

MEASUREMENT REPORT

FCC Part 15.407 802.11ax WiFi 6E (OFDMA)

Applicant Name:

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

Date of Testing:

3/4 - 5/26/2023

Test Report Issue Date:

5/31/2023

Test Site/Location:

Element lab., Columbia, MD, USA

Test Report Serial No.:

1M2303170032-14.A3L

FCC ID:

A3LSMF731B

APPLICANT:

Samsung Electronics Co., Ltd.

Application Type:

Certification

Model:

SM-F731B

EUT Type:

Portable Handset

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)

Test Procedure(s):

ANSI C63.10-2013, KDB 987594 D02 v01r01,
KDB 648474 D03 v01r04,

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in 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. Conducted Power [mW]	Max. Conducted Power [dBm]
20	5	5935 - 6415	30.764	14.88
	6	6435 - 6515	31.088	14.93
	7	6535 - 6875	28.071	14.48
	8	6895 - 7115	28.172	14.50
40	5	5965 - 6405	29.155	14.65
	6	6445 - 6525	29.764	14.74
	7	6565 - 6845	28.753	14.59
	8	6885 - 7085	28.989	14.62
80	5	5985 - 6385	31.265	14.95
	6	6465	29.587	14.71
	7	6545 - 6865	30.453	14.84
	8	6945 - 7025	28.693	14.58
160	5	6025 - 6345	30.704	14.87
	6	6505	31.018	14.92
	7	6665 - 6825	29.086	14.64
	8	6985	29.712	14.73

EUT Overview

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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 **Samsung Electronics Co., Ltd. Portable Handset FCC ID: A3LSMF731B**. 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.: 0084M, 0097M, 0091M, 0032M, 0096M, 0432M, 0164M

2.2 Device Capabilities

This device contains the following capabilities:

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

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

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

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

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

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

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

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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 (160MHz BW) Frequency / Channel Operations

Notes:

1. 6GHz NII operation is possible in 20MHz, 40MHz, 80MHz, and 160MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = peak per the guidance of Section B)2)b) of ANSI C63.10-2013. 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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Mode	Antenna	Bandwidth	Tone	Duty Cycle
		[MHz]		
802.11ax NII RU 6E	MIMO	20	26T	99.4
			52T	99.3
			106T	99.3
			242T	99.3
		40	26T	99.2
			52T	99.4
			106T	99.3
			242T	99.3
			484T	99.3
		80	26T	99.1
			52T	99.3
			106T	98.9
			242T	99.2
			484T	99.3
			996T	99.3
		160 1st	26T	98.3
			52T	99.1
			106T	99.3
			242T	98.8
			484T	99.3
			996T	99.3
		160 2nd	26T	99.1
			52T	99.3
			106T	98.5
			242T	99.3
			484T	99.2
			996T	99.4
		160	996*2T	99.7

Table 2-5. Measured Duty Cycles

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

WiFi Configurations		SISO		CDD		SDM	
		ANT1	ANT2	ANT1	ANT2	ANT1	ANT2
6 GHz	11ax	×	×	✓	✓	✓	✓

Table 2-6. Frequency / Channel Operations

✓ = Support; × = NOT Support

SISO = Single Input Single Output

SDM = Spatial Diversity Multiplexing – MIMO function

CDD = Cyclic Delay Diversity - 2Tx Function

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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 2-7. 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 2-8. Power Operation

✓= Support; ✗ = NOT Support

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2.3 Antenna Description

The following antenna gains are used in this device per the "Unlicensed Band Antenna Gain" document provided by the client. This document is also included in the filing as a public exhibit.

Frequency	Ant1 Peak Gain [dBi]	Ant2 Peak Gain [dBi]	Directional Gain [dBi]
5925 MHz	-10.51	-10.61	-7.55
6025 MHz	-10.75	-10.05	-7.38
6125 MHz	-10.37	-10.61	-7.48
6225 MHz	-10.16	-10.04	-7.09
6325 MHz	-10.95	-10.13	-7.52
6425 MHz	-10.00	-10.64	-7.30
6525 MHz	-10.77	-10.30	-7.52
6625 MHz	-10.65	-10.79	-7.71
6725 MHz	-10.29	-10.28	-7.27
6825 MHz	-10.28	-10.42	-7.34
6925 MHz	-10.39	-10.55	-7.46
7025 MHz	-10.74	-10.35	-7.53
7125 MHz	-10.42	-10.84	-7.62

Table 2-9 Antenna Peak Gain per Frequency

	Ant1 Peak Gain [dBi]	Ant2 Peak Gain [dBi]	Directional Gain [dBi]
5925 – 6425 MHz	-10.16	-10.04	-7.09
6425 – 6525 MHz	-10.00	-10.64	-7.30
6525 – 6875 MHz	-10.29	-10.28	-7.27
6875 – 7125 MHz	-10.39	-10.55	-7.46

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 three configurations: one is with screen open; one is where the screen is half open (90 degrees), and one is with the screen closed. All configurations are tested, and the worst case radiated emissions data is shown in this report.

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.

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

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2.5 Software and Firmware

The test was conducted with firmware version F731BXXU0AWD7 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
-	ETS-001	EMC Cable and Switch System	8/11/2022	Annual	8/11/2023	ETS-001
-	ETS-002	EMC Cable and Switch System	8/11/2022	Annual	8/11/2023	ETS-002
-	AP2-001	EMC Cable and Switch System	8/11/2022	Annual	8/11/2023	AP2-001
-	AP2-002	EMC Cable and Switch System	8/11/2022	Annual	8/11/2023	AP2-002
-	WL25-1	Conducted Cable Set (25GHz)	7/29/2022	Annual	7/29/2023	WL25-1
-	WL25-2	Conducted Cable Set (25GHz)	7/29/2022	Annual	7/29/2023	WL25-2
-	WL40-1	Conducted Cable Set (40GHz)	7/29/2022	Annual	7/29/2023	WL40-1
Agilent	N9038A	Power Meter	5/9/2022	Annual	5/9/2023	1328004
Agilent	N9038A	MXE EMI Receiver	1/21/2022	Annual	1/21/2023	MY51210133
Agilent	N9030A	PXA Signal Analyzer (44GHz)	8/18/2022	Annual	8/18/2023	MY49430494
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	4/13/2022	Biennial	4/13/2024	121034
Emco	3115	Horn Antenna (1-18GHz)	8/8/2022	Biennial	8/8/2024	9704-5182
Emco	3116	Horn Antenna (18 - 40GHz)	7/20/2021	Biennial	7/20/2023	9203-2178
ETS-Lindgren	3816/2NM	Line Impedance Stabilization Network	8/11/2022	Biennial	8/11/2024	114451
Keysight Technologies	N9030A	PXA Signal Analyzer (3Hz-26.5GHz)	9/6/2022	Annual	9/6/2023	MY54490576
Pasternack	NMLC-2	Line Conducted Emissions Cable (NM)	12/19/2021	Annual	12/19/2022	NMLC-2
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	8/29/2022	Annual	8/29/2023	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	8/25/2022	Annual	8/25/2023	100348
Sunol	DRH-118	Horn Antenna (1-18GHz)	2/14/2022	Biennial	2/14/2024	A050307
Sunol	DRH-118	Horn Antenna (1-18 GHz)	1/14/2022	Biennial	1/14/2024	A042511
Sunol	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: Samsung Electronics Co., Ltd.
 FCC ID: A3LSMF731B
 FCC Classification: 15E 6GHz Low Power Dual Client (6CD)

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1046, 15.407(a)(11)	Maximum Conducted Output Power	N/A	CONDUCTED	PASS	Section 7.3
15.407(a)(8), 15.407(a)(7)	Maximum Radiated Output Power	< 24dBm over the frequency band of operation <30dBm over the frequency band of operation when connecting to a standard power access point		PASS	Section 7.3
2.1049, 15.407(a)(10)	Occupied Bandwidth/ 26dB Bandwidth	99% of the occupied bandwidth of any channel must be contained within each of its respective U-NII sub bands The maximum transmitter channel bandwidth for U-NII devices in the 5.925-7.125 GHz band is 320 megahertz.		PASS	Section 7.2
15.407(a)(8), 15.407(a)(7)	Maximum Power Spectral Density	< -1dBm/MHz e.i.r.p. <17dBm/MHz when operating with a standard power access point		PASS	Section 7.4
15.407(b)(7)	In-Band Emissions	EUT must meet the limits detailed in 15.407(b)(7)		PASS	Section 7.5
15.407(d)(6)	Contention Based Protocol	EUT must detect AWGN signal with 90% (or better) certainty	RADIATED	PASS	Section 7.6
15.407(b)(6)	Undesirable Emissions	< -27dBm/MHz e.i.r.p. outside of the 5.925 – 7.125GHz band		PASS	Section 7.7
15.205, 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209		PASS	Section 7.7
15.407	AC Conducted Emissions 150kHz – 30MHz	<FCC 15.207 limits	LINE CONDUCTED	PASS	Please 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) 802.11ax OFDMA testing was performed for all signal tone configurations as specified by the 802.11ax standard. Worst case results are determined and reported per the guidance provided at the October 2018 TCB Workshop.
- 8) Only one RU index could be selected at a time, so no contiguous or non-contiguous RUs were considered for testing.

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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

None.

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	Frequency [MHz]	Channel	802.11 MODE	Antenna-1 Occupied Bandwidth [MHz]	Antenna-2 Occupied Bandwidth [MHz]
Band 5	5935	2	ax (20MHz)	17.07	17.10
	6175	45	ax (20MHz)	17.38	17.10
	6415	93	ax (20MHz)	17.26	17.14
	5965	3	ax (40MHz)	36.73	36.60
	6165	43	ax (40MHz)	36.77	36.47
	6405	91	ax (40MHz)	38.98	38.36
	5985	7	ax (80MHz)	80.65	79.60
	6145	39	ax (80MHz)	80.80	80.07
	6385	87	ax (80MHz)	76.04	75.34
	6025	15	ax (160MHz)	161.00	160.20
	6185	47	ax (160MHz)	161.26	159.72
	6345	79	ax (160MHz)	161.19	161.32
Band 6	6435	97	ax (20MHz)	17.33	16.92
	6475	105	ax (20MHz)	19.26	17.13
	6515	113	ax (20MHz)	17.29	17.21
	6445	99	ax (40MHz)	39.04	38.96
	6485	107	ax (40MHz)	39.11	38.80
	6525	115	ax (40MHz)	38.92	38.89
	6465	103	ax (80MHz)	78.16	79.46
	6505	111	ax (160MHz)	161.08	161.23
Band 7	6535	117	ax (20MHz)	17.23	17.07
	6695	149	ax (20MHz)	17.41	17.11
	6875	185	ax (20MHz)	17.27	17.16
	6565	123	ax (40MHz)	39.22	38.50
	6685	155	ax (40MHz)	38.99	38.65
	6845	179	ax (40MHz)	38.82	38.46
	6545	119	ax (80MHz)	80.28	79.24
	6705	151	ax (80MHz)	81.98	80.52
	6865	183	ax (80MHz)	81.80	80.40
	6665	143	ax (160MHz)	160.89	160.77
Band 8	6825	175	ax (160MHz)	163.34	163.55
	6895	189	ax (20MHz)	17.30	17.16
	6995	209	ax (20MHz)	17.48	17.18
	7115	233	ax (20MHz)	17.31	17.18
	6885	187	ax (40MHz)	38.80	38.36
	6965	211	ax (40MHz)	38.32	38.82
	7085	227	ax (40MHz)	39.13	38.71
	6945	199	ax (80MHz)	80.74	79.62
	7025	215	ax (80MHz)	81.14	81.82
	6985	207	ax (160MHz)	155.07	154.50

Table 7-2. Occupied Bandwidth Measurements (26 Tones)

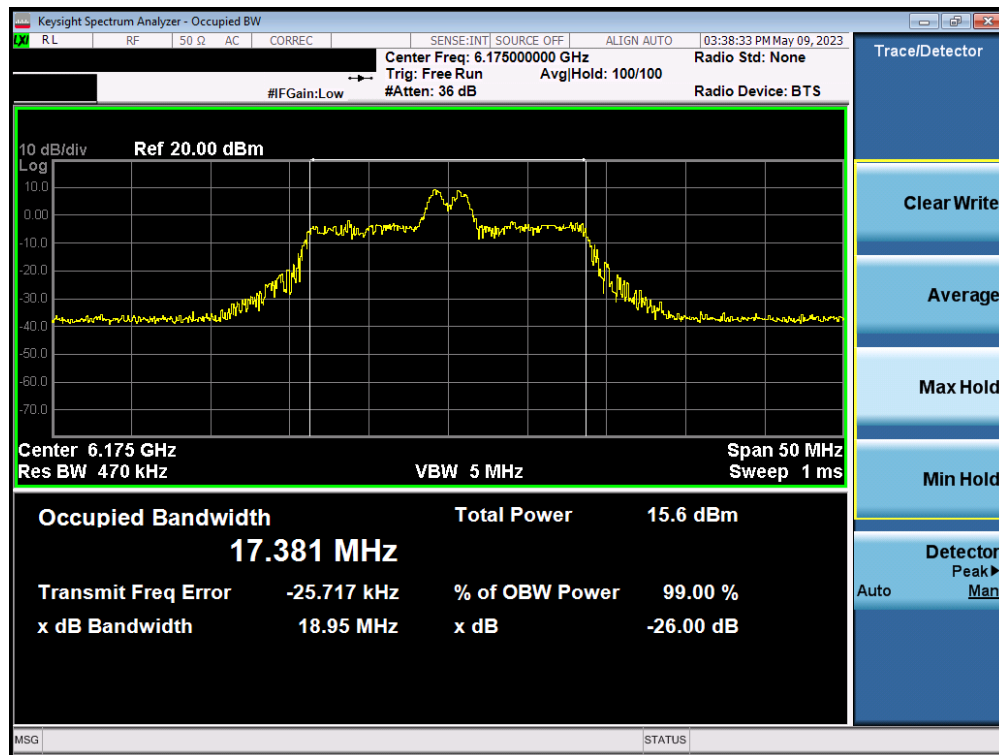
FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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	Frequency [MHz]	Channel	802.11 MODE	Antenna-1 Occupied Bandwidth [MHz]	Antenna-2 Occupied Bandwidth [MHz]
Band 5	5935	2	ax (20MHz)	19.25	19.18
	6175	45	ax (20MHz)	19.24	19.13
	6415	93	ax (20MHz)	19.30	19.20
	5965	3	ax (40MHz)	38.31	38.35
	6165	43	ax (40MHz)	38.30	38.35
	6405	91	ax (40MHz)	38.29	38.30
	5985	7	ax (80MHz)	78.32	78.10
	6145	39	ax (80MHz)	78.36	78.21
	6385	87	ax (80MHz)	78.39	78.04
	6025	15	ax (160MHz)	155.68	155.82
	6185	47	ax (160MHz)	156.04	155.57
	6345	79	ax (160MHz)	155.81	155.75
Band 6	6435	97	ax (20MHz)	19.25	19.21
	6475	105	ax (20MHz)	19.26	19.20
	6515	113	ax (20MHz)	19.22	19.22
	6445	99	ax (40MHz)	38.26	38.29
	6485	107	ax (40MHz)	38.22	38.48
	6525	115	ax (40MHz)	38.41	38.22
	6465	103	ax (80MHz)	78.16	78.22
	6505	111	ax (160MHz)	155.70	155.62
Band 7	6535	117	ax (20MHz)	19.26	19.20
	6695	149	ax (20MHz)	19.23	19.20
	6875	185	ax (20MHz)	19.26	19.18
	6565	123	ax (40MHz)	38.27	38.29
	6685	155	ax (40MHz)	38.27	38.47
	6845	179	ax (40MHz)	38.29	38.31
	6545	119	ax (80MHz)	78.33	78.12
	6705	151	ax (80MHz)	78.63	78.14
	6865	183	ax (80MHz)	78.45	78.09
	6665	143	ax (160MHz)	156.37	155.54
Band 8	6825	175	ax (160MHz)	155.97	155.54
	6895	189	ax (20MHz)	19.30	19.20
	6995	209	ax (20MHz)	19.31	19.16
	7115	233	ax (20MHz)	19.30	19.21
	6885	187	ax (40MHz)	38.32	38.29
	6965	211	ax (40MHz)	38.32	38.34
	7085	227	ax (40MHz)	38.29	38.40
	6945	199	ax (80MHz)	78.32	78.13
	7025	215	ax (80MHz)	78.52	78.18
	6985	207	ax (160MHz)	155.92	155.89

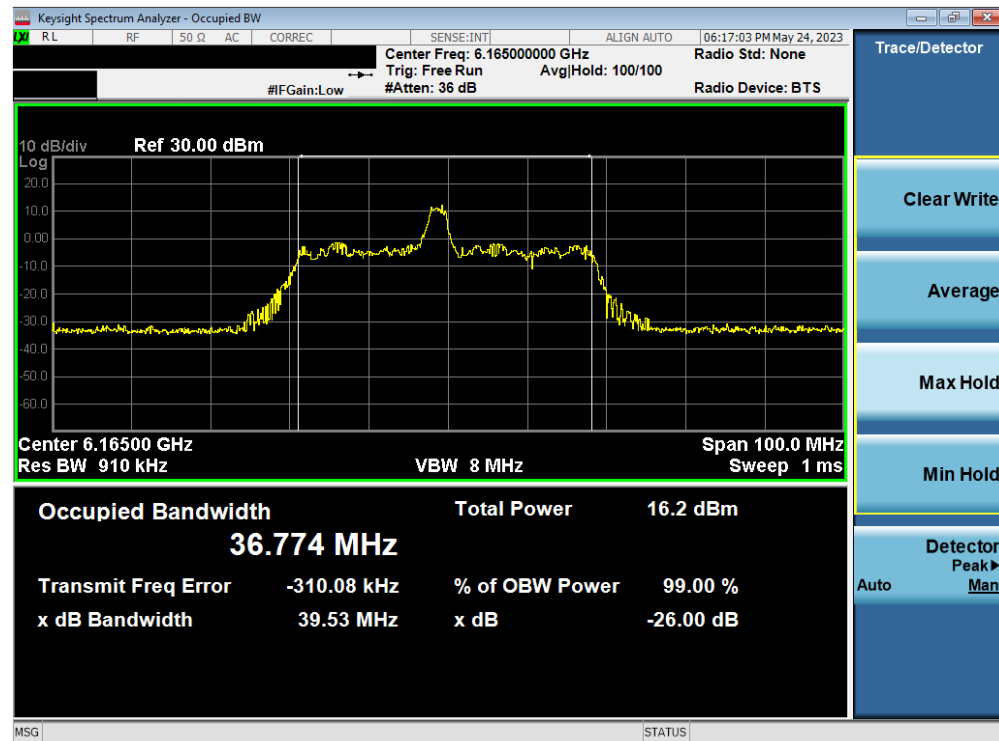
Table 7-3. Occupied Bandwidth Measurements (Full Tones)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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7.2.1 MIMO Antenna-1 Bandwidth Measurements - (Partial Tones)



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

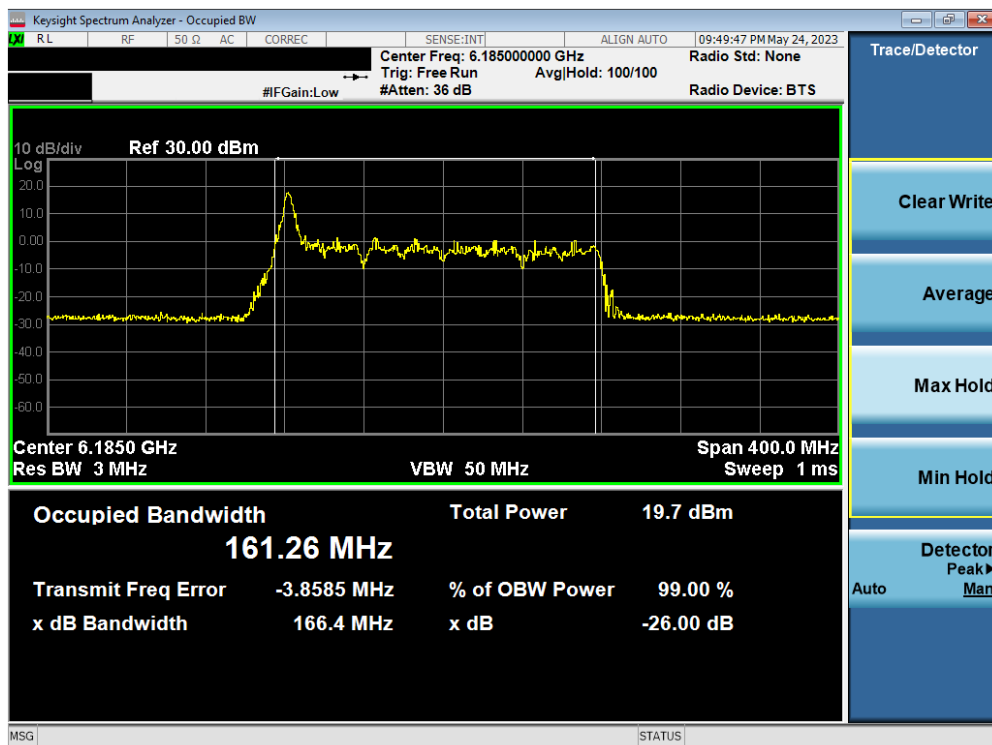


Plot 7-2. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 43)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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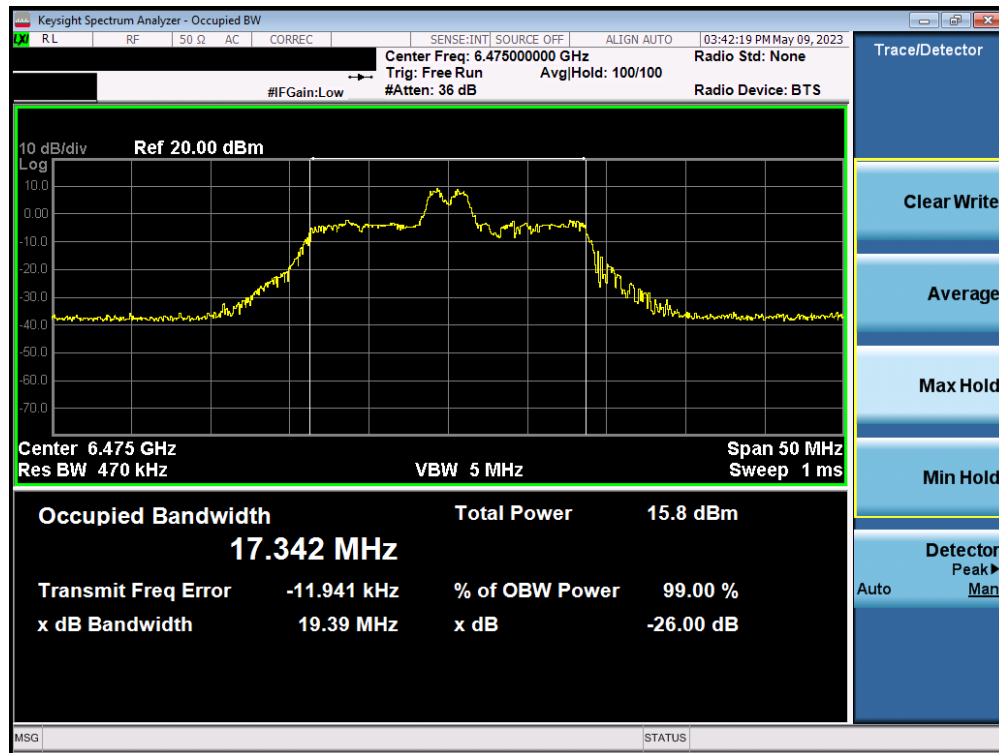
Plot 7-3. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 39)



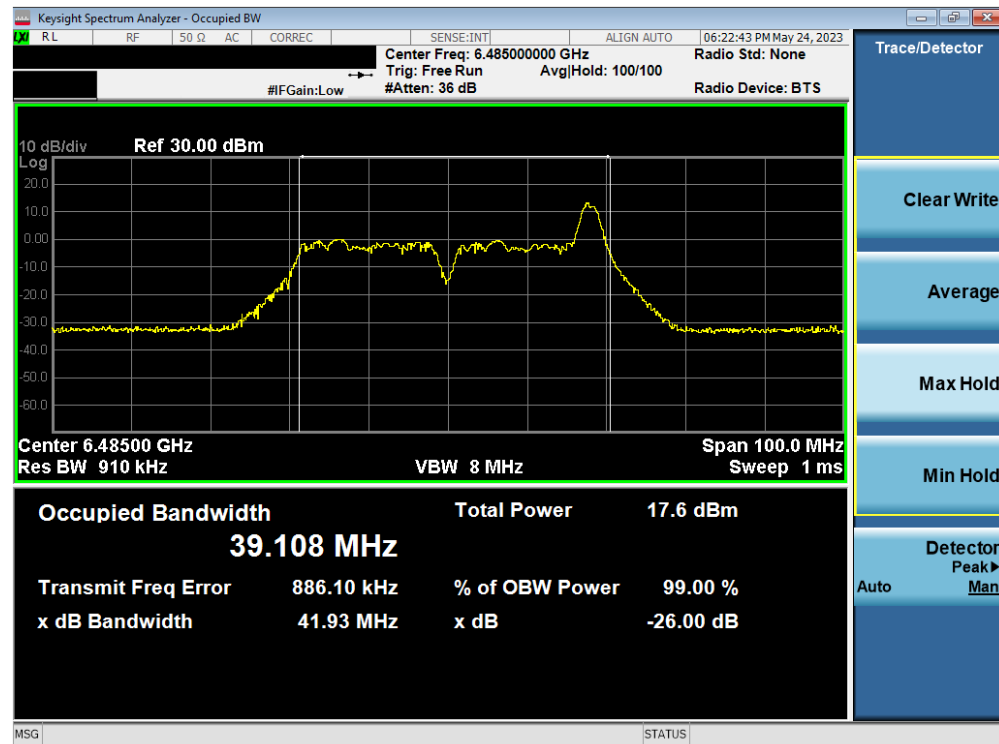
Plot 7-4. Occupied Bandwidth Plot MIMO ANT1 (160MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 47)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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MIMO Antenna-1 Bandwidth Measurements - (Partial Tones)

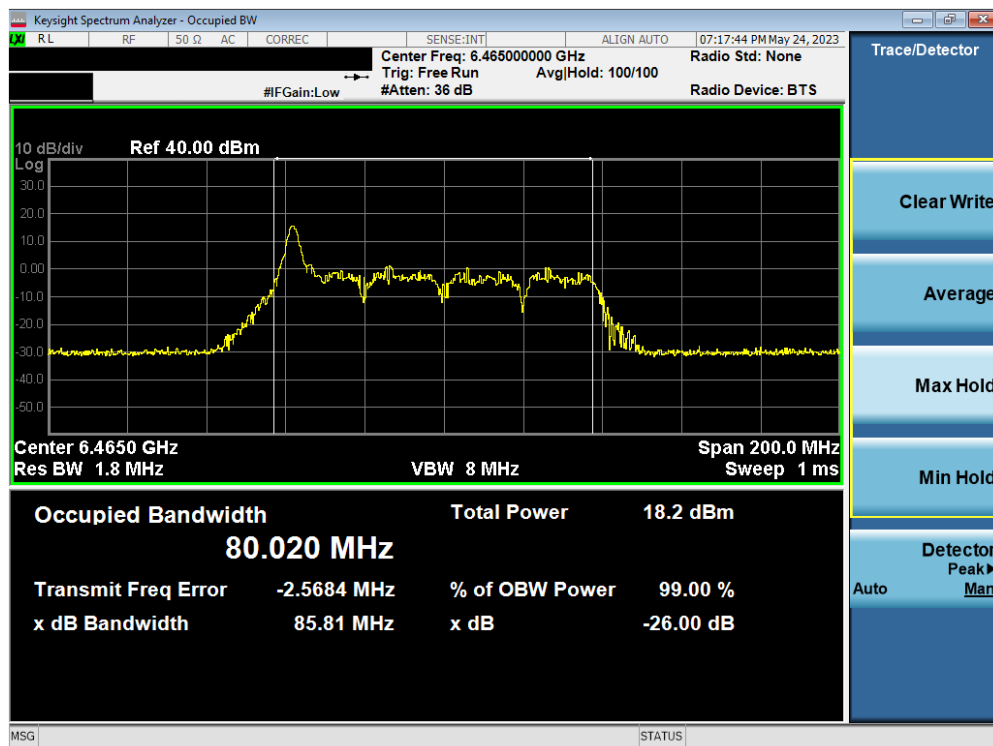


Plot 7-5. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 105)

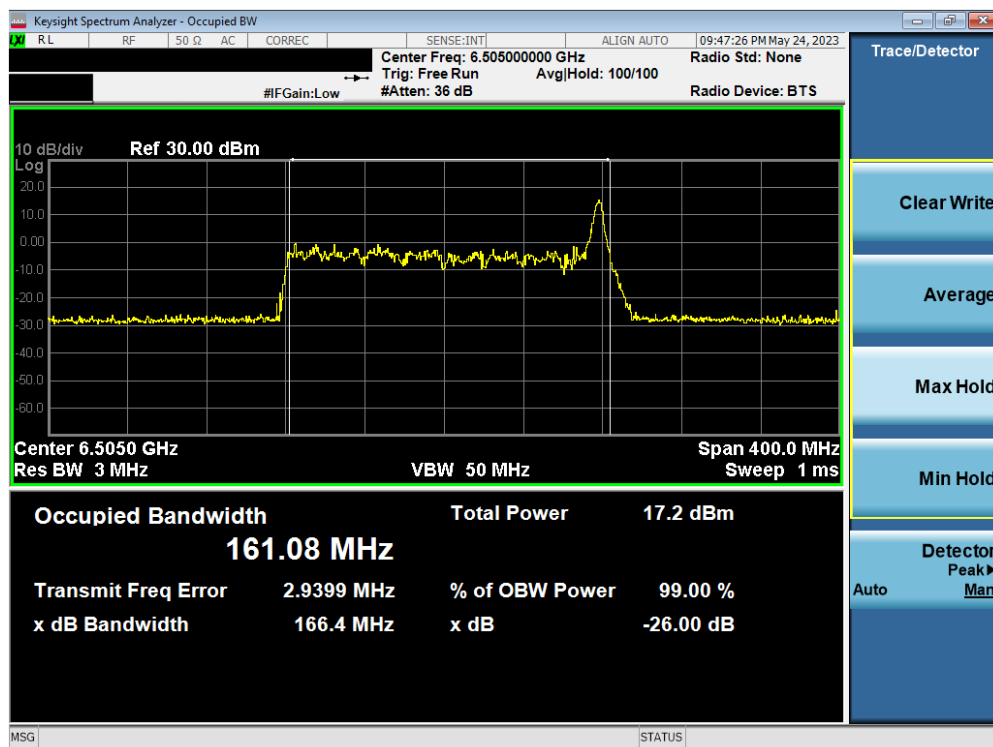


Plot 7-6. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 107)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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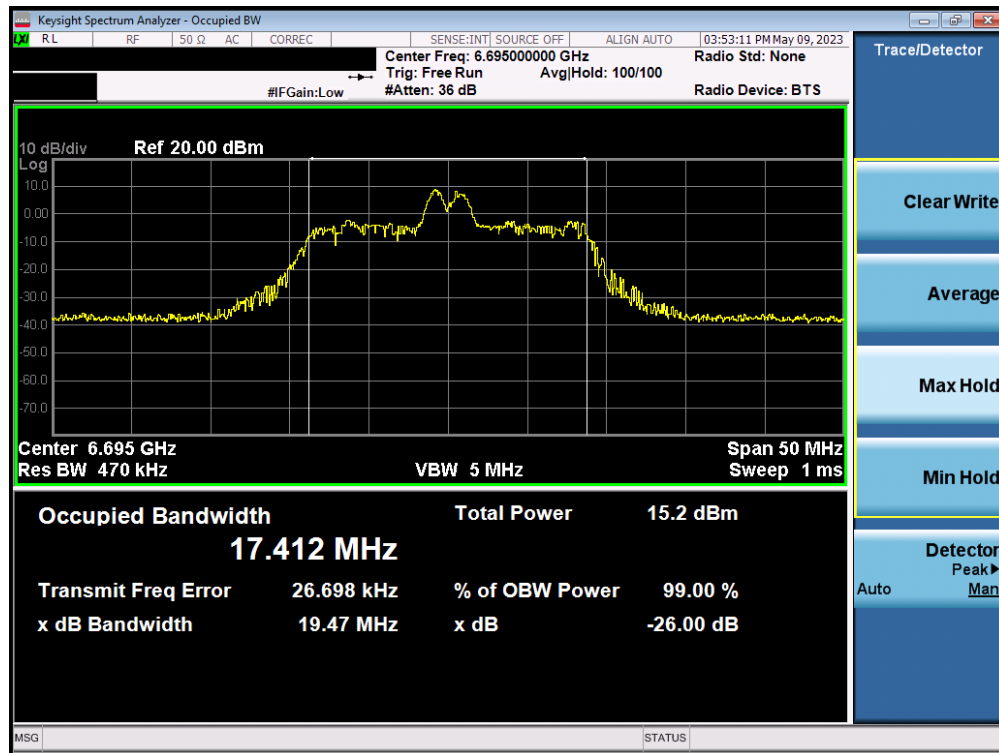
Plot 7-7. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 103)



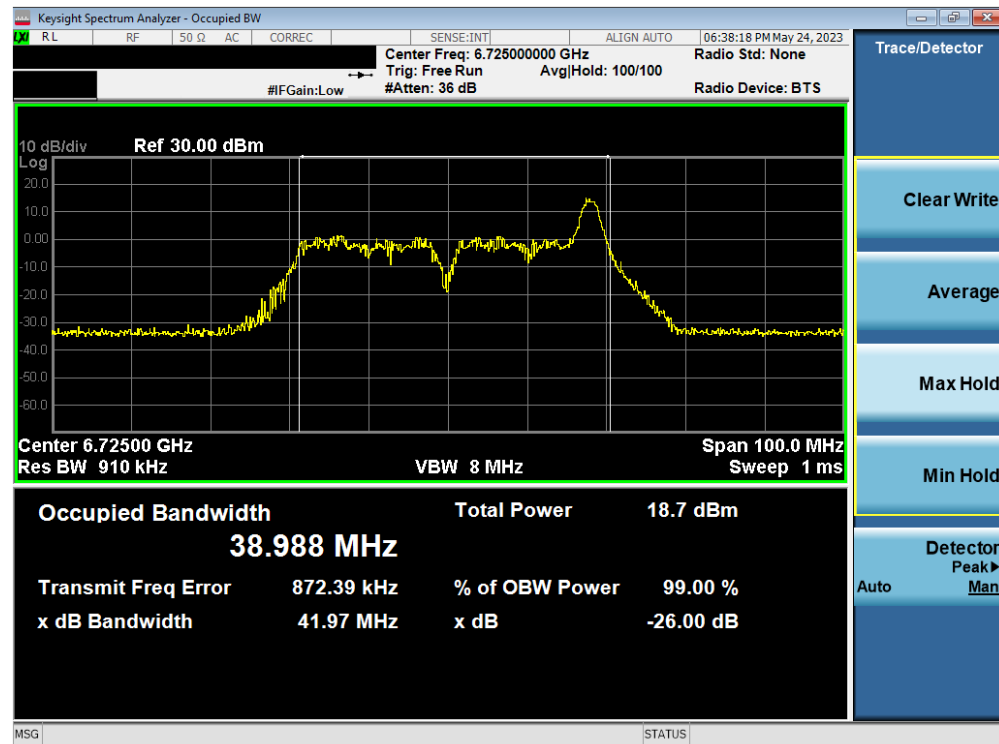
Plot 7-8. Occupied Bandwidth Plot MIMO ANT1 (160MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 111)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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MIMO Antenna-1 Bandwidth Measurements - (Partial Tones)

