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MEASUREMENT REPORT FCC Part 15.407 802.11a/ax WIFI 6E

Applicant Name:

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

Date of Testing:

9/9 – 11/18/2021 **Test Report Issue Date:** 12/22/2021 **Test Site/Location:** PCTEST Lab. Columbia, MD, USA **Test Report Serial No.:** 1M2109220110-11-R1.A3L

FCC ID:

A3LSMS908E

APPLICANT:

Samsung Electronics Co., Ltd.

Application Type:	Certification
Model:	SM-S908E/DS
Additional Model(s):	SM-S908E
EUT Type:	Portable Handset
Frequency Range:	5935 – 7115MHz
Modulation Type:	OFDM
FCC Classification:	15E 6GHz Low Power Indoor Client (6XD)
Test Procedure(s):	ANSI C63.10-2013, KDB 789033 D02 v02r01,
	KDB 648474 D03 v01r04, KDB 662911 D01 v02r01,
	KDB 987594 D02 v01r01

This equipment has been shown to be capable of compliance with the applicable technical standards as indicated in the measurement report and was tested in accordance with the measurement procedures specified in ANSI C63.10-2013 and KDB 789033 D02 v02r01. Test results reported herein relate only to the item(s) tested.

Note: This revised Test Report (S/N: 1M2109220110-11-R1.A3L) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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

Råndy Ortanez President



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			МІ	мо
Channel Bandwidth [MHz]	UNII Band	Tx Frequency [MHz]	Max. Power [mW]	Max. Power [dBm]
	5	5935 - 6415	18.836	12.75
20	6	6435 - 6515	30.620	14.86
20	7	6535 - 6875	31.550	14.99
	8	6895 - 7115	31.477	14.98
	5	5965 - 6405	36.392	15.61
40	6	6445 - 6525	37.497	15.74
40	7	6565 - 6845	39.537	15.97
	8	6885 - 7085	35.481	15.50
	5	5985 - 6385	39.719	15.99
80	6	6465	34.198	15.34
80	7	6545 - 6865	38.905	15.90
	8	6945 - 7025	36.141	15.58
	5	6025 - 6345	35.075	15.45
100	6	6505	35.237	15.47
160	7	6665 - 6825	35.075	15.45
	8	6985	32.885	15.17

EUT Overview

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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 PCTEST Test Location

These measurement tests were conducted at the PCTEST facility located at 7185 Oakland Mills Road, Columbia, MD 21046. The measurement facility is compliant with the test site requirements specified in ANSI C63.4-2014.

1.3 Test Facility / Accreditations

Measurements were performed at PCTEST located in Columbia, MD 21046, U.S.A.

- PCTEST 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.
- PCTEST 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).
- PCTEST facility is a registered (2451B) test laboratory with the site description on file with ISED.

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2.0 **PRODUCT INFORMATION**

2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMS908E**. 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.: 0501M, 0579M, 3922M, 0299M, 0545M

2.2 Device Capabilities

This device contains the following capabilities:

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

Band	5
------	---

Ch.	Frequency (MHz)
2	5935
:	
45	6175
:	:
93	6415

	Band 6
Ch. Frequency (MH	
97	6435
:	•
105	6475
:	:
113	6515

л, LU	Band 7	
Ch.	Frequency (MHz)	
117	6535	
:	:	
149	6695	
:	:	
185	6875	

	Band 8
Ch.	Frequency (MHz)
189	6895
:	:
209	6995
:	:
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)	С	h.	Frequency (MHz)
3	5965	99	6445	123	6565	18	37	6885
:	:	:	:	:	:			:
43	6165	107	6485	155	6725	2'	1	7005
:	:	:	:	:	:			:
91	6405	115	6525	179	6845	22	27	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)	C	h.	Frequency (MHz)		Ch.	Frequency (MHz)
7	5985		103	6465	1	19	6545	Ī	199	6945
:	:					:	:		:	:
39	6145				1	51	6705		215	7025
:	:					•	:	-		
87	6385				1	83	6865			
	Tab	2 2	-3 802	11av (80MHz BW)	Tod	ion	cy / Channel Opera	tio	ne	

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

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

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

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Notes:

 6GHz NII operation is possible in 20MHz, and 40MHz, and 80MHz and 160MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = peak per the guidance of Section B)2)b) of ANSI C63.10-2013 and KDB 789033 D02 v02r01. 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:

		MIMO				
802.11	802.11 Mode/Band					
		Cycle [%]				
	а	98.6				
	ax (HT20)	96.8				
6GHz	ax (HT40)	94.4				
	ax (HT80)	90.6				
	ax (HT160)	90.4				
Table 2-5.	Table 2-5. Measured Duty Cycles					

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

WiFi Configurations		SISO		C	DD	SDM	
	oningurations	ANT1	ANT2	ANT1	ANT2	ANT1	ANT2
	11a	×	×	✓	✓	×	×
	11ax (20MHz)	×	×	✓	✓	✓	✓
6GHz	11ax (40MHz)	×	×	✓	✓	✓	✓
	11ax (80MHz)	×	×	✓	✓	✓	✓
	11ax (160MHz)	×	×	✓	✓	✓	✓

Table 2-6. Frequency / Channel Operations

✓ = Support ; ×= NOT Support

SDM = Spatial Diversity Multiplexing – MIMO function

CDD = Cyclic Delay Diversity - 2Tx Function

2.3 Antenna Description

Following antenna was used for the testing.

Frequency Band	Antenna-1 Gain [dBi]	Antenna-2 Gain [dBi]	Directional Gain [dBi]
Band 5	-6.31	-5.56	-2.92
Band 6	-11.39	-6.32	-5.48
Band 7	-7.00	-7.37	-4.17
Band 8	-7.00	-10.56	-5.59

Table 2-7. Antenna Peak Gain

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2.4 Test Configuration

The EUT was tested per the guidance of KDB 987594 D02 and KDB 789033 D02 v02r01. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing and AC line conducted testing. See Sections 3.2 for AC line conducted emissions test setups, 3.3 for radiated emissions test setups, and 7.2, 7.3, 7.4, 7.5 and 7.6 for antenna port conducted emissions test setups.

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

2.5 Software and Firmware

The test was conducted with firmware version S908USQU0AUJV installed on the EUT.

2.6 EMI Suppression Device(s)/Modifications

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

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3.0 DESCRIPTION OF TESTS

3.1 Evaluation Procedure

The measurement procedures described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) and the guidance provided in KDB 789033 D02 v02r01 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, $50\Omega/50\mu$ H 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 7.9. 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 in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 1 x 1.5 meter table. The EUT, support equipment, and test environment of the 1 x 1.5 meter table. The EUT, support equipment, and test environment and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, mode of operation, turntable azimuth, and receive antenna height was noted for each frequency found.

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

All radiated measurements are performed in a chamber that meets the site requirements per ANSI C63.4-2014. Additionally, radiated emissions below 30MHz are also validated on an Open Area Test Site to assert correlation with the chamber measurements per the requirements of KDB 474788 D01.

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

Contribution	Expanded Uncertainty (±dB)
Conducted Bench Top Measurements	1.13
Line Conducted Disturbance	3.09
Radiated Disturbance (<1GHz)	4.98
Radiated Disturbance (>1GHz)	5.07
Radiated Disturbance (>18GHz)	5.09

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6.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	WL25-1	Conducted Cable Set (25GHz)	9/7/2021	Annual	9/7/2022	WL25-1
-	WL25-2	Conducted Cable Set (25GHz)	9/7/2021	Annual	9/7/2022	WL25-2
-	WL25-3	Conducted Cable Set (25GHz)	9/7/2021	Annual	9/7/2022	WL25-3
-	WL40-1	Conducted Cable Set (40GHz)	9/10/2021	Annual	9/10/2022	WL40-1
Agilent	N9038A	MXE EMI Receiver	8/11/2020	Annual	12/1/2021	MY51210133
Agilent	N9030A	PXA Signal Analyzer (44GHz)	7/21/2021	Annual	7/21/2022	MY49430494
Anritsu	ML2495A	Power Meter	1/18/2021	Annual	1/18/2022	941001
Anritsu	MA2411B	Pulse Power Sensor	3/8/2021	Annual	3/8/2022	1339007
Emco	3115	Horn Antenna (1-18GHz)	6/18/2020	Biennial	6/18/2022	9704-5182
Emco	3116C	Horn Antenna (18 - 40GHz)	5/112021	Biennial	5/11/2023	218893
ETS-Lindgren	3816/2NM	Line Impedance Stabilization Network	7/9/2020	Biennial	7/9/2022	114451
Keysight Technologies	N9030A	PXA Signal Analyzer (44GHz)	8/17/2020	Annual	12/17/2021	MY52350166
Pasternack	NMLC-2	Line Conducted Emissions Cable (NM)	9/10/2021	Annual	9/10/2022	NMLC-2
Keysight Technologies	N9030A	PXA Signal Analyzer (44GHz)	7/21/2021	Annual	7/12/2022	MY49430494
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	8/3/2021	Annual	8/3/2022	100342
Rohde & Schwarz	ESW44	EMI Test Receiver 2Hz to 44GHz	1/21/2021	Annual	1/21/2022	101716
Rohde & Schwarz	FSW67	Signal / Spectrum Analyzer	8/25/2021	Annual	8/25/2022	103200
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	9/3/2021	Annual	9/3/2022	102138
Solar Electronics	8012-50-R-24-BNC	Line Impedance Stabilization Network	9/21/2021	Biennial	9/21/2023	310233
Schwarzbeck	VULB9162	Bilog Antenna	4/17/2020	Biennial	4/17/2022	00301

Table 6-1. Annual Test Equipment Calibration Schedule

Note:

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

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7.0 TEST RESULTS

7.1 Summary

Company Name:	Samsung Electronics Co., Ltd.
FCC ID:	A3LSMS908E
FCC Classification:	15E 6GHz Low Power Indoor Client (6XD)

FCC Part Section(s)	Test Description	Test Limit	Test Condition	Test Result	Reference
2.1046, 15.407(a)(11)	Maximum Conducted Output Power	N/A		PASS	Section 7.3
2.1049, 15.407(a)(10)	Occupied Bandwidth/ 26dB Bandwidth	99% of the occupied bandwidth of any channel must be contained within each of its respective U-NII sub bands The maximum transmitter channel bandwidth for U-NII devices in the 5.925- 7.125 GHz band is 320 megahertz.	CONDUCTED	PASS	Section 7.2
15.407(a)(8)	Maximum Power Spectral Density	< -1dBm/MHz e.i.r.p.		PASS	Section 7.4
15.407(a)(8)	Maximum Radiated Output Power	< 24dBm over the frequency band of operation		PASS	Section 7.3
15.407(b)(6)	In-Band Emissions	EUT must meet the limits detailed in 15.407(b)(6)		PASS	Section 7.5
15.407(d)(6)	Contention Based Protocol	EUT must detect AWGN signal with 90% (or better) certainty		PASS	Section 7.6
15.407(b)(5)	Undesirable Emissions	< -27dBm/MHz e.i.r.p. outside of the 5.925 – 7.125GHz band		PASS	Section 7.7
15.205, 15.209	General Field Strength Limits (Restricted Bands and Radiated Emission Limits)	Emissions in restricted bands must meet the radiated limits detailed in 15.209	RADIATED	PASS	Section 7.7, 7.8
15.407(b)(8)	AC Conducted Emissions (150kHz – 30MHz)	< FCC 15.207 limits	LINE CONDUCTED	PASS	Section 7.9

Table 7-1. Summary of Test Results

Notes:

- 1) All channels, modes, and modulations/data rates were investigated among all UNII bands. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "UNII Automation," Version 4.7.
- 5) For radiated band edge, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "Chamber Automation," Version 1.3.1.

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7.2 26dB Bandwidth Measurement – 802.11a/ax

<u>2.1049, 15.407(a)(10)</u>

Test Overview and Limit

The bandwidth at 26dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in ANSI C63.10-2013 and KDB 789033 D02 v02r01, and at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 26dB bandwidth.

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

Test Procedure Used

ANSI C63.10-2013 – Section 12.4 KDB 789033 D02 v02r01 – Section C KDB 987594 D02

Test Settings

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

Test Setup

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



Figure 7-1. Test Instrument & Measurement Setup

Test Notes

None.

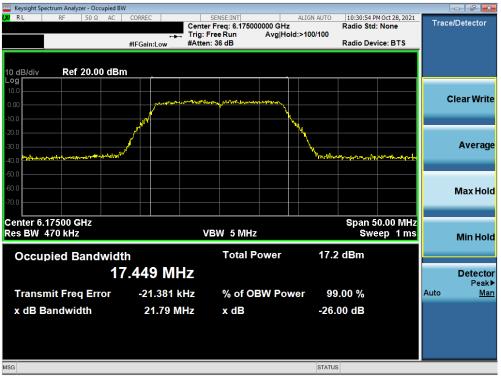
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MIMO Antenna-1 26 dB Bandwidth Measurements - (UNII Band 5)



Plot 7-1. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11a (UNII Band 5) - Ch. 2)



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

FCC ID: A3LSMS908E	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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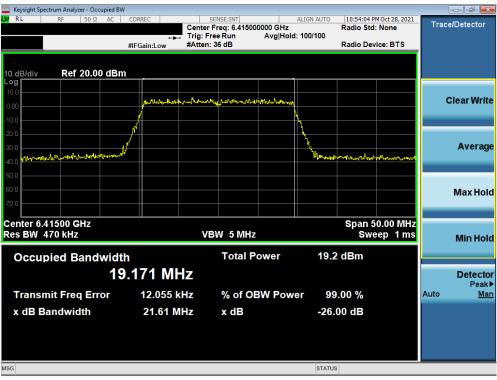
Plot 7-4. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11ax (UNII Band 5) - Ch. 2)

FCC ID: A3LSMS908E	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-5. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11ax (UNII Band 5) - Ch. 45)



Plot 7-6. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11ax (UNII Band 5) - Ch. 93

FCC ID: A3LSMS908E	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BW							
LX/RL RF 50Ω AC CO		NSE:INT	ALIGN AUTO		M Oct 28, 2021	Trac	e/Detector
	Trig: Fre	req: 5.965000000 GHz	d: 100/100	Radio Std:	None		
#IF	Gain:Low #Atten: 3			Radio Dev	ice: BTS		
10 dB/div Ref 30.00 dBm							
20.0							
							Clear Write
10.0	Survey of the alf Monorth	Amount would be a free of the second					
0.00							
-10.0	ļ						
-20.0	<u> </u>						Average
20.0			Ъ,				Ŭ
all you to be when any a children of the read of the set of the			manner	philosophiles	mylunden		
-40.0							
-50.0							Max Hold
-60.0							
Center 5.96500 GHz					00.0 MHz		
Res BW 910 kHz	VB	W 8 MHz		Swe	ep 1 ms		Min Hold
Occupied Bandwidth		Total Power	20.6	dBm			
37 7	46 MHz						Detector
011							Peak►
Transmit Freq Error	-43.565 kHz	% of OBW Pow	ver 99	.00 %		Auto	<u>Man</u>
x dB Bandwidth	40.90 MHz	x dB	26 (00 dB			
	40.90 MITZ	XUD	-20.0	JU UB			
MSG			STATUS				

