



ELEMENT WASHINGTON DC LLC

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PART 27 MEASUREMENT REPORT

Applicant Name:

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

Date of Testing:

4/8/2022 - 6/30/2022

Test Report Issue Date:

6/30/2022

Test Site/Location:

Element Lab., Columbia, MD, USA

Test Report Serial No.:

1M2204080051-05.A3L

FCC ID:

A3LSMF721U

Applicant Name:

Samsung Electronics Co., Ltd.

Application Type:

Certification

Model:

SM-F721U

Additional Model(s):

SM-F721U1

EUT Type:

Portable Handset

FCC Classification:

PCS Licensed Transmitter Held to Ear (PCE)

FCC Rule Part:

27

Test Procedure(s):

ANSI C63.26-2015, KDB 648474 D03 v01r04

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

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

RJ Ortanez
Executive Vice President



FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2204080051-05.A3L	Test Dates: 4/8/2022 - 6/30/2022	EUT Type: Portable Handset	Page 1 of 238

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Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
LTE Band 30	10 MHz	QPSK	2310.0	0.162	22.09	9M07G7D
		16QAM	2310.0	0.134	21.28	9M06W7D
	5 MHz	QPSK	2307.5 - 2312.5	0.169	22.27	4M54G7D
		16QAM	2307.5 - 2312.5	0.139	21.44	4M55W7D
LTE Band 7	20 MHz	QPSK	2510.0 - 2560.0	0.181	22.58	18M0G7D
		16QAM	2510.0 - 2560.0	0.151	21.80	18M0W7D
	15 MHz	QPSK	2507.5 - 2562.5	0.182	22.60	13M5G7D
		16QAM	2507.5 - 2562.5	0.149	21.72	13M5W7D
	10 MHz	QPSK	2505.0 - 2565.0	0.181	22.58	9M05G7D
		16QAM	2505.0 - 2565.0	0.149	21.73	9M04W7D
	5 MHz	QPSK	2502.5 - 2567.5	0.182	22.60	4M53G7D
		16QAM	2502.5 - 2567.5	0.153	21.84	4M54W7D
LTE Band 41(PC2)	20 MHz	QPSK	2506.0 - 2680.0	0.359	25.55	18M1G7D
		16QAM	2506.0 - 2680.0	0.297	24.72	18M1W7D
	15 MHz	QPSK	2503.5 - 2682.5	0.363	25.60	13M6G7D
		16QAM	2503.5 - 2682.5	0.297	24.73	13M6W7D
	10 MHz	QPSK	2501.0 - 2685.0	0.366	25.63	9M07G7D
		16QAM	2501.0 - 2685.0	0.297	24.73	9M07W7D
	5 MHz	QPSK	2498.5 - 2687.5	0.361	25.57	4M55G7D
		16QAM	2498.5 - 2687.5	0.267	24.26	4M55W7D
LTE Band 41(PC3)/38	20 MHz	QPSK	2506.0 - 2680.0	0.257	24.10	18M0G7D
		16QAM	2506.0 - 2680.0	0.206	23.13	18M0W7D
	15 MHz	QPSK	2503.5 - 2682.5	0.251	24.00	13M5G7D
		16QAM	2503.5 - 2682.5	0.226	23.55	13M5W7D
	10 MHz	QPSK	2501.0 - 2685.0	0.258	24.12	9M02G7D
		16QAM	2501.0 - 2685.0	0.223	23.48	9M05W7D
	5 MHz	QPSK	2498.5 - 2687.5	0.313	24.96	4M53G7D
		16QAM	2498.5 - 2687.5	0.282	24.51	4M55W7D

EUT Overview (LTE)

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Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n30 (ANT B)	10 MHz	$\pi/2$ BPSK	2310.0	0.164	22.16	9M03G7D
		QPSK	2310.0	0.165	22.18	9M38G7D
		16QAM	2310.0	0.132	21.22	9M39W7D
	5 MHz	$\pi/2$ BPSK	2307.5 - 2312.5	0.165	22.19	4M57G7D
		QPSK	2307.5 - 2312.5	0.164	22.15	4M56G7D
		16QAM	2307.5 - 2312.5	0.138	21.41	4M56W7D
NR Band n7 (ANT B)	40MHz	$\pi/2$ BPSK	2510.0 - 2560.0	0.165	22.17	38M8G7D
		QPSK	2510.0 - 2560.0	0.162	22.10	38M9G7D
		16QAM	2510.0 - 2560.0	0.150	21.75	38M9W7D
	30MHz	$\pi/2$ BPSK	2507.5 - 2562.5	0.184	22.66	28M8G7D
		QPSK	2507.5 - 2562.5	0.180	22.55	28M7G7D
		16QAM	2507.5 - 2562.5	0.164	22.16	28M7W7D
	25MHz	$\pi/2$ BPSK	2505.0 - 2565.0	0.164	22.14	23M0G7D
		QPSK	2505.0 - 2565.0	0.137	21.37	24M0G7D
		16QAM	2505.0 - 2565.0	0.120	20.79	23M9W7D
	20MHz	$\pi/2$ BPSK	2510.0 - 2560.0	0.159	22.01	18M0G7D
		QPSK	2510.0 - 2560.0	0.165	22.18	19M0G7D
		16QAM	2510.0 - 2560.0	0.148	21.71	19M1W7D
	15 MHz	$\pi/2$ BPSK	2507.5 - 2562.5	0.158	21.98	13M5G7D
		QPSK	2507.5 - 2562.5	0.166	22.21	14M2G7D
		16QAM	2507.5 - 2562.5	0.137	21.36	14M2W7D
	10MHz	$\pi/2$ BPSK	2505.0 - 2565.0	0.169	22.28	9M04G7D
		QPSK	2505.0 - 2565.0	0.162	22.10	9M35G7D
		16QAM	2505.0 - 2565.0	0.139	21.45	9M35W7D
	5 MHz	$\pi/2$ BPSK	2502.5 - 2567.5	0.147	21.66	4M52G7D
		QPSK	2502.5 - 2567.5	0.145	21.62	4M53G7D
		16QAM	2502.5 - 2567.5	0.129	21.11	4M52W7D
NR Band n41 (ANT I)	100 MHz	$\pi/2$ BPSK	2546.0 - 2640.0	0.525	27.20	97M0G7D
		QPSK	2546.0 - 2640.0	0.505	27.03	98M2G7D
		16QAM	2546.0 - 2640.0	0.405	26.07	98M2W7D
	90 MHz	$\pi/2$ BPSK	2541.0 - 2645.0	0.472	26.74	87M4G7D
		QPSK	2541.0 - 2645.0	0.487	26.87	88M0G7D
		16QAM	2541.0 - 2645.0	0.412	26.14	87M9W7D
	80 MHz	$\pi/2$ BPSK	2536.0 - 2650.0	0.505	27.03	77M5G7D
		QPSK	2536.0 - 2650.0	0.481	26.82	77M8G7D
		16QAM	2536.0 - 2650.0	0.391	25.93	77M8W7D
	70 MHz	$\pi/2$ BPSK	2531.0 - 2655.0	0.473	26.75	64M7G7D
		QPSK	2531.0 - 2655.0	0.443	26.46	67M7G7D
		16QAM	2531.0 - 2655.0	0.384	25.84	67M8G7D
	60 MHz	$\pi/2$ BPSK	2526.0 - 2660.0	0.482	26.83	58M1G7D
		QPSK	2526.0 - 2660.0	0.492	26.92	58M2G7D
		16QAM	2526.0 - 2660.0	0.408	26.11	58M2W7D
	50 MHz	$\pi/2$ BPSK	2521.0 - 2665.0	0.537	27.30	46M1G7D
		QPSK	2521.0 - 2665.0	0.479	26.80	47M8G7D
		16QAM	2521.0 - 2665.0	0.412	26.15	47M8W7D
NR Band n41/n38 (ANT I)	40 MHz	$\pi/2$ BPSK	2516.0 - 2670.0	0.551	27.41	35M9G7D
		QPSK	2516.0 - 2670.0	0.466	26.69	38M1G7D
		16QAM	2516.0 - 2670.0	0.429	26.32	38M2W7D
	30 MHz	$\pi/2$ BPSK	2511.0 - 2675.0	0.505	27.03	27M0G7D
		QPSK	2511.0 - 2675.0	0.470	26.72	28M0G7D
		16QAM	2511.0 - 2675.0	0.406	26.09	28M0W7D
	20 MHz	$\pi/2$ BPSK	2506.0 - 2680.0	0.525	27.20	18M0G7D
		QPSK	2506.0 - 2680.0	0.498	26.98	18M4G7D
		16QAM	2506.0 - 2680.0	0.400	26.02	18M4W7D

EUT Overview (NR Bands)

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Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n30 (ANT I)	10 MHz	$\pi/2$ BPSK	2310.0	0.173	22.39	9M00G7D
		QPSK	2310.0	0.173	22.38	9M34G7D
		16QAM	2310.0	0.139	21.42	9M35W7D
	5 MHz	$\pi/2$ BPSK	2307.5 - 2312.5	0.164	22.14	4M55G7D
		QPSK	2307.5 - 2312.5	0.160	22.03	4M53G7D
		16QAM	2307.5 - 2312.5	0.133	21.25	4M52W7D

EUT Overview (NR Bands)

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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.

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMF721U**. 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.: 0209M, 0270M, 0294M, 0533M, 0660M, 0665M, 0666M, 0668M, 0670M, 0672M, 0834M, 0860M, 0868M, 1135M, 1150M, 1159M, 1165M

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 C63.26-2015. See Section 7.0 of this test report for a description of the radiated and antenna port conducted emissions tests.

This device supports 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.

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

2.4 Software and Firmware

Testing was performed on device(s) using software/firmware version F721USQU0AVED 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.

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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:

$$P_d \text{ [dBm]} = P_g \text{ [dBm]} - \text{cable loss [dB]} + \text{antenna gain [dBd/dBi]};$$

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 $P_g \text{ [dBm]} - \text{cable loss [dB]}$.

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:

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

And

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

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.

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

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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	1/4/2022	Annual	1/4/2023	AP2
-	AP1	EMC Cable and Switch System	12/12/2021	Annual	12/12/2022	AP1
-	ETS	EMC Cable and Switch System	12/9/2021	Annual	12/9/2022	ETS
-	LTx4	Licensed Transmitter Cable Set	12/19/2021	Annual	12/19/2022	LTx4
-	LTx5	Licensed Transmitter Cable Set	12/19/2021	Annual	12/19/2022	LTx5
Anritsu	MT8821C	Radio Communication Analyzer	N/A			6201525694
Emco	3115	Horn Antenna (1-18GHz)	6/18/2020	Biennial	6/18/2022	9704-5182
Emco	3116	Horn Antenna (18 - 40GHz)	7/20/2021	Biennial	7/20/2023	9203-2178
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/20/2021	Biennial	4/20/2023	00125518
Keysight Technologies	N9020A	MXA Signal Analyzer	3/15/2022	Annual	3/15/2023	MY54500644
Keysight Technologies	N9030A	PXA Signal Analyzer (44GHz)	7/21/2021	Annual	7/21/2022	MY49430494
Keysight Technologies	N9038A	MXE EMI Receiver	1/21/2022	Annual	1/21/2023	MY51210133
Keysight Technologies	E7515B	UXM 5G Wireless Test Platform	1/12/2022	Annual	1/12/2023	MY59150289
Rohde & Schwarz	CMW500	Radio Communication Tester	N/A			112347
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	ESW44	EMI Test Receiver 2Hz to 44 GHz	3/28/2022	Annual	3/28/2023	101716
Rohde & Schwarz	FSW26	2Hz-26.5GHz Signal and Spectrum Analyzer	4/14/2022	Annual	4/14/2023	103187
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107

Table 5-1. Test Equipment

Notes:

1. For equipment listed above that has a calibration date or calibration due date that falls within the test date range, care was taken to ensure that this equipment was used after the calibration date and before the calibration due date.
2. Equipment with a calibration date of "N/A" shown in this list was not used to make direct calibrated measurements.

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6.0 SAMPLE CALCULATIONS

QPSK Modulation

Emission Designator = 8M62G7D

LTE BW = 8.62 MHz

G = Phase Modulation

7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

QAM Modulation

Emission Designator = 8M45W7D

LTE BW = 8.45 MHz

W = Amplitude/Angle Modulated

7 = Quantized/Digital Info

D = Data transmission, telemetry, telecommand

Spurious Radiated Emission

Example: Spurious emission at 3700.40 MHz

The receive spectrum analyzer reading at 3 meters with the EUT on the turntable was -81.0 dBm. The gain of the substituted antenna is 8.1 dBi. The signal generator connected to the substituted antenna terminals is adjusted to produce a reading of -81.0 dBm on the spectrum analyzer. The loss of the cable between the signal generator and the terminals of the substituted antenna is 2.0 dB at 3700.40 MHz. So 6.1 dB is added to the signal generator reading of -30.9 dBm yielding -24.80 dBm. The fundamental EIRP was 25.50 dBm so this harmonic was 25.50 dBm $- (-24.80) = 50.3$ dBc.

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7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.
 FCC ID: A3LSMF721U
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 Mode(s): LTE/NR/ULCA

Test Condition	Test Description	FCC Part Section(s)	Test Limit	Test Result	Reference
CONDUCTED	Transmitter Conducted Output Power*	2.1046(a), 2.1046(c)	N/A	PASS	Section 7.2
	Occupied Bandwidth	2.1049(h)	N/A	PASS	Section 7.3
	Conducted Band Edge / Spurious Emissions (LTE Band 30; NR Band n30)	2.1051, 27.53(a)(4)	Undesirable emissions must meet the limits detailed in 27.53(a)(4)	PASS	Sections 7.4, 7.5
	Conducted Band Edge / Spurious Emissions (LTE Band 7, 38, 41; NR Band n7, n38, n41)	2.1051, 27.53(m)(4)	Undesirable emissions must meet the limits detailed in 27.53(m)(4)	PASS	Sections 7.4, 7.5
	Frequency Stability	2.1055, 27.54	Fundamental emissions stay within authorized frequency block	PASS	Section 7.8
RADIATED	Equivalent Isotropic Radiated Power (LTE Band 30; NR Band n30)	27.50(a)(3)	≤ 250mW / 5MHz max. EIRP	PASS	Section 7.6
	Equivalent Isotropic Radiated Power (LTE Band 7, 38, 41; NR Band n7, n38, n41)	27.50(h)(2)	≤ 2 Watts max. EIRP	PASS	Section 7.6
	Radiated Spurious Emissions (LTE Band 30; NR Band n30)	2.1053, 27.53(a)(4)	Undesirable emissions must meet the limits detailed in 27.53(a)(4)	PASS	Section 7.7
	Radiated Spurious Emissions (LTE Band 7, 38, 41; NR Band n7, n38, n41)	2.1053, 27.53(m)	Undesirable emissions must meet the limits detailed in 27.53(m)	PASS	Section 7.7

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

Notes:

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

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7.2 Conducted Output Power Data

Test Overview

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

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

Test Procedure Used

ANSI C63.26-2015 – Section 5.2

Test Settings

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

Test Setup

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

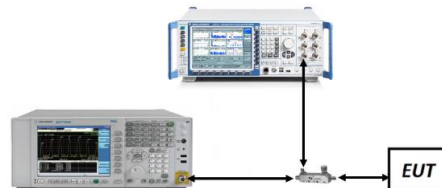


Figure 7-1. Test Instrument & Measurement Setup

Test Notes

1. Uplink carrier aggregation is only supported in this EUT while operating in Power Class 3.
2. Conducted power measurements were evaluated using various combinations of RB size, RB offset, modulation, and channel bandwidth. Channel bandwidth data is shown in the tables below based only on the channel bandwidths that were supported in this device.
3. All other conducted power measurements are contained in the RF exposure report for this filing.

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Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
10 MHz	$\pi/2$ BPSK	27710	2310.0	1 / 38	23.73
	QPSK	27710	2310.0	1 / 38	23.87
	16-QAM	27710	2310.0	1 / 38	22.82
5 MHz	$\pi/2$ BPSK	27685	2307.5	1 / 6	23.48
		27710	2310.0	1 / 6	23.49
		27735	2312.5	1 / 6	23.33
	QPSK	27685	2307.5	1 / 6	23.53
		27710	2310.0	1 / 6	23.53
		27735	2312.5	1 / 6	23.45
	16-QAM	27710	2310.0	1 / 6	22.65

Table 7-1. Conducted Power Data (NR Band n30 ANT I)

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Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	$\pi/2$ BPSK	509202	2546.0	1 / 68	26.14
		518598	2593.0	1 / 136	26.34
		528000	2640.0	1 / 136	26.42
	QPSK	509202	2546.0	1 / 68	26.17
		518598	2593.0	1 / 136	26.41
		528000	2640.0	1 / 68	26.47
	16-QAM	528000	2640.0	1 / 136	25.29
90 MHz	$\pi/2$ BPSK	508200	2541.0	1 / 122	25.66
		518592	2593.0	1 / 122	25.88
		529002	2645.0	1 / 122	25.73
	QPSK	508200	2541.0	1 / 122	25.81
		518592	2593.0	1 / 122	26.06
		529002	2645.0	1 / 122	26.31
	16-QAM	529002	2645.0	1 / 122	25.36
80 MHz	$\pi/2$ BPSK	507204	2536.0	1 / 108	25.80
		518598	2593.0	1 / 108	26.18
		529998	2650.0	1 / 108	25.79
	QPSK	507204	2536.0	1 / 108	25.81
		518598	2593.0	1 / 108	26.05
		529998	2650.0	1 / 108	26.26
	16-QAM	529998	2650.0	1 / 108	25.15
70 MHz	$\pi/2$ BPSK	506196	2531.0	1 / 108	25.96
		518598	2593.0	1 / 108	25.89
		531000	2655.0	1 / 108	25.82
	QPSK	506196	2531.0	1 / 108	25.99
		518598	2593.0	1 / 108	25.93
		531000	2655.0	1 / 108	25.90
	16-QAM	518598	2593.0	1 / 108	24.98
60 MHz	$\pi/2$ BPSK	505200	2526.0	1 / 81	25.66
		518598	2593.0	1 / 81	25.98
		531996	2660.0	1 / 40	26.27
	QPSK	505200	2526.0	1 / 81	25.99
		518598	2593.0	1 / 81	26.25
		531996	2660.0	1 / 40	26.36
	16-QAM	531996	2660.0	1 / 40	25.33
50 MHz	$\pi/2$ BPSK	504204	2521.0	1 / 99	26.26
		518598	2593.0	1 / 99	26.44
		532998	2665.0	1 / 99	26.45
	QPSK	504204	2521.0	1 / 66	26.05
		518598	2593.0	1 / 66	26.27
		532998	2665.0	1 / 66	26.24
	16-QAM	532998	2665.0	1 / 99	25.37
40 MHz	$\pi/2$ BPSK	503202	2516.0	1 / 79	26.43
		518598	2593.0	1 / 79	26.55
		534000	2670.0	1 / 79	26.58
	QPSK	503202	2516.0	1 / 53	26.05
		518598	2593.0	1 / 53	26.24
		534000	2670.0	1 / 79	26.13
	16-QAM	534000	2670.0	1 / 79	25.54
30 MHz	$\pi/2$ BPSK	502203	2511.0	1 / 58	25.88
		518598	2593.0	1 / 39	26.18
		534999	2675.0	1 / 39	25.89
	QPSK	502203	2511.0	1 / 39	26.02
		518598	2593.0	1 / 39	26.24
		534999	2675.0	1 / 39	26.16
	16-QAM	534999	2675.0	1 / 39	25.31
20 MHz	$\pi/2$ BPSK	501204	2506.0	1 / 25	26.03
		518598	2593.0	1 / 25	26.34
		535998	2680.0	1 / 25	26.24
	QPSK	501204	2506.0	1 / 25	26.18
		518598	2593.0	1 / 25	26.59
		535998	2680.0	1 / 25	26.41
	16-QAM	535998	2680.0	1 / 25	25.24

Table 7-2. Conducted Power Data (NR Band n41PC2 ANT I)

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Bandwidth	Modulation	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	2546.0	1 / 204	20.76
		2593.0	1 / 204	20.75
		2640.0	1 / 68	20.32
	QPSK	2546.0	1 / 136	20.77
		2593.0	1 / 204	20.28
		2640.0	1 / 68	20.34

Table 7-3. Conducted Power Data (NR Band n41PC2 ANT B)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	510000	2550.0	1 / 136	20.05
		518598	2593.0	273 / 0	19.73
		528000	2640.0	1 / 68	18.54
	QPSK	510000	2550.0	1 / 136	19.94
		518598	2593.0	1 / 204	19.15
		528000	2640.0	1 / 68	18.54

Table 7-4. Conducted Power Data (NR Band n41PC2 ANT F)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	510000	2550.0	1 / 204	15.84
		518598	2593.0	1 / 136	13.99
		528000	2640.0	1 / 136	13.69
	QPSK	510000	2550.0	1 / 136	15.55
		518598	2593.0	1 / 68	13.73
		528000	2640.0	1 / 68	13.67

Table 7-5. Conducted Power Data (NR Band n41PC2 ANT C)

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NR (SCS 15kHz)						LTE						NR	LTE	EN-DC
NR Band	NR Bandwidth [MHz]	NR Channel	NR Frequency [MHz]	Mod.	NR RB#/Offset	LTE Band	LTE Bandwidth [MHz]	LTE Channel	LTE Frequency [MHz]	Mod.	LTE RB#/Offset	Conducted Power [dBm]	Conducted Power [dBm]	Total Tx. Power [dBm]
n30	10	Mid	2310	QPSK	50/0	B5	10	Mid	836.5	QPSK	50/0	17.12	22.86	23.89
				QPSK	50/0					QPSK	1/25	17.23	23.08	24.08
				QPSK	1/26					QPSK	50/0	17.33	22.98	24.03
				QPSK	1/26					QPSK	1/25	17.27	23.04	24.06
				16Q	50/0					16Q	1/25	17.07	23.10	24.07

Table 7-6. EN-DC Conducted Power Data (EN-DC n30-B5)

NR (SCS 15kHz)						LTE						NR	LTE	EN-DC
NR Band	NR Bandwidth [MHz]	NR Channel	NR Frequency [MHz]	Mod.	NR RB#/Offset	LTE Band	LTE Bandwidth [MHz]	LTE Channel	LTE Frequency [MHz]	Mod.	LTE RB#/Offset	Conducted Power [dBm]	Conducted Power [dBm]	Total Tx. Power [dBm]
n30	10	Mid	2310	QPSK	50/0	B66	20	Mid	1745	QPSK	100/0	19.80	21.12	23.52
				QPSK	50/0					QPSK	1/50	19.76	21.34	23.63
				QPSK	1/26					QPSK	100/0	20.77	21.19	24.00
				QPSK	1/26					QPSK	1/50	20.83	21.24	24.05
				16Q	1/26					16Q	1/50	20.01	21.09	23.59

Table 7-7. EN-DC Conducted Power Data (EN-DC n30-B66)

NR (SCS 30kHz)						LTE						NR	LTE	EN-DC
NR Band	NR Bandwidth [MHz]	NR Channel	NR Frequency [MHz]	Mod.	NR RB#/Offset	LTE Band	LTE Bandwidth [MHz]	LTE Channel	LTE Frequency [MHz]	Mod.	LTE RB#/Offset	Conducted Power [dBm]	Conducted Power [dBm]	Total Tx. Power [dBm]
n41	100	Mid	2593	QPSK	270/0	B66	20	Mid	1745	QPSK	100/0	20.49	20.60	23.56
				QPSK	270/0					QPSK	1/50	20.35	21.53	23.99
				QPSK	1/136					QPSK	100/0	21.27	20.54	23.93
				QPSK	1/136					QPSK	1/50	21.31	21.60	24.47
				16Q	1/136					16Q	1/50	20.36	21.31	23.87

Table 7-8. EN-DC Conducted Power Data (n41-B66)

Power State	Band	Bandwidth (PCC + SCC)	PCC					SCC					ULCA Tx. Power [dBm]
			Modulation	UL Channel	UL Frequency	UL # RB	UL RB Offset	Modulation	UL Channel	UL Frequency	UL # RB	UL RB Offset	
Max	LTE B41 (PC2)	20MHz + 20MHz	QPSK	39750	2506.0	1	99	QPSK	39948	2525.8	1	0	25.92
				40620	2593.0	1	99		40818	2612.8	1	0	26.06
				41490	2680.0	1	0		41292	2660.2	1	99	26.21
			QPSK	41490	2680	100	0	QPSK	41292	2660.2	100	0	24.40
			16-QAM	41490	2680	100	0	16-QAM	41292	2660.2	100	0	23.42
			64-QAM	41490	2680	100	0	64-QAM	41292	2660.2	100	0	22.74
			256-QAM	41490	2680	100	0	256-QAM	41292	2660.2	100	0	21.41

Table 7-9. Conducted Power Data (ULCA LTE B41(PC2))

Power State	Band	Bandwidth (PCC + SCC)	PCC					SCC					ULCA Tx. Power [dBm]
			Modulation	UL Channel	UL Frequency	UL # RB	UL RB Offset	Modulation	UL Channel	UL Frequency	UL # RB	UL RB Offset	
Max	LTE B41 (PC3)	20MHz + 20MHz	QPSK	39750	2506.0	1	99	QPSK	39948	2525.8	1	0	24.42
				40620	2593.0	1	99		40818	2612.8	1	0	24.83
				41490	2680.0	1	0		41292	2660.2	1	99	24.28
			QPSK	40620	2593	100	0	QPSK	40818	2612.8	100	0	22.58
			16-QAM	40620	2593	100	0	16-QAM	40818	2612.8	100	0	21.66
			64-QAM	40620	2593	100	0	64-QAM	40818	2612.8	100	0	21.14
			256-QAM	40620	2593	100	0	256-QAM	40818	2612.8	100	0	19.67

Table 7-10. Conducted Power Data (ULCA LTE B41(PC3))

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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 $\geq 3 \times$ 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.

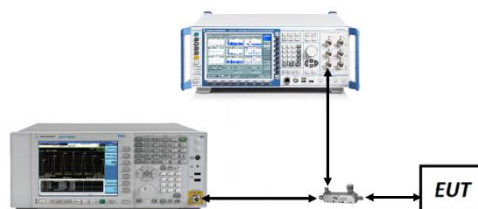


Figure 7-2. Test Instrument & Measurement Setup

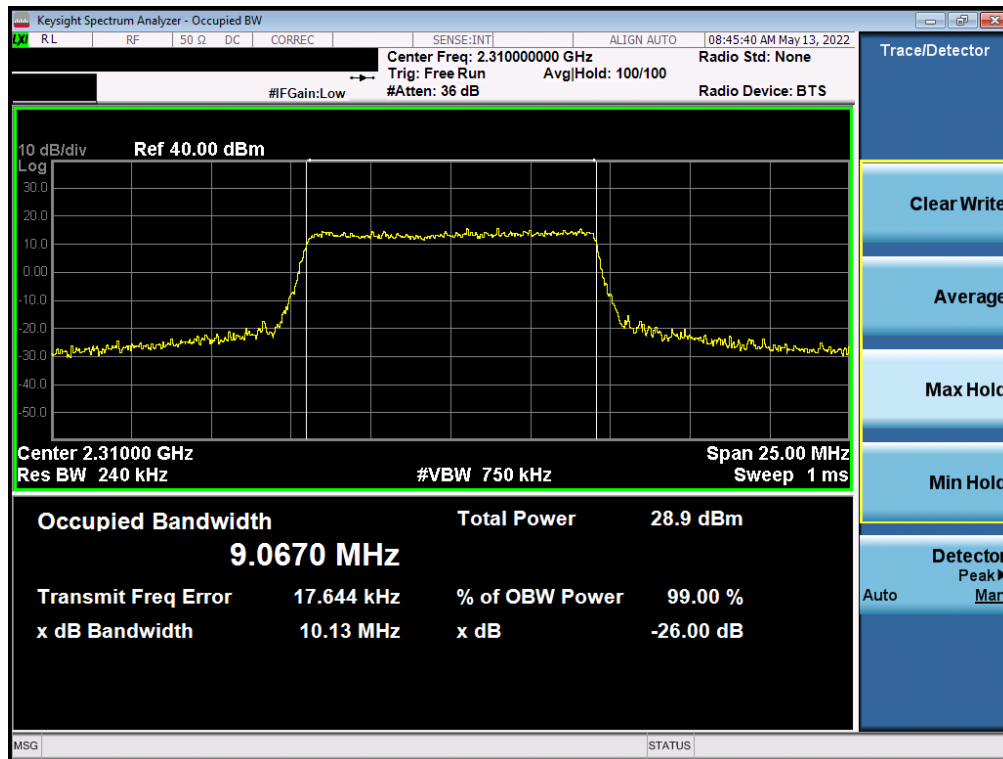
Test Notes

None.

