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MEASUREMENT REPORT

FCC Part 15.407 / ISED RSS-248 802.11a/ax WiFi 6GHz (OFDM)

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

Date of Testing:
10/29/2025-12/18/2025
Test Report Issue Date:
1/5/2026
Test Site/Location:
Element Lab., Columbia, MD, USA
Test Report Serial No.:
1M2510280090-18-R1.A3L

FCC ID:	**A3LSMA576U**
IC:	**649E-SMA576W**
APPLICANT:	**Samsung Electronics Co., Ltd.**

Application Type:	Certification
Model:	SM-A576U1
HVIN:	SM-A576W
EUT Type:	Portable Handset
Frequency Range:	5935 – 7115MHz
Modulation Type:	OFDM
FCC Classification:	15E 6GHz Low Power Dual Client (6CD)
FCC Rule Part(s):	Part 15 Subpart E (15.407)
ISED Specification:	RSS-248 Issue 3
FCC Test Procedure(s):	ANSI C63.10:2020 + Cor. 1:2023, KDB 987594 D02 v03
ISED Test Procedure(s):	ANSI C63.10:2020 + Cor. 1:2023 + C63.10a:2024 + Errata to C63.10a:2024, KDB 987594 D02 v03

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 C63.10:2020. Test results reported herein relate only to the item(s) tested.

This revised Test Report (S/N: 1M2510280090-18-R1.A3L) supersedes and replaces the previously issued test report (S/N: 1M2510280090-18.A3L) 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.

RJ Ortanez
Executive Vice President

ACCREDITED
CERT #2041.01

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TEST REPORT REVISION HISTORY

Rev. No.	Description	Issue Date	Revised By
-	Initial Release	12/24/2025	WKR0000005883
1	Addressed comments made by TCB reviewer	1/5/2026	WKR0000005883

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MEASUREMENT REPORT

Channel Bandwidth [MHz]	UNII Band	Tx Frequency [MHz]	MIMO	
			Max. Power [mW]	Max. Power [dBm]
20	5	5955 - 6415	41.45	16.18
	6	6435 - 6515	8.33	9.20
	7	6535 - 6875	30.38	14.83
	8	6895 - 7115	7.03	8.47
40	5	5965 - 6405	18.65	12.71
	6	6445 - 6525	7.82	8.93
	7	6565 - 6845	16.13	12.08
	8	6885 - 7085	7.62	8.82
80	5	5985 - 6385	13.63	11.35
	6	6465	6.58	8.18
	7	6545 - 6865	12.12	10.84
	8	6945 - 7025	6.31	8.00

EUT Overview - EIRP

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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

Measurements were conducted at the Element laboratory(ies) indicated in Section 1.3 below. All measurement facilities are compliant with the test site requirements specified in ANSI C63.4:2014 and KDB 414788 D01 v01r01.

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 test laboratory with the site description on file with ISED (Wireless Test Lab number 2451B) and FCC (Designation Number US1113).

- 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 Electronics Co., Ltd. Portable Handset FCC ID: A3LSMA576U** and **IC: 649E-SMA576W**. 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.: 0545M, 0554M, 2256M, 2378M, 2417M

2.2 Device Capabilities

This device contains the following capabilities:

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

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

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

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

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

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

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

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Notes:

1. 6GHz NII operation is possible in 20MHz, 40MHz, and 80MHz 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 C63.10:2020. 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:

802.11 Mode/Band		ANT1		ANT2		MIMO (1+2)	
		Duty Cycle [%]	Radiated DCCF [dB]	Duty Cycle [%]	Radiated DCCF [dB]	Duty Cycle [%]	Radiated DCCF [dB]
6GHz	a	96.31	0.16	96.28	0.16	96.31	0.16
	ax (HE20)	97.50	0.11	97.81	0.10	96.85	0.14
	ax (HE40)	97.02	0.13	97.21	0.12	94.33	0.25
	ax (HE80)	93.96	0.27	93.18	0.31	89.68	0.47

Table 2-4. Measured Duty Cycles

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

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

Table 2-5. Antenna / Technology Configurations

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

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

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802.11a	MCS Index	Spatial Stream	OFDM (802.11ax)								
20MHz			20MHz			40MHz			80MHz		
	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
6	0	1	8.6	8.1	7.3	17.2	16.3	14.6	36	34	30.6
9	1	1	17.2	16.3	14.6	34.4	32.5	29.3	72.1	68.1	61.3
12	2	1	25.8	24.4	21.9	51.6	48.8	43.9	108.1	102.1	91.9
18	3	1	34.4	32.5	29.3	68.8	65	58.5	144.1	136.1	122.5
24	4	1	51.6	48.8	43.9	103.2	97.5	87.8	216.2	204.2	183.8
36	5	1	68.8	65	58.5	137.6	130	117	288.2	272.2	245
48	6	1	77.4	73.1	65.8	154.9	146.3	131.6	324.3	306.3	275.6
54	7	1	86	81.3	73.1	172.1	162.5	146.3	360.3	340.3	306.3
	8	1	103.2	97.5	87.8	206.5	195	175.5	432.4	408.3	367.5
	9	1	114.7	108.3	97.5	229.4	216.7	195	480.4	453.7	408.3
	10	1	129	121.9	109.7	258.1	243.8	219.4	540.4	510.4	459.4
	11	1	143.4	135.4	121.9	286.8	270.8	243.8	600.5	567.1	510.4
		1	154.9	146.3	131.6	309.7	292.5	263.3	648.5	612.5	551.3
		1	172.1	162.5	146.3	344.1	325	292.5	720.6	680.6	612.5
6	0	2	17.2	16.3	14.6	34.4	32.5	29.3	72.1	68.1	61.3
9	1	2	34.4	32.5	29.3	68.8	65	58.5	144.1	136.1	122.5
12	2	2	51.6	48.8	43.9	103.2	97.5	87.8	216.2	204.2	183.8
18	3	2	68.8	65	58.5	137.6	130	117	288.2	272.2	245
24	4	2	103.2	97.5	87.8	206.5	195	175.5	432.4	408.3	367.5
36	5	2	137.6	130	117	275.3	260	234	576.5	544.4	490
48	6	2	154.9	146.3	131.6	309.7	292.5	263.3	648.5	612.5	551.3
54	7	2	172.1	162.5	146.3	344.1	325	292.5	720.6	680.6	612.5
	8	2	206.5	195	175.5	412.9	390	351	864.7	816.7	735
	9	2	229.4	216.7	195	458.8	433.3	390	960.8	907.4	816.7
	10	2	258.1	243.8	219.4	516.2	487.5	438.8	1080.9	1020.8	918.8
	11	2	286.8	270.8	243.8	573.5	541.7	487.5	1201	1134.3	1020.8
		2	309.7	292.5	263.3	619.4	585	526.5	1297.1	1225	1102.5
		2	344.1	325	292.5	688.2	650	585	1441.2	1361.1	1225

Table 2-6. Supported Data Rates

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

UNII Band	Standard Power (SP)	Low Power Indoor (LPI)	Very Low Power (VLP)
UNII 5	✓	✓	✓
UNII 6	×	✓	✓
UNII 7	✓	✓	✓
UNII 8	×	✓	✓

Table 2-7. Power Operation

✓= Support; × = NOT Support

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2.3 Antenna Description

The manufacturer provided the antenna gains which can affect the validity of test results used for determination of compliance. The following antenna gains are used in this device per the "Unlicensed Band Antenna Gain" document provided by the client. This document is also included in the filing as a public exhibit.

Frequency	Ant1 Peak Gain [dBi]	Ant2 Peak Gain [dBi]
5925 MHz	-6.65	-6.38
6025 MHz	-5.78	-4.07
6125 MHz	-5.51	-4.57
6225 MHz	-5.32	-5.30
6325 MHz	-5.27	-5.01
6425 MHz	-4.92	-5.46
6525 MHz	-5.35	-6.30
6625MHz	-5.44	-5.58
6725MHz	-5.59	-5.89
6825MHz	-6.31	-5.93
6925MHz	-6.15	-5.95
7025MHz	-5.85	-5.95
7125MHz	-5.81	-6.00

Table 2-8 Antenna Peak Gain per Frequency

	Ant1 Peak Gain [dBi]	Ant2 Peak Gain [dBi]	Directional Gain [dBi]
5925 – 6425 MHz	-4.92	-4.07	-1.47
6425 – 6525 MHz	-4.92	-5.46	-2.18
6525 – 6875 MHz	-5.35	-5.58	-2.45
6875 – 7125 MHz	-5.81	-5.95	-2.87

Table 2-9. Antenna Peak Gain

2.4 Test Configuration

The EUT was tested per the guidance of ANSI C63.10:2020 and KDB 987594 D02 v03. ANSI C63.10:2020 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing. See Sections 3.2 for AC line conducted emissions test setups, 3.3 for radiated emissions test setups, and 7.2, 7.3, 7.4, and 7.5 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 or very low power access point

This device operates in the 5.925-7.125 GHz band when under control of an indoor access point or very lower power access point. Additionally, the device may operate in the 5.925-6.425 GHz and 6.525-6.875 GHz bands when under control of a standard power access point.

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2.5 Software and Firmware

The test was conducted with firmware version A576U1UEU0AYK3 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 C63.10:2020) and the guidance provided in KDB 987594 D02 v03 were used in the measurement of the EUT.

Deviation from measurement procedure……..…….....None

3.2 AC Line Conducted Emissions

The line-conducted facility is located inside a 10'x16'x9' shielded enclosure. The shielded enclosure is manufactured by ETS Lindgren RF Enclosures. The shielding effectiveness of the shielded room is in accordance with MIL-Std-285 or NSA 65-5. A 1m x 1.5m wooden table 80cm high is placed 40cm away from the vertical wall and 80cm away from the sidewall of the shielded room. Two 10kHz-30MHz, 50Ω/50μH Line-Impedance Stabilization Networks (LISNs) are bonded to the shielded room floor. Power to the LISNs is filtered by external high-current high-insertion loss power line filters. The external power line filter is an ETS Lindgren Model LPRX-4X30 (100dB Attenuation, 14kHz-18GHz) and the two EMI/RFI filters are ETS Lindgren Model LRW-2030-S1 (100dB Minimum Insertion Loss, 14kHz – 10GHz). These filters attenuate ambient signal noise from entering the measurement lines. These filters are also bonded to the shielded enclosure.

The EUT is powered from one LISN and the support equipment is powered from the second LISN. If the EUT is a DC-powered device, power will be derived from the source power supply it normally will be powered from and this supply line(s) will be connected to the second LISN. All interconnecting cables more than 1 meter were shortened to a 1 meter length by non-inductive bundling (serpentine fashion) and draped over the back edge of the test table. All cables were at least 40cm above the horizontal reference groundplane. Power cables for support equipment were routed down to the second LISN while ensuring that that cables were not draped over the second LISN.

Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The RF output of the LISN was connected to the spectrum analyzer and exploratory measurements were made to determine the frequencies producing the maximum emission from the EUT. The spectrum was scanned from 150kHz to 30MHz with a spectrum analyzer. The detector function was set to peak mode for exploratory measurements while the bandwidth of the analyzer was set to 10kHz. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Once the worst case emissions have been identified, the one EUT cable configuration/arrangement and mode of operation that produced these emissions is used for final measurements on the same test site. The analyzer is set to CISPR quasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

Line conducted emissions test results are shown in Section 7.7. The EMI Receiver mode of the Agilent MXE was used to perform AC line conducted emissions testing.

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3.3 Radiated Emissions

The radiated test facilities consisted of an indoor 3-meter semi-anechoic chamber used for final measurements and exploratory measurements, when necessary. The measurement area is contained within the semi-anechoic chamber which is shielded from any ambient interference. The test site inside the chamber is a 6m x 5.2m elliptical, obstruction-free area in accordance with Figure 5.7 of Clause 5 in ANSI C63.4:2014. Absorbers are arranged on the floor between the turn table and the antenna mast in such a way so as to maximize the reduction of reflections for measurements above 1GHz. An 80cm tall test table made of Styrodur is placed on top of the turn table. For measurements above 1GHz, an additional Styrodur pedestal is placed on top of the test table to bring the total table height to 1.5m.

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33 depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed 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 precautions were 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 were noted for each frequency found.

Final measurements were made in the semi-anechoic chamber using calibrated, linearly polarized broadband and horn antennas. The test setup was configured to the setup that produced the worst-case emissions. The spectrum analyzer was set to investigate all frequencies required for testing to compare the highest radiated disturbances with respect to the specified limits. The turntable containing the EUT was rotated through 360 degrees and the height of the receive antenna was varied 1 to 4 meters and stopped at the azimuth and height producing the maximum emission. Each emission was maximized by changing the orientation of the EUT through three orthogonal planes and changing the polarity of the receive antenna, whichever produced the worst-case emissions.

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4:2014. Additionally, radiated emissions below 30MHz are also validated on an Open Area Test Site to assert correlation with the chamber measurements per the requirements of KDB 414788 D01 v01r01.

3.4 Environmental Conditions

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

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4.0 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 C63.10:2020. 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	1.13
Line Conducted Disturbance	3.09
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

Table 5-1. Measurement Uncertainty Budget

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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
-	MD 1M 40	EMC Cable and Switch System	2/25/2025	Annual	2/25/2026	MD 1M 40
-	AP1-002	EMC Cable and Switch System	2/25/2025	Annual	2/25/2026	AP1-002
-	AP2-001	EMC Cable and Switch System	2/25/2025	Annual	2/25/2026	AP2-001
-	AP2-002	EMC Cable and Switch System	2/25/2025	Annual	2/25/2026	AP2-002
-	ETS-001	EMC Cable and Switch System	12/11/2024	Annual	12/11/2025	ETS-001
-	ETS-002	EMC Cable and Switch System	12/11/2024	Annual	12/11/2025	ETS-002
-	WL25-1	Conducted Cable Set (25GHz)	2/25/2025	Annual	2/25/2026	WL25-1
-	WL25-2	Conducted Cable Set (25GHz)	2/25/2025	Annual	2/25/2026	WL25-2
-	WL40-1	Conducted Cable Set (40GHz)	2/25/2025	Annual	2/25/2026	WL40-1
Agilent	N9038A	MXE EMI Receiver	11/10/2025	Annual	11/10/2026	MY51210133
Anritsu	MA24408A	POWER SENSOR	2/11/2025	Annual	2/11/2026	12776
EMCO	3115	Horn Antenna (1-18GHz)	9/6/2024	Biennial	9/6/2026	9704-5182
Espec	ESX-2CA	Environmental Chamber	11/20/2024	Biennial	11/20/2026	17620
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	6/4/2025	Biennial	6/4/2027	125518
ETS-Lindgren	3164-05	Quad Ridge Horn (Small) 2 - 18GHz	6/4/2025	Biennial	6/4/2027	208255
ETS-Lindgren	3816/2NM	Line Impedance Stabilization Network	4/21/2025	Biennial	4/21/2027	114451
Keysight Technologies	N9030A	PXA Signal Analyzer (44GHz)	6/6/2025	Annual	6/6/2026	MY52350166
Keysight Technologies	N9020A	MXA Signal Analyzer	6/4/2025	Annual	6/4/2026	MY54500644
Keysight Technologies	N9030A	PXA Signal Analyzer	11/3/2025	Annual	11/3/2026	MY54490576
Pasternack	NMLC-2	Line Conducted Emissions Cable (NM)	3/25/2025	Annual	3/25/2026	NMLC-2
Rohde & Schwarz	CMX500	5G Radio Communication Tester	N/A			101202
Rohde & Schwarz	ESW44	EMI Test Receiver 2Hz to 44 GHz	3/25/2025	Annual	3/25/2026	101716
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	10/16/2024	Annual	12/31/2025	100342
Rohde & Schwarz	180-422-KF	Horn (18 - 40GHz)	10/9/2024	Biennial	10/9/2026	U157403-01
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	9/11/2024	Biennial	9/11/2026	A051107
Sunol	JB6	Bi-Log Antenna (30M - 5GHz)	3/24/2025	Biennial	3/24/2027	A082816

Table 6-1. Test Equipment Calibration Table

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.
Equipment listed with “N/A under calibration information was not used to make calibrated measurements.

Component	Serial Number
MegaPhase Cable TM26-S1S1-36	18160103 003
Pasternack 6dB Attenuator PE7005-6	N/A

Table 6-2. WL25-1 Conducted Cable Set Components

Component	Serial Number
MiniCircuirs Cable CBL-2FT-SMSM+	77743
MCL 6dB Attenuator BW-S6W2+	1314

Table 6-3. WL25-2 Conducted Cable Set Components

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Component	Serial Number
MegaPhase Cable TM40K1K1-36	18160102 001
MCL 10dB Attenuator BW-K10 2W44+	1902

Table 6-4. WL40-1 Conducted Cable Set Components

Component	Serial Number
Pasternack Cable RG214/U	111815
MegaPhase (CAGE 1GVT4) Cable GR18-N5N5-24	14042714 001

Table 6-5. ETS-001 EMC Cable and Switch System Components

Component	Serial Number
MegaPhase (CAGE 1GVT4) Cable GR18-N5N5-24	14042714 001
MegaPhase (CAGE 1GVT4) Cable NC29-N1N1-324	20502201 001
Rohde & Schwarz SF Unit	102134
Minicircuits Cable CBL=0.5M-NMNM+	15440

Table 6-6. ETS-002 EMC Cable and Switch System Components

Component	Serial Number
Sucoflex 106A Cable	501992
MegaPhase Cable N29-N1N1-324	20335606 001
Rohde & Schwarz SF Unit	102133
MiniCircuits Cable CBL-2FT-SMSM+	77745
MegaPhase Cable 10511-1	15034701 001
MiniCircuits Switch RC 2SPDT-A18	11703270 041
Sucoflex 104 Cable	320259/4
Sucoflex 104 Cable	321999/4
Sucoflex 104 Cable	321995/4

Table 6-7. AP1-002 EMC Cable and Switch System Components

Component	Serial Number
Flex Cable	P2A-0001
Micro-Coax Utilfex Cable UFB311A-Q-3346-50U50U MFR 64639	231978-003
Chamber Passthrough	CP4/X12
Micro-Coax Utilfex Cable UFB311A-1-0629-50U50U MFR 64639	231986-003
Micro-Coax Utiflex Cable UFB142A-0-0629-5GU200 MFR 6463	232069-001
Rohde & Schwarz TS-PR8 Pre-Amplifier	102335
Rohde & Schwarz OSP130 Open Switch and Control Unit	101181

Table 6-8. AP2-001 EMC Cable and Switch System Components

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Component	Serial Number
MiniCircuits Cable CBL-0.5M-SMNM+	47261
Micro-Coax Utilfex Cable UFB311A-Q-3346-50U50U MFR 64639	231978-001
Micro-Coax Utilfex Cable UFB311A-1-0629-50U50U MFR 64639	231986-002
MegaPhase (CAGE 1GVT4) Cable NC29-N1N1-324	19046401 001
Megaphase (CAGE 1GVT4) Flex Cable 10511-1	15044701-006
Micro-Coax Utiflex Cable UFB311A-Q-3346-50U50U MFR 64639	231978-002
Micro-Coax Utilfex Cable UFB311A-1-0629-50U50U MFR 64639	231986-004
Micro-Coax Utiflex Cable UFB142A-0-0629-5GU200 MFR 64639	232069-001
Rohde & Schwarz SF Unit	102138
Rohde & Schwarz OSP130 Open Switch and Control Unit	101181
Micro-Coax Utilfex Cable UFB311A-Q-3346-50U50U MFR 64639	231978-003
· Micro-Coax Utilfex Cable UFB311A-1-0629-50U50U MFR 64639	231986-003
Rohde & Schwarz TS-PR8 Pre-Amplifier	102335

Table 6-9. AP2-002 EMC Cable and Switch System Components

Component	Serial Number
MegaPhase Cable TM40-K1K1-30	20233002-004
UTIPLEX Cable	64639 232063-001
Rohde & Schwarz Pre-amp RS-PR1840 18G-40G	9037.7670.02

Table 6-10. MD 1M 18-40 EMC Cable and Switch System Components

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7.0 TEST RESULTS

7.1 Summary

Company Name: Samsung Electronics Co., Ltd.
FCC ID: A3LSMA576U
IC: 649E-SMA576W
FCC Classification: 15E 6GHz Low Power Dual Client (6CD)

FCC Part Section(s)	RSS Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1046, 15.407(a)(12)	RSS-248(4.5)	Maximum Conducted Output Power	N/A	CONDUCTED	PASS	Section 7.3
15.407(a)(8), 15.407(a)(7)	RSS-248(4.5)	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)(11)	RSS-248(4.4)	Occupied Bandwidth/ 26dB Bandwidth	99% of the occupied bandwidth of any channel must be contained within each of its respective U-NII sub bands. The maximum transmitter channel bandwidth for U-NII devices in the 5.925-7.125 GHz band is 320 megahertz.		PASS	Section 7.2
15.407(a)(8), 15.407(a)(7)	RSS-248(4.5)	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)	In-Band Emissions	EUT must meet the limits detailed in 15.407(b)(7)		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	See CBP Supplemental Report
15.407(a)(7)	RSS-248 (4.5.5)	Power Reduction Verification	EUT must limit its power to no more than 6dB below its associated standard power access point's authorized transmit power. EUT must distinguish its associated access point as standard or low power and control its power levels accordingly.		PASS	See AFC PRV Supplemental Report
15.407(b)(6)	RSS-248(4.6)	Undesirable Emissions	< -27dBm/MHz e.i.r.p. outside of the 5.925 – 7.125GHz band	RADIATED	PASS	Section 7.6
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		PASS	Section 7.6
15.407(b)(9)	RSS-Gen (8.8)	AC Conducted Emissions (150kHz – 30MHz)	< FCC 15.207 limits	LINE CONDUCTED	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) 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 does 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 v03.
5) 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.
6) 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.

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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 C63.10:2020, and at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26dB bandwidth.

Test Procedure Used

ANSI C63.10:2020 – Section 12.5

Test Settings

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

Test Setup

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

Figure 7-1. Test Instrument & Measurement Setup

Test Notes

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

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	Frequency [MHz]	Channel	802.11 MODE	Antenna-1 26dB Bandwidth [MHz]	Antenna-2 26dB Bandwidth [MHz]	Antenna-1 Occupied Bandwidth [MHz]	Antenna-2 Occupied Bandwidth [MHz]
Band 5	5935	2	a	24.86	24.29	18.67	18.42
	6175	45	a	24.59	24.20	18.43	18.37
	6415	93	a	24.71	23.27	18.76	18.32
	5935	2	ax (20MHz)	24.43	23.57	19.45	19.36
	6175	45	ax (20MHz)	24.03	23.32	19.53	19.30
	6415	93	ax (20MHz)	23.53	23.52	19.50	19.31
	5965	3	ax (40MHz)	44.61	45.38	38.96	38.89
	6165	43	ax (40MHz)	44.58	45.56	38.89	38.84
	6405	91	ax (40MHz)	45.88	45.69	38.85	38.79
	5985	7	ax (80MHz)	92.02	99.98	78.69	78.70
	6145	39	ax (80MHz)	93.89	102.84	78.43	78.79
	6385	87	ax (80MHz)	91.65	108.53	78.44	78.66
Band 6	6435	97	a	24.70	24.37	18.64	18.40
	6475	105	a	24.36	24.34	18.39	18.15
	6515	113	a	24.90	24.15	18.67	18.17
	6435	97	ax (20MHz)	24.57	23.46	19.44	19.29
	6475	105	ax (20MHz)	23.92	24.37	19.33	19.27
	6515	113	ax (20MHz)	23.98	22.72	19.39	19.28
	6445	99	ax (40MHz)	45.17	45.67	38.88	38.93
	6485	107	ax (40MHz)	44.48	45.37	38.99	38.83
	6525	115	ax (40MHz)	44.42	46.04	38.89	39.14
	6465	103	ax (80MHz)	90.70	107.50	78.50	78.71
Band 7	6535	117	a	24.12	24.53	18.58	18.19
	6695	149	a	24.43	24.25	18.50	18.24
	6875	185	a	24.39	24.42	18.62	18.38
	6535	117	ax (20MHz)	25.39	23.10	19.56	19.24
	6695	149	ax (20MHz)	24.06	23.54	19.41	19.32
	6875	185	ax (20MHz)	23.85	23.27	19.49	19.18
	6565	123	ax (40MHz)	45.02	45.73	38.90	38.96
	6725	155	ax (40MHz)	45.22	44.62	39.09	38.86
	6845	179	ax (40MHz)	45.90	46.00	38.94	38.84
	6545	119	ax (80MHz)	92.51	98.57	78.52	78.62
	6705	151	ax (80MHz)	90.20	91.73	78.39	78.35
	6865	183	ax (80MHz)	90.25	93.40	78.48	78.30
Band 8	6895	189	a	24.79	24.34	18.82	18.32
	6995	209	a	24.76	24.55	18.62	18.25
	7115	233	a	24.64	24.08	18.36	18.32
	6895	189	ax (20MHz)	23.69	23.89	19.45	19.33
	6995	209	ax (20MHz)	23.52	23.00	19.38	19.34
	7115	233	ax (20MHz)	24.86	24.30	19.50	19.28
	6885	187	ax (40MHz)	45.06	45.90	38.98	38.95
	7005	211	ax (40MHz)	45.26	45.82	38.89	38.80
	7085	227	ax (40MHz)	45.00	45.42	39.09	39.27
	6945	199	ax (80MHz)	95.95	96.66	78.47	78.46
	7025	215	ax (80MHz)	95.44	91.57	78.79	78.32

Table 7-2. 26dB Bandwidth Results - LPI

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	Frequency [MHz]	Channel	802.11 MODE	Antenna-1 26dB Bandwidth [MHz]	Antenna-2 26dB Bandwidth [MHz]	Antenna-1 Occupied Bandwidth [MHz]	Antenna-2 Occupied Bandwidth [MHz]
Band 5	5935	2	a	24.70	24.38	18.79	18.32
	6175	45	a	24.27	23.92	18.72	18.03
	6415	93	a	24.60	24.43	18.63	18.34
	5935	2	ax (20MHz)	24.85	23.60	19.51	19.49
	6175	45	ax (20MHz)	23.02	23.82	19.47	19.31
	6415	93	ax (20MHz)	24.25	23.87	19.42	19.34
	5965	3	ax (40MHz)	44.85	45.08	38.96	38.85
	6165	43	ax (40MHz)	45.22	45.43	38.96	38.70
	6405	91	ax (40MHz)	44.22	45.48	38.98	38.65
	5985	7	ax (80MHz)	91.83	97.79	78.62	78.53
	6145	39	ax (80MHz)	91.95	93.88	78.63	78.26
	6385	87	ax (80MHz)	91.25	96.23	78.63	78.36
Band 7	6535	117	a	24.43	22.85	18.49	18.41
	6695	149	a	24.61	24.39	18.62	18.23
	6855	181	a	24.78	24.42	18.74	18.16
	6535	117	ax (20MHz)	23.15	24.23	19.38	19.32
	6695	149	ax (20MHz)	24.50	23.60	19.31	19.42
	6855	181	ax (20MHz)	25.42	23.39	19.47	19.41
	6565	123	ax (40MHz)	45.01	45.53	38.94	38.85
	6725	155	ax (40MHz)	43.82	44.97	39.01	38.74
	6845	179	ax (40MHz)	45.02	45.59	38.90	39.17
	6625	135	ax (80MHz)	92.30	93.10	78.56	78.30
	6705	151	ax (80MHz)	89.64	95.79	78.42	78.27
	6785	167	ax (80MHz)	93.54	96.26	78.61	78.56

Table 7-3. 26dB Bandwidth Results – SP

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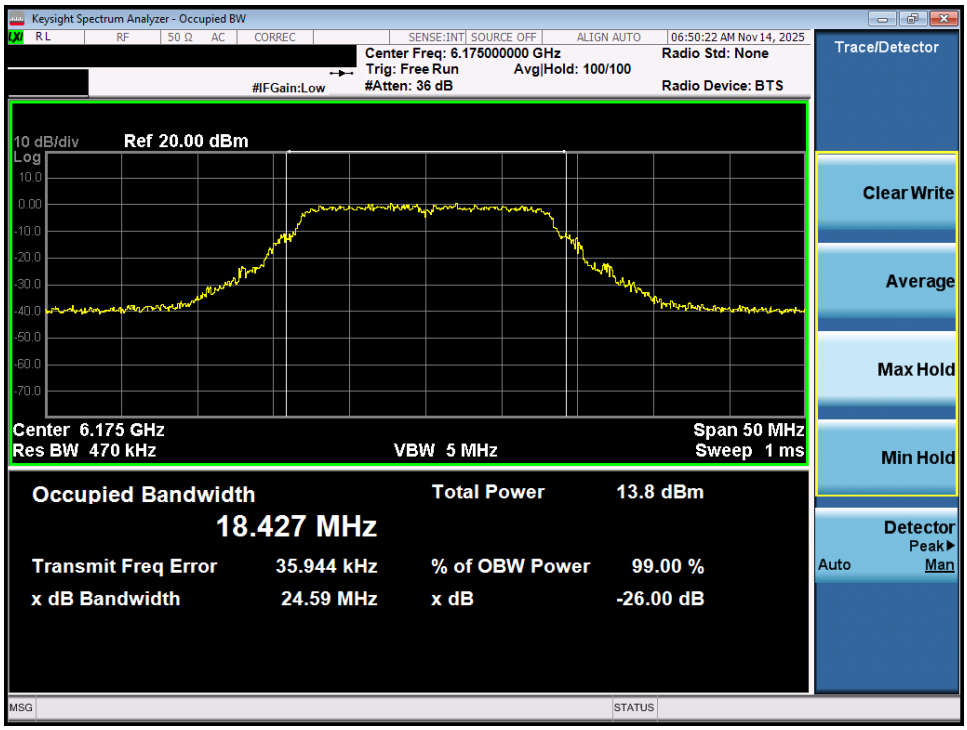
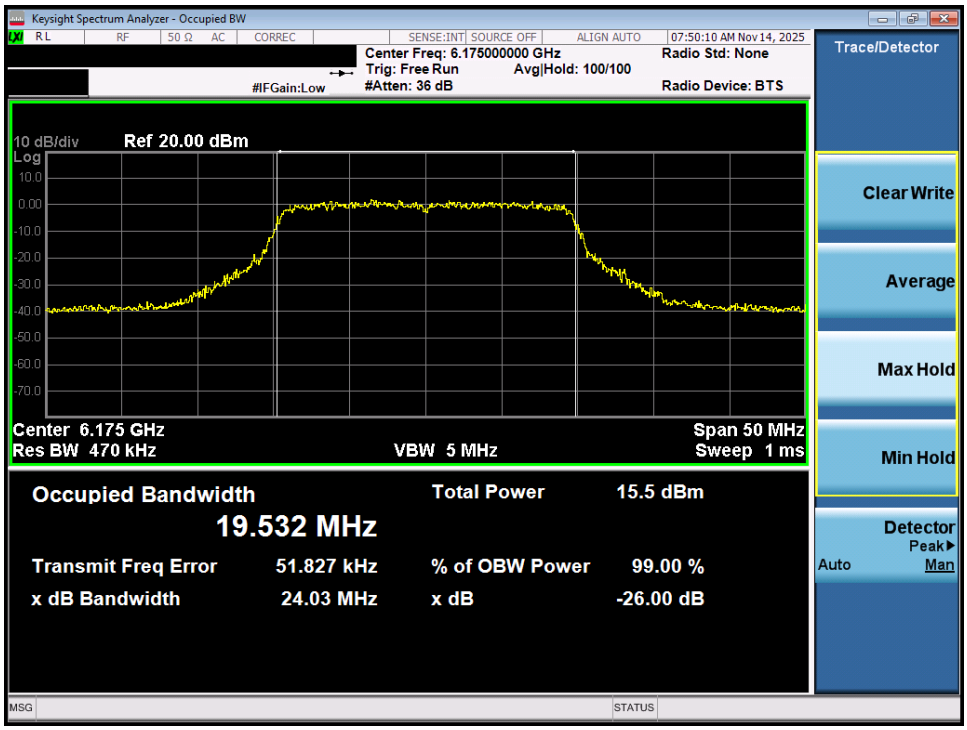
7.2.1 MIMO Antenna-1 26 dB Bandwidth Measurements - (UNII Band 5)



Plot 7-1. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11a (UNII Band 5) – Ch. 45) - LPI



