

ELEMENT SUWON

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MEASUREMENT REPORT FCC Part 15.407 802.11be WiFi 6GHz (OFDMA)

Applicant Name:

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

Date of Testing: 12/15/2023 - 1/11/2024 **Test Report Issue Date:** 1/18/2024 **Test Site/Location:** Element lab., Gyeonggi-do, South Korea **Test Report Serial No.:** 1M2312180128-07.A3L

A3LSMX910

649E-SMX910

APPLICANT:

FCC ID:

IC:

Samsung Electronics Co., Ltd.

Application Type:	Class II Permissive Change
Model/HVIN:	SM-X910
EUT Type:	Portable Tablet
Frequency Range:	5935 – 7115MHz
Modulation Type:	OFDMA
FCC Classification:	15E 6GHz Low Power Dual Client (6CD)
FCC Rule Part(s):	Part 15 Subpart E (15.407)
ISED Specification:	RSS-248 Issue 2
Test Procedure(s):	ANSI C63.10-2013, KDB 987594 D02 v01r01,
Class II Permissive Change:	Enabling WiFi 7 functionality via software
Original Grant Date:	06/08/2023

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013. Test results reported herein relate only to the item(s) tested.

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

Prepared by

Reviewed by

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Channel			Тх	MIMO	
Bandwidth [MHz]	IEEE Mode	UNII Band	Frequency [MHz]	Max. Power [mW]	Max. Power [dBm]
	802.11be	5	5935 - 6415	15.00	11.76
20	802.11be	6	6435 - 6515	13.52	11.31
20	802.11be	7	6535 - 6875	13.55	11.32
	802.11be	8	6895 - 7115	10.99	10.41
	802.11be	5	6025 - 6345	45.60	16.59
160	802.11be	6	6505	41.40	16.17
160	802.11be	7	6665 - 6825	45.71	16.60
	802.11be	8	6985	43.05	16.34
	802.11be	5	6105 - 6265	46.88	16.71
220	802.11be	6	6425	46.77	16.70
320	802.11be	7	6585 - 6745	47.64	16.78
	802.11be	8	6905	49.43	16.94

MEASUREMENT REPORT

EUT Overview – Conducted Power

Note:

The powers in the table above are maximum conducted powers. The maximum EIRP's are determined from the relevant tables in Section 7.3 of this report.

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1 INTRODUCTION

1.1 Scope

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

1.2 Element Test Location

These measurement tests were conducted at the Element Suwon Laboratory located at 13, Heungdeok 1-ro, Giheung-gu, Yongin-si, Gyeonggi-do, 16954, South Korea. 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 Materials Technology Suwon, Ltd. located in Yongin-si, Gyeonggi-do, 16954, South Korea.

- Element Materials Technology Suwon, Ltd. is an ISO 17025-2017 accredited test facility under the American Association for Laboratory Accreditation(A2LA) with Certificate number 2041.04 for Specific Absorption Rate (SAR), and Electromagnetic Compatibility (EMC) & Telecommunications testing for FCC and Innovation, Science, and Economic Development Canada rules.
- Element Materials Technology Suwon, Ltd. facility is accredited, designated, and recognized in accordance with the provision of Radio Wave Act and International Standard ISO/IEC 17025:2017 under the National Radio Research Agency.
 - Designation Number / CABID: KR0169
 - Test Firm Registration Number of FCC: 417945
 - Test Firm Registration Number of ISED: 26168

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PRODUCT INFORMATION

2.1 **Equipment Description**

The Equipment Under Test (EUT) is the Samsung Electronics Co., Ltd. Portable Tablet FCC: A3LSMX910, IC: 649E-SMX910. The test data contained in this report pertains only to the emissions due to the EUT's UNII transmitter while operating in the 6GHz band.

Test Device Serial No.: 0150M, 4628G, 3657M

2.2 Device Capabilities

This device contains the following capabilities:

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

Band 5		Band 6		Band 7		Band 8
Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
5935	97	6435	117	6535	189	6895
:	:	:	:	:	:	:
6175	105	6475	149	6695	209	6995
:	:	:	:	:	:	:
6415	113	6515	185	6875	233	7115
	Frequency (MHz) 5935 : 6175 :	Frequency (MHz) Ch. 5935 97 : : 6175 105 : :	Frequency (MHz) Ch. Frequency (MHz) 5935 97 6435 : : : : 6175 105 6475 : : : :	Frequency (MHz) Ch. Frequency (MHz) Ch. 5935 97 6435 117 : : : : 117 : 105 6475 149 : : : : :	Frequency (MHz) Ch. Frequency (MHz) Ch. Frequency (MHz) 5935 97 6435 117 6535 : : : : 117 6535 : 105 6475 149 6695 : : : : :	Frequency (MHz) Ch. State Ch. State Ch. Frequency (MHz) Ch. State State Ch. State State <th< td=""></th<>

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

	Band 5		Band 6		Band 7		Band 8
Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
3	5965	99	6445	123	6565	187	6885
:	:	:	:	:	:		:
43	6165	107	6485	155	6725	211	7005
:	:	:	:	:	:		:
91	6405	115	6525	179	6845	227	7085
	Table	2 2 902 1	1ax/ba (40MUz B		cy / Channel One	rations	

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

Band 5
Frequency (MHz)

5985

:

6145

:

6385

Ch.

7

39

:

87

Band 6

Frequency (MHz)

6465

Ch.

103

183

Band 7							
Ch.	Frequency (MHz)						
119	6545						
:	•						
151	6705						
:							

6865

Band 8							
Ch.	Frequency (MHz)						
199	6945						
:							
215	7025						

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

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

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

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

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

Notes:

 6GHz NII operation is possible in 20MHz, 40MHz, 80MHz, 160MHz, and 320MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = peak per the guidance of Section B)2)b) of ANSI C63.10-2013. The RBW and VBW were both greater than 50/T, where T is the minimum transmission duration, and the number of sweep points across T was greater than 100. The duty cycles are as follows:

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		-		МІМО	(1+2)		
Band	Bandwidth	Tone Type	Tone Size	Duty Cycle [%]	Radiated DCCF [dB]		
	201411-	MRU	52+26T	99.05	N/A		
	20MHz	MRU	106+26T	99.40	N/A		
	40MHz	MRU	52+26T	99.28	N/A		
	401/01/12	WRU	106+26T	99.21	N/A		
			52+26T	98.94	N/A		
	80MHz	MRU	106+26T	99.16	N/A		
			484+242T	99.34	N/A		
			52+26T	99.32	N/A		
			106+26T	99.24	N/A		
	160MHz	MRU	484+242T	99.31	N/A		
			996+484T	99.23	N/A		
			966+484+242T	99.62	N/A		
			26T	98.11	N/A		
6GHz			52T	98.70	N/A		
00112		RU	106T	99.32	N/A		
			242T	99.22	N/A		
		RU	484T	99.26	N/A		
			996T	99.19	N/A		
			2x996T	99.16	N/A		
	320MHz		4x996T	98.03	N/A		
	SZUWIFIZ		52+26T	99.28	N/A		
			106+26T	99.08	N/A		
			484+242T	98.97	N/A		
		MRU	996+484T	98.90	N/A		
		WINU	966+484+242T	99.58	N/A		
			2x996+484T	99.20	N/A		
			3x996T	99.04	N/A		
			3x996+484T	98.91	N/A		

Table 2-6. Measured Duty Cycles

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

	Configurations	SIS	SO	C	DD	SDM		
VIFIC	Configurations	ANT1	ANT2	ANT1	ANT2	ANT1	ANT2	
	11ax	✓	✓	\checkmark	✓	✓	✓	
	11be	✓	✓	\checkmark	✓	✓	\checkmark	

Table 2-7. Frequency / Channel Operations

 \checkmark = Support; \times = 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 I	ndex	Spatial										OFD	MA (802.11	lax/be)										OFE	MA (802.1	1be)
		Stream		26T			52T			106T			242T			484T			996T			2x996T			4x996T	
HE	EHT		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	0.8µs GI	1.6µs GI	3.2µs GI
0	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	144.1	136.1	122.5
1	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	288.2	272.2	245
2	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	432.4	408.3	367.5
3	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	576.5	544.4	490
4	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	864.7	816.7	735
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	1152.9	1088.9	980
6	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	1297.1	1225	1102.5
7	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	1441.2	1361.1	1225
8	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	1729.4	1633.3	1470
9	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	1921.6	1814.8	1633.3
10	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	2161.8	2041.7	1837.5
11	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	2402	2268.5	2041.7
	12	1	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	2594.1	2450	2205
	13	1	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	2882.4	2722.2	2450
0	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	288.2	272.2	245
1	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	576.5	544.4	490
2	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	864.7	816.7	735
3	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	1152.9	1088.9	980
4	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	1729.4	1633.3	1470
5	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	2305.9	2177.8	1960
6	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	2594.1	2450	2205
7	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	2882.4	2722.2	2450
8	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	3458.8	3266.7	2940
9	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	3843.1	3629.6	3266.7
10	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	4323.5	4083.3	3675
11	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	4803.9	4537	4083.3
	12	2	31.8	30	27	63.5	60	54	135	127.5	114.8	309.7	292.5	263.3	619.4	585	526.5	1297.1	1225	1102.5	2594.1	2450	2205	5188.2	4900	4410
	13	2	35.3	33.3	30	70.6	66.7	60	150	141.7	127.5	344.1	325	292.5	688.2	650	585	1441.2	1361.1	1225	2882.4	2722.2	2450	5764.7	5444.4	4900

Table 2-8. Supported Data Rates

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

UNII Band	Standard Power (SP)	Low Power Indoor (LPI)
UNII 5	~	\checkmark
UNII 6	Х	✓
UNII 7	\checkmark	✓
UNII 8	Х	✓

Table 2-9. Power Operation

✓ = Support; × = NOT Support

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2.3 Antenna Description

The following antenna gains were used for the testing.

Frequency (MHz)	Ant1 Peak Gain [dBi]	Ant2 Peak Gain [dBi]	Directional Gain [dBi]
5915	-6.89	-7.84	-4.34
6015	-6.14	-8.42	-4.20
6115	-6.17	-7.98	-4.02
6215	-5.99	-8.27	-4.05
6315	-7.21	-9.47	-5.26
6350	-7.45	-9.9	-5.58
6415	-8.71	-11.1	-6.81
6515	-9.73	-11.8	-7.69
6615	-10.6	-12.5	-8.49
6700	-9.74	-12.75	-8.10
6715	-9.9	-12.5	-8.09
6815	-9.96	-12.5	-8.13
6915	-9.92	-11.7	-7.75
7015	-9.82	-11.8	-7.74
7100	-10.26	-12.29	-8.21
7125	-10.1	-13.2	-8.50

 Table 2-10 Antenna Peak Gain per Frequency

2.4 Test Configuration

ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing. See Sections 3.2 for radiated emissions test setups, and 7.2, 7.3, 7.4, 7.5 and 7.6 for antenna port conducted emissions test setups.

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

2.5 Software and Firmware

The test was conducted with firmware version X910XXU1BWL3 installed on the EUT.

2.6 EMI Suppression Device(s) / Modifications

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

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3 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

The measurement procedures described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) and the guidance provided in KDB 987594 D02 v01r01 were used in the measurement of the EUT.

Deviation from measurement procedure......None

3.2 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 ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

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

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

Conclusion:

The EUT complies with the requirement of §15.203.

