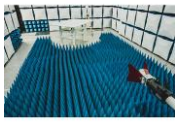
PCTEST
7185 Oakland Mills Road, Columbia, MD 21046 USA
Tel. 410.290.6652 / Fax 410.290.6654
http://www.pctest.com



PART 27 C2PC TEST REPORT

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

Date of Testing:
2/02/2022 - 2/28/2022
Test Report Issue Date:
2/28/2022
Test Site/Location:
PCTEST Lab. Columbia, MD, USA
Test Report Serial No.:
1M2202030011-04.A3L

FCC ID:	**A3LSMS908E**
Applicant Name:	**Samsung Electronics Co., Ltd.**

Application Type:	Class II Permissive Change
Model:	SM-S908E/DS
Additional Model(s):	SM-S908E
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
Class II Permissive Change:	Please see FCC change document
Original Grant Date:	01/07/2022

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

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

Randy Ortanez
President

ACCREDITED
CERT #2041.01

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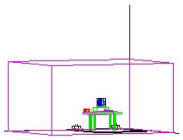
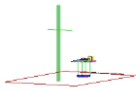


PART 27 MEASUREMENT REPORT



Mode	Bandwidth	Modulation	Tx Frequency Range [MHz]	EIRP		Emission Designator
				Max. Power [W]	Max. Power [dBm]	
NR Band n77 PC3 (3450 - 3550MHz)	100 MHz	π/2 BPSK	3500.0	0.205	23.13	96M7G7D
		QPSK	3500.0	0.206	23.15	97M9G7D
		16QAM	3500.0	0.189	22.77	97M7W7D
	90 MHz	π/2 BPSK	3495.0 - 3505.0	0.224	23.51	87M1G7D
		QPSK	3495.0 - 3505.0	0.216	23.34	87M8G7D
		16QAM	3495.0 - 3505.0	0.198	22.98	87M9W7D
	80 MHz	π/2 BPSK	3490.0 - 3510.0	0.229	23.61	77M4G7D
		QPSK	3490.0 - 3510.0	0.214	23.31	77M8G7D
		16QAM	3490.0 - 3510.0	0.185	22.68	77M7W7D
	70 MHz	π/2 BPSK	3485.0 - 3515.0	0.235	23.72	64M6G7D
		QPSK	3485.0 - 3515.0	0.211	23.25	67M8G7D
		16QAM	3485.0 - 3515.0	0.186	22.70	67M6W7D
	60 MHz	π/2 BPSK	3480.0 - 3520.0	0.231	23.64	58M3G7D
		QPSK	3480.0 - 3520.0	0.229	23.60	58M2G7D
		16QAM	3480.0 - 3520.0	0.213	23.29	58M1W7D
	50 MHz	π/2 BPSK	3475.0 - 3525.0	0.229	23.60	46M0G7D
		QPSK	3475.0 - 3525.0	0.223	23.48	47M7G7D
		16QAM	3475.0 - 3525.0	0.184	22.64	47M7W7D
	40 MHz	π/2 BPSK	3470.0 - 3530.0	0.247	23.92	35M9G7D
		QPSK	3470.0 - 3530.0	0.243	23.86	38M0G7D
		16QAM	3470.0 - 3530.0	0.212	23.25	38M0W7D
	30 MHz	π/2 BPSK	3465.0 - 3535.0	0.207	23.17	26M9G7D
		QPSK	3465.0 - 3535.0	0.238	23.76	28M1G7D
		16QAM	3465.0 - 3535.0	0.200	23.01	28M0W7D
	20 MHz	π/2 BPSK	3460.0 - 3540.0	0.258	24.12	18M0G7D
		QPSK	3460.0 - 3540.0	0.255	24.07	18M3G7D
		16QAM	3460.0 - 3540.0	0.228	23.58	18M3W7D
	15 MHz	π/2 BPSK	3457.5 - 3542.5	0.255	24.07	13M1G7D
		QPSK	3457.5 - 3542.5	0.252	24.02	13M7G7D
		16QAM	3457.5 - 3542.5	0.238	23.76	13M7W7D
	10 MHz	π/2 BPSK	3455.0 - 3545.0	0.232	23.66	8M73G7D
		QPSK	3455.0 - 3545.0	0.258	24.11	8M73G7D
		16QAM	3455.0 - 3545.0	0.217	23.37	8M73W7D
NR Band n77 PC3 (3700 - 3980MHz)	100 MHz	π/2 BPSK	3750.0 - 3930.0	0.175	22.42	97M1G7D
		QPSK	3750.0 - 3930.0	0.177	22.47	97M8G7D
		16QAM	3750.0 - 3930.0	0.145	21.62	97M6W7D
	90 MHz	π/2 BPSK	3745.0 - 3935.0	0.183	22.63	87M0G7D
		QPSK	3745.0 - 3935.0	0.181	22.57	88M1G7D
		16QAM	3745.0 - 3935.0	0.162	22.11	87M7W7D
	80 MHz	π/2 BPSK	3740.0 - 3940.0	0.186	22.69	77M4G7D
		QPSK	3740.0 - 3940.0	0.179	22.53	77M7G7D
		16QAM	3740.0 - 3940.0	0.177	22.48	77M7W7D
	70 MHz	π/2 BPSK	3735.0 - 3945.0	0.182	22.59	64M6G7D
		QPSK	3735.0 - 3945.0	0.183	22.62	67M8G7D
		16QAM	3735.0 - 3945.0	0.176	22.46	67M7W7D
	60 MHz	π/2 BPSK	3730.0 - 3950.0	0.193	22.85	58M1G7D
		QPSK	3730.0 - 3950.0	0.192	22.82	58M2G7D
		16QAM	3730.0 - 3950.0	0.179	22.52	58M0W7D
	50 MHz	π/2 BPSK	3725.0 - 3955.0	0.198	22.96	45M9G7D
		QPSK	3725.0 - 3955.0	0.193	22.86	47M7G7D
		16QAM	3725.0 - 3955.0	0.159	22.02	47M7W7D
	40 MHz	π/2 BPSK	3720.0 - 3960.0	0.201	23.03	36M0G7D
		QPSK	3720.0 - 3960.0	0.200	23.01	38M1G7D
		16QAM	3720.0 - 3960.0	0.195	22.90	38M1W7D
	30 MHz	π/2 BPSK	3715.0 - 3965.0	0.220	23.43	27M0G7D
		QPSK	3715.0 - 3965.0	0.194	22.88	28M1G7D
		16QAM	3715.0 - 3965.0	0.196	22.93	28M0W7D
	20 MHz	π/2 BPSK	3710.0 - 3970.0	0.233	23.67	18M1G7D
		QPSK	3710.0 - 3970.0	0.203	23.06	18M4G7D
		16QAM	3710.0 - 3970.0	0.192	22.82	18M3W7D
	15 MHz	π/2 BPSK	3707.5 - 3972.5	0.185	22.67	13M1G7D
		QPSK	3707.5 - 3972.5	0.185	22.66	13M7G7D
		16QAM	3707.5 - 3972.5	0.181	22.57	13M7W7D
	10 MHz	π/2 BPSK	3705.0 - 3975.0	0.191	22.82	8M73G7D
		QPSK	3705.0 - 3975.0	0.200	23.02	8M71G7D
		16QAM	3705.0 - 3975.0	0.175	22.44	8M70W7D

EUT Overview

1.0 INTRODUCTION

1.1 Scope

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

1.2 PCTEST Test Location

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

1.3 Test Facility / Accreditations

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

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

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

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

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID : A3LSMS908E**. 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.: 6044M, 0090V, 0105V, 6048M

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), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII (5GHz), Bluetooth (1x, EDR, LE), NFC, Wireless Power Transfer, Ultra Wideband

The device has 1 Tx antenna for n77 data (Ant F) and 3 Rx antennas (Ant C, L, D). With SRS operations, all 4 antennas can transmit the SRS signal to check for the channel quality of n77. The antennas cannot simultaneously transmit. Only the single TX/RX antenna is used for Data transmission.

2.3 Test Configuration

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

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

2.4 EMI Suppression Device(s)/Modifications

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

3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

The measurement procedures described in the "Land Mobile FM or PM – Communications Equipment – Measurements and Performance Standards" (ANSI/TIA-603-E-2016) and "Measurement Guidance for Certification of Licensed Digital Transmitters" (KDB 971168 D01 v03r01) 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/TIA-603-E-2016. A half-wave dipole is substituted in place of the EUT. For emissions above 1GHz, a horn antenna is substituted in place of the EUT. The substitute antenna is driven by a signal generator with the level of the signal generator being adjusted to obtain the same receive spectrum analyzer level previously recorded from the spurious emission from the EUT. The power of the emission is calculated using the following formula:

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

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

For radiated spurious emissions measurements and calculations, conversion method is used per the formulas in KDB 971168 Section 5.8.4. Field Strength (EIRP) is calculated using the following formulas:

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

And

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

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

Radiated power and radiated spurious emission levels are investigated with the receive antenna horizontally and vertically polarized per ANSI/TIA-603-E-2016.

4.0 MEASUREMENT UNCERTAINTY

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

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

5.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	AP2	EMC Cable and Switch System	3/4/2021	Annual	3/4/2022	AP2
-	AP1	EMC Cable and Switch System	3/9/2021	Annual	3/9/2022	AP1
-	ETS	EMC Cable and Switch System	3/4/2021	Annual	3/4/2022	ETS
-	LTx3	LIcensed Transmitter Cable Set	2/26/2021	Annual	2/26/2022	LTx3
-	LTx4	Licensed Transmitter Cable Set	3/12/2021	Annual	3/12/2022	LTx4
Emco	3115	Horn Antenna (1-18GHz)	6/18/2020	Biennial	6/18/2022	9704-5182
Espec	ESX-2CA	Environmental Chamber	8/27/2020	Annual	8/27/2022	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	4/20/2021	Biennial	4/20/2023	00125518
ETS Lindgren	3164-08	Quad Ridge Horn Antenna	3/12/2020	Biennial	3/12/2022	128337
ETS Lindgren	3816/2NM	LISN	7/9/2020	Biennial	7/9/2022	00114451
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11208010032
Mini-Circuits	SSG-4000HP	Synthesized Signal Generator	N/A			11403100002
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107
Sunol	JB6	LB6 Antenna	11/13/2020	Biennial	11/13/2022	A082816
Keysight Technologies	N9038A	MXE EMI Receiver	1/21/2022	Annual	1/21/2023	MY51210133
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	8/3/2021	Annual	8/3/2022	100342

Table 5-1. Test Equipment

Notes:

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

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

6.0 SAMPLE CALCULATIONS

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.

7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.

FCC ID: A3LSMS908E

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
	Frequency Stability	2.1055, 27.54	Fundamental emissions stay within authorized frequency block.	PASS	Section 7.8
RADIATED	Effective Radiated Power / Equivalent Isotropic Radiated Power (NR Band n77)	27.53(j)(3), 27.53(k)(3)	≤ 1 Watt EIRP	PASS	Section 7.6
	Radiated Spurious Emissions (NR Band n77)	2.1053, 27.53(l), 27.53(n)	≤ 13 dBm / MHz	PASS	Section 7.7

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

Table 7-1. Summary of Test Results

Notes:

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

7.2 Conducted Power Output Data

§2.1046

Test Overview

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

Test Procedure Used

KDB 971168 D01 v03r01 – Section 6.0

Test Settings

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

Test Setup

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

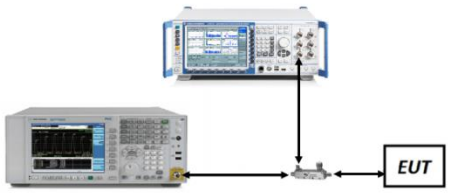


Figure 7-1. Test Instrument & Measurement Setup

Test Notes:

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

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

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	633334	3500.01	1 / 68	23.03
	QPSK	633334	3500.01	1 / 68	23.12
	16-QAM	633334	3500.01	1 / 68	22.82
90 MHz	π/2 BPSK	633000	3495.00	1 / 183	22.47
		633334	3500.01	1 / 183	23.13
		633666	3504.99	1 / 61	23.42
	QPSK	633000	3495.00	1 / 183	22.86
		633334	3500.01	1 / 183	23.32
		633666	3504.99	1 / 61	23.20
	16-QAM	633666	3504.99	1 / 61	23.03
80 MHz	π/2 BPSK	632668	3490.02	1 / 54	23.51
		633334	3500.01	1 / 54	23.24
		634000	3510.00	1 / 54	23.00
	QPSK	632668	3490.02	1 / 54	23.25
		633334	3500.01	1 / 54	23.29
		634000	3510.00	1 / 54	23.19
	16-QAM	632668	3490.02	1 / 54	22.74
70 MHz	π/2 BPSK	632334	3485.01	1 / 47	23.62
		633334	3500.01	1 / 47	23.56
		634332	3514.98	1 / 47	23.54
	QPSK	632334	3485.01	1 / 47	23.23
		633334	3500.01	1 / 47	23.19
		634332	3514.98	1 / 47	23.16
	16-QAM	632334	3485.01	1 / 47	22.76
60 MHz	π/2 BPSK	632000	3480.00	1 / 81	23.55
		633334	3500.01	1 / 81	23.51
		634666	3519.99	1 / 81	23.45
	QPSK	632000	3480.00	1 / 81	23.57
		633334	3500.01	1 / 81	23.57
		634666	3519.99	1 / 81	23.51
	16-QAM	632000	3480.00	1 / 81	23.34
50 MHz	π/2 BPSK	631668	3475.02	1 / 99	23.25
		633334	3500.01	1 / 66	23.50
		635000	3525.00	1 / 66	23.36
	QPSK	631668	3475.02	1 / 99	23.46
		633334	3500.01	1 / 66	23.41
		635000	3525.00	1 / 66	23.35
	16-QAM	631668	3475.02	1 / 99	22.70
40 MHz	π/2 BPSK	631334	3470.01	1 / 53	23.83
		633334	3500.01	1 / 79	23.54
		635332	3529.98	1 / 53	23.54
	QPSK	631334	3470.01	1 / 53	23.84
		633334	3500.01	1 / 79	23.67
		635332	3529.98	1 / 53	23.20
	16-QAM	635332	3529.98	1 / 53	23.31
30 MHz	π/2 BPSK	631000	3465.00	1 / 39	23.07
		633334	3500.01	1 / 39	23.07
		635666	3534.99	1 / 39	22.59
	QPSK	631000	3465.00	1 / 39	23.74
		633334	3500.01	1 / 39	23.63
		635666	3534.99	1 / 39	23.44
	16-QAM	631000	3465.00	1 / 39	23.07
20 MHz	π/2 BPSK	630668	3460.02	1 / 37	24.02
		633334	3500.01	1 / 25	23.47
		636000	3540.00	1 / 37	23.51
	QPSK	630668	3460.02	1 / 37	24.05
		633334	3500.01	1 / 25	23.76
		636000	3540.00	1 / 37	23.53
	16-QAM	630668	3460.02	1 / 37	23.63
15 MHz	π/2 BPSK	630500	3457.50	1 / 28	23.97
		633334	3500.01	1 / 28	23.85
		636166	3542.49	1 / 28	23.30
	QPSK	630500	3457.50	1 / 28	23.99
		633334	3500.01	1 / 28	23.91
		636166	3542.49	1 / 28	23.38
	16-QAM	633334	3500.01	1 / 28	23.82
10 MHz	π/2 BPSK	630334	3455.01	1 / 12	23.56
		633334	3500.01	1 / 12	23.47
		636332	3544.98	1 / 12	23.36
	QPSK	630334	3455.01	1 / 12	24.09
		633334	3500.01	1 / 12	23.95
		636332	3544.98	1 / 12	23.79
	16-QAM	636332	3544.98	1 / 12	23.42

Table 7-1. Conducted Power Output Data (n77 (DoD Band) – ANT F)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	633334	3500.01	1 / 204	18.94
	QPSK	633334	3500.01	1 / 204	19.29
	16-QAM	633334	3500.01	1 / 204	18.07

Table 7-2. Conducted Power Output Data (n77 (DoD Band) SRS2 – ANT C)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	633334	3500.01	1 / 68	21.34
	QPSK	633334	3500.01	1 / 68	21.44
	16-QAM	633334	3500.01	1 / 68	21.03

Table 7-3. Conducted Power Output Data (n77 (DoD Band) SRS3 – ANT L)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	633334	3500.01	1 / 68	18.67
	QPSK	633334	3500.01	1 / 68	18.82
	16-QAM	633334	3500.01	1 / 68	18.61

