

PCTEST ENGINEERING LABORATORY, INC.

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MEASUREMENT REPORT FCC PART 15.407 UNII 802.11ax OFDMA

Applicant Name:

FCC ID:

APPLICANT:

Samsung Electronics Co., Ltd. 129, Samsung-ro, Yeongtong-gu, Suwon-si Gyeonggi-do, 16677, Korea Date of Testing: 01/22 - 05/08/2019 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M1903060032-09.A3L

A3LSMG977T

Samsung Electronics Co., Ltd.

Application Type:	Certification			
Model:	SM-G977T			
Additional Model:	SM-G977P			
EUT Type:	Portable Handset			
Frequency Range:	5180 – 5825MHz			
FCC Classification:	Unlicensed National Information Infrastructure (UNII)			
FCC Rule Part(s):	Part 15 Subpart E (15.407)			
Test Procedure(s):	ANSI C63.10-2013, KDB 789033 D02 v02r01,			
	KDB 648474 D03 v01r04, KDB 662911 D01 v02r01			

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.

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.





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	Channel		ANT1		AN	JT2	MIMO		
UNII Band	UNII Band Bandwidth (MHz)	Tx Frequency (MHz)	Max. Power (mW)	Max. Power (dBm)	Max. Power (mW)	Max. Power (dBm)	Max. Power (mW)	Max. Power (dBm)	
1		5180 - 5240	37.411	15.73	39.719	15.99	38.462	15.85	
2A	20	5260 - 5320	35.975	15.56	38.459	15.85	39.558	15.97	
2C		5500 - 5720	38.459	15.85	39.628	15.98	38.776	15.89	
3		5745 - 5825	37.931	15.79	37.844	15.78	39.752	15.99	
1	40	5190 - 5230	25.003	13.98	24.946	13.97	24.693	13.93	
2A		5270 - 5310	24.660	13.92	23.988	13.80	24.760	13.94	
2C	40	5510 - 5710	25.061	13.99	25.061	13.99	24.954	13.97	
3		5755 - 5795	25.003	13.98	24.099	13.82	24.496	13.89	
1		5210	19.861	12.98	19.907	12.99	19.908	12.99	
2A	80	5290	19.861	12.98	19.907	12.99	19.862	12.98	
2C	00	5530 - 5690	19.907	12.99	19.770	12.96	19.913	12.99	
3		5775	19.907	12.99	19.770	12.96	19.613	12.93	

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 Engineering Laboratory, Inc. 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 Engineering Lab located in Columbia, MD 21046, U.S.A.

- PCTEST is an ISO 17025-2005 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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PRODUCT INFORMATION 2.0

2.1 **Equipment Description**

The Equipment Under Test (EUT) is the Samsung Portable Handset FCC ID: A3LSMG977T. The test data contained in this report pertains only to the emissions due to the EUT's UNII transmitter.

Test Device Serial No.: 0181M, 0234M, 0251M, 0263M, 3773B, 9877B

2.2 **Device Capabilities**

This device contains the following capabilities:

850/1900 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1, BC10), 850/1900 GSM/GPRS/EDGE, 850/1700/1900 WCDMA/HSPA, Multi-band LTE, 5G NR (n41, n260, n261, EN-DC), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII, Bluetooth (1x, EDR, LE), NFC, Wireless Phone Transfer

Band 1			Band 2A			Band 2C			Band 3
Frequency (MHz)		Ch.	Frequency (MHz)		Ch.	Frequency (MHz)		Ch.	Frequency (MHz)
5180		52	5260		100	5500		149	5745
:			:		:	:		:	:
5210		56	5280		120	5600		157	5785
:			:		:	:		:	:
5240		64	5320		144	5720		165	5825
	Frequency (MHz) 5180 : 5210 :	Frequency (MHz) 5180 : 5210 :	Frequency (MHz) Ch. 5180 52 : : 5210 56 : :	Frequency (MHz) Ch. Frequency (MHz) 5180 52 5260 : : : : 5210 56 5280 : : : :	Frequency (MHz) Ch. Frequency (MHz) 5180 52 5260 : : : 5210 56 5280 : : :	Frequency (MHz) Ch. Frequency (MHz) Ch. 5180 52 5260 100 : : : : 120 : : : : : : 5210 56 5280 120 : : : : :	Frequency (MHz) Ch. Frequency (MHz) Ch. Frequency (MHz) 5180 52 5260 100 5500 : : : : 100 5500 : 56 5280 120 5600 : : : : : :	Frequency (MHz) Ch. Frequency (MHz) Ch. Frequency (MHz) 5180 52 5260 100 5500 : : : : 100 5500 : 56 5280 120 5600 : : : : :	Frequency (MHz) Ch. Index

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

	Band 1
Ch.	Frequency (MHz)
38	5190
:	

5230

46

	Band 2A
Ch.	Frequency (MHz)
54	5270
:	•
62	5310

	Band 2C				
Ch.	Frequency (MHz)				
102	5510				
:	•••				
118	5590				
:	:				
142	5710				

Band 3	
Frequency (MHz)	

Ch.	Frequency (MHz)
151	5755
:	:
159	5795

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

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

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

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Notes:

5GHz NII operation is possible in 20MHz, and 40MHz, and 80MHz channel bandwidths. The maximum achievable duty cycles for all modes were determined based on measurements performed on a spectrum analyzer in zero-span mode with RBW = 8MHz, VBW = 50MHz, and detector = peak per the guidance of Section B)2)b) of ANSI C63.10-2013 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:

Mode	Antenna	Channel	Tone	duty cycle
			26T	99.7
			52T	99.7
802.11ax	1	36/38/42	106T	99.6
NII RU	T	50/56/42	242T	99.6
			484T	99.1
			996T	99.5
	2	36/38/42 5 4	26T	99.7
			52T	99.7
802.11ax			106T	99.6
NII RU			242T	99.7
			484T	99.1
			996T	99.5
			26T	99.3
			52T	98.9
802.11ax RU	MIMO SDM	26/20/12	106T	98.9
NII		36/38/42	242T	99.1
			484T	99.3
			996T	98.7

Table 2-4. Measured Duty Cycles

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

WiFi Configurations		S	ISO	SE	DM	CDD/	MIMO
		ANT1	ANT2	ANT1	ANT2	ANT1	ANT2
	11a	✓	✓	×	×	✓	✓
FCH-	11n/ac/ax (20MHz)	✓	✓	✓	✓	✓	✓
5GHz	11n/ac/ax (40MHz)	✓	✓	✓	✓	✓	✓
	11ac/ax (80MHz)	✓	✓	✓	✓	✓	✓

Table 2-5. Frequency / Channel Operations

✓ = Support ; × = NOT Support

SISO = Single Input Single Output

SDM = Spatial Diversity Multiplexing – MIMO function

CDD = Cyclic Delay Diversity - 2Tx Function

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3. This device supports simultaneous transmission operation, which allows for two SISO channels to operate independent of one another in the 2.4GHz (WLAN & BT) and 5GHz bands simultaneously on each antenna. The following tables show the worst case configurations determined during testing. The data for these configurations is contained in this test report. The BT + 5GHz case is not considered as worst case since the BT power is lower than the 2.4GHz WLAN power.

Description	2.4 GHz Emission	5 GHz Emission
Antenna	1	2
Channel	6	157
Operating Frequency (MHz)	2437	5785
Data Rate (Mbps)	1	6
Mode	802.11b	802.11a

Configuration 1: ANT1 transmitting in 2.4GHz mode and ANT2 in 5GHz mode

Table 2-6. Config-1 (ANT1 2.4GHz & ANT2 5GHz)

Configuration 2: ANT1 transmitting in 5GHz mode and ANT2 in 2.4GHz mode

Description	2.4 GHz Emission	5 GHz Emission
Antenna	2	1
Channel	1	120
Operating Frequency (MHz)	2412	5600
Data Rate (Mbps)	1	6
Mode	802.11b	802.11a

Table 2-7. Config-2 (ANT1 5GHz & ANT2 2.4GHz)

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Configuration 3: ANT1 and ANT2 both transmitting in 2.4GHz and 5GHz modes simultaneously

Description	2.4 GHz Emission	5 GHz Emission
Antenna	1, 2	1, 2
Channel	11	120
Operating Frequency (MHz)	2462	5600
Data Rate (Mbps)	6	6
Mode	802.11g	802.11a

Table 2-8. Config-3 (ANT1 MIMO & ANT2 MIMO)

2.3 Test Configuration

The EUT was tested per the guidance of KDB 789033 D02 v02r01. ANSI C63.10-2013 was used to reference the appropriate EUT setup for radiated spurious emissions testing.

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 placed on an authorized wireless charging pad (WCP) Model: 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.

2.4 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 Radiated Emissions

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

For all measurements, the spectrum was scanned through all EUT azimuths and from 1 to 4 meter receive antenna height using a broadband antenna from 30MHz up to the upper frequency shown in 15.33 depending on the highest frequency generated or used in the device or on which the device operates or tunes. For frequencies above 1GHz, linearly polarized double ridge horn antennas were used. For frequencies below 30MHz, a calibrated loop antenna was used. When exploratory measurements were necessary, they were performed at 1 meter test distance inside the semi-anechoic chamber using broadband antennas, broadband amplifiers, and spectrum analyzers to determine the frequencies and modes producing the maximum emissions. Sufficient time for the EUT, support equipment, and test equipment was allowed in order for them to warm up to their normal operating condition. The test set-up was placed on top of the 1 x 1.5 meter table. The EUT, support equipment, and interconnecting cables were arranged and manipulated to maximize each emission. Appropriate precaution was taken to ensure that all emissions from the EUT were maximized and investigated. The system configuration, mode of operation, turntable azimuth, and receive antenna height was noted for each frequency found.

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

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

3.3 Environmental Conditions

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

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4.0 ANTENNA REQUIREMENTS

Excerpt from §15.203 of the FCC Rules/Regulations:

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

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

Conclusion:

The EUT complies with the requirement of §15.203.