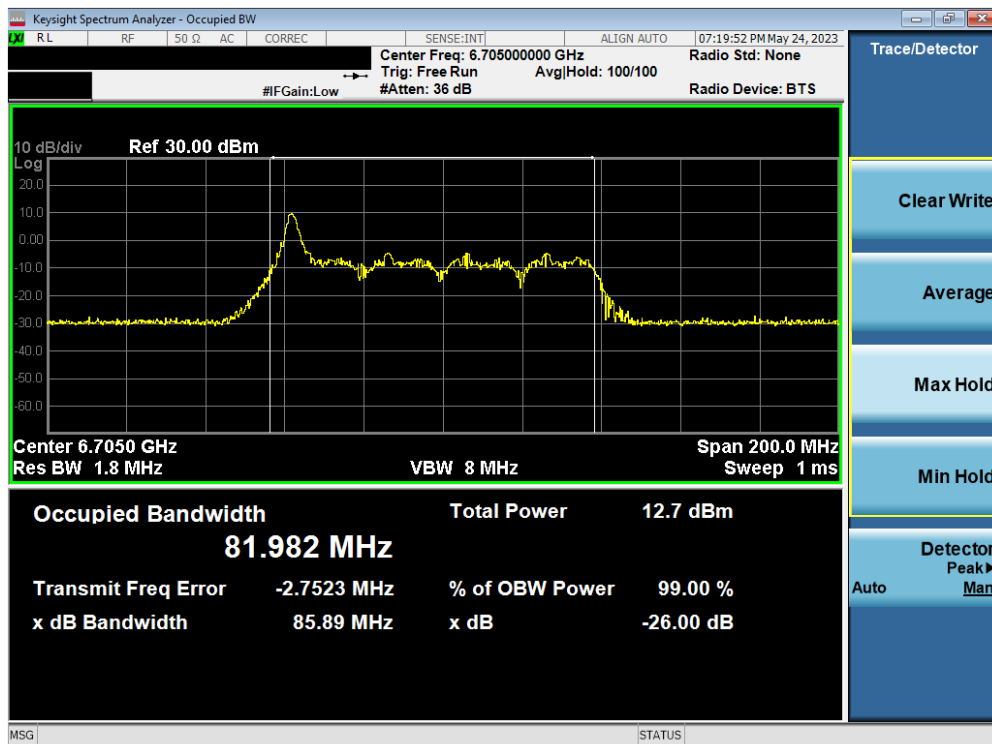


Plot 7-9. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 149)

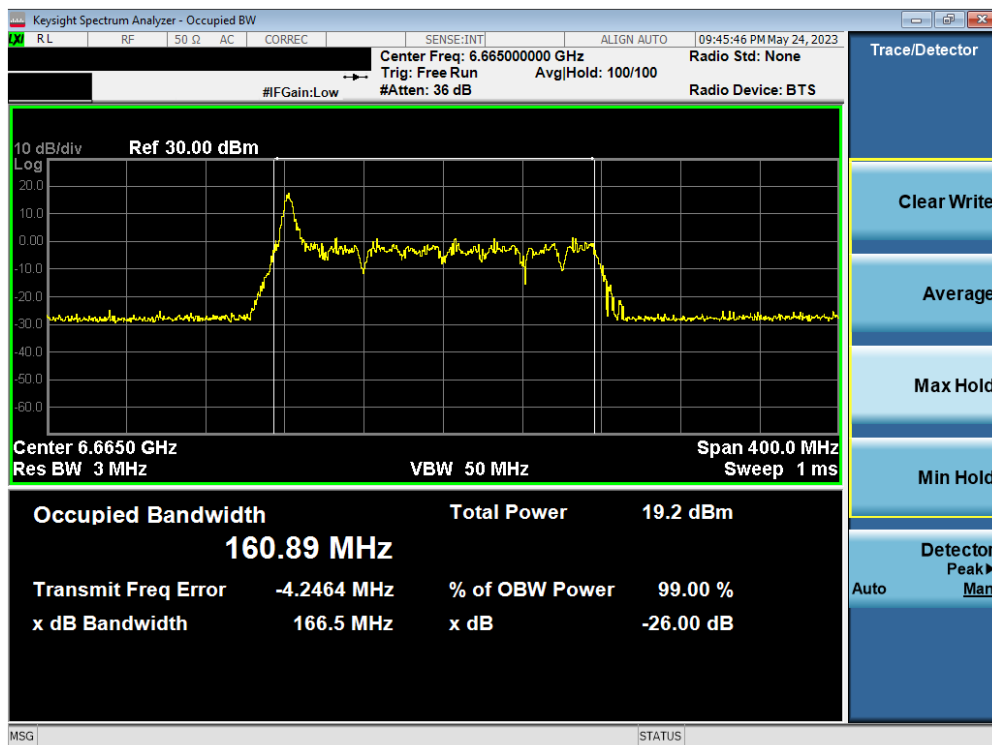


Plot 7-10. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 155)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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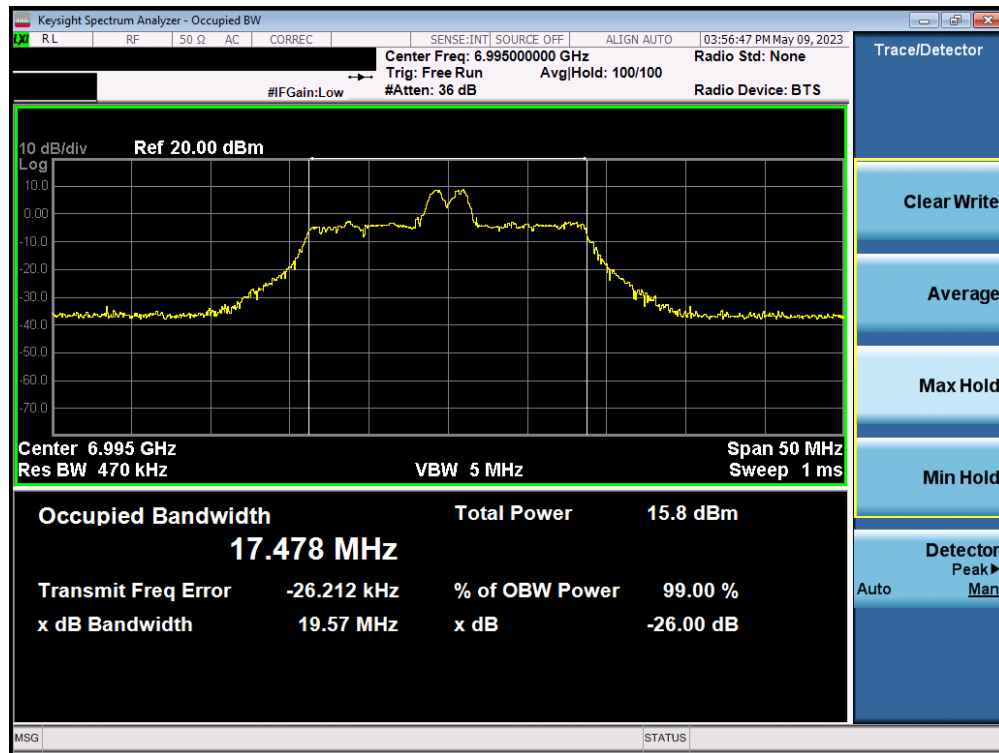
Plot 7-11. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 151)



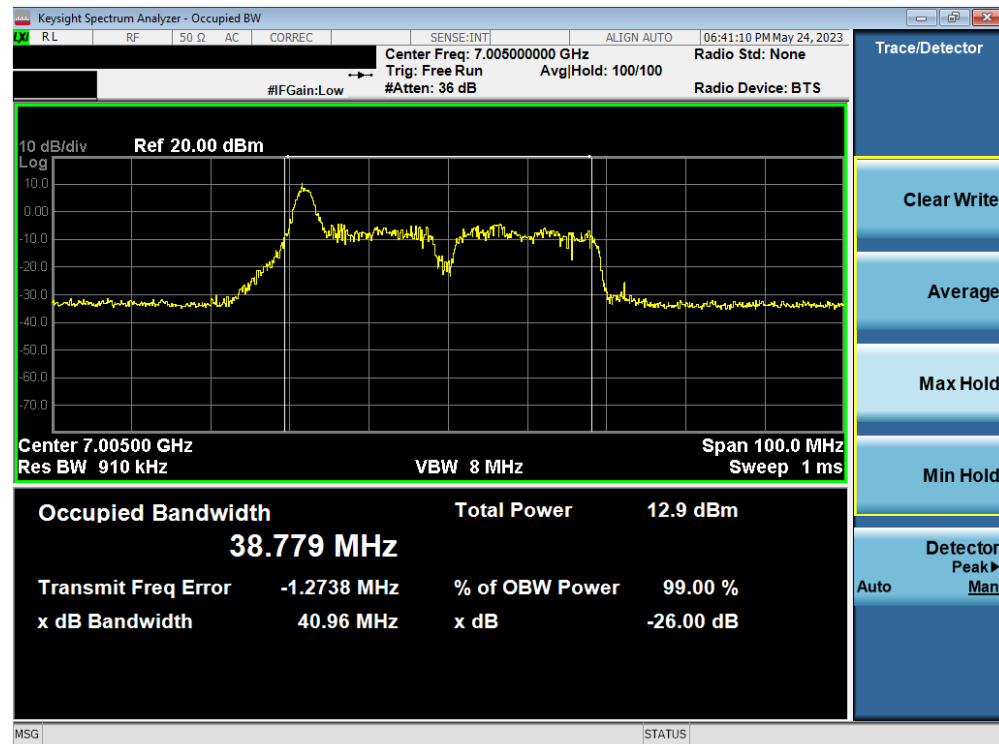
Plot 7-12. Occupied Bandwidth Plot MIMO ANT1 (160MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 143)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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MIMO Antenna-1 Bandwidth Measurements - (Partial Tones)



Plot 7-13. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (26 Tones) (UNII Band 8) – Ch. 209)

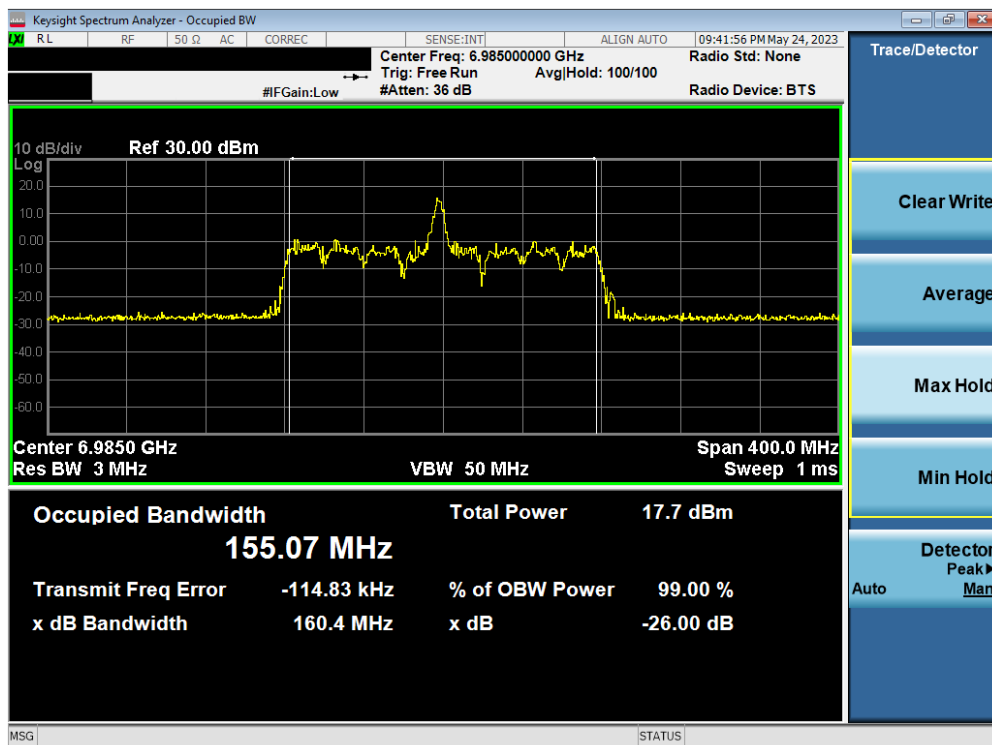


Plot 7-14. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (26 Tones) (UNII Band 8) – Ch. 211)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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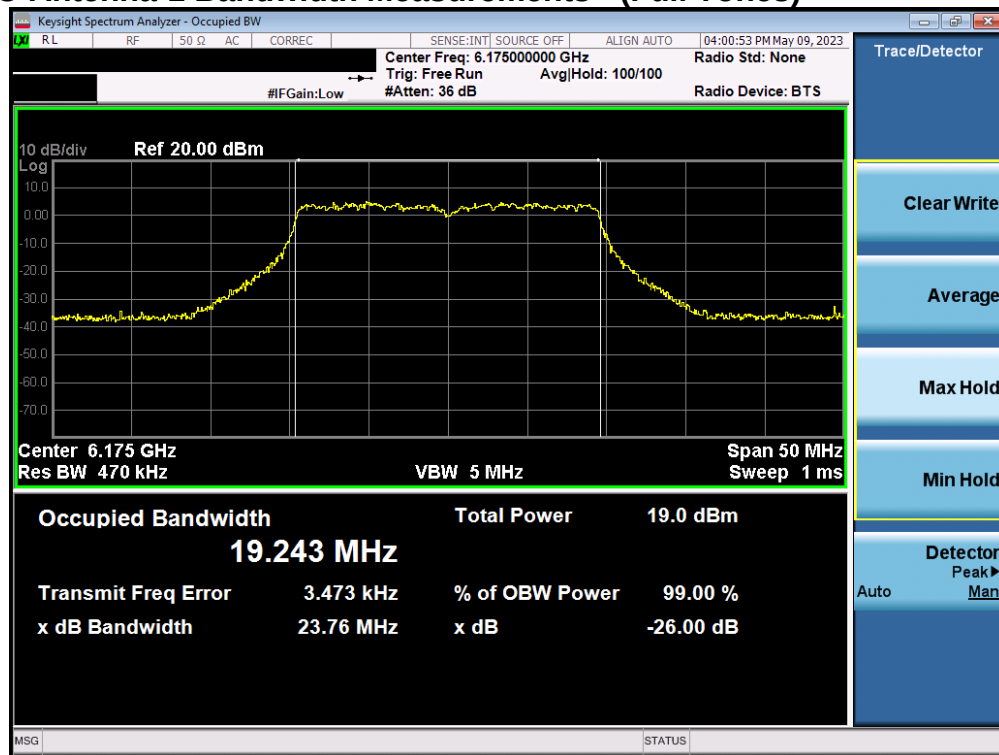
Plot 7-15. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (26 Tones) (UNII Band 8) – Ch. 199)



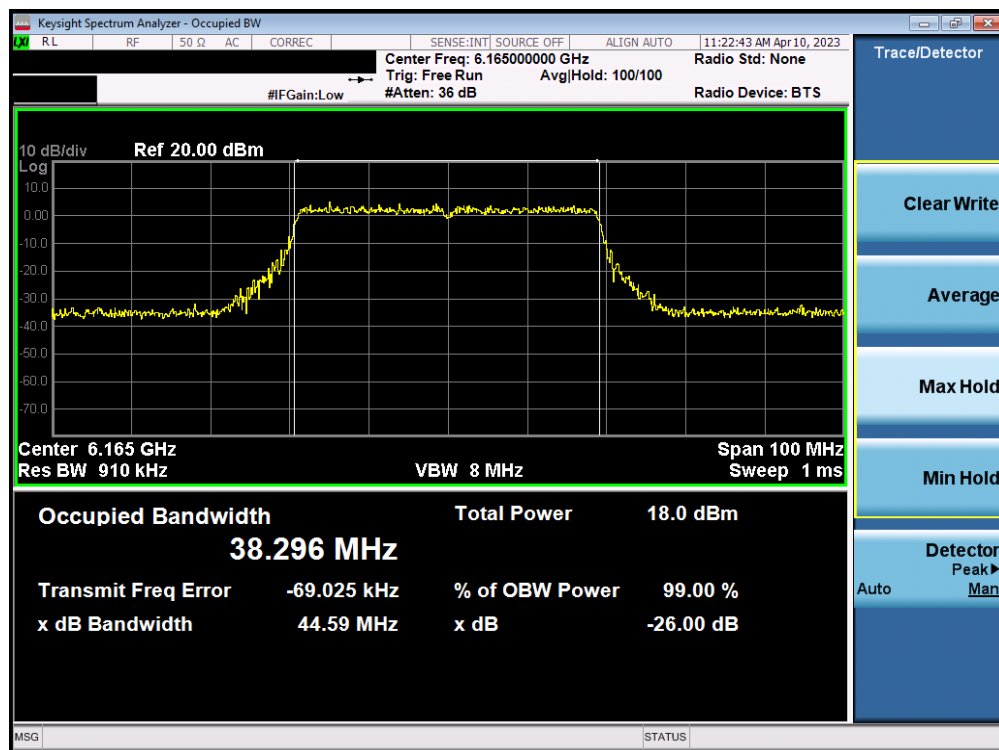
Plot 7-16. Occupied Bandwidth Plot MIMO ANT1 (160MHz BW 802.11ax (26 Tones) (UNII Band 8) – Ch. 207)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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7.2.2 MIMO Antenna-1 Bandwidth Measurements - (Full Tones)

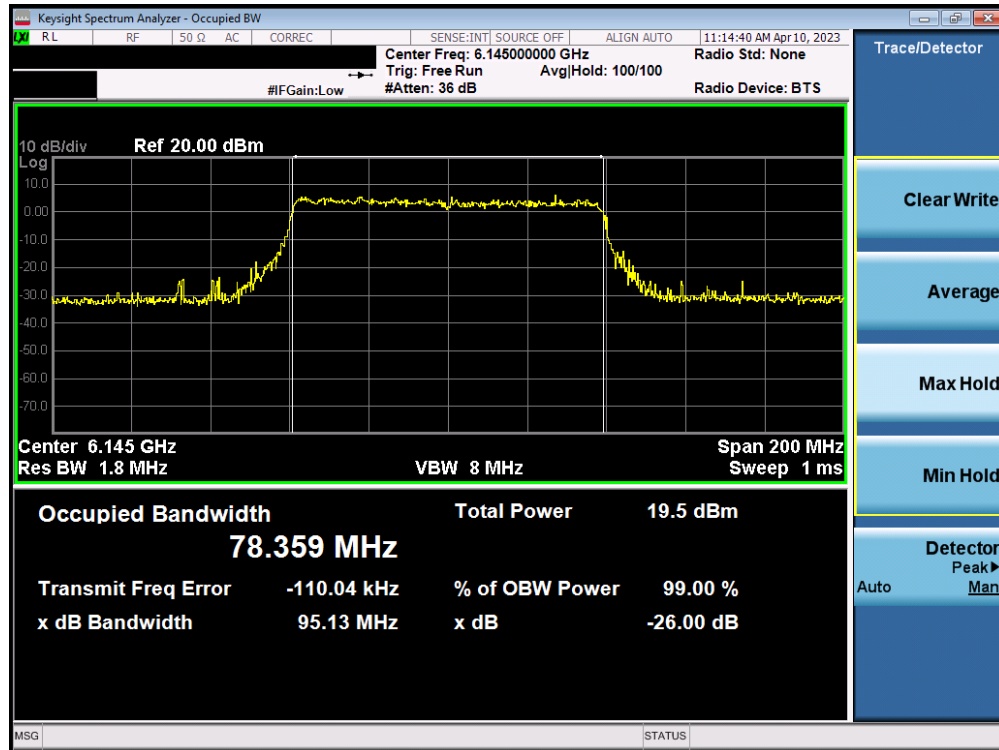


Plot 7-17. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 45)

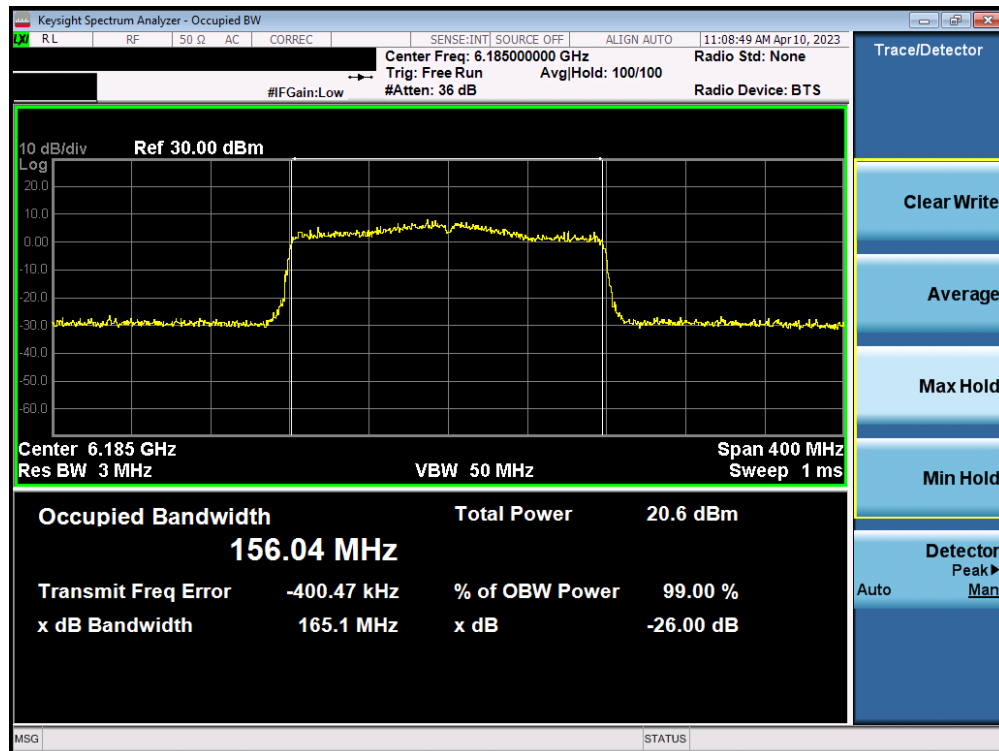


Plot 7-18. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 43)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-19. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 39)



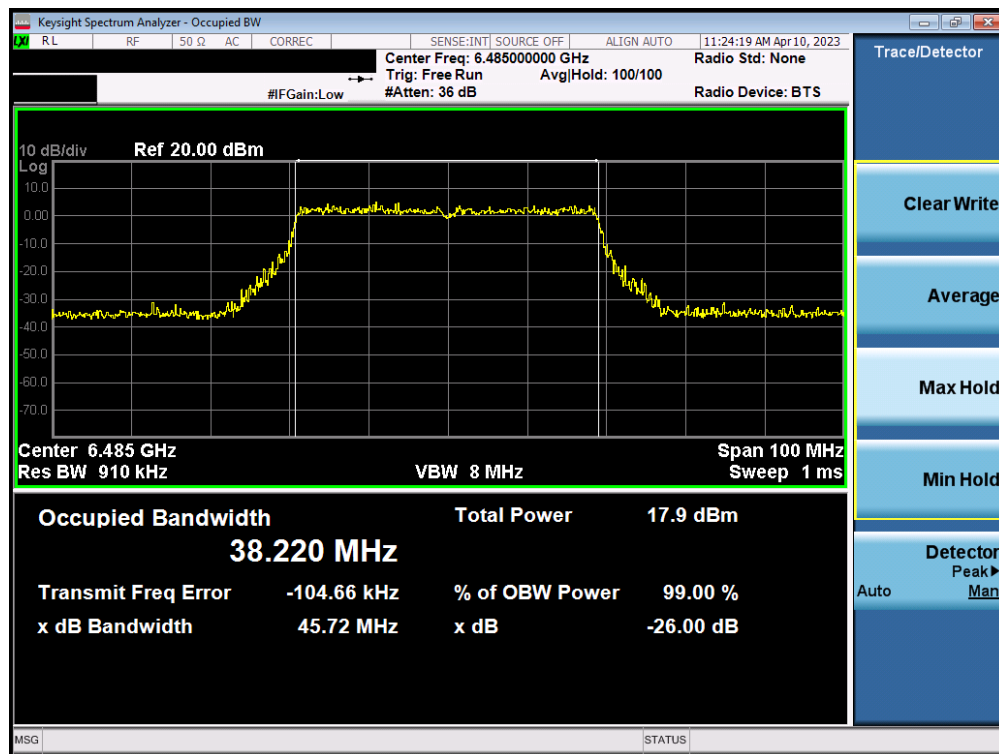
Plot 7-20. Occupied Bandwidth Plot MIMO ANT1 (160MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 47)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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MIMO Antenna-1 Bandwidth Measurements - (Full Tones)

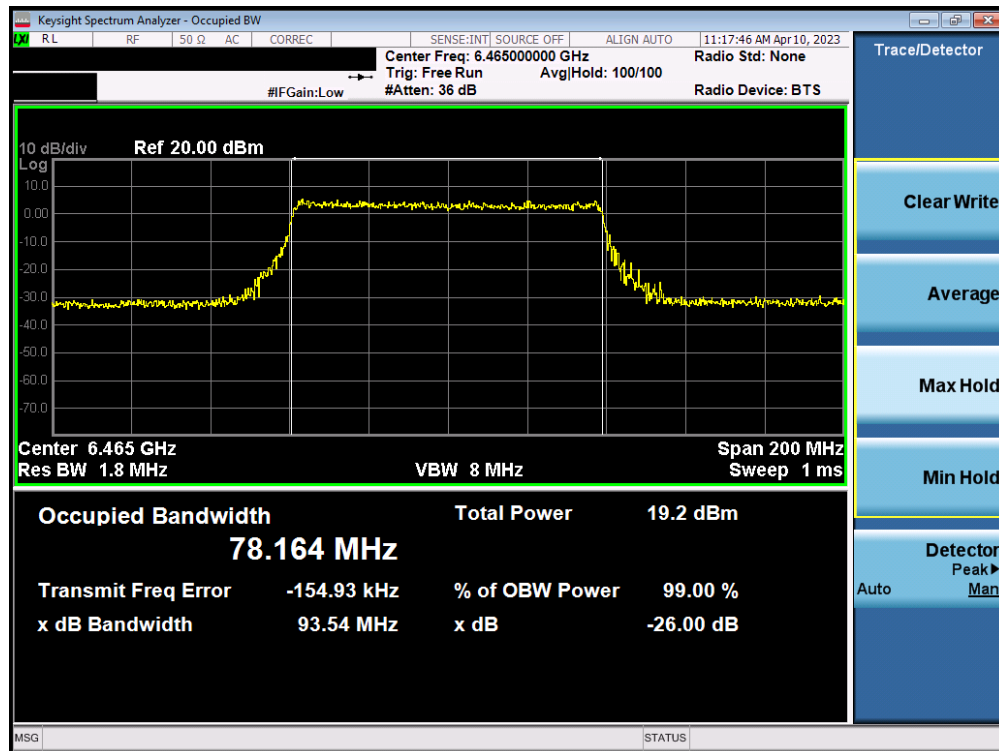


Plot 7-21. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 105)

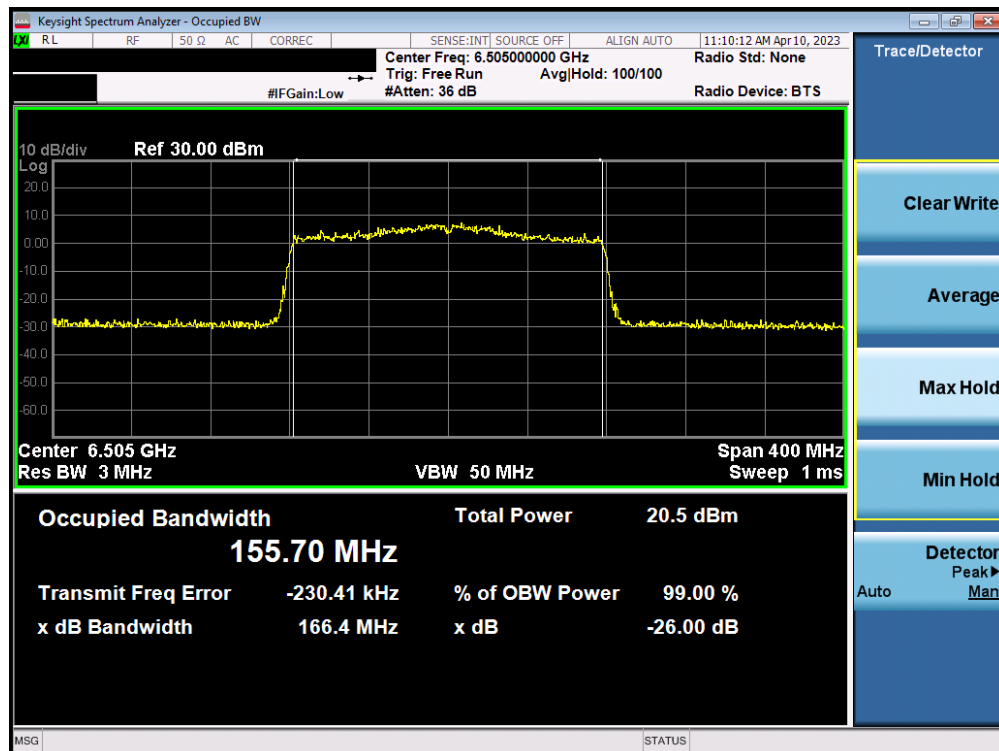


Plot 7-22. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 107)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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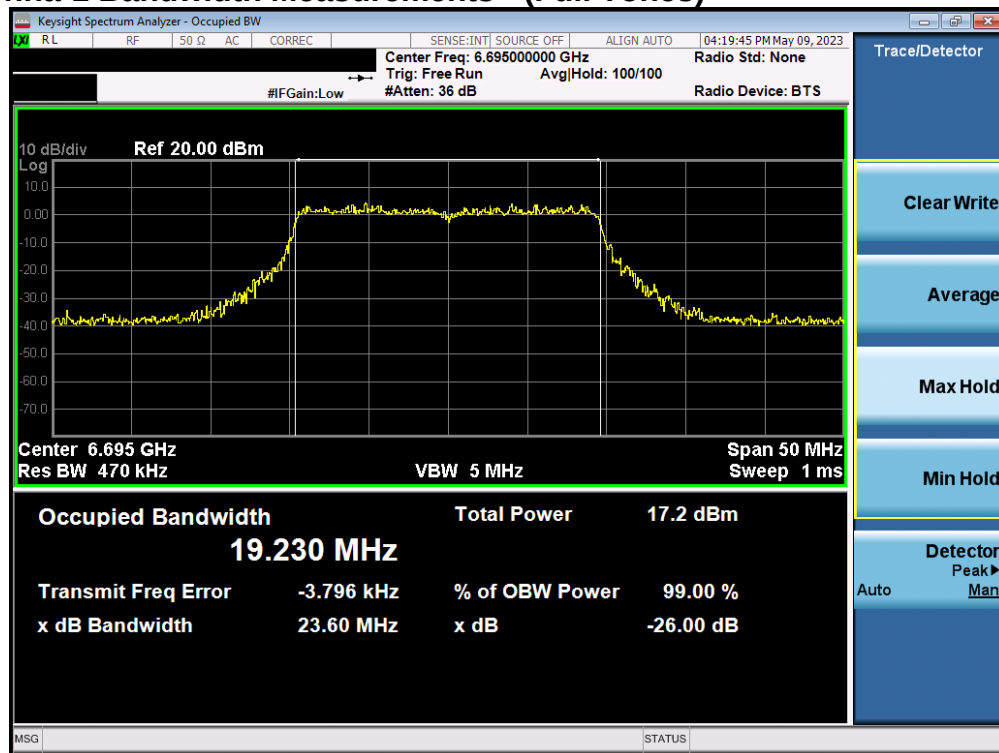
Plot 7-23. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 103)



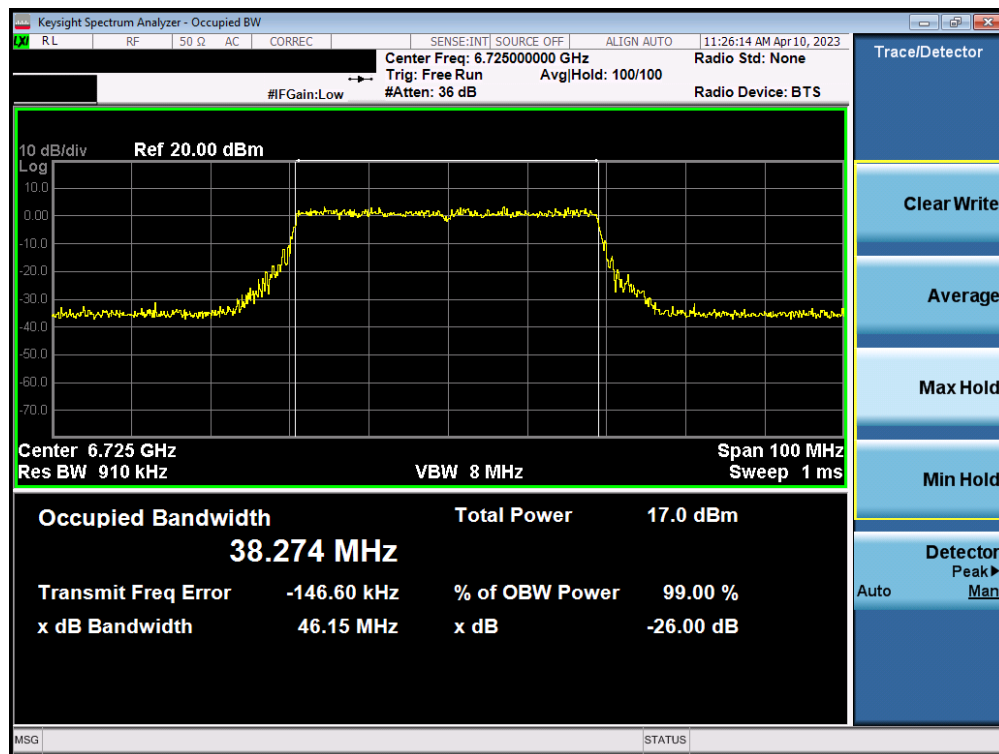
Plot 7-24. Occupied Bandwidth Plot MIMO ANT1 (160MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 111)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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MIMO Antenna-1 Bandwidth Measurements - (Full Tones)

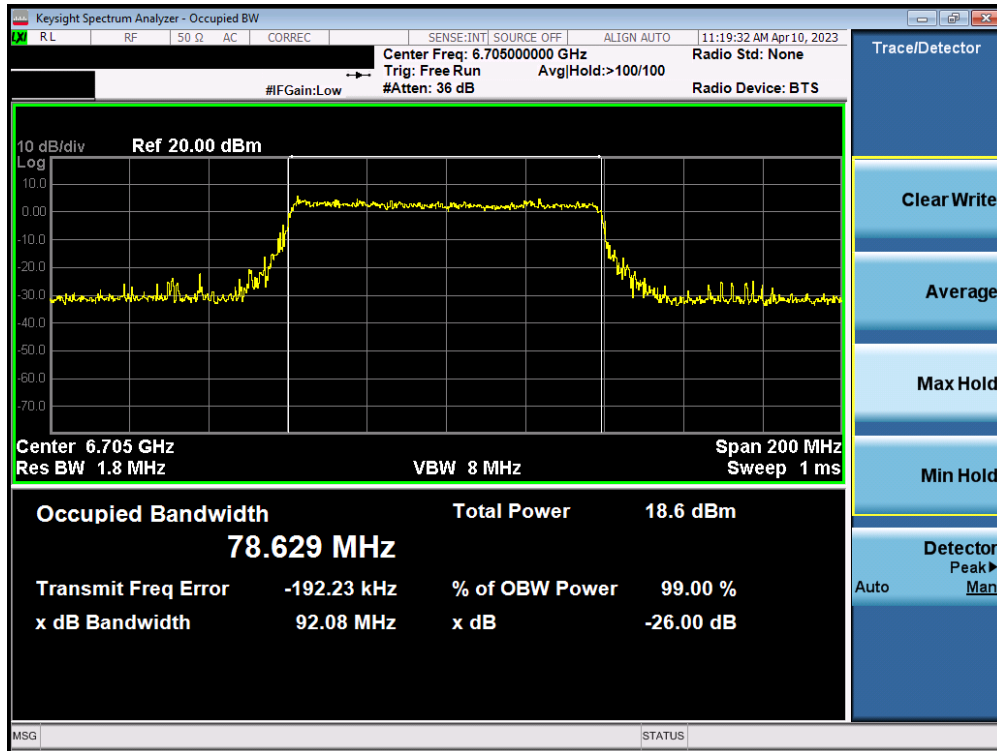


Plot 7-25. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 149)

