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

MEASUREMENT REPORT
FCC Part 15.407 802.11ax WIFI 6E OFDMA

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

Date of Testing:
4/1/2022 – 6/29/2022
Report Release Date:
7/12/2022
Test Site/Location:
Element Washington DC LLC. Columbia, MD, USA
Test Report Serial No.:
1M2204110052-14.A3L

FCC ID:	**A3LSMF936B**
APPLICANT:	**Samsung Electronics Co., Ltd.**

Application Type:	Certification
Model:	SM-F936B/DS
Additional Model(s):	SM-F936B
EUT Type:	Portable Handset
Frequency Range:	5935 – 7115MHz
Modulation Type:	OFDM
FCC Classification:	15E 6GHz Low Power Indoor Client (6XD)
Test Procedure(s):	ANSI C63.10-2013, KDB 648474 D03 v01r04, KDB 987594 D02 v01r01, KDB 987594 D04 v01

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 ANSI C63.10-2013 and KDB 789033 D02 v02r01. Test results reported herein relate only to the item(s) tested.

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

RJ Ortanez
Executive Vice President

ACCREDITED
TESTING CERT#2041.01

TABLE OF CONTENTS

MEASUREMENT REPORT

Channel Bandwidth [MHz]	UNII Band	Tx Frequency [MHz]	MIMO	
			Max. Power [mW]	Max. Power [dBm]
20	5	5935 - 6415	18.315	12.63
	6	6435 - 6515	22.570	13.54
	7	6535 - 6875	22.640	13.55
	8	6895 - 7115	23.772	13.76
40	5	5965 - 6405	24.352	13.87
	6	6445 - 6525	23.259	13.67
	7	6565 - 6845	23.230	13.66
	8	6885 - 7085	25.039	13.99
80	5	5985 - 6385	24.521	13.90
	6	6465	25.049	13.99
	7	6545 - 6865	24.768	13.94
	8	6945 - 7025	24.503	13.89
160	5	6025 - 6345	24.092	13.82
	6	6505	22.186	13.46
	7	6665 - 6825	24.655	13.92
	8	6985	25.070	13.99

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 Element 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 ELEMENT lab located in Columbia, MD 21046, U.S.A.

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

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

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

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

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMF936B**. The test data contained in this report pertains only to the emissions due to the EUT's UNII transmitter while operating in the 6GHz band.

Test Device Serial No.: *0109M, 0303M, 0374M, 3059R*

2.2 Device Capabilities

This device contains the following capabilities:

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

Band 5		Band 6		Band 7		Band 8	
Ch.	**Frequency (MHz)**	**Ch.**	**Frequency (MHz)**	**Ch.**	**Frequency (MHz)**	**Ch.**	**Frequency (MHz)**
2	5935	97	6435	117	6535	189	6895
:	:	:	:	:	:	:	:
45	6175	105	6475	149	6695	209	6995
:	:	:	:	:	:	:	:
93	6415	113	6515	185	6875	233	7115

Table 2-1. 802.11ax (20MHz) Frequency / Channel Operations

Band 5		Band 6		Band 7		Band 8	
Ch.	**Frequency (MHz)**	**Ch.**	**Frequency (MHz)**	**Ch.**	**Frequency (MHz)**	**Ch.**	**Frequency (MHz)**
3	5965	99	6445	123	6565	187	6885
:	:	:	:	:	:	:	:
43	6165	107	6485	155	6725	211	7005
:	:	:	:	:	:	:	:
91	6405	115	6525	179	6845	227	7085

Table 2-2. 802.11ax (40MHz BW) Frequency / Channel Operations

Band 5		Band 6		Band 7		Band 8	
Ch.	**Frequency (MHz)**	**Ch.**	**Frequency (MHz)**	**Ch.**	**Frequency (MHz)**	**Ch.**	**Frequency (MHz)**
7	5985	103	6465	119	6545	199	6945
:	:			:	:	:	:
39	6145			151	6705	215	7025
:	:			:	:		
87	6385			183	6865		

Table 2-3. 802.11ax (80MHz BW) Frequency / Channel Operations

Band 5	
Ch.	**Frequency (MHz)**
15	6025
:	:
47	6185
:	:
79	6345

Band 6	
Ch.	**Frequency (MHz)**
111	6505

Band 7	
Ch.	**Frequency (MHz)**
143	6665
:	:
175	6825

Band 8	
Ch.	**Frequency (MHz)**
207	6985

Table 2-4. 802.11ax (160MHz BW) Frequency / Channel Operations

Notes:

1. 6GHz NII operation is possible in 20MHz, and 40MHz, and 80MHz and 160MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = peak per the guidance of Section B)2)b) of ANSI C63.10-2013 and KDB 789033 D02 v02r01. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

Mode	Bandwidth [MHz]	Channel	Duty Cycle
802.11ax NII RU 6E	20	2	99.6
			99.6
			99.6
			99.6
802.11ax NII RU 6E	40	3	99.6
			99.7
			99.6
			99.6
			99.7
802.11ax NII RU 6E	80	7	99.7
			99.7
			99.6
			99.6
			99.6
			99.7
802.11ax NII RU 6E	160 1st	15	99.7
			99.7
			99.6
			99.6
			99.6
			99.6
802.11ax NII RU 6E	160 2nd	15	99.6
			99.7
			99.6
			99.6
			99.6
			99.6

Table 2-5. Measured Duty Cycles

2. The device employs MIMO technology. Below are the possible configurations.

WiFi Configurations		CDD		SDM	
		ANT1	ANT2	ANT1	ANT2
6 GHz	11ax (20MHz)	✓	✓	✓	✓
	11ax (40MHz)	✓	✓	✓	✓
	11ax (80MHz)	✓	✓	✓	✓
	11ax (160MHz)	✓	✓	✓	✓

Table 2-6. Frequency / Channel Operations

✓= Support; = NOT Support
SDM = Spatial Diversity Multiplexing – MIMO function
CDD = Cyclic Delay Diversity - 2Tx Function

3. This device supports simultaneous transmission operation, which allows for two SISO channels to operate independent of one another in the 2.4GHz (WLAN & BT), 5GHz, and 6GHz bands simultaneously on each antenna.

2.3 Antenna Description

Following antenna was used for the testing.

	Ant1 Peak Gain [dBi]	Ant2 Peak Gain [dBi]	Directional Gain [dBi]
5925 – 6425 MHz	-3.83	-3.42	-0.61
6425 – 6525 MHz	-3.83	-10.50	-3.53
6525 – 6875 MHz	-7.21	-8.64	-4.89
6875 – 7125 MHz	-8.90	-11.46	-7.08

Table 2-7. Antenna Peak Gain

2.4 Test Configuration

The EUT was tested per the guidance of KDB 987594 D02 v01r01 and KDB 789033 D02 v02r01. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing. See Sections 3.2 for AC line conducted emissions test setups, 3.3 for radiated emissions test setups, and 7.2, 7.3, 7.4, 7.5 and 7.6 for antenna port conducted emissions test setups.

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

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): 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.

2.5 Software and Firmware

The test was conducted with firmware version F936BXXU0AVD9 installed on the EUT.

2.6 EMI Suppression Device(s)/Modifications

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

3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

The measurement procedures described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) and the guidance provided in KDB 789033 D02 v02r01 were used in the measurement of the EUT**.**

Deviation from measurement procedure……..…….....None

3.2 AC Line Conducted Emissions

The line-conducted facility is located inside a 10'x16'x9' shielded enclosure. The shielded enclosure is manufactured by ETS Lindgren RF Enclosures. The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 65-5. A 1m x 1.5m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50Ω/50μH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. The external power line filter is an ETS Lindgren Model LPRX-4X30 (100dB Attenuation, 14kHz-18GHz) and the two EMI/RFI filters are ETS Lindgren Model LRW-2030-S1 (100dB Minimum Insertion Loss, 14kHz – 10GHz). These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply line(s) will be connected to the second LISN. All interconnecting cables more than 1 meter were shortened to a 1-meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference groundplane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The spectrum was scanned from 150kHz to 30MHz with a spectrum analyzer. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 10kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Once the worst-case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions is used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

3.3 Radiated 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. An 80cm tall test table made of Styrodur is placed on top of the turn table. For measurements above 1GHz, an additional Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33 depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, mode of operation, turntable azimuth, and receive antenna height was noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions.

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.

3.4 Environmental Conditions

The temperature is controlled within range of 15ºC to 35ºC. The relative humidity is controlled within range of 10% to 75%. The atmospheric pressure is monitored within the range 86-106kPa (860-1060mbar).

4.0 ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:
"An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section."

- The antennas of the EUT are **permanently attached.**
- There are no provisions for connection to an external antenna.

Conclusion:

The EUT complies with the requirement of §15.203.

5.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013. 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)
Contention Based Protocol Conducted Measurements	0.86
Conducted Bench Top Measurements	1.13
Line Conducted Disturbance	3.09
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

6.0 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
-	WL25-1	Conducted Cable Set (25GHz)	12/19/2021	Annual	12/19/2022	WL25-1
-	WL25-2	Conducted Cable Set (25GHz)	12/19/2021	Annual	12/19/2022	WL25-2
-	WL40-1	Conducted Cable Set (40GHz)	12/19/2021	Annual	12/19/2022	WL40-1
-	ETS-001	EMC Cable and Switch System	12/9/2021	Annual	12/9/2022	ETS-001
-	ETS-002	EMC Cable and Switch System	3/10/2022	Annual	3/10/2023	ETS-002
-	AP1-002	EMC Cable and Switch System	3/9/2022	Annual	3/9/2023	AP1-002
-	AP2-001	EMC Cable and Switch System	1/4/2022	Annual	1/4/2023	AP2-001
-	AP2-002	EMC Cable and Switch System	3/11/2022	Annual	3/11/2023	AP2-002
Agilent	N9038A	MXE EMI Receiver	1/21/2022	Annual	1/21/2023	MY51210133
Agilent	N9020A	MXA Signal Analyzer	3/4/2022	Annual	3/4/2023	US46470561
Agilent	N9030A	PXA Signal Analyzer (44GHz)	7/21/2021	Annual	7/21/2022	MY49430494
Anritsu	ML2495A	Power Meter	3/17/2022	Annual	3/17/2023	1328004
Anritsu	ML2495A	Power Meter	3/17/2022	Annual	3/17/2023	941001
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	4/13/2022	Biennial	4/13/2024	121034
Emco	3115	Horn Antenna (1-18GHz)	6/18/2020	Biennial	6/18/2022	9704-5182
Emco	3116	Horn Antenna (18 - 40GHz)	7/20/2021	Biennial	7/20/2023	9203-2178
ETS-Lindgren	3816/2NM	Line Impedance Stabilization Network	7/9/2020	Biennial	7/9/2022	114451
Pasternack	NMLC-2	Line Conducted Emissions Cable (NM)	12/19/2021	Annual	12/19/2022	NMLC-2
Rohde & Schwarz	FSV40-N	Spectrum Analyzer	1/14/2021	Annual	8/3/2022	83244
Rohde & Schwarz	SMW200A	Vector Signal Generator	N/A			83365
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	8/3/2021	Annual	8/3/2022	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	5/25/2021	Annual	5/25/2022	100348
Sunol	DRH-118	Horn Antenna (1-18GHz)	2/14/2022	Biennial	2/14/2024	A050307
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	7/27/2020	Biennial	7/27/2022	A051107

Table 6-1. Annual Test Equipment Calibration Schedule

Note:

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.

7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.
FCC ID: A3LSMF936B
FCC Classification: 15E 6GHz Low Power Indoor Client (6XD)

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1046, 15.407(a)(11)	Maximum Conducted Output Power	N/A	CONDUCTED	PASS	Section 7.3
2.1049, 15.407(a)(10)	Occupied Bandwidth/ 26dB Bandwidth	99% of the occupied bandwidth of any channel must be contained within each of its respective U-NII sub bands The maximum transmitter channel bandwidth for U-NII devices in the 5.925-7.125 GHz band is 320 megahertz.		PASS	Section 7.2
15.407(a)(8)	Maximum Power Spectral Density	< -1dBm/MHz e.i.r.p.		PASS	Section 7.4
15.407(a)(8)	Maximum Radiated Output Power	< 24dBm over the frequency band of operation		PASS	Section 7.3
15.407(b)(7)	In-Band Emissions	EUT must meet the limits detailed in 15.407(b)(6)		PASS	Section 7.5
15.407(d)(6)	Contention Based Protocol	EUT must detect AWGN signal with 90% (or better) certainty	RADIATED	PASS	Section 7.6
15.407(b)(6)	Undesirable Emissions	< -27dBm/MHz e.i.r.p. outside of the 5.925 – 7.125GHz band		PASS	Section 7.7
15.205, 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209		PASS	Section 7.7, 7.8

Table 7-1. Summary of Test Results

Notes:

1) All channels, modes, and modulations/data rates were investigated among all UNII bands. The test results shown in the following sections represent the worst case emissions.
2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer 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 and attenuators.
4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "UNII Automation," Version 4.7.
5) For radiated band edge, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "Chamber Automation," Version 1.3.1.

7.2 26dB Bandwidth Measurement – 802.11ax

2.1049, 15.407(a)(10)

Test Overview and Limit

The bandwidth at 26dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in ANSI C63.10-2013 and KDB 789033 D02 v02r01, and at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26dB bandwidth.

Test Procedure Used

ANSI C63.10-2013 – Section 12.4
KDB 789033 D02 v02r01 – Section C
KDB 987594 D02 v01r01

Test Settings

1. The signal analyzers' automatic bandwidth measurement capability was used to perform the 26dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 26. The automatic bandwidth measurement function also has the capability of simultaneously measuring the 99% occupied bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
2. RBW = approximately 1% of the emission bandwidth
3. VBW $\geq$ 3 x RBW
4. Detector = Peak
5. Trace mode = max hold

Test Setup

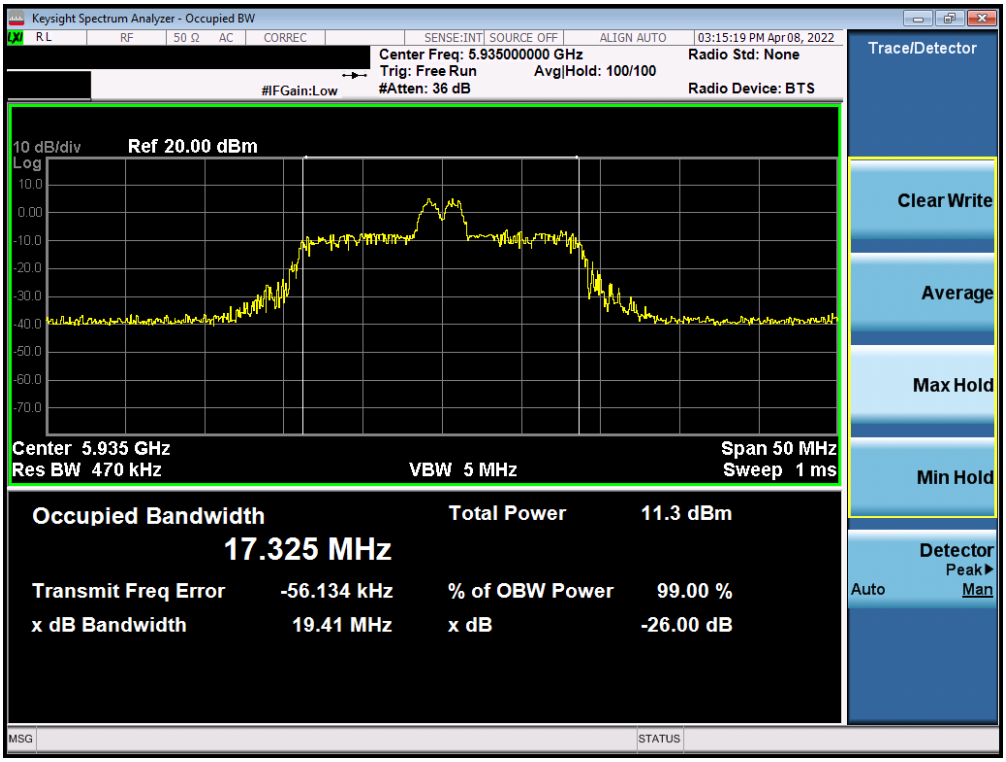
The EUT and measurement equipment were set up as shown in the diagram below.

Figure 7-1. Test Instrument & Measurement Setup

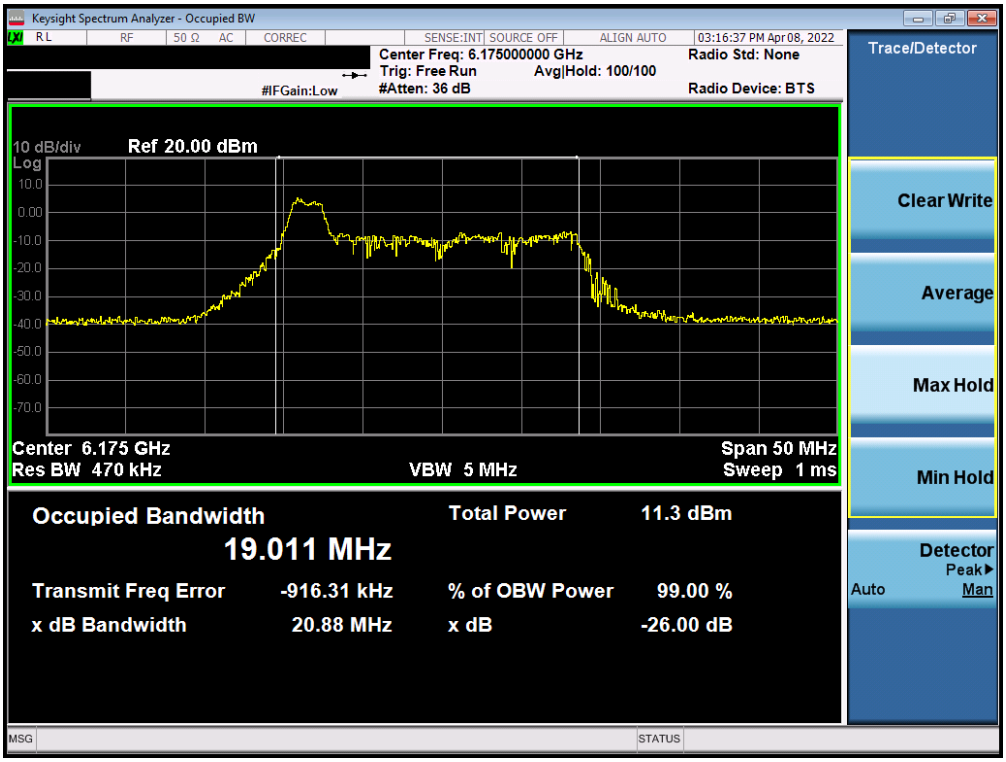
Test Notes

None.

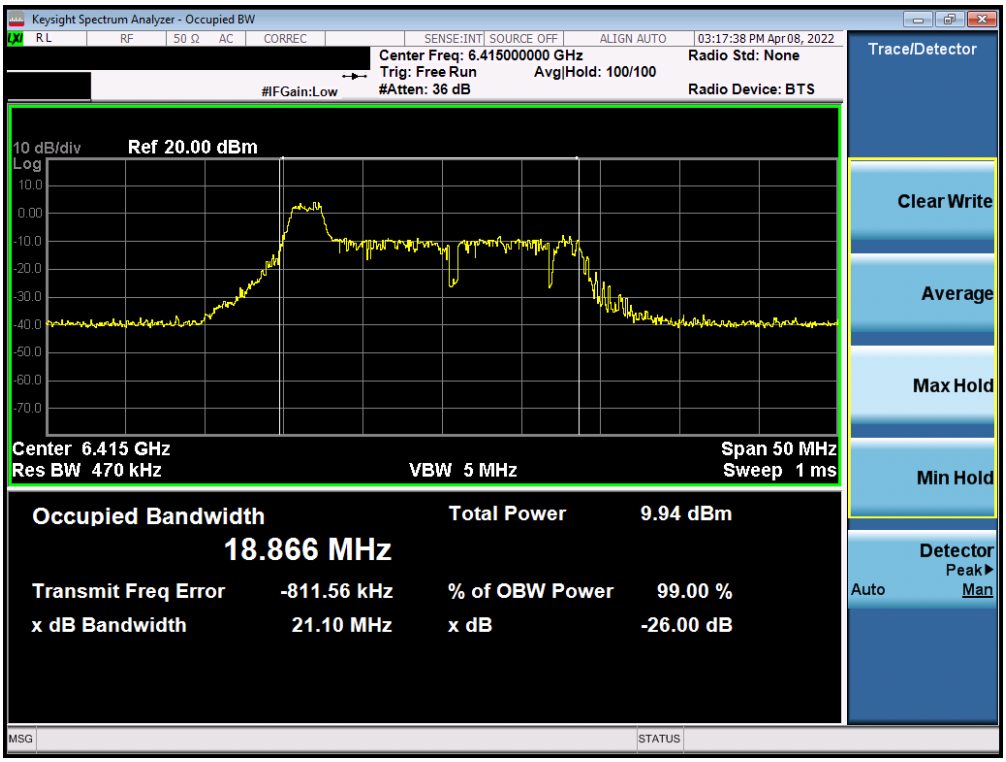
MIMO Antenna-1 Occupied Bandwidth Measurements (26 Tones)



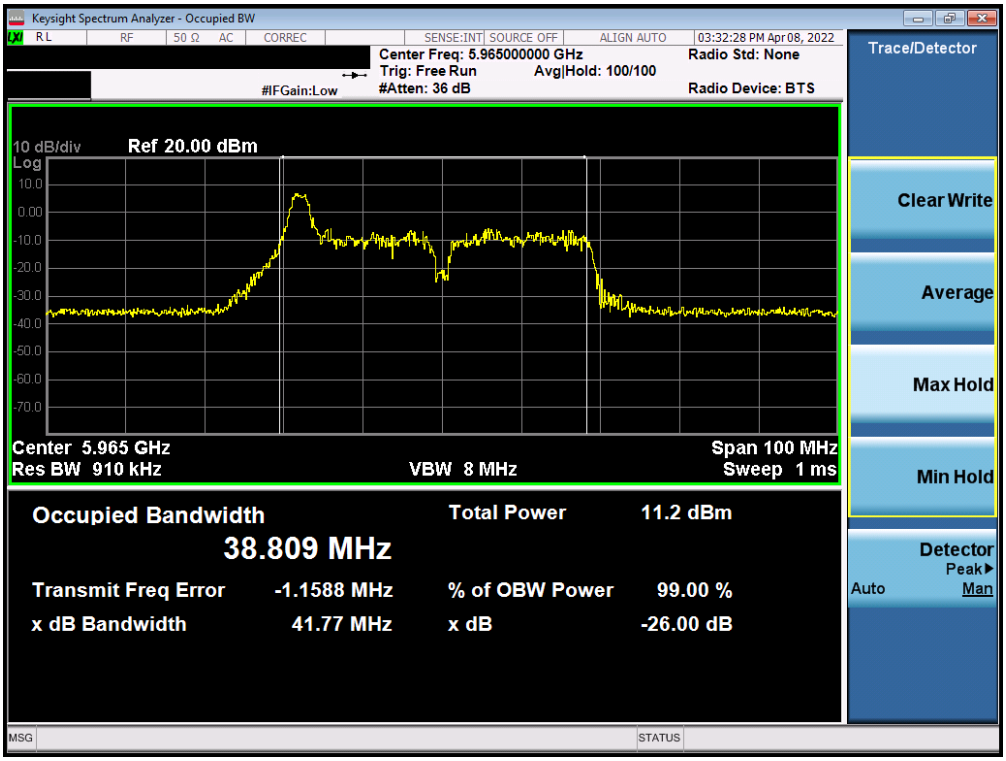
Plot 7-1. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (26 Tones) UNII Band 5) – Ch. 2



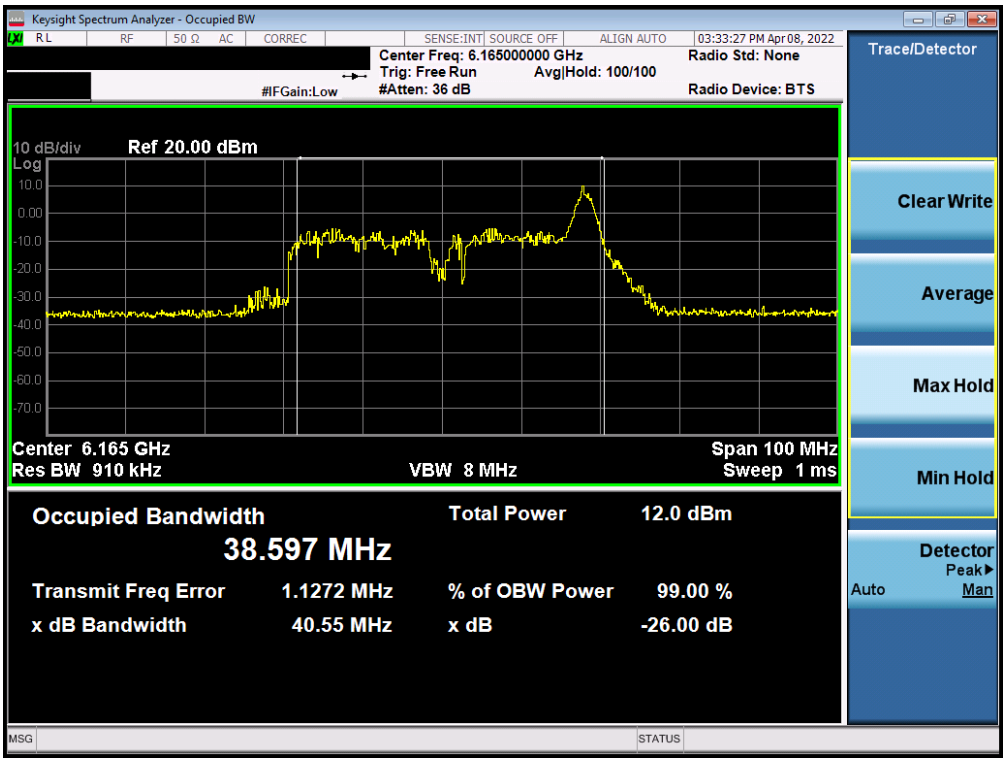
Plot 7-2. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 45)



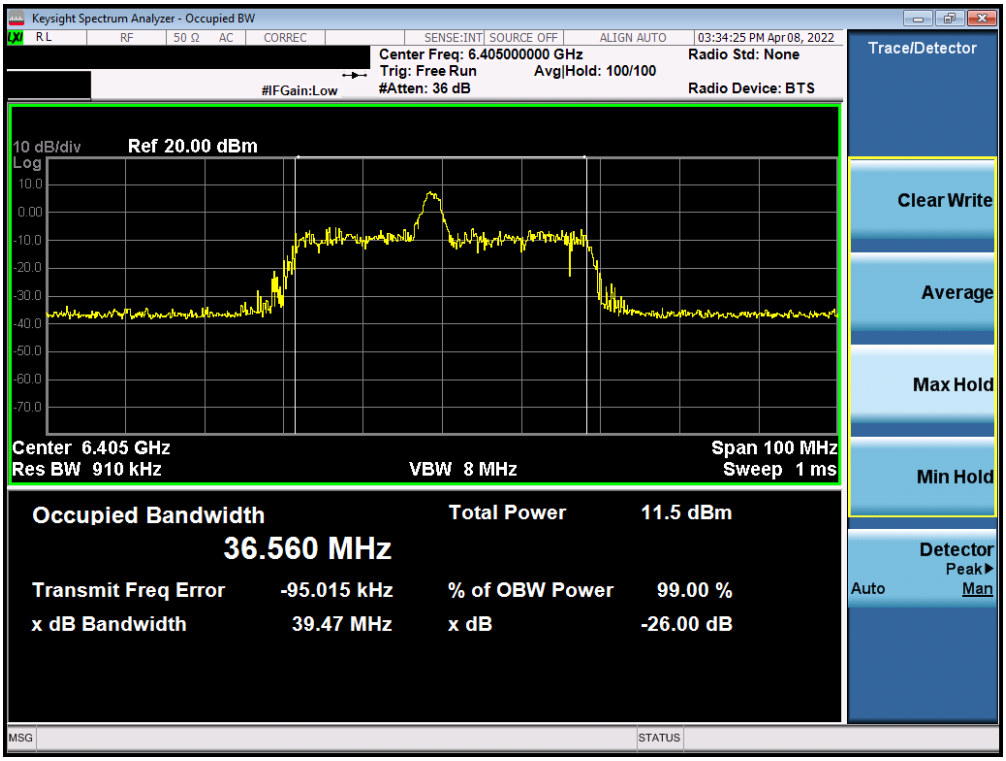
Plot 7-3. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (26 Tones) UNII Band 5) – Ch. 93)



