

**MEASUREMENT REPORT
FCC PART 15.407 802.11ax (OFDMA)**

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

Date of Testing:
11/07-12/29/2023
Test Report Issue Date:
12/22/2023
Test Site/Location:
Element lab., Columbia, MD, USA
Test Report Serial No.:
1M2311010111-14.A3L

FCC ID:	A3LSMA356U
APPLICANT:	Samsung Electronics Co., Ltd.

Application Type: Certification
Model: SM-A356U
Additional Model(s): SM-A356U1, SM-S356V
EUT Type: Portable Handset
Frequency Range: 5180 – 5825MHz
Modulation Type: OFDMA
FCC Equipment Class: Unlicensed National Information Infrastructure TX (NII)
FCC Rule Part(s): Part 15 Subpart E (15.407)
Test Procedure(s): ANSI C63.10-2013, 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



FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 1 of 110

T A B L E O F C O N T E N T S

1.0	INTRODUCTION.....	4
1.1	Scope.....	4
1.2	Element Test Location.....	4
1.3	Test Facility / Accreditations.....	4
2.0	PRODUCT INFORMATION.....	5
2.1	Equipment Description.....	5
2.2	Device Capabilities.....	5
2.3	Antenna Description.....	8
2.4	Test Configuration.....	8
2.5	Software and Firmware.....	8
2.6	EMI Suppression Device(s) / Modifications.....	8
3.0	DESCRIPTION OF TESTS.....	9
3.1	Evaluation Procedure.....	9
3.2	Radiated Emissions.....	9
3.3	Environmental Conditions.....	9
4.0	ANTENNA REQUIREMENTS.....	10
5.0	MEASUREMENT UNCERTAINTY.....	11
6.0	TEST EQUIPMENT CALIBRATION DATA.....	12
7.0	TEST RESULTS.....	13
7.1	Summary.....	13
7.2	26dB Bandwidth Measurement.....	14
7.2.1	MIMO Antenna-1 26dB Bandwidth Measurements.....	17
7.2.2	MIMO Antenna-2 26dB Bandwidth Measurements.....	26
7.3	6dB Bandwidth Measurement.....	35
7.3.1	MIMO Antenna-1 6dB Bandwidth Measurements.....	37
7.3.2	MIMO Antenna-2 6dB Bandwidth Measurements.....	40
7.4	UNII Output Power Measurement.....	43
7.5	Maximum Power Spectral Density.....	47
7.5.1	MIMO Antenna-1 Power Spectral Density Measurements.....	51
7.5.2	MIMO Antenna-2 Power Spectral Density Measurements.....	63
7.6	Radiated Emission Measurements.....	76
7.6.1	MIMO Radiated Spurious Emission Measurements (26 Tones).....	82
7.6.2	MIMO Radiated Spurious Emission Measurements (242 Tones).....	92
7.6.3	MIMO Radiated Band Edge Measurements (20MHz BW – Partial Tone – 106T).....	102
7.6.4	MIMO Radiated Band Edge Measurements (20MHz BW – Full Tone – 242T).....	104
7.6.5	MIMO Radiated Band Edge Measurements (40MHz BW – Full Tone – 484T).....	106
7.6.6	MIMO Radiated Band Edge Measurements (80MHz BW – Full Tone – 996T).....	108
8.0	CONCLUSION.....	110

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 2 of 110

MEASUREMENT REPORT

Channel Bandwidth [MHz]	UNII Band	Tx Frequency [MHz]	MIMO	
			Max. Power [mW]	Max. Power [dBm]
20	1	5180 - 5240	46.13	16.64
	2A	5260 - 5320	46.91	16.71
	2C	5500 - 5720	48.77	16.88
	3	5745 - 5825	46.47	16.67
40	1	5190 - 5230	45.98	16.63
	2A	5270 - 5310	45.70	16.60
	2C	5510 - 5710	42.99	16.33
	3	5755 - 5795	42.99	16.33
80	1	5210	35.22	15.47
	2A	5290	35.86	15.55
	2C	5530 - 5690	36.29	15.60
	3	5775	34.37	15.36

EUT Overview

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 3 of 110

1.0 INTRODUCTION

1.1 Scope

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

1.2 Element Test Location

These measurement tests were conducted at the Element 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).

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 4 of 110

2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMA356U**. The test data contained in this report pertains only to the emissions due to the EUT's UNII transmitter.

Test Device Serial No.: 3576M, 3642M, 0638M, 0622M, 1078M, 0626M

2.2 Device Capabilities

This device contains the following capabilities:

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

Band 1		Band 2A		Band 2C		Band 3	
Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
36	5180	52	5260	100	5500	149	5745
:	:	:	:	:	:	:	:
40	5200	56	5280	120	5600	157	5785
:	:	:	:	:	:	:	:
48	5240	64	5320	144	5720	165	5825

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

Band 1		Band 2A		Band 2C		Band 3	
Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
38	5190	54	5270	102	5510	151	5755
:	:	:	:	:	:	:	:
46	5230	62	5310	118	5590	159	5795
				:	:		
				142	5710		

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

Band 1		Band 2A		Band 2C		Band 3	
Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
42	5210	58	5290	106	5530	155	5775
				:	:		
				122	5610		
				:	:		
				138	5690		

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

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 5 of 110

Notes:

- 5GHz 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:

Band	Bandwidth	Tone Type	Tone Size	MIMO (1+2)
				Duty Cycle [%]
5GHz	20MHz	RU	26T	98.06
			52T	97.78
			106T	97.92
			242T	97.55
	40MHz	RU	26T	98.08
			52T	98.05
			106T	97.64
			242T	97.18
	80MHz	RU	484T	94.70
			26T	98.07
			52T	98.31
			106T	97.60
		RU	242T	97.55
			484T	94.00
			996T	88.46

Table 2-4. Measured Duty Cycles

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

WiFi Configurations		SISO		SDM		CDD	
		ANT1	ANT2	ANT1	ANT2	ANT1	ANT2
5GHz	11a	✓	✓	✗	✗	✓	✓
	11n	✓	✓	✓	✓	✓	✓
	11ac	✓	✓	✓	✓	✓	✓
	11ax	✓	✓	✓	✓	✓	✓

Table 2-5. Frequency / Channel Operations

✓ = Support; ✗ = NOT Support

SISO = Single Input Single Output

SDM = Spatial Diversity Multiplexing – MIMO function

CDD = Cyclic Delay Diversity – 2Tx Function

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

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 6 of 110

802.11a	MCS Index				Spatial Stream	OFDM (802.11n/802.11ac)				OFDM (802.11ac)		OFDM (802.11ax)								
						20MHz		40MHz		80MHz		20MHz			40MHz			80MHz		
	HT	VHT	HE	EHT		0.8μs GI	0.4μs GI	0.8μs GI	0.4μs GI	0.8μs GI	0.4μs 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
6	0	0	0	0	1	6.5	7.2	13.5	15	29.3	32.5	8.6	8.1	7.3	17.2	16.3	14.6	36	34	30.6
9	1	1	1	1	1	13	14.4	27	30	58.5	65	17.2	16.3	14.6	34.4	32.5	29.3	72.1	68.1	61.3
12	2	2	2	2	1	19.5	21.7	40.5	45	87.8	97.5	25.8	24.4	21.9	51.6	48.8	43.9	108.1	102.1	91.9
18	3	3	3	3	1	26	28.9	54	60	117	130	34.4	32.5	29.3	68.8	65	58.5	144.1	136.1	122.5
24	4	4	4	4	1	39	43.3	81	90	175.5	195	51.6	48.8	43.9	103.2	97.5	87.8	216.2	204.2	183.8
36	5	5	5	5	1	52	57.8	108	120	234	260	68.8	65	58.5	137.6	130	117	288.2	272.2	245
48	6	6	6	6	1	58.5	65	121.5	135	263.3	292.5	77.4	73.1	65.8	154.9	146.3	131.6	324.3	306.3	275.6
54	7	7	7	7	1	65	72.2	135	150	292.5	325	86	81.3	73.1	172.1	162.5	146.3	360.3	340.3	306.3
		8	8	8	1	78	86.7	162	180	351	390	103.2	97.5	87.8	206.5	195	175.5	432.4	408.3	367.5
		9	9	9	1	N/A	N/A	180	200	390	433.3	114.7	108.3	97.5	229.4	216.7	195	480.4	453.7	408.3
			10	10	1							129	121.9	109.7	258.1	243.8	219.4	540.4	510.4	459.4
			11	11	1							143.4	135.4	121.9	286.8	270.8	243.8	600.5	567.1	510.4
				12	1							154.9	146.3	131.6	309.7	292.5	263.3	648.5	612.5	551.3
				13	1							172.1	162.5	146.3	344.1	325	292.5	720.6	680.6	612.5
6	8	0	0	0	2	13	14.4	27	30	58.5	65	17.2	16.3	14.6	34.4	32.5	29.3	72.1	68.1	61.3
9	9	1	1	1	2	26	28.9	54	60	117	130	34.4	32.5	29.3	68.8	65	58.5	144.1	136.1	122.5
12	10	2	2	2	2	39	43.3	81	90	175.5	195	51.6	48.8	43.9	103.2	97.5	87.8	216.2	204.2	183.8
18	11	3	3	3	2	52	57.8	108	120	234	260	68.8	65	58.5	137.6	130	117	288.2	272.2	245
24	12	4	4	4	2	78	86.7	162	180	351	390	103.2	97.5	87.8	206.5	195	175.5	432.4	408.3	367.5
36	13	5	5	5	2	104	115.6	216	240	468	520	137.6	130	117	275.3	260	234	576.5	544.4	490
48	14	6	6	6	2	117	130	243	270	526.5	585	154.9	146.3	131.6	309.7	292.5	263.3	648.5	612.5	551.3
54	15	7	7	7	2	130	144.4	270	300	585	650	172.1	162.5	146.3	344.1	325	292.5	720.6	680.6	612.5
		8	8	8	2	156	173.3	324	360	702	780	206.5	195	175.5	412.9	390	351	864.7	816.7	735
		9	9	9	2	N/A	N/A	360	400	780	866.7	229.4	216.7	195	458.8	433.3	390	960.8	907.4	816.7
			10	10	2							258.1	243.8	219.4	516.2	487.5	438.8	1080.9	1020.8	918.8
			11	11	2							286.8	270.8	243.8	573.5	541.7	487.5	1201	1134.3	1020.8
				12	2							309.7	292.5	263.3	619.4	585	526.5	1297.1	1225	1102.5
				13	2							344.1	325	292.5	688.2	650	585	1441.2	1361.1	1225

Table 2-6. Supported Data Rates

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 7 of 110

2.3 Antenna Description

The following antenna gains were used for the testing.

Frequency [GHz]	Antenna 1 Gain (dBi)	Antenna 2 Gain (dBi)	Directional Gain (dBi)
5.20	-3.55	-2.69	-0.10
5.30	-2.54	-2.59	0.45
5.50	-3.24	-3.44	-0.33
5.80	-1.20	-6.52	-0.45

Table 2-7. Antenna Peak Gain

2.4 Test Configuration

ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions. See Section 7.6 for radiated emissions test setups, and 7.2, 7.3, 7.4, and 7.5 for antenna port conducted emissions test setups.

2.5 Software and Firmware

The test was conducted with software/firmware version A356USQU0AWJ2 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.

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 8 of 110

3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

The measurement procedures described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) was used in the measurement of the EUT.

Deviation from measurement procedure.....None

3.2 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.

3.3 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).

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 9 of 110

4.0 ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

“An intentional radiator antenna shall be designed to ensure that no antenna other than that furnished by the responsible party can be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.”

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

Conclusion:

The EUT complies with the requirement of §15.203.

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 10 of 110

5.0 MEASUREMENT UNCERTAINTY

The measurement uncertainties shown below were calculated in accordance with the requirements of ANSI C63.10-2013. All measurement uncertainty values are shown with a coverage factor of $k = 2$ to indicate a 95% level of confidence. The measurement uncertainty shown below meets or exceeds the U_{CISPR} measurement uncertainty values specified in CISPR 16-4-2 and, thus, can be compared directly to specified limits to determine compliance.

Contribution	Expanded Uncertainty (\pm dB)
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

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 11 of 110

6.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	AP2-001	EMC Cable and Switch System	1/11/2023	Annual	1/11/2024	AP2-001
-	ETS-001	EMC Cable and Switch System	1/11/2023	Annual	1/11/2024	ETS-001
-	ETS-002	EMC Cable and Switch System	1/11/2023	Annual	1/11/2024	ETS-002
-	MD 1M 18-40	EMC Cable and Switch System	1/11/2023	Annual	1/11/2024	MD 1M 18-40
-	WL40-1	Conducted Cable Set (40GHz)	1/12/2023	Annual	1/12/2024	WL40-1
-	WL25-1	Conducted Cable Set (25GHz)	1/12/2023	Annual	1/12/2024	WL25-1
Anritsu	MA24406A	Microwave Peak Power Sensor	9/7/2023	Annual	9/7/2024	11240
Emco	3115	Horn Antenna (1-18GHz)	8/8/2022	Biennial	8/8/2024	9704-5182
Emco	3116	Horn Antenna (18 - 40GHz)	7/5/2022	Biennial	7/5/2024	9203-2178
Pastermack	MNLC-2	Line Conducted Emission Cable (NM)	1/11/2023	Annual	1/11/2024	NMNC-2
ETS-Lindgren	3816/2NM	Line Impedance Stabilization Network	8/11/2022	Biennial	8/11/2024	114451
ETS Lindgren	3116C	1-18 GHz DRG Horn Antenna	2/27/2023	Biennial	2/27/2024	00218893
ETS Lindgren	3115	Double Ridged Guide Horn	4/12/2022	Biennial	4/12/2024	82333
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	4/13/2022	Biennial	4/13/2025	121034
Keysight Technologies	N9020A	MXA Signal Analyzer	3/15/2023	Annual	3/15/2024	MY54500644
Keysight Technologies	N9030A	PXA Signal Analyzer (44GHz)	3/15/2023	Annual	3/15/2024	MY52350166
Keysight Technologies	N9030A	PXA Signal Analyzer	1/31/2023	Annual	1/31/2024	MY55410501
Keysight Technologies	N9030B	PXA Signal Analyzer, Multi-touch	9/7/2023	Annual	9/7/2024	MY57141001
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	9/25/2023	Annual	9/25/2024	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	9/11/2023	Annual	9/11/2024	100348
Rohde & Schwarz	ESW44	EMI Test Receiver 2Hz to 44 GHz	3/1/2023	Annual	3/1/2024	101716
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	1/13/2023	Annual	1/13/2024	103200
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	2/21/2023	Biennial	2/21/2025	A051107
Sunol	JB6	LB6 Antenna	3/2/2023	Biennial	3/2/2025	A082816

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.

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 12 of 110

7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.
 FCC ID: A3LSMA356U
 FCC Classification: Unlicensed National Information Infrastructure (UNII)

FCC Part Section(s)	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
N/A	RSS-Gen [6.7]	26dB Bandwidth	N/A	CONDUCTED	PASS	Section 7.2
15.407(e)	RSS-Gen [6.7]	6dB Bandwidth	>500kHz (5725-5850MHz and 5850 – 5895MHz)		PASS	Section 7.3
15.407 (a)(1)(iv), (a)(2), (a)(3)	RSS-247 [6.2]	Maximum Conducted Output Power	Maximum conducted powers must meet the limits detailed in 15.407 (a) (RSS-247 [6.2])		PASS	Section 7.4
15.407 (a)(1)(iv), (a)(2), (a)(3)	RSS-247 [6.2]	Maximum Power Spectral Density	Maximum power spectral density must meet the limits detailed in 15.407 (a) (RSS-247 [6.2])		PASS	Section 7.5
15.407(h)	RSS-247 [6.3]	Dynamic Frequency Selection	See DFS Test Report		PASS	See DFS Test Report
15.407(b)(1), (b)(2), (b)(3), (b)(4)	RSS-247 [6.2]	Undesirable Emissions	Undesirable emissions must meet the limits detailed in 15.407(b) (RSS-247 [6.2])	RADIATED	PASS	Section 7.6
15.205, 15.407(b)(1), (b)(4), (b)(5), (b)(6)	RSS-Gen [8.9]	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209 (RSS-Gen [8.9])		PASS	Section 7.6, 7.7

Table 7-1. Summary of Test Results

Notes:

- 1) All channels, modes, and modulations/data rates were investigated among all UNII bands. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is 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 1.5.0.
- 6) 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.
- 7) Only one RU index could be selected at a time, so no contiguous or non-contiguous RUs were considered for testing.

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 13 of 110

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.

The 26dB bandwidth is used to determine the conducted power limits.

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 x RBW
4. Detector = Peak
5. Trace mode = max hold

Test Setup

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



Figure 7-1. Test Instrument & Measurement Setup

Test Notes

The 26dB Bandwidth measurement for each channel was measured with the RU index showing the highest conducted power.

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 14 of 110

MIMO 26dB Bandwidth Measurements

	Frequency [MHz]	802.11 MODE	Channel	Antenna-1 26dB Bandwidth [MHz]	Antenna-2 26dB Bandwidth [MHz]
Band 1	5180	ax (20MHz)	36	22.81	21.48
	5200	ax (20MHz)	40	22.24	21.44
	5240	ax (20MHz)	48	22.59	21.67
	5190	ax (40MHz)	38	19.76	24.39
	5230	ax (40MHz)	46	22.13	23.40
	5210	ax (80MHz)	42	23.17	23.21
Band 2A	5260	ax (20MHz)	52	22.21	22.10
	5280	ax (20MHz)	56	23.16	22.08
	5320	ax (20MHz)	64	22.63	21.38
	5270	ax (40MHz)	54	21.89	23.09
	5310	ax (40MHz)	62	22.37	21.95
	5290	ax (80MHz)	58	23.79	21.55
Band 2C	5500	ax (20MHz)	100	21.78	21.60
	5600	ax (20MHz)	120	21.44	21.65
	5720	ax (20MHz)	144	22.08	21.02
	5510	ax (40MHz)	102	21.95	23.07
	5590	ax (40MHz)	118	22.32	22.49
	5710	ax (40MHz)	142	21.52	22.77
	5530	ax (80MHz)	106	24.46	22.93
	5610	ax (80MHz)	122	22.71	25.21
	5690	ax (80MHz)	138	23.32	24.62

Table 7-2. Bands 1, 2A, 2C Conducted 26dB Bandwidth Measurements MIMO (26 Tones)

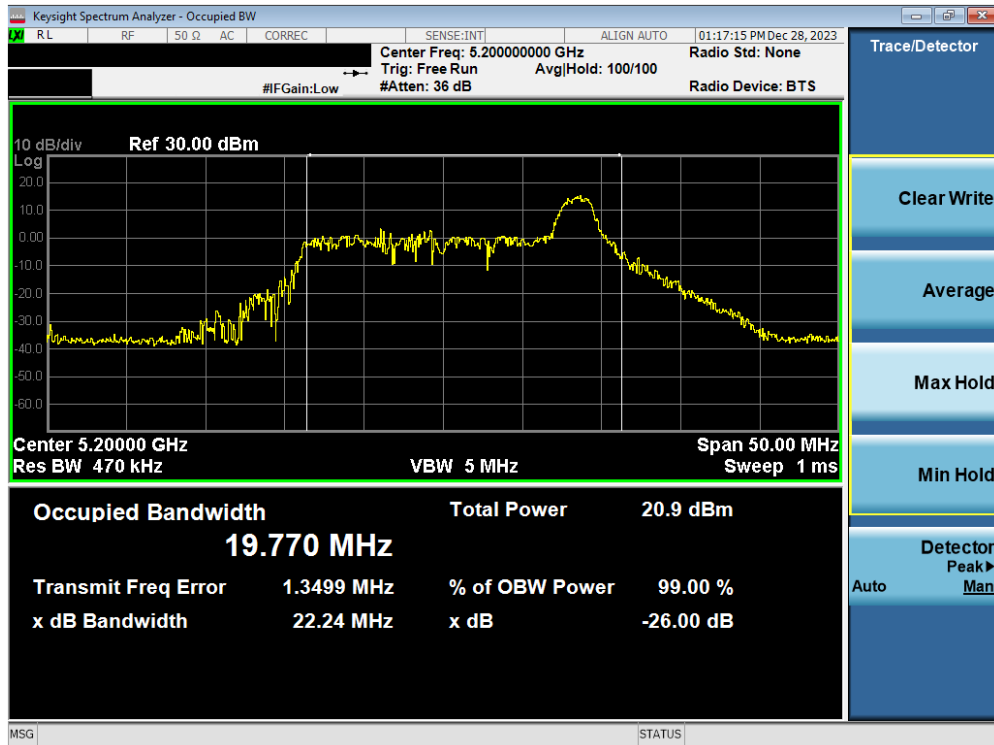
FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 15 of 110

	Frequency [MHz]	802.11 MODE	Channel	Antenna-1 26dB Bandwidth [MHz]	Antenna-2 26dB Bandwidth [MHz]
Band 1	5180	ax (20MHz)	36	29.08	27.23
	5200	ax (20MHz)	40	32.76	33.20
	5240	ax (20MHz)	48	30.52	27.68
	5190	ax (40MHz)	38	68.82	65.85
	5230	ax (40MHz)	46	70.85	66.56
	5210	ax (80MHz)	42	86.45	86.86
Band 2A	5260	ax (20MHz)	52	29.35	27.81
	5280	ax (20MHz)	56	34.04	28.65
	5320	ax (20MHz)	64	31.60	30.37
	5270	ax (40MHz)	54	71.30	69.57
	5310	ax (40MHz)	62	72.61	70.15
	5290	ax (80MHz)	58	100.21	86.26
Band 2C	5500	ax (20MHz)	100	27.08	27.26
	5600	ax (20MHz)	120	33.26	29.76
	5720	ax (20MHz)	144	31.00	32.30
	5510	ax (40MHz)	102	50.64	49.36
	5590	ax (40MHz)	118	84.64	75.37
	5710	ax (40MHz)	142	75.12	76.31
	5530	ax (80MHz)	106	151.12	121.60
	5610	ax (80MHz)	122	165.07	171.73
	5690	ax (80MHz)	138	138.96	137.40

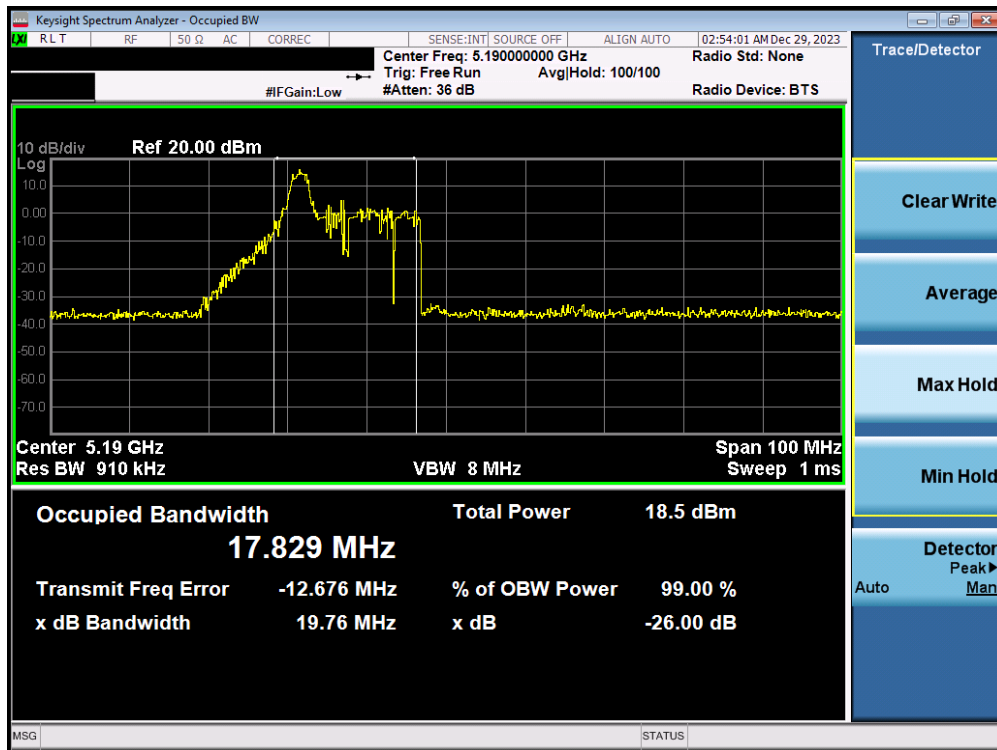
Table 7-3. Bands 1, 2A, 2C Conducted 26dB Bandwidth Measurements MIMO (Full Tones)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 16 of 110

7.2.1 MIMO Antenna-1 26dB Bandwidth Measurements

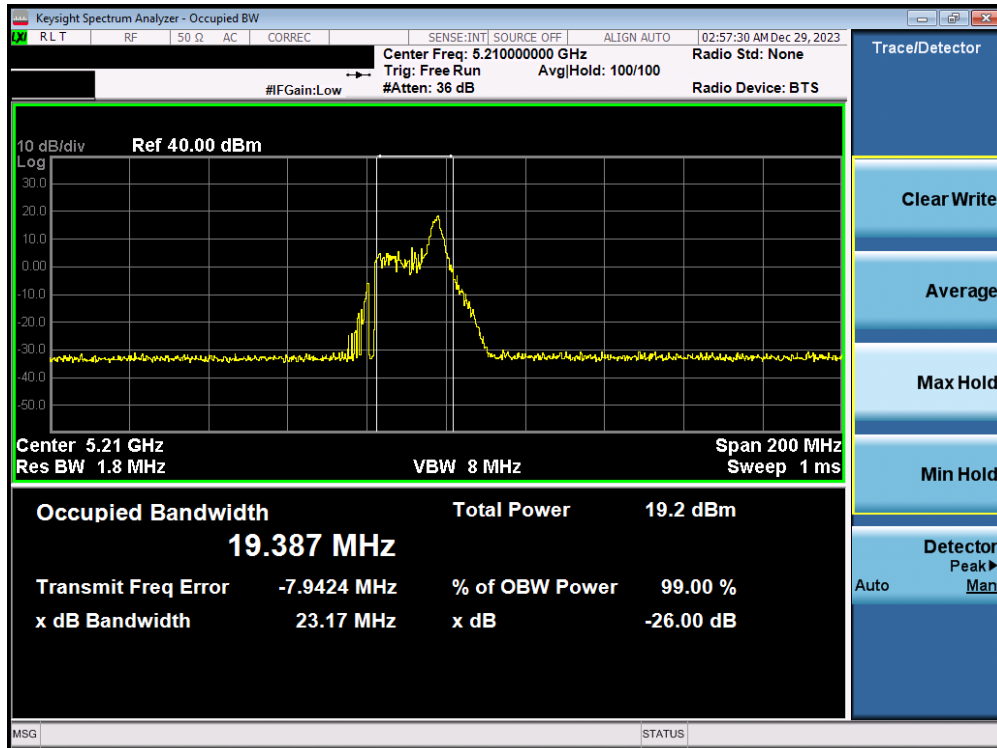


Plot 7-1. 26dB Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax – 26 Tones (UNII Band 1) – Ch. 40)

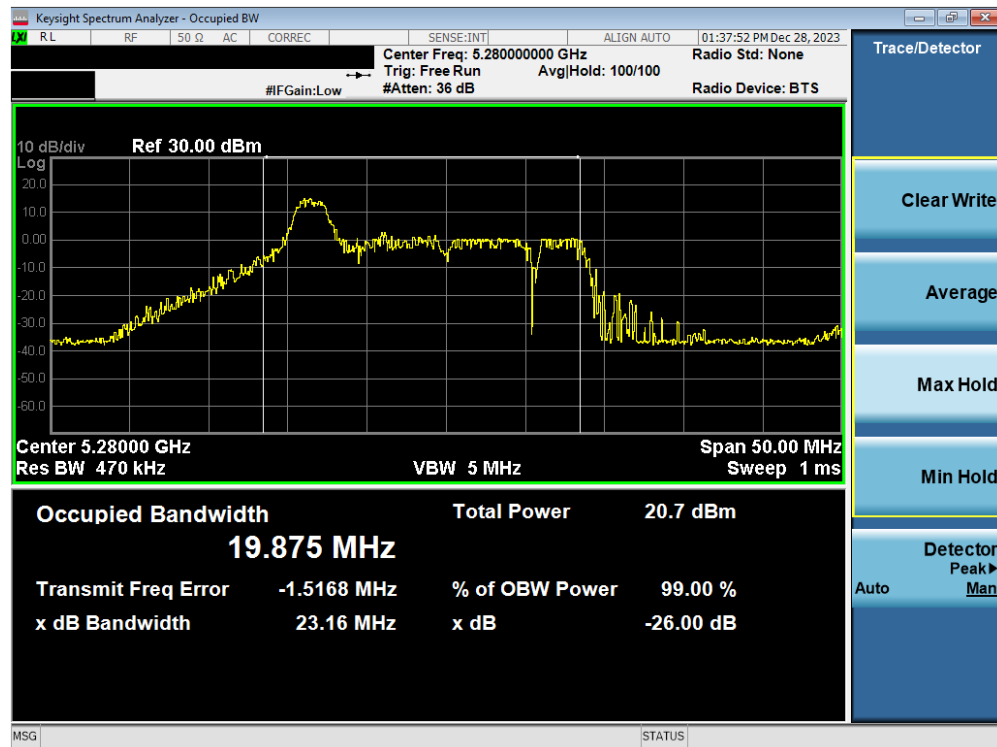


Plot 7-2. 26dB Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax – 26 Tones (UNII Band 1) – Ch. 38)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 17 of 110

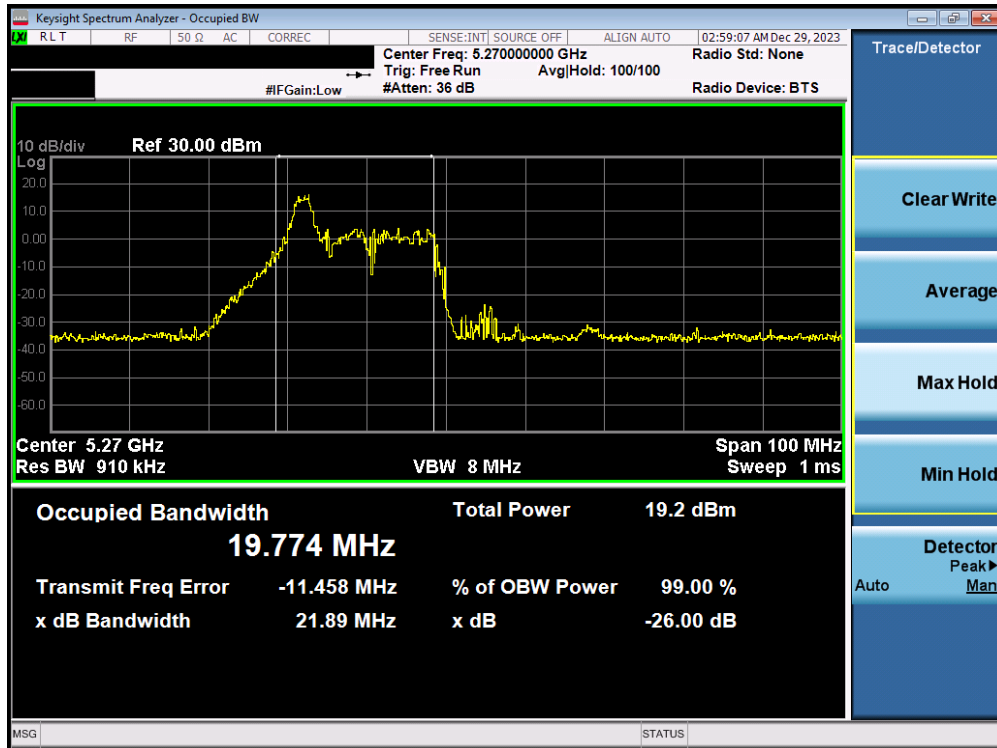


Plot 7-3. 26dB Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax – 26 Tones (UNII Band 1) – Ch. 42)

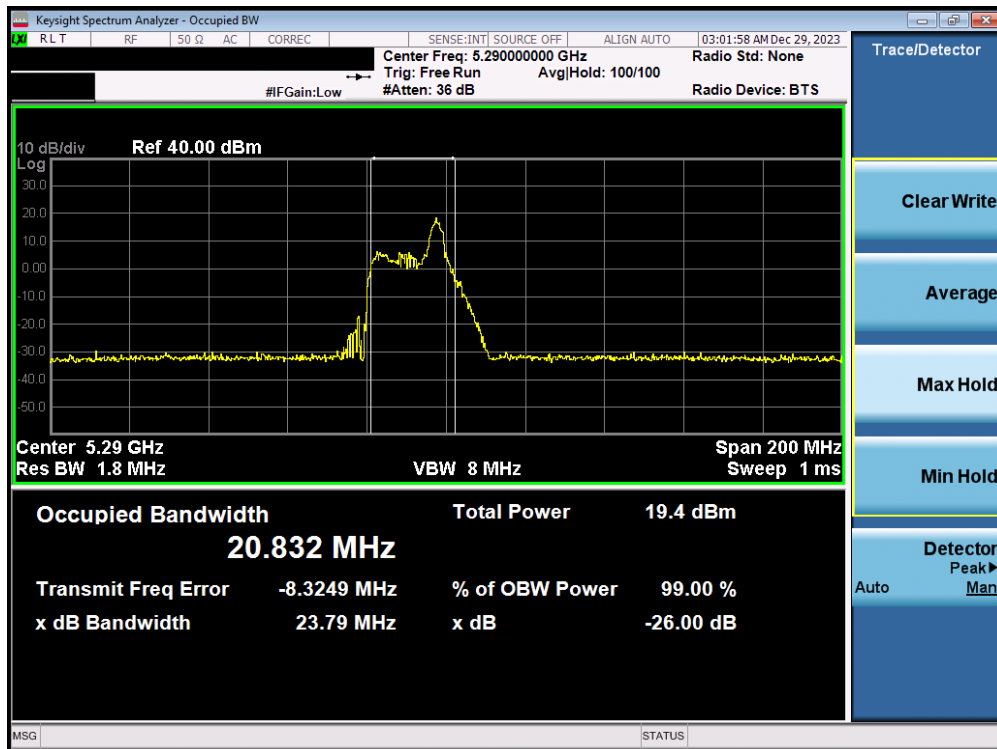


Plot 7-4. 26dB Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax – 26 Tones (UNII Band 2A) – Ch. 56)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 18 of 110