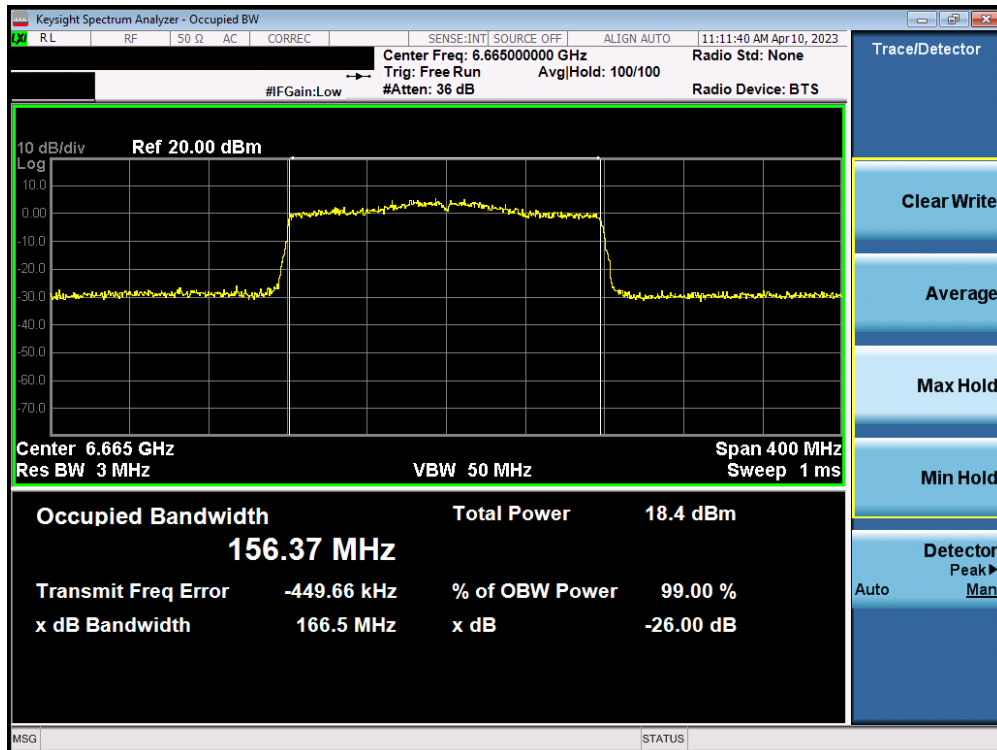


Plot 7-26. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 155)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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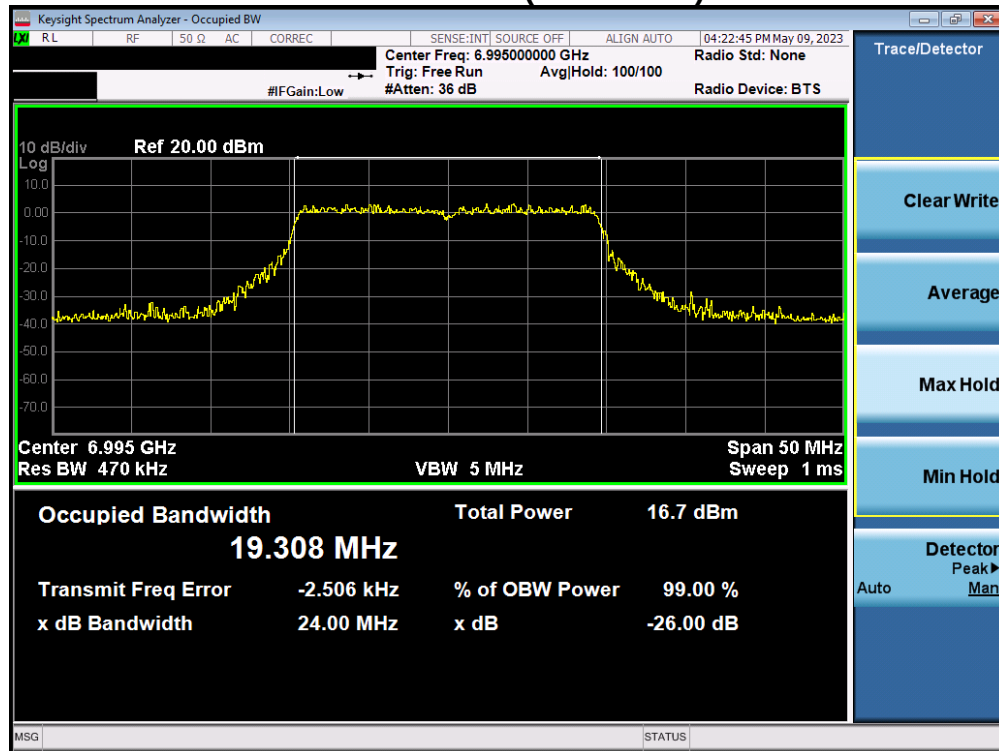
Plot 7-27. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 151)



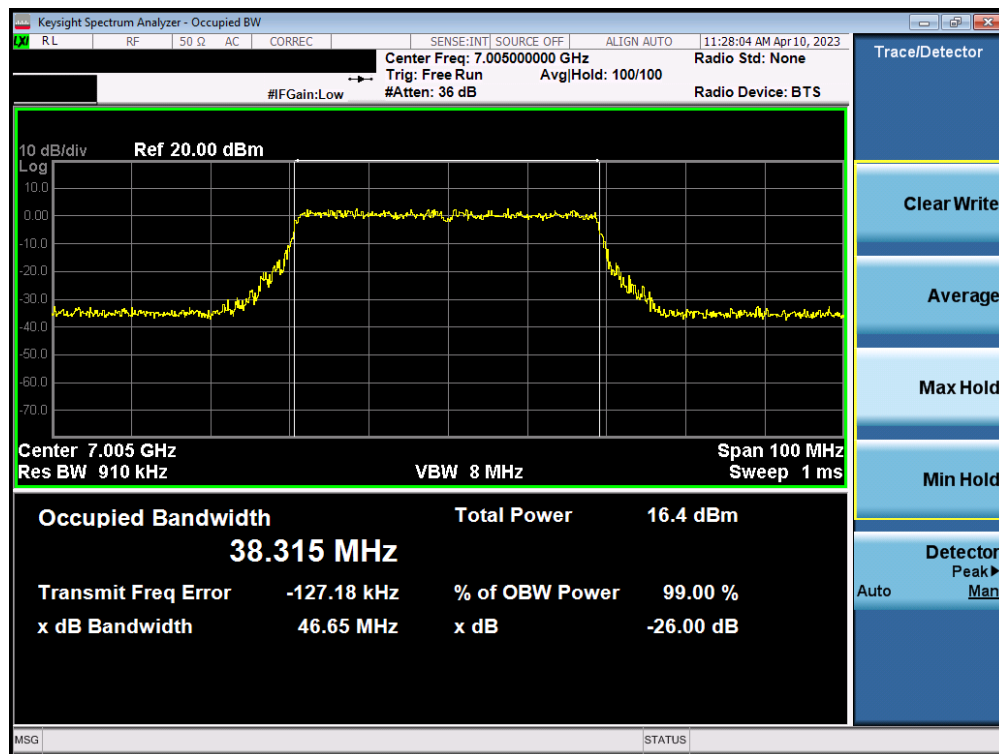
Plot 7-28. Occupied Bandwidth Plot MIMO ANT1 (160MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 143)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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MIMO Antenna-1 Bandwidth Measurements - (Full Tones)

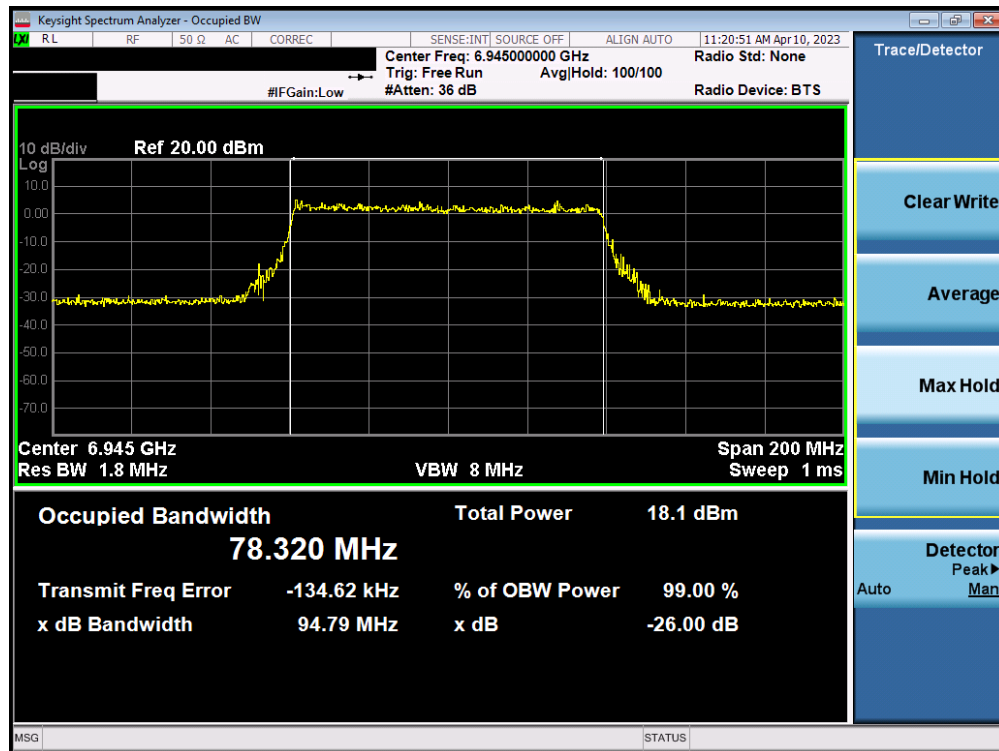


Plot 7-29. Occupied Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 209)

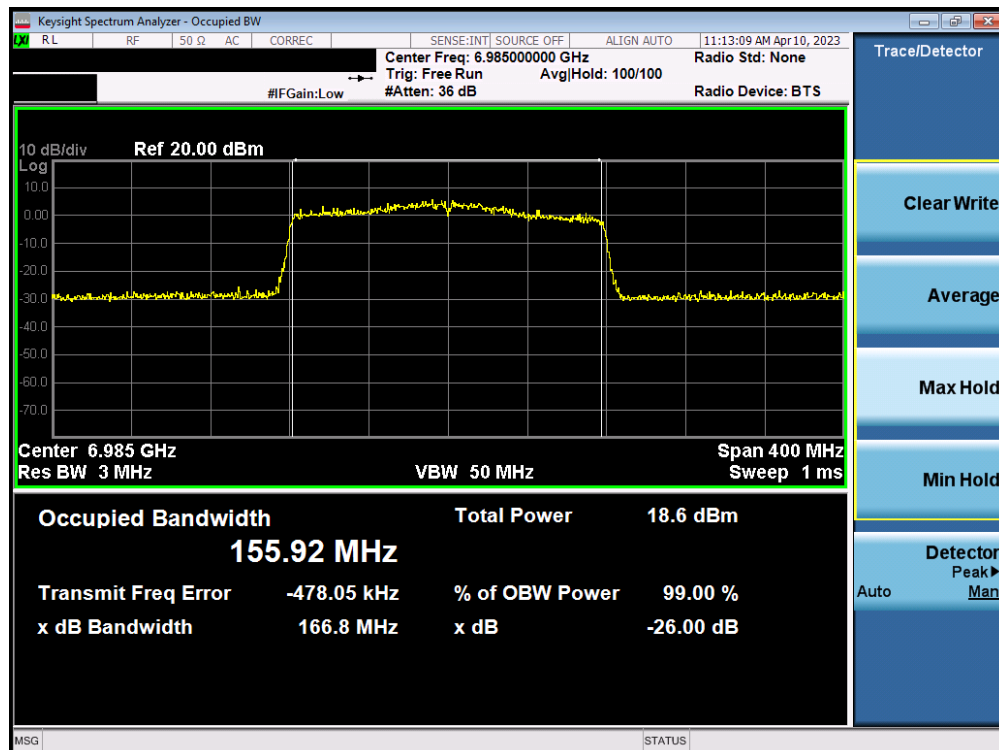


Plot 7-30. Occupied Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 211)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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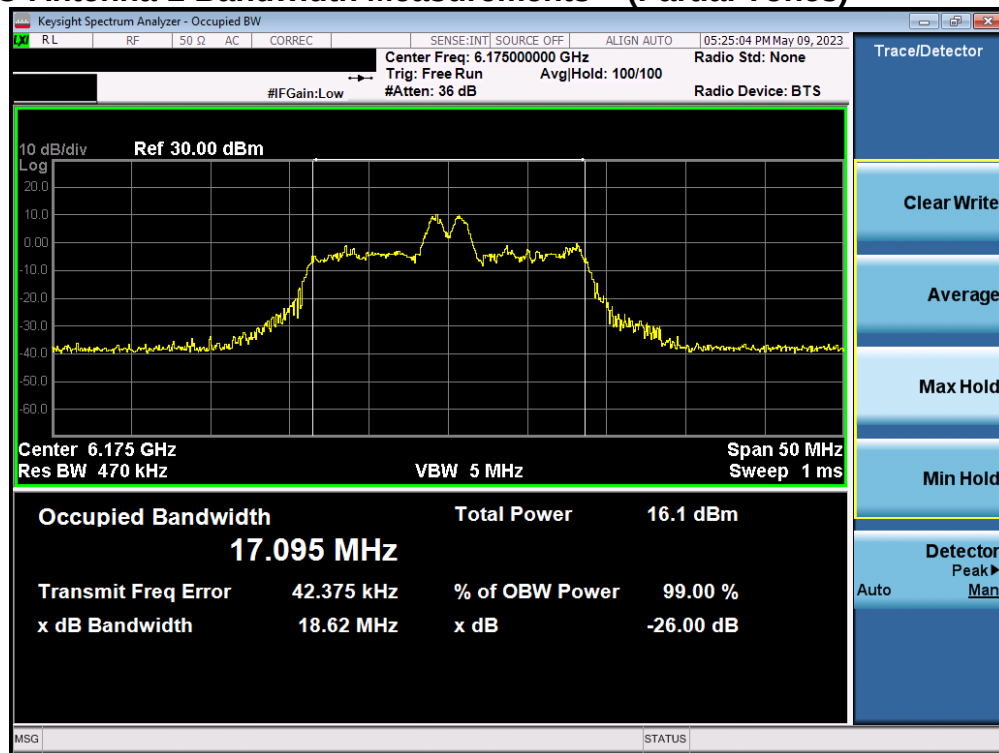
Plot 7-31. Occupied Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 199)



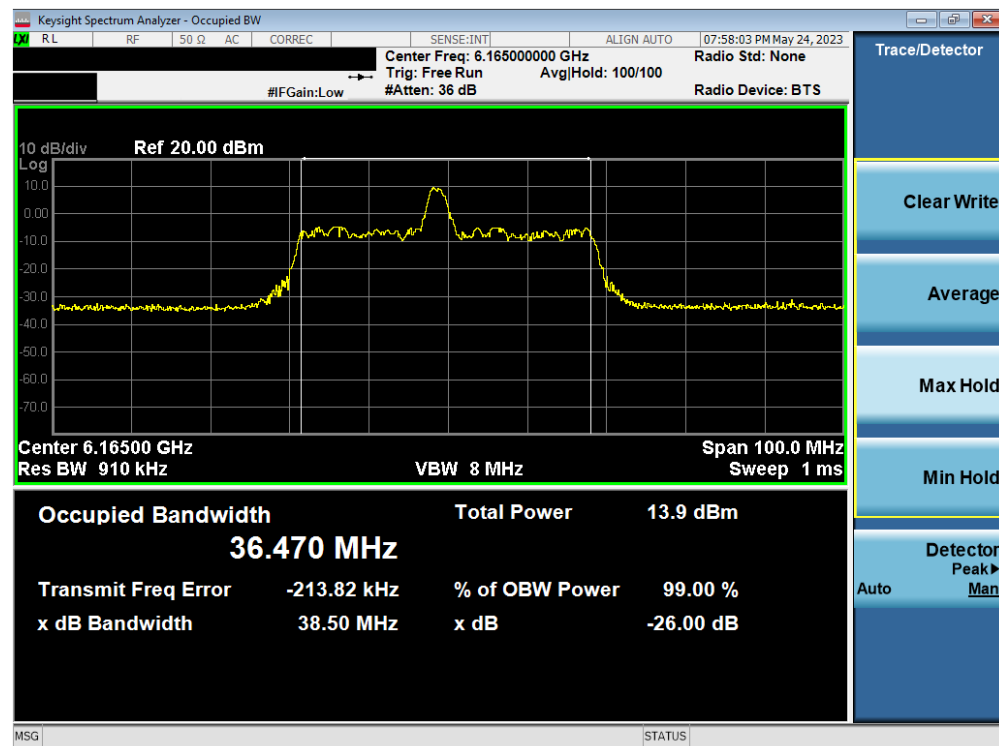
Plot 7-32. Occupied Bandwidth Plot MIMO ANT1 (160MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 207)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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7.2.3 MIMO Antenna-2 Bandwidth Measurements – (Partial Tones)

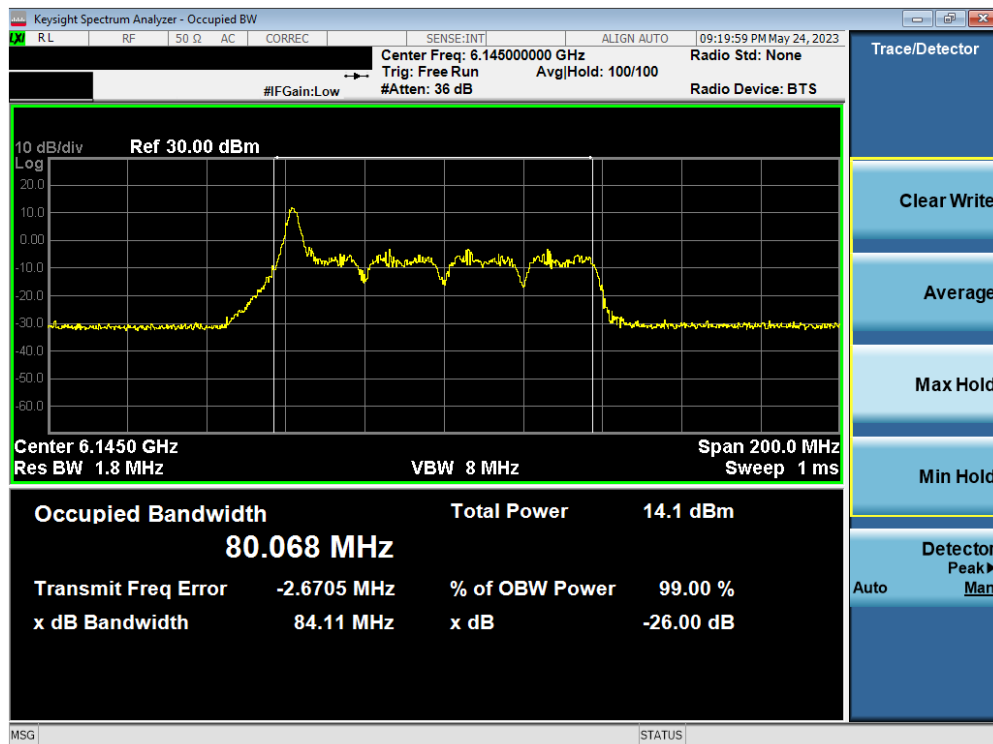


Plot 7-33. Occupied Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 45)

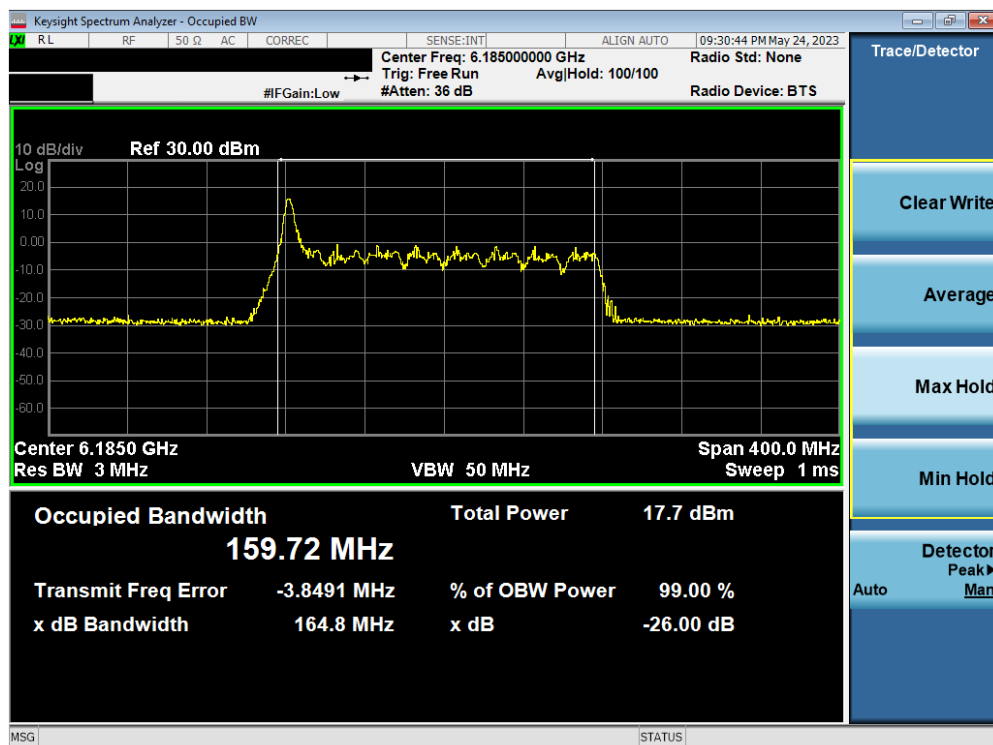


Plot 7-34. Occupied Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 43)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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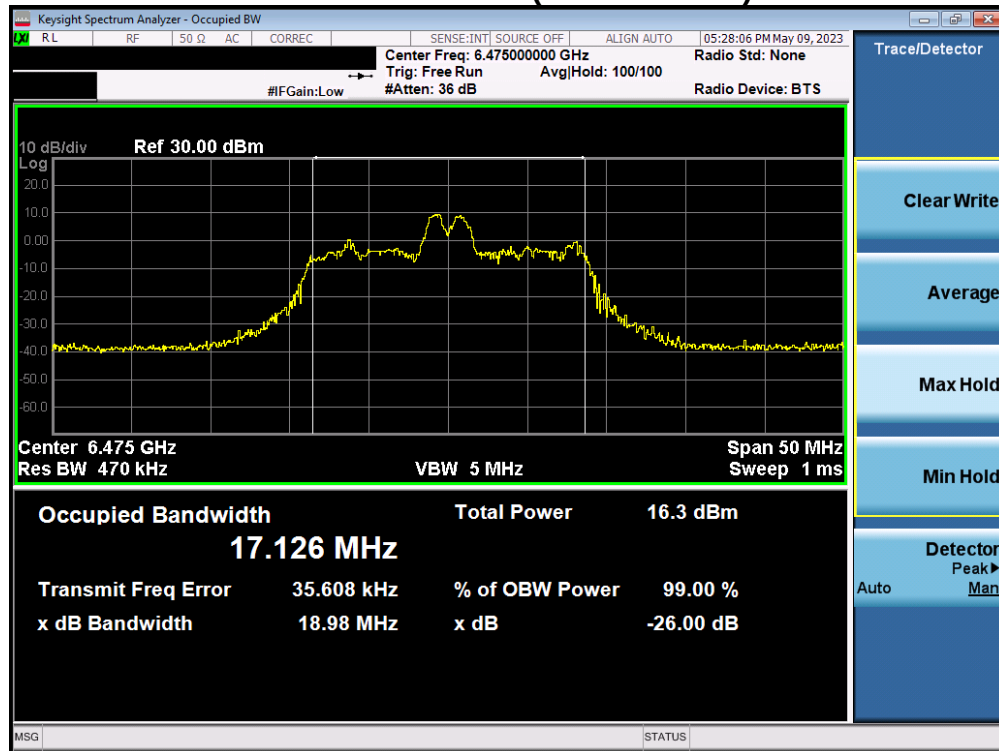
Plot 7-35. Occupied Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 39)



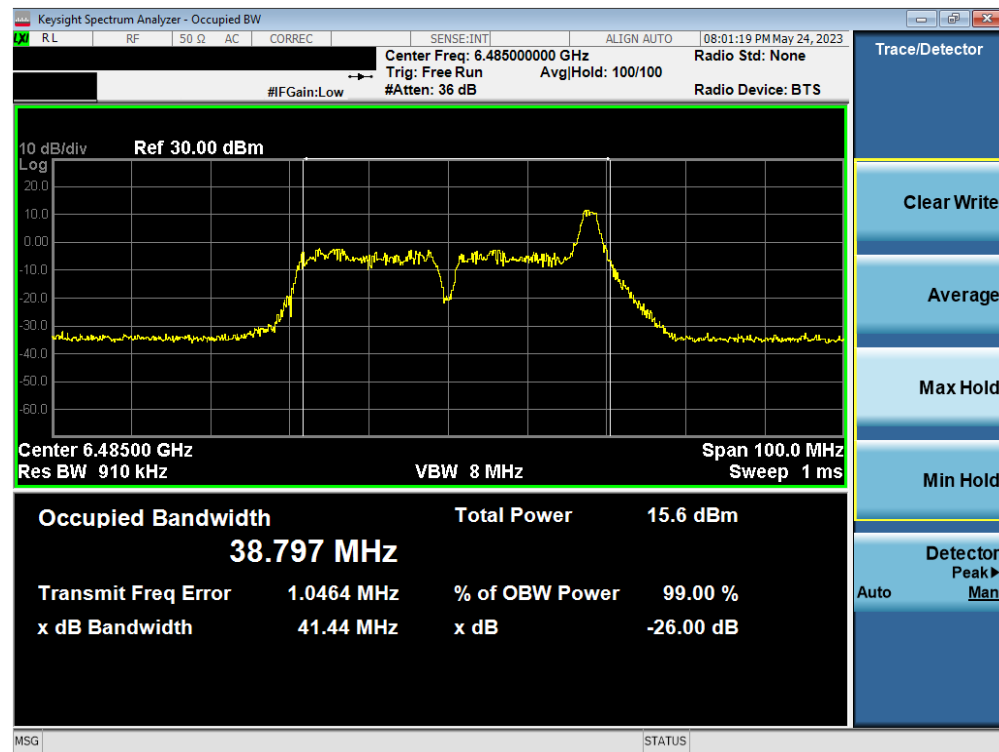
Plot 7-36. Occupied Bandwidth Plot MIMO ANT2 (160MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 47)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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MIMO Antenna-2 Bandwidth Measurements – (Partial Tones)

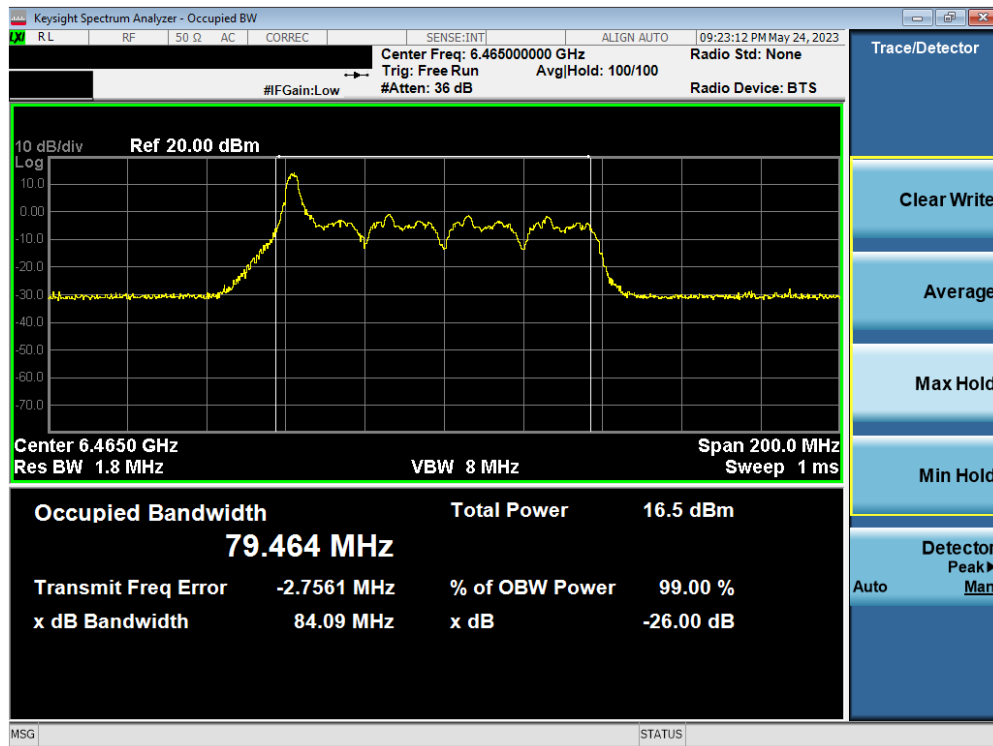


Plot 7-37. Occupied Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 105)

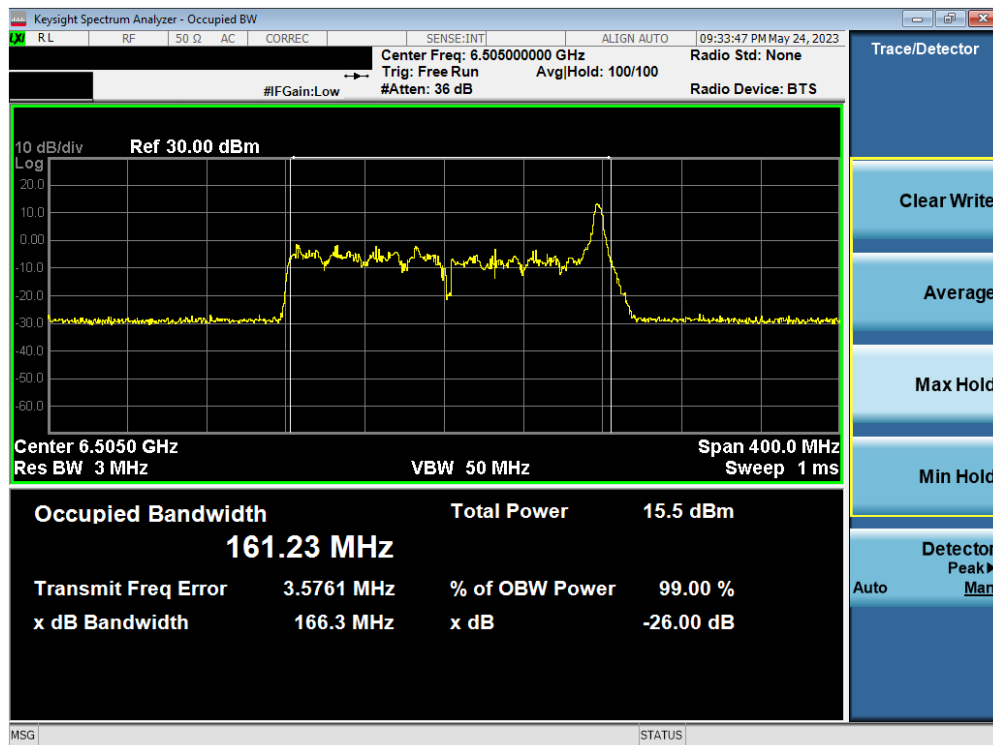


Plot 7-38. Occupied Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 107)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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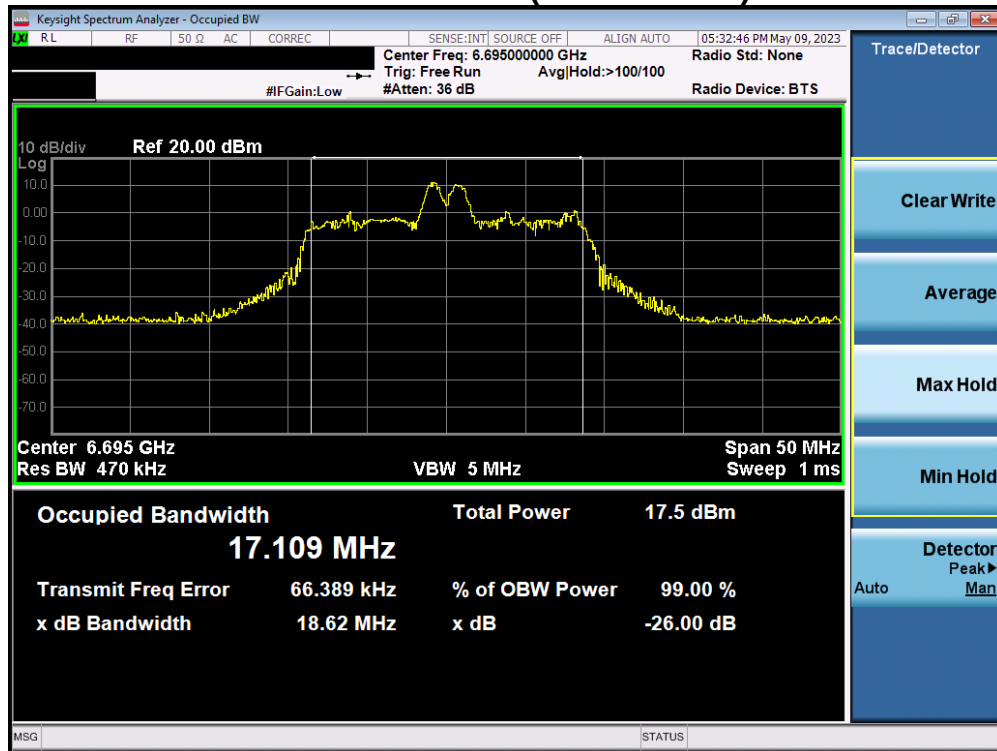
Plot 7-39. Occupied Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 103)



