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PART 22 & 90 MEASUREMENT REPORT

Applicant Name:
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Date of Testing:
09/05/2024 – 11/13/2024
Test Report Issue Date:
11/13/2024
Test Site/Location:
Element lab., Columbia, MD, USA
Test Report Serial No.:
1M2408260066-27.A3L

FCC ID:	**A3LSMS936B**
APPLICANT:	**Samsung Electronics Co., Ltd.**

Application Type:	Certification
Model:	SM-S936B/DS
Additional Model:	SM-S936B
EUT Type:	Portable Handset
FCC Classification:	PCS Licensed Transmitter Held to Ear (PCE)
FCC Rule Part:	§22(H), §90(S), §90(R)
Test Procedure(s):	ANSI C63.26-2015, KDB 648474 D03 v01r04

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

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

RJ Ortanez
Executive Vice President

ACCREDITED
CERT #2041.01

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MEASUREMENT REPORT
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Antenna-A							
Mode	**Bandwidth**	**Modulation**	**Tx Frequency Range [MHz]**	**Measurement**	**Max. Power [W]**	**Max. Power [dBm]**	**Emission Designator**
LTE Band 26	15 MHz	QPSK	821.5	ERP	0.055	17.42	13M5G7D
		16QAM	821.5	ERP	0.043	16.34	13M5W7D
	15 MHz	QPSK	821.5	Conducted	0.295	24.70	13M5G7D
		16QAM	821.5	Conducted	0.245	23.88	13M5W7D
	10 MHz	QPSK	819.0	Conducted	0.293	24.67	8M99G7D
		16QAM	819.0	Conducted	0.240	23.79	9M05W7D
	5 MHz	QPSK	816.5 - 821.5	Conducted	0.291	24.64	4M54G7D
		16QAM	816.5 - 821.5	Conducted	0.247	23.93	4M50W7D
	3 MHz	QPSK	815.5 - 822.5	Conducted	0.291	24.64	2M72G7D
		16QAM	815.5 - 822.5	Conducted	0.244	23.88	2M72W7D
	1.4 MHz	QPSK	814.7 - 823.3	Conducted	0.293	24.66	1M10G7D
		16QAM	814.7 - 823.3	Conducted	0.246	23.91	1M10W7D
NR Band n26	20 MHz	π/2 BPSK	824.0	ERP	0.105	20.20	18M0G7D
		QPSK	824.0	ERP	0.100	20.00	19M0G7D
		16QAM	824.0	ERP	0.077	18.85	19M1W7D
	15 MHz	π/2 BPSK	821.5	ERP	0.108	20.32	13M5G7D
		QPSK	821.5	ERP	0.097	19.89	14M2G7D
		16QAM	821.5	ERP	0.078	18.93	14M2W7D
	20 MHz	π/2 BPSK	824.0	Conducted	0.265	24.23	18M0G7D
		QPSK	824.0	Conducted	0.269	24.29	19M0G7D
		16QAM	824.0	Conducted	0.201	23.03	19M1W7D
	15 MHz	π/2 BPSK	821.5	Conducted	0.272	24.35	13M5G7D
		QPSK	821.5	Conducted	0.262	24.18	14M2G7D
		16QAM	821.5	Conducted	0.205	23.11	14M2W7D
	10 MHz	π/2 BPSK	819.0	Conducted	0.268	24.28	9M01G7D
		QPSK	819.0	Conducted	0.272	24.34	9M35G7D
		16QAM	819.0	Conducted	0.197	22.95	9M38W7D
	5 MHz	π/2 BPSK	816.5 - 821.5	Conducted	0.270	24.32	4M53G7D
		QPSK	816.5 - 821.5	Conducted	0.266	24.24	4M52G7D
		16QAM	816.5 - 821.5	Conducted	0.226	23.54	4M57W7D

Antenna-E							
Mode	**Bandwidth**	**Modulation**	**Tx Frequency Range [MHz]**	**Measurement**	**Max. Power [W]**	**Max. Power [dBm]**	**Emission Designator**
LTE Band 26	15 MHz	QPSK	821.5	ERP	0.088	19.47	13M6G7D
		16QAM	821.5	ERP	0.078	18.91	13M5W7D
	15 MHz	QPSK	821.5	Conducted	0.260	24.14	13M6G7D
		16QAM	821.5	Conducted	0.223	23.49	13M5W7D
	10 MHz	QPSK	819.0	Conducted	0.259	24.14	9M04G7D
		16QAM	819.0	Conducted	0.229	23.60	8M99W7D
	5 MHz	QPSK	816.5 - 821.5	Conducted	0.264	24.21	4M56G7D
		16QAM	816.5 - 821.5	Conducted	0.228	23.57	4M52W7D
	3 MHz	QPSK	815.5 - 822.5	Conducted	0.262	24.19	2M72G7D
		16QAM	815.5 - 822.5	Conducted	0.227	23.56	2M72W7D
	1.4 MHz	QPSK	814.7 - 823.3	Conducted	0.267	24.26	1M10G7D
		16QAM	814.7 - 823.3	Conducted	0.228	23.57	1M11W7D
NR Band n26	20 MHz	π/2 BPSK	824.0	ERP	0.049	16.88	18M0G7D
		QPSK	824.0	ERP	0.050	16.98	19M0G7D
		16QAM	824.0	ERP	0.038	15.78	19M0W7D
	15 MHz	π/2 BPSK	821.5	ERP	0.051	17.08	13M5G7D
		QPSK	821.5	ERP	0.050	17.01	14M2G7D
		16QAM	821.5	ERP	0.037	15.64	14M2W7D
	20 MHz	π/2 BPSK	824.0	Conducted	0.223	23.48	18M0G7D
		QPSK	824.0	Conducted	0.225	23.53	19M0G7D
		16QAM	824.0	Conducted	0.173	22.39	19M0W7D
	15 MHz	π/2 BPSK	821.5	Conducted	0.233	23.68	13M5G7D
		QPSK	821.5	Conducted	0.227	23.56	14M2G7D
		16QAM	821.5	Conducted	0.168	22.25	14M2W7D
	10 MHz	π/2 BPSK	819.0	Conducted	0.227	23.56	9M03G7D
		QPSK	819.0	Conducted	0.168	22.25	9M36G7D
		16QAM	819.0	Conducted	0.180	22.56	9M40W7D
	5 MHz	π/2 BPSK	816.5 - 821.5	Conducted	0.236	23.72	4M51G7D
		QPSK	816.5 - 821.5	Conducted	0.240	23.80	4M52G7D
		16QAM	816.5 - 821.5	Conducted	0.175	22.42	4M59W7D

1.0 INTRODUCTION

1.1 Scope

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

1.2 Element Test Location

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

1.3 Test Facility / Accreditations

Measurements were performed at Element lab located in Columbia, MD 21046, U.S.A.

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

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

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

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

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Portable Handset FCC ID: A3LSMS936B.** 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 90 and 22H.

Test Device Serial No.: 2299M, 1268M, 1313M, 1287M, 1299M, 1402M, 1510M

2.2 Device Capabilities

This device contains the following capabilities:

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

2.3 Test Configuration

The EUT was tested per the guidance of ANSI C63.26-2015. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

2.4 Software and Firmware

Testing was performed on device(s) using software/firmware version S936BXXU0AXJO installed on the EUT.

2.5 EMI Suppression Device(s)/Modifications

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

3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

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

Deviation from Measurement Procedure……..None

3.2 Radiated Power and Radiated Spurious Emissions

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

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

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

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

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

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

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

And

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

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

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

4.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.4-2014. All measurement uncertainty values are shown with a coverage factor of k = 2 to indicate a 95% level of confidence. The measurement uncertainty shown below meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

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

5.0 TEST EQUIPMENT CALIBRATION DATA

Test Equipment Calibration is traceable to the National Institute of Standards and Technology (NIST). Measurements antennas used during testing were calibrated in accordance to the requirements of ANSI C63.5-2017.

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	AP2	EMC Cable and Switch System	4/2/2024	Annual	4/2/2025	AP2
-	LTx2	Licensed Transmitter Cable Set	4/2/2024	Annual	4/2/2025	LTx2
-	LTx3	LIcensed Transmitter Cable Set	4/2/2024	Annual	4/2/2025	LTx3
-	LTx5	LIcensed Transmitter Cable Set	4/2/2024	Annual	4/2/2025	LTx5
Agilent	N9030A	50GHz PXA Signal Analyzer	4/23/2024	Annual	4/23/2025	US51350301
Anritsu	MT8821C	Radio Communication Analyzer	N/A			6201381794
Com-Power	AL-130R	Active Loop Antenna	2/22/2024	Biennial	2/22/2026	121085
Emco	3115	Horn Antenna (1-18GHz)	8/8/2022	Biennial	8/8/2024	9704-5182
Emco	3116	Horn Antenna (18 - 40GHz)	7/5/2023	Triennial	7/5/2025	9203-2178
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	2/22/2024	Biennial	2/22/2026	125518
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/29/2023	Biennial	3/29/2025	128337
ETS Lindgren	3164-10	Quad Ridge Horn 400MHz - 10000MHz	7/13/2023	Biennial	7/13/2025	166283
ETS Lindgren	3816/2NM	LISN	8/11/2022	Biennial	8/11/2024	114451
Keysight Technologies	N9020A	MXA Signal Analyzer	4/11/2024	Annual	4/11/2025	MY54500644
Keysight Technologies	N9030A	PXA Signal Analyzer (44GHz)	8/29/2023	Annual	8/29/2024	MY49430494
Keysight Technologies	N9030A	PXA Signal Analyzer	8/7/2023	Annual	8/7/2024	MY54490576
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11403100002
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			100976
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	9/25/2023	Annual	9/25/2024	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	9/11/2023	Annual	9/11/2024	100348
Rohde & Schwarz	FSW26	2Hz-26.5GHz Signal and Spectrum Analyzer	3/8/2024	Annual	3/8/2025	103187
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	8/30/2022	Biennial	8/30/2024	A051107

Table 5-1. Test Equipment

Notes:

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

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

6.0 SAMPLE CALCULATIONS

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) = 50.3 dBc.

7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.

FCC ID: A3LSMS936B

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

Mode(s): LTE/NR

Test Condition	Test Description	FCC Part Section(s)	Test Limit	Test Result	Reference
CONDUCTED	Transmitter Conducted Output Power*	2.1046(a), 90.635(b)	< 100 Watts	PASS	Section 7.2
	Occupied Bandwidth	2.1049(h)	N/A	PASS	Section 7.3
	Conducted Band Edge / Spurious Emissions (LTE Band 26; NR Band n26)	2.1051, 90.691(a)	> 43 + 10 log10(P[Watts]) for all out-of-band emissions except emissions beyond 37.5kHz from the block edge > 50 + 10 log10(P[Watts]) at Band Edge and for all out-of-band emissions within 37.5kHz of Block Edge	PASS	Sections 7.4, 7.5
	Frequency Stability	2.1055, 90.213	< 2.5 ppm **Fundamental emissions stay within authorized frequency block	PASS	Section 7.8
RADIATED	Effective Radiated Power (LTE Band 26; NR Band n26)	22.913(a)(2)	< 7 Watts max. ERP	PASS	Section 7.6
	Radiated Spurious Emissions (LTE Band 26; NR Band n26)	2.1053, 90.691(a)	> 43 + 10 log10(P[Watts]) for all out-of-band emissions except emissions beyond 37.5kHz from the block edge > 50 + 10 log10(P[Watts]) at Band Edge and for all out-of-band emissions within 37.5kHz of Block Edge	PASS	Section 7.7

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

Table 7-1. Summary of Test Results

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 EMC Software Tool v2.3.2.

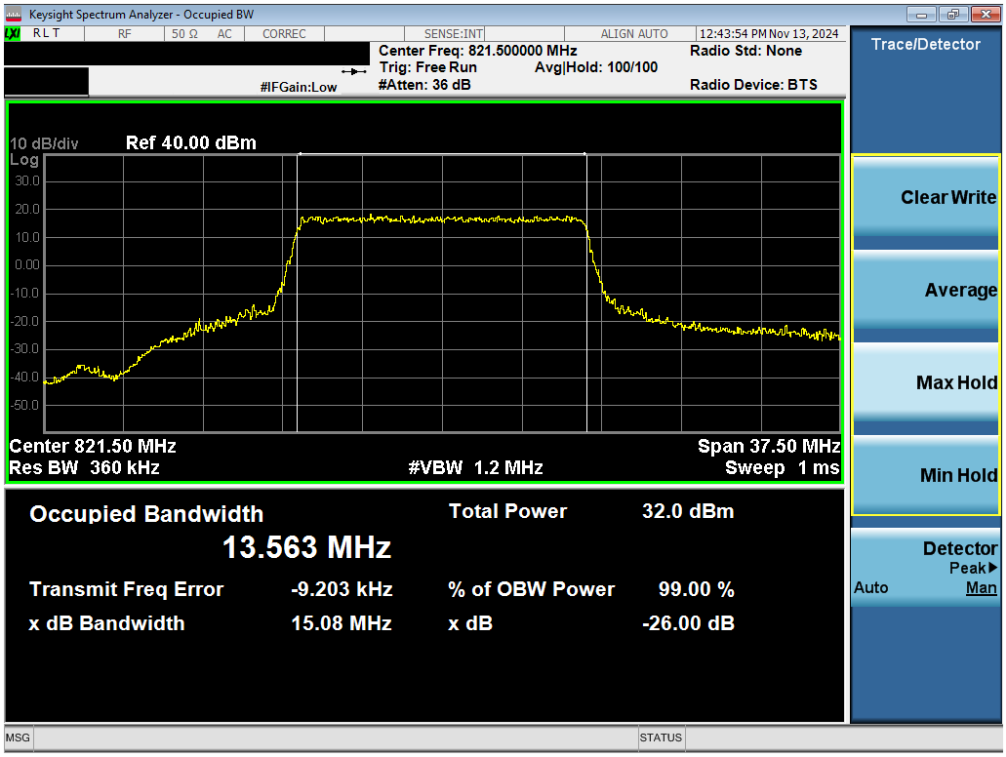
5. Data was leveraged from model SM-S936U for the certification of SM-S936B/DS. See Table 7-2 for spot-check results.

FCC Rules	Test Item	Test Case	Units	Limit	Reference Model: SM-S936U	Variant Model: SM-S936B/DS	Deviation (dB)	Max Deviation (dB)	Pass/Fail
90	Conducted Output Power	Mid Ch.,15MHz, QPSK, Ant A	dBm	50	24.70	23.99	-0.71	1	PASS
	Occupied Bandwidth	Mid Ch.,15MHz, QPSK, Ant A	dBm	N/A	13.514	13.563	-	N/A	PASS
	ERP	Mid Ch., 15MHz, QPSK, Ant A	dBm	38.45	17.42	18.70	1.28	3	PASS
	RSE	Mid Ch., 15MHz, 1638MHz, Ant A	dBm	-13	-68.10	-66.72	1.38	3	PASS

Table 7-2. Summary of Spot-Checks

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]	Conducted Power [Watts]	Conducted Power Limit [dBm]	Margin [dB]
15 MHz	QPSK	26765	821.5	1 / 37	23.99	0.251	50.00	-26.01

Table 7-3. Conducted Output Power Measurements (Spot-check)



Plot 7-1. Occupied Bandwidth (Spot-check)

Bandwidth	Mod.	Frequency [MHz]	Ant. Pol. [H/V]	EUT Pol.	Antenna Height [cm]	Turntable Azimuth [degree]	Ant. Gain [dBi]	RB Size/Offset	Substitute Level [dBm]	ERP [dBm]	ERP [Watts]	ERP Limit [dBm]	Margin [dB]
15 MHz	QPSK	821.50	V	Z	130	260	1.04	1 / 74	19.81	**18.70**	0.074	38.45	-19.75

Table 7-4. ERP Measurements (Spot-check)

Frequency [MHz]	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Field Strength [dBµV/m]	EIRP Spurious Emission Level [dBm]	Limit [dBm]	Margin [dB]
1638.00	V	-	-	-76.19	-2.27	28.54	-66.72	-13.00	-53.72

Table 7-5. Radiated Spurious Measurements (Spot-check)

1. Each spot check test on the EUT was performed using the same procedure and setting that were used to perform the test on the corresponding reference device.

2. All test cases were performed to verify the variant EUT is still in compliance with the spot checked results to the reference device and was performed using the guidance of ANSI C63.26-2015.

7.2 Conducted Output Power Data

Test Overview

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

Test Procedure Used

ANSI C63.26-2015 – Section 5.2

Test Settings

1. Span = 2 x OBW to 3 x OBW
2. Detector = RMS
3. Trace mode = trace average for continuous emissions, max hold for pulse emissions
4. Sweep time = auto couple
5. The trace was allowed to stabilize
6. Please see test notes below for RBW and VBW settings

Test Setup

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

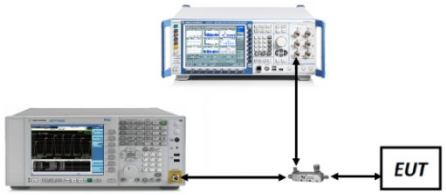


Figure 7-1. Test Instrument & Measurement Setup

Test Notes

1. For LTE mode, the device was tested under all modulations, RB sizes and offsets, and channel bandwidth configurations and the worst case emissions are reported with 1 RB.

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

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

4. Conducted power was found to reduce for the higher order QAM modulations when compared to 16QAM. Due to this trend, only the worst-case QAM (16QAM) powers are included in this section.

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]	Conducted Power [Watts]	Conducted Power Limit [dBm]	Margin [dB]
15 MHz	QPSK	26765	821.5	1 / 0	24.70	0.295	50.00	-25.30
	16-QAM	26765	821.5	1 / 74	23.88	0.245	50.00	-26.12
	64-QAM	26765	821.5	1 / 0	22.70	0.186	50.00	-27.30
	256-QAM	26765	821.5	1 / 0	19.61	0.091	50.00	-30.39
10 MHz	QPSK	26740	819.0	1 / 0	24.67	0.293	50.00	-25.33
	16-QAM	26740	819.0	1 / 25	23.79	0.240	50.00	-26.21
5 MHz	QPSK	26715	816.5	1 / 12	24.64	0.291	50.00	-25.36
		26765	821.5	1 / 0	24.60	0.289	50.00	-25.40
	16-QAM	26715	816.5	1 / 24	23.93	0.247	50.00	-26.07
		26765	821.5	1 / 12	23.89	0.245	50.00	-26.11
3 MHz	QPSK	26705	815.5	1 / 14	24.64	0.291	50.00	-25.36
		26775	822.5	1 / 0	24.57	0.287	50.00	-25.43
	16-QAM	26705	815.5	1 / 14	23.88	0.244	50.00	-26.12
		26775	822.5	1 / 0	23.72	0.236	50.00	-26.28
1.4 MHz	QPSK	26697	814.7	1 / 0	24.66	0.293	50.00	-25.34
		26783	823.3	1 / 3	24.52	0.283	50.00	-25.48
	16-QAM	26697	814.7	1 / 0	23.90	0.245	50.00	-26.10
		26783	823.3	1 / 5	23.91	0.246	50.00	-26.09

Table 7-6. LTE Band 26 Conducted Powers – Ant A

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]	Conducted Power [Watts]	Conducted Power Limit [dBm]	Margin [dB]
20 MHz	π/2 BPSK	164800	824.0	1 / 1	24.23	0.265	50.00	-25.77
	QPSK	164800	824.0	1 / 1	24.29	0.269	50.00	-25.71
	16-QAM	164800	824.0	1 / 1	23.03	0.201	50.00	-26.97
15 MHz	π/2 BPSK	164300	821.5	1 / 1	24.35	0.272	50.00	-25.65
	QPSK	164300	821.5	1 / 1	24.18	0.262	50.00	-25.82
	16-QAM	164300	821.5	1 / 1	23.11	0.205	50.00	-26.89
10 MHz	π/2 BPSK	163800	819.0	1 / 26	24.28	0.268	50.00	-25.72
	QPSK	163800	819.0	1 / 26	24.34	0.272	50.00	-25.66
	16-QAM	163800	819.0	1 / 26	22.95	0.197	50.00	-27.05
5 MHz	π/2 BPSK	163300	816.5	1 / 12	24.25	0.266	50.00	-25.75
		164300	821.5	1 / 12	24.32	0.270	50.00	-25.68
	QPSK	163300	816.5	1 / 12	24.24	0.266	50.00	-25.76
		164300	821.5	1 / 12	24.19	0.263	50.00	-25.81
	16-QAM	163300	816.5	1 / 12	23.04	0.201	50.00	-26.96
		164300	821.5	1 / 12	23.54	0.226	50.00	-26.46

Table 7-7. NR Band n26 Conducted Powers – Ant A

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]	Conducted Power [Watts]	Conducted Power Limit [dBm]	Margin [dB]
15 MHz	QPSK	26765	821.5	1 / 0	24.14	0.260	50.00	-25.86
	16-QAM	26765	821.5	1 / 0	23.49	0.223	50.00	-26.51
10 MHz	QPSK	26740	819.0	1 / 49	24.14	0.259	50.00	-25.86
	16-QAM	26740	819.0	1 / 0	23.60	0.229	50.00	-26.40
5 MHz	QPSK	26715	816.5	1 / 0	24.11	0.258	50.00	-25.89
		26765	821.5	1 / 12	24.21	0.264	50.00	-25.79
	16-QAM	26715	816.5	1 / 24	23.39	0.218	50.00	-26.61
		26765	821.5	1 / 0	23.57	0.228	50.00	-26.43
3 MHz	QPSK	26705	815.5	1 / 0	24.19	0.262	50.00	-25.81
		26775	822.5	1 / 7	24.03	0.253	50.00	-25.97
	16-QAM	26705	815.5	1 / 14	23.56	0.227	50.00	-26.44
		26775	822.5	1 / 14	23.38	0.218	50.00	-26.62
1.4 MHz	QPSK	26697	814.7	1 / 3	24.26	0.267	50.00	-25.74
		26783	823.3	1 / 5	24.07	0.255	50.00	-25.93
	16-QAM	26697	814.7	1 / 3	23.57	0.228	50.00	-26.43
		26783	823.3	1 / 5	23.42	0.220	50.00	-26.58

Table 7-8. LTE Band 26 Conducted Powers – Ant E

7.3 Occupied Bandwidth

Test Overview

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

Test Procedure Used

ANSI C63.26-2015 – Section 5.4.4

Test Settings

1. The signal analyzer's automatic bandwidth measurement capability was used to perform the 99% occupied bandwidth and the 26dB bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = 1 – 5% of the expected OBW
3. VBW ≥ 3 x RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple
7. The trace was allowed to stabilize
8. If necessary, steps 2 – 7 were repeated after changing the RBW such that it would be within 1 – 5% of the 99% occupied bandwidth observed in Step 7