Plot 7-2. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11ax (UNII Band 5) – Ch. 45) - LPI

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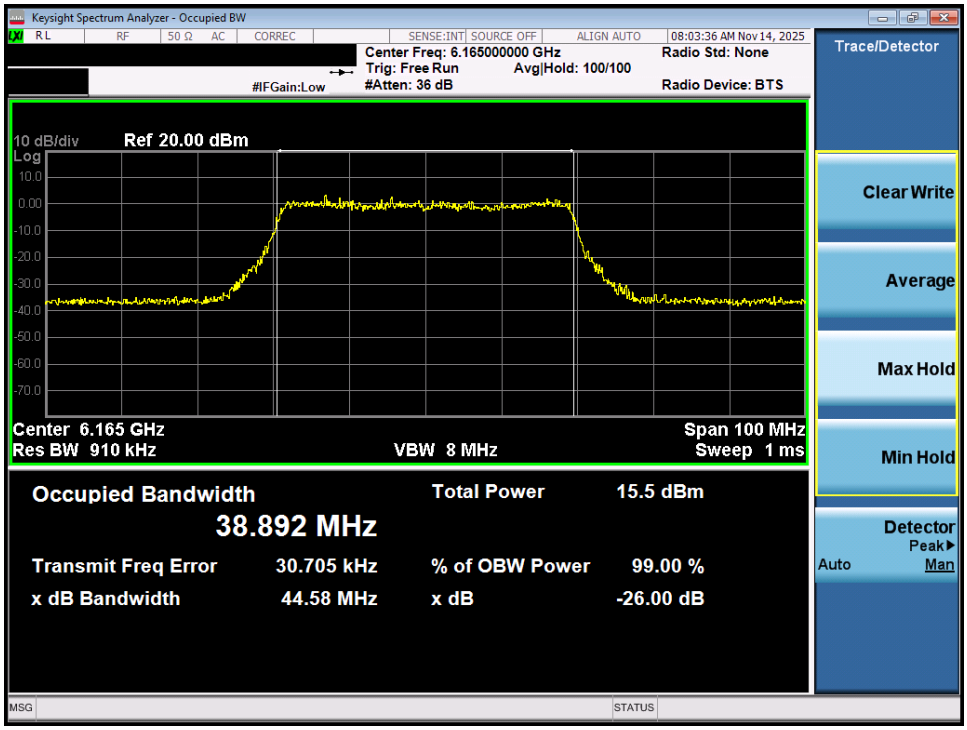
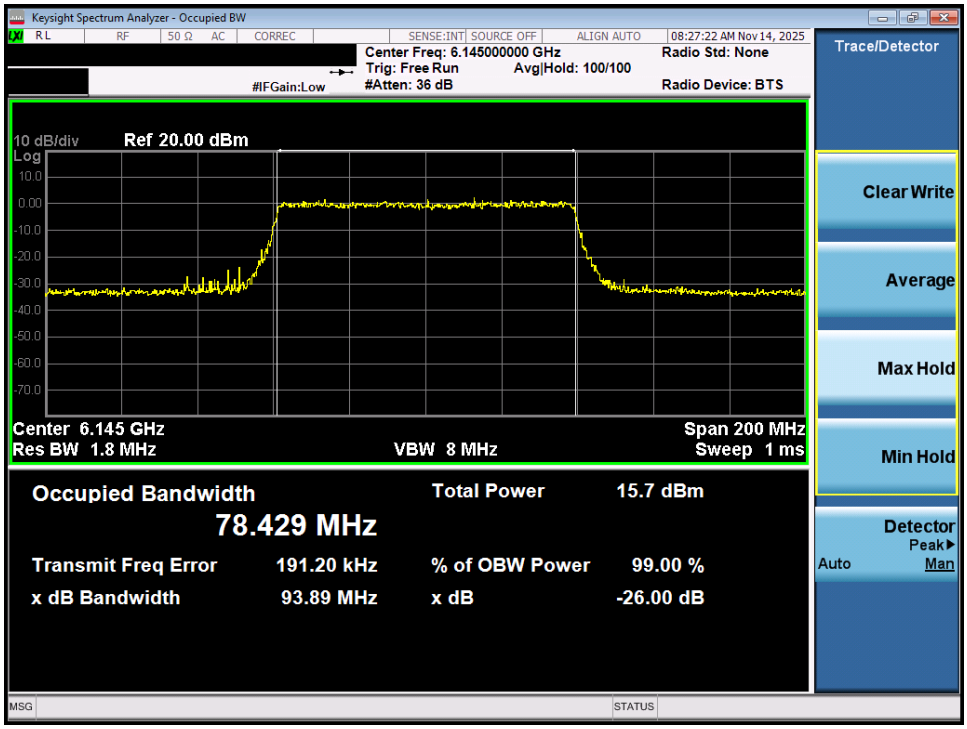


Plot 7-3. 26dB Bandwidth Plot MIMO ANT1 (40MHz 802.11ax (UNII Band 5) – Ch. 43) - LPI



Plot 7-4. 26dB Bandwidth Plot MIMO ANT1 (80MHz 802.11ax (UNII Band 5) – Ch. 39) – LPI

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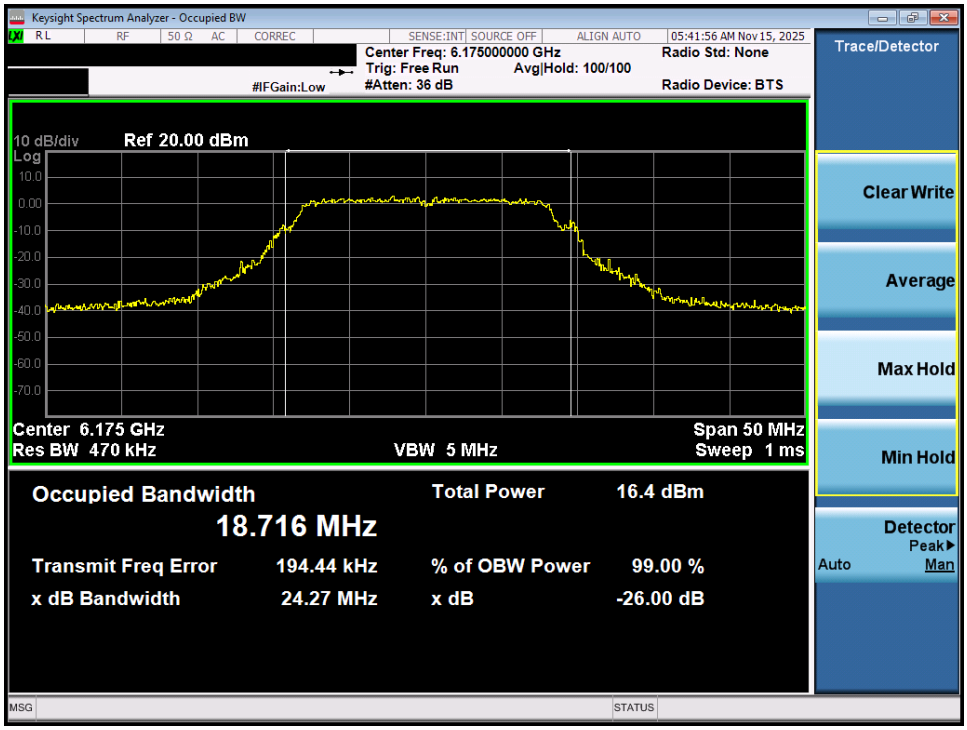
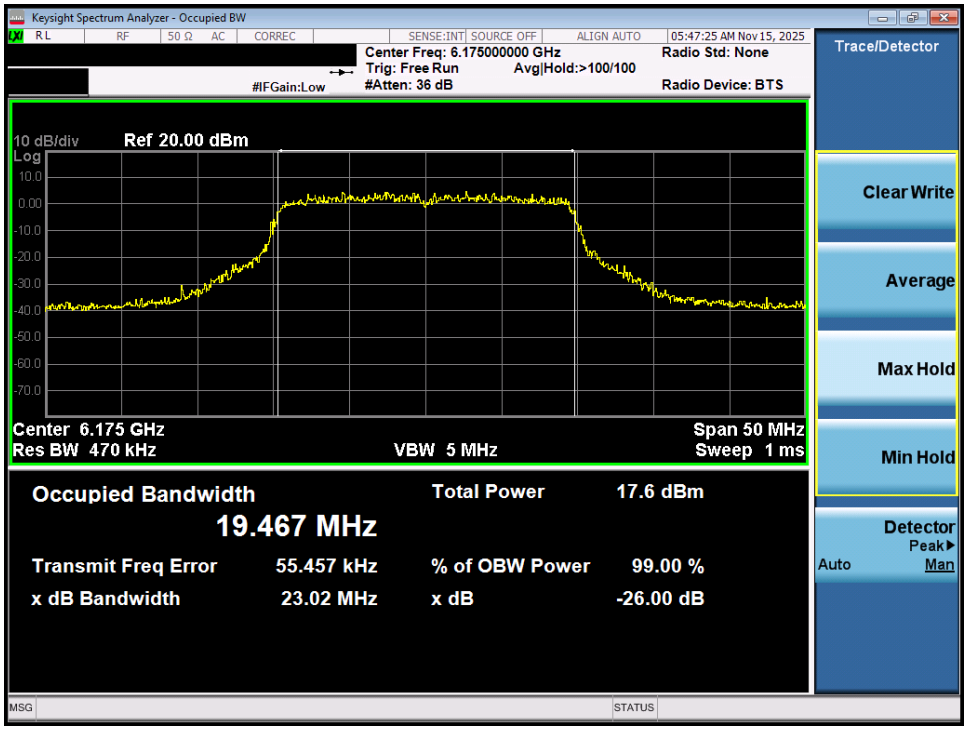


Plot 7-5. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11a (UNII Band 5) – Ch. 45) - SP



Plot 7-6. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11ax (UNII Band 5) – Ch. 45) - SP

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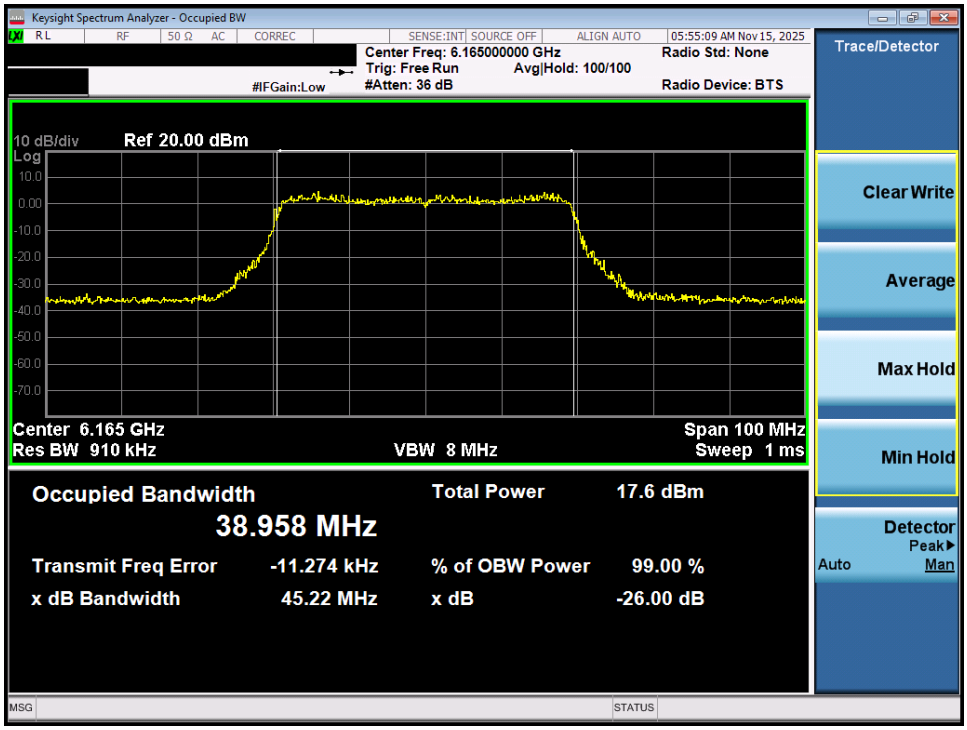
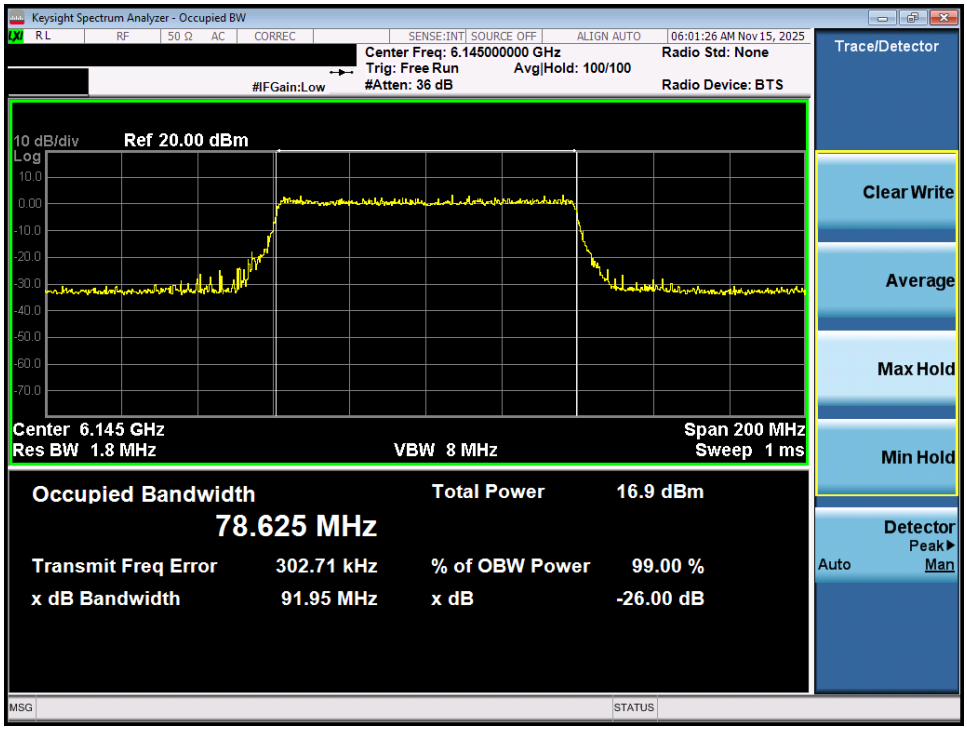


Plot 7-7. 26dB Bandwidth Plot MIMO ANT1 (40MHz 802.11ax (UNII Band 5) – Ch. 43) – SP



Plot 7-8. 26dB Bandwidth Plot MIMO ANT1 (80MHz 802.11ax (UNII Band 5) – Ch. 39) – SP

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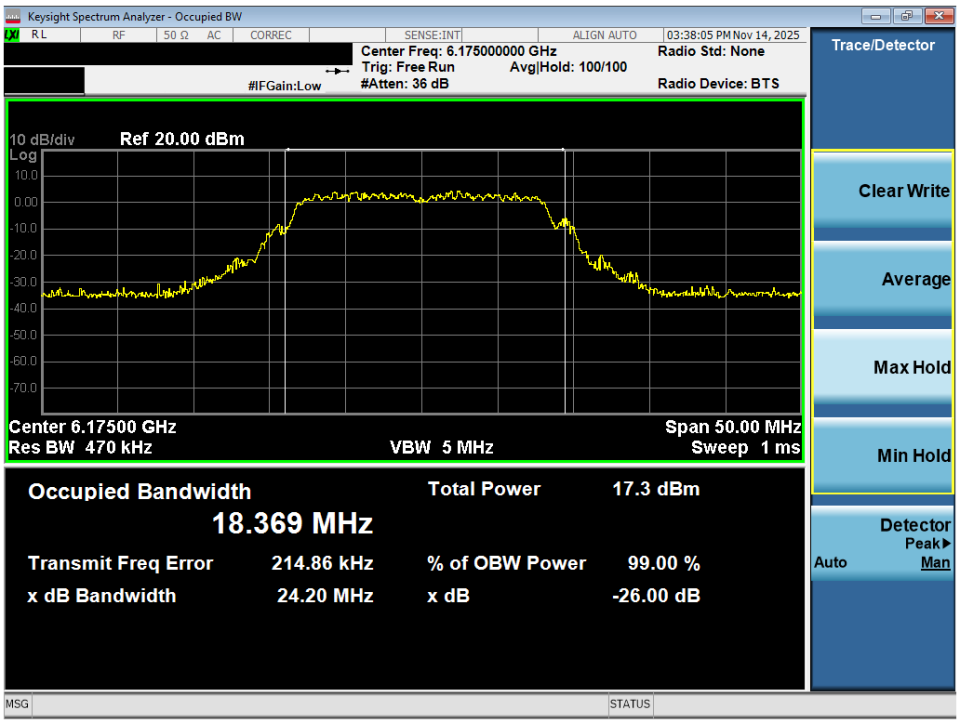
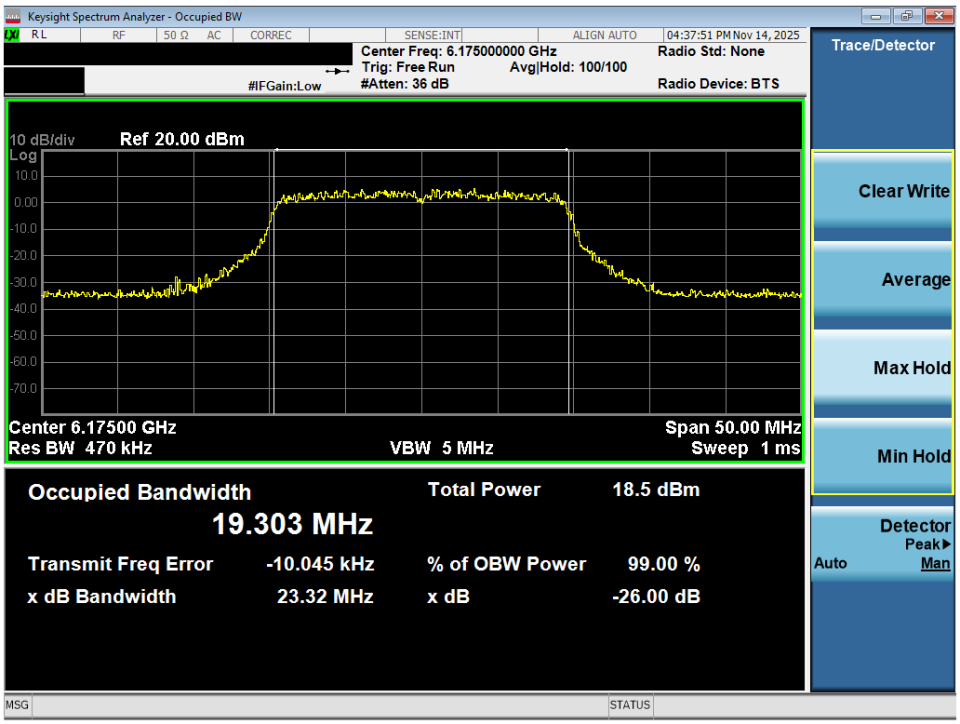
7.2.2 MIMO Antenna-2 26 dB Bandwidth Measurements - (UNII Band 5)



Plot 7-9. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11a (UNII Band 5) – Ch. 45) - LPI



Plot 7-10. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11ax (UNII Band 5) – Ch. 45) - LPI

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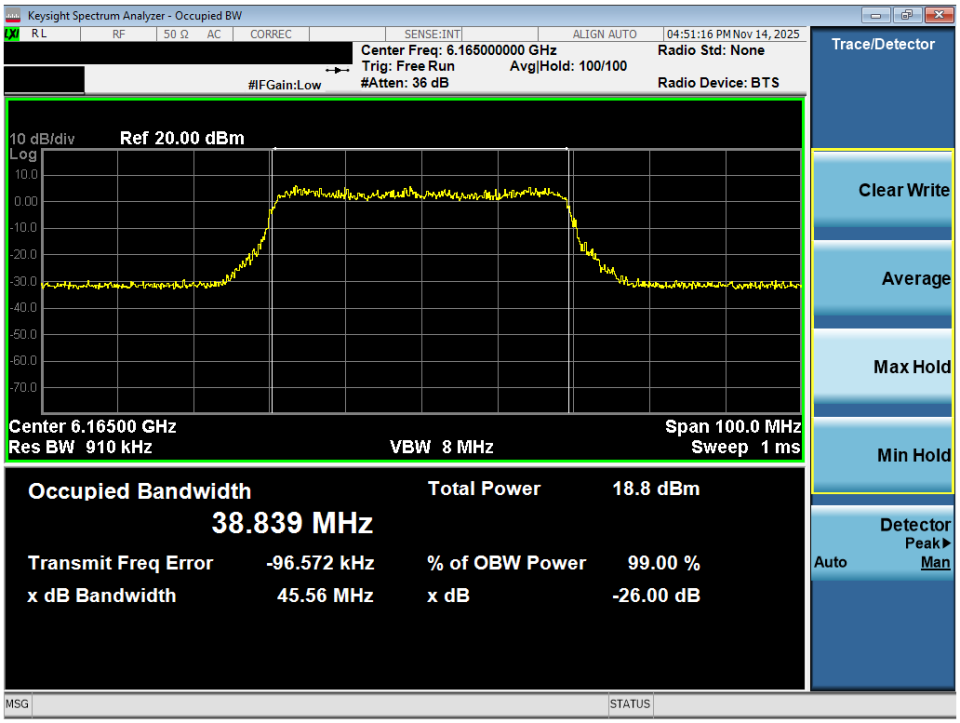
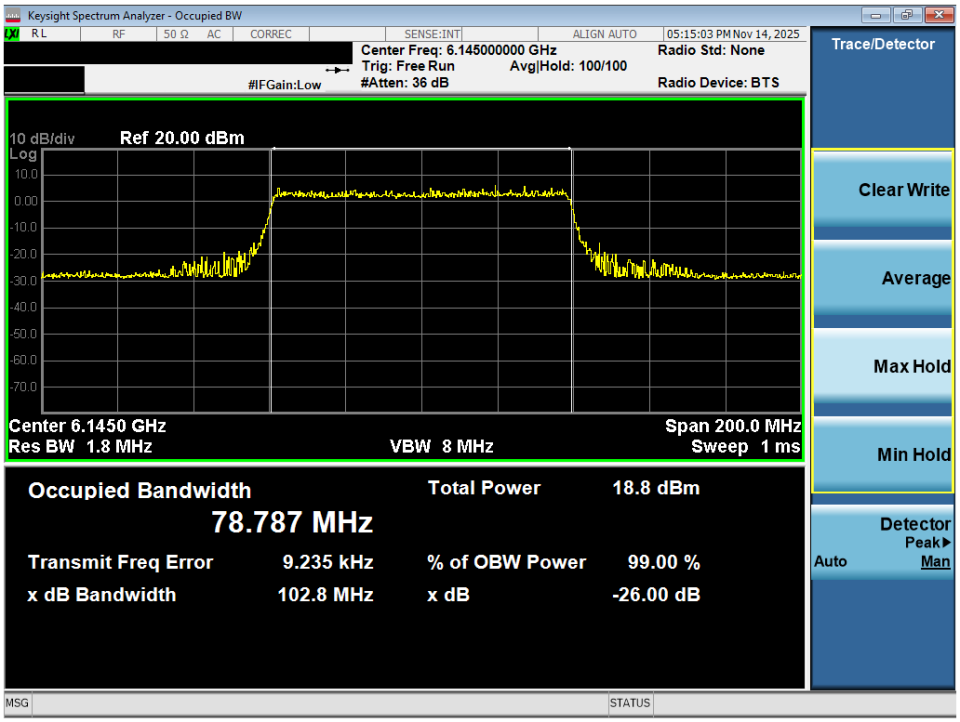


Plot 7-11. 26dB Bandwidth Plot MIMO ANT2 (40MHz 802.11ax (UNII Band 5) – Ch. 43) - LPI



Plot 7-12. 26dB Bandwidth Plot MIMO ANT2 (80MHz 802.11ax (UNII Band 5) – Ch. 39) – LPI

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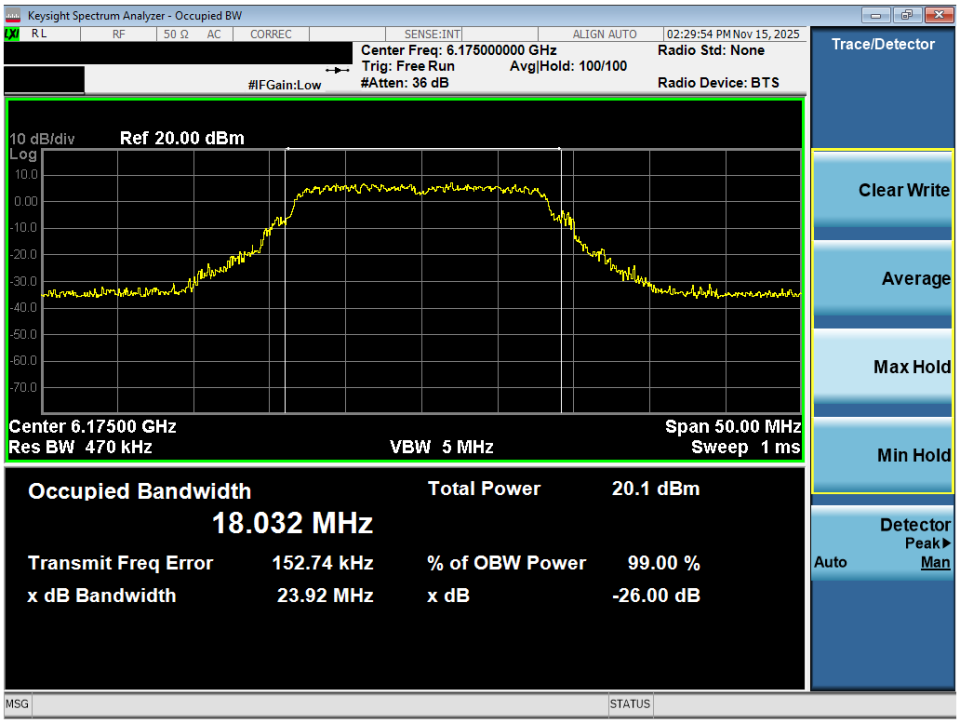
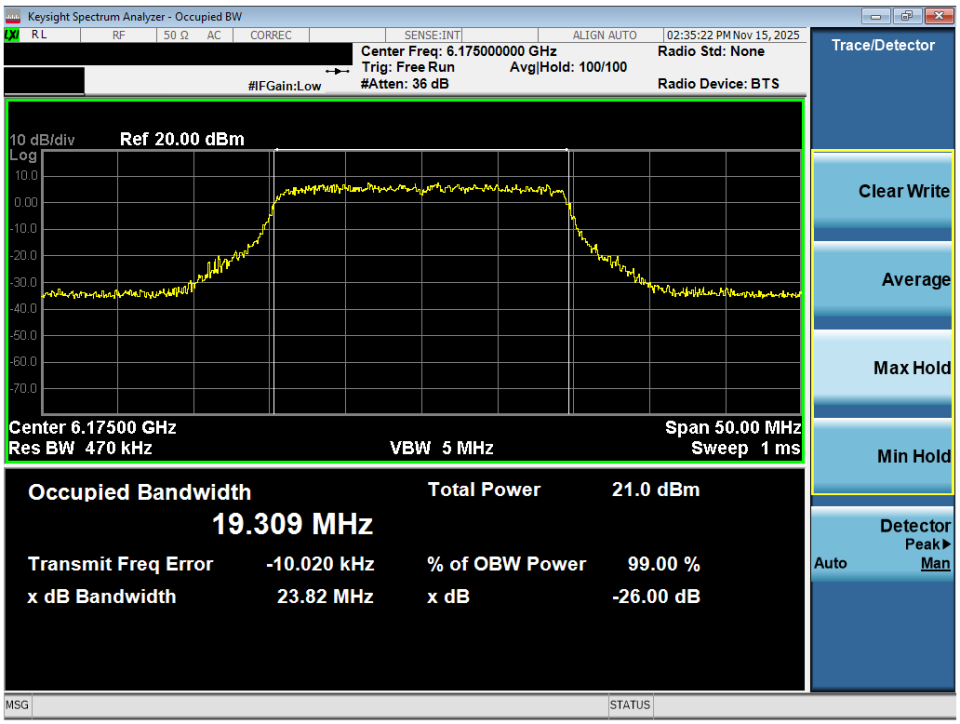


Plot 7-13. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11a (UNII Band 5) – Ch. 45) - SP



Plot 7-14. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11ax (UNII Band 5) – Ch. 45) - SP

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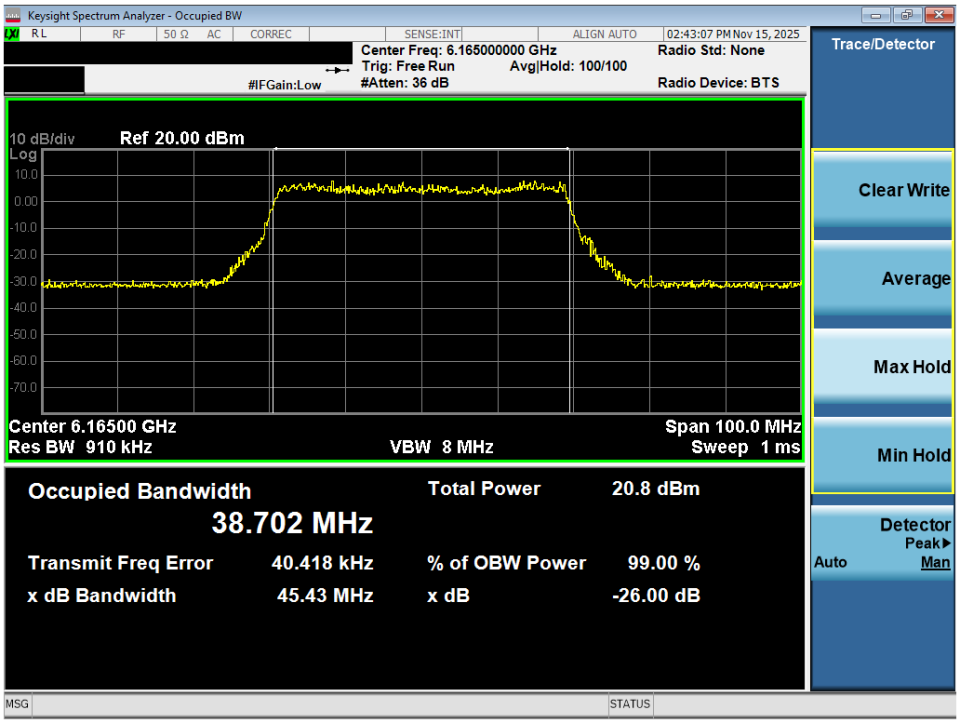
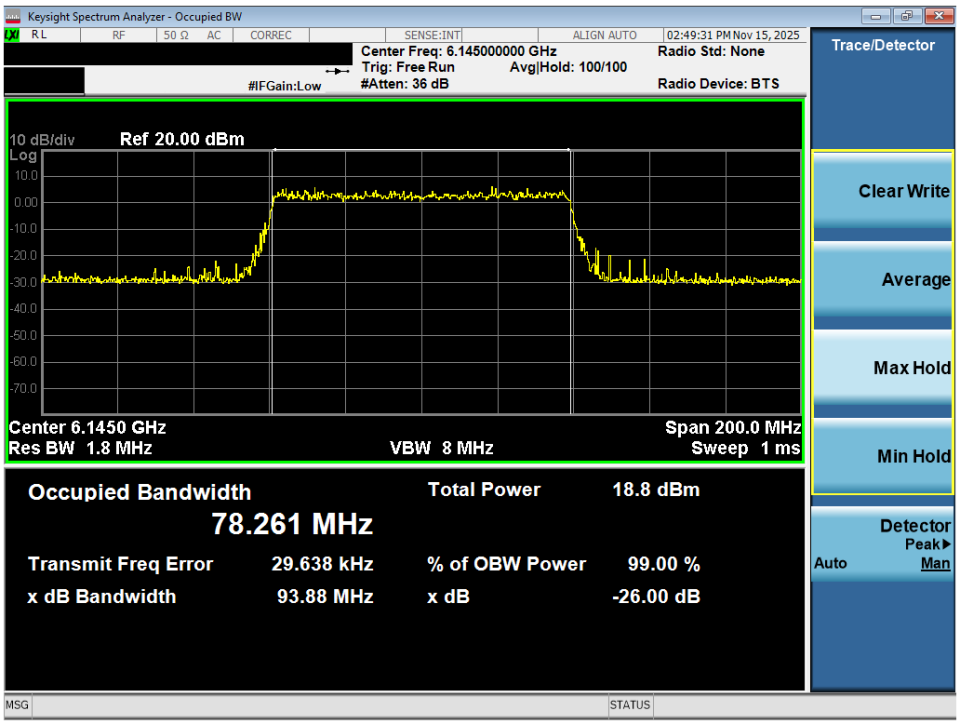


Plot 7-15. 26dB Bandwidth Plot MIMO ANT2 (40MHz 802.11ax (UNII Band 5) – Ch. 43) – SP



Plot 7-16. 26dB Bandwidth Plot MIMO ANT2 (80MHz 802.11ax (UNII Band 5) – Ch. 39) – SP

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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 C63.10:2020, 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 C63.10:2020 – Section 12.4.3.2 Method PM-G
ANSI C63.10:2020 – Section 14.5.2.3 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.