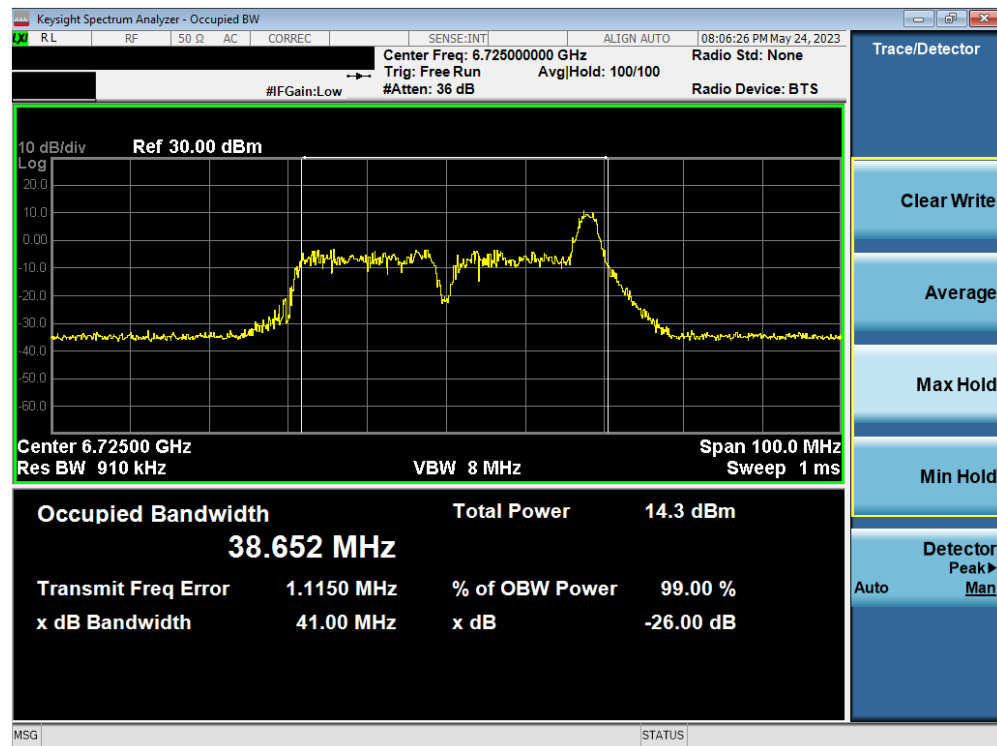
Plot 7-40. Occupied Bandwidth Plot MIMO ANT2 (160MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 111)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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MIMO Antenna-2 Bandwidth Measurements – (Partial Tones)

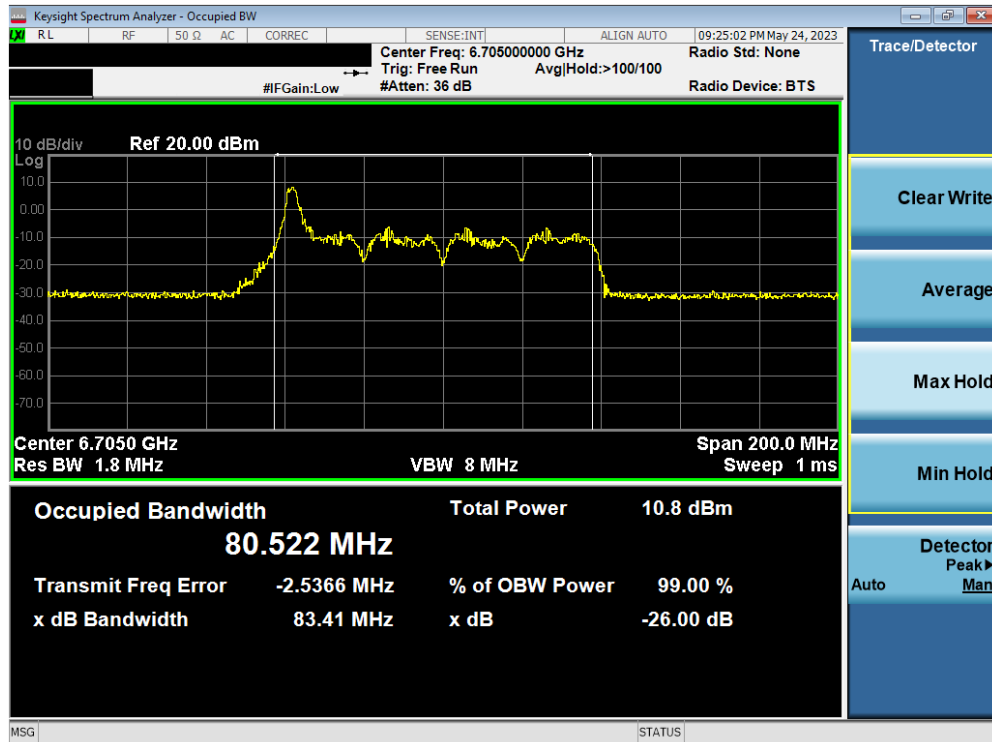


Plot 7-41. Occupied Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 149)

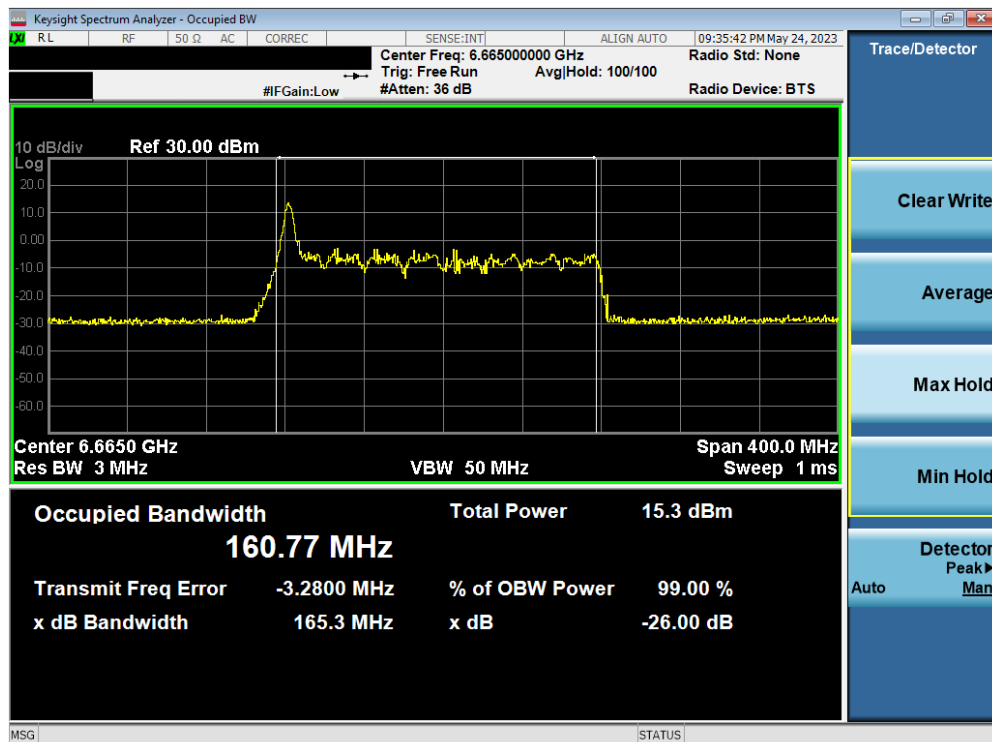


Plot 7-42. Occupied Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 155)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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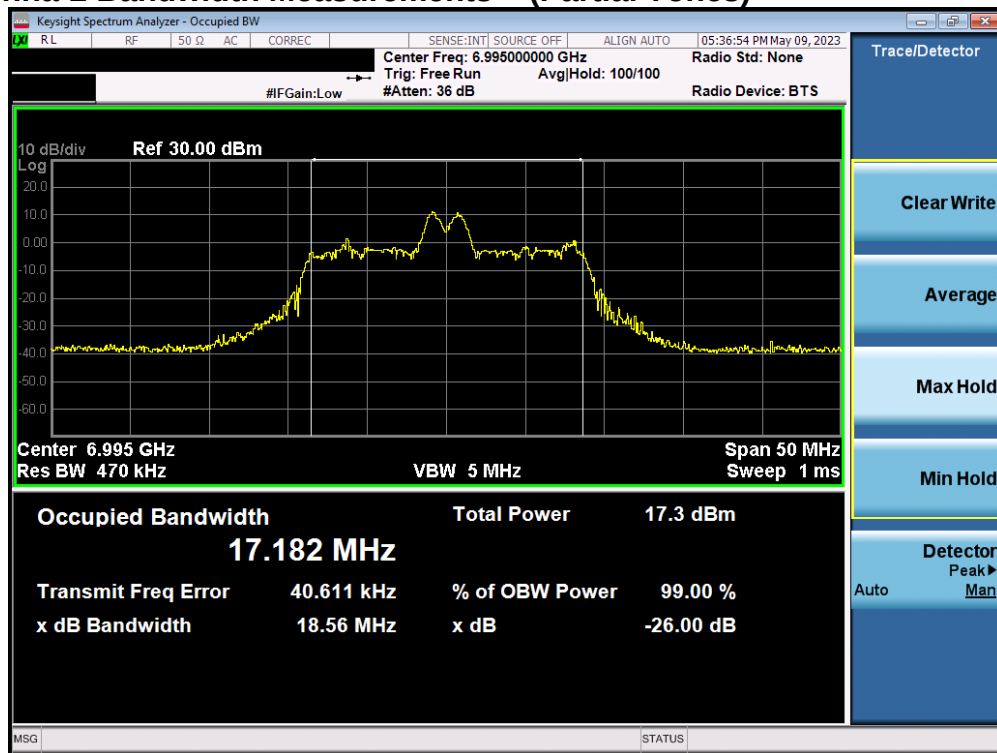
Plot 7-43. Occupied Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 151)



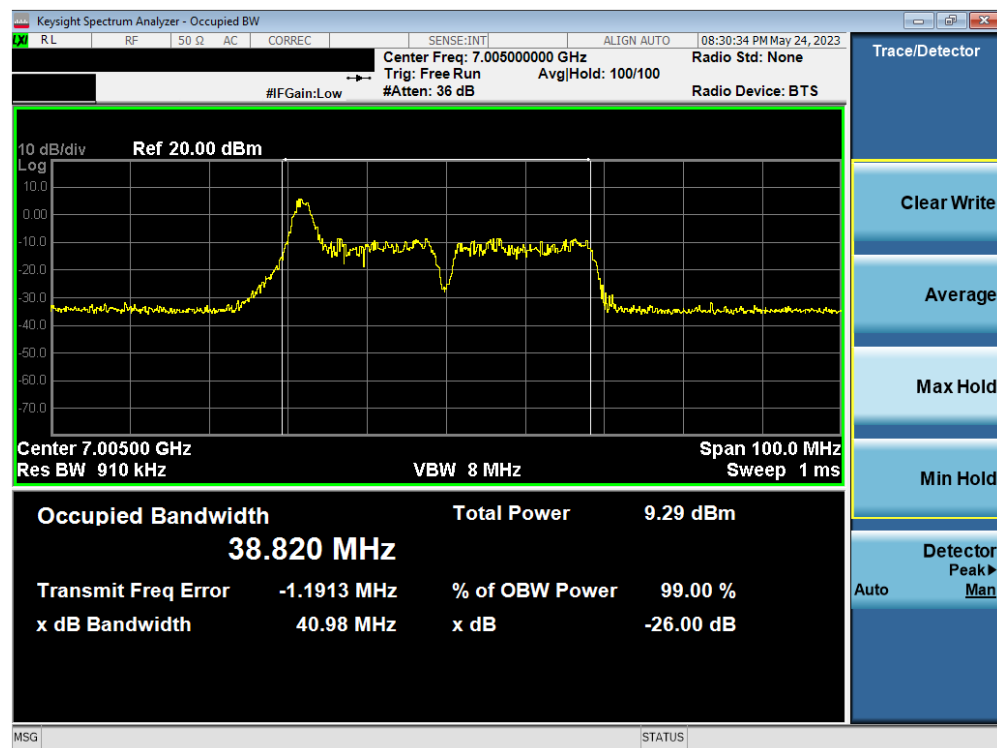
Plot 7-44. Occupied Bandwidth Plot MIMO ANT2 (160MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 143)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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MIMO Antenna-2 Bandwidth Measurements – (Partial Tones)

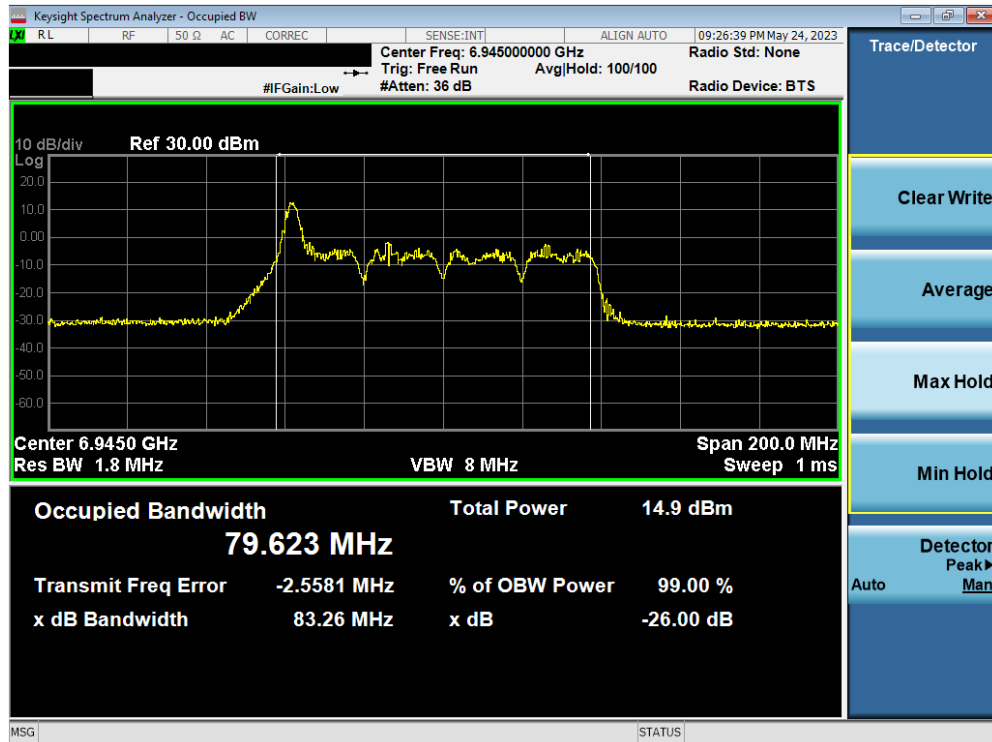


Plot 7-45. Occupied Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax (26 Tones) (UNII Band 8) – Ch. 209)

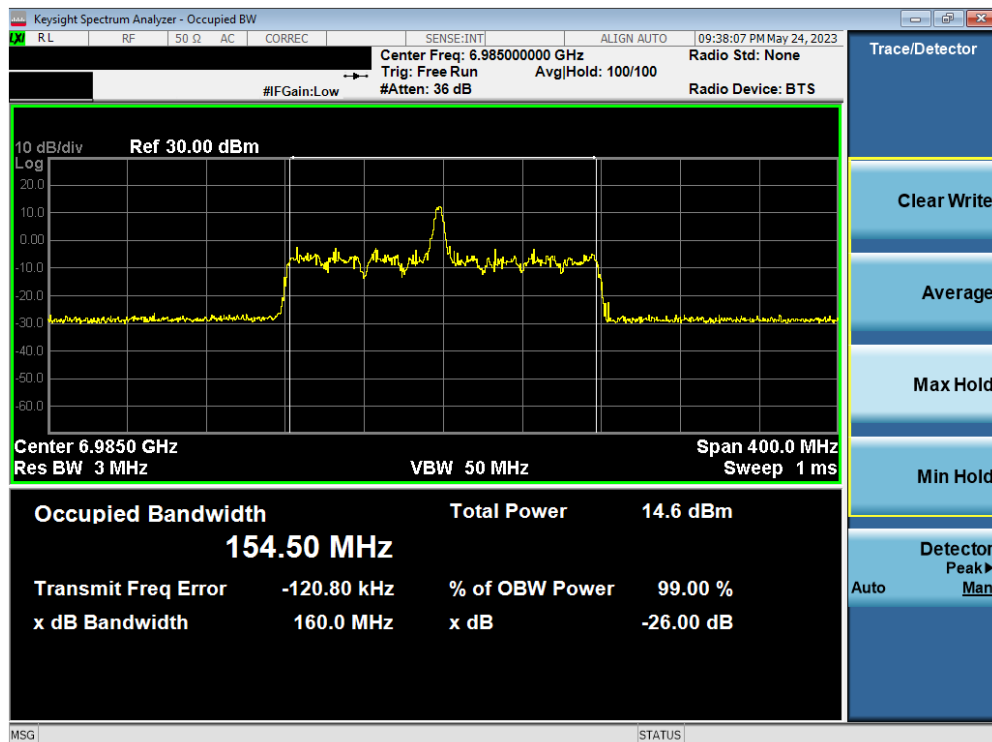


Plot 7-46. Occupied Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax (26 Tones) (UNII Band 8) – Ch. 211)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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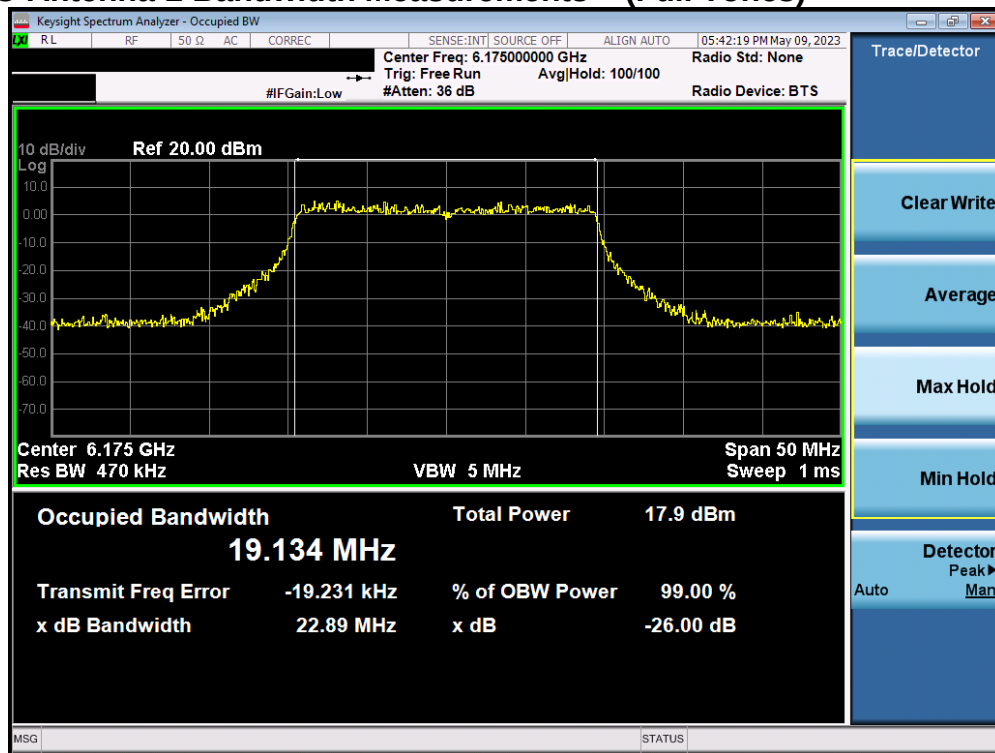
Plot 7-47. Occupied Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax (26 Tones) (UNII Band 8) – Ch. 199)



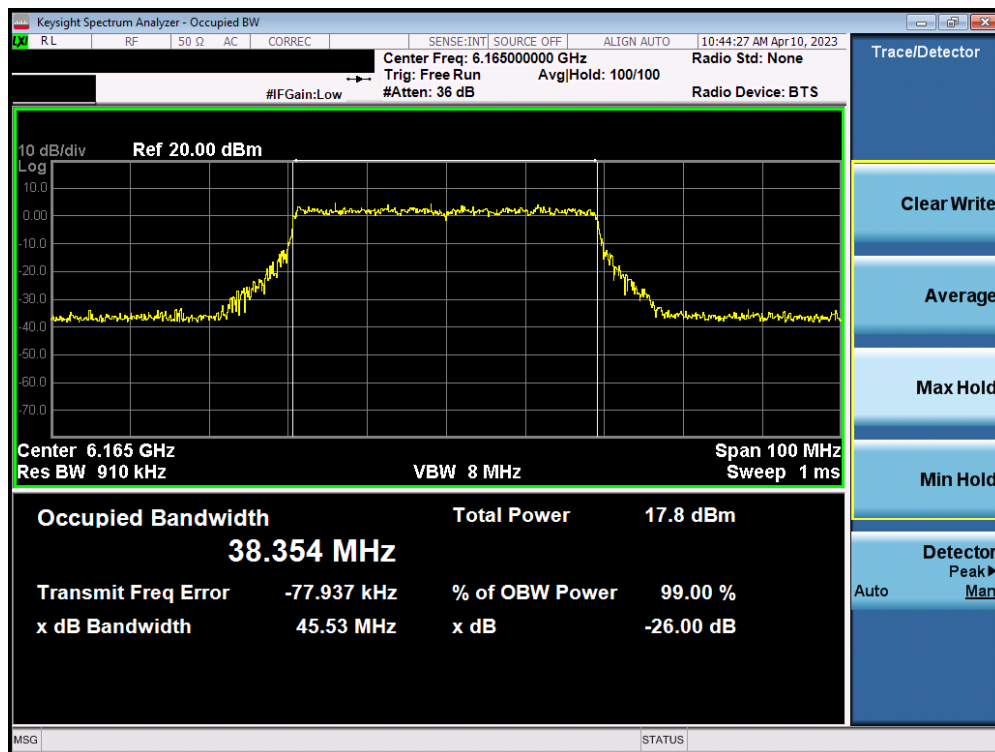
Plot 7-48. Occupied Bandwidth Plot MIMO ANT2 (160MHz BW 802.11ax (26 Tones) (UNII Band 8) – Ch. 207)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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7.2.4 MIMO Antenna-2 Bandwidth Measurements – (Full Tones)

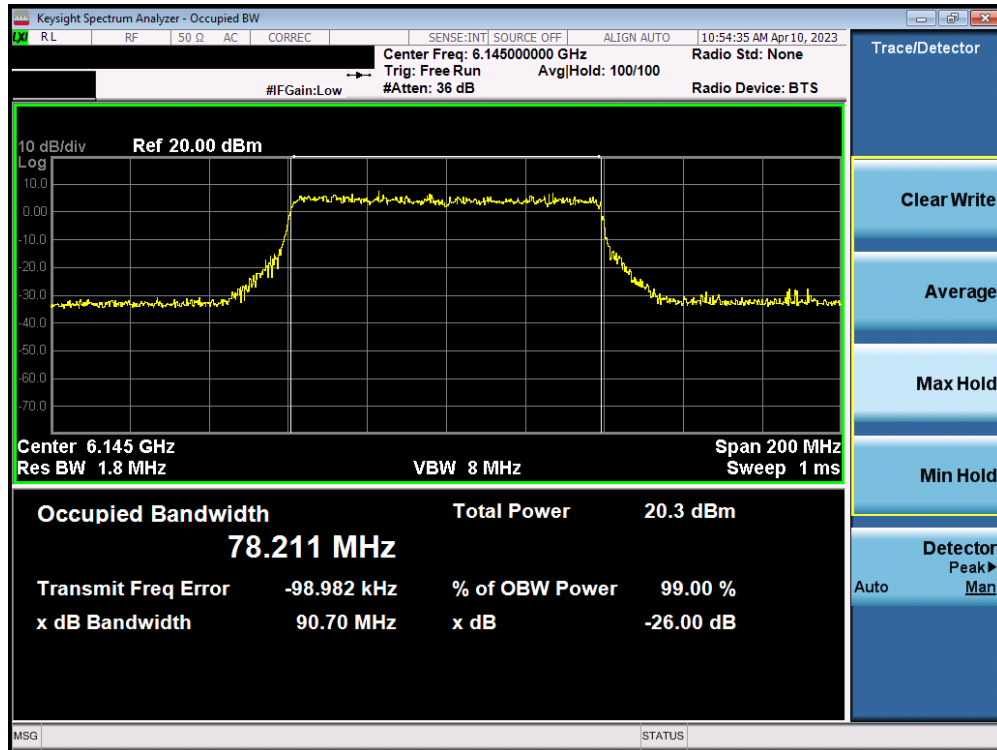


Plot 7-49. Occupied Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 45)

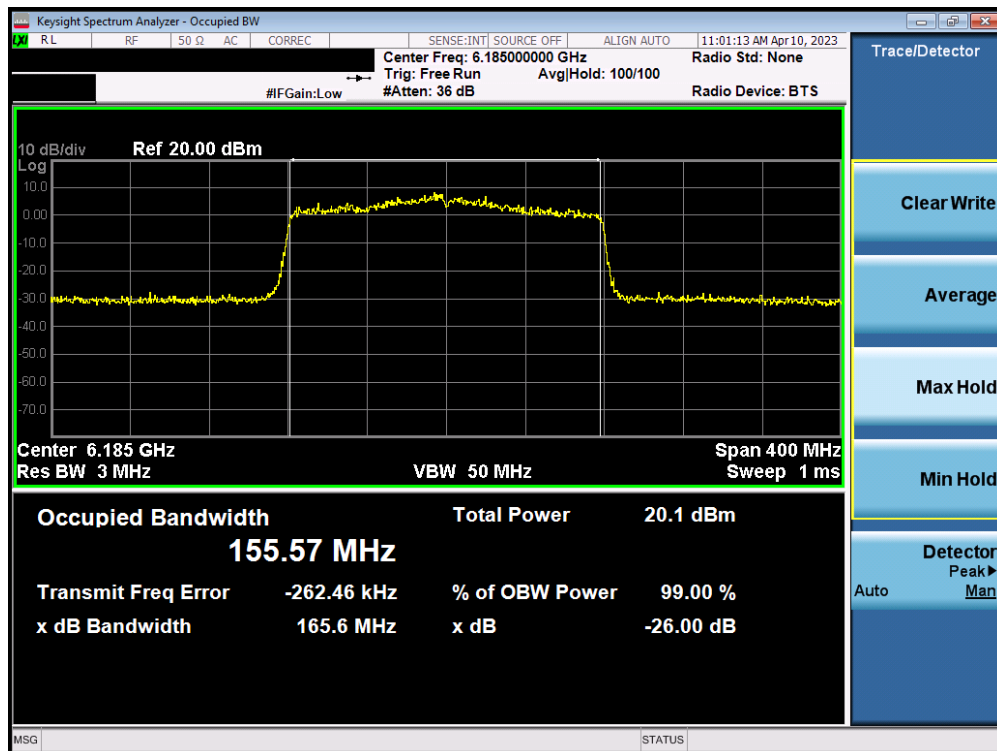


Plot 7-50. Occupied Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 43)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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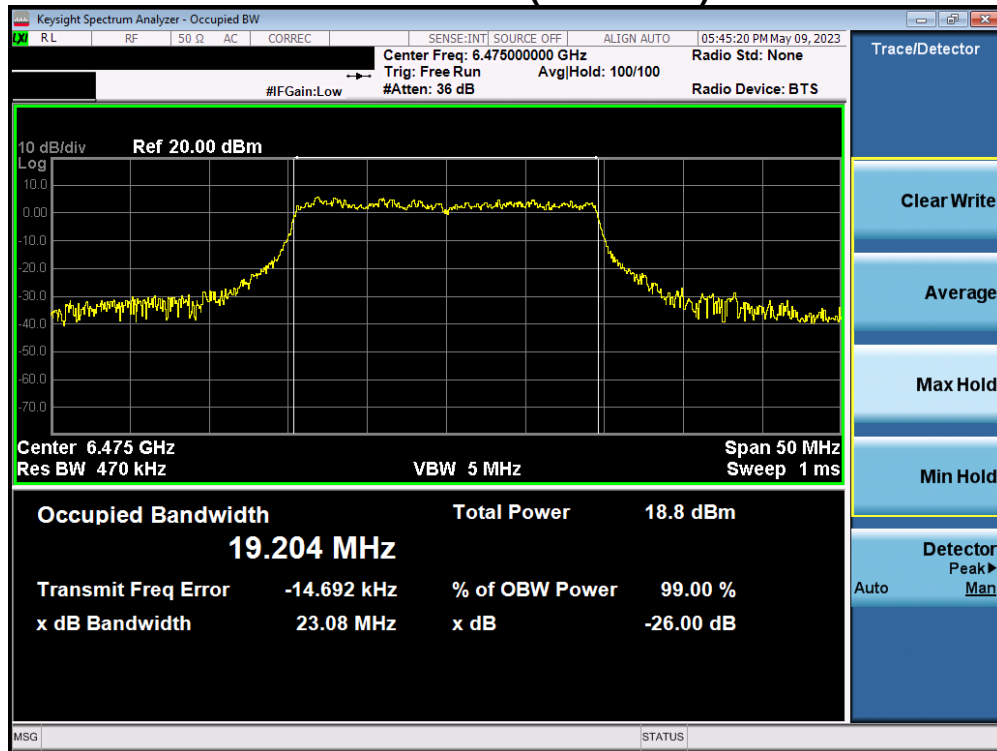
Plot 7-51. Occupied Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 39)



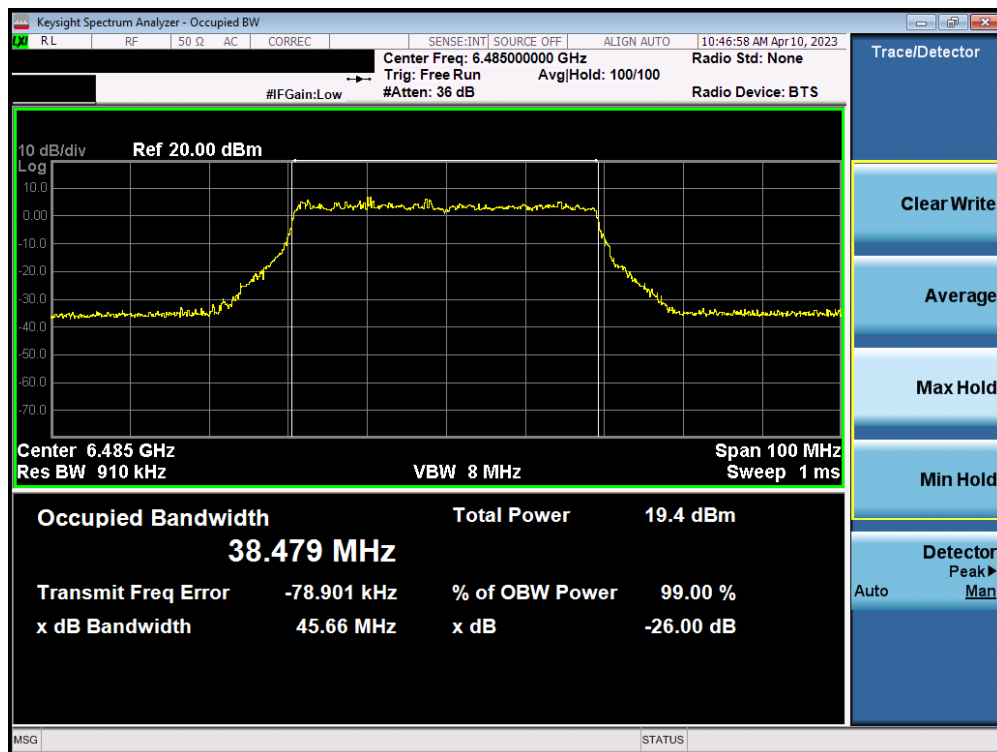
Plot 7-52. Occupied Bandwidth Plot MIMO ANT2 (160MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 47)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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MIMO Antenna-2 Bandwidth Measurements – (Full Tones)

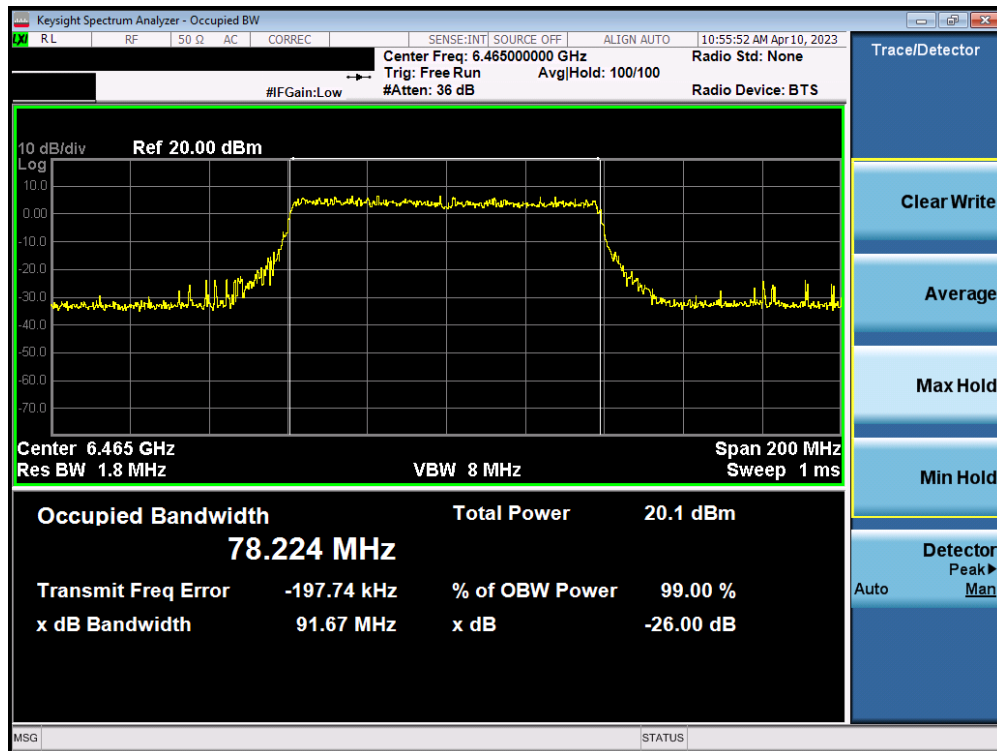


Plot 7-53. Occupied Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 105)

