

PCTEST ENGINEERING LABORATORY, INC.

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# MEASUREMENT REPORT FCC PART 15.407 UNII 802.11a/n/ac/ax

Samsung Electronics Co., Ltd.

#### **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.: 1M1903060032-08.A3L

# A3LSMG977T

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.





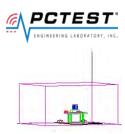
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# **MEASUREMENT REPORT**



	Channel		AN	ЛТ1	AN	JT2	MI	NO
UNII Band	Channel 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	62.951	17.99	62.806	17.98	125.026	20.97
2A	20	5260 - 5320	62.951	17.99	61.660	17.90	122.462	20.88
2C	20	5500 - 5720	62.806	17.98	61.376	17.88	123.595	20.92
3		5745 - 5825	62.951	17.99	61.518	17.89	120.226	20.80
1		5190 - 5230	49.431	16.94	49.659	16.96	99.083	19.96
2A	40	5270 - 5310	46.238	16.65	47.534	16.77	93.756	19.72
2C	40	5510 - 5710	50.003	16.99	48.084	16.82	97.949	19.91
3		5755 - 5795	47.424	16.76	49.431	16.94	96.383	19.84
1		5210	19.907	12.99	18.836	12.75	19.187	12.83
2A	80	5290	19.011	12.79	19.409	12.88	18.323	12.63
2C		5530 - 5690	36.644	15.64	37.670	15.76	73.282	18.65
3		5775	37.584	15.75	39.628	15.98	77.268	18.88

**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

#### 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
Ch.	Frequency (MHz)						
36	5180	52	5260	100	5500	149	5745
:	:	:	:	:	:	:	:
42	5210	56	5280	120	5600	157	5785
:	:	:	:	:	:	:	:
48	5240	64	5320	144	5720	165	5825

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

_				
R	ar	۱d	1	

Dond 04

Band 3

С

1

1

	Bana i
Ch.	Frequency (MHz)
38	5190
:	:
46	5230

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

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

	Dana 3
ch.	Frequency (MHz)
51	5755
:	:
59	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	Γ	58	5290	106	5530	155	5775
					:	:		
					138	5690		

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

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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:

	Maximum Achievable Duty Cycles						
902 11 M	802.11 Mode/Band		Duty Cycle [%]				
802.11 W	ode/band	ANT1	ANT2	MIMO/CDD			
	а	99.3	99.7	99.3			
	n (HT20)	99.3	99.6	99.3			
	ac (HT20)	99.3	99.6	98.6			
	ax (HT20)	99.1	99.1	99.1			
5GHz	n (HT40)	98.5	98.5	98.7			
	ac (HT40)	98.6	98.5	98.4			
	ax (HT40)	98.3	98.2	98.2			
	ac (HT80)	95.2	97.1	94.4			
	ax (HT80)	94.6	96.8	94.3			

#### Table 2-4. Measured Duty Cycles

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

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

Table 2-5. Frequency / Channel Operations

 $\checkmark$  = Support ; \* = NOT Support SISO = Single Input Single Output SDM = Spatial Diversity Multiplexing – MIMO function CDD = Cyclic Delay Diversity - 2Tx Function

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.

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

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

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)

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)

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# 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 and AC line conducted testing. See section 3.2 for AC line conducted emissions test setups, section 7.6 and 7.7 for radiated emissions test setups, and section 7.2, 7.3, 7.4 and 7.5 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 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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#### **DESCRIPTION OF TESTS** 3.0

#### 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, 50Ω/50uH 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 guasi-peak and average detectors with a 9kHz resolution bandwidth for final measurements.

Line conducted emissions test results are shown in Section 7.8. 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 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.

### 3.4 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)	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 12/27		Biennial	12/27/2018	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.
FCC ID:	A3LSMG977T
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 [6.6]	26dB Bandwidth	N/A		PASS	Section 7.2
15.407(e)	RSS-Gen [6.6]	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)	eneral Field Strength mits (Restricted Bands nd Radiated Emission 15 209 (RSS-Gen (8 9))		PASS	Section 7.6, 7.7
15.407	RSS-Gen [8.8]	AC Conducted Emissions 150kHz – 30MHz	< FCC 15.207 (RSS-Gen [8.8]) limits	LINE CONDUCTED	PASS	Section 7.8

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 4.6.
- 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.

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### 7.2 26dB Bandwidth Measurement – 802.11a/n/ac/ax 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  $\geq$  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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# SISO Antenna-1 26 dB Bandwidth Measurements

	Frequency	Channel			Measured 26dB
	[MHz]	No.	802.11 Mode	Data Rate [Mbps]	Bandwidth
		00	-		[MHz]
	5180	36	а	6	21.00
	5200	40	а	6	21.65
	5240	48	a	6	21.21
	5180	36	n (20MHz)	6.5/7.2 (MCS0)	23.92
	5200	40	n (20MHz)	6.5/7.2 (MCS0)	23.18
	5240	48	n (20MHz)	6.5/7.2 (MCS0)	24.13
d 1	5180	36	ax (20MHz)	6.5/7.2 (MCS0)	21.37
Band 1	5200	40	ax (20MHz)	6.5/7.2 (MCS0)	20.90
	5240	48	ax (20MHz)	6.5/7.2 (MCS0)	21.62
	5190	38	n (40MHz)	13.5/15 (MCS0)	36.27
	5230	46	n (40MHz)	13.5/15 (MCS0)	36.60
	5190	38	ax (40MHz)	13.5/15 (MCS0)	37.73
	5230	46	ax (40MHz)	13.5/15 (MCS0)	37.76
	5210	42	ac (80MHz)	29.3/32.5 (MCS0)	75.51
	5210	42	ax (80MHz)	29.3/32.5 (MCS0)	77.05
	5260	52	а	6	21.65
	5280	56	а	6	21.40
	5320	64	а	6	21.32
	5260	52	n (20MHz)	6.5/7.2 (MCS0)	22.00
	5280	56	n (20MHz)	6.5/7.2 (MCS0)	21.96
	5320	64	n (20MHz)	6.5/7.2 (MCS0)	21.59
124	5260	52	ax (20MHz)	6.5/7.2 (MCS0)	21.66
Band 2A	5280	56	ax (20MHz)	6.5/7.2 (MCS0)	21.51
<u> </u>	5320	64	ax (20MHz)	6.5/7.2 (MCS0)	21.18
	5270	54	n (40MHz)	13.5/15 (MCS0)	36.40
	5310	62	n (40MHz)	13.5/15 (MCS0)	36.19
	5270	54	ax (40MHz)	13.5/15 (MCS0)	37.74
	5310	62	ax (40MHz)	13.5/15 (MCS0)	37.74
	5290	58	ac (80MHz)	29.3/32.5 (MCS0)	75.81
	5290	58	ax (80MHz)	29.3/32.5 (MCS0)	77.27
	5500	100	а	6	21.14
	5600	120	а	6	21.35
	5720	144	а	6	30.21
	5500	100	n (20MHz)	6.5/7.2 (MCS0)	25.58
	5600	120	n (20MHz)	6.5/7.2 (MCS0)	26.32
	5720	144	n (20MHz)	6.5/7.2 (MCS0)	31.86
	5500	100	ax (20MHz)	6.5/7.2 (MCS0)	21.40
	5600	120	ax (20MHz)	6.5/7.2 (MCS0)	21.32
	5720	144	ax (20MHz)	6.5/7.2 (MCS0)	21.15
Band 2C	5510	102	n (40MHz)	13.5/15 (MCS0)	36.03
and	5590	118	n (40MHz)	13.5/15 (MCS0)	36.25
ä	5710	142	n (40MHz)	13.5/15 (MCS0)	36.38
	5510	102	ax (40MHz)	13.5/15 (MCS0)	37.80
	5590	118	ax (40MHz)	13.5/15 (MCS0)	37.52
	5710	142	ax (40MHz)	13.5/15 (MCS0)	37.73
	5530	106	ac (80MHz)	29.3/32.5 (MCS0)	75.93
	5610	122	ac (80MHz)	29.3/32.5 (MCS0)	81.74
	5690	138	ac (80MHz)	29.3/32.5 (MCS0)	76.32
	5530	106	ax (80MHz)	29.3/32.5 (MCS0)	77.44
	5610	122	ax (80MHz)	29.3/32.5 (MCS0)	81.29
	5690	138	ax (80MHz)	29.3/32.5 (MCS0)	76.87
Tahle	7-2 Con	ductod	<b>Bandwidth</b>	n Measuremer	Nte SISO ANT