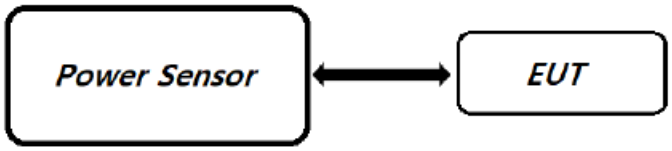

Figure 7-2. Test Instrument & Measurement Setup

Test Notes

none

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MIMO Maximum Conducted Output Power Measurements

6GHz WIFI (20MHz 802.11a MIMO)						Directional Ant. Gain [dBi]	Max e.i.r.p [dBm]	e.i.r.p Limit [dBm]	e.i.r.p Margin [dB]
Band	Freq [MHz]	Channel	Avg. Conducted Powers [dBm]						
			ANT1	ANT2	MIMO				
UNII-5	5935	2	6.56	9.90	11.55	-1.47	10.08	24.00	-13.92
	5955	1	6.91	9.99	11.73	-1.47	10.26	24.00	-13.74
	6175	45	6.62	9.65	11.40	-1.47	9.93	24.00	-14.07
	6415	93	6.95	9.25	11.26	-1.47	9.79	24.00	-14.21
UNII-6	6435	97	6.80	9.08	11.10	-2.18	8.92	24.00	-15.08
	6475	105	6.85	9.49	11.38	-2.18	9.20	24.00	-14.80
	6515	113	6.75	9.38	11.27	-2.18	9.09	24.00	-14.91
UNII-7	6535	117	6.85	9.40	11.32	-2.45	8.87	24.00	-15.13
	6675	145	6.55	9.30	11.15	-2.45	8.70	24.00	-15.30
	6695	149	6.70	9.25	11.17	-2.45	8.72	24.00	-15.28
	6875	185	6.65	9.25	11.15	-2.45	8.70	24.00	-15.30
UNII-8	6895	189	6.75	9.35	11.25	-2.87	8.38	24.00	-15.62
	6995	209	6.65	9.45	11.28	-2.87	8.41	24.00	-15.59
	7115	233	6.90	9.40	11.34	-2.87	8.47	24.00	-15.53

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

6GHz WIFI (20MHz 802.11ax MIMO)						Directional Ant. Gain [dBi]	Max e.i.r.p [dBm]	e.i.r.p Limit [dBm]	e.i.r.p Margin [dB]
Band	Freq [MHz]	Channel	Avg. Conducted Powers [dBm]						
			ANT1	ANT2	MIMO				
UNII-5	5935	2	6.65	9.25	11.15	-1.47	9.68	24.00	-14.32
	5955	1	6.60	9.90	11.57	-1.47	10.10	24.00	-13.90
	6175	45	6.49	9.45	11.23	-1.47	9.76	24.00	-14.24
	6415	93	6.84	8.95	11.03	-1.47	9.56	24.00	-14.44
UNII-6	6435	97	6.75	9.35	11.25	-2.18	9.07	24.00	-14.93
	6475	105	6.25	9.30	11.05	-2.18	8.87	24.00	-15.13
	6515	113	6.45	9.15	11.02	-2.18	8.84	24.00	-15.16
UNII-7	6535	117	6.70	9.95	11.63	-2.45	9.18	24.00	-14.82
	6675	145	6.65	9.30	11.18	-2.45	8.73	24.00	-15.27
	6695	149	6.20	9.50	11.17	-2.45	8.72	24.00	-15.28
	6875	185	6.80	9.40	11.30	-2.45	8.85	24.00	-15.15
UNII-8	6895	189	6.35	9.00	10.88	-2.87	8.01	24.00	-15.99
	6995	209	6.40	9.65	11.33	-2.87	8.46	24.00	-15.54
	7115	233	6.40	9.70	11.37	-2.87	8.50	24.00	-15.50

Table 7-5. MIMO 20MHz BW 802.11ax (UNII) Maximum Conducted Output Power– LPI

6GHz WIFI (40MHz 802.11ax MIMO)						Directional Ant. Gain [dBi]	Max e.i.r.p [dBm]	e.i.r.p Limit [dBm]	e.i.r.p Margin [dB]
Band	Freq [MHz]	Channel	Avg. Conducted Powers [dBm]						
			ANT1	ANT2	MIMO				
UNII-5	5965	3	6.30	9.05	10.90	-1.47	9.43	24.00	-14.57
	6165	43	6.70	8.85	10.92	-1.47	9.45	24.00	-14.55
	6285	67	6.75	8.55	10.75	-1.47	9.28	24.00	-14.72
	6405	91	6.55	8.80	10.83	-1.47	9.36	24.00	-14.64
UNII-6	6445	99	6.85	8.40	10.70	-2.18	8.52	24.00	-15.48
	6485	107	6.60	8.90	10.91	-2.18	8.73	24.00	-15.27
	6525	115	6.89	9.05	11.11	-2.18	8.93	24.00	-15.07
UNII-7	6565	123	6.55	8.75	10.80	-2.45	8.35	24.00	-15.65
	6685	147	6.85	8.30	10.65	-2.45	8.20	24.00	-15.80
	6725	155	6.45	9.10	10.98	-2.45	8.53	24.00	-15.47
	6845	179	6.95	9.15	11.20	-2.45	8.75	24.00	-15.25
UNII-8	6885	187	6.80	9.99	11.69	-2.87	8.82	24.00	-15.18
	7005	211	6.90	9.45	11.37	-2.87	8.50	24.00	-15.50
	7085	227	6.95	8.55	10.83	-2.87	7.96	24.00	-16.04

Table 7-6. MIMO 40MHz BW 802.11ax (UNII) Maximum Conducted Output Power– LPI

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6GHz WIFI (80MHz 802.11ax MIMO)						Directional Ant. Gain [dBi]	Max e.i.r.p [dBm]	e.i.r.p Limit [dBm]	e.i.r.p Margin [dB]
Band	Freq [MHz]	Channel	Avg. Conducted Powers [dBm]						
			ANT1	ANT2	MIMO				
UNII-5	5985	7	6.10	8.35	10.38	-1.47	8.91	24.00	-15.09
	6145	39	6.50	8.10	10.38	-1.47	8.91	24.00	-15.09
	6305	71	6.25	8.45	10.50	-1.47	9.03	24.00	-14.97
	6385	87	6.35	8.16	10.36	-1.47	8.89	24.00	-15.11
UNII-6	6465	103	6.30	8.20	10.36	-2.18	8.18	24.00	-15.82
UNII-7	6545	119	6.25	9.35	11.08	-2.45	8.63	24.00	-15.37
	6705	151	6.55	9.81	11.49	-2.45	9.04	24.00	-14.96
	6785	167	6.45	9.70	11.38	-2.45	8.93	24.00	-15.07
	6865	183	6.50	9.25	11.10	-2.45	8.65	24.00	-15.35
UNII-8	6945	199	6.30	9.00	10.87	-2.87	8.00	24.00	-16.00
	7025	215	6.40	8.35	10.49	-2.87	7.62	24.00	-16.38

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

6GHz WIFI (20MHz 802.11a MIMO)						Directional Ant. Gain [dBi]	Max e.i.r.p [dBm]	e.i.r.p Limit [dBm]	e.i.r.p Margin [dB]
Band	Freq [MHz]	Channel	Avg. Conducted Powers [dBm]						
			ANT1	ANT2	MIMO				
UNII-5	5935	2	6.56	9.90	11.55	-1.47	10.08	30.00	-19.92
	5955	1	12.80	15.30	17.24	-1.47	15.77	30.00	-14.23
	6175	45	12.70	15.10	17.07	-1.47	15.60	30.00	-14.40
	6275	65	12.10	14.50	16.47	-1.47	15.00	30.00	-15.00
	6415	93	12.35	14.90	16.82	-1.47	15.35	30.00	-14.65
UNII-7	6535	117	12.60	15.10	17.04	-2.45	14.59	30.00	-15.41
	6675	145	12.80	14.95	17.02	-2.45	14.57	30.00	-15.43
	6695	149	12.30	15.20	17.00	-2.45	14.55	30.00	-15.45
	6875	185	12.95	14.55	16.83	-2.45	14.38	30.00	-15.62

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

6GHz WIFI (20MHz 802.11ax MIMO)						Directional Ant. Gain [dBi]	Max e.i.r.p [dBm]	e.i.r.p Limit [dBm]	e.i.r.p Margin [dB]
Band	Freq [MHz]	Channel	Avg. Conducted Powers [dBm]						
			ANT1	ANT2	MIMO				
UNII-5	5935	2	6.65	9.25	11.15	-1.47	9.68	30.00	-20.32
	5955	1	12.75	15.95	17.65	-1.47	16.18	30.00	-13.82
	6175	45	13.10	15.30	17.35	-1.47	15.88	30.00	-14.12
	6415	93	12.60	14.40	16.60	-1.47	15.13	30.00	-14.87
UNII-7	6535	117	12.65	15.25	17.15	-2.45	14.70	30.00	-15.30
	6675	145	13.40	15.00	17.28	-2.45	14.83	30.00	-15.17
	6695	149	12.80	15.25	17.21	-2.45	14.76	30.00	-15.24
	6875	185	13.15	14.90	17.12	-2.45	14.67	30.00	-15.33

Table 7-9. MIMO 20MHz BW 802.11ax (UNII) Maximum Conducted Output Power– SP

6GHz WIFI (40MHz 802.11ax MIMO)						Directional Ant. Gain [dBi]	Max e.i.r.p [dBm]	e.i.r.p Limit [dBm]	e.i.r.p Margin [dB]
Band	Freq [MHz]	Channel	Avg. Conducted Powers [dBm]						
			ANT1	ANT2	MIMO				
UNII-5	5965	3	9.10	12.35	14.03	-1.47	12.56	30.00	-17.44
	6165	43	9.99	12.10	14.18	-1.47	12.71	30.00	-17.29
	6285	67	9.85	11.89	14.00	-1.47	12.53	30.00	-17.47
	6405	91	9.65	12.30	14.18	-1.47	12.71	30.00	-17.29
UNII-7	6565	123	9.75	12.40	14.28	-2.45	11.83	30.00	-18.17
	6685	147	9.80	12.75	14.53	-2.45	12.08	30.00	-17.92
	6725	155	9.20	12.35	14.06	-2.45	11.61	30.00	-18.39
	6845	179	9.60	12.80	14.50	-2.45	12.05	30.00	-17.95

Table 7-10. MIMO 40MHz BW 802.11ax (UNII) Maximum Conducted Output Power– SP

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6GHz WIFI (80MHz 802.11ax MIMO)						Directional Ant. Gain [dBi]	Max e.i.r.p [dBm]	e.i.r.p Limit [dBm]	e.i.r.p Margin [dB]
Band	Freq [MHz]	Channel	Avg. Conducted Powers [dBm]						
			ANT1	ANT2	MIMO				
UNII-5	5985	7	8.15	11.00	12.82	-1.47	11.35	30.00	-18.65
	6145	39	8.50	10.75	12.78	-1.47	11.31	30.00	-18.69
	6305	71	8.99	10.50	12.82	-1.47	11.35	30.00	-18.65
	6385	87	8.80	10.40	12.68	-1.47	11.21	30.00	-18.79
UNII-7	6545	119	8.70	11.40	13.27	-2.45	10.82	30.00	-19.18
	6705	151	8.60	11.49	13.29	-2.45	10.84	30.00	-19.16
	6785	167	8.70	11.30	13.20	-2.45	10.75	30.00	-19.25
	6865	183	8.80	11.30	13.24	-2.45	10.79	30.00	-19.21

Table 7-11. MIMO 80MHz BW 802.11ax (UNII) Maximum Conducted Output Power – SP

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Sample MIMO Calculation:

At 5935MHz in 802.11a (20MHz BW) mode, the average conducted output power was measured to be 6.56 dBm for Antenna-1 and 9.90 dBm for Antenna-2.

Antenna 1 + Antenna 2 = MIMO

(6.56 dBm + 9.90 dBm) = (4.529 mW + 9.772 mW) = 14.301 mW = 11.55 dBm

Sample Directional Gain Calculation:

Per ANSI C63.10:2020 Section 14.6.3, the directional gain is calculated using the following formula, where G_N is the gain of the nth antenna and N_{ANT}, the total number of antennas used.

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

Sample e.i.r.p. Calculation:

At 5935MHz in 802.11a (20MHz BW) mode, the average MIMO conducted power was calculated to be 11.55 dBm with directional gain of -1.47 dBi.

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

11.55 dBm + -1.47 dBi = 10.08 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 C63.10:2020, and at the appropriate frequencies. Method SA-1, as defined in ANSI C63.10:2020, was used to measure the power spectral density for 802.11a/ax.

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 C63.10:2020 – Section 12.4.2.2
ANSI C63.10:2020 – Section 14.5.2.3 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 ≥ 2 x (span/RBW)
6. Sweep time = auto
7. Detector = power averaging (RMS)
8. Trigger was set to free run for all modes.
9. Trace was averaged over 100 sweeps.
10. The peak search function of the spectrum analyzer was used to find the peak of the spectrum.

Test Setup

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

Figure 7-3. Test Instrument & Measurement Setup

Test Notes

none

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MIMO Power Spectral Density Measurements

	Frequency [MHz]	Channel	802.11 MODE	Antenna-1 Power Density [dBm]	Antenna-2 Power Density [dBm]	Antenna-1 Gain [dBi]	Antenna-2 Gain [dBi]	Summed MIMO Power Density [dBm/MHz]	Directional Gain [dBi]	DCCF [dB]	EIRP Density [dBm/MHz]	EIRP Density Limit [dBm/MHz]	Margin [dB]
Band 5	5935	2	a	-4.99	-1.88	-4.92	-4.07	-0.15	-1.47	0.16	-1.47	-1	-0.47
	6175	45	a	-4.68	-1.72	-4.92	-4.07	0.06	-1.47	0.16	-1.26	-1	-0.26
	6415	93	a	-4.93	-2.04	-4.92	-4.07	-0.24	-1.47	0.16	-1.55	-1	-0.55
	5935	2	ax (20MHz)	-5.28	-2.08	-4.92	-4.07	-0.38	-1.47	0.14	-1.71	-1	-0.71
	6175	45	ax (20MHz)	-5.40	-2.15	-4.92	-4.07	-0.46	-1.47	0.14	-1.80	-1	-0.80
	6415	93	ax (20MHz)	-5.20	-2.43	-4.92	-4.07	-0.59	-1.47	0.14	-1.92	-1	-0.92
	5965	3	ax (40MHz)	-5.64	-2.96	-4.92	-4.07	-1.09	-1.47	0.25	-2.31	-1	-1.31
	6165	43	ax (40MHz)	-5.61	-2.94	-4.92	-4.07	-1.06	-1.47	0.25	-2.28	-1	-1.28
	6405	91	ax (40MHz)	-5.84	-2.70	-4.92	-4.07	-0.98	-1.47	0.25	-2.21	-1	-1.21
	5985	7	ax (80MHz)	-9.81	-5.20	-4.92	-4.07	-3.91	-1.47	0.47	-4.91	-1	-3.91
	6145	39	ax (80MHz)	-9.08	-6.81	-4.92	-4.07	-4.79	-1.47	0.47	-5.79	-1	-4.79
	6385	87	ax (80MHz)	-8.94	-6.88	-4.92	-4.07	-4.78	-1.47	0.47	-5.78	-1	-4.78
Band 6	6435	97	a	-4.34	-2.01	-4.92	-5.46	-0.01	-2.18	0.16	-2.02	-1	-1.02
	6475	105	a	-4.15	-2.02	-4.92	-5.46	0.05	-2.18	0.16	-1.96	-1	-0.96
	6515	113	a	-4.14	-1.92	-4.92	-5.46	0.12	-2.18	0.16	-1.89	-1	-0.89
	6435	97	ax (20MHz)	-4.40	-2.75	-4.92	-5.46	-0.48	-2.18	0.14	-2.52	-1	-1.52
	6475	105	ax (20MHz)	-4.94	-2.90	-4.92	-5.46	-0.79	-2.18	0.14	-2.83	-1	-1.83
	6515	113	ax (20MHz)	-5.02	-2.55	-4.92	-5.46	-0.60	-2.18	0.14	-2.63	-1	-1.63
	6445	99	ax (40MHz)	-5.63	-3.03	-4.92	-5.46	-1.13	-2.18	0.25	-3.05	-1	-2.05
	6485	107	ax (40MHz)	-5.59	-3.23	-4.92	-5.46	-1.24	-2.18	0.25	-3.17	-1	-2.17
	6525	115	ax (40MHz)	-5.14	-3.36	-4.92	-5.46	-1.15	-2.18	0.25	-3.07	-1	-2.07
	6465	103	ax (80MHz)	-9.87	-6.44	-4.92	-5.46	-4.81	-2.18	0.47	-6.52	-1	-5.52
Band 7	6535	117	a	-4.41	-2.08	-5.35	-5.58	-0.08	-2.45	0.16	-2.38	-1	-1.38
	6695	149	a	-4.75	-1.68	-5.35	-5.58	0.06	-2.45	0.16	-2.23	-1	-1.23
	6875	185	a	-4.82	-1.06	-5.35	-5.58	0.47	-2.45	0.16	-1.82	-1	-0.82
	6535	117	ax (20MHz)	-4.20	-2.21	-5.35	-5.58	-0.08	-2.45	0.14	-2.40	-1	-1.40
	6695	149	ax (20MHz)	-5.24	-2.27	-5.35	-5.58	-0.50	-2.45	0.14	-2.81	-1	-1.81
	6875	185	ax (20MHz)	-4.26	-2.45	-5.35	-5.58	-0.25	-2.45	0.14	-2.56	-1	-1.56
	6565	123	ax (40MHz)	-5.37	-2.57	-5.35	-5.58	-0.73	-2.45	0.25	-2.94	-1	-1.94
	6725	155	ax (40MHz)	-5.78	-2.79	-5.35	-5.58	-1.02	-2.45	0.25	-3.23	-1	-2.23
	6845	179	ax (40MHz)	-5.43	-1.99	-5.35	-5.58	-0.37	-2.45	0.25	-2.57	-1	-1.57
	6545	119	ax (80MHz)	-8.98	-6.18	-5.35	-5.58	-4.35	-2.45	0.47	-6.33	-1	-5.33
	6705	151	ax (80MHz)	-9.06	-6.42	-5.35	-5.58	-4.53	-2.45	0.47	-6.52	-1	-5.52
	6865	183	ax (80MHz)	-9.10	-6.61	-5.35	-5.58	-4.67	-2.45	0.47	-6.65	-1	-5.65
Band 8	6895	189	a	-4.26	-1.23	-5.81	-5.95	0.53	-2.87	0.16	-2.18	-1	-1.18
	6995	209	a	-5.40	-0.84	-5.81	-5.95	0.46	-2.87	0.16	-2.25	-1	-1.25
	7115	233	a	-5.78	-1.12	-5.81	-5.95	0.16	-2.87	0.16	-2.55	-1	-1.55
	6895	189	ax (20MHz)	-4.89	-2.27	-5.81	-5.95	-0.38	-2.87	0.14	-3.11	-1	-2.11
	6995	209	ax (20MHz)	-5.77	-1.60	-5.81	-5.95	-0.19	-2.87	0.14	-2.92	-1	-1.92
	7115	233	ax (20MHz)	-6.06	-1.43	-5.81	-5.95	-0.15	-2.87	0.14	-2.88	-1	-1.88
	6885	187	ax (40MHz)	-5.69	-2.94	-5.81	-5.95	-1.09	-2.87	0.25	-3.71	-1	-2.71
	7005	211	ax (40MHz)	-6.51	-2.73	-5.81	-5.95	-1.21	-2.87	0.25	-3.83	-1	-2.83
	7085	227	ax (40MHz)	-6.72	-2.73	-5.81	-5.95	-1.27	-2.87	0.25	-3.89	-1	-2.89
	6945	199	ax (80MHz)	-9.39	-6.59	-5.81	-5.95	-4.76	-2.87	0.47	-7.16	-1	-6.16
	7025	215	ax (80MHz)	-9.07	-6.95	-5.81	-5.95	-4.87	-2.87	0.47	-7.27	-1	-6.27

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

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	Frequency [MHz]	Channel	802.11 MODE	Antenna-1 Power Density [dBm/MHz]	Antenna-2 Power Density [dBm/MHz]	Antenna-1 Gain [dBi]	Antenna-2 Gain [dBi]	Summed MIMO Power Density [dBm/MHz]	Directional Gain [dBi]	DCCF [dB]	EIRP Density [dBm/MHz]	EIRP Density Limit [dBm/MHz]	Margin [dB]
Band 5	5935	2	a	0.38	3.63	-4.92	-4.07	5.31	-1.47	0.16	4.00	17	-13.00
	6175	45	a	1.82	3.96	-4.92	-4.07	6.03	-1.47	0.16	4.72	17	-12.28
	6415	93	a	1.24	3.74	-4.92	-4.07	5.68	-1.47	0.16	4.36	17	-12.64
	5935	2	ax (20MHz)	0.56	3.97	-4.92	-4.07	5.60	-1.47	0.14	4.27	17	-12.73
	6175	45	ax (20MHz)	1.63	3.90	-4.92	-4.07	5.92	-1.47	0.14	4.59	17	-12.41
	6415	93	ax (20MHz)	1.29	3.72	-4.92	-4.07	5.68	-1.47	0.14	4.35	17	-12.65
	5965	3	ax (40MHz)	-4.80	-1.16	-4.92	-4.07	0.40	-1.47	0.25	-0.82	17	-17.82
	6165	43	ax (40MHz)	-4.06	-1.67	-4.92	-4.07	0.31	-1.47	0.25	-0.91	17	-17.91
	6405	91	ax (40MHz)	-4.60	-2.10	-4.92	-4.07	-0.16	-1.47	0.25	-1.39	17	-18.39
	5985	7	ax (80MHz)	-9.49	-6.50	-4.92	-4.07	-4.73	-1.47	0.47	-5.74	17	-22.74
	6145	39	ax (80MHz)	-8.48	-6.42	-4.92	-4.07	-4.32	-1.47	0.47	-5.32	17	-22.32
	6385	87	ax (80MHz)	-8.65	-6.36	-4.92	-4.07	-4.35	-1.47	0.47	-5.35	17	-22.35
Band 7	6535	117	a	2.04	4.32	-5.35	-5.58	6.34	-2.45	0.16	4.05	17	-12.95
	6695	149	a	1.23	4.38	-5.35	-5.58	6.09	-2.45	0.16	3.80	17	-13.20
	6855	181	a	2.21	4.37	-5.35	-5.58	6.43	-2.45	0.16	4.14	17	-12.86
	6535	117	ax (20MHz)	0.78	4.14	-5.35	-5.58	5.79	-2.45	0.14	3.47	17	-13.53
	6695	149	ax (20MHz)	0.80	4.38	-5.35	-5.58	5.96	-2.45	0.14	3.65	17	-13.35
	6855	181	ax (20MHz)	2.16	4.50	-5.35	-5.58	6.50	-2.45	0.14	4.18	17	-12.82
	6565	123	ax (40MHz)	-4.98	-1.17	-5.35	-5.58	0.34	-2.45	0.25	-1.86	17	-18.86
	6725	155	ax (40MHz)	-4.48	-1.26	-5.35	-5.58	0.43	-2.45	0.25	-1.77	17	-18.77
	6845	179	ax (40MHz)	-4.78	-1.52	-5.35	-5.58	0.16	-2.45	0.25	-2.04	17	-19.04
	6625	135	ax (80MHz)	-9.13	-6.27	-5.35	-5.58	-4.46	-2.45	0.47	-6.44	17	-23.44
	6705	151	ax (80MHz)	-8.84	-6.33	-5.35	-5.58	-4.40	-2.45	0.47	-6.38	17	-23.38
	6785	167	ax (80MHz)	-8.72	-5.72	-5.35	-5.58	-3.95	-2.45	0.47	-5.94	17	-22.94

Table 7-13. MIMO e.i.r.p. Conducted Power Spectral Density Measurements SP

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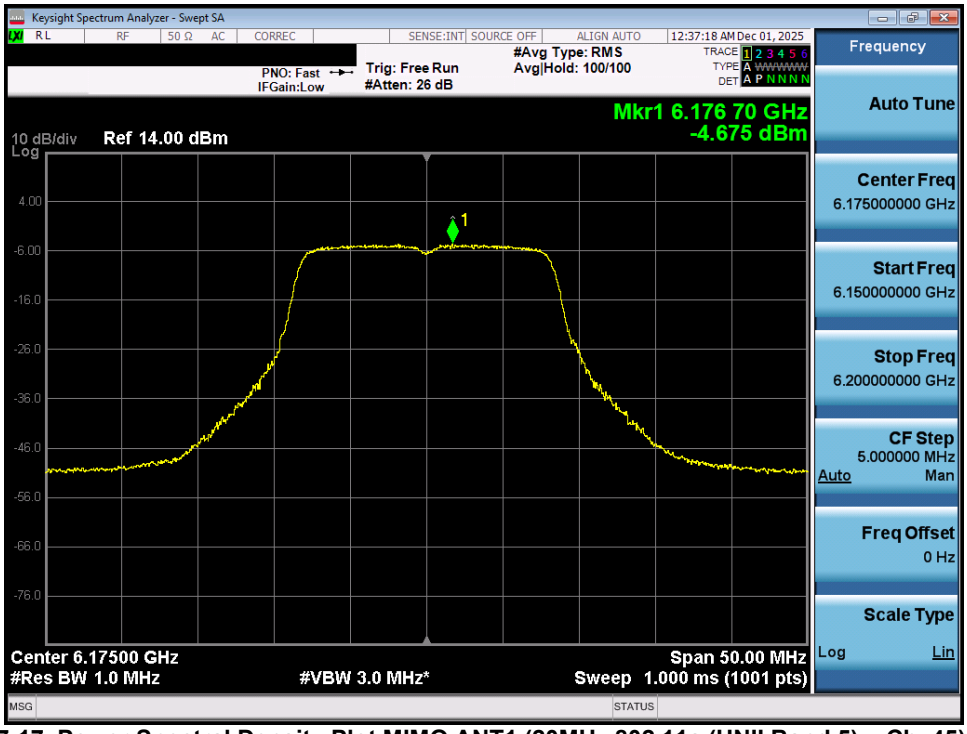
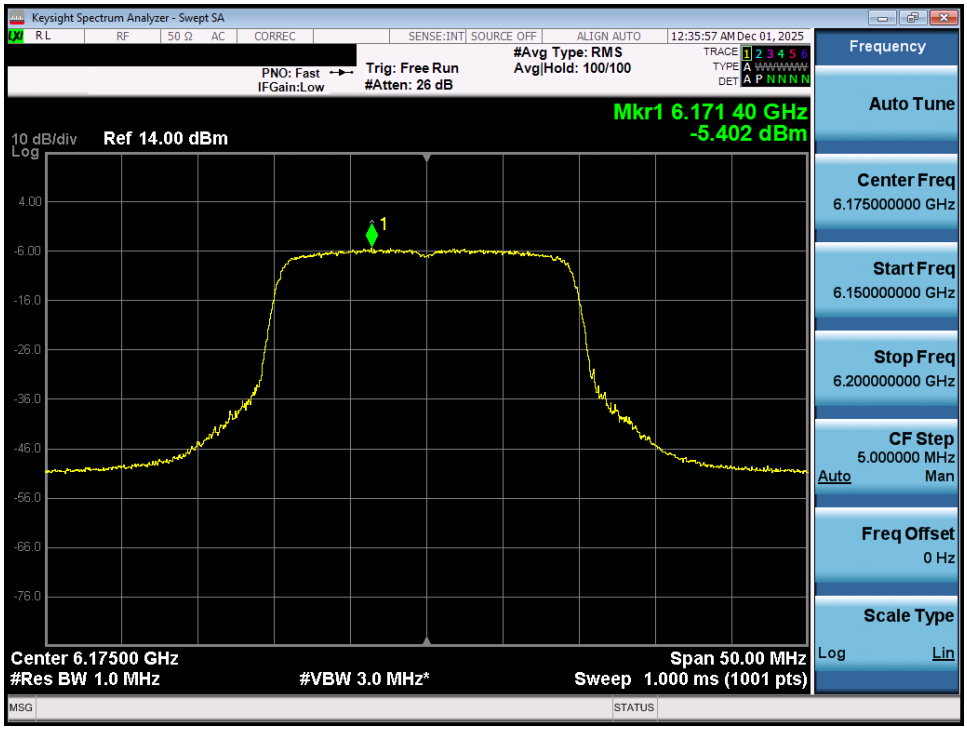
7.4.1 MIMO Antenna-1 Power Spectral Density Measurement - (UNII Band 5)



Plot 7-17. Power Spectral Density Plot MIMO ANT1 (20MHz 802.11a (UNII Band 5) – Ch. 45) - LPI



Plot 7-18. Power Spectral Density Plot MIMO ANT1 (20MHz 802.11ax (UNII Band 5) – Ch. 45) - LPI

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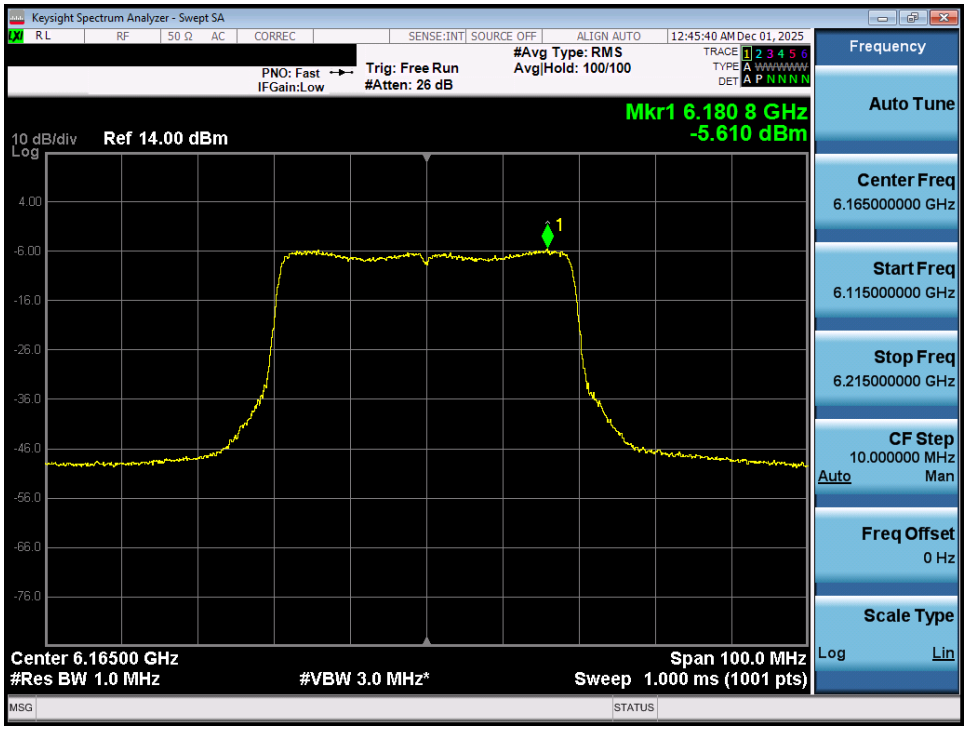
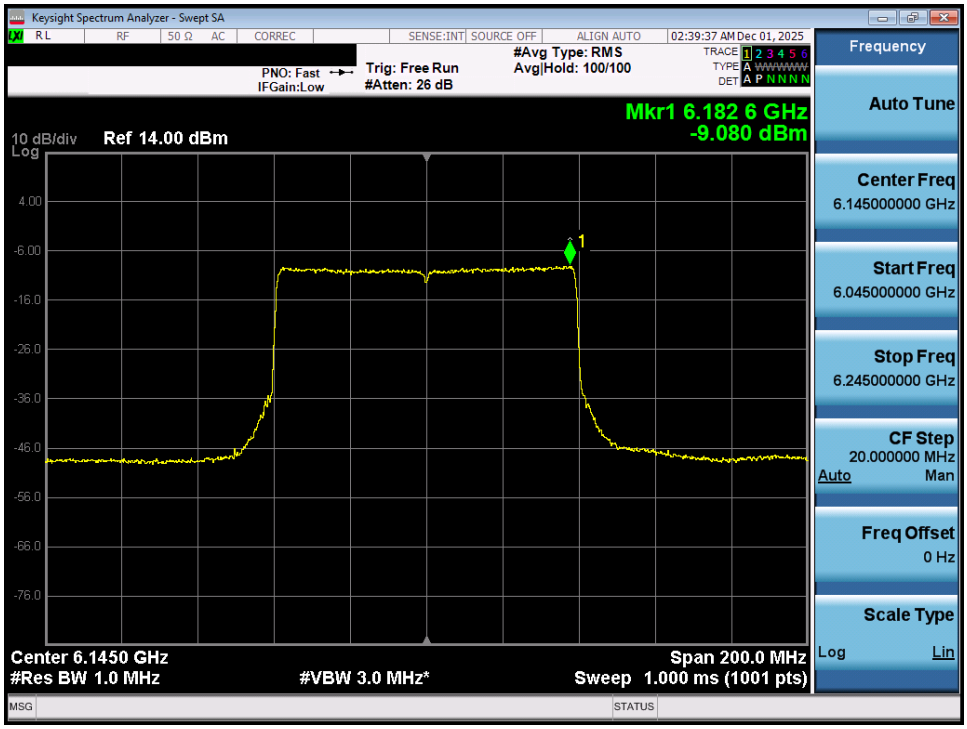