Test Setup

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

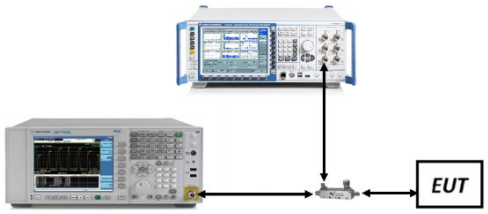


Figure 7-2. Test Instrument & Measurement Setup

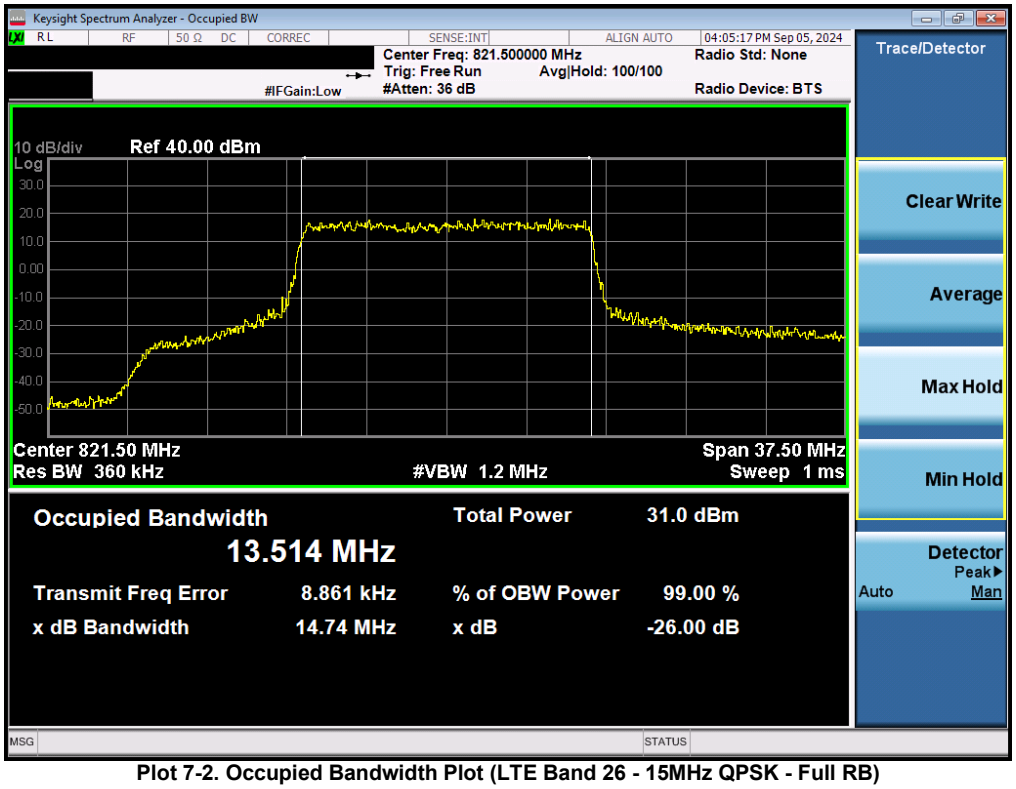
Test Notes

None

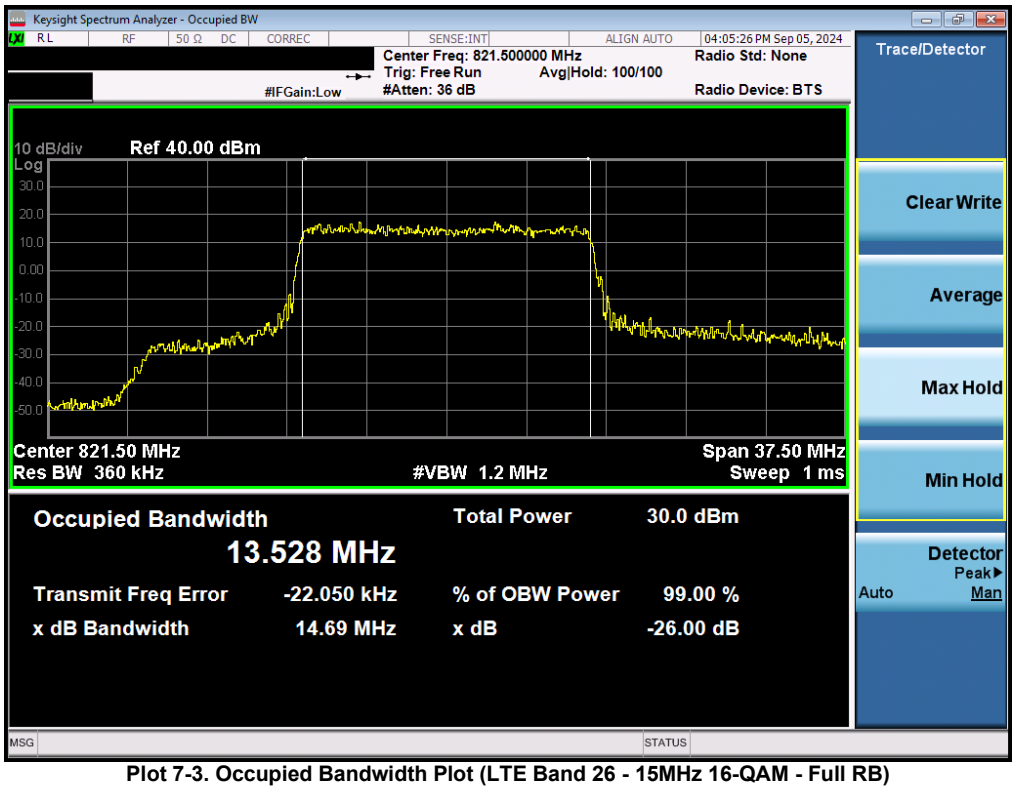
Mode	Bandwidth	Modulation	OBW [MHz]
LTE-B26	15 MHz	QPSK	13.51
		16QAM	13.53
	10 MHz	QPSK	8.99
		16QAM	9.05
	5 MHz	QPSK	4.52
		QPSK	4.54
		16QAM	4.50
		16QAM	4.49
	3 MHz	QPSK	2.71
		QPSK	2.72
		16QAM	2.71
		16QAM	2.72
	1.4 MHz	QPSK	1.09
		QPSK	1.10
		16QAM	1.10
NR-n26	20 MHz	π/2 BPSK	18.00
		QPSK	18.99
		16QAM	19.09
	15 MHz	π/2 BPSK	13.53
		QPSK	14.18
		16QAM	14.21
	10 MHz	π/2 BPSK	9.01
		QPSK	9.35
		16QAM	9.38
	5 MHz	π/2 BPSK	4.50
		π/2 BPSK	4.53
		QPSK	4.52
		QPSK	4.51
		16QAM	4.55
		16QAM	4.57

Table 7-9. Occupied Bandwidth Test Results – Ant A

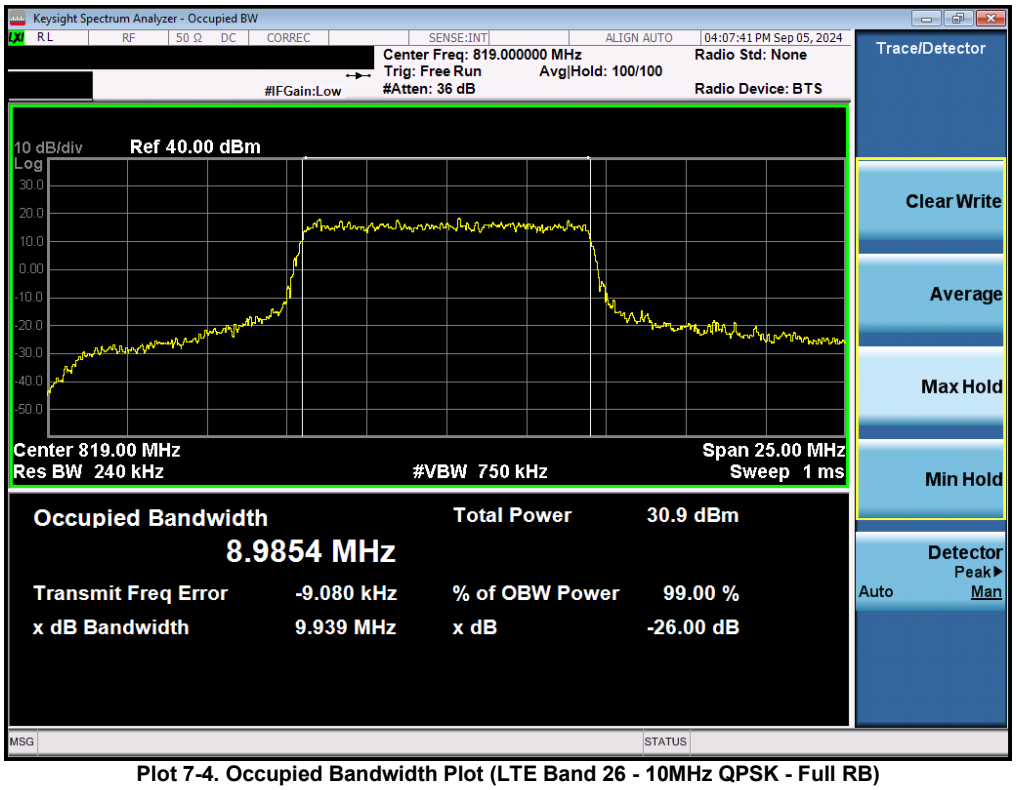
LTE Band 26 – Ant A



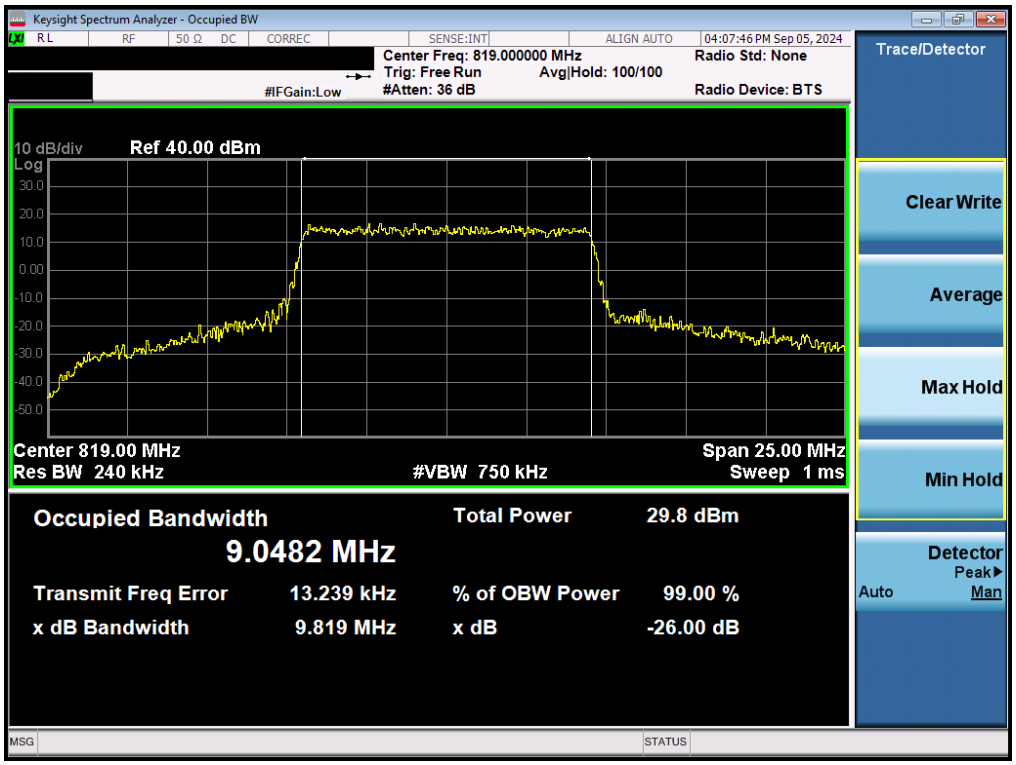
Plot 7-2. Occupied Bandwidth Plot (LTE Band 26 - 15MHz QPSK - Full RB)



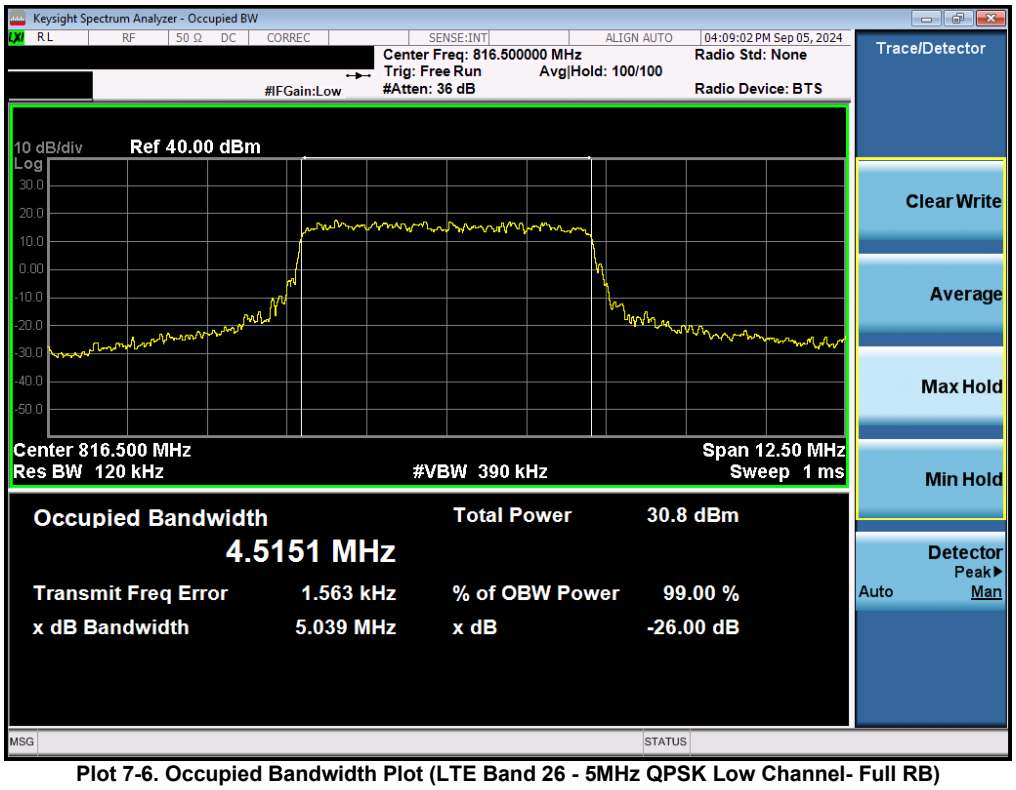
Plot 7-3. Occupied Bandwidth Plot (LTE Band 26 - 15MHz 16-QAM - Full RB)



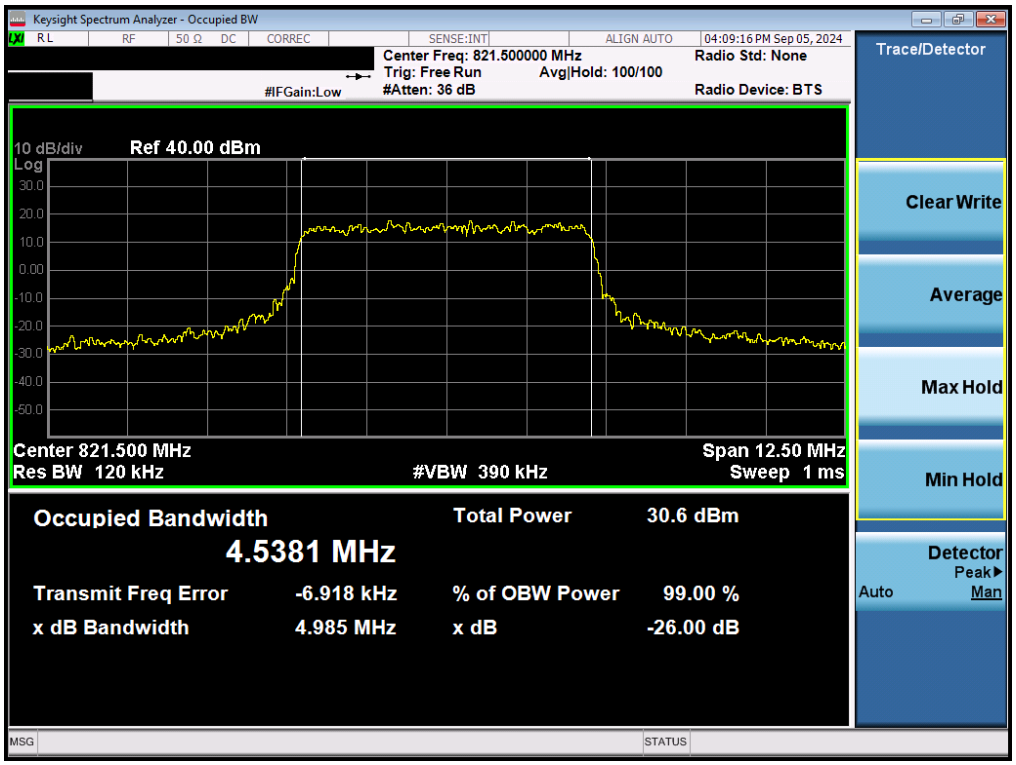
Plot 7-4. Occupied Bandwidth Plot (LTE Band 26 - 10MHz QPSK - Full RB)



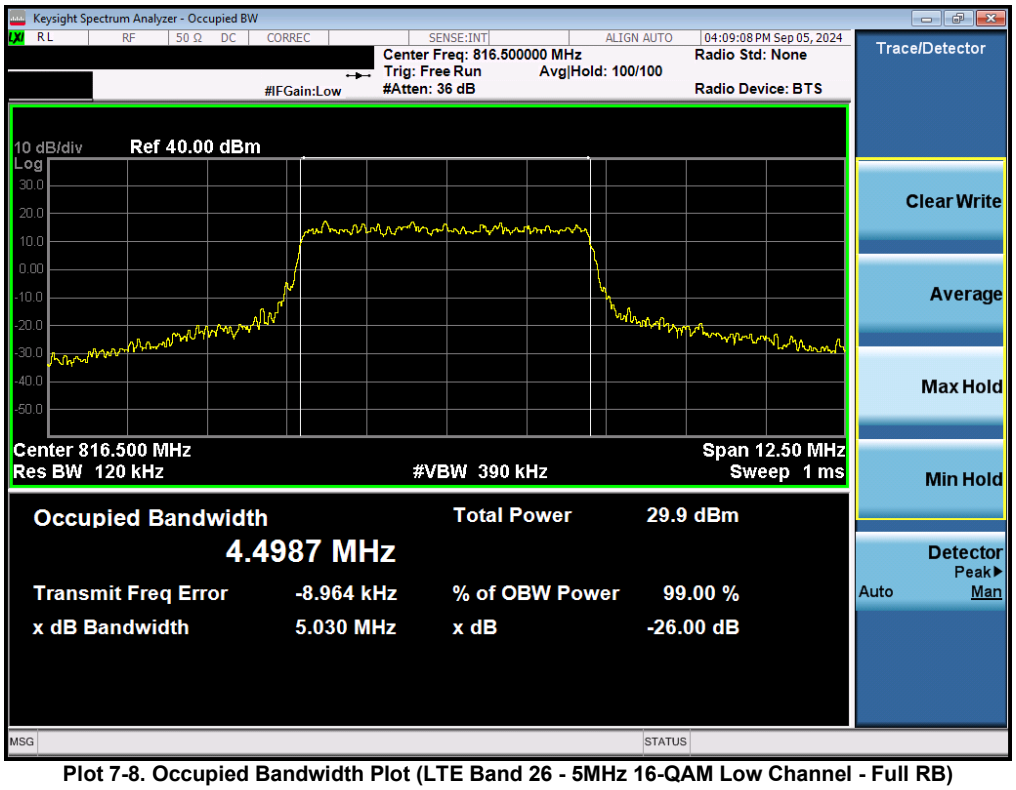
Plot 7-5. Occupied Bandwidth Plot (LTE Band 26 - 10MHz 16-QAM - Full RB)



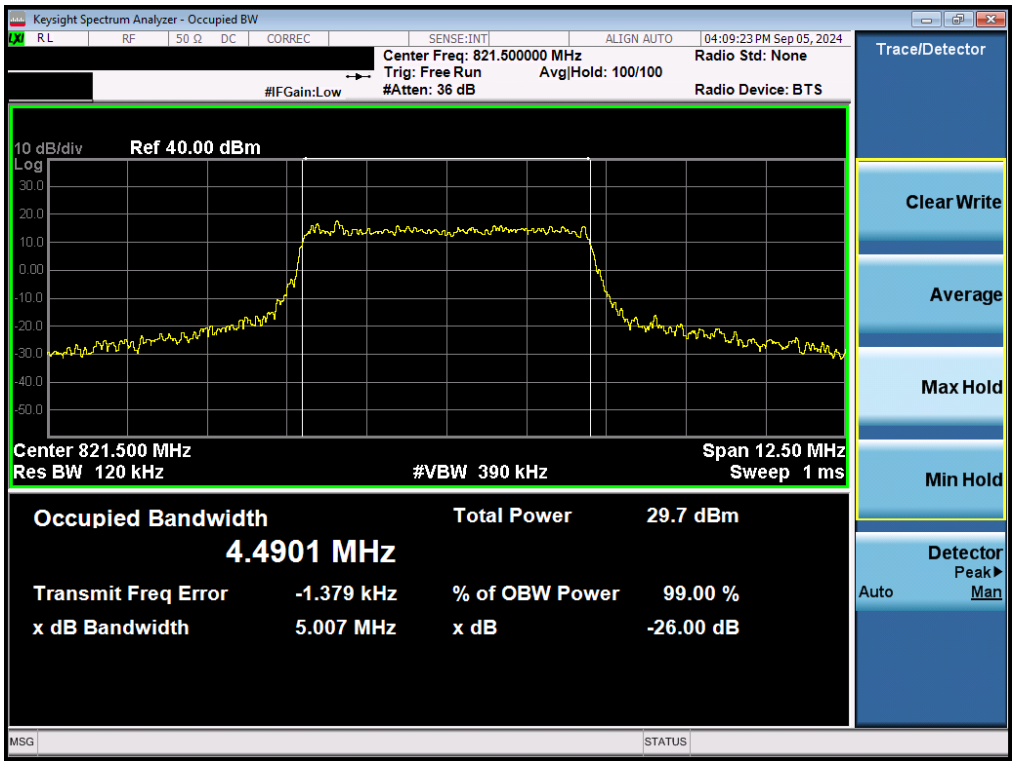
Plot 7-6. Occupied Bandwidth Plot (LTE Band 26 - 5MHz QPSK Low Channel- Full RB)



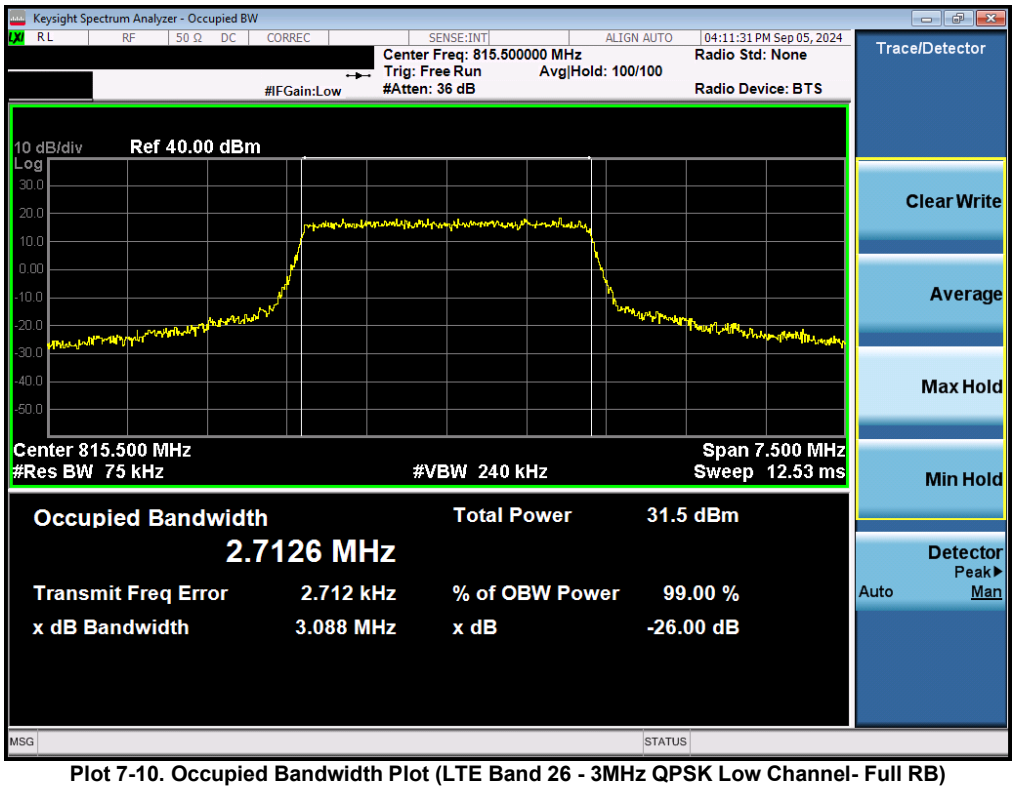
Plot 7-7. Occupied Bandwidth Plot (LTE Band 26 - 5MHz QPSK High Channel - Full RB)