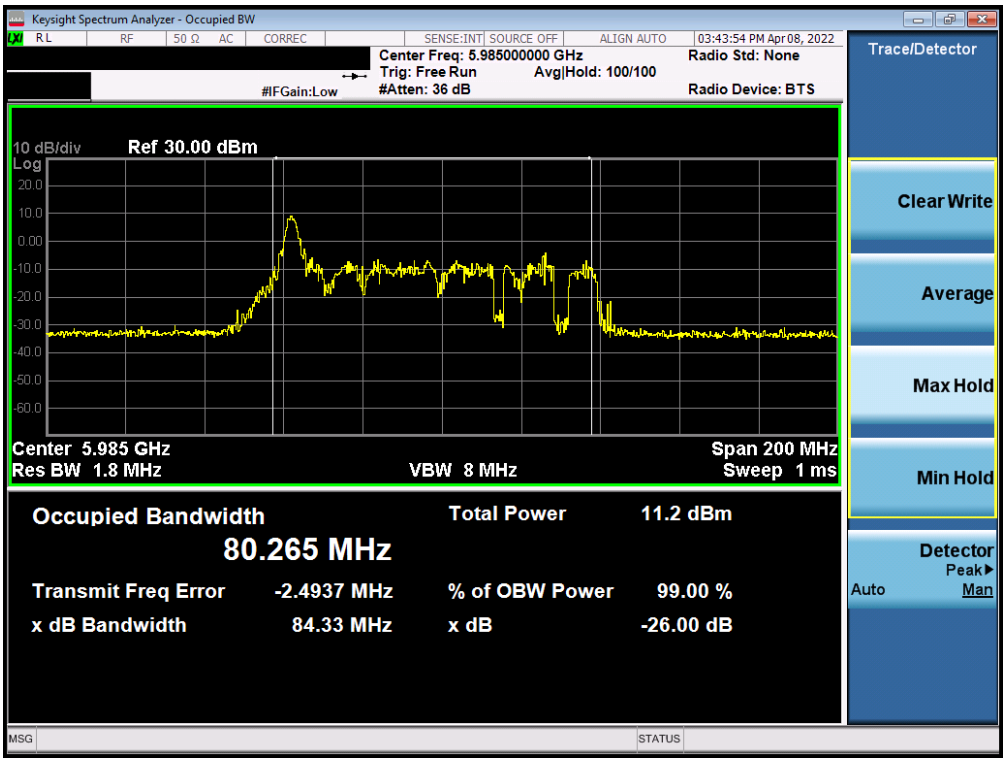
Plot 7-4. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 3)



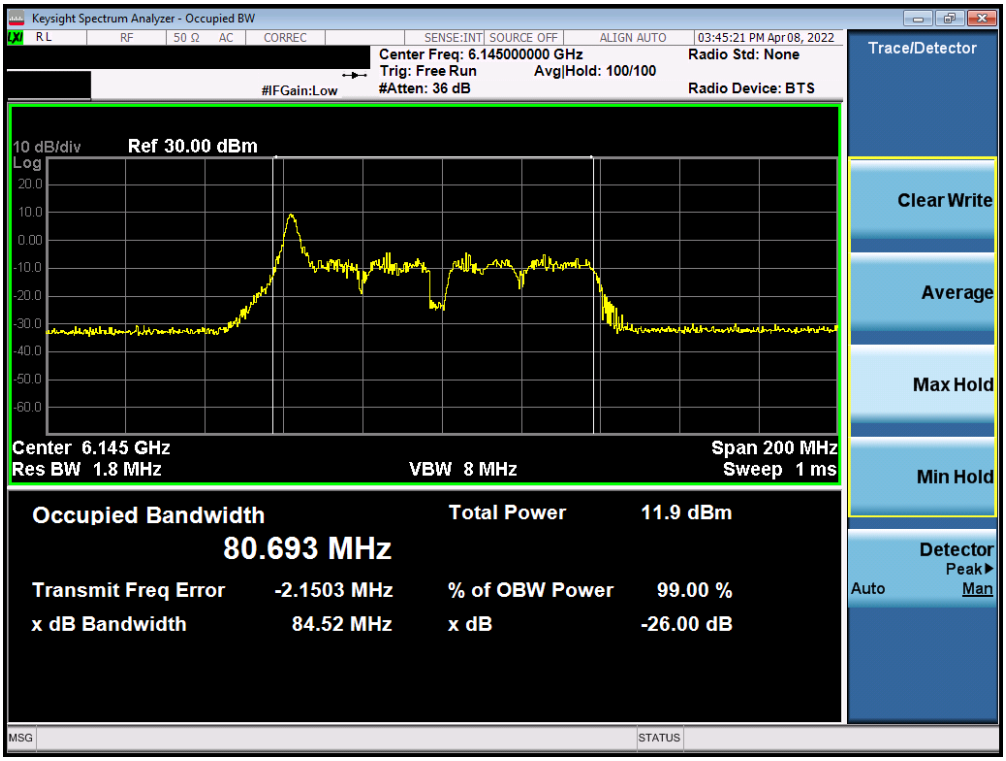
Plot 7-5. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 43)



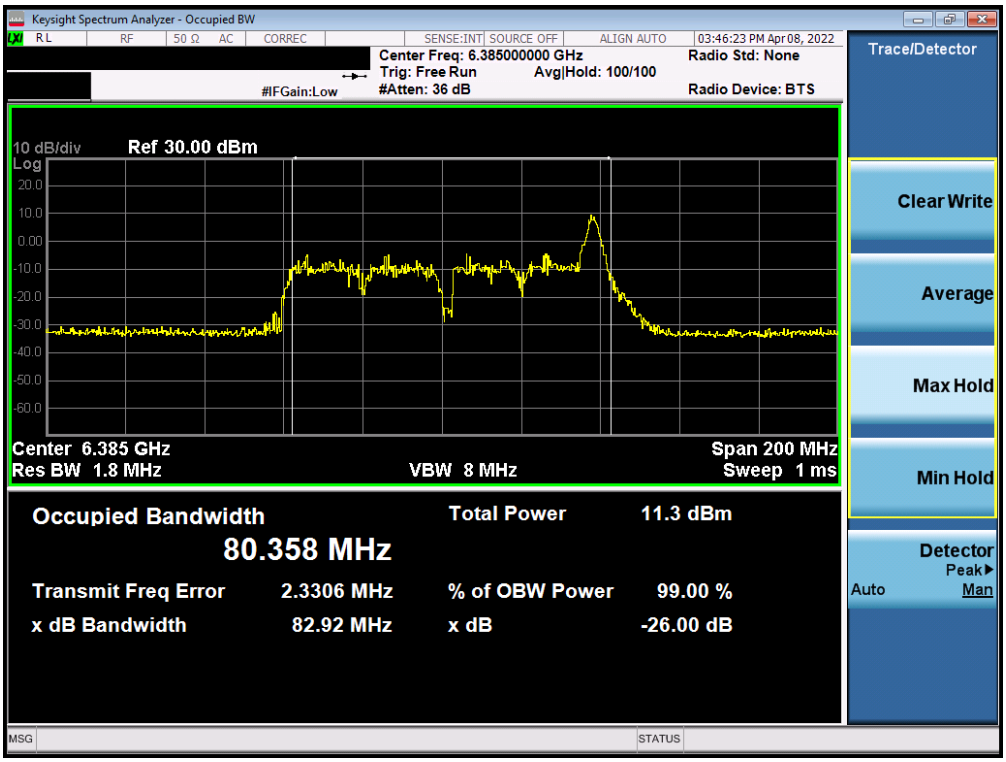
Plot 7-6. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 91)



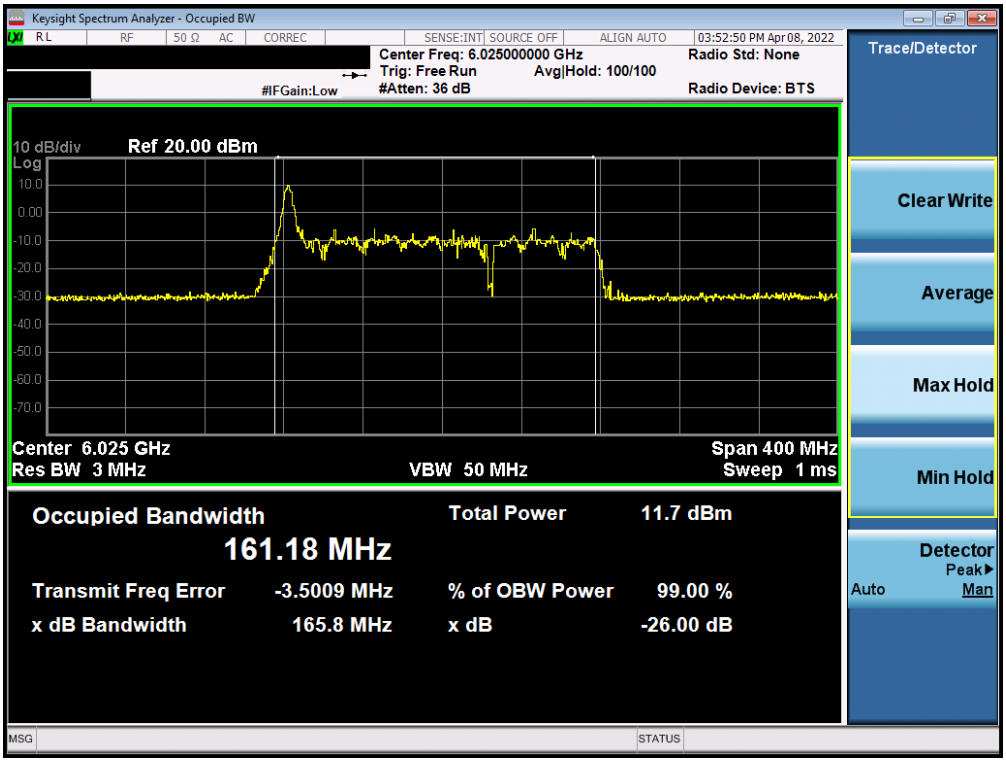
Plot 7-7. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 7)



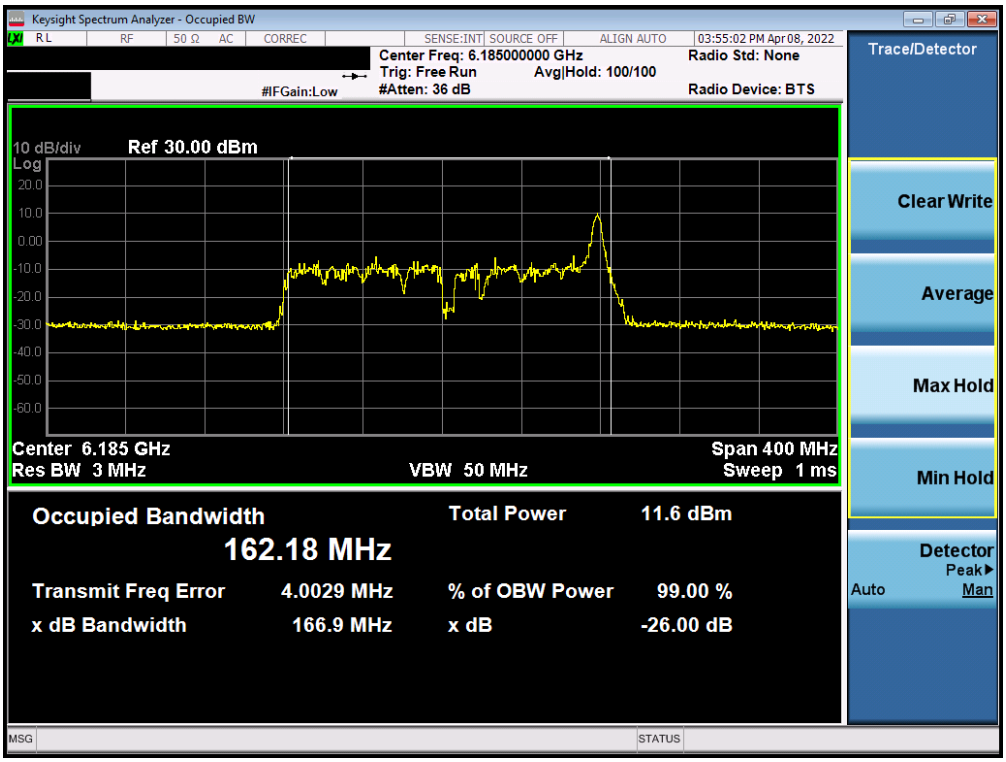
Plot 7-8. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 39)



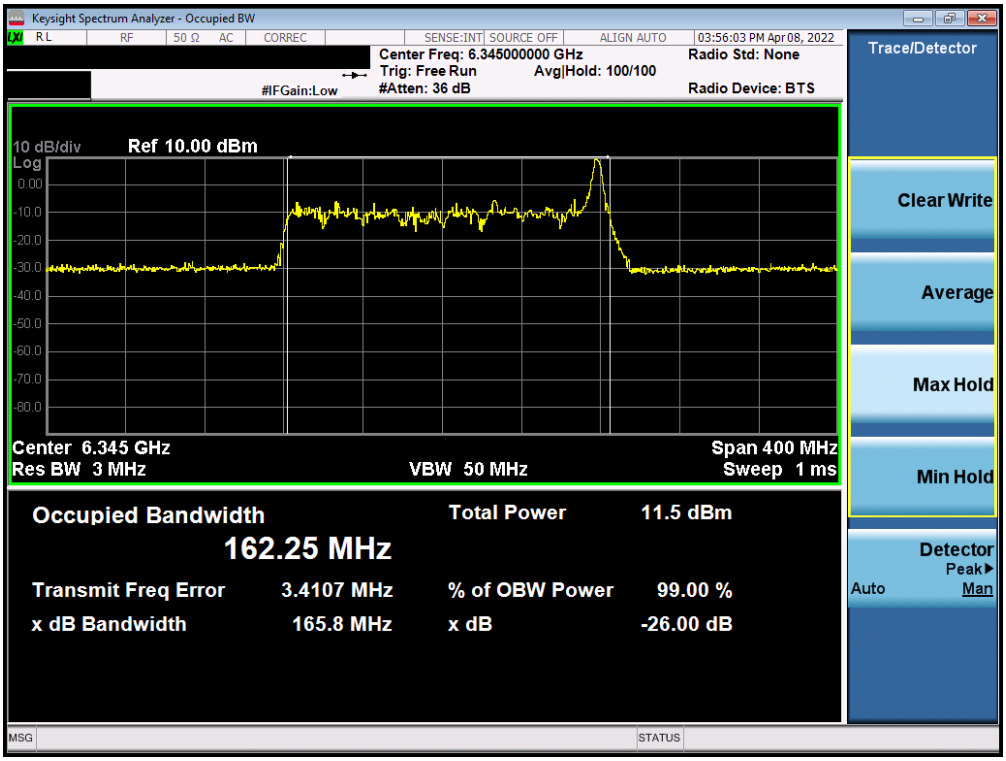
Plot 7-9. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 87)



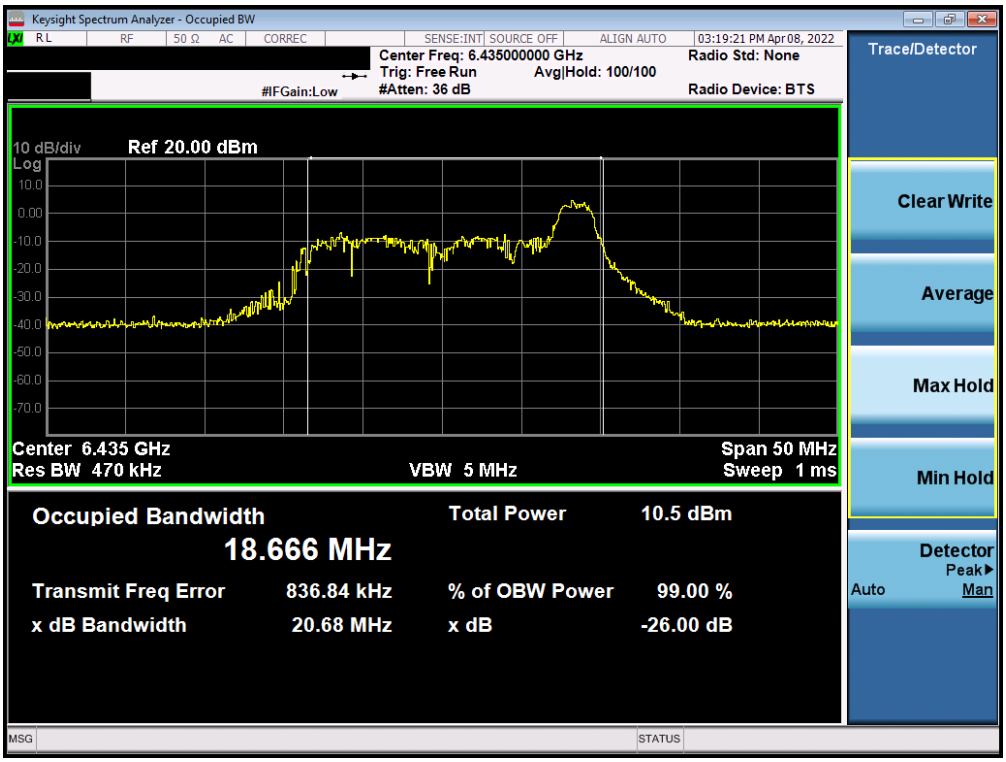
Plot 7-10. Occupied Bandwidth Plot MIMO ANT1 (160MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 15)



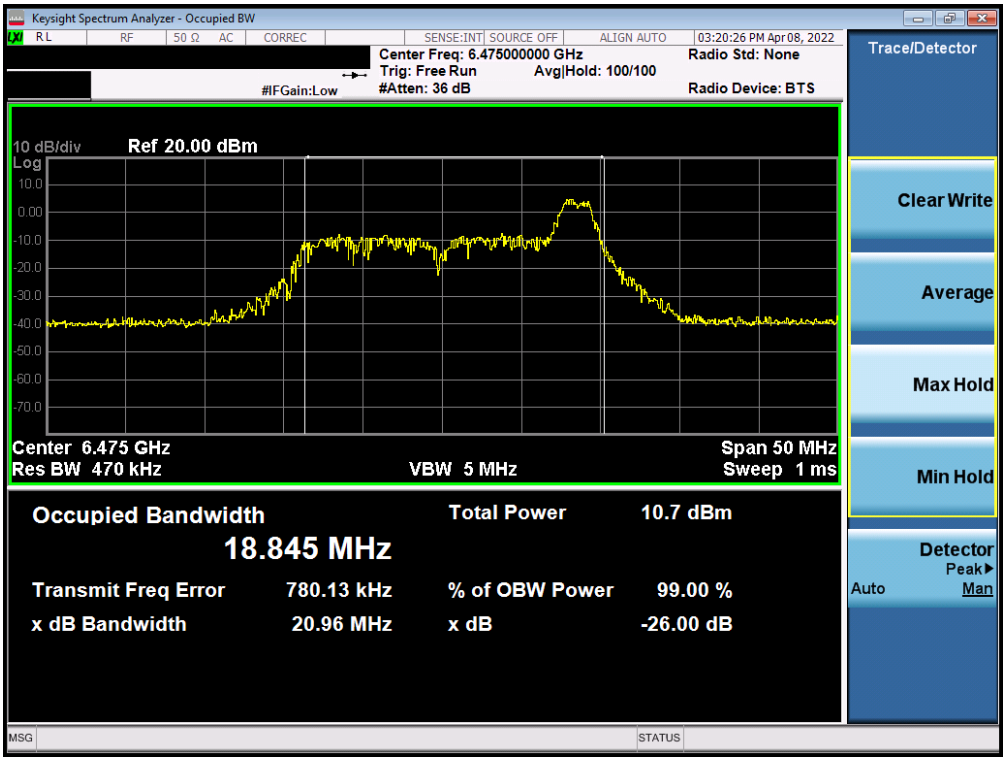
Plot 7-11. Occupied Bandwidth Plot MIMO ANT1 (160MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 47)



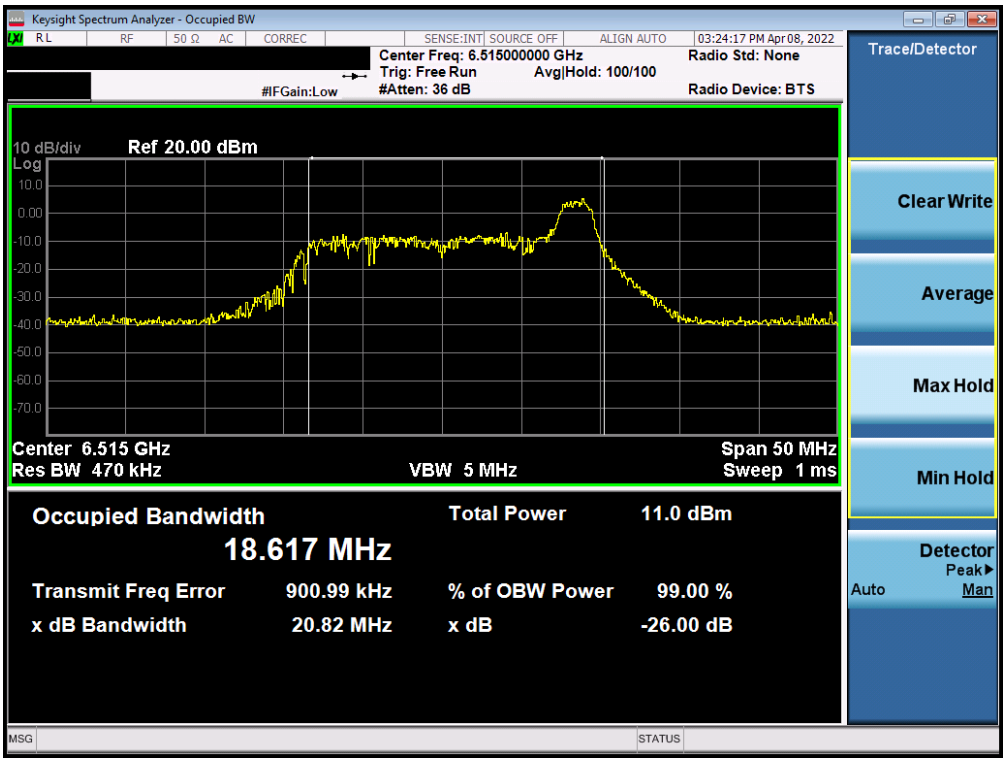
Plot 7-12. Occupied Bandwidth Plot MIMO ANT1 (160MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 79)



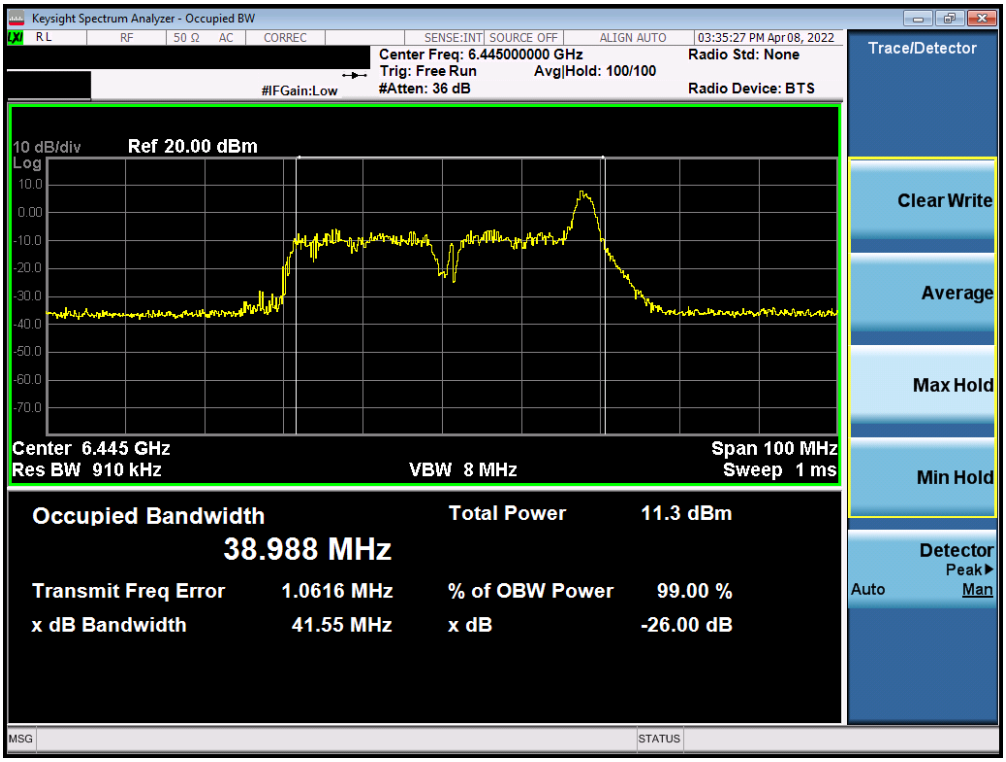
Plot 7-13. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 97)



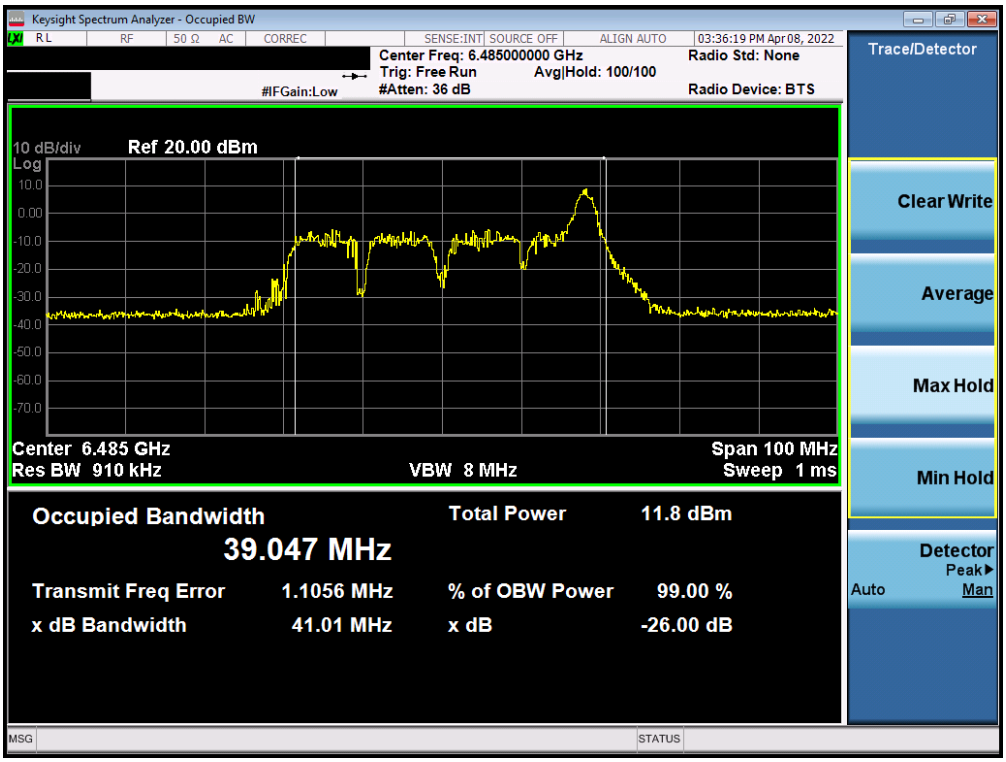
Plot 7-14. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 105)



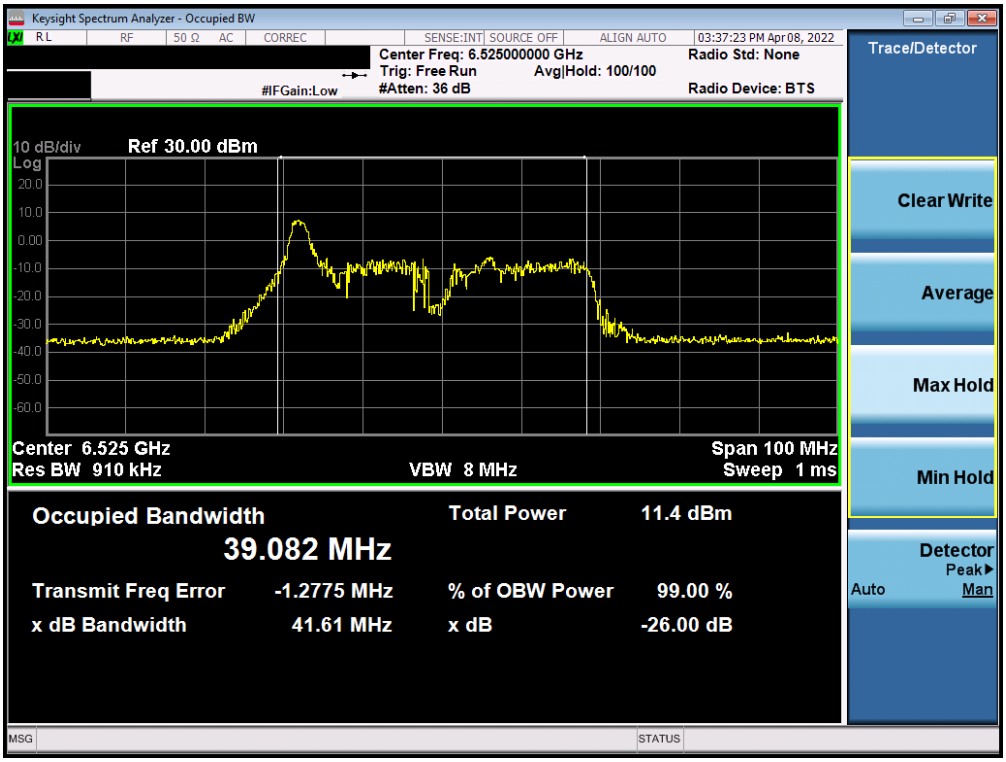
Plot 7-15. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 113)



