

# PCTEST

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## MEASUREMENT REPORT FCC PART 15.407 / ISED RSS-247 UNII OFDMA

#### **Applicant Name:**

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

# Date of Testing:

4/17 - 6/22/2020 **Test Site/Location:** PCTEST Lab. Columbia, MD, USA **Test Report Serial No.:** 1M2004170066-06.A3L

# FCC ID:

## A3LSMN986W

Certification

IC: APPLICANT:

# 649E-SMN986W

Samsung Electronics Co., Ltd.

Application Type: Model/HVIN: EUT Type: Frequency Range: Modulation Type: FCC Classification: FCC Rule Part(s): ISED Specification: Test Procedure(s):

SM-N986W Portable Handset 5180 – 5825MHz OFDMA Unlicensed National Information Infrastructure (UNII) Part 15 Subpart E (15.407) RSS-247 Issue 2 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.

Randy Ortanez President



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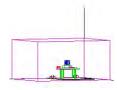


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# **MEASUREMENT REPORT**



	Channel		AN	JT1	AN	П2	MI	MO
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	56.364	17.51	59.704	17.76	56.184	17.50
2A	20	5260 - 5320	54.954	17.40	58.479	17.67	58.731	17.69
2C	20	5500 - 5720	62.087	17.93	59.566	17.75	54.773	17.39
3		5745 - 5825	58.345	17.66	57.412	17.59	51.479	17.12
1		5190 - 5230	47.098	16.73	49.888	16.98	46.638	16.69
2A	40	5270 - 5310	45.920	16.62	47.424	16.76	49.744	16.97
2C	40	5510 - 5710	45.499	16.58	49.091	16.91	49.840	16.98
3		5755 - 5795	46.238	16.65	47.643	16.78	47.094	16.73
1		5210	38.815	15.89	38.637	15.87	38.691	15.88
2A	80	5290	36.559	15.63	39.264	15.94	39.589	15.98
2C	00	5530 - 5690	39.355	15.95	39.719	15.99	36.194	15.59
3		5775	39.355	15.95	39.355	15.95	39.642	15.98

**EUT Overview** 

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## 1.0 INTRODUCTION

## 1.1 Scope

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

## 1.2 PCTEST Test Location

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

### **1.3 Test Facility / Accreditations**

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

- PCTEST is an ISO 17025-2005 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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# 2.0 **PRODUCT INFORMATION**

## 2.1 Equipment Description

The Equipment Under Test (EUT) is the **Samsung Portable Handset FCC ID: A3LSMN986W**. The test data contained in this report pertains only to the emissions due to the EUT's UNII transmitter.

Test Device Serial No.: 0702M, 0713M, 1245M, 1251M, 1250M, 1242M

## 2.2 Device Capabilities

This device contains the following capabilities:

850 CDMA/EvDO Rev0/A, 1x Advanced (BC0), 850/1900 GSM/GPRS/EDGE, 850/1700/1900, WCDMA/HSPA, Multi-band LTE, 5G NR (n71, n41, n66), 802.11b/g/n/ax WLAN, 802.11a/n/ac/ax UNII, Bluetooth (1x, EDR, LE), NFC, Wireless Power Transfer, UWB

	Band 1	_		Band 2A		Band 2C		Band 3
Ch.	Frequency (MHz)		Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch	. Frequency (MHz)
36	5180		52	5260	100	5500	14	9 5745
:	:		:	:	:	:	:	:
42	5210		56	5280	120	5600	15	7 5785
:	:		:	:	:	:	:	:
48	5240	Γ	64	5320	144	5720	16	5 5825
	Та	hla	21 0	02 11 ov (20MU-) Er	auona	Channel Operati	200	

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

	Band 1
Ch.	Frequency (MHz)
38	5190
:	:
46	5230

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

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

B	a	n	d	3

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

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

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

Table 2-3. 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	Bandwidth [MHz]	Channel	Tone	Duty Cycle		
				26T	99.4		
802.11ax	1		26	52T	99.7		
NII RU	1		36	106T	99.3		
		20		242T	98.1		
802.11ax		20		26T	99.4		
	2		36	52T	99.7		
NII RU	2		50	106T	99.3		
				242T	98.6		
				26T	99.7		
802.11ax	MIMO CDD	20	36	52T	99.3		
NII RU		20	50	106T	98.8		
				242T	97.1		
				26T	98.7		
802.11ax				52T	99.0		
NII RU	1		38	106T	99.3		
NII KO				242T	98.4		
		40		484T	93.2		
	2	40	38	26T	98.8		
802.11ax				52T	99.0		
NII RU				106T	98.1		
NILKO				242T	98.4		
				484T	95.7		
	MIMO CDD	40	38	26T	99.1		
802.11ax				52T	98.1		
NII RU				106T	96.3		
Nii Ko				242T	97.1		
				484T	88.8		
				26T	99.4		
				52T	99.2		
802.11ax	1		42	106T	99.4		
NII RU	RU		42	242T	98.6		
				484T	96.1		
		80		996T	94.7		
				26T	99.5		
				52T	99.7		
802.11ax	2		42	106T	99.4		
NII RU				242T	98.6		
				484T	97.4		
				996T	95.9		
				26T	99.2		
				52T	98.1		
802.11ax	MIMO CDD	80	42	106T	96.2		
NII RU				242T	92.7		
				484T	95.5		
						996T	91.2

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

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

WiFi Configurations		SISO		SDM		MIMO	
VIFI CO	Ingulations	ANT1	ANT2	ANT1	ANT2	ANT1	ANT2
	11ax (20MHz)	✓	$\checkmark$	✓	$\checkmark$	✓	$\checkmark$
5GHz	11ax (40MHz)	✓	✓	✓	√	✓	✓
	11ax (80MHz)	$\checkmark$	$\checkmark$	✓	$\checkmark$	$\checkmark$	$\checkmark$

Table 2-5. Frequency / Channel Operations

✓ = Support ; × = NOT Support
SISO = Single Input Single Output
SDM = Spatial Diversity Multiplexing – MIMO 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.