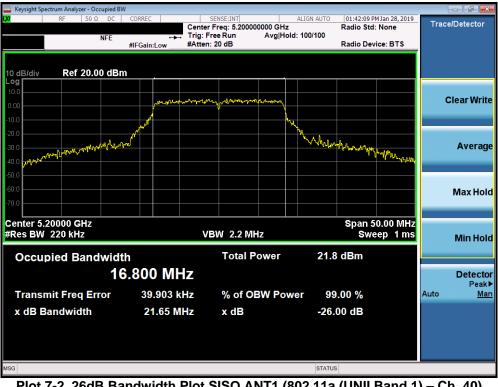
Table 7-2. Conducted Bandwidth Measurements SISO ANT1

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Plot 7-1. 26dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 1) - Ch. 36)



Plot 7-2. 26dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 1) - Ch. 40)

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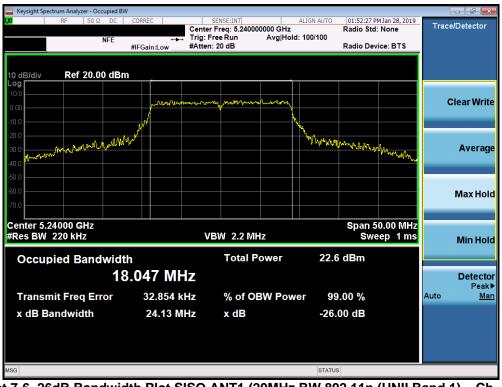
Plot 7-4. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 1) - Ch. 36)

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🤤 Keysight Spectrum Analyzer - Occupie	ed BW				
KM RF 50 Ω D	Cent Trig	SENSE:INT Ser Freq: 5.200000000 GHz Free Run Avg Ho en: 20 dB	ALIGN AUTO 01:51:19 F Radio Std Id: 100/100 Radio Dev		Trace/Detector
	#IFGain:Low #Atte	en. 20 dB	Radio Del	Ace. BT3	
10 dB/div <b>Ref 20.00 d</b>	IBm				
	- Alerano - Alerano	ma Anna man			Clear Write
-10.0					
-20.0 -30.0	white a second sec		Mul Manuk Manus	ant work of Moderation	Average
-50.0					
-60.0					Max Hold
Center 5.20000 GHz #Res BW 220 kHz		VBW 2.2 MHz		60.00 MHz eep 1 ms	Min Hold
Occupied Bandwi		Total Power	21.9 dBm		
	18.059 MHz				Detector Peak▶
Transmit Freq Error	55.074 kHz	% of OBW Pov	ver 99.00 %		Auto <u>Man</u>
x dB Bandwidth	23.18 MHz	x dB	-26.00 dB		
MSG			STATUS		

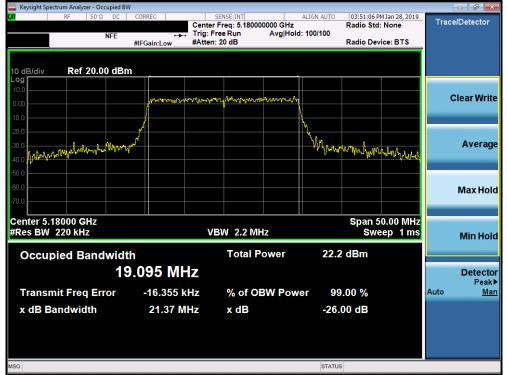
Plot 7-5. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 1) - Ch. 40)



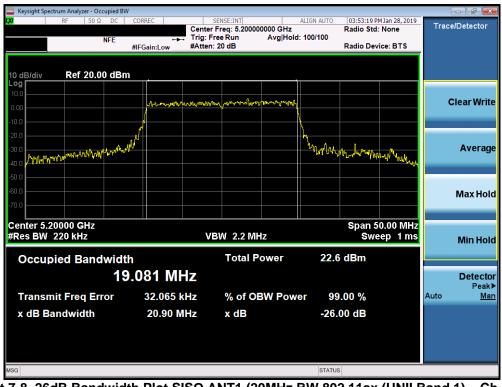
Plot 7-6. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 1) - Ch. 48)

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



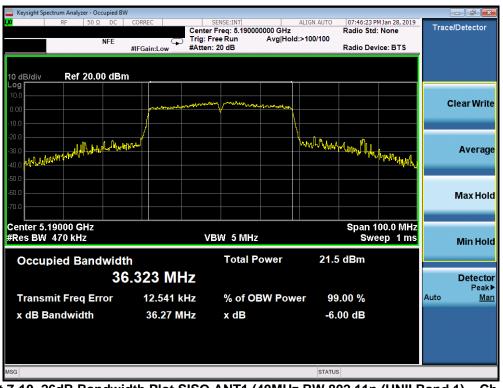
Plot 7-8. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 1) - Ch. 40)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BW						F X
NFE	🛶 Trig:	SENSE:INT er Freq: 5.240000000 GHz Free Run Avg Hol n: 20 dB	Radio St d: 100/100	PM Jan 28, 2019 d: None	Trace/Dete	ctor
	#IFGain:Low #Atte	iii. 20 uB	Radio De	VICE. B13		
10 dB/div Ref 20.00 dBm						
	Marin Inn marine 1	My Monta-marker	<b>A</b>		Clear	Write
-10.0	м <sup>4</sup>					
-30.0 -40.0 and			WWWWWWWW	un hyrighty	Av	erage
-50.0						
-60.0					Max	Hold
Center 5.24000 GHz #Res BW 220 kHz		/BW 2.2 MHz		50.00 MHz veep 1 ms	Mir	Hold
Occupied Bandwidth		Total Power	23.1 dBm			monu
			2011 4811			
19.	024 MHz					t <b>ector</b> Peak▶
Transmit Freq Error	10.718 kHz	% of OBW Pov	ver 99.00 %		Auto	<u>Man</u>
x dB Bandwidth	21.62 MHz	x dB	-26.00 dB			
MSG			STATUS			

Plot 7-9. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 1) - Ch. 48)



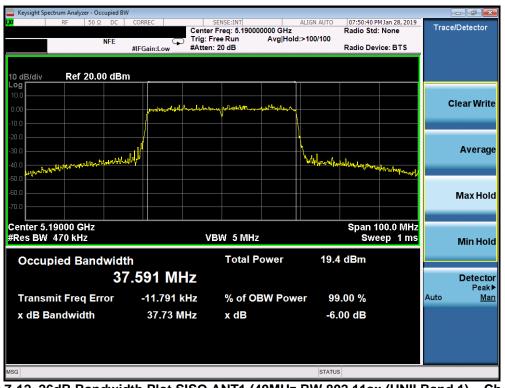
Plot 7-10. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 1) - Ch. 38)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager			
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🔤 Keysight Spectrum Analyzer - Occupied BW	1				
KF 50 Ω DC	CORREC	SENSE:INT er Freg: 5.230000000 GHz		PM Jan 28, 2019	Trace/Detector
NFE			old:>100/100	a: None	
		n: 20 dB		vice: BTS	
10 dB/div Ref 20.00 dBm					
Log					
10.0					Clear Write
0.00	meliphoner another	when the show we have the second	<b>\</b>		Clear write
-10.0	<b>/</b>				
-20.0					
LIN MARKE	yn,1V		hunder manually parts	<b>b</b> 1.	Average
CTAPAPA MALAN				walk	Archuge
-40.0					
-50.0					
-60.0					Max Hold
-70.0					
Center 5.23000 GHz				100.0 MHz	
#Res BW 470 kHz		/BW/5MHz	SW	eep 1ms	Min Hold
Occupied Rendwidt		Total Power	21.7 dBm		
Occupied Bandwidt		Total Fower	21.7 UBIII		
36	6.512 MHz				Detector
			00.00.00		Peak►
Transmit Freq Error	42.819 kHz	% of OBW Pov	wer 99.00 %		Auto <u>Man</u>
x dB Bandwidth	36.60 MHz	x dB	-6.00 dB		
			1 1		
MSG			STATUS		

Plot 7-11. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 1) - Ch. 46)



Plot 7-12. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 1) - Ch. 38)