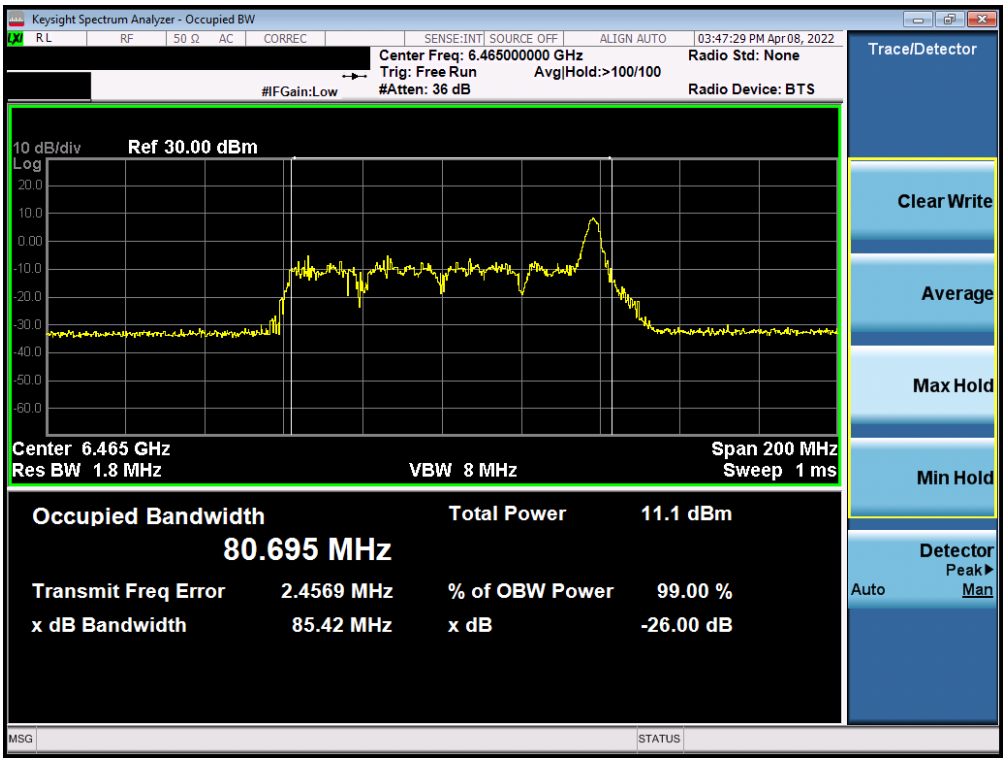
Plot 7-16. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 99)



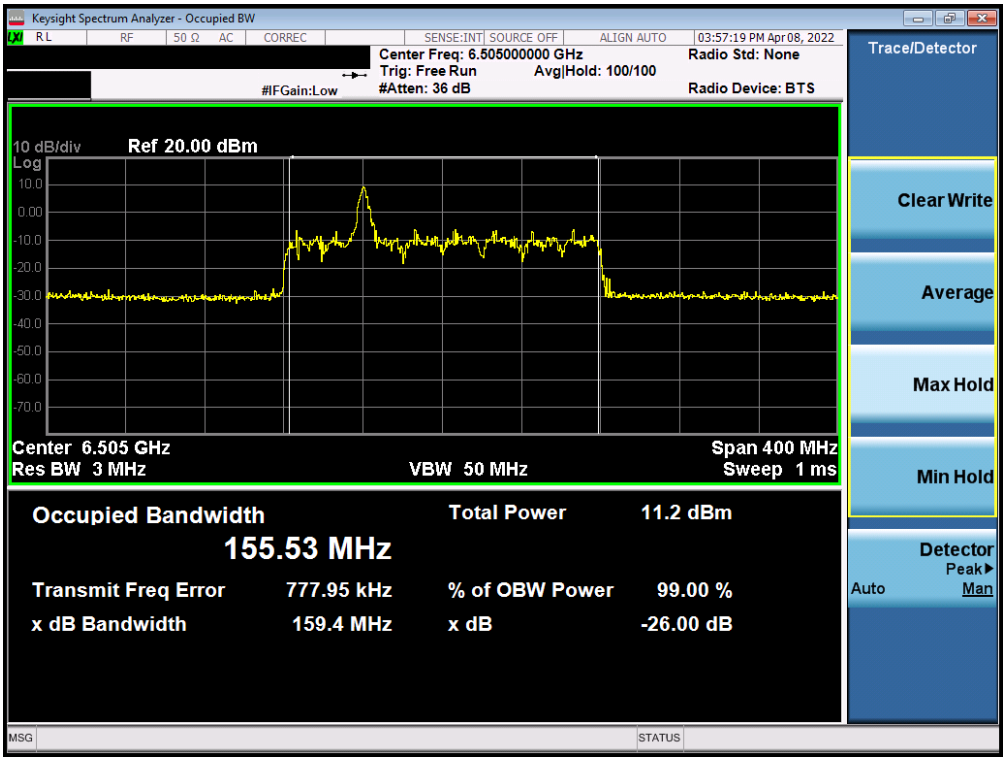
Plot 7-17. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 107)



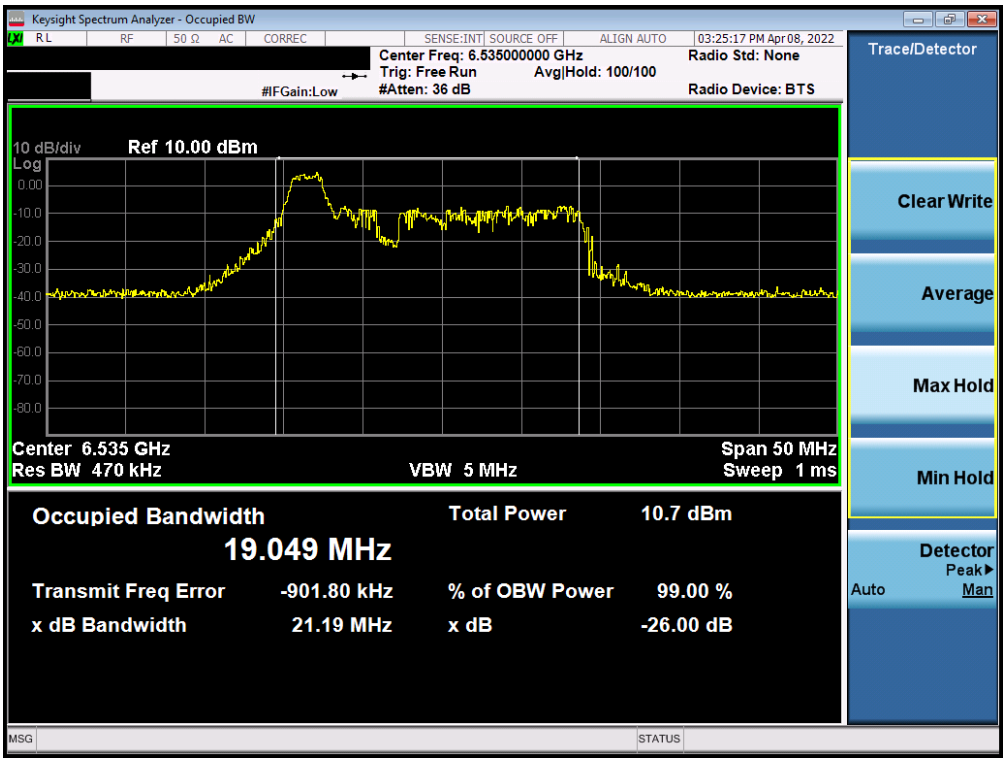
Plot 7-18. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 115)



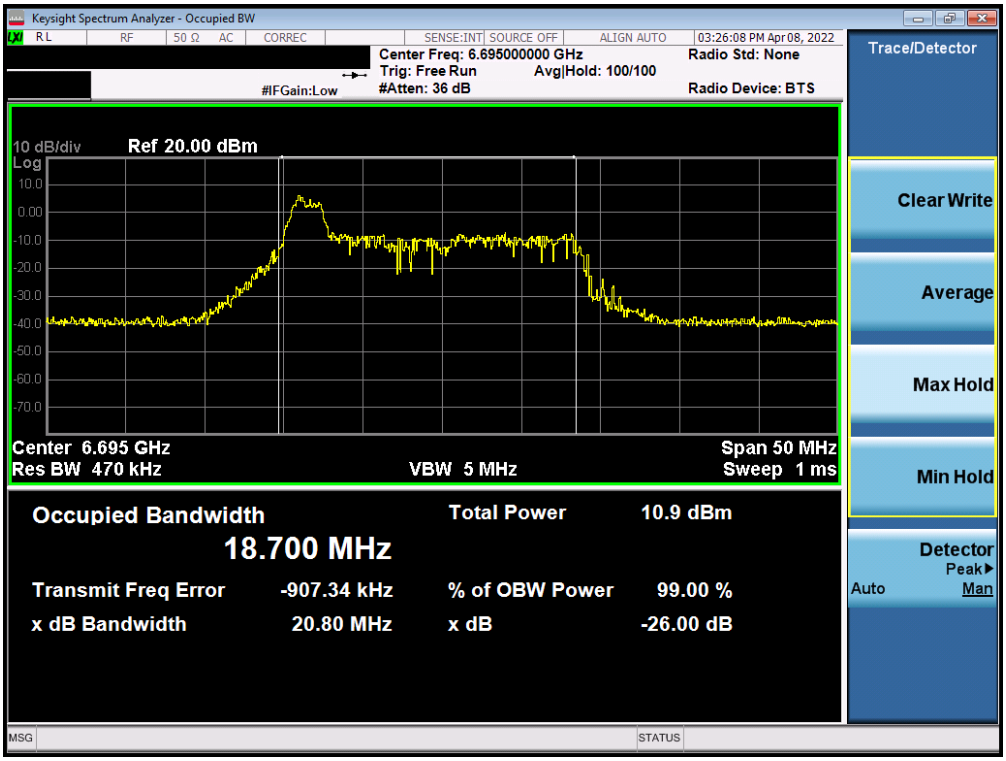
Plot 7-19. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 103)



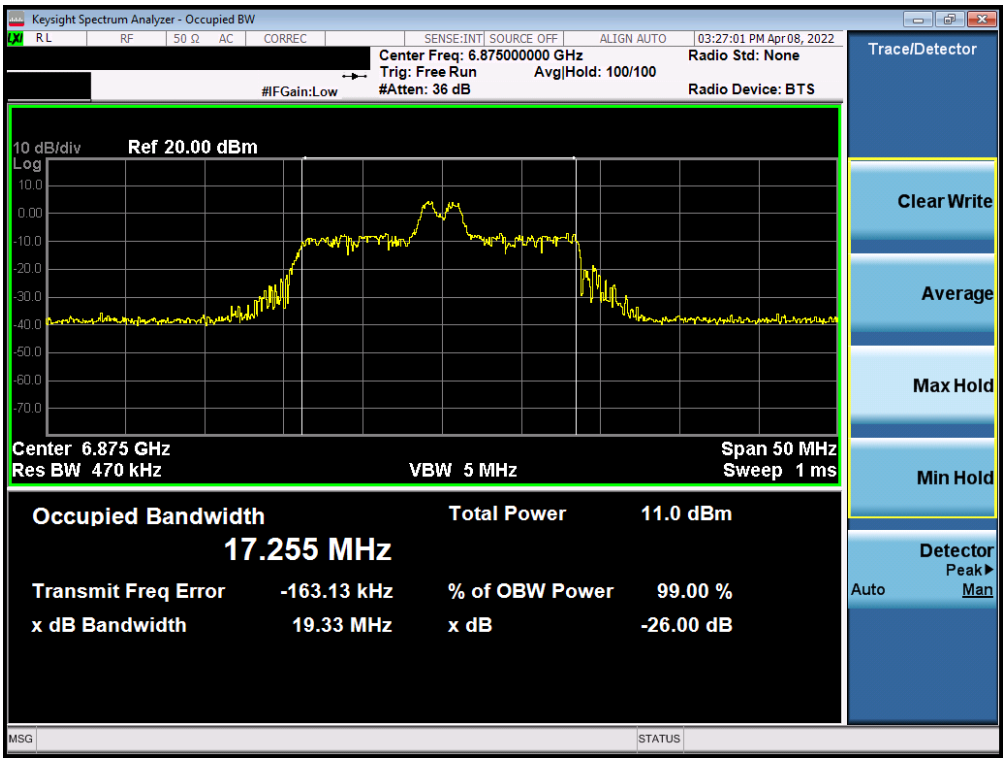
Plot 7-20. Occupied Bandwidth Plot MIMO ANT1 (160MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 111)



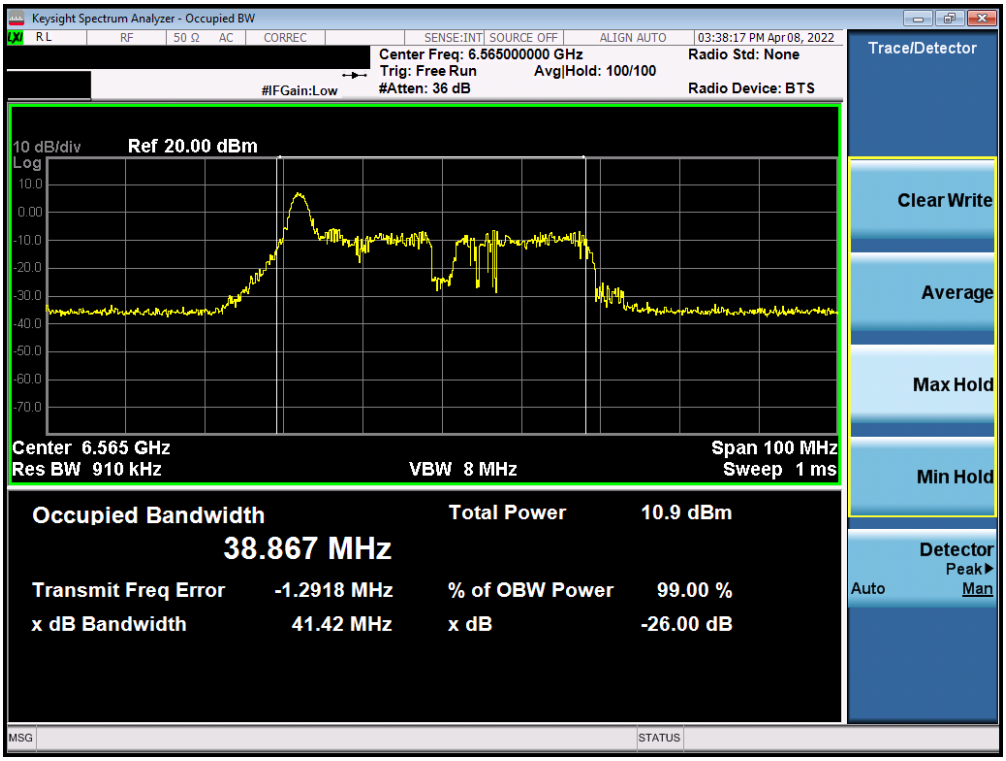
Plot 7-21. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 117)



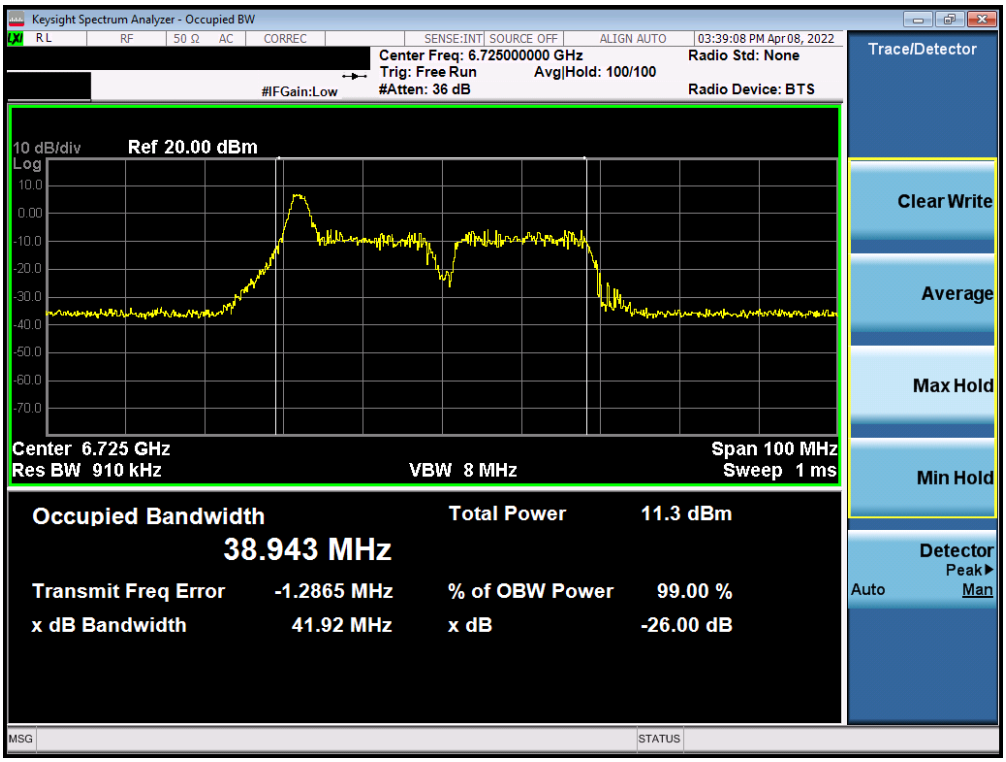
Plot 7-22. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 149)



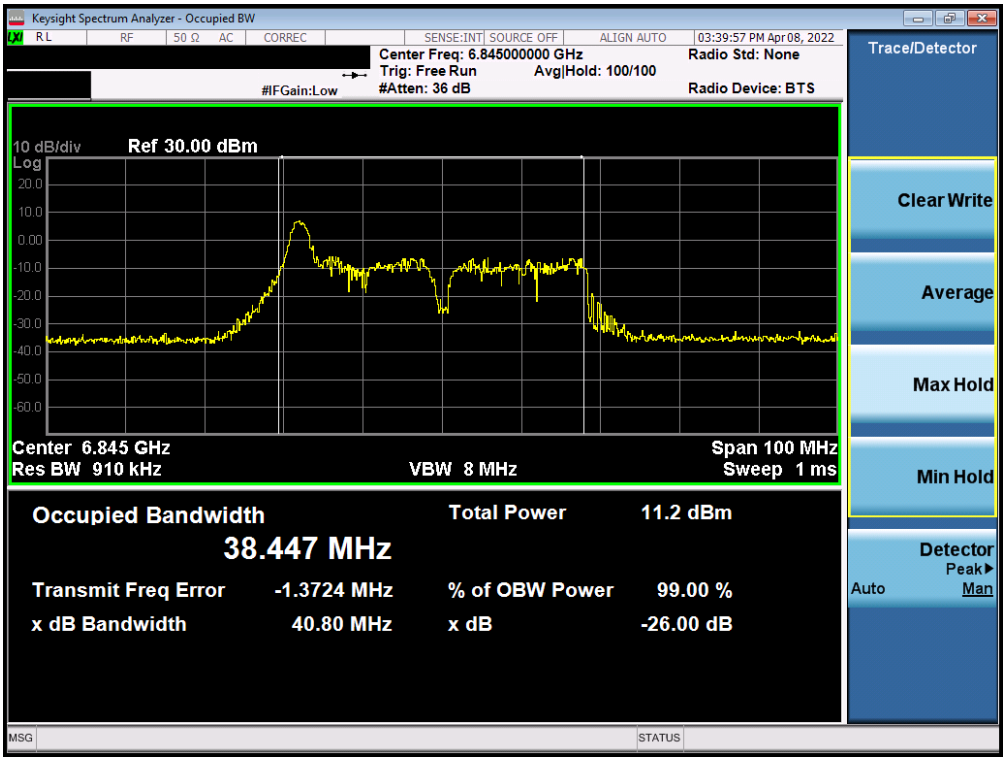
Plot 7-23. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 185)



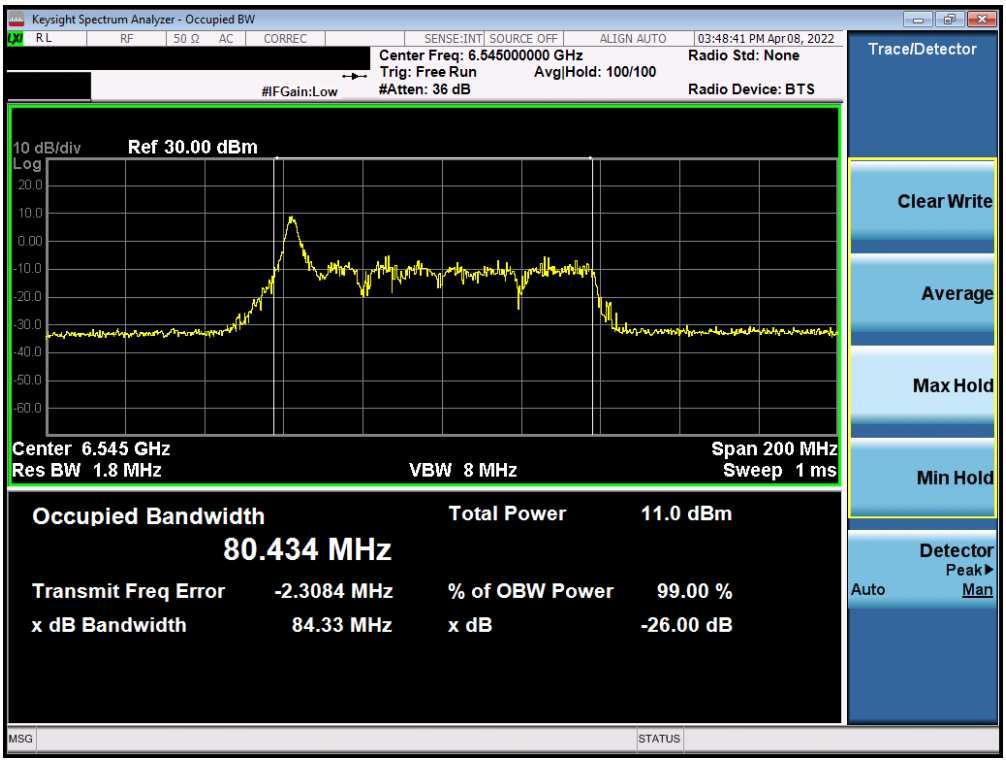
Plot 7-24. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 123)



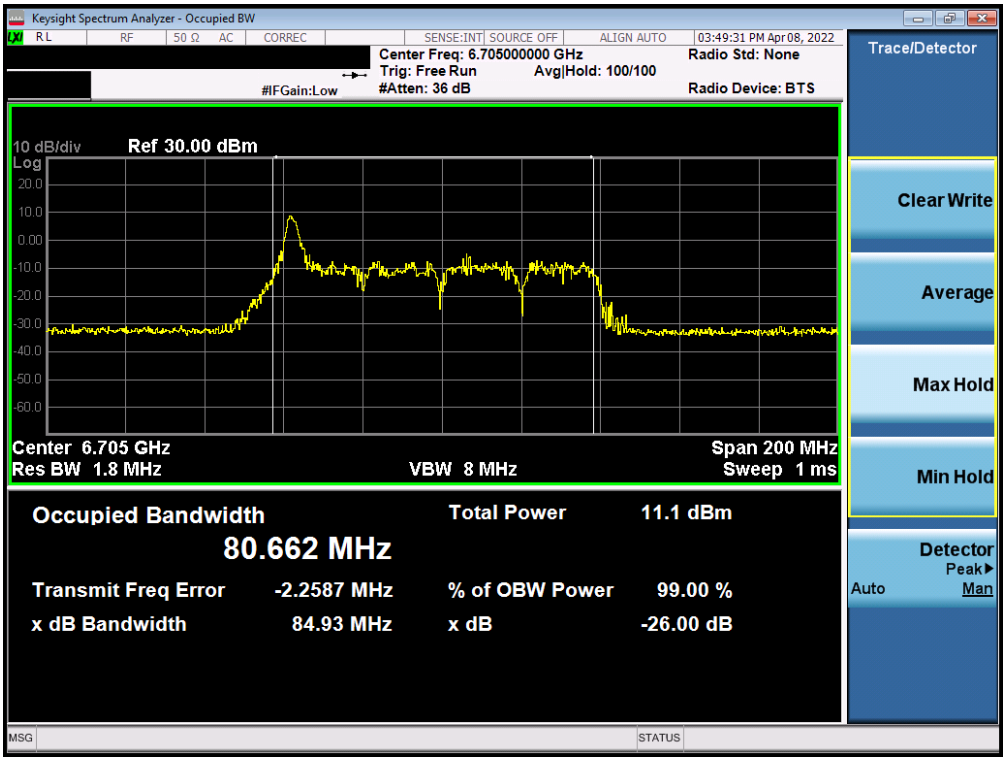
Plot 7-25. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 155)



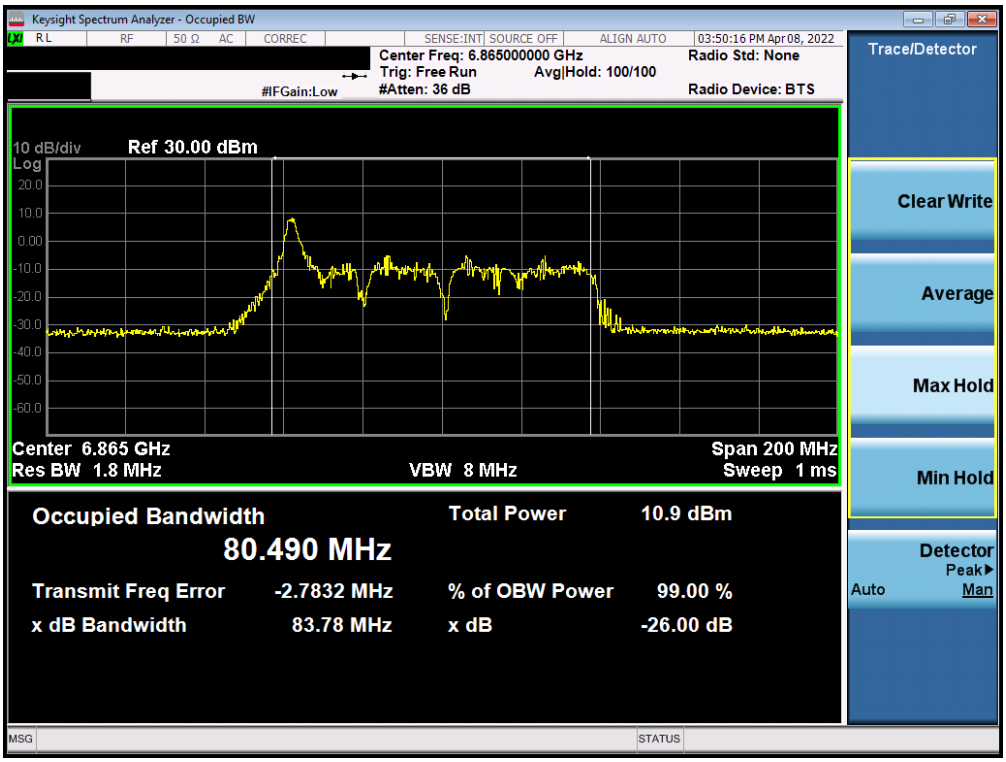
Plot 7-26. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 179)



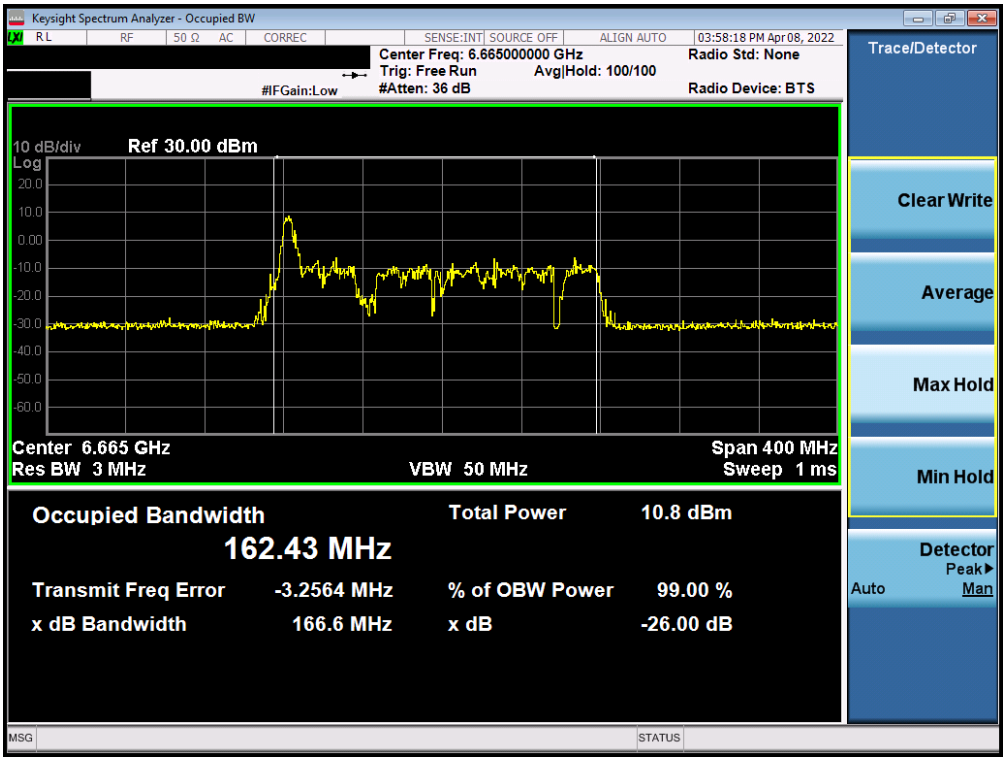
Plot 7-27. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 119)