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



Plot 7-8. 26dB Bandwidth Plot MIMO ANT1 (40MHz 802.11ax (UNII Band 5) – Ch. 43)

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🔤 Keysight Spectrum Analyzer - Occupied B	N				
L <mark>X/</mark> RL RF 50Ω AC	CORREC	SENSE:INT Freg: 6.405000000 GHz	ALIGN AUTO	11:19:59 PM Oct 28, Radio Std: None	,2021 Trace/Detector
	Trig:	Free Run Avg Ho	d: 100/100		
	#IFGain:Low #Atte	n: 36 dB		Radio Device: BT	S
10 dB/div Ref 20.00 dBr	n		-		
Log 10.0					
0.00	Homonymouth	May and the work where a second	~u		Clear Write
-10.0	í.		\		
-20.0					
					Average
-30.0	14 ¹		Withmany	sanherlanderilManagerlanderersers	Average
-40.0					
-50.0					
-60.0					Max Hold
-70.0					
Center 6.40500 GHz				Span 100.0 I	MHz
Res BW 910 kHz	١	/BW/8MHz		Sweep 1	
				chicop .	ms Min Hold
Occupied Bandwid	th	Total Power	20.7	dBm	
3	7.680 MHz				Detector
					Peak►
Transmit Freq Error	-1.377 kHz	% of OBW Pov	wer 99	.00 %	Auto <u>Man</u>
x dB Bandwidth	40.48 MHz	x dB	-26.0	00 dB	
			OTATUO		
MSG			STATUS		

Plot 7-9. 26dB Bandwidth Plot MIMO ANT1 (40MHz 802.11ax (UNII Band 5) - Ch. 91)



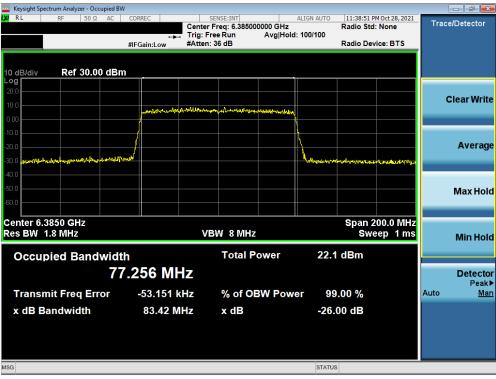
Plot 7-10. 26dB Bandwidth Plot MIMO ANT1 (80MHz 802.11ax (UNII Band 5) – Ch. 7)

FCC ID: A3LSMS908E		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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🔤 Keysight Spectrum Analyzer - Occupied BV					
LXI RL RF 50 Ω AC	CORREC	SENSE:INT nter Freg: 6.145000000 GHz	ALIGN AUTO	11:37:40 PM Oct 28, 2 Radio Std: None	021 Trace/Detector
	tipe Tri	ig: Free Run Avg He	bld: 100/100	Radio Sta. None	
	#IFGain:Low #A	tten: 36 dB		Radio Device: BTS	
10 dB/div Ref 30.00 dBn	n				
Log					
20.0					Clear Write
10.0	augural all berete	working and many about ways	40		
0.00					
-10.0	 				
-20.0	_/				Average
-30.0 and the second se			Hastrillora	anterwork and an intervent	And a second
-40.0					
-50.0					
-60.0					Max Hold
-80.0					
Center 6.1450 GHz				Span 200.0 M	Hz
Res BW 1.8 MHz		VBW 8 MHz		Sweep 1r	
Occupied Bandwidt	h	Total Power	21.9	∂ dBm	
77	7.393 MHz				Detector
					Peak▶
Transmit Freq Error	87.072 kHz	% of OBW Po	wer 99	9.00 %	Auto <u>Man</u>
x dB Bandwidth	82.46 MHz	x dB	-26.	00 dB	
				1	
MSG			STATU	S	

Plot 7-11. 26dB Bandwidth Plot MIMO ANT1 (80MHz 802.11ax (UNII Band 5) - Ch. 39)



Plot 7-12. 26dB Bandwidth Plot MIMO ANT1 (80MHz 802.11ax (UNII Band 5) - Ch. 87)

FCC ID: A3LSMS908E		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BV					
LXI RE 50Ω AC	CORREC	SENSE:INT	ALIGN AUTO	11:44:19 PM Oct 28, Radio Std: None	,2021 Trace/Detector
		Trig: Free Run	Avg Hold: 100/100		
	#IFGain:Low	#Atten: 36 dB		Radio Device: BT	'S
10 dB/div Ref 30.00 dBr	n				
Log 20.0					
					Clear Write
10.0	and more thank	answer wormen	he and the manufacture		
0.00					
-10.0			<u>├</u> ───		
-20.0			┼────┤┤────		Average
-30.0 mananamanallemanny marting	~~		Mar Hotel	water a start of the confidence	Mages
-40.0					
-50.0					Max Hold
-60.0					Max Holu
00.0					
Center 6.0250 GHz				Span 400.0 I	
Res BW/3 MHz		VBW 50 MH	z	Sweep 1	ms Min Hold
		T-4-LD		0	
Occupied Bandwidt		Total P	ower 22.	0 dBm	
15	57.24 MH	Z			Detector
	0 0 4 0 1 1				Peak►
Transmit Freq Error	3.343 k⊦	1Z % of O	BW Power 99	9.00 %	Auto <u>Man</u>
x dB Bandwidth	168.2 MF	lz xdB	-26	.00 dB	
MSG			STATU		

Plot 7-13. 26dB Bandwidth Plot MIMO ANT1 (160MHz 802.11ax (UNII Band 5) - Ch. 15)



Plot 7-14. 26dB Bandwidth Plot MIMO ANT1 (160MHz 802.11ax (UNII Band 5) - Ch. 47)

FCC ID: A3LSMS908E	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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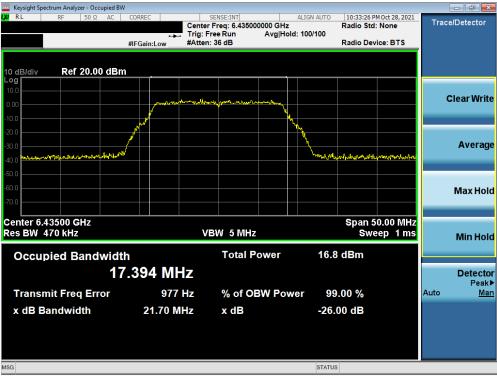
Keysight Spectrum Analyzer - Occupied						- • • ×
LX/ RL RF 50Ω AC	CORREC	SENSE:INT Center Freg: 6.34500	ALIGN AUTO	11:47:03 PM C Radio Std: N		Trace/Detector
	- + -	Trig: Free Run	Avg Hold: 100/100			
	#IFGain:Low	#Atten: 36 dB		Radio Device	e: BTS	
10 dB/div Ref 30.00 dE	3m					
20.0						
10.0						Clear Write
0.00	molum	wayers was the start of the sta	aphtopologic and			
-10.0	/		\			
-20.0						Average
-30.0 constrained of Manual marker of	huberrow		hand a start		Arctuoliote	
-40.0						
-50.0						
						Max Hold
-60.0						
Center 6.3450 GHz		·		Span 400	0.0 MHz	
Res BW 3 MHz		VBW 50 MH	z	Swee	p 1 ms	Min Hold
	141	Total P		.4 dBm		
Occupied Bandwic			ower 21	.4 abm		
1	56.67 MH	Z				Detector
Transmit Freg Error	6.997 k		BW Power 9	9.00 %		Peak▶ Auto Man
· · · · ·						Mato <u>man</u>
x dB Bandwidth	166.3 M	Hz x dB	-26	5.00 dB		
MSG			STAT	US		

Plot 7-15. 26dB Bandwidth Plot MIMO ANT1 (160MHz 802.11ax (UNII Band 5) - Ch. 79)

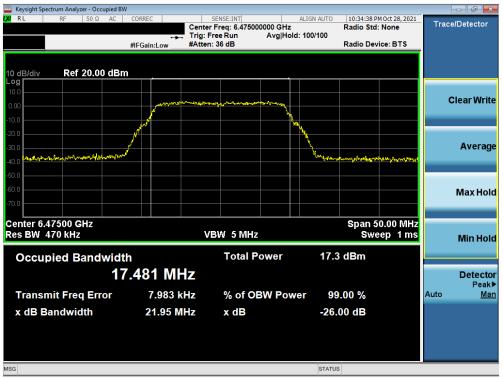
FCC ID: A3LSMS908E	Proved to be part of the element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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MIMO Antenna-1 26 dB Bandwidth Measurements - (UNII Band 6)



Plot 7-16. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11a (UNII Band 6) - Ch. 97)



Plot 7-17. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11a (UNII Band 6) - Ch. 105)

FCC ID: A3LSMS908E	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied E						1	
IXIRL RF 50Ω AC	CORREC	SENSE:INT Center Freq: 6.51500 Trig: Free Run #Atten: 36 dB	ALIGN AI 00000 GHz Avg Hold: 100/10	Radio Std		Trace	e/Detector
10 dB/div Ref 20.00 dB	m						
Log 10.0 0.00		NM ald Mary a South Mary Mary	unny			c	Clear Write
-10.0	A A A A A A A A A A A A A A A A A A A		Mady Mary				Average
-40.0 41444-4-1-1-2-1-2-1-1-1-1-1-1-1-1-1-1-1-	<u>A</u>		¥u	^ม ัง [๛] าการใหม่ไหนสารใหญ	เพราะเขาเขา		
-60.0							Max Hold
Center 6.51500 GHz Res BW 470 kHz		VBW 5 MHz	2		50.00 MHz eep 1 ms		Min Hold
Occupied Bandwid		Total P	ower	16.9 dBm			_
1	7.424 MH	z					Detector Peak
Transmit Freq Error	11.217 k	Hz % of O	BW Power	99.00 %		Auto	Mar
x dB Bandwidth	21.89 M	Hz xdB	· · · ·	26.00 dB			
MSG			S	TATUS			

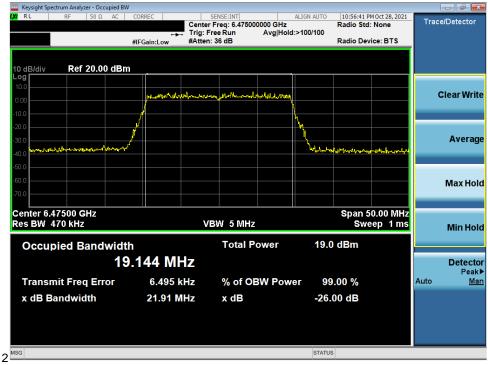
Plot 7-18. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11a (UNII Band 6) - Ch. 113)



Plot 7-19. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11ax (UNII Band 6) - Ch. 97)

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Plot 7-20. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11ax (UNII Band 6) - Ch. 105)



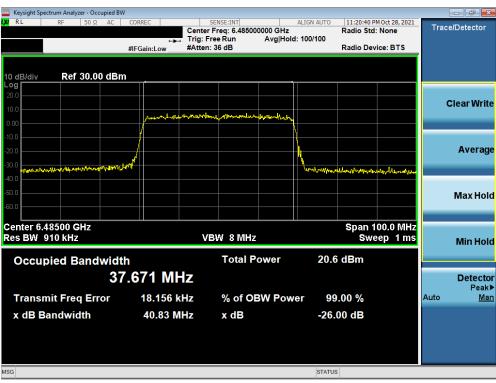
Plot 7-21. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11ax (UNII Band 6) - Ch. 113)

FCC ID: A3LSMS908E		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied B							
LX/ R.L RF 50Ω AC	CORREC	SENSE:INT ter Freg: 6.445000000 GHz	ALIGN AUTO	11:22:02 P Radio Std	M Oct 28, 2021	Trace	/Detector
	🛶 Trig		ld: 100/100				
	#IFGain:Low #At	ten: 36 dB		Radio Dev	ICE: BIS		
10 dB/div Ref 20.00 dBi	n		- -				
10.0							
0.00	Judge synned stor hours	allow and a second and a second	M			c	lear Write
-10.0							
-20.0	/		<u> </u>				
-30.0	n N		1.				Average
-30.0			"Levelinghtman	rv-vesugnikkyng	AT-manyhalmaan		
-50.0							
-60.0							Max Hold
-70.0							Max Hold
Center 6.44500 GHz					00.0 MHz		
Res BW 910 kHz		VBW 8 MHz		Swe	ep 1ms		Min Hold
Occupied Bandwid	th	Total Power	19.8	dBm			
	 7.718 MHz						Detector
3							Detector Peak
Transmit Freq Error	32.838 kHz	% of OBW Pov	wer 99.	00 %		Auto	Man
x dB Bandwidth	40.80 MHz	x dB	-26.0	0 dB			
			2010	o u			
MSG			STATUS				
NGG			STATUS				

Plot 7-22. 26dB Bandwidth Plot MIMO ANT1 (40MHz 802.11ax (UNII Band 6) - Ch. 99)



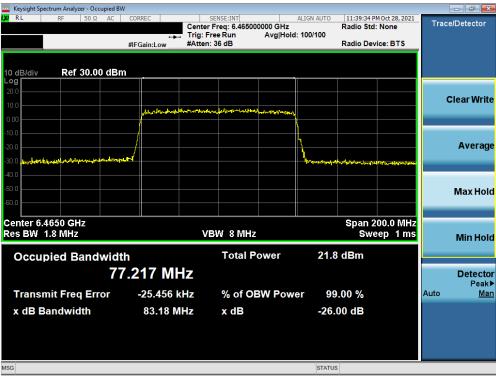
Plot 7-23. 26dB Bandwidth Plot MIMO ANT1 (40MHz 802.11ax (UNII Band 6) - Ch. 107)

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🔤 Keysight Spectrum Analyzer - Occupied BW									
<mark>LX/</mark> RL RF 50Ω AC C	ORREC		ISE:INT		ALIGN AUTO		4 Oct 28, 2021	Trac	e/Detector
			eq: 6.52500		d: 100/100	Radio Std:	None	mac	CID CLOCUO
#	⊷ FGain:Low	#Atten: 36		Avginor	4. 100/100	Radio Dev	ice: BTS		
10 dB/div Ref 20.00 dBm									
Log 10.0									
	mounted	her hand many	mound	mhadener					Clear Write
0.00					ξ				
-10.0					l				
-20.0	1				4				
-30.0	f								Average
war where and be the margin the set war where the two					Markin worklose	water for the second of the	when the second		Average
-40.0									
-50.0									
-60.0									Max Hold
-70.0									Μάλ Πυίμ
-70.0									
Center 6.52500 GHz						Span 1	00.0 MHz		
Res BW 910 kHz		VBV	V 8 MHz				ep 1 ms		
							op i nio		Min Hold
Occupied Bandwidth			Total P	ower	20.4	dBm			
37.	714 M⊦	Z							Detector
									Peak▶
Transmit Freq Error	-24.572 k	Hz	% of OE	3W Pow	'er 99	.00 %		Auto	<u>Man</u>
x dB Bandwidth	40.56 M	Hz	x dB		-26.	00 dB			
MSG					STATUS				

