

PART 27 MEASUREMENT REPORT

Applicant Name:

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

Date of Testing:

09/03/2024 - 11/06/2024

Test Report Issue Date:

11/07/2024

Test Site/Location:

Element Lab. Yongin-Si, Gyeonggi-do, South Korea

Test Report Serial No.:

1M2408260066-10.A3L

FCC ID:

A3LSMS936B

Applicant Name:

Samsung Electronics Co., Ltd.

Application Type:

Certification

Model:

SM-S936B/DS

Additional Model(s):

SM-S936B

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.



Prepared by



Reviewed by

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Test Report S/N: 1M2408260066-10.A3L	Test Dates: 09/03/2024 - 11/06/2024	EUT Type: Portable Handset	Page 1 of 154

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Antenna-F						
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n77 PC2 (3450 - 3550MHz)	100 MHz	TT/2 BPSK	3500.0	0.213	23.29	96M9G7D
		QPSK	3500.0	0.214	23.30	98M1G7D
		16QAM	3500.0	0.177	22.48	98M2W7D
	90 MHz	TT/2 BPSK	3495.0 - 3505.0	0.209	23.20	87M5G7D
		QPSK	3495.0 - 3505.0	0.224	23.51	87M9G7D
		16QAM	3495.0 - 3505.0	0.185	22.66	87M9W7D
	80 MHz	TT/2 BPSK	3490.0 - 3510.0	0.247	23.92	77M5G7D
		QPSK	3490.0 - 3510.0	0.255	24.07	77M8G7D
		16QAM	3490.0 - 3510.0	0.200	23.02	77M8W7D
	70 MHz	TT/2 BPSK	3485.0 - 3515.0	0.249	23.97	64M7G7D
		QPSK	3485.0 - 3515.0	0.270	24.32	67M9G7D
		16QAM	3485.0 - 3515.0	0.216	23.35	67M8W7D
	60 MHz	TT/2 BPSK	3480.0 - 3520.0	0.228	23.58	58M2G7D
		QPSK	3480.0 - 3520.0	0.254	24.04	58M2G7D
		16QAM	3480.0 - 3520.0	0.209	23.21	58M1W7D
	50 MHz	TT/2 BPSK	3475.0 - 3525.0	0.209	23.20	46M2G7D
		QPSK	3475.0 - 3525.0	0.236	23.72	47M9G7D
		16QAM	3475.0 - 3525.0	0.195	22.91	47M8W7D
	40 MHz	TT/2 BPSK	3470.0 - 3530.0	0.219	23.41	35M9G7D
		QPSK	3470.0 - 3530.0	0.241	23.82	38M0G7D
		16QAM	3470.0 - 3530.0	0.182	22.61	38M0W7D
	30 MHz	TT/2 BPSK	3465.0 - 3535.0	0.226	23.55	27M0G7D
		QPSK	3465.0 - 3535.0	0.246	23.91	28M1G7D
		16QAM	3465.0 - 3535.0	0.199	22.98	28M1W7D
	25 MHz	TT/2 BPSK	3462.5 - 3537.5	0.249	23.96	23M0G7D
		QPSK	3462.5 - 3537.5	0.303	24.82	23M3G7D
		16QAM	3462.5 - 3537.5	0.230	23.62	23M3W7D
	20 MHz	TT/2 BPSK	3460.0 - 3540.0	0.200	23.02	18M0G7D
		QPSK	3460.0 - 3540.0	0.217	23.37	18M4G7D
		16QAM	3460.0 - 3540.0	0.181	22.58	18M3W7D
	15 MHz	TT/2 BPSK	3457.5 - 3542.5	0.238	23.77	13M0G7D
		QPSK	3457.5 - 3542.5	0.282	24.50	13M7G7D
		16QAM	3457.5 - 3542.5	0.217	23.37	13M7W7D
	10 MHz	TT/2 BPSK	3455.0 - 3545.0	0.187	22.73	8M71G7D
		QPSK	3455.0 - 3545.0	0.217	23.37	8M68G7D
		16QAM	3455.0 - 3545.0	0.171	22.34	8M67W7D

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Antenna-F						
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n77 PC2 (3700 - 3980MHz)	100 MHz	$\pi/2$ BPSK	3750.0 - 3930.0	0.288	24.59	97M0G7D
		QPSK	3750.0 - 3930.0	0.287	24.58	98M0G7D
		16QAM	3750.0 - 3930.0	0.240	23.79	98M1W7D
	90 MHz	$\pi/2$ BPSK	3745.0 - 3935.0	0.284	24.54	87M4G7D
		QPSK	3745.0 - 3935.0	0.285	24.55	88M1G7D
		16QAM	3745.0 - 3935.0	0.263	24.20	87M9W7D
	80 MHz	$\pi/2$ BPSK	3740.0 - 3940.0	0.298	24.75	77M5G7D
		QPSK	3740.0 - 3940.0	0.310	24.92	77M8G7D
		16QAM	3740.0 - 3940.0	0.251	23.99	77M9W7D
	70 MHz	$\pi/2$ BPSK	3735.0 - 3945.0	0.339	25.30	64M6G7D
		QPSK	3735.0 - 3945.0	0.307	24.87	67M7G7D
		16QAM	3735.0 - 3945.0	0.267	24.26	67M7W7D
	60 MHz	$\pi/2$ BPSK	3730.0 - 3950.0	0.344	25.36	58M3G7D
		QPSK	3730.0 - 3950.0	0.324	25.10	58M3G7D
		16QAM	3730.0 - 3950.0	0.289	24.61	58M3W7D
	50 MHz	$\pi/2$ BPSK	3725.0 - 3955.0	0.404	26.06	46M0G7D
		QPSK	3725.0 - 3955.0	0.399	26.01	47M8G7D
		16QAM	3725.0 - 3955.0	0.284	24.53	47M8W7D
	40 MHz	$\pi/2$ BPSK	3720.0 - 3960.0	0.400	26.02	35M9G7D
		QPSK	3720.0 - 3960.0	0.400	26.02	38M1G7D
		16QAM	3720.0 - 3960.0	0.322	25.08	38M1W7D
	30 MHz	$\pi/2$ BPSK	3715.0 - 3965.0	0.415	26.19	27M0G7D
		QPSK	3715.0 - 3965.0	0.417	26.20	28M1G7D
		16QAM	3715.0 - 3965.0	0.280	24.47	28M1W7D
	25 MHz	$\pi/2$ BPSK	3712.5 - 3967.5	0.329	25.17	23M0G7D
		QPSK	3712.5 - 3967.5	0.328	25.16	23M3G7D
		16QAM	3712.5 - 3967.5	0.305	24.85	23M0W7D
	20 MHz	$\pi/2$ BPSK	3710.0 - 3970.0	0.412	26.15	18M0G7D
		QPSK	3710.0 - 3970.0	0.416	26.19	18M3G7D
		16QAM	3710.0 - 3970.0	0.287	24.58	18M3W7D
	15 MHz	$\pi/2$ BPSK	3707.5 - 3972.5	0.303	24.81	13M0G7D
		QPSK	3707.5 - 3972.5	0.375	25.74	13M7G7D
		16QAM	3707.5 - 3972.5	0.348	25.41	13M7W7D
	10 MHz	$\pi/2$ BPSK	3705.0 - 3975.0	0.381	25.80	8M65G7D
		QPSK	3705.0 - 3975.0	0.403	26.06	8M67G7D
		16QAM	3705.0 - 3975.0	0.367	25.64	8M69W7D

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Antenna-C						
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n77 PC2 (3450 - 3550MHz)	100 MHz	$\pi/2$ BPSK	3500.0	0.175	22.43	96M9G7D
		QPSK	3500.0	0.174	22.41	98M1G7D
		16QAM	3500.0	0.175	22.42	98M2W7D
NR Band n77 PC2 (3700 - 3980MHz)	100 MHz	$\pi/2$ BPSK	3750.0 - 3930.0	0.095	19.76	97M0G7D
		QPSK	3750.0 - 3930.0	0.092	19.63	97M8G7D
		16QAM	3750.0 - 3930.0	0.077	18.84	98M2W7D

Antenna-I						
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n77 PC2 (3450 - 3550MHz)	100 MHz	$\pi/2$ BPSK	3500.0	0.156	21.92	97M2G7D
		QPSK	3500.0	0.155	21.89	98M0G7D
		16QAM	3500.0	0.145	21.62	98M1W7D
NR Band n77 PC2 (3700 - 3980MHz)	100 MHz	$\pi/2$ BPSK	3750.0 - 3930.0	0.182	22.61	97M0G7D
		QPSK	3750.0 - 3930.0	0.183	22.62	98M1G7D
		16QAM	3750.0 - 3930.0	0.174	22.41	98M0W7D

Antenna-D						
Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n77 PC2 (3450 - 3550MHz)	100 MHz	$\pi/2$ BPSK	3500.0	0.058	17.63	97M2G7D
		QPSK	3500.0	0.058	17.60	98M0G7D
		16QAM	3500.0	0.058	17.61	98M2W7D
NR Band n77 PC2 (3700 - 3980MHz)	100 MHz	$\pi/2$ BPSK	3750.0 - 3930.0	0.036	15.51	97M1G7D
		QPSK	3750.0 - 3930.0	0.035	15.50	98M3G7D
		16QAM	3750.0 - 3930.0	0.029	14.65	97M9W7D

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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 Suwon Laboratory located at 13, Heungdeok 1-ro, Giheung-gu, Yongin-si, Gyeonggi-do, 16954, South Korea. 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 Materials Technology Suwon, Ltd. located in Yongin-si, Gyeonggi-do, 16954, South Korea.

- Element Materials Technology Suwon, Ltd. is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.04 for Specific Absorption Rate (SAR), and Electromagnetic Compatibility (EMC) & Telecommunications testing for FCC and Innovation, Science, and Economic Development Canada rules.
- Element Materials Technology Suwon, Ltd. facility is accredited, designated, and recognized in accordance with the provision of Radio Wave Act and International Standard ISO/IEC 17025:2017 under the National Radio Research Agency.
 - Designation Number / CABID: KR0169
 - Test Firm Registration Number of FCC: 417945
 - Test Firm Registration Number of ISSED: 26168

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung 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 27.

Test Device Serial No.: 1698M, 1700M, 2358M, 2366M

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/ac/ax/be WLAN, 802.11a/n/ac/ax/be UNII (5GHz and 6GHz), Bluetooth (1x, EDR, LE), Wireless Power Transfer, UWB

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

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.

2.4 Software and Firmware

Testing was performed on device(s) using software/firmware version S936BXXU0AQQ2 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	1.95
Radiated Disturbance (<1GHz)	4.10
Radiated Disturbance (>1GHz)	4.82
Radiated Disturbance (>18GHz)	4.96

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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
Agilent	N9030A	PXA Signal Analyzer	2024-07-08	Annual	2025-07-08	
Anritsu	S820E	Cable and Antenna Analyzer	2024-07-09	Annual	2025-07-08	1839097
Anritsu	MA24106A	USB Power Sensor	2024-07-09	Annual	2025-07-08	1244512
Anritsu	MT8000A	Radio Communication Test Station	2024-09-05	Annual	2025-09-04	6272337405
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	2024-10-07	Biennial	2026-10-06	10160045
Espec	SH-242	Environmental Chamber	2024-07-09	Annual	2025-07-08	93011064
Fairview Microwave	FM2CP1122-10	2.92mm Directional Coupler	2024-07-09	Annual	2025-07-08	1946
Keysight Technologies	N9030B	PXA Signal Analyzer	2024-07-08	Annual	2025-07-08	MY57143278
Mini-Circuits	BW-N10W5+	Attenuator	2024-04-08	Annual	2025-04-07	TEMPNO.01-151
Mini-Circuits	BW-N10W5+	Attenuator	2024-04-08	Annual	2025-04-07	TEMPNO.01-150
NARDA	180-442A-KF	Horn Antenna (small)	2024-01-16	Annual	2025-01-15	T058701-03
Rohde & Schwarz	SMB100A03	Signal Generator	2024-01-11	Annual	2025-01-10	182487
Rohde & Schwarz	CMW500	Wideband Radio Communication Tester	2024-01-11	Annual	2025-01-10	171075
Rohde & Schwarz	FSW43	Signal and Spectrum Analyzer	2024-01-11	Annual	2025-01-10	101955
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	2024-01-11	Annual	2025-01-10	102131
Schwarzbeck	VULB9162	Broadband TRILOG Antenna	2023-06-01	Biennial	2025-05-31	9162-217
Sunol	DRH-118	Horn Antenna	2023-01-26	Biennial	2025-01-25	A060215

Table 5-1. Test Equipment

Notes:

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.

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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: A3LSMS936B
 FCC Classification: PCS Licensed Transmitter Held to Ear (PCE)
 Mode(s): NR

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 (NR Band n77)	2.1051, 27.53(l), 27.53(n)	≤ -13 dBm / MHz	PASS	Sections 7.4, 7.5
	Peak-to-Average Ratio (NR Band n77)	27.50(j)(4), 27.50(k)(4)	≤ 13 dB	PASS	Section 7.6
	Frequency Stability	2.1055, 27.54	Fundamental emissions stay within authorized frequency block.	PASS	Section 7.9
RADIATED	Effective Radiated Power / Equivalent Isotropic Radiated Power (NR Band n77)	27.50(j)(3), 27.50(k)(3)	≤ 1 Watt EIRP	PASS	Section 7.7
	Radiated Spurious Emissions (NR Band n77)	2.1053, 27.53(l), 27.53(n)	≤ -13 dBm / MHz	PASS	Section 7.8

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

Table 7-1. Summary of Test Results

Notes:

- 1) All modes of operation and data rates were investigated. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots 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 v1.2.2.

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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.

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.

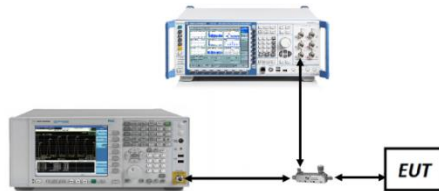


Figure 7-1. Test Instrument & Measurement Setup

Test Notes

1. 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.
2. All other conducted power measurements are contained in the RF exposure report for this filing.
3. 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.

