

ELEMENT WASHINGTON DC LLC

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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: 5/23/2024 - 7/28/2024 **Test Report Issue Date:** 8/8/2024 **Test Site/Location:** Element lab., Columbia, MD, USA **Test Report Serial No.:** 1M2405140040-05-R1.A3L

FCC ID:

A3LSMX820

APPLICANT:

Samsung Electronics Co., Ltd.

Application Type:	Certification
Model:	SM-X820
EUT Type:	Portable Tablet
Frequency Range:	5180 – 5885MHz
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, KDB 484596 D01 v02r03

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.

Note: This revised Test Report (S/N: 1M2405140040-05-R1.A3L) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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.

R.I Ortanez **Executive Vice President**



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Channel	Channel Tx Antenna-1 Antenna-2 MIMO							MO
Bandwidth [MHz]	UNII Band	Frequency [MHz]	Max. Power [mW]	Max. Power [dBm]	Max. Power [mW]	Max. Power [dBm]	Max. Power [mW]	Max. Power [dBm]
	1	5180 - 5240	12.39	10.93	12.22	10.87	21.94	13.41
	2A	5260 - 5320	12.11	10.83	11.51	10.61	24.25	13.85
20	2C	5500 - 5720	12.47	10.96	12.53	10.98	22.39	13.50
	3	5745 - 5825	11.91	10.76	12.53	10.98	23.47	13.71
	4	5845 - 5885	10.54	10.23	10.42	10.18	9.84	9.93
	1	5190 - 5230	12.45	10.95	12.13	10.84	21.72	13.37
	2A	5270 - 5310	12.45	10.95	12.02	10.80	24.55	13.90
40	2C	5510 - 5710	12.56	10.99	11.78	10.71	23.18	13.65
	3	5755 - 5795	12.53	10.98	12.47	10.96	23.18	13.65
	4	5835 - 5875	10.40	10.17	11.19	10.49	10.51	10.22
	1	5210	11.32	10.54	12.53	10.98	22.40	13.50
	2A	5290	11.48	10.60	12.53	10.98	21.97	13.42
80	2C	5530 - 5690	12.02	10.80	12.47	10.96	23.02	13.62
	3	5775	12.33	10.91	11.97	10.78	22.56	13.53
	4	5855	10.40	10.17	11.19	10.49	10.51	10.22
160	1/2A	5250	10.96	10.40	12.30	10.90	21.71	13.37
	2C	5570	10.84	10.35	11.30	10.53	23.88	13.78
	3/4	5815	10.94	10.39	10.05	10.02	9.39	9.73
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Note: The UNII Band 4 max power values shown in the above table are e.i.r.p values.

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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).

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2.0 PRODUCT INFORMATION

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Tablet FCC ID: A3LSMX820**. The test data contained in this report pertains only to the emissions due to the EUT's UNII transmitter.

Test Device Serial No.: 17720, 17670, 18108, 25483, 17936

2.2 Device Capabilities

This device contains the following capabilities:

Ch.

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802.11b/g/n/ac/ax WLAN, 802.11a/n/ac/ax UNII (5GHz and 6GHz), Bluetooth (1x, EDR, LE), Wireless Power Transfer

	Band 1		Band 2A Band 2C Band 3			Band 3/4			
Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
36	5180	52	5260	100	5500	149	5745	169	5845
:	:	:	:	:	:	:	:	:	:
40	5200	56	5280	120	5600	157	5785	173	5865
:	:	:	:	:	:	:	:	:	:
48	5240	64	5320	144	5720	165	5825	177	5885

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

Band 1	
Frequency (MHz)	
5190	
:	
5230	
	Frequency (MHz) 5190 :

Band 2A	_
Frequency (MHz)	0
5270] [1
:	
5310	1
	1

Band 2C
Frequency (MHz)
5510
:
5590
:
5710

Band 3
Frequency (MHz)
5755
:
5795

	Band 3/4
Ch.	Frequency (MHz)
167	5835
:	:
175	5875

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

Band 1		Band 2A		Band 2C		Band 3		Band 3/4		
Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)		
5210	58	5290	106	5530	155	5775	167	5835		
			:	:						
			122	5610						
			:	:						
			138	5690						
Table 2-3. 802.11ax (80MHz BW) Frequency / Channel Operations										
	(MHz)	(MHz) 5210 58	(MHz) Cn. (MHz) 5210 58 5290	(MHz) Cn. (MHz) Cn. 5210 58 5290 106 : 122 : 138	(MHz) Cn. (MHz) Cn. (MHz) 5210 58 5290 106 5530 : : : 122 5610 : : : 138 5690	(MHz) Cn. (MHz) Instance Instance	(MHz) Cn. (MHz) Cn. <th< td=""><td>(MHz) Cn. (MHz) 167</td></th<>	(MHz) Cn. (MHz) 167		

	Band 1/2A			Band 2C	Band 3/4		
Ch.	Frequency (MHz)		Ch.	Frequency (MHz)		Ch.	Frequency (MHz)
50	5250		114	5570		163	5815
Table 2-4. 802.11ax (160MHz BW) Frequency / Channel Operations							

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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:

		T		ANT1	ANT2	MIMO	(1+2)
Band	Bandwidth	Tone Type	Tone Size	Duty Cycle [%]	Duty Cycle [%]	Duty Cycle [%]	Radiated DCCF [dB]
		RU	26T	99.30	98.84	99.25	N/A
	20MHz		52T	99.21	98.98	98.65	N/A
			106T	99.20	99.16	97.28	0.12
5GHz			242T	99.08	98.94	94.35	0.25
	40MHz	RU	484T	99.13	99.13	90.41	0.44
	80MHz	RU	996T	99.26	99.09	94.10	0.26
	160MHz	RU	2x996T	99.09	98.89	90.10	0.45

Table 2-5. Measured Duty Cycles

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

WiFi Co	nfigurations	SIS	SO	SE	DM	CDD	
	Ingulations	ANT1	ANT2	ANT1	ANT2	ANT1	ANT2
5GHz	11ax	✓	✓	✓	✓	✓	✓

Table 2-6. Frequency / Channel Operations

 \checkmark = 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	Spatial		OFDMA (802.11ax)																			
Index	Stream		26T			52T			106T			242T			484T			996T			2x996T	
HE		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

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2.3 Antenna Description

Frequency [MHz]	Antenna 1 Gain (dBi)	Antenna 2 Gain (dBi)	Directional Gain (dBi)
5150	-4.9	-7.2	-2.96
5350	-5.0	-7.7	-3.24
5500	-4.9	-8.0	-3.30
5700	-5.2	-8.2	-3.56
5795	-5.3	-8.1	-3.58
5815	-5.5	-7.8	-3.56
5825	-5.5	-8.2	-3.74
5850	-5.6	-8.1	-3.75
5885	-5.7	-7.9	-3.72
	Table 2-8. Ante	enna Peak Gain	

The following antenna gains were used for the testing.

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 5GHz UNII OFDM report for AC line conducted emissions test setups, 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 X820XXU0AXFC 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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3.0 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).

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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.

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5.0 MEASUREMENT UNCERTAINTY

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

Contribution	Expanded Uncertainty (±dB)
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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6.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	WL25-1	Conducted Cable Set (25GHz)	4/2/2024	Annual	4/2/2025	WL25-1
-	WL25-2	Conducted Cable Set (25GHz)	4/2/2024	Annual	4/2/2025	WL25-2
-	WL40-1	Conducted Cable Set (40GHz)	4/2/2024	Annual	4/2/2025	WL40-1
	AP1-002	EMC Cable and Switch System	4/2/2024	Annual	4/2/2025	AP1-002
-	ETS-001	EMC Cable and Switch System	4/2/2024	Annual	4/2/2025	ETS-001
-	ETS-002	EMC Cable and Switch System	4/2/2024	Annual	4/2/2025	ETS-002
	MD 1M 18-40	EMC Cable and Switch System	4/2/2024	Annual	4/2/2025	MD 1M 18-40
Anritsu	MA24406A	Microwave Peak Power Sensor	9/7/2023	Annual	9/7/2024	11240
Emco	3116	Horn Antenna (18 - 40GHz)	8/8/2022	Biennial	8/8/2024	9203-2178
Rohde & Schwarz	TC-TA18	Vivaldi Antenna	2/23/2023	Biennial	2/23/2025	26040036
Rohde & Schwarz	FSW26	Signal and spectrum analyzer	3/8/2024	Annual	3/8/2025	103187
Pasternack	NMLC-2	Line Conducted Emissions Cable (NM)	4/2/2024	Annual	4/2/2025	NMLC-2
ETS-Lindgren	3816/2NM	Line Impedance Stabilization Network	8/11/2022	Biennial	8/11/2024	114451
Keysight Technologies	N9030A	PXA Signal Analyzer (44GHz)	4/9/2024	Annual	4/9/2025	MY52350166
Keysight Technologies	N9020A	MXA Signal Analyzer	4/11/2024	Annual	4/11/2025	MY54500644
Keysight Technologies	N9030A	PXA Signal Analyzer	2/29/2024	Annual	3/1/2025	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	4/5/2024 Annual		4/5/2025	101716
Rohde & Schwarz	FSW26	Signal and spectrum analyze (26.5GHz)	3/8/2024	Annual	3/8/2025	103187
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	2/15/2024	Annual	2/15/2025	103200
Sunol	JB6	JB6 Antenna	3/2/2023	Biennial	3/2/2025	A082816
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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7.0 TEST RESULTS

7.1 Summary

Company Name:	Samsung Electronics Co., Ltd.
FCC ID:	<u>A3LSMX820</u>
FCC Classification:	Unlicensed National Information Infrastructure (UNII)

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
N/A	26dB Bandwidth	N/A		PASS	Section 7.2
15.407(e)	6dB Bandwidth	>500kHz (5725-5850MHz and 5850 – 5895MHz)		PASS	Section 7.3
15.407 (a)(1)(iv), (a)(2), (a)(3)	Maximum Conducted Output Power	Maximum conducted powers must meet the limits detailed in 15.407 (a)	CONDUCTED	PASS	Section 7.4
15.407 (a)(1)(iv), (a)(2), (a)(3)	Maximum Power Spectral Density	Maximum power spectral density must meet the limits detailed in 15.407 (a)		PASS	Section 7.5
15.407(h)	Dynamic Frequency Selection	See DFS Test Report		PASS	See DFS Test Report
15.407(b)(1), (b)(2), (b)(3), (b)(4)	Undesirable Emissions	Undesirable emissions must meet the limits detailed in 15.407(b)		PASS	Section 7.6
15.205, 15.407(b)(1), (b)(4), (b)(5), (b)(6)	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	RADIATED	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 "EMC Software Tool," Version 2.3.0.
- 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.
- 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.

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8) Data was leveraged from model SM-X828U for the certification of SM-X820U. See Table 7-2 for spot-check results.

FCC Rules	Test Item	Test Case	Units	Limit	Reference Model: SM-X828U	Variant Model: SM-X820	Deviation (dB)	Max Deviation (dB)	Pass/Fail
2.1046, 15.407(a)(8)	Conducted Output Power	20MHz, Ch.40, 802.11a, MIMO	dBm	N/A	19.68	19.52	-0.16	3	PASS
15.209, 15.407(b)(1), 15.407(b)(2), 15.407(b)(3), 15.407(b)(4)	Radiated Spurious Emissions	20MHz, Ch.120, 802.11a, MIMO	dBm	53.98	44.01	43.61	-0.40	3	PASS
15.209	Radiated Band Edge Emissions	80MHz, Ch.42, 802.11ac, MIMO	dBm	53.98	51.84	52.03	0.19	3	PASS

 Table 7-2. Summary of Spot-checks

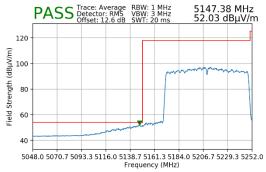
		5GHz WIFI	(20MHz 802.11	a MIMO)		Conducted	Conducted	Directional			
Band	Freq	Channel	Avg. Conducted Powers [dBm]			Power Limit	Power Margin	Ant. Gain	Max e.i.r.p [dBm]	e.i.r.p Limit [dBm]	e.i.r.p Margin [dB]
	[MHz]		ANT1	ANT2	MIMO	[dBm]	[dB]	[dBi]			
UNII-1	5200	40	16.26	16.74	19.52	23.98	-4.46	-2.96	16.56	30.00	-13.44
Table 7.3. Conducted Output Bower Measurements (Spot check)											

Table 7-3. Conducted Output Power Measurements (Spot-check)

Mode	Antenna	UNII Band	Channel	Test Channel Freq. [MHz]	Restricted	Frequency [MHz]	Detector	Ant. Pol. [H/V]	Antenna Height [cm]	Turntable Azimuth [degree]	Analyzer Level [dBm]	AFCL [dB/m]	Distance Correction Factor [dB]	Field Strength [dBµV/m]	Limit [dBµV/m]	Margin [dB]
802.11a	MIMO	2C	120	5600	*	11200.00	Average	V	133	148	-81.00	17.61	0.00	43.61	53.98	-10.37

Table 7-4. Radiated Measurements MIMO (Spot-check)

Worst Case Mode:	802.11ac
Worst Case Transfer Rate:	MCS0
Distance of Measurements:	3 Meters
Operating Frequency:	5180MHz
Channel:	42



Plot 7-1. Radiated Lower Band Edge Plot MIMO (Average - UNII Band 1)

- 9) Each spot check test on the EUT was performed using the same procedure and setting that were used to perform the test on the corresponding reference device.
- 10) All test cases were performed to verify the variant EUT is still in compliance with the spot checked results to the reference device and was performed using the guidance of ANSI C63.10-2013.

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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.

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

Test Procedure Used

ANSI C63.10-2013 - Section 12.4

Test Settings

- 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 <u>></u> 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.