Plot 7-19. Power Spectral Density Plot MIMO ANT1 (40MHz 802.11ax (UNII Band 5) – Ch. 43) - LPI



Plot 7-20. Power Spectral Density Plot MIMO ANT1 (80MHz 802.11ax (UNII Band 5) – Ch. 39) – LPI

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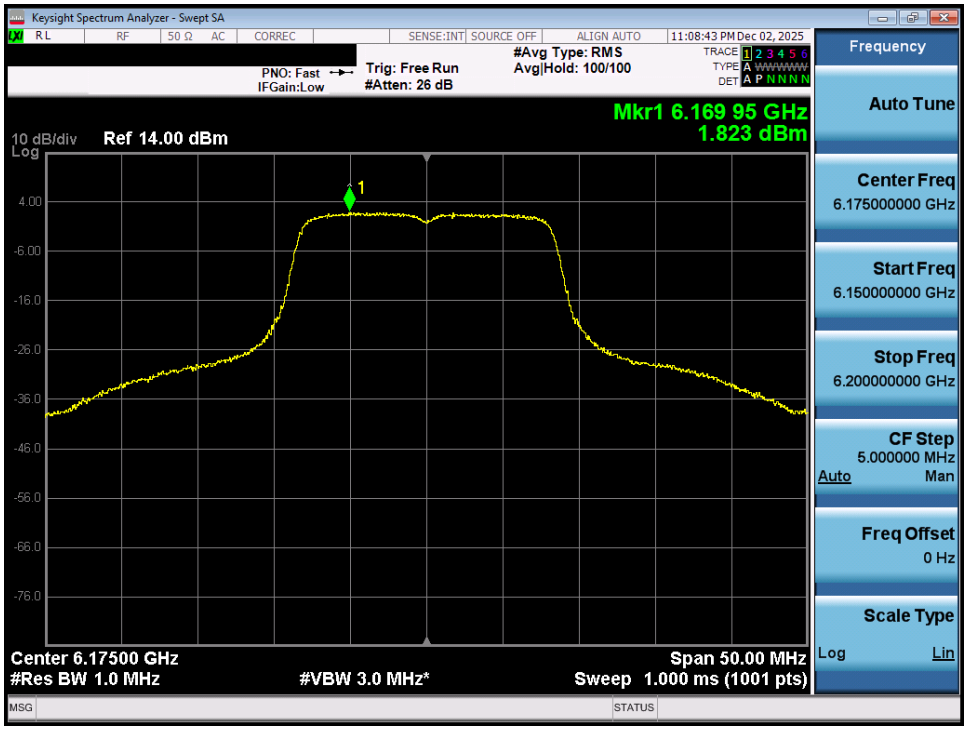
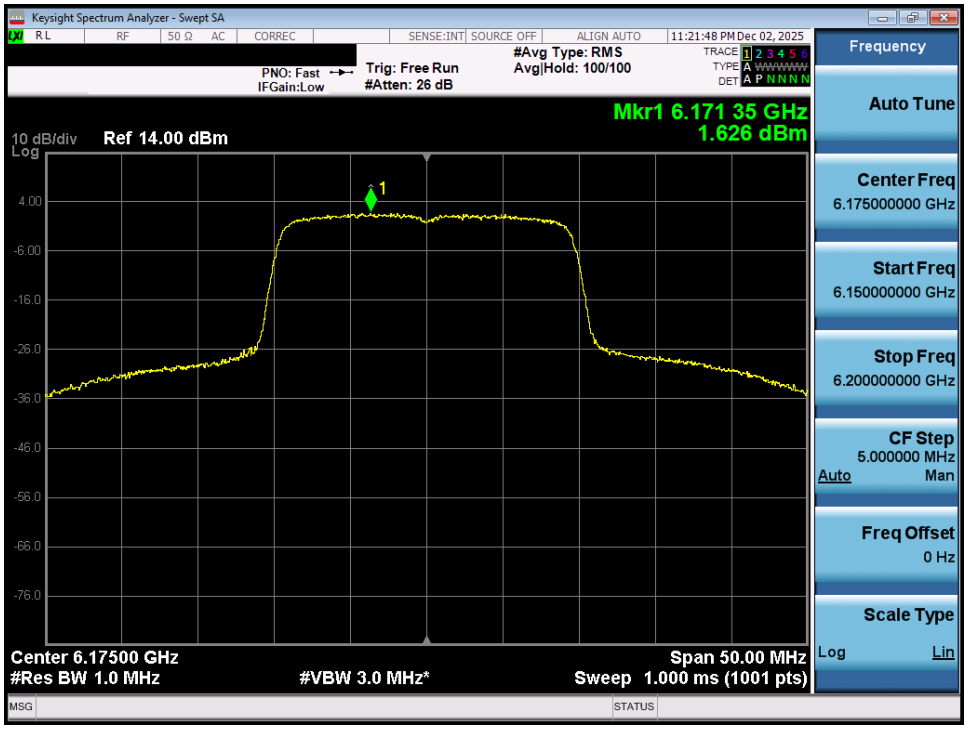


Plot 7-21. Power Spectral Density Plot MIMO ANT1 (20MHz 802.11a (UNII Band 5) – Ch. 45) - SP



Plot 7-22. Power Spectral Density Plot MIMO ANT1 (20MHz 802.11ax (UNII Band 5) – Ch. 45) - SP

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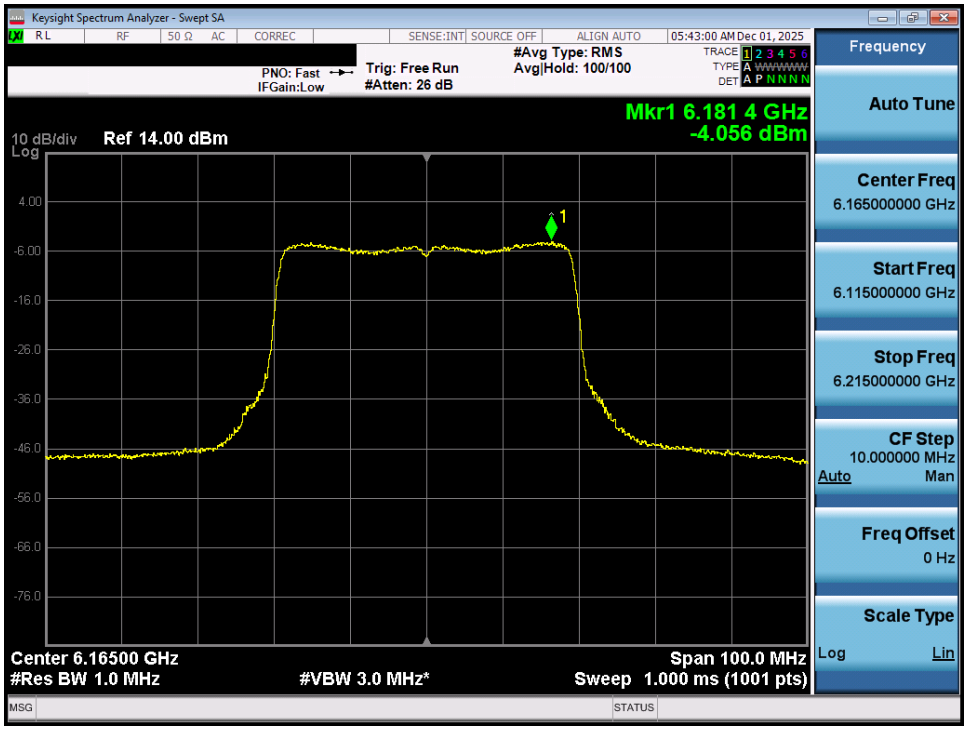
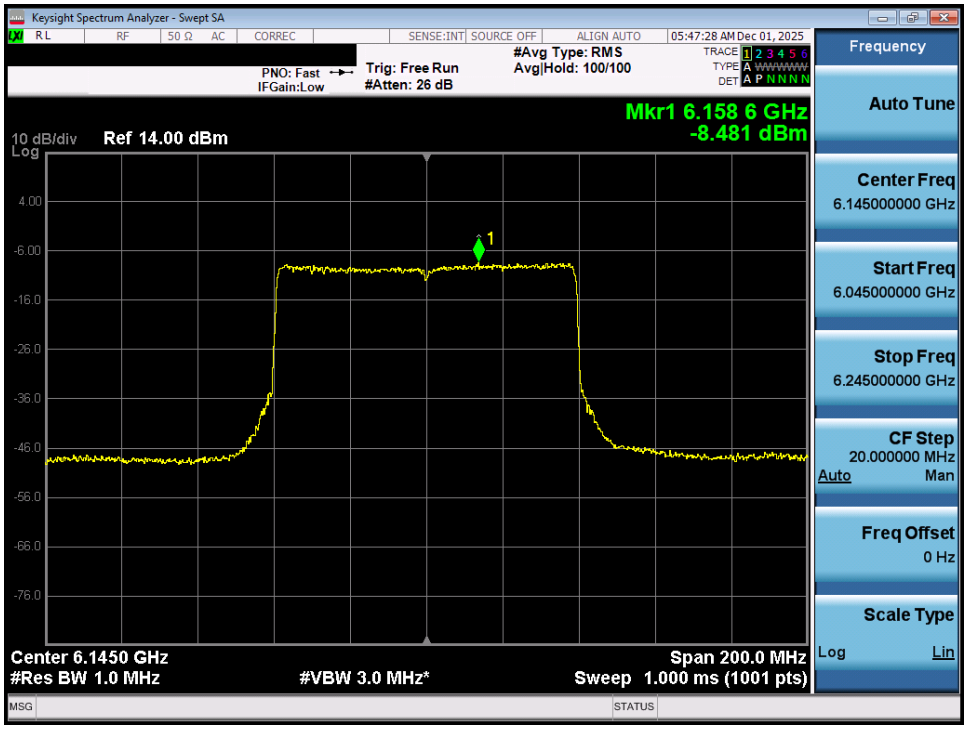


Plot 7-23. Power Spectral Density Plot MIMO ANT1 (40MHz 802.11ax (UNII Band 5) – Ch. 43) – SP



Plot 7-24. Power Spectral Density Plot MIMO ANT1 (80MHz 802.11ax (UNII Band 5) – Ch. 39) – SP

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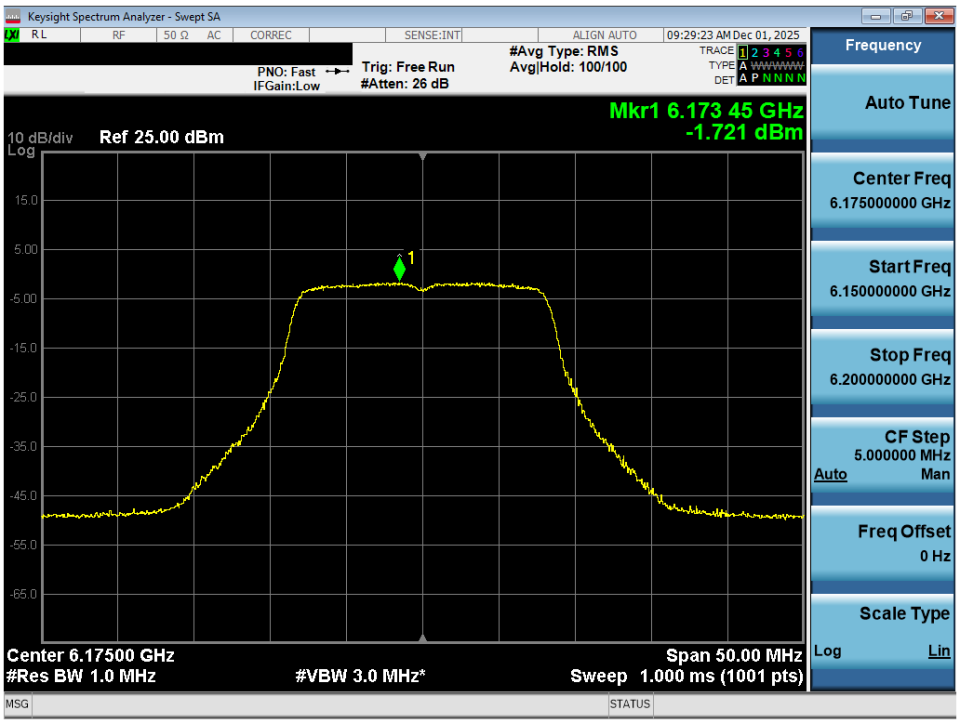
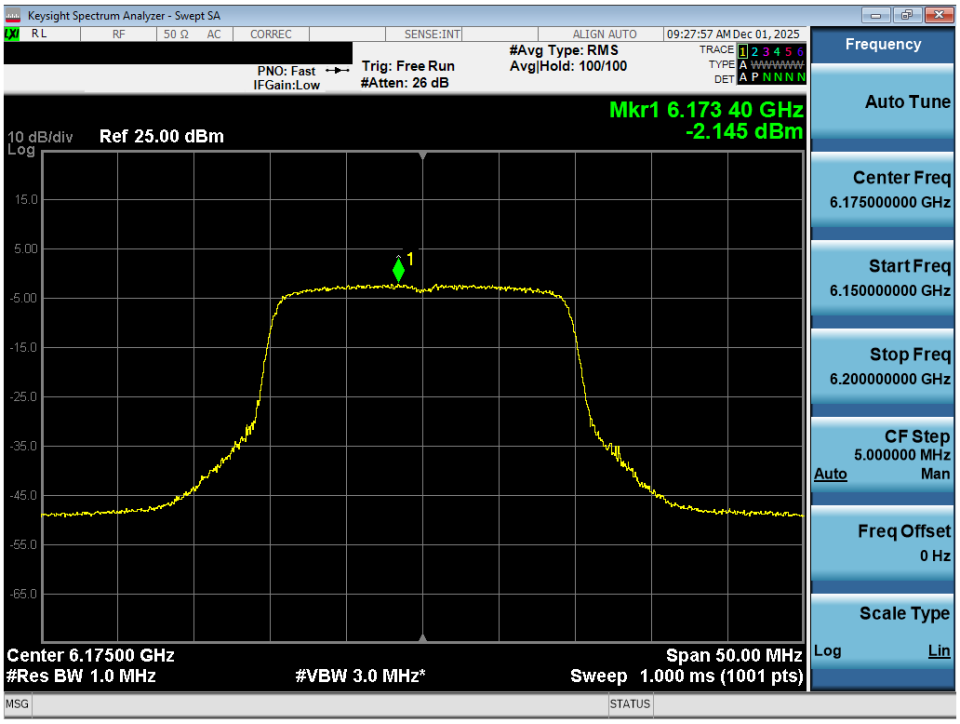
7.4.2 MIMO Antenna-2 Power Spectral Density Measurement - (UNII Band 5)



Plot 7-25. Power Spectral Density Plot MIMO ANT2 (20MHz 802.11a (UNII Band 5) – Ch. 45) - LPI



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

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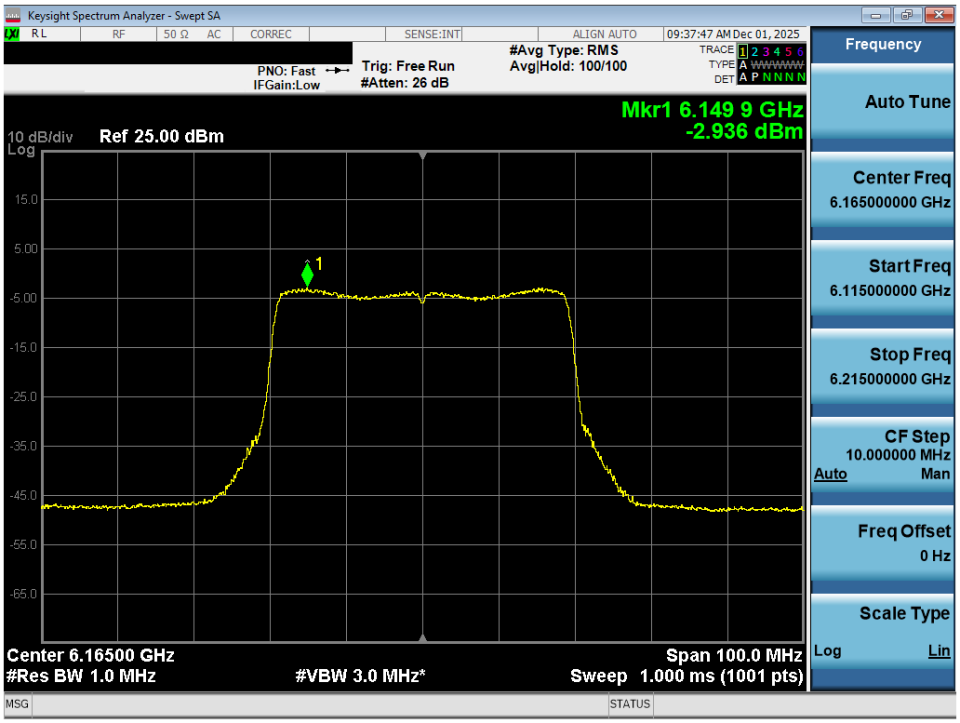
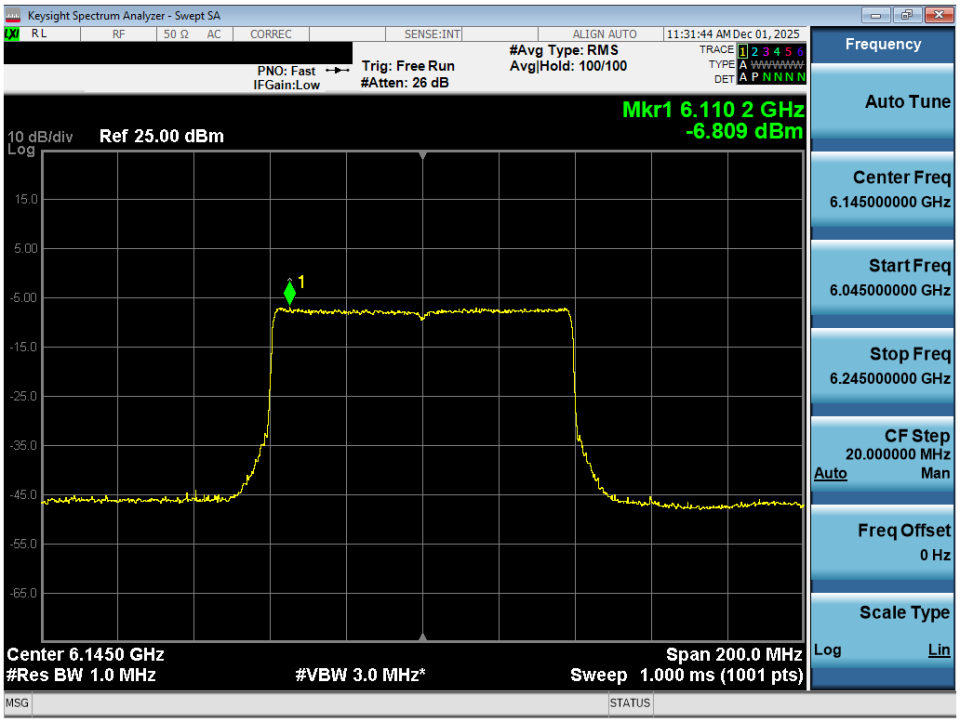


Plot 7-27. Power Spectral Density Plot MIMO ANT2 (40MHz 802.11ax (UNII Band 5) – Ch. 43) - LPI



Plot 7-28. Power Spectral Density Plot MIMO ANT2 (80MHz 802.11ax (UNII Band 5) – Ch. 39) – LPI

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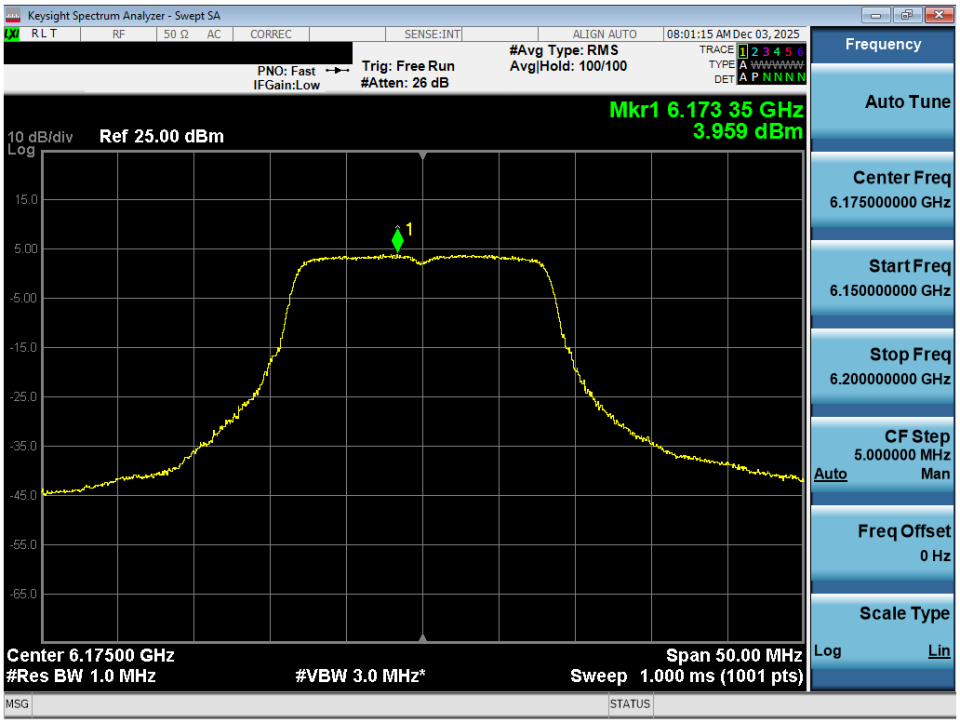
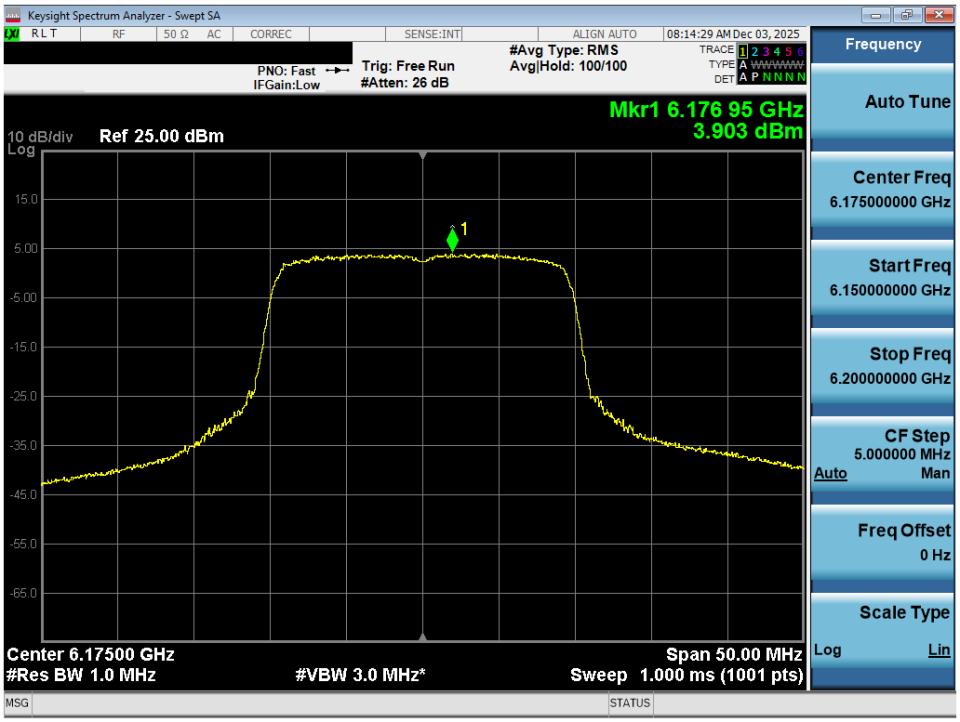


Plot 7-29. Power Spectral Density Plot MIMO ANT2 (20MHz 802.11a (UNII Band 5) – Ch. 45) - SP



Plot 7-30. Power Spectral Density Plot MIMO ANT2 (20MHz 802.11ax (UNII Band 5) – Ch. 45) - SP

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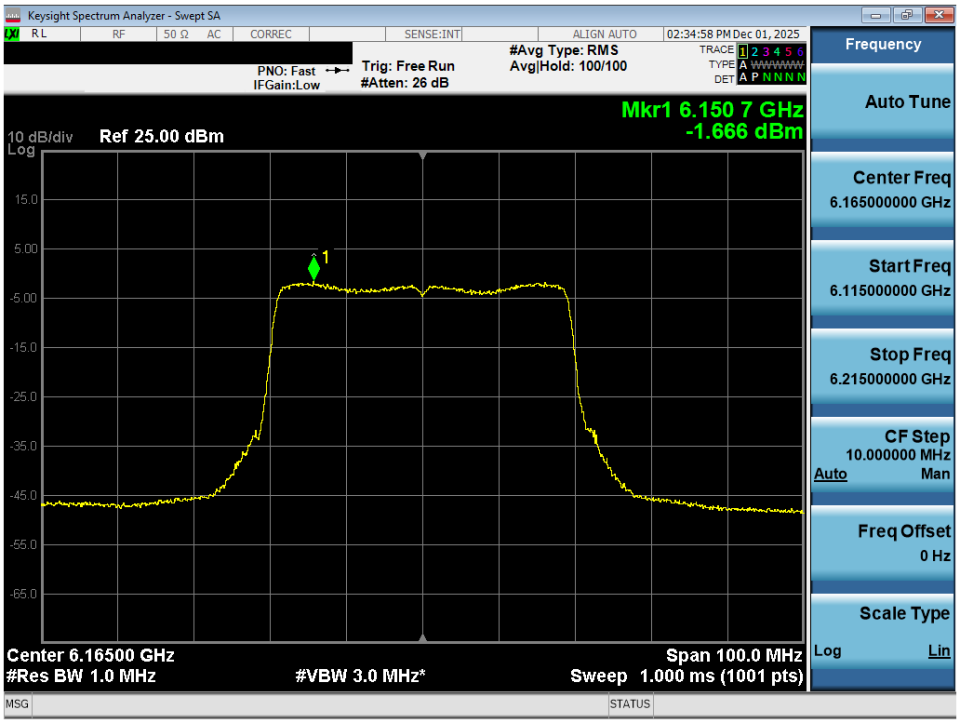
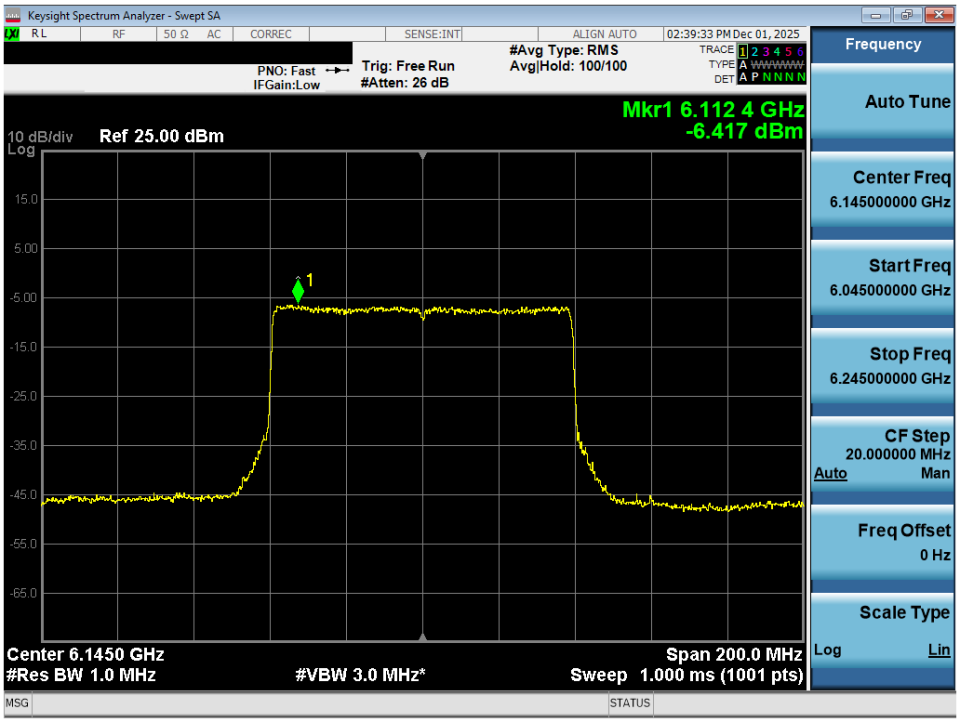


Plot 7-31. Power Spectral Density Plot MIMO ANT2 (40MHz 802.11ax (UNII Band 5) – Ch. 43) – SP



Plot 7-32. Power Spectral Density Plot MIMO ANT2 (80MHz 802.11ax (UNII Band 5) – Ch. 39) – SP

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Note:

Per ANSI C63.10:2020 Section 14.5.2.3 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 C63.10:2020 Section 14.6.3, the directional gain is calculated using the following formula, where G_N is the gain of the nth antenna and N_{ANT}, the total number of antennas used.

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

Sample MIMO Calculation:

At 5935MHz in 802.11a (20MHz BW) mode, the average conducted power spectral density was measured to be -4.99 dBm for Antenna-1 and -1.88 dBm for Antenna-2.

Antenna 1 + Antenna 2 = MIMO

(-4.99 dBm + -1.88 dBm) = (0.317 mW + 0.648 mW) = 0.965 mW = -0.15 dBm

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

At 5935 MHz in 802.11a (20MHz BW) mode, the average MIMO power density was calculated to be -0.15 dBm with directional gain of -1.47 dBi.