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Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	$\pi/2$ BPSK	633334	3500.01	1 / 271	25.74
	QPSK	633334	3500.01	1 / 271	25.67
	16-QAM	633334	3500.01	1 / 271	24.84
90 MHz	$\pi/2$ BPSK	633000	3495.00	1 / 243	25.87
		633334	3500.01	1 / 243	25.97
		633666	3504.99	1 / 243	25.86
	QPSK	633000	3495.00	1 / 243	25.81
		633334	3500.01	1 / 243	25.82
		633666	3504.99	1 / 243	25.76
	16-QAM	633000	3495.00	1 / 243	24.89
80 MHz	$\pi/2$ BPSK	632668	3490.02	1 / 215	25.93
		633334	3500.01	1 / 215	25.90
		634000	3510.00	1 / 215	25.97
	QPSK	632668	3490.02	1 / 215	25.79
		633334	3500.01	1 / 215	25.83
		634000	3510.00	1 / 215	25.82
70 MHz	$\pi/2$ BPSK	633334	3500.01	1 / 215	24.85
		632334	3485.01	1 / 94	25.81
		633334	3500.01	1 / 187	25.87
	QPSK	634332	3514.98	1 / 187	25.81
		632334	3485.01	1 / 187	25.67
		633334	3500.01	1 / 187	25.86
60 MHz	$\pi/2$ BPSK	634332	3514.98	1 / 187	25.77
		634332	3514.98	1 / 187	24.86
		632000	3480.00	1 / 160	25.80
	QPSK	633334	3500.01	1 / 160	25.87
		634666	3519.99	1 / 160	25.75
		632000	3480.00	1 / 160	25.63
50 MHz	$\pi/2$ BPSK	633334	3500.01	1 / 160	25.83
		634666	3519.99	1 / 160	25.78
		633334	3500.01	1 / 160	24.80
	QPSK	631668	3475.02	1 / 66	26.11
		633334	3500.01	1 / 1	25.97
		635000	3525.00	1 / 131	26.03
40 MHz	$\pi/2$ BPSK	631668	3475.02	1 / 131	25.77
		633334	3500.01	1 / 131	25.89
		635000	3525.00	1 / 131	25.87
	QPSK	633334	3500.01	1 / 1	24.92
		631334	3470.01	1 / 104	25.86
		633334	3500.01	1 / 1	25.78
30 MHz	$\pi/2$ BPSK	635332	3529.98	1 / 104	25.78
		631334	3470.01	1 / 104	25.84
		633334	3500.01	1 / 1	25.93
	QPSK	635332	3529.98	1 / 104	25.83
		631000	3465.00	1 / 1	25.93
		633334	3500.01	1 / 1	25.99
25 MHz	$\pi/2$ BPSK	635666	3534.99	1 / 76	25.90
		631000	3465.00	1 / 76	25.84
		633334	3500.01	1 / 1	25.94
	QPSK	635666	3534.99	1 / 76	26.02
		633334	3500.01	1 / 1	24.78
		630834	3462.51	1 / 32	25.98
20 MHz	$\pi/2$ BPSK	633334	3500.01	1 / 1	26.14
		635832	3537.48	1 / 63	26.02
		630834	3462.51	1 / 63	25.71
	QPSK	633334	3500.01	1 / 63	25.91
		635832	3537.48	1 / 32	26.04
		633334	3500.01	1 / 1	24.90
15 MHz	$\pi/2$ BPSK	630668	3460.02	1 / 1	25.83
		633334	3500.01	1 / 1	25.93
		636000	3540.00	1 / 1	25.98
	QPSK	630668	3460.02	1 / 49	25.57
		633334	3500.01	1 / 1	25.79
		636000	3540.00	1 / 25	25.86
10 MHz	$\pi/2$ BPSK	633334	3500.01	1 / 1	24.72
		630500	3457.50	1 / 36	25.93
		633334	3500.01	1 / 1	25.79
	QPSK	636166	3542.49	1 / 36	25.94
		630500	3457.50	1 / 1	25.68
		633334	3500.01	1 / 36	25.94
10 MHz	$\pi/2$ BPSK	636166	3542.49	1 / 36	25.70
		630500	3457.50	1 / 36	24.79
		630334	3455.01	1 / 1	25.90
	QPSK	633334	3500.01	1 / 22	25.87
		636332	3544.98	1 / 1	26.06
		630334	3455.01	1 / 12	25.41
10 MHz	$\pi/2$ BPSK	633334	3500.01	1 / 22	25.87
		636332	3544.98	1 / 22	26.06
		630334	3455.01	1 / 12	25.41
	QPSK	633334	3500.01	1 / 22	25.87
		636332	3544.98	1 / 22	26.06
		630334	3455.01	1 / 12	25.41

Table 7-1. Conducted Power Data (NR Band n77 DoD-band – Ant F)

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Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	$\pi/2$ BPSK	650000	3750.00	1 / 271	25.74
		656000	3840.00	1 / 136	25.78
		662000	3930.00	1 / 271	26.13
	QPSK	650000	3750.00	1 / 271	25.95
		656000	3840.00	1 / 136	25.59
		662000	3930.00	1 / 271	26.10
90 MHz	$\pi/2$ BPSK	649668	3745.02	1 / 243	26.15
		656000	3840.00	1 / 122	26.09
		662332	3934.98	1 / 243	26.18
	QPSK	649668	3745.02	1 / 243	25.98
		656000	3840.00	1 / 122	26.13
		662332	3934.98	1 / 243	26.08
80 MHz	$\pi/2$ BPSK	649334	3740.01	1 / 215	26.20
		656000	3840.00	1 / 1	26.40
		662666	3939.99	1 / 215	26.41
	QPSK	649334	3740.01	1 / 215	26.06
		656000	3840.00	1 / 1	26.44
		662666	3939.99	1 / 215	26.43
70 MHz	$\pi/2$ BPSK	649000	3735.00	1 / 94	26.12
		656000	3840.00	1 / 1	26.32
		663000	3945.00	1 / 187	26.38
	QPSK	649000	3735.00	1 / 94	26.09
		656000	3840.00	1 / 1	26.33
		663000	3945.00	1 / 187	26.37
60 MHz	$\pi/2$ BPSK	648668	3730.02	1 / 160	26.05
		656000	3840.00	1 / 1	26.21
		663332	3949.98	1 / 160	26.45
	QPSK	648668	3730.02	1 / 160	26.07
		656000	3840.00	1 / 1	26.29
		663332	3949.98	1 / 81	26.44
50 MHz	$\pi/2$ BPSK	648334	3725.01	1 / 131	26.48
		656000	3840.00	1 / 1	26.48
		663666	3954.99	1 / 66	26.41
	QPSK	648334	3725.01	1 / 131	26.44
		656000	3840.00	1 / 1	26.43
		663666	3954.99	1 / 131	26.19
40 MHz	$\pi/2$ BPSK	648000	3720.00	1 / 104	26.49
		656000	3840.00	1 / 1	26.41
		664000	3960.00	1 / 104	26.38
	QPSK	648000	3720.00	1 / 104	26.43
		656000	3840.00	1 / 1	26.40
		664000	3960.00	1 / 53	26.47
30 MHz	$\pi/2$ BPSK	647668	3715.02	1 / 76	26.38
		656000	3840.00	1 / 1	26.41
		664332	3964.98	1 / 76	26.36
	QPSK	647668	3715.02	1 / 39	26.26
		656000	3840.00	1 / 1	26.37
		664332	3964.98	1 / 39	26.38
25 MHz	$\pi/2$ BPSK	647500	3712.50	1 / 76	26.25
		656000	3840.00	1 / 1	26.37
		664500	3967.50	1 / 76	26.46
	QPSK	647500	3712.50	1 / 76	26.11
		656000	3840.00	1 / 1	26.46
		664500	3967.50	1 / 76	26.46
20 MHz	$\pi/2$ BPSK	647334	3710.01	1 / 49	25.87
		656000	3840.00	1 / 25	26.43
		664666	3969.99	1 / 25	26.35
	QPSK	647334	3710.01	1 / 49	25.92
		656000	3840.00	1 / 49	26.37
		664666	3969.99	1 / 1	26.45
15 MHz	$\pi/2$ BPSK	647168	3707.52	1 / 1	25.93
		656000	3840.00	1 / 36	26.23
		664832	3972.48	1 / 1	26.07
	QPSK	647168	3707.52	1 / 1	25.93
		656000	3840.00	1 / 1	26.23
		664832	3972.48	1 / 1	26.20
10 MHz	$\pi/2$ BPSK	647000	3705.00	1 / 22	25.31
		656000	3840.00	1 / 22	25.81
		665000	3975.00	1 / 12	25.82
	QPSK	647000	3705.00	1 / 1	25.48
		656000	3840.00	1 / 22	25.92
		665000	3975.00	1 / 1	26.17
	16-QAM	656000	3840.00	1 / 22	24.94
		656000	3840.00	1 / 22	24.94

Table 7-2. Conducted Power Data (NR Band n77 C-band – Ant F)

FCC ID: A3LSMS936B	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	$\pi/2$ BPSK	633334	3500.01	270 / 0	19.56
	QPSK	633334	3500.01	1 / 136	19.52
	16-QAM	633334	3500.01	1 / 136	19.06

Table 7-3. Conducted Power Data (NR Band n77 DoD – Ant C)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	$\pi/2$ BPSK	650000	3750.00	1 / 271	18.78
		656000	3840.00	1 / 271	18.43
		662000	3930.00	1 / 271	18.78
	QPSK	650000	3750.00	1 / 271	18.71
		656000	3840.00	1 / 271	18.43
		662000	3930.00	1 / 271	18.83
	16-QAM	662000	3930.00	1 / 271	18.26

Table 7-4. Conducted Power Data (NR Band n77 C-band – Ant C)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	$\pi/2$ BPSK	633334	3500.01	1 / 136	24.23
	QPSK	633334	3500.01	1 / 136	24.17
	16-QAM	633334	3500.01	1 / 136	23.18

Table 7-5. Conducted Power Data (NR Band n77 DoD – Ant I)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	$\pi/2$ BPSK	650000	3750.00	1 / 136	23.14
		656000	3840.00	1 / 204	23.46
		662000	3930.00	1 / 136	24.02
	QPSK	650000	3750.00	1 / 136	23.27
		656000	3840.00	1 / 204	23.41
		662000	3930.00	1 / 136	23.99
	16-QAM	662000	3930.00	1 / 136	23.24

Table 7-6. Conducted Power Data (NR Band n77 C-band – Ant I)

FCC ID: A3LSMS936B	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	$\pi/2$ BPSK	633334	3500.01	270 / 0	18.30
	QPSK	633334	3500.01	1 / 136	18.12
	16-QAM	633334	3500.01	1 / 271	17.59

Table 7-7. Conducted Power Data (NR Band n77 DoD – Ant D)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	$\pi/2$ BPSK	650000	3750.00	270 / 0	18.75
		656000	3840.00	1 / 1	17.60
		662000	3930.00	270 / 0	18.15
	QPSK	650000	3750.00	1 / 136	18.57
		656000	3840.00	1 / 136	17.57
		662000	3930.00	1 / 1	17.87
	16-QAM	650000	3750.00	1 / 136	17.85

Table 7-8. Conducted Power Data (NR Band n77 C-band – Ant D)

FCC ID: A3LSMS936B	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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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.

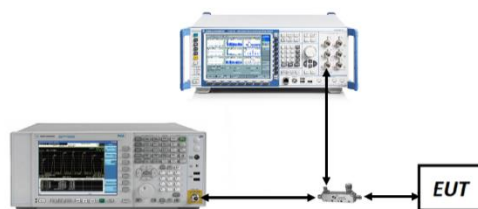


Figure 7-2. Test Instrument & Measurement Setup

Test Notes

None.

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Mode	Bandwidth	Modulation	OBW [MHz]
NR-n77PC2-R1	100MHz	$\pi/2$ BPSK	96.92
		QPSK	98.10
		16QAM	98.17
	90MHz	$\pi/2$ BPSK	87.48
		QPSK	87.95
		16QAM	87.91
	80MHz	$\pi/2$ BPSK	77.53
		QPSK	77.78
		16QAM	77.78
	70MHz	$\pi/2$ BPSK	64.68
		QPSK	67.90
		16QAM	67.75
	60MHz	$\pi/2$ BPSK	58.22
		QPSK	58.16
		16QAM	58.12
	50MHz	$\pi/2$ BPSK	46.17
		QPSK	47.85
		16QAM	47.76
	40MHz	$\pi/2$ BPSK	35.95
		QPSK	38.00
		16QAM	38.00
	30MHz	$\pi/2$ BPSK	26.98
		QPSK	28.06
		16QAM	28.12
	25MHz	$\pi/2$ BPSK	22.95
		QPSK	23.30
		16QAM	23.29
	20MHz	$\pi/2$ BPSK	18.05
		QPSK	18.36
		16QAM	18.34
	15MHz	$\pi/2$ BPSK	12.95
		QPSK	13.69
		16QAM	13.69
	10MHz	$\pi/2$ BPSK	8.71
		QPSK	8.68
		16QAM	8.67

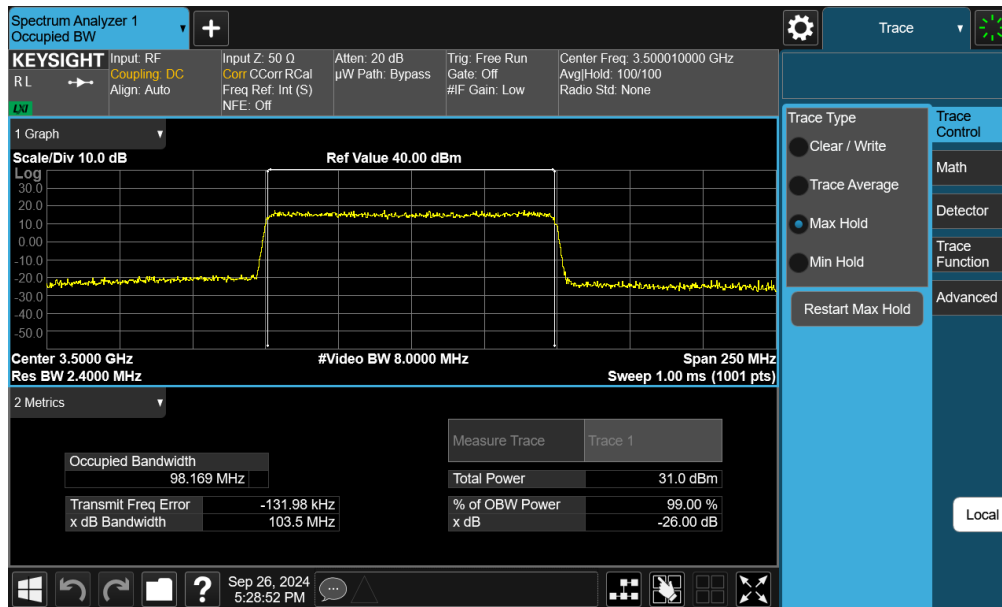
Table 7-2. Occupied Bandwidth Test Results – NR Band n77 DoD – Ant F

FCC ID: A3LSMS936B	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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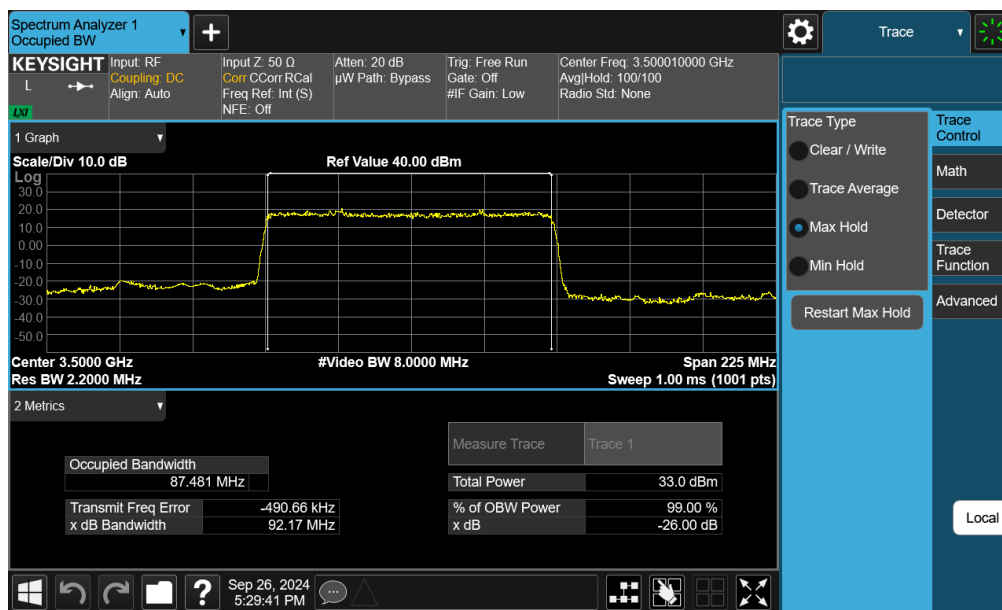
Mode	Bandwidth	Modulation	OBW [MHz]
NR-n77PC2	100MHz	$\pi/2$ BPSK	97.03
		QPSK	98.03
		16QAM	98.09
	90MHz	$\pi/2$ BPSK	87.39
		QPSK	88.05
		16QAM	87.93
	80MHz	$\pi/2$ BPSK	77.51
		QPSK	77.81
		16QAM	77.88
	70MHz	$\pi/2$ BPSK	64.57
		QPSK	67.66
		16QAM	67.72
	60MHz	$\pi/2$ BPSK	58.32
		QPSK	58.29
		16QAM	58.28
	50MHz	$\pi/2$ BPSK	46.04
		QPSK	47.78
		16QAM	47.84
	40MHz	$\pi/2$ BPSK	35.94
		QPSK	38.15
		16QAM	38.05
	30MHz	$\pi/2$ BPSK	27.00
		QPSK	28.07
		16QAM	28.08
	25MHz	$\pi/2$ BPSK	22.96
		QPSK	23.34
		16QAM	23.26
	20MHz	$\pi/2$ BPSK	17.97
		QPSK	18.33
		16QAM	18.31
	15MHz	$\pi/2$ BPSK	12.98
		QPSK	13.67
		16QAM	13.72
	10MHz	$\pi/2$ BPSK	8.65
		QPSK	8.67
		16QAM	8.69