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5.0 MEASUREMENT UNCERTAINTY

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

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

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6.0 TEST EQUIPMENT CALIBRATION DATA

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

Manufacturer	Model	Description	Cal Date	Cal Interval	Cal Due	Serial Number
-	WL25-1	Conducted Cable Set (25GHz)	10/31/2018	Annual	10/31/2019	WL25-1
Agilent	N9030A	PXA Signal Analyzer (44GHz)	5/25/2018	Annual	5/25/2019	MY52350166
Anritsu	MA2411B	Pulse Power Sensor	10/30/2018	Annual	10/30/2019	846215
Anritsu	ML2495A	Power Meter	10/21/2018	Annual	10/21/2019	941001
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2017	Biennial	10/10/2019	121034
COM-Power	PAM-103	Pre-Amplifier (1-1000MHz)	9/17/2018	Annual	9/17/2019	441119
Emco	3115	Horn Antenna (1-18GHz)	3/28/2018	Biennial	3/28/2020	9704-5182
Emco	3116	Horn Antenna (18 - 40GHz)	6/7/2018	Triennial	6/7/2021	9203-2178
ETS-Lindgren	3816/2NM	Line Impedance Stabilization Network	6/18/2018	Biennial	6/18/2020	114451
Huber + Suhner	Sucoflex 102A	40GHz Radiated Cable Set	8/23/2018	Annual	8/23/2019	251425001
Pasternack	NMLC-2	Line Conducted Emissions Cable (NM)	8/23/2018	Annual	8/23/2019	NMLC-2
Rohde & Schwarz	ESU26	EMI Test Receiver (26.5GHz)	5/21/2018	Annual	5/21/2019	100342
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	8/9/2018	Annual	8/9/2019	100348
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	6/18/2018	Annual	6/18/2019	102134
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	6/25/2018	Annual	6/25/2019	102133
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	9/19/2018	Annual	9/19/2019	100040
Rohde & Schwarz	TS-PR40	26.5-40 GHz Pre-Amplifier	9/19/2018	Annual	9/19/2019	100037
Seekonk	NC-100	Torque Wrench 8in-lb	5/9/2018	Biennial	5/9/2020	N/A
Sunol	DRH-118	Horn Antenna (1-18GHz)	8/11/2017	Biennial	8/11/2019	A050307
Sunol	JB5	Bi-Log Antenna (30M - 5GHz)	4/19/2018	Biennial	4/19/2020	A051107

Table 6-1. Annual Test Equipment Calibration Schedule

Note:

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

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7.0 TEST RESULTS

7.1 Summary

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

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

Table 7-1. Summary of Test Results

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Notes:

- 1) All channels, modes, and modulations/data rates were investigated among all UNII bands. The test results shown in the following sections represent the worst case emissions.
- 2) The analyzer plots shown in this section were all taken with a correction table loaded into the analyzer. The correction table was used to account for the losses of the cables and attenuators used as part of the system to connect the EUT to the analyzer at all frequencies of interest.
- 3) All antenna port conducted emissions testing was performed on a test bench with the antenna port of the EUT connected to the spectrum analyzer through calibrated cables and attenuators.
- 4) For conducted spurious emissions, automated test software was used to measure emissions and capture the corresponding plots necessary to show compliance. The measurement software utilized is PCTEST "UNII Automation," Version 4.6.
- 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 0.2.16.
- 6) Per RSS-247 Section 6.2.3, transmission on channels which overlap the 5600-5650 MHz is prohibited. This device operates under these frequencies only under the control of a certified master device and does not support active scanning on these channels. This device does not transmit any beacons or initiate any transmissions in UNII Bands 2A or 2C.
- 802.11ax OFDMA testing was performed for all signal tone configurations as specified by the 802.11ax standard. Worst case results are determined and reported per the guidance provided at the October 2018 TCB Workshop.
- 8) Only one RU index could be selected at a time so no contiguous or non-contiguous RU's were considered for testing.

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7.2 26dB Bandwidth Measurement – 802.11ax OFDMA RSS-Gen [6.2]

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

Test Settings

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

Test Setup

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



Figure 7-1. Test Instrument & Measurement Setup

Test Notes

The 26dB Bandwidth measurement for each channel was measured with the fully loaded RU configuration and also the partially loaded RU configuration expected to result in the narrowest 26dB BW.

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SISO Antenna-1 26 dB Bandwidth Measurements (26 Tones)

	Frequency [MHz]	Channel No.	802.11 Mode	Tones	Data Rate [Mbps]	Measured 26dB Bandwidth [MHz]
	5180	36	ax (20MHz)	26T	MCS0	18.98
	5200	40	ax (20MHz)	26T	MCS0	19.03
Band 1	5240	48	ax (20MHz)	26T	MCS0	19.15
Bar	5190	38	ax (40MHz)	26T	MCS0	21.87
	5230	46	ax (40MHz)	26T	MCS0	21.92
	5210	42	ax (80MHz)	26T	MCS0	21.59
	5260	52	ax (20MHz)	26T	MCS0	19.99
∢	5280	56	ax (20MHz)	26T	MCS0	19.54
d 2A	5320	64	ax (20MHz)	26T	MCS0	18.51
Band	5270	54	ax (40MHz)	26T	MCS0	18.98
	5310	62	ax (40MHz)	26T	MCS0	19.10
	5290	58	ax (80MHz)	26T	MCS0	27.63
	5500	100	ax (20MHz)	26T	MCS0	19.92
	5600	120	ax (20MHz)	26T	MCS0	18.32
	5720	144	ax (20MHz)	26T	MCS0	18.78
SC	5510	102	ax (40MHz)	26T	MCS0	19.60
Band	5590	118	ax (40MHz)	26T	MCS0	19.28
Ba	5710	142	ax (40MHz)	26T	MCS0	22.42
	5530	106	ax (80MHz)	26T	MCS0	19.30
	5610	122	ax (80MHz)	26T	MCS0	19.37
	5690	138	ax (80MHz)	26T	MCS0	20.24

Table 7-2. Conducted Bandwidth Measurements SISO ANT1 (26 Tones)

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Plot 7-1. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 36)



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

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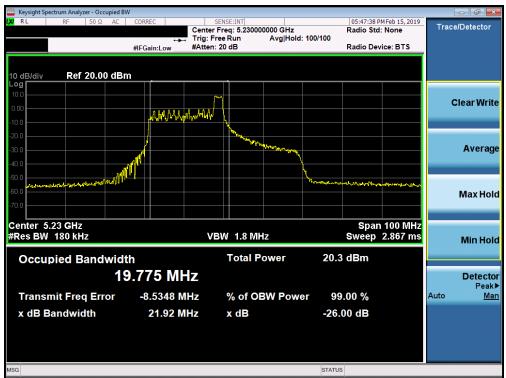
Plot 7-3. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 48)



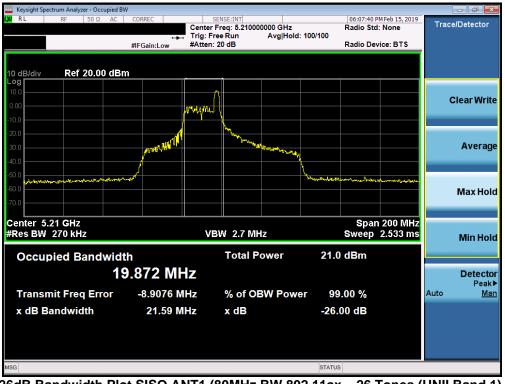
Plot 7-4. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 38)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-5. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 46)



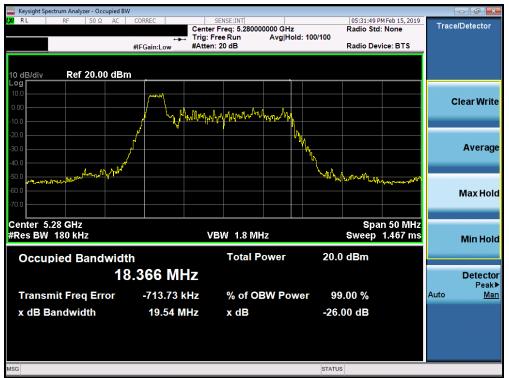
Plot 7-6. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 42)

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Plot 7-7. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 52)



Plot 7-8. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 56)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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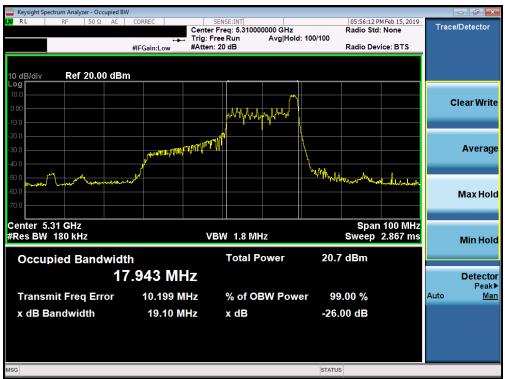
Plot 7-9. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 64)



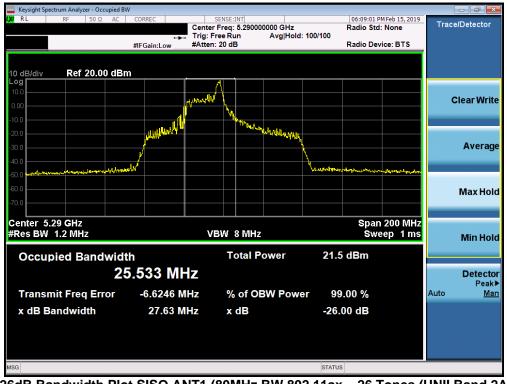
Plot 7-10. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 54)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-11. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 62)



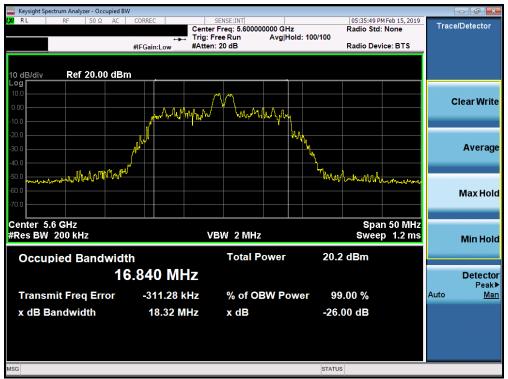
Plot 7-12. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax – 26 Tones (UNII Band 2A) – Ch. 58)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-13. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 100)

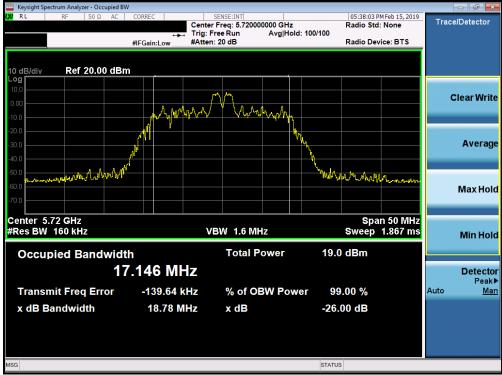


Plot 7-14. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 120)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-15. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 144)