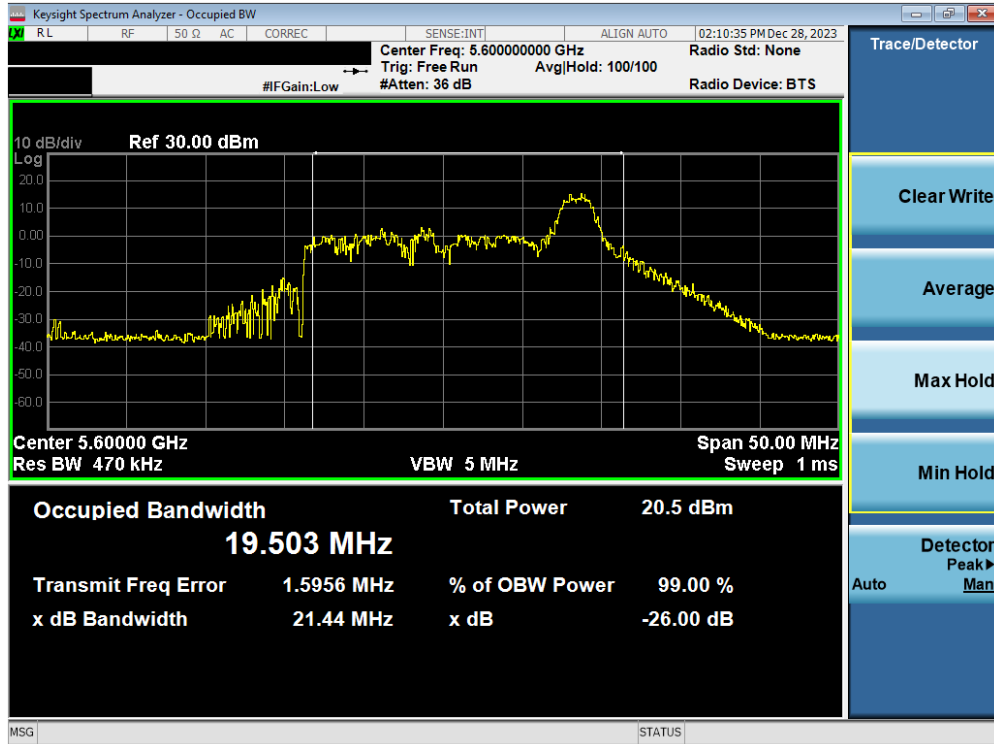


Plot 7-5. 26dB Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax – 26 Tones (UNII Band 2A) – Ch. 54)

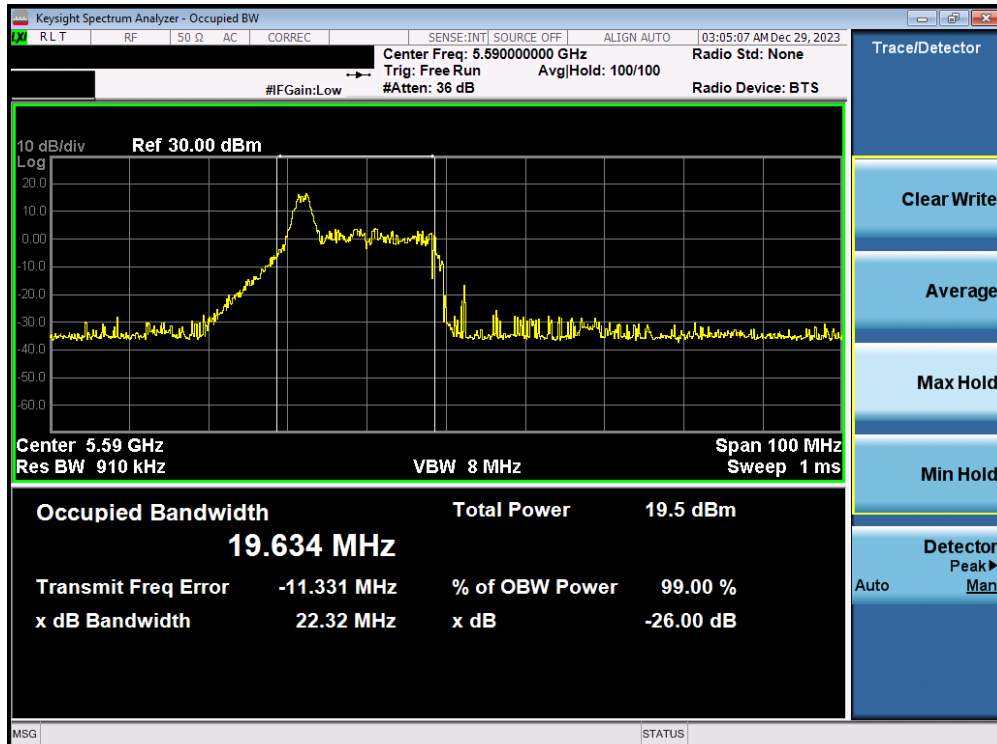


Plot 7-6. 26dB Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax – 26 Tones (UNII Band 2A) – Ch. 58)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 19 of 110

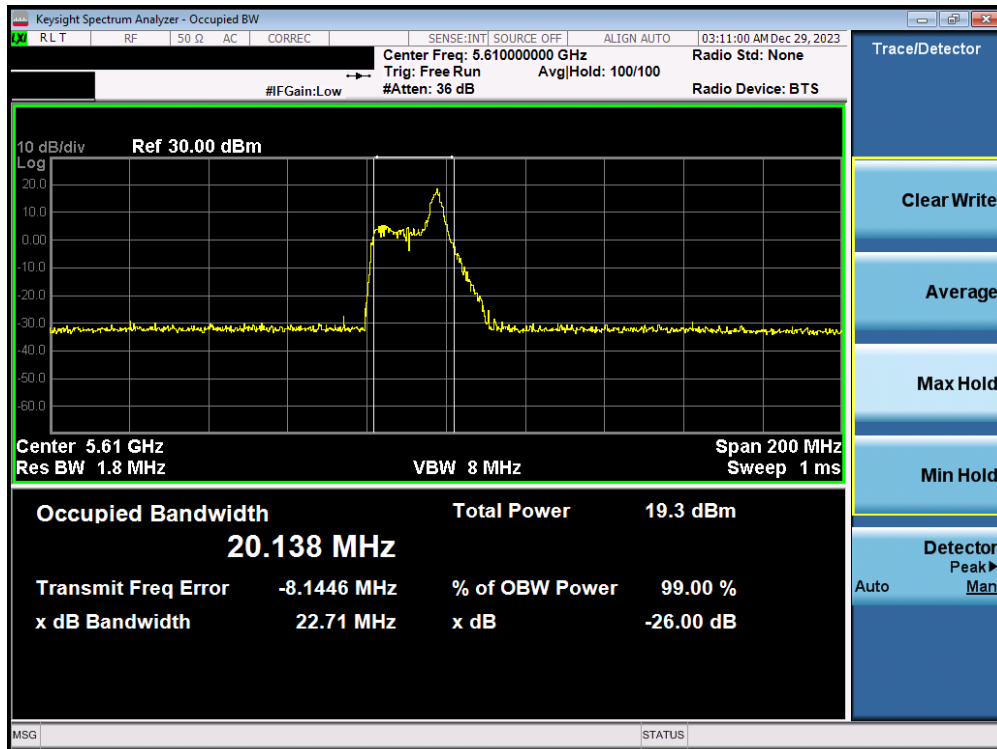


Plot 7-7. 26dB Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax – 26 Tones (UNII Band 2C) – Ch. 120)

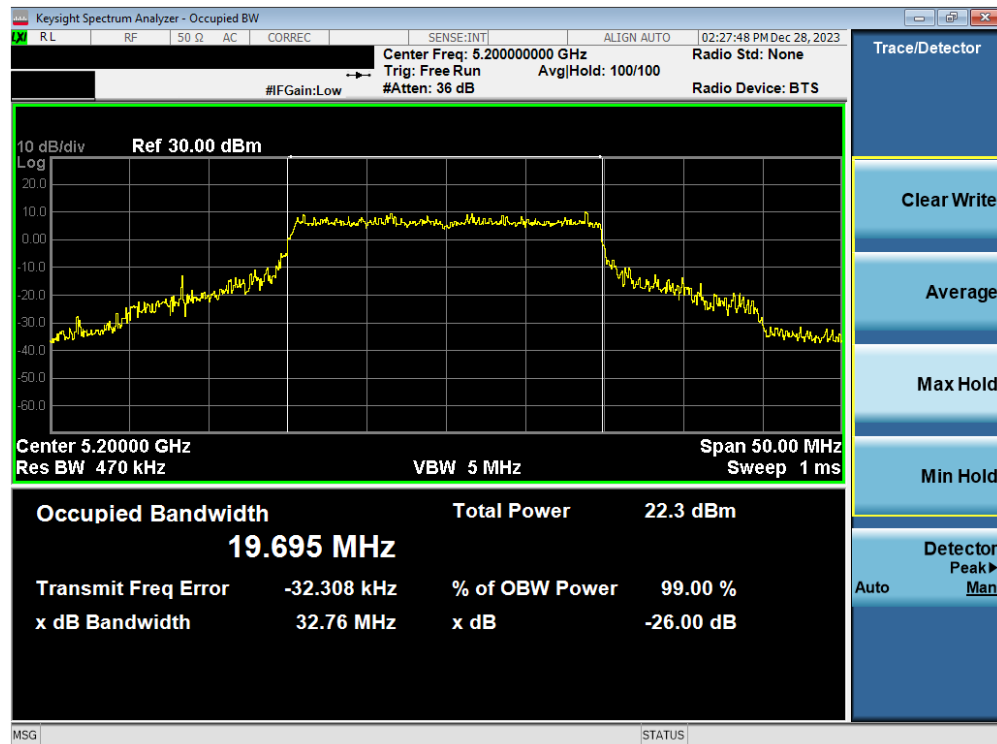


Plot 7-8. 26dB Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax – 26 Tones (UNII Band 2C) – Ch. 118)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 20 of 110

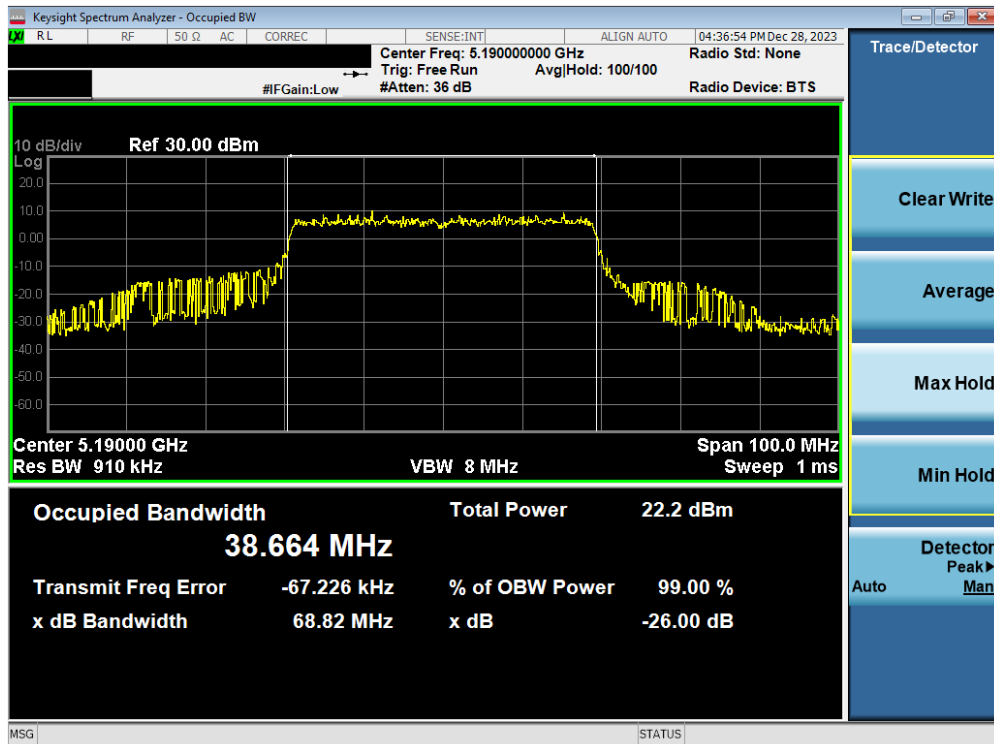


Plot 7-9. 26dB Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax – 26 Tones (UNII Band 2C) – Ch. 122)

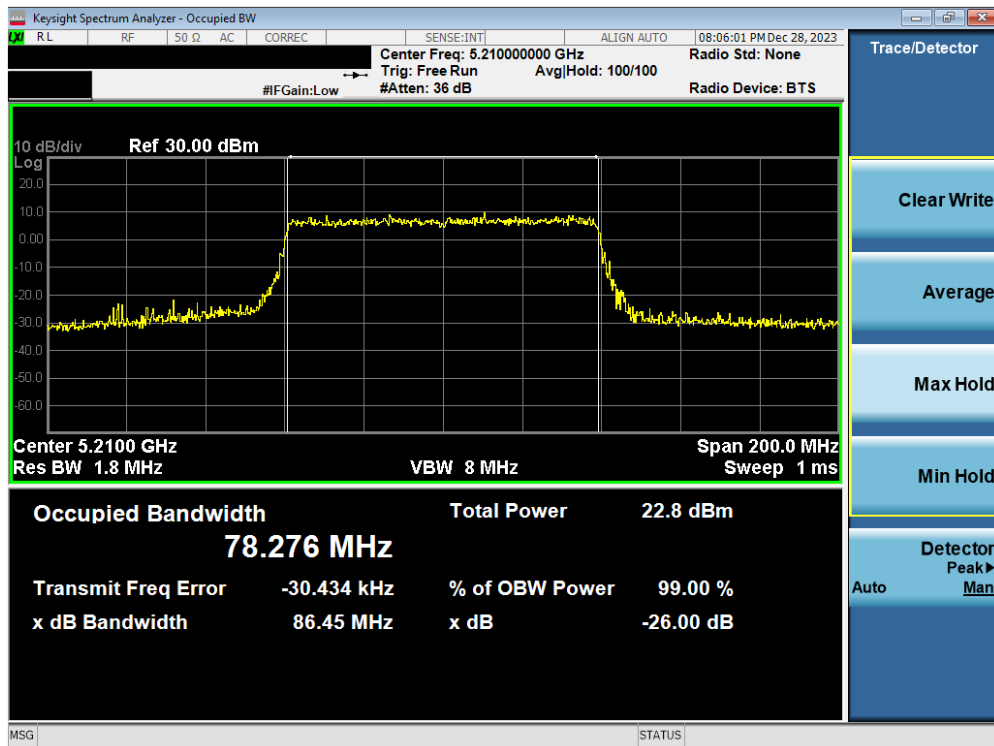


Plot 7-10. 26dB Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax – 242 Tones (UNII Band 1) – Ch. 40)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 21 of 110

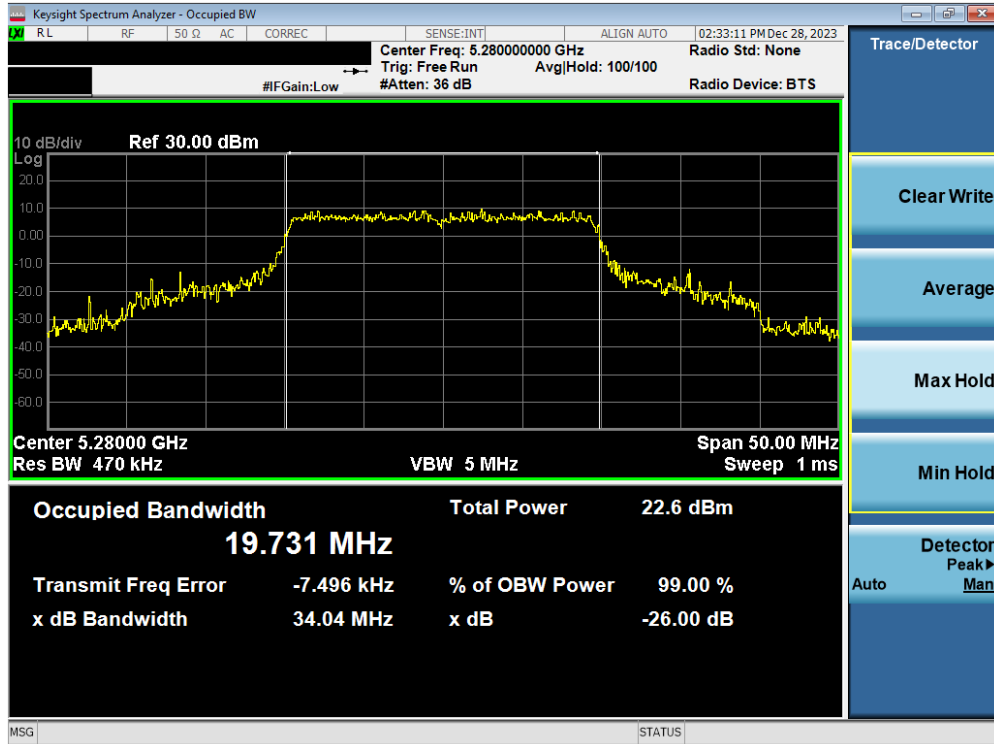


Plot 7-11. 26dB Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax – 484 Tones (UNII Band 1) – Ch. 38)

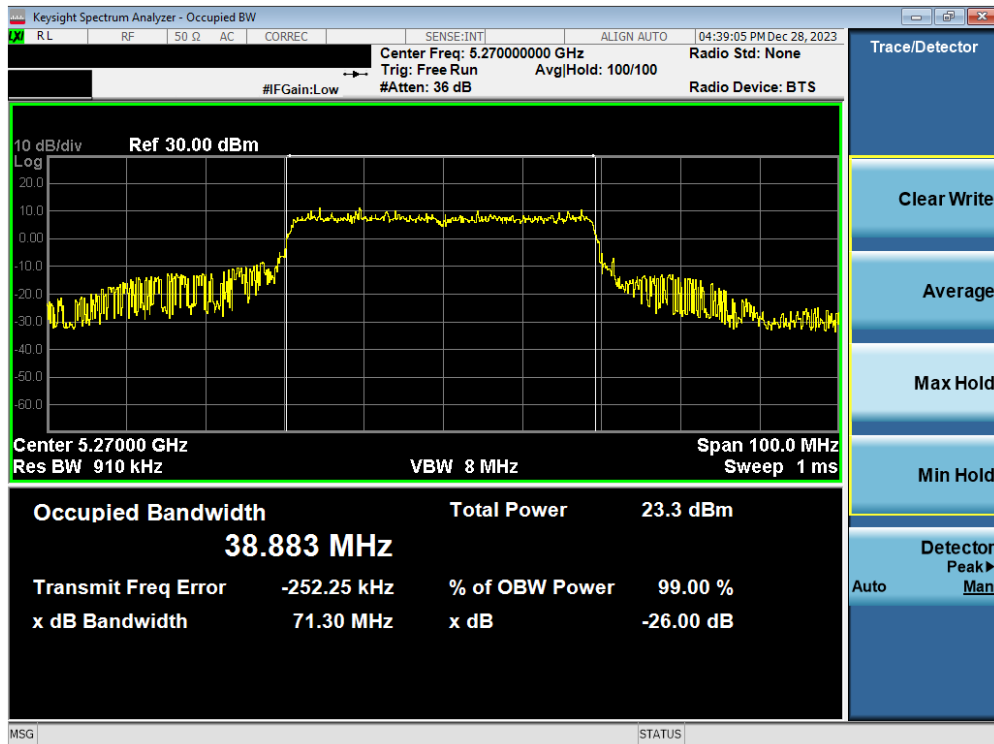


Plot 7-12. 26dB Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax – 996 Tones (UNII Band 1) – Ch. 42)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 22 of 110

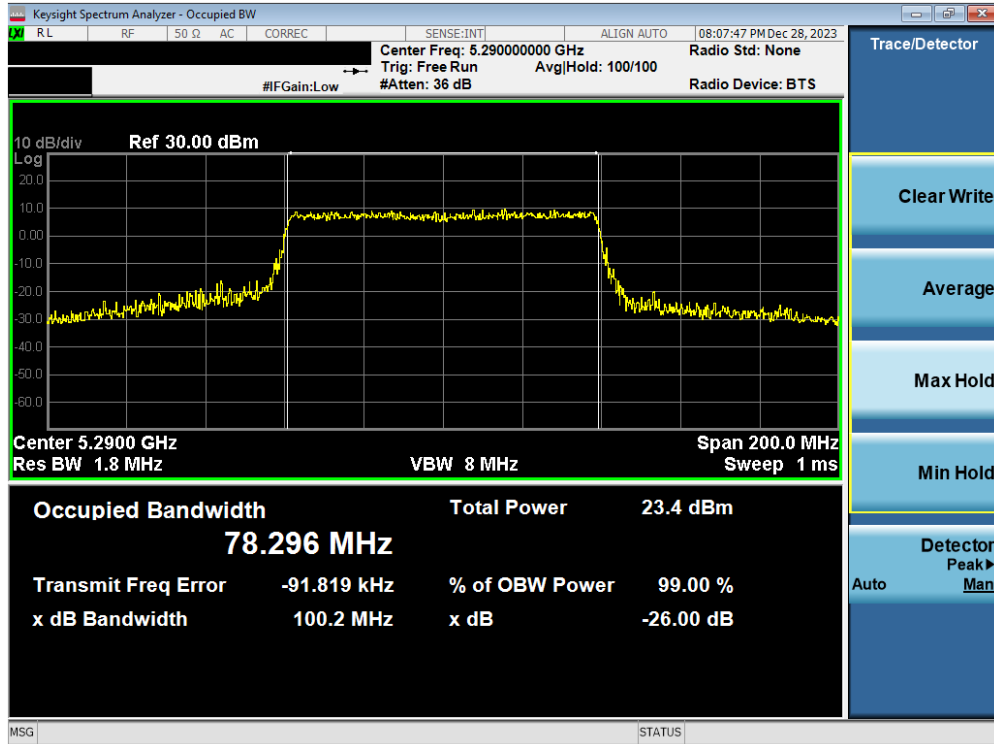


Plot 7-13. 26dB Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax – 242 Tones (UNII Band 2A) – Ch. 56)

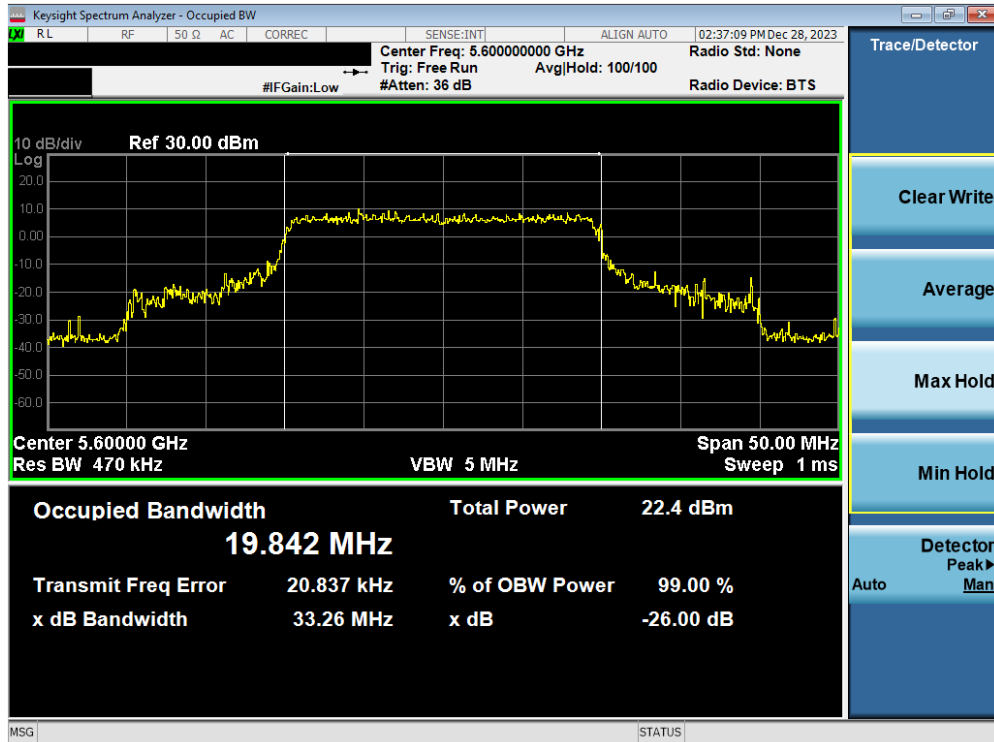


Plot 7-14. 26dB Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax – 484 Tones (UNII Band 2A) – Ch. 54)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 23 of 110

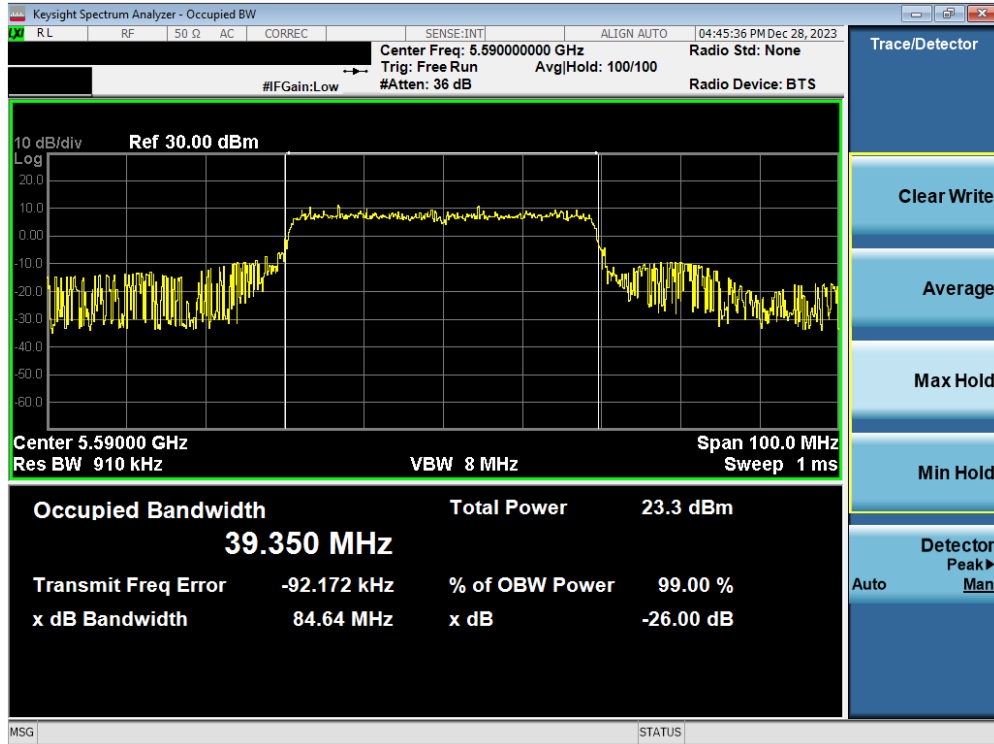


Plot 7-15. 26dB Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax – 996 Tones (UNII Band 2A) – Ch. 58)

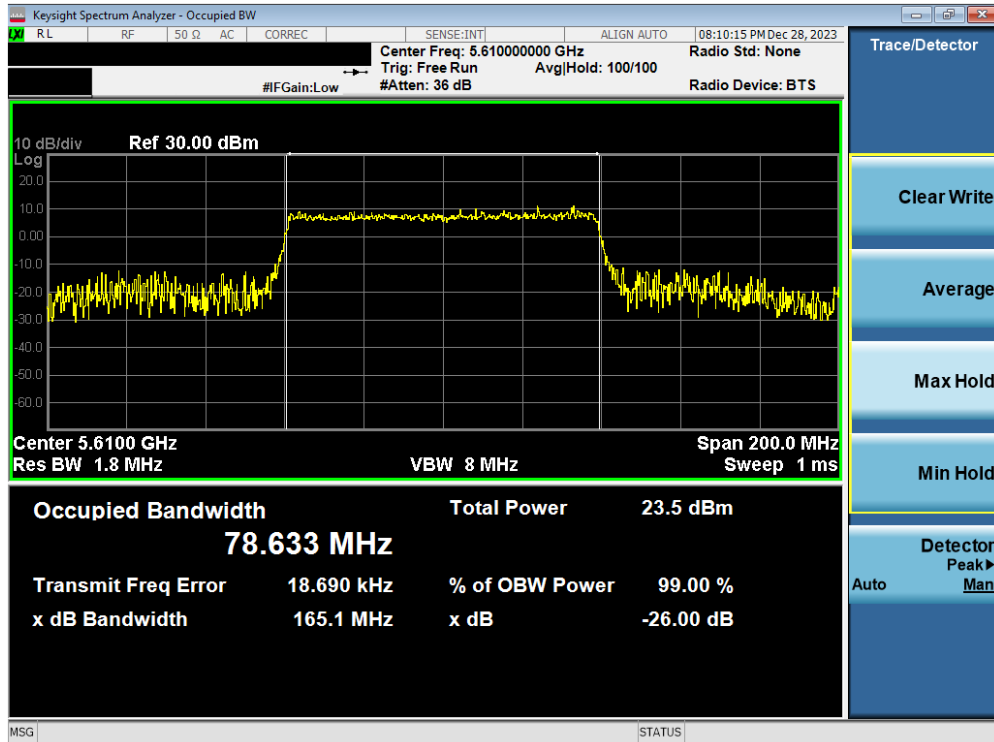


Plot 7-16. 26dB Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax – 242 Tones (UNII Band 2C) – Ch. 120)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 24 of 110



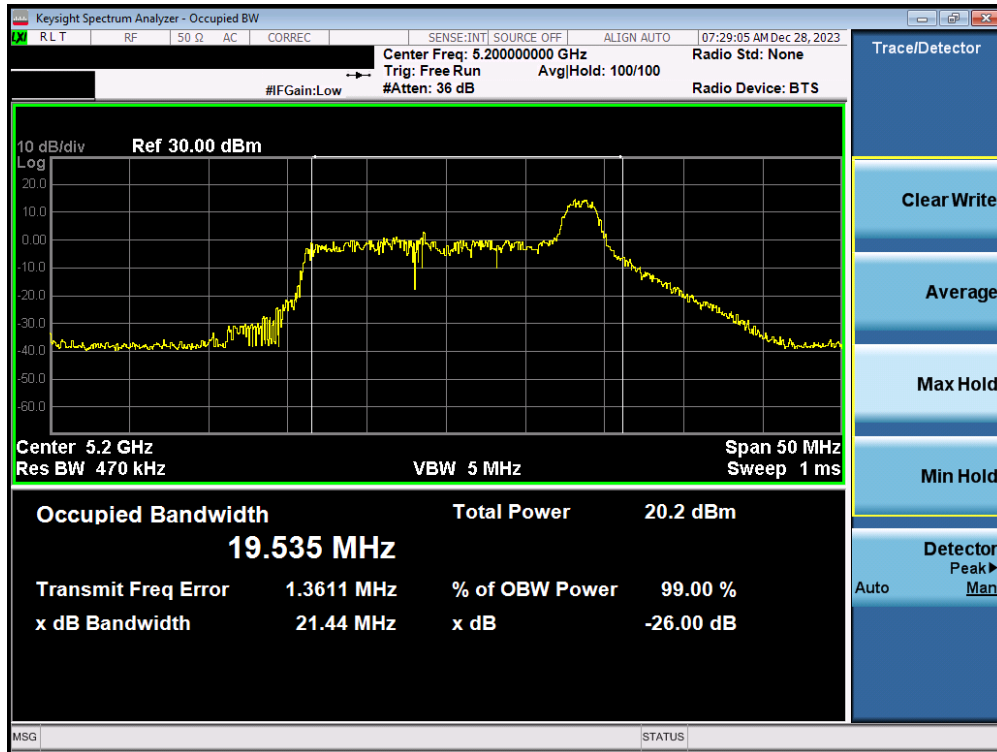
Plot 7-17. 26dB Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax – 484 Tones (UNII Band 2C) – Ch. 118)



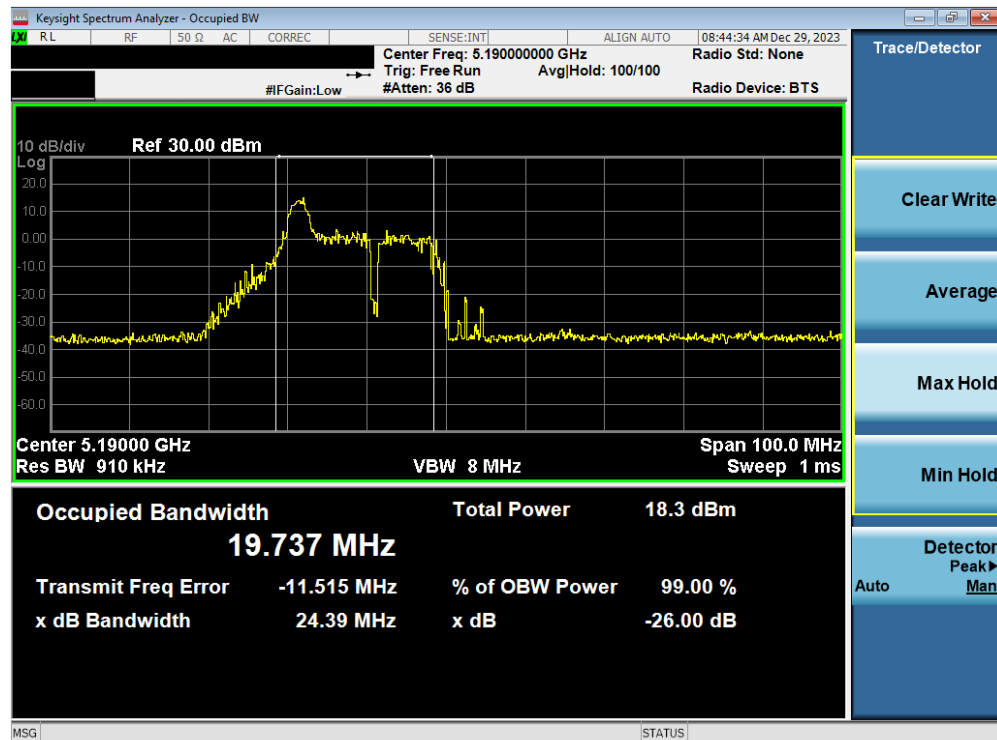
Plot 7-18. 26dB Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax – 996 Tones (UNII Band 2C) – Ch. 122)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 25 of 110