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MIMO 26dB Bandwidth Measurements

	Frequency [MHz]	802.11 MODE	Channel	Antenna-1 26dB Bandwidth [MHz]	Antenna-2 26dB Bandwidth [MHz]
	5180	ax (20MHz)	36	18.94	19.22
	5200	ax (20MHz)	40	19.26	19.32
Band 1	5240	ax (20MHz)	48	19.15	19.24
Bar	5190	ax (40MHz)	38	19.70	20.22
	5230	ax (40MHz)	46	19.59	22.23
	5210	ax (80MHz)	42	22.59	26.57
Band 1/2A	5250	ax (160MHz)	50	34.53	36.65
	5260	ax (20MHz)	52	19.11	19.15
4	5280	ax (20MHz)	56	19.33	19.33
Band 2A	5320	ax (20MHz)	64	19.11	19.06
3an (5270	ax (40MHz)	54	19.40	21.91
	5310	ax (40MHz)	62	19.00	21.44
	5290	ax (80MHz)	58	20.61	26.03
	5500	ax (20MHz)	100	19.16	19.22
	5600	ax (20MHz)	120	19.16	19.17
	5720	ax (20MHz)	144	19.15	19.42
U	5510	ax (40MHz)	102	19.59	19.94
d 2	5590	ax (40MHz)	118	19.57	22.94
Band 2C	5710	ax (40MHz)	142	19.70	21.44
	5530	ax (80MHz)	106	23.01	29.61
	5610	ax (80MHz)	122	20.91	21.18
	5690	ax (80MHz)	138	52.30	48.04
	5570	ax (160MHz)	114	34.88	28.51

Table 7-5. Bands 1, 2A, 2C Conducted 26dB Bandwidth Measurements MIMO ANT1/2 (26 Tones)

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	Frequency [MHz]	802.11 MODE	Channel	Antenna-1 26dB Bandwidth [MHz]	Antenna-2 26dB Bandwidth [MHz]
	5180	ax (20MHz)	36	20.04	20.03
	5200	ax (20MHz)	40	20.07	20.10
Band 1	5240	ax (20MHz)	48	20.07	20.03
Bar	5190	ax (40MHz)	38	40.03	39.93
	5230	ax (40MHz)	46	40.09	39.98
	5210	ax (80MHz)	42	81.55	135.02
Band 1/2A	5250	ax (160MHz)	50	175.54	177.20
	5260	ax (20MHz)	52	20.11	20.03
∢	5280	ax (20MHz)	56	20.10	20.04
Band 2A	5320	ax (20MHz)	64	20.10	20.16
3an	5270	ax (40MHz)	54	40.01	40.05
	5310	ax (40MHz)	62	40.13	39.99
	5290	ax (80MHz)	58	88.31	135.17
	5500	ax (20MHz)	100	20.11	20.11
	5600	ax (20MHz)	120	20.05	20.16
	5720	ax (20MHz)	144	20.08	20.13
U	5510	ax (40MHz)	102	40.16	40.21
Band 2C	5590	ax (40MHz)	118	39.95	40.06
3an	5710	ax (40MHz)	142	39.95	40.06
	5530	ax (80MHz)	106	82.02	81.80
	5610	ax (80MHz)	122	81.67	81.81
	5690	ax (80MHz)	138	81.58	81.70
	5570	ax (160MHz)	114	178.16	163.61

Table 7-6. Bands 1, 2A, 2C Conducted 26dB Bandwidth Measurements MIMO ANT1/2 (Full Tones)

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7.2.1 MIMO Antenna-1 26dB Bandwidth Measurements



Plot 7-2. 26dB Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 40)



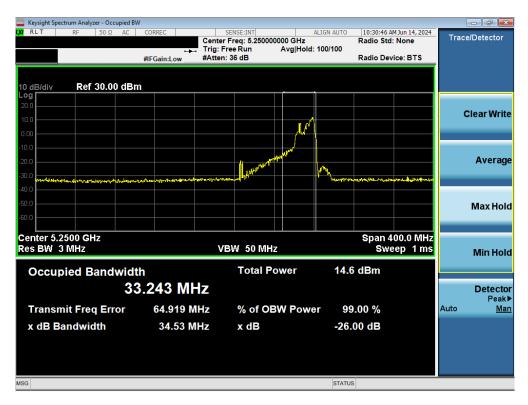
Plot 7-3. 26dB Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 38)

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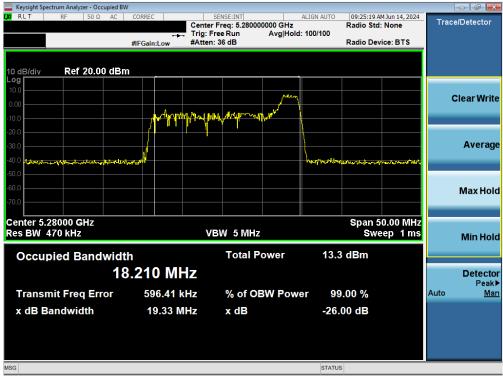
Plot 7-4. 26dB Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 42)



Plot 7-5. 26dB Bandwidth Plot MIMO ANT1 (160MHz BW 802.11ax - 26 Tones (UNII Band 1/2A) - Ch. 50)

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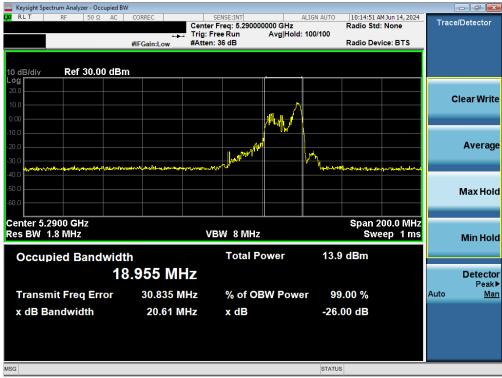
Plot 7-6. 26dB Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 56)



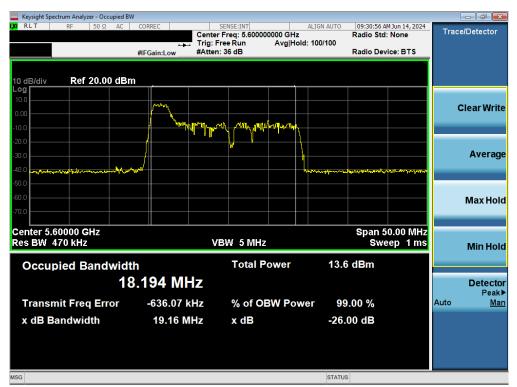
Plot 7-7. 26dB Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 54)

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Plot 7-8. 26dB Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 58)



Plot 7-9. 26dB Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 120)

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Plot 7-10. 26dB Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 118)



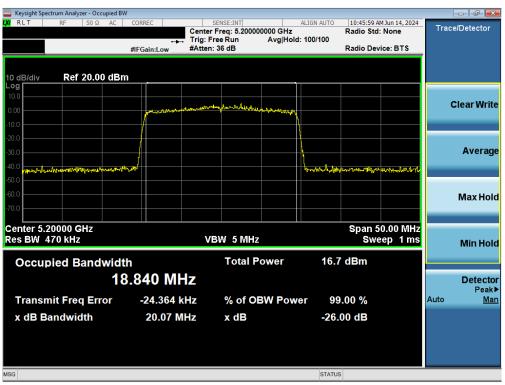
Plot 7-11. 26dB Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 122)

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Plot 7-12. 26dB Bandwidth Plot MIMO ANT1 (160MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 114)



Plot 7-13. 26dB Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax - 242 Tones (UNII Band 1) - Ch. 40)

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Keysight Spectrum Analyzer - Occupied I	BW				
IXI RLT RF 50Ω AC		SENSE:INT ter Freq: 5.190000000 GH : Free Run Avg H		M Jun 14, 2024 : None	Trace/Detector
		en: 36 dB	Radio Dev	vice: BTS	
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-50.0					
-60.0					
-70.0					Max Hold
····0.0					
Center 5.19000 GHz				00.0 MHz	
Res BW 910 kHz		VBW 8 MHz	Swe	eep 1 ms	Min Hold
Occupied Bandwid	lth	Total Power	17.5 dBm		
3	7.540 MHz				Detector
					Peak►
Transmit Freq Error	-33.337 kHz	% of OBW Po	ower 99.00 %		Auto <u>Man</u>
x dB Bandwidth	40.03 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-14. 26dB Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax - 484 Tones (UNII Band 1) - Ch. 38)



Plot 7-15. 26dB Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax - 996 Tones (UNII Band 1) - Ch. 42)

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www.www.com analyzer - Occupied BW									
💢 RLT RF 50Ω AC	CORREC		NSE:INT		ALIGN AUTO		M Jun 14, 2024	Trac	ce/Detector
	-		req: 5.25000 e Run	0000 GHz Avg Hold	1. 100/100	Radio Std	None	TT CA	
	FGain:Low	#Atten: 3		Aughtore		Radio Dev	ice: BTS		
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20.0									
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-20.0					Lan These				Average
. dilling and birde						f I I h			
					III II IIII	ዛ በ በት	1 Marching		
-40.0									
-50.0									Max Hold
-60.0									Max Holu
-00.0									
Center 5.2500 GHz			1	1		Span 4	00.0 MHz		
Res BW 3 MHz		VB۱	N 50 MH	z			ep 1 ms		Min Hold
Occupied Bandwidth			Total P	ower	19.9	dBm			
15	5.99 MI	ΠZ							Detector
T	222.05.1	-11-	0/ -5 0			00.0/		Auto	Peak►
Transmit Freq Error	-223.05	KHZ	% of OI	3W Pow	er 99	.00 %		Auto	<u>Man</u>
x dB Bandwidth	175.5 N	IHz	x dB		-26.	00 dB			
MSG					STATUS			_	

Plot 7-16. 26dB Bandwidth Plot MIMO ANT1 (160MHz BW 802.11ax - 2x996 Tones (UNII Band 1/2A) - Ch. 50)



Plot 7-17. 26dB Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax - 242 Tones (UNII Band 2A) - Ch. 56)

FCC ID: A3LSMX820		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Daga 25 of 120
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www.www.www.com/www.www.com/www.cow/ww	ed BW						
LX RLT RF 50Ω A		SENSE:INT	ALIGN AUTO	11:09:46 AM J		Trace	e/Detector
		Center Freq: 5.270000 Trig: Free Run	000 GHz Avg Hold: 100/100	Radio Std: N	lone		
		#Atten: 36 dB		Radio Device	e: BTS		
10 dB/div Ref 20.00 d	IBm						
Log 10.0							
	L. J. J.	water first for a little to the water				c	lear Write
0.00	C C C C C C C C C C C C C C C C C C C		-margarithm				
-10.0			<u>\</u>				
-20.0							
-30.0			Miratia hi i	^w initi hind waa	mi n t		Average
	J J HAFA F		որվա	"ML MUM	4., M		
-50.0							
-60.0							
							Max Hold
-70.0						_	
Center 5.27000 GHz				Span 100			
Res BW 910 kHz		VBW 8 MHz			p 1 ms		Min Hold
							Min Hold
Occupied Bandwi	idth	Total Po	wer 17.7	dBm		_	
	37.662 MH						Detector
	37.002 WIT	Z					Detector Peak▶
Transmit Freq Error	-19.509 kl	z % of OB	W Power 99	.00 %		Auto	Man
x dB Bandwidth	40.01 MH	z xdB	-26.	00 dB			
MSG			STATUS				

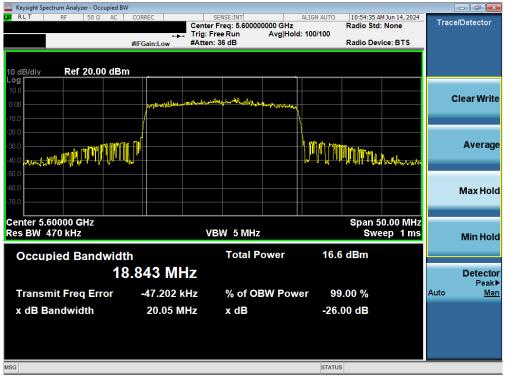
Plot 7-18. 26dB Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax – 484 Tones (UNII Band 2A) – Ch. 54)



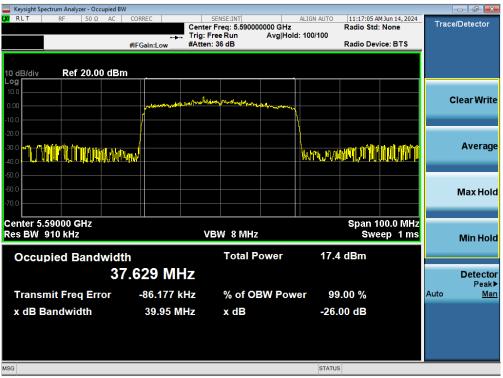
Plot 7-19. 26dB Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax - 996 Tones (UNII Band 2A) - Ch. 58)

FCC ID: A3LSMX820		MEASUREMENT REPORT	Approved by: Technical Manager
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Plot 7-20. 26dB Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax - 242 Tones (UNII Band 2C) - Ch. 120)



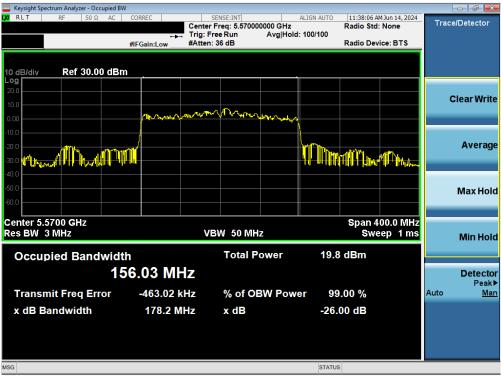
Plot 7-21. 26dB Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax – 484 Tones (UNII Band 2C) – Ch. 118)