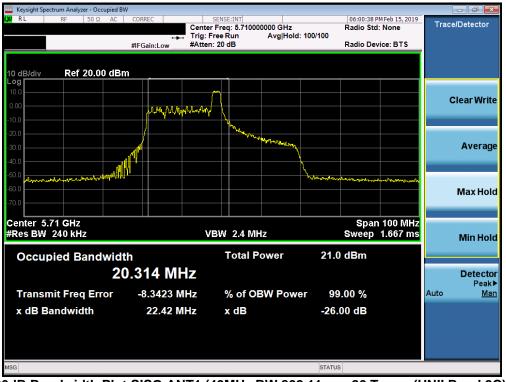
Plot 7-16. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 102)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occupied BW					
024 RL RF 50 Ω AC	Center		05:59:18 F Radio Sto d: 100/100 Radio Der		Trace/Detector
10 dB/div Ref 20.00 dBm					
Log 10.0 0.00 -10.0		anto Ahyaldand			Clear Write
-20.0 -30.0 -40.0	A A A A A A A A A A A A A A A A A A A	η	h and h wind name		Average
-50.0	M ²		ⁱ wrYlw ^w Hyllylwrylyr	₩₩₽₩₩₩₩₩₩₩₩₩₩	Max Hold
Center 5.59 GHz #Res BW 160 kHz		BW 1.6 MHz	Sweep	100 MHz 3.667 ms	Min Hold
	.832 MHz	Total Power	21.2 dBm		Detector Peak▶
Transmit Freq Error x dB Bandwidth	10.219 MHz 19.28 MHz	% of OBW Pow x dB	er 99.00 % -26.00 dB		Auto <u>Man</u>
MSG			STATUS		

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



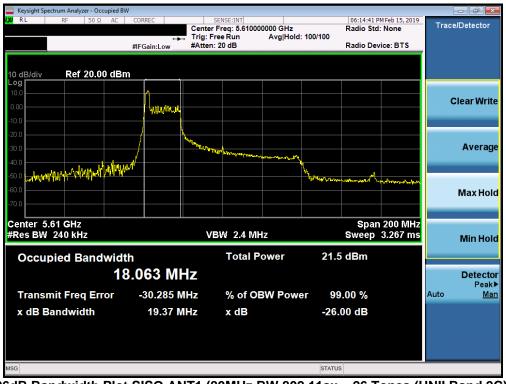
Plot 7-18. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 142)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BW						
LX/ RL RF 50Ω AC C	CORREC Cen	SENSE:INT ter Freg: 5.530000000 GHz	06:13:24	PM Feb 15, 2019	Trace/Dete	ctor
	+++ Trig	: Free Run Avg Hold:	100/100			
#	IFGain:Low #Att	en: 20 dB	Radio De	vice: BTS		
10 dB/div Ref 20.00 dBm						
10.0	- <u>^</u>					
0.00	h, Wh, Mr. H				Clear	Write
-10.0	and the second					_
-20.0						
-30.0		Mund			Ave	erage
-40.0		and second and a second s				
-50.0 www.halantantantantantantantantantantantantanta			Hutman Marson My			
-60.0			and the second	a forestand and the	Мах	Hold
-70.0					Mux	noid
Center 5.53 GHz #Res BW 240 kHz		VBW 2.4 MHz		1 200 MHz 3.267 ms		
THE DIVE 240 KHZ			Sweep	J.207 IIIS	Min	Hold
Occupied Bandwidth		Total Power	21.1 dBm			
	976 MHz				Det	ector
					I	Peak▶
Transmit Freq Error	-30.325 MHz	% of OBW Powe	r 99.00 %		Auto	<u>Man</u>
x dB Bandwidth	19.30 MHz	x dB	-26.00 dB			
MSG			STATUS			

Plot 7-19. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 106)



Plot 7-20. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 122)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 00 at 005	
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	ctrum Analyzer												
LXI RL	RF 5	50Ω)	AC O	ORREC			NSE:INT eq: 5.69000	0000 GHz		06:15:58 F	M Feb 15, 2019	Trac	e/Detector
						Total Free	Run	Avg Hold	: 100/100	Radio Dev	vice: BTS		
,			#1	FGain:l	LOW	#Atten. 2				Radio Dev	/ice. B13		
10 dB/div	Ref 2	0 0 0 4	IRm										
Log		0.00 (
10.0													Clear Write
0.00								Mandan					
-10.0													
-20.0								l	l,				Average
-30.0				, nh.vi	www.www				A Malla see				Average
-40.0	r^		لمان	x					A MARKED	n Million Andre	Marthall		
-50.0	when a ferrer	Concertion of the	poles Milling								d a sa shi ta firak		
-50.0													Max Hold
-70.0													
Center 5.											1 200 MHz		
#Res BW	270 KHZ					VBI	V 2.7 MH	IZ		Sweep	2.533 ms		Min Hold
Occur	bied Ba	ndw	idth				Total P	ower	21.7	dBm			
				252	Mŀ	17							Detector
			10.7	200									Peak►
Transr	nit Freq	Erro	٢	30.2	250 M	Hz	% of O	3W Pow	er 99	.00 %		Auto	<u>Man</u>
x dB B	andwidt	h		20	.24 M	Hz	x dB		-26.	00 dB			
MSG									STATUS				

Plot 7-21. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax – 26 Tones (UNII Band 2C) – Ch. 138)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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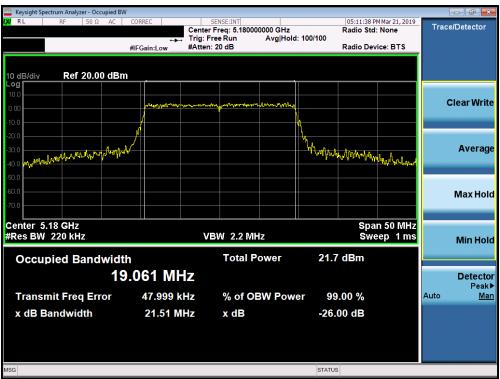
SISO Antenna-1 26 dB Bandwidth Measurements (Full Tones)

	Frequency [MHz]	Channel No.	802.11 Mode	Tones	Data Rate [Mbps]	Measured 26dB Bandwidth [MHz]
	5180	36	ax (20MHz)	242T	MCS0	21.51
_	5200	40	ax (20MHz)	242T	MCS0	21.39
1 pt	5240	48	ax (20MHz)	242T	MCS0	21.34
Band 1	5190	38	ax (40MHz)	484T	MCS0	39.80
	5230	46	ax (40MHz)	484T	MCS0	39.81
	5210	42	ax (80MHz)	996T	MCS0	81.04
	5260	52	ax (20MHz)	242T	MCS0	21.77
۲	5280	56	ax (20MHz)	242T	MCS0	21.54
d 2,	5320	64	ax (20MHz)	242T	MCS0	21.61
Band 2A	5270	54	ax (40MHz)	484T	MCS0	40.06
ш	5310	62	ax (40MHz)	484T	MCS0	40.02
	5290	58	ax (80MHz)	996T	MCS0	80.77
	5500	100	ax (20MHz)	242T	MCS0	21.50
	5600	120	ax (20MHz)	242T	MCS0	21.74
	5720	144	ax (20MHz)	242T	MCS0	22.29
5C	5510	102	ax (40MHz)	484T	MCS0	40.18
Band 2C	5590	118	ax (40MHz)	484T	MCS0	39.79
Ba	5710	142	ax (40MHz)	484T	MCS0	39.60
	5530	106	ax (80MHz)	996T	MCS0	80.77
	5610	122	ax (80MHz)	996T	MCS0	81.30
	5690	138	ax (80MHz)	996T	MCS0	81.00

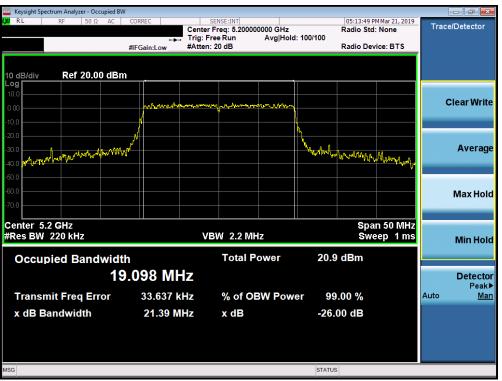
Table 7-3. Conducted Bandwidth Measurements SISO ANT1 (Full Tones)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 20 of 205	
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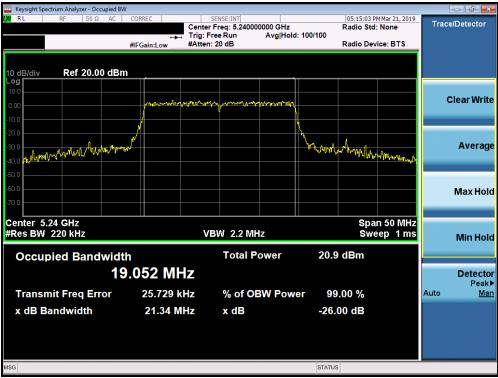
Plot 7-22. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - Full Tones (UNII Band 1) - Ch. 36)



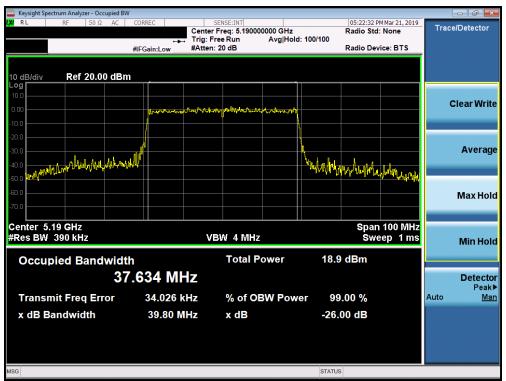
Plot 7-23. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - Full Tones (UNII Band 1) - Ch. 40)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:		Page 29 of 285			
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Plot 7-24. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - Full Tones (UNII Band 1) - Ch. 48)



Plot 7-25. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - Full Tones (UNII Band 1) - Ch. 38)

