0.167	22.22	4M50G7D
		16QAM	1712.5 - 1777.5	0.124	20.92	4M51W7D

Overview Table (>1GHz Bands)

1.0 INTRODUCTION

1.1 Scope

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

1.2 PCTEST Test Location

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

1.3 Test Facility / Accreditations

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

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

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

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

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMS906U**. The test data contained in this report pertains only to the emissions due to the EUT's licensed transmitters that operate under the provisions of Part 27.

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

2.2 Device Capabilities

This device contains the following capabilities:

850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 5G NR (FR1 and FR2), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5,6GHz), Bluetooth (1x, EDR, LE), NFC, UWB, Wireless Power Transfer

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

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

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

2.3 Test Configuration

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

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

2.4 EMI Suppression Device(s)/Modifications

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

3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

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

3.2 Radiated Power and Radiated Spurious Emissions

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

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

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

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

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

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

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). Measurement antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	AP2	EMC Cable and Switch System	3/4/2021	Annual	3/4/2022	AP2
-	AP1	EMC Cable and Switch System	3/9/2021	Annual	3/9/2022	AP1
-	ETS	EMC Cable and Switch System	3/4/2021	Annual	3/4/2022	ETS
-	LTx1	Licensed Transmitter Cable Set	3/12/2021	Annual	3/12/2022	LTx1
-	LTx2	Licensed Transmitter Cable Set	3/12/2021	Annual	3/12/2022	LTx2
Agilent	N9030A	50GHz PXA Signal Analyzer	1/20/2021	Annual	1/20/2022	US51350301
Anritsu	MT8821C	Radio Communication Analyzer	N/A			6201381794
Emco	3115	Horn Antenna (1-18GHz)	6/18/2020	Biennial	6/18/2022	9704-5182
Espec	ESX-2CA	Environmental Chamber	8/27/2020	Annual	8/27/2022	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/20/2021	Biennial	4/20/2023	00125518
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/12/2020	Biennial	3/12/2022	128337
Keysight Technologies	N9020A	MXA Signal Analyzer	12/22/2020	Annual	12/22/2021	MY54500644
Keysight Technologies	N9030A	PXA Signal Analyzer (44GHz)	7/21/2021	Annual	7/21/2022	MY49430494
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			100976
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	8/3/2021	Annual	8/3/2022	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	4/30/2021	Annual	4/30/2022	100348
Rohde & Schwarz	ESW44	EMI Test Receiver 2Hz to 44 GHz	1/21/2021	Annual	1/21/2022	101716
Rohde & Schwarz	FSW26	2Hz-26.5GHz Signal and Spectrum Analyzer	2/10/2021	Annual	2/10/2022	103187
Sunol	JB6	LB6 Antenna	11/13/2020	Biennial	11/13/2022	A082816

Table 5-1. Test Equipment

Notes:

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

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

6.0 SAMPLE CALCULATIONS

Emission Designator

WCDMA Emission Designator

Emission Designator = 4M16F9W

WCDMA BW = 4.16 MHz
F = Frequency Modulation
9 = Composite Digital Info
W = Combination (Audio/Data)

QPSK Modulation

Emission Designator = 8M62G7D

LTE BW = 8.62 MHz
G = Phase Modulation
7 = Quantized/Digital Info
D = Data transmission, telemetry, telecommand

QAM Modulation

Emission Designator = 8M45W7D

LTE BW = 8.45 MHz
W = Amplitude/Angle Modulated
7 = Quantized/Digital Info
D = Data transmission, telemetry, telecommand

Spurious Radiated Emission – LTE Band

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

The average spectrum analyzer reading at 3 meters with the EUT on the turntable was –81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of –81.0 dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 1564 MHz. So, 6.1 dB is added to the signal generator reading of –30.9 dBm yielding –24.80 dBm. The fundamental EIRP was 25.50 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: A3LSMS906U

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

Mode(s): LTE/NR/WCDMA

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

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

Table 7-1. Summary of Test Results

Notes:

1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
2) The analyzer plots shown in Section 7.0 were taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables, directional couplers, and attenuators used as part of the system to maintain a link between the call box and the EUT at all frequencies of interest.
3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables, attenuators, and couplers.
4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST EMC Software Tool v1.0.

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.

Test Procedure Used

KDB 971168 D01 v03r01 – Section 6.0

Test Settings

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

Test Setup

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

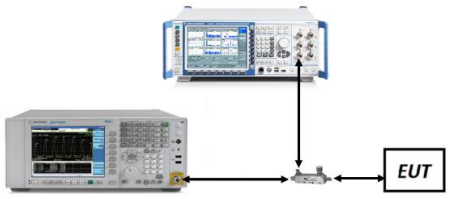


Figure 7-1. Test Instrument & Measurement Setup

Test Notes:

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

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

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

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
40 MHz	π/2 BPSK	346000	1730.0	1 / 108	24.43
		349000	1745.0	1 / 161	24.38
		352000	1760.0	1 / 161	24.42
	QPSK	346000	1730.0	1 / 108	24.37
		349000	1745.0	1 / 161	24.31
		352000	1760.0	1 / 161	24.25
	16-QAM	346000	1730.0	1 / 108	23.23
30 MHz	π/2 BPSK	345000	1725.0	1 / 40	24.48
		349000	1745.0	1 / 80	24.45
		353000	1765.0	1 / 119	24.41
	QPSK	345000	1725.0	1 / 40	24.34
		349000	1745.0	1 / 80	24.47
		353000	1765.0	1 / 119	24.42
	16-QAM	345000	1725.0	1 / 40	23.36
20 MHz	π/2 BPSK	344000	1720.0	1 / 79	24.49
		349000	1745.0	1 / 53	24.44
		354000	1770.0	1 / 79	24.40
	QPSK	344000	1720.0	1 / 79	24.47
		349000	1745.0	1 / 53	24.27
		354000	1770.0	1 / 79	24.25
	16-QAM	344000	1720.0	1 / 79	23.31
15 MHz	π/2 BPSK	343500	1717.5	1 / 20	24.49
		349000	1745.0	1 / 20	24.48
		354500	1772.5	1 / 58	24.40
	QPSK	343500	1717.5	1 / 20	24.47
		349000	1745.0	1 / 20	24.42
		354500	1772.5	1 / 58	24.32
	16-QAM	343500	1717.5	1 / 20	23.34
10 MHz	π/2 BPSK	343000	1715.0	1 / 13	24.46
		349000	1745.0	1 / 26	24.48
		355000	1775.0	1 / 26	24.47
	QPSK	343000	1715.0	1 / 13	24.36
		349000	1745.0	1 / 26	24.34
		355000	1775.0	1 / 26	24.37
	16-QAM	343000	1715.0	1 / 13	23.68
5 MHz	π/2 BPSK	342500	1712.5	1 / 6	24.48
		349000	1745.0	1 / 12	24.48
		355500	1777.5	1 / 12	24.48
	QPSK	342500	1712.5	1 / 6	24.48
		349000	1745.0	1 / 12	24.39
		355500	1777.5	1 / 12	24.46
	16-QAM	342500	1712.5	1 / 6	23.77

Table 7-2. Conducted Max Powers (NR Band n66 - ANT A)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
40 MHz	π/2 BPSK	346000	1730.0	1 / 161	24.36
		349000	1745.0	1 / 54	24.39
		352000	1760.0	1 / 108	24.27
	QPSK	346000	1730.0	1 / 161	24.23
		349000	1745.0	1 / 54	24.19
		352000	1760.0	1 / 108	24.34
	16-QAM	346000	1730.0	1 / 161	23.68
30 MHz	π/2 BPSK	345000	1725.0	1 / 119	24.35
		349000	1745.0	1 / 119	24.35
		353000	1765.0	1 / 80	24.35
	QPSK	345000	1725.0	1 / 119	24.31
		349000	1745.0	1 / 80	24.36
		353000	1765.0	1 / 80	24.29
	16-QAM	345000	1725.0	1 / 119	23.39
20 MHz	π/2 BPSK	344000	1720.0	1 / 79	24.37
		349000	1745.0	1 / 79	24.43
		354000	1770.0	1 / 53	24.26
	QPSK	344000	1720.0	1 / 79	24.17
		349000	1745.0	1 / 79	24.21
		354000	1770.0	1 / 53	24.20
	16-QAM	344000	1720.0	1 / 79	23.08
15 MHz	π/2 BPSK	343500	1717.5	1 / 58	24.28
		349000	1745.0	1 / 58	24.41
		354500	1772.5	1 / 58	24.37
	QPSK	343500	1717.5	1 / 58	24.28
		349000	1745.0	1 / 58	24.33
		354500	1772.5	1 / 58	24.21
	16-QAM	343500	1717.5	1 / 58	23.41
10 MHz	π/2 BPSK	343000	1715.0	1 / 38	24.26
		349000	1745.0	1 / 38	24.48
		355000	1775.0	1 / 38	24.44
	QPSK	343000	1715.0	1 / 38	24.07
		349000	1745.0	1 / 38	24.42
		355000	1775.0	1 / 38	24.43
	16-QAM	343000	1715.0	1 / 38	23.04
5 MHz	π/2 BPSK	342500	1712.5	1 / 12	24.34
		349000	1745.0	1 / 18	24.41
		355500	1777.5	1 / 12	24.36
	QPSK	342500	1712.5	1 / 12	24.23
		349000	1745.0	1 / 18	24.32
		355500	1777.5	1 / 12	24.21
	16-QAM	342500	1712.5	1 / 12	23.50

Table 7-3. Conducted Max Powers (NR Band n66 - ANT I)

PCC							SCC							PCC Conducted Power [dBm]	SCC Conducted Power [dBm]	Inter-Band ULCA Total Tx. Power (dBm)
PCC Band	PCC Bandwidth [MHz]	PCC (UL) channel	PCC (UL) channel	PCC (UL) frequency	Mod.	PCC UL RB#/Offset	SCC Band	SCC Bandwidth [MHz]	SCC (UL) channel	PCC (UL) channel	PCC (UL) frequency	Mod.	SCC UL RB#/Offset			
n66	40	Low	346000	1730.0	π/2 BPSK	1 / 108	n77	100	Low	633333	3500.0	π/2 BPSK	1 / 137	19.92	21.80	23.97
					QPSK	216 / 0						QPSK	270 / 0	19.42	21.17	23.39
					QPSK	1 / 54						QPSK	1 / 68	19.75	21.71	23.85
					QPSK	1 / 108						QPSK	1 / 137	19.90	21.84	23.99
					QPSK	1 / 162						QPSK	1 / 205	19.73	21.95	23.99
					16Q	1 / 108						16Q	1 / 137	19.83	21.77	23.92
		Mid	349000	1745.0	π/2 BPSK	1 / 162			Mid	633333	3500.0	π/2 BPSK	1 / 205	19.77	21.80	23.91
					QPSK	216 / 0						QPSK	270 / 0	18.68	20.90	22.94
					QPSK	1 / 54						QPSK	1 / 68	19.69	21.35	23.61
					QPSK	1 / 108						QPSK	1 / 137	19.72	21.41	23.66
					QPSK	1 / 162						QPSK	1 / 205	19.75	21.60	23.78
					16Q	1 / 162						16Q	1 / 205	19.90	21.59	23.84
		High	352000	1760.0	π/2 BPSK	1 / 162			High	633333	3500.0	π/2 BPSK	1 / 205	19.64	21.60	23.74
					QPSK	216 / 0						QPSK	270 / 0	18.62	20.90	22.92
					QPSK	1 / 54						QPSK	1 / 68	19.58	21.27	23.52
					QPSK	1 / 108						QPSK	1 / 137	19.64	21.43	23.64
					QPSK	1 / 162						QPSK	1 / 205	19.71	21.57	23.75
					16Q	1 / 162						16Q	1 / 205	19.80	21.46	23.72

Table 7-4. Conducted Max Powers (NR Bands n66 – 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.

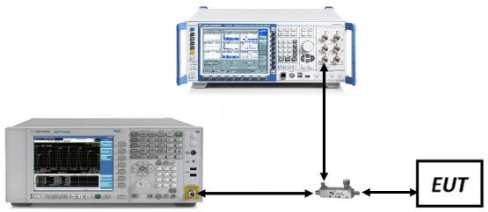
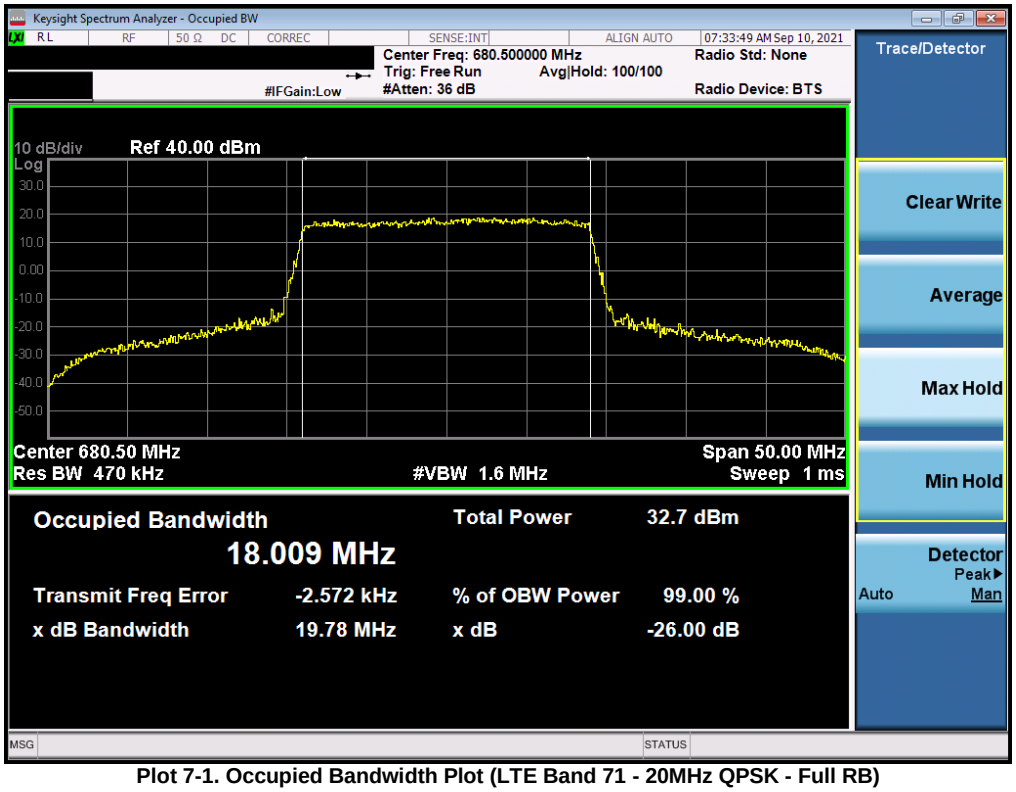


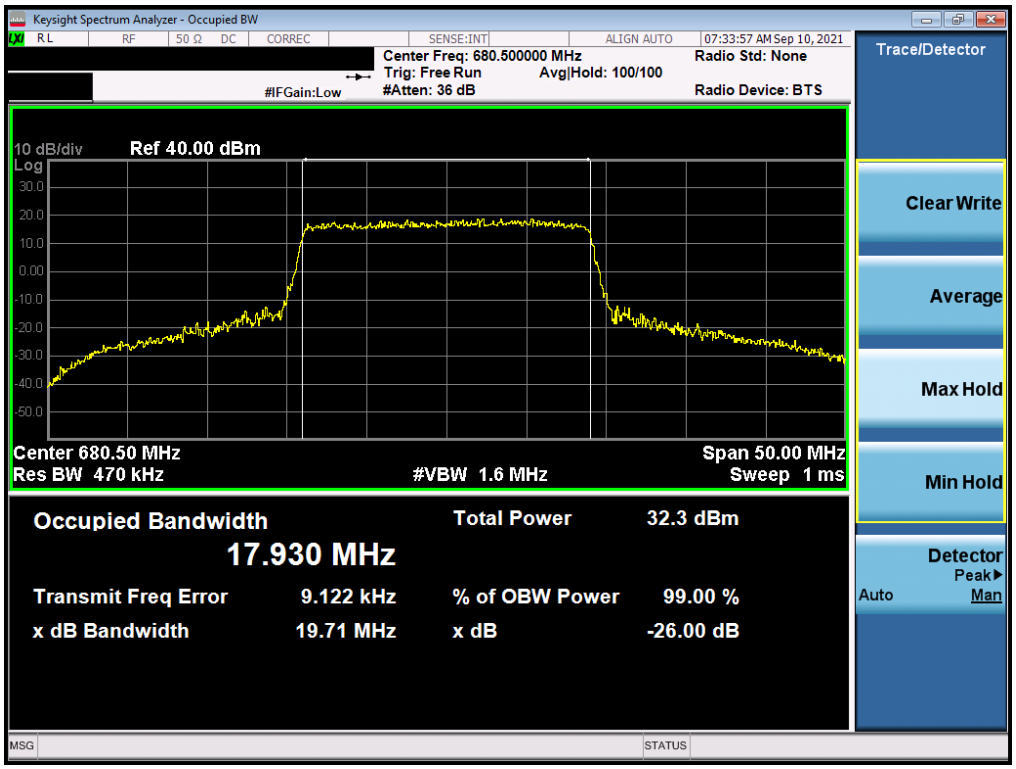
Figure 7-2. Test Instrument & Measurement Setup

Test Notes

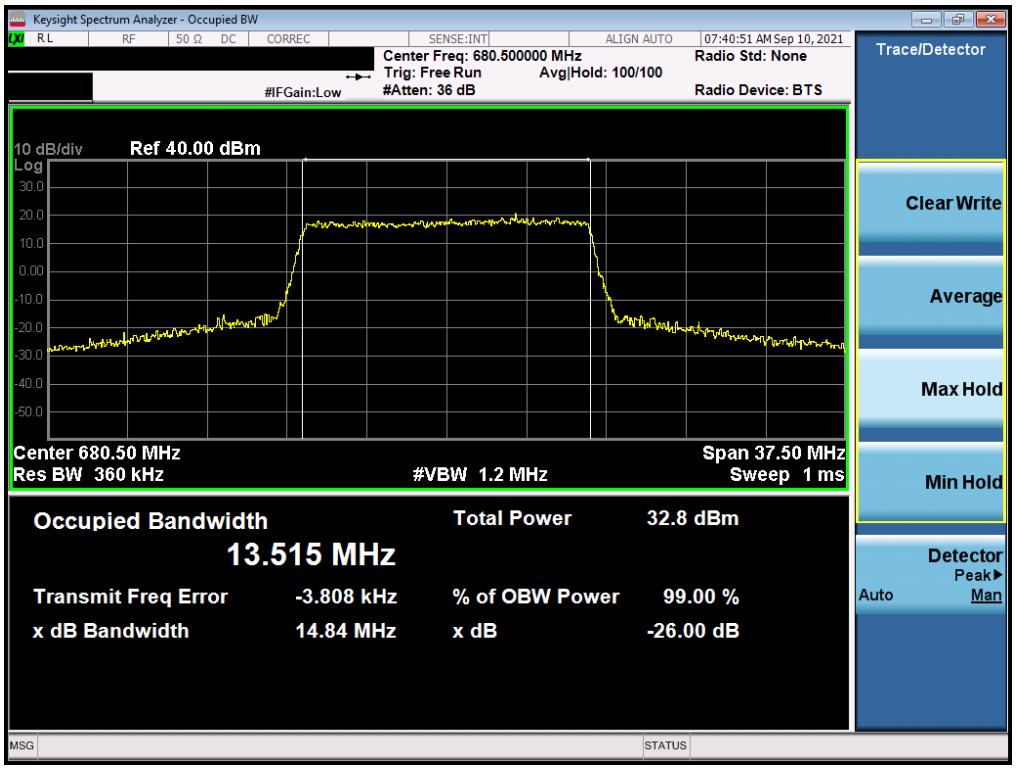
None.



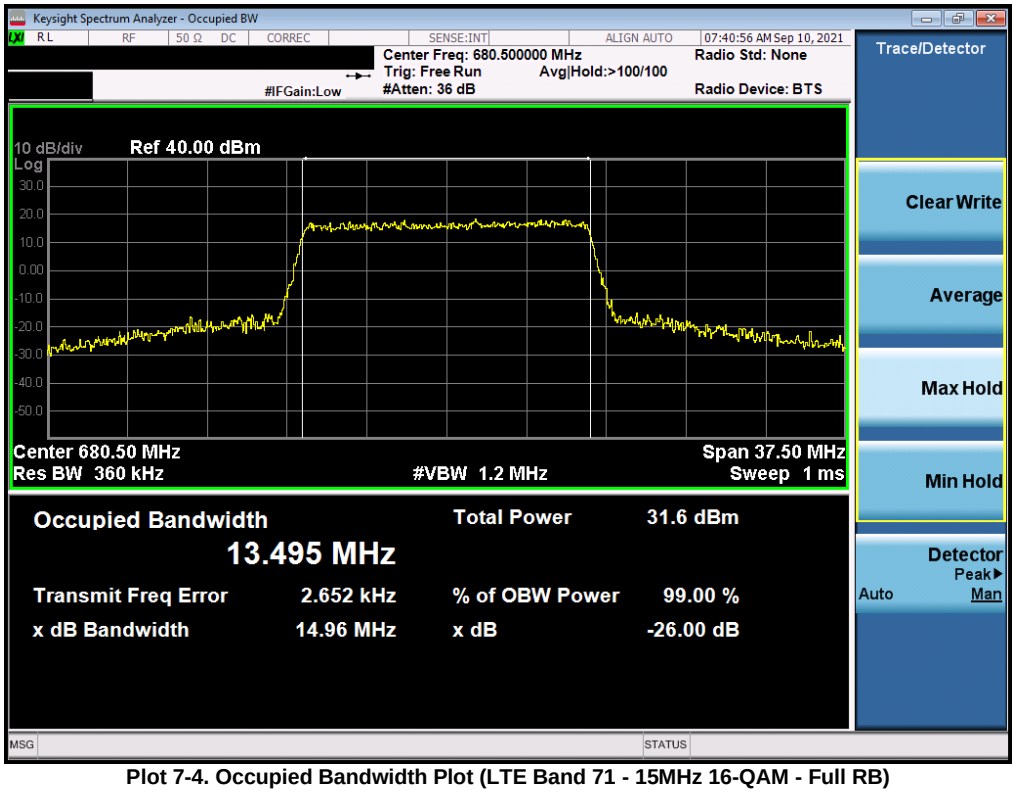
Plot 7-1. Occupied Bandwidth Plot (LTE Band 71 - 20MHz QPSK - Full RB)



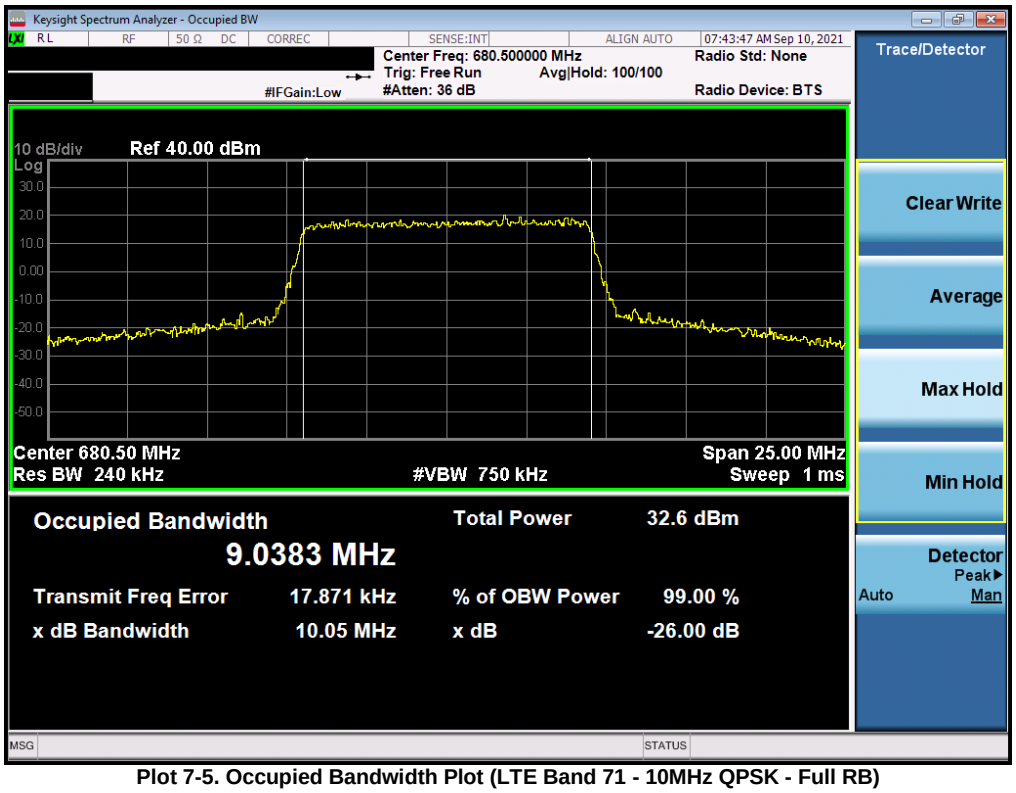
Plot 7-2. Occupied Bandwidth Plot (LTE Band 71 - 20MHz 16-QAM - Full RB)



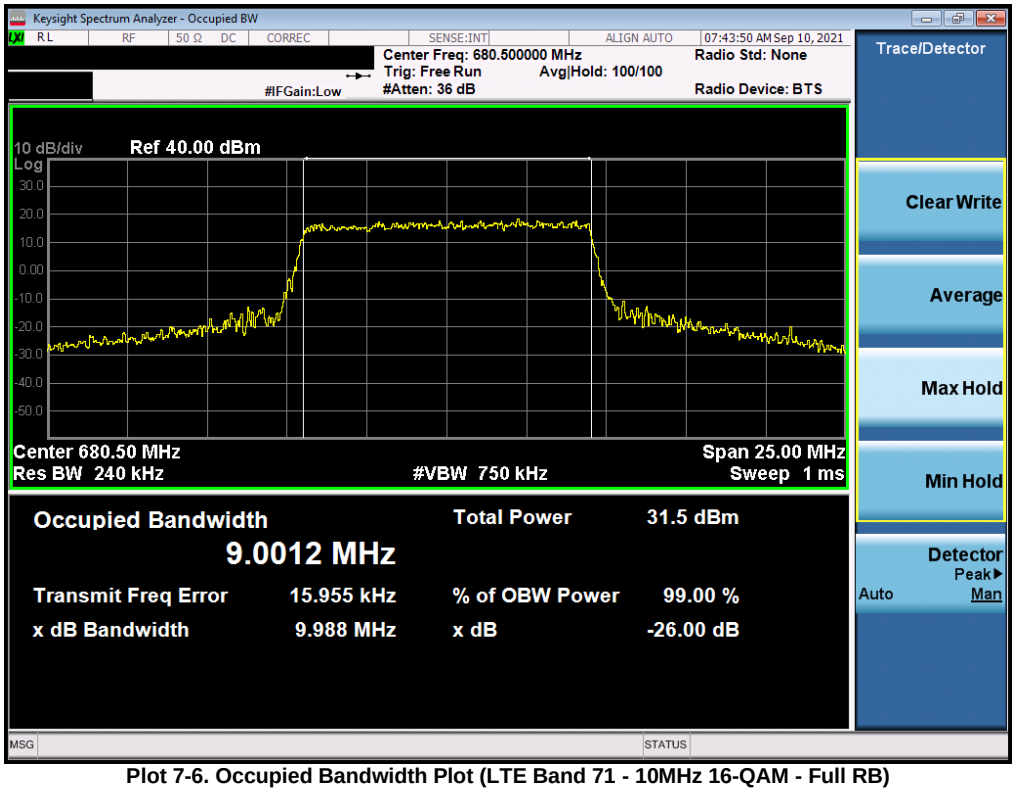
Plot 7-3. Occupied Bandwidth Plot (LTE Band 71 - 15MHz QPSK - Full RB)



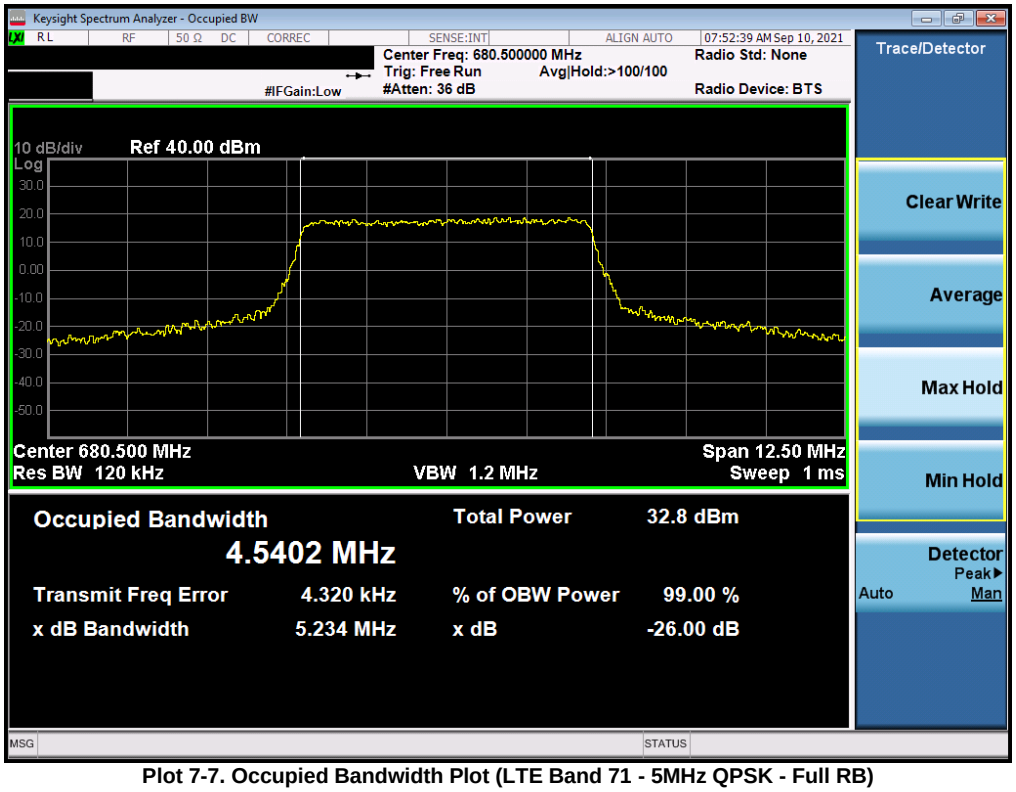
Plot 7-4. Occupied Bandwidth Plot (LTE Band 71 - 15MHz 16-QAM - Full RB)



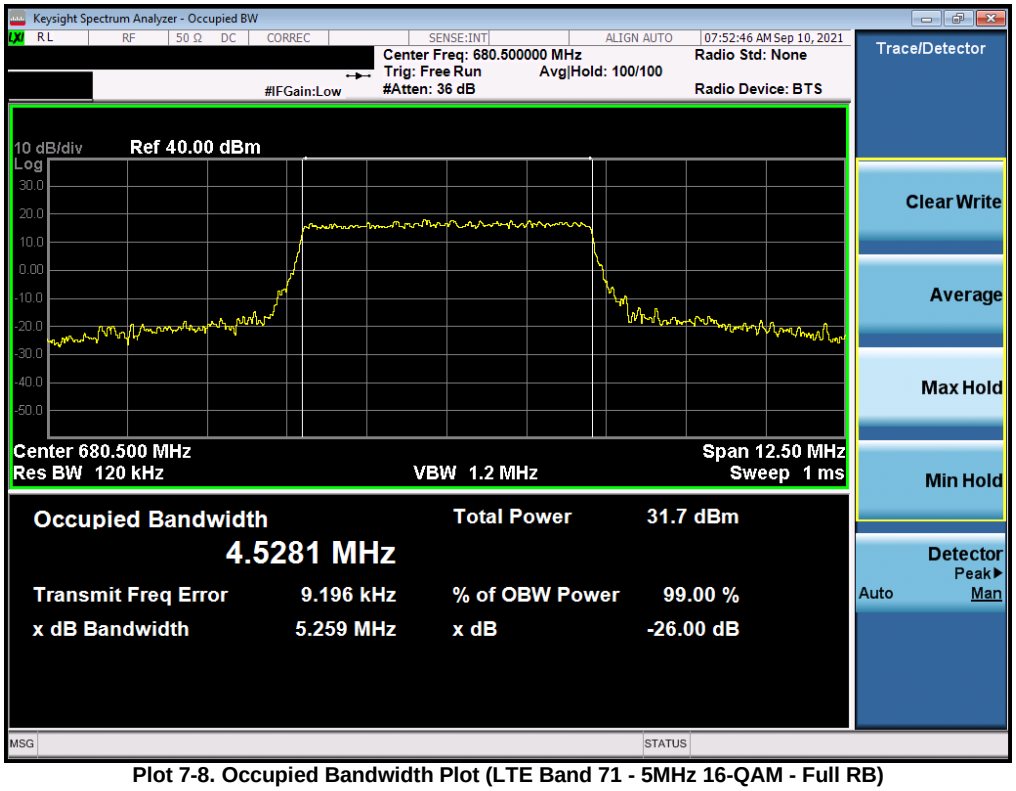
Plot 7-5. Occupied Bandwidth Plot (LTE Band 71 - 10MHz QPSK - Full RB)



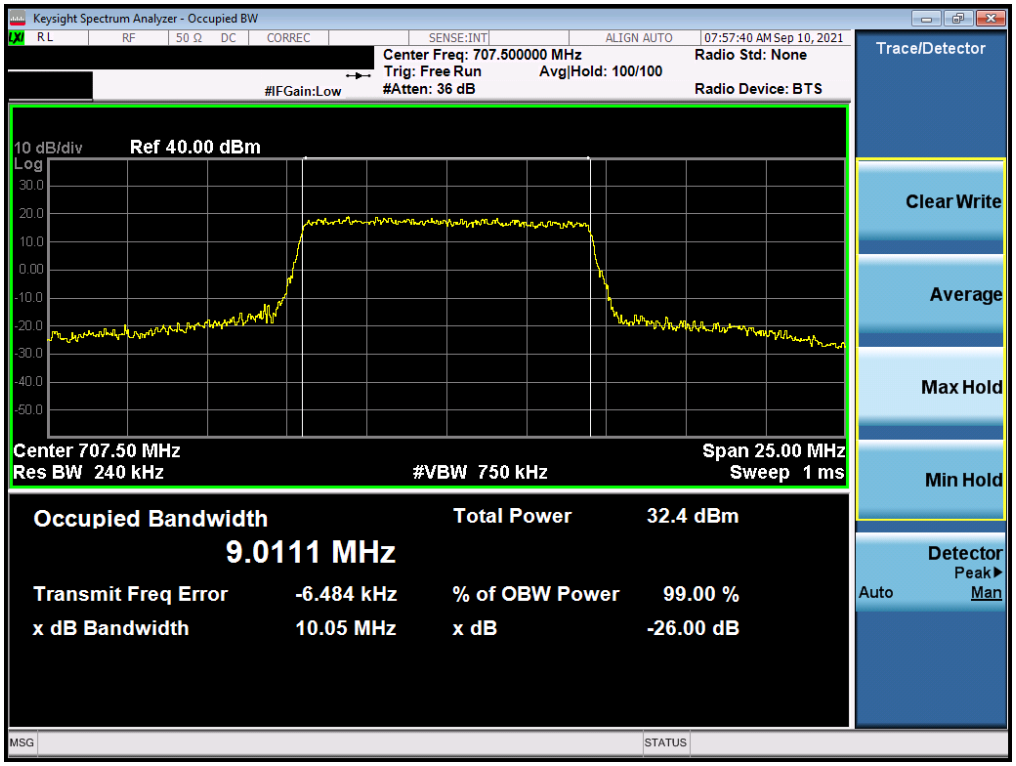
Plot 7-6. Occupied Bandwidth Plot (LTE Band 71 - 10MHz 16-QAM - Full RB)