FCC ID: A3LSMX820		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 07 of 120
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Keysight Spectrum Analyzer - Occup	pied BW									
LXI RLT RF 50Ω	AC CORF	REC		ISE:INT		ALIGN AUTO		M Jun 14, 2024	Trac	e/Detector
				eq: 5.61000 Run	Avg Hold	: 100/100	Radio Std	None		
	#IFG	ain:Low	#Atten: 3		0.		Radio Dev	ice: BTS		
10 dB/div Ref 30.00	dBm									
Log									_	
20.0										
10.0										Clear Write
0.00		an the second	w water	manufula	wormen the					
-10.0	í									
-20.0						l.				Average
	SUM ON CV					1	a chinana	Diate a .		Average
-30.0	₩₩₩							1111 / 111		
-40.0										
-50.0										Max Hold
-60.0										
Center 5.6100 GHz								00.0 MHz		
Res BW 1.8 MHz			VBV	V 8 MHz			Swe	ep 1ms		Min Hold
				Total P	011/07	40.0	dBm			
Occupied Bandw				TOLATE	ower	10.0	ubill			
	77.3	34 MI	-IZ							Detector
										Peak▶
Transmit Freq Erro	r -	12.377	(Hz	% of O	3W Pow	er 99	.00 %		Auto	<u>Man</u>
x dB Bandwidth		81.67 M	IHz	x dB		-26.	00 dB			
MSG						STATUS	5			

Plot 7-22. 26dB Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax - 996 Tones (UNII Band 2C) - Ch. 122)



Plot 7-23. 26dB Bandwidth Plot MIMO ANT1 (160MHz BW 802.11ax - 2x996 Tones (UNII Band 2C) - Ch. 114)

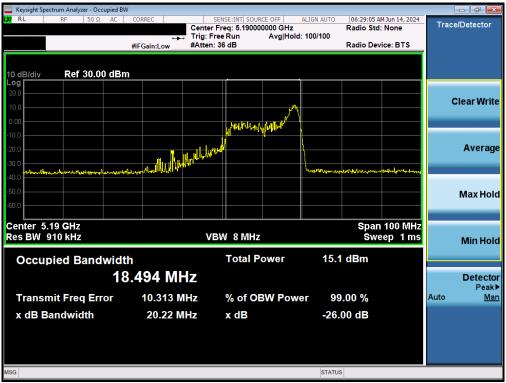
FCC ID: A3LSMX820		MEASUREMENT REPORT Approved Technical M		
Test Report S/N:	Test Dates:	EUT Type:	Dage 28 of 120	
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7.2.2 MIMO Antenna-2 26dB Bandwidth Measurements



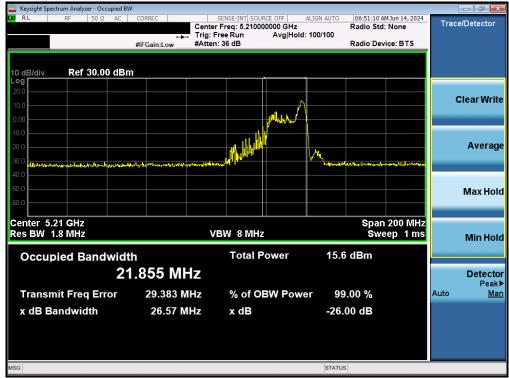
Plot 7-24. 26dB Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax – 26 Tones (UNII Band 1) – Ch. 40)



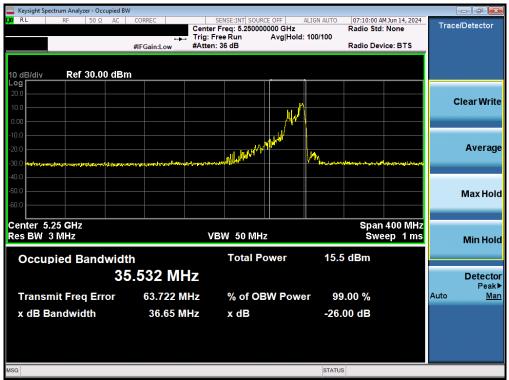
Plot 7-25. 26dB Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 38)

FCC ID: A3LSMX820		Approved by: Technical Manager		
Test Report S/N:	Test Dates:	EUT Type:	Page 29 of 139	
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Plot 7-26. 26dB Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 42)



Plot 7-27. 26dB Bandwidth Plot MIMO ANT2 (160MHz BW 802.11ax - 26 Tones (UNII Band 1/2A) - Ch. 50)

FCC ID: A3LSMX820		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 20 of 120
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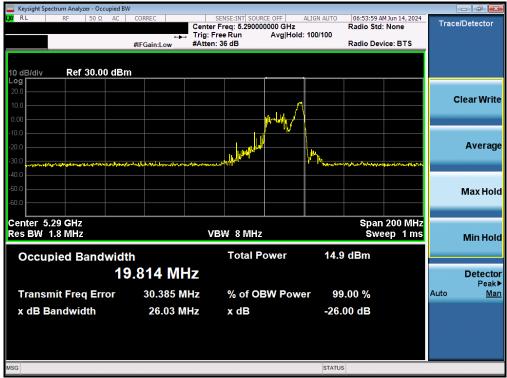
Plot 7-28. 26dB Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 56)



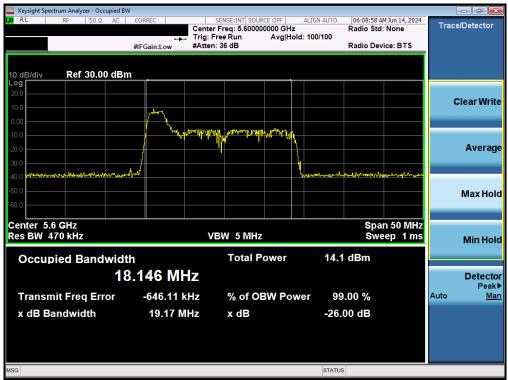
Plot 7-29. 26dB Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 54)

FCC ID: A3LSMX820		Approved by: Technical Manager			
Test Report S/N:	Test Dates:	EUT Type:	Dage 21 of 120		
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Plot 7-30. 26dB Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 58)



Plot 7-31. 26dB Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 120)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager	
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Plot 7-32. 26dB Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 118)



Plot 7-33. 26dB Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 122)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Page 33 of 139	
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Keysight Spectrum Analyzer - Occupied BV	V				
KI RF 50Ω AC	CORREC	SENSE:INT SOURCE OFF A	LIGN AUTO 07:13:54 A Radio Std	M Jun 14, 2024	Trace/Detector
		Free Run Avg Hold:		. None	
	#IFGain:Low #Atter	n: 36 dB	Radio Dev	vice: BTS	
10 dB/div Ref 30.00 dBn	n				
Log					
20.0					Clear Write
10.0	<u>Λ.</u>				Clear write
0.00	_				
-10.0					
-20.0	They are the second				Average
-30.0 Mastershetersheter	/w	والمتحديد والمحرب ومحالي والمراجع والمراجع والم	يمعر بر المراجع الم		
-40.0					
-50.0					Max Hold
-60.0					
Center 5.57 GHz					
Res BW 3 MHz	v	BW 50 MHz		1400 MHz eep 1 ms	
ICS DW SIMILZ	v	DVV 5014112	000	cep mis	Min Hold
Occupied Bandwidt	h	Total Power	14.5 dBm		
					Detector
36	6.946 MHz				Detector Peak►
Transmit Freq Error	-63.099 MHz	% of OBW Powe	r 99.00 %		Auto <u>Man</u>
x dB Bandwidth	28.51 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-34. 26dB Bandwidth Plot MIMO ANT2 (160MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 114)



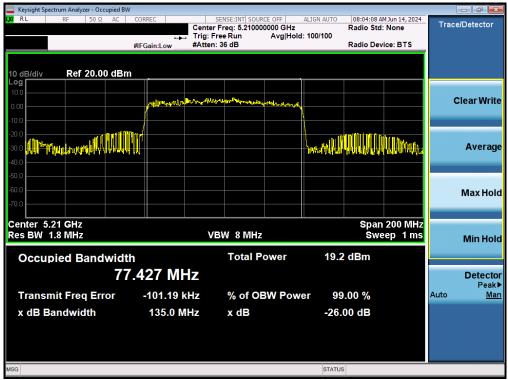
Plot 7-35. 26dB Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax - 242 Tones (UNII Band 1) - Ch. 40)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager	
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🔤 Keysight Spectrum Analyzer - Occupied BW	1						
KL RF 50Ω AC	CORREC	SENSE:INT SOURCE OFF	ALIGN AUTO	07:45:12 A Radio Std	M Jun 14, 2024	Trac	e/Detector
	Trig: F	ree Run Avg Hol	d: 100/100				
	#IFGain:Low #Atter	1: 36 dB		Radio Dev	ice: BTS		
10 dB/div Ref 20.00 dBm	<u> </u>		•,				
Log 10.0							
0.00	In a red with the street	marchall marchel and a				(Clear Write
-10.0		· · · · · · · · · · · · · · · · · · ·)				
-20.0							
			h linh hii a a a	h P an ku ska u	Herbert		Average
				W NJINJINJ	MAL MA		Average
-40.0							
-50.0							
-60.0							Max Hold
-70.0							
Center 5.19 GHz				Snan	100 MHz		
Res BW 910 kHz	v	BW 8 MHz			ep 1 ms		Min Hold
							MIII HUIU
Occupied Bandwidt	h	Total Power	17.8	dBm			
37	.728 MHz						Detector
							Peak▶
Transmit Freq Error	-33.016 kHz	% of OBW Pow	ver 99	.00 %		Auto	<u>Man</u>
x dB Bandwidth	39.93 MHz	x dB	-26.0	00 dB			
MSG			STATUS				

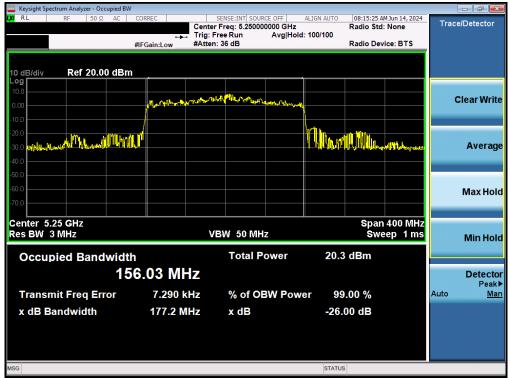
Plot 7-36. 26dB Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax – 484 Tones (UNII Band 1) – Ch. 38)



Plot 7-37. 26dB Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax - 996 Tones (UNII Band 1) - Ch. 42)

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Plot 7-38. 26dB Bandwidth Plot MIMO ANT2 (160MHz BW 802.11ax - 2x996 Tones (UNII Band 1/2A) - Ch. 50)



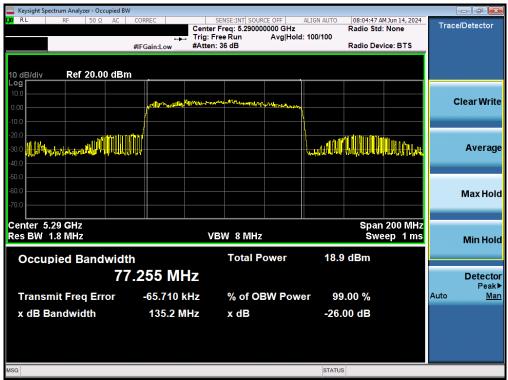
Plot 7-39. 26dB Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax - 242 Tones (UNII Band 2A) - Ch. 56)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager	
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Keysight Spectrum Analyzer - Occupied BW									
LXI RL RF 50 Ω AC	CORREC		NSE:INT SOUR		ALIGN AUTO	07:48:00 A	M Jun 14, 2024	Trac	e/Detector
		Trig: Free	Run		d: 100/100				
	#IFGain:Low	#Atten: 3	6 dB			Radio Dev	ICE: BIS		
10 dB/div Ref 20.00 dBm									
					İ				
10.0			har a ta						Clear Write
0.00	remander	al the second	at when the second	u-multinip					
-10.0									
-20.0	-								
-30.0 M. A. MARKALIMIA AWALAN							White the latest		Average
-40.0					an MMM M	en a stated ada te	n in 1d lekalaning		
-50.0									
-60.0									Max Hold
-70.0									
Center 5.27 GHz						Enan	100 MHz		
Res BW 910 kHz		VBV	V 8 MHz				ep 1 ms		Min Hold
									ΜΙΠΗΟΙά
Occupied Bandwidth			Total P	ower	18.4	dBm			
37.	.636 MF	z							Detector
									Peak▶
Transmit Freq Error	-36.383 k	HZ	% of O	SW Pow	ver 99	.00 %		Auto	Man
x dB Bandwidth	40.05 M	Hz	x dB		-26.	00 dB			
MSG					STATUS	;			

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



Plot 7-41. 26dB Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax - 996 Tones (UNII Band 2A) - Ch. 58)

FCC ID: A3LSMX820		Approved by: Technical Manager	
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Keysight Spectrum Analyzer - Occupied BW					
LX RL RF 50Ω AC (SENSE:INT SOURCE OFF	ALIGN AUTO 07:32:46 A Radio Std	M Jun 14, 2024	Trace/Detector
			d: 100/100	. None	
#	IFGain:Low #Atten	: 36 dB	Radio Dev	rice: BTS	
10 dB/div Ref 20.00 dBm					
Log					
10.0		n .			Clear Write
0.00	mallendowned	14 m - Loren Jerren frihelinger and			Clear write
-10.0					
-20.0					
-30.0					Average
-40.0 margin brancher and a failed and the francher			Unterstation you	whenter	
-50.0					
-60.0					Max Hold
-70.0					
			0	- 50 MIL	
Center 5.6 GHz Res BW 470 kHz	v	BW 5 MHz		n 50 MHz ep 1 ms	
Res BW 470 KHz	v.		Swe	ep mis	Min Hold
Occupied Bandwidth		Total Power	17.0 dBm		
18.	842 MHz				Detector Peak►
Transmit Freq Error	-29.784 kHz	% of OBW Pow	ver 99.00 %		Auto Man
					man
x dB Bandwidth	20.16 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-42. 26dB Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax - 242 Tones (UNII Band 2C) - Ch. 120)