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5 MEASUREMENT UNCERTAINTY

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

Contribution	Expanded Uncertainty (±dB)
Contention Based Protocol Conducted Measurements	0.86
Conducted Bench Top Measurements	1.95
Line Conducted Disturbance	3.09
Radiated Disturbance (<1GHz)	4.10
Radiated Disturbance (>1GHz)	4.82
Radiated Disturbance (>18GHz)	4.96

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6 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
Agilent	N9030A	PXA Signal Analyzer	7/6/2023	Annual	7/3/2024	MY49432391
Antritsu	S820E	Cable and Antenna Analyzer	7/4/2023	Annual	7/3/2024	1839097
Antritsu	TOSLKF50A-40	Calibration Kit	N/A	-	N/A	1825024
Com-Power	AL-130R	Active Loop Antenna	10/21/2022	Biennial	10/20/2024	10160045
Fairview Microwave	FM2CP1122-10	Coupler	7/4/2023	Annual	7/3/2024	1946
Keysight Technologies	N9030B	PXA Signal Analyzer	4/6/2023	Annual	4/5/2024	MY57142018
Mini-Circuits	BW-N10W5+	Attenuator	4/6/2023	Annual	4/5/2024	TEMPNO.01-151
Rohde & Schwarz	TS-PR18	Preamplifier	7/6/2023	Annual	7/5/2024	102141
Rohde & Schwarz	TS-PR1840	Preamplifier	7/6/2023	Annual	7/5/2024	100049
Rohde & Schwarz	ENV216	Two-Line V-Network	4/7/2023	Annual	4/6/2024	101319
Rohde & Schwarz	ESW43	EMI TEST Receiver	7/5/2023	Annual	7/4/2024	101761
Rohde & Schwarz	TS-SFUNIT-Rx	Shielded Filter Unit	1/13/2023	Annual	1/12/2024	102151
Schwarzbeck	VULB9162	Broadband TRILOG Antenna	6/1/2023	Biennial	5/31/2025	9162-217
Sunol Sciences	DRH-118	Horn Antenna	1/26/2023	Biennial	1/25/2025	A102416-1
TESTEK	-	LISN Extension Cord	4/7/2023	Annual	4/6/2024	N/A

Table 6-1. Annual Test Equipment Calibration Schedule

Note:

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

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7 TEST RESULTS

7.1 Summary

Company Name:Samsung Electronics CO., Ltd.FCC ID:A3LSMX910IC:649E-SMX910FCC Classification:15E 6GHz Low Power Dual Client (6CD)

FCC Part Section(s)	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1046, 15.407(a)(11)	RSS-Gen [6.12]	Maximum Conducted Output Power	N/A		PASS	Section 7.3
15.407(a)(8), 15.407(a)(7)	RSS-248 [4.5.3]	Maximum Radiated Output Power	< 24dBm over the frequency band of operation <30dBm over the frequency band of operation when connecting to a standard power access point		PASS	Section 7.3
2.1049, 15.407(a)(10)	RSS-Gen [6.7], RSS-248 [4.4]	Occupied Bandwidth/ 26dB Bandwidth	99% of the occupied bandwidth of any channel must be contained within each of its respective U-NII sub bands The maximum transmitter channel bandwidth for U-NII devices in the 5.925-7.125 GHz band is 320 megahertz.	CONDUCTED	PASS	Section 7.2
15.407(a)(8), 15.407(a)(7)	RSS-248 [4.5.3]	Maximum Power Spectral Density	 < -1dBm/MHz e.i.r.p. <17dBm/MHz when operating with a standard power access point 		PASS	Section 7.4
15.407(b)(7)	RSS-248 [4.6.2]	In-Band Emissions	EUT must meet the limits detailed in 15.407(b)(6)		PASS	Section 7.5
15.407(d)(6)	RSS-248 [4.7]	Contention Based Protocol	EUT must detect AWGN signal with 90% (or better) certainty		PASS	Section 7.6
15.407(b)(6)	RSS-248 [4.6.2]	Undesirable Emissions	< -27dBm/MHz e.i.r.p. outside of the 5.925 – 7.125GHz band		PASS	Section 7.7
15.205, 15.209	RSS-Gen [8.9]	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	RADIATED	PASS	Section 7.7

Table 7-1. Summary of Test Results

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Notes:

- 1) All channels, modes, and modulations/data rates were investigated among all UNII bands. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is Element "UNII Automation," Version 4.7.
- 5) For radiated band edge, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is Element "Chamber Automation," Version 1.3.1.
- 6) Per 15.407(a)(7), a device operating under the control of a standard power access point in 5.925-6.425 GHz and 6.525-6.875 GHz bands must not have the maximum power spectral density exceed 17 dBm/MHz e.i.r.p., must limit the maximum e.i.r.p. over the frequency band of operation not exceed 30 dBm, and must limit its power to no more than 6 dB below its associated standard power access point's authorized transmit power. Compliance to this clause is addressed via submission of an attestation following Appendix B of KDB 987594 D01 v01r03.
- 802.11ax/be OFDMA testing was performed for all signal tone configurations as specified by the 802.11ax standard. Worst case results are determined and reported per the guidance provided at the October 2018 TCB Workshop.
- 8) Only one RU index could be selected at a time, so no contiguous or non-contiguous RUs were considered for testing.

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7.2 26dB Bandwidth Measurement

Test Overview and Limit

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

Test Procedure Used

ANSI C63.10-2013 - Section 12.4

Test Settings

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

Test Setup

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



Figure 7-1. Test Instrument & Measurement Setup

Test Notes

All cases were investigated; a subset of the taken plots were included to represent relevant settings and measurements.

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		Fraguancy		802.11	Antenna-1	Antenna-2	Antenna-1	Antenna-2
			Channel	MODE	26dB Bandwidth	6dB Bandwidth	Occupied	Occupied
		[MHz]		MODE	[MHz]	[MHz]	Bandwidth [MHz]	Bandwidth [MHz]
D	Band 5	6105	31	be (320MHz)*	334.00	332.60	314.59	314.91
E	ballu 5	6265	63	be (320MHz)*	332.90	333.10	314.20	315.44
Bar	nd 5/6/7	6425	95	be (320MHz)*	332.10	333.00	313.87	314.45
Ba	and 6/7	6585	127	be (320MHz)*	333.90	333.20	315.39	314.25
Ba	and 7/8	6745	159	be (320MHz)*	333.00	330.30	315.33	313.03
Ba	and 7/8	6905	191	be (320MHz)*	333.10	330.60	315.02	314.36

Table 7-2. 26dB Bandwidth Measurements – Full Tones

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

Keysight Spectrum Analyzer - Occupied B 06:11:06 AM Jan 03, 2024 RI ALIGN AUTO Trace/Detector Center Freq: 6.105000000 GHz Trig: Free Run Avg|Hold: 100/100 #Atten: 30 dB Center Freq 6.105000000 GHz Radio Std: None Radio Device: BTS #IFGain:Low Ref 30.00 dBm 10 dB/div og **Clear Write** humber Average unh. Max Hold Center 6.1050 GHz #Res BW 4 MHz Span 800.0 MHz Sweep 1.333 ms VBW 50 MHz **Min Hold Occupied Bandwidth Total Power** 23.3 dBm 314.59 MHz Detector Peak▶ <u>Man</u> 644.73 kHz % of OBW Power Auto **Transmit Freq Error** 99.00 % -26.00 dB x dB Bandwidth 334.0 MHz x dB STATUS

Plot 7-1. Occupied Bandwidth Plot MIMO ANT1 (320MHz BW 802.11be (Full Tones) (UNII Band 5) - Ch. 31)

Keysight Spectrum Analyzer - Occupied BW						- F <mark>-</mark>
Center Freq 6.265000000 G	tite trig:	SENSE:INT er Freq: 6.265000000 GH Free Run Avg H en: 30 dB	ALIGN AUTO Iz Iold: 100/100	Radio Std: Radio Devi		Trace/Detector
10 dB/div Ref 30.00 dBm						
10.0	مراجعهم المراجع	for the for the second second				Clear Write
20.0						Averaq
-30.0 Augustus Jacoperadilational automatica,			human	ender and and an and an	Bethsodor Illian	
50.0						Max Hol
Center 6.2650 GHz #Res BW 4 MHz		VBW 50 MHz			00.0 MHz 1.333 ms	Min Hol
Occupied Bandwidth		Total Power	22.4	4 dBm		
314	.20 MHz					Detecto Peak
Transmit Freq Error	625.33 kHz	% of OBW Po	ower 99	9.00 %		Auto <u>Ma</u>
x dB Bandwidth	332.9 MHz	x dB	-26.	.00 dB		
SG			STATU	s		

Plot 7-2. Occupied Bandwidth Plot MIMO ANT1 (320MHz BW 802.11be (Full Tones) (UNII Band 5) - Ch. 63)

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MIMO Antenna-1 Bandwidth Measurements - (Full Tones) - (UNII Band 5/6)



Plot 7-3. Occupied Bandwidth Plot MIMO ANT1 (320MHz BW 802.11ax/be (26 Tones) (UNII Band 5/6/7) - Ch. 95)

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	
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MIMO Antenna-1 Bandwidth Measurements - (Full Tones) - (UNII Band 6/7)



Plot 7-4. Occupied Bandwidth Plot MIMO ANT1 (320MHz BW 802.11ax/be (Full Tones) (UNII Band 6/7) – Ch. 127)

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MIMO Antenna-1 Bandwidth Measurements - (Full Tones) - (UNII Band 7/8)

Keysight Sp zer - Occu 06:14:39 AM Jan 03, 2024 RI ALIGN AUTO Trace/Detector Center Freq 6.745000000 GHz Center Freq: 6.745000000 GHz Trig: Free Run Avg|Hold: 100/100 Radio Std: None #Atten: 30 dB Radio Device: BTS #IFGain:Low Ref 30.00 dBm l0 dB/div og **Clear Write** بالتقويلين محمد بالمسمع ومعريدان alada Average howwork Max Hold Center 6.7450 GHz #Res BW 4 MHz Span 800.0 MHz Sweep 1.333 ms VBW 50 MHz Min Hold **Occupied Bandwidth** Total Power 23.3 dBm 315.33 MHz Detector Peak▶ <u>Man</u> 100.00 kHz Auto **Transmit Freq Error** % of OBW Power 99.00 % x dB Bandwidth 333.0 MHz x dB -26.00 dB STATUS

Plot 7-5. Occupied Bandwidth Plot MIMO ANT1 (320MHz BW 802.11be (Full Tones) (UNII Band 8) - Ch. 159)

Keysight Spectrum Analyzer - Occupied						-0	- F
Center Freq 6.90500000	CORREC Cen	SENSE:INT ter Freq: 6.905000000 GH	ALIGN AUTO	06:09:41 AM Radio Std:		Trace/D	etector
Center Freq 0.30300000	trig		old: 100/100	Radio Devid	DTC		
	#IFGain:Low #Au	en. 30 dB		Radio Devid	ae. B13		
	100						
10 dB/div Ref 30.00 dE							
20.0						Cla	ar Write
10.0						Cie	
0.00	Mary Manus and a start of the	may manager and the	~~~				
-10.0	 						
-20.0						1	Average
-30.0	h. v. yl		hyphistophian and	hadhad	wearanteend		
-40.0							
-50.0						N	lax Hold
-60.0							
Center 6.9050 GHz				Snan 90	0.0 MHz		
#Res BW 4 MHz		VBW 50 MHz		Sweep 1		n	/lin Hold
							AITHOR
Occupied Bandwic	lth	Total Power	21.7	dBm			
3	15.02 MHz					I	Detector
Transmit Freq Error	436.65 kHz	% of OBW Po		.00 %		Auto	Peak≢ Mar
						, alo	mai
x dB Bandwidth	333.1 MHz	x dB	-26.0)0 dB			
MSG			STATUS				

Plot 7-6. Occupied Bandwidth Plot MIMO ANT1 (320MHz BW 802.11be (Full Tones) (UNII Band 7/8) - Ch. 191)

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7.2.2 MIMO Antenna-2 Bandwidth Measurements - (Full Tones)

Keysight Spectrum Analyzer - Occupied B 05:32:31 AM Jan 03, 2024 RI ALIGN AUTO Trace/Detector Center Freq: 6.105080000 GHz Trig: Free Run Avg|Hold: 100/100 #Atten: 30 dB Center Freq 6.105080000 GHz Radio Std: None Radio Device: BTS #IFGain:Low Ref 30.00 dBm 10 dB/div og **Clear Write** Average Max Hold Center 6.1051 GHz #Res BW 4 MHz Span 800.0 MHz Sweep 1.333 ms VBW 50 MHz **Min Hold Occupied Bandwidth Total Power** 21.9 dBm 314.91 MHz Detector Peak▶ <u>Man</u> -231.03 kHz % of OBW Power Auto **Transmit Freq Error** 99.00 % 332.6 MHz -26.00 dB x dB Bandwidth x dB STATUS

Plot 7-7. Occupied Bandwidth Plot MIMO ANT2 (320MHz BW 802.11be (Full Tones) (UNII Band 5) - Ch. 31)

Keysight Spectrum Analyzer - Occupied BW							- P
Center Freq 6.265000000 G	Z Center		ALIGN AUTO	Radio Dev		Trace/D	etector
#II	-Gain:Low #Atten.			Radio Dev	ice. DT3		
0 dB/div Ref 30.00 dBm							
og 20.0							
0.0		million and marked				Cle	ear Wri
.00	And the adjust of the second second		~ <u> </u>				
0.0			-t				Avera
0.0 mound month when the marked grower of			himstern	morenal	and a street of the second		Avera
3.0							
			_			N	lax Ho
0.0							
enter 6.2650 GHz					00.0 MHz		
Res BW 4 MHz	VI	BW 50 MHz		Sweep	1.333 ms	ſ	Min Ho
Occupied Bandwidth		Total Power	23.5	5 dBm			
315	.44 MHz						Detect
Transmit Freq Error	147.19 kHz	% of OBW Po	wer 90	.00 %		Auto	Pea M
x dB Bandwidth	333.1 MHz	x dB		00 dB			_
	000.1 11112	A GB	-20.	oo ab			
G			STATUS	3			

Plot 7-8. Occupied Bandwidth Plot MIMO ANT2 (320MHz BW 802.11be (Full Tones) (UNII Band 5) - Ch. 63)

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MIMO Antenna-2 Bandwidth Measurements - (Full Tones) - (UNII Band 5/6)



Plot 7-9. Occupied Bandwidth Plot MIMO ANT2 (320MHz BW 802.11be (26 Tones) (UNII Band 5/6/7) – Ch. 95)

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MIMO Antenna-2 Bandwidth Measurements - (Full Tones) - (UNII Band 6/7)



Plot 7-10. Occupied Bandwidth Plot MIMO ANT2 (320MHz BW 802.11be (Full Tones) (UNII Band 6/7) – Ch. 127)