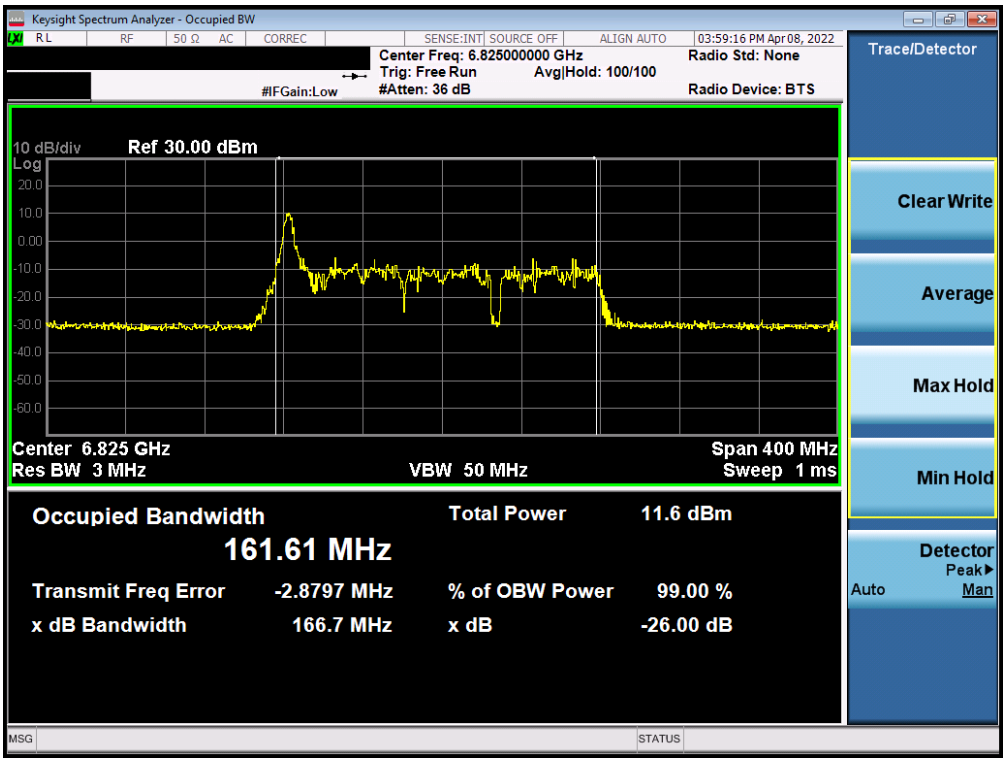
Plot 7-28. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 151)



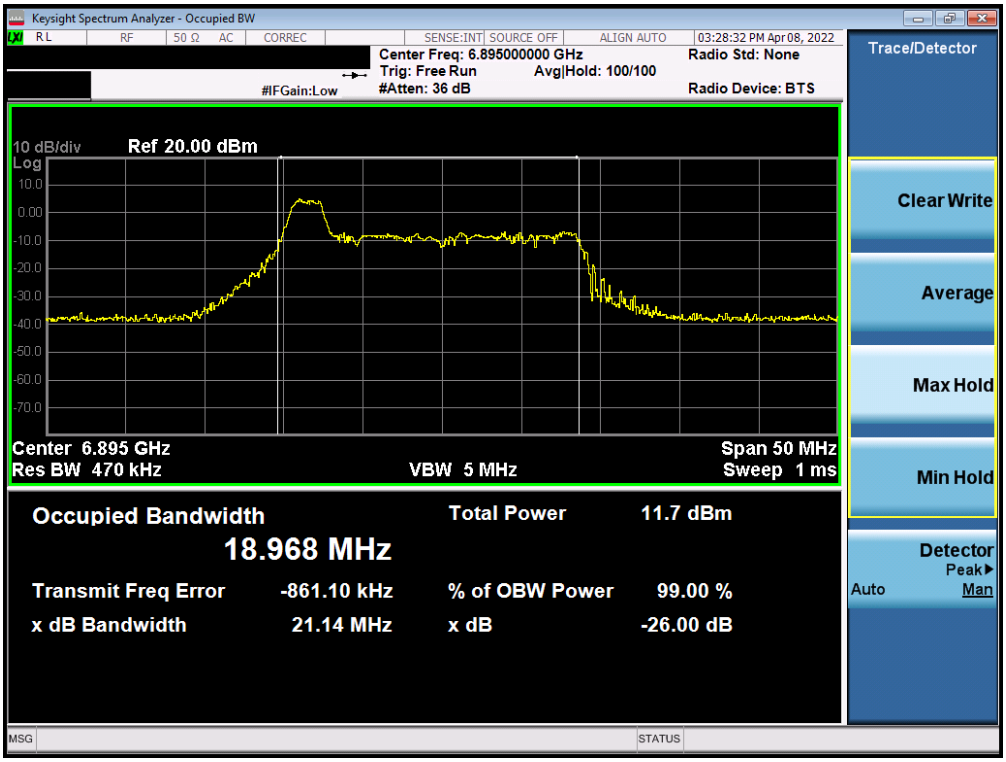
Plot 7-29. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 183)



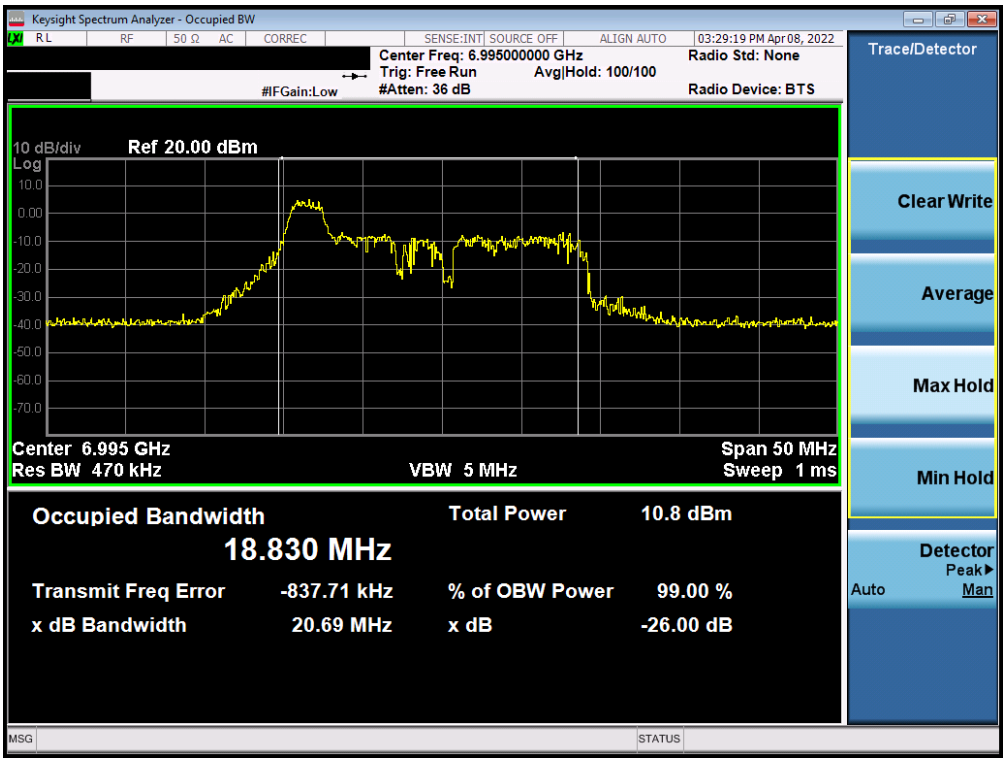
Plot 7-30. Occupied Bandwidth Plot MIMO ANT1 (160MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 143)



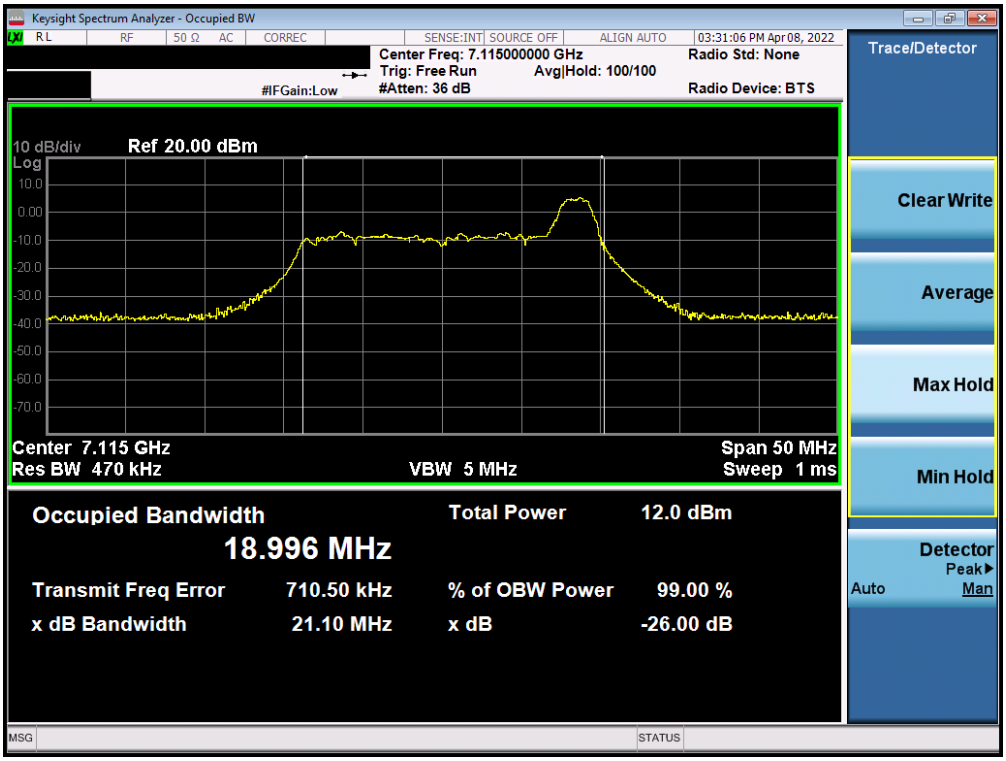
Plot 7-31. Occupied Bandwidth Plot MIMO ANT1 (160MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 175)



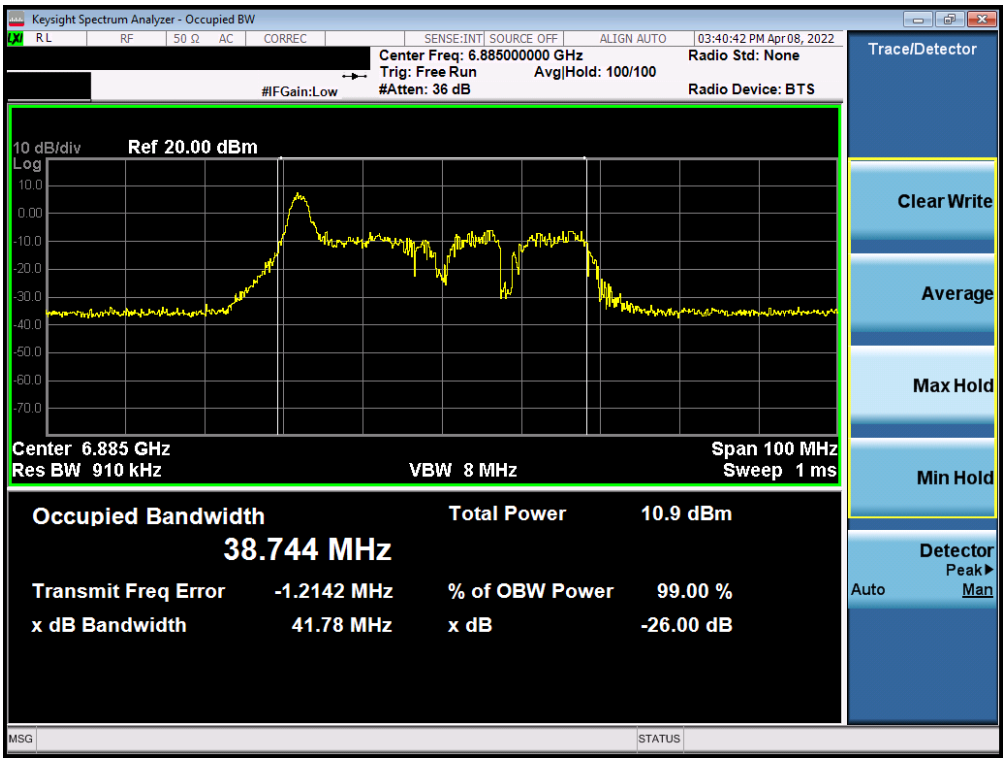
Plot 7-32. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (26 Tones) (UNII Band 8) – Ch. 189)



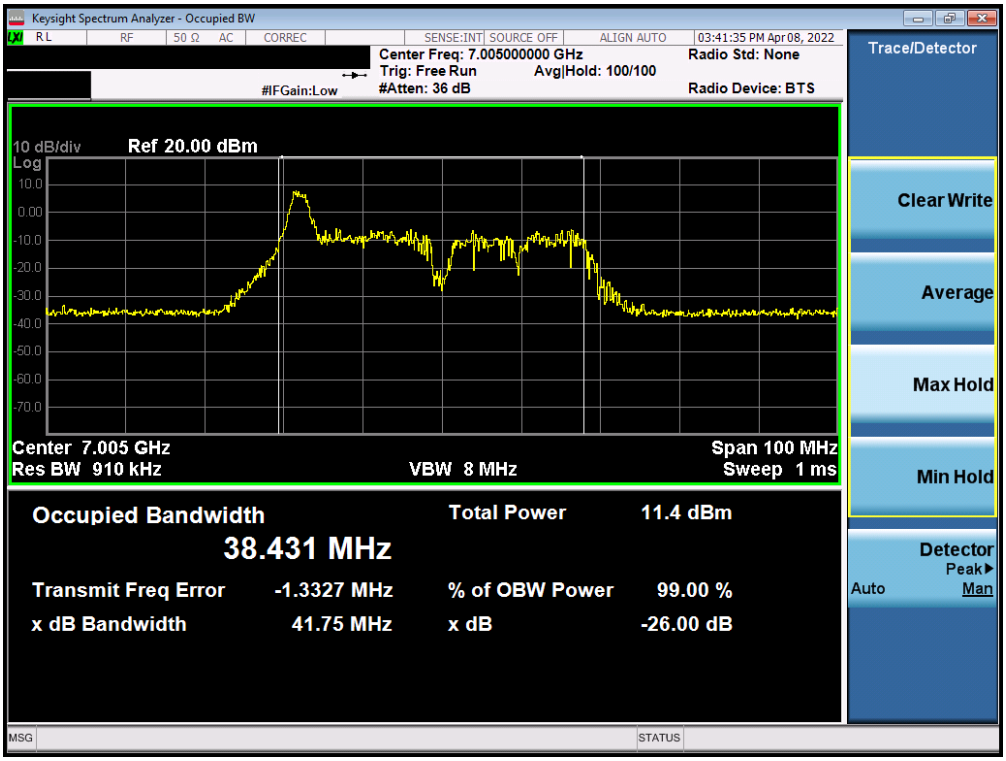
Plot 7-33. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (26 Tones) (UNII Band 8) – Ch. 209)



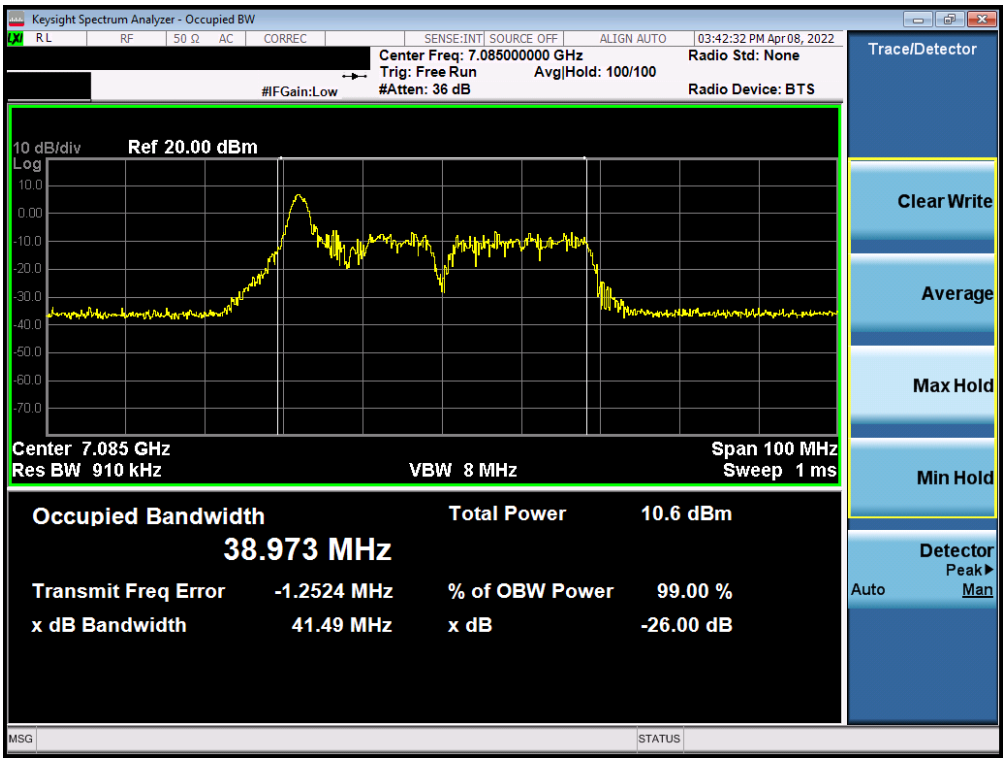
Plot 7-34. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (26 Tones) (UNII Band 8) – Ch. 233)



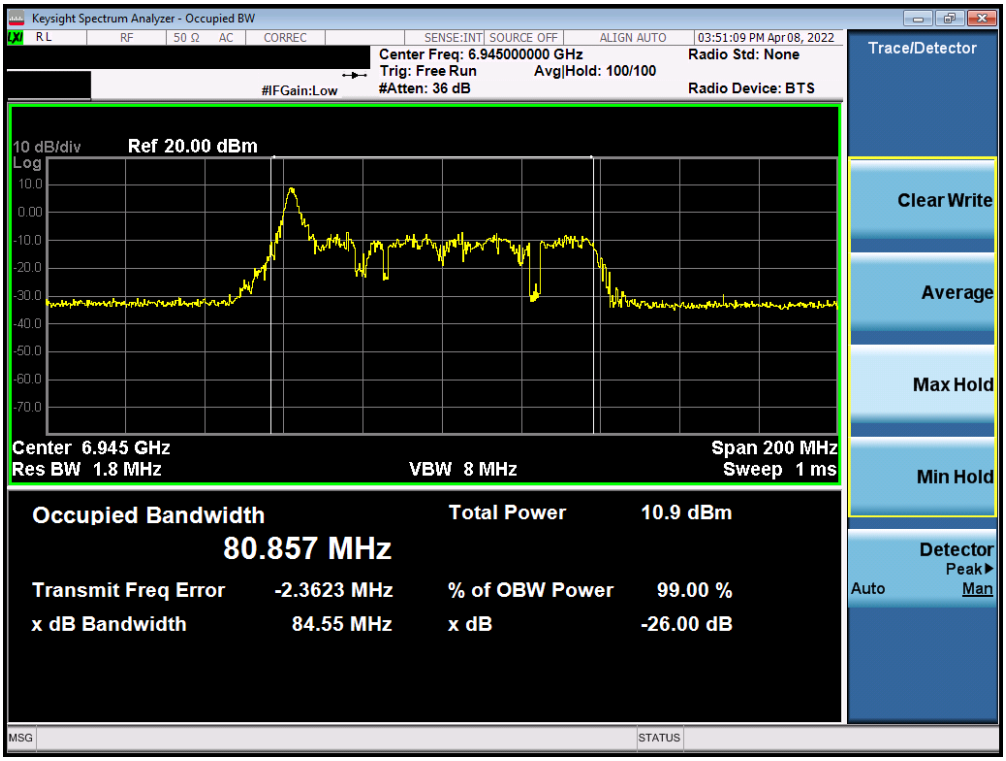
Plot 7-35. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (26 Tones) (UNII Band 8) – Ch. 187)



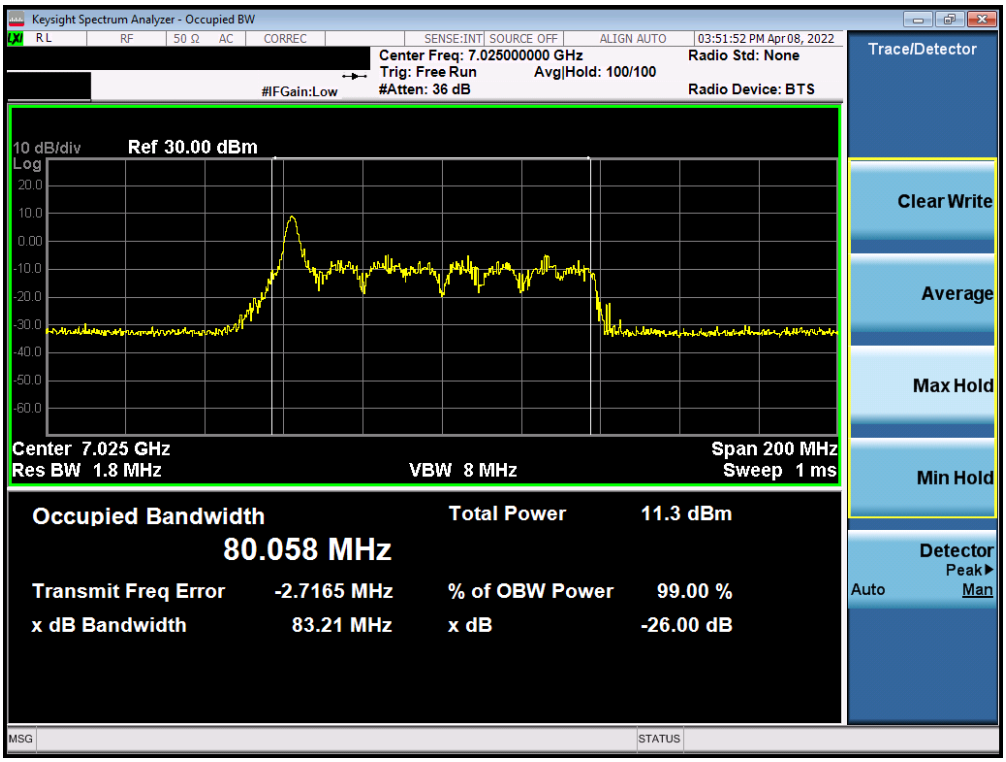
Plot 7-36. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (26 Tones) (UNII Band 8) – Ch. 211)



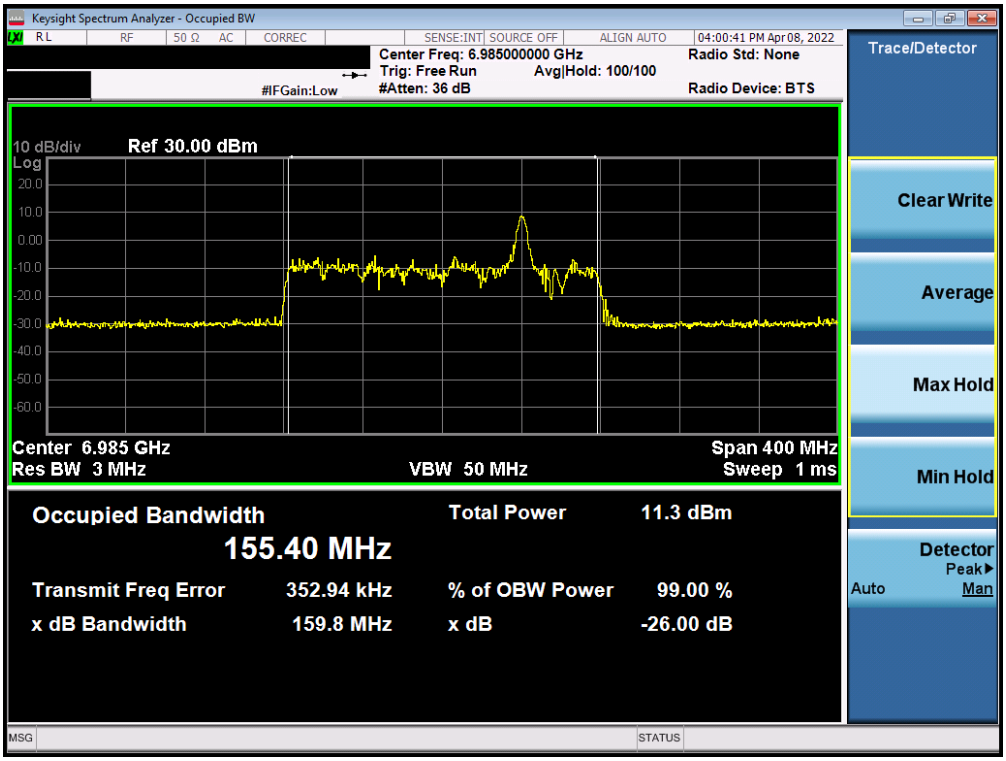
Plot 7-37. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (26 Tones) (UNII Band 8) – Ch. 227)



Plot 7-38. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (26 Tones) (UNII Band 8) – Ch. 199)

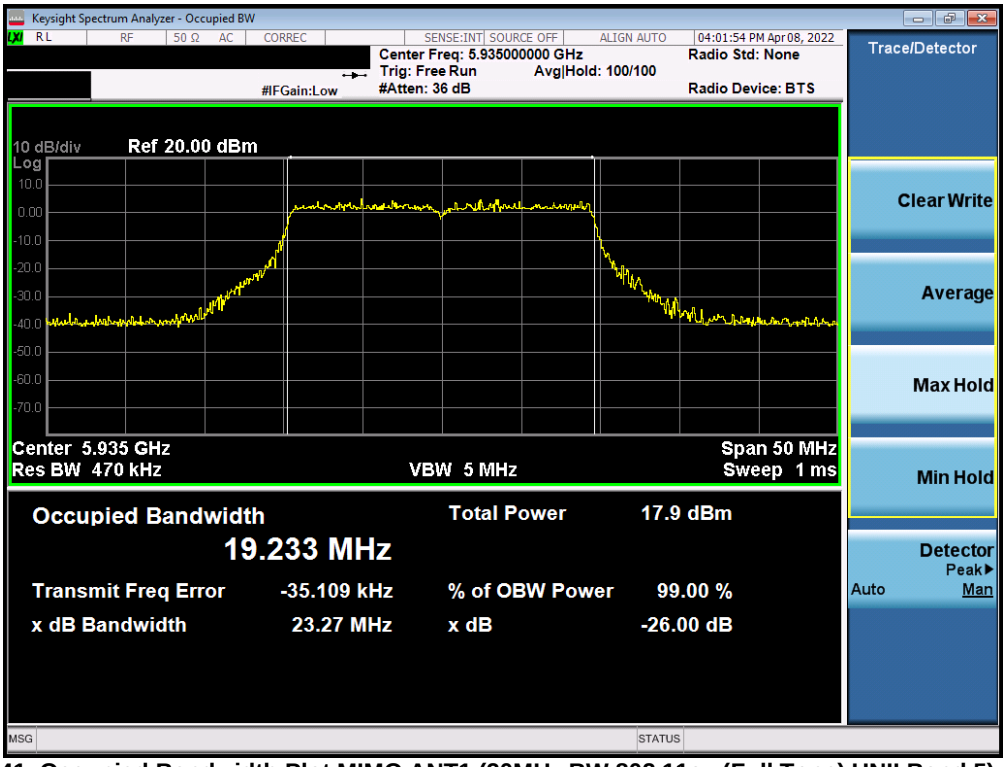


Plot 7-39. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (26 Tones) (UNII Band 8) – Ch. 215)

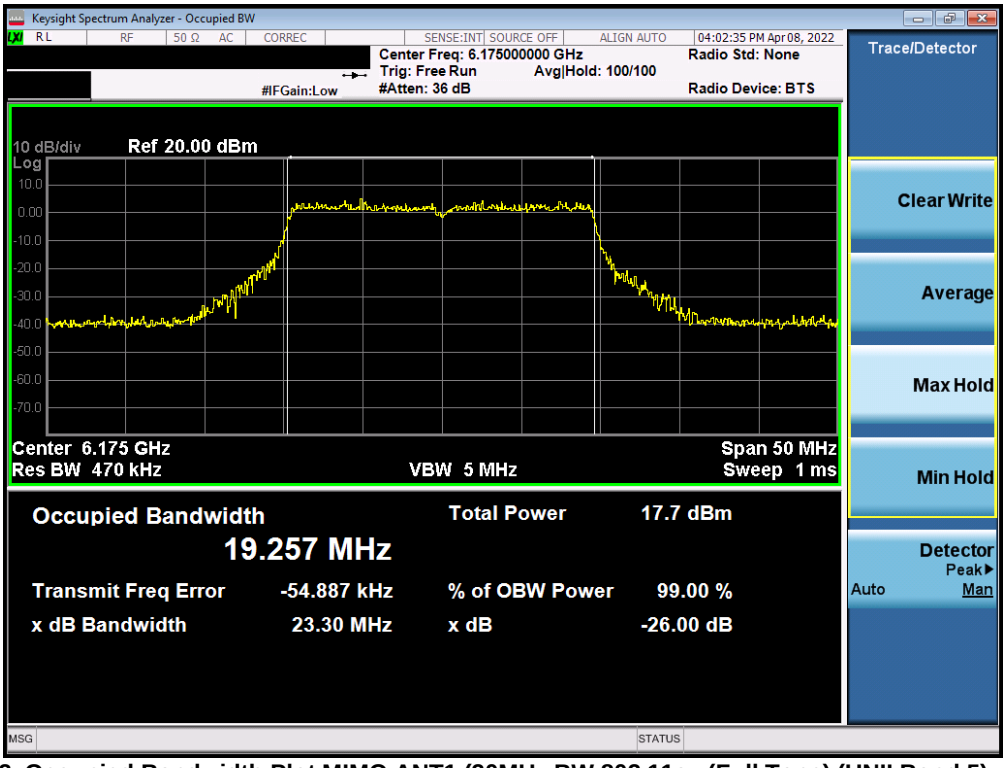


Plot 7-40. Occupied Bandwidth Plot MIMO ANT1 (160MHz BW 802.11ax (26 Tones) (UNII Band 8) – Ch. 207)