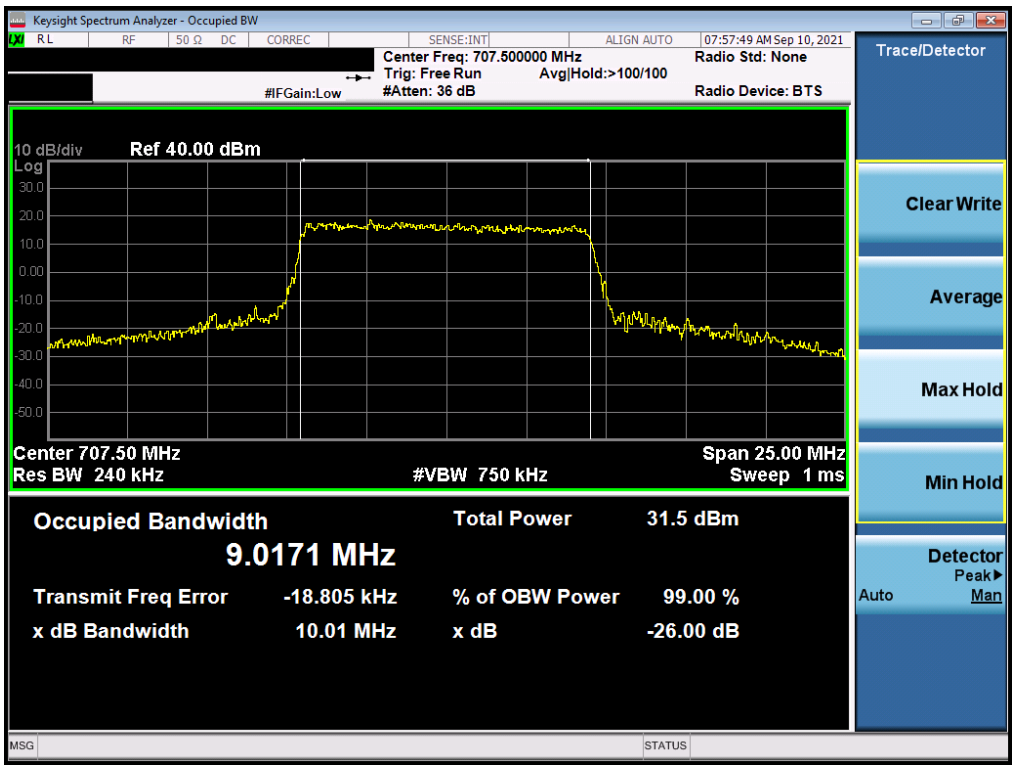
Plot 7-7. Occupied Bandwidth Plot (LTE Band 71 - 5MHz QPSK - Full RB)



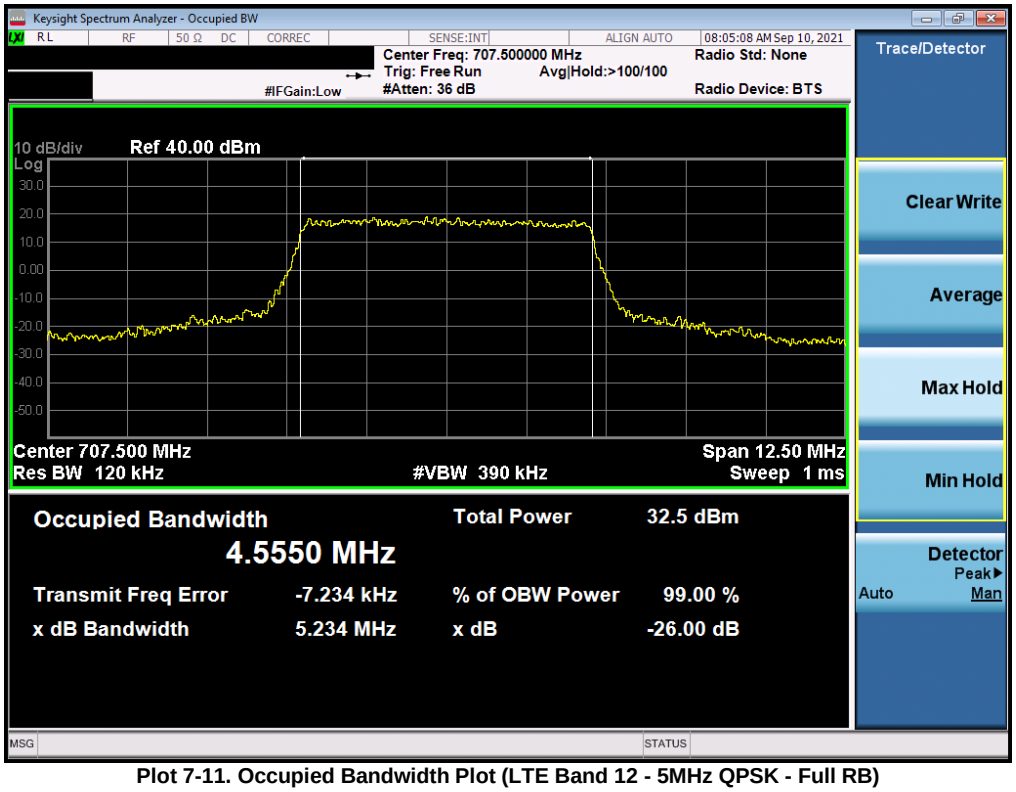
Plot 7-8. Occupied Bandwidth Plot (LTE Band 71 - 5MHz 16-QAM - Full RB)



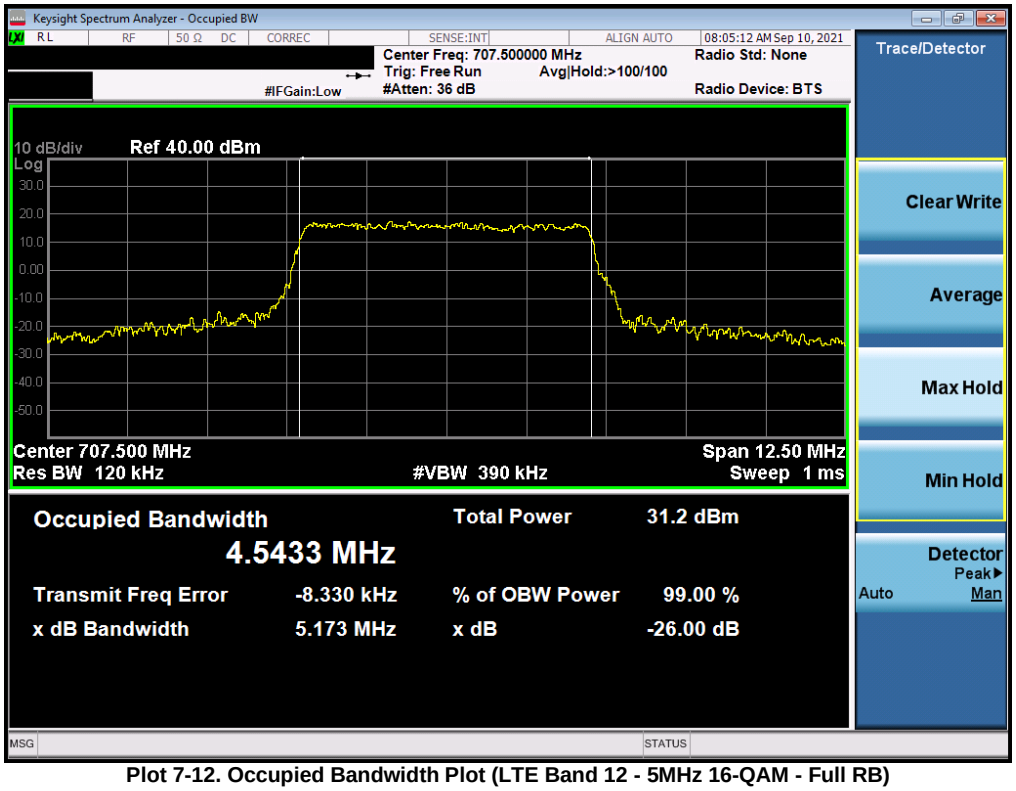
Plot 7-9. Occupied Bandwidth Plot (LTE Band 12 - 10MHz QPSK - Full RB)



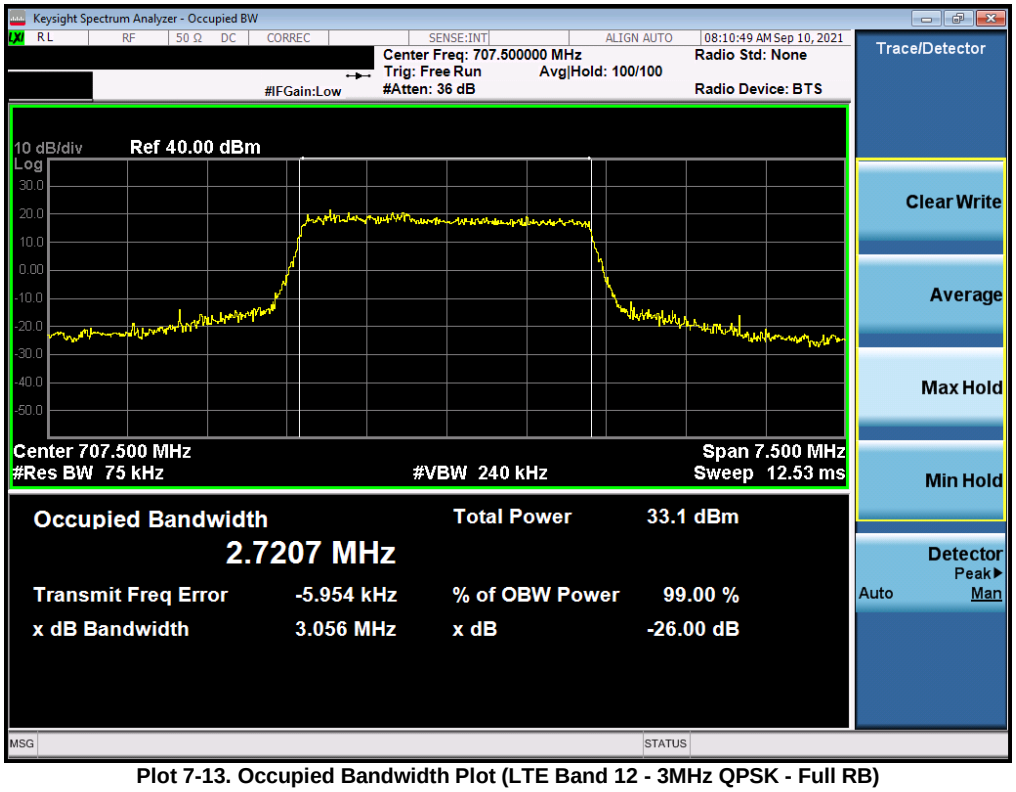
Plot 7-10. Occupied Bandwidth Plot (LTE Band 12 - 10MHz 16-QAM - Full RB)



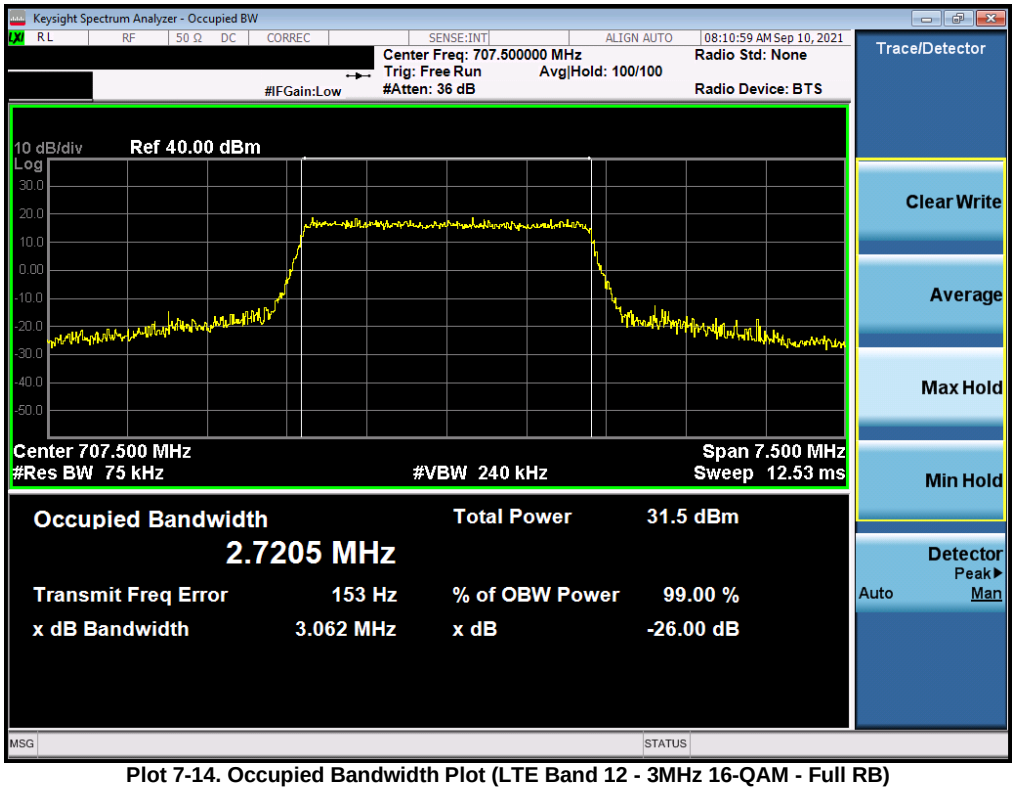
Plot 7-11. Occupied Bandwidth Plot (LTE Band 12 - 5MHz QPSK - Full RB)



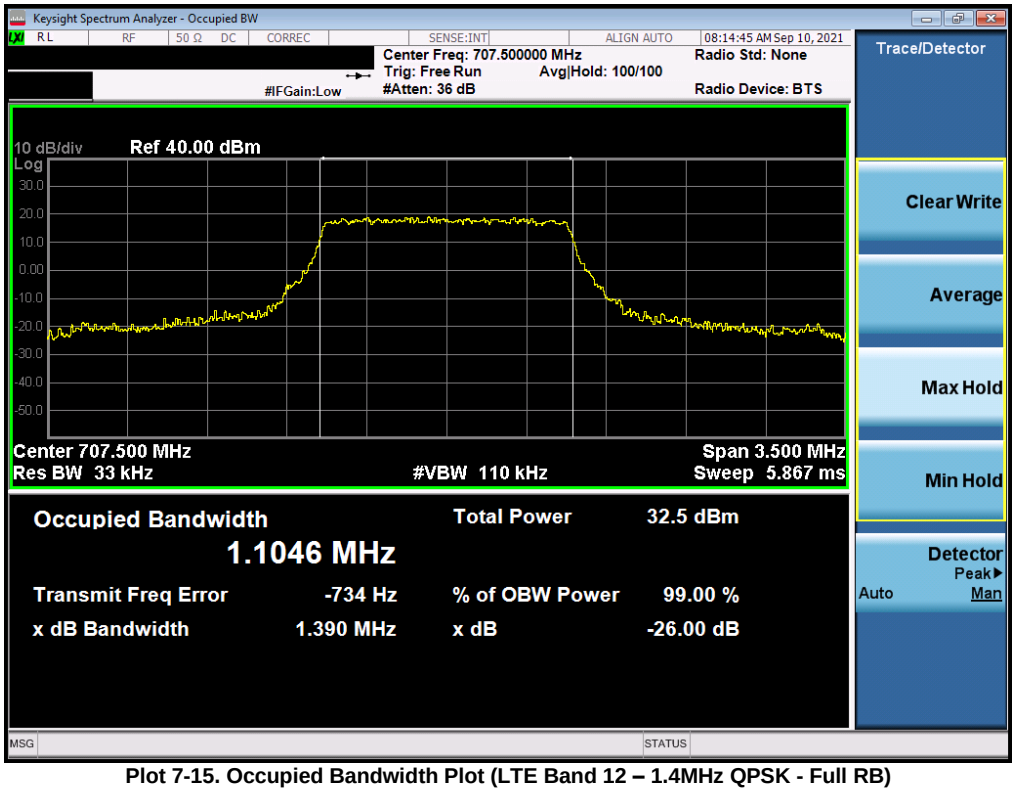
Plot 7-12. Occupied Bandwidth Plot (LTE Band 12 - 5MHz 16-QAM - Full RB)



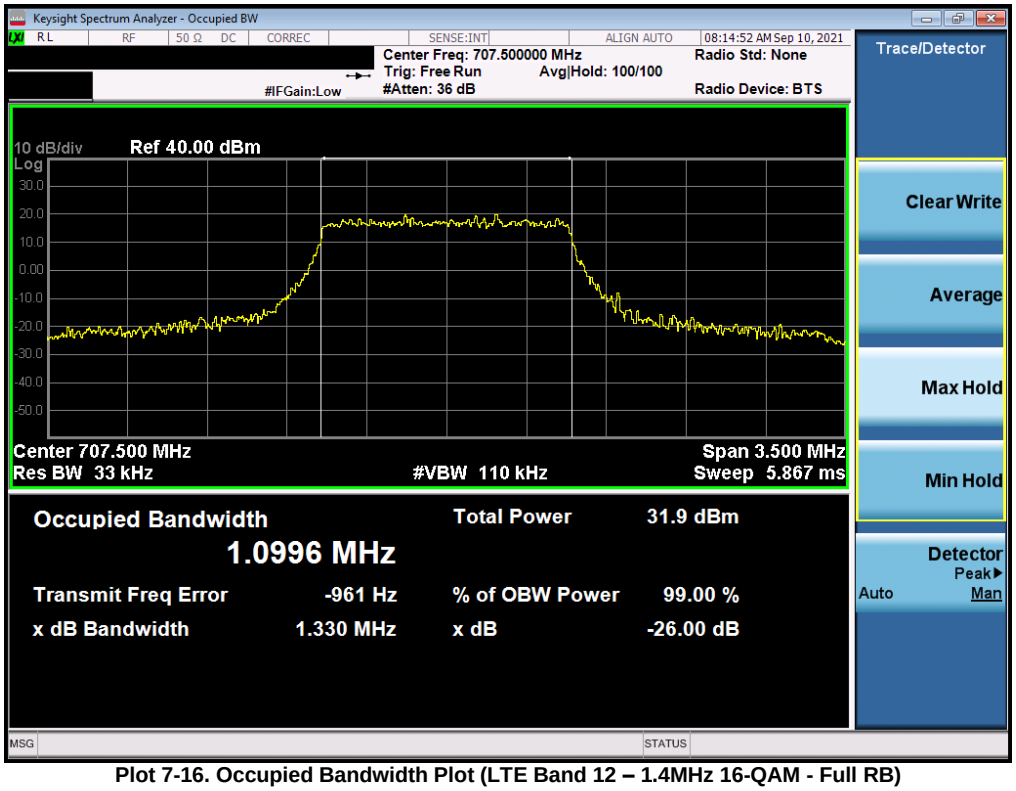
Plot 7-13. Occupied Bandwidth Plot (LTE Band 12 - 3MHz QPSK - Full RB)



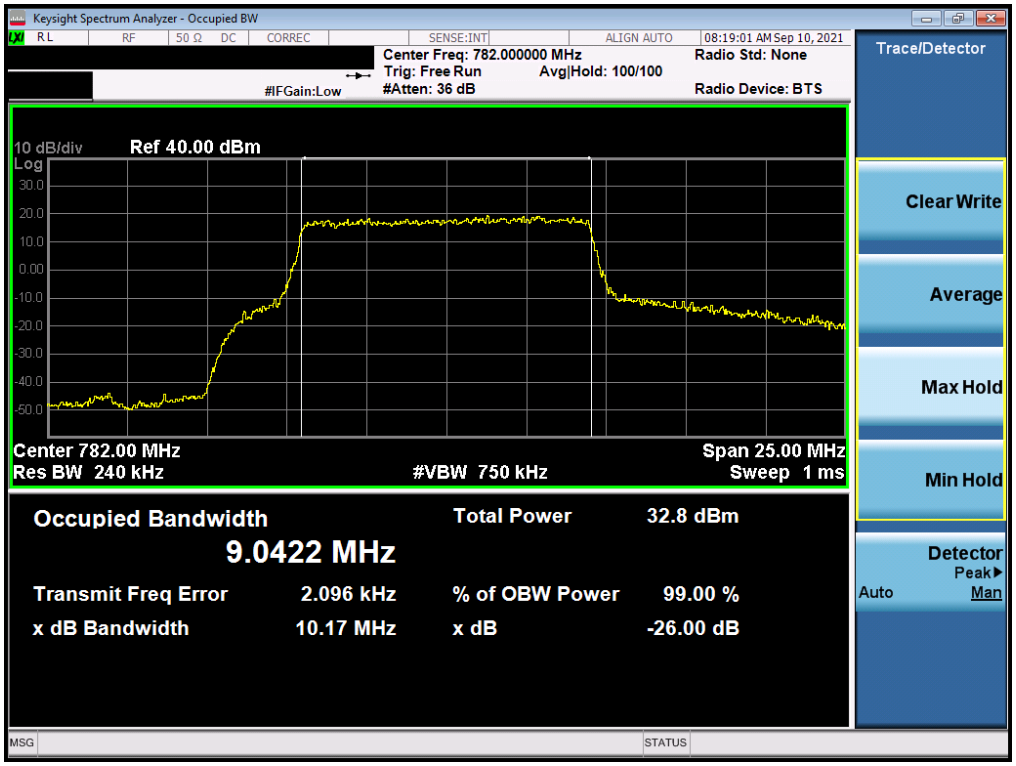
Plot 7-14. Occupied Bandwidth Plot (LTE Band 12 - 3MHz 16-QAM - Full RB)



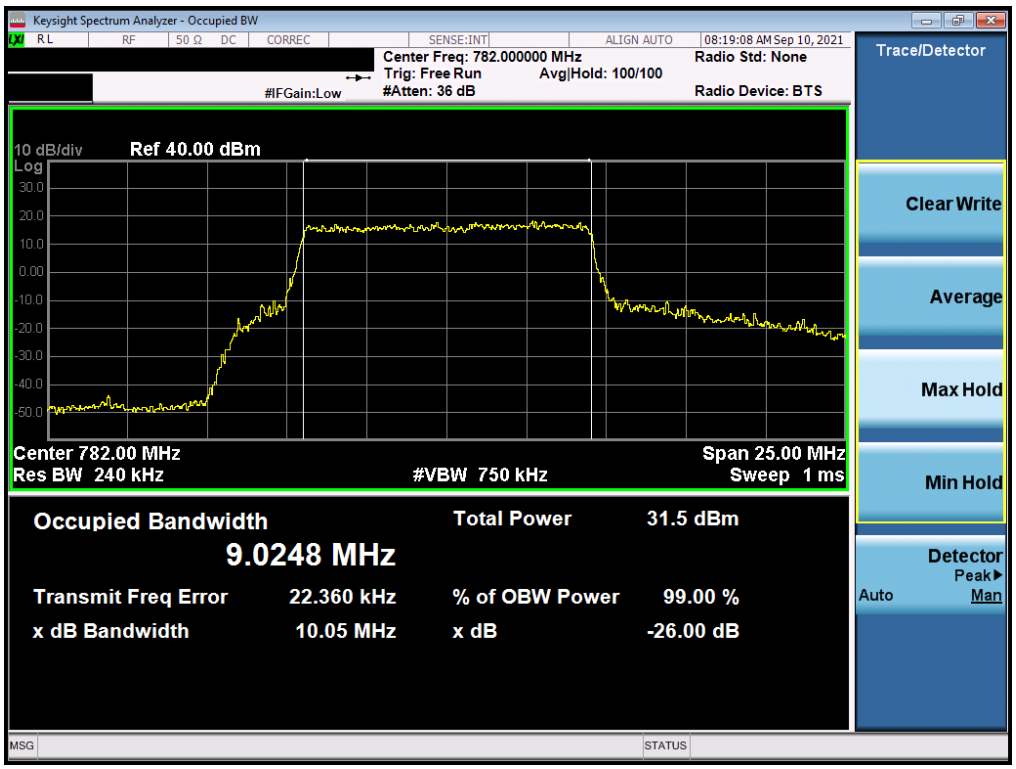
Plot 7-15. Occupied Bandwidth Plot (LTE Band 12 – 1.4MHz QPSK - Full RB)



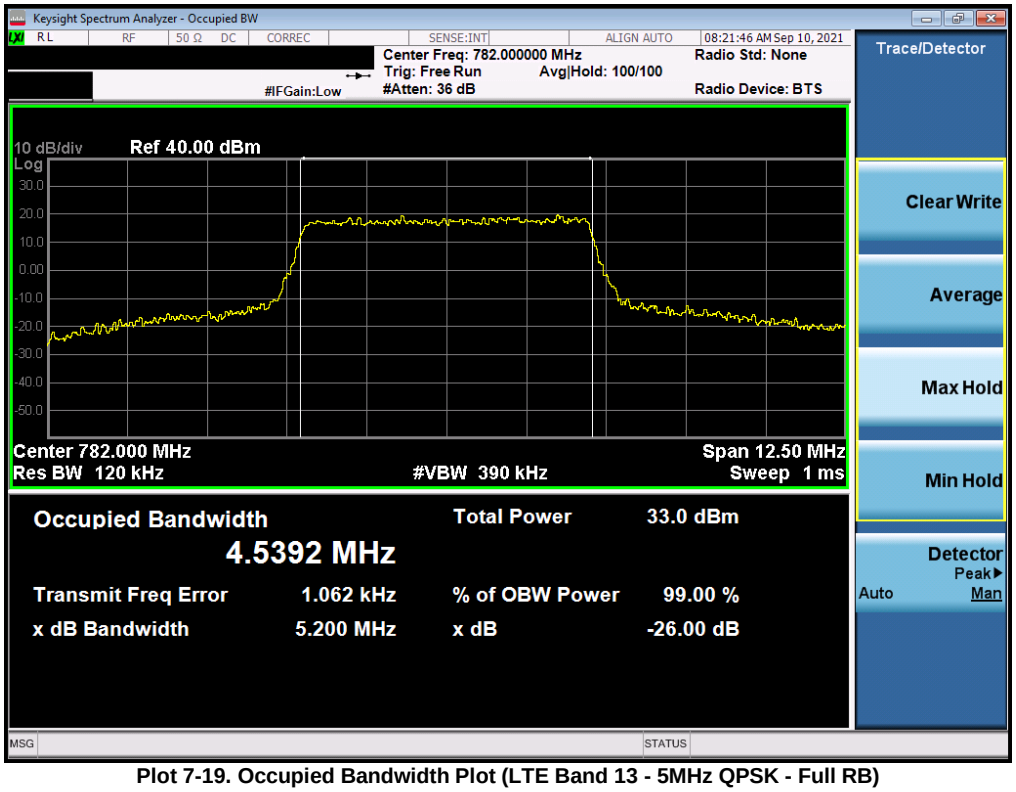
Plot 7-16. Occupied Bandwidth Plot (LTE Band 12 – 1.4MHz 16-QAM - Full RB)



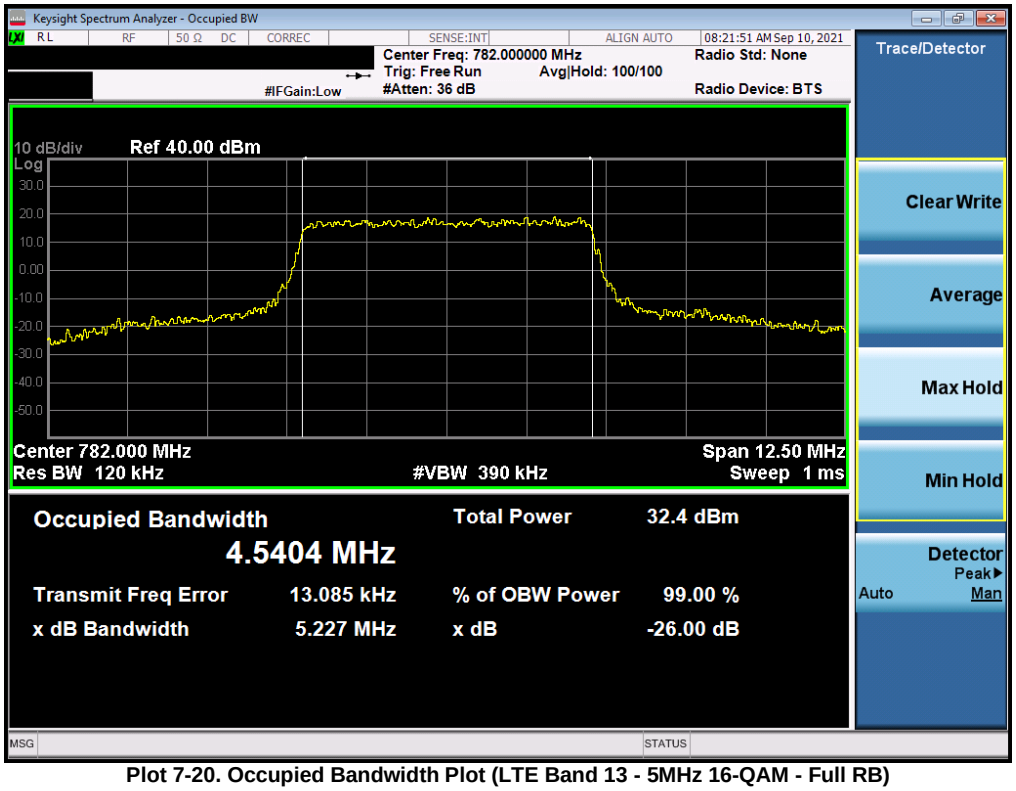
Plot 7-17. Occupied Bandwidth Plot (LTE Band 13 - 10MHz QPSK - Full RB)



Plot 7-18. Occupied Bandwidth Plot (LTE Band 13 - 10MHz 16-QAM - Full RB)

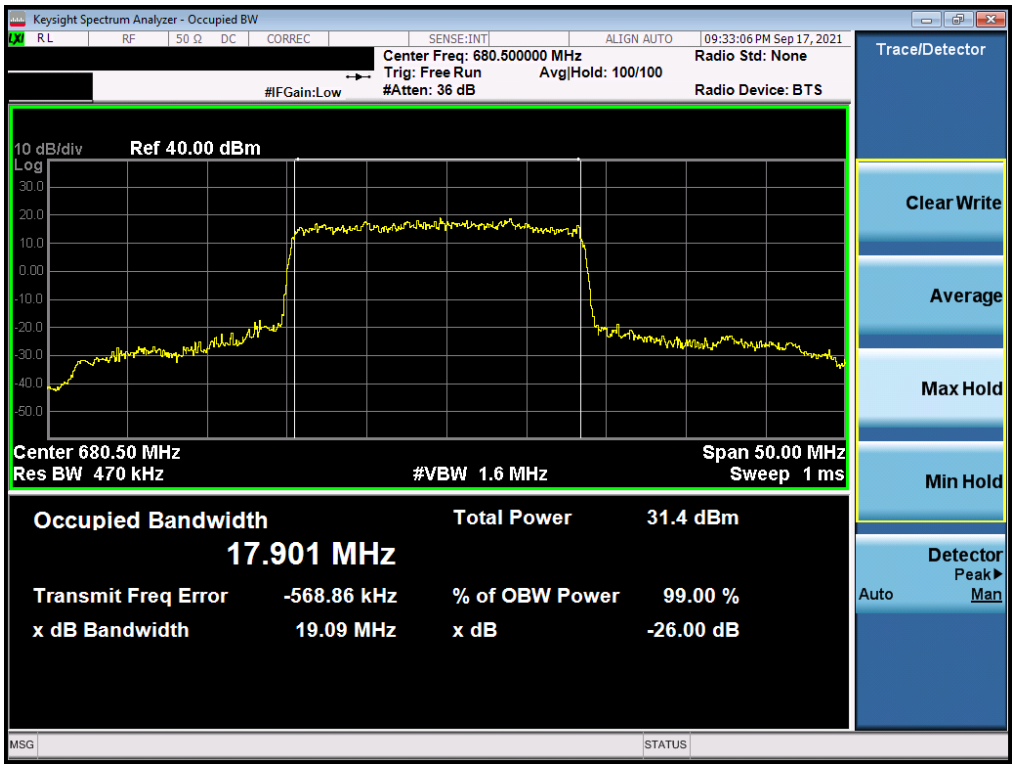


Plot 7-19. Occupied Bandwidth Plot (LTE Band 13 - 5MHz QPSK - Full RB)

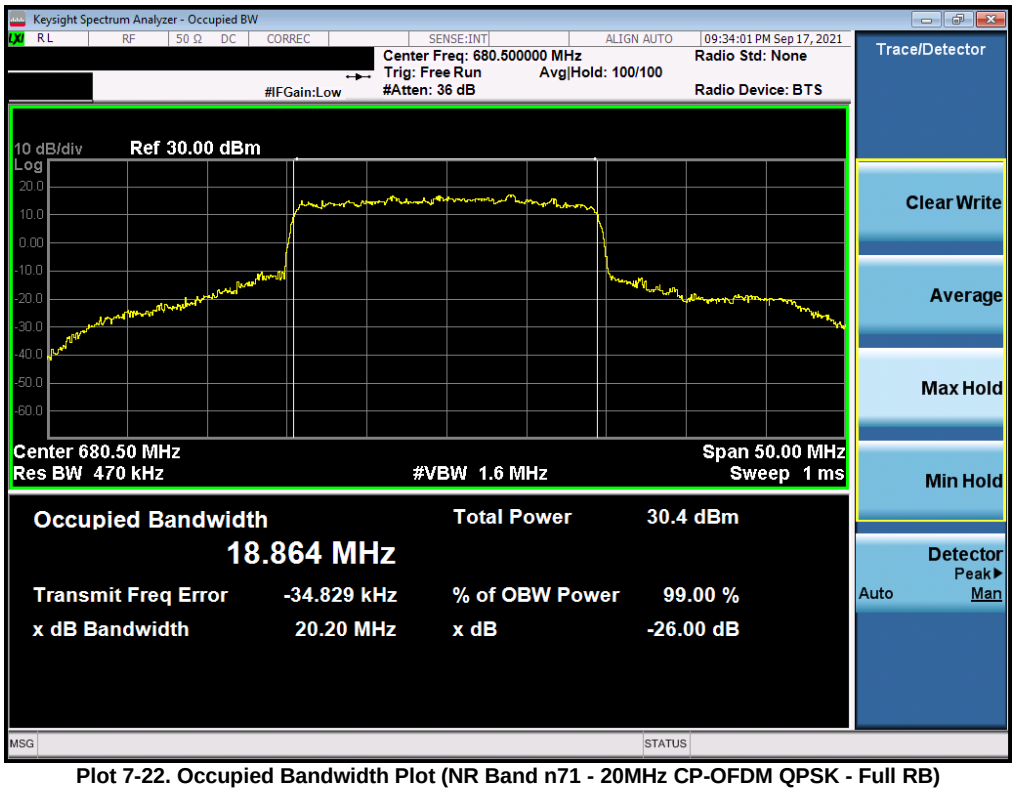


Plot 7-20. Occupied Bandwidth Plot (LTE Band 13 - 5MHz 16-QAM - Full RB)