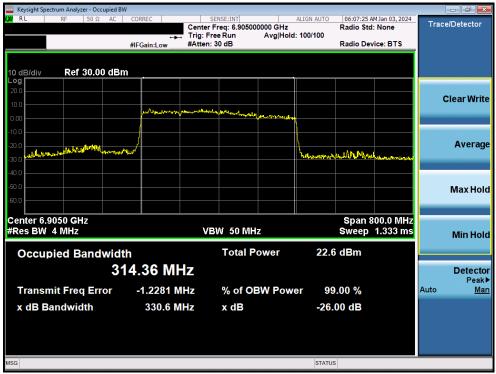
FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
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MIMO Antenna-2 Bandwidth Measurements - (Full Tones) - (UNII Band 7/8)

Keysight Spe ctrum Analyzer - Occu 05:37:59 AM Jan 03, 2024 RI ALIGN AUTO Trace/Detector Center Freq: 6.745000000 GHz Trig: Free Run Avg|Ho Radio Std: None Center Freq 6.745000000 GHz Avg|Hold: 100/100 Radio Device: BTS #IFGain:Low #Atten: 30 dB Ref 30.00 dBm l0 dB/div og **Clear Write** Average a k de Max Hold Center 6.7450 GHz #Res BW 4 MHz Span 800.0 MHz Sweep 1.333 ms VBW 50 MHz Min Hold Occupied Bandwidth Total Power 23.0 dBm 313.03 MHz Detector Peak) -1.1667 MHz 99.00 % Auto Man % of OBW Power **Transmit Freq Error** x dB Bandwidth 330.3 MHz x dB -26.00 dB ISG 🧼 Already in Single, press Restart to initiate a new sweep or sequence STATUS

Plot 7-11. Occupied Bandwidth Plot MIMO ANT2 (320MHz BW 802.11be (Full Tones) (UNII Band 8) - Ch. 159)



Plot 7-12. Occupied Bandwidth Plot MIMO ANT2 (320MHz BW 802.11be (Full Tones) (UNII Band 7/8) - Ch. 191)

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
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7.3 UNII Output Power Measurement

Test Overview and Limits

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

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

Test Procedure Used

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

Test Settings

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

Test Setup

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



Figure 7-2. Test Instrument & Measurement Setup

Test Notes

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

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MIMO Maximum Conducted Output Power Measurements

N		Band	Freq [MHz]	Channel	Tones	71		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				
Ξ		-	5935	2	52+26T	3.98	4.24	7.12	-4.34	2.8	24.0	-21.22
2	2	5	6175	45	52+26T	6.26	6.61	9.45	-4.05	5.4	24.0	-18.60
2	3	6	6475	105	52+26T	5.28	7.23	9.37	-7.69	1.7	24.0	-22.32
		7	6695	149	52+26T	5.51	6.56	9.08	-8.10	1.0	24.0	-23.02
		8	6995	209	52+26T	5.74	5.21	8.49	-7.74	0.8	24.0	-23.25

Table 7-3. MIMO BW 802.11be (UNII) Maximum Conducted Output Power - 52+26T

							Average Conduc							
2	Band	Freq [MHz]	Channel	Tones			RU I	ndex			Dir. Ant. Gain	Max e.i.r.p	e.i.r.p Limit	e.i.r.p Margin
Ξ.					ANT1	82 ANT2	MIMO	ANT1	83 ANT2	MIMO	[dBi]	[dBm]	[dBm]	[dB]
N														
1	-	5935	2	106+26T	5.58	5.71	8.66	5.64	5.82	8.74	-4.34	4.4	24.0	-19.60
\geq	5	6175	45	106+26T	8.45	8.85	11.66	8.56	8.94	11.76	-4.05	7.7	24.0	-16.29
5	6	6475	105	106+26T	7.26	9.13	11.31	7.16	9.15	11.28	-7.69	3.6	24.0	-20.38
	7	6695	149	106+26T	7.63	8.89	11.32	7.58	8.92	11.31	-8.10	3.2	24.0	-20.78
	8	7115	233	106+26T	7.72	7.02	10.39	7.65	7.13	10.41	-8.50	1.9	24.0	-22.09

Table 7-4. MIMO BW 802.11be (UNII) Maximum Conducted Output Power – 106+26T

_						Average Conducted Power (dBm)								
B	Band	Freg [MHz]	Channel	Tones		MRU Index					Dir. Ant. Gain	Max e.i.r.p	e.i.r.p Limit	e.i.r.p Margin
N						94 95					[dBi]	[dBm]	[dBm]	[dB]
二日二日					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO]			
. ≥	5	6025	15	996+484T	13.41	13.75	16.59	13.38	13.73	16.57	-4.20	12.4	24.0	-11.61
99	6	6505	111	996+484T	13.87	12.31	16.17	13.68	12.28	16.05	-7.69	8.5	24.0	-15.52
-	7	6665	143	996+484T	13.26	13.89	16.60	13.24	13.84	16.56	-8.10	8.5	24.0	-15.50
	8	6985	207	996+484T	13.78	12.82	16.34	13.75	12.79	16.31	-8.10	8.2	24.0	-15.76

Table 7-5. MIMO BW 802.11be (UNII) Maximum Conducted Output Power – 996+484T

Band	Freq [MHz]	Channel	Tones	69		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				
_	6105	31	4x996T	13.94	12.65	16.35	-4.02	12.3	24.0	-11.67
5	6265	63	4x996T	13.41	13.23	16.33	-4.05	12.3	24.0	-11.72
6	6425	95	4x996T	13.11	13.53	16.34	-6.81	9.5	24.0	-14.47
7	6585	127	4x996T	13.47	13.63	16.56	-8.49	8.1	24.0	-15.93
· [6745	159	4x996T	13.73	13.45	16.60	-8.09	8.5	24.0	-15.49
8	6905	191	4x996T	12.63	13.61	16.16	-7.75	8.4	24.0	-15.59
B	and 5 6 7 8	6105 6265 6 6425 7 6585 7 6745 7 6745 7 6745 7	6105 31 5 6265 63 6 6425 95 7 6685 127 6745 159	6105 31 4x996T 6 6425 95 4x996T 7 6585 127 4x996T	6105 31 4x996T 13.94 5 6265 63 4x996T 13.41 6 6425 95 4x996T 13.41 7 6585 127 4x996T 13.47 6745 159 4x996T 13.73 8 6905 191 4x996T 12.63	And Freq[MHz] Channel Tones 69 5 6105 31 4x996T 13.94 12.65 6 6425 63 4x996T 13.41 13.23 6 6425 95 4x996T 13.11 13.53 7 6585 127 4x996T 13.47 13.63 6 6745 159 4x996T 13.73 13.45	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	$ \begin{array}{c c c c c c c c c c c c c c c c c c c $	And Freq (MHz) Channel Tones 69 [dBi] [dBm] 5 6105 31 4x996T 13.94 12.65 16.35 -4.02 12.3 6 6255 63 4x996T 13.41 13.23 16.33 -4.05 12.3 6 6425 95 4x996T 13.11 13.53 16.34 -6.81 9.5 7 6585 127 4x996T 13.47 13.63 16.56 -8.49 8.1 7 6745 159 4x996T 13.73 13.45 16.60 -8.09 8.5 8 6905 191 4x996T 12.63 13.61 16.16 -7.75 8.4	And Freq (MHz) Channel Tones 69 [dBi] [dBm] <

Table 7-6. MIMO BW 802.11be (UNII) Maximum Conducted Output Power – 4x996T

×	_							ted Power (dBm) Index			Dir. Ant. Gain	Max e.i.r.p	e.i.r.p Limit	e.i.r.p Margin
8	Band	Freq [MHz]	Channel	Tones	105 11106				(dBi)	[dBm]	(dBm)	(dB)		
ΗZ					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO				
Σ	5	6105	31	3x996+484T	13.87	12.41	16.21	13.75	12.45	16.16	-4.02	12.2	24.0	-11.81
50	6	6425	95	3x996+484T	13.21	13.86	16.56	13.42	13.94	16.70	-6.81	9.9	24.0	-14.11
33	7	6745	159	3x996+484T	13.88	13.32	16.62	13.82	13.61	16.73	-8.09	8.6	24.0	-15.36
	8	6905	191	3x996+484T	13.94	13.74	16.85	13.87	13.98	16.94	-7.75	9.2	24.0	-14.81

Table 7-7. MIMO BW 802.11be (UNII) Maximum Conducted Output Power – 3x996+484T

M	Band	Freg [MHz]	Channel	Tones			Average Conduc MRU	ted Power (dBm) Index				e.i.r.p Limit	e.i.r.p Margin	
	Band	Freq[MHZ]	Channel	Tones		104 11104				[dBi]	[dBm]	[dBm]	[dB]	
Ŧ					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO				
Σ	5	6105	31	3x996T	13.95	12.72	16.39	13.82	12.94	16.41	-4.02	12.4	24.0	-11.61
ā	6	6425	95	3x996T	12.72	13.59	16.19	13.05	13.66	16.38	-6.81	9.6	24.0	-14.43
33	7	6745	159	3x996T	13.86	13.41	16.65	13.78	13.75	16.78	-8.09	8.7	24.0	-15.31
	8	6905	191	3x996T	13.49	13.53	16.52	13.43	13.74	16.60	-7.75	8.8	24.0	-15.15

Table 7-8. MIMO BW 802.11be (UNII) Maximum Conducted Output Power – 3x996T

					Average Conducted Power (dBm)									
×	Band	Freg [MHz]	Channel	T		MRU Index				Dir. Ant. Gain	Max e.i.r.p	e.i.r.p Limit	e.i.r.p Margin	
	Band	Freq[MHZ]	Channel	Tones		100 11103				(dBi)	[dBm]	[dBm]	[dB]	
Ŧ					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO				
Σ	5	6105	31	2x996+484T	13.95	13.43	16.71	13.93	13.24	16.61	-4.02	12.7	24.0	-11.31
50	6	6425	95	2x996+484T	13.56	13.75	16.67	13.51	13.72	16.63	-6.81	9.9	24.0	-14.14
33	7	6745	159	2x996+484T	13.87	13.67	16.78	13.84	13.38	16.63	-8.09	8.7	24.0	-15.31
	8	6905	191	2x996+484T	13.41	13.71	16.57	13.41	13.38	16.41	-7.75	8.8	24.0	-15.18

Table 7-9. MIMO BW 802.11be (UNII) Maximum Conducted Output Power – 2x996+484T

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Sample MIMO Calculation:

At 5935MHz in 802.11be (20MHz BW – 52+26 Tones) mode, the average conducted output power was measured to be 3.98 dBm for Antenna-1 and 4.24 dBm for Antenna-2.

Antenna 1 + Antenna 2 = MIMO

(3.98 dBm + 4.24 dBm) = (2.500 mW + 2.655 mW) = 4.155 mW = 7.12 dBm

Sample Directional Gain Calculation:

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

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

Sample e.i.r.p. Calculation:

At 5935MHz in 802.11ax (20MHz BW – 26 Tones) mode, the average MIMO conducted power was calculated to be 1.63 dBm with directional gain of -2.85 dBi.

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

7.12 dBm + -4.34 dBi = 2.78 dBm

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7.4 Maximum Power Spectral Density

Test Overview and Limit

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

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

Test Procedure Used

ANSI C63.10-2013 – Section 12.3.2.2 ANSI C63.10-2013 – Section 14.3.2.2 Measure-and-Sum Technique

Test Settings

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

Test Setup

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



Figure 7-3. Test Instrument & Measurement Setup

Test Notes

None.