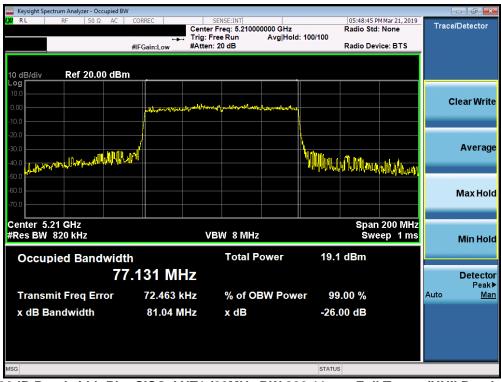
FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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	🧱 Keysight Spectrum Analyzer - Occupied BW								
LX/ RL RF 50 Ω	AC CORREC	SENSI Center Fred		000 GHz		05:23:03 P	Mar 21, 2019	Trac	e/Detector
	•	📕 Trig: Free F	Run	Avg Hold	i: 100/100				
	#IFGain:Low	#Atten: 20 d	dB			Radio Dev	ice: BTS		
10 dB/div Ref 20.00) dBm			,					
Log 10.0									
0.00	athetes	an shale determined	1. Annahanah	W. Martin Martin				(Clear Write
-10.0	and the second se	and the second se		a configuration for					
-20.0									
-30.0	J				ļ				Average
-40.0	www.ch				Nata da	ي م ا	. 1		
-40.0 -50.0 Will Well with the many mill					ALC: NO PROVIDE A PROVIDA PROVIDE A PROVIDA PROVIDE A PROVIDE A PROVIDE A PROVIDE A PROVIDA PROV	$A_{\mu\nu}$	(Holor Marting		
-60.0									
									Max Hold
-70.0									
Center 5.23 GHz						Span	100 MHz		
#Res BW 390 kHz		VBW	4 MHz			Swe	ep 1 ms		Min Hold
		_	Total Po	owor	40.4	dBm			
Occupied Bandy			TOTAL PO	Jwei	19.1	иып			
	37.554 N	IHZ							Detector
Transmit Freq Erro	or 26.337	kHz 🤋	% of OE	W Pow	er 99	.00 %		Auto	Peak▶ <u>Man</u>
x dB Bandwidth	39.81		k dB		-26 (00 dB			
	59.01	WIFIZ A	K U D		-20.	JU UB			
MSG					STATUS				

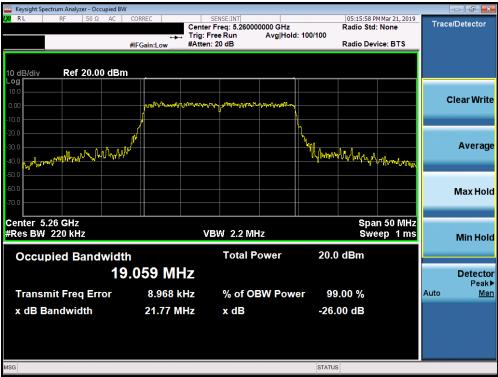
Plot 7-26. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - Full Tones (UNII Band 1) - Ch. 46)



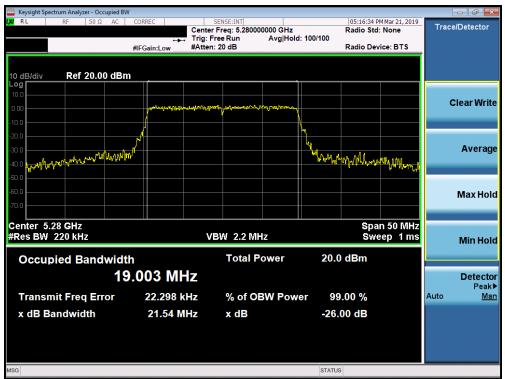
Plot 7-27. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax - Full Tones (UNII Band 1) - Ch. 42)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager			
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Plot 7-28. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax – Full Tones (UNII Band 2A) – Ch. 52)



Plot 7-29. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - Full Tones (UNII Band 2A) - Ch. 56)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 295
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🔤 Keysight Spectrum Analyzer - Occupie	ed BW						
<mark>LX/</mark> RL RF 50Ω A		SENSE:INT	0000 GHz	05:17:03 P Radio Std	M Mar 21, 2019	Trace	e/Detector
		Trig: Free Run	Avg Hold: 100/100				
	#IFGain:Low	fAtten: 20 dB		Radio Dev	ice: BTS		
10 dB/div Ref 20.00 d	IBm						
Log 10.0							
0.00	a drawnad ar lada	warner when her	man 65% ~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~			C	lear Write
		· · · · · · · · · · · · · · · · · · ·	1				
-10.0	<u></u>						
-20.0			1 N.				
-30.0 -40.0 Blastorelfard writer Monard	mohund		M. March	www.			Average
1. market				······································	APA PURALITAN		
-50.0							
-60.0							Max Hold
-70.0							
				0			
Center 5.32 GHz #Res BW 220 kHz		VBW 2.2 MH	7	Spa Swe	n 50 MHz ep 1 ms		
TRCS DW 220 KHZ		VDVV 2.2 IVII	12	OWC	ср т шэ		Min Hold
Occupied Bandwi	idth	Total P	ower 20	.5 dBm			
	19.069 MHz						Detector
		4					Peak ►
Transmit Freq Error	39.362 kH	z % of Ol	BW Power 9	99.00 %		Auto	Man
x dB Bandwidth	21.61 MH	z xdB	-2	6.00 dB			
	211011111		_				
			0743	110			
MSG			STAT	105			

Plot 7-30. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - Full Tones (UNII Band 2A) - Ch. 64)



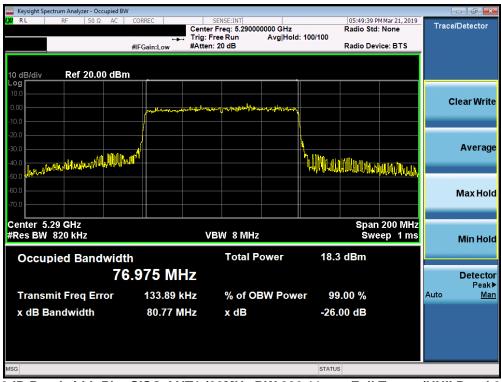
Plot 7-31. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - Full Tones (UNII Band 2A) - Ch. 54)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occu	pied BW					
LX RL RF 50 Ω	AC CORREC	SENSE:INT Center Freg: 5.310000	000 GHz	05:24:01 PM Mar Radio Std: Nor		Trace/Detector
	- -	Trig: Free Run	Avg Hold: 100/100			
	#IFGain:Low	#Atten: 20 dB		Radio Device:	BTS	
10 dB/div Ref 20.00	dBm					
Log 10.0						
0.00						Clear Write
-10.0	- Mety control	ember of prominented	A A B B B B B B B B B B B B B B B B B B			
-20.0						
-30.0			ì			Average
						Average
-40.0	Wellywilling		"WWW/WW	ANN MANY	AMARA	
-50.0					to i date	
-60.0						Max Hold
-70.0						
Center 5.31 GHz				Span 10		
#Res BW 390 kHz		VBW 4 MHz		Sweep		Min Hold
			10.0			
Occupied Bandy		Total Po	ower 18.8	d Bm		
	37.533 MH	Z				Detector
T			W D			Peak▶ uto Man
Transmit Freq Erro			W Power 99	.00 %	<i>P</i>	luto <u>ivian</u>
x dB Bandwidth	40.02 MH	z xdB	-26.	00 dB		
MSG			STATUS	3		

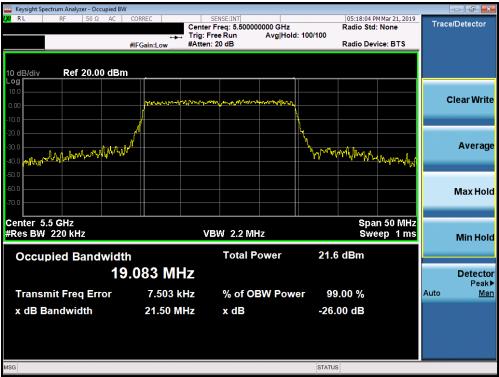
Plot 7-32. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - Full Tones (UNII Band 2A) - Ch. 62)



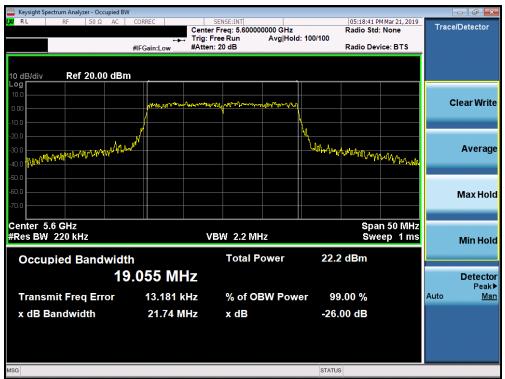
Plot 7-33. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax - Full Tones (UNII Band 2A) - Ch. 58)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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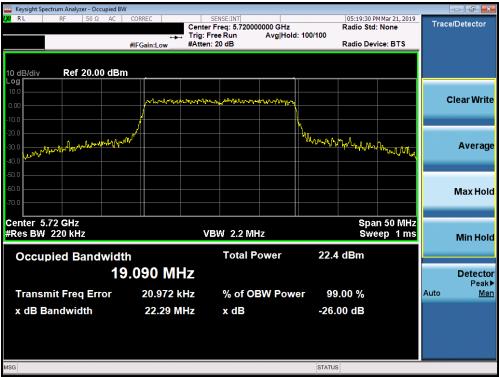
Plot 7-34. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - Full Tones (UNII Band 2C) - Ch. 100)



Plot 7-35. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - Full Tones (UNII Band 2C) - Ch. 120)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-36. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - Full Tones (UNII Band 2C) - Ch. 144)