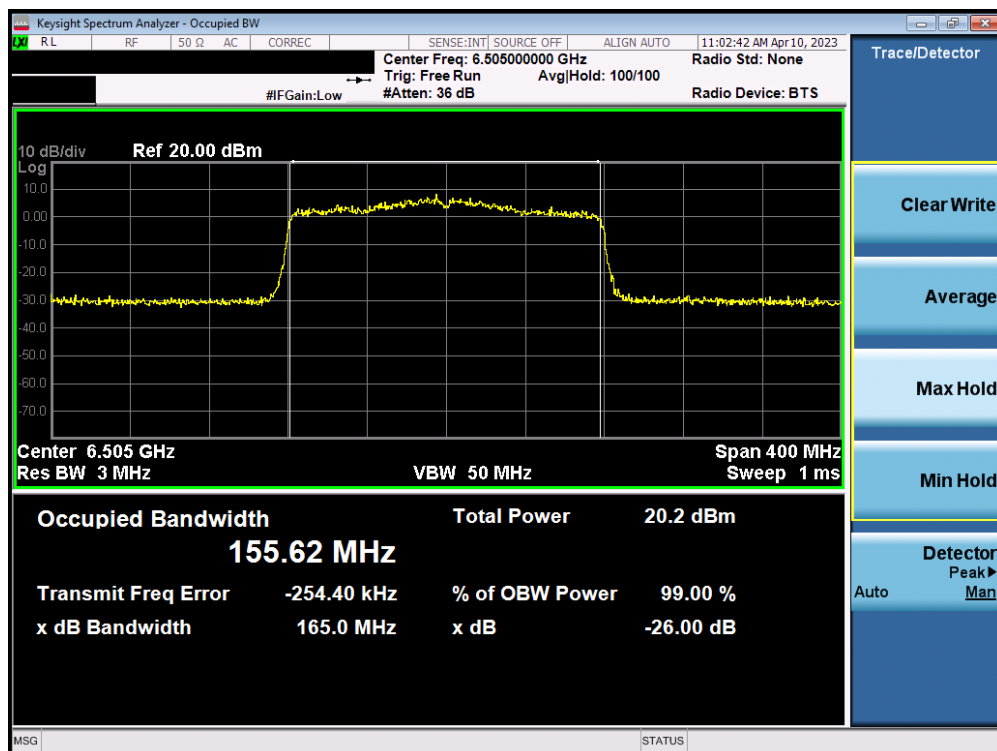


Plot 7-54. Occupied Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 107)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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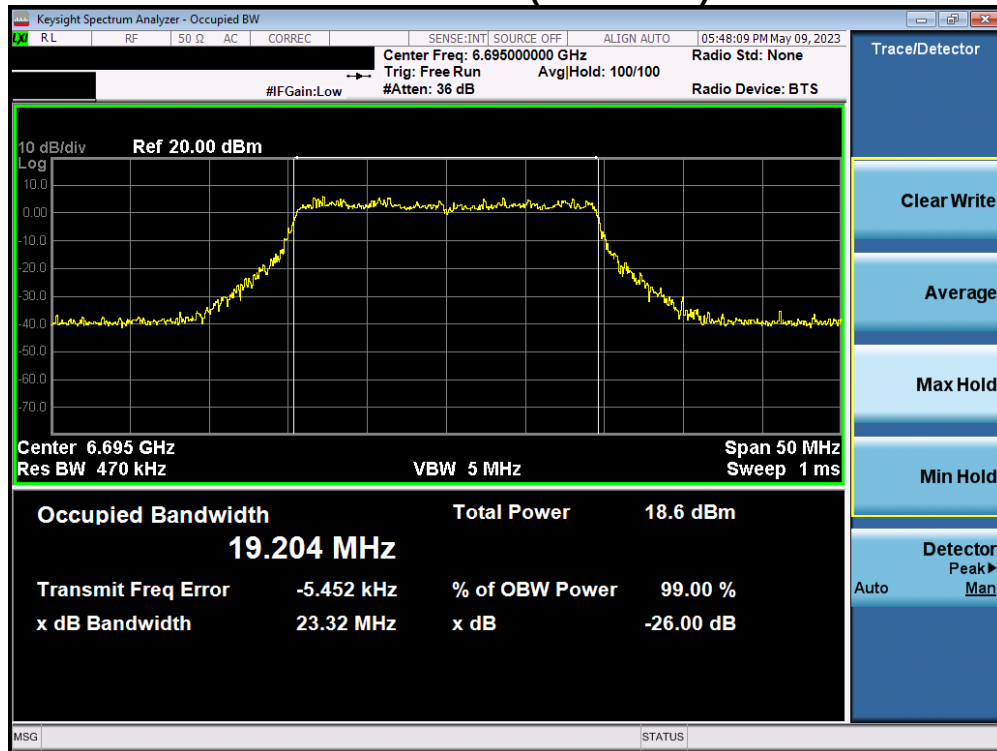
Plot 7-55. Occupied Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 103)



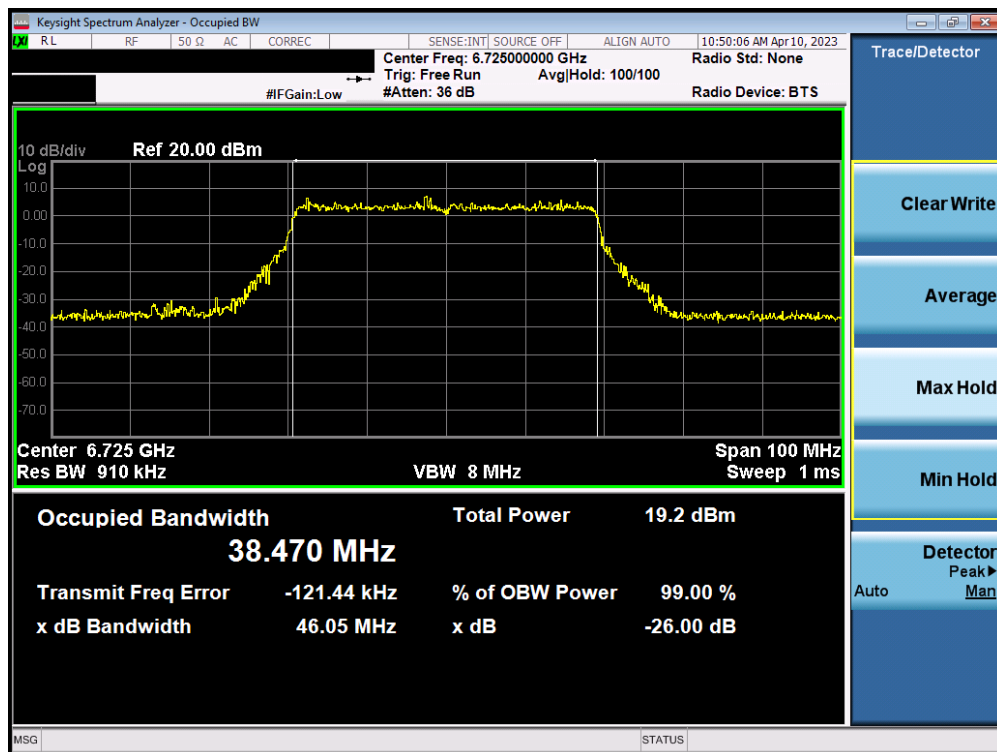
Plot 7-56. Occupied Bandwidth Plot MIMO ANT2 (160MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 111)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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MIMO Antenna-2 Bandwidth Measurements – (Full Tones)

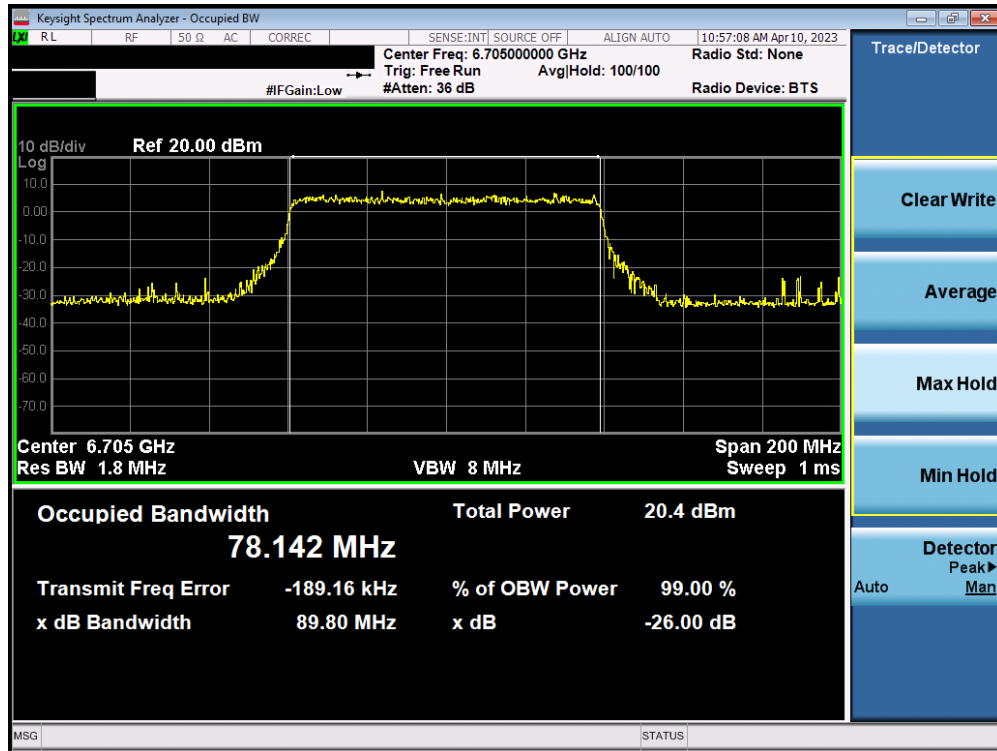


Plot 7-57. Occupied Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 149)

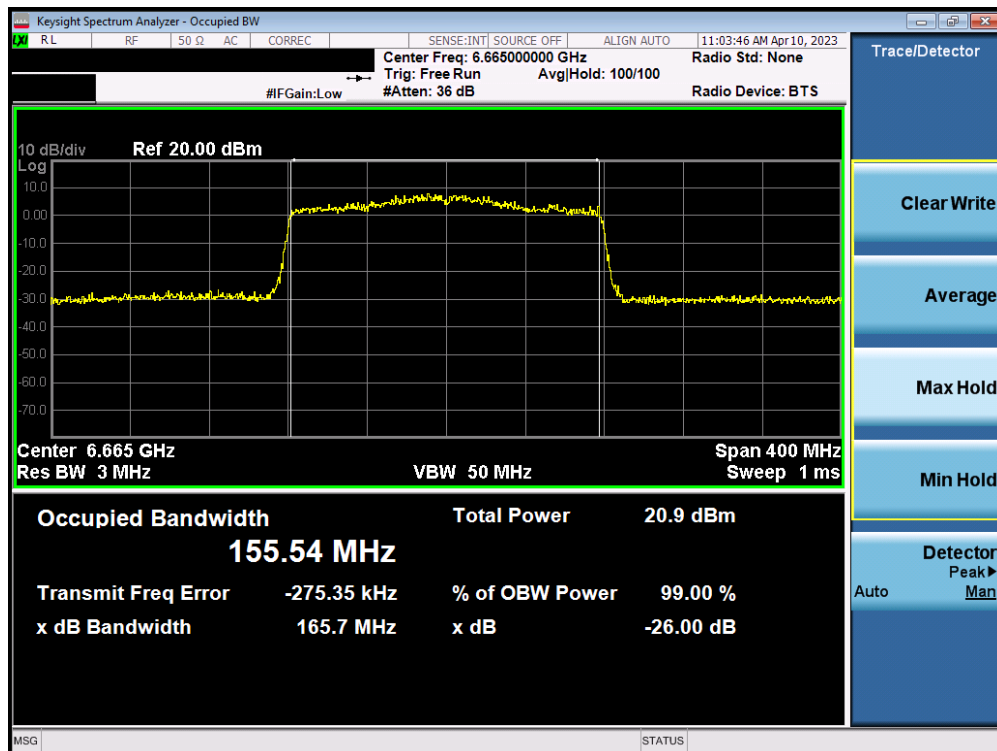


Plot 7-58. Occupied Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 155)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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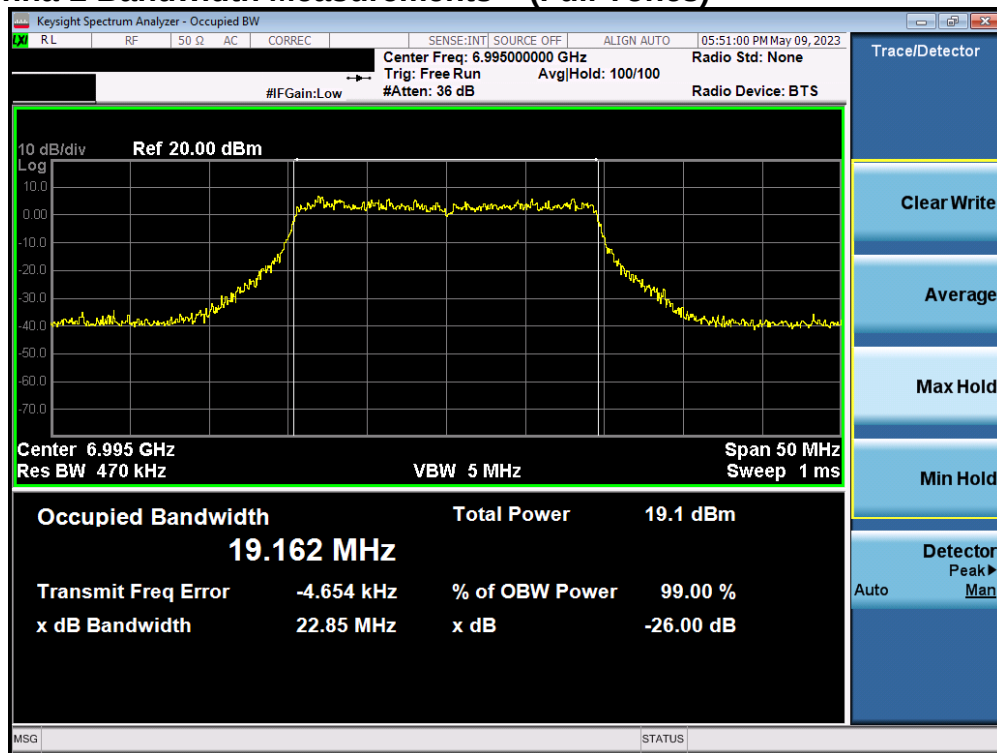
Plot 7-59. Occupied Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 151)



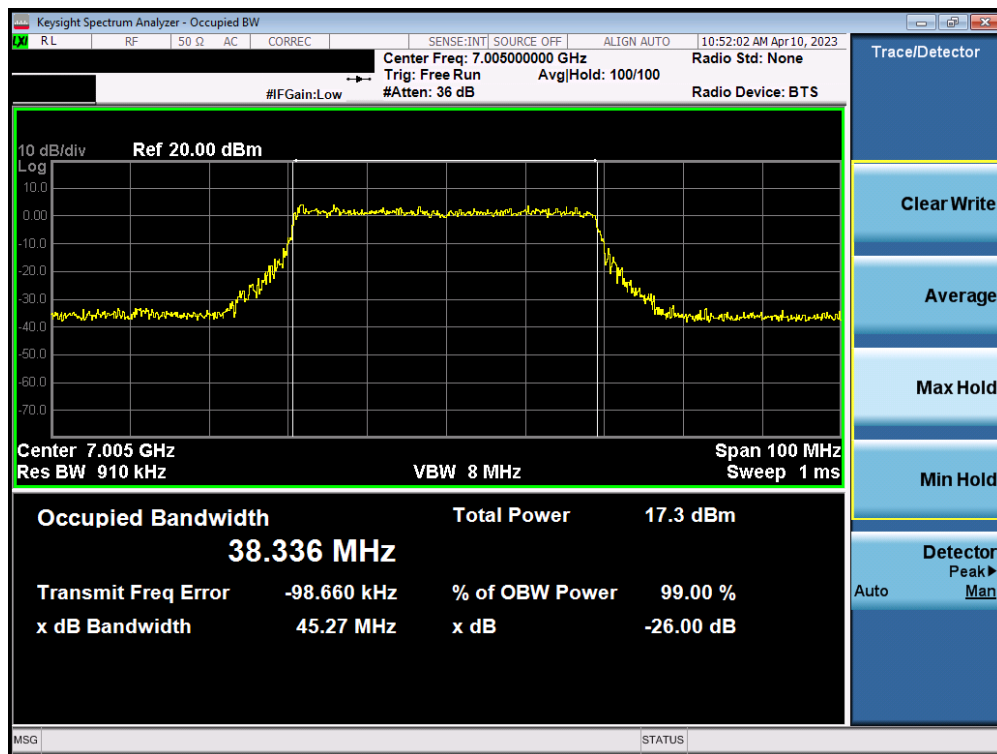
Plot 7-60. Occupied Bandwidth Plot MIMO ANT2 (160MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 143)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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MIMO Antenna-2 Bandwidth Measurements – (Full Tones)

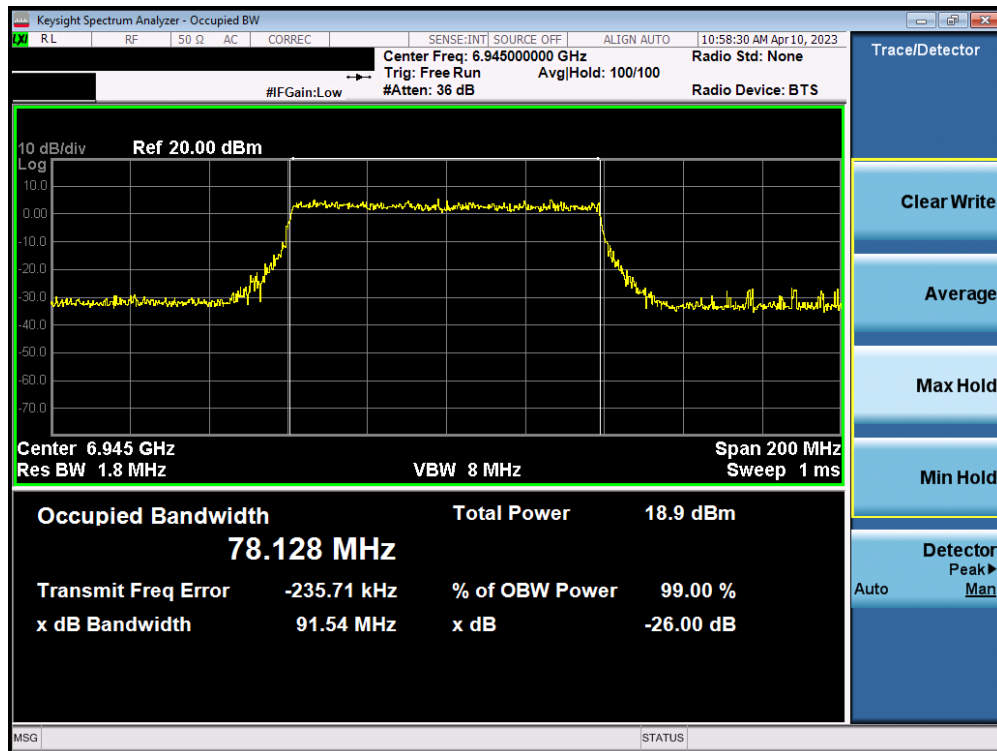


Plot 7-61. Occupied Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 209)

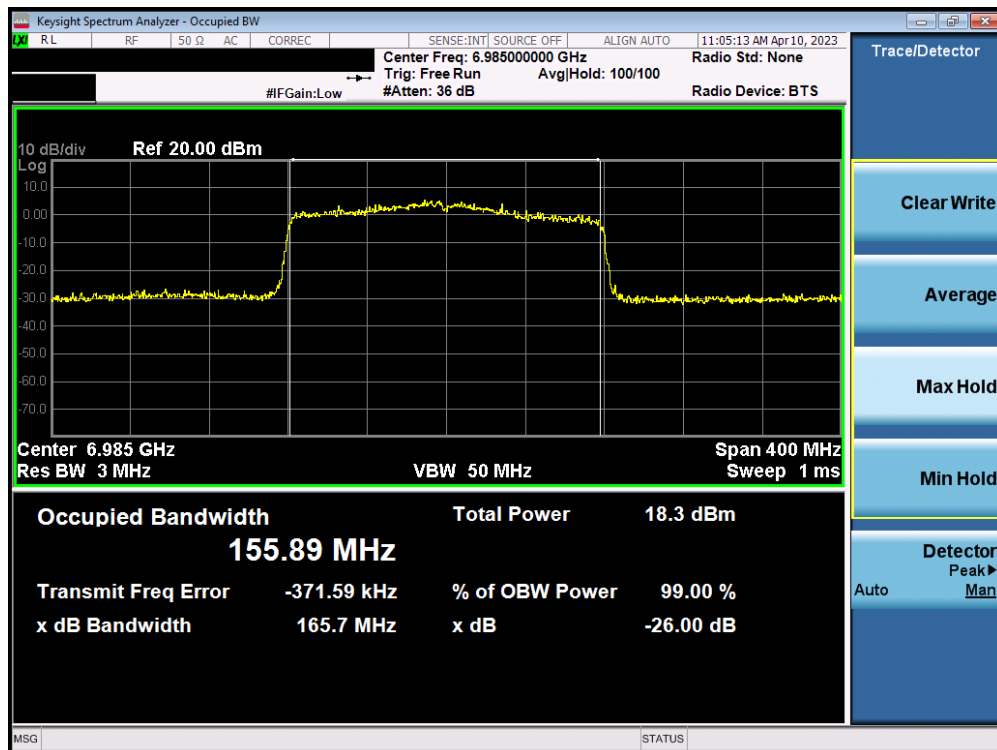


Plot 7-62. Occupied Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 211)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-63. Occupied Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 199)



Plot 7-64. Occupied Bandwidth Plot MIMO ANT2 (160MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 207)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		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 (26 Tones)

20MHz BW	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)									Directional Ant. Gain [dB]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
					RU Index: 0			RU Index: 4			RU Index: 8						
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO				
	5	5935	2	26T	2.43	3.48	6.00	2.43	3.39	5.95	2.36	3.15	5.78	-7.09	-1.09	24.00	-25.09
6175		45	26T	2.42	3.04	5.75	2.34	2.95	5.67	2.42	3.23	5.85	-7.09	-1.24	24.00	-25.24	
6415		93	26T	2.11	3.40	5.81	2.11	3.36	5.79	2.43	3.72	6.13	-7.09	-0.96	24.00	-24.96	
6435		97	26T	2.11	3.08	5.63	2.10	3.19	5.69	2.43	3.51	6.01	-7.30	-1.29	24.00	-25.29	
6	6475	105	26T	2.24	3.39	5.86	2.22	3.36	5.84	2.09	3.12	5.65	-7.30	-1.44	24.00	-25.44	
	6515	113	26T	2.07	3.43	5.81	2.10	3.29	5.75	2.41	3.63	6.07	-7.30	-1.23	24.00	-25.23	
	6535	117	26T	2.10	3.30	5.75	2.11	3.20	5.70	2.40	3.57	6.03	-7.27	-1.24	24.00	-25.24	
7	6695	149	26T	1.99	3.78	5.99	1.46	3.46	5.58	1.75	3.78	5.89	-7.27	-1.28	24.00	-25.28	
	6875	185	26T	1.47	3.47	5.59	0.89	3.57	5.44	1.70	3.77	5.87	-7.27	-1.40	24.00	-25.40	
	6895	189	26T	1.44	3.51	5.61	1.36	3.60	5.63	1.70	3.58	5.75	-7.46	-1.71	24.00	-25.71	
8	6995	209	26T	1.60	3.97	5.96	1.56	3.76	5.81	1.39	3.75	5.74	-7.46	-1.50	24.00	-25.50	
	7115	233	26T	1.60	3.74	5.81	1.50	3.66	5.72	1.81	3.78	5.92	-7.46	-1.54	24.00	-25.54	

Table 7-4. MIMO 20MHz BW 802.11ax (UNII) Maximum Conducted Output Power

40MHz BW	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)									Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
					RU Index: 0			RU Index: 8			RU Index: 17						
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO				
	5	5965	3	26T	3.19	4.16	6.71	3.20	4.22	6.75	3.20	4.17	6.72	-7.09	-0.34	24.00	-24.34
6165		43	26T	3.03	4.47	6.82	3.10	4.51	6.87	3.10	4.48	6.85	-7.09	-0.22	24.00	-24.22	
6405		91	26T	2.71	4.89	6.95	2.28	4.45	6.51	2.39	4.46	6.56	-7.09	-0.14	24.00	-24.14	
6	6445	99	26T	2.77	4.46	6.71	2.82	4.60	6.81	2.88	4.60	6.83	-7.30	-0.47	24.00	-24.47	
	6485	107	26T	2.87	4.58	6.82	2.93	4.70	6.91	2.98	4.68	6.92	-7.30	-0.38	24.00	-24.38	
	6525	115	26T	2.65	4.77	6.85	2.79	4.80	6.92	2.88	4.81	6.96	-7.30	-0.34	24.00	-24.34	
7	6565	123	26T	2.75	4.90	6.97	2.35	4.46	6.54	2.37	4.46	6.55	-7.27	-0.30	24.00	-24.30	
	6725	155	26T	1.50	5.03	6.62	1.63	5.02	6.66	1.72	4.98	6.66	-7.27	-0.61	24.00	-24.61	
	6845	179	26T	1.92	5.02	6.75	1.55	4.82	6.50	1.57	5.03	6.65	-7.27	-0.52	24.00	-24.52	
8	6885	187	26T	2.46	5.03	6.94	2.00	5.02	6.78	2.07	5.03	6.81	-7.46	-0.52	24.00	-24.52	
	7005	211	26T	2.19	4.96	6.80	1.79	5.03	6.72	1.83	5.03	6.73	-7.46	-0.66	24.00	-24.66	
	7085	227	26T	2.13	5.02	6.82	1.67	4.70	6.45	1.71	4.83	6.55	-7.46	-0.64	24.00	-24.64	

Table 7-5. MIMO 40MHz BW 802.11ax (UNII) Maximum Conducted Output Power

80MHz BW	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)									Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
					RU Index: 0			RU Index: 18			RU Index: 36						
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO				
	5	5985	7	26T	5.54	4.21	7.94	5.39	4.04	7.78	5.21	3.81	7.58	-7.09	0.85	24.00	-23.15
		6145	39	26T	5.32	4.62	7.99	5.20	4.65	7.94	5.12	4.46	7.81	-7.09	0.90	24.00	-23.10
		6385	87	26T	5.49	3.96	7.80	5.53	4.18	7.92	5.54	4.04	7.86	-7.09	0.83	24.00	-23.17
	6	6465	103	26T	5.34	4.53	7.96	5.13	4.37	7.78	5.20	4.20	7.74	-7.30	0.66	24.00	-23.34
		6545	119	26T	5.11	4.70	7.92	5.07	4.60	7.85	5.09	4.53	7.83	-7.27	0.65	24.00	-23.35
		6705	151	26T	4.98	4.92	7.96	4.67	4.92	7.81	4.81	4.91	7.87	-7.27	0.69	24.00	-23.31
	7	6865	183	26T	4.56	4.91	7.75	3.74	4.92	7.38	3.84	4.92	7.42	-7.27	0.48	24.00	-23.52
6945		199	26T	4.71	4.92	7.83	3.95	4.60	7.30	4.11	4.70	7.42	-7.46	0.37	24.00	-23.63	
7025		215	26T	4.32	4.92	7.64	3.91	4.92	7.45	3.99	4.92	7.49	-7.46	0.18	24.00	-23.82	

Table 7-6. MIMO 80MHz BW 802.11ax (UNII) Maximum Conducted Output Power

160MHz BW	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)									Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
					RU Index: 0 (L)			RU Index: 36 (L)			RU Index: 36 (U)						
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO				
5	6025	15	26T	4.74	4.27	7.52	4.63	4.27	7.46	4.67	4.03	7.37	-7.09	0.43	24.00	-23.57	
	6185	47	26T	4.69	5.17	7.94	4.32	4.93	7.64	4.64	4.72	7.69	-7.09	0.85	24.00	-23.15	
	6345	79	26T	4.69	4.99	7.85	4.64	4.84	7.75	4.75	4.67	7.72	-7.09	0.76	24.00	-23.24	
6	6505	111	26T	4.44	5.13	7.81	4.26	5.17	7.75	4.73	5.17	7.96	-7.30	0.66	24.00	-23.34	
7	6665	143	26T	3.80	5.70	7.86	3.13	5.70	7.61	3.65	5.38	7.61	-7.27	0.59	24.00	-23.41	
	6825	175	26T	3.46	5.70	7.73	3.12	5.68	7.59	3.72	5.68	7.82	-7.27	0.55	24.00	-23.45	
8	6985	207	26T	3.94	5.58	7.85	3.77	5.64	7.81	3.87	5.37	7.69	-7.46	0.39	24.00	-23.61	

Table 7-7. MIMO 160MHz BW 802.11ax (UNII) Maximum Conducted Output Power

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MIMO Maximum Conducted Output Power Measurements (52 Tones)

20MHz BW	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)									Directional Ant. Gain [dB]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
					RU Index: 37			RU Index: 38			RU Index: 40						
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO				
5		5935	2	52T	3.71	5.54	7.73	3.89	5.69	7.89	4.05	5.78	8.01	-7.09	0.92	24.00	-23.08
		6175	45	52T	4.03	5.78	8.00	4.11	5.77	8.03	3.81	5.67	7.85	-7.09	0.94	24.00	-23.06
		6415	93	52T	4.30	4.94	7.64	4.34	5.21	7.81	4.62	5.37	8.02	-7.09	0.93	24.00	-23.07
		6435	97	52T	4.26	5.18	7.75	4.38	5.52	8.00	4.49	5.69	8.14	-7.30	0.84	24.00	-23.16
6		6475	105	52T	4.34	5.07	7.73	4.38	5.22	7.83	4.43	5.40	7.95	-7.30	0.65	24.00	-23.35
		6515	113	52T	4.08	5.31	7.75	4.28	5.44	7.91	4.40	5.59	8.05	-7.30	0.75	24.00	-23.25
		6535	117	52T	4.07	5.20	7.68	4.25	5.35	7.85	4.34	5.51	7.97	-7.27	0.70	24.00	-23.30
		6695	149	52T	4.03	5.90	8.08	4.03	5.78	8.00	3.71	5.63	7.79	-7.27	0.81	24.00	-23.19
7		6875	185	52T	4.38	5.59	8.04	4.41	5.57	8.04	4.21	5.22	7.75	-7.27	0.77	24.00	-23.23
		6895	189	52T	4.34	5.54	7.99	4.01	5.26	7.69	4.17	5.45	7.87	-7.46	0.53	24.00	-23.47
	8	6995	209	52T	4.07	5.78	8.02	3.72	5.74	7.86	3.86	5.78	7.94	-7.46	0.56	24.00	-23.44
		7115	233	52T	3.82	5.81	7.94	4.02	5.78	8.00	3.62	5.69	7.79	-7.46	0.54	24.00	-23.46

Table 7-8. MIMO 20MHz BW 802.11ax (UNII) Maximum Conducted Output Power

40MHz BW	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)									Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
					RU Index: 37			RU Index: 40			RU Index: 44						
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO				
5		5965	3	52T	5.23	3.91	7.63	5.29	4.04	7.72	5.23	4.04	7.69	-7.09	0.63	24.00	-23.37
		6165	43	52T	5.02	4.39	7.73	4.60	4.03	7.34	4.55	3.96	7.28	-7.09	0.64	24.00	-23.36
		6405	91	52T	4.69	4.81	7.76	4.33	4.41	7.38	4.36	4.37	7.38	-7.09	0.67	24.00	-23.33
6		6445	99	52T	4.76	4.86	7.82	4.37	4.48	7.44	4.43	4.45	7.45	-7.30	0.52	24.00	-23.48
		6485	107	52T	4.93	4.57	7.77	4.53	4.15	7.36	4.53	4.12	7.34	-7.30	0.47	24.00	-23.53
		6525	115	52T	4.77	4.86	7.83	4.38	4.53	7.47	4.40	4.54	7.48	-7.30	0.53	24.00	-23.47
7		6565	123	52T	4.73	4.61	7.68	4.34	4.22	7.29	4.35	4.22	7.30	-7.27	0.41	24.00	-23.59
		6725	155	52T	3.58	4.86	7.28	3.20	4.85	7.11	3.30	4.85	7.16	-7.27	0.01	24.00	-23.99
		6845	179	52T	3.93	4.86	7.43	3.58	4.86	7.28	3.58	4.86	7.28	-7.27	0.16	24.00	-23.84
8		6885	187	52T	4.52	4.85	7.70	4.14	4.86	7.53	4.17	4.86	7.54	-7.46	0.24	24.00	-23.76
		7005	211	52T	3.79	4.76	7.31	3.39	4.86	7.20	3.41	4.86	7.21	-7.46	-0.15	24.00	-24.15
		7085	227	52T	4.21	4.86	7.56	3.83	4.79	7.35	3.79	4.86	7.37	-7.46	0.10	24.00	-23.90

Table 7-9. MIMO 40MHz BW 802.11ax (UNII) Maximum Conducted Output Power

80MHz BW	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)									Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]	
					RU Index: 37			RU Index: 44			RU Index: 52							
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO					
	5	5985	7	52T	8.45	7.62	11.07	8.23	7.51	10.90	8.00	7.35	10.70	-7.09	3.98	24.00	-20.02	
		6145	39	52T	8.03	8.02	11.04	8.13	8.34	11.25	7.89	8.09	11.00	-7.09	4.16	24.00	-19.84	
		6385	87	52T	8.33	7.56	10.97	8.44	7.35	10.94	8.44	7.11	10.84	-7.09	3.88	24.00	-20.12	
	6	6465	103	52T	8.18	8.38	11.29	7.99	8.32	11.17	8.00	8.09	11.06	-7.30	3.99	24.00	-20.01	
		7	6545	119	52T	8.18	8.40	11.30	7.97	8.35	11.17	7.92	8.19	11.07	-7.27	4.03	24.00	-19.97
			6705	151	52T	7.78	8.47	11.15	7.06	8.45	10.82	7.11	8.47	10.85	-7.27	3.88	24.00	-20.12
	6865		183	52T	7.40	8.37	10.92	6.67	8.46	10.67	6.68	8.47	10.68	-7.27	3.65	24.00	-20.35	
8	6945	199	52T	7.58	8.47	11.06	6.92	8.19	10.61	6.97	8.21	10.64	-7.46	3.60	24.00	-20.40		
	7025	215	52T	7.12	8.35	10.79	6.92	8.47	10.77	6.90	8.35	10.70	-7.46	3.33	24.00	-20.67		

Table 7-10. MIMO 80MHz BW 802.11ax (UNII) Maximum Conducted Output Power

160MHz BW	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)									Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
					RU Index: 37 (L)			RU Index: 52 (L)			RU Index: 52 (U)						
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO				
5		6025	15	52T	4.81	4.42	7.63	4.62	4.37	7.51	4.79	4.51	7.66	-7.09	0.57	24.00	-23.43
		6185	47	52T	4.67	5.22	7.96	4.28	5.24	7.80	4.48	4.99	7.75	-7.09	0.87	24.00	-23.13
		6345	79	52T	4.75	5.20	7.99	4.66	5.21	7.95	4.73	5.03	7.89	-7.09	0.90	24.00	-23.10
6		6505	111	52T	4.23	5.49	7.91	4.25	5.33	7.83	4.64	5.25	7.97	-7.30	0.67	24.00	-23.33
	7		6665	143	52T	3.72	5.50	7.71	3.07	5.98	7.77	3.55	5.95	7.92	-7.27	0.65	24.00
		6825	175	52T	3.44	5.98	7.90	3.17	5.95	7.79	3.60	5.96	7.95	-7.27	0.68	24.00	-23.32
8		6985	207	52T	3.69	5.76	7.86	3.90	5.77	7.94	4.10	5.71	7.99	-7.46	0.53	24.00	-23.47

Table 7-11. MIMO 160MHz BW 802.11ax (UNII) Maximum Conducted Output Power

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MIMO Maximum Conducted Output Power Measurements (106 Tones)

20MHz BW	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)						Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
					RU Index: 53			RU Index: 54						
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO				
	5	5935	2	106T	11.90	11.19	14.57	11.99	11.57	14.80	-7.09	7.71	24.00	-16.29
		6175	45	106T	11.99	11.44	14.73	11.92	11.31	14.64	-7.09	7.64	24.00	-16.36
		6415	93	106T	11.91	11.83	14.88	11.79	11.71	14.76	-7.09	7.79	24.00	-16.21
	6	6435	97	106T	11.29	11.80	14.56	11.19	11.65	14.44	-7.30	7.26	24.00	-16.74
		6475	105	106T	11.84	11.99	14.93	11.72	11.87	14.81	-7.30	7.63	24.00	-16.37
		6515	113	106T	11.05	11.67	14.38	11.57	11.99	14.80	-7.30	7.50	24.00	-16.50
	7	6535	117	106T	11.15	11.71	14.45	11.05	11.60	14.34	-7.27	7.18	24.00	-16.82
6695		149	106T	10.77	11.99	14.43	10.64	11.99	14.38	-7.27	7.16	24.00	-16.84	
6875		185	106T	11.07	11.80	14.46	10.91	11.97	14.48	-7.27	7.21	24.00	-16.79	
8	6895	189	106T	11.03	11.82	14.45	10.92	11.99	14.50	-7.46	7.04	24.00	-16.96	
	6995	209	106T	10.77	11.99	14.43	10.64	11.98	14.37	-7.46	6.97	24.00	-17.03	
	7115	233	106T	10.74	11.99	14.42	10.59	11.99	14.36	-7.46	6.96	24.00	-17.04	