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MIMO Power Spectral Density Measurements

6105 31 be(320MHz) 0.79 -1.56 -6.17 -7.98 2.78 -4.02 -1.24	-1 -0.24
Band 5 0105 51 05 (5200012) 0.75 11.50 0.17 7.50 2.76 4.02 11.24	-1 -0.24
6265 63 be(320MHz) -0.21 -0.08 -5.99 -8.27 2.87 -4.05 -1.18	-1 -0.18
Band 5/6/7 6425 95 be (320MHz) 0.16 0.85 -8.71 -11.10 3.53 -6.81 -3.28	-1 -2.28
Band 6/7 6585 127 be (320MHz) 0.80 0.07 -10.60 -12.50 3.46 -8.49 -5.02	-1 -4.02
Band 7/8 6745 159 be (320MHz) 0.26 0.70 -9.90 -12.50 3.49 -8.09 -4.60	-1 -3.60
Band 7/8 6905 191 be (320MHz) -0.11 1.95 -9.92 -11.70 4.05 -7.75 -3.70	-1 -2.70

Table 7-10. MIMO e.i.r.p. Conducted Power Spectral Density Measurements (26 Tones)

Freque [MH	Channel	802.11 MODE	Antenna-1 Power Density [dBm]	Antenna-2 Power Density [dBm]	Antenna-1 Gain [dBi]	Antenna-2 Gain [dBi]	Summed MIMO Power Density [dBm]	Directional Gain [dBi]	EIRP [dBm]	Max EIRP [dBm]	Margin [dB]
Band 5 610	31	be (320MHz)	-8.69	-9.87	-6.17	-7.98	-6.23	-4.02	-10.25	-1	-9.25
626	63	be (320MHz)	-9.11	-8.41	-5.99	-8.27	-5.74	-4.05	-9.78	-1	-8.78
Band 5/6/7 642	95	be (320MHz)	-8.92	-8.46	-8.71	-11.10	-5.67	-6.81	-12.48	-1	-11.48
Band 6/7 658	127	be (320MHz)	-9.22	-8.49	-10.60	-12.50	-5.83	-8.49	-14.32	-1	-13.32
Band 7/8 674	159	be (320MHz)	-9.15	-8.84	-9.90	-12.50	-5.99	-8.09	-14.08	-1	-13.08
Band 7/8 690	191	be (320MHz)	-10.31	-9.05	-9.92	-11.70	-6.62	-7.75	-14.38	-1	-13.38

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

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
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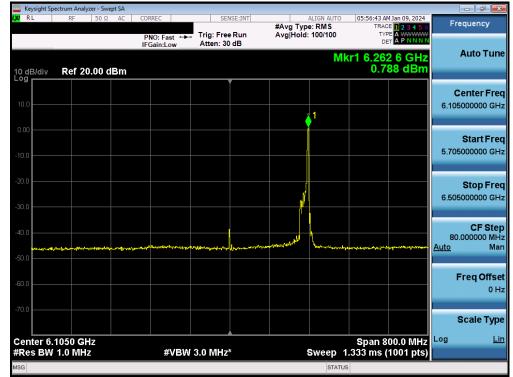


[Summed				
	Frequency		802.11	MRU	MRU	Antenna-1	Antenna-2	Antenna-1 Gain	Antenna- 2 Gain	MIMO	Directional Gain	EIRP	Max EIRP	Margin
	[MHz]	Channel	MODE	Cases	Index	Power Density [dBm]	Power Density [dBm]	[dBi]	[dBi]	Power Density	[dBi]	[dBm]	[dBm]	[dB]
						[dbm]	[dbm]			[dBm]				
	5935	2	be (20MHz)	52T+26T	71	-3.59	-4.69	-6.89	-7.84	-1.09	-4.34	-5.44	-1	-4.44
	5935	2	be (20MHz)	106T+26T	82	-3.38	-4.44	-6.89	-7.84	-0.86	-4.34	-5.20	-1	-4.20
	5935	2	be (20MHz)	106T+26T	83	-3.60	-4.51	-6.89	-7.84	-1.02	-4.34	-5.36	-1	-4.36
	6175	45	be (20MHz)	52T+26T	71	-0.18	-1.41	-5.99	-8.27	2.26	-4.05	-1.78	-1	-0.78
	6175	45	be (20MHz)	106T+26T	82	-0.58	-0.72	-5.99	-8.27	2.36	-4.05	-1.68	-1	-0.68
	6175	45	be (20MHz)	106T+26T	83	-0.18	-0.79	-5.99	-8.27	2.54	-4.05	-1.51	-1	-0.51
	5985	7	be (80MHz)	242T+484T	90	-1.33	-2.17	-6.14	-8.42	1.28	-4.20	-2.91	-1	-1.91
Band 5	5985	7	be (80MHz)	242T+484T	91	-1.35	-2.39	-6.14	-8.42	1.17	-4.20	-3.02	-1	-2.02
æ	6025	15	be (160MHz)	996T+484T	94	-6.68	-6.66	-6.14	-8.42	-3.66	-4.20	-7.85	-1	-6.85
	602.5	15	be (160MHz)	996T+484T	95	-6.37	-6.59	-6.14	-8.42	-3.47	-4.20	-7.66	-1	-6.66
	6105	31	be (320MHz)	2x996T+484T	00100	-7.43	-8.12	-6.17	-7.98	-4.75	-4.02	-8.77	-1	-7.77
	6105	31	be (320MHz)	3x996T	00104	-8.52	-9.68	-6.17	-7.98	-6.05	-4.02	- 10.07	-1	-9.07
	6105	31	be (320MHz)	3x996T+484T	00105	-9.12	-10.40	-6.17	-7.98	-6.70	-4.02	- 10.72	-1	-9.72
	6105	31	be (320MHz)	2x996T+484T	11103	-7.45	-8.25	-6.17	-7.98	-4.82	-4.02	-8.84	-1	-7.84
	6105	31	be (320MHz)	3x996T	11104	-8.08	-9.50	-6.17	-7.98	-5.72	-4.02	-9.74	-1	-8.74
	6105	31	be (320MHz)	3x996T+484T	11106	-8.83	-10.28	-6.17	-7.98	-6.49	-4.02	- 10.50	-1	-9.50
	6475	105	be (20MHz)	52T+26T	71	-1.61	-0.79	-9.73	-11.80	1.83	-7.69	-5.86	-1	-4.86
-	6475	105	be (20MHz)	106T+26T	82	-1.62	-0.93	-9.73	-11.80	1.75	-7.69	-5.95	-1	-4.95
9	6475	105	be (20MHz)	106T+26T	83	-1.77	-0.94	-9.73	-11.80	1.68	-7.69	-6.02	-1	-5.02
Band	6465	103	be (80MHz)	242T+484T	90	-2.56	-2.35	-8.71	-11.10	0.55	-6.81	-6.26	-1	-5.26
_	6465	103	be (80MHz)	242T+484T	91	-2.10	-2.30	-8.71	-11.10	0.81	-6.81	-6.00	-1	-5.00
-	6505	111	be (160MHz)	996T+484T	94	-6.64	-6.77	-9.73	-11.80	-3.70	-7.69	- 11. 39	-1	-10.39
	6505	111	be (160MHz)	996T+484T	95	-6.01	-6.76	-9.73	-11.80	-3.36	-7.69	-11.06	-1	-10.06 -9.96
	6425 6425	95 95	be (320MHz) be (320MHz)	2x996T+484T 3x996T	00100	-7.27	-7.05	-8.71	-11.10	-4.15	-6.81 -6.81	- 10.96	-1	-9.96
5/6/7	6425	95	be (320MHz)	3x996T+484T	00105	-8.31	-8.51	-8.71	-11.10	-5.40	-6.81	-12.00	-1	-11.00
- 2°	6425	95	be (320MHz)	2x996T+484T	11103	-6.96	-6.88	-8.71	-11.10	-3.91	-6.81	- 10.72	-1	-9.72
Band	6425	95	be (320MHz)	3x996T	11103	-8.64	-7.83	-8.71	-11.10	-5.21	-6.81	-12.02	-1	-11.02
-	6425	95	be (320MHz)	3x996T+484T	11104	-8.27	-8.03	-8.71	-11.10	-5.14	-6.81	-11.95	-1	-10.95
	6695	149	be (20MHz)	52T+26T	71	-1.41	-0.70	-9.74	-12.75	1.97	-8.10	-6.14	-1	-5.14
	6695	149	be (20MHz)	106T+26T	82	-1.20	-0.26	-9.74	-12.75	2.31	-8.10	-5.80	-1	-4.80
~	6695	149	be (20MHz)	106T+26T	83	-1.45	-0.70	-9.74	-12.75	1.95	-8.10	-6.15	-1	-5.15
Band 7	6705	151	be (80MHz)	242T+484T	90	-2.06	-1.84	-9.74	-12.75	1.06	-8.10	-7.04	-1	-6.04
8	6705	151	be (80MHz)	242T+484T	91	-1.80	-1.63	-9.74	-12.75	1.29	-8.10	-6.81	-1	-5.81
	6665	143	be (160MHz)	996T+484T	94	-6.06	-5.73	-9.74	-12.75	-2.88	-8.10	- 10.99	-1	-9.99
	6665	143	be (160MHz)	996T+484T	95	-6.14	-5.44	-9.74	-12.75	-2.76	-8.10	- 10.87	-1	-9.87
	6745	159	be (320MHz)	2x996T+484T	00100	-7.89	-6.83	-9.90	-12.50	-4.32	-8.09	-12.41	-1	-11.41
5	6745	159	be (320MHz)	3x996T	00104	-7.99	-7.25	-9.90	-12.50	-4.60	-8.09	-12.69	-1	-11.69
Band 6/7	6745	159	be (320MHz)	3x996T+484T	00105	-9.89	-7.99	-9.90	-12.50	-5.83	-8.09	- 13.92	-1	-12.92
ā.	6745	159	be (320MHz)	2x996T+484T	11103	-7.94	-6.92	-9.90	-12.50	-4.39	-8.09	- 12. 48	-1	-11.48
_	6745	159	be (320MHz)	3x996T	11104	-8.12	-7.57	-9.90	-12.50	-4.83	-8.09	- 12.92	-1	-11.92
	6745	159	be (320MHz)	3x996T+484T	11106	-9.74	-8.27	-9.90	-12.50	-5.93	-8.09	- 14.02	-1	-13.02
	6995 7115	209 233	be (20MHz) be (20MHz)	52T+26T 106T+26T	71 82	-1.37	-1.70	-9.82 -10.10	-11.80 -13.20	1.48	-7.74 -8.50	-6.26 -7.00	-1	-5.26 -6.00
	7115	233	be (20MHz)	106T+26T	82	-1.00	-2.08	-10.10	-13.20	1.50	-8.50	-7.00	-1	-6.00
8 purd 8	702.5	215	be (80MHz)	242T+484T	90	-1.12	-2.84	-9.82	-11.80	1.11	-7.74	-6.63	-1	-5.63
۳	7025	215	be (80MHz)	242T+484T	91	-1.54	-2.65	-9.82	-11.80	0.95	-7.74	-6.79	-1	-5.79
	6985	207	be (160MHz)	996T+484T	94	-5.57	-6.61	-9.82	-11.80	-3.04	-7.74	- 10.79	-1	-9.79
	6985 6905	207 191	be (160MHz) be (320MHz)	996T+484T 2x996T+484T	95 00100	-5.56	-5.50 -6.31	-9.82	-11.80 -11.70	-2.52	-7.74	- 10.27	-1	-9.27 -10.50
	6905	191	be (320MHz)	3x996T	00100	-7.25	-6.71	-9.92	-11.70	-3.74	-7.75	-11.50	-1	-10.50
17/8	6905	191	be (320MHz)	3x996T+484T	00105	-7.62	-6.44	-9.92	-11.70	-3.98	-7.75	-11.73	-1	-10.73
Page	6905	191	be (320MHz)	2x996T+484T	11103	-7.50	-6.22	-9.92	-11.70	-3.80	-7.75	-11.56	-1	-10.56
-	6905 6005	191 191	be (320MHz)	3x996T	11104	-7.92	-7.13	-9.92 -9.92	-11.70 -11.70	-4.50 -5.52	-7.75 -7.75	-12.25	-1	-11.25
	6905		be (320MHz)	3x996T+484T	11106						ements —	-13.27	-1	-12.27

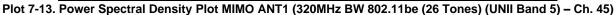
Table 7-12. MIMO e.i.r.p. Conducted Power Spectral Density Measurements – MRU

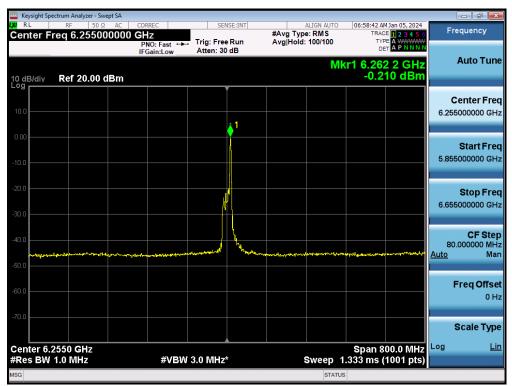
FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)			
Test Report S/N:	Test Dates:	EUT Type:	Daga 22 of 107		
1M2312180128-07.A3L	12/15/2023 - 1/11/2024	Portable Tablet	Page 32 of 107		
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7.4.1 MIMO Antenna-1 Power Spectral Measurements – (26 Tones)

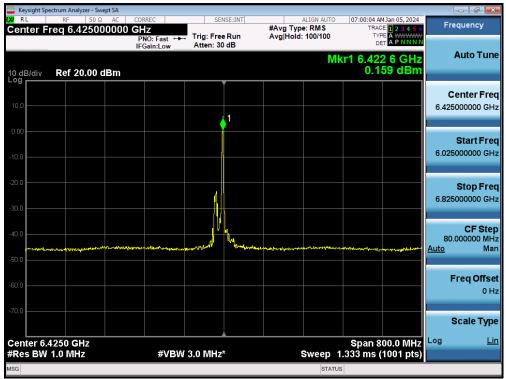




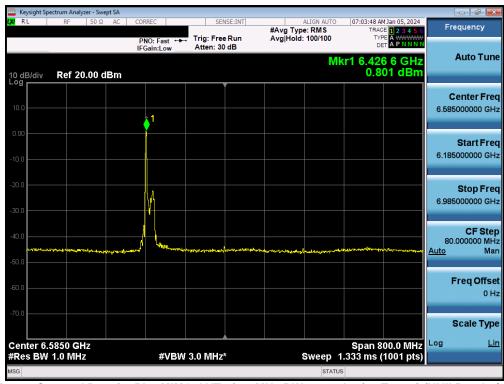
Plot 7-14. Power Spectral Density Plot MIMO ANT1 (320MHz BW 802.11be (26 Tones) (UNII Band 5) - Ch. 63)

