

**MEASUREMENT REPORT****FCC PART 15.407 / ISED RSS-248 802.11a/ax/be WiFi 6E (OFDMA)****Applicant Name:**

Microsoft Corporation  
One Microsoft Way  
Redmond, WA 98052  
United States

**Date of Testing:**

12/14/2023 - 05/20/2024

**Test Report Issue Date:**

5/20/2024

**Test Site/Location:**

Element lab., Columbia, MD, USA

**Test Report Serial No.:**

1M2312040120-22-R2.C3K

**FCC ID:**

**C3K2077**

**IC:**

**3048A-2077**

**APPLICANT:**

**Microsoft Corporation**

**Application Type:**

Certification

**Model/HVIN:**

2077

**EUT Type:**

Portable Computing Device

**Frequency Range:**

5935 – 7115MHz

**Modulation Type:**

OFDMA

**FCC Classification:**

15E 6GHz Low Power Dual Client (6CD)

**FCC Rule Part(s):**

Part 15 Subpart E (15.407)

**ISED Specification:**

RSS-248 Issue 2

**Test Procedure(s):**

ANSI C63.10-2013, KDB 987594 D02 v02r01

Note: This revised Test Report (S/N: 1M2312040120-22-R2.C3K) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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. 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



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Channel Bandwidth [MHz]	UNII Band	Tx Frequency [MHz]	MIMO	
			Max. Power [mW]	Max. Power [dBm]
20	5	5935 - 6415	7.20	8.58
	6	6435 - 6515	6.88	8.37
	7	6535 - 6875	7.22	8.59
	8	6895 - 7115	7.30	8.63
40	5	5965 - 6405	11.91	10.76
	6	6445 - 6525	13.24	11.22
	7	6565 - 6845	13.71	11.37
	8	6885 - 7085	14.87	11.72
80	5	5985 - 6385	26.66	14.26
	6	6465	22.55	13.53
	7	6545 - 6865	29.24	14.66
	8	6945 - 7025	27.48	14.39
160	5	6025 - 6345	51.35	17.11
	6	6505	41.81	16.21
	7	6665 - 6825	40.27	16.05
	8	6985	44.59	16.49
320	5	6105 - 6265	105.96	20.25
	6	6425	88.43	19.47
	7	6585 - 6745	85.02	19.30
	8	6905	86.80	19.39

**EUT Overview – Low Power Indoor Client – EIRP**

Channel Bandwidth [MHz]	UNII Band	Tx Frequency [MHz]	MIMO	
			Max. Power [mW]	Max. Power [dBm]
20	5	5935 - 6415	472.32	26.74
	7	6535 - 6875	438.96	26.42
40	5	5965 - 6405	537.87	27.31
	7	6565 - 6845	510.97	27.08
80	5	5985 - 6385	789.12	28.97
	7	6545 - 6865	691.77	28.40
160	5	6025 - 6345	839.81	29.24
	7	6665 - 6825	701.54	28.46
320	5	6105 - 6265	744.75	28.72

**EUT Overview – Standard Power Client - EIRP**

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# 1 INTRODUCTION

## 1.1 Scope

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

## 1.2 Element Test Location

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

## 1.3 Test Facility / Accreditations

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

- Element Washington DC LLC is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation (A2LA) with Certificate number 2041.01 for Specific Absorption Rate (SAR), Hearing Aid Compatibility (HAC) testing, where applicable, and Electromagnetic Compatibility (EMC) testing for FCC and Innovation, Science, and Economic Development Canada rules.
- Element Washington DC LLC TCB is a Telecommunication Certification Body (TCB) accredited to ISO/IEC 17065-2012 by A2LA (Certificate number 2041.03) in all scopes of FCC Rules and ISED Standards (RSS).
- Element Washington DC LLC facility is a registered (2451B) test laboratory with the site description on file with ISED.
- Element Washington DC LLC is a Recognized U.S. Certification Assessment Body (CAB # US0110) for ISED Canada as designated by NIST under the U.S. and Canada Mutual Recognition Agreements (MRAs).

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## 2 PRODUCT INFORMATION

### 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Microsoft Corporation Portable Computing Device FCC: C3K2077**. 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.:** 7CBC2, 7CDQ2, 7CBD2, B44D2, 7CF42

### 2.2 Device Capabilities

This device contains the following capabilities:

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

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/be (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. 802.11 ax/be (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. 802.11 ax/be (80MHz BW) Frequency / Channel Operations

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Band 5		Band 6		Band 7		Band 8	
Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
15	6025	111	6505	143	6665	207	6985
:	:			:	:		
47	6185			175	6825		
:	:						
79	6345						

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

Band 5		Band 6		Band 7		Band 8	
Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
31	6105	95	6425	127	6585	191	6905
63	6265			159	6745		

**Table 2-5. 802.11be (320MHz BW) Frequency / Channel Operations**

**Notes:**

1. 6GHz NII operation is possible in 20MHz, 40MHz, 80MHz, 160MHz, and 320MHz 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. 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:

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Band	Bandwidth	Tone Type	Tone Size	MIMO (1+2)
				Duty Cycle [%]
6GHz	20MHz	RU	26T	99.57
			52T	99.57
			106T	99.55
			242T	98.77
		MRU	52+26T	99.57
			106+26T	99.18
	40MHz	RU	26T	99.57
			52T	99.57
			106T	99.55
			242T	99.23
			484T	98.48
	80MHz	RU	26T	99.78
			52T	99.57
			106T	99.55
			242T	99.22
			484T	98.48
		996T	97.76	
	MRU	484+242T	97.33	
	160MHz	RU	26T	99.58
			52T	99.58
			106T	99.55
			242T	99.23
			484T	98.48
			996T	97.79
			2x996T	97.44
		MRU	996+484T	96.91
	320MHz	RU	26T	99.57
			52T	99.57
			106T	99.55
			242T	99.23
484T			98.48	
996T			97.79	
2x996T			97.44	
4x996T		99.82		
MRU		2x996+484T	95.49	
		3x996T	94.92	
	3x996+484T	94.88		

**Table 2-6. Measured Duty Cycles**

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

WiFi Configurations		SISO		CDD		SDM	
		ANT1	ANT2	ANT1	ANT2	ANT1	ANT2
6 GHz	11a	✓	✓	✓	✓	✗	✗
	11ax	✓	✓	✓	✓	✓	✓
	11be	✓	✓	✓	✓	✓	✓

**Table 2-7. Frequency / Channel Operations**

✓ = Support; ✗ = NOT Support  
**SISO** = Single Input Single Output  
**SDM** = Spatial Diversity Multiplexing – MIMO function  
**CDD** = Cyclic Delay Diversity - 2Tx Function

3. The device supports the following data rates (shown in Mbps):

MCS Index	Spatial Stream	OFDMA (802.11ax)																							
		26T			52T			106T			242T			484T			996T			2x996T					
		0.8µs GI	1.6µs GI	3.2µs GI	0.8µs GI	1.6µs GI	3.2µs GI	0.8µs GI	1.6µs GI	3.2µs GI	0.8µs GI	1.6µs GI	3.2µs GI	0.8µs GI	1.6µs GI	3.2µs GI	0.8µs GI	1.6µs GI	3.2µs GI	0.8µs GI	1.6µs GI	3.2µs GI			
0	1	0.9	0.8	0.8	1.8	1.7	1.5	3.8	3.5	3.2	8.6	8.1	7.3	17.2	16.3	14.6	36	34	30.6	72.1	68.1	61.3			
1	1	1.8	1.7	1.5	3.5	3.3	3	7.5	7.1	6.4	17.2	16.3	14.6	34.4	32.5	29.3	72.1	68.1	61.3	144.1	136.1	122.5			
2	1	2.6	2.5	2.3	5.3	5	4.5	11.3	10.6	9.6	25.8	24.4	21.9	51.6	48.8	43.9	108.1	102.1	91.9	216.2	204.2	183.8			
3	1	3.5	3.3	3	7.1	6.7	6	15	14.2	12.8	34.4	32.5	29.3	68.8	65	58.5	144.1	136.1	122.5	288.2	272.2	245			
4	1	5.3	5	4.5	10.6	10	9	22.5	21.3	19.1	51.6	48.8	43.9	103.2	97.5	87.8	216.2	204.2	183.8	432.4	408.3	367.5			
5	1	7.1	6.7	6	14.1	13.3	12	30	28.3	25.5	68.8	65	58.5	137.6	130	117	288.2	272.2	245	576.5	544.4	490			
6	1	7.9	7.5	6.8	15.9	15	13.5	33.8	31.9	28.7	77.4	73.1	65.8	154.9	146.3	131.6	324.3	306.3	275.6	648.5	612.5	551.3			
7	1	8.8	8.3	7.5	17.6	16.7	15	37.5	35.4	31.9	86	81.3	73.1	172.1	162.5	146.3	360.3	340.3	306.3	720.6	680.6	612.5			
8	1	10.6	10	9	21.2	20	18	45	42.5	38.3	103.2	97.5	87.8	206.5	195	175.5	432.4	408.3	367.5	864.7	816.7	735			
9	1	11.8	11.1	10	23.5	22.2	20	50	47.2	42.5	114.7	108.3	97.5	229.4	216.7	195	480.4	453.7	408.3	960.8	907.4	816.7			
10	1	13.2	12.5	11.3	26.5	25	22.5	56.3	53.1	47.8	129	121.9	109.7	258.1	243.8	219.4	540.4	510.4	459.4	1080.9	1020.8	918.8			
11	1	14.7	13.9	12.5	29.4	27.8	25	62.5	59	53.1	143.4	135.4	121.9	286.8	270.8	243.8	600.5	567.1	510.4	1201	1134.3	1020.8			
0	2	1.8	1.7	1.5	3.5	3.3	3	7.5	7.1	6.4	17.2	16.3	14.6	34.4	32.5	29.3	72.1	68.1	61.3	144.1	136.1	122.5			
1	2	3.5	3.3	3	7.1	6.7	6	15	14.2	12.8	34.4	32.5	29.3	68.8	65	58.5	144.1	136.1	122.5	288.2	272.2	245			
2	2	5.3	5	4.5	10.6	10	9	22.5	21.3	19.1	51.6	48.8	43.9	103.2	97.5	87.8	216.2	204.2	183.8	432.4	408.3	367.5			
3	2	7.1	6.7	6	14.1	13.3	12	30	28.3	25.5	68.8	65	58.5	137.6	130	117	288.2	272.2	245	576.5	544.4	490			
4	2	10.6	10	9	21.2	20	18	45	42.5	38.3	103.2	97.5	87.8	206.5	195	175.5	432.4	408.3	367.5	864.7	816.7	735			
5	2	14.1	13.3	12	28.2	26.7	24	60	56.7	51	137.6	130	117	275.3	260	234	576.5	544.4	490	1152.9	1088.9	980			
6	2	15.9	15	13.5	31.8	30	27	67.5	63.8	57.4	154.9	146.3	131.6	309.7	292.5	263.3	648.5	612.5	551.3	1297.1	1225	1102.5			
7	2	17.6	16.7	15	35.3	33.3	30	75	70.8	63.8	172.1	162.5	146.3	344.1	325	292.5	720.6	680.6	612.5	1441.2	1361.1	1225			
8	2	21.2	20	18	42.4	40	36	90	85	76.5	206.5	195	175.5	412.9	390	351	864.7	816.7	735	1729.4	1633.3	1470			
9	2	23.5	22.2	20	47.1	44.4	40	100	94.4	85	229.4	216.7	195	458.8	433.3	390	960.8	907.4	816.7	1921.6	1814.8	1633.3			
10	2	26.5	25	22.5	52.9	50	45	112.5	106.3	95.6	258.1	243.8	219.4	516.2	487.5	438.8	1080.9	1020.8	918.8	2161.8	2041.7	1837.5			
11	2	29.4	27.8	25	58.8	55.6	50	125	118.1	106.3	286.8	270.8	243.8	573.5	541.7	487.5	1201	1134.3	1020.8	2402	2268.5	2041.7			

**Table 2-8. Supported Data Rates**

4. The device supports either Standard Power (SP) or Low Power Indoor (LPI) operation in the following UNII bands:

UNII Band	Standard Power (SP)	Low Power Indoor (LPI)
UNII 5	✓	✓
UNII 6	✗	✓
UNII 7	✓	✓
UNII 8	✗	✓

**Table 2-9. Power Operation**

✓ = Support; ✗ = NOT Support

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## 2.3 Antenna Description

The following antenna gains were used for the testing.

	Ant1 Peak Gain [dBi]	Ant2 Peak Gain [dBi]	Directional Gain [dBi]
5925 – 6425 MHz	4.19	2.59	6.44
6425 – 6525 MHz	3.82	1.36	5.69
6525 – 6875 MHz	3.50	2.33	5.94
6875 – 7125 MHz	2.62	3.93	6.31

**Table 2-10. Antenna Peak Gain**

## 2.4 Test Configuration

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 operation under control of either a low-power indoor access point or standard power access point for frequency ranges 5925 – 6425 MHz and 6525 – 6875 MHz. Power for the EUT may vary depending on whether the device is connected to a standard access point (SP Operation) or a low-power indoor access point (LPI Operation). In cases where these targets differ two data sets have been provided to demonstrate compliance. The worst-case emissions data is shown in this report.

## 2.5 Software and Firmware

The test was conducted with firmware version 2024.111.46 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.

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### 3 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 987594 D02 v01r01 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.

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

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## 4 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.

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## 5 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 ( $\pm$ 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

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## 6 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
N/A	WL25-1	Conducted Cable Set (25GHz)	11/15/2023	Annual	11/15/2024	WL25-1
N/A	WL25-2	WLAN Cable Set (25GHz)	11/15/2023	Annual	11/15/2024	WL25-2
N/A	WL40-1	WLAN Cable Set (40GHz)	11/15/2023	Annual	11/15/2024	WL40-1
N/A	ETS-001	EMC Cable and Switch System	11/15/2023	Annual	11/15/2024	ETS-001
N/A	ETS-002	EMC Cable and Switch System	11/15/2023	Annual	11/15/2024	ETS-002
N/A	AP1-002	EMC Cable and Switch System	11/15/2023	Annual	11/15/2024	AP1-002
N/A	AP2-001	EMC Cable and Switch System	11/15/2023	Annual	11/15/2024	AP2-001
N/A	AP2-002	EMC Cable and Switch System	11/15/2023	Annual	11/15/2024	AP2-002
Anritsu	MA2411B	Pulse Power Sensor	11/8/2023	Annual	11/8/2024	1027293
Anritsu	MA2411B	Pulse Power Sensor	6/14/2023	Annual	6/14/2024	1911105
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	4/13/2022	Biennial	4/13/2024	121034
Keysight Technologies	N9038A	MXE EMI Receiver	8/30/2023	Annual	8/30/2024	MY51210133
Keysight Technologies	N9030A	PXA Signal Analyzer	2/29/2024	Annual	3/1/2025	MY55410501
Keysight Technologies	N9020A	MXA Signal Analyzer	3/15/2023	Annual	3/15/2024	MY54500644
Pasternack	NMLC-2	Line Conducted Emissions Cable (NM)	11/15/2023	Annual	11/15/2024	NMLC-2
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	9/25/2023	Annual	9/25/2024	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	9/11/2023	Annual	9/11/2024	100348
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	2/15/2024	Annual	2/15/2025	103200
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	3/15/2023	Biennial	3/15/2025	102136
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	3/15/2023	Biennial	3/15/2025	102132
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	1/11/2024	Annual	1/11/2025	102151
Sunol Sciences	DRH-118	Horn (Small)	2/21/2024	Biennial	2/21/2026	A050307
Sunol Sciences	JB5	Bi-Log Antenna (30M-5GHz)	8/30/2022	Biennial	8/30/2024	A051107

**Table 6-1. Annual Test Equipment Calibration Schedule**

**Note:**

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

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## 7 TEST RESULTS

### 7.1 Summary

Company Name: Microsoft Corporation  
 FCC ID: C3K2077  
 FCC Classification: 15E 6GHz Low Power Dual Client (6CD)

FCC Part Section(s)	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1046, 15.407(a)(12)	RSS-Gen [6.12]	Maximum Conducted Output Power	N/A	CONDUCTED	PASS	Section 7.3
15.407(a)(8)	RSS-Gen [6.7, RSS-248 [4.5.3]	Maximum Radiated Output Power (LPI)	< 24dBm over the frequency band of operation		PASS	Section 7.3
15.407(a)(7)	RSS-Gen [6.7, RSS-248 [4.5.5]	Maximum Radiated Output Power (SP)	< 30dBm over the frequency band of operation		PASS	Section 7.3
2.1049, 15.407(a)(11)	RSS-248 [4.4]	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)	RSS-248 [4.5.3]	Maximum Power Spectral Density (LPI)	< -1dBm/MHz e.i.r.p.		PASS	Section 7.4
15.407(a)(7)	RSS-248 [4.5.5]	Maximum Power Spectral Density (SP)	< 17dBm/MHz e.i.r.p.		PASS	Section 7.4
15.407(a)(7)	RSS-248 [4.5.5(c)]	Power Reduction Verification for standard client device	EUT must limit its power to no more than 6 dB below its associated standard power access point's authorized transmit power		PASS	Attestation
15.407(b)(7)	RSS-248 [4.6.2]	In-Band Emissions	EUT must meet the limits detailed in RSS-248 [4.6.2]		PASS	Section 7.5
15.407(d)(6)	RSS-248 [4.7.2]	Contention Based Protocol	EUT must detect AWGN signal with 90% (or better) certainty	PASS	Section 7.6	
15.407(b)(6)	RSS-248 [4.6.2]	Undesirable Emissions	< -27dBm/MHz e.i.r.p. outside of the 5.925 – 7.125GHz band	RADIATED	PASS	Section 7.7
15.205, 15.209	RSS-Gen [8.9]	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions shall comply with RSS-Gen (8.9) limits		PASS	Section 7.7
15.407(b)(9)	RSS-Gen [8.8]	AC Conducted Emissions (150kHz – 30MHz)	< RSS-Gen [8.8] limits	LINE CONDUCTED	PASS	See UNII 6E OFDM Report

**Table 7-1. Summary of Test Results**

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**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 Element "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 Element "Chamber Automation," Version 1.3.1.
- 6) Per 15.407(a)(7), a device operating under the control of a standard power access point in 5.925-6.425 GHz and 6.525-6.875 GHz bands must not have the maximum power spectral density exceed 17 dBm/MHz e.i.r.p., must limit the maximum e.i.r.p. over the frequency band of operation not exceed 30 dBm, and must limit its power to no more than 6 dB below its associated standard power access point's authorized transmit power. Compliance to this clause is addressed via submission of an attestation following Appendix B of KDB 987594 D01 v01r03.
- 7) 802.11be OFDMA testing was performed for all signal tone configurations as specified by the 802.11be standard. Worst case results are determined and reported per the guidance provided at the October 2018 TCB Workshop.

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## 7.2 26dB Bandwidth Measurement

### 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 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

### 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  $\geq 3 \times$  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

1. All cases were investigated; a subset of the taken plots were included to represent relevant settings and measurements.
2. In this section, the bandwidth data table (Table 7-3) includes mainly the 26dB bandwidth measurements. In case of 320MHz operation, an occupied bandwidth measurement was included in the table to demonstrate compliance. Thus, all measurements in the tables are 26dB bandwidth measurements except for the 320MHz bandwidth cases which are occupied bandwidth measurements.

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	Frequency [MHz]	Channel	802.11 MODE	Antenna-1 26dB Bandwidth [MHz]	Antenna-2 26dB Bandwidth [MHz]	
Band 5	5935	2	be (20MHz)	19.13	18.51	
	6175	45	be (20MHz)	18.51	18.22	
	6415	93	be (20MHz)	18.79	16.02	
	5965	3	be (40MHz)	26.11	25.03	
	6165	43	be (40MHz)	25.79	24.50	
	6405	91	be (40MHz)	23.97	25.18	
	5985	7	be (80MHz)	27.62	37.14	
	6145	39	be (80MHz)	31.07	32.66	
	6385	87	be (80MHz)	36.34	30.85	
	6025	15	be (160MHz)	32.53	40.26	
	6185	47	be (160MHz)	38.37	36.81	
	6345	79	be (160MHz)	38.92	40.24	
	6105	31	be (320MHz)	40.22	41.18	
6265	63	be (320MHz)	34.06	32.09		
Band 6	6435	97	be (20MHz)	17.79	16.82	
	6475	105	be (20MHz)	18.81	16.86	
	6515	113	be (20MHz)	18.48	17.80	
	6445	99	be (40MHz)	26.35	24.39	
	6485	107	be (40MHz)	25.11	23.87	
	6525	115	be (40MHz)	26.43	23.32	
	6465	103	be (80MHz)	29.52	35.23	
6505	111	be (160MHz)	39.09	43.91		
Band 5/6/7	6425	95	be (320MHz)	39.87	42.74	
Band 7	6535	117	be (20MHz)	18.17	18.27	
	6695	149	be (20MHz)	18.48	17.87	
	6875	185	be (20MHz)	18.91	18.27	
	6565	123	be (40MHz)	26.21	24.75	
	6725	155	be (40MHz)	26.02	23.66	
	6845	179	be (40MHz)	25.76	23.14	
	6545	119	be (80MHz)	34.37	35.96	
	6705	151	be (80MHz)	37.67	32.22	
	6865	183	be (80MHz)	35.25	35.71	
	6665	143	be (160MHz)	37.31	35.94	
	6825	175	be (160MHz)	37.31	44.91	
	Band 6/7	6585	127	be (320MHz)	45.57	39.52
	Band 7/8	6745	159	be (320MHz)	40.08	37.13
Band 8	6895	189	be (20MHz)	19.09	17.80	
	6995	209	be (20MHz)	17.82	18.09	
	7115	233	be (20MHz)	19.01	18.68	
	6885	187	be (40MHz)	25.45	24.29	
	7005	211	be (40MHz)	25.37	24.12	
	7085	227	be (40MHz)	25.87	24.42	
	6945	199	be (80MHz)	34.91	34.87	
	7025	215	be (80MHz)	32.58	35.62	
	6985	207	be (160MHz)	40.62	36.09	
Band 7/8	6905	191	be (320MHz)	41.58	42.95	

**Table 7-2. Occupied Bandwidth Measurements – 26T**

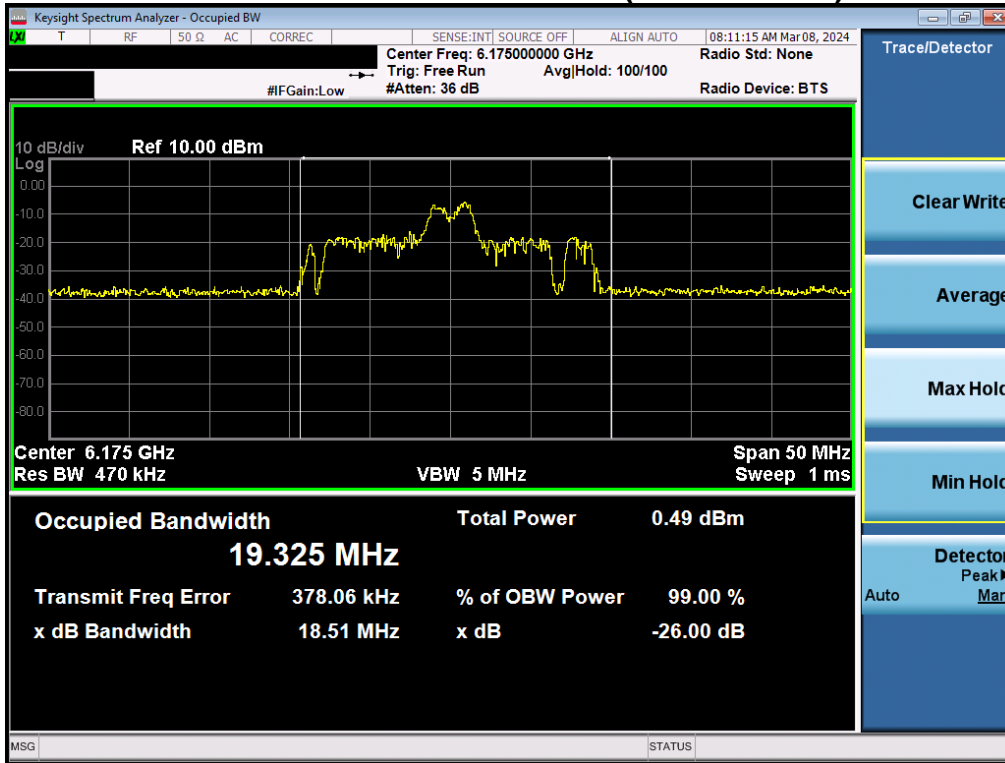
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	Frequency [MHz]	Channel	802.11 MODE	Antenna-1 26dB Bandwidth [MHz]	Antenna-2 6dB Bandwidth [MHz]	Antenna-1 Occupied Bandwidth [MHz]	Antenna-2 Occupied Bandwidth [MHz]
Band 5	5935	2	be (20MHz)	21.67	23.08	-	-
	6175	45	be (20MHz)	23.42	22.78	-	-
	6415	93	be (20MHz)	23.50	22.36	-	-
	5965	3	be (40MHz)	45.56	45.43	-	-
	6165	43	be (40MHz)	45.43	44.80	-	-
	6405	91	be (40MHz)	45.53	45.45	-	-
	5985	7	be (80MHz)	92.76	90.57	-	-
	6145	39	be (80MHz)	93.24	90.19	-	-
	6385	87	be (80MHz)	93.49	90.40	-	-
	6025	15	be (160MHz)	179.30	178.64	-	-
	6185	47	be (160MHz)	175.54	174.47	-	-
	6345	79	be (160MHz)	177.48	177.39	-	-
	6105	31	be (320MHz)	-	-	315.04	314.34
	6265	63	be (320MHz)	-	-	314.09	314.40
Band 6	6435	97	be (20MHz)	22.02	22.76	-	-
	6475	105	be (20MHz)	22.12	22.40	-	-
	6515	113	be (20MHz)	22.48	22.80	-	-
	6445	99	be (40MHz)	44.97	45.67	-	-
	6485	107	be (40MHz)	44.54	44.72	-	-
	6525	115	be (40MHz)	45.36	46.23	-	-
	6465	103	be (80MHz)	96.52	89.95	-	-
6505	111	be (160MHz)	175.11	174.76	-	-	
Band 5/6/7	6425	95	be (320MHz)	-	-	314.73	314.63
Band 7	6535	117	be (20MHz)	22.83	22.19	-	-
	6695	149	be (20MHz)	22.04	23.08	-	-
	6875	185	be (20MHz)	22.35	22.26	-	-
	6565	123	be (40MHz)	45.13	44.57	-	-
	6725	155	be (40MHz)	44.81	44.51	-	-
	6845	179	be (40MHz)	44.61	44.92	-	-
	6545	119	be (80MHz)	91.82	94.44	-	-
	6705	151	be (80MHz)	91.97	90.68	-	-
	6865	183	be (80MHz)	93.75	88.59	-	-
	6665	143	be (160MHz)	180.19	175.63	-	-
6825	175	be (160MHz)	176.57	173.60	-	-	
Band 6/7	6585	127	be (320MHz)	-	-	314.72	314.72
Band 7/8	6745	159	be (320MHz)	-	-	314.68	314.77
Band 8	6895	189	be (20MHz)	22.37	22.88	-	-
	6995	209	be (20MHz)	22.75	22.46	-	-
	7115	233	be (20MHz)	22.19	22.15	-	-
	6885	187	be (40MHz)	45.61	45.24	-	-
	7005	211	be (40MHz)	45.81	44.28	-	-
	7085	227	be (40MHz)	45.42	44.88	-	-
	6945	199	be (80MHz)	92.14	91.13	-	-
	7025	215	be (80MHz)	94.09	93.29	-	-
6985	207	be (160MHz)	182.32	174.46	-	-	
Band 7/8	6905	191	be (320MHz)	-	-	314.27	314.38

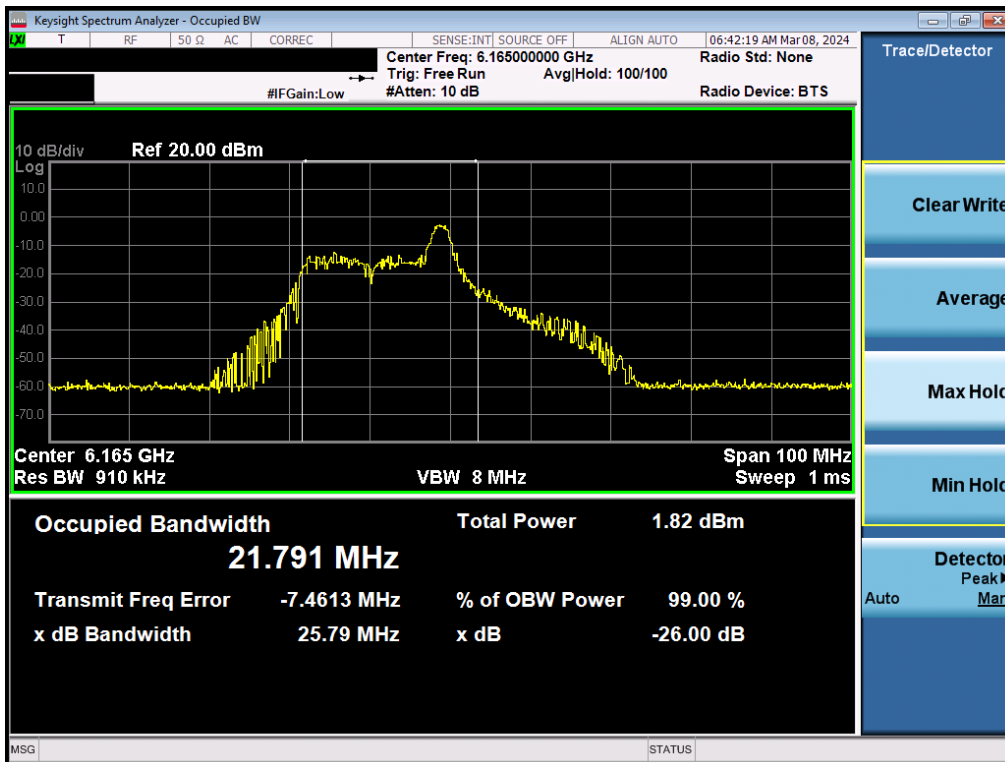
**Table 7-3. Occupied Bandwidth Measurements – Full Tones**

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## 7.2.1 MIMO Antenna-1 Bandwidth Measurements - (Partial Tones)

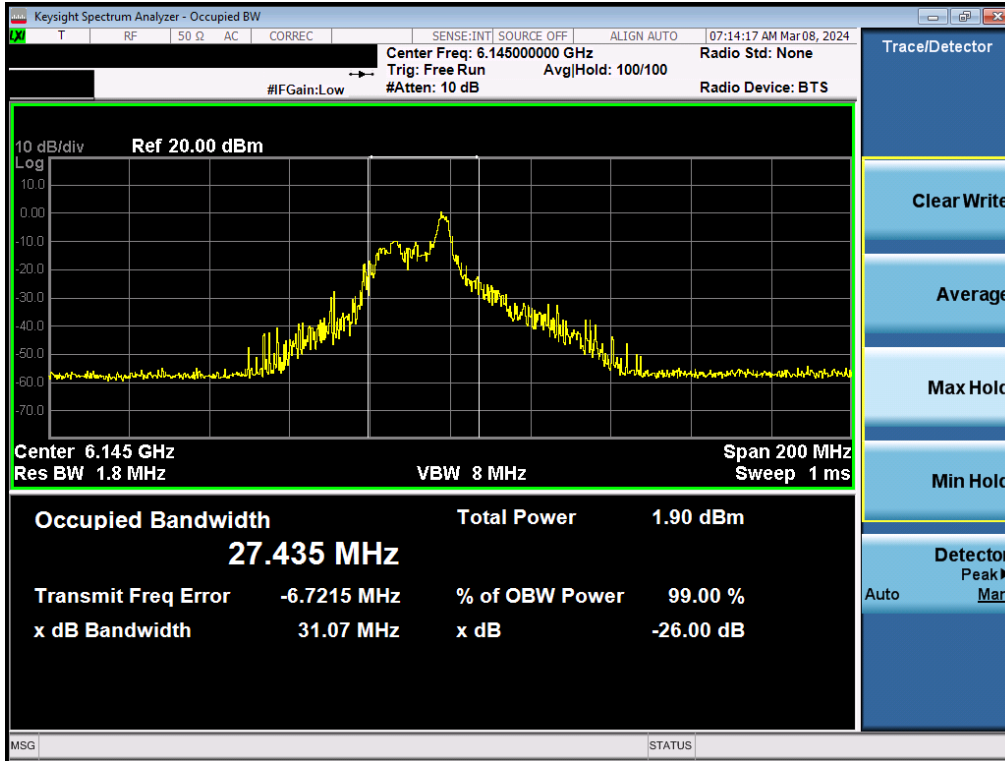


Plot 7-1. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11be (26 Tones) (UNII Band 5) – Ch. 45)

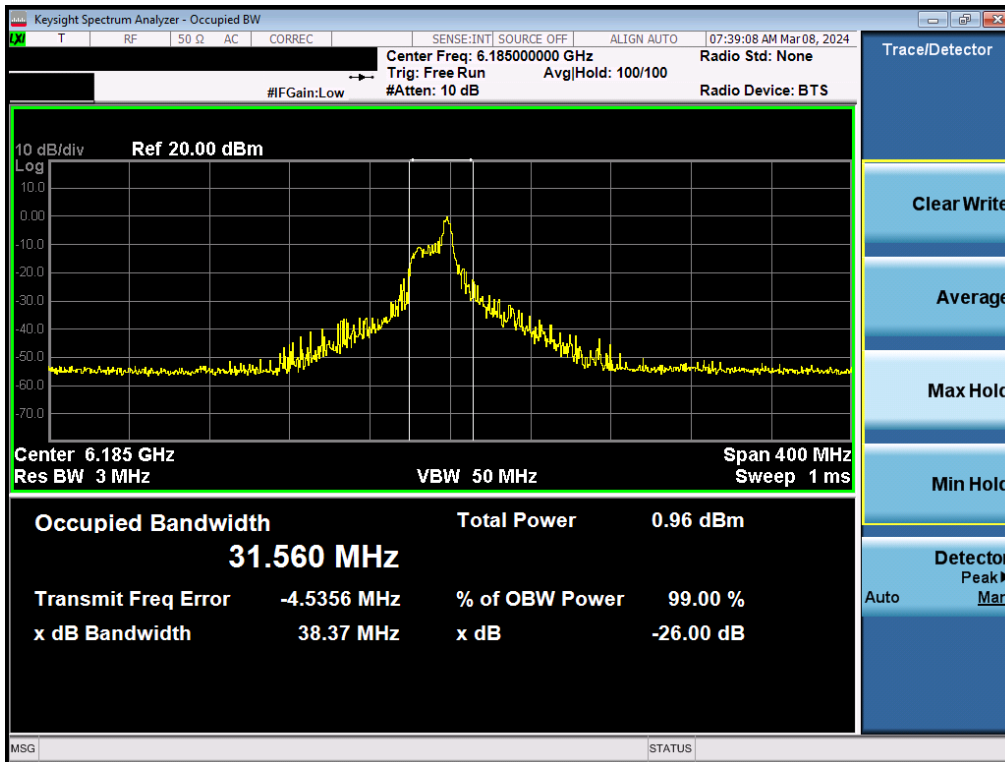


Plot 7-2. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11be (26 Tones) (UNII Band 5) – Ch. 43)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 21 of 274

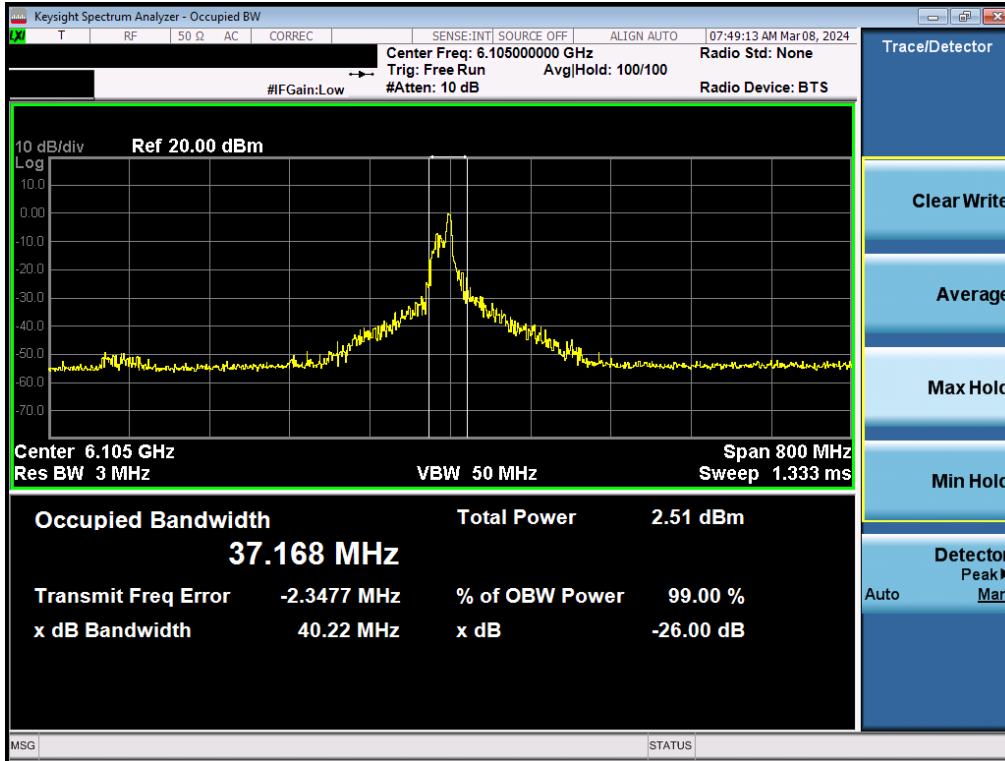


Plot 7-3. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802. 11be (26 Tones) (UNII Band 5) – Ch. 39)



Plot 7-4. Occupied Bandwidth Plot MIMO ANT1 (160MHz BW 802. 11be (26 Tones) (UNII Band 5) – Ch. 47)

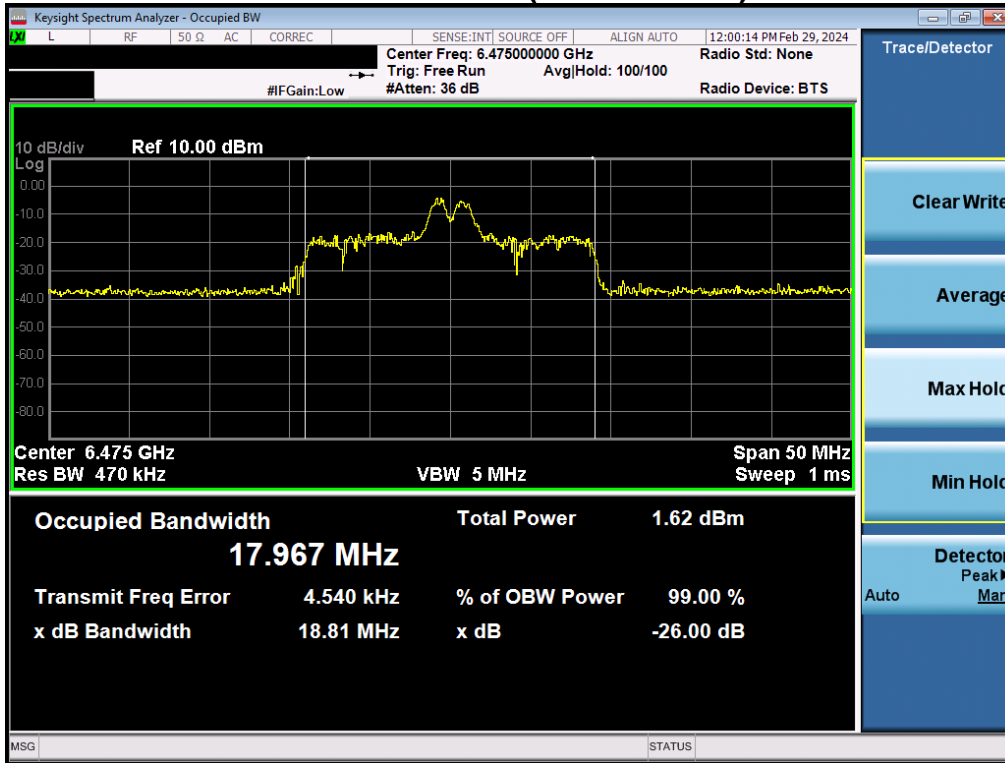
FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 22 of 274