FCC ID: A3LSMG977T	INVITING LANDON IN	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager		
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Keysight Spectrum Analyzer - O										- d <b>-</b>
(X) RF 50 9		REC	Center Fr	NSE:INT reg: 5.23000		ALIGN AUTO	07:51:23 P Radio Std	M Jan 28, 2019 None	Trac	e/Detector
	NFE #IF(	Gain:Low 🖵	Trig: Free #Atten: 2		AvgiHold	d:>100/100	Radio Dev	ice: BTS		
, 										
10 dB/div Ref 20.0	00 dBm	_								
Log 10.0										
0.00		mound	adosmananta	Margarent	himmonly				(	Clear Write
-10.0		<b>/</b>								
-20.0		/								
-30.0						<u>\</u>				Average
-40.0	APPAN CONTRACT					Witzhowski	We have have	maple		
-50.0								· · · · · · · · · · · · · · · · · · ·		
-60.0										Max Hold
-70.0									_	_
Center 5.23000 GHz								00.0 MHz		
#Res BW 470 kHz			VB	N/5 MHz			Swe	ep 1 ms		Min Hold
Occupied Ban	dwidth			Total P	ower	19.7	dBm			
		83 MI	7							Detector
										Peak▶
Transmit Freq E	rror	5.138 k	(Hz	% of O	3W Pow	er 99	.00 %		Auto	<u>Man</u>
x dB Bandwidth		37.76 N	IHz	x dB		-6.	00 dB			
MSG						STATUS				

Plot 7-13. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 1) - Ch. 46)



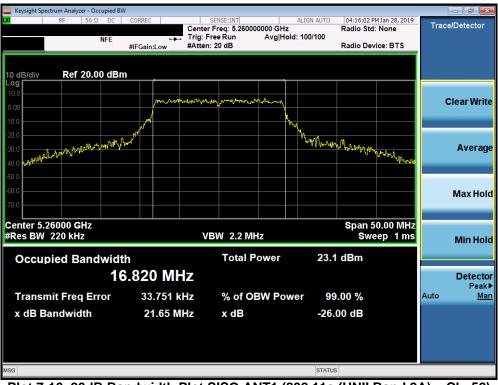
Plot 7-14. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 1) - Ch. 42)

FCC ID: A3LSMG977T	INVITING LANDON IN	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager		
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Plot 7-15. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax (UNII Band 1) - Ch. 42)



Plot 7-16. 26dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 2A) - Ch. 52)

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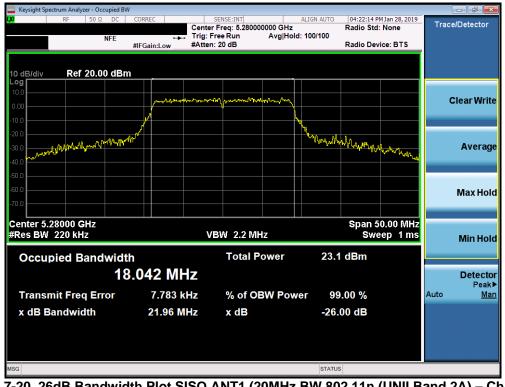
Plot 7-18. 26dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 2A) - Ch. 64)

FCC ID: A3LSMG977T	INVITUAL DESCRIPTION	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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	DC CORRI NFE #IFGa	Cen Trig	SENSE:INT Iter Freq: 5.2600( g: Free Run ten: 20 dB		ALIGN AUTO	04:20:30 P Radio Std Radio Dev		Trace	Detector
10 dB/div Ref 20.0	0 dBm					1			
0.00		and the particular and the second	Mary May 100	angen en				с	lear Write
-10.0 -20.0 -30.0 -40.0	Monte al Anti-				Wall Marine Marile	ᠰᡊ᠋ᢩᠰ᠈᠋ᠧ᠕ᡁ	pr theman		Average
-50.0 -60.0 -70.0									Max Hold
Center 5.26000 GHz #Res BW 220 kHz			VBW 2.2 MI	Hz			0.00 MHz ep 1 ms		Min Hold
Occupied Band		86 MHz	Total P	ower	23.0	dBm			Detector
Transmit Freq Err x dB Bandwidth	ror	-9.364 kHz 22.00 MHz	% of O x dB	BW Pow		.00 % 00 dB		Auto	Peak▶ <u>Man</u>
MSG					STATUS				

Plot 7-19. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2A) - Ch. 52)



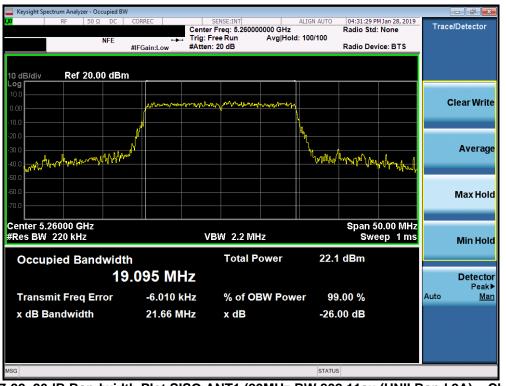
Plot 7-20. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2A) - Ch. 56)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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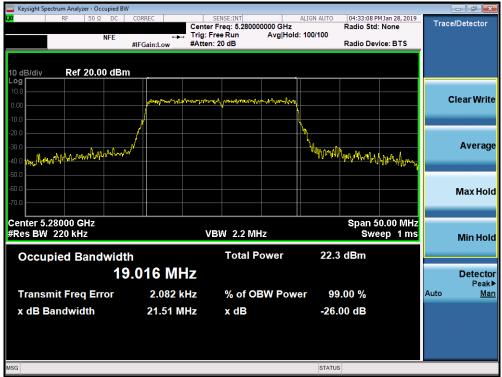
Plot 7-21. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2A) – Ch. 64)



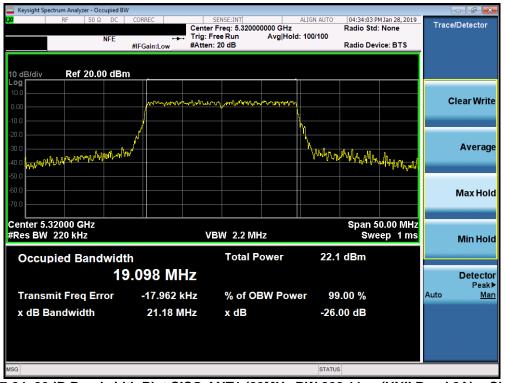
Plot 7-22. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 2A) - Ch. 52)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 07 of 050
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Plot 7-23. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 2A) - Ch. 56)



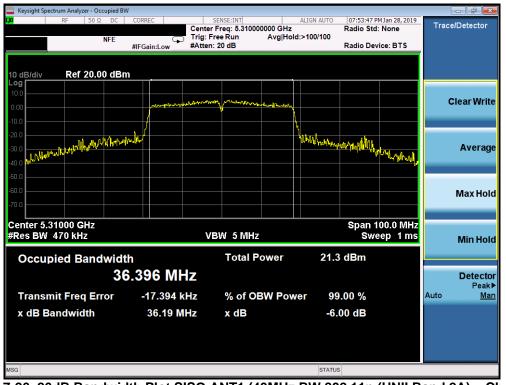
Plot 7-24. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 2A) - Ch. 64)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-25. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2A) - Ch. 54)



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

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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🔤 Keysight Spectrum Analyzer - O								
LXI RF 50 9	Ω DC CORREC		e:INT q: 5.270000000 GHz	ALIGN AUTO	07:57:09 Pf Radio Std:	4 Jan 28, 2019	Trace	/Detector
	NFE	Trig: Free F	Run Avg Hol	d:>100/100				
	#IFGain:Lo	#Atten: 20	dB		Radio Dev	ice: BTS		
	00 dBm							
Log 10.0								
		Landrood U.					С	lear Write
0.00			لل المحكم ومن يعد المن يعد المن المن المن المن المن المن المن المن					
-10.0				l.				
-20.0								
-30.0	An und I			h	1			Average
-40.0	Mananall			mardy	alad why have	MUTHANK N		
-50.0					`			
-60.0								Max Hold
-70.0								Max Holu
10.0								
Center 5.27000 GHz						00.0 MHz		
#Res BW 470 kHz		VBW	5 MHz		Swe	ep 1ms		Min Hold
0	1	-	Total Power	40.7	dBm			
Occupied Ban			rotal Fower	19.7	иыш			
	37.608	MHz						Detector
Tronomit From F		20 611-			00.0/		Auto	Peak▶ Man
Transmit Freq E	rror -/.8	38 kHz	% of OBW Pow	/er 99	.00 %		Auto	ivian
x dB Bandwidth	37.	74 MHz >	x dB	-6.	00 dB			
MSG				STATUS				
mod				STATUS				

Plot 7-27. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 2A) - Ch. 54)



Plot 7-28. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 2A) - Ch. 62)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-29. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 2A) - Ch. 58)