**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	11	157
Operating Frequency (MHz)	2462	5785
Data Rate (Mbps)	1	MCS0
Mode	802.11b	802.11n

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	100
Operating Frequency (MHz)	2412	5500
Data Rate (Mbps)	1	MCS0
Mode	802.11b	802.11n

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	1	100
Operating Frequency (MHz)	2412	5500
Data Rate (Mbps)	1	MCS0
Mode	802.11b	802.11n

#### 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.

This device supports wireless charging capability and, thus, is subject to the test requirements of KDB 648474 D03 v01r04. Additional radiated spurious emission measurements were performed with the EUT lying flat on an authorized wireless charging pad (WCP) 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)	10/30/2019	Annual	10/30/2020	WL25-1
-	WL40-1	Conducted Cable Set (40GHz)	3/13/2020	Annual	3/13/2021	WL40-1
-	WL25-4	Conducted Cable Set (25GHz)	1/22/2020	Annual	1/22/2021	WL25-4
Agilent	N9038A	MXE EMI Receiver	7/17/2019	Annual	7/17/2020	MY51210133
Anritsu	ML2495A	Power Meter	12/17/2019	Annual	12/17/2020	941001
Anritsu	MA2411B	Pulse Power Sensor	12/4/2019	Annual	12/4/2020	846215
Anritsu	MA2411B	Pulse Power Sensor	8/14/2019	Annual	8/14/2020	1315051
Anritsu	ML2495A	Power Meter	1/15/2020	Annual	1/15/2021	1328004
Anritsu	ML2496A	Power Meter	11/6/2019	Annual	11/6/2020	1405003
Anritsu	MA2411B	Pulse Power Sensor	8/27/2019	Annual	8/27/2020	1339027
Anritsu	MA2411B	Pulse Power Sensor	10/15/2019	Annual	10/15/2020	1339026
Anritsu	MS46322A	Vector Network Analyzer	8/19/2019	Annual	8/19/2020	1521001
Anritsu	36585K-2F	Precision Autocal 2-Port	7/16/2019	Annual	7/16/2020	1628014
Com-Power	AL-130	9kHz - 30MHz Loop Antenna	10/10/2019	Biennial	10/10/2021	121034
EMCO	3160-09	Small Horn (18 - 26.5GHz)	8/9/2018	Biennial	8/9/2020	135427
EMCO	3160-10	Small Horn (26.5 - 40GHz)	8/9/2018	Biennial	8/9/2020	130993
ETS Lindgren	3117	1-18 GHz DRG Horn (Medium)	2/14/2019	Biennial	2/14/2021	125518
ETS-Lindgren	3115	Double Ridged Guide Horn 750MHz - 18GHz	3/12/2020	Biennial	3/12/2022	150693
Pasternack	NMLC-2	Line Conducted Emissions Cable (NM)	1/9/2020	Annual	1/9/2021	NMLC-2
Rohde & Schwarz	TS-PR26	18-26.5 GHz Pre-Amplifier	11/1/2019	Annual	11/1/2020	100040
Rohde & Schwarz	TS-PR40	26.5-40 GHz Pre-Amplifier	11/1/2019	Annual	11/1/2020	100037
Rohde & Schwarz	ESU40	EMI Test Receiver (40GHz)	9/23/2019	Annual	9/23/2020	100348
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/11/2019	Annual	7/11/2020	102134
Rohde & Schwarz	SFUNIT-Rx	Shielded Filter Unit	7/8/2019	Annual	7/8/2020	102133
Sunol	DRH-118	Horn Antenna (1-18 GHz)	8/27/2019	Biennial	8/27/2021	A042511

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:	A3LSMN986W
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

### Notes:

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

The 26dB Bandwidth measurement for each channel was measured with the RU index showing the highest conducted power.

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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	17.15
_	5200	40	ax (20MHz)	26T	MCS0	25.64
Band 1	5240	48	ax (20MHz)	26T	MCS0	20.14
Bar	5190	38	ax (40MHz)	26T	MCS0	19.95
	5230	46	ax (40MHz)	26T	MCS0	17.37
	5210	42	ax (80MHz)	26T	MCS0	34.74
	5260	52	ax (20MHz)	26T	MCS0	18.15
∢	5280	56	ax (20MHz)	26T	MCS0	15.00
d 2	5320	64	ax (20MHz)	26T	MCS0	17.03
Band 2A	5270	54	ax (40MHz)	26T	MCS0	18.98
ш	5310	62	ax (40MHz)	26T	MCS0	18.90
	5290	58	ax (80MHz)	26T	MCS0	18.57
	5500	100	ax (20MHz)	26T	MCS0	18.30
	5600	120	ax (20MHz)	26T	MCS0	17.54
	5720	144	ax (20MHz)	26T	MCS0	17.48
2C	5510	102	ax (40MHz)	26T	MCS0	18.52
Band 2C	5590	118	ax (40MHz)	26T	MCS0	19.75
Ba	5710	142	ax (40MHz)	26T	MCS0	17.99
	5530	106	ax (80MHz)	26T	MCS0	19.67
	5610	122	ax (80MHz)	26T	MCS0	18.37
	5690	138	ax (80MHz)	26T	MCS0	34.84

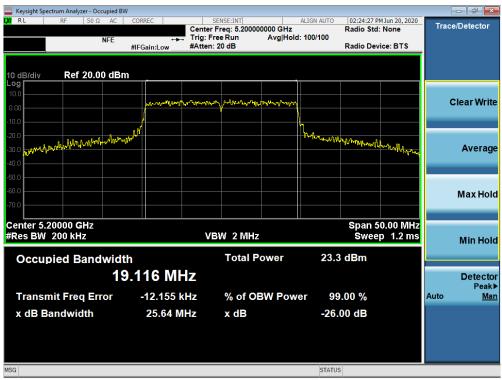
Table 7-2. Conducted Bandwidth Measurements SISO ANT1 (26 Tones)

FCC ID: A3LSMN986W	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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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)

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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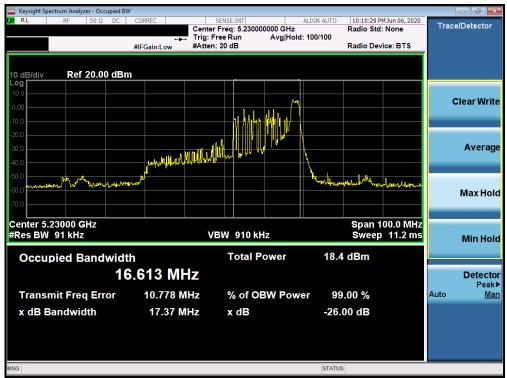
Plot 7-3. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 48)



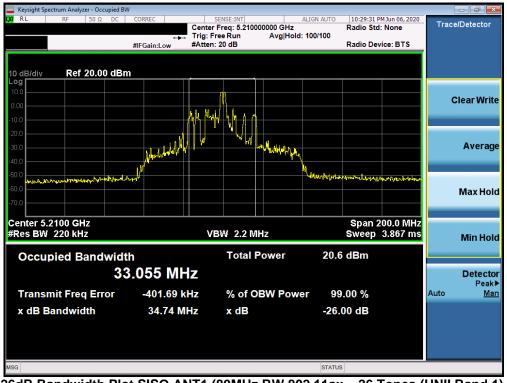
Plot 7-4. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax – 26 Tones (UNII Band 1) – Ch. 38)