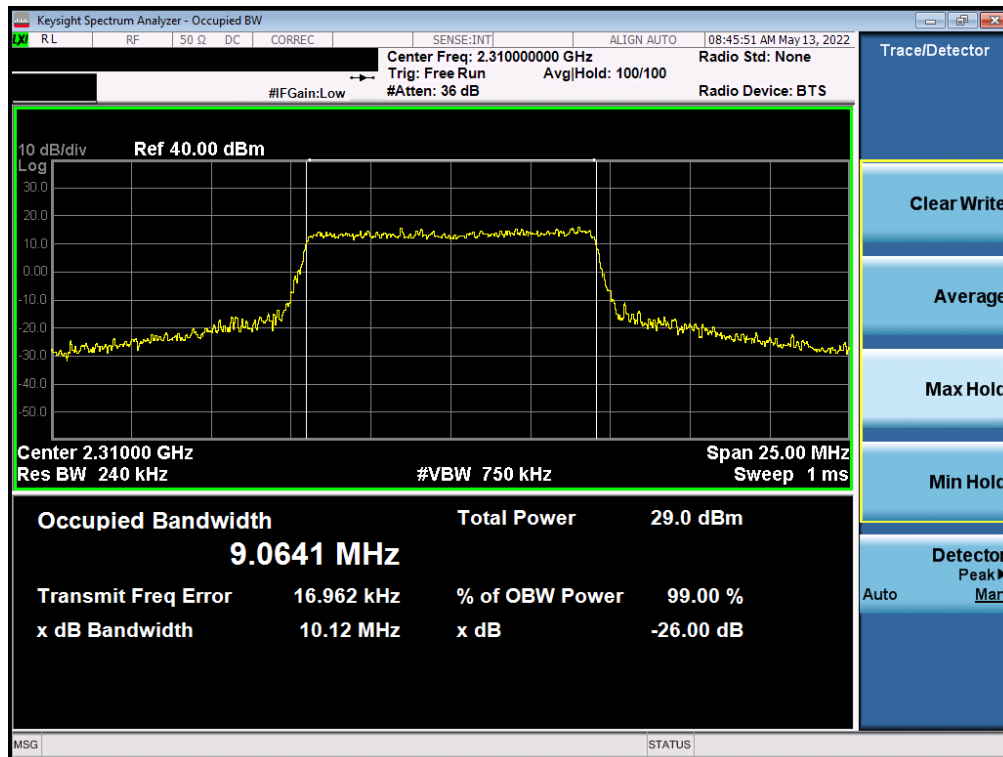
FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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LTE Band 30

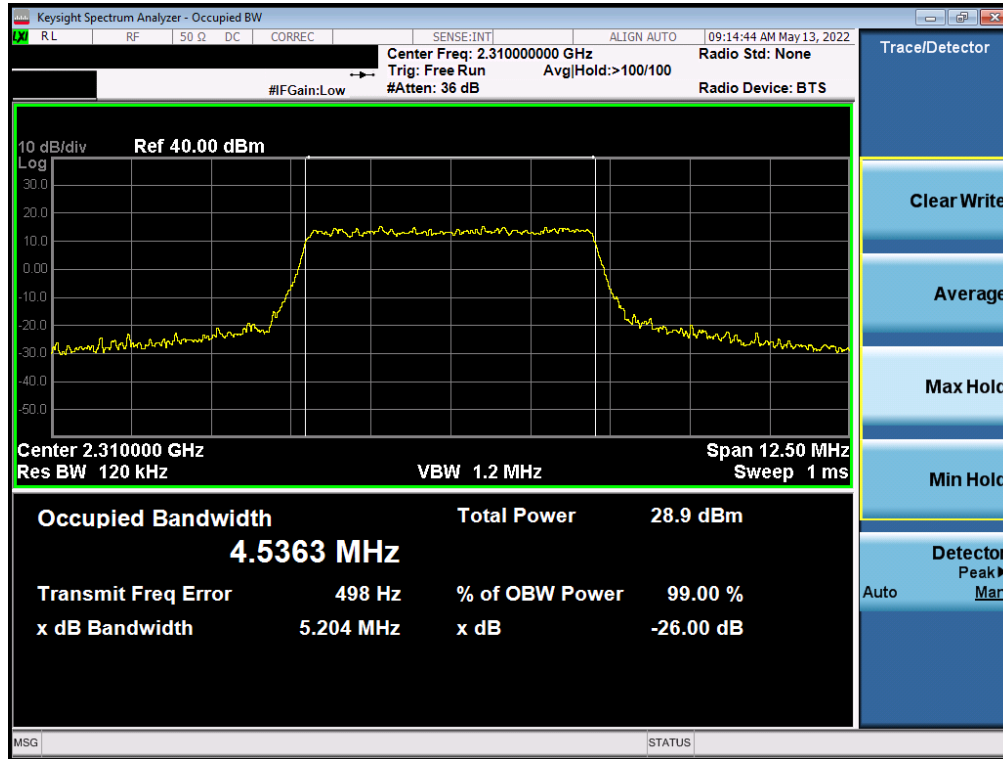


Plot 7-11. Occupied Bandwidth Plot (LTE Band 30 - 10MHz QPSK - Full RB)

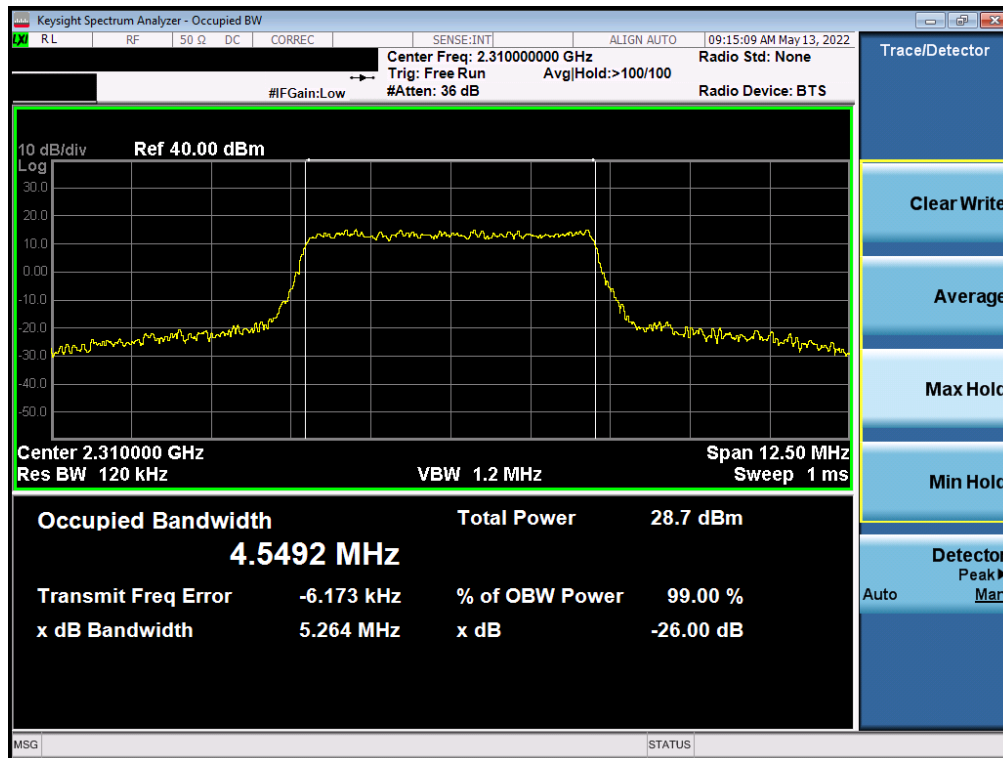


Plot 7-12. Occupied Bandwidth Plot (LTE Band 30 - 10MHz 16-QAM - Full RB)

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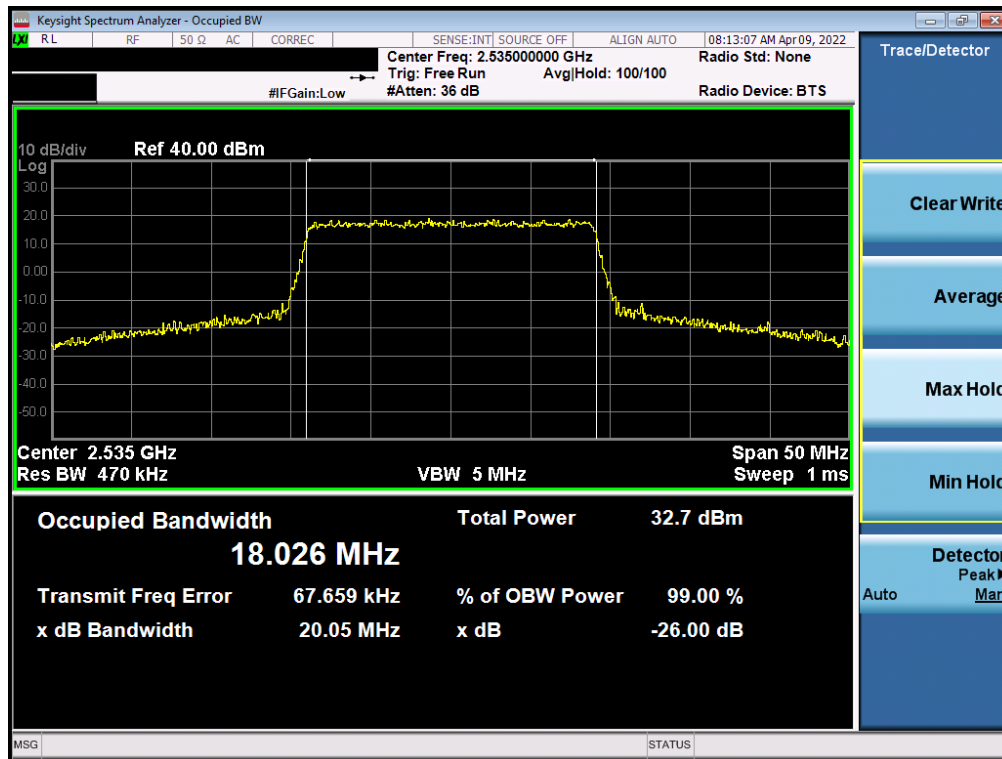
Plot 7-13. Occupied Bandwidth Plot (LTE Band 30 - 5MHz QPSK - Full RB)



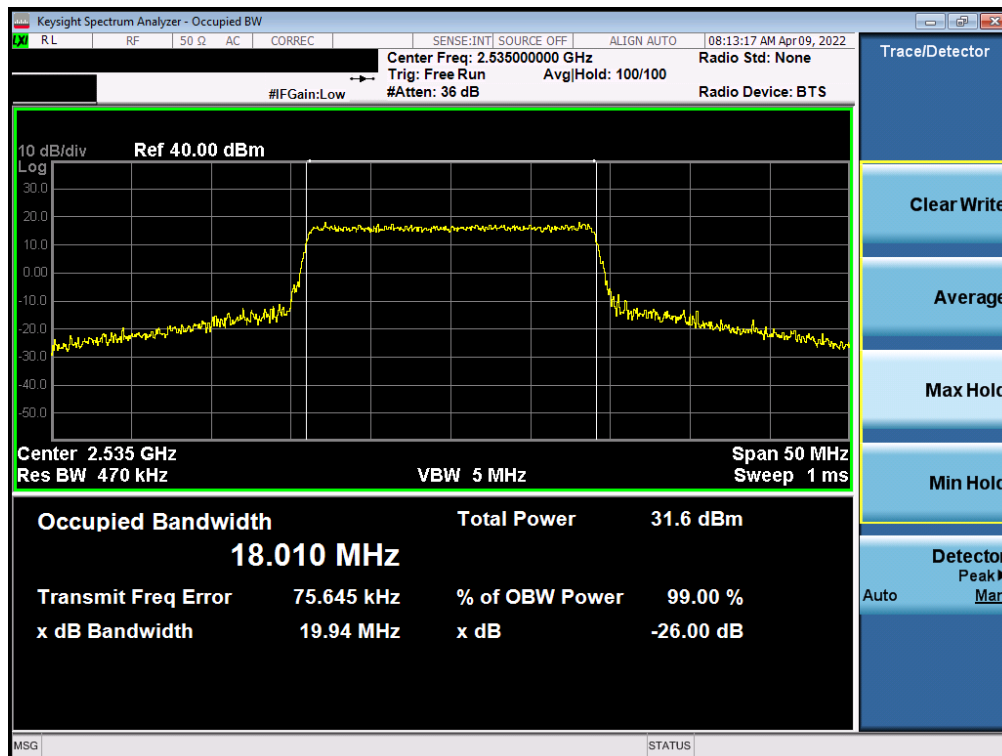
Plot 7-14. Occupied Bandwidth Plot (LTE Band 30 - 5MHz 16-QAM - Full RB)

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LTE Band 7

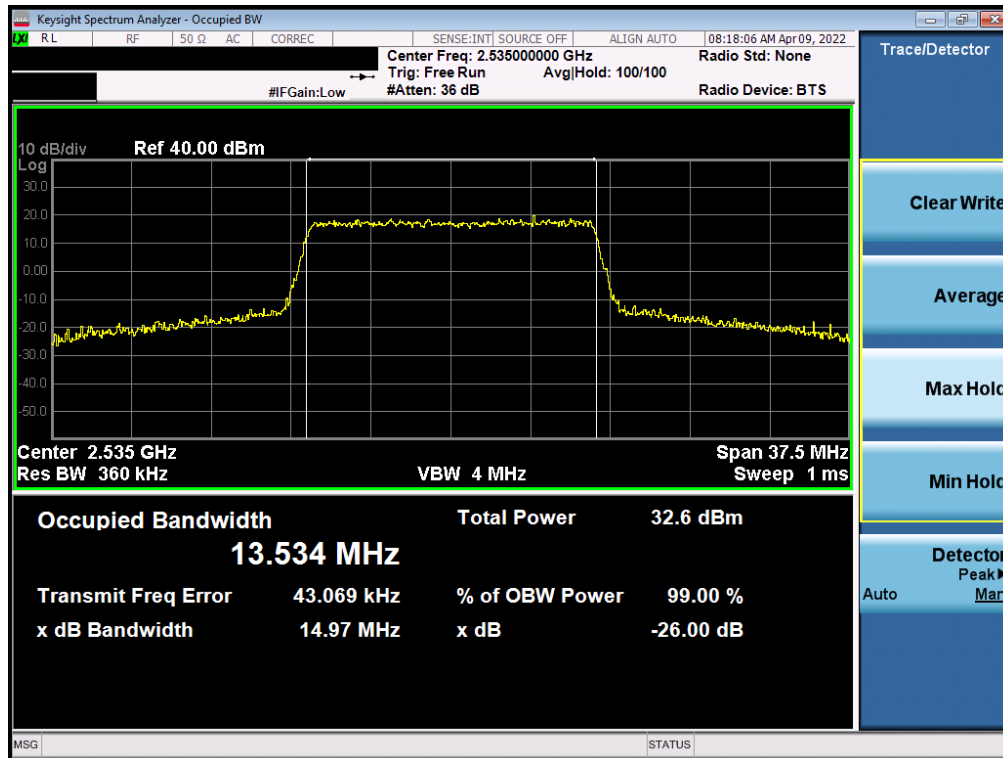


Plot 7-15. Occupied Bandwidth Plot (LTE Band 7 - 20MHz QPSK - Full RB)

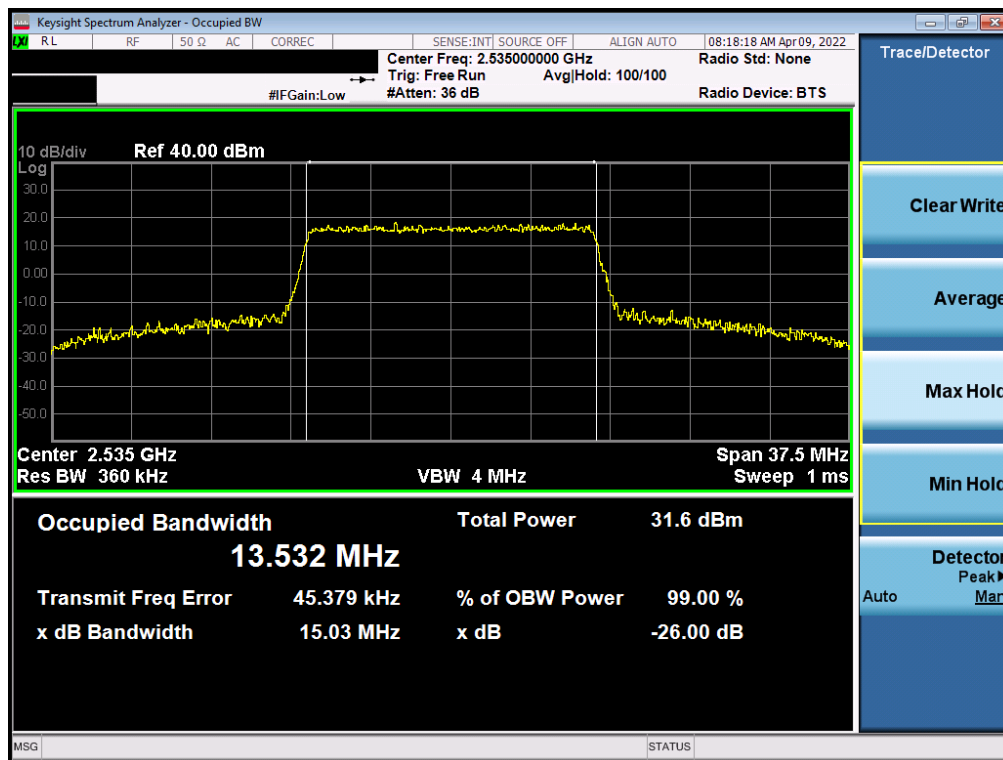


Plot 7-16. Occupied Bandwidth Plot (LTE Band 7 - 20MHz 16-QAM - Full RB)

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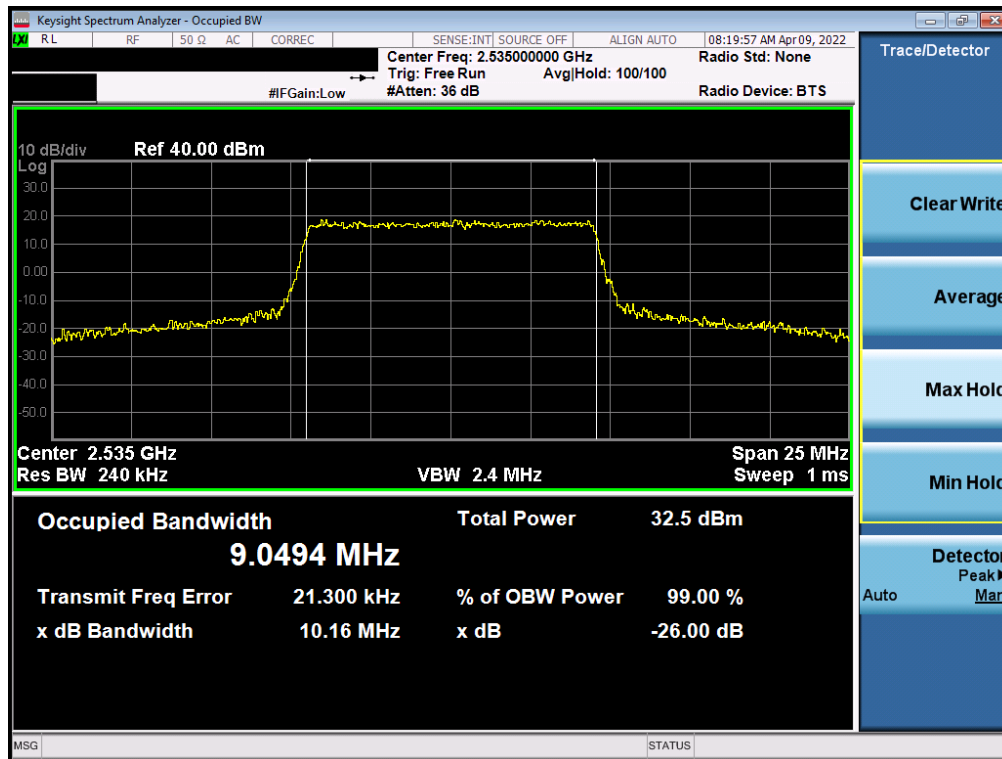


Plot 7-17. Occupied Bandwidth Plot (LTE Band 7 - 15MHz QPSK - Full RB)

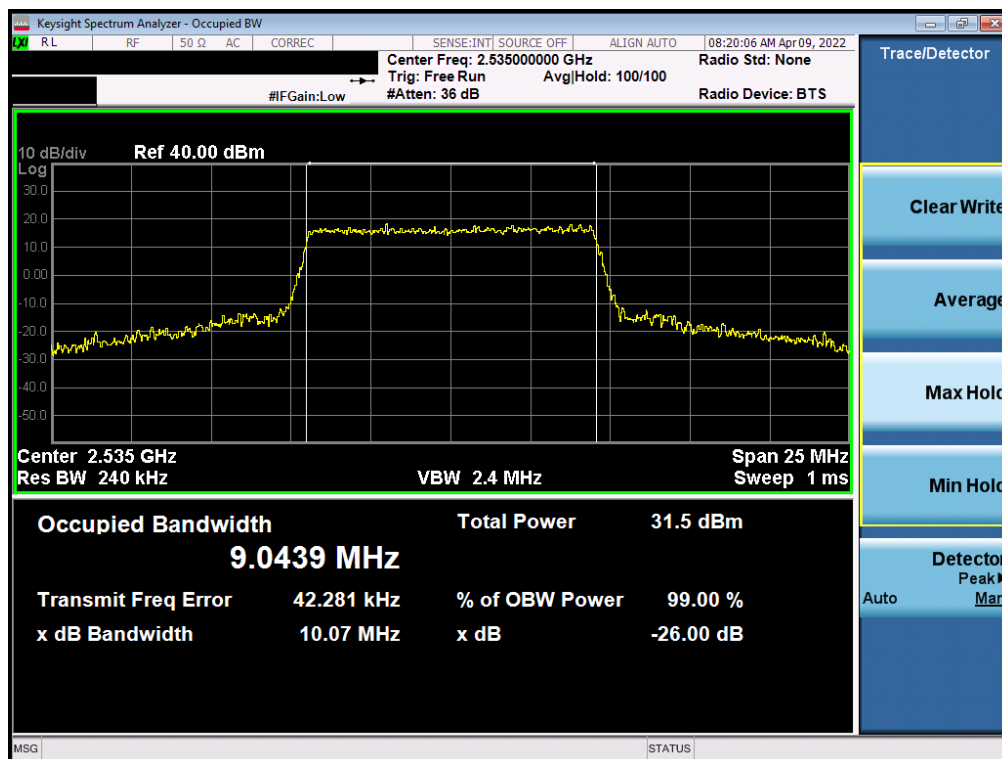


Plot 7-18. Occupied Bandwidth Plot (LTE Band 7 - 15MHz 16-QAM - Full RB)

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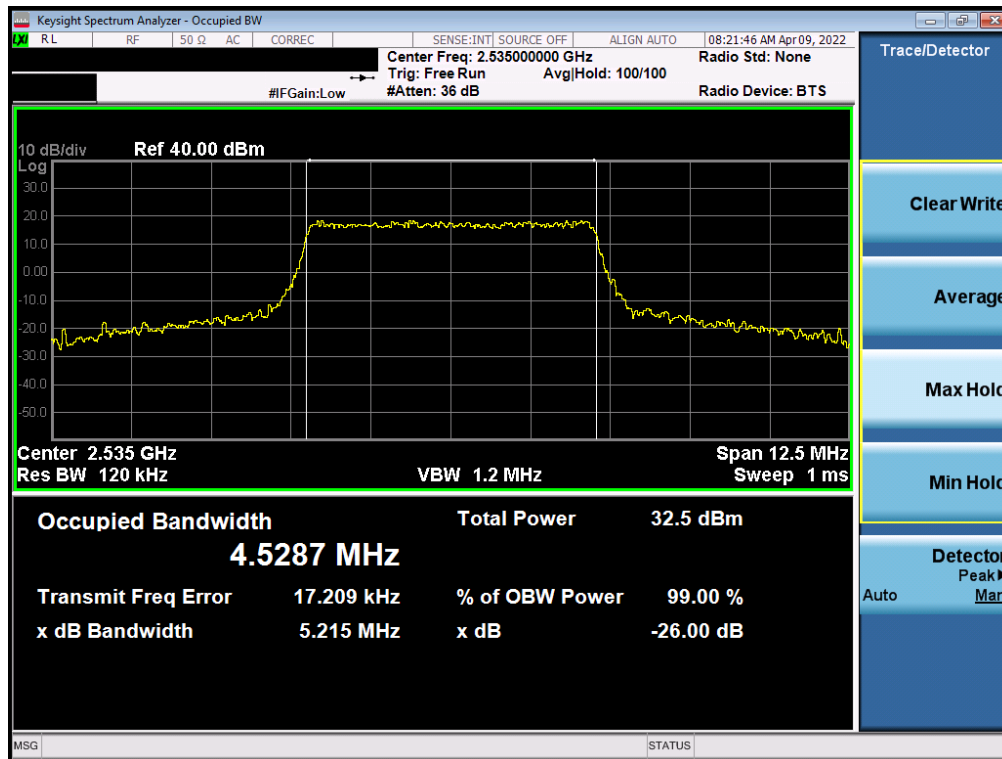


Plot 7-19. Occupied Bandwidth Plot (LTE Band 7 - 10MHz QPSK - Full RB)

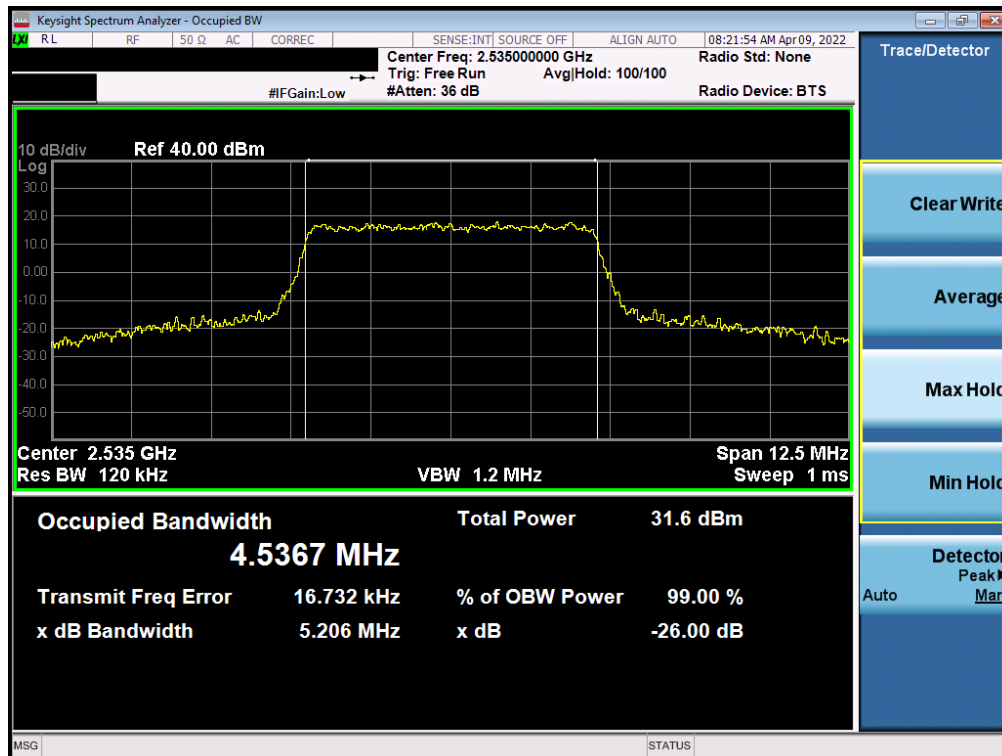


Plot 7-20. Occupied Bandwidth Plot (LTE Band 7 - 10MHz 16-QAM - Full RB)

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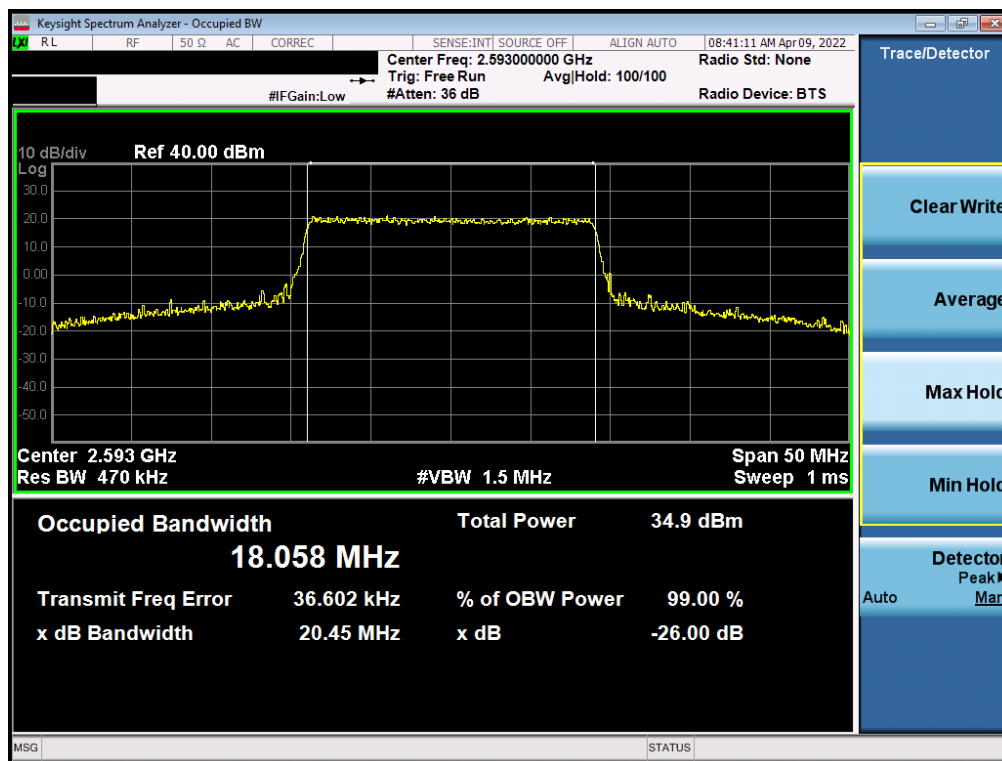
Plot 7-21. Occupied Bandwidth Plot (LTE Band 7 - 5MHz QPSK - Full RB)



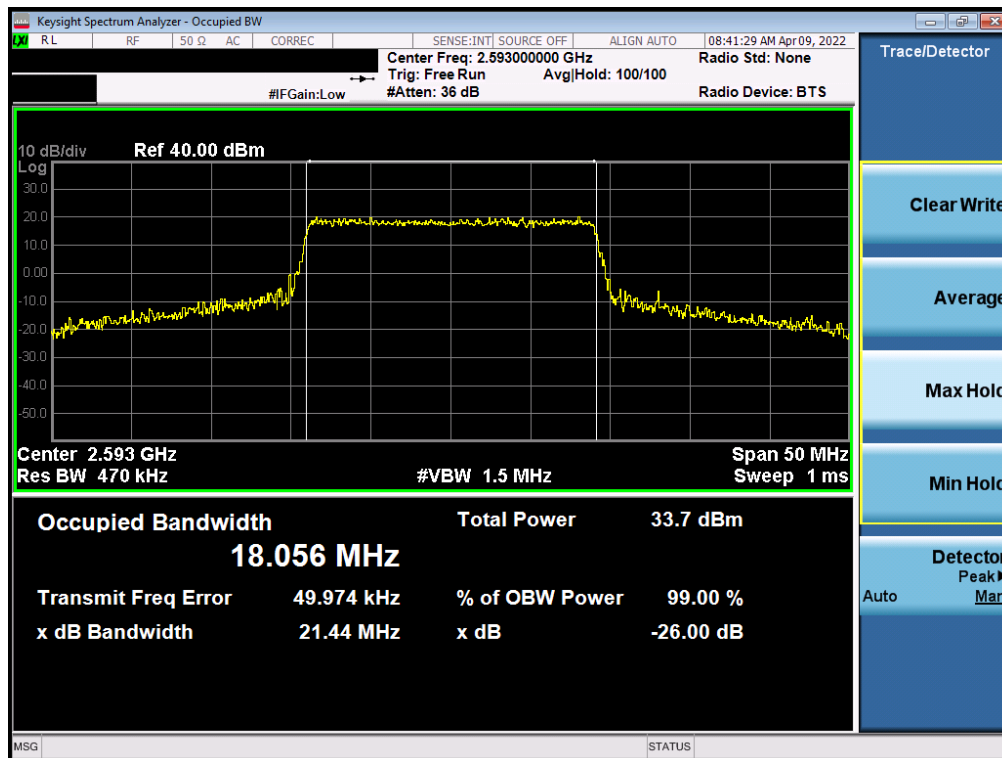
Plot 7-22. Occupied Bandwidth Plot (LTE Band 7 - 5MHz 16-QAM - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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LTE Band 41(PC2)



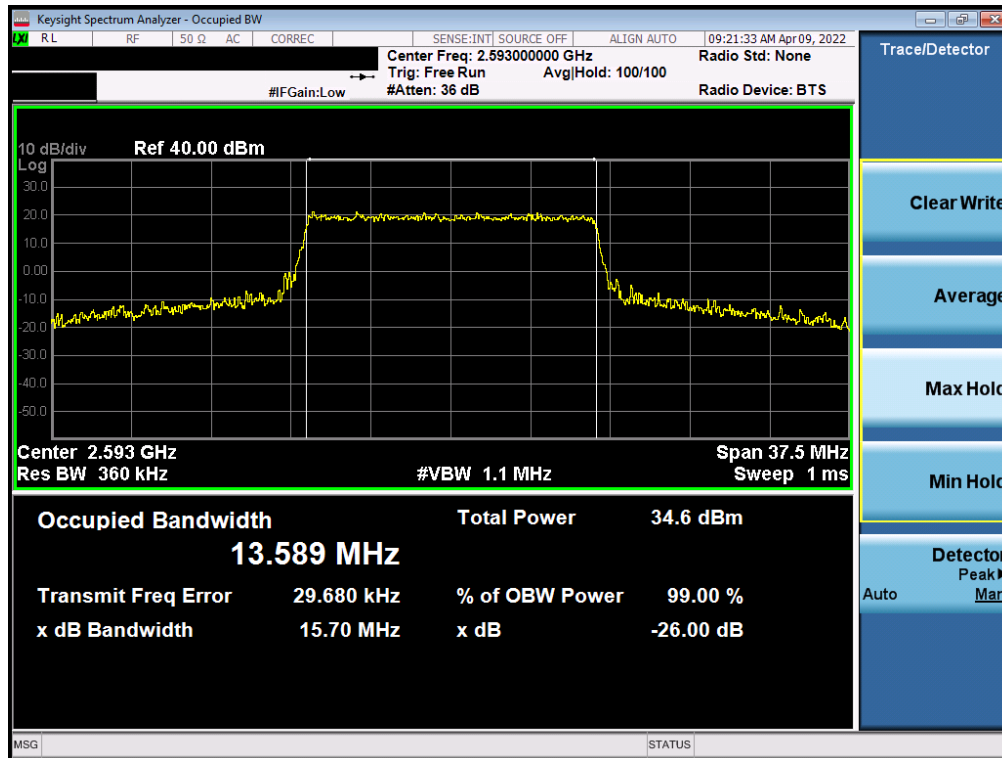
Plot 7-23. Occupied Bandwidth Plot (LTE Band 41(PC2) - 20MHz QPSK - Full RB)



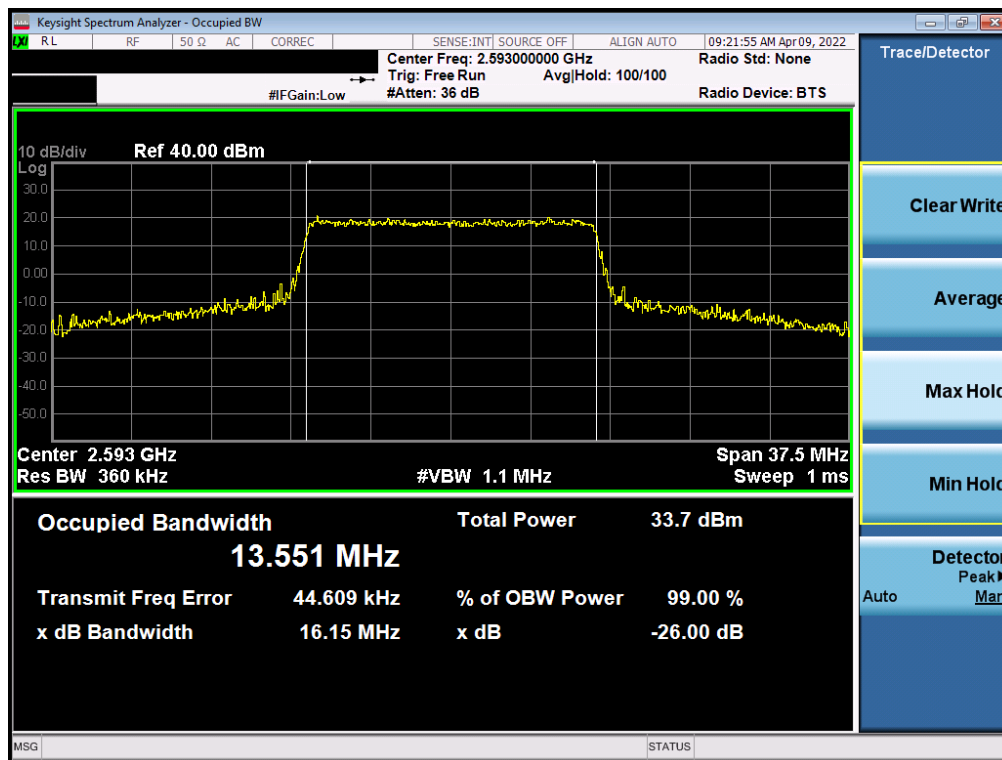
Plot 7-24. Occupied Bandwidth Plot (LTE Band 41(PC2) - 20MHz 16-QAM - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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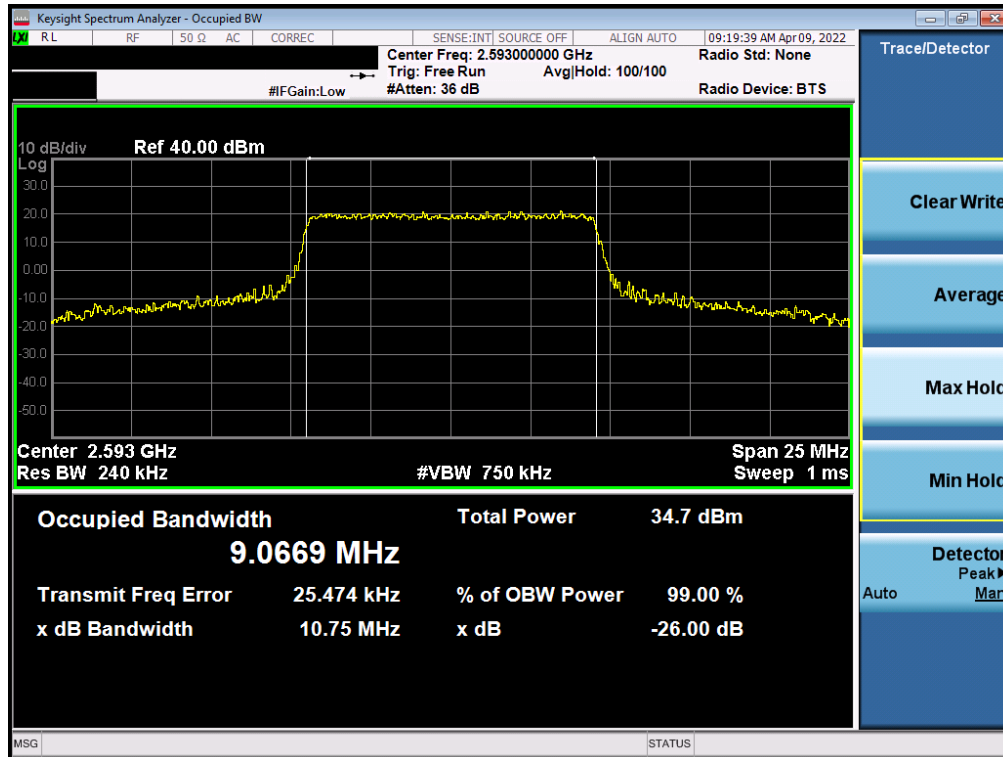