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	
1M2312180128-07.A3L	12/15/2023 - 1/11/2024	Portable Tablet	Page 33 of 107
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Plot 7-15. Power Spectral Density Plot MIMO ANT1 (320MHz BW 802.11be (26 Tones) (UNII Band 5/6/7) - Ch. 95)



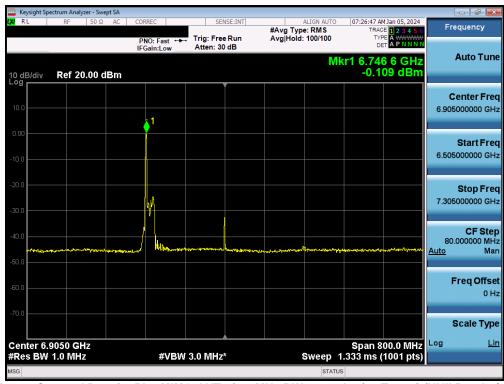
Plot 7-16. Power Spectral Density Plot MIMO ANT1 (320MHz BW 802.11be (26 Tones) (UNII Band 6/7) - Ch. 127)

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 24 of 107
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	ght Spec	trum Analyzer - S									
	vr Er	RF 50 eq 6.7450		CORREC	SE	NSE:INT	#Avg Typ	ALIGN AUTO		Jan 05, 2024	Frequency
Cente	31 Г1			PNO: Fast IFGain:Low	Trig: Free Atten: 30		Avg Hold:	: 100/100	TYP DE		Auto Tune
10 dB/d Log	div	Ref 20.00	dBm						0.2	56 dBm	
10.0											Center Freq 6.745000000 GHz
0.00				• • • •							
-10.0											Start Freq 6.345000000 GHz
-20.0											
-30.0				14							Stop Freq 7.145000000 GHz
-40.0				- Ann				h			CF Step 80.000000 MHz
-50.0	, which the second				an in a second dependent of the		All and a second second	and all the second s			<u>Auto</u> Man
-60.0											Freq Offset 0 Hz
70.0											
-70.0											Scale Type
		450 GHz						_	Span 8	00.0 MHz	Log <u>Lin</u>
	BW	1.0 MHz		#VE	W 3.0 MHz	*			1.333 ms (*	1001 pts)	
MSG								STATU	S		

Plot 7-17. Power Spectral Density Plot MIMO ANT1 (320MHz BW 802.11be (26 Tones) (UNII Band 7/8) - Ch. 159)



Plot 7-18. Power Spectral Density Plot MIMO ANT1 (320MHz BW 802.11be (26 Tones) (UNII Band 7/8) - Ch. 191)

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 25 of 107
1M2312180128-07.A3L	12/15/2023 - 1/11/2024	Portable Tablet	Page 35 of 107
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7.4.2 MIMO Antenna-1 Power Spectral Measurements - (Full Tones)



Plot 7-19. Power Spectral Density Plot MIMO ANT1 (320MHz BW 802.11be (Full Tone) (UNII Band 5) - Ch. 31)



Plot 7-20. Power Spectral Density Plot MIMO ANT1 (320MHz BW 802.11be (Full Tone) (UNII Band 5) - Ch. 63)

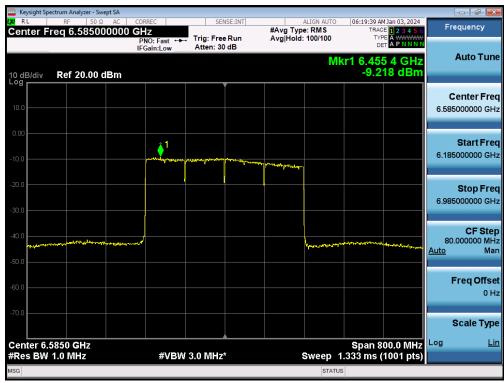
FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 26 of 107
1M2312180128-07.A3L	12/15/2023 - 1/11/2024	Portable Tablet	Page 36 of 107
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Plot 7-21. Power Spectral Density Plot MIMO ANT1 (320MHz BW 802.11be (Full Tone) (UNII Band 5/6/7) - Ch. 95)



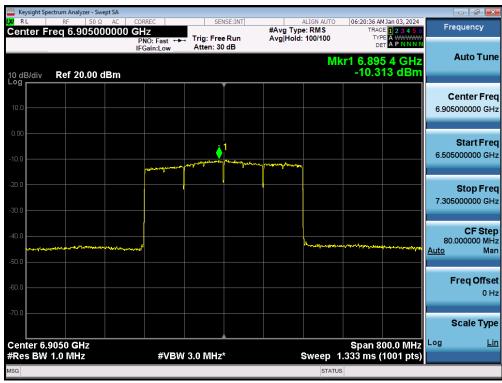
Plot 7-22. Power Spectral Density Plot MIMO ANT1 (320MHz BW 802.11be (Full Tone) (UNII Band 6/7) - Ch. 127)

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	
Test Report S/N:	Test Dates:	Test Dates: EUT Type:	
1M2312180128-07.A3L	12/15/2023 - 1/11/2024	Portable Tablet	Page 37 of 107
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Plot 7-23. Power Spectral Density Plot MIMO ANT1 (320MHz BW 802.11be (Full Tone) (UNII Band 7/8) - Ch. 159)



Plot 7-24. Power Spectral Density Plot MIMO ANT1 (320MHz BW 802.11be (Full Tone) (UNII Band 7/8) - Ch. 191)

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	
Test Report S/N:	Test Dates:	Test Dates: EUT Type:	
1M2312180128-07.A3L	12/15/2023 - 1/11/2024	Portable Tablet	Page 38 of 107
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7.4.3 MIMO Antenna-1 Power Spectral Measurements - (MRU)

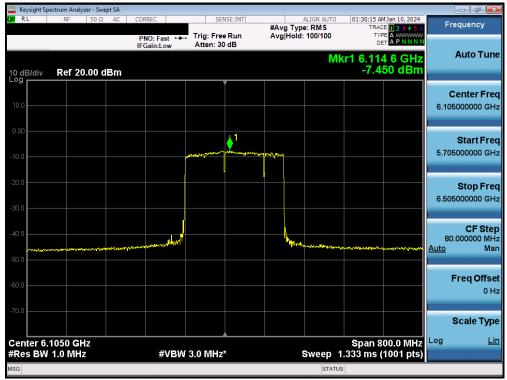
Plot 7-25. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11be (106+26 Tone) (UNII Band 5) - Ch. 45)



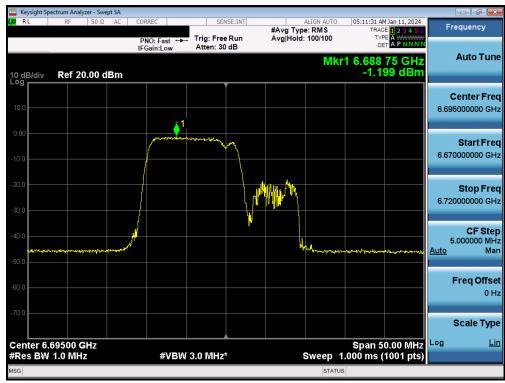
Plot 7-26, Power Spectral Density Plot MIMO ANT1 (20MHz BW 802,11be (52+26 Tone) (UNII Band 6) - Ch. 105)

	· · · · · · · · · · · · · · · · · · ·	()(
FCC ID: A3LSMX910		MEASUREMENT REPORT		
IC: 649E-SMX910		(Class II Permissive Change)	Technical Manager	
Test Report S/N:	Test Dates:	EUT Type:	Page 39 of 107	
1M2312180128-07.A3L	12/15/2023 - 1/11/2024	Portable Tablet	Fage 59 01 107	
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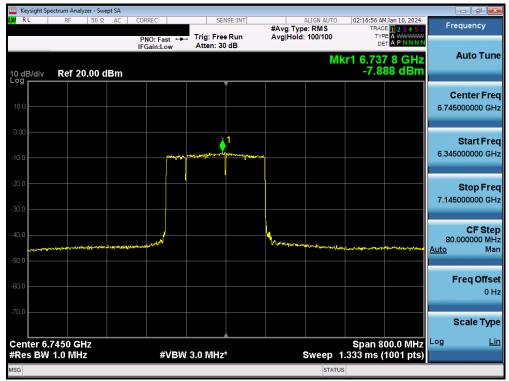
Plot 7-27. Power Spectral Density Plot MIMO ANT1 (320MHz BW 802.11be (2x996+484 Tone) (UNII Band 5/6/7) - Ch. 95)



Plot 7-28. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11be (106+26 Tone) (UNII Band 7) - Ch. 149)

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)		
Test Report S/N:	Test Dates:	Test Dates: EUT Type:		
1M2312180128-07.A3L	12/15/2023 - 1/11/2024	Portable Tablet	Page 40 of 107	
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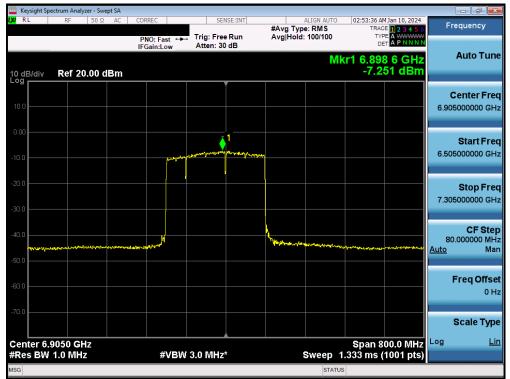
Plot 7-29. Power Spectral Density Plot MIMO ANT1 (320MHz BW 802.11be (2x996+484 Tone) (UNII Band 6/7) - Ch. 159)



Plot 7-30. Power Spectral Density Plot MIMO ANT1 (20MHz BW 802.11be (106+26 Tone) (UNII Band 8) - Ch. 233)

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)		
Test Report S/N:	Test Dates:	Test Dates: EUT Type:		
1M2312180128-07.A3L	12/15/2023 - 1/11/2024	Portable Tablet	Page 41 of 107	
© 2024 ELEMENT			V 11 1 08/28/2023	

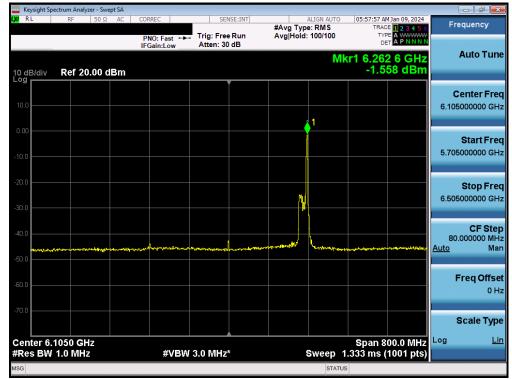




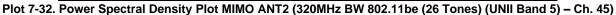
Plot 7-31. Power Spectral Density Plot MIMO ANT1 (320MHz BW 802.11be (2x996+484 Tone) (UNII Band 8) - Ch. 233)

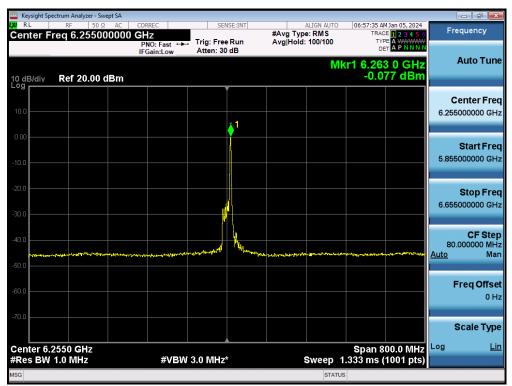
FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)		
Test Report S/N:	Test Dates:	EUT Type:		
1M2312180128-07.A3L	12/15/2023 - 1/11/2024	Portable Tablet	Page 42 of 107	
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7.4.4 MIMO Antenna-2 Power Spectral Measurements – (26 Tones)





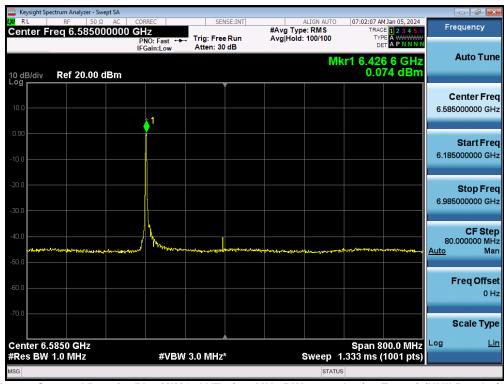
Plot 7-33. Power Spectral Density Plot MIMO ANT2 (320MHz BW 802.11be (26 Tones) (UNII Band 5) - Ch. 63)