Table 7-4. Conducted Power Output Data (n77 (DoD Band) SRS4 – ANT D)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	650000	3750.00	1 / 136	23.32
		656000	3840.00	1 / 136	22.88
		662000	3930.00	1 / 136	22.94
	QPSK	650000	3750.00	1 / 136	23.43
		656000	3840.00	1 / 136	23.06
		662000	3930.00	1 / 136	23.09
	16-QAM	650000	3750.00	1 / 136	22.28
90 MHz	π/2 BPSK	649668	3745.02	1 / 183	23.35
		656000	3840.00	1 / 122	23.19
		662332	3934.98	1 / 183	22.84
	QPSK	649668	3745.02	1 / 183	23.52
		656000	3840.00	1 / 122	23.26
		662332	3934.98	1 / 183	23.28
	16-QAM	656000	3840.00	1 / 122	22.46
80 MHz	π/2 BPSK	649334	3740.01	1 / 108	23.58
		656000	3840.00	1 / 108	23.07
		662666	3939.99	1 / 108	23.21
	QPSK	649334	3740.01	1 / 108	23.49
		656000	3840.00	1 / 108	23.00
		662666	3939.99	1 / 108	23.12
	16-QAM	649334	3740.01	1 / 108	23.14
70 MHz	π/2 BPSK	649000	3735.00	1 / 141	23.39
		656000	3840.00	1 / 47	23.15
		663000	3945.00	1 / 141	23.20
	QPSK	649000	3735.00	1 / 141	23.57
		656000	3840.00	1 / 47	23.15
		663000	3945.00	1 / 141	23.36
	16-QAM	649000	3735.00	1 / 141	23.12
60 MHz	π/2 BPSK	648668	3730.02	1 / 81	23.74
		656000	3840.00	1 / 81	23.29
		663332	3949.98	1 / 81	23.54
	QPSK	648668	3730.02	1 / 81	23.77
		656000	3840.00	1 / 81	23.32
		663332	3949.98	1 / 81	23.65
	16-QAM	663332	3949.98	1 / 81	22.98
50 MHz	π/2 BPSK	648334	3725.01	1 / 66	23.86
		656000	3840.00	1 / 66	23.34
		663666	3954.99	1 / 66	23.08
	QPSK	648334	3725.01	1 / 66	23.81
		656000	3840.00	1 / 66	23.25
		663666	3954.99	1 / 66	23.06
	16-QAM	648334	3725.01	1 / 66	22.68
40 MHz	π/2 BPSK	648000	3720.00	1 / 79	23.92
		656000	3840.00	1 / 79	23.33
		664000	3960.00	1 / 79	23.30
	QPSK	648000	3720.00	1 / 79	23.96
		656000	3840.00	1 / 79	23.35
		664000	3960.00	1 / 79	23.38
	16-QAM	648000	3720.00	1 / 79	23.56
30 MHz	π/2 BPSK	647668	3715.02	1 / 39	24.32
		656000	3840.00	1 / 19	23.38
		664332	3964.98	1 / 39	24.06
	QPSK	647668	3715.02	1 / 39	23.83
		656000	3840.00	1 / 19	23.08
		664332	3964.98	1 / 39	23.35
	16-QAM	647668	3715.02	1 / 39	23.59
20 MHz	π/2 BPSK	647334	3710.01	1 / 37	23.86
		656000	3840.00	1 / 25	23.80
		664666	3969.99	1 / 25	24.38
	QPSK	647334	3710.01	1 / 37	24.02
		656000	3840.00	1 / 37	23.43
		664666	3969.99	1 / 25	23.05
	16-QAM	647334	3710.01	1 / 37	23.48
15 MHz	π/2 BPSK	647167	3707.51	1 / 28	23.56
		656000	3840.00	1 / 28	22.98
		664499	3972.50	1 / 28	23.28
	QPSK	647167	3707.51	1 / 28	23.62
		656000	3840.00	1 / 28	23.04
		664499	3972.50	1 / 28	23.28
	16-QAM	647167	3707.51	1 / 28	23.23
10 MHz	π/2 BPSK	647000	3705.00	1 / 17	23.31
		656000	3840.00	1 / 17	23.37
		664332	3975.00	1 / 17	22.84
	QPSK	647000	3705.00	1 / 17	23.97
		656000	3840.00	1 / 17	23.52
		664332	3975.00	1 / 17	23.55
	16-QAM	656000	3840.00	1 / 17	22.79

Table 7-5. Conducted Power Output Data (n77 (C Band) – ANT F)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	650000	3750.00	1 / 136	20.02
		656000	3840.00	1 / 136	19.14
		662000	3930.00	1 / 136	18.57
	QPSK	650000	3750.00	1 / 136	20.28
		656000	3840.00	1 / 136	19.42
		662000	3930.00	1 / 136	18.86
	16-QAM	662000	3930.00	1 / 136	18.29

Table 7-6. Conducted Power Output Data (n77 (C Band) SRS2 – ANT C)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	650000	3750.00	1 / 204	22.60
		656000	3840.00	1 / 68	21.84
		662000	3930.00	1 / 136	21.87
	QPSK	650000	3750.00	1 / 204	22.63
		656000	3840.00	1 / 68	21.89
		662000	3930.00	1 / 136	21.90
	16-QAM	650000	3750.00	1 / 204	22.42

Table 7-7. Conducted Power Output Data (n77 (C Band) SRS3 – ANT L)

Bandwidth	Modulation	Channel	Frequency [MHz]	RB Size/Offset	Conducted Power [dBm]
100 MHz	π/2 BPSK	650000	3750.00	1 / 136	19.44
		656000	3840.00	1 / 68	18.69
		662000	3930.00	1 / 68	17.57
	QPSK	650000	3750.00	1 / 136	19.49
		656000	3840.00	1 / 68	18.77
		662000	3930.00	1 / 68	17.75
	16-QAM	662000	3930.00	1 / 68	17.41

Table 7-8. Conducted Power Output Data (n77 (C Band) SRS4 – ANT D)

7.3 Occupied Bandwidth

Test Overview

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

Test Procedure Used

KDB 971168 D01 v03r01 – Section 4.2

Test Settings

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

Test Setup

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

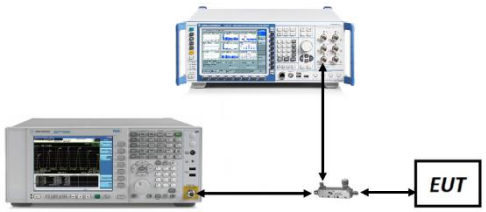
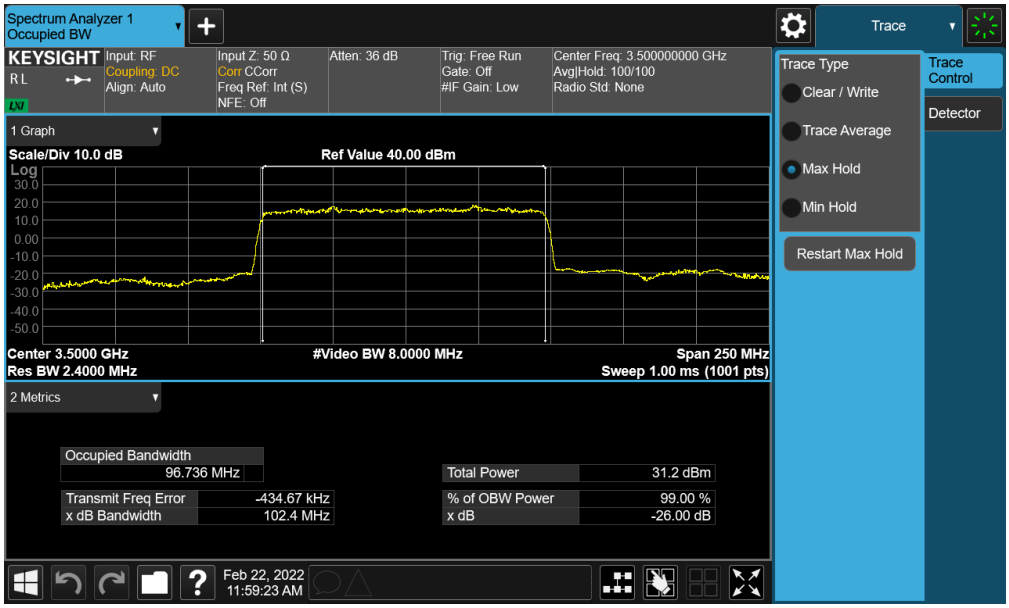


Figure 7-2. Test Instrument & Measurement Setup

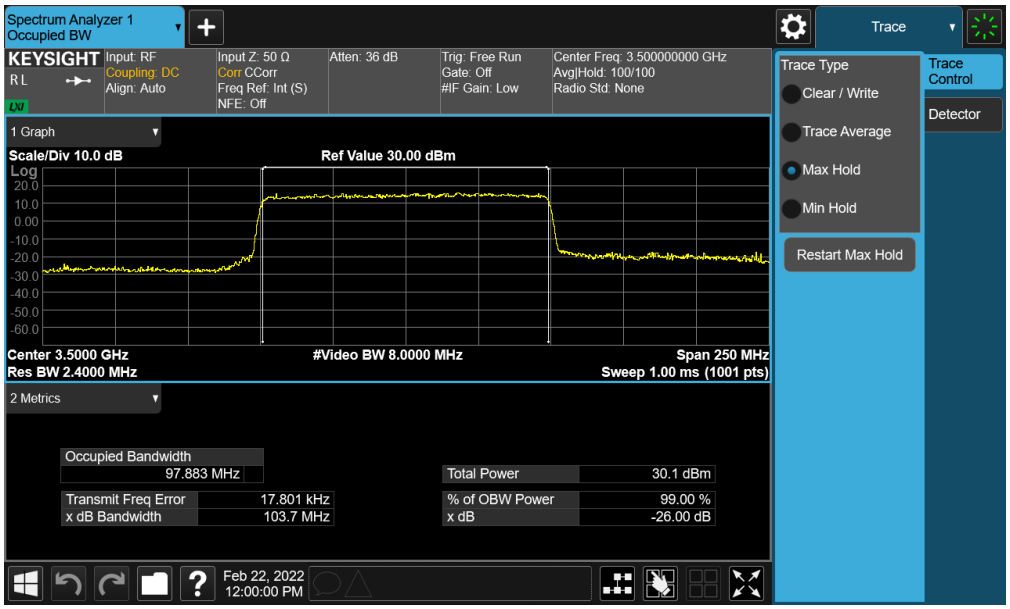
Test Notes

None.

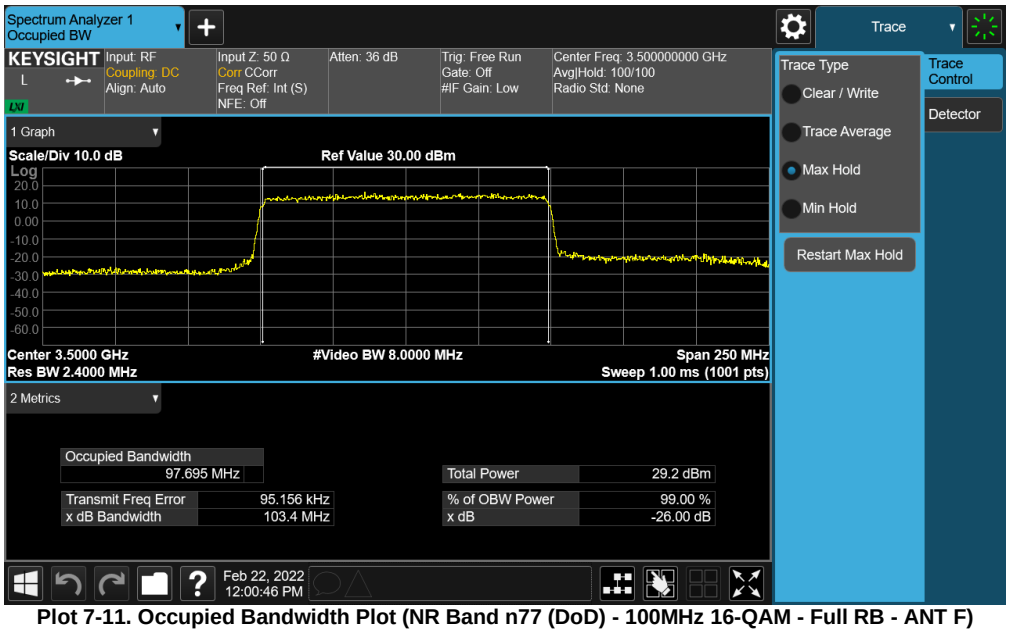
NR Band n77 (PC3) – DoD-Band – SRS-1 – ANT F



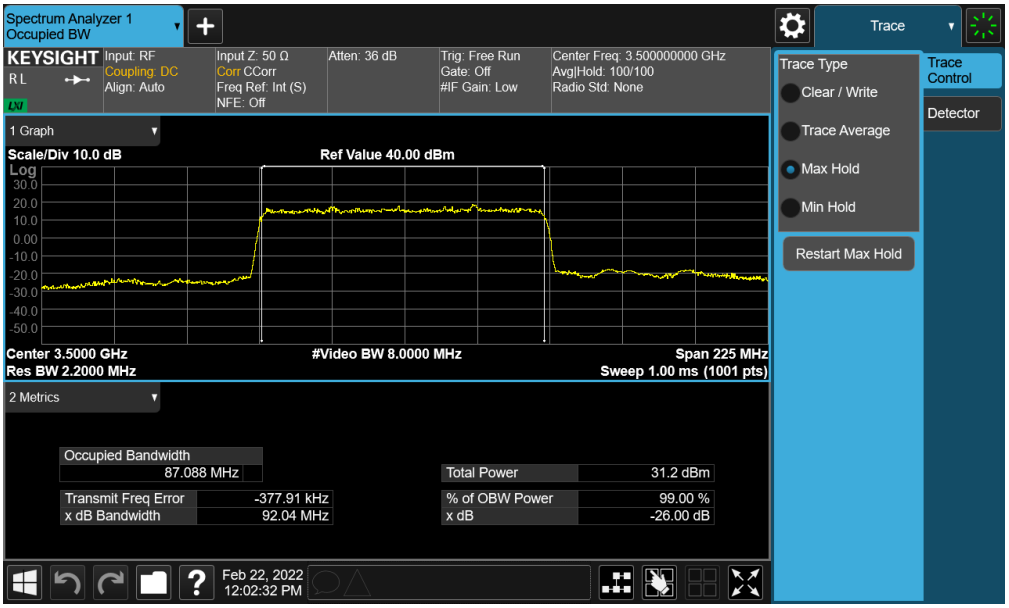
Plot 7-9. Occupied Bandwidth Plot (NR Band n77 (DoD) - 100MHz π/2 BPSK - Full RB - ANT F)



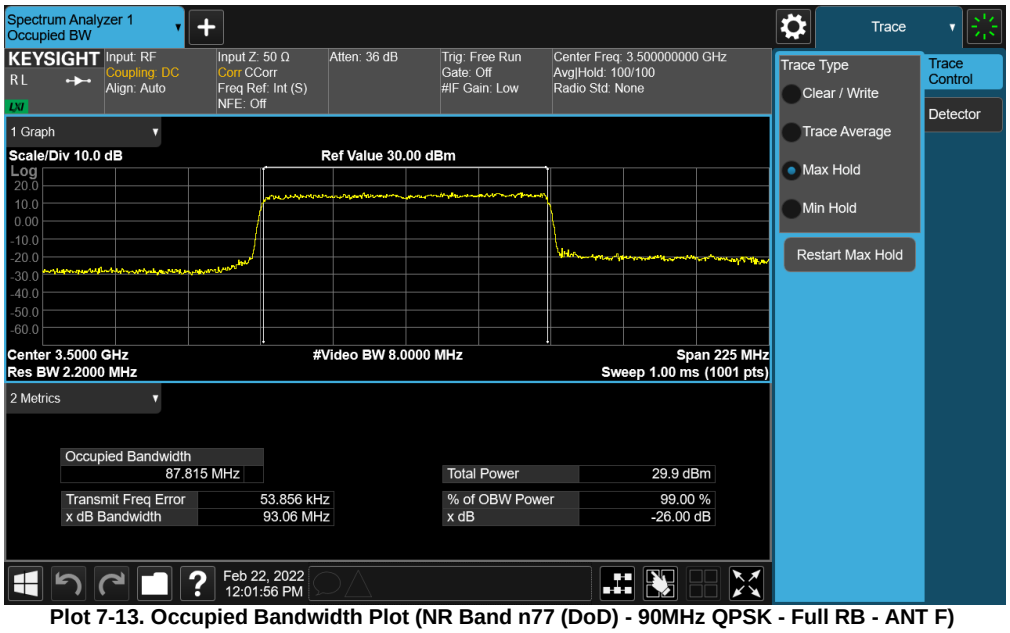
Plot 7-10. Occupied Bandwidth Plot (NR Band n77 (DoD) - 100MHz QPSK - Full RB - ANT F)