FCC ID: A3LSMN986W		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)

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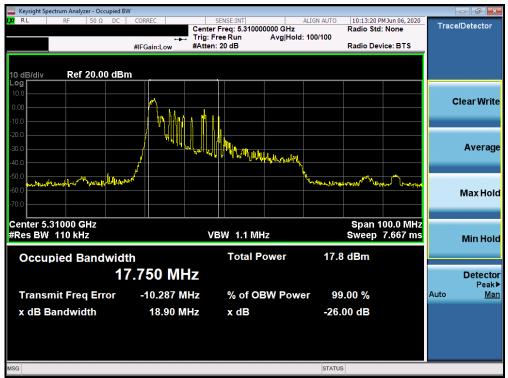
Plot 7-9. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 64)



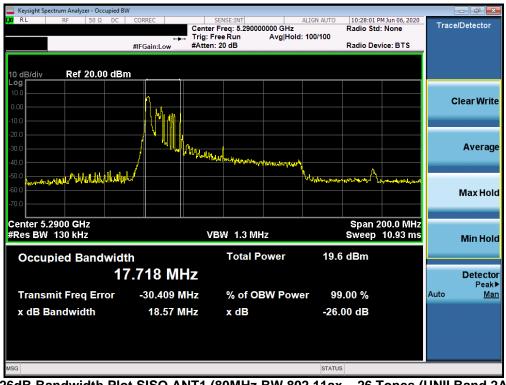
Plot 7-10. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 54)

FCC ID: A3LSMN986W		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: A3LSMN986W		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)



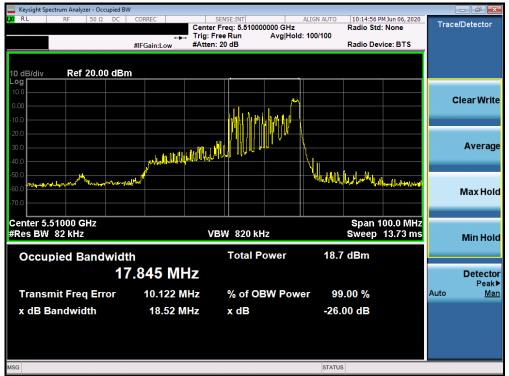
Plot 7-14. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 120)

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	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)



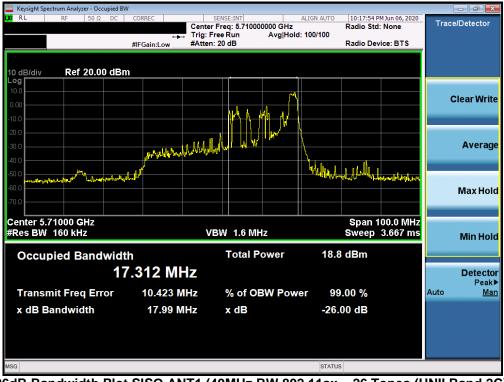
Plot 7-16. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 102)

FCC ID: A3LSMN986W	PCTEST Mould forbe part of B	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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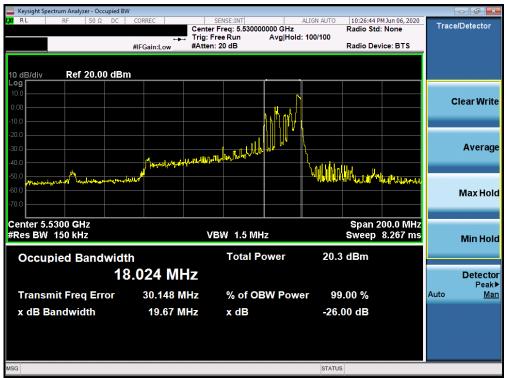
Plot 7-17. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 118)



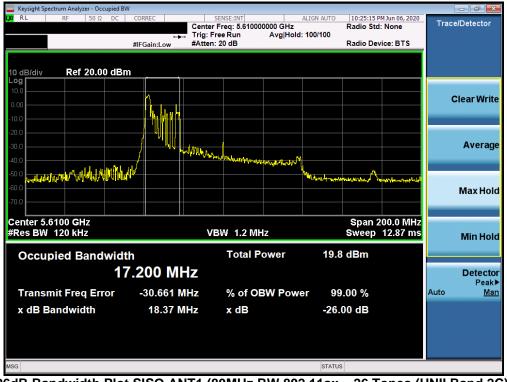
Plot 7-18. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 142)

FCC ID: A3LSMN986W	Houst for be part of B	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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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: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Plot 7-21. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 138)

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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	23.36
	5200	40	ax (20MHz)	242T	MCS0	22.65
Band 1	5240	48	ax (20MHz)	242T	MCS0	31.74
Bar	5190	38	ax (40MHz)	484T	MCS0	48.82
	5230	46	ax (40MHz)	484T	MCS0	40.50
	5210	42	ax (80MHz)	996T	MCS0	81.24
	5260	52	ax (20MHz)	242T	MCS0	35.14
	5280	56	ax (20MHz)	242T	MCS0	38.71
Band 2A	5320	64	ax (20MHz)	242T	MCS0	36.77
Ban	5270	54	ax (40MHz)	484T	MCS0	52.19
	5310	62	ax (40MHz)	484T	MCS0	67.25
	5290	58	ax (80MHz)	996T	MCS0	102.20
	5500	100	ax (20MHz)	242T	MCS0	33.37
	5580	116	ax (20MHz)	242T	MCS0	35.95
	5700	140	ax (20MHz)	242T	MCS0	36.42
ပ္ရ	5510	102	ax (40MHz)	484T	MCS0	65.33
Band 2C	5590	118	ax (40MHz)	484T	MCS0	71.44
Ba	5710	142	ax (40MHz)	484T	MCS0	52.80
	5530	106	ax (80MHz)	996T	MCS0	103.50
	5610	122	ax (80MHz)	996T	MCS0	97.51
	5690	138	ax (80MHz)	996T	MCS0	96.79

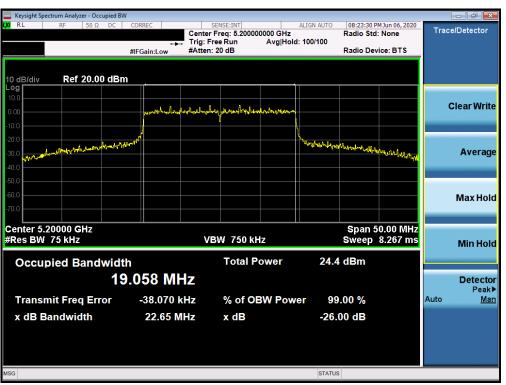
Table 7-3. Conducted Bandwidth Measurements SISO ANT1 (Full Tones)