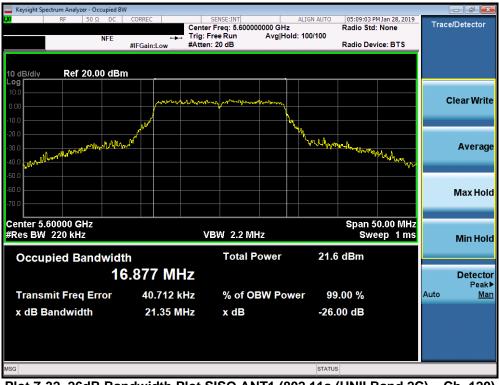
Plot 7-30. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax (UNII Band 2A) - Ch. 58)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-31. 26dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 2C) - Ch. 100)



Plot 7-32. 26dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 2C) - Ch. 120)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 250
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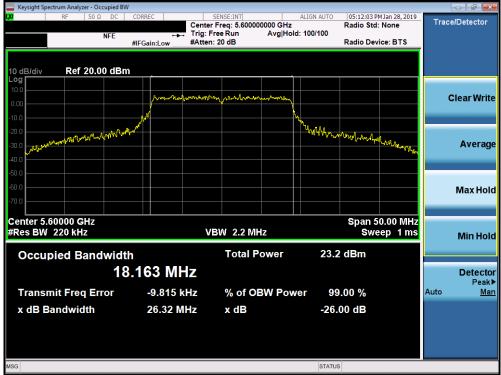
Plot 7-33. 26dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 2C) - Ch. 144)



Plot 7-34. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2C) - Ch. 100)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-35. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2C) - Ch. 120)



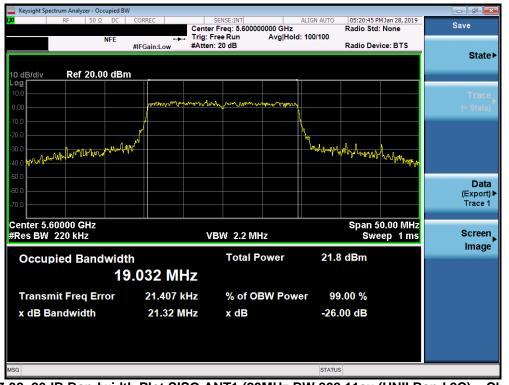
Plot 7-36. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2C) - Ch. 144)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga 24 of 250
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Plot 7-37. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 2C) - Ch. 100)



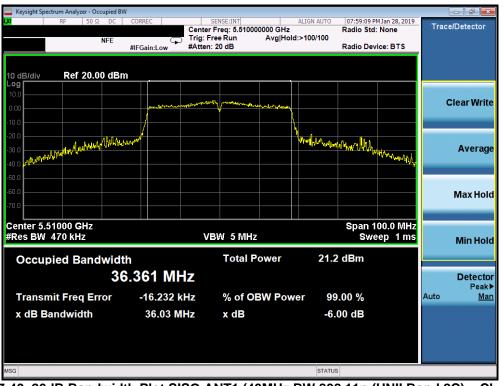
Plot 7-38. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 2C) - Ch. 120)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BV	V				
LXI RF 50 Ω DC	🛶 Trig: F	SENSE:INT r Freq: 5.720000000 GHz Free Run Avg Hole h: 20 dB	ALIGN AUTO 05:21:47 F Radio Std d: 100/100 Radio Dev		Trace/Detector
10 dB/div Ref 20.00 dBn	wi Guin.cow				
Log 10.0 0.00 -10.0	A A A A A A A A A A A A A A A A A A A	๛ฦ๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛๛			Clear Write
-20.0 -30.0 -40.0 Martine (111) Lynn Hwrite (111)			W WWWWWWWWWW	MANN MUL	Average
-50.0 -60.0 -70.0					Max Hold
Center 5.72000 GHz #Res BW 220 kHz	v	'BW 2.2 MHz		i0.00 MHz eep 1 ms	Min Hold
Occupied Bandwidt	հ 9.076 MHz	Total Power	22.1 dBm		Detector
Transmit Freq Error	9.731 kHz	% of OBW Pow	ver 99.00 %		Peak► Auto <u>Man</u>
x dB Bandwidth	21.15 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-39. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 2C) - Ch. 144)



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

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Oc							
<b>ιχι</b> RF 50 Ω	2 DC CORREC	SENSE:INT Center Freg: 5.5900	ALIGN A	AUTO 08:00:05 P Radio Std	M Jan 28, 2019	Tracel	Detector
	NFE 🕞	Trig: Free Run	Avg Hold:>100/	100			
	#IFGain:Low	#Atten: 20 dB		Radio Dev	ice: BTS		
10 dB/div Ref 20.0	00 dBm						
Log 10.0							
0.00	J. Lande, Japhin	and manufactures	wall			CI	ear Write
-10.0		<u>v</u>					
	/						
-20.0	Mud Carl Wall		Word all	www.allowall.	n 41		Average
-40.0 What have have been seen as a second s					<sup>ĸ</sup> " <sup>"</sup> w <sup>a</sup> thwallelu		Average
-50.0							
-60.0						1	Max Hold
-70.0						_	
Center 5.59000 GHz				Span 1	00.0 MHz		
#Res BW 470 kHz		VBW 5 MH	Z		ep 1 ms		Min Hold
							minitiona
Occupied Banc	dwidth	Total F	Power	20.6 dBm			
	36.524 MI	Hz					Detector
							Peak▶
Transmit Freq Er	ror 17.507 l	kHz % of O	BW Power	99.00 %		Auto	Man
x dB Bandwidth	36.25 N	lHz xdB		-6.00 dB			
MSG			1	STATUS			

Plot 7-41. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2C) - Ch. 118)



Plot 7-42. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2C) - Ch. 142)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occupie	ed BW				
<b>LX</b> RF 50ΩC	Cente	SENSE:INT Freq: 5.51000000 GHz	ALIGN AUTO 08:13:18 Radio Sto	M Jan 28, 2019	Trace/Detector
NFI		Free Run Avg Hol n:20 dB	d:>100/100 Radio De	vice: BTS	
	#IFGalli.Low #/tter		Rudio Be		
10 dB/div Ref 20.00 c	IBm				
Log 10.0					
0.00	to an in the optical weather an	and a work of the state of the state of the			Clear Write
-10.0					
-20.0	/				
					Average
-30.0 -40.0 Martine Aller Martine Mar	M.M.		held how any provident	Anter	J
-50.0				v. m. Auf	
-60.0					Max Hold
-70.0					Muxitolu
Center 5.51000 GHz #Res BW 470 kHz	V	/BW 5 MHz		100.0 MHz eep 1 ms	No. 11-1-1
					Min Hold
Occupied Bandw	idth	Total Power	19.6 dBm		
	37.603 MHz				Detector
Transmit Freq Error	17.739 kHz	% of OBW Pov	ver 99.00 %		Peak▶ Auto Man
					Mato
x dB Bandwidth	37.80 MHz	x dB	-6.00 dB		
MSG			STATUS		

Plot 7-43. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 2C) - Ch. 102)



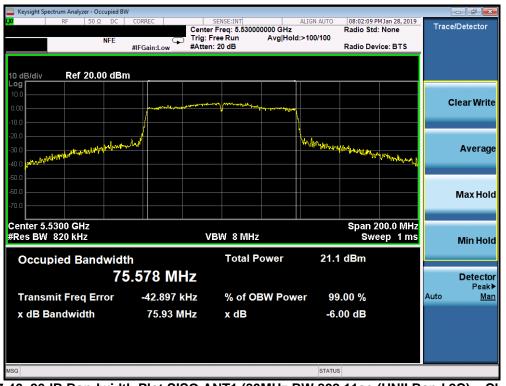
Plot 7-44. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 2C) - Ch. 118)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occupie							_	
LXI RF 50 Ω D	C CORREC	SENSE:INT		ALIGN AUTO	08:14:51 P	M Jan 28, 2019	Trace	e/Detector
NFE		Trig: Free Run		d:>100/100				
	#IFGain:Low	#Atten: 20 dB			Radio Dev	ice: BTS		
10 dB/div Ref 20.00 d	IBm							
Log 10.0								
		Lauran Lel m. Massil					c	lear Write
0.00	الى مەلەرغارالىلىم ا	united and the second second	and the second					
-10.0	/							
-20.0	<b>/</b>			1				
-30.0	wh what he had a second s			Winder	MAMA ANA W	_		Average
-40.0 AMUNION				<u> </u>	n Ann il	water with t		
-50.0								
-60.0								Max Hold
-70.0								Max Hold
10.0								
Center 5.71000 GHz					Span 1	00.0 MHz		
#Res BW 470 kHz		VBW 51	∀lHz		Swe	ep 1ms		Min Hold
		<b>-</b>		40.4	dBm			
Occupied Bandwi			al Power	19.1	aBm			
	37.583 MI	Z						Detector
	15 00 4 1			0.0	00.0/			Peak►
Transmit Freq Error	-15.804	(HZ % 0	f OBW Pow	/er 99	.00 %		Auto	Man
x dB Bandwidth	37.73 N	lHz x di	3	-6.	00 dB			
MSG				STATUS				and the second sec