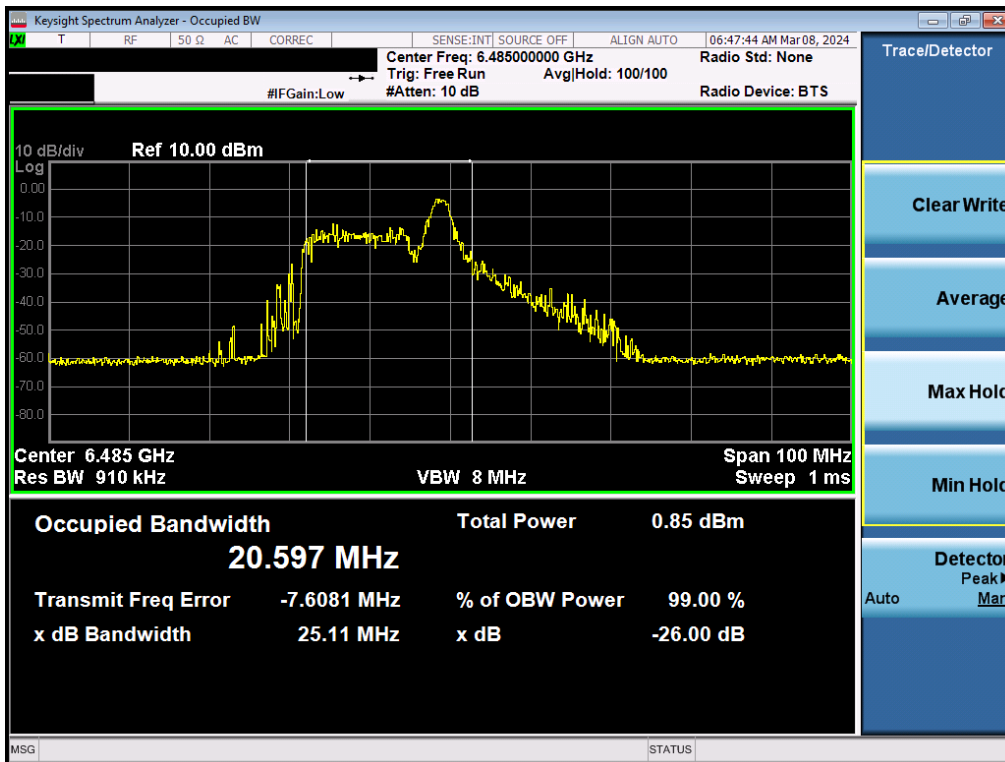
Plot 7-5. Occupied Bandwidth Plot MIMO ANT1 (320MHz BW 802. 11be (26 Tones) (UNII Band 5) – Ch. 31)

FCC ID: C3K2077	<b>MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 23 of 274

## MIMO Antenna-1 Bandwidth Measurements - (Partial Tones)



Plot 7-6. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802. 11be (26 Tones) (UNII Band 6) – Ch. 105)



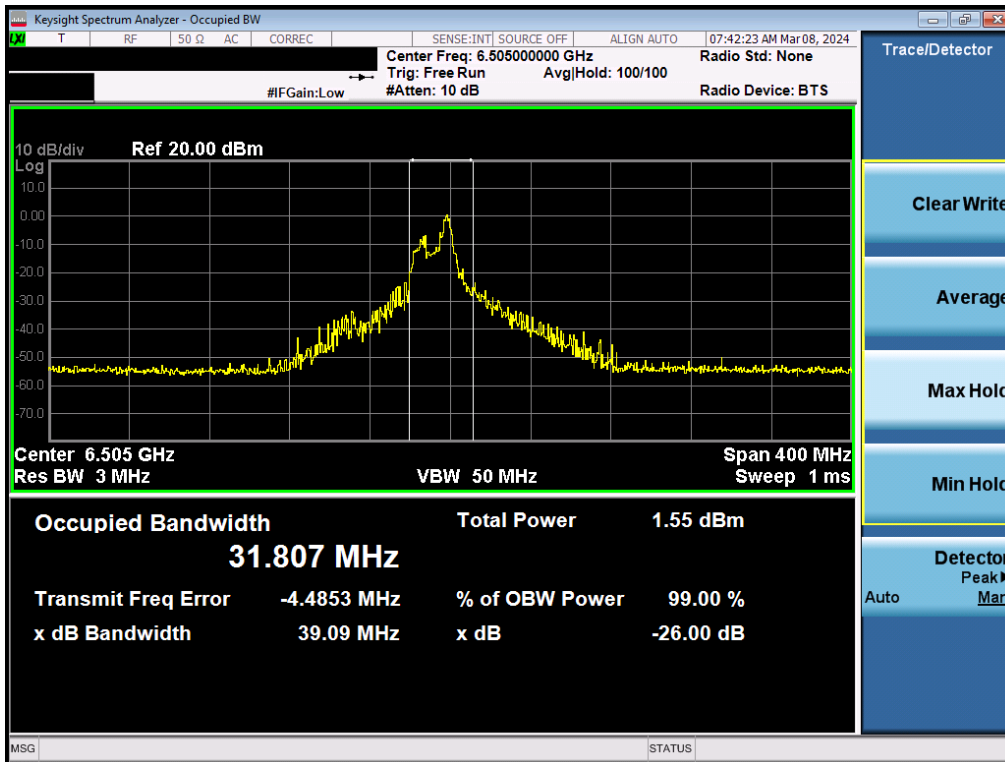
Plot 7-7. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802. 11be (26 Tones) (UNII Band 6) – Ch. 107)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 24 of 274



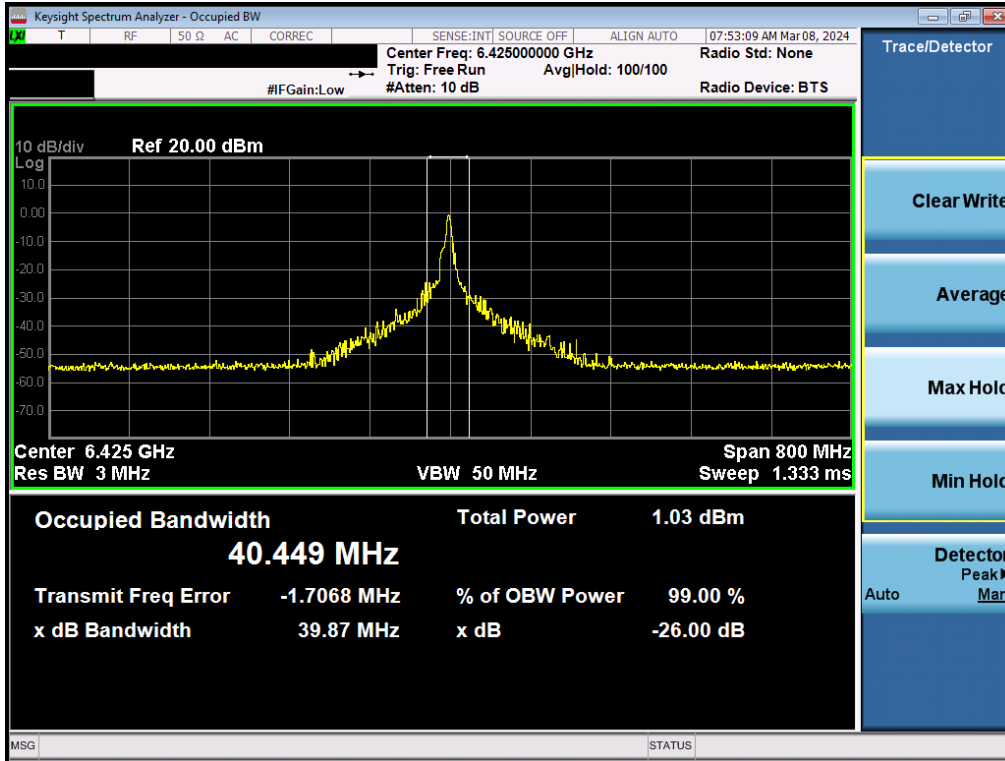


Plot 7-8. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802. 11be (26 Tones) (UNII Band 6) – Ch. 103)



Plot 7-9. Occupied Bandwidth Plot MIMO ANT1 (160MHz BW 802. 11be (26 Tones) (UNII Band 6) – Ch. 111)

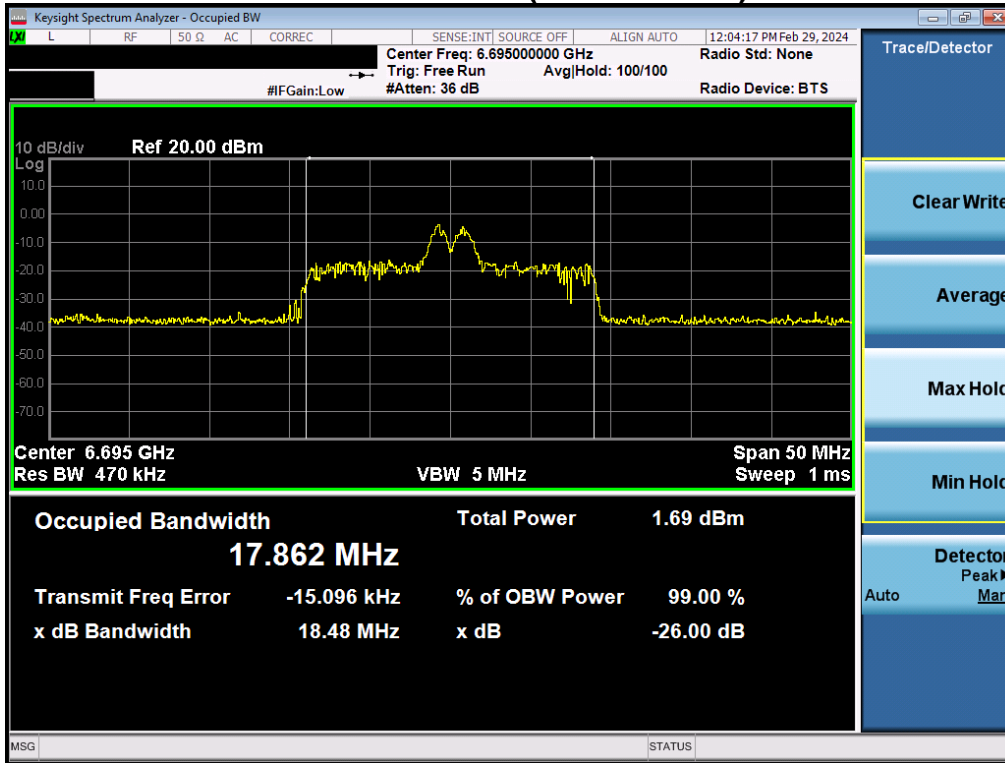
FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 25 of 274



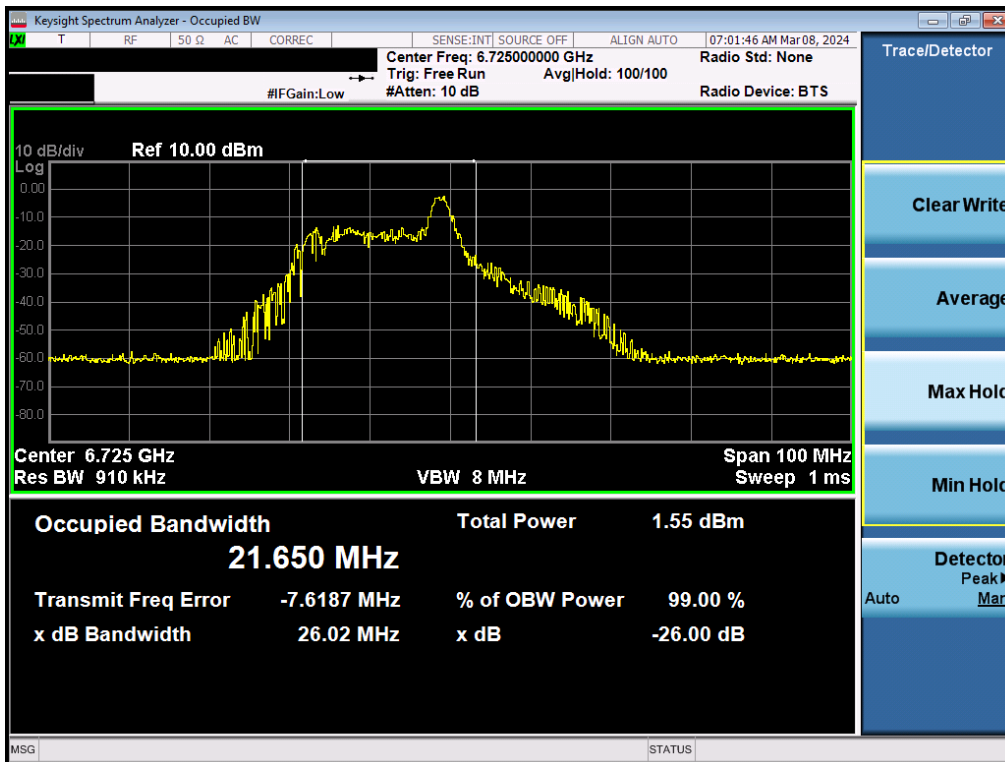
Plot 7-10. Occupied Bandwidth Plot MIMO ANT1 (320MHz BW 802. 11be (26 Tones) (UNII Band 6) – Ch. 95)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 26 of 274

## MIMO Antenna-1 Bandwidth Measurements - (Partial Tones)

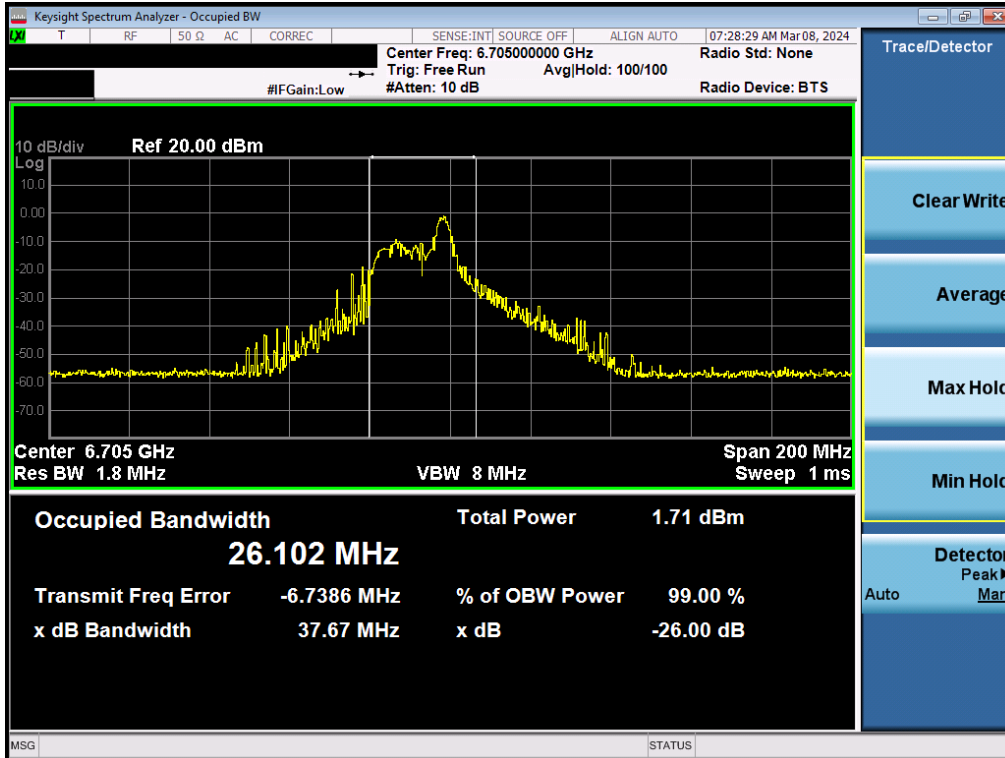


Plot 7-11. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802. 11be (26 Tones) (UNII Band 7) – Ch. 149)

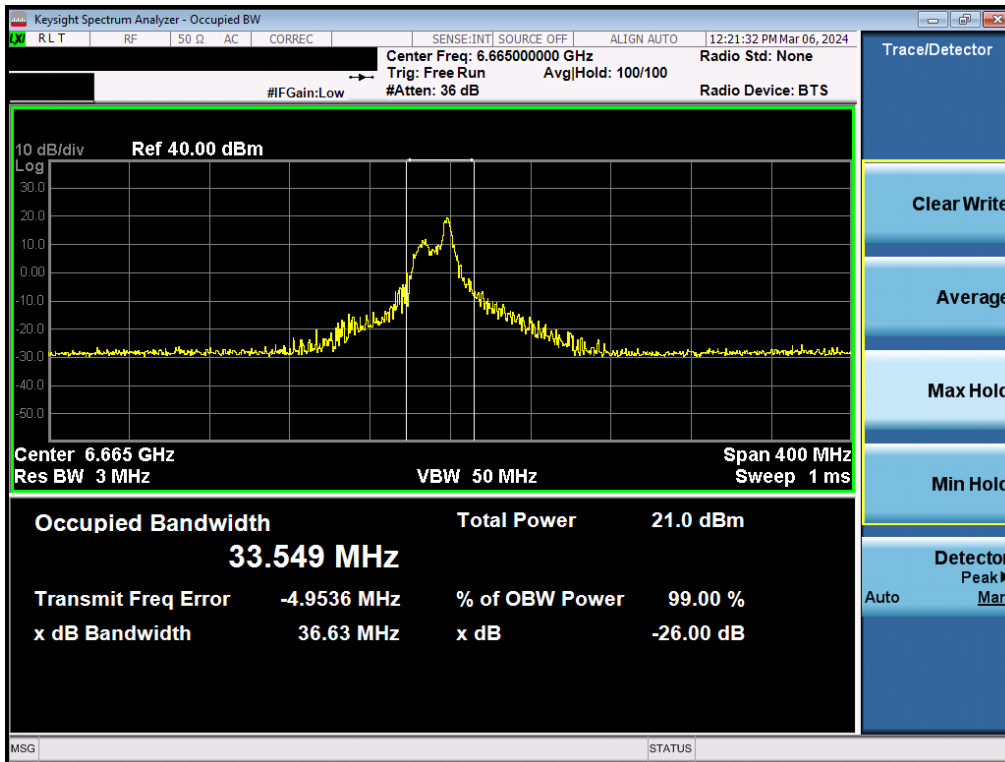


Plot 7-12. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802. 11be (26 Tones) (UNII Band 7) – Ch. 155)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 27 of 274

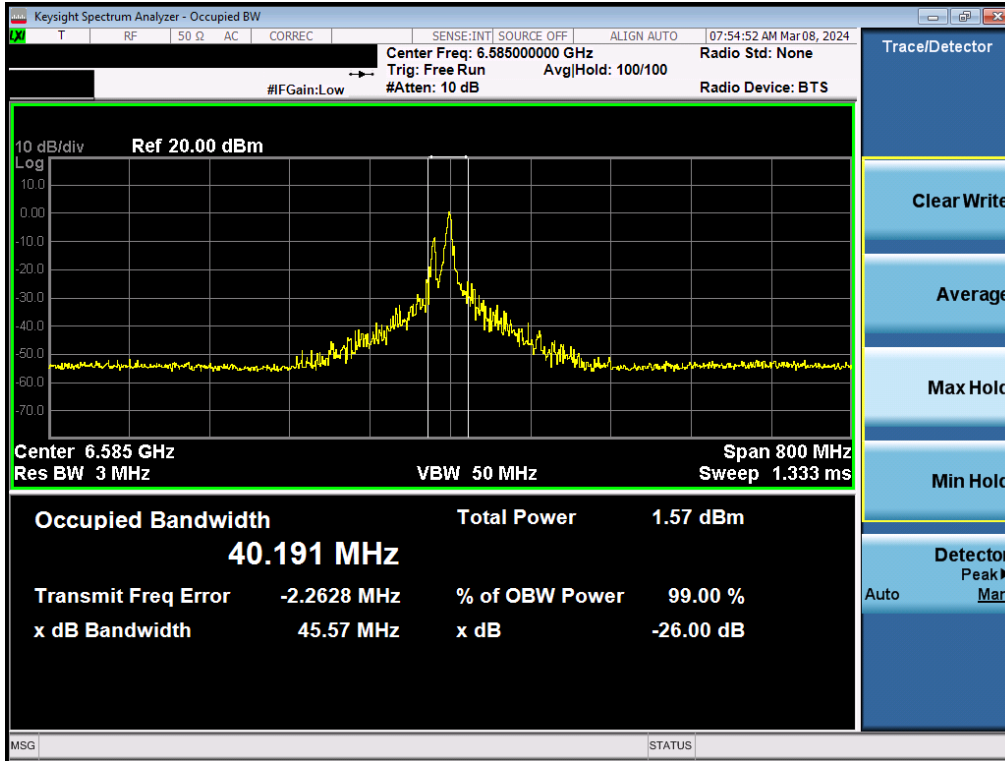


Plot 7-13. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802. 11be (26 Tones) (UNII Band 7) – Ch. 151)



Plot 7-14. Occupied Bandwidth Plot MIMO ANT1 (160MHz BW 802. 11be (26 Tones) (UNII Band 7) – Ch. 143)

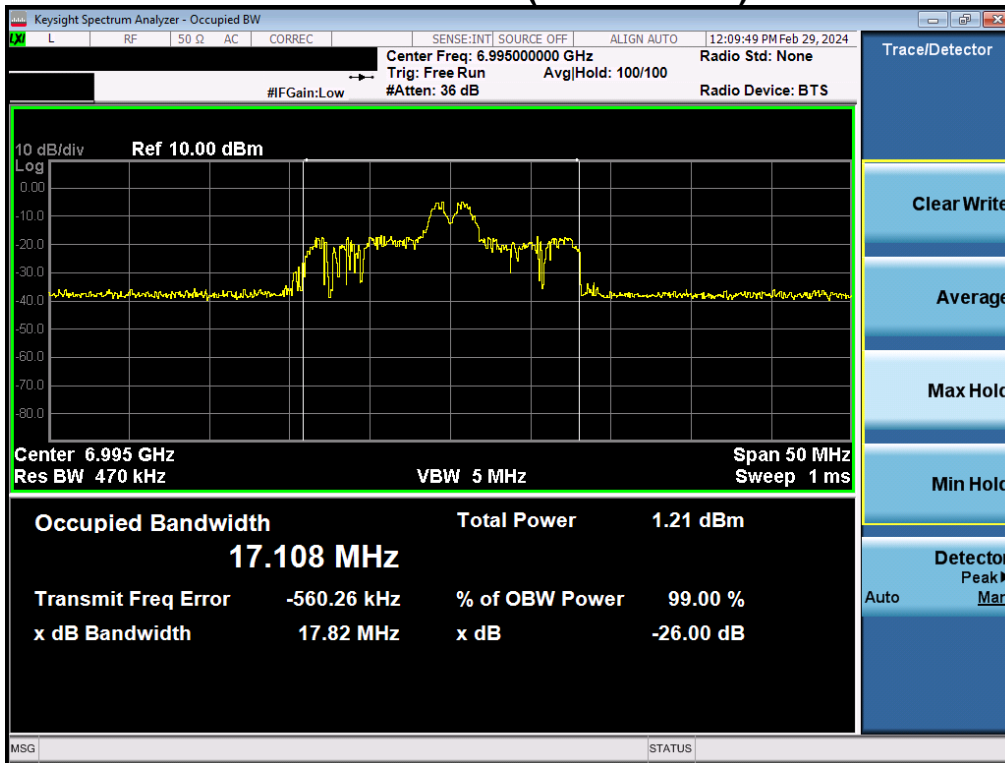
FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 28 of 274



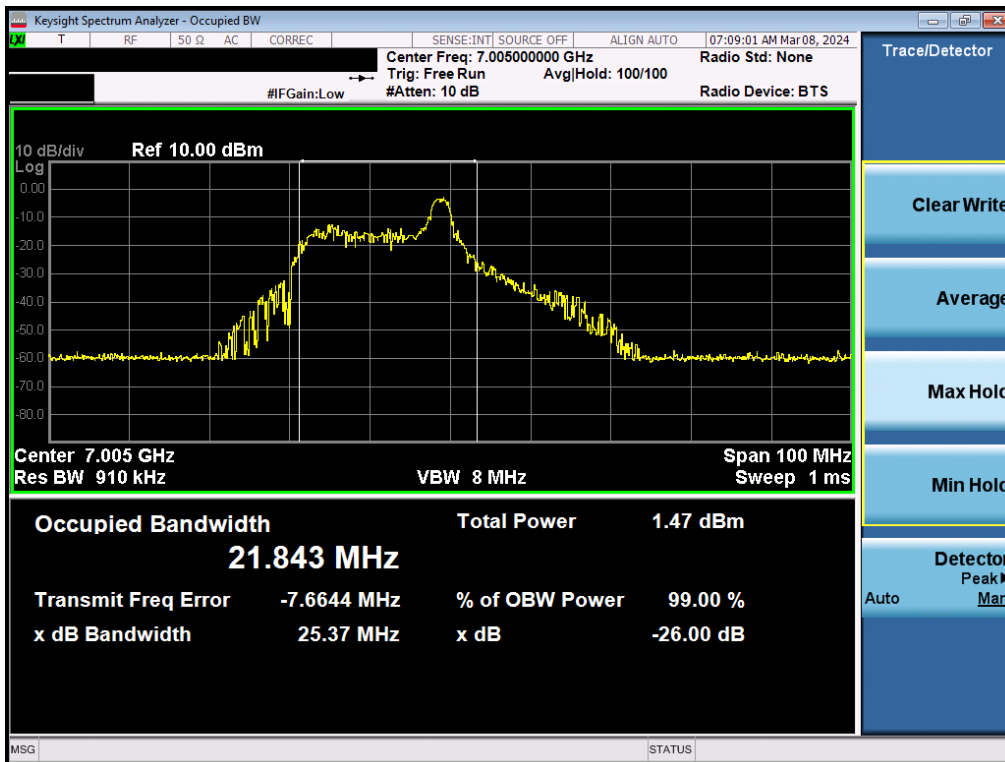
Plot 7-15. Occupied Bandwidth Plot MIMO ANT1 (320MHz BW 802. 11be (26 Tones) (UNII Band 7) – Ch. 127)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 29 of 274

## MIMO Antenna-1 Bandwidth Measurements - (Partial Tones)



Plot 7-16. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802. 11be (26 Tones) (UNII Band 8) – Ch. 209)

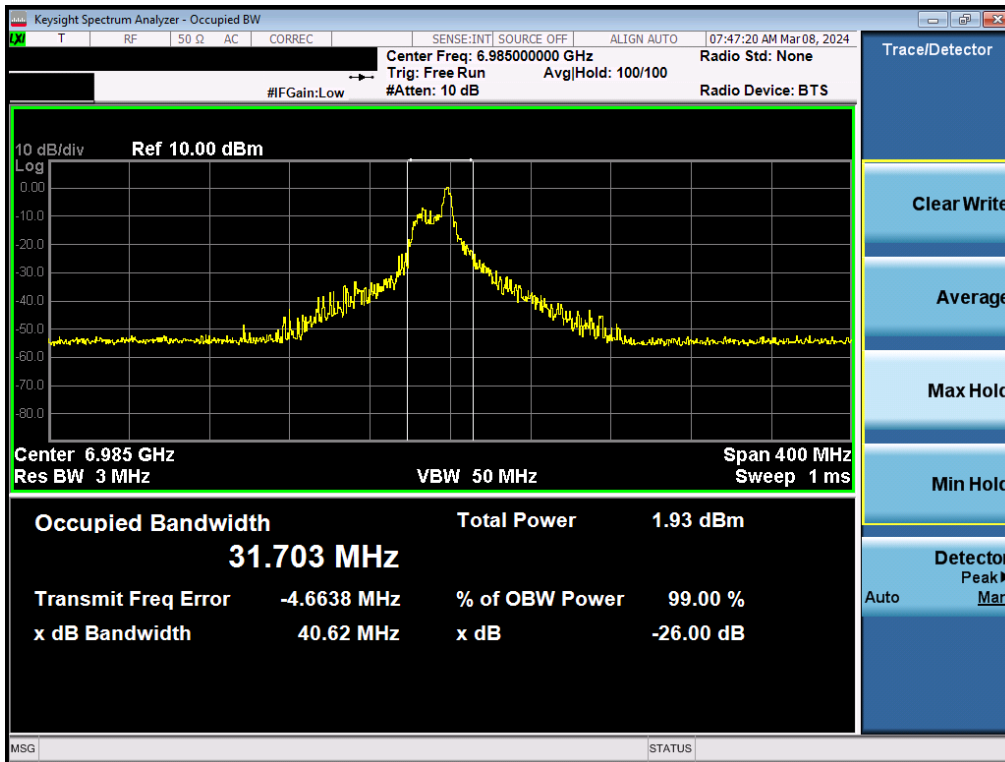


Plot 7-17. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802. 11be (26 Tones) (UNII Band 8) – Ch. 211)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 30 of 274

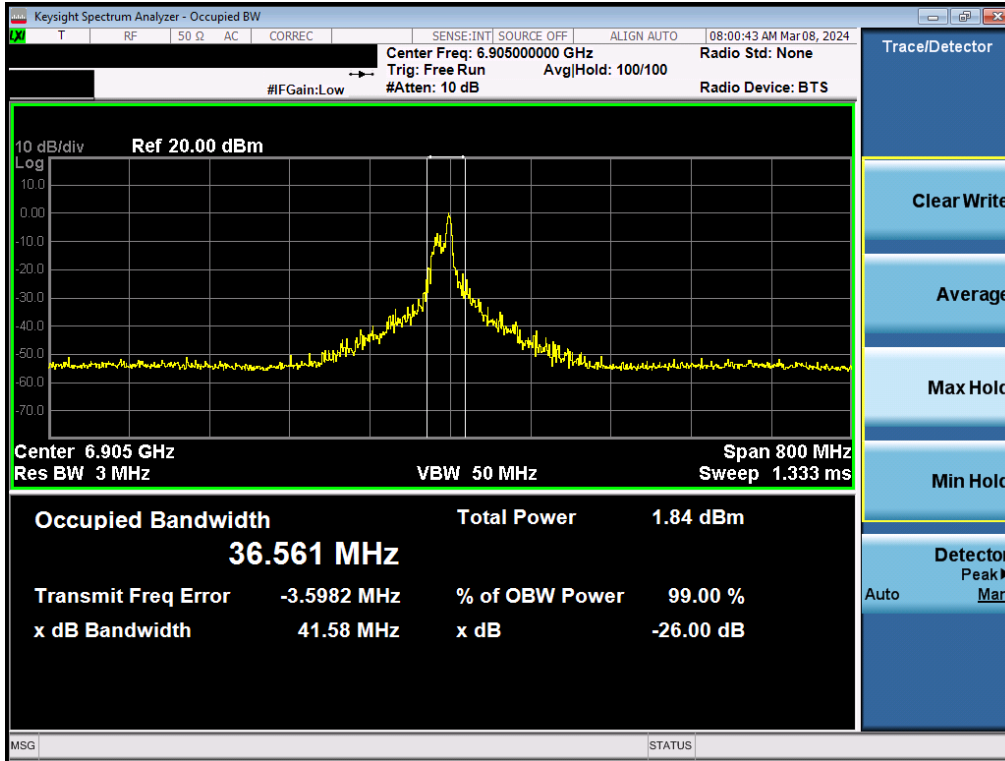


Plot 7-18. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802. 11be (26 Tones) (UNII Band 8) – Ch. 199)



Plot 7-19. Occupied Bandwidth Plot MIMO ANT1 (160MHz BW 802. 11be (26 Tones) (UNII Band 8) – Ch. 207)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 31 of 274

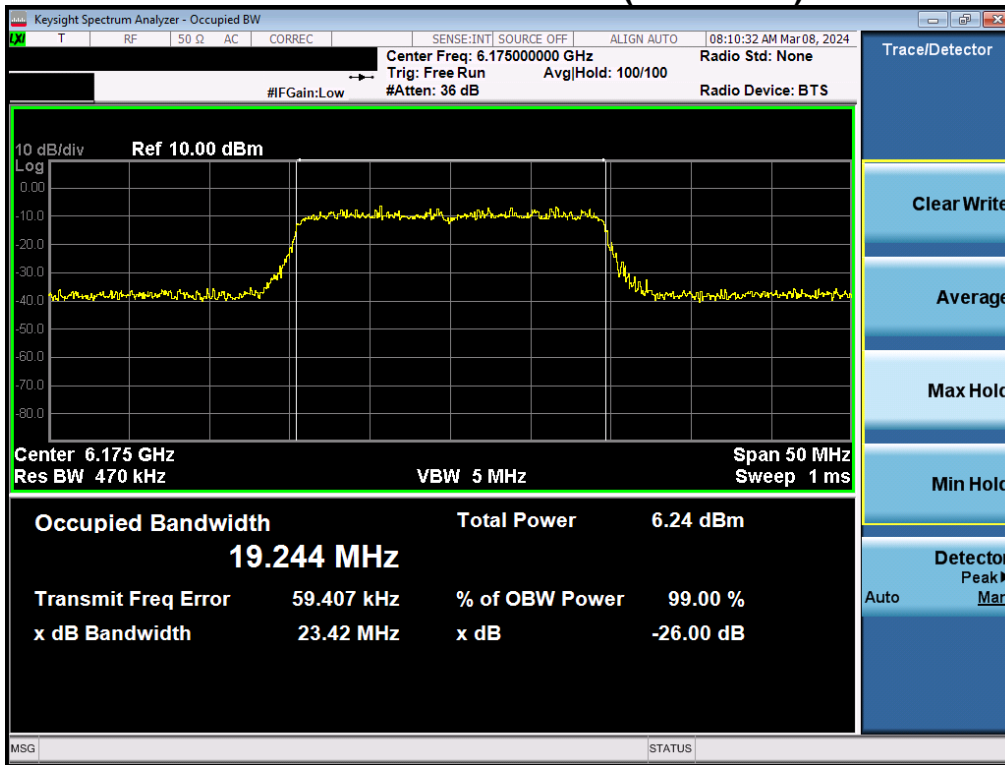


Plot 7-20. Occupied Bandwidth Plot MIMO ANT1 (320MHz BW 802. 11be (26 Tones) (UNII Band 8) – Ch. 191)

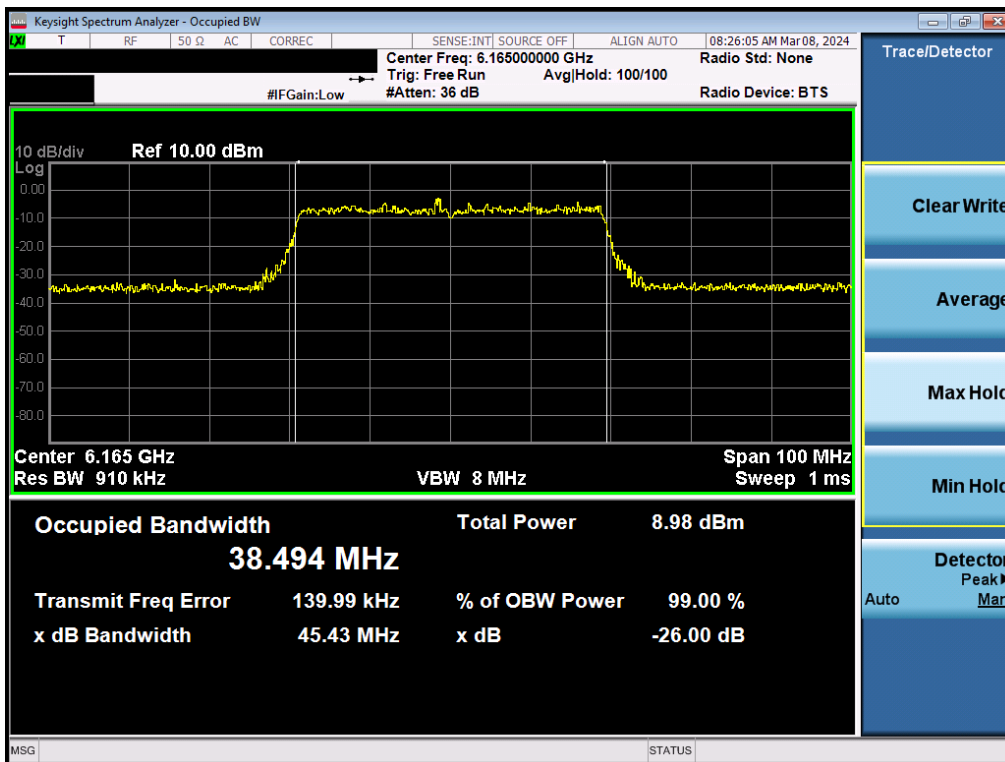
<b>FCC ID:</b> C3K2077	<b>MEASUREMENT REPORT</b>		<b>Approved by:</b> Technical Manager
<b>Test Report S/N:</b> 1M2312040120-22-R2.C3K	<b>Test Dates:</b> 12/14/2023 - 05/20/2024	<b>EUT Type:</b> Portable Computing Device	Page 32 of 274



## 7.2.2 MIMO Antenna-1 Bandwidth Measurements - (Full Tones)

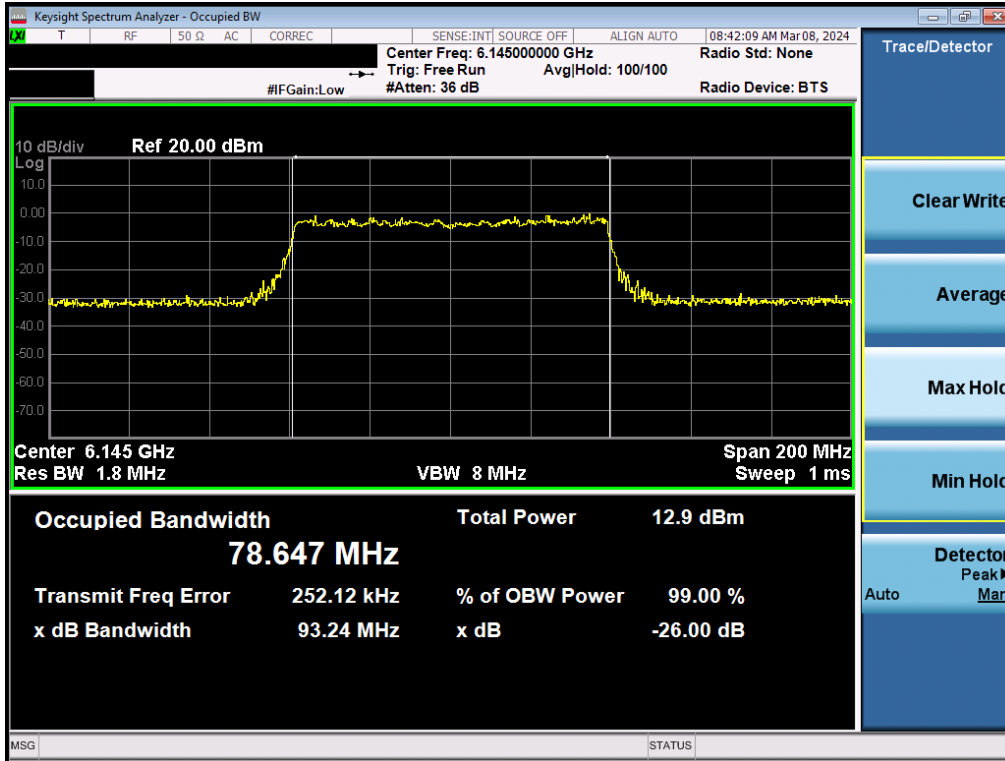


Plot 7-21. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802. 11be (Full Tone) (UNII Band 5) – Ch. 45)