Table 7-3. Occupied Bandwidth Test Results – NR Band n77 C Band – Ant F

FCC ID: A3LSMS936B	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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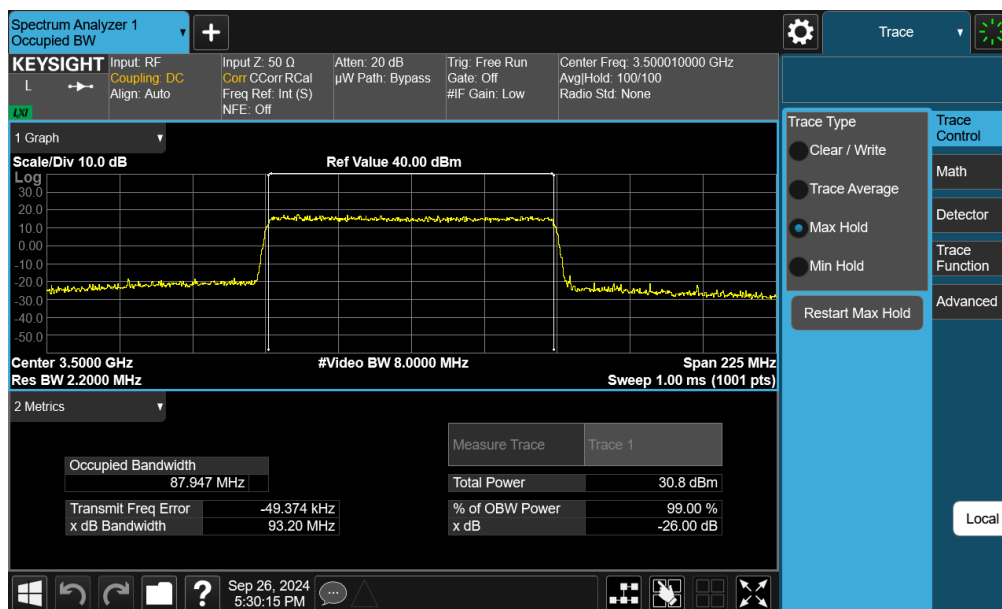


Plot 7-11. Occupied Bandwidth Plot (NR Band n77 DoD - 100MHz 16-QAM - Full RB - Ant F)

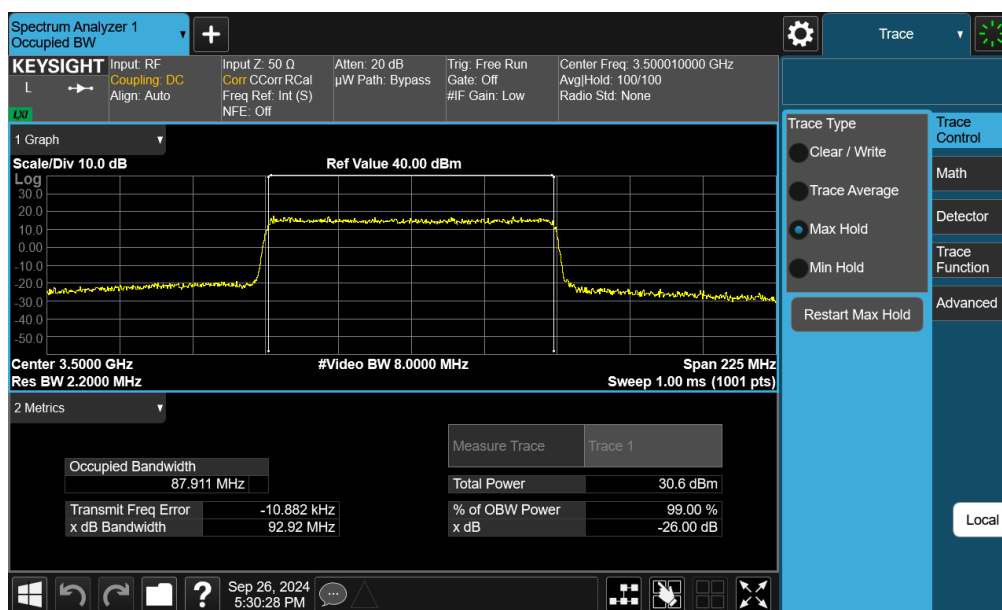


Plot 7-12. Occupied Bandwidth Plot (NR Band n77 DoD - 90MHz $\pi/2$ BPSK - Full RB - Ant F)

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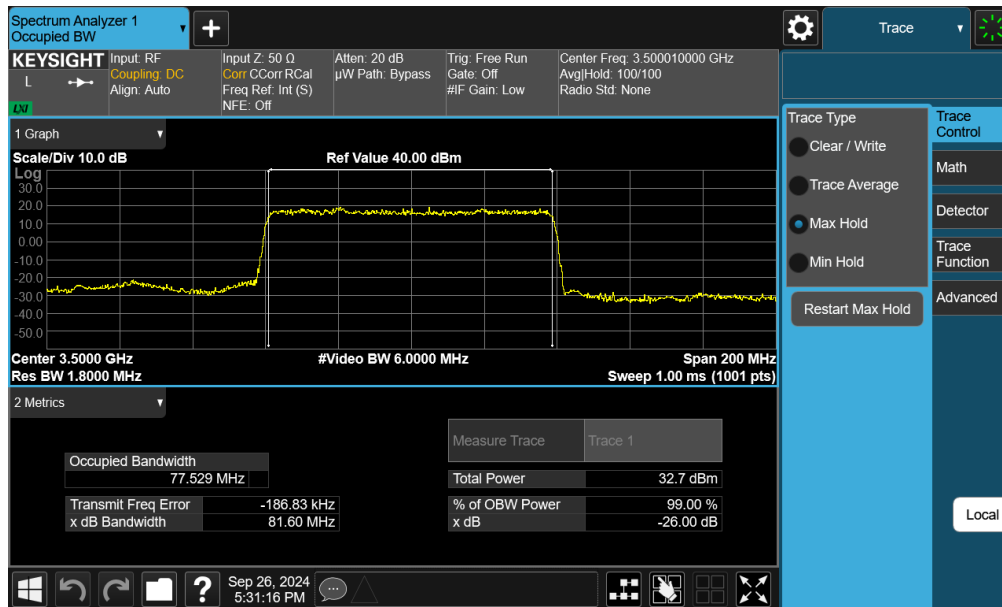


Plot 7-13. Occupied Bandwidth Plot (NR Band n77 DoD - 90MHz QPSK - Full RB - Ant F)

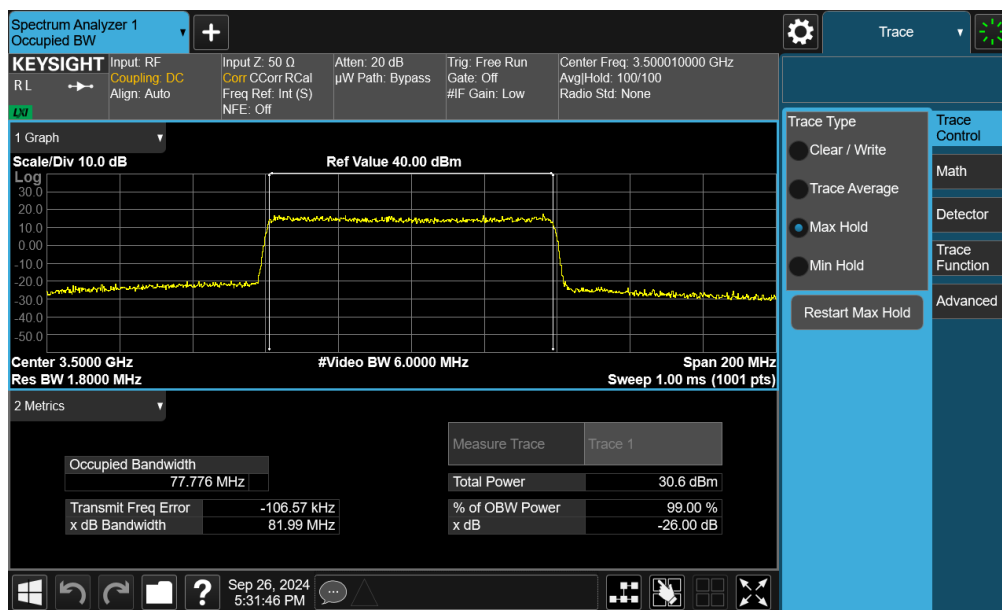


Plot 7-14. Occupied Bandwidth Plot (NR Band n77 DoD - 90MHz 16-QAM - Full RB - Ant F)

FCC ID: A3LSMS936B	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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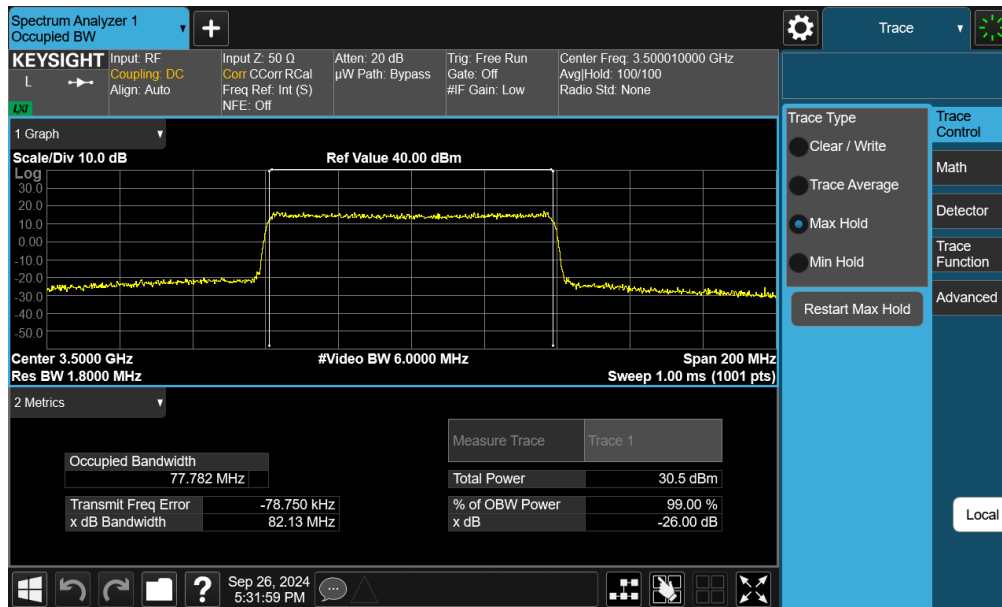


Plot 7-15. Occupied Bandwidth Plot (NR Band n77 DoD - 80MHz $\pi/2$ BPSK - Full RB - Ant F)

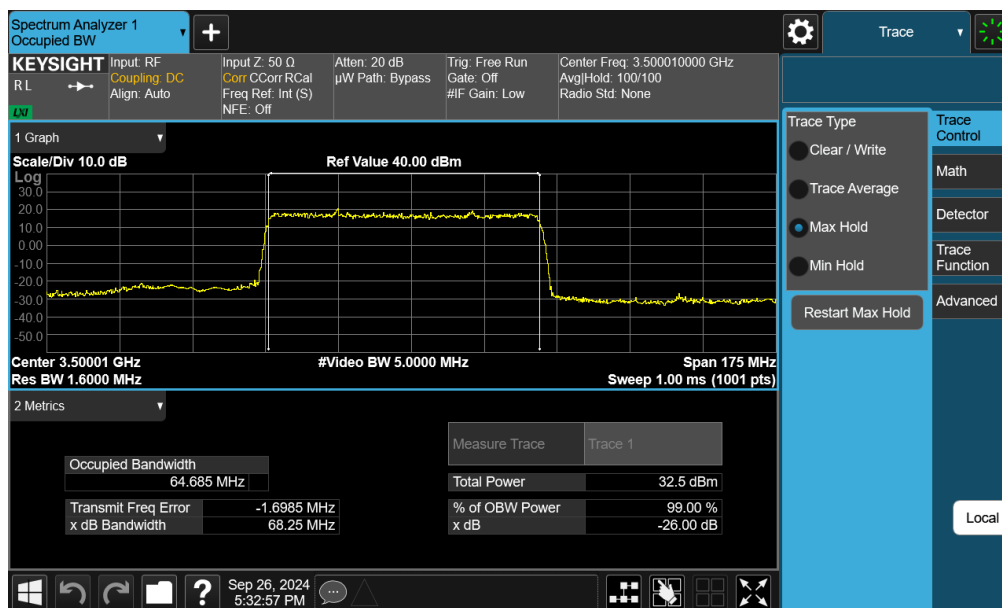


Plot 7-16. Occupied Bandwidth Plot (NR Band n77 DoD - 80MHz QPSK - Full RB - Ant F)

FCC ID: A3LSMS936B	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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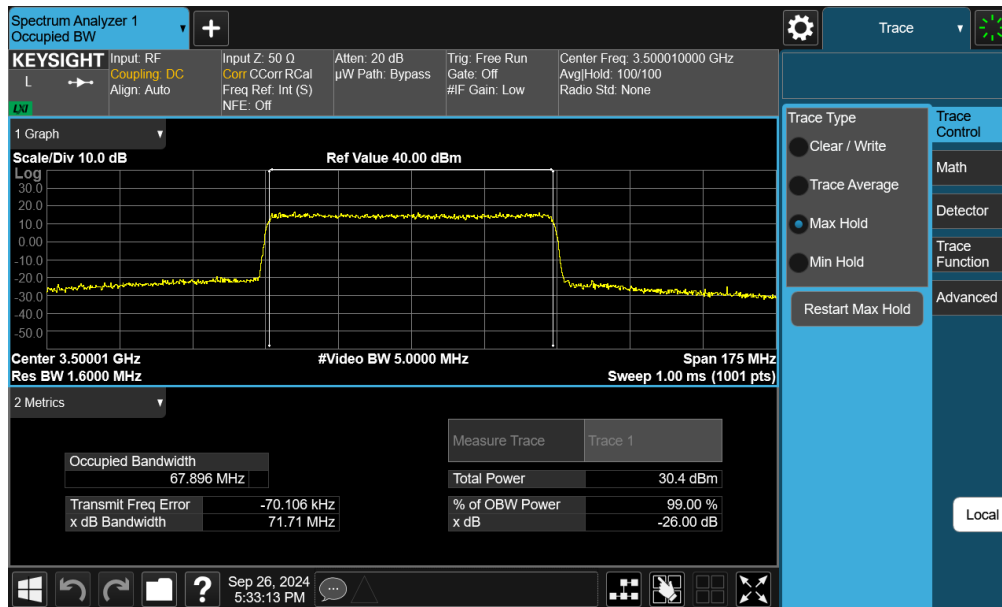


Plot 7-17. Occupied Bandwidth Plot (NR Band n77 DoD - 80MHz 16-QAM - Full RB - Ant F)