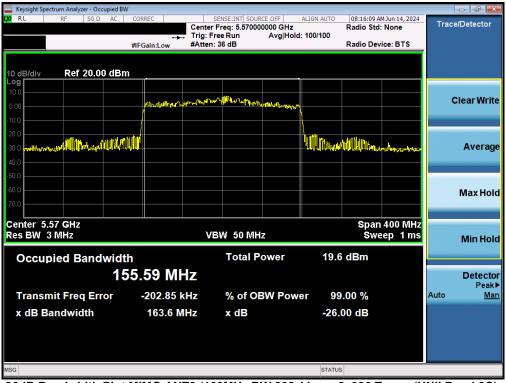
Plot 7-43. 26dB Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax - 484 Tones (UNII Band 2C) - Ch. 118)

FCC ID: A3LSMX820		Approved by: Technical Manager			
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Keysight Spectrum Analyzer - Occupied BW					
LXIRL RF 50Ω AC	CORREC	SENSE:INT SOURCE OFF		AM Jun 14, 2024	Trace/Detector
	🛶 Tri	g:FreeRun Avg Ho	ld: 100/100		
	#IFGain:Low #At	ten: 36 dB	Radio De	vice: BTS	
10 dB/div Ref 20.00 dBm					
10.0					
0.00	millionumitation	anger a configuration of the state of the st	A		Clear Write
-10.0					
-20.0					
-30.0 Mthalledomeni and and the Mthall			Land March Marth Marting	H.H.W	Average
-40.0			and the state of t		Ū
-50.0					
-60.0					
-70.0					Max Hold
Center 5.61 GHz				ז 200 MHz	
Res BW 1.8 MHz		VBW 8 MHz	Sw	eep 1 ms	Min Hold
Occupied Bandwidth		Total Power	18.5 dBm		
	.076 MHz				Detector Peak▶
Transmit Freq Error	-129.30 kHz	% of OBW Pov	ver 99.00 %		Auto <u>Man</u>
x dB Bandwidth	81.81 MHz	x dB	-26.00 dB		
		XUB	-20.00 UB		
MSG			STATUS		

Plot 7-44. 26dB Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax - 996 Tones (UNII Band 2C) - Ch. 122)



Plot 7-45. 26dB Bandwidth Plot MIMO ANT2 (160MHz BW 802.11ax – 2x996 Tones (UNII Band 2C) – Ch. 114)

FCC ID: A3LSMX820		Approved by: Technical Manager			
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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 and 5.850-5.895GHz bands, the 6dB bandwidth must be \geq 500 kHz.

Test Procedure Used

ANSI C63.10-2013 - Section 6.9.2

Test Settings

- 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 <u>></u> 3 x 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.

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MIMO 6dB Bandwidth Measurements

-		Frequency [MHz]	802.11 MODE	Channel	Antenna-1 6dB Bandwidth [MHz]	Antenna-2 6dB Bandwidth [MHz]
		5745	ax (20MHz)	149	2.07	2.07
	e	5785	ax (20MHz)	157	2.05	2.04
		5825	ax (20MHz)	165	2.68	2.68
	Band	5755	ax (40MHz)	151	2.19	2.12
		5795	ax (40MHz)	159	2.19	2.16
		5775	ax (80MHz)	155	2.28	2.12

Table 7-7. Band 3 Conducted 6dB Bandwidth Measurements MIMO ANT1/2 (26 Tones)

	Frequency [MHz]	802.11 MODE	Channel	Antenna-1 6dB Bandwidth [MHz]	Antenna-2 6dB Bandwidth [MHz]
Band 3/4	5845	ax (20MHz)	169	2.64	2.69
Band 4	5865	ax (20MHz)	173	2.65	2.68
Dallu 4	5885	ax (20MHz)	177	2.07	2.04
Band 3/4	5835	ax (40MHz)	167	2.19	2.16
Band 4	5875	ax (40MHz)	175	2.13	2.15
Band 3/4	5855	ax (80MHz)	171	2.27	2.26
Band 4	5815	ax (160MHz)	163	2.69	2.46

Table 7-8. Bands 3/4 Conducted 6dB Bandwidth Measurements MIMO ANT1/2 (26 Tones)

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	Frequency [MHz]	802.11 MODE	Channel	Antenna-1 6dB Bandwidth [MHz]	Antenna-2 6dB Bandwidth [MHz]
	5745	ax (20MHz)	149	17.01	18.01
m	5785	ax (20MHz)	157	17.89	15.84
	5825	ax (20MHz)	165	17.38	16.88
Band	5755	ax (40MHz)	151	35.76	34.26
	5795	ax (40MHz)	159	35.42	35.20
	5775	ax (80MHz)	155	75.34	75.50

Table 7-9. Band 3 Conducted 6dB Bandwidth Measurements MIMO ANT1/2 (Full Tones)

	Frequency [MHz]	802.11 MODE	Channel	Antenna-1 6dB Bandwidth [MHz]	Antenna-2 6dB Bandwidth [MHz]
Band 3/4	5845	ax (20MHz)	169	16.48	17.07
Band 4	5865	ax (20MHz)	173	17.02	17.71
Danu 4	5885	ax (20MHz)	177	18.14	18.00
Band 3/4	5835	ax (40MHz)	167	35.38	36.15
Band 4	5875	ax (40MHz)	175	35.19	36.54
Band 3/4	5855	ax (80MHz)	171	75.23	75.47
Danu 3/4	5815	ax (160MHz)	163	155.46	155.47

Table 7-10. Bands 3/4 Conducted 6dB Bandwidth Measurements MIMO ANT1/2 (Full Tones)

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7.3.1 MIMO Antenna-1 6dB Bandwidth Measurements



Plot 7-46. 6dB Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax – 26 Tones (UNII Band 3) – Ch. 157)



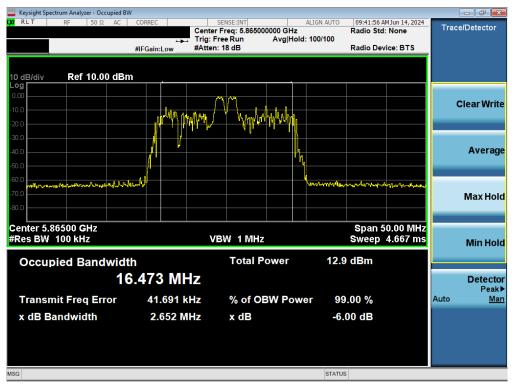
Plot 7-47. 6dB Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 3) - Ch. 151)

FCC ID: A3LSMX820		MEASUREMENT REPORT	
Test Report S/N:	Test Dates:	EUT Type:	Dama 42 of 420
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Keysight Spectrum Analyzer - Occupied BV	V						
LXIRLT RF 50Ω AC			ALIGN AUTO		M Jun 14, 2024	Trace	e/Detector
		Freq: 5.775000000 GHz Free Run Avg Hold:		Radio Std	: None	mac	
		: 36 dB		Radio Dev	rice: BTS		
	in ounces						
10 dB/div Ref 20.00 dBn	n <u> </u>						
Log							
10.0							lear Write
0.00							lear write
-10.0						_	
	1 The super-						
-20.0							
-30.0							Average
-40.0	11						
-50.0 ณะเป็นเป็นเป็นเป็นเป็นเป็นเป็นเป็นเป็นเป็น	- when	Mahrman	strandarda	with whether	المقدوا وسعار المراسلون		
-50.0							
-60.0							Max Hold
-70.0							
Center 5.7750 GHz				Span 2	00.0 MHz		
#Res BW 100 kHz	#	VBW 300 kHz		Sweep	19.13 ms		Min Hold
							Wintfiold
Occupied Bandwidt	h	Total Power	12.9	dBm			
1/	7.835 MHz						Detector
							Peak►
Transmit Freq Error	-30.289 MHz	% of OBW Powe	er 99.	00 %		Auto	<u>Man</u>
x dB Bandwidth	2.279 MHz	x dB	-6.0	0 dB			
		A dB	0.0				
MSG			STATUS				

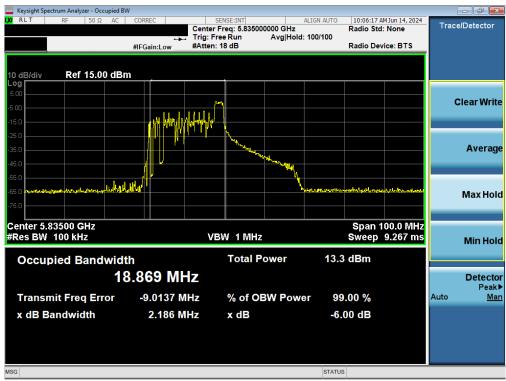
Plot 7-48. 6dB Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax - 26 Tones (UNII Band 3) - Ch. 155)



Plot 7-49. 6dB Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax – 26 Tones (UNII Band 4) – Ch. 173)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dega 44 of 120
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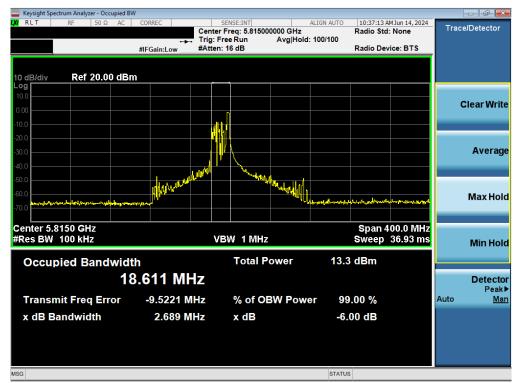
Plot 7-50. 6dB Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 3/4) - Ch. 167)



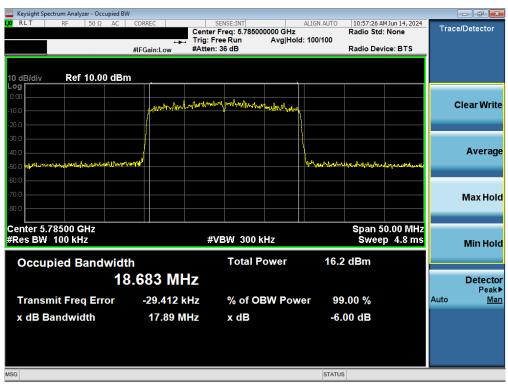
Plot 7-51. 6dB Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax – 26 Tones (UNII Band 3/4) – Ch. 171)

FCC ID: A3LSMX820		MEASUREMENT REPORT		MEASUREMENT REPORT Tech	
Test Report S/N:	Test Dates:	EUT Type:	D 45		
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Plot 7-52. 6dB Bandwidth Plot MIMO ANT1 (160MHz BW 802.11ax - 26 Tones (UNII Band 3/4) - Ch. 163)



Plot 7-53. 6dB Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax – 242 Tones (UNII Band 3) – Ch. 157)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Deve 40 of 400
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Keysight Spectrum Analyzer - Occupied BW							
XIRLT RF 50Ω AC	CORREC	SENSE:INT	ALIGN AUTO		M Jun 14, 2024	Trace	e/Detector
		ter Freq: 5.755000000 GH; : Free Run Avg He	z old: 100/100	Radio Std:	None		
		ten: 36 dB		Radio Dev	ice: BTS		
10 dB/div Ref 10.00 dBm			-				
0.00							
-10.0	1 J. B. B. Juniohild	John March March 19 M				0	Clear Write
			* 1 -				
-20.0							
-30.0							
-40.0 Marilanti addition and a start			- \		ine ad all the Cold of the		Average
-40.0 11-14/14/14/14/14/14/14/14/14/14/14/14/14/1	1, de		Will ber way town	mar the strate way	ledhalaa ka ana a fa		
-60.0							
-70.0							Max Hold
-80.0							
Center 5.75500 GHz		#1(DWL 000 LUL			00.0 MHz		
#Res BW 100 kHz		#VBW 300 kHz		Swee	p 9.6 ms		Min Hold
Occupied Bandwidth		Total Power	16 0	dBm			
			10.0				
37.	412 MHz						Detector
							Peak►
Transmit Freq Error	18.089 kHz	% of OBW Po	wer 99	.00 %		Auto	<u>Man</u>
x dB Bandwidth	35.76 MHz	x dB	-6.	00 dB			
MSG			STATUS	5			

Plot 7-54. 6dB Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax - 484 Tones (UNII Band 3) - Ch. 151)

Keysight Spectrum Analyzer - Occupied					
RLT RF 50 Ω AC	Cent ⊷⊷ Trig	sense:INT ter Freq: 5.775000000 GHz : Free Run Avg Hol en: 36 dB	Radio : d: 100/100	D5 AM Jun 14, 2024 Std: None Device: BTS	Trace/Detector
0 dB/div Ref 10.00 dl	3m		·		
	July Mala Mandal	MAAny MANGARAN	↓ 		Clear Wri
0.0 0.0 1.0 1.0 1.0			Menterstrationality	YUM/Margalisenana	Avera
0.0 0.0 0.0					Max Ho
enter 5.7750 GHz Res BW 100 kHz		#VBW 300 kHz		n 200.0 MHz p 19.13 ms	Min Ho
Occupied Bandwi		Total Power	17.9 dBm		
	76.641 MHz				Detect Pea
Transmit Freq Error	-75.100 kHz	% of OBW Pow	ver 99.00 %		Auto <u>M</u>
x dB Bandwidth	75.34 MHz	x dB	-6.00 dB		
G			STATUS		

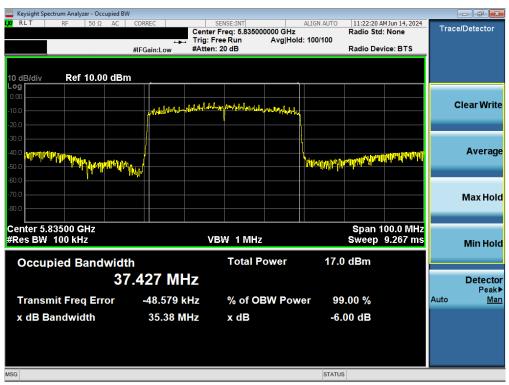
Plot 7-55. 6dB Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax - 996 Tones (UNII Band 3) - Ch. 155)