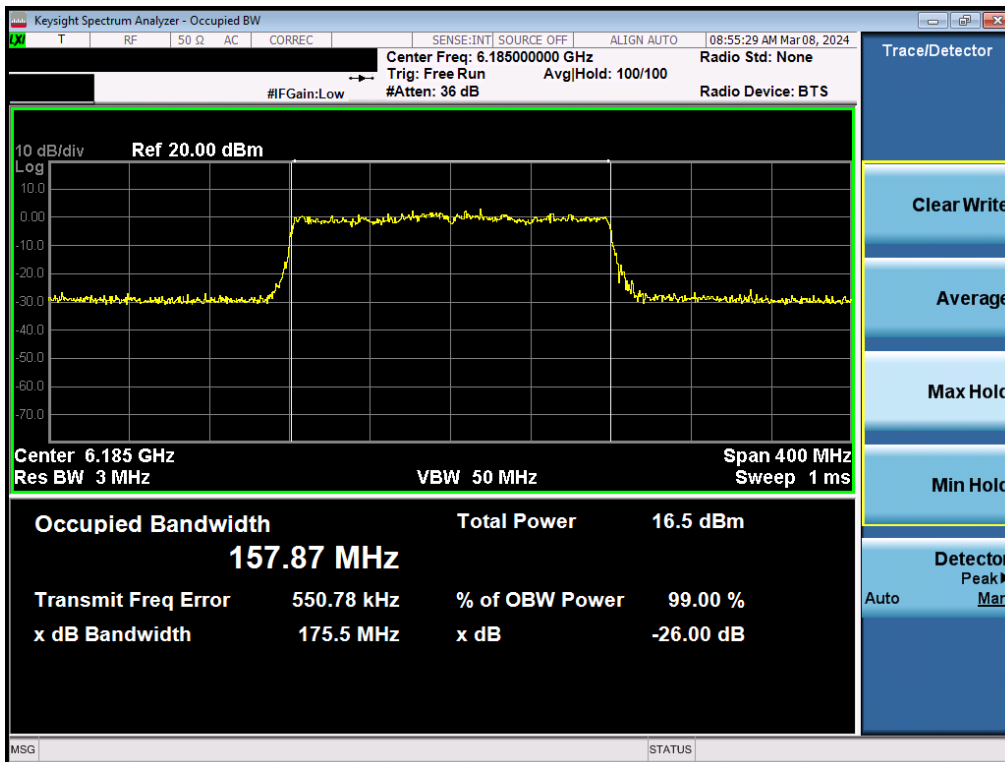


Plot 7-22. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802. 11be (Full Tone) (UNII Band 5) – Ch. 43)

FCC ID: C3K2077		MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device		Page 33 of 274

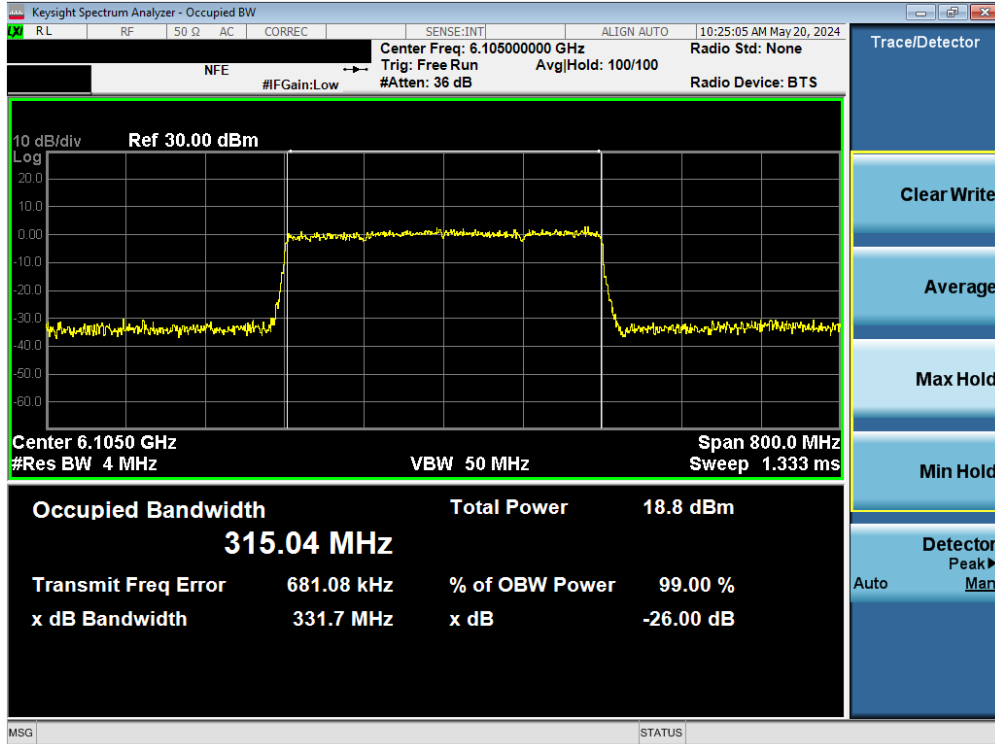


Plot 7-23. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802. 11be (Full Tone) (UNII Band 5) – Ch. 39)



Plot 7-24. Occupied Bandwidth Plot MIMO ANT1 (160MHz BW 802. 11be (Full Tone) (UNII Band 5) – Ch. 47)

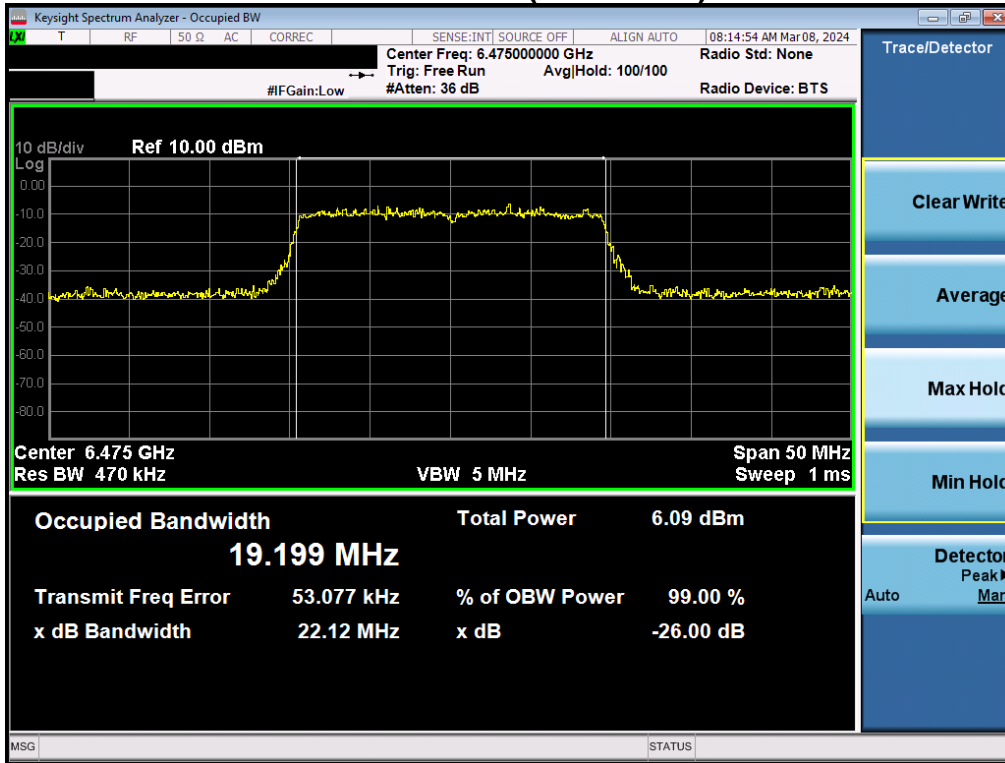
FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 34 of 274



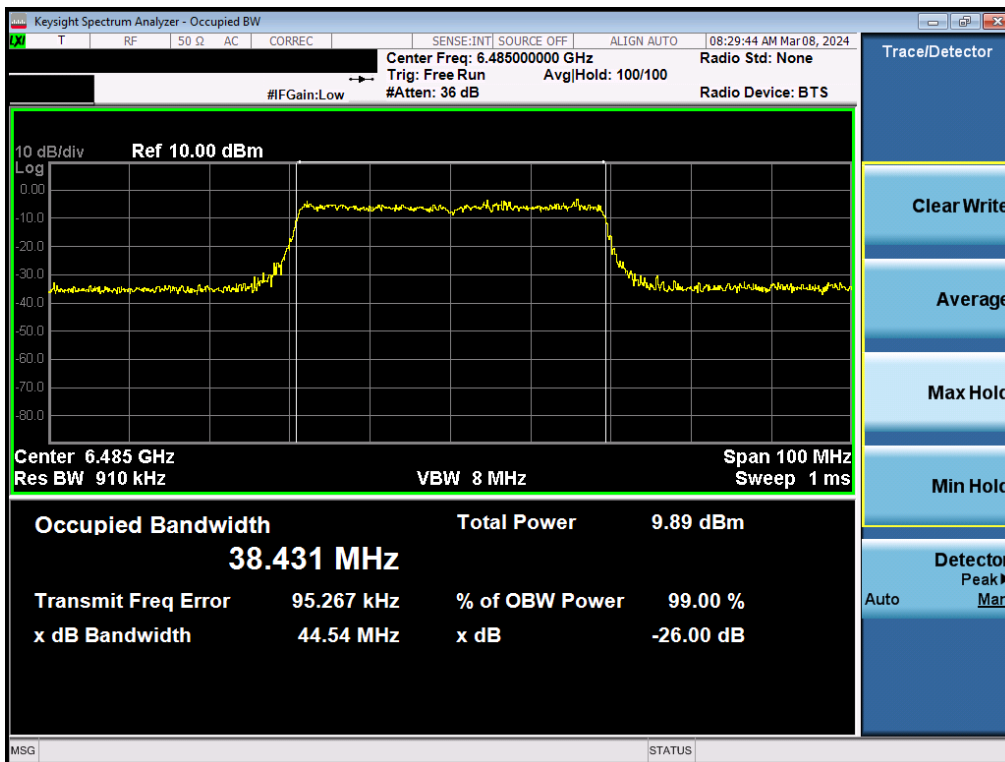
Plot 7-25. Occupied Bandwidth Plot MIMO ANT1 (320MHz BW 802. 11be (Full Tones) (UNII Band 5) – Ch. 31)

FCC ID: C3K2077	<b>MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 35 of 274

## MIMO Antenna-1 Bandwidth Measurements - (Full Tones)

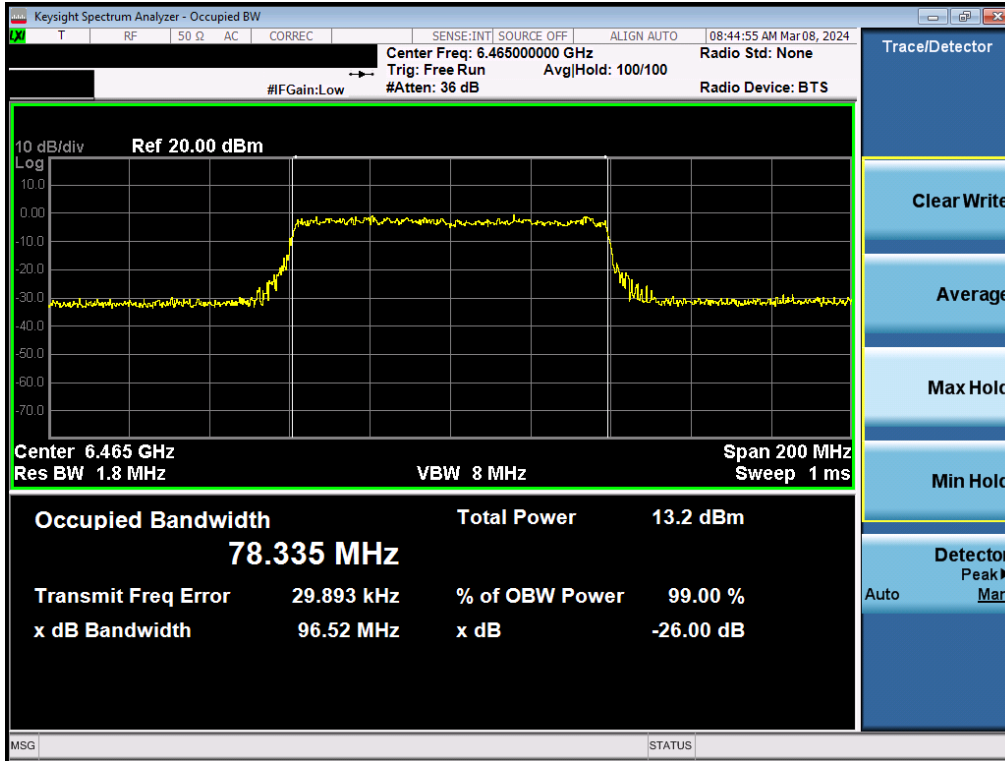


Plot 7-26. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11be (Full Tone) (UNII Band 6) – Ch. 105)

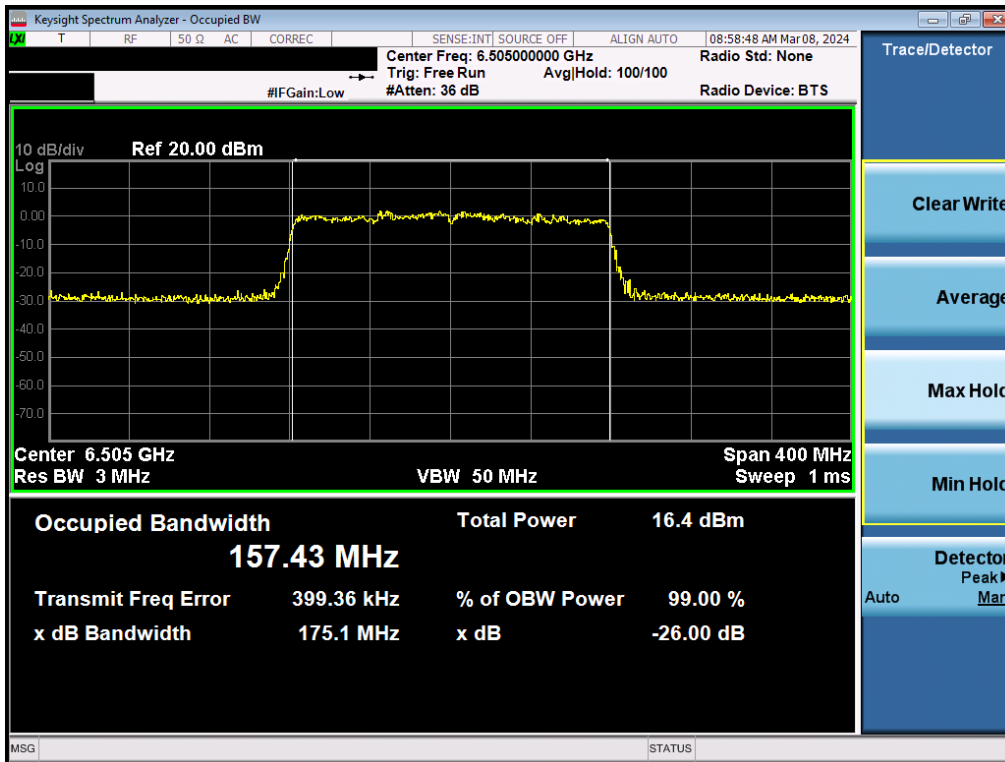


Plot 7-27. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11be (Full Tone) (UNII Band 6) – Ch. 107)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 36 of 274

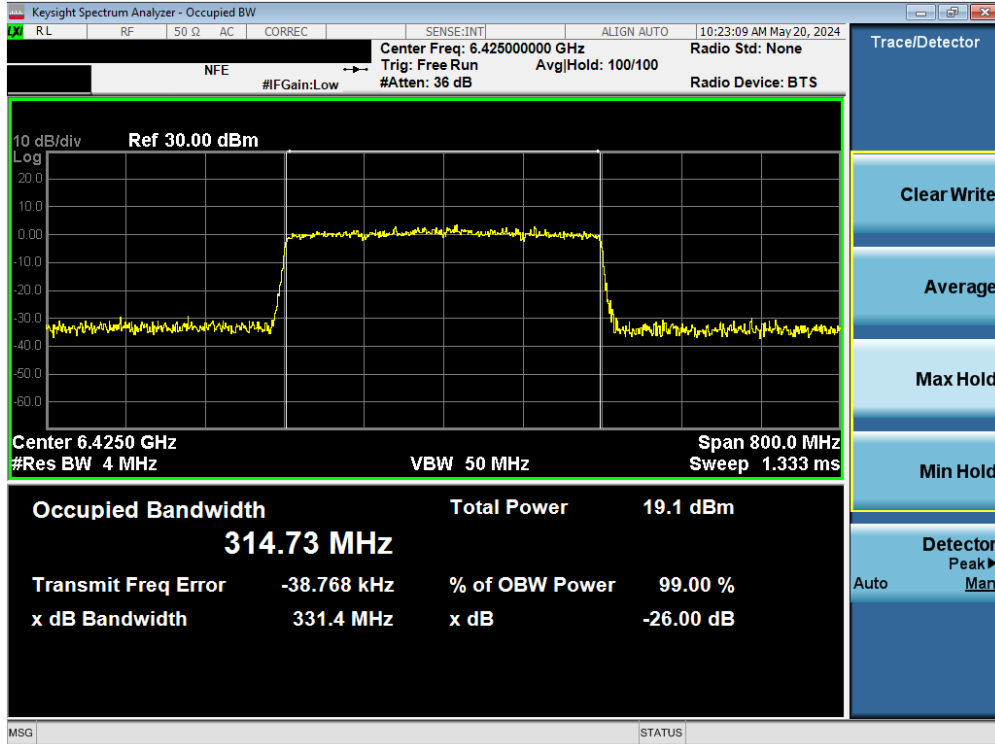


Plot 7-28. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802. 11be (Full Tone) (UNII Band 6) – Ch. 103)



Plot 7-29. Occupied Bandwidth Plot MIMO ANT1 (160MHz BW 802. 11be (Full Tone) (UNII Band 6) – Ch. 111)

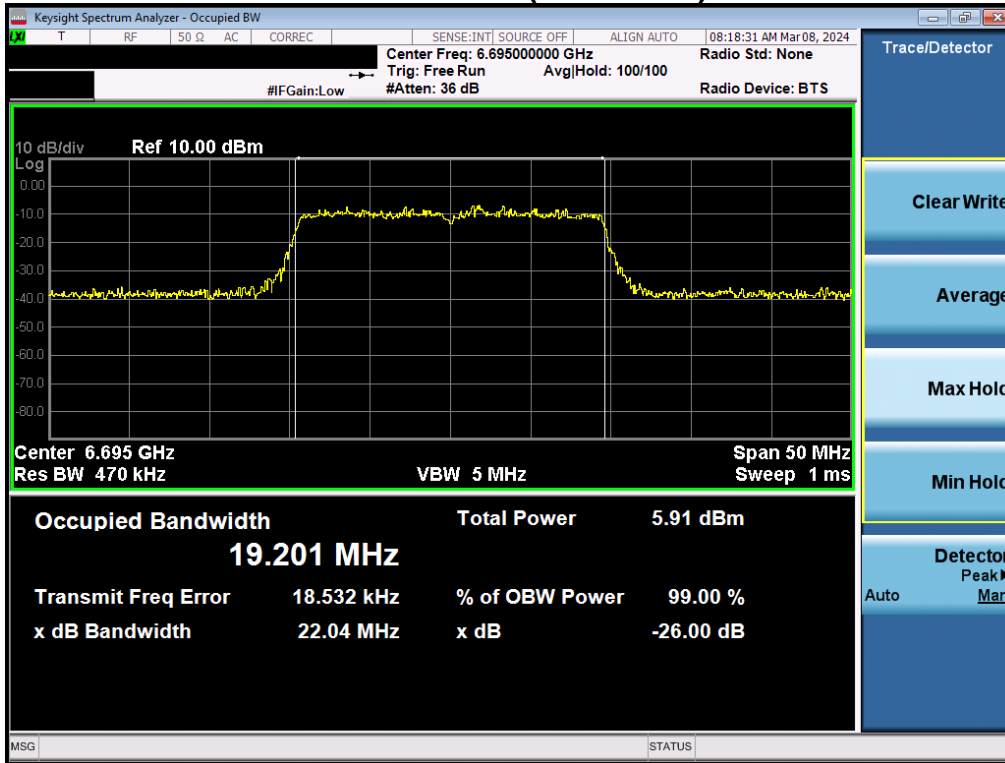
FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 37 of 274



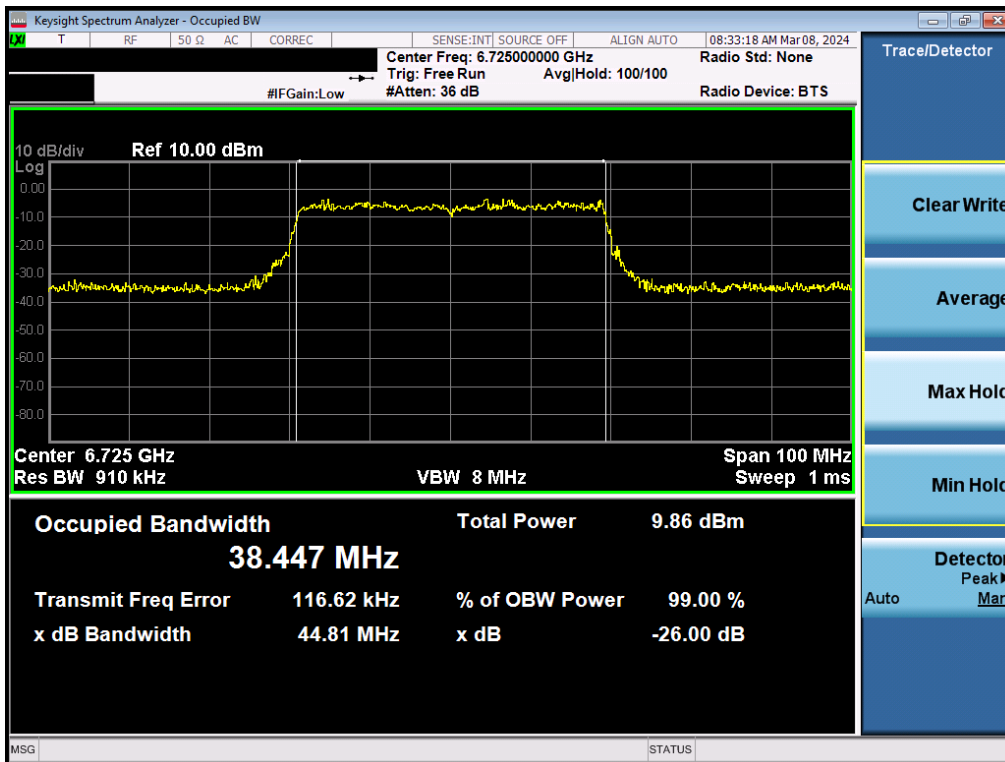
Plot 7-30. Occupied Bandwidth Plot MIMO ANT1 (320MHz BW 802. 11be (Full Tones) (UNII Band 6) – Ch. 95)

FCC ID: C3K2077	<b>MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 38 of 274

## MIMO Antenna-1 Bandwidth Measurements - (Full Tones)

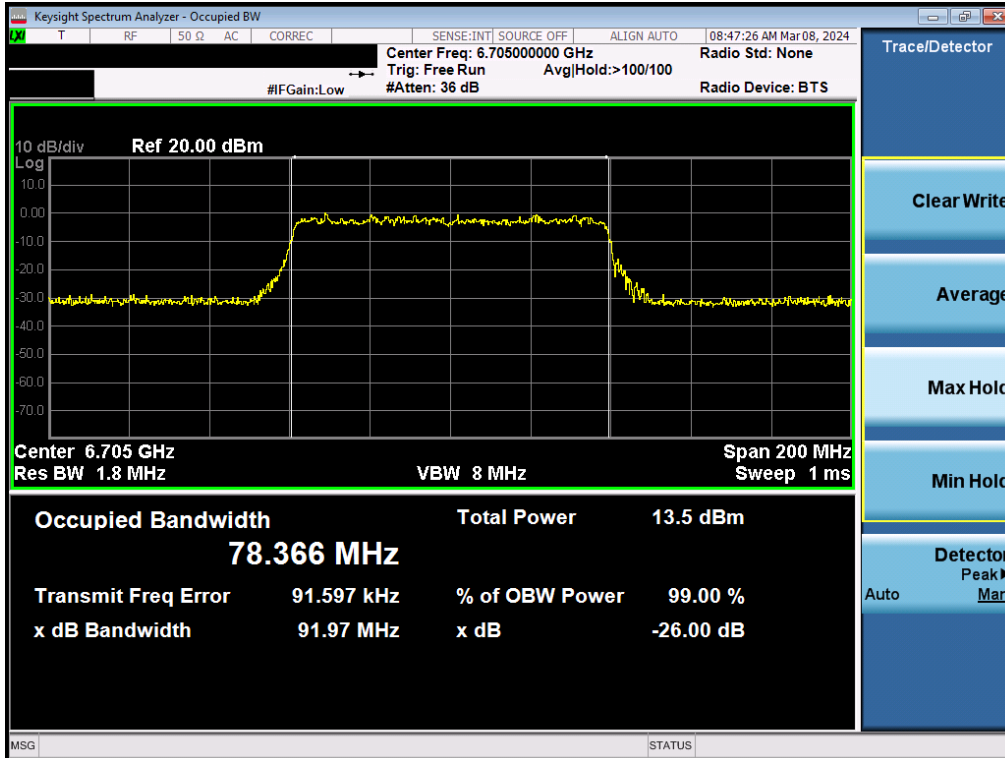


Plot 7-31. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11be (Full Tone) (UNII Band 7) – Ch. 149)

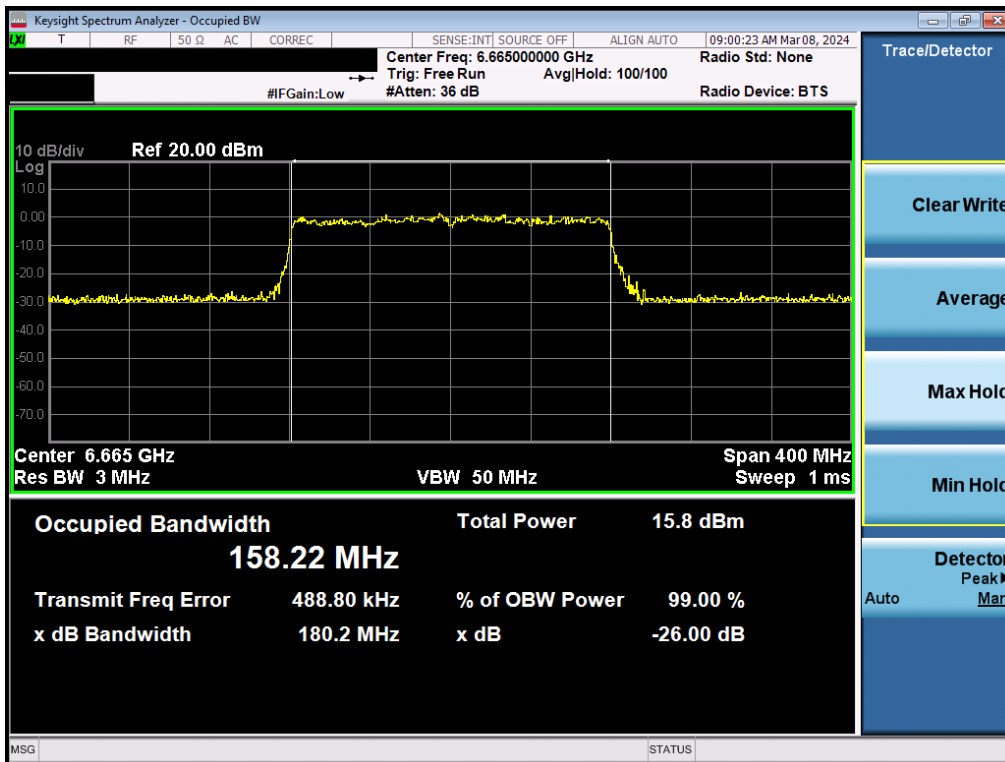


Plot 7-32. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11be (Full Tone) (UNII Band 7) – Ch. 155)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 39 of 274



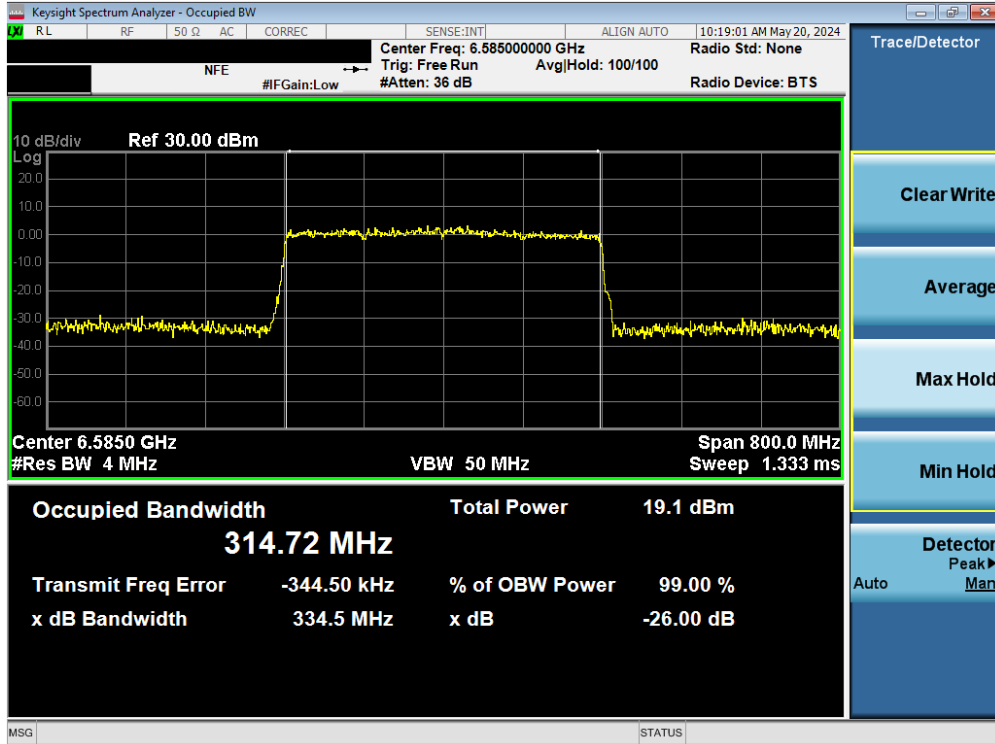
Plot 7-33. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802. 11be (Full Tone) (UNII Band 7) – Ch. 151)



Plot 7-34. Occupied Bandwidth Plot MIMO ANT1 (160MHz BW 802. 11be (Full Tone) (UNII Band 7) – Ch. 143)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 40 of 274

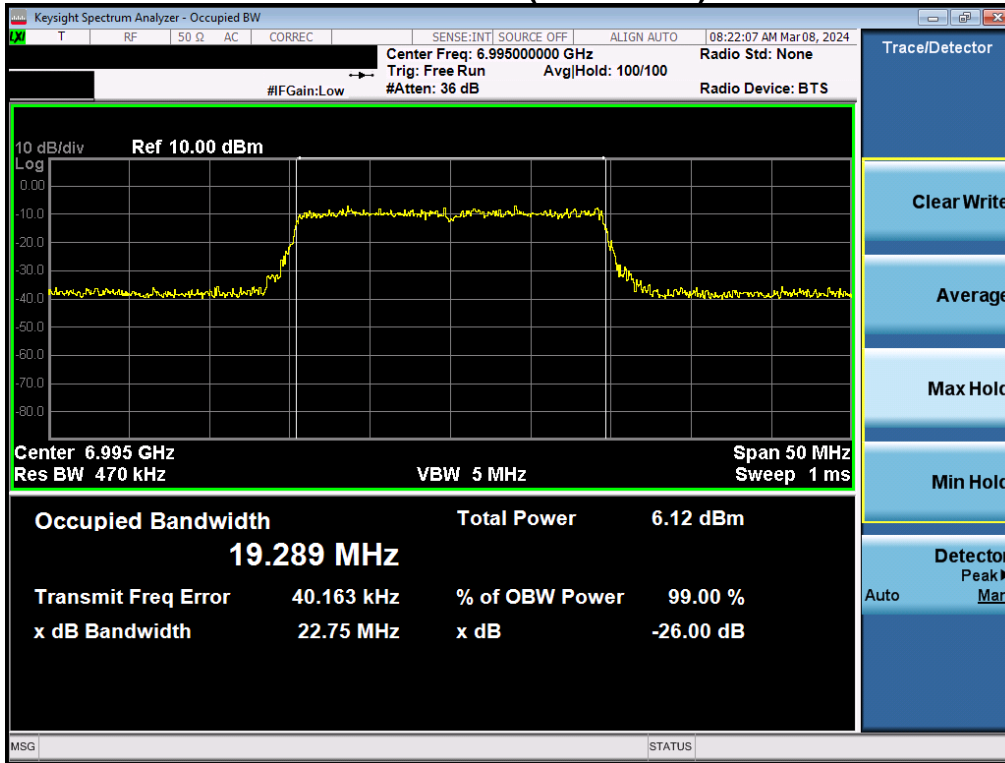




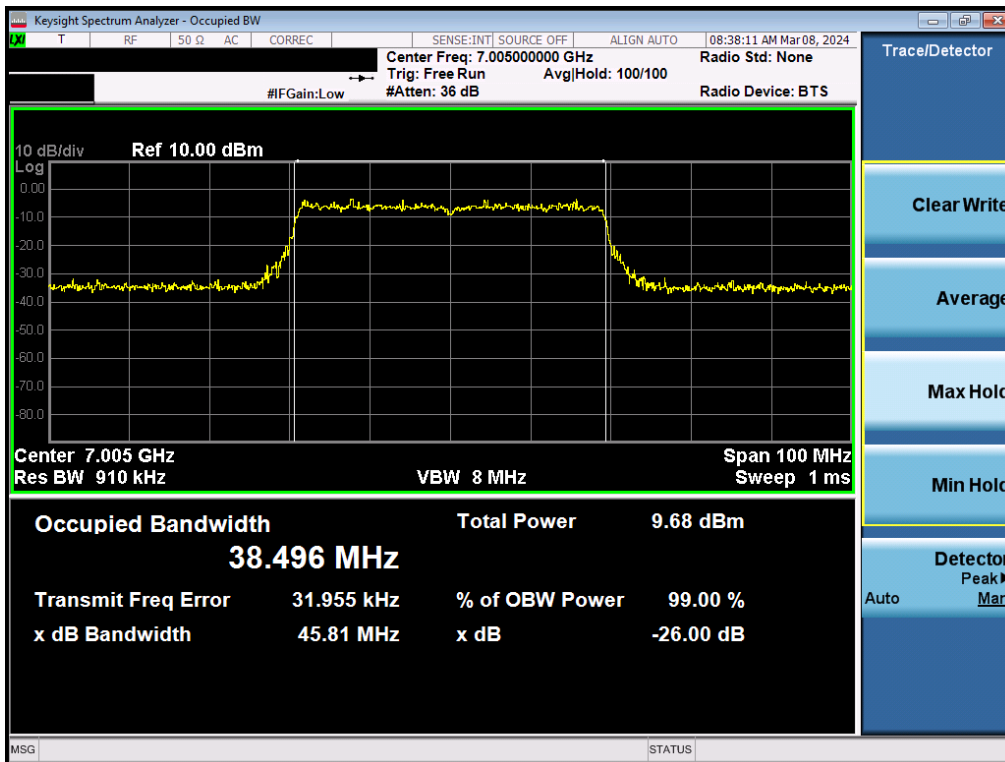
Plot 7-35. Occupied Bandwidth Plot MIMO ANT1 (320MHz BW 802. 11be (Full Tone) (UNII Band 7) – Ch. 127)

FCC ID: C3K2077	<b>MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 41 of 274

## MIMO Antenna-1 Bandwidth Measurements - (Full Tones)

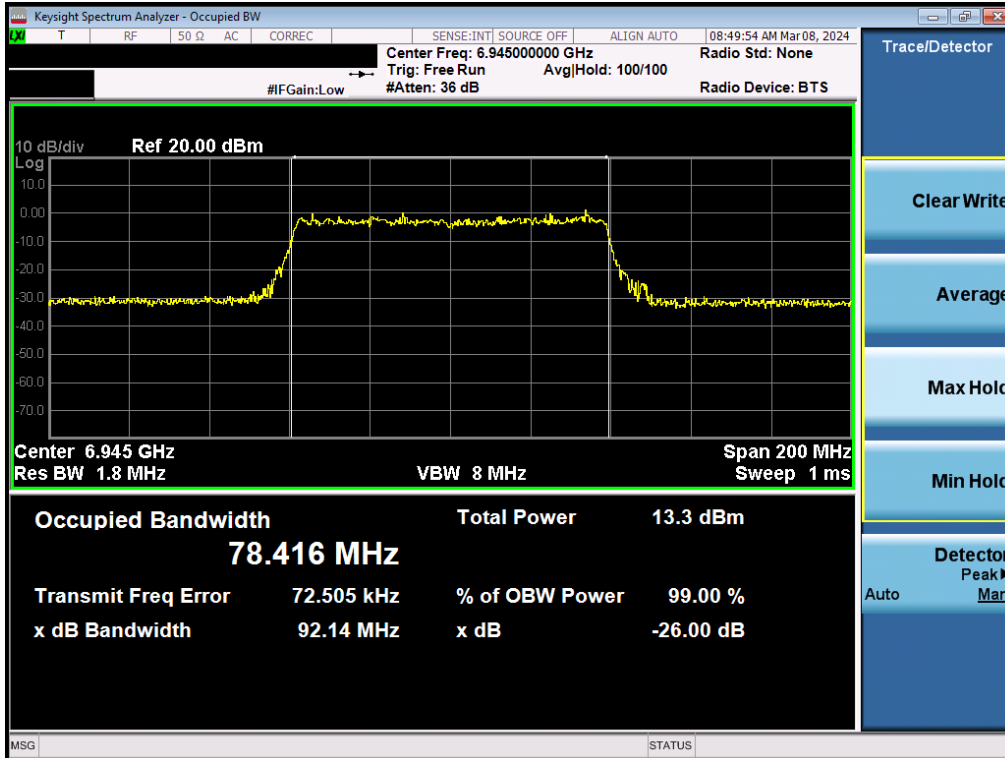


Plot 7-36. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802. 11be (Full Tone) (UNII Band 8) – Ch. 209)