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BW	1				
0/4 RL   RF  50Ω DC	Center Trig: F #IFGain:Low #Atten		Radio 5 d: 100/100	9 PM Jun 06, 2020 Std: None Device: BTS	Trace/Detector
10 dB/div Ref 20.00 dBm 10.0 0.00 -10.0	) 	m franksammafar yangangangan			Clear Write
-20.0 -30.0 -40.0	N. AV		In him land and hand hand hand hand hand hand ha	auge bruge appending	Averag
-60.0					Max Hole
Center 5.18000 GHz #Res BW 220 kHz Occupied Bandwidt		BW 2.2 MHz Total Power		1 50.00 MHz weep 1 ms	Min Hole
19	.076 MHz				Detecto Peak
Transmit Freq Error x dB Bandwidth	-39.361 kHz 23.36 MHz	% of OBW Pow x dB	ver 99.00 % -26.00 dB		Auto <u>Ma</u>
MSG			STATUS		

Plot 7-22. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 242 Tones (UNII Band 1) - Ch. 36)



Plot 7-23. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 242 Tones (UNII Band 1) - Ch. 40)

FCC ID: A3LSMN986W	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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🔤 Keysight Spectrum Analyzer - Occupied BW 🚽							
LX/ RL RF 50Ω DC C		ENSE:INT Freg: 5.240000000 GHz	ALIGN AUTO	08:27:29 P Radio Std	M Jun 06, 2020	Trac	e/Detector
	Trig: Fr	ee Run Avg Hol	d:>100/100				
#	FGain:Low #Atten:	20 dB		Radio Dev	ice: BTS		
10 dB/div Ref 20.00 dBm			·				
10.0							
0.00	Mar marker Mar Marker	Chin man har all and and	1			(	Clear Write
-10.0			<b>\</b> .				
-10.0	r I		Whym	and march of			
-20.0 -20.0 -10.0				and the second	www.		Average
30.0							Average
-40.0							
-50.0							
-60.0							Max Hold
-70.0							
Center 5.24000 GHz				Cnon F			
#Res BW 330 kHz	VB	W 3 MHz			0.00 MHz ep 1 ms		
INTO DA GOURIE					Job 1 1110		Min Hold
Occupied Bandwidth		Total Power	24.7	dBm			
	344 MHz						Detector
19.3							Peak ►
Transmit Freq Error	8.260 kHz	% of OBW Pow	/er 99	.00 %		Auto	<u>Man</u>
x dB Bandwidth	31.74 MHz	x dB	-26	00 dB			
		A GB	20.				
MSG			STATUS				

Plot 7-24. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 242 Tones (UNII Band 1) - Ch. 48)



Plot 7-25. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - 484 Tones (UNII Band 1) - Ch. 38)

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Keysight Spectrum Analyzer - Occupied BW					- ē <del>x</del>
02 RL RF 50Ω DC	HFGain:Low #Atter	SENSE:INT     r Freq: 5.23000000 GHz Free Run Avg Hol 1: 20 dB	ALIGN AUTO 09:24:15 I Radio Sto d: 100/100 Radio De		Trace/Detector
Log 10.0 -10.0		n n garanaska majira na ana ang na magika			Clear Write
-20.0 -30.0 -40.0	Jud <sup>1</sup>		homelit hat the former of the	hn han with the	Average
-50.0 -60.0 -70.0					Max Hold
Center 5.23000 GHz #Res BW 510 kHz		/BW 5 MHz Total Power		100.0 MHz eep 1 ms	Min Hold
	.772 MHz				Detector Peak►
Transmit Freq Error x dB Bandwidth	17.062 kHz 40.50 MHz	% of OBW Pow x dB	ver 99.00 % -26.00 dB		Auto <u>Man</u>
MSG			STATUS		

Plot 7-26. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - 484 Tones (UNII Band 1) - Ch. 46)



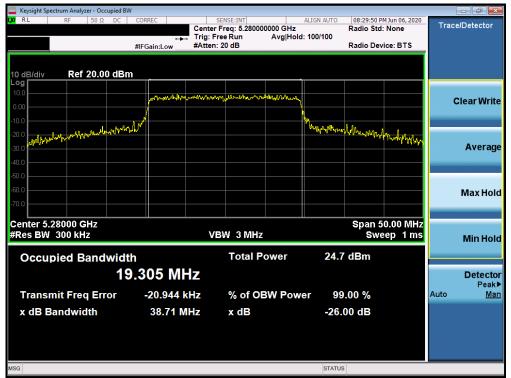
Plot 7-27. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax - 996 Tones (UNII Band 1) - Ch. 42)

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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🧫 Keysight Spectrum Analyzer - Occupied	BW						
LXI RL RF 50Ω DC	CORREC	SENSE:INT Center Freg: 5.26000	ALIGN AUTO	08:28:40 PI Radio Std:	MJun 06, 2020	Trace	Detector
		Trig: Free Run	Avg Hold: 100/100	Radio Stu:	None		
	#IFGain:Low	#Atten: 20 dB		Radio Dev	ice: BTS		
10 dB/div Ref 20.00 dE	3m						
Log 10.0							
	hardologia	muumlun ya anany kanya	warranervy			С	lear Write
0.00							
-10.0	and the second second		Mushar ale	ALK A			
-10.0 -20.0			4 - 1 - 1 - V - V - V - V - V - V - V - V	whydre	throwing to		
-30.0							Average
-40.0							
-50.0							
-60.0							Max Hold
-70.0							Max Holu
10.0							
Center 5.26000 GHz					0.00 MHz		
#Res BW 330 kHz		VBW 3 MHz		Swe	ep 1 ms		Min Hold
Occurried Dendurie	141-	Total P	owor 24.6	dBm			
Occupied Bandwic			Ower 24.0	UDIII			
1	9.290 MH	Ζ					Detector
Transmit Freq Error	-17.038 kH	z % of O	BW Power 99	.00 %		Auto	Peak▶ <u>Man</u>
x dB Bandwidth	35.14 MH	z xdB	-26.	00 dB			
100							
MSG			STATUS	5			

Plot 7-28. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 242 Tones (UNII Band 2A) - Ch. 52)



Plot 7-29. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 242 Tones (UNII Band 2A) - Ch. 56)