Plot 7-25. Occupied Bandwidth Plot (LTE Band 41(PC2) - 15MHz QPSK - Full RB)



Plot 7-26. Occupied Bandwidth Plot (LTE Band 41(PC2) - 15MHz 16-QAM - Full RB)

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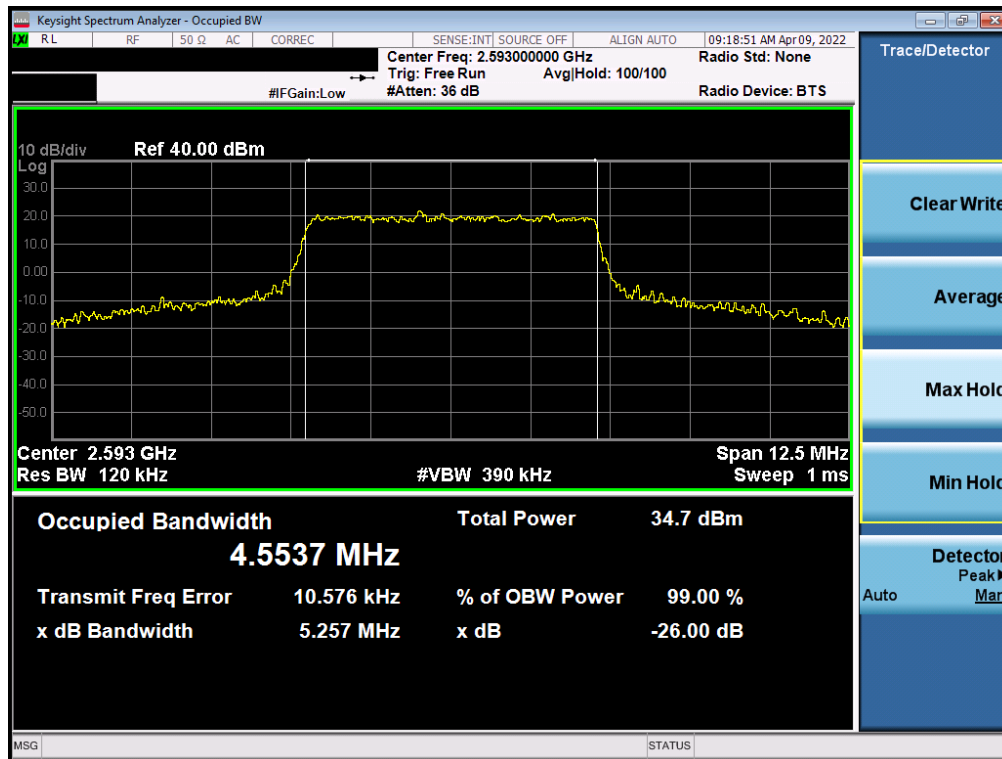


Plot 7-27. Occupied Bandwidth Plot (LTE Band 41(PC2) - 10MHz QPSK - Full RB)

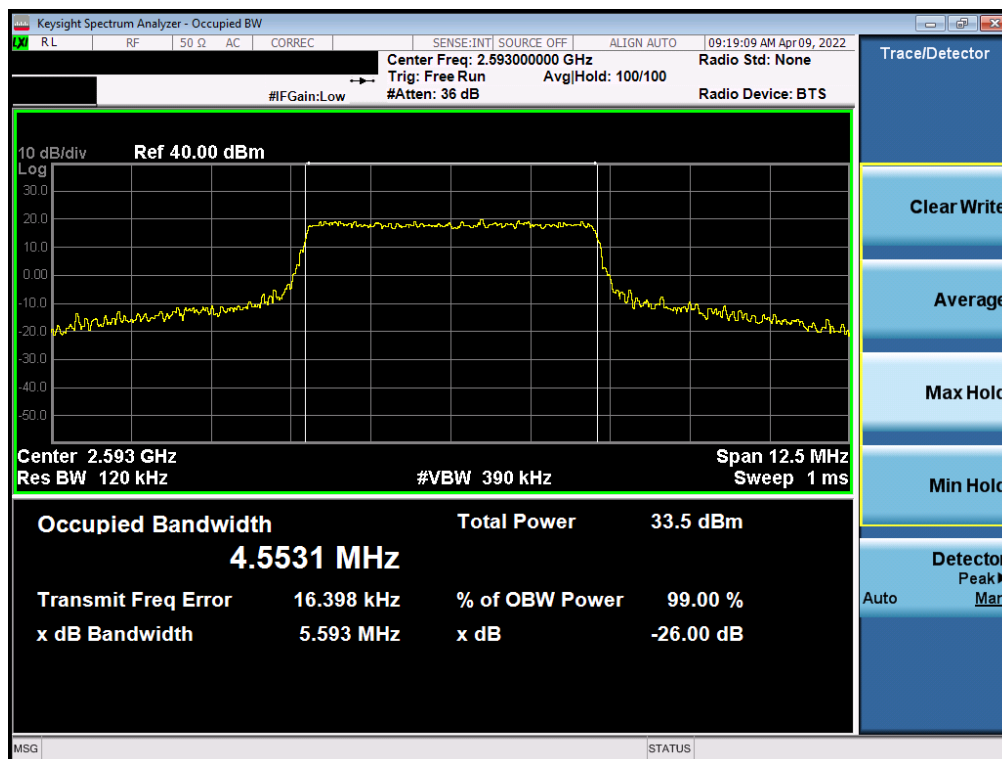


Plot 7-28. Occupied Bandwidth Plot (LTE Band 41(PC2) - 10MHz 16-QAM - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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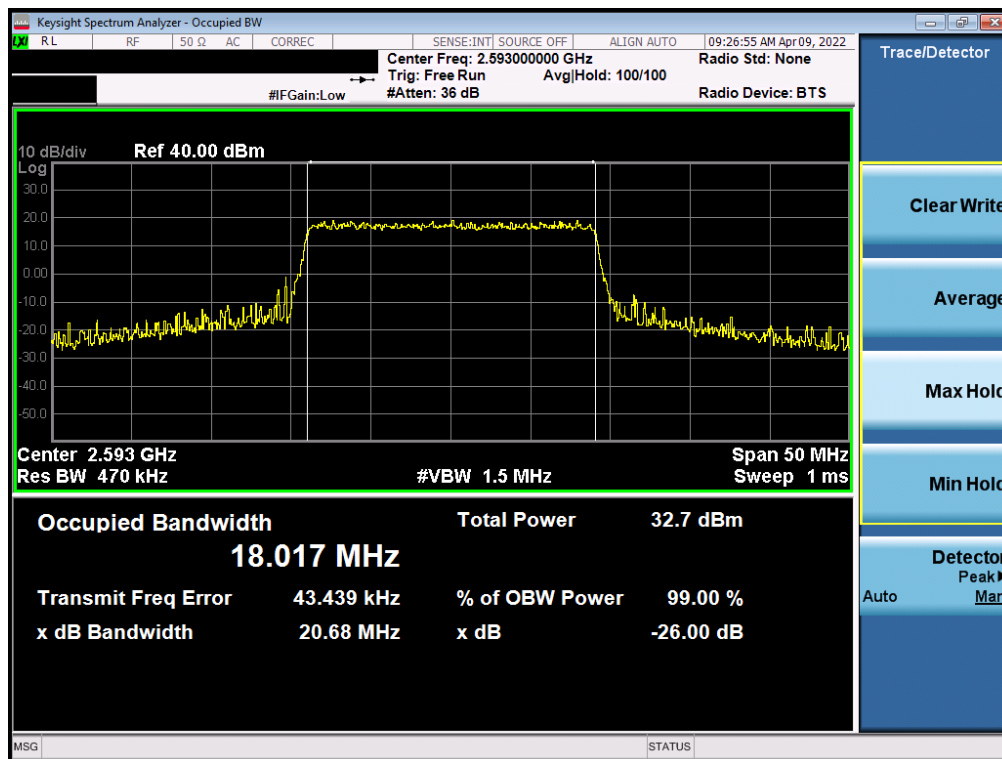
Plot 7-29. Occupied Bandwidth Plot (LTE Band 41(PC2) - 5MHz QPSK - Full RB)



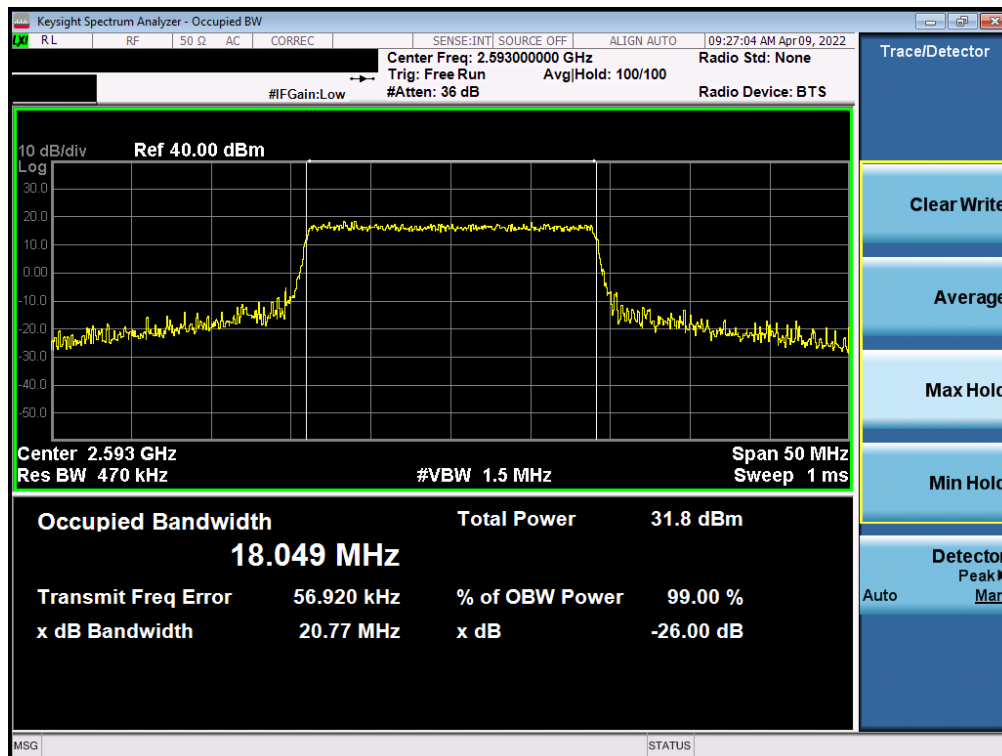
Plot 7-30. Occupied Bandwidth Plot (LTE Band 41(PC2) - 5MHz 16-QAM - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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LTE Band 41(PC3)/38



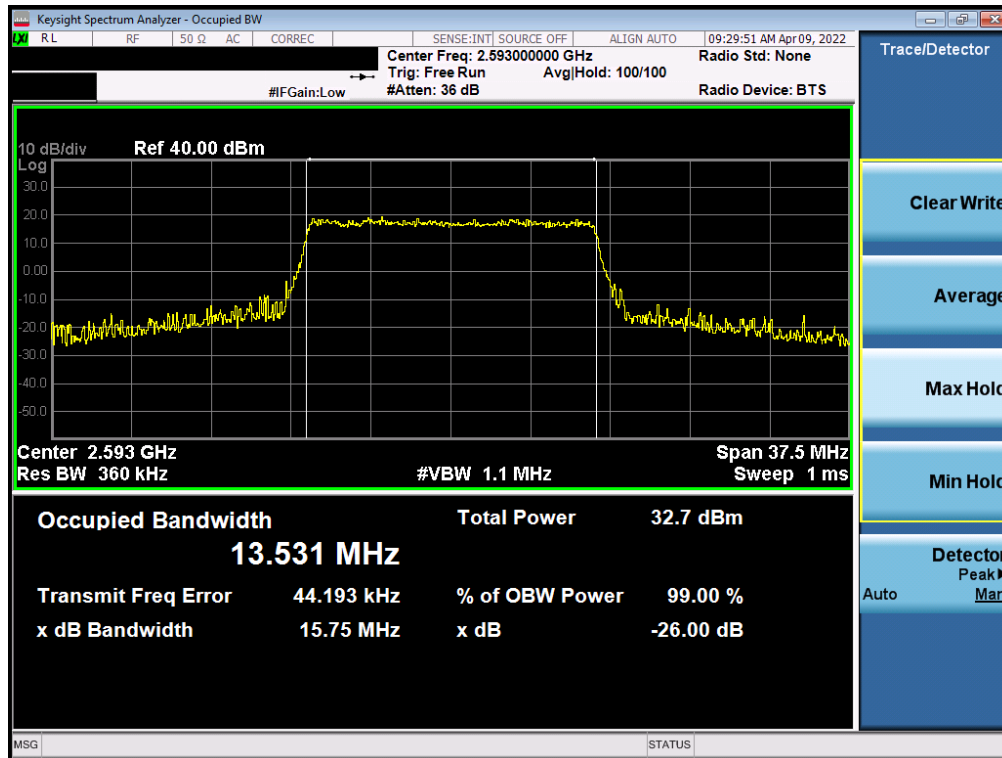
Plot 7-31. Occupied Bandwidth Plot (LTE Band 41(PC3)/38 - 20MHz QPSK - Full RB)



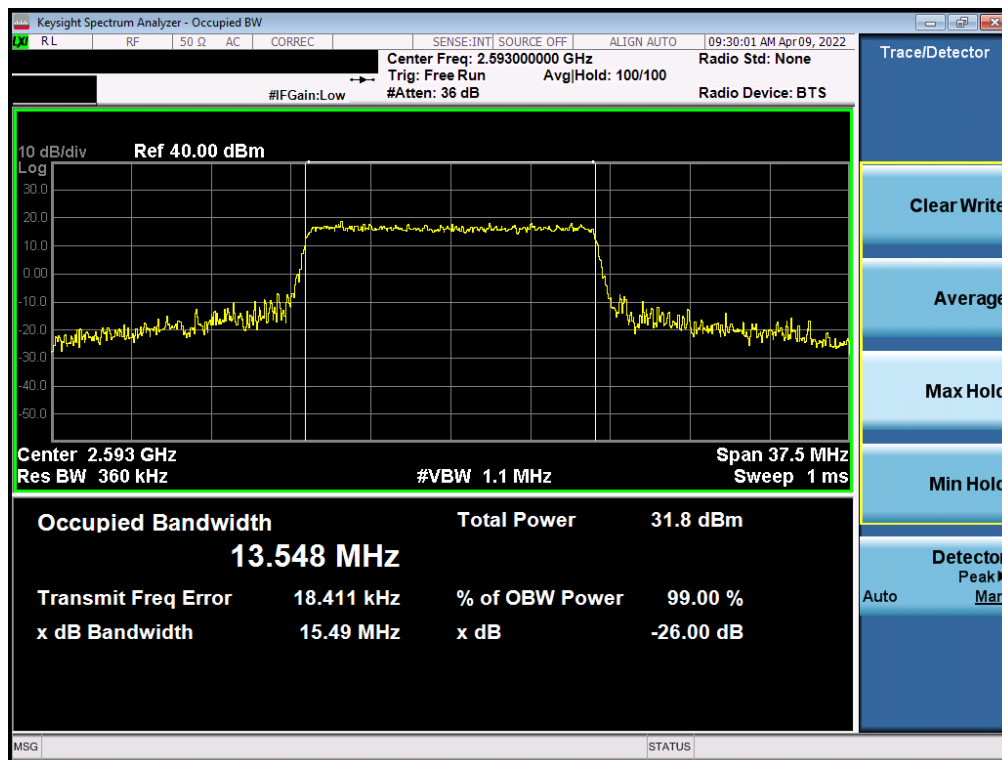
Plot 7-32. Occupied Bandwidth Plot (LTE Band 41(PC3)/38 - 20MHz 16-QAM - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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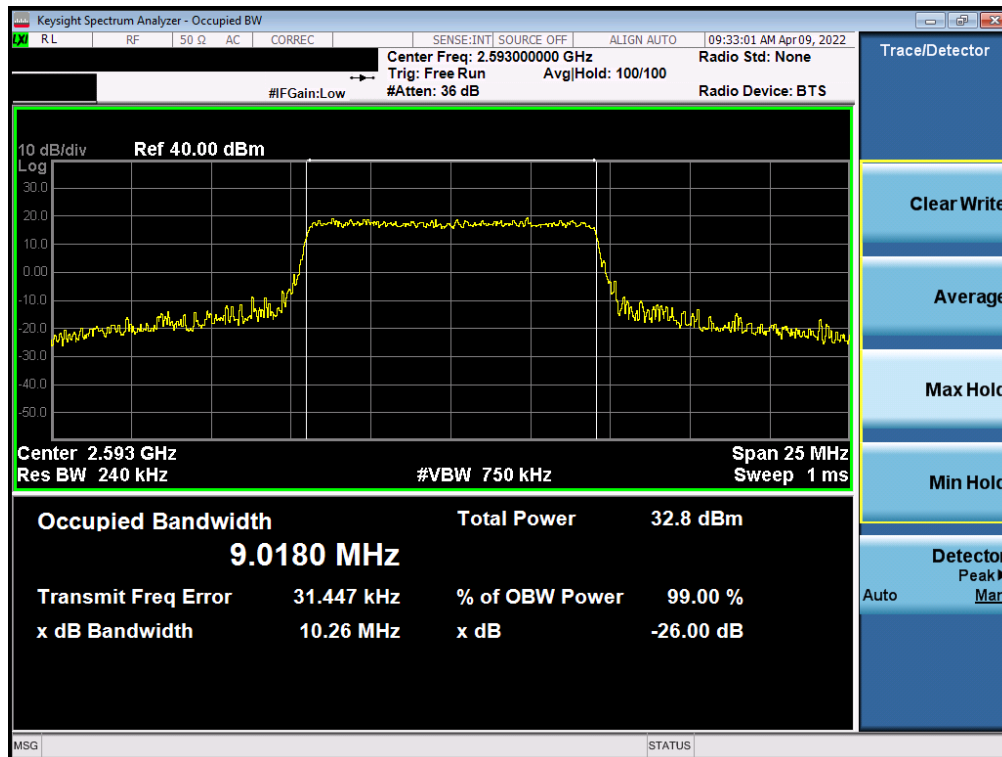


Plot 7-33. Occupied Bandwidth Plot (LTE Band 41(PC3)/38 - 15MHz QPSK - Full RB)

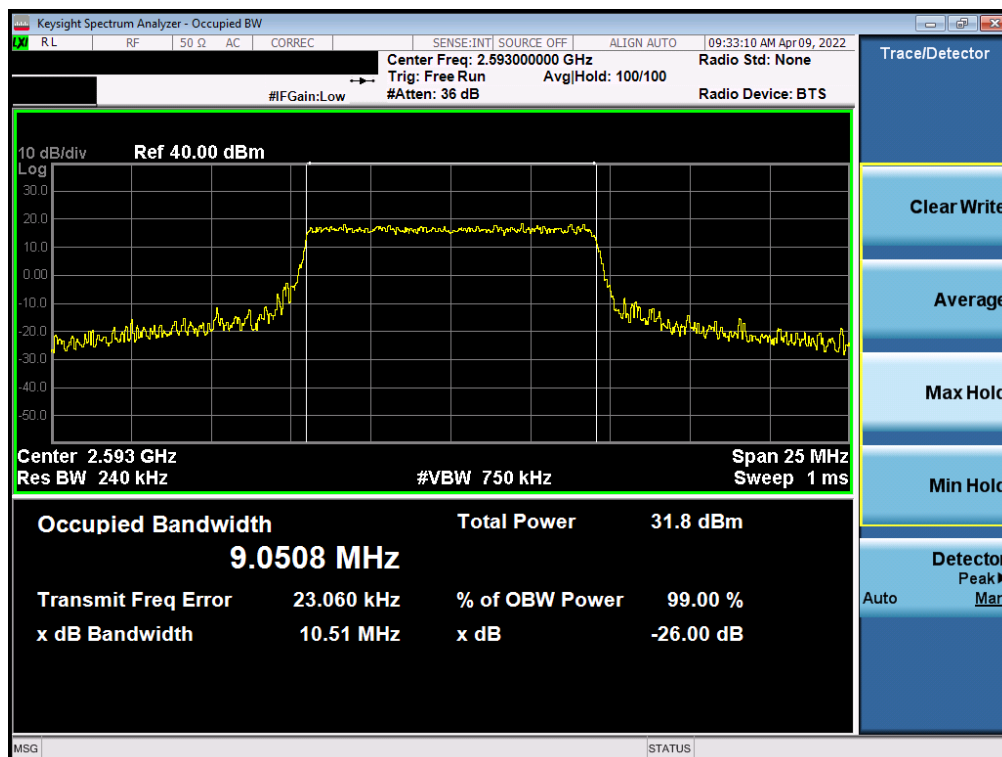


Plot 7-34. Occupied Bandwidth Plot (LTE Band 41(PC3)/38 - 15MHz 16-QAM - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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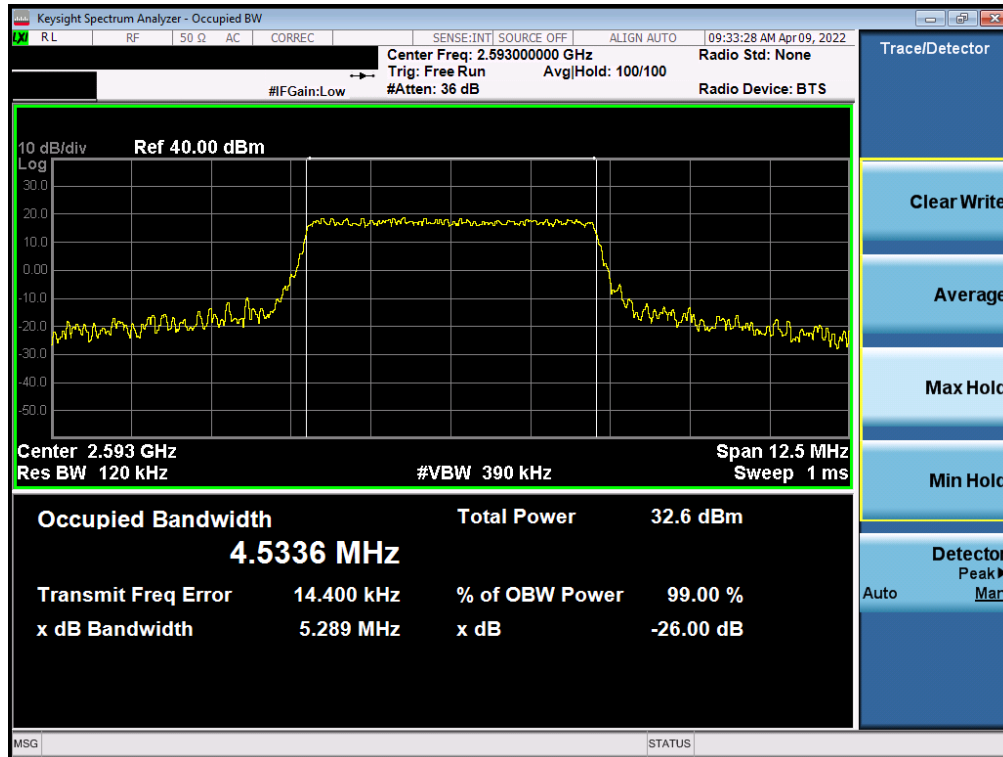


Plot 7-35. Occupied Bandwidth Plot (LTE Band 41(PC3)/38 - 10MHz QPSK - Full RB)



Plot 7-36. Occupied Bandwidth Plot (LTE Band 41(PC3)/38 - 10MHz 16-QAM - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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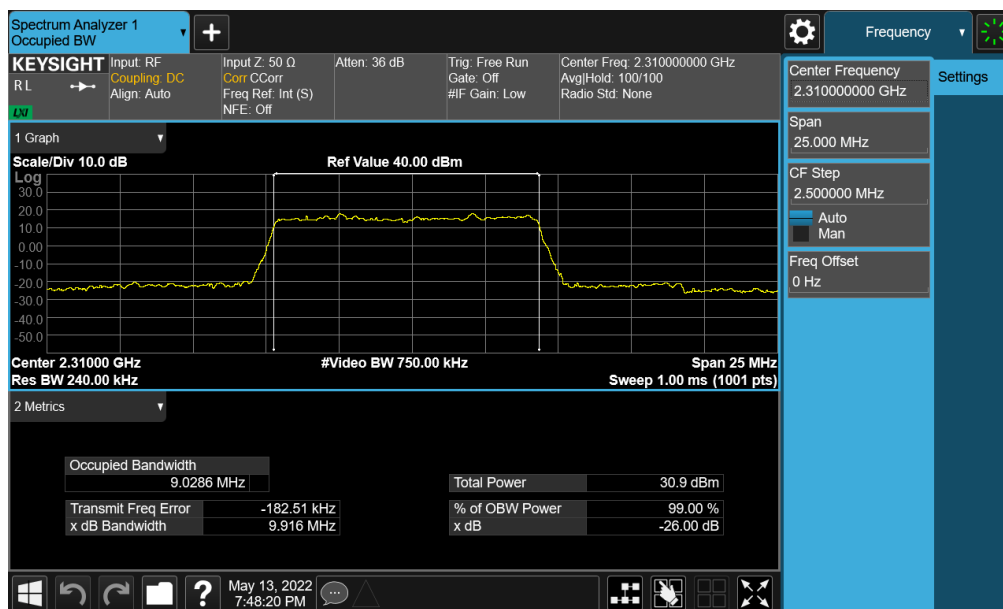
Plot 7-37. Occupied Bandwidth Plot (LTE Band 41(PC3)/38 - 5MHz QPSK - Full RB)



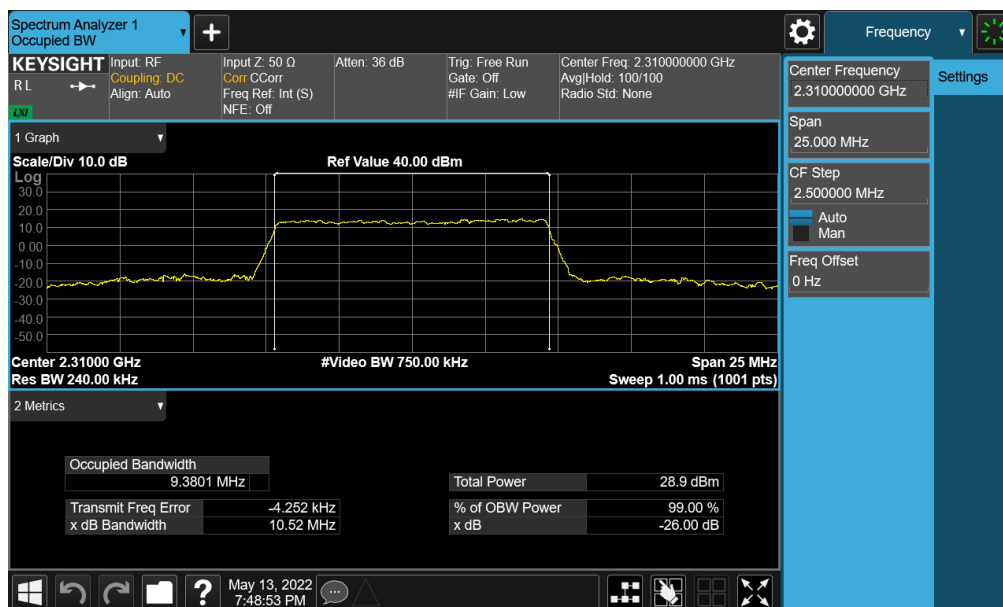
Plot 7-38. Occupied Bandwidth Plot (LTE Band 41(PC3)/38 - 5MHz 16-QAM - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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NR Band n30 – ANT B



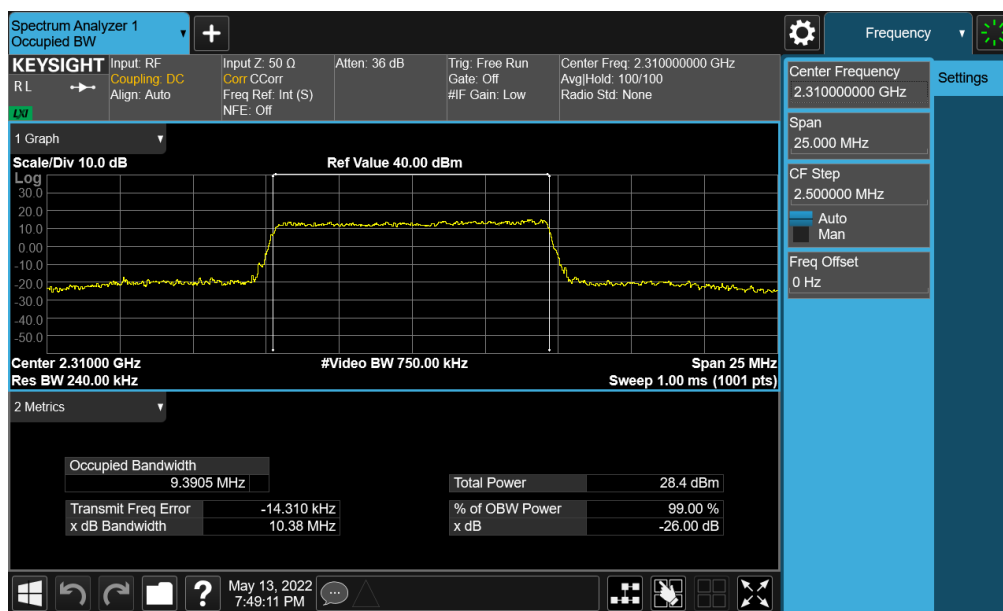
Plot 7-39. Occupied Bandwidth Plot (NR Band n30 - 10MHz $\pi/2$ BPSK - Full RB)



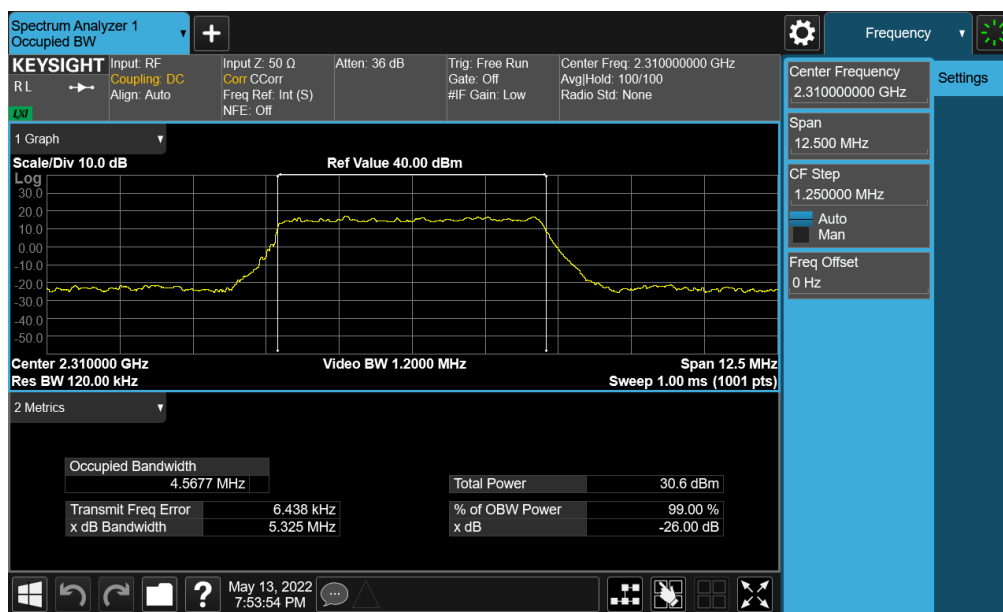
Plot 7-40. Occupied Bandwidth Plot (NR Band n30 - 10MHz QPSK - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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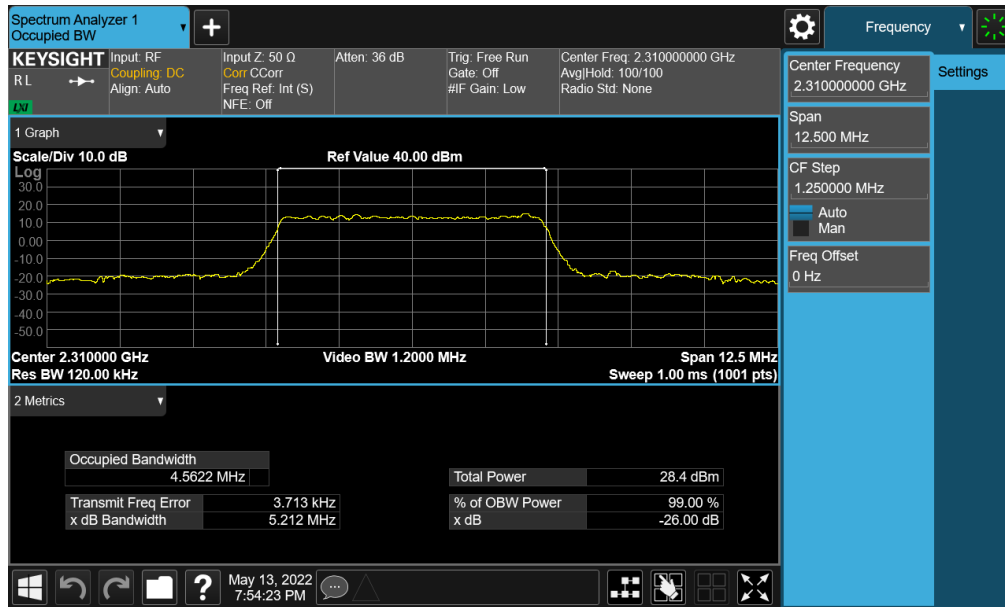