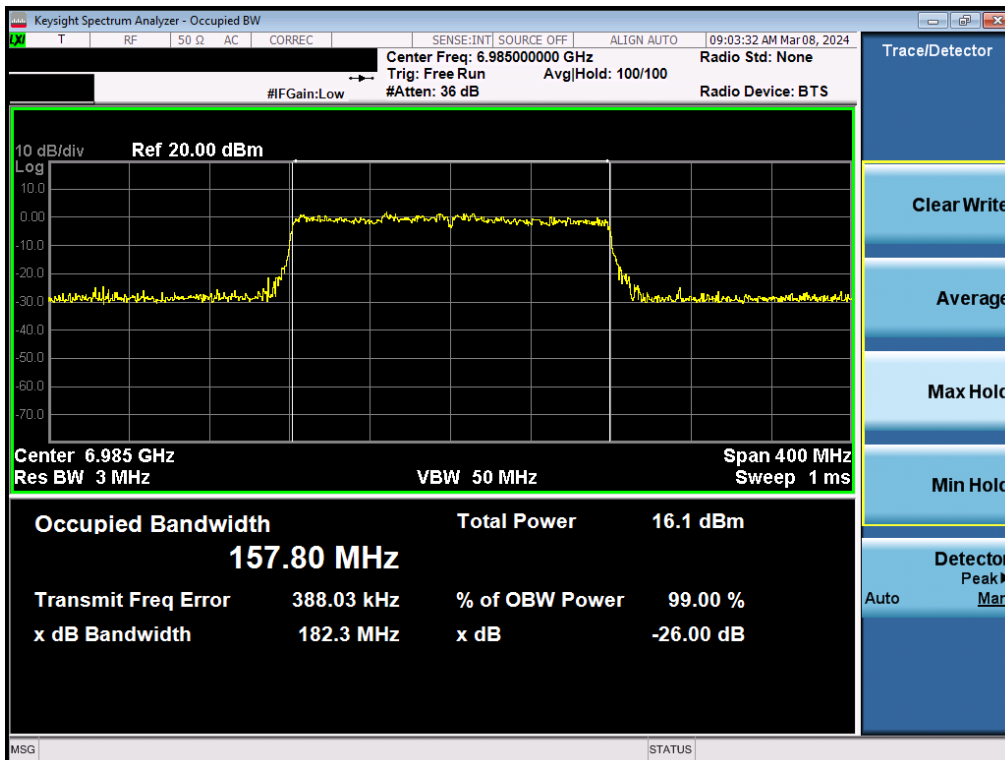


Plot 7-37. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802. 11be (Full Tone) (UNII Band 8) – Ch. 211)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 42 of 274

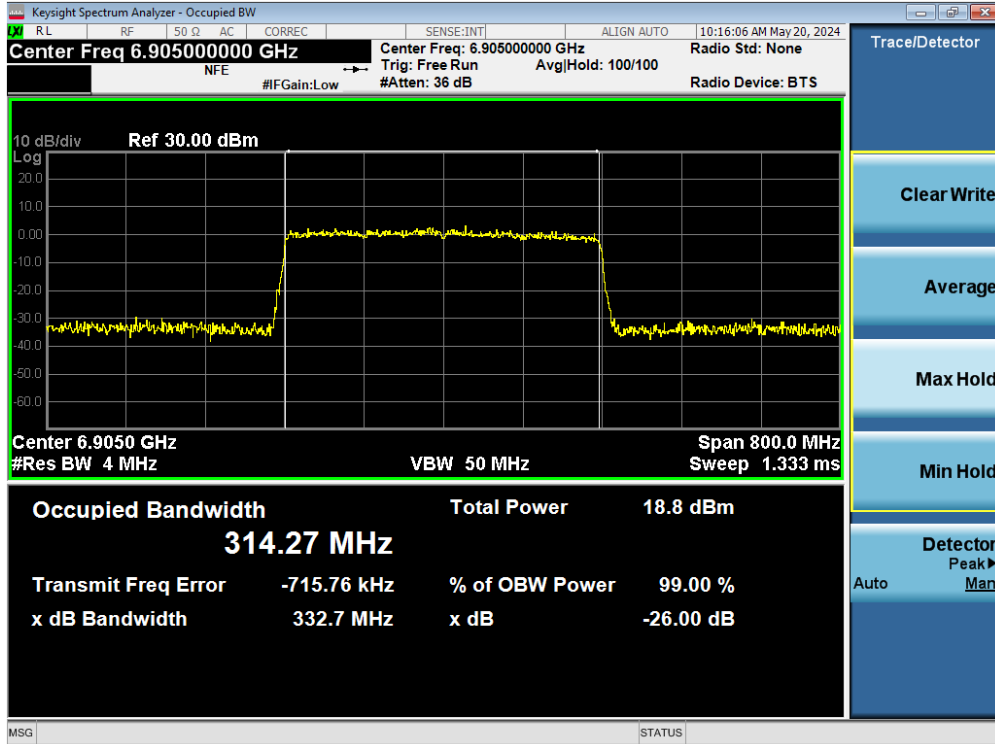


Plot 7-38. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802. 11be (Full Tone) (UNII Band 8) – Ch. 199)



Plot 7-39. Occupied Bandwidth Plot MIMO ANT1 (160MHz BW 802. 11be (Full Tone) (UNII Band 8) – Ch. 207)

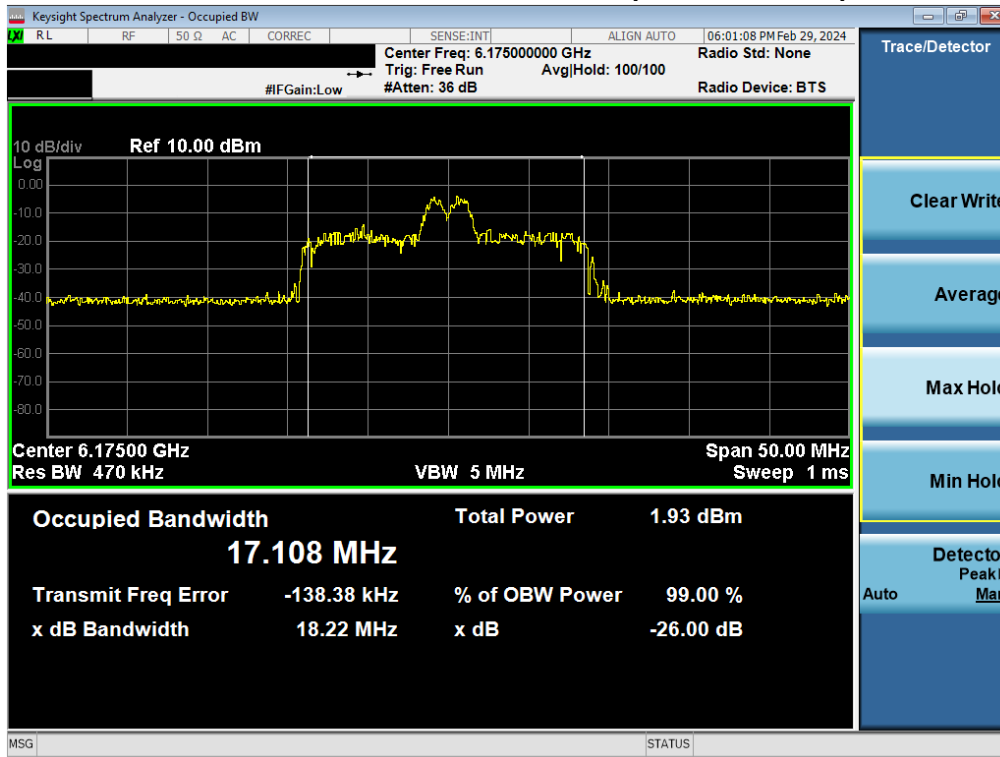
FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 43 of 274



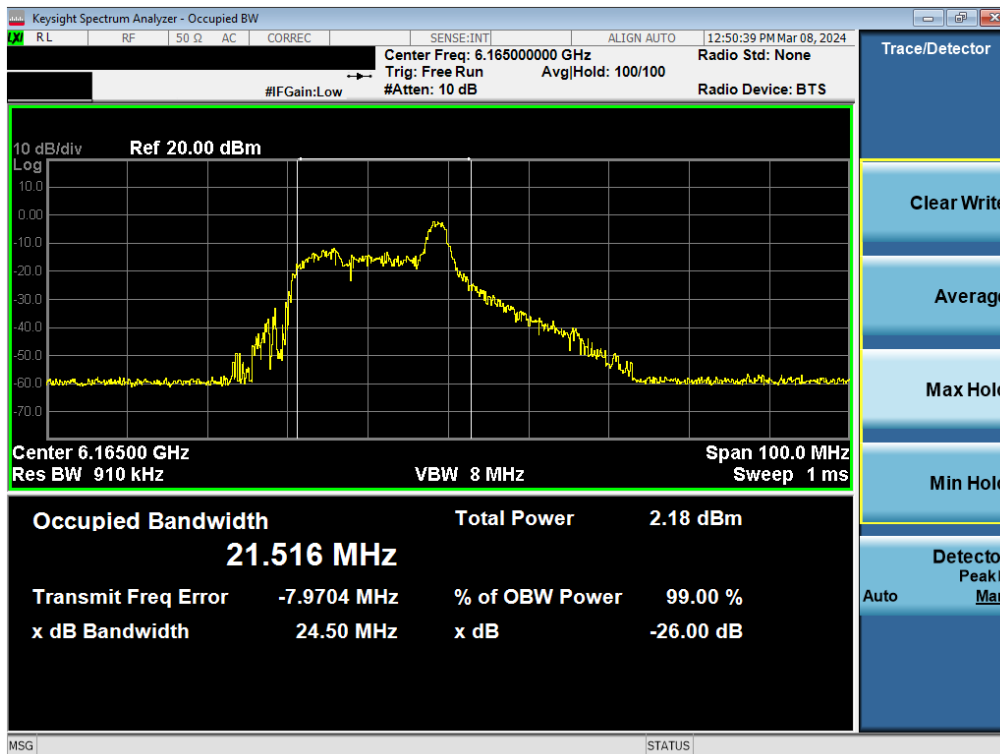
Plot 7-40. Occupied Bandwidth Plot MIMO ANT1 (320MHz BW 802. 11be (Full Tones) (UNII Band 8) – Ch. 191)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
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### 7.2.3 MIMO Antenna-2 Bandwidth Measurements – (Partial Tones)

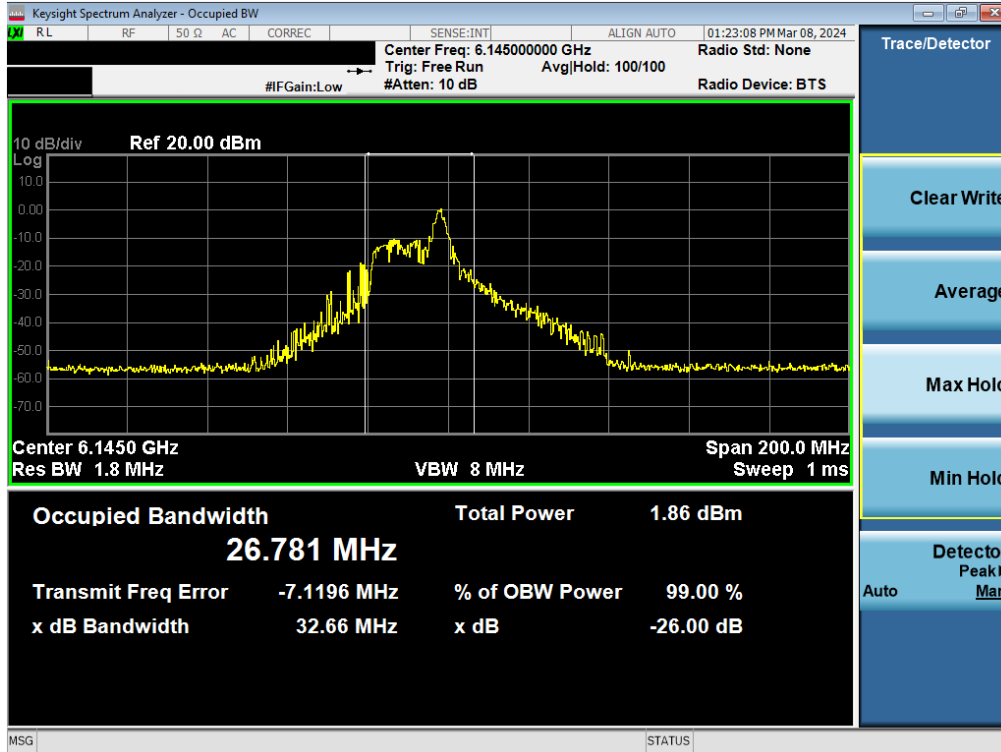


Plot 7-41. Occupied Bandwidth Plot MIMO ANT2 (20MHz BW 802. 11be (26 Tones) (UNII Band 5) – Ch. 45)

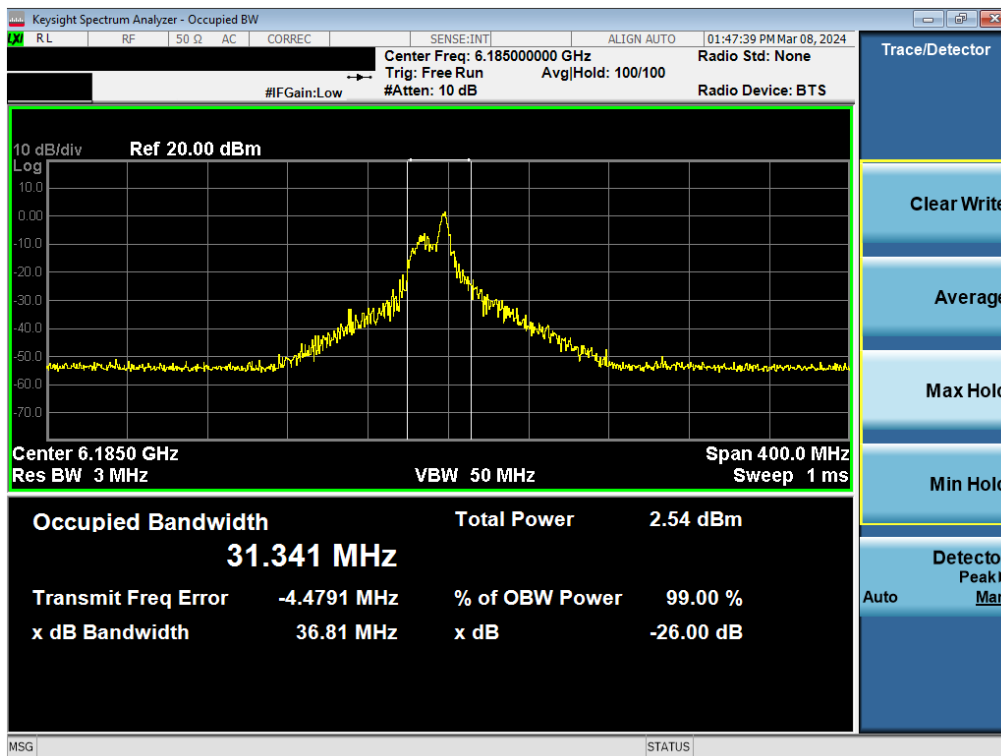


Plot 7-42. Occupied Bandwidth Plot MIMO ANT2 (40MHz BW 802. 11be (26 Tones) (UNII Band 5) – Ch. 43)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 45 of 274

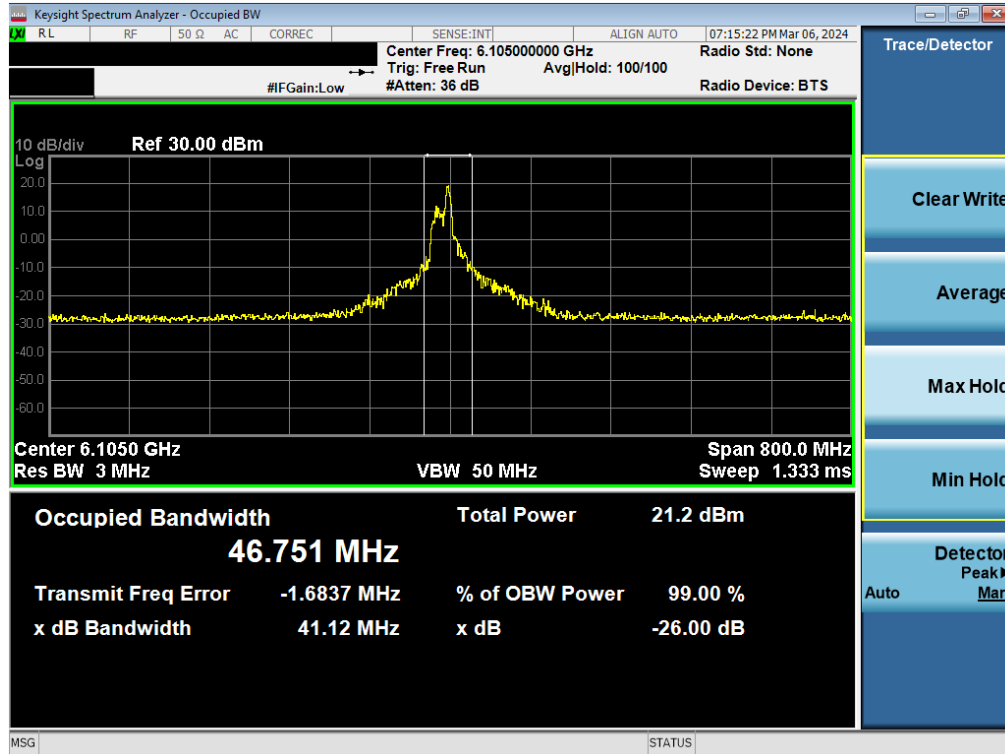


Plot 7-43. Occupied Bandwidth Plot MIMO ANT2 (80MHz BW 802. 11be (26 Tones) (UNII Band 5) – Ch. 39)



Plot 7-44. Occupied Bandwidth Plot MIMO ANT2 (160MHz BW 802. 11be (26 Tones) (UNII Band 5) – Ch. 47)

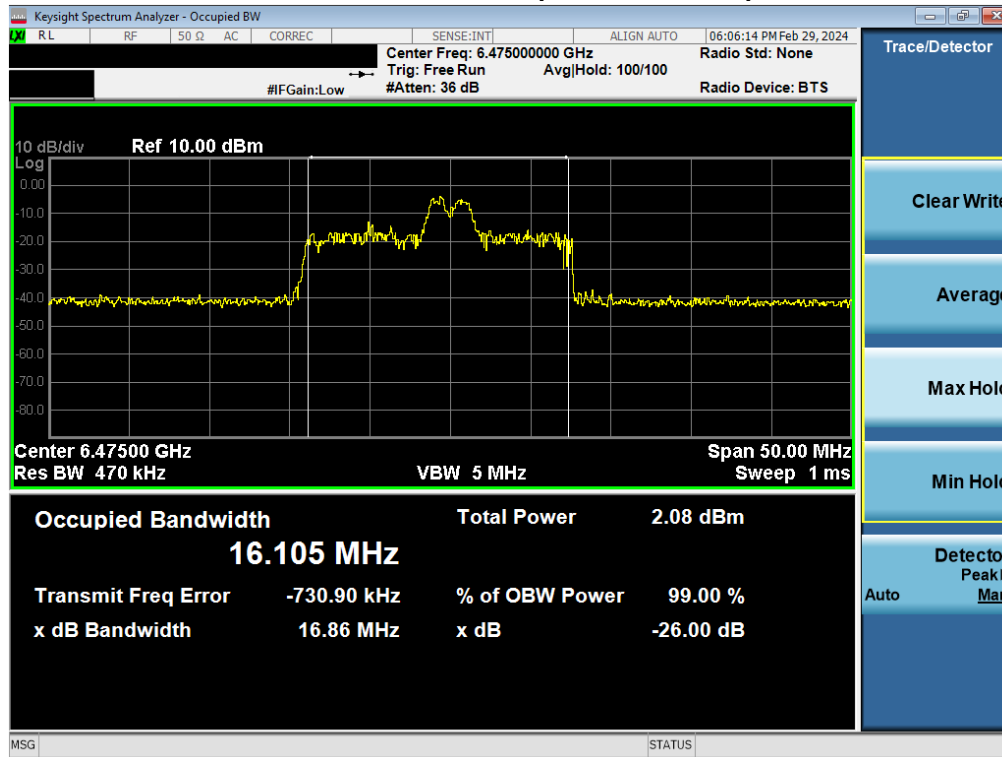
FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 46 of 274



Plot 7-45. Occupied Bandwidth Plot MIMO ANT2 (320MHz BW 802. 11be (26 Tones) (UNII Band 5) – Ch. 31)

FCC ID: C3K2077	<b>MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 47 of 274

## MIMO Antenna-2 Bandwidth Measurements – (Partial Tones)



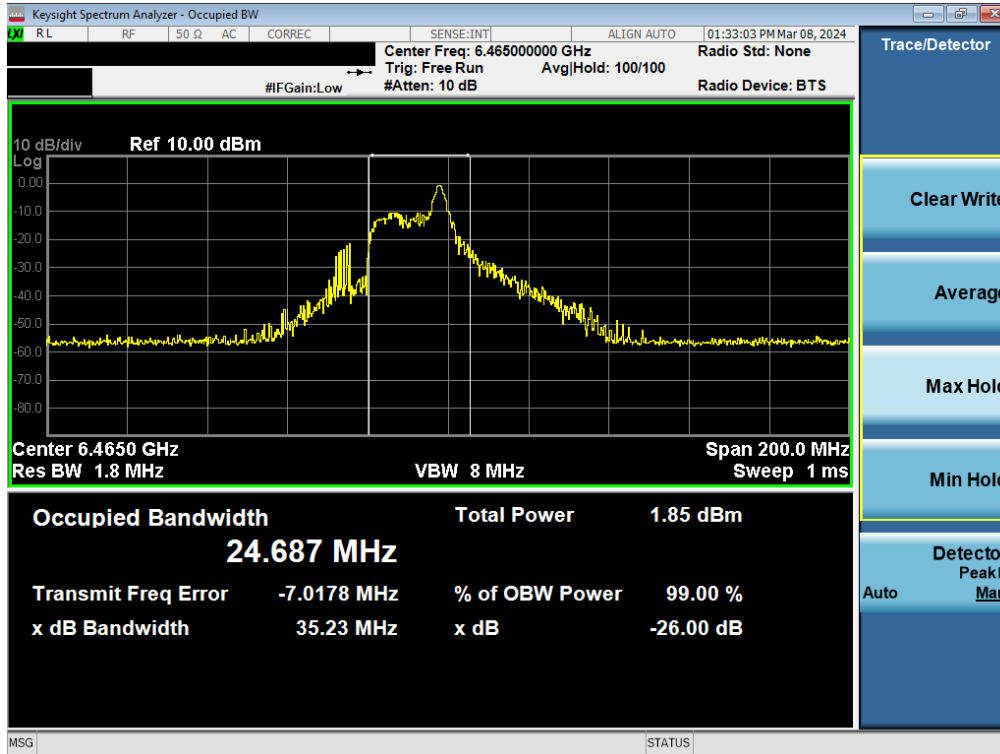
Plot 7-46. Occupied Bandwidth Plot MIMO ANT2 (20MHz BW 802. 11be (26 Tones) (UNII Band 6) – Ch. 105)



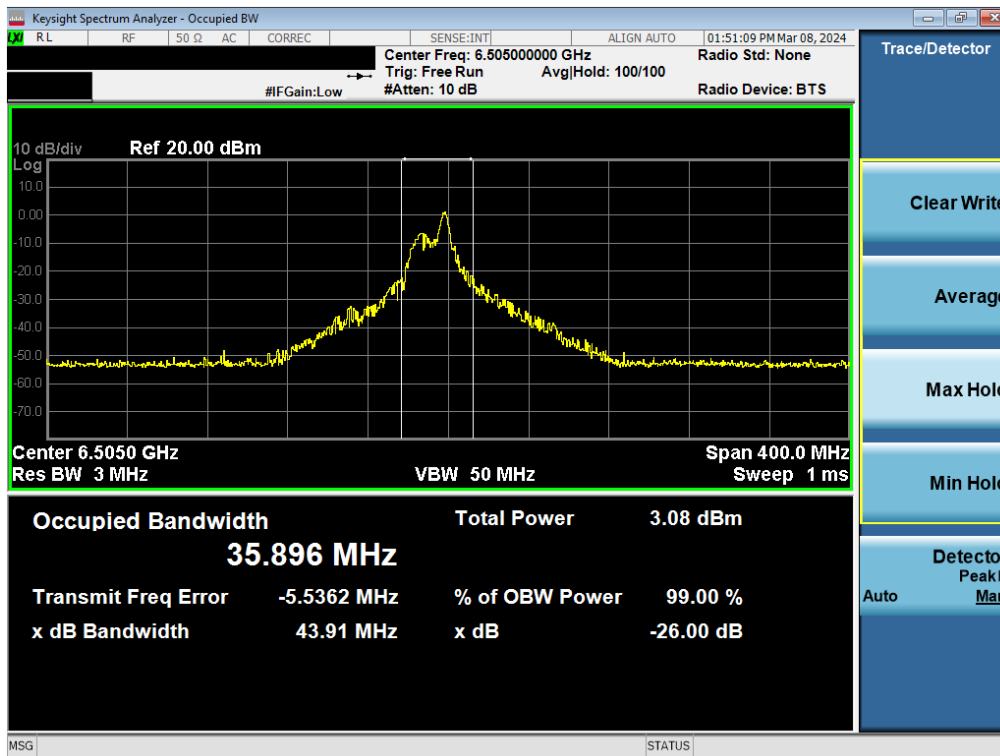
Plot 7-47. Occupied Bandwidth Plot MIMO ANT2 (40MHz BW 802. 11be (26 Tones) (UNII Band 6) – Ch. 107)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 48 of 274



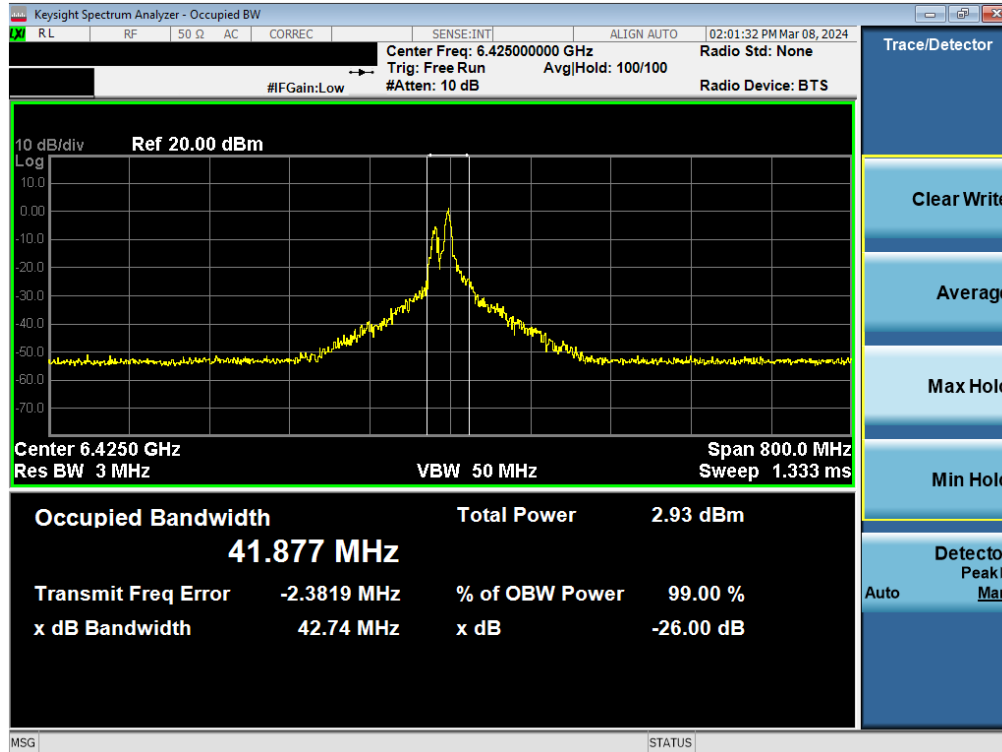


Plot 7-48. Occupied Bandwidth Plot MIMO ANT2 (80MHz BW 802. 11be (26 Tones) (UNII Band 6) – Ch. 103)



Plot 7-49. Occupied Bandwidth Plot MIMO ANT2 (160MHz BW 802. 11be (26 Tones) (UNII Band 6) – Ch. 111)

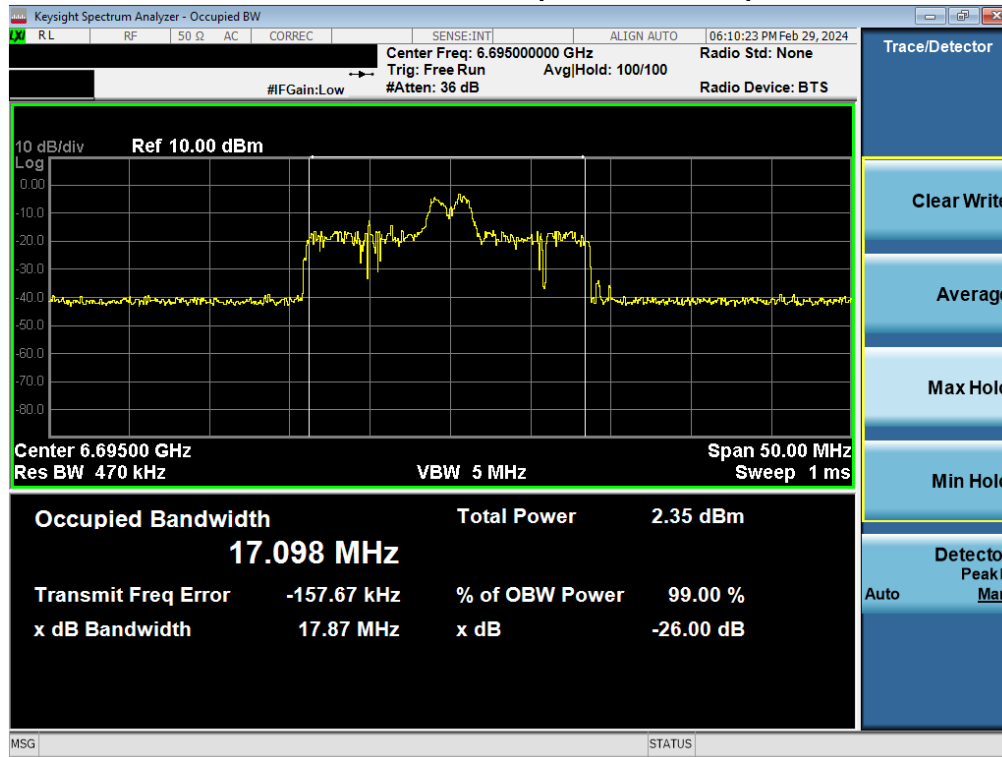
FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 49 of 274



Plot 7-50. Occupied Bandwidth Plot MIMO ANT2 (320MHz BW 802. 11be (26 Tones) (UNII Band 6) – Ch. 95)

FCC ID: C3K2077	<b>MEASUREMENT REPORT</b>		Approved by: Technical Manager
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## MIMO Antenna-2 Bandwidth Measurements – (Partial Tones)

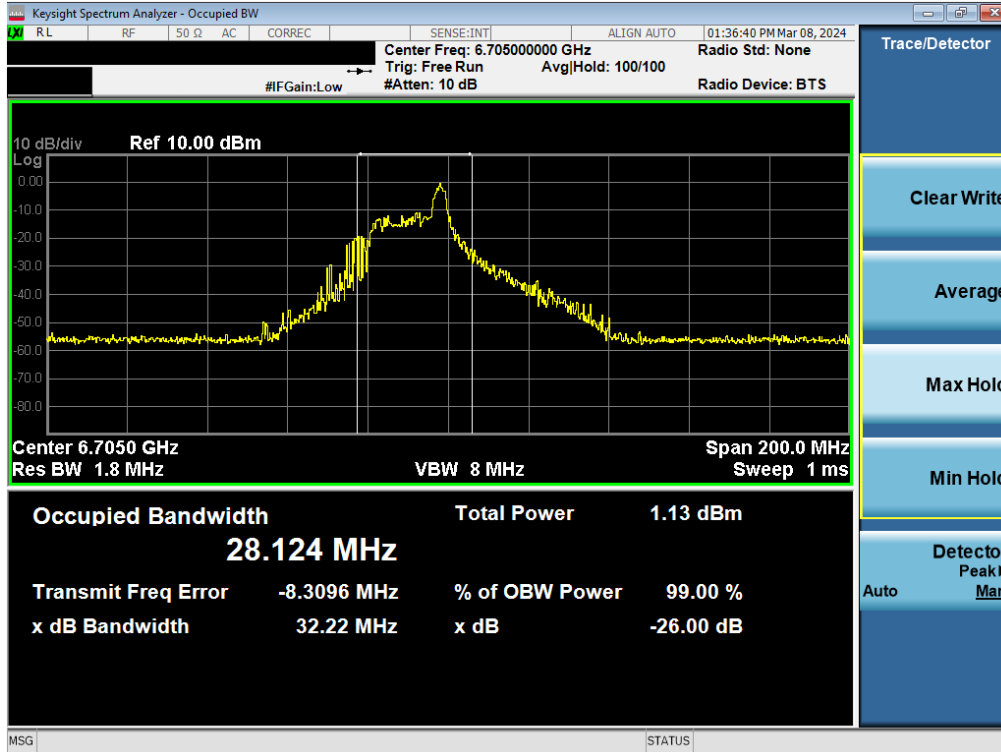


Plot 7-51. Occupied Bandwidth Plot MIMO ANT2 (20MHz BW 802. 11be (26 Tones) (UNII Band 7) – Ch. 149)

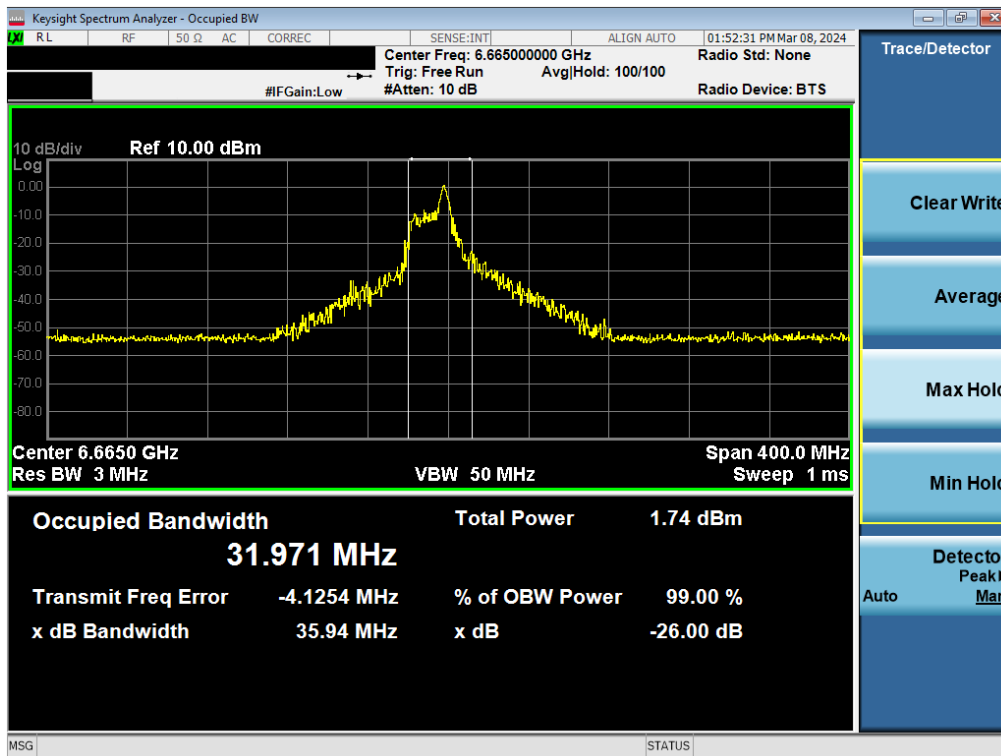


Plot 7-52. Occupied Bandwidth Plot MIMO ANT2 (40MHz BW 802. 11be (26 Tones) (UNII Band 7) – Ch. 155)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
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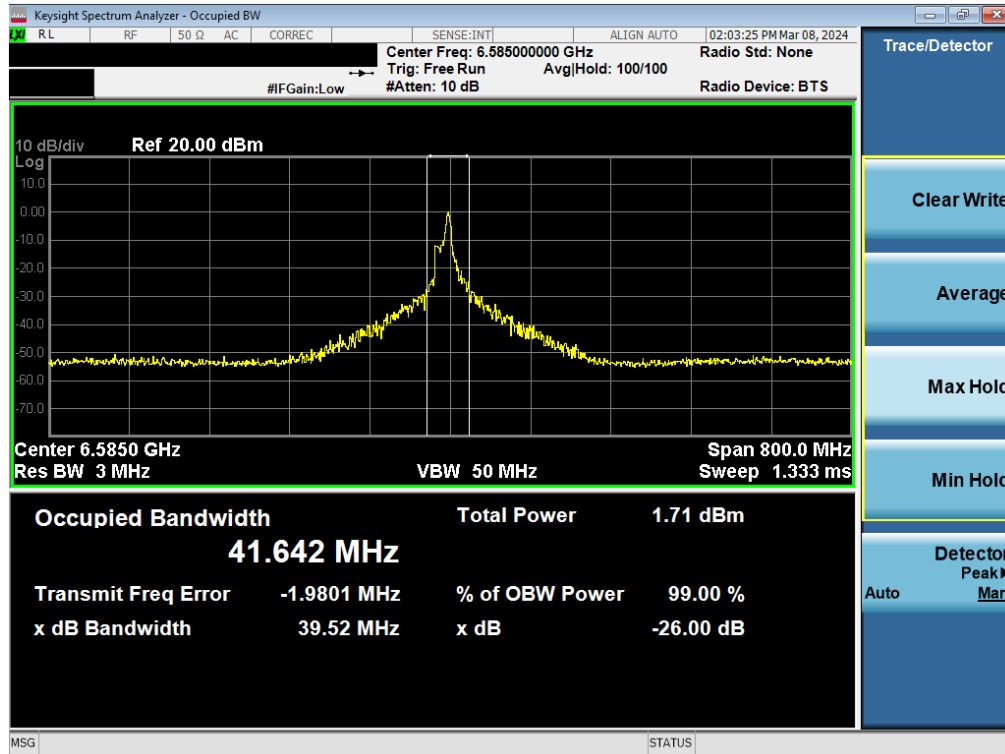


Plot 7-53. Occupied Bandwidth Plot MIMO ANT2 (80MHz BW 802. 11be (26 Tones) (UNII Band 7) – Ch. 151)



Plot 7-54. Occupied Bandwidth Plot MIMO ANT2 (160MHz BW 802. 11be (26 Tones) (UNII Band 7) – Ch. 143)

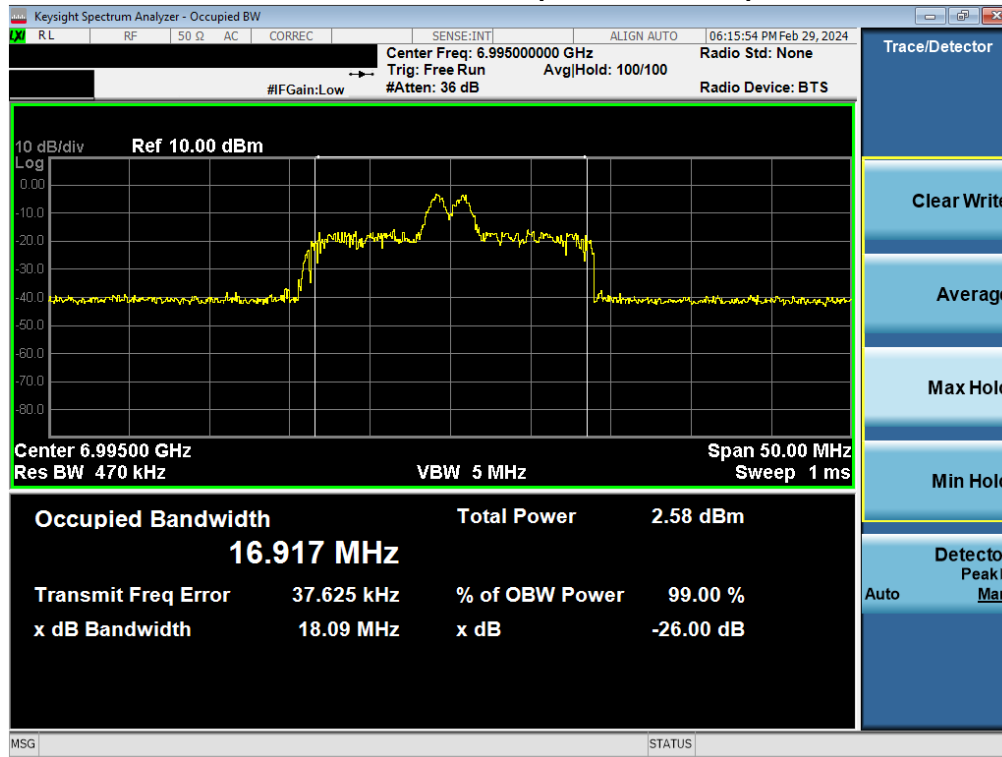
FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 52 of 274