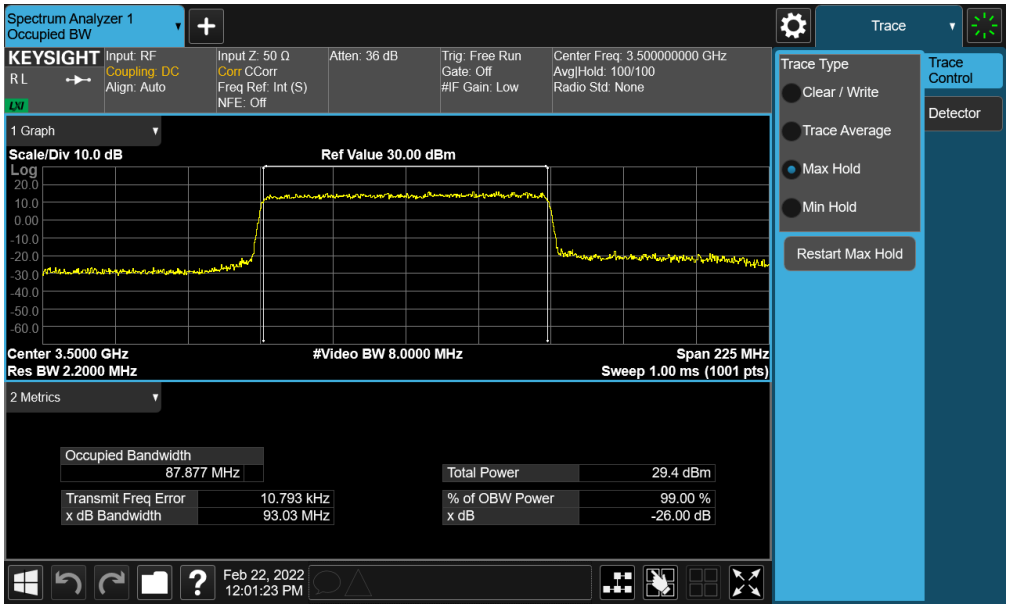
Plot 7-11. Occupied Bandwidth Plot (NR Band n77 (DoD) - 100MHz 16-QAM - Full RB - ANT F)



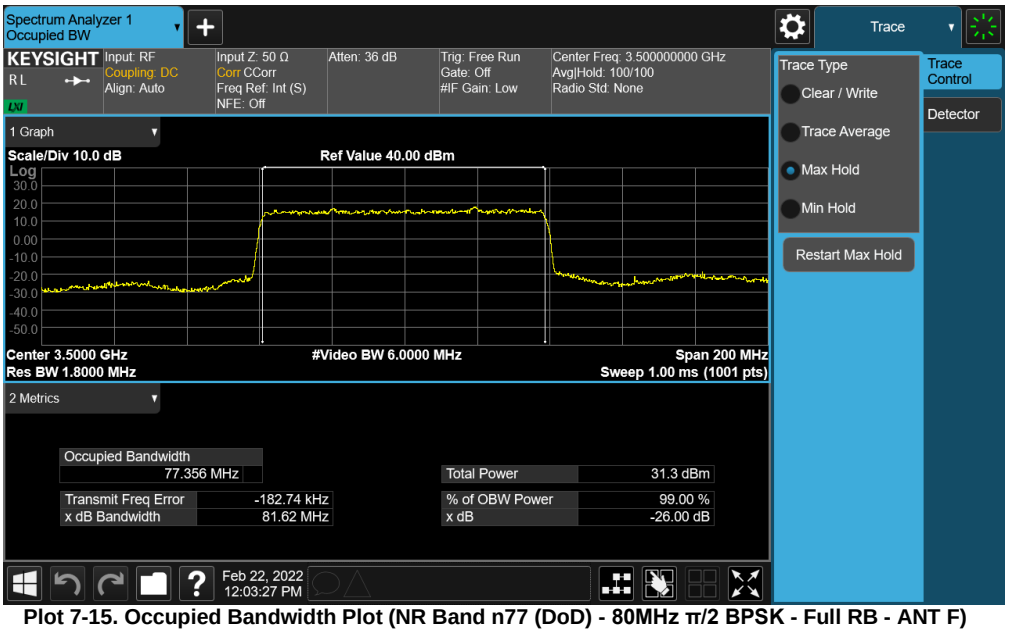
Plot 7-12. Occupied Bandwidth Plot (NR Band n77 (DoD) - 90MHz π/2 BPSK - Full RB - ANT F)



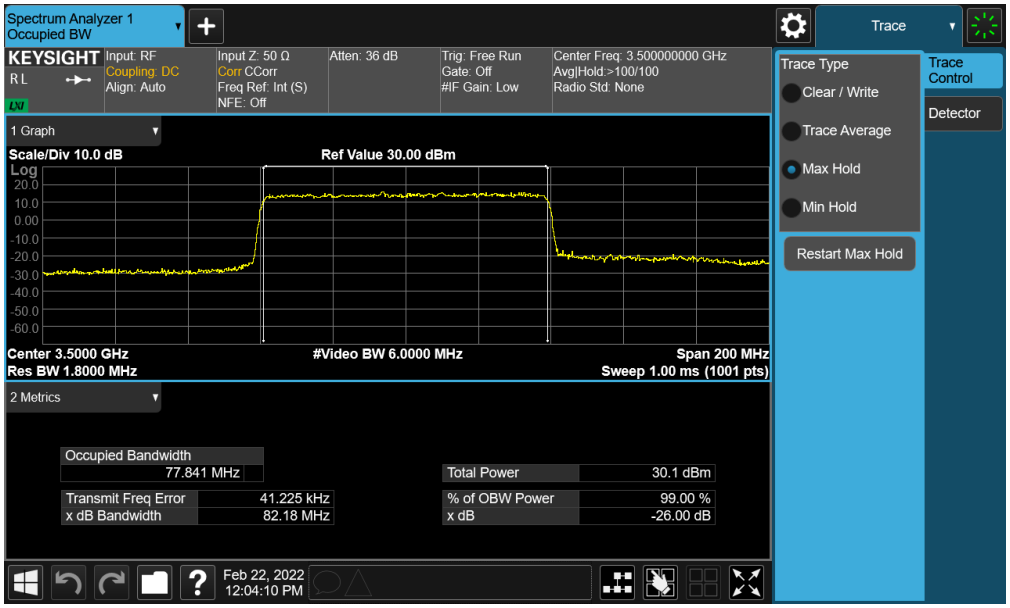
Plot 7-13. Occupied Bandwidth Plot (NR Band n77 (DoD) - 90MHz QPSK - Full RB - ANT F)



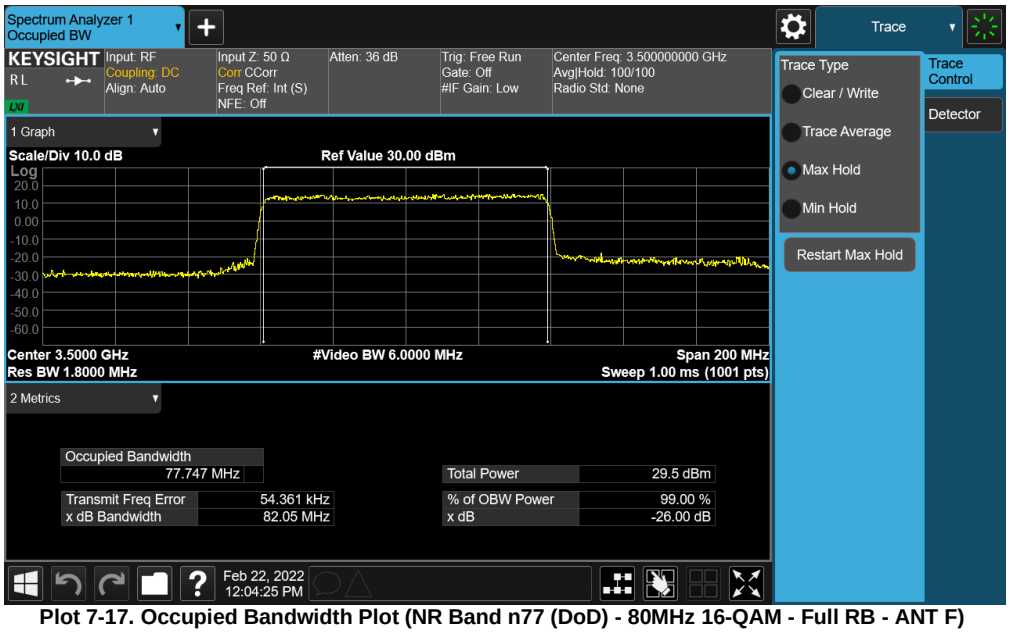
Plot 7-14. Occupied Bandwidth Plot (NR Band n77 (DoD) - 90MHz 16-QAM - Full RB - ANT F)



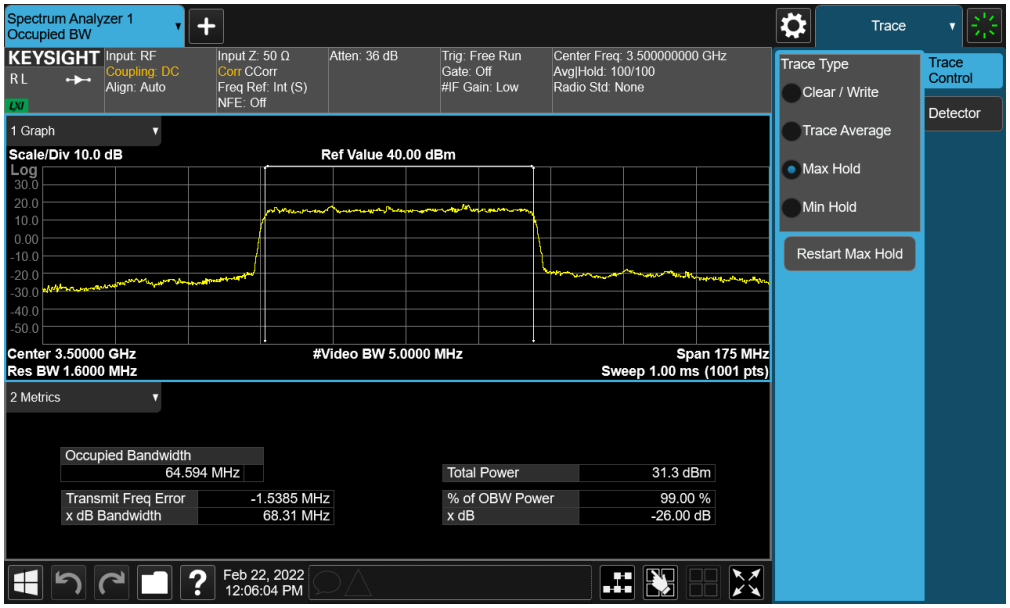
Plot 7-15. Occupied Bandwidth Plot (NR Band n77 (DoD) - 80MHz π/2 BPSK - Full RB - ANT F)



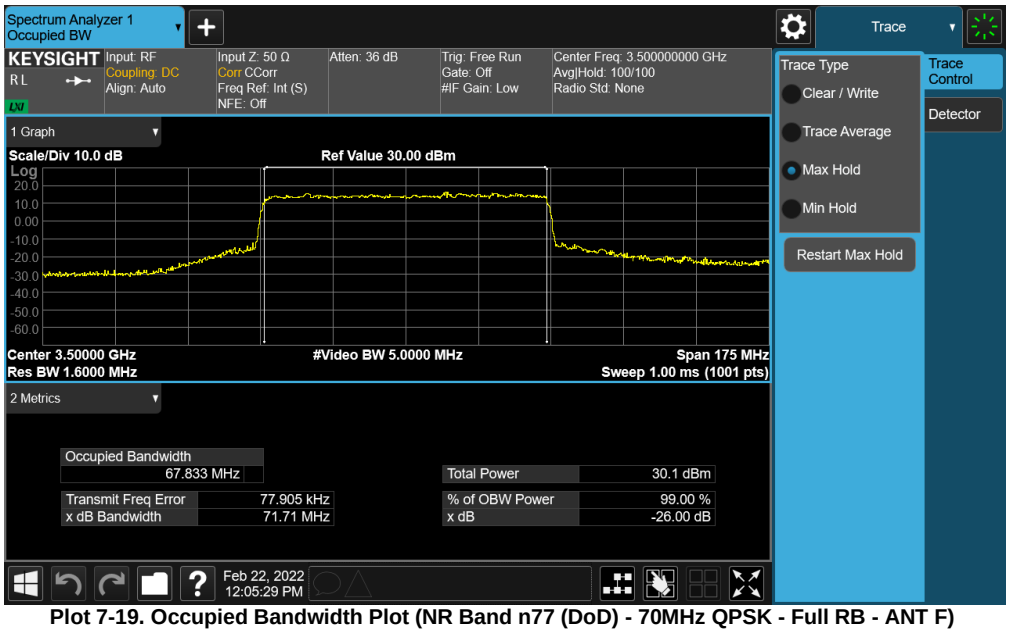
Plot 7-16. Occupied Bandwidth Plot (NR Band n77 (DoD) - 80MHz QPSK - Full RB - ANT F)



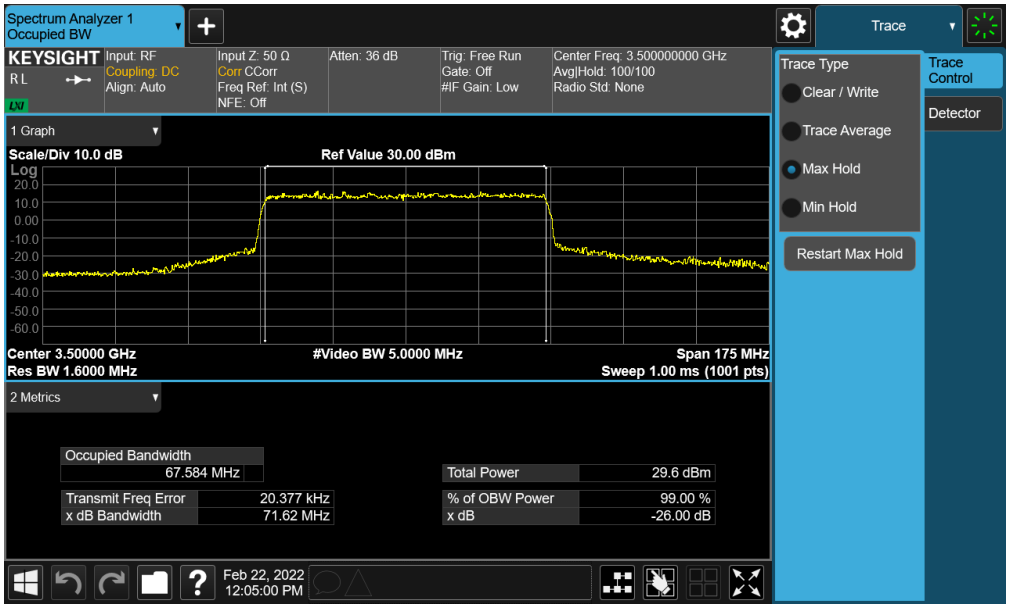
Plot 7-17. Occupied Bandwidth Plot (NR Band n77 (DoD) - 80MHz 16-QAM - Full RB - ANT F)



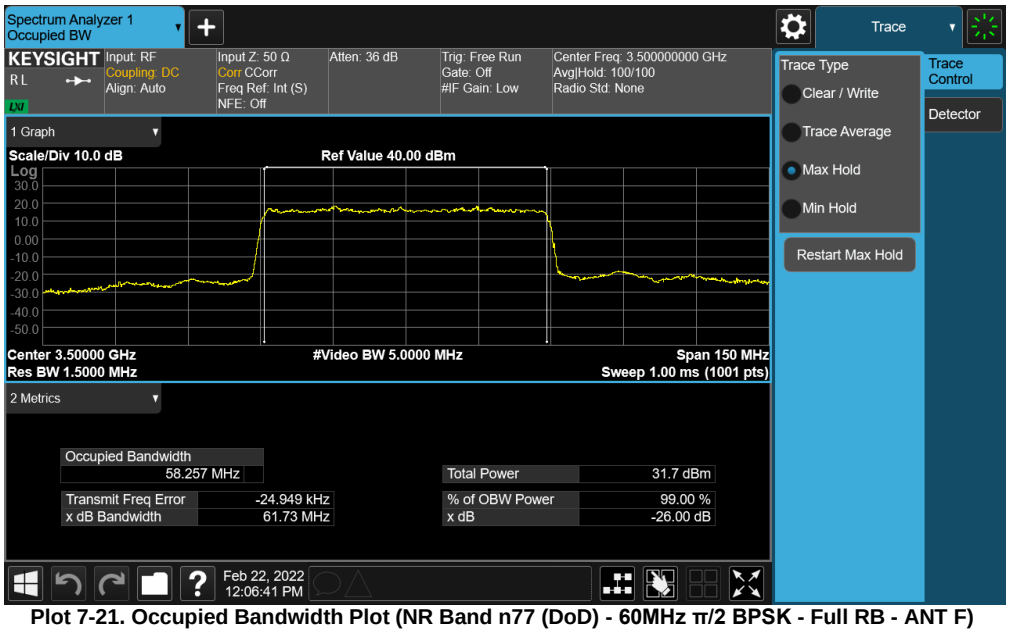
Plot 7-18. Occupied Bandwidth Plot (NR Band n77 (DoD) - 70MHz π/2 BPSK - Full RB - ANT F)