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BW									
<mark>LX/</mark> RL RF 50Ω DC (	CORREC	Center Fre	SE:INT	0000 GH7	ALIGN AUTO	08:32:15 P	M Jun 06, 2020	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									
10.0									
0.00	pennon	Hard Marker Land	հրուստ ԴՄՆ-հրույ 	Whenthew Wry				(	Clear Write
-10.0	1				L,				
-20.0 - Mader Park Market Market	5 <sup>40</sup>				monthlying	h human have	sh		
A Maria Anna an							and the second second		Average
-30.0									Average
-40.0									
-50.0									
-60.0									Max Hold
-70.0									
Center 5.32000 GHz						Snan 5	0.00 MHz		
#Res BW 360 kHz		VBW	4 MHz				ep 1 ms		Min Hold
									Minitiona
Occupied Bandwidth			Total P	ower	24.8	dBm			
19.	523 MH	Z							Detector
				_					Peak▶
Transmit Freq Error	-18.354 kl	HZ	% of OE	BW Pow	er 99	.00 %		Auto	<u>Man</u>
x dB Bandwidth	36.77 MI	Hz	x dB		-26.	00 dB			
MSG					STATUS	;			

Plot 7-30. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax – 242 Tones (UNII Band 2A) – Ch. 64)



Plot 7-31. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - 484 Tones (UNII Band 2A) - Ch. 54)

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dage 22 of 202	
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Keysight Spectrum Analyzer - Occupied	BW						- • • ×
<b>(X) RL</b> RF 50Ω DC	Trig:	SENSE:INT er Freq: 5.310000000 GHz Free Run Avg Hol en: 20 dB	d: 100/100	09:27:01 Pl Radio Std: Radio Devi		Trace/I	Detector
10 dB/div Ref 20.00 dB	m		•				
10.0 0.00	Mr. Marken and Marken a	my thank the and the master	4			СІ	ear Write
-10.0 -20.0 -30.0	ылат <sup>(</sup>		1 MMARdaellhay	ᡩᡟᡊᡊᡃᡘ᠆ᠯᠬᡃᢩᡀᠧ	~~hahatakan		Average
-40.0 -50.0 -60.0 -70.0							Max Hold
Center 5.31000 GHz #Res BW 620 kHz		VBW 6 MHz			00.0 MHz ep 1 ms		Min Hold
Occupied Bandwid	ith 7.734 MHz	Total Power	24.3	dBm			Detector Peak▶
Transmit Freq Error x dB Bandwidth	-12.673 kHz 67.25 MHz	% of OBW Pov x dB	ver 99.1 -26.0	00 % 0 dB		Auto	Peak► <u>Man</u>
MSG			STATUS				

Plot 7-32. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - 484 Tones (UNII Band 2A) - Ch. 62)



Plot 7-33. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax - 996 Tones (UNII Band 2A) - Ch. 58)

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 00 at 000	
1M2004170066-06.A3L	4/17 - 6/22/2020	Portable Handset		Page 33 of 292	
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Keysight Spectrum Analyzer - Occupied BW							- 6 ×
LXX RL RF 50Ω DC COF		NSE:INT reg: 5.500000000 GHz	ALIGN AUTO	08:33:36 P	M Jun 06, 2020	Trac	e/Detector
	🛶 Trig: Fre	e Run Avg Hol	d: 100/100				
#IF0	#IFGain:Low #Atten: 20 dB Radio Device: BTS						
10 dB/div Ref 20.00 dBm	1		-				
10.0	Reterior Martin Martin Strategie	war www.	<b>L</b>				
0.00			<u> </u>				Clear Write
-10.0			March 1 and	1			
-20.0 alather flagen and flagen alf and all the			**** 4w/\UUU	month Marthant	whole was		
-30.0							Average
-40.0							
-50.0							
-60.0							Max Hold
-70.0							maxmona
				<b>0</b>			
Center 5.50000 GHz #Res BW 390 kHz	VB	W 4 MHz			0.00 MHz ep 1 ms		
		A + MI12		0	ср тшэ		Min Hold
Occupied Bandwidth		Total Power	24.7	′ dBm			
19.4	75 MHz						Detector
							Peak►
Transmit Freq Error	-1.239 kHz	% of OBW Pov	ver 99	.00 %		Auto	<u>Man</u>
x dB Bandwidth	33.37 MHz	x dB	-26.	00 dB			
MSG			STATUS	3			

Plot 7-34. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 242 Tones (UNII Band 2C) - Ch. 100)



Plot 7-35. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 242 Tones (UNII Band 2C) - Ch. 120)

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occupied BW								
LX/RL RF 50Ω DC C	ORREC	SENSE:INT enter Freg: 5.72000		ALIGN AUTO	08:36:22 P Radio Std	M Jun 06, 2020	Trac	e/Detector
		rig: 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	ALL MARK	عريبي والإلالة المحمد	1 A A A A A					
0.00	College Colleg	- We also have a local state of the State	Didion Bloch Grown				(	Clear Write
-10.0	1			<b>\</b>				
-20.0 with Whow yester man white	ſ			M Marile Marine	where where the second	Mann of I		
-30.0								Average
-40.0								Average
-50.0								
-60.0								Max Hold
-70.0								
Center 5.72000 GHz					Span 5	0.00 MHz		
#Res BW 360 kHz		VBW 4 MHz				eep 1 ms		Min Hold
		<b>T</b> -4-1 D		04.0				
Occupied Bandwidth		Total P	ower	24.6	dBm			
19.	460 MHz							Detector
Tronowit From Freeze	24 244 615	% of OE		00	00.0/		Auto	Peak▶ Man
· · · ·	-24.211 kHz		SVV POW		.00 %		Auto	IVIAII
x dB Bandwidth	36.42 MHz	x dB		-26.	00 dB			
MSG				STATUS				

Plot 7-36. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 242 Tones (UNII Band 2C) - Ch. 144)



Plot 7-37. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - 484 Tones (UNII Band 2C) - Ch. 102)

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occupied BW	1						- 6 ×
LXX RL RF 50Ω DC	Center Trig: F	SENSE:INT Freq: 5.590000000 GHz Free Run Avg Hol I: 20 dB	ALIGN AUTO	09:29:35 P Radio Std: Radio Dev		Trace	/Detector
10 dB/div Ref 20.00 dBm	1						
Log 10.0 0.00	matagetybergerartiteday	wayneerstatestar				с	lear Write
-10.0 -20.0 -30.0 WWWWWWWWWWWWWWWWW -40.0			WWw.gentwinde.fr	<del>ห่างๆใหม่อย่างใจม</del> า	<sup>ᡎ</sup> ᠰᡅᢛᡝᢩᠰ᠆ᡁ <mark>ᡀᢣ</mark>		Average
-50.0 -60.0 -70.0							Max Hold
Center 5.59000 GHz #Res BW 750 kHz		BW 8 MHz		Swe	00.0 MHz ep 1 ms		Min Hold
Occupied Bandwidt 37	<sup>h</sup> ′.8 <b>99 MHz</b>	Total Power	24.3	dBm			Detector Peak▶
Transmit Freq Error	-24.388 kHz	% of OBW Pow		.00 %		Auto	<u>Man</u>
x dB Bandwidth	71.44 MHz	x dB	-26.0	00 dB			
MSG			STATUS				