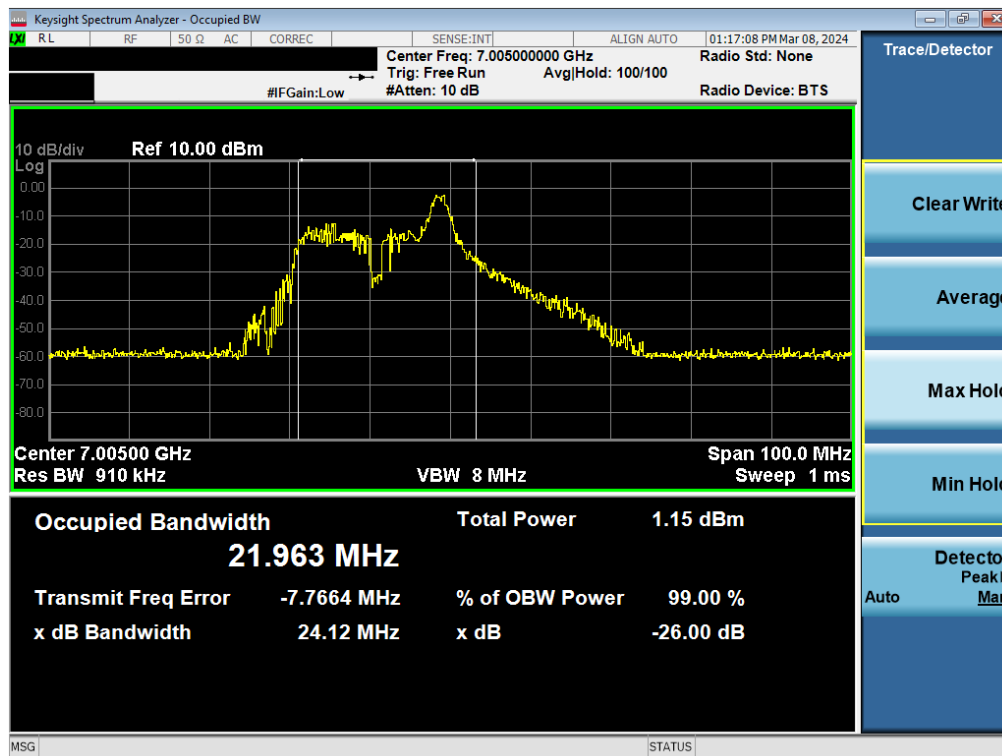
Plot 7-55. Occupied Bandwidth Plot MIMO ANT2 (320MHz BW 802. 11be (26 Tones) (UNII Band 7) – Ch. 127)

FCC ID: C3K2077	<b>MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 53 of 274

## MIMO Antenna-2 Bandwidth Measurements – (Partial Tones)

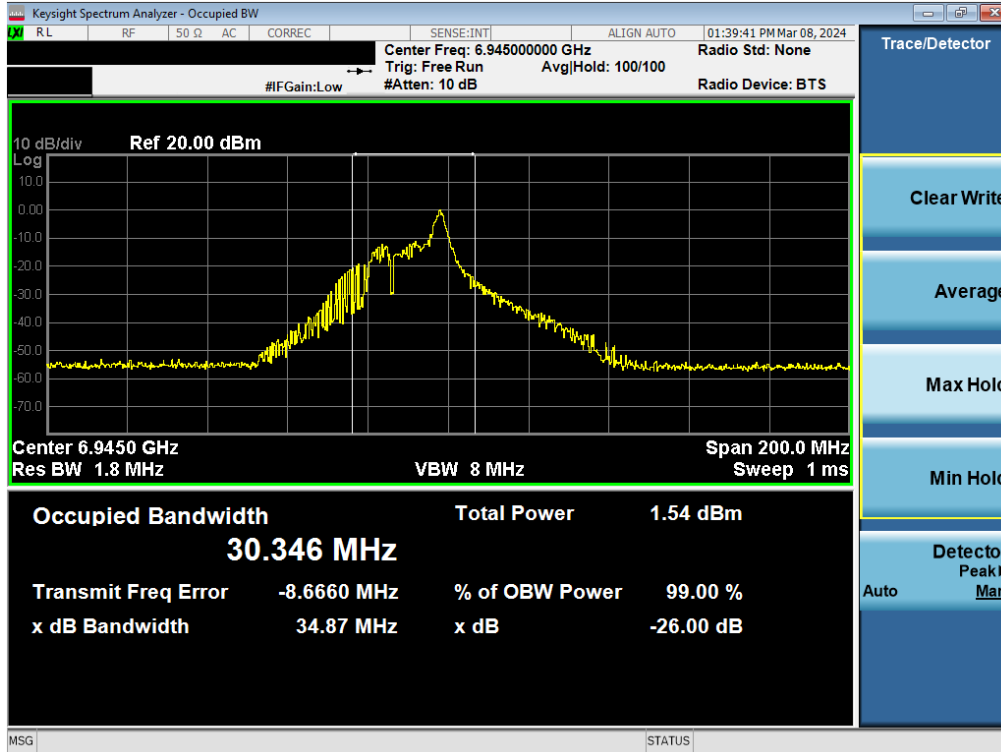


Plot 7-56. Occupied Bandwidth Plot MIMO ANT2 (20MHz BW 802. 11be (26 Tones) (UNII Band 8) – Ch. 209)

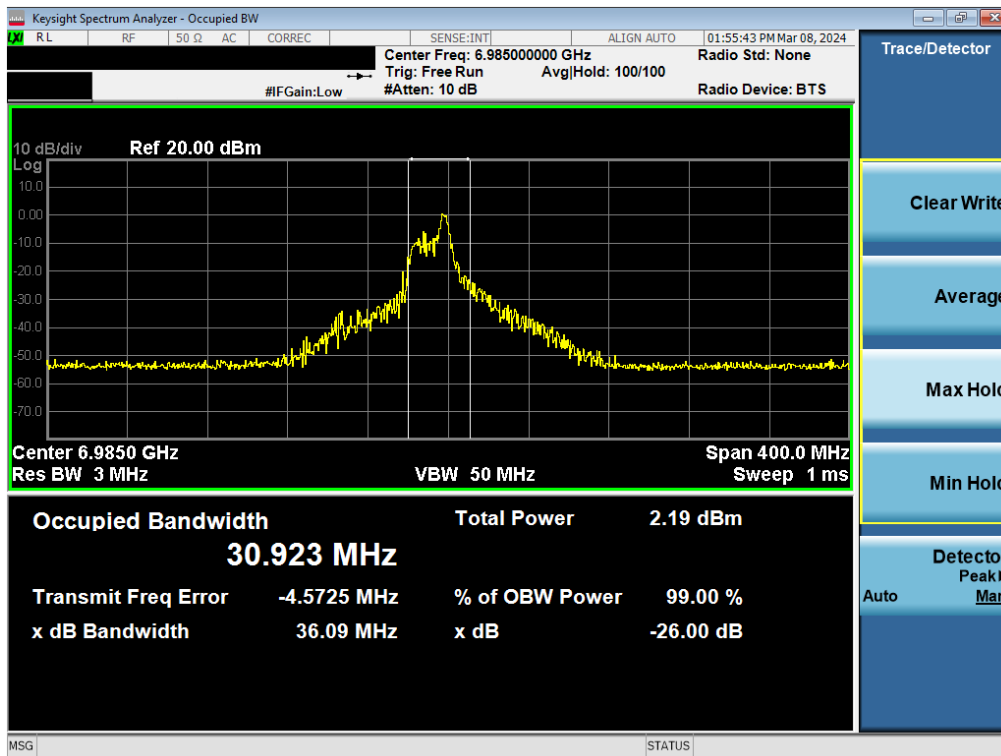


Plot 7-57. Occupied Bandwidth Plot MIMO ANT2 (40MHz BW 802. 11be (26 Tones) (UNII Band 8) – Ch. 211)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
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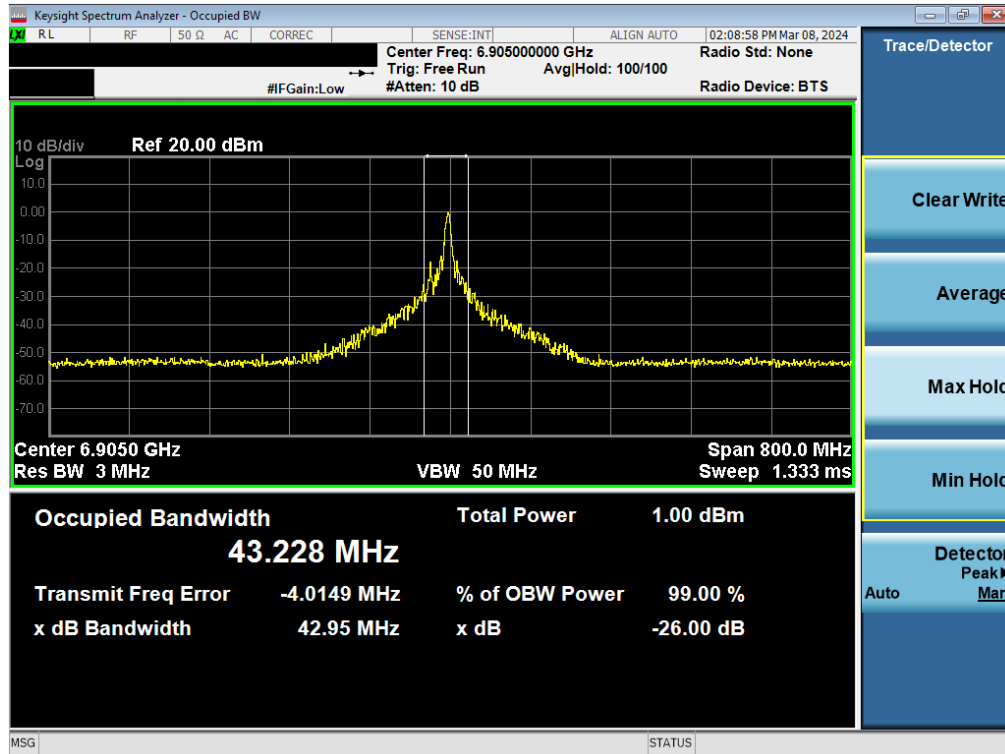


Plot 7-58. Occupied Bandwidth Plot MIMO ANT2 (80MHz BW 802. 11be (26 Tones) (UNII Band 8) – Ch. 199)



Plot 7-59. Occupied Bandwidth Plot MIMO ANT2 (160MHz BW 802. 11be (26 Tones) (UNII Band 8) – Ch. 207)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
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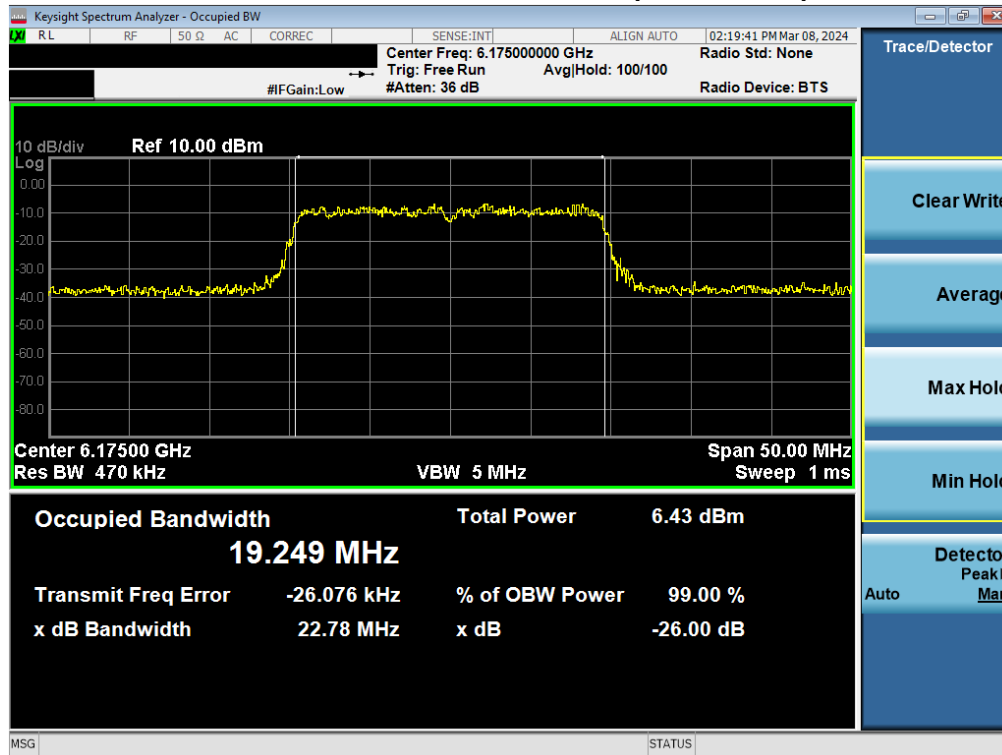


Plot 7-60. Occupied Bandwidth Plot MIMO ANT2 (320MHz BW 802. 11be (26 Tones) (UNII Band 8) – Ch. 191)

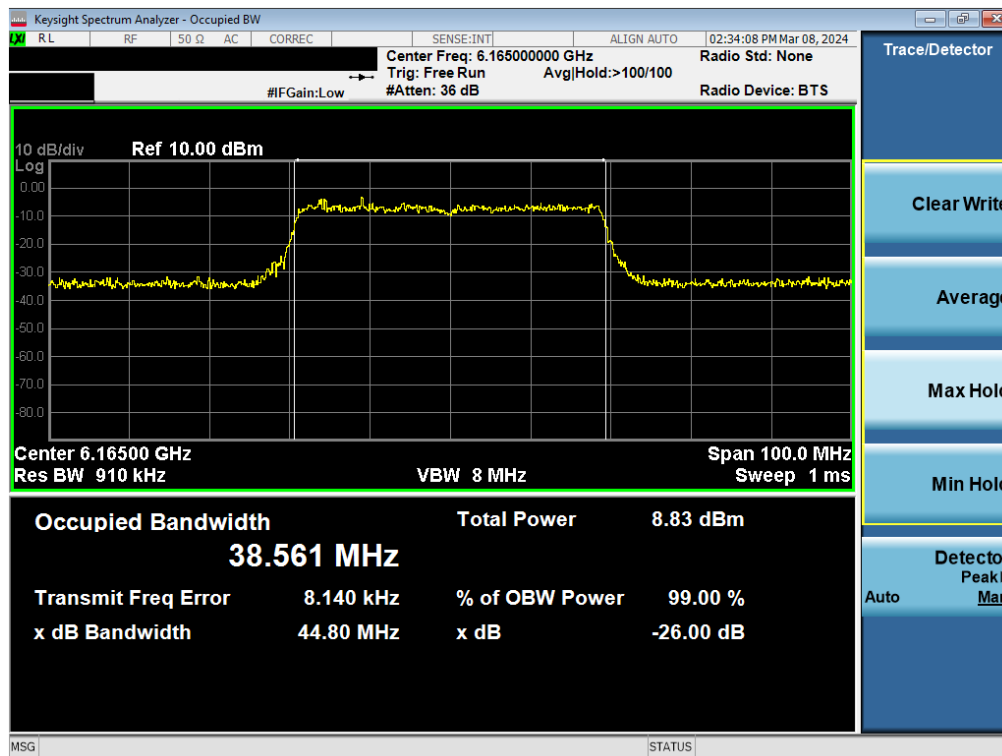
FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 56 of 274



## 7.2.4 MIMO Antenna-2 Bandwidth Measurements – (Full Tones)

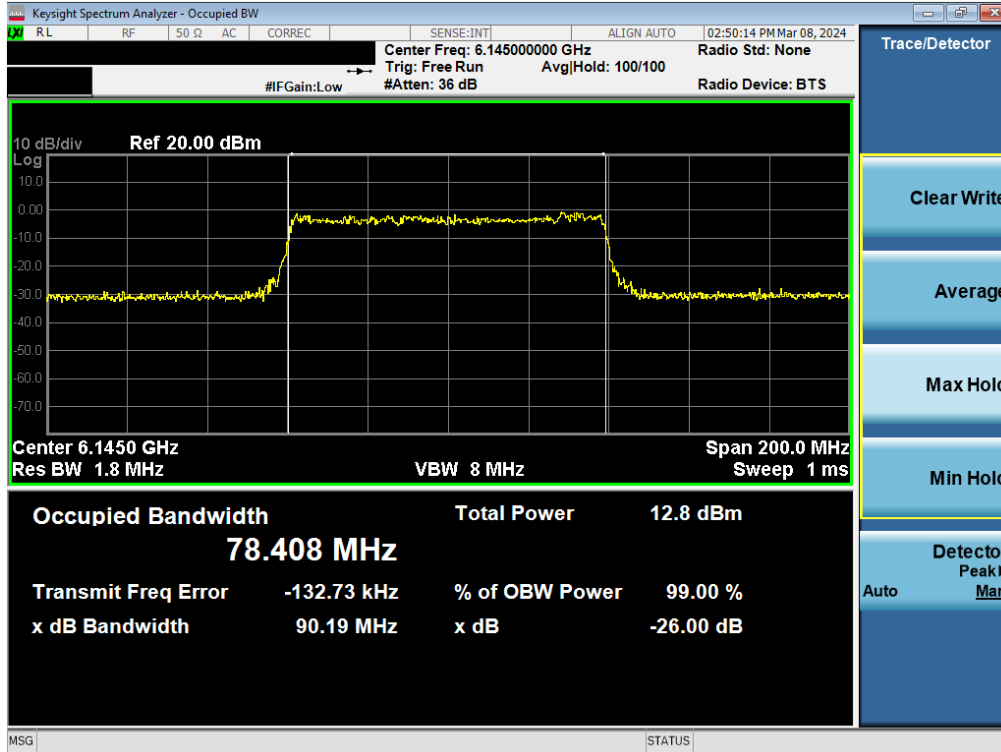


Plot 7-61. Occupied Bandwidth Plot MIMO ANT2 (20MHz BW 802. 11be (Full Tone) (UNII Band 5) – Ch. 45)

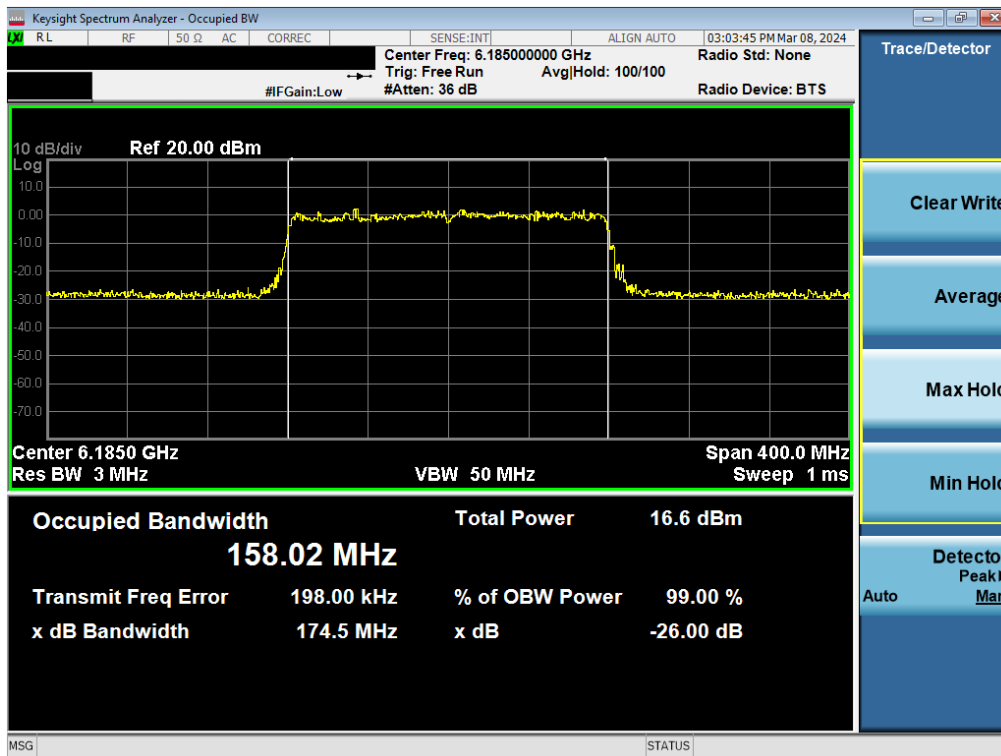


Plot 7-62. Occupied Bandwidth Plot MIMO ANT2 (40MHz BW 802. 11be (Full Tone) (UNII Band 5) – Ch. 43)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 57 of 274

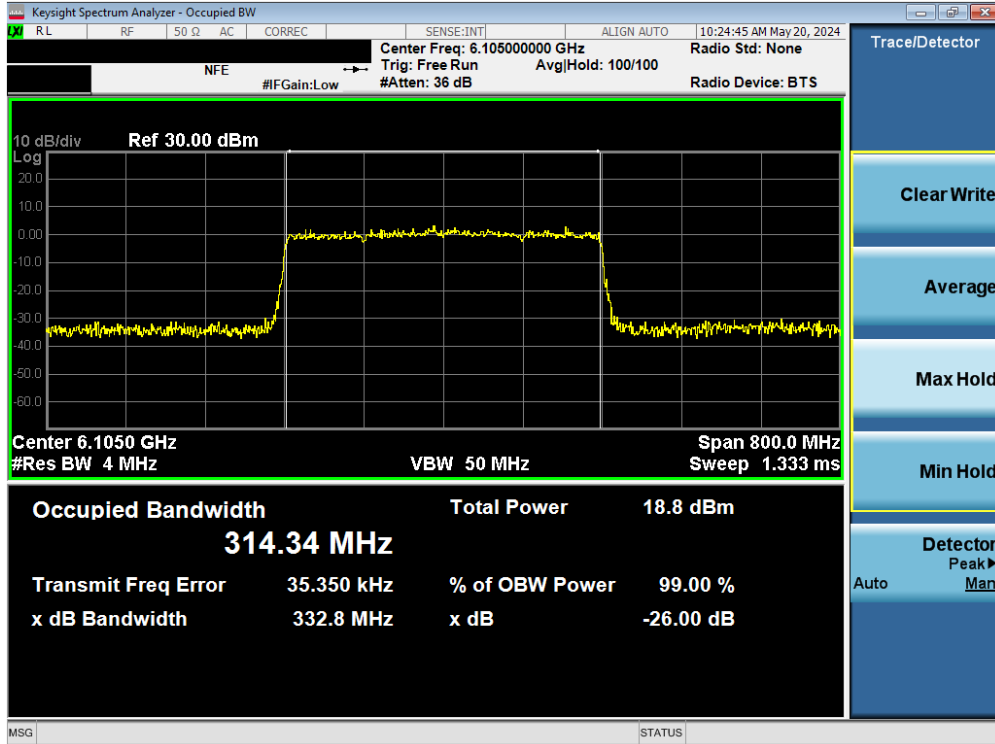


Plot 7-63. Occupied Bandwidth Plot MIMO ANT2 (80MHz BW 802. 11be (Full Tone) (UNII Band 5) – Ch. 39)



Plot 7-64. Occupied Bandwidth Plot MIMO ANT2 (160MHz BW 802. 11be (Full Tone) (UNII Band 5) – Ch. 47)

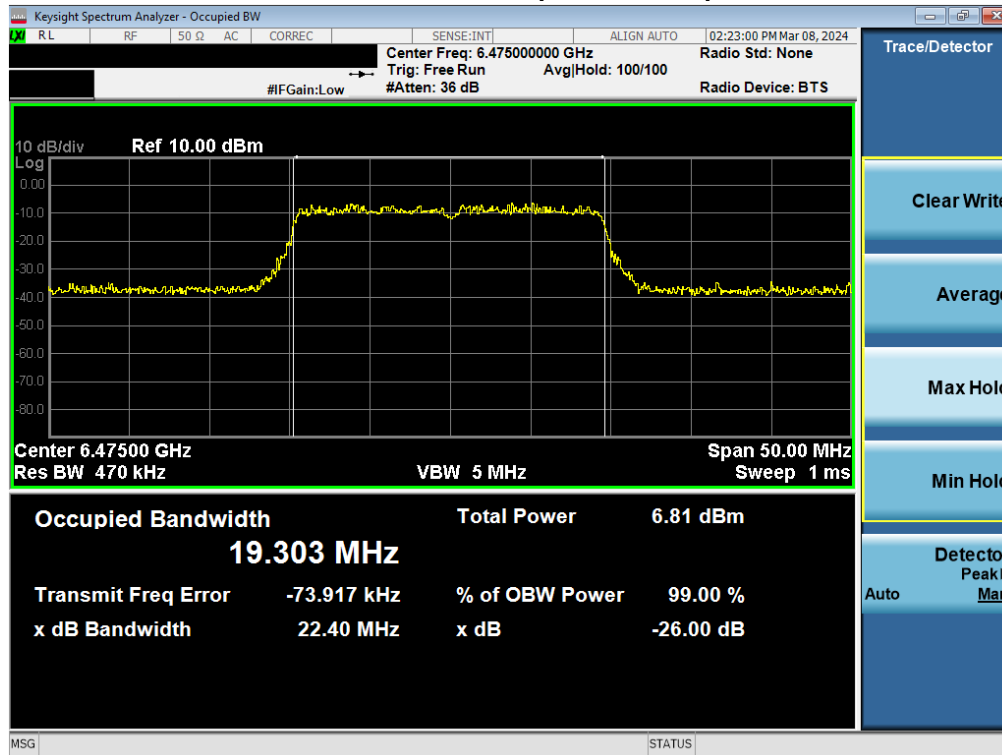
FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 58 of 274



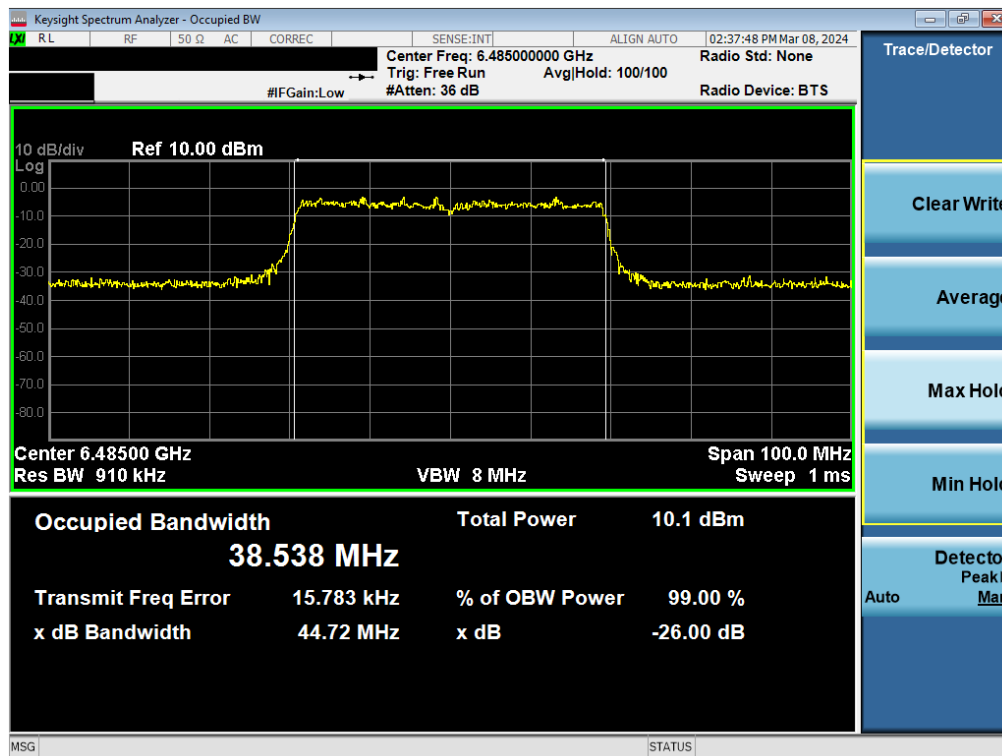
Plot 7-65. Occupied Bandwidth Plot MIMO ANT2 (320MHz BW 802. 11be (26 Tones) (UNII Band 5) – Ch. 31)

FCC ID: C3K2077	<b>MEASUREMENT REPORT</b>		Approved by: Technical Manager
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## MIMO Antenna-2 Bandwidth Measurements – (Full Tones)

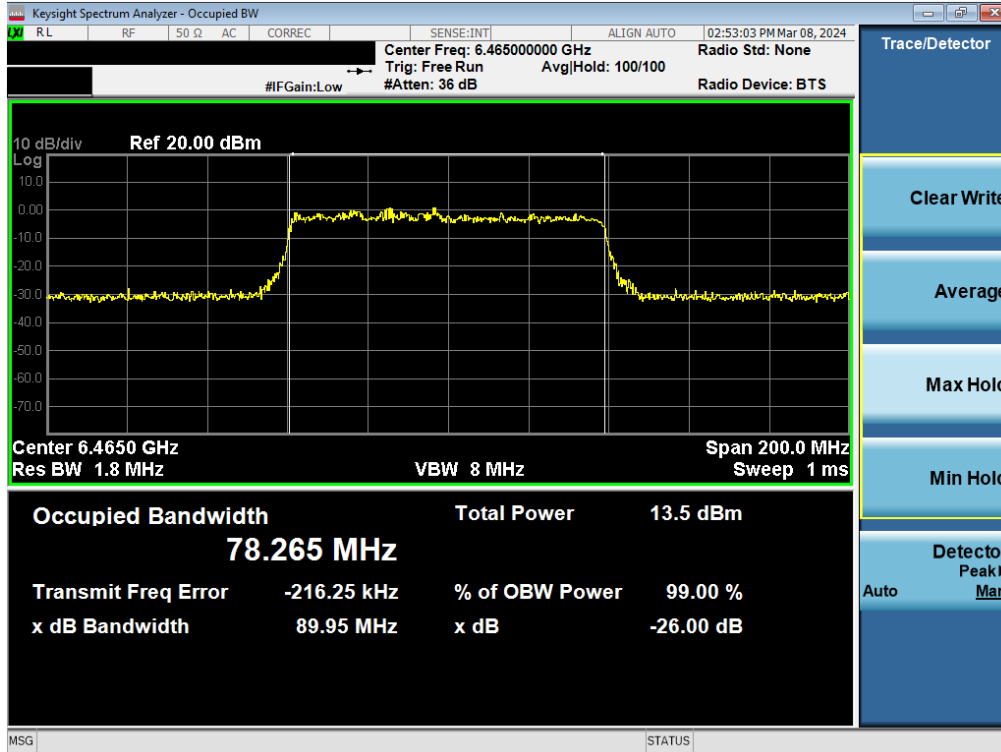


Plot 7-66. Occupied Bandwidth Plot MIMO ANT2 (20MHz BW 802. 11be (Full Tone) (UNII Band 6) – Ch. 105)

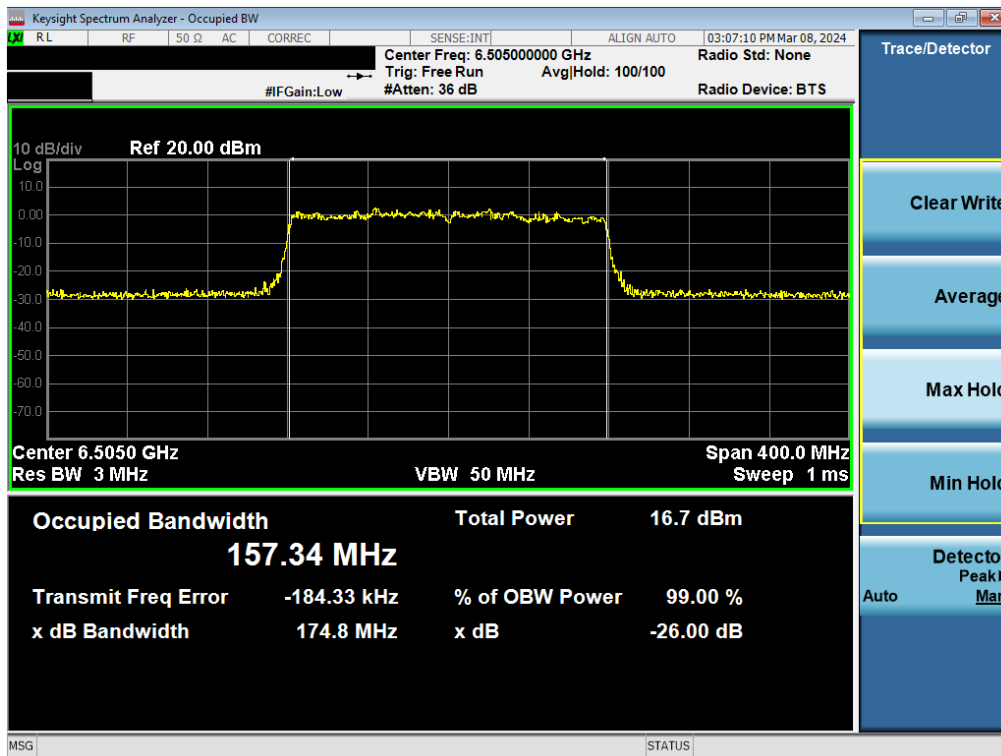


Plot 7-67. Occupied Bandwidth Plot MIMO ANT2 (40MHz BW 802. 11be (Full Tone) (UNII Band 6) – Ch. 107)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
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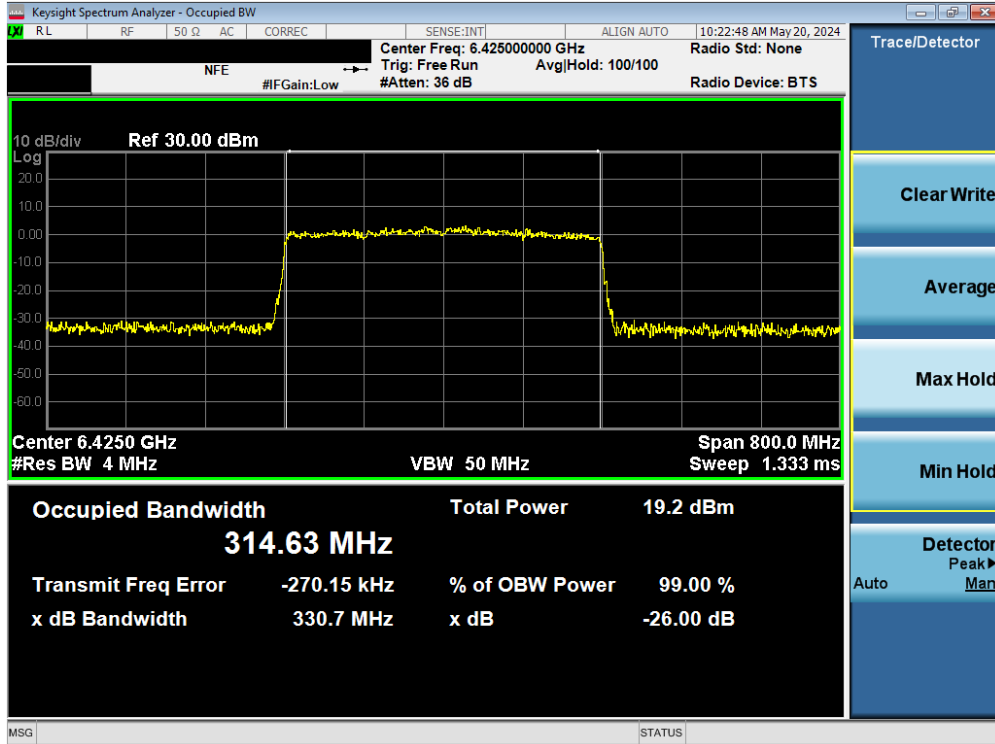


Plot 7-68. Occupied Bandwidth Plot MIMO ANT2 (80MHz BW 802. 11be (Full Tone) (UNII Band 6) – Ch. 103)



Plot 7-69. Occupied Bandwidth Plot MIMO ANT2 (160MHz BW 802. 11be (Full Tone) (UNII Band 6) – Ch. 111)

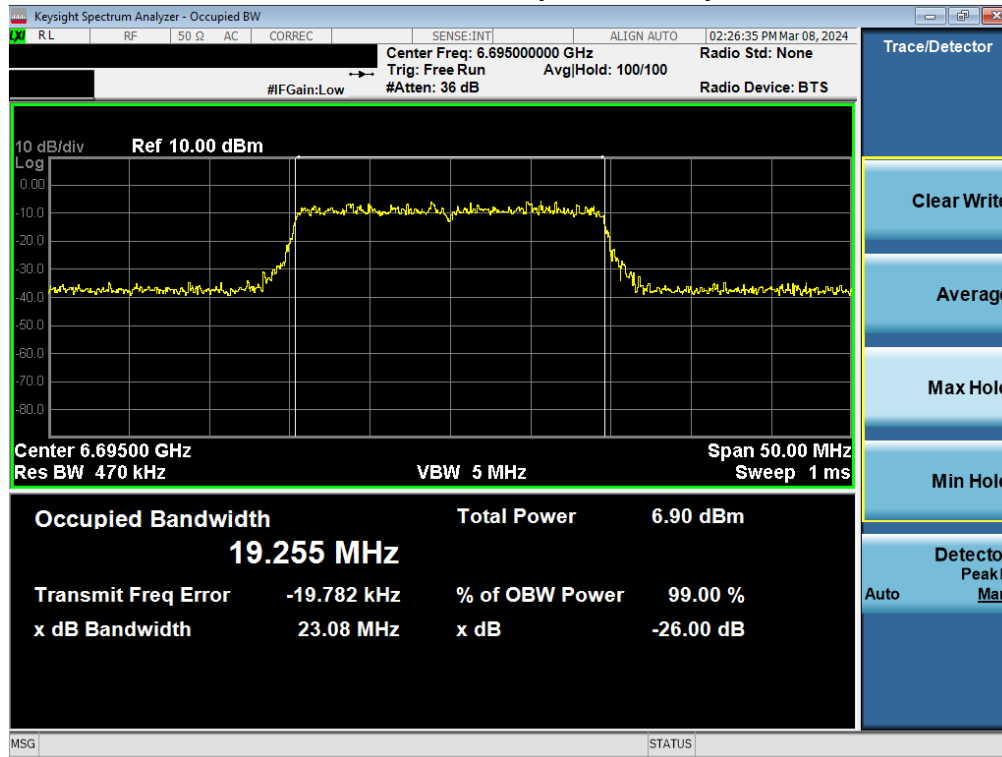
FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 61 of 274