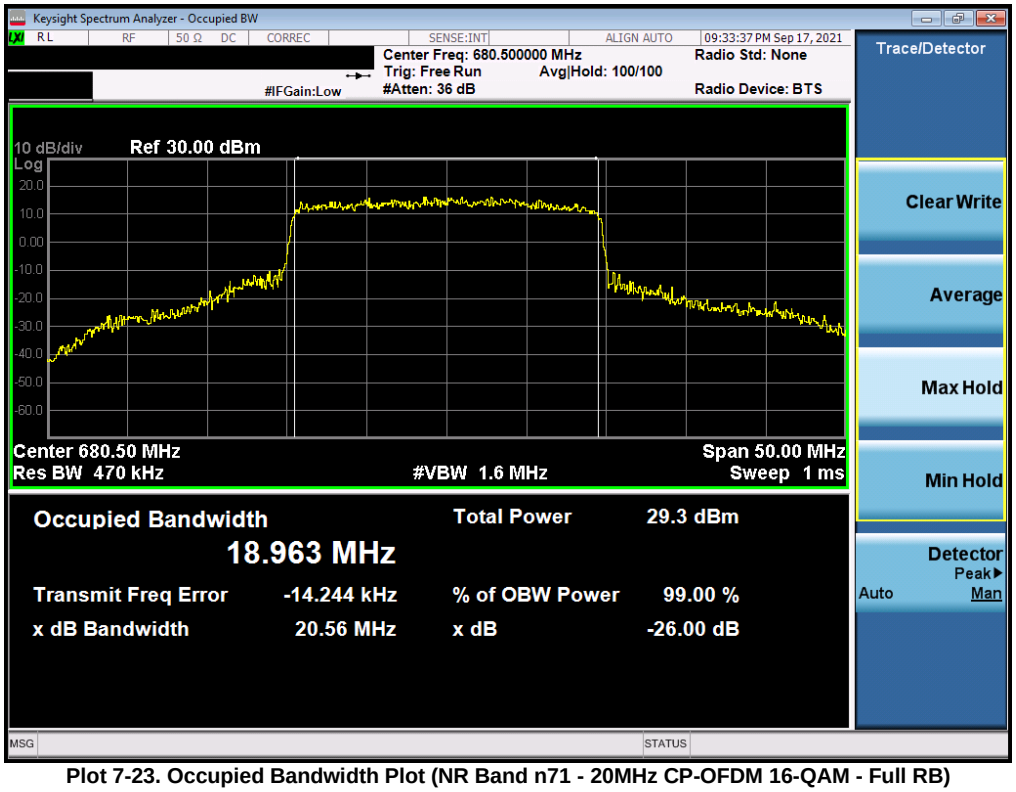
NR Band n71



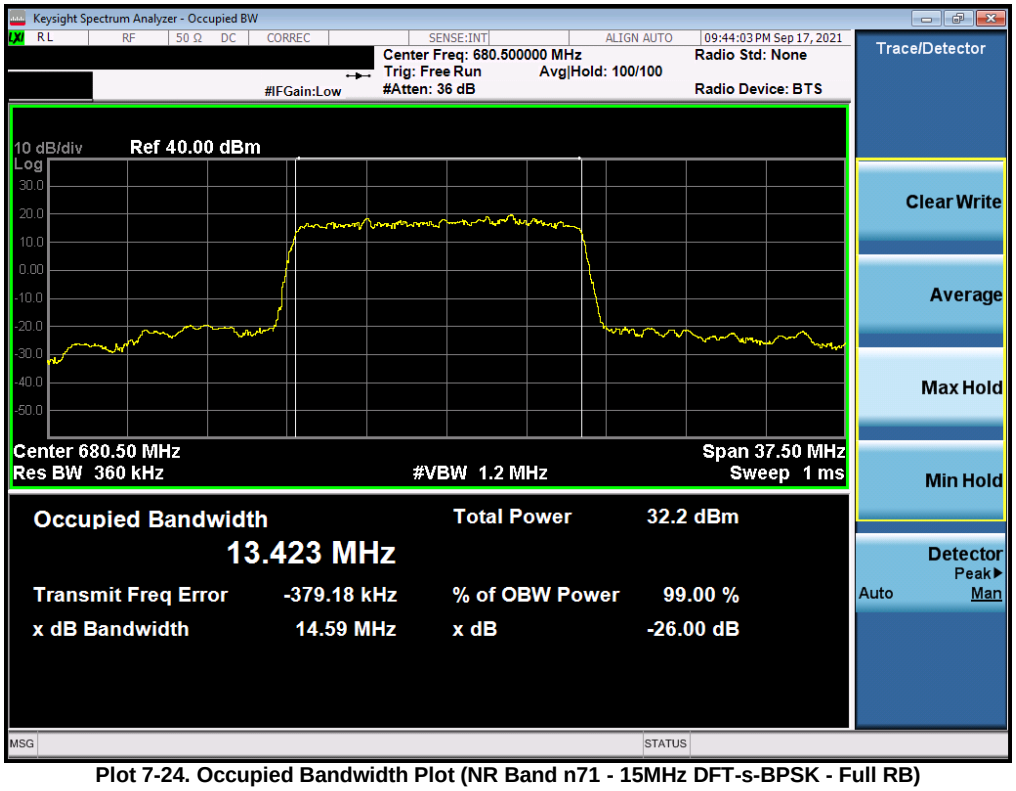
Plot 7-21. Occupied Bandwidth Plot (NR Band n71 - 20MHz DFT-s-BPSK - Full RB)



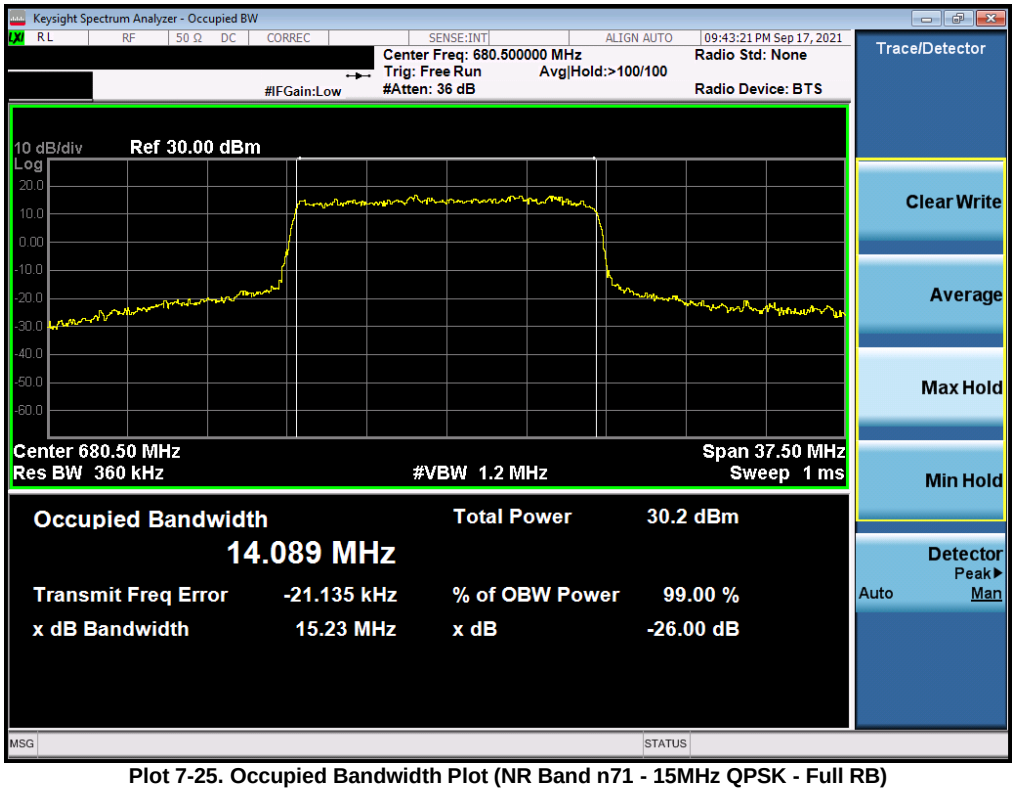
Plot 7-22. Occupied Bandwidth Plot (NR Band n71 - 20MHz CP-OFDM QPSK - Full RB)



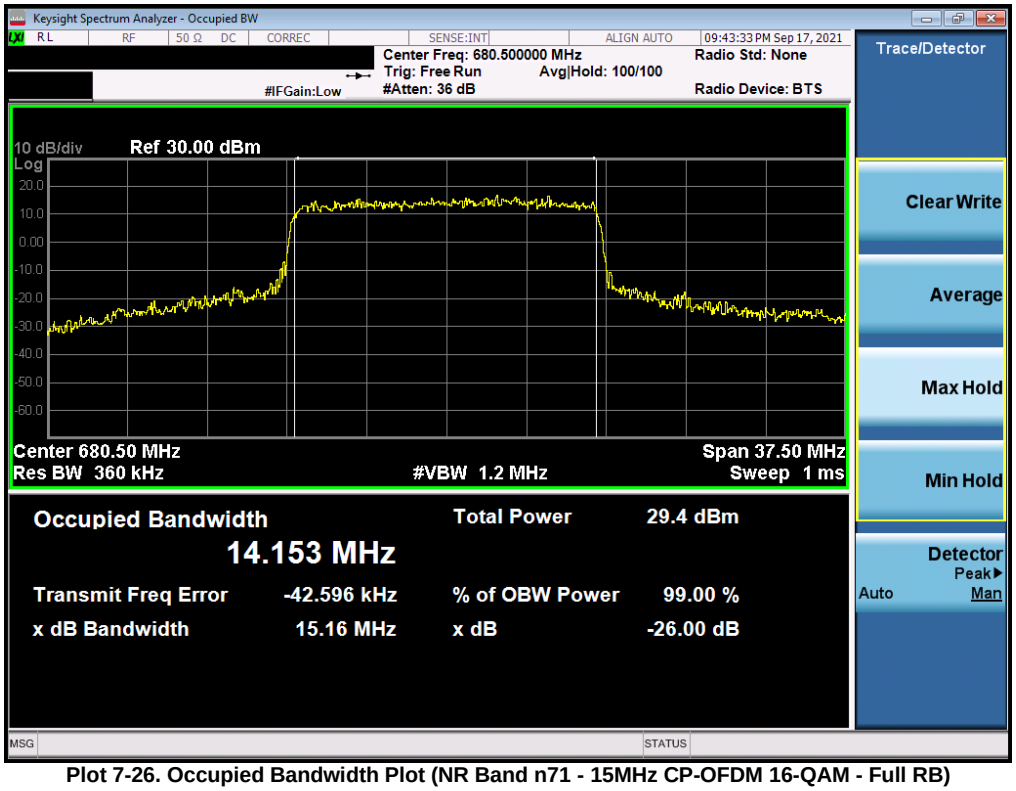
Plot 7-23. Occupied Bandwidth Plot (NR Band n71 - 20MHz CP-OFDM 16-QAM - Full RB)



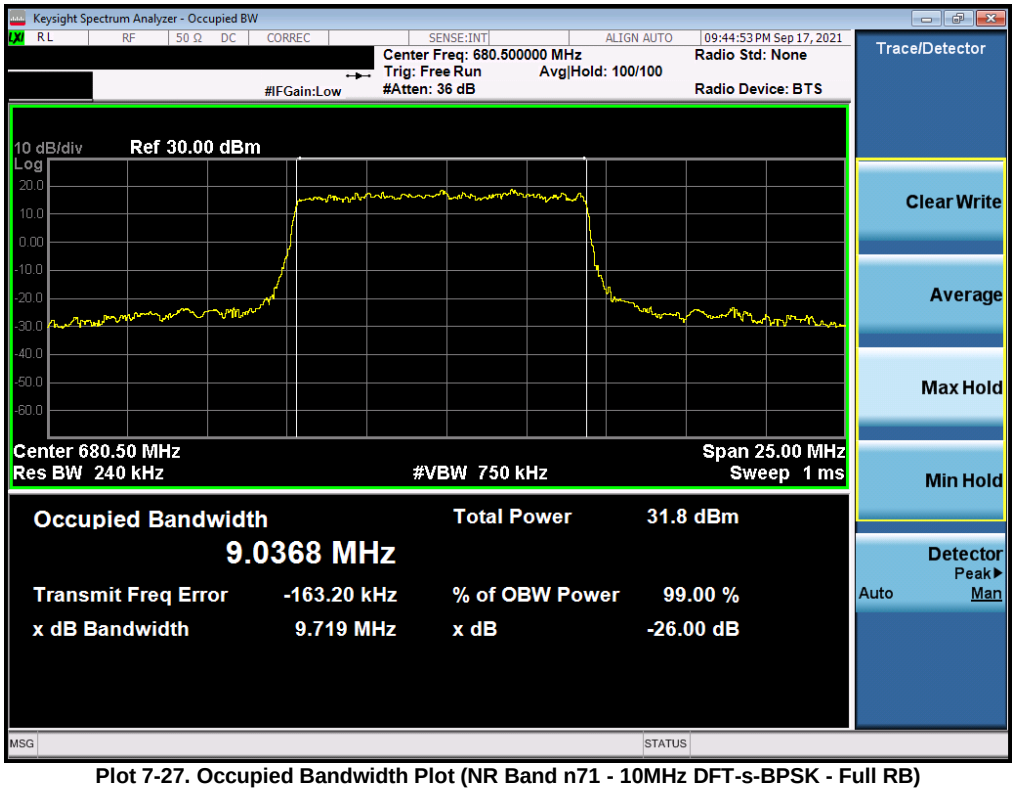
Plot 7-24. Occupied Bandwidth Plot (NR Band n71 - 15MHz DFT-s-BPSK - Full RB)



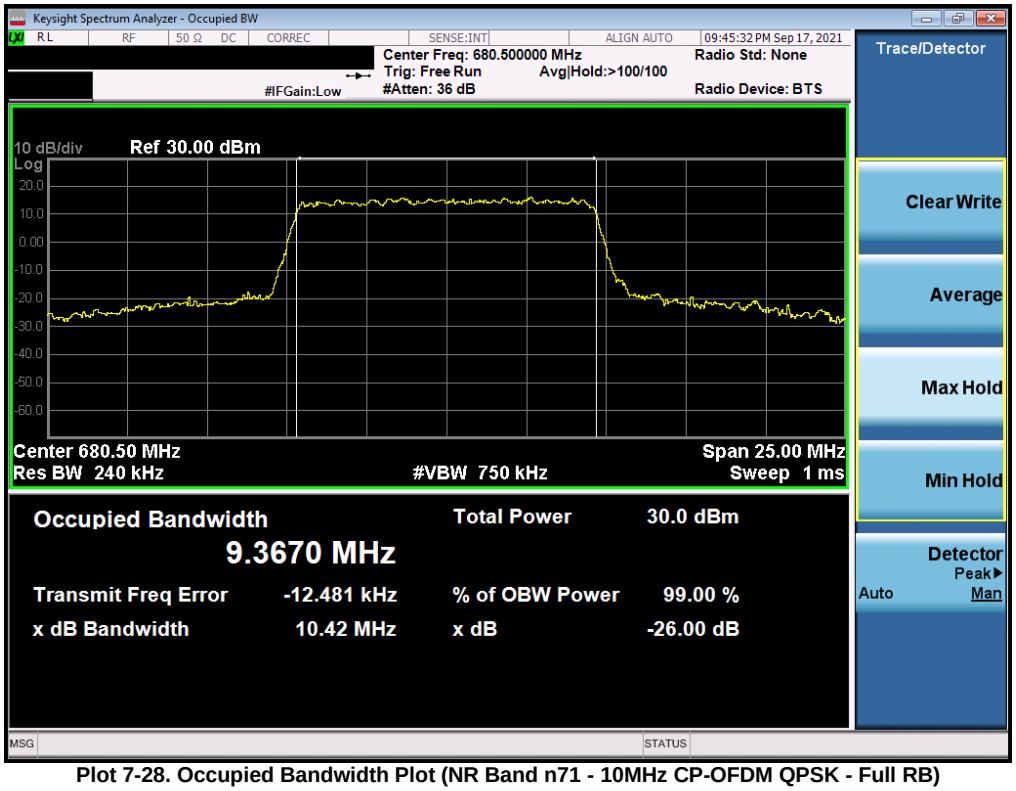
Plot 7-25. Occupied Bandwidth Plot (NR Band n71 - 15MHz QPSK - Full RB)



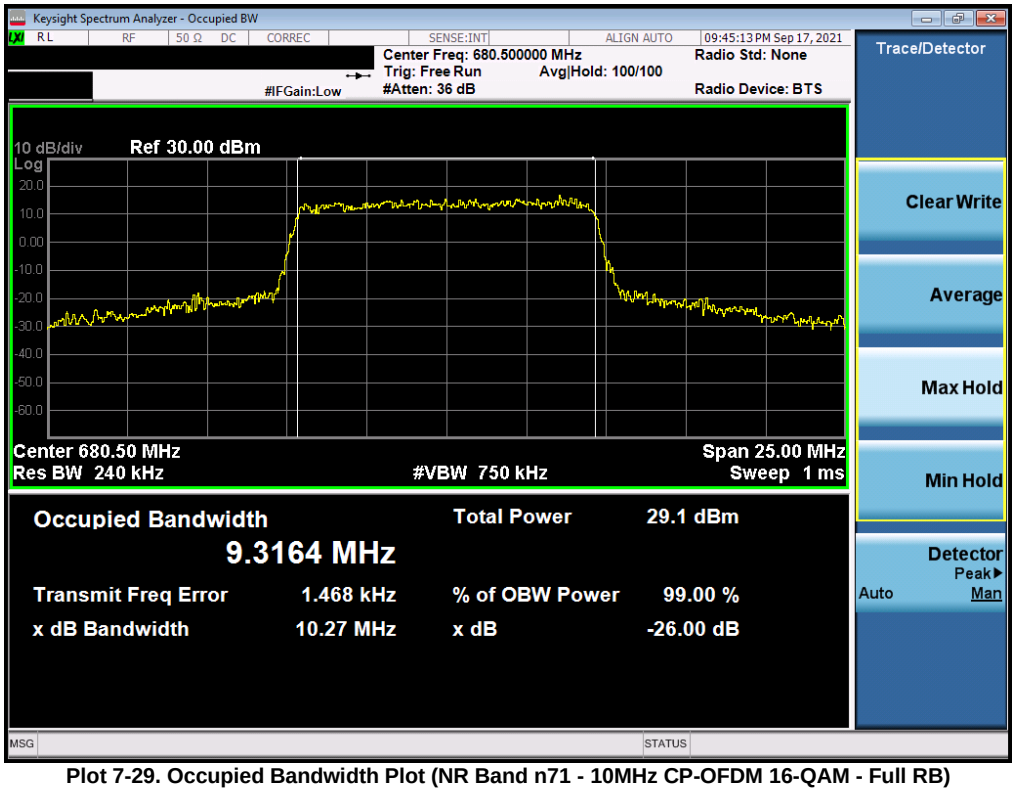
Plot 7-26. Occupied Bandwidth Plot (NR Band n71 - 15MHz CP-OFDM 16-QAM - Full RB)



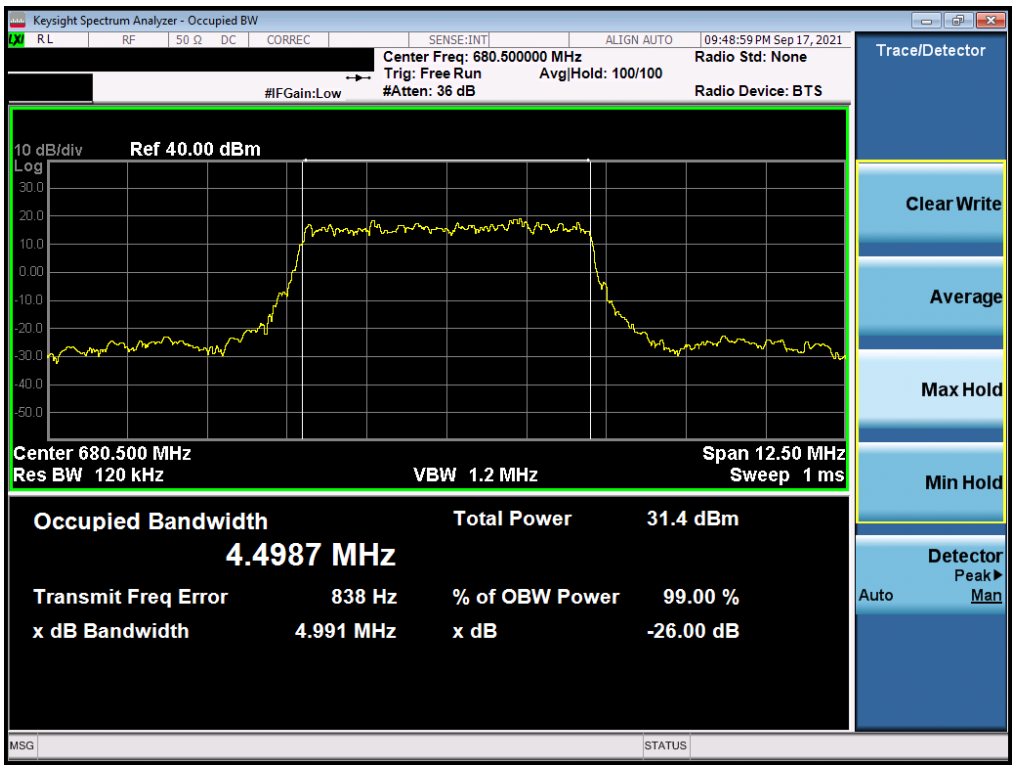
Plot 7-27. Occupied Bandwidth Plot (NR Band n71 - 10MHz DFT-s-BPSK - Full RB)



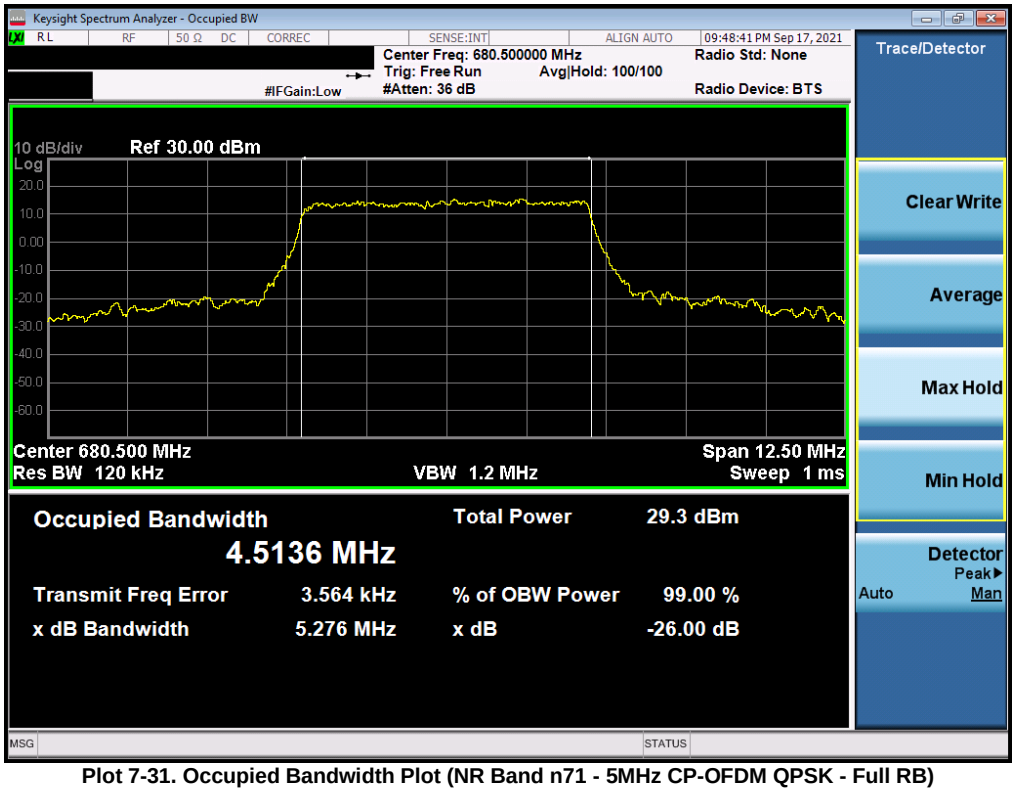
Plot 7-28. Occupied Bandwidth Plot (NR Band n71 - 10MHz CP-OFDM QPSK - Full RB)



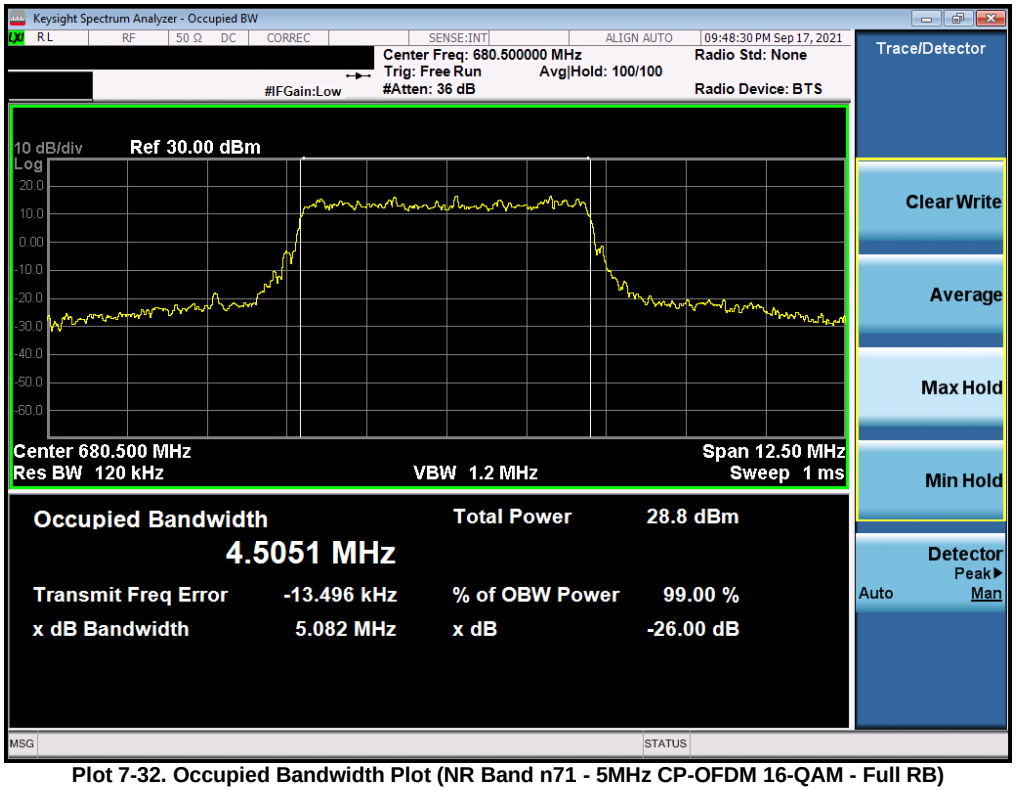
Plot 7-29. Occupied Bandwidth Plot (NR Band n71 - 10MHz CP-OFDM 16-QAM - Full RB)



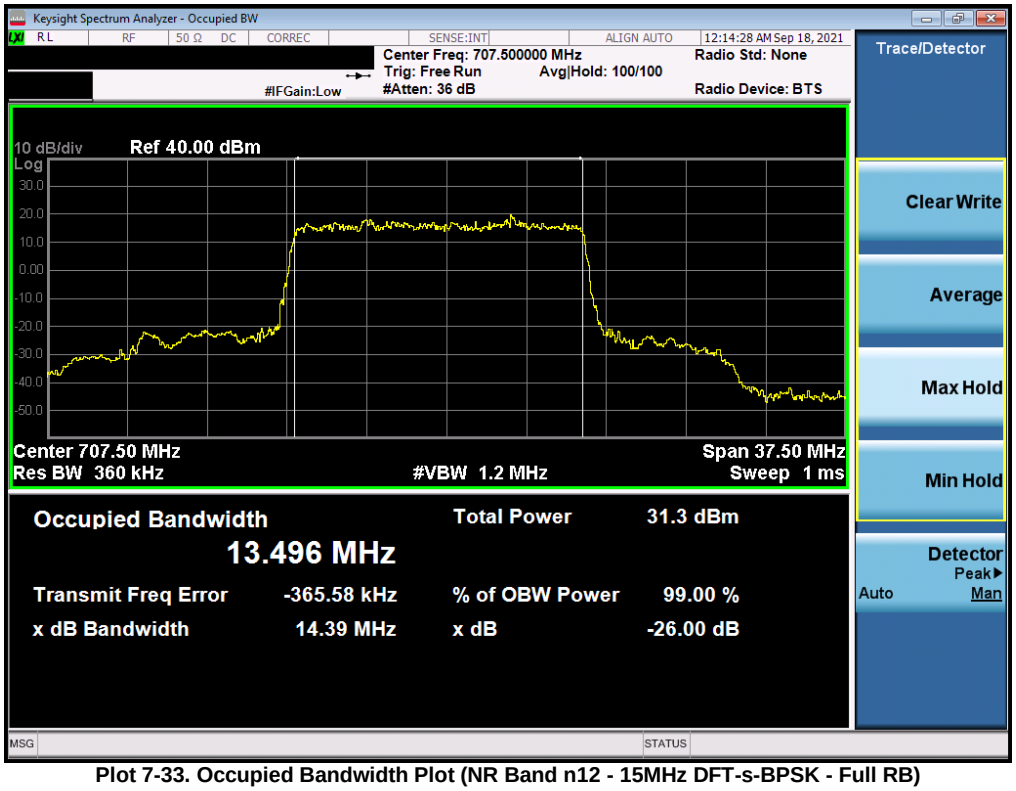
Plot 7-30. Occupied Bandwidth Plot (NR Band n71 - 5MHz DFT-s-BPSK - Full RB)



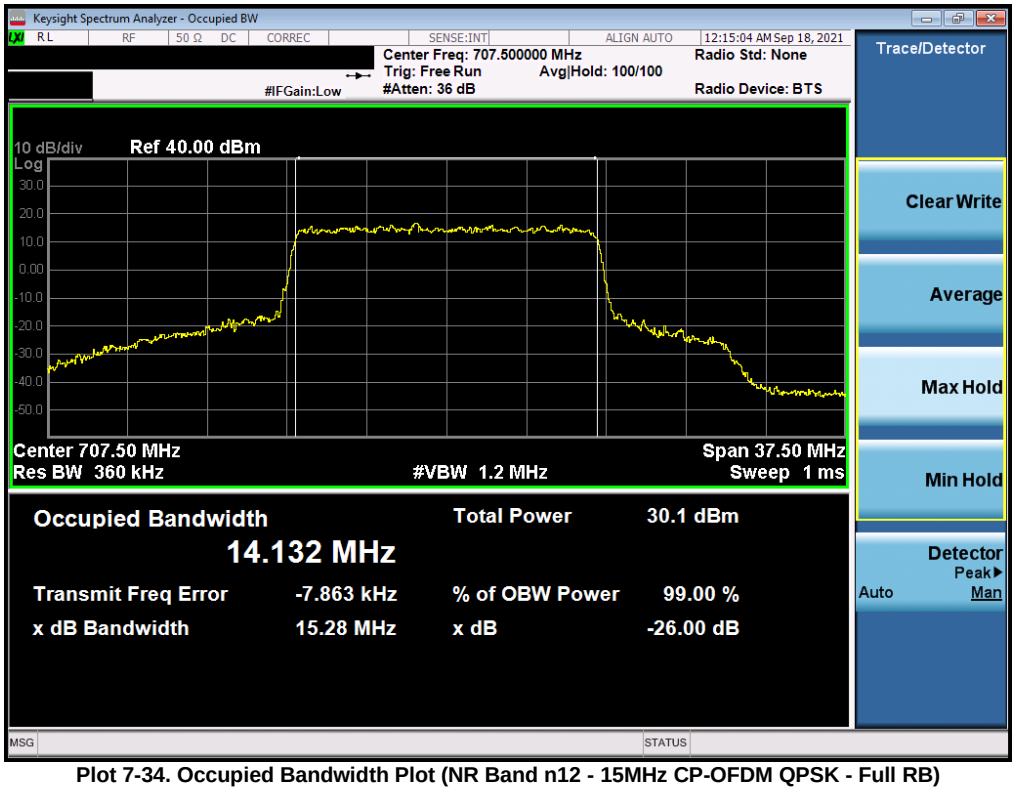
Plot 7-31. Occupied Bandwidth Plot (NR Band n71 - 5MHz CP-OFDM QPSK - Full RB)



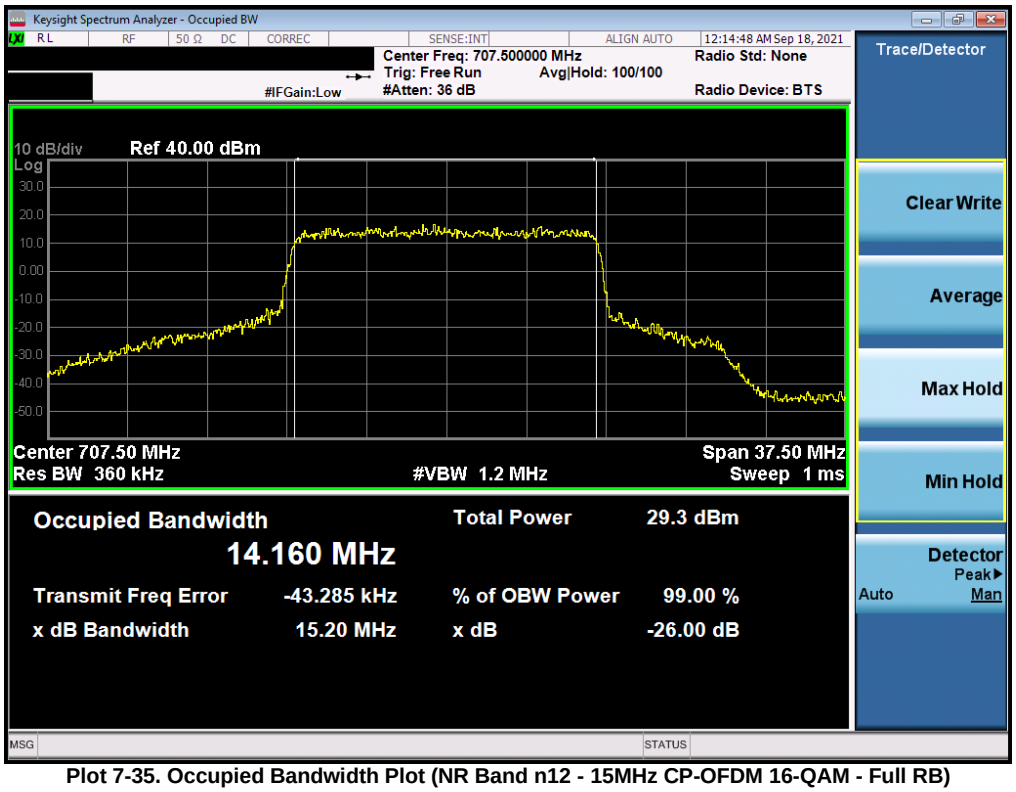
Plot 7-32. Occupied Bandwidth Plot (NR Band n71 - 5MHz CP-OFDM 16-QAM - Full RB)



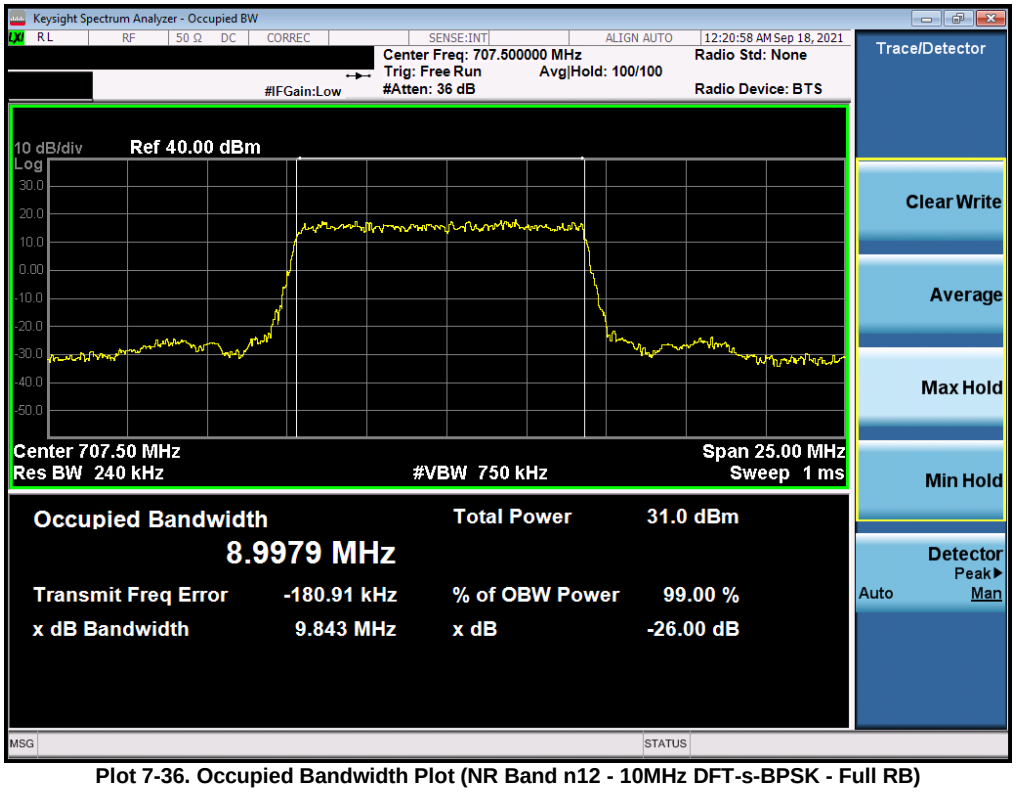
Plot 7-33. Occupied Bandwidth Plot (NR Band n12 - 15MHz DFT-s-BPSK - Full RB)