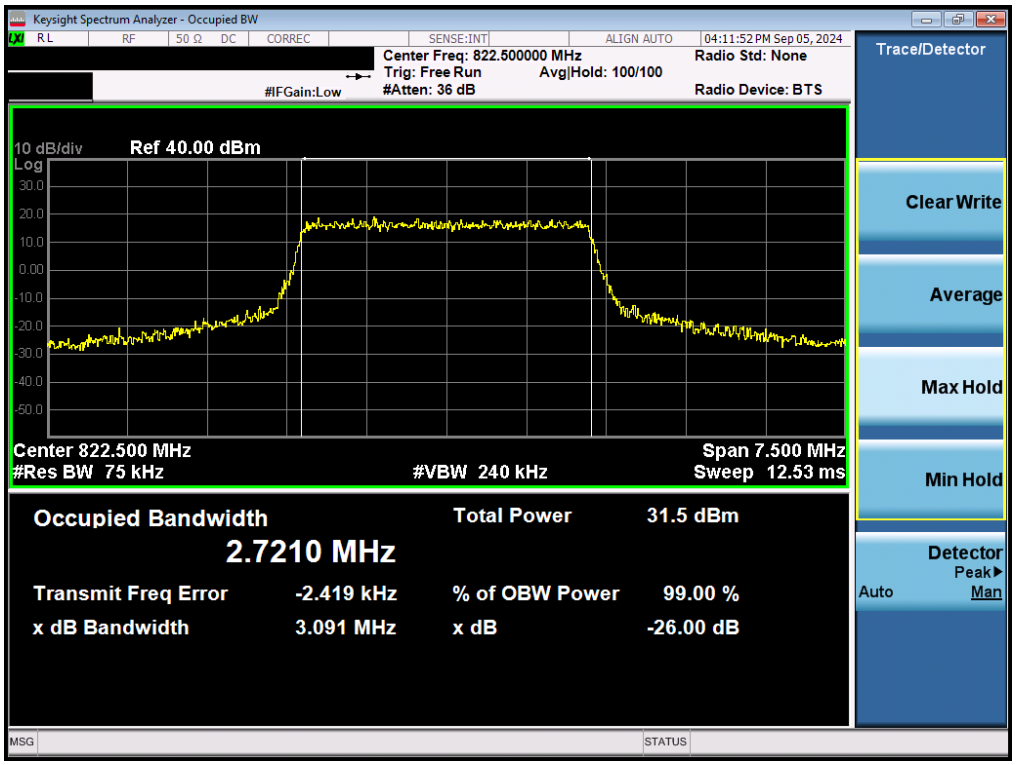
Plot 7-8. Occupied Bandwidth Plot (LTE Band 26 - 5MHz 16-QAM Low Channel - Full RB)



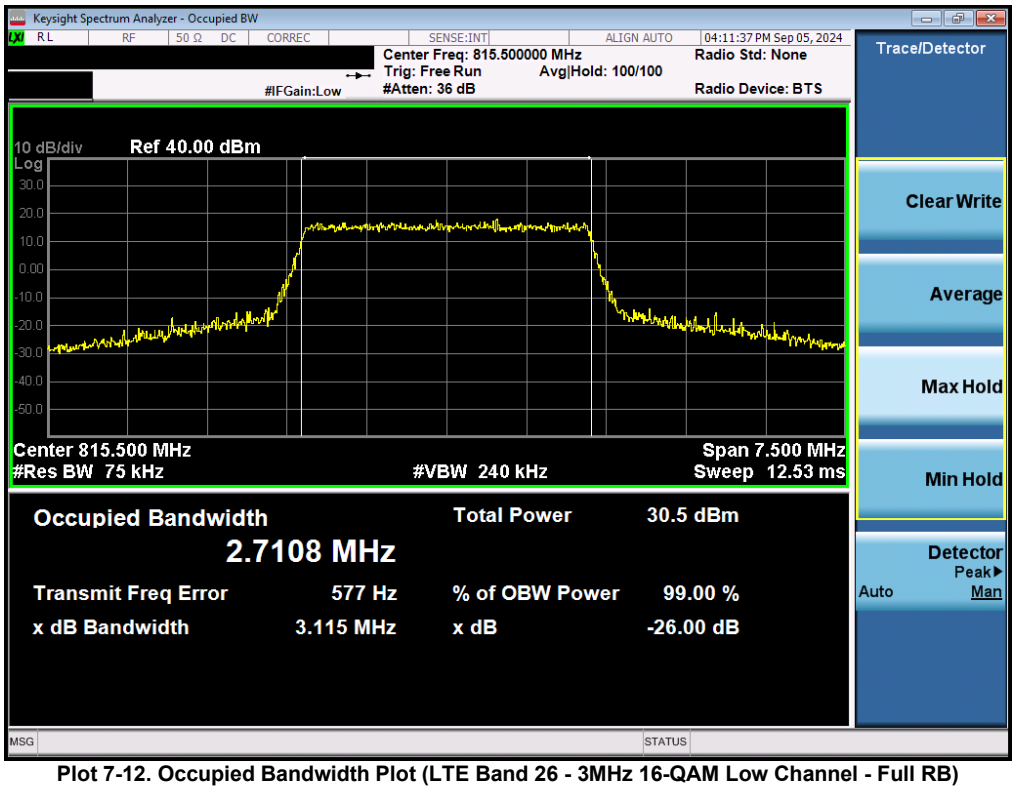
Plot 7-9. Occupied Bandwidth Plot (LTE Band 26 - 5MHz 16-QAM High Channel - Full RB)



Plot 7-10. Occupied Bandwidth Plot (LTE Band 26 - 3MHz QPSK Low Channel- Full RB)

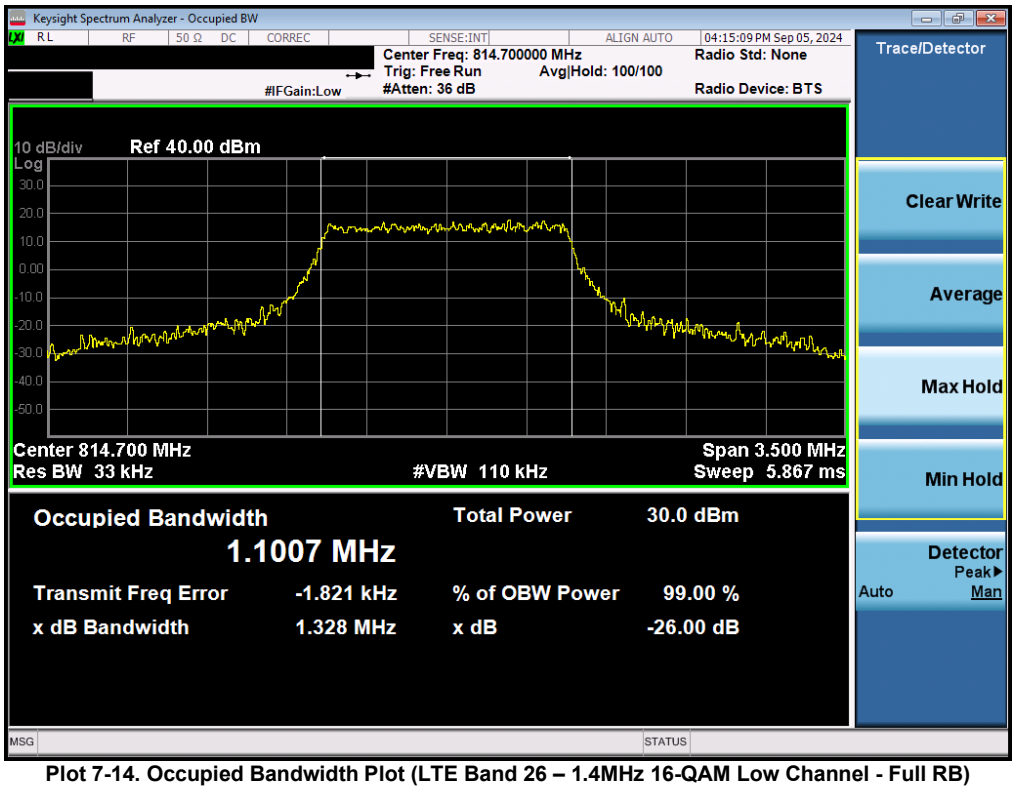


Plot 7-11. Occupied Bandwidth Plot (LTE Band 26 - 3MHz QPSK High Channel - Full RB)

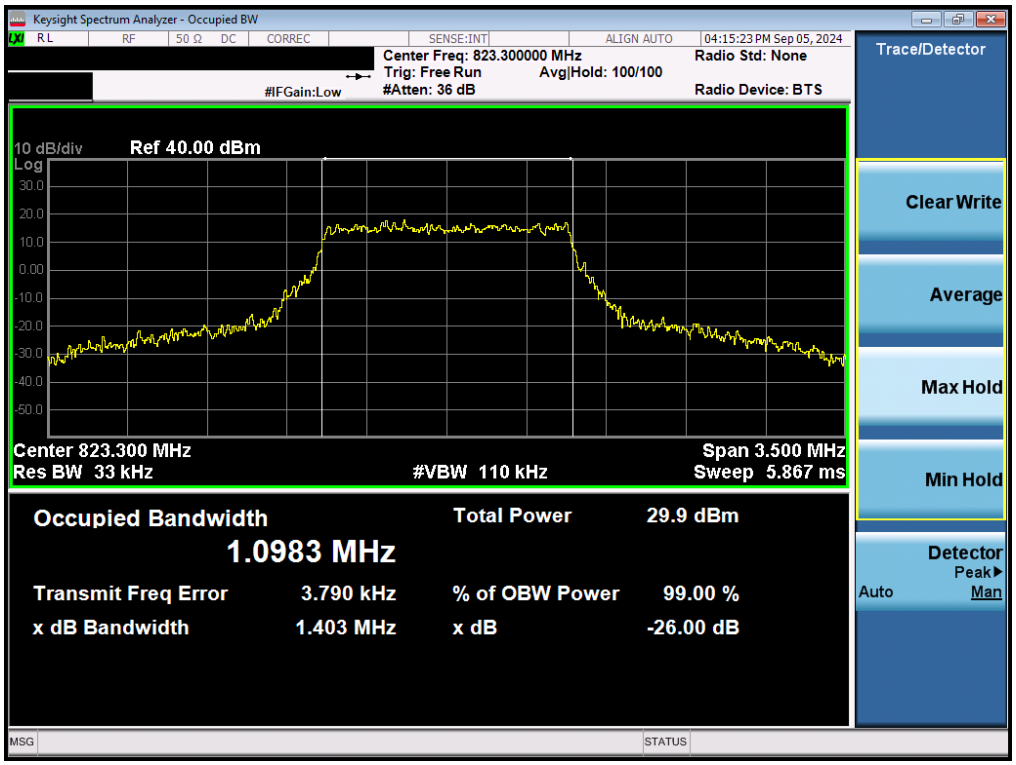


Plot 7-12. Occupied Bandwidth Plot (LTE Band 26 - 3MHz 16-QAM Low Channel - Full RB)

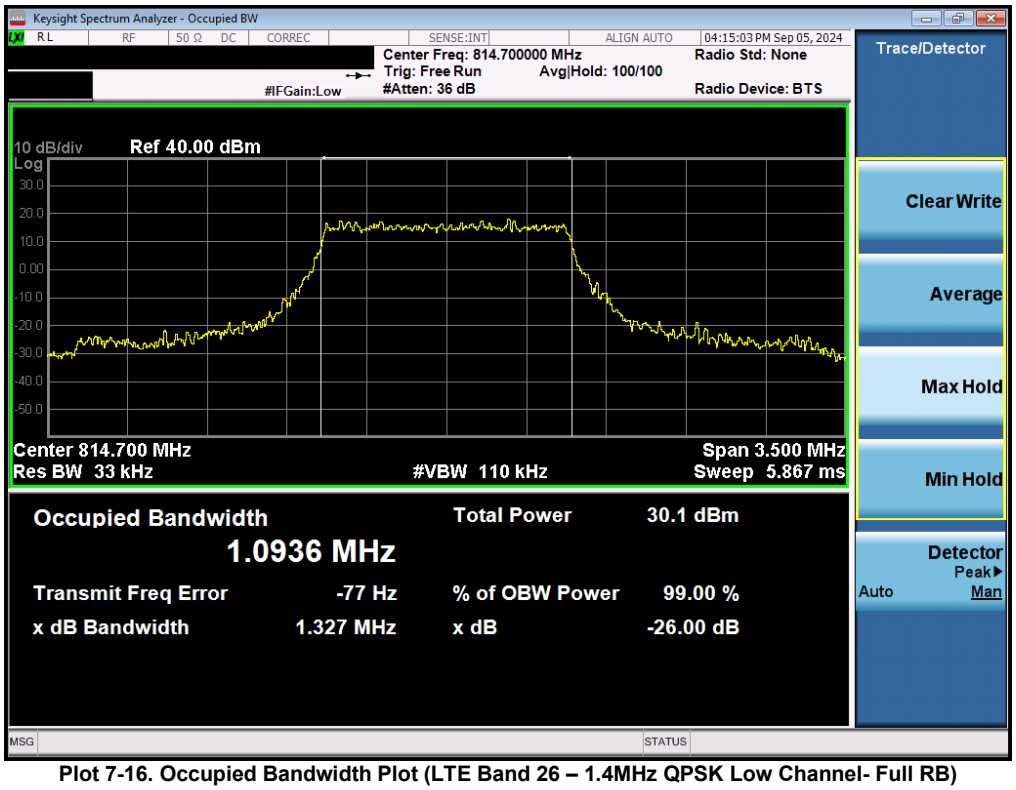
Plot 7-13. Occupied Bandwidth Plot (LTE Band 26 - 3MHz 16-QAM High Channel - Full RB)



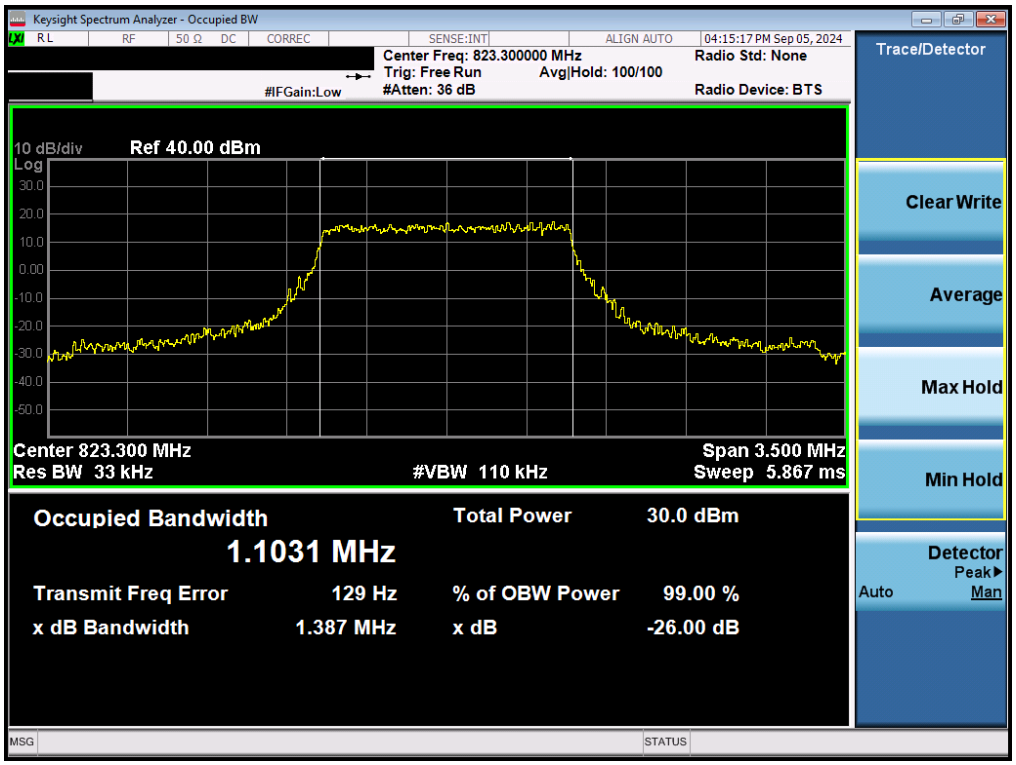
Plot 7-14. Occupied Bandwidth Plot (LTE Band 26 – 1.4MHz 16-QAM Low Channel - Full RB)



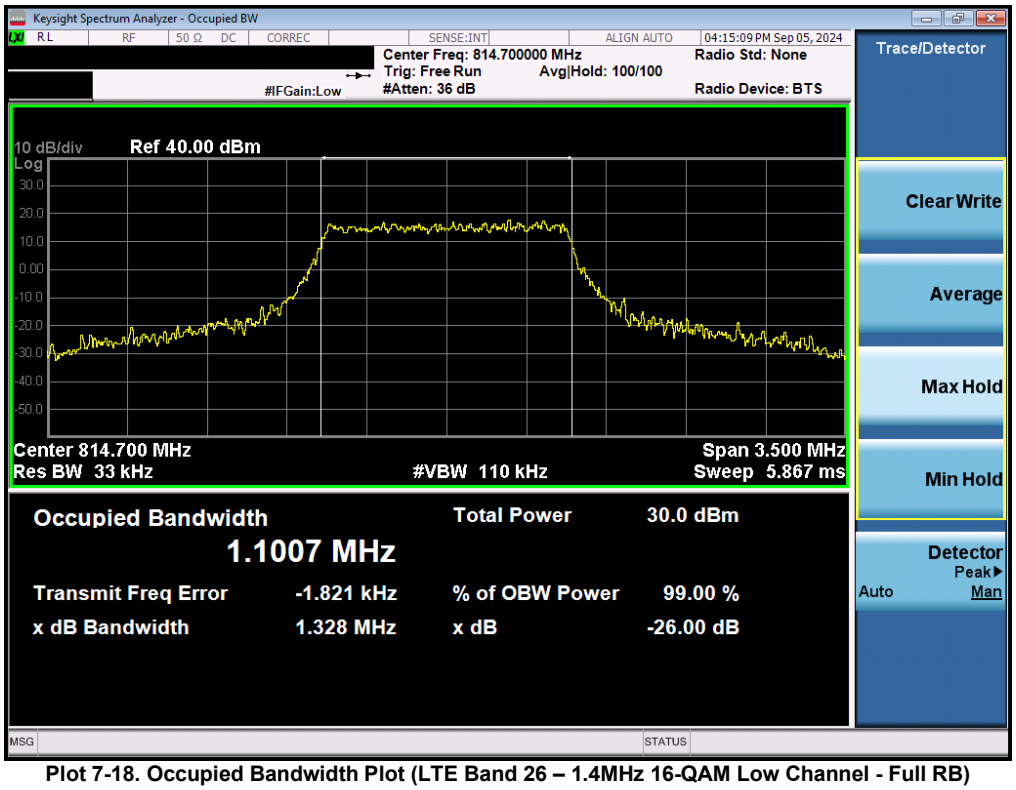
Plot 7-15. Occupied Bandwidth Plot (LTE Band 26 – 1.4MHz 16-QAM High Channel - Full RB)



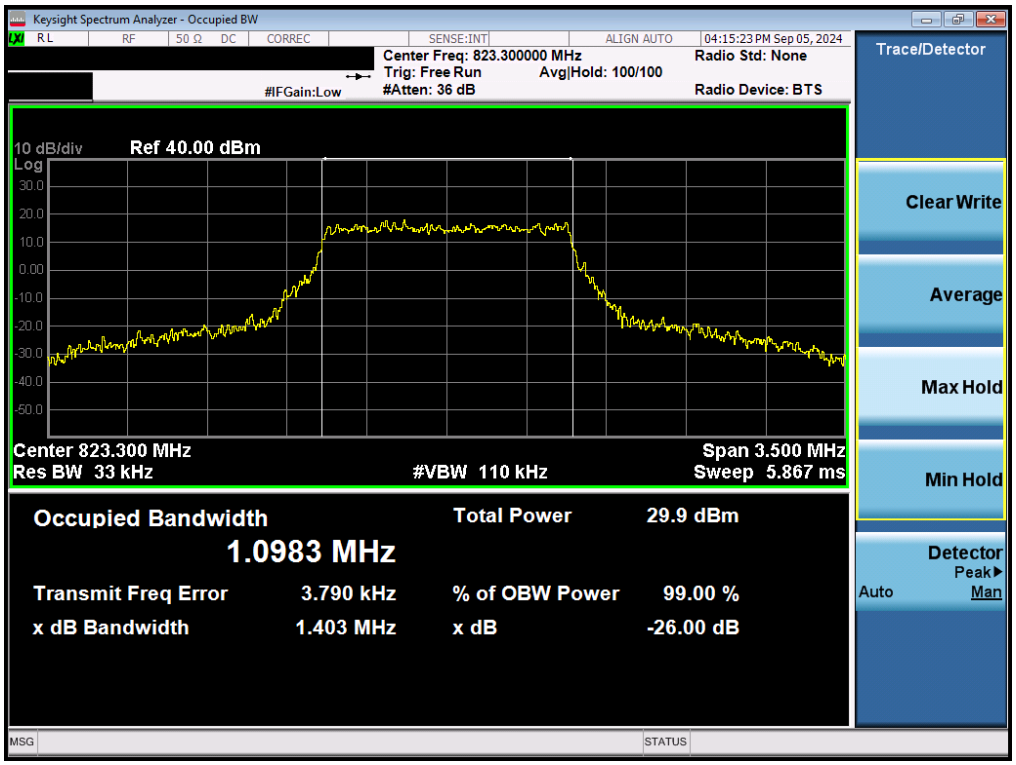
Plot 7-16. Occupied Bandwidth Plot (LTE Band 26 – 1.4MHz QPSK Low Channel- Full RB)



Plot 7-17. Occupied Bandwidth Plot (LTE Band 26 – 1.4MHz QPSK High Channel - Full RB)

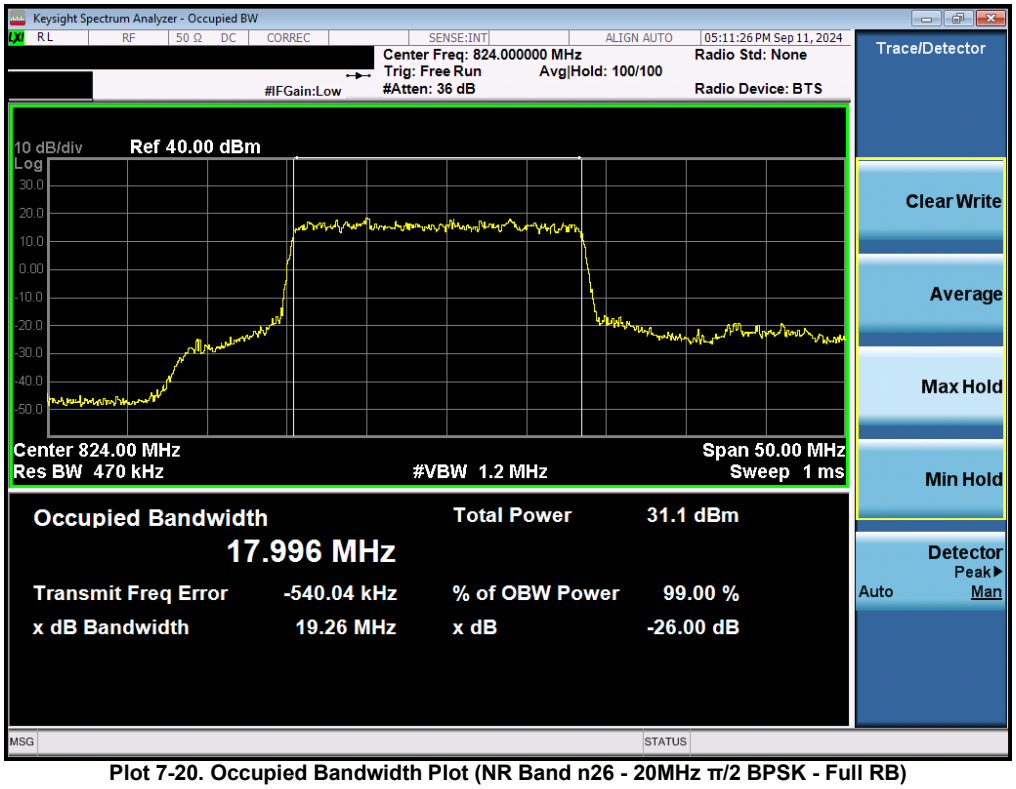


Plot 7-18. Occupied Bandwidth Plot (LTE Band 26 – 1.4MHz 16-QAM Low Channel - Full RB)