7.2.2 MIMO Antenna-2 26dB Bandwidth Measurements

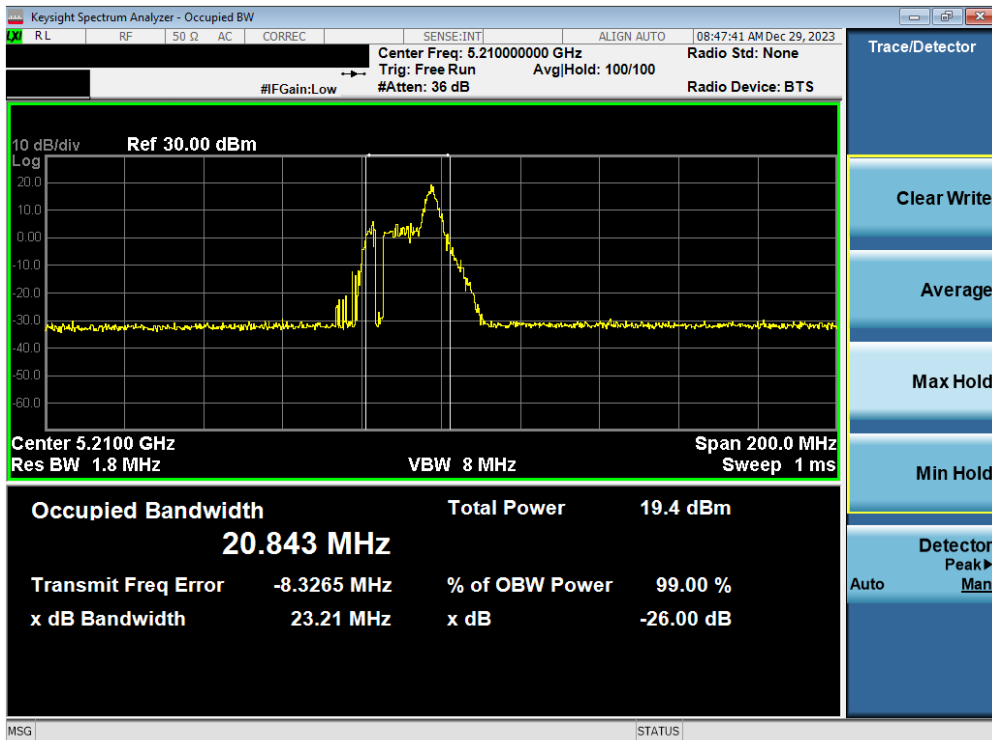


Plot 7-19. 26dB Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax – 26 Tones (UNII Band 1) – Ch. 40)

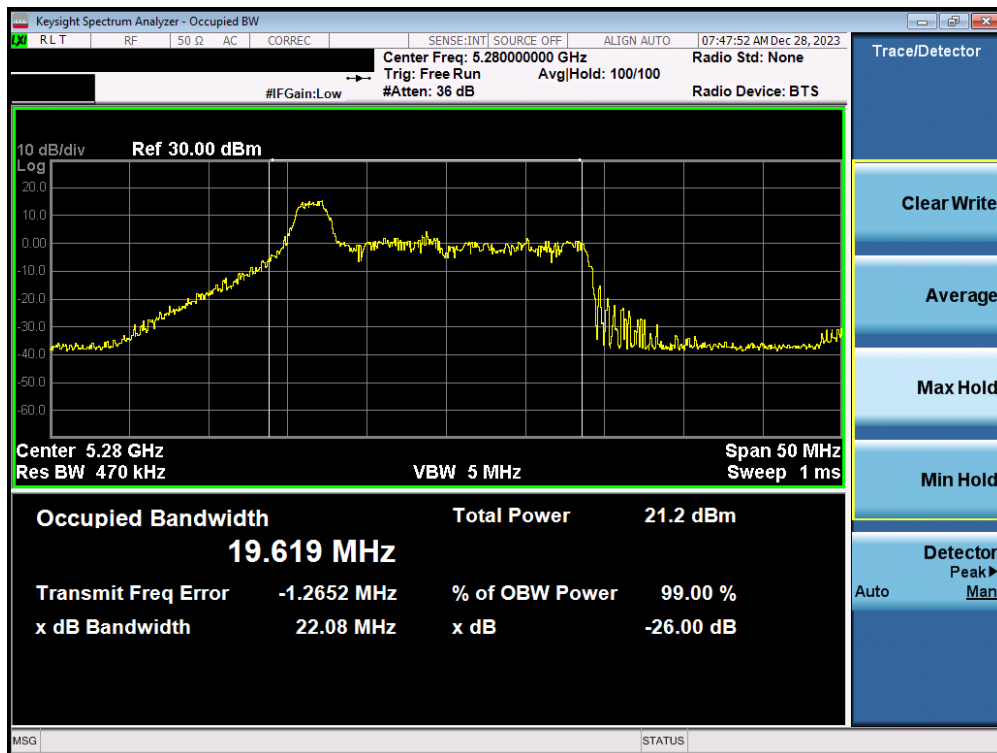


Plot 7-20. 26dB Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax – 26 Tones (UNII Band 1) – Ch. 38)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 26 of 110

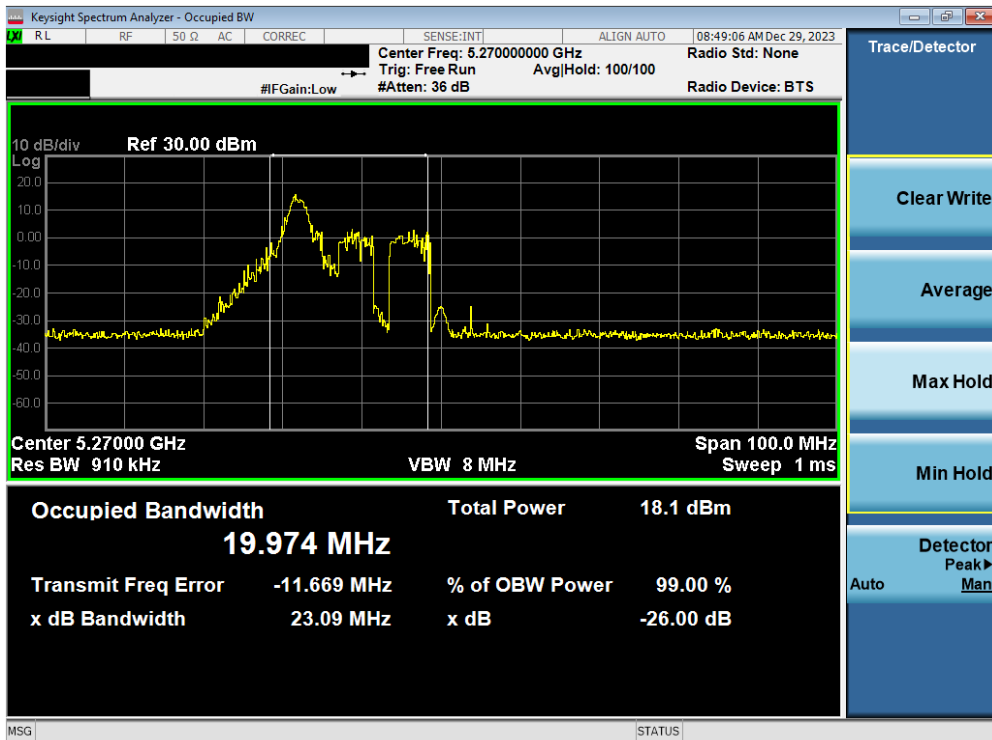


Plot 7-21. 26dB Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax – 26 Tones (UNII Band 1) – Ch. 42)

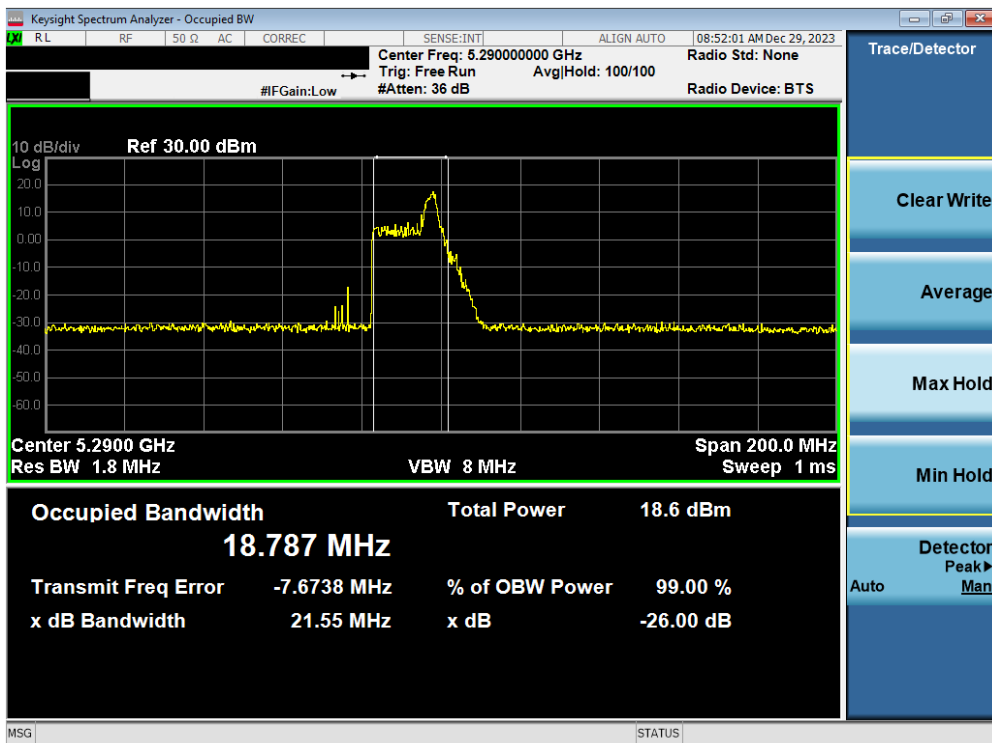


Plot 7-22. 26dB Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax – 26 Tones (UNII Band 2A) – Ch. 56)

FCC ID: A3LSMA356U		MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 27 of 110	

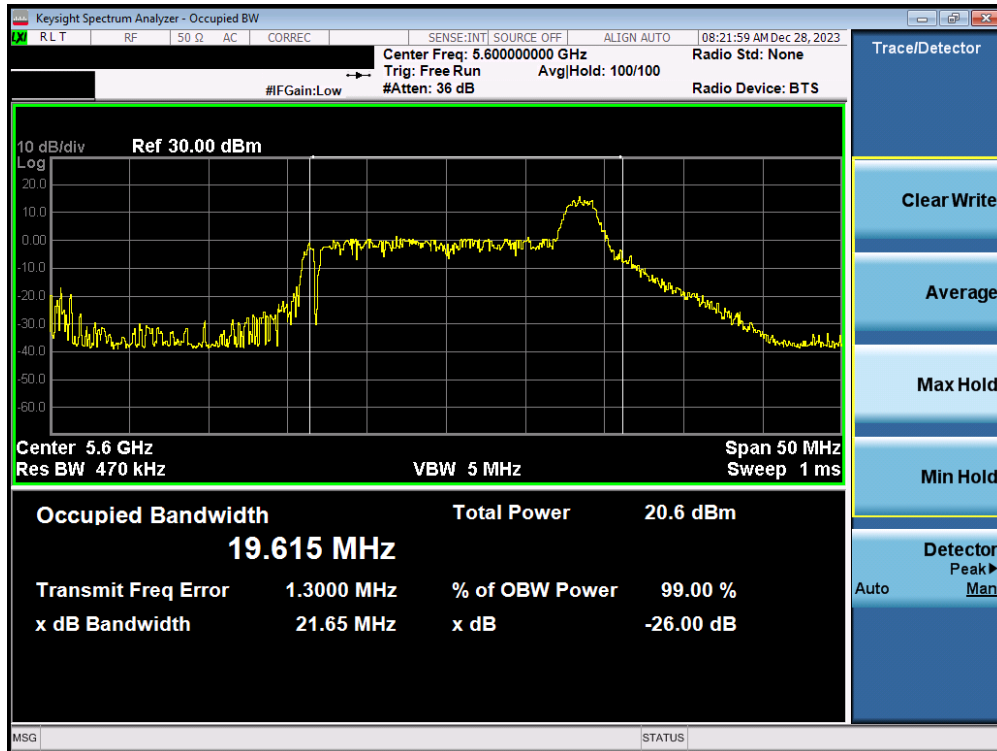


Plot 7-23. 26dB Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax – 26 Tones (UNII Band 2A) – Ch. 54)

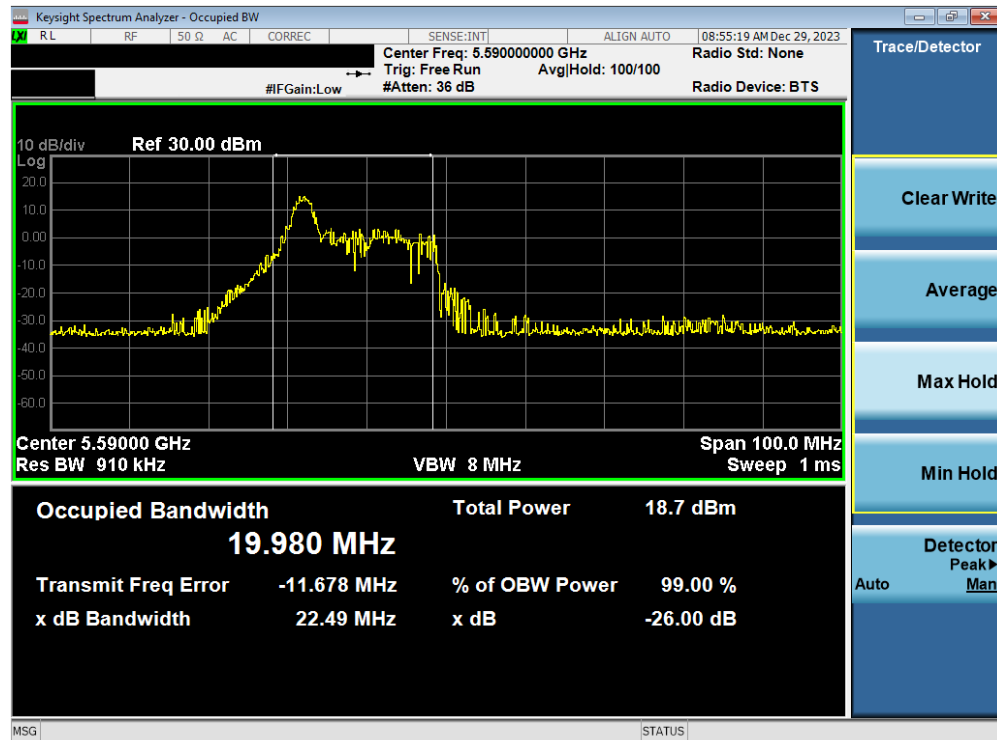


Plot 7-24. 26dB Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax – 26 Tones (UNII Band 2A) – Ch. 58)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 28 of 110

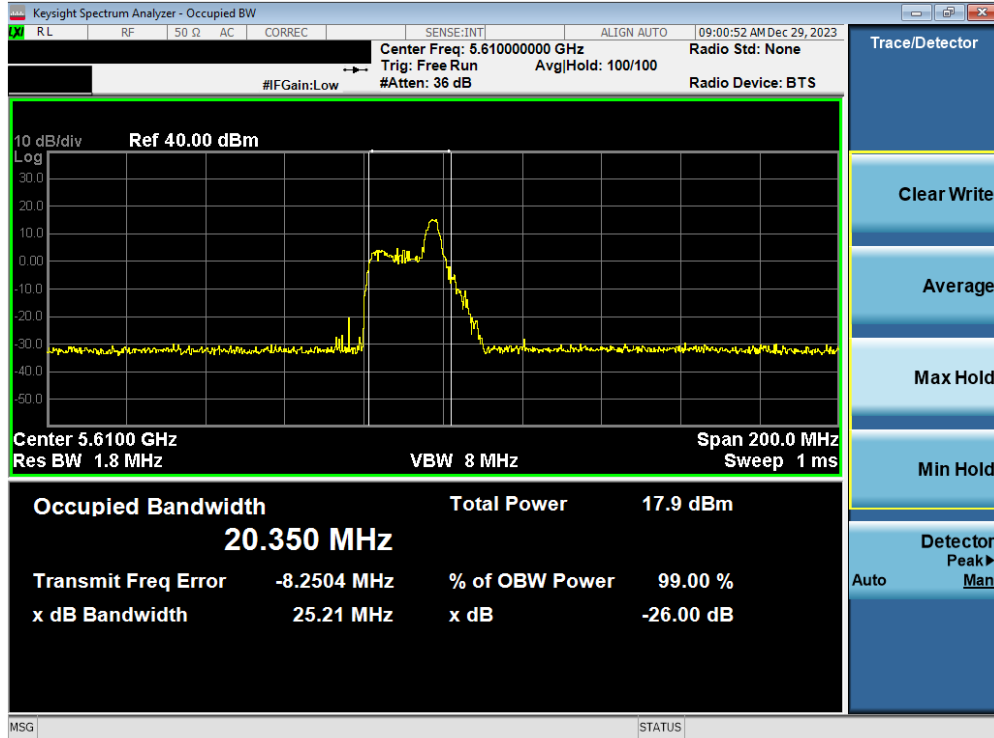


Plot 7-25. 26dB Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax – 26 Tones (UNII Band 2C) – Ch. 120)

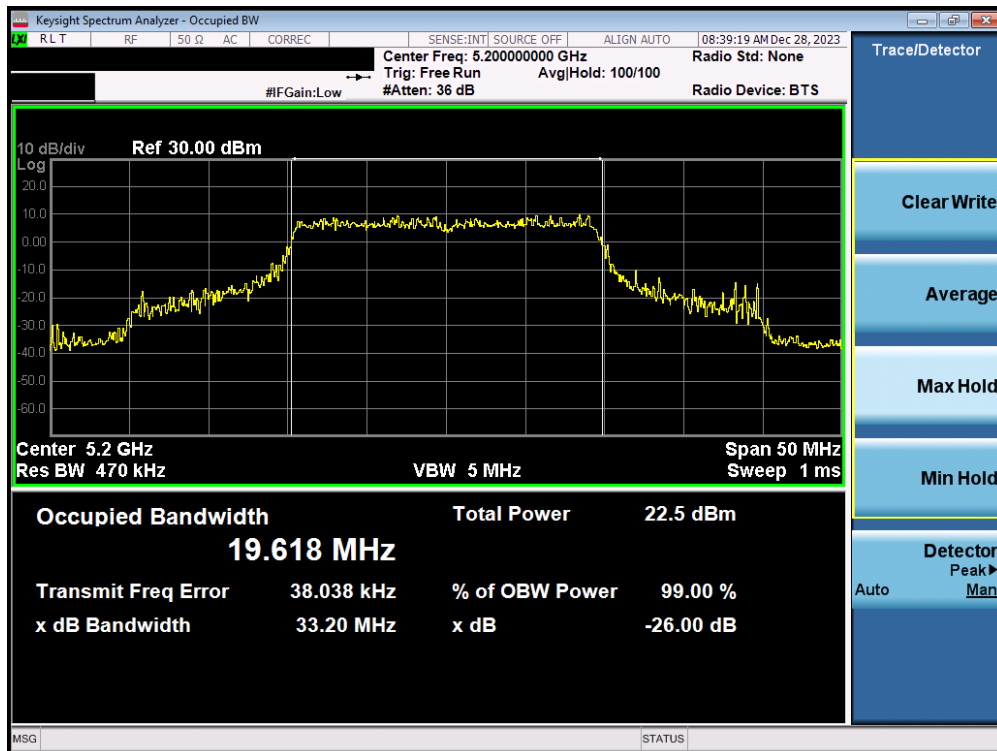


Plot 7-26. 26dB Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax – 26 Tones (UNII Band 2C) – Ch. 118)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 29 of 110

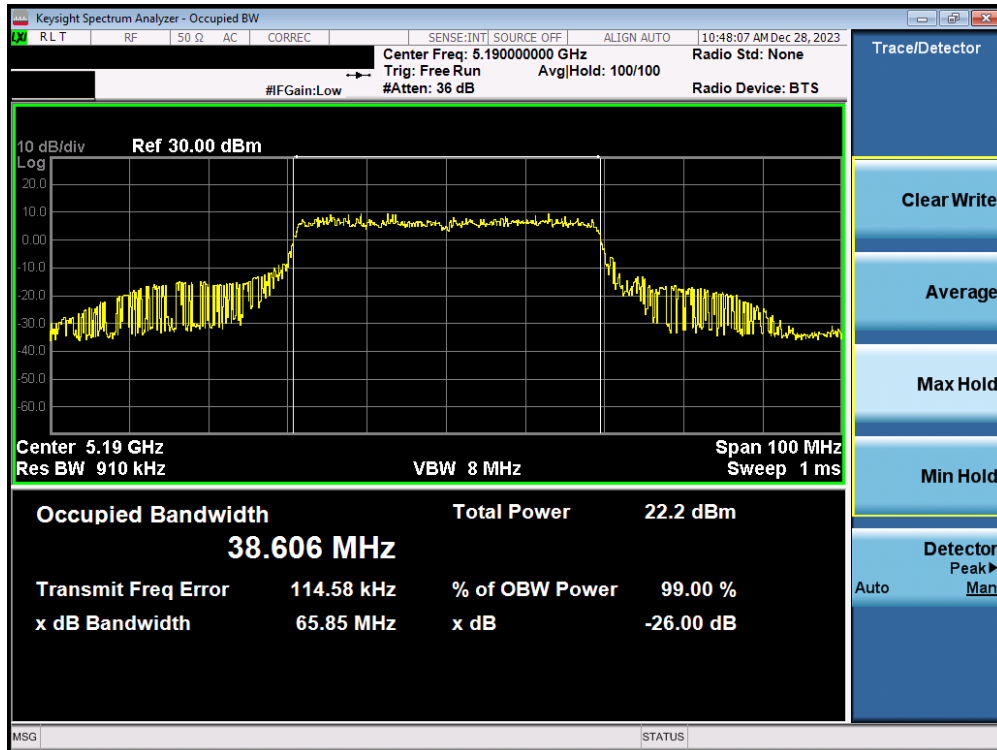


Plot 7-27. 26dB Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax – 26 Tones (UNII Band 2C) – Ch. 122)

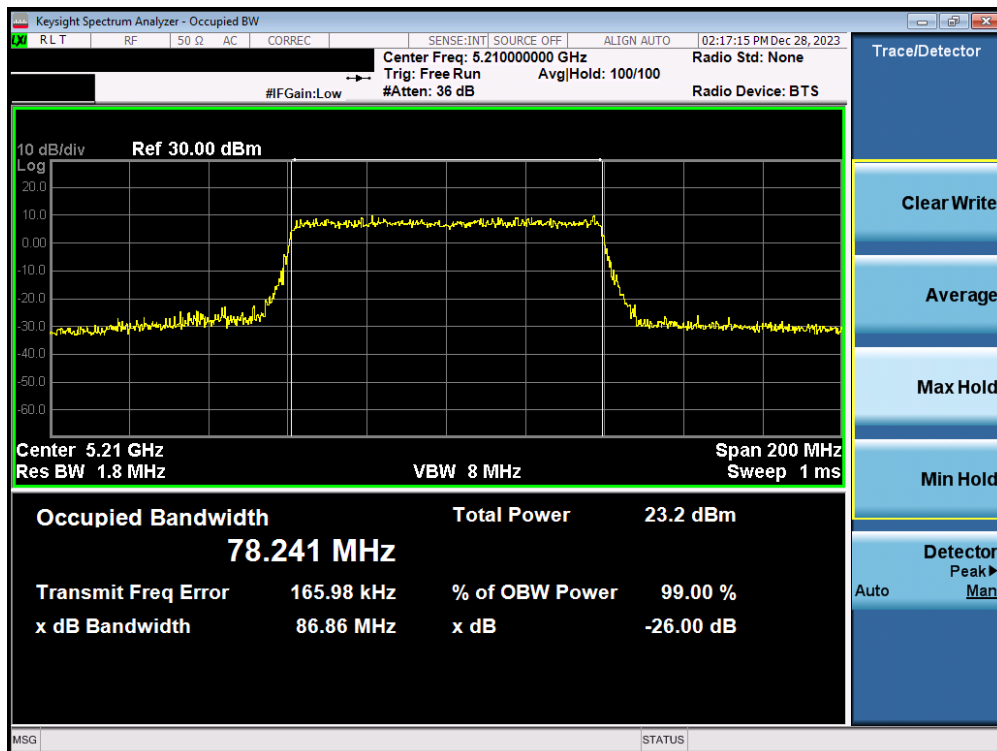


Plot 7-28. 26dB Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax – 242 Tones (UNII Band 1) – Ch. 40)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 30 of 110

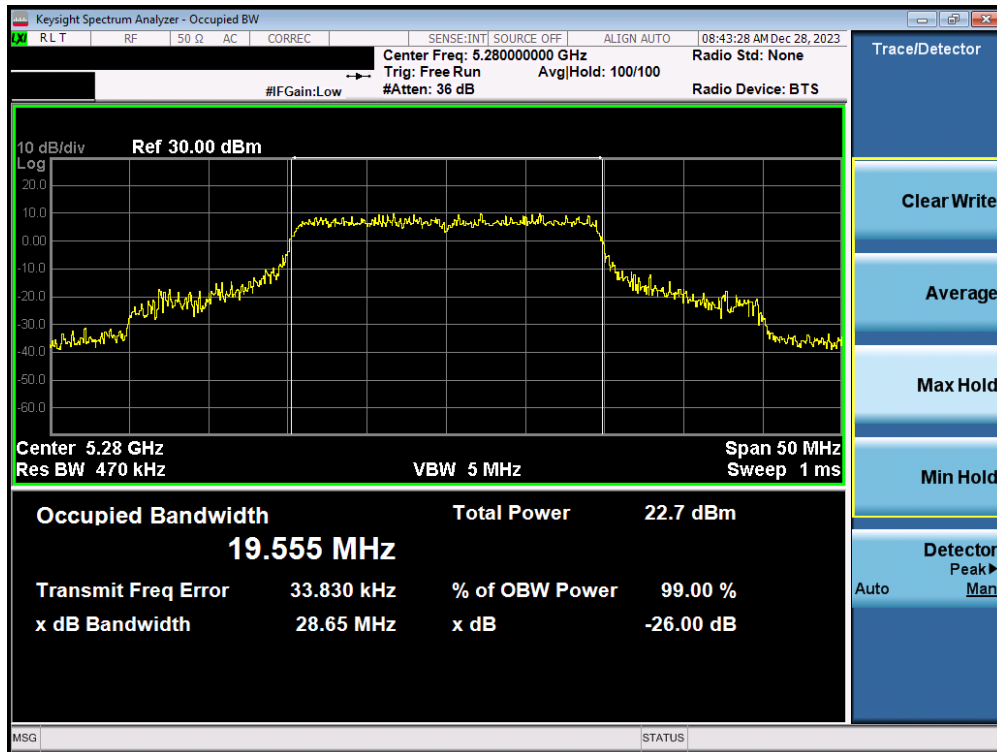


Plot 7-29. 26dB Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax – 484 Tones (UNII Band 1) – Ch. 38)



Plot 7-30. 26dB Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax – 996 Tones (UNII Band 1) – Ch. 42)

FCC ID: A3LSMA356U		MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 31 of 110	

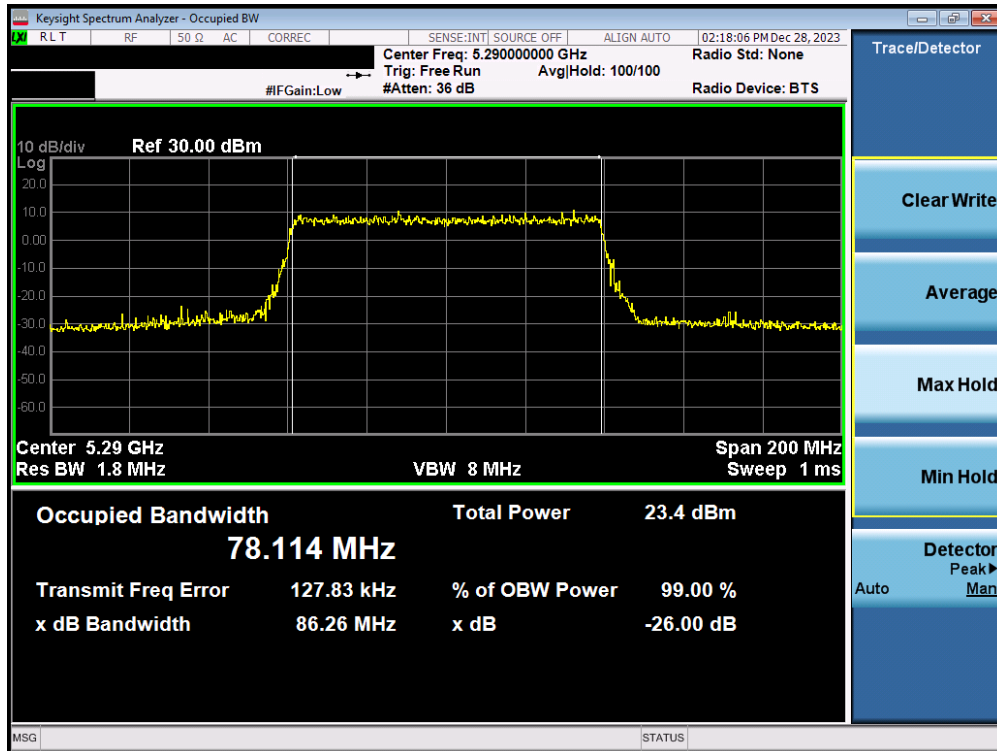


Plot 7-31. 26dB Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax – 242 Tones (UNII Band 2A) – Ch. 56)

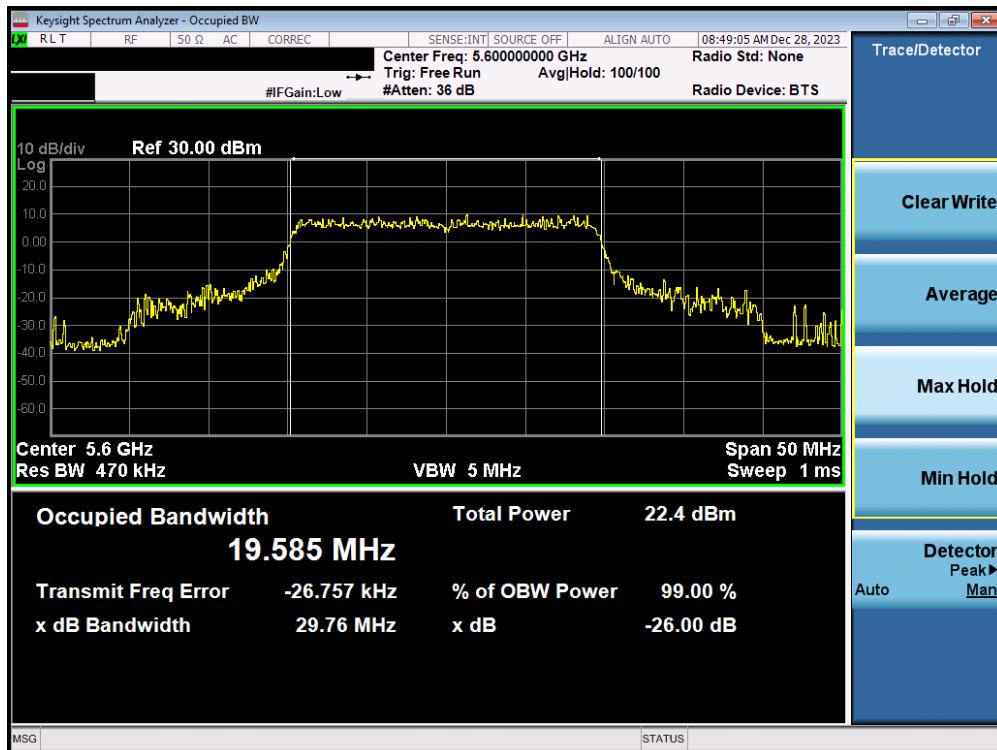


Plot 7-32. 26dB Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax – 484 Tones (UNII Band 2A) – Ch. 54)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 32 of 110

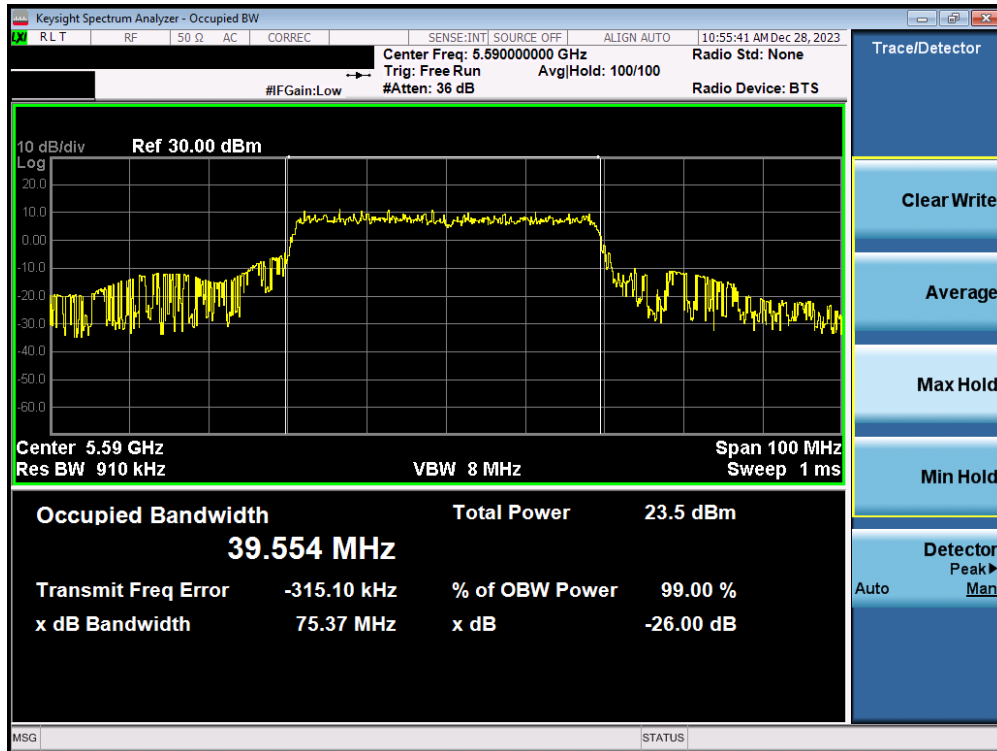


Plot 7-33. 26dB Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax – 996 Tones (UNII Band 2A) – Ch. 58)

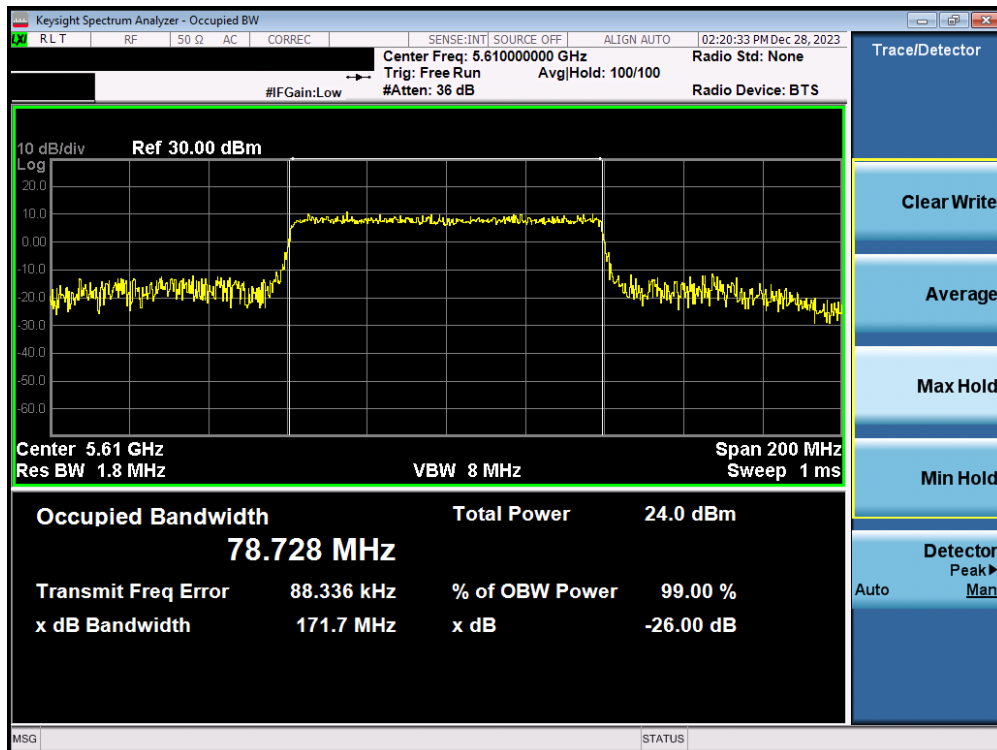


Plot 7-34. 26dB Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax – 242 Tones (UNII Band 2C) – Ch. 120)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 33 of 110



Plot 7-35. 26dB Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax – 484 Tones (UNII Band 2C) – Ch. 118)



Plot 7-36. 26dB Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax – 996 Tones (UNII Band 2C) – Ch. 122)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 34 of 110

7.3 6dB Bandwidth Measurement

Test Overview and Limit

The bandwidth at 6dB 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 6dB bandwidth.