Plot 7-45. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 2C) – Ch. 142)



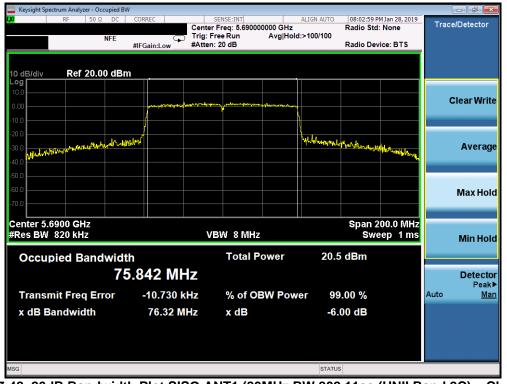
Plot 7-46. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 2C) - Ch. 106)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-47. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 2C) - Ch. 122)



Plot 7-48. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 2C) - Ch. 138)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-49. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax (UNII Band 2C) - Ch. 106)



Plot 7-50. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax (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 41 of 250	
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Keysight Spectrum Analyzer - Occupied BW					
XI RF 50 Ω DC	Trig:	sense:INT er Freq: 5.690000000 GHz Free Run Avg Hol n: 20 dB	d:>100/100	08:11:15 PM Jan 28, 2019 Radio Std: None Radio Device: BTS	Trace/Detector
10 dB/div Ref 20.00 dBm					
10.0 0.00 10.0	, and the second second second	-anglestor fallow and algoridation			Clear Write
20.0 30.0 Mollowoortheausstealporthew, My	And		howwww.	hound the dealer and	Average
50.0					Max Hold
Center 5.6900 GHz Res BW 820 kHz	V	/BW/8MHz		Span 200.0 MHz Sweep 1 ms	Min Hold
Occupied Bandwidt	h	Total Power	19.2	dBm	
77	.079 MHz				Detector Peak
Transmit Freq Error	6.967 kHz	% of OBW Pow	ver 99.	00 %	Auto <u>Mar</u>
x dB Bandwidth	76.87 MHz	x dB	-6.0	0 dB	
SG			STATUS		

Plot 7-51. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax (UNII Band 2C) - Ch. 138)

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

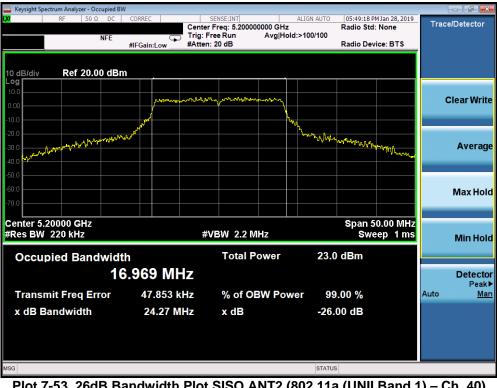
	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured 26dB Bandwidth [MHz]
	5180	36	а	6	24.27
	5200	40	a	6	24.27
	5240	48	a	6	23.74
	5180	36	n (20MHz)	6.5/7.2 (MCS0)	25.28
	5200	40	n (20MHz)	6.5/7.2 (MCS0)	29.05
	5240	48	n (20MHz)	6.5/7.2 (MCS0)	26.68
<del></del>	5180	36	ax (20MHz)	6.5/7.2 (MCS0)	21.35
Band 1	5200	40	ax (20MHz)	6.5/7.2 (MCS0)	21.72
Ba	5240	48	ax (20MHz)	6.5/7.2 (MCS0)	21.48
	5190	38	n (40MHz)	13.5/15 (MCS0)	36.21
	5230	46	n (40MHz)	13.5/15 (MCS0)	36.49
	5190	38	ax (40MHz)	13.5/15 (MCS0)	37.91
	5230	46	ax (40MHz)	13.5/15 (MCS0)	37.45
	5210	42	ac (80MHz)	29.3/32.5 (MCS0)	75.74
	5210	42	ax (80MHz)	29.3/32.5 (MCS0)	77.41
	5260	52	a	6	23.34
	5280	56	a	6	22.65
	5320	64	a	6	21.17
	5260	52	n (20MHz)	6.5/7.2 (MCS0)	27.07
	5280	56	n (20MHz)	6.5/7.2 (MCS0)	25.09
	5320	64	n (20MHz)	6.5/7.2 (MCS0)	21.58
<b></b> ₹	5260	52	ax (20MHz)	6.5/7.2 (MCS0)	21.57
p	5280	56	ax (20MHz)	6.5/7.2 (MCS0)	21.62
Band 2A	5320	64	ax (20MHz)	6.5/7.2 (MCS0)	21.52
_	5270	54	n (40MHz)	13.5/15 (MCS0)	36.56
	5310	62	n (40MHz)	13.5/15 (MCS0)	36.03
	5270	54	ax (40MHz)	13.5/15 (MCS0)	37.59
	5310	62	ax (40MHz)	13.5/15 (MCS0)	37.85
	5290	58	ac (80MHz)	29.3/32.5 (MCS0)	75.72
	5290	58	ax (80MHz)	29.3/32.5 (MCS0)	77.51
	5500	100	a	6	22.07
	5600	120	а	6	27.17
	5720	144	a	6	32.44
	5500	100	n (20MHz)	6.5/7.2 (MCS0)	25.16
	5600	120	n (20MHz)	6.5/7.2 (MCS0)	36.53
	5720	144	n (20MHz)	6.5/7.2 (MCS0)	39.18
	5500	100	ax (20MHz)	6.5/7.2 (MCS0)	21.59
	5600	120	ax (20MHz)	6.5/7.2 (MCS0)	26.51
	5720	144	ax (20MHz)	6.5/7.2 (MCS0)	27.16
ပ္လ	5510	102	n (40MHz)	13.5/15 (MCS0)	36.13
p	5590	118	n (40MHz)	13.5/15 (MCS0)	36.49
Band 2C	5710	142	n (40MHz)	13.5/15 (MCS0)	36.60
	5510	102	ax (40MHz)	13.5/15 (MCS0)	37.63
	5590	118	ax (40MHz)	13.5/15 (MCS0)	37.60
	5710	142	ax (40MHz)	13.5/15 (MCS0)	37.73
	5530	106	ac (80MHz)	29.3/32.5 (MCS0)	75.60
	5610	122	ac (80MHz)	29.3/32.5 (MCS0)	94.54
	5690	138	ac (80MHz)	29.3/32.5 (MCS0)	76.47
	5530	106	ax (80MHz)	29.3/32.5 (MCS0)	77.47
	5610	122	ax (80MHz)	29.3/32.5 (MCS0)	81.88
	5690	138	ax (80MHz)	29.3/32.5 (MCS0)	77.38
				Measuremer	

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Plot 7-52. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 1) - Ch. 36)



Plot 7-53. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 1) – Ch. 40)

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Plot 7-54. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 1) - Ch. 48)



Plot 7-55. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 1) - Ch. 36)

FCC ID: A3LSMG977T	INVESTOR DEPENDENCE	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 45 of 250
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🔤 Keysight Spectrum Analyzer - Occupi	ed BW				- ē 🔀
<b>ΙΧΙ</b> RF 50 Ω [	E Ce		Radio Ste ld:>100/100		Trace/Detector
	#IFGain:Low #A	tten: 20 dB	Radio De	vice: BTS	
10 dB/div Ref 20.00 d	dBm				
10.0 0.00	mann	many			Clear Write
-10.0					
-20.0 -30.0	ann hand		The and the and the set of the set	www.harafay	Average
-50.0					
-60.0					Maxilald
-70.0					Max Hold
Center 5.20000 GHz #Res BW 220 kHz		#VBW 2.2 MHz		50.00 MHz eep 1 ms	Min Hold
Occupied Bandw	idth	Total Power	23.6 dBm		
	18.193 MHz				Detector Peak▶
Transmit Freq Error	63.672 kHz	% of OBW Pov	ver 99.00 %		Auto <u>Man</u>
x dB Bandwidth	29.05 MHz	x dB	-26.00 dB		
MSG			STATUS		

Plot 7-56. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 1) - Ch. 40)