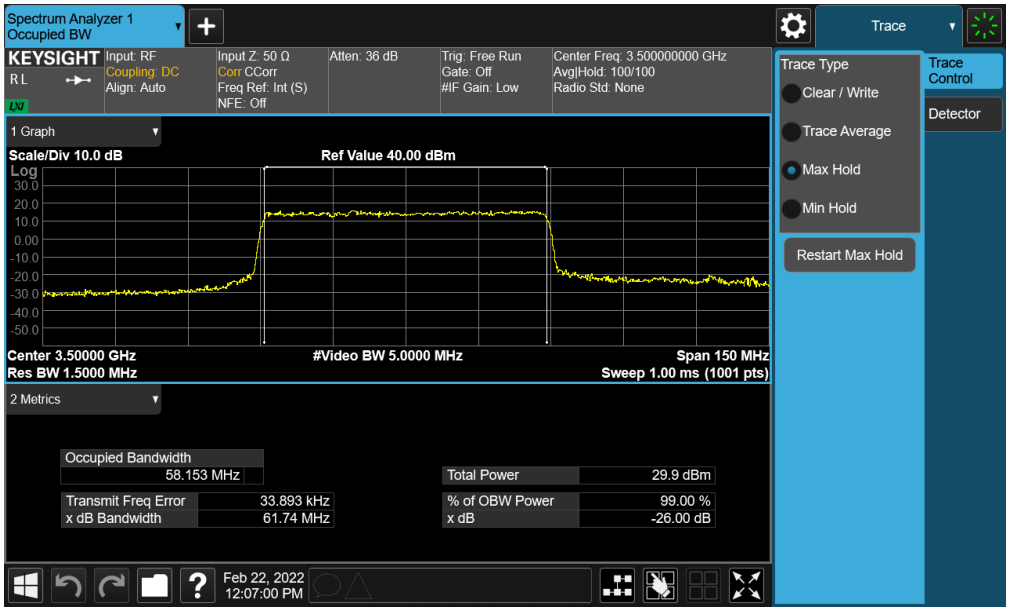
Plot 7-19. Occupied Bandwidth Plot (NR Band n77 (DoD) - 70MHz QPSK - Full RB - ANT F)



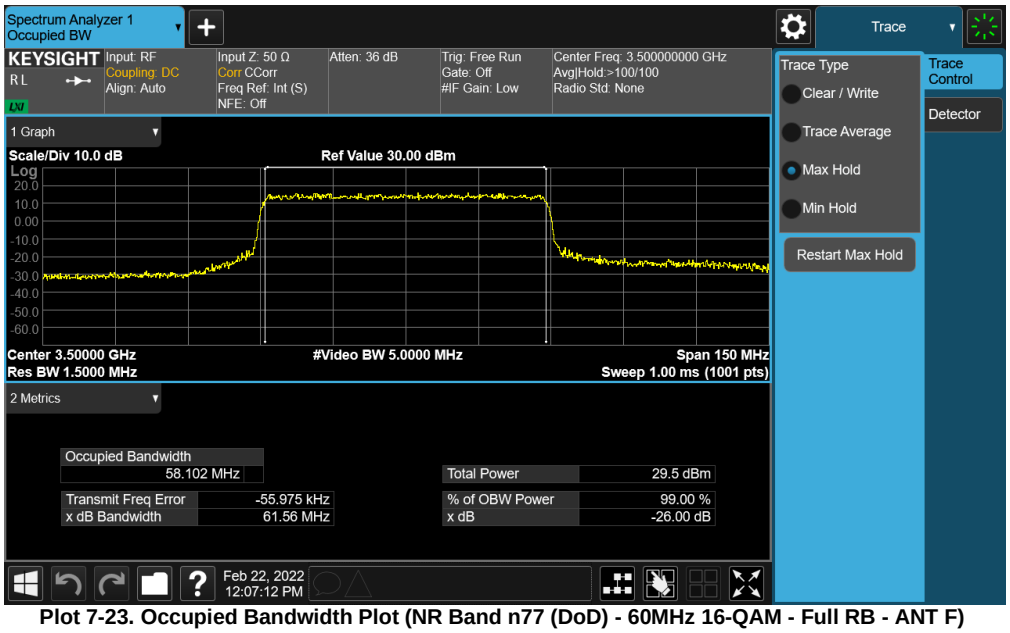
Plot 7-20. Occupied Bandwidth Plot (NR Band n77 (DoD) - 70MHz 16-QAM - Full RB - ANT F)



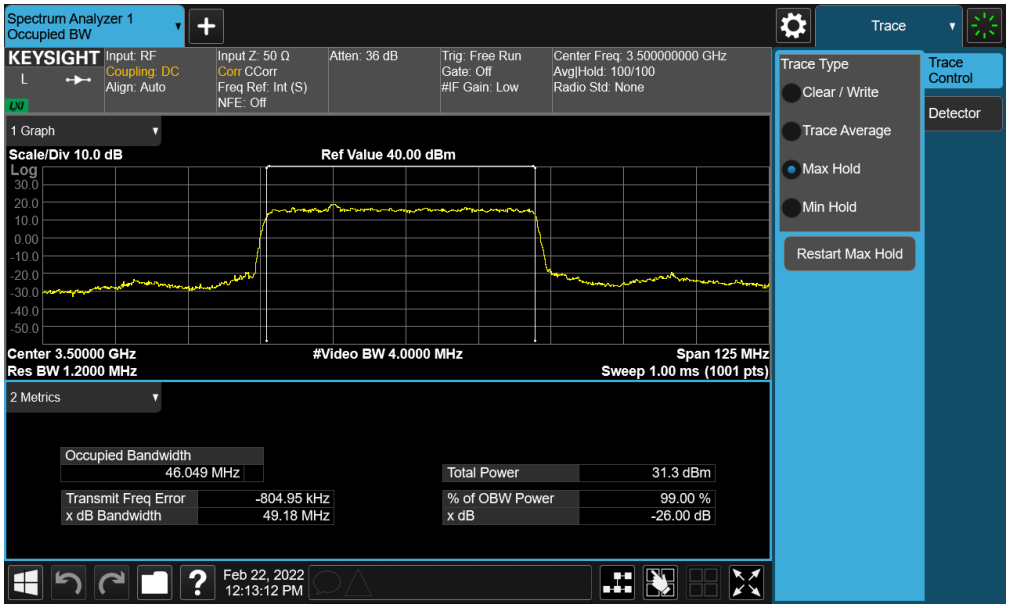
Plot 7-21. Occupied Bandwidth Plot (NR Band n77 (DoD) - 60MHz π/2 BPSK - Full RB - ANT F)



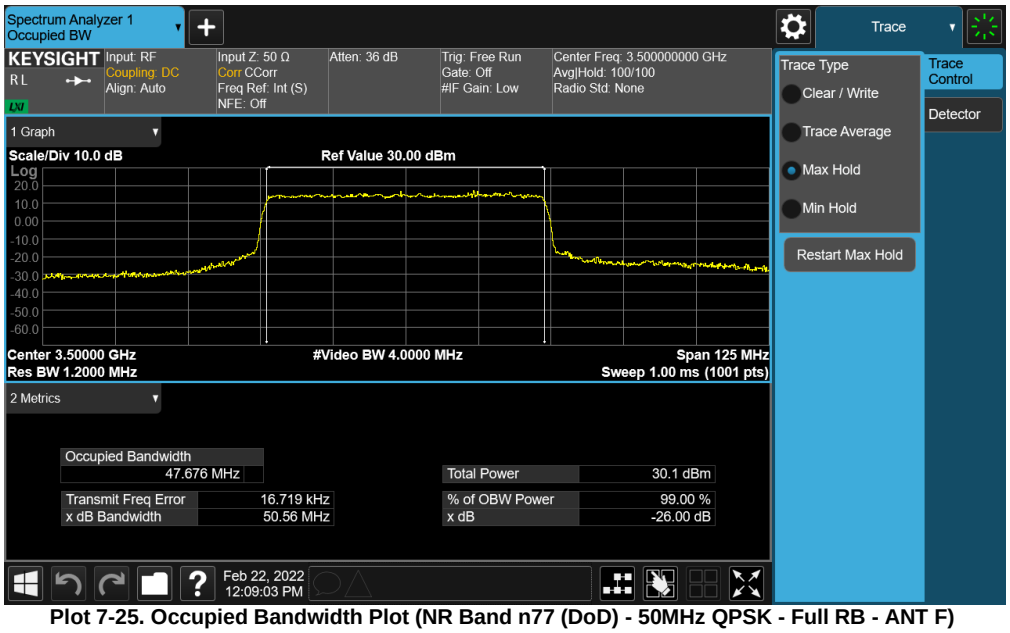
Plot 7-22. Occupied Bandwidth Plot (NR Band n77 (DoD) - 60MHz QPSK - Full RB - ANT F)



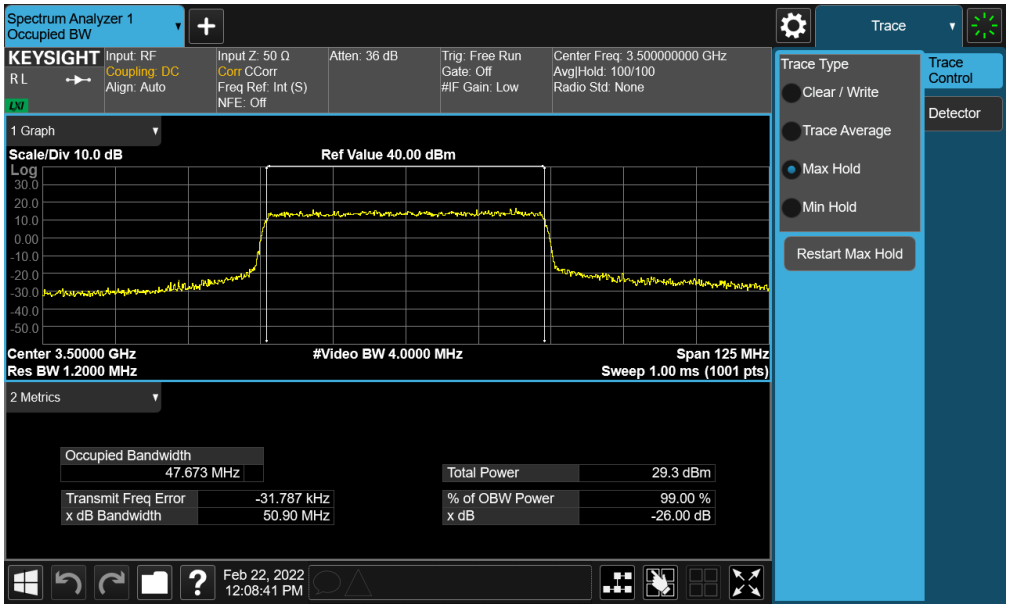
Plot 7-23. Occupied Bandwidth Plot (NR Band n77 (DoD) - 60MHz 16-QAM - Full RB - ANT F)



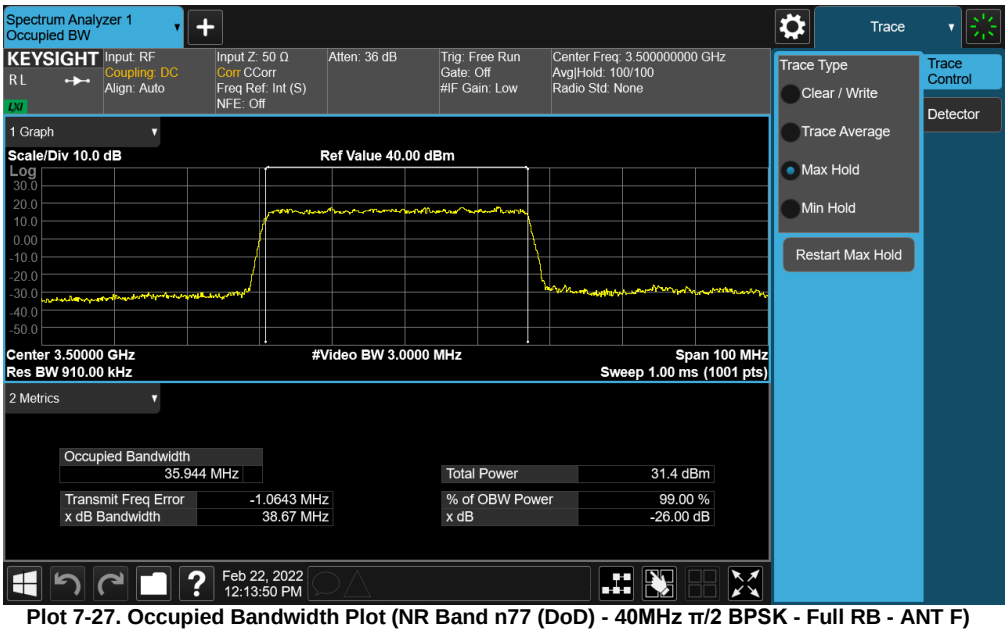
Plot 7-24. Occupied Bandwidth Plot (NR Band n77 (DoD) - 50MHz π/2 BPSK - Full RB - ANT F)



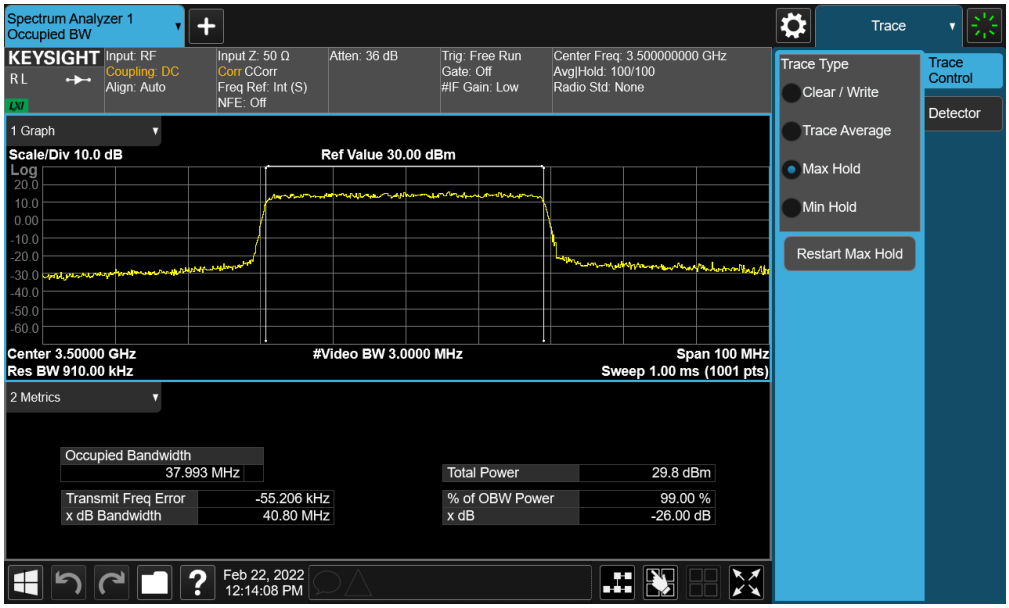
Plot 7-25. Occupied Bandwidth Plot (NR Band n77 (DoD) - 50MHz QPSK - Full RB - ANT F)



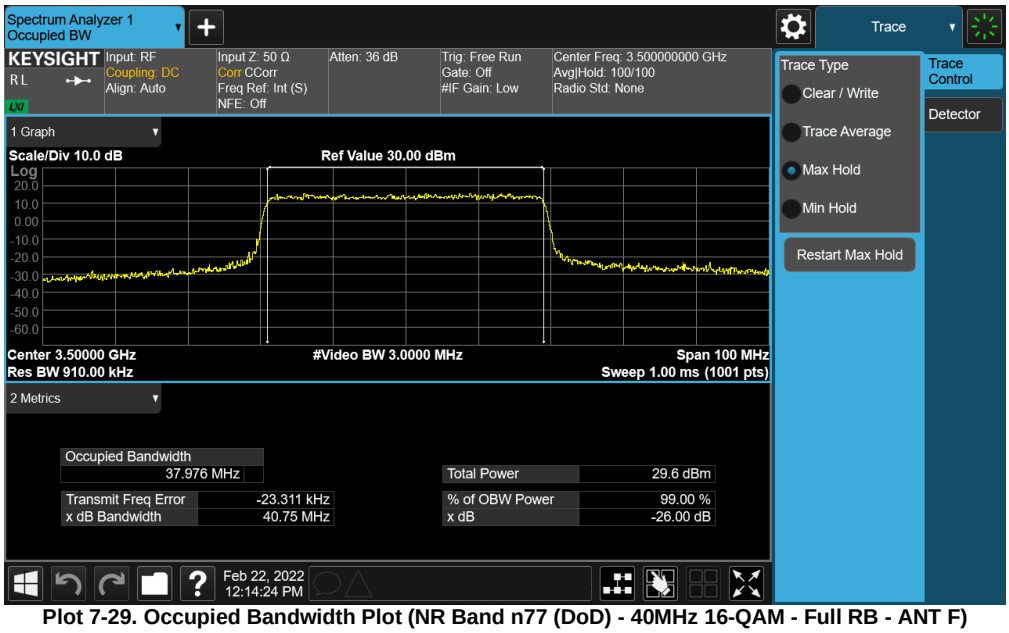
Plot 7-26. Occupied Bandwidth Plot (NR Band n77 (DoD) - 50MHz 16-QAM - Full RB - ANT F)