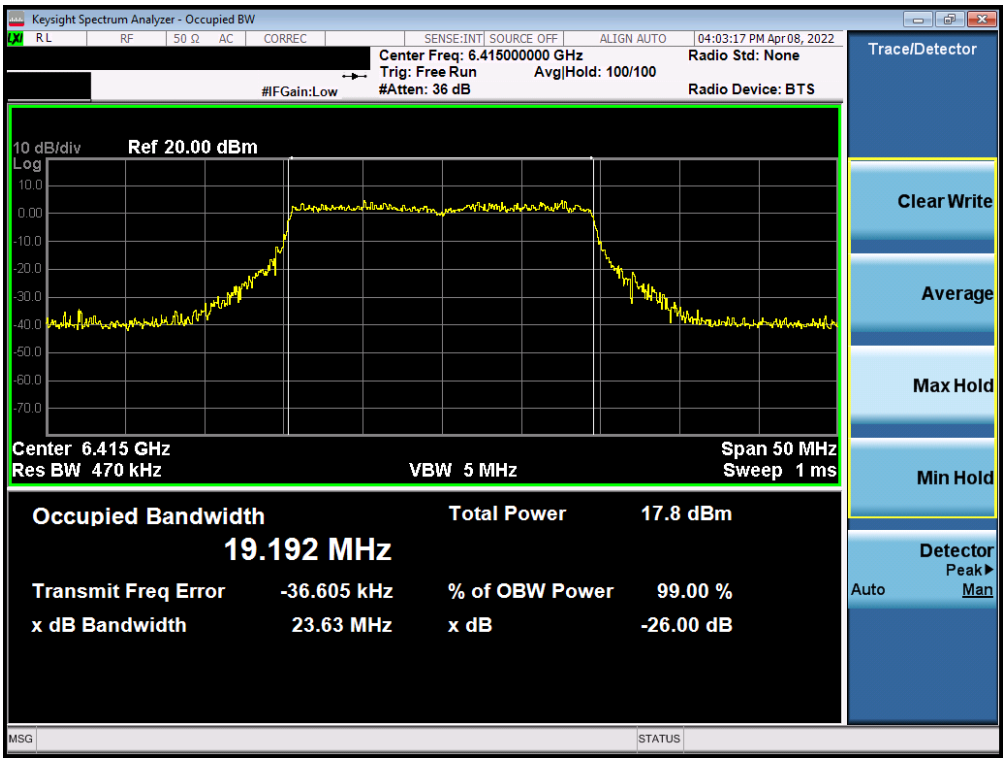
MIMO Antenna-1 Occupied Bandwidth Measurements (Full Tones)



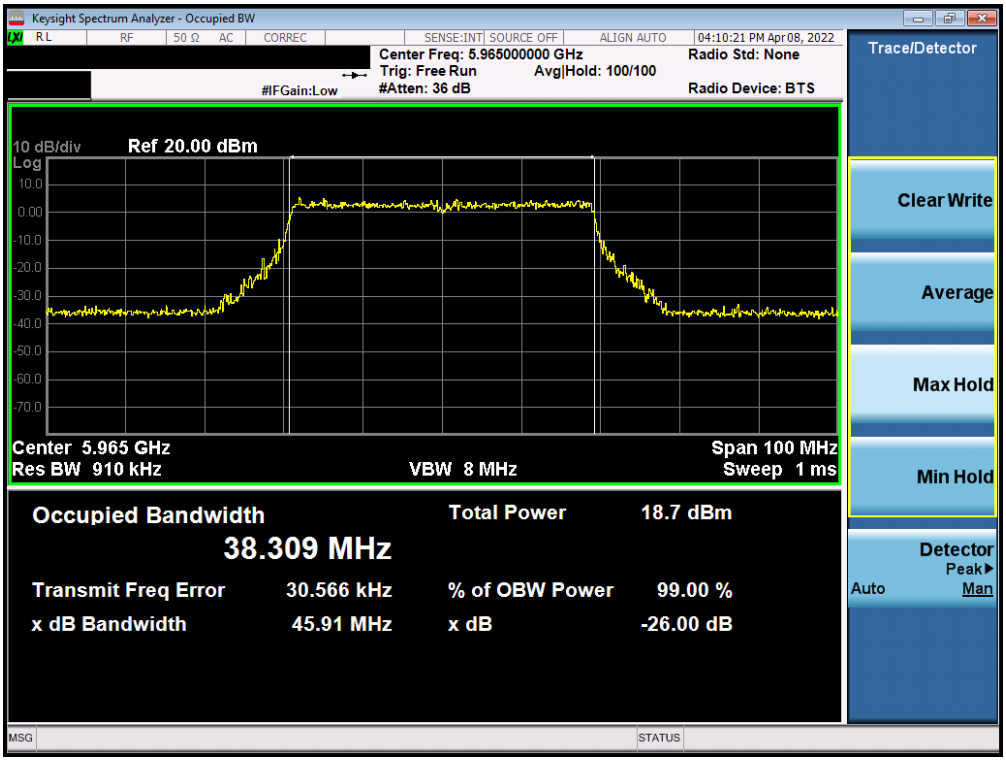
Plot 7-41. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (Full Tone) UNII Band 5) – Ch. 2



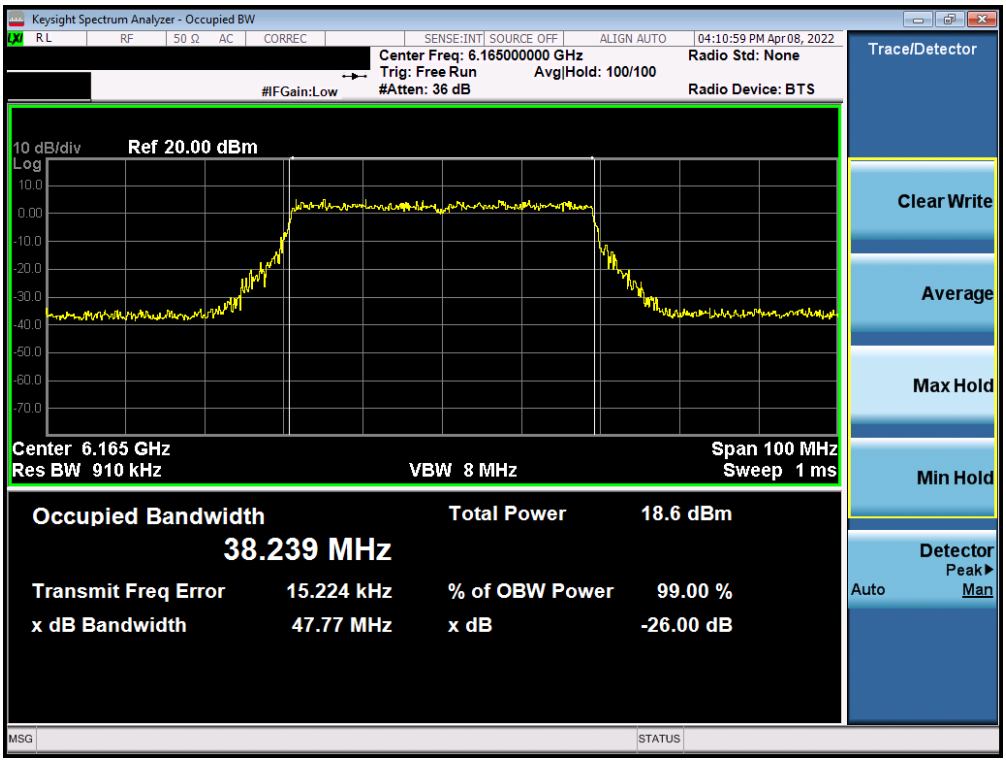
Plot 7-42. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 45)



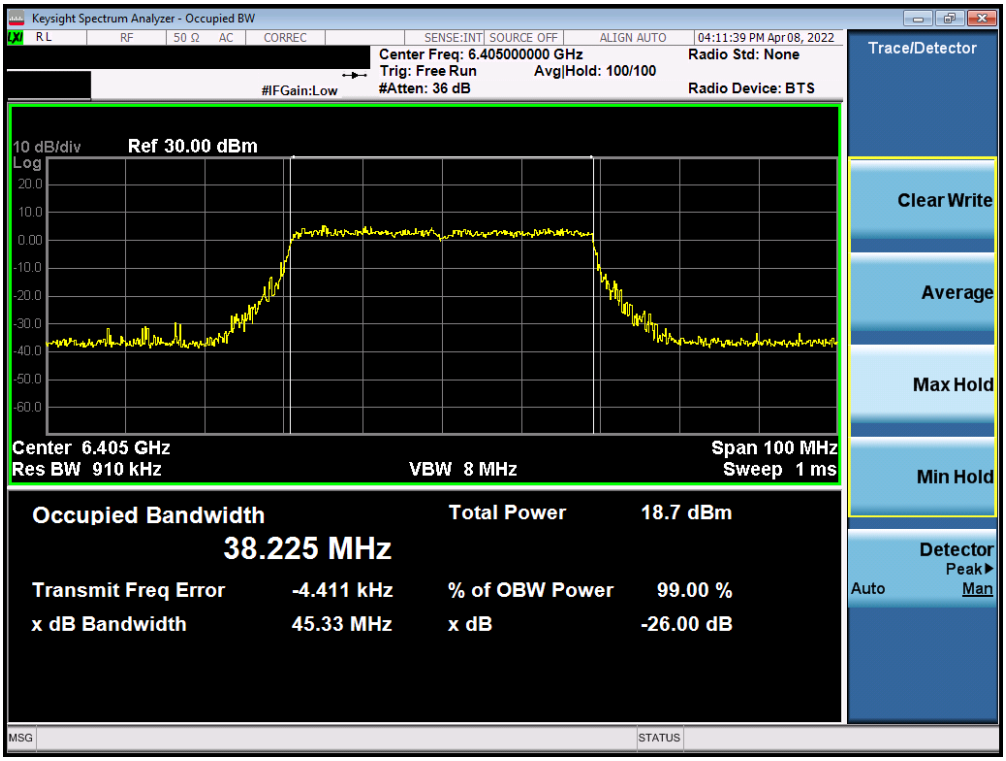
Plot 7-43. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (Full Tone) UNII Band 5) – Ch. 93)



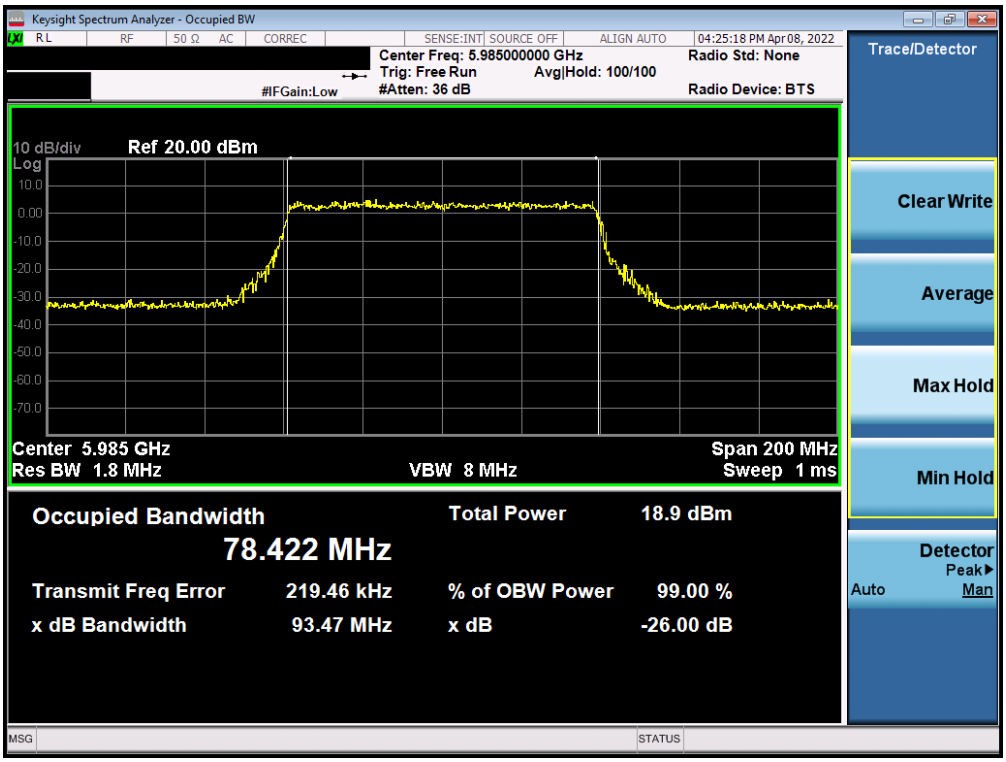
Plot 7-44. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 3)



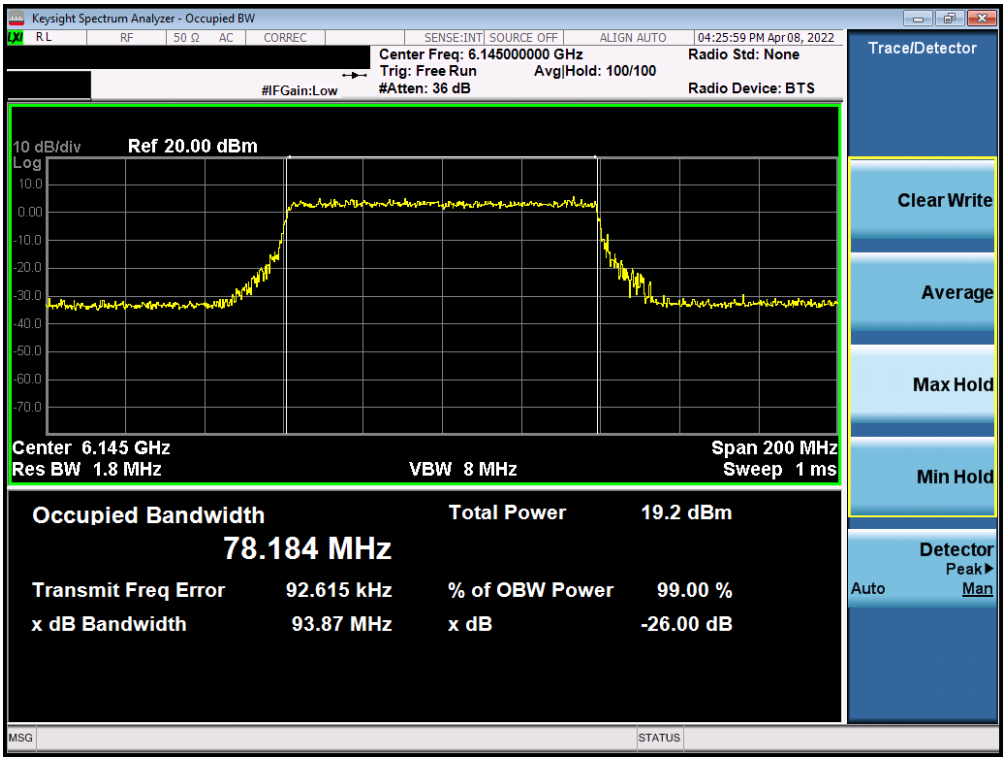
Plot 7-45. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 43)



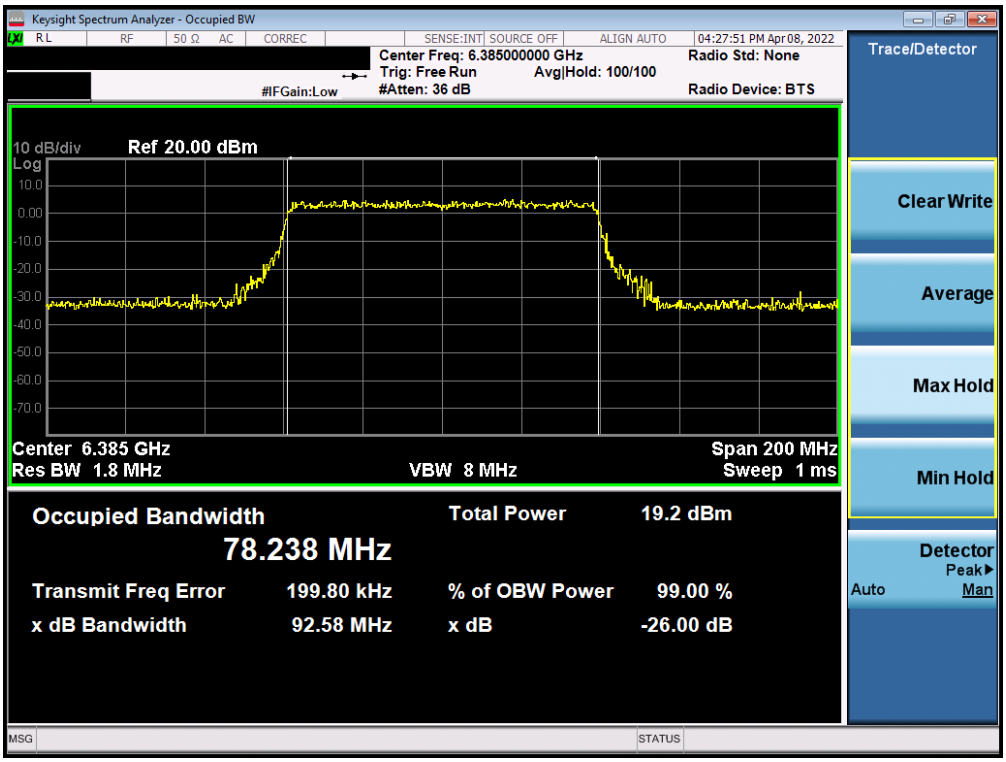
Plot 7-46. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 91)



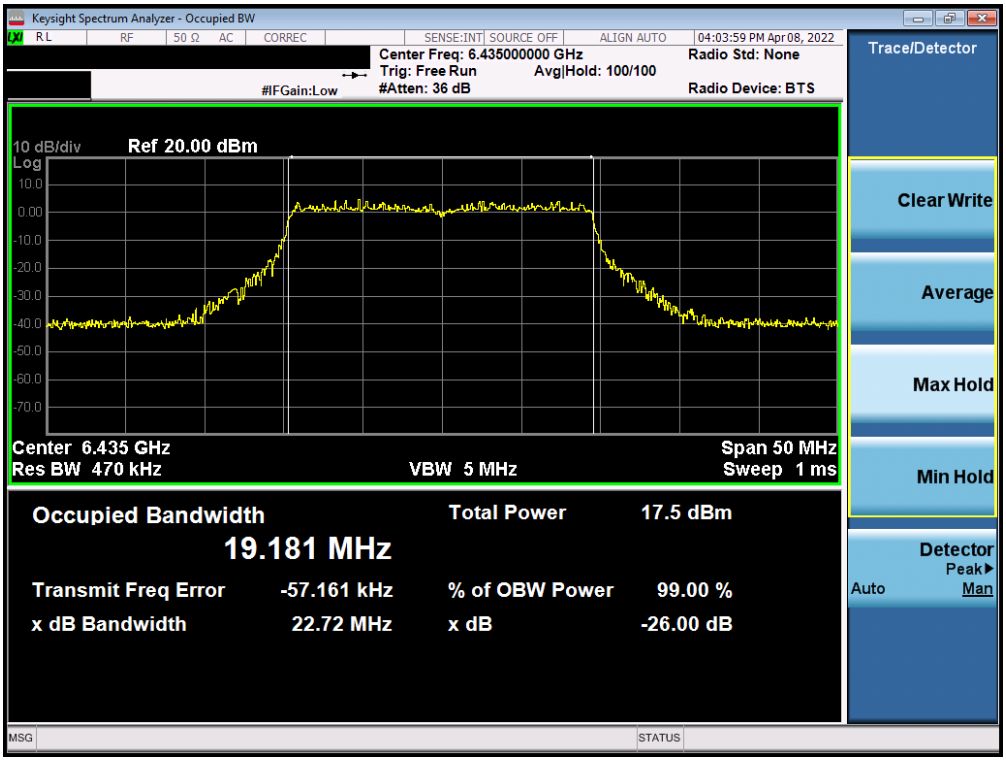
Plot 7-47. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 7)



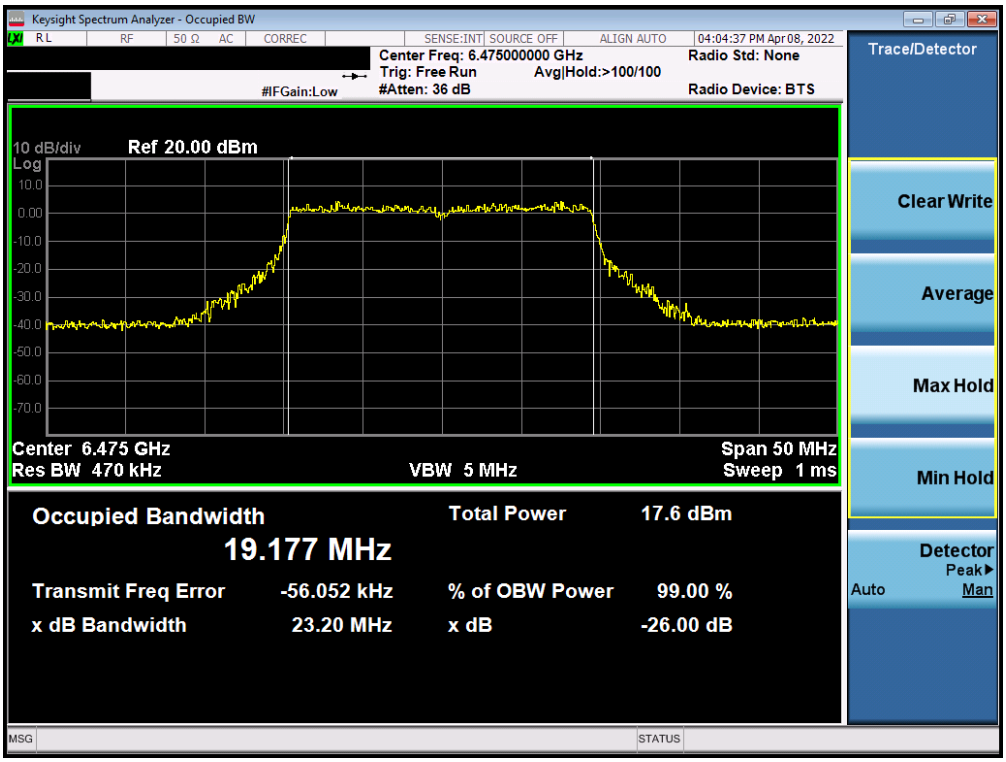
Plot 7-48. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 39)



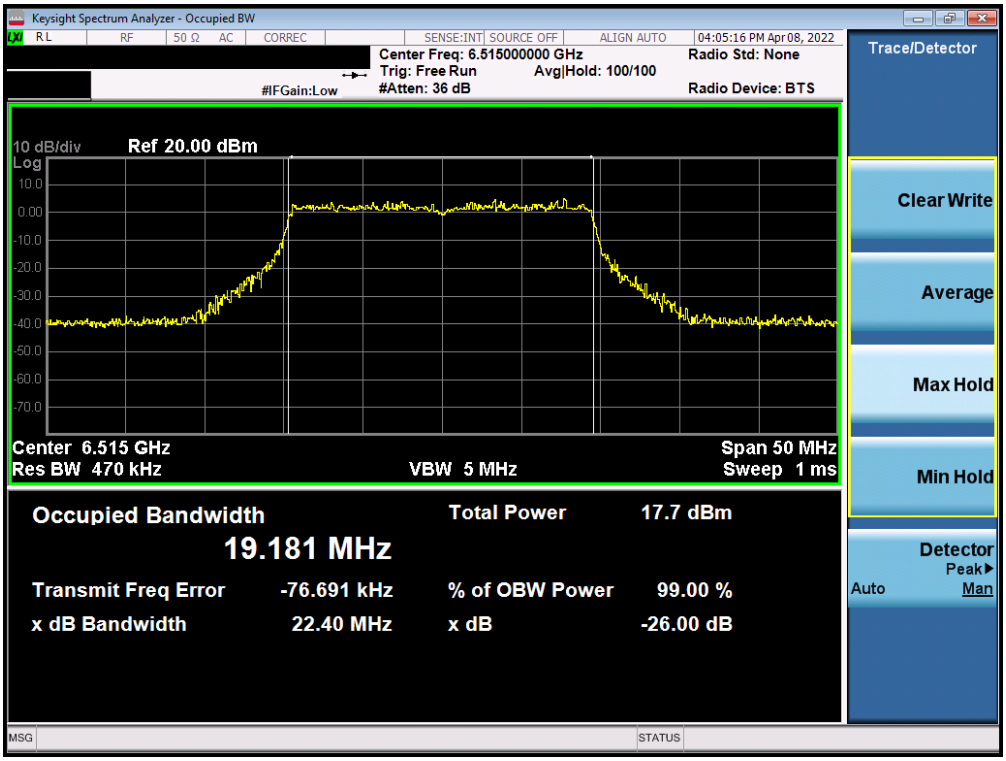
Plot 7-49. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 87)



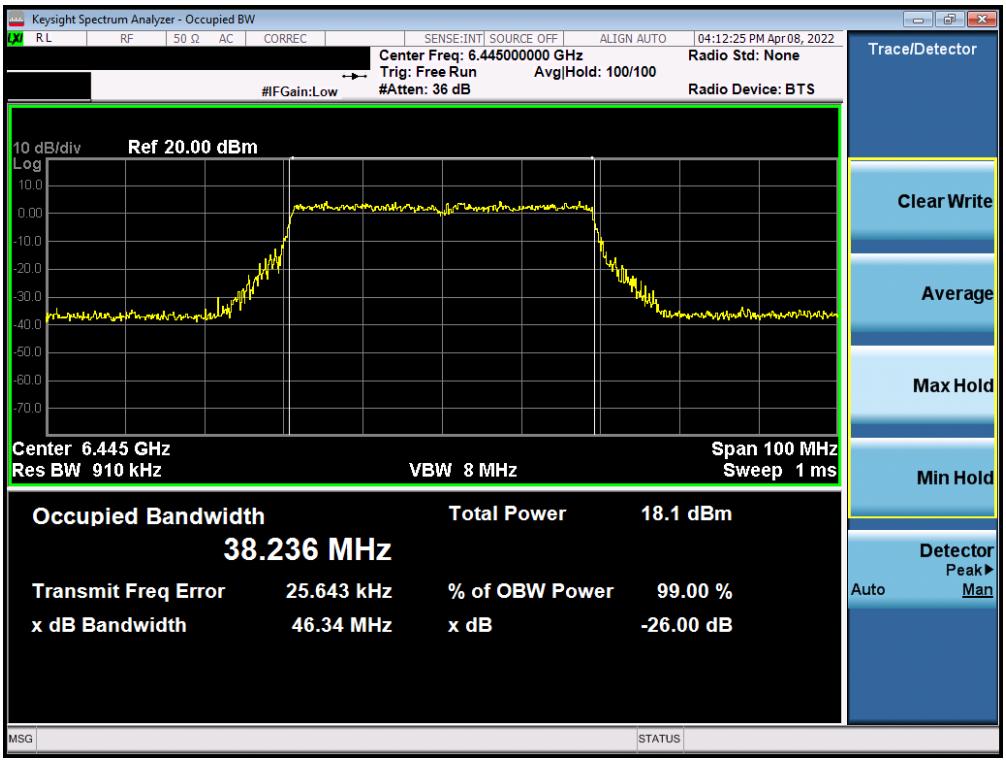
Plot 7-50. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 97)



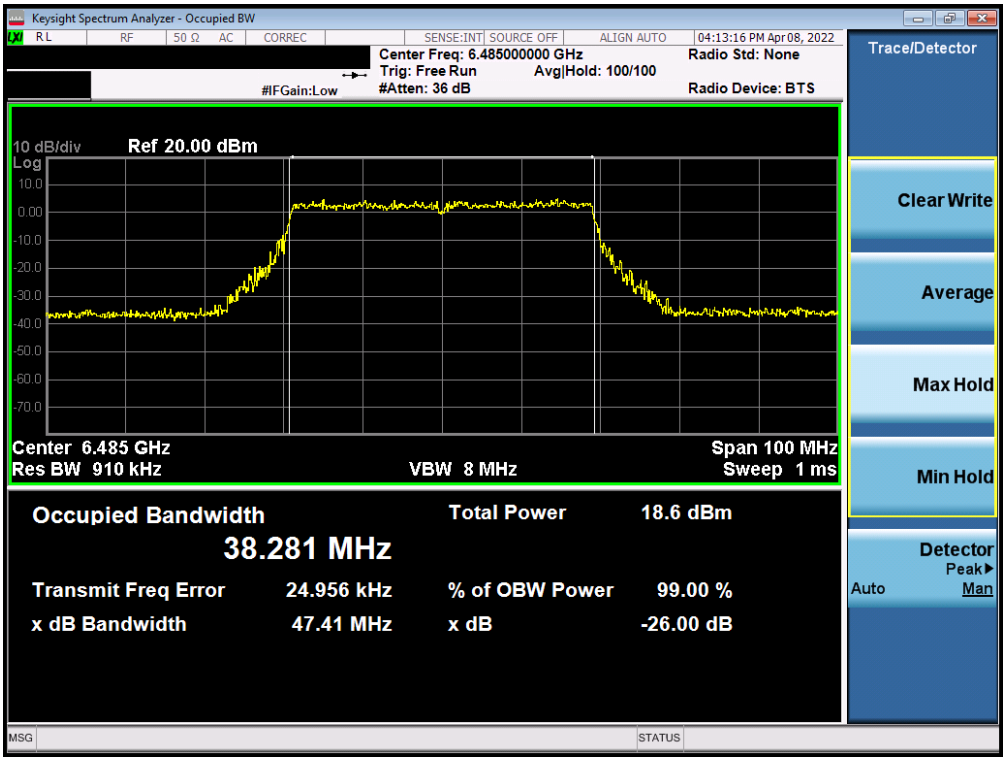
Plot 7-51. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 105)