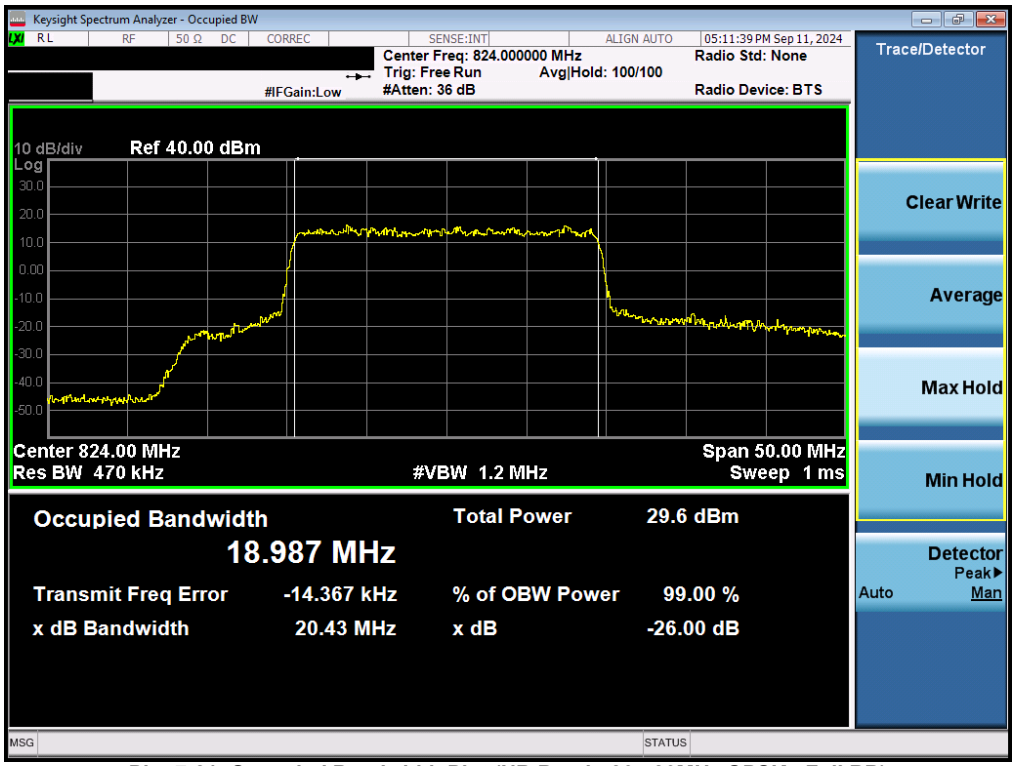


Plot 7-19. Occupied Bandwidth Plot (LTE Band 26 – 1.4MHz 16-QAM High Channel - Full RB)

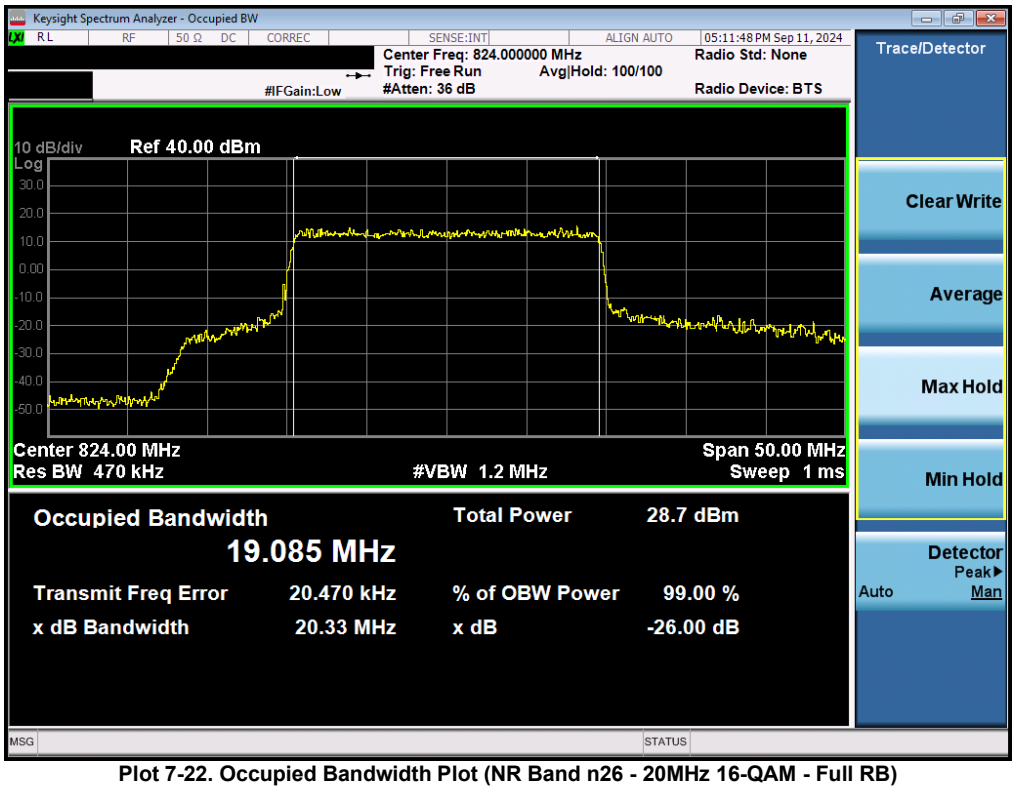
NR Band n26 - Ant A



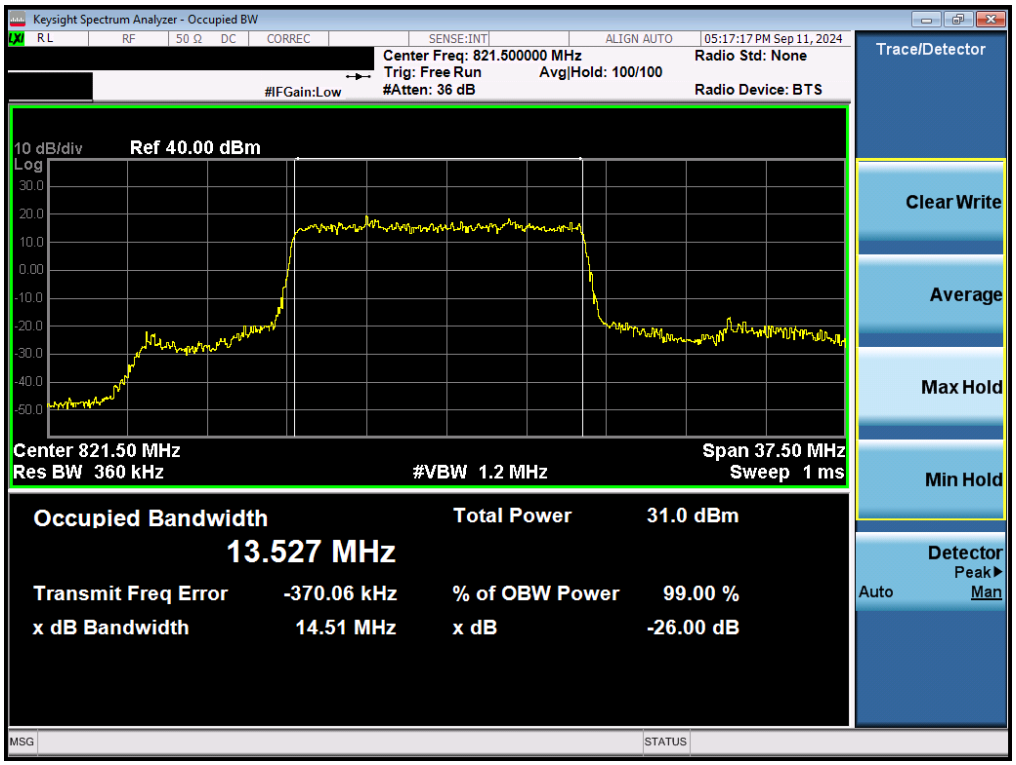
Plot 7-20. Occupied Bandwidth Plot (NR Band n26 - 20MHz π/2 BPSK - Full RB)



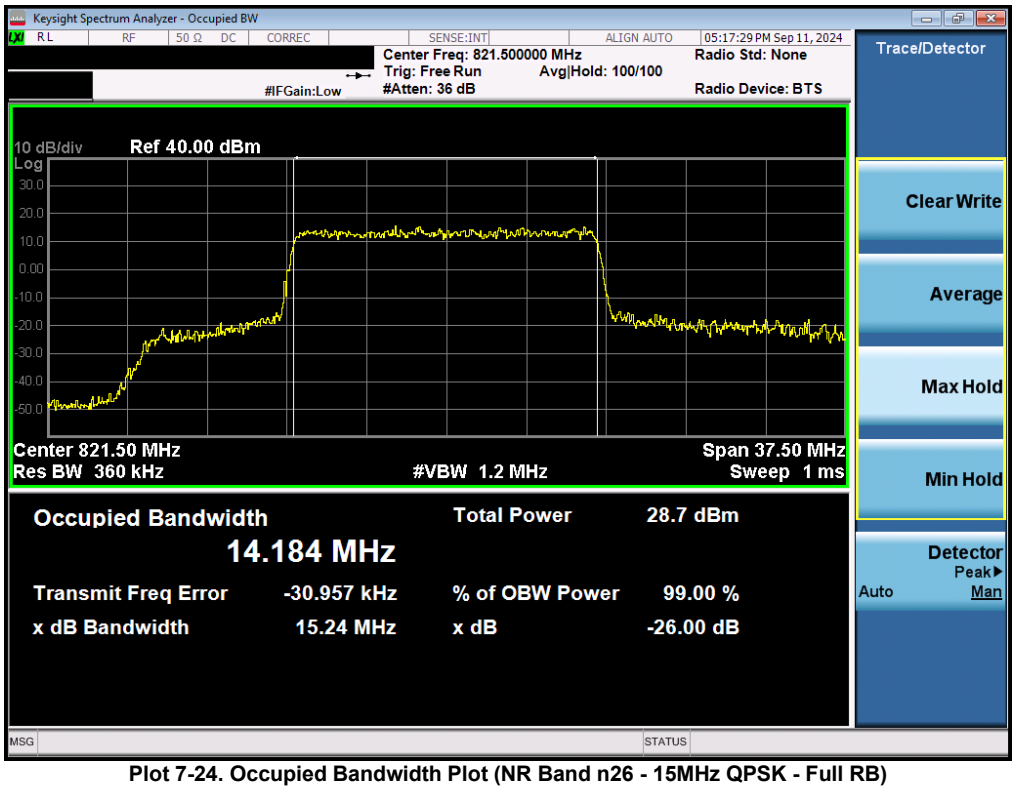
Plot 7-21. Occupied Bandwidth Plot (NR Band n26 - 20MHz QPSK - Full RB)



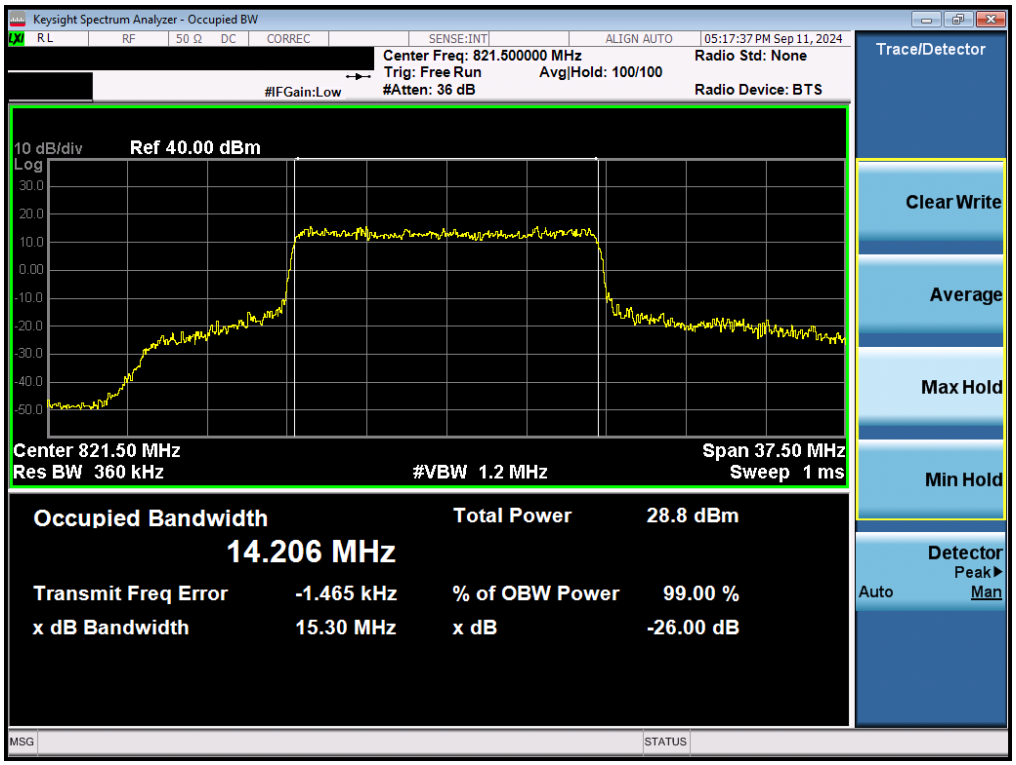
Plot 7-22. Occupied Bandwidth Plot (NR Band n26 - 20MHz 16-QAM - Full RB)



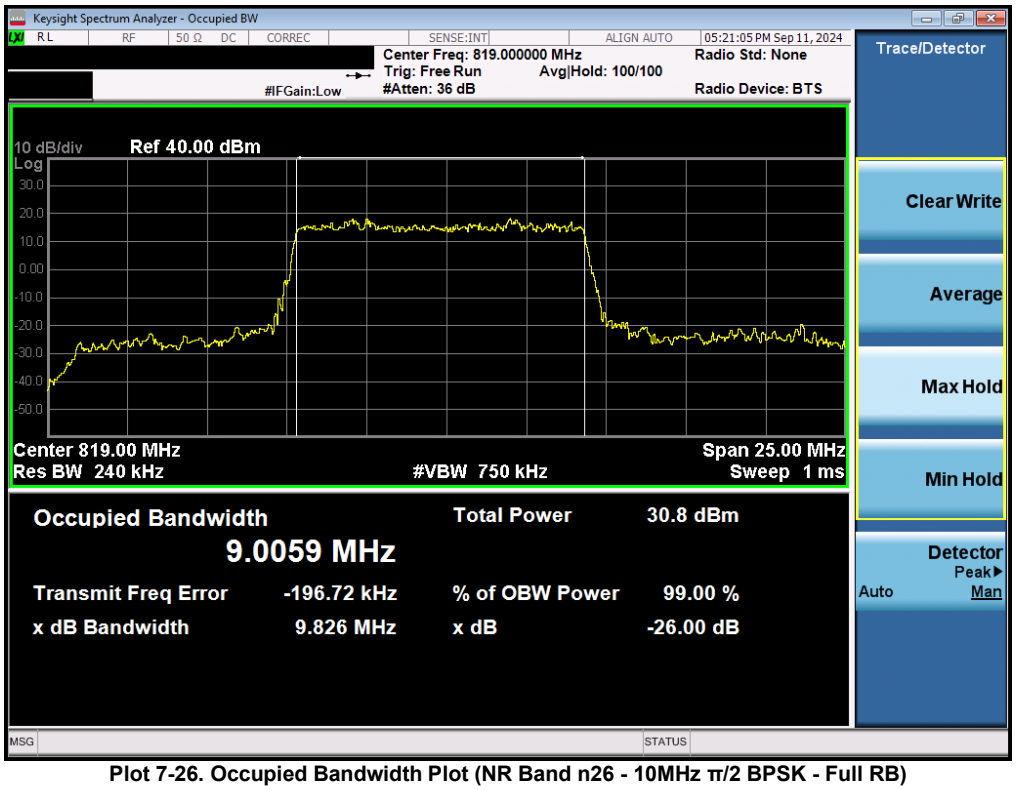
Plot 7-23. Occupied Bandwidth Plot (NR Band n26 - 15MHz π/2 BPSK - Full RB)



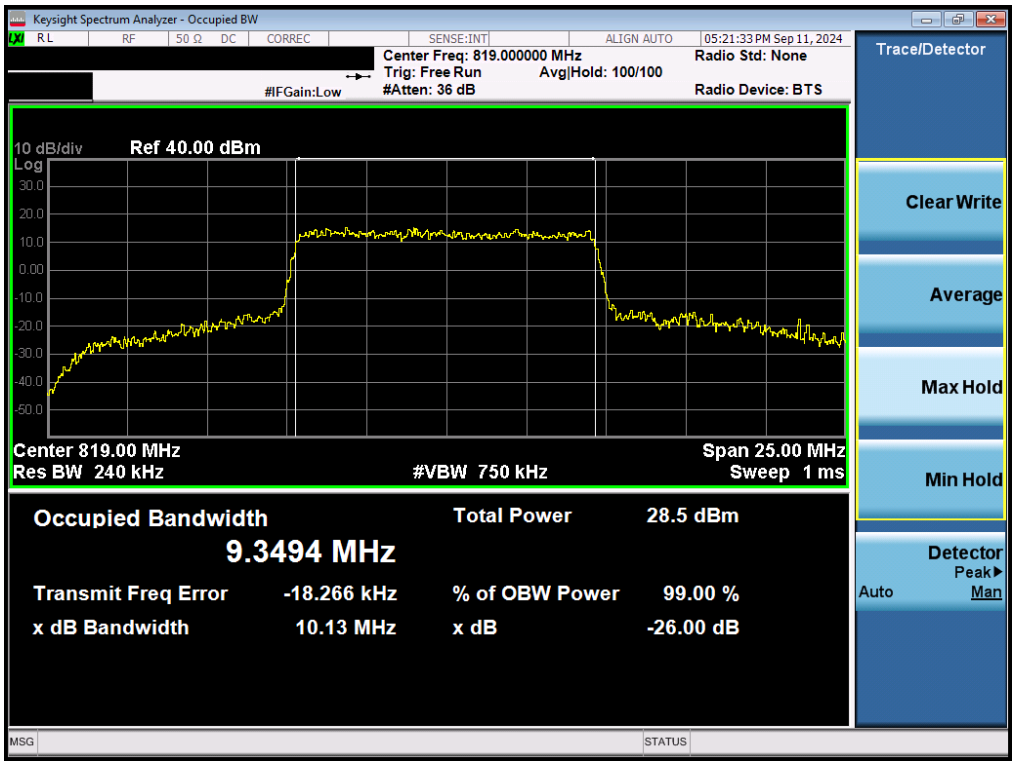
Plot 7-24. Occupied Bandwidth Plot (NR Band n26 - 15MHz QPSK - Full RB)



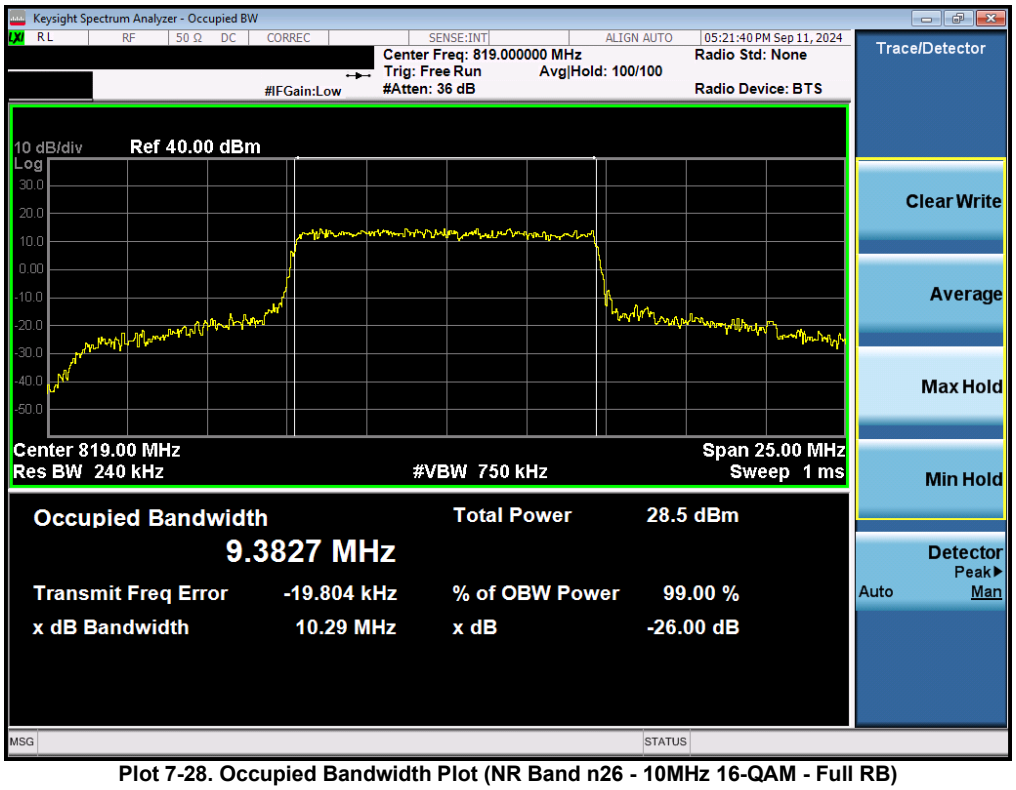
Plot 7-25. Occupied Bandwidth Plot (NR Band n26 - 15MHz 16-QAM - Full RB)



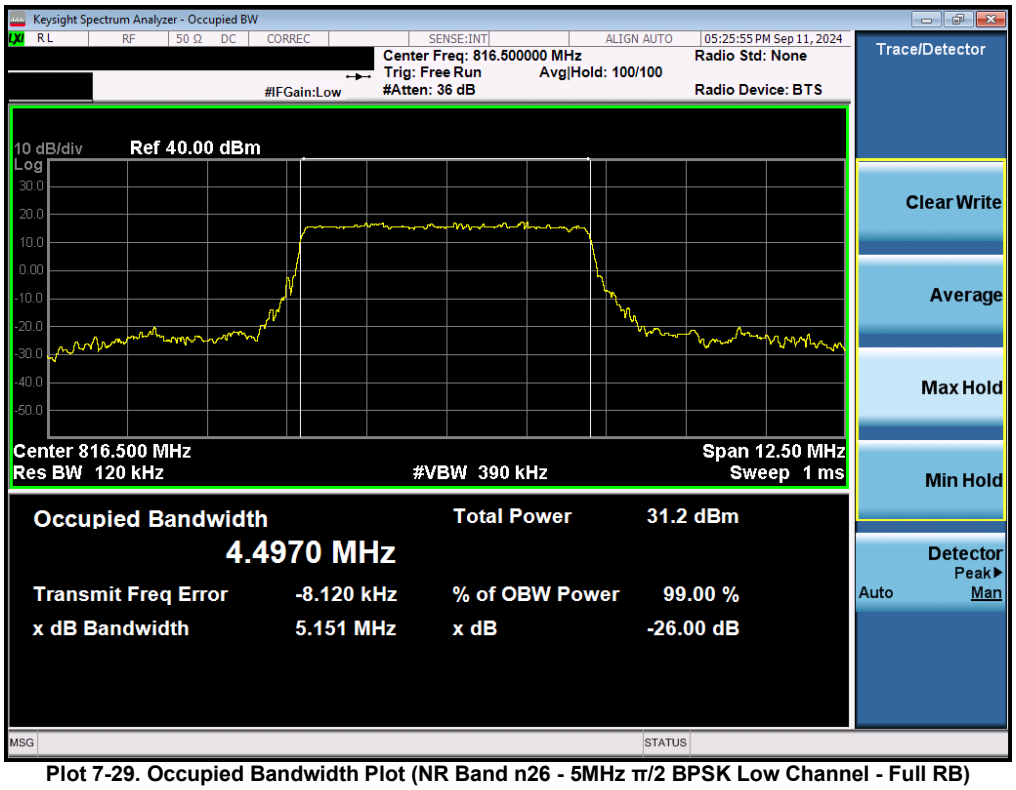
Plot 7-26. Occupied Bandwidth Plot (NR Band n26 - 10MHz π/2 BPSK - Full RB)