Plot 7-38. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax – 484 Tones (UNII Band 2C) – Ch. 118)



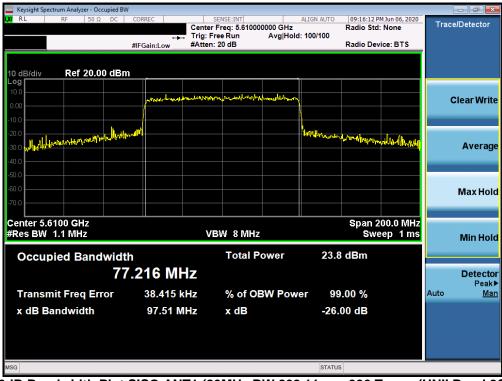
Plot 7-39. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - 484 Tones (UNII Band 2C) - Ch. 142)

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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1M2004170066-06.A3L	4/17 - 6/22/2020	Portable Handset	ble Handset		
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Keysight Spectrum Analyzer - Occupied B	W				
02 RL RF 50 Ω DC	, , , , , , , , , , , , , , , , , , ,	SENSE:INT Preq: 5.530000000 GHz Free Run Avg Ho en: 20 dB			Trace/Detector
Log 10.0 0.00 -10.0	Wand and a start of the start o	millen janaall ter Vikatika siyaa ay	<b>%</b>		Clear Write
-20.0 -30.0 ///////////////////////////////////			han Takondakya Minanya anakin 		Average
-50.0					Max Hold
Center 5.5300 GHz #Res BW 1 MHz Occupied Bandwid		VBW 8 MHz Total Power		200.0 MHz eep 1 ms	Min Hold
	7.186 MHz				Detector Peak▶
Transmit Freq Error x dB Bandwidth	28.880 kHz 103.5 MHz	% of OBW Pow x dB	wer 99.00 % -26.00 dB		Auto <u>Man</u>
MSG			STATUS		

Plot 7-40. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax – 996 Tones (UNII Band 2C) – Ch. 106)



Plot 7-41. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax - 996 Tones (UNII Band 2C) - Ch. 122)

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dega 07 of 000	
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Keysight Spectrum Analyzer - Occupied BW					- ē 💌
#IF1	Center Trig: F	SENSE:INT Freq: 5.690000000 GHz ree Run Avg Holo : 20 dB	Radio 1: 100/100	:45 PM Jun 06, 2020 Std: None Device: BTS	Trace/Detector
10 aB/div Ref 20.00 dBm Log 100 000 -100	Julius provident	เกม Marthondola Juginitha Juginitha Juginitha Juginitha Juginitha Juginitha Juginitha Juginitha Juginitha Jugini			Clear Write
-20.0 -20.0 Appl yunghim and an a factural -40.0			hap the deriver of the	-rhouse (Migrellinghell)	Average
-60.0 -60.0 -70.0					Max Hold
Center 5.6900 GHz #Res BW 1.1 MHz Occupied Bandwidth	V	BW 8 MHz Total Power		n 200.0 MHz Sweep 1 ms 1	Min Hold
77.1 Transmit Freq Error x dB Bandwidth	24 MHz 82.665 kHz 96.79 MHz	% of OBW Pow x dB	-26.00 dE		Detector Peak▶ Auto <u>Man</u>
MSG			STATUS		

Plot 7-42. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax – 996 Tones (UNII Band 2C) – Ch. 138)

FCC ID: A3LSMN986W	PCTEST	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	20.02
_	5200	40	ax (20MHz)	26T	MCS0	18.53
1 pt	5240	48	ax (20MHz)	26T	MCS0	6.25
Band 1	5190	38	ax (40MHz)	26T	MCS0	21.04
	5230	46	ax (40MHz)	26T	MCS0	19.45
	5210	42	ax (80MHz)	26T	MCS0	32.88
	5260	52	ax (20MHz)	26T	MCS0	18.90
۷	5280	56	ax (20MHz)	26T	MCS0	17.59
Band 2A	5320	64	ax (20MHz)	26T	MCS0	17.29
3an	5270	54	ax (40MHz)	26T	MCS0	20.92
ш	5310	62	ax (40MHz)	26T	MCS0	20.05
	5290	58	ax (80MHz)	26T	MCS0	38.23
	5500	100	ax (20MHz)	26T	MCS0	13.30
	5600	120	ax (20MHz)	26T	MCS0	15.06
	5720	144	ax (20MHz)	26T	MCS0	19.70
2C	5510	102	ax (40MHz)	26T	MCS0	16.75
Band 2C	5590	118	ax (40MHz)	26T	MCS0	18.81
Ba	5710	142	ax (40MHz)	26T	MCS0	17.99
	5530	106	ax (80MHz)	26T	MCS0	36.56
	5610	122	ax (80MHz)	26T	MCS0	37.16
	5690	138	ax (80MHz)	26T	MCS0	34.84

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

FCC ID: A3LSMN986W	PCTEST	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: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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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: A3LSMN986W		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: A3LSMN986W	Houst for be part of B	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-49. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 52)



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

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-51. 26dB Bandwidth Plot SISO ANT2 (20MHz 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: A3LSMN986W		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: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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1M2004170066-06.A3L	4/17 - 6/22/2020	Portable Handset		Page 45 of 292	
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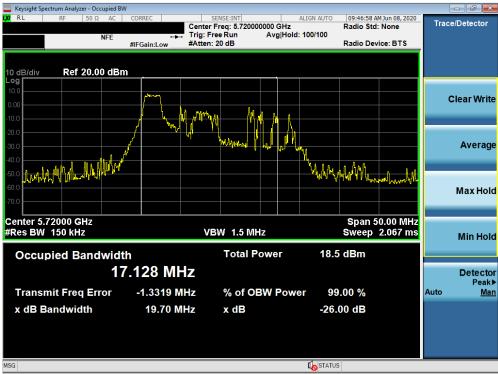
Plot 7-55. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 100)



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

FCC ID: A3LSMN986W	PCTEST Mould forbe part of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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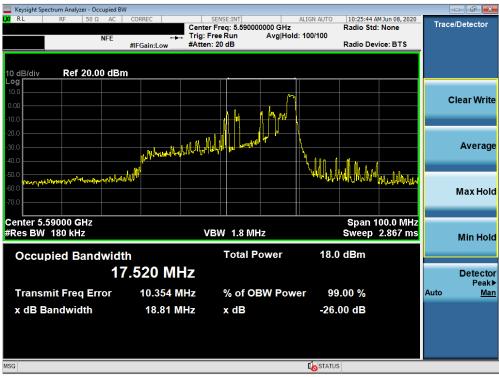
Plot 7-57. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 144)