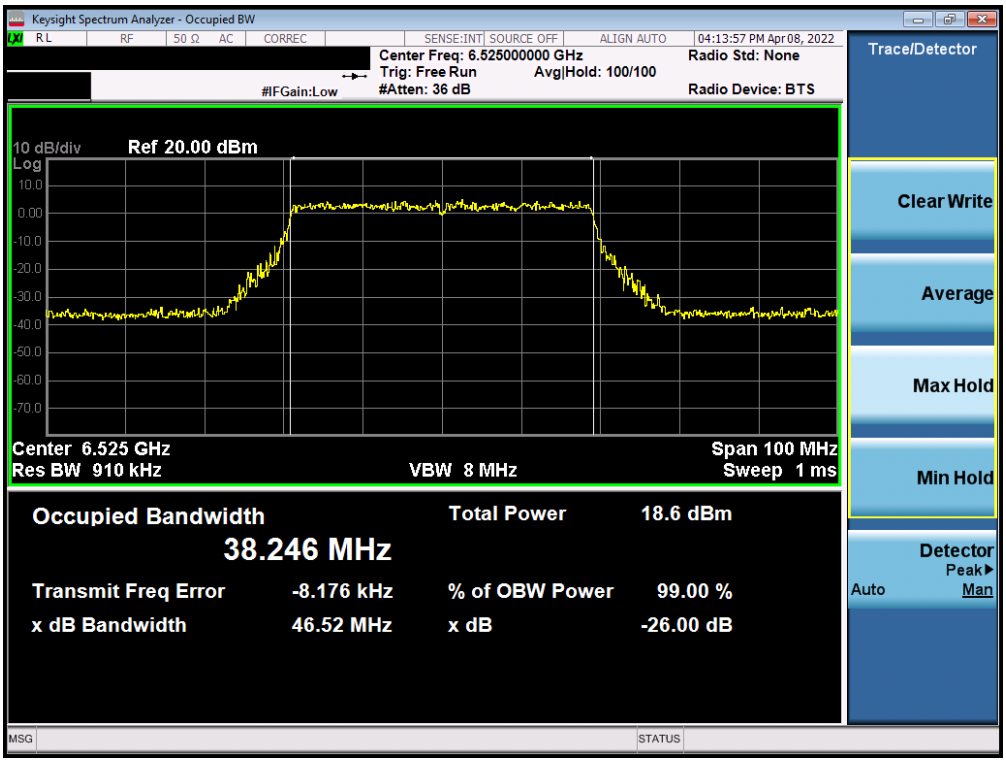
Plot 7-52. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 113)



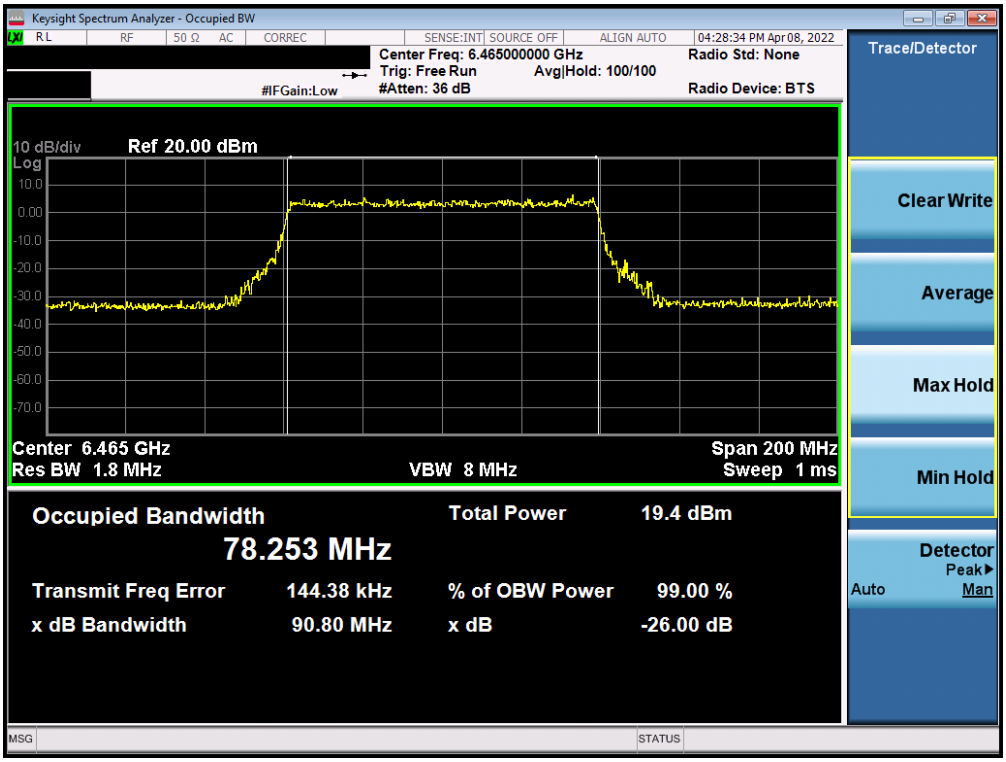
Plot 7-53. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 99)



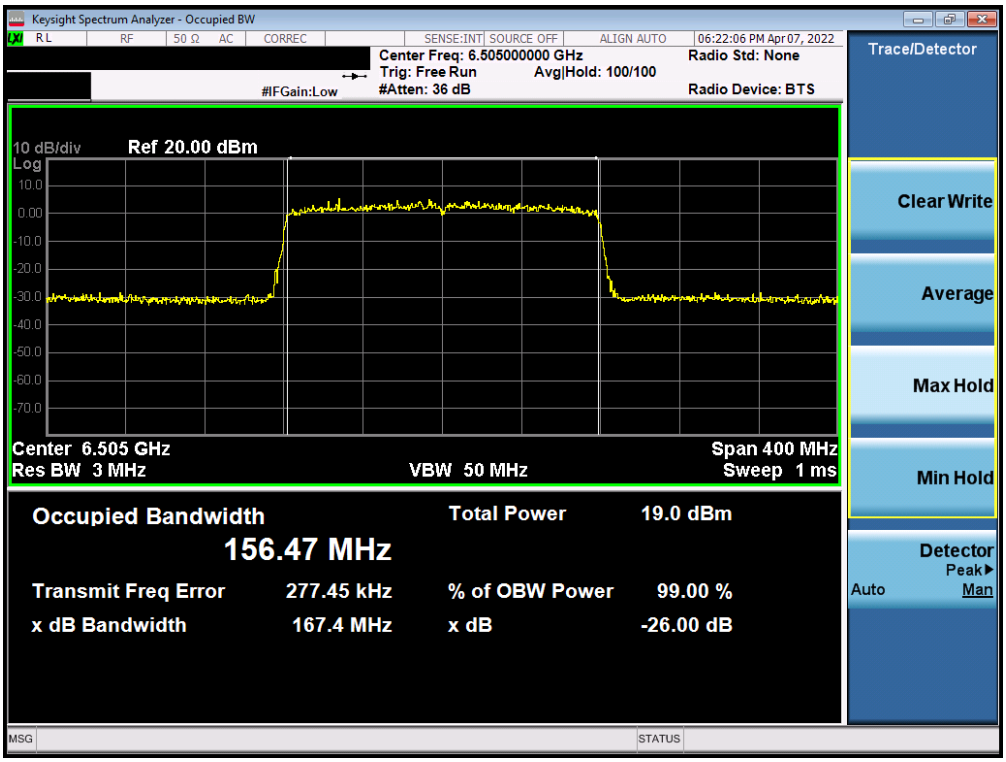
Plot 7-54. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 107)



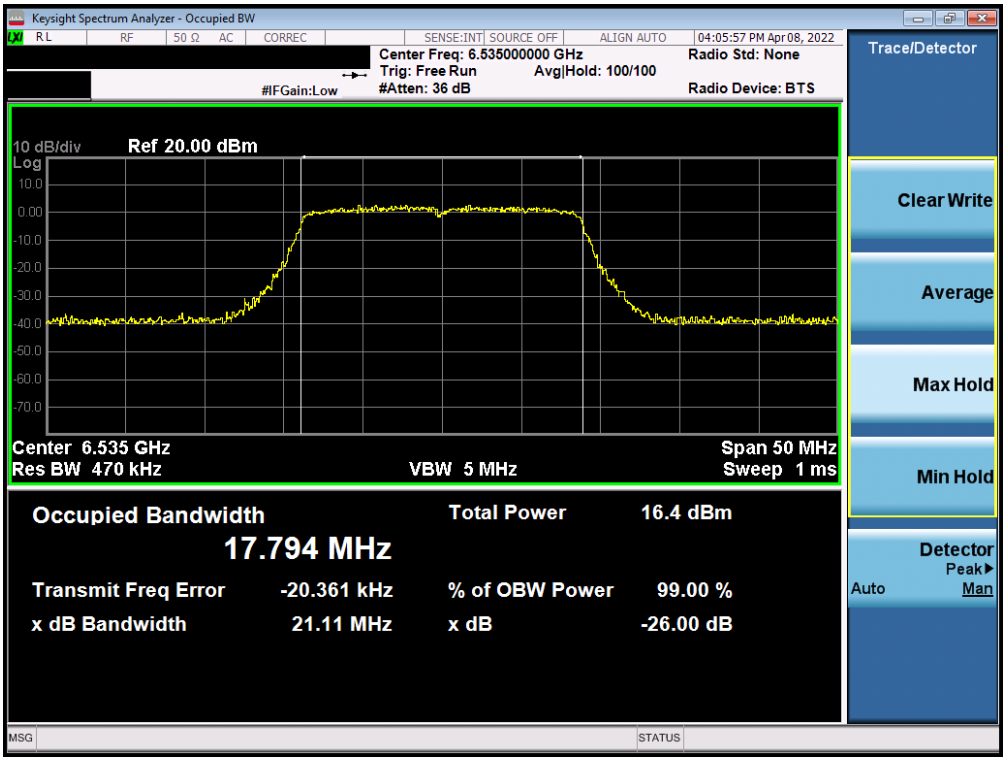
Plot 7-55. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 115)



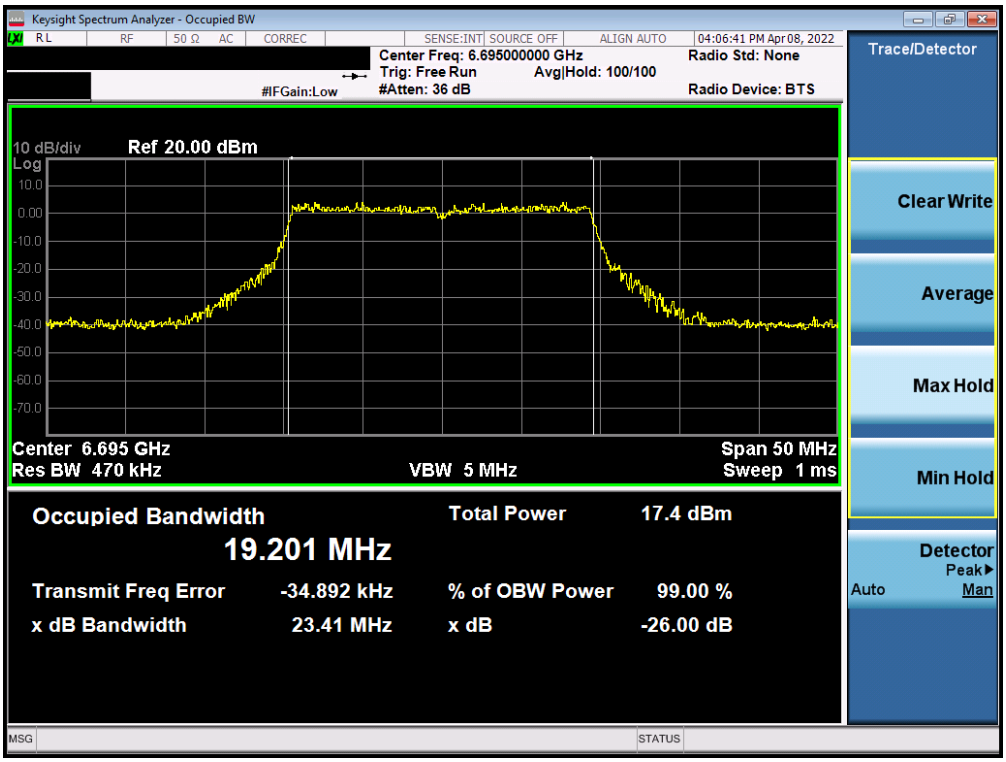
Plot 7-56. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 103)



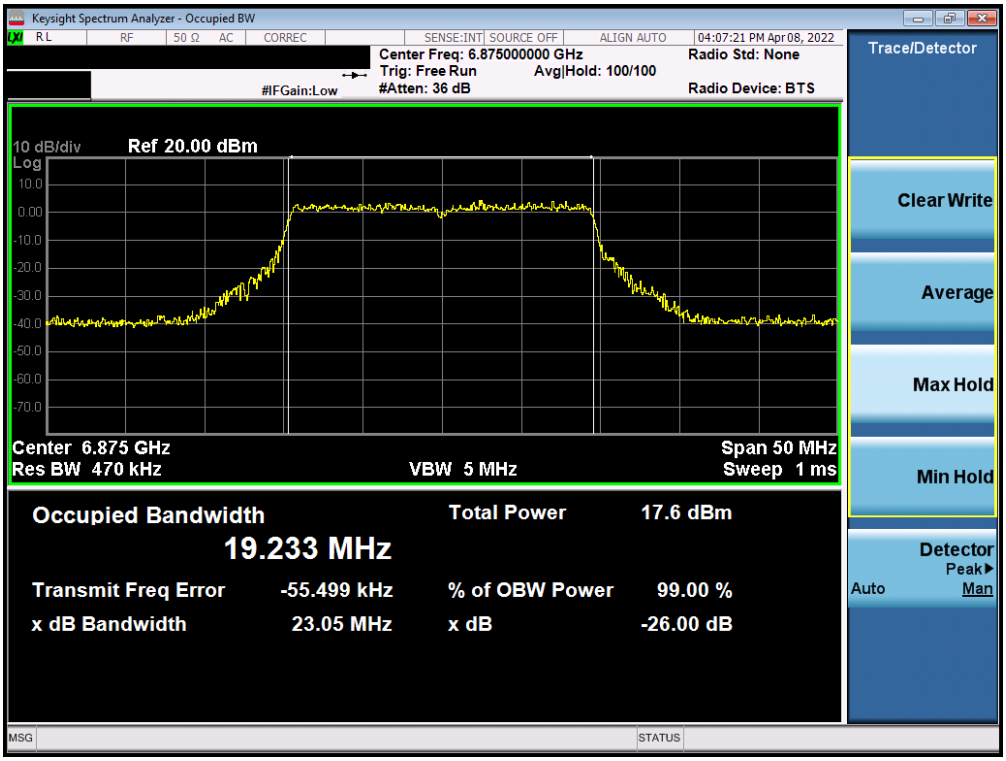
Plot 7-57. Occupied Bandwidth Plot MIMO ANT1 (160MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 111)



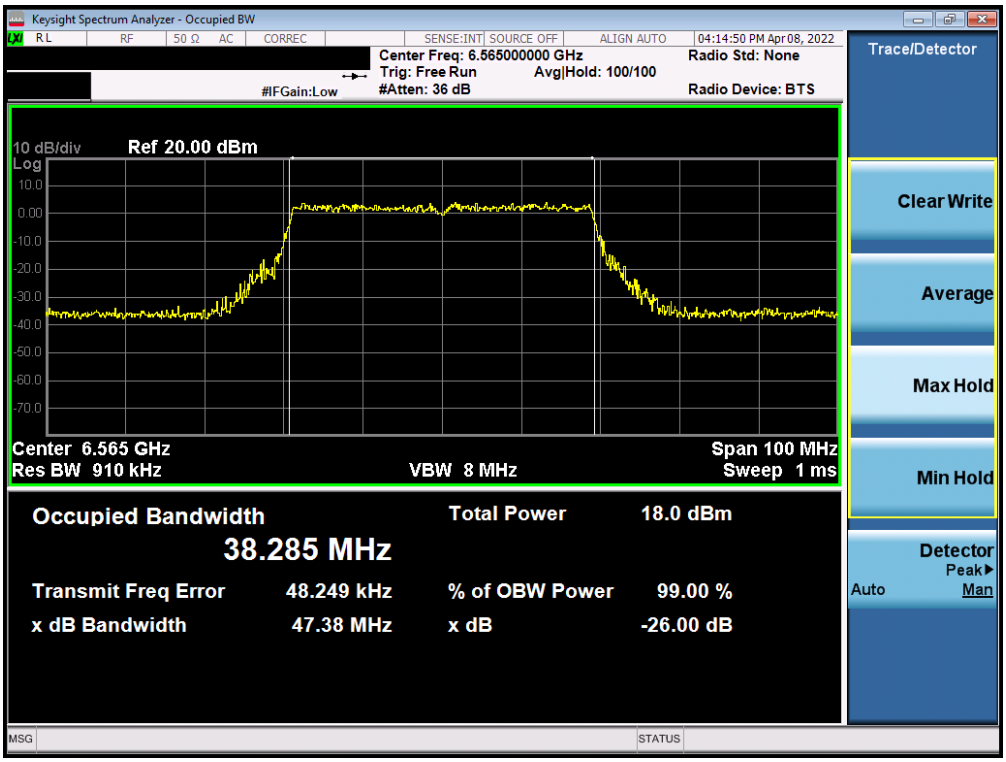
Plot 7-58. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 117)



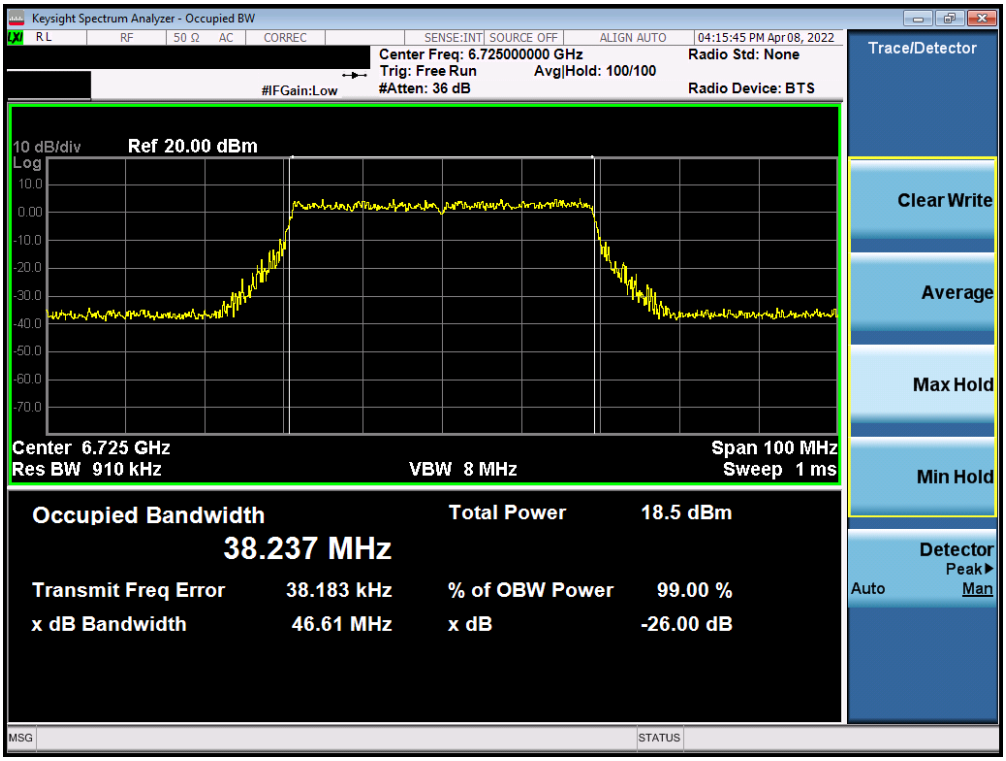
Plot 7-59. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 149)



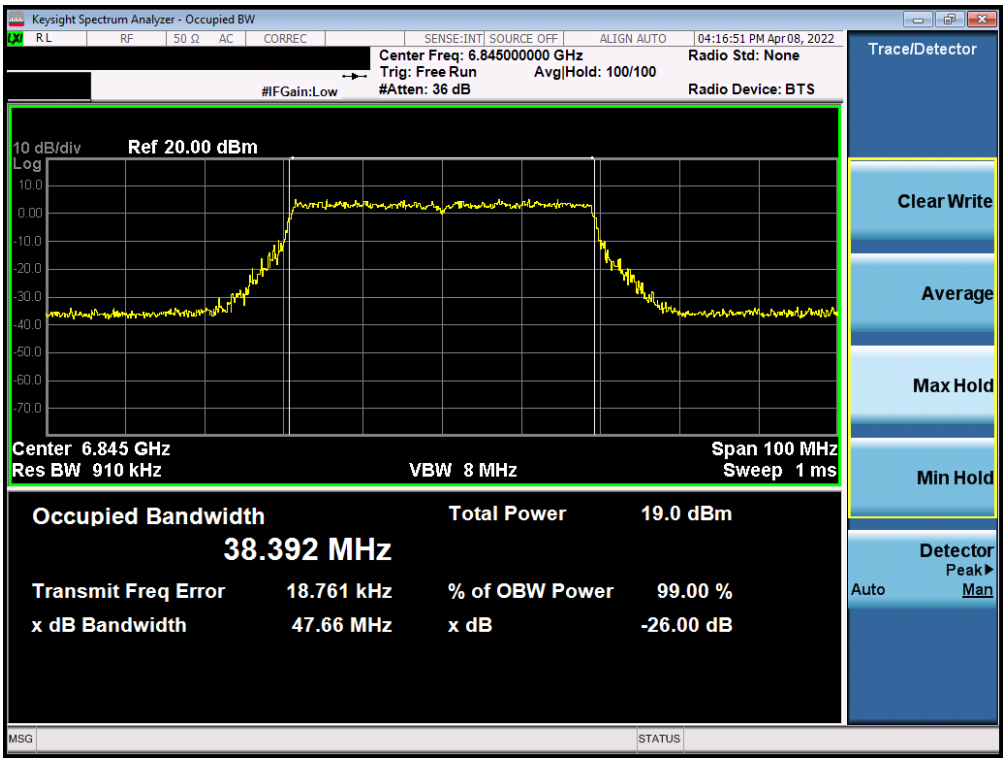
Plot 7-60. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 185)



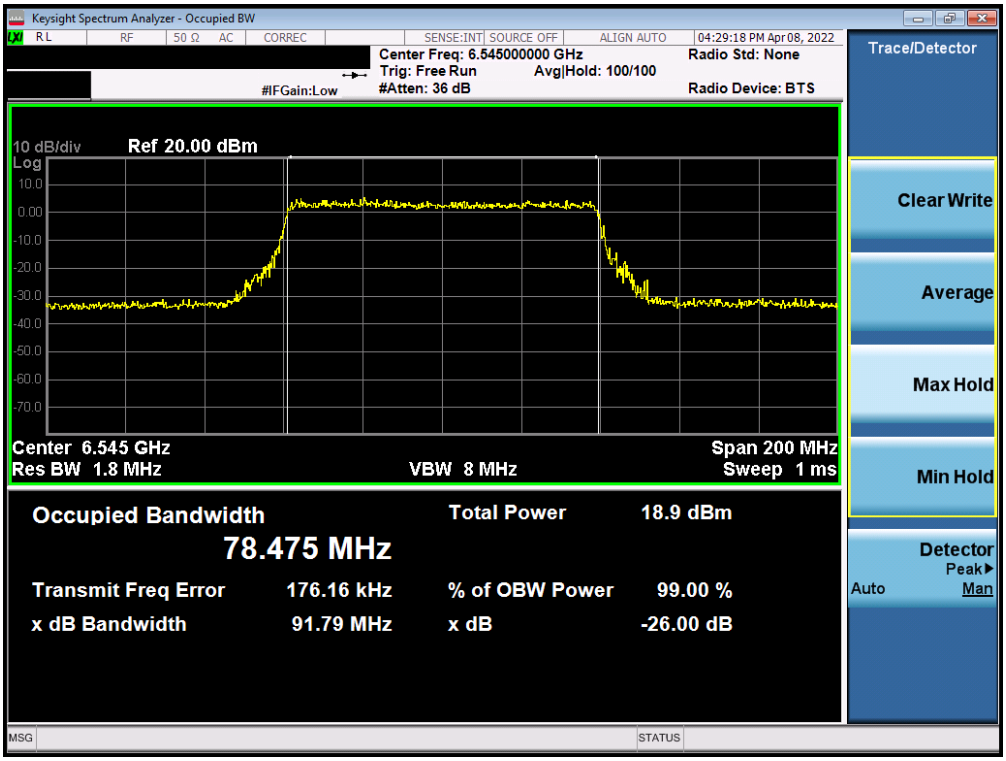
Plot 7-61. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 123)



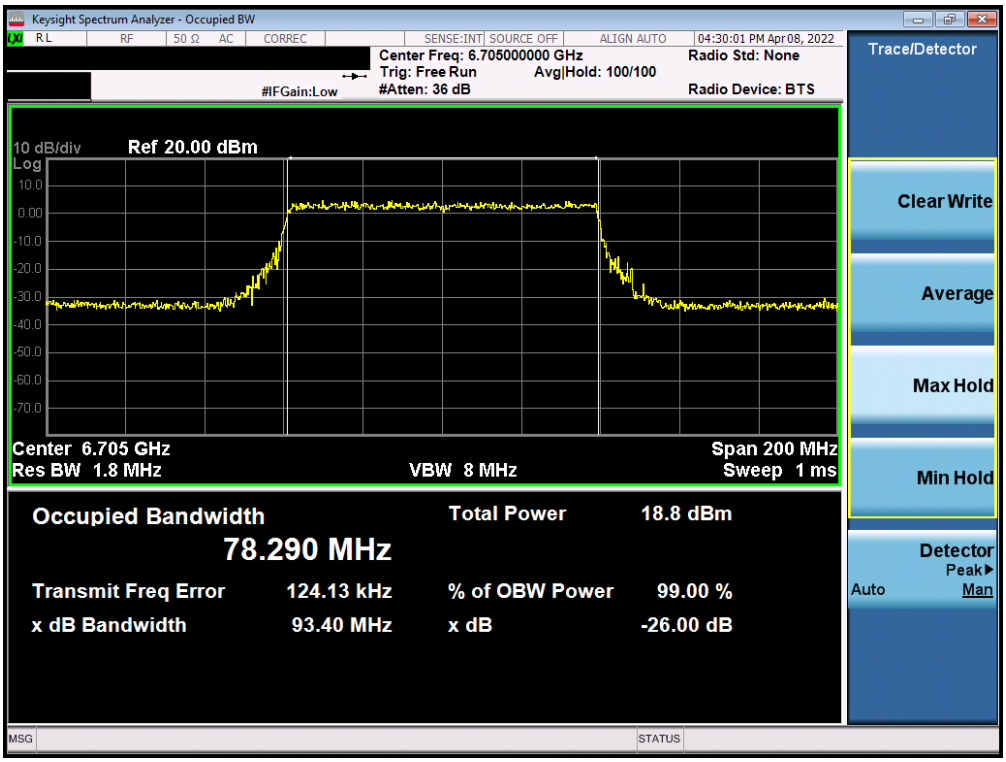
Plot 7-62. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 155)



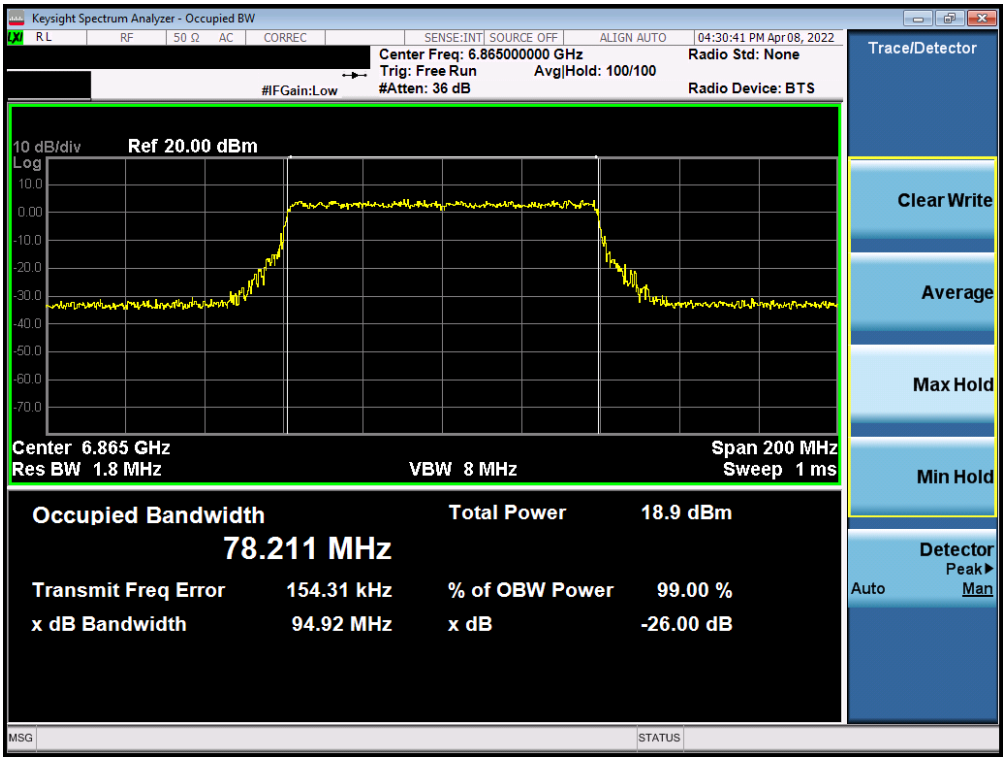
Plot 7-63. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 179)