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

-0.15 dBm + -1.47 dBi + 0.16 dB = -1.47 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 C63.10:2020, 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 v03

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 4.1.6.2 of ANSI C63.10:2020.
3. Measure the 26 dB EBW using the test procedure 12.5.2 of ANSI C63.10:2020. (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:
    a) Set the span to encompass the entire 26 dB EBW of the signal.
    b) Set RBW = same RBW used for 26 dB EBW measurement.
    c) Set VBW ≥ 3 X RBW
    d) Number of points in sweep ≥ [2 X span / RBW].
    e) Sweep time = auto.
    f) Detector = RMS (i.e., power averaging)
    g) Trace average at least 100 traces in power averaging (rms) mode.
    h) Use the peak search function on the instrument to find the peak of the spectrum.
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:
    i) Suppressed by 20 dB at 1 MHz outside of the channel edge. (The channel edge is defined as the 26-dB point on either side of the carrier center frequency.)
    j) Suppressed by 28 dB at one channel bandwidth from the channel center.
    k) Suppressed by 40 dB at one- and one-half times the channel bandwidth from the channel center.
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.

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	Frequency [MHz]	Channel	802.11 MODE	Antenna-1 In-Band Emission	Antenna-2 In-Band Emission
Band 5	5935	2	a	PASS	PASS
	6175	45	a	PASS	PASS
	6415	93	a	PASS	PASS
	5935	2	ax (20MHz)	PASS	PASS
	6175	45	ax (20MHz)	PASS	PASS
	6415	93	ax (20MHz)	PASS	PASS
	5965	3	ax (40MHz)	PASS	PASS
	6165	43	ax (40MHz)	PASS	PASS
	6405	91	ax (40MHz)	PASS	PASS
	5985	7	ax (80MHz)	PASS	PASS
	6145	39	ax (80MHz)	PASS	PASS
	6385	87	ax (80MHz)	PASS	PASS
Band 6	6435	97	a	PASS	PASS
	6475	105	a	PASS	PASS
	6515	113	a	PASS	PASS
	6435	97	ax (20MHz)	PASS	PASS
	6475	105	ax (20MHz)	PASS	PASS
	6515	113	ax (20MHz)	PASS	PASS
	6445	99	ax (40MHz)	PASS	PASS
	6485	107	ax (40MHz)	PASS	PASS
	6525	115	ax (40MHz)	PASS	PASS
	6465	103	ax (80MHz)	PASS	PASS
Band 7	6535	117	a	PASS	PASS
	6695	149	a	PASS	PASS
	6875	185	a	PASS	PASS
	6535	117	ax (20MHz)	PASS	PASS
	6695	149	ax (20MHz)	PASS	PASS
	6875	185	ax (20MHz)	PASS	PASS
	6565	123	ax (40MHz)	PASS	PASS
	6725	155	ax (40MHz)	PASS	PASS
	6845	179	ax (40MHz)	PASS	PASS
	6545	119	ax (80MHz)	PASS	PASS
	6705	151	ax (80MHz)	PASS	PASS
	6865	183	ax (80MHz)	PASS	PASS
Band 8	6895	189	a	PASS	PASS
	6995	209	a	PASS	PASS
	7115	233	a	PASS	PASS
	6895	189	ax (20MHz)	PASS	PASS
	6995	209	ax (20MHz)	PASS	PASS
	7115	233	ax (20MHz)	PASS	PASS
	6885	187	ax (40MHz)	PASS	PASS
	7005	211	ax (40MHz)	PASS	PASS
	7085	227	ax (40MHz)	PASS	PASS
	6945	199	ax (80MHz)	PASS	PASS
	7025	215	ax (80MHz)	PASS	PASS

Table 7-14. MIMO In-Band Emissions Results – LPI

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	Frequency [MHz]	Channel	802.11 MODE	Antenna-1 In-Band Emission	Antenna-2 In-Band Emission
Band 5	5935	2	a	PASS	PASS
	6175	45	a	PASS	PASS
	6415	93	a	PASS	PASS
	5935	2	ax (20MHz)	PASS	PASS
	6175	45	ax (20MHz)	PASS	PASS
	6415	93	ax (20MHz)	PASS	PASS
	5965	3	ax (40MHz)	PASS	PASS
	6165	43	ax (40MHz)	PASS	PASS
	6405	91	ax (40MHz)	PASS	PASS
	5985	7	ax (80MHz)	PASS	PASS
	6145	39	ax (80MHz)	PASS	PASS
	6385	87	ax (80MHz)	PASS	PASS
Band 7	6535	117	a	PASS	PASS
	6695	149	a	PASS	PASS
	6875	185	a	PASS	PASS
	6535	117	ax (20MHz)	PASS	PASS
	6695	149	ax (20MHz)	PASS	PASS
	6875	185	ax (20MHz)	PASS	PASS
	6565	123	ax (40MHz)	PASS	PASS
	6725	155	ax (40MHz)	PASS	PASS
	6845	179	ax (40MHz)	PASS	PASS
	6545	119	ax (80MHz)	PASS	PASS
	6705	151	ax (80MHz)	PASS	PASS
	6865	183	ax (80MHz)	PASS	PASS

Table 7-15. MIMO In-Band Emissions Results – SP

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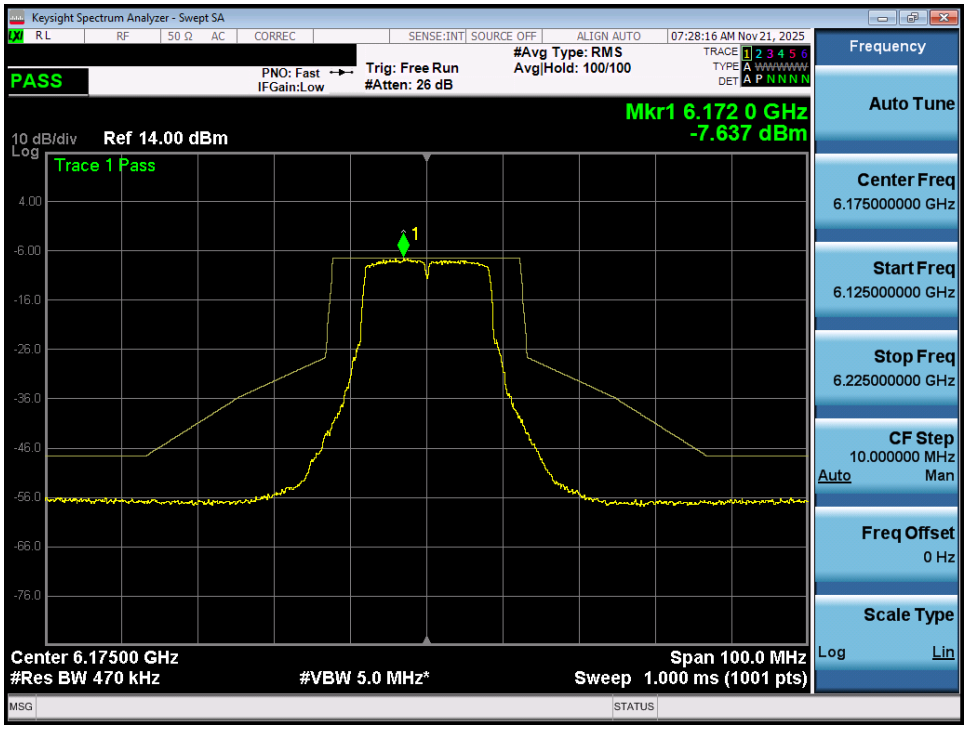
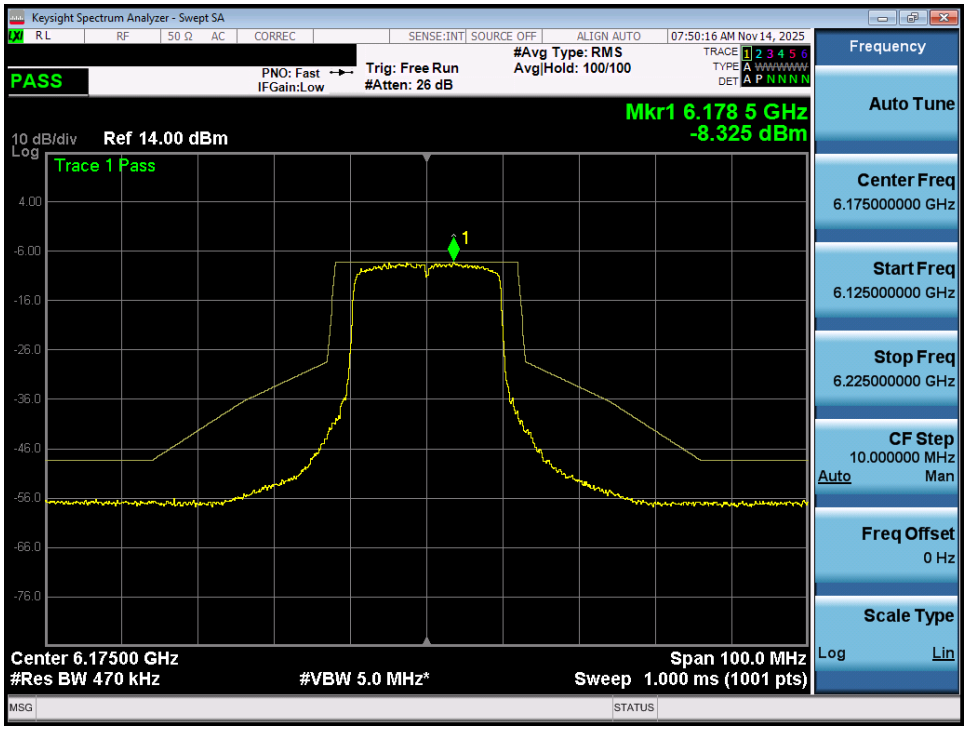
7.5.1 MIMO Antenna-1 In-Band Emission Plot Measurement - (UNII Band 5)



Plot 7-33. In Band Emissions Plot MIMO ANT1 (20MHz 802.11a (UNII Band 5) – Ch. 45) - LPI



Plot 7-34. In Band Emissions Plot MIMO ANT1 (20MHz 802.11ax (UNII Band 5) – Ch. 45) - LPI

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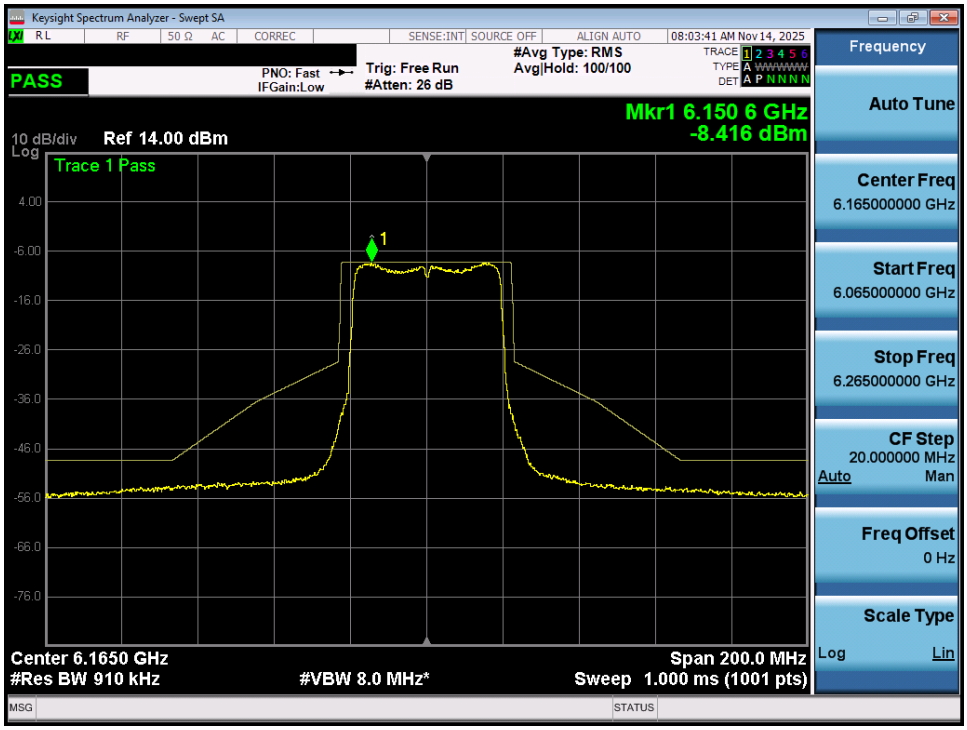
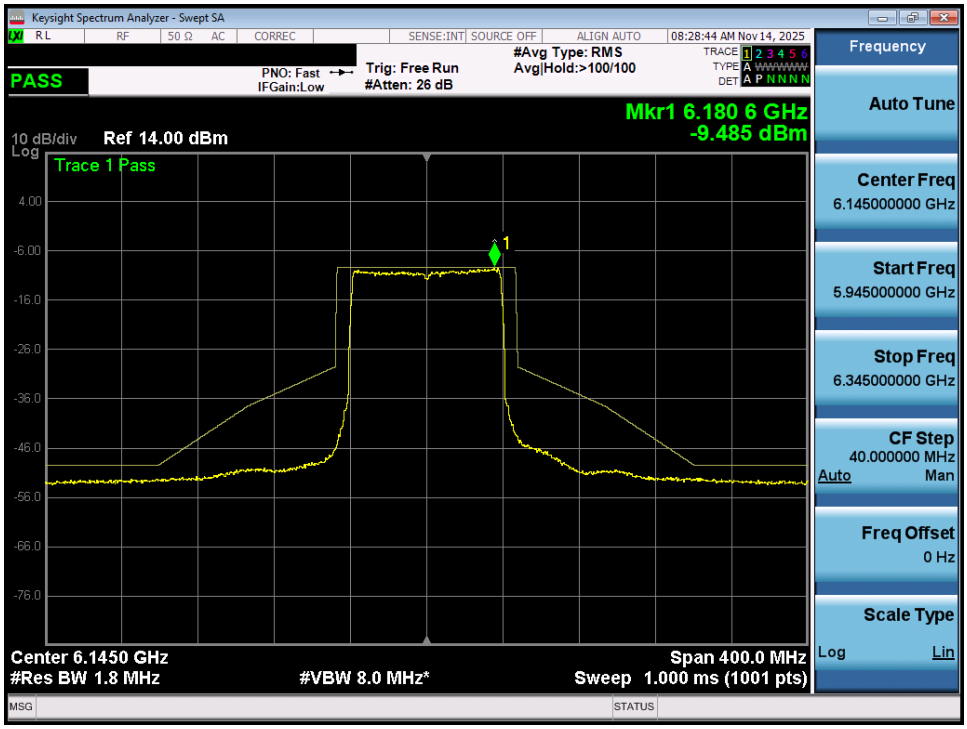


Plot 7-35. In Band Emissions Plot MIMO ANT1 (40MHz 802.11ax (UNII Band 5) – Ch. 43) - LPI



Plot 7-36. In Band Emissions Plot MIMO ANT1 (80MHz 802.11ax (UNII Band 5) – Ch. 39) – LPI

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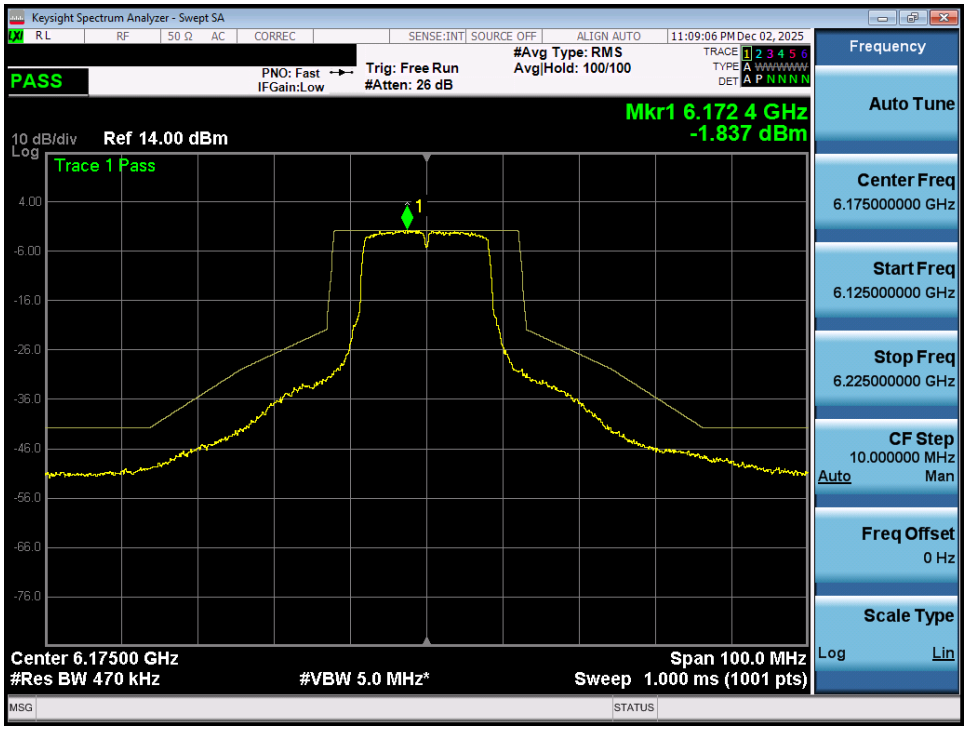
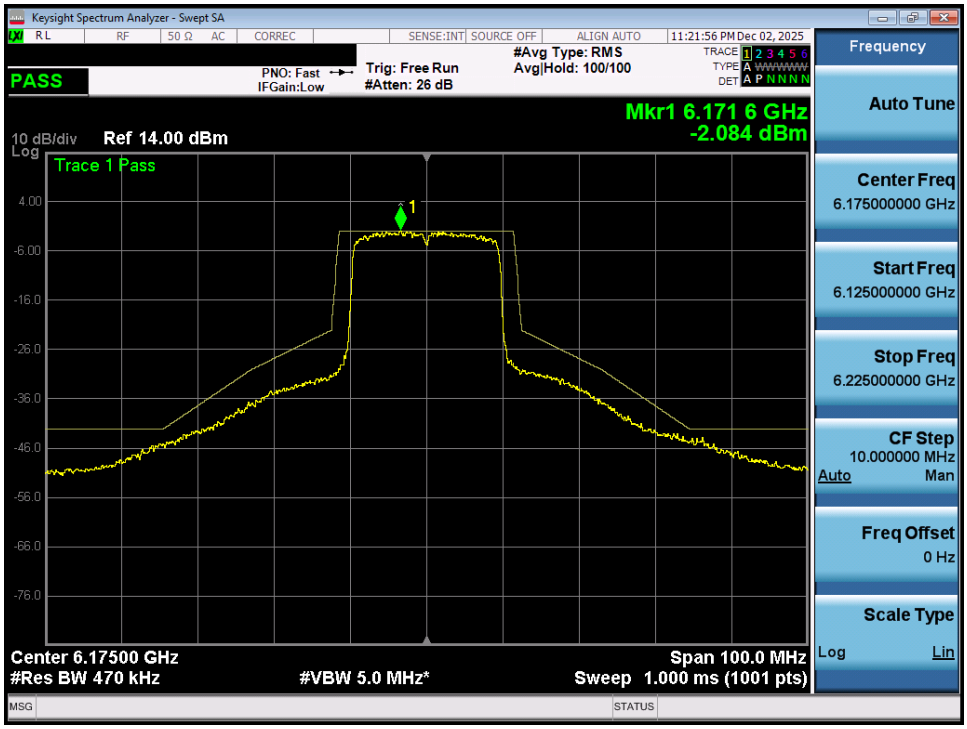


Plot 7-37. In Band Emissions Plot MIMO ANT1 (20MHz 802.11a (UNII Band 5) – Ch. 45) - SP



Plot 7-38. In Band Emissions Plot MIMO ANT1 (20MHz 802.11ax (UNII Band 5) – Ch. 45) - SP

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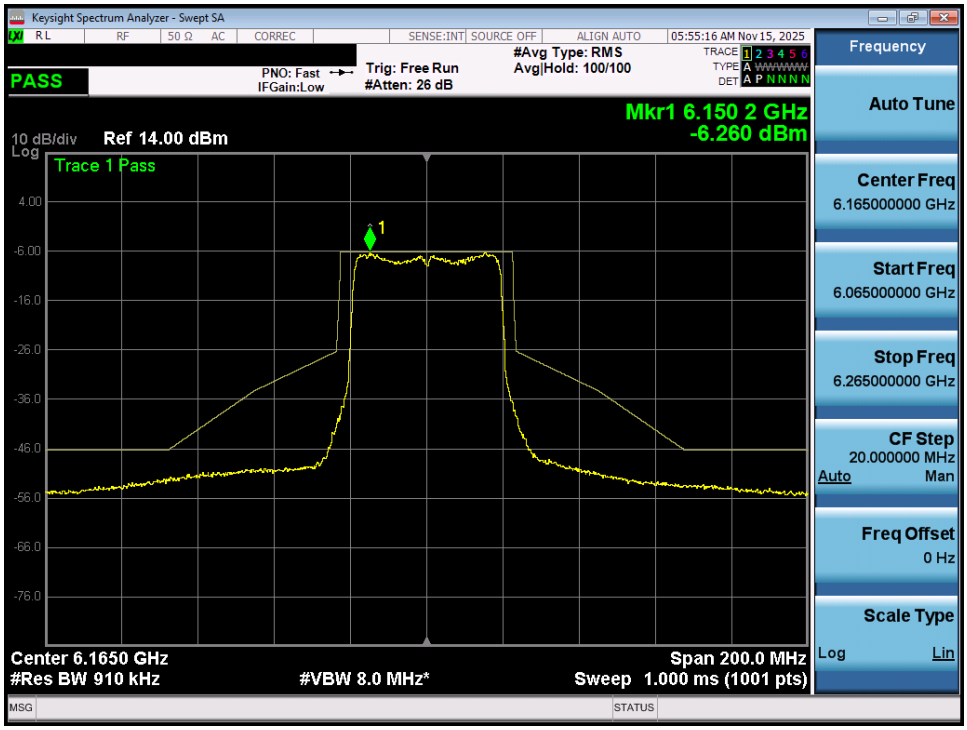
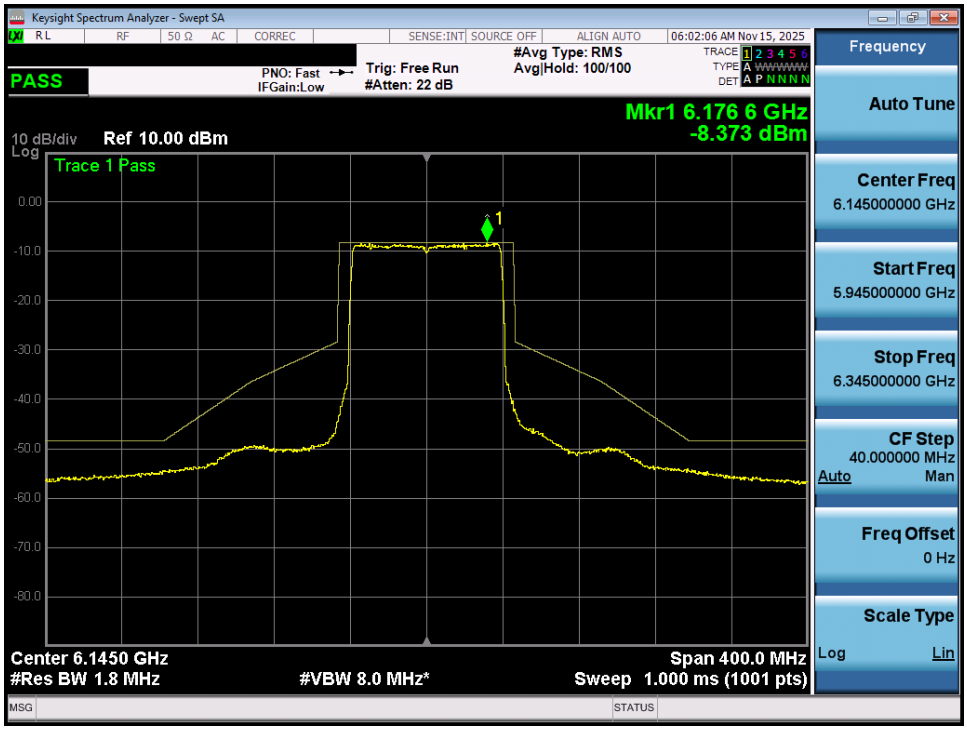


Plot 7-39. In Band Emissions Plot MIMO ANT1 (40MHz 802.11ax (UNII Band 5) – Ch. 43) – SP



Plot 7-40. In Band Emissions Plot MIMO ANT1 (80MHz 802.11ax (UNII Band 5) – Ch. 39) – SP

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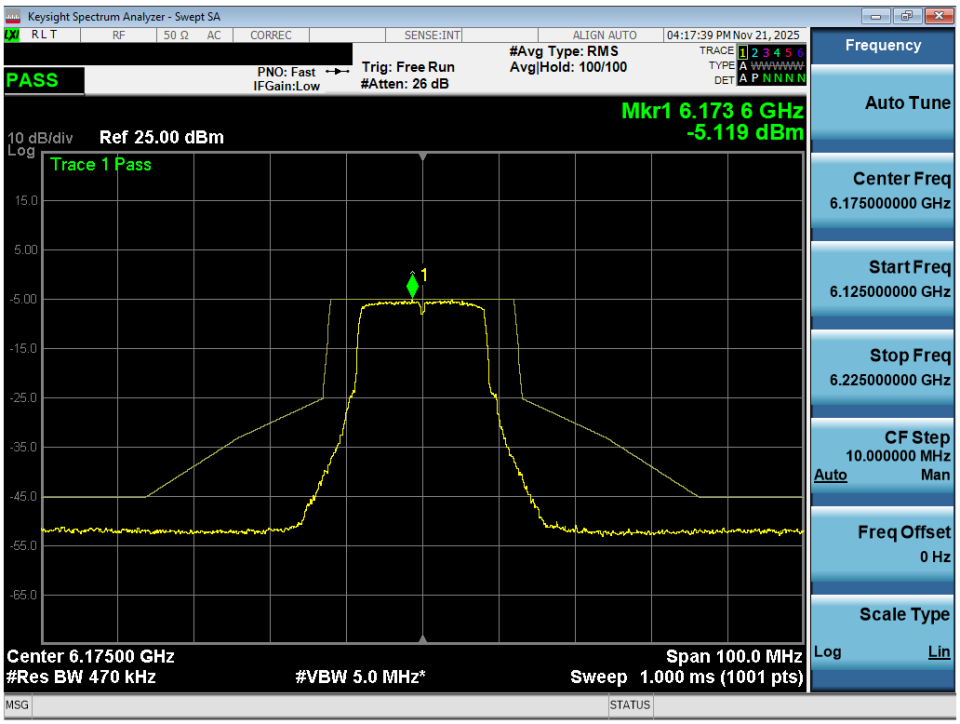
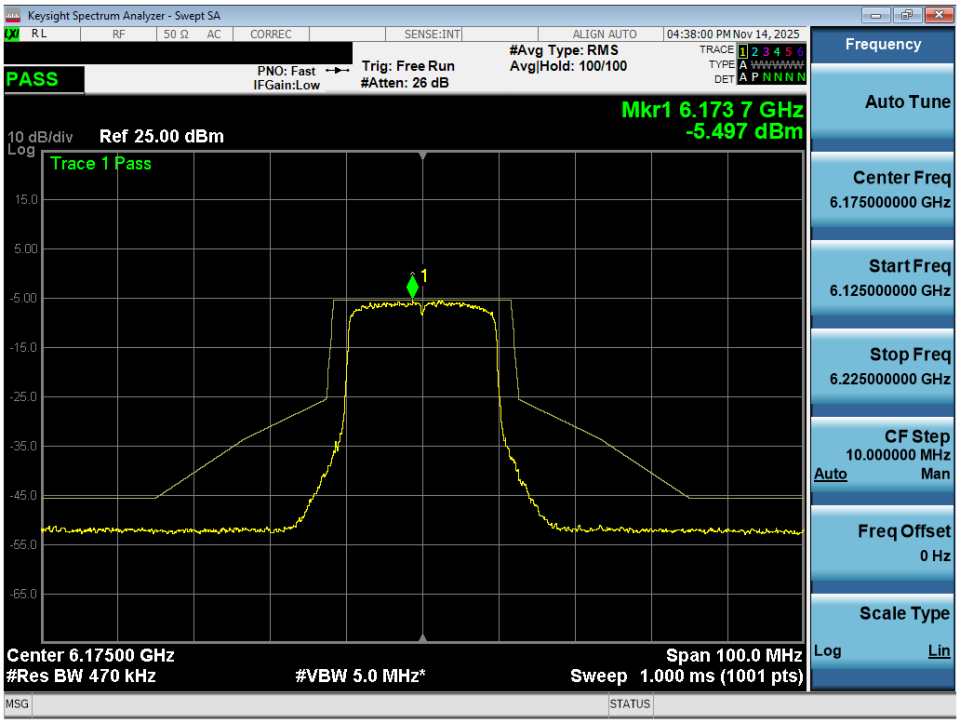
7.5.2 MIMO Antenna-2 In-Band Emission Plot Measurement - (UNII Band 5)



Plot 7-41. In Band Emissions Plot MIMO ANT2 (20MHz 802.11a (UNII Band 5) – Ch. 45) - LPI



Plot 7-42. In Band Emissions Plot MIMO ANT2 (20MHz 802.11ax (UNII Band 5) – Ch. 45) - LPI

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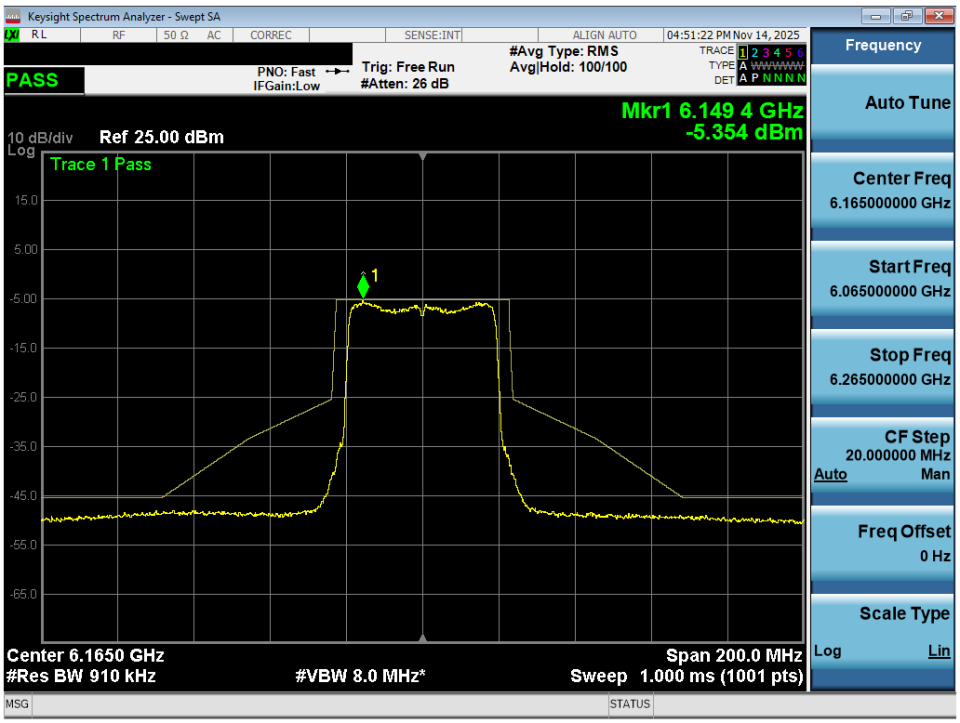
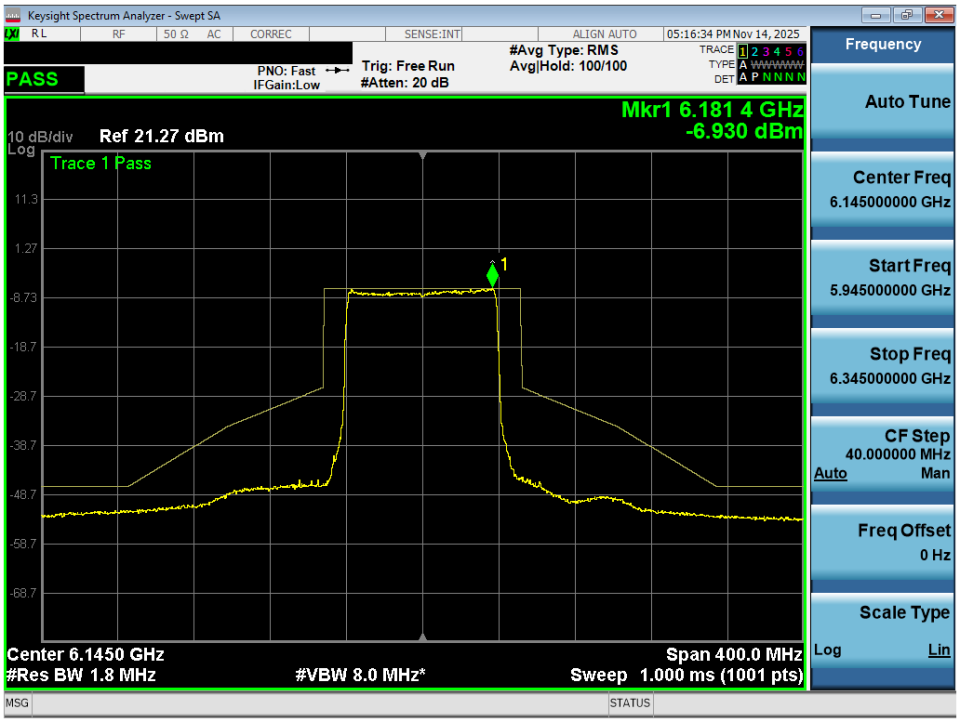


