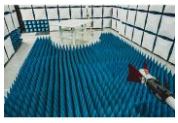
PCTEST
7185 Oakland Mills Road, Columbia, MD 21046 USA
Tel. 410.290.6652 / Fax 410.290.6654
http://www.pctest.com



PART 27 MEASUREMENT REPORT

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

Date of Testing:
09/09/2021 - 11/10/2021
Test Report Issue Date:
12/02/2021
Test Site/Location:
PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
1M2109080099-4-R2.A3L

FCC ID:	**A3LSMS901U**
APPLICANT:	**Samsung Electronics Co., Ltd.**

Application Type:	Certification
Model:	SM-S901U
Additional Model(s):	SM-S901U1
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

Note: This revised Test Report (S/N: 1M2109080099-04-R2.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.

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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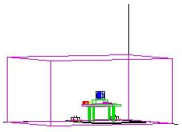
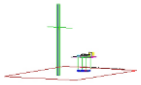


MEASUREMENT REPORT
FCC Part 27



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	0.041	16.08	0.067	18.23	18M0G7D
		16QAM	673.0 - 688.0	0.035	15.40	0.057	17.55	17M9W7D
	15 MHz	QPSK	670.5 - 690.5	0.040	15.99	0.065	18.14	13M5G7D
		16QAM	670.5 - 690.5	0.034	15.36	0.056	17.51	13M5W7D
	10 MHz	QPSK	668.0 - 693.0	0.041	16.08	0.067	18.23	9M01G7D
		16QAM	668.0 - 693.0	0.037	15.69	0.061	17.84	9M02W7D
	5 MHz	QPSK	665.5 - 695.5	0.040	16.01	0.065	18.16	4M54G7D
		16QAM	665.5 - 695.5	0.036	15.50	0.058	17.65	4M54W7D
LTE Band 12	10 MHz	QPSK	704.0 - 711.0	0.062	17.94	0.102	20.09	9M01G7D
		16QAM	704.0 - 711.0	0.050	17.02	0.083	19.17	9M02W7D
	5 MHz	QPSK	701.5 - 713.5	0.062	17.95	0.102	20.10	4M55G7D
		16QAM	701.5 - 713.5	0.048	16.81	0.079	18.96	4M55W7D
	3 MHz	QPSK	700.5 - 714.5	0.061	17.87	0.100	20.02	2M73G7D
		16QAM	700.5 - 714.5	0.047	16.68	0.076	18.83	2M74W7D
	1.4 MHz	QPSK	699.7 - 715.3	0.061	17.84	0.100	19.99	1M10G7D
		16QAM	699.7 - 715.3	0.047	16.75	0.078	18.90	1M11W7D
LTE Band 13	10 MHz	QPSK	782.0	0.103	20.13	0.169	22.28	8M97G7D
		16QAM	782.0	0.085	19.29	0.139	21.44	8M99W7D
	5 MHz	QPSK	779.5 - 784.5	0.104	20.19	0.171	22.34	4M53G7D
		16QAM	779.5 - 784.5	0.085	19.28	0.139	21.43	4M54W7D

EUT Overview (LTE)

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	ERP		EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	Max. Power [W]	Max. Power [dBm]	
NR Band n71	20 MHz	π/2 BPSK	673.0 - 688.0	0.059	17.70	0.097	19.85	18M0G7D
		QPSK	673.0 - 688.0	0.061	17.85	0.100	20.00	19M0G7D
		16QAM	673.0 - 688.0	0.048	16.82	0.079	18.97	18M9W7D
	15 MHz	π/2 BPSK	670.5 - 690.5	0.058	17.67	0.096	19.82	13M5G7D
		QPSK	670.5 - 690.5	0.058	17.63	0.095	19.78	14M0G7D
		16QAM	670.5 - 690.5	0.047	16.71	0.077	18.86	14M0W7D
	10 MHz	π/2 BPSK	668.0 - 693.0	0.058	17.65	0.096	19.80	9M01G7D
		QPSK	668.0 - 693.0	0.059	17.72	0.097	19.87	9M36G7D
		16QAM	668.0 - 693.0	0.047	16.74	0.077	18.89	9M32W7D
	5 MHz	π/2 BPSK	665.5 - 695.5	0.058	17.67	0.096	19.82	4M51G7D
		QPSK	665.5 - 695.5	0.059	17.71	0.097	19.86	4M52G7D
		16QAM	665.5 - 695.5	0.047	16.69	0.077	18.84	4M55W7D
NR Band n12	15 MHz	π/2 BPSK	706.5 - 708.5	0.051	17.09	0.084	19.24	13M5G7D
		QPSK	706.5 - 708.5	0.053	17.23	0.087	19.38	14M0G7D
		16QAM	706.5 - 708.5	0.046	16.62	0.075	18.77	14M0W7D
	10 MHz	π/2 BPSK	704.0 - 711.0	0.052	17.14	0.085	19.29	8M95G7D
		QPSK	704.0 - 711.0	0.052	17.18	0.086	19.33	9M34G7D
		16QAM	704.0 - 711.0	0.046	16.61	0.075	18.76	9M33W7D
	5 MHz	π/2 BPSK	701.5 - 713.5	0.053	17.28	0.088	19.43	4M51G7D
		QPSK	701.5 - 713.5	0.054	17.36	0.089	19.51	4M52G7D
		16QAM	701.5 - 713.5	0.047	16.72	0.077	18.87	4M54W7D

Overview Table (NR Bands <1GHz Bands)

Mode	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
			Max. Power [W]	Max. Power [dBm]	
WCDMA1700	Spread Spectrum	1712.4 - 1752.6	0.302	24.80	4M17F9W

EUT Overview (WCDMA)

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
LTE Band 66/4	20 MHz	QPSK	1720.0 - 1770.0	0.299	24.76	18M1G7D
		16QAM	1720.0 - 1770.0	0.217	23.37	18M0W7D
	15 MHz	QPSK	1717.5 - 1772.5	0.300	24.77	13M6G7D
		16QAM	1717.5 - 1772.5	0.231	23.63	13M6W7D
	10 MHz	QPSK	1715.0 - 1775.0	0.318	25.02	9M03G7D
		16QAM	1715.0 - 1775.0	0.222	23.47	9M06W7D
	5 MHz	QPSK	1712.5 - 1777.5	0.313	24.95	4M55G7D
		16QAM	1712.5 - 1777.5	0.234	23.69	4M56W7D
	3 MHz	QPSK	1711.5 - 1778.5	0.309	24.90	2M72G7D
		16QAM	1711.5 - 1778.5	0.234	23.70	2M73W7D
	1.4 MHz	QPSK	1710.7 - 1779.3	0.310	24.92	1M11G7D
		16QAM	1710.7 - 1779.3	0.236	23.72	1M11W7D

EUT Overview (LTE)

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n66 ANT A	40 MHz	π/2 BPSK	1730.0 - 1760.0	0.435	26.38	39M2G7D
		QPSK	1730.0 - 1760.0	0.428	26.31	38M9G7D
		16QAM	1730.0 - 1760.0	0.377	25.76	38M9W7D
	30 MHz	π/2 BPSK	1725.0 - 1765.0	0.421	26.24	29M0G7D
		QPSK	1725.0 - 1765.0	0.399	26.01	28M7G7D
		16QAM	1725.0 - 1765.0	0.350	25.44	28M7W7D
	20 MHz	π/2 BPSK	1720.0 - 1770.0	0.448	26.51	18M0G7D
		QPSK	1720.0 - 1770.0	0.439	26.42	19M0G7D
		16QAM	1720.0 - 1770.0	0.360	25.57	19M0W7D
	15 MHz	π/2 BPSK	1717.5 - 1772.5	0.452	26.55	13M5G7D
		QPSK	1717.5 - 1772.5	0.427	26.30	14M0G7D
		16QAM	1717.5 - 1772.5	0.367	25.65	14M0W7D
	10 MHz	π/2 BPSK	1715.0 - 1775.0	0.463	26.65	9M03G7D
		QPSK	1715.0 - 1775.0	0.441	26.45	9M36G7D
		16QAM	1715.0 - 1775.0	0.393	25.94	9M34W7D
	5 MHz	π/2 BPSK	1712.5 - 1777.5	0.447	26.50	4M52G7D
		QPSK	1712.5 - 1777.5	0.438	26.41	4M52G7D
		16QAM	1712.5 - 1777.5	0.358	25.54	4M54W7D

EUT Overview (NR Band n66 (Ant A))

Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n66 ANT F	40 MHz	π/2 BPSK	1730.0 - 1760.0	0.141	21.50	38M9G7D
		QPSK	1730.0 - 1760.0	0.141	21.49	38M8G7D
		16QAM	1730.0 - 1760.0	0.115	20.62	38M7W7D
	30 MHz	π/2 BPSK	1725.0 - 1765.0	0.144	21.59	28M8G7D
		QPSK	1725.0 - 1765.0	0.142	21.51	28M7G7D
		16QAM	1725.0 - 1765.0	0.114	20.56	28M7W7D
	20 MHz	π/2 BPSK	1720.0 - 1770.0	0.140	21.46	18M0G7D
		QPSK	1720.0 - 1770.0	0.128	21.06	19M0G7D
		16QAM	1720.0 - 1770.0	0.110	20.40	19M0W7D
	15 MHz	π/2 BPSK	1717.5 - 1772.5	0.144	21.57	13M5G7D
		QPSK	1717.5 - 1772.5	0.144	21.60	14M2G7D
		16QAM	1717.5 - 1772.5	0.118	20.72	14M2W7D
	10 MHz	π/2 BPSK	1715.0 - 1775.0	0.133	21.25	8M98G7D
		QPSK	1715.0 - 1775.0	0.132	21.21	9M35G7D
		16QAM	1715.0 - 1775.0	0.105	20.19	9M36W7D
	5 MHz	π/2 BPSK	1712.5 - 1777.5	0.148	21.71	4M51G7D
		QPSK	1712.5 - 1777.5	0.143	21.54	4M54G7D
		16QAM	1712.5 - 1777.5	0.131	21.16	4M52W7D

EUT Overview (NR Band n66 (Ant F))

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 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: A3LSMS901U**. 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.: 0301M, 0528M, 0536M, 0277M, 0539M, 0291M, 0261M, 1018M

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 (5GHz), Bluetooth (1x, EDR, LE), NFC, 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.

2.3 Test Configuration

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

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

2.4 EMI Suppression Device(s)/Modifications

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

2.5 Software and Firmware

The test was conducted with software/firmware version S901USQU0AUJ5installed on the EUT.

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 C63.26-2015.

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	LTx1	Licensed Transmitter Cable Set	3/12/2021	Annual	3/12/2022	LTx1
-	LTx3	Licensed Transmitter Cable Set	2/26/2021	Annual	2/26/2022	LTx3
Agilent	N9020A	MXA Signal Analyzer	9/22/2020	Annual	12/22/2021	MY54500644
Agilent	N9038A	MXE EMI Receiver	8/11/2020	Annual	12/11/2021	MY51210133
Agilent	N9030A	3Hz-44GHz PXA Signal Analyzer	7/21/2021	Annual	7/21/2022	MY49430494
Anritsu	MT8821C	Radio Communication Analyzer	N/A			6201381794
Anritsu	MT8821C	Radio Communication Analyzer	N/A			6200901190
Com-Power	AL-130	Active Loop Antenna	10/29/2020	Biennial	10/29/2022	10160045
Emco	3115	Horn Antenna (1-18GHz)	6/18/2020	Biennial	6/18/2022	9704-5182
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/12/2020	Biennial	3/12/2022	128337
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			112347
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			102060
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	8/3/2021	Annual	8/3/2022	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	5/25/2021	Annual	5/25/2022	100348
Rohde & Schwarz	FSW67	Signal and Spectrum Analyzer (2Hz-67GHz)	3/22/2021	Annual	3/22/2022	101366
Rohde & Schwarz	ETS-002	EMC Cable and Switch System	9/10/2021	Annual	9/10/2022	ETS-002
Rohde & Schwarz	AP2-002	EMC Cable and Switch System	9/3/2021	Annual	9/3/2022	102134
Rohde & Schwarz	ETS-001	EMC Cable and Switch System	9/10/2021	Annual	9/10/2022	102133
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107

Table 5-1. Test Equipment

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

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 analzyer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 1564 MHz. So 6.1 dB is added to the signal generator reading of –30.9 dBm yielding –24.80 dBm. The fundamental EIRP was 25.501 dBm so this harmonic was 25.501 dBm – (-24.80).

7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.

FCC ID: A3LSMS901U

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

Mode(s): WCDMA/LTE/NR/UL-CA

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)	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, 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 7.6
	Frequency Stability	2.1055, 27.54	Fundamental emissions stay within authorized frequency block	PASS	Section 7.9
RADIATED	Effective Radiated Power (LTE Band 13)	27.50(b)(10)	≤ 3 Watts max. ERP	PASS	Section 7.7
	Effective Radiated Power (LTE Band 12, 71; NR Band n12, n71)	27.50(c)(10)	≤ 3 Watts max. ERP	PASS	Section 7.7
	Equivalent Isotropic Radiated Power (WCDMA AWS; LTE Band 4, 66; NR Band n66)	27.50(d)(10)	≤ 1 Watt max. EIRP	PASS	Section 7.7
	Radiated Spurious Emissions (LTE Band 13)	2.1053, 27.53(c), 27.53(f)	Undesirable emissions must meet the limits detailed in sections 27.53(c) and 27.53(f)	PASS	Section 7.8
	Radiated Spurious Emissions (LTE Band 12, 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 (FCC)

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

§2.1046

Test Overview

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

Test Procedure Used

KDB 971168 D01 v03r01 – Section 6.0

Test Settings

1. Span = 2 x OBW to 3 x OBW
2. RBW = 1% to 5% of the OBW
3. Number of measurement points in sweep ≥ 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.

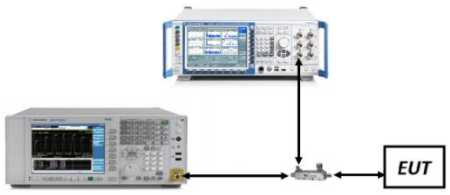


Figure 7-1. Test Instrument & Measurement Setup

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 / 161	24.16
		349000	1745.0	1 / 54	24.14
		352000	1760.0	1 / 54	24.03
	QPSK	346000	1730.0	1 / 161	24.24
	16-QAM	346000	1730.0	1 / 161	23.47
30 MHz	π/2 BPSK	345000	1725.0	1 / 80	24.02
		349000	1745.0	1 / 40	24.04
		353000	1765.0	1 / 80	24.05
	QPSK	345000	1725.0	1 / 80	23.93
	16-QAM	345000	1725.0	1 / 80	23.14
20 MHz	π/2 BPSK	344000	1720.0	1 / 53	24.29
		349000	1745.0	1 / 79	24.26
		354000	1770.0	1 / 79	24.29
	QPSK	344000	1720.0	1 / 53	24.35
	16-QAM	344000	1720.0	1 / 53	23.27
15 MHz	π/2 BPSK	343500	1717.5	1 / 20	24.33
		349000	1745.0	1 / 58	24.12
		354500	1772.5	1 / 20	24.14
	QPSK	343500	1717.5	1 / 20	24.23
	16-QAM	343500	1717.5	1 / 20	23.35
10 MHz	π/2 BPSK	343000	1715.0	1 / 13	24.43
		349000	1745.0	1 / 26	24.23
		355000	1775.0	1 / 26	24.20
	QPSK	343000	1715.0	1 / 13	24.37
	16-QAM	343000	1715.0	1 / 13	23.65
5 MHz	π/2 BPSK	342500	1712.5	1 / 6	24.28
		349000	1745.0	1 / 12	24.24
		355500	1777.5	1 / 12	24.42
	QPSK	342500	1712.5	1 / 6	24.34
	16-QAM	342500	1712.5	1 / 6	23.24

Table 7-2. Conducted Power Output Data (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 / 108	24.09
		349000	1745.0	1 / 54	23.95
		352000	1760.0	1 / 54	24.28
	QPSK	346000	1730.0	1 / 108	24.08
	16-QAM	346000	1730.0	1 / 108	23.08
30 MHz	π/2 BPSK	345000	1725.0	1 / 119	24.18
		349000	1745.0	1 / 119	23.94
		353000	1765.0	1 / 80	23.79
	QPSK	345000	1725.0	1 / 119	24.09
	16-QAM	345000	1725.0	1 / 119	23.02
20 MHz	π/2 BPSK	344000	1720.0	1 / 79	24.04
		349000	1745.0	1 / 26	24.17
		354000	1770.0	1 / 26	24.08
	QPSK	354000	1770.0	1 / 26	24.06
	16-QAM	354000	1770.0	1 / 26	23.19
15 MHz	π/2 BPSK	343500	1717.5	1 / 20	24.16
		349000	1745.0	1 / 20	23.99
		354500	1772.5	1 / 20	24.22
	QPSK	343500	1717.5	1 / 20	24.18
	16-QAM	343500	1717.5	1 / 20	23.17
10 MHz	π/2 BPSK	343000	1715.0	1 / 38	23.83
		349000	1745.0	1 / 13	24.19
		355000	1775.0	1 / 13	24.23
	QPSK	355000	1775.0	1 / 13	24.21
	16-QAM	355000	1775.0	1 / 13	22.98
5 MHz	π/2 BPSK	342500	1712.5	1 / 12	24.30
		349000	1745.0	1 / 18	24.12
		355500	1777.5	1 / 12	24.26
	QPSK	355500	1777.5	1 / 12	24.54
	16-QAM	355500	1777.5	1 / 12	23.95

Table 7-3. Conducted Power Output Data (NR Band n66 – ANT F)

PCC						SCC						PCC Conducted Power [dBm]	SCC Conducted Power [dBm]	Inter-Band ULCA Total Tx. Power (dBm)
PCC Band	PCC Frequency (MHz)	PCC Bandwidth [MHz]	PCC (UL) channel	Mod.	PCC UL RB#/Offset	SCC Band	SCC Frequency (MHz)	SCC Bandwidth [MHz]	SCC (UL) channel	Mod.	SCC UL RB#/Offset			
n66	1730	40	Low	π/2 BPSK	1/108	n77	3750	100	Low	π/2 BPSK	1/136	20.72	21.49	24.13
				QPSK	216 / 0					QPSK	270 / 0	20.66	21.18	23.94
				QPSK	1 / 54					QPSK	1 / 68	20.81	21.12	23.98
				QPSK	1 / 108					QPSK	1 / 136	20.98	21.56	24.29
				QPSK	1 / 161					QPSK	1 / 204	20.64	21.12	23.90
				16Q	1/108					16Q	1/136	20.77	21.33	24.07
	1745		Mid	π/2 BPSK	1/108		3840		Mid	π/2 BPSK	1/136	20.69	21.30	24.02
				QPSK	216 / 0					QPSK	270 / 0	20.50	20.88	23.70
				QPSK	1 / 54					QPSK	1 / 68	20.47	21.06	23.79
				QPSK	1 / 108					QPSK	1 / 136	20.73	21.33	24.05
				QPSK	1 / 161					QPSK	1 / 204	20.40	21.18	23.82
				16Q	1/108					16Q	1/136	20.59	21.26	23.95
	1760		High	π/2 BPSK	1/108		3930		High	π/2 BPSK	1/136	20.58	21.47	24.06
				QPSK	216 / 0					QPSK	270 / 0	20.68	21.51	24.13
				QPSK	1 / 54					QPSK	1 / 68	20.70	21.44	24.10
				QPSK	1 / 108					QPSK	1 / 136	20.73	21.58	24.19
				QPSK	1 / 161					QPSK	1 / 204	20.40	21.50	24.00
				16Q	1/108					16Q	1/136	20.53	21.15	23.86

Table 7-4. Conducted Power Output Data (ULCA 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.

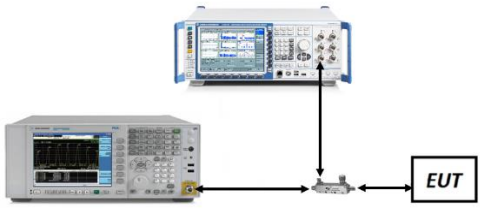
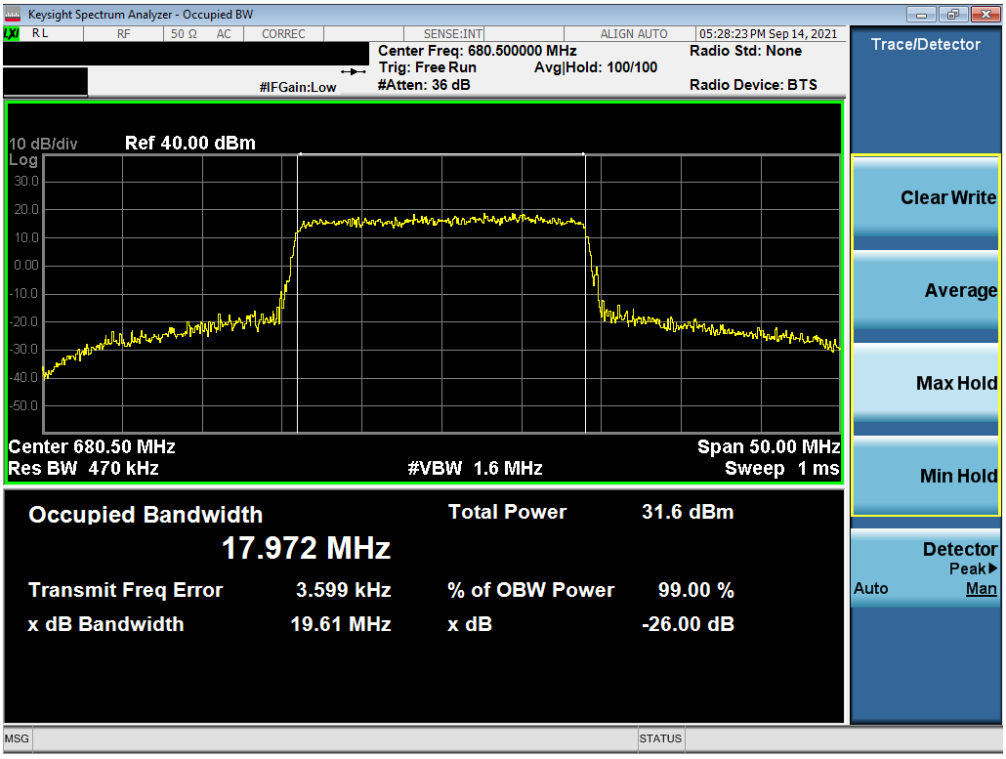


Figure 7-2. Test Instrument & Measurement Setup

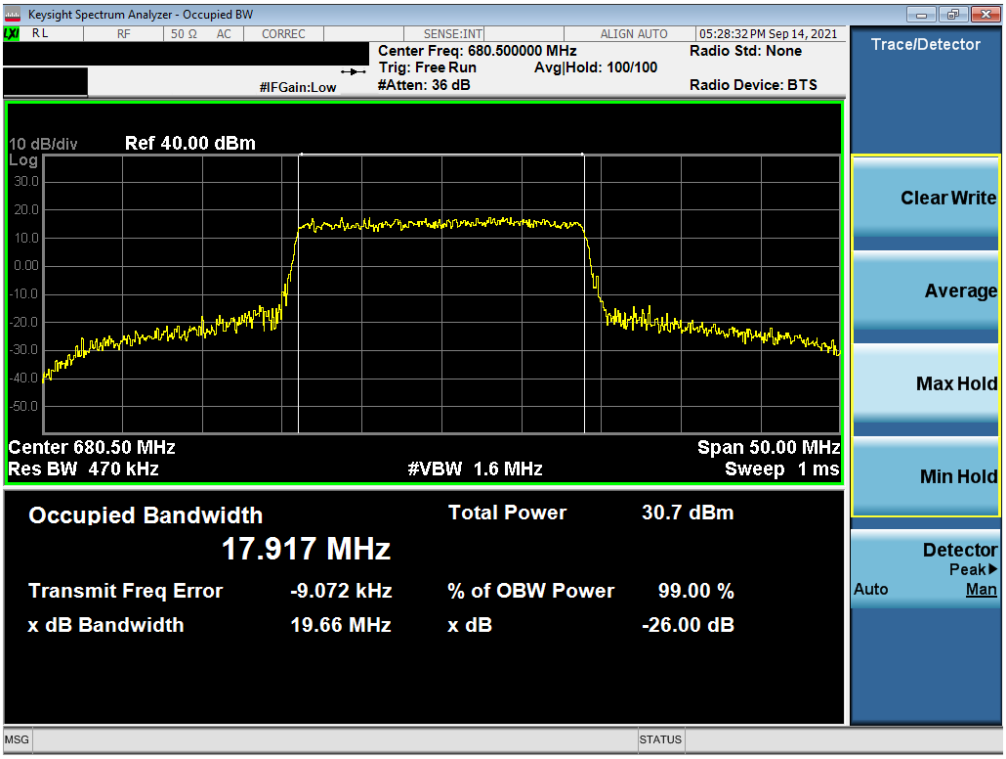
Test Notes

None.

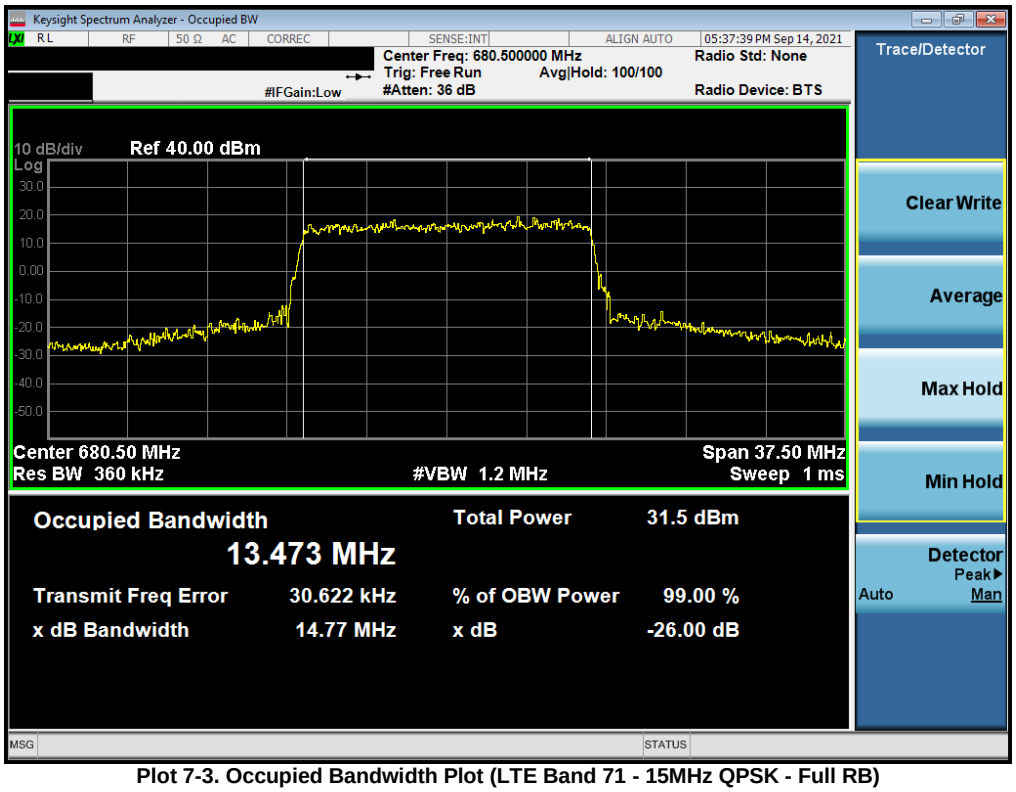
LTE Band 71



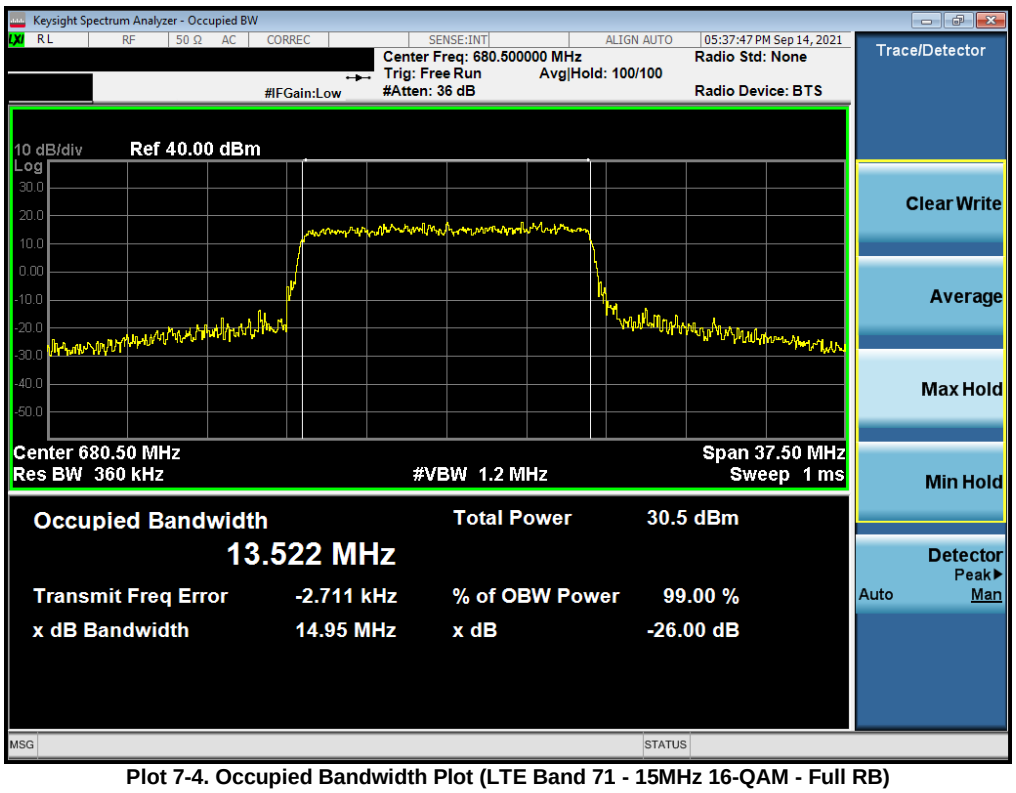
Plot 7-1. Occupied Bandwidth Plot (LTE Band 71 - 20MHz QPSK - Full RB)



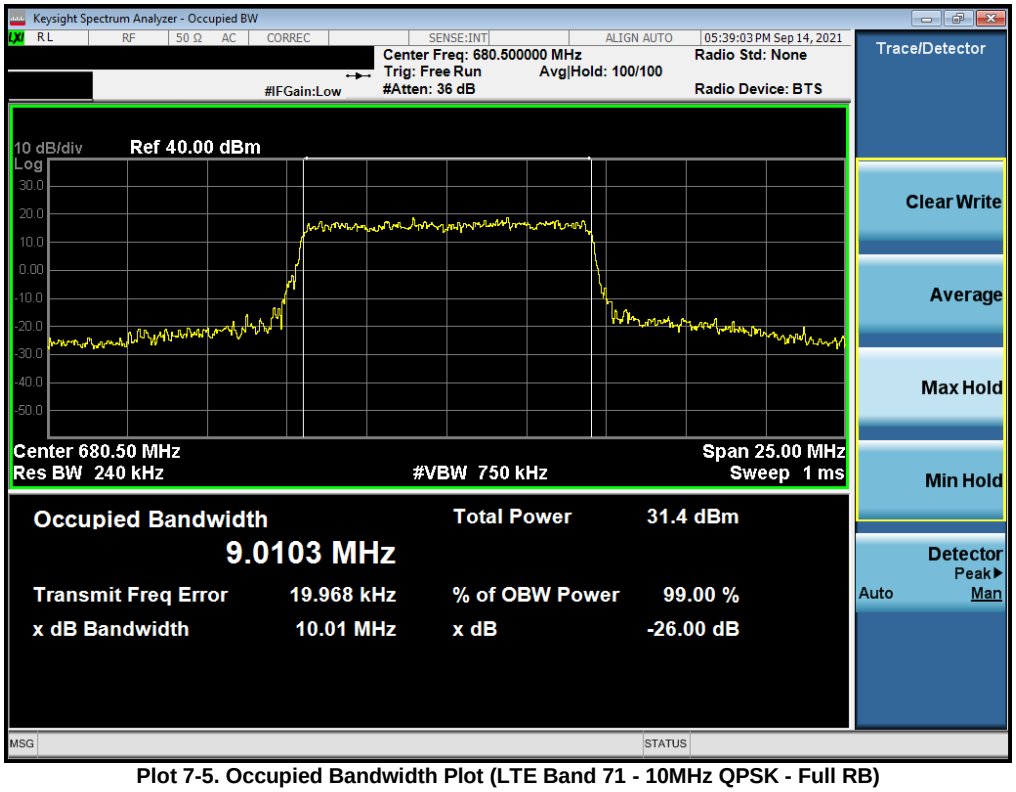
Plot 7-2. Occupied Bandwidth Plot (LTE Band 71 - 20MHz 16-QAM - Full RB)



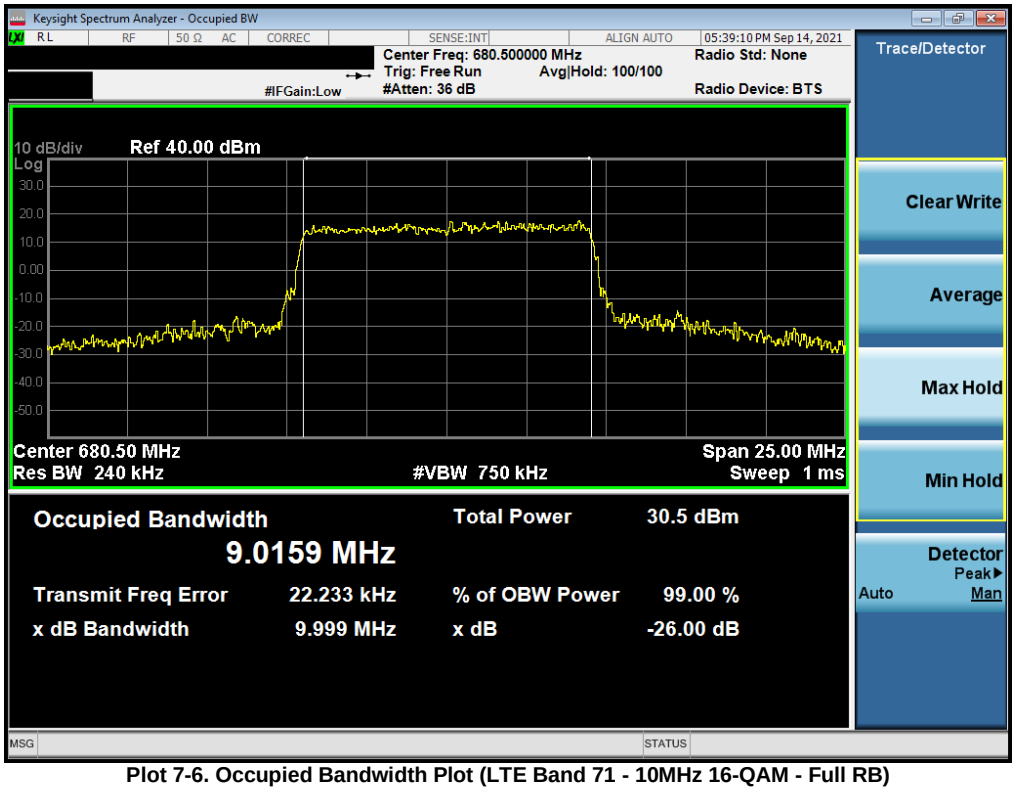
Plot 7-3. Occupied Bandwidth Plot (LTE Band 71 - 15MHz QPSK - Full RB)



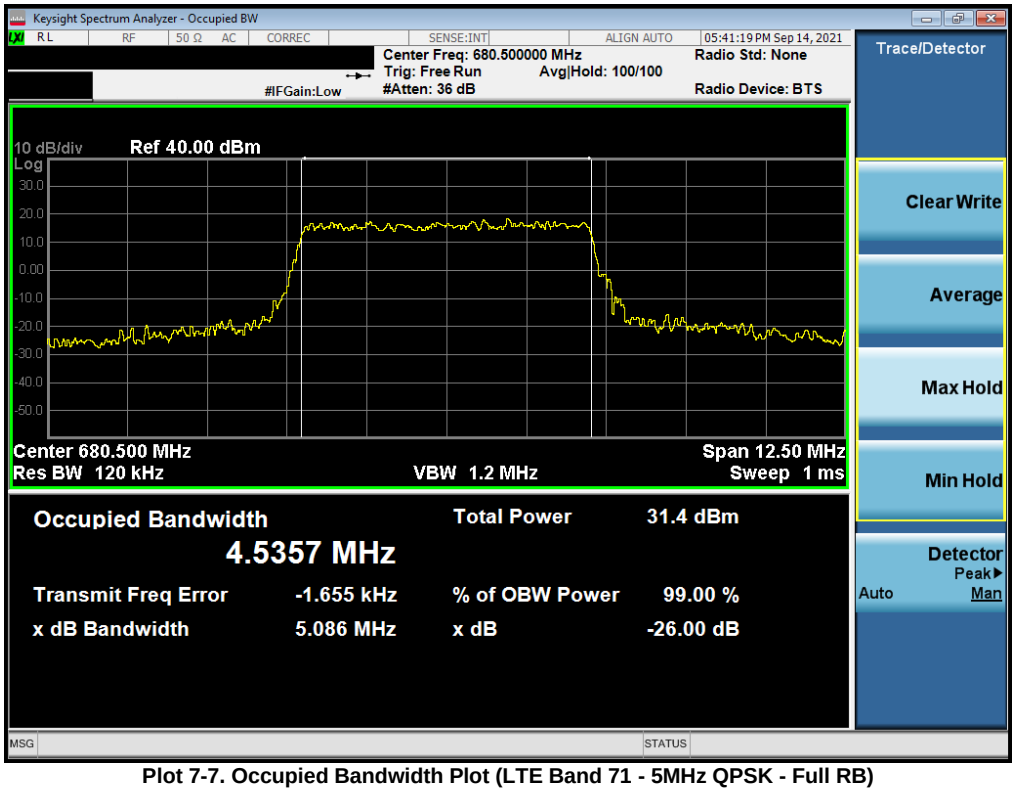
Plot 7-4. Occupied Bandwidth Plot (LTE Band 71 - 15MHz 16-QAM - Full RB)