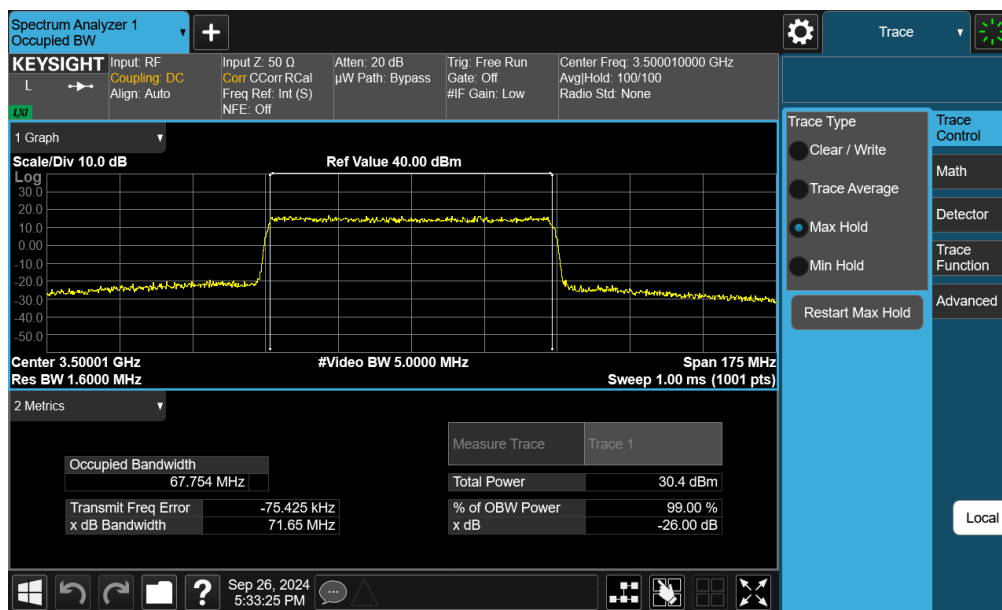


Plot 7-18. Occupied Bandwidth Plot (NR Band n77 DoD - 70MHz 7π/2 BPSK - Full RB - Ant F)

FCC ID: A3LSMS936B	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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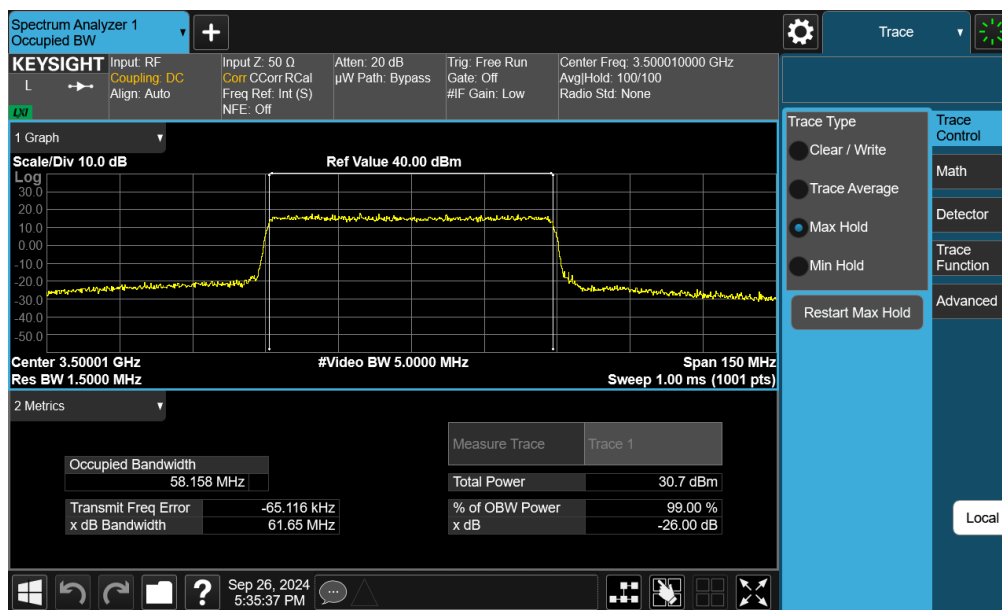
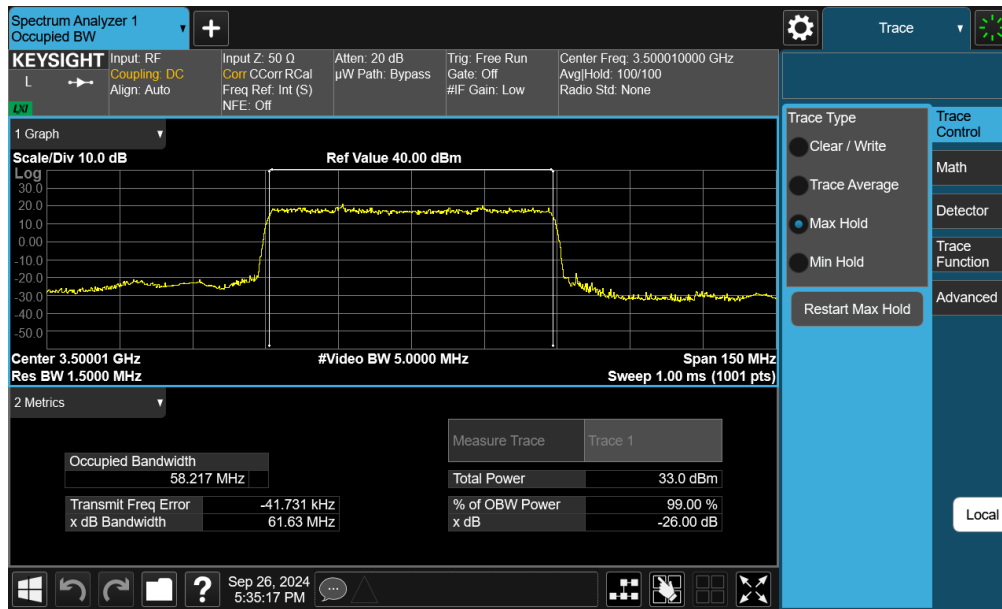


Plot 7-19. Occupied Bandwidth Plot (NR Band n77 DoD - 70MHz QPSK - Full RB - Ant F)

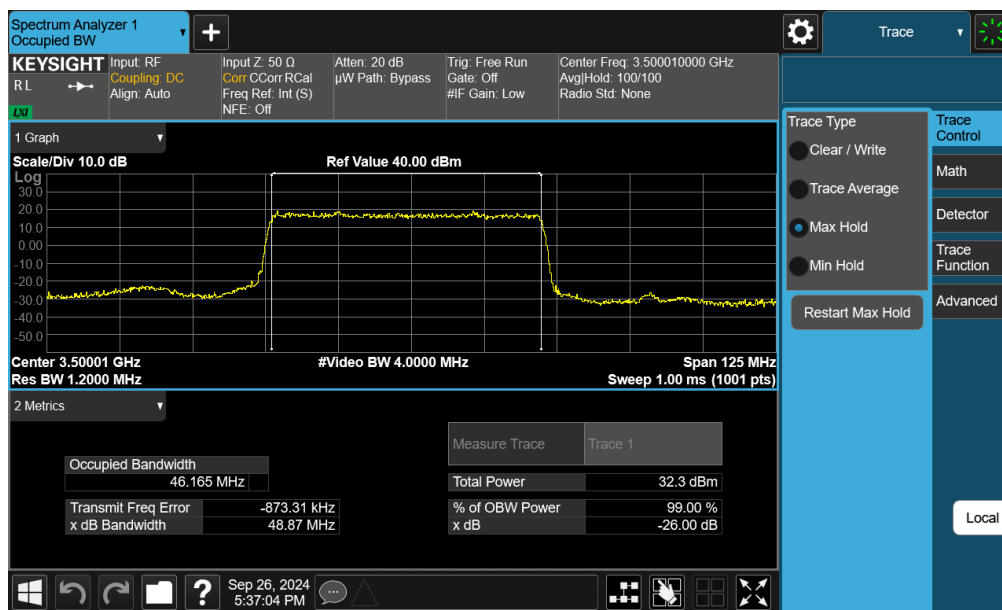


Plot 7-20. Occupied Bandwidth Plot (NR Band n77 DoD - 70MHz 16-QAM - Full RB - Ant F)

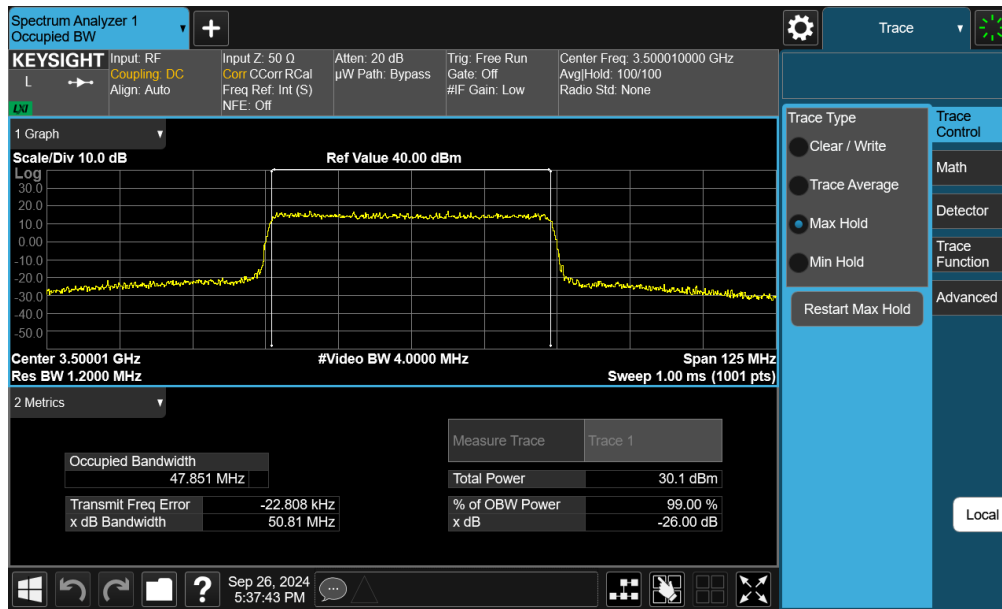
FCC ID: A3LSMS936B	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2408260066-10.A3L	Test Dates: 09/03/2024 - 11/06/2024	EUT Type: Portable Handset	Page 26 of 154



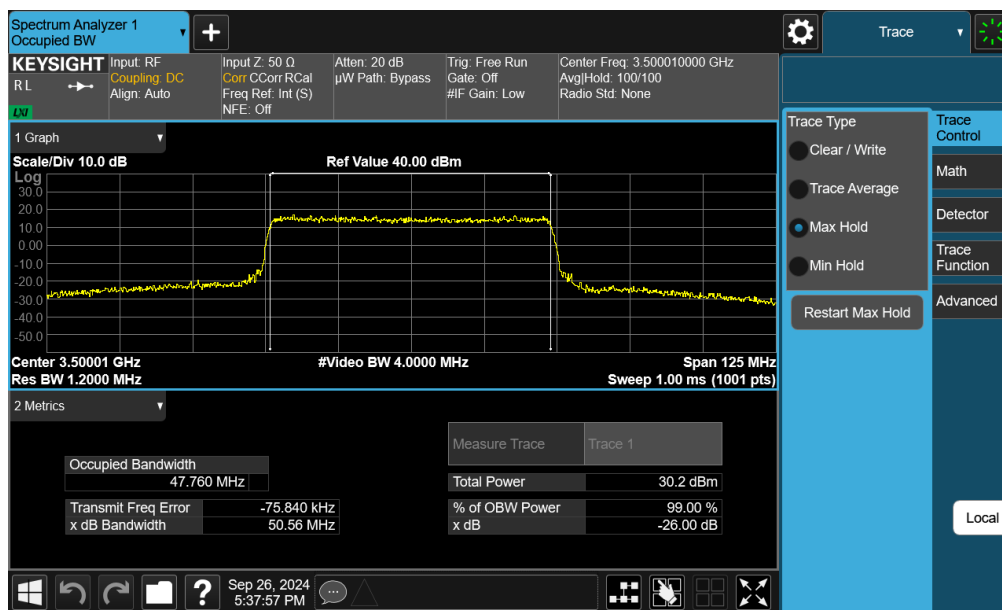
FCC ID: A3LSMS936B	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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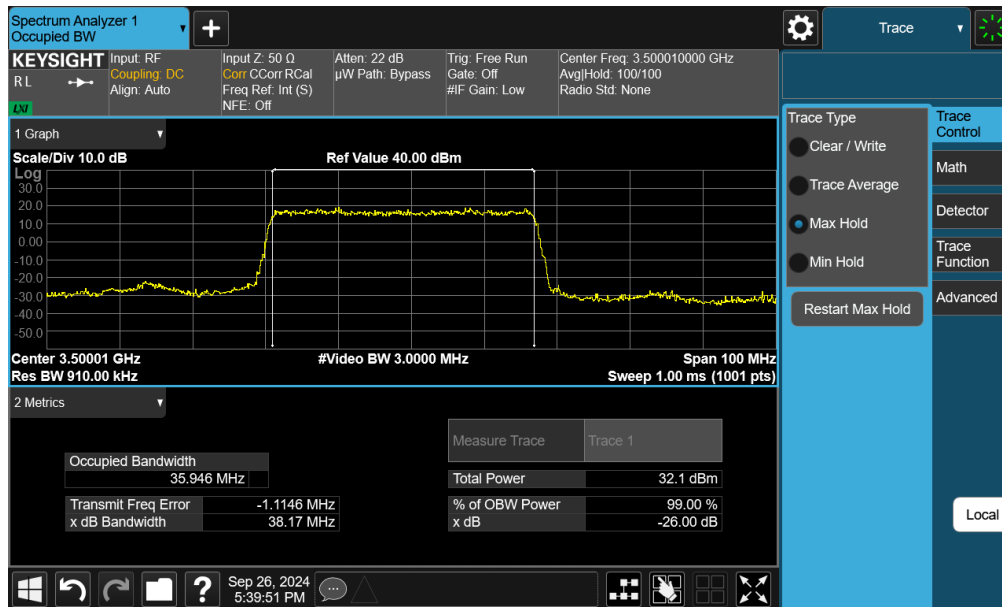


Plot 7-25. Occupied Bandwidth Plot (NR Band n77 DoD - 50MHz QPSK - Full RB - Ant F)

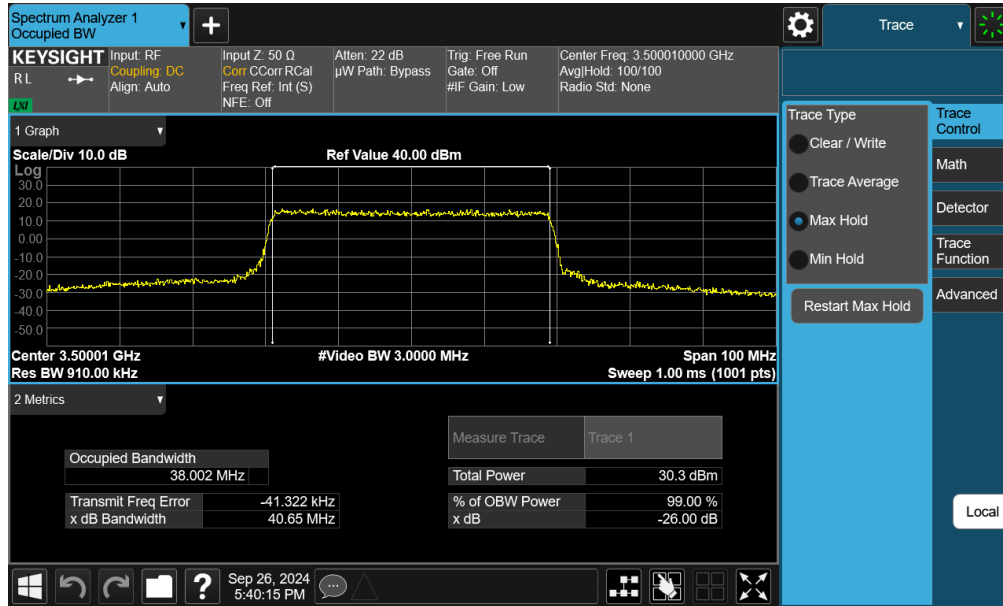


Plot 7-26. Occupied Bandwidth Plot (NR Band n77 DoD - 50MHz 16-QAM - Full RB - Ant F)