Plot 7-24. 26dB Bandwidth Plot MIMO ANT1 (40MHz 802.11ax (UNII Band 6) - Ch. 115)



Plot 7-25. 26dB Bandwidth Plot MIMO ANT1 (80MHz 802.11ax (UNII Band 6) - Ch. 103)

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🔤 Keysight Spectrum Analyzer - Occupied							d X
X RL RF 50 Ω AC		SENSE:INT nter Freg: 6.505000000 GHz	ALIGN AUTO	11:48:30 PM Radio Std:	1 Oct 28, 2021	Trace/Dete	ector
			l: 100/100	Radio Std:	None		
		tten: 36 dB		Radio Devi	ce: BTS		
10 dB/div Ref 30.00 dl	Bm						
Log							
20.0							
10.0						Clear	Write
0.00	provide and	had a fair and the stand of the	-				_
-10.0			1			_	
-20.0			1			AV	erage
-30.0 manufactor allower the balance and the second	H Handred		hourse	aller Mantingue	elahatarana persola		
-40.0							
-50.0						Max	x Hold
-60.0						wa)	ποία
-80.0							
Center 6.5050 GHz				Span 4	00.0 MHz		
Res BW 3 MHz		VBW 50 MHz			ep 1 ms	Mir	n Hold
						IVIII	THOIL
Occupied Bandwi	dth	Total Power	20.8	3 dBm			
	156.98 MHz					Dei	tector
	150.30 WINZ						Peak ►
Transmit Freq Error	-423.62 kHz	% of OBW Pow	er 99	0.00 %		Auto	Man
x dB Bandwidth	166.6 MHz	x dB	-26.	00 dB			
MSG			STATUS	2			
mod			STATU	3			

Plot 7-26. 26dB Bandwidth Plot MIMO ANT1 (160MHz 802.11ax (UNII Band 6) - Ch. 111)

FCC ID: A3LSMS908E	Proved to be part of the element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 20 of 222
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MIMO Antenna-1 26 dB Bandwidth Measurements - (UNII Band 7)



Plot 7-27. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11a (UNII Band 7) - Ch. 117)



Plot 7-28. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11a (UNII Band 7) - Ch. 149)

FCC ID: A3LSMS908E	Proud to be part of the element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 20 ef 222	
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Plot 7-29. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11a (UNII Band 7) - Ch. 185)



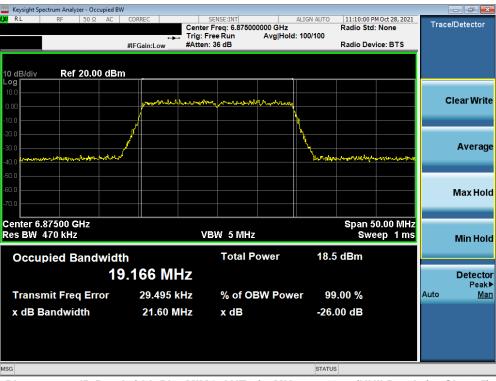
Plot 7-30. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11ax (UNII Band 7) - Ch. 117)

FCC ID: A3LSMS908E		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 21 of 222	
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Plot 7-31. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11ax (UNII Band 7) - Ch. 149)



Plot 7-32. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11ax (UNII Band 7) - Ch. 185)

FCC ID: A3LSMS908E		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 22 of 222	
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Keysight Spectrum Analyzer - Occupied BW							
KL RF 50Ω AC CO		ENSE:INT	ALIGN AUTO		M Oct 28, 2021	Trac	e/Detector
	trig: Fr	Freq: 6.56500000 ee Run A	vg Hold: 100/100	Radio Std	: None		
#IF	Gain:Low #Atten:			Radio Dev	vice: BTS		
,							
10 dB/div Ref 20.00 dBm Log							
10.0							
0.00	moundation	m resultine she had for	artemory			(Clear Write
	1		A.			_	
-10.0							
-20.0			\				
-30.0			Million	monoun	manada		Average
-40.0					10	_	
-50.0							
-60.0							
							Max Hold
-70.0						_	
Center 6.56500 GHz				Snan 1	00.0 MHz		
Res BW 910 kHz	VE	SW 8 MHz			ep 1 ms		Min Llold
							Min Hold
Occupied Bandwidth		Total Pow	/er 19	.8 dBm			
37.6	71 MHz						Detector Peak▶
Transmit Freq Error	-5.148 kHz	% of OBW	Power (9.00 %		Auto	Man
x dB Bandwidth	40.46 MHz	x dB	-2	6.00 dB			
MSG			STA	110			

Plot 7-33. 26dB Bandwidth Plot MIMO ANT1 (40MHz 802.11ax (UNII Band 7) - Ch. 123)



Plot 7-34. 26dB Bandwidth Plot MIMO ANT1 (40MHz 802.11ax (UNII Band 7) - Ch. 155)

FCC ID: A3LSMS908E		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 22 of 222
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🔤 Keysight Spectrum Analyzer - Occupied BW 🚽								
LX/ RL RF 50Ω AC C	ORREC	SENSE:INT		ALIGN AUTO		M Oct 28, 2021	Trac	e/Detector
		Center Freq: 6.8450 Trig: Free Run	00000 GHz Avg Hold	400/400	Radio Std:	None	mac	erbetector
		#Atten: 36 dB	Avginoid	. 100/100	Radio Dev	ice: BTS		
	IF Galili.Low				Itaalo Dol			
10 dB/div Ref 20.00 dBm								
Log								
10.0	mondentinglen	hermony	and the later of					Clear Write
0.00	Alter and all and a state of the	a harring of some of the second second	The stand of the					clear write
-10.0	<u> </u>							
-20.0	J.			ì.			_	
	1			1				_
-30.0	f			Mary Mary	whentwhereigh	nandanlasteller		Average
-40.0					and a second	فلتتقتقا		
-50.0								
-60.0								Max Hold
-70.0								
Center 6.84500 GHz						00.0 MHz		
Res BW 910 kHz		VBW 8 MH	z		Swe	ep 1ms		Min Hold
		T - 4 - 1		00.4	10			
Occupied Bandwidth		lotal	Power	20.1	dBm			
37	723 MH	7						Detector
01.								Peak▶
Transmit Freg Error	17.152 kH	z % of C	BW Pow	er 99	.00 %		Auto	Man
· · ·								
x dB Bandwidth	40.82 MH	z xdB		-26.0	00 dB			
MSG				STATUS				

Plot 7-35. 26dB Bandwidth Plot MIMO ANT1 (40MHz 802.11ax (UNII Band 7) - Ch. 179)



Plot 7-36. 26dB Bandwidth Plot MIMO ANT1 (80MHz 802.11ax (UNII Band 7) - Ch. 119)

FCC ID: A3LSMS908E	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 24 of 222
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Keysight Spectrum Analyzer - Occupie	ed BW							
<mark>LX/</mark> RL RF 50Ω A	AC CORREC	SENSE:INT		IGN AUTO		4 Oct 28, 2021	Trac	e/Detector
		Center Freq: 6.70500 Trig: Free Run	0000 GHz Avg Hold:>1	100/100	Radio Std:	None	mac	CIDECECTO
	#IFGain:Low	#Atten: 36 dB	Avginoid.21	100/100	Radio Dev	ice: BTS		
,	in Gameon							
10 dB/div Ref 30.00 d	dBm							
Log								
20.0								Clear Write
10.0		margar she determined						
0.00	And an and and and and and and and and an	and the second	with the retraction					
-10.0								
			l N					A
-20.0			<u>ا ا</u> ر					Average
-30.0 พระการทำเราการทางสามาราชาว	ophysikophi ^C			www.warana	****	ana walkana haraka ma		
-40.0								
-50.0								
								Max Hold
-60.0								
					0			
Center 6.7050 GHz						00.0 MHz		
Res BW 1.8 MHz		VBW 8 MHz			Swe	ep 1 ms		Min Hold
		Total P		20.0	dBm			
Occupied Bandw	lath	Total P	ower	20.9	aвm			
	77.588 MH	7						Detector
								Peak▶
Transmit Freq Error	-129.02 kH	z % of OE	3W Power	99	.00 %		Auto	<u>Man</u>
	00.00 M			200				
x dB Bandwidth	82.86 MH	z xdB		-20.0)0 dB			
MSG				STATUS				

Plot 7-37. 26dB Bandwidth Plot MIMO ANT1 (80MHz 802.11ax (UNII Band 7) - Ch. 151)



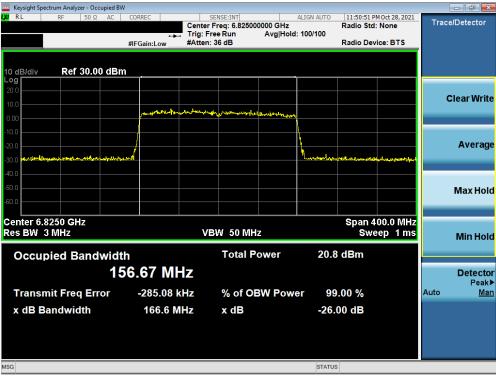
Plot 7-38. 26dB Bandwidth Plot MIMO ANT1 (80MHz 802.11ax (UNII Band 7) - Ch. 183)

FCC ID: A3LSMS908E		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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🔤 Keysight Spectrum Analyzer - Occupied BW	
KL RF 50 Ω AC CORREC SENSE:INT ALIGN AUTO 11:49:19 PM Oct 28, 2 Center Freq: 6.665000000 GHz Radio Std: None	021 Trace/Detector
Center Freq: 6.665000000 GHz Radio Std: None Trig: Free Run Avg Hold: 100/100	
#IFGain:Low #Atten: 36 dB Radio Device: BTS	
10 dB/div Ref 20.00 dBm	
Log	
10.0	Clear Write
-10.0	
-30.0 Broad the marked ward from the second se	Average
-40.0	
-50.0	
-60.0	Max Hold
.70.0	
Center 6.6650 GHz Span 400.0 M Res BW 3 MHz VBW 50 MHz Sweep 1 (
Res BW 3 MHz VBW 50 MHz Sweep 1	ms Min Hold
Occupied Bandwidth Total Power 20.7 dBm	
	Detector
156.65 MHz	Detector Peak▶
Transmit Freq Error -275.13 kHz % of OBW Power 99.00 %	Auto <u>Man</u>
x dB Bandwidth 166.9 MHz x dB -26.00 dB	

Plot 7-39. 26dB Bandwidth Plot MIMO ANT1 (160MHz 802.11ax (UNII Band 7) - Ch. 143)



Plot 7-40. 26dB Bandwidth Plot MIMO ANT1 (160MHz 802.11ax (UNII Band 7) - Ch. 175)

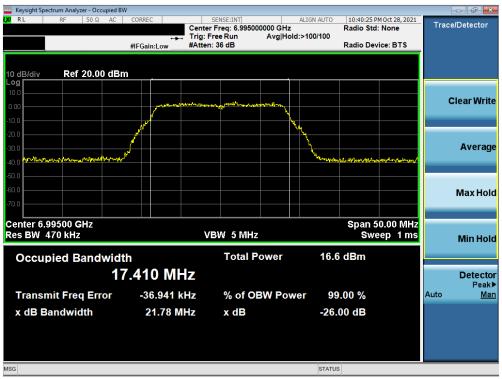
FCC ID: A3LSMS908E		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	
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MIMO Antenna-1 26 dB Bandwidth Measurements - (UNII Band 8)



Plot 7-41. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11a (UNII Band 8) - Ch. 189)



Plot 7-42. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11a (UNII Band 8) - Ch. 209)

FCC ID: A3LSMS908E	Proud to be part of the element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 27 of 222	
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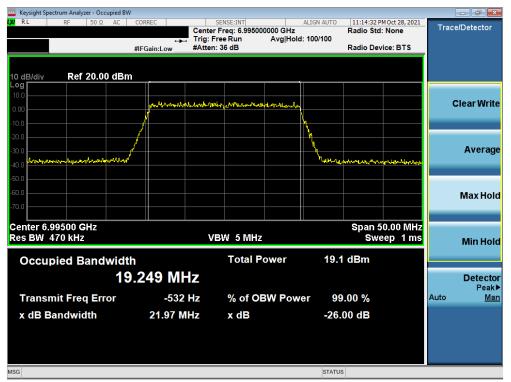
Plot 7-43. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11a (UNII Band 8) - Ch. 233)



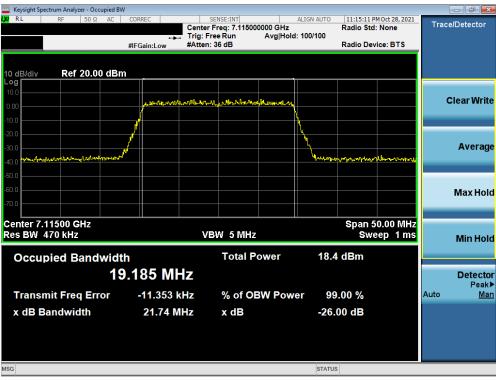
Plot 7-44. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11ax (UNII Band 8) - Ch. 189)

FCC ID: A3LSMS908E	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 20 of 222
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Plot 7-45. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11ax (UNII Band 8) - Ch. 209)



Plot 7-46. 26dB Bandwidth Plot MIMO ANT1 (20MHz 802.11ax (UNII Band 8) - Ch. 233)

FCC ID: A3LSMS908E		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 20 of 222
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Keysight Spectrum Analyzer - Occupied BW							
LX RL RF 50Ω AC COP		ENSE:INT	ALIGN AUTO		M Oct 28, 2021	Trac	e/Detector
		req: 6.885000000 GH	: old: 100/100	Radio Std:	None	mac	endereeron
#16	Gain:Low #Atten:		. 100/100	Radio Dev	ice: BTS		
	Guineon						
10 dB/div Ref 30.00 dBm			-				
Log							
20.0							Clear Write
10.0		8.0.001					
0.00	and the many second and	- Barberth Margarian	M				
-10.0	/		Υ.				
			1				A
-20.0			1				Average
-30.0 automospitaleman				unuluhhhann	s and a second		
-40.0			and Caller and	antinites Alexan Maridae	A TA AND A		
-50.0							
							Max Hold
-60.0							
				O mark 4			
Center 6.88500 GHz Res BW 910 kHz	VB	W 8 MHz			00.0 MHz		
Res BW 910 KHZ	VD			Swe	ep 1 ms		Min Hold
		Total Power	20.0	dBm			
Occupied Bandwidth		Total Fower	20.0	ubili			
37.6	90 MHz						Detector
							Peak▶
Transmit Freq Error	-5.611 kHz	% of OBW Po	wer 99	.00 %		Auto	<u>Man</u>
x dB Bandwidth	40.57 MHz	x dB	26	00 dB			
	40.57 WITZ	хub	-20.0	00 ab			
MSG			STATUS				