FCC ID: A3LSMX820		MEASUREMENT REPORT		
Test Report S/N:	Test Dates:	EUT Type:	Deve 47 of 400	
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Plot 7-56. 6dB Bandwidth Plot MIMO ANT1 (20MHz BW 802.11ax - 242 Tones (UNII Band 4) - Ch. 173)



Plot 7-57. 6dB Bandwidth Plot MIMO ANT1 (40MHz BW 802.11ax - 484 Tones (UNII Band 3/4) - Ch. 167)

FCC ID: A3LSMX820		Approved by: Technical Manager			
Test Report S/N:	Test Dates:	EUT Type:	Dama 40 of 400		
1M2405140040-05-R1.A3L	5/23/2024 - 7/28/2024	Portable Tablet	Page 48 of 139		
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💢 RLT RF 50Ω AC C	ORREC	SENSE:INT	ALIGN AU		M Jun 14, 2024	Trace	Detector
		nter Freq: 5.855000 g: Free Run	000 GHz Avg Hold: 100/10	Radio Std	None	macci	Detector
#		tten: 18 dB	Arginola. Toolia	Radio Dev	ice: BTS		
10 dB/div Ref 10.00 dBm Log							
0.00							
		Malily Making party and				С	lear Write
-10.0	AUCHLUL AVCHLORAD	PUTATION AND AND A CONTRACTOR	attompty				
-20.0							
-30.0							
-40.0							Average
and the state of t	~ *		l	Way and a property of	and the second second		
-50.0			i and i a	r	Comments of the second		
-60.0			WY I				
-70.0							Max Hold
-80.0							Maxilolu
-00.0							
Center 5.8550 GHz				Span 2	00.0 MHz		
#Res BW 100 kHz		VBW 1 MHz			18.47 ms		Min Hold
							MITHOIU
Occupied Bandwidth		Total Po	wer	18.3 dBm			
/ 6.	889 MHz						Detector
Transmit Frog Free	-105.29 kHz	% of OP	W Power	99.00 %		Auto	Peak▶ Man
Transmit Freq Error	-105.29 KHZ	% OI OB	vv Fower	99.00 %		Auto	Iviari
x dB Bandwidth	75.23 MHz	x dB		-6.00 dB			
						_	
MSG			S	TATUS			

Plot 7-58. 6dB Bandwidth Plot MIMO ANT1 (80MHz BW 802.11ax - 996 Tones (UNII Band 3/4) - Ch. 171)



Plot 7-59. 6dB Bandwidth Plot MIMO ANT1 (160MHz BW 802.11ax - 996*2 Tones (UNII Band 3/4) - Ch. 163)

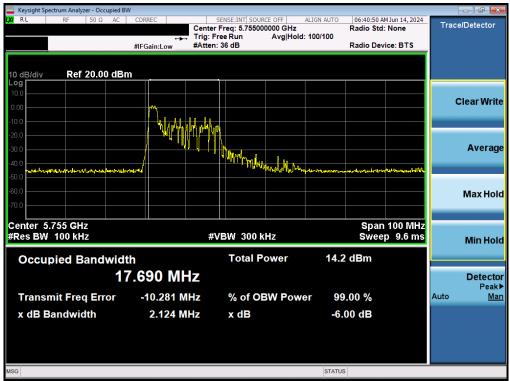
FCC ID: A3LSMX820		MEASUREMENT REPORT		
Test Report S/N:	Test Dates:	EUT Type:	Dama 40 of 400	
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7.3.2 MIMO Antenna-2 6dB Bandwidth Measurements

Keysight Spectrum Analyzer - Occupied BV 06:14:37 AM Jun 14, 2024 RL ALIGN AUTO Trace/Detector Center Freq: 5.785000000 GHz Radio Std: None Avg|Hold: 100/100 Trig: Free Run #IFGain:Low #Atten: 36 dB Radio Device: BTS 10 dB/div Ref 20.00 dBm Log **Clear Write** a sin ta da Average Max Hold Span 50 MHz Sweep 4.8 ms Center 5.785 GHz #Res BW 100 kHz #VBW 300 kHz Min Hold **Occupied Bandwidth** Total Power 13.5 dBm 18.014 MHz Detector Peak Transmit Freg Error -547.83 kHz % of OBW Power 99.00 % Auto Man x dB Bandwidth 2.042 MHz x dB -6.00 dB STATUS ISG

Plot 7-60. 6dB Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax – 26 Tones (UNII Band 3) – Ch. 157)



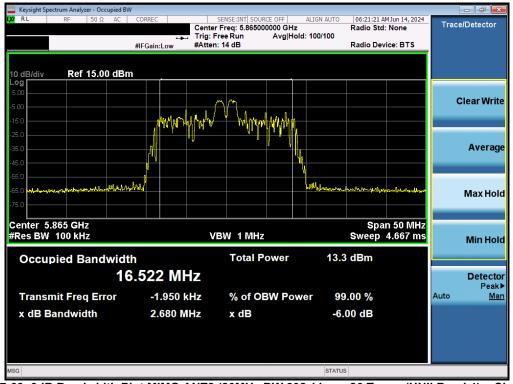
Plot 7-61. 6dB Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax - 26 Tones (UNII Band 3) - Ch. 151)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dega 50 of 120
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🧫 Keysight Spectrum Analyzer - Occupied BW	1				
LXIRL RF 50Ω AC		ENSE:INT SOURCE OFF A Freq: 5.775000000 GHz	LIGN AUTO 07:00:21 A Radio Std	M Jun 14, 2024	Trace/Detector
	🛶 Trig: Fr	ee Run Avg Hold:	100/100		
	#IFGain:Low #Atten:	36 dB	Radio Dev	/ice: BTS	
10 dB/div Ref 20.00 dBm Log	<u> </u>				
10.0					
0.00	<mark></mark>				Clear Write
-10.0					
-20.0	Th Man In				
-30.0					Average
-40.0					
-50.0		hoursemplanes	ويهم المحمد على المحمد المحمد والمحمد و	mananakihidapan	
-60.0					
-70.0					Max Hold
-70.0					
Center 5.775 GHz				200 MHz	
#Res BW 100 kHz	#V	'BW 300 kHz	Sweep	19.13 ms	Min Hold
Occupied Bandwidt	h	Total Power	14.7 dBm		
Occupied Bandwidt		I Otal FOwer	14.7 UBIII		
18	3.247 MHz				Detector
Transmit Freq Error	-30.070 MHz	% of OBW Powe	r 99.00 %		Peak▶ Auto Man
x dB Bandwidth	2.120 MHz	x dB	-6.00 dB		
MSG			STATUS		

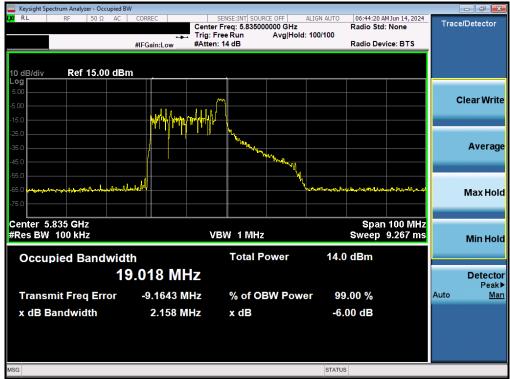
Plot 7-62. 6dB Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax – 26 Tones (UNII Band 3) – Ch. 155)



Plot 7-63. 6dB Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax - 26 Tones (UNII Band 4) - Ch. 173)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager
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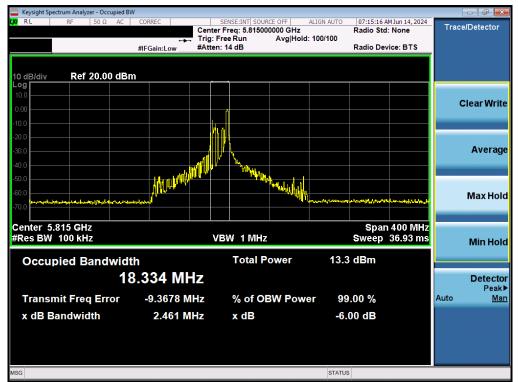
Plot 7-64. 6dB Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax - 26 Tones (UNII Band 3/4) - Ch. 167)



Plot 7-65. 6dB Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax – 26 Tones (UNII Band 3/4) – Ch. 171)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager	
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Plot 7-66. 6dB Bandwidth Plot MIMO ANT2 (160MHz BW 802.11ax - 26 Tones (UNII Band 3/4) - Ch. 163)



Plot 7-67. 6dB Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax - 242 Tones (UNII Band 3) - Ch. 157)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager
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🔤 Keysight Spectrum Analyzer - Occupied BW								
<mark>μχυ</mark> RL RF 50Ω AC C	ORREC	SENSE:INT SOUR Center Freq: 5.75500		ALIGN AUTO	07:58:37 A	M Jun 14, 2024	Trac	e/Detector
		Trig: Free Run	Avg Hold:	: 100/100				
#	FGain:Low	#Atten: 36 dB			Radio Dev	ice: BTS		
10 dB/div Ref 10.00 dBm			<u> </u>					
0.00								
-10.0	and mark and	relling raphillains	white phase				(Clear Write
-20.0								
-30.0								
-40.0								Average
-50.0	J			Without March	winter	-louthangerral at pu		
-60.0								
-70.0								
								Max Hold
-80.0								_
Center 5.755 GHz					Span	100 MHz		
#Res BW 100 kHz		#VBW 300 k	Hz		Swee	p 9.6 ms		Min Hold
		Total P	0)11/0 F	47.7	dBm			
Occupied Bandwidth			ower	17.7	авт			
37.	515 MHz	Z						Detector
Transmit Freq Error	-44.023 kH	z % of O	BW Powe	or 99	.00 %		Auto	Peak▶ Man
x dB Bandwidth	34.26 MH	z xdB		-6.0	00 dB			
MSG				STATUS				

Plot 7-68. 6dB Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax - 484 Tones (UNII Band 3) - Ch. 151)

Keysight Spectrum Analyzer - Occupied BW R RL RF 50 Ω AC	CORREC Cente	SENSE:INT SOURCE OFF Freq: 5.775000000 GHz Free Run Avg Hol n: 36 dB	Radio d: 100/100	Std: None	ि िि िि ि
10 dB/div Ref 10.00 dBn		n: 36 db	Radio	Device: BTS	
	Music Mathematica	alul galana and a call patro	n		Clear Writ
0.0 	neuth		watherwater	n Martin al Martin ann an A	Averaç
0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0 0.0					Max Ho
enter 5.775 GHz Res BW 100 kHz		VBW 300 kHz	Swe	pan 200 MHz ep 19.13 ms	Min Ho
Occupied Bandwidt	ⁿ 6.602 MHz	Total Power	18.7 dBn		Detect
Transmit Freq Error x dB Bandwidth	-54.004 kHz 75.50 MHz	% of OBW Pow x dB	ver 99.00 % -6.00 dE	-	Auto <u>Ma</u>
3			STATUS		

Plot 7-69. 6dB Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax – 996 Tones (UNII Band 3) – Ch. 155)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager
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Keysight Spectrum Analyzer - Occupied I	BW				
KX RL RF 50Ω AC	Cente 		z Radio Std old: 100/100		Trace/Detector
	#IFGain:Low #Atte	en: 20 dB	Radio Dev	rice: BTS	
10 dB/div Ref 10.00 dB	Bm				
Log 0.00 -10.0	Kerner Mandaland	4. My My More frequence			Clear Writ
-20.0		<u>د میں میں م</u>			
-30.0					
-40.0	<u>س مع الم</u>				Averag
-50.0	rdat.				
	كر وي الكتر		how many many many many	และคนใจม ะที่สน	
-70.0	<u>ه کا کا ا</u>				Max Hol
-80.0	<u>کر کا الم</u>				_
Center 5.865 GHz				n 50 MHz	
#Res BW 100 kHz		VBW 1 MHz	Sweep	4.667 ms	Min Hol
Occupied Bandwid	dth	Total Power	17.1 dBm		
1	8.748 MHz				Detecto
Transmit Freq Error	-38.101 kHz	% of OBW Pov	wer 99.00 %		Peak Auto <u>Ma</u>
x dB Bandwidth	17.71 MHz	x dB	-6.00 dB		
	17.7 F Will2	Xub	-0.00 015		
MSG			STATUS		

Plot 7-70. 6dB Bandwidth Plot MIMO ANT2 (20MHz BW 802.11ax - 242 Tones (UNII Band 4) - Ch. 173)



Plot 7-71. 6dB Bandwidth Plot MIMO ANT2 (40MHz BW 802.11ax - 484 Tones (UNII Band 3/4) - Ch. 167)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga EE of 120
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🔤 Keysight Spectrum Analyzer - Occupied B	W				
LXIRL RF 50Ω AC	CORREC	SENSE:INT SOURCE OFF		AM Jun 14, 2024	Trace/Detector
	Trig:	Free Run Avg Hold	d: 100/100		
	#IFGain:Low #Atte	n: 14 dB	Radio D	evice: BTS	
10 dB/div Ref 10.00 dB	m				
Log 0.00					
-10.0	MANUL MULL M	Ality all al plate be deliver the			Clear Write
-20.0	Distantion Control 11 and		<mark>]</mark>		
-30.0					
-40.0					Average
and the second se	maya		at least day way of a standard	~	Averuge
-50.0			a June of the state	A MANA AND A MANA	
-80.0					
-70.0					Max Hold
-80.0					
Center 5.855 GHz			Spa	n 200 MHz	
#Res BW 100 kHz	١	/BW 1 MHz) 18.47 ms	Min Hold
			40.7.15		
Occupied Bandwid		Total Power	18.7 dBm		
7	6.568 MHz				Detector
Tranomit Frag Frag	67 457 1/1-	% of OBM Bar	00.00 %		Peak▶ Auto Man
Transmit Freq Error	-67.157 kHz	% of OBW Pow			Auto <u>Man</u>
x dB Bandwidth	75.47 MHz	x dB	-6.00 dB		
MSG			STATUS		

Plot 7-72. 6dB Bandwidth Plot MIMO ANT2 (80MHz BW 802.11ax – 996 Tones (UNII Band 3/4) – Ch. 171)



Plot 7-73. 6dB Bandwidth Plot MIMO ANT2 (160MHz BW 802.11ax - 996*2 Tones (UNII Band 3/4) - Ch. 163)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager
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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	Fraguanay Panga	Maximum Conducted Power Limit	Maximum e.i.r.p
Band	Frequency Range	FCC	FCC
UNII 1	5.15 – 5.25GHz	23.98dBm (250mW)	N/A
UNII 2A	5.25 – 5.35GHz		
UNII 2C	5.47 – 5.725GHz	The lesser of 23.98dBm (250mW) or 11dBm + 10log₁₀B	N/A
UNII 3	5.725 – 5.850GHz	30dBm (1W)	N/A
UNII 4	5.850 – 5.895GHz	N/A	30dBm (1W)

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 7-3. Test Instrument & Measurement Setup

Test Notes

None.