Table 7-12. MIMO 20MHz BW 802.11ax (UNII) Maximum Conducted Output Power

40MHz BW	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)									Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
					RU Index: 53			RU Index: 54			RU Index: 56						
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO				
	5	5965	3	106T	11.93	10.94	14.47	11.99	11.22	14.63	11.92	11.08	14.53	-7.09	7.54	24.00	-16.46
		6165	43	106T	11.76	11.51	14.65	11.43	11.18	14.32	11.32	11.06	14.20	-7.09	7.56	24.00	-16.44
		6405	91	106T	11.37	11.83	14.62	11.13	11.54	14.35	11.09	11.47	14.29	-7.09	7.53	24.00	-16.47
	6	6445	99	106T	11.44	11.93	14.70	11.18	11.66	14.44	11.14	11.54	14.35	-7.30	7.40	24.00	-16.60
		6485	107	106T	11.60	11.61	14.62	11.34	11.33	14.35	11.29	11.21	14.26	-7.30	7.32	24.00	-16.68
		6525	115	106T	11.48	11.96	14.74	11.19	11.68	14.45	11.12	11.64	14.40	-7.30	7.44	24.00	-16.56
	7	6565	123	106T	11.46	11.69	14.59	11.16	11.42	14.30	11.10	11.34	14.23	-7.27	7.32	24.00	-16.68
6725		155	106T	10.31	11.99	14.24	10.06	11.98	14.14	10.04	11.99	14.13	-7.27	6.97	24.00	-17.03	
6845		179	106T	10.66	11.99	14.39	10.42	11.99	14.29	10.31	11.98	14.24	-7.27	7.12	24.00	-16.88	
8	6885	187	106T	11.21	11.98	14.62	11.02	11.99	14.54	10.87	11.99	14.48	-7.46	7.16	24.00	-16.84	
	7005	211	106T	10.47	11.99	14.31	10.18	11.99	14.19	10.13	11.99	14.17	-7.46	6.85	24.00	-17.15	
	7085	227	106T	10.95	11.99	14.51	10.63	11.91	14.33	10.51	11.96	14.31	-7.46	7.05	24.00	-16.95	

Table 7-13. MIMO 40MHz BW 802.11ax (UNII) Maximum Conducted Output Power

80MHz BW	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)									Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
					RU Index: 53			RU Index: 56			RU Index: 60						
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO				
5	5	5985	7	106T	11.99	11.01	14.54	11.73	10.93	14.36	11.89	11.18	14.56	-7.09	7.47	24.00	-16.53
		6145	39	106T	11.89	11.99	14.95	11.21	11.39	14.31	11.39	11.49	14.45	-7.09	7.86	24.00	-16.14
		6385	87	106T	11.71	10.98	14.37	11.99	10.81	14.45	11.98	10.57	14.34	-7.09	7.36	24.00	-16.64
	6	6465	103	106T	11.62	11.78	14.71	11.48	11.87	14.69	11.40	11.58	14.50	-7.30	7.41	24.00	-16.59
		6545	119	106T	11.61	11.88	14.76	11.52	11.86	14.70	11.43	11.66	14.56	-7.27	7.49	24.00	-16.51
		6705	151	106T	11.24	11.98	14.64	11.09	11.98	14.57	10.98	11.99	14.52	-7.27	7.37	24.00	-16.63
	7	6865	183	106T	10.81	11.87	14.38	10.19	11.85	14.11	10.11	11.91	14.11	-7.27	7.11	24.00	-16.89
		6945	199	106T	11.04	11.99	14.55	10.92	11.92	14.46	10.87	11.99	14.48	-7.46	7.09	24.00	-16.91
		7025	215	106T	11.03	11.89	14.49	10.46	11.93	14.27	10.34	11.87	14.18	-7.46	7.03	24.00	-16.97

Table 7-14. MIMO 80MHz BW 802.11ax (UNII) Maximum Conducted Output Power

160MHz BW	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)									Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
					RU Index: 53 (L)			RU Index: 60 (L)			RU Index: 60 (U)						
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO				
	5	6025	15	106T	11.99	10.72	14.41	12.19	10.74	14.54	11.98	10.48	14.30	-7.09	7.45	24.00	-16.55
6185		47	106T	11.8	11.24	14.54	11.4	11.21	14.32	11.54	10.88	14.23	-7.09	7.45	24.00	-16.55	
6345		79	106T	11.91	11.16	14.56	11.77	11.21	14.51	11.99	10.93	14.50	-7.09	7.47	24.00	-16.53	
6	6505	111	106T	11.38	11.49	14.45	11.37	11.31	14.35	11.73	11.16	14.46	-7.30	7.16	24.00	-16.84	
	6665	143	106T	11.23	11.99	14.64	10.69	11.99	14.40	10.57	11.99	14.35	-7.27	7.37	24.00	-16.63	
7	6825	175	106T	10.59	11.98	14.35	10.26	11.99	14.22	10.69	11.98	14.39	-7.27	7.12	24.00	-16.88	
	6985	207	106T	11.09	11.61	14.37	11.02	11.91	14.50	11.43	11.99	14.73	-7.46	7.27	24.00	-16.73	

Table 7-15. MIMO 160MHz BW 802.11ax (UNII) Maximum Conducted Output Power

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2303170032-14.A3L	Test Dates: 3/4 – 5/26/2023	EUT Type: Portable Handset	Page 57 of 178

MIMO Maximum Conducted Output Power Measurements (242 Tones)

20MHz BW	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)			Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
					RU Index: 61						
					ANT1	ANT2	MIMO				
	5	5935	2	242T	10.65	10.35	13.51	-7.09	6.42	24.00	-17.58
		6175	45	242T	10.70	10.41	13.57	-7.09	6.48	24.00	-17.52
		6415	93	242T	10.75	10.97	13.87	-7.09	6.78	24.00	-17.22
	6	6435	97	242T	10.72	10.89	13.82	-7.30	6.52	24.00	-17.48
		6475	105	242T	10.64	10.67	13.67	-7.30	6.37	24.00	-17.63
		6515	113	242T	10.75	10.94	13.86	-7.30	6.56	24.00	-17.44
	7	6535	117	242T	10.78	10.89	13.85	-7.27	6.58	24.00	-17.42
6695		149	242T	9.89	10.99	13.48	-7.27	6.21	24.00	-17.79	
6875		185	242T	9.91	10.98	13.49	-7.27	6.22	24.00	-17.78	
8	6895	189	242T	9.96	10.99	13.52	-7.46	6.06	24.00	-17.94	
	6995	209	242T	9.71	10.99	13.41	-7.46	5.95	24.00	-18.05	
	7115	233	242T	9.65	10.99	13.38	-7.46	5.92	24.00	-18.08	

Table 7-16. MIMO 20MHz BW 802.11ax (UNII) Maximum Conducted Output Power

40MHz BW	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)						Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
					RU Index: 61			RU Index: 62						
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO				
	5	5965	3	242T	10.83	9.86	13.38	10.89	10.07	13.51	-7.09	6.42	24.00	-17.58
		6165	43	242T	10.59	10.24	13.43	10.32	9.98	13.16	-7.09	6.34	24.00	-17.66
		6405	91	242T	10.27	10.69	13.50	10.09	10.43	13.27	-7.09	6.41	24.00	-17.59
	6	6445	99	242T	10.79	10.91	13.86	10.57	10.64	13.62	-7.30	6.56	24.00	-17.44
		6485	107	242T	10.88	10.99	13.95	10.65	10.73	13.70	-7.30	6.65	24.00	-17.35
		6525	115	242T	10.83	10.95	13.90	10.58	10.68	13.64	-7.30	6.60	24.00	-17.40
	7	6565	123	242T	10.78	10.98	13.89	10.56	10.79	13.69	-7.27	6.62	24.00	-17.38
6725		155	242T	9.17	10.99	13.18	9.00	10.98	13.11	-7.27	5.91	24.00	-18.09	
6845		179	242T	9.46	10.99	13.30	9.21	10.99	13.20	-7.27	6.03	24.00	-17.97	
8	6885	187	242T	9.65	10.96	13.36	9.42	10.75	13.15	-7.46	5.90	24.00	-18.10	
	7005	211	242T	9.73	10.98	13.41	9.48	10.99	13.31	-7.46	5.95	24.00	-18.05	
	7085	227	242T	9.67	10.91	13.34	9.41	10.79	13.16	-7.46	5.88	24.00	-18.12	

Table 7-17. MIMO 40MHz BW 802.11ax (UNII) Maximum Conducted Output Power

80MHz BW	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)									Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
					RU Index: 61			RU Index: 62			RU Index: 64						
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO				
	5	5985	7	242T	11.98	11.44	14.73	11.87	11.08	14.50	11.97	11.19	14.61	-7.09	7.64	24.00	-16.36
		6145	39	242T	11.79	11.93	14.87	11.32	11.49	14.42	11.39	11.51	14.46	-7.09	7.78	24.00	-16.22
		6385	87	242T	12.07	11.39	14.75	11.74	11.02	14.41	11.89	11.11	14.53	-7.09	7.66	24.00	-16.34
	6	6465	103	242T	11.53	11.44	14.50	11.12	11.11	14.13	11.63	11.66	14.66	-7.30	7.36	24.00	-16.64
		6545	119	242T	11.50	11.62	14.57	11.12	11.30	14.22	11.41	11.49	14.46	-7.27	7.30	24.00	-16.70
	7	6705	151	242T	11.18	11.99	14.61	10.78	11.84	14.35	10.99	11.99	14.53	-7.27	7.34	24.00	-16.66
		6865	183	242T	10.69	11.99	14.40	10.29	11.98	14.23	10.60	11.98	14.35	-7.27	7.13	24.00	-16.87
8	6945	199	242T	10.87	11.98	14.47	10.49	11.84	14.23	10.80	11.99	14.45	-7.46	7.01	24.00	-16.99	
	7025	215	242T	10.93	11.99	14.50	10.56	11.97	14.33	10.27	11.90	14.17	-7.46	7.04	24.00	-16.96	

Table 7-18. MIMO 80MHz BW 802.11ax (UNII) Maximum Conducted Output Power

160MHz BW	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)									Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
					RU Index: 61 (L)			RU Index: 64 (L)			RU Index: 64 (U)						
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO				
	5	6025	15	242T	11.99	10.79	14.44	11.85	10.51	14.24	11.99	10.47	14.31	-7.09	7.35	24.00	-16.65
6185		47	242T	11.98	11.74	14.87	11.57	11.28	14.44	11.49	10.88	14.21	-7.09	7.78	24.00	-16.22	
6345		79	242T	11.99	11.55	14.79	11.93	11.32	14.65	11.99	10.91	14.49	-7.09	7.70	24.00	-16.30	
6	6505	111	242T	11.89	11.91	14.91	11.99	11.82	14.92	11.98	11.55	14.78	-7.30	7.62	24.00	-16.38	
	6665	143	242T	10.84	11.99	14.46	10.31	11.99	14.24	10.44	11.99	14.29	-7.27	7.19	24.00	-16.81	
7	6825	175	242T	10.58	11.99	14.35	10.31	11.98	14.24	10.47	11.97	14.29	-7.27	7.08	24.00	-16.92	
	6985	207	242T	10.92	11.99	14.50	11.11	11.97	14.57	11.26	11.99	14.65	-7.46	7.19	24.00	-16.81	

Table 7-19. MIMO 160MHz BW 802.11ax (UNII) Maximum Conducted Output Power

FCC ID: A3LSMF731B	MEASUREMENT REPORT			Approved by: Technical Manager
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MIMO Maximum Conducted Output Power Measurements (484 Tones)

40MHz BW	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)			Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
					RU Index: 65						
					ANT1	ANT2	MIMO				
	5	5965	3	484T	10.99	10.24	13.64	-7.09	6.55	24.00	-17.45
		6165	43	484T	10.96	10.59	13.79	-7.09	6.70	24.00	-17.30
		6405	91	484T	10.71	10.99	13.86	-7.09	6.77	24.00	-17.23
	6	6445	99	484T	10.67	10.82	13.76	-7.30	6.46	24.00	-17.54
		6485	107	484T	10.79	10.93	13.87	-7.30	6.57	24.00	-17.43
		6525	115	484T	10.70	10.92	13.82	-7.30	6.52	24.00	-17.48
	7	6565	123	484T	10.64	10.96	13.81	-7.27	6.54	24.00	-17.46
6725		155	484T	9.07	10.98	13.14	-7.27	5.87	24.00	-18.13	
6845		179	484T	9.38	10.99	13.27	-7.27	6.00	24.00	-18.00	
8	6885	187	484T	9.49	10.91	13.27	-7.46	5.81	24.00	-18.19	
	7005	211	484T	9.62	10.99	13.37	-7.46	5.91	24.00	-18.09	
	7085	227	484T	9.55	10.89	13.28	-7.46	5.82	24.00	-18.18	

Table 7-20. MIMO 40MHz BW 802.11ax (UNII) Maximum Conducted Output Power

80MHz BW	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)						Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
					RU Index: 65			RU Index: 66						
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO				
	5	5985	7	484T	11.80	11.20	14.52	11.90	11.12	14.54	-7.09	7.45	24.00	-16.55
		6145	39	484T	11.51	11.67	14.60	11.36	11.46	14.42	-7.09	7.51	24.00	-16.49
		6385	87	484T	11.99	11.05	14.56	11.90	10.55	14.29	-7.09	7.47	24.00	-16.53
	6	6465	103	484T	11.27	11.49	14.39	11.31	11.58	14.46	-7.30	7.16	24.00	-16.84
		6545	119	484T	11.73	11.92	14.84	11.30	11.66	14.49	-7.27	7.57	24.00	-16.43
	7	6705	151	484T	10.84	11.99	14.46	10.39	11.88	14.21	-7.27	7.19	24.00	-16.81
		6865	183	484T	10.45	11.96	14.28	10.53	11.98	14.33	-7.27	7.06	24.00	-16.94
8	6945	199	484T	11.16	11.94	14.58	10.74	11.96	14.40	-7.46	7.12	24.00	-16.88	
	7025	215	484T	10.70	11.89	14.35	10.24	11.99	14.21	-7.46	6.89	24.00	-17.11	

Table 7-21. MIMO 80MHz BW 802.11ax (UNII) Maximum Conducted Output Power

160MHz BW	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)									Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
					RU Index: 65 (L)			RU Index: 66 (L)			RU Index: 66 (U)						
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO				
	5	6025	15	484T	11.99	10.48	14.31	11.99	10.55	14.34	11.99	10.26	14.22	-7.09	7.25	24.00	-16.75
		6185	47	484T	11.89	11.55	14.73	11.6	11.37	14.50	11.97	11.16	14.59	-7.09	7.64	24.00	-16.36
		6345	79	484T	12.02	11.38	14.72	11.98	11.42	14.72	11.8	10.79	14.33	-7.09	7.63	24.00	-16.37
	6	6505	111	484T	11.61	11.46	14.55	11.51	11.51	14.52	11.35	11.02	14.20	-7.30	7.25	24.00	-16.75
		6665	143	484T	10.56	11.98	14.34	10.44	11.98	14.29	10.13	11.99	14.17	-7.27	7.07	24.00	-16.93
	7	6825	175	484T	10.35	11.99	14.26	10.43	11.99	14.29	10.28	11.98	14.22	-7.27	7.02	24.00	-16.98
		6985	211	484T	11.41	11.9	14.67	10.83	11.51	14.19	10.64	11.38	14.04	-7.46	7.21	24.00	-16.79

Table 7-22. MIMO 160MHz BW 802.11ax (UNII) Maximum Conducted Output Power

FCC ID: A3LSMF731B	MEASUREMENT REPORT			Approved by: Technical Manager
Test Report S/N: 1M2303170032-14.A3L	Test Dates: 3/4 – 5/26/2023	EUT Type: Portable Handset		Page 59 of 178

MIMO Maximum Conducted Output Power Measurements (996 Tones)

80MHz BW	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)			Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
					RU Index: 67						
					ANT1	ANT2	MIMO				
	5	5985	7	996T	12.11	11.30	14.73	-7.09	7.64	24.00	-16.36
		6145	39	996T	11.56	11.69	14.64	-7.09	7.55	24.00	-16.45
		6385	87	996T	11.99	11.16	14.61	-7.09	7.52	24.00	-16.48
	6	6465	103	996T	11.39	11.73	14.57	-7.30	7.27	24.00	-16.73
	7	6545	119	996T	11.44	11.73	14.60	-7.27	7.33	24.00	-16.67
		6705	151	996T	11.03	11.89	14.49	-7.27	7.22	24.00	-16.78
		6865	183	996T	10.66	11.99	14.39	-7.27	7.12	24.00	-16.88
8	6945	199	996T	10.82	11.87	14.39	-7.46	6.93	24.00	-17.07	
	7025	215	996T	10.90	11.96	14.47	-7.46	7.01	24.00	-16.99	

Table 7-23. MIMO 80MHz BW 802.11ax (UNII) Maximum Conducted Output Power

160MHz BW	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)						Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
					RU Index: 67 (L)			RU Index: 67 (U)						
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO				
	5	6025	15	996T	11.98	10.64	14.37	11.99	10.77	14.43	-7.09	7.34	24.00	-16.66
		6185	47	996T	11.87	11.53	14.71	11.96	11.04	14.53	-7.09	7.62	24.00	-16.38
		6345	79	996T	11.89	11.5	14.71	11.93	10.59	14.32	-7.09	7.62	24.00	-16.38
	6	6505	111	996T	11.65	11.59	14.63	11.99	11.37	14.70	-7.30	7.40	24.00	-16.60
	7	6665	143	996T	10.57	11.99	14.35	10.37	11.99	14.27	-7.27	7.08	24.00	-16.92
		6825	175	996T	10.49	11.98	14.31	10.58	11.98	14.35	-7.27	7.08	24.00	-16.92
	8	6985	207	996T	11.37	11.99	14.70	11.39	11.89	14.66	-7.46	7.24	24.00	-16.76

Table 7-24. MIMO 160MHz BW 802.11ax (UNII) Maximum Conducted Output Power

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MIMO Maximum Conducted Output Power Measurements (2x996 Tones)

160MHz BW	Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)			Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
					68						
					ANT1	ANT2	MIMO				
	5	6025	15	2x996T	11.99	10.44	14.29	-7.09	7.20	24.00	-16.80
		6185	47	2x996T	11.99	11.29	14.66	-7.09	7.57	24.00	-16.43
		6345	79	2x996T	11.99	10.82	14.45	-7.09	7.36	24.00	-16.64
	6	6505	111	2x996T	11.99	11.59	14.80	-7.30	7.50	24.00	-16.50
	7	6665	143	2x996T	10.57	11.98	14.34	-7.27	7.07	24.00	-16.93
		6825	175	2x996T	10.44	11.99	14.29	-7.27	7.02	24.00	-16.98
	8	6985	207	2x996T	10.91	11.78	14.38	-7.46	6.92	24.00	-17.08

Table 7-25. MIMO 160MHz BW 802.11ax (UNII) Maximum Conducted Output Power

Sample MIMO Calculation:

At 5935MHz in 802.11ax (20MHz BW – 26 Tones) mode, the average conducted output power was measured to be 2.43 dBm for Antenna-1 and 3.48 dBm for Antenna-2.

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

$$(2.43 \text{ dBm} + 3.48 \text{ dBm}) = (1.750 \text{ mW} + 2.228 \text{ mW}) = 3.978 \text{ mW} = 6.00 \text{ dBm}$$

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.

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

Sample e.i.r.p. Calculation:

At 5935MHz in 802.11ax (20MHz BW – 26 Tones) mode, the average MIMO conducted power was calculated to be 6.00 dBm with directional gain of -7.09 dBi.

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

$$6.00 \text{ dBm} + -7.09 \text{ dBi} = -1.09 \text{ dBm}$$

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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 $\geq 2 \times (\text{span/RBW})$
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

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 -1dBm/MHz e.i.r.p. for both cases.

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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]	Antenna-1 Gain [dBi]	Antenna-2 Gain [dBi]	Summed MIMO Power Density [dBm]	Directional Gain [dBi]	EIRP [dBm]	Max EIRP [dBm]	Margin [dB]
Band 5	5935	2	ax (20MHz)	-3.38	-3.86	-10.51	-10.61	-0.60	-7.55	-8.15	-1	-7.15
	6175	45	ax (20MHz)	-2.86	-2.64	-10.16	-10.04	0.26	-7.09	-6.83	-1	-5.83
	6415	93	ax (20MHz)	-3.79	-3.14	-10.00	-10.64	-0.44	-7.30	-7.74	-1	-6.74
	5965	3	ax (40MHz)	-3.62	-2.98	-10.51	-10.61	-0.28	-7.55	-7.83	-1	-6.83
	6165	43	ax (40MHz)	-2.09	-2.19	-10.16	-10.04	0.87	-7.09	-6.22	-1	-5.22
	6405	91	ax (40MHz)	-2.56	-2.09	-10.00	-10.64	0.69	-7.30	-6.61	-1	-5.61
	5985	7	ax (80MHz)	-3.26	-4.05	-10.51	-10.61	-0.63	-7.55	-8.18	-1	-7.18
	6145	39	ax (80MHz)	-3.74	-4.09	-10.16	-10.04	-0.90	-7.09	-7.99	-1	-6.99
	6385	87	ax (80MHz)	-3.97	-3.82	-10.00	-10.64	-0.88	-7.30	-8.19	-1	-7.19
	6025	15	ax (160MHz)	-3.43	-3.20	-10.51	-10.61	-0.30	-7.55	-7.85	-1	-6.85
Band 6	6185	47	ax (160MHz)	-2.53	-4.10	-10.16	-10.04	-0.23	-7.09	-7.32	-1	-6.32
	6345	79	ax (160MHz)	-3.45	-4.19	-10.00	-10.64	-0.79	-7.30	-8.10	-1	-7.10
	6435	97	ax (20MHz)	-2.97	-2.41	-10.00	-10.64	0.33	-7.30	-6.97	-1	-5.97
	6475	105	ax (20MHz)	-3.64	-3.75	-10.00	-10.64	-0.69	-7.30	-7.99	-1	-6.99
	6515	113	ax (20MHz)	-3.73	-3.82	-10.77	-10.30	-0.76	-7.52	-8.29	-1	-7.29
	6445	99	ax (40MHz)	-2.15	-2.83	-10.00	-10.64	0.54	-7.30	-6.77	-1	-5.77
	6485	107	ax (40MHz)	-2.40	-2.51	-10.00	-10.64	0.55	-7.30	-6.75	-1	-5.75
	6525	115	ax (40MHz)	-1.71	-2.62	-10.77	-10.30	0.87	-7.52	-6.65	-1	-5.65
	6465	103	ax (80MHz)	-3.62	-4.24	-10.00	-10.64	-0.91	-7.30	-8.21	-1	-7.21
	6505	111	ax (160MHz)	-3.02	-4.17	-10.77	-10.30	-0.55	-7.52	-8.07	-1	-7.07
Band 7	6535	117	ax (20MHz)	-3.37	-4.24	-10.77	-10.30	-0.77	-7.52	-8.29	-1	-7.29
	6695	149	ax (20MHz)	-4.33	-4.43	-10.29	-10.28	-1.37	-7.27	-8.64	-1	-7.64
	6875	185	ax (20MHz)	-3.26	-4.95	-10.39	-10.55	-1.02	-7.46	-8.48	-1	-7.48
	6565	123	ax (40MHz)	-2.30	-2.22	-10.77	-10.30	0.75	-7.52	-6.77	-1	-5.77
	6725	155	ax (40MHz)	-3.54	-2.08	-10.29	-10.28	0.26	-7.27	-7.01	-1	-6.01
	6845	179	ax (40MHz)	-3.04	-2.58	-10.39	-10.55	0.20	-7.46	-7.25	-1	-6.25
	6545	119	ax (80MHz)	-3.58	-4.18	-10.77	-10.30	-0.86	-7.52	-8.38	-1	-7.38
	6705	151	ax (80MHz)	-4.67	-2.73	-10.29	-10.28	-0.58	-7.27	-7.86	-1	-6.86
	6865	183	ax (80MHz)	-3.71	-3.79	-10.39	-10.55	-0.74	-7.46	-8.20	-1	-7.20
	6665	143	ax (160MHz)	-3.78	-3.30	-10.65	-10.79	-0.52	-7.71	-8.23	-1	-7.23
Band 8	6825	175	ax (160MHz)	-3.07	-4.55	-10.28	-10.42	-0.74	-7.34	-8.08	-1	-7.08
	6895	189	ax (20MHz)	-3.84	-4.29	-10.39	-10.55	-1.05	-7.46	-8.51	-1	-7.51
	6995	209	ax (20MHz)	-5.06	-6.40	-10.74	-10.35	-2.66	-7.53	-10.20	-1	-9.20
	7115	233	ax (20MHz)	-5.18	-5.50	-10.42	-10.84	-2.33	-7.62	-9.94	-1	-8.94
	6885	187	ax (40MHz)	-3.36	-3.19	-10.39	-10.55	-0.26	-7.46	-7.72	-1	-6.72
	7005	211	ax (40MHz)	-3.58	-2.89	-10.74	-10.35	-0.21	-7.53	-7.75	-1	-6.75
	7085	227	ax (40MHz)	-3.34	-3.44	-10.42	-10.84	-0.38	-7.62	-8.00	-1	-7.00
	6945	199	ax (80MHz)	-3.98	-3.79	-10.39	-10.55	-0.87	-7.46	-8.33	-1	-7.33
	7025	215	ax (80MHz)	-4.92	-3.99	-10.74	-10.35	-1.42	-4.03	-5.45	-1	-4.45
	6985	207	ax (160MHz)	-3.87	-4.40	-10.74	-10.35	-1.12	-7.53	-8.65	-1	-7.65

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

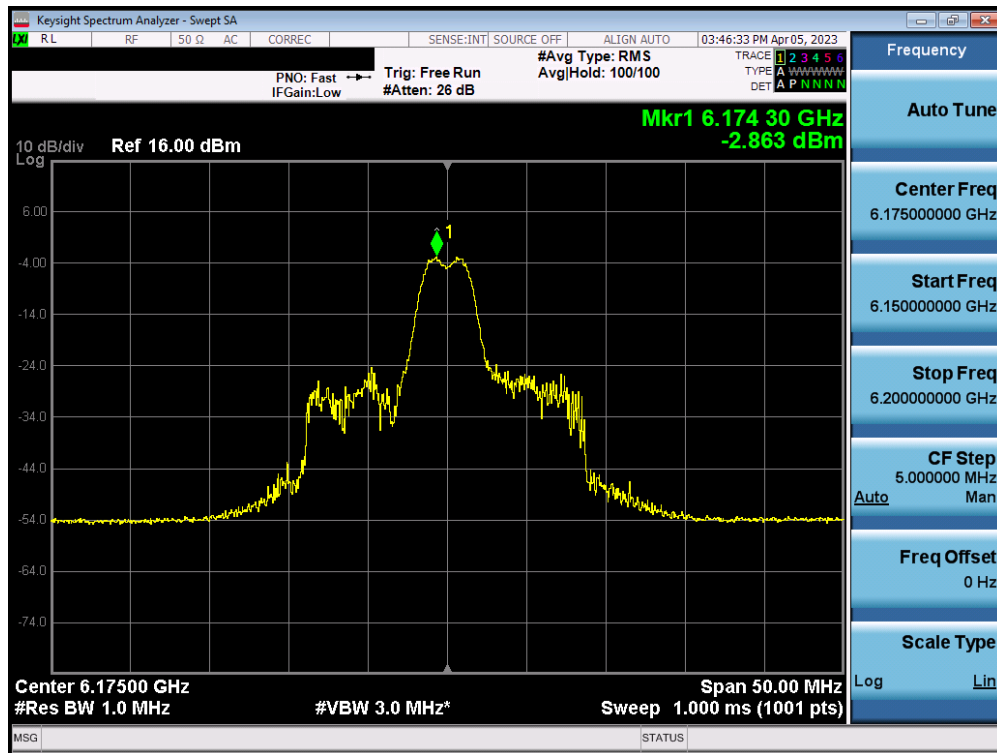
FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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	Frequency [MHz]	Channel	802.11 MODE	Antenna-1 Power Density [dBm]	Antenna-2 Power Density [dBm]	Antenna-1 Gain [dBi]	Antenna-2 Gain [dBi]	Summed MIMO Power Density [dBm]	Directional Gain [dBi]	EIRP [dBm]	Max EIRP [dBm]	Margin [dB]
Band 5	5935	2	ax (20MHz)	-3.46	-3.42	-10.51	-10.61	-0.43	-7.55	-7.98	-1	-6.98
	6175	45	ax (20MHz)	-1.66	-2.07	-10.16	-10.04	1.15	-7.09	-5.94	-1	-4.94
	6415	93	ax (20MHz)	-1.72	-2.09	-10.00	-10.64	1.11	-7.30	-6.19	-1	-5.19
	5965	3	ax (40MHz)	-4.49	-4.98	-10.51	-10.61	-1.71	-7.55	-9.26	-1	-8.26
	6165	43	ax (40MHz)	-4.46	-4.48	-10.16	-10.04	-1.46	-7.09	-8.55	-1	-7.55
	6405	91	ax (40MHz)	-4.89	-3.86	-10.00	-10.64	-1.33	-7.30	-8.64	-1	-7.64
	5985	7	ax (80MHz)	-5.42	-6.43	-10.51	-10.61	-2.88	-10.56	-13.44	-1	-12.44
	6145	39	ax (80MHz)	-6.28	-6.13	-10.16	-10.04	-3.20	-10.10	-13.30	-1	-12.30
	6385	87	ax (80MHz)	-4.67	-6.64	-10.00	-10.64	-2.53	-10.31	-12.84	-1	-11.84
	6025	15	ax (160MHz)	-7.46	-7.70	-10.51	-10.61	-4.57	-7.55	-12.12	-1	-11.12
	6185	47	ax (160MHz)	-5.97	-7.22	-10.16	-10.04	-3.54	-7.09	-10.63	-1	-9.63
	6345	79	ax (160MHz)	-5.75	-9.01	-10.00	-10.64	-4.07	-7.30	-11.37	-1	-10.37
Band 6	6435	97	ax (20MHz)	-1.77	-2.47	-10.00	-10.64	0.90	-7.30	-6.40	-1	-5.40
	6475	105	ax (20MHz)	-2.39	-2.60	-10.00	-10.64	0.51	-7.30	-6.79	-1	-5.79
	6515	113	ax (20MHz)	-1.88	-2.27	-10.77	-10.30	0.94	-7.52	-6.58	-1	-5.58
	6445	99	ax (40MHz)	-5.05	-4.40	-10.00	-10.64	-1.70	-7.30	-9.01	-1	-8.01
	6485	107	ax (40MHz)	-4.99	-4.33	-10.00	-10.64	-1.64	-7.30	-8.94	-1	-7.94
	6525	115	ax (40MHz)	-4.64	-4.32	-10.77	-10.30	-1.47	-7.52	-8.99	-1	-7.99
	6465	103	ax (80MHz)	-7.59	-6.07	-10.00	-10.64	-3.75	-10.31	-14.06	-1	-13.06
	6505	111	ax (160MHz)	-6.61	-8.10	-10.77	-10.30	-4.28	-7.52	-11.80	-1	-10.80
Band 7	6535	117	ax (20MHz)	-1.65	-2.43	-10.77	-10.30	0.99	-7.52	-6.53	-1	-5.53
	6695	149	ax (20MHz)	-2.19	0.34	-10.29	-10.28	2.27	-7.27	-5.01	-1	-4.01
	6875	185	ax (20MHz)	-2.31	-0.86	-10.39	-10.55	1.49	-7.46	-5.97	-1	-4.97
	6565	123	ax (40MHz)	-4.81	-4.24	-10.77	-10.30	-1.50	-7.52	-9.03	-1	-8.03
	6725	155	ax (40MHz)	-5.84	-3.94	-10.29	-10.28	-1.78	-7.27	-9.05	-1	-8.05
	6845	179	ax (40MHz)	-5.77	-3.97	-10.39	-10.55	-1.77	-7.46	-9.23	-1	-8.23
	6545	119	ax (80MHz)	-6.70	-5.80	-10.77	-10.30	-3.21	-10.53	-13.74	-1	-12.74
	6705	151	ax (80MHz)	-6.50	-5.97	-10.29	-10.28	-3.22	-10.28	-13.50	-1	-12.50
	6865	183	ax (80MHz)	-6.91	-5.72	-10.39	-10.55	-3.26	-10.47	-13.73	-1	-12.73
	6665	143	ax (160MHz)	-7.77	-5.94	-10.65	-10.79	-3.75	-7.71	-11.46	-1	-10.46
	6825	175	ax (160MHz)	-8.20	-5.91	-10.28	-10.42	-3.89	-7.34	-11.23	-1	-10.23
	6895	189	ax (20MHz)	-2.41	-1.04	-10.39	-10.55	1.34	-7.46	-6.12	-1	-5.12
Band 8	6995	209	ax (20MHz)	-2.24	-0.61	-10.74	-10.35	1.66	-7.53	-5.87	-1	-4.87
	7115	233	ax (20MHz)	-2.96	-1.26	-10.42	-10.84	0.98	-7.62	-6.63	-1	-5.63
	6885	187	ax (40MHz)	-5.69	-4.59	-10.39	-10.55	-2.09	-7.46	-9.55	-1	-8.55
	7005	211	ax (40MHz)	-5.88	-4.11	-10.74	-10.35	-1.89	-7.53	-9.43	-1	-8.43
	7085	227	ax (40MHz)	-5.90	-4.46	-10.42	-10.84	-2.11	-7.62	-9.73	-1	-8.73
	6945	199	ax (80MHz)	-6.87	-5.68	-10.39	-10.55	-3.22	-7.46	-10.68	-1	-9.68
	7025	215	ax (80MHz)	-7.01	-5.67	-10.74	-10.35	-3.28	-10.54	-13.82	-1	-12.82
	6985	207	ax (160MHz)	-7.85	-8.33	-10.74	-10.35	-5.07	-7.53	-12.60	-1	-11.60

Table 7-27. MIMO e.i.r.p. Conducted Power Spectral Density Measurements (Full Tones)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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7.4.1 MIMO Antenna-1 Power Spectral Density Measurements



Plot 7-65. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 45)