Plot 7-47. 26dB Bandwidth Plot MIMO ANT1 (40MHz 802.11ax (UNII Band 8) - Ch. 187)



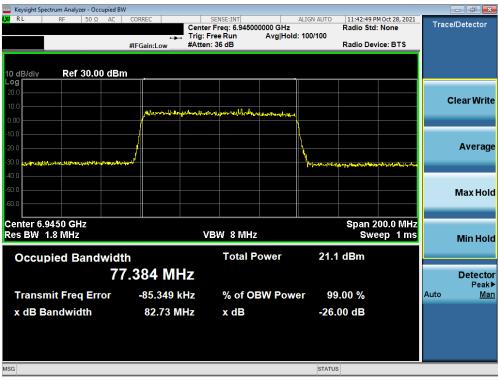
Plot 7-48. 26dB Bandwidth Plot MIMO ANT1 (40MHz 802.11ax (UNII Band 8) - Ch. 211)

FCC ID: A3LSMS908E		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 40 of 222
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Keysight Spectrum Analyzer - Occupied BW							
LX/ RL RF 50Ω AC	CORREC	SENSE:INT	ALIGN AU		M Oct 28, 2021	Trace	e/Detector
		enter Freq: 7.08500 rig: Free Run	Avg Hold: 100/10	Radio Std:	None		
		Atten: 36 dB	Avginola. 100/10	Radio Dev	ice: BTS		
10 dB/div Ref 20.00 dBm							
Log 10.0							
	H. marchen and	and the second second	Lutertraders			c	lear Write
0.00							
-10.0	— / ———————————————————————————————————						
-20.0							
-30.0	ſ						Average
www.warder.com.gage	*		Without	www.alantana.	nor when here		·····g-
-40.0							
-50.0							
-60.0							Max Hold
-70.0							Muxitolu
10.0						-	
Center 7.08500 GHz				Span 1	00.0 MHz		
Res BW 910 kHz		VBW 8 MHz			ep 1 ms		Min Hold
							Winthold
Occupied Bandwidth		Total P	ower 1	9.6 dBm			
37.	891 MHz						Detector Peak▶
Transmit Freq Error	-34.045 kHz	% of OF	3W Power	99.00 %		Auto	Man
				33.00 %		Auto	man
x dB Bandwidth	40.43 MHz	x dB	-	26.00 dB			
MSG			ST	TATUS			

Plot 7-49. 26dB Bandwidth Plot MIMO ANT1 (40MHz 802.11ax (UNII Band 8) - Ch. 227)



Plot 7-50. 26dB Bandwidth Plot MIMO ANT1 (80MHz 802.11ax (UNII Band 8) - Ch. 199)

FCC ID: A3LSMS908E		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BW							
LX RL RF 50Ω AC COI		NSE:INT	ALIGN AUTO		1 Oct 28, 2021	Trac	e/Detector
	Trig: Fre	req: 7.025000000 GHz e Run AvalHold	l: 100/100	Radio Std:	None		
#IF	Gain:Low #Atten: 3			Radio Devi	ce: BTS		
10 dB/div Ref 30.00 dBm							
20.0							
						0	Clear Write
10.0	and the particular and the second second	and the mark the mark the second second					
0.00							
-10.0							
-20.0			1				Average
							Ŭ
			and the second second	Whythe have the w	to gran probably to set		
-40.0							
-50.0							Max Hold
-60.0							
Center 7.0250 GHz					00.0 MHz		
Res BW 1.8 MHz	VB	W 8 MHz		Swe	ep 1 ms		Min Hold
Occupied Bandwidth		Total Power	21.0	dBm			
77.3	90 MHz						Detector
11.5							Peak▶
Transmit Freq Error	-61.180 kHz	% of OBW Pow	er 99.	00 %		Auto	<u>Man</u>
x dB Bandwidth	82.85 MHz	x dB	26.0	0 dB			
		Xub	-20.0				
MSG			STATUS				

Plot 7-51. 26dB Bandwidth Plot MIMO ANT1 (80MHz 802.11ax (UNII Band 8) - Ch. 215)

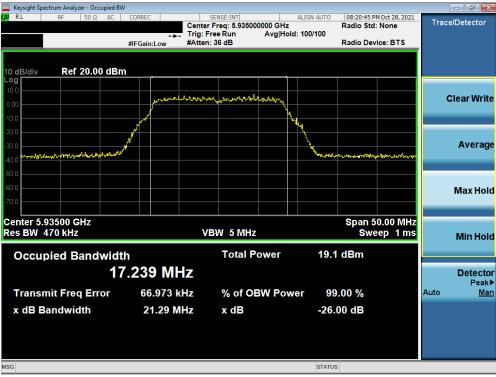


Plot 7-52. 26dB Bandwidth Plot MIMO ANT1 (160MHz 802.11ax (UNII Band 8) - Ch. 207)

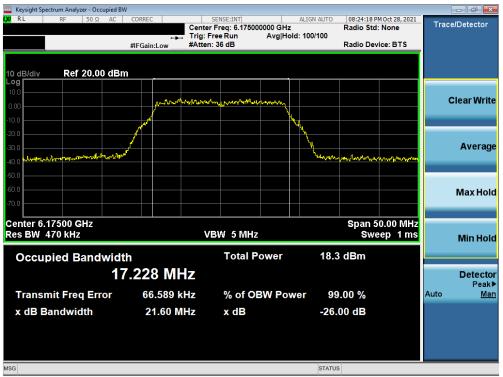
FCC ID: A3LSMS908E		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 40 of 222
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MIMO Antenna-2 26 dB Bandwidth Measurements - (UNII Band 5)







Plot 7-54. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11a (UNII Band 5) - Ch. 45)

FCC ID: A3LSMS908E	Proud to be part of the element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 42 of 222	
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Plot 7-55. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11a (UNII Band 5) - Ch. 93



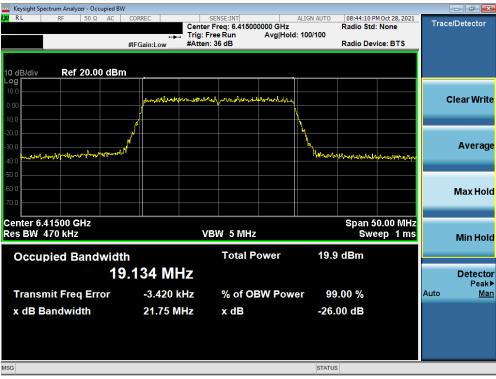
Plot 7-56. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11ax (UNII Band 5) - Ch. 2)

FCC ID: A3LSMS908E	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-57. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11ax (UNII Band 5) - Ch. 45)



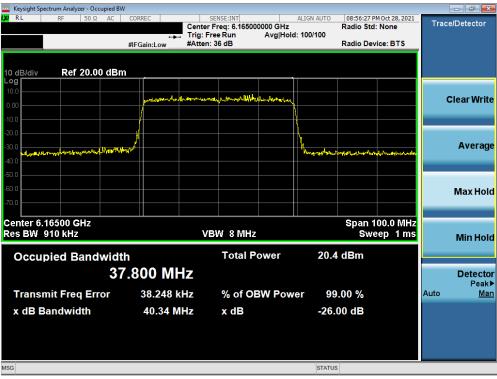
Plot 7-58. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11ax (UNII Band 5) – Ch. 93

FCC ID: A3LSMS908E		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BW							
<mark>(X)</mark> RL RF 50Ω AC CO		NSE:INT	ALIGN AUTO		1 Oct 28, 2021	Trac	e/Detector
	Trig: Fre	req: 5.965000000 GHz	d: 100/100	Radio Std:	None		
#IF	Gain:Low #Atten: 3			Radio Devi	ce: BTS		
10 dB/div Ref 30.00 dBm							
20.0							
							Clear Write
10.0	Multimered uniter and	water with a water and maker					
0.00							
-10.0	<u>/</u>		1				
-20.0							Average
			h				J
- and mark the watched a same with the second the			hyber Wind	Antonio Managelle	withink		
-40.0							
-50.0							Max Hold
-60.0							
Center 5.96500 GHz				Span 1	00.0 MHz		
Res BW 910 kHz	VB	W 8 MHz		Swe	ep 1 ms		Min Hold
Occupied Bandwidth		Total Power	21.2	dBm			
37.7	33 MHz						Detector
57.1							Peak ►
Transmit Freq Error	-37.859 kHz	% of OBW Pow	er 99	.00 %		Auto	Man
x dB Bandwidth	40.26 MHz	x dB	-26 ()0 dB			
	40.20 11112	X GB	-2010				
MSG			STATUS				

Plot 7-59. 26dB Bandwidth Plot MIMO ANT2 (40MHz 802.11ax (UNII Band 5) - Ch. 3)



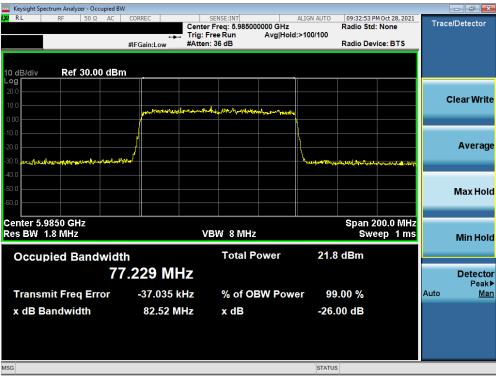
Plot 7-60. 26dB Bandwidth Plot MIMO ANT2 (40MHz 802.11ax (UNII Band 5) - Ch. 43)

FCC ID: A3LSMS908E		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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🔤 Keysight Spectrum Analyzer - Occupied BW 🚽								
<mark>LX/</mark> RL RF 50Ω AC (CORREC	SENSE:INT		ALIGN AUTO		4 Oct 28, 2021	Trac	e/Detector
		ter Freq: 6.40500 g: Free Run	Avg Hold:		Radio Std:	None		
#		ten: 36 dB			Radio Dev	ice: BTS		
10 dB/div Ref 30.00 dBm		Ĭ						
20.0								
								Clear Write
10.0	مطيعه ومدالة أعدادارما	munic Maple and	dimmen					
0.00								
-10.0	_ <mark>/</mark>							
-20.0	_		}	,				Average
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and the set of the second of the second seco				howardowner	homenne	}~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~		
-40.0								
-50.0								Max Hold
-60.0								
Center 6.40500 GHz						00.0 MHz		
Res BW 910 kHz		VBW 8 MHz			Swe	ep 1 ms		Min Hold
Occupied Bandwidth		Total P	ower	20.7	dBm			
37	766 MHz							Detector
011								Peak▶
Transmit Freq Error	-18.989 kHz	% of O	3W Powe	r 99.	00 %		Auto	<u>Man</u>
x dB Bandwidth	40.46 MHz	x dB		-26.0	0 dB			
	40.40 MINZ	A UD		-20.0	U U D			
MSG				STATUS				

Plot 7-61. 26dB Bandwidth Plot MIMO ANT2 (40MHz 802.11ax (UNII Band 5) - Ch. 91)



Plot 7-62. 26dB Bandwidth Plot MIMO ANT2 (80MHz 802.11ax (UNII Band 5) - Ch. 7)

FCC ID: A3LSMS908E	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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🔤 Keysight Spectrum Analyzer - Occupied BW 👘							- •
LXX RL RF 50Ω AC C	ORREC	SENSE:INT Freg: 6.145000000 GHz	ALIGN AUTO	09:34:17 Pf Radio Std:	4 Oct 28, 2021	Trac	e/Detector
			d: 100/100	Radio Sta:	None		
#1	FGain:Low #Atter	n: 36 dB		Radio Dev	ice: BTS		
10 dB/div Ref 30.00 dBm							
Log							
20.0							Clear Write
10.0	per march marsh the state of the	with the second second second					
0.00	1						
-10.0							
-20.0	/		- \				Average
-30.0 mound and provide and provide and			According to the second	Population (Margari	and the section of		
-40.0							
-50.0							
							Max Hold
-60.0							
Center 6.1450 GHz				Span 2	00.0 MHz		
Res BW 1.8 MHz	v	/BW 8 MHz		Swe	ep 1 ms		Min Hold
							WIIITTIOIG
Occupied Bandwidth		Total Power	21.6	dBm			
77 /	428 MHz						Detector
111-							Peak▶
Transmit Freq Error	24.268 kHz	% of OBW Pov	ver 99	.00 %		Auto	<u>Man</u>
x dB Bandwidth	83.07 MHz	x dB	-26.	00 dB			
MSG			STATUS				

Plot 7-63. 26dB Bandwidth Plot MIMO ANT2 (80MHz 802.11ax (UNII Band 5) - Ch. 39)



Plot 7-64. 26dB Bandwidth Plot MIMO ANT2 (80MHz 802.11ax (UNII Band 5) – Ch. 87)

FCC ID: A3LSMS908E		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BW							- x
X RL RF 50Ω AC CO		ENSE:INT	ALIGN AUTO		4 Oct 28, 2021	Trace/Deteo	stor
		Freq: 6.025000000	3Hz a Hold: 100/100	Radio Std:	None	Tacerbelet	
#1	FGain:Low #Atten:			Radio Devi	ice: BTS		
	FGalli.Low # telefit			Tradio Dori			
10 dB/div Ref 30.00 dBm							
Log							
20.0						01	
10.0						Clear	write
0.00	maken manufacture and an	Valence market and	where				_
-10.0			<u>\</u>				
-20.0	/					Ave	erage
-30.0 mindow man Month March well and the head			monthening	and the second	energy in which		
-40.0							
-50.0						Max	Hold
-60.0							
Center 6.0250 GHz				Span 4	00.0 MHz		
Res BW 3 MHz	VE	SW 50 MHz			ep 1 ms	Min	Hold
							TIOIU
Occupied Bandwidth		Total Powe	r 22.3	dBm			
156	5.59 MHz						ector
							°eak▶
Transmit Freq Error	-230.31 kHz	% of OBW I	ower 99	.00 %		Auto	Man
x dB Bandwidth	165.8 MHz	x dB	-26	00 dB			
		A GIP	201				
MSG			STATUS				

Plot 7-65. 26dB Bandwidth Plot MIMO ANT2 (160MHz 802.11ax (UNII Band 5) - Ch. 15)



Plot 7-66. 26dB Bandwidth Plot MIMO ANT2 (160MHz 802.11ax (UNII Band 5) - Ch. 47)