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MIMO Conducted Output Power Measurements

								Average C	Conducted Pow	er (dBm)				Conducted Power	Conducted Power				
	Der d	Freq [MHz]	Channel .	Tones					RU Index					Limit	Margin	Dir. Ant. Gain	Max e.i.r.p	e.i.r.p Limit	e.i.r.p Margin
	band	rreq [Mriz]	Channel	Tones		0			4			8				[dBi]	[dBm]	[dBm]	[dB]
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	[dBm]	[dB]				
		5180	36	26T	5.43	5.66	8.56	5.43	5.92	8.69	5.61	5.83	8.73	23.98	-15.25	-2.96	5.77	30.0	-24.23
	1	5200	40	26T	5.01	5.61	8.33	5.05	5.91	8.51	5.53	5.84	8.70	23.98	-15.28	-2.96	5.73	30.0	-24.27
		5240	48	26T	5.11	5.89	8.53	5.01	5.94	8.51	4.62	5.58	8.14	23.98	-15.45	-2.96	5.56	30.0	-24.44
BW		5260	52	26T	5.45	5.81	8.64	5.29	5.71	8.52	4.93	5.31	8.13	23.98	-15.34	-3.24	5.41	30.0	-24.59
m	2A	5280	56	26T	4.76	5.38	8.09	5.09	5.92	8.54	5.51	5.99	8.77	23.98	-15.21	-3.24	5.53	30.0	-24.47
E E		5320	64	26T	5.61	5.83	8.73	5.25	5.68	8.48	5.14	5.22	8.19	23.98	-15.25	-3.24	5.50	30.0	-24.50
N		5500	100	26T	5.11	5.91	8.54	5.21	5.47	8.35	5.18	5.61	8.41	23.98	-15.44	-3.30	5.24	30.0	-24.76
20	2C	5600	120	26T	5.74	5.84	8.80	5.54	5.56	8.56	5.66	5.87	8.78	23.98	-15.18	-3.30	5.50	30.0	-24.50
		5720	144	26T	5.58	5.39	8.50	5.86	5.49	8.69	5.90	5.66	8.79	23.98	-15.19	-3.30	5.49	30.0	-24.51
		5745	149	26T	5.88	5.91	8.91	5.61	5.69	8.66	5.71	5.94	8.84	30	-21.09	-3.58	5.33	36.0	-30.67
	3	5785	157	26T	5.84	5.87	8.87	5.50	5.68	8.60	5.63	5.82	8.74	30	-21.13	-3.58	5.29	36.0	-30.71
		5825	165	26T	5.53	5.93	8.74	5.97	5.98	8.99	5.55	5.83	8.70	30	-21.01	-3.58	5.41	36.0	-30.59
		5845	169	26T	5.46	5.59	8.54	5.68	5.98	8.84	5.34	5.49	8.43			-3.75	5.09	30.0	-24.91
	4	5865	173	26T	5.31	5.54	8.44	5.55	5.88	8.73	5.67	5.76	8.73	-	-	-3.75	4.98	30.0	-25.02
		5885	177	26T	5.69	5.90	8.81	5.46	5.72	8.60	5.52	5.85	8.70			-3.75	5.06	30.0	-24.94

Table 7-11. MIMO 20MHz BW (UNII) Maximum Conducted Output Power (26 Tones)

								Average	Conducted Pow	er (dBm)				Conducted Power	Conducted Power				
	Band	Freq [MHz]	Channel	Tones					RU Index					Limit	Margin	Dir. Ant. Gain	Max e.i.r.p	e.i.r.p Limit	e.i.r.p Margin
						37			39			40		[dBm]	[dB]	[dBi]	[dBm]	[dBm]	[dB]
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO						
		5180	36	52T	5.09	5.24	8.18	5.52	5.72	8.63	5.11	5.29	8.21	23.98	-15.35	-2.96	5.67	30.0	-24.33
	1	5200	40	52T	5.39	5.82	8.62	5.35	5.71	8.54	5.49	5.53	8.52	23.98	-15.36	-2.96	5.66	30.0	-24.34
		5240	48	52T	5.07	5.82	8.47	5.01	5.72	8.39	5.10	5.81	8.48	23.98	-15.50	-2.96	5.52	30.0	-24.48
BW		5260	52	52T	5.40	5.80	8.61	5.28	5.68	8.49	5.42	5.79	8.62	23.98	-15.36	-3.24	5.38	30.0	-24.62
	2A	5280	56	52T	5.49	5.82	8.67	5.39	5.92	8.67	5.47	5.82	8.66	23.98	-15.31	-3.24	5.44	30.0	-24.56
Ŧ		5320	64	52T	5.58	5.76	8.68	5.25	5.67	8.48	5.62	5.77	8.71	23.98	-15.27	-3.24	5.47	30.0	-24.53
MO		5500	100	52T	5.05	5.82	8.46	4.97	5.72	8.37	5.04	5.51	8.29	23.98	-15.52	-3.30	5.16	30.0	-24.84
20	2C	5600	120	52T	5.68	5.70	8.70	5.46	5.80	8.64	5.57	5.60	8.60	23.98	-15.28	-3.30	5.40	30.0	-24.60
		5720	144	52T	5.49	5.05	8.29	5.82	5.43	8.64	5.91	5.55	8.74	23.98	-15.24	-3.30	5.44	30.0	-24.56
		5745	149	52T	5.74	5.84	8.80	5.62	5.70	8.67	5.68	5.78	8.74	30	-21.20	-3.58	5.22	36.0	-30.78
	3	5785	157	52T	5.74	5.49	8.63	5.59	5.61	8.61	5.44	5.68	8.57	30	-21.37	-3.58	5.05	36.0	-30.95
		5825	165	52T	5.66	5.59	8.64	5.28	5.50	8.40	5.39	5.79	8.60	30	-21.36	-3.58	5.06	36.0	-30.94
		5845	169	52T	5.43	5.54	8.50	5.72	5.90	8.82	5.23	5.51	8.38			-3.75	5.07	30.0	-24.93
	4	5865	173	52T	5.26	5.17	8.23	5.56	5.58	8.58	5.15	5.15	8.16		-	-3.75	4.83	30.0	-25.17
		5885	177	52T	5.76	5.92	8.85	5.51	5.80	8.67	5.54	5.81	8.69			-3.75	5.10	30.0	-24.90
												-							

Table 7-12. MIMO 20MHz BW (UNII) Maximum Conducted Output Power (52 Tones)

						А	verage Conduct	ted Power (dBn	1)		Conducted Power	Conducted Power				
	Band	Freq [MHz]	Channel	Tones			RU la	ndex			Lim it	Margin	Dir. Ant. Gain	Max e.i.r.p	e.i.r.p Limit	e.i.r.p Margin
	Dunu	rieq [min.]	channer	rones		53			54		[dBm]	~	[dBi]	[dBm]	[dBm]	[dB]
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	. ,	[dB]				
		5180	36	106T	5.42	5.88	8.67	5.51	5.67	8.60	23.98	-15.31	-2.96	5.70	30.0	-24.30
	1	5200	40	106T	5.21	5.91	8.58	5.31	5.69	8.51	23.98	-15.40	-2.96	5.62	30.0	-24.38
		5240	48	106T	4.95	5.91	8.47	4.94	5.99	8.51	23.98	-15.47	-2.96	5.54	30.0	-24.46
BW		5260	52	106T	5.15	5.56	8.37	4.98	5.86	8.45	23.98	-15.53	-3.24	5.22	30.0	-24.78
m	2A	5280	56	106T	5.01	5.65	8.35	5.25	5.81	8.55	23.98	-15.43	-3.24	5.31	30.0	-24.69
Ŧ		5320	64	106T	5.23	5.61	8.43	5.15	5.61	8.40	23.98	-15.55	-3.24	5.20	30.0	-24.80
Σ		5500	100	106T	4.91	5.72	8.34	5.13	5.66	8.41	23.98	-15.57	-3.30	5.11	30.0	-24.89
20	2C	5600	120	106T	5.55	5.62	8.60	5.51	5.81	8.67	23.98	-15.31	-3.30	5.37	30.0	-24.63
		5720	144	106T	5.90	5.51	8.72	5.76	5.44	8.61	23.98	-15.26	-3.30	5.42	30.0	-24.58
		5745	149	106T	5.55	5.77	8.67	5.53	5.66	8.61	30	-21.33	-3.58	5.09	36.0	-30.91
	3	5785	157	106T	5.33	5.62	8.49	5.30	5.61	8.47	30	-21.51	-3.58	4.91	36.0	-31.09
		5825	165	106T	5.35	5.51	8.44	5.94	5.99	8.98	30	-21.02	-3.58	5.40	36.0	-30.60
		5845	169	106T	5.73	5.96	8.86	5.95	5.91	8.94	-	-	-3.75	5.19	30.0	-24.81
	4	5865	173	106T	5.61	5.60	8.62	5.44	5.81	8.64	-	-	-3.75	4.89	30.0	-25.11
		5885	177	106T	5.51	5.78	8.66	5.35	5.71	8.54	-	-	-3.75	4.91	30.0	-25.09

Table 7-13. MIMO 20MHz BW (UNII) Maximum Conducted Output Power (106 Tones)

	Band	Freq [MHz]	Channel	Tones		Conducted Pow RU Index 61		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]
		5100	26	0.407	ANTI	ANT2	MIMO	٤ J		2.07	10.45	20.0	10.55
		5180	36	242T	10.16	10.63	13.41	23.98	-10.57	-2.96	10.45	30.0	-19.55
	1	5200	40	242T	10.07	10.69	13.40	23.98	-10.58	-2.96	10.44	30.0	-19.56
		5240	48	242T	10.02	10.49	13.27	23.98	-10.71	-2.96	10.31	30.0	-19.69
BW		5260	52	242T	10.03	10.74	13.41	23.98	-10.57	-3.24	10.17	30.0	-19.83
E E E	2A	5280	56	242T	10.29	10.69	13.50	23.98	-10.48	-3.24	10.27	30.0	-19.73
Ĥ		5320	64	242T	10.70	10.97	13.85	23.98	-10.13	-3.24	10.61	30.0	-19.39
0MH:		5500	100	242T	10.01	10.47	13.26	23.98	-10.72	-3.30	9.95	30.0	-20.05
20	2C	5600	120	242T	10.25	10.65	13.46	23.98	-10.52	-3.30	10.16	30.0	-19.84
		5720	144	242T	10.48	10.50	13.50	23.98	-10.48	-3.30	10.20	30.0	-19.80
		5745	149	242T	10.51	10.69	13.61	30	-16.39	-3.58	10.03	36.0	-25.97
	3	5785	157	242T	10.53	10.53	13.54	30	-16.46	-3.58	9.96	36.0	-26.04
		5825	165	242T	10.67	10.72	13.71	30	-16.29	-3.58	10.13	36.0	-25.87
		5845	169	242T	10.67	10.67	13.68	-	-	-3.75	9.93	30.0	-20.07
	4	5865	173	242T	10.43	10.78	13.62	-	-	-3.75	9.87	30.0	-20.13
		5885	177	242T	10.35	10.68	13.53		-	-3.75	9.78	30.0	-20.22

Table 7-14. MIMO 20MHz BW (UNII) Maximum Conducted Output Power (242 Tones)

	Band	Freq [MHz]	Channel	Tones	Average	Conducted Pow RU Index 65	ver (dBm)	Lim it	Conducted Power Margin	Dir. Ant. Gain [dBi]	Max e.i.r.p [dBm]	e.i.r.p Limit [dBm]	e.i.r.p Margin [dB]
					ANT1	ANT2	MIMO	[dBm]	[dB]				. ,
	1	5190	38	484T	10.01	10.68	13.37	23.98	-10.61	-2.96	10.40	30.0	-19.60
N N	1	5230	46	484T	9.66	10.45	13.08	23.98	-10.90	-2.96	10.12	30.0	-19.88
B	2A	5270	54	484T	10.83	10.95	13.90	23.98	-10.08	-3.24	10.67	30.0	-19.33
MHz	24	5310	62	484T	10.77	10.95	13.87	23.98	-10.11	-3.24	10.64	30.0	-19.36
N		5510	102	484T	10.01	10.46	13.25	23.98	-10.73	-3.30	9.95	30.0	-20.05
40]	2C	5590	118	484T	10.63	10.76	13.71	23.98	-10.27	-3.30	10.40	30.0	-19.60
		5710	142	484T	10.66	10.59	13.64	23.98	-10.34	-3.30	10.33	30.0	-19.67
	2	5755	151	484T	10.61	10.67	13.65	30	-16.35	-3.58	10.07	36.0	-25.93
	3	5795	159	484T	10.34	10.66	13.51	30	-16.49	-3.58	9.94	36.0	-26.06
	4	5835	167	484T	10.93	10.98	13.97	-	-	-3.75	10.22	30.0	-19.78
	4	5875	175	484T	10.45	10.81	13.64	-	-	-3.75	9.89	30.0	-20.11

Table 7-15. MIMO 40MHz BW (UNII) Maximum Conducted Output Power (484 Tones)