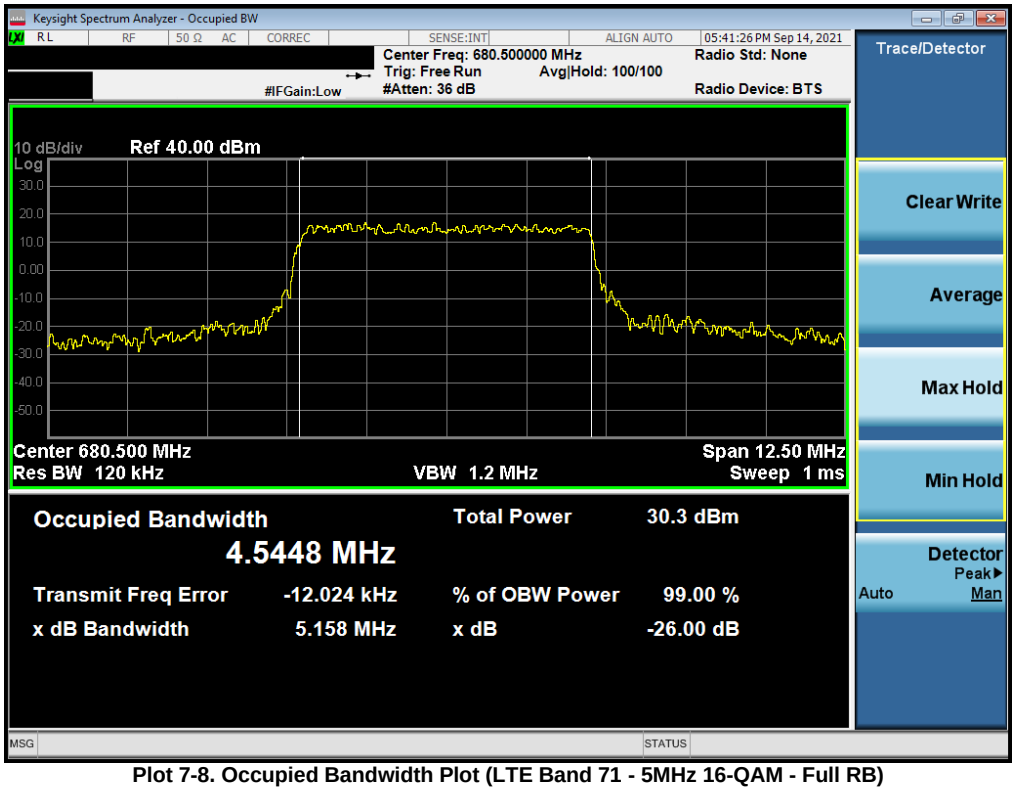
Plot 7-5. Occupied Bandwidth Plot (LTE Band 71 - 10MHz QPSK - Full RB)



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

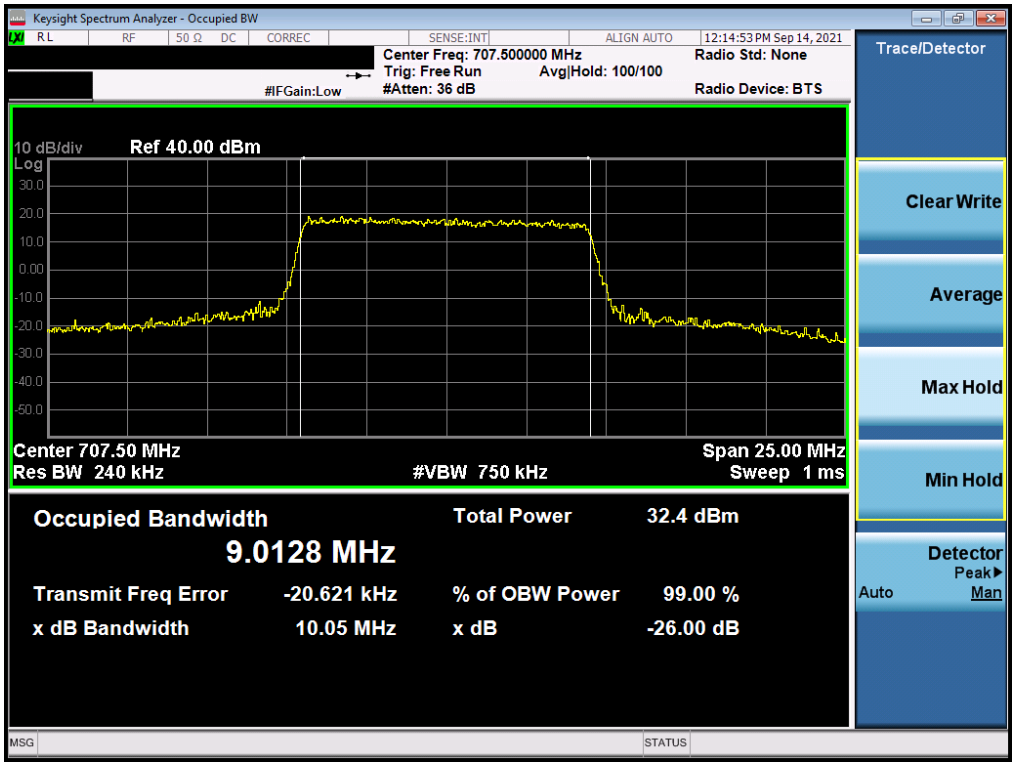


Plot 7-7. Occupied Bandwidth Plot (LTE Band 71 - 5MHz QPSK - Full RB)

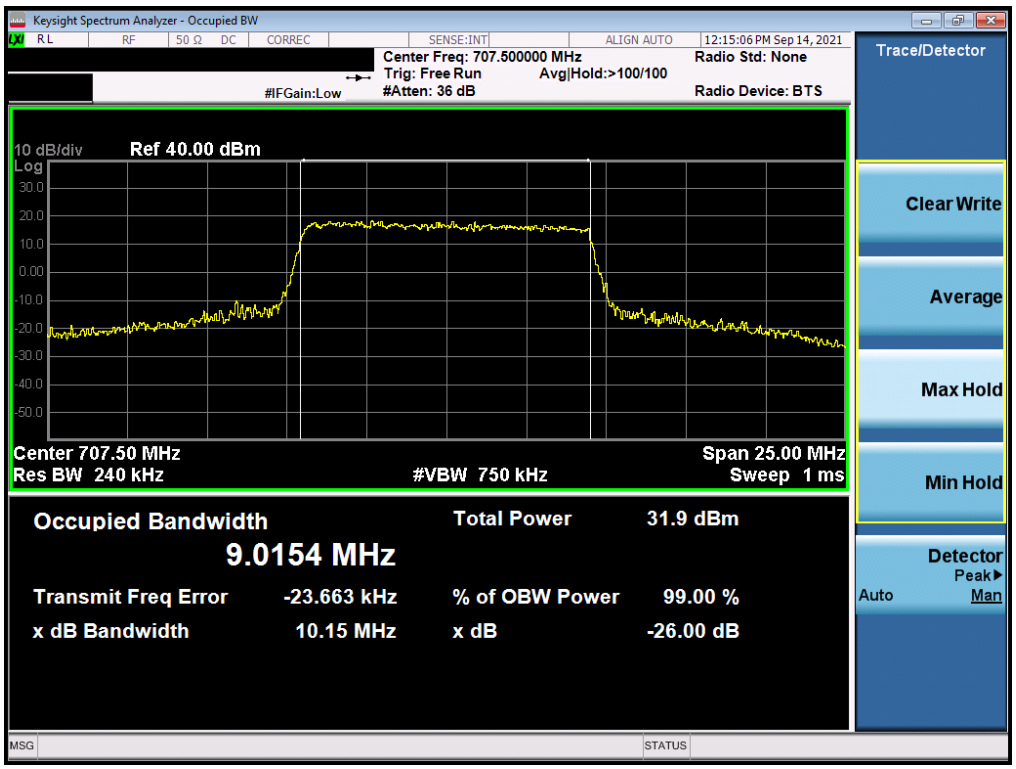


Plot 7-8. Occupied Bandwidth Plot (LTE Band 71 - 5MHz 16-QAM - Full RB)

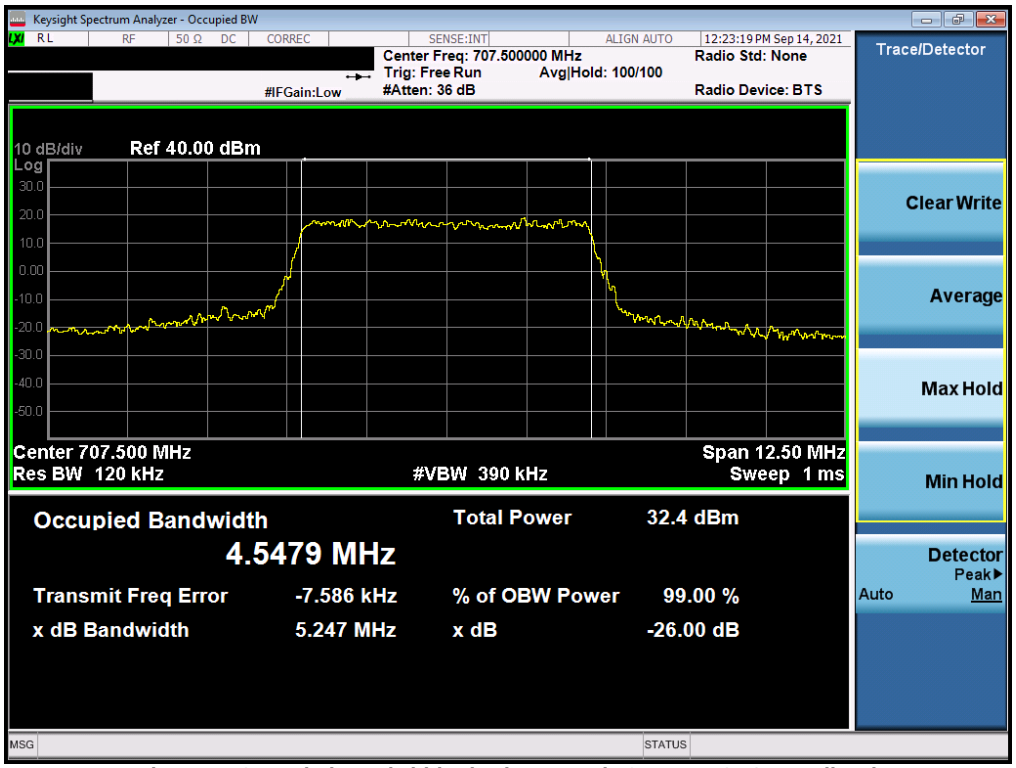
LTE Band 12



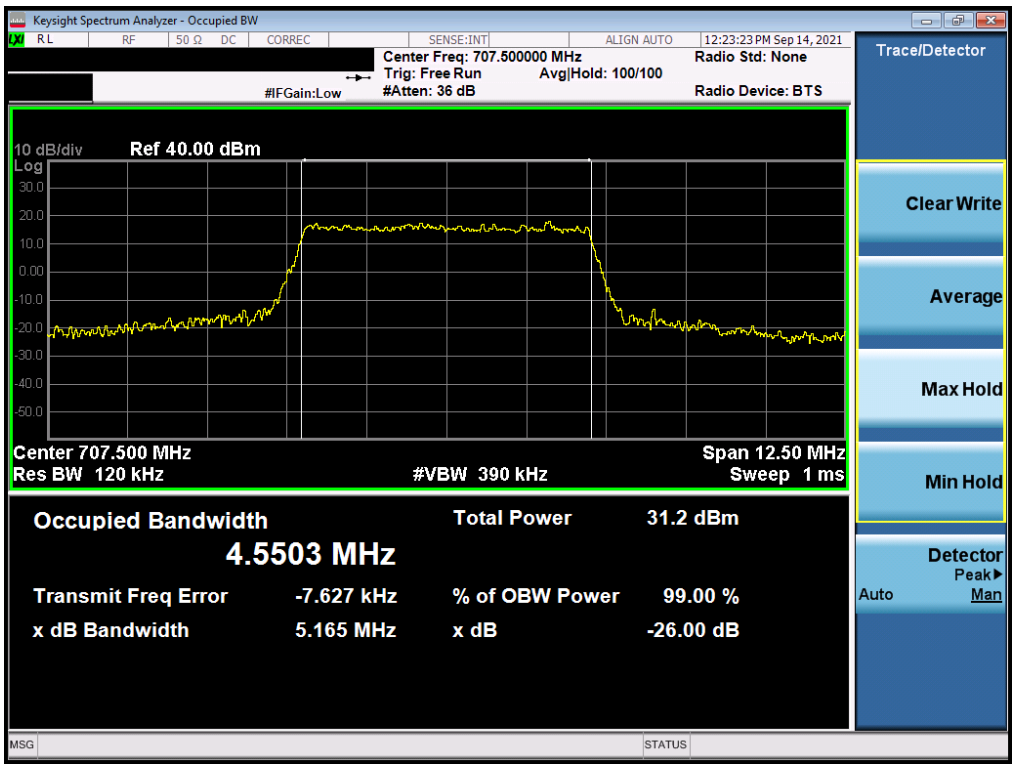
Plot 7-9. Occupied Bandwidth Plot (LTE Band 12 - 10MHz QPSK - Full RB)



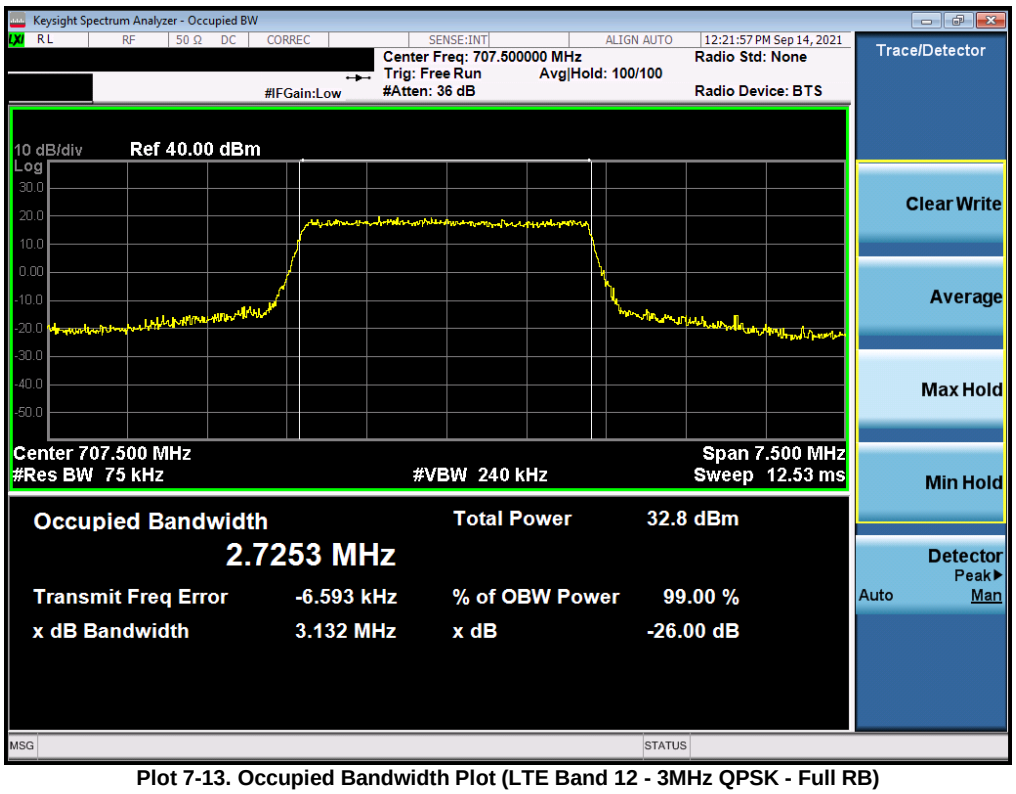
Plot 7-10. Occupied Bandwidth Plot (LTE Band 12 - 10MHz 16-QAM - Full RB)



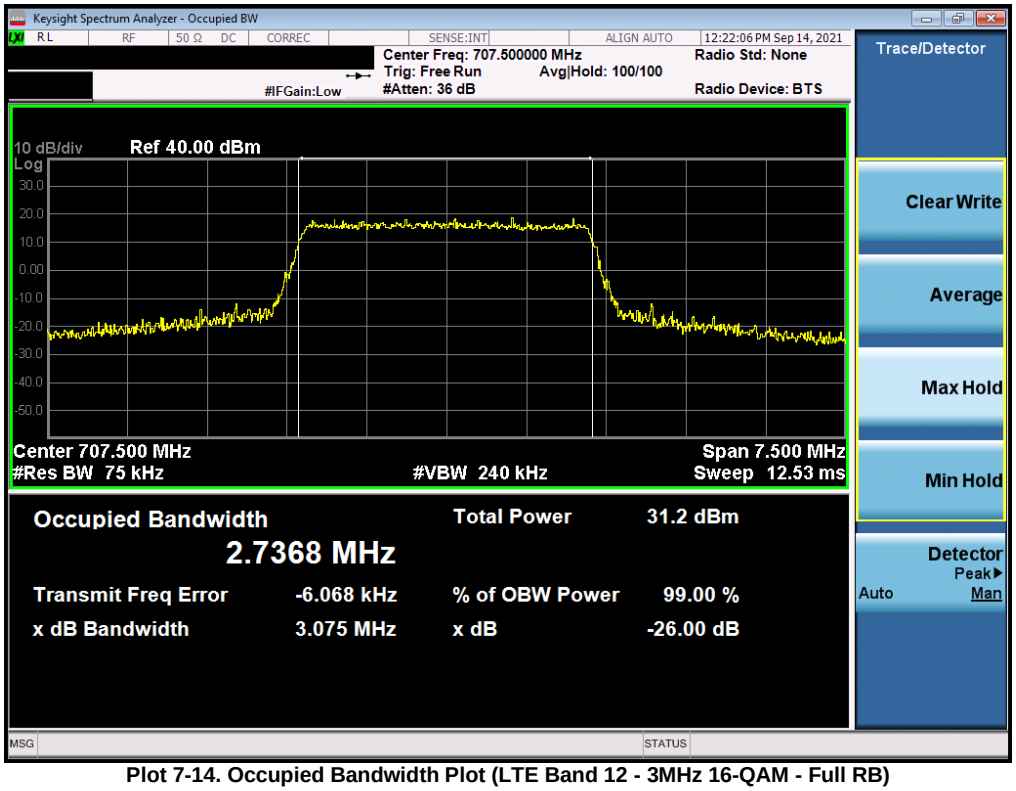
Plot 7-11. Occupied Bandwidth Plot (LTE Band 12 - 5MHz QPSK - Full RB)



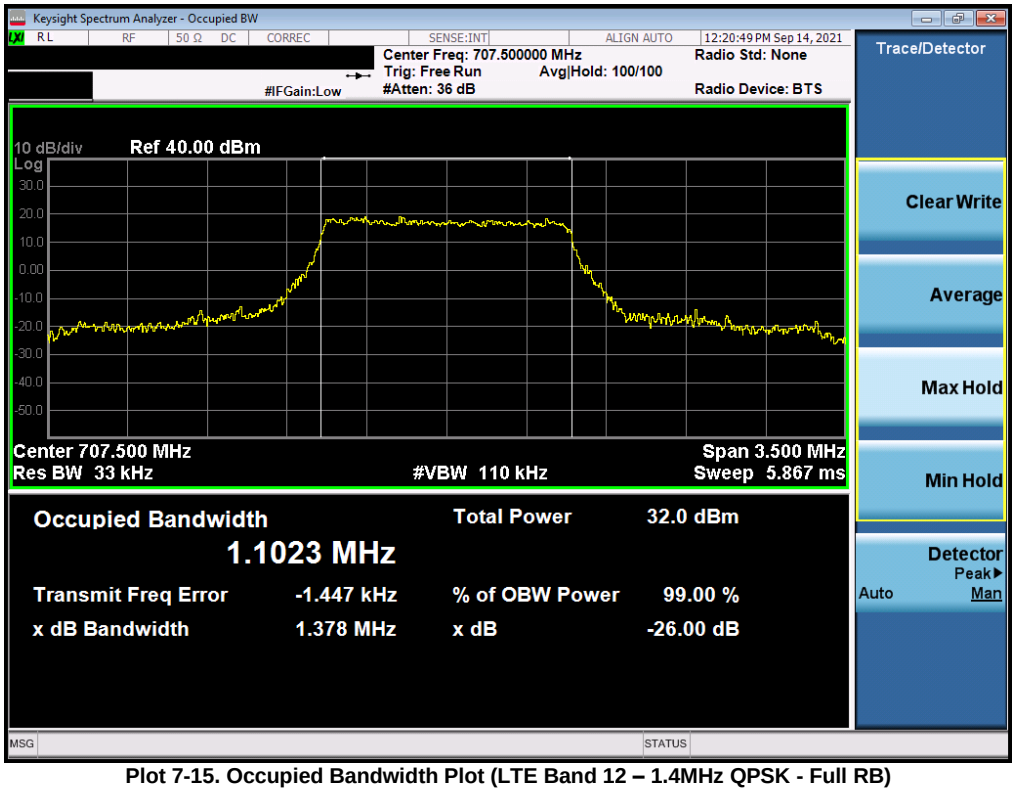
Plot 7-12. Occupied Bandwidth Plot (LTE Band 12 - 5MHz 16-QAM - Full RB)



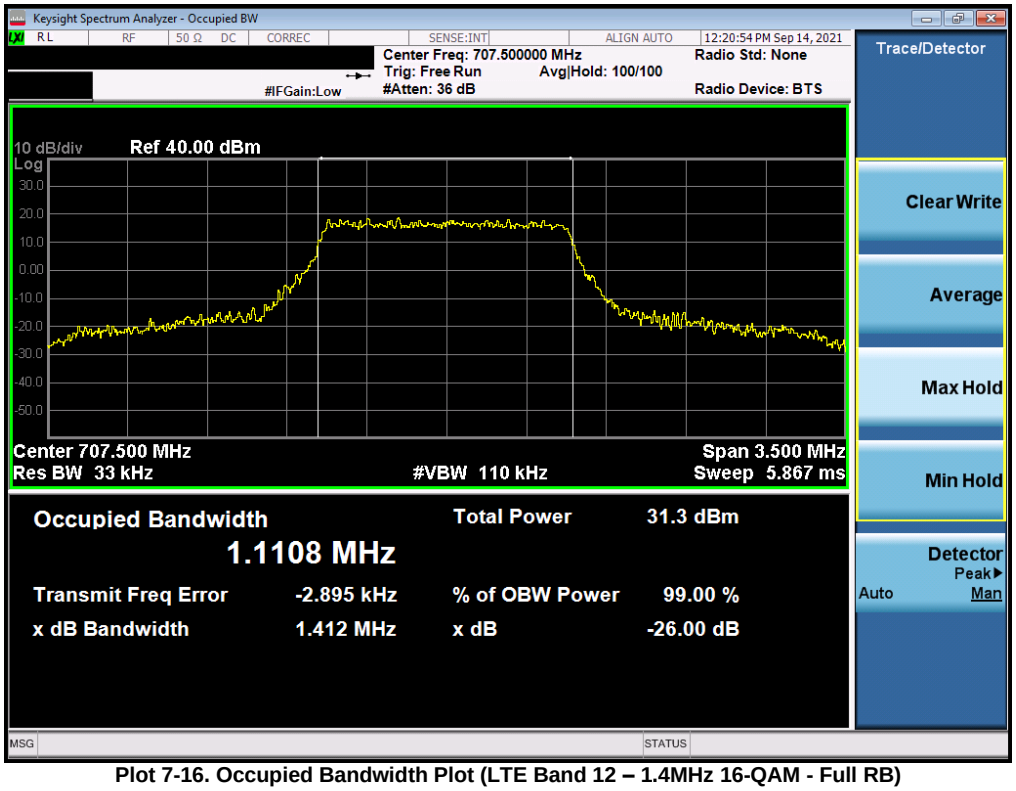
Plot 7-13. Occupied Bandwidth Plot (LTE Band 12 - 3MHz QPSK - Full RB)



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

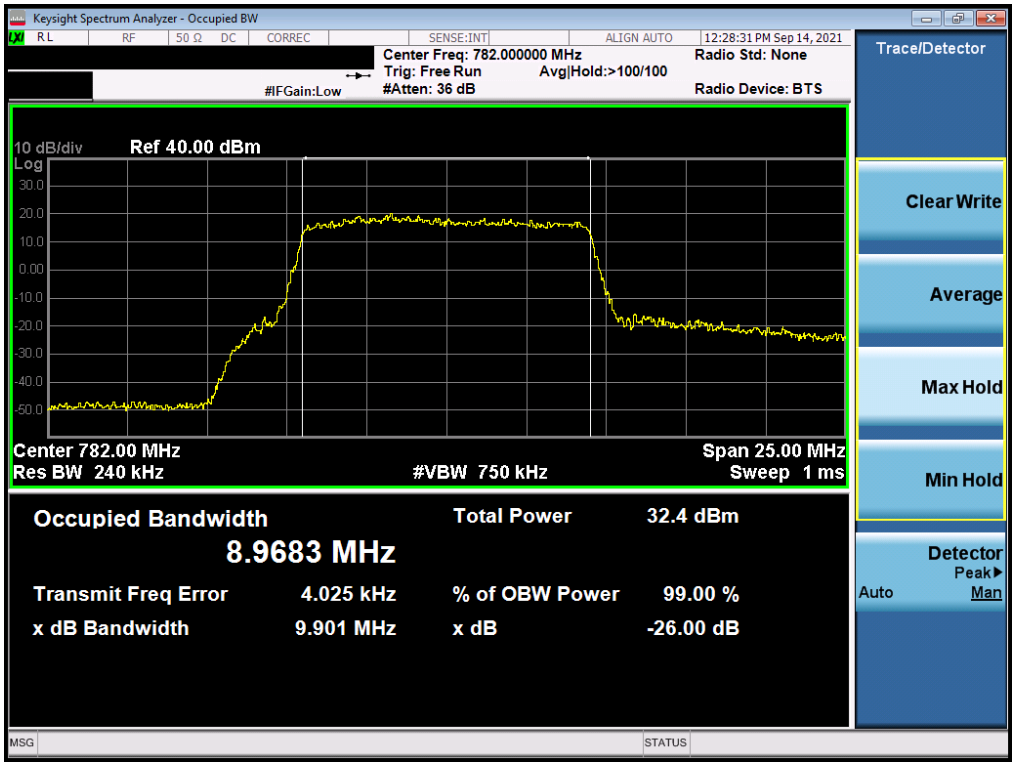


Plot 7-15. Occupied Bandwidth Plot (LTE Band 12 – 1.4MHz QPSK - Full RB)

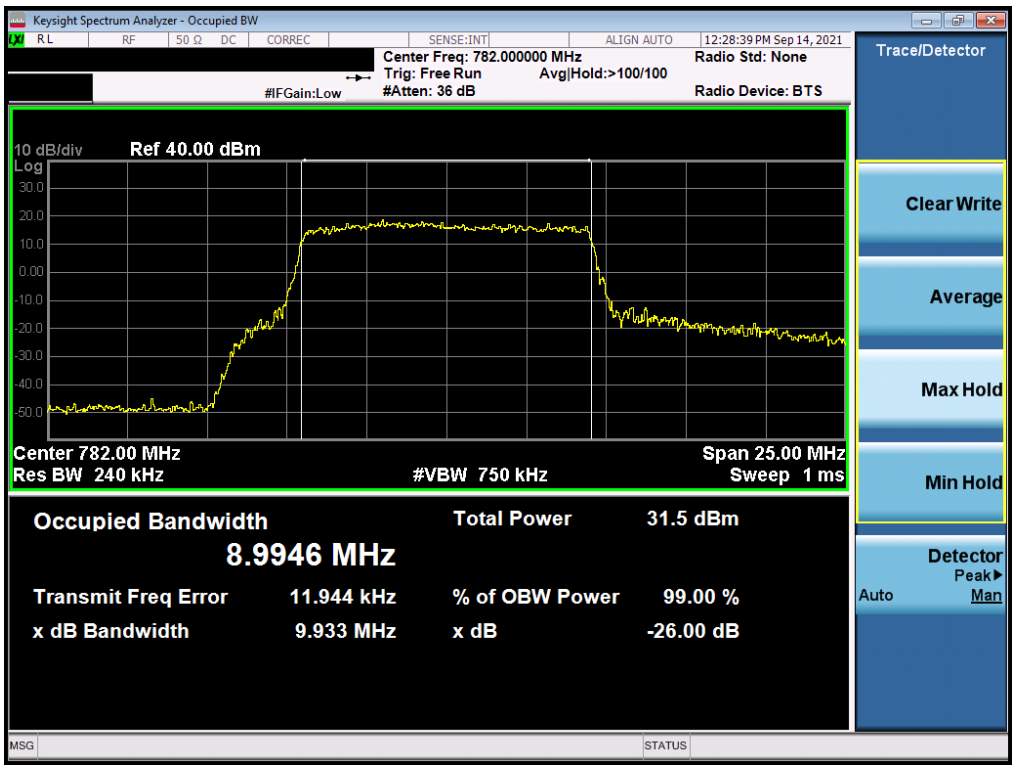


Plot 7-16. Occupied Bandwidth Plot (LTE Band 12 – 1.4MHz 16-QAM - Full RB)

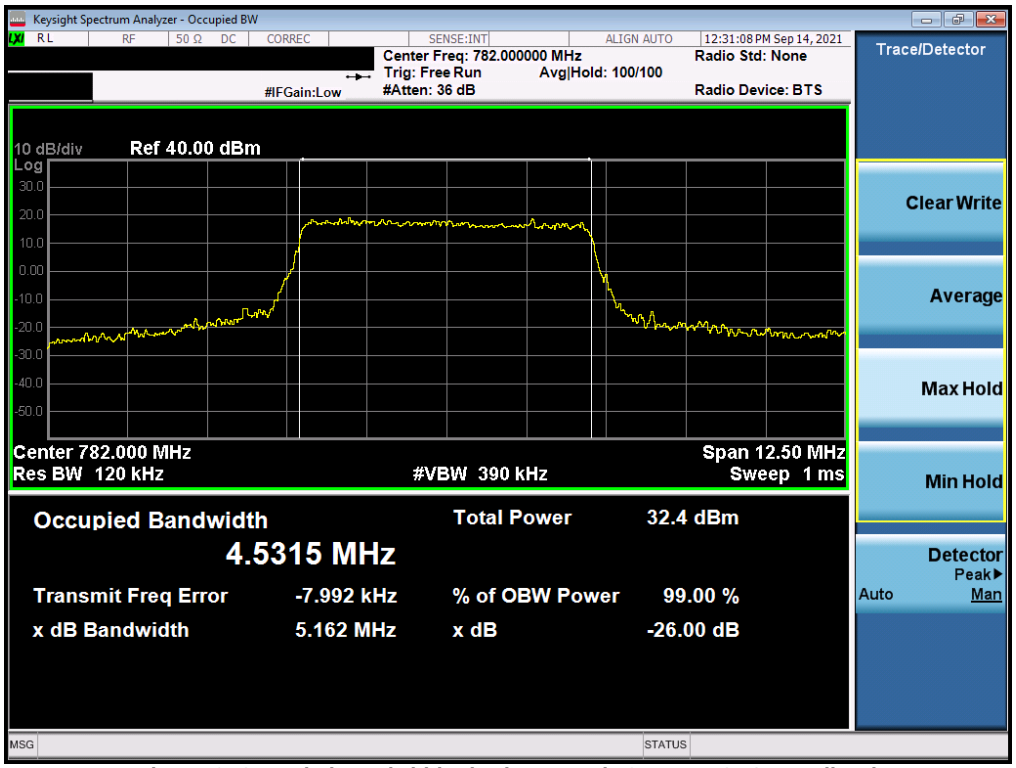
LTE Band 13



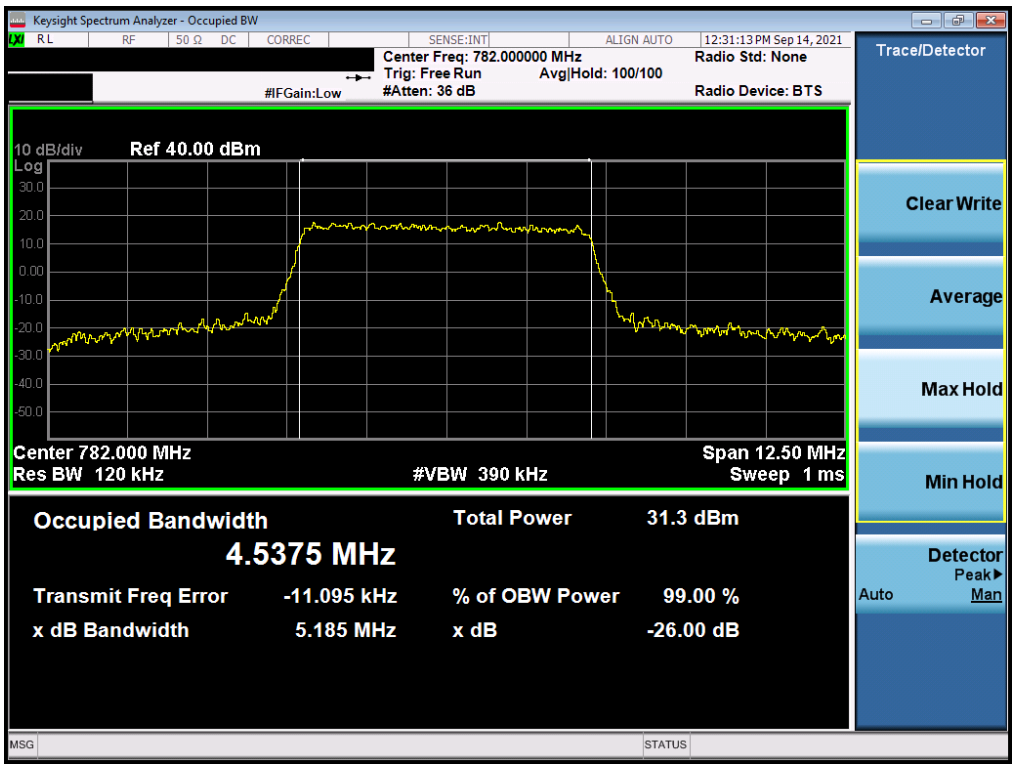
Plot 7-17. Occupied Bandwidth Plot (LTE Band 13 - 10MHz QPSK - Full RB)



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

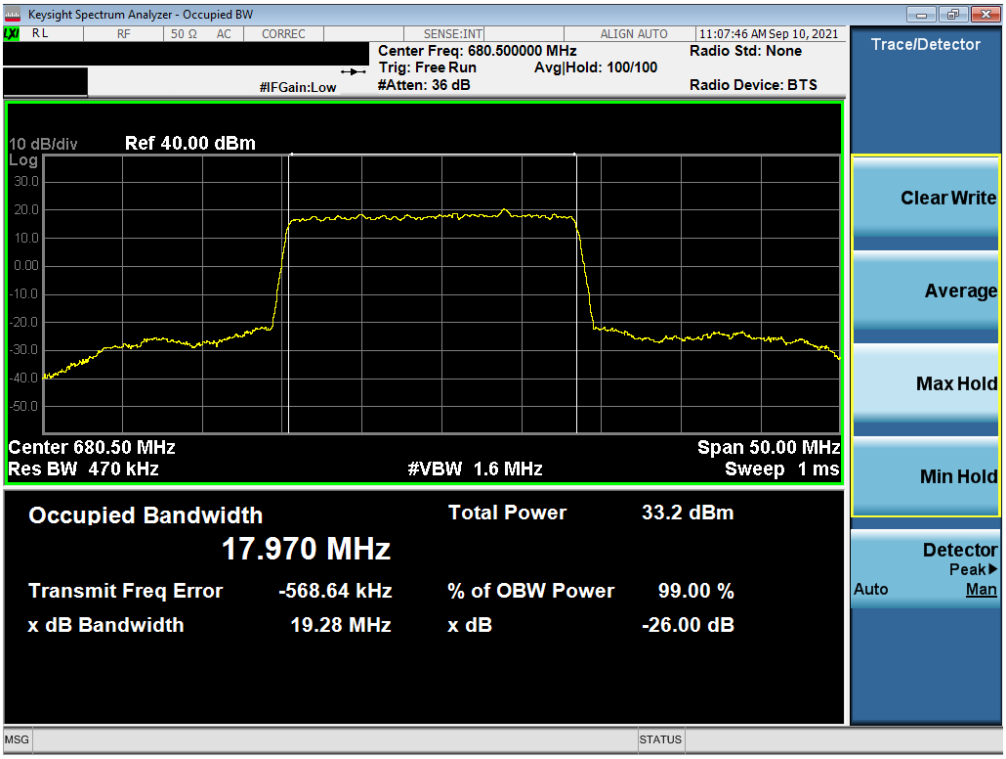


Plot 7-19. Occupied Bandwidth Plot (LTE Band 13 - 5MHz QPSK - Full RB)