Plot 7-41. Occupied Bandwidth Plot (NR Band n30 - 10MHz 16-QAM - Full RB)

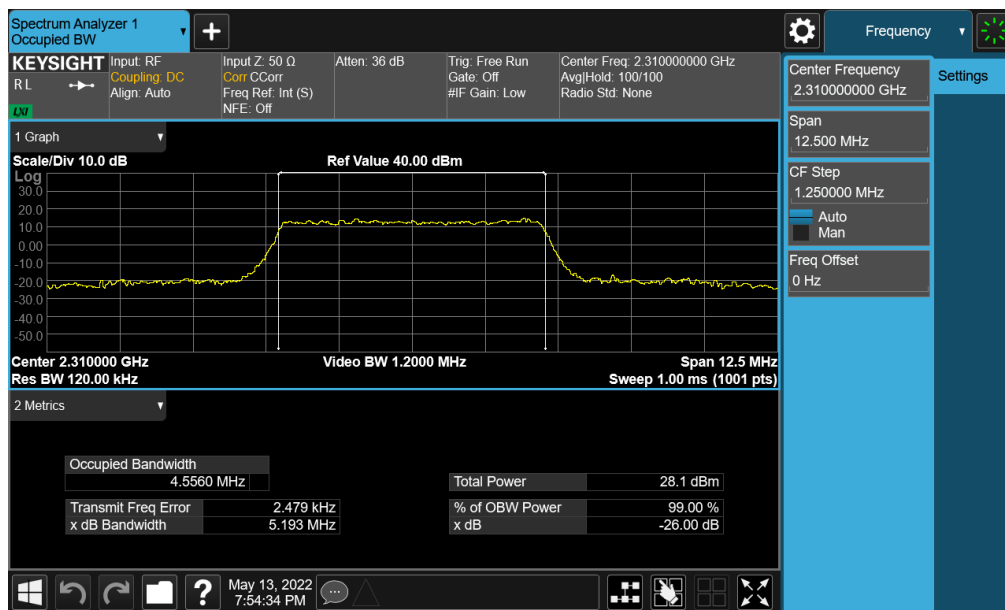


Plot 7-42. Occupied Bandwidth Plot (NR Band n30 - 5MHz $\pi/2$ BPSK - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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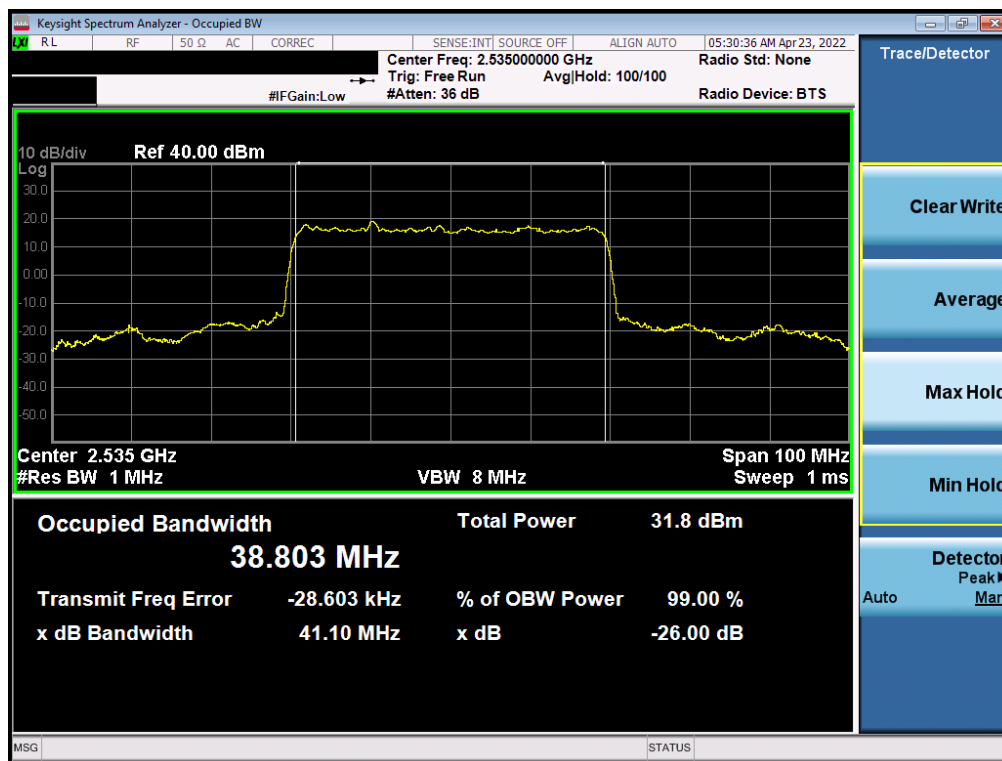
Plot 7-43. Occupied Bandwidth Plot (NR Band n30 - 5MHz QPSK - Full RB)



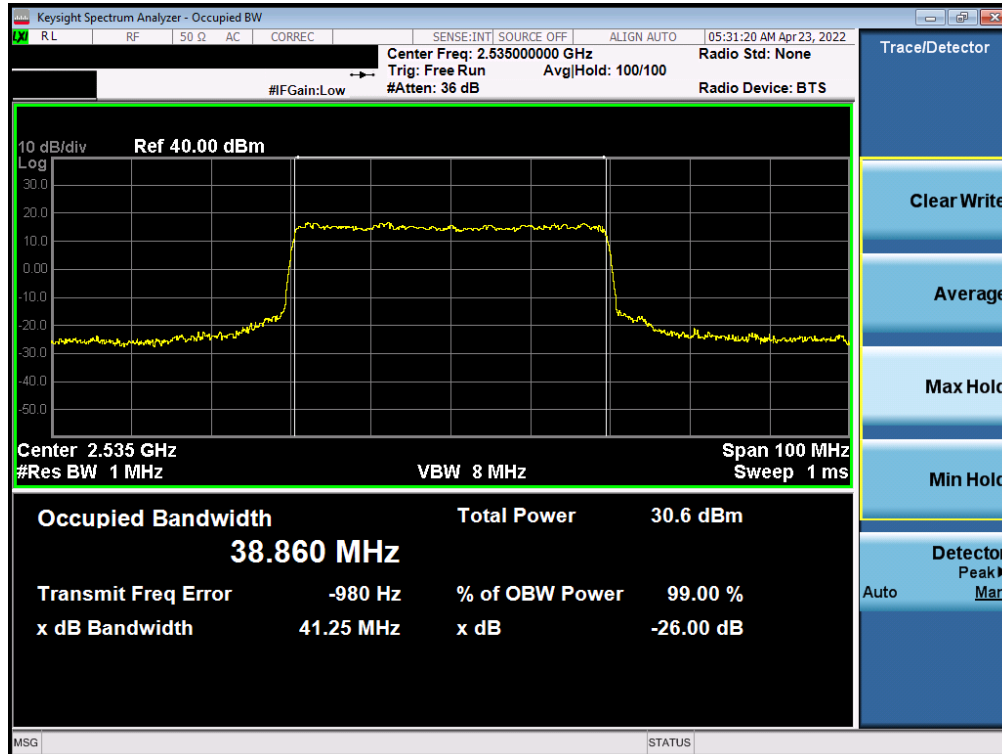
Plot 7-44. Occupied Bandwidth Plot (NR Band n30 - 5MHz 16-QAM - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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NR Band n7 – ANT B



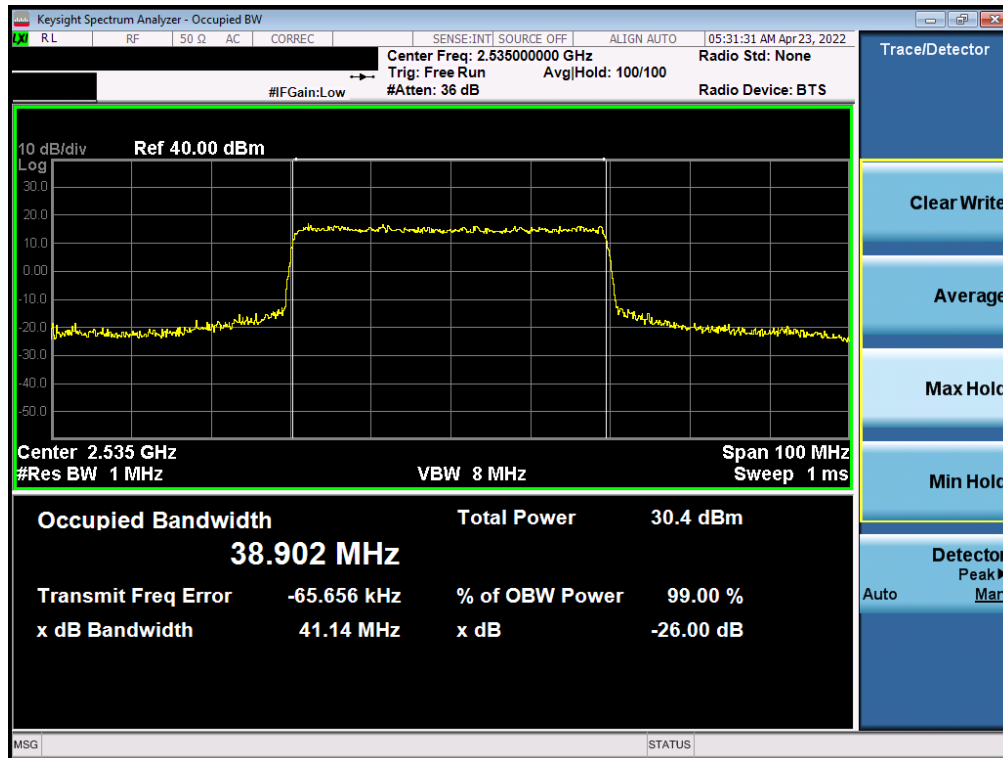
Plot 7-45. Occupied Bandwidth Plot (NR Band n7 - 40MHz $\pi/2$ BPSK - Full RB)



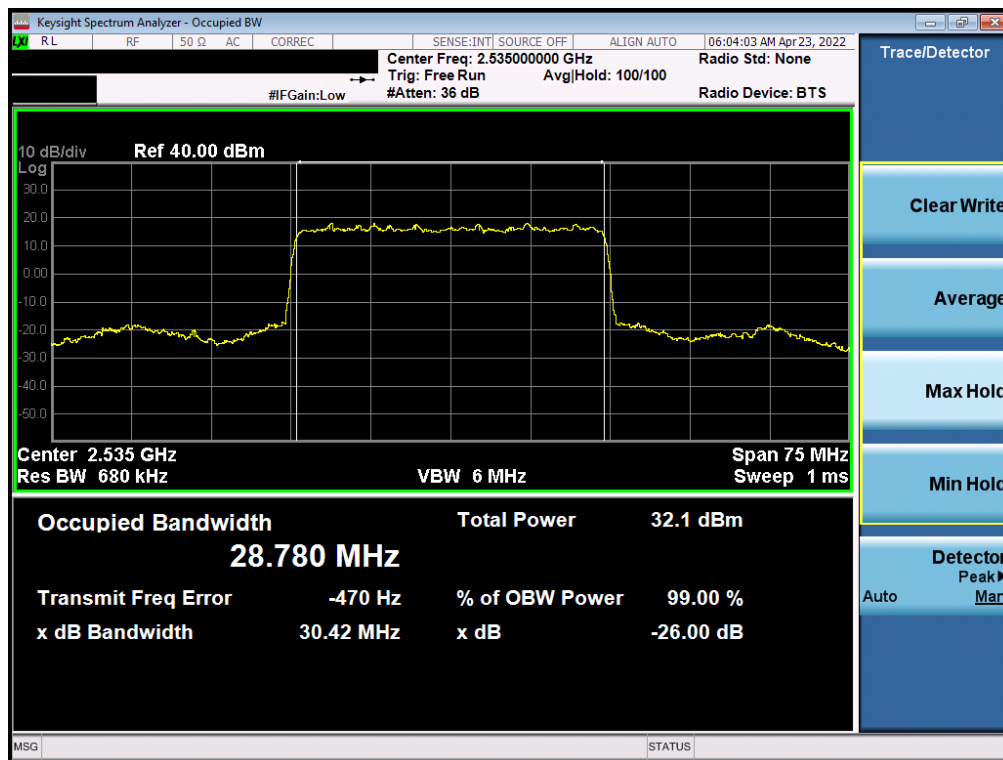
Plot 7-46. Occupied Bandwidth Plot (NR Band n7 -40MHz QPSK - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-47. Occupied Bandwidth Plot (NR Band n7 - 40MHz 16-QAM - Full RB)

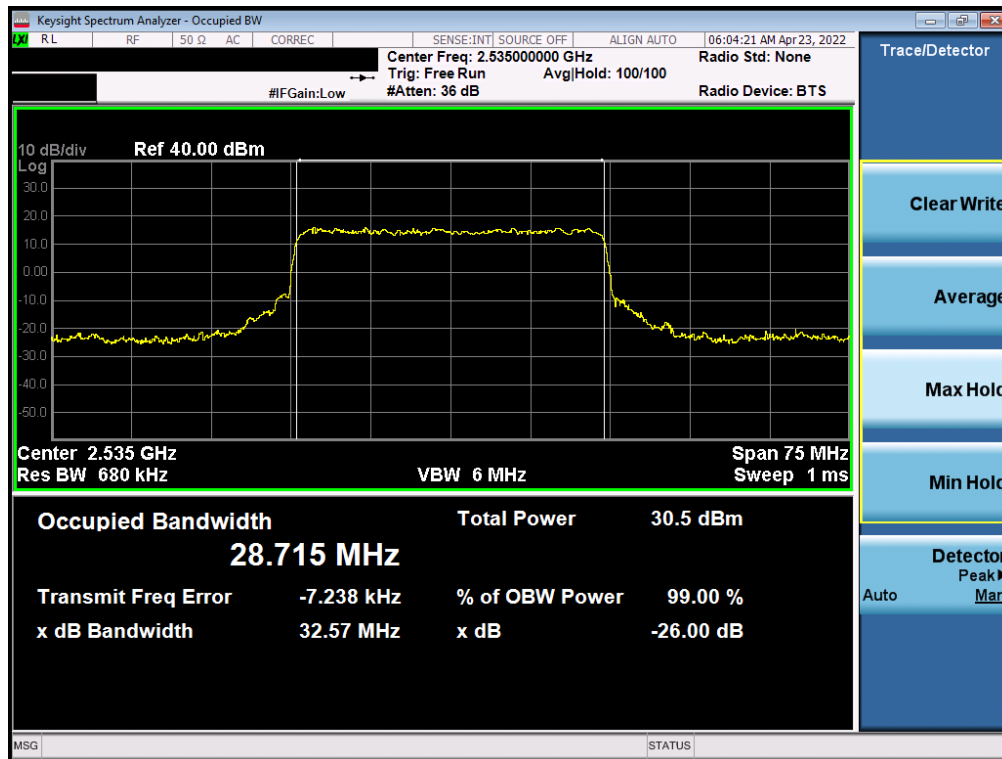


Plot 7-48. Occupied Bandwidth Plot (NR Band n7 - 30MHz $\pi/2$ BPSK - Full RB)

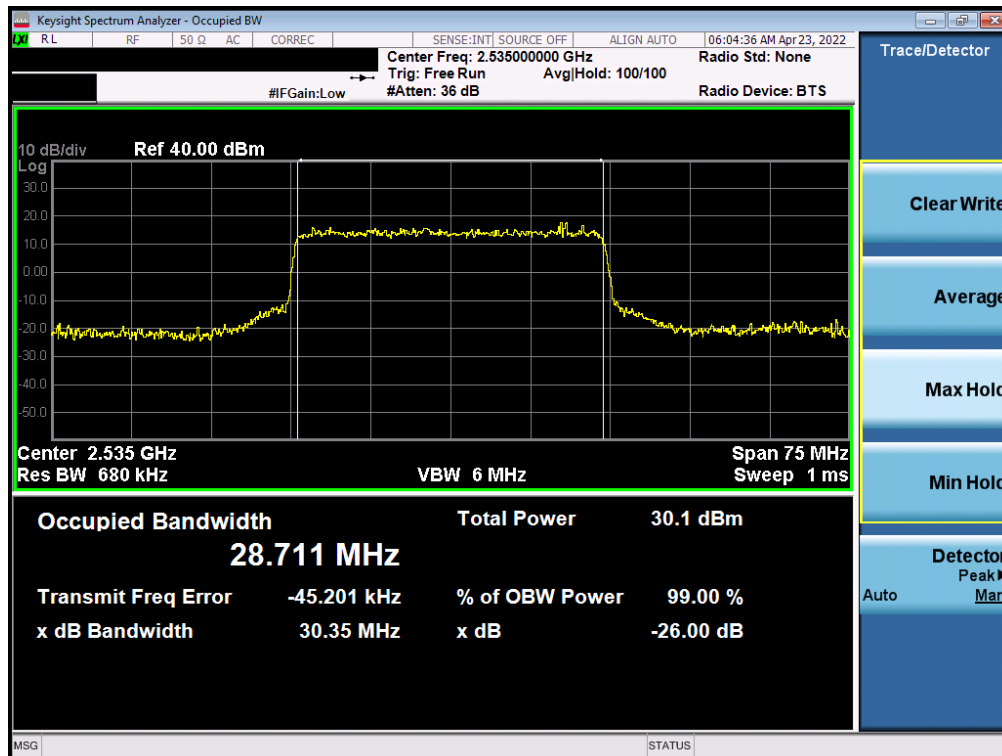
FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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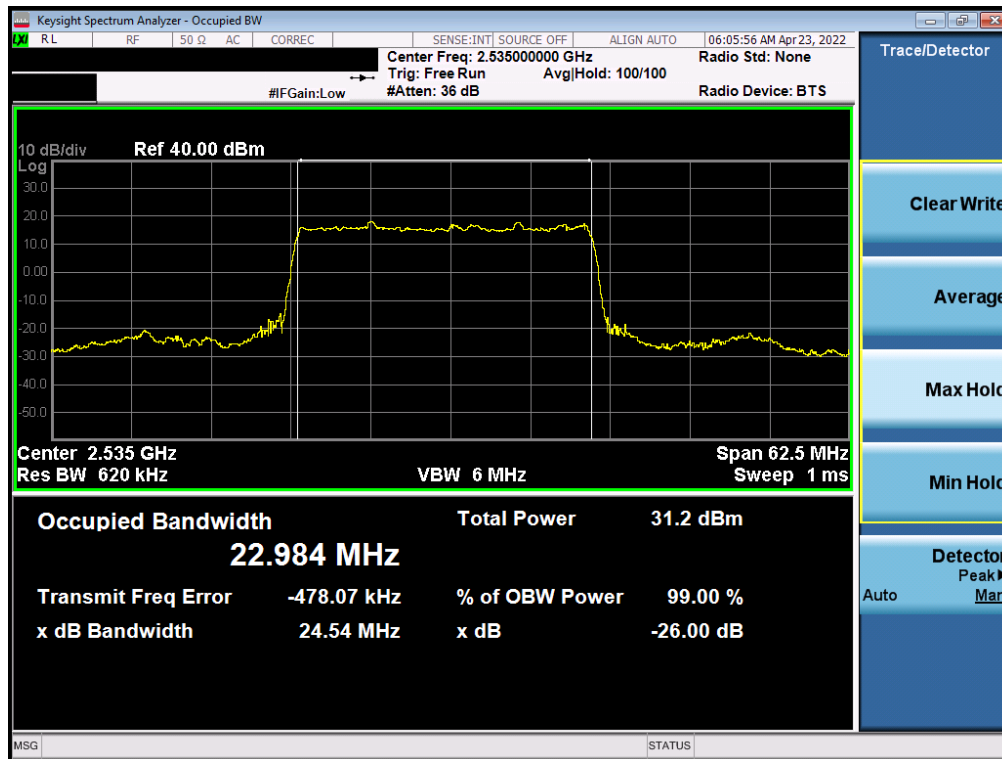


Plot 7-49. Occupied Bandwidth Plot (NR Band n7 - 30MHz QPSK - Full RB)

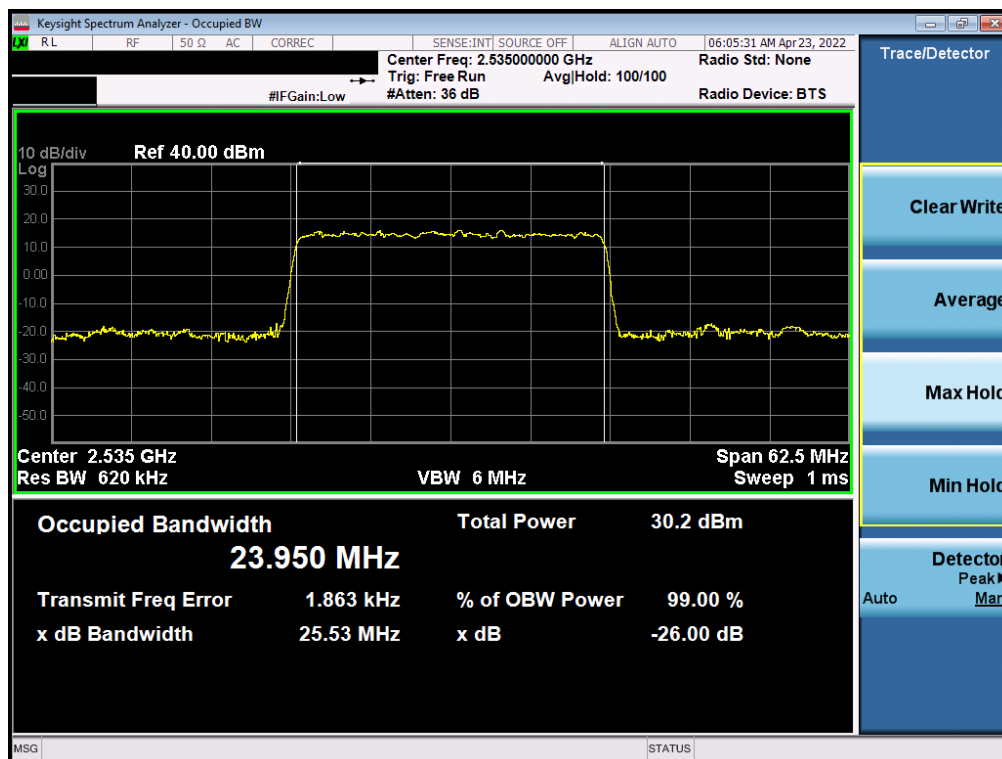


Plot 7-50. Occupied Bandwidth Plot (NR Band n7 - 30MHz 16-QAM - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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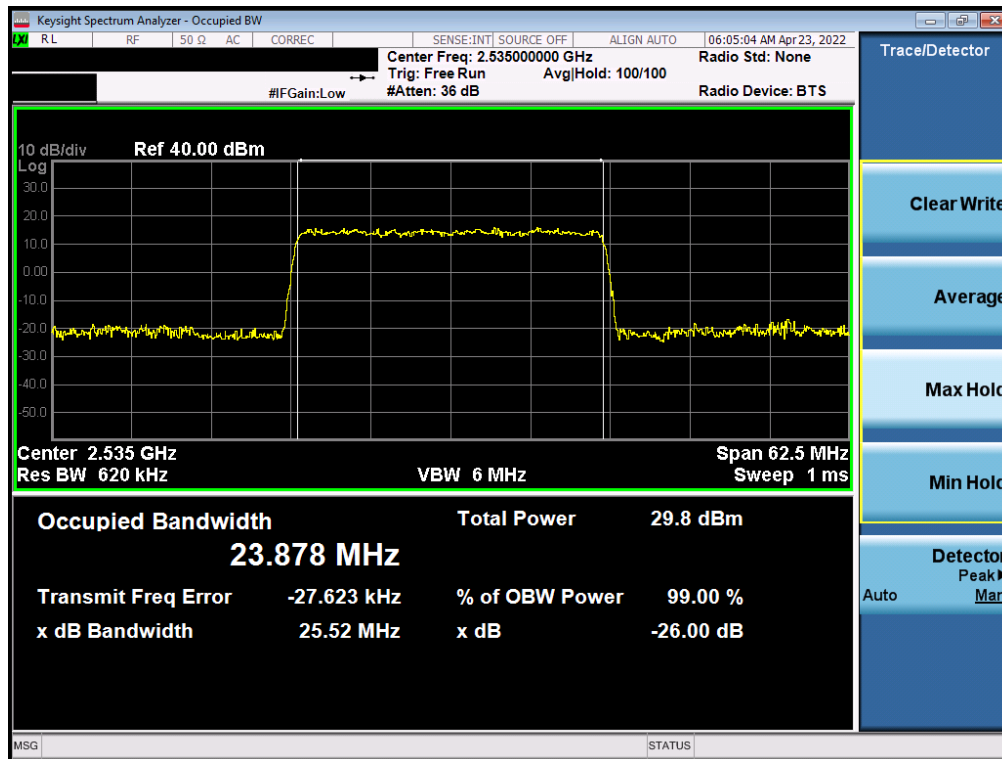


Plot 7-51. Occupied Bandwidth Plot (NR Band n7 - 25MHz $\pi/2$ BPSK - Full RB)

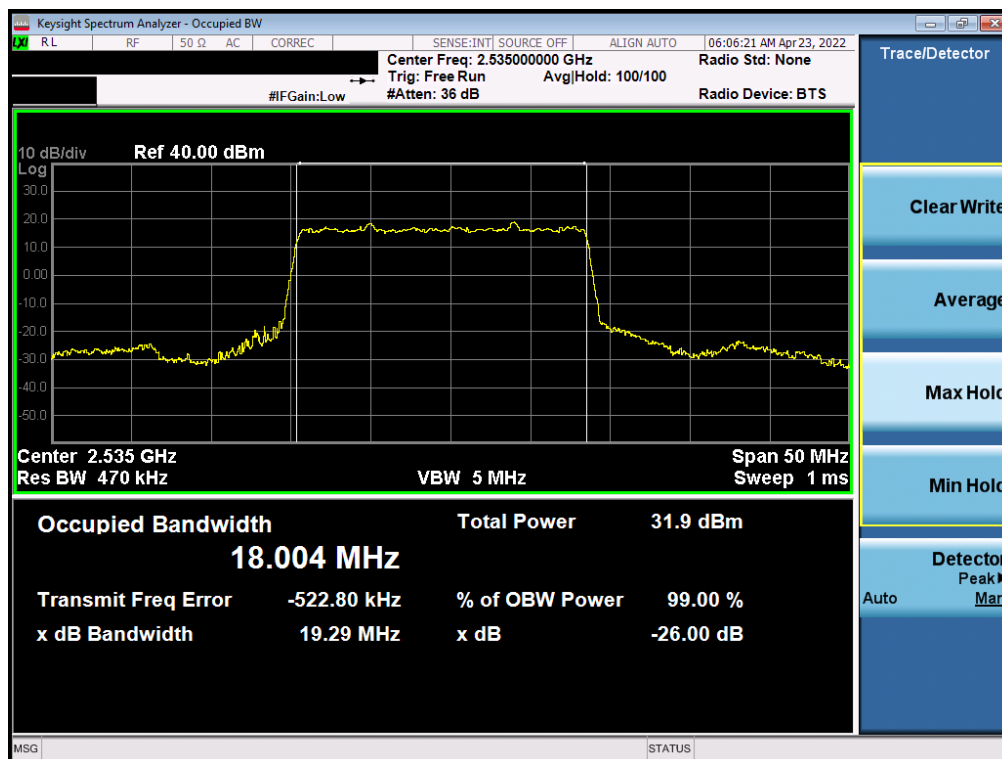


Plot 7-52. Occupied Bandwidth Plot (NR Band n7 - 25MHz QPSK - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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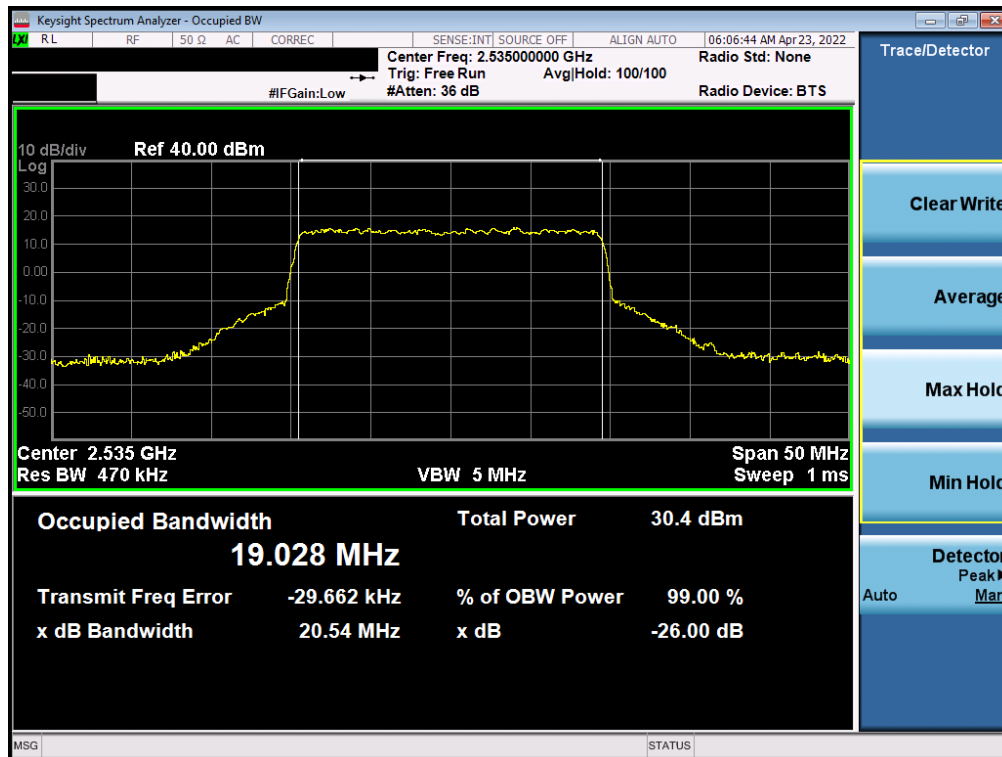


Plot 7-53. Occupied Bandwidth Plot (NR Band n7 - 25MHz 16-QAM - Full RB)