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ſ						Average	Conducted Pow	er (dBm)	Conducted Power	Conducted Power				
		Band	Freq [MHz]	Channel	Tones		RU Index		Lim it	Margin	Dir. Ant. Gain	Max e.i.r.p	e.i.r.p Limit	e.i.r.p Margin
	~						67		[dBm]	[dB]	[dBi]	[dBm]	[dBm]	[dB]
	B					ANT1	ANT2	MIMO	e ,					
1		1	5210	42	996T	10.23	10.74	13.50	23.98	-10.48	-2.96	10.54	30.0	-19.46
	出	2A	5290	58	996T	10.14	10.66	13.42	23.98	-10.56	-3.24	10.18	30.0	-19.82
	N N		5530	106	996T	10.01	10.49	13.27	23.98	-10.71	-3.30	9.96	30.0	-20.04
	80N	2C	5610	122	996T	10.32	10.71	13.53	23.98	-10.45	-3.30	10.23	30.0	-19.77
			5690	138	996T	10.83	10.38	13.62	23.98	-10.36	-3.30	10.32	30.0	-19.68
		3	5775	155	996T	10.36	10.68	13.53	30	-16.47	-3.58	9.96	36.0	-26.04
- 1		4	5855	171	006T	10.59	10.94	13.78	-	_	-3.75	10.03	30.0	-19.97

Table 7-16. MIMO 80MHz BW (UNII) Maximum Conducted Output Power (996 Tones)

IHz BW	Band	Freq [MHz]	Channel	Tones	Average ANT1	Conducted Pow RU Index 68 ANT2	rer (dBm) MIMO	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]
NO N	1/2A	5250	50	2x996T	10.27	10.44	13.37	23.98	-10.61	-2.96	10.40	30.0	-19.60
16	2C	5570	114	2x996T	10.42	10.52	13.48	23.98	-10.50	-3.30	10.18	30.0	-19.82
	3/4	5815	163	2x996T	10.35	10.58	13.48		-	-3.75	9.73	30.0	-20.27

Table 7-17. MIMO 160MHz BW (UNII) Maximum Conducted Output Power (2x996 Tones)

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Note:

Per ANSI C63.10-2013 and KDB 662911 v02r01 Section E)1), 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.

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

Sample MIMO Calculation:

At 5180MHz in 802.11ax (20MHz BW) mode, the average conducted output power was measured to be 5.61 dBm for Antenna 1 and 5.83 dBm for Antenna 2.

Antenna 1 + Antenna 2 = MIMO

(5.61 dBm + 5.83 dBm) = (3.64 mW + 3.83 mW) = 7.47 mW = 8.73 dBm

Sample e.i.r.p. Calculation:

At 5180MHz in 802.11ax (20MHz BW) mode, the average MIMO conducted power was calculated to be 8.69 dBm with directional gain of -2.96 dBi.

e.i.r.p. (dBm) = Conducted Power (dBm) + Ant gain (dBi)

8.73 dBm + -2.96 dBi = 5.77 dBm

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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	Frequency Range	Maximum Conducted Power Limit
Band	Frequency Mange	FCC
UNII 1	5.15 – 5.25GHz	
UNII 2A	5.25 – 5.35GHz	11dBm/MHz
UNII 2C	5.47 – 5.725GHz	T (dbh//MHz
UNII 3	5.725 – 5.850GHz	30dBm/500kHz
UNII 4	5.850 – 5.895GHz	14dBm/MHz e.i.r.p

Test Procedure Used

ANSI C63.10-2013 – Section 12.3.2.2 (Method SA-1) 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.



Test Notes

Figure 7-4. Test Instrument & Measurement Setup

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

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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]
	5180	ax (20MHz)	36	2.10	2.28	5.20	11.00	-5.80
	5200	ax (20MHz)	40	1.93	2.27	5.12	11.00	-5.88
Band 1	5240	ax (20MHz)	48	2.16	2.19	5.18	11.00	-5.82
Bar	5190	ax (40MHz)	38	1.80	2.41	5.13	11.00	-5.87
	5230	ax (40MHz)	46	1.90	1.85	4.88	11.00	-6.12
	5210	ax (80MHz)	42	1.80	2.75	5.31	11.00	-5.69
Band 1/2A	5250	ax (160MHz)	50	0.72	1.90	4.36	11.00	-6.64
	5260	ax (20MHz)	52	1.60	2.46	5.06	11.00	-5.94
٩	5280	ax (20MHz)	56	1.71	2.51	5.14	11.00	-5.86
Band 2A	5320	ax (20MHz)	64	1.55	2.36	4.99	11.00	-6.01
Ban	5270	ax (40MHz)	54	1.44	2.34	4.92	11.00	-6.08
	5310	ax (40MHz)	62	1.68	2.55	5.15	11.00	-5.85
	5290	ax (80MHz)	58	1.22	2.58	4.96	11.00	-6.04
	5500	ax (20MHz)	100	1.49	2.01	4.77	11.00	-6.23
	5600	ax (20MHz)	120	1.75	2.15	4.97	11.00	-6.03
	5720	ax (20MHz)	144	1.42	3.00	5.29	11.00	-5.71
U	5510	ax (40MHz)	102	1.77	1.99	4.89	11.00	-6.11
d 2	5590	ax (40MHz)	118	2.00	2.53	5.28	11.00	-5.72
Band 2C	5710	ax (40MHz)	142	1.35	2.78	5.13	11.00	-5.87
	5530	ax (80MHz)	106	1.74	1.88	4.82	11.00	-6.18
	5610	ax (80MHz)	122	1.90	2.41	5.17	11.00	-5.83
	5690	ax (80MHz)	138	0.65	1.19	3.94	11.00	-7.06
	5570	ax (160MHz)	114	1.21	0.84	4.04	11.00	-6.96

Table 7-18. 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]
	5745	ax (20MHz)	149	-1.17	0.37	2.68	28.28	-25.60
	5785	ax (20MHz)	157	-0.64	0.08	2.75	28.28	-25.53
1d 3	5825	ax (20MHz)	165	-1.22	-0.29	2.28	28.28	-26.00
Band	5755	ax (40MHz)	151	-1.27	0.06	2.46	28.28	-25.82
	5795	ax (40MHz)	159	-0.78	-0.42	2.41	28.28	-25.87
	5775	ax (80MHz)	155	-1.42	0.16	2.45	28.28	-25.83

Table 7-19. Band 3 MIMO Conducted Power Spectral Density Measurements MIMO (26 Tones)

FCC ID: A3LSMX820		MEASUREMENT REPORT	Approved by: Technical Manager
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	Frequency [MHz]	802.11 MODE	Channel	Antenna 1 PSD [dBm]	Antenna 2 PSD [dBm]	Antenna Gain [dBi]	MIMO Summed EIRP PSD [dBm]	Max EIRP PSD [dBm]	Margin [dB]
Band 3/4	5845	ax (20MHz)	169	0.99	1.65	-3.75	0.59	14.00	-13.41
Band 4	5865	ax (20MHz)	173	0.74	1.35	-3.75	0.32	14.00	-13.68
Dallu 4	5885	ax (20MHz)	177	1.95	2.56	-3.75	1.53	14.00	-12.47
Band 3/4	5835	ax (40MHz)	167	1.81	2.45	-3.75	1.40	14.00	-12.60
Band 4	5875	ax (40MHz)	175	1.98	2.99	-3.75	1.78	14.00	-12.22
Band 3/4	5855	ax (80MHz)	171	1.63	2.47	-3.75	1.33	14.00	-12.67
Dallu 5/4	5815	ax (160MHz)	163	1.01	1.69	-3.75	0.62	14.00	-13.38

 Table 7-20. Bands 3/4 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]
	5180	ax (20MHz)	36	-1.15	-1.00	1.93	11.00	-9.07
	5200	ax (20MHz)	40	-1.10	-0.77	2.08	11.00	-8.92
Band 1	5240	ax (20MHz)	48	-1.22	-0.81	2.00	11.00	-9.00
Bar	5190	ax (40MHz)	38	-4.01	-3.82	-0.90	11.00	-11.90
	5230	ax (40MHz)	46	-4.43	-3.79	-1.09	11.00	-12.09
	5210	ax (80MHz)	42	-7.05	-6.29	-3.64	11.00	-14.64
Band 1/2A	5250	ax (160MHz)	50	-8.85	-8.29	-5.55	11.00	-16.55
	5260	ax (20MHz)	52	-1.20	-0.55	2.15	11.00	-8.85
⊲	5280	ax (20MHz)	56	-1.19	-0.82	2.01	11.00	-8.99
Band 2A	5320	ax (20MHz)	64	-0.71	0.08	2.71	11.00	-8.29
3an	5270	ax (40MHz)	54	-3.91	-2.88	-0.35	11.00	-11.35
	5310	ax (40MHz)	62	-3.83	-2.92	-0.34	11.00	-11.34
	5290	ax (80MHz)	58	-7.09	-6.15	-3.59	11.00	-14.59
	5500	ax (20MHz)	100	-1.32	-1.28	1.71	11.00	-9.29
	5600	ax (20MHz)	120	-1.16	-0.83	2.02	11.00	-8.98
	5720	ax (20MHz)	144	-1.66	-0.63	1.90	11.00	-9.10
U	5510	ax (40MHz)	102	-4.57	-4.17	-1.36	11.00	-12.36
d 2	5590	ax (40MHz)	118	-3.92	-3.44	-0.66	11.00	-11.66
Band 2C	5710	ax (40MHz)	142	-4.36	-3.17	-0.72	11.00	-11.72
	5530	ax (80MHz)	106	-7.52	-7.63	-4.56	11.00	-15.56
	5610	ax (80MHz)	122	-7.64	-6.83	-4.20	11.00	-15.20
	5690	ax (80MHz)	138	-7.45	-6.41	-3.89	11.00	-14.89
	5570	ax (160MHz)	114	-8.89	-9.51	-6.18	11.00	-17.18

Table 7-21. Bands 1, 2A, 2C MIMO Conducted Power Spectral Density Measurements MIMO (Full Tones)

FCC ID: A3LSMX820		MEASUREMENT REPORT	Approved by: Technical Manager
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	Frequency [MHz]	802.11 MODE	Channel	Antenna 1 PSD [dBm]	Antenna 2 PSD [dBm]	MIMO Summed PSD [dBm]	Max Conducted PSD [dBm]	Margin [dB]
	5745	ax (20MHz)	149	-4.16	-3.27	-0.68	28.28	-28.96
-	5785	ax (20MHz)	157	-4.04	-3.21	-0.59	28.28	-28.87
5 pr	5825	ax (20MHz)	165	-3.65	-2.93	-0.27	28.28	-28.55
Band	5755	ax (40MHz)	151	-6.44	-6.09	-3.25	28.28	-31.53
	5795	ax (40MHz)	159	-7.13	-5.90	-3.46	28.28	-31.74
	5775	ax (80MHz)	155	-9.63	-9.17	-6.39	28.28	-34.67

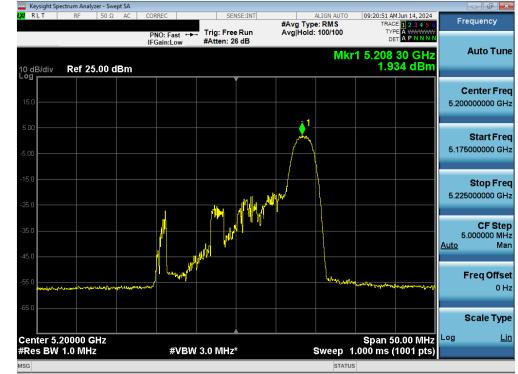
Table 7-22. Band 3 MIMO Conducted Power Spectral Density Measurements MIMO (Full Tones)

	Frequency [MHz]	802.11 MODE	Channel	Antenna 1 PSD [dBm]	Antenna 2 PSD [dBm]	Antenna Gain [dBi]	MIMO Summed EIRP PSD [dBm]	Max EIRP PSD [dBm]	Margin [dB]
Band 3/4	5845	ax (20MHz)	169	-1.33	-0.05	-3.75	-1.38	14.00	-15.38
Band 4	5865	ax (20MHz)	173	-1.20	-0.43	-3.75	-1.53	14.00	-15.53
Dallu 4	5885	ax (20MHz)	177	-0.64	-0.61	-3.75	-1.36	14.00	-15.36
Band 3/4	5835	ax (40MHz)	167	-4.19	-3.45	-3.75	-4.55	14.00	-18.55
Band 4	5875	ax (40MHz)	175	-3.92	-3.14	-3.75	-4.25	14.00	-18.25
Band 3/4	5855	ax (80MHz)	171	-6.81	-5.91	-3.75	-7.08	14.00	-21.08
Band 5/4	5815	ax (160MHz)	163	-9.40	-9.12	-3.75	-9.99	14.00	-23.99

Table 7-23. Bands 3/4 MIMO Conducted Power Spectral Density Measurements MIMO (Full Tones)

FCC ID: A3LSMX820		MEASUREMENT REPORT	Approved by: Technical Manager	
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7.5.1 MIMO Antenna-1 Power Spectral Density Measurements

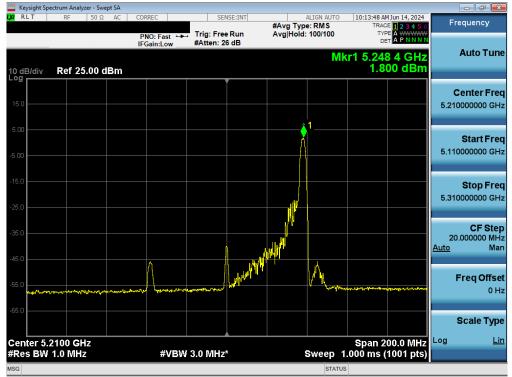
Plot 7-74. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 40)