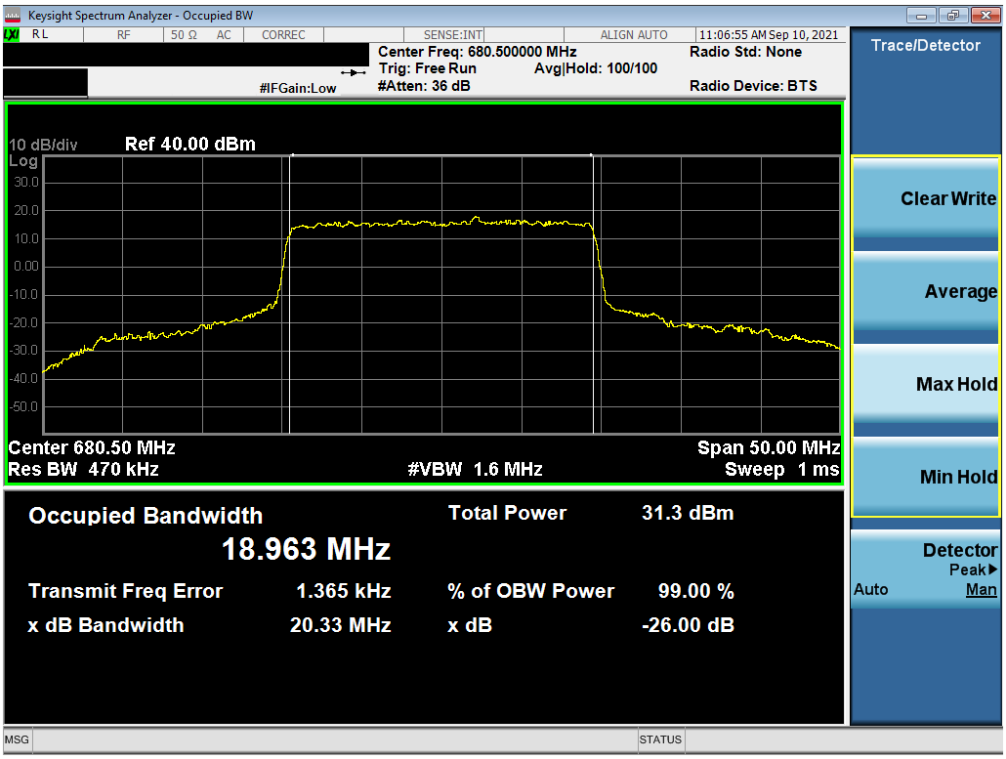


Plot 7-20. Occupied Bandwidth Plot (LTE Band 13 - 5MHz 16-QAM - Full RB)

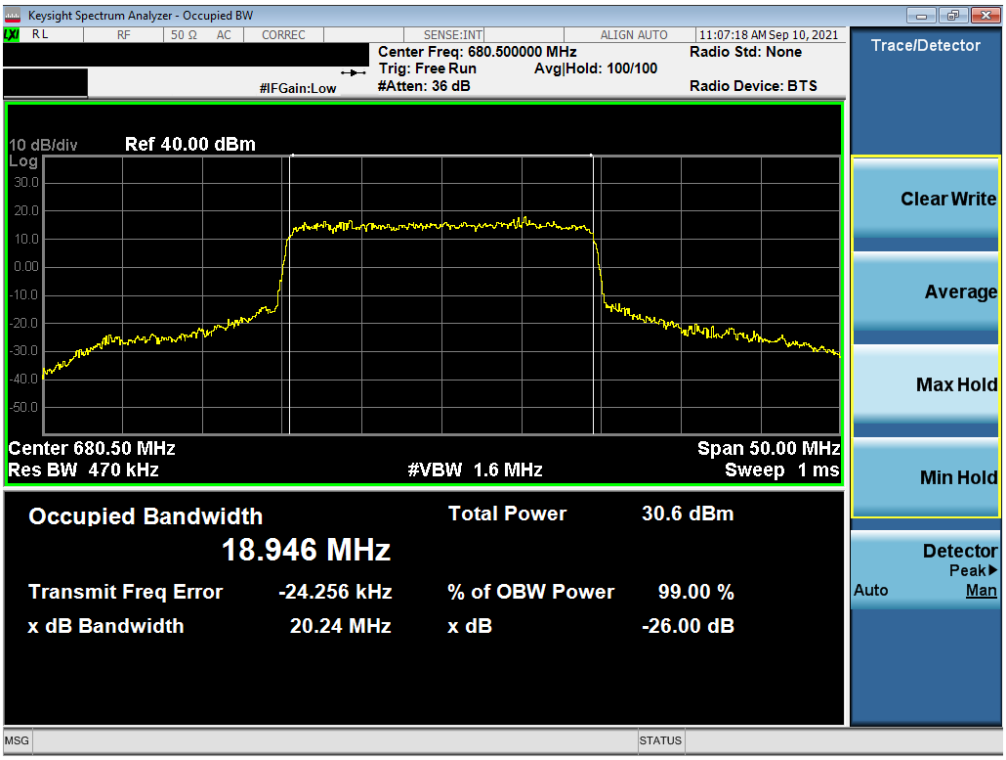
NR Band n71



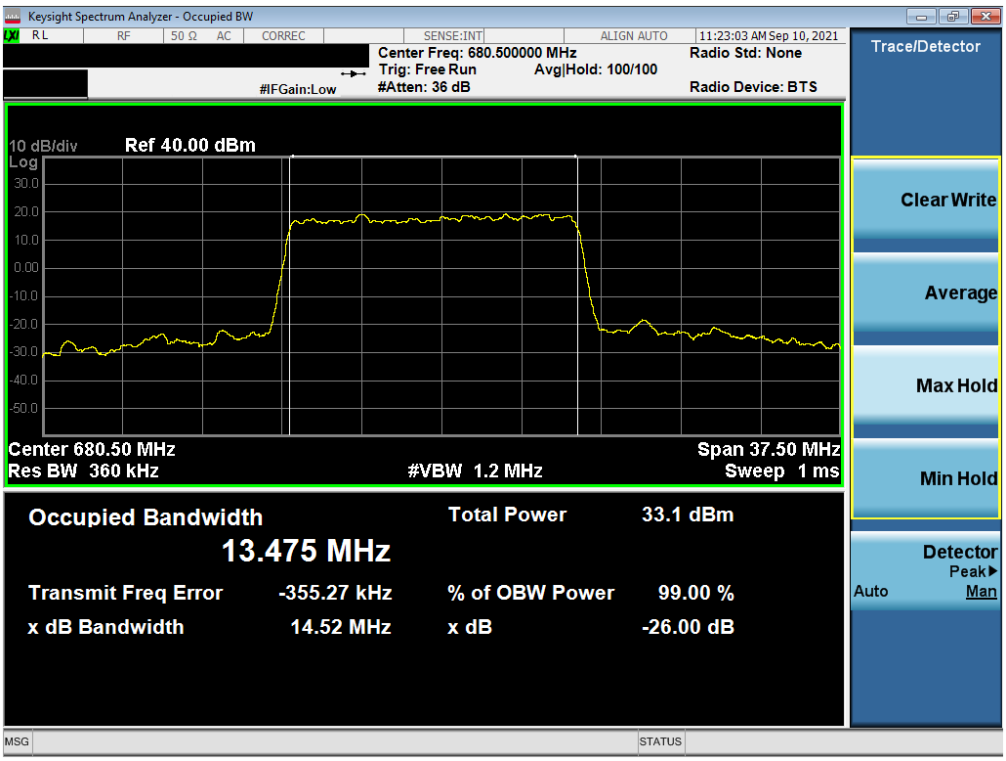
Plot 7-21. Occupied Bandwidth Plot (NR Band n71 - 20MHz DFT-s-OFDM BPSK - Full RB)



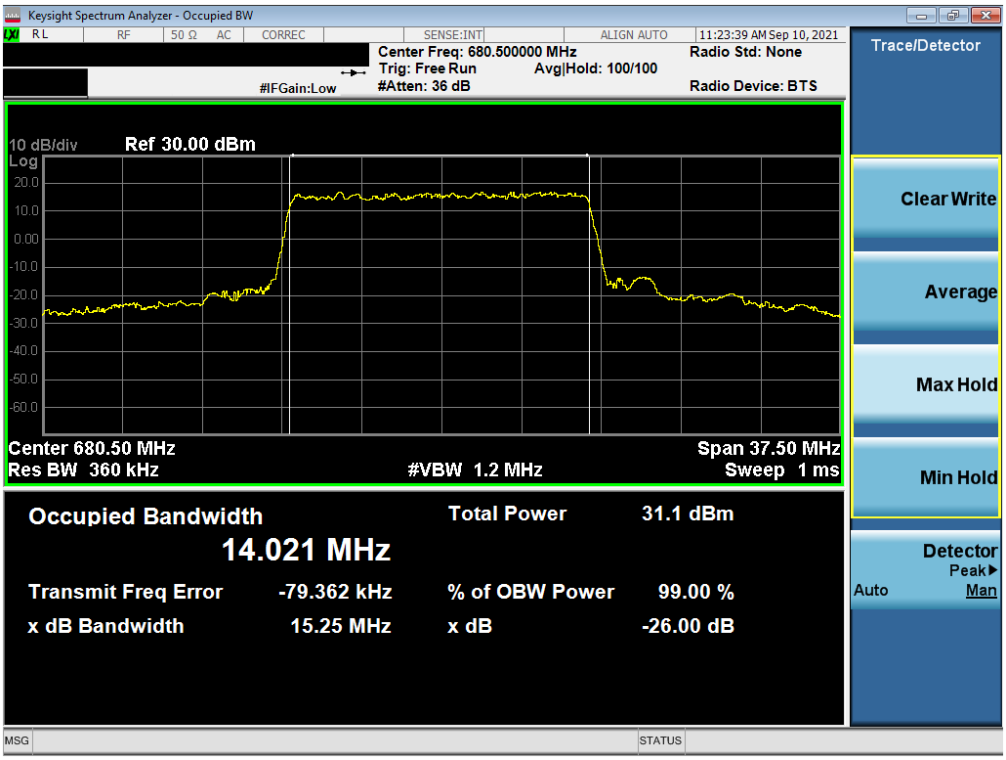
Plot 7-22. Occupied Bandwidth Plot (NR Band n71 - 20MHz CP-OFDM QPSK - Full RB)



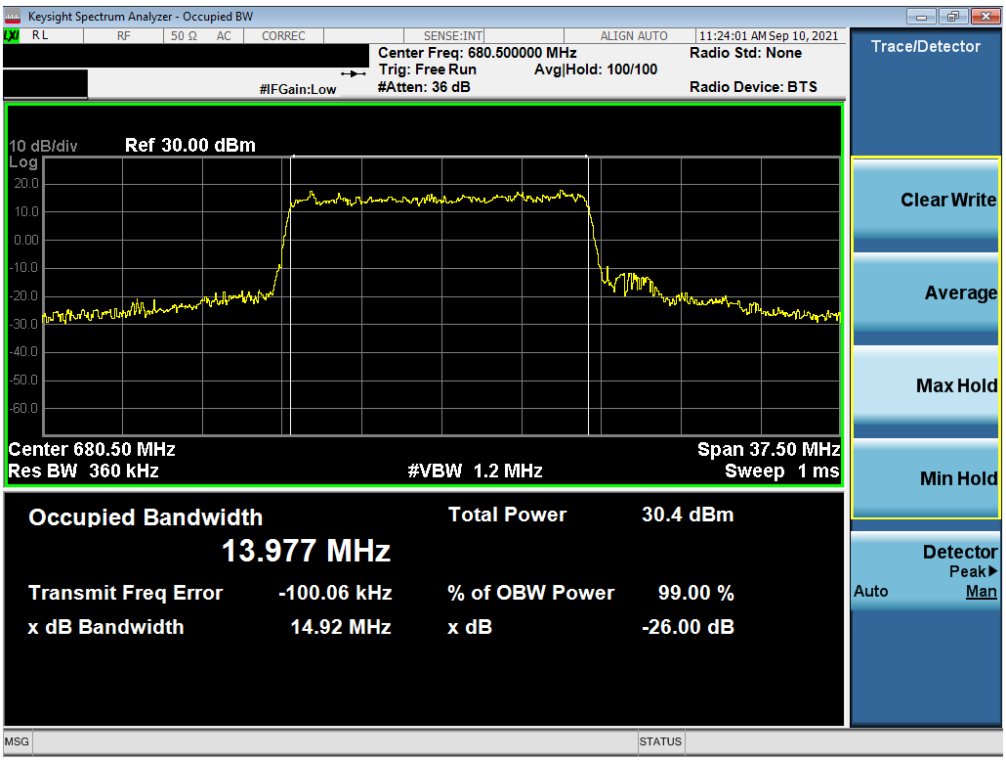
Plot 7-23. Occupied Bandwidth Plot (NR Band n71 - 20MHz CP-OFDM 16-QAM - Full RB)



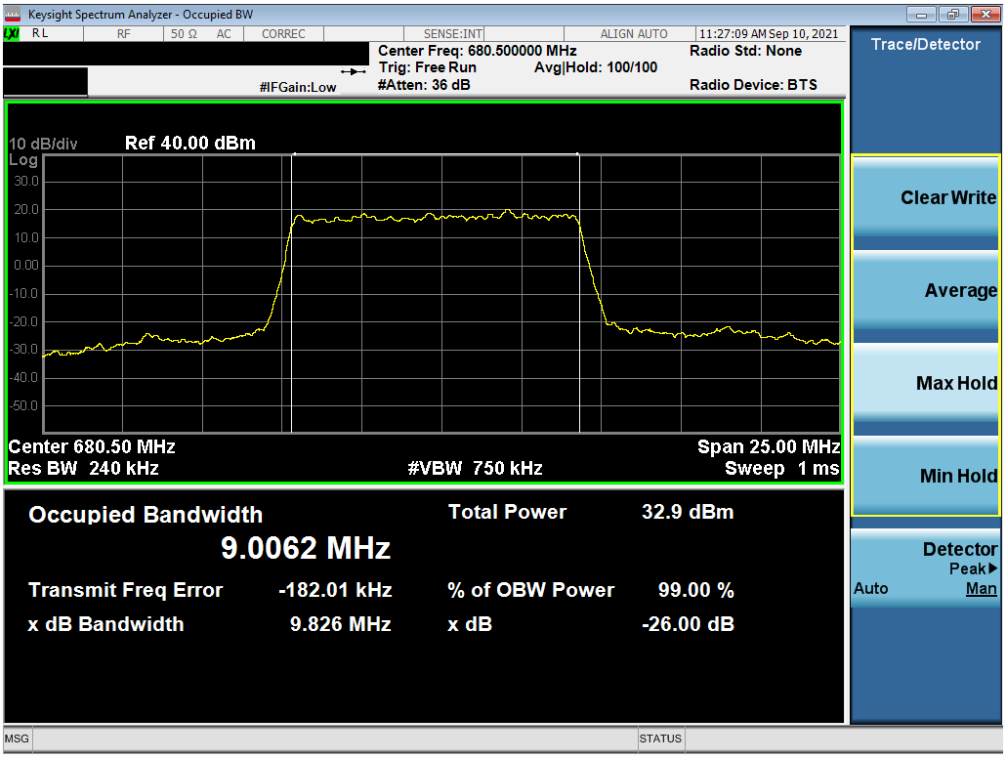
Plot 7-24. Occupied Bandwidth Plot (NR Band n71 - 15MHz DFT-s-OFDM BPSK - Full RB)



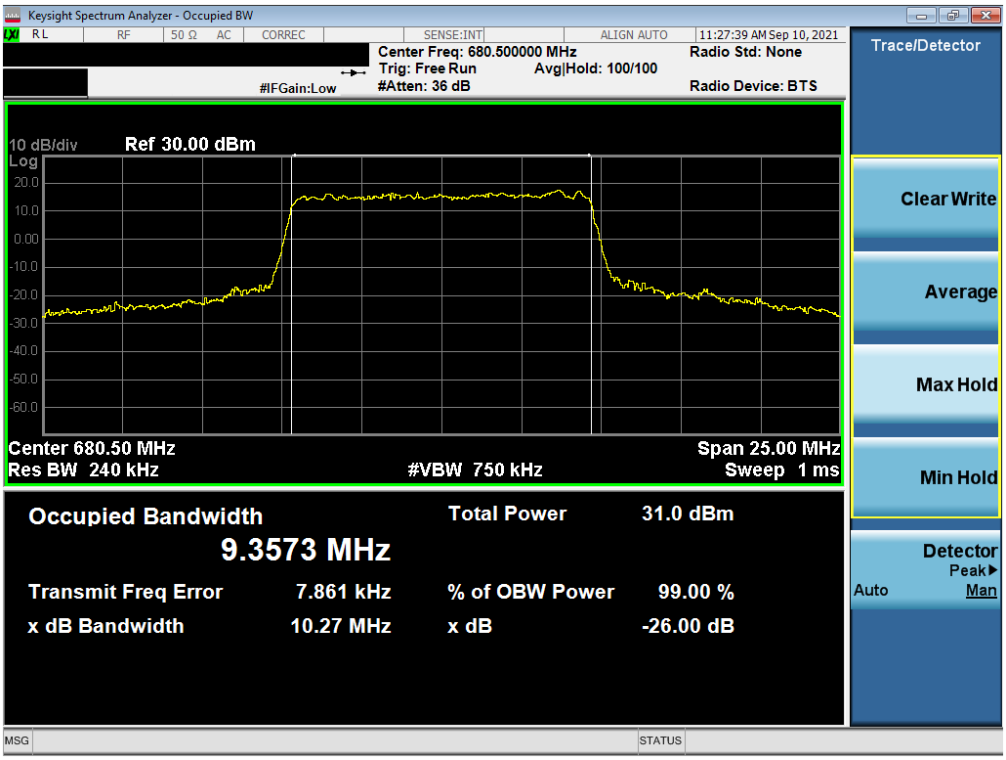
Plot 7-25. Occupied Bandwidth Plot (NR Band n71 - 15MHz CP-OFDM QPSK - Full RB)



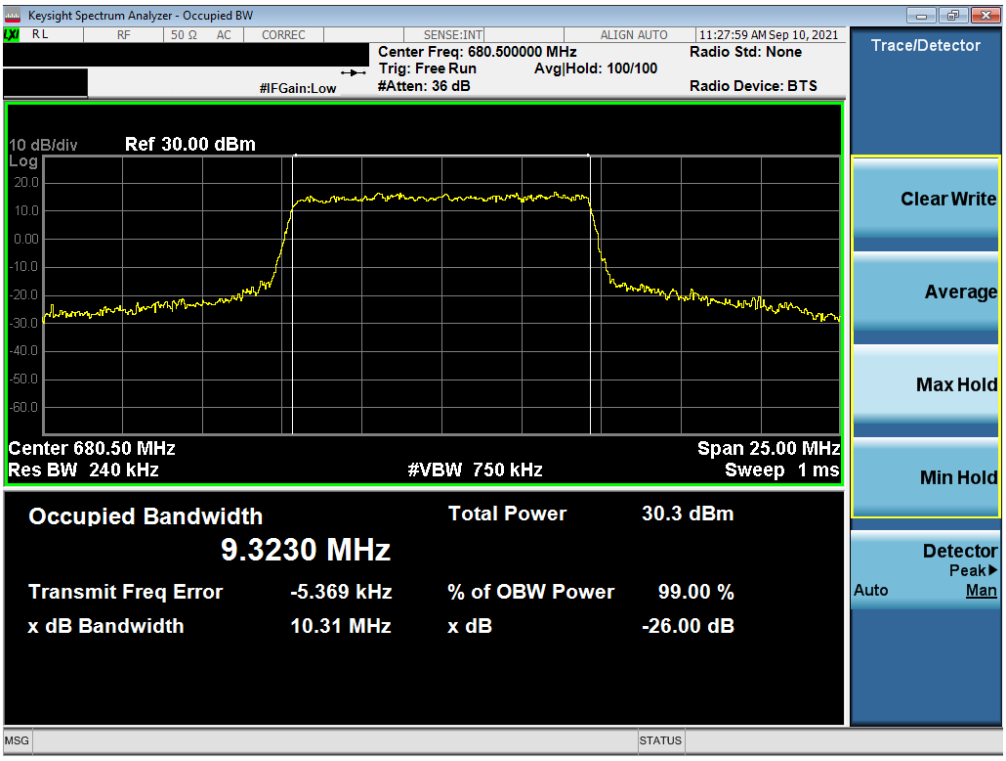
Plot 7-26. Occupied Bandwidth Plot (NR Band n71 - 15MHz CP-OFDM 16-QAM - Full RB)



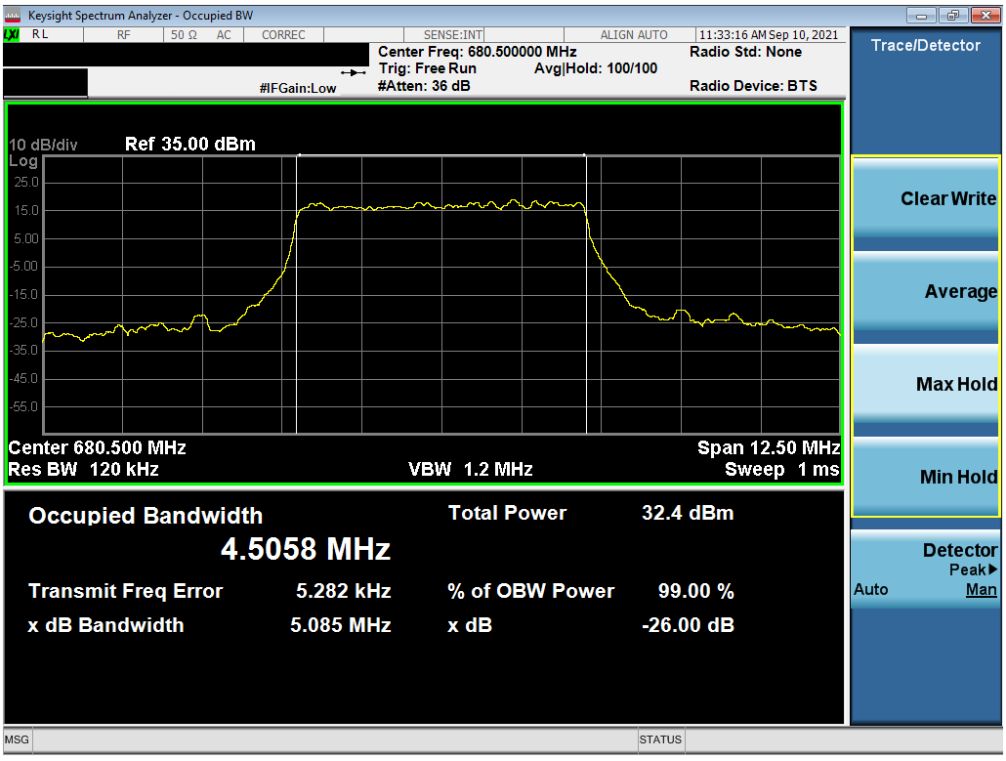
Plot 7-27. Occupied Bandwidth Plot (NR Band n71 - 10MHz DFT-s-OFDM BPSK - Full RB)



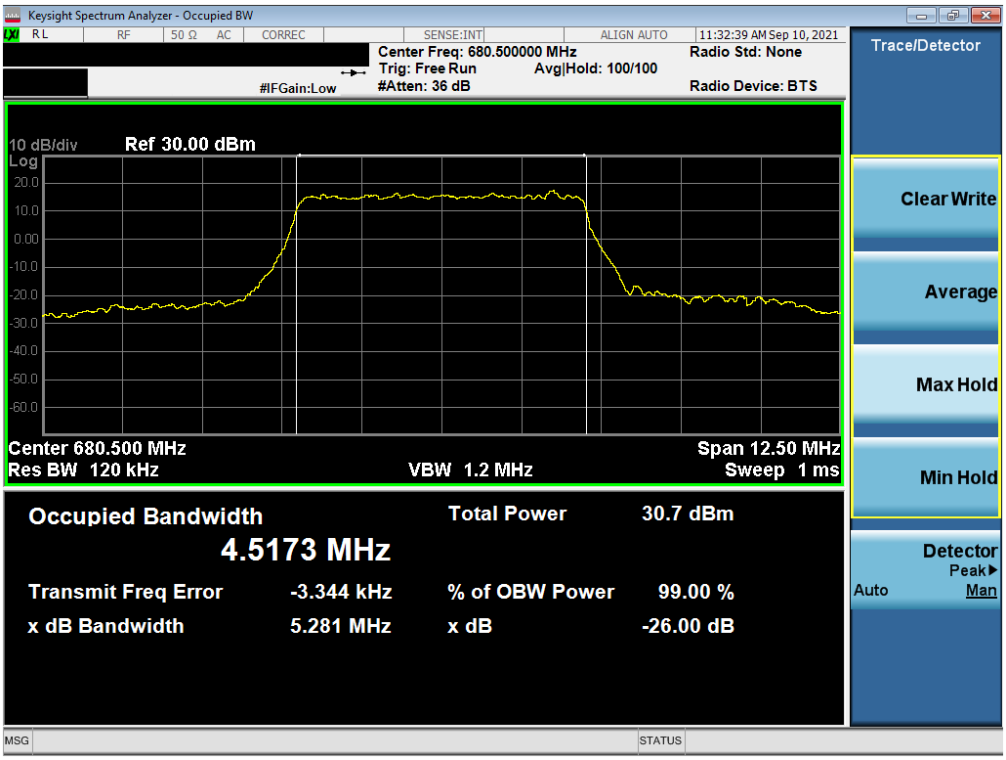
Plot 7-28. Occupied Bandwidth Plot (NR Band n71 - 10MHz CP-OFDM QPSK - Full RB)



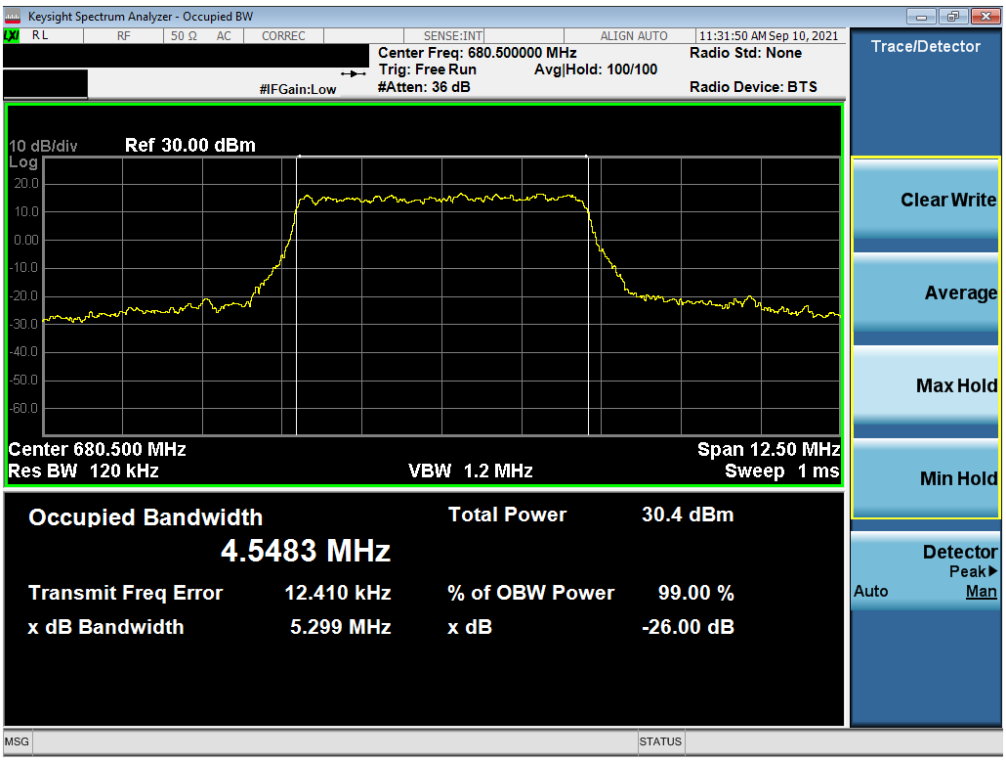
Plot 7-29. Occupied Bandwidth Plot (NR Band n71 - 10MHz CP-OFDM 16-QAM - Full RB)



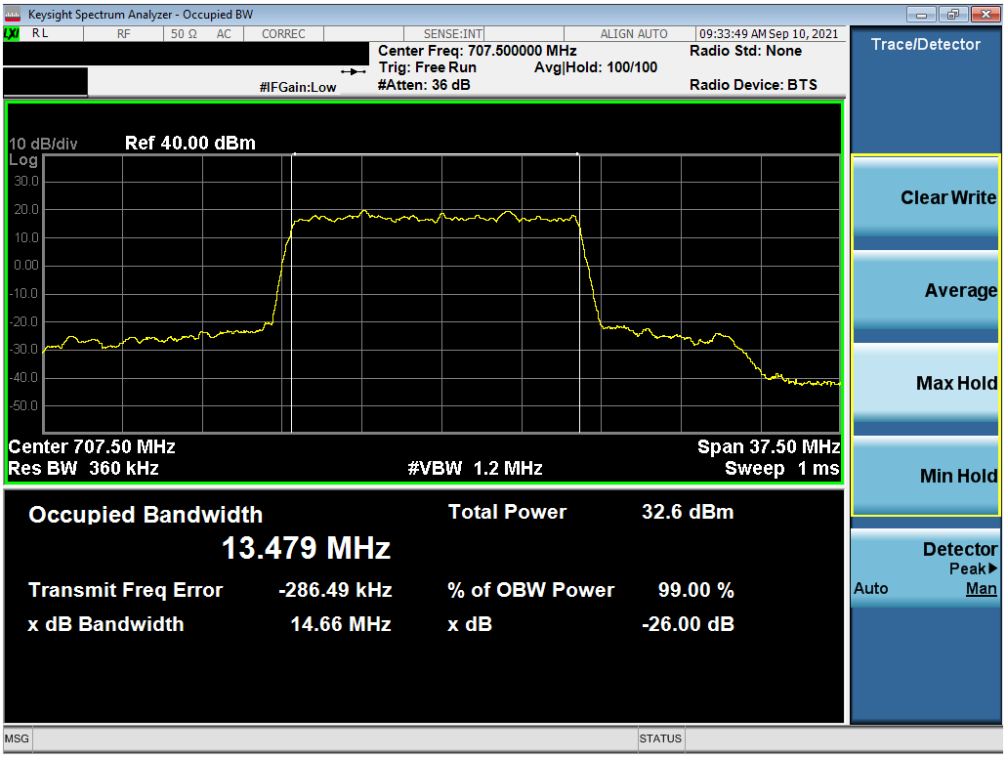
Plot 7-30. Occupied Bandwidth Plot (NR Band n71 - 5MHz DFT-s-OFDM BPSK - Full RB)



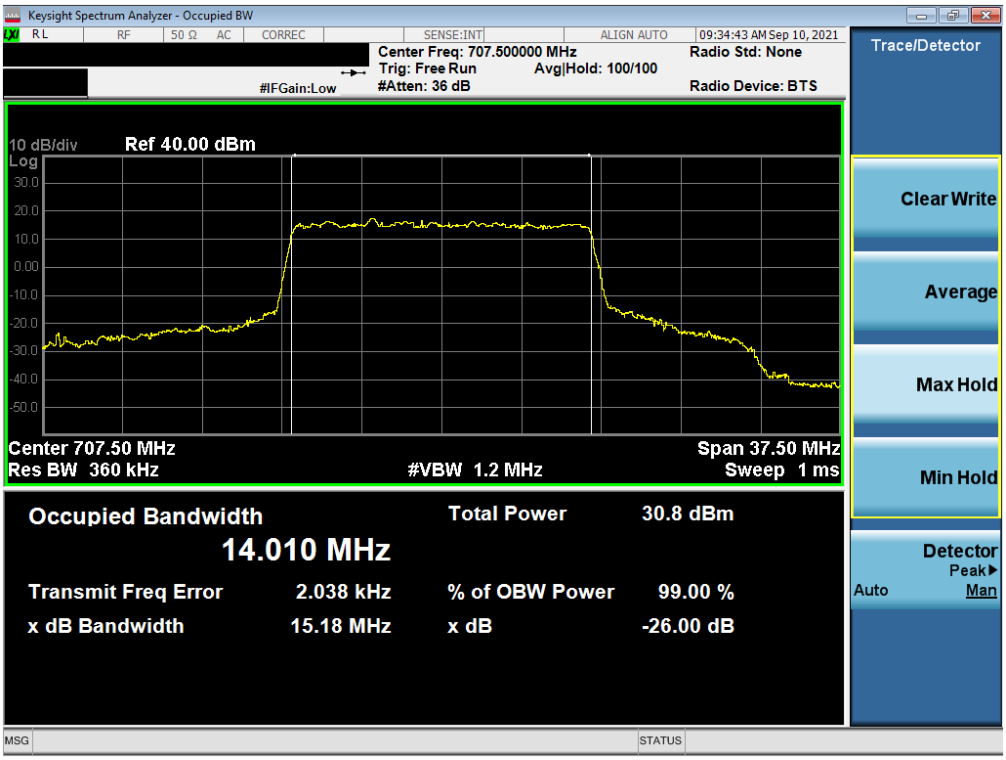
Plot 7-31. Occupied Bandwidth Plot (NR Band n71 - 5MHz CP-OFDM QPSK - Full RB)



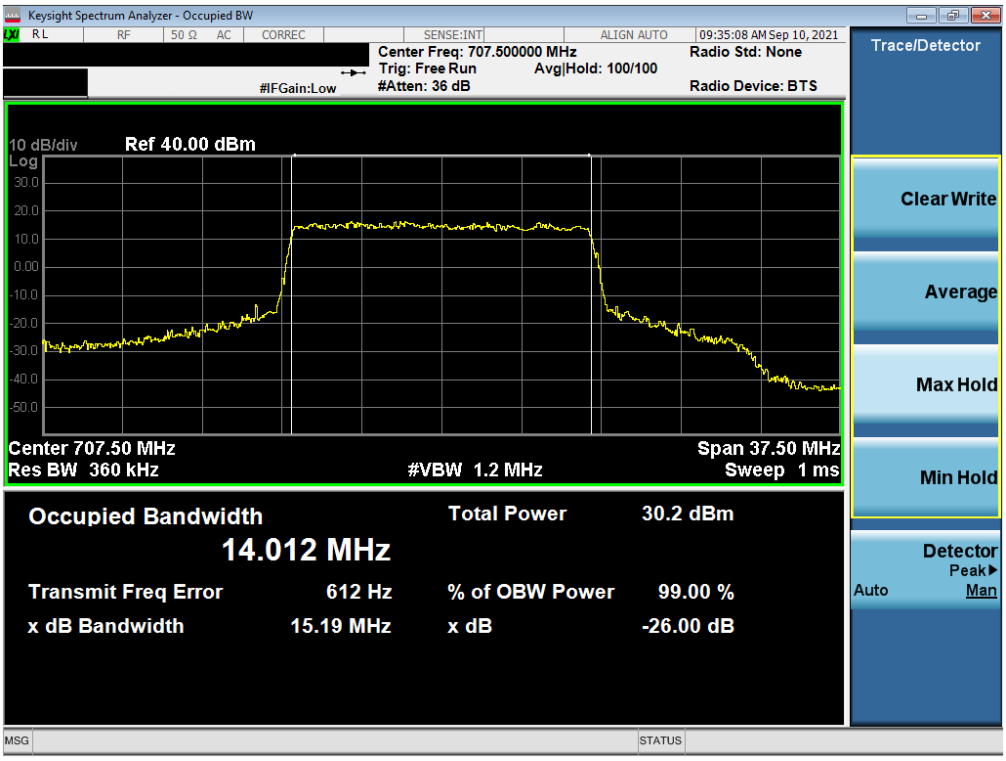
Plot 7-32. Occupied Bandwidth Plot (NR Band n71 - 5MHz CP-OFDM 16-QAM - Full RB)



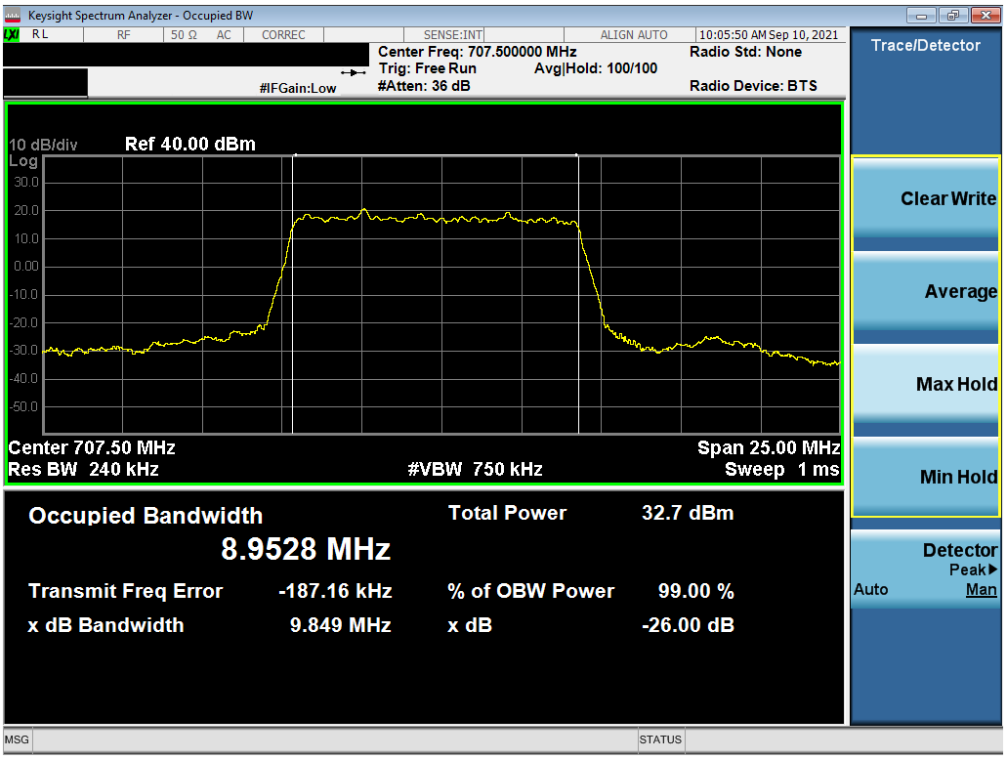
Plot 7-33. Occupied Bandwidth Plot (NR Band n12 - 15MHz DFT-s-OFDM PSK - Full RB)