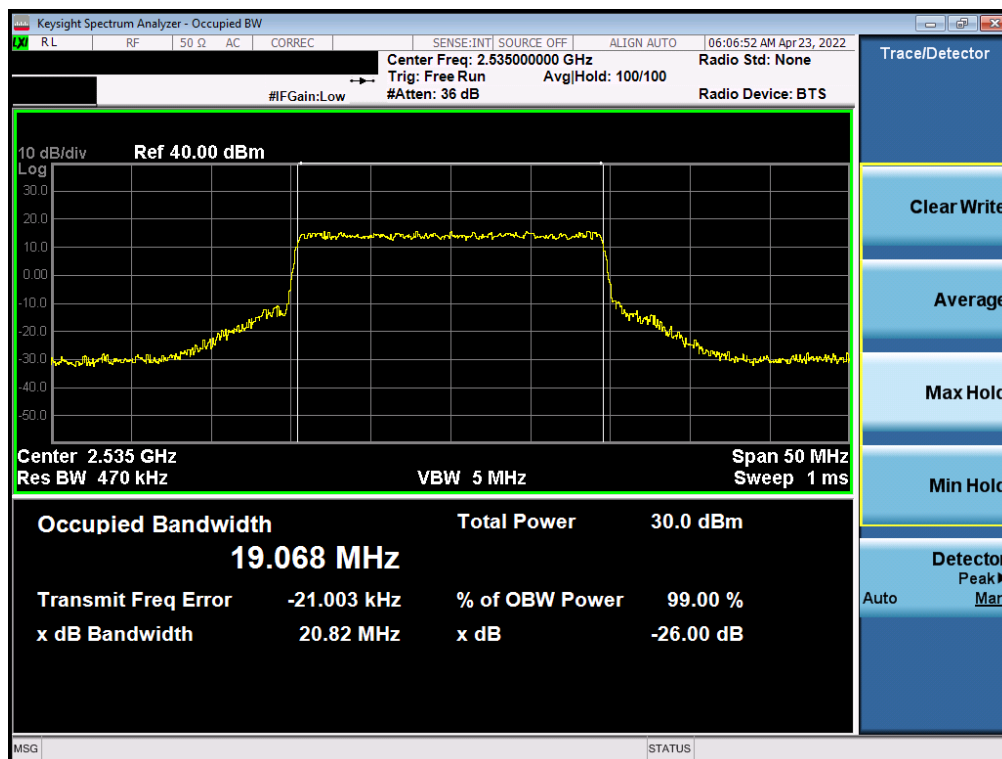


Plot 7-54. Occupied Bandwidth Plot (NR Band n7 - 20MHz $\pi/2$ BPSK - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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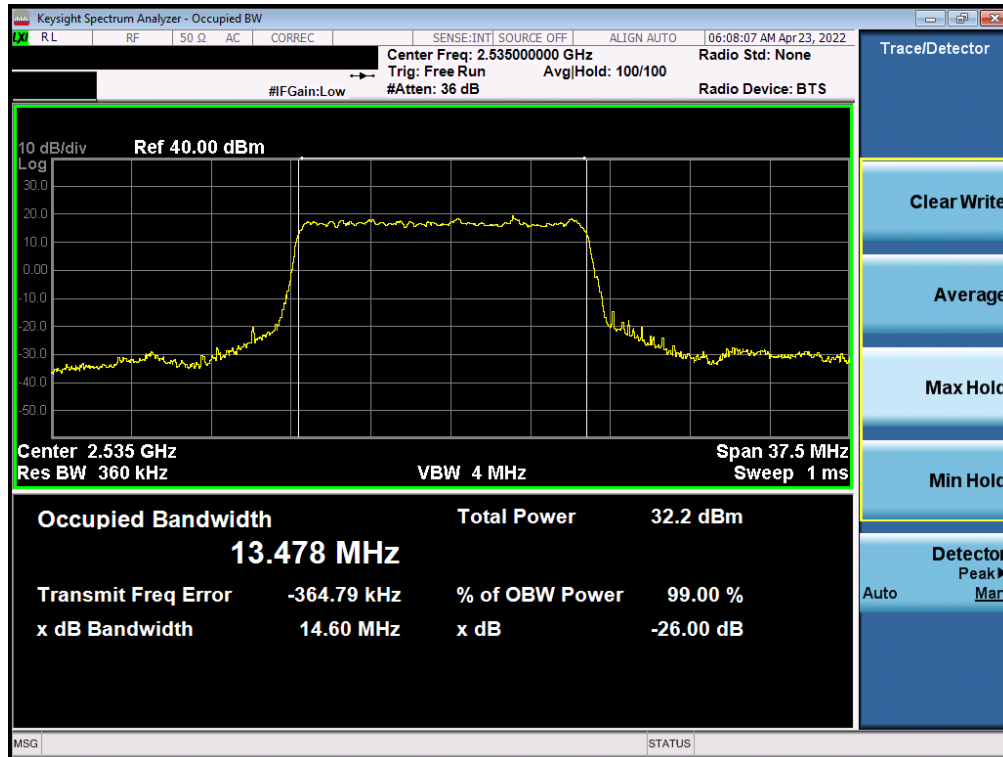
Plot 7-55. Occupied Bandwidth Plot (NR Band n7 - 20MHz QPSK - Full RB)



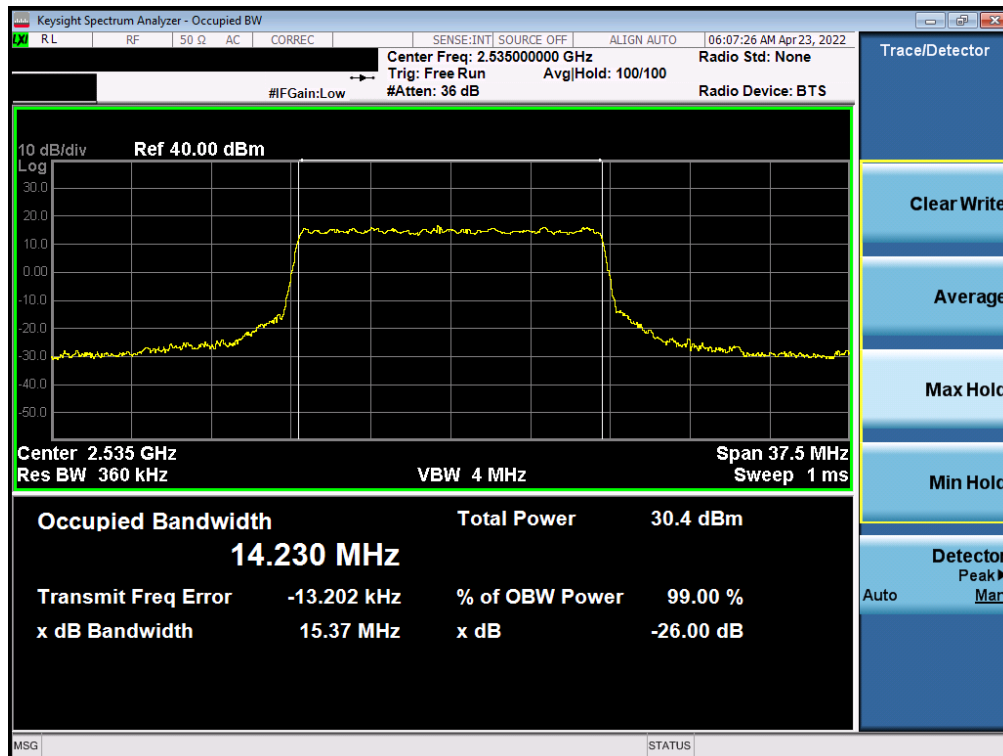
Plot 7-56. Occupied Bandwidth Plot (NR Band n7 - 20MHz 16-QAM - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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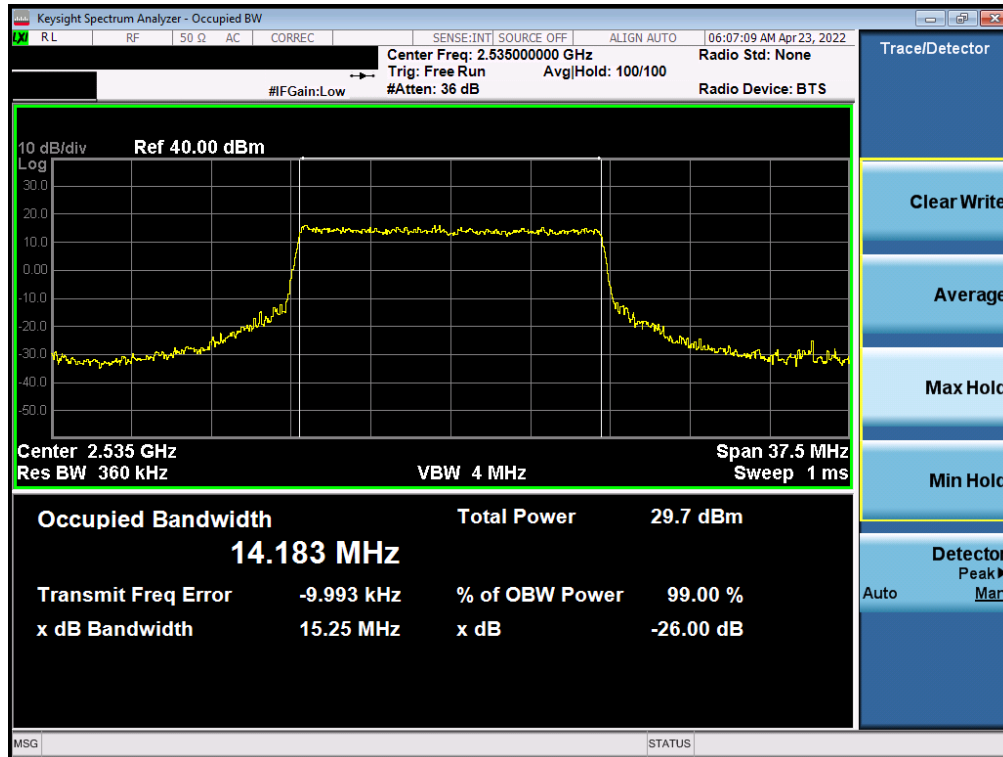


Plot 7-57. Occupied Bandwidth Plot (NR Band n7 - 15MHz $\pi/2$ BPSK - Full RB)

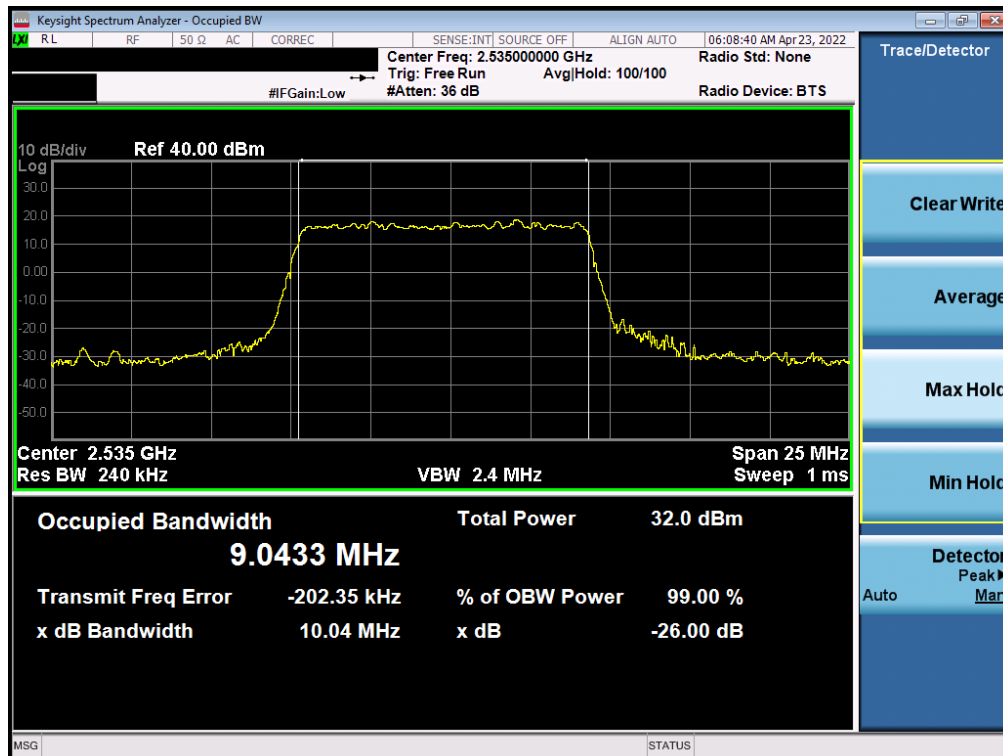


Plot 7-58. Occupied Bandwidth Plot (NR Band n7 - 15MHz QPSK - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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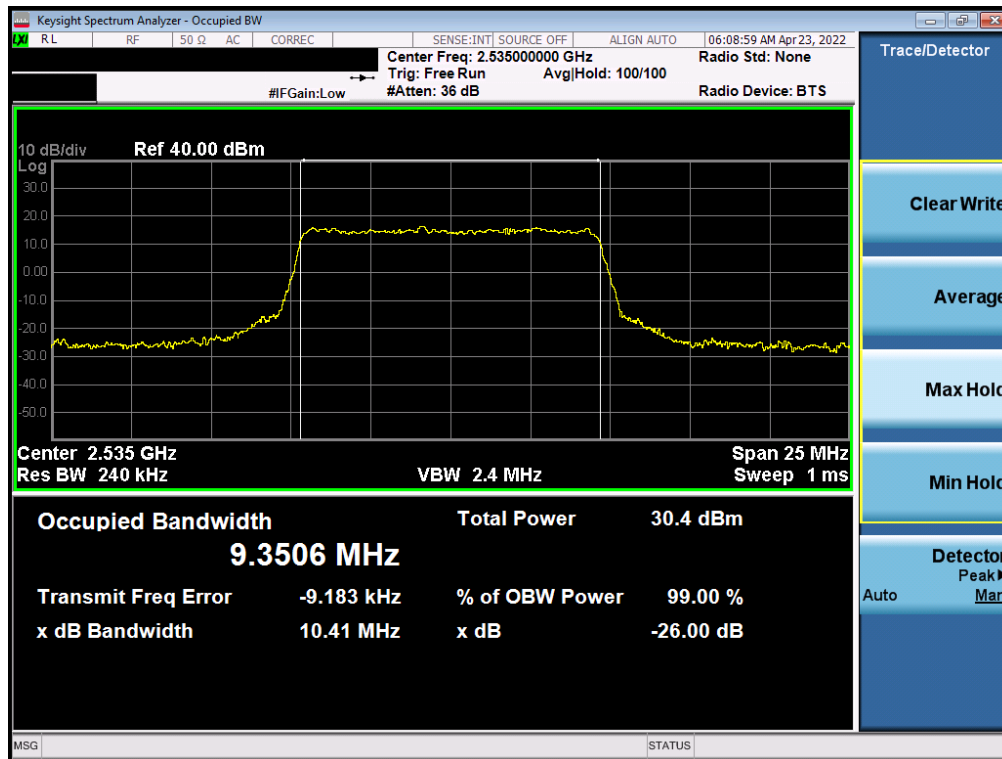


Plot 7-59. Occupied Bandwidth Plot (NR Band n7 - 15MHz 16-QAM - Full RB)

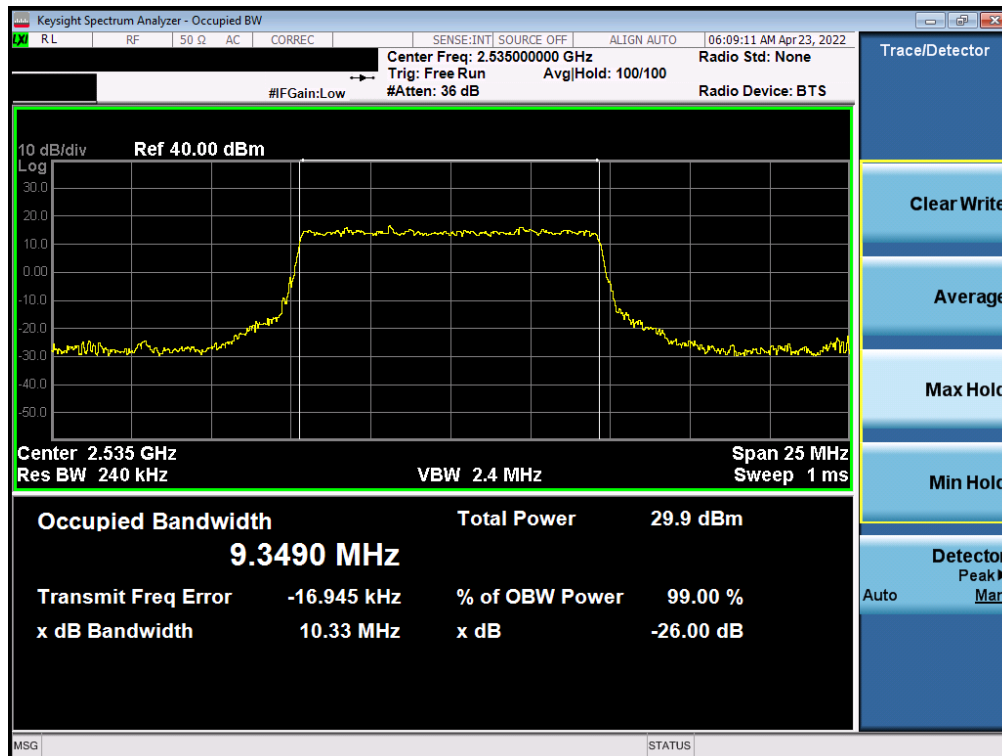


Plot 7-60. Occupied Bandwidth Plot (NR Band n7 - 10MHz $\pi/2$ BPSK - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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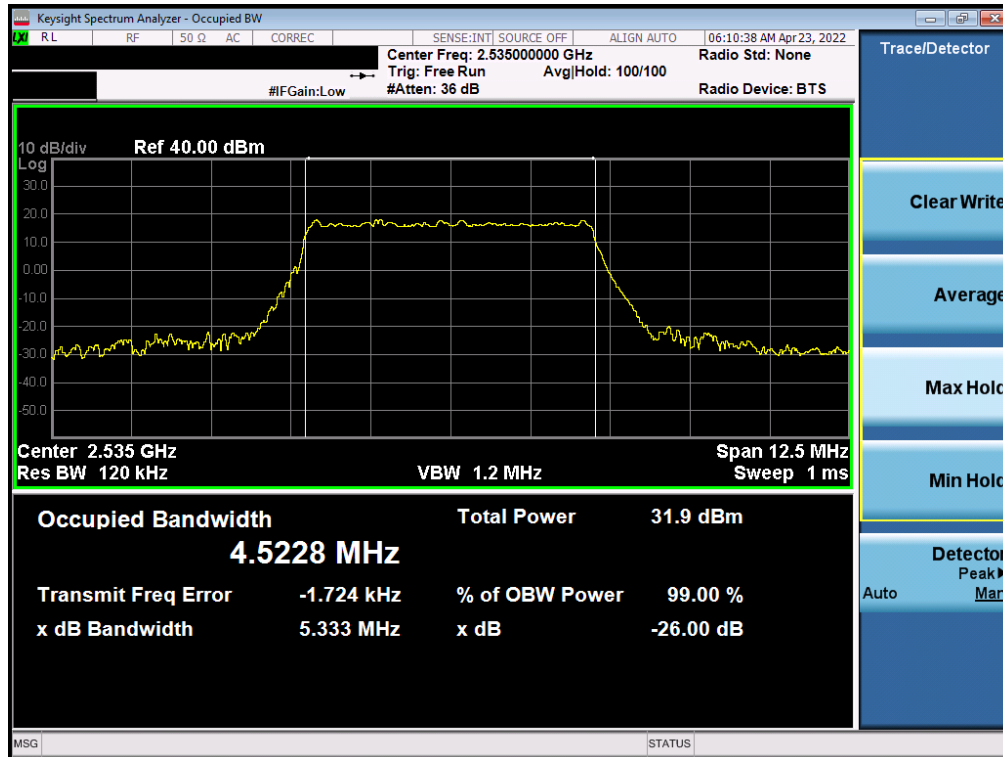


Plot 7-61. Occupied Bandwidth Plot (NR Band n7 - 10MHz QPSK - Full RB)

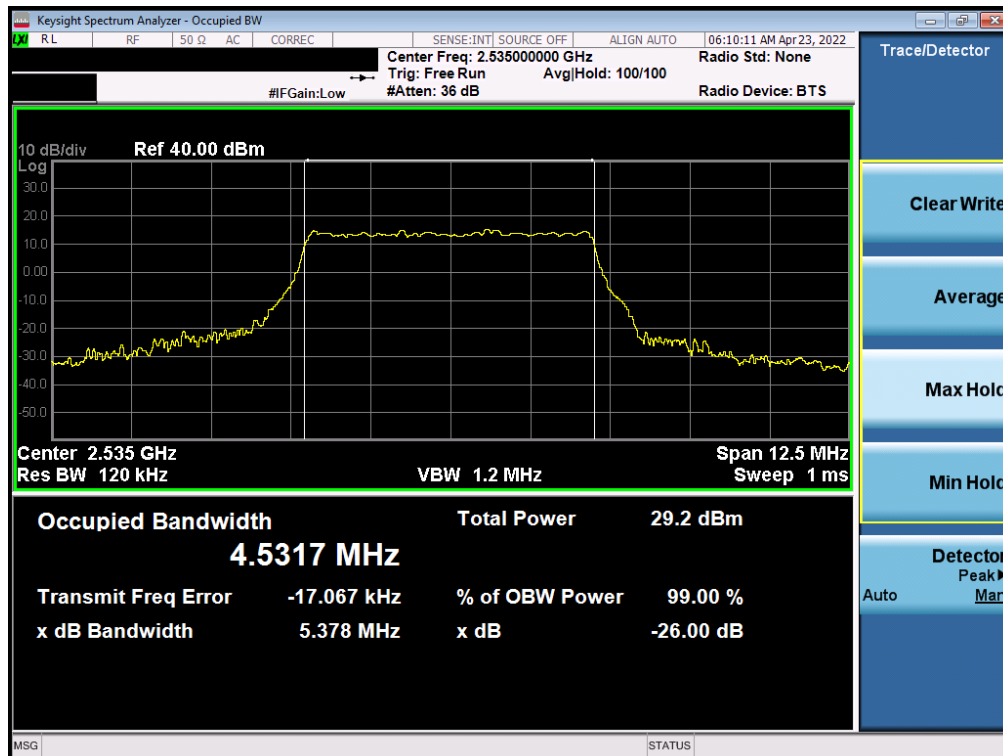


Plot 7-62. Occupied Bandwidth Plot (NR Band n7 - 10MHz 16-QAM - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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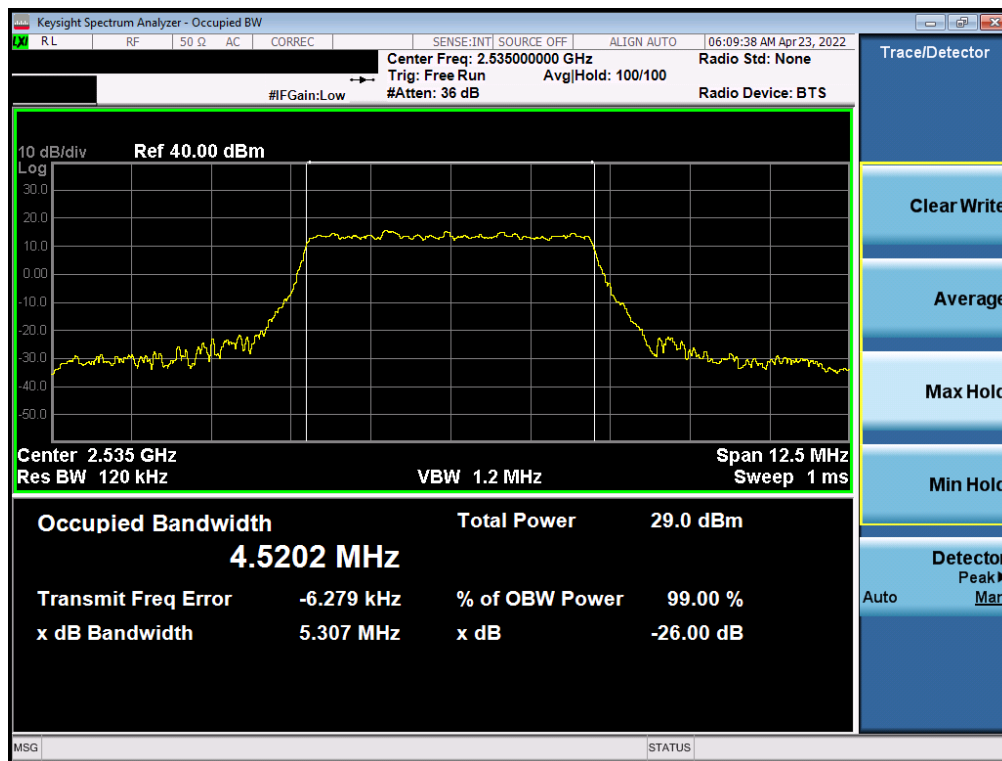


Plot 7-63. Occupied Bandwidth Plot (NR Band n7 - 5MHz $\pi/2$ BPSK - Full RB)



Plot 7-64. Occupied Bandwidth Plot (NR Band n7 - 5MHz QPSK - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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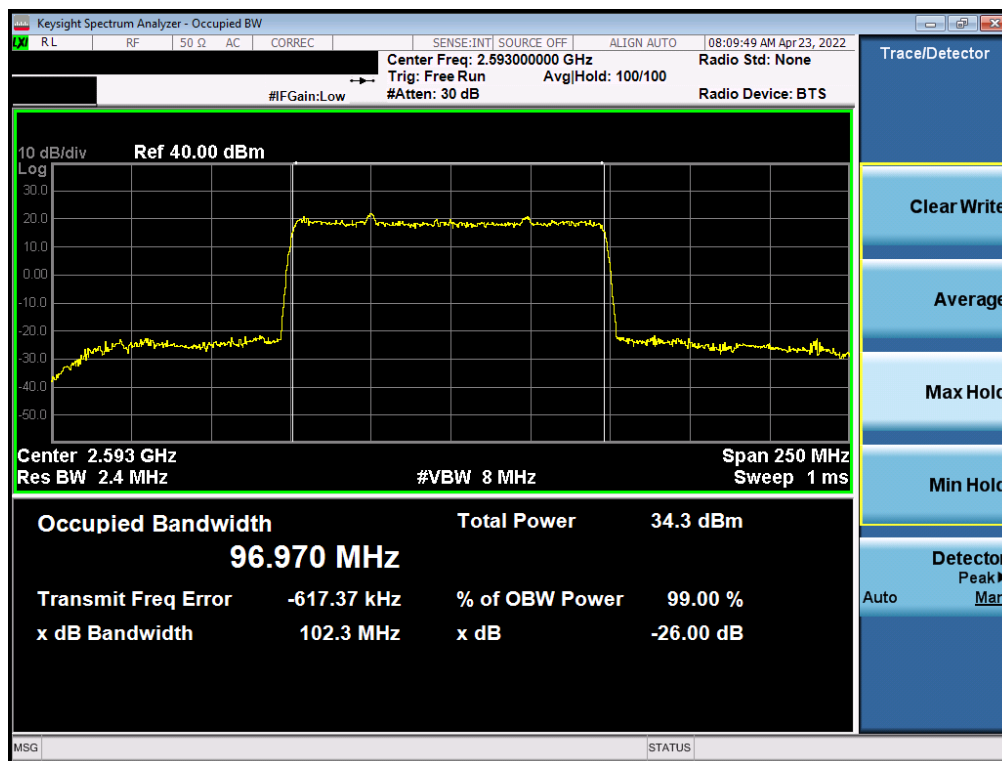


Plot 7-65. Occupied Bandwidth Plot (NR Band n7 - 5MHz 16-QAM - Full RB)

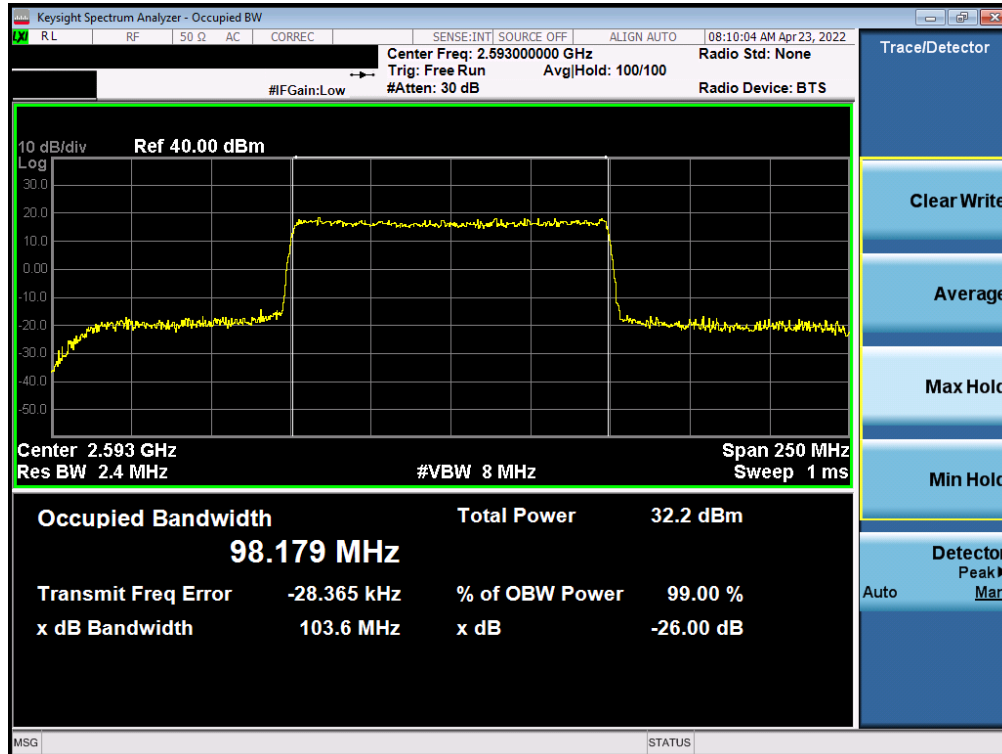
FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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NR Band n41 – ANT I



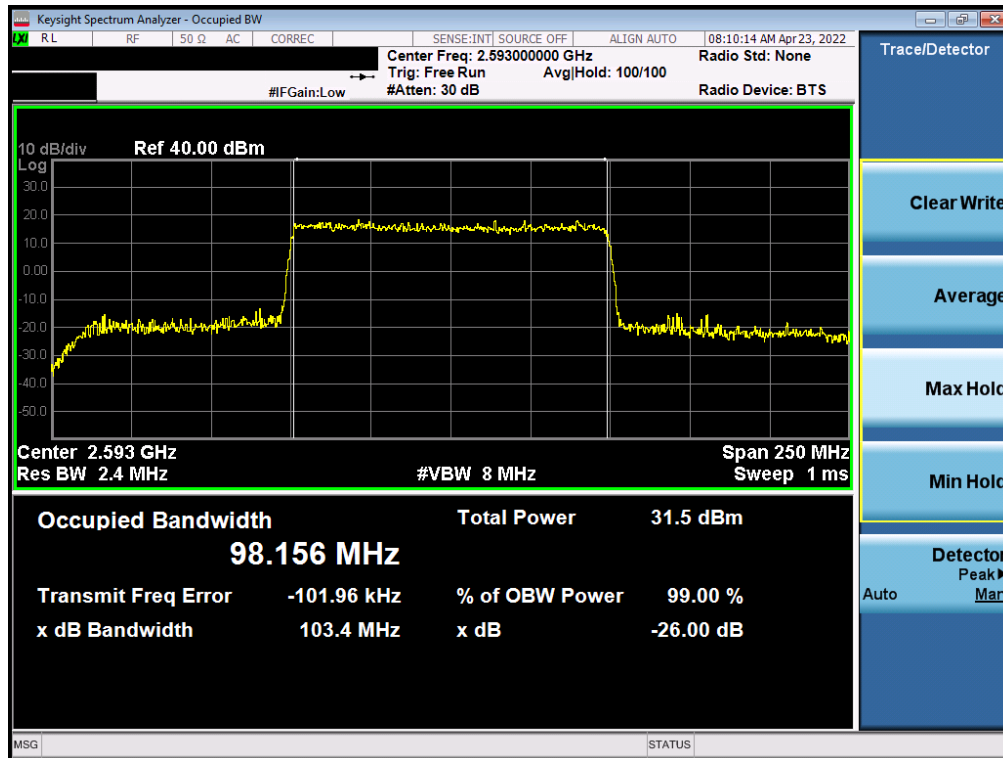
Plot 7-66. Occupied Bandwidth Plot (NR Band n41 - 100MHz $\pi/2$ BPSK - Full RB)



Plot 7-67. Occupied Bandwidth Plot (NR Band n41 - 100MHz QPSK - Full RB)

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Plot 7-68. Occupied Bandwidth Plot (NR Band n41 - 100MHz 16-QAM - Full RB)

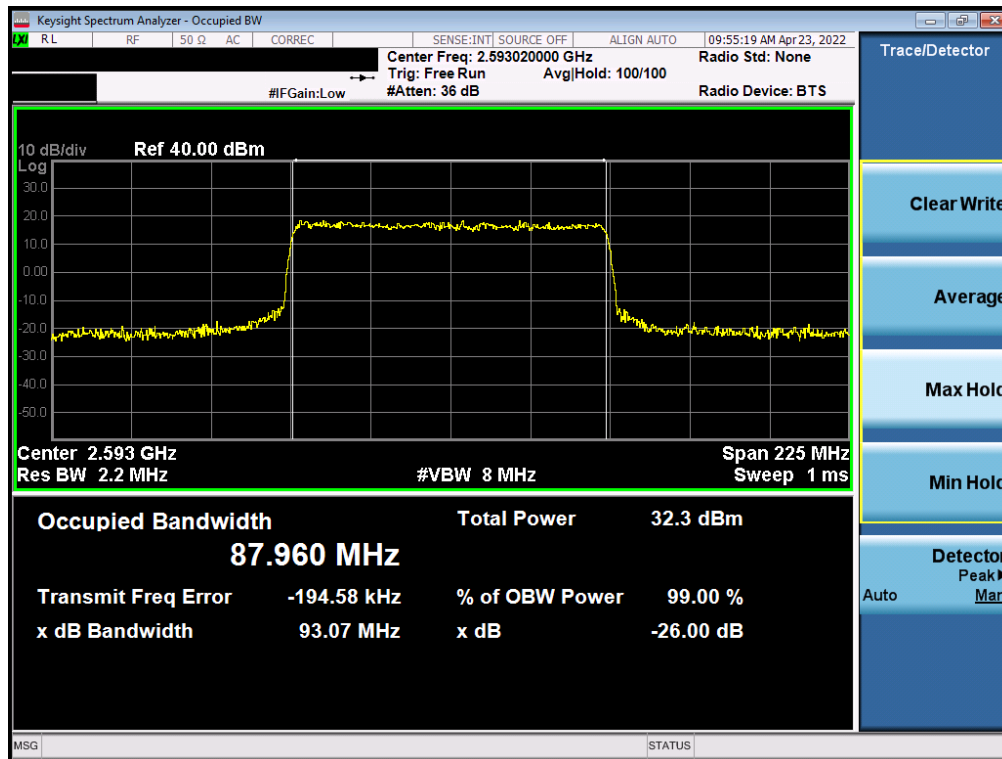


Plot 7-69. Occupied Bandwidth Plot (NR Band n41 - 90MHz $\pi/2$ BPSK - Full RB)