In the 5.725 – 5.850GHz band, the 6dB bandwidth must be ≥ 500 kHz.

Test Procedure Used

ANSI C63.10-2013 – Section 6.9.2

Test Settings

1. The signal analyzers' automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to $X = 6$. 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 = 100 kHz
3. VBW $\geq 3 \times$ RBW
4. Detector = Peak
5. Trace mode = max hold
6. Sweep = auto couple

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

The 6dB Bandwidth measurement for each channel was measured with the RU index showing the highest conducted power.

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 35 of 110

MIMO 6dB Bandwidth Measurements

	Frequency [MHz]	802.11 MODE	Channel	Antenna-1 6dB Bandwidth [MHz]	Antenna-2 6dB Bandwidth [MHz]
Band 3	5745	ax (20MHz)	149	2.11	2.15
	5785	ax (20MHz)	157	2.10	2.09
	5825	ax (20MHz)	165	2.09	2.11
	5755	ax (40MHz)	151	2.15	2.19
	5795	ax (40MHz)	159	2.20	2.14
	5775	ax (80MHz)	155	2.25	2.27

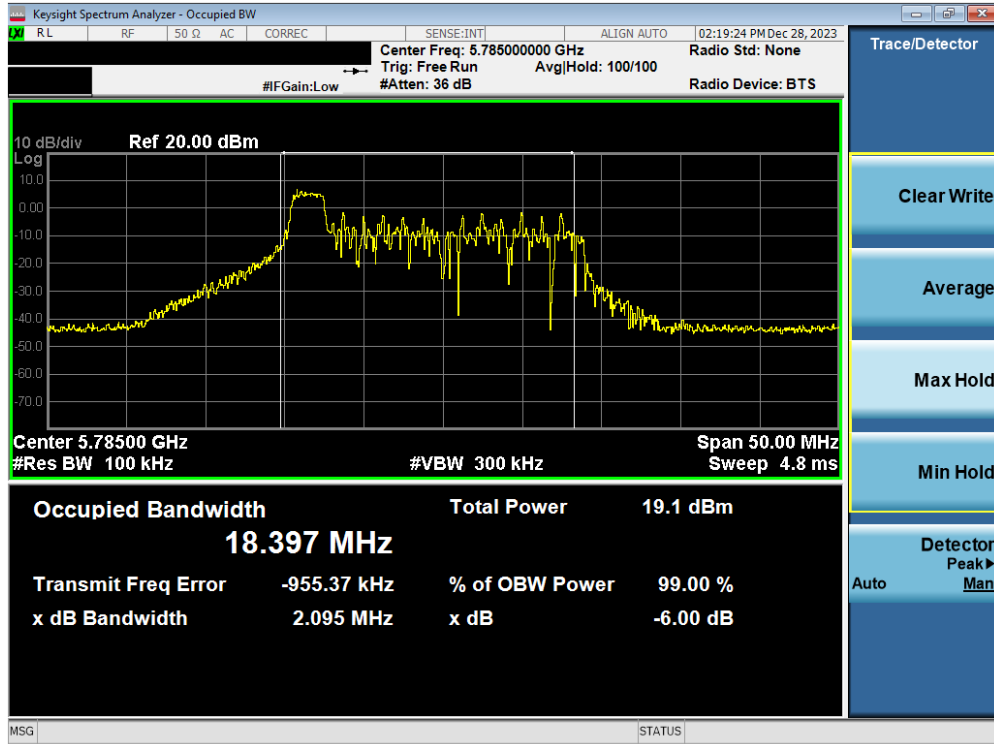
Table 7-4. Band 3 Conducted 6dB Bandwidth Measurements MIMO (26 Tones)

	Frequency [MHz]	802.11 MODE	Channel	Antenna-1 6dB Bandwidth [MHz]	Antenna-2 6dB Bandwidth [MHz]
Band 3	5745	ax (20MHz)	149	19.20	19.70
	5785	ax (20MHz)	157	19.12	19.15
	5825	ax (20MHz)	165	19.09	18.99
	5755	ax (40MHz)	151	38.01	38.18
	5795	ax (40MHz)	159	38.05	38.16
	5775	ax (80MHz)	155	78.24	78.00

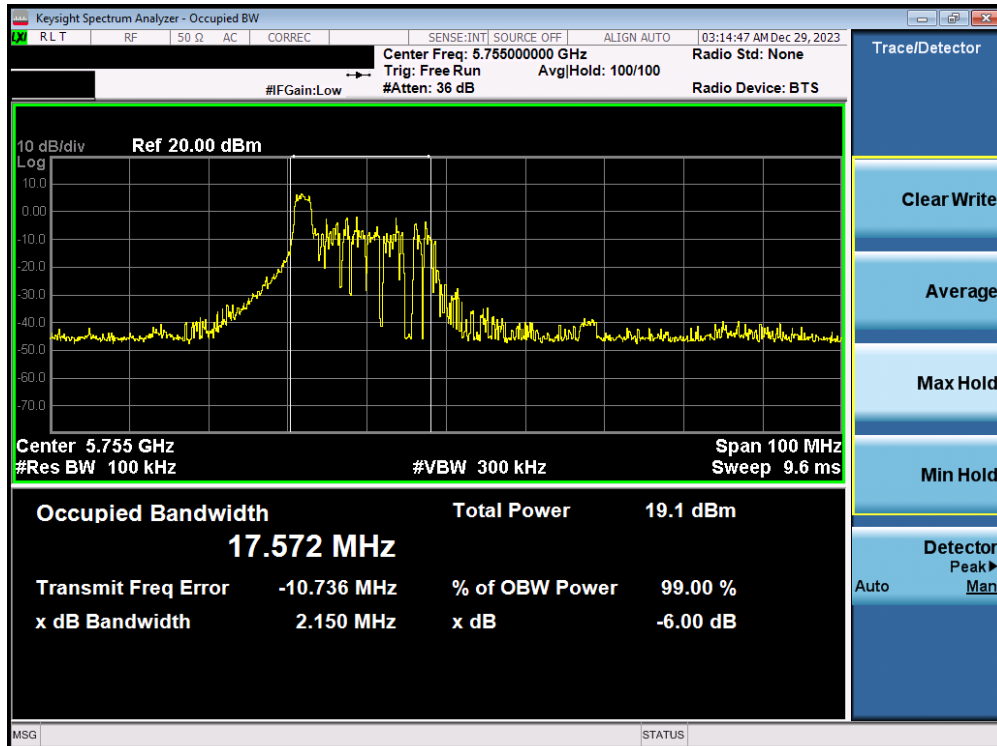
Table 7-5. Band 3 Conducted 6dB Bandwidth Measurements MIMO (Full Tones)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 36 of 110

7.3.1 MIMO Antenna-1 6dB Bandwidth Measurements

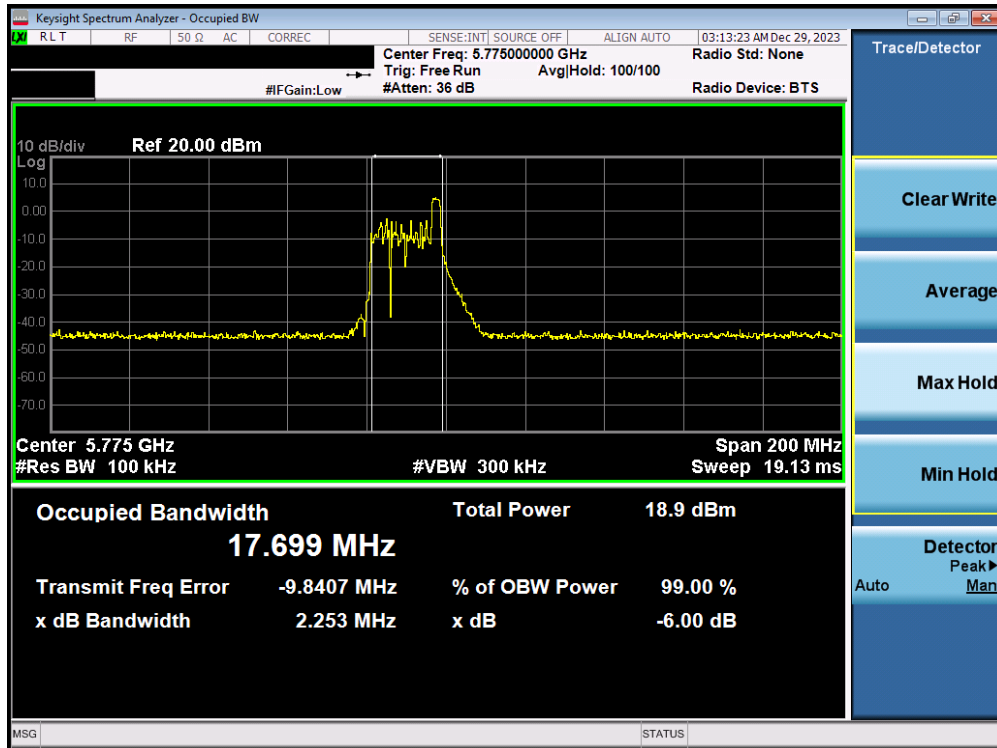


Plot 7-37. 6dB Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax – 26 Tones (UNII Band 3) – Ch. 157)

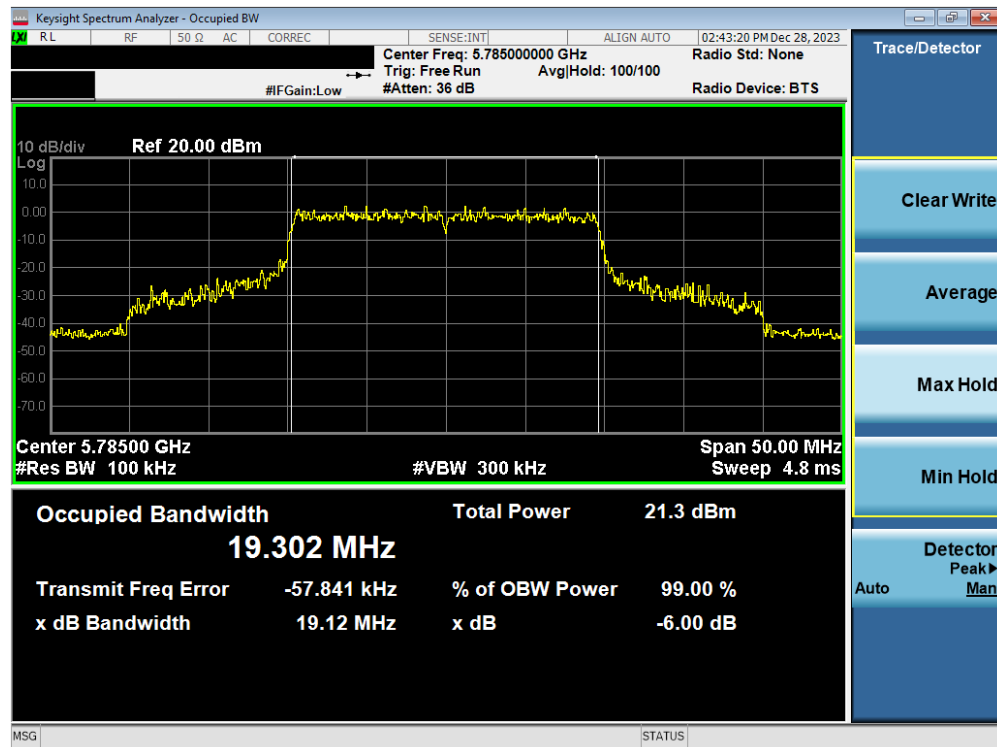


Plot 7-38. 6dB Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax – 26 Tones (UNII Band 3) – Ch. 151)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 37 of 110

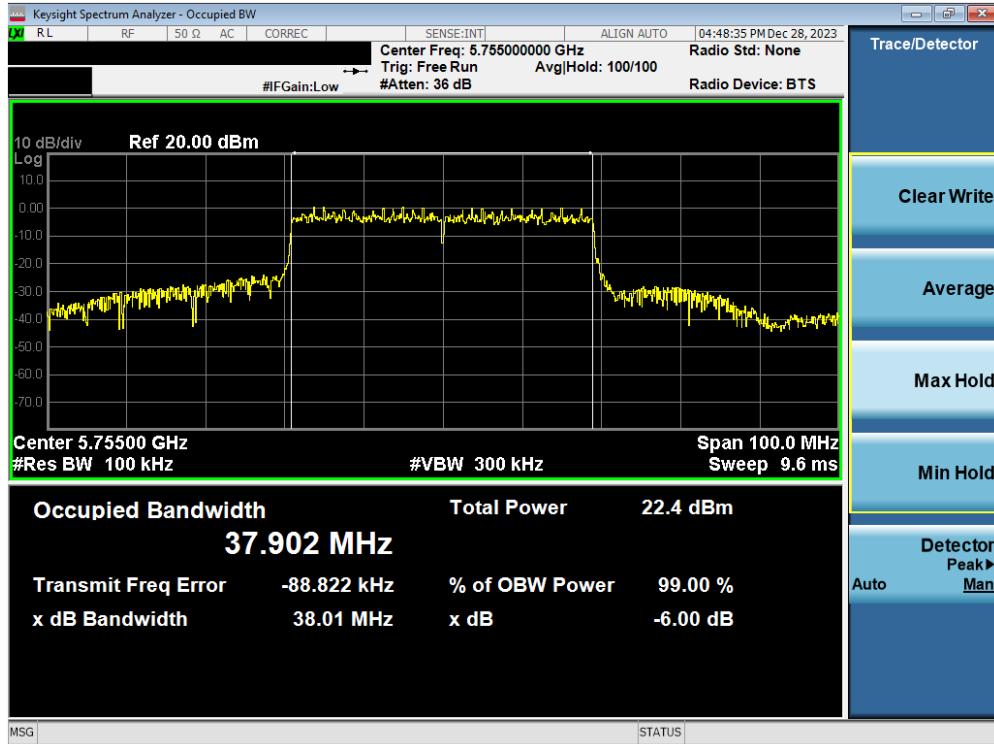


Plot 7-39. 6dB Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax – 26 Tones (UNII Band 3) – Ch. 155)

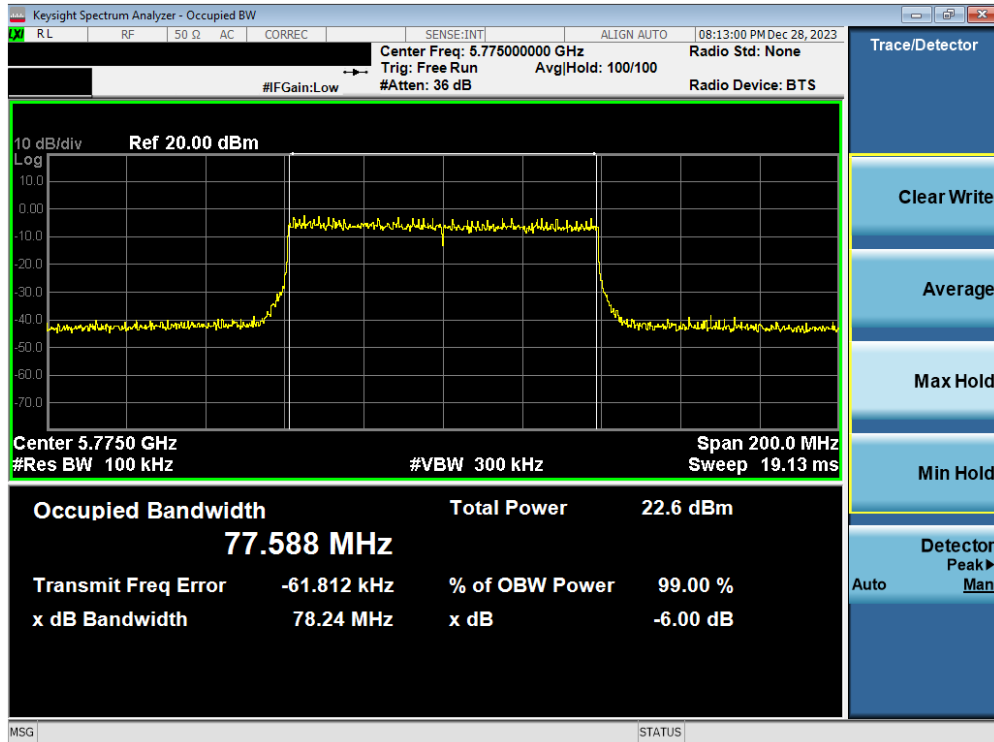


Plot 7-40. 6dB Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax – 242 Tones (UNII Band 3) – Ch. 157)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 38 of 110



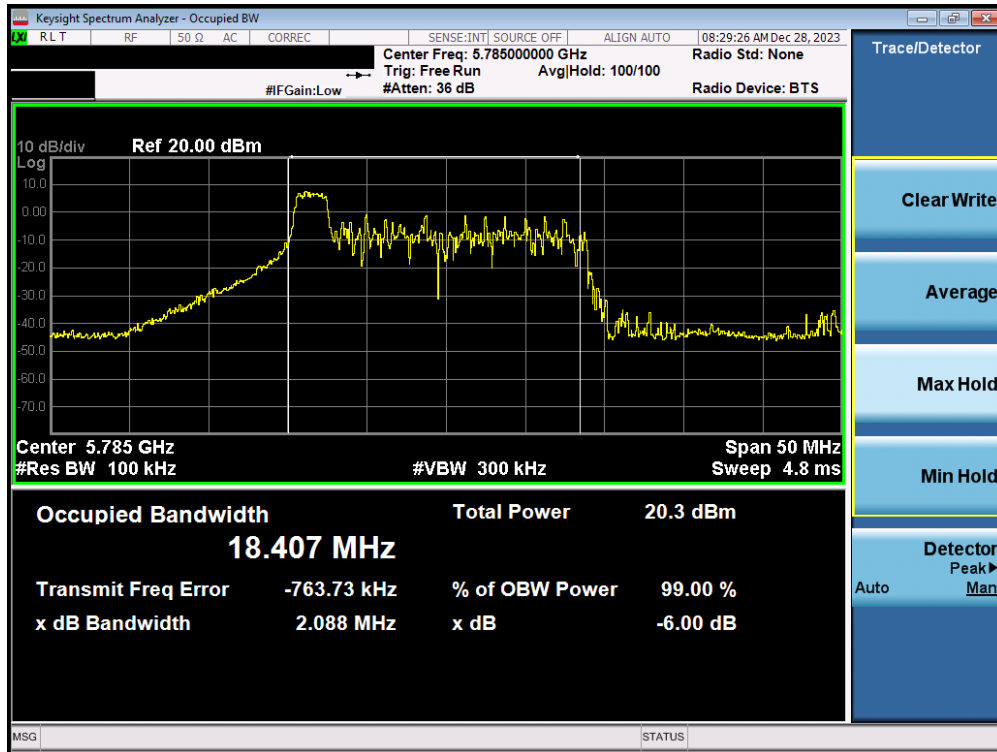
Plot 7-41. 6dB Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax – 484 Tones (UNII Band 3) – Ch. 151)



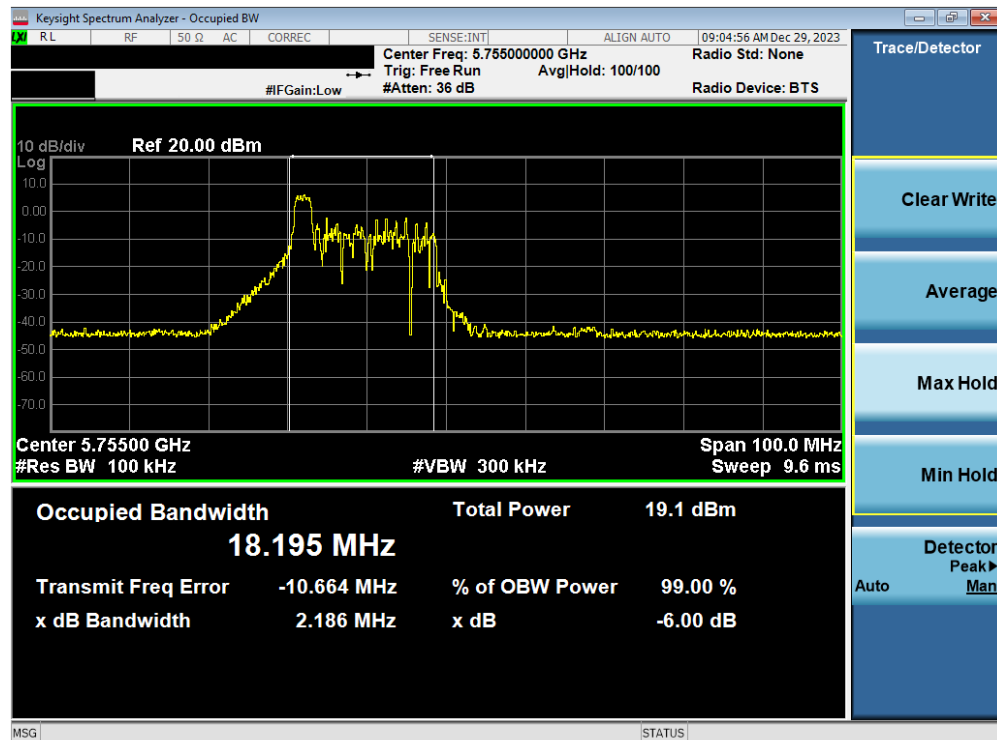
Plot 7-42. 6dB Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax – 996 Tones (UNII Band 3) – Ch. 155)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 39 of 110

7.3.2 MIMO Antenna-2 6dB Bandwidth Measurements

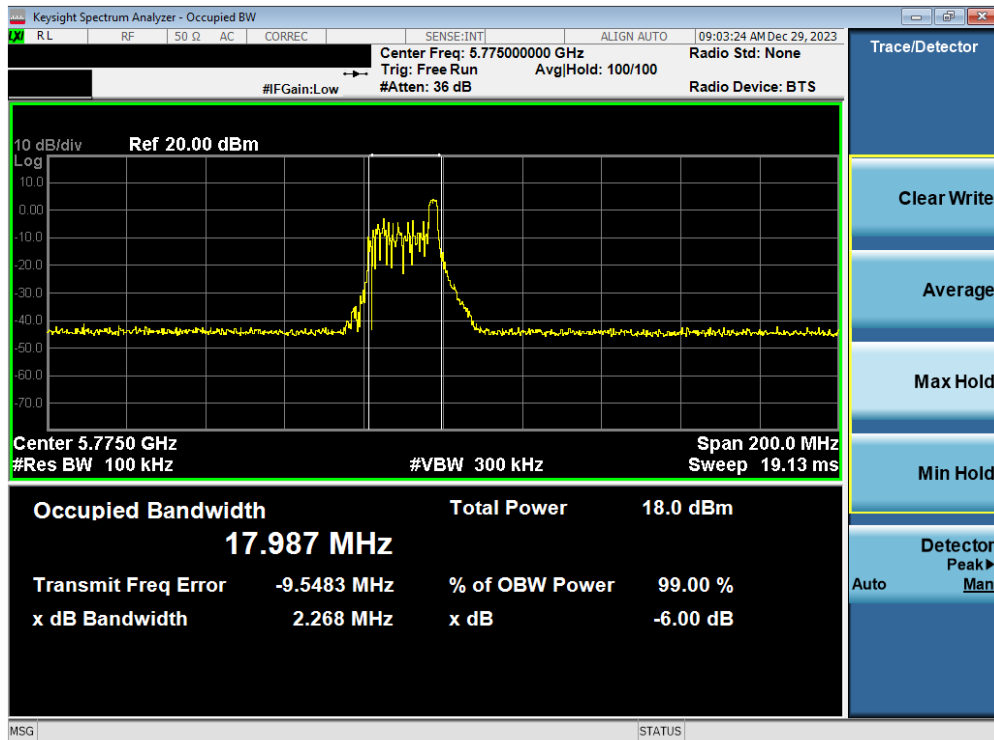


Plot 7-43. 6dB Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax – 26 Tones (UNII Band 3) – Ch. 157)

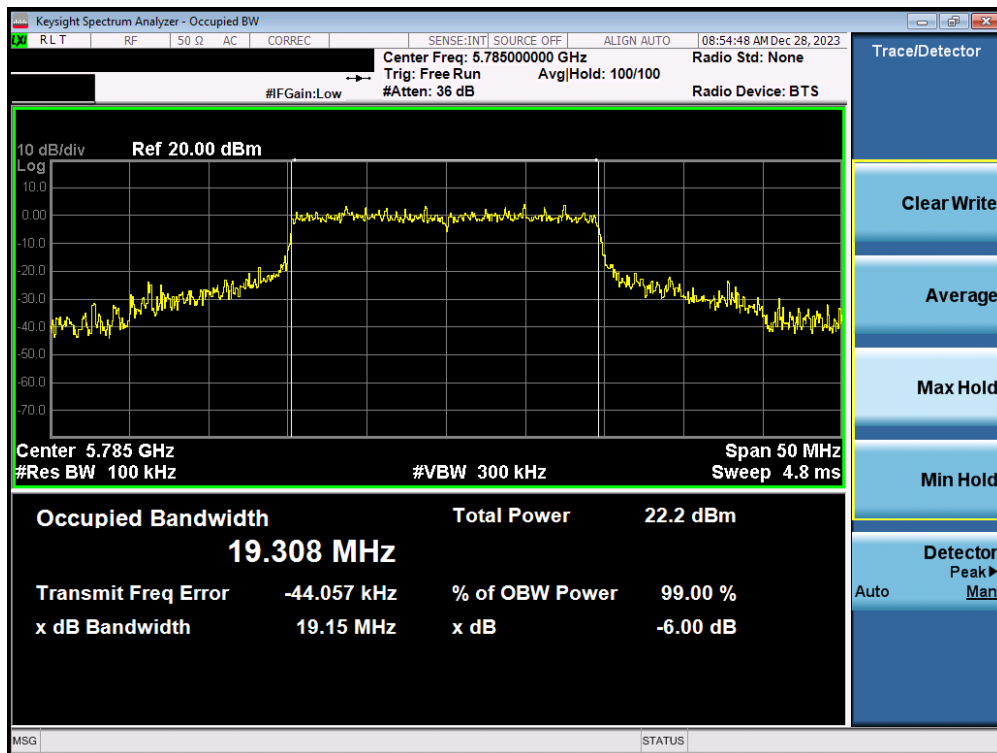


Plot 7-44. 6dB Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax – 26 Tones (UNII Band 3) – Ch. 151)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 40 of 110



Plot 7-45. 6dB Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax – 26 Tones (UNII Band 3) – Ch. 155)

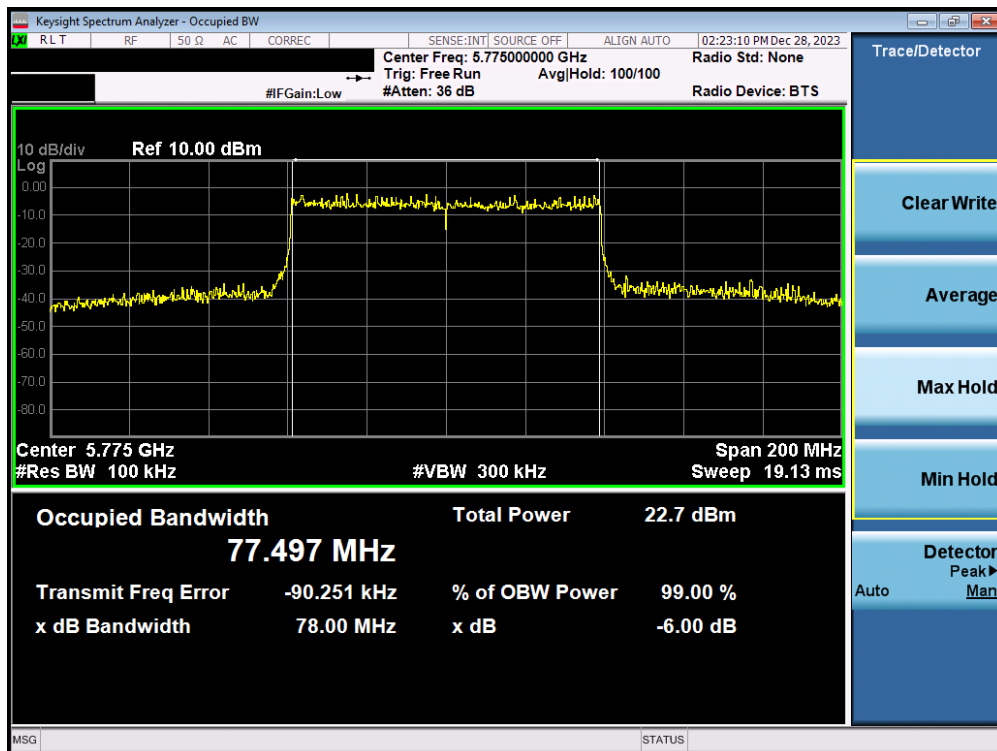


Plot 7-46. 6dB Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax – 242 Tones (UNII Band 3) – Ch. 157)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 41 of 110



Plot 7-47. 6dB Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax – 484 Tones (UNII Band 3) – Ch. 151)



Plot 7-48. 6dB Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax – 996 Tones (UNII Band 3) – Ch. 155)

FCC ID: A3LSMA356U		MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 42 of 110	

7.4 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.