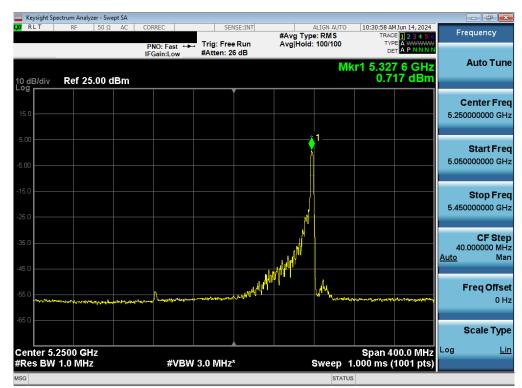
Plot 7-75. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 38)

FCC ID: A3LSMX820		MEASUREMENT REPORT	Approved by: Technical Manager	
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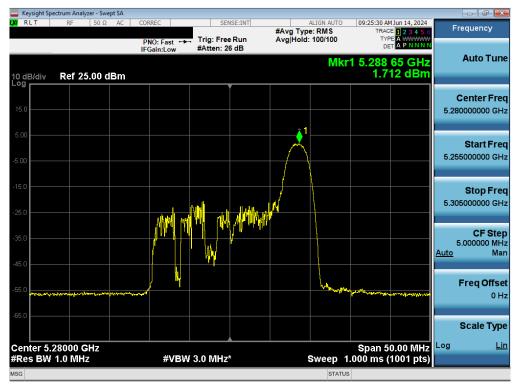
Plot 7-76. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 42)



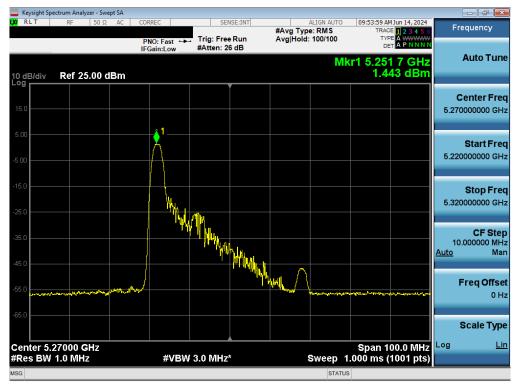
Plot 7-77. Power Spectral Density Plot MIMO ANT1 (160MHz BW 802.11ax – 26 Tones (UNII Band 1/2A) – Ch. 50)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-78. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 56)



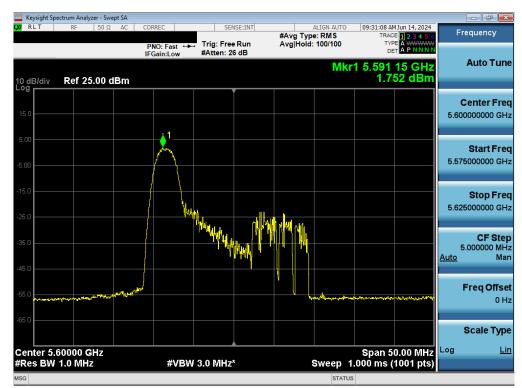
Plot 7-79. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 54)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager
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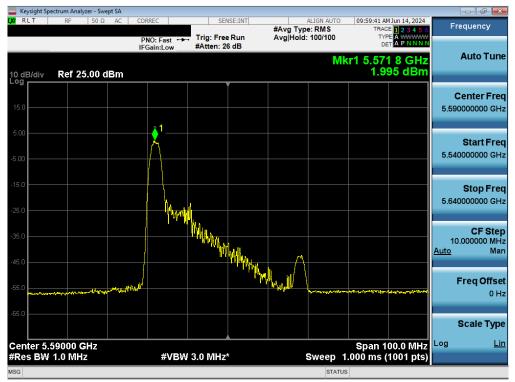
Plot 7-80. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 58)



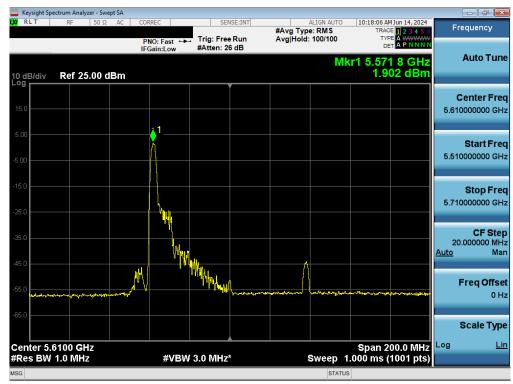
Plot 7-81. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 120)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager
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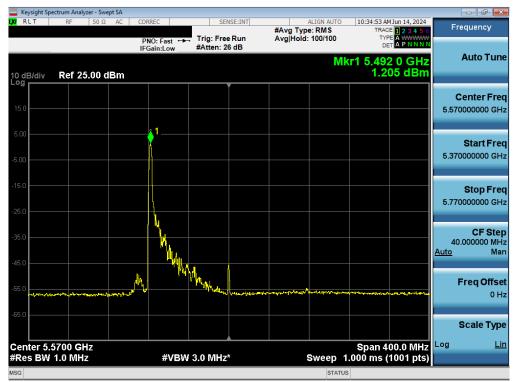
Plot 7-82. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 118)



Plot 7-83. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 122)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-84. Power Spectral Density Plot MIMO ANT1 (160MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 114)



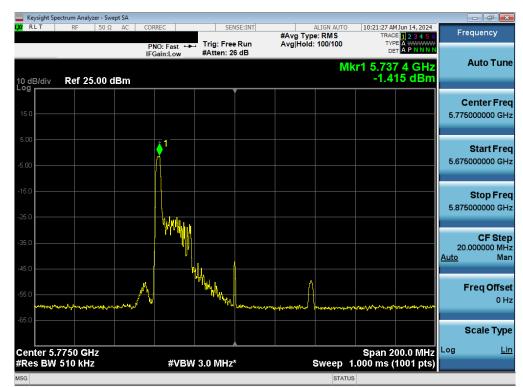
Plot 7-85. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 3) - Ch. 157)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager
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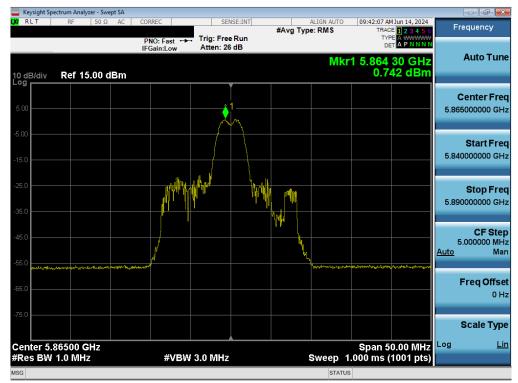
Plot 7-86. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 3) - Ch. 151)



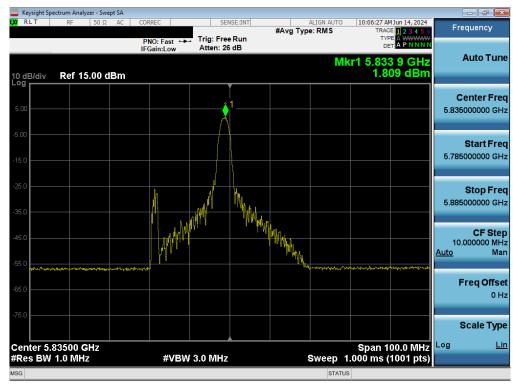
Plot 7-87. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11ax - 26 Tones (UNII Band 3) - Ch. 155)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager
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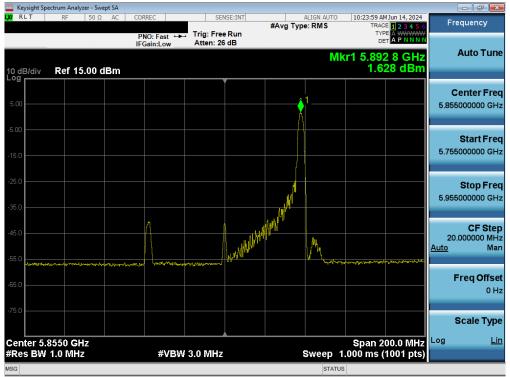
Plot 7-88. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 4) - Ch. 173)



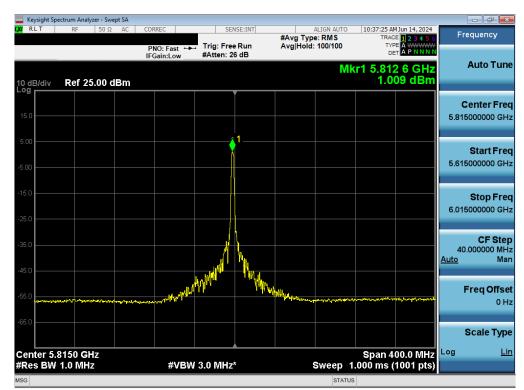
Plot 7-89. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 3/4) - Ch. 167)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager
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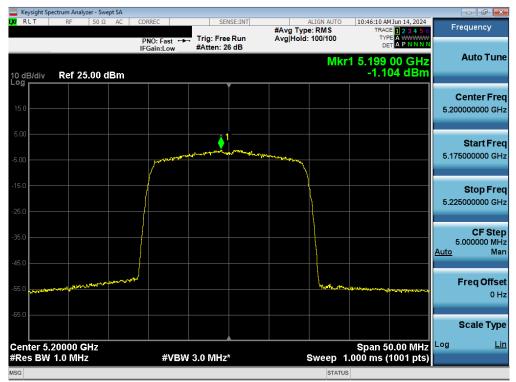
Plot 7-90. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11ax - 26 Tones (UNII Band 3/4) - Ch. 171)



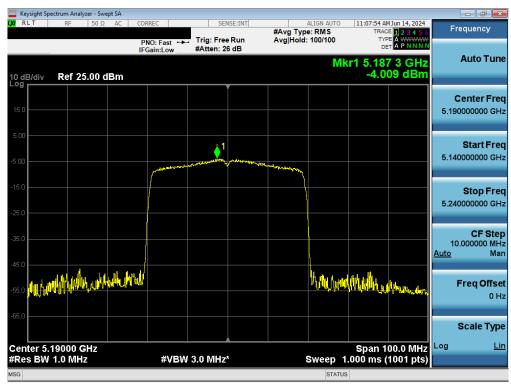
Plot 7-91. Power Spectral Density Plot MIMO ANT1 (160MHz BW 802.11ax - 26 Tones (UNII Band 3/4) - Ch. 163)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-92. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11ax - 242 Tones (UNII Band 1) - Ch. 40)



Plot 7-93. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11ax - 484 Tones (UNII Band 1) - Ch. 38)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager
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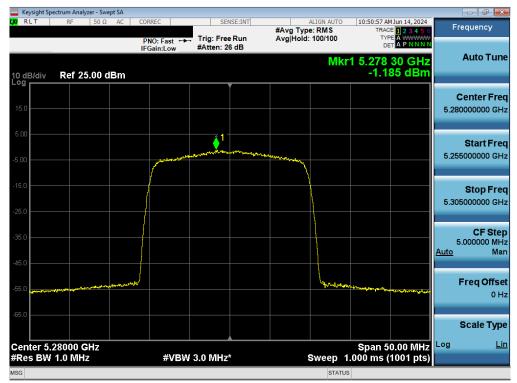
Plot 7-94. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11ax - 996 Tones (UNII Band 1) - Ch. 42)



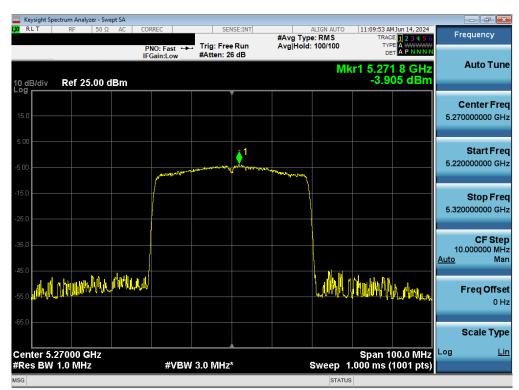
Plot 7-95. Power Spectral Density Plot MIMO ANT1 (160MHz BW 802.11ax - 2x996 Tones (UNII Band 1/2A) - Ch. 50)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager
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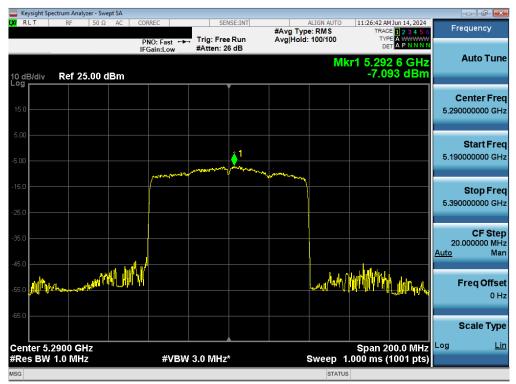
Plot 7-96. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11ax - 242 Tones (UNII Band 2A) - Ch. 56)



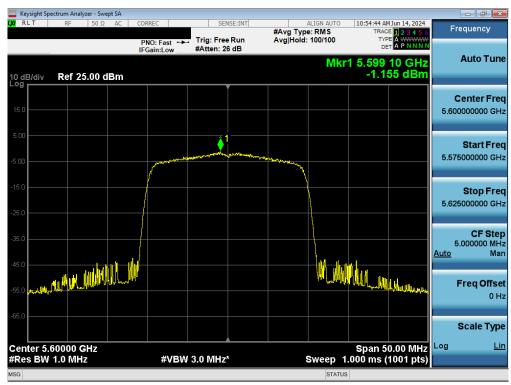
Plot 7-97. Power Spectral Density Plot MIMO ANT1 (40MHz BW 802.11ax - 484 Tones (UNII Band 2A) - Ch. 54)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager
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Plot 7-98. Power Spectral Density Plot MIMO ANT1 (80MHz BW 802.11ax - 996 Tones (UNII Band 2A) - Ch. 58)



Plot 7-99. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11ax - 242 Tones (UNII Band 2C) - Ch. 120)

FCC ID: A3LSMX820	MEASUREMENT REPORT		Approved by: Technical Manager
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