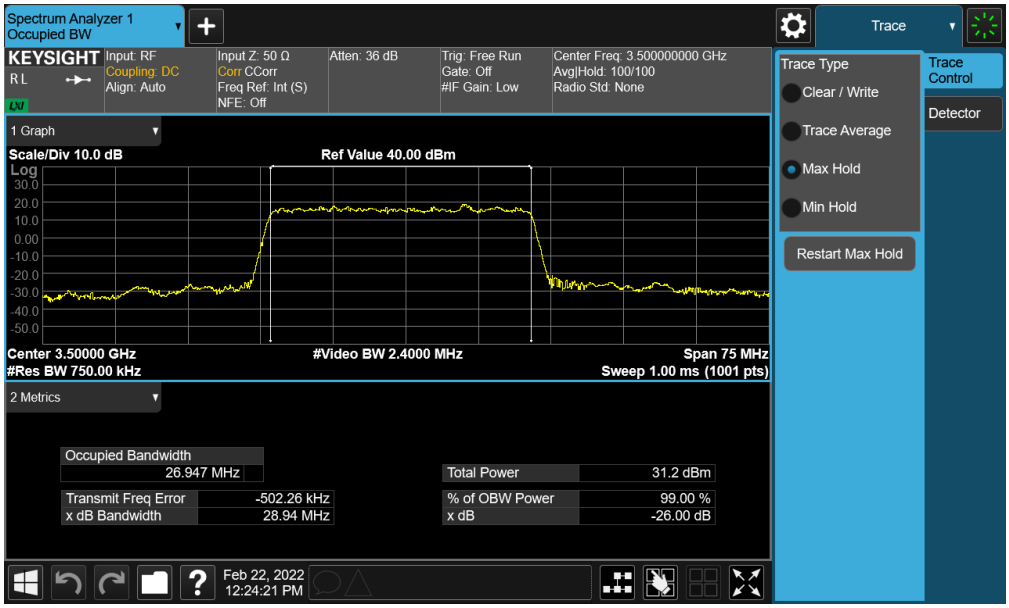
Plot 7-27. Occupied Bandwidth Plot (NR Band n77 (DoD) - 40MHz π/2 BPSK - Full RB - ANT F)



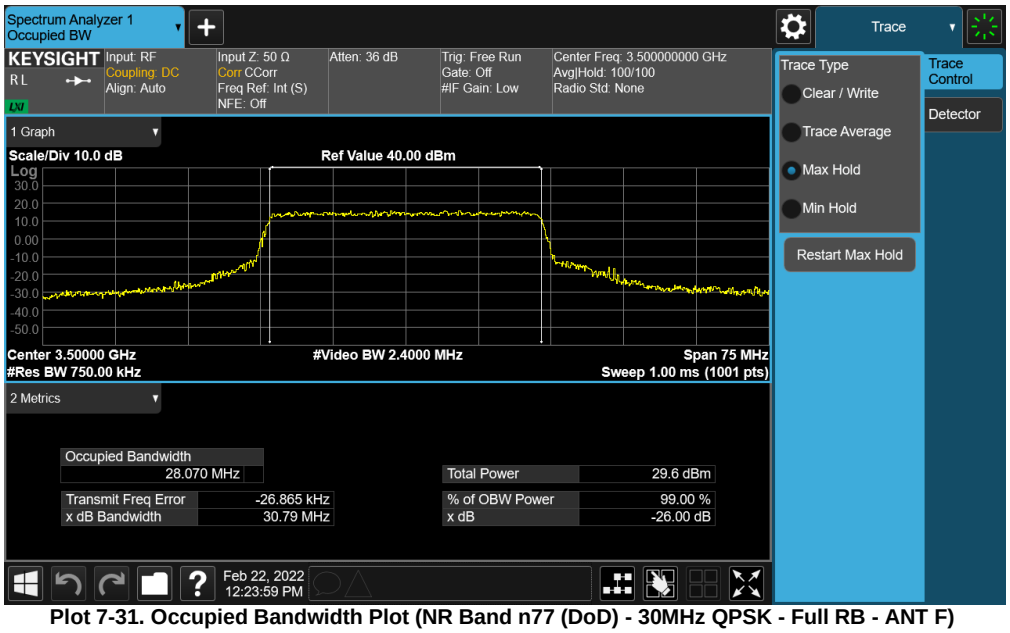
Plot 7-28. Occupied Bandwidth Plot (NR Band n77 (DoD) - 40MHz QPSK - Full RB - ANT F)



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

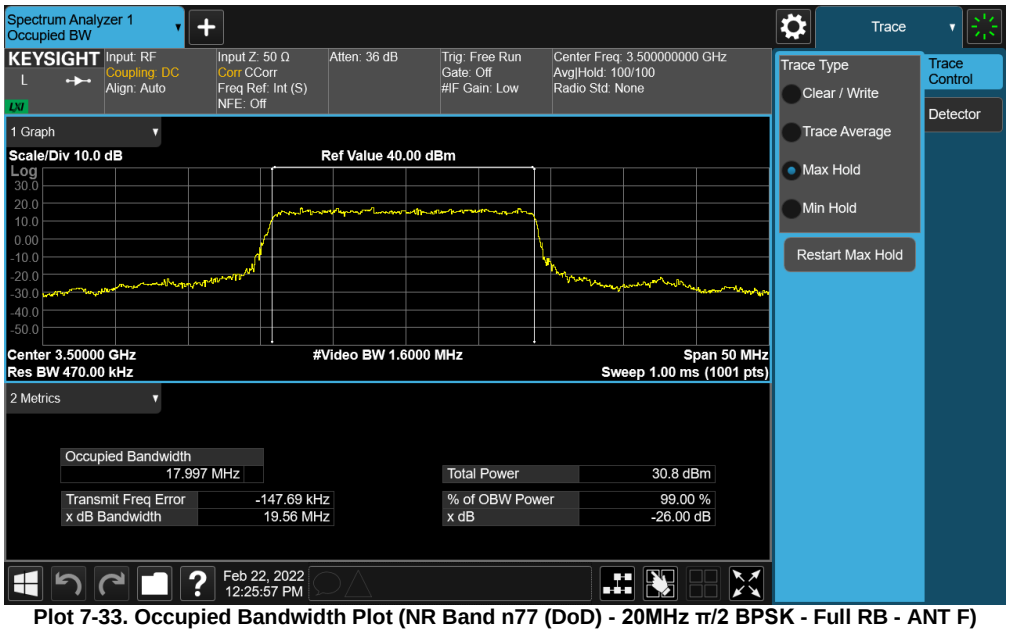


Plot 7-30. Occupied Bandwidth Plot (NR Band n77 (DoD) - 30MHz π/2 BPSK - Full RB - ANT F)



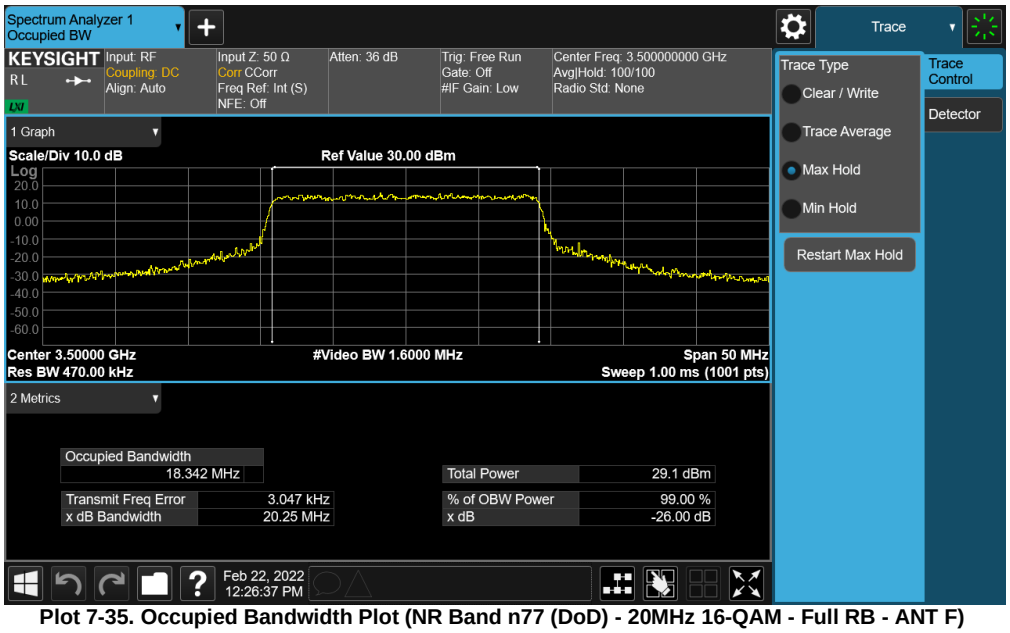
Plot 7-31. Occupied Bandwidth Plot (NR Band n77 (DoD) - 30MHz QPSK - Full RB - ANT F)

Plot 7-32. Occupied Bandwidth Plot (NR Band n77 (DoD) - 30MHz 16-QAM - Full RB - ANT F)



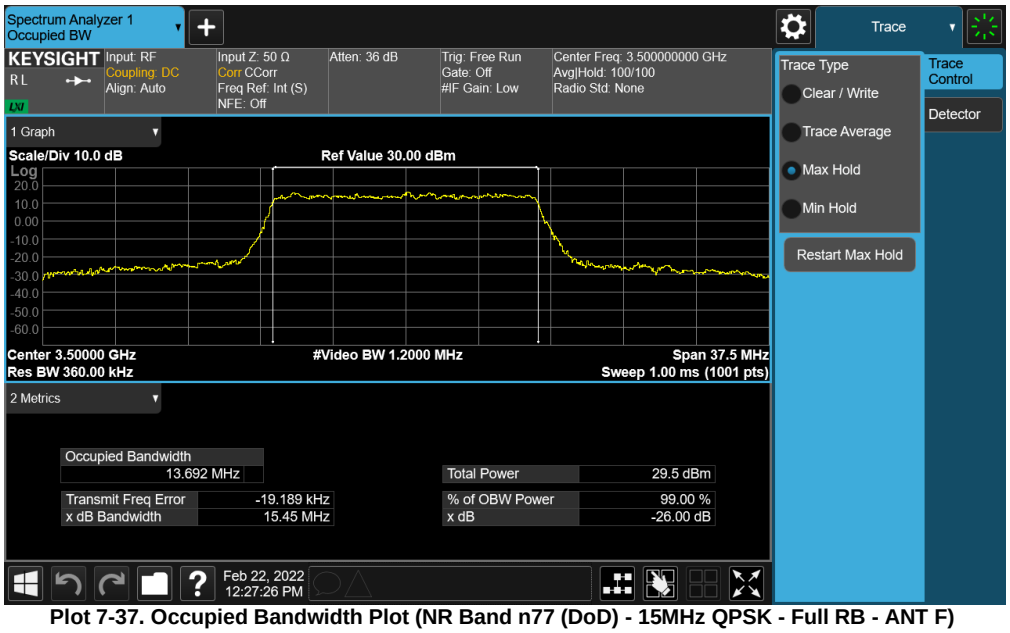
Plot 7-33. Occupied Bandwidth Plot (NR Band n77 (DoD) - 20MHz π/2 BPSK - Full RB - ANT F)

Plot 7-34. Occupied Bandwidth Plot (NR Band n77 (DoD) - 20MHz QPSK - Full RB - ANT F)



Plot 7-35. Occupied Bandwidth Plot (NR Band n77 (DoD) - 20MHz 16-QAM - Full RB - ANT F)

Plot 7-36. Occupied Bandwidth Plot (NR Band n77 (DoD) - 15MHz π/2 BPSK - Full RB - ANT F)

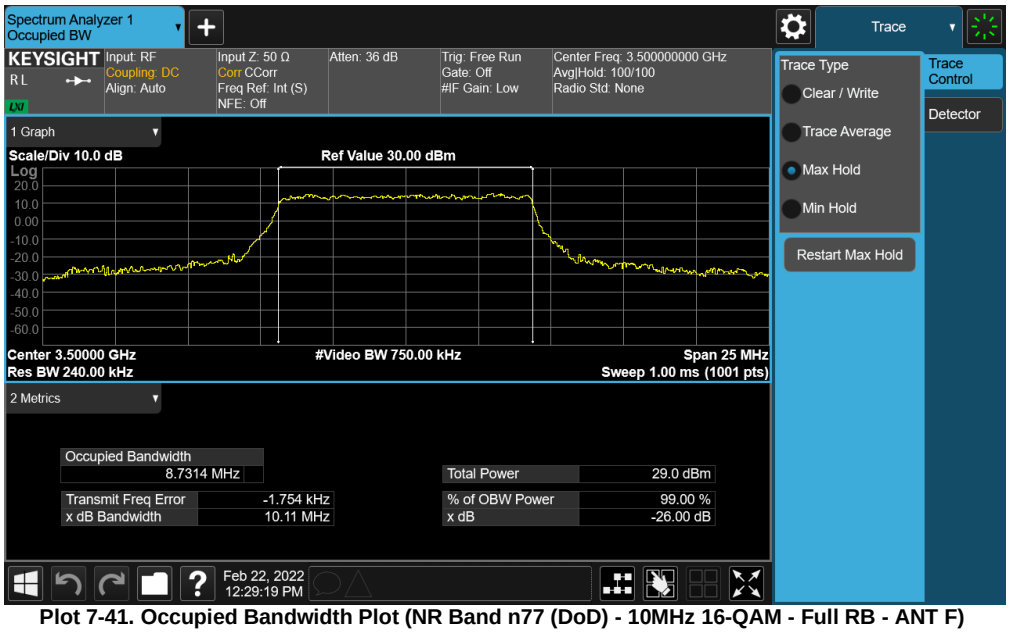


Plot 7-37. Occupied Bandwidth Plot (NR Band n77 (DoD) - 15MHz QPSK - Full RB - ANT F)

Plot 7-38. Occupied Bandwidth Plot (NR Band n77 (DoD) - 15MHz 16-QAM - Full RB - ANT F)

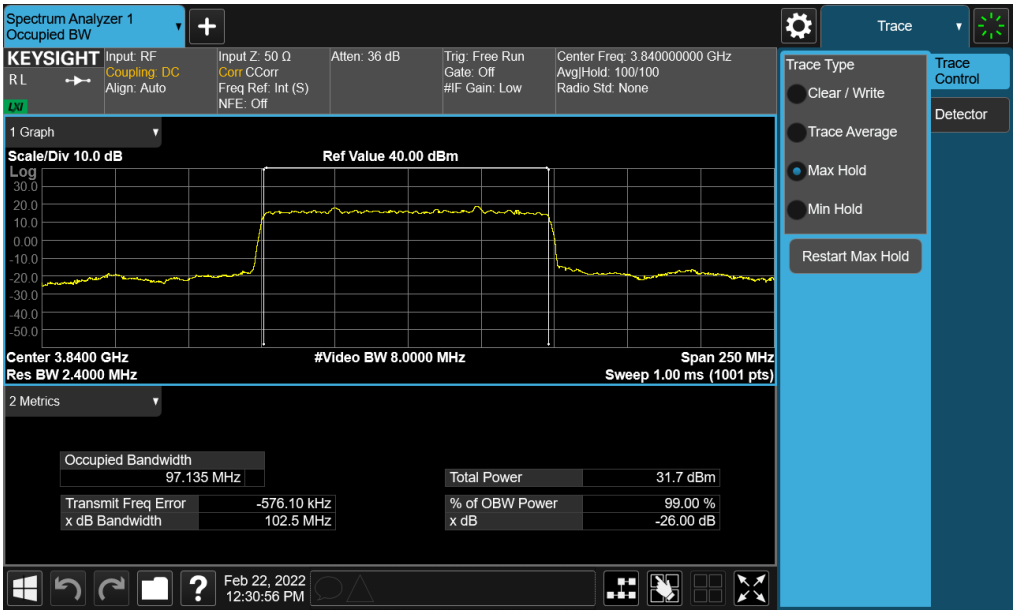
Plot 7-39. Occupied Bandwidth Plot (NR Band n77 (DoD) - 10MHz π/2 BPSK - Full RB - ANT F)

Plot 7-40. Occupied Bandwidth Plot (NR Band n77 (DoD) - 10MHz QPSK - Full RB - ANT F)

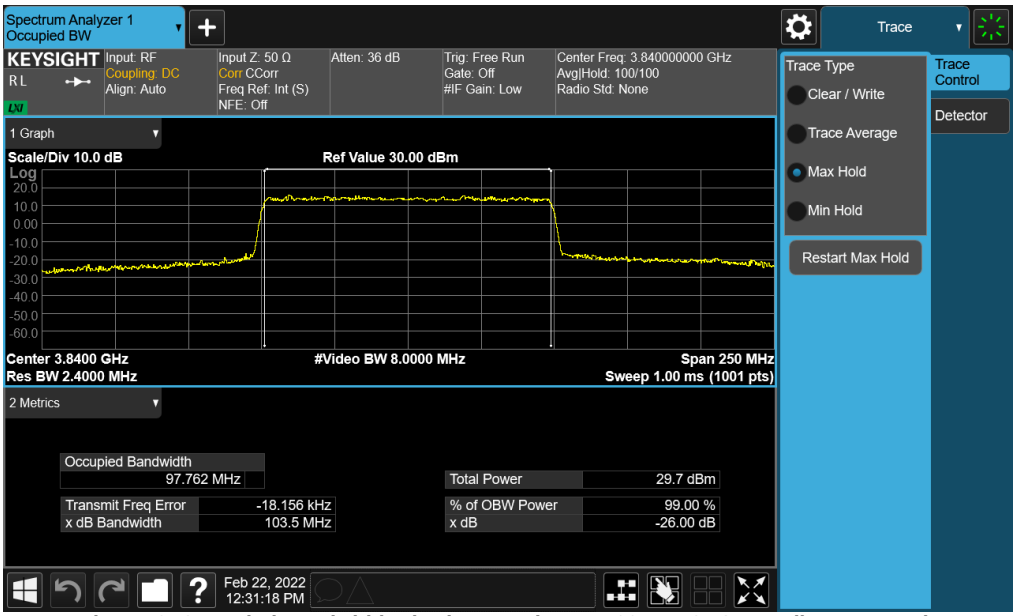


Plot 7-41. Occupied Bandwidth Plot (NR Band n77 (DoD) - 10MHz 16-QAM - Full RB - ANT F)