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	
Test Report S/N:	Test Dates:	EUT Type:	Dage 12 of 107
1M2312180128-07.A3L	12/15/2023 - 1/11/2024	Portable Tablet	Page 43 of 107
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	ectrum Analyzer - Swept SA					
LXI RL	RF 50 Ω AC	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	07:01:32 AM Jan 05, 2024 TRACE 1 2 3 4 5 6	Frequency
		PNO: Fast ↔ IFGain:Low	Trig: Free Run Atten: 30 dB	Avg Hold: 100/100	Cr1 6.266 6 GHz 0.852 dBm	Auto Tune
10 dB/div Log	Ref 20.00 dBm		•		0.052 0.011	
10.0		<u>1</u>				Center Freq 6.425000000 GHz
-10.0						Start Freq 6.025000000 GHz
-20.0						Stop Freq 6.825000000 GHz
-40.0	m. A. S. May of States of the State of the S	- A home		anarananananananananananananananananana	1986-19-19-19-19-19-19-19-19-19-19-19-19-19-	CF Step 80.000000 MHz <u>Auto</u> Man
-50.0						Freq Offset 0 Hz
-70.0						Scale Type
Center 6. #Res BW	4250 GHz 1.0 MHz	#VBW	3.0 MHz*	Sweep 1	Span 800.0 MHz .333 ms (1001 pts)	Log <u>Lin</u>
MSG		<i>,,,</i> ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,	0.0 10112	STATU		

Plot 7-34. Power Spectral Density Plot MIMO ANT2 (320MHz BW 802.11be (26 Tones) (UNII Band 5/6/7) - Ch. 95)



Plot 7-35. Power Spectral Density Plot MIMO ANT2 (320MHz BW 802.11be (26 Tones) (UNII Band 6/7) - Ch. 127)

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)		
Test Report S/N:	Test Dates:	Test Dates: EUT Type:		
1M2312180128-07.A3L	12/15/2023 - 1/11/2024	Portable Tablet	Page 44 of 107	
© 2024 ELEMENT			V 11 1 08/28/2023	



	t Spectrum Analyzer - Swept SA					
K RL	RF 50 Ω AC Freq 6.745000000	CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	07:18:25 AM Jan 05, 2024 TRACE 1 2 3 4 5 6	Frequency
Center	Fieq 0.74500000	PNO: Fast +- IFGain:Low	Trig: Free Run Atten: 30 dB	Avg Hold: 100/100	DET A PNNN	
10 dB/di [;] Log	Ref 20.00 dBm			M	(r1 6.586 6 GHz 0.696 dBm	Auto Tune
10.0		1				Center Freq 6.745000000 GHz
-10.0						Start Freq 6.345000000 GHz
-20.0						Stop Freq 7.145000000 GHz
-40.0	uigeny constraints for the first of the start of the star	Manunger	an a			CF Step 80.000000 MHz <u>Auto</u> Man
-60.0						Freq Offset 0 Hz
-70.0						Scale Type
	6.7450 GHz W 1.0 MHz	#VBW	3.0 MHz*	Sweep 1	Span 800.0 MHz .333 ms (1001 pts)	Log <u>Lin</u>
MSG				STATUS		

Plot 7-36. Power Spectral Density Plot MIMO ANT2 (320MHz BW 802.11be (26 Tones) (UNII Band 7/8) - Ch. 159)

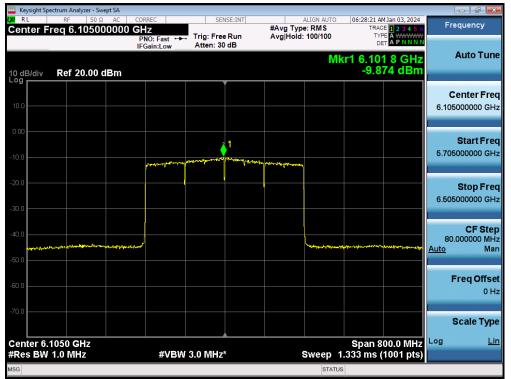


Plot 7-37. Power Spectral Density Plot MIMO ANT2 (320MHz BW 802.11be (26 Tones) (UNII Band 7/8) - Ch. 191)

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)		
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7.4.5 MIMO Antenna-2 Power Spectral Measurements - (Full Tones)



Plot 7-38. Power Spectral Density Plot MIMO ANT2 (320MHz BW 802.11be (Full Tone) (UNII Band 5) - Ch. 31)

Keysight Spectrum Analyzer - Swept S					
RL RF 50 Ω A Center Freq 6.2650000	AC CORREC	SENSE:INT	ALIGN AUTO #Avg Type: RMS	06:28:54 AM Jan 03, 2024 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast ↔→ IFGain:Low	Trig: Free Run Atten: 30 dB	Avg Hold: 100/100	TYPE A WWWWW DET A P N N N N	
			M	kr1 6.267 4 GHz	Auto Tune
10 dB/div Ref 20.00 dBr	m			-8.408 dBm	
		ľ			Center Freq
10.0					6.265000000 GHz
0.00		1			Start Freq
-10.0	L. JJo dbl (SA)				5.865000000 GHz
-20.0	/				Stop Freq
-30.0					6.665000000 GHz
-30.0					
-40.0					CF Step 80.000000 MHz
- way and the manual	and a famely a		"high appropriate the second s	Lafed and the set of t	Auto Man
-50.0					
-60.0					Freq Offset
					0 Hz
-70.0					
					Scale Type
Center 6.2650 GHz		^		Span 800.0 MHz	Log <u>Lin</u>
#Res BW 1.0 MHz	#VBW	3.0 MHz*		1.333 ms (1001 pts)	
MSG			STATU	S	

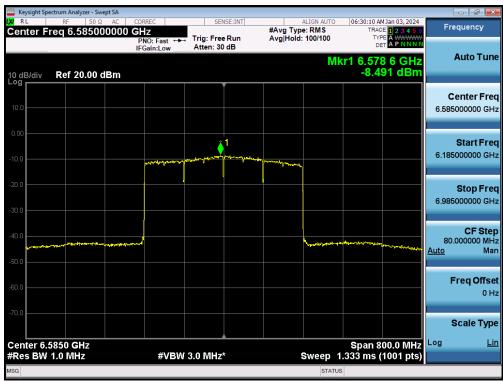
Plot 7-39. Power Spectral Density Plot MIMO ANT2 (320MHz BW 802.11be (Full Tone) (UNII Band 5) - Ch. 63)

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
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🔤 Keysight Spectrum Analyzer - Swept SA						- 6 -
RL RF 50 Ω AC Center Freq 6.42500000		SENSE	HAVG TY		06:29:30 AM Jan 03, 2024 TRACE 1 2 3 4 5 6	Frequency
	PNO: Fast +++ IFGain:Low	Trig: Free R Atten: 30 dl	tun Avg Hold	i: 100/100	DET A WWWWW	Auto Tune
10 dB/div Ref 20.00 dBm				Mkr	1 6.442 6 GHz -8.455 dBm	Auto Tune
		ľ				Center Freq
10.0						6.425000000 GHz
0.00						
			∮ ¹			Start Freq 6.025000000 GHz
-10.0	mound	North and the state of the state	and the second	1		0.023000000 GH2
-20.0						Ctop Erog
						Stop Freq 6.825000000 GHz
-30.0						
-40.0						CF Step
	mound			www.	Manser Changed and the	80.000000 MHz <u>Auto</u> Man
-50.0						
-60.0						Freq Offset
00.0						0 Hz
-70.0						
						Scale Type
Center 6.4250 GHz		A			Span 800.0 MHz	Log <u>Lin</u>
#Res BW 1.0 MHz	#VBW	3.0 MHz*		Sweep 1.3	33 ms (1001 pts)	
MSG				STATUS		

Plot 7-40. Power Spectral Density Plot MIMO ANT2 (320MHz BW 802.11be (Full Tone) (UNII Band 5/6/7) - Ch. 95)



Plot 7-41. Power Spectral Density Plot MIMO ANT2 (320MHz BW 802.11be (Full Tone) (UNII Band 6/7) - Ch. 127)

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Plot 7-42. Power Spectral Density Plot MIMO ANT2 (320MHz BW 802.11be (Full Tone) (UNII Band 7/8) - Ch. 159)



Plot 7-43. Power Spectral Density Plot MIMO ANT2 (320MHz BW 802.11be (Full Tone) (UNII Band 7/8) - Ch. 191)

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
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7.4.6 MIMO Antenna-2 Power Spectral Measurements - (MRU)

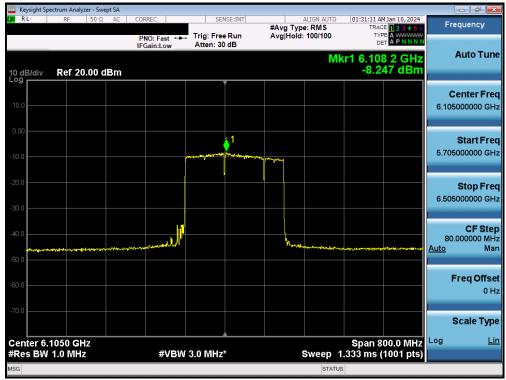
Plot 7-44. Power Spectral Density Plot MIMO ANT2 (20MHz BW 802.11be (106+26 Tone) (UNII Band 5) - Ch. 45)



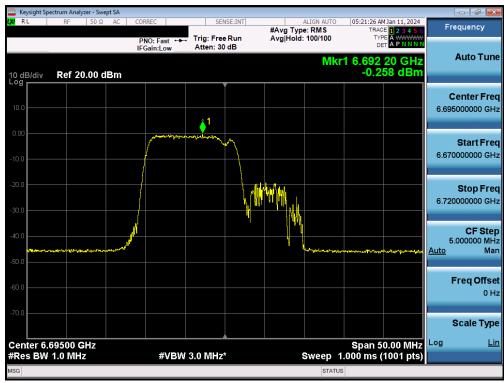
Plot 7-45. Power Spectral Density Plot MIMO ANT2 (20MHz BW 802.11be (52+26 Tone) (UNII Band 6) - Ch. 105)

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 40 of 107
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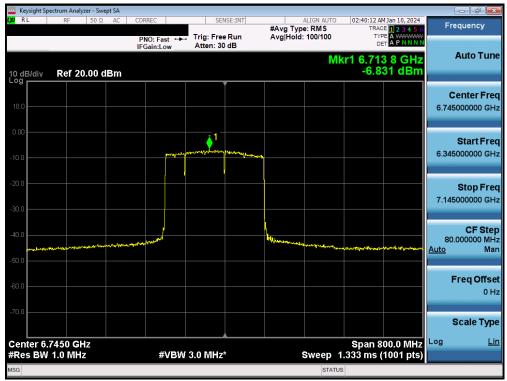
Plot 7-46. Power Spectral Density Plot MIMO ANT2 (320MHz BW 802.11be (2x996+484 Tone) (UNII Band 5/6/7) - Ch. 95)



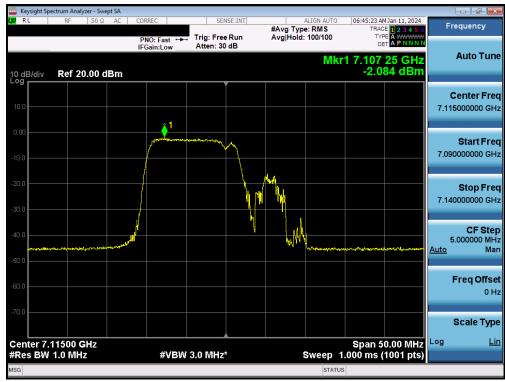
Plot 7-47. Power Spectral Density Plot MIMO ANT2 (20MHz BW 802.11be (106+26 Tone) (UNII Band 7) - Ch. 149)

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
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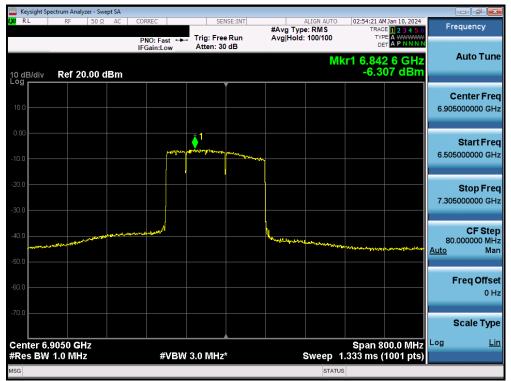
Plot 7-48. Power Spectral Density Plot MIMO ANT2 (320MHz BW 802.11be (2x996+484 Tone) (UNII Band 6/7) - Ch. 159)



Plot 7-49. Power Spectral Density Plot MIMO ANT2 (20MHz BW 802.11be (106+26 Tone) (UNII Band 8) - Ch. 233)

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
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Plot 7-50. Power Spectral Density Plot MIMO ANT2 (320MHz BW 802.11be (2x996+484 Tone) (UNII Band 8) - Ch. 233)

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
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Note:

Per ANSI C63.10-2013 Section 14.3.2.2 and KDB 662911 v02r01 Section E)2), the power spectral density at Antenna 1 and Antenna 2 were first measured separately 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 GN is the gain of the nth antenna and NANT, 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 6105MHz in 802.11be (20MHz BW) mode, the average conducted power spectral density was measured to be 0.79 dBm for Antenna-1 and -1.56 dBm for Antenna-2.

Antenna 1 + Antenna 2 = MIMO

(0.79 dBm + -1.56 dBm) = (1.199 mW + 0.698 mW) = 1.897 mW = 2.78 dBm

Sample e.i.r.p Power Spectral Density Calculation:

At 6105 MHz in 802.11be (20MHz BW) mode, the average MIMO power density was calculated to be -1.00 dBm with directional gain of -4.02 dBi.

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

2.78 dBm + -4.02 dBi = -1.24 dBm

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7.5 In-Band Emissions

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.