The output power limits are specified in the tables below.

UNII Band	Frequency Range	Maximum Conducted Power Limit		Maximum e.i.r.p	
		FCC	ISED	FCC	ISED
UNII 1	5.15 – 5.25GHz	23.98dBm (250mW)	N/A	N/A	The lesser of 23.01dBm (200mW) or 10dBm + 10log ₁₀ B
UNII 2A	5.25 – 5.35GHz	The lesser of 23.98dBm (250mW) or 11dBm + 10log ₁₀ B		N/A	The lesser of 30dBm (1W) or 17dBm + 10log ₁₀ B
UNII 2C	5.47 – 5.725GHz				

UNII Band	Frequency Range	Maximum Conducted Power Limit	Maximum e.i.r.p
		FCC	FCC
UNII 1	5.15 – 5.25GHz	23.98dBm (250mW)	N/A
UNII 2A	5.25 – 5.35GHz	The lesser of 23.98dBm (250mW) or 11dBm + 10log ₁₀ B	N/A
UNII 2C	5.47 – 5.725GHz		
UNII 3	5.725 – 5.850GHz	30dBm (1W)	N/A

UNII Band	Frequency Range	Maximum Conducted Power Limit	Maximum e.i.r.p
		ISED	ISED
UNII 1	5.15 – 5.25GHz	N/A	The lesser of 23.01dBm (200mW) or 10dBm + 10log ₁₀ B
UNII 2A	5.25 – 5.35GHz	The lesser of 23.98dBm (250mW) or 11dBm + 10log ₁₀ B	The lesser of 30dBm (1W) or 17dBm + 10log ₁₀ B
UNII 2C	5.47 – 5.725GHz		
UNII 3	5.725 – 5.850GHz	30dBm (1W)	N/A

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.

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 43 of 110



Figure 7-3. Test Instrument & Measurement Setup

Test Notes

None.

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 44 of 110



MIMO Conducted Output Power Measurements

Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)									Conducted Power Limit [dBm]	Conducted Power Margin [dB]	Dir. Ant. Gain [dBi]	Max e.i.r.p [dBm]	e.i.r.p Limit [dBm]	e.i.r.p Margin [dB]	
				RU Index															
				0			8			8									
20MHz BW	1	5180	36	26T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	23.98	-11.22	-0.10	12.66	30.0	-17.34
					9.42	9.76	12.60	9.55	9.39	12.48	9.63	9.87	12.76						
					9.75	9.64	12.71	9.76	9.74	12.76	9.79	9.45	12.63						
	2A	5240	48	26T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	23.98	-11.22	-0.10	12.66	30.0	-17.43
					9.33	9.97	12.67	9.34	9.87	12.67	9.37	9.81	12.64						
					9.23	9.59	12.42	9.17	9.75	12.48	9.81	9.76	12.80						
	2C	5260	52	26T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	23.98	-11.18	0.45	13.12	30.0	-16.88
					8.73	13.60	13.20	8.16	9.72	12.02	8.68	9.90	12.72						
					9.62	9.75	12.70	9.61	9.82	12.75	9.40	9.88	12.66						
	3	5280	56	26T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	23.98	-11.18	0.45	13.24	30.0	-16.76
9.23					9.59	12.42	9.17	9.75	12.48	9.81	9.76	12.80							
9.23					9.59	12.42	9.17	9.75	12.48	9.81	9.76	12.80							
3	5500	100	26T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	23.98	-11.25	-0.33	12.40	30.0	-17.60	
				9.62	9.75	12.70	9.61	9.82	12.75	9.40	9.88	12.66							
				9.38	9.89	12.65	8.82	9.70	12.29	8.95	9.75	12.38							
3	5720	144	26T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	23.98	-11.38	-0.33	12.27	30.0	-17.72	
				9.34	9.82	12.60	9.31	9.30	12.32	9.07	9.74	12.43							
				8.42	9.96	12.27	8.50	9.96	12.30	8.50	9.72	12.16							
3	5745	149	26T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	30	-17.53	-0.45	12.02	36.0	-23.98	
				8.62	9.92	12.33	8.51	9.99	12.32	8.86	9.98	12.47							
				8.88	9.65	12.29	9.18	9.63	12.42	9.25	9.78	12.53							
3	5825	165	26T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	30	-17.47	-0.45	12.08	36.0	-23.92	
				8.88	9.65	12.29	9.18	9.63	12.42	9.25	9.78	12.53							
				8.88	9.65	12.29	9.18	9.63	12.42	9.25	9.78	12.53							

Table 7-6. MIMO 20MHz BW (UNII) Maximum Conducted Output Power (26 Tones)

Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)									Conducted Power Limit [dBm]	Conducted Power Margin [dB]	Dir. Ant. Gain [dBi]	Max e.i.r.p [dBm]	e.i.r.p Limit [dBm]	e.i.r.p Margin [dB]	
				RU Index															
				37			40			40									
20MHz BW	1	5180	36	52T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	23.98	-8.01	-0.10	15.87	30.0	-14.13
					12.90	12.76	15.84	12.97	12.95	15.97	12.80	12.88	15.85						
					12.62	12.63	15.64	12.96	12.61	15.80	12.77	12.67	15.73						
	2A	5240	48	52T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	23.98	-8.19	-0.10	15.70	30.0	-14.39
					12.54	12.85	15.71	12.30	12.83	15.64	12.40	12.97	15.70						
					12.88	12.38	15.65	12.90	12.40	15.67	12.89	12.51	15.72						
	2C	5260	52	52T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	23.98	-8.26	0.45	16.16	30.0	-13.84
					12.99	12.61	15.81	12.99	12.24	15.64	12.99	12.69	15.85						
					12.15	12.45	15.31	12.14	12.54	15.11	12.63	15.39	15.33						
	3	5500	100	52T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	23.98	-8.38	-0.33	15.27	30.0	-14.73
12.34					12.83	15.60	12.20	12.66	15.45	12.20	12.72	15.52							
12.22					12.63	15.44	12.55	12.76	15.67	12.62	12.73	15.69							
3	5720	144	52T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	23.98	-8.46	-0.33	15.19	30.0	-14.81	
				12.01	12.85	15.46	12.14	12.85	15.52	12.08	12.38	15.35							
				12.01	12.86	15.47	12.12	12.85	15.51	12.11	12.59	15.37							
3	5745	149	52T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	30	-14.49	-0.45	15.06	36.0	-20.94	
				12.05	12.94	15.53	12.01	12.69	15.37	12.99	12.14	15.60							
				12.01	12.27	15.15	12.33	12.32	15.34	12.13	12.35	15.25							
3	5825	165	52T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	30	-14.66	-0.45	14.89	36.0	-21.11	
				12.01	12.27	15.15	12.33	12.32	15.34	12.13	12.35	15.25							
				12.01	12.27	15.15	12.33	12.32	15.34	12.13	12.35	15.25							

Table 7-7. MIMO 20MHz BW (UNII) Maximum Conducted Output Power (52 Tones)

Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)									Conducted Power Limit [dBm]	Conducted Power Margin [dB]	Dir. Ant. Gain [dBi]	Max e.i.r.p [dBm]	e.i.r.p Limit [dBm]	e.i.r.p Margin [dB]	
				RU Index															
				53			54			54									
20MHz BW	1	5180	36	106T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	23.98	-7.34	-0.10	16.54	30.0	-13.46
					13.64	13.14	16.41	13.91	13.33	16.64	13.98	13.35	16.64						
					13.77	13.08	16.45	13.80	13.04	16.45	13.98	13.77	16.45						
	2A	5240	48	106T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	23.98	-7.49	-0.10	16.39	30.0	-13.61
					13.42	13.01	16.23	13.62	13.32	16.49	13.98	13.42	16.49						
					13.86	13.46	16.67	13.91	13.48	16.71	13.98	13.86	16.71						
	2C	5260	52	106T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	23.98	-7.27	0.45	17.16	30.0	-12.84
					13.97	13.29	16.65	13.91	13.39	16.67	13.98	13.97	16.67						
					12.15	12.45	15.31	12.14	12.54	15.11	12.63	15.39	15.33						
	3	5500	100	106T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	23.98	-7.10	-0.33	16.55	30.0	-13.45
13.75					13.99	16.88	13.49	13.89	16.70	13.98	13.75	16.70							
13.61					13.49	16.56	13.44	13.33	16.40	13.98	13.61	16.40							
3	5600	120	106T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	23.98	-7.42	-0.33	16.23	30.0	-13.77	
				13.29	13.67	16.49	13.32	13.59	16.47	13.98	13.29	16.47							
				13.14	13.91	16.55	13.15	13.98	16.60	13.40	13.98	16.60							
3	5720	144	106T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	30	-13.33	-0.45	16.22	36.0	-19.78	
				13.28	13.99	16.66	13.33	13.97	16.67	13.98	13.28	16.67							
				13.44	13.32	16.39	13.47	13.77	16.63	13.97	13.44	16.63							
3	5745	149	106T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	30	-13.33	-0.45	16.18	36.0	-19.82	
				13.28	13.99	16.66	13.33	13.97	16.67	13.98	13.28	16.67							
				13.44	13.32	16.39	13.47	13.77	16.63	13.97	13.44	16.63							
3	5825	165	106T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	30	-13.37	-0.45	16.18	36.0	-19.82	
				13.28	13.99	16.66	13.33	13.97	16.67	13.98	13.28	16.67							
				13.44	13.32	16.39	13.47	13.77	16.63	13.97	13.44	16.63							

Table 7-8. MIMO 20MHz BW (UNII) Maximum Conducted Output Power (106 Tones)

Band	Freq [MHz]	Channel	Tones	Average Conducted Power (dBm)									Conducted Power Limit [dBm]	Conducted Power Margin [dB]	Dir. Ant. Gain [dBi]	Max e.i.r.p [dBm]	e.i.r.p Limit [dBm]	e.i.r.p Margin [dB]	
				RU Index															
				61			61			61									
20MHz BW	1	5180	36	242T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	23.98	-7.52	-0.10	16.36	30.0	-13.64
					13.66	13.22	16.46	13.91	13.33	16.64	13.98	13.35	16.64						
					13.77	13.08	16.45	13.80	13.04	16.45	13.98	13.77	16.45						
	2A	5240	48	242T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	23.98	-7.55	-0.10	16.34	30.0	-13.66
					13.42	13.01	16.23	13.62	13.32	16.49	13.98	13.42	16.49						
					13.86	13.46	16.67	13.91	13.48	16.71	13.98	13.86	16.71						
	2C	5260	52	242T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	23.98	-7.50	0.45	16.92	30.0	-13.08
					13.97	13.29	16.65	13.91	13.39	16.67	13.98	13.97	16.67						
					12.15	12.45	15.31	12.14	12.54	15.11	12.63	15.39	15.33						
	3	5500	100	242T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	23.98	-7.68	-0.33	15.97	30.0	-14.03
13.75					13.99	16.88	13.49	13.89	16.70	13.98	13.75	16.70							
13.61					13.49	16.56	13.44	13.33	16.40	13.98	13.61	16.40							
3	5600	120	242T	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	23.98	-7.70	-0.33	15.95	30.0	-14.05	
				13.33	13.21	16.28	13.32	13.59	16.47	13.98	13.33	16.47							
				13.11	13.22	16.18	13.15	13.98	16.60	13.40	13.98	16.60							



Note:

Per ANSI C63.10-2013 and KDB 662911 v02r01 Section E1), the conducted powers at Antenna 1 and Antenna 2 were first measured separately during MIMO transmission as shown in the section above. The measured values were then summed in linear power units then converted back to dBm.

Per ANSI C63.10-2013 Section 14.4.3, the directional gain is calculated using the following formula, where G_N is the gain of the nth antenna and N_{ANT} , the total number of antennas used.

$$\text{Directional gain} = 10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{ANT}] \text{ dBi}$$

Sample MIMO Calculation:

At 5180MHz in 802.11ax (20MHz BW) mode, the average conducted output power was measured to be 13.66 dBm for Antenna 1 and 13.22 dBm for Antenna 2.

Antenna 1 + Antenna 2 = MIMO

$$(13.66 \text{ dBm} + 13.22 \text{ dBm}) = (23.23 \text{ mW} + 20.99 \text{ mW}) = 44.23 \text{ mW} = 16.46 \text{ dBm}$$

Sample e.i.r.p. Calculation:

At 5180MHz in 802.11ax (20MHz BW) mode, the average MIMO conducted power was calculated to be 16.46 dBm with directional gain of -0.99dBi.

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

$$16.46 \text{ dBm} + -0.10 \text{ dBi} = 16.36 \text{ dBm}$$

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 46 of 110

7.5 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.

The output power density limits are as specified in the tables below.

UNII Band	Frequency Range	Maximum Power Spectral Density	
		FCC	ISED
UNII 1	5.15 – 5.25GHz	11dBm/MHz	10dBm/MHz e.i.r.p
UNII 2A	5.25 – 5.35GHz	11dBm/MHz	
UNII 2C	5.47 – 5.725GHz		
UNII 3	5.725 – 5.850GHz	30dBm/500kHz	

UNII Band	Frequency Range	Maximum Conducted Power Limit
		FCC
UNII 1	5.15 – 5.25GHz	11dBm/MHz
UNII 2A	5.25 – 5.35GHz	
UNII 2C	5.47 – 5.725GHz	
UNII 3	5.725 – 5.850GHz	30dBm/500kHz

UNII Band	Frequency Range	Maximum Conducted Power Limit
		ISED
UNII 1	5.15 – 5.25GHz	10dBm/MHz e.i.r.p
UNII 2A	5.25 – 5.35GHz	11dBm/MHz
UNII 2C	5.47 – 5.725GHz	
UNII 3	5.725 – 5.850GHz	30dBm/500kHz

Test Procedure Used

ANSI C63.10-2013 – Section 12.3.2.3 (Method SA-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 $\geq 2 \times (\text{span}/\text{RBW})$
6. Sweep time = auto
7. Detector = power averaging (RMS)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 47 of 110

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 7-4. Test Instrument & Measurement Setup

Test Notes

The power spectral density for each channel was measured with the RU index showing the highest conducted power.

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 48 of 110

Summed MIMO Power Spectral Density Measurements

	Frequency [MHz]	802.11 MODE	Channel	Antenna 1 PSD [dBm]	Antenna 2 PSD [dBm]	MIMO Summed PSD [dBm]	Max Conducted PSD [dBm]	Margin [dB]
Band 1	5180	ax (20MHz)	36	7.39	7.29	10.35	11.00	-0.65
	5200	ax (20MHz)	40	7.95	7.46	10.72	11.00	-0.28
	5240	ax (20MHz)	48	7.68	7.68	10.69	11.00	-0.31
	5190	ax (40MHz)	38	6.48	6.58	9.54	11.00	-1.46
	5230	ax (40MHz)	46	6.13	6.32	9.24	11.00	-1.76
	5210	ax (80MHz)	42	6.42	6.24	9.34	11.00	-1.66
Band 2A	5260	ax (20MHz)	52	7.49	7.73	10.62	11.00	-0.38
	5280	ax (20MHz)	56	7.74	7.73	10.74	11.00	-0.26
	5320	ax (20MHz)	64	6.98	7.90	10.47	11.00	-0.53
	5270	ax (40MHz)	54	6.19	6.14	9.17	11.00	-1.83
	5310	ax (40MHz)	62	5.63	5.28	8.47	11.00	-2.53
Band 2C	5290	ax (80MHz)	58	6.52	5.92	9.24	11.00	-1.76
	5500	ax (20MHz)	100	7.70	7.85	10.78	11.00	-0.22
	5600	ax (20MHz)	120	7.73	7.46	10.60	11.00	-0.40
	5720	ax (20MHz)	144	7.06	7.56	10.33	11.00	-0.67
	5510	ax (40MHz)	102	6.38	6.25	9.33	11.00	-1.67
	5590	ax (40MHz)	118	6.34	5.69	9.04	11.00	-1.96
	5710	ax (40MHz)	142	5.98	5.87	8.93	11.00	-2.07
	5530	ax (80MHz)	106	6.27	6.10	9.19	11.00	-1.81
5610	ax (80MHz)	122	6.38	5.29	8.88	11.00	-2.12	
	5690	ax (80MHz)	138	6.70	5.08	8.98	11.00	-2.02

Table 7-12. Bands 1, 2A, 2C MIMO Conducted Power Spectral Density Measurements MIMO (26 Tones)

	Frequency [MHz]	802.11 MODE	Channel	Antenna 1 PSD [dBm]	Antenna 2 PSD [dBm]	MIMO Summed PSD [dBm]	Max Conducted PSD [dBm]	Margin [dB]
Band 3	5745	ax (20MHz)	149	4.69	6.38	8.63	30.00	-21.37
	5785	ax (20MHz)	157	5.01	6.62	8.90	30.00	-21.10
	5825	ax (20MHz)	165	5.39	5.95	8.69	30.00	-21.31
	5755	ax (40MHz)	151	5.24	4.71	7.99	30.00	-22.01
	5795	ax (40MHz)	159	5.34	4.22	7.83	30.00	-22.17
	5775	ax (80MHz)	155	3.56	2.35	6.01	30.00	-23.99

Table 7-13. Band 3 MIMO Conducted Power Spectral Density Measurements MIMO (26 Tones)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 49 of 110

	Frequency [MHz]	802.11 MODE	Channel	Antenna 1 PSD [dBm]	Antenna 2 PSD [dBm]	DCCF [dB]	MIMO Summed PSD [dBm]	Max Conducted PSD [dBm]	Margin [dB]
Band 1	5180	ax (20MHz)	36	2.66	3.01	0.11	5.96	11.00	-5.04
	5200	ax (20MHz)	40	3.08	2.56	0.11	5.95	11.00	-5.05
	5240	ax (20MHz)	48	3.04	3.11	0.11	6.20	11.00	-4.80
	5190	ax (40MHz)	38	-1.16	-1.36	0.24	1.99	11.00	-9.01
	5230	ax (40MHz)	46	-0.20	1.06	0.24	3.73	11.00	-7.27
	5210	ax (80MHz)	42	-3.09	-3.47	0.53	0.26	11.00	-10.74
Band 2A	5260	ax (20MHz)	52	2.96	3.42	0.11	6.31	11.00	-4.69
	5280	ax (20MHz)	56	2.93	3.14	0.11	6.16	11.00	-4.84
	5320	ax (20MHz)	64	2.58	3.26	0.11	6.05	11.00	-4.95
	5270	ax (40MHz)	54	0.03	-0.07	0.24	3.23	11.00	-7.77
	5310	ax (40MHz)	62	-0.57	1.00	0.24	3.53	11.00	-7.47
Band 2C	5290	ax (80MHz)	58	-3.10	-3.51	0.53	0.24	11.00	-10.76
	5500	ax (20MHz)	100	3.36	3.17	0.11	6.38	11.00	-4.62
	5600	ax (20MHz)	120	3.18	2.41	0.11	5.93	11.00	-5.07
	5720	ax (20MHz)	144	2.85	2.88	0.11	5.98	11.00	-5.02
	5510	ax (40MHz)	102	-4.59	-4.96	0.24	-1.52	11.00	-12.52
	5590	ax (40MHz)	118	-0.39	-0.22	0.24	2.95	11.00	-8.05
	5710	ax (40MHz)	142	-0.51	0.04	0.24	3.02	11.00	-7.98
	5530	ax (80MHz)	106	-2.48	-2.72	0.53	0.94	11.00	-10.06
5610	ax (80MHz)	122	-3.29	-2.64	0.53	0.59	11.00	-10.41	
5690	ax (80MHz)	138	-3.05	-2.30	0.53	0.88	11.00	-10.12	

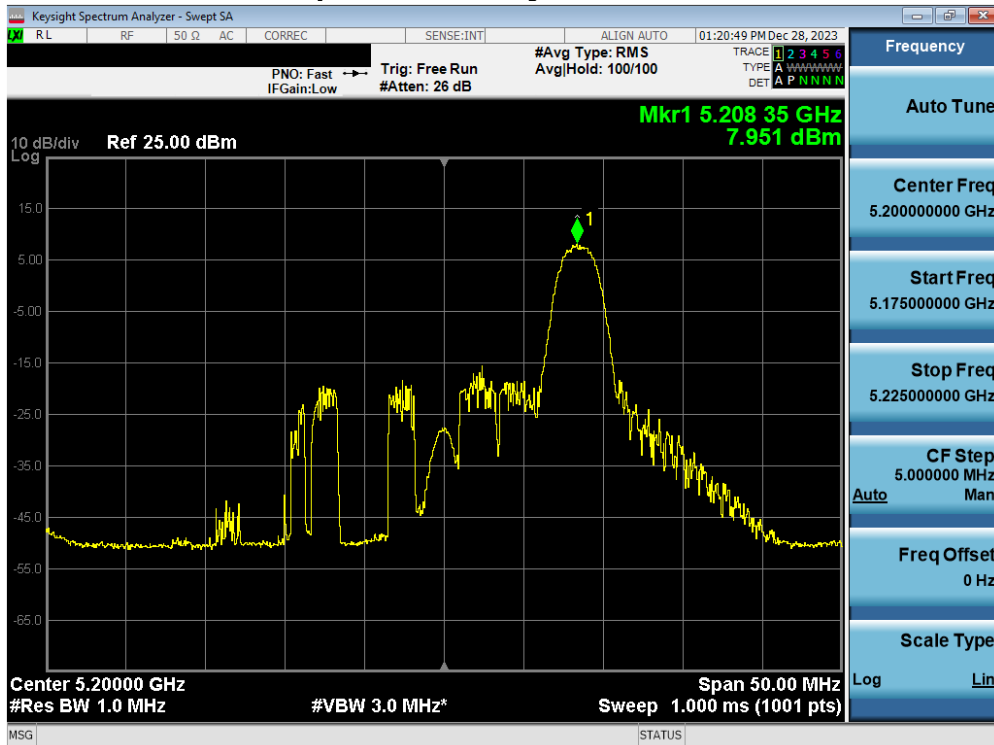
Table 7-14. Bands 1, 2A, 2C MIMO Conducted Power Spectral Density Measurements MIMO (Full Tones)

	Frequency [MHz]	802.11 MODE	Channel	Antenna 1 PSD [dBm]	Antenna 2 PSD [dBm]	DCCF [dB]	MIMO Summed PSD [dBm]	Max Conducted PSD [dBm]	Margin [dB]
Band 3	5745	ax (20MHz)	149	-0.52	0.66	0.11	3.23	30.00	-26.77
	5785	ax (20MHz)	157	-0.46	0.64	0.11	3.25	31.00	-27.75
	5825	ax (20MHz)	165	-0.70	0.31	0.11	2.96	32.00	-29.04
	5755	ax (40MHz)	151	-3.68	-2.53	0.24	0.18	36.00	-35.82
	5795	ax (40MHz)	159	-3.28	-2.27	0.24	0.51	37.00	-36.49
	5775	ax (80MHz)	155	-5.61	-6.12	0.53	-2.32	40.00	-42.32

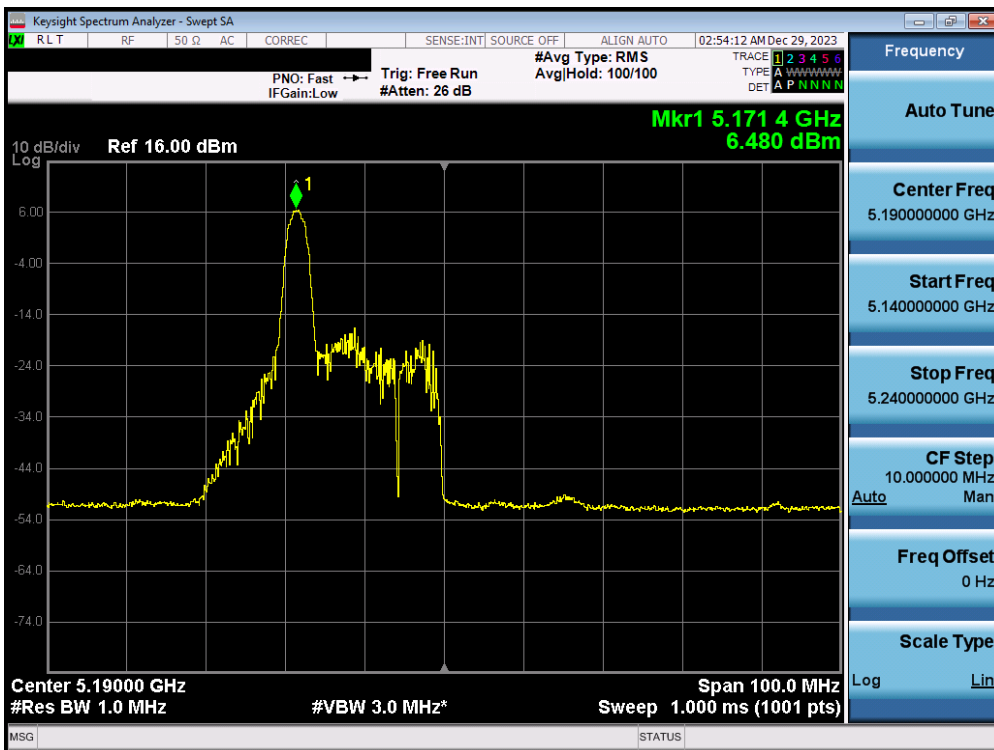
Table 7-15. Band 3 MIMO Conducted Power Spectral Density Measurements MIMO (Full Tones)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 50 of 110

7.5.1 MIMO Antenna-1 Power Spectral Density Measurements

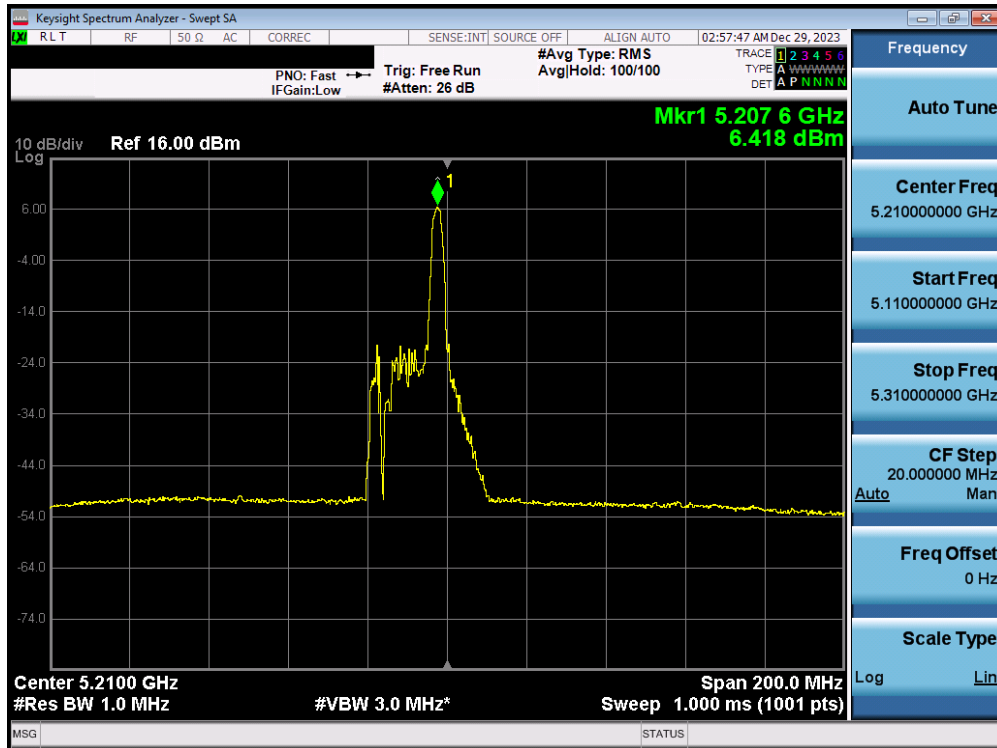


Plot 7-49. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11ax – 26 Tones (UNII Band 1) – Ch. 40)

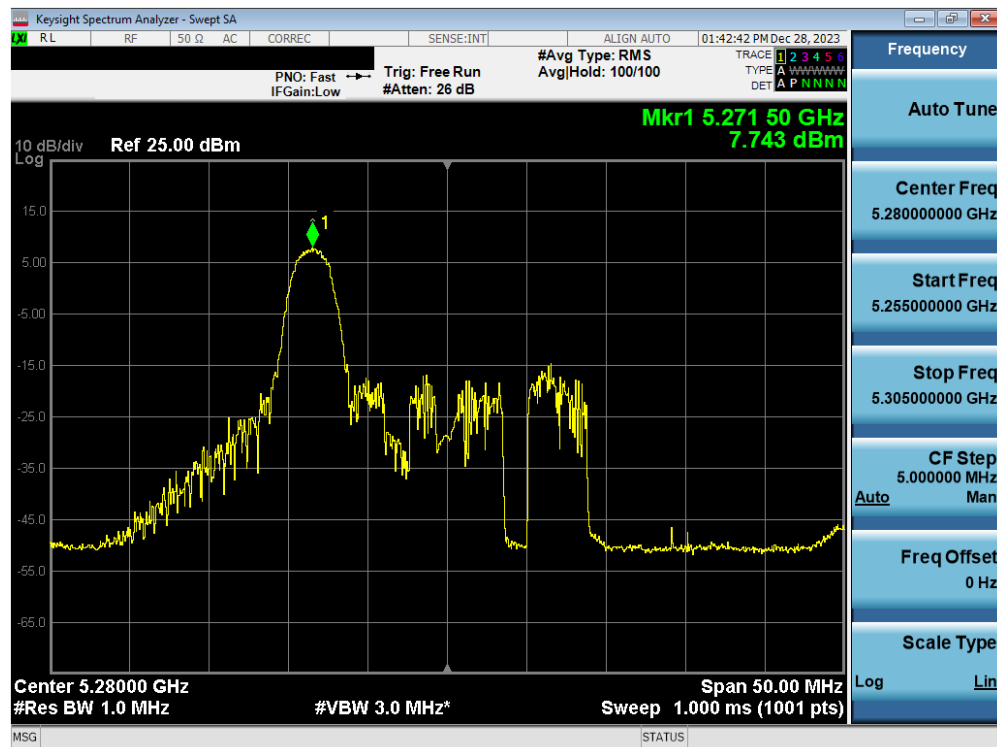


Plot 7-50. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11ax – 26 Tones (UNII Band 1) – Ch. 38)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 51 of 110

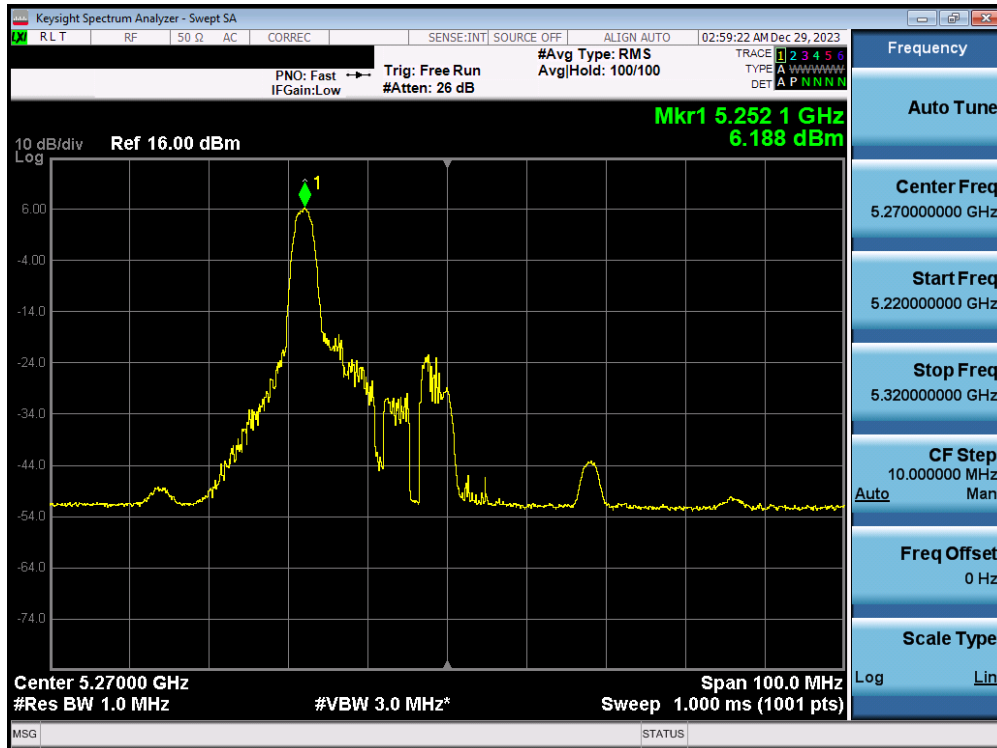


Plot 7-51. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11ax – 26 Tones (UNII Band 1) – Ch. 42)