FCC ID: A3LSMS908E		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	es: EUT Type:	
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🔤 Keysight Spectrum Analyzer - Occupi	ed BW					
<mark>(X)</mark> RL RF 50Ω /		SENSE:INT Center Freg: 6.34500	ALIGN AUTO	10:04:15 PM Radio Std:		Trace/Detector
		Trig: Free Run	Avg Hold: 100/100	Raulo Stu. I	None	
	#IFGain:Low	#Atten: 36 dB	- .	Radio Devid	e: BTS	
10 dB/div Ref 30.00 d	lBm					
Log						
20.0						Clear Write
10.0	A. Margaret alleger	Judensia and atternal a				Clear write
0.00	A solution and a solution of	a suched film to contract and the	-wint-wild with a second			
-10.0						
-20.0						Average
-30.0 monortheren there we upon the	whether .		hyperson	least hermoter the Me Last.	have a bur of	
-40.0						
-50.0						Max Hold
-60.0						
Center 6.3450 GHz Res BW 3 MHz		VBW 50 MH	17		10.0 MHz 20 1 ms	
KES DW JIVINZ			2	Swee	sp i llis	Min Hold
Occupied Bandw	idth	Total P	ower 22	.3 dBm		
		_				
	156.24 MH	Z				Detector Peak▶
Transmit Freq Error	-52.461 kH	z % of O	BW Power 9	9.00 %		Auto Man
x dB Bandwidth	166.1 MF	z xdB	-26	6.00 dB		
MSG			STAT	us		
			UIAI			

Plot 7-67. 26dB Bandwidth Plot MIMO ANT2 (160MHz 802.11ax (UNII Band 5) - Ch. 79)

FCC ID: A3LSMS908E	Proved to be part of the element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 50 of 200	
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MIMO Antenna-2 26 dB Bandwidth Measurements - (UNII Band 6)



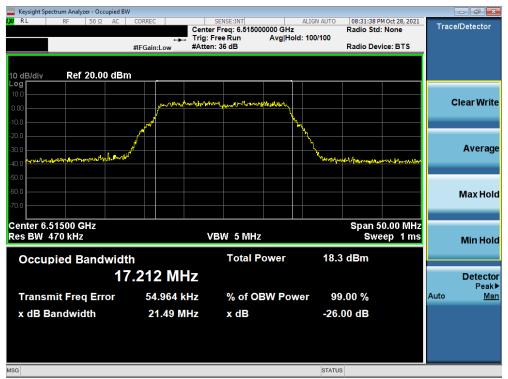
Plot 7-68. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11a (UNII Band 6) - Ch. 97)



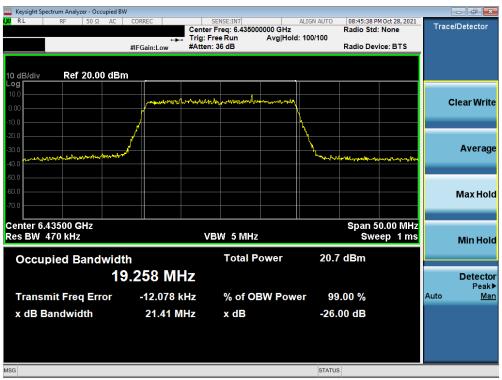
Plot 7-69. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11a (UNII Band 6) - Ch. 105)

FCC ID: A3LSMS908E	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga 51 of 222	
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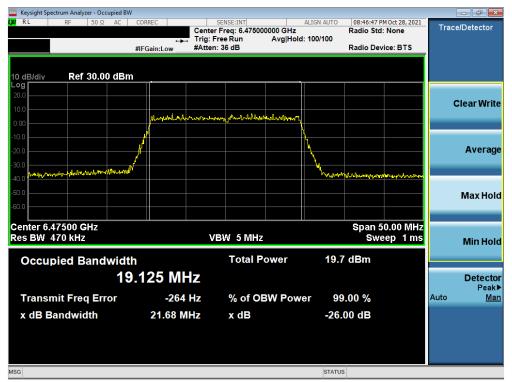
Plot 7-70. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11a (UNII Band 6) - Ch. 113)



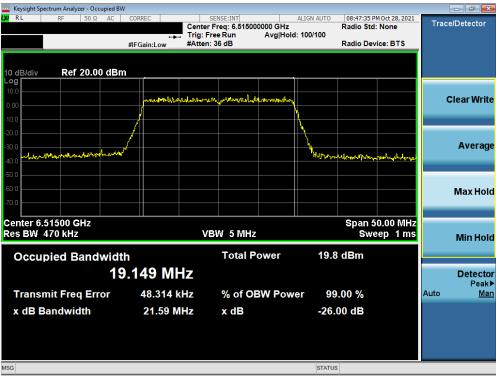
Plot 7-71. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11ax (UNII Band 6) - Ch. 97)

FCC ID: A3LSMS908E	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 52 of 222
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Plot 7-72. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11ax (UNII Band 6) - Ch. 105)



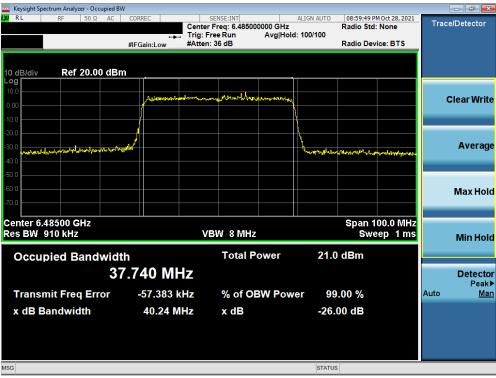
Plot 7-73. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11ax (UNII Band 6) - Ch. 113)

FCC ID: A3LSMS908E	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Daga 52 of 222	
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LX RL RF 50Ω AC (ORREC	SENSE:INT	ALIGN AUT	0 09:01:46 PI Radio Std:	M Oct 28, 2021	Trace/D	etector
		Center Freq: 6.44500 Trig: Free Run	Avg Hold: 100/100	Radio Std:	None		
#	IFGain:Low	#Atten: 36 dB		Radio Dev	ice: BTS		
10 dB/div Ref 30.00 dBm							
Log							
20.0							
10.0		anon deres and a solution	<u> </u>			Cle	ar Write
0.00	pensitivation	and the state of t	emblemethy				
-10.0	/						
-20.0							Average
	1		Г П <mark>1</mark>				weruge
-30.0 saw werden song solar real of the solar of the solar of the			Talphone	ralishingrouphil	and with the		
-40.0							
-50.0						N	lax Hold
-60.0							
Center 6.44500 GHz				Span 1	00.0 MHz		
Res BW 910 kHz		VBW 8 MHz		SWe	ep 1 ms	Ν	/lin Hold
Occupied Bandwidth		Total P	ower 20).8 dBm			
				.o abiii			
37.	622 M⊦	Z					Detector
Transmit Freq Error	14.167 k	Hz % of OF	3W Power	99.00 %		Auto	Peak▶ Man
							man
x dB Bandwidth	40.56 M	Hz xdB	-2	6.00 dB			
MSG			0.74	TUS			

Plot 7-74. 26dB Bandwidth Plot MIMO ANT2 (40MHz 802.11ax (UNII Band 6) - Ch. 99)



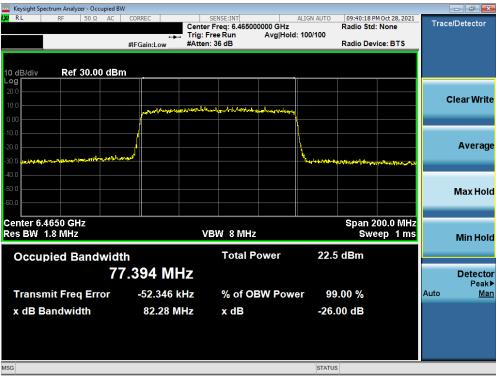
Plot 7-75. 26dB Bandwidth Plot MIMO ANT2 (40MHz 802.11ax (UNII Band 6) - Ch. 107)

FCC ID: A3LSMS908E	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 54 of 222
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Keysight Spectrum Analyzer - Occupied BW									
LX/ RL RF 50Ω AC	CORREC		SE:INT		ALIGN AUTO		M Oct 28, 2021	Trac	e/Detector
		Center Fre Trig: Free			l: 100/100	Radio Std:	None	mac	CID CLOCUO
	++- #IFGain:Low	#Atten: 36		Arginoit	. 100/100	Radio Dev	ice: BTS		
	Guineon								
10 dB/div Ref 20.00 dBm									
Log									
10.0	unharden	apple more and	mandulun	duelle martin					Clear Write
0.00		- Ť							
-10.0	<mark>/</mark>				\				
-20.0									
					1 L				A.v
-30.0	N				humanaly	and the my	mundance		Average
-40.0									
-50.0									
-60.0									
									Max Hold
-70.0									
Center 6.52500 GHz			0.6411-				00.0 MHz		
Res BW 910 kHz		VBW	/8 MHz			Swe	ep 1 ms		Min Hold
			Tatal D		20.7	-1D			
Occupied Bandwidth			Total P	ower	20.7	dBm			
37	.667 MF	7							Detector
011									Peak▶
Transmit Freg Error	-27.143 k	Hz	% of OE	W Pow	er 99	.00 %		Auto	Man
· ·									
x dB Bandwidth	40.57 M	HZ	x dB		-26.	00 dB			
MSG					STATUS				

Plot 7-76. 26dB Bandwidth Plot MIMO ANT2 (40MHz 802.11ax (UNII Band 6) - Ch. 115)



Plot 7-77. 26dB Bandwidth Plot MIMO ANT2 (80MHz 802.11ax (UNII Band 6) - Ch. 103)

FCC ID: A3LSMS908E		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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www.www.com/www.cow/www.co	BW				- -
LX/ RL RF 50Ω AC		SENSE:INT	ALIGN AUTO	10:06:44 PM Oct 28, 20 Radio Std: None	Trace/Detector
		Trig: Free Run	Avg Hold: 100/100	Radio Std: None	
		#Atten: 36 dB		Radio Device: BTS	
10 dB/div Ref 30.00 dE	3m				
Log					
20.0					Clear Write
10.0	a simple and	whiteless rikestrong	ب بداخته و م		Clear write
0.00	rad all and the state of the st	and the provide the	and and a start of the street		
-10.0					
-20.0			l l		Average
Il	added and a		Annual and a second sec		Average
-30.0 http://www.united.org/and/org/and					· · · · · · · · · · · · · · · · · · ·
-40.0					
-50.0					Max Hold
-60.0					
Center 6.5050 GHz				Span 400.0 MH	
Res BW 3 MHz		VBW 50 MH	Z	Sweep 1 m	S Min Hold
Occupied Bandwid	dth	Total P	ower 22	2 dBm	
1	56.43 MHz	Ζ			Detector
				0.00.0/	Peak► Auto Man
Transmit Freq Error	-41.525 kH	z % of O	BW Power 9	9.00 %	Auto <u>Man</u>
x dB Bandwidth	166.1 MH	z xdB	-26	.00 dB	
MSG			STATI	JS	

Plot 7-78. 26dB Bandwidth Plot MIMO ANT2 (160MHz 802.11ax (UNII Band 6) - Ch. 111)

FCC ID: A3LSMS908E	Proved to be part of the element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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MIMO Antenna-2 26 dB Bandwidth Measurements - (UNII Band 7)



Plot 7-79. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11a (UNII Band 7) - Ch. 117)



Plot 7-80. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11a (UNII Band 7) - Ch. 149)

FCC ID: A3LSMS908E	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dege 57 of 000
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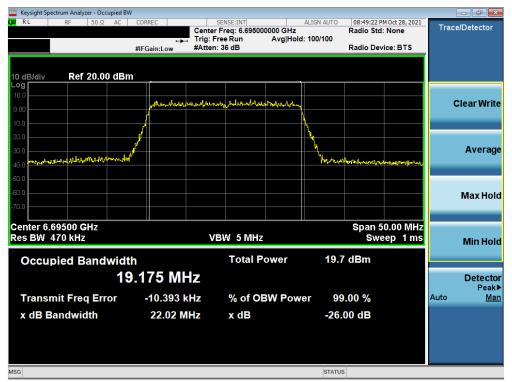
Plot 7-81. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11a (UNII Band 7) - Ch. 185)



Plot 7-82. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11ax (UNII Band 7) - Ch. 117)

FCC ID: A3LSMS908E	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-83. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11ax (UNII Band 7) - Ch. 149)



Plot 7-84. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11ax (UNII Band 7) - Ch. 185)

FCC ID: A3LSMS908E		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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🔤 Keysight Spectrum Analyzer - Occupied BW 🚽									
<mark>LX/</mark> RL RF 50Ω AC (ORREC		ISE:INT		ALIGN AUTO		M Oct 28, 2021	Trac	e/Detector
			eq: 6.56500	0000 GHz Avg Hold	· 100/100	Radio Std	None	mac	CID CLOCUOI
	⊶⊶ IFGain:Low	#Atten: 30		Arginoid	. 100/100	Radio Dev	ice: BTS		
10 dB/div Ref 20.00 dBm	_								
Log 10.0									
	ومدامه المراجد	intro any literary	walkande	-					Clear Write
0.00	1								cical mile
-10.0	_{								
-20.0					<u>\</u>				
20.0	1 I				5				Average
-30.0 manual and an and party and a second and and the grant	^a				May restand	umadiande	when when the		Average
-40.0									
-50.0									
-60.0									Max Hold
-70.0									Max Hold
-70.0								_	
Center 6.56500 GHz						Snan 1	00.0 MHz	_	
Res BW 910 kHz		VBV	V 8 MHz				ep 1 ms		
									Min Hold
Occupied Bandwidth			Total P	ower	20.9	dBm			
		-							
37.	696 MF	Z							Detector
									Peak►
Transmit Freq Error	32.941 k	Hz	% of OE	3W Pow	er 99	.00 %		Auto	<u>Man</u>
x dB Bandwidth	40.43 M	Hz	x dB		-26.	00 dB			
MSG					STATUS				

Plot 7-85. 26dB Bandwidth Plot MIMO ANT2 (40MHz 802.11ax (UNII Band 7) - Ch. 123)



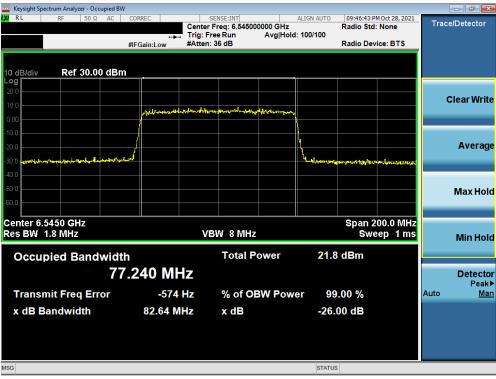
Plot 7-86. 26dB Bandwidth Plot MIMO ANT2 (40MHz 802.11ax (UNII Band 7) - Ch. 155)

FCC ID: A3LSMS908E		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occupied BW							
🗶 RL RF 50Ω AC CORI		NSE:INT	ALIGN AUTO		M Oct 28, 2021	Trac	e/Detector
		req: 6.845000000 GHz	: old: 100/100	Radio Std:	None	mac	ciberceroi
#IFG	Gain:Low #Atten: 3		. 100/100	Radio Dev	ice: BTS		
	anneon -						
10 dB/div Ref 30.00 dBm			-				
Log							
20.0							Clear Write
10.0	and he becall and	parate how which the					
0.00	Land Martin Contraction Contraction		4				
-10.0			l.				
							Average
-20.0							Average
-30.0 manthermalantermantermanter			hullenes and	and a farmer was a fu	I to the star of the		
-40.0				a de la segle e			
-50.0							
							Max Hold
-60.0							
Center 6.84500 GHz				On on 4			
Res BW 910 kHz)/P)	W 8 MHz			00.0 MHz ep 1 ms		
	VDI	VV ÖTVILLZ		Swe	ep 1 ms		Min Hold
Occurried Developidth		Total Power	20.0	dBm			
Occupied Bandwidth		TOTALLEOWEI	20.5	UBIII			
37.7	74 MHz						Detector
							Peak▶
Transmit Freq Error -	33.829 kHz	% of OBW Po	wer 99	.00 %		Auto	<u>Man</u>
x dB Bandwidth	40.66 MHz	x dB	26	00 dB			
	40.00 MITZ	XUD	-20.	00 UB			
MSG			STATUS				