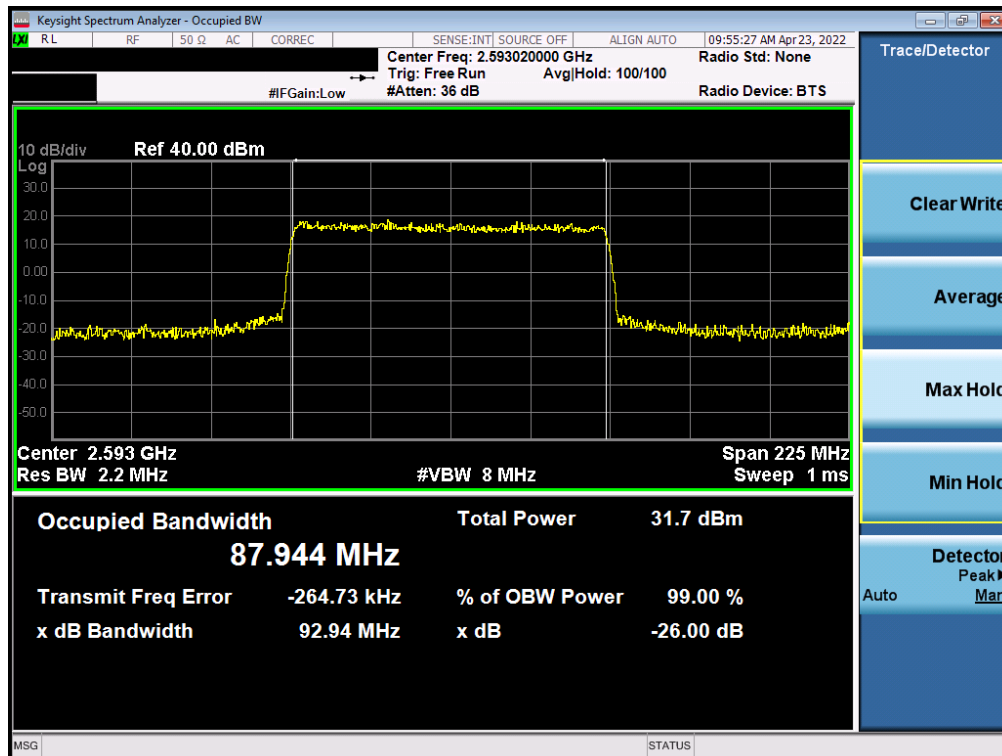
FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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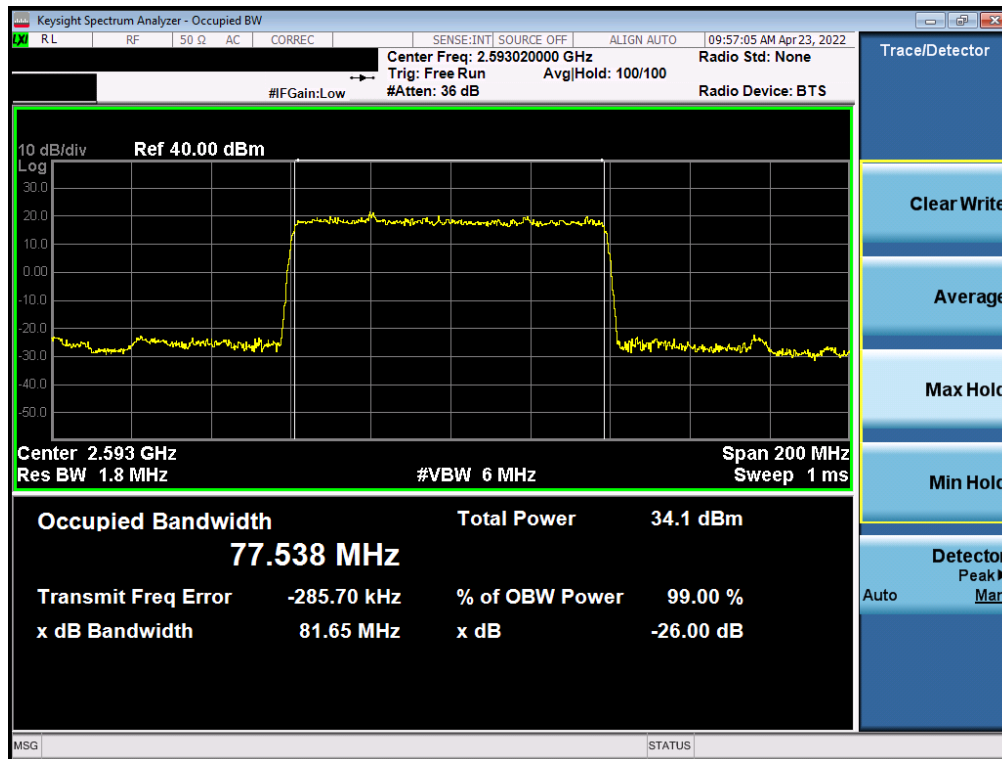


Plot 7-70. Occupied Bandwidth Plot (NR Band n41 - 90MHz QPSK - Full RB)

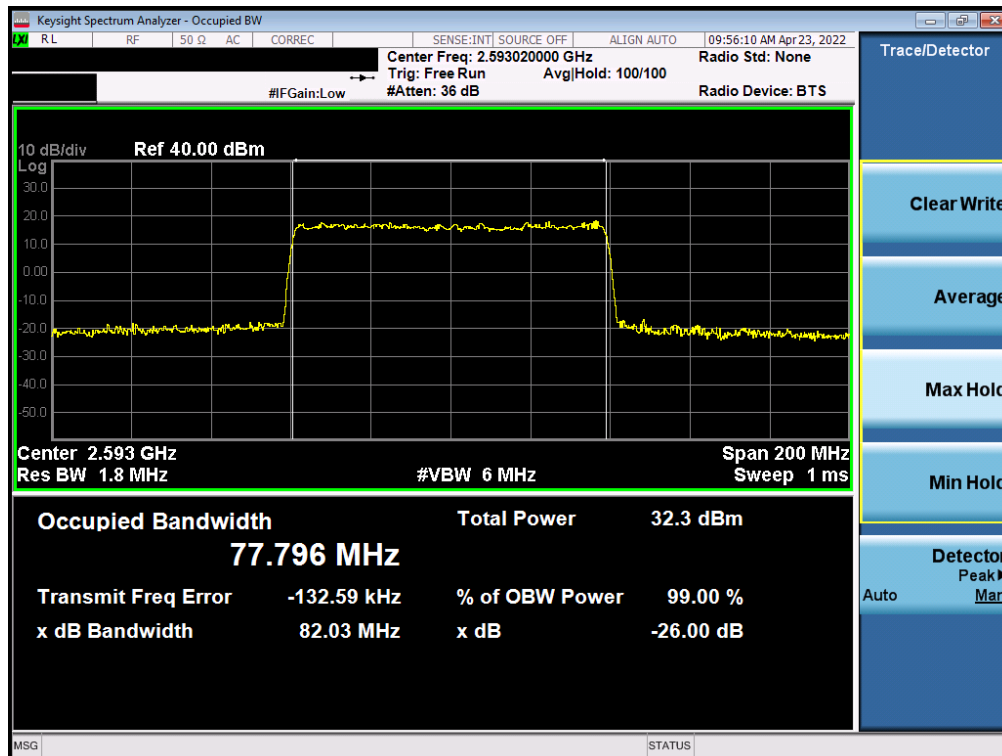


Plot 7-71. Occupied Bandwidth Plot (NR Band n41 - 90MHz 16-QAM - Full RB)

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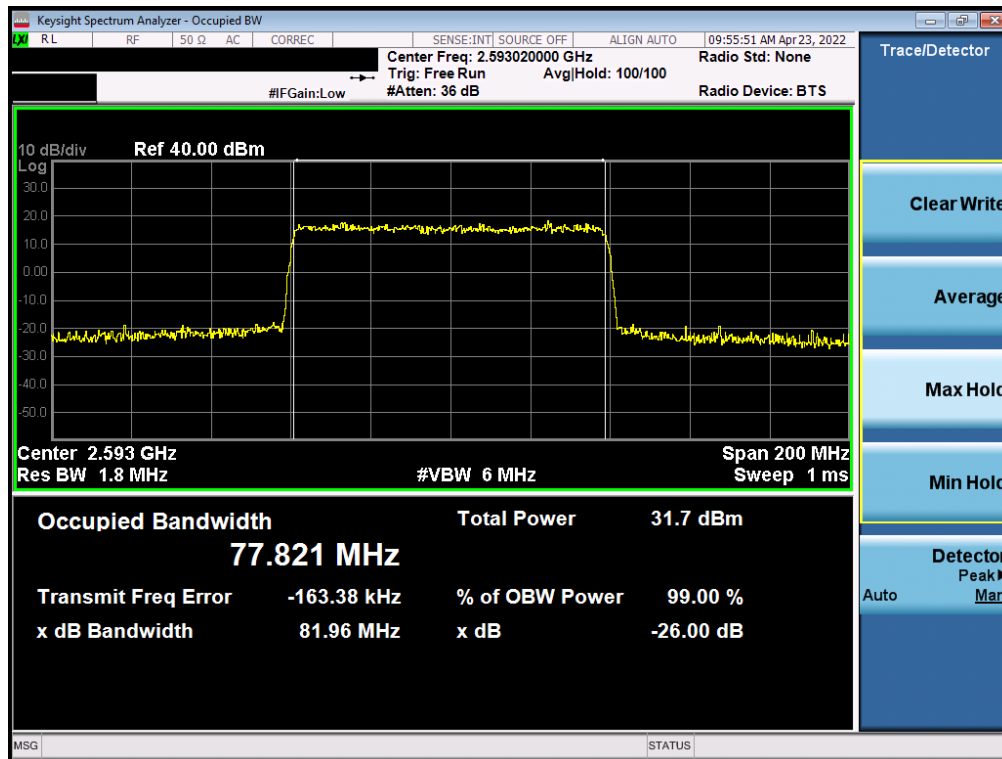


Plot 7-72. Occupied Bandwidth Plot (NR Band n41 - 80MHz $\pi/2$ BPSK - Full RB)

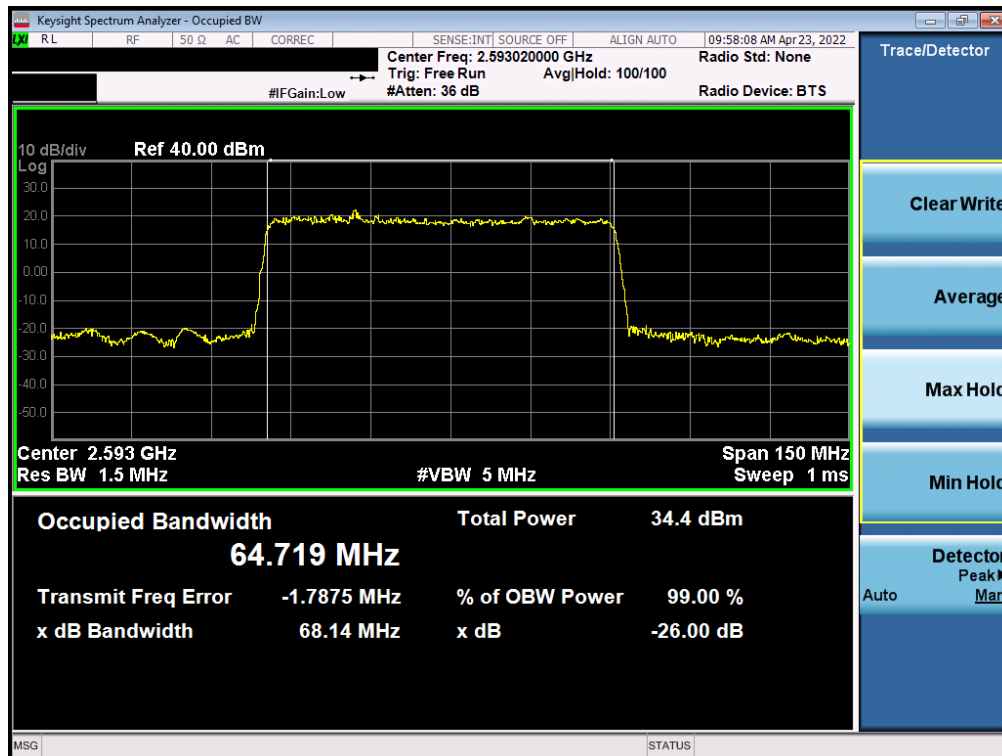


Plot 7-73. Occupied Bandwidth Plot (NR Band n41 - 80MHz QPSK - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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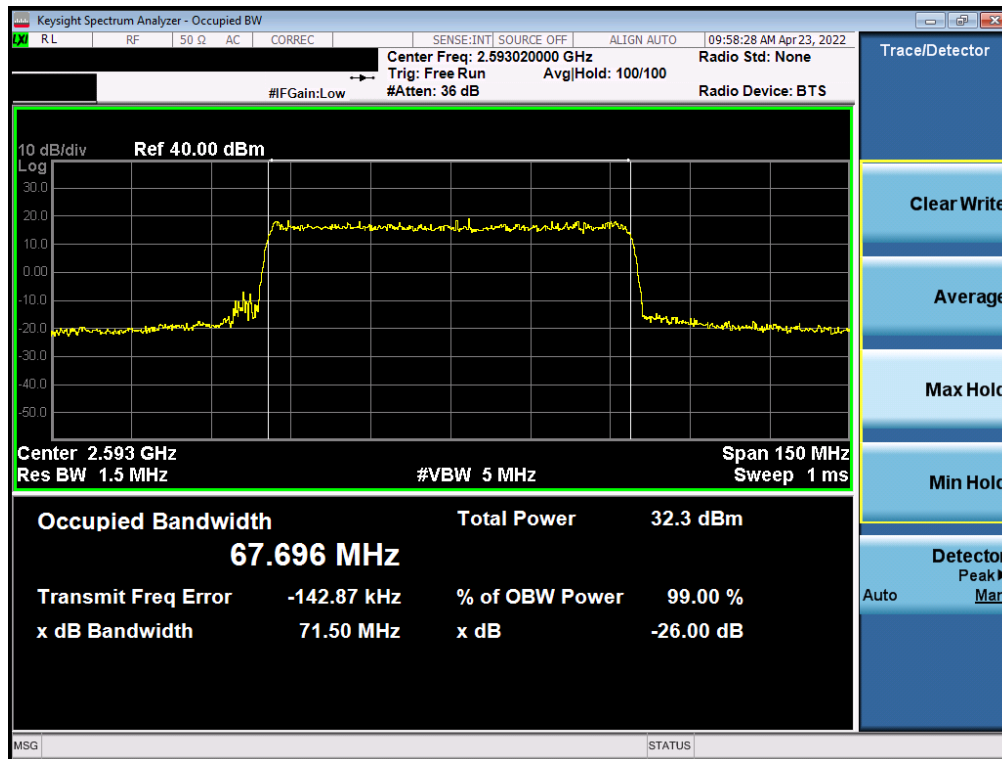


Plot 7-74. Occupied Bandwidth Plot (NR Band n41 - 80MHz 16-QAM - Full RB)

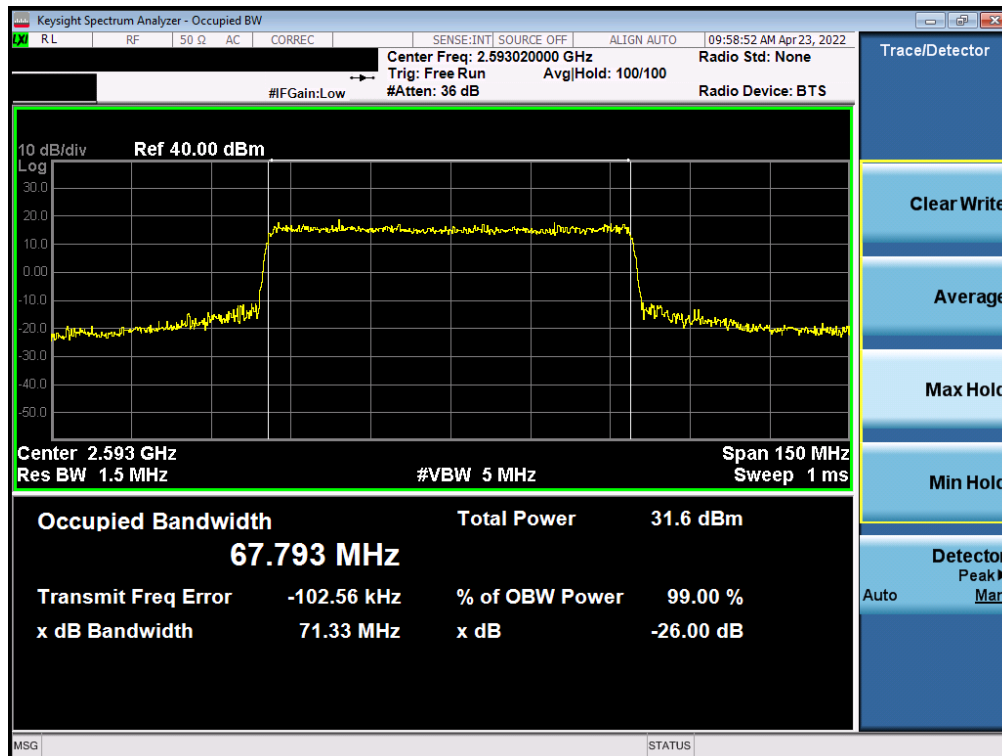


Plot 7-75. Occupied Bandwidth Plot (NR Band n41 - 70MHz $\pi/2$ BPSK - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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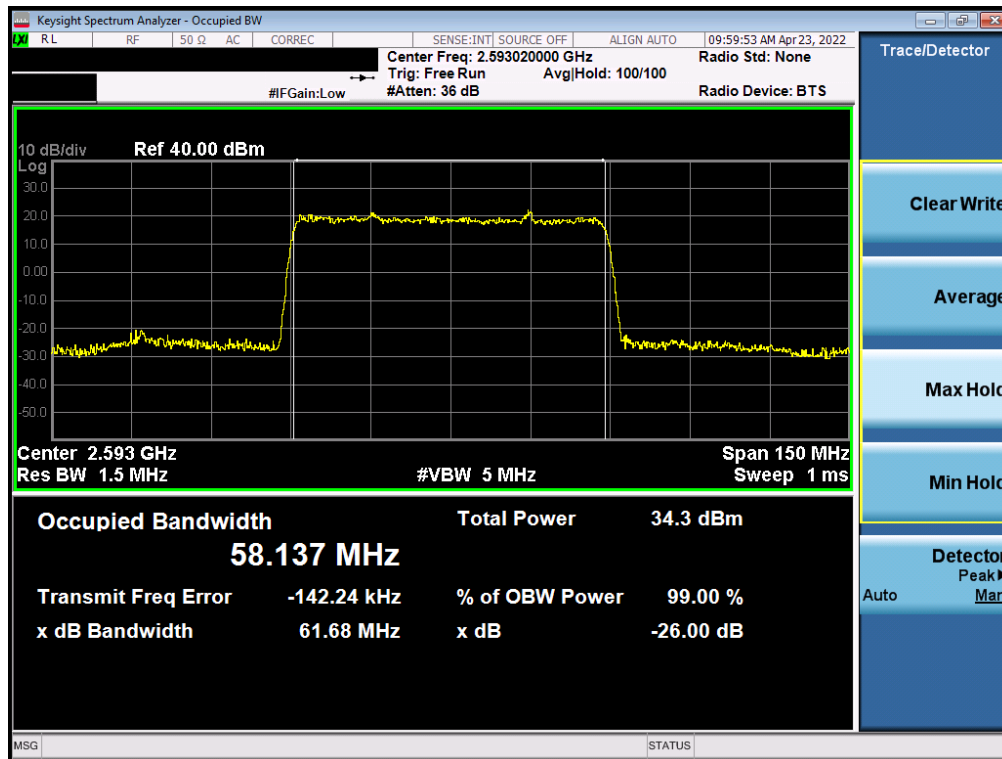


Plot 7-76. Occupied Bandwidth Plot (NR Band n41 - 70MHz QPSK - Full RB)

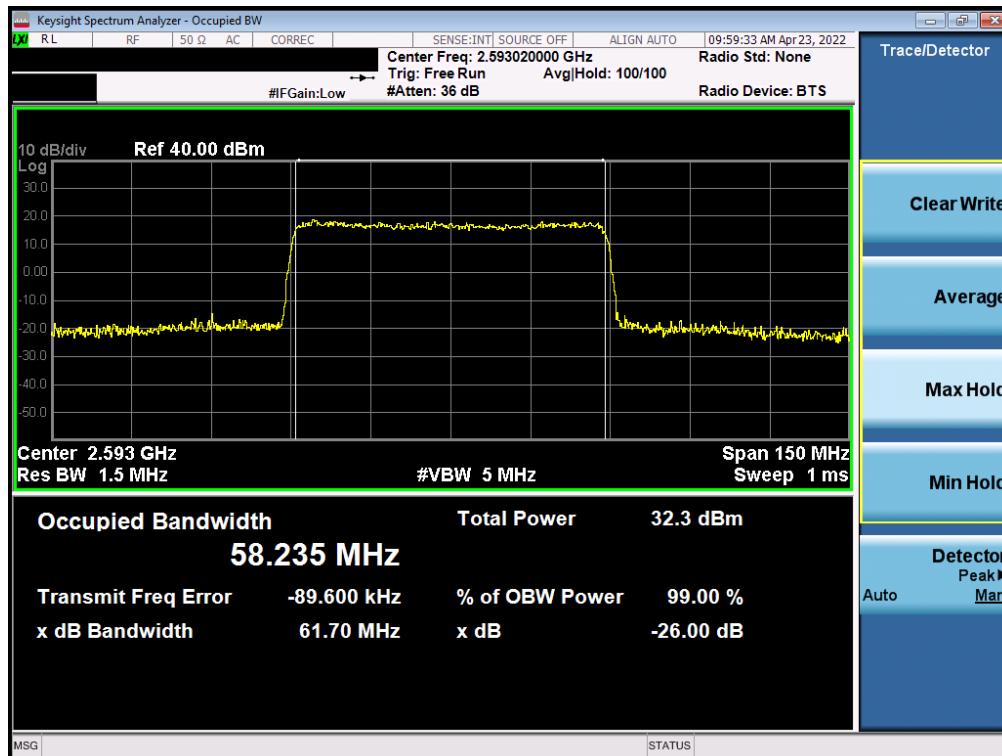


Plot 7-77. Occupied Bandwidth Plot (NR Band n41 - 70MHz 16-QAM - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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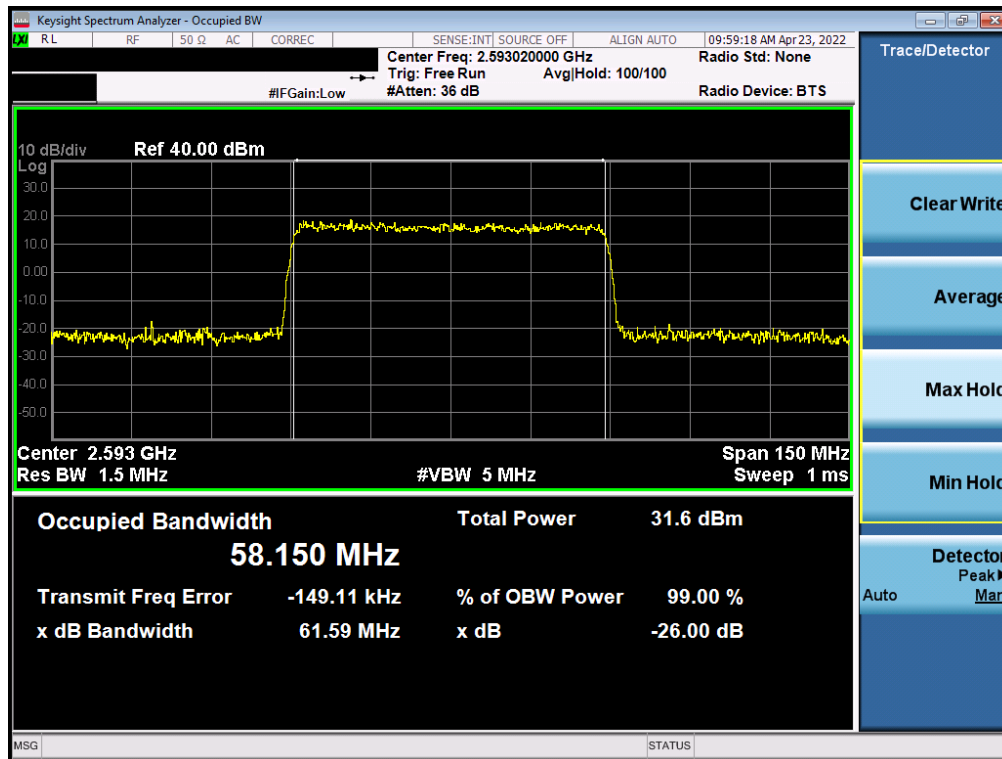


Plot 7-78. Occupied Bandwidth Plot (NR Band n41 - 60MHz $\pi/2$ BPSK - Full RB)

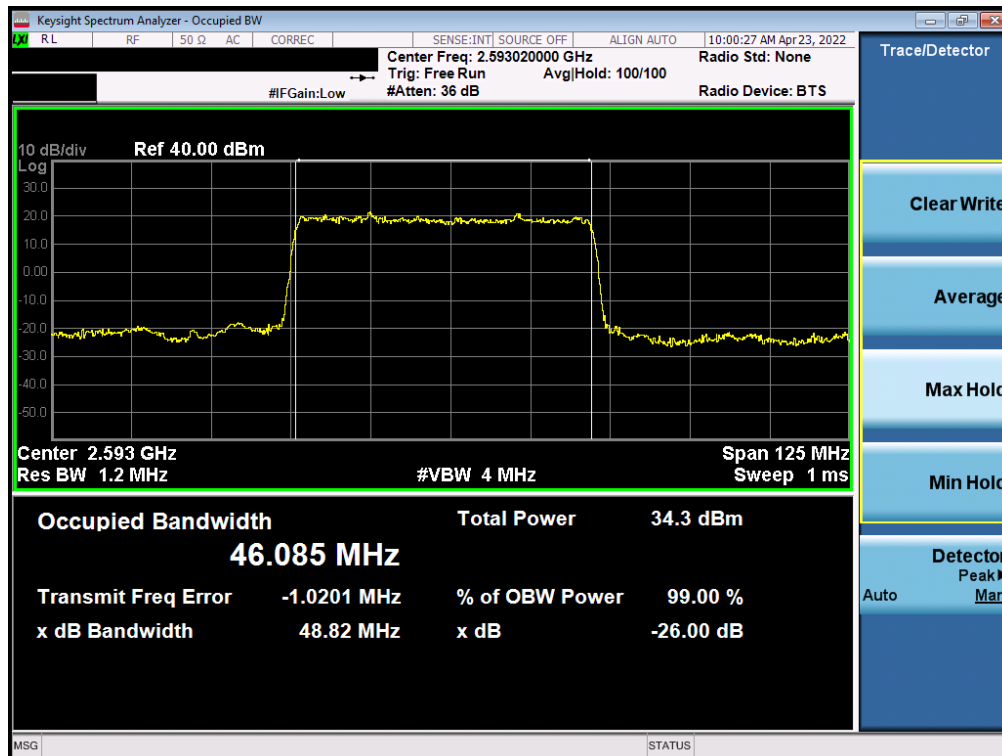


Plot 7-79. Occupied Bandwidth Plot (NR Band n41 - 60MHz QPSK - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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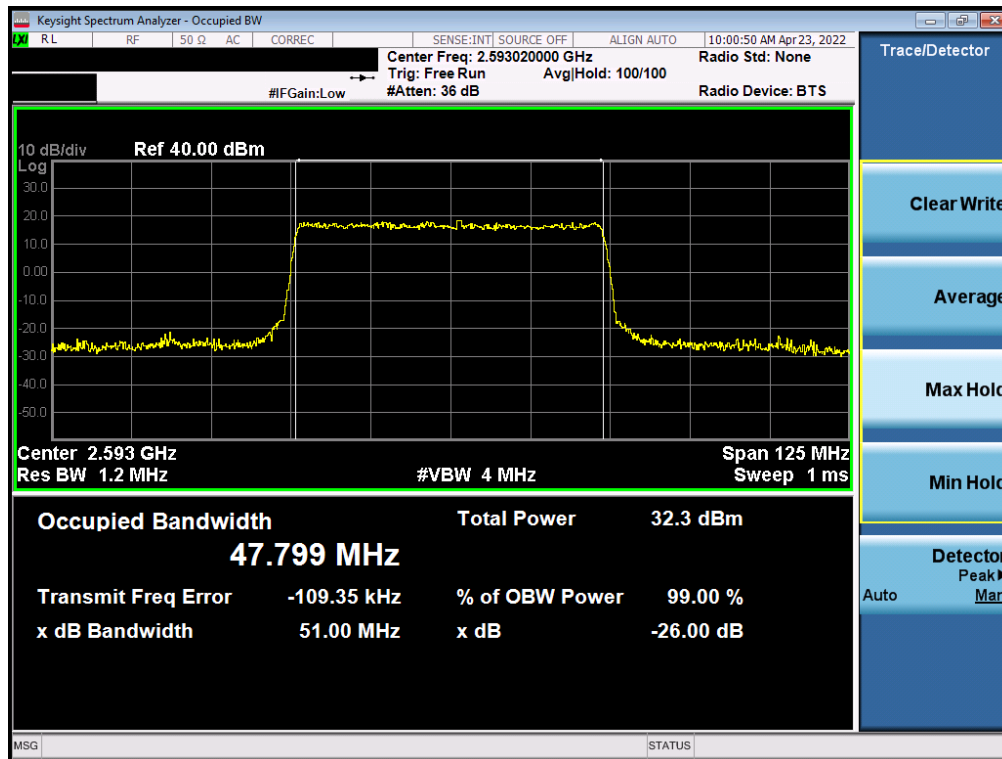


Plot 7-80. Occupied Bandwidth Plot (NR Band n41 - 60MHz 16-QAM - Full RB)

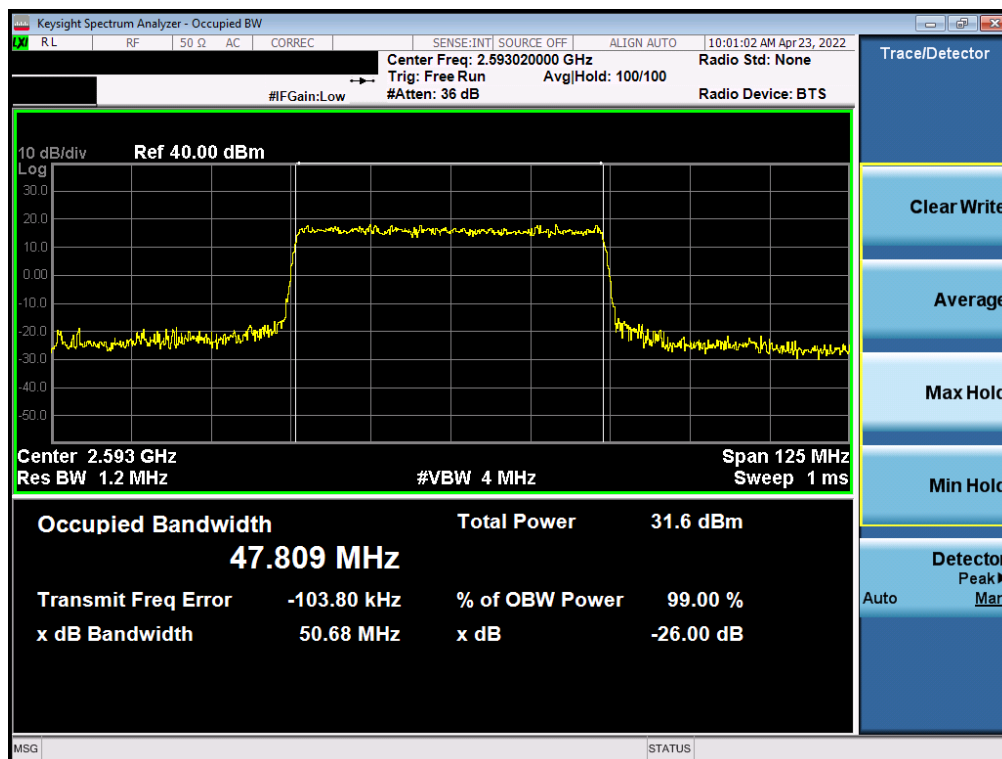


Plot 7-81. Occupied Bandwidth Plot (NR Band n41 - 50MHz $\pi/2$ BPSK - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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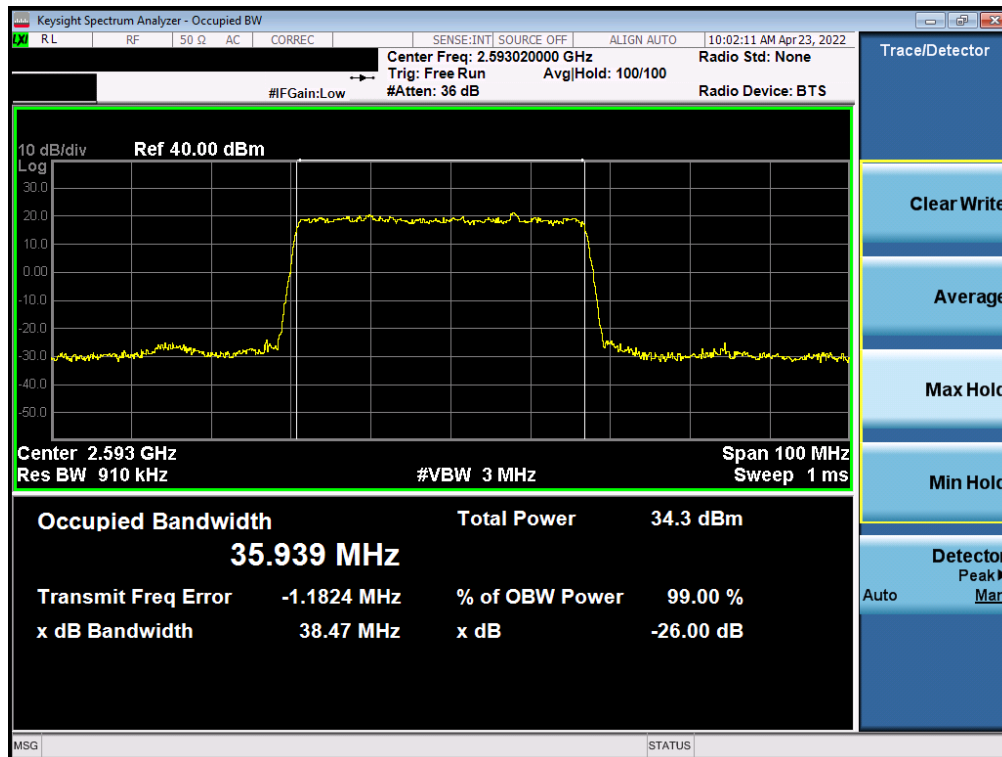