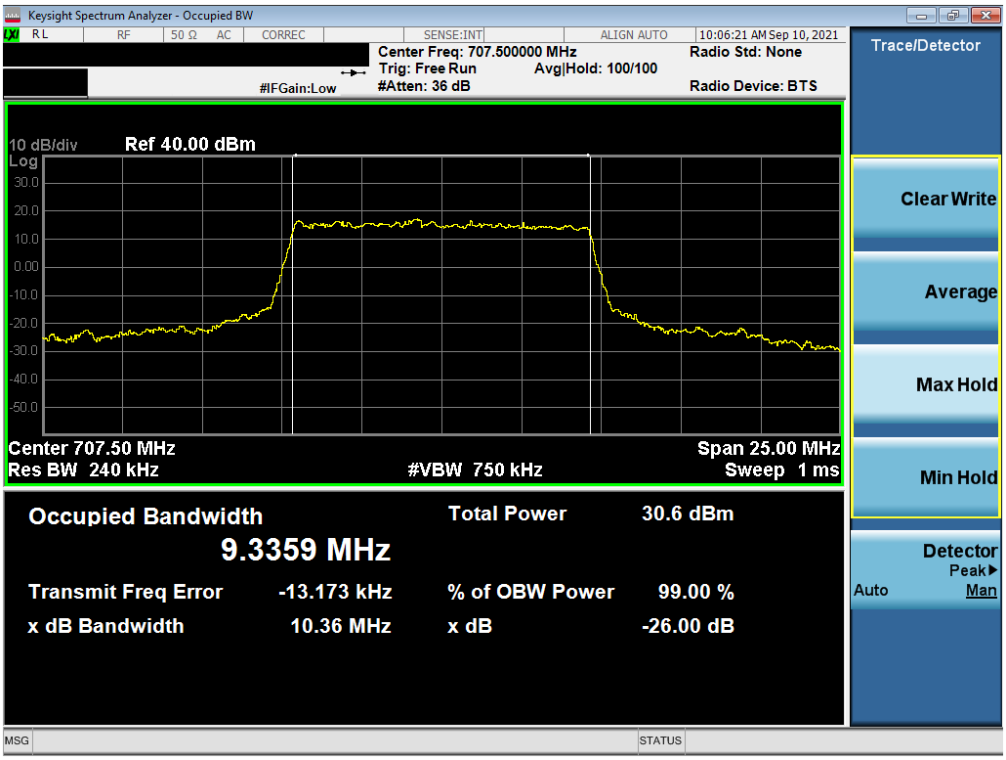
Plot 7-34. Occupied Bandwidth Plot (NR Band n12 - 15MHz CP-OFDM QPSK - Full RB)



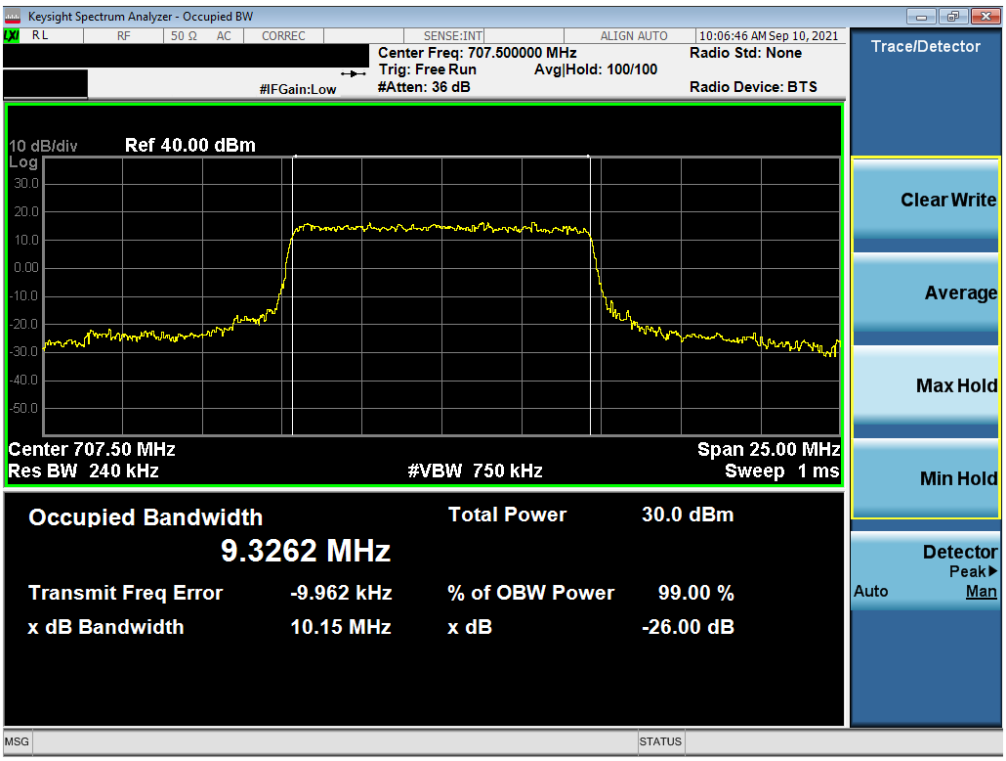
Plot 7-35. Occupied Bandwidth Plot (NR Band n12 - 15MHz CP-OFDM 16-QAM - Full RB)



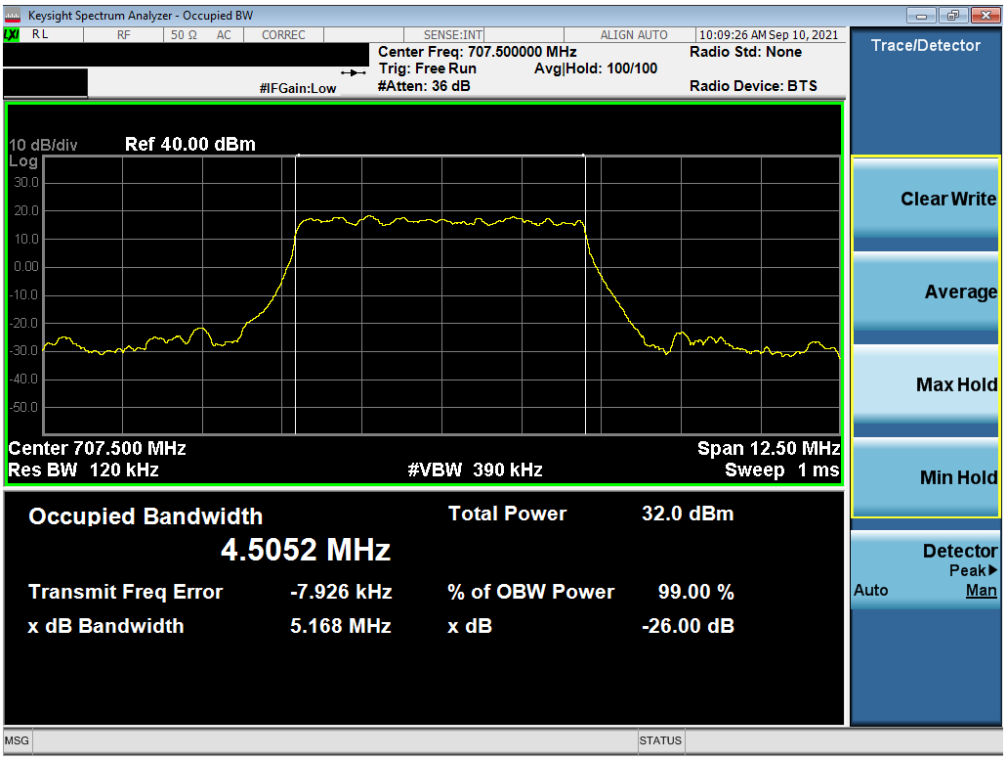
Plot 7-36. Occupied Bandwidth Plot (NR Band n12 - 10MHz DFT-s-OFDM BPSK - Full RB)



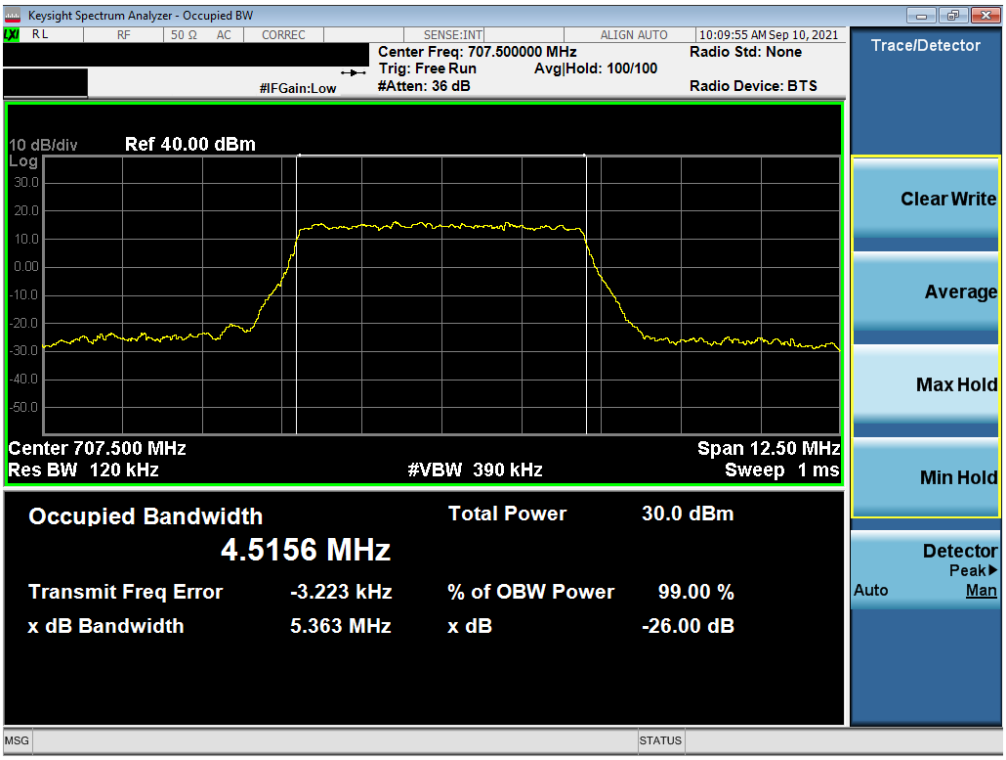
Plot 7-37. Occupied Bandwidth Plot (NR Band n12 - 10MHz CP-OFDM QPSK - Full RB)



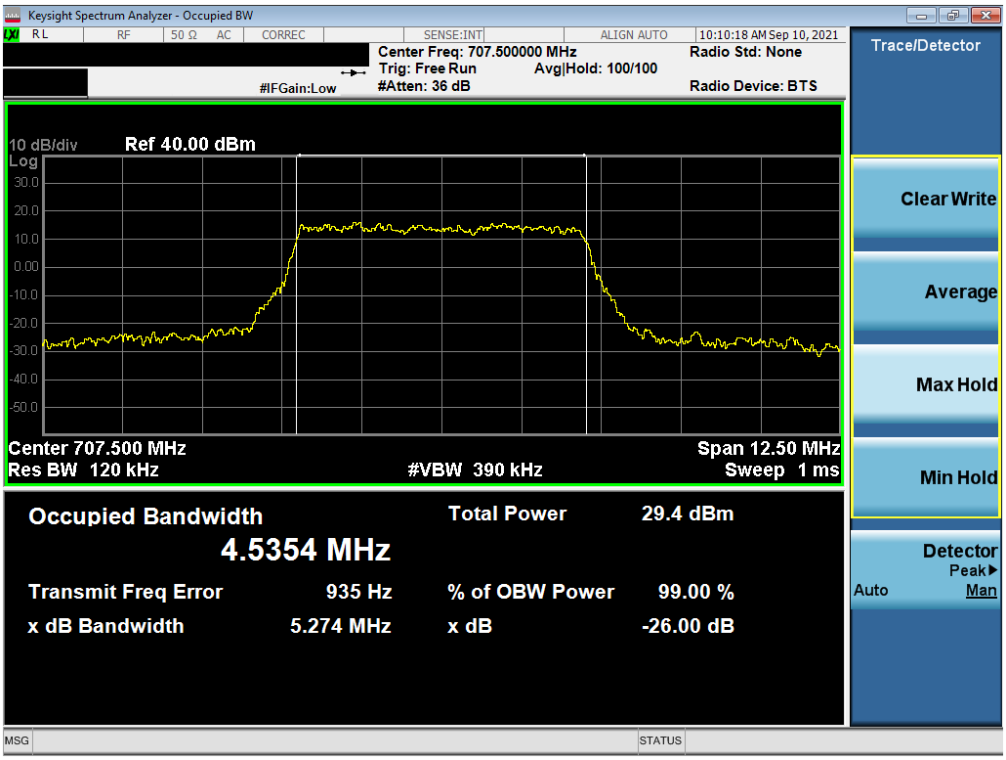
Plot 7-38. Occupied Bandwidth Plot (NR Band n12 - 10MHz CP-OFDM 16-QAM - Full RB)



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

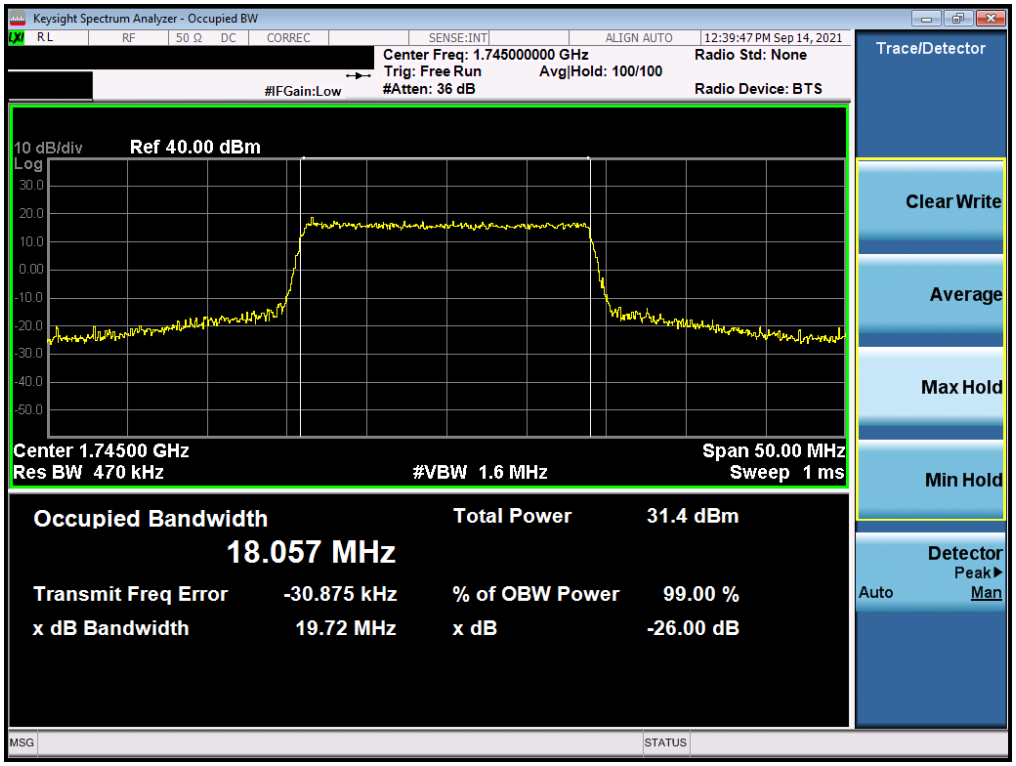


Plot 7-40. Occupied Bandwidth Plot (NR Band n12 - 5MHz CP-OFDM QPSK - Full RB)



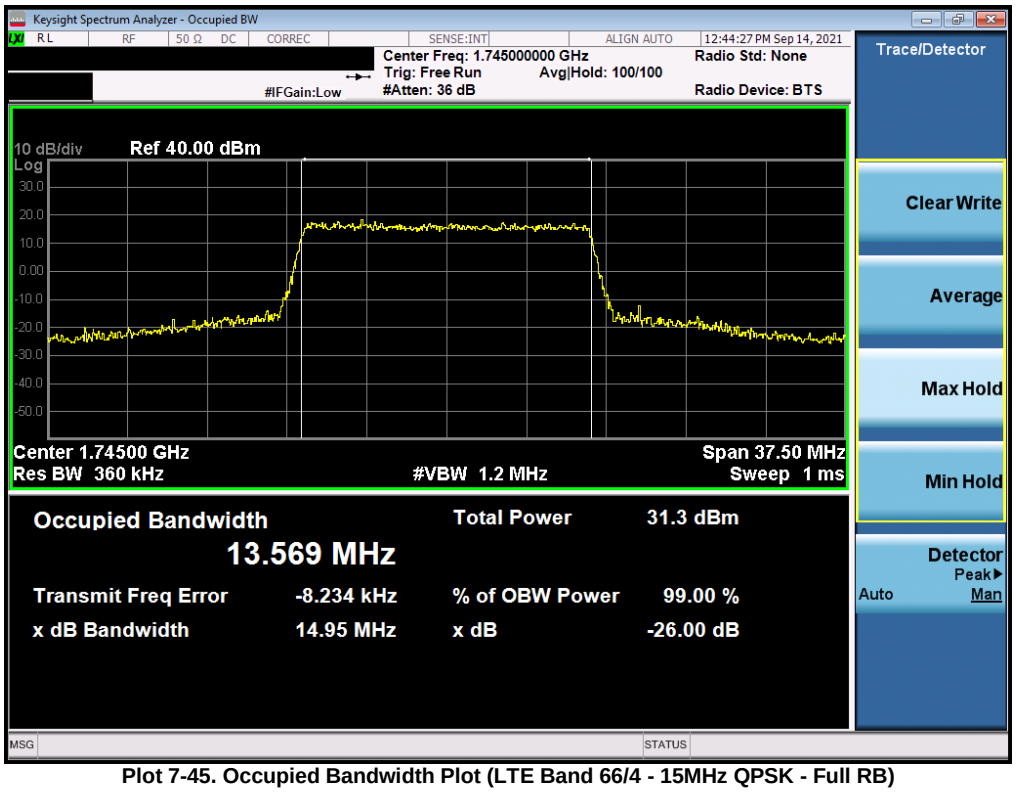
Plot 7-41. Occupied Bandwidth Plot (NR Band n12 - 5MHz CP-OFDM 16-QAM - Full RB)

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

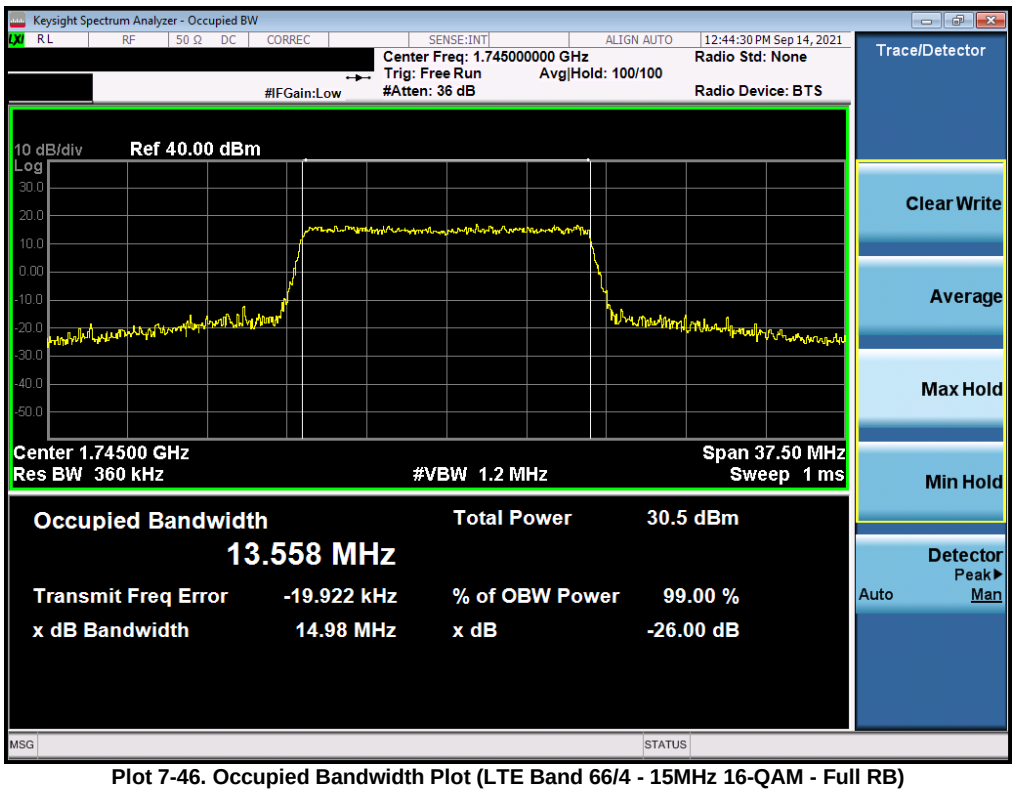


Plot 7-43. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz QPSK - Full RB)

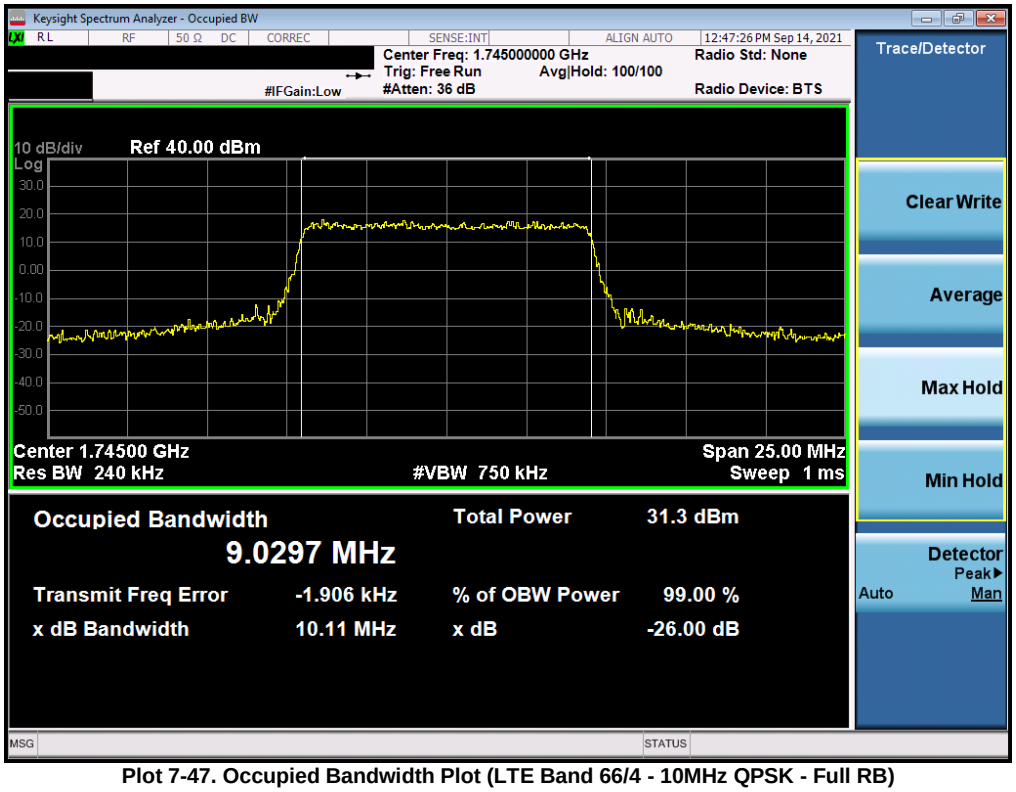
Plot 7-44. Occupied Bandwidth Plot (LTE Band 66/4 - 20MHz 16-QAM - Full RB)



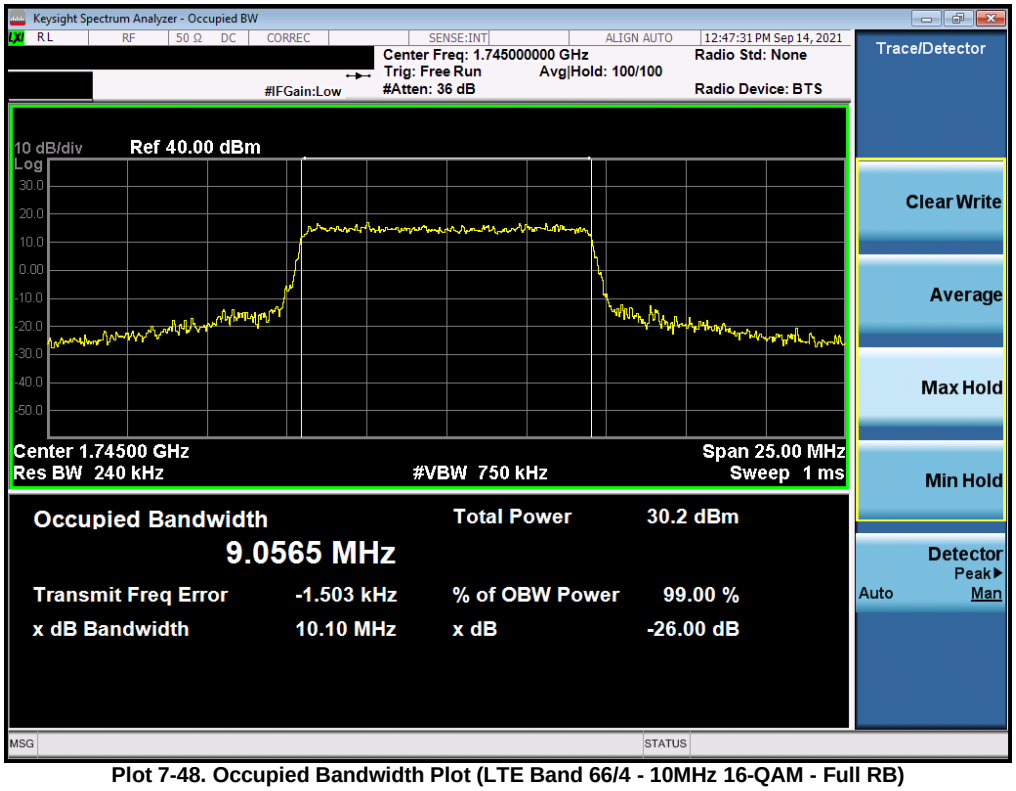
Plot 7-45. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz QPSK - Full RB)



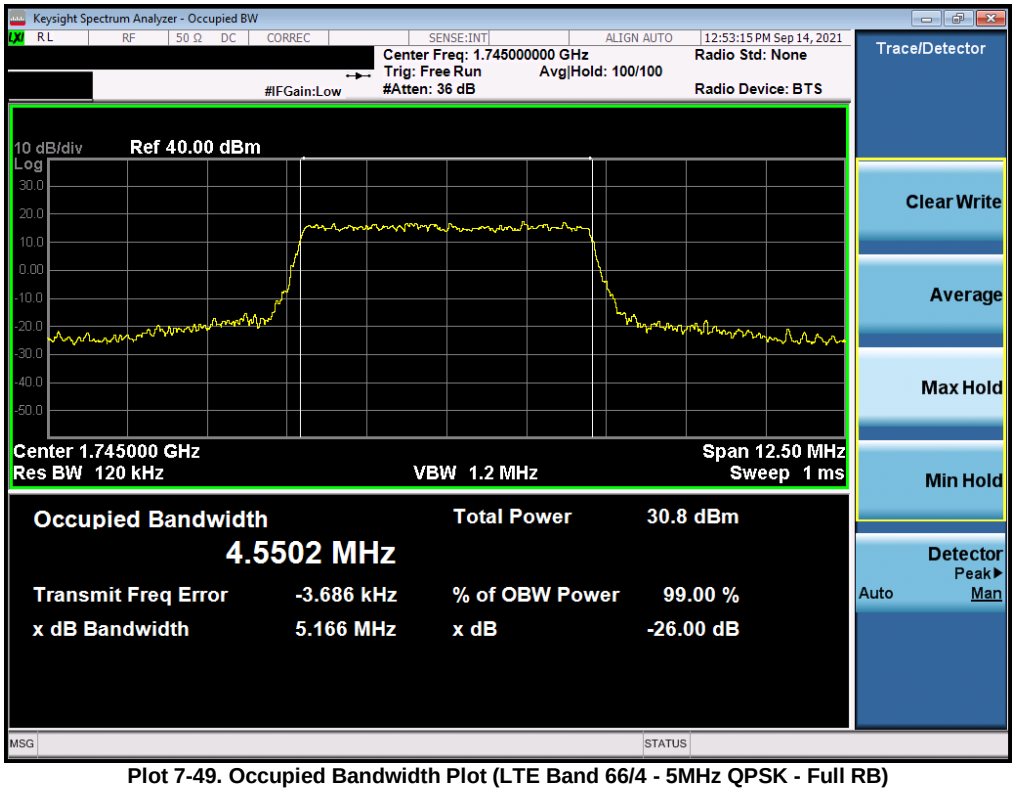
Plot 7-46. Occupied Bandwidth Plot (LTE Band 66/4 - 15MHz 16-QAM - Full RB)



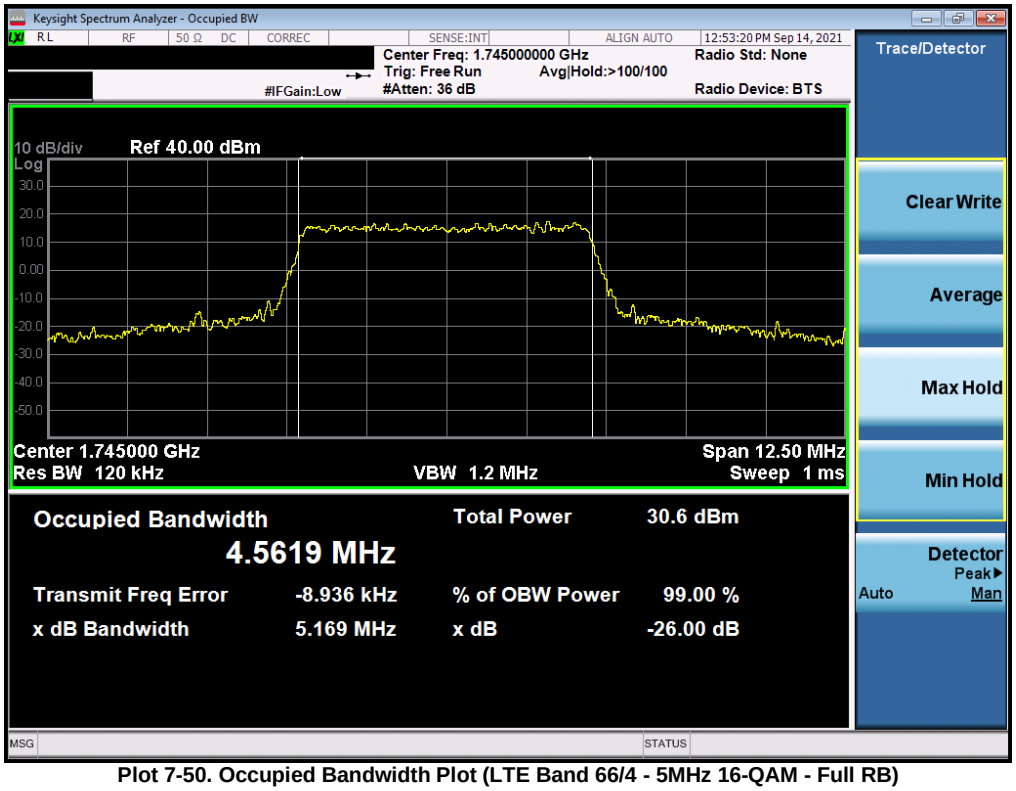
Plot 7-47. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz QPSK - Full RB)



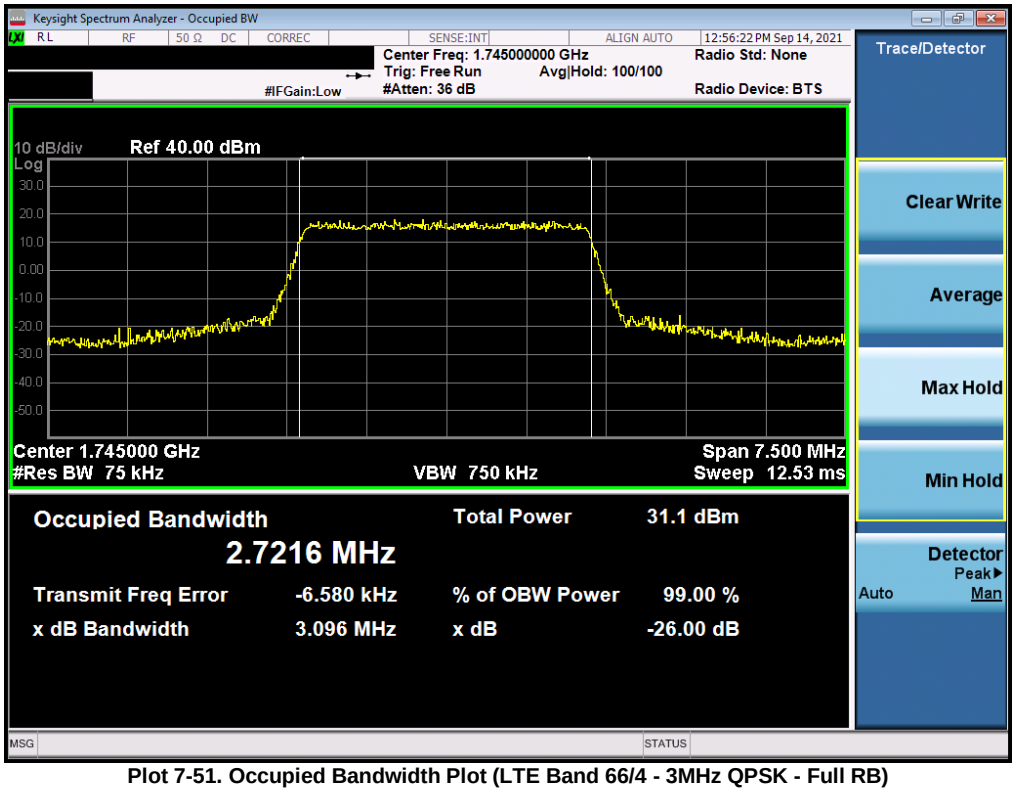
Plot 7-48. Occupied Bandwidth Plot (LTE Band 66/4 - 10MHz 16-QAM - Full RB)



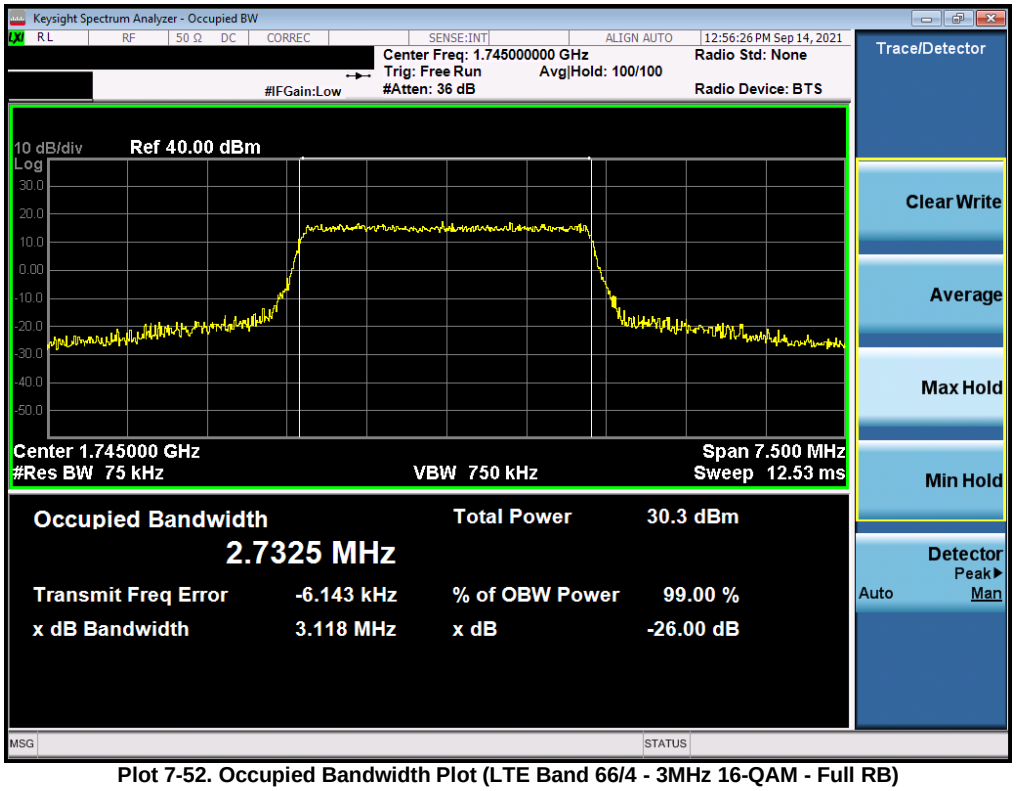
Plot 7-49. Occupied Bandwidth Plot (LTE Band 66/4 - 5MHz QPSK - Full RB)