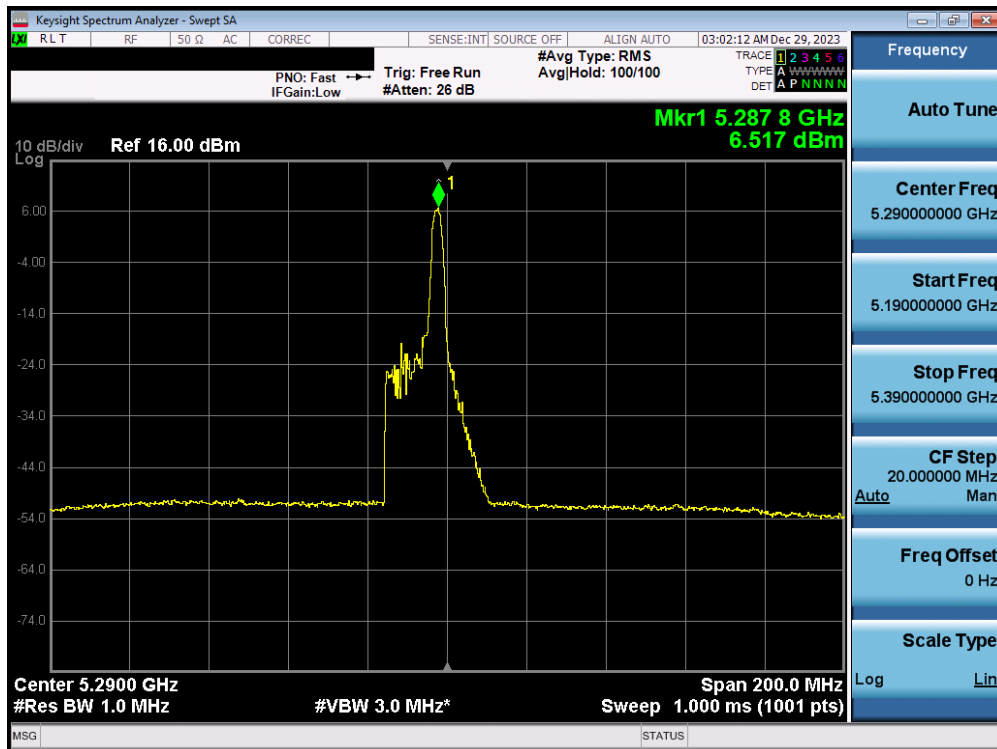


Plot 7-52. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11ax – 26 Tones (UNII Band 2A) – Ch. 56)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 52 of 110

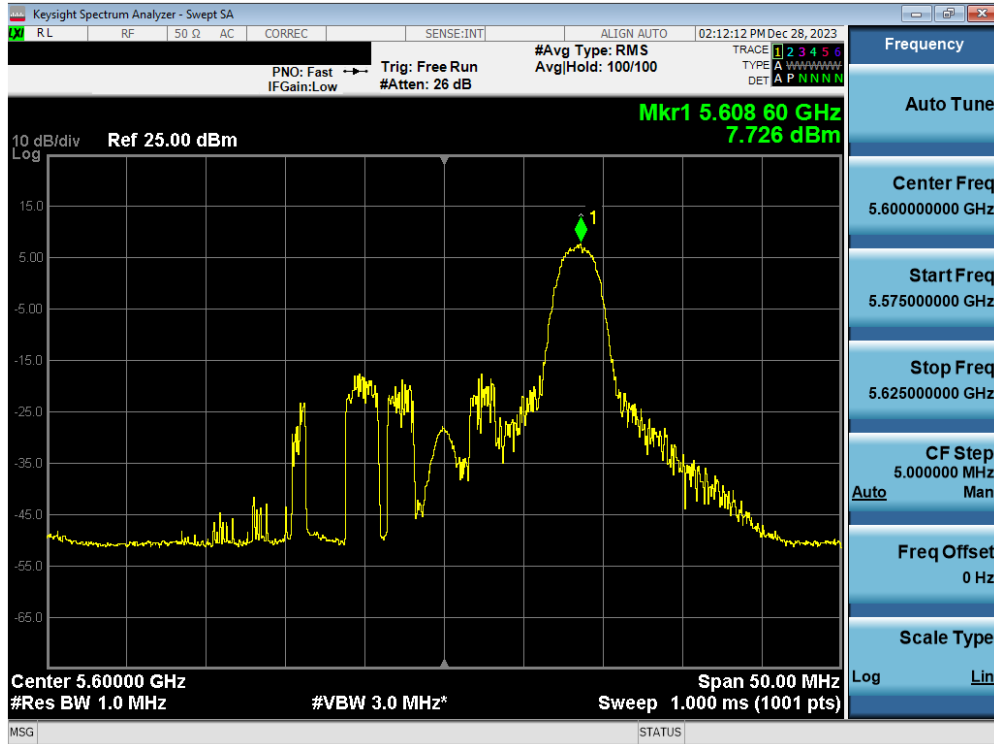


Plot 7-53. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11ax – 26 Tones (UNII Band 2A) – Ch. 54)

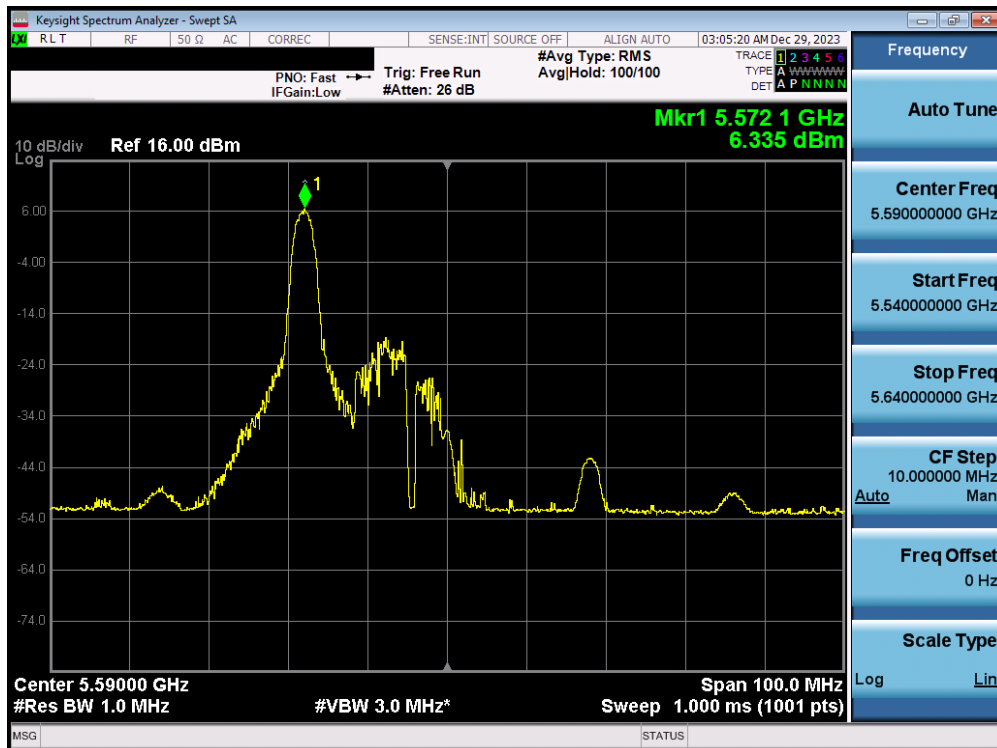


Plot 7-54. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11ax – 26 Tones (UNII Band 2A) – Ch. 58)

FCC ID: A3LSMA356U		MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 53 of 110	

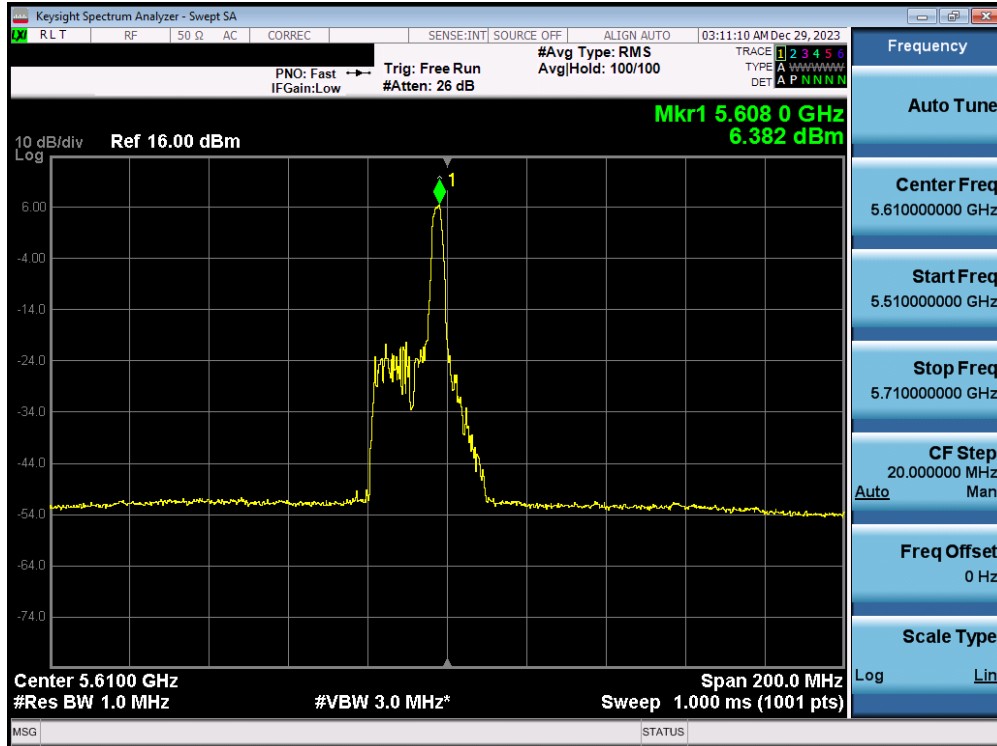


Plot 7-55. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11ax – 26 Tones (UNII Band 2C) – Ch. 120)

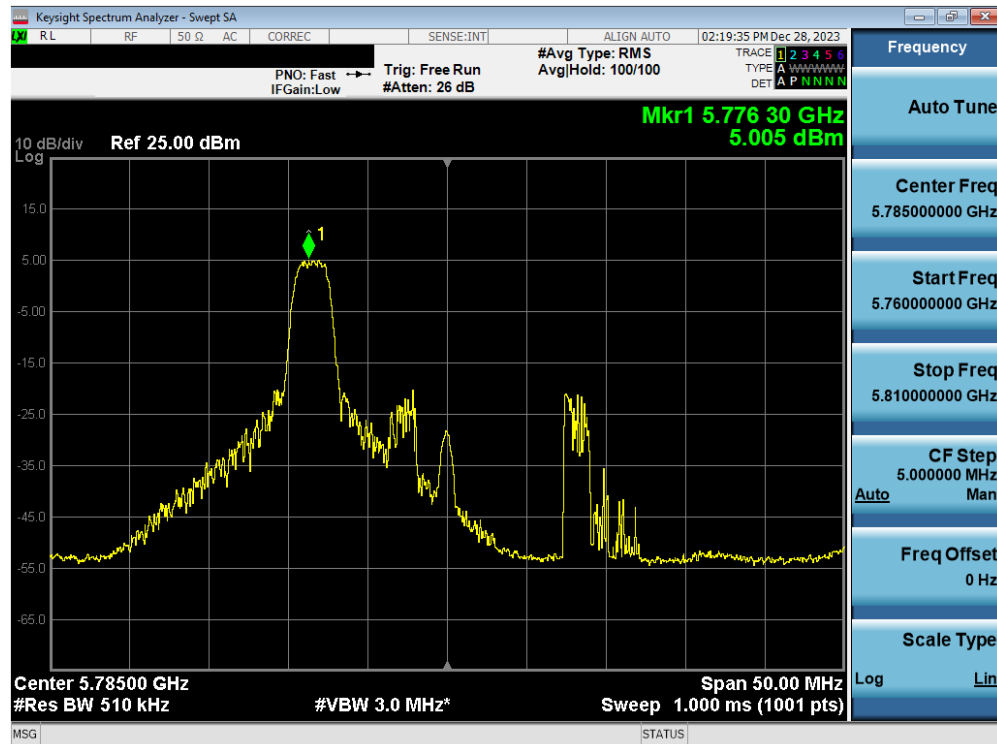


Plot 7-56. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11ax – 26 Tones (UNII Band 2C) – Ch. 118)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 54 of 110

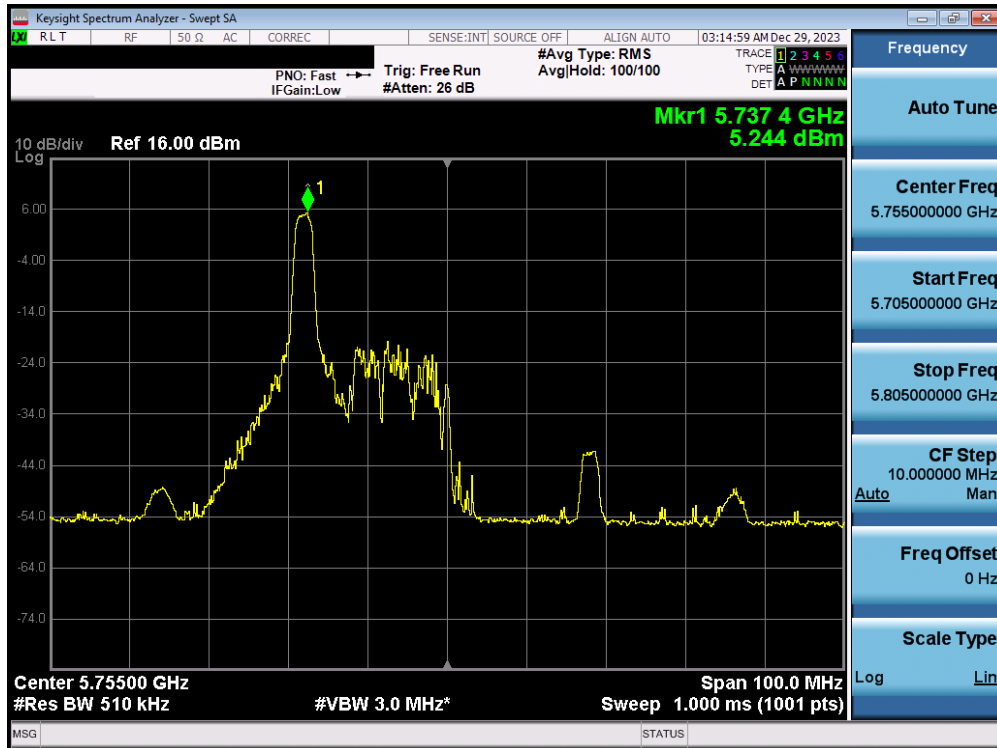


Plot 7-57. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11ax – 26 Tones (UNII Band 2C) – Ch. 122)

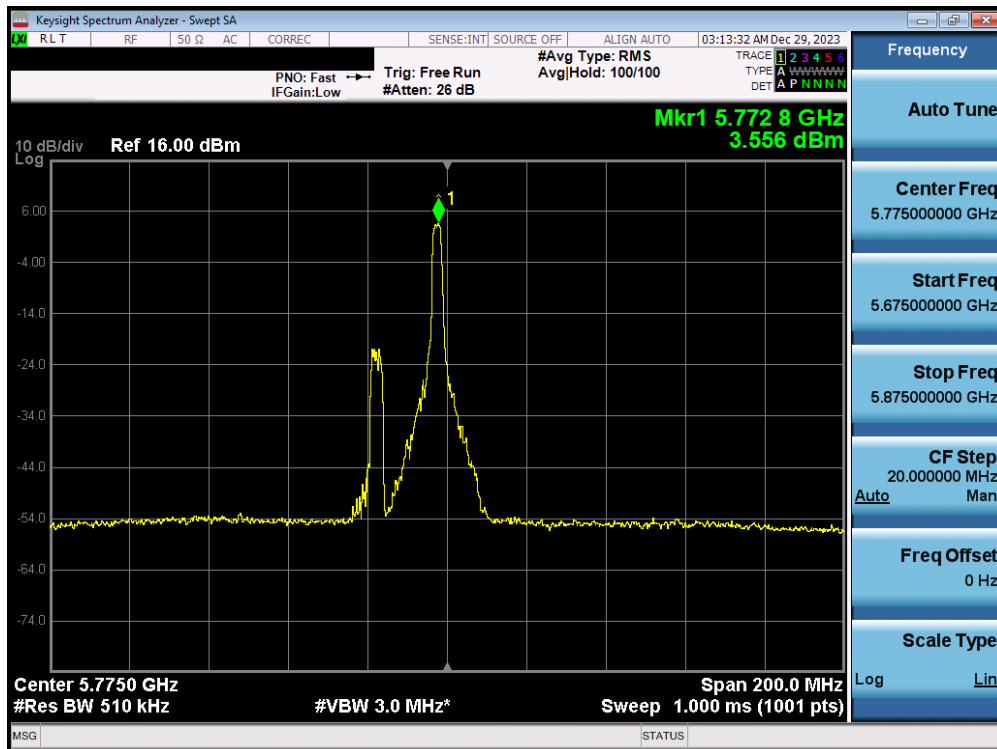


Plot 7-58. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11ax – 26 Tones (UNII Band 3) – Ch. 157)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 55 of 110

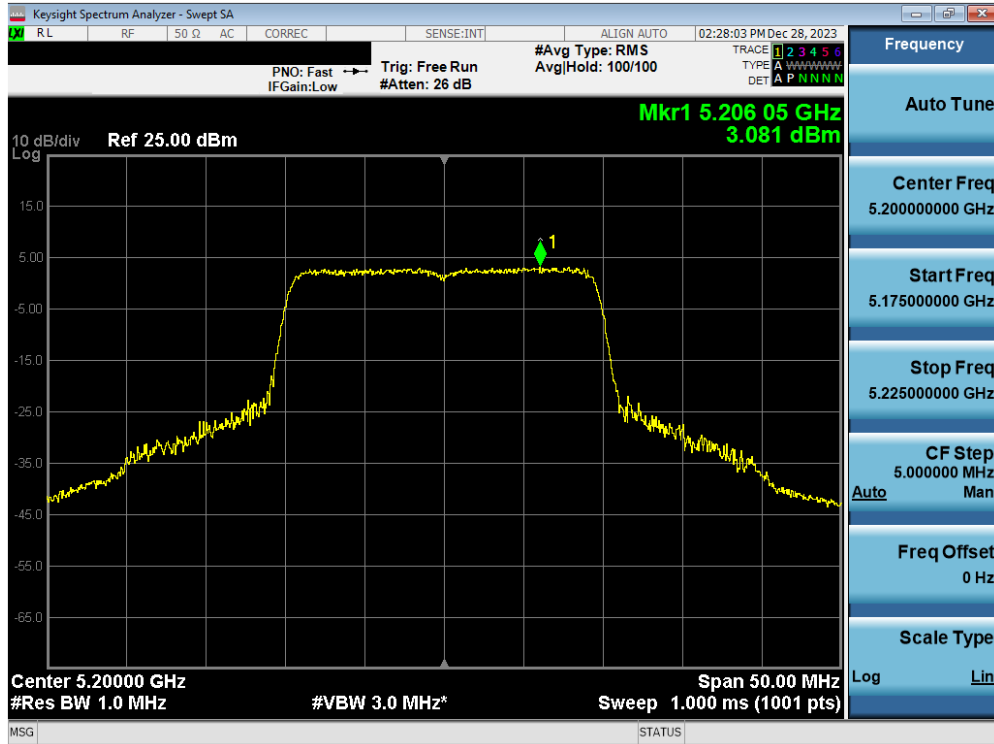


Plot 7-59. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11ax – 26 Tones (UNII Band 3) – Ch. 151)

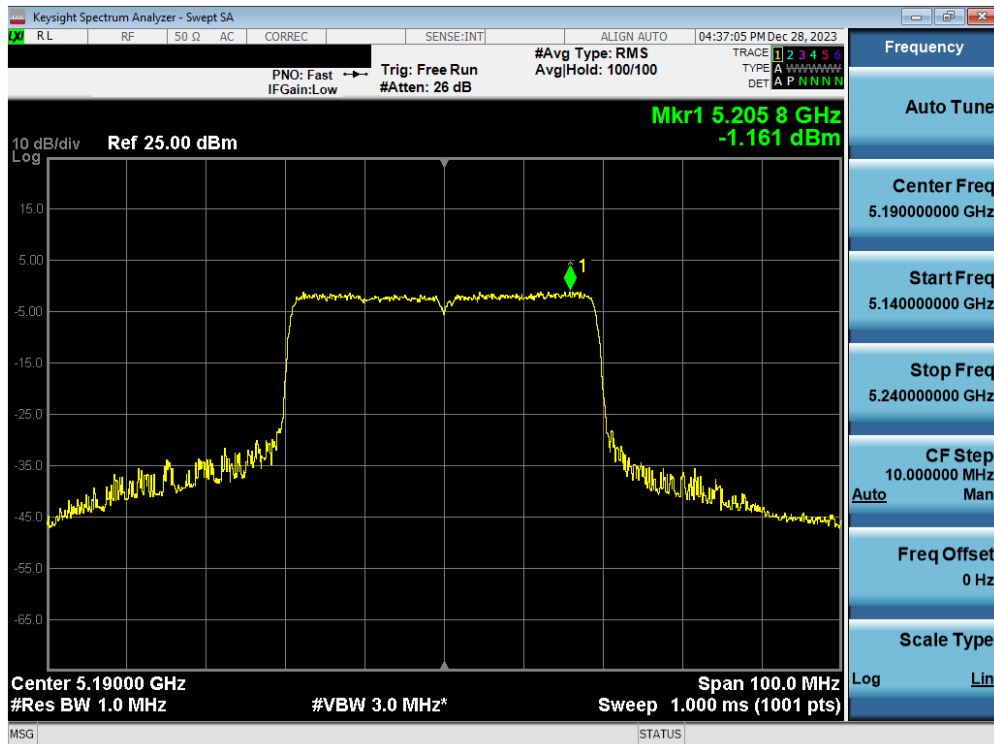


Plot 7-60. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11ax – 26 Tones (UNII Band 3) – Ch. 155)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 56 of 110

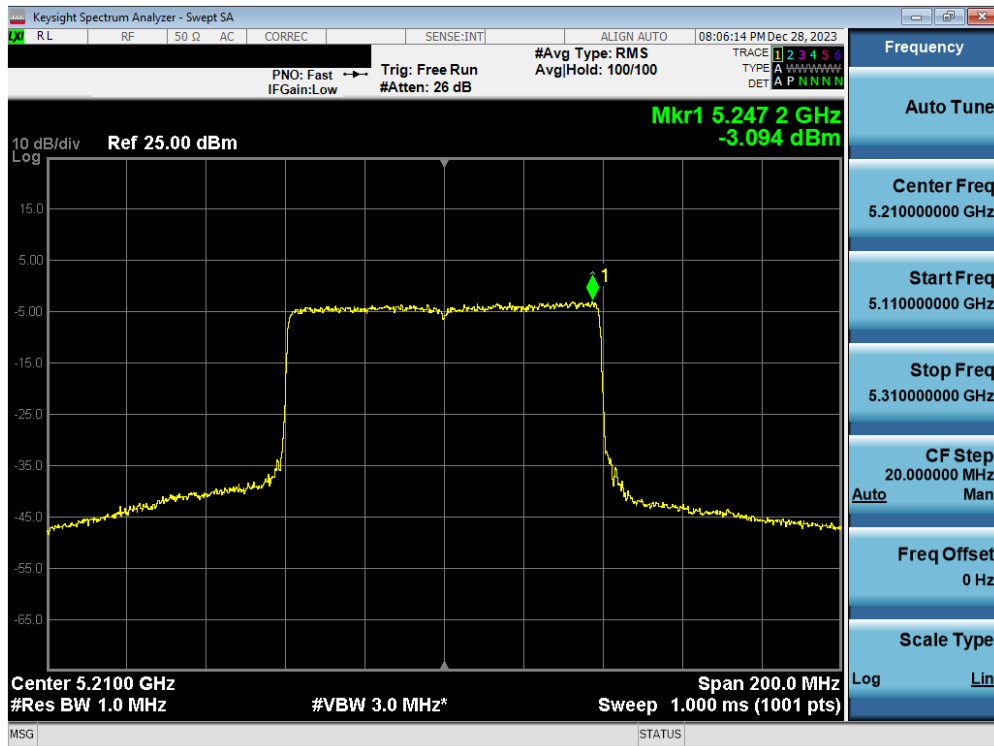


Plot 7-61. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11ax – 242 Tones (UNII Band 1) – Ch. 40)

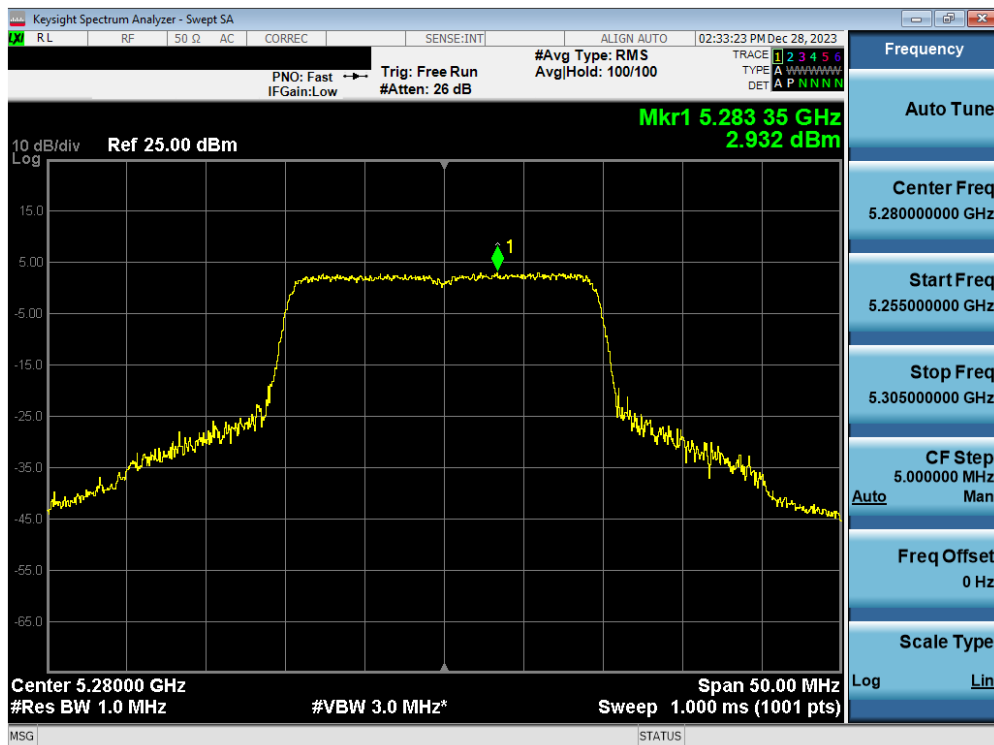


Plot 7-62. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11ax – 484 Tones (UNII Band 1) – Ch. 38)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 57 of 110

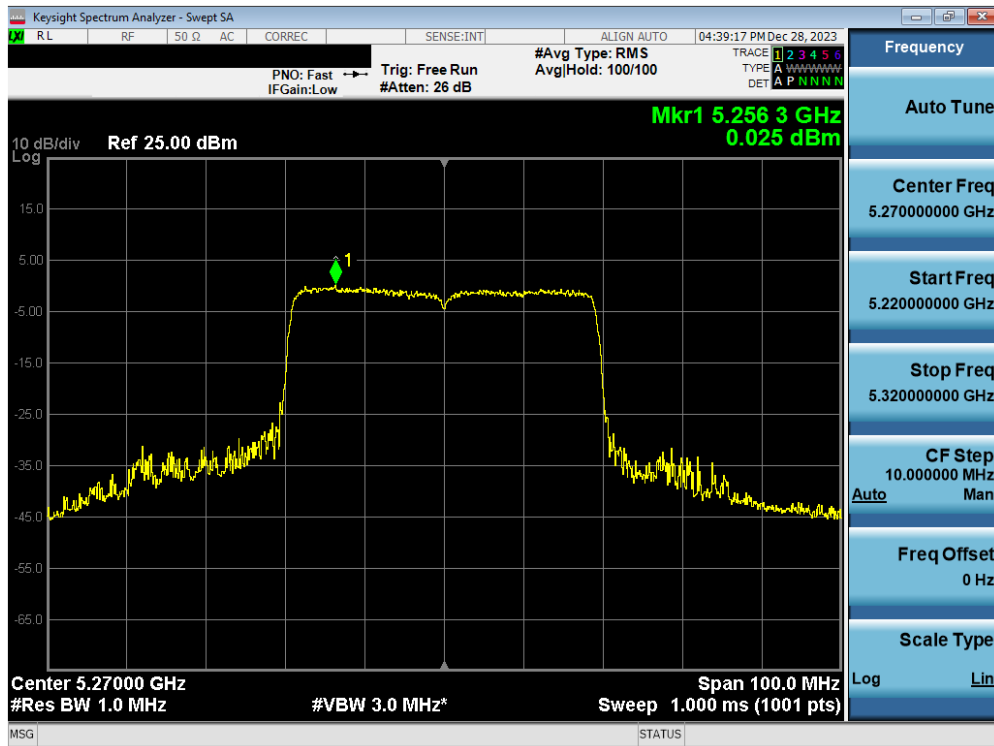


Plot 7-63. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11ax – 996 Tones (UNII Band 1) – Ch. 42)

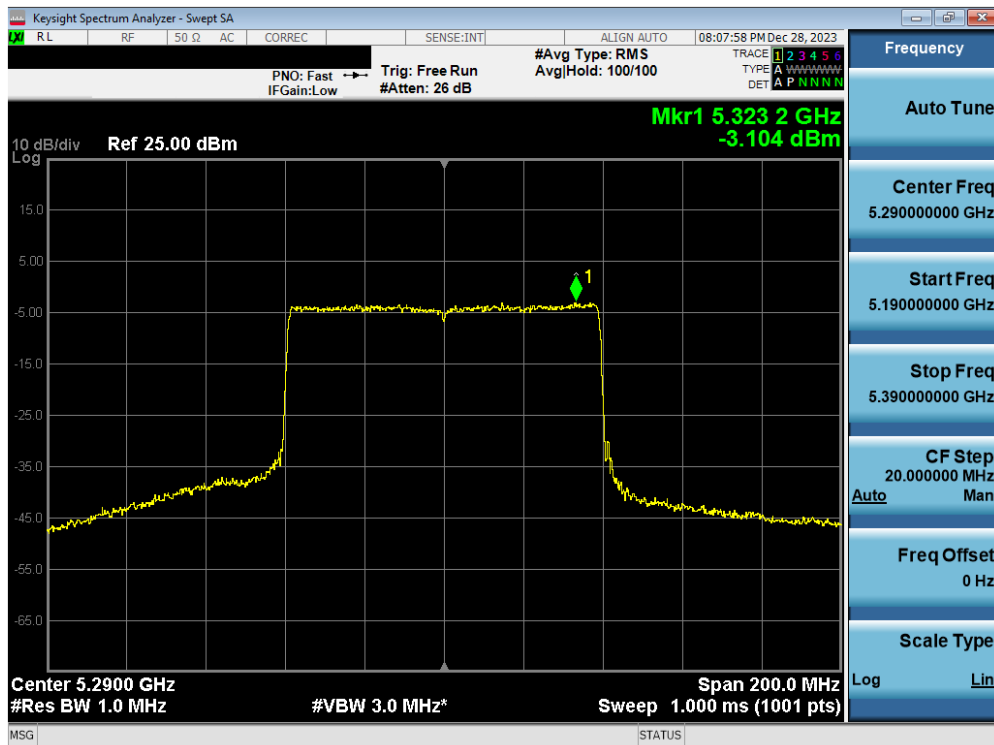


Plot 7-64. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11ax – 242 Tones (UNII Band 2A) – Ch. 56)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 58 of 110

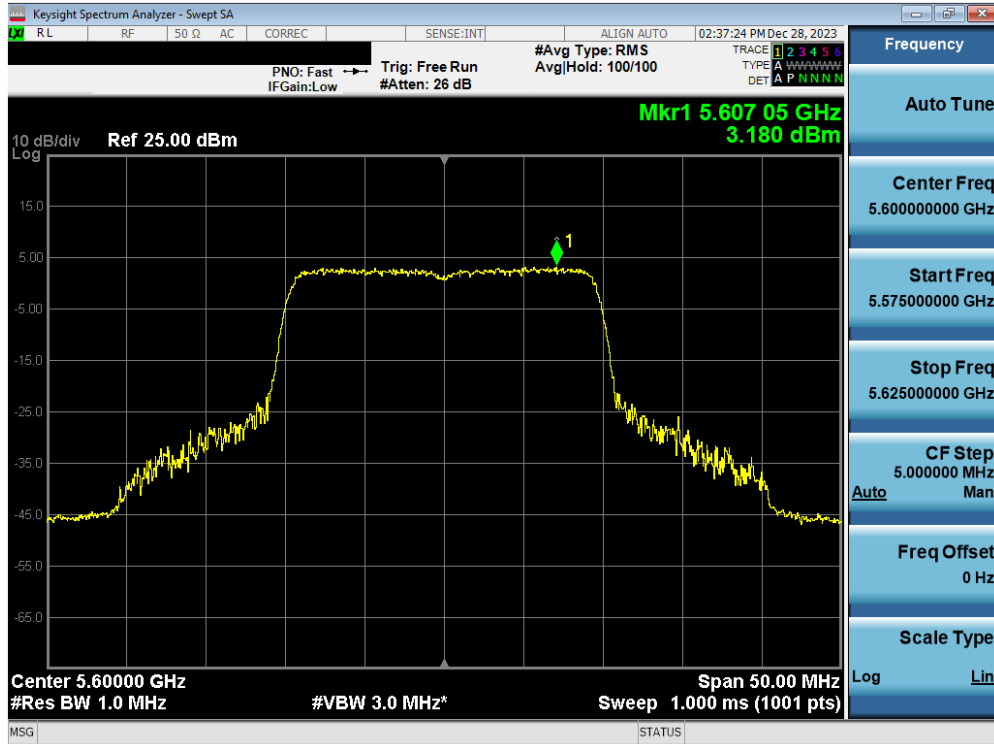


Plot 7-65. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11ax – 484 Tones (UNII Band 2A) – Ch. 54)