Plot 7-87. 26dB Bandwidth Plot MIMO ANT2 (40MHz 802.11ax (UNII Band 7) - Ch. 179)



Plot 7-88. 26dB Bandwidth Plot MIMO ANT2 (80MHz 802.11ax (UNII Band 7) - Ch. 119)

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🚾 Keysight Spectrum Analyzer - Occupied BW							- •
🗶 RL RF 50Ω AC COR		NSE:INT	ALIGN AUTO		4 Oct 28, 2021	Trac	e/Detector
	Trig: Free	req: 6.705000000 (e Run Avo	3Hz Hold: 100/100	Radio Std:	None		
#IFG	Gain:Low #Atten: 3		,	Radio Dev	ice: BTS		
10 dB/div Ref 30.00 dBm Log							
20.0							
10.0						C	Clear Write
	her ward war had	here the state of	and set				
0.00							
-10.0							
-20.0							Average
-30.0 Lower and the second of			- Andrewskill	mound	diane with the state	_	
-40.0					فتصنق		
-50.0							
							Max Hold
-60.0						_	
Center 6.7050 GHz				Snan 2	00.0 MHz		
Res BW 1.8 MHz	VB	N/8 MHz			ep 1 ms		Min Llold
							Min Hold
Occupied Bandwidth		Total Powe	r 22.3	dBm			
	0.4 MILL-						
[].2	34 MHz						Detector Peak▶
Transmit Freq Error -	103.12 kHz	% of OBW I	Power 00	.00 %		Auto	Man
•						, ture	
x dB Bandwidth	82.90 MHz	x dB	-26.	00 dB			
MSG			STATUS				

Plot 7-89. 26dB Bandwidth Plot MIMO ANT2 (80MHz 802.11ax (UNII Band 7) - Ch. 151)



Plot 7-90. 26dB Bandwidth Plot MIMO ANT2 (80MHz 802.11ax (UNII Band 7) - Ch. 183)

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🔤 Keysight Spectrum Analyzer - Occupie	ed BW					
<mark>(X)</mark> RL RF 50Ω A	C CORREC	SENSE:INT	ALIGN AUTO		4 Oct 28, 2021	Trace/Detector
		Center Freq: 6.66500 Trig: Free Run	0000 GHz Avg Hold: 100/100	Radio Std:	None	Hacebeteetor
	↔ #IFGain:Low	#Atten: 36 dB	Avginola. 100/100	Radio Devi	ice: BTS	
	in dameon					
10 dB/div Ref 30.00 d	IBm					
Log 20.0						
						Clear Write
10.0	مراده وحصراته و	water provider the	Advantary .			
0.00						
-10.0						
-20.0	/					Average
مطاببيه المراجع العارين والمتعاد	when a					Average
-30.0 ald the same tray to be the factor of the			Heller and	man	a hayo sheka di faya ang tang tang tang tang tang tang tang	
-40.0						
-50.0						Max Hold
-60.0						wax noiu
-00.0						
Center 6.6650 GHz				Span 4	00.0 MHz	
Res BW 3 MHz		VBW 50 MH	Z		ep 1 ms	Min Hold
						Min Hold
Occupied Bandwi	idth	Total P	ower 22.	1 dBm		
	156.48 MH	Ζ				Detector
						Peak▶
Transmit Freq Error	-113.90 k	Hz % of OE	3W Power 99	9.00 %		Auto <u>Man</u>
x dB Bandwidth	167.1 M	Hz xdB	-26	00 dB		
MSG			STATU	s		

Plot 7-91. 26dB Bandwidth Plot MIMO ANT2 (160MHz 802.11ax (UNII Band 7) - Ch. 143)



Plot 7-92. 26dB Bandwidth Plot MIMO ANT2 (160MHz 802.11ax (UNII Band 7) - Ch. 175)

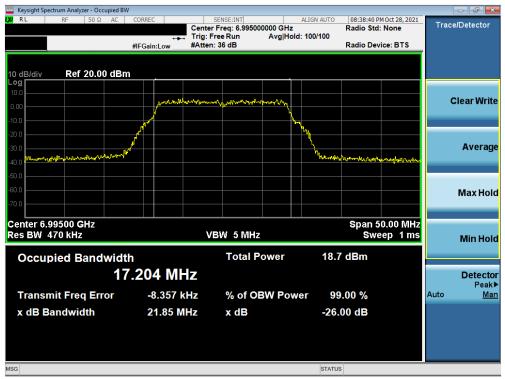
FCC ID: A3LSMS908E		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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MIMO Antenna-2 26 dB Bandwidth Measurements - (UNII Band 8)



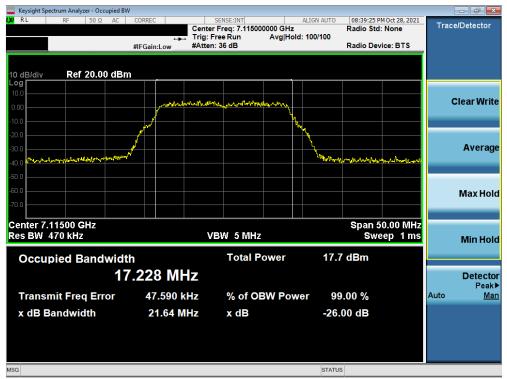
Plot 7-93. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11a (UNII Band 8) - Ch. 189)



Plot 7-94. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11a (UNII Band 8) - Ch. 209)

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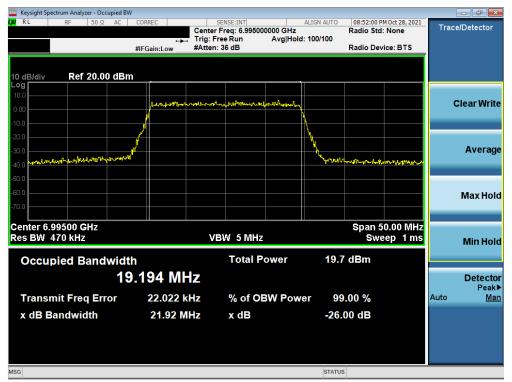
Plot 7-95. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11a (UNII Band 8) - Ch. 233)



Plot 7-96. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11ax (UNII Band 8) - Ch. 189)

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Plot 7-97. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11ax (UNII Band 8) - Ch. 209)



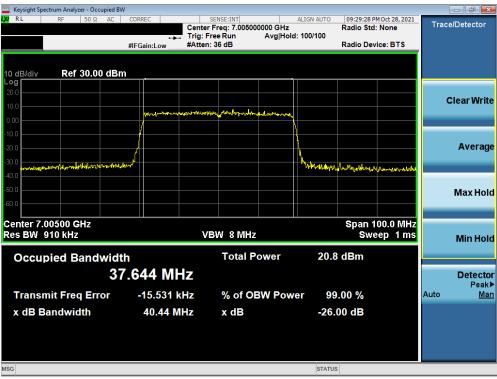
Plot 7-98. 26dB Bandwidth Plot MIMO ANT2 (20MHz 802.11ax (UNII Band 8) - Ch. 233)

FCC ID: A3LSMS908E	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BW							
LX RL RF 50Ω AC CO	ORREC	SENSE:INT	ALIGN		Oct 28, 2021	Trace/D	etector
		Center Freq: 6.88500 Trig: Free Run	0000 GHz Avg Hold: 100/1	Radio Std:	None	Haccib	
#1		#Atten: 36 dB	Avginola. 100/1	Radio Devi	ce: BTS		
	Gameow						
10 dB/div Ref 20.00 dBm	_						
Log							
10.0	and bar Morenew	pal American programme	matrimen			Cle	ar Write
0.00						UIC	
-10.0			<u> </u>				
-20.0	j l						
	4 I I I I I I I I I I I I I I I I I I I		۱. <u>۱</u>				Waraga
-30.0	íi — — — — — — — — — — — — — — — — — — —		Մերան	بالم والمعالية والمعام والمعام والمعالم	Aren from the	,	Average
-40.0							
-50.0							
-60.0							
						IV	lax Hold
-70.0							
Center 6.88500 GHz				Enon ((00.0 MHz		
Res BW 910 kHz		VBW 8 MHz			ep 1 ms		
Kes BW 910 KH2				Swe	ep i llis	N	lin Hold
Occupied Bandwidth		Total P	ower	20.4 dBm			
Occupied Bandwidth			Ower	20.4 0011			
37.0	673 MH	Z					Detector
							Peak▶
Transmit Freq Error	25.061 kH	z % of OE	3W Power	99.00 %		Auto	<u>Man</u>
x dB Bandwidth	40.48 MH	z xdB		-26.00 dB			
X dB Balldwidth	40.40 1011			-20100 uB			
MSG				STATUS			

Plot 7-99. 26dB Bandwidth Plot MIMO ANT2 (40MHz 802.11ax (UNII Band 8) - Ch. 187)



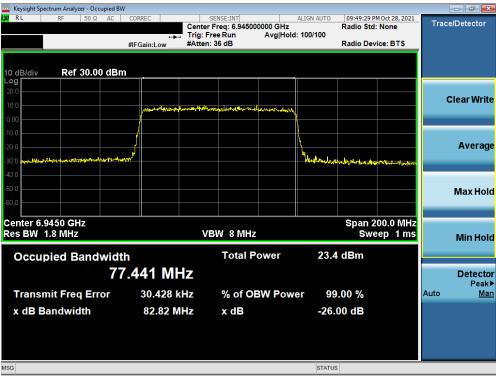
Plot 7-100. 26dB Bandwidth Plot MIMO ANT2 (40MHz 802.11ax (UNII Band 8) - Ch. 211)

FCC ID: A3LSMS908E		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BW									
LXI RL RF 50Ω AC	CORREC		ISE:INT		ALIGN AUTO		M Oct 28, 2021	Trac	e/Detector
			eq: 7.08500	0000 GHz Avg Hold	400/400	Radio Std	None	mac	erbetector
	++→ #IFGain:Low	#Atten: 36		Avginoid	1. 100/100	Radio Dev	ice: BTS		
	#IFGam.Low					Tradio Der			
10 dB/div Ref 20.00 dBm									
Log				Î					
10.0		un and a star	ي و والحديث	1					Clear Write
0.00	all services a services	ALI 19-19-19-100 (10) 14-1	A name and the state	and of the second second	1				Clear write
-10.0	/				\				
-20.0								_	
					1				_
-30.0	~ ⁴				Manufacture	Neder and then	Dearly & dama		Average
-40.0						a di se di se di se di se di			
-50.0									
-60.0									Max Hold
-70.0									
Center 7.08500 GHz							00.0 MHz		
Res BW 910 kHz		VBV	V 8 MHz			SWe	ep 1ms		Min Hold
			_						
Occupied Bandwidth	1		Total P	ower	20.1	dBm			
37	.638 MF	7							Detector
51	.000 Mil								Peak▶
Transmit Freq Error	-59.849 k	Hz	% of OE	3W Pow	er 99	.00 %		Auto	Man
-									
x dB Bandwidth	40.28 M	Hz	x dB		-26.	00 dB			
MSG					STATUS				

Plot 7-101. 26dB Bandwidth Plot MIMO ANT2 (40MHz 802.11ax (UNII Band 8) - Ch. 227)



Plot 7-102. 26dB Bandwidth Plot MIMO ANT2 (80MHz 802.11ax (UNII Band 8) - Ch. 199)

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Keysight Spectrum Analyzer - Occupied B\	N					
XX RL RF 50Ω AC	CORREC	SENSE:INT nter Freg: 7.02500	ALIGN AUTO	09:59:07 PM Oct 2 Radio Std: Non		etector
		ig: Free Run	Avg Hold: 100/100	Radio Std: Non	le	
	#IFGain:Low #A	tten: 36 dB		Radio Device: E	BTS	
10 dB/div Ref 30.00 dBr	n					
Log	ويرجعهم المتث					
20.0						ar Write
10.0	الأعيني ومراليه بالدرور	A Photo in a second designed				arwrite
0.00	a distant and a second s		-			
-10.0						
-20.0						Average
						Average
-30.0 activity for the state of the second second			"", the second sec	and an algorithm of the second	www.	
-40.0						_
-50.0					N	lax Hold
-60.0						
Center 7.0250 GHz				Span 200.0		
Res BW 1.8 MHz		VBW 8 MHz		Sweep	1 ms	Ain Hold
Occupied Rendwidt	la la	Total P	ower 226	6 dBm		
Occupied Bandwidt		Total I		J U D III		
77	7.356 MHz					Detector
The name it From From	400 70 kHz	%	000 D	9.00 %	Auto	Peak▶ Man
Transmit Freq Error	-102.70 kHz	% of OF	BW Power 99	9.00 %	Auto	<u>ivian</u>
x dB Bandwidth	82.67 MHz	x dB	-26.	00 dB		
				_		_
MSG			STATU	S		

Plot 7-103. 26dB Bandwidth Plot MIMO ANT2 (80MHz 802.11ax (UNII Band 8) - Ch. 215)



Plot 7-104. 26dB Bandwidth Plot MIMO ANT2 (160MHz 802.11ax (UNII Band 8) - Ch. 207)

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7.3 UNII Output Power Measurement – 802.11a/ax § 2.1046, §15.407(a)(11), §15.407(a)(8)

Test Overview and Limits

A transmitter antenna terminal of the EUT is connected to the input of an RF pulse power sensor. Measurement is made using a broadband average power meter while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in ANSI C63.10-2013 and KDB 789033 D02 v02r01, and at the appropriate frequencies.