Plot 7-82. Occupied Bandwidth Plot (NR Band n41 - 50MHz QPSK - Full RB)

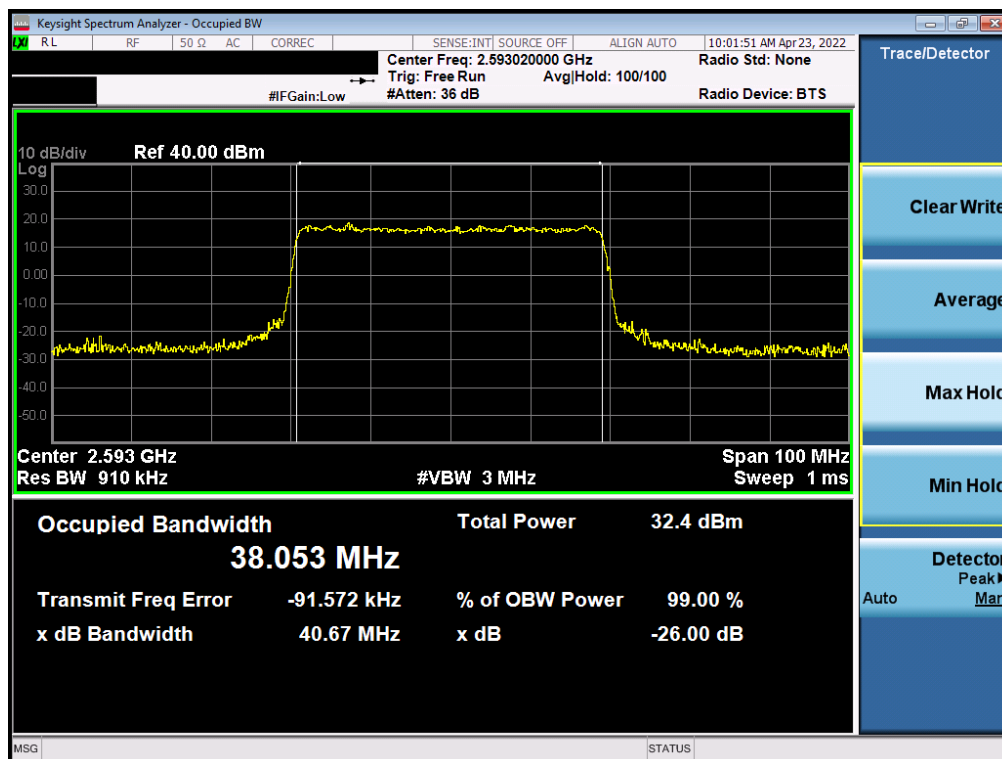


Plot 7-83. Occupied Bandwidth Plot (NR Band n41 - 50MHz 16-QAM - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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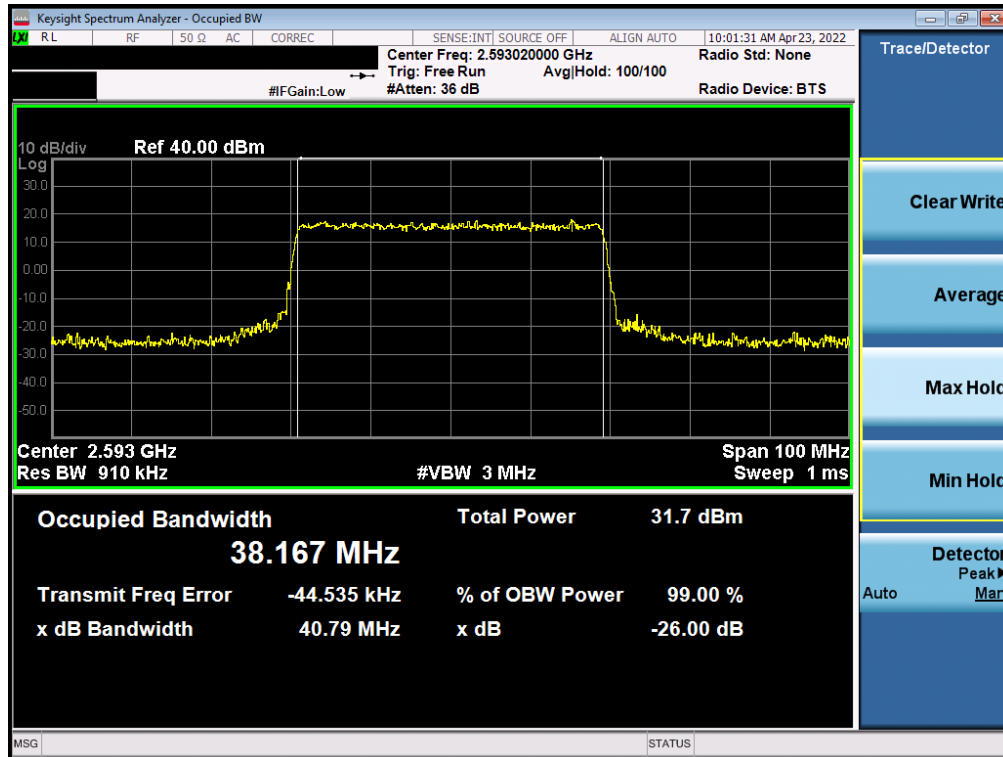


Plot 7-84. Occupied Bandwidth Plot (NR Band n41/n38 - 40MHz $\pi/2$ BPSK - Full RB)

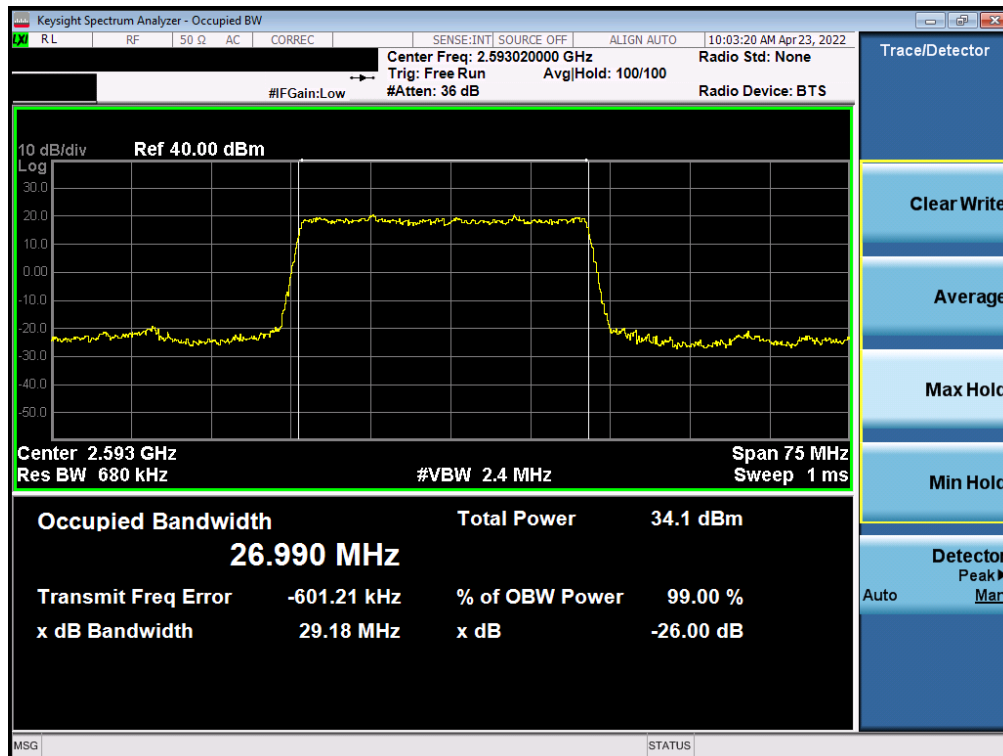


Plot 7-85. Occupied Bandwidth Plot (NR Band n41/n38 - 40MHz QPSK - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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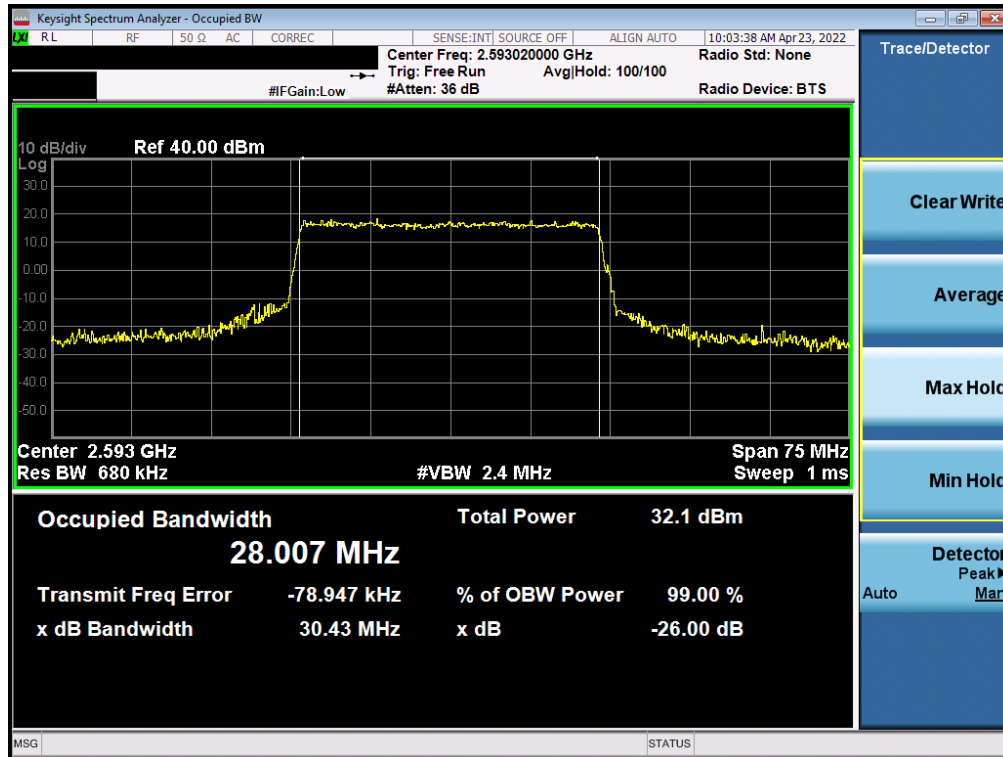


Plot 7-86. Occupied Bandwidth Plot (NR Band n41/n38 - 40MHz 16-QAM - Full RB)

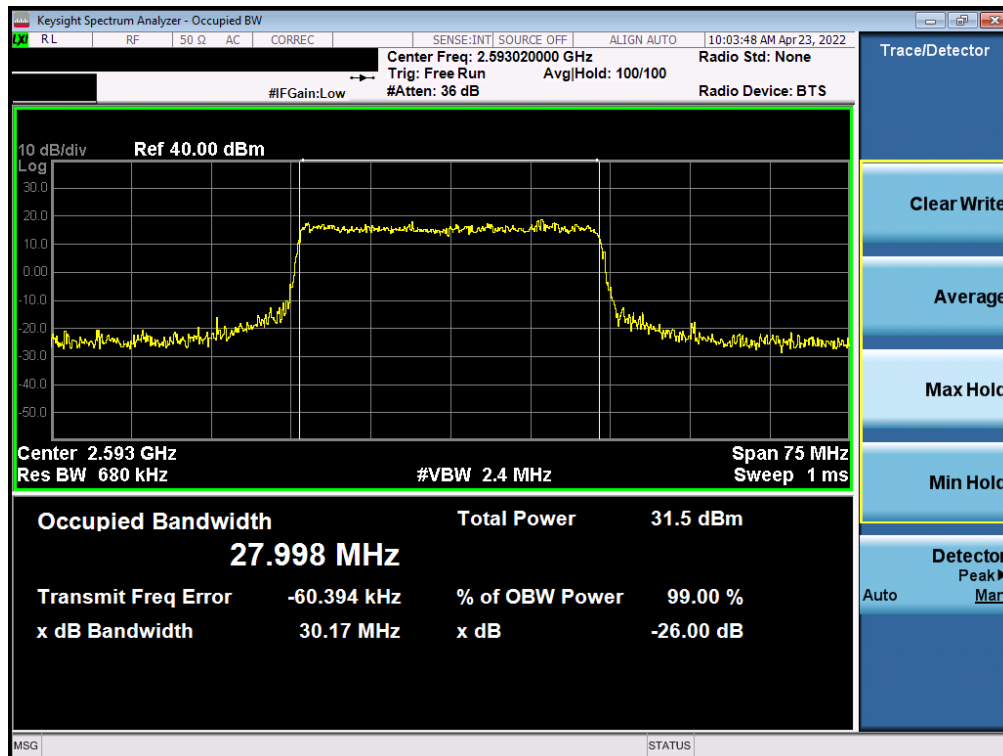


Plot 7-87. Occupied Bandwidth Plot (NR Band n41/n38 - 30MHz $\pi/2$ BPSK - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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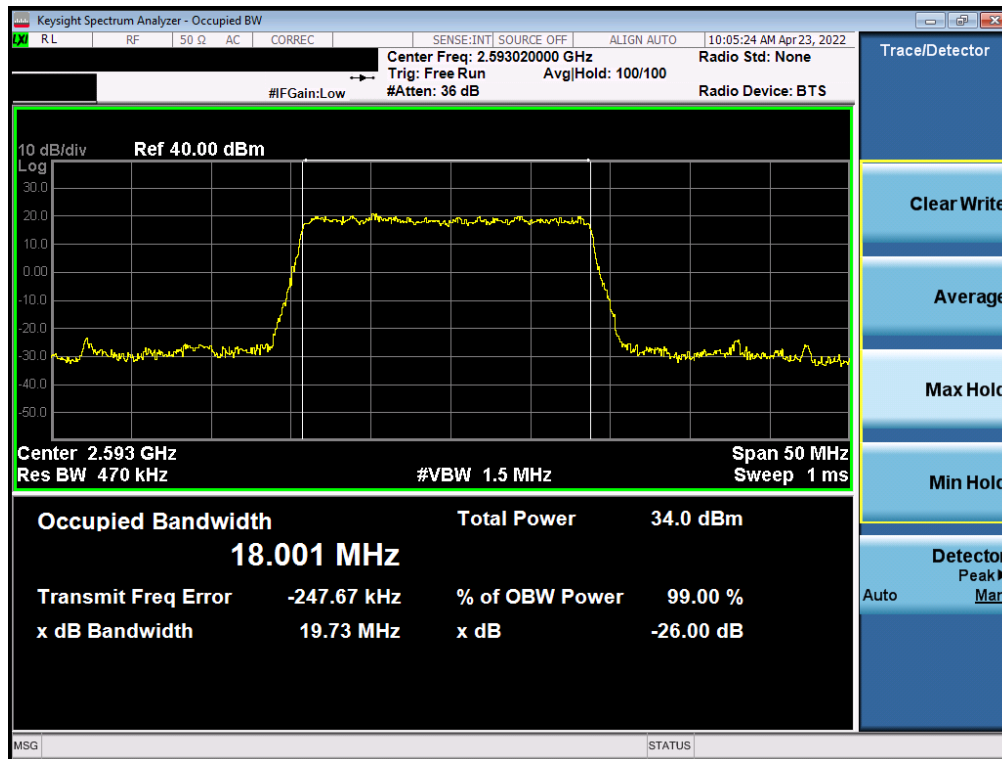


Plot 7-88. Occupied Bandwidth Plot (NR Band n41/n38 - 30MHz QPSK - Full RB)

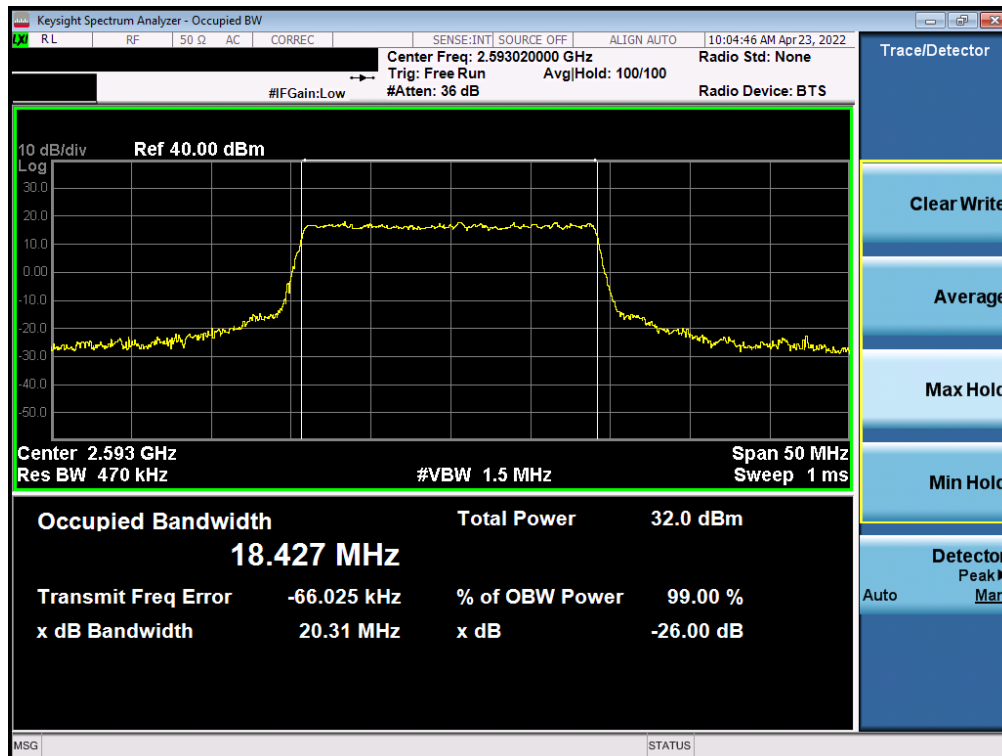


Plot 7-89. Occupied Bandwidth Plot (NR Band n41/n38 - 30MHz 16-QAM - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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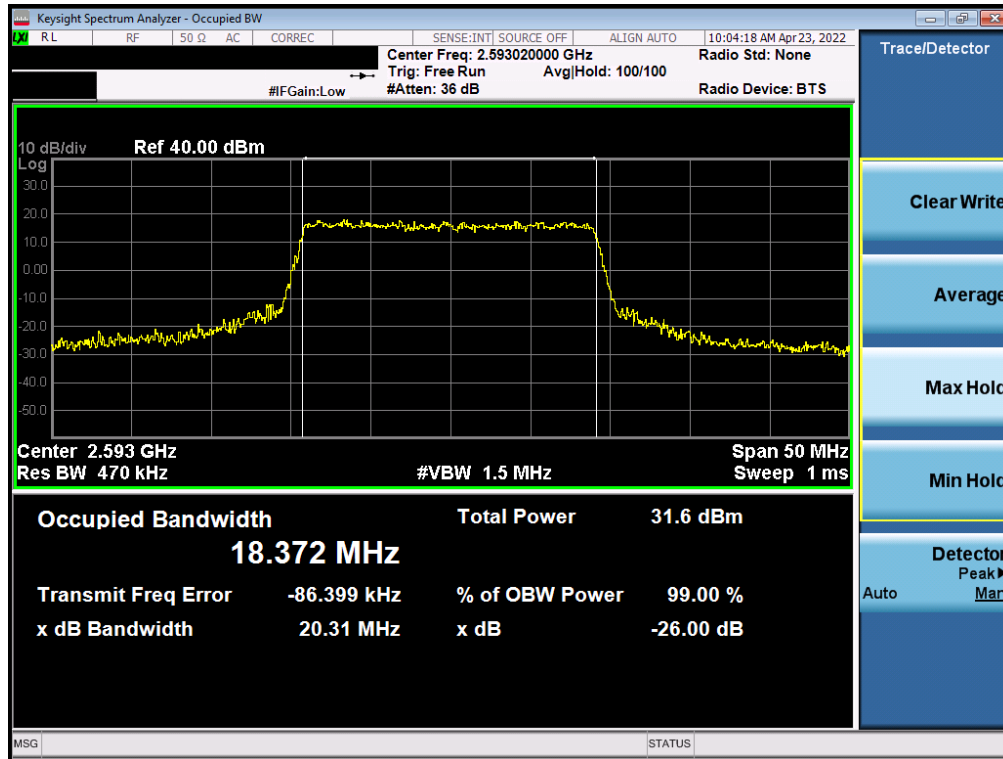


Plot 7-90. Occupied Bandwidth Plot (NR Band n41/n38 - 20MHz $\pi/2$ BPSK - Full RB)



Plot 7-91. Occupied Bandwidth Plot (NR Band n41/n38 - 20MHz QPSK - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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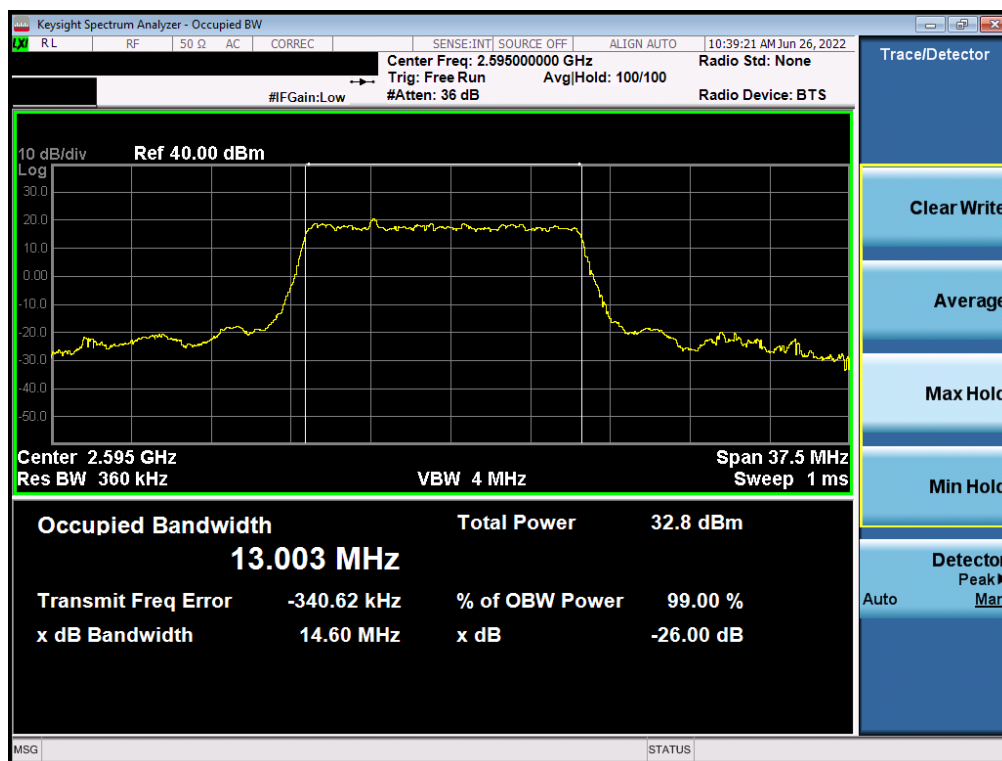


Plot 7-92. Occupied Bandwidth Plot (NR Band n41/n38 - 20MHz 16-QAM - Full RB)

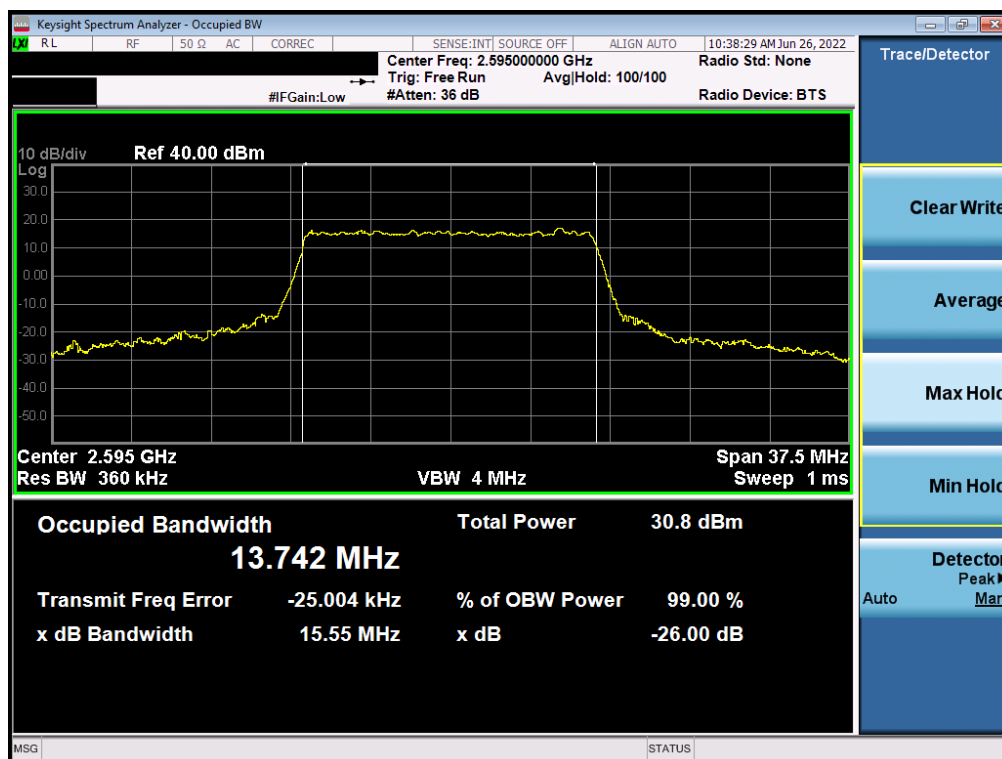
FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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NR Band n38



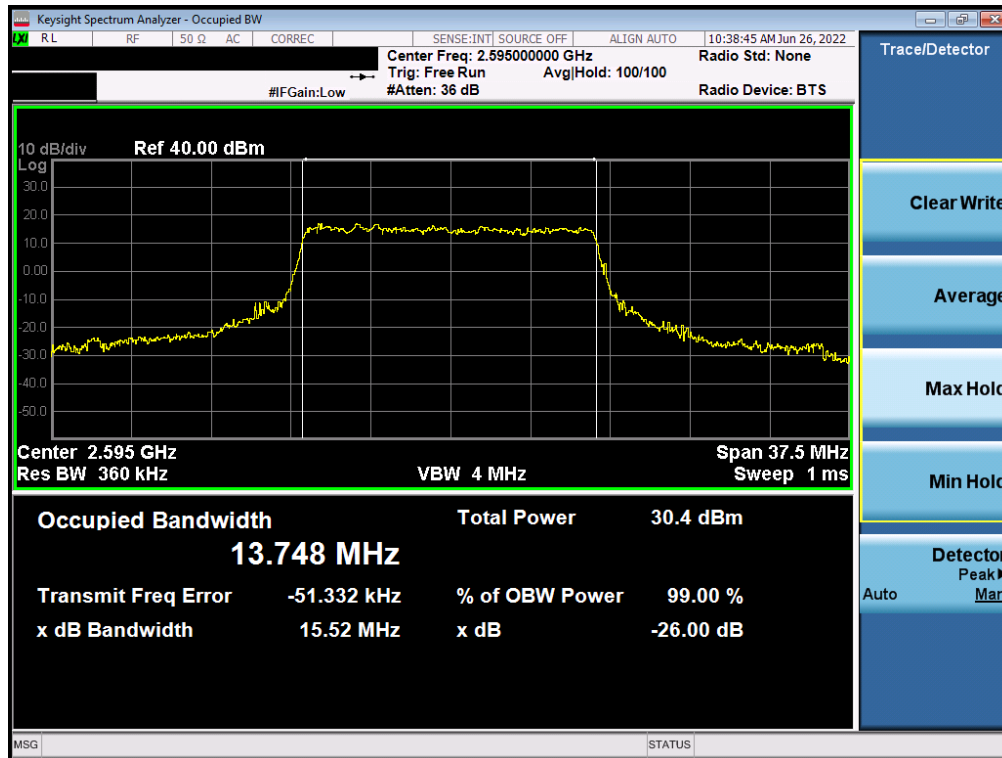
Plot 7-93. Occupied Bandwidth Plot (NR Band n38 - 15MHz $\pi/2$ BPSK - Full RB)



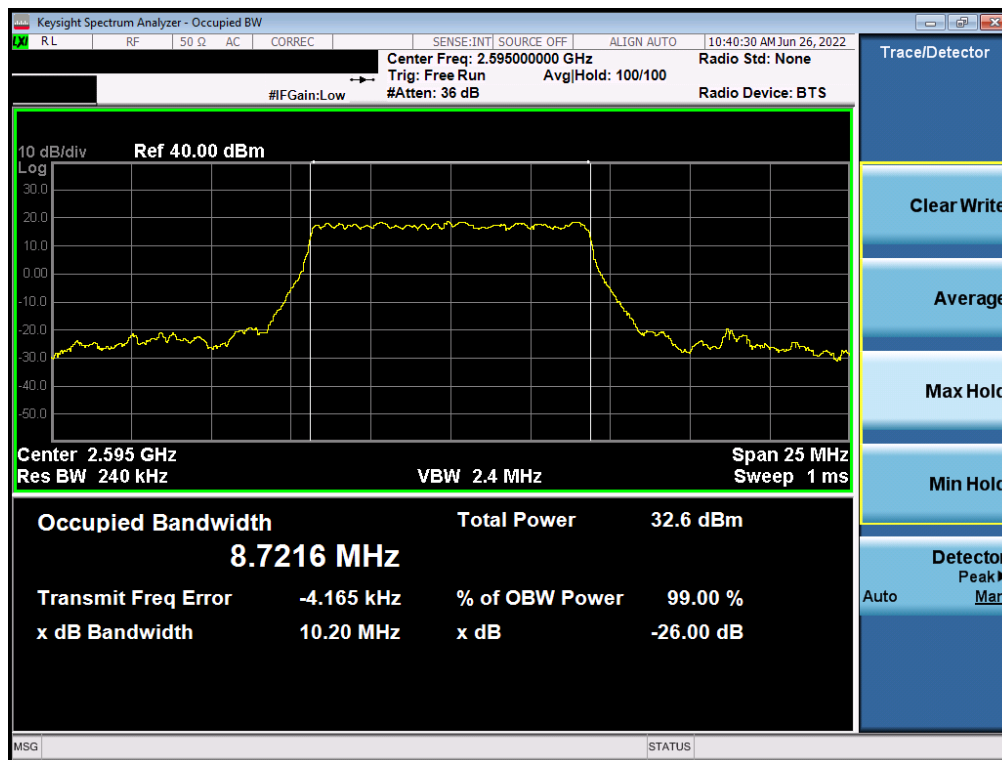
Plot 7-94. Occupied Bandwidth Plot (NR Band n38 - 15MHz QPSK - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-95. Occupied Bandwidth Plot (NR Band n38 - 15MHz 16-QAM - Full RB)