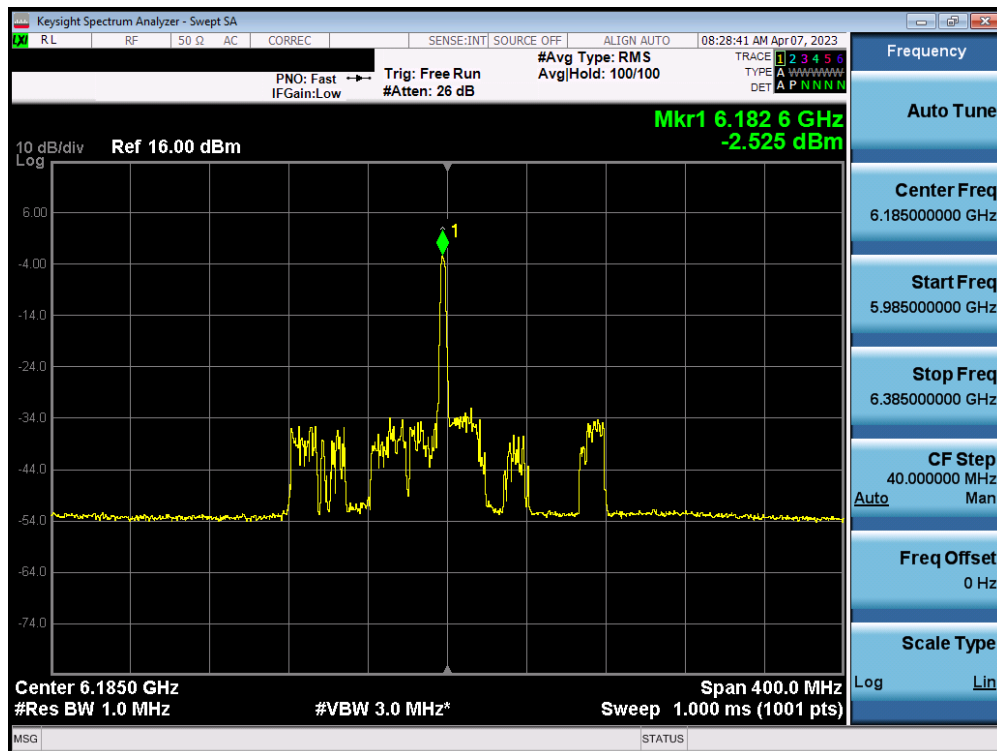


Plot 7-66. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 43)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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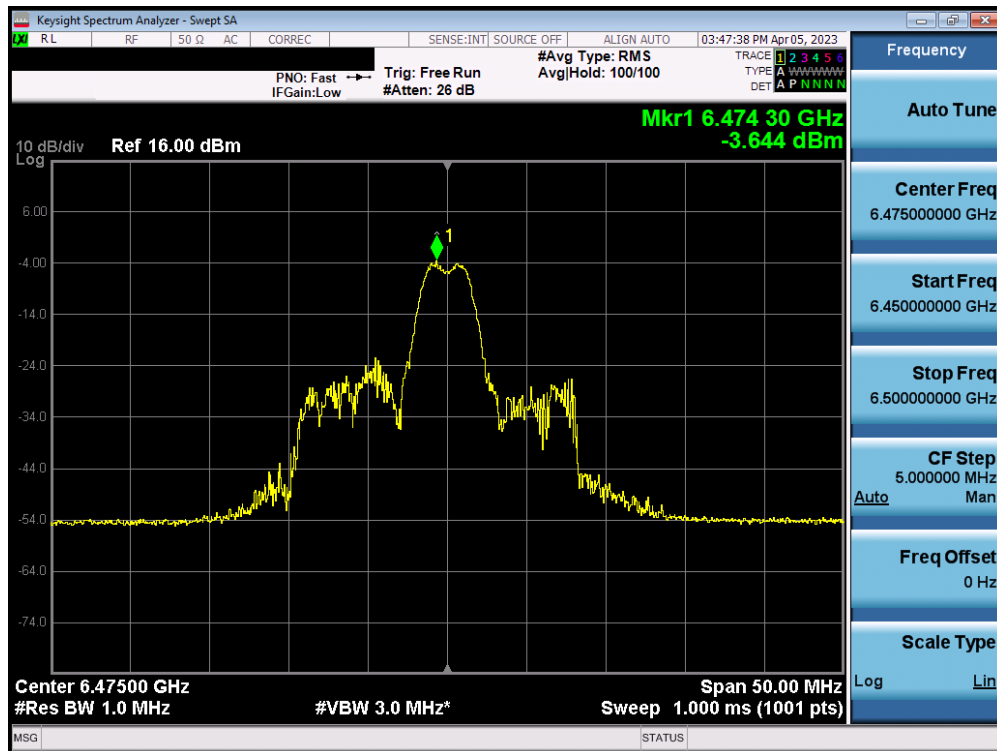


Plot 7-67. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 39)



Plot 7-68. Power Spectral Density Plot MIMO ANT1 (160MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 47)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2303170032-14.A3L	Test Dates: 3/4 – 5/26/2023	EUT Type: Portable Handset	Page 66 of 178

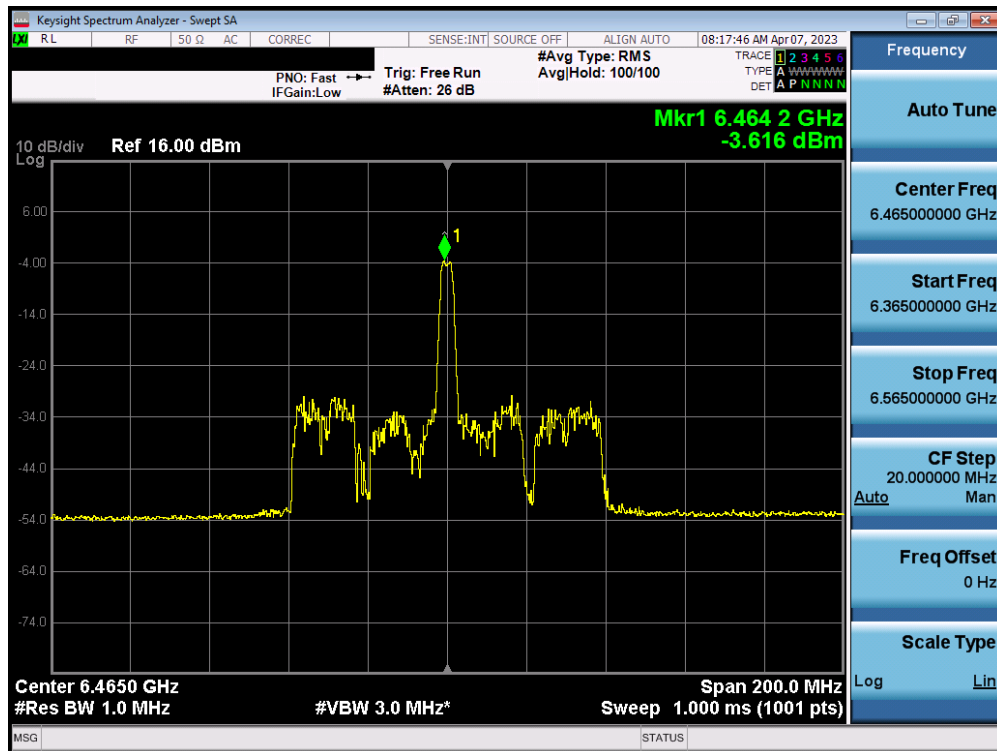


Plot 7-69. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 105)

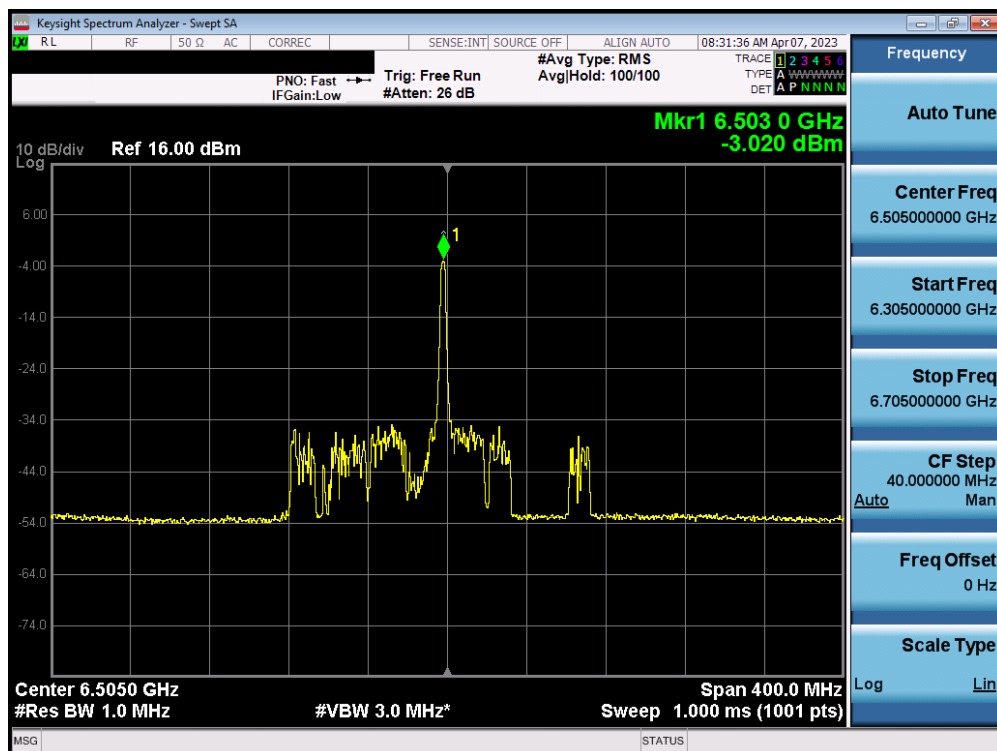


Plot 7-70. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 107)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2303170032-14.A3L	Test Dates: 3/4 – 5/26/2023	EUT Type: Portable Handset	Page 67 of 178



Plot 7-71. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 103)



Plot 7-72. Power Spectral Density Plot MIMO ANT1 (160MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 111)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2303170032-14.A3L	Test Dates: 3/4 – 5/26/2023	EUT Type: Portable Handset	Page 68 of 178

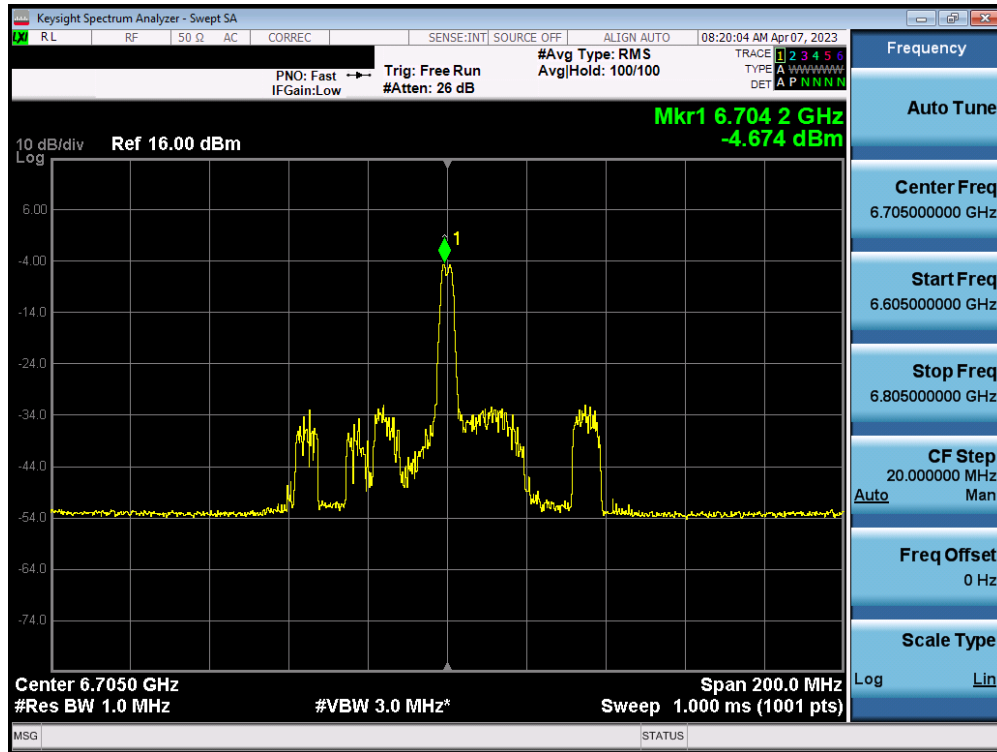


Plot 7-73. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 149)

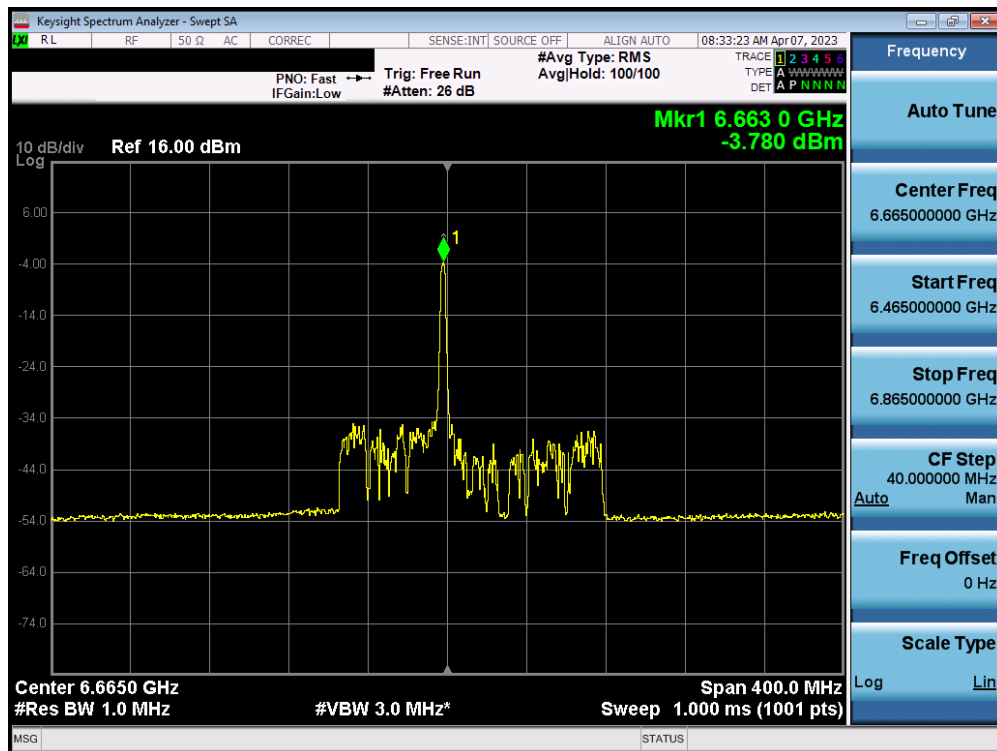


Plot 7-74. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 155)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-75. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 151)

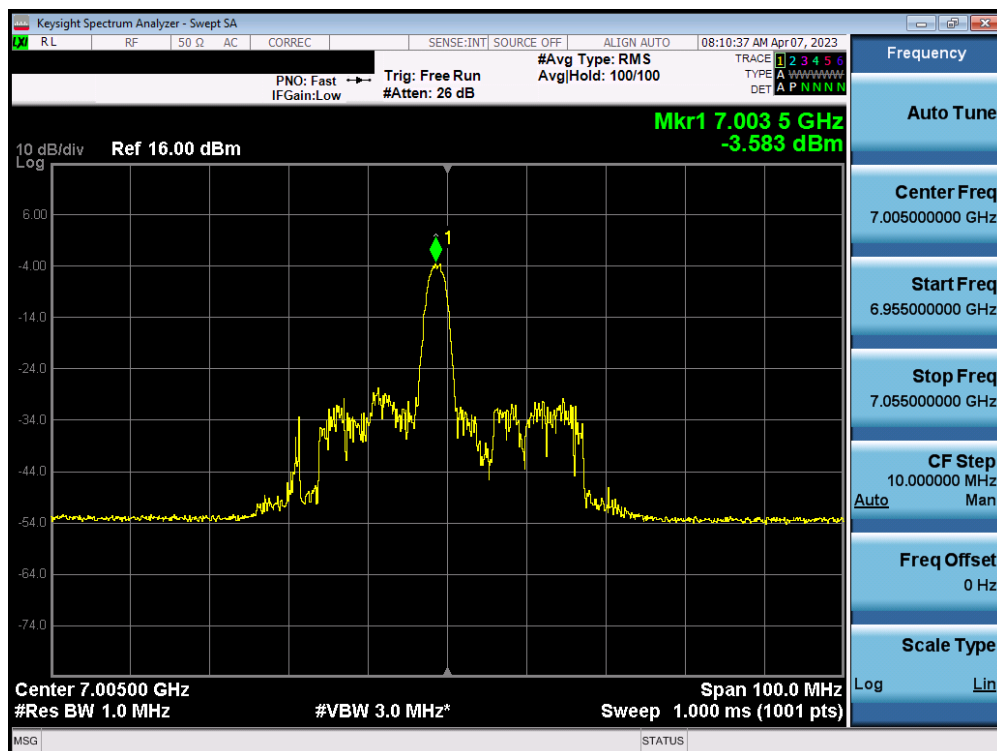


Plot 7-76. Power Spectral Density Plot MIMO ANT1 (160MHz BW 802.11ax (26 Tones) (UNII Band 7) – Ch. 143)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2303170032-14.A3L	Test Dates: 3/4 – 5/26/2023	EUT Type: Portable Handset	Page 70 of 178



Plot 7-77. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11ax (26 Tones) (UNII Band 8) – Ch. 209)

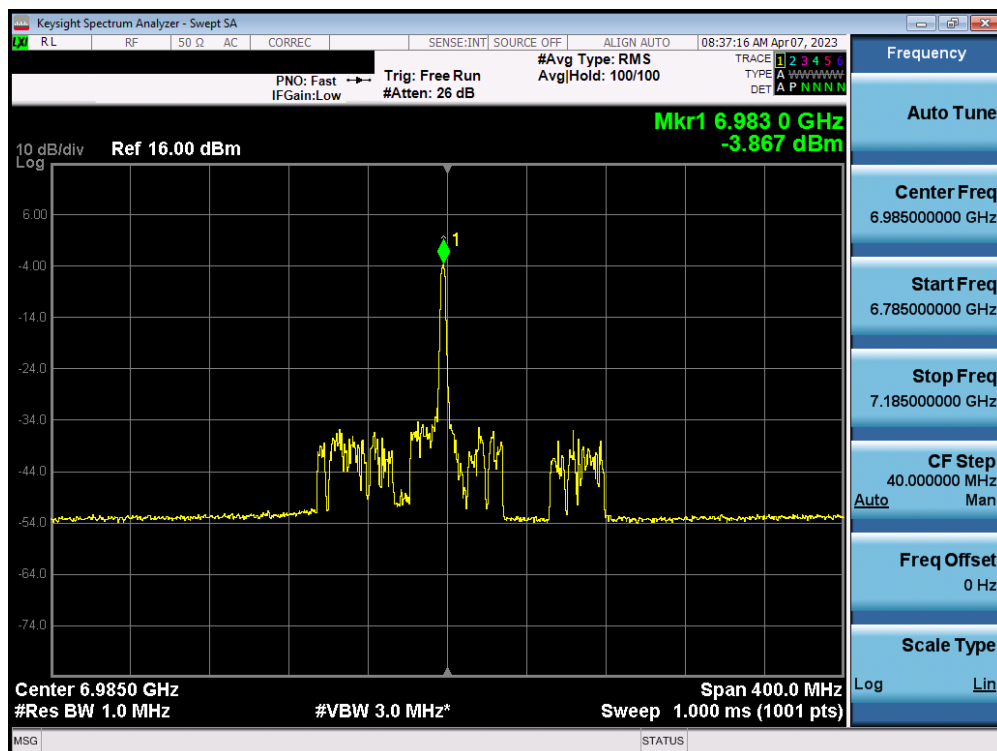


Plot 7-78. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11ax (26 Tones) (UNII Band 8) – Ch. 211)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2303170032-14.A3L	Test Dates: 3/4 – 5/26/2023	EUT Type: Portable Handset	Page 71 of 178

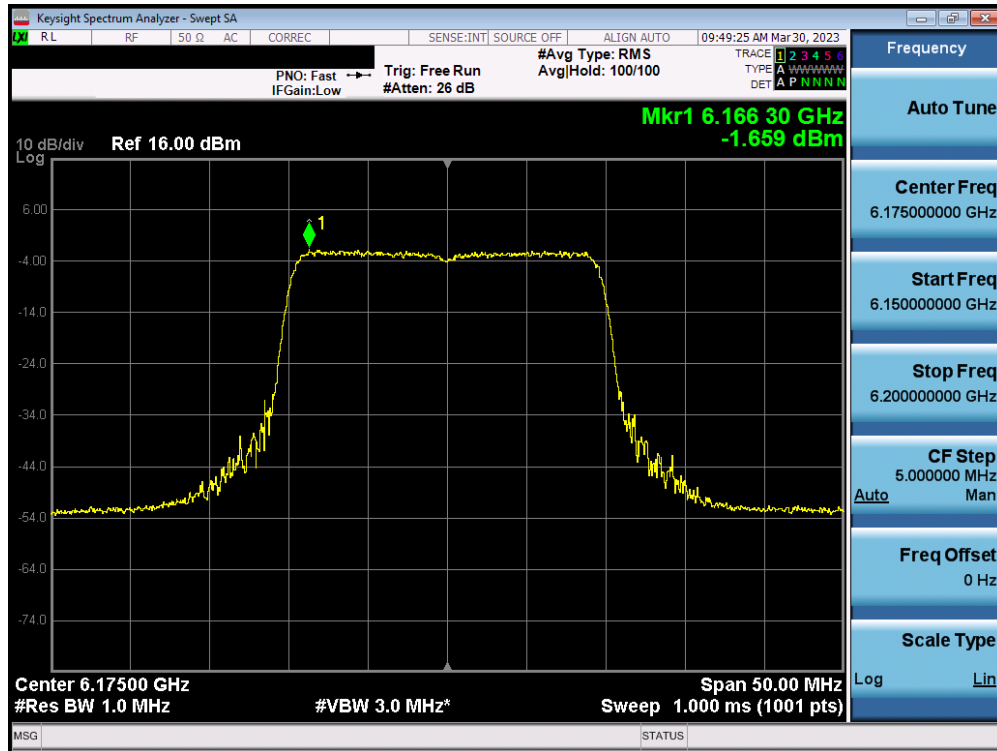


Plot 7-79. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11ax (26 Tones) (UNII Band 8) – Ch. 199)

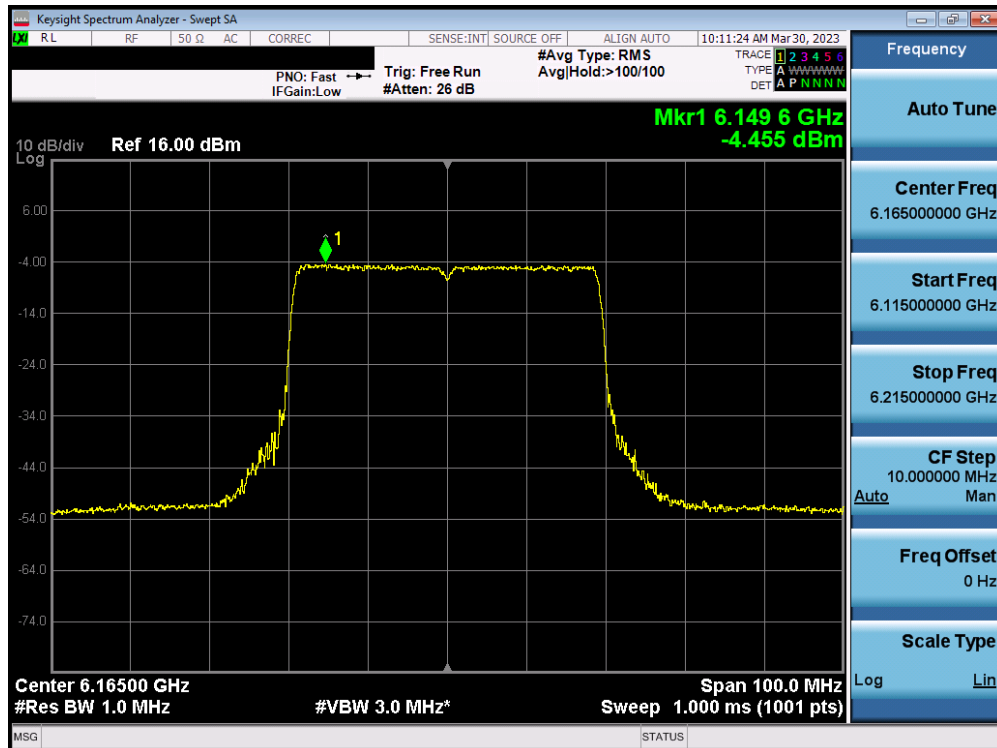


Plot 7-80. Power Spectral Density Plot MIMO ANT1 (160MHz BW 802.11ax (26 Tones) (UNII Band 8) – Ch. 207)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2303170032-14.A3L	Test Dates: 3/4 – 5/26/2023	EUT Type: Portable Handset	Page 72 of 178

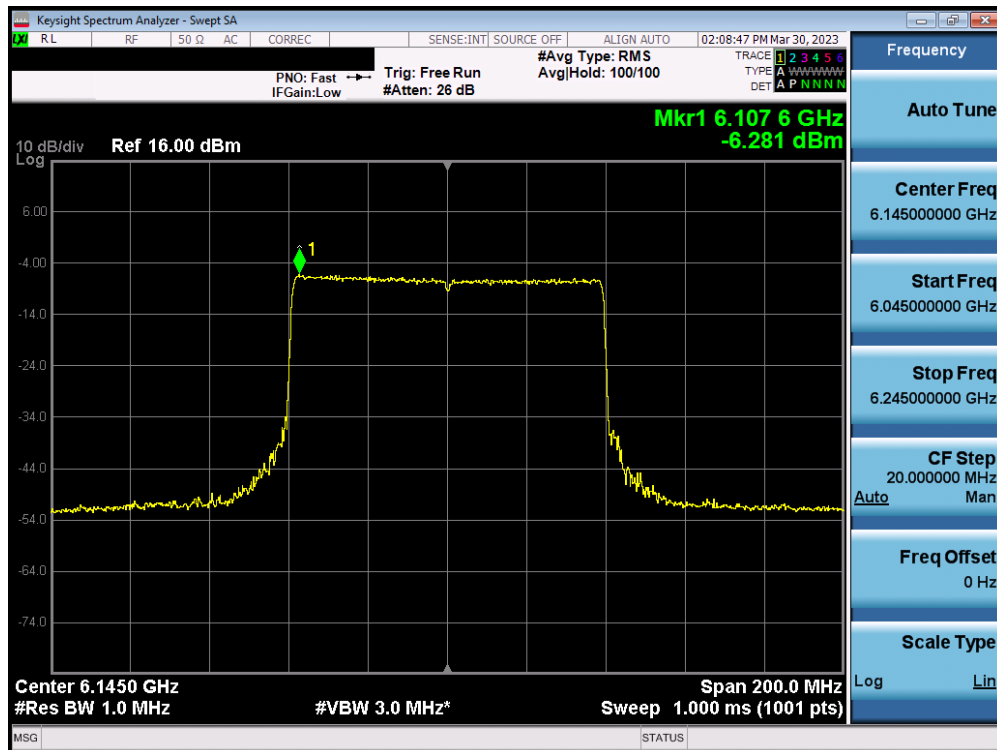


Plot 7-81. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 45)

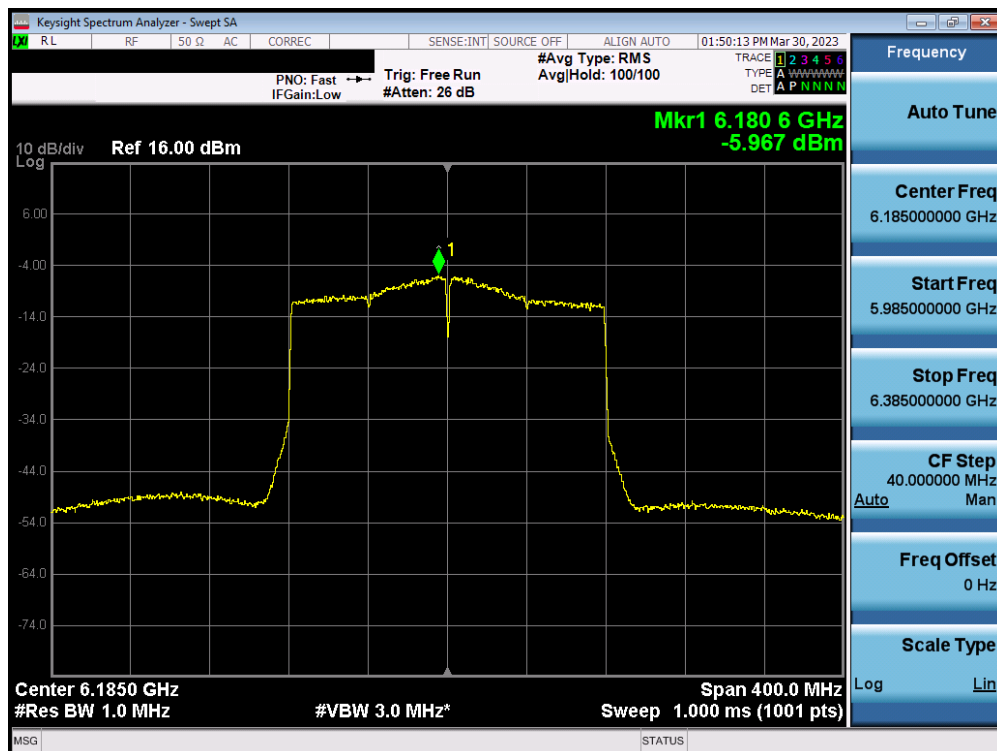


Plot 7-82. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 43)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2303170032-14.A3L	Test Dates: 3/4 – 5/26/2023	EUT Type: Portable Handset	Page 73 of 178

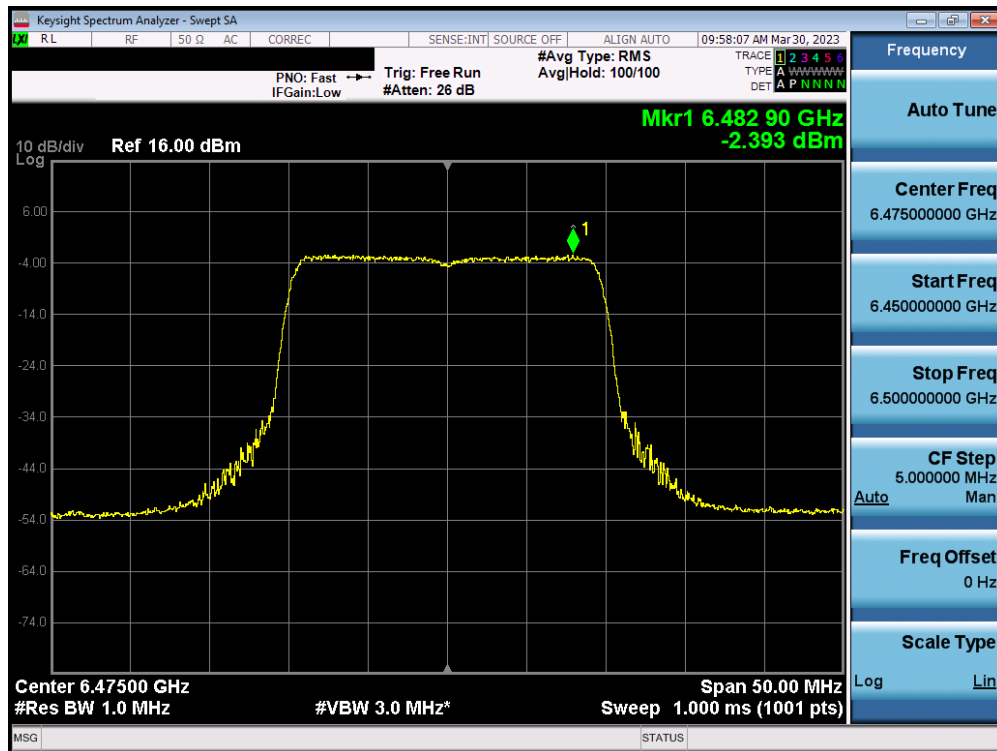


Plot 7-83. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 39)

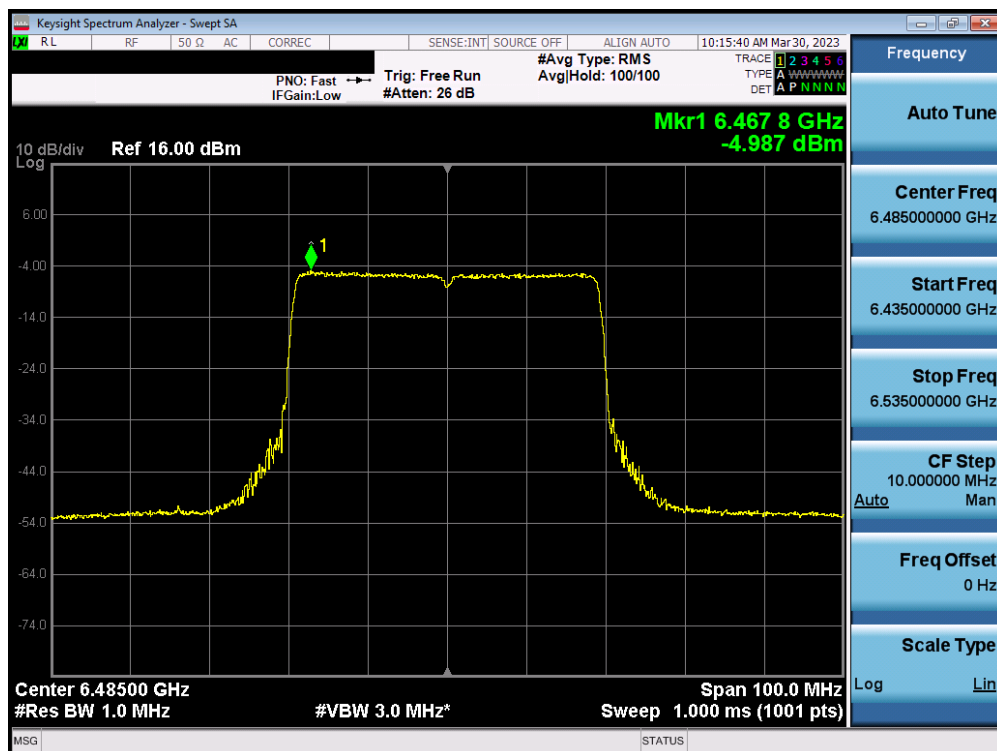


Plot 7-84. Power Spectral Density Plot MIMO ANT1 (160MHz BW 802.11ax (Full Tone) (UNII Band 5) – Ch. 47)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2303170032-14.A3L	Test Dates: 3/4 – 5/26/2023	EUT Type: Portable Handset	Page 74 of 178

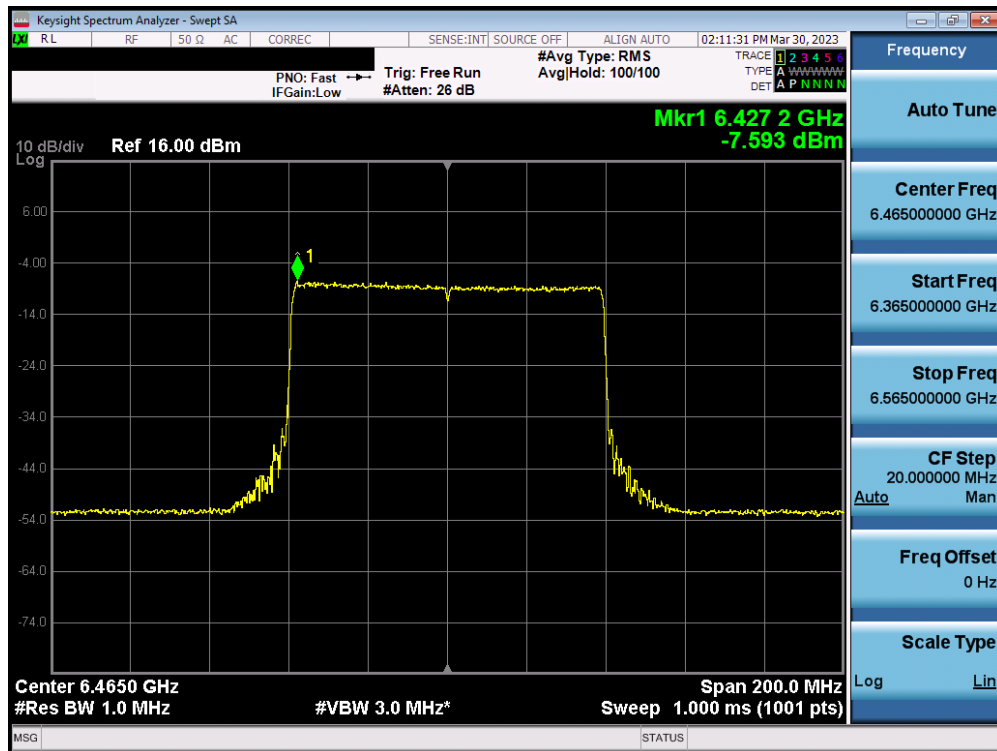


Plot 7-85. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 105)