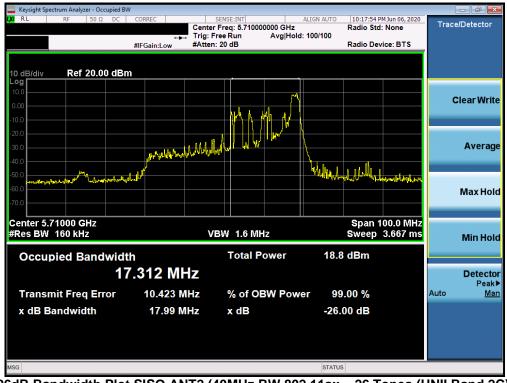
Plot 7-58. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 102)

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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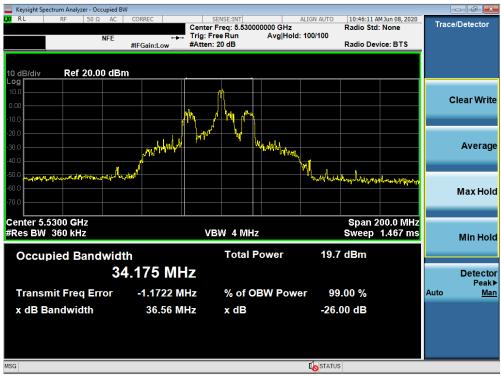
Plot 7-59. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 118)



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

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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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: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Plot 7-63. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 138)

FCC ID: A3LSMN986W	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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## SISO Antenna-2 26dB 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	27.08
	5200	40	ax (20MHz)	242T	MCS0	29.63
Band 1	5240	48	ax (20MHz)	242T	MCS0	31.59
Bar	5190	38	ax (40MHz)	484T	MCS0	41.78
	5230	46	ax (40MHz)	484T	MCS0	49.12
	5210	42	ax (80MHz)	996T	MCS0	80.76
	5260	52	ax (20MHz)	242T	MCS0	33.68
	5280	56	ax (20MHz)	242T	MCS0	34.53
Band 2A	5320	64	ax (20MHz)	242T	MCS0	33.73
Ban	5270	54	ax (40MHz)	484T	MCS0	49.26
	5310	62	ax (40MHz)	484T	MCS0	67.43
	5290	58	ax (80MHz)	996T	MCS0	81.45
	5500	100	ax (20MHz)	242T	MCS0	42.35
	5580	116	ax (20MHz)	242T	MCS0	47.62
	5700	140	ax (20MHz)	242T	MCS0	48.16
ပ္ရ	5510	102	ax (40MHz)	484T	MCS0	79.43
Band 2C	5590	118	ax (40MHz)	484T	MCS0	83.33
B	5710	142	ax (40MHz)	484T	MCS0	78.40
	5530	106	ax (80MHz)	996T	MCS0	161.20
	5610	122	ax (80MHz)	996T	MCS0	158.10
	5690	138	ax (80MHz)	996T	MCS0	137.00

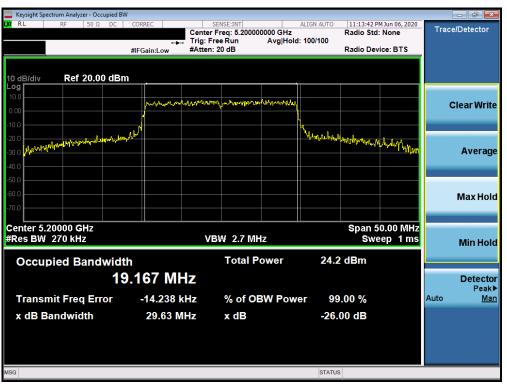
Table 7-5. Conducted Bandwidth Measurements SISO ANT2 (Full Tones)

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 51 of 202	
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Keysight Spectrum Analyzer - Occupied	BW				- ē <del>×</del>
<b>LXI RL</b> RF 50 Ω DC	+++ Trig: I	SENSE:INT r Freq: 5.180000000 GHz Free Run Avg Holo h: 20 dB	ALIGN AUTO  11:12:14 F Radio Sto d: 100/100 Radio De		Trace/Detector
10 dB/div Ref 20.00 dE	¦m				
0.00	undraftall-teiningarandarandar	Way w water and when he way	· · · · · · · · · · · · · · · · · · ·		Clear Write
-10.0 -20.0 -30.0 wall all and a share all and a share all and a share all and a share all a share all a share all and a share all a share	Aural		Mugan productions	um m ha	Average
-50.0 -60.0 -70.0					Max Hold
Center 5.18000 GHz #Res BW 240 kHz	V	/BW 2.4 MHz	Sw	50.00 MHz eep 1 ms	Min Hold
	Occupied Bandwidth Total Power 24.0 dBm 19.172 MHz				
Transmit Freq Error x dB Bandwidth	-20.533 kHz 27.08 MHz	% of OBW Pow x dB	ver 99.00 % -26.00 dB		Peak▶ Auto <u>Man</u>
MSG			STATUS		

Plot 7-64. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 242 Tones (UNII Band 1) - Ch. 36)



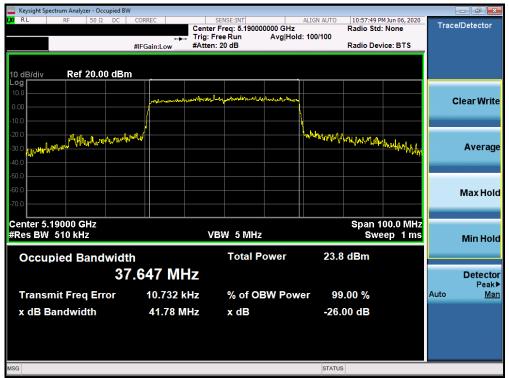
Plot 7-65. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 242 Tones (UNII Band 1) - Ch. 40)