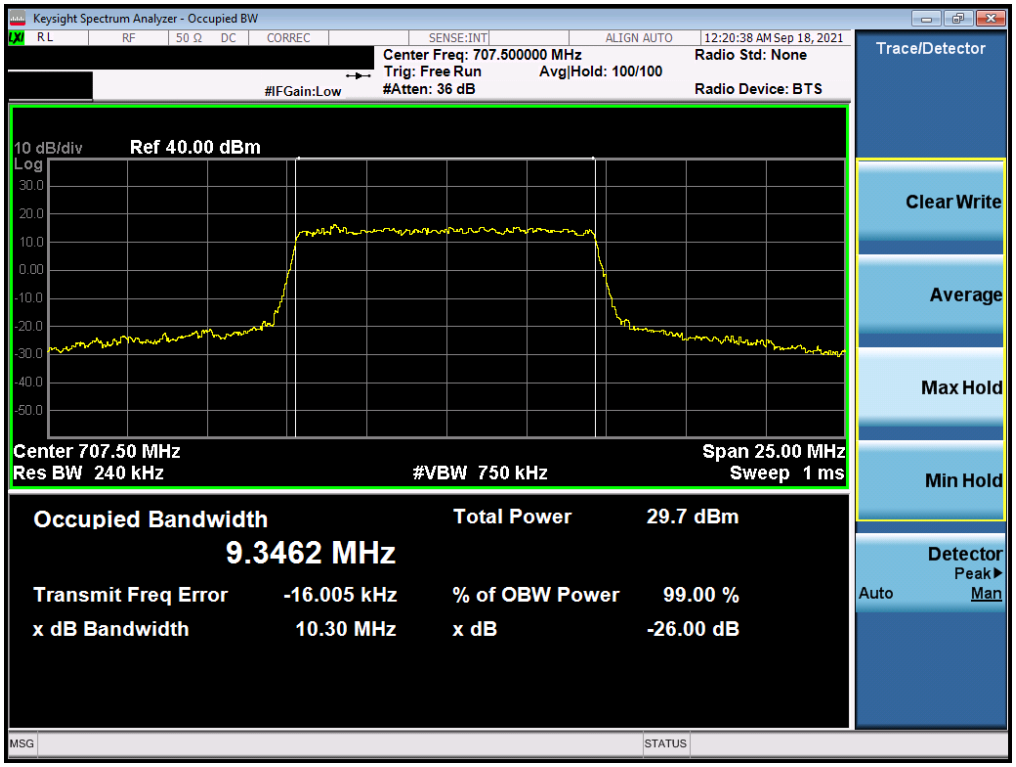
Plot 7-34. Occupied Bandwidth Plot (NR Band n12 - 15MHz CP-OFDM QPSK - Full RB)



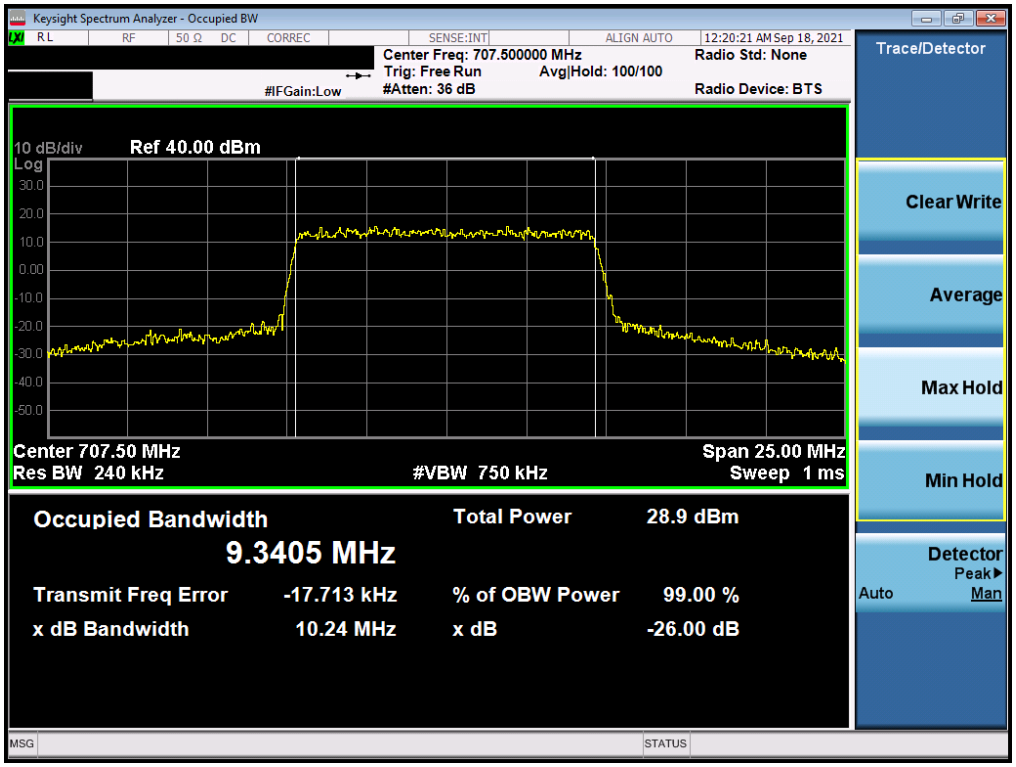
Plot 7-35. Occupied Bandwidth Plot (NR Band n12 - 15MHz CP-OFDM 16-QAM - Full RB)



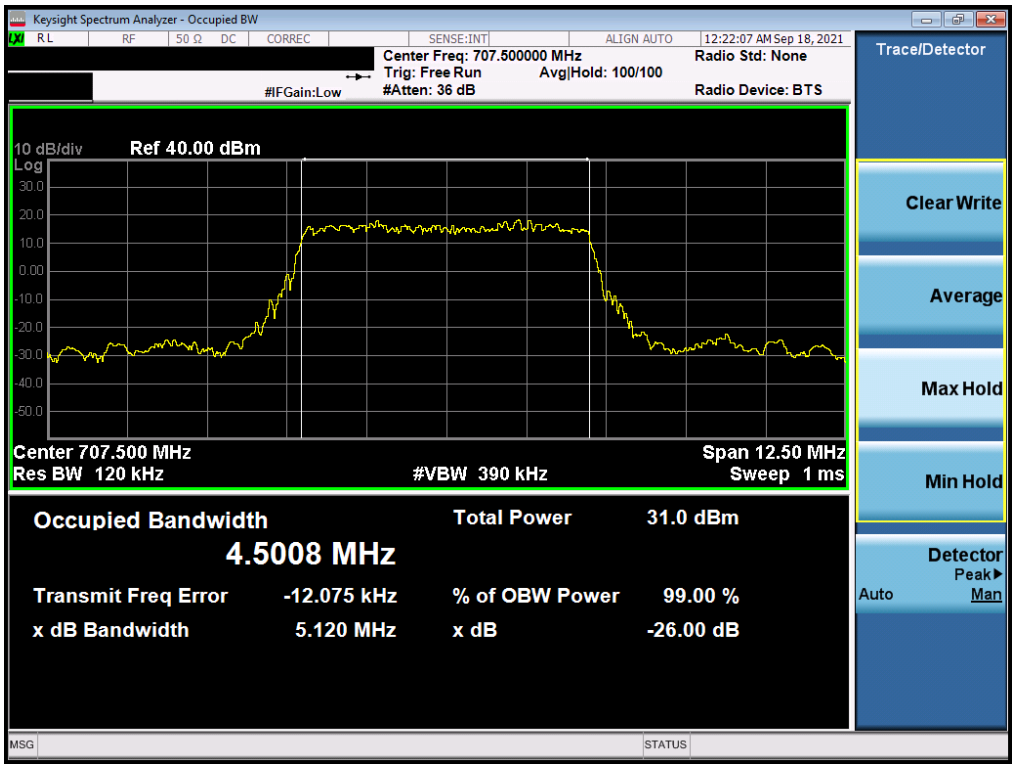
Plot 7-36. Occupied Bandwidth Plot (NR Band n12 - 10MHz DFT-s-BPSK - Full RB)



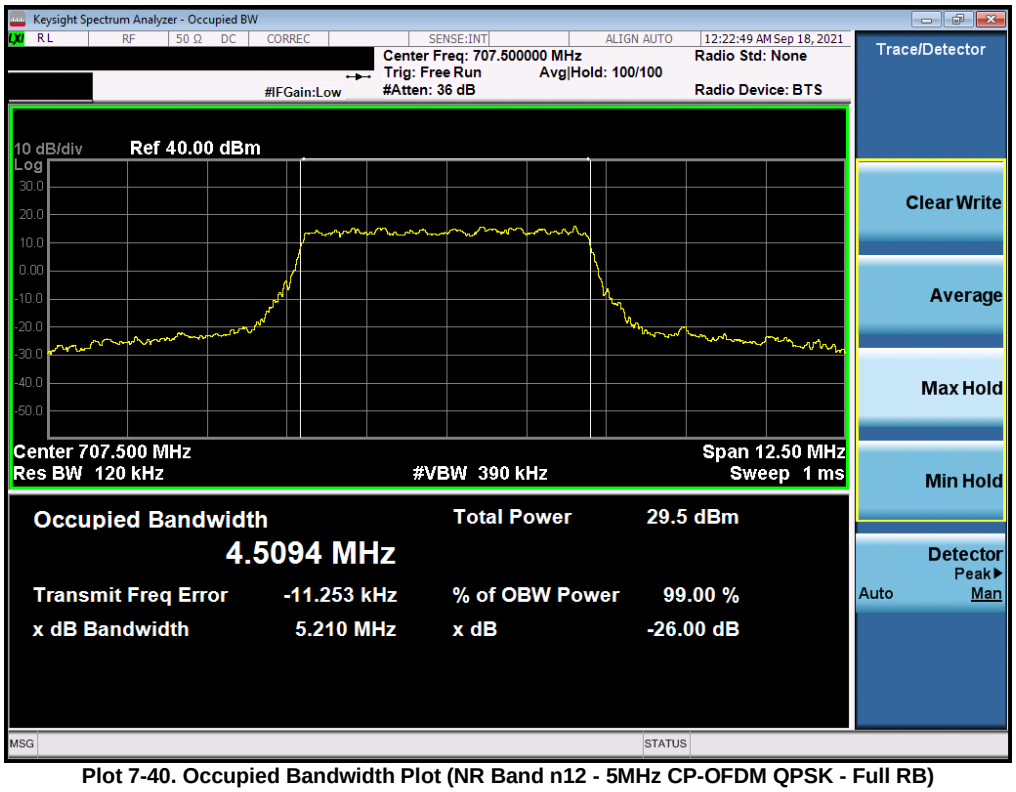
Plot 7-37. Occupied Bandwidth Plot (NR Band n12 - 10MHz CP-OFDM QPSK - Full RB)



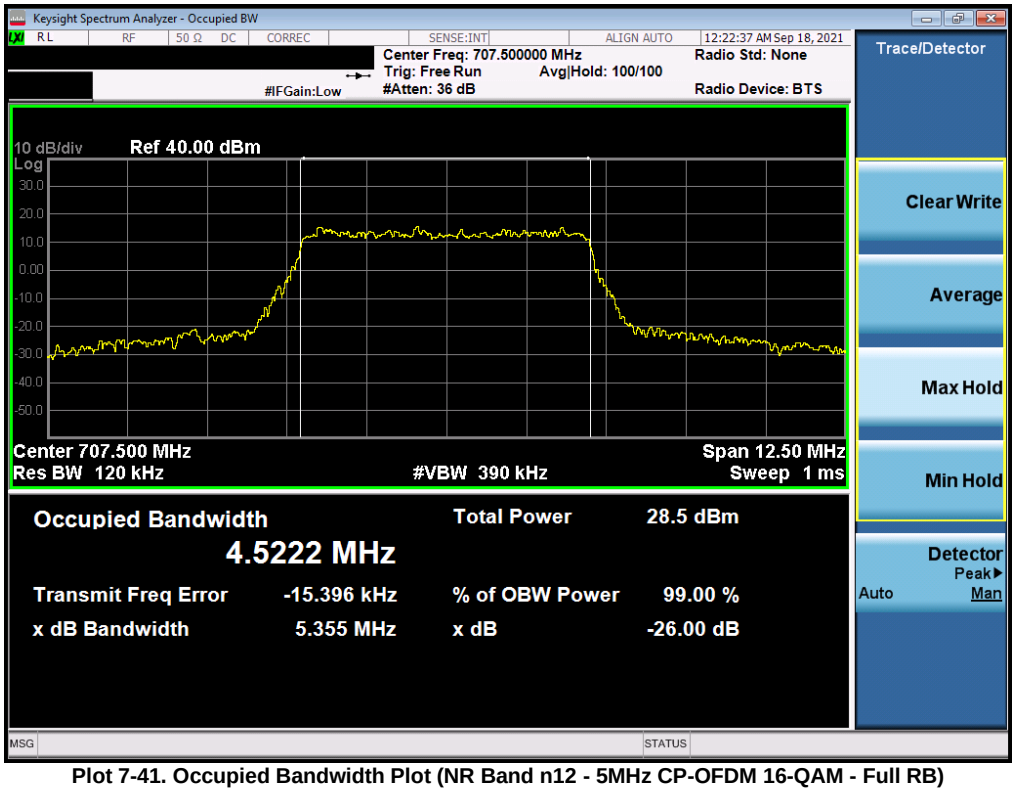
Plot 7-38. Occupied Bandwidth Plot (NR Band n12 - 10MHz CP-OFDM 16-QAM - Full RB)



Plot 7-39. Occupied Bandwidth Plot (NR Band n12 - 5MHz DFT-s-BPSK - Full RB)

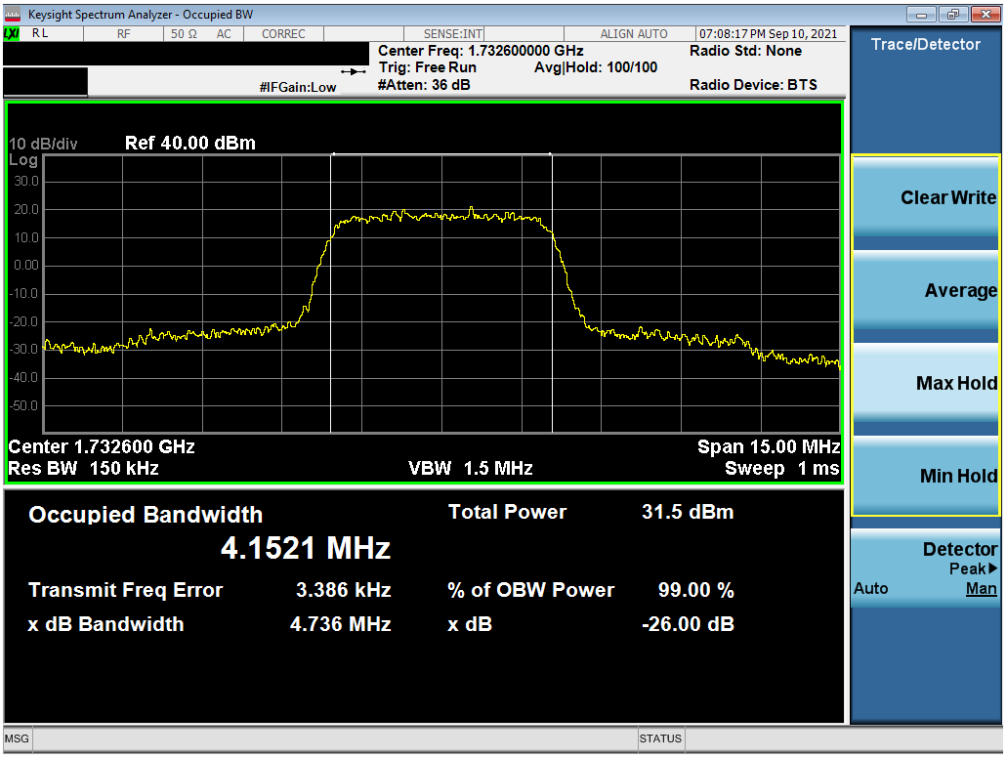


Plot 7-40. Occupied Bandwidth Plot (NR Band n12 - 5MHz CP-OFDM QPSK - Full RB)

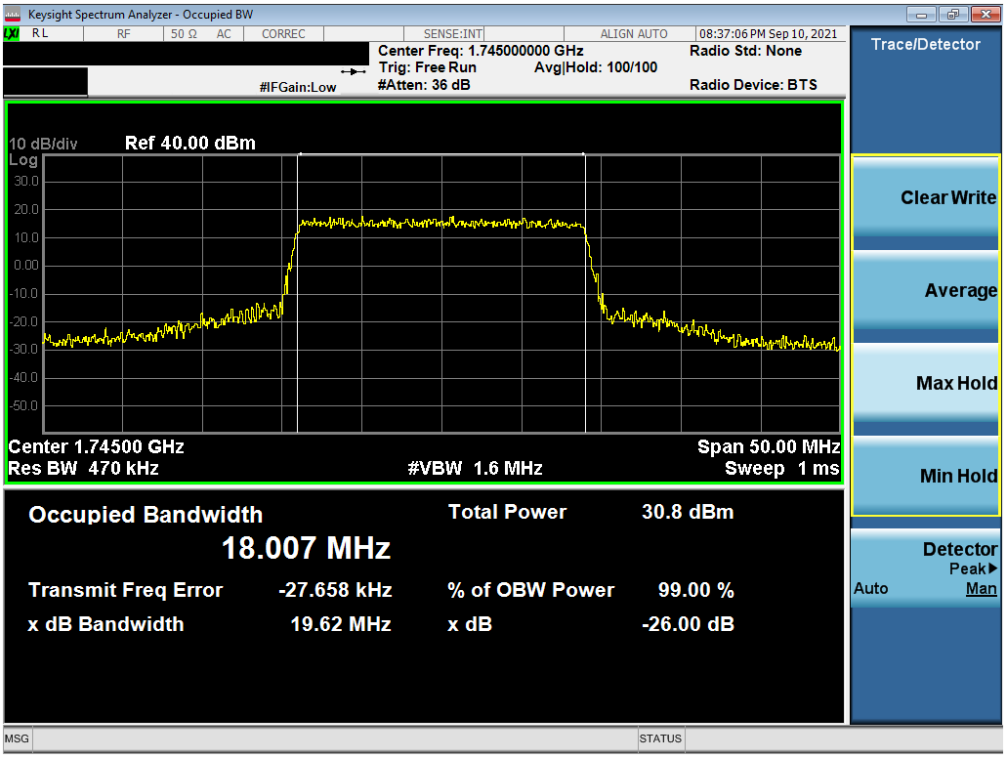


Plot 7-41. Occupied Bandwidth Plot (NR Band n12 - 5MHz CP-OFDM 16-QAM - Full RB)

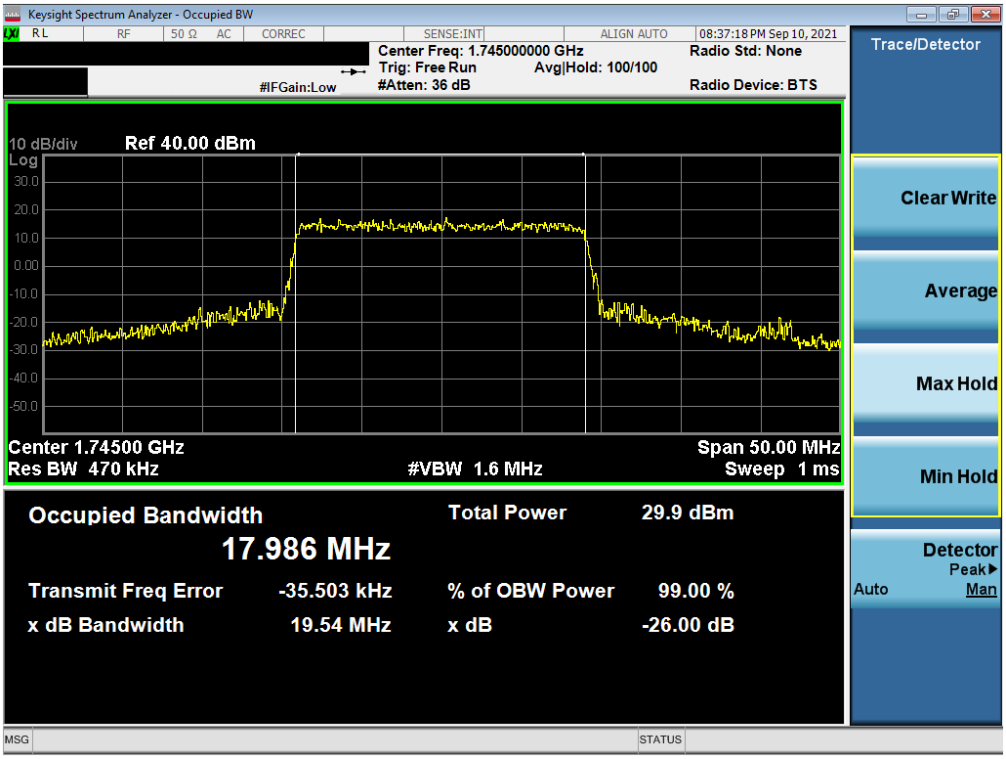
WCDMA AWS



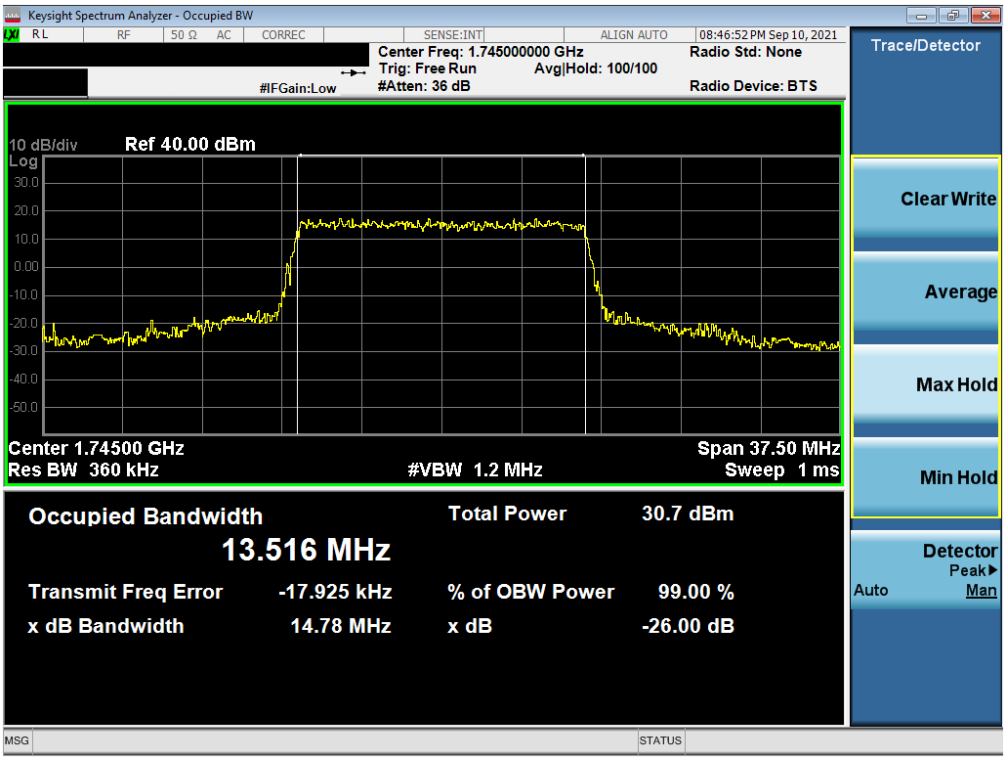
Plot 7-42. Occupied Bandwidth Plot (WCDMA, Ch. 1413)



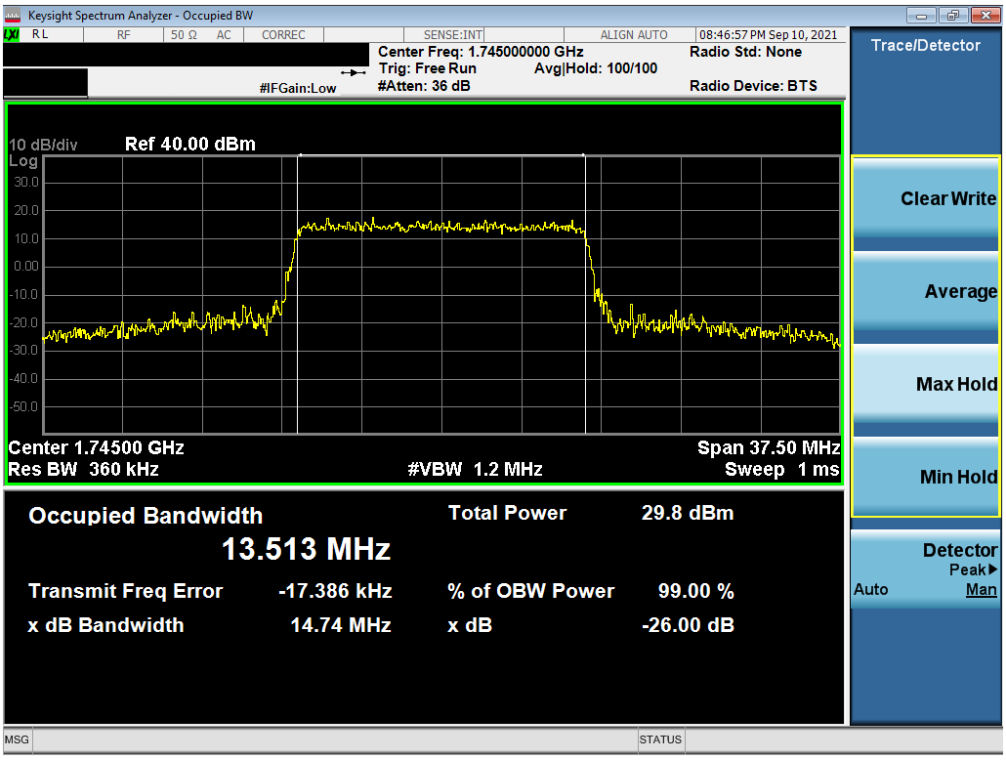
Plot 7-43. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz QPSK - Full RB)



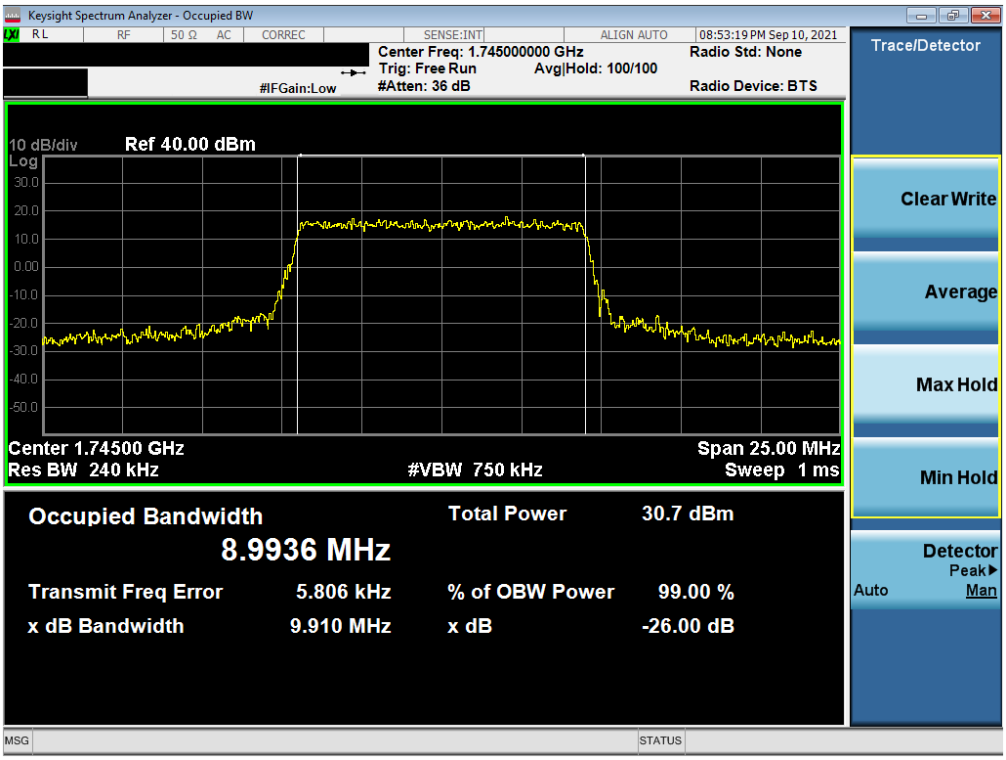
Plot 7-44. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz 16-QAM - Full RB)



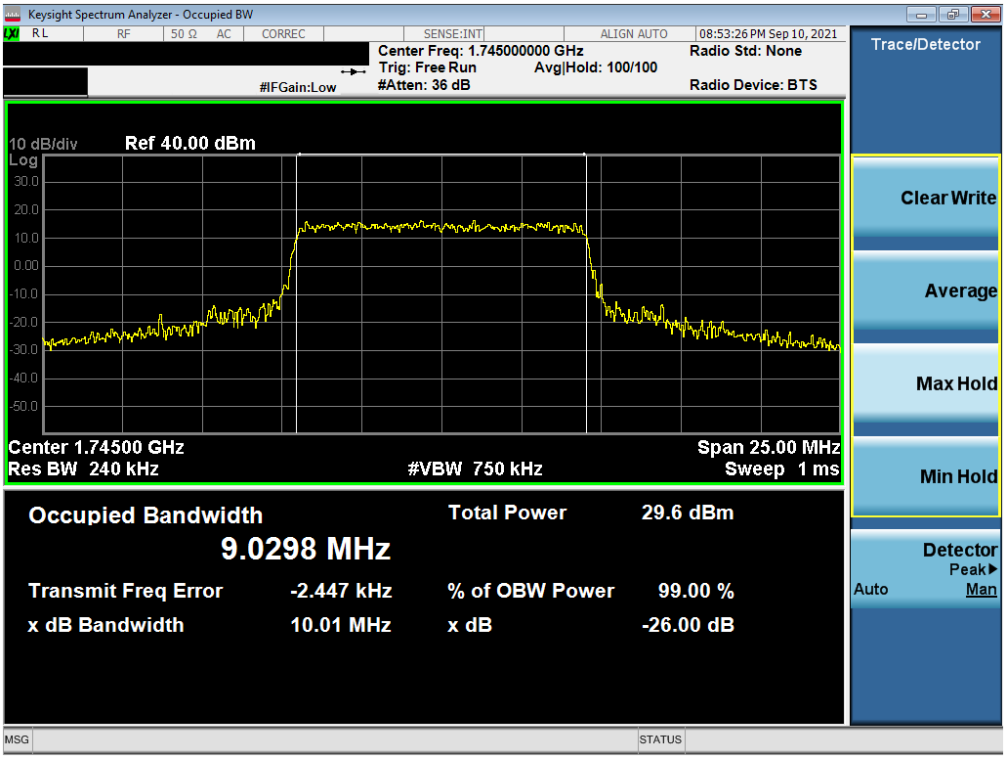
Plot 7-45. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz QPSK - Full RB)



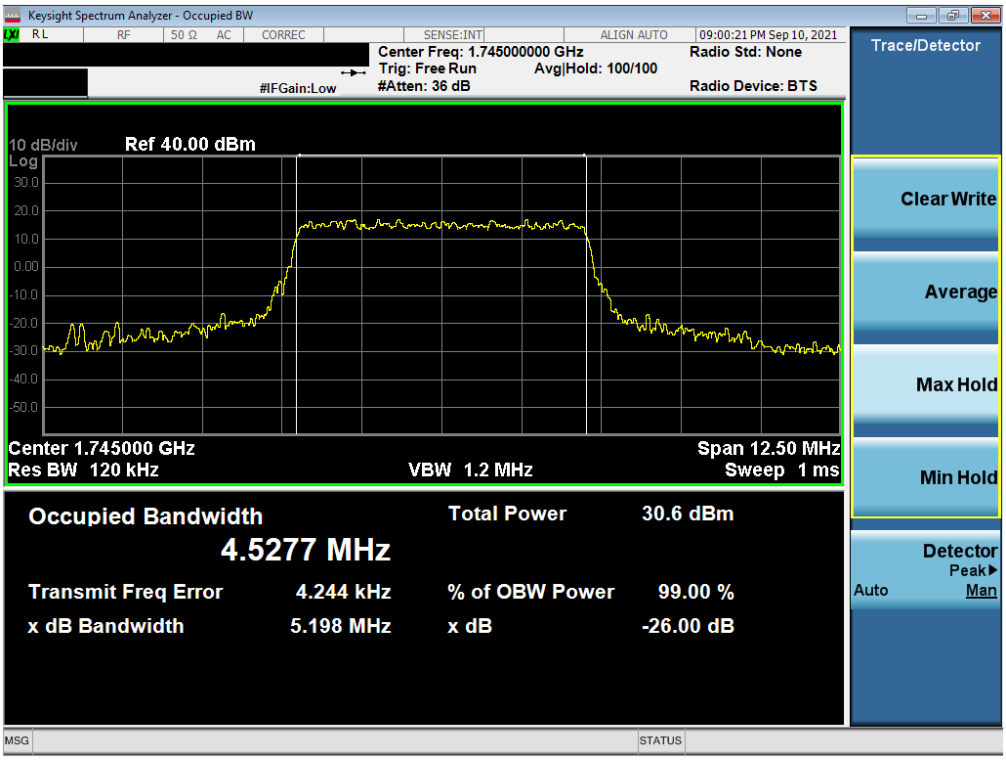
Plot 7-46. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz 16-QAM - Full RB)



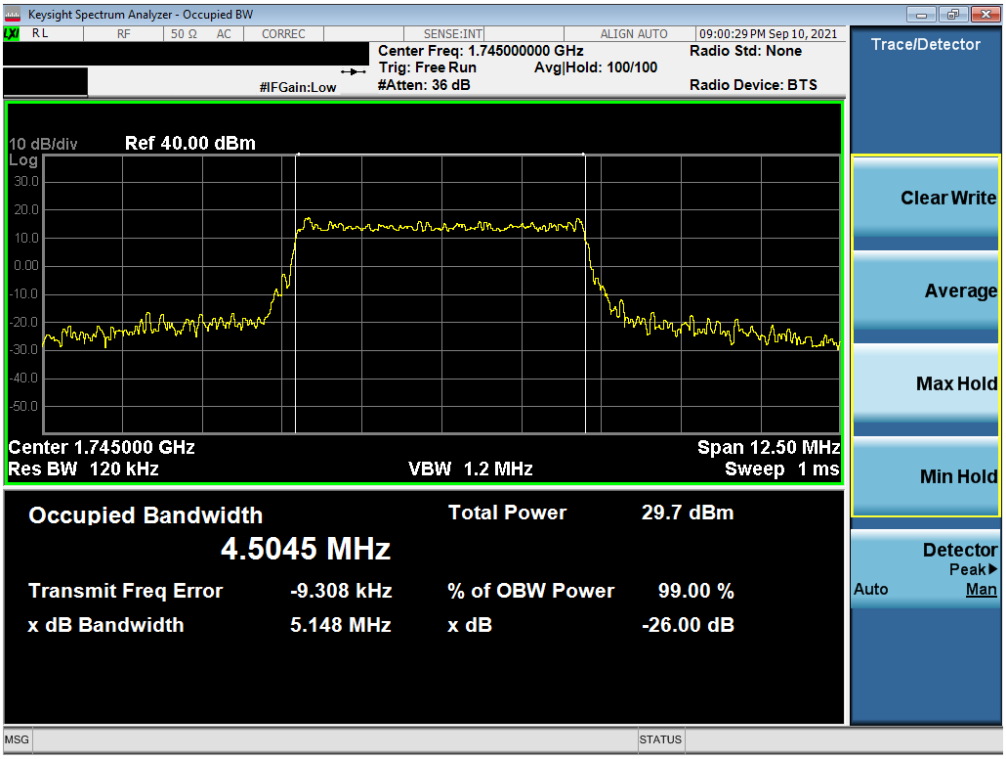
Plot 7-47. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz QPSK - Full RB)