Test Procedure Used

ANSI C63.10-2013 – Section 12.3.3.2 Method PM-G KDB 789033 D02 v02r01 – Section E)3)b) Method PM-G ANSI C63.10-2013 – Section 14.2 Measure-and-Sum Technique KDB 662911 v02r01 – Section E)1) 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 (20MHz) 8	302.11a Conducte	ed Power [dBm]			
andwidth)	Freq [MHz]	Channel	ANT1	ANT2	MIMO	Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
Ξ	5935	2	9.35	9.43	12.40	-2.92	9.48	24.0	-14.52
q	6075	25	9.34	9.22	12.29	-2.92	9.37	24.0	-14.63
Ĕ	6175	45	9.20	9.01	12.12	-2.92	9.20	24.0	-14.80
g	6275	65	9.36	9.30	12.34	-2.92	9.42	24.0	-14.58
8	6415	93	9.49	9.40	12.46	-2.92	9.54	24.0	-14.46
N	6435	97	12.02	11.47	14.76	-5.48	9.28	24.0	-14.72
	6475	105	12.05	11.35	14.73	-5.48	9.25	24.0	-14.75
(20M	6515	113	12.13	11.55	14.86	-5.48	9.38	24.0	-14.62
O.	6535	117	11.72	11.33	14.54	-4.17	10.37	24.0	-13.63
<u>C</u>	6675	145	12.09	11.57	14.85	-4.17	10.68	24.0	-13.32
N	6695	149	12.19	11.50	14.87	-4.17	10.70	24.0	-13.30
Î	6875	185	11.26	11.80	14.55	-4.17	10.38	24.0	-13.62
99	6895	189	10.98	12.78	14.98	-5.59	9.39	24.0	-14.61
9	6995	209	11.09	12.14	14.66	-5.59	9.07	24.0	-14.93
	7115	233	11.20	11.26	14.24	-5.59	8.65	24.0	-15.35

Table 7-2. MIMO 20MHz BW 802.11a (UNII) Maximum Conducted Output Power

	6GHz (20MHz) 802.11ax Conducted Power [dBm]									
Bandwidth)	Freq [MHz]	Channel	ANT1	ANT2	MIMO	Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]	
- <u>></u>	5935	2	9.64	9.83	12.75	-2.92	9.83	24.0	-14.17	
q	6075	25	9.29	9.36	12.34	-2.92	9.42	24.0	-14.58	
Ľ	6175	45	9.41	9.22	12.33	-2.92	9.41	24.0	-14.59	
a	6275	65	9.72	9.50	12.62	-2.92	9.70	24.0	-14.30	
—	6415	93	9.41	9.42	12.43	-2.92	9.51	24.0	-14.49	
Ηz	6435	97	12.14	11.35	14.77	-5.48	9.29	24.0	-14.71	
_	6475	105	12.14	11.47	14.83	-5.48	9.35	24.0	-14.65	
(20M	6515	113	12.16	11.50	14.86	-5.48	9.38	24.0	-14.62	
50	6535	117	12.04	11.46	14.77	-4.17	10.60	24.0	-13.40	
	6675	145	12.30	11.46	14.91	-4.17	10.74	24.0	-13.26	
N	6695	149	12.26	11.67	14.99	-4.17	10.82	24.0	-13.18	
Î	6875	185	11.50	11.81	14.67	-4.17	10.50	24.0	-13.50	
99	6895	189	11.15	12.49	14.88	-5.59	9.29	24.0	-14.71	
Ő	6995	209	11.22	12.33	14.82	-5.59	9.23	24.0	-14.77	
	7115	233	11.24	11.35	14.31	-5.59	8.72	24.0	-15.28	

Table 7-3. MIMO 20MHz BW 802.11ax (UNII) Maximum Conducted Output Power

	6GHz (40MHz) 802.11ax Conducted Power [dBm]										
dth)	Freq [MHz]	Channel	ANT1	ANT2	MIMO	Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]		
dwi	5965	3	12.41	12.56	15.50	-2.92	12.58	24.0	-11.42		
ð	6085	27	12.30	12.33	15.33	-2.92	12.41	24.0	-11.59		
an	6165	43	12.40	12.28	15.35	-2.92	12.43	24.0	-11.57		
a	6285	67	12.62	12.57	15.61	-2.92	12.69	24.0	-11.31		
B	6405	91	12.56	12.62	15.60	-2.92	12.68	24.0	-11.32		
Hz	6445	99	13.15	12.16	15.69	-5.48	10.21	24.0	-13.79		
<u> </u>	6485	107	13.21	12.19	15.74	-5.48	10.26	24.0	-13.74		
Σ	6525	115	13.28	12.09	15.74	-5.48	10.26	24.0	-13.74		
(40M	6565	123	13.19	12.21	15.74	-4.17	11.57	24.0	-12.43		
(7	6685	147	13.10	12.55	15.84	-4.17	11.67	24.0	-12.33		
N	6725	155	13.35	12.52	15.97	-4.17	11.80	24.0	-12.20		
T	6845	179	12.47	12.42	15.46	-4.17	11.29	24.0	-12.71		
9	6885	187	12.62	12.32	15.48	-5.59	9.89	24.0	-14.11		
Ő	7005	211	12.01	12.92	15.50	-5.59	9.91	24.0	-14.09		
	7085	227	12.28	12.32	15.31	-5.59	9.72	24.0	-14.28		

Table 7-4. MIMO 40MHz BW 802.11ax (UNII) Maximum Conducted Output Power

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	6GHz (80MHz) 802.11ax Conducted Power [dBm]									
	Freq [MHz]	Channel	ANT1	ANT2	MIMO	Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]	
₽	5985	7	13.20	12.72	15.98	-2.92	13.06	24.0	-10.94	
1 to 1	6065	23	12.42	11.79	15.13	-2.92	12.21	24.0	-11.79	
(80MH width)	6145	39	13.16	12.80	15.99	-2.92	13.07	24.0	-10.93	
vi (8	6305	71	13.12	12.70	15.93	-2.92	13.01	24.0	-10.99	
с тр	6385	87	12.94	12.76	15.86	-2.92	12.94	24.0	-11.06	
P č	6465	103	12.63	12.02	15.34	-5.48	9.86	24.0	-14.14	
L a	6545	119	12.57	11.84	15.23	-4.17	11.06	24.0	-12.94	
<u>В</u> 6	6705	151	12.71	11.89	15.33	-4.17	11.16	24.0	-12.84	
U	6785	167	12.50	13.24	15.90	-4.17	11.73	24.0	-12.27	
	6865	183	12.65	12.60	15.63	-4.17	11.46	24.0	-12.54	
	6945	199	11.58	13.38	15.58	-5.59	9.99	24.0	-14.01	
	7025	215	11.51	12.51	15.05	-5.59	9.46	24.0	-14.54	

Table 7-5. MIMO 80MHz BW 802.11ax (UNII) Maximum Conducted Output Power

	6GHz (160MHz) 802.11ax Conducted Power [dBm]									
(160MHz dwidth)	Freq [MHz]	Channel	ANT1	ANT2	MIMO	Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]	
/idf	6025	15	12.29	12.58	15.45	-2.92	12.53	24.0	-11.47	
	6185	47	12.37	12.28	15.33	-2.92	12.41	24.0	-11.59	
	6345	79	12.17	12.61	15.41	-2.92	12.49	24.0	-11.51	
σI	6505	111	12.74	12.16	15.47	-5.48	9.99	24.0	-14.01	
<u>о</u> п	6665	143	12.75	12.09	15.45	-4.17	11.28	24.0	-12.72	
9	6825	175	12.14	12.65	15.41	-4.17	11.24	24.0	-12.76	
	6985	207	11.59	12.66	15.17	-5.59	9.58	24.0	-14.42	

Table 7-6. MIMO 160MHz BW 802.11ax (UNII) Maximum Conducted Output Power

FCC ID: A3LSMS908E	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Note:

Per ANSI C63.10-2013 Section 14.3.2.2 and KDB 662911 v02r01 Section E)2), the power spectral density at Antenna 1 and Antenna 2 were first measured separately as shown in the section above. The measured values were then summed in linear power units then converted back to dBm.

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

Directional gain = $10 \log[(10^{G_{1/20}} + 10^{G_{2/20}} + ... + 10^{G_{N/20}})^2 / N_{ANT}] dBi$ = $10 \log[(10^{-6.31/20} + 10^{-5.56/20})^2 / 2] dBi$ = -2.92 dBi

Sample MIMO Calculation:

At 5935MHz in 802.11ax (20MHz BW) mode, the average conducted output power was measured to be 9.64 dBm for Antenna-1 and 9.83 dBm for Antenna-2.

(9.64 dBm + 9.83 dBm) = (9.204 mW + 9.616mW) =18.820 mW = 12.75 dBm

Sample e.i.r.p. Calculation:

At 5935MHz in 802.11ax (20MHz BW) mode, the average MIMO conducted power was calculated to be 12.75 dBm with directional gain of -2.92 dBi.

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

12.75 dBm + -2.92 dBi = 9.83 dBm

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7.4 Maximum Power Spectral Density – 802.11a/ax §15.407(a)(8)

Test Overview and Limit

The spectrum analyzer was connected to the antenna terminal while the EUT was operating at its maximum duty cycle, at its maximum power control level, as defined in ANSI C63.10-2013 and KDB 789033 D02 v02r01, and at the appropriate frequencies. Method SA-1, as defined in ANSI C63.10-2013 and KDB 789033 D02 v02r01, was used to measure the power spectral density for 802.11ax. Method SA-2, as defined in ANSI C63.10-2013 and KDB 789033 D02 v02r01 and KDB 789033 D02 v02r01, was used to measure the power spectral density for 802.11ax.

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

Test Procedure Used

ANSI C63.10-2013 – Section 12.3.2.2 KDB 789033 D02 v02r01 – Section F ANSI C63.10-2013 – Section 14.3.2.2 Measure-and-Sum Technique KDB 662911 v02r01 – Section E)2) Measure-and-Sum Technique

Test Settings

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

Test Setup

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



Figure 7-3. Test Instrument & Measurement Setup

Test Notes

None.

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MIMO Power Spectral Density Measurements

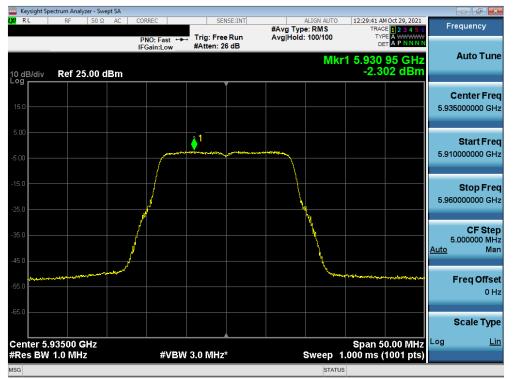
	Frequency [MHz]	Channel	802.11 MODE	Antenna-1 Power Density	Antenna-2 Power Density	Summed MIMO Power Density	Directional Gain [dBi]	e.i.r.p Density [dBm/MHz]	Max EIRP Density	Margin [dB]
	5935	2	-	[dBm]	[dBm]	[dBm/MHz]	2.02	1 76	[dBm/MHz]	0.76
	6175	2 45	a	-2.30 -2.38	-1.45 -2.60	1.15 0.52	-2.92 -2.92	-1.76 -2.40	-1 -1	-0.76 -1.40
	6415	93	a a	-2.38	-2.60	1.30	-2.92	-2.40	-1	-0.62
	5935	2		-2.10	-1.85	1.03	-2.92	-1.88	-1	-0.88
	6175	45	ax (20MHz)	-2.10	-1.85	0.46	-2.92	-1.88	-1 -1	-0.88
	6415	93	ax (20MHz) ax (20MHz)	-2.55	-2.00	0.74	-2.92	-2.46	-1	-1.46
	5965	3	ax (200Hz)	-2.00	-1.27	1.39	-2.92	-1.52	-1	-0.52
d 5	6165	43	ax (40MHz)	-2.80	-2.26	0.49	-2.92	-2.43	-1	-1.43
Band	6405	43 91	ax (40MHz)	-2.05	-1.94	1.02	-2.92	-1.90	-1	-0.90
	5985	- 91 - 7	ax (40101HZ) ax (80MHz)	-4.28	-4.31	-1.29	-2.92	-4.20	-1	-3.20
	6145	39	ax (80MHz)	-4.28	-4.51	-1.38	-2.92	-4.20	-1	-3.20
	6385	87	ax (80MHz)	-4.14	-4.31	-1.19	-2.92	-4.23	-1	-3.11
	6025	15	ax (300MHz)	-7.64	-7.05	-4.33	-2.92	-7.24	-1	-6.24
	6185	47	ax (160MHz)	-8.02	-7.59	-4.33	-2.92	-7.71	-1	-6.71
	6345	79	ax (160MHz)	-7.27	-6.88	-4.06	-2.92	-6.98	-1	-5.98
	6435	97	, , ,	-0.66	0.29	2.85	-5.48	-2.63	-1	-1.63
	6475	105	a a	-0.00	0.53	3.16	-5.48	-2.32	-1	-1.32
	6515	103	a	-0.27	0.33	2.96	-5.48	-2.52	-1	-1.52
	6435	97	ax (20MHz)	-0.47	0.08	2.64	-5.48	-2.84	-1	-1.32
9	6475	105	ax (20MHz)	-0.88	0.08	3.04	-5.48	-2.84	-1 -1	-1.84
	6515	103	ax (20MHz)	-0.28	-0.07	2.64	-5.48	-2.84	-1	-1.44
Band	6445	99	ax (2010HZ) ax (40MHz)	-2.95	-1.72	0.72	-5.48	-4.76	-1	-3.76
	6485	107	ax (40101HZ) ax (40MHz)	-2.95	-1.72	1.03	-5.48	-4.45	-1	-3.45
	6525	107	ax (40MHz)	-2.14	-1.85	0.68	-5.48	-4.45	-1	-3.45
	6465	113	ax (40101HZ) ax (80MHz)	-2.46	-3.96	-1.25	-5.48	-4.80	-1	-5.73
	6505	103		-7.98	-7.02	-4.46	-5.48	-9.94	-1	-8.94
	6535	111	ax (160MHz) a	-1.25	0.20	2.55	-4.17	-9.94	-1	-0.63
	6695	117	a	-0.83	0.75	3.04	-4.17	-1.03	-1	-0.03
	6875	145	a	-0.83	0.19	2.88	-4.17	-1.29	-1	-0.13
	6535	185	ax (20MHz)	-1.32	0.05	2.43	-4.17	-1.75	-1	-0.25
	6695	149	ax (20MHz)	-0.71	0.05	2.43	-4.17	-1.39	-1	-0.39
	6875	145	ax (20MHz)	-0.85	-0.06	2.73	-4.17	-1.60	-1	-0.60
2	6565	123	ax (2014112) ax (40MHz)	-3.15	-1.96	0.50	-4.17	-3.68	-1	-2.68
Band 7	6725	125	ax (40MHz)	-2.43	-1.30	1.22	-4.17	-2.95	-1	-1.95
ä	6885	179	ax (40MHz)	-2.45	-2.17	0.56	-4.17	-3.61	-1	-2.61
	6545	119	ax (40101HZ) ax (80MHz)	-5.46	-4.47	-1.93	-4.17	-6.10	-1	-5.10
	6705	119	ax (80MHz)	-5.23	-4.47	-1.60	-4.17	-5.77	-1	-4.77
	6865	183	ax (80MHz)	-5.14	-4.12	-1.59	-4.17	-5.77	-1	-4.77
	6665	143	ax (300MHz)	-8.58	-7.28	-4.87	-4.17	-9.05	-1	-4.77
	6825	143	ax (160MHz)	-8.40	-7.41	-4.87	-4.17	-9.04	-1	-8.03
	6895	189	ax (100101112) a	-0.42	1.27	3.52	-5.59	-2.07	-1	-1.07
	6995	209	a	-0.42	0.87	3.23	-5.59	-2.36	-1	-1.36
	7115	233	a	-0.94	-0.11	2.49	-5.59	-3.10	-1	-2.10
	6895	189	ax (20MHz)	-0.98	0.79	3.01	-5.59	-2.58	-1	-1.58
	6995	209	ax (20MHz)	-0.71	0.38	2.88	-5.59	-2.71	-1	-1.71
8	7115	233	ax (20MHz)	-1.18	-0.48	2.19	-5.59	-3.40	-1	-2.40
Band	6885	187	ax (2010112) ax (40MHz)	-2.55	-2.07	0.71	-5.59	-4.88	-1	-3.88
ä	7005	211	ax (40MHz)	-3.01	-1.86	0.61	-5.59	-4.88	-1	-3.88
	7005	211 227	ax (40101H2) ax (40MHz)	-3.20	-2.55	0.15	-5.59	-5.44	-1	-3.97
	6945	199	ax (40101HZ) ax (80MHz)	-5.20	-2.55	-0.94	-5.59	-5.44 -6.53	-1 -1	-4.44
	7025	215	ax (80MHz)	-5.24	-3.48	-0.94	-5.59	-6.84	-1 -1	-5.84
	6985	215		-5.21 -8.21	-3.48 -6.74	-1.25 -4.40	-5.59	-6.84 -9.99	-1 -1	-5.84 -8.99
	0965	207	ax (160MHz)	-0.21	-0.74	-4.40	-3.39	-3.33	-1	-0.33