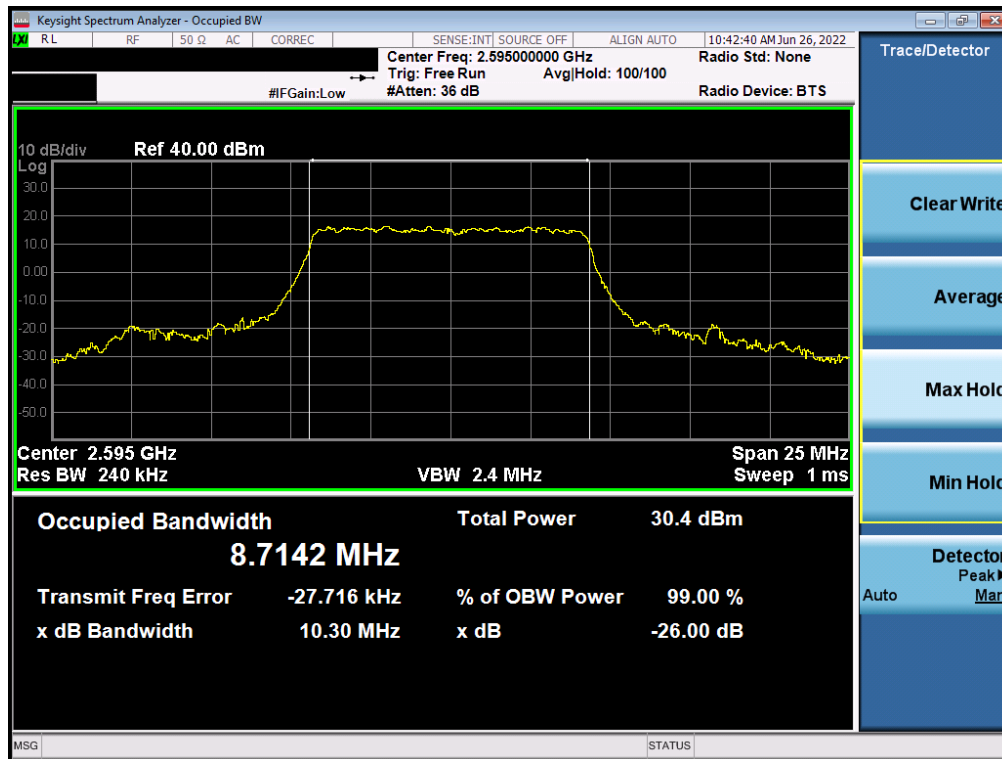


Plot 7-96. Occupied Bandwidth Plot (NR Band n38 - 10MHz $\pi/2$ BPSK - Full RB)

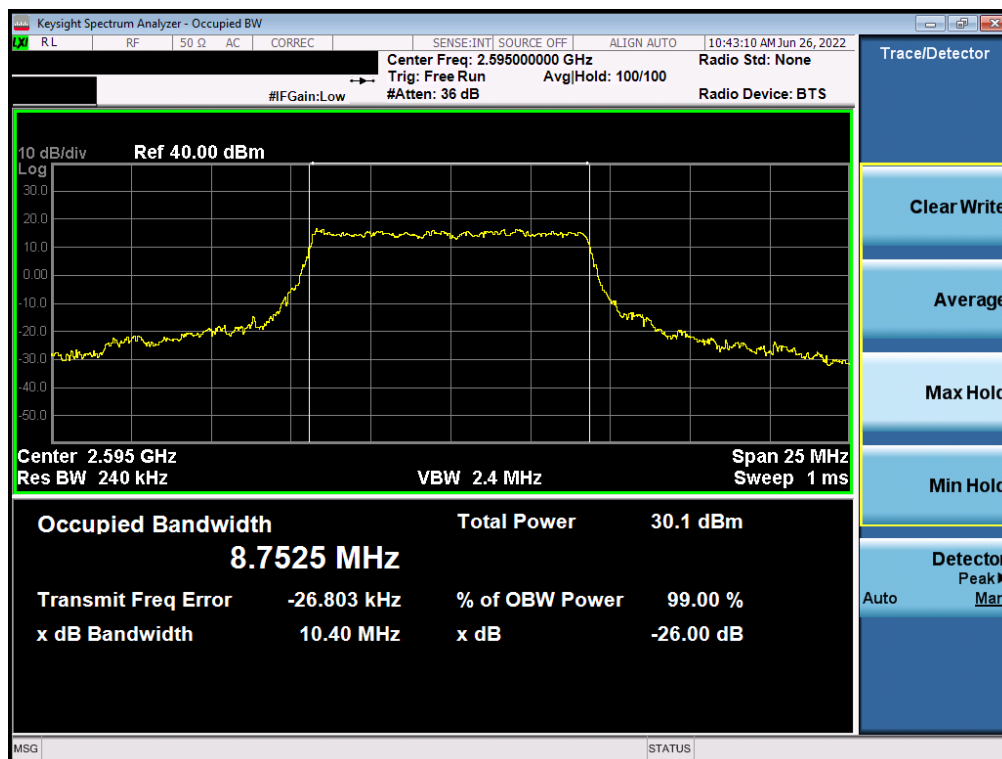
FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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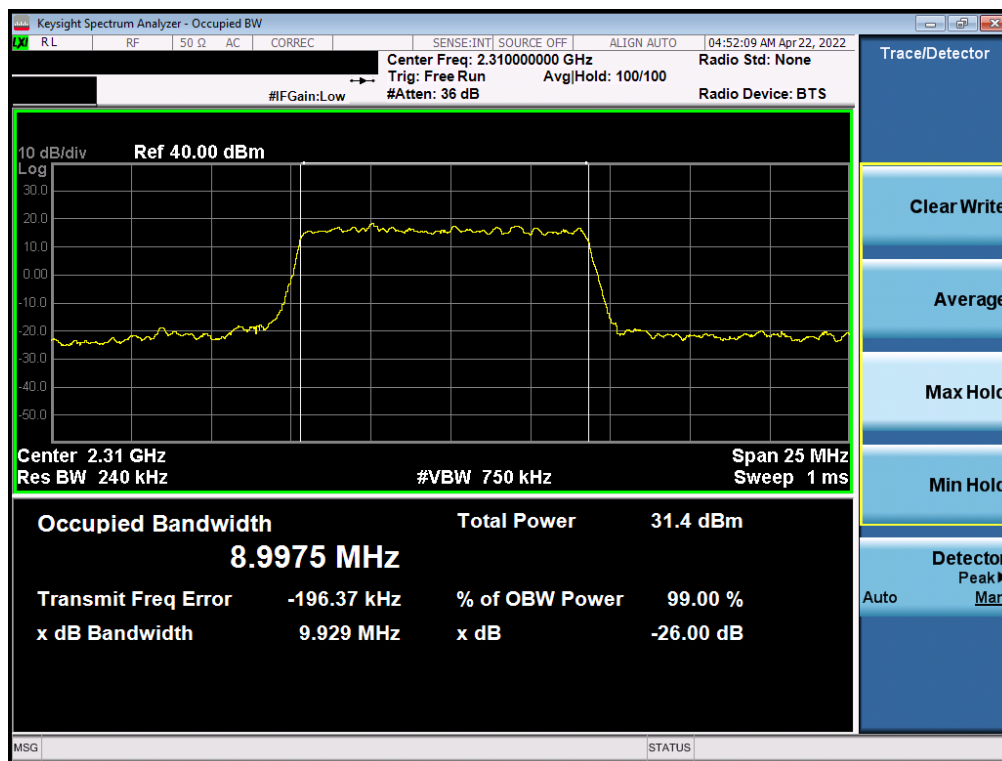
Plot 7-97. Occupied Bandwidth Plot (NR Band n38 - 10MHz QPSK - Full RB)



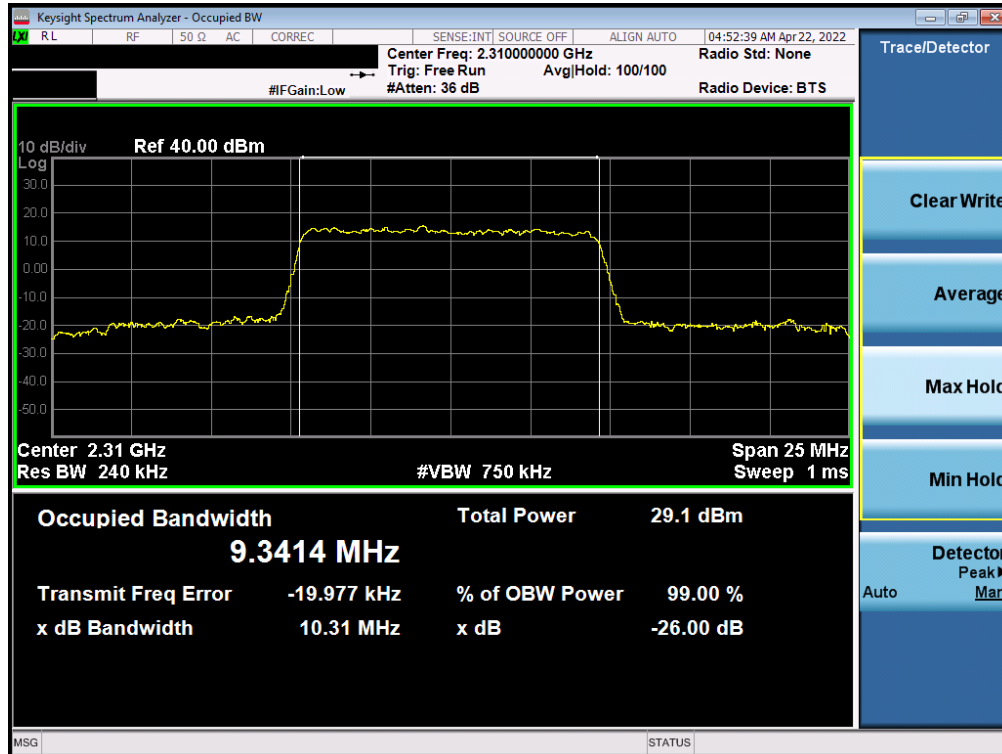
Plot 7-98. Occupied Bandwidth Plot (NR Band n38 - 10MHz 16-QAM - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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NR Band n30 – Ant I



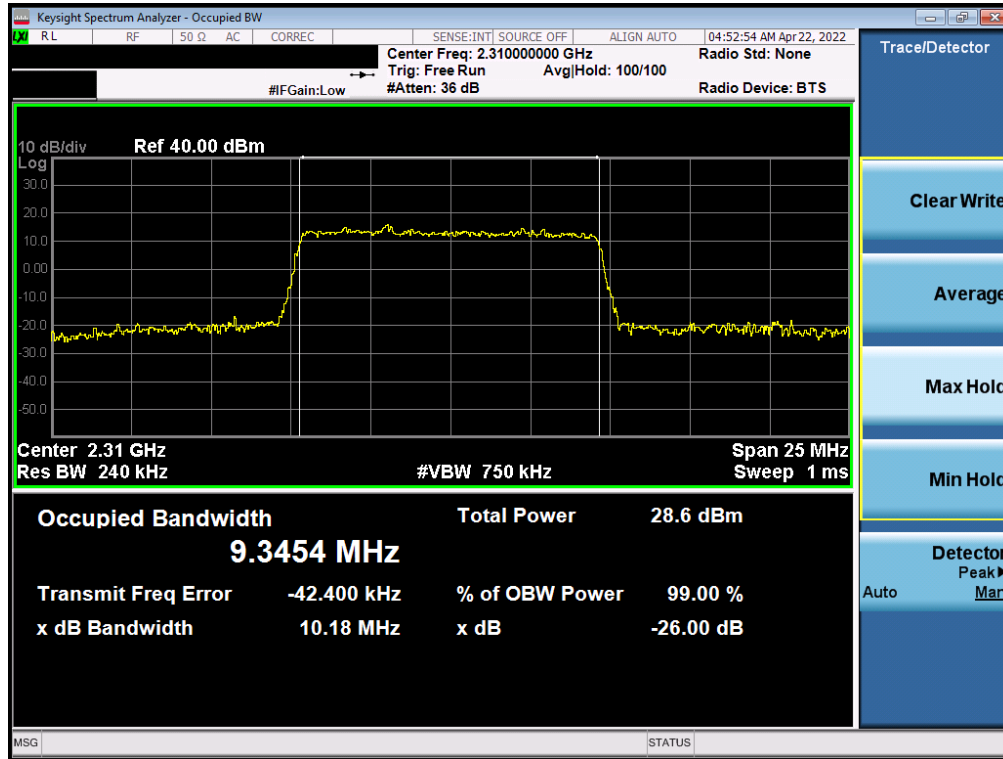
Plot 7-99. Occupied Bandwidth Plot (NR Band n30 - 10MHz $\pi/2$ BPSK - Full RB)



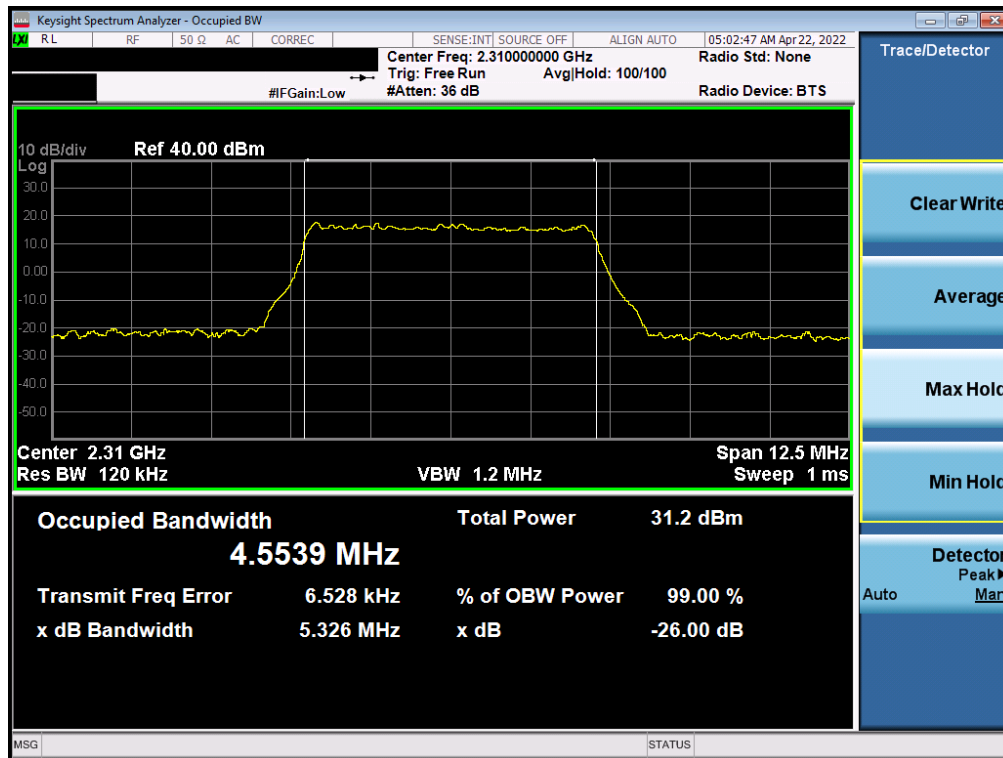
Plot 7-100. Occupied Bandwidth Plot (NR Band n30 - 10MHz QPSK - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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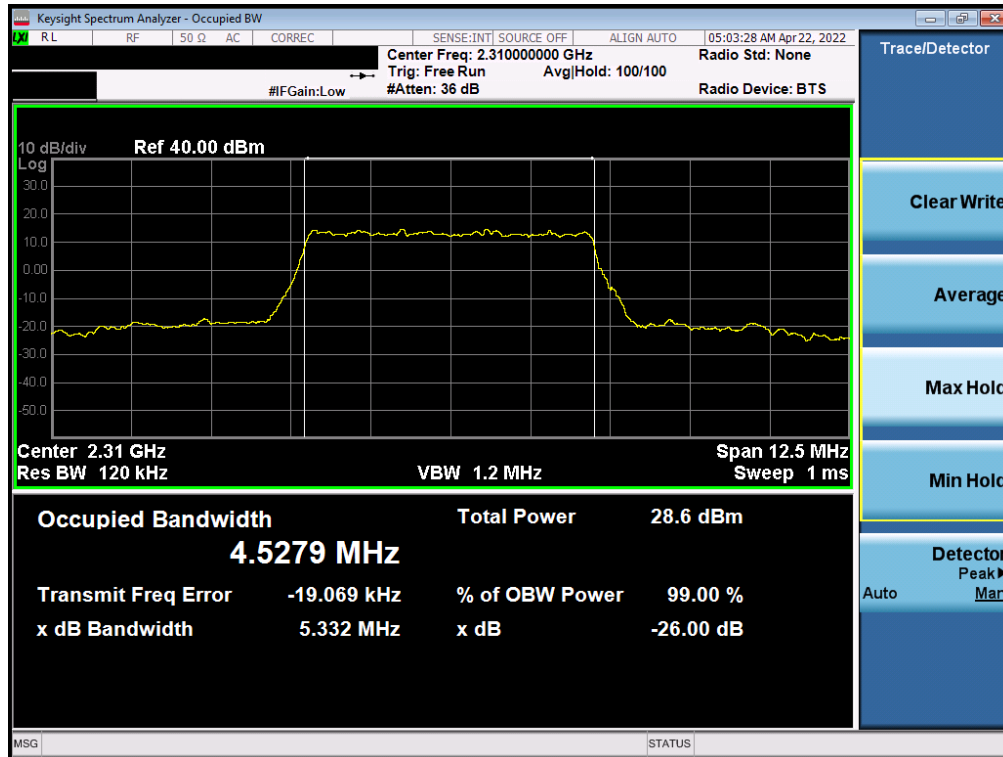


Plot 7-101. Occupied Bandwidth Plot (NR Band n30 - 10MHz 16-QAM - Full RB)

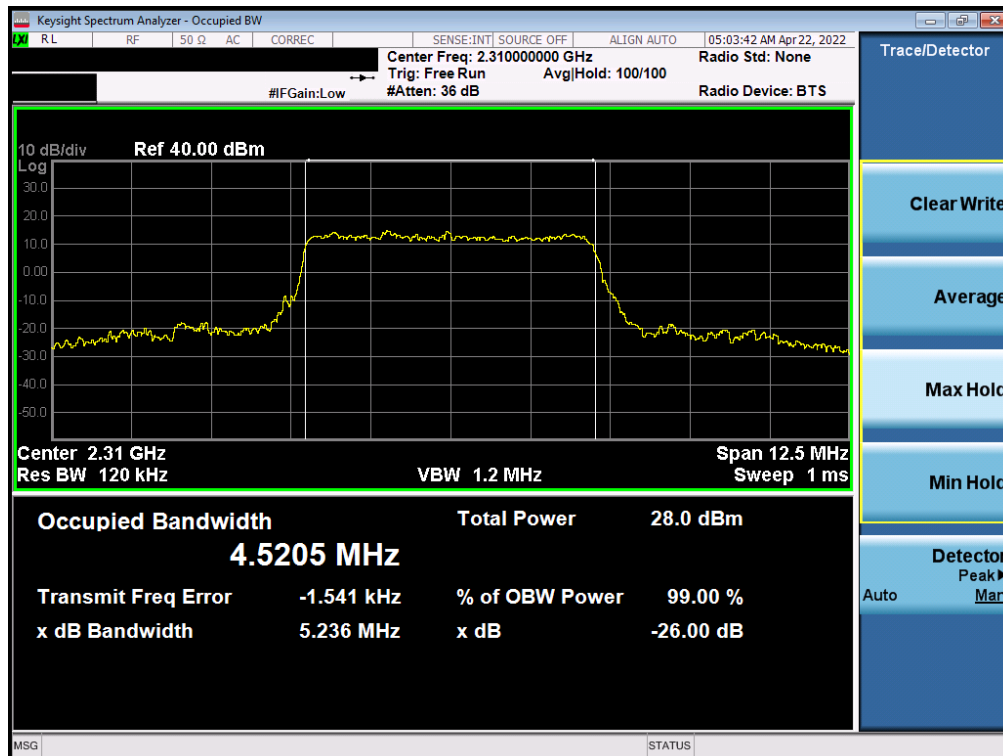


Plot 7-102. Occupied Bandwidth Plot (NR Band n30 - 5MHz $\pi/2$ BPSK - Full RB)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-103. Occupied Bandwidth Plot (NR Band n30 - 5MHz QPSK - Full RB)



Plot 7-104. Occupied Bandwidth Plot (NR Band n30 - 5MHz 16-QAM - Full RB)

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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 $43 + 10 \log_{10}(P_{\text{Watts}})$, where P is the transmitter power in Watts.

For Band 30, the minimum permissible attenuation level of any spurious emission <2288MHz and >2365MHz is $70 + 10 \log_{10}(P_{\text{Watts}})$.

For Band 7 and 41, the minimum permissible attenuation level of any spurious emission is $55 + 10 \log_{10}(P_{\text{Watts}})$.

Test Procedure Used

ANSI C63.26-2015 – Section 5.7.4

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to 10GHz (separated into at least two plots per channel)
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.

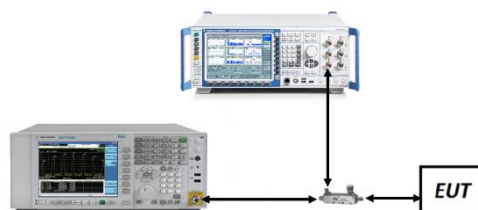


Figure 7-3. Test Instrument & Measurement Setup

Test Notes

1. Per Part 27, RSS-195 and RSS-199, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth of 1 MHz.
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.

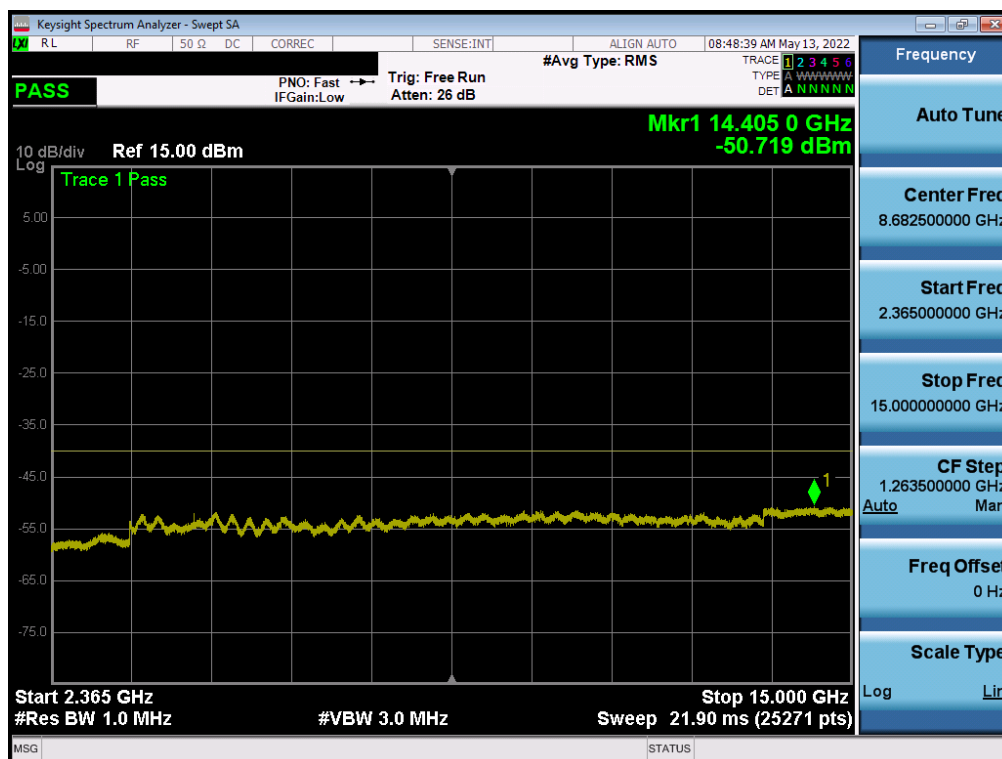
FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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LTE Band 30



Plot 7-105. Conducted Spurious Plot (LTE Band 30 - 10MHz QPSK - RB Size 1, RB Offset 0)



Plot 7-106. Conducted Spurious Plot (LTE Band 30 - 10MHz QPSK - RB Size 1, RB Offset 0)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-107. Conducted Spurious Plot (LTE Band 30 - 10MHz QPSK - RB Size 1, RB Offset 0)

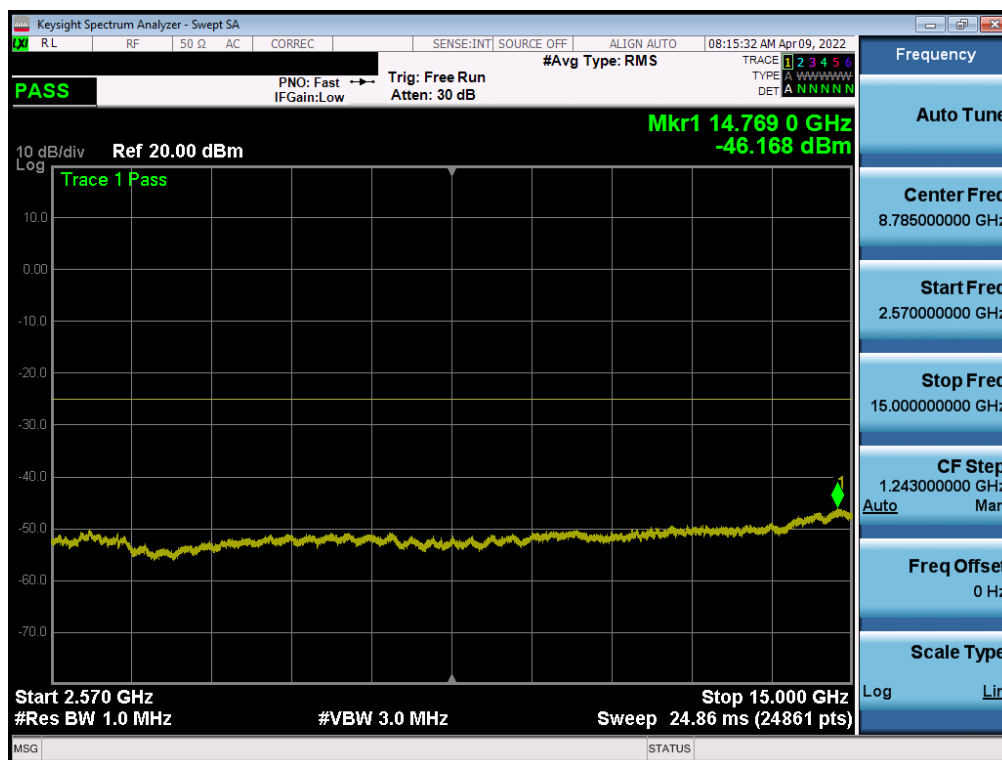
FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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LTE Band 7



Plot 7-108. Conducted Spurious Plot (LTE Band 7 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

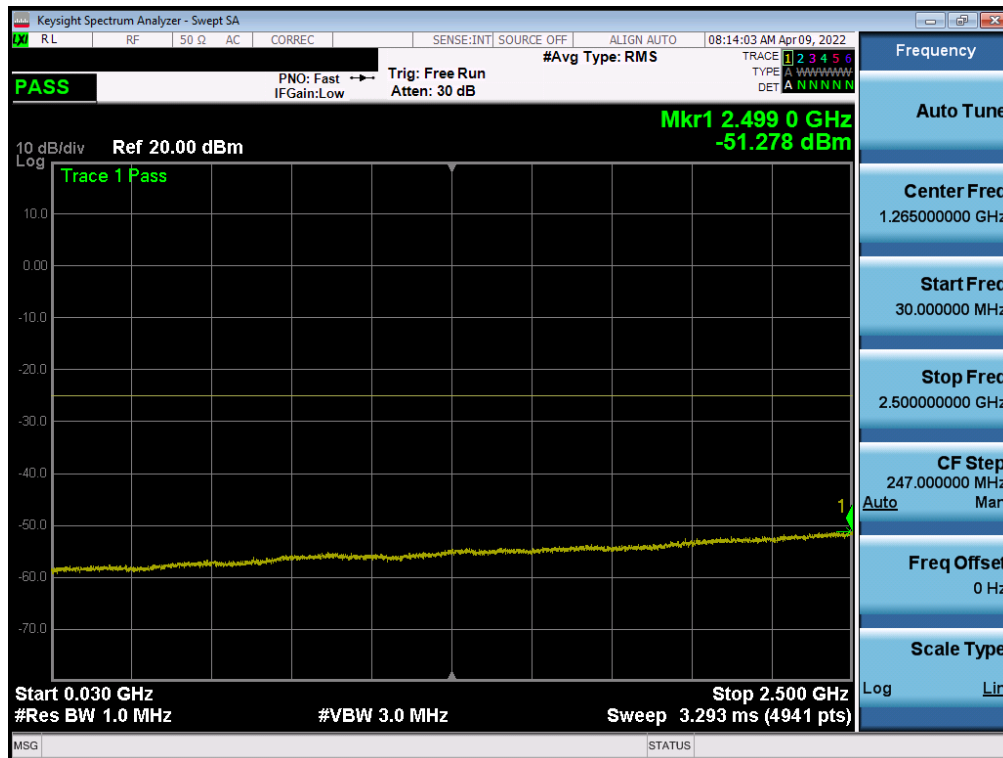


Plot 7-109. Conducted Spurious Plot (LTE Band 7 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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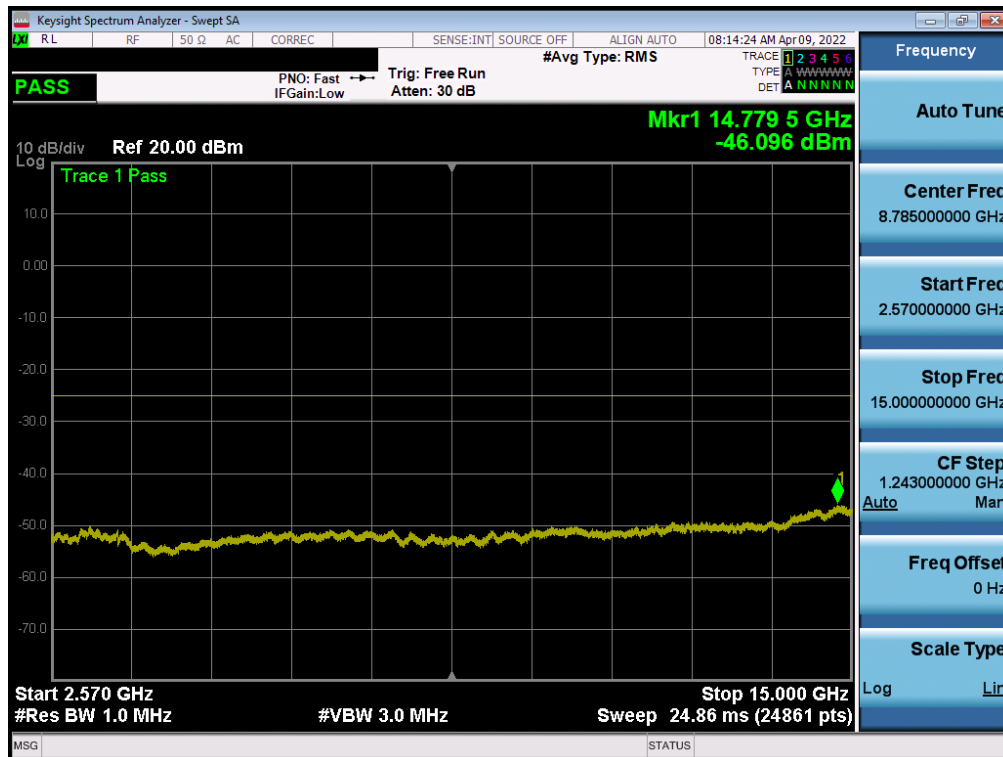


Plot 7-110. Conducted Spurious Plot (LTE Band 7 - 20MHz QPSK - RB Size 1, RB Offset 0 - Low Channel)

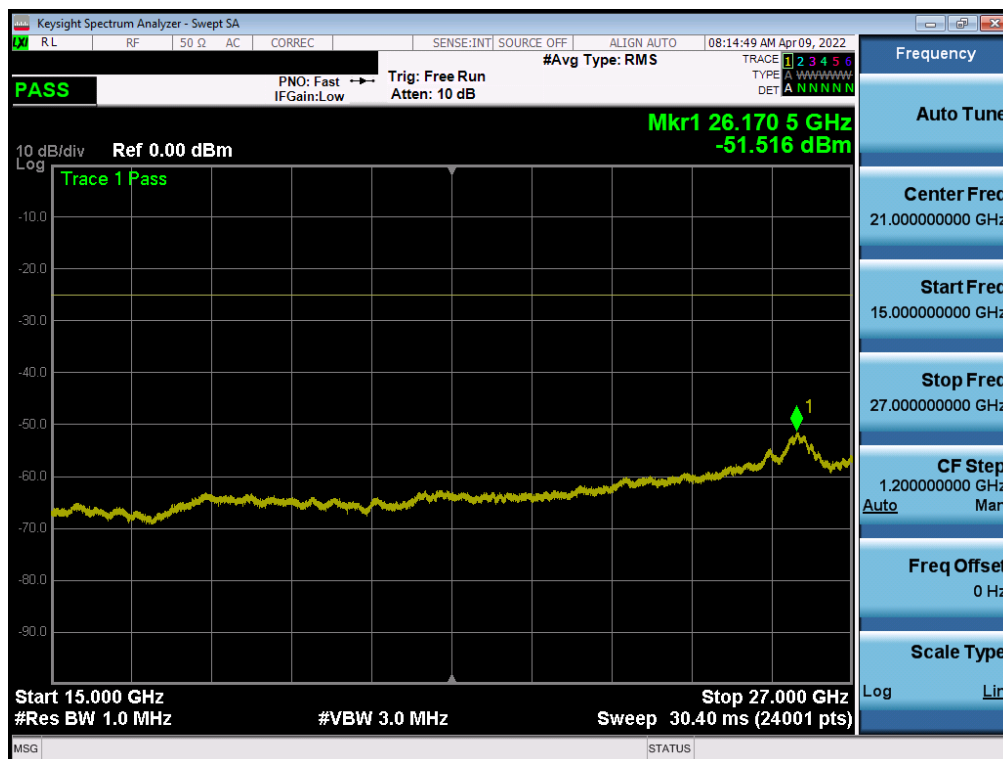


Plot 7-111. Conducted Spurious Plot (LTE Band 7 - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-112. Conducted Spurious Plot (LTE Band 7 - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)



Plot 7-113. Conducted Spurious Plot (LTE Band 7 - 20MHz QPSK - RB Size 1, RB Offset 0 - Mid Channel)

FCC ID: A3LSMF721U	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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