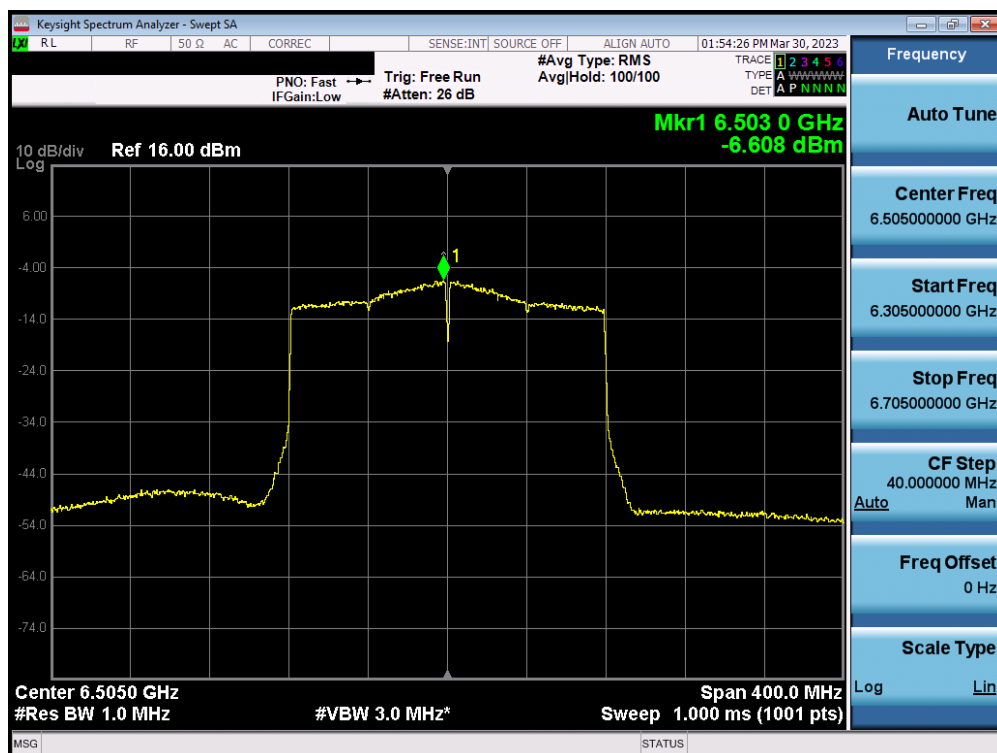


Plot 7-86. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 107)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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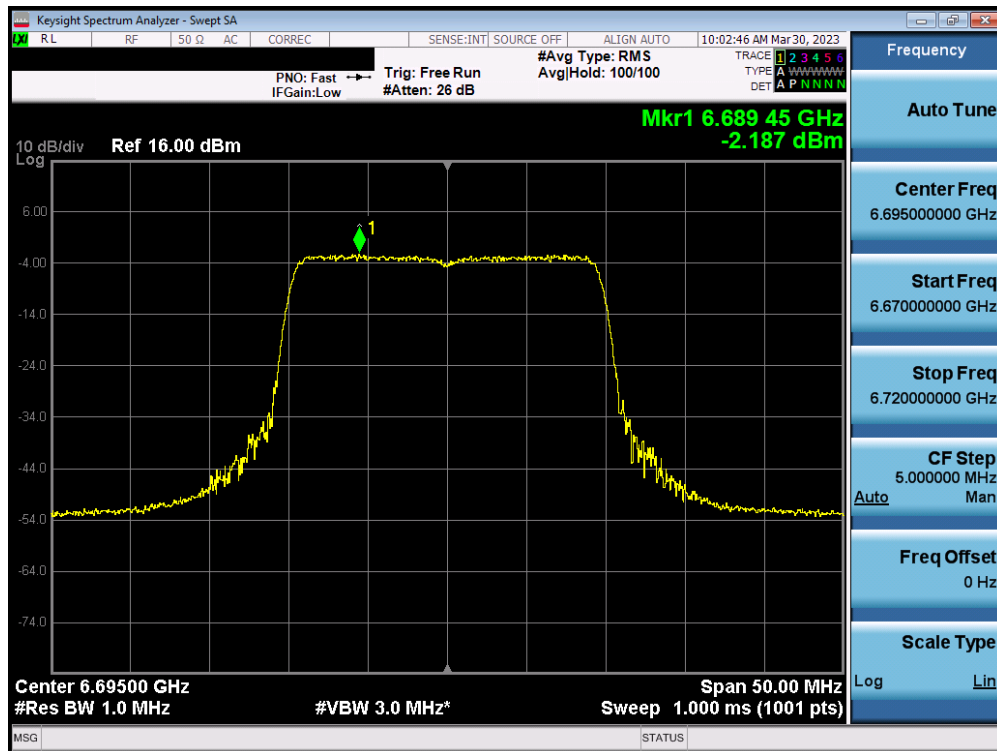


Plot 7-87. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 103)

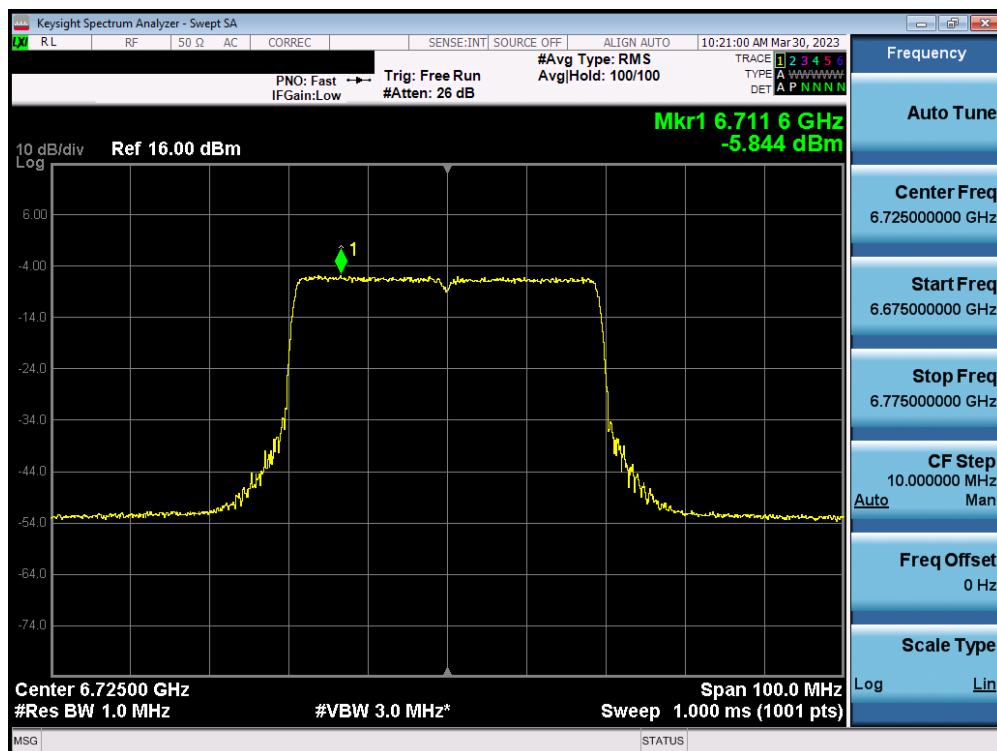


Plot 7-88. Power Spectral Density Plot MIMO ANT1 (160MHz BW 802.11ax (Full Tone) (UNII Band 6) – Ch. 111)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2303170032-14.A3L	Test Dates: 3/4 – 5/26/2023	EUT Type: Portable Handset	Page 76 of 178

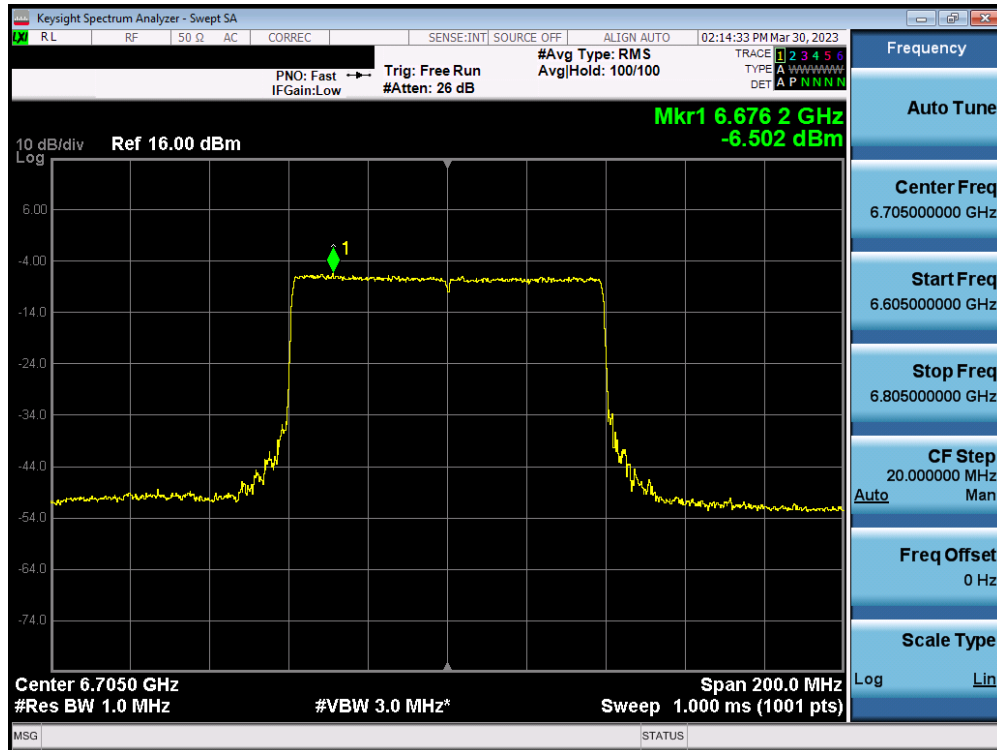


Plot 7-89. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 149)

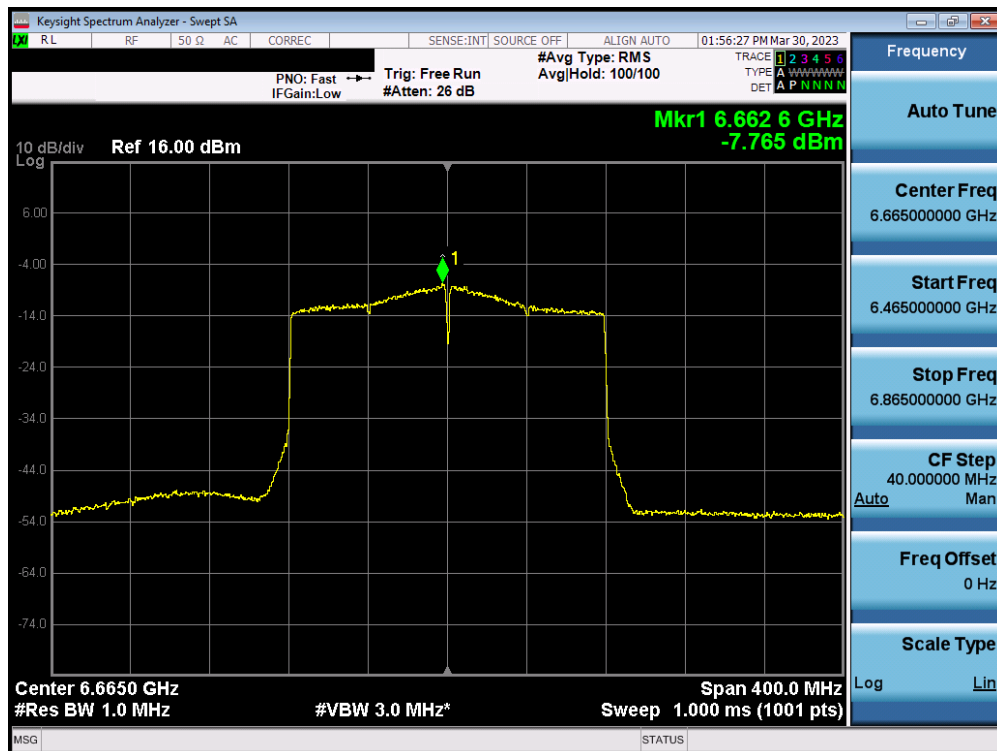


Plot 7-90. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 155)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2303170032-14.A3L	Test Dates: 3/4 – 5/26/2023	EUT Type: Portable Handset	Page 77 of 178

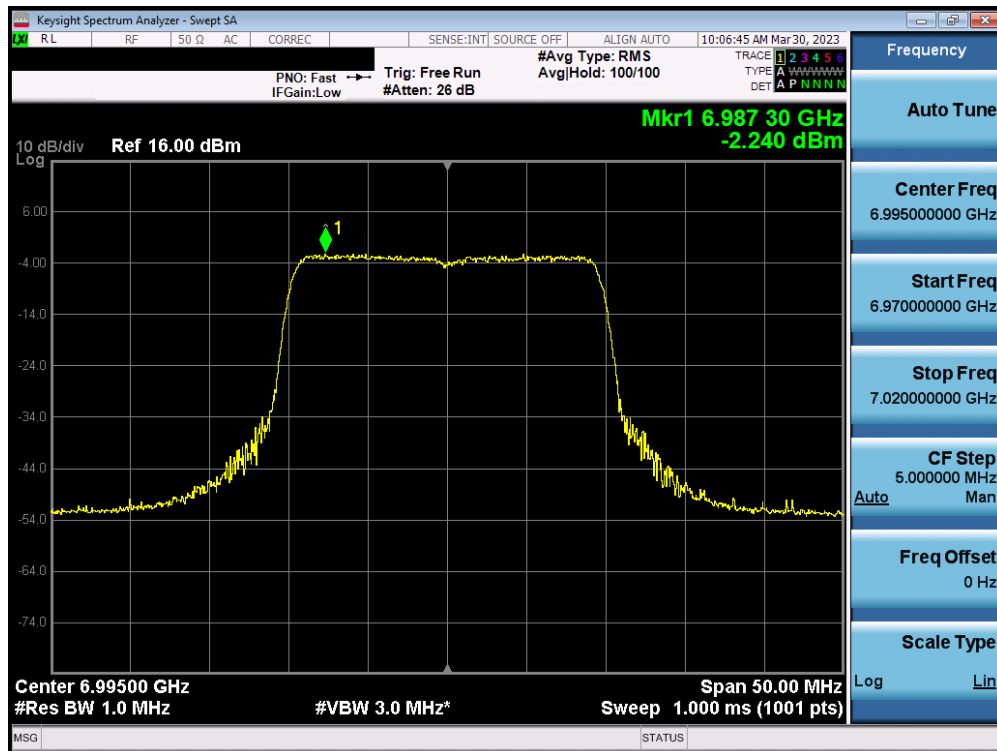


Plot 7-91. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 151)

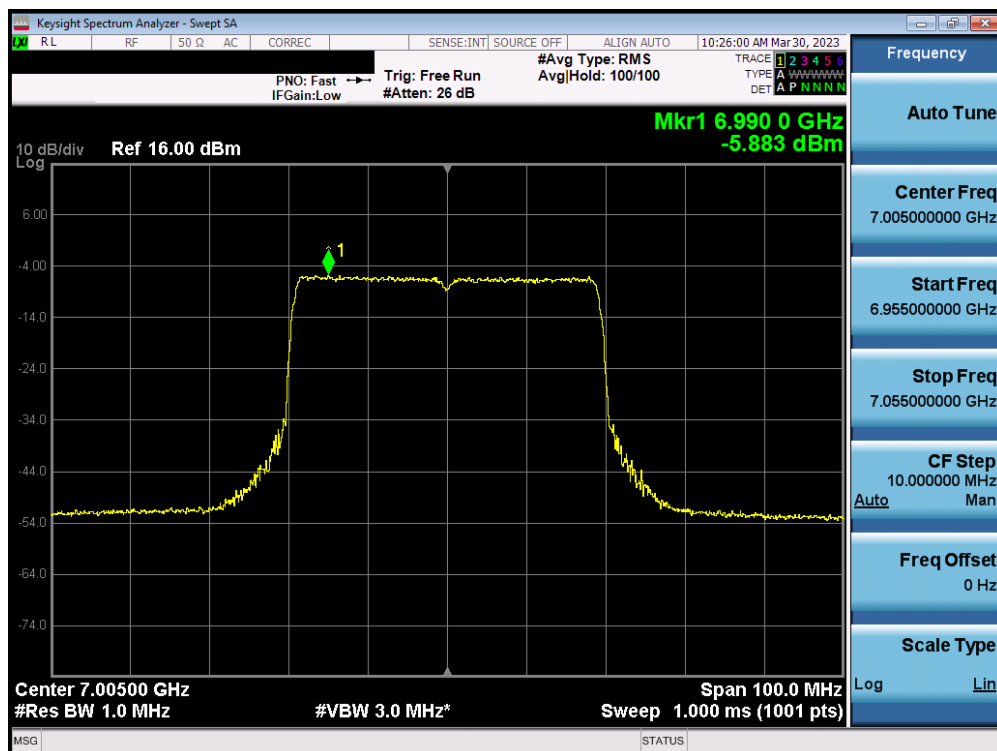


Plot 7-92. Power Spectral Density Plot MIMO ANT1 (160MHz BW 802.11ax (Full Tone) (UNII Band 7) – Ch. 143)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2303170032-14.A3L	Test Dates: 3/4 – 5/26/2023	EUT Type: Portable Handset	Page 78 of 178

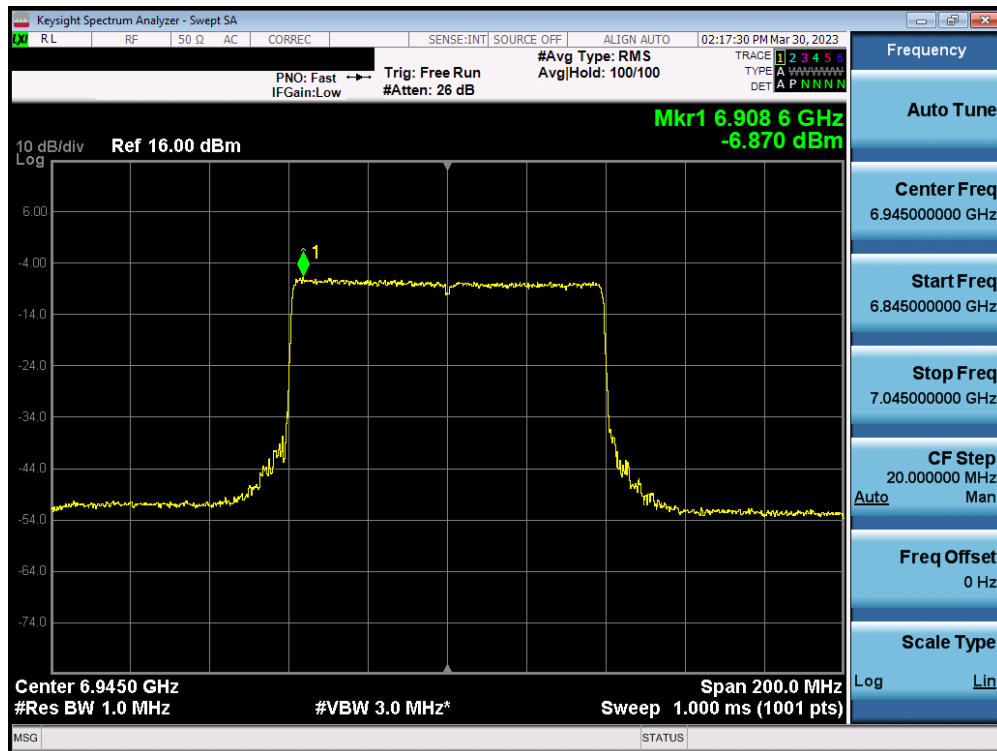


Plot 7-93. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 209)

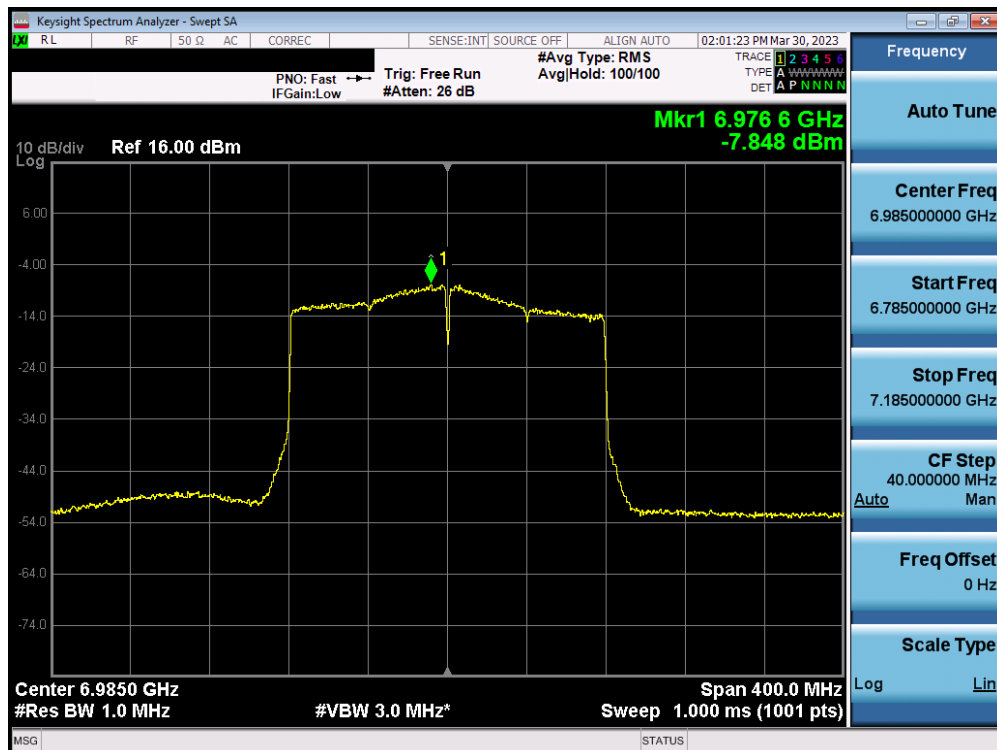


Plot 7-94. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 211)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-95. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 199)



Plot 7-96. Power Spectral Density Plot MIMO ANT1 (160MHz BW 802.11ax (Full Tone) (UNII Band 8) – Ch. 207)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2303170032-14.A3L	Test Dates: 3/4 – 5/26/2023	EUT Type: Portable Handset	Page 80 of 178

7.4.2 MIMO Antenna-2 Power Spectral Density Measurements



Plot 7-97. Power Spectral Density Plot MIMO ANT2 (20MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 45)

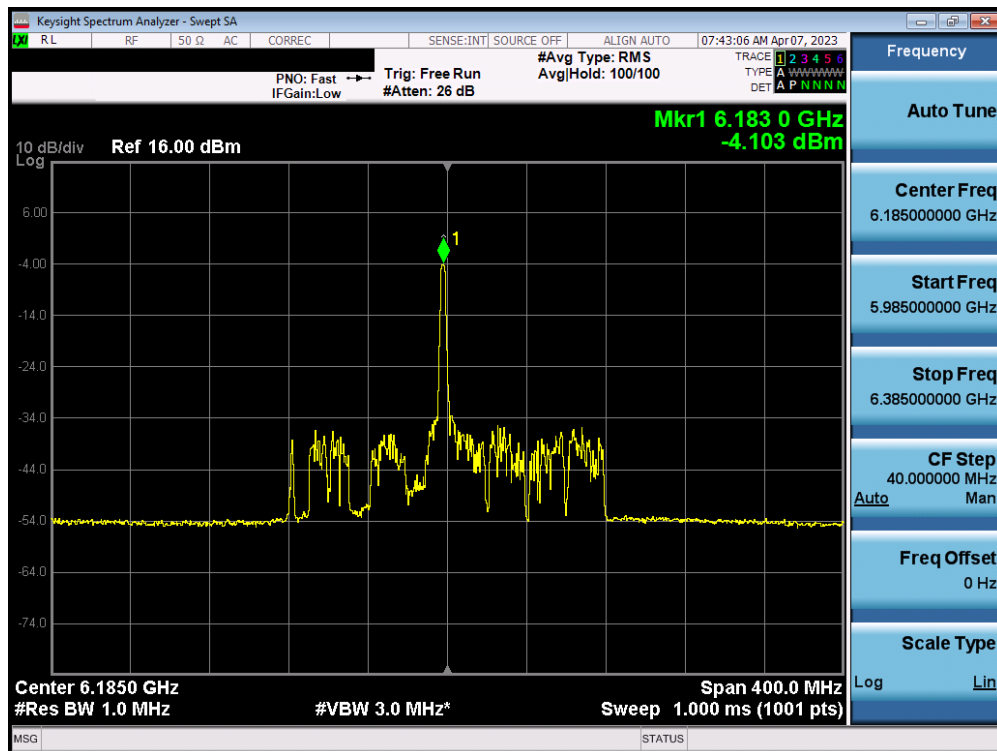


Plot 7-98. Power Spectral Density Plot MIMO ANT2 (40MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 43)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2303170032-14.A3L	Test Dates: 3/4 – 5/26/2023	EUT Type: Portable Handset	Page 81 of 178

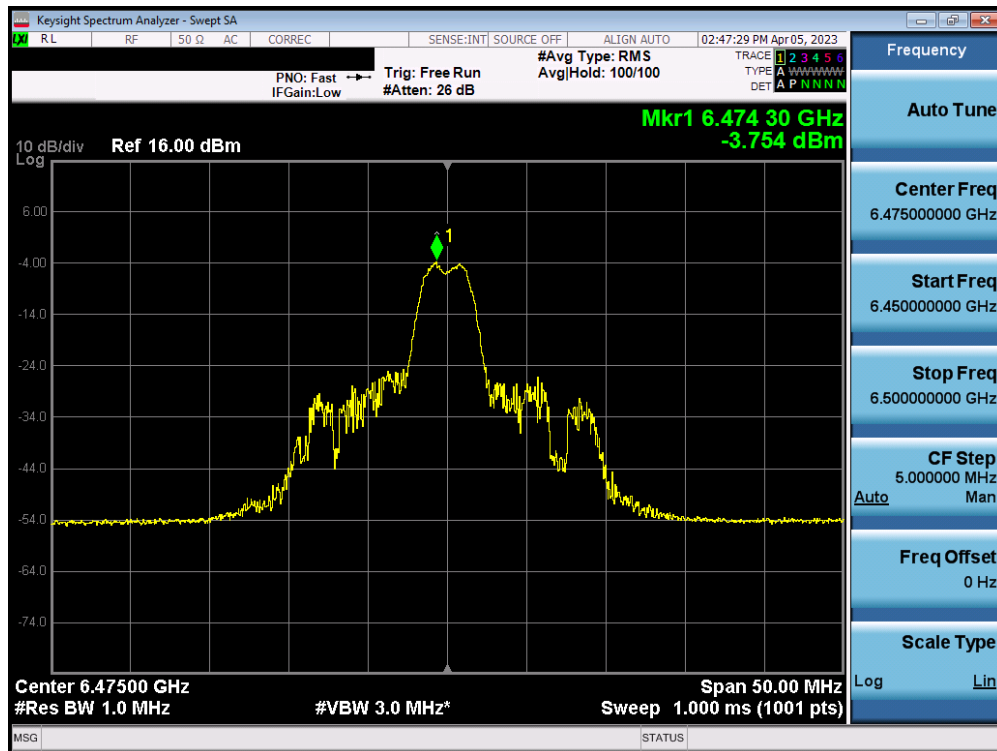


Plot 7-99. Power Spectral Density Plot MIMO ANT2 (80MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 39)

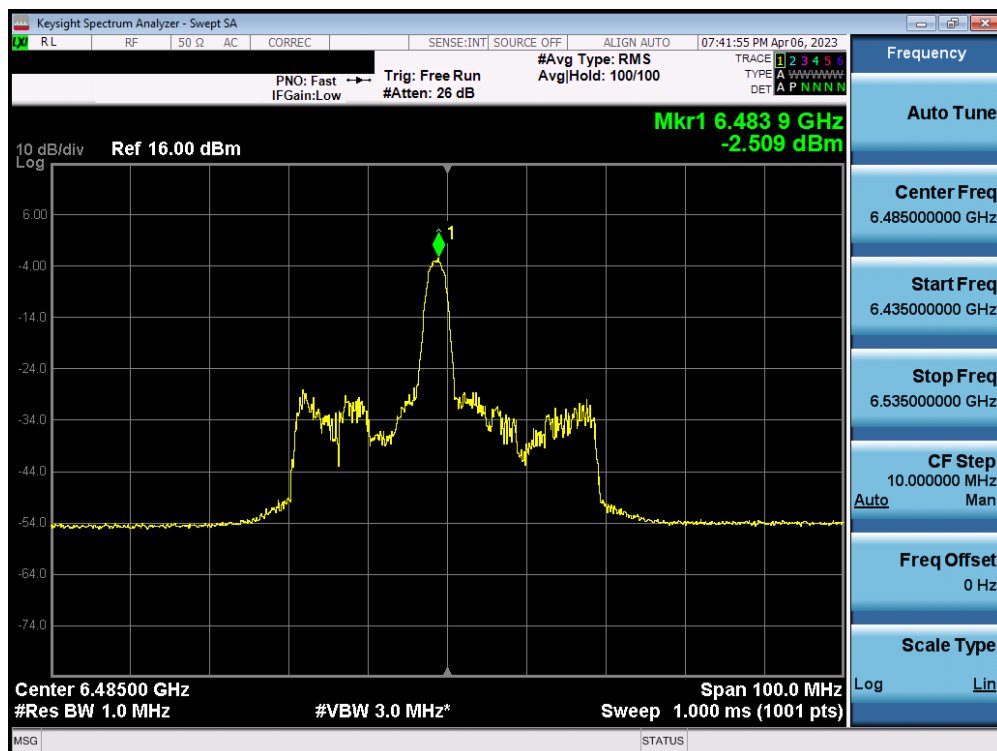


Plot 7-100. Power Spectral Density Plot MIMO ANT2 (160MHz BW 802.11ax (26 Tones) (UNII Band 5) – Ch. 47)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2303170032-14.A3L	Test Dates: 3/4 – 5/26/2023	EUT Type: Portable Handset	Page 82 of 178

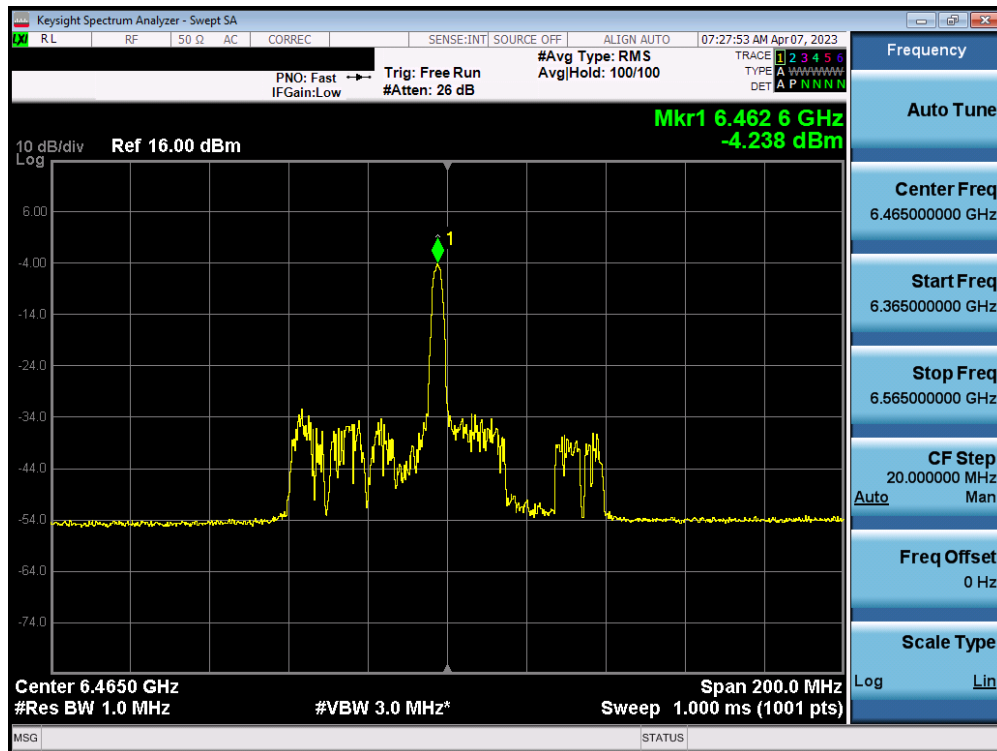


Plot 7-101. Power Spectral Density Plot MIMO ANT2 (20MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 105)

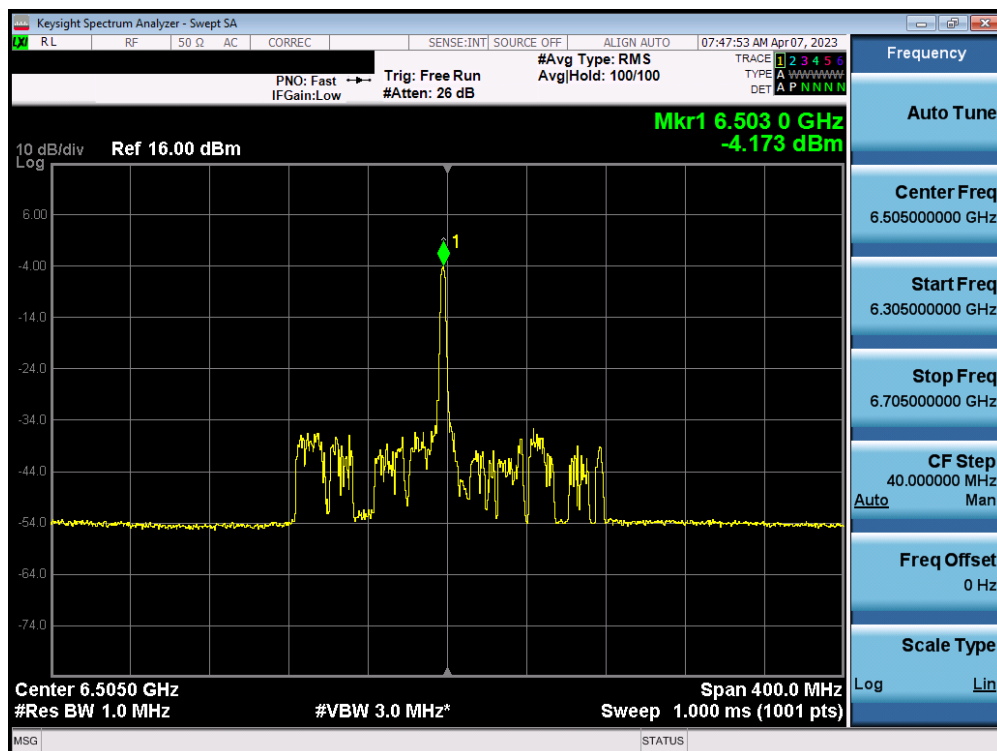


Plot 7-102. Power Spectral Density Plot MIMO ANT2 (40MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 107)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-103. Power Spectral Density Plot MIMO ANT2 (80MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 103)



Plot 7-104. Power Spectral Density Plot MIMO ANT2 (160MHz BW 802.11ax (26 Tones) (UNII Band 6) – Ch. 111)

FCC ID: A3LSMF731B	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2303170032-14.A3L	Test Dates: 3/4 – 5/26/2023	EUT Type: Portable Handset	Page 84 of 178