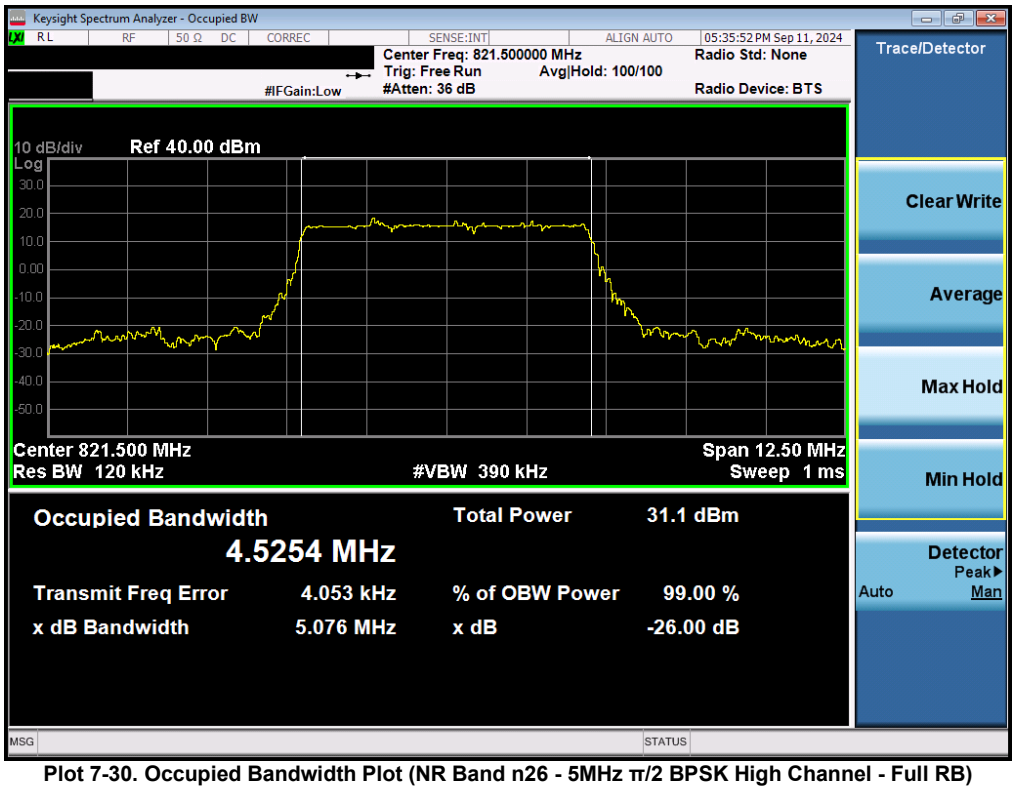
Plot 7-27. Occupied Bandwidth Plot (NR Band n26 - 10MHz QPSK - Full RB)



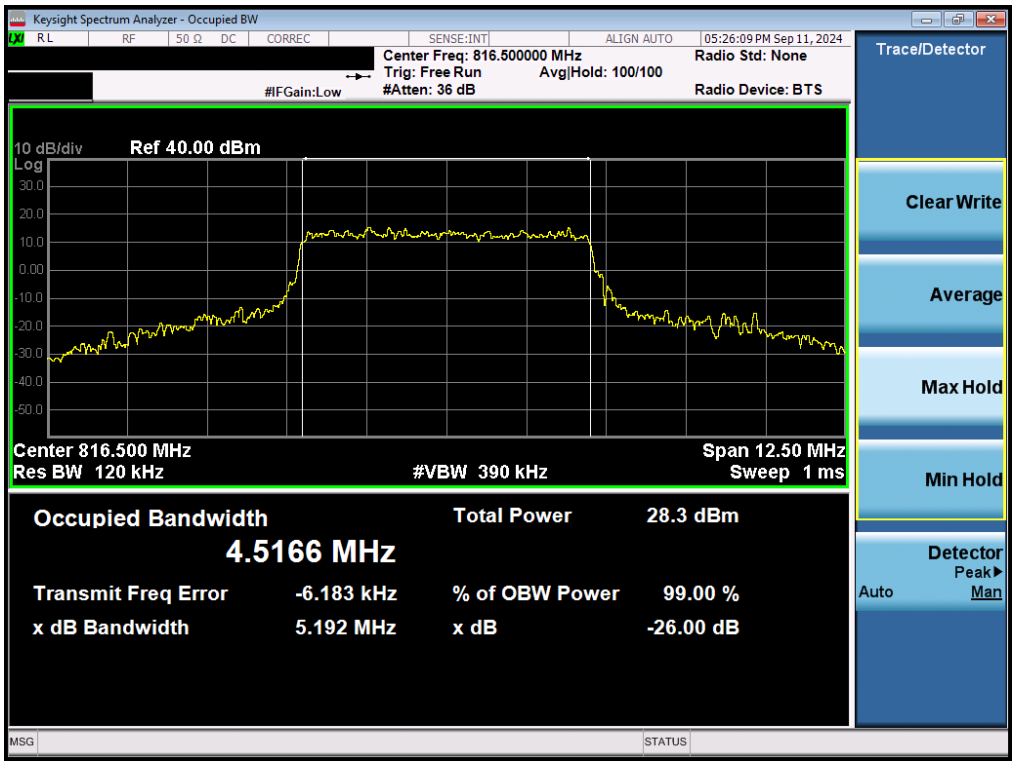
Plot 7-28. Occupied Bandwidth Plot (NR Band n26 - 10MHz 16-QAM - Full RB)



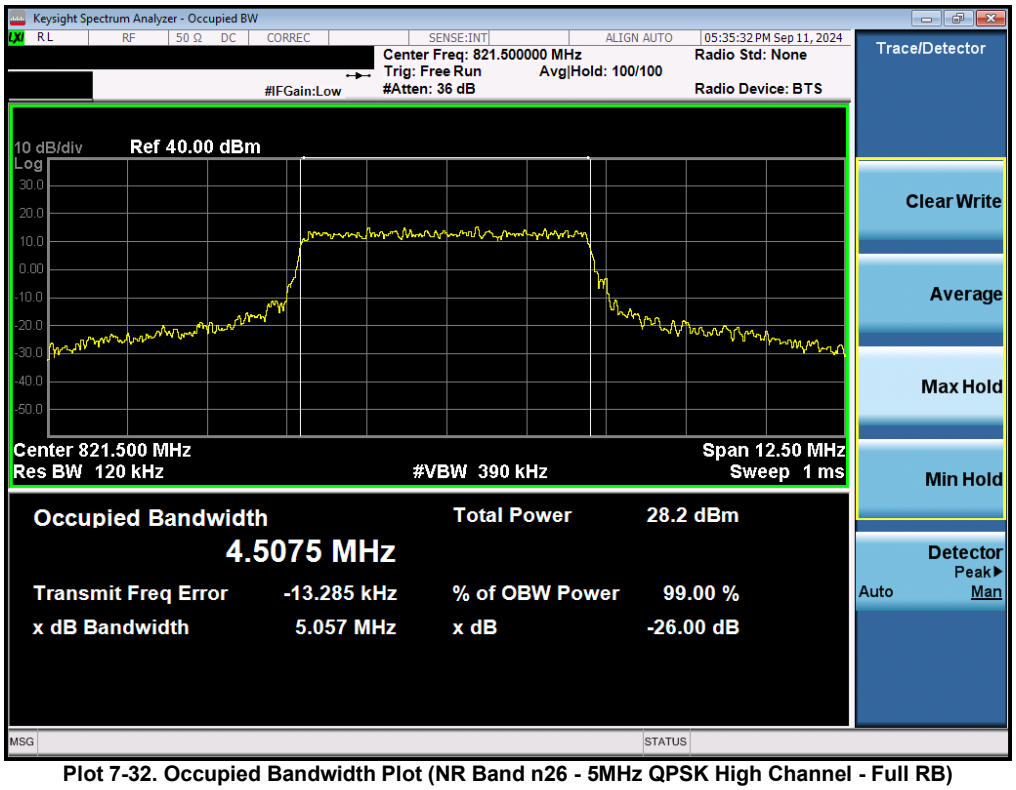
Plot 7-29. Occupied Bandwidth Plot (NR Band n26 - 5MHz π/2 BPSK Low Channel - Full RB)



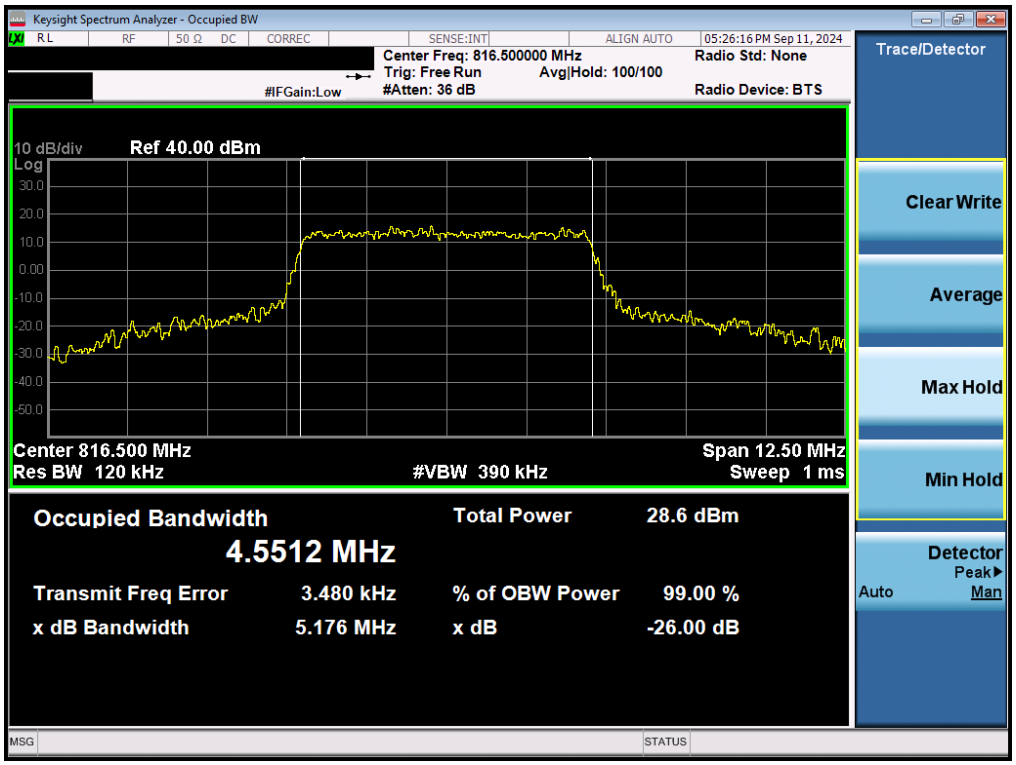
Plot 7-30. Occupied Bandwidth Plot (NR Band n26 - 5MHz π/2 BPSK High Channel - Full RB)



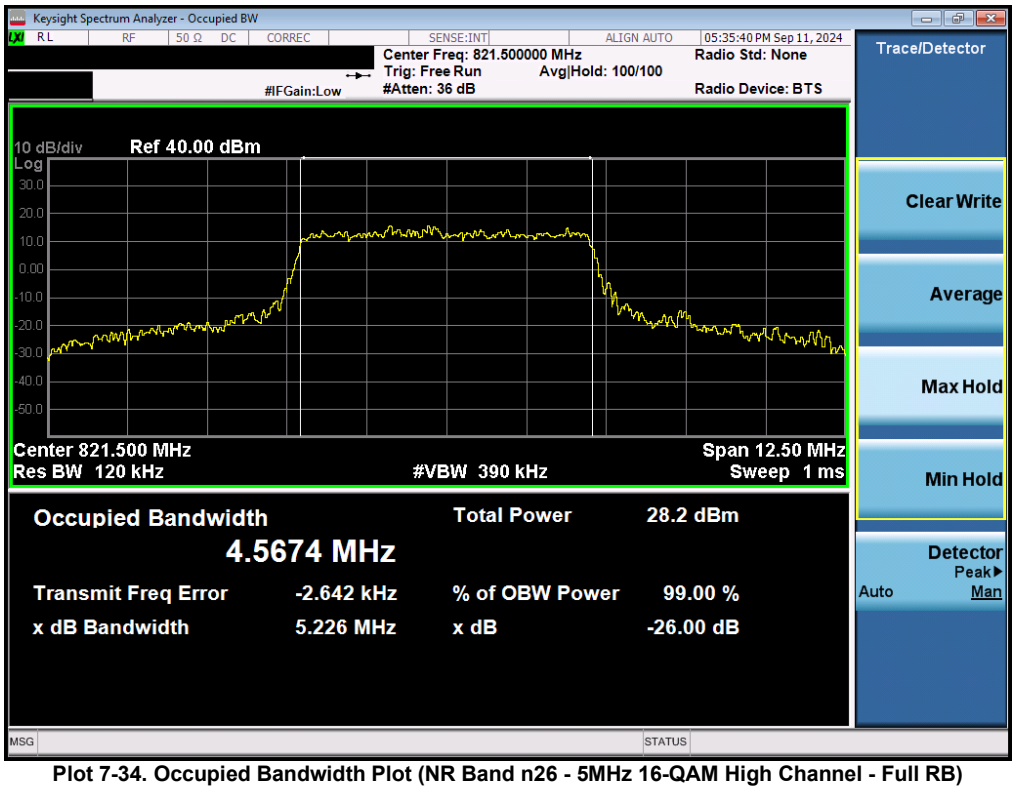
Plot 7-31. Occupied Bandwidth Plot (NR Band n26 - 5MHz QPSK Low Channel - Full RB)



Plot 7-32. Occupied Bandwidth Plot (NR Band n26 - 5MHz QPSK High Channel - Full RB)



Plot 7-33. Occupied Bandwidth Plot (NR Band n26 - 5MHz 16-QAM Low Channel - Full RB)

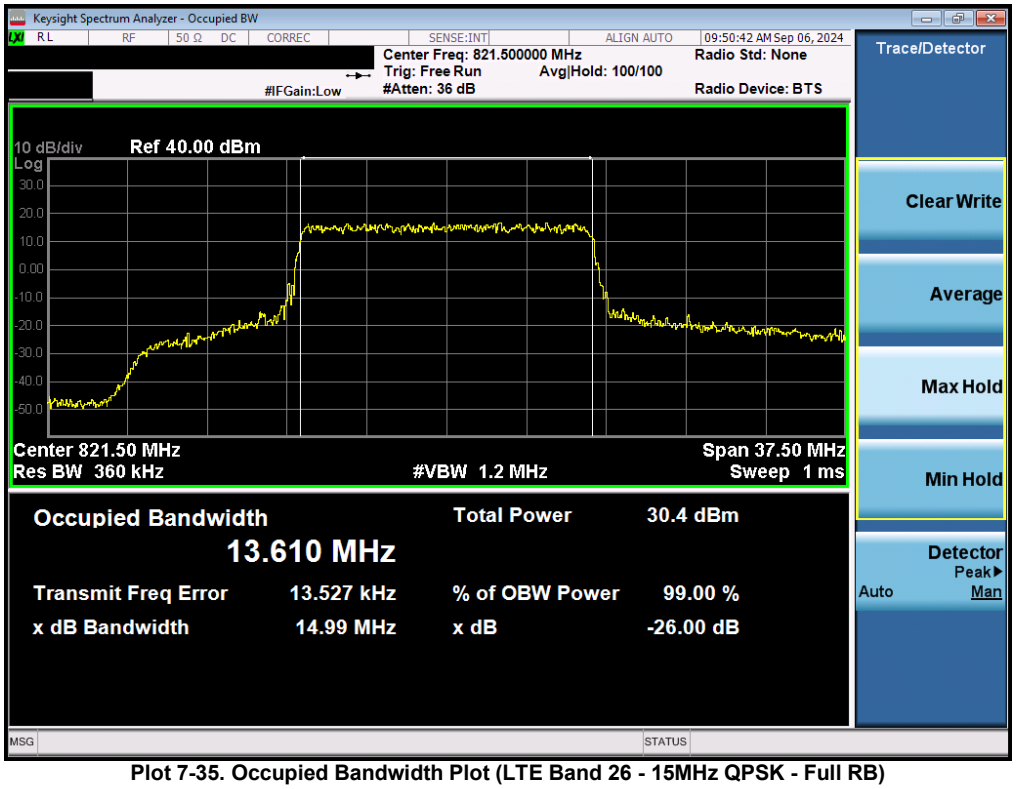


Plot 7-34. Occupied Bandwidth Plot (NR Band n26 - 5MHz 16-QAM High Channel - Full RB)

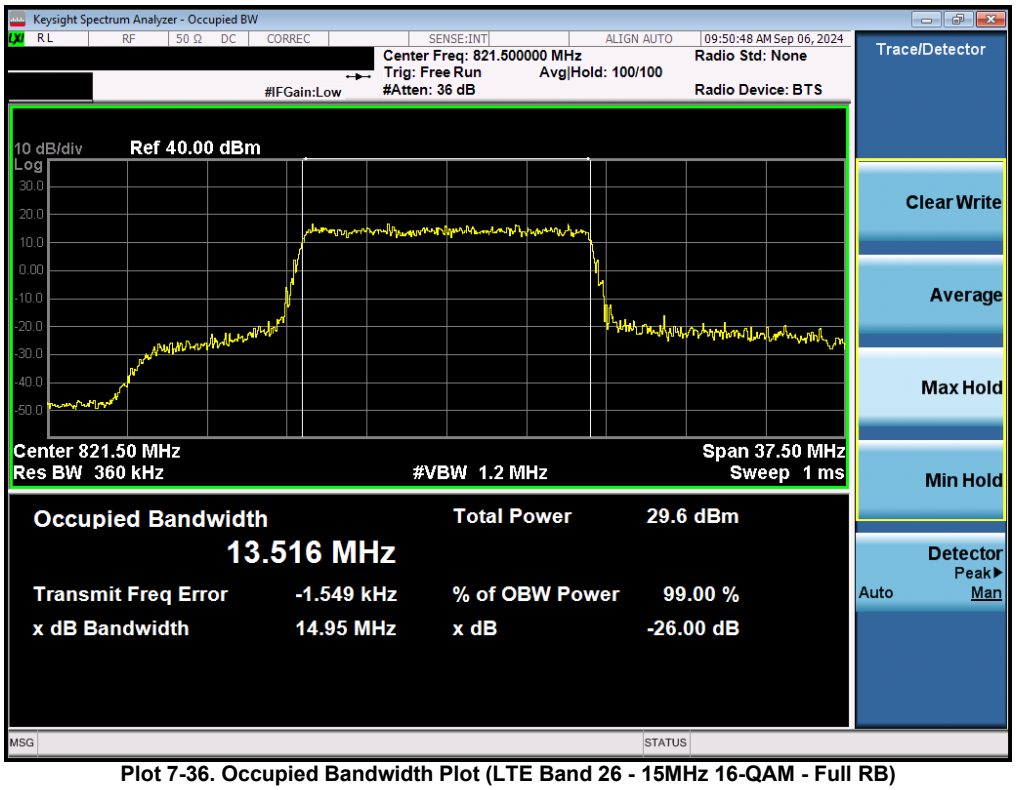
Mode	Bandwidth	Modulation	OBW [MHz]
LTE-B26	15 MHz	QPSK	13.61
		16QAM	13.52
	10 MHz	QPSK	9.04
		16QAM	8.99
	5 MHz	QPSK	4.54
		QPSK	4.56
		16QAM	4.52
		16QAM	4.52
	3 MHz	QPSK	2.72
		QPSK	2.72
		16QAM	2.72
		16QAM	2.72
	1.4 MHz	QPSK	1.10
		QPSK	1.09
		16QAM	1.11
		16QAM	1.11
NR-n26	20 MHz	π/2 BPSK	17.95
		QPSK	19.01
		16QAM	19.03
	15 MHz	π/2 BPSK	13.55
		QPSK	14.18
		16QAM	14.24
	10 MHz	π/2 BPSK	9.03
		QPSK	9.36
		16QAM	9.40
	5 MHz	π/2 BPSK	4.49
		π/2 BPSK	4.51
		QPSK	4.52
		QPSK	4.52
		16QAM	4.59
		16QAM	4.55

Table 7-10. Occupied Bandwidth Test Results – Ant E

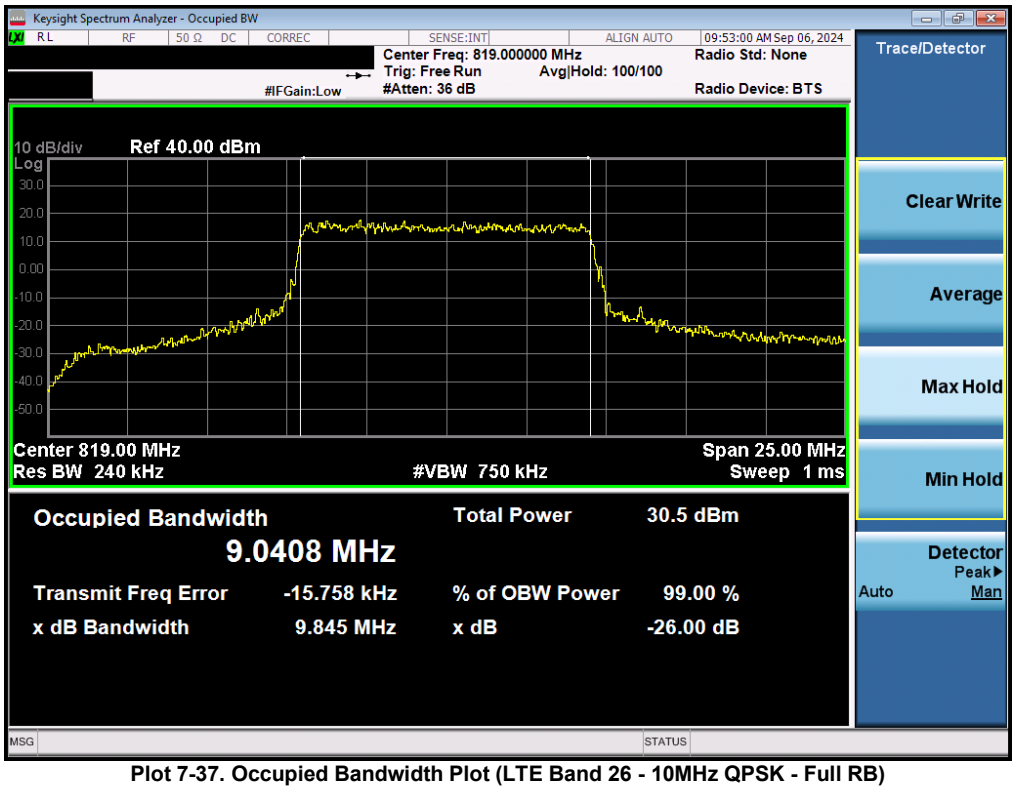
LTE Band 26 – Ant E



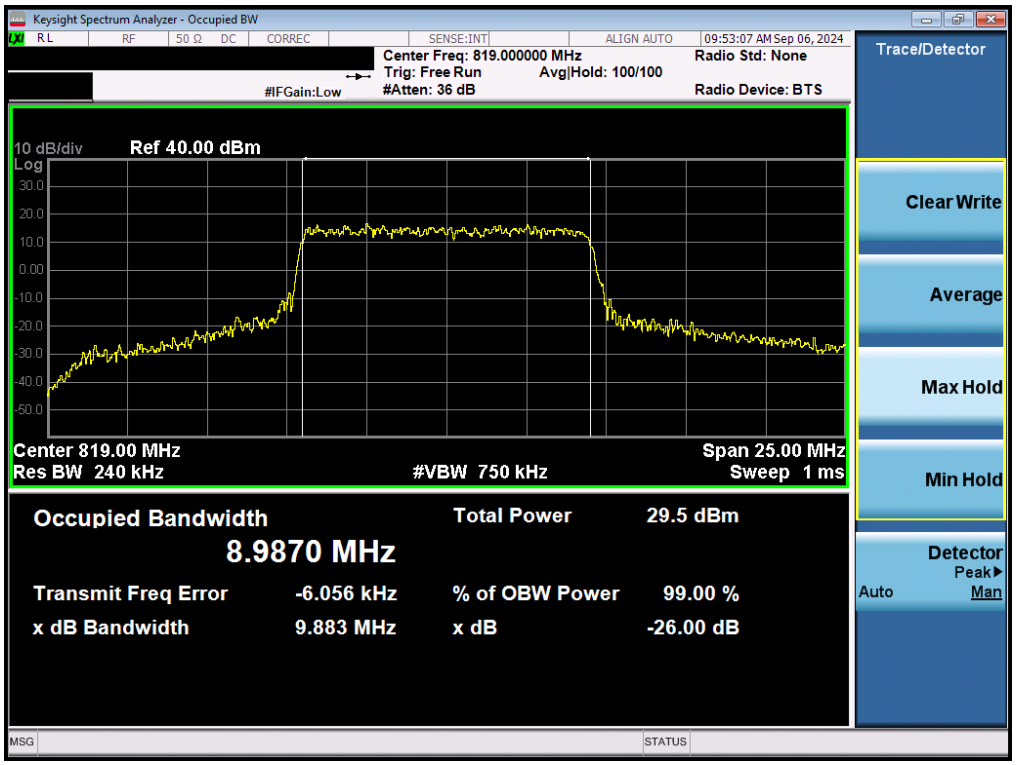
Plot 7-35. Occupied Bandwidth Plot (LTE Band 26 - 15MHz QPSK - Full RB)