FCC ID: A3LSMS936B	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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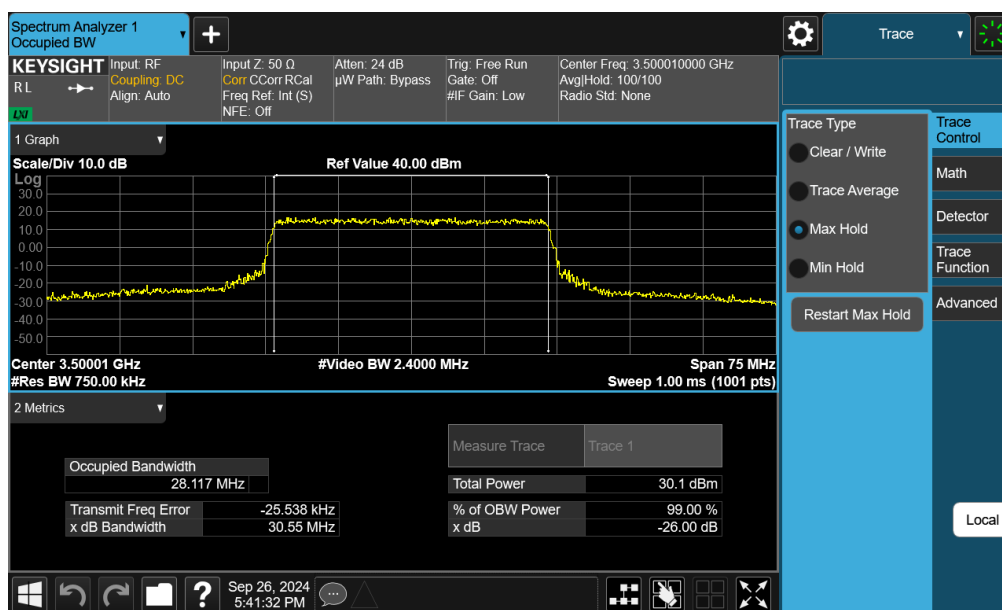
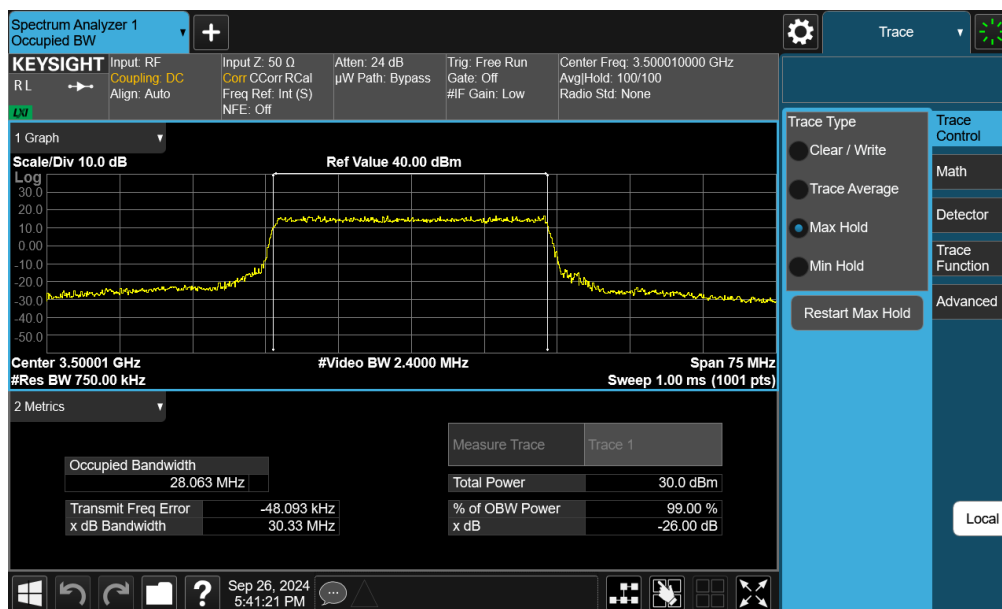


Plot 7-29. Occupied Bandwidth Plot (NR Band n77 DoD - 40MHz 16-QAM - Full RB - Ant F)

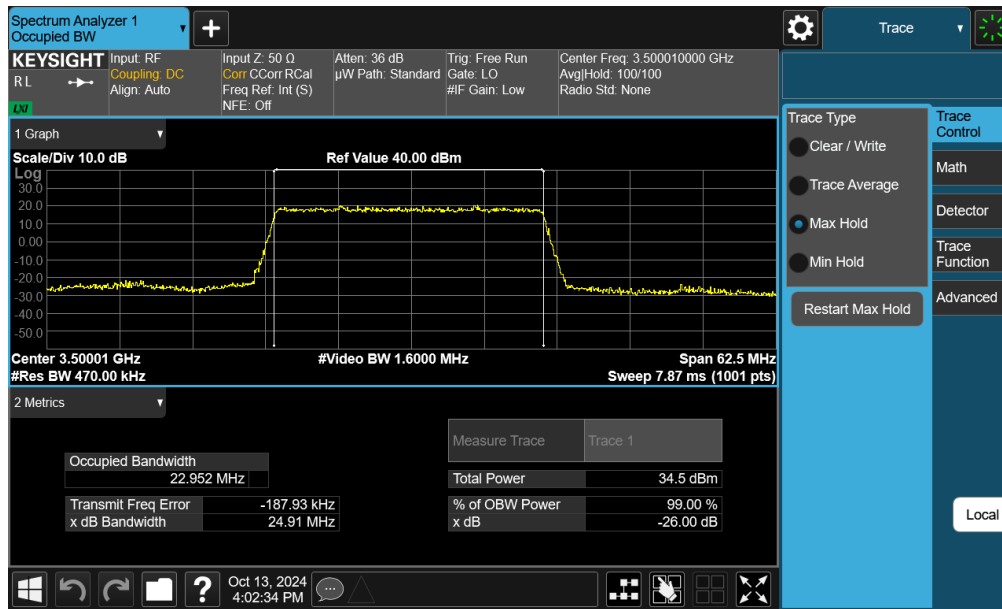


Plot 7-30. Occupied Bandwidth Plot (NR Band n77 DoD - 30MHz $\pi/2$ BPSK - Full RB - Ant F)

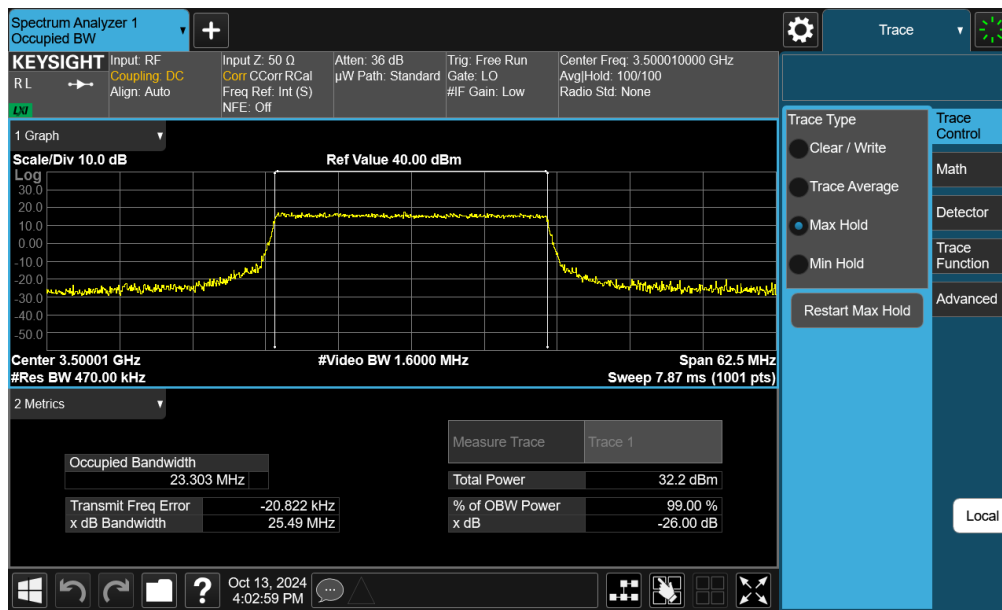
FCC ID: A3LSMS936B	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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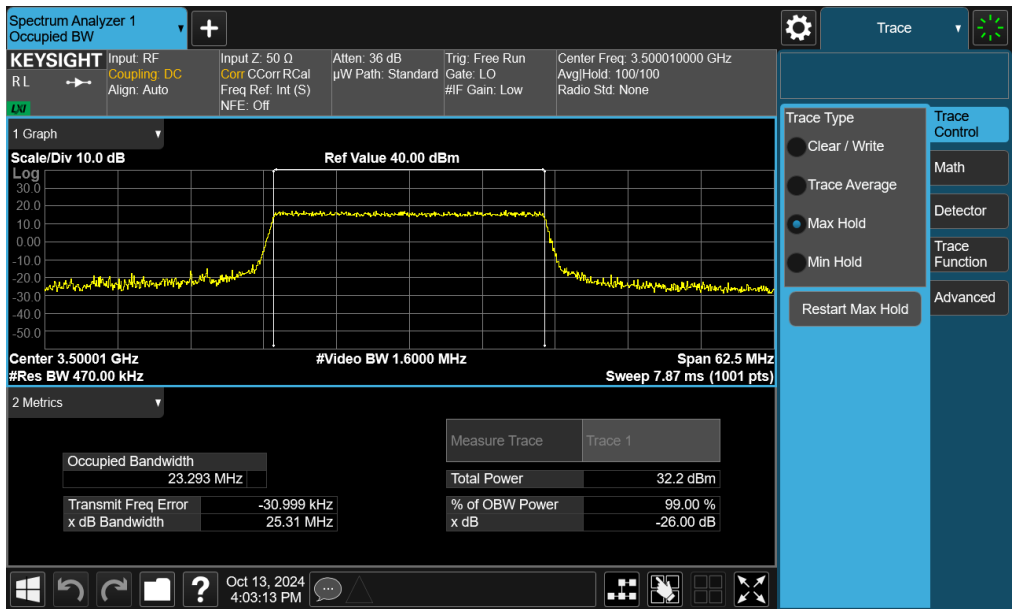


Plot 7-33. Occupied Bandwidth Plot (NR Band n77 DoD - 25MHz $\pi/2$ BPSK - Full RB - Ant F)

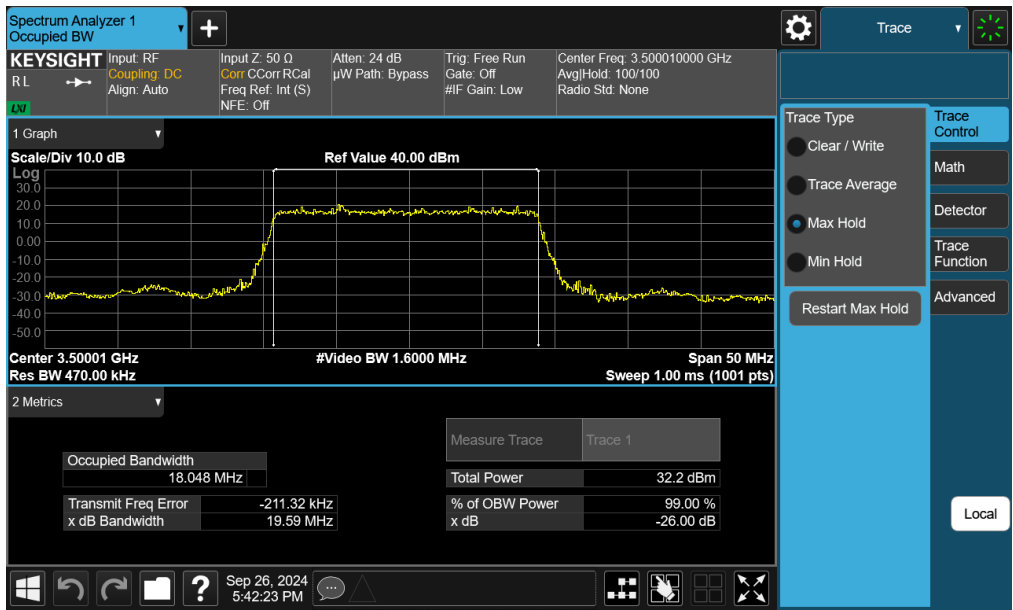


Plot 7-34. Occupied Bandwidth Plot (NR Band n77 DoD - 25MHz QPSK - Full RB - Ant F)

FCC ID: A3LSMS936B	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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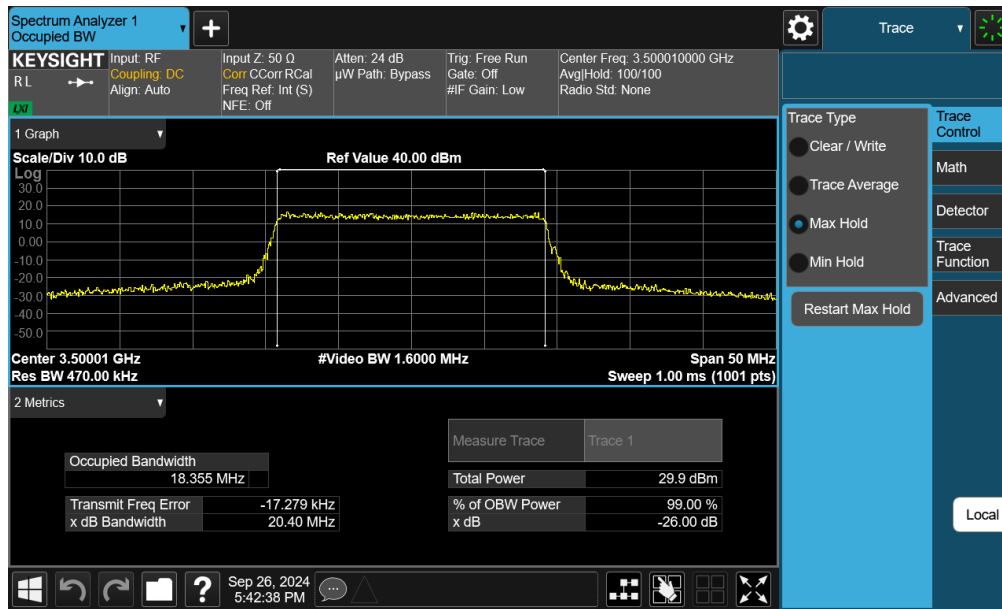


Plot 7-35. Occupied Bandwidth Plot (NR Band n77 DoD - 25MHz 16-QAM - Full RB - Ant F)

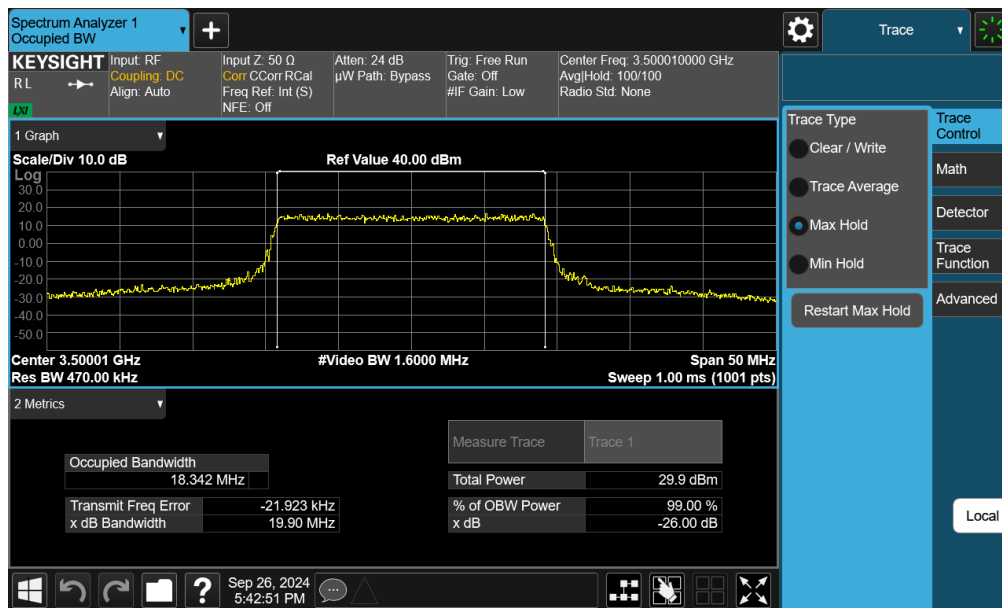


Plot 7-36. Occupied Bandwidth Plot (NR Band n77 DoD - 20MHz π/2 BPSK - Full RB - Ant F)