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

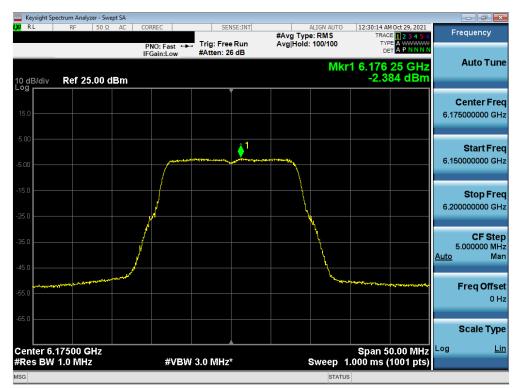
FCC ID: A3LSMS908E	Proud to be part of the element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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MIMO Antenna-1 Power Spectral Density Measurements - (UNII Band 5)



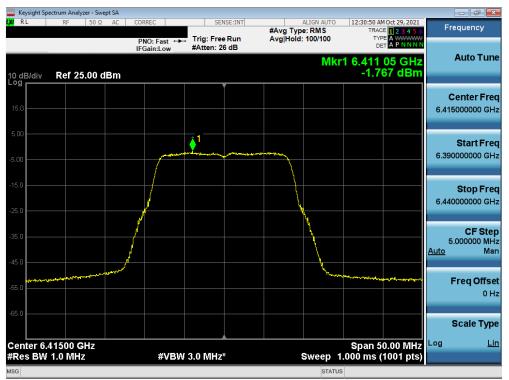
Plot 7-105. Power Spectral Density Measurement Plot MIMO ANT1 (20MHz 802.11a (UNII Band 5) - Ch. 2)



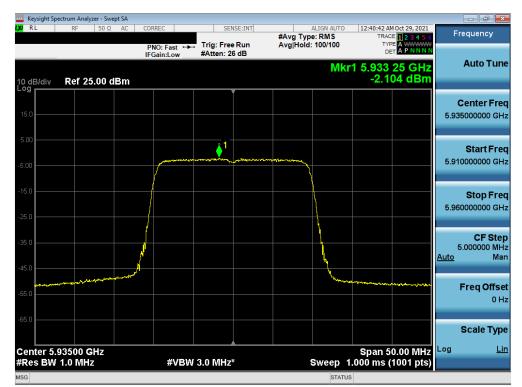
Plot 7-106. Power Spectral Density Measurement Plot MIMO ANT1 (20MHz 802.11a (UNII Band 5) - Ch. 45)

FCC ID: A3LSMS908E	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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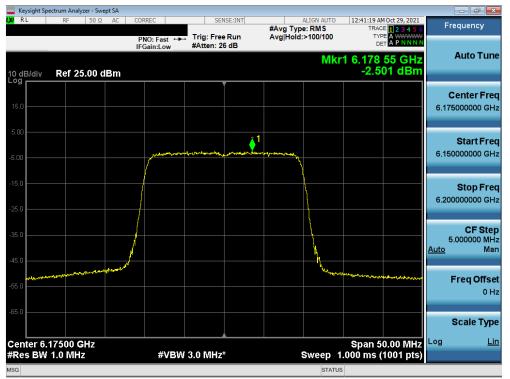
Plot 7-107. Power Spectral Density Measurement Plot MIMO ANT1 (20MHz 802.11a (UNII Band 5) - Ch. 93



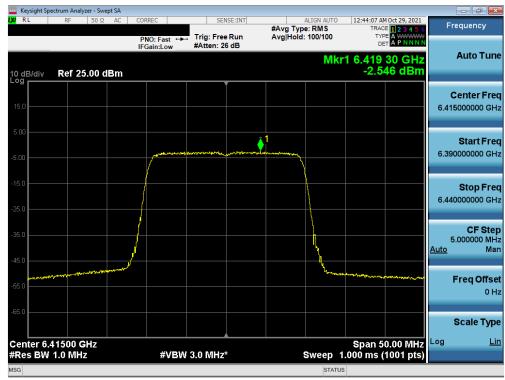
Plot 7-108. Power Spectral Density Measurement Plot MIMO ANT1 (20MHz 802.11ax (UNII Band 5) - Ch. 2)

FCC ID: A3LSMS908E	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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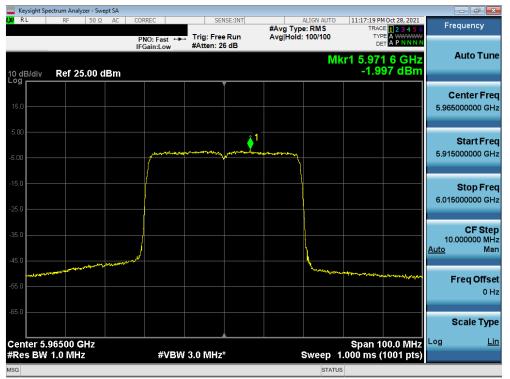
Plot 7-109. Power Spectral Density Measurement Plot MIMO ANT1 (20MHz 802.11ax (UNII Band 5) - Ch. 45)



Plot 7-110. Power Spectral Density Measurement Plot MIMO ANT1 (20MHz 802.11ax (UNII Band 5) - Ch. 93

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Plot 7-111. Power Spectral Density Measurement Plot MIMO ANT1 (40MHz 802.11ax (UNII Band 5) - Ch. 3)



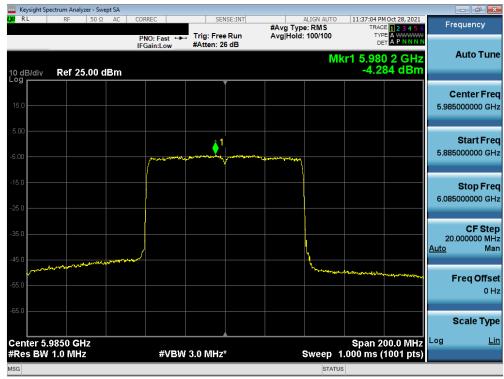
Plot 7-112. Power Spectral Density Measurement Plot MIMO ANT1 (40MHz 802.11ax (UNII Band 5) - Ch. 43)

FCC ID: A3LSMS908E	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-113. Power Spectral Density Measurement Plot MIMO ANT1 (40MHz 802.11ax (UNII Band 5) - Ch. 91)



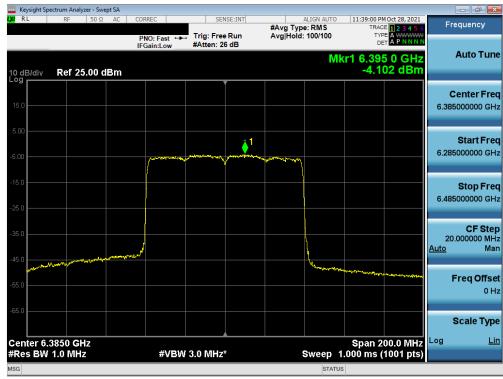
Plot 7-114. Power Spectral Density Measurement Plot MIMO ANT1 (80MHz 802.11ax (UNII Band 5) - Ch. 7)

FCC ID: A3LSMS908E	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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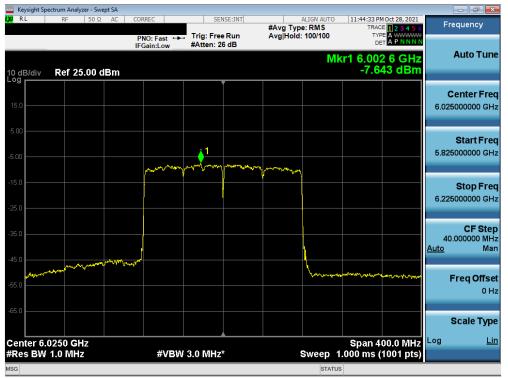
Plot 7-115. Power Spectral Density Measurement Plot MIMO ANT1 (80MHz 802.11ax (UNII Band 5) - Ch. 39)



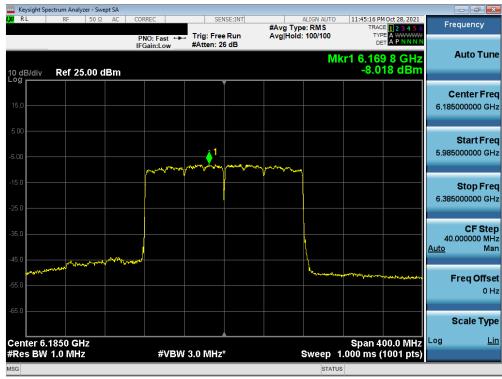
Plot 7-116. Power Spectral Density Measurement Plot MIMO ANT1 (80MHz 802.11ax (UNII Band 5) - Ch. 87)

FCC ID: A3LSMS908E	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-117. Power Spectral Density Measurement Plot MIMO ANT1 (160MHz 802.11ax (UNII Band 5) - Ch. 15)



Plot 7-118. Power Spectral Density Measurement Plot MIMO ANT1 (160MHz 802.11ax (UNII Band 5) - Ch. 47)

FCC ID: A3LSMS908E	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-119. Power Spectral Density Measurement Plot MIMO ANT1 (160MHz 802.11ax (UNII Band 5) - Ch. 79)

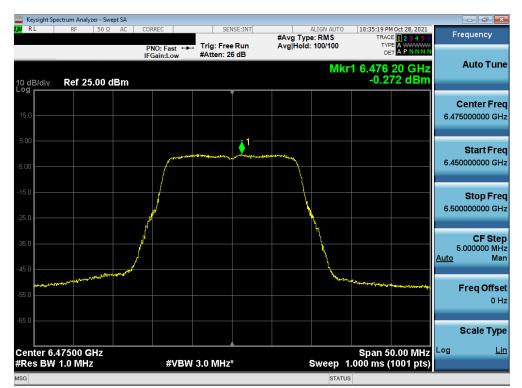
FCC ID: A3LSMS908E	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 82 of 222
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MIMO Antenna-1 Power Spectral Density Measurements - (UNII Band 6)



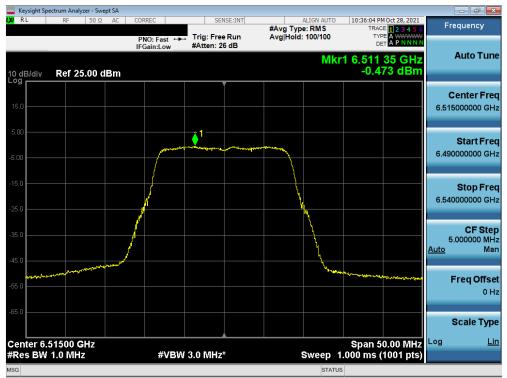
Plot 7-120. Power Spectral Density Measurement Plot MIMO ANT1 (20MHz 802.11a (UNII Band 6) - Ch. 97)



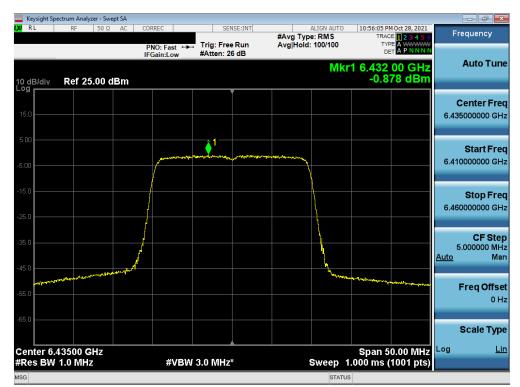
Plot 7-121. Power Spectral Density Measurement Plot MIMO ANT1 (20MHz 802.11a (UNII Band 6) - Ch. 105)

FCC ID: A3LSMS908E	PCTEST Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		
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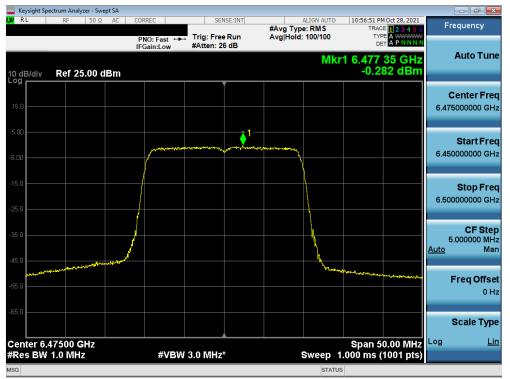
Plot 7-122. Power Spectral Density Measurement Plot MIMO ANT1 (20MHz 802.11a (UNII Band 6) - Ch. 113)



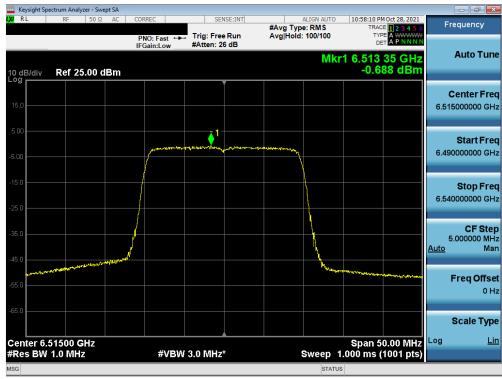
Plot 7-123. Power Spectral Density Measurement Plot MIMO ANT1 (20MHz 802.11ax (UNII Band 6) - Ch. 97)

FCC ID: A3LSMS908E	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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Plot 7-124. Power Spectral Density Measurement Plot MIMO ANT1 (20MHz 802.11ax (UNII Band 6) - Ch. 105)



Plot 7-125. Power Spectral Density Measurement Plot MIMO ANT1 (20MHz 802.11ax (UNII Band 6) - Ch. 113)

FCC ID: A3LSMS908E	Proud to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
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