Plot 7-43. In Band Emissions Plot MIMO ANT2 (40MHz 802.11ax (UNII Band 5) – Ch. 43) - LPI



Plot 7-44. In Band Emissions Plot MIMO ANT2 (80MHz 802.11ax (UNII Band 5) – Ch. 39) – LPI

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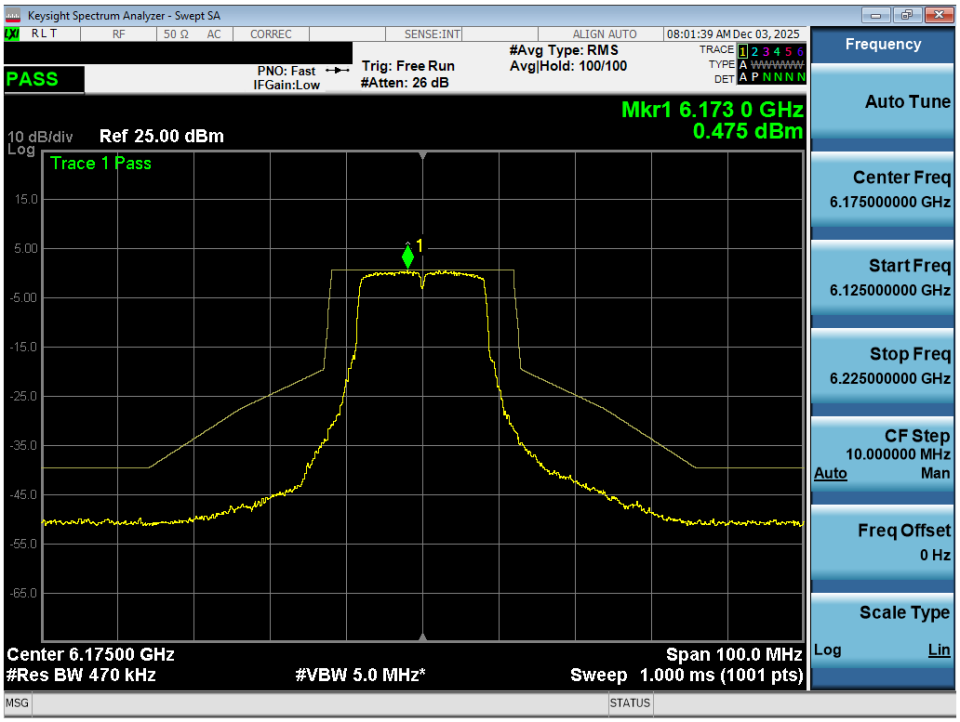
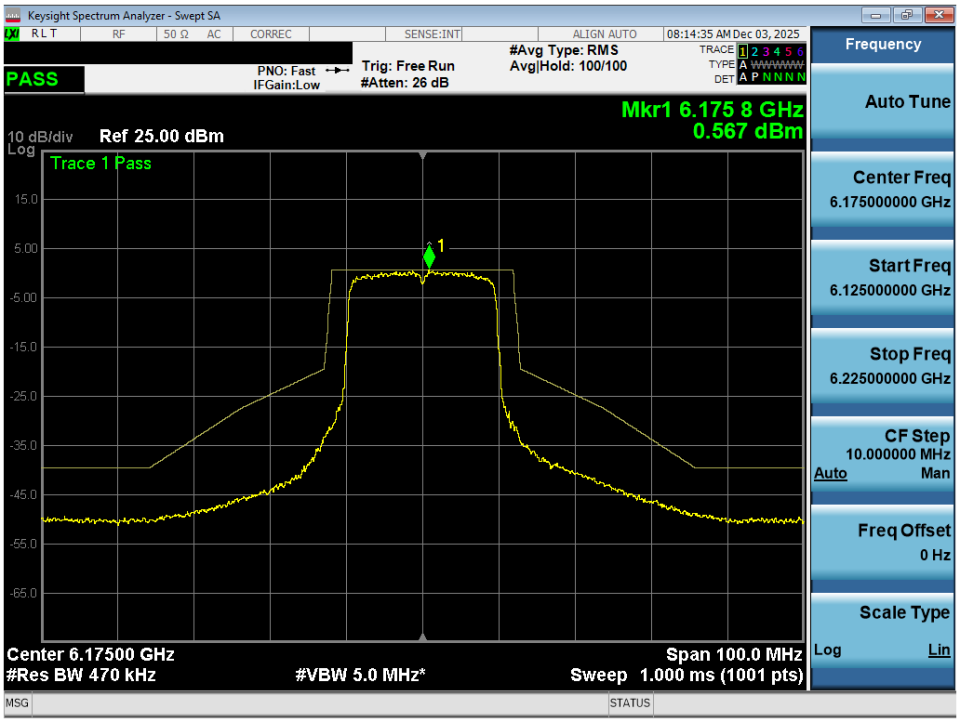


Plot 7-45. In Band Emissions Plot MIMO ANT2 (20MHz 802.11a (UNII Band 5) – Ch. 45) - SP



Plot 7-46. In Band Emissions Plot MIMO ANT2 (20MHz 802.11ax (UNII Band 5) – Ch. 45) - SP

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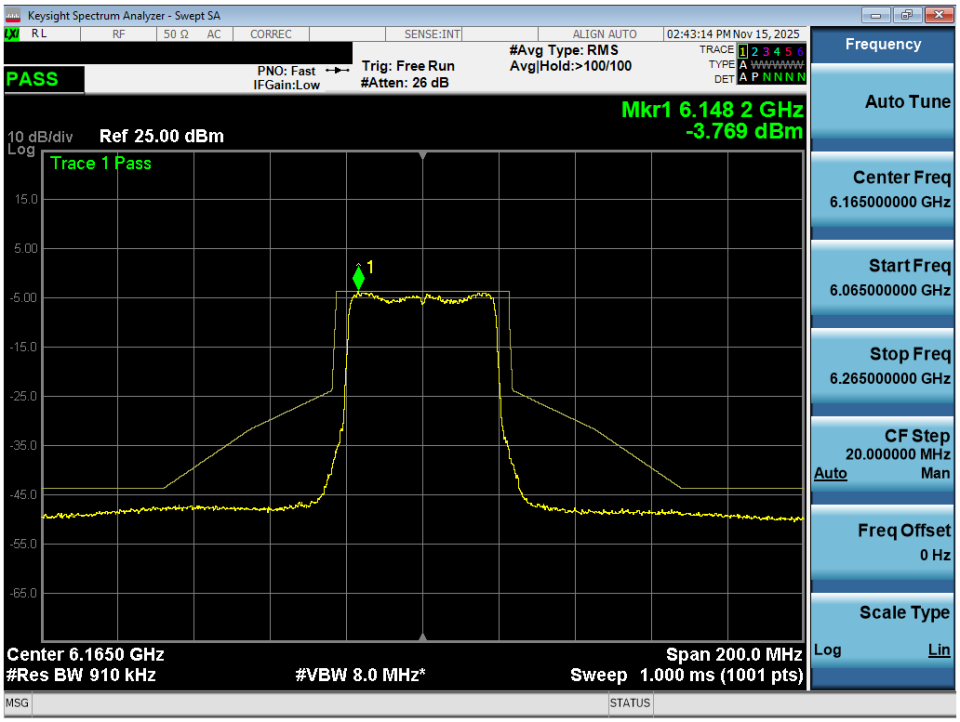
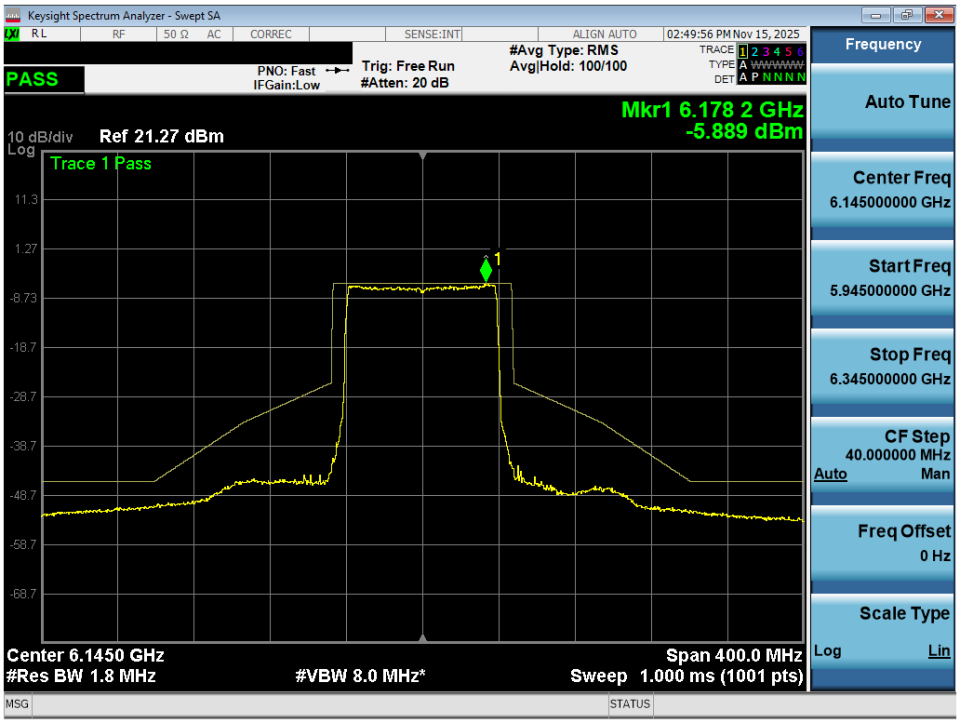


Plot 7-47. In Band Emissions Plot MIMO ANT2 (40MHz 802.11ax (UNII Band 5) – Ch. 43) – SP



Plot 7-48. In Band Emissions Plot MIMO ANT2 (80MHz 802.11ax (UNII Band 5) – Ch. 39) – SP

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7.6 Radiated Emission Measurements

Test Overview and Limit

All out of band radiated spurious emissions are measured with a spectrum analyzer connected to a receive antenna while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in ANSI C63.10:2020, and at the appropriate frequencies. All channels, modes (e.g. 802.11a, 802.11ax, (20/40/80MHz), and modulations/data rates were investigated among all UNII bands. Only the radiated emissions of the configuration that produced the worst-case emissions are reported in this section.

For transmitters operating in the 5.925-7.125 GHz band: All emissions outside of the 5.925-7.125 GHz band shall not exceed an EIRP of -27dBm/MHz (68.2dBuV/m at a 3m distance). Emissions found in a restricted band are subject to the limits of 15.209 as shown in the table below.

Frequency	Field Strength [µV/m]	Measured Distance [Meters]
0.009 – 0.490 MHz	2400\F (kHz)	300
0.490 – 1.705 MHz	24000\F (kHz)	30
1.705 – 30.00 MHz	30	30
30.00 – 88.00 MHz	100	3
88.00 – 216.0 MHz	150	3
216.0 – 960.0 MHz	200	3
Above 960.0 MHz	500	3

Table 7-16. Radiated Limits

Test Procedures Used

ANSI C63.10:2020 – Sections 12.7.7.2, 12.7.6, 12.7.5

Test Settings – Above 1GHz

Average Field Strength Measurements (Method AD – Average Detection)

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest.
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = power average (RMS)
5. Number of measurement points = 1001 (Number of points must be ≥ 2 x span/RBW)
6. Sweep time = auto
7. Trace (RMS) averaging was performed over at least 100 traces.

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Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest.
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize.

Test Settings – Below 1GHz

Quasi-Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest.
2. RBW = 120kHz (for emissions from 30MHz – 1GHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize.

Test Setup

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

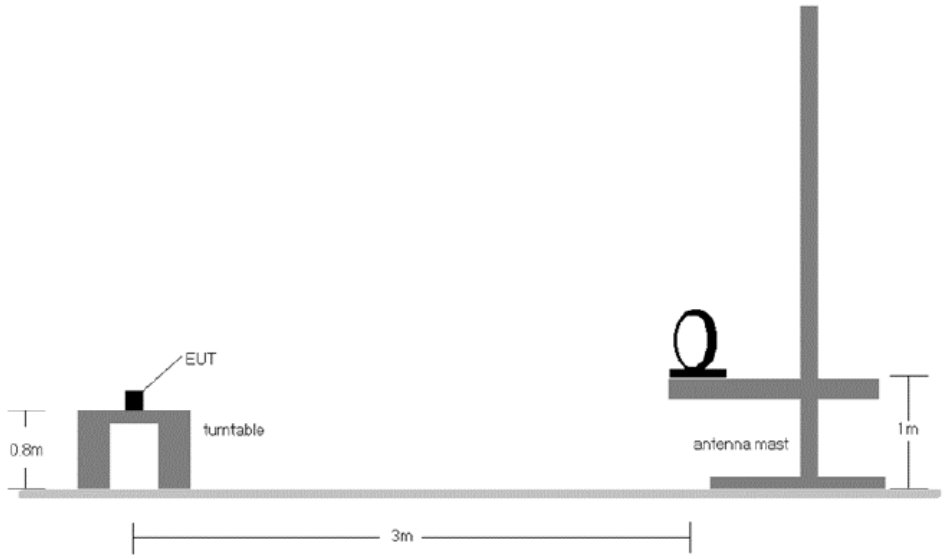

Figure 7-5. Radiated Test Setup < 30MHz

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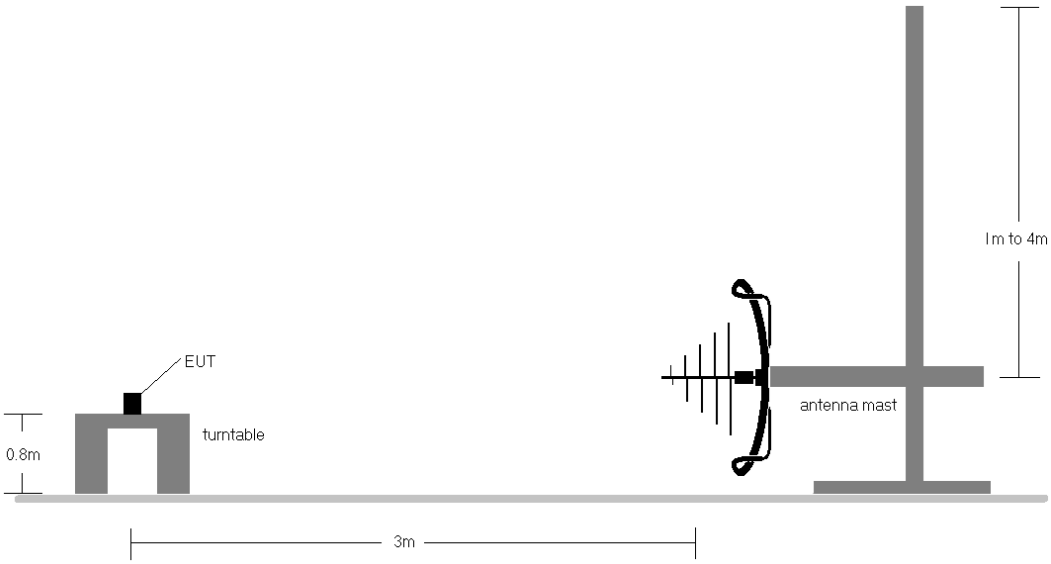

Figure 7-6. Radiated Test Setup < 1GHz

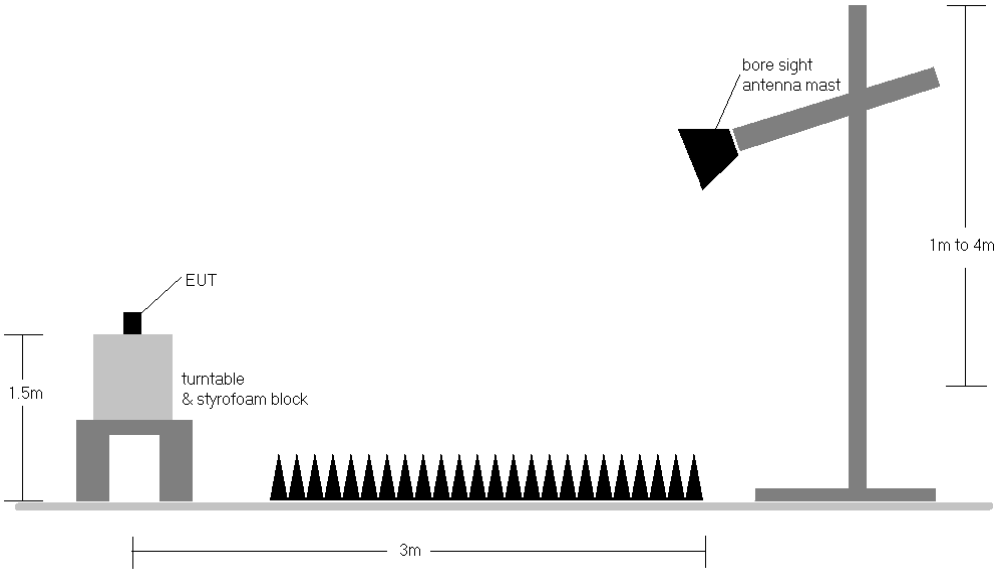

Figure 7-7. Radiated Test Setup > 1GHz

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Test Notes

1. All spurious emissions lying in restricted bands specified in §15.205 are below the limits specified in §15.209. All spurious emissions that do not lie in a restricted band are subject to an average limit of -27dBm/MHz. At 3 meters, the field strength limit in dBμV/m can be determined by adding a "conversion" factor of 95.2dB to the EIRP limit of -27dBm/MHz to obtain the limit for out of band spurious emissions of 68.2dBμV/m.
2. All spurious emissions that do not lie in a restricted band are subject to a peak limit not to exceed 20dB of the average limit [68.2dBμV/m]. If a peak measurement passes the average limit, it was determined no further investigation is necessary.
3. The antenna is manipulated through typical positions, polarity, and length during the tests. The EUT is manipulated through three orthogonal planes.
4. This unit was tested with its standard battery.
5. The spectrum is measured from 9kHz to the 10th harmonic of the fundamental frequency of the transmitter using CISPR quasi peak detector below 1GHz. Above 1 GHz, average and peak measurements were taken using linearly polarized horn antennas. The worst-case emissions are reported, however emissions whose levels were not within 20dB of the respective limits were not reported.
6. Emissions below 18GHz were measured at a 3-meter test distance while emissions above 18GHz were measured at a 1-meter test distance with the application of a distance correction factor.
7. The wide spectrum spurious emissions plots shown on the following pages are used only for the purpose of emission identification. Any emissions found to be within 20dB of the limit are fully investigated and the results are shown in this section. The "-" shown in the following RSE tables are used to denote a noise floor measurement.
8. In the case where a peak-detector measurement passed the given RMS limit it was determined sufficient to demonstrate compliance.
9. The results recorded using the broadband antenna are known to correlate with the results obtained by using a tuned dipole with an acceptable degree of accuracy. The VSWR for the measurement antenna was found to be less than 2:1.
10. In this section, plots showing measurements shown as "channel power" are recorded using the integration methods descrribed in Section 11.12.3.2 of ANSI C63.10:2020 for average and peak measurements as allowed per Section 12.7.4.4.1. Also, the average measurements include the duty cycle correction factor shown in Section 2.2 of this report.

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Sample Calculations

Determining Spurious Emissions Levels

- Field Strength Level [dBμV/m] = Analyzer Level [dBm] + 107 + AFCL [dB/m]
- AFCL [dB/m] = Antenna Factor [dB/m] + Cable Loss [dB]
- Margin [dB] = Field Strength Level [dBμV/m] – Limit [dBμV/m]

Radiated Band Edge Measurement Offset

The amplitude offset shown in the radiated restricted band edge plots was calculated using the formula:

Offset (dB) = (Antenna Factor + Cable Loss + Attenuator) – Preamplifier Gain

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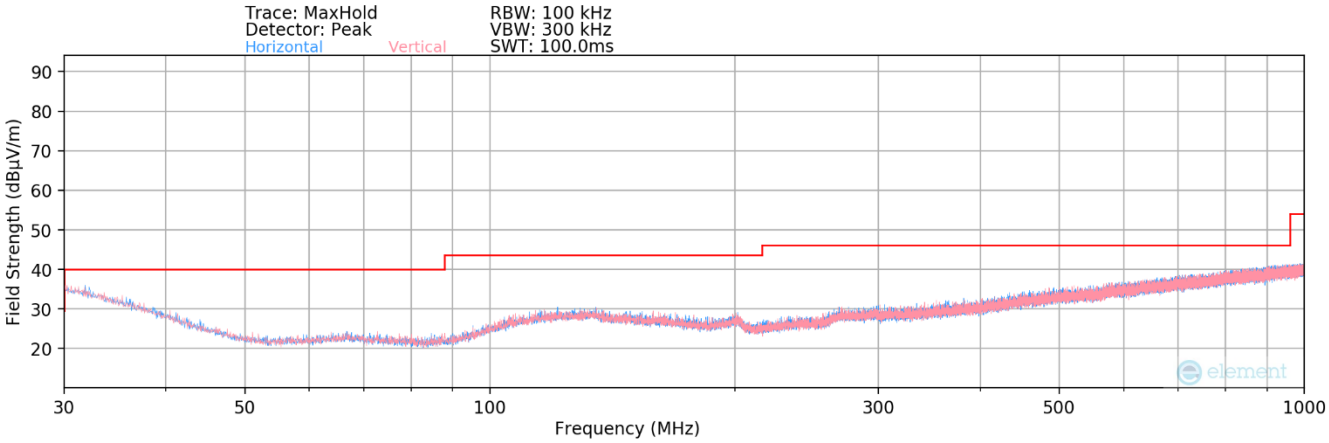
7.6.1 MIMO Radiated Spurious Emission Measurements



Plot 7-49. Radiated Spurious Plot below 1GHz MIMO (802.11a)

Mode	Antenna	UNII Band	Channel	Test Channel Freq. [MHz]	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	5	45	6175	140.00	Quasi-Peak	H	-	-	-99.48	19.93	0.00	27.45	43.52	-16.07
					190.00	Quasi-Peak	H	250	271	-96.87	18.20	0.00	28.33	43.52	-15.19
					590.00	Quasi-Peak	H	-	-	-95.78	26.97	0.00	38.19	46.02	-7.83

Table 7-17. Radiated Measurements below 1GHz MIMO (802.11a)

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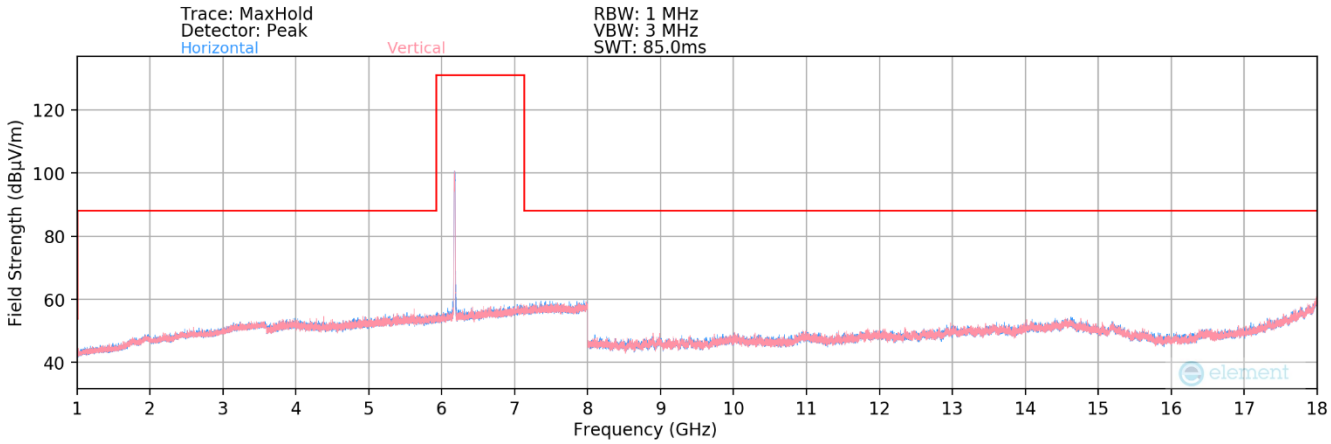
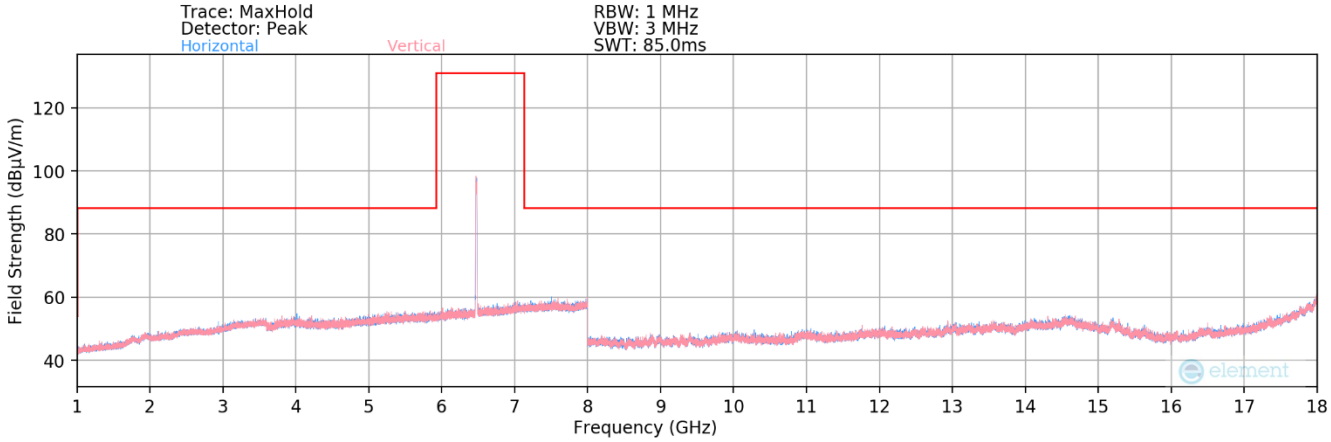
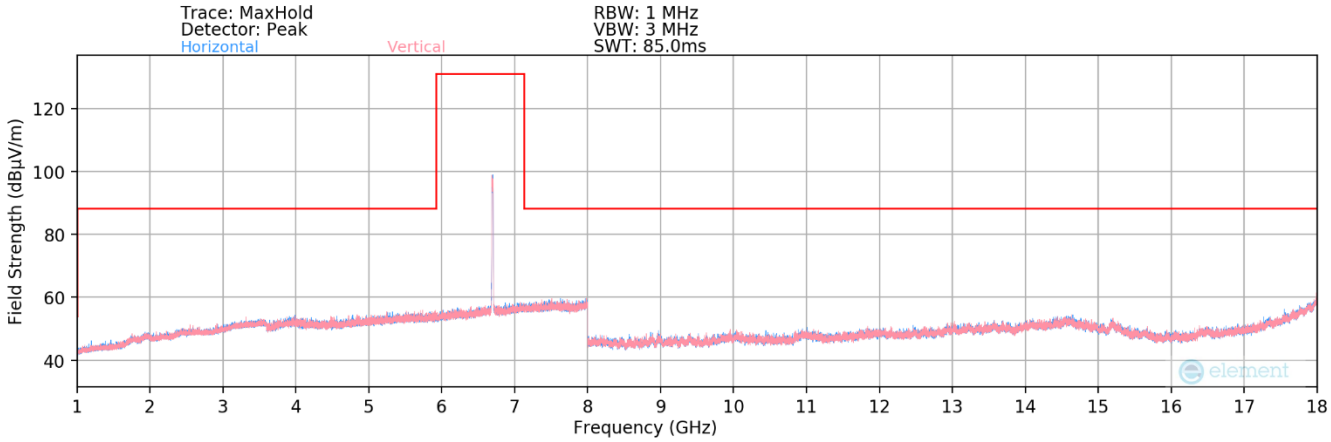


Plot 7-50. Radiated Spurious Plot 1GHz – 18GHz MIMO (802.11a – UNII Band 5 Ch. 45)



Plot 7-51. Radiated Spurious Plot 1GHz – 18GHz MIMO (802.11a – UNII Band 6 Ch. 105)



Plot 7-52. Radiated Spurious Plot 1GHz – 18GHz MIMO (802.11a – UNII Band 7 Ch. 149)

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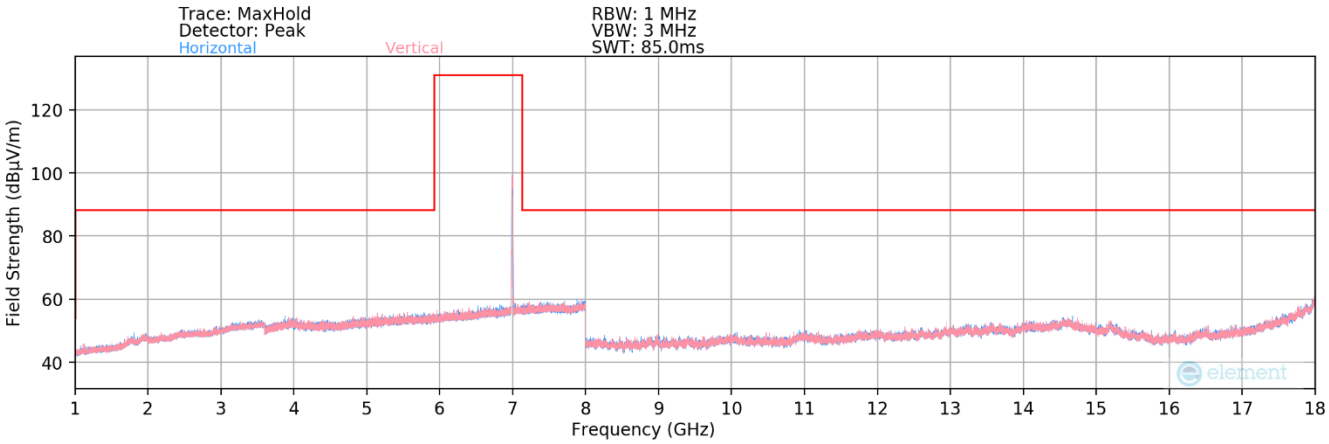
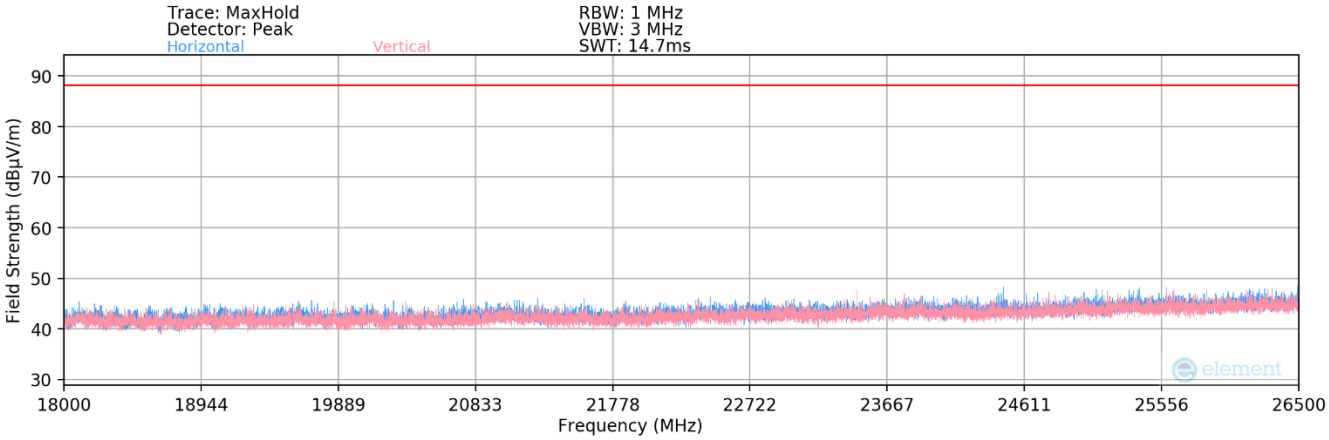
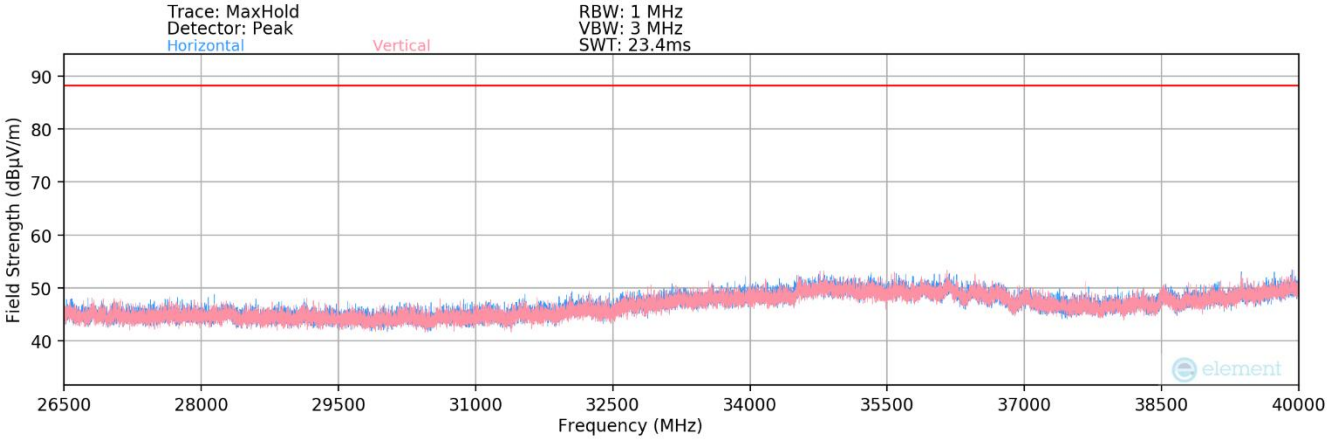