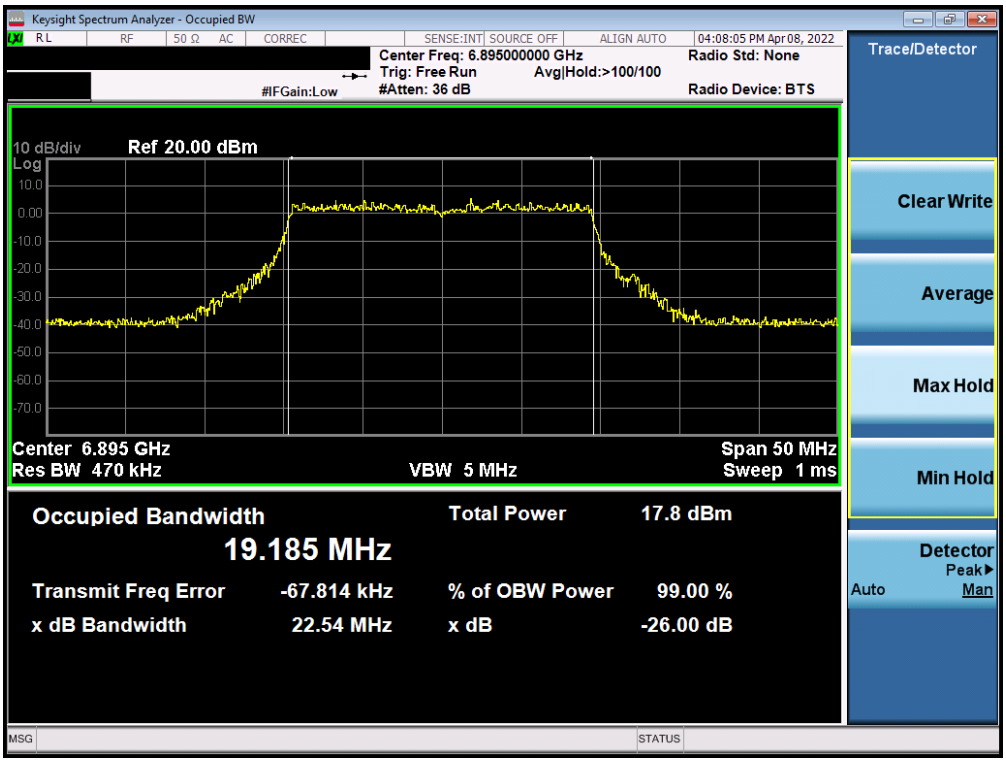
Plot 7-64. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 119)



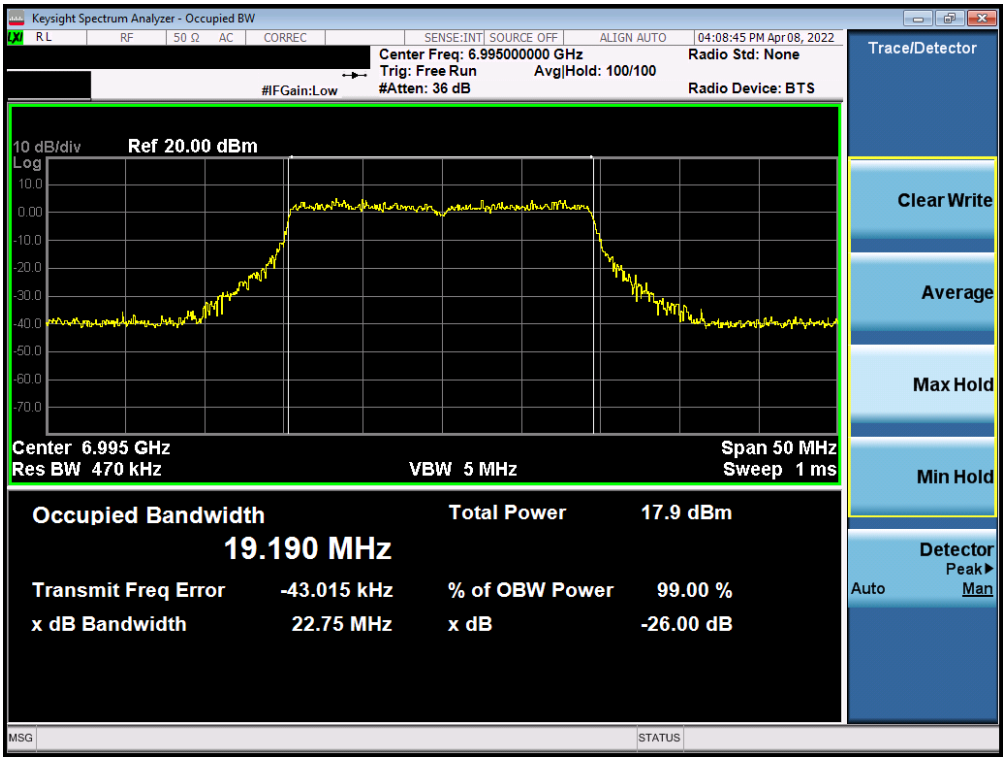
Plot 7-65. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 151)



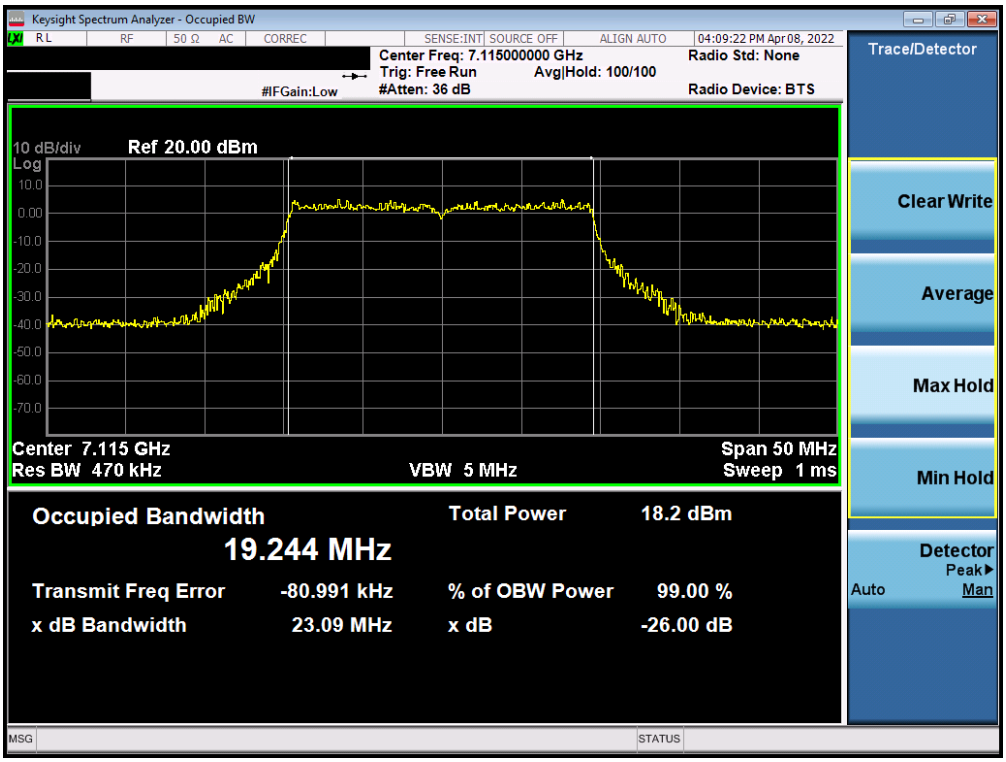
Plot 7-66. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 183)



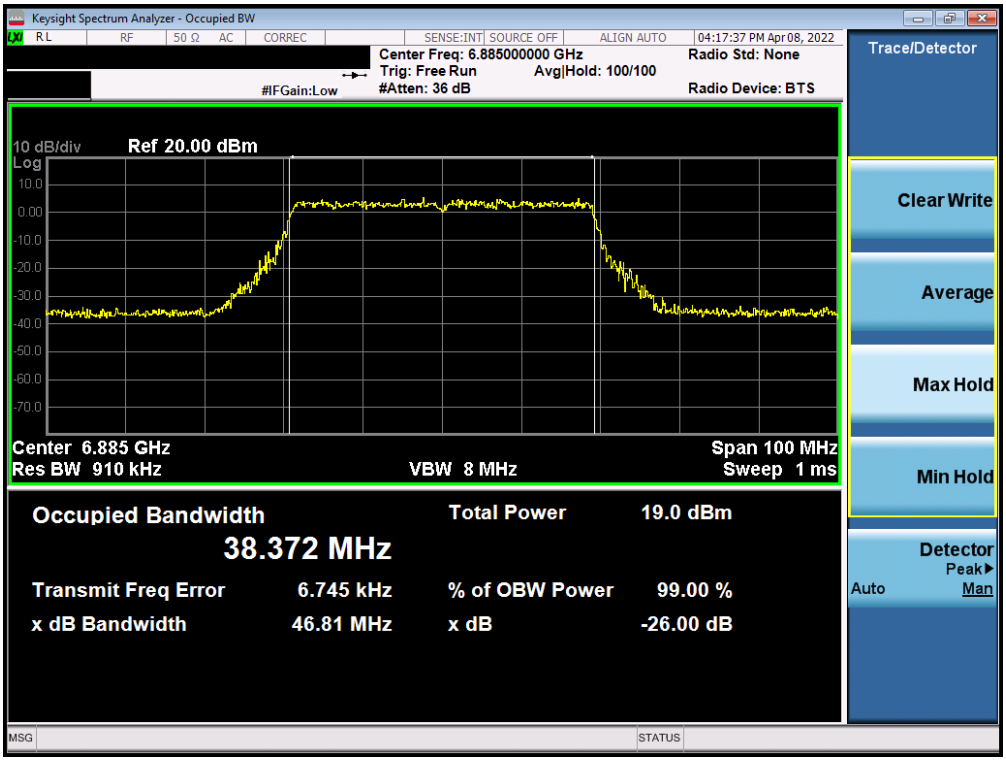
Plot 7-67. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 189)



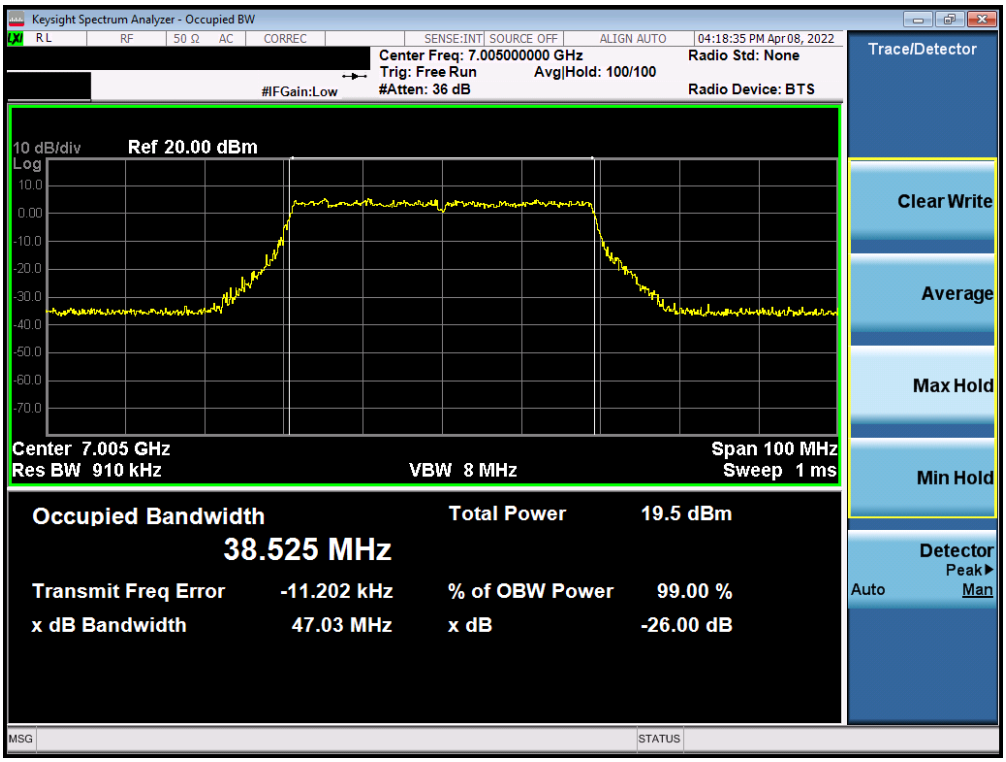
Plot 7-68. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 209)



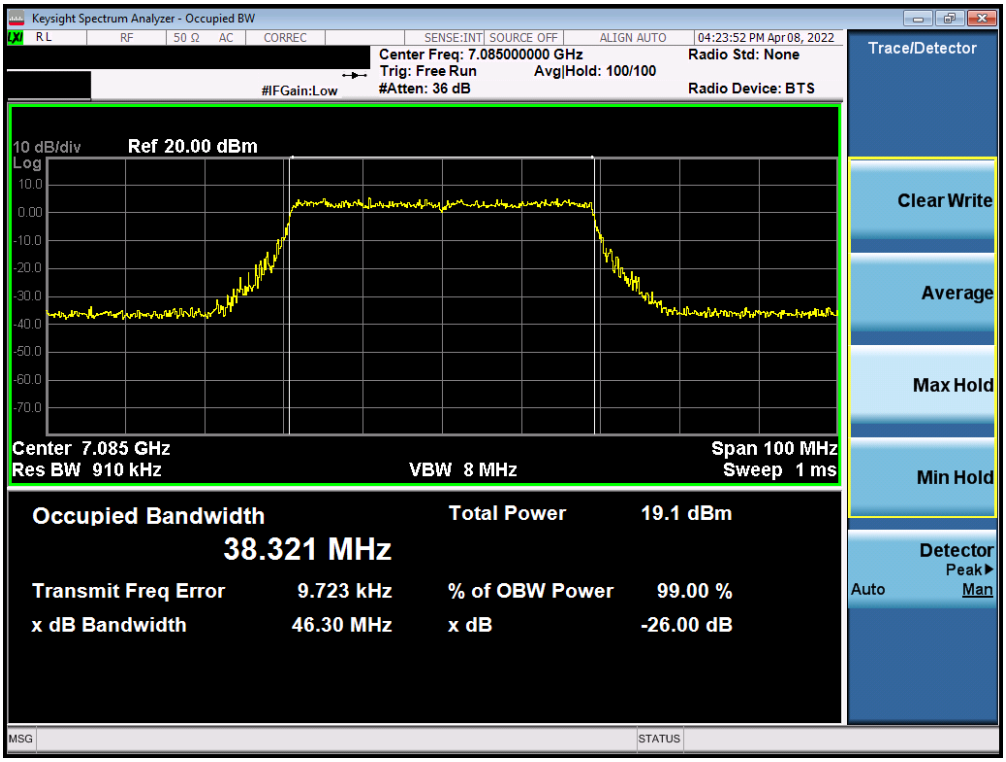
Plot 7-69. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 233)



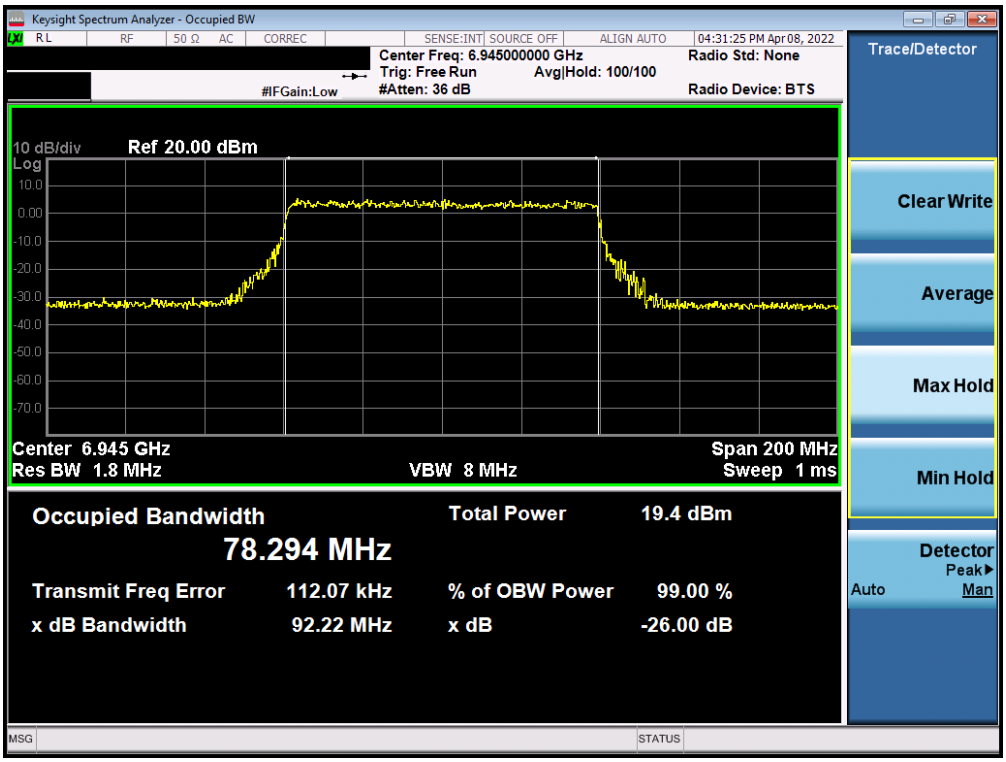
Plot 7-70. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 187)



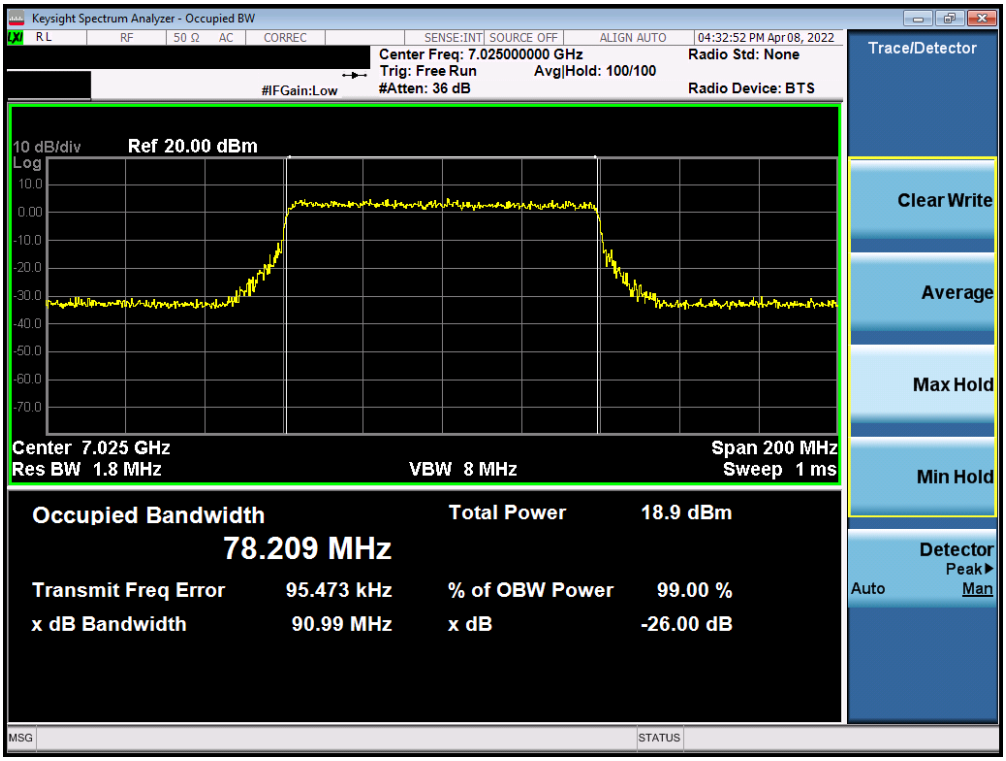
Plot 7-71. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 211)



Plot 7-72. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 227)

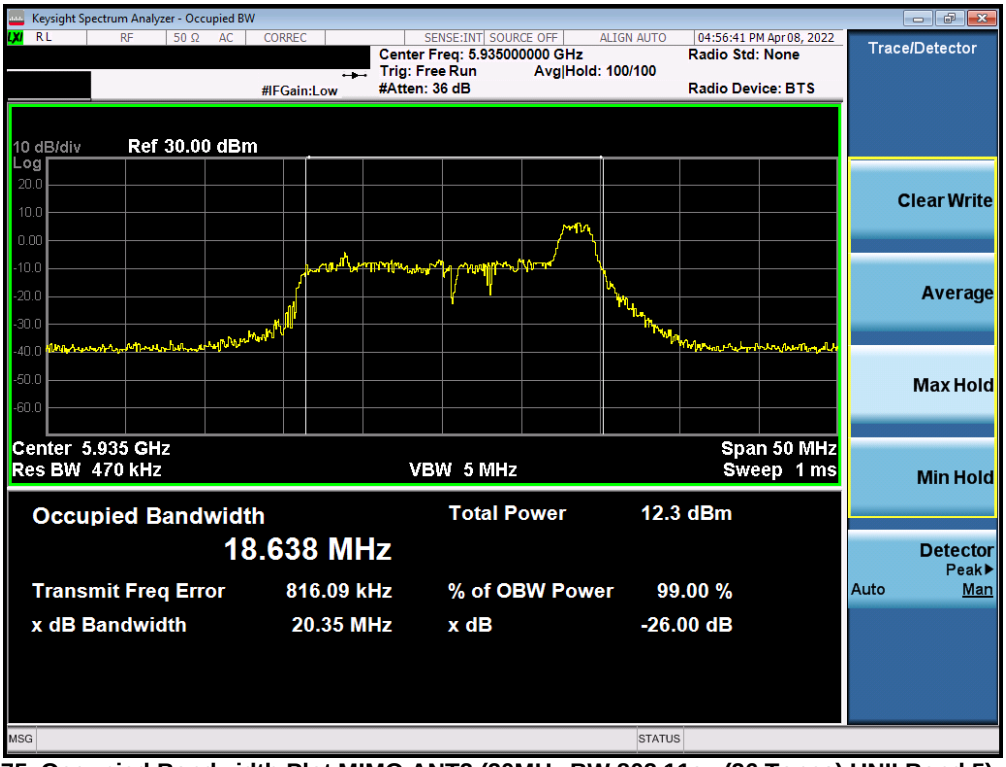


Plot 7-73. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 199)

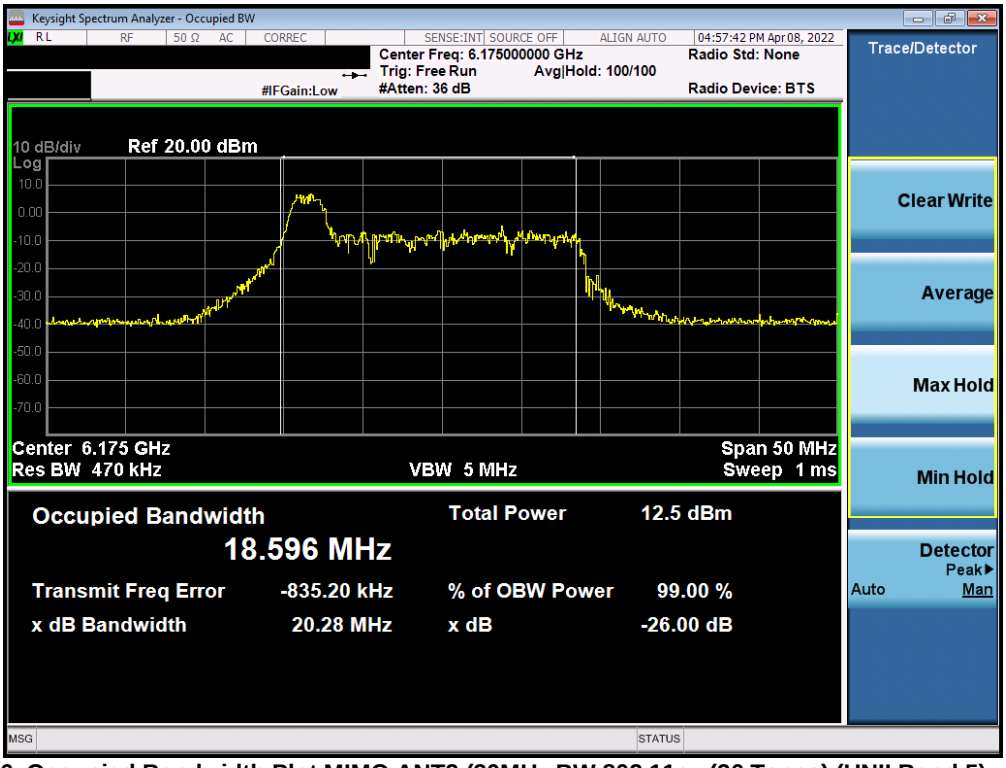


Plot 7-74. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 215)

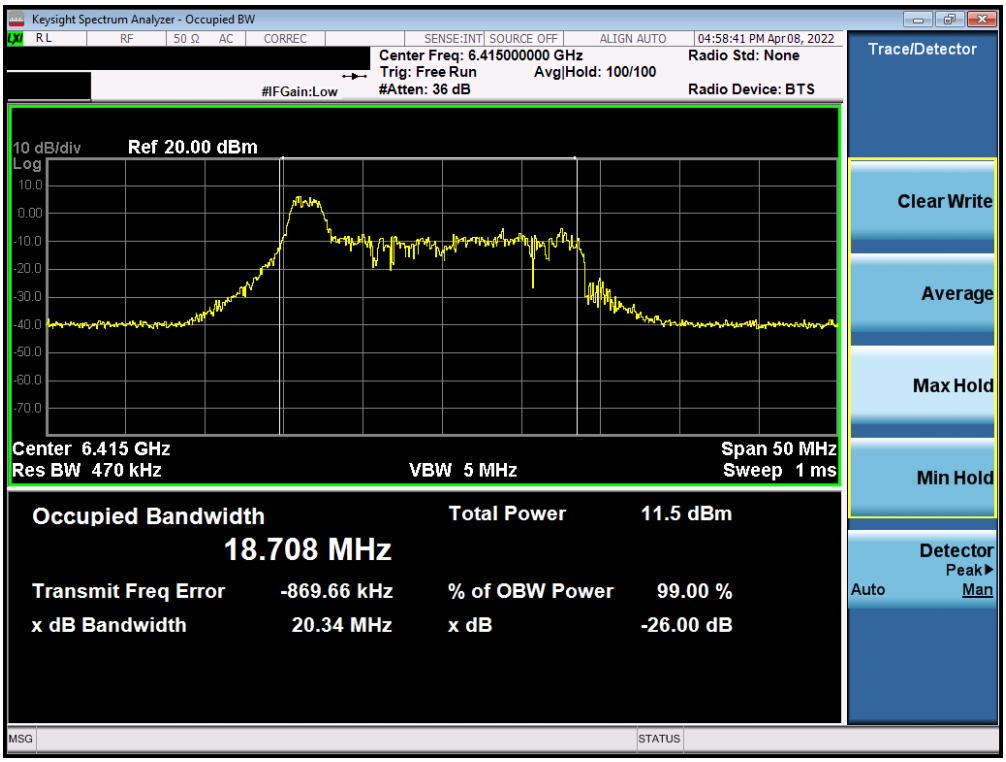
MIMO Antenna-2 Occupied Bandwidth Measurements (26 Tones)



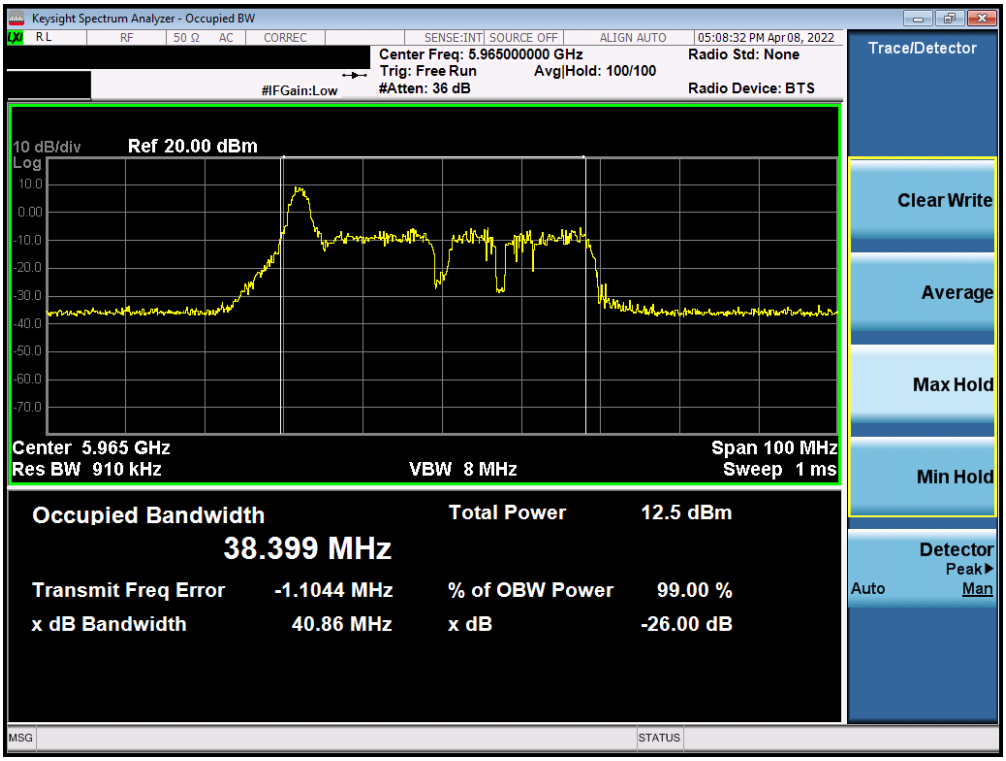
Plot 7-75. Occupied Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax (26 Tones) UNII Band 5) – Ch. 2



Plot 7-76. Occupied Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 45)