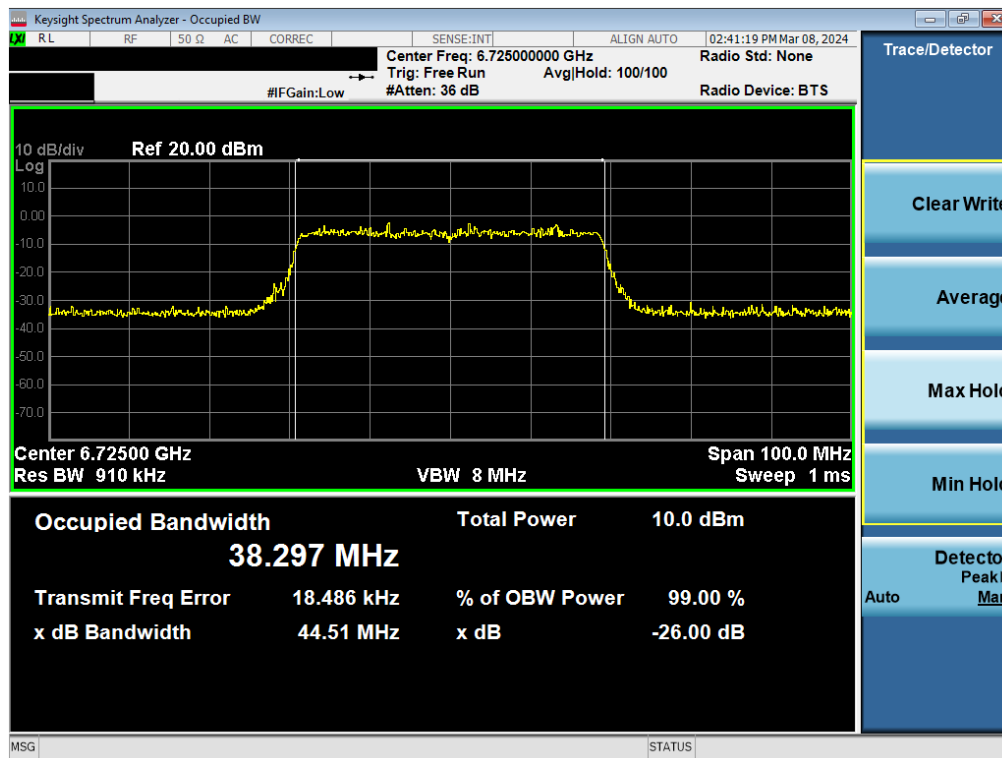
Plot 7-70. Occupied Bandwidth Plot MIMO ANT2 (320MHz BW 802. 11be (Full Tones) (UNII Band 6) – Ch. 95)

FCC ID: C3K2077	<b>MEASUREMENT REPORT</b>		Approved by: Technical Manager
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## MIMO Antenna-2 Bandwidth Measurements – (Full Tones)

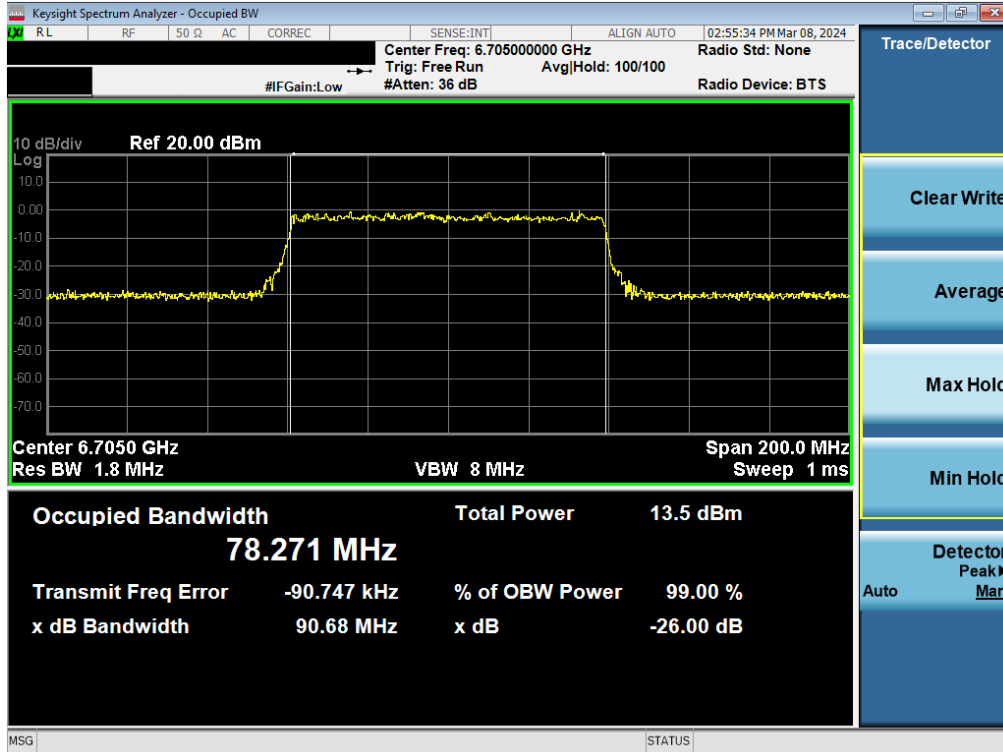


Plot 7-71. Occupied Bandwidth Plot MIMO ANT2 (20MHz BW 802. 11be (Full Tone) (UNII Band 7) – Ch. 149)

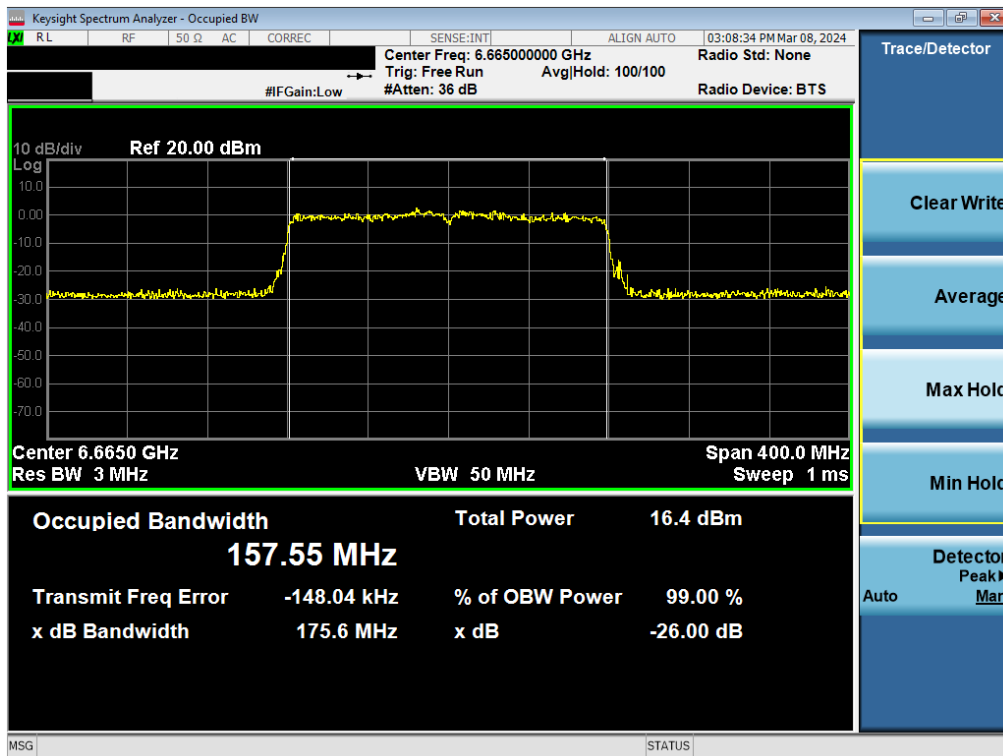


Plot 7-72. Occupied Bandwidth Plot MIMO ANT2 (40MHz BW 802. 11be (Full Tone) (UNII Band 7) – Ch. 155)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 63 of 274



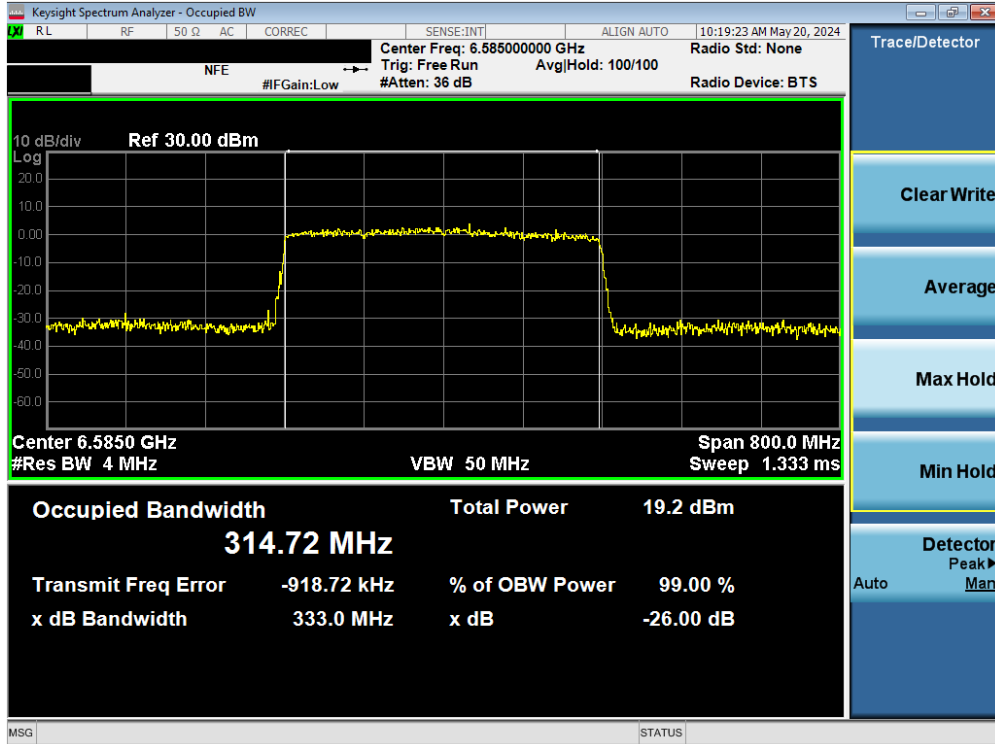
Plot 7-73. Occupied Bandwidth Plot MIMO ANT2 (80MHz BW 802. 11be (Full Tone) (UNII Band 7) – Ch. 151)



Plot 7-74. Occupied Bandwidth Plot MIMO ANT2 (160MHz BW 802. 11be (Full Tone) (UNII Band 7) – Ch. 143)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 64 of 274

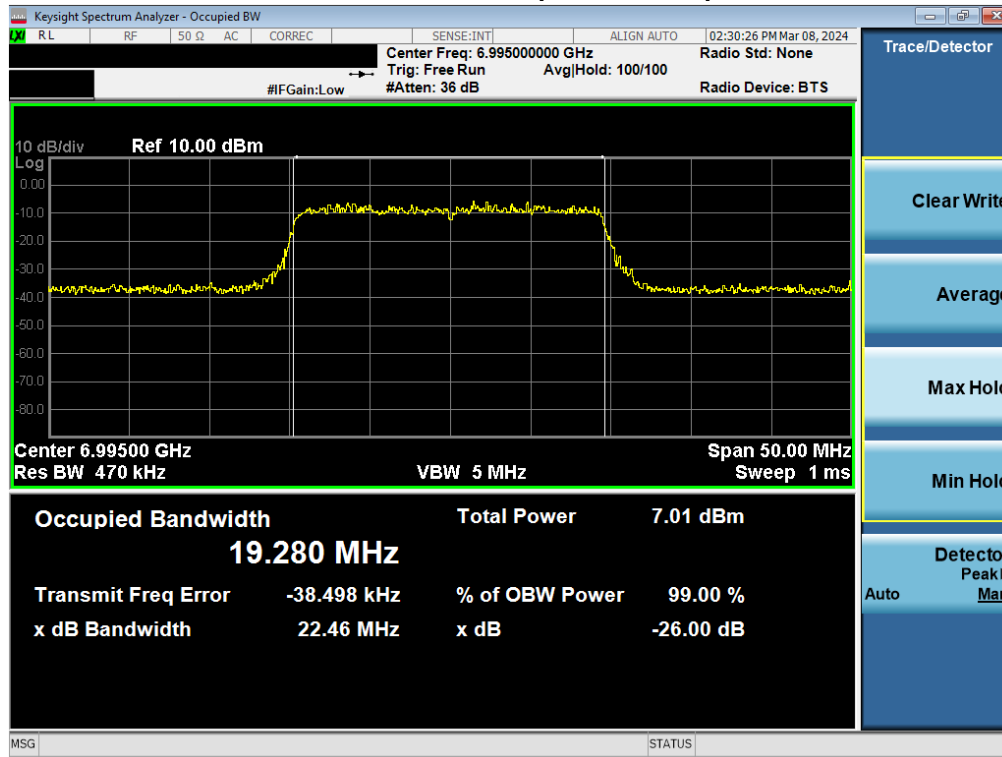




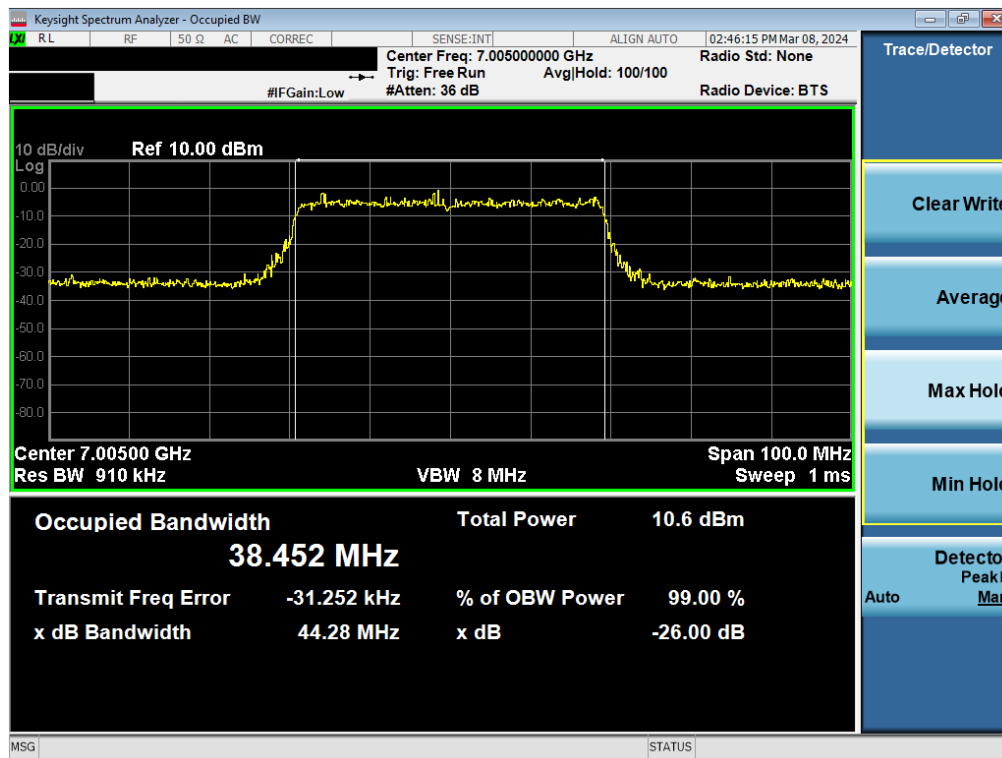
Plot 7-75. Occupied Bandwidth Plot MIMO ANT2 (320MHz BW 802. 11be (Full Tone) (UNII Band 7) – Ch. 127)

FCC ID: C3K2077	<b>MEASUREMENT REPORT</b>		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 65 of 274

## MIMO Antenna-2 Bandwidth Measurements – (Full Tones)

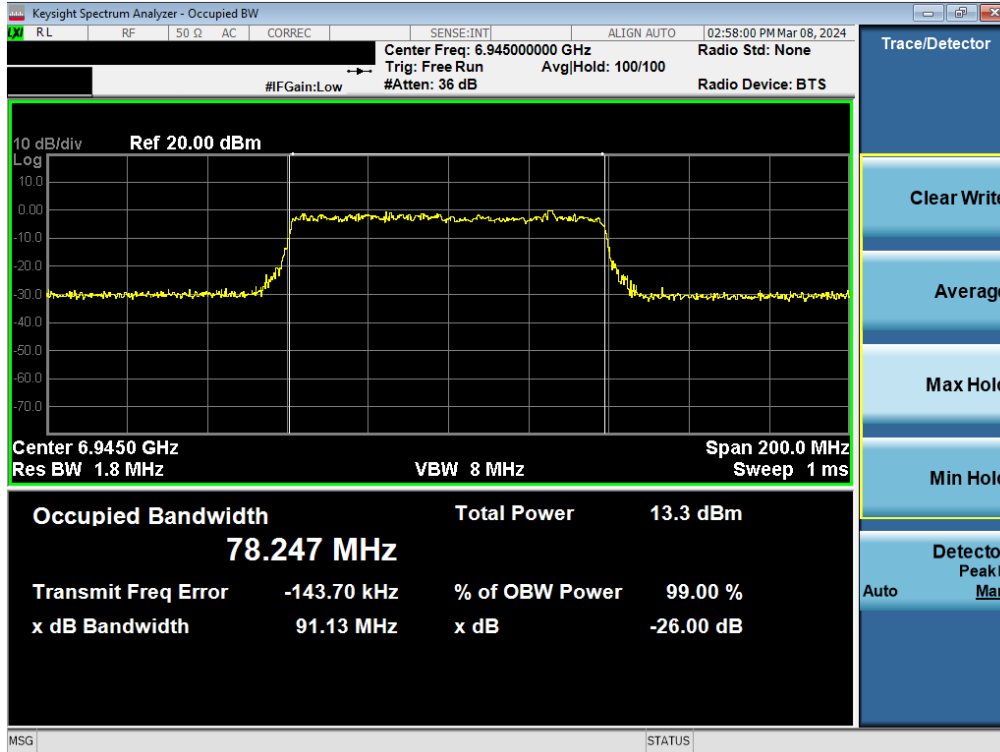


Plot 7-76. Occupied Bandwidth Plot MIMO ANT2 (20MHz BW 802. 11be (Full Tone) (UNII Band 8) – Ch. 209)

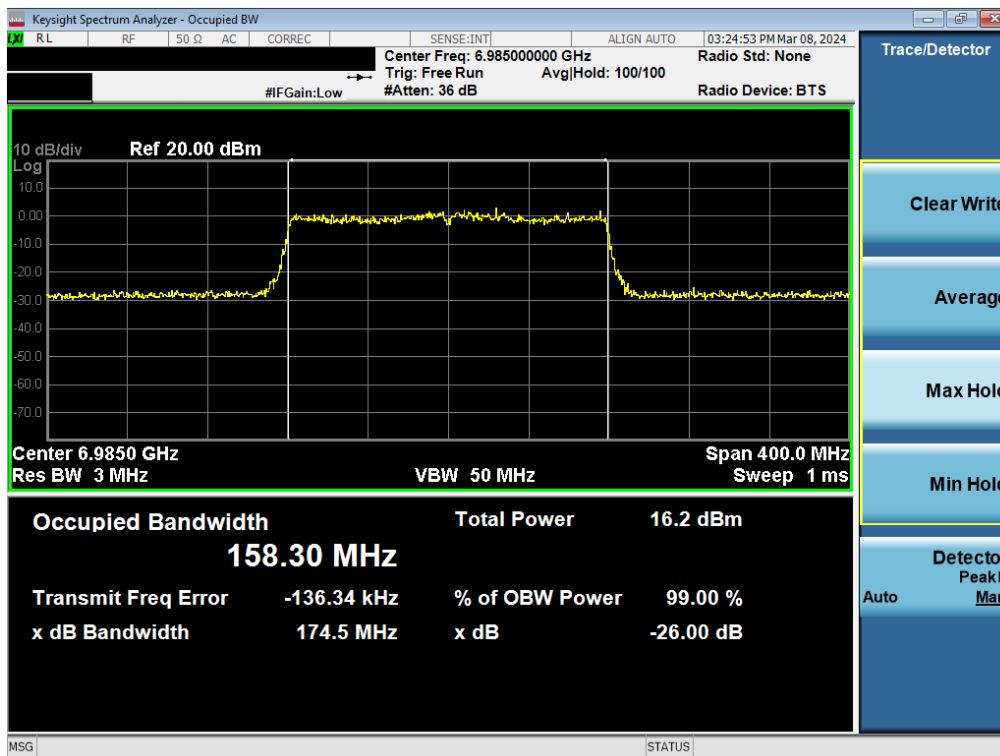


Plot 7-77. Occupied Bandwidth Plot MIMO ANT2 (40MHz BW 802. 11be (Full Tone) (UNII Band 8) – Ch. 211)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 66 of 274

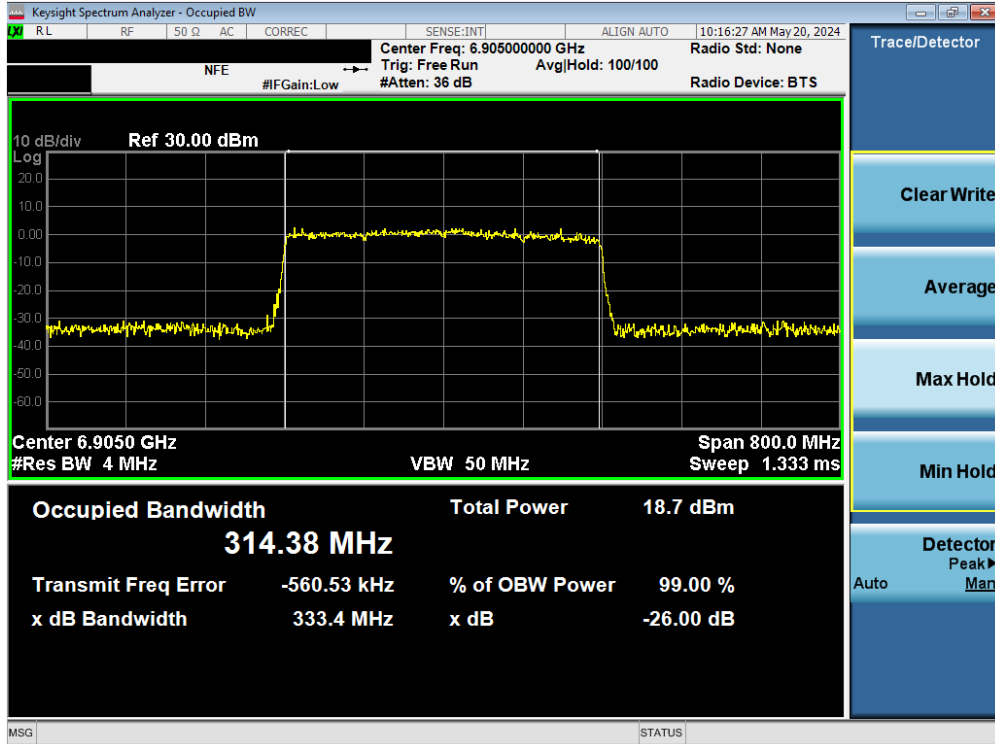


Plot 7-78. Occupied Bandwidth Plot MIMO ANT2 (80MHz BW 802. 11be (Full Tone) (UNII Band 8) – Ch. 199)



Plot 7-79. Occupied Bandwidth Plot MIMO ANT2 (160MHz BW 802. 11be (Full Tone) (UNII Band 8) – Ch. 207)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-80. Occupied Bandwidth Plot MIMO ANT2 (320MHz BW 802. 11be (Full Tones) (UNII Band 8) – Ch. 191)

FCC ID: C3K2077	<b>MEASUREMENT REPORT</b>		Approved by: Technical Manager
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### 7.3 UNII Output Power Measurement

#### Test Overview and Limits

A transmitter antenna terminal of the EUT is connected to the input of an RF pulse power sensor. Measurement is made using a broadband average power meter while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in ANSI C63.10-2013, and at the appropriate frequencies.

**For client devices operating under the control of an indoor access point in the 5.925-7.125 GHz bands, the maximum e.i.r.p. over the frequency band of operation must not exceed 24 dBm. For client devices operating under the control of a standard power access point, the maximum e.i.r.p. over the frequency band of operation must not exceed 30 dBm and the device must limit its power to no more than 6 dB below its associated standard power access point's authorized transmit power.**

#### Test Procedure Used

ANSI C63.10-2013 – Section 12.3.3.2 Method PM-G  
 ANSI C63.10-2013 – Section 14.2 Measure-and-Sum Technique

#### Test Settings

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter. The trace was averaged over 100 traces to obtain the final measured average power.

#### 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

Compliance for this device while operating under the control of either an indoor low power access point or a standard power access point is demonstrated by applying the tighter low power indoor access point limit of 24dBm e.i.r.p. for both cases.

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# MIMO Maximum Conducted Output Power Measurements - LPI

Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)									Dir. Ant. Gain [dB]	Max e.i.r.p [dBm]	e.i.r.p Limit [dBm]	e.i.r.p Margin [dB]	
				RU Index													
				0			4.00			8.00							
ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO									
20MHz BW	5	2	26T	-7.87	-7.35	-4.59	-7.89	-7.27	-4.56	-7.88	-7.37	-4.61	6.44	1.88	24.0	-22.12	
			26T	-7.92	-7.27	-4.57	-7.72	-7.08	-4.38	-7.86	-7.18	-4.50	6.44	2.06	24.0	-21.94	
			26T	-7.91	-7.04	-4.44	-7.71	-7.01	-4.34	-7.71	-7.02	-4.34	6.44	2.10	24.0	-21.90	
	6	97	26T	-7.90	-7.00	-4.42	-7.99	-7.16	-4.54	-7.98	-7.34	-4.64	5.69	1.27	24.0	-22.73	
			105	26T	-7.04	-7.02	-4.45	-7.94	-7.03	-4.45	-7.91	-7.12	-4.49	5.69	1.24	24.0	-22.76
			113	26T	-7.71	-7.24	-4.46	-7.63	-7.27	-4.44	-7.84	-7.44	-4.63	5.69	1.25	24.0	-22.75
	7	117	26T	-7.99	-7.31	-4.63	-7.98	-7.34	-4.64	-7.98	-7.52	-4.73	5.94	1.32	24.0	-22.68	
			149	26T	-7.99	-7.21	-4.57	-7.99	-7.01	-4.46	-7.97	-7.06	-4.48	5.94	1.48	24.0	-22.52
			185	26T	-7.93	-7.21	-4.54	-7.73	-7.30	-4.50	-7.84	-7.43	-4.62	5.94	1.45	24.0	-22.55
	8	209	26T	-8.12	-7.66	-4.87	-8.17	-7.57	-4.85	-8.27	-7.59	-4.91	6.31	1.46	24.0	-22.54	
			233	26T	-8.49	-7.82	-5.13	-8.47	-7.81	-5.12	-8.36	-7.51	-4.90	6.31	1.41	24.0	-22.59

Table 7-4. MIMO BW 802.11be (UNII) Maximum Conducted Output Power – Partial and Full Tones

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
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Bandwidth	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)									Dir. Ant. Gain [dBi]	Max e.i.r.p [dBm]	e.i.r.p Limit [dBm]	e.i.r.p Margin [dB]
					MRU Index												
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO				
80MHz BW	90									92			6.44	10.49	24.0	-13.51	
	5	6145	39	242+484T	1.05	1.03	4.05	0.89	0.86	3.89							
	6	6465	103	242+484T	2.33	2.22	5.29	2.26	2.07	5.18							
	7	6705	151	242+484T	2.07	2.13	5.11	2.24	2.51	5.39							
	8	6945	199	242+484T	2.38	2.52	5.56	2.54	2.50	5.83							
160MHz BW	94									105			6.44	14.04	24.0	-9.96	
	5	6185	47	996+484T	4.56	4.60	7.59	4.55	4.63	7.60							
	6	6505	111	996+484T	4.72	4.72	7.73	4.80	4.82	7.82							
	7	6665	143	996+484T	5.07	4.99	8.04	5.13	5.10	8.12							
	8	6985	207	996+484T	4.94	5.22	8.09	4.94	5.21	8.09							
320MHz BW	105									10105			6.44	17.20	24.0	-6.80	
	5	6105	31	3x996+484T	7.61	7.90	10.77	7.56	7.89	10.74							
	6	6425	95	3x996+484T	7.56	7.82	10.70	7.55	7.88	10.73							
	7	6585	127	3x996+484T	6.72	6.52	9.63	6.90	6.80	9.86							
	8	6905	191	3x996+484T	6.68	6.98	9.84	6.56	6.79	9.69							
320MHz BW	104									1104			6.44	17.01	24.0	-6.99	
	5	6105	31	3x996T	7.23	7.29	10.27	7.25	7.86	10.57							
	6	6425	95	3x996T	7.19	7.12	10.17	7.25	7.33	10.30							
	7	6585	127	3x996T	6.67	6.63	9.66	6.69	6.87	9.79							
	8	6905	191	3x996T	6.82	7.02	9.93	7.09	7.26	10.19							
320MHz BW	01100									10103			6.44	17.01	24.0	-6.99	
	5	6105	31	2x996+484T	7.30	7.69	10.51	7.44	7.67	10.57							
	6	6425	95	2x996+484T	7.59	7.81	10.71	7.63	7.77	10.71							
	7	6585	127	2x996+484T	7.05	6.75	9.91	6.99	6.60	9.81							
	8	6905	191	2x996+484T	6.72	7.05	9.90	6.51	6.69	9.61							
20MHz BW	70									72			6.44	3.81	24.0	-20.19	
	5	6175	45	52+26T	-5.83	-5.46	-2.63	-5.91	-5.54	-2.71	-5.85	-5.63					-2.73
	6	6475	105	52+26T	-5.92	-5.33	-2.60	-5.86	-5.32	-2.57	-5.93	-5.37					-2.63
	7	6695	149	52+26T	-5.92	-5.53	-2.71	-5.94	-5.64	-2.78	-5.90	-5.49					-2.68
	8	6995	209	52+26T	-6.49	-6.39	-3.43	-6.12	-6.03	-3.06	-6.05	-5.94					-2.98
20MHz BW	82									83			6.44	0.63	24.0	-23.37	
	5	6175	45	106+26T	-9.11	-8.75	-5.92	-8.96	-8.67	-5.80							
	6	6475	105	106+26T	-9.43	-9.22	-6.31	-9.47	-9.19	-6.32							
	7	6695	149	106+26T	-9.05	-8.73	-5.88	-9.01	-8.68	-5.83							
	8	6995	209	106+26T	-9.48	-9.47	-6.46	-9.51	-9.46	-6.47							

Table 7-5. MIMO BW 802.11be (UNII) Maximum Conducted Output Power – MRU

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# MIMO Maximum Conducted Output Power Measurements – SP

Bandwidth	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)									Dir. Ant. Gain [dBi]	Max e.i.r.p [dBm]	e.i.r.p Limit [dBm]	e.i.r.p Margin [dB]		
					RU Index														
					0			4			8								
	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO										
20MHz BW	5	5935	2	26T	0.05	-0.20	2.94	0.49	0.35	3.43	0.13	-0.06	3.05	6.44	9.87	30.0	-20.13		
		6175	45	26T	9.87	10.20	13.05	10.31	10.72	13.53	10.01	10.28	13.16	6.44	19.97	30.0	-10.03		
		6415	93	26T	9.98	10.53	13.27	10.47	10.91	13.71	9.91	10.49	13.22	6.44	20.14	30.0	-9.86		
	7	6535	117	26T	11.06	11.02	14.05	11.45	11.42	14.45	10.98	10.95	13.98	5.94	20.39	30.0	-9.61		
		6695	149	26T	10.87	11.02	13.96	10.97	11.57	14.29	10.77	11.12	13.96	5.94	20.24	30.0	-9.76		
		20MHz BW	5	5935	2	52T	3.63	3.45	6.55	3.98	3.84	6.92	3.61	3.46	6.55	6.44	13.36	30.0	-16.64
6175	45			52T	14.16	13.94	17.06	14.02	13.77	16.91	14.20	13.93	17.07	6.44	23.51	30.0	-6.49		
6415	93			52T	14.36	14.08	17.23	14.19	13.86	17.03	14.21	13.99	17.11	6.44	23.67	30.0	-6.33		
7	6535		117	52T	14.87	14.62	17.76	15.20	14.92	18.07	14.81	14.54	17.69	5.94	24.02	30.0	-5.98		
	6695		149	52T	15.04	14.80	17.93	15.36	15.17	18.27	14.91	14.67	17.80	5.94	24.22	30.0	-5.78		
	20MHz BW		5	5935	2	106T	5.41	5.28	8.36	5.42	5.31	8.38				6.44	14.81	30.0	-15.19
6175		45		106T	15.28	15.16	18.23	15.29	15.10	18.21				6.44	24.67	30.0	-5.33		
6415		93		106T	15.49	15.32	18.42	15.45	15.14	18.31				6.44	24.85	30.0	-5.15		
7		6535	117	106T	16.46	16.22	19.35	16.45	16.13	19.31				5.94	25.29	30.0	-4.71		
		6695	149	106T	16.77	16.38	19.59	16.76	16.45	19.62				5.94	25.56	30.0	-4.44		
		20MHz BW	5	5935	2	242T	9.62	9.33	12.49							6.44	18.92	30.0	-11.08
6175	45			242T	17.36	17.02	20.21							6.44	26.64	30.0	-3.36		
6415	93			242T	17.41	17.18	20.31							6.44	26.74	30.0	-3.26		
7	6535		117	242T	17.39	17.12	20.27							5.94	26.21	30.0	-3.79		
	6695		149	242T	17.67	17.26	20.48							5.94	26.42	30.0	-3.58		
	40MHz BW		5	5965	3	484T	17.69	17.85	20.78							6.44	27.22	30.0	-2.78
6005		11		484T	17.80	17.51	20.67							6.44	27.10	30.0	-2.90		
6165		43		484T	17.85	17.61	20.74							6.44	27.18	30.0	-2.82		
7		6405	91	484T	18.06	17.65	20.87							6.44	27.31	30.0	-2.69		
		6565	123	484T	17.93	17.83	20.89							5.94	26.84	30.0	-3.16		
		6685	147	484T	18.29	17.96	21.14							5.94	27.08	30.0	-2.92		
60MHz BW	5	5985	7	996T	18.46	18.55	21.52							6.44	27.95	30.0	-2.05		
		6145	39	996T	19.51	19.54	22.53							6.44	28.97	30.0	-1.03		
		6385	87	996T	19.69	19.34	22.33							6.44	28.97	30.0	-1.03		
	7	6705	151	996T	19.14	19.30	22.23							5.94	28.18	30.0	-1.82		
		160MHz BW	5	6025	15	2x996T	16.57	16.73	19.66							6.44	26.10	30.0	-3.90
				6185	47	2x996T	16.92	16.90	19.92							6.44	26.36	30.0	-3.64
6345	79			2x996T	16.91	16.62	19.78							6.44	26.22	30.0	-3.78		
7	6665		143	2x996T	17.11	16.84	19.99							5.94	25.93	30.0	-4.07		
	320MHz BW		5	6105	31	4x996T	19.24	19.29	22.28							6.44	28.71	30.0	-1.29
				6745	159	4x996T	19.41	19.39	22.51							5.94	28.46	30.0	-1.54

Table 7-6. MIMO BW 802.11be (UNII) Maximum Conducted Output Power – Partial and Full Tones

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Bandwidth	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)									Dir. Ant. Gain [dBi]	Max e.i.r.p [dBm]	e.i.r.p Limit [dBm]	e.i.r.p Margin [dB]
					MRU Index												
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO				
80MHz BW	5	6145	39	242+484T	90									6.44	27.39	30.0	-2.61
					MRU Index												
					17.90	17.98	20.95	17.75	17.86	20.81							
7	6705	151	242+484T	92									5.94	27.01	30.0	-2.99	
				MRU Index													
				18.01	18.10	21.07	17.61	17.61	20.62								
160MHz BW	5	6025	15	996+484T	94									6.44	28.29	30.0	-1.71
					MRU Index												
					18.80	18.56	21.69	18.82	18.87	21.86							
5	6185	47	996+484T	MRU 1095									6.44	29.07	30.0	-0.93	
				MRU Index													
				19.62	19.43	22.54	19.73	19.50	22.63								
5	6345	79	996+484T	MRU 1095									6.44	29.24	30.0	-0.76	
				MRU Index													
				19.79	19.55	22.68	19.92	19.66	22.80								
7	6665	143	996+484T	MRU 1095									5.94	28.46	30.0	-1.54	
				MRU Index													
				19.55	19.25	22.41	19.61	19.40	22.52								
320MHz BW	5	6105	31	3x996+484T	00105									6.44	26.88	30.0	-3.12
					MRU Index												
					17.44	17.37	20.42	17.52	17.34	20.44							
320MHz BW	5	6105	31	3x996T	00104									6.44	27.19	30.0	-2.81
					MRU Index												
					17.66	17.64	20.66	17.69	17.79	20.75							
320MHz BW	5	6105	31	2x996+484T	01100									6.44	27.08	30.0	-2.92
					MRU Index												
					17.60	17.48	20.55	17.60	17.67	20.65							
20MHz BW	5	6175	45	52+26T	70									6.44	23.38	30.0	-6.62
					MRU Index												
					13.97	13.75	16.87	14.03	13.83	16.94							
7	6695	149	52+26T	71									5.94	23.78	30.0	-6.22	
				MRU Index													
				14.91	14.60	17.77	14.98	14.67	17.84								
7	6695	149	52+26T	72									6.44	24.69	30.0	-5.31	
				MRU Index													
				15.31	15.13	18.23	15.35	15.13	18.25								
20MHz BW	5	6175	45	106+26T	82									6.44	24.69	30.0	-5.31
					MRU Index												
					15.31	15.13	18.23	15.35	15.13	18.25							
7	6695	149	106+26T	83									5.94	24.64	30.0	-5.36	
				MRU Index													
				15.76	15.47	18.62	15.89	15.47	18.69								

**Table 7-7. MIMO BW 802.11be (UNII) Maximum Conducted Output Power – MRU**

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**Sample MIMO Calculation:**

At 5935MHz in 802.11be (20MHz BW – 26 Tones) mode, the average conducted output power was measured to be 0.05 dBm for Antenna-1 and -0.20 dBm for Antenna-2.

$$\text{Antenna 1} + \text{Antenna 2} = \text{MIMO}$$

$$(0.05\text{dBm} + -0.20 \text{ dBm}) = (1.012 \text{ mW} + 0.955 \text{ mW}) = 1.967 \text{ mW} = 2.94 \text{ dBm}$$

**Sample Directional Gain Calculation:**

Per ANSI C63.10-2013 Section 14.4.3, the directional gain is calculated using the following formula, where GN is the gain of the nth antenna and NANT, the total number of antennas used.

$$\text{Directional gain} = 10 \log[(10^{G1/20} + 10^{G2/20} + \dots + 10^{GN/20})^2 / N_{\text{ANT}}] \text{ dBi}$$

**Sample e.i.r.p. Calculation:**

At 5935MHz in 802.11be (20MHz BW – 26 Tones) mode, the average MIMO conducted power was calculated to be 2.94 dBm with directional gain of 6.44 dBi.

$$\text{e.i.r.p. (dBm)} = \text{Conducted Power (dBm)} + \text{Ant gain (dBi)}$$

$$2.94 \text{ dBm} + 6.44 \text{ dBi} = 9.87 \text{ dBm}$$

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## 7.4 Maximum Power Spectral Density

### Test Overview and Limit

The spectrum analyzer was connected to the antenna terminal while the EUT was operating at its maximum duty cycle, at its maximum power control level, as defined in ANSI C63.10-2013, and at the appropriate frequencies. Method SA-1, as defined in ANSI C63.10-2013, was used to measure the power spectral density.

***In the 5.925-7.125 GHz bands, the maximum power spectral density must not exceed  $-1$  dBm e.i.r.p. in any 1-megahertz band. For client devices, except for fixed client devices as defined in this subpart, operating under the control of a standard power access point in 5.925-6.425 GHz and 6.525-6.875 GHz bands, the maximum power spectral density must not exceed 17 dBm/MHz e.i.r.p.***

### Test Procedure Used

ANSI C63.10-2013 – Section 12.3.2.2

ANSI C63.10-2013 – Section 14.3.2.2 Measure-and-Sum Technique

### Test Settings

1. Analyzer was set to the center frequency of the UNII channel under investigation
2. Span was set to encompass the entire emission bandwidth of the signal
3. RBW = 1MHz
4. VBW = 3MHz
5. Number of sweep points  $\geq 2 \times$  (span/RBW)
6. Sweep time = auto
7. Detector = power averaging (RMS)
8. Trigger was set to free run for all modes
9. Trace was averaged over 100 sweeps
10. The peak search function of the spectrum analyzer was used to find the peak of the spectrum.