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 50 at 000
1M2004170066-06.A3L	4/17 - 6/22/2020	4/17 - 6/22/2020 Portable Handset		Page 52 of 292
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🧫 Keysight Spectrum Analyzer - Occupied BW							
LXI RL RF 50Ω DC C		ENSE:INT Freg: 5.240000000 GHz	ALIGN AUTO	11:14:56 P Radio Std	M Jun 06, 2020	Trac	e/Detector
	Trig: Fr	ee Run Avg Hold	d: 100/100				
#	IFGain:Low #Atten:	20 dB		Radio Dev	ice: BTS		
10 dB/div Ref 20.00 dBm							
Log 10.0							
0.00	14th all all all and a contraction	What was a start and the second	ļ			(	Clear Write
-10.0	1						
-10.0	<del>v</del> /		100000	Ju			
-20.0				A BANKANA AND AND A	Mr. Warwall for		Average
							Average
-40,0							
-50.0							
-60.0							Max Hold
-70.0							
Center 5.24000 GHz				Cnon 5	0.00 MHz		
#Res BW 300 kHz	VE	SW 3 MHz			ep 1 ms		Min Hold
							ΜΙΠΗΟΙά
Occupied Bandwidth		Total Power	24.5	dBm			
19	225 MHz						Detector
							Peak▶
Transmit Freq Error	-11.974 kHz	% of OBW Pow	'er 99	.00 %		Auto	<u>Man</u>
x dB Bandwidth	31.59 MHz	x dB	-26.	00 dB			
MSG			STATUS				
100			STATUS				

Plot 7-66. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 242 Tones (UNII Band 1) - Ch. 48)



Plot 7-67. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - 484 Tones (UNII Band 1) - Ch. 38)

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 52 of 202	
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Keysight Spectrum Analyzer - Occupied BW							- 6
	Center		ALIGN AUTO	10:59:19 P Radio Std: Radio Dev		Trace	/Detector
10 dB/div Ref 20.00 dBm							
Log 10.0 0.00	hand have have have have have have have have	A from internet water	• • •			C	lear Write
-10.0 -20.0 -30.0	Wed		herildiyand	, <sup>1</sup> կի <sub>ն</sub> ի <sub>տ</sub> երոչտ <sup>1</sup> իս,	uww.		Average
-50.0 -60.0 -70.0							Max Hold
Center 5.23000 GHz #Res BW 680 kHz	VE	3W 6 MHz			00.0 MHz ep 1 ms		Min Hold
Occupied Bandwidth		Total Power	24.6	i dBm			
	.694 MHz						Detector Peak▶
Transmit Freq Error	15.173 kHz	% of OBW Pow	ver 99	.00 %		Auto	Man
x dB Bandwidth	49.12 MHz	x dB	-26.	00 dB			
MSG			STATUS	5			

Plot 7-68. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - 484 Tones (UNII Band 1) - Ch. 46)



Plot 7-69. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax - 996 Tones (UNII Band 1) - Ch. 42)

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occupied	d BW						×
<mark>(X)</mark> RL RF 50 Ω DC	C CORREC	SENSE:INT Center Freq: 5.26000	ALIGN AUTO	11:16:06 P Radio Std	M Jun 06, 2020	Trace/Deteo	tor
	·••·	Trig: Free Run	Avg Hold: 100/100	Raulo Stu	None		
	#IFGain:Low	#Atten: 20 dB		Radio Dev	ice: BTS		
10 dB/div Ref 20.00 d	Bm						
Log 10.0							
	munition	www.www.www.	mmm			Clear	Nrite
0.00							
-10.0	1 De 01 <sup>94</sup>		Multon (				
-20.0	Jack In.			hower	When when a	_	
-30.0 2					e i fili	Ave	erage
-40.0							_
-50.0							
-60.0						Мах	Hold
-70.0							
Center 5.26000 GHz #Res BW 270 kHz		VBW 2.7 MH	-		0.00 MHz		
#Res DW 270 KHZ			12	SWE	ep 1ms	Min	Hold
Occupied Bandwi	dth	Total P	ower 24.	7 dBm			_
		_					
	19.249 MH	Z					ector <sup>P</sup> eak ►
Transmit Freq Error	-24.463 kl	lz % of OE	BW Power 99	9.00 %		Auto	Man
x dB Bandwidth	33.68 MI	lz xdB	-26	.00 dB			
NSO			07171	0			
MSG			STATU	5			

Plot 7-70. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax – 242 Tones (UNII Band 2A) – Ch. 52)



Plot 7-71. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 242 Tones (UNII Band 2A) - Ch. 56)

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BW							- 6 🔀
🗶 RL RF 50Ω DC COP		ENSE:INT Freg: 5.320000000 GHz	ALIGN AUTO	11:19:43 P Radio Std	M Jun 06, 2020	Trac	e/Detector
	Trig: Fre		d: 100/100	Radio Stu	None		
#IFC	Gain:Low #Atten: :	20 dB		Radio Dev	ice: BTS		
10 dB/div Ref 20.00 dBm							
Log 10.0							
0.00	match man ment here may	to and a start and the start a	V			(	Clear Write
			h				
-10.0			W		0		
-20.0 Million Manus Marken Marken Marken				and the second	Walk Walt		Average
-30.0							Average
-40.0							
-50.0							
-60.0							Max Hold
-70.0						_	
Center 5.32000 GHz				Snan 5	0.00 MHz		
#Res BW 360 kHz	VB	W 4 MHz			ep 1 ms		Min Hold
							WIITHOLU
Occupied Bandwidth		Total Power	24.3	dBm			
19.4	76 MHz						Detector
							Peak▶
Transmit Freq Error	-1.911 kHz	% of OBW Pow	er 99.	.00 %		Auto	<u>Man</u>
x dB Bandwidth	33.73 MHz	x dB	-26.0	00 dB			
MSG			STATUS				

Plot 7-72. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax – 242 Tones (UNII Band 2A) – Ch. 64)



Plot 7-73. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - 484 Tones (UNII Band 2A) - Ch. 54)

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 56 of 292
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Keysight Spectrum Analyzer - Occupied BV	V				_ <b>6</b> <u>×</u>
L <mark>X/</mark> RL RF 50Ω DC	CORREC	SENSE:INT er Freg: 5.310000000 GHz	ALIGN AUTO 11:01:54 Radio Std	M Jun 06, 2020	Trace/Detector
	Trig:	Free Run Avg Hol	d: 100/100		
	#IFGain:Low #Atte	n: 20 dB	Radio De	vice: BTS	
10 dB/div Ref 20.00 dBn	n				
Log 10.0					
	mallometershare	my derether the the second	l l		Clear Write
0.00					
-10.0					
-20.0	here and the second sec		What also William of the	M	
-30.0 Cripter of the second				- Carlo all Alfanticals	Average
-40.0					
-50.0					
-60.0					Max Hold
-70.0					
Center 5.31000 GHz #Res BW 510 kHz	,	/BW 5 MHz		100.0 MHz eep 1 ms	
#Res BW 510 KHz			SW	eep rins	Min Hold
Occupied Bandwidt	h	Total Power	23.7 dBm		
	7.703 MHz				Detector
31					Detector Peak▶
Transmit Freq Error	-30.368 kHz	% of OBW Pow	ver 99.00 %		Auto <u>Man</u>
x dB Bandwidth	67.43 MHz	x dB	-26