For transmitters operating within the 5.925-7.125 GHz bands: Power spectral density must be suppressed by 20 dB at 1 MHz outside of channel edge, by 28 dB at one channel bandwidth from the channel center, and by 40 dB at one- and one-half times the channel bandwidth away from channel center. At frequencies between one megahertz outside an unlicensed device's channel edge and one channel bandwidth from the center of the channel, the limits must be linearly interpolated between 20 dB and 28 dB suppression, and at frequencies between one and one- and one-half times an unlicensed device's channel bandwidth, the limits must be linearly interpolated between 28 dB and 40 dB suppression. Emissions removed from the channel center by more than one- and one-half times the channel bandwidth must be suppressed by at least 40 dB.

Test Procedure Used

KDB 987594 D02 v01r01

Test Settings

- 1. Connect output of the antenna port to a spectrum analyzer or EMI receiver, with appropriate attenuation, as to not damage the instrumentation.
- 2. Set the reference level of the measuring equipment in accordance with procedure 4.1.5.2 of ANSI C63.10-2013.
- 3. Measure the 26 dB EBW using the test procedure 12.4.1 of ANSI C63.10-2013. (This will be used to determine the channel edge.)
- 4. Measure the power spectral density (which will be used for emissions mask reference) using the following procedure:
 - Set the span to encompass the entire 26 dB EBW of the signal. a)
 - b) Set RBW = same RBW used for 26 dB EBW measurement.
 - Set VBW ≥ 3 X RBW c)
 - d) Number of points in sweep \geq [2 X span / RBW].
 - Sweep time = auto. e)
 - f) Detector = RMS (i.e., power averaging)
 - Trace average at least 100 traces in power averaging (rms) mode. g)
 - Use the peak search function on the instrument to find the peak of the spectrum. h)
- 5. For the purposes of developing the emission mask, the channel bandwidth is defined as the 26 dB EBW.
- 6. Using the measuring equipment limit line function, develop the emissions mask based on the following requirements. The emissions power spectral density must be reduced below the peak power spectral density (in dB) as follows:
 - Suppressed by 20 dB at 1 MHz outside of the channel edge. (The channel edge is defined as the a) 26-dB point on either side of the carrier center frequency.)
 - b) Suppressed by 28 dB at one channel bandwidth from the channel center.
 - Suppressed by 40 dB at one- and one-half times the channel bandwidth from the channel center. c)
- 7. Adjust the span to encompass the entire mask as necessary.
- 8. Clear trace.
- 9. Trace average at least 100 traces in power averaging (rms) mode.
- 10. Adjust the reference level as necessary so that the crest of the channel touches the top of the emission mask.

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Test Setup

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



Figure 7-4. Test Instrument & Measurement Setup

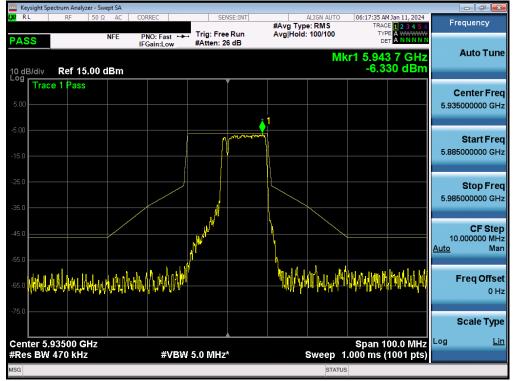
Test Notes

None.

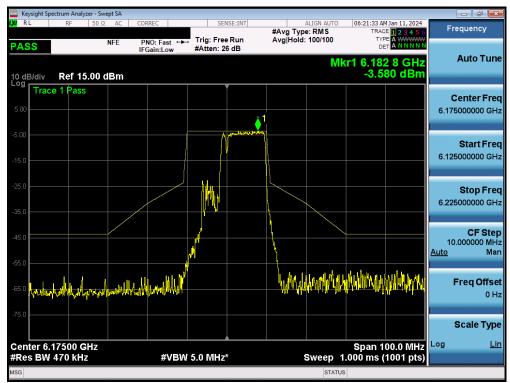
FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
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7.5.1 MIMO Antenna-1 In-Band Emission - (MRU) - (UNII Band 5)



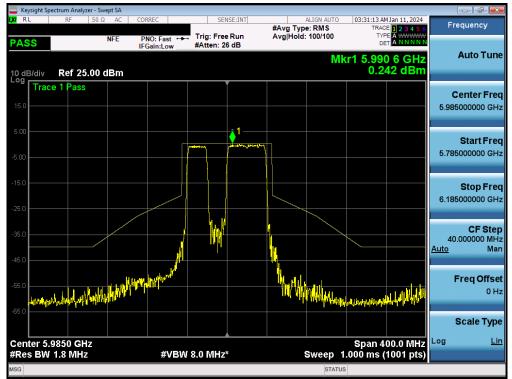
Plot 7-51. In-Band Emission Plot MIMO ANT1 (20MHz BW 802.11be (MRU) (UNII Band 5) - Ch. 2) - 106+26T



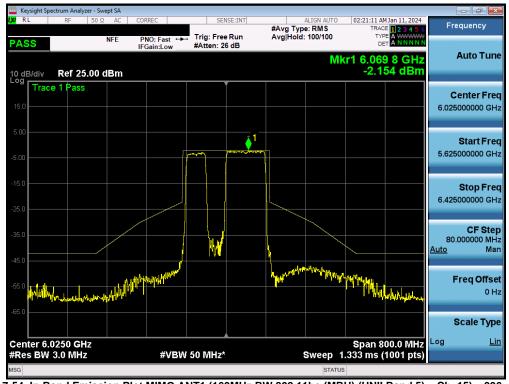
Plot 7-52. In-Band Emission Plot MIMO ANT1 (20MHz BW 802.11be (MRU) (UNII Band 5) - Ch. 45) - 106+26T

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
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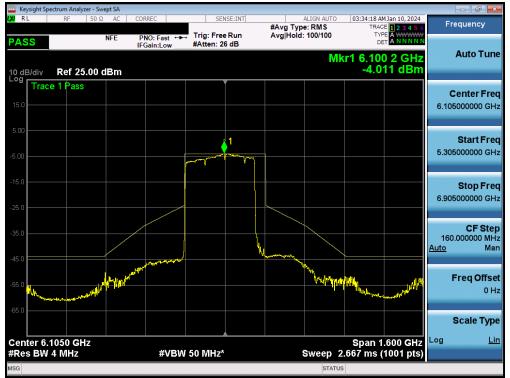
Plot 7-53. In-Band Emission Plot MIMO ANT1 (80MHz BW 802.11be (MRU) (UNII Band 5) - Ch. 7) - 242+484T



Plot 7-54. In-Band Emission Plot MIMO ANT1 (160MHz BW 802.11be (MRU) (UNII Band 5) - Ch. 15) - 996+484T

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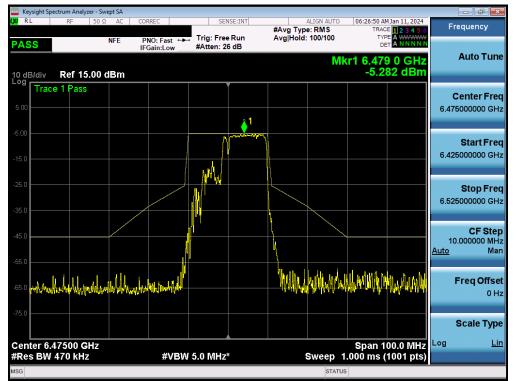


Plot 7-55. In-Band Emission Plot MIMO ANT1 (320MHz BW 802.11be (MRU) (UNII Band 5) - Ch. 31) - 3x996+484T

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	
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MIMO Antenna-1 In-Band Emission - (MRU) - (UNII Band 6)



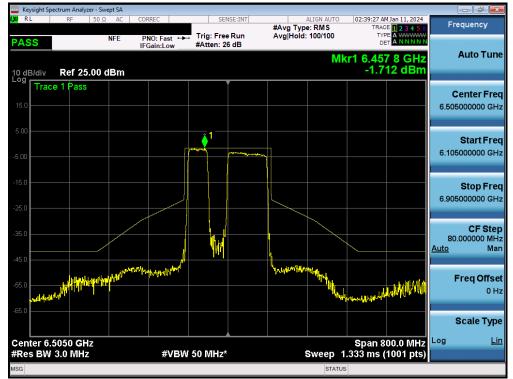
Plot 7-56. In-Band Emission Plot MIMO ANT1 (20MHz BW 802.11be (MRU) (UNII Band 6) - Ch. 105) - 106+26T



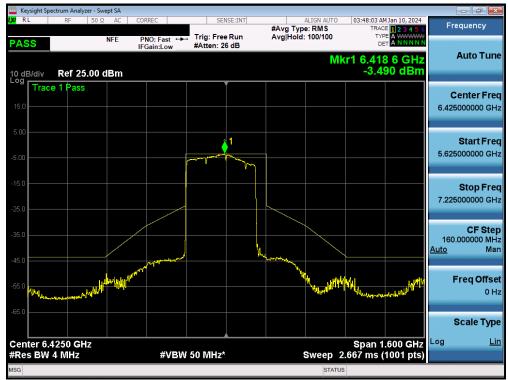
Plot 7-57. In-Band Emission Plot MIMO ANT1 (80MHz BW 802.11be (MRU) (UNII Band 6) - Ch. 103) - 242+484T

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
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Plot 7-58. In-Band Emission Plot MIMO ANT1 (160MHz BW 802.11be (MRU) (UNII Band 6) - Ch. 111) - 996+484T

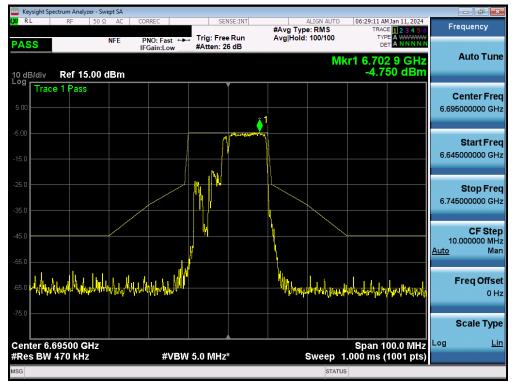


Plot 7-59. In-Band Emission Plot MIMO ANT1 (320MHz BW 802.11be (MRU) (UNII Band 5/6/7) - Ch. 95) - 3x996+484T

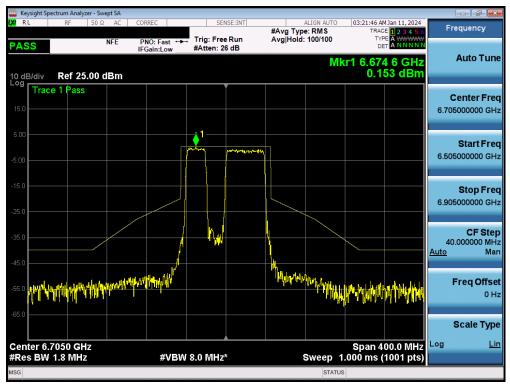
FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	
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MIMO Antenna-1 In-Band Emission - (MRU) – (UNII Band 7)



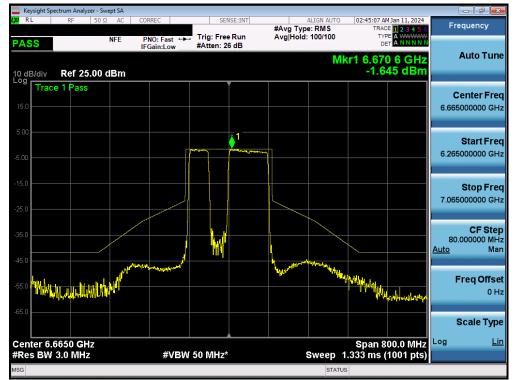
Plot 7-60. In-Band Emission Plot MIMO ANT1 (20MHz BW 802.11be (MRU) (UNII Band 7) - Ch. 149) - 106+26T



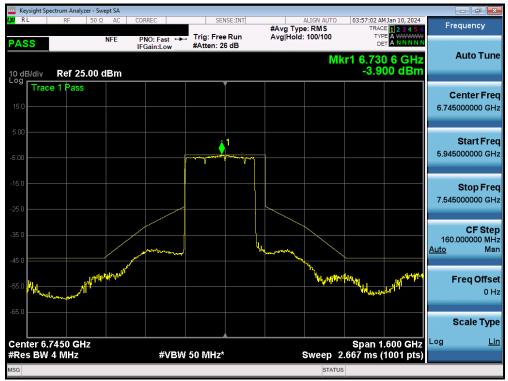
Plot 7-61. In-Band Emission Plot MIMO ANT1 (80MHz BW 802.11be (MRU) (UNII Band 7) - Ch. 151) - 242+484T

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Plot 7-62. In-Band Emission Plot MIMO ANT1 (160MHz BW 802.11be (MRU) (UNII Band 7) - Ch. 143) - 996+484T