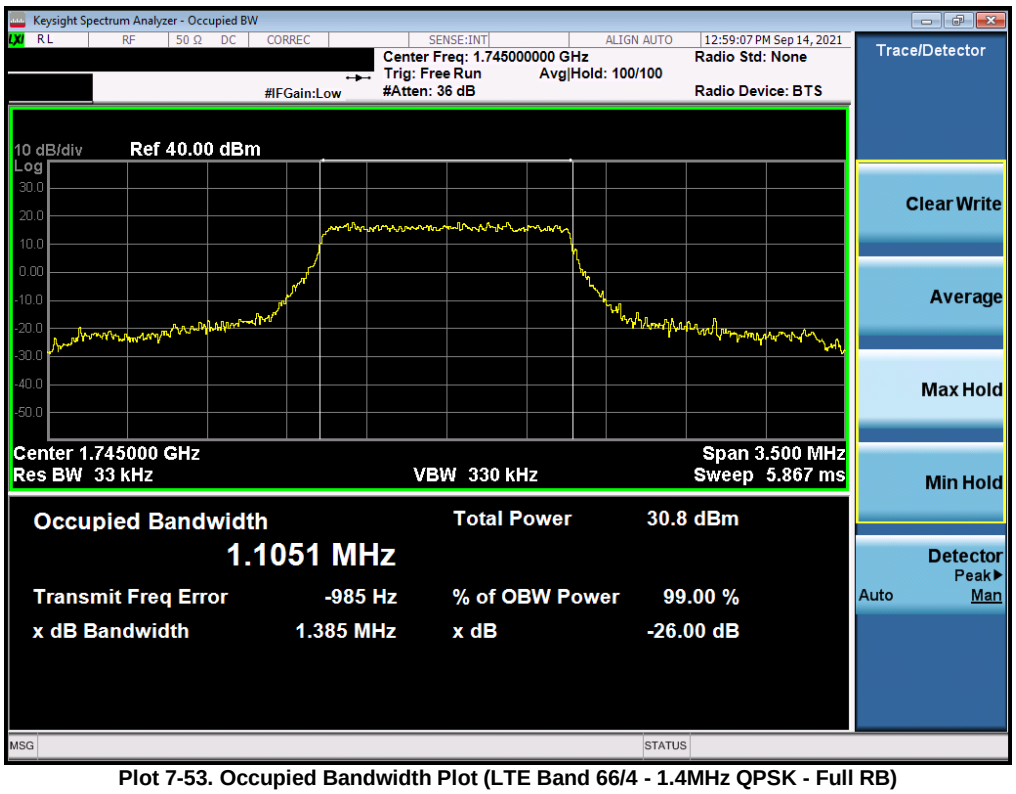
Plot 7-50. Occupied Bandwidth Plot (LTE Band 66/4 - 5MHz 16-QAM - Full RB)



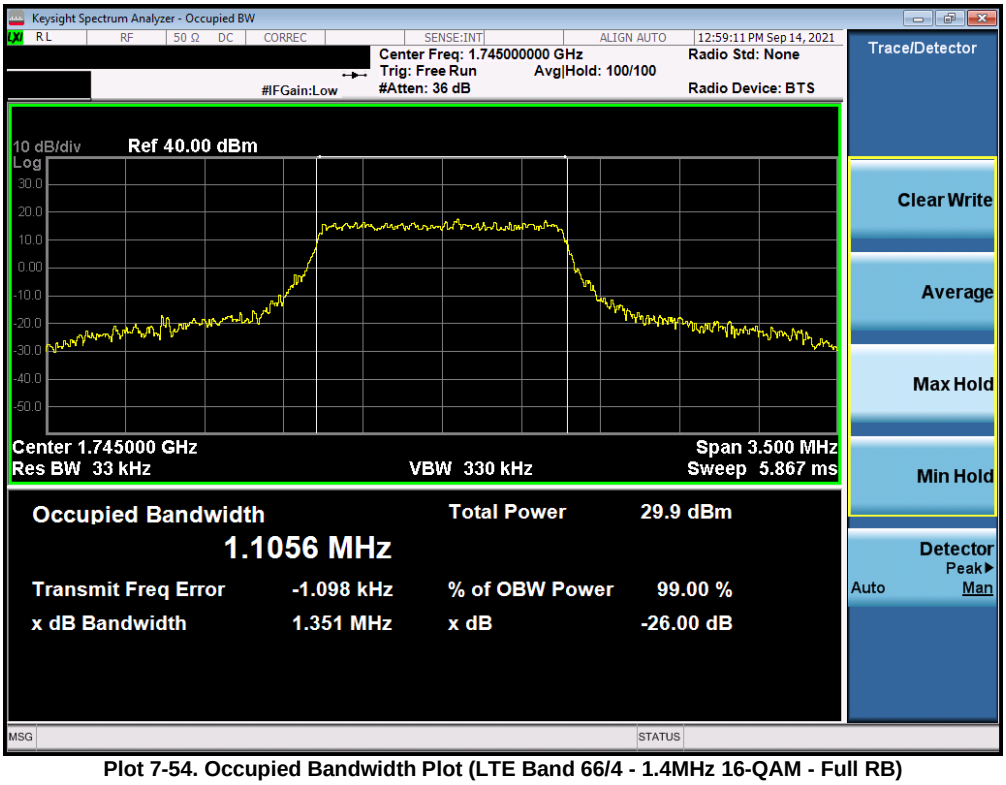
Plot 7-51. Occupied Bandwidth Plot (LTE Band 66/4 - 3MHz QPSK - Full RB)



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

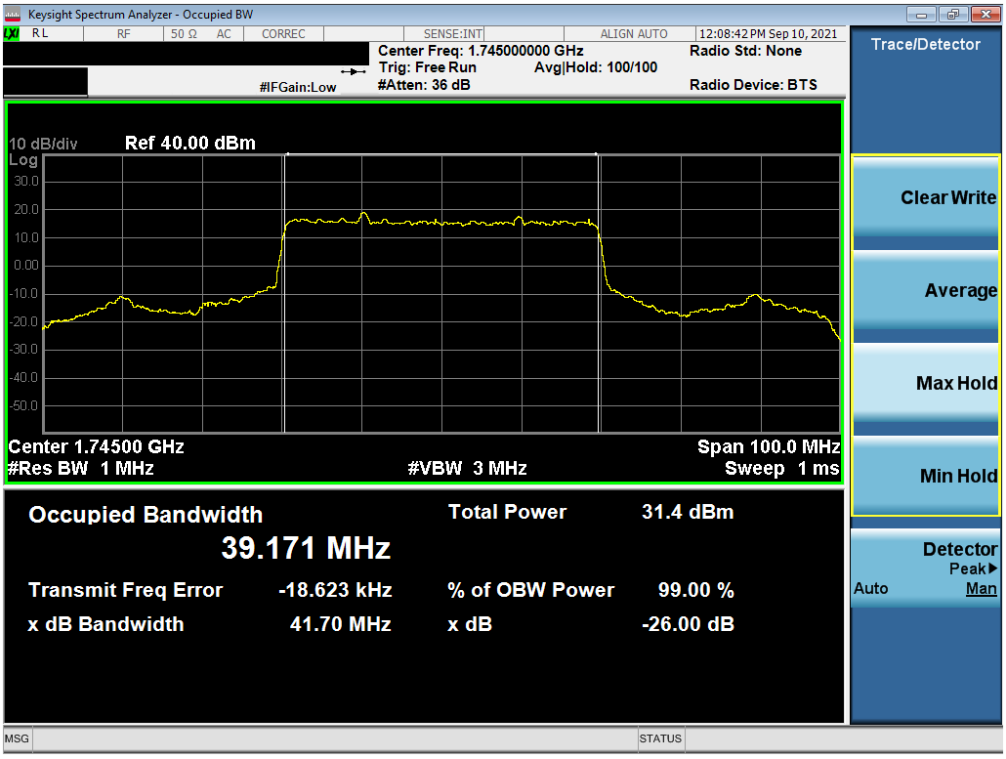


Plot 7-53. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz QPSK - Full RB)

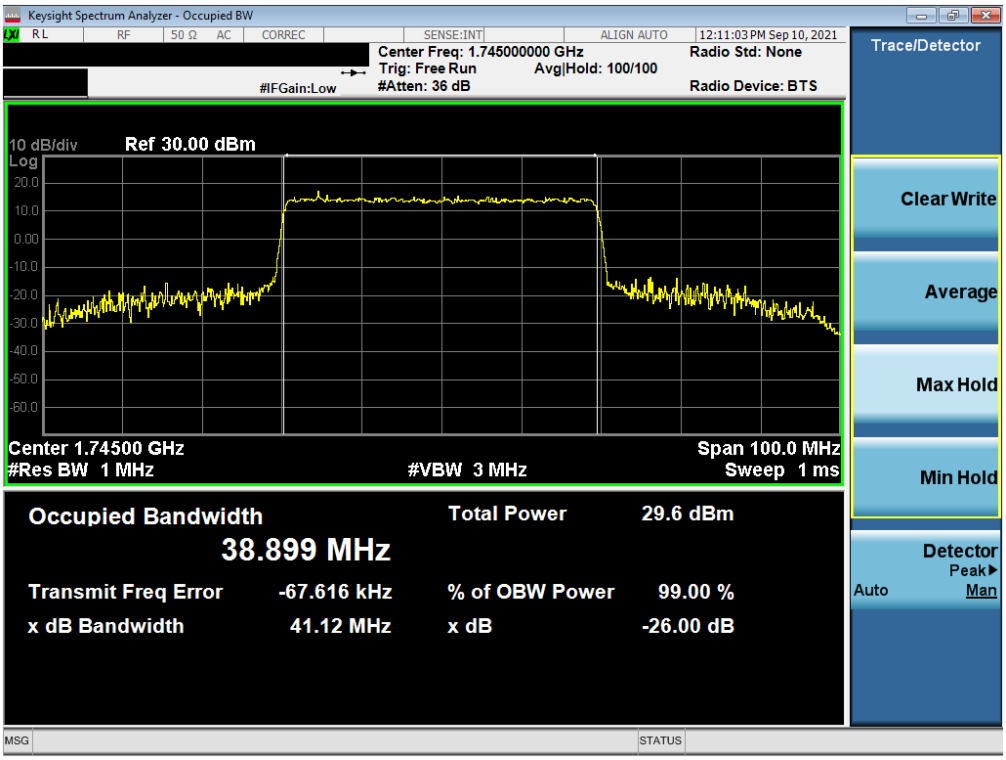


Plot 7-54. Occupied Bandwidth Plot (LTE Band 66/4 - 1.4MHz 16-QAM - Full RB)

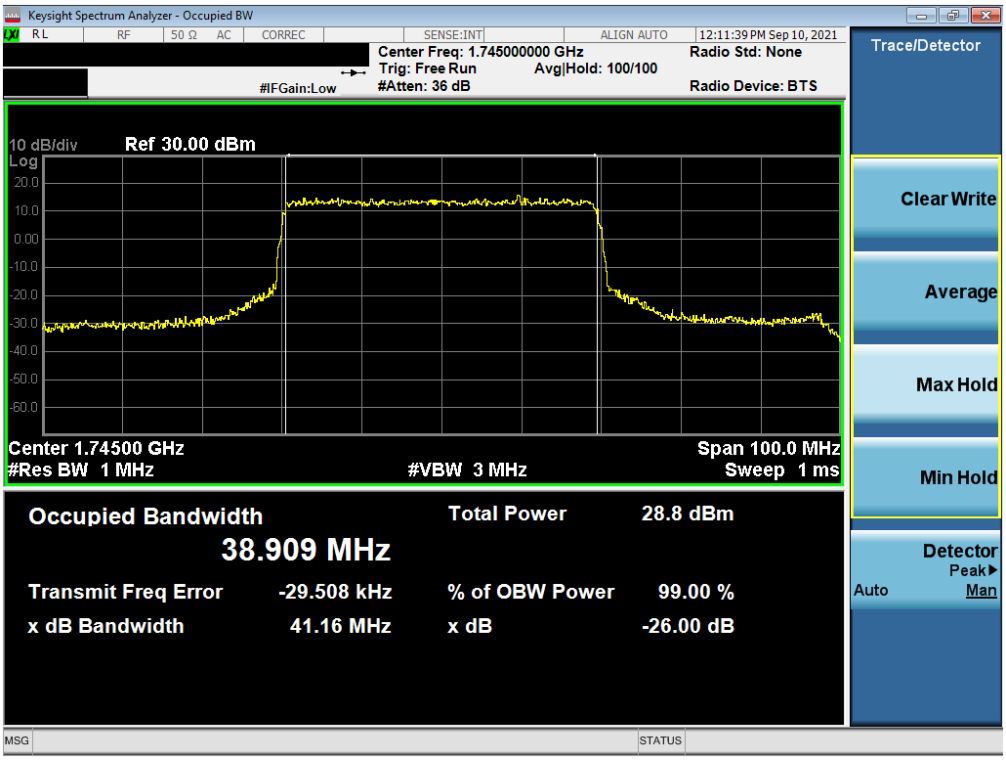
NR Band n66 – ANT A



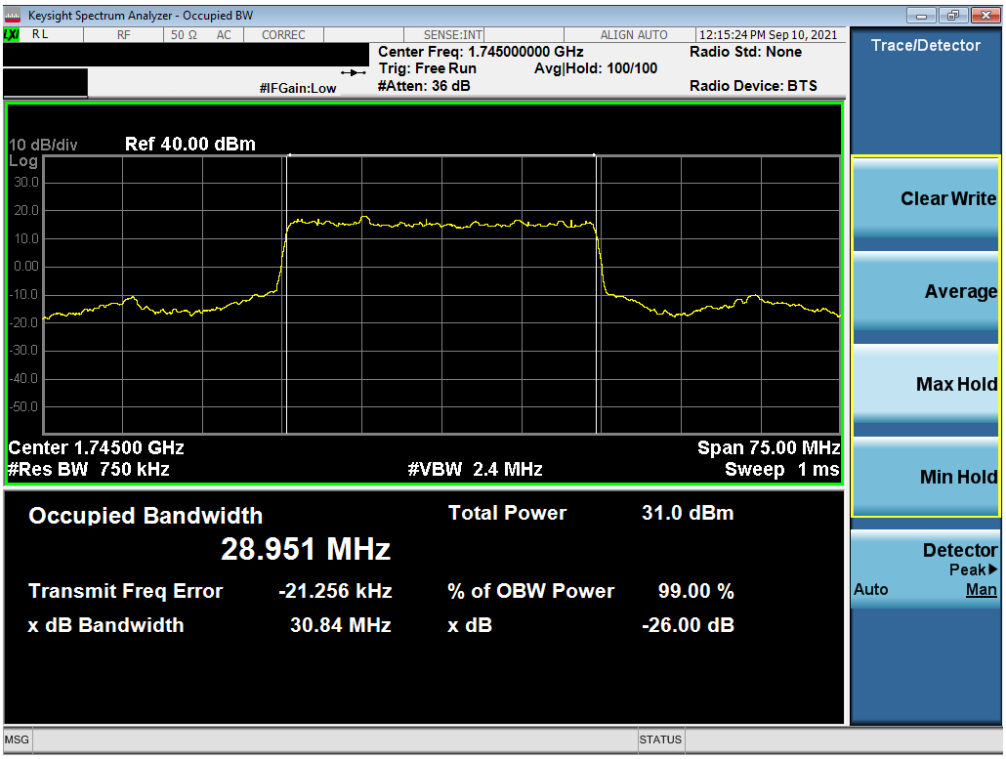
Plot 7-55. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz DFT-s-OFDM BPSK - Full RB – ANT A)



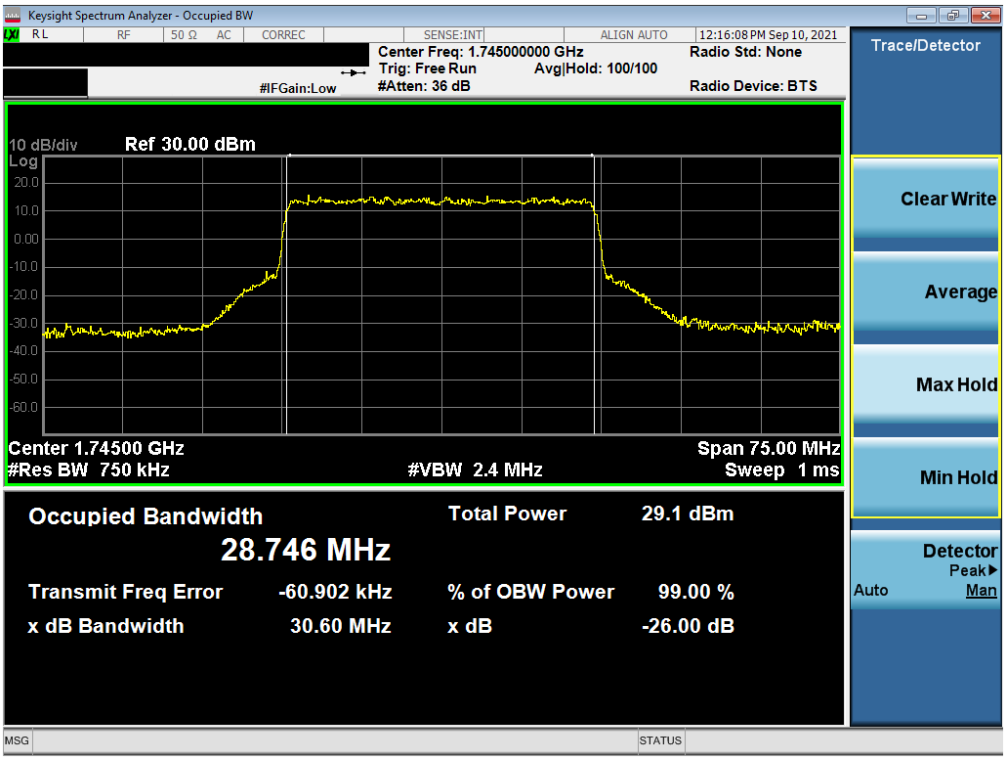
Plot 7-56. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM QPSK - Full RB – ANT A)



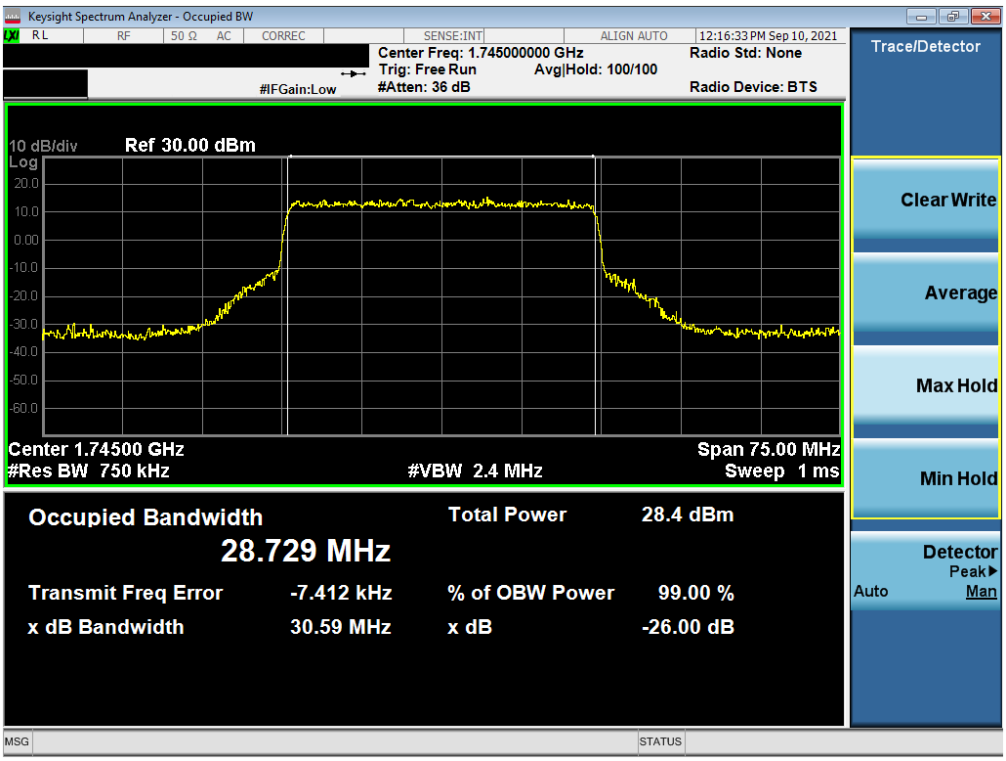
Plot 7-57. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM 16QAM - Full RB – ANT A)



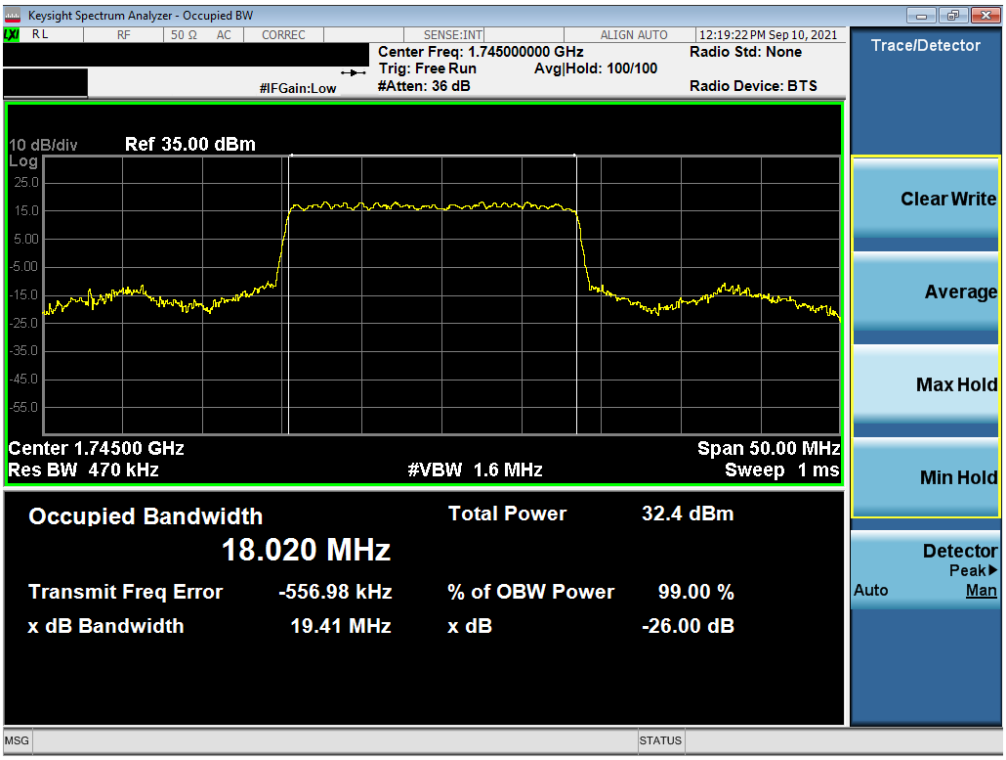
Plot 7-58. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz DFT-s-OFDM BPSK - Full RB – ANT A)



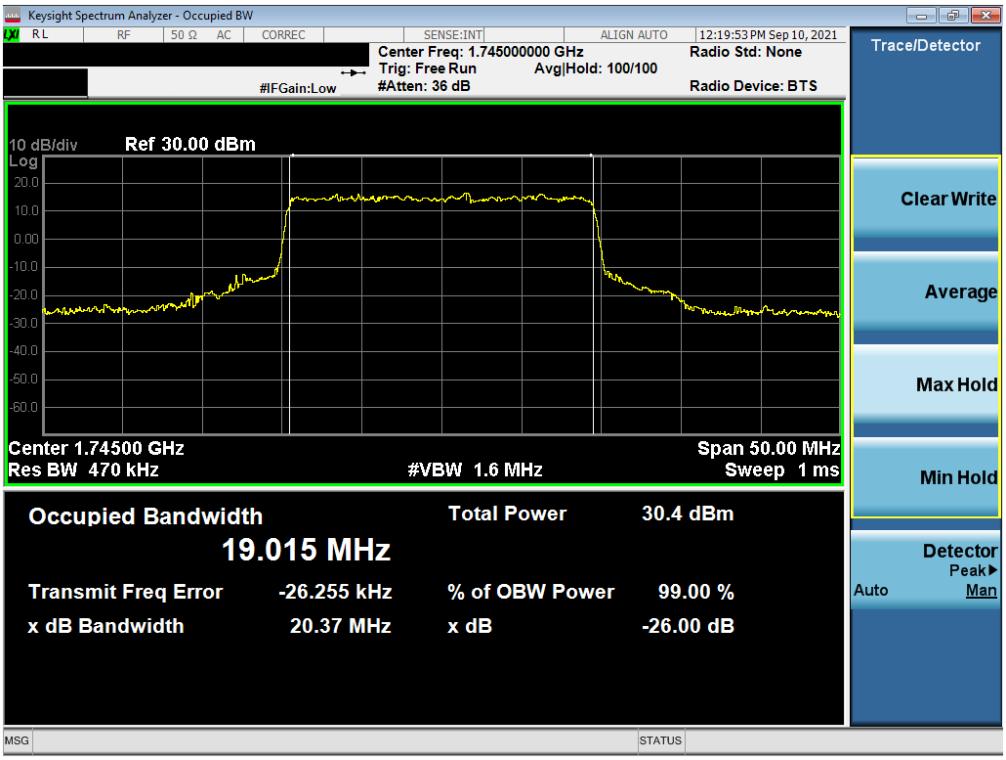
Plot 7-59. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM QPSK - Full RB – ANT A)



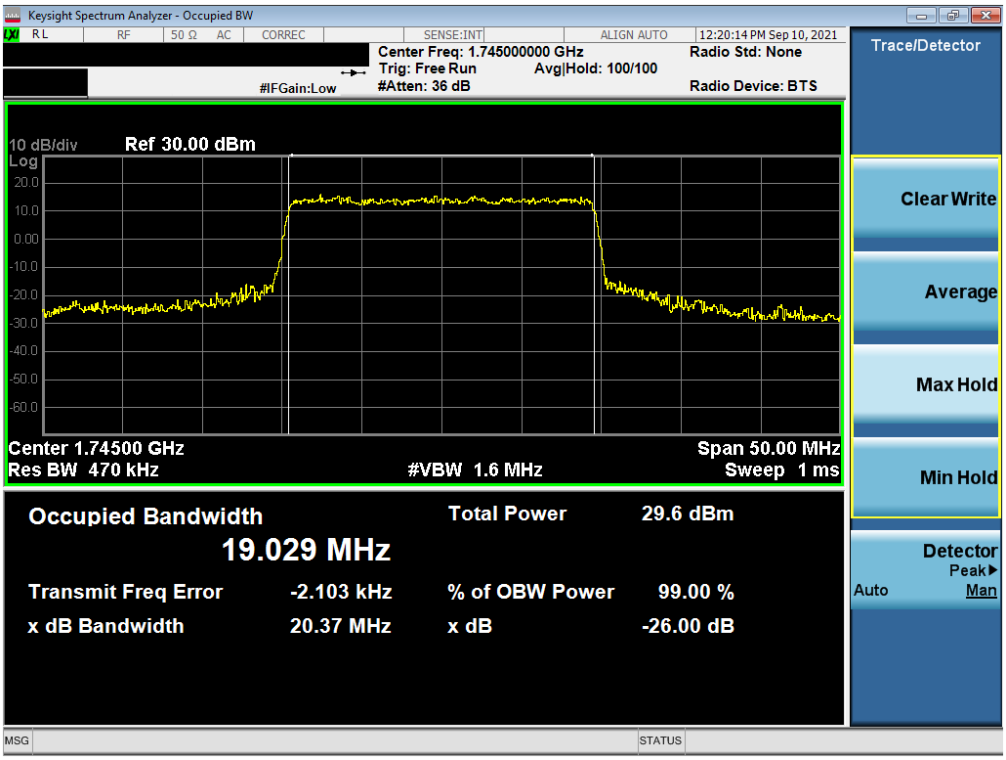
Plot 7-60. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM 16QAM - Full RB – ANT A)



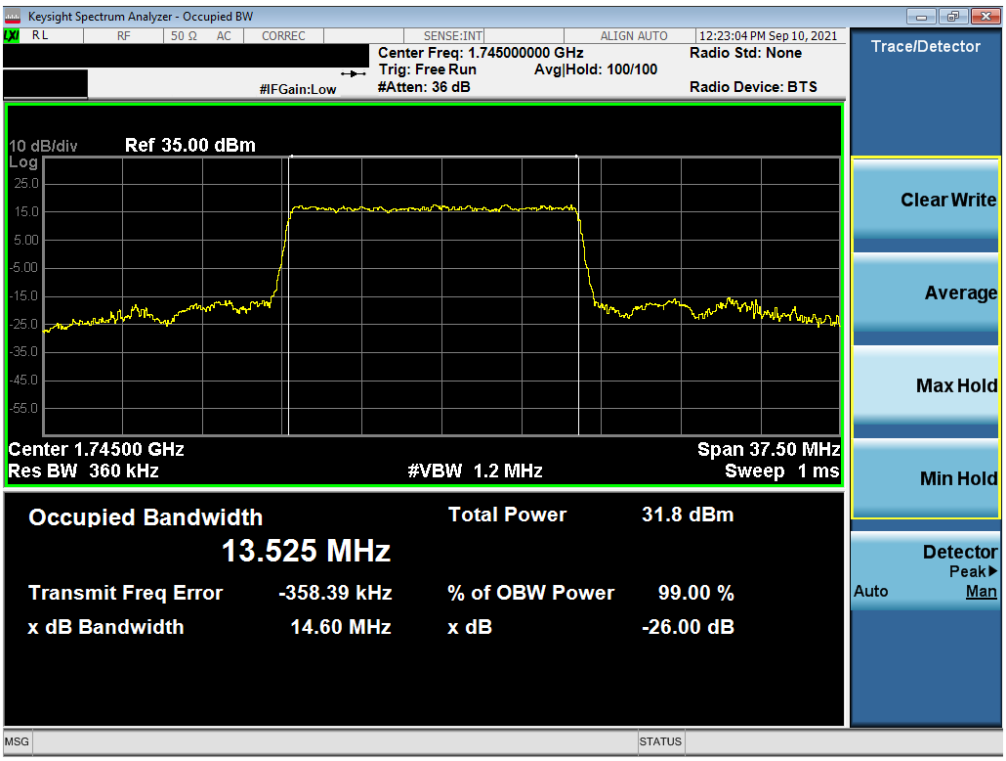
Plot 7-61. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz DFT's-OFDM BPSK - Full RB – ANT A)



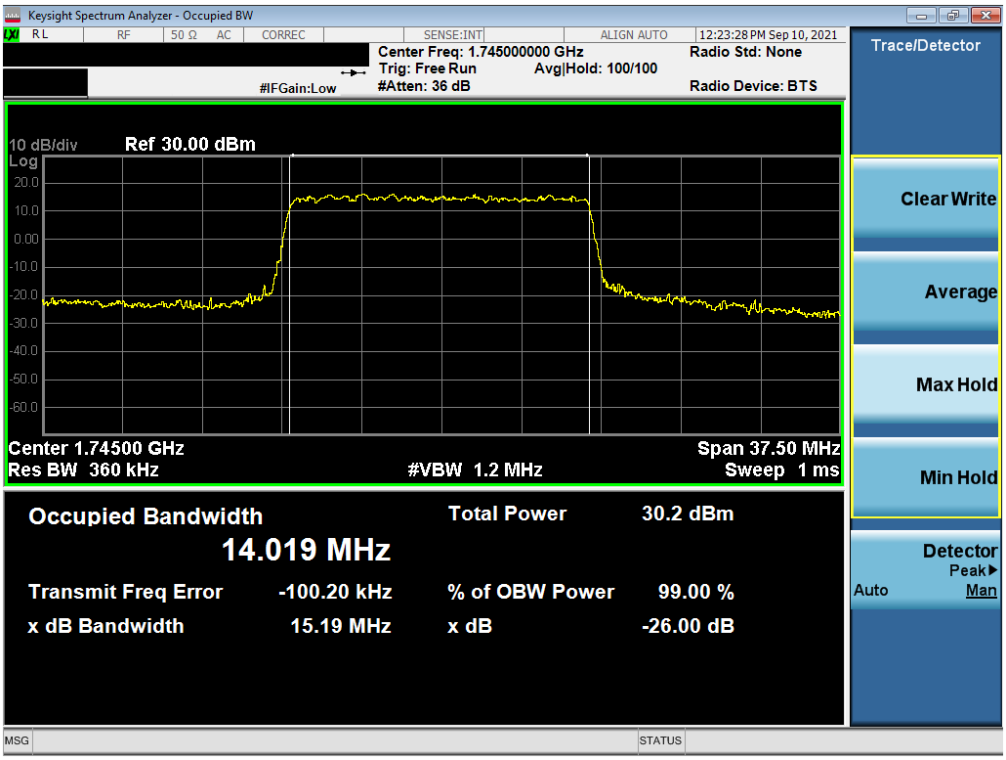
Plot 7-62. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM QPSK - Full RB – ANT A)



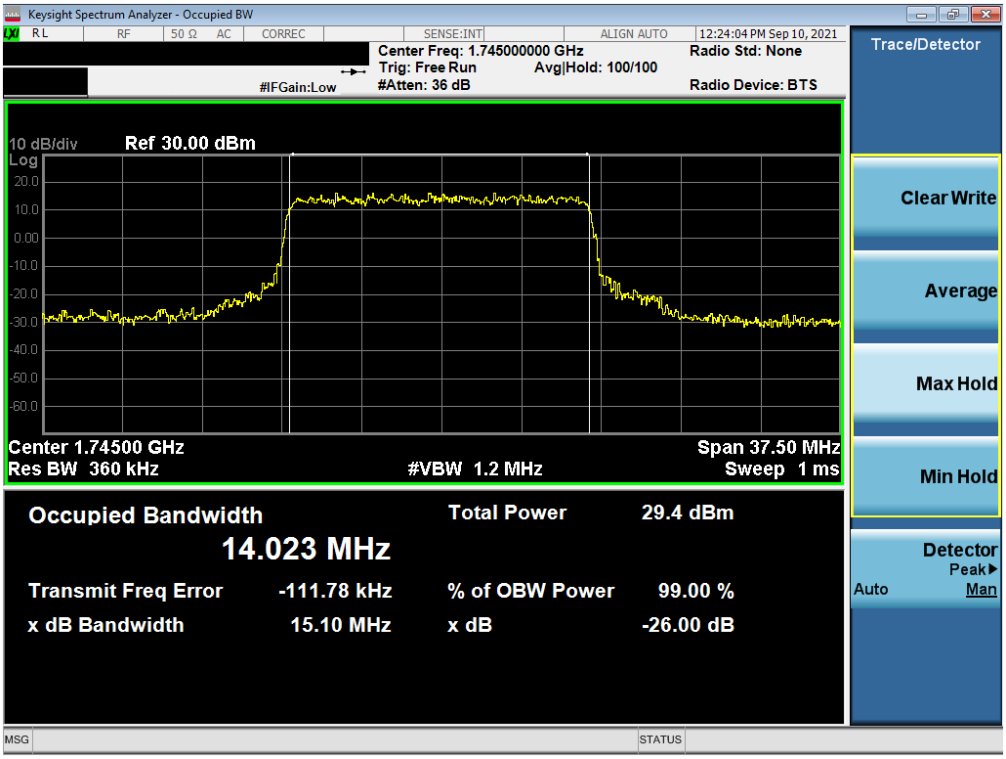
Plot 7-63. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM 16QAM - Full RB – ANT A)



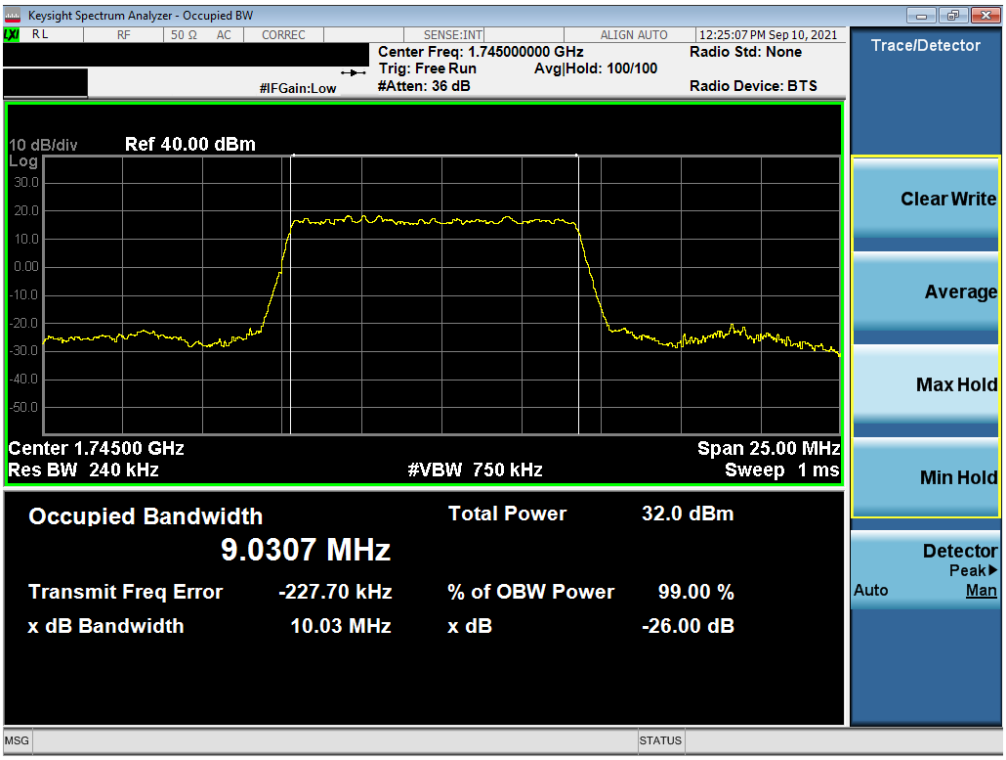
Plot 7-64. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz DFT-s-OFDM BPSK - Full RB – ANT A)