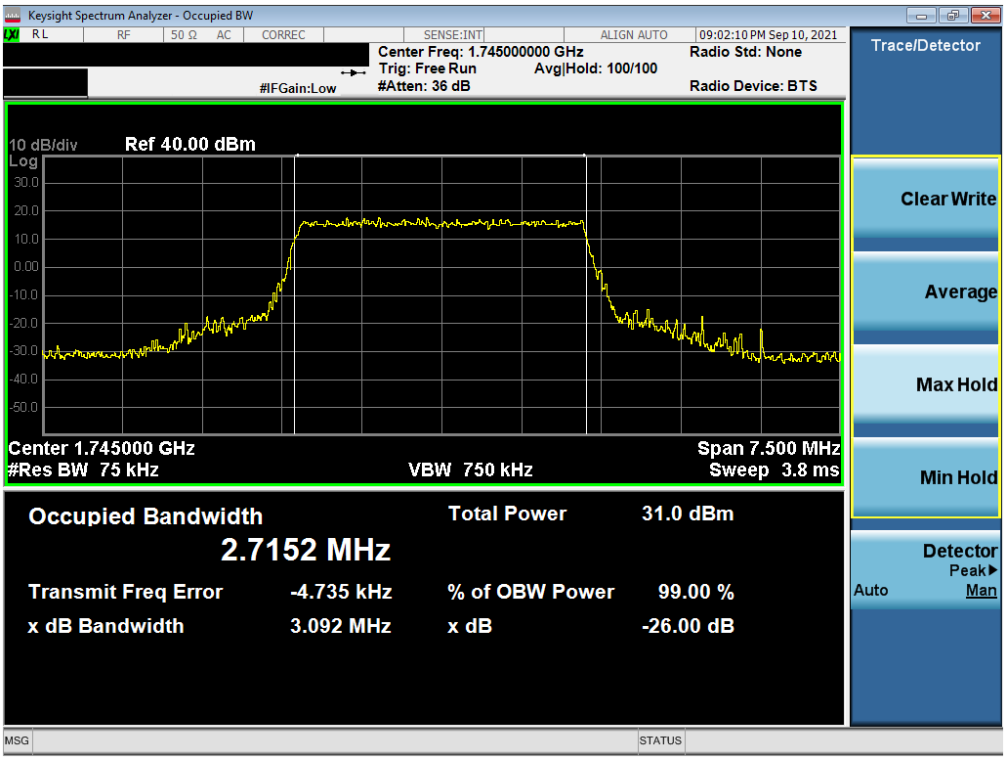
Plot 7-48. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz 16-QAM - Full RB)



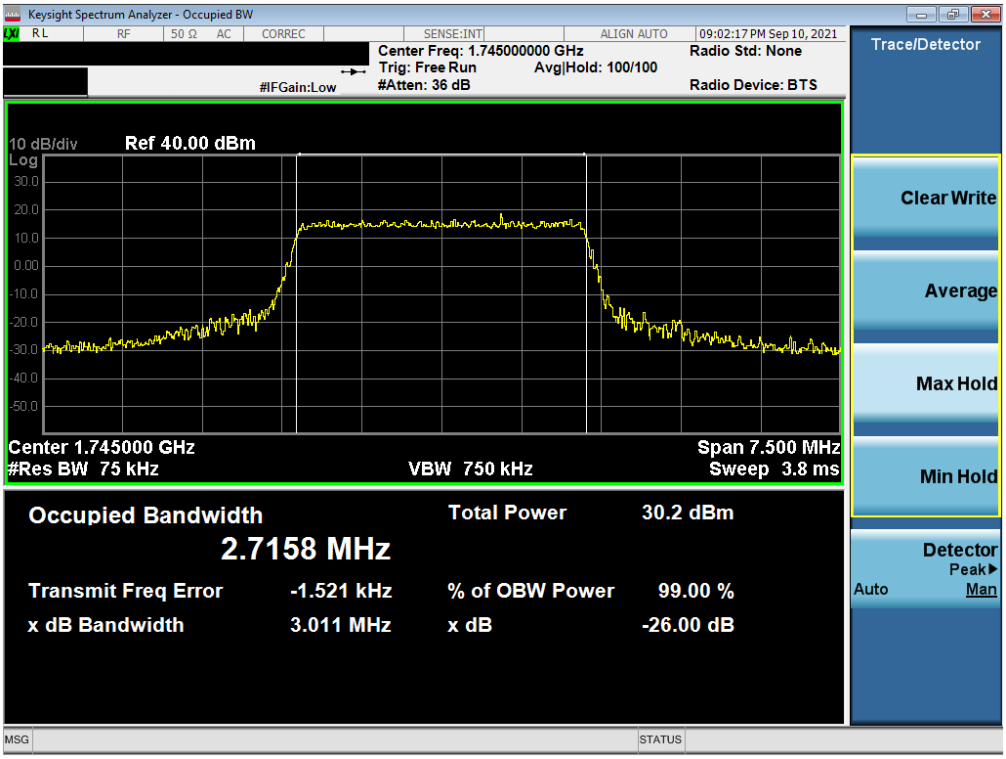
Plot 7-49. Occupied Bandwidth Plot (LTE Band 66/4 - 5MHz QPSK - Full RB)



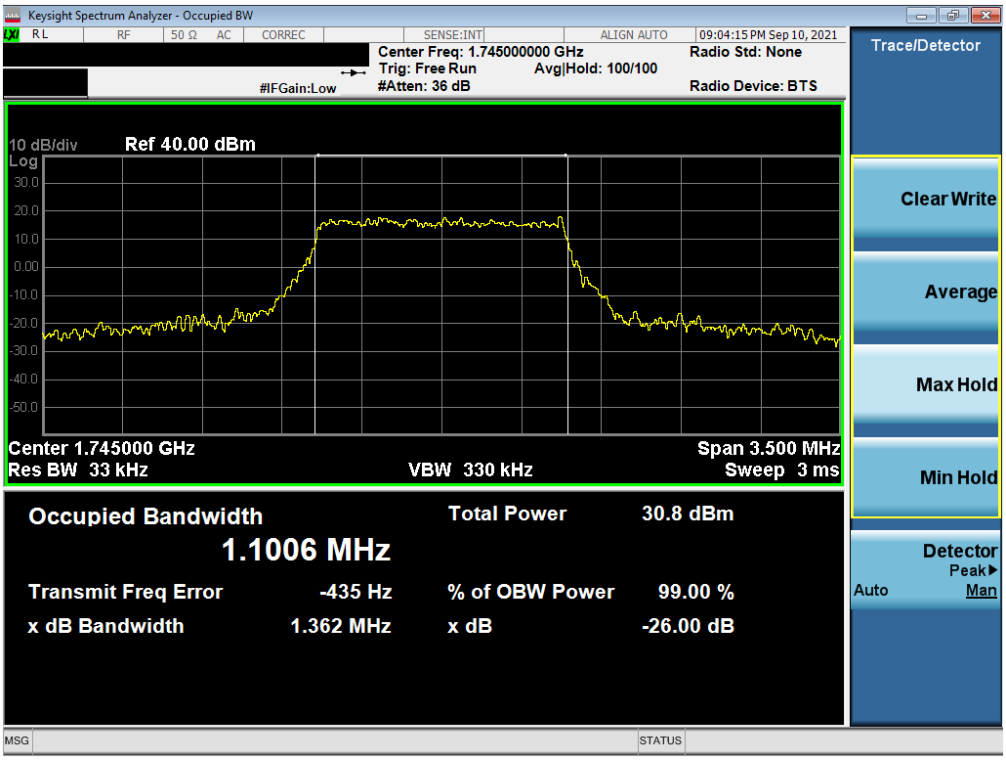
Plot 7-50. Occupied Bandwidth Plot (LTE Band 66/4 - 5MHz 16-QAM - Full RB)



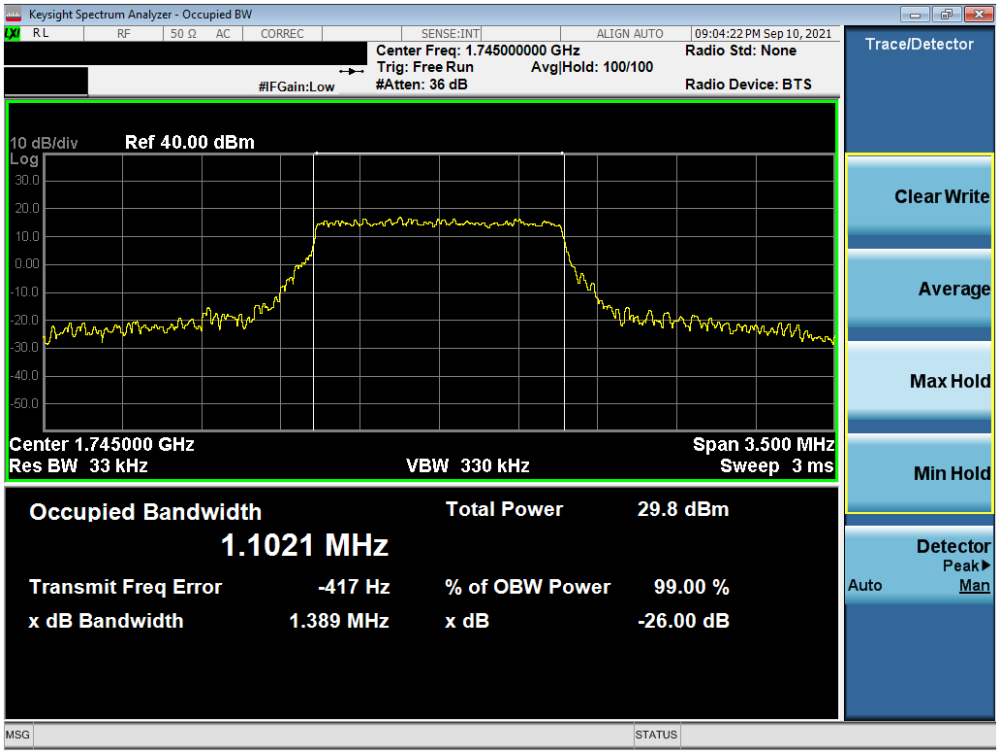
Plot 7-51. Occupied Bandwidth Plot (LTE Band 66/4 - 3MHz QPSK - Full RB)



Plot 7-52. Occupied Bandwidth Plot (LTE Band 66/4 - 3MHz 16-QAM - Full RB)

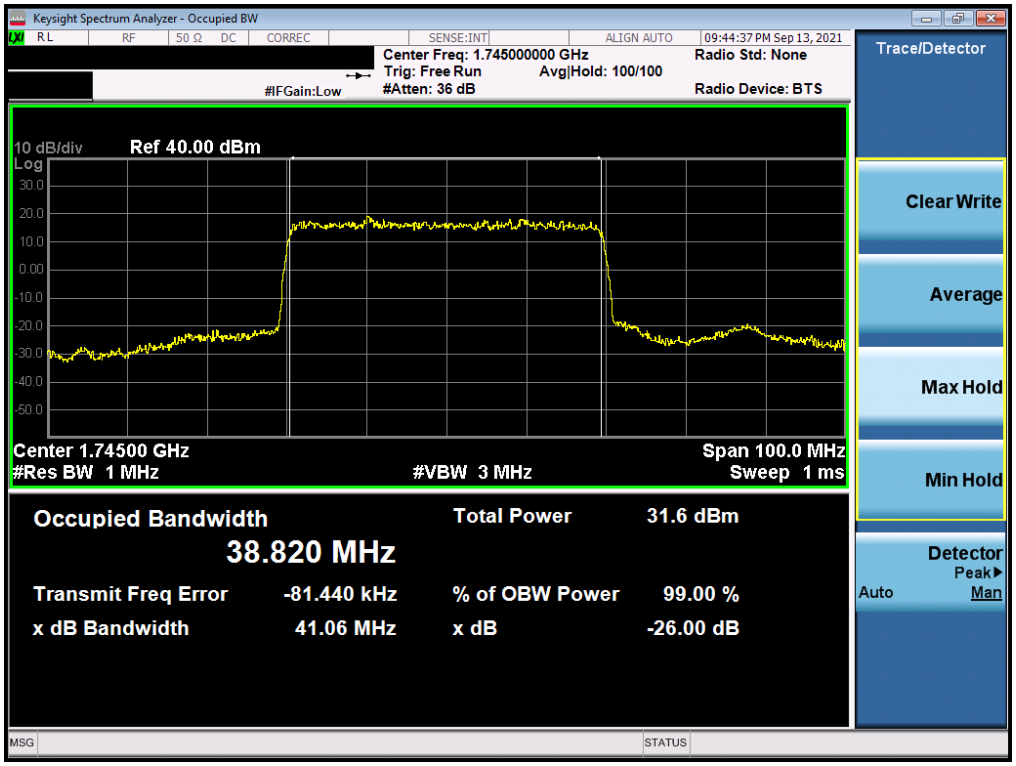


Plot 7-53. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz QPSK - Full RB)

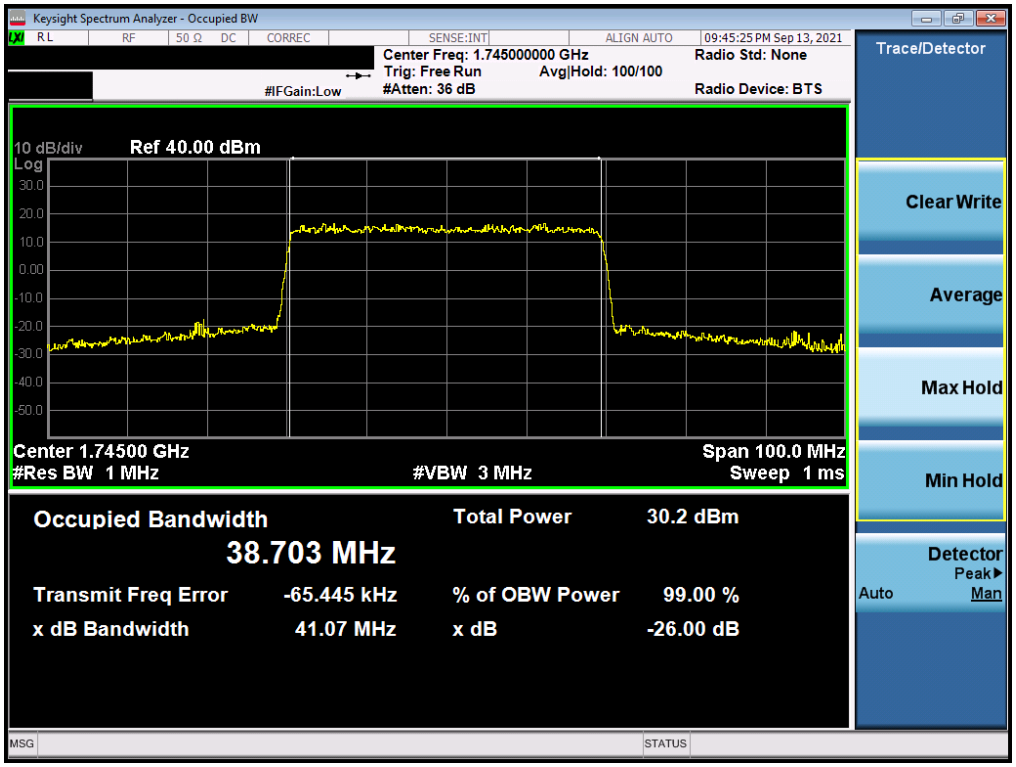


Plot 7-54. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz 16-QAM - Full RB)

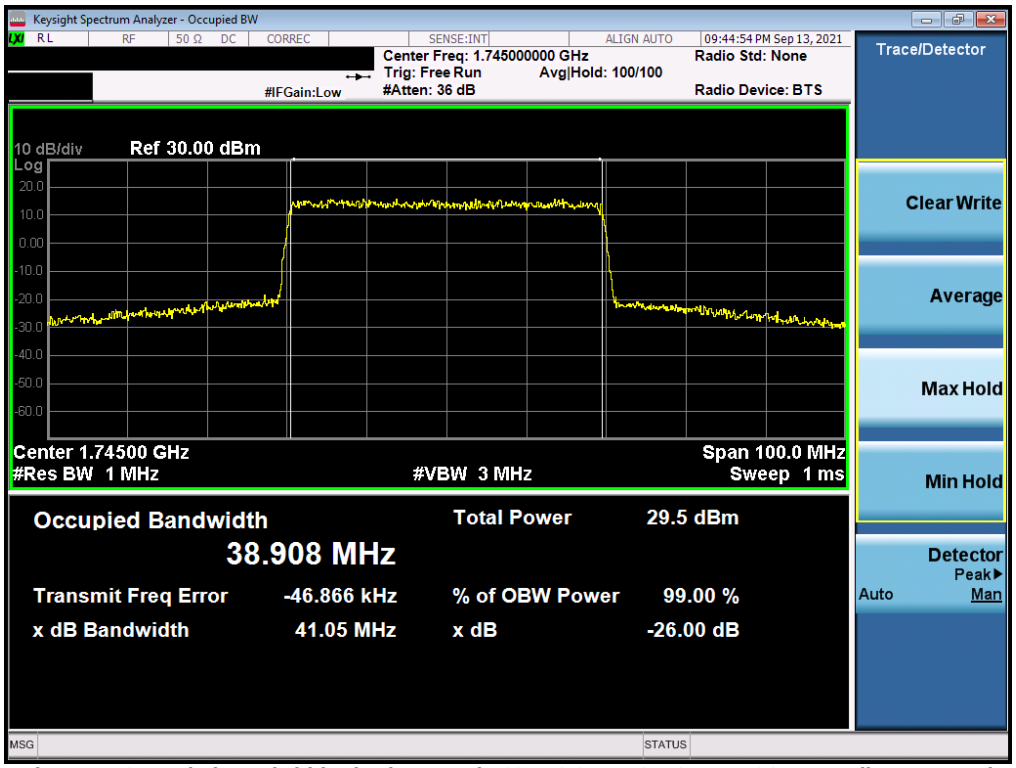
NR Band n66 – Ant A



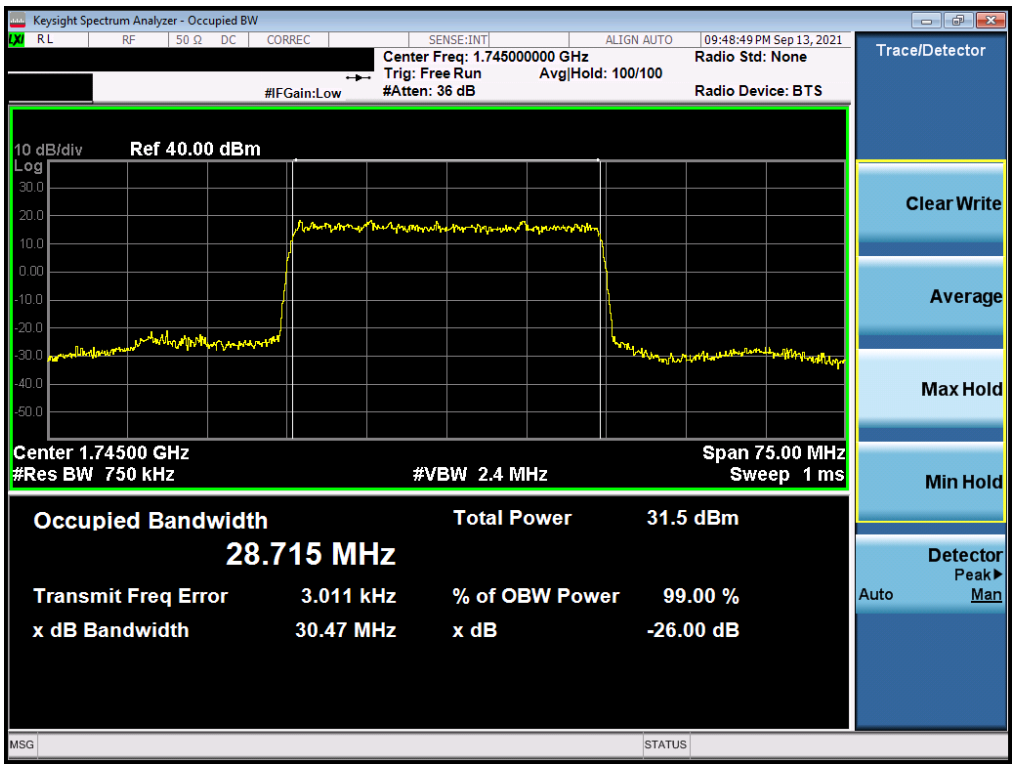
Plot 7-55. Occupied Bandwidth Plot (NR Band n66 - 40MHz DFT-s-BPSK - Full RB – Ant A)



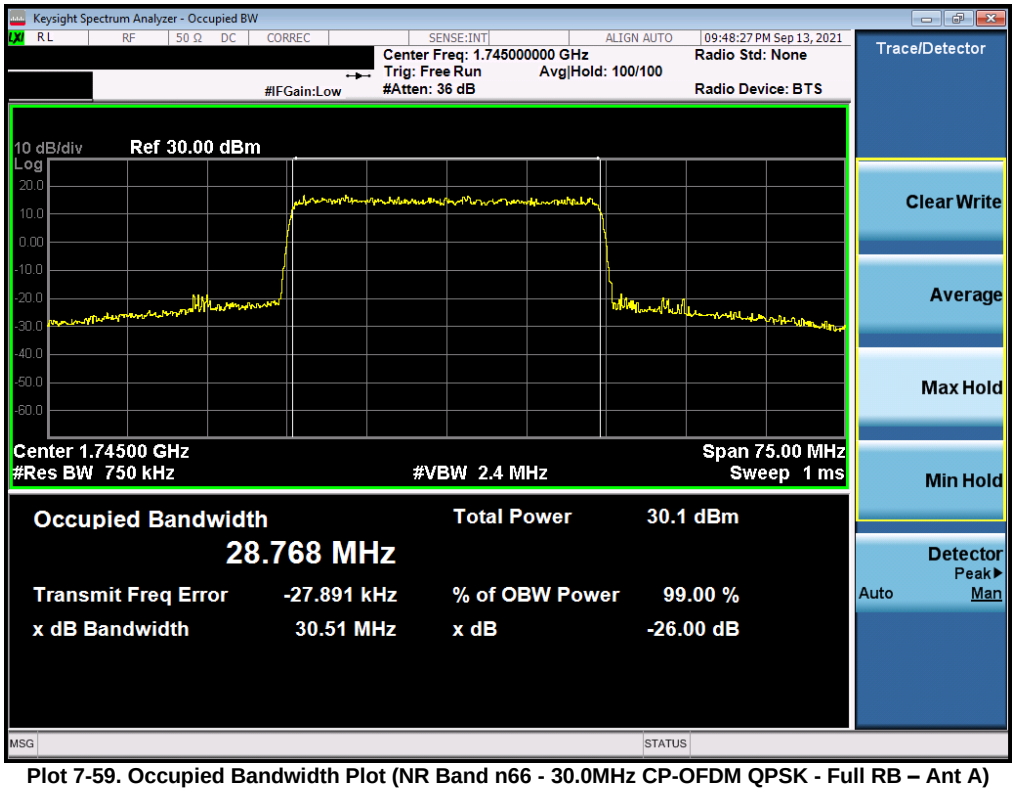
Plot 7-56. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM QPSK - Full RB – Ant A)



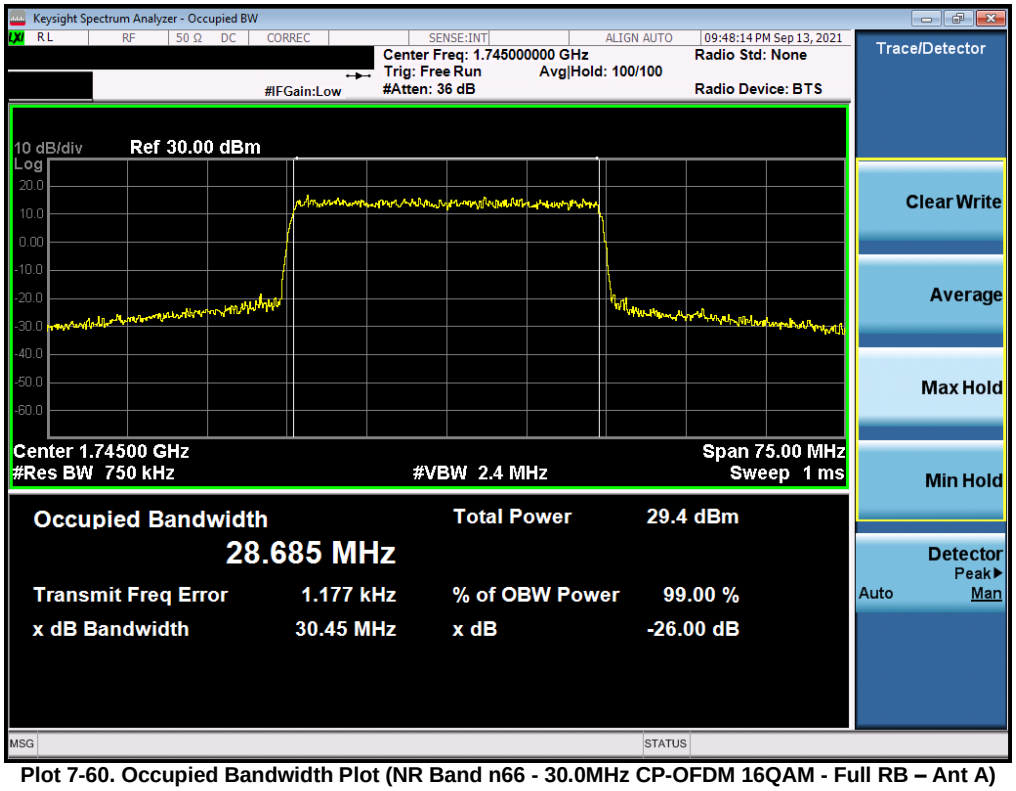
Plot 7-57. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM 16QAM - Full RB – Ant A)



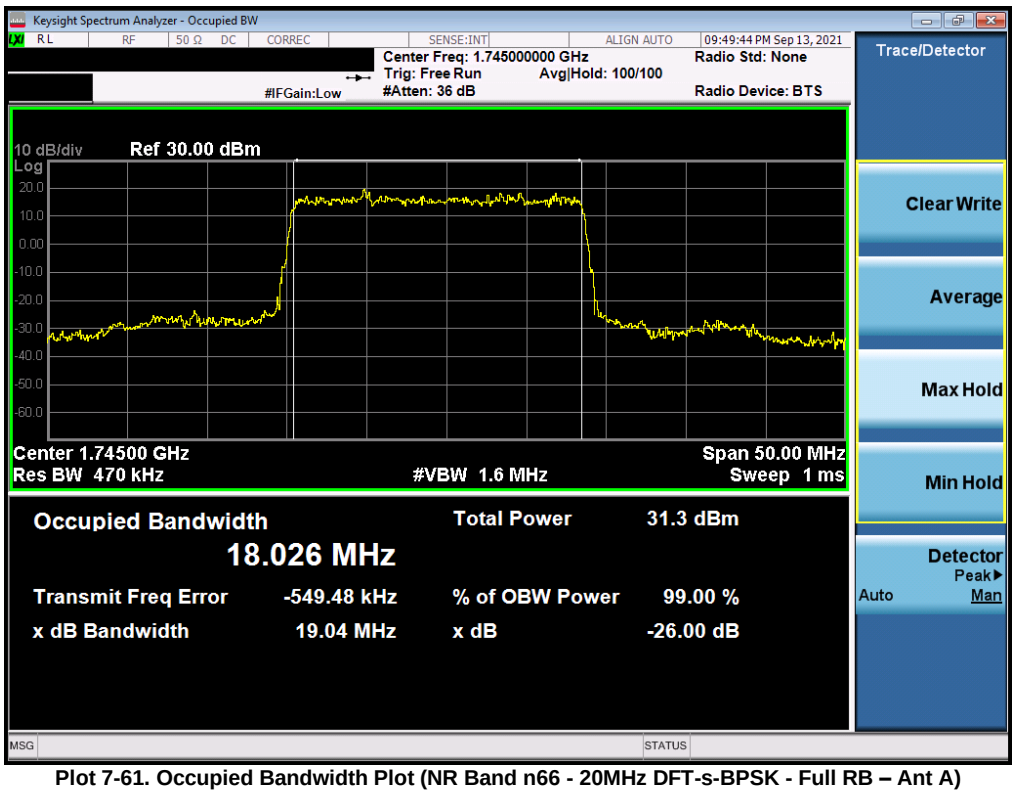
Plot 7-58. Occupied Bandwidth Plot (NR Band n66 - 30MHz DFT-s-BPSK - Full RB – Ant A)



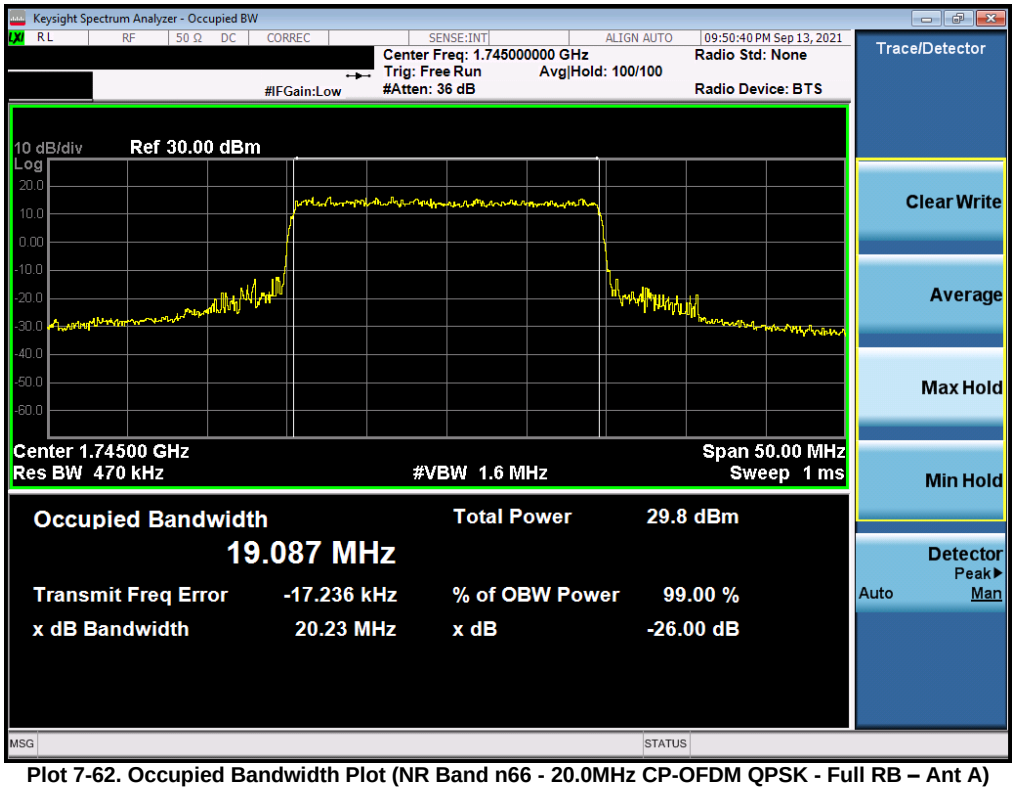
Plot 7-59. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM QPSK - Full RB – Ant A)



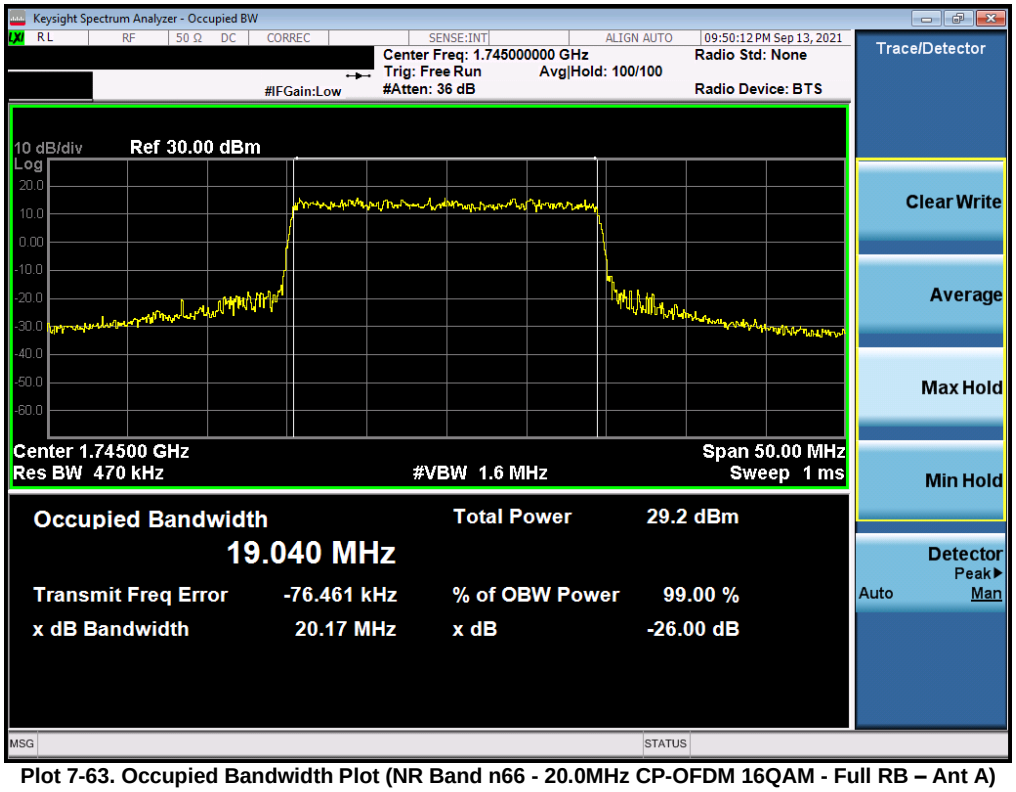
Plot 7-60. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM 16QAM - Full RB – Ant A)