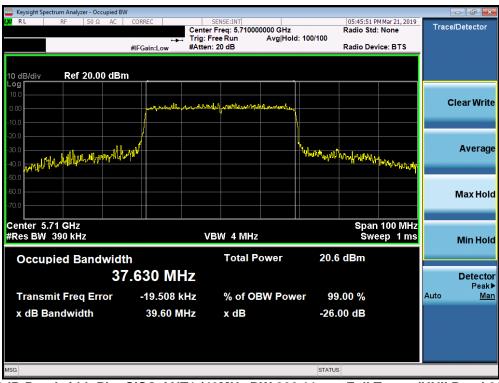
Plot 7-37. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - Full Tones (UNII Band 2C) - Ch. 102)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyze	r - Occupied BW									
LXI RE RE		REC Gain:Low	Center Fr			d: 100/100	05:25:40 P Radio Std: Radio Dev		Trac	e/Detector
10 dB/div Ref 2	20.00 dBm					1				
0.00		andrain	be manage	manne	๚ <mark>๗๛๛</mark> ๙๛๛๛๛					Clear Write
-10.0 -20.0 -30.0 -40.0	wellingen fr					hunder water	un higging	The work and a		Average
-50.0										Max Hold
Center 5.59 GHz #Res BW 390 kHz			VBV	N 4 MHz				100 MHz ep 1 ms		Min Hold
Occupied Ba	ndwidth			Total P	ower	20.1	dBm			
		91 MI								Detector Peak▶
Transmit Freq	Error	23.209 k	Hz	% of OE	3W Pow	ver 99	.00 %		Auto	<u>Man</u>
x dB Bandwidt	th	39.79 M	IHz	x dB		-26.	00 dB			
MSG						STATUS	;			

Plot 7-38. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - Full Tones (UNII Band 2C) - Ch. 118)



Plot 7-39. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - Full Tones (UNII Band 2C) - Ch. 142)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupier	d BW					- • •
Ι XI RF 50 Ω AC	Cente	SENSE:INT er Freq: 5.530000000 GHz Free Run Avg Hold	05:50:27 P Radio Std d: 100/100	M Mar 21, 2019 : None	Trace/I	Detector
		en: 20 dB	Radio Dev	/ice: BTS		
10 dB/div Ref 20.00 d	Bm					
10.0						
0.00	Released and realized in the	had a group of the state of the			CI	ear Write
-10.0						_
-20.0						
-30.0			λ			Average
-40.0 Jason Alart Brown Alart Brown	nn an a			and the second		
-50.0			A hard distributed for	artin dika Martin		
-60.0					ſ	Max Hold
-70.0						Maxinora
				000 1411-		
Center 5.53 GHz #Res BW 820 kHz		VBW 8 MHz		1200 MHz eep 1 ms		
						Min Hold
Occupied Bandwi	dth	Total Power	18.4 dBm			
	76.871 MHz					Detector
Transmit Freq Error	-21.439 kHz	% of OBW Pow	ver 99.00 %		Auto	Peak▶ <u>Man</u>
x dB Bandwidth	80.77 MHz	x dB	-26.00 dB			
			20100-012			
MSG			STATUS			

Plot 7-40. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax - Full Tones (UNII Band 2C) - Ch. 106)



Plot 7-41. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax - Full Tones (UNII Band 2C) - Ch. 122)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager		
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Keysight Spectrum Analyzer - Occupied BW									- 6 ×
LXI RL RF 50 Ω AC COR	REC		ISE:INT eq: 5.69000	0000 GHz		05:51:56 P	Mar 21, 2019	Trac	e/Detector
	• • -	Trig: Free	Run	Avg Hold	i: 100/100				
#IFG	Sain:Low	#Atten: 20) dB			Radio Dev	ice: BTS		
10 dB/div Ref 20.00 dBm Log	·								
10.0									
0.00	Annoration	dar have a hiller of		-lagrant of the last					Clear Write
-10.0									
-20.0]				
-30.0									Average
-40.0 Marshar Marshar all William -40.0					14 Under to	a MAN John and	abhait he saba		
-50.0							ann ar-Windhah		
-60.0									May Hold
-70,0									Max Hold
Center 5.69 GHz							200 MHz		
#Res BW 820 kHz		VBV	V 8 MHz			Swe	ep 1 ms		Min Hold
Occupied Bandwidth			Total P	ower	19.4	dBm			
		-							
//.0	15 MH	Z							Detector Peak▶
Transmit Freq Error	87.726 kl	Hz	% of OE	BW Pow	er 99	.00 %		Auto	Man
x dB Bandwidth	81.00 MH	Hz	x dB		-26.	00 dB			
MSG					STATUS				

Plot 7-42. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax – Full Tones (UNII Band 2C) – Ch. 138)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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SISO Antenna-2 26dB Bandwidth Measurements (26 Tones)

	Frequency [MHz]	Channel No.	802.11 Mode	Tones	Data Rate [Mbps]	Measured 26dB Bandwidth [MHz]
	5180	36	ax (20MHz)	26T	MCS0	19.59
_	5200	40	ax (20MHz)	26T	MCS0	18.86
1 pr	5240	48	ax (20MHz)	26T	MCS0	19.16
Band 1	5190	38	ax (40MHz)	26T	MCS0	19.10
	5230	46	ax (40MHz)	26T	MCS0	22.71
	5210	42	ax (80MHz)	26T	MCS0	19.43
	5260	52	ax (20MHz)	26T	MCS0	18.97
۷	5280	56	ax (20MHz)	26T	MCS0	20.79
Band 2A	5320	64	ax (20MHz)	26T	MCS0	20.50
Ban	5270	54	ax (40MHz)	26T	MCS0	19.26
ш	5310	62	ax (40MHz)	26T	MCS0	19.37
	5290	58	ax (80MHz)	26T	MCS0	20.07
	5500	100	ax (20MHz)	26T	MCS0	18.72
	5600	120	ax (20MHz)	26T	MCS0	20.64
	5720	144	ax (20MHz)	26T	MCS0	18.66
2C	5510	102	ax (40MHz)	26T	MCS0	19.97
Band 2C	5590	118	ax (40MHz)	26T	MCS0	19.80
Ba	5710	142	ax (40MHz)	26T	MCS0	19.14
	5530	106	ax (80MHz)	26T	MCS0	21.85
	5610	122	ax (80MHz)	26T	MCS0	19.31
	5690	138	ax (80MHz)	26T	MCS0	20.59

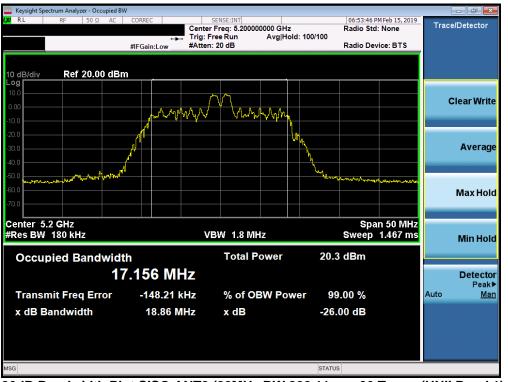
Table 7-4. Conducted Bandwidth Measurements SISO ANT2 (26 Tones)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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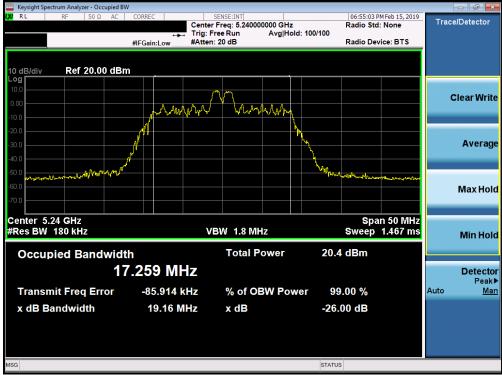
Plot 7-43. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 36)



Plot 7-44. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 40)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 41 of 205	
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Plot 7-45. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 48)



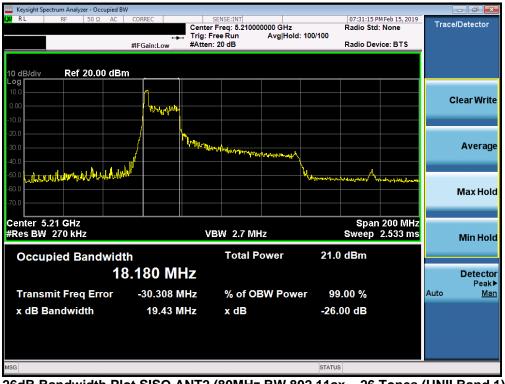
Plot 7-46. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 38)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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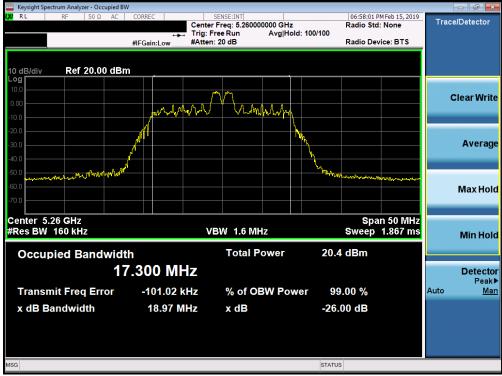
Plot 7-47. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 46)



Plot 7-48. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax – 26 Tones (UNII Band 1) – Ch. 42)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 42 of 285	
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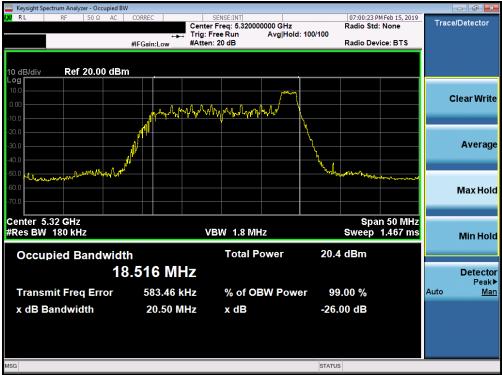
Plot 7-49. 26dB Bandwidth Plot SISO ANT2 (20 MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 52)



Plot 7-50. 26dB Bandwidth Plot SISO ANT2 (20 MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 56)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Plot 7-51. 26dB Bandwidth Plot SISO ANT2 (20 MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 64)



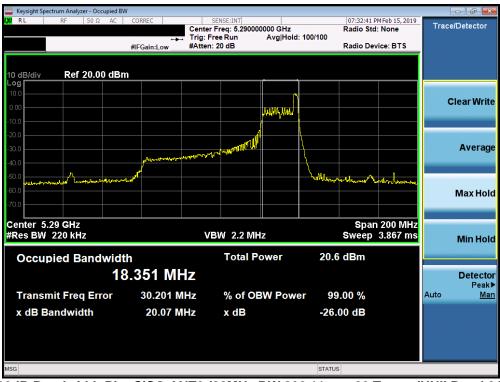
Plot 7-52. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 54)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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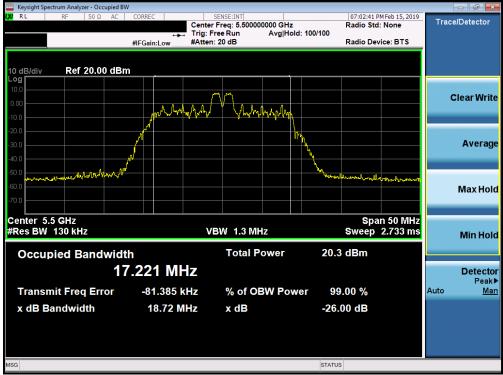
Plot 7-53. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 62)