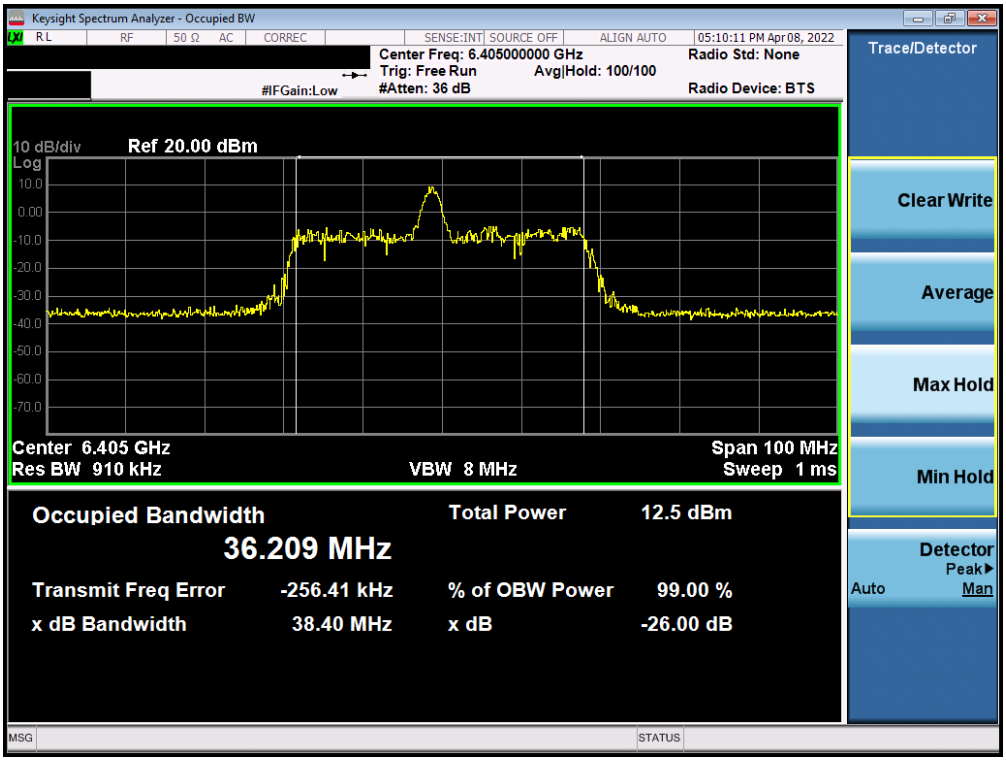


Plot 7-77. Occupied Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax (26 Tones) UNII Band 5) – Ch. 93)

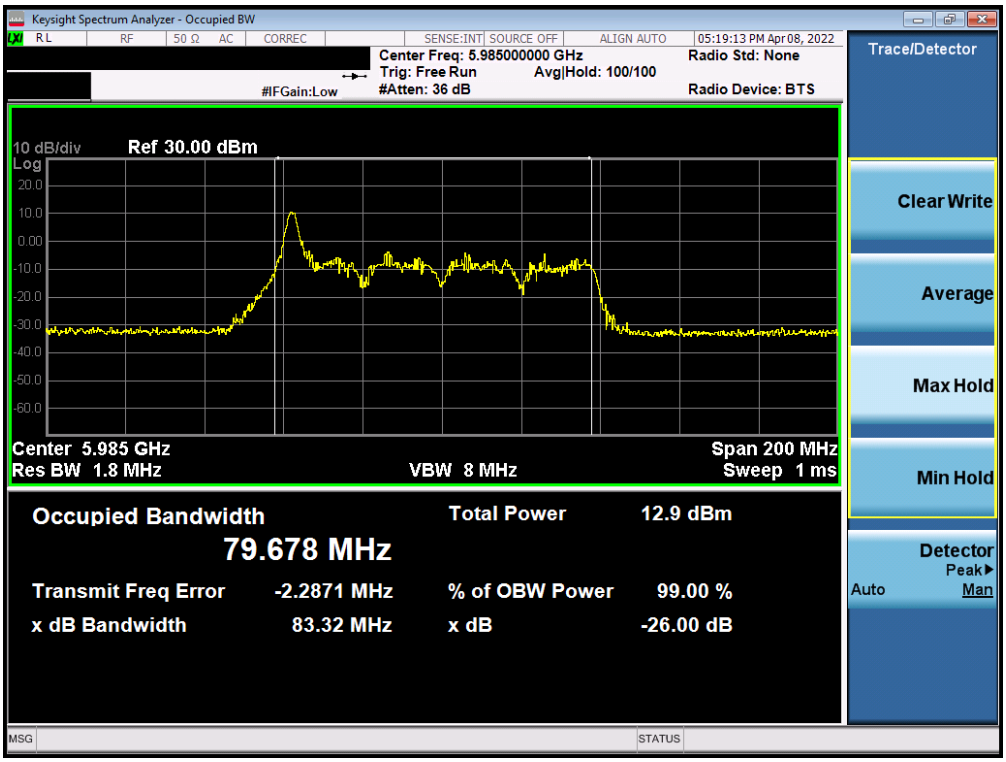


Plot 7-78. Occupied Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 3)

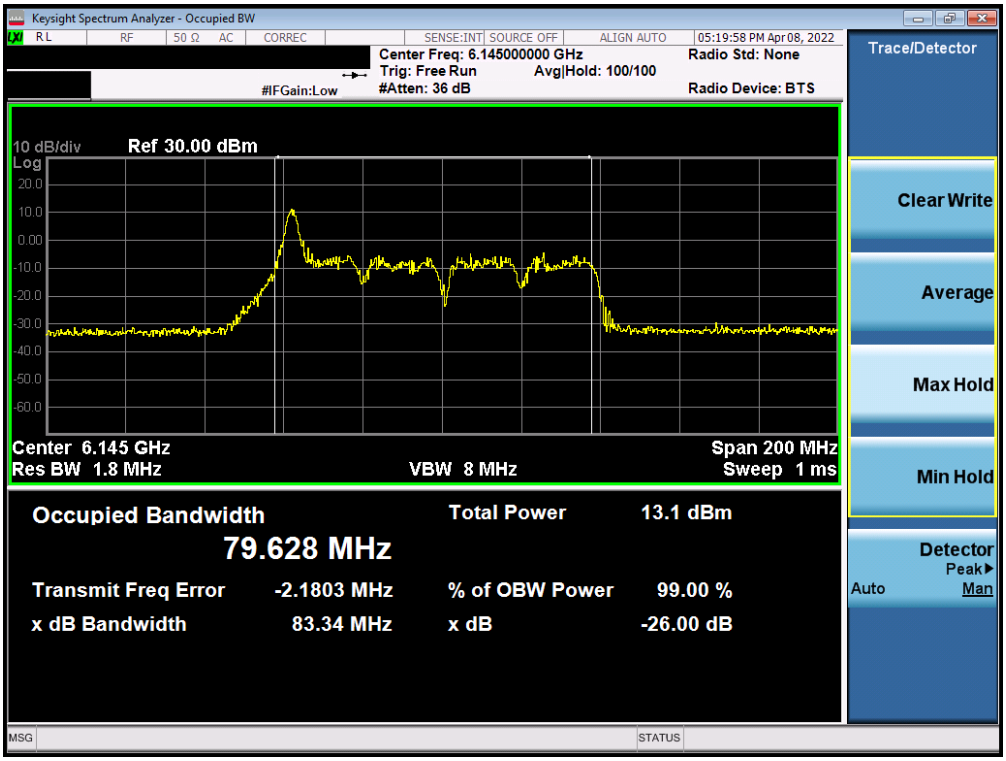
Plot 7-79. Occupied Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 43)



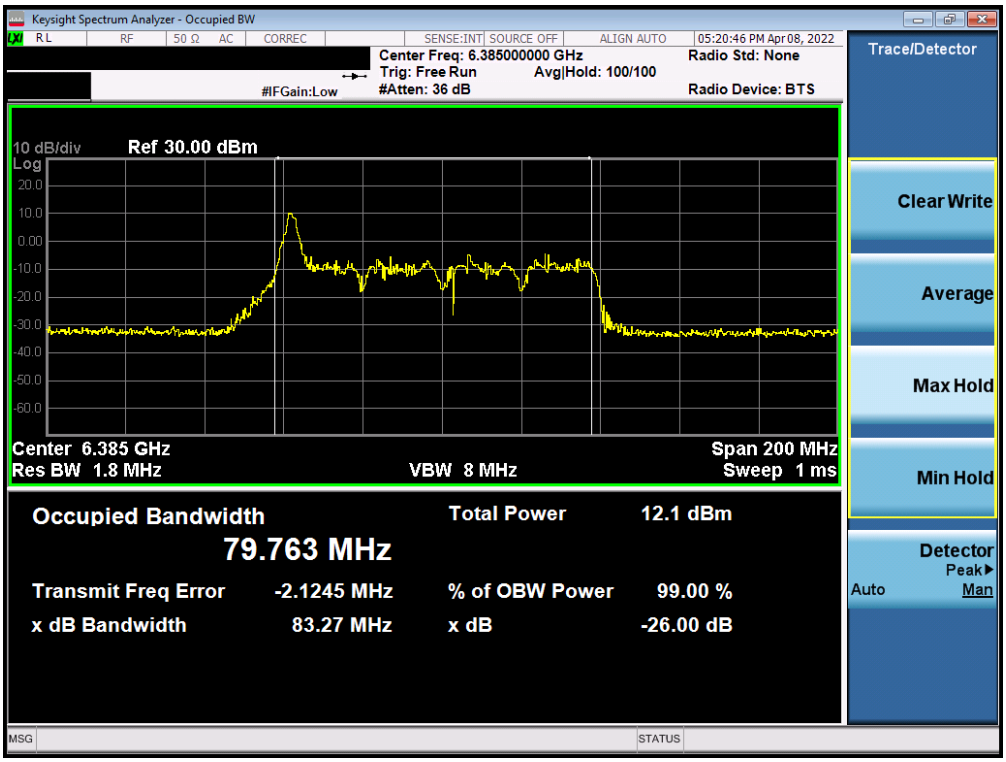
Plot 7-80. Occupied Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 91)



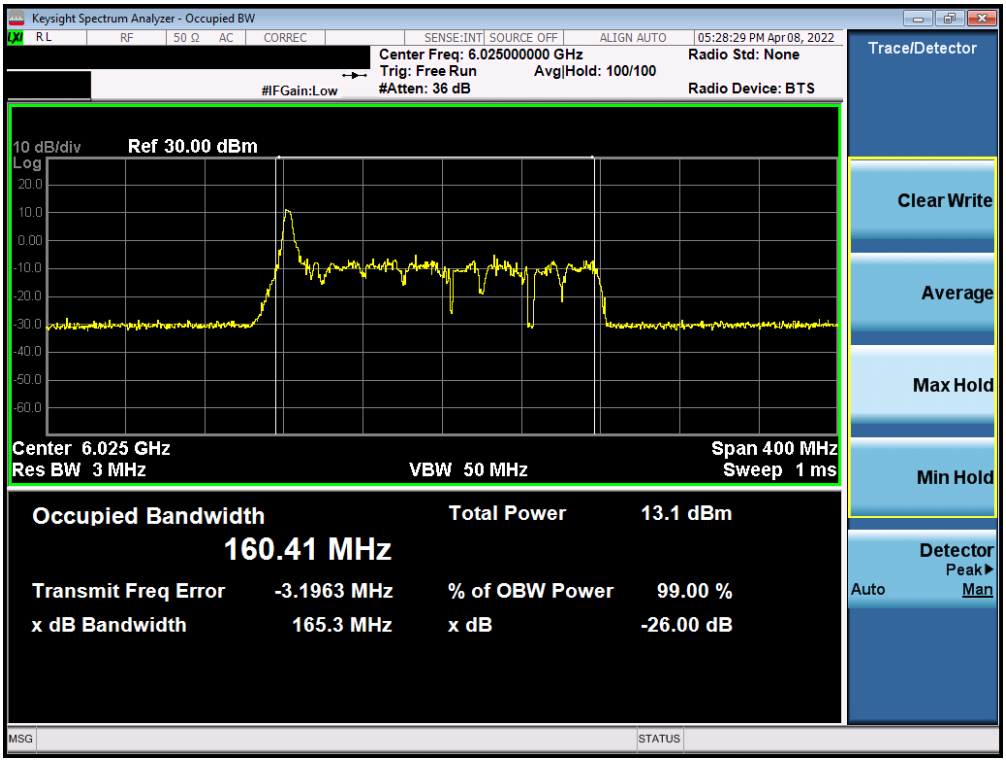
Plot 7-81. Occupied Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 7)



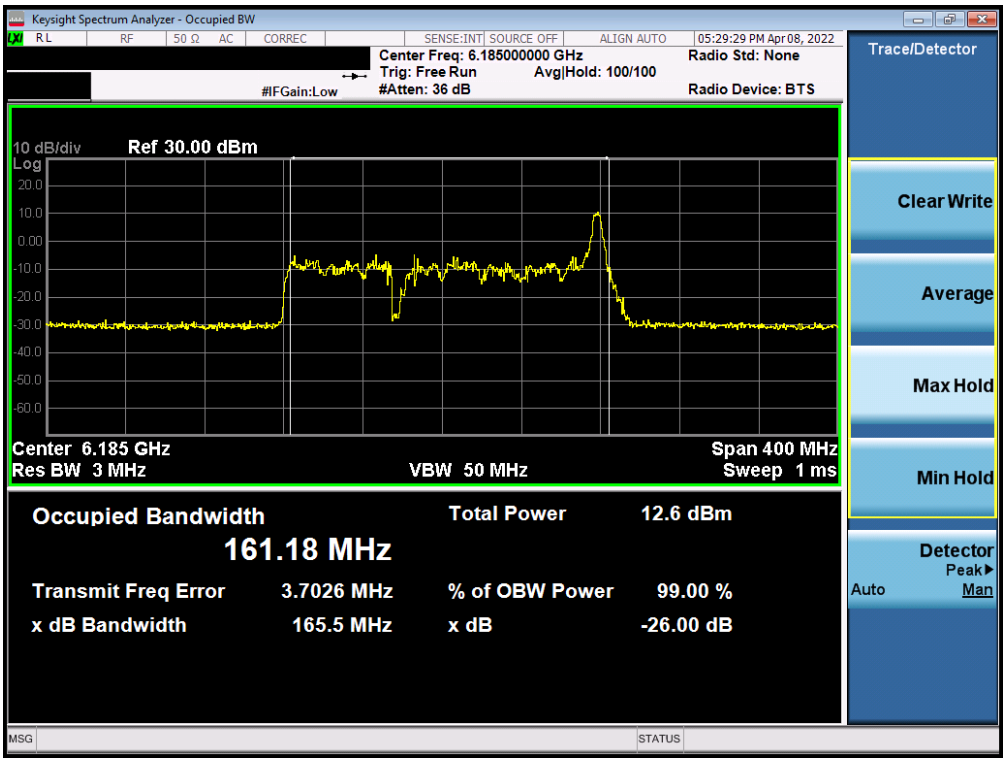
Plot 7-82. Occupied Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 39)



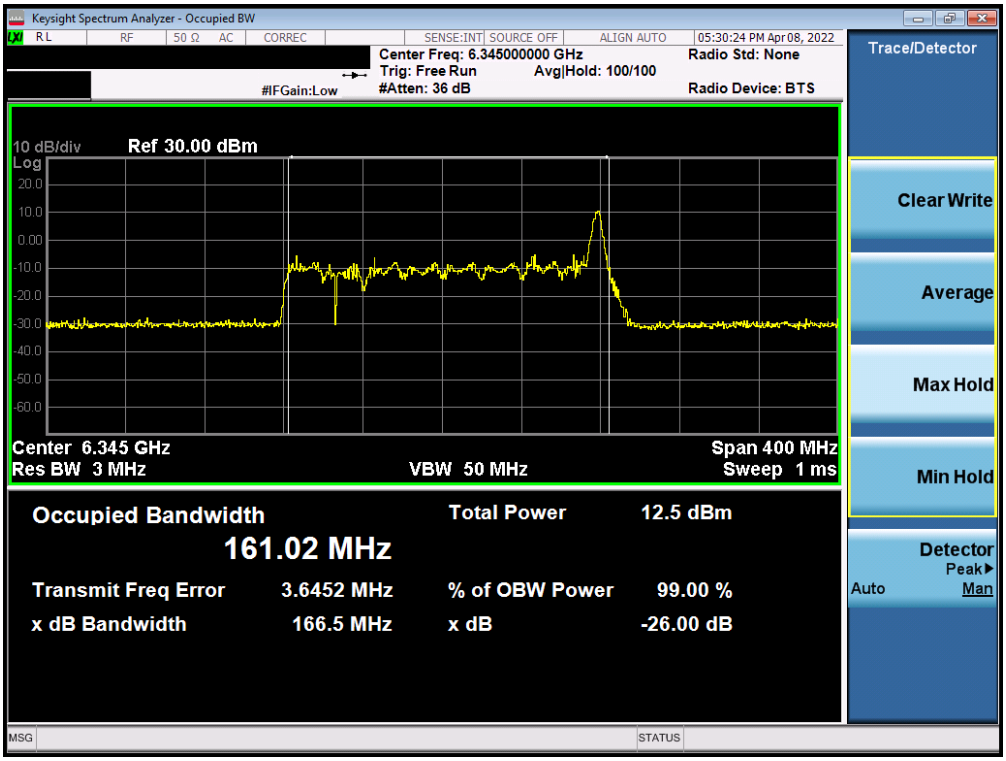
Plot 7-83. Occupied Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 87)



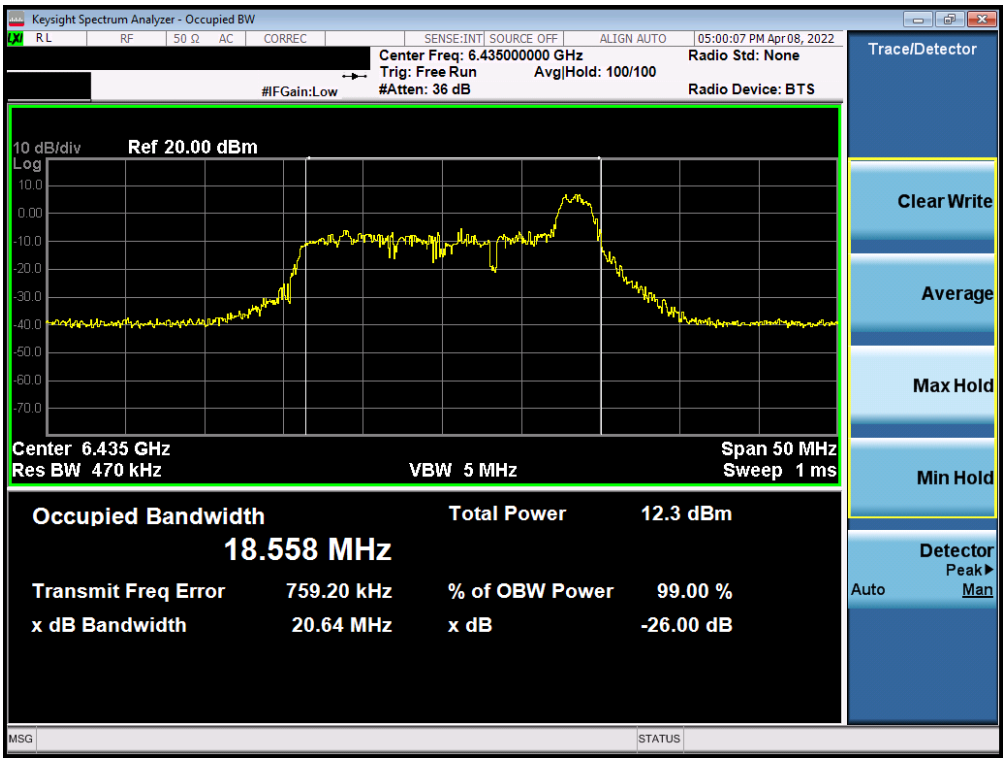
Plot 7-84. Occupied Bandwidth Plot MIMO ANT2 (160MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 15)



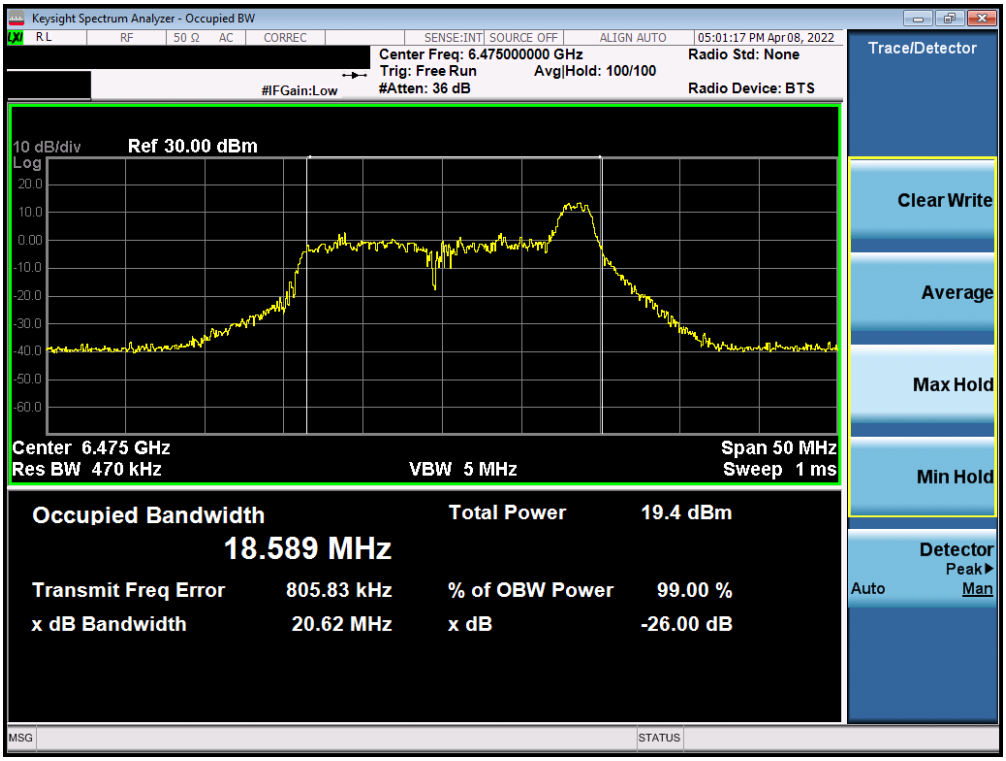
Plot 7-85. Occupied Bandwidth Plot MIMO ANT2 (160MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 47)



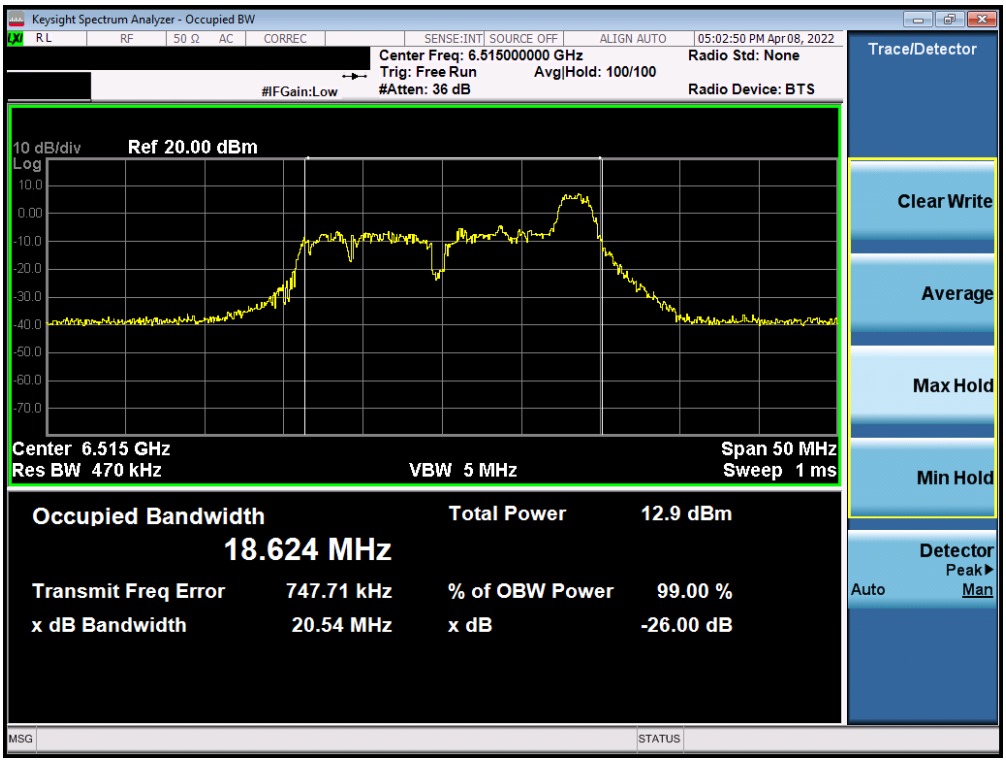
Plot 7-86. Occupied Bandwidth Plot MIMO ANT2 (160MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 79)



Plot 7-87. Occupied Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 97)

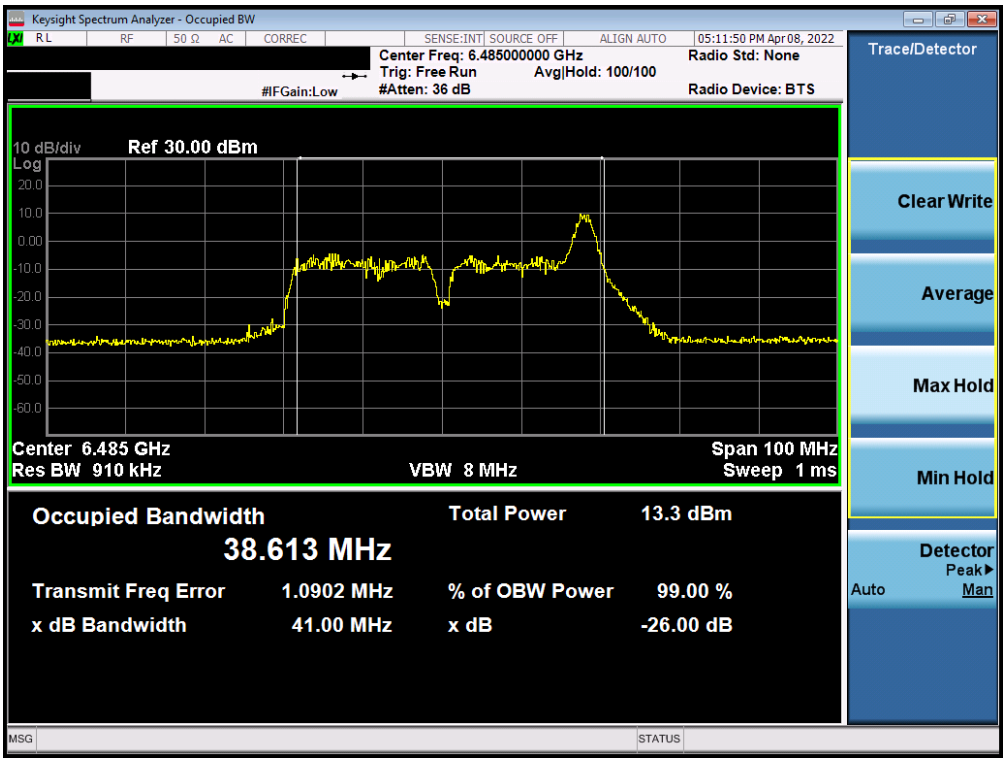


Plot 7-88. Occupied Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 105)

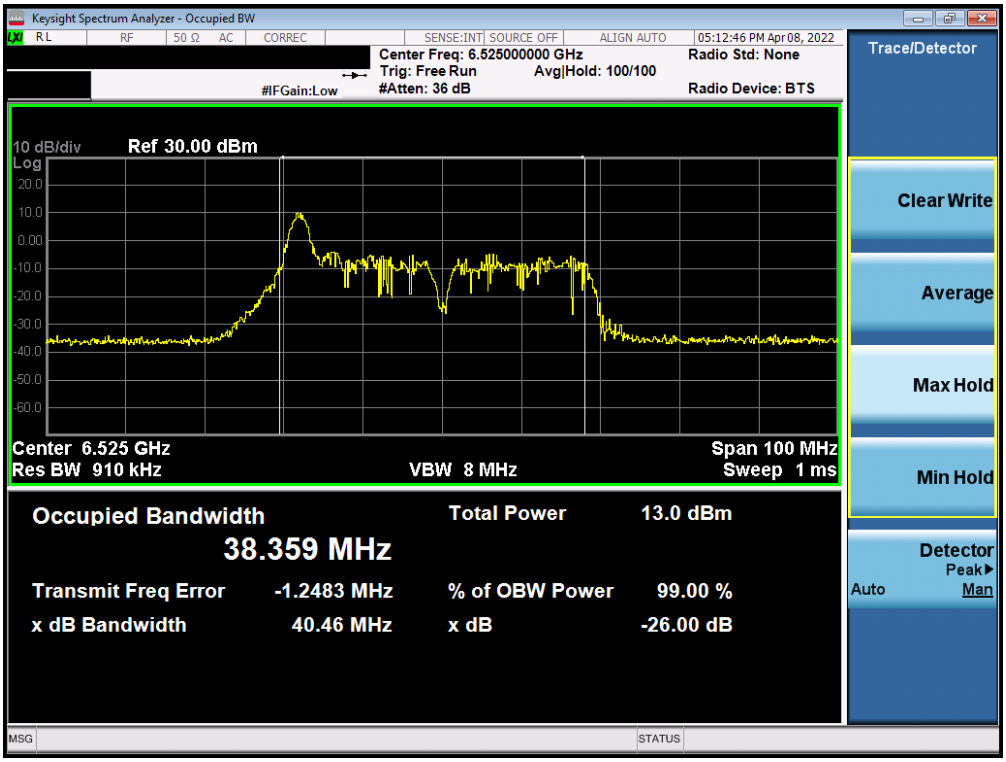


Plot 7-89. Occupied Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 113)

Plot 7-90. Occupied Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 99)



Plot 7-91. Occupied Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 107)



Plot 7-92. Occupied Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 115)