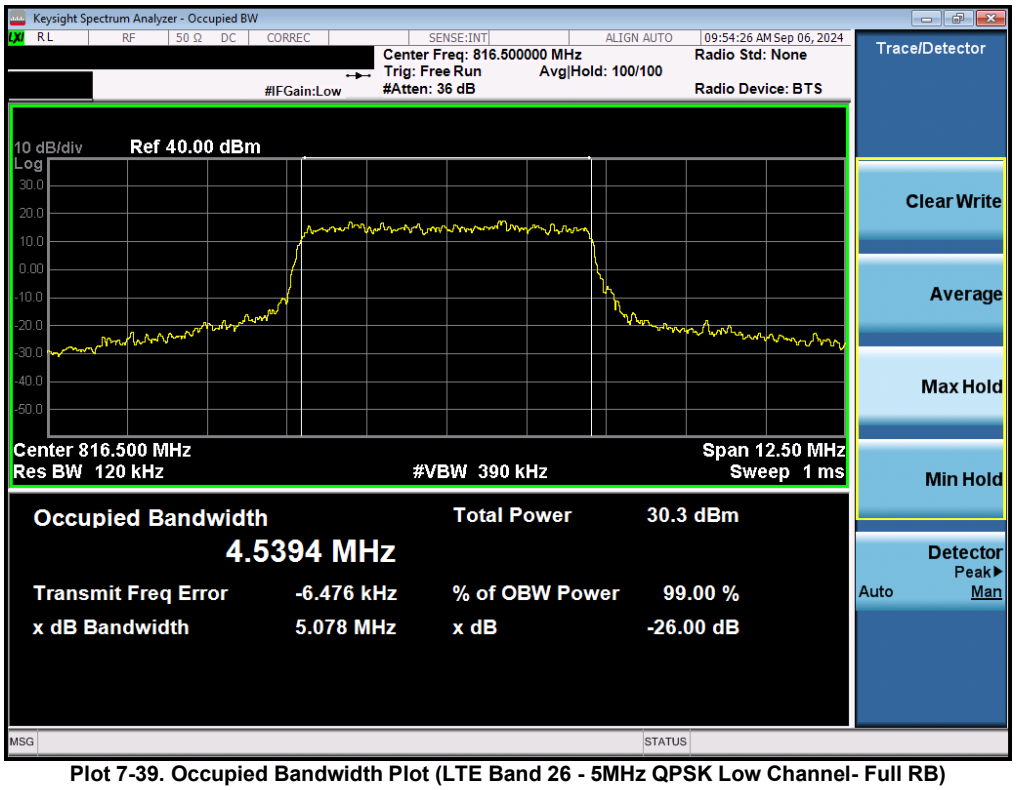
Plot 7-36. Occupied Bandwidth Plot (LTE Band 26 - 15MHz 16-QAM - Full RB)



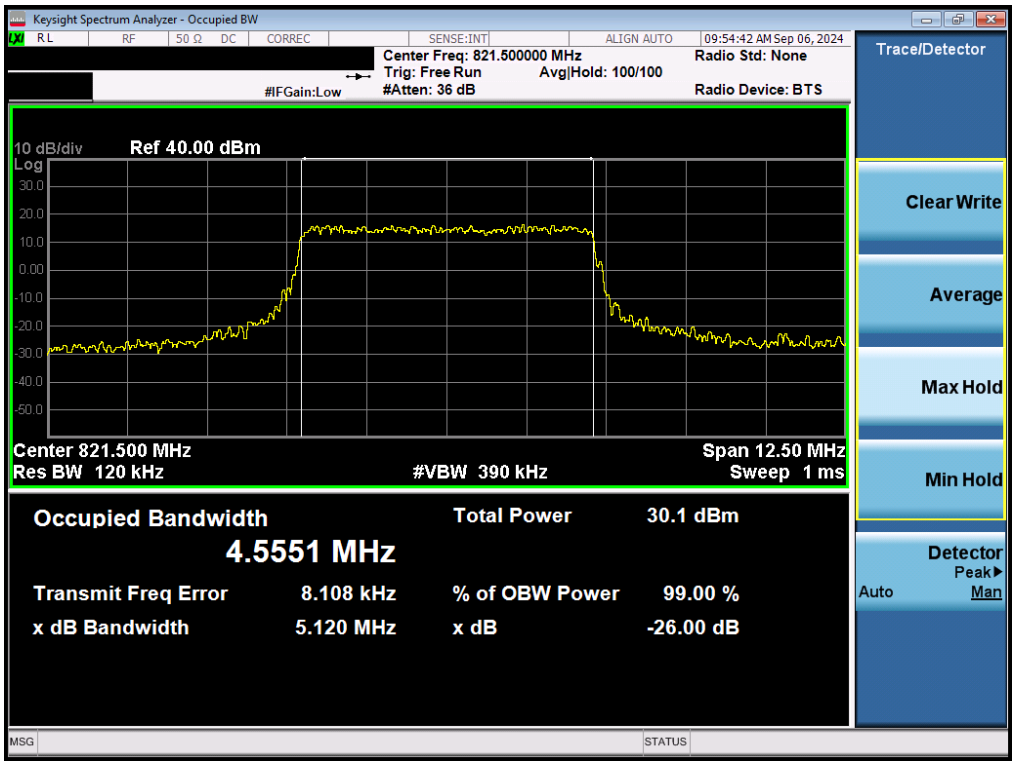
Plot 7-37. Occupied Bandwidth Plot (LTE Band 26 - 10MHz QPSK - Full RB)



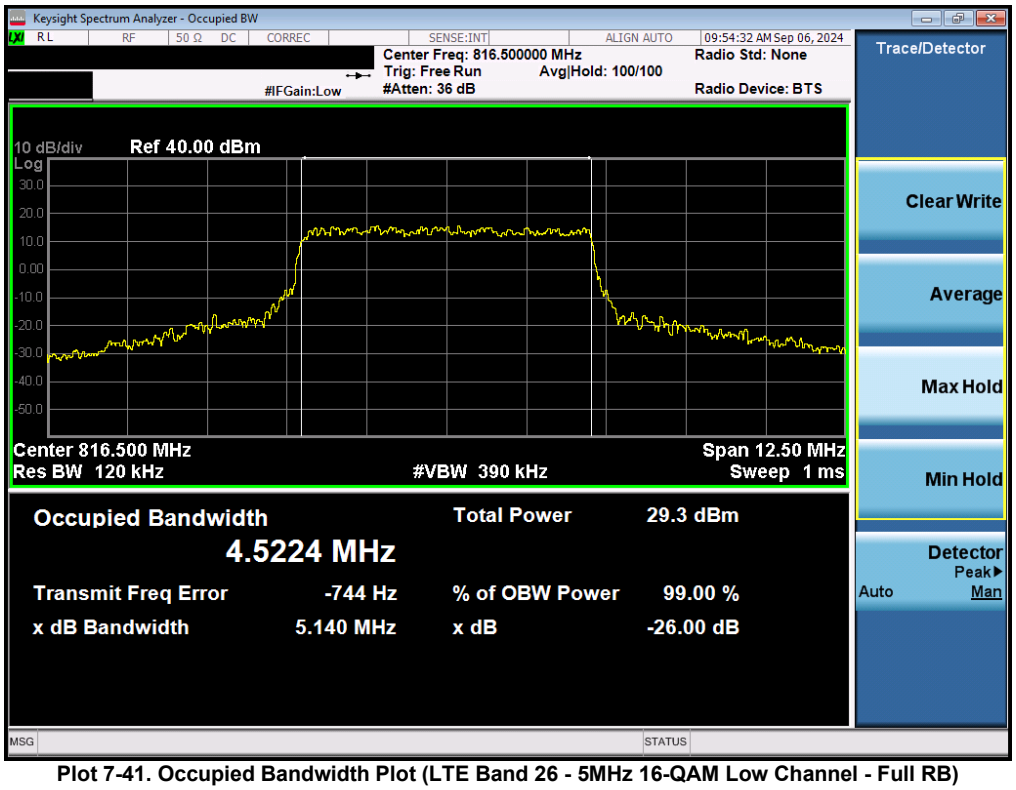
Plot 7-38. Occupied Bandwidth Plot (LTE Band 26 - 10MHz 16-QAM - Full RB)



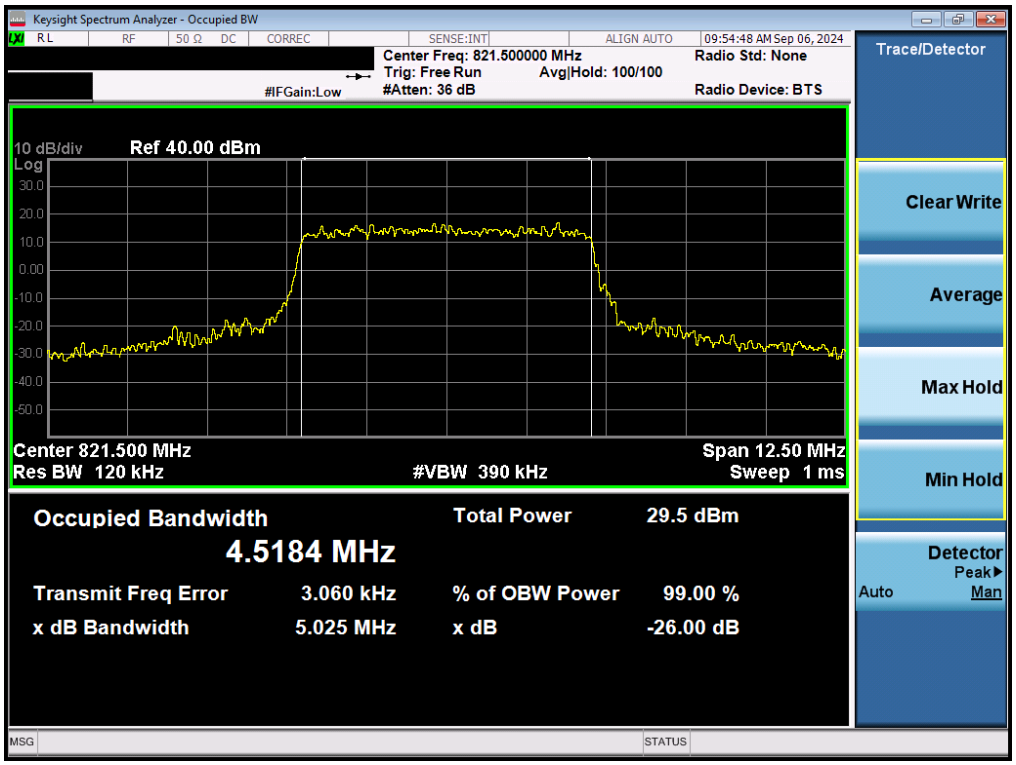
Plot 7-39. Occupied Bandwidth Plot (LTE Band 26 - 5MHz QPSK Low Channel- Full RB)



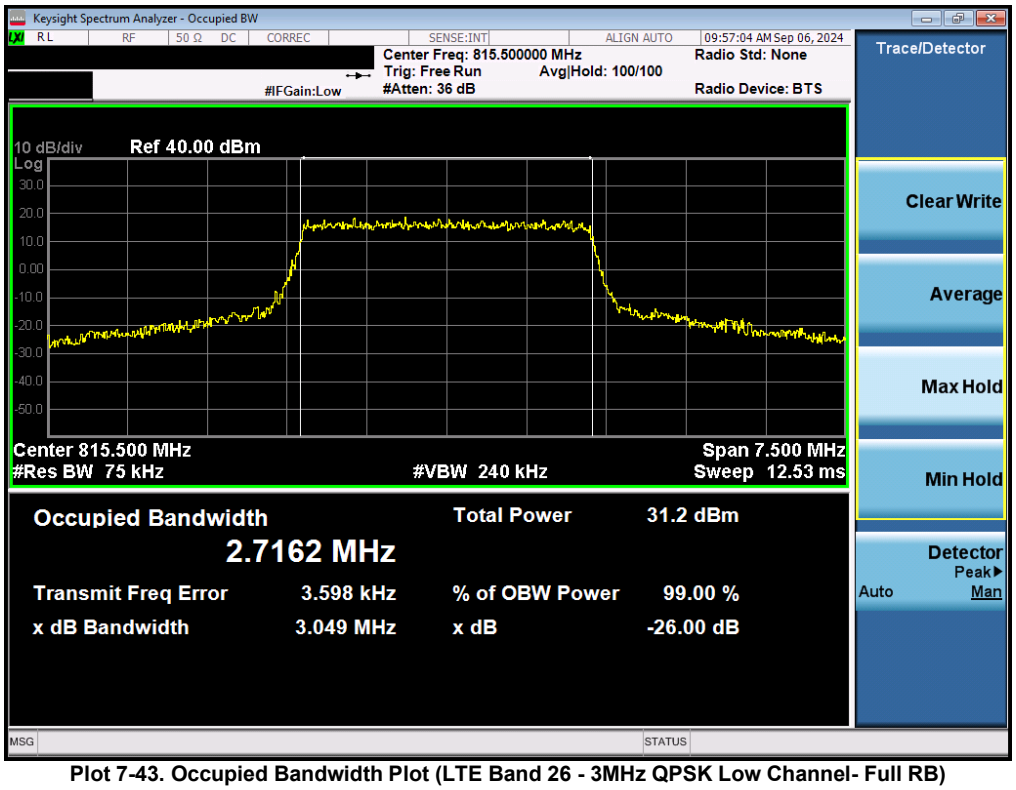
Plot 7-40. Occupied Bandwidth Plot (LTE Band 26 - 5MHz QPSK High Channel - Full RB)



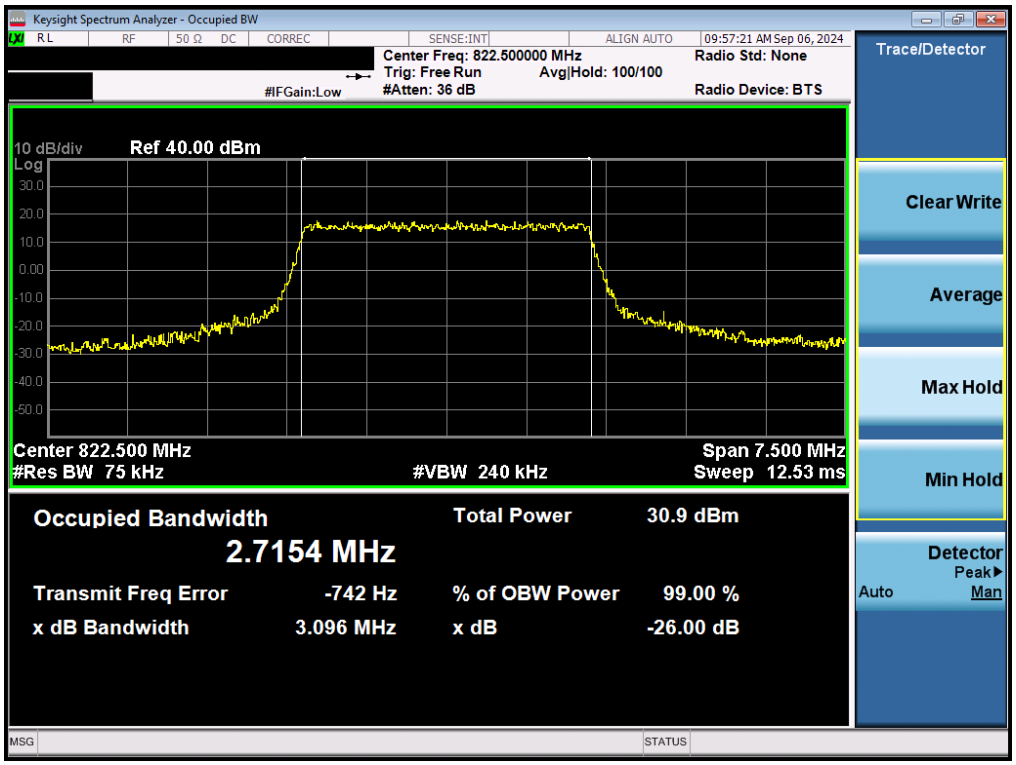
Plot 7-41. Occupied Bandwidth Plot (LTE Band 26 - 5MHz 16-QAM Low Channel - Full RB)



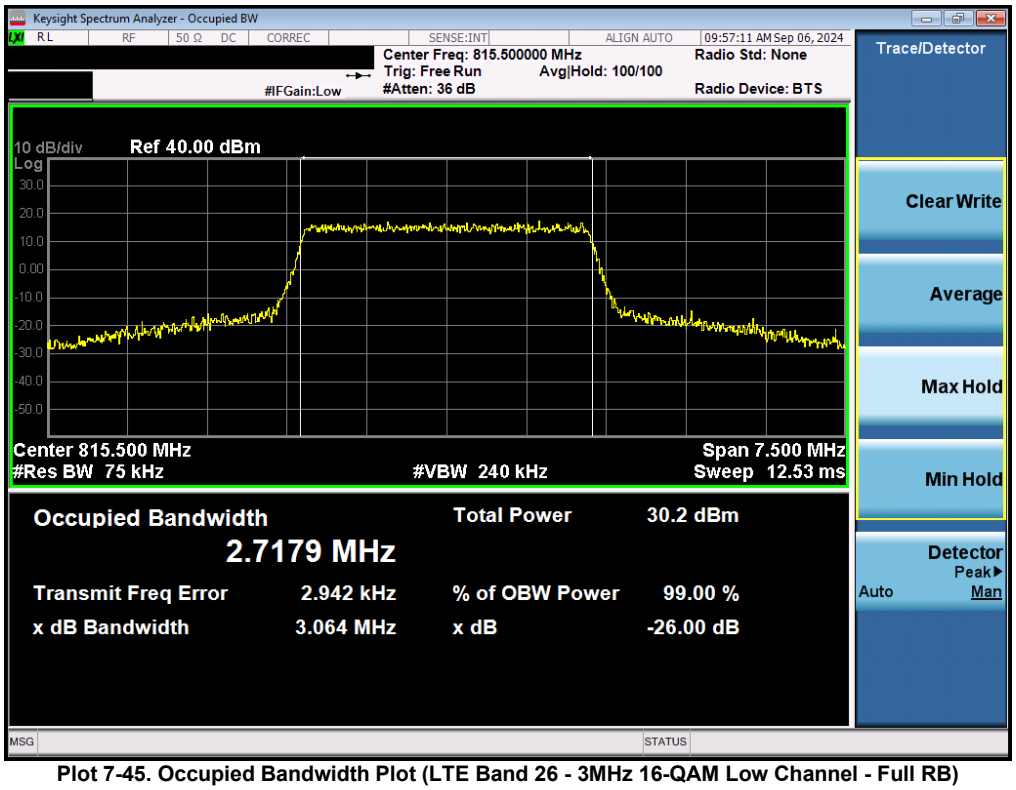
Plot 7-42. Occupied Bandwidth Plot (LTE Band 26 - 5MHz 16-QAM High Channel - Full RB)



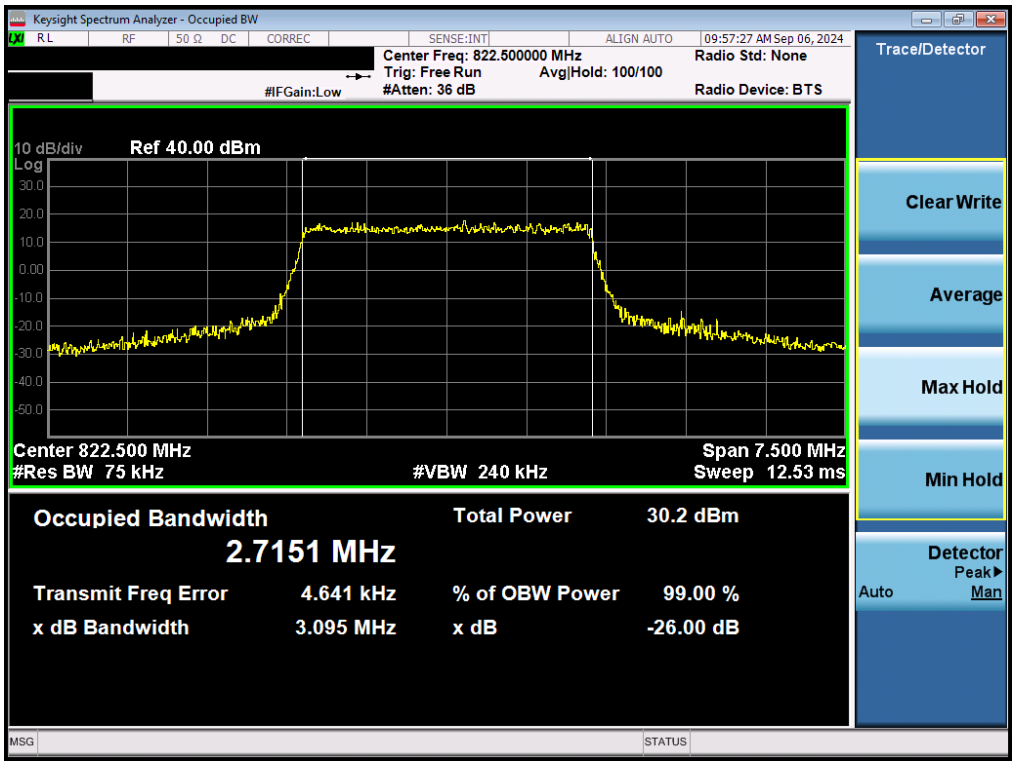
Plot 7-43. Occupied Bandwidth Plot (LTE Band 26 - 3MHz QPSK Low Channel- Full RB)