### 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

None

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## MIMO Power Spectral Density Measurements

	Frequency [MHz]	Channel	802.11 MODE	Antenna-1 Power Density [dBm]	Antenna-2 Power Density [dBm]	Summed MIMO Power Density [dBm]	Directional Gain [dBi]	EIRP [dBm]	Max EIRP [dBm]	Margin [dB]
Band 5	5935	2	be (20MHz)	-11.58	-10.90	-8.22	6.44	-1.78	-1	-0.78
	6175	45	be (20MHz)	-12.19	-10.62	-8.33	6.44	-1.89	-1	-0.89
	6415	93	be (20MHz)	-11.12	-10.68	-7.88	6.44	-1.45	-1	-0.45
	5965	3	be (40MHz)	-10.80	-10.85	-7.81	6.44	-1.38	-1	-0.38
	6165	43	be (40MHz)	-10.67	-10.48	-7.56	6.44	-1.12	-1	-0.12
	6405	91	be (40MHz)	-10.98	-10.64	-7.80	6.44	-1.36	-1	-0.36
	5985	7	be (80MHz)	-10.68	-11.51	-8.07	6.44	-1.63	-1	-0.63
	6145	39	be (80MHz)	-11.09	-11.14	-8.11	6.44	-1.67	-1	-0.67
	6385	87	be (80MHz)	-11.42	-11.77	-8.58	6.44	-2.14	-1	-1.14
	6025	15	be (160MHz)	-10.59	-11.06	-7.81	6.44	-1.37	-1	-0.37
	6185	47	be (160MHz)	-11.84	-10.67	-8.20	6.44	-1.76	-1	-0.76
6345	79	be (160MHz)	-10.63	-10.64	-7.62	6.44	-1.19	-1	-0.19	
6105	31	be (320MHz)	-10.68	-10.60	-7.63	6.44	-1.19	-1	-0.19	
6265	63	be (320MHz)	-11.02	-10.85	-7.93	6.44	-1.49	-1	-0.49	
Band 6	6435	97	be (20MHz)	-11.96	-10.86	-8.37	5.69	-2.68	-1	-1.68
	6475	105	be (20MHz)	-11.57	-10.59	-8.04	5.69	-2.36	-1	-1.36
	6515	113	be (20MHz)	-11.26	-10.88	-8.06	5.69	-2.37	-1	-1.37
	6445	99	be (40MHz)	-10.55	-10.33	-7.43	5.69	-1.74	-1	-0.74
	6485	107	be (40MHz)	-10.81	-10.74	-7.77	5.69	-2.08	-1	-1.08
	6525	115	be (40MHz)	-10.84	-11.26	-8.03	5.69	-2.34	-1	-1.34
	6465	103	be (80MHz)	-11.38	-10.95	-8.15	5.69	-2.46	-1	-1.46
6505	111	be (160MHz)	-11.45	-11.33	-8.38	5.69	-2.70	-1	-1.70	
Band 5/6/7	6425	95	be (320MHz)	-10.94	-10.66	-7.79	6.44	-1.35	-1	-0.35
Band 7	6535	117	be (20MHz)	-11.78	-10.84	-8.27	5.94	-2.33	-1	-1.33
	6695	149	be (20MHz)	-11.40	-10.35	-7.84	5.94	-1.89	-1	-0.89
	6875	185	be (20MHz)	-11.33	-11.15	-8.23	5.94	-2.28	-1	-1.28
	6565	123	be (40MHz)	-10.72	-11.09	-7.89	5.94	-1.94	-1	-0.94
	6725	155	be (40MHz)	-10.67	-10.71	-7.68	5.94	-1.73	-1	-0.73
	6845	179	be (40MHz)	-10.42	-11.19	-7.78	5.94	-1.83	-1	-0.83
	6545	119	be (80MHz)	-11.81	-11.74	-8.76	5.94	-2.82	-1	-1.82
	6705	151	be (80MHz)	-10.77	-11.31	-8.02	5.94	-2.07	-1	-1.07
	6865	183	be (80MHz)	-11.24	-11.44	-8.33	5.94	-2.38	-1	-1.38
6665	143	be (160MHz)	-11.19	-10.86	-8.01	5.94	-2.07	-1	-1.07	
6825	175	be (160MHz)	-10.77	-11.04	-7.89	5.94	-1.95	-1	-0.95	
Band 6/7	6585	127	be (320MHz)	-11.13	-11.46	-8.28	5.94	-2.33	-1	-1.33
Band 7/8	6745	159	be (320MHz)	-11.13	-10.85	-7.97	6.31	-1.66	-1	-0.66
Band 8	6895	189	be (20MHz)	-11.37	-10.80	-8.06	6.31	-1.75	-1	-0.75
	6995	209	be (20MHz)	-11.23	-10.64	-7.92	6.31	-1.61	-1	-0.61
	7115	233	be (20MHz)	-12.88	-11.82	-9.31	6.31	-3.00	-1	-2.00
	6885	187	be (40MHz)	-11.36	-11.42	-8.38	6.31	-2.07	-1	-1.07
	7005	211	be (40MHz)	-11.29	-10.63	-7.93	6.31	-1.62	-1	-0.62
	7085	227	be (40MHz)	-11.18	-11.07	-8.12	6.31	-1.81	-1	-0.81
	6945	199	be (80MHz)	-11.20	-10.95	-8.06	6.31	-1.75	-1	-0.75
	7025	215	be (80MHz)	-11.05	-11.48	-8.25	6.31	-1.94	-1	-0.94
6985	207	be (160MHz)	-12.11	-10.34	-8.13	6.31	-1.82	-1	-0.82	
Band 7/8	6905	191	be (320MHz)	-11.58	-11.62	-8.59	6.31	-2.28	-1	-1.28

Table 7-8. MIMO e.i.r.p. Conducted Power Spectral Density Measurements (26 Tones) – LPI

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	Frequency [MHz]	Channel	802.11 MODE	Antenna-1 Power Density [dBm]	Antenna-2 Power Density [dBm]	Summed MIMO Power Density [dBm]	Directional Gain [dBi]	EIRP [dBm]	Max EIRP [dBm]	Margin [dB]
Band 5	5935	2	be (20MHz)	-3.50	-2.90	-0.18	6.44	6.26	17	-10.74
	6175	45	be (20MHz)	7.28	7.41	10.36	6.44	16.79	17	-0.21
	6415	93	be (20MHz)	7.38	7.51	10.46	6.44	16.89	17	-0.11
	5965	3	be (40MHz)	-2.85	-1.73	0.76	6.44	7.19	17	-9.81
	6165	43	be (40MHz)	7.30	7.45	10.38	6.44	16.82	17	-0.18
	6405	91	be (40MHz)	7.15	7.72	10.46	6.44	16.89	17	-0.11
	5985	7	be (80MHz)	-2.46	-1.75	0.92	6.44	7.35	17	-9.65
	6145	39	be (80MHz)	7.39	7.24	10.33	6.44	16.76	17	-0.24
	6385	87	be (80MHz)	7.08	7.48	10.29	6.44	16.73	17	-0.27
	6025	15	be (160MHz)	-0.88	0.37	2.80	6.44	9.23	17	-7.77
	6185	47	be (160MHz)	7.16	7.34	10.26	6.44	16.70	17	-0.30
	6345	79	be (160MHz)	7.22	7.54	10.40	6.44	16.83	17	-0.17
6105	31	be (320MHz)	7.16	7.58	10.39	6.44	16.82	17	-0.18	
6265	63	be (320MHz)	7.34	7.27	10.32	6.44	16.76	17	-0.24	
Band 7	6535	117	be (20MHz)	7.80	7.57	10.70	5.94	16.64	17	-0.36
	6695	149	be (20MHz)	7.82	8.07	10.96	5.94	16.90	17	-0.10
	6875	185	be (20MHz)	7.77	7.90	10.85	5.94	16.79	17	-0.21
	6565	123	be (40MHz)	8.01	7.91	10.97	5.94	16.91	17	-0.09
	6725	155	be (40MHz)	7.85	8.22	11.05	5.94	16.99	17	-0.01
	6845	179	be (40MHz)	7.79	8.05	10.93	5.94	16.88	17	-0.12
	6545	119	be (80MHz)	7.92	7.69	10.81	5.94	16.76	17	-0.24
	6705	151	be (80MHz)	7.74	7.87	10.81	5.94	16.76	17	-0.24
	6865	183	be (80MHz)	7.71	7.62	10.68	5.94	16.62	17	-0.38
	6665	143	be (160MHz)	7.49	8.33	10.94	5.94	16.88	17	-0.12
6825	175	be (160MHz)	7.54	8.24	10.91	5.94	16.85	17	-0.15	

**Table 7-9. MIMO e.i.r.p. Conducted Power Spectral Density Measurements (26 Tones) – SP**

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 77 of 274

	Frequency [MHz]	Channel	802.11 MODE	Antenna-1 Power Density [dBm]	Antenna-2 Power Density [dBm]	Summed MIMO Power Density [dBm]	Directional Gain [dBi]	DCCF	EIRP [dBm]	Max EIRP [dBm]	Margin [dB]
Band 5	5935	2	be (20MHz)	-12.59	-12.71	-9.64	6.44	0.00	-3.20	-1	-2.20
	6175	45	be (20MHz)	-12.96	-12.71	-9.83	6.44	0.00	-3.39	-1	-2.39
	6415	93	be (20MHz)	-13.33	-12.86	-10.08	6.44	0.00	-3.64	-1	-2.64
	5965	3	be (40MHz)	-13.44	-13.50	-10.46	6.44	0.00	-4.02	-1	-3.02
	6165	43	be (40MHz)	-13.84	-13.79	-10.81	6.44	0.00	-4.37	-1	-3.37
	6405	91	be (40MHz)	-14.24	-13.84	-11.02	6.44	0.00	-4.58	-1	-3.58
	5985	7	be (80MHz)	-12.33	-13.30	-9.78	6.44	0.10	-3.24	-1	-2.24
	6145	39	be (80MHz)	-12.92	-13.21	-10.05	6.44	0.10	-3.52	-1	-2.52
	6385	87	be (80MHz)	-12.68	-13.43	-10.03	6.44	0.10	-3.49	-1	-2.49
	6025	15	be (160MHz)	-12.17	-12.15	-9.15	6.44	0.11	-2.60	-1	-1.60
	6185	47	be (160MHz)	-12.61	-12.35	-9.47	6.44	0.11	-2.92	-1	-1.92
	6345	79	be (160MHz)	-12.05	-12.20	-9.12	6.44	0.11	-2.57	-1	-1.57
6105	31	be (320MHz)	-12.64	-12.21	-9.41	6.44	0.00	-2.97	-1	-1.97	
6265	63	be (320MHz)	-12.69	-12.51	-9.59	6.44	0.00	-3.15	-1	-2.15	
Band 6	6435	97	be (20MHz)	-12.67	-12.26	-9.45	5.69	0.00	-3.76	-1	-2.76
	6475	105	be (20MHz)	-13.16	-12.36	-9.73	5.69	0.00	-4.04	-1	-3.04
	6515	113	be (20MHz)	-12.26	-12.42	-9.33	5.69	0.00	-3.64	-1	-2.64
	6445	99	be (40MHz)	-12.28	-12.29	-9.27	5.69	0.00	-3.59	-1	-2.59
	6485	107	be (40MHz)	-12.82	-12.58	-9.68	5.69	0.00	-4.00	-1	-3.00
	6525	115	be (40MHz)	-12.65	-12.86	-9.74	5.69	0.00	-4.05	-1	-3.05
	6465	103	be (80MHz)	-13.24	-12.81	-10.01	5.69	0.10	-4.22	-1	-3.22
	6505	111	be (160MHz)	-12.41	-12.30	-9.34	5.69	0.11	-3.54	-1	-2.54
Band 5/6/7	6425	95	be (320MHz)	-12.60	-11.52	-9.01	6.44	0.00	-2.58	-1	-1.58
	6535	117	be (20MHz)	-12.45	-12.60	-9.51	5.94	0.00	-3.57	-1	-2.57
Band 7	6695	149	be (20MHz)	-13.03	-12.65	-9.83	5.94	0.00	-3.88	-1	-2.88
	6875	185	be (20MHz)	-12.19	-12.34	-9.25	5.94	0.00	-3.31	-1	-2.31
	6565	123	be (40MHz)	-12.50	-12.94	-9.70	5.94	0.00	-3.76	-1	-2.76
	6725	155	be (40MHz)	-12.85	-13.09	-9.96	5.94	0.00	-4.01	-1	-3.01
	6845	179	be (40MHz)	-12.13	-12.53	-9.31	5.94	0.00	-3.37	-1	-2.37
	6545	119	be (80MHz)	-12.55	-12.80	-9.66	5.94	0.10	-3.62	-1	-2.62
	6705	151	be (80MHz)	-12.88	-13.05	-9.95	5.94	0.10	-3.91	-1	-2.91
	6865	183	be (80MHz)	-12.68	-12.92	-9.79	5.94	0.10	-3.74	-1	-2.74
	6665	143	be (160MHz)	-13.12	-12.39	-9.73	5.94	0.11	-3.68	-1	-2.68
	6825	175	be (160MHz)	-13.45	-12.68	-10.04	5.94	0.11	-3.99	-1	-2.99
Band 6/7	6585	127	be (320MHz)	-12.96	-12.96	-9.95	5.94	0.00	-4.00	-1	-3.00
Band 7/8	6745	159	be (320MHz)	-13.17	-12.68	-9.91	6.31	0.00	-3.60	-1	-2.60
Band 8	6895	189	be (20MHz)	-12.84	-12.89	-9.86	6.31	0.00	-3.55	-1	-2.55
	6995	209	be (20MHz)	-12.96	-12.29	-9.60	6.31	0.00	-3.29	-1	-2.29
	7115	233	be (20MHz)	-13.03	-12.60	-9.80	6.31	0.00	-3.49	-1	-2.49
	6885	187	be (40MHz)	-12.21	-12.77	-9.47	6.31	0.00	-3.16	-1	-2.16
	7005	211	be (40MHz)	-12.82	-12.43	-9.61	6.31	0.00	-3.30	-1	-2.30
	7085	227	be (40MHz)	-12.52	-12.44	-9.47	6.31	0.00	-3.16	-1	-2.16
	6945	199	be (80MHz)	-12.71	-13.26	-9.97	6.31	0.10	-3.56	-1	-2.56
	7025	215	be (80MHz)	-12.08	-12.97	-9.49	6.31	0.10	-3.08	-1	-2.08
6985	207	be (160MHz)	-12.84	-12.50	-9.66	6.31	0.11	-3.24	-1	-2.24	
Band 7/8	6905	191	be (320MHz)	-13.03	-12.01	-9.47	6.31	0.00	-3.16	-1	-2.16

**Table 7-10. MIMO e.i.r.p. Conducted Power Spectral Density Measurements (Full Tones) – LPI**

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 78 of 274

	Frequency [MHz]	Channel	802.11 MODE	Antenna-1 Power Density [dBm]	Antenna-2 Power Density [dBm]	Summed MIMO Power Density [dBm]	Directional Gain [dBi]	DCCF	EIRP [dBm]	Max EIRP [dBm]	Margin [dB]
Band 5	5935	2	be (20MHz)	-2.03	-2.48	0.76	6.44	0.00	7.20	17	-9.80
	6175	45	be (20MHz)	5.40	5.70	8.56	6.44	0.00	15.00	17	-2.00
	6415	93	be (20MHz)	5.84	6.34	9.10	6.44	0.00	15.54	17	-1.46
	5965	3	be (40MHz)	3.06	2.84	5.96	6.44	0.00	12.39	17	-4.61
	6165	43	be (40MHz)	2.93	3.15	6.05	6.44	0.00	12.48	17	-4.52
	6405	91	be (40MHz)	3.29	3.42	6.36	6.44	0.00	12.80	17	-4.20
	5985	7	be (80MHz)	1.46	0.51	4.02	6.44	0.10	10.56	17	-6.44
	6145	39	be (80MHz)	2.40	1.82	5.13	6.44	0.10	11.67	17	-5.33
	6385	87	be (80MHz)	2.10	2.01	5.07	6.44	0.10	11.60	17	-5.40
	6025	15	be (160MHz)	-2.83	-3.11	0.05	6.44	0.11	6.59	17	-10.41
	6185	47	be (160MHz)	-3.27	-2.82	-0.03	6.44	0.11	6.52	17	-10.48
	6345	79	be (160MHz)	-2.72	-2.87	0.22	6.44	0.11	6.77	17	-10.23
6105	31	be (320MHz)	-2.46	-2.41	0.58	6.44	0.00	7.01	17	-9.99	
6265	63	be (320MHz)	-3.02	-2.90	0.05	6.44	0.00	6.49	17	-10.51	
Band 7	6535	117	be (20MHz)	5.81	5.57	8.70	5.94	0.00	14.65	17	-2.35
	6695	149	be (20MHz)	5.74	6.30	9.04	5.94	0.00	14.98	17	-2.02
	6875	185	be (20MHz)	5.90	6.15	9.04	5.94	0.00	14.98	17	-2.02
	6565	123	be (40MHz)	2.94	2.96	5.96	5.94	0.00	11.90	17	-5.10
	6725	155	be (40MHz)	3.59	3.63	6.62	5.94	0.00	12.57	17	-4.43
	6845	179	be (40MHz)	2.81	3.16	6.00	5.94	0.00	11.94	17	-5.06
	6545	119	be (80MHz)	1.98	1.70	4.85	5.94	0.10	10.90	17	-6.10
	6705	151	be (80MHz)	2.24	1.99	5.13	5.94	0.10	11.17	17	-5.83
	6865	183	be (80MHz)	1.22	0.83	4.04	5.94	0.10	10.08	17	-6.92
	6665	143	be (160MHz)	-2.90	-2.38	0.38	5.94	0.11	6.43	17	-10.57
	6825	175	be (160MHz)	-2.71	-2.28	0.52	5.94	0.11	6.58	17	-10.42

**Table 7-11. MIMO e.i.r.p. Conducted Power Spectral Density Measurements (Full Tones) – SP**

	Frequency [MHz]	Channel	802.11 MODE	MRU Cases	Antenna-1 Power Density [dBm]	Antenna-2 Power Density [dBm]	Summed MIMO Power Density [dBm]	Directional Gain [dBi]	DCCF	EIRP [dBm]	Max EIRP [dBm]	Margin [dB]
Band 5	6145	39	be (80MHz)	484+242T	-15.67	-16.31	-12.97	6.44	0.12	-6.41	-1	-5.41
	6185	47	be (160MHz)	996+484T	-14.24	-13.84	-11.03	6.44	0.14	-4.45	-1	-3.45
	6105	31	be (320MHz)	3x996+484T	-15.92	-15.26	-12.57	6.44	0.23	-5.90	-1	-4.90
	6105	31	be (320MHz)	3x996T	-14.79	-13.86	-11.29	6.44	0.23	-4.62	-1	-3.62
	6105	31	be (320MHz)	2x996+484T	-12.59	-11.72	-9.12	6.44	0.20	-2.48	-1	-1.48
Band 6	6465	103	be (80MHz)	484+242T	-14.25	-14.69	-11.45	5.69	0.12	-5.64	-1	-4.64
	6505	111	be (160MHz)	996+484T	-13.85	-13.84	-10.83	5.69	0.14	-5.00	-1	-4.00
Band 5/6/7	6425	95	be (320MHz)	3x996+484T	-15.85	-15.15	-12.47	6.44	0.23	-5.80	-1	-4.80
	6425	95	be (320MHz)	3x996T	-14.34	-13.11	-10.67	6.44	0.23	-4.00	-1	-3.00
	6425	95	be (320MHz)	2x996+484T	-12.71	-9.70	-7.94	6.44	0.20	-1.30	-1	-0.30
Band 7	6705	151	be (80MHz)	484+242T	-11.80	-12.82	-9.27	5.94	0.12	-3.21	-1	-2.21
	6665	143	be (160MHz)	996+484T	-13.61	-13.22	-10.40	5.94	0.14	-4.32	-1	-3.32
Band 7/8	6745	159	be (320MHz)	3x996+484T	-14.78	-15.49	-12.11	6.31	0.23	-5.57	-1	-4.57
	6745	159	be (320MHz)	3x996T	-14.27	-14.35	-11.30	6.31	0.23	-4.76	-1	-3.76
	6745	159	be (320MHz)	2x996+484T	-13.09	-13.30	-10.18	6.31	0.20	-3.67	-1	-2.67
Band 8	6945	199	be (80MHz)	484+242T	-12.25	-12.28	-9.25	6.31	0.12	-2.82	-1	-1.82
	6985	207	be (160MHz)	996+484T	-14.29	-13.37	-10.80	6.31	0.14	-4.35	-1	-3.35
Band 7/8	6905	191	be (320MHz)	3x996+484T	-15.23	-15.92	-12.55	6.31	0.23	-6.01	-1	-5.01
	6905	191	be (320MHz)	3x996T	-14.29	-13.68	-10.96	6.31	0.23	-4.42	-1	-3.42
	6905	191	be (320MHz)	2x996+484T	-13.54	-12.81	-10.15	6.31	0.20	-3.64	-1	-2.64

**Table 7-12. MIMO e.i.r.p. Conducted Power Spectral Density Measurements (MRU) – LPI**

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 79 of 274

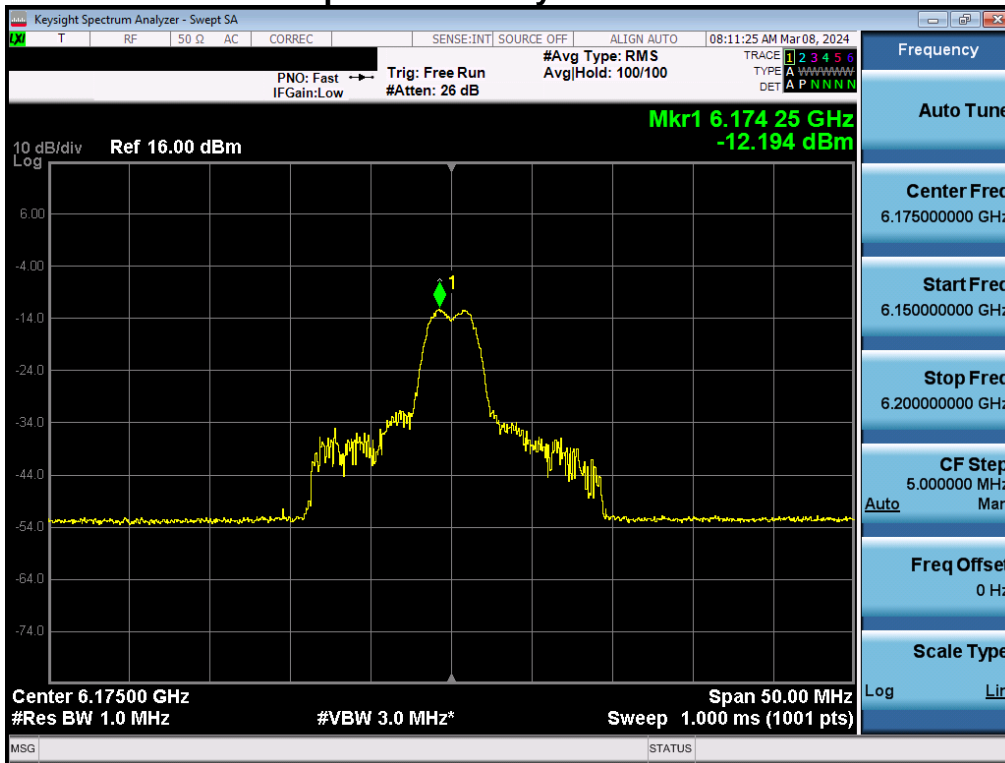
	Frequency [MHz]	Channel	802.11 MODE	MRU Cases	Antenna-1 Power Density [dBm]	Antenna-2 Power Density [dBm]	Summed MIMO Power Density [dBm]	Directional Gain [dBi]	DCCF	EIRP [dBm]	Max EIRP [dBm]	Margin [dB]
Band 5	6145	39	be (80MHz)	484+242T	2.39	1.40	4.93	6.44	0.12	11.49	17	-5.51
	6185	47	be (160MHz)	996+484T	0.84	0.87	3.86	6.44	0.14	10.44	17	-6.56
	6105	31	be (320MHz)	3x996+484T	-5.51	-5.92	-2.70	6.44	0.23	3.97	17	-13.03
	6105	31	be (320MHz)	3x996T	-6.44	-5.47	-2.92	6.44	0.23	3.75	17	-13.25
	6105	31	be (320MHz)	2x996+484T	-3.03	-3.13	-0.07	6.44	0.20	6.57	17	-10.43
Band 7	6705	151	be (80MHz)	484+242T	1.79	1.74	4.78	5.94	0.12	10.84	17	-6.16
	6665	143	be (160MHz)	996+484T	0.55	1.04	3.81	5.94	0.14	9.89	17	-7.11

**Table 7-13. MIMO e.i.r.p. Conducted Power Spectral Density Measurements (MRU) – SP**

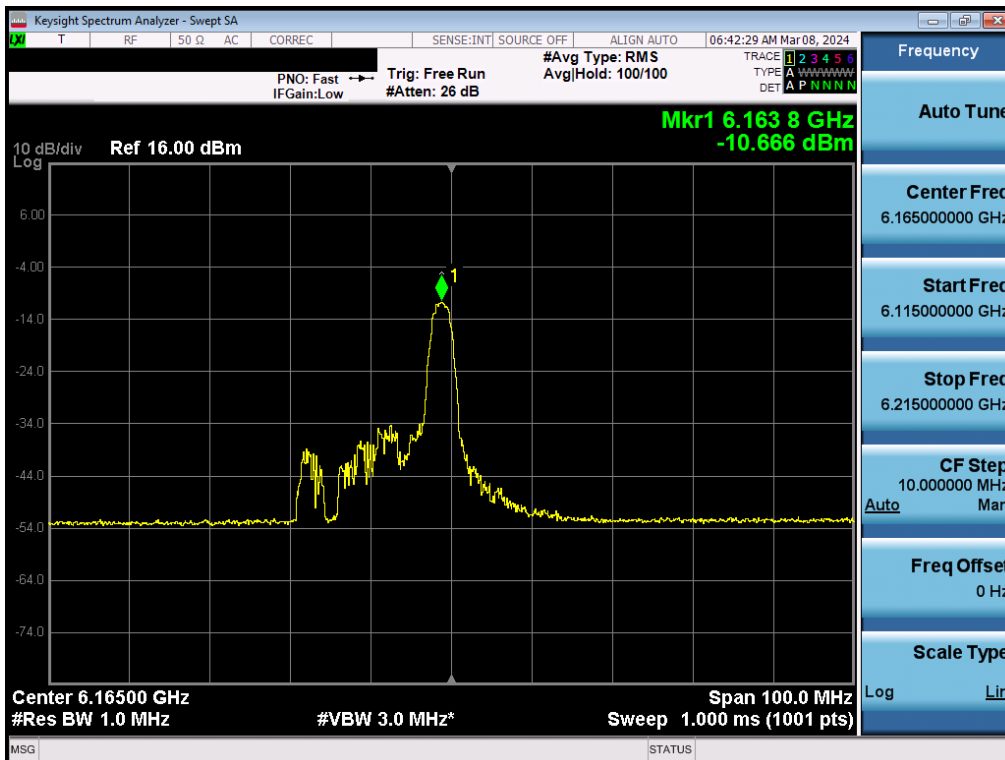
<b>FCC ID:</b> C3K2077	<b>MEASUREMENT REPORT</b>		<b>Approved by:</b> Technical Manager
<b>Test Report S/N:</b> 1M2312040120-22-R2.C3K	<b>Test Dates:</b> 12/14/2023 - 05/20/2024	<b>EUT Type:</b> Portable Computing Device	Page 80 of 274



### 7.4.1 MIMO Antenna-1 Power Spectral Density Measurements

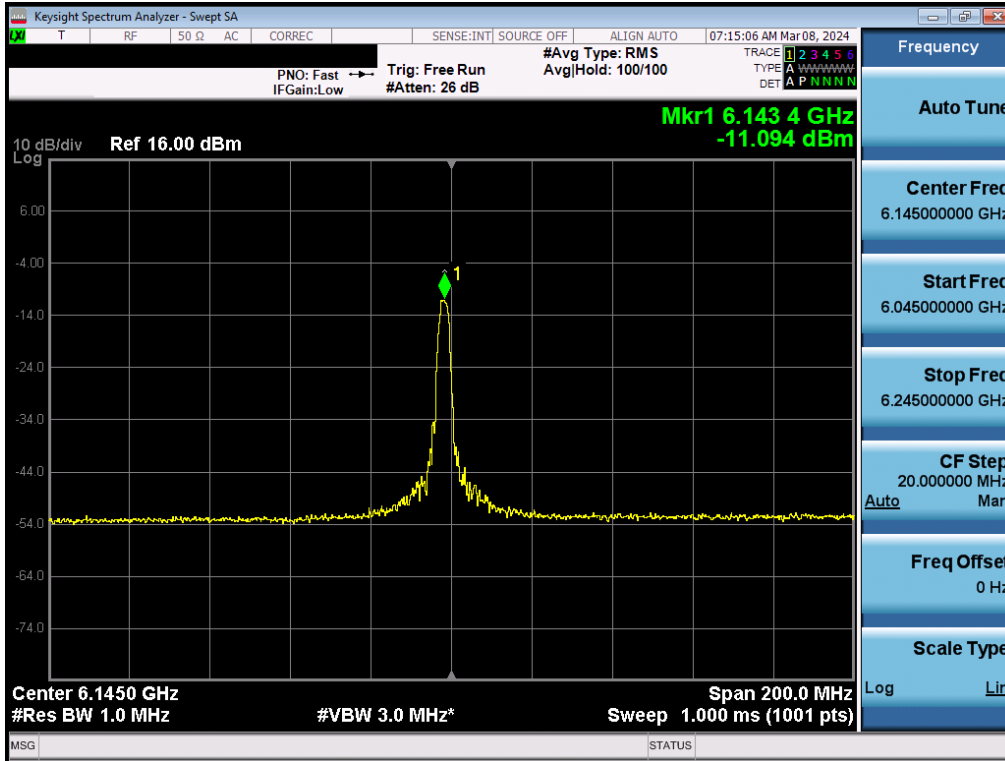


Plot 7-81. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11be (26 Tones) (UNII Band 5) – Ch. 45)

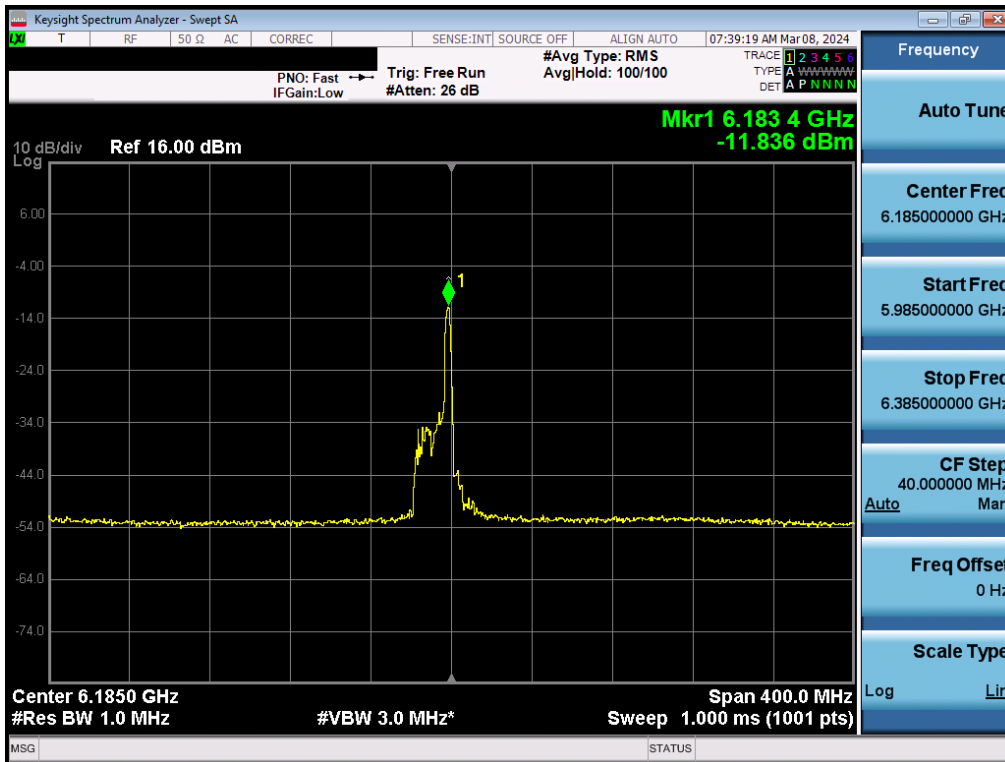


Plot 7-82. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11be (26 Tones) (UNII Band 5) – Ch. 43)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 81 of 274

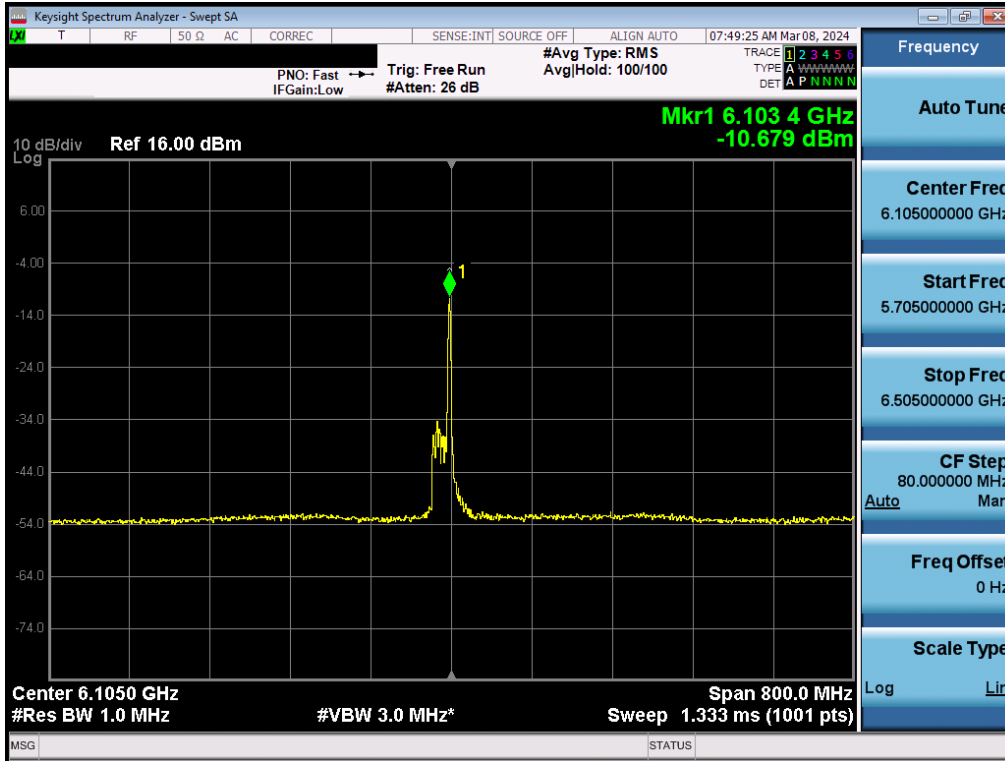


Plot 7-83. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11be (26 Tones) (UNII Band 5) – Ch. 39)

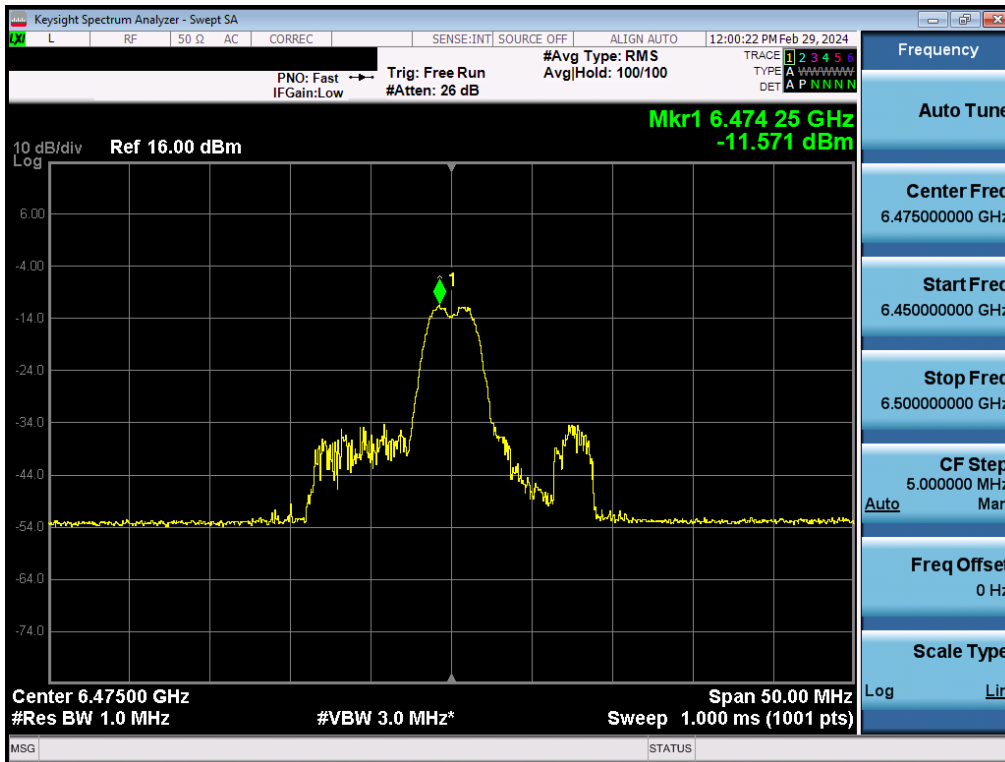


Plot 7-84. Power Spectral Density Plot MIMO ANT1 (160MHz BW 802.11be (26 Tones) (UNII Band 5) – Ch. 47)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 82 of 274

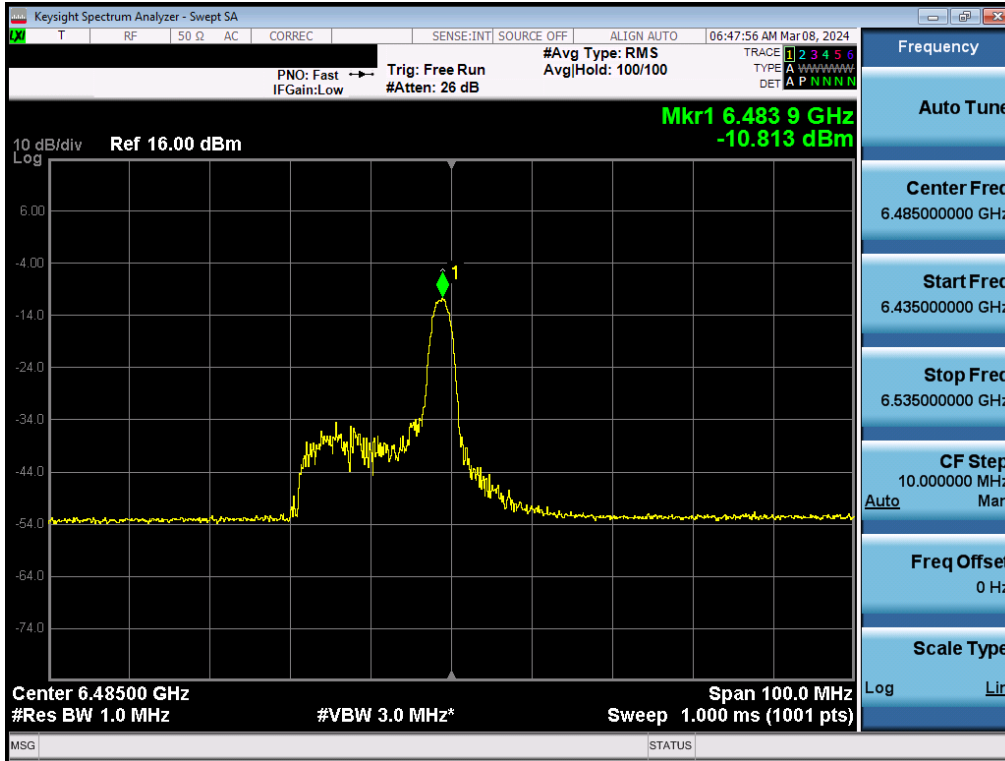


Plot 7-85. Power Spectral Density Plot MIMO ANT1 (320MHz BW 802.11be (26 Tones) (UNII Band 5) – Ch. 31)