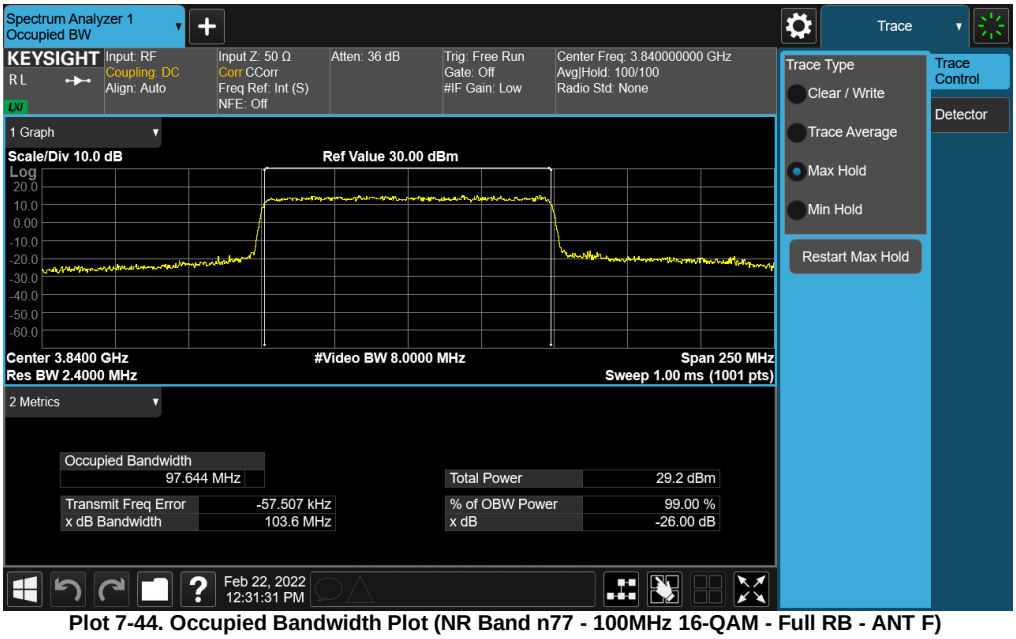
NR Band n77 (PC3) – C-Band – SRS-1 – ANT F



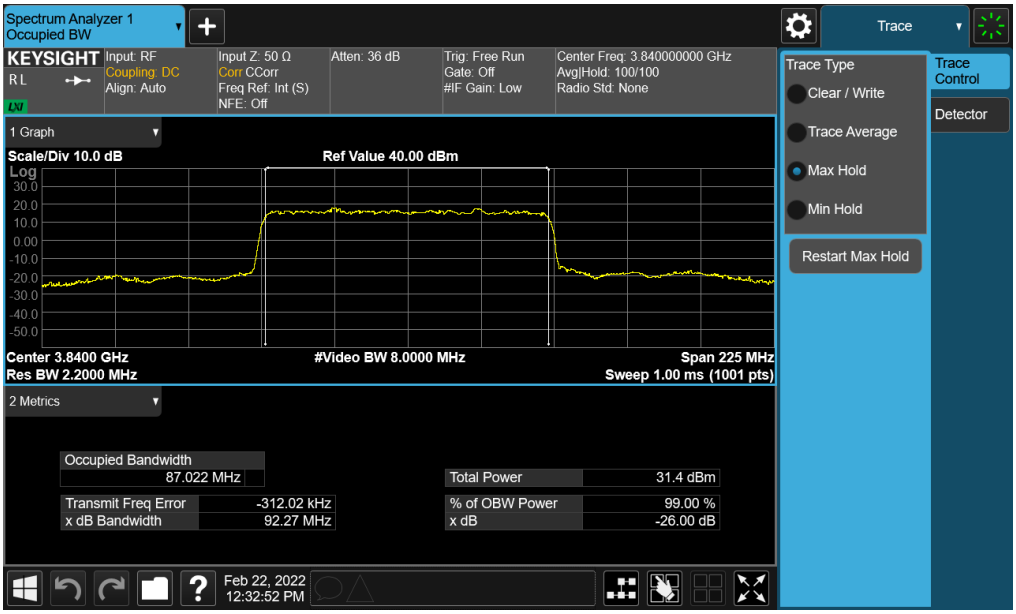
Plot 7-42. Occupied Bandwidth Plot (NR Band n77 - 100MHz π/2 BPSK - Full RB - ANT F)



Plot 7-43. Occupied Bandwidth Plot (NR Band n77 - 100MHz QPSK - Full RB - ANT F)

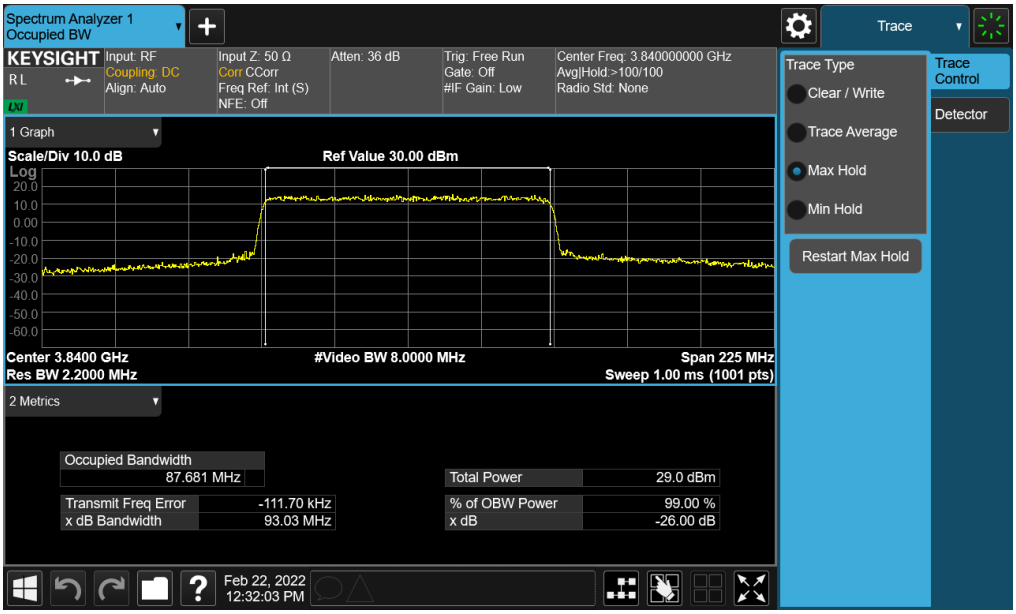


Plot 7-44. Occupied Bandwidth Plot (NR Band n77 - 100MHz 16-QAM - Full RB - ANT F)

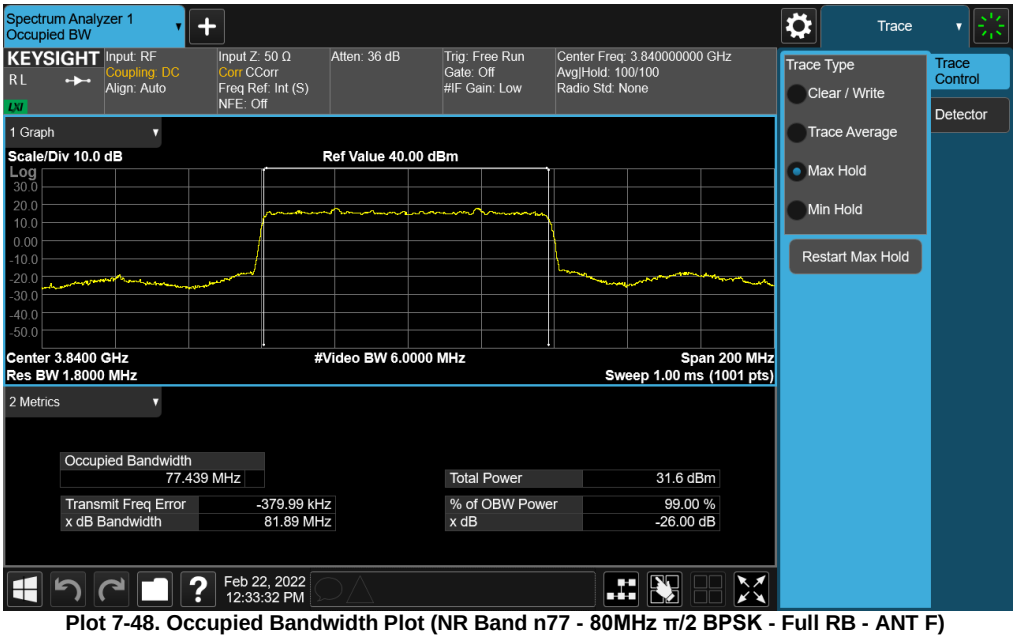


Plot 7-45. Occupied Bandwidth Plot (NR Band n77 - 90MHz π/2 BPSK - Full RB - ANT F)

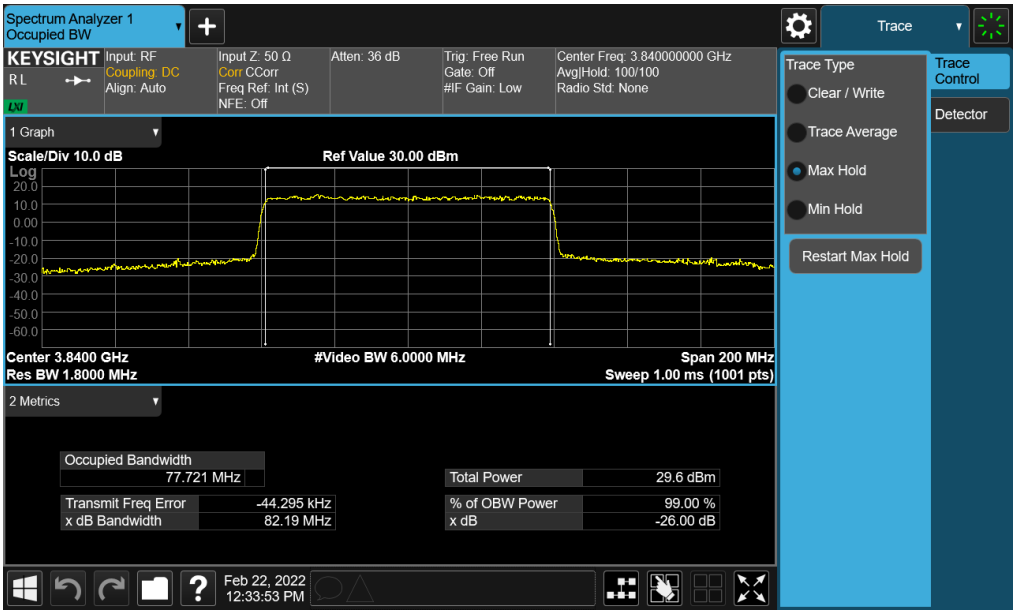
Plot 7-46. Occupied Bandwidth Plot (NR Band n77 - 90MHz QPSK - Full RB - ANT F)



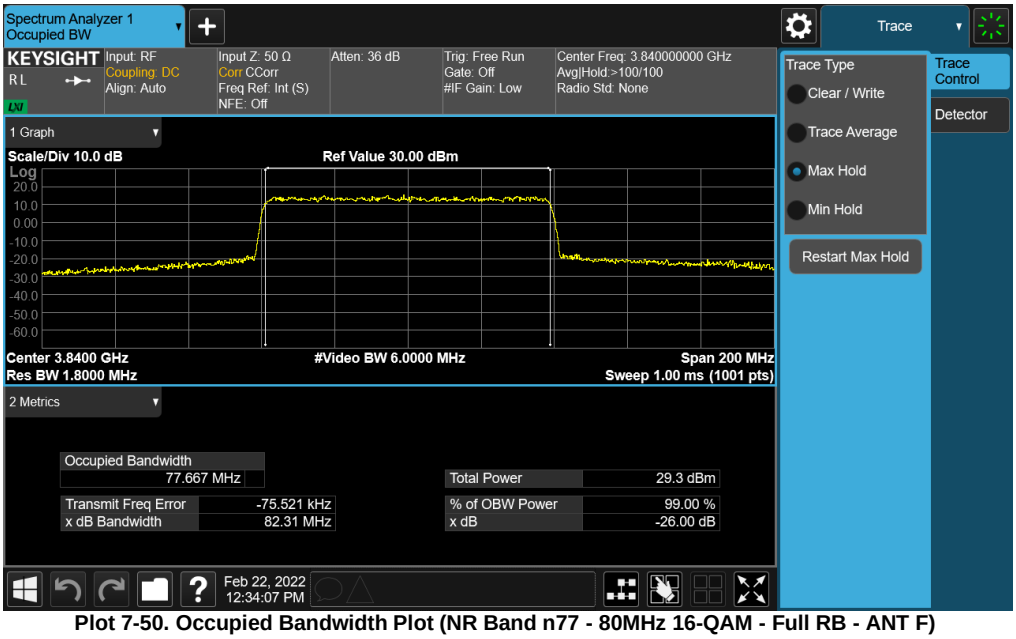
Plot 7-47. Occupied Bandwidth Plot (NR Band n77 - 90MHz 16-QAM - Full RB - ANT F)



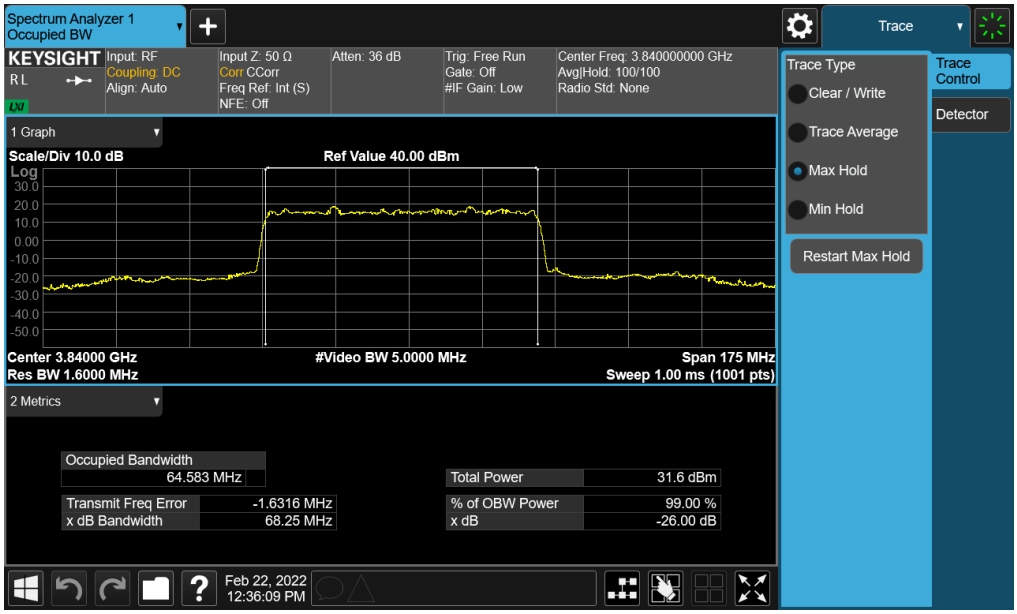
Plot 7-48. Occupied Bandwidth Plot (NR Band n77 - 80MHz π/2 BPSK - Full RB - ANT F)



Plot 7-49. Occupied Bandwidth Plot (NR Band n77 - 80MHz QPSK - Full RB - ANT F)