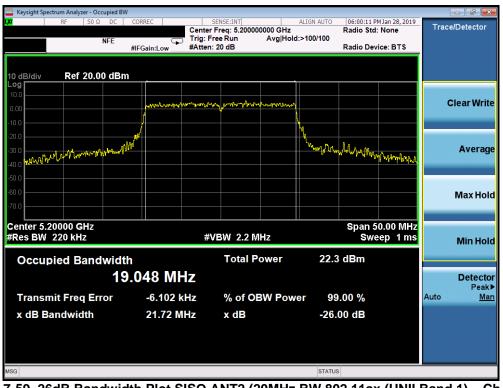
Plot 7-57. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 1) - Ch. 48)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 46 of 250	
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🔤 Keysight Spectrum Analyzer - Occupied BW	1				
<b>LXI</b> RF 50 Ω DC	CORREC	SENSE:INT r Freq: 5.18000000 GHz	ALIGN AUTO 05:59:21 P Radio Std	M Jan 28, 2019	Trace/Detector
NFE	🗔 Trig: F	Free Run Avg Hol	d:>100/100		
	#IFGain:Low #Atter	n: 20 dB	Radio Dev	/ice: BTS	
10 dB/div Ref 20.00 dBm	1				
Log					
	monthender	WW INTO WARDER	<b>_</b>		Clear Write
0.00					
-10.0			ι.		
-20.0	. p//		Whatenan		_
-30.0	<u>n</u>		Wher The alar And a free to a free the second secon	Whyler Mulher h	Average
-40.0 With the second s					
-50.0					
-60.0					Max Hold
-70.0					
Center 5.18000 GHz #Res BW 220 kHz	#	VBW 2.2 MHz		60.00 MHz eep 1 ms	
#Res BW 220 KHZ	#		500	eep mis	Min Hold
Occupied Bandwidt	h	Total Power	22.1 dBm		
	 .089 MHz				Detector
19					Detector Peak▶
Transmit Freg Error	19.897 kHz	% of OBW Pow	ver 99.00 %		Auto <u>Man</u>
x dB Bandwidth	21.35 MHz	x dB	-26.00 dB		
	21.33 MHZ	A UD	-20.00 00		
MSG			STATUS		

Plot 7-58. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 1) - Ch. 36)



Plot 7-59. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax (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 47 of 250
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Keysight Spectrum Analyzer - Occupied BW					
		SENSE:INT er Freq: 5.240000000 GHz Free Run Avg Hol		1:09 PM Jan 28, 2019 o Std: None	Export Data
NFE #		en: 20 dB		o Device: BTS	Amplitude
					Correction
10 dB/div Ref 20.00 dBm					Correction 1
Log					
10.0		Con a myther was a worked and a second			Trace
0.00	Andre de alever en et et		1		Thee
-10.0	<u>र्ग</u>		Ŋ		
-20.0	ſ'		- Υ		Limit.
-2000 -30.0 -40.0			What appropriation	white	
-40.0 100 100 100 100 100 100 100 100 100				a	· · · · · ·
-50.0					
-60.0					Mass Desute
-70.0					Meas Results
10.0					
Center 5.24000 GHz			Sp	an 50.00 MHz	
#Res BW 220 kHz		#VBW 2.2 MHz		Sweep 1 ms	
Occupied Bandwidth		Total Power	23.2 dBr	n	
	042 MHz				
Transmit Freq Error	503 Hz	% of OBW Pow	ver 99.00 9	/o	
x dB Bandwidth	21.48 MHz	x dB	-26.00 d	В	
					Save As
					ouve As
MSG			STATUS		

Plot 7-60. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 1) - Ch. 48)



Plot 7-61. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (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 40 of 250	
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Keysight Spectrum Analyzer - Occup	pied BW				
LXI RF 50 Ω	FE Cent	SENSE:INT ter Freq: 5.230000000 GHz : Free Run Avg Hold: en: 20 dB	Radio Std:		Trace/Detector
	#IFGain:Low #Att	en: 20 dB	Radio Dev	ICE: BIS	
10 dB/div Ref 20.00	dBm				
	permetration manual	un particular and a start			Clear Write
-10.0 -20.0 -30.0	nt/what-shark		hallan an a		
-40.0				WHIT WHIT WHIT	Average
-50.0					
-60.0					Max Hold
-70.0					
Center 5.23000 GHz #Res BW 470 kHz		#VBW 5 MHz	Span 1 Swe	00.0 MHz ep 1 ms	Min Hold
Occupied Bandw	vidth	Total Power	23.8 dBm		
	36.543 MHz				Detector Peak▶
Transmit Freq Erro	or 63.642 kHz	% of OBW Powe	er 99.00 %		Auto <u>Man</u>
x dB Bandwidth	36.49 MHz	x dB	-6.00 dB		
MSG			STATUS		

Plot 7-62. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 1) - Ch. 46)



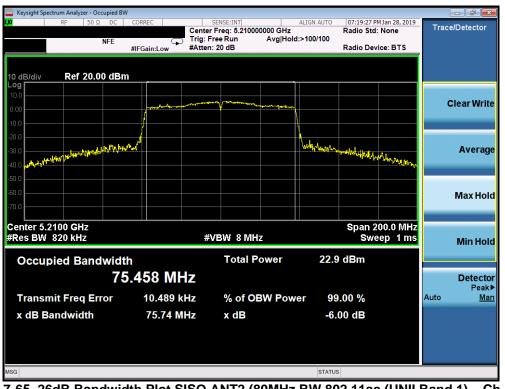
Plot 7-63. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax (UNII Band 1) - Ch. 38)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 40 of 250
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🤤 Keysight Spectrum Analyzer - Occu	upied BW				- 6 -
KM RF 50 Ω		SENSE:INT enter Freq: 5.230000000 GHz ig: Free Run Avg Holo tten: 20 dB	ALIGN AUTO 07:22:50 PF Radio Std: d:>100/100 Radio Dev		Trace/Detector
	#IFGain:Low #A	Atten: 20 dB	Radio Dev	ICE: BIS	
10 dB/div Ref 20.00	dBm				
10.0		hand phone the month and			Clear Write
0.00	and the second	The Contraction of the second state of the sec			Clear write
-10.0					
-20.0			<u>k</u>		
-30.0	hrund		hand for the state		Average
HIN HIMMAN			· M III II VI II II VI II V	www.minhlwyyh	
-50.0					
-60.0					Max Hold
-70.0					
Center 5.23000 GHz			Span 1	00.0 MHz	
#Res BW 470 kHz		VBW 5 MHz		ep 1 ms	Min Hold
Occupied Bandy	width	Total Power	21.7 dBm		
	37.516 MHz				Detector
					Detector Peak▶
Transmit Freq Erro	or 13.364 kHz	% of OBW Pow	er 99.00 %	A	uto <u>Man</u>
x dB Bandwidth	37.45 MHz	x dB	-6.00 dB		
MSG			STATUS		

Plot 7-64. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax (UNII Band 1) - Ch. 46)



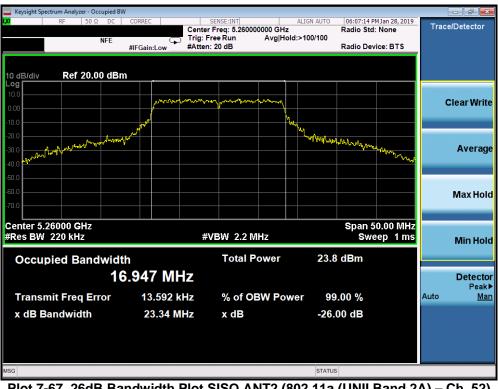
Plot 7-65. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 1) - Ch. 42)

FCC ID: A3LSMG977T	INVITING LANDON IN	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga E0 of 2E0
1M1903060032-08.A3L	01/22 - 05/08/2019	Portable Handset		Page 50 of 259
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🧫 Keysight Spectrum Analyzer - Occupi	ied BW					
	DC CORREC	SENSE:INT Center Freq: 5.21000 Trig: Free Run	ALIGN AUTO 0000 GHz Avg Hold:>100/100	07:23:59 PM Jan Radio Std: Nor		race/Detector
NF	E #IFGain:Low	#Atten: 20 dB	Avg Hold.>100/100	Radio Device:	втя	
10 dB/div Ref 20.00 d	dBm					
10.0						
0.00	mannahan	humandungaharistante	andrahan			Clear Write
-10.0						
-20.0						
-30.0			<u> </u>			Average
-40.0	udulani.		- Walnut Mar	Margh John Margh Marg	Notice at	
-50.0					1 1 1 H H H	
-60.0						Max Hold
-70.0						
Center 5.2100 GHz				Span 200.	0 MHz	
#Res BW 820 kHz		VBW 8 MHz		Sweep		Min Hold
Occupied Bandw	u olto	Total P	ower 20.9	dBm		
			20.0	(IDIII		
	76.959 MH	IZ				Detector Peak►
Transmit Freq Error	r -33.237 k	Hz % of OE	3W Power 99	.00 %	Aut	
x dB Bandwidth	77.41 M	Hz xdB	-6.	00 dB		
MSG			STATUS	5		