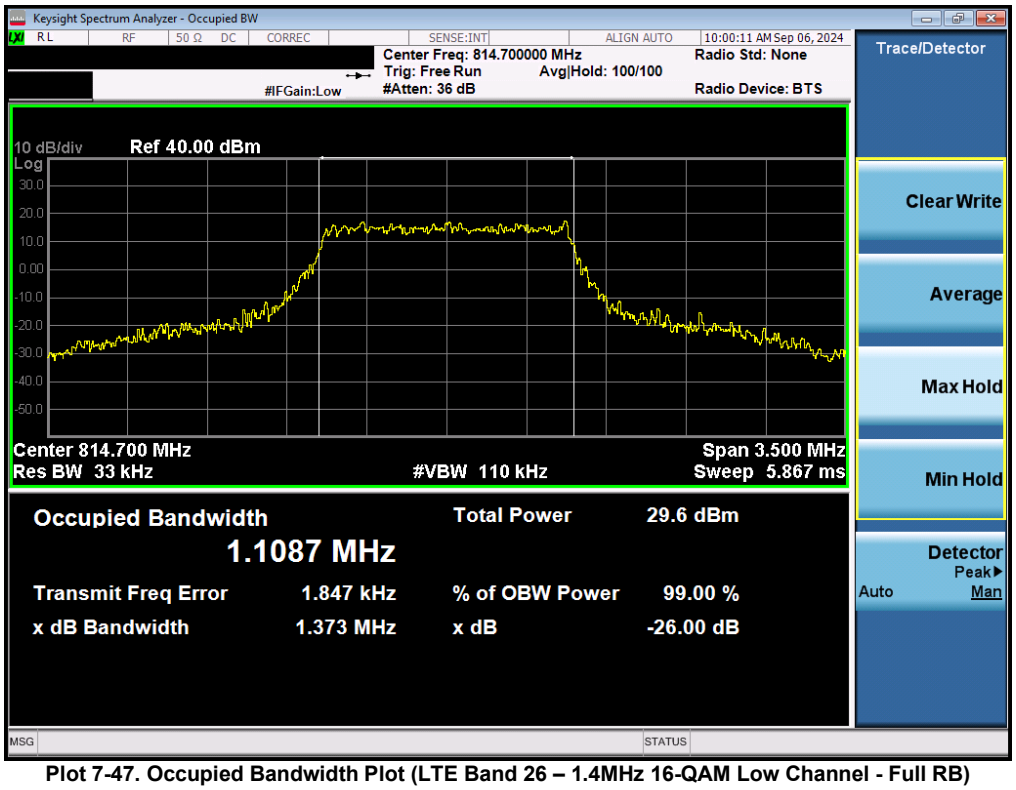
Plot 7-44. Occupied Bandwidth Plot (LTE Band 26 - 3MHz QPSK High Channel - Full RB)



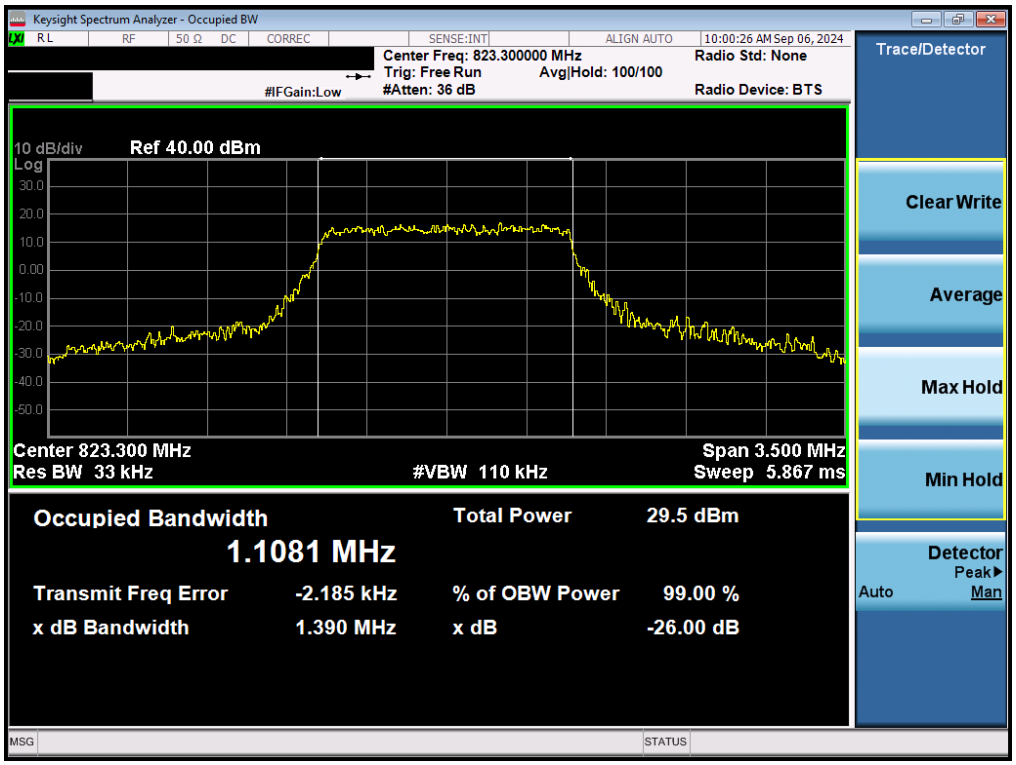
Plot 7-45. Occupied Bandwidth Plot (LTE Band 26 - 3MHz 16-QAM Low Channel - Full RB)



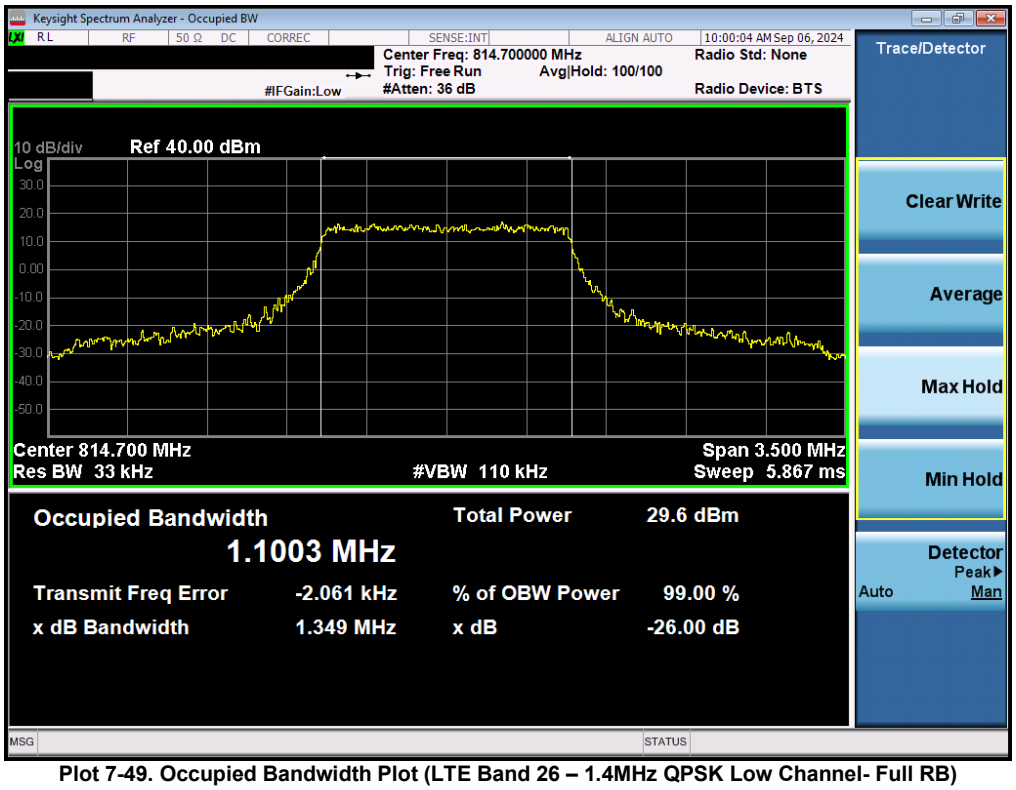
Plot 7-46. Occupied Bandwidth Plot (LTE Band 26 - 3MHz 16-QAM High Channel - Full RB)



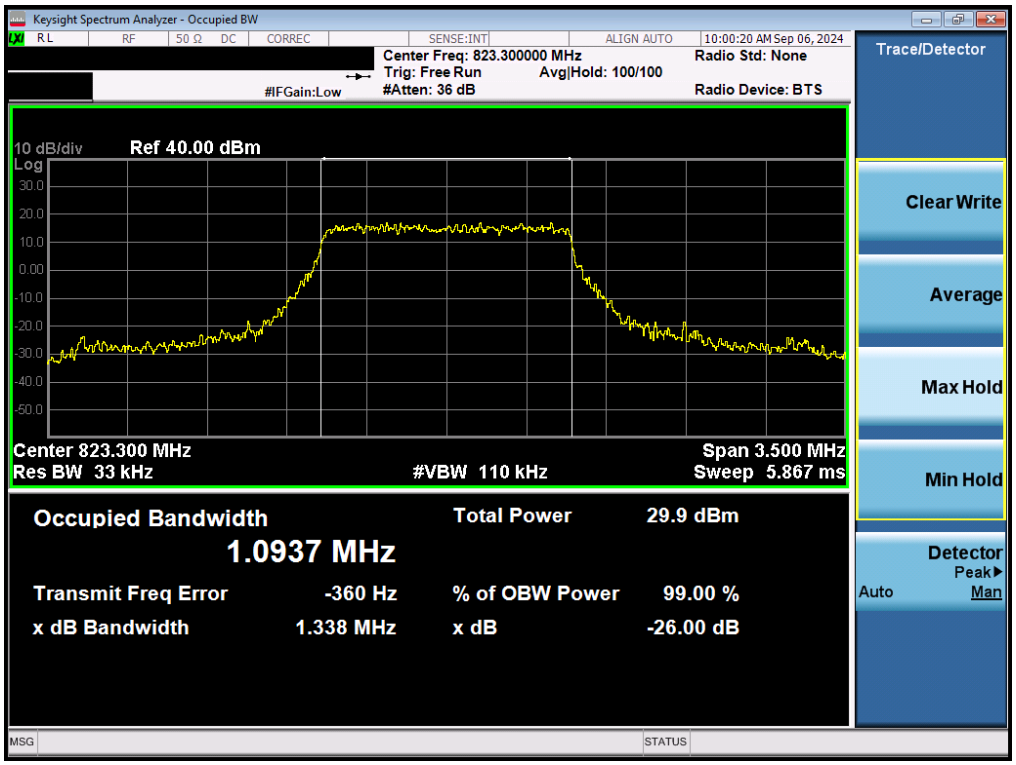
Plot 7-47. Occupied Bandwidth Plot (LTE Band 26 – 1.4MHz 16-QAM Low Channel - Full RB)



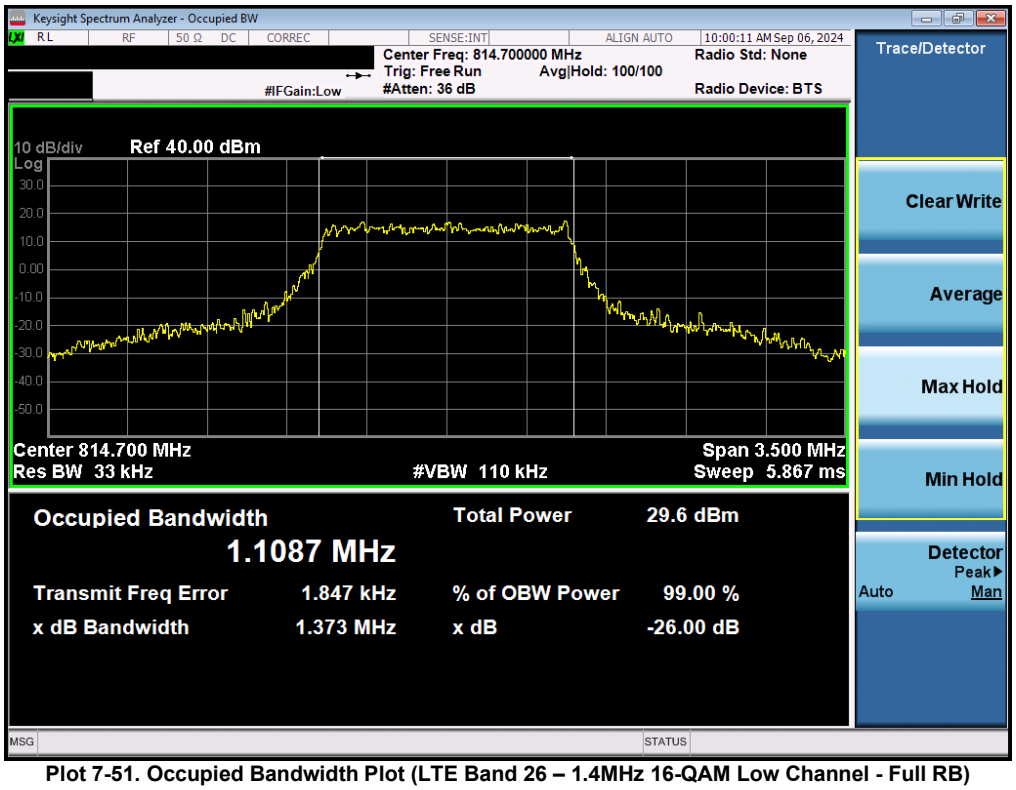
Plot 7-48. Occupied Bandwidth Plot (LTE Band 26 – 1.4MHz 16-QAM High Channel - Full RB)



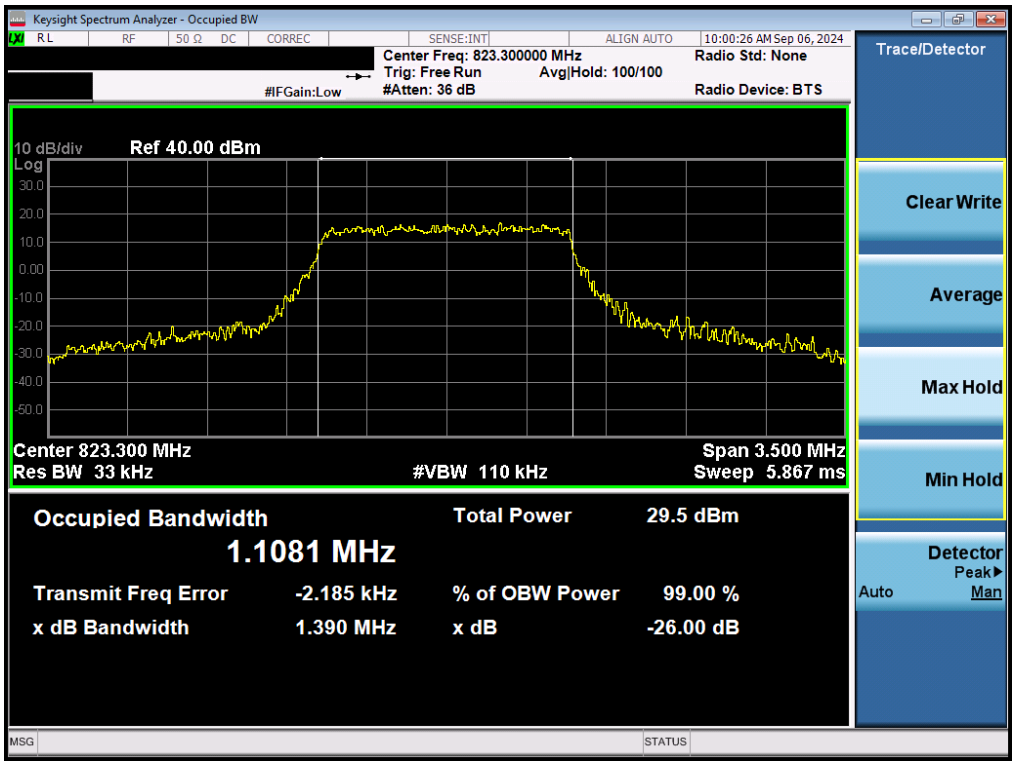
Plot 7-49. Occupied Bandwidth Plot (LTE Band 26 – 1.4MHz QPSK Low Channel- Full RB)



Plot 7-50. Occupied Bandwidth Plot (LTE Band 26 – 1.4MHz QPSK High Channel - Full RB)

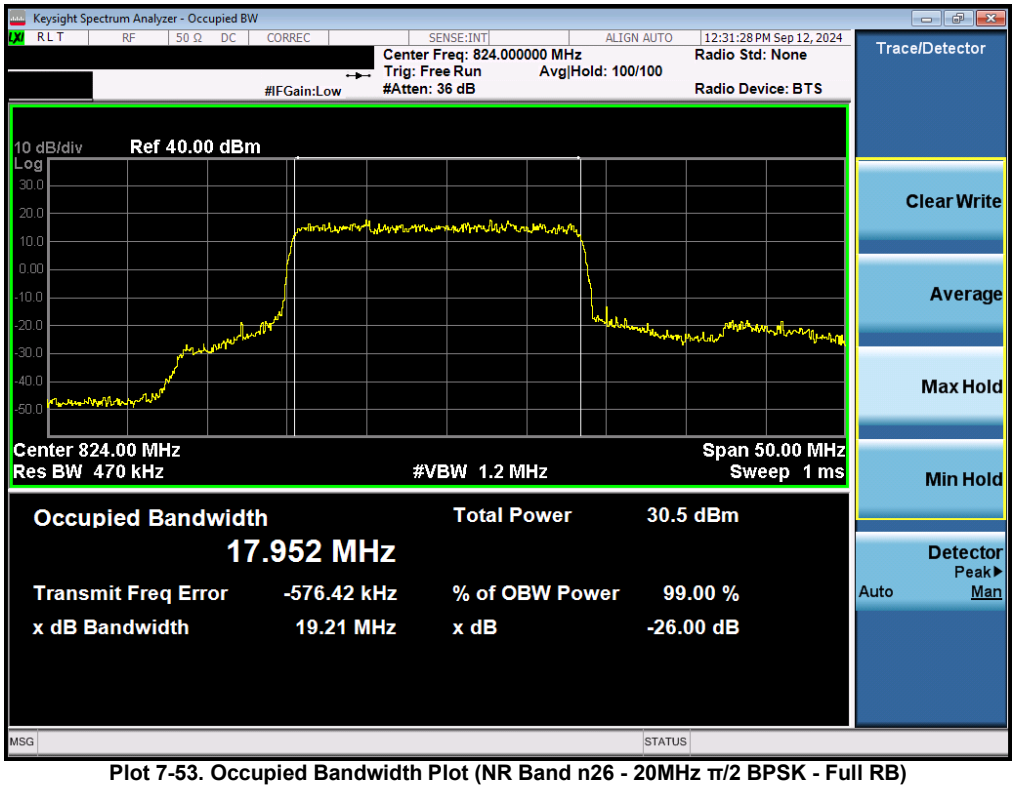


Plot 7-51. Occupied Bandwidth Plot (LTE Band 26 – 1.4MHz 16-QAM Low Channel - Full RB)

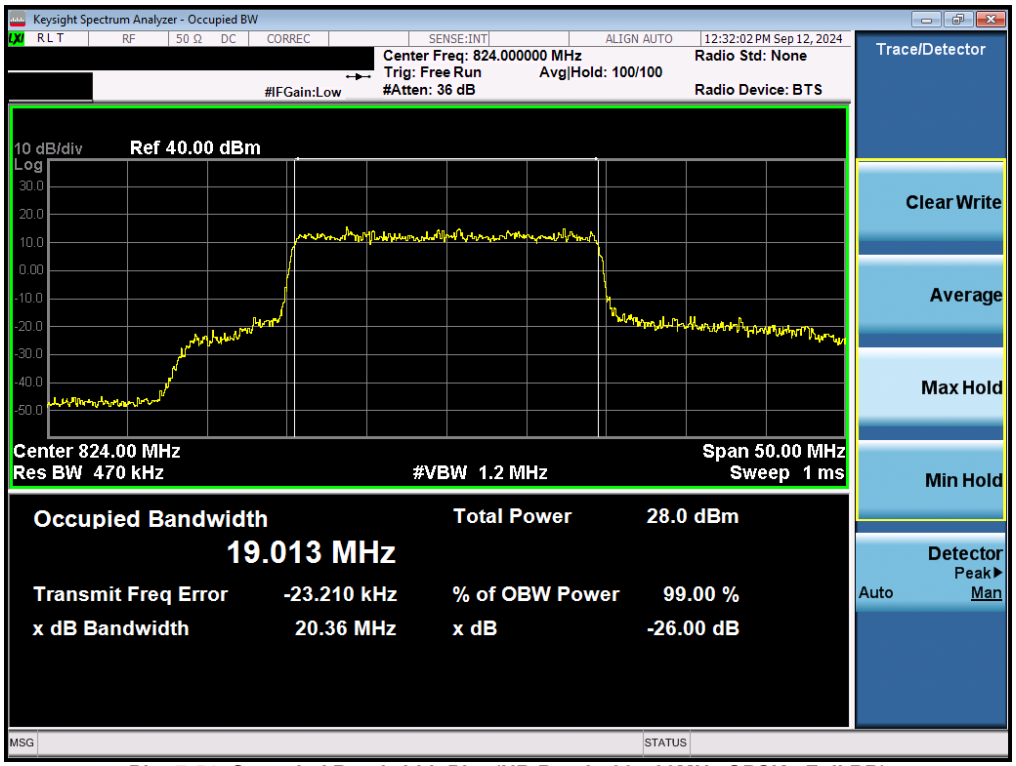


Plot 7-52. Occupied Bandwidth Plot (LTE Band 26 – 1.4MHz 16-QAM High Channel - Full RB)

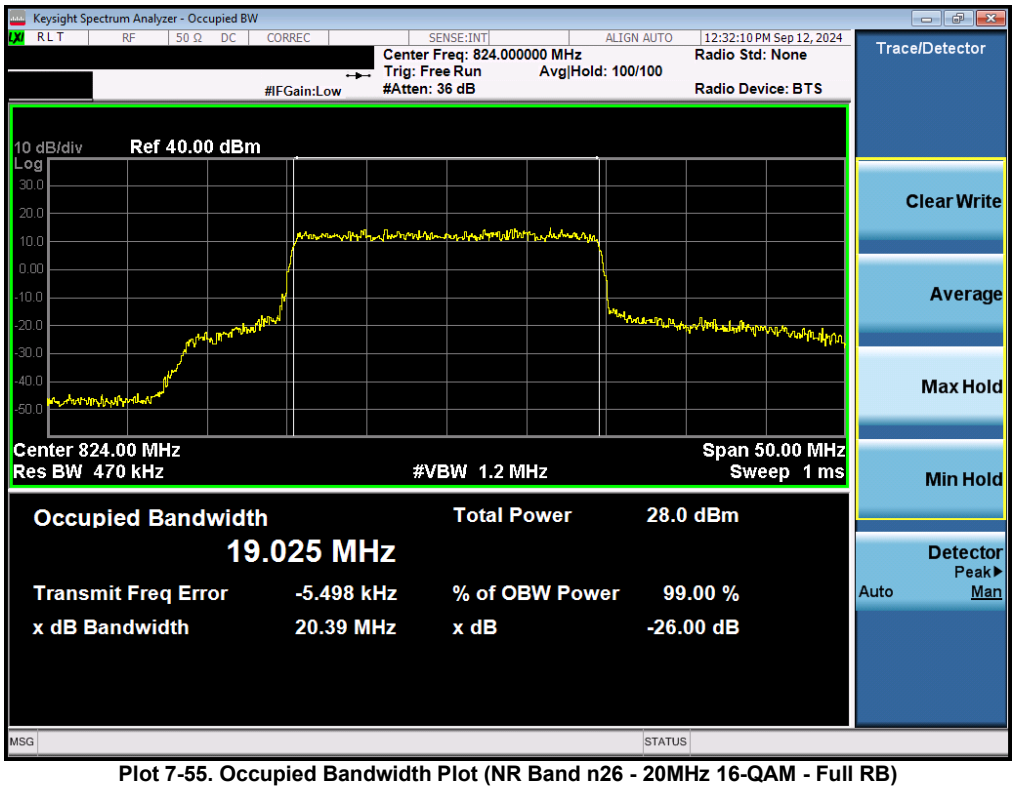
NR Band n26 - Ant E



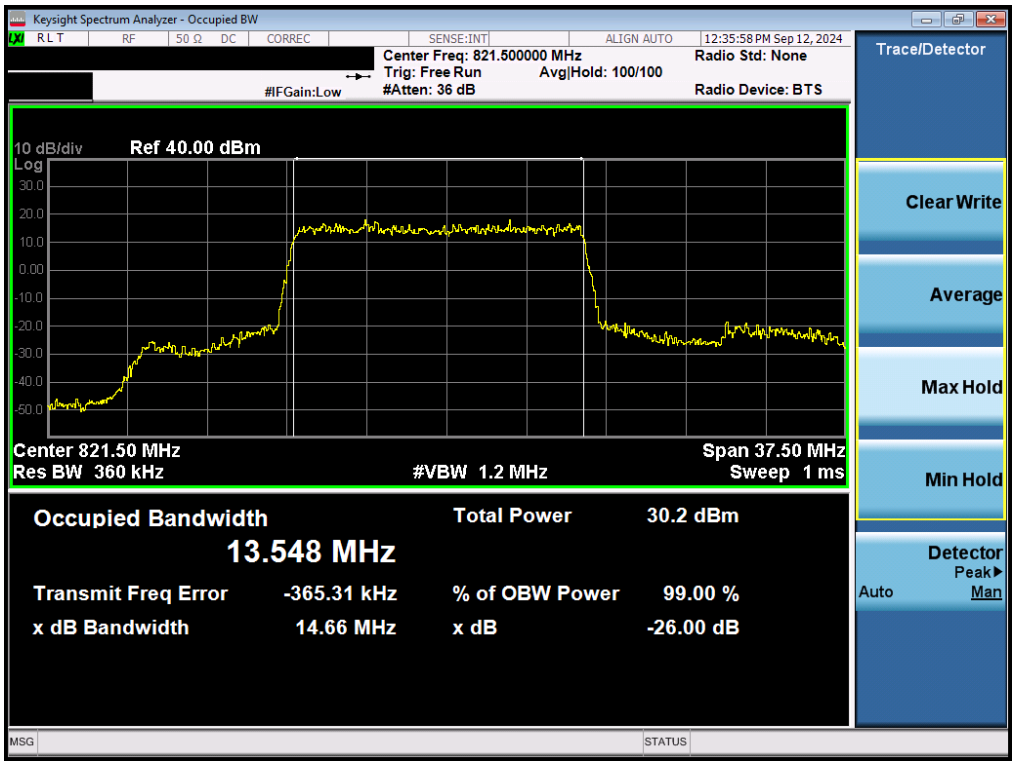
Plot 7-53. Occupied Bandwidth Plot (NR Band n26 - 20MHz π/2 BPSK - Full RB)