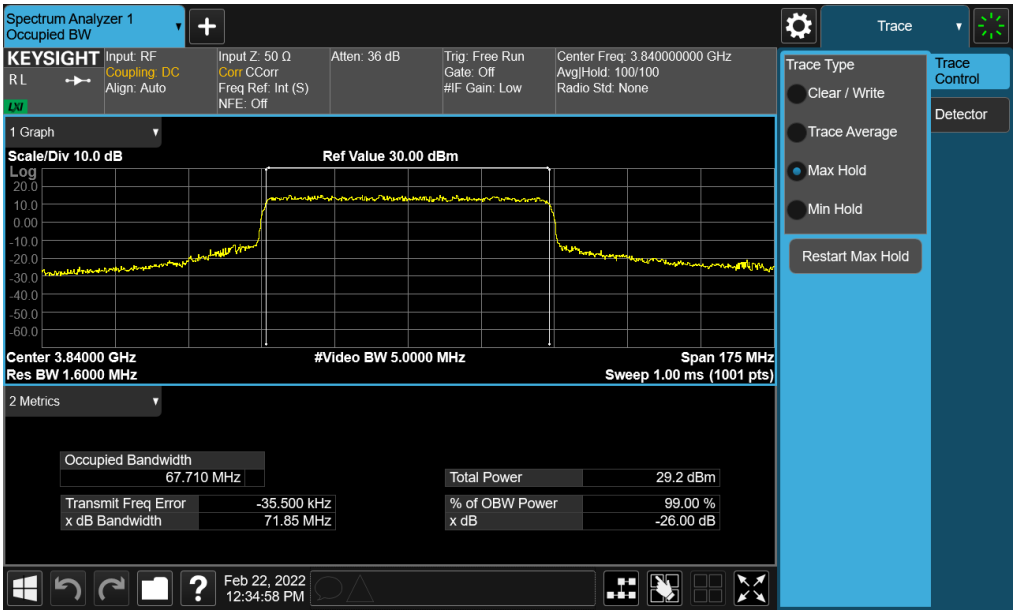


Plot 7-50. Occupied Bandwidth Plot (NR Band n77 - 80MHz 16-QAM - Full RB - ANT F)

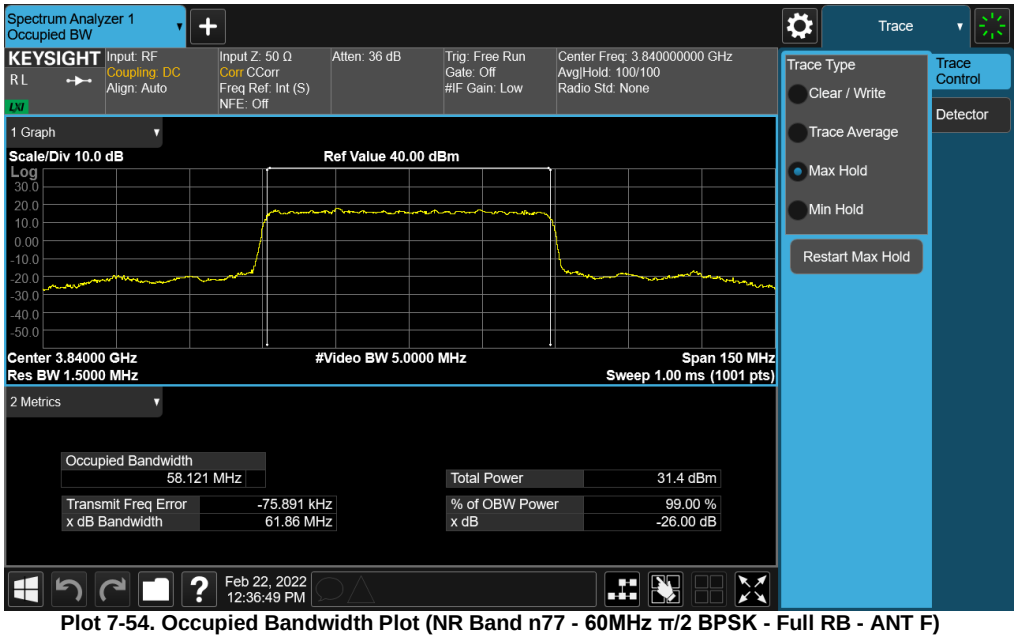


Plot 7-51. Occupied Bandwidth Plot (NR Band n77 - 70MHz π/2 BPSK - Full RB - ANT F)

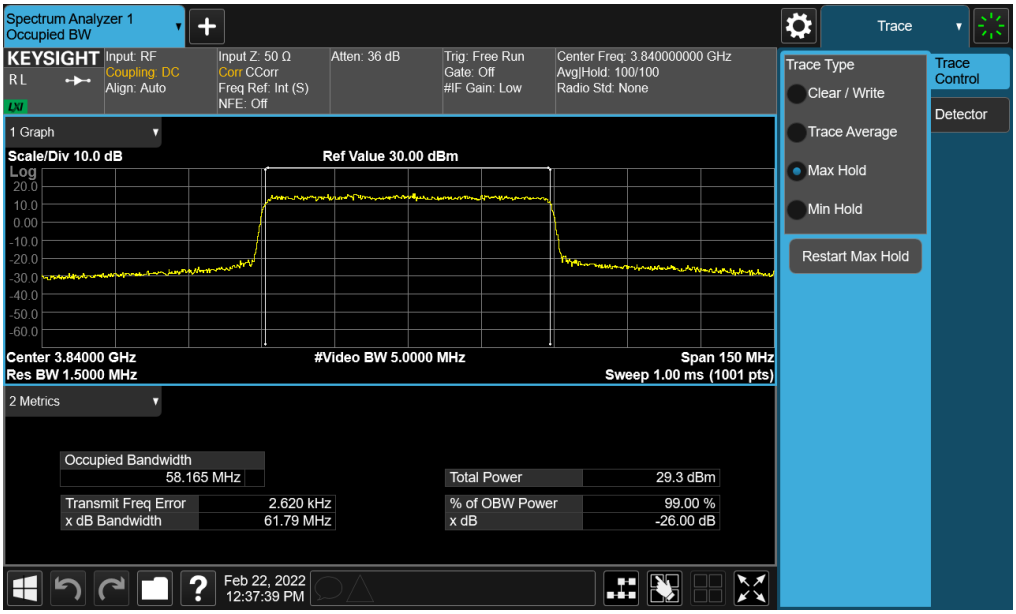
Plot 7-52. Occupied Bandwidth Plot (NR Band n77 - 70MHz QPSK - Full RB - ANT F)



Plot 7-53. Occupied Bandwidth Plot (NR Band n77 - 70MHz 16-QAM - Full RB - ANT F)

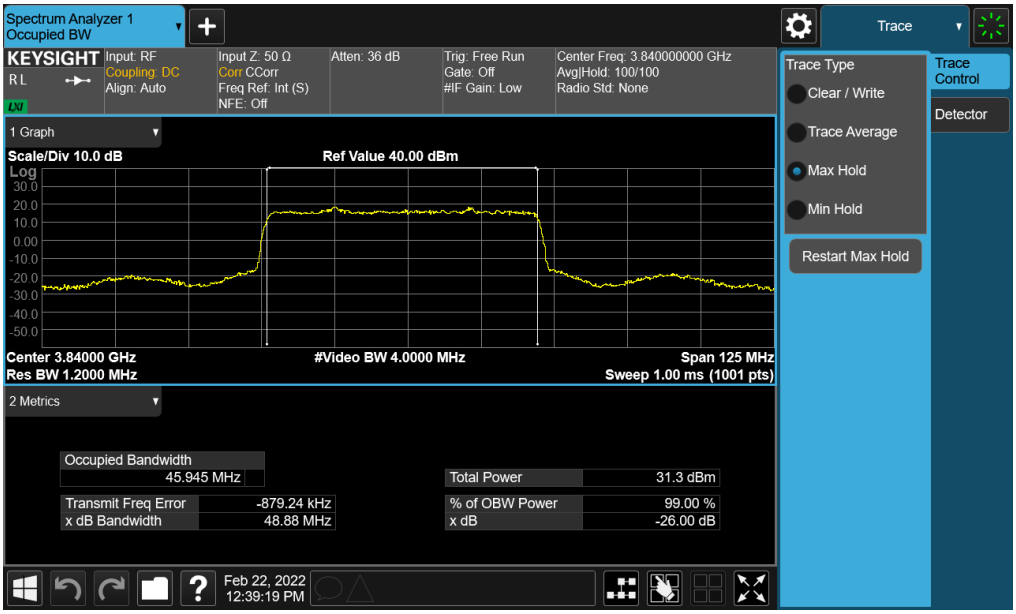


Plot 7-54. Occupied Bandwidth Plot (NR Band n77 - 60MHz π/2 BPSK - Full RB - ANT F)



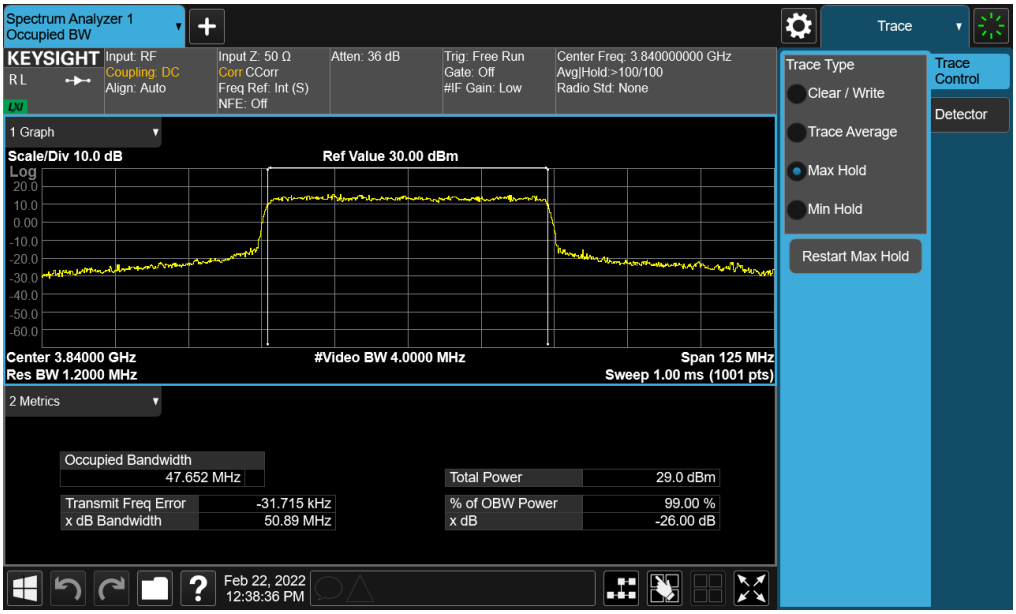
Plot 7-55. Occupied Bandwidth Plot (NR Band n77 - 60MHz QPSK - Full RB - ANT F)

Plot 7-56. Occupied Bandwidth Plot (NR Band n77 - 60MHz 16-QAM - Full RB - ANT F)

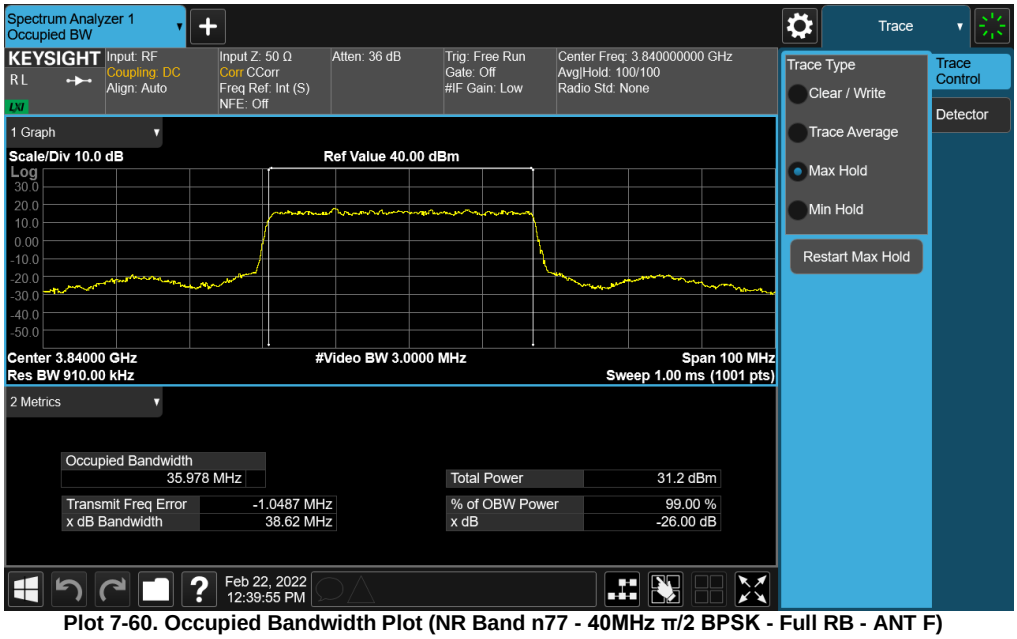


Plot 7-57. Occupied Bandwidth Plot (NR Band n77 - 50MHz π/2 BPSK - Full RB - ANT F)

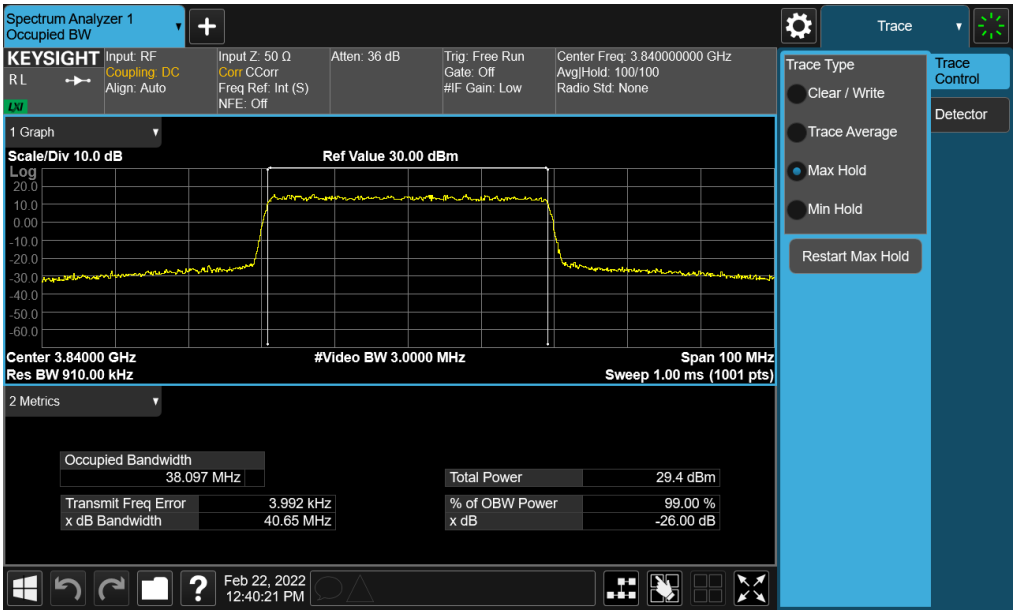
Plot 7-58. Occupied Bandwidth Plot (NR Band n77 - 50MHz QPSK - Full RB - ANT F)



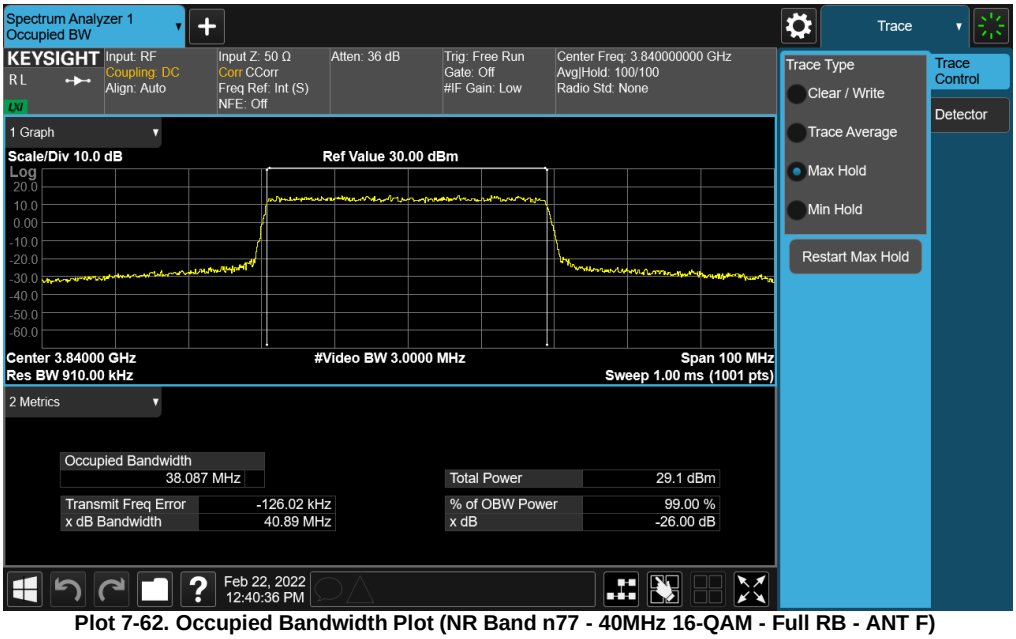
Plot 7-59. Occupied Bandwidth Plot (NR Band n77 - 50MHz 16-QAM - Full RB - ANT F)



Plot 7-60. Occupied Bandwidth Plot (NR Band n77 - 40MHz π/2 BPSK - Full RB - ANT F)