FCC ID: A3LSMS936B	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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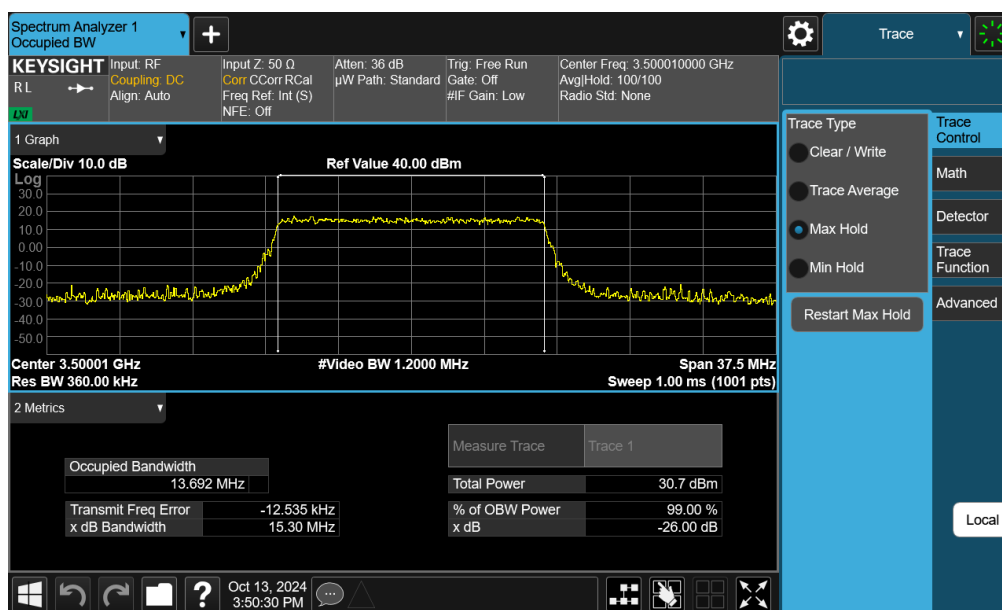
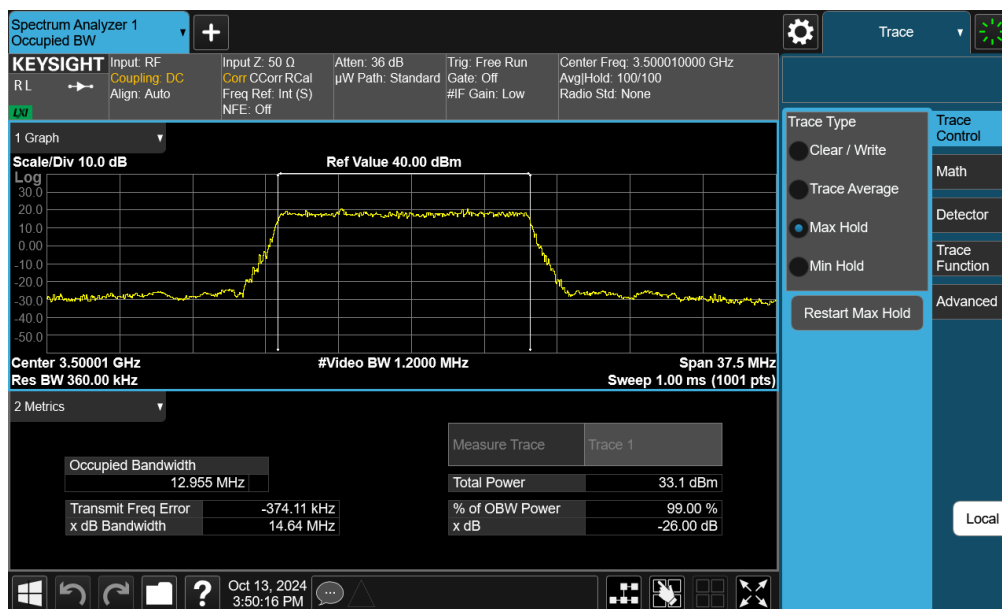


Plot 7-37. Occupied Bandwidth Plot (NR Band n77 DoD - 20MHz QPSK - Full RB - Ant F)

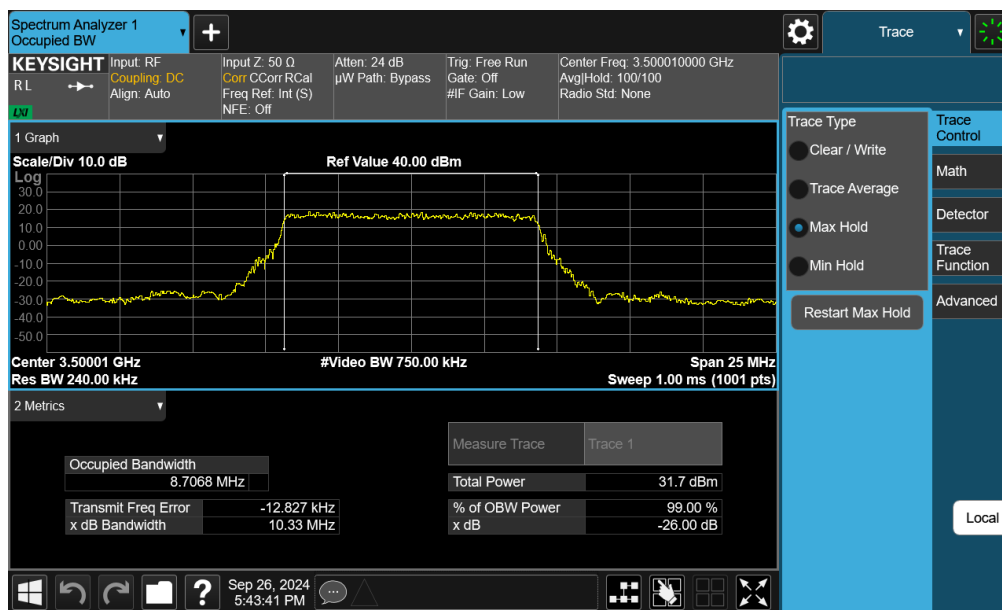
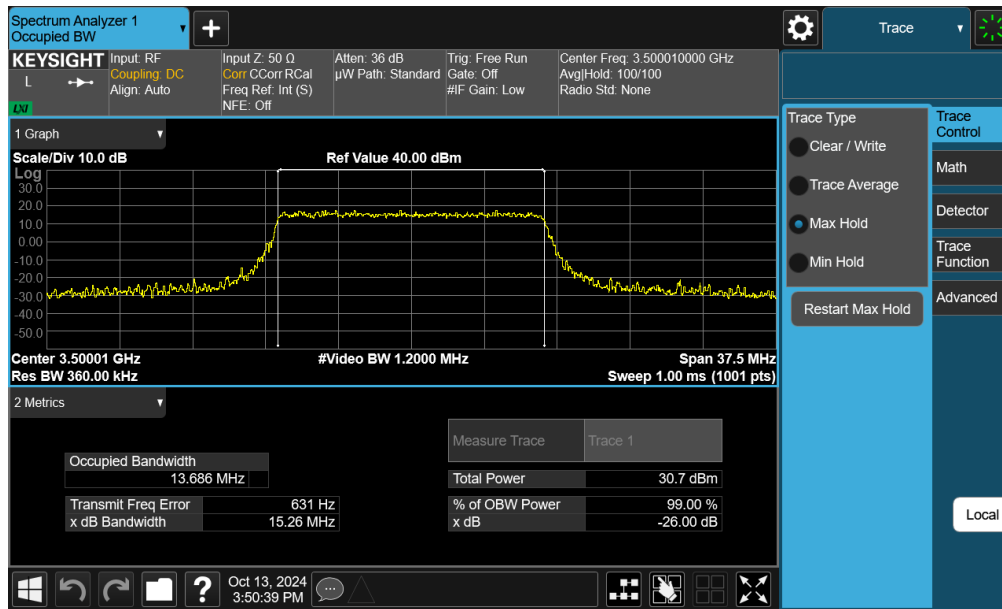


Plot 7-38. Occupied Bandwidth Plot (NR Band n77 DoD - 20MHz 16-QAM - Full RB - Ant F)

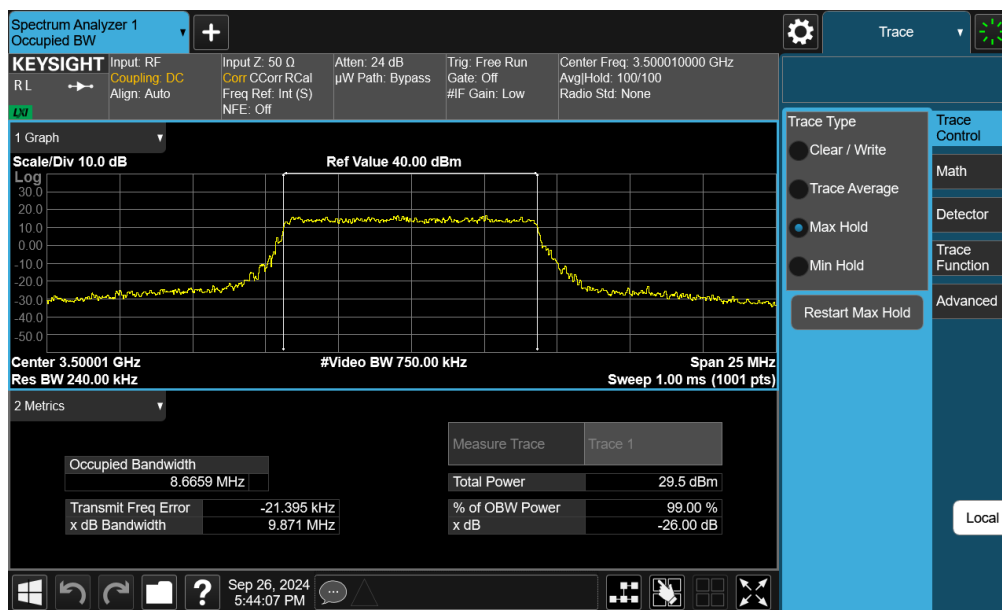
FCC ID: A3LSMS936B	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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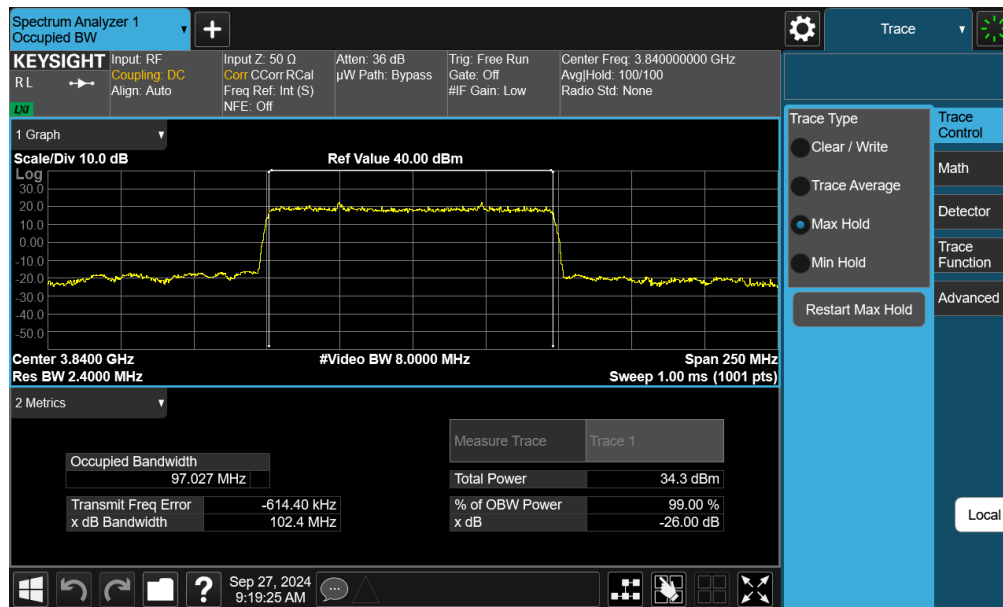


FCC ID: A3LSMS936B	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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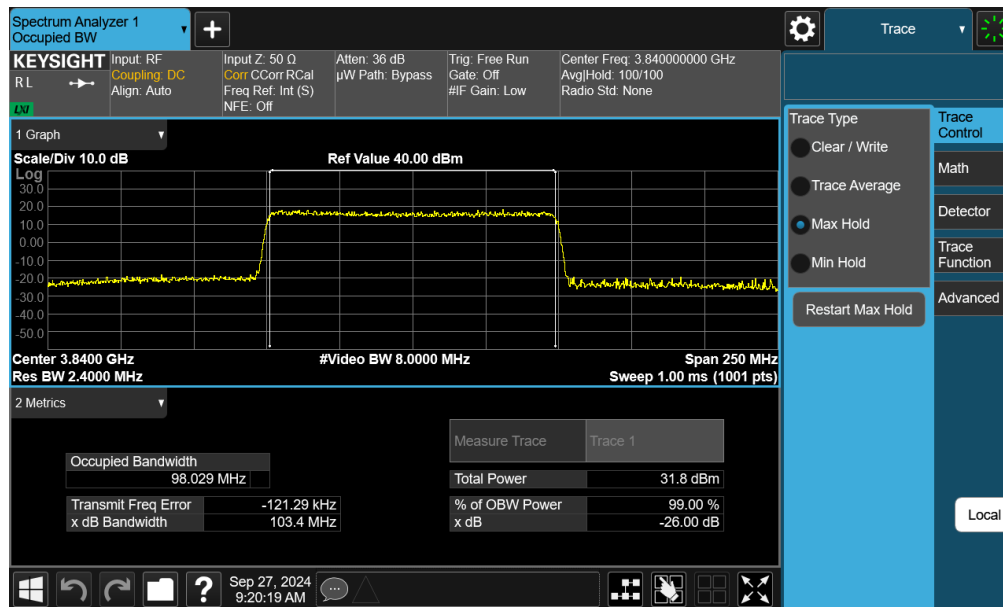


FCC ID: A3LSMS936B	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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NR Band n77 C-band – Ant F