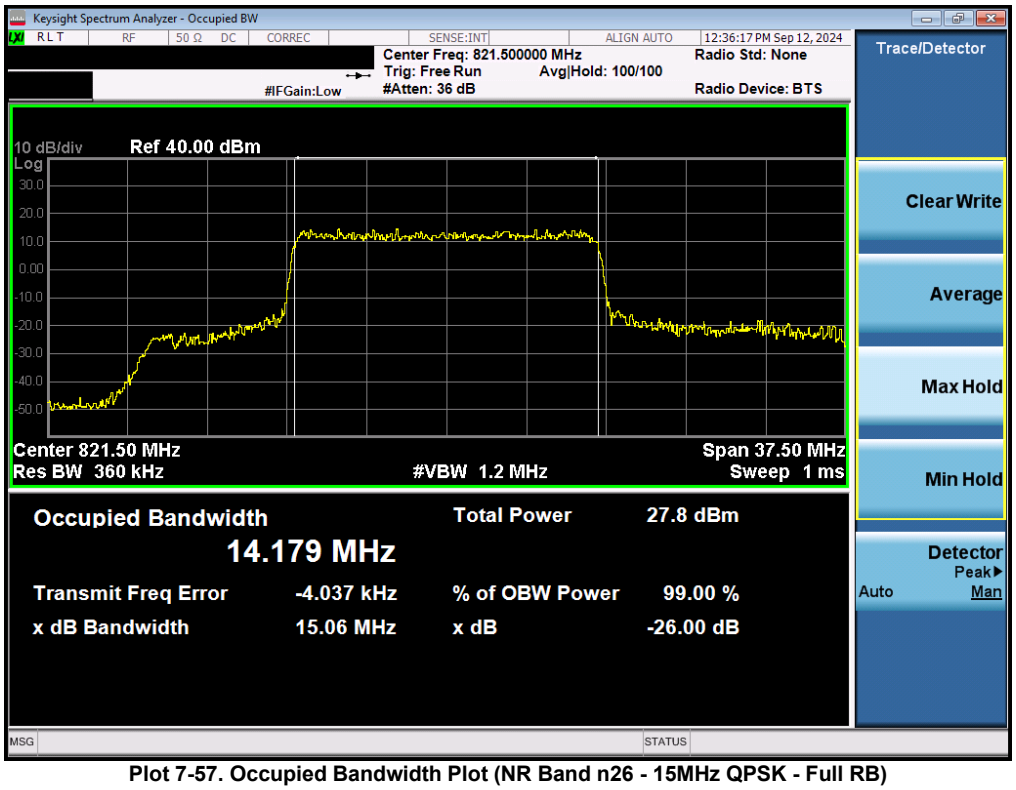
Plot 7-54. Occupied Bandwidth Plot (NR Band n26 - 20MHz QPSK - Full RB)



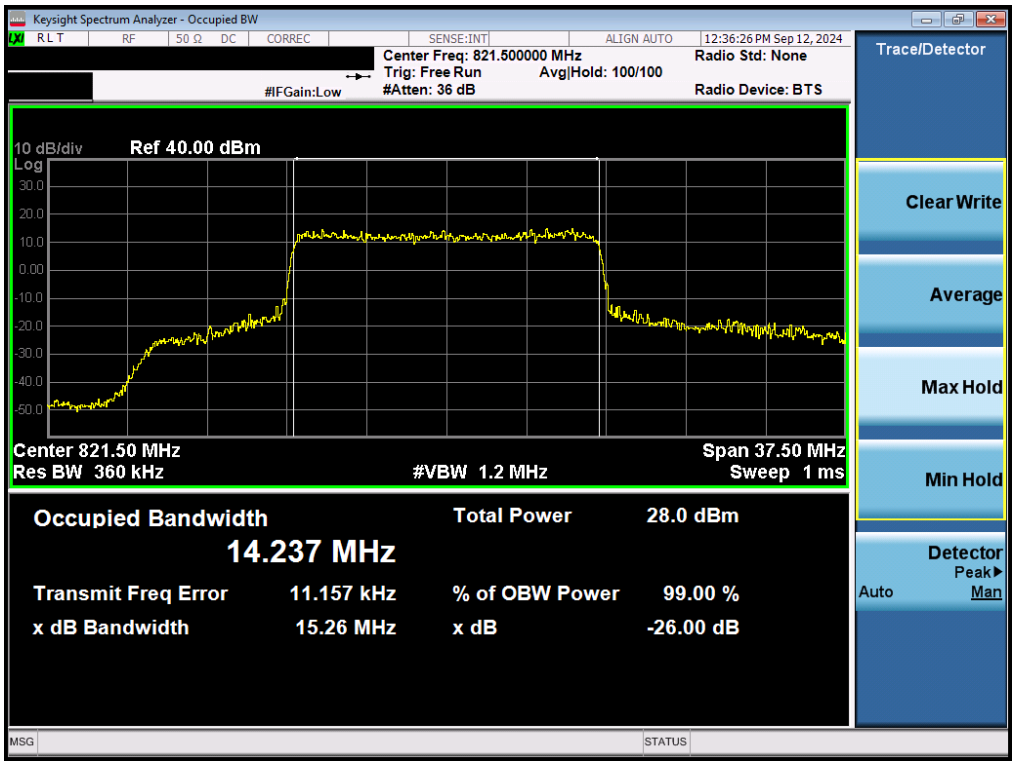
Plot 7-55. Occupied Bandwidth Plot (NR Band n26 - 20MHz 16-QAM - Full RB)



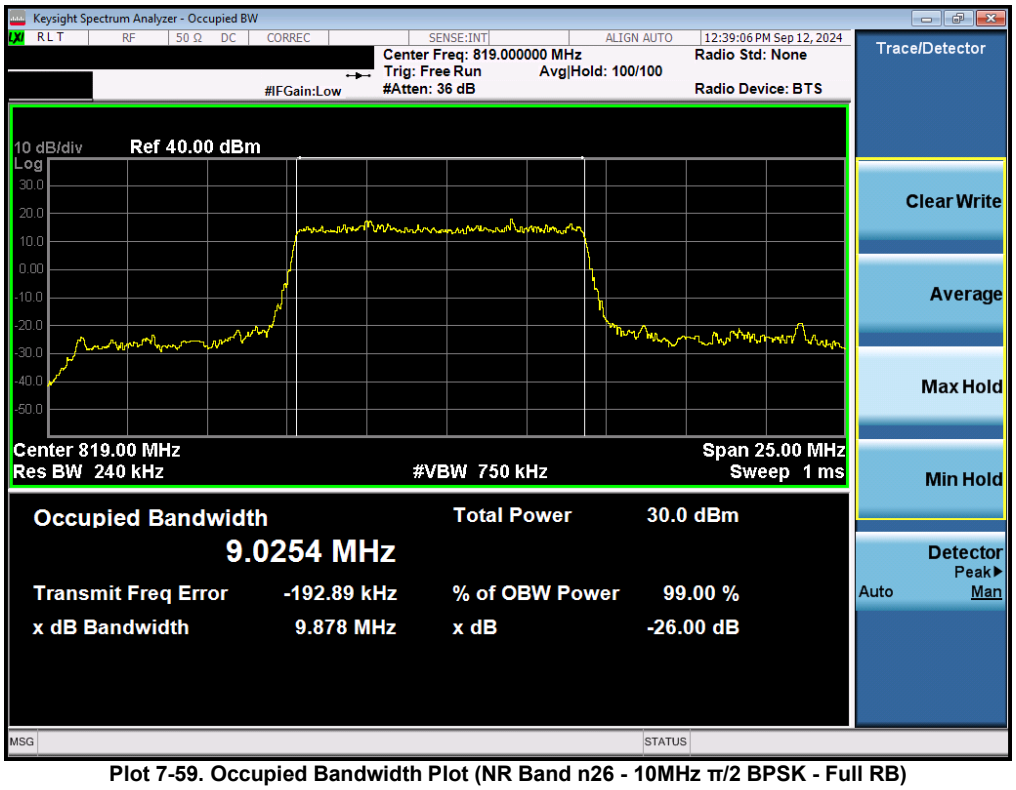
Plot 7-56. Occupied Bandwidth Plot (NR Band n26 - 15MHz π/2 BPSK - Full RB)



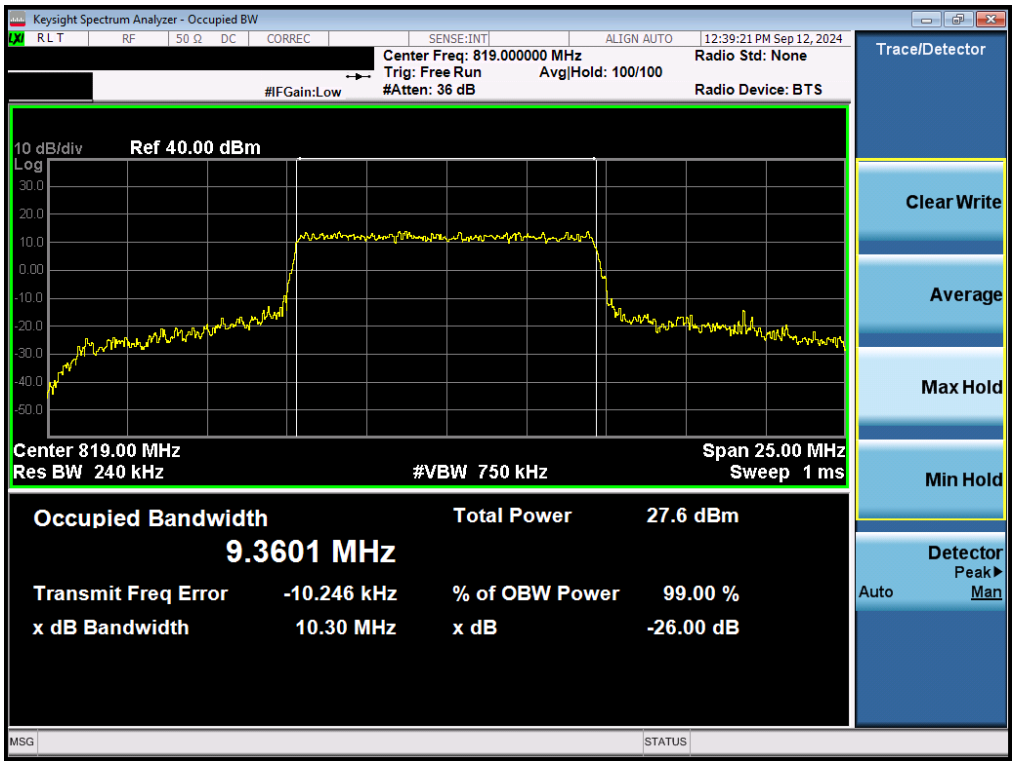
Plot 7-57. Occupied Bandwidth Plot (NR Band n26 - 15MHz QPSK - Full RB)



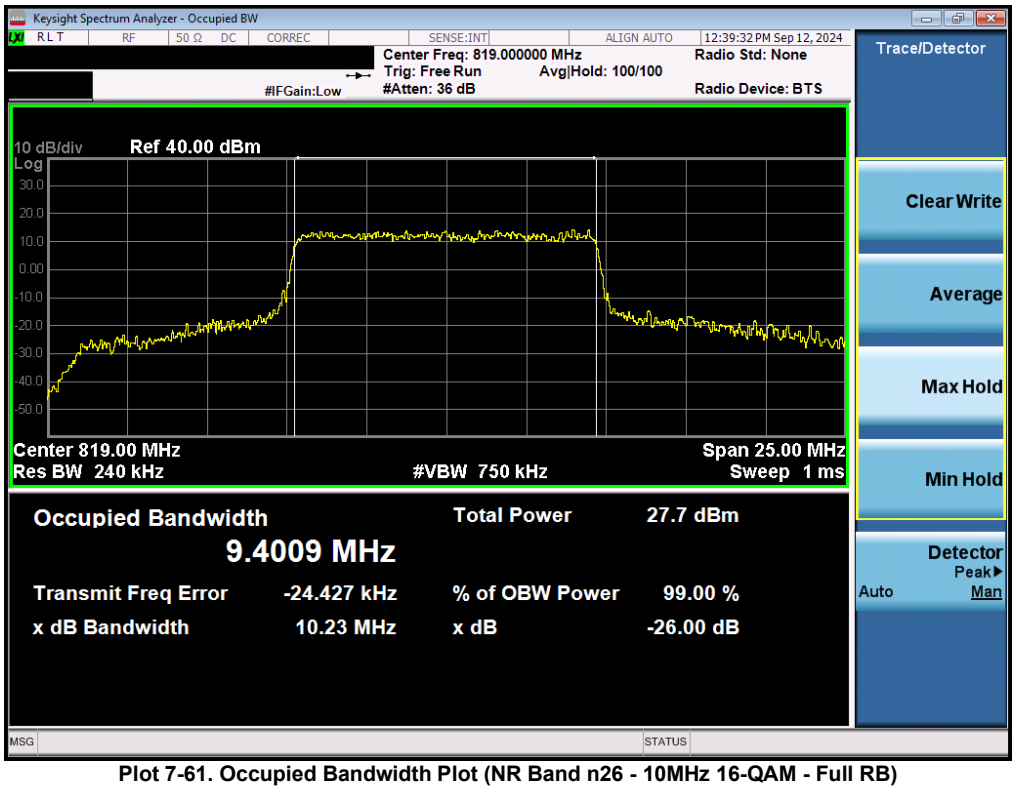
Plot 7-58. Occupied Bandwidth Plot (NR Band n26 - 15MHz 16-QAM - Full RB)



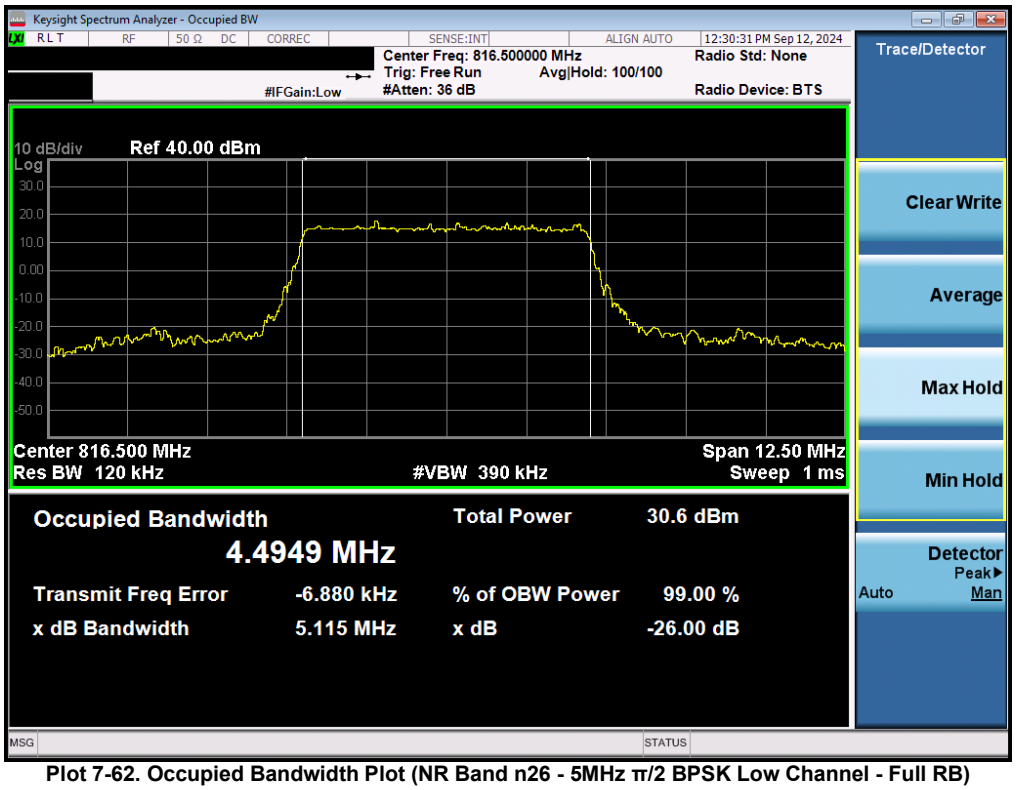
Plot 7-59. Occupied Bandwidth Plot (NR Band n26 - 10MHz π/2 BPSK - Full RB)



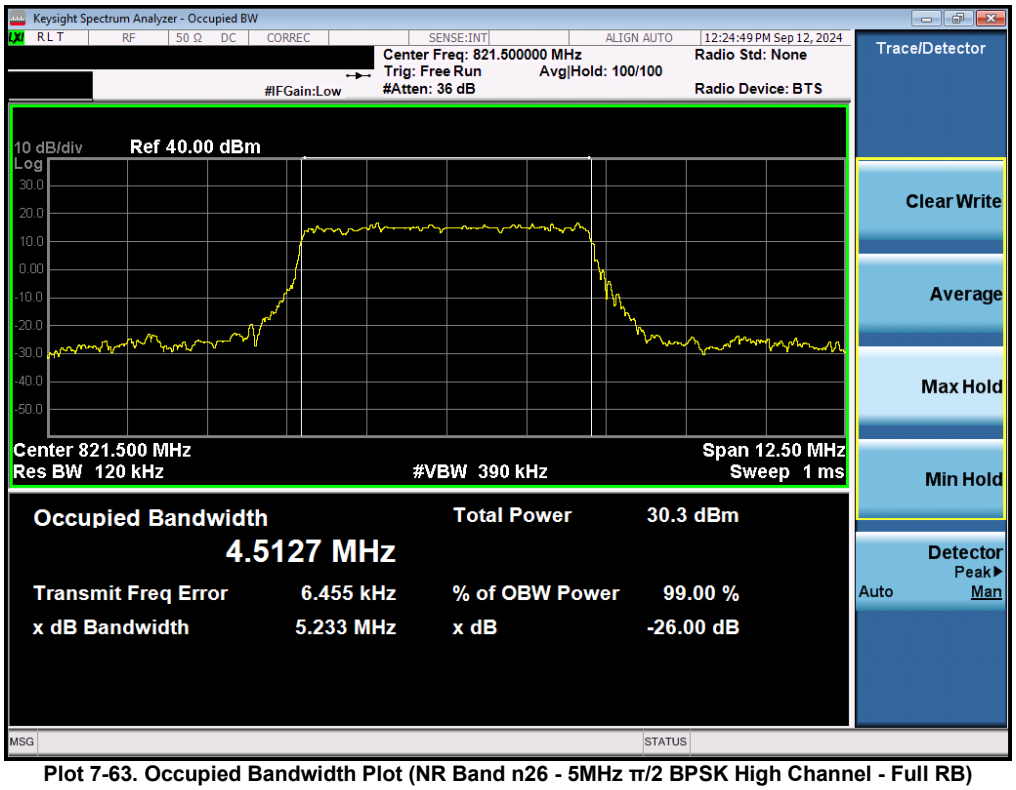
Plot 7-60. Occupied Bandwidth Plot (NR Band n26 - 10MHz QPSK - Full RB)



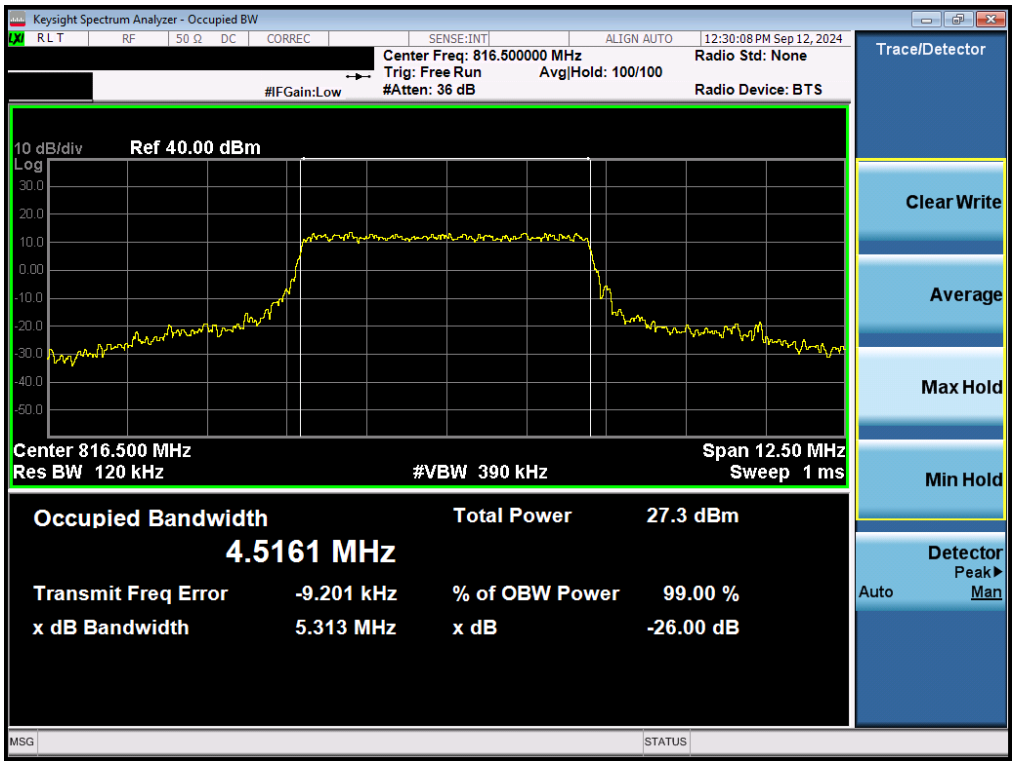
Plot 7-61. Occupied Bandwidth Plot (NR Band n26 - 10MHz 16-QAM - Full RB)



Plot 7-62. Occupied Bandwidth Plot (NR Band n26 - 5MHz π/2 BPSK Low Channel - Full RB)



Plot 7-63. Occupied Bandwidth Plot (NR Band n26 - 5MHz π/2 BPSK High Channel - Full RB)



Plot 7-64. Occupied Bandwidth Plot (NR Band n26 - 5MHz QPSK Low Channel - Full RB)