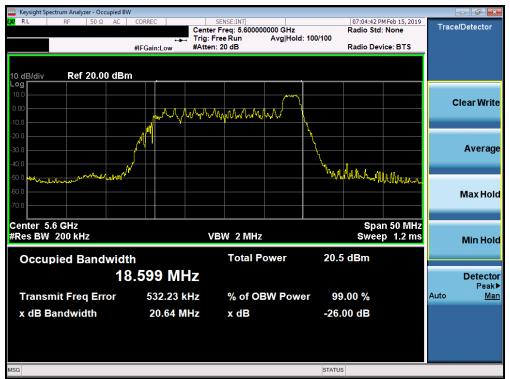
Plot 7-54. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 58)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 46 of 205
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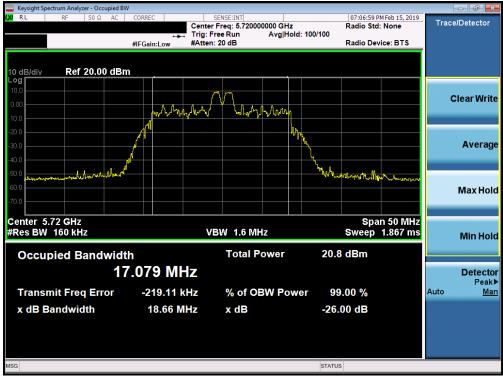
Plot 7-55. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 100)



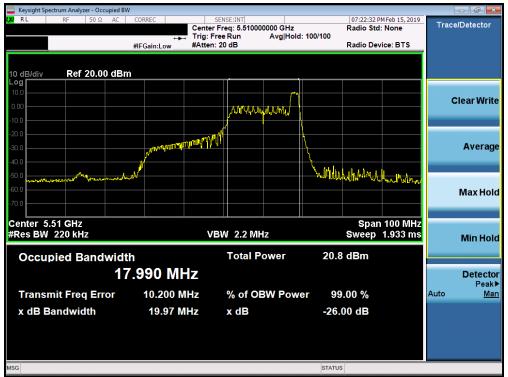
Plot 7-56. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 120)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-57. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 144)



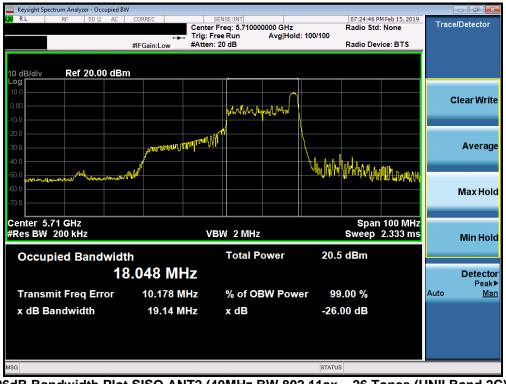
Plot 7-58. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 102)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BW					
IXI RL RF 50Ω AC	Trig: F	SENSE:INT r Freq: 5.590000000 GHz Free Run Avg Holo n: 20 dB	07:23:47 F Radio Std d: 100/100 Radio Dev		Trace/Detector
10 dB/div Ref 20.00 dBm					
0.00		Martin			Clear Write
-10.0 -20.0 -30.0 -40.0	A CONTRACTION TO THE TO THE	үр ^а (Average
-50.0 	Jell		M.M.M.M.	AMAMAMAN	Max Hold
Center 5.59 GHz #Res BW 200 kHz	v	BW 2 MHz		100 MHz 2.333 ms	Min Hold
Occupied Bandwidth 18	י .061 MHz	Total Power	20.6 dBm		Detector Peak▶
Transmit Freq Error	10.151 MHz	% of OBW Pow	er 99.00 %		Auto <u>Man</u>
x dB Bandwidth	19.80 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-59. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 118)



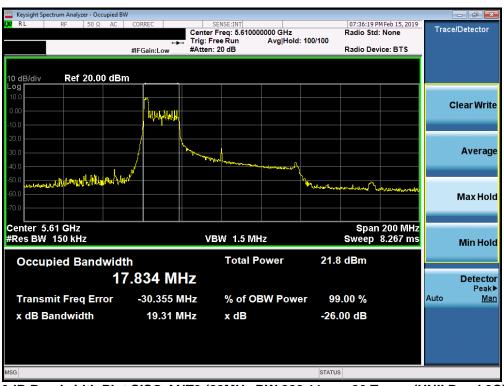
Plot 7-60. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 142)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 40 of 005	
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Plot 7-61. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 106)



Plot 7-62. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 122)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 50 of 295
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Keysight Spectrum Analyzer - Occupied B\							
LX RL RF 50Ω AC	CORREC	SENSE:INT ter Freg: 5.690000000	GHz	07:38:05 P Radio Std	M Feb 15, 2019	Trace	/Detector
	+++ Trig	: Free Run Ave	Hold: 100/100				
	#IFGain:Low #At	ten: 20 dB		Radio Dev	vice: BTS		
10 dB/div Ref 20.00 dBr	<u>n</u>						
10.0			<u>n</u>				
0.00			JUN			C	lear Write
-10.0							
-20.0			<u>}</u>				
-30.0	Males	and all the second second					Average
-40.0				Whiteman	WAR WAR		
-50.0 males marken the marken with	<i>\</i> ,₩			a lada I da	min many		
-60.0							Max Hold
-70.0							
Center 5.69 GHz				Cnar	1 200 MHz		
#Res BW 270 kHz		VBW 2.7 MHz			2.533 ms		Min Hold
Occupied Bandwidt	th	Total Powe	r 21.9) dBm			
18	3.614 MHz						Detector
	30.092 MHz	% of OBW I		9.00 %		Auto	Peak▶ Man
Transmit Freq Error						Auto	IVIAII
x dB Bandwidth	20.59 MHz	x dB	-26.	00 dB			
MSG			STATUS	S			

Plot 7-63. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax – 26 Tones (UNII Band 2C) – Ch. 138)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 51 of 205
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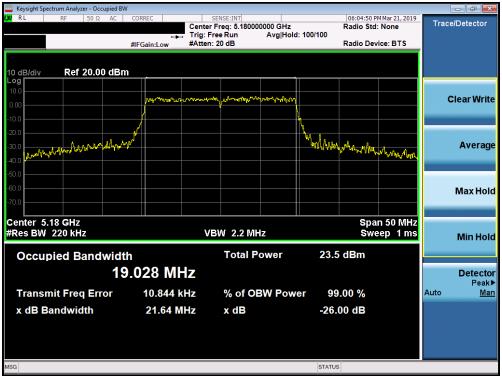
SISO Antenna-2 26 dB Bandwidth Measurements (Full Tones)

	Frequency [MHz]	Channel No.	802.11 Mode	Tones	Data Rate [Mbps]	Measured 26dB Bandwidth [MHz]
	5180	36	ax (20MHz)	242T	MCS0	21.64
	5200	40	ax (20MHz)	242T	MCS0	21.58
Band 1	5240	48	ax (20MHz)	242T	MCS0	21.92
Bar	5190	38	ax (40MHz)	484T	MCS0	40.06
	5230	46	ax (40MHz)	484T	MCS0	40.27
	5210	42	ax (80MHz)	996T	MCS0	81.43
	5260	52	ax (20MHz)	242T	MCS0	21.69
∢	5280	56	ax (20MHz)	242T	MCS0	21.71
d 2	5320	64	ax (20MHz)	242T	MCS0	21.68
Band 2A	5270	54	ax (40MHz)	484T	MCS0	39.87
ш	5310	62	ax (40MHz)	484T	MCS0	40.17
	5290	58	ax (80MHz)	996T	MCS0	81.26
	5500	100	ax (20MHz)	242T	MCS0	21.53
	5600	120	ax (20MHz)	242T	MCS0	21.93
	5720	144	ax (20MHz)	242T	MCS0	22.12
5C	5510	102	ax (40MHz)	484T	MCS0	40.15
Band 2C	5590	118	ax (40MHz)	484T	MCS0	40.16
Ba	5710	142	ax (40MHz)	484T	MCS0	40.26
	5530	106	ax (80MHz)	996T	MCS0	81.36
	5610	122	ax (80MHz)	996T	MCS0	81.19
	5690	138	ax (80MHz)	996T	MCS0	81.04

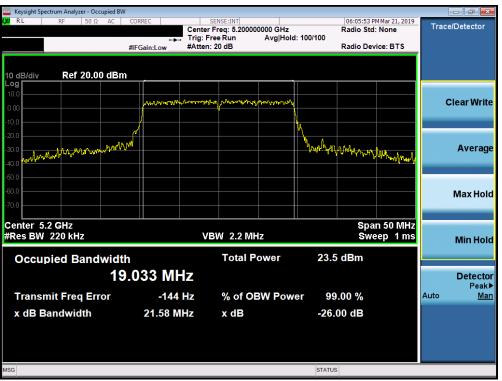
Table 7-5. Conducted Bandwidth Measurements SISO ANT2 (Full Tones)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	AMSUNG	Approved by: Quality Manager	
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Plot 7-64. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - Full Tones (UNII Band 1) - Ch. 36)



Plot 7-65. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - Full Tones (UNII Band 1) - Ch. 40)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 52 of 205
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Plot 7-66. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - Full Tones (UNII Band 1) - Ch. 48)



Plot 7-67. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - Full Tones (UNII Band 1) - Ch. 38)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage E4 of 205
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Keysight Spectrum Analyzer - Occu	pied BW								
Ι,ΧΙ R F 50 Ω	AC CORREC	SENSE:INT Center Freq: 5.230000 Trig: Free Run	0000 GHz Avg Hold: 100/100	06:15:10 PM Mar 21, 2 Radio Std: None	Trace/D	etector			
	#FGain:Low #Atten: 20 dB Radio Device: BTS								
10 dB/div Ref 20.00	dBm								
10.0 0.00		making making making			Cle	ar Write			
-10.0									
-30.0 -40.0	Hrad M		- VILANN	Malling and the second		Average			
-50.0						ax Hold			
Center 5.23 GHz				Span 100 M		_			
#Res BW 390 kHz		VBW 4 MHz		Sweep 1 r	ns N	lin Hold			
Occupied Bandy		Total Po	ower 21.6	dBm					
	37.707 MH					Detector Peak►			
Transmit Freq Erro	or 47.376 kl	Hz % of OE	3W Power 99	.00 %	Auto	<u>Man</u>			
x dB Bandwidth	40.27 Mł	Hz x dB	-26.0	00 dB					
MSG			STATUS						