Plot 7-53. Radiated Spurious Plot 1GHz – 18GHz MIMO (802.11a – U Band 8 Ch. 209)



Plot 7-54. Radiated Spurious Plot 18GHz - 26.5GHz (802.11a)



Plot 7-55. Radiated Spurious Plot 26.5GHz - 40GHz (802.11a)

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MIMO Radiated Spurious Emission Measurements – UNII Band 5

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6Mbps
Distance of Measurements: 1 & 3 Meters

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	5	2	5935	*	11870.00	Average	H	186	40	-73.32	9.41	0.00	43.09	53.98	-10.89
					*	11870.00	Peak	H	186	40	-61.95	9.41	0.00	54.46	73.98	-19.52
					*	17805.00	Average	H	-	-	-78.05	16.76	0.00	45.71	53.98	-8.27
					*	17805.00	Peak	H	-	-	-65.49	16.76	0.00	58.27	73.98	-15.71
					*	23740.00	Average	H	-	-	-67.88	4.02	-9.54	33.61	53.98	-20.37
					*	23740.00	Peak	H	-	-	-60.20	4.02	-9.54	41.29	73.98	-32.69
						29675.00	Peak	H	-	-	-57.14	5.01	-9.54	45.33	68.20	-22.87
			45	6175	*	12350.00	Average	H	120	337	-78.42	9.78	0.00	38.36	53.98	-15.62
					*	12350.00	Peak	H	120	337	-64.82	9.78	0.00	51.96	73.98	-22.02
					*	18525.00	Average	H	-	-	-66.67	1.00	-9.54	31.78	53.98	-22.20
					*	18525.00	Peak	H	-	-	-56.42	1.00	-9.54	42.03	73.98	-31.95
						24700.00	Peak	H	-	-	-56.20	4.23	-9.54	45.49	68.20	-22.71
						30875.00	Peak	H	-	-	-56.59	5.66	-9.54	46.53	68.20	-21.67
			93	6415		12830.00	Peak	H	-	-	-66.33	10.40	0.00	51.07	68.20	-17.13
					*	19245.00	Average	H	-	-	-66.34	1.74	-9.54	32.86	53.98	-21.12
					*	19245.00	Peak	H	-	-	-55.59	1.74	-9.54	43.61	73.98	-30.37
						25660.00	Peak	H	-	-	-55.69	4.69	-9.54	46.47	68.20	-21.73
						32075.00	Peak	H	-	-	-55.90	6.47	-9.54	48.03	68.20	-20.17

Table 7-18. Radiated Measurements MIMO – SP

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MIMO Radiated Spurious Emission Measurements – UNII Band 6

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6Mbps
Distance of Measurements: 1 & 3 Meters

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	6	97	6435		12870.00	Peak	H	-	-	-67.14	10.56	0.00	50.42	68.20	-17.78
					*	19305.00	Average	H	-	-	-66.72	1.65	-9.54	32.39	53.98	-21.59
					*	19305.00	Peak	H	-	-	-54.77	1.65	-9.54	44.34	73.98	-29.64
						25740.00	Peak	H	-	-	-55.71	4.71	-9.54	46.46	68.20	-21.74
						32175.00	Peak	H	-	-	-57.29	6.76	-9.54	46.93	68.20	-21.27
			105	6475		12950.00	Peak	H	-	-	-65.08	10.59	0.00	52.51	68.20	-15.69
					*	19425.00	Average	H	-	-	-66.84	1.76	-9.54	32.38	53.98	-21.60
					*	19425.00	Peak	H	-	-	-55.95	1.76	-9.54	43.27	73.98	-30.71
						25900.00	Peak	H	-	-	-55.91	4.78	-9.54	46.34	68.20	-21.86
						32375.00	Peak	H	-	-	-57.04	6.56	-9.54	46.98	68.20	-21.22
			113	6515		13030.00	Peak	H	131	107	-65.65	10.85	0.00	52.20	68.20	-16.00
					*	19545.00	Average	H	-	-	-67.31	1.89	-9.54	32.05	53.98	-21.93
					*	19545.00	Peak	H	-	-	-55.17	1.89	-9.54	44.18	73.98	-29.80
						26060.00	Peak	H	-	-	-56.36	4.92	-9.54	46.03	68.20	-22.17
						32575.00	Peak	H	-	-	-56.72	6.76	-9.54	47.50	68.20	-20.70

Table 7-19. Radiated Measurements MIMO – LPI

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MIMO Radiated Spurious Emission Measurements – UNII Band 7

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6Mbps
Distance of Measurements: 1 & 3 Meters

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	7	117	6535		13070.00	Peak	H	-	-	-65.78	10.74	0.00	51.96	68.20	-16.24
					*	19605.00	Average	H	-	-	-66.94	2.20	-9.54	32.72	53.98	-21.26
					*	19605.00	Peak	H	-	-	-55.65	2.20	-9.54	44.01	73.98	-29.97
						26140.00	Peak	H	-	-	-56.87	4.98	-9.54	45.57	68.20	-22.63
						32675.00	Peak	H	-	-	-56.16	7.14	-9.54	48.43	68.20	-19.77
			149	6695	*	13390.00	Average	H	-	-	-78.30	11.04	0.00	39.74	53.98	-14.24
					*	13390.00	Peak	H	-	-	-65.79	11.04	0.00	52.25	73.98	-21.73
					*	20085.00	Average	H	-	-	-66.50	2.07	-9.54	33.03	53.98	-20.95
					*	20085.00	Peak	H	-	-	-55.96	2.07	-9.54	43.57	73.98	-30.41
						26780.00	Peak	H	-	-	-56.45	5.18	-9.54	46.19	68.20	-22.01
						33475.00	Peak	H	-	-	-56.44	8.48	-9.54	49.51	68.20	-18.69
			185	6875		13750.00	Peak	H	-	-	-65.88	11.51	0.00	52.63	68.20	-15.57
					*	20625.00	Average	H	-	-	-67.21	2.36	-9.54	32.61	53.98	-21.37
					*	20625.00	Peak	H	-	-	-56.28	2.36	-9.54	43.54	73.98	-30.44
						27500.00	Peak	H	-	-	-55.33	5.00	-9.54	47.13	68.20	-21.07
						34375.00	Peak	H	-	-	-57.26	9.46	-9.54	49.67	68.20	-18.53

Table 7-20. Radiated Measurements MIMO – SP

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MIMO Radiated Spurious Emission Measurements – UNII Band 8

Worst Case Mode: 802.11a
Worst Case Transfer Rate: 6Mbps
Distance of Measurements: 1 & 3 Meters

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	8	189	6895		13790.00	Peak	H	-	-	-65.80	11.38	0.00	52.58	68.20	-15.62
					*	20685.00	Average	H	-	-	-67.05	2.33	-9.54	32.74	53.98	-21.24
					*	20685.00	Peak	H	-	-	-56.75	2.33	-9.54	43.05	73.98	-30.93
						27580.00	Peak	H	-	-	-56.78	5.33	-9.54	46.01	68.20	-22.19
						34475.00	Peak	H	-	-	-57.08	9.33	-9.54	49.70	68.20	-18.50
			209	6995		13990.00	Peak	H	-	-	-66.28	11.63	0.00	52.35	68.20	-15.85
					*	20985.00	Average	H	-	-	-67.83	2.83	-9.54	32.47	53.98	-21.51
					*	20985.00	Peak	H	-	-	-56.73	2.83	-9.54	43.57	73.98	-30.41
						27980.00	Peak	H	-	-	-56.74	5.30	-9.54	46.02	68.20	-22.18
						34975.00	Peak	H	-	-	-57.18	9.79	-9.54	50.07	68.20	-18.13
			233	7115		14230.00	Peak	H	-	-	-66.73	12.35	0.00	52.62	68.20	-15.58
					*	21345.00	Average	H	-	-	-66.96	2.85	-9.54	33.35	53.98	-20.63
					*	21345.00	Peak	H	-	-	-56.08	2.85	-9.54	44.23	73.98	-29.75
						28460.00	Peak	H	-	-	-56.95	5.34	-9.54	45.85	68.20	-22.35
						35575.00	Peak	H	-	-	-56.47	9.53	-9.54	50.52	68.20	-17.68

Table 7-21. Radiated Measurements MIMO – LPI

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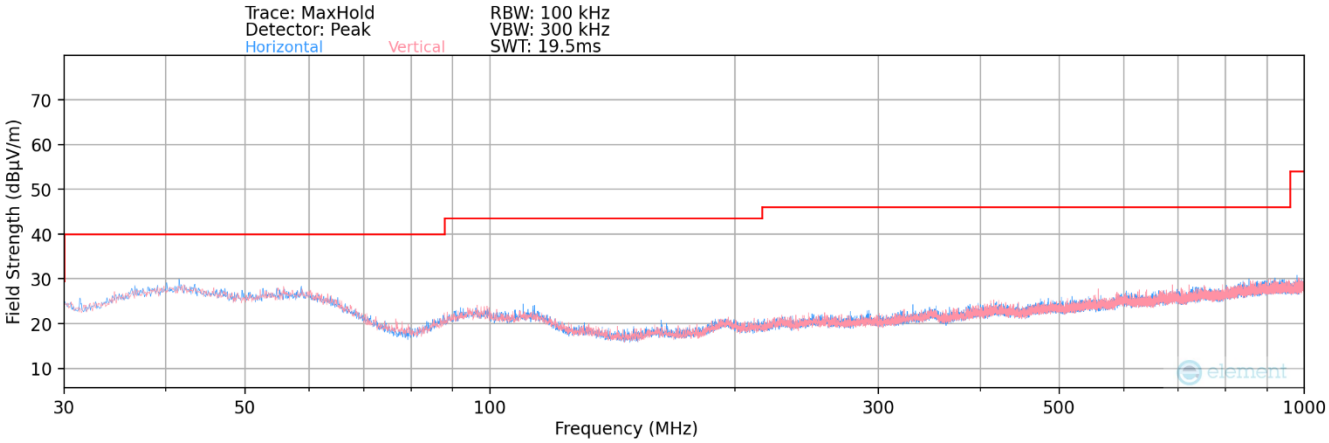
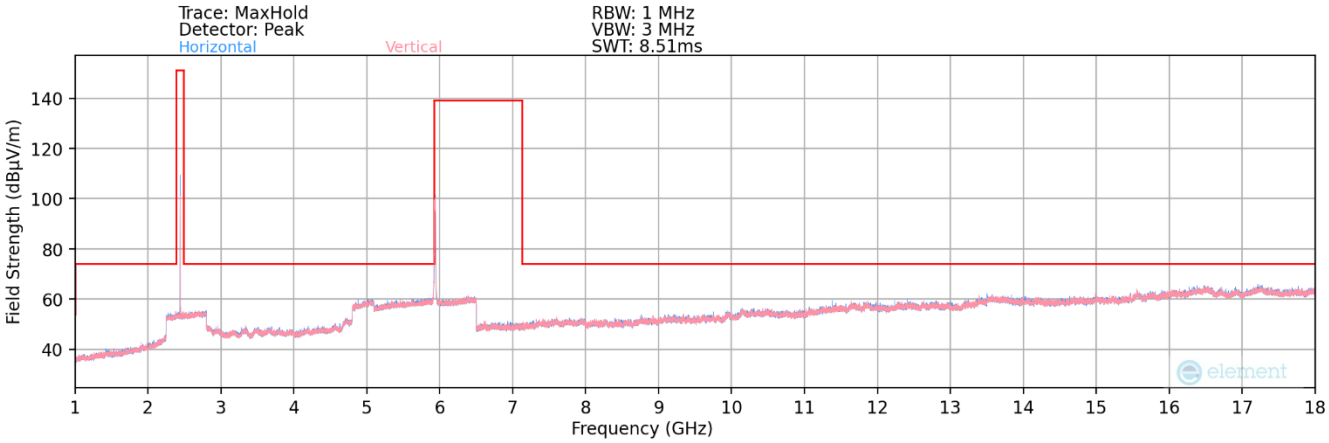
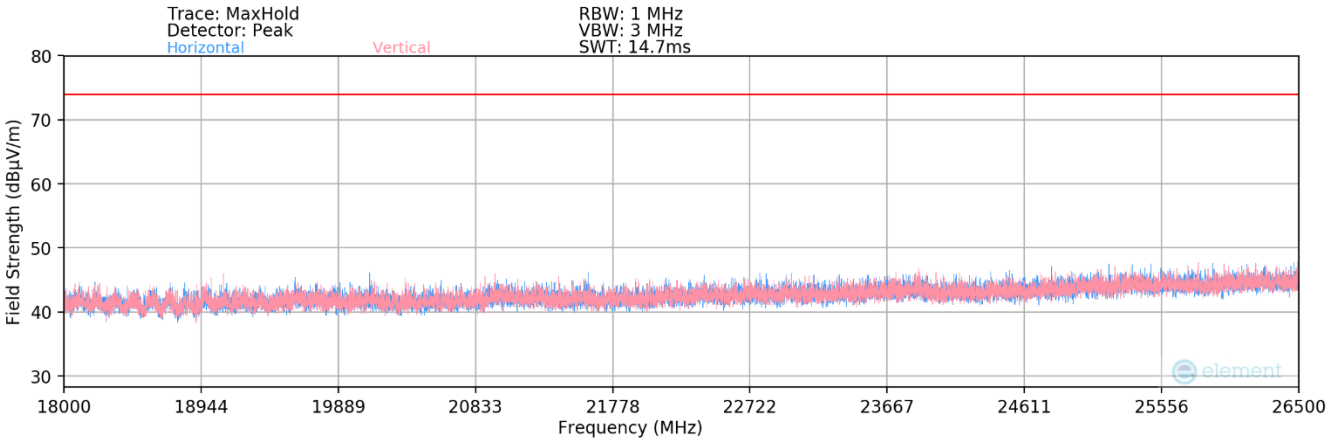
7.6.2 Radiated Spurious Emission Measurements – Simultaneous Transmission



Plot 7-56. Radiated Spurious Plot below 1GHz Bluetooth (1Mbps – CH39) + MIMO 802.11a (6GHz – Ch.2)



Plot 7-57. Radiated Spurious Plot above 1GHz Bluetooth (1Mbps – CH39) + MIMO 802.11a (6GHz – Ch.2)



Plot 7-58. Radiated Spurious Plot 18GHz – 26.5GHz Bluetooth (1Mbps – CH39) + MIMO 802.11a (6GHz – Ch.2)

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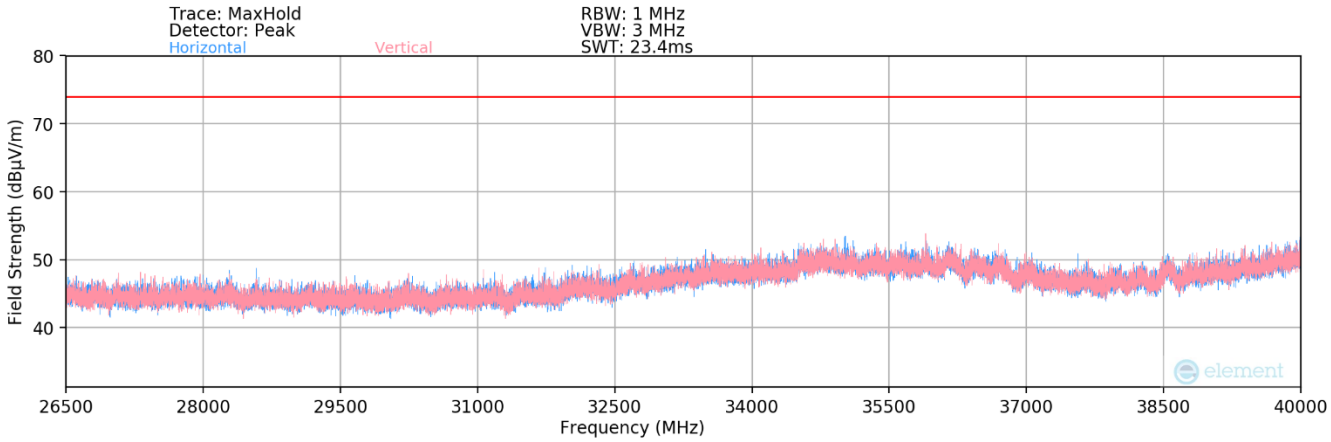

Plot 7-59. Radiated Spurious Plot 26.5GHz – 40GHz Bluetooth (1Mbps – CH39) + MIMO 802.11a (6GHz – Ch.2)

Mode	Antenna	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]
BT 1Mbps + 6E 802.11a	BT SISO + 6E MIMO	BTCh39 & 6GHz Ch2	2441 & 5935		335.00	Peak	H	-	-	-78.92	-9.78	0.00	18.30	46.02	-27.72
				*	1053.00	Average	H	-	-	-77.28	-2.97	0.00	26.75	53.98	-27.23
				*	1053.00	Peak	H	-	-	-65.72	-2.97	0.00	38.31	73.98	-35.67
				*	1388.00	Average	H	-	-	-77.88	-1.17	0.00	27.95	53.98	-26.03
				*	1388.00	Peak	H	-	-	-66.29	-1.17	0.00	39.54	73.98	-34.44
					3494.00	Peak	H	-	-	-69.01	8.41	0.00	46.40	68.20	-21.80
					6988.00	Peak	H	-	-	-70.68	14.48	0.00	50.80	68.20	-17.40
				*	8376.00	Average	H	-	-	-82.59	16.89	0.00	41.30	53.98	-12.68
				*	8376.00	Peak	H	-	-	-71.78	16.89	0.00	52.11	73.98	-21.87
				*	9429.00	Average	H	-	-	-83.28	18.88	0.00	42.60	53.98	-11.38
				*	9429.00	Peak	H	-	-	-72.25	18.88	0.00	53.63	73.98	-20.35
				*	10817.00	Average	H	-	-	-83.57	20.59	0.00	44.02	53.98	-9.96
				*	10817.00	Peak	H	-	-	-72.12	20.59	0.00	55.47	73.98	-18.51

Table 7-22. Radiated Measurements Bluetooth (1Mbps) + MIMO 802.11a (6GHz)

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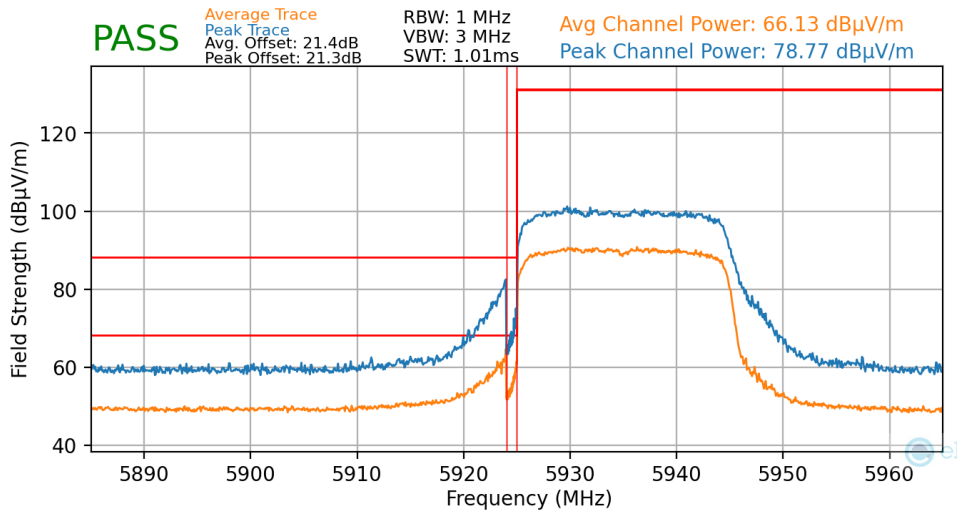
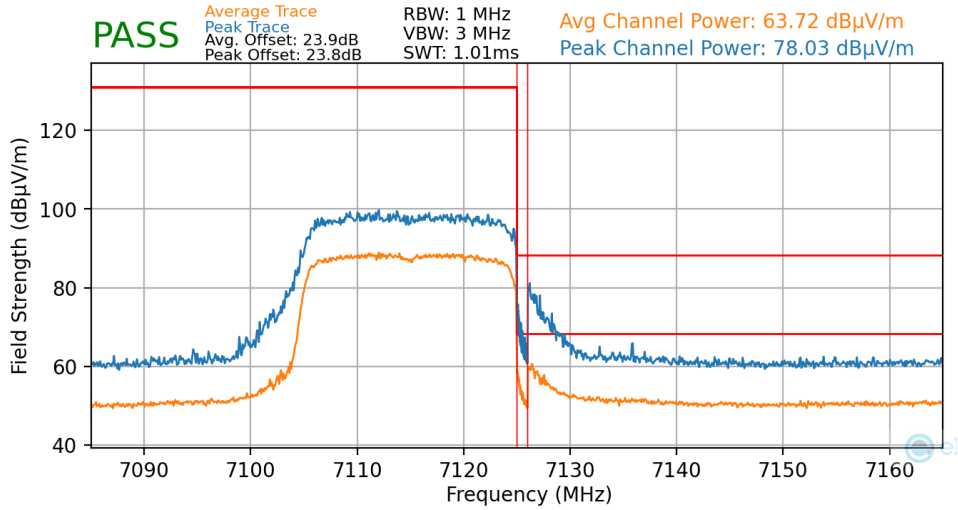
7.6.3 MIMO Radiated Band Edge Measurements (20MHz BW)

Worst Case Mode:	802.11ax
Worst Case Transfer Rate:	MCS0
Distance of Measurements:	3 Meters
Operating Frequency:	5935MHz
Channel:	2



Plot 7-60. Radiated Lower Band Edge Plot MIMO (Average & Peak – UNII Band 5)

Worst Case Mode:	802.11ax
Worst Case Transfer Rate:	MCS0
Distance of Measurements:	3 Meters
Operating Frequency:	7115MHz
Channel:	233



Plot 7-61. Radiated Upper Band Edge Plot MIMO (Average & Peak – UNII Band 8)

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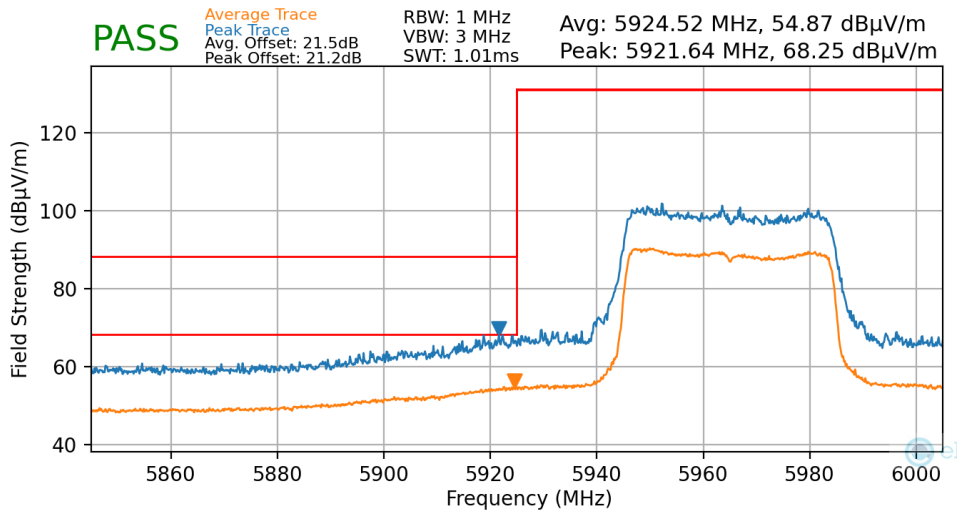
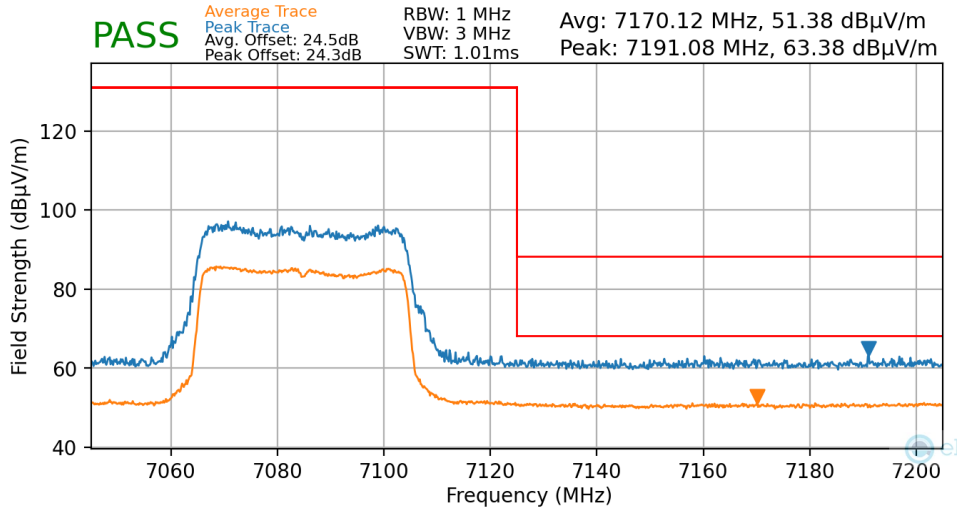
7.6.4 MIMO Radiated Band Edge Measurements (40MHz BW)

Worst Case Mode:	802.11ax
Worst Case Transfer Rate:	MCS0
Distance of Measurements:	3 Meters
Operating Frequency:	5965MHz
Channel:	3



Plot 7-62. Radiated Lower Band Edge Plot MIMO (Average & Peak – UNII Band 5)

Worst Case Mode:	802.11ax
Worst Case Transfer Rate:	MCS0
Distance of Measurements:	3 Meters
Operating Frequency:	7085MHz
Channel:	227



Plot 7-63. Radiated Upper Band Edge Plot MIMO (Average & Peak – UNII Band 8)

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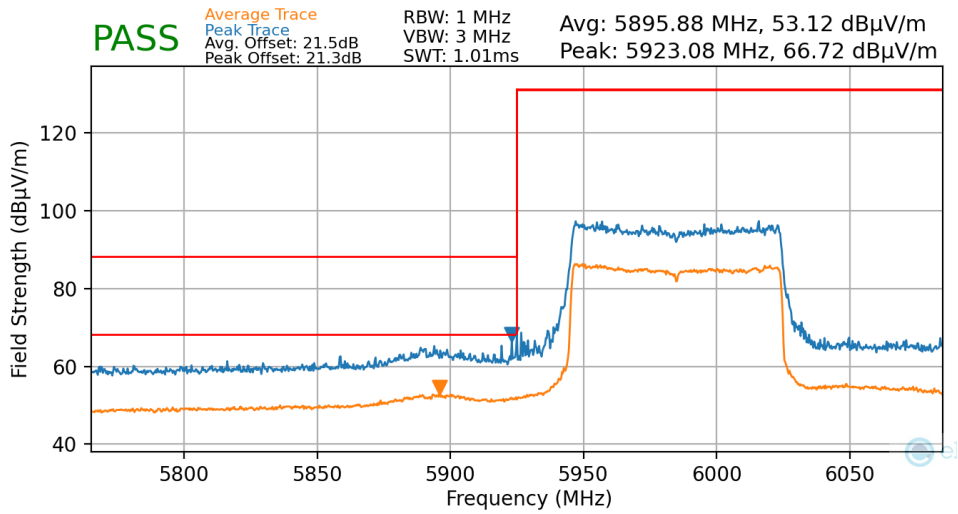
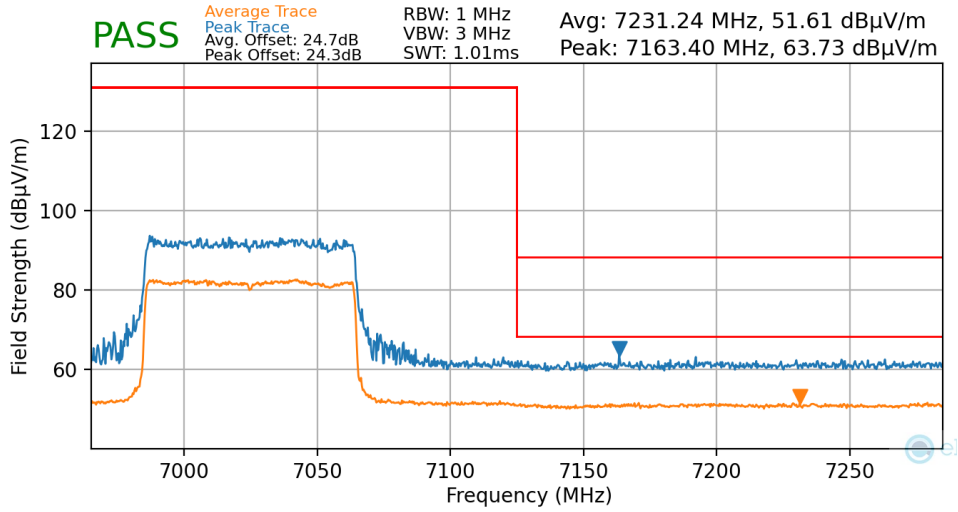
7.6.5 MIMO Radiated Band Edge Measurements (80MHz BW)

Worst Case Mode:	802.11ax
Worst Case Transfer Rate:	MCS0
Distance of Measurements:	3 Meters
Operating Frequency:	5985MHz
Channel:	7



Plot 7-64. Radiated Lower Band Edge Plot MIMO (Average & Peak – UNII Band 5)

Worst Case Mode:	802.11ax
Worst Case Transfer Rate:	MCS0
Distance of Measurements:	3 Meters
Operating Frequency:	7025MHz
Channel:	215



Plot 7-65. Radiated Upper Band Edge Plot MIMO (Average & Peak – UNII Band 8)

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7.7 Line Conducted Test Data

Test Overview and Limit

All AC line conducted spurious emissions are measured with a receiver connected to a grounded LISN while the EUT is operating at its maximum duty cycle, at maximum power, and at the appropriate frequencies. All data rates and modes were investigated for conducted spurious emissions. Only the conducted emissions of the configuration that produced the worst-case emissions are reported in this section.