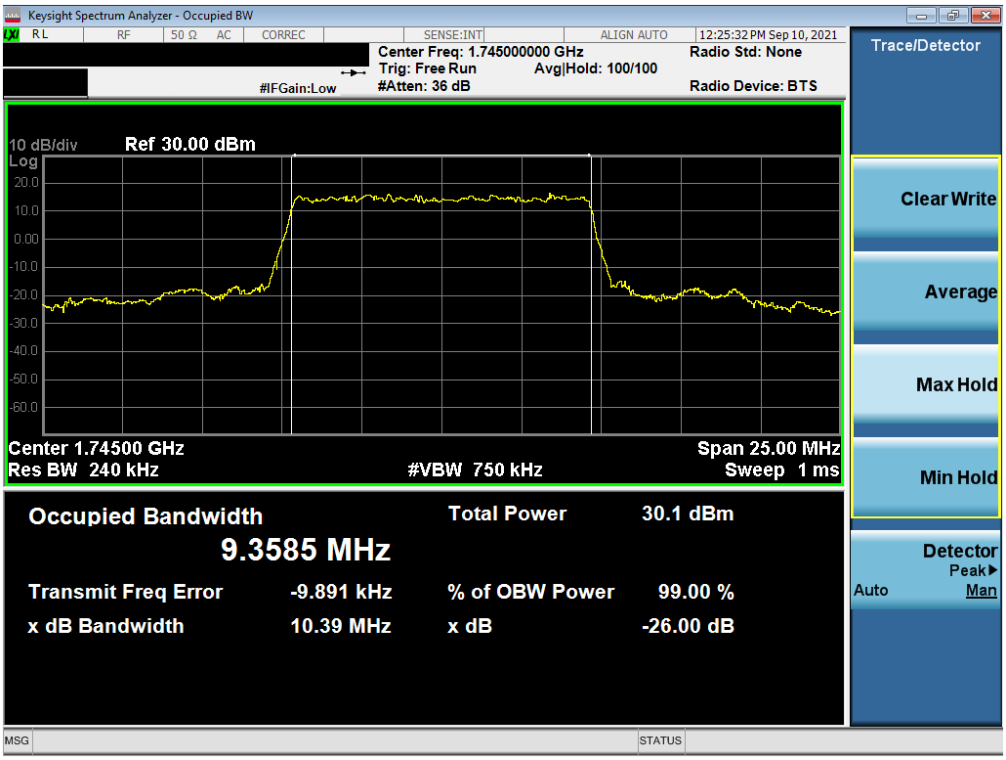
Plot 7-65. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz CP-OFDM QPSK - Full RB – ANT A)



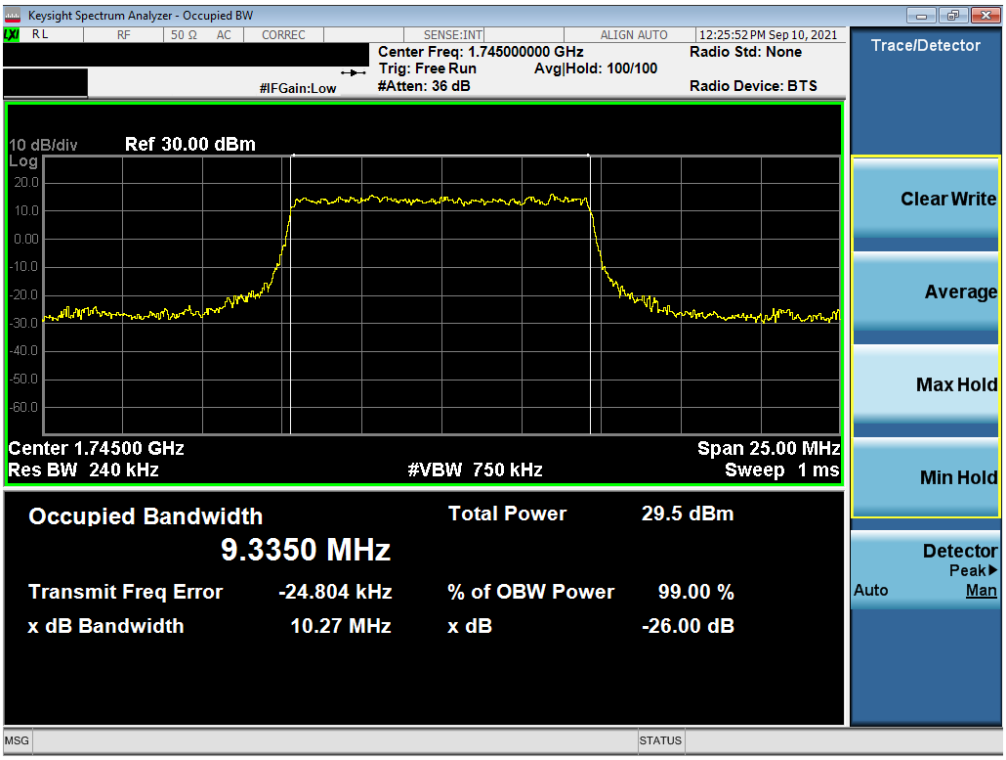
Plot 7-66. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz CP-OFDM 16QAM - Full RB – ANT A)



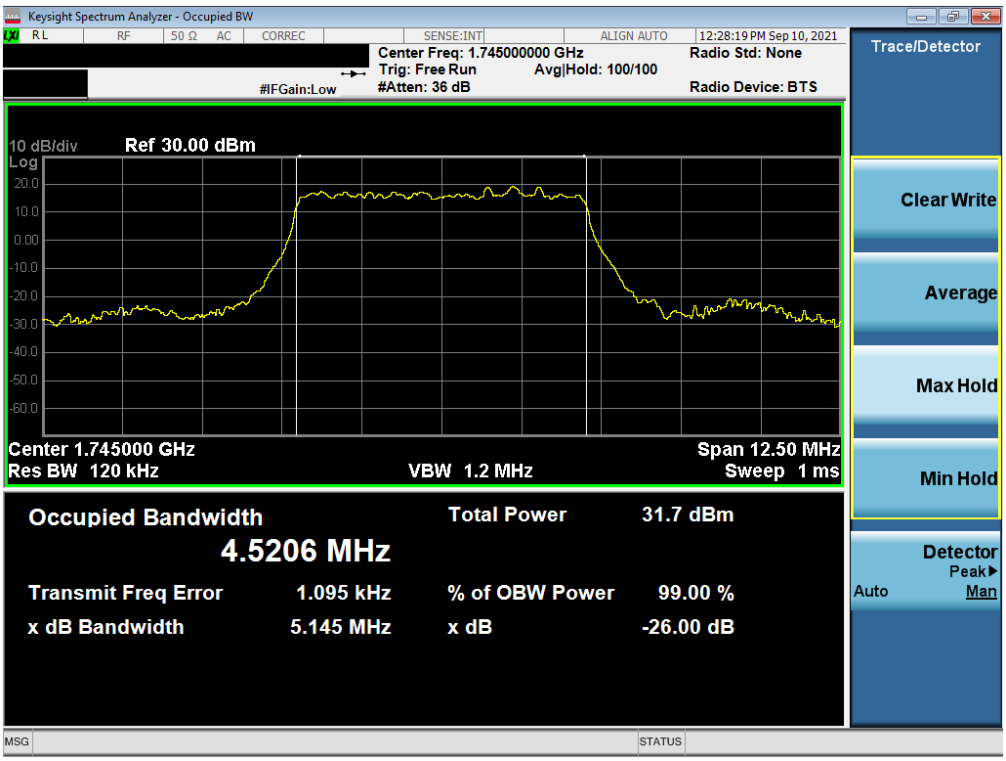
Plot 7-67. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz DFT-s-OFDM BPSK - Full RB – ANT A)



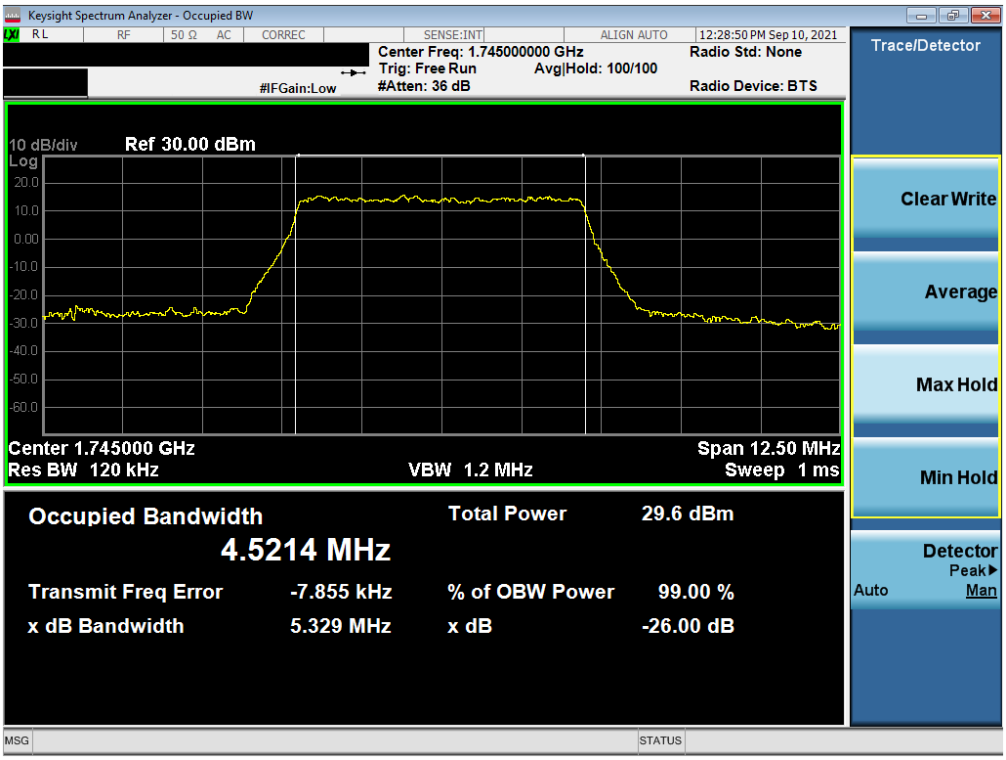
Plot 7-68. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz CP-OFDM QPSK - Full RB – ANT A)



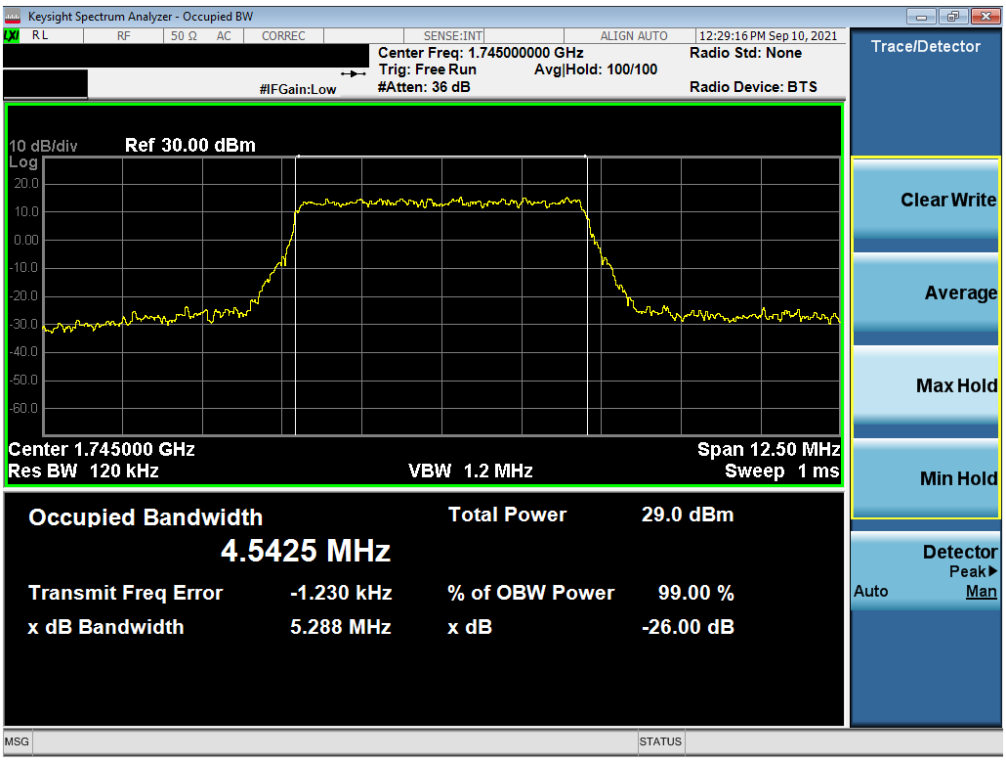
Plot 7-69. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz CP-OFDM 16QAM - Full RB – ANT A)



Plot 7-70. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz DFT-s-OFDM BPSK - Full RB – ANT A)

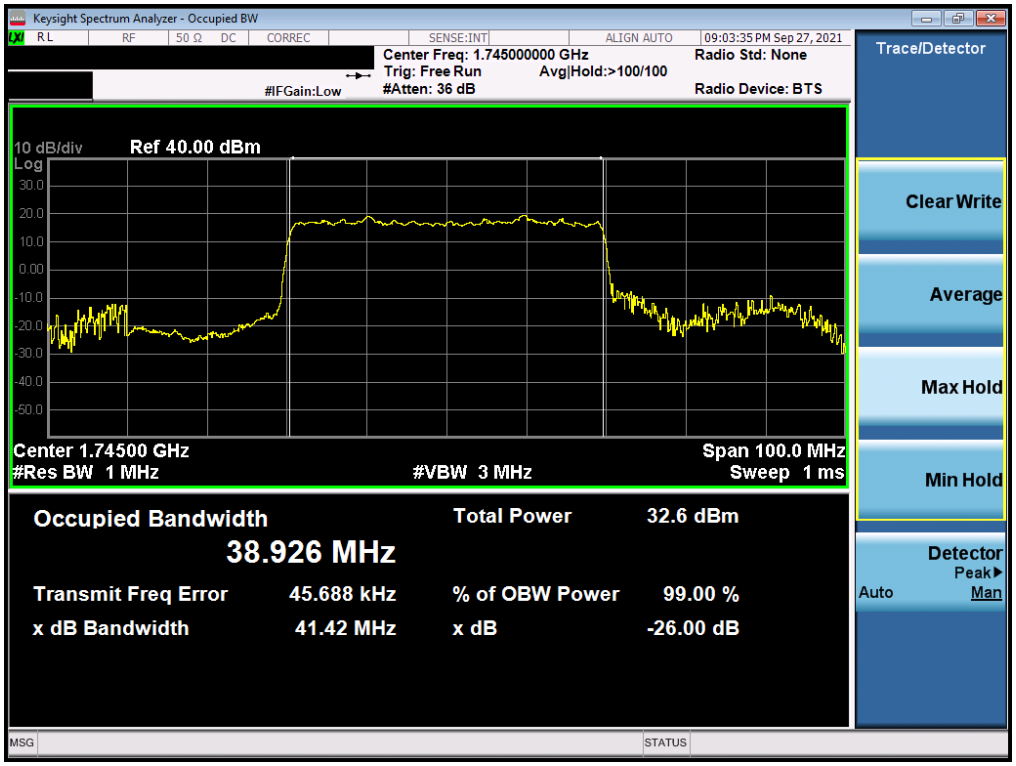


Plot 7-71. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz CP-OFDM QPSK - Full RB – ANT A)

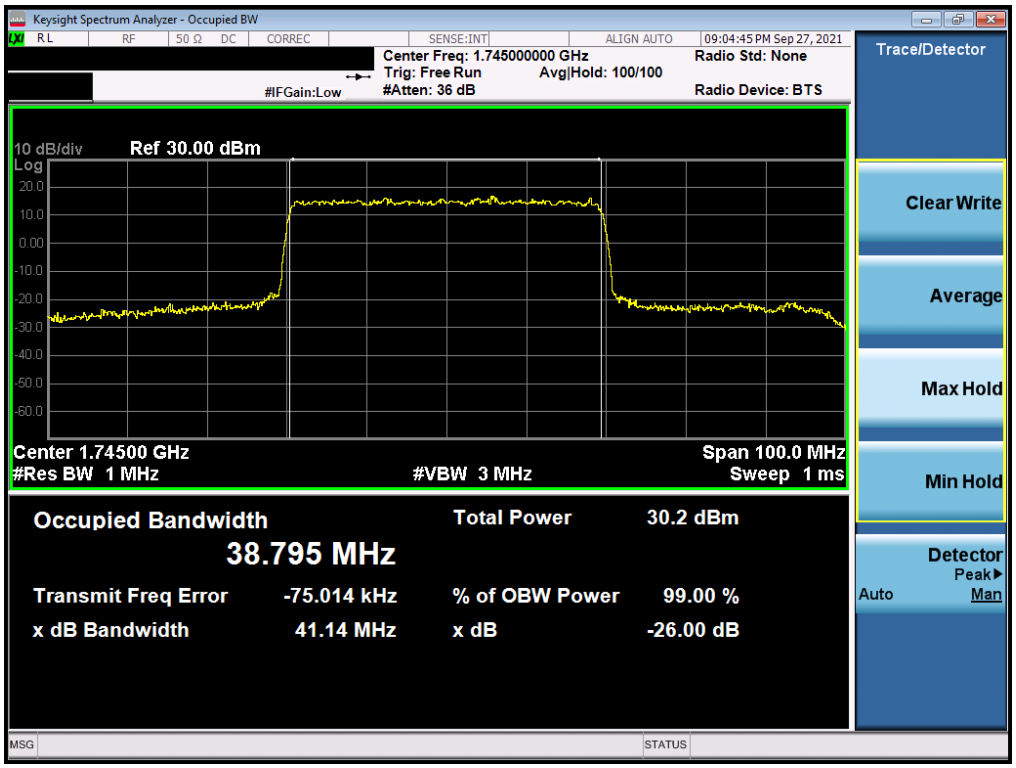


Plot 7-72. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz CP-OFDM 16QAM - Full RB – ANT A)

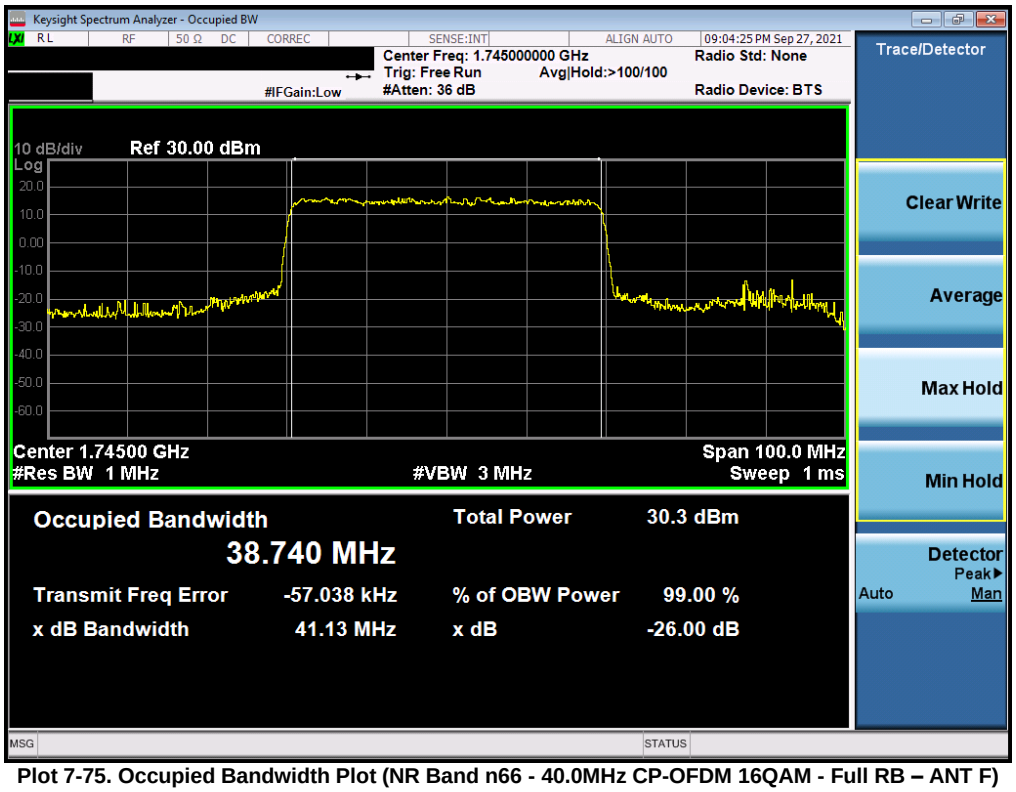
NR Band n66 – ANT F



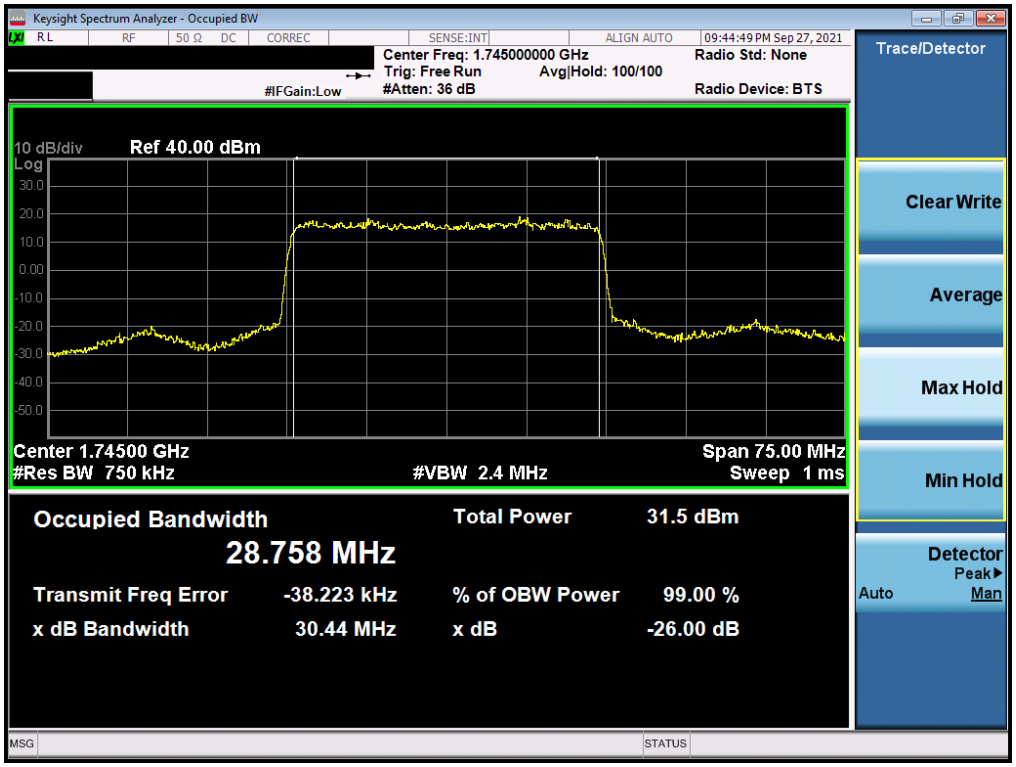
Plot 7-73. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz DFT-s-OFDM BPSK - Full RB – ANT F)



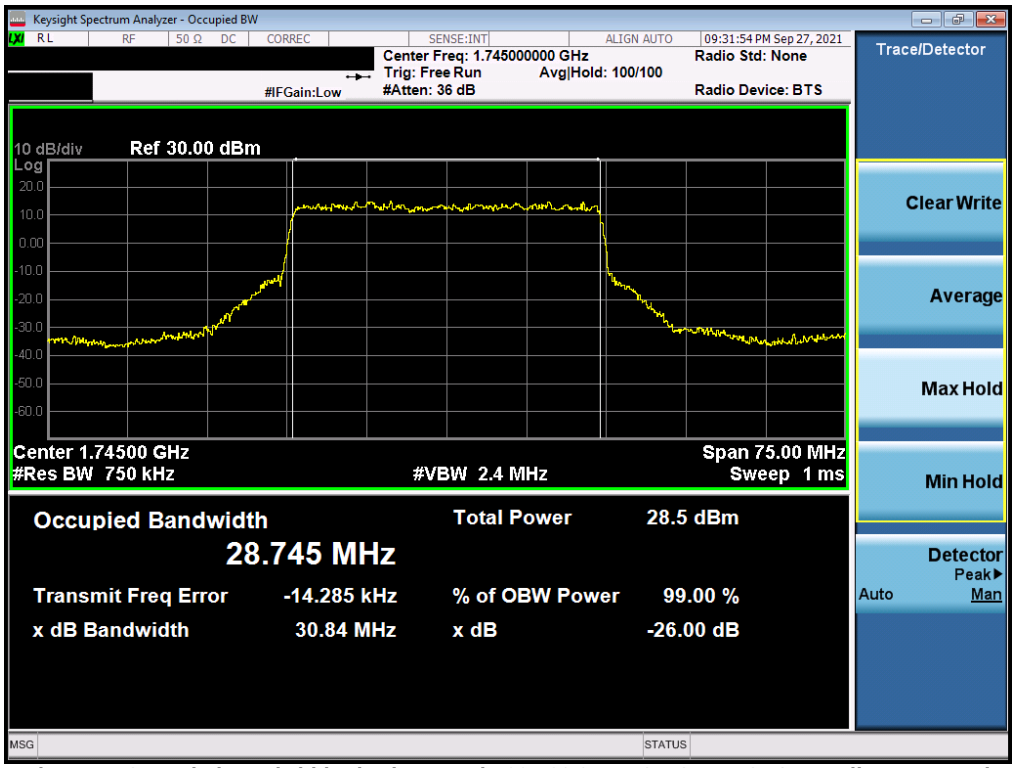
Plot 7-74. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM QPSK - Full RB – ANT F)



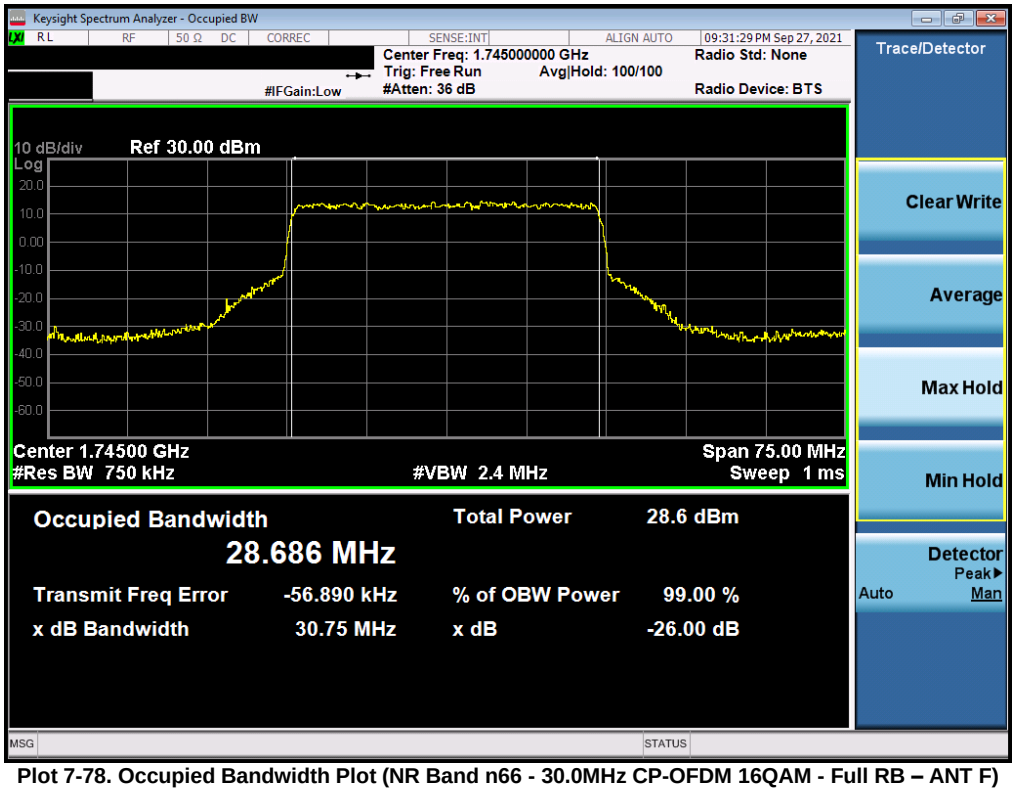
Plot 7-75. Occupied Bandwidth Plot (NR Band n66 - 40.0MHz CP-OFDM 16QAM - Full RB – ANT F)



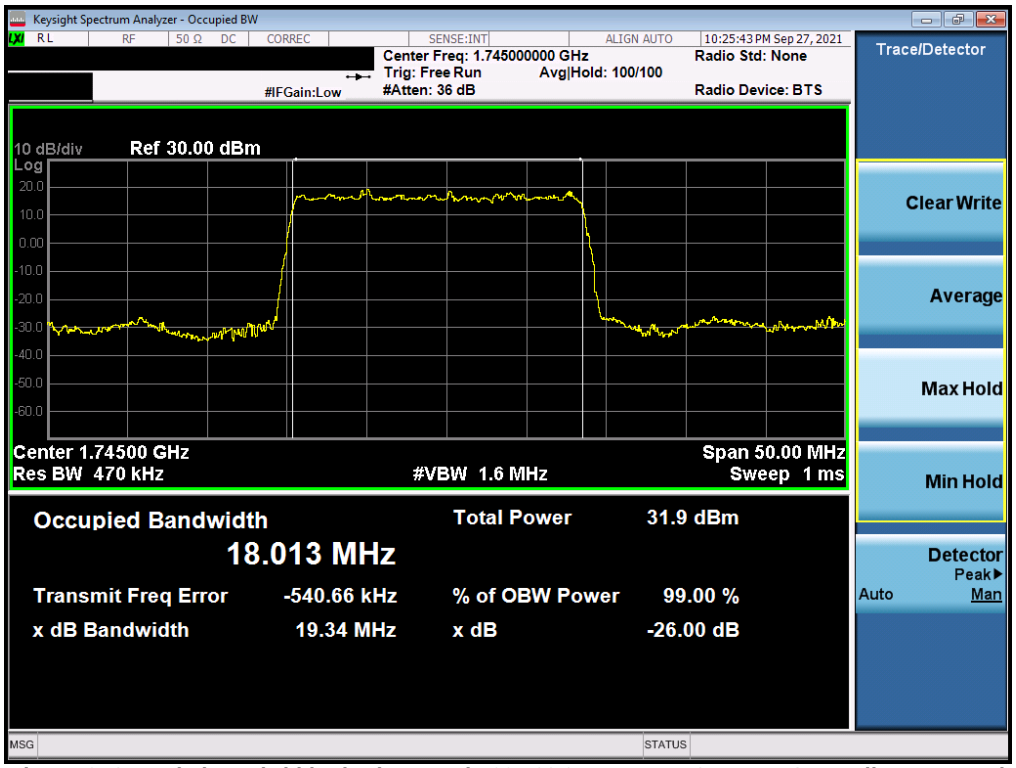
Plot 7-76. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz DFT-s-OFDM BPSK - Full RB – ANT F)



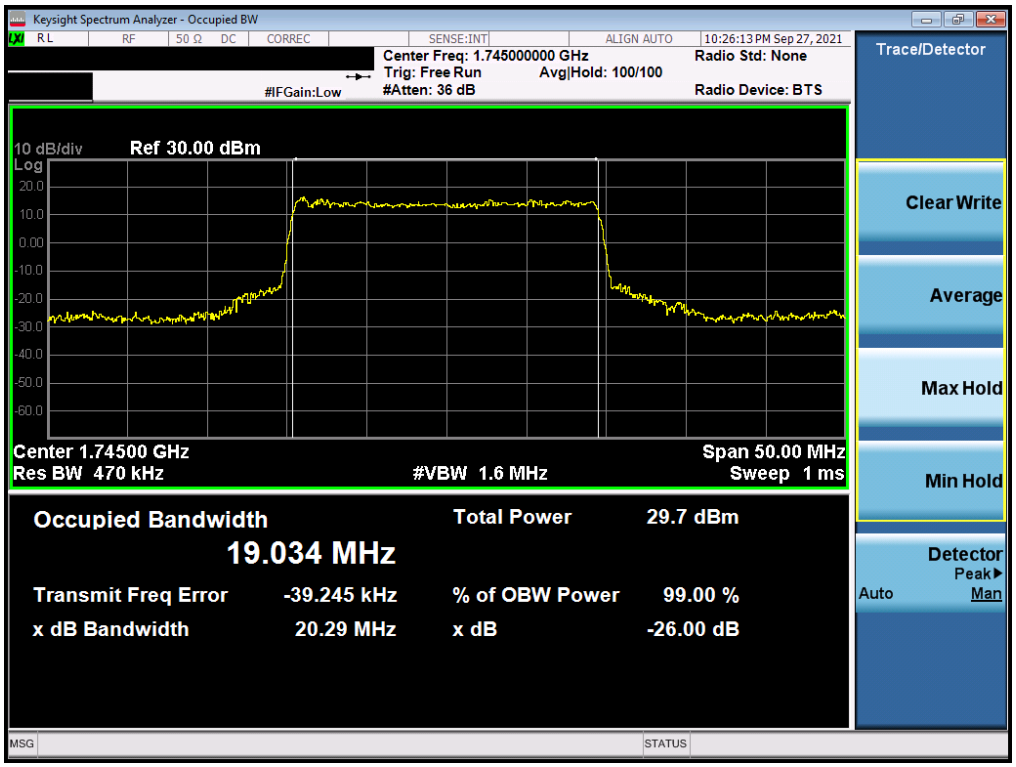
Plot 7-77. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM QPSK - Full RB – ANT F)



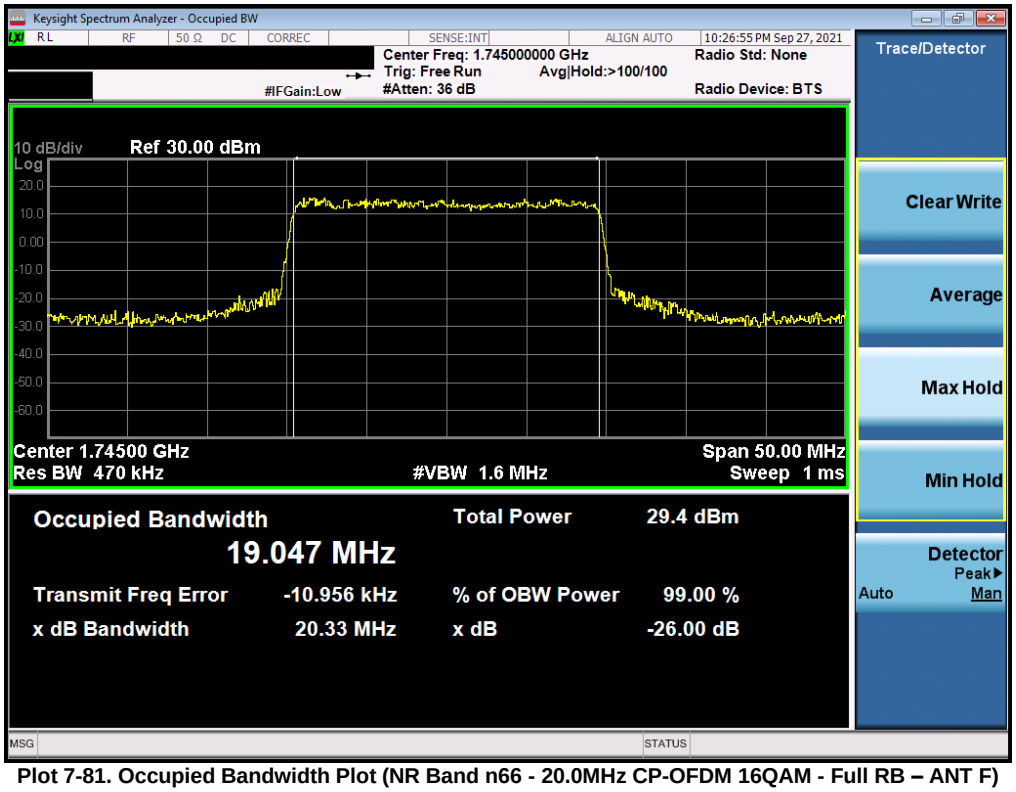
Plot 7-78. Occupied Bandwidth Plot (NR Band n66 - 30.0MHz CP-OFDM 16QAM - Full RB – ANT F)



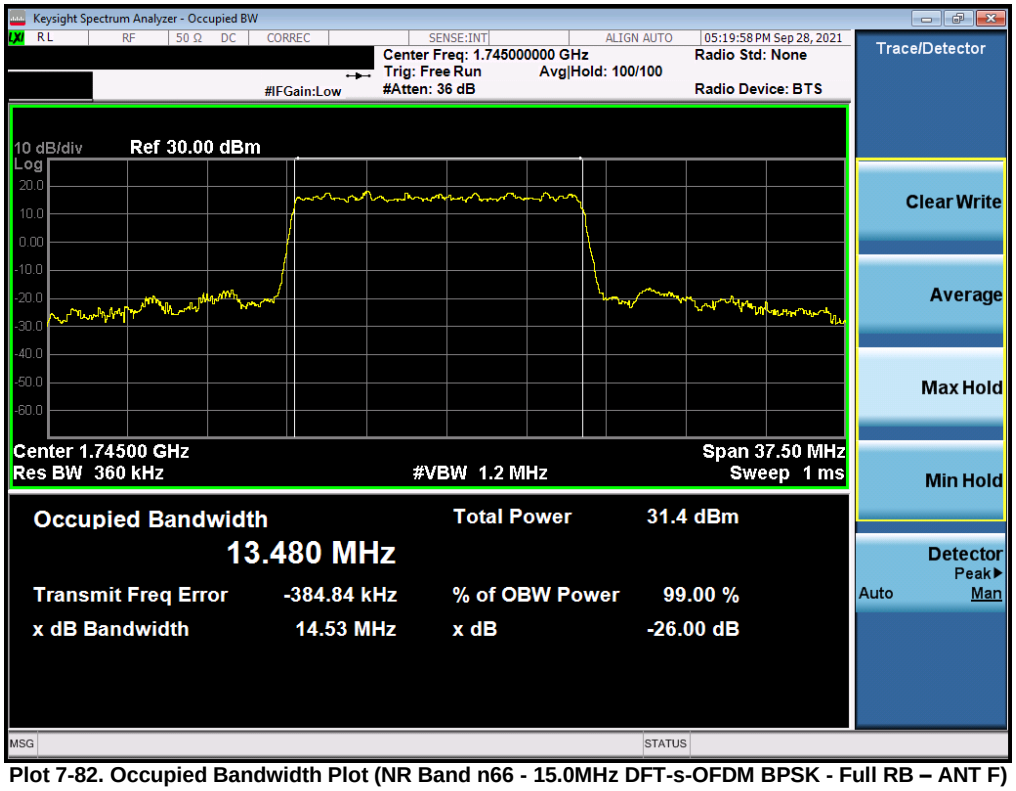
Plot 7-79. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz DFT-s-OFDM BPSK - Full RB – ANT F)