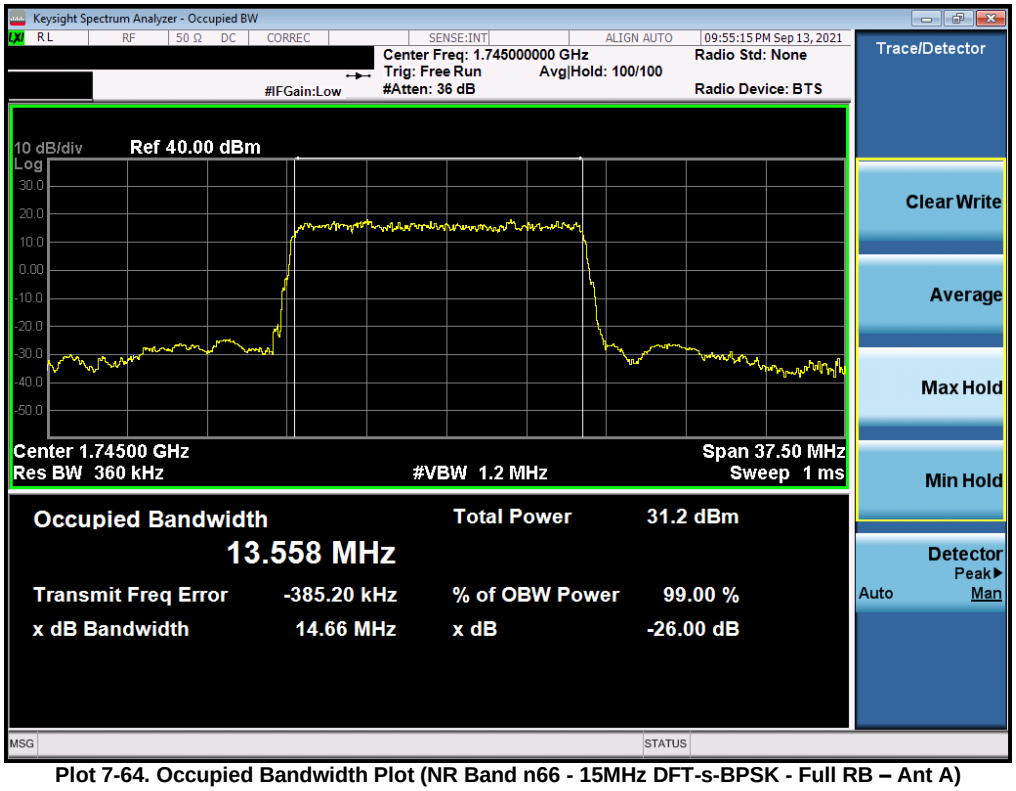
Plot 7-61. Occupied Bandwidth Plot (NR Band n66 - 20MHz DFT-s-BPSK - Full RB – Ant A)



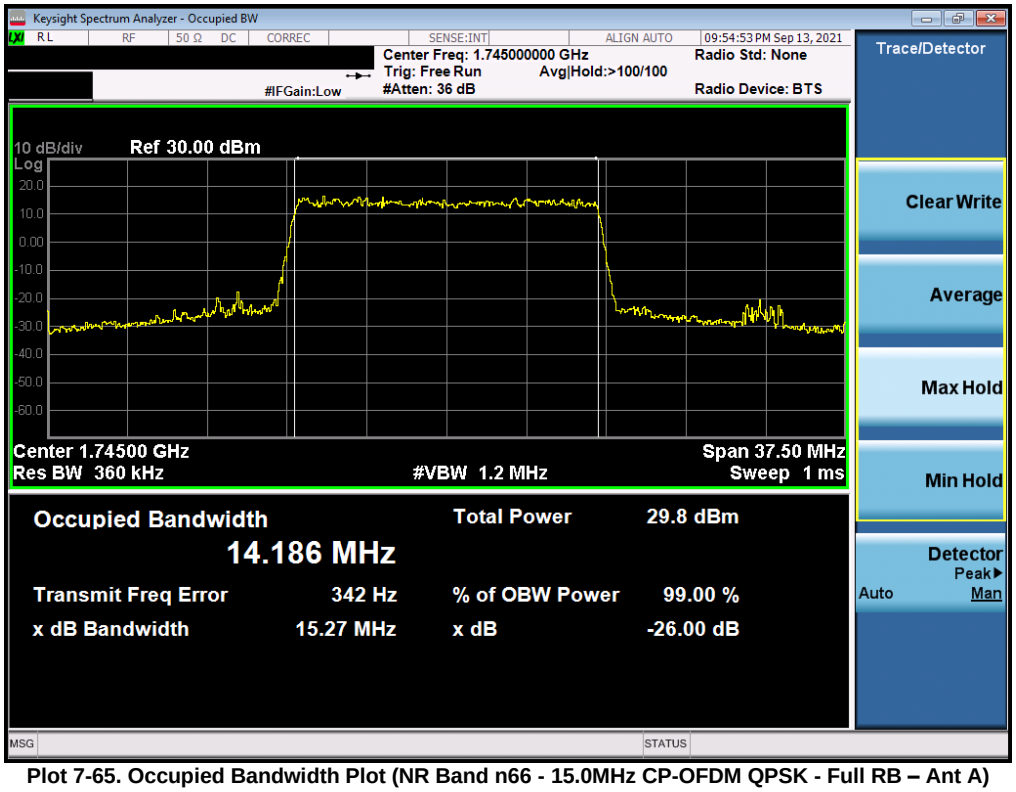
Plot 7-62. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM QPSK - Full RB – Ant A)



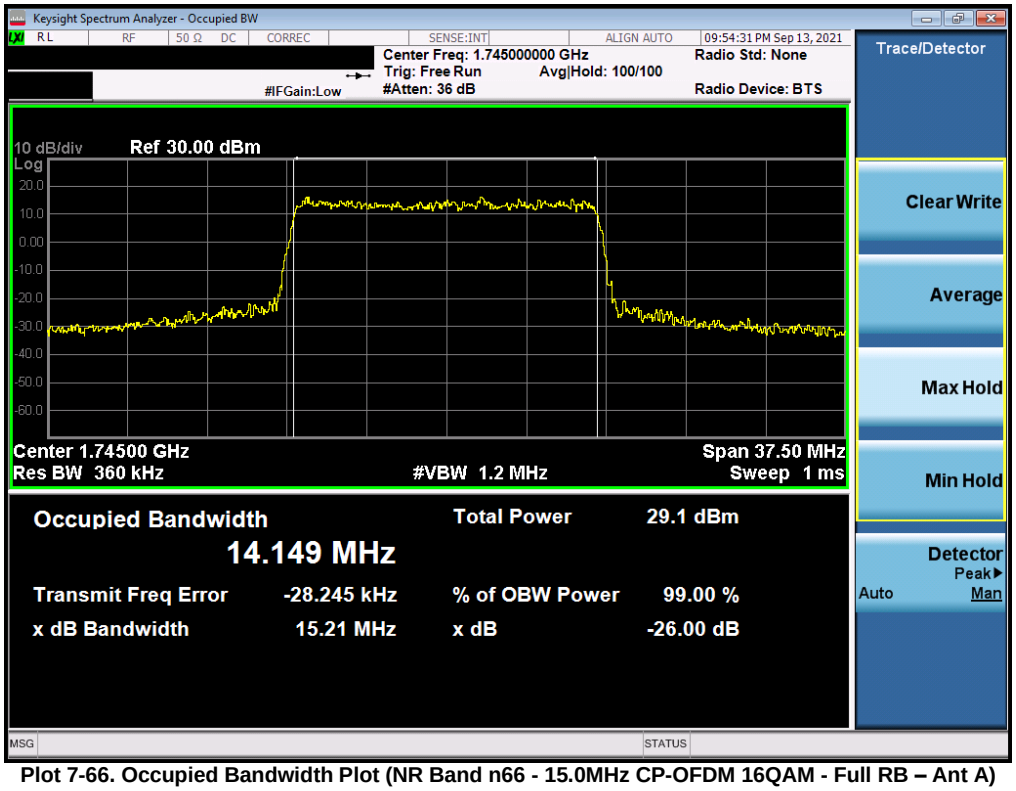
Plot 7-63. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM 16QAM - Full RB – Ant A)



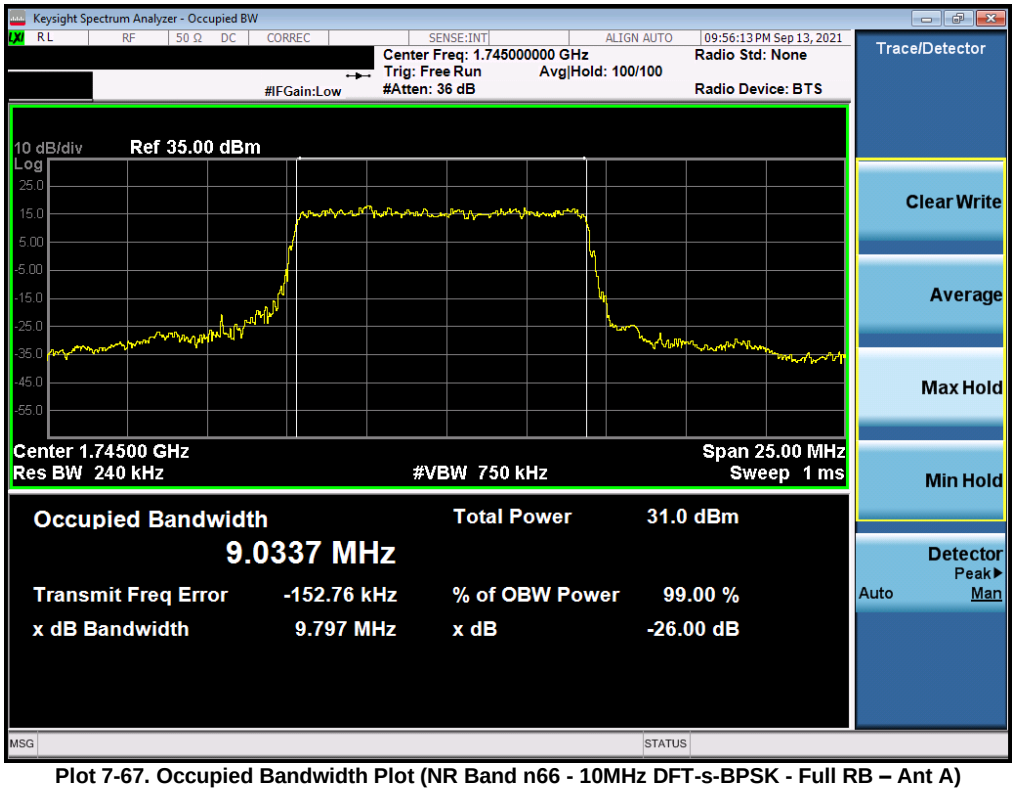
Plot 7-64. Occupied Bandwidth Plot (NR Band n66 - 15MHz DFT-s-BPSK - Full RB – Ant A)



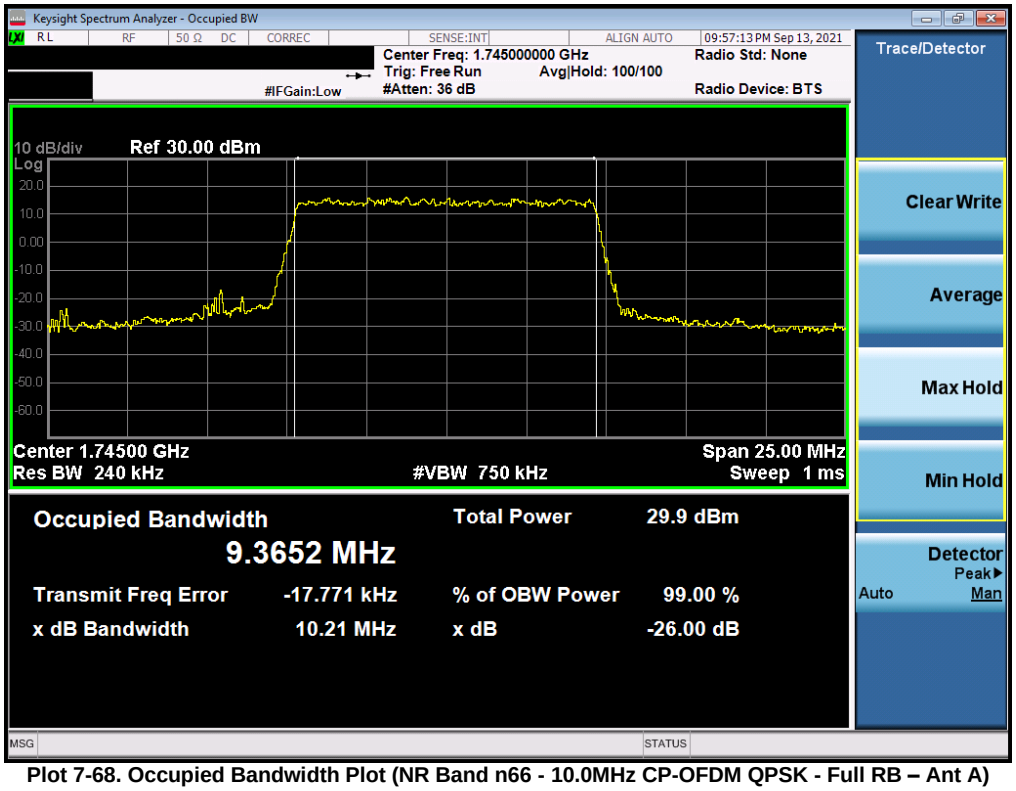
Plot 7-65. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz CP-OFDM QPSK - Full RB – Ant A)



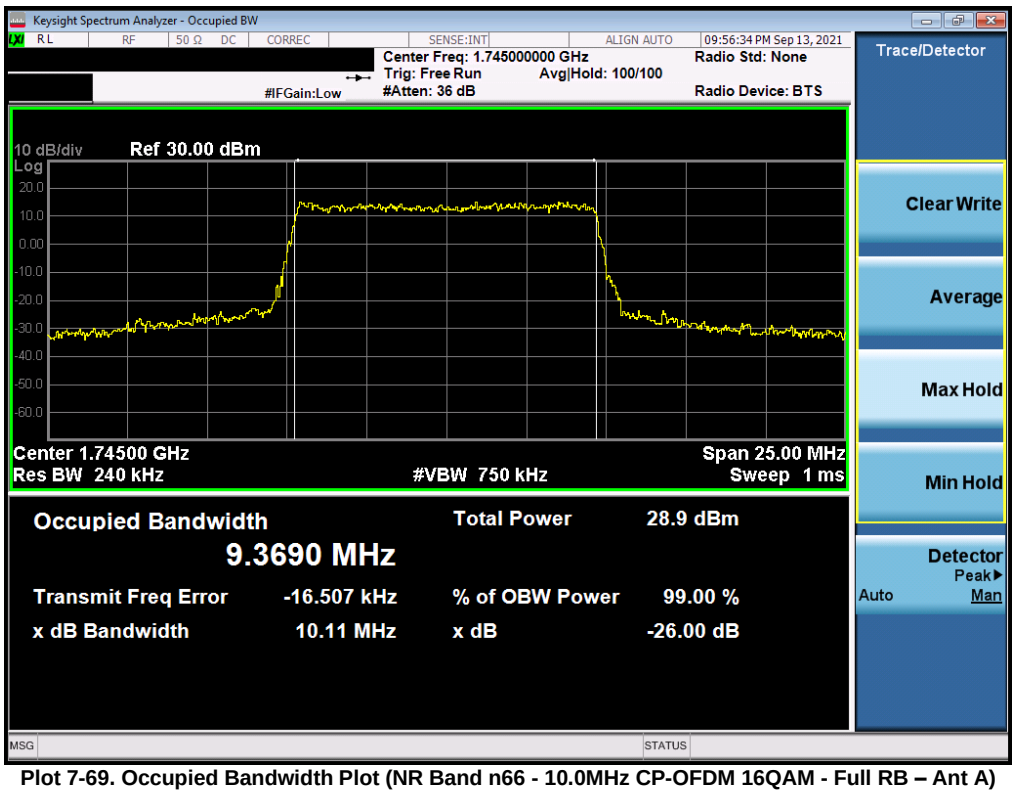
Plot 7-66. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz CP-OFDM 16QAM - Full RB – Ant A)



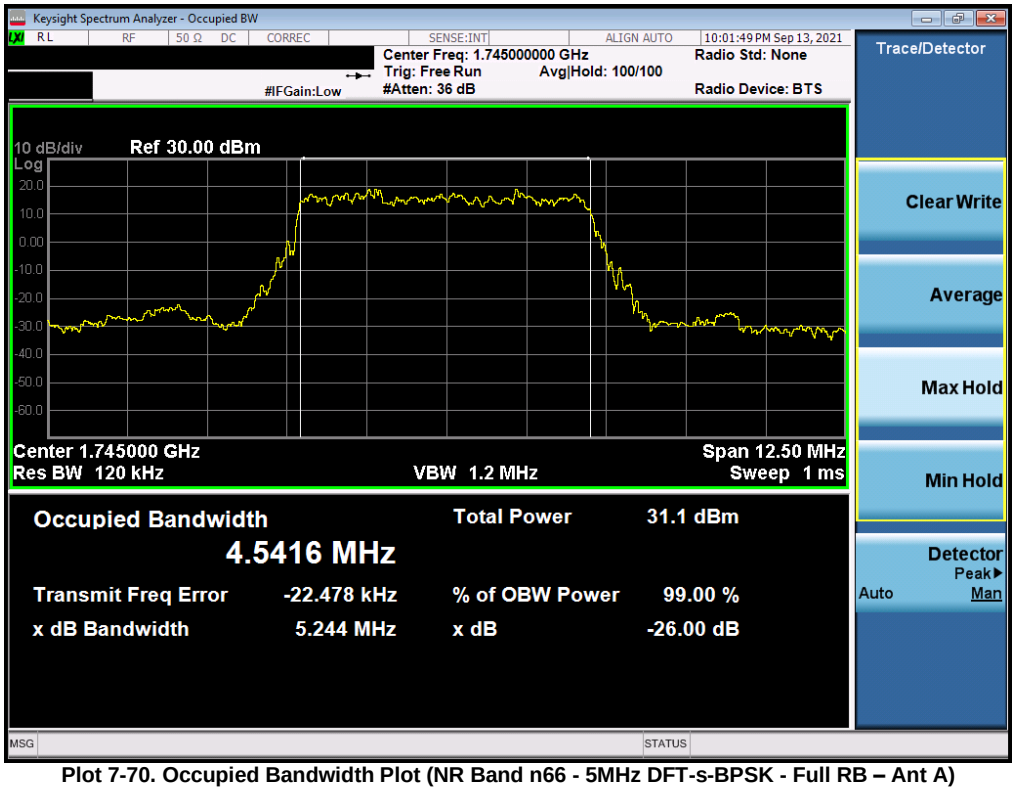
Plot 7-67. Occupied Bandwidth Plot (NR Band n66 - 10MHz DFT-s-BPSK - Full RB – Ant A)



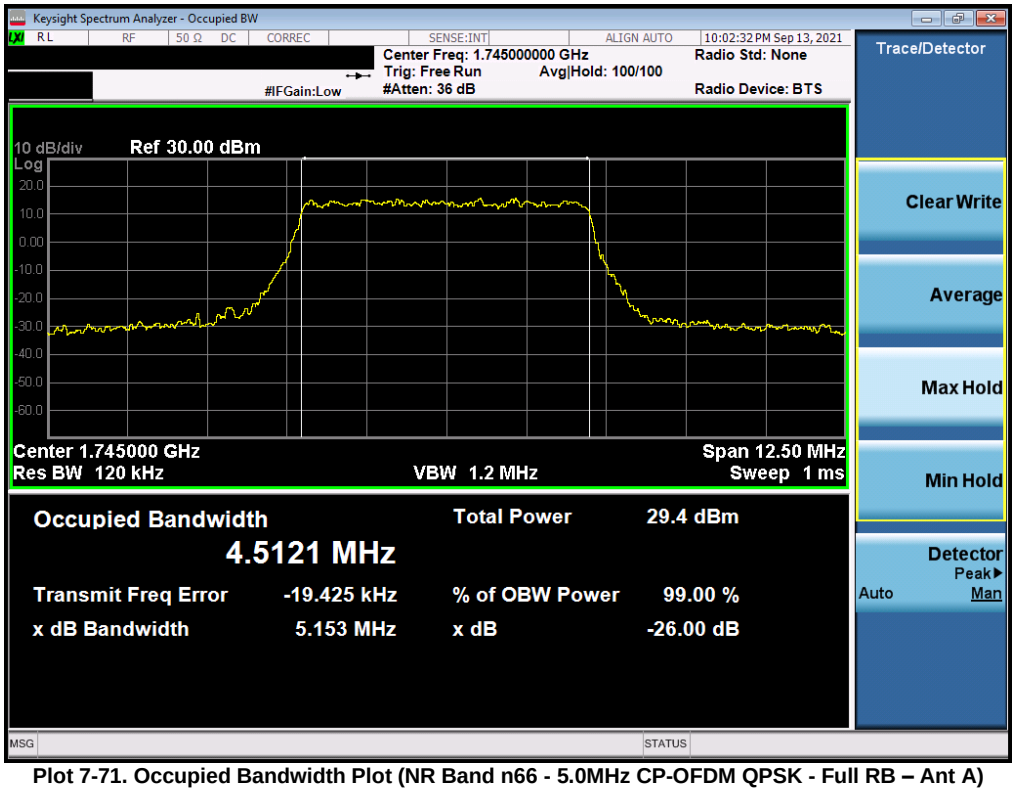
Plot 7-68. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz CP-OFDM QPSK - Full RB – Ant A)



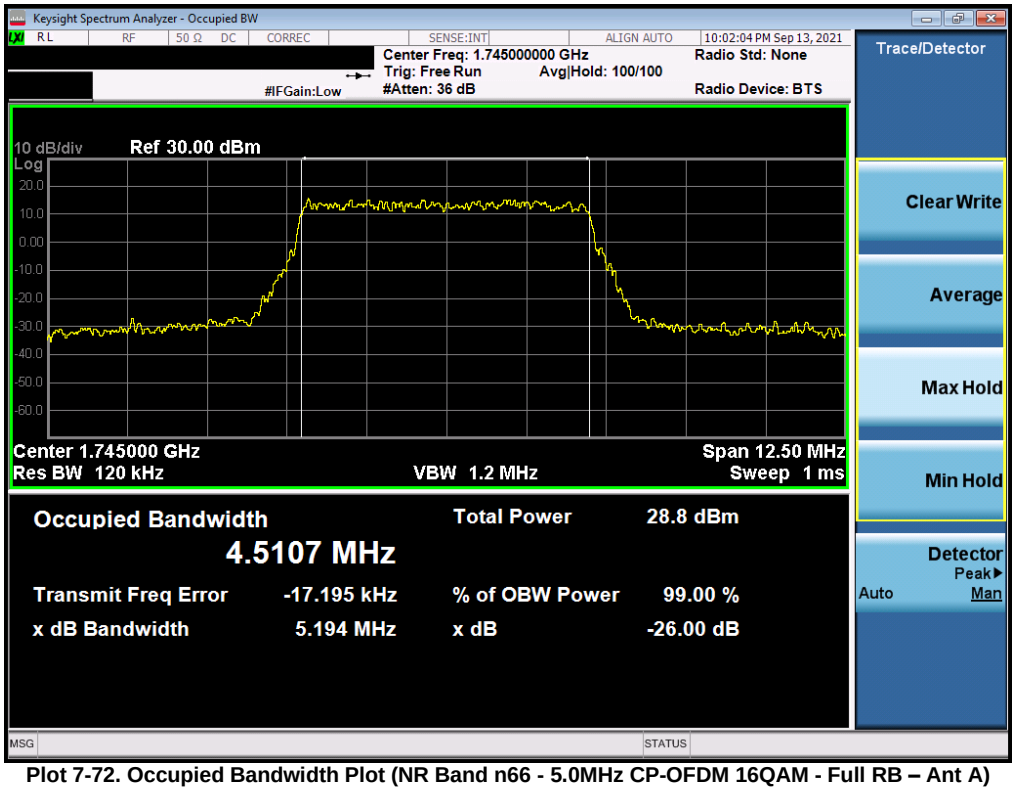
Plot 7-69. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz CP-OFDM 16QAM - Full RB – Ant A)



Plot 7-70. Occupied Bandwidth Plot (NR Band n66 - 5MHz DFT-s-BPSK - Full RB – Ant A)

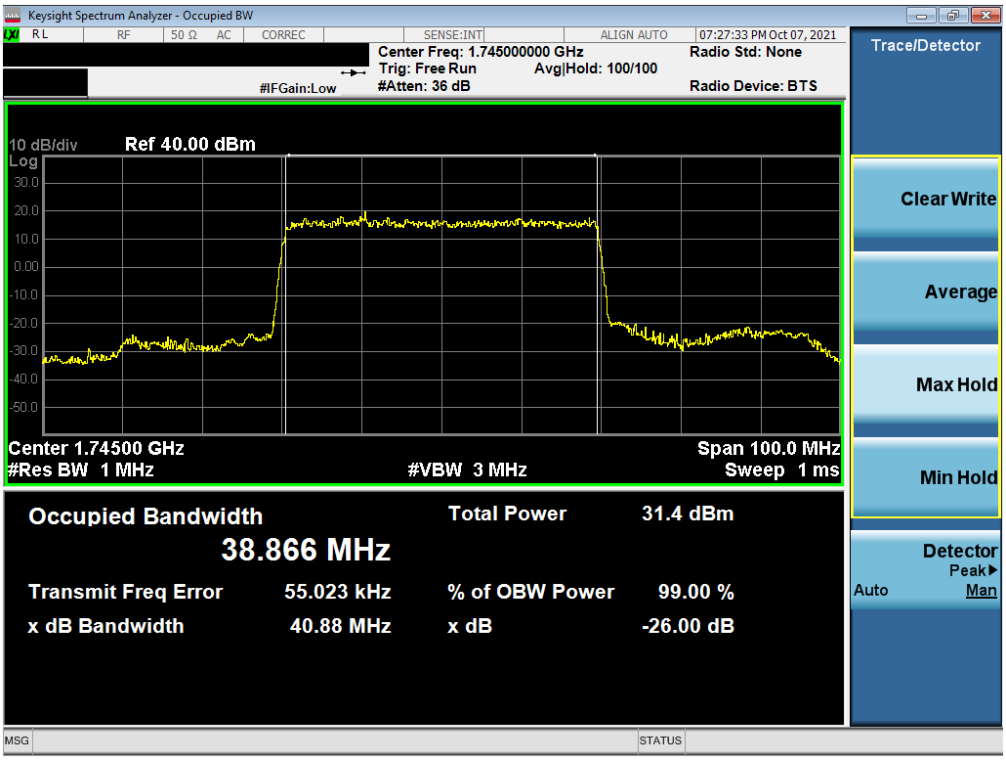


Plot 7-71. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz CP-OFDM QPSK - Full RB – Ant A)

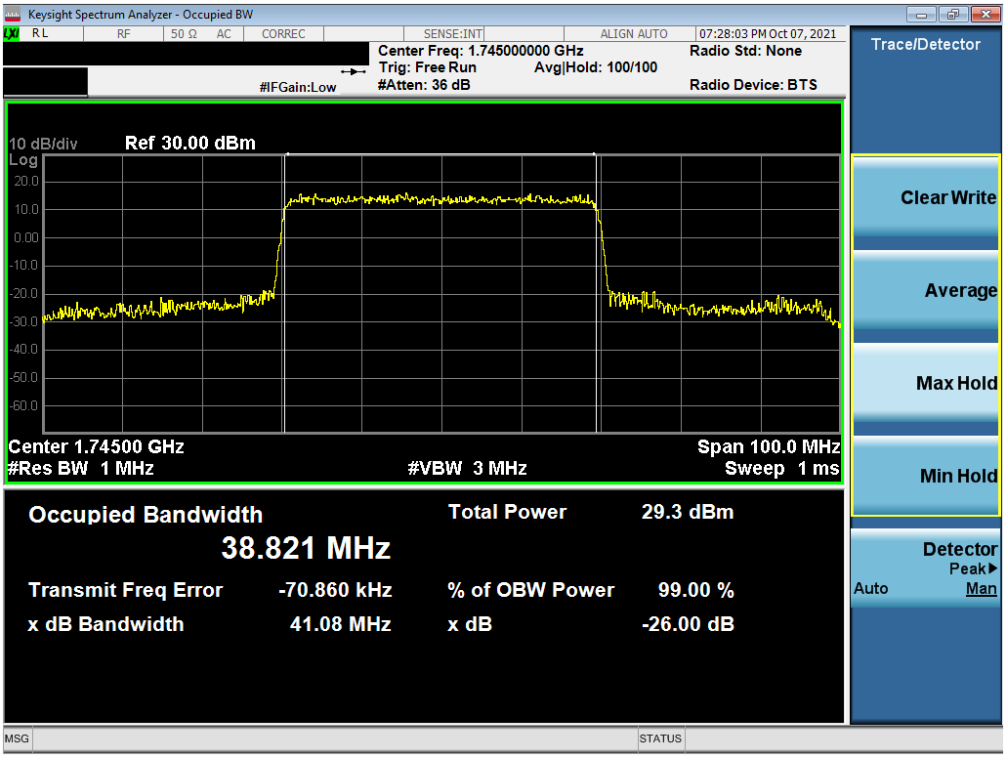


Plot 7-72. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz CP-OFDM 16QAM - Full RB – Ant A)

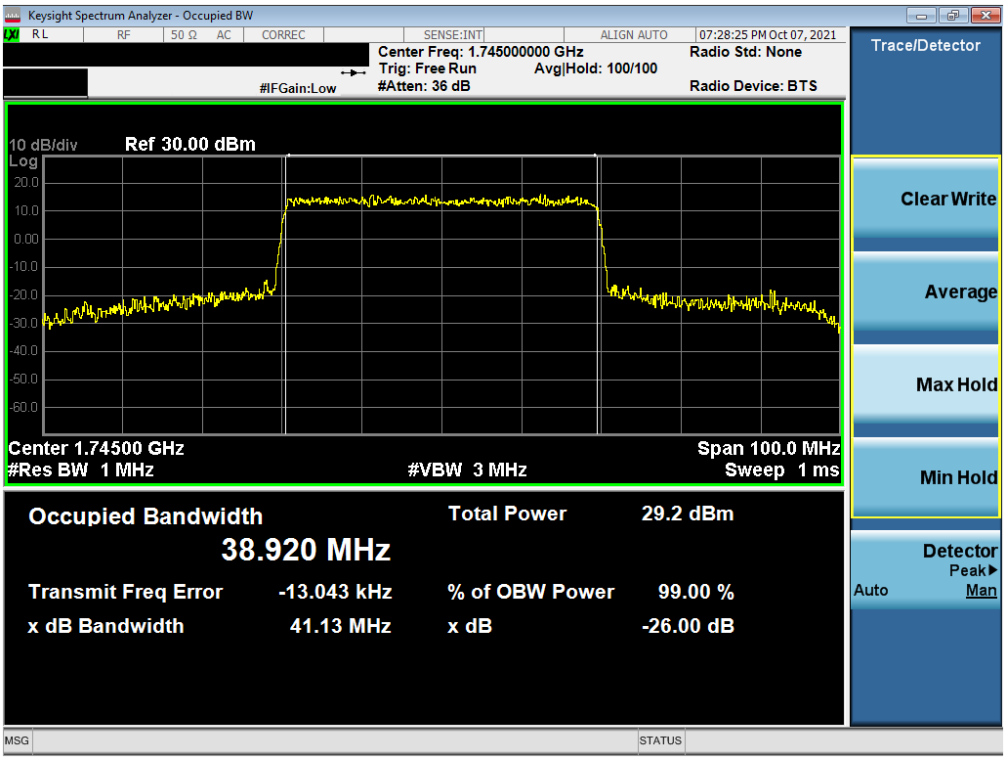
NR Band n66 – Ant I



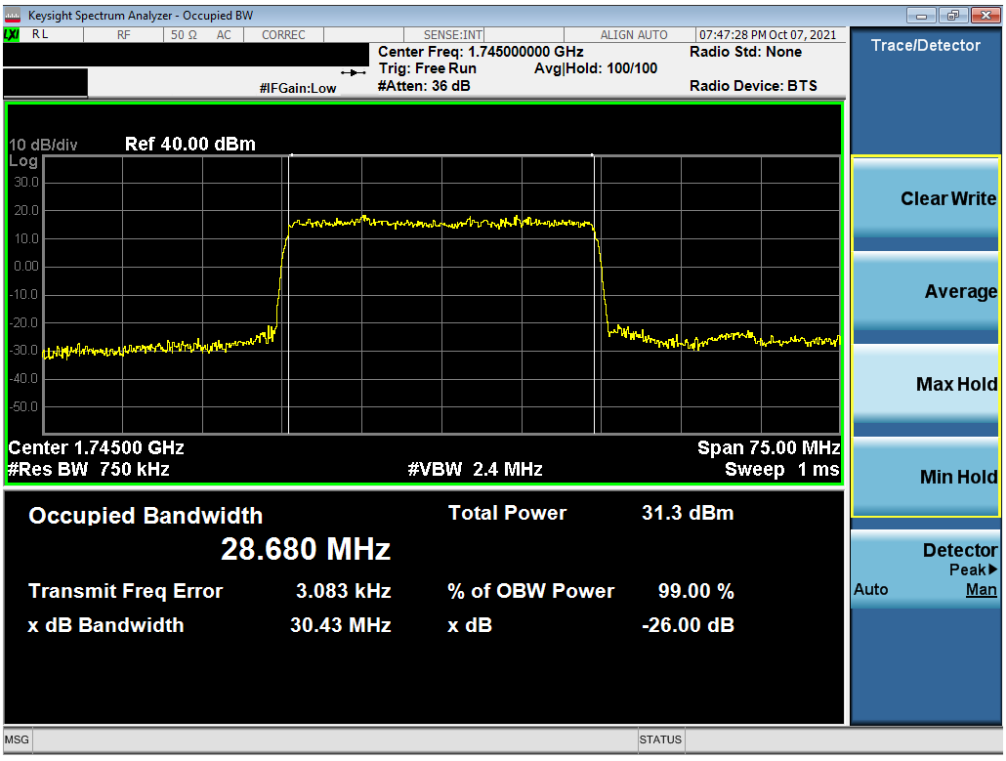
Plot 7-73. Occupied Bandwidth Plot (NR Band n66 - 40MHz DFT-s-BPSK - Full RB – Ant I)



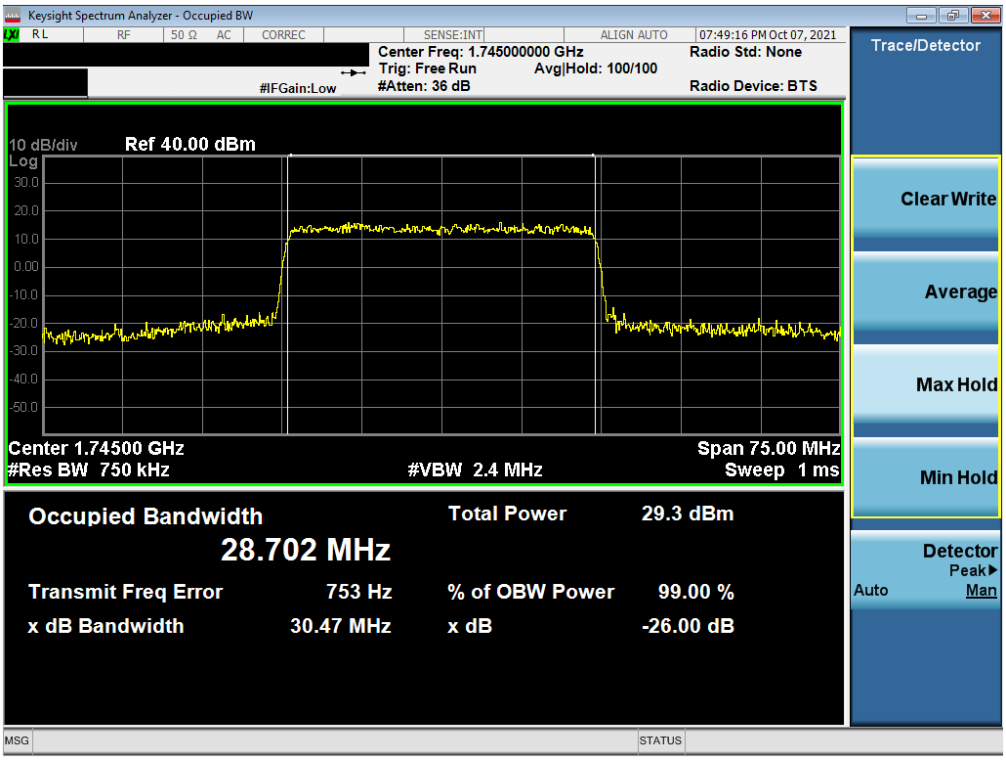
Plot 7-74. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM QPSK - Full RB – Ant I)