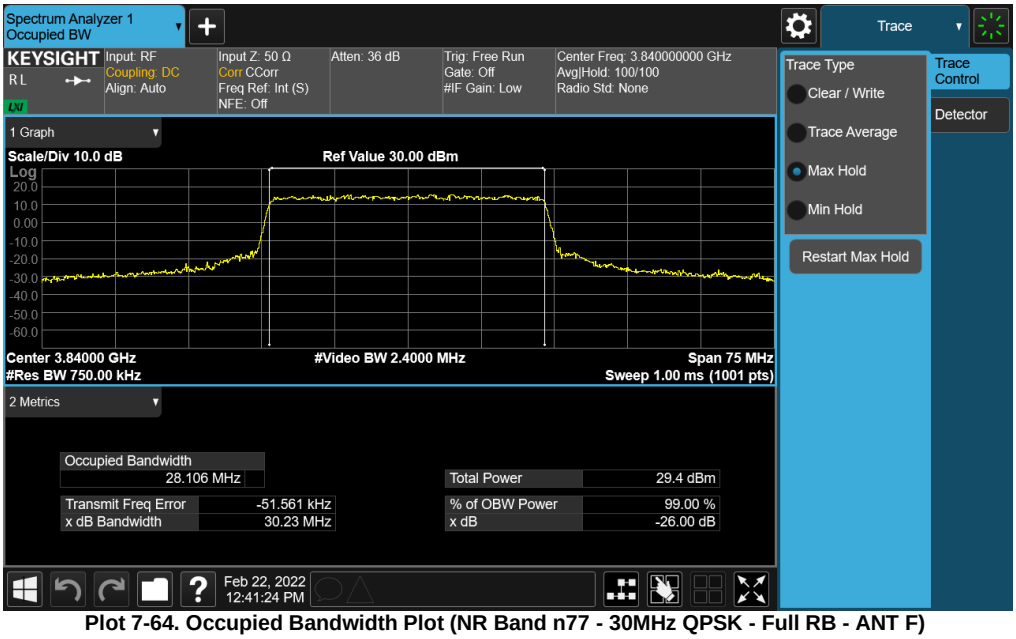


Plot 7-61. Occupied Bandwidth Plot (NR Band n77 - 40MHz QPSK - Full RB - ANT F)



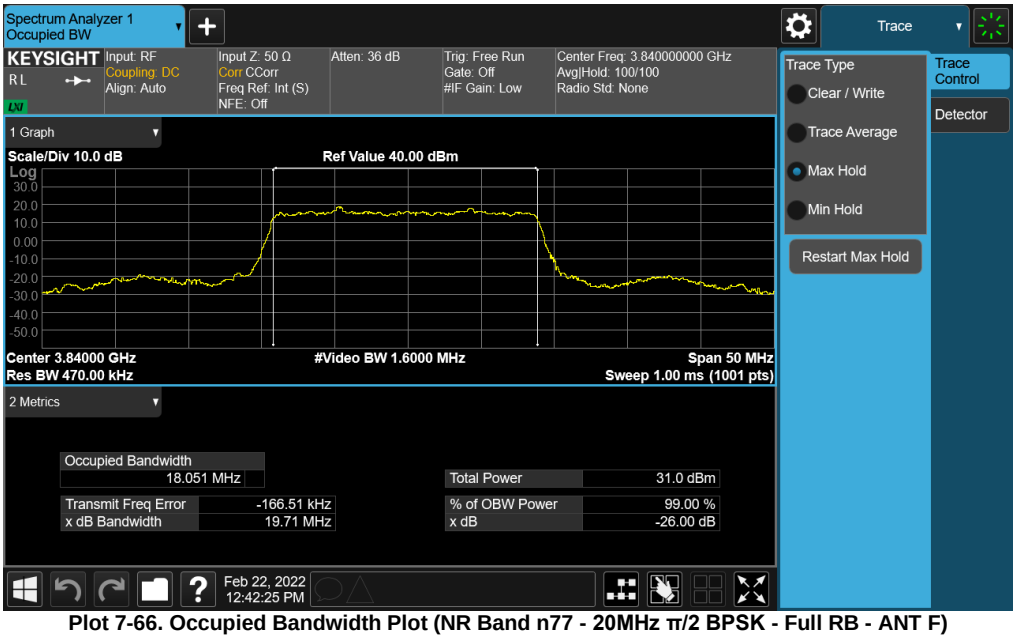
Plot 7-62. Occupied Bandwidth Plot (NR Band n77 - 40MHz 16-QAM - Full RB - ANT F)

Plot 7-63. Occupied Bandwidth Plot (NR Band n77 - 30MHz π/2 BPSK - Full RB - ANT F)



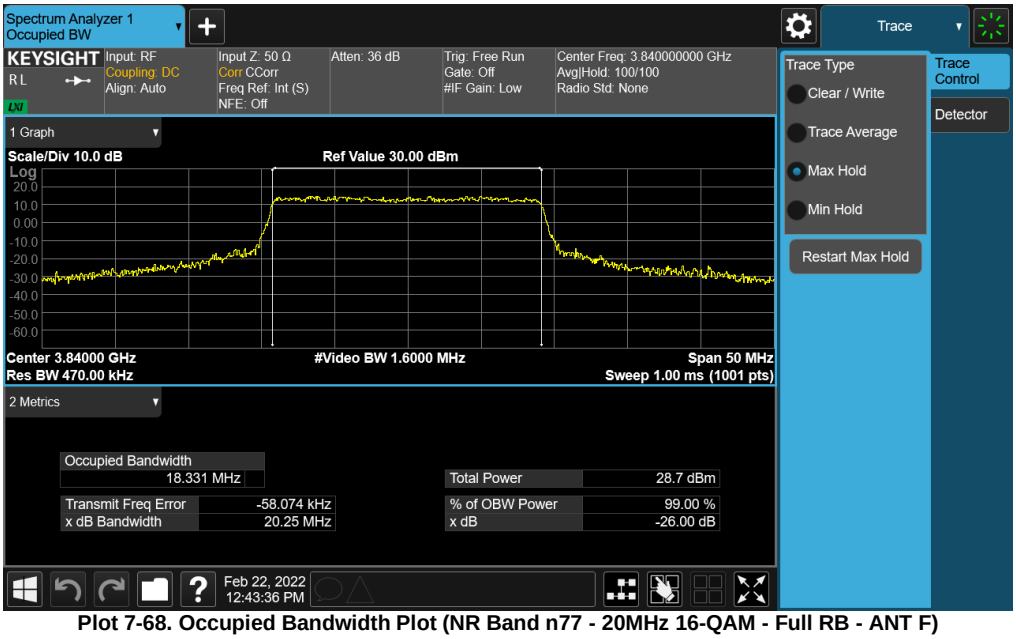
Plot 7-64. Occupied Bandwidth Plot (NR Band n77 - 30MHz QPSK - Full RB - ANT F)

Plot 7-65. Occupied Bandwidth Plot (NR Band n77 - 30MHz 16-QAM - Full RB - ANT F)



Plot 7-66. Occupied Bandwidth Plot (NR Band n77 - 20MHz π/2 BPSK - Full RB - ANT F)

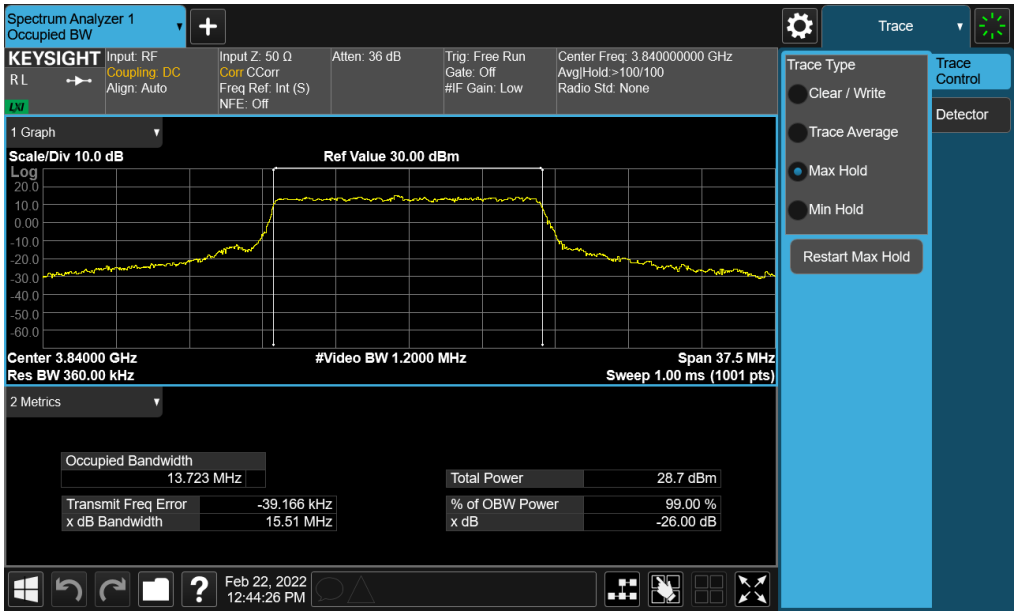
Plot 7-67. Occupied Bandwidth Plot (NR Band n77 - 20MHz QPSK - Full RB - ANT F)



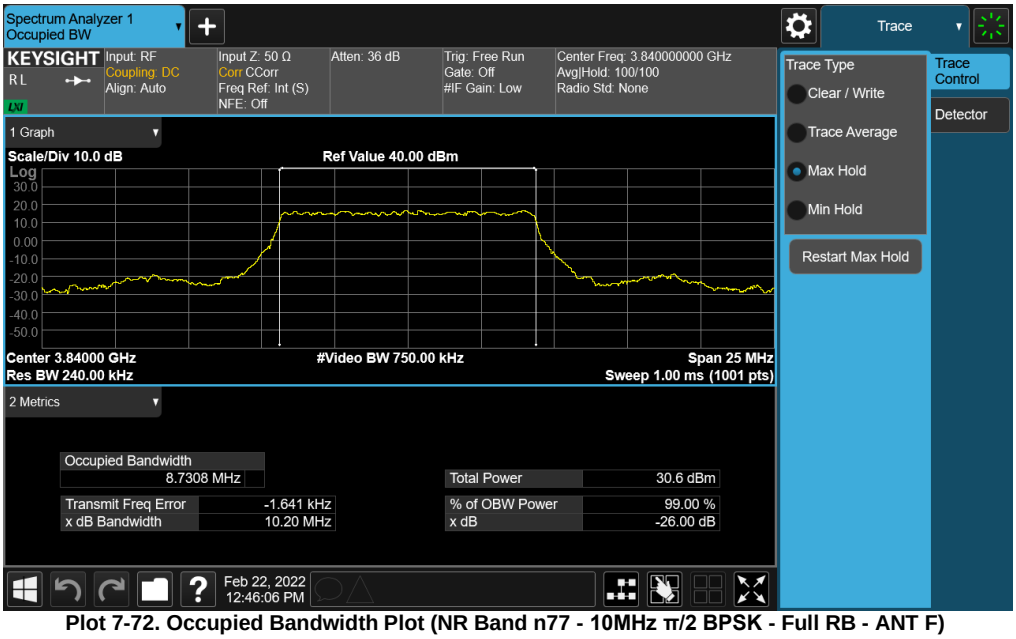
Plot 7-68. Occupied Bandwidth Plot (NR Band n77 - 20MHz 16-QAM - Full RB - ANT F)

Plot 7-69. Occupied Bandwidth Plot (NR Band n77 - 15MHz π/2 BPSK - Full RB - ANT F)

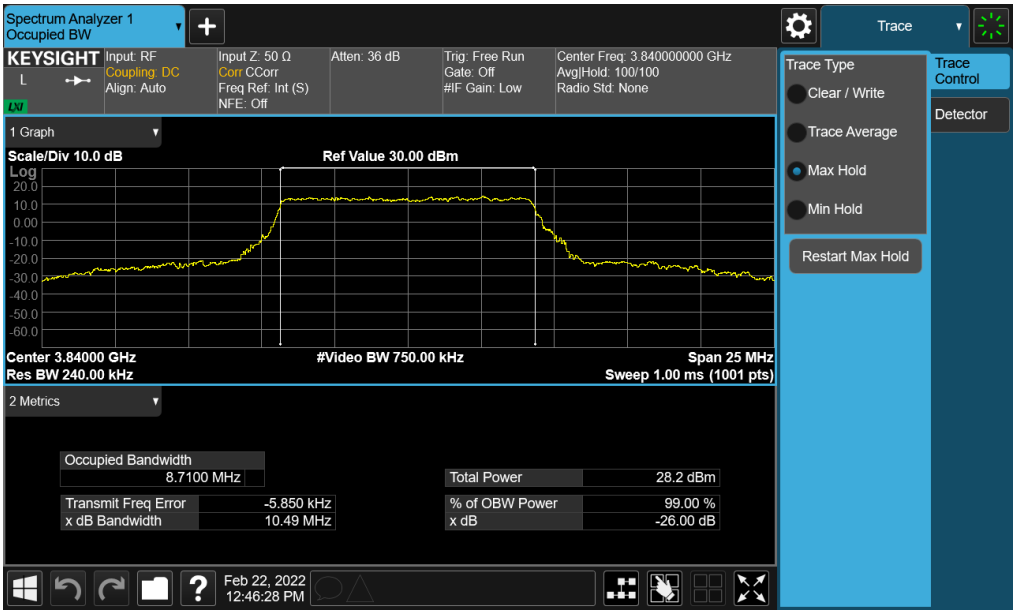
Plot 7-70. Occupied Bandwidth Plot (NR Band n77 - 15MHz QPSK - Full RB - ANT F)



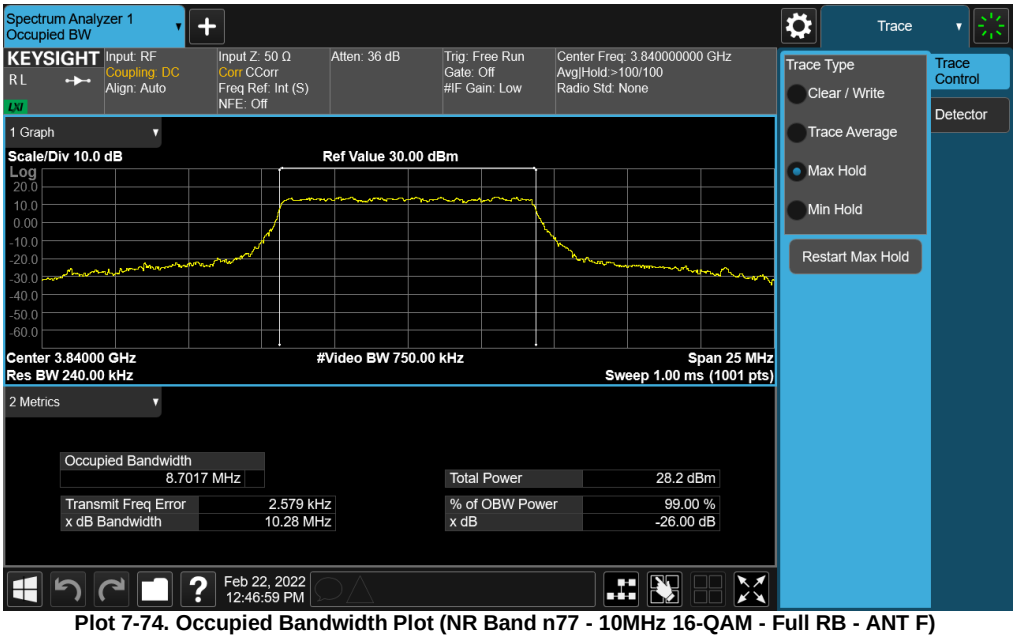
Plot 7-71. Occupied Bandwidth Plot (NR Band n77 - 15MHz 16-QAM - Full RB - ANT F)



Plot 7-72. Occupied Bandwidth Plot (NR Band n77 - 10MHz π/2 BPSK - Full RB - ANT F)



Plot 7-73. Occupied Bandwidth Plot (NR Band n77 - 10MHz QPSK - Full RB - ANT F)



Plot 7-74. Occupied Bandwidth Plot (NR Band n77 - 10MHz 16-QAM - Full RB - ANT F)

7.4 Spurious and Harmonic Emissions at Antenna Terminal

Test Overview

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

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

Test Procedure Used

KDB 971168 D01 v03r01 – Section 6.0

Test Settings

1. Start frequency was set to 30MHz and stop frequency was set to 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.

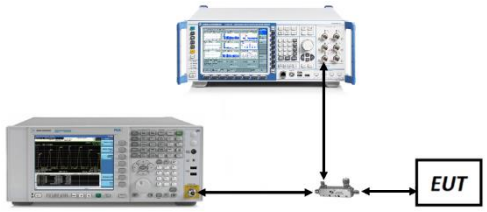


Figure 7-3. Test Instrument & Measurement Setup

Test Notes

1. Per Part 27 and RSS-199, compliance with the applicable limits is based on the use of measurement instrumentation employing a resolution bandwidth 100 kHz or greater for measurements below 1GHz. However, in the 1 MHz bands immediately outside and adjacent to the frequency block a resolution bandwidth of at least one percent of the emission bandwidth of the fundamental emission of the transmitter may be employed. The emission bandwidth is defined as the width of the signal between two points, one below the carrier center frequency and one above the carrier center frequency, outside of which all emission are attenuated at least 26 dB below the transmitter power.

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