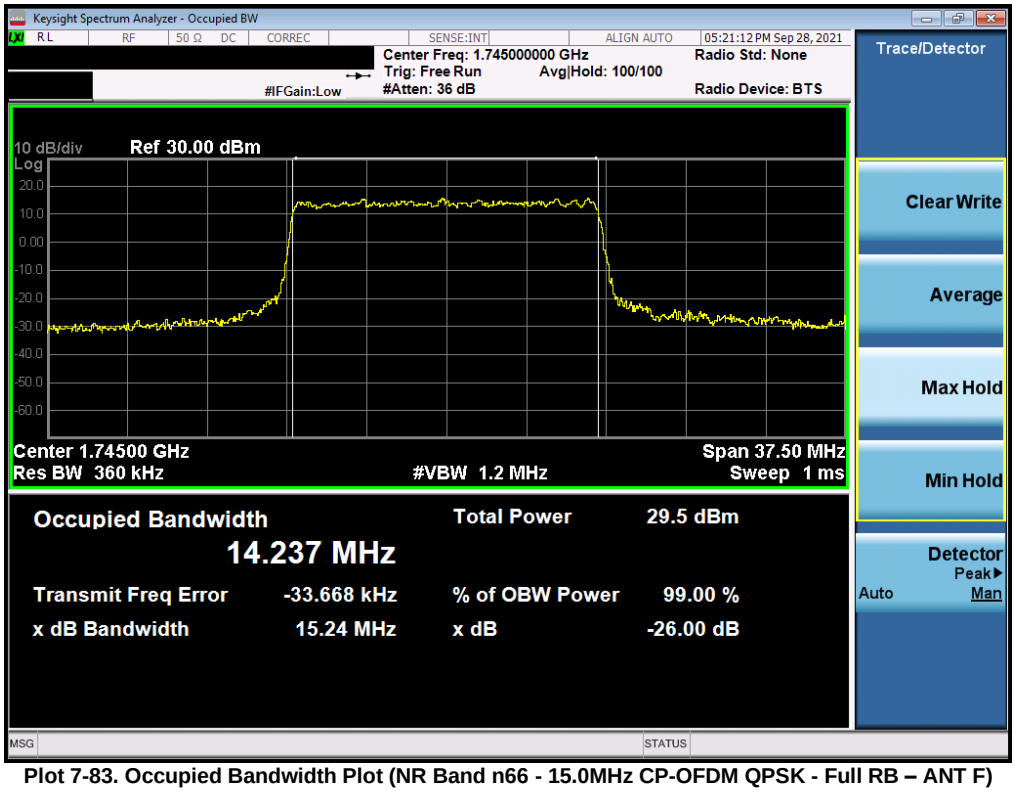
Plot 7-80. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM QPSK - Full RB – ANT F)



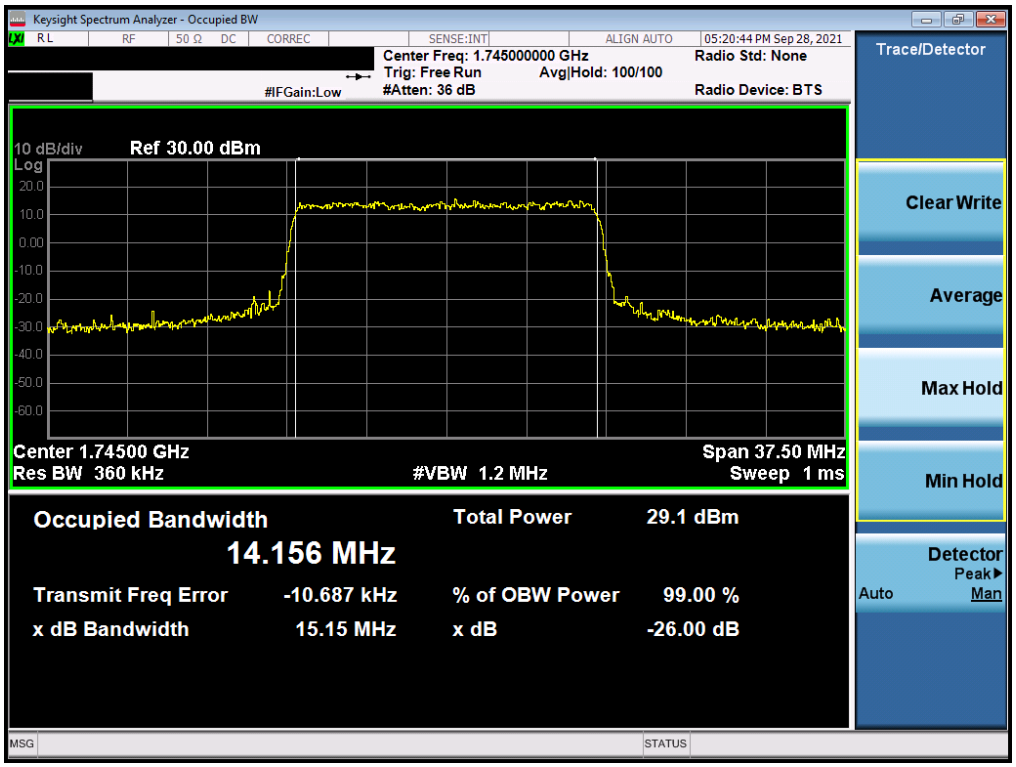
Plot 7-81. Occupied Bandwidth Plot (NR Band n66 - 20.0MHz CP-OFDM 16QAM - Full RB – ANT F)



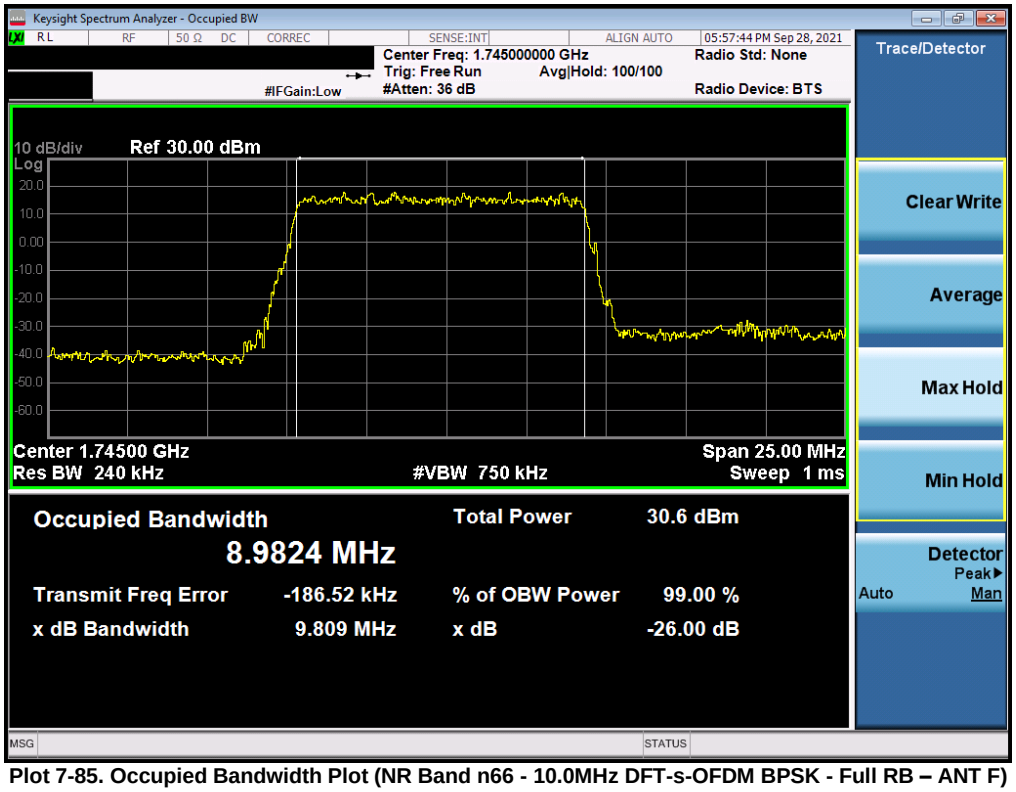
Plot 7-82. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz DFT-s-OFDM BPSK - Full RB – ANT F)



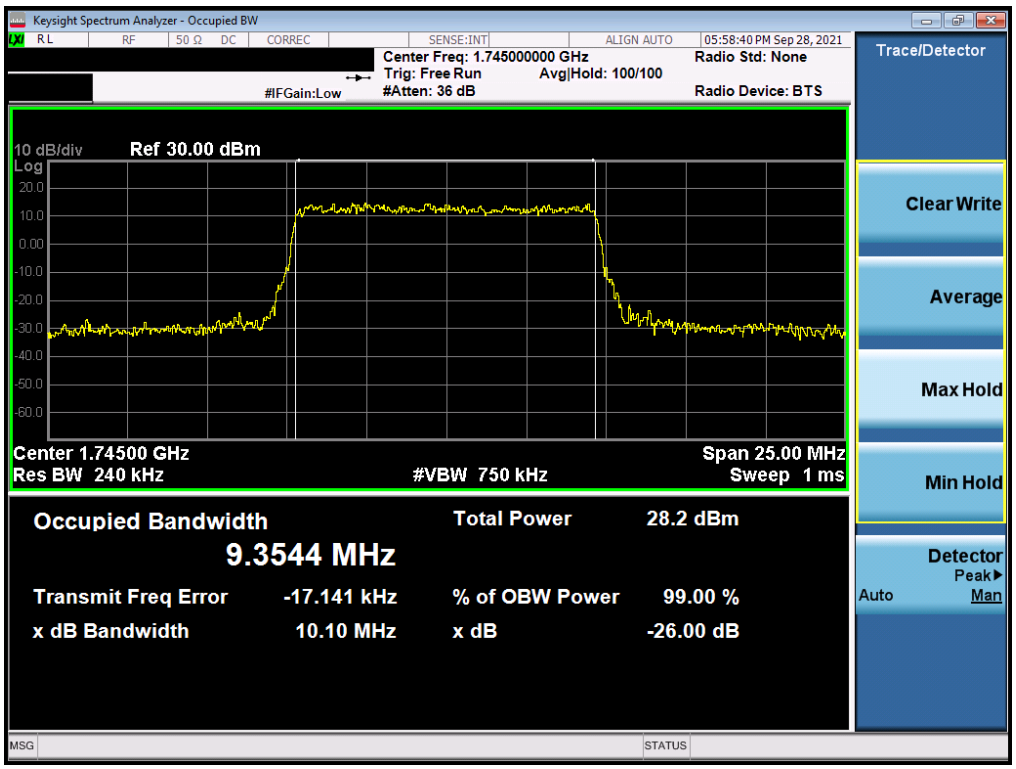
Plot 7-83. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz CP-OFDM QPSK - Full RB – ANT F)



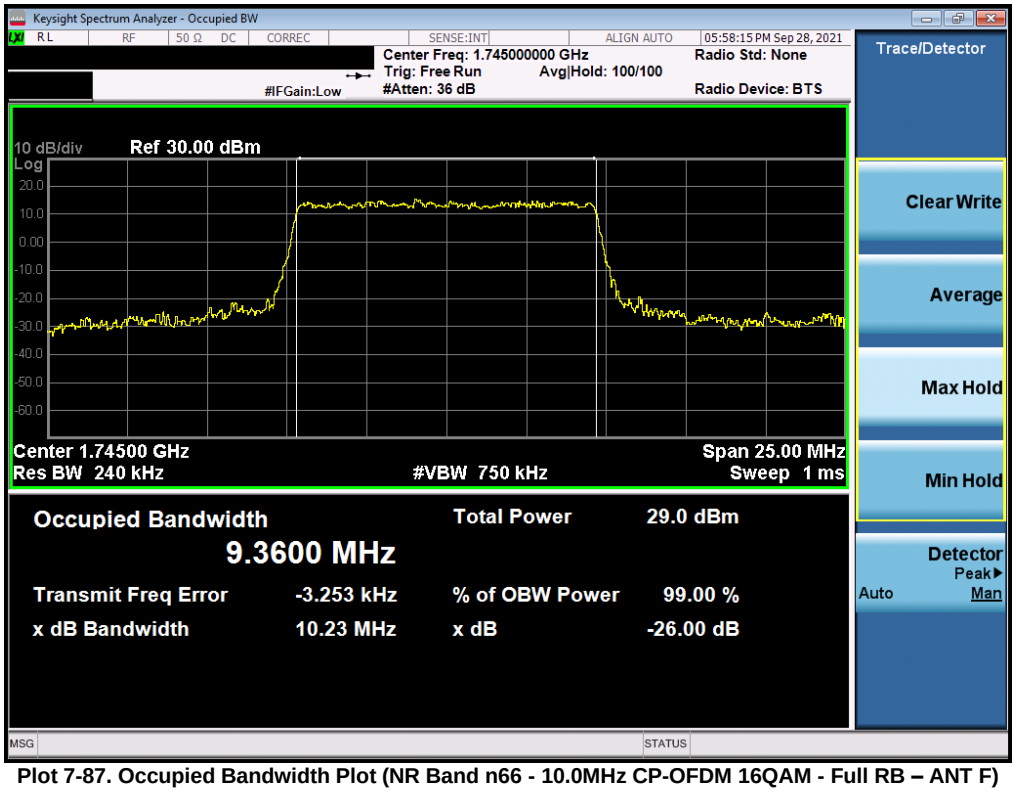
Plot 7-84. Occupied Bandwidth Plot (NR Band n66 - 15.0MHz CP-OFDM 16QAM - Full RB – ANT F)



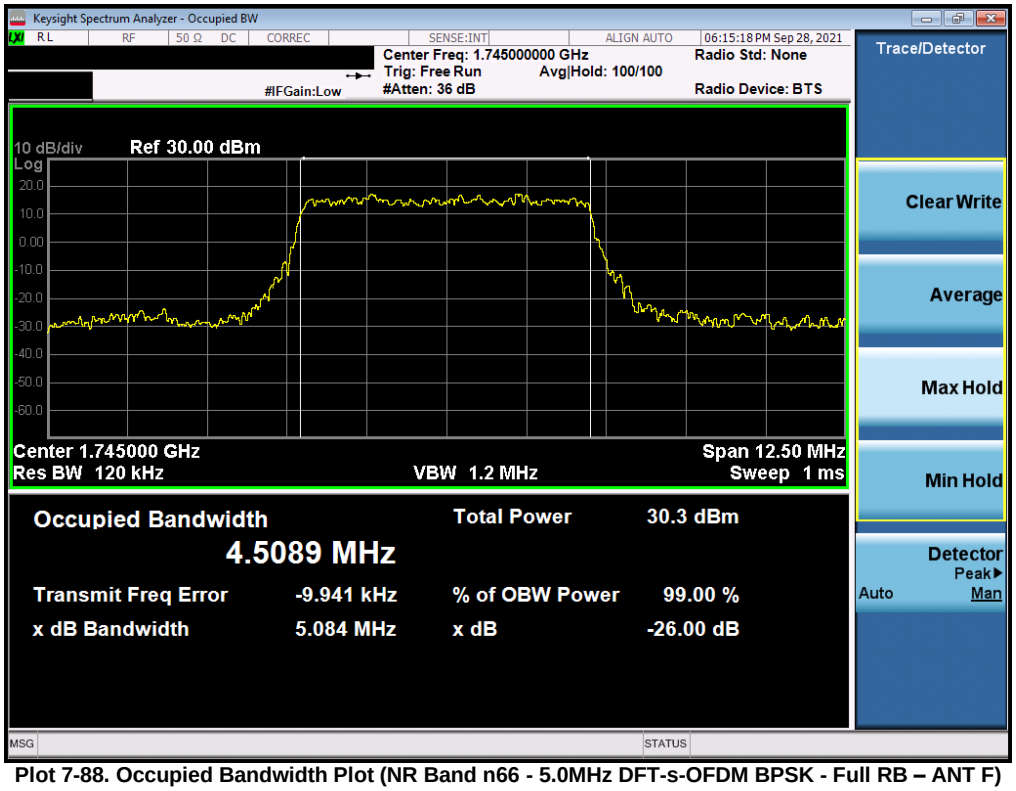
Plot 7-85. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz DFT-s-OFDM BPSK - Full RB – ANT F)



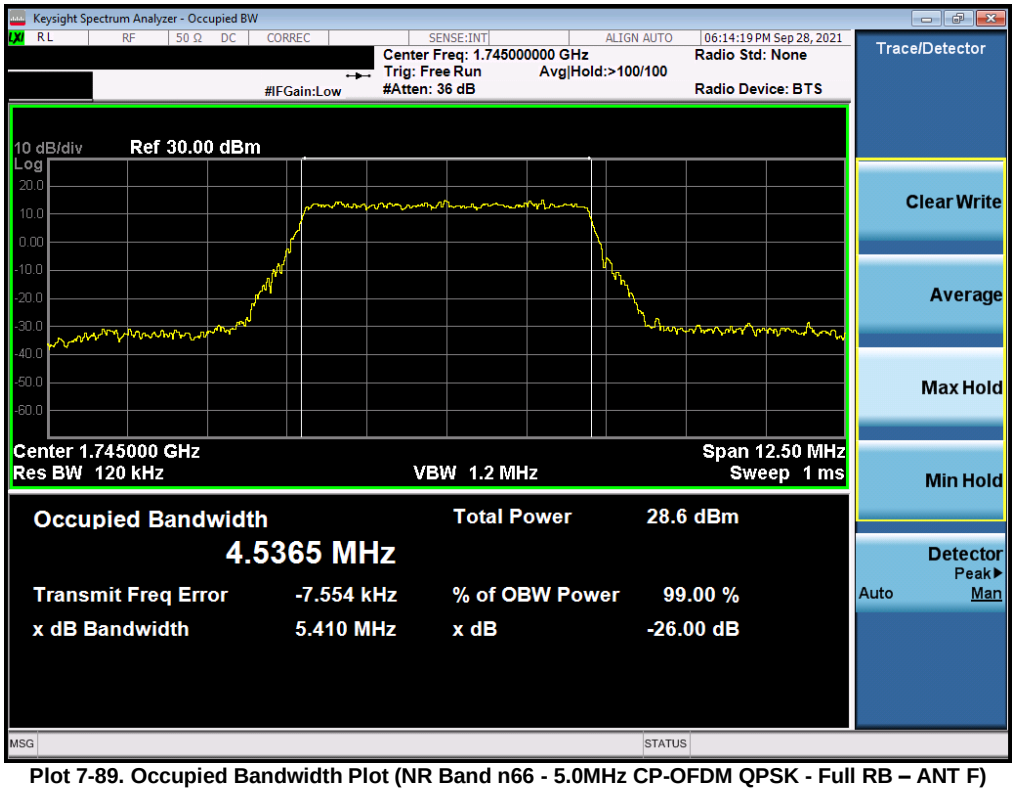
Plot 7-86. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz CP-OFDM QPSK - Full RB – ANT F)



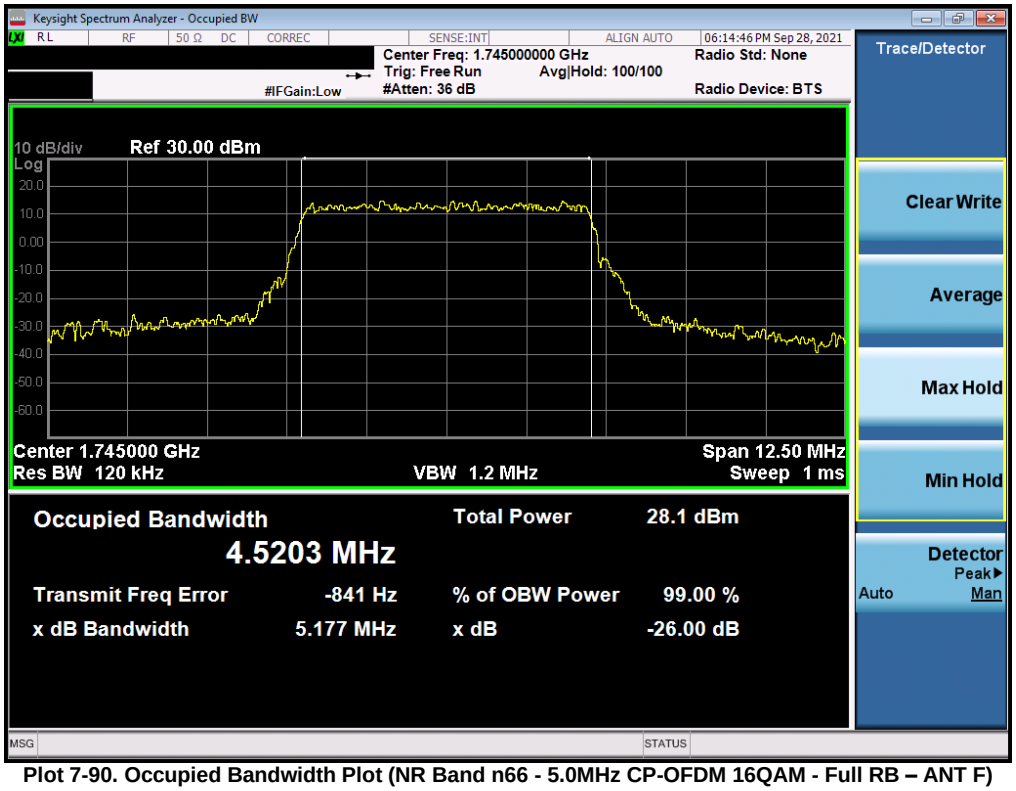
Plot 7-87. Occupied Bandwidth Plot (NR Band n66 - 10.0MHz CP-OFDM 16QAM - Full RB – ANT F)



Plot 7-88. Occupied Bandwidth Plot (NR Band n66 - 5.0MHz DFT-s-OFDM BPSK - Full RB – ANT F)



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



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

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.

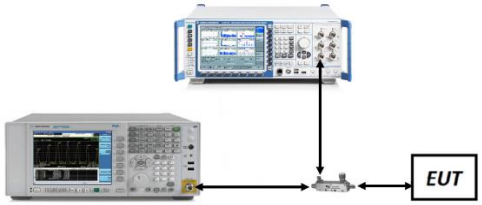


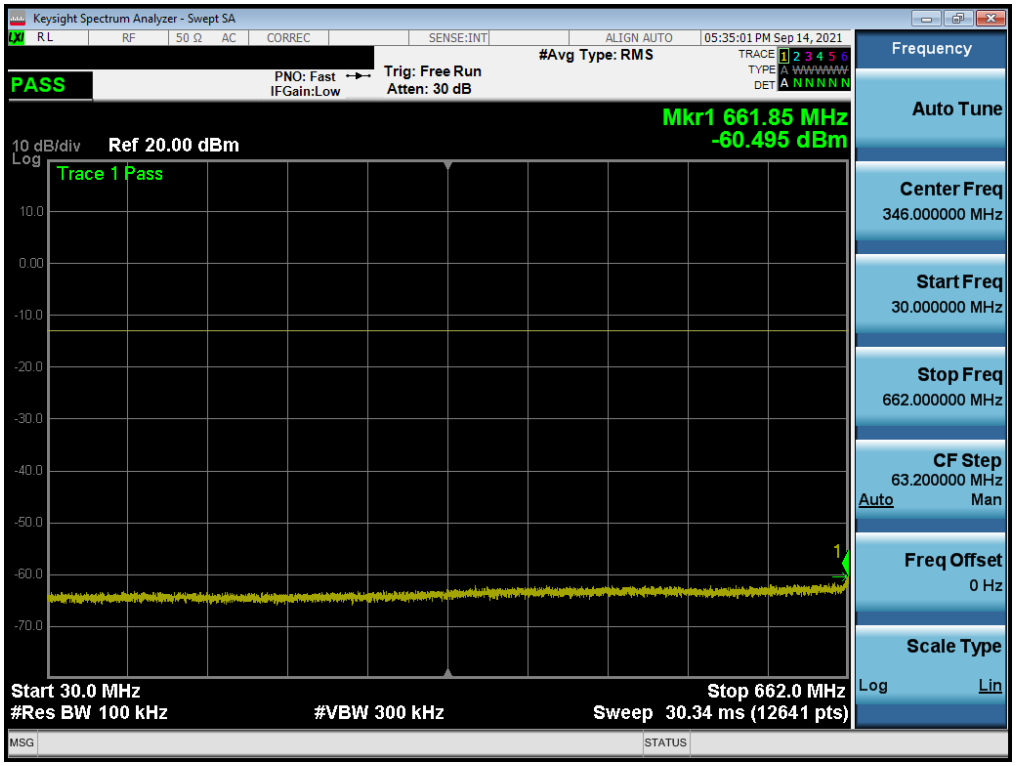
Figure 7-3. Test Instrument & Measurement Setup

Test Notes

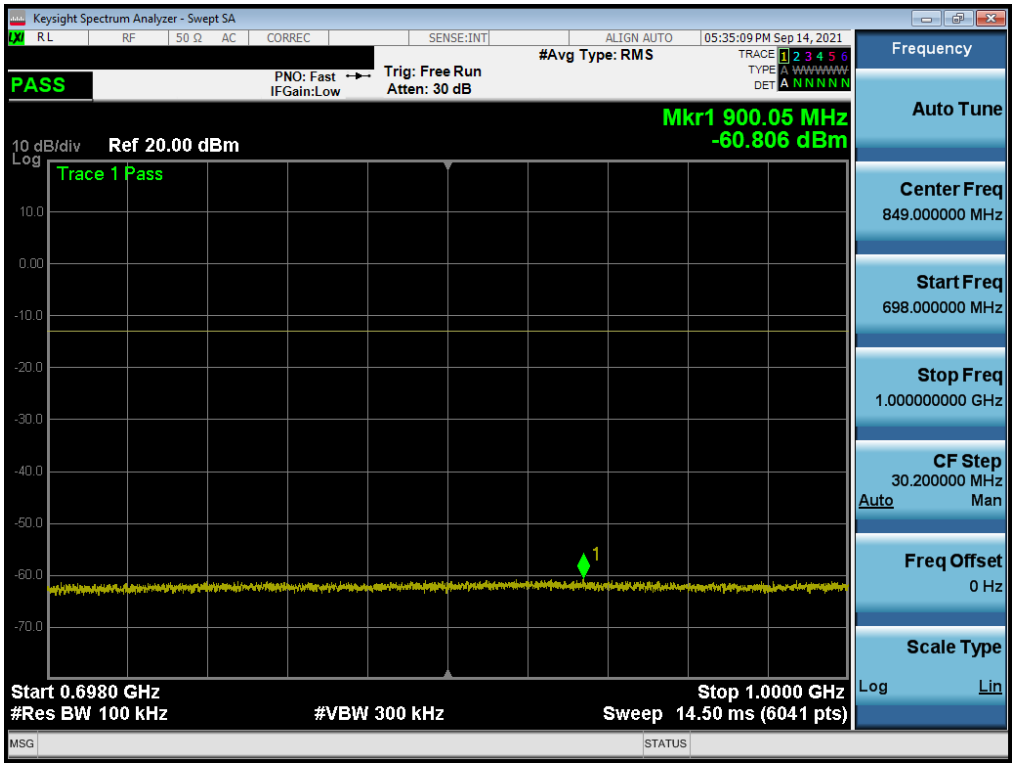
1. Per Part 27 and RSS-139, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth 100 kHz or greater for measurements below 1GHz and a resolution bandwidth of 1MHz for measurements above 1GHz.

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.

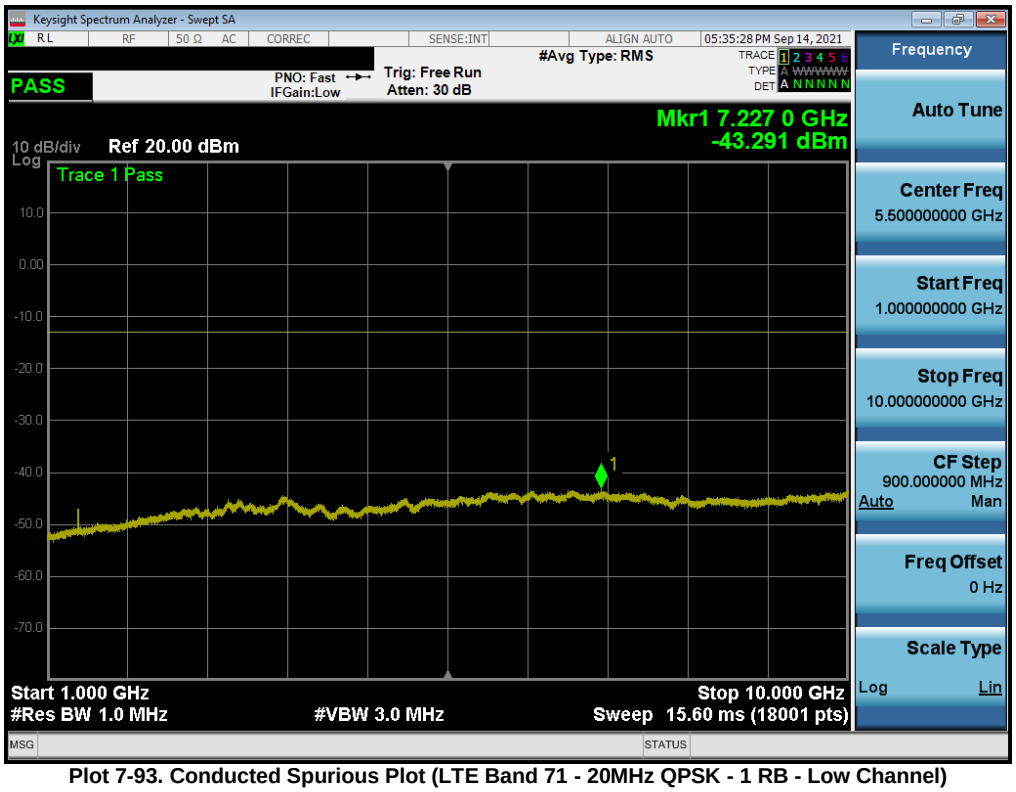
LTE Band 71



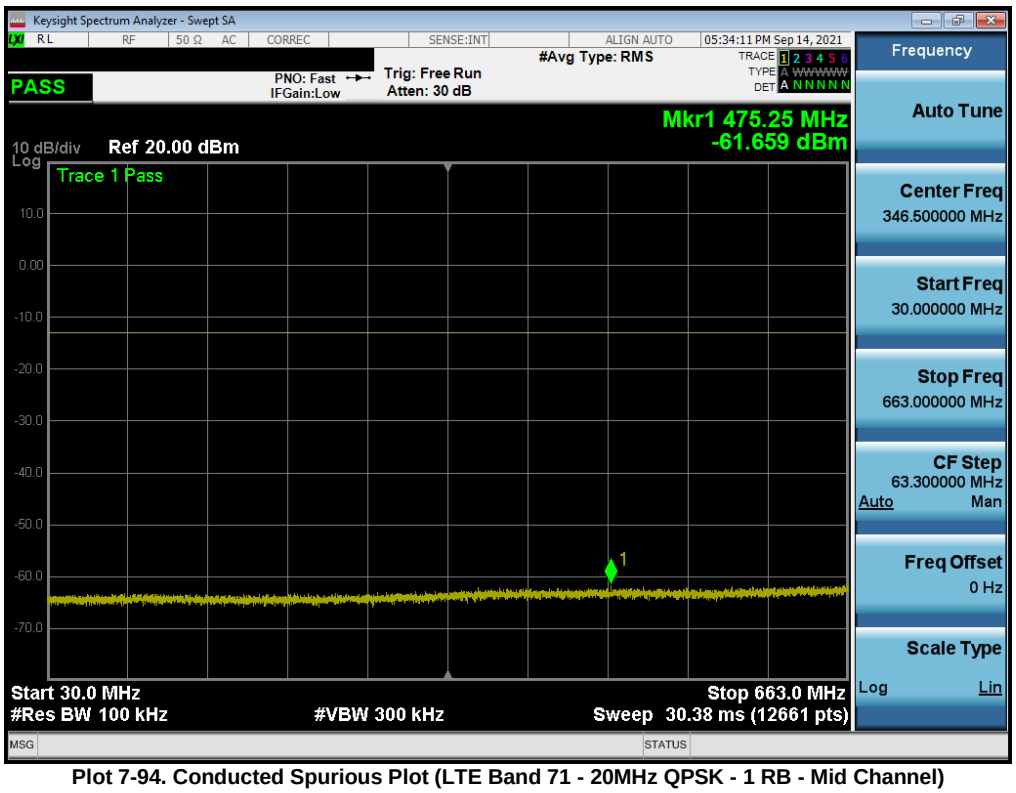
Plot 7-91. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Low Channel)



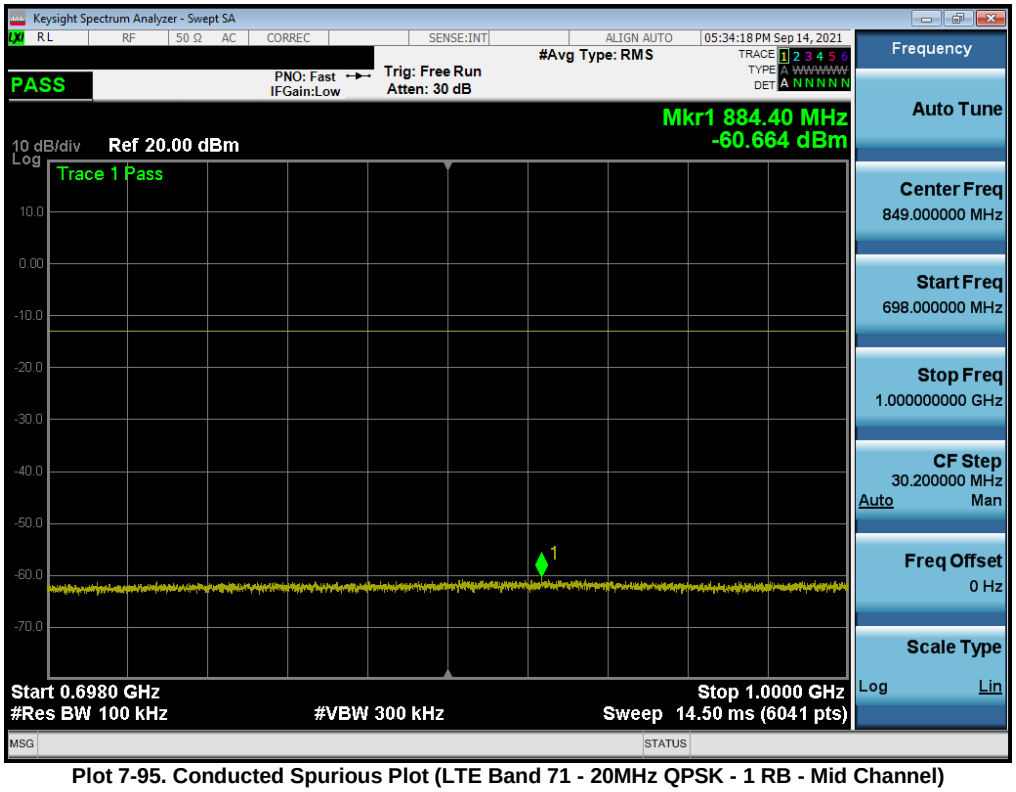
Plot 7-92. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Low Channel)



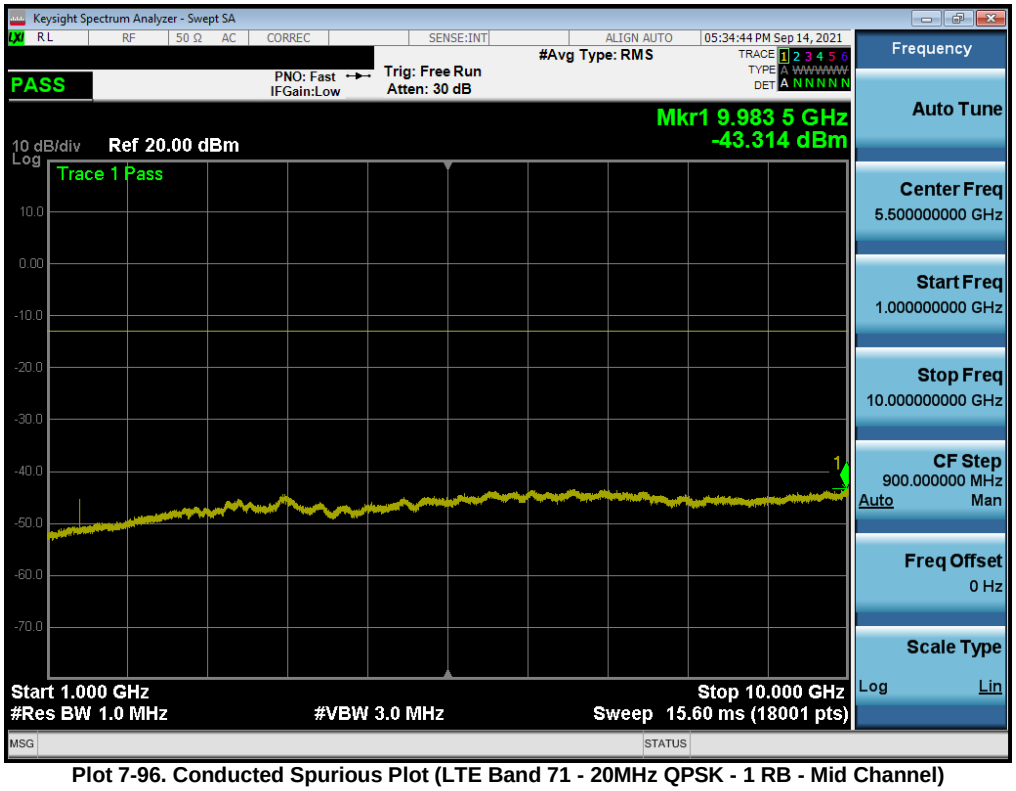
Plot 7-93. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Low Channel)