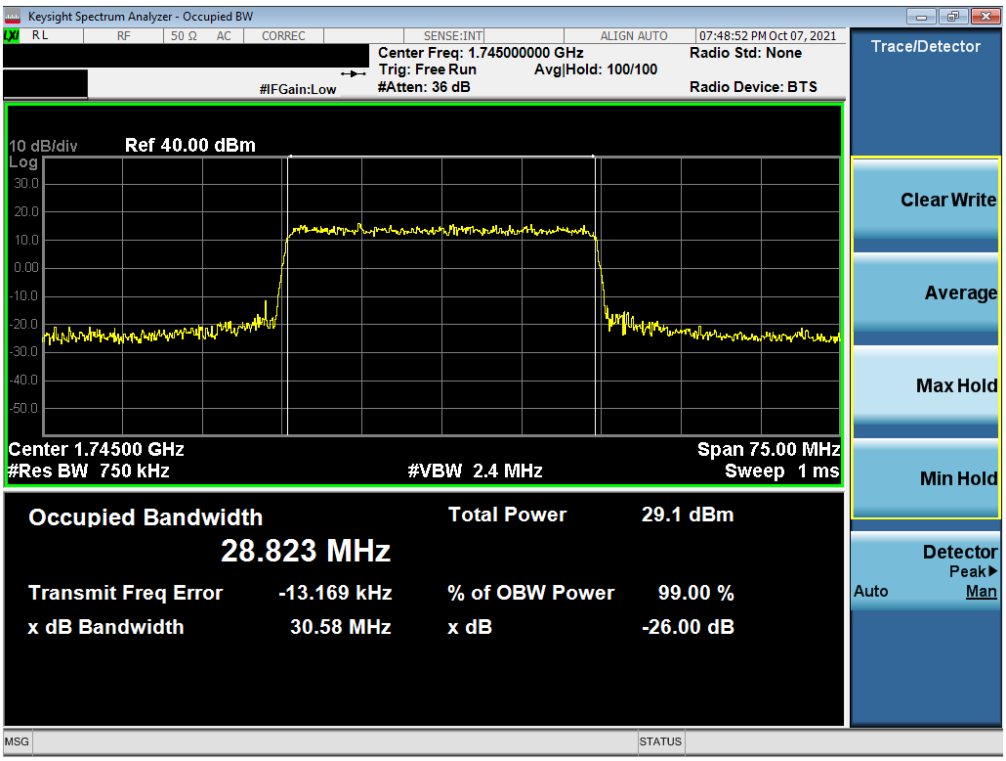
Plot 7-75. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM 16QAM - Full RB – Ant I)



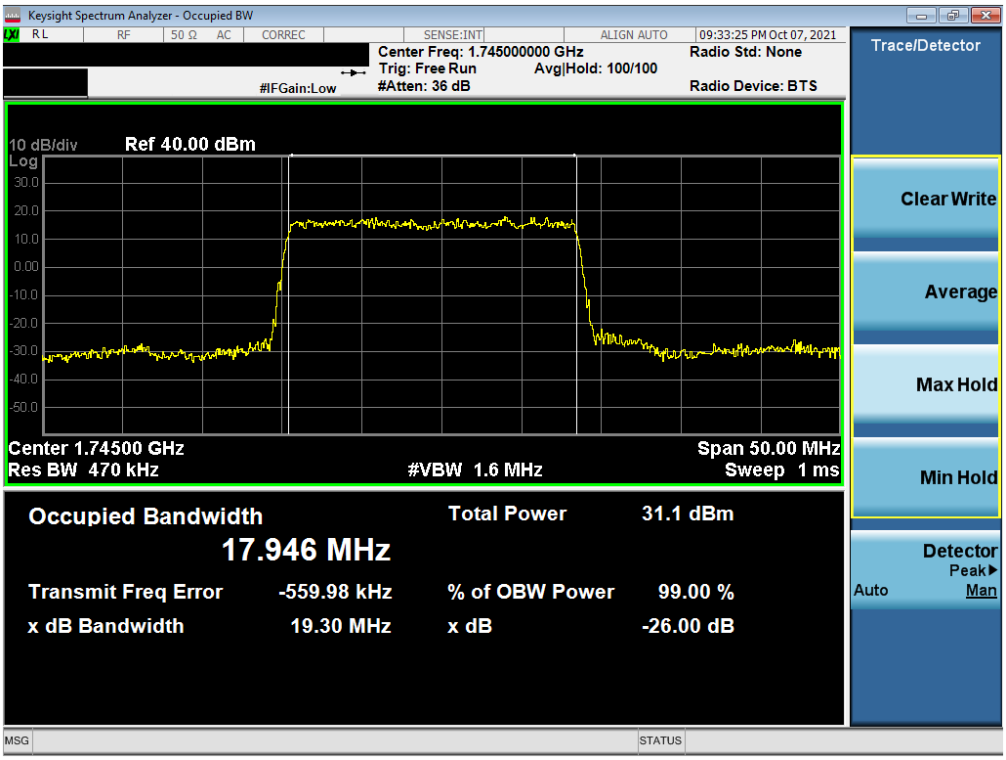
Plot 7-76. Occupied Bandwidth Plot (NR Band n66 - 30MHz DFT-s-BPSK - Full RB – Ant I)



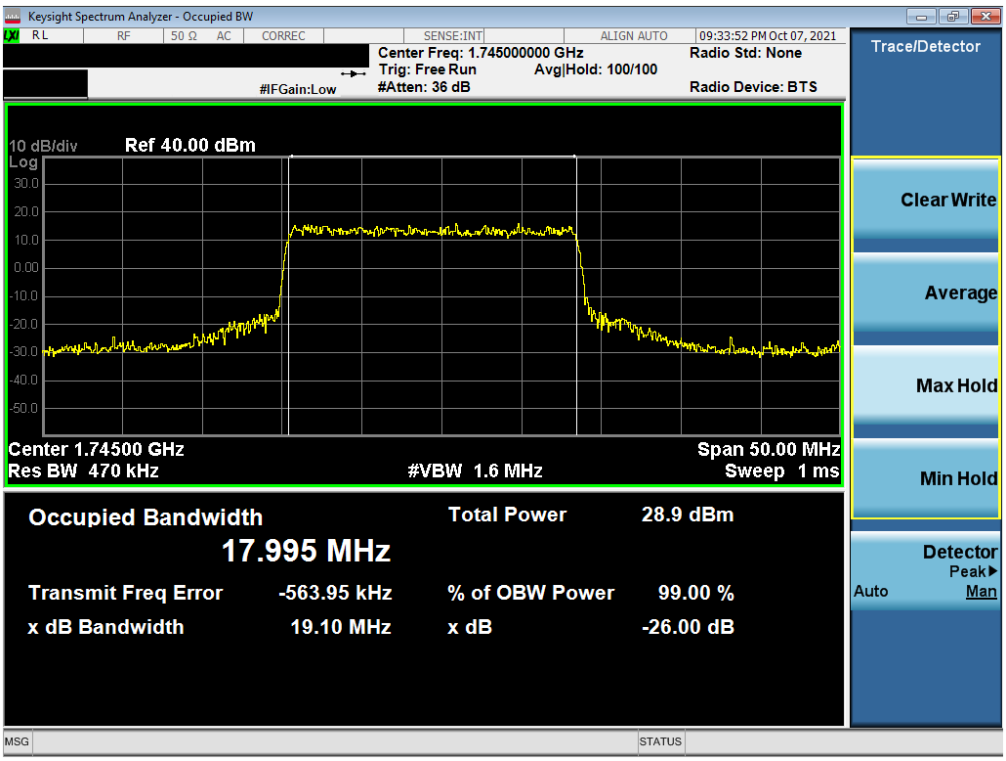
Plot 7-77. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM QPSK - Full RB – Ant I)



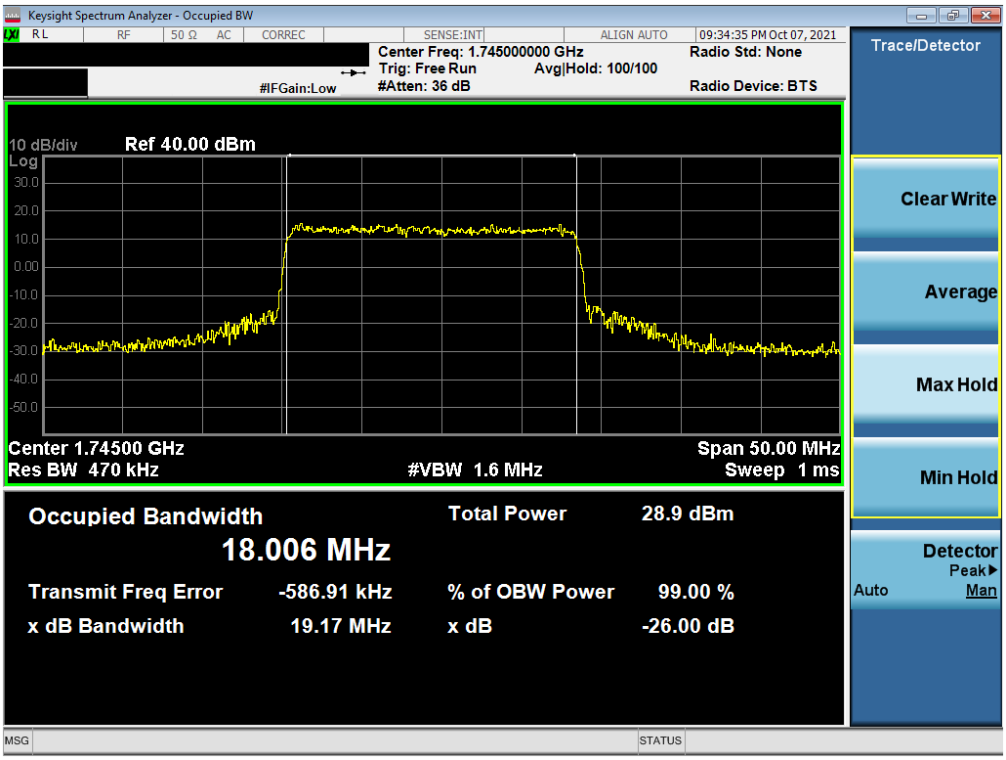
Plot 7-78. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM 16QAM - Full RB – Ant I)



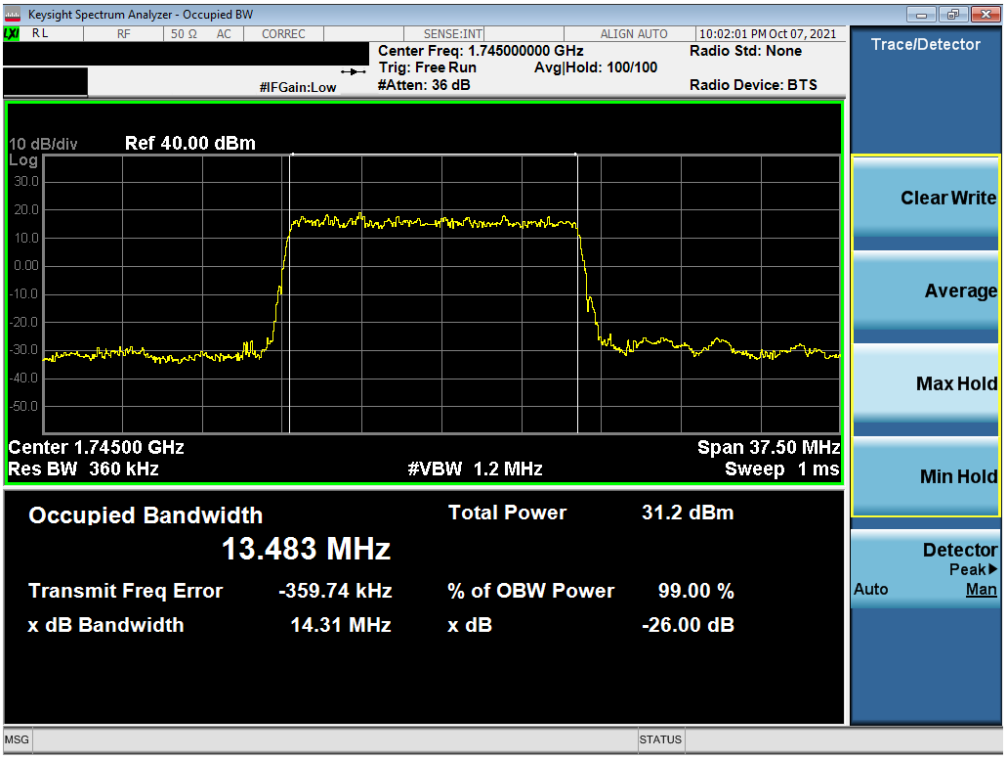
Plot 7-79. Occupied Bandwidth Plot (NR Band n66 - 20MHz DFT-s-BPSK - Full RB – Ant I)



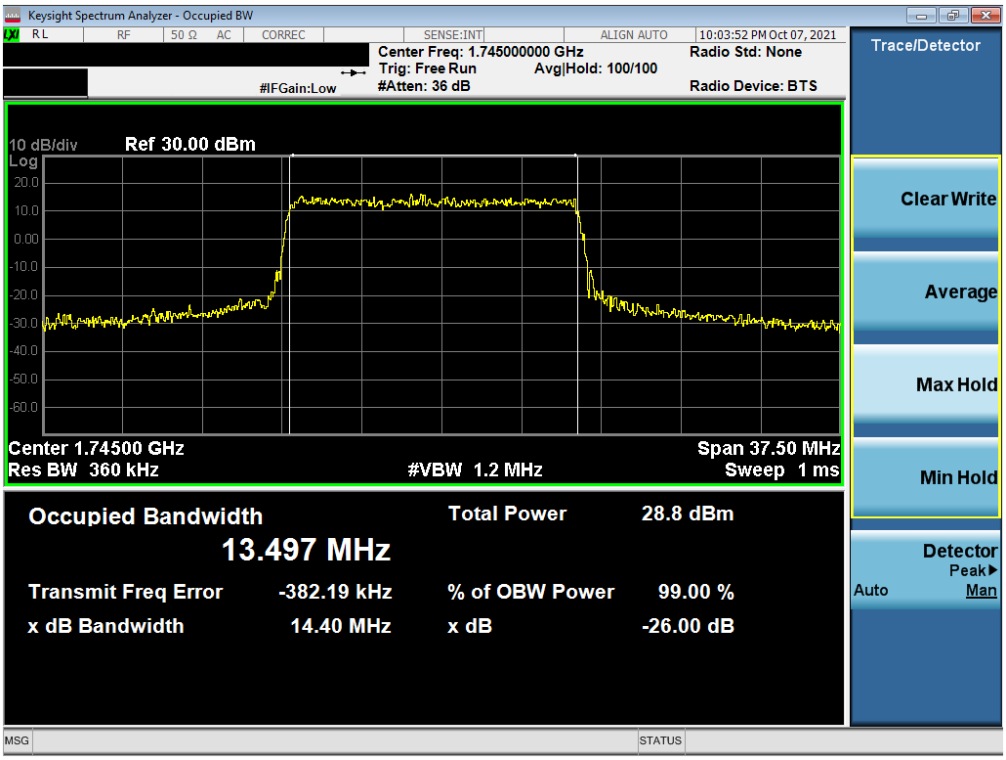
Plot 7-80. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM QPSK - Full RB – Ant I)



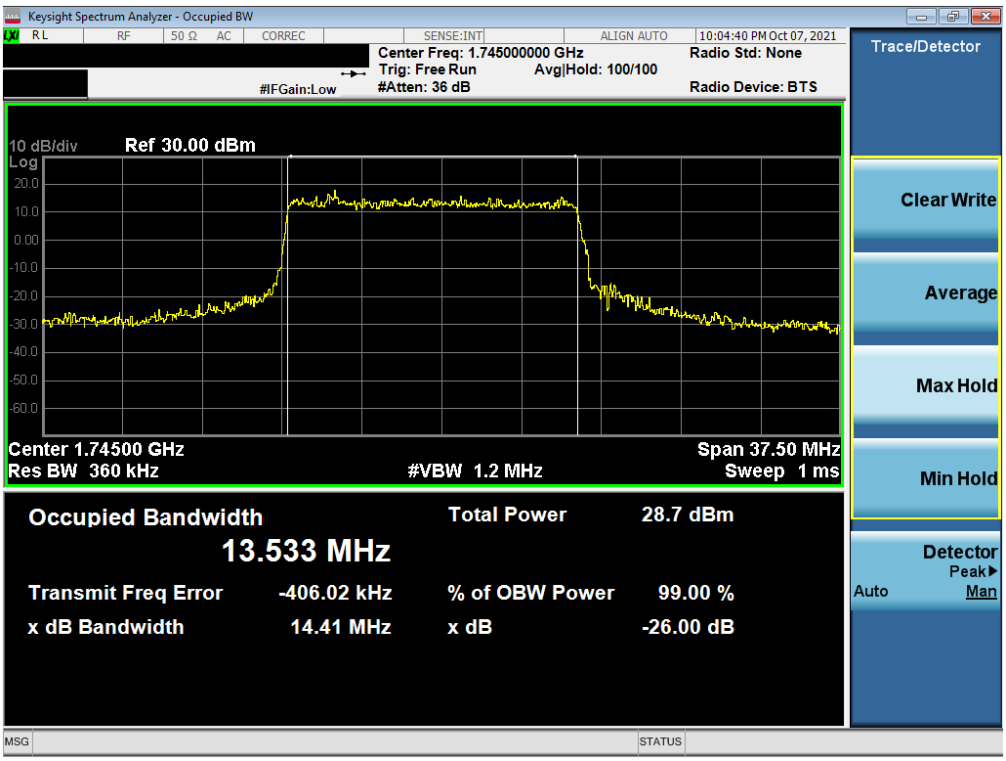
Plot 7-81. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM 16QAM - Full RB – Ant I)



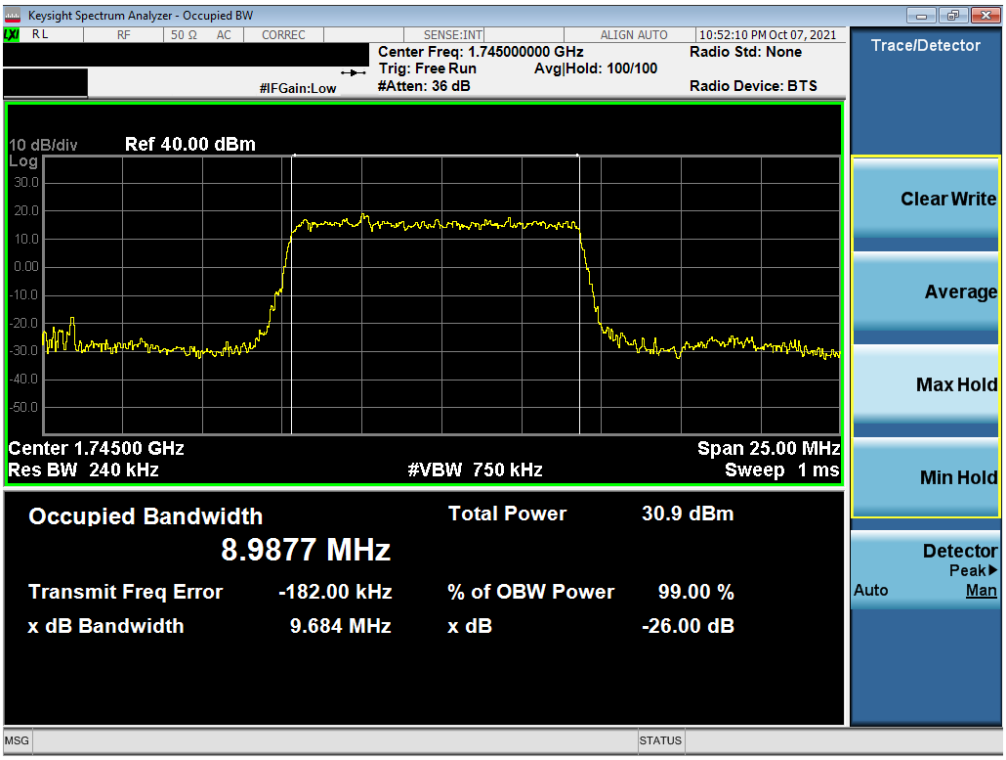
Plot 7-82. Occupied Bandwidth Plot (NR Band n66 - 15MHz DFT-s-BPSK - Full RB – Ant I)



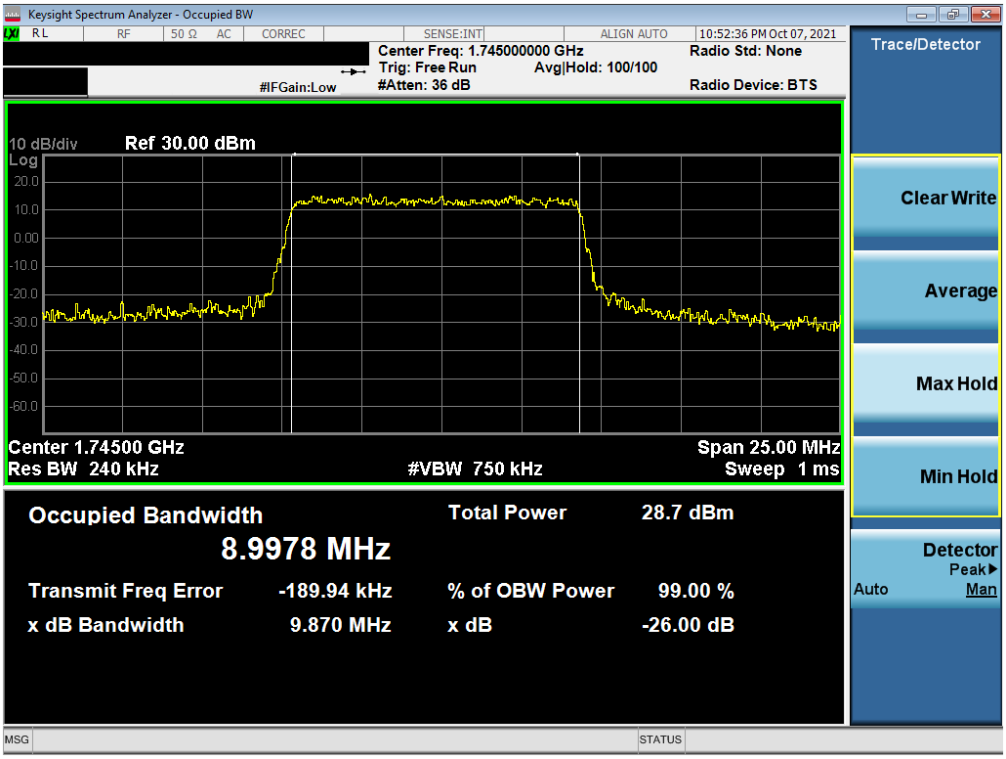
Plot 7-83. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz CP-OFDM QPSK - Full RB – Ant I)



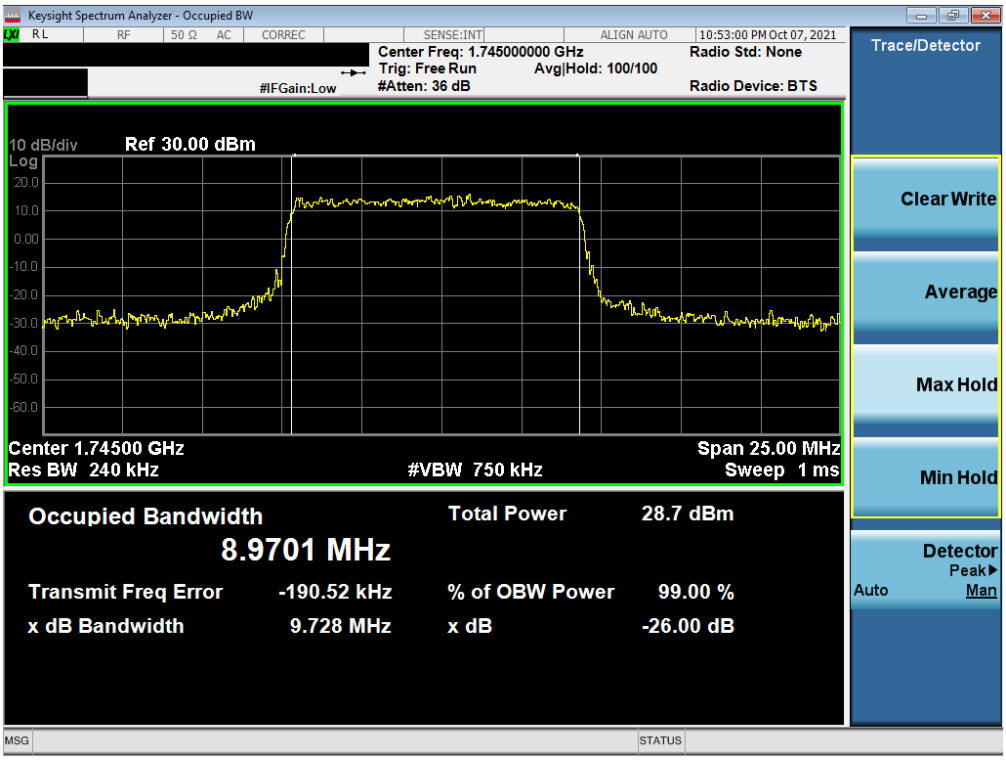
Plot 7-84. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz CP-OFDM 16QAM - Full RB – Ant I)



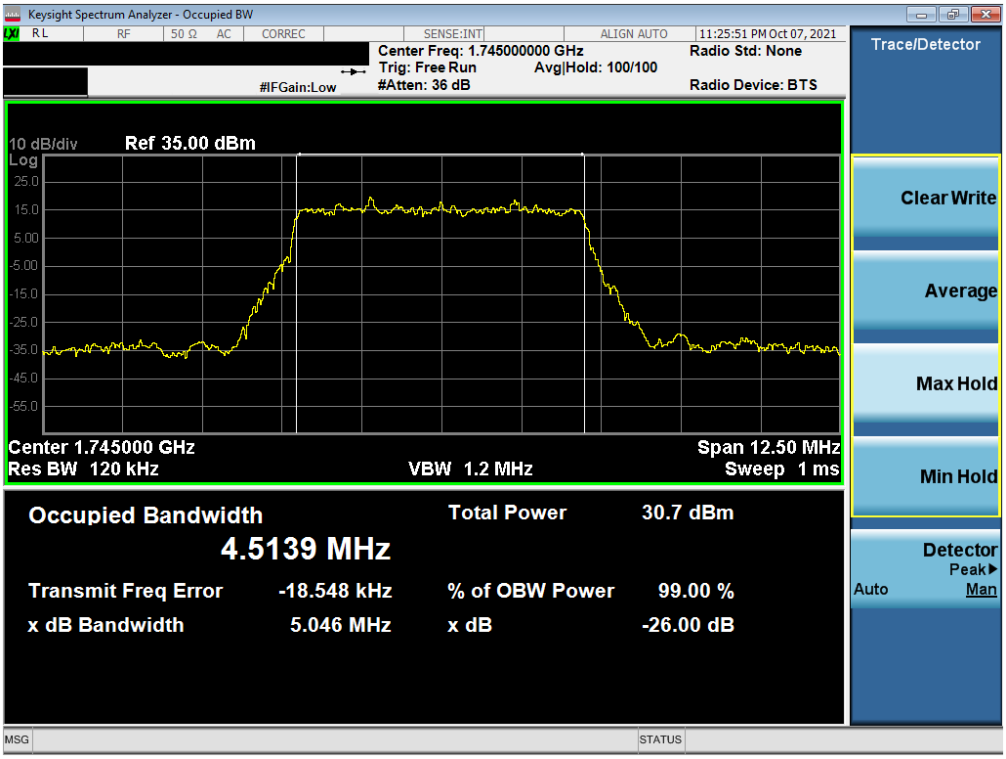
Plot 7-85. Occupied Bandwidth Plot (NR Band n66 - 10MHz DFT-s-BPSK - Full RB – Ant I)



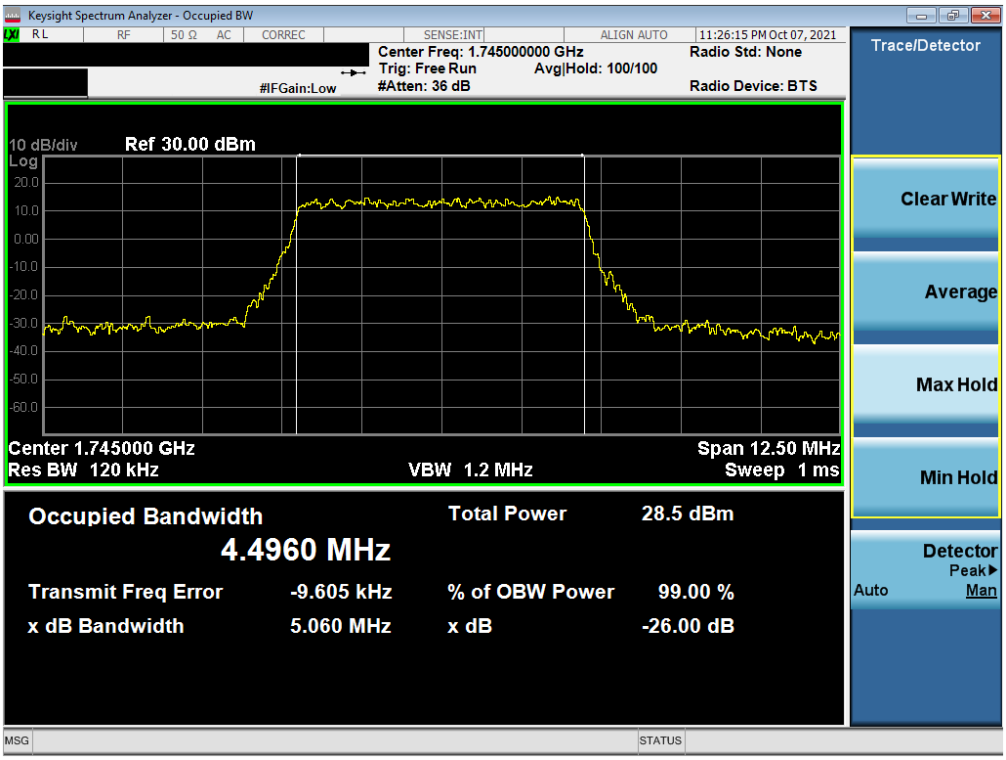
Plot 7-86. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz CP-OFDM QPSK - Full RB – Ant I)



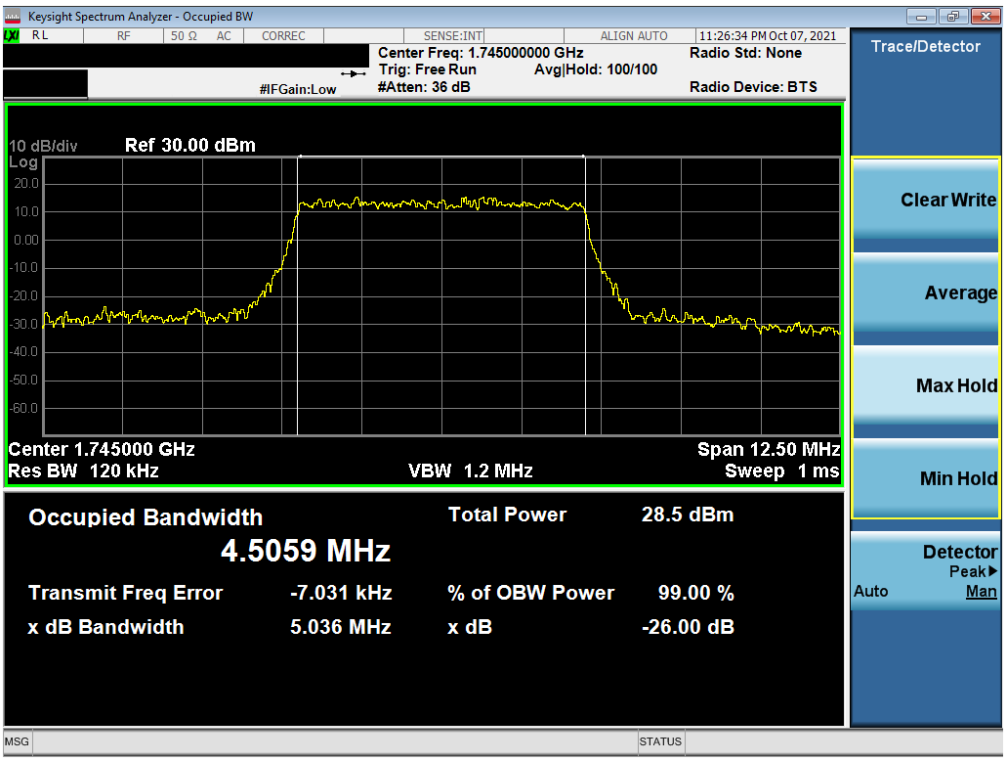
Plot 7-87. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz CP-OFDM 16QAM - Full RB – Ant I)



Plot 7-88. Occupied Bandwidth Plot (NR Band n66 - 5MHz DFT-s-BPSK - Full RB – Ant I)



Plot 7-89. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz CP-OFDM QPSK - Full RB – Ant I)



Plot 7-90. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz CP-OFDM 16QAM - Full RB – Ant I)

7.4 Spurious and Harmonic Emissions at Antenna Terminal

Test Overview

The level of the carrier and the various conducted spurious and harmonic frequencies is measured by means of a calibrated spectrum analyzer. The spectrum is scanned from the lowest frequency generated in the equipment up to a frequency including its 10th harmonic. All out of band emissions are measured with a spectrum analyzer connected to the antenna terminal of the EUT while the EUT is operating at maximum power, and at the appropriate frequencies. All data rates were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

The minimum permissible attenuation level of any spurious emission is 43 + 10 $log_{10}(P_{[Watts]})$, where P is the transmitter power in Watts.