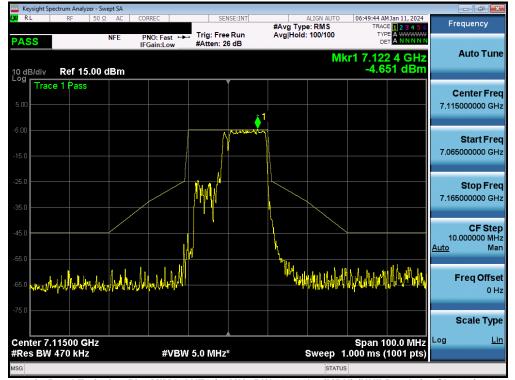


Plot 7-63. In-Band Emission Plot MIMO ANT1 (320MHz BW 802.11be (MRU) (UNII Band 6/7) - Ch. 159) - 3x996+484T

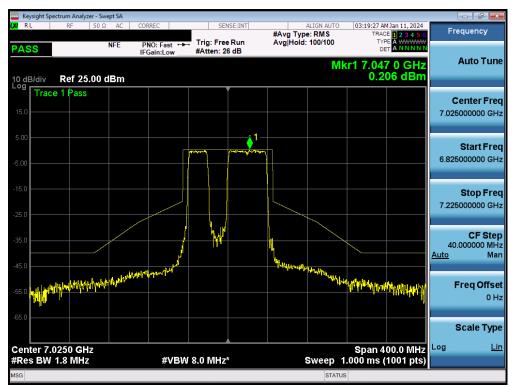
FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	
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MIMO Antenna-1 In-Band Emission - (MRU) - (UNII Band 8)



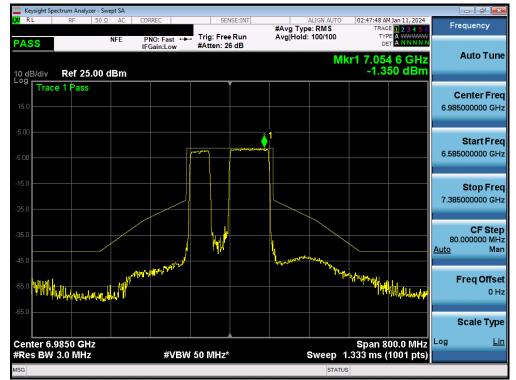
Plot 7-64. In-Band Emission Plot MIMO ANT1 (20MHz BW 802.11be (MRU) (UNII Band 8) - Ch. 233) - 106+26T



Plot 7-65. In-Band Emission Plot MIMO ANT1 (80MHz BW 802.11be (MRU) (UNII Band 8) - Ch. 215) - 242+484T

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Plot 7-66. In-Band Emission Plot MIMO ANT1 (160MHz BW 802.11be (MRU) (UNII Band 8) - Ch. 207) - 996+484T

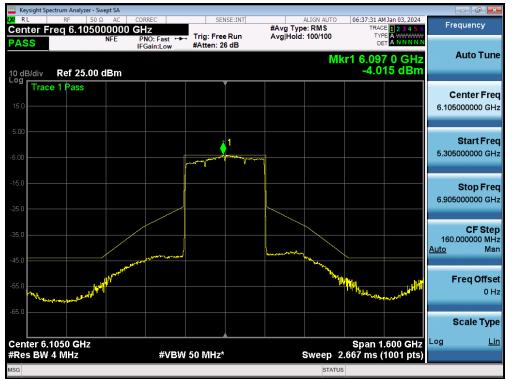


Plot 7-67. In-Band Emission Plot MIMO ANT1 (320MHz BW 802.11be (MRU) (UNII Band 8) - Ch. 211) - 3x996+484T

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	
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7.5.2 MIMO Antenna-1 In-Band Emission - (Full Tones)



Plot 7-68. In-Band Emission Plot MIMO ANT1 (320MHz BW 802.11be (Full Tone) (UNII Band 5) - Ch. 31)

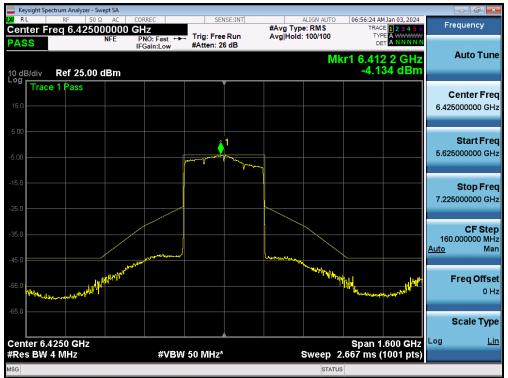


Plot 7-69. In-Band Emission Plot MIMO ANT1 (320MHz BW 802.11be (Full Tone) (UNII Band 5) - Ch. 63)

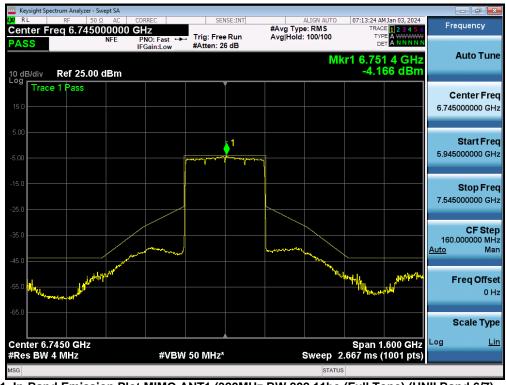
FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	
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²⁰²⁴ ELEMENT





Plot 7-70. In-Band Emission Plot MIMO ANT1 (320MHz BW 802.11be (Full Tone) (UNII Band 5/6/7) - Ch. 95)



Plot 7-71. In-Band Emission Plot MIMO ANT1 (320MHz BW 802.11be (Full Tone) (UNII Band 6/7) - Ch. 159)

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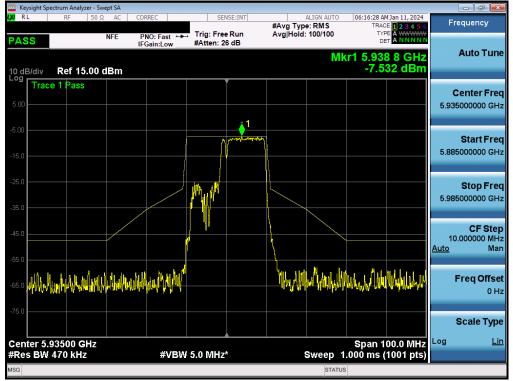


Plot 7-72. In-Band Emission Plot MIMO ANT1 (320MHz BW 802.11be (Full Tone) (UNII Band 7/8) - Ch. 191)

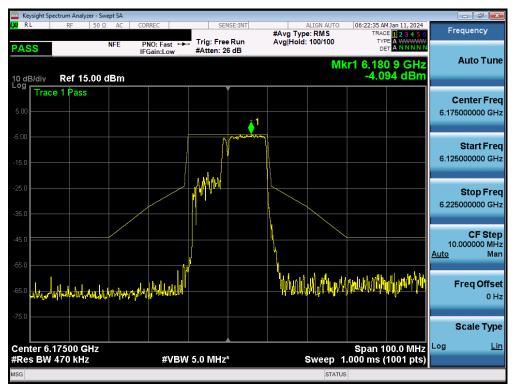
FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 67 of 107
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7.5.3 MIMO Antenna-2 In-Band Emission - (MRU) – (UNII Band 5)



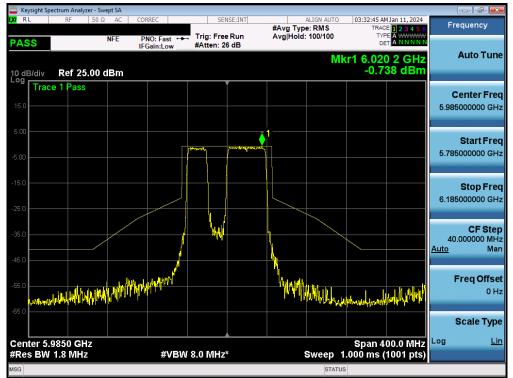
Plot 7-73. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11be (MRU) (UNII Band 5) - Ch. 2) - 106+26T



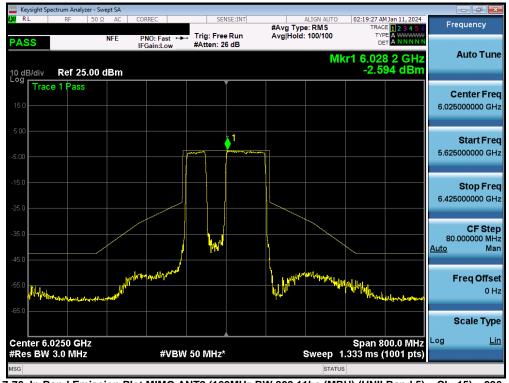
Plot 7-74. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11be (MRU) (UNII Band 5) - Ch. 45) - 106+26T

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
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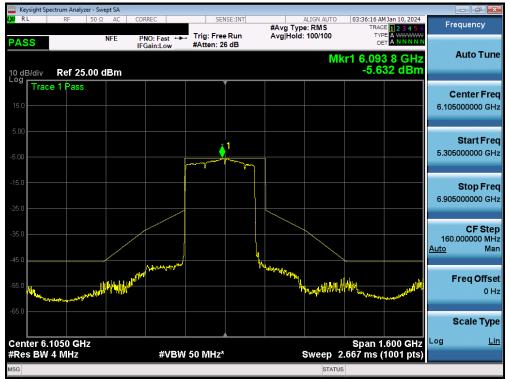
Plot 7-75. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11be (MRU) (UNII Band 5) - Ch. 7) - 242+484T



Plot 7-76. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11be (MRU) (UNII Band 5) - Ch. 15) - 996+484T

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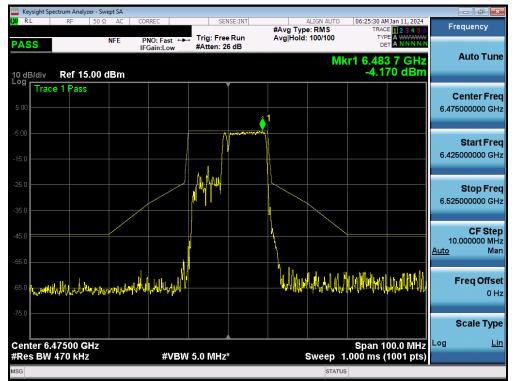


Plot 7-77. In-Band Emission Plot MIMO ANT2 (320MHz BW 802.11be (MRU) (UNII Band 5) - Ch. 31) - 3x996+484T

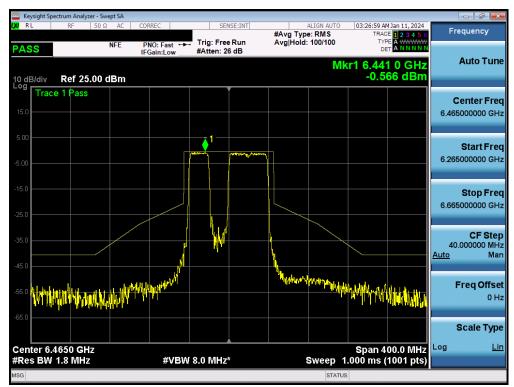
FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	Approved by: Technical Manager
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MIMO Antenna-2 In-Band Emission - (MRU) - (UNII Band 6)



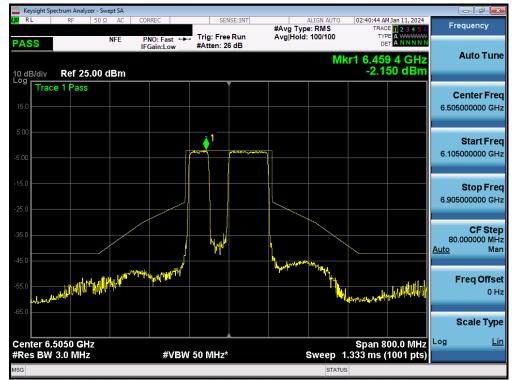
Plot 7-78. In-Band Emission Plot MIMO ANT2 (20MHz BW 802.11be (MRU) (UNII Band 6) - Ch. 105) - 106+26T



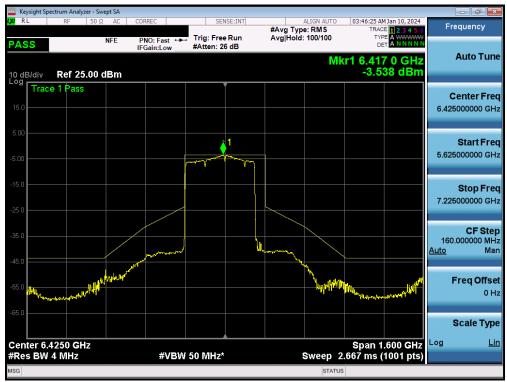
Plot 7-79. In-Band Emission Plot MIMO ANT2 (80MHz BW 802.11be (MRU) (UNII Band 6) - Ch. 103) - 242+484T

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	
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Plot 7-80. In-Band Emission Plot MIMO ANT2 (160MHz BW 802.11be (MRU) (UNII Band 6) - Ch. 111) - 996+484T



Plot 7-81. In-Band Emission Plot MIMO ANT2 (320MHz BW 802.11be (MRU) (UNII Band 5/6/7) - Ch. 95) - 3x996+484T

FCC ID: A3LSMX910 IC: 649E-SMX910		MEASUREMENT REPORT (Class II Permissive Change)	
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