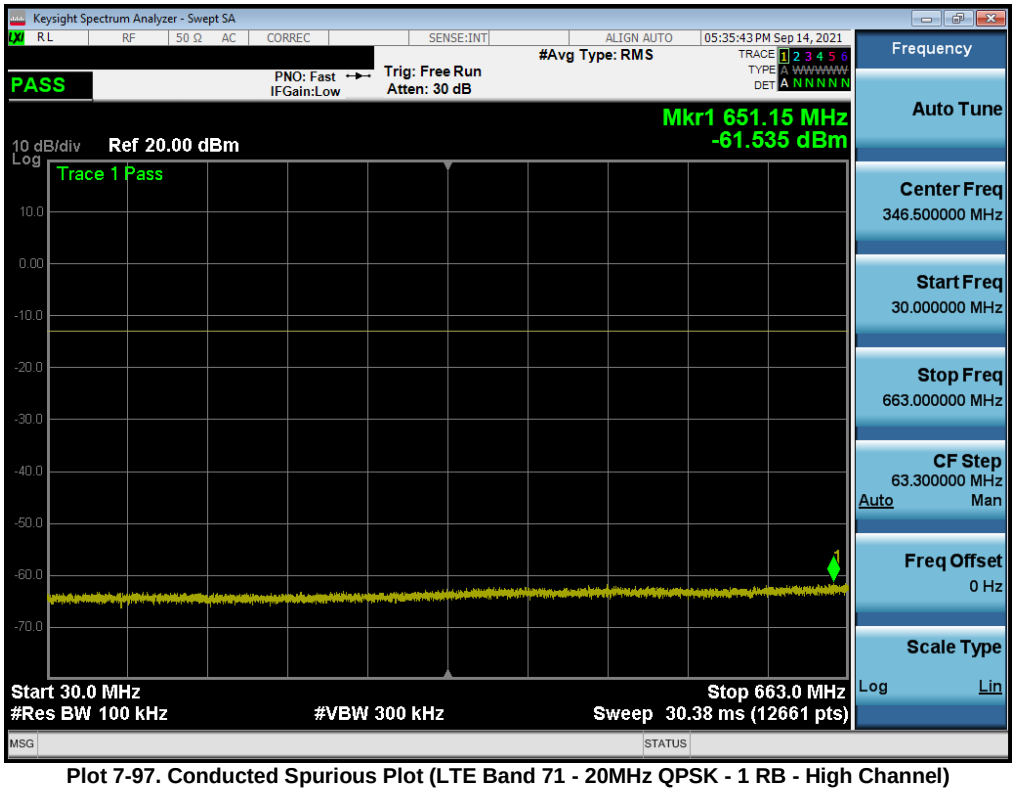
Plot 7-94. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Mid Channel)



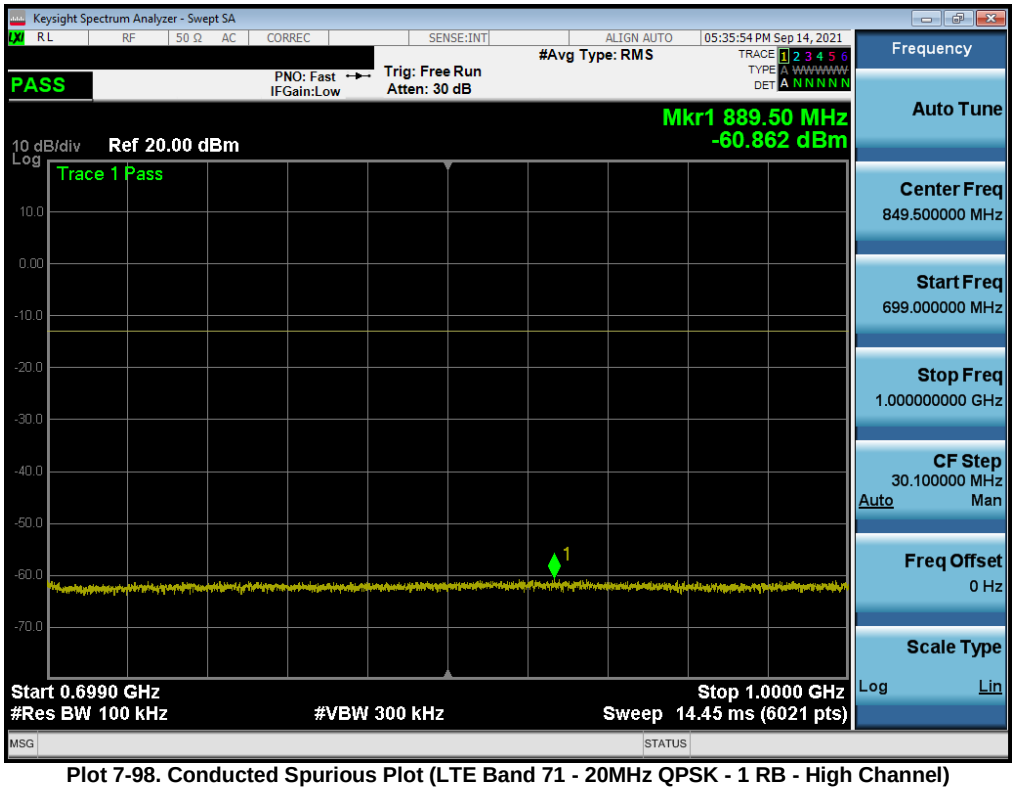
Plot 7-95. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - Mid Channel)



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



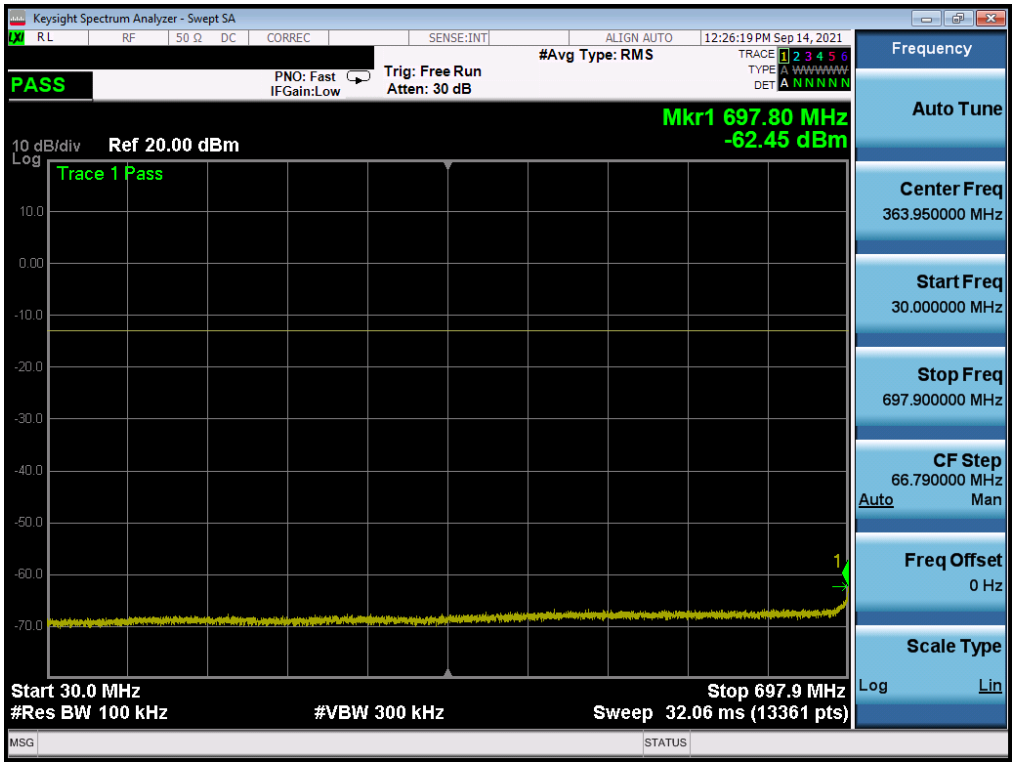
Plot 7-97. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - High Channel)



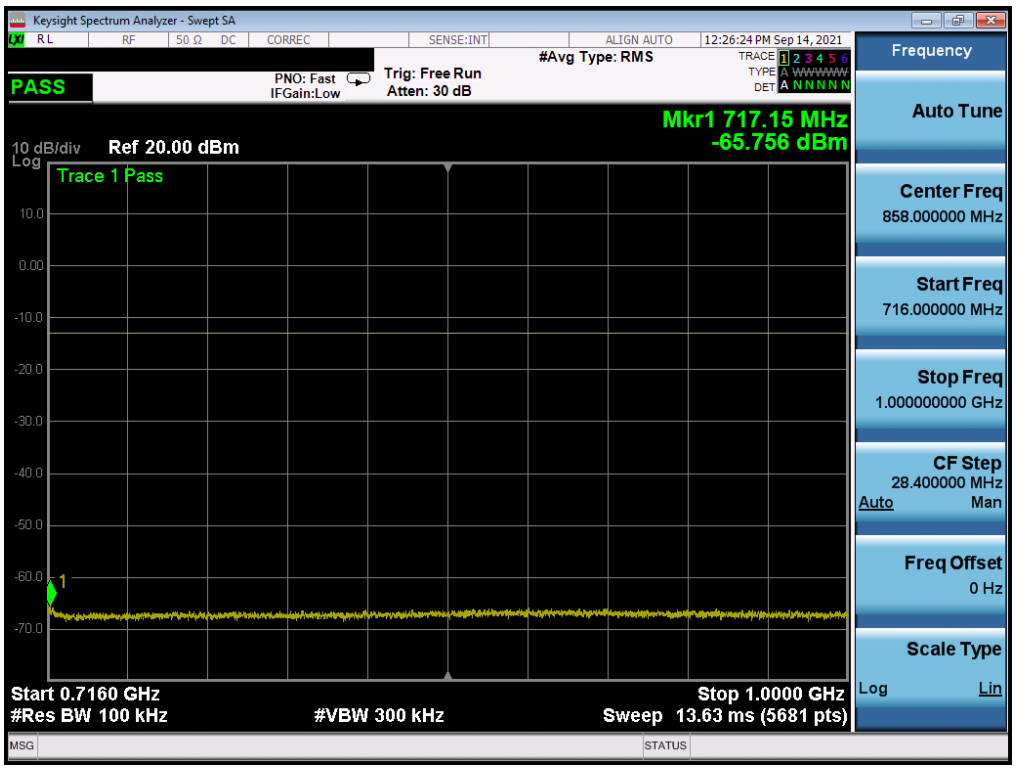
Plot 7-98. Conducted Spurious Plot (LTE Band 71 - 20MHz QPSK - 1 RB - High Channel)

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

LTE Band 12

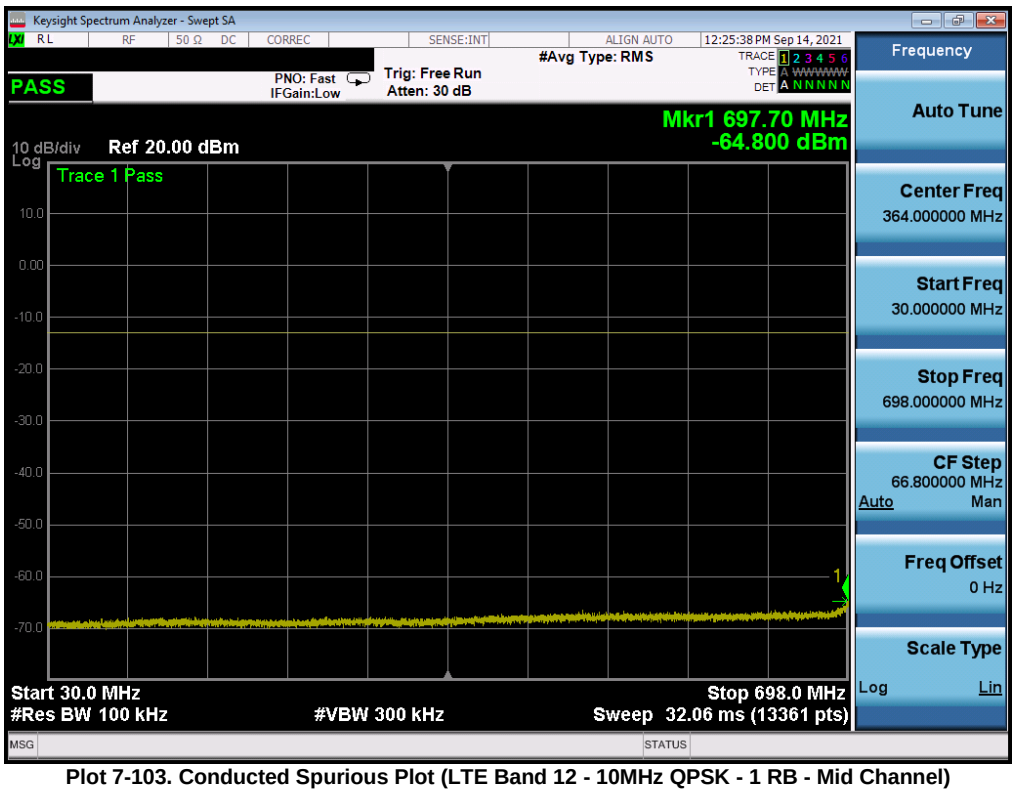


Plot 7-100. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - Low Channel)

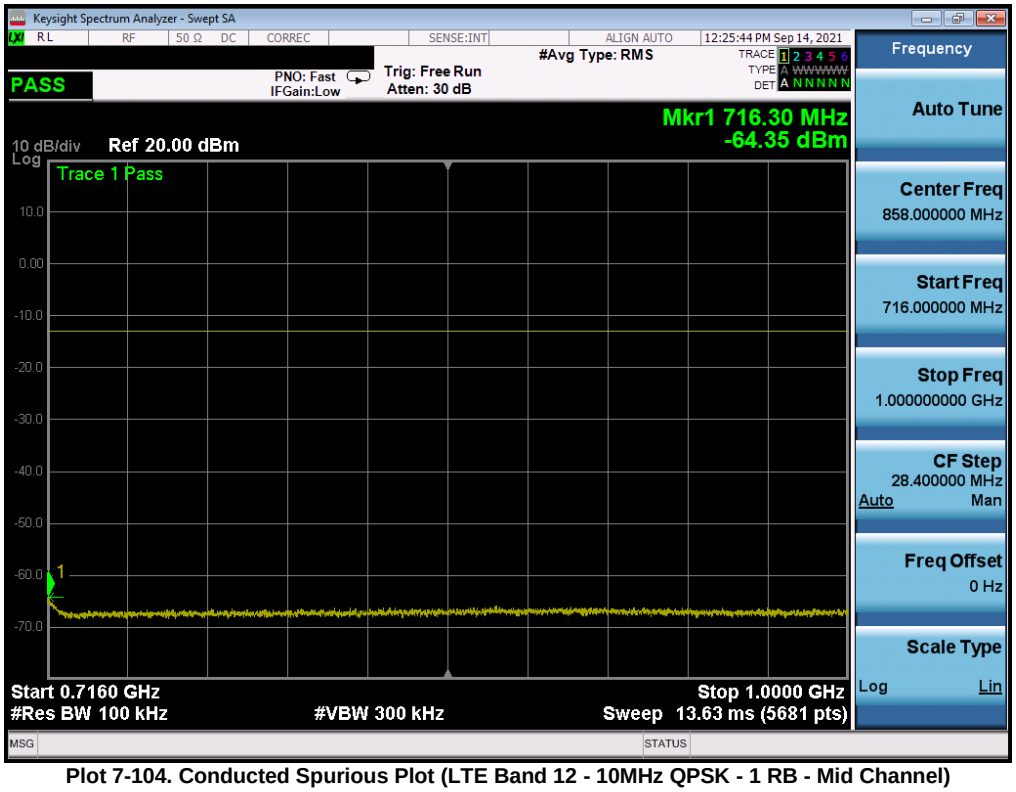


Plot 7-101. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - Low Channel)

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

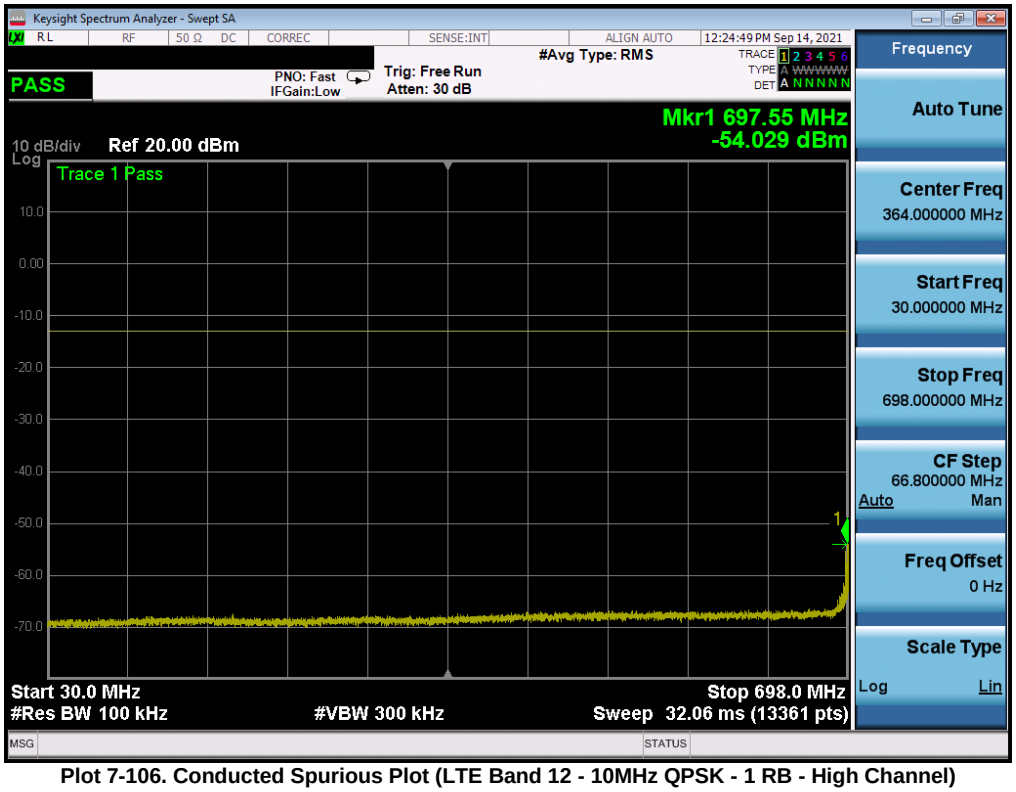


Plot 7-103. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - Mid Channel)

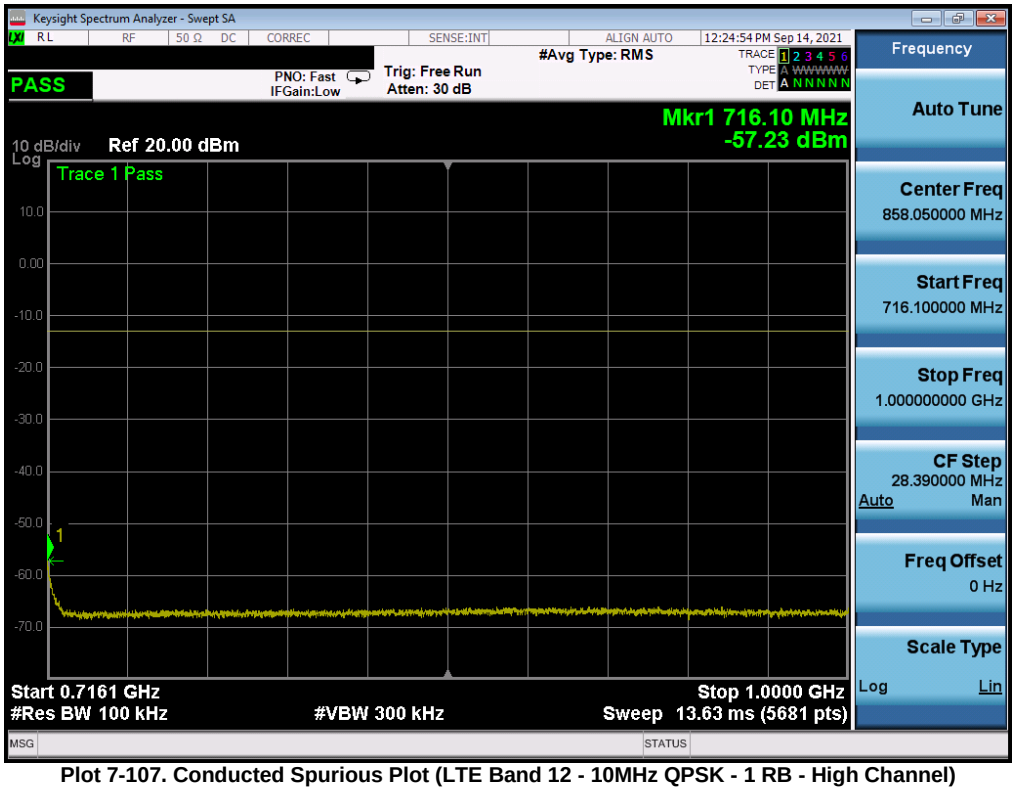


Plot 7-104. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - Mid Channel)

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

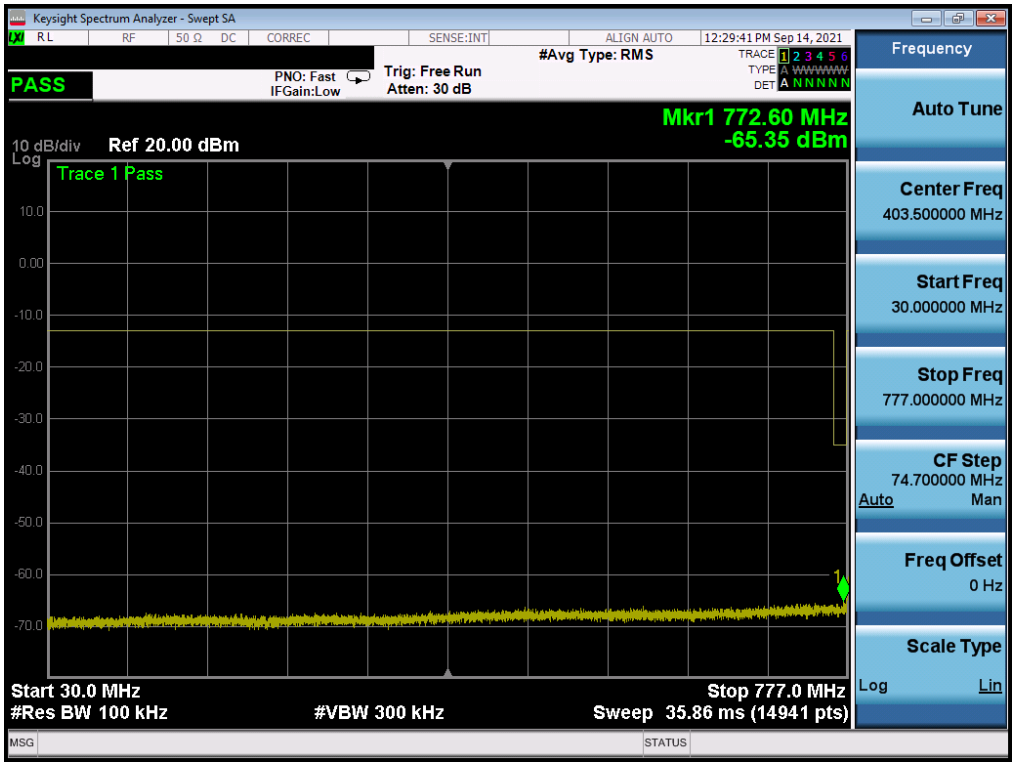


Plot 7-106. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - High Channel)

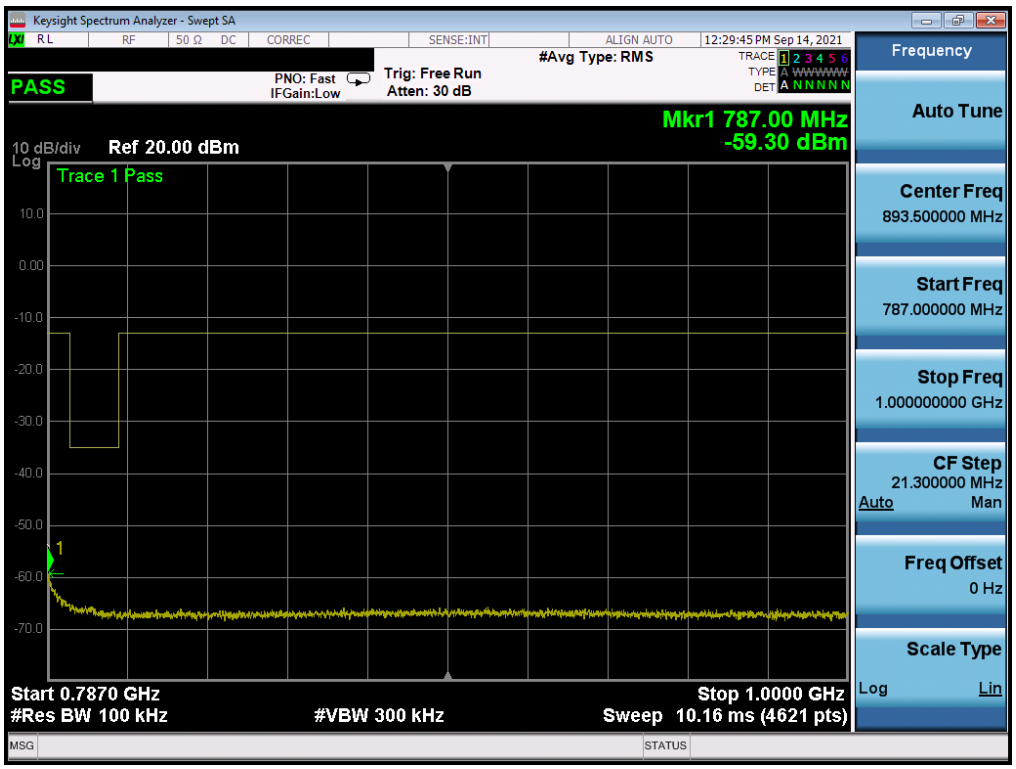


Plot 7-107. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - High Channel)

Plot 7-108. Conducted Spurious Plot (LTE Band 12 - 10MHz QPSK - 1 RB - High Channel)

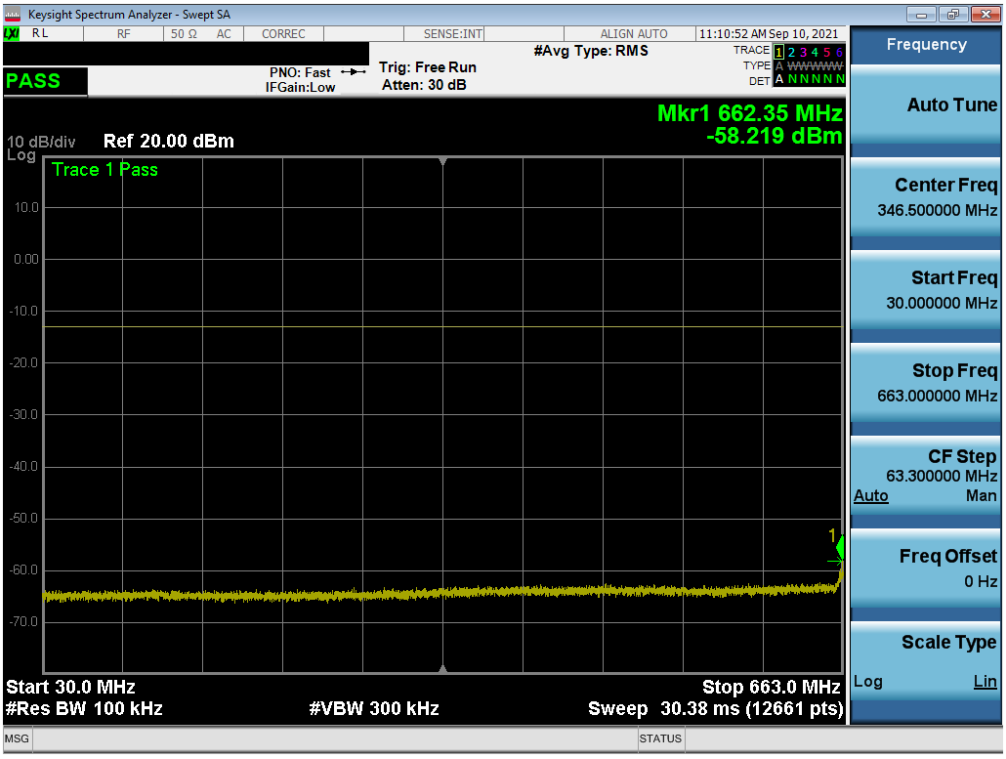


Plot 7-109. Conducted Spurious Plot (LTE Band 13 - 10MHz QPSK - 1 RB)

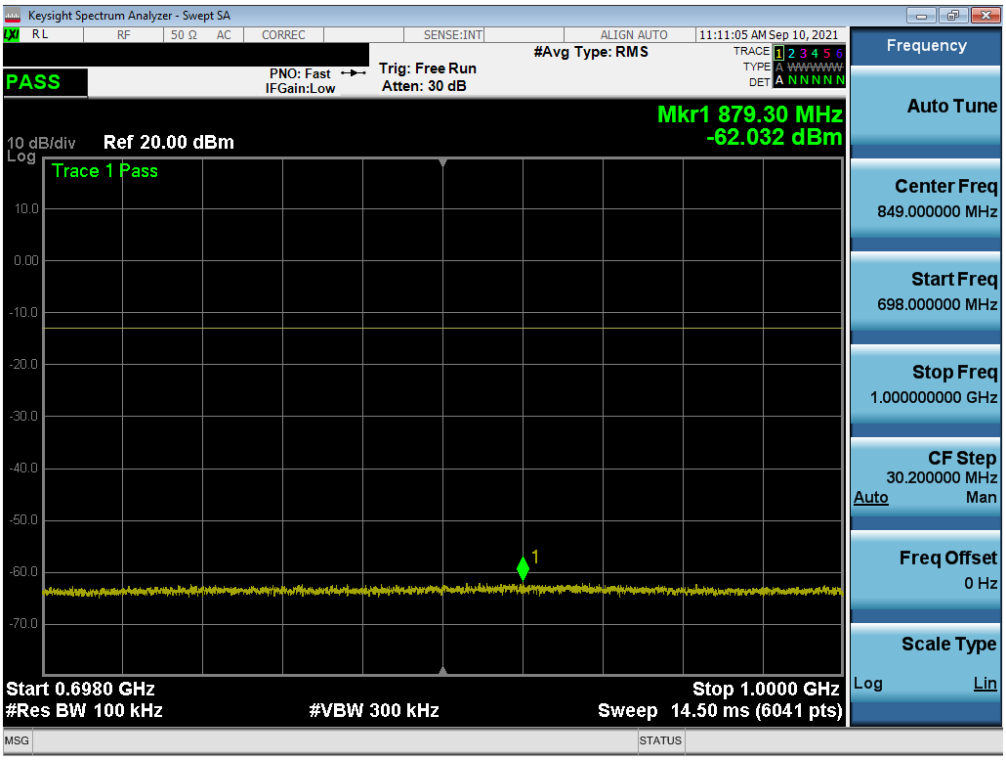


Plot 7-110. Conducted Spurious Plot (LTE Band 13 - 10MHz QPSK - 1 RB)

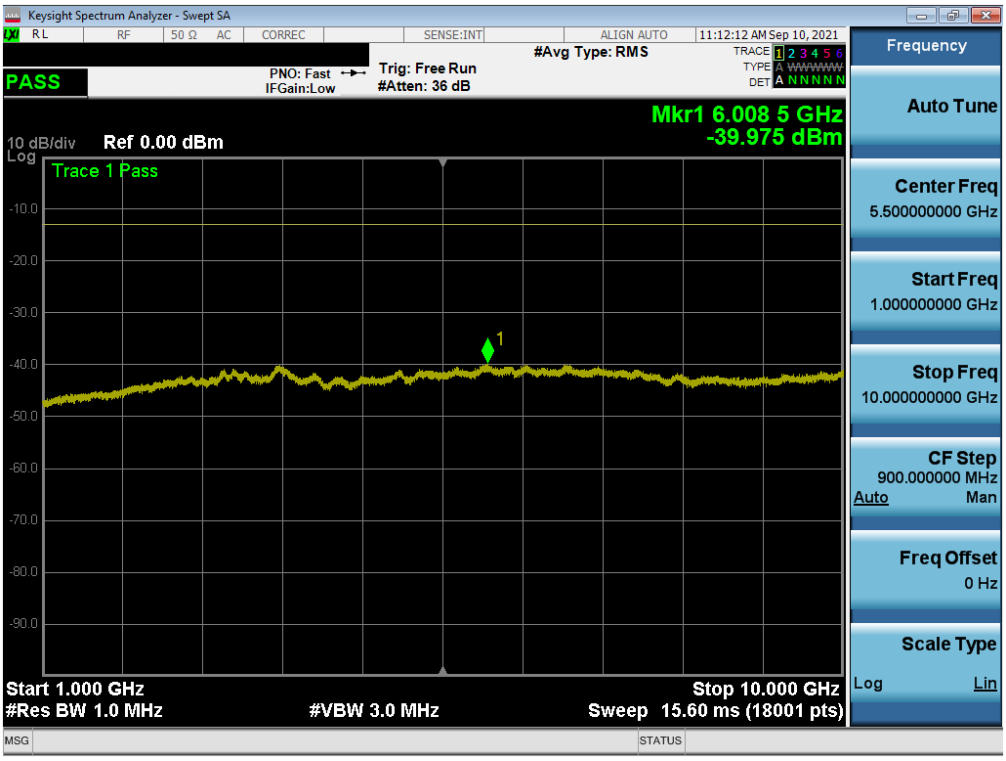
Plot 7-111. Conducted Spurious Plot (LTE Band 13 - 10MHz QPSK - 1 RB)



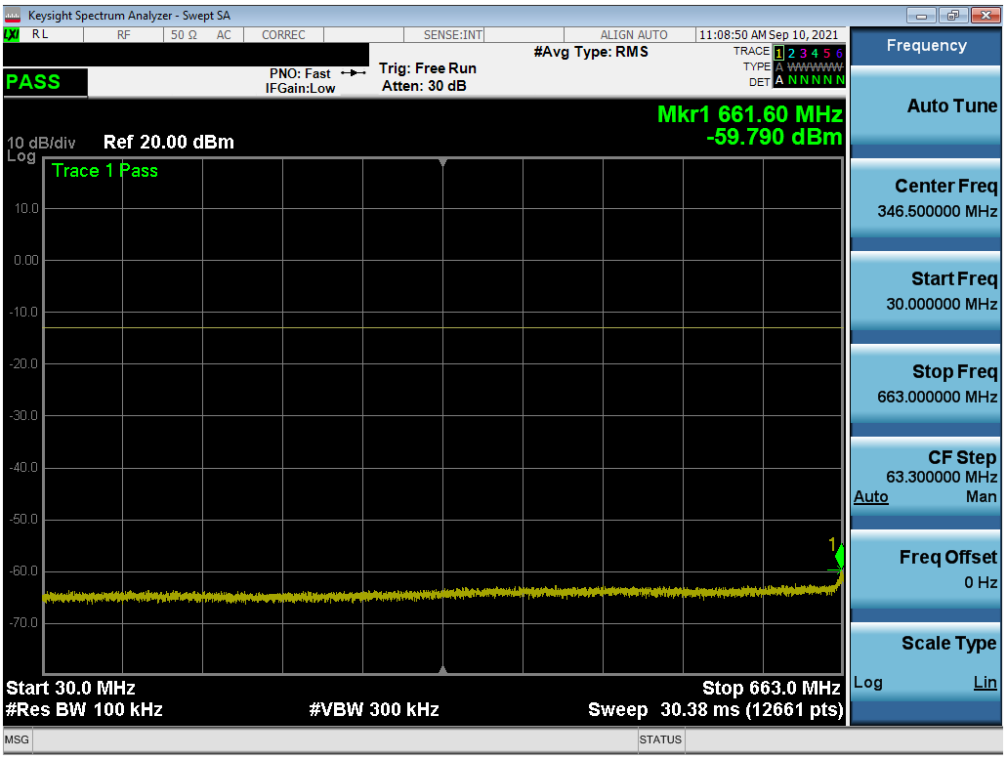
Plot 7-112. Conducted Spurious Plot (NR Band n71 -20.0MHz - 1 RB - Low Channel)



Plot 7-113. Conducted Spurious Plot (NR Band n71 - 20.0MHz - 1 RB - Low Channel)



Plot 7-114. Conducted Spurious Plot (NR Band n71 - 20.0MHz - 1 RB - Low Channel)



Plot 7-115. Conducted Spurious Plot (NR Band n71 - 20.0MHz - 1 RB - Mid Channel)