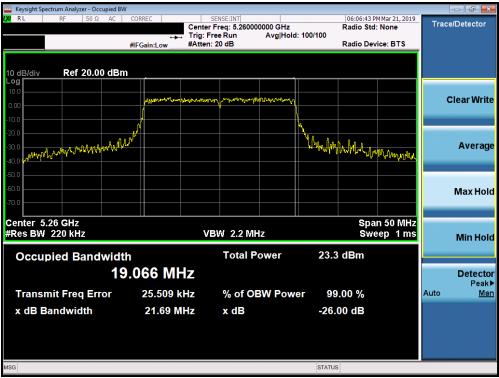
Plot 7-68. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - Full Tones (UNII Band 1) - Ch. 46)



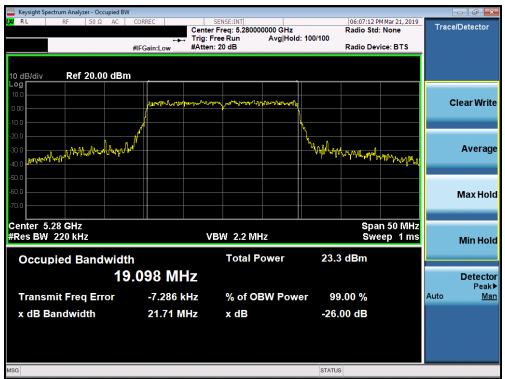
Plot 7-69. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax - Full Tones (UNII Band 1) - Ch. 42)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage FE of 205
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Plot 7-70. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax – Full Tones (UNII Band 2A) – Ch. 52)



Plot 7-71. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - Full Tones (UNII Band 2A) - Ch. 56)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage FC of 205
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Keysight Spectrum Analyzer - Occupied BW							
LXX RL RF 50Ω AC	CORREC	SENSE:INT Center Freg: 5.32000	0000 GHz	06:07:46 PI Radio Std:	Mar 21, 2019	Trac	e/Detector
		Trig: Free Run	Avg Hold: 100/100				
	#IFGain:Low	#Atten: 20 dB		Radio Dev	ice: BTS		
10 dB/div Ref 20.00 dBm							
Log 10.0							
0.00	montheresting	mark of marking	munshing			(Clear Write
-10.0	1						
-20.0			h,				
	/		Silui - A	1.			Average
-30.0 40.0 40.0 40.0 40.0 40.0 40.0 40.0			- All	han whith	MANUMAN		Average
-50.0							
-60.0							Max Hold
-70.0							
Center 5.32 GHz			I II	Spa	n 50 MHz		
#Res BW 220 kHz		VBW 2.2 MF	Iz		ep 1 ms		Min Hold
				A 15			Minificia
Occupied Bandwidth		Total P	ower 23.	.6 dBm			
19	.113 MH	Z					Detector
							Peak►
Transmit Freq Error	36.296 kH	z % of OE	3W Power 9	9.00 %		Auto	Man
x dB Bandwidth	21.68 MH	z xdB	-26	i.00 dB			
MSG			STAT	US			

Plot 7-72. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - Full Tones (UNII Band 2A) - Ch. 64)



Plot 7-73. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - Full Tones (UNII Band 2A) - Ch. 54)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 57 of 205
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Keysight Spectrum Analyzer - Occupied	BW				
LX RL RF 50 Ω AC	Cent Trig:	SENSE:INT er Freq: 5.310000000 GHz Free Run Avg Hold	Radio Std : 100/100		Trace/Detector
	#IFGain:Low #Atte	en: 20 dB	Radio Dev	vice: BTS	
10 dB/div Ref 20.00 dE	3m				
0.00	harrow and the second second	when Malowellowing and a factor			Clear Write
-10.0					
-30.0			h hha a haad d		Average
-50.0			VWwww.ml.n ⁺ WU _m m _n ty	nd winder was	
-70.0					Max Hold
Center 5.31 GHz #Res BW 390 kHz		VBW 4 MHz		100 MHz eep 1 ms	Min Hold
Occupied Bandwid		Total Power	21.5 dBm		
	37.526 MHz				Detector Peak▶
Transmit Freq Error	63.222 kHz	% of OBW Powe	er 99.00 %		Auto <u>Man</u>
x dB Bandwidth	40.17 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-74. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - Full Tones (UNII Band 2A) - Ch. 62)



Plot 7-75. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax - Full Tones (UNII Band 2A) - Ch. 58)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BW							- 0 ×
LXX RL RF 50Ω AC		SENSE:INT Center Freq: 5.500000 Frig: Free Run	0000 GHz Avg Hold: 100/100	06:09:51 P Radio Std	M Mar 21, 2019 : None	Trace	Detector
	#IFGain:Low #	Atten: 20 dB		Radio Dev	vice: BTS		
10 dB/div Ref 20.00 dBm							
	Mummun	production of many many many and	unhanonya			c	lear Write
-10.0							
-30.0 www.m.m.h.m.h.m.a.	v 		<u></u>	when the start of	wilwer with		Average
-50.0							
-70.0							Max Hold
Center 5.5 GHz #Res BW 220 kHz		VBW 2.2 MH	z		n 50 MHz ep 1 ms		Min Hold
Occupied Bandwidth	ı	Total Po	ower 23	3.7 dBm			
	.035 MHz						Detector Peak▶
Transmit Freq Error	6.249 kH	z % of OE	BW Power	99.00 %		Auto	<u>Man</u>
x dB Bandwidth	21.53 MH	z x dB	-2	6.00 dB			
MSG			STA	TUS			

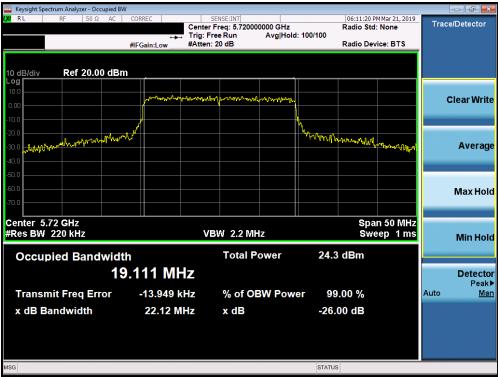
Plot 7-76. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - Full Tones (UNII Band 2C) - Ch. 100)



Plot 7-77. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - Full Tones (UNII Band 2C) - Ch. 120)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-78. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - Full Tones (UNII Band 2C) - Ch. 144)



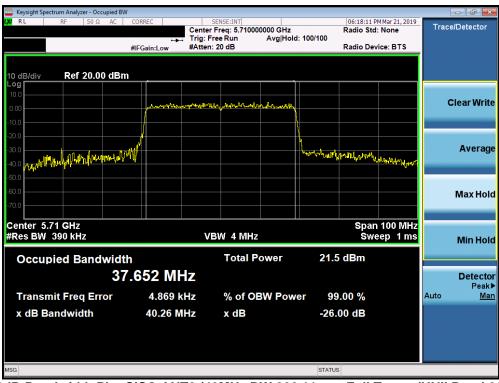
Plot 7-79. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - Full Tones (UNII Band 2C) - Ch. 102)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 60 of 205
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Keysight Spectrum	Analyzer - Occ	cupied BW									
LX/RL R	F 50 Ω	AC COR	REC		NSE:INT req: 5.59000	0000 GHz		06:17:42 P Radio Std	M Mar 21, 2019	Trac	e/Detector
			·→-	. Trig: Free	e Run		d: 100/100				
	#IFGain:Low #Atten: 20 dB Radio Device: BTS										
10 dB/div Log	Ref 20.0	0 dBm	·								
10.0											
0.00			moundar	monderel	manhan	mllwhat				(Clear Write
-10.0							1				
-20.0											
20.0		los (l _{ala} .				Average
-40.0	MANAM	mpymm					M VI M M	MANAN	Դավով շել է		
-40.0 July 10 pri - -50.0							1 10		A MULLING AND		
-50.0											
											Max Hold
-70.0											
Center 5.59	GHz							Span	100 MHz		
#Res BW 39	0 kHz			VB	N/4 MHz			Swe	ep 1 ms		Min Hold
Occurrie	d Dand	u di al fila			Total P	ower	21.9	dBm			
Occupie	d Band			-	TOLATE	ower	21.0	UDIII			
		37.5	82 MI	Z							Detector
Transmit	Freq Err	or	9.452 k	Hz	% of O	BW Pow	ver 99	.00 %		Auto	Peak▶ <u>Man</u>
x dB Band	dwidth		40.16 M	Hz	x dB		-26.	00 dB			
							201				
MSG							STATUS				
							UNATOS				

Plot 7-80. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - Full Tones (UNII Band 2C) - Ch. 118)



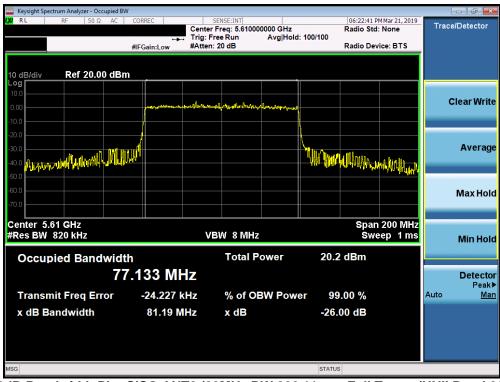
Plot 7-81. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - Full Tones (UNII Band 2C) - Ch. 142)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occupied	BW						
LX/ RL RF 50 Ω AC		SENSE:INT enter Freg: 5.530000	000 GH7	06:22:09 PM Radio Std:	Mar 21, 2019	Trace	e/Detector
	T Lat	rig: Free Run	Avg Hold: 100/100				
	#IFGain:Low #/	Atten: 20 dB		Radio Devi	ice: BTS		
10 dB/div Ref 20.00 dE	3m						
10.0							
0.00	ميهيري المساليون والمراد	wanterthorner				c	Clear Write
-10.0							
-20.0							
-30.0 -40.0 Mar 199 - 40. J. J. Mar 199	L ALL MA		Willin .a	dilla to			Average
	YW.			al House and the second	ally the fill may		
-50.0					and the st		
-60.0							Max Hold
-70.0							
Center 5.53 GHz #Res BW 820 kHz		VBW 8 MHz			200 MHz ep 1 ms		
#RES BW 620 KHZ				Swe	ep ma		Min Hold
Occupied Bandwid	dth	Total Po	wer 20.8	dBm		_	
	7.006 MHz						Detector
							Detector Peak▶
Transmit Freq Error	-427 Hz	% of OB	W Power 99	.00 %		Auto	Man
x dB Bandwidth	81.36 MHz	x dB	-26.	00 dB			
MSG			STATUS				