Test Procedure Used

KDB 971168 D01 v03r01 – Section 6.0

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to 18GHz (separated into at least two plots per channel)
2. RBW ≥ 100kHz
3. VBW ≥ 3 x RBW
4. Detector = RMS
5. Trace mode = max hold
6. Sweep time = auto couple
7. The trace was allowed to stabilize

Test Setup

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

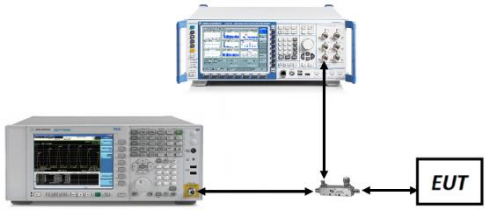


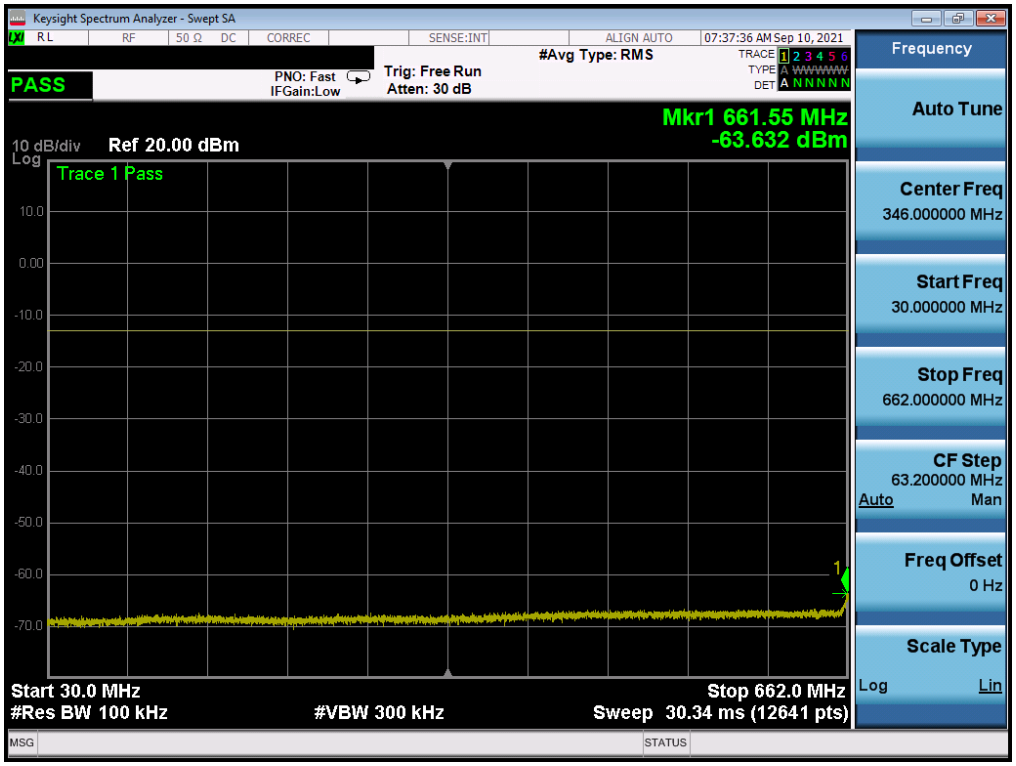
Figure 7-3. Test Instrument & Measurement Setup

Test Notes

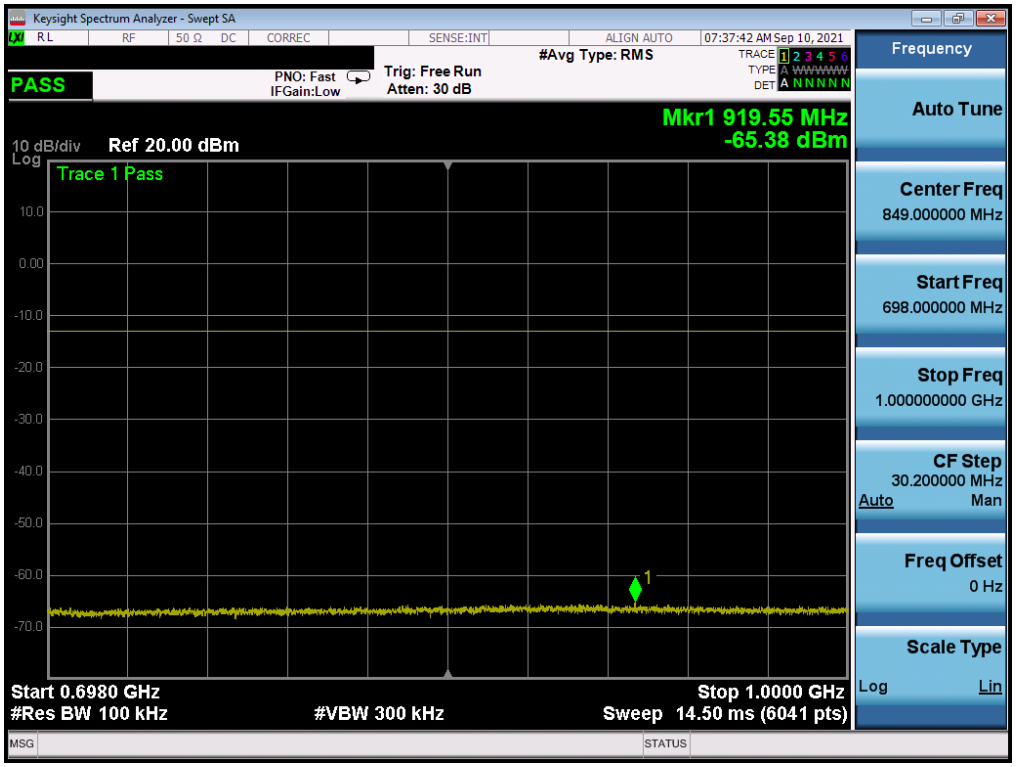
1. Per Part 27 and RSS-139, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth 100 kHz or greater for measurements below 1GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

2. For NR operation, all subcarrier spacings (SCS) and transmission schemes (e.g. CP-OFDM and DFT-s-OFDM) were investigated to determine the worst case configuration. All modes of operation were investigated and the worst case configuration results are reported in this section.

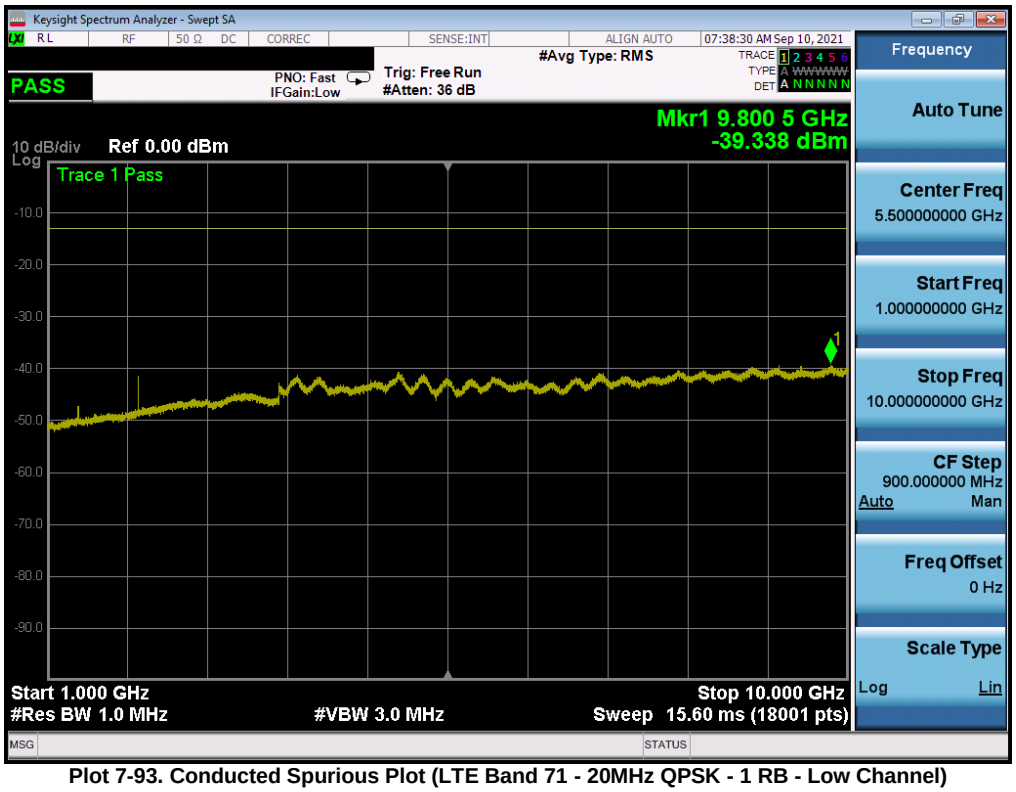
LTE Band 71



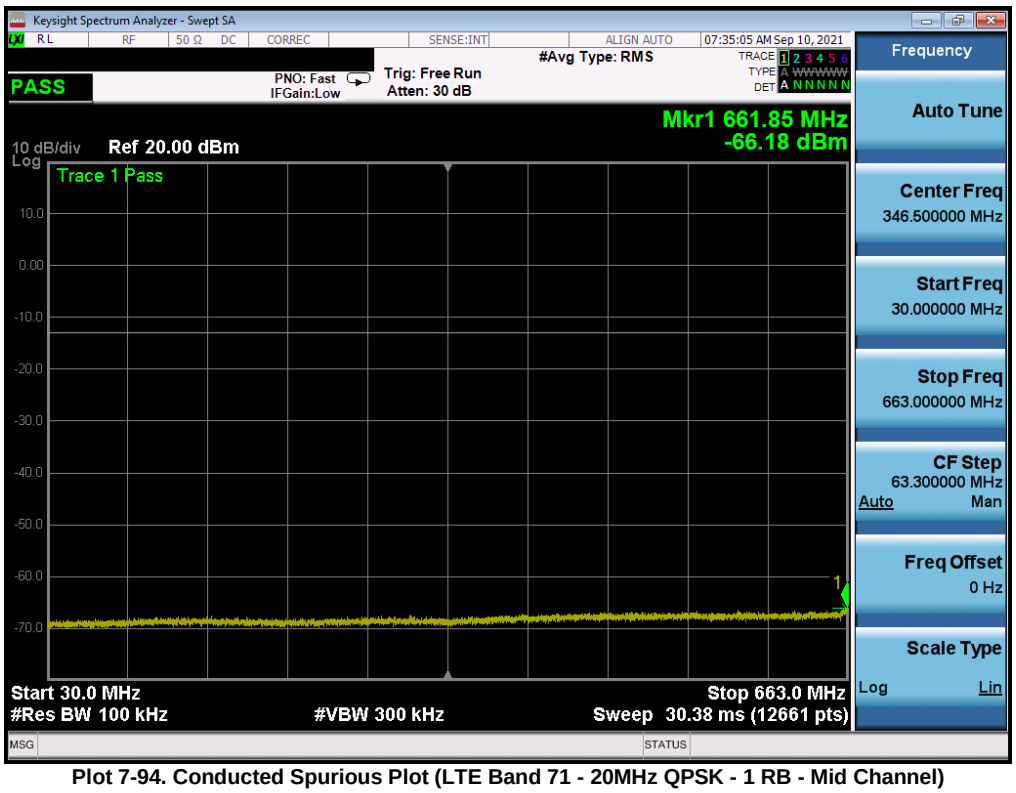
Plot 7-91. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Low Channel)



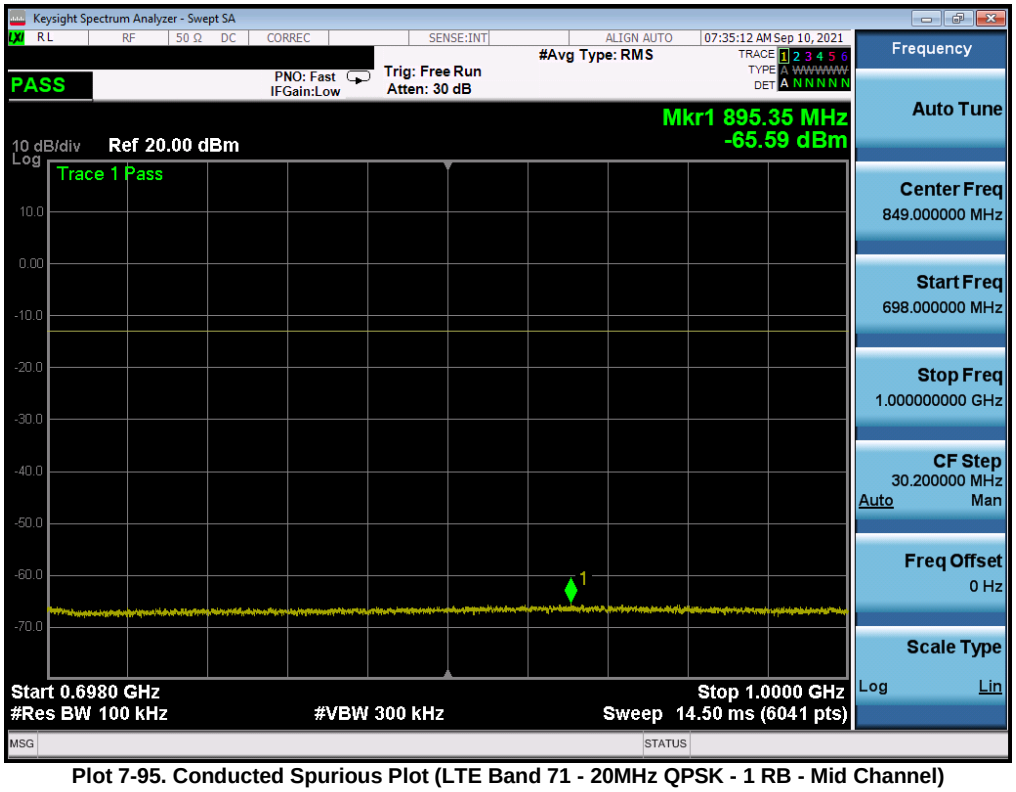
Plot 7-92. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Low Channel)



Plot 7-93. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Low Channel)

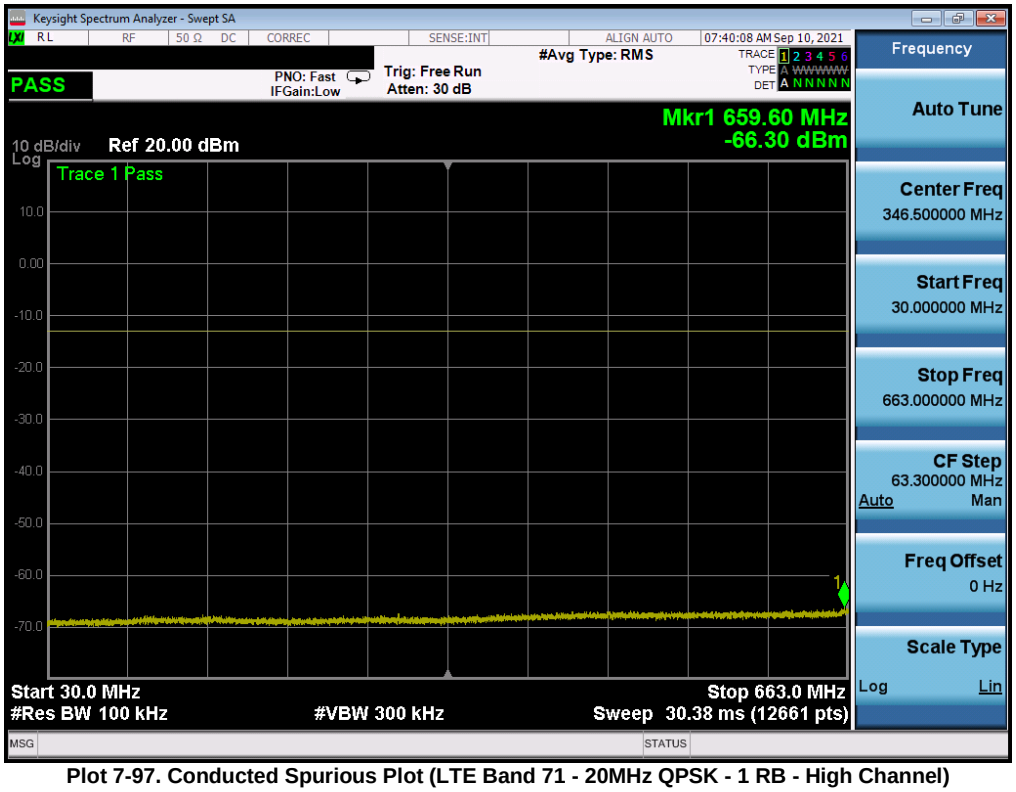


Plot 7-94. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Mid Channel)

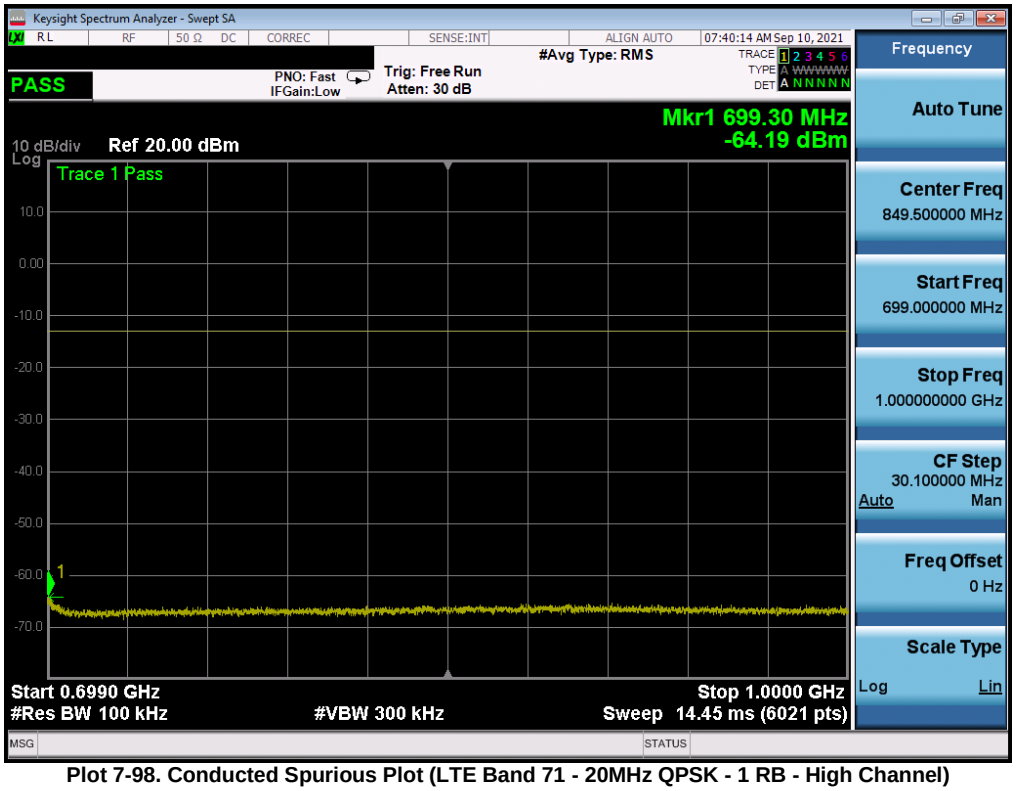


Plot 7-95. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Mid Channel)

Plot 7-96. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Mid Channel)



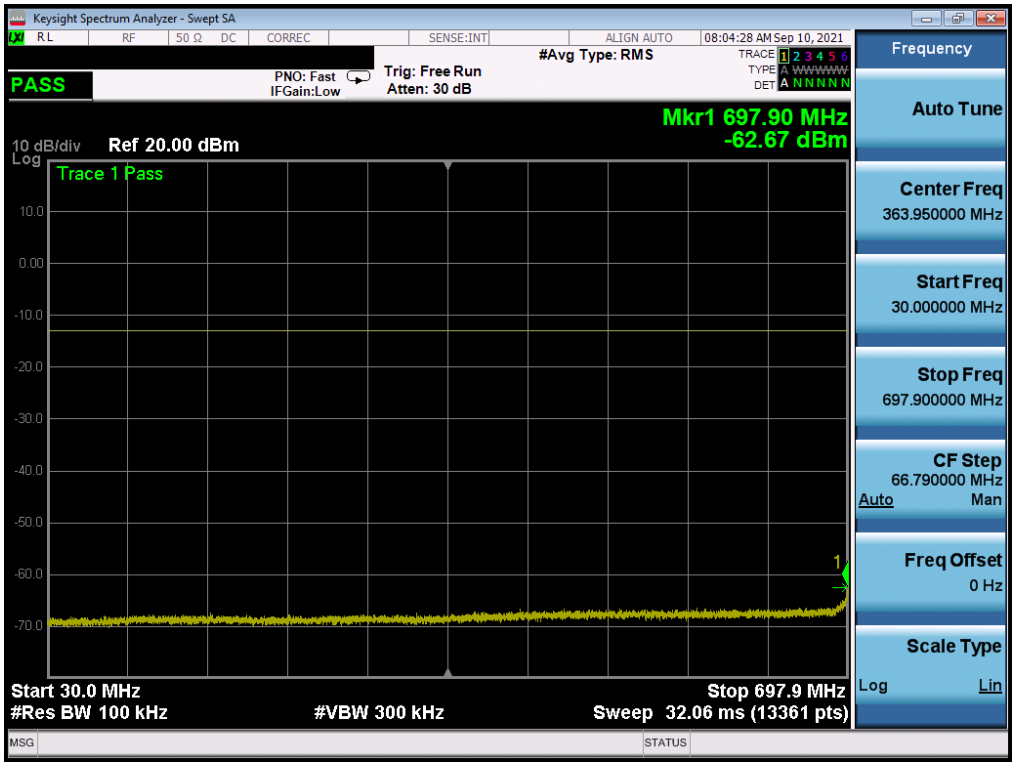
Plot 7-97. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - High Channel)



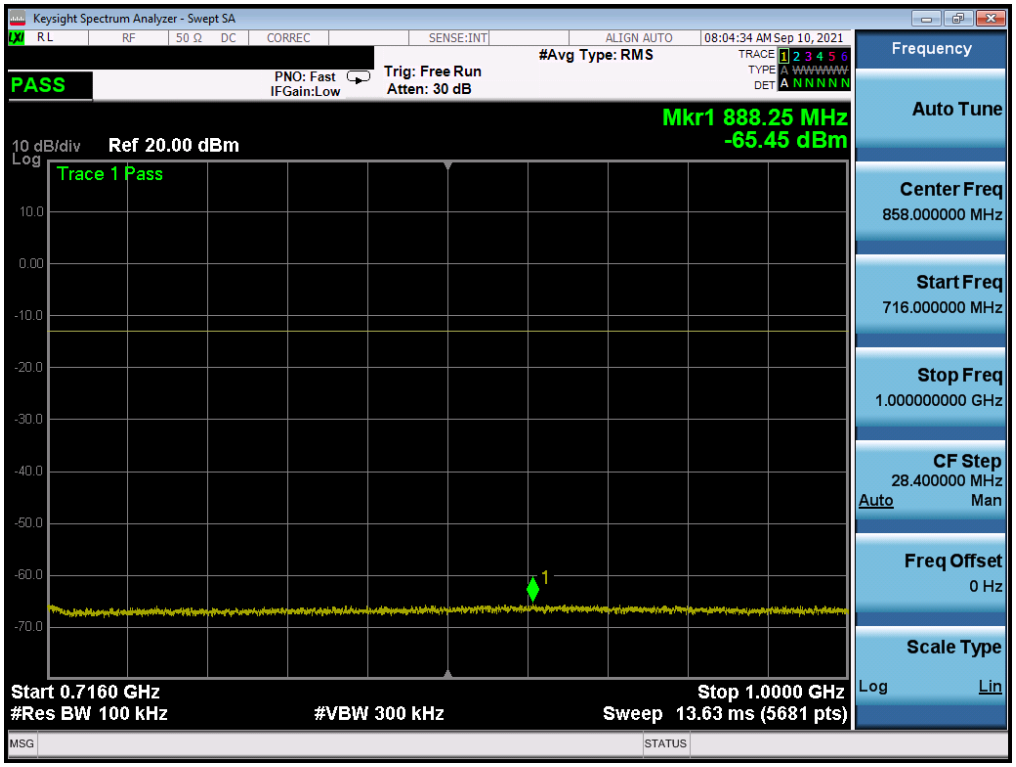
Plot 7-98. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - High Channel)

Plot 7-99. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - High Channel)

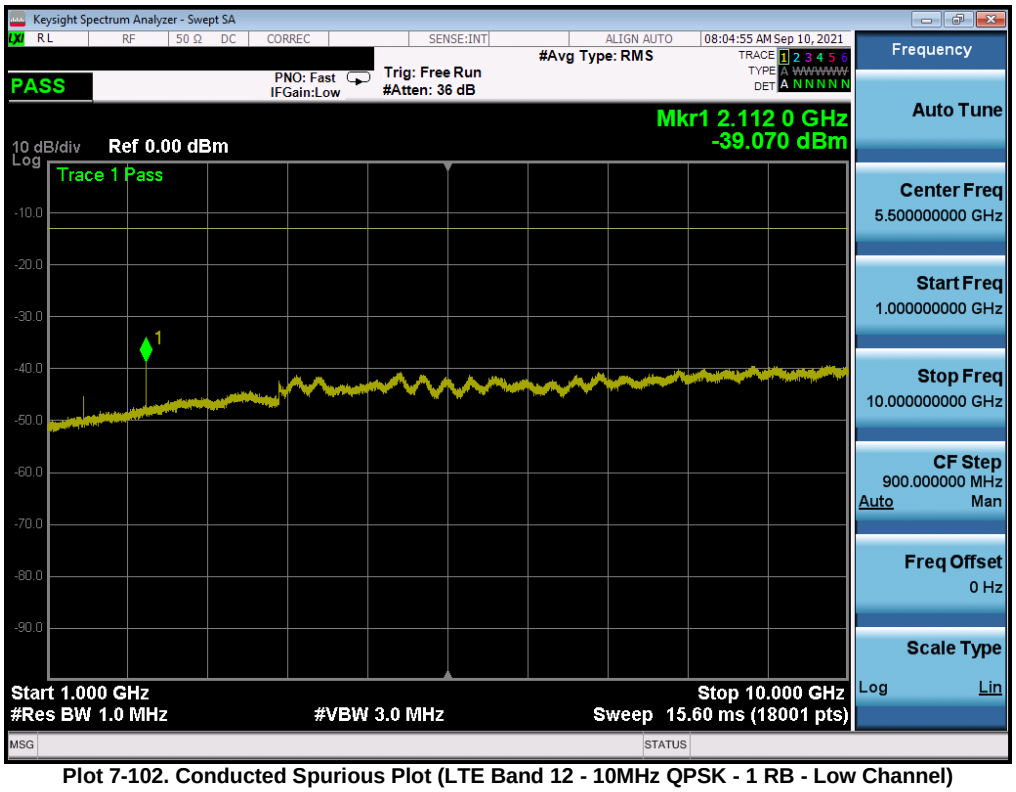
LTE Band 12



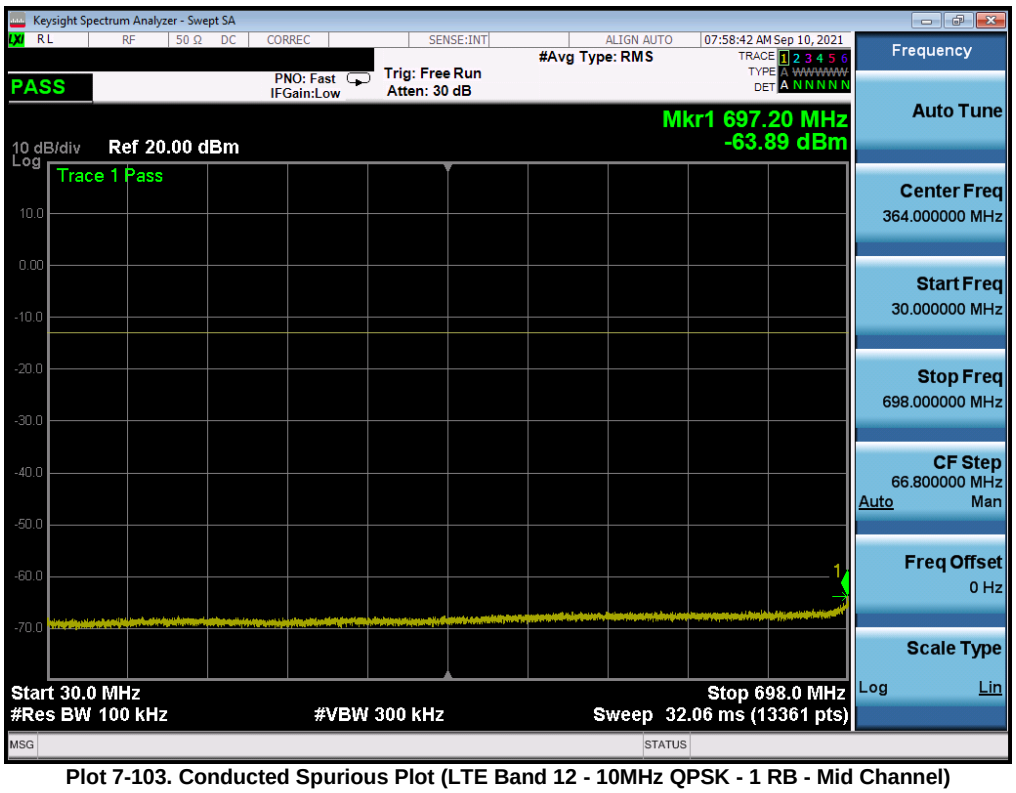
Plot 7-100. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - Low Channel)



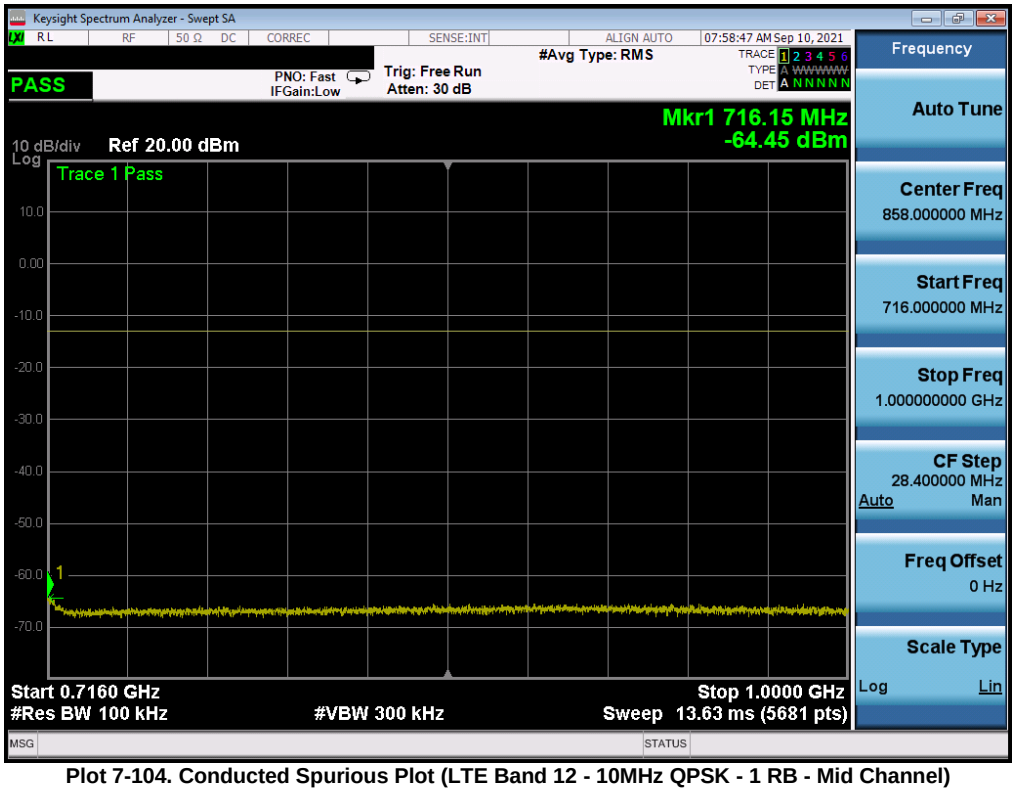
Plot 7-101. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - Low Channel)



Plot 7-102. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - Low Channel)

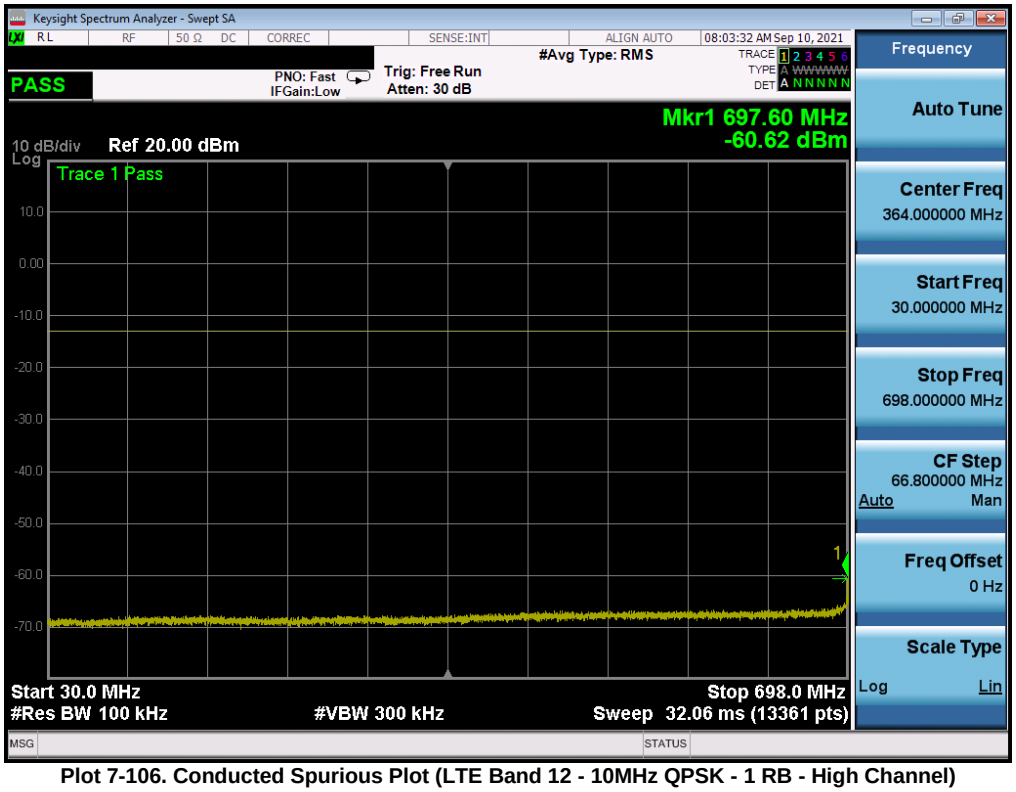


Plot 7-103. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - Mid Channel)

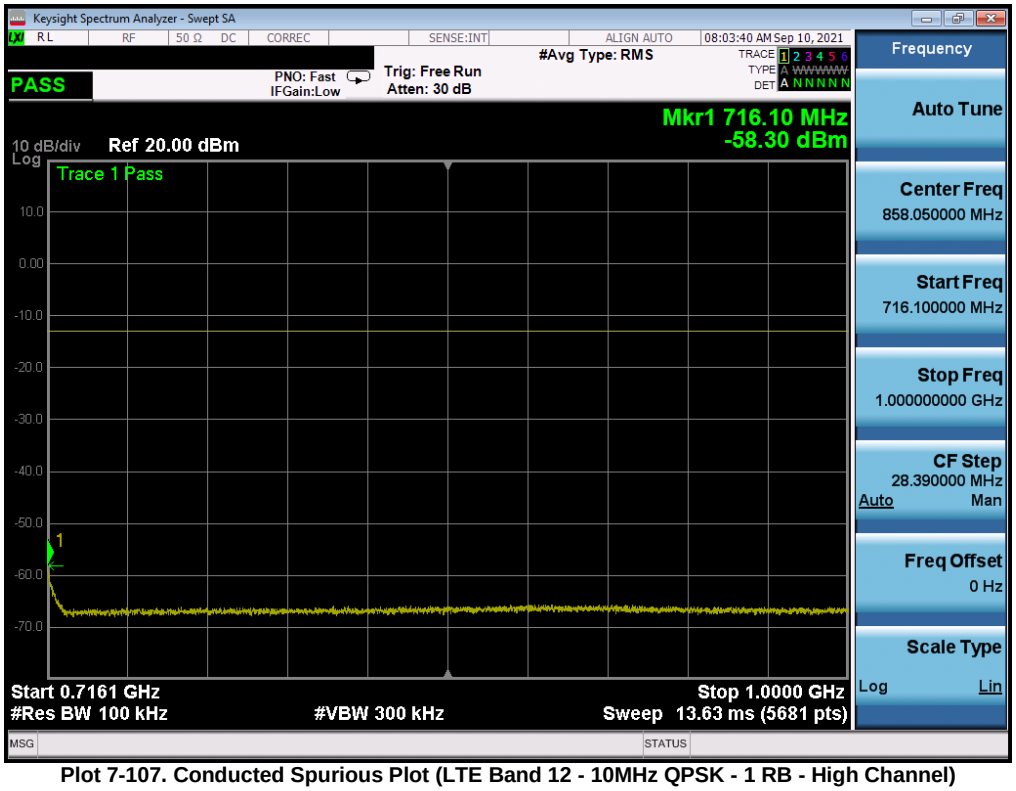


Plot 7-104. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - Mid Channel)

Plot 7-105. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - Mid Channel)



Plot 7-106. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - High Channel)



Plot 7-107. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - High Channel)