All conducted emissions must not exceed the limits shown in the table below, per Section 15.207.

Frequency of emission (MHz)	Conducted Limit (dBμV)	
	Quasi-peak	Average
0.15 – 0.5	66 to 56*	56 to 46*
0.5 – 5	56	46
5 – 30	60	50

Table 7-23. Conducted Limits

*Decreases with the logarithm of the frequency.

Test Procedures Used

ANSI C63.10:2020, Section 6.2

Test Settings

Quasi-Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the spurious emission of interest.
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = quasi-peak
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize.

Average Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the spurious emission of interest.
2. RBW = 9kHz (for emissions from 150kHz – 30MHz)
3. Detector = RMS
4. Sweep time = auto couple
5. Trace mode = max hold
6. Trace was allowed to stabilize.

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Test Setup

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

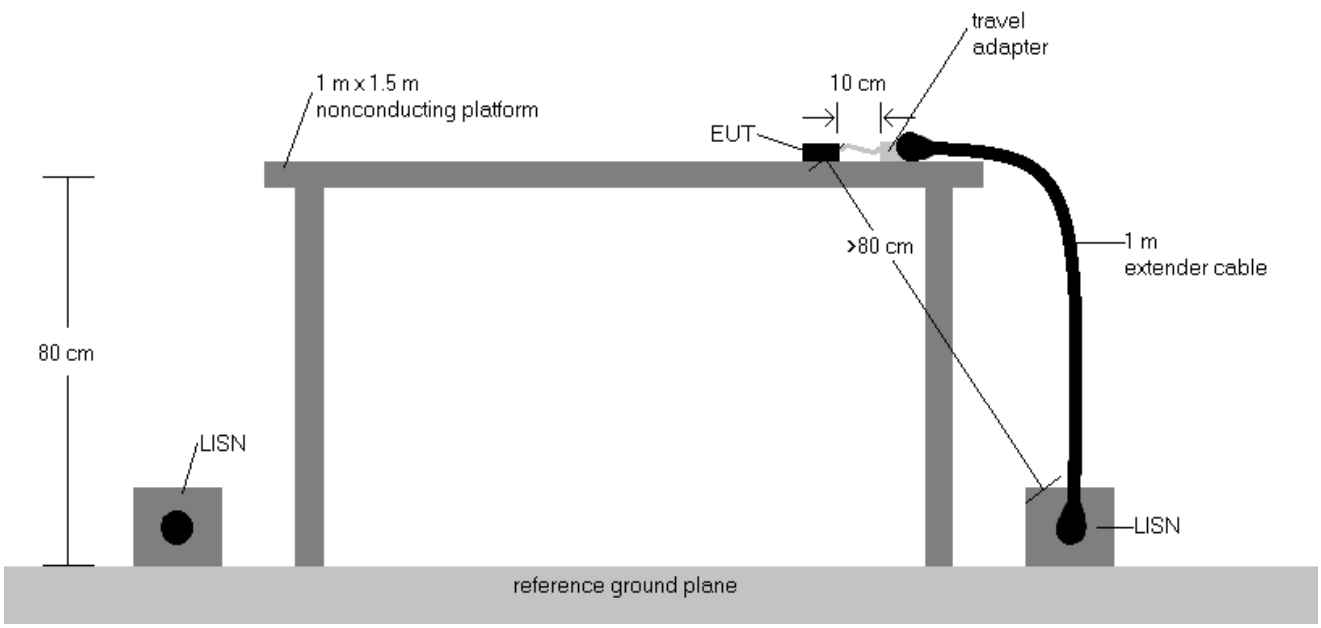

Figure 7-8. Test Instrument & Measurement Setup

Test Notes

1. All modes of operation were investigated, and the worst-case emissions are reported using mid channel. The emissions found were not affected by the choice of channel used during testing.
2. The limit for an intentional radiator from 150kHz to 30MHz is specified in 15.207.
3. Corr. (dB) = Cable loss (dB) + LISN insertion factor (dB)
4. QP/AV Level (dBμV) = QP/AV Analyzer/Receiver Level (dBμV) + Corr. (dB)
5. Margin (dB) = QP/AV Limit (dBμV) - QP/AV Level (dBμV)
6. Traces shown in plot are made using a peak detector.
7. Deviations to the Specifications: None.

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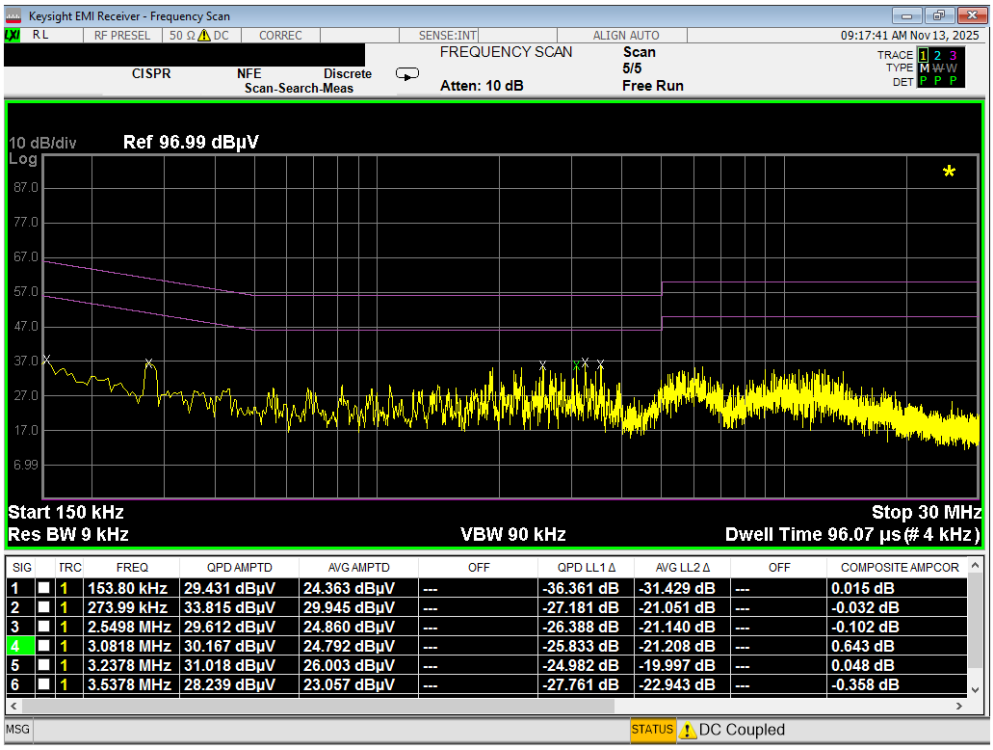
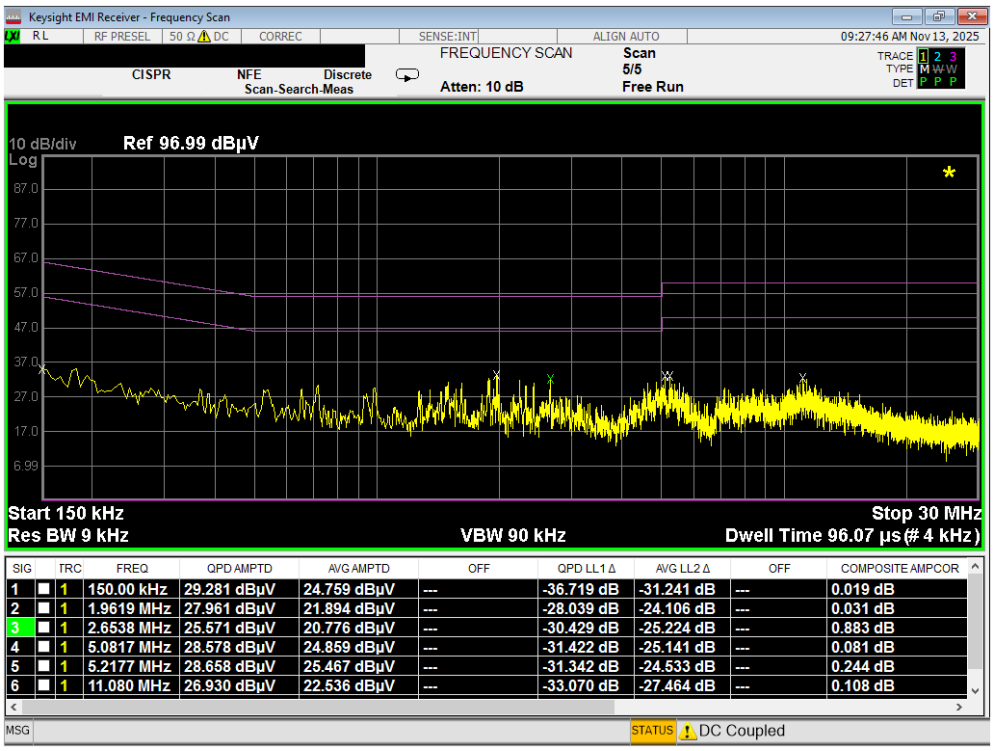


SIG	TRC	FREQ	QPD AMPTD	AVG AMPTD	OFF	QPD LL1 Δ	AVG LL2 Δ	OFF	COMPOSITE AMPCOR
1	1	153.80 kHz	29.431 dBµV	24.363 dBµV	---	-36.361 dB	-31.429 dB	---	0.015 dB
2	1	273.99 kHz	33.815 dBµV	29.945 dBµV	---	-27.181 dB	-21.051 dB	---	-0.032 dB
3	1	2.5498 MHz	29.612 dBµV	24.860 dBµV	---	-26.388 dB	-21.140 dB	---	-0.102 dB
4	1	3.0818 MHz	30.167 dBµV	24.792 dBµV	---	-25.833 dB	-21.208 dB	---	0.643 dB
5	1	3.2378 MHz	31.018 dBµV	26.003 dBµV	---	-24.982 dB	-19.997 dB	---	0.048 dB
6	1	3.5378 MHz	28.239 dBµV	23.057 dBµV	---	-27.761 dB	-22.943 dB	---	-0.358 dB

Plot 7-66. Line Conducted Plot with 802.11a UNII Band 5 (L1)



SIG	TRC	FREQ	QPD AMPTD	AVG AMPTD	OFF	QPD LL1 Δ	AVG LL2 Δ	OFF	COMPOSITE AMPCOR
1	1	150.00 kHz	29.281 dBµV	24.759 dBµV	---	-36.719 dB	-31.241 dB	---	0.019 dB
2	1	1.9619 MHz	27.961 dBµV	21.894 dBµV	---	-28.039 dB	-24.106 dB	---	0.031 dB
3	1	2.6538 MHz	25.571 dBµV	20.776 dBµV	---	-30.429 dB	-25.224 dB	---	0.883 dB
4	1	5.0817 MHz	28.578 dBµV	24.859 dBµV	---	-31.422 dB	-25.141 dB	---	0.081 dB
5	1	5.2177 MHz	28.658 dBµV	25.467 dBµV	---	-31.342 dB	-24.533 dB	---	0.244 dB
6	1	11.080 MHz	26.930 dBµV	22.536 dBµV	---	-33.070 dB	-27.464 dB	---	0.108 dB

Plot 7-67. Line Conducted Plot with 802.11a UNII Band 5 (N)

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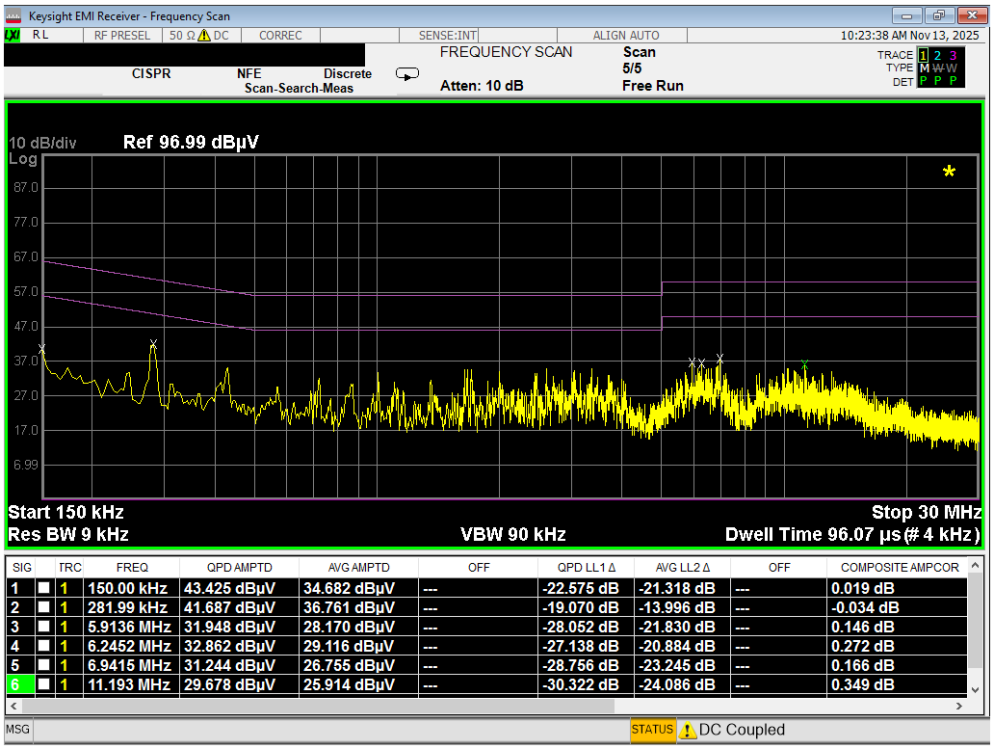
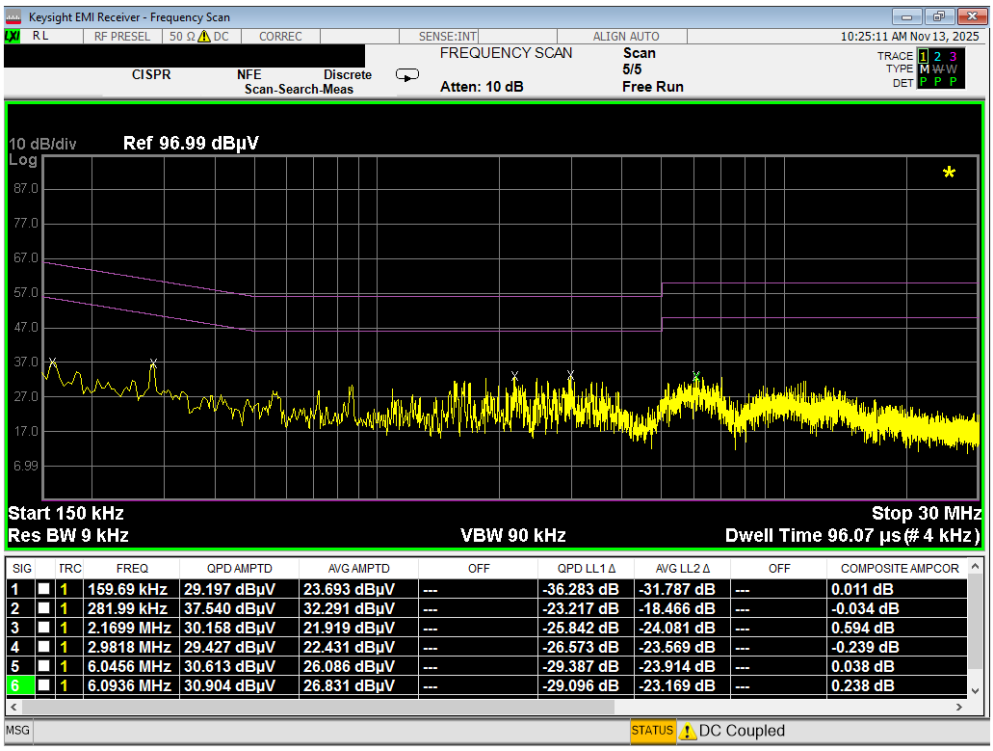


SIG	TRC	FREQ	QPD AMPTD	AVG AMPTD	OFF	QPD LL1 Δ	AVG LL2 Δ	OFF	COMPOSITE AMPCOR
1	1	150.00 kHz	43.425 dBµV	34.682 dBµV	---	-22.575 dB	-21.318 dB	---	0.019 dB
2	1	281.99 kHz	41.687 dBµV	36.761 dBµV	---	-19.070 dB	-13.996 dB	---	-0.034 dB
3	1	5.9136 MHz	31.948 dBµV	28.170 dBµV	---	-28.052 dB	-21.830 dB	---	0.146 dB
4	1	6.2452 MHz	32.862 dBµV	29.116 dBµV	---	-27.138 dB	-20.884 dB	---	0.272 dB
5	1	6.9415 MHz	31.244 dBµV	26.755 dBµV	---	-28.756 dB	-23.245 dB	---	0.166 dB
6	1	11.193 MHz	29.678 dBµV	25.914 dBµV	---	-30.322 dB	-24.086 dB	---	0.349 dB

Plot 7-68. Line Conducted Plot with 802.11a UNII Band 6 (L1)



SIG	TRC	FREQ	QPD AMPTD	AVG AMPTD	OFF	QPD LL1 Δ	AVG LL2 Δ	OFF	COMPOSITE AMPCOR
1	1	159.69 kHz	29.197 dBµV	23.693 dBµV	---	-36.283 dB	-31.787 dB	---	0.011 dB
2	1	281.99 kHz	37.540 dBµV	32.291 dBµV	---	-23.217 dB	-18.466 dB	---	-0.034 dB
3	1	2.1699 MHz	30.158 dBµV	21.919 dBµV	---	-25.842 dB	-24.081 dB	---	0.594 dB
4	1	2.9818 MHz	29.427 dBµV	22.431 dBµV	---	-26.573 dB	-23.569 dB	---	-0.239 dB
5	1	6.0456 MHz	30.613 dBµV	26.086 dBµV	---	-29.387 dB	-23.914 dB	---	0.038 dB
6	1	6.0936 MHz	30.904 dBµV	26.831 dBµV	---	-29.096 dB	-23.169 dB	---	0.238 dB

Plot 7-69. Line Conducted Plot with 802.11a UNII Band 6 (N)

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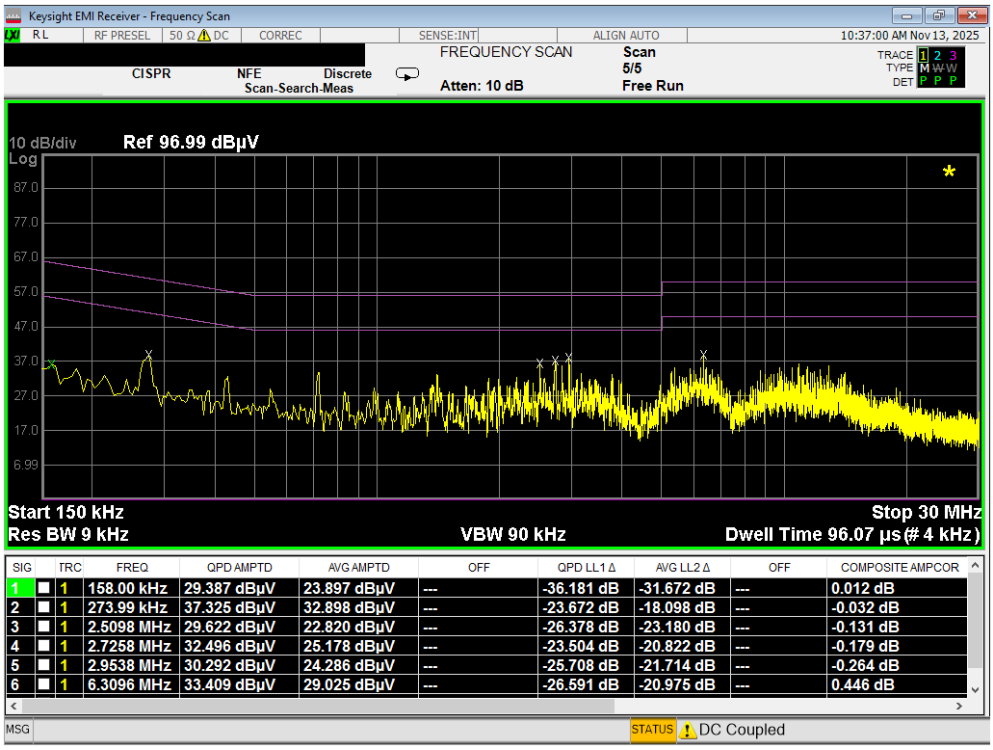
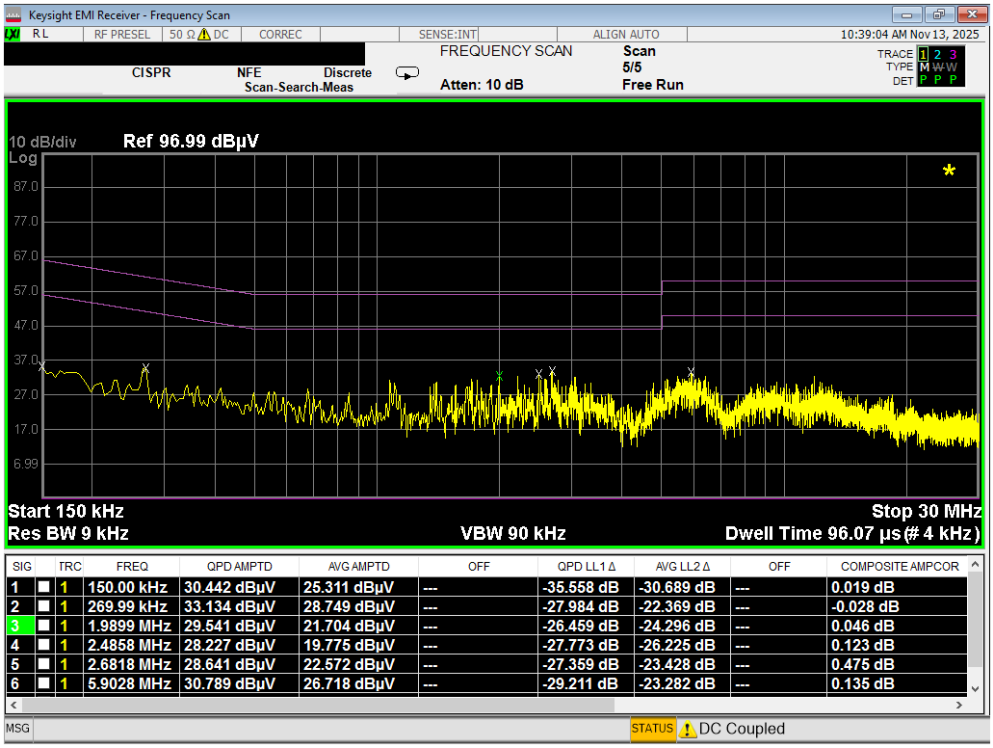


SIG	TRC	FREQ	QPD AMPTD	AVG AMPTD	OFF	QPD LL1 Δ	AVG LL2 Δ	OFF	COMPOSITE AMPCOR
1	1	158.00 kHz	29.387 dBµV	23.897 dBµV	---	-36.181 dB	-31.672 dB	---	0.012 dB
2	1	273.99 kHz	37.325 dBµV	32.898 dBµV	---	-23.672 dB	-18.098 dB	---	-0.032 dB
3	1	2.5098 MHz	29.622 dBµV	22.820 dBµV	---	-26.378 dB	-23.180 dB	---	-0.131 dB
4	1	2.7258 MHz	32.496 dBµV	25.178 dBµV	---	-23.504 dB	-20.822 dB	---	-0.179 dB
5	1	2.9538 MHz	30.292 dBµV	24.286 dBµV	---	-25.708 dB	-21.714 dB	---	-0.264 dB
6	1	6.3096 MHz	33.409 dBµV	29.025 dBµV	---	-26.591 dB	-20.975 dB	---	0.446 dB

Plot 7-70. Line Conducted Plot with 802.11a UNII Band 7 (L1)



SIG	TRC	FREQ	QPD AMPTD	AVG AMPTD	OFF	QPD LL1 Δ	AVG LL2 Δ	OFF	COMPOSITE AMPCOR
1	1	150.00 kHz	30.442 dBµV	25.311 dBµV	---	-35.558 dB	-30.689 dB	---	0.019 dB
2	1	269.99 kHz	33.134 dBµV	28.749 dBµV	---	-27.984 dB	-22.369 dB	---	-0.028 dB
3	1	1.9899 MHz	29.541 dBµV	21.704 dBµV	---	-26.459 dB	-24.296 dB	---	0.046 dB
4	1	2.4858 MHz	28.227 dBµV	19.775 dBµV	---	-27.773 dB	-26.225 dB	---	0.123 dB
5	1	2.6818 MHz	28.641 dBµV	22.572 dBµV	---	-27.359 dB	-23.428 dB	---	0.475 dB
6	1	5.9028 MHz	30.789 dBµV	26.718 dBµV	---	-29.211 dB	-23.282 dB	---	0.135 dB

Plot 7-71. Line Conducted Plot with 802.11a UNII Band 7 (N)

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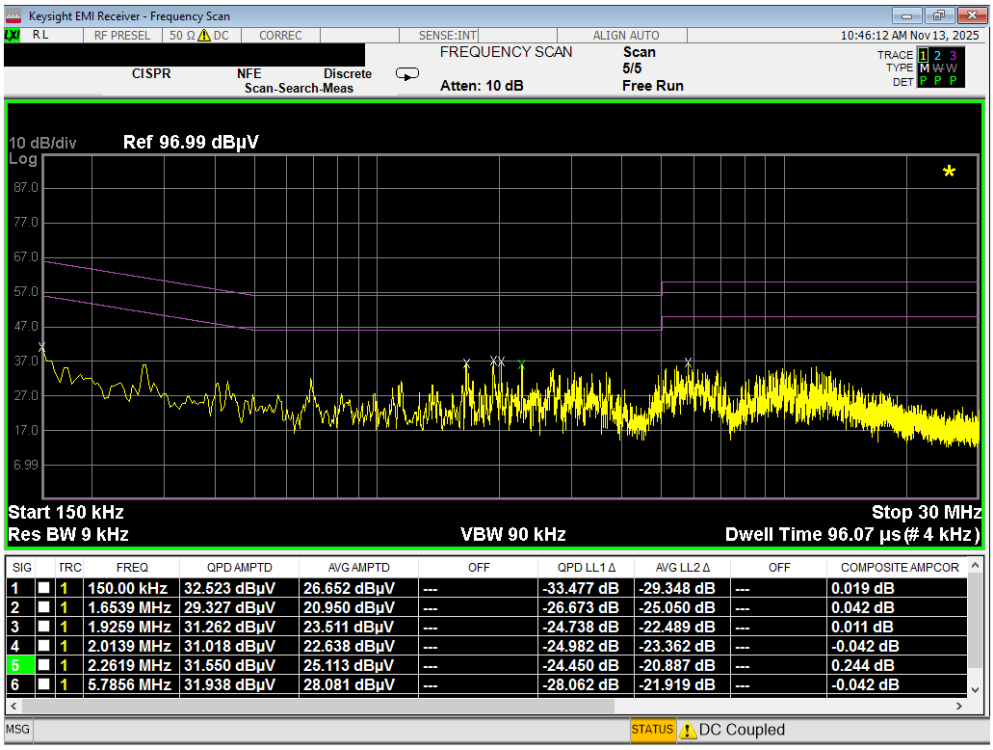
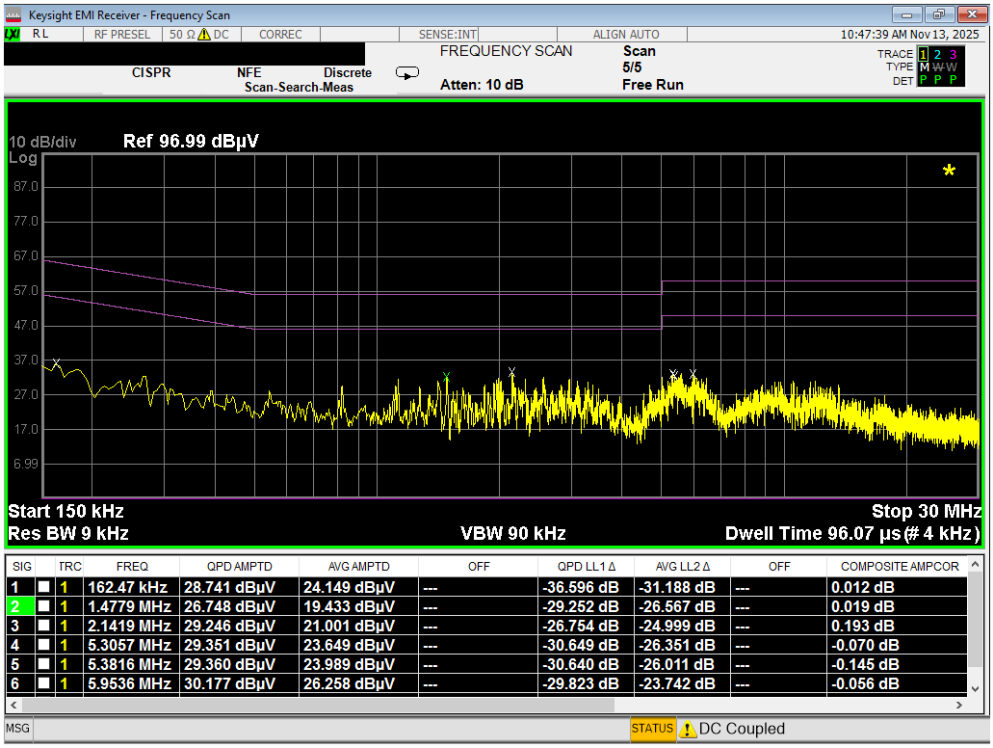


SIG	TRC	FREQ	QPD AMPTD	AVG AMPTD	OFF	QPD LL1 Δ	AVG LL2 Δ	OFF	COMPOSITE AMPCOR
1	1	150.00 kHz	32.523 dBµV	26.652 dBµV	---	-33.477 dB	-29.348 dB	---	0.019 dB
2	1	1.6539 MHz	29.327 dBµV	20.950 dBµV	---	-26.673 dB	-25.050 dB	---	0.042 dB
3	1	1.9259 MHz	31.262 dBµV	23.511 dBµV	---	-24.738 dB	-22.489 dB	---	0.011 dB
4	1	2.0139 MHz	31.018 dBµV	22.638 dBµV	---	-24.982 dB	-23.362 dB	---	-0.042 dB
5	1	2.2619 MHz	31.550 dBµV	25.113 dBµV	---	-24.450 dB	-20.887 dB	---	0.244 dB
6	1	5.7856 MHz	31.938 dBµV	28.081 dBµV	---	-28.062 dB	-21.919 dB	---	-0.042 dB

Plot 7-72. Line Conducted Plot with 802.11a UNII Band 8 (L1)



SIG	TRC	FREQ	QPD AMPTD	AVG AMPTD	OFF	QPD LL1 Δ	AVG LL2 Δ	OFF	COMPOSITE AMPCOR
1	1	162.47 kHz	28.741 dBµV	24.149 dBµV	---	-36.596 dB	-31.188 dB	---	0.012 dB
2	1	1.4779 MHz	26.748 dBµV	19.433 dBµV	---	-29.252 dB	-26.567 dB	---	0.019 dB
3	1	2.1419 MHz	29.246 dBµV	21.001 dBµV	---	-26.754 dB	-24.999 dB	---	0.193 dB
4	1	5.3057 MHz	29.351 dBµV	23.649 dBµV	---	-30.649 dB	-26.351 dB	---	-0.070 dB
5	1	5.3816 MHz	29.360 dBµV	23.989 dBµV	---	-30.640 dB	-26.011 dB	---	-0.145 dB
6	1	5.9536 MHz	30.177 dBµV	26.258 dBµV	---	-29.823 dB	-23.742 dB	---	-0.056 dB

Plot 7-73. Line Conducted Plot with 802.11a UNII Band 8 (N)

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8.0 CONCLUSION

The data collected relate only the item(s) tested and show that the **Samsung Portable Handset FCC ID: A3LSMA576U** and **IC: 649E-SMA576W** is in compliance with FCC Part Subpart E (15.407) of the FCC rules and RSS-248 Issue 3 of the ISED Canada rules for operation as a Dual Client Device.

- END OF TEST REPORT -

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