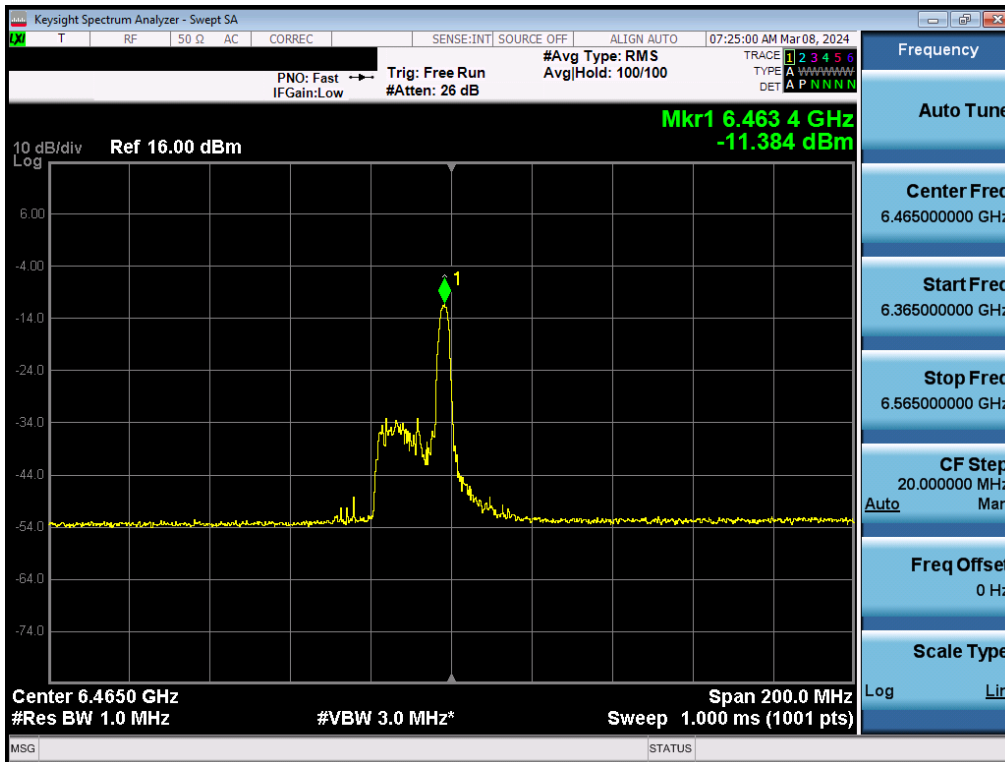


Plot 7-86. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11be (26 Tones) (UNII Band 6) – Ch. 105)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 83 of 274

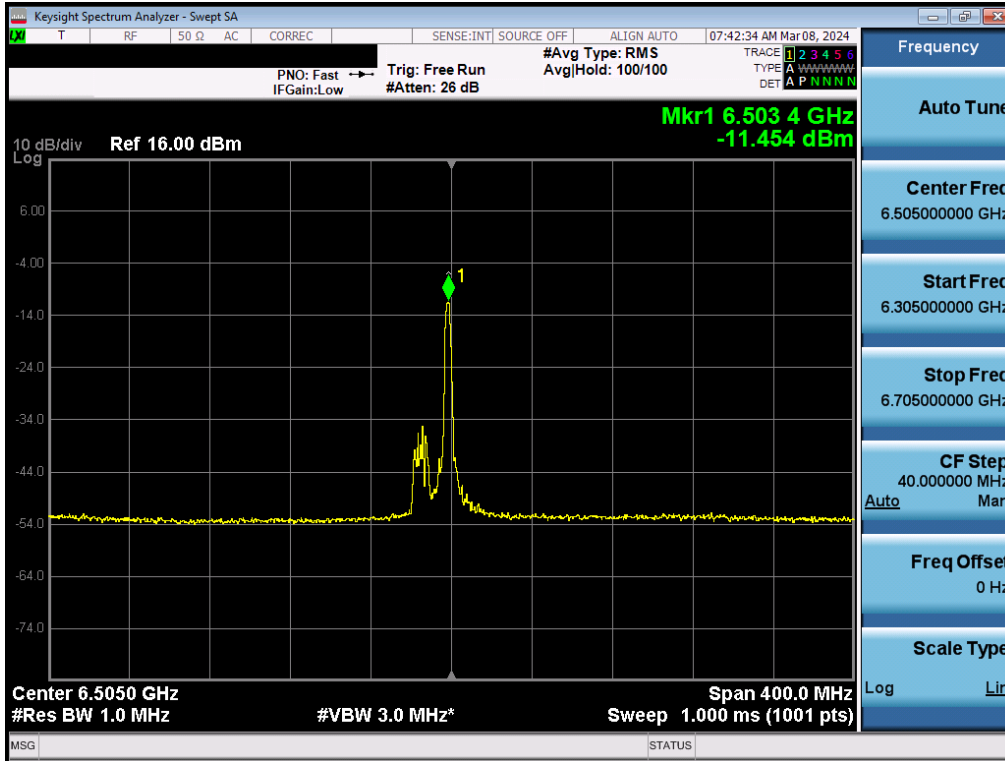


Plot 7-87. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11be (26 Tones) (UNII Band 6) – Ch. 107)

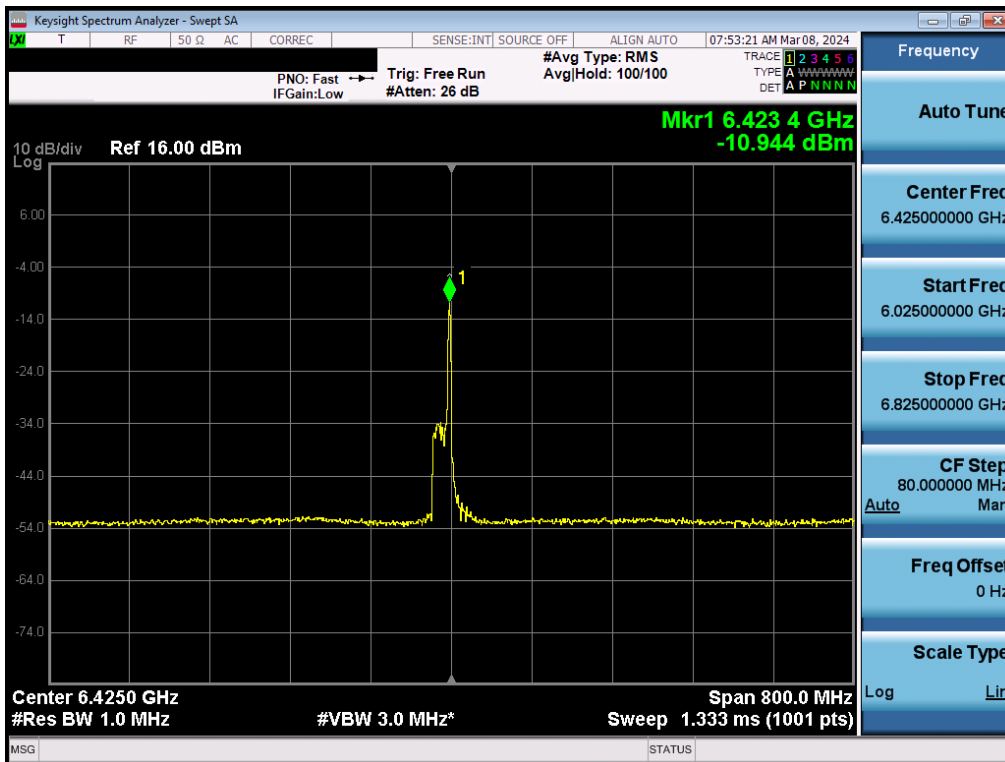


Plot 7-88. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11be (26 Tones) (UNII Band 6) – Ch. 103)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 84 of 274

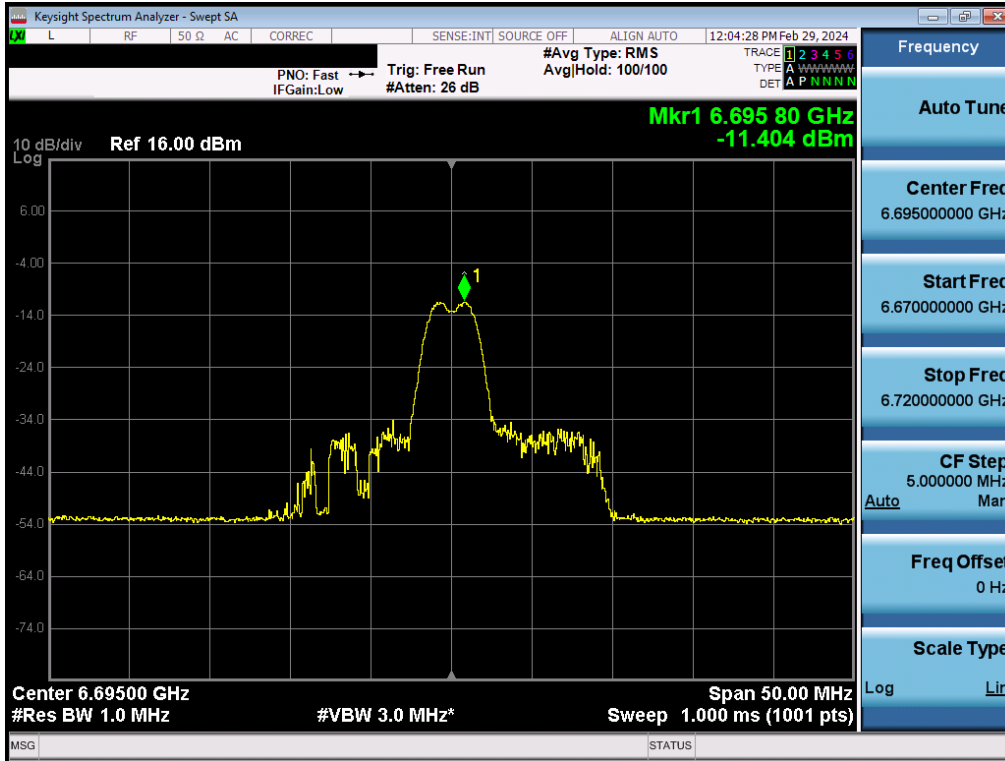


Plot 7-89. Power Spectral Density Plot MIMO ANT1 (160MHz BW 802.11be (26 Tones) (UNII Band 6) – Ch. 111)

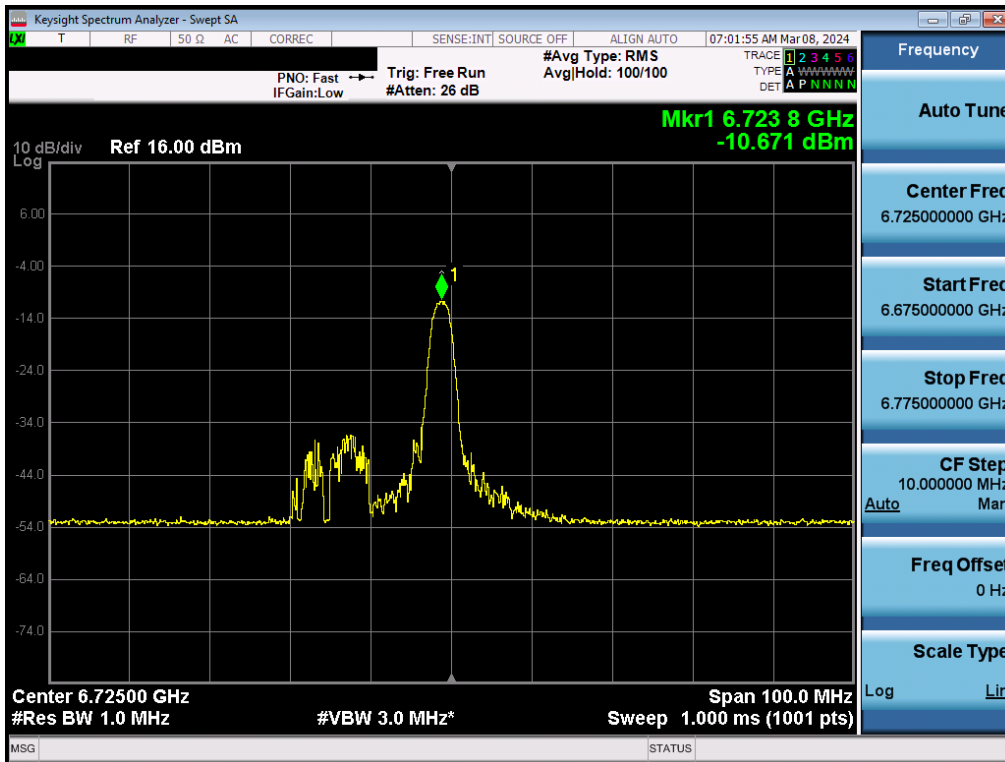


Plot 7-90. Power Spectral Density Plot MIMO ANT1 (320MHz BW 802.11be (26 Tones) (UNII Band 6) – Ch. 95)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2312040120-22-R2.C3K	Test Dates: 12/14/2023 - 05/20/2024	EUT Type: Portable Computing Device	Page 85 of 274

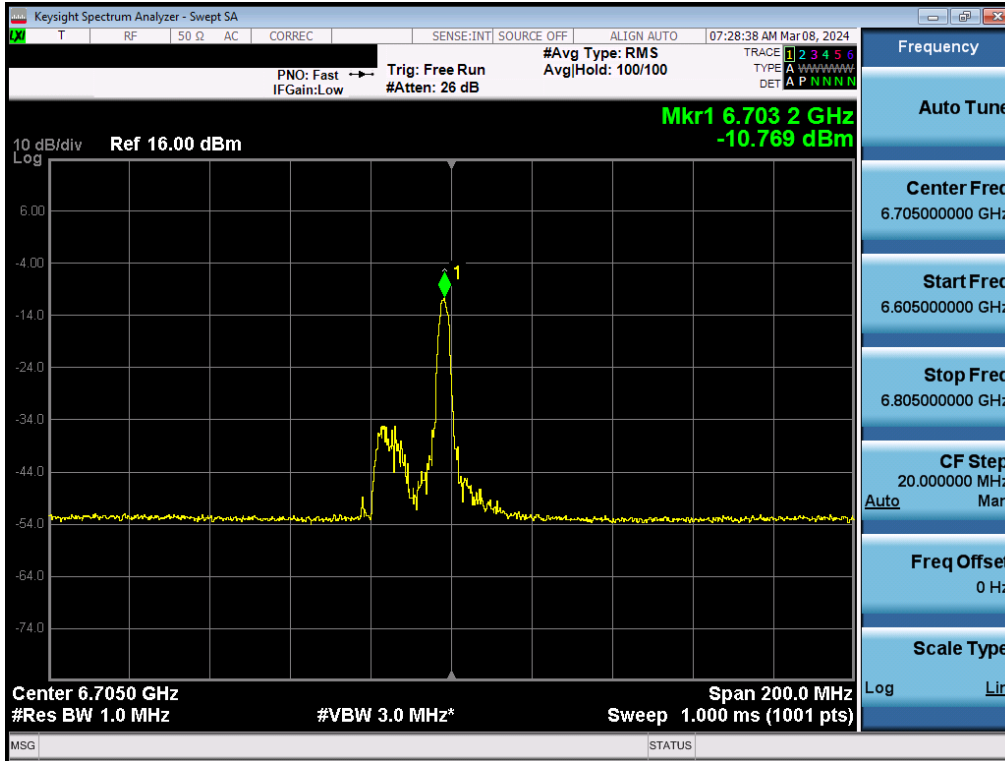


Plot 7-91. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11be (26 Tones) (UNII Band 7) – Ch. 149)

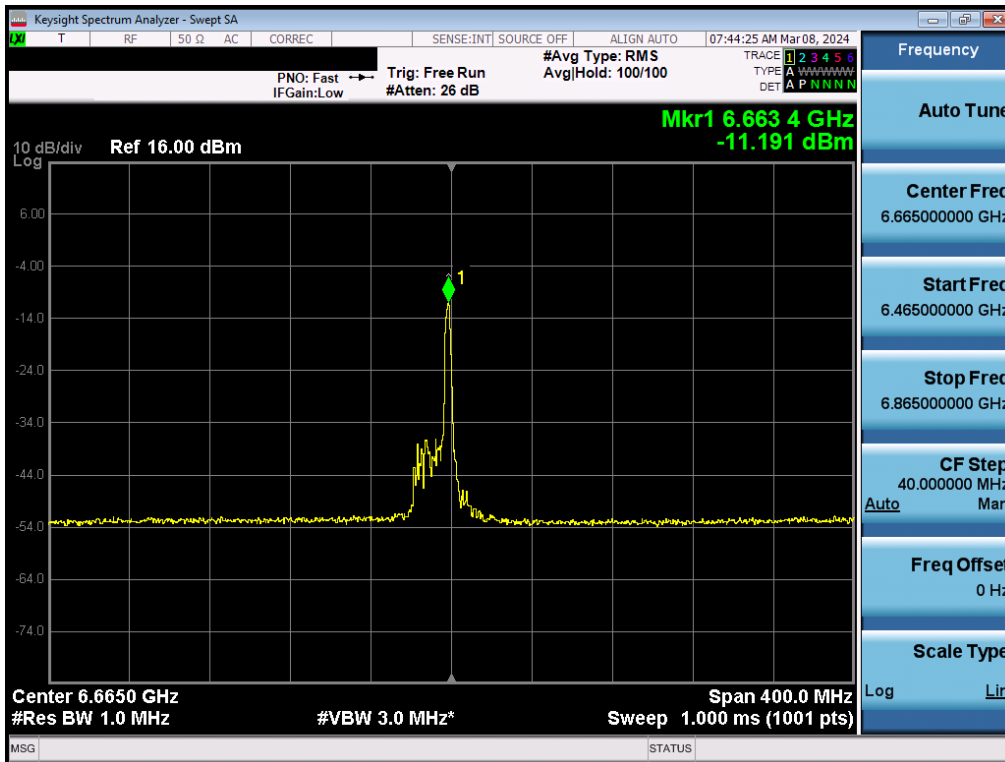


Plot 7-92. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11be (26 Tones) (UNII Band 7) – Ch. 155)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
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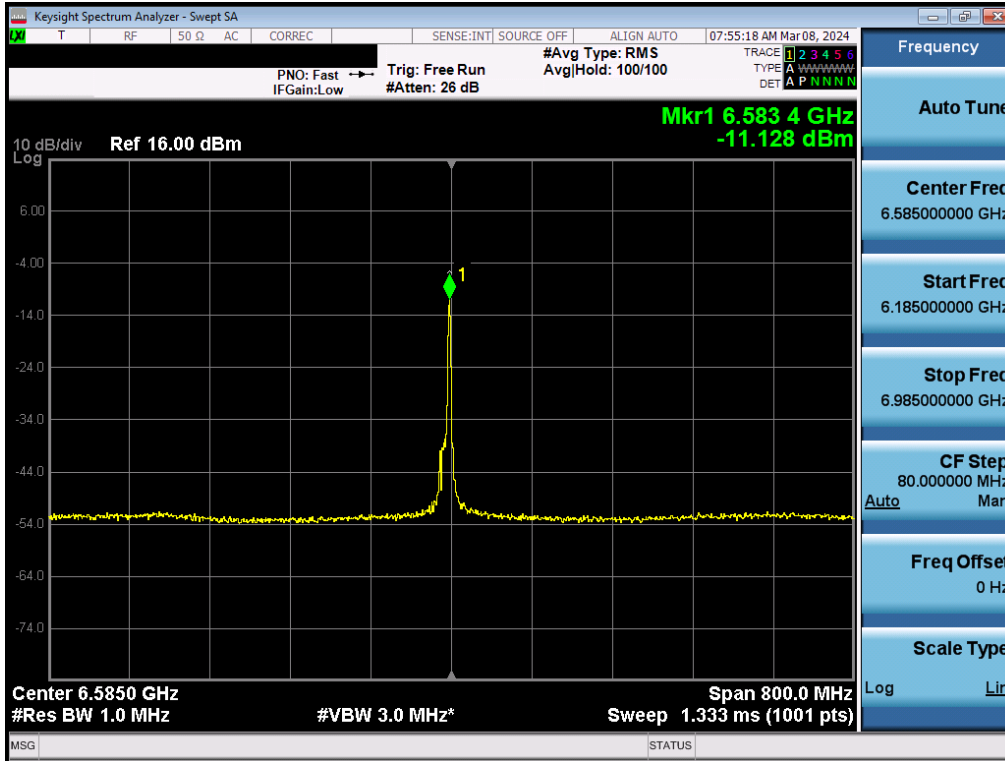


Plot 7-93. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11be (26 Tones) (UNII Band 7) – Ch. 151)

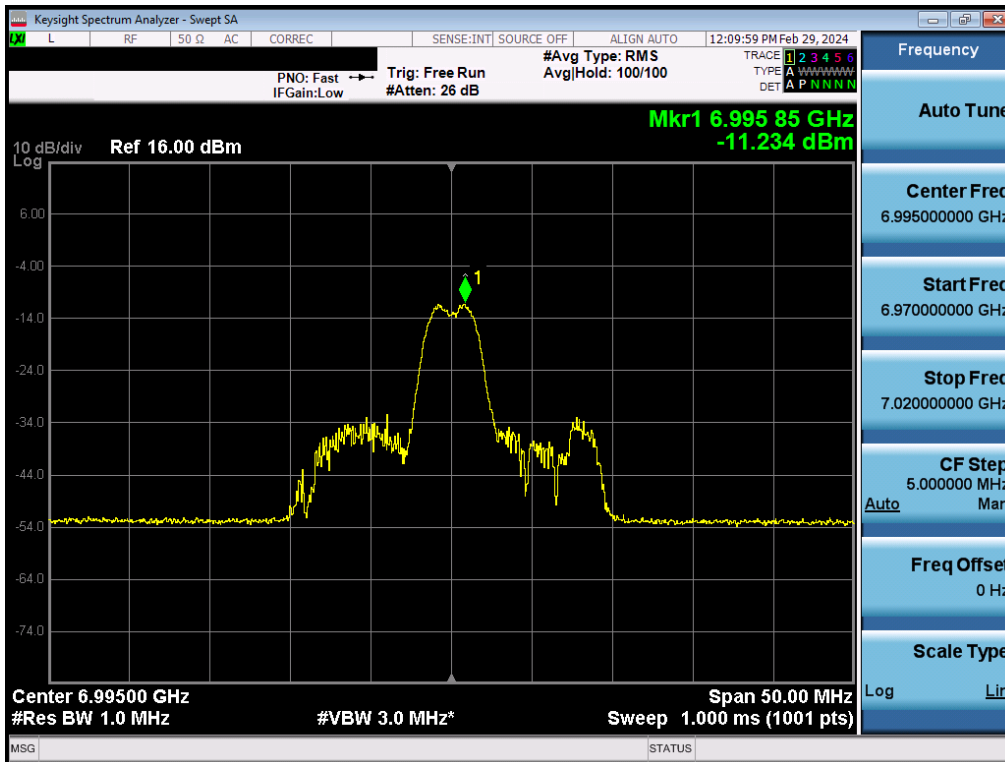


Plot 7-94. Power Spectral Density Plot MIMO ANT1 (160MHz BW 802.11be (26 Tones) (UNII Band 7) – Ch. 143)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
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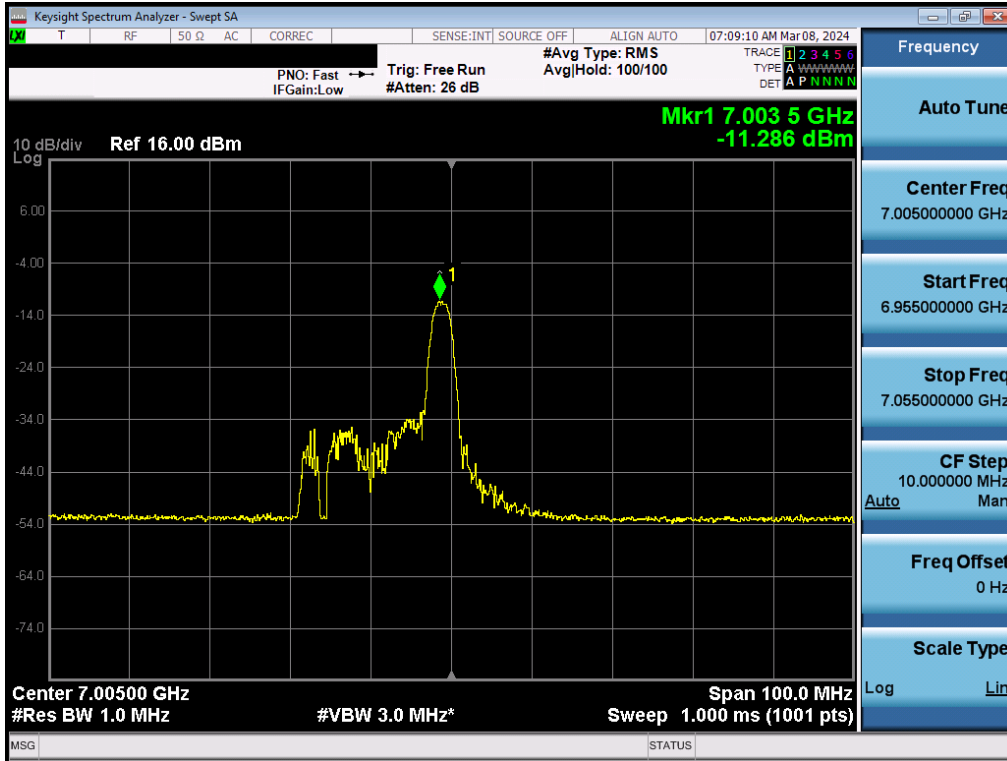
Plot 7-95. Power Spectral Density Plot MIMO ANT1 (320MHz BW 802.11be (26 Tones) (UNII Band 7) – Ch. 127)



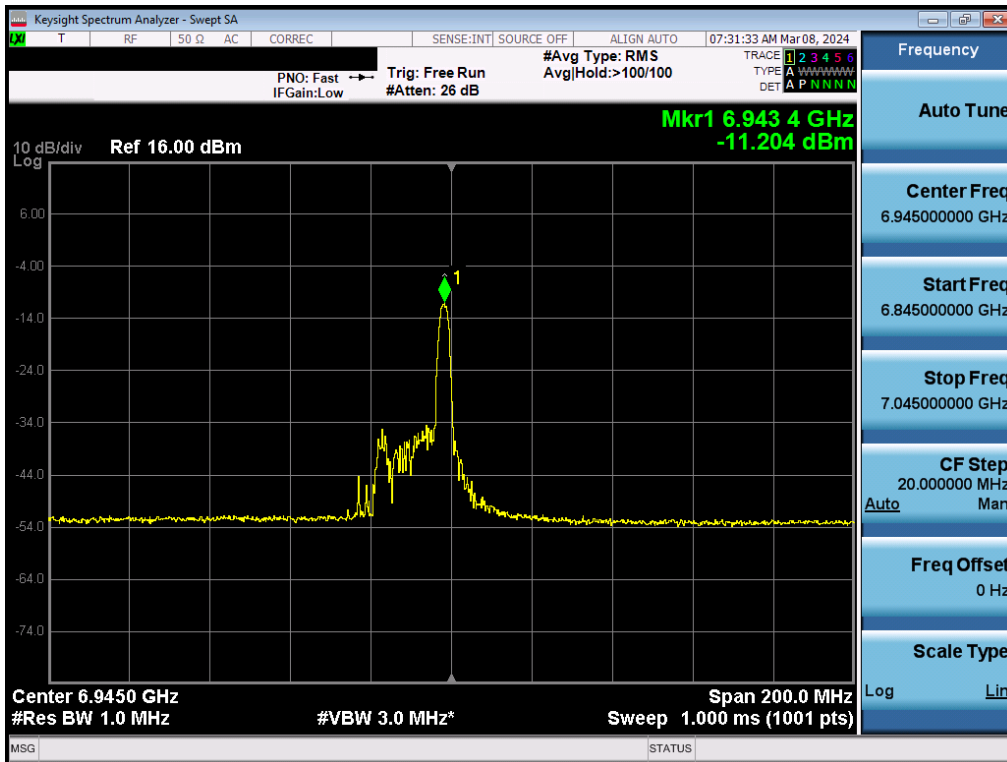
Plot 7-96. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11be (26 Tones) (UNII Band 8) – Ch. 209)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
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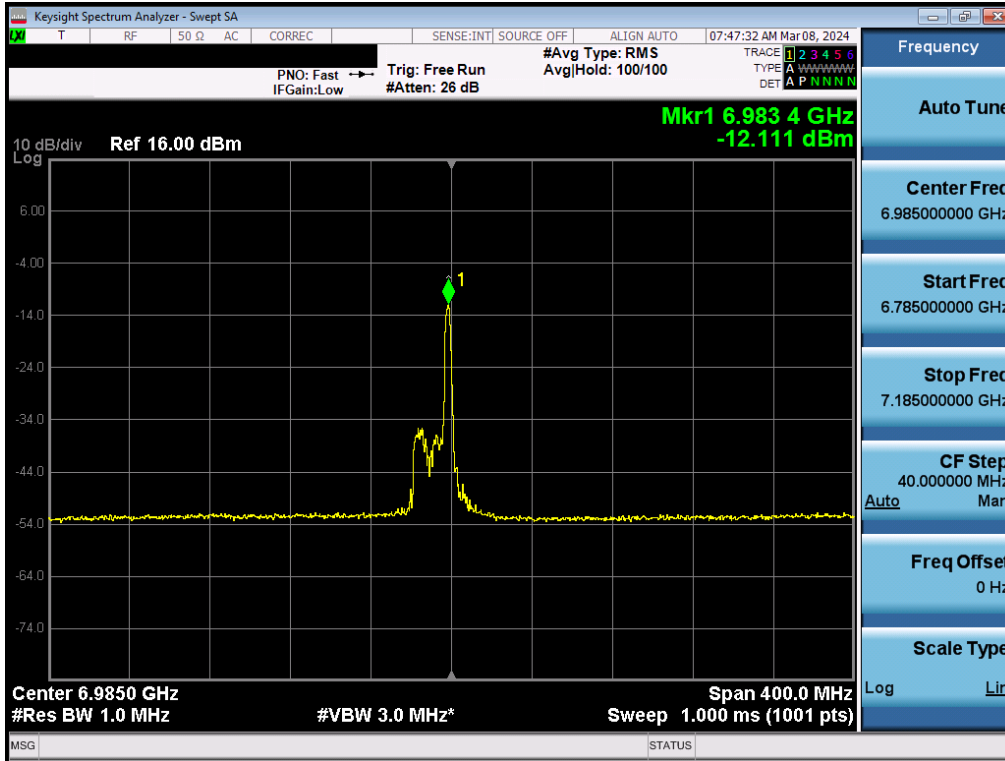


Plot 7-97. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11be (26 Tones) (UNII Band 8) – Ch. 211)

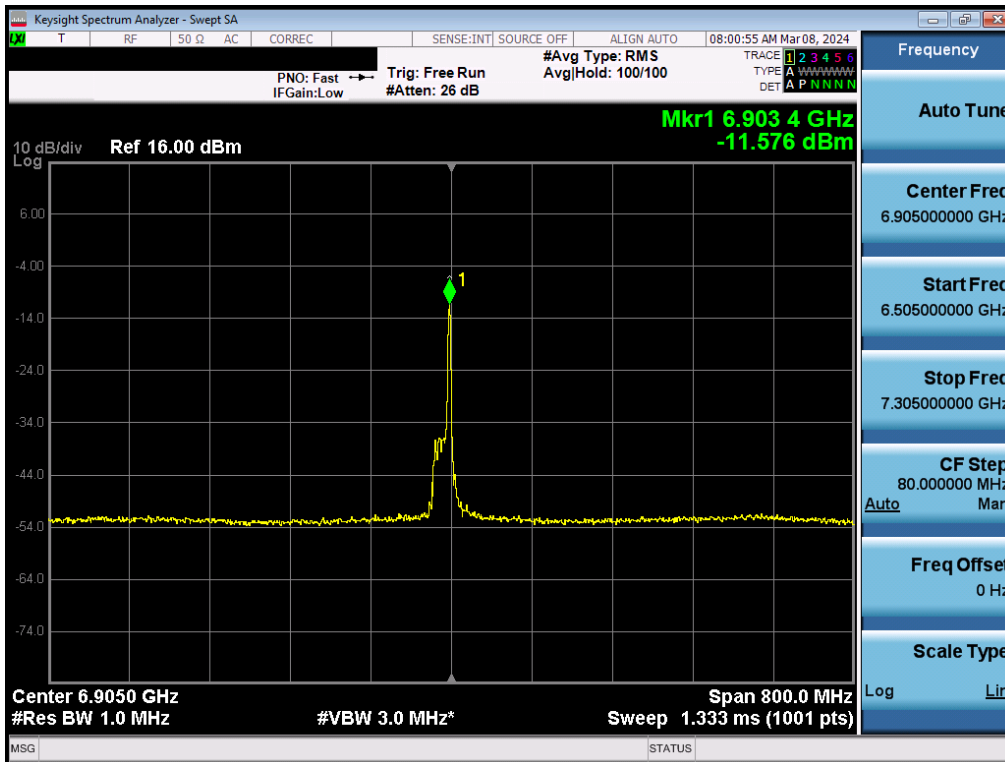


Plot 7-98. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11be (26 Tones) (UNII Band 8) – Ch. 199)

FCC ID: C3K2077	MEASUREMENT REPORT		Approved by: Technical Manager
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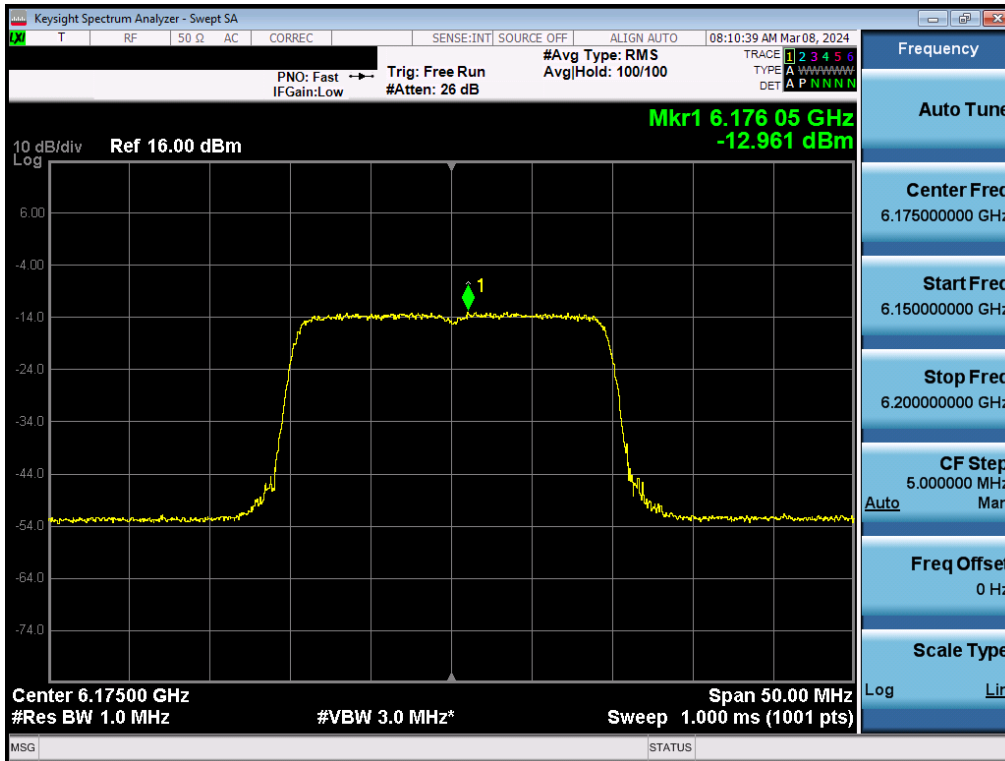


Plot 7-99. Power Spectral Density Plot MIMO ANT1 (160MHz BW 802.11be (26 Tones) (UNII Band 8) – Ch. 207)

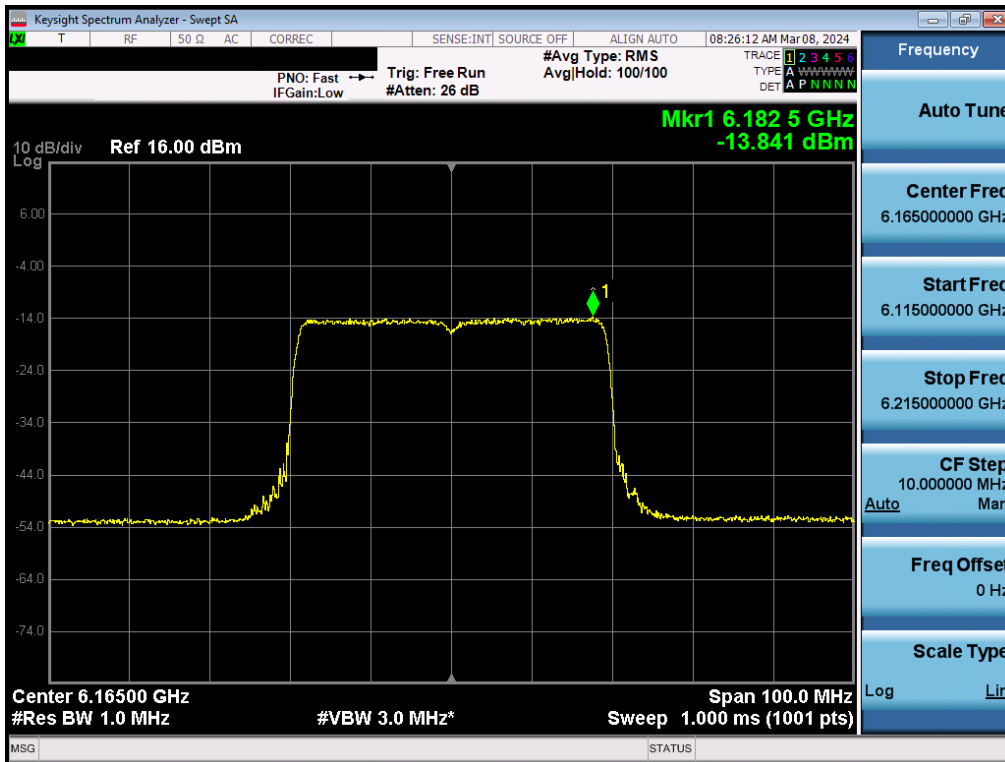


Plot 7-100. Power Spectral Density Plot MIMO ANT1 (320MHz BW 802.11be (26 Tones) (UNII Band 8) – Ch. 191)

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Plot 7-101. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11be (Full Tone) (UNII Band 5) – Ch. 45)



Plot 7-102. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11be (Full Tone) (UNII Band 5) – Ch. 43)

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