Plot 7-82. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax - Full Tones (UNII Band 2C) - Ch. 106)



Plot 7-83. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax - Full Tones (UNII Band 2C) - Ch. 122)

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Keysight Spectrum Analyzer - Occupied BW								
LXU RL RF 50Ω AC CO		SENSE:INT Iter Freq: 5.69000 g: Free Run	0000 GHz Avg Hold	1: 100/100	06:23:17 P Radio Std	Mar 21, 2019 None	Trace	e/Detector
#IF		ten: 20 dB			Radio Dev	ice: BTS		
10 dB/div Ref 20.00 dBm								
10.0	month the second states	mayunthaile	helment				c	Clear Write
-10.0								
-20.0 -30.0 -40.0 //14-3.17 0+14. // //////////////////////////////////				WILLIME DALLAN	all Under	MulMupp		Average
-50.0								
-60.0								Max Hold
Center 5.69 GHz #Res BW 820 kHz		VBW 8 MHz				200 MHz ep 1 ms		Min Hold
Occupied Bandwidth		Total P	ower	21.3	dBm			
	35 MHz							Detector Peak▶
Transmit Freq Error	45.093 kHz	% of OE	BW Pow	er 99	.00 %		Auto	<u>Man</u>
x dB Bandwidth	81.04 MHz	x dB		-26.	00 dB			
MSG				STATUS	5			

Plot 7-84. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax – Full Tones (UNII Band 2C) – Ch. 138)

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7.3 6dB Bandwidth Measurement – 802.11ax OFDMA §15.407 (e); RSS-Gen [6.7]

Test Overview and Limit

The bandwidth at 6dB down from the highest in-band spectral density is measured with a spectrum analyzer connected to the antenna terminal while the EUT is operating at its maximum duty cycle, at its maximum power control level, as defined in ANSI C63.10-2013 and KDB 789033 D02 v02r01, and at the appropriate frequencies. The spectrum analyzer's bandwidth measurement function is configured to measure the 6dB bandwidth.

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

Test Procedure Used

ANSI C63.10-2013 – Section 6.9.2 KDB 789033 D02 v02r01 – Section C

Test Settings

- The signal analyzers' automatic bandwidth measurement capability was used to perform the 6dB bandwidth measurement. The "X" dB bandwidth parameter was set to X = 6. The automatic bandwidth measurement function also has the capability of simultaneously measuring the 99% occupied bandwidth. The bandwidth measurement was not influenced by any intermediate power nulls in the fundamental emission.
- 2. RBW = 100 kHz
- 3. VBW <u>></u> 3 x RBW
- 4. Detector = Peak
- 5. Trace mode = max hold
- 6. Sweep = auto couple

Test Setup

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



Figure 7-2. Test Instrument & Measurement Setup

Test Notes

The 6dB Bandwidth measurement for each channel was measured with the fully loaded RU configuration and also the partially loaded RU configuration expected to result in the narrowest 6dB BW.

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SISO Antenna-1 6 dB Bandwidth Measurements (26 Tones)

	Frequency [MHz]	Channel No.	802.11 Mode	Tones	Data Rate [Mbps]	Measured 6dB Bandwidth [MHz]
	5745	149	ax (20MHz)	26T	MCS0	2.11
e	5785	157	ax (20MHz)	26T	MCS0	2.14
	5825	165	ax (20MHz)	26T	MCS0	2.67
Band	5755	151	ax (40MHz)	26T	MCS0	2.11
	5795	159	ax (40MHz)	26T	MCS0	2.16
	5775	155	ax (80MHz)	26T	MCS0	2.29

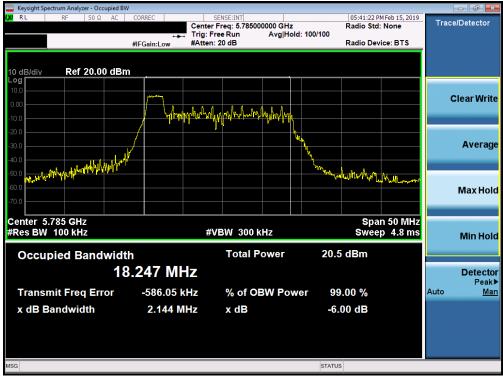
Table 7-6. Conducted Bandwidth Measurements SISO ANT1 (26 Tones)



Plot 7-85. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 3) - Ch. 149)

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Plot 7-86. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 3) - Ch. 157)



Plot 7-87. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 3) - Ch. 165)

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Plot 7-88. 6dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 3) - Ch. 151)



Plot 7-89. 6dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 3) - Ch. 159)

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Keysight Spectr		er - Occu	upied BW										
(X/RL	RF	50 Ω	AC	CORREC			NSE:INT	000000 GHz		06:17:49 F	M Feb 15, 2019	Trac	e/Detector
					→-	. Trig: Fre	e Run	Avg Hold:	100/100				
				#IFGain:I	Low	#Atten: 2	20 dB			Radio Dev	/ice: BTS		
10 dB/div Log	Ref 2	20.00	dBm										
10.0													
0.00													Clear Write
-10.0						MW-MW							
-20.0							<u> </u>						
-30.0					, sel		- where						Average
-40.0				m	and a			and a stranger of the state					-
-50.0				/									
-60.0 entertaile	manun	-	Landarda	New York Street					University	······································	amount		Max Hold
-70.0													Max Hold
Center 5.7										Spar	200 MHz		
#Res BW 1	00 kHz	-				#VI	3W 300	KHZ		Sweep	19.13 ms		Min Hold
Occupi	ed Ba	and	vidt	,			Total	Power	21.3	dBm			
Coccupi				.180		1							B - 4 4
			10	. 100		72							Detector Peak►
Transmi	it Freq	Erro	or	-9.69	979 M	IHz	% of (DBW Powe	er 99	.00 %		Auto	Man
x dB Ba	ndwid	th		2.2	291 M	IHz	x dB		-6	00 dB			
							A						
MSG									STATUS	2			
									STATUS				

Plot 7-90. 6dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax – 26 Tones (UNII Band 3) – Ch. 155)

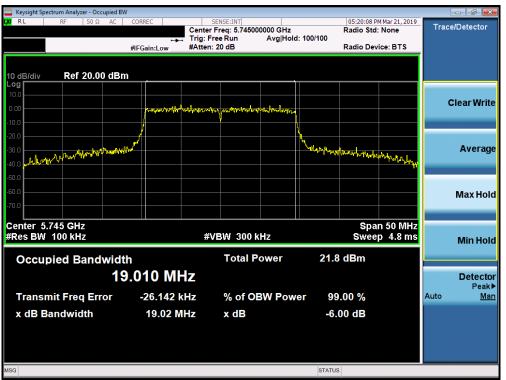
FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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SISO Antenna-1 6 dB Bandw	vidth Measurements (Full Tones)
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	Frequency [MHz]	Channel No.	802.11 Mode	Tones	Data Rate [Mbps]	Measured 6dB Bandwidth [MHz]
	5745	149	ax (20MHz)	242T	MCS0	19.02
e	5785	157	ax (20MHz)	242T	MCS0	18.97
	5825	165	ax (20MHz)	242T	MCS0	18.95
Band	5755	151	ax (40MHz)	484T	MCS0	37.76
	5795	159	ax (40MHz)	484T	MCS0	37.09
	5775	155	ax (80MHz)	996T	MCS0	77.45

Table 7-7. Conducted Bandwidth Measurements SISO ANT1 (Full Tones)



Plot 7-91. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - Full Tones (UNII Band 3) - Ch. 149)

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D2 RL RF 50 Ω AC CORREC SENSE/INT 05:20:36 PM Mar 21,2019 Trace/Det Center Freq: 6.785000000 GHz Radio Std: None Trig: Free Run Avg[Hold: 100/100	ector -
	10101
#IFGain:Low #Atten: 20 dB Radio Device: BTS	
10 dB/div Ref 20.00 dBm	
0.00 Clear	Write
-10.0	
-0.0	_
	erage
	erage
Ma	x Hold
Center 5.785 GHz Span 50 MHz	
#Dec PM/ 400 kHz #V/PM/ 200 kHz Cureen 4.9 mo	n Hold
	molu
Occupied Bandwidth Total Power 21.9 dBm	
18.989 MHz	tector
	Peak▶
Transmit Freq Error -3.362 kHz % of OBW Power 99.00 %	<u>Man</u>
x dB Bandwidth 18.97 MHz x dB -6.00 dB	
MSG STATUS	

Plot 7-92. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - Full Tones (UNII Band 3) - Ch. 157)



Plot 7-93. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - Full Tones (UNII Band 3) - Ch. 165)

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🔤 Keysight Spectrum Analyzer - Occupie	ed BW				
02 RL RF 50Ω A	HFGain:Low Centr Centr Trig: #Atte	SENSE:INT Pr Freq: 5.755000000 GHz Free Run Avg Hold n: 20 dB	Radio Std:		Trace/Detector
10 dB/div Ref 20.00 d Log 10.0 .000		ulay provide the line of a start of the start of the			Clear Write
-20.0 -30.0 -40.0 -50.0 avvativ/149/av/avv19	ha Archester -		Monte and and the first of the second	mbdallhym	Average
-60.0					Max Hold
Center 5.755 GHz #Res BW 100 kHz Occupied Bandwi		¥VBW 300 kHz Total Power		100 MHz 9.6 ms	Min Hold
:	37.524 MHz				Detector Peak▶
Transmit Freq Error x dB Bandwidth	-30.992 kHz 37.76 MHz	% of OBW Pow x dB	er 99.00 % -6.00 dB		Auto <u>Man</u>
MSG			STATUS		

Plot 7-94. 6dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - Full Tones (UNII Band 3) - Ch. 151)



Plot 7-95. 6dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - Full Tones (UNII Band 3) - Ch. 159)

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