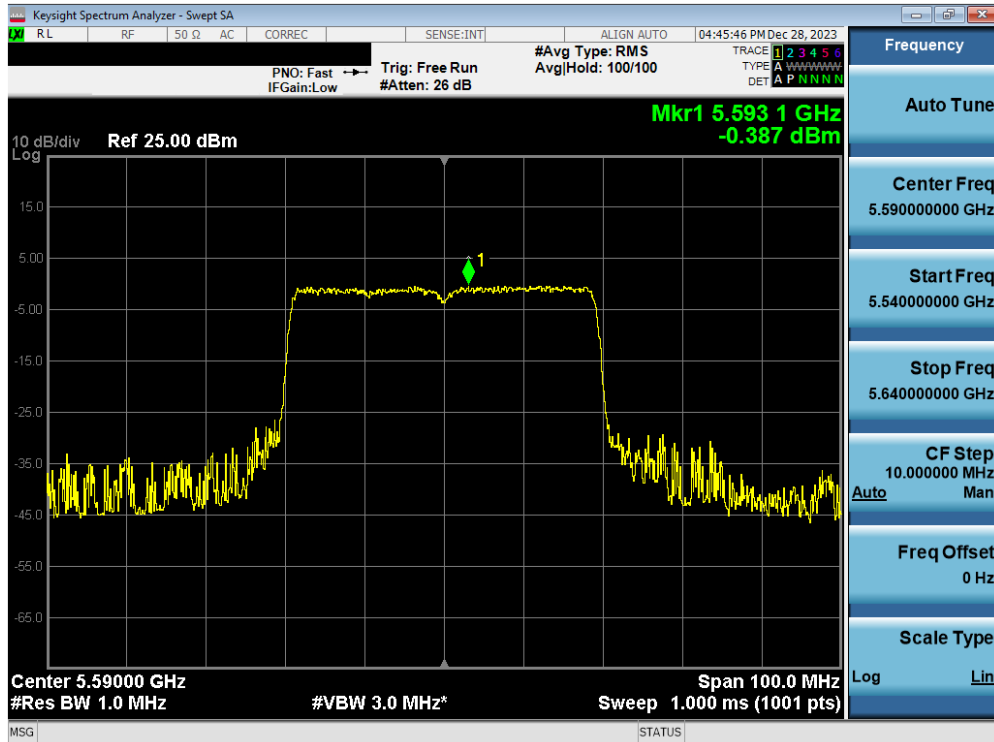


Plot 7-66. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11ax – 996 Tones (UNII Band 2A) – Ch. 58)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 59 of 110

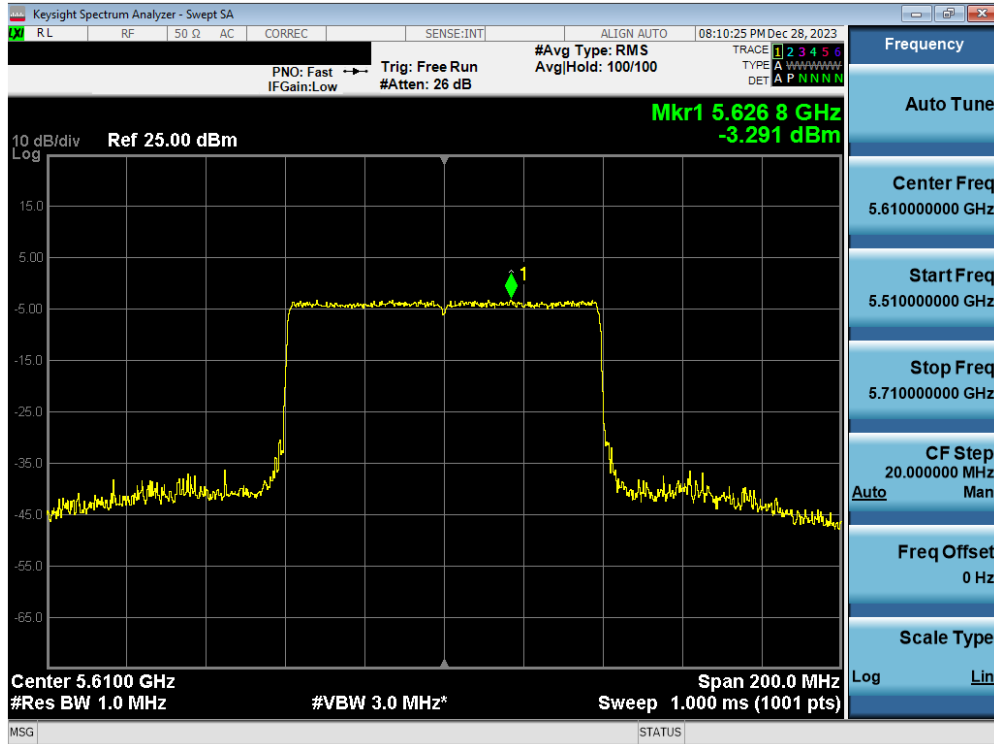


Plot 7-67. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11ax – 242 Tones (UNII Band 2C) – Ch. 120)

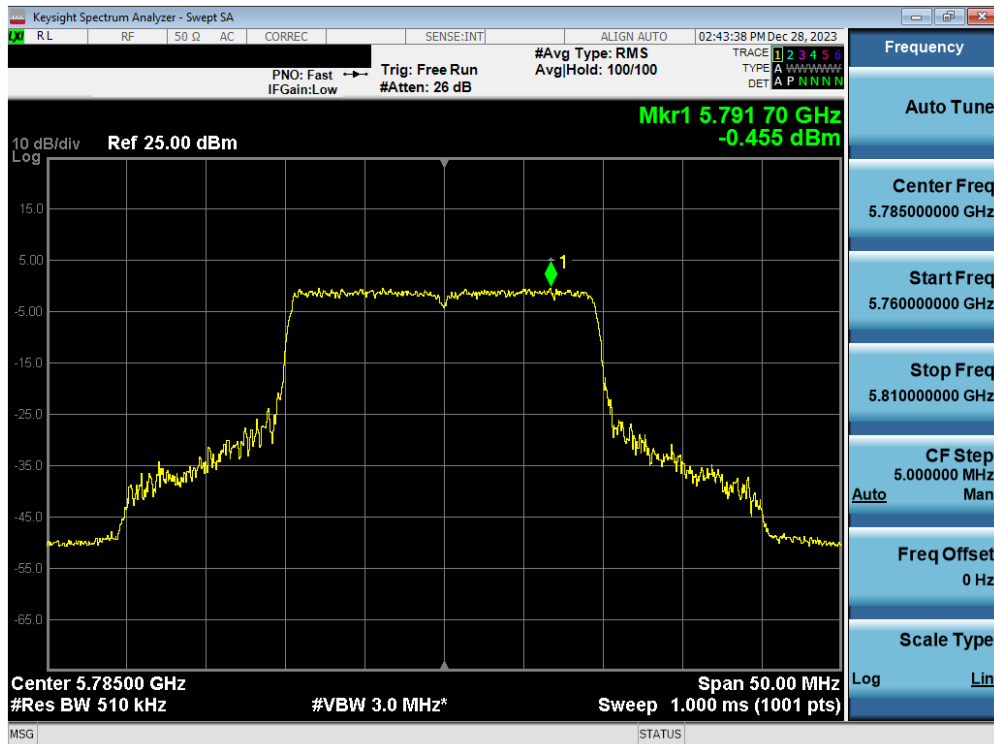


Plot 7-68. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11ax – 484 Tones (UNII Band 2C) – Ch. 118)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 60 of 110

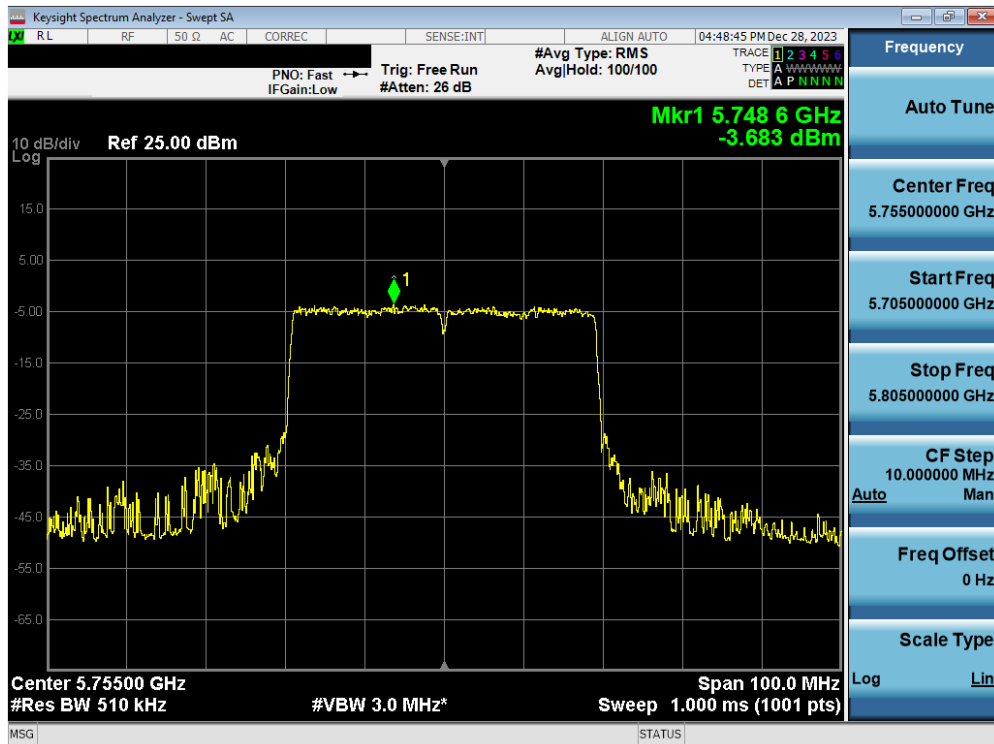


Plot 7-69. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11ax – 996 Tones (UNII Band 2C) – Ch. 122)

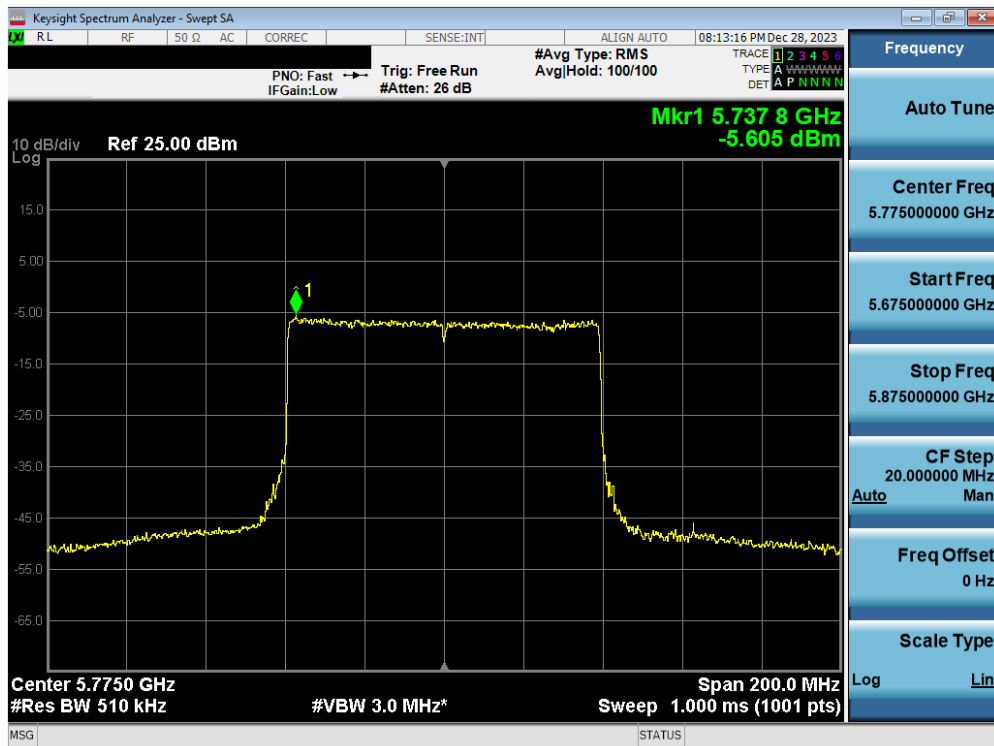


Plot 7-70. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11ax – 242 Tones (UNII Band 3) – Ch. 157)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 61 of 110



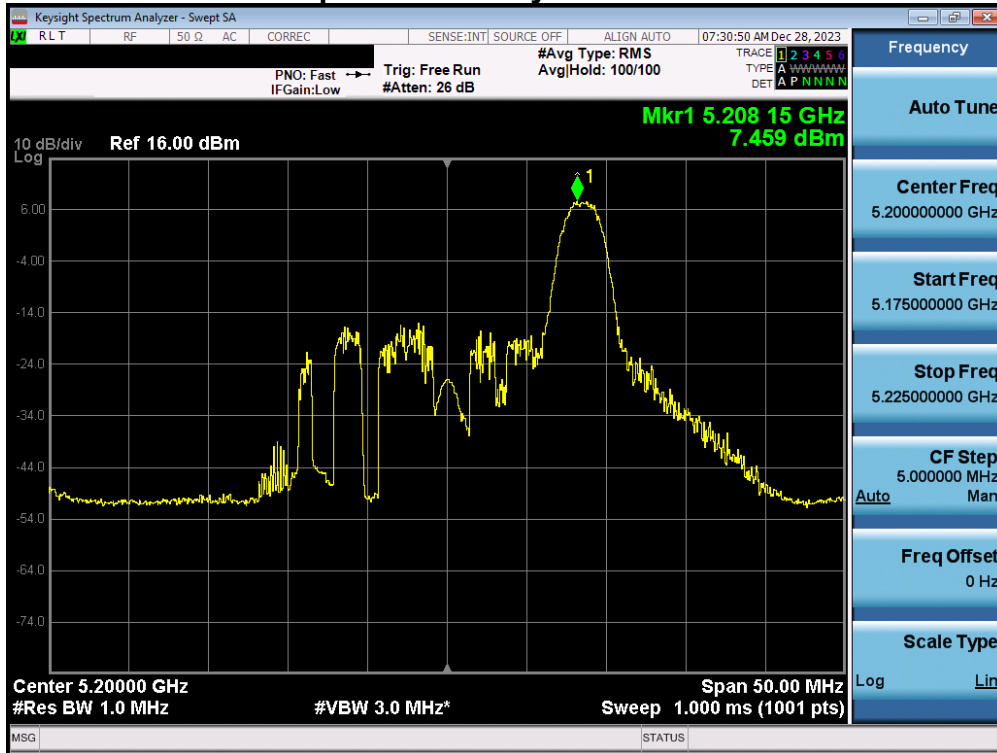
Plot 7-71. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11ax – 484 Tones (UNII Band 3) – Ch. 151)



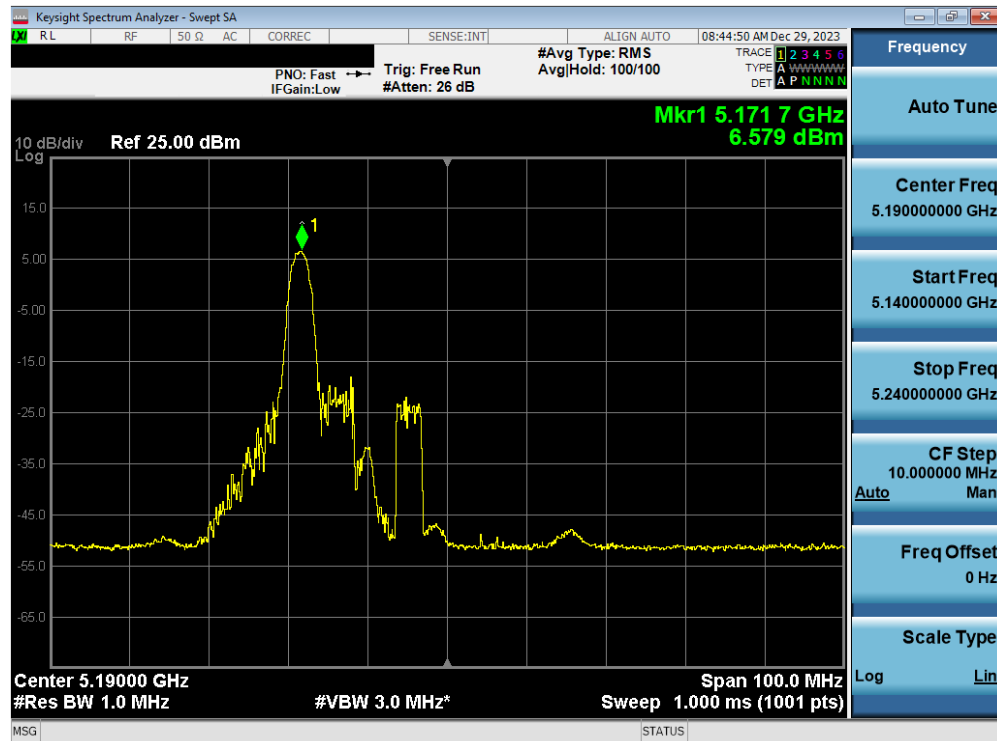
Plot 7-72. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11ax – 996 Tones (UNII Band 3) – Ch. 155)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 62 of 110

7.5.2 MIMO Antenna-2 Power Spectral Density Measurements

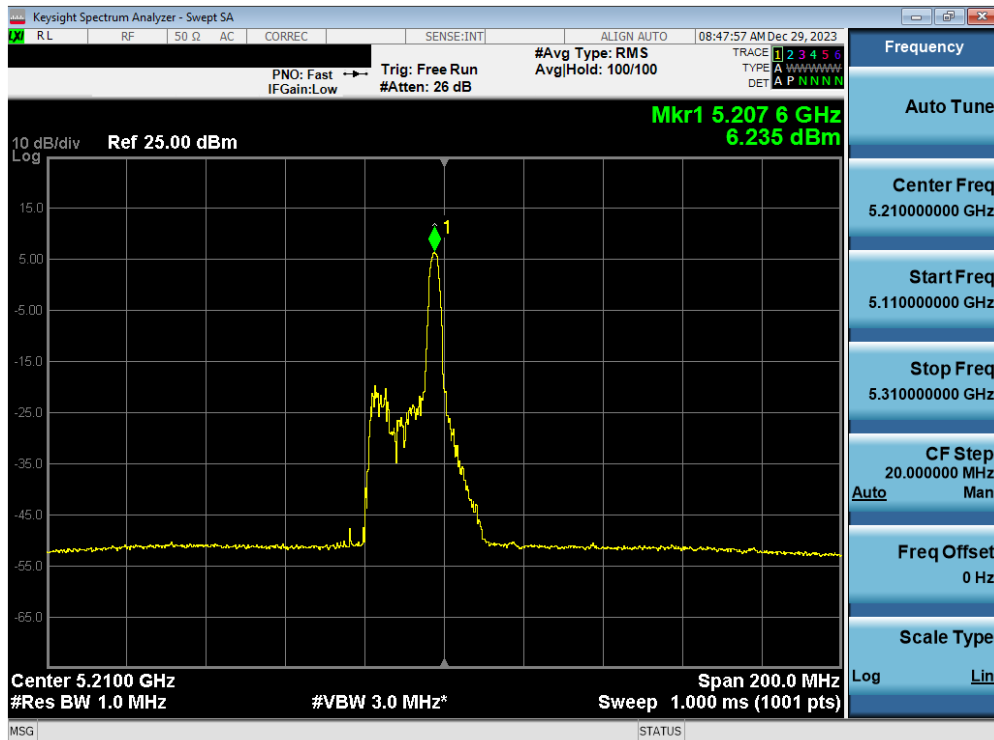


Plot 7-73. Power Spectral Density Plot MIMO ANT2 (20MHz BW 802.11ax – 26 Tones (UNII Band 1) – Ch. 40)

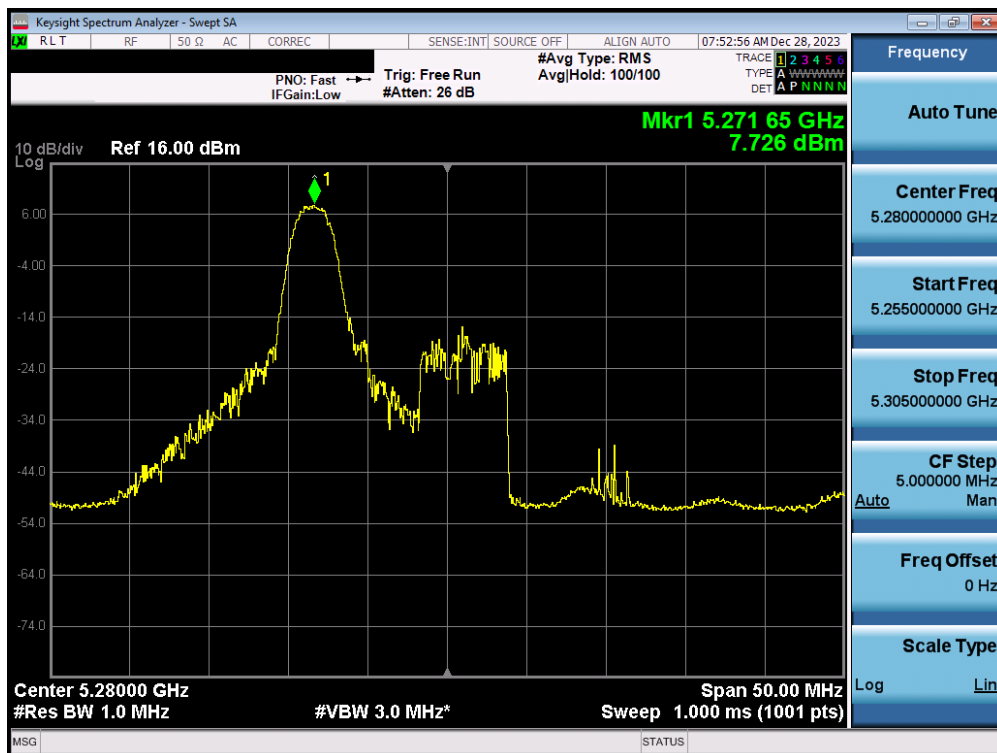


Plot 7-74. Power Spectral Density Plot MIMO ANT2 (40MHz BW 802.11ax – 26 Tones (UNII Band 1) – Ch. 38)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 63 of 110

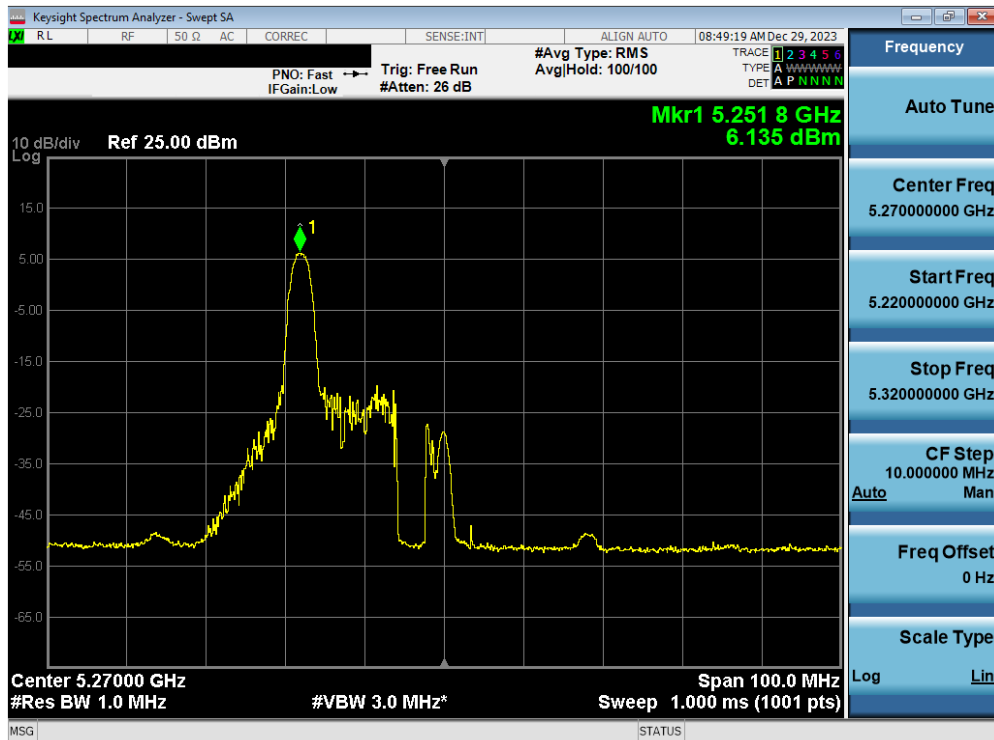


Plot 7-75. Power Spectral Density Plot MIMO ANT2 (80MHz BW 802.11ax – 26 Tones (UNII Band 1) – Ch. 42)

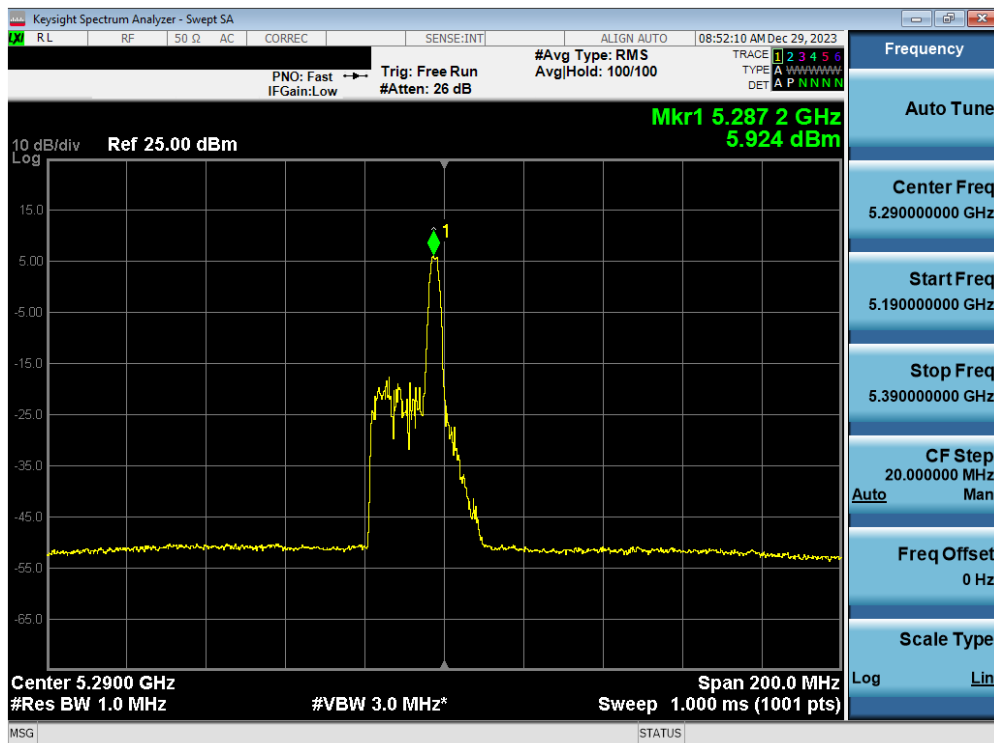


Plot 7-76. Power Spectral Density Plot MIMO ANT2 (20MHz BW 802.11ax – 26 Tones (UNII Band 2A) – Ch. 56)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 64 of 110

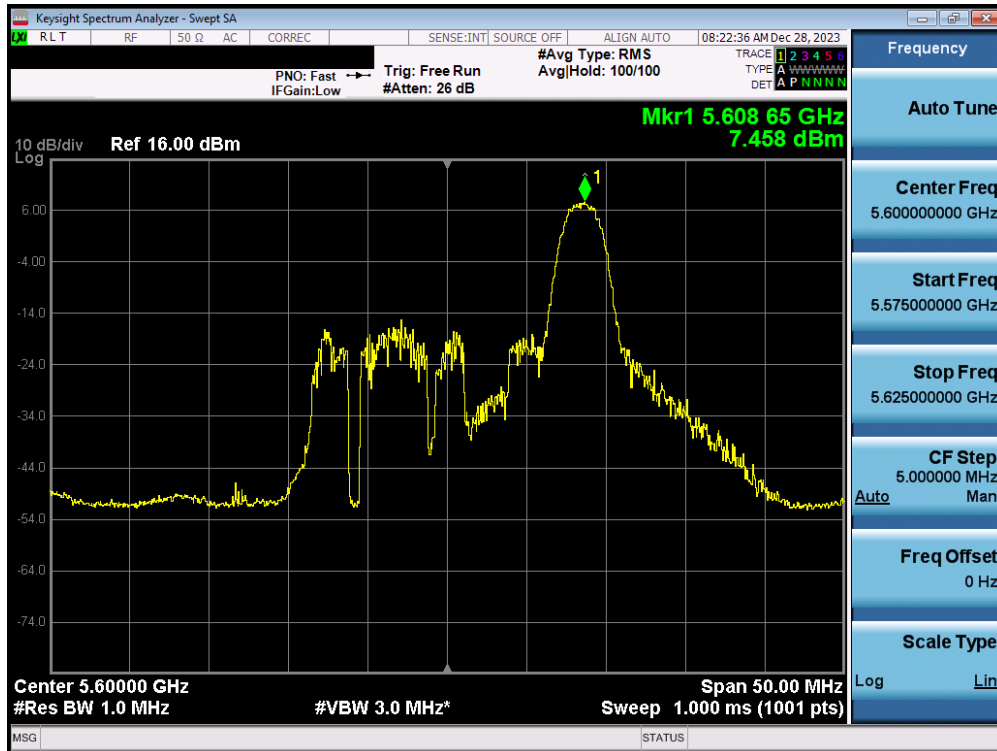


Plot 7-77. Power Spectral Density Plot MIMO ANT2 (40MHz BW 802.11ax – 26 Tones (UNII Band 2A) – Ch. 54)

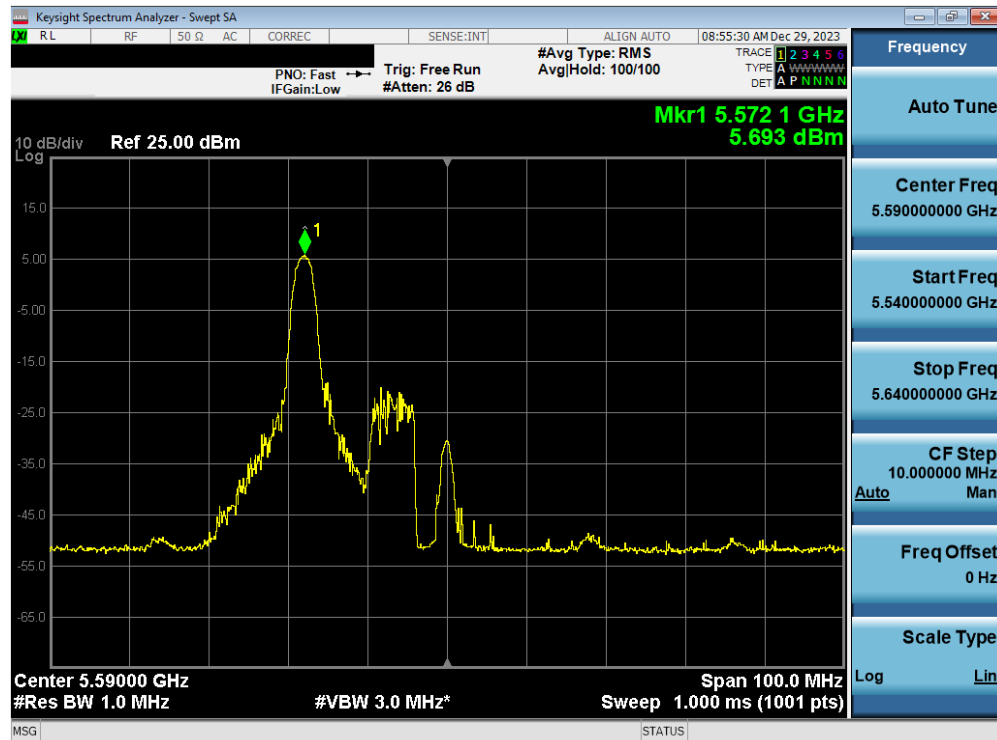


Plot 7-78. Power Spectral Density Plot MIMO ANT2 (80MHz BW 802.11ax – 26 Tones (UNII Band 2A) – Ch. 58)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 65 of 110

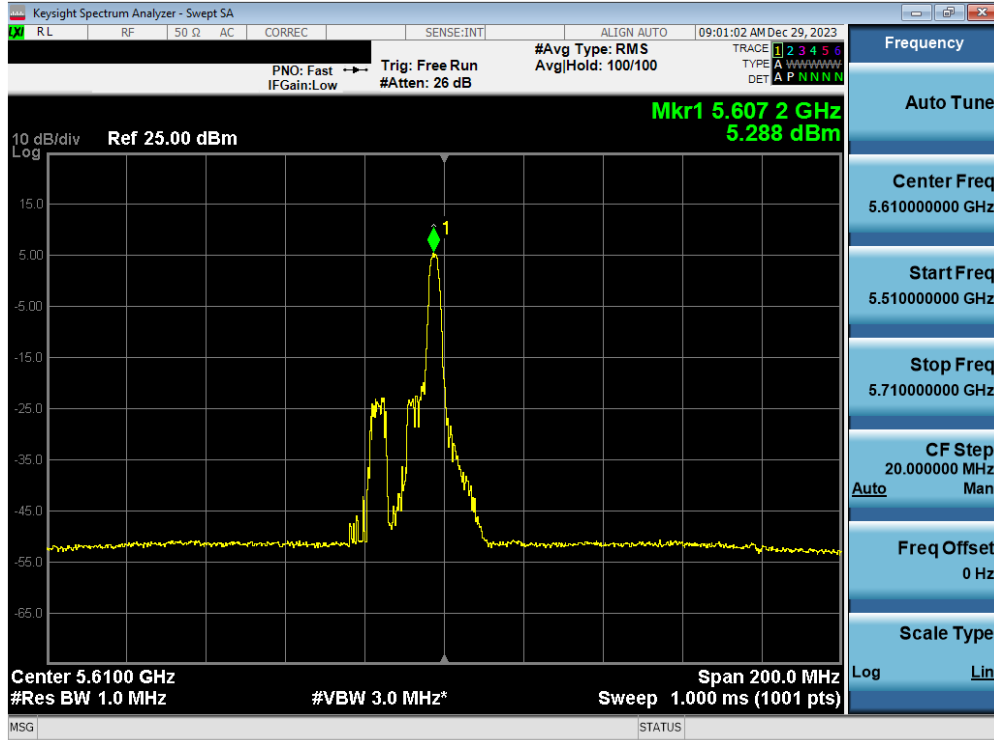


Plot 7-79. Power Spectral Density Plot MIMO ANT2 (20MHz BW 802.11ax – 26 Tones (UNII Band 2C) – Ch. 120)