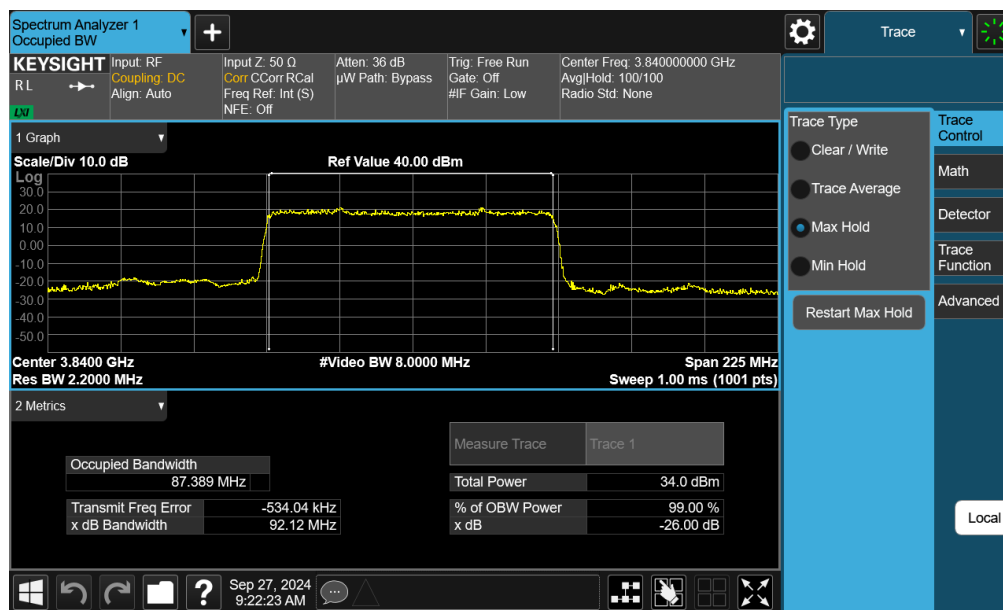
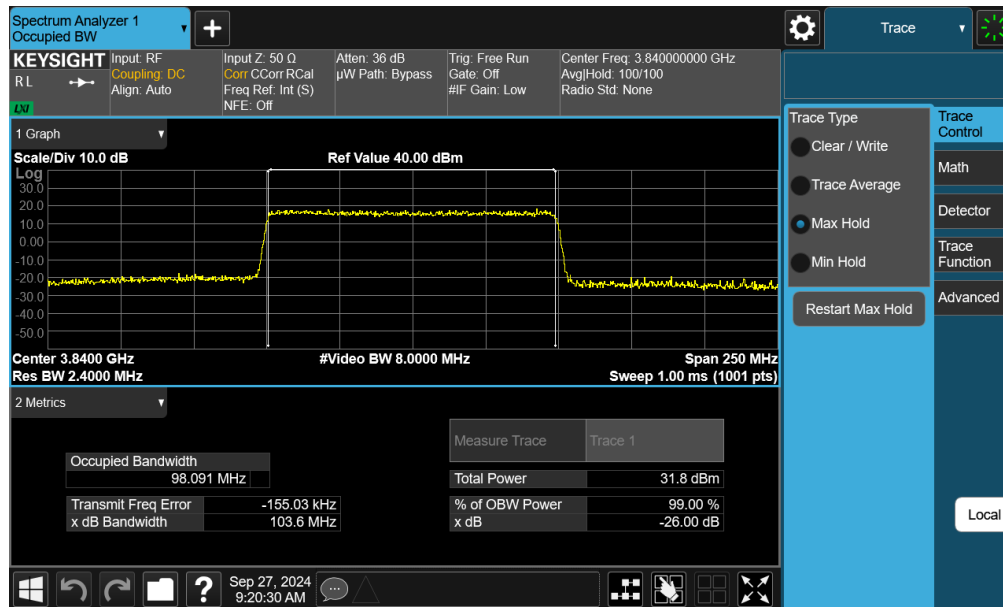


Plot 7-45. Occupied Bandwidth Plot (NR Band n77 C-band - 100MHz $\pi/2$ BPSK - Full RB - Ant F)

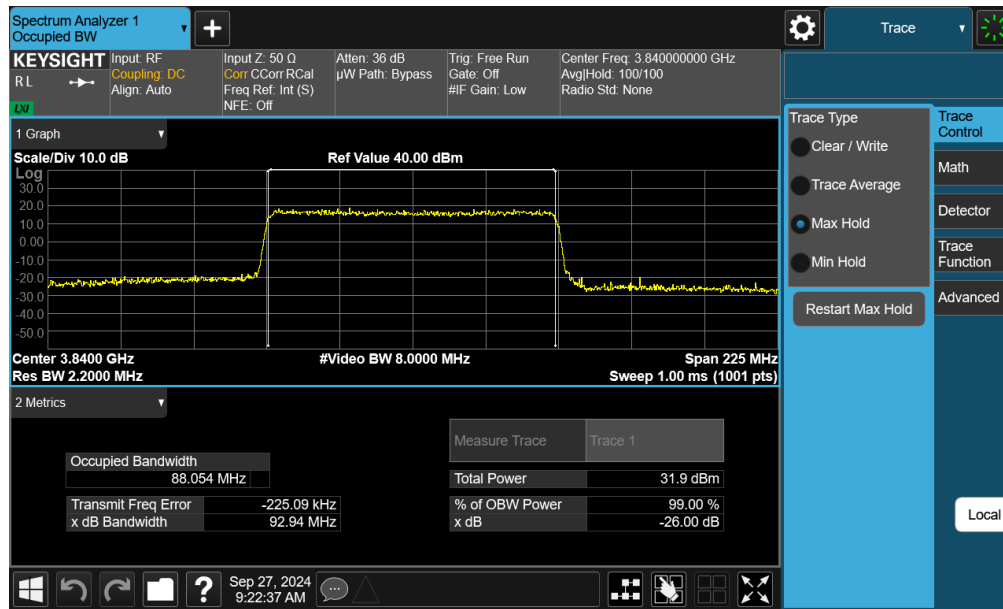


Plot 7-46. Occupied Bandwidth Plot (NR Band n77 C-band - 100MHz QPSK - Full RB - Ant F)

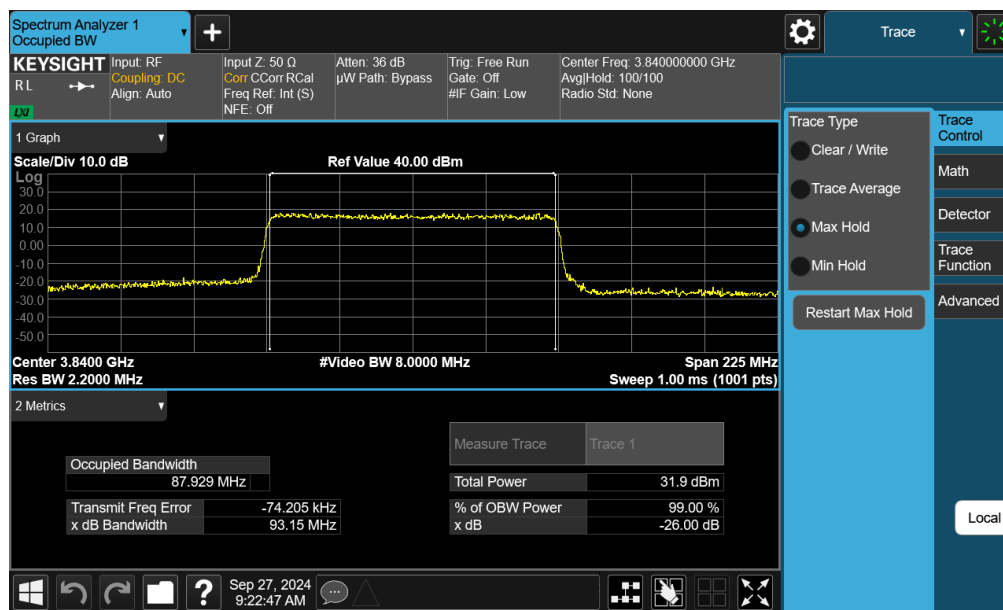
FCC ID: A3LSMS936B	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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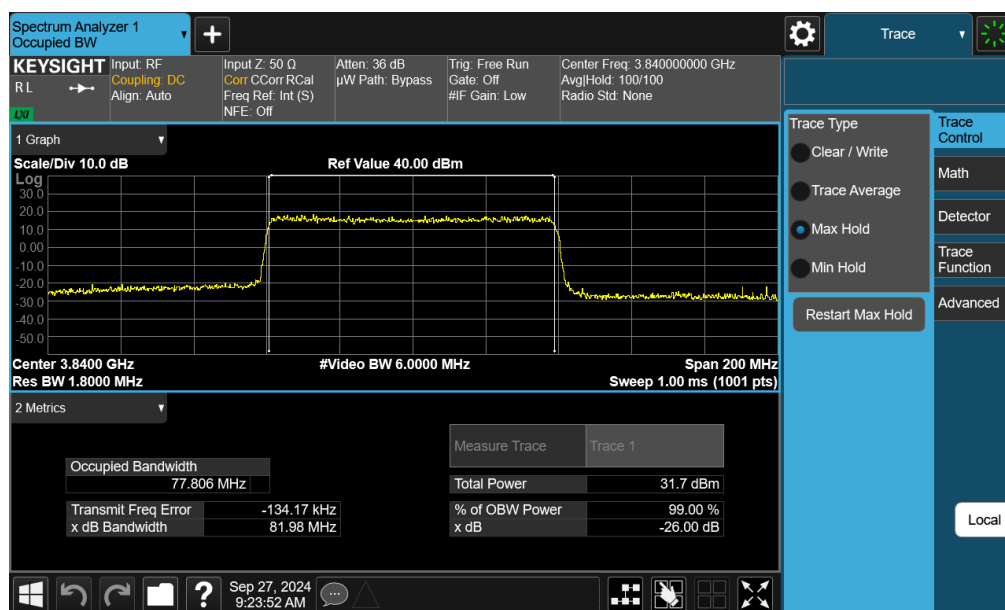
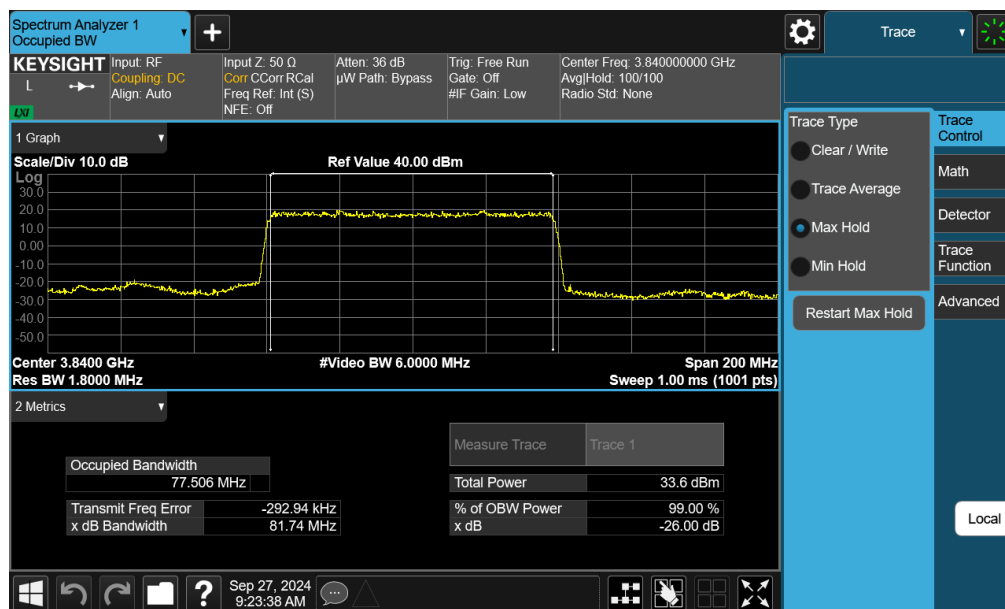


Plot 7-49. Occupied Bandwidth Plot (NR Band n77 C-band - 90MHz QPSK - Full RB - Ant F)

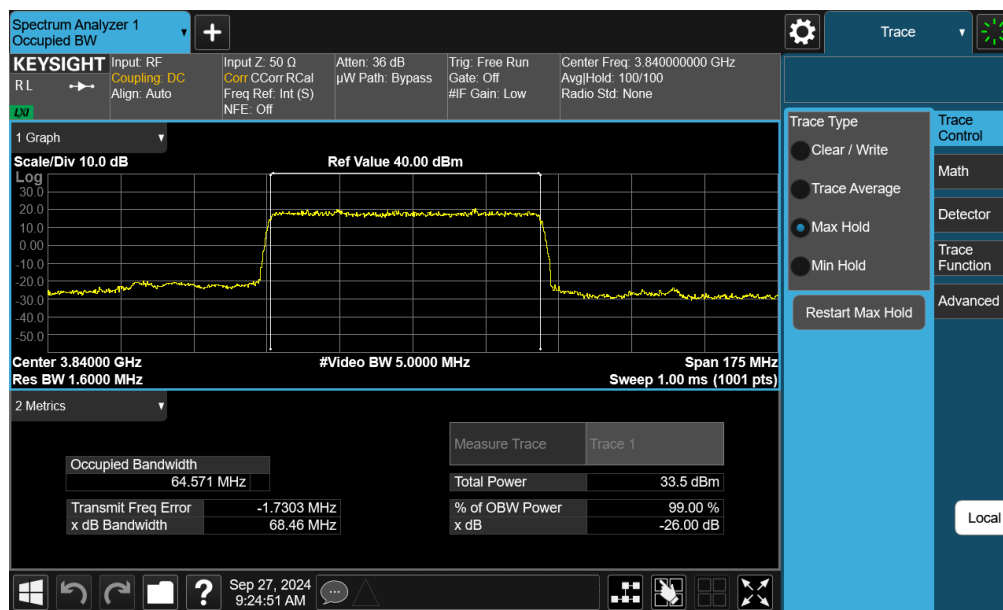
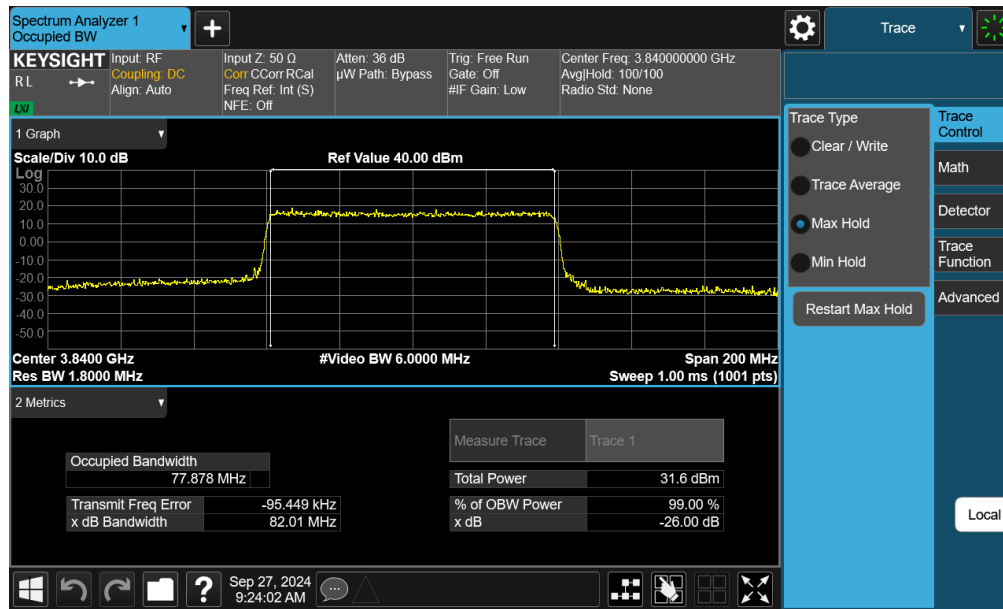


Plot 7-50. Occupied Bandwidth Plot (NR Band n77 C-band - 90MHz 16-QAM - Full RB - Ant F)