Plot 7-66. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax (UNII Band 1) - Ch. 42)



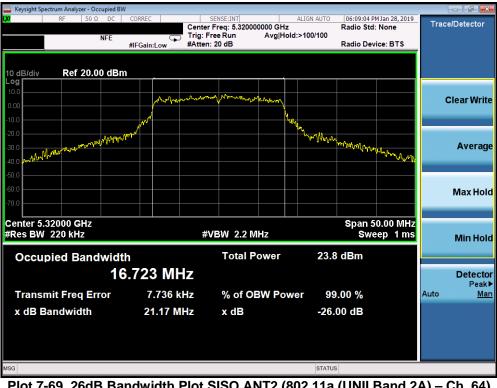
Plot 7-67. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 2A) - Ch. 52)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo E1 of 250
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Plot 7-68. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 2A) - Ch. 56)



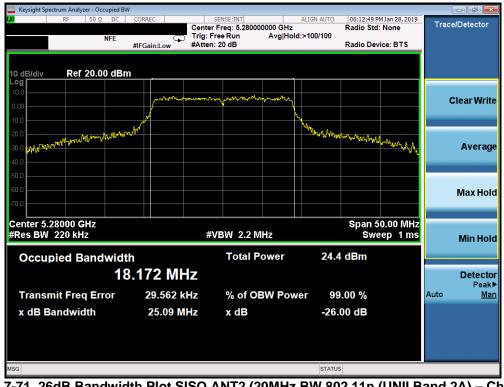
Plot 7-69. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 2A) – Ch. 64)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:			
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🔤 Keysight Spectrum Analyzer - Occup	pied BW				
L <mark>XI</mark> RF 50 Ω	DC CORREC	SENSE:INT Center Freg: 5.2600000	ALIGN AUTO	06:11:15 PM Jan 28, Radio Std: None	2019 Trace/Detector
N	FE 😱		Avg Hold:>100/100	Radio Stu. None	
	#IFGain:Low	#Atten: 20 dB		Radio Device: BT	s
10 dB/div Ref 20.00	dBm				
Log					
10.0	mulham	marine want	hanten		Clear Write
0.00					
-10.0	N				
-20.0	www.lat.		- Walking of	Julla more may have	
-30.0				Warder Charles	Average
-40.0					· 1) vite
-50.0					
-60.0					Max Hold
-70.0					
Center 5.26000 GHz				Span 50.00 I	
#Res BW 220 kHz		#VBW 2.2 MH	7	Sweep 1	P2 0
				chicop i	Min Hold
Occupied Bandw	vidth	Total Pov	wer 23.9	9 dBm	
	18.070 MH	-			Detector
					Detector Peak►
Transmit Freq Erro	or 13.404 kH	Iz % of OBV	V Power 99	9.00 %	Auto <u>Man</u>
x dB Bandwidth	27.07 MI	z xdB	-26.	.00 dB	
MSG			STATU	s	

Plot 7-70. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2A) - Ch. 52)



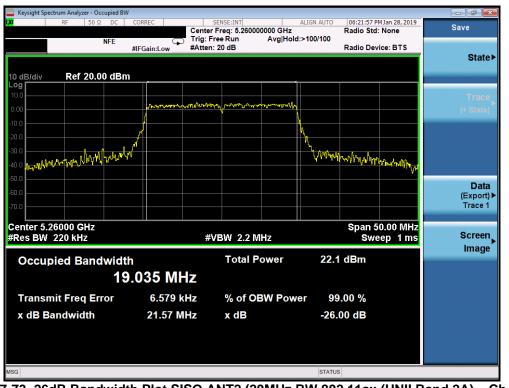
Plot 7-71. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2A) - Ch. 56)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	Test Dates: EUT Type:		Daga 52 of 250	
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Plot 7-72. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2A) – Ch. 64)



Plot 7-73. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 2A) - Ch. 52)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 54 at 050	
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Keysight Spectrum Analyzer - Occupied E						
<b>LXI</b> RF 50 Ω DC		SENSE:INT Freg: 5.280000000 GHz		PM Jan 28, 2019	Tracell	Detector
NFE	Trig: F	ree Run Avg Hol	ld:>100/100			
	#IFGain:Low #Atten	: 20 dB	Radio De	evice: BTS		
10 dB/div Ref 20.00 dB	m					
Log 10.0						
0.00	Malm marker of man	my lann with my your	4		CI	ear Write
-10.0						
-20.0	ţ .		۲.			
	A.		10 June 10			Average
and a showed William	الملير		M. M. Markey	Myda, Mar		Average
-40.0				• ግ ማግበት የላይ		
-60.0					1	Max Hold
-70.0					_	
Center 5.28000 GHz			Span	50.00 MHz		
#Res BW 220 kHz	#	VBW 2.2 MHz		reep 1ms		Min Hold
		T-4-1 Damas				
Occupied Bandwid		Total Power	22.1 dBm			
1	9.059 MHz					Detector
Transmit Freg Error	-12.302 kHz	% of OBW Pov	ver 99.00 %		Auto	Peak▶ Man
					Auto	man
x dB Bandwidth	21.62 MHz	x dB	-26.00 dB			
MSG			STATUS			

Plot 7-74. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 2A) - Ch. 56)



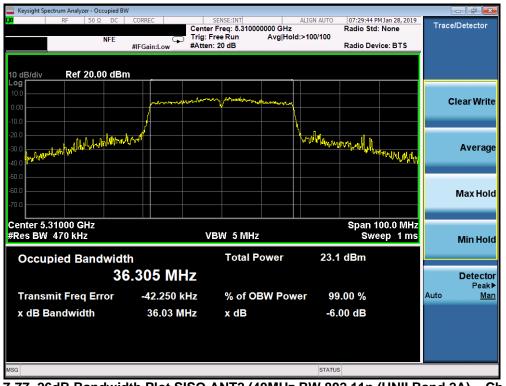
Plot 7-75. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 2A) - Ch. 64)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 55 at 050	
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Plot 7-76. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2A) - Ch. 54)



Plot 7-77. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2A) - Ch. 62)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 50 af 050	
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Keysight Spectrum Analyzer - Occupied B					
LXI RF 50 Ω DC		SENSE:INT Freg: 5.270000000 GHz	ALIGN AUTO 07:26:50 Radio Sto	PM Jan 28, 2019	Trace/Detector
NFE	Trig: F	ree Run Avg Hol	d:>100/100		
	#IFGain:Low #Atten	: 20 dB	Radio De	vice: BTS	
10 dB/div Ref 20.00 dB	m				
Log					
0.00	worker marshell	me mark mark and and			Clear Write
-10.0					
-20.0	*				
-30.0 -40.0 . 1. manuter 10 . 1. margaret			Une lowed have had a		Average
-40.0			a down a new with the	"fleer of your light	
-50.0					
-60.0					Max Hold
-70.0					
			<u> </u>		
Center 5.27000 GHz #Res BW 470 kHz	v	BW 5 MHz		100.0 MHz eep 1 ms	
TRES DUE TO RITZ	v	D44 3 141112		eep mis	Min Hold
Occupied Bandwid	th	Total Power	21.4 dBm		
	7.530 MHz				Detector
3					Detector Peak►
Transmit Freq Error	-29.673 kHz	% of OBW Pow	ver 99.00 %		Auto <u>Man</u>
x dB Bandwidth	37.59 MHz	x dB	-6.00 dB		
MSG			STATUS		

Plot 7-78. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax (UNII Band 2A) - Ch. 54)



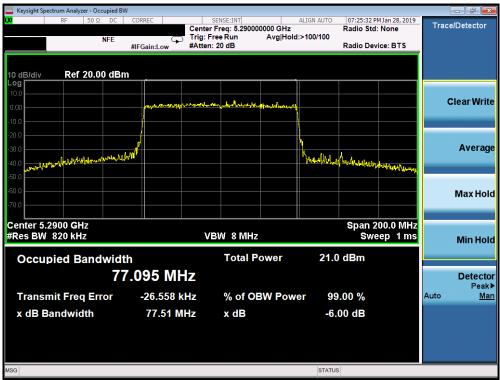
Plot 7-79. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax (UNII Band 2A) - Ch. 62)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied	BW				
<b>LXI</b> RF 50 Ω DC		SENSE:INT er Freq: 5.290000000	ALIGN AUTO	07:31:10 PM Jan 28 Radio Std: None	,2019 Trace/Detector
NEE			g Hold:>100/100	Radio Std: None	
	#IFGain:Low #Atte	en: 20 dB		Radio Device: BT	rs
10 dB/div Ref 20.00 dE	sm				
Log					
10.0	بالمبادر	man manana .			Clear Write
0.00					
-10.0					
-20.0					
-30.0 -40.0 allehtyantillandellandellandellandellandellandellandellandellandellandellandellandellandellandellandelland	Alagan Alagan		Mort March has	when the White has been	Averag
-40.0 aller all and a second				and and the states of	Mary
-50.0					
-60.0					
					Max Hol
-70.0					
Center 5.2900 GHz				Span 200.0	MHZ
#Res BW 820 kHz		VBW 8 MHz		Sweep 1	
					MITHO
Occupied Bandwid	ith	Total Powe	er 22.9	dBm	
7	5.470 MHz				Detecto
					Peak
Transmit Freq Error	-57.471 kHz	% of OBW	Power 99	.00 %	Auto <u>Ma</u>
x dB Bandwidth	75.72 MHz	x dB	-6	00 dB	
		X GB			
				4	
MSG			STATUS	5	