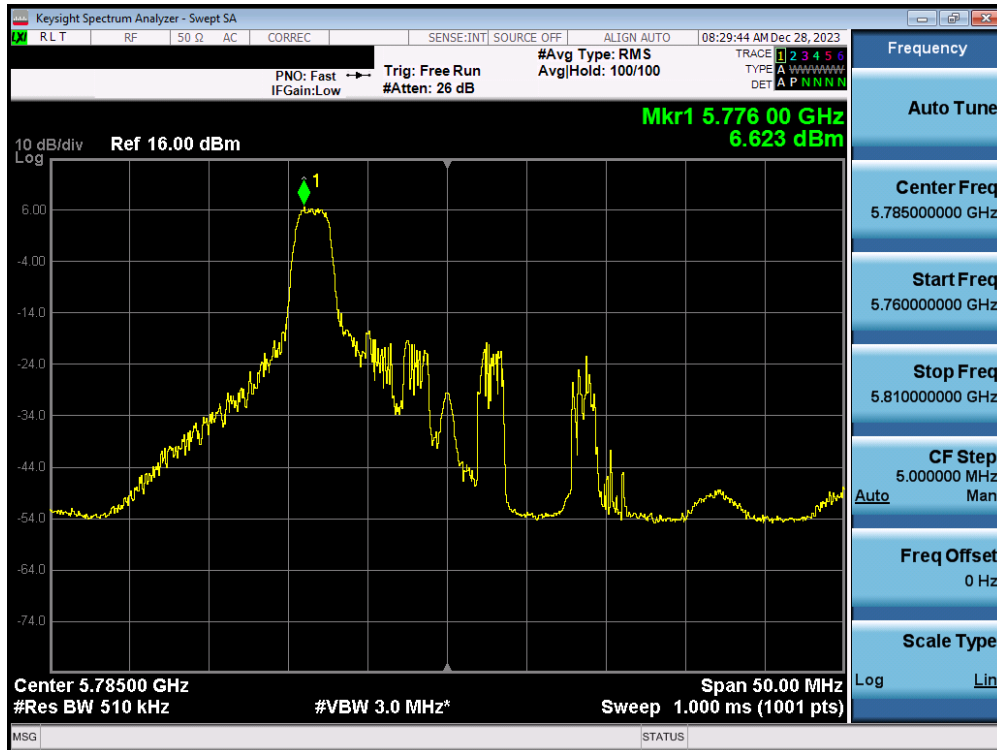


Plot 7-80. Power Spectral Density Plot MIMO ANT2 (40MHz BW 802.11ax – 26 Tones (UNII Band 2C) – Ch. 118)

FCC ID: A3LSMA356U		MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 66 of 110	

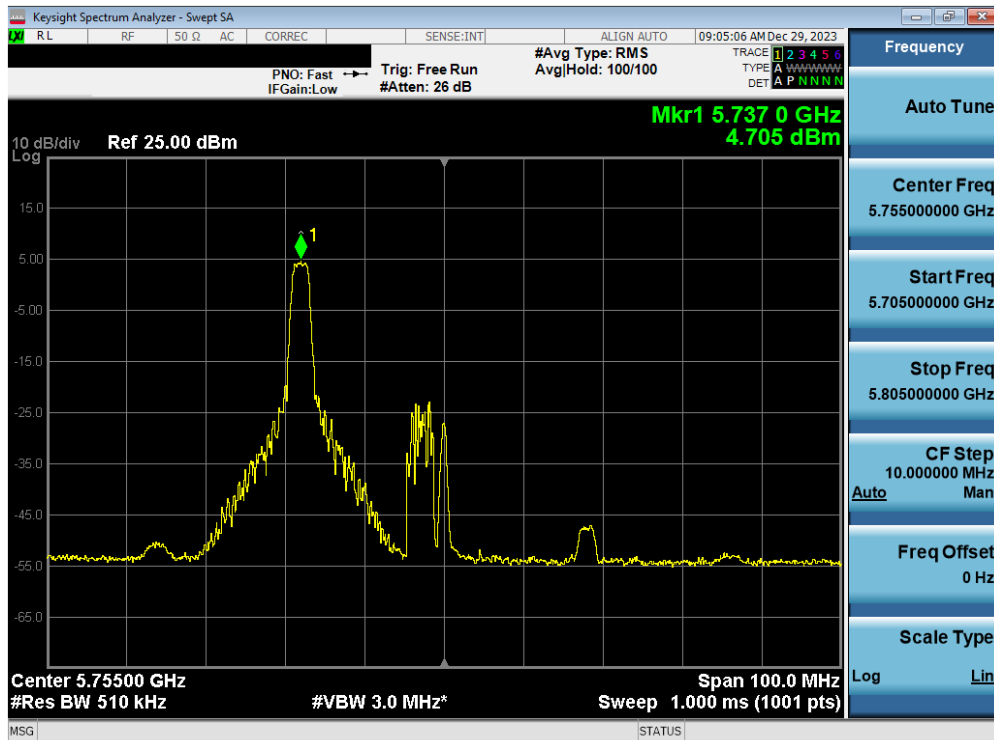


Plot 7-81. Power Spectral Density Plot MIMO ANT2 (80MHz BW 802.11ax – 26 Tones (UNII Band 2C) – Ch. 122)

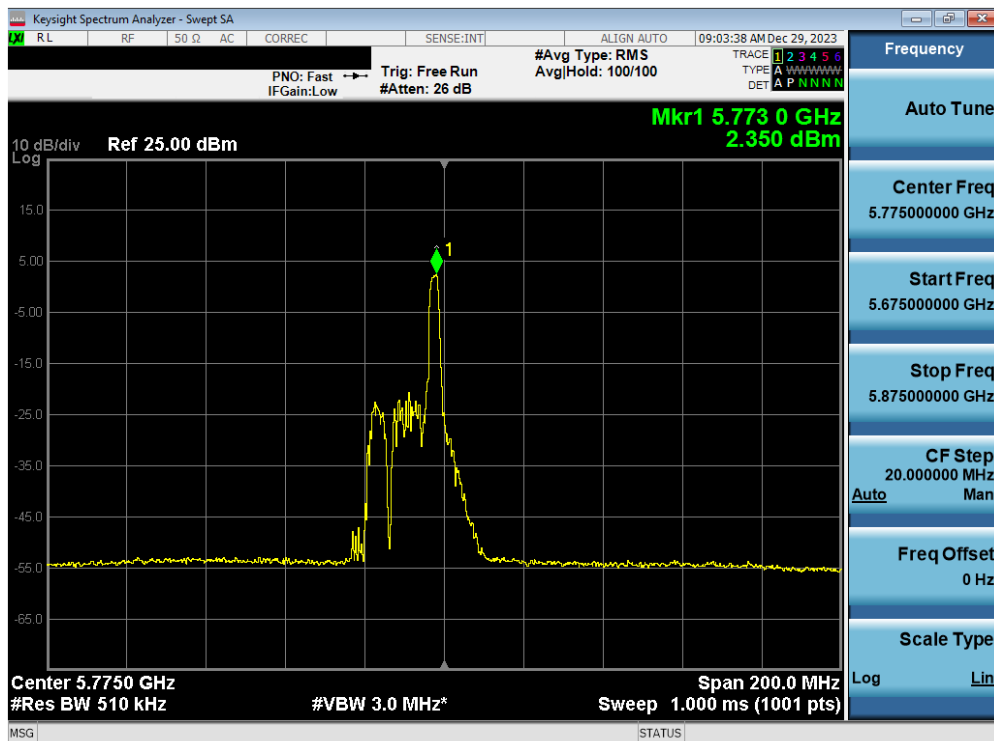


Plot 7-82. Power Spectral Density Plot MIMO ANT2 (20MHz BW 802.11ax – 26 Tones (UNII Band 3) – Ch. 157)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 67 of 110

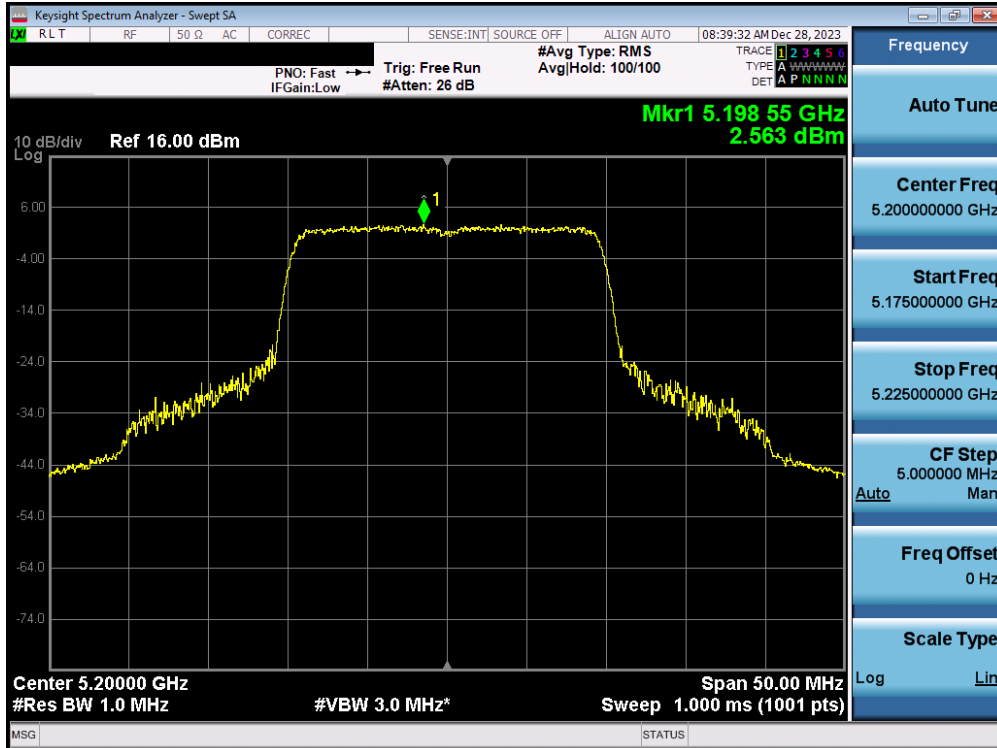


Plot 7-83. Power Spectral Density Plot MIMO ANT2 (40MHz BW 802.11ax – 26 Tones (UNII Band 3) – Ch. 151)

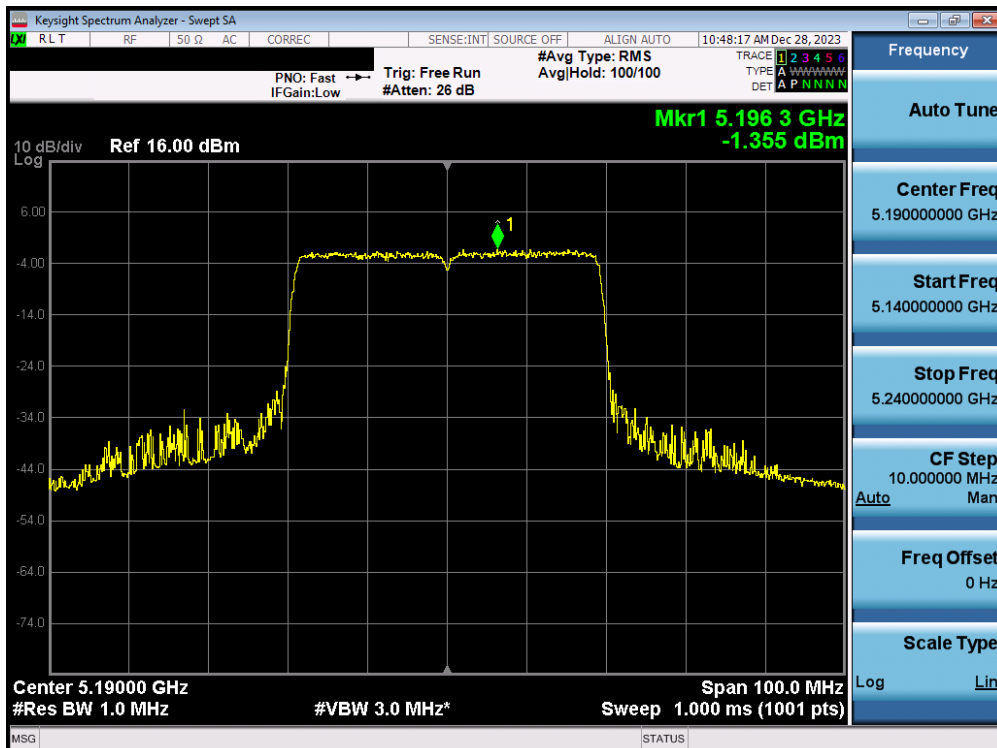


Plot 7-84. Power Spectral Density Plot MIMO ANT2 (80MHz BW 802.11ax – 26 Tones (UNII Band 3) – Ch. 155)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 68 of 110

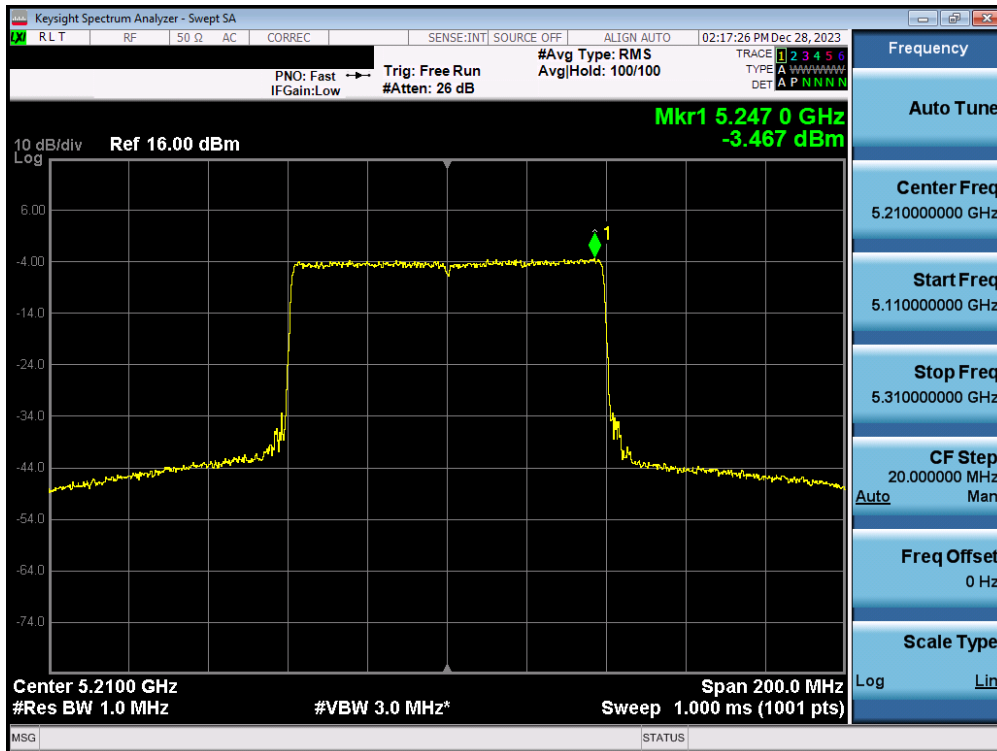


Plot 7-85. Power Spectral Density Plot MIMO ANT2 (20MHz BW 802.11ax – 242 Tones (UNII Band 1) – Ch. 40)

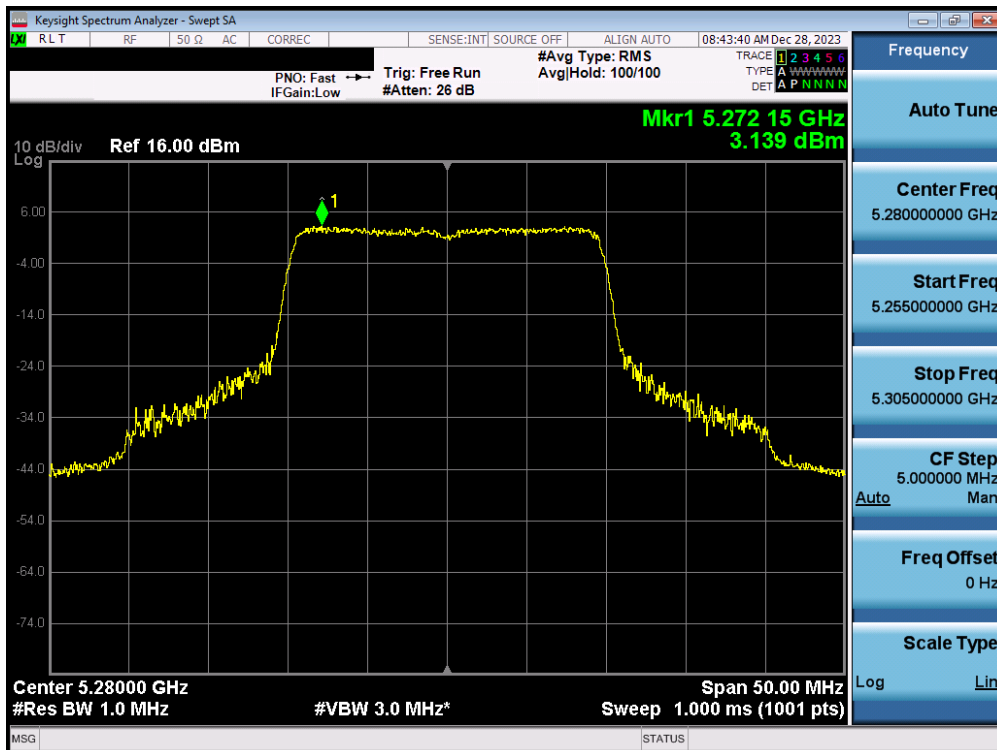


Plot 7-86. Power Spectral Density Plot MIMO ANT2 (40MHz BW 802.11ax – 484 Tones (UNII Band 1) – Ch. 38)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 69 of 110

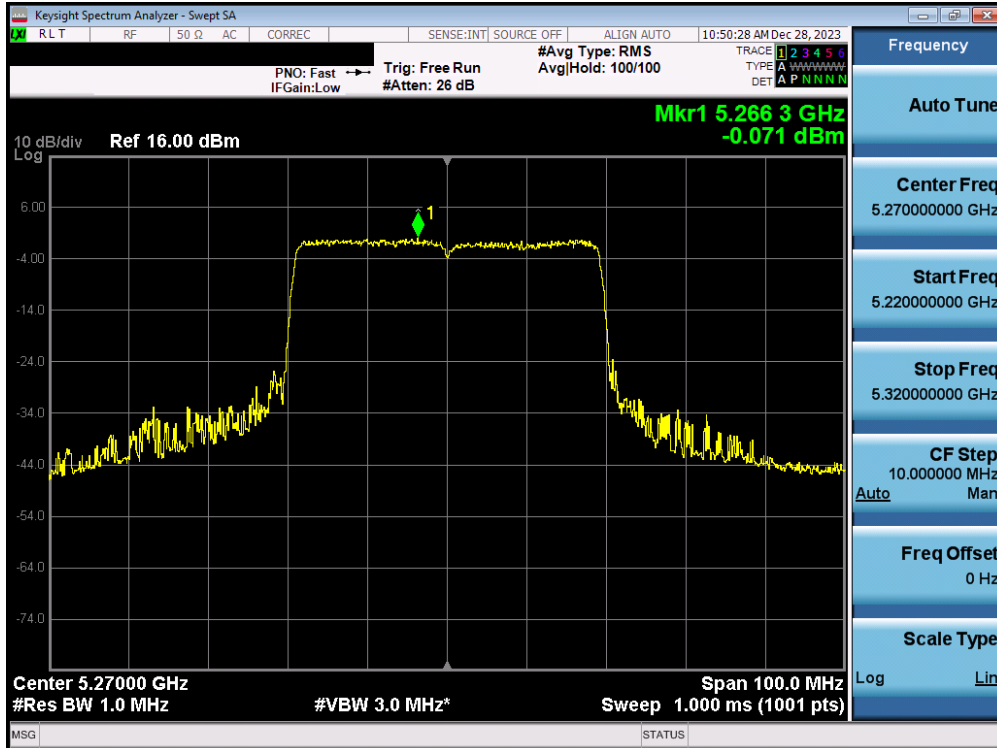


Plot 7-87. Power Spectral Density Plot MIMO ANT2 (80MHz BW 802.11ax – 996 Tones (UNII Band 1) – Ch. 42)

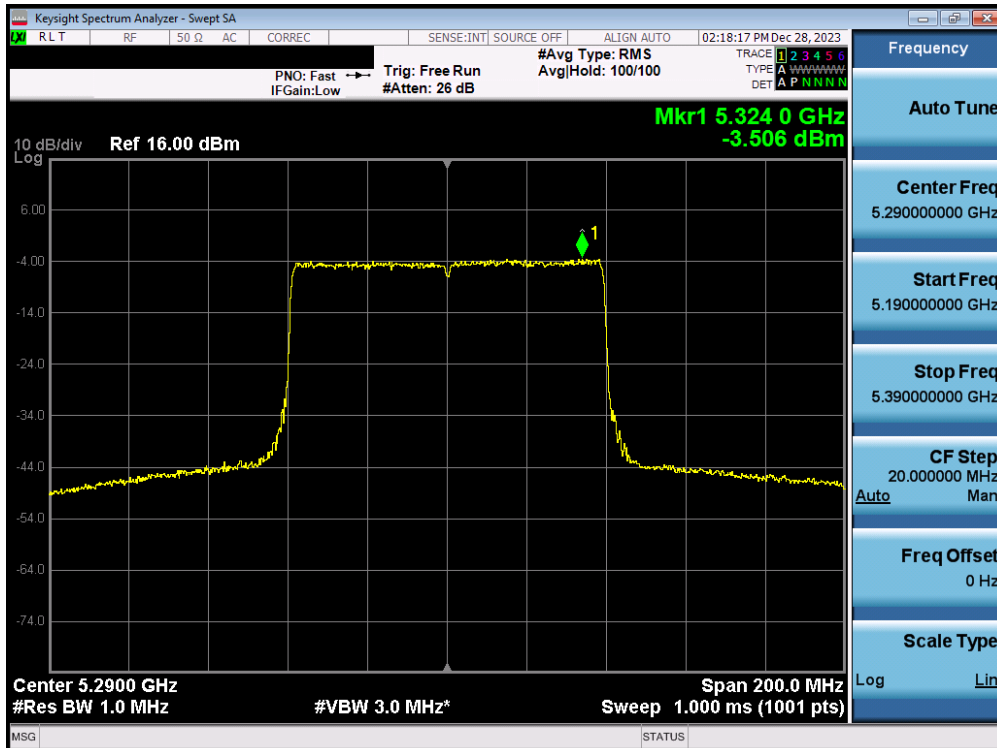


Plot 7-88. Power Spectral Density Plot MIMO ANT2 (20MHz BW 802.11ax – 242 Tones (UNII Band 2A) – Ch. 56)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 70 of 110

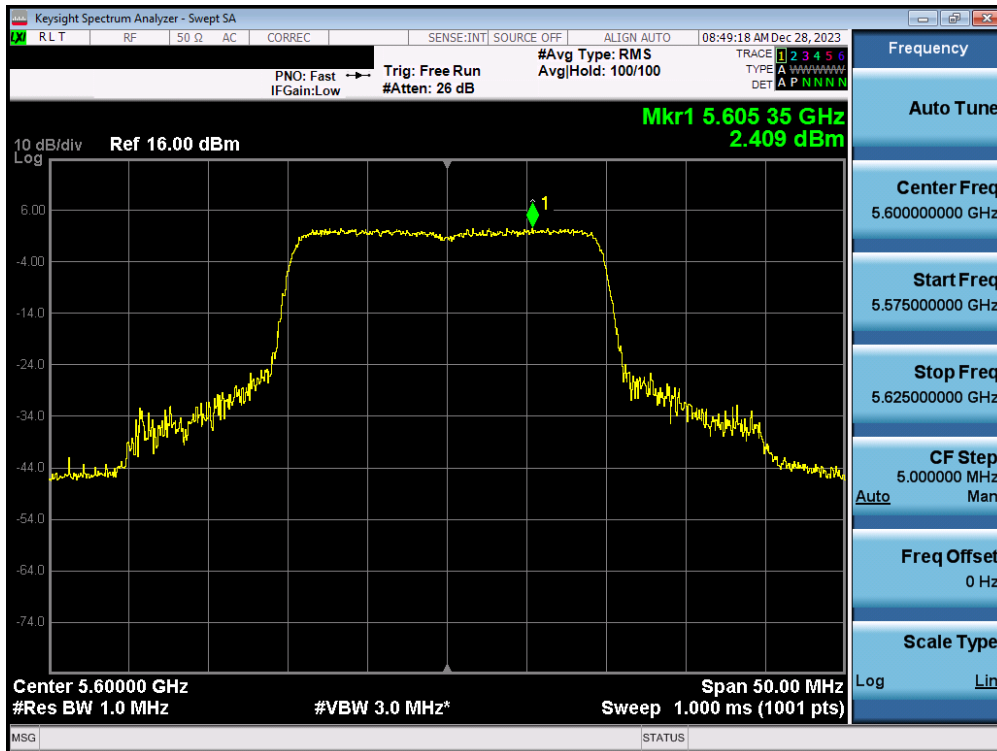


Plot 7-89. Power Spectral Density Plot MIMO ANT2 (40MHz BW 802.11ax – 484 Tones (UNII Band 2A) – Ch. 54)

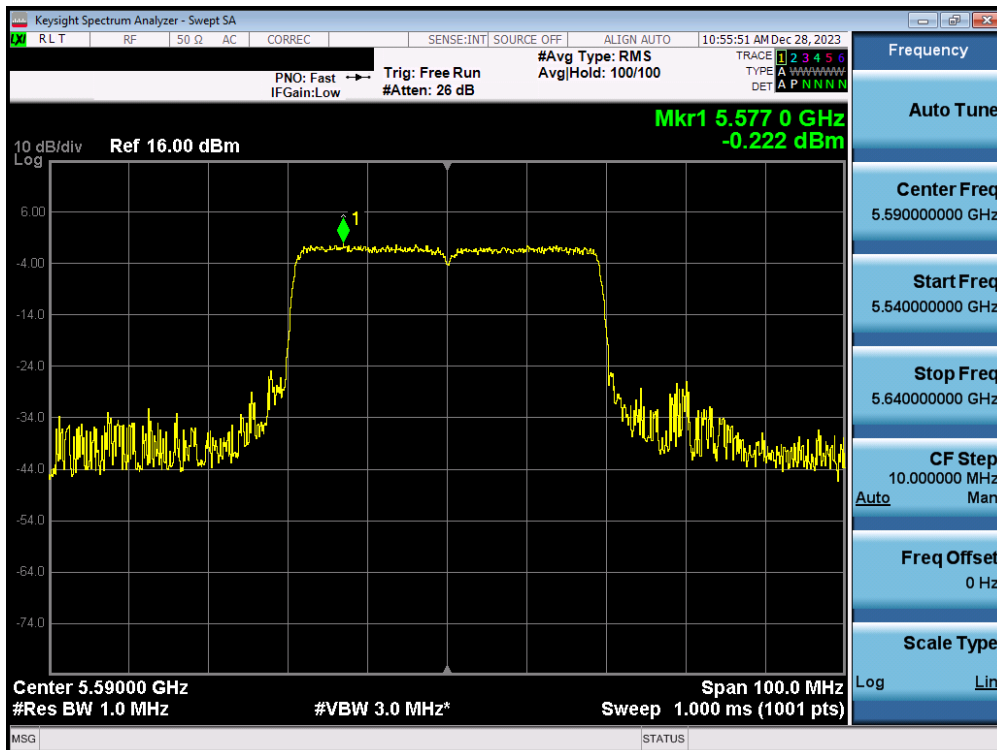


Plot 7-90. Power Spectral Density Plot MIMO ANT2 (80MHz BW 802.11ax – 996 Tones (UNII Band 2A) – Ch. 58)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 71 of 110

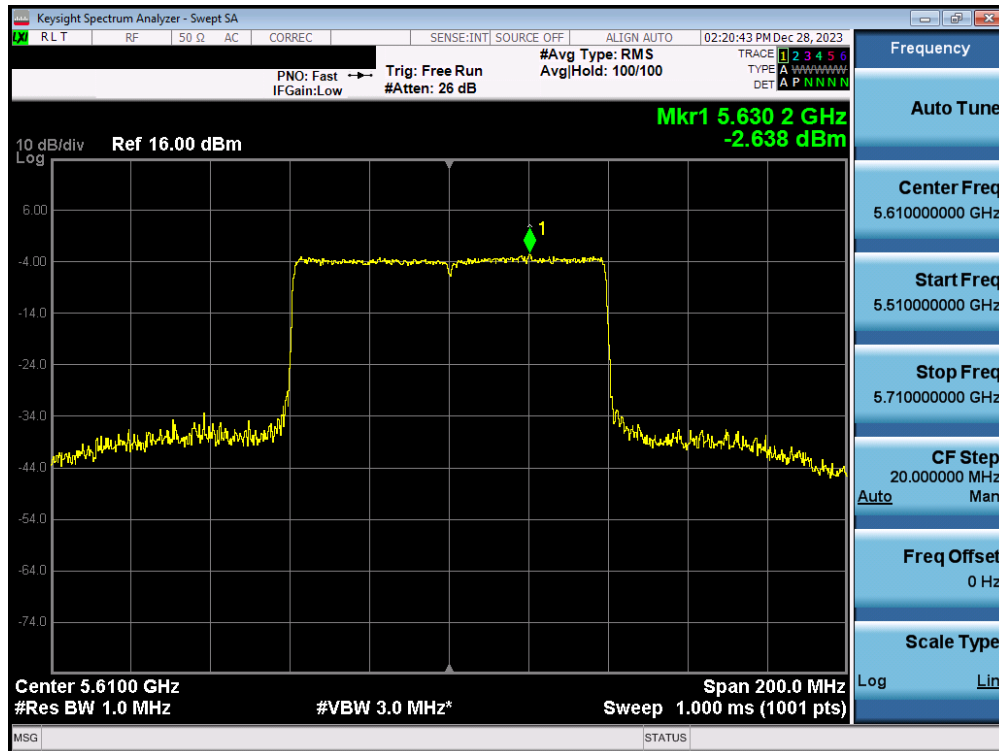


Plot 7-91. Power Spectral Density Plot MIMO ANT2 (20MHz BW 802.11ax – 242 Tones (UNII Band 2C) – Ch. 120)

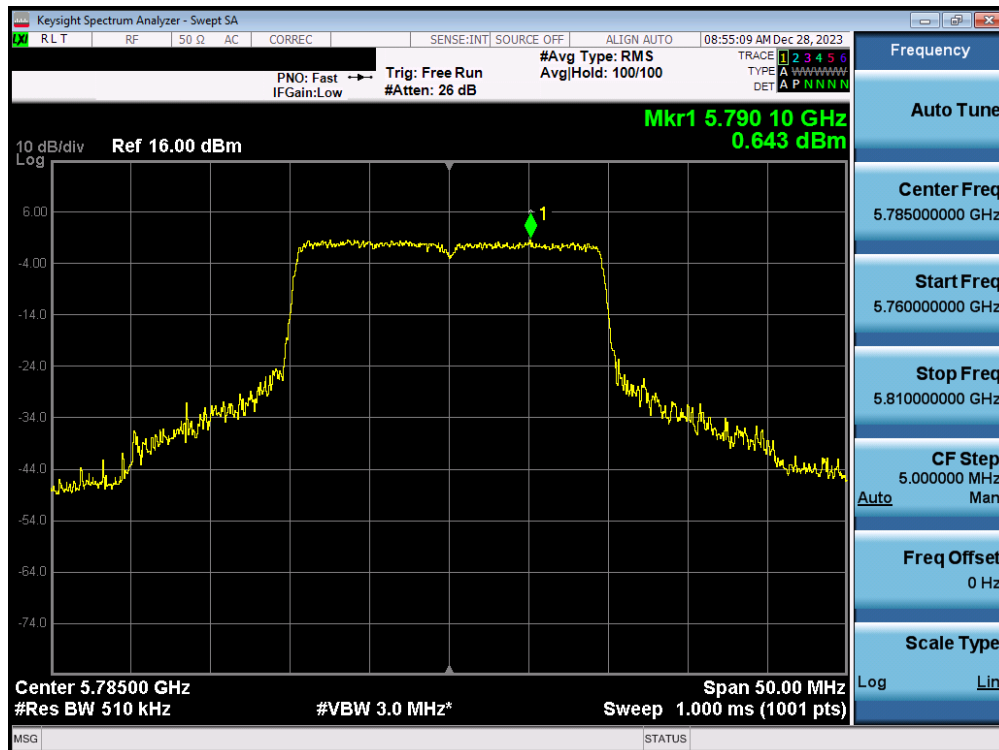


Plot 7-92. Power Spectral Density Plot MIMO ANT2 (40MHz BW 802.11ax – 484 Tones (UNII Band 2C) – Ch. 118)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 72 of 110



Plot 7-93. Power Spectral Density Plot MIMO ANT2 (80MHz BW 802.11ax – 996 Tones (UNII Band 2C) – Ch. 122)



Plot 7-94. Power Spectral Density Plot MIMO ANT2 (20MHz BW 802.11ax – 242 Tones (UNII Band 3) – Ch. 157)

FCC ID: A3LSMA356U	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N: 1M2311010111-14.A3L	Test Dates: 11/07-12/29/2023	EUT Type: Portable Handset	Page 73 of 110