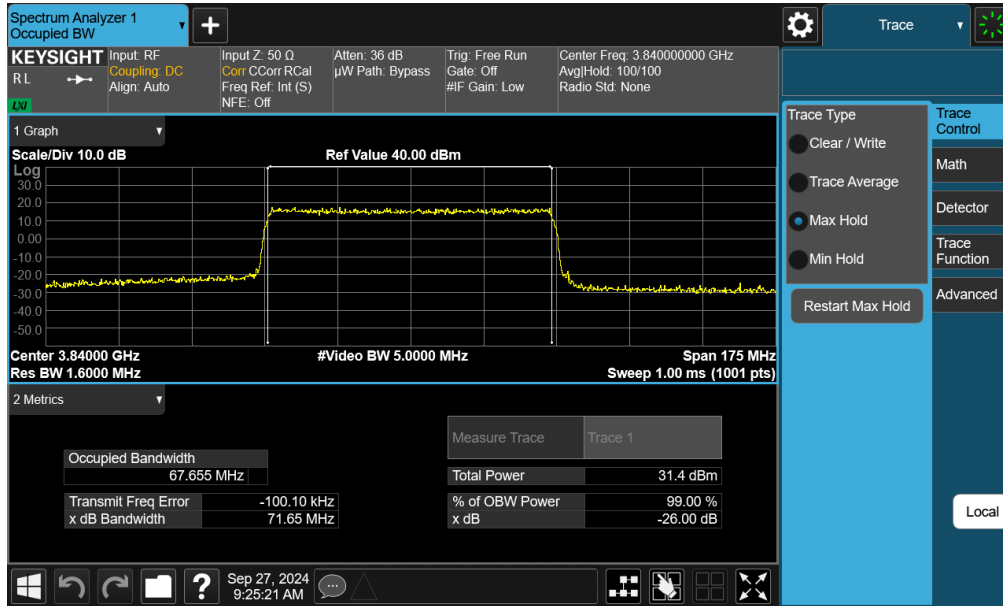
FCC ID: A3LSMS936B	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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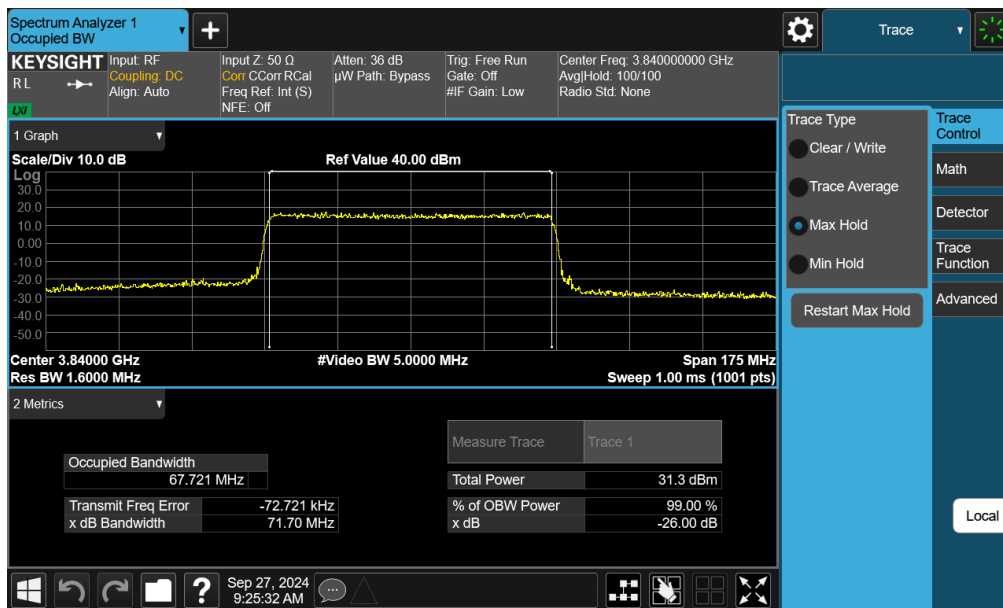
FCC ID: A3LSMS936B	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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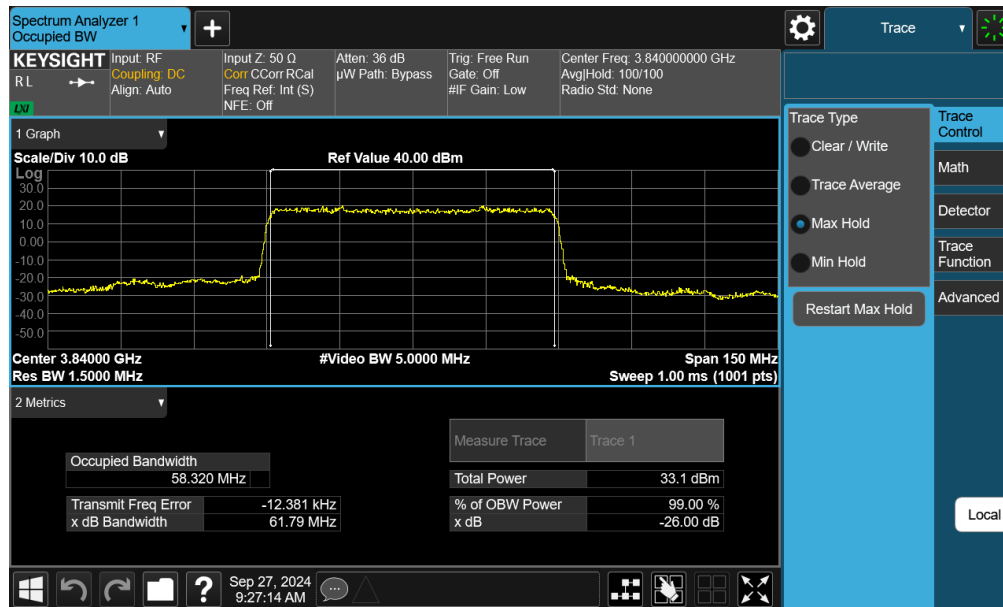


Plot 7-55. Occupied Bandwidth Plot (NR Band n77 C-band - 70MHz QPSK - Full RB - Ant F)

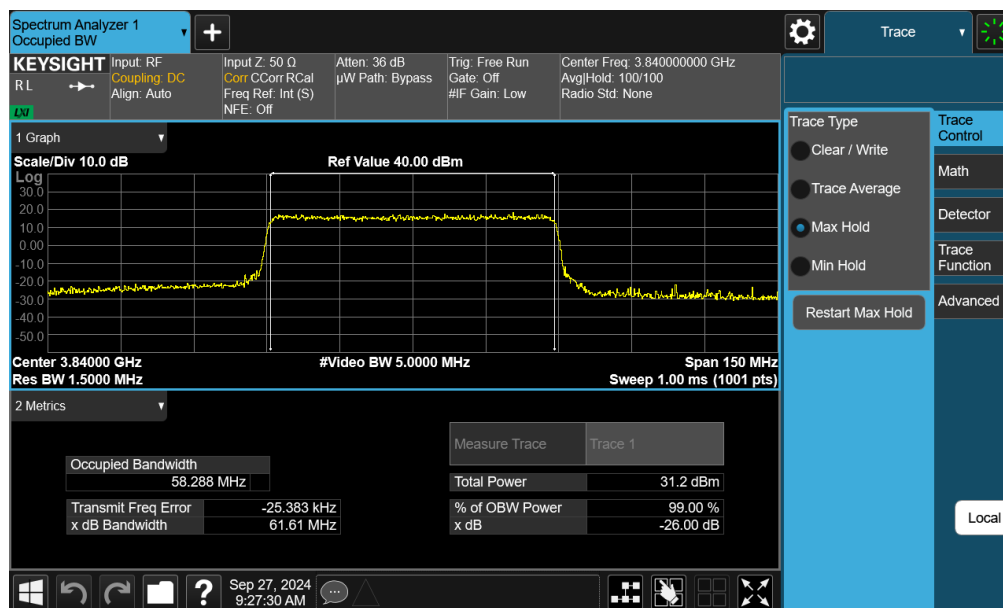


Plot 7-56. Occupied Bandwidth Plot (NR Band n77 C-band - 70MHz 16-QAM - Full RB - Ant F)

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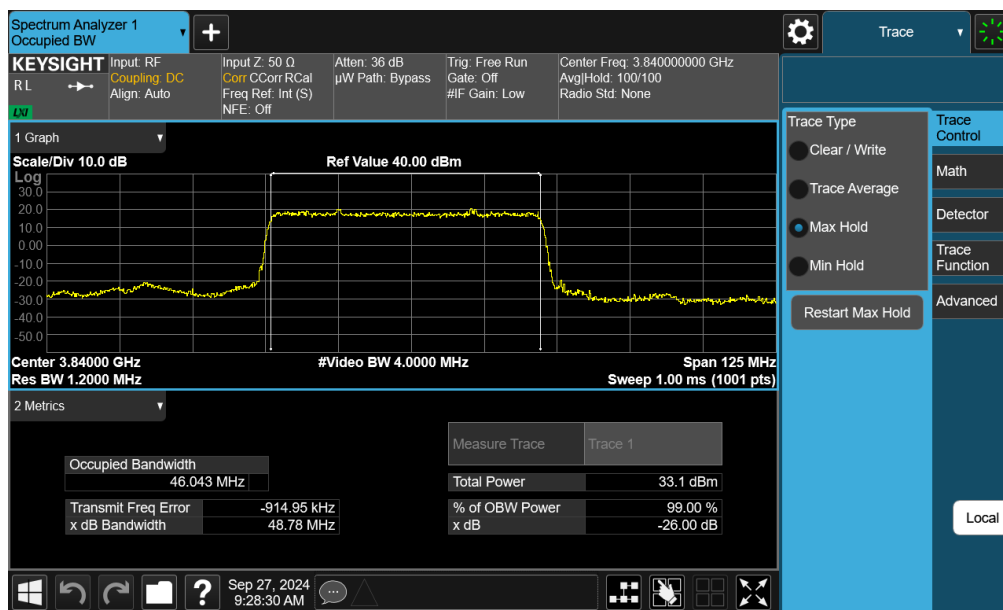
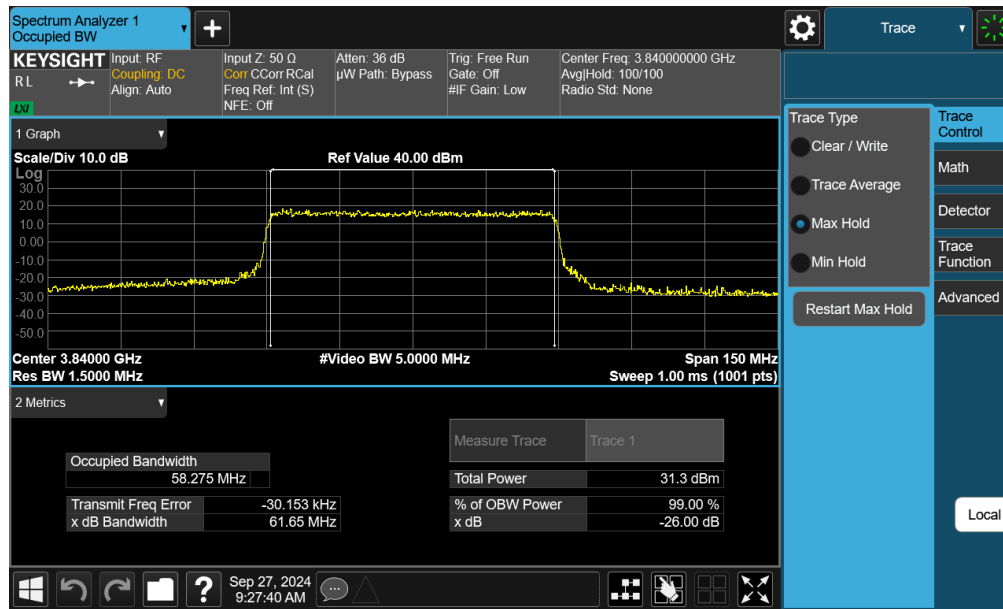


Plot 7-57. Occupied Bandwidth Plot (NR Band n77 C-band - 60MHz $\pi/2$ BPSK - Full RB - Ant F)

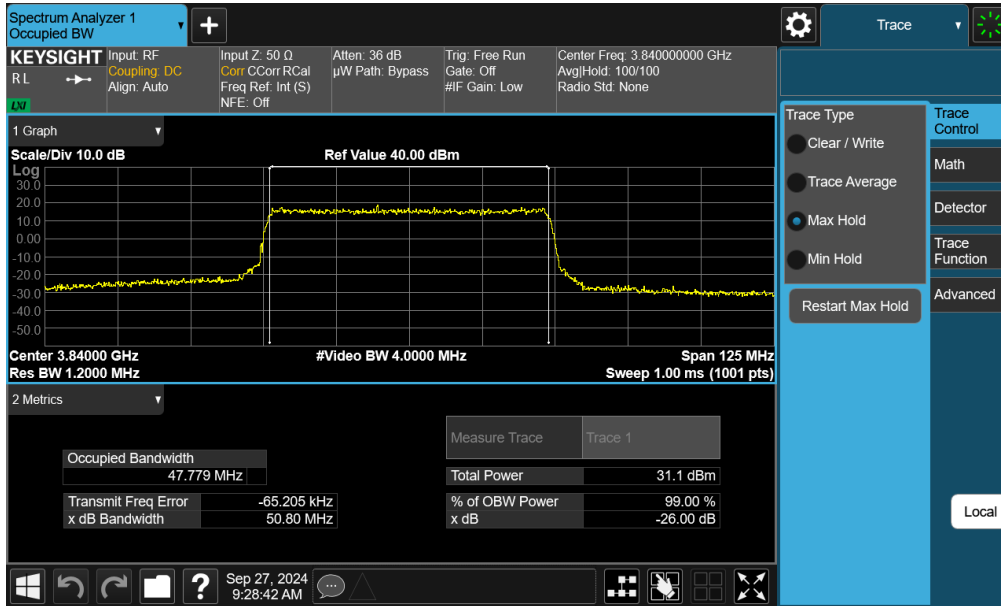


Plot 7-58. Occupied Bandwidth Plot (NR Band n77 C-band - 60MHz QPSK - Full RB - Ant F)

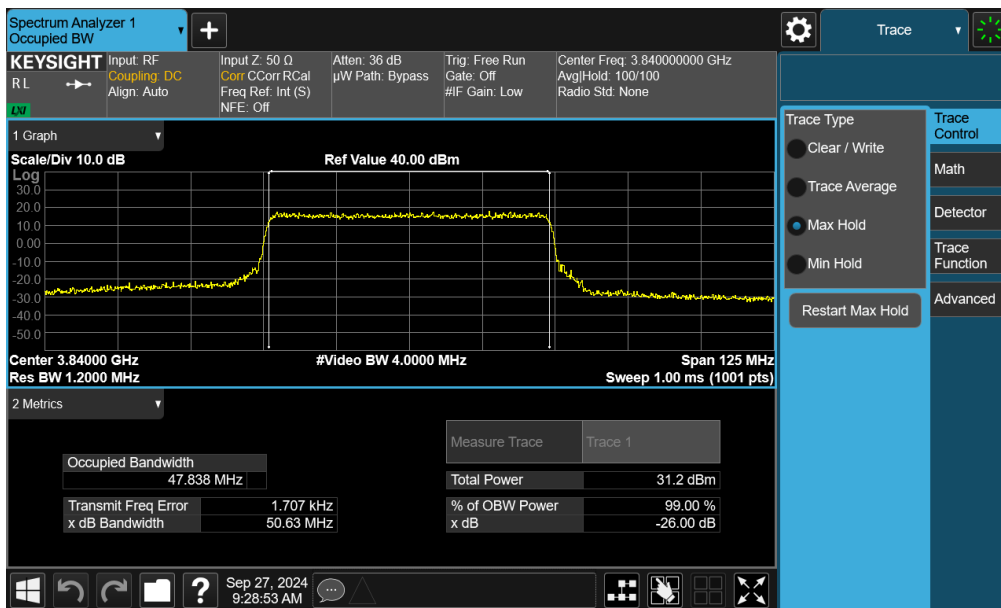
FCC ID: A3LSMS936B	PART 27 MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-61. Occupied Bandwidth Plot (NR Band n77 C-band - 50MHz QPSK - Full RB - Ant F)



Plot 7-62. Occupied Bandwidth Plot (NR Band n77 C-band - 50MHz 16-QAM - Full RB - Ant F)

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