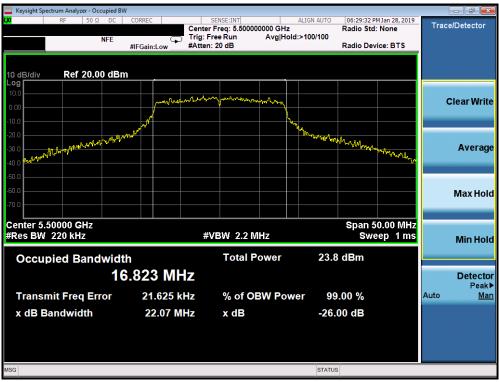
Plot 7-80. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 2A) - Ch. 58)



Plot 7-81. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax (UNII Band 2A) - Ch. 58)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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Plot 7-82. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 2C) - Ch. 100)



Plot 7-83. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 2C) - Ch. 120)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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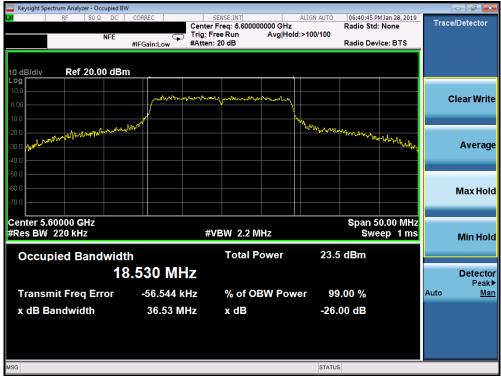
Plot 7-84. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 2C) - Ch. 144)



Plot 7-85. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2C) - Ch. 100)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 60 of 250
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Plot 7-86. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2C) - Ch. 120)



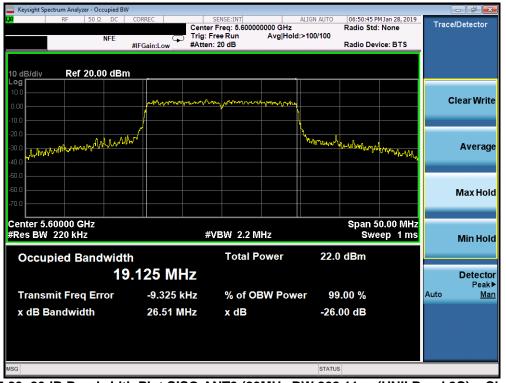
Plot 7-87. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2C) - Ch. 144)

FCC ID: A3LSMG977T	INVESTIGATION IN	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 61 of 250
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Plot 7-88. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 2C) - Ch. 100)



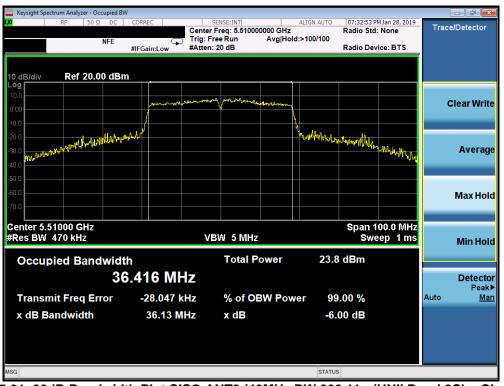
Plot 7-89. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 2C) - Ch. 120)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied	BW				
<b>LXI</b> RF 50 Ω DC		SENSE:INT r Freg: 5.720000000 GHz	ALIGN AUTO 06:51:44 F Radio Std	M Jan 28, 2019	Trace/Detector
NFE	Trig: I	Free Run Avg Hole	d:>100/100		
	#IFGain:Low #Atter	n: 20 dB	Radio De	vice: BTS	
10 dB/div Ref 20.00 dE	3m				
Log 10.0					
0.00	mononingian	hay man and an an and and			Clear Write
-10.0	1		η.		
-20.0 -30.0	Jann-P		~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Alex 6	
-30.0 John and a start a s				& Way holow	Average
-40.0					
-50.0					
-60.0					Max Hold
-70.0					maxitora
Center 5.72000 GHz				50.00 MHz	
#Res BW 220 kHz	#	VBW 2.2 MHz	SW	eep 1 ms	Min Hold
Occupied Bandwig	lth	Total Power	22.4 dBm		
1	9.122 MHz				Detector Peak►
Transmit Freq Error	-14.977 kHz	% of OBW Pow	ver 99.00 %		Auto <u>Man</u>
x dB Bandwidth	27.16 MHz	x dB	-26.00 dB		
			-20.00 08		
MSG			STATUS		

Plot 7-90. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 2C) - Ch. 144)



Plot 7-91. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2C) - Ch. 102)

FCC ID: A3LSMG977T	INVIGIALIST DADATINAL INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied B	W					-	- 0 <b>-</b> ×
<b>LX</b> RF 50 Ω DC	CORREC	SENSE:INT er Freg: 5.590000000 GI	ALIGN AUTO	07:34:00 PM Radio Std:	Jan 28, 2019	Trace	Detector
NFE	Trig:	Free Run Avg	Hold:>100/100				
	#IFGain:Low #Atte	en: 20 dB		Radio Dev	ice: BTS		
10 dB/div Ref 20.00 dB	m						
Log 10.0							
	manuthan	man when man and a street	m,			С	ear Write
0.00		-Υ					
-10.0			Ann No.				
-20.0	ALT I THE		halled have and	Maria Malla	NAL 1		
-30.0					Tracing With		Average
-40.0							
-50.0							
-60.0							Max Hold
-70.0							Mux Hold
Center 5.59000 GHz					00.0 MHz		
#Res BW 470 kHz		VBW 5 MHz		Swe	ep 1 ms		Min Hold
Occupied Rendwid	<b>t</b> h	Total Power	23 (	) dBm			
Occupied Bandwid			20.0				
3	6.713 MHz						Detector
Transmit Freq Error	-39.049 kHz	% of OBW P	ower 90	.00 %		Auto	Peak▶ Man
x dB Bandwidth	36.49 MHz	x dB	-6.	00 dB			
MSG			STATUS	5			

Plot 7-92. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2C) - Ch. 118)



Plot 7-93. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2C) - Ch. 142)

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Keysight Spectrum Analyzer - Occ					- ā <del>x</del>
<b>ιχι</b> RF 50 Ω	DC CORREC	SENSE:INT Center Freg: 5.51000	ALIGN AUTO	07:40:47 PM Jan 28, 2019 Radio Std: None	Trace/Detector
	NFE 🔾	Trig: Free Run	Avg Hold:>100/100		
	#IFGain:Low	#Atten: 20 dB		Radio Device: BTS	-
10 dB/div Ref 20.00	0 dBm				
Log 10.0					
0.00	manum	Alexand marshall	f.M. Lubar Mr.		Clear Write
-10.0			ļ		
-20.0	N.				
-30.0	Jun Minn Willin		Not we have	when the pulled on the	Average
-40.0				and the second stand of the second stand s	
-50.0					
-60.0					Max Hold
-70.0					
Center 5.51000 GHz				Span 100.0 MHz	
#Res BW 470 kHz		VBW 5 MHz		Sweep 1 ms	Min Hold
Occupied Band	width	Total P	ower 21.8	dBm	
Occupied Balla					
	37.555 Mŀ	1Z			Detector Peak►
Transmit Freq Err	or -33.456 k	Hz % of O	BW Power 99	.00 %	Auto <u>Man</u>
x dB Bandwidth	37.63 M	Hz x dB	-6.	00 dB	
MSG			STATUS	3	

Plot 7-94. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax (UNII Band 2C) - Ch. 102)



Plot 7-95. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax (UNII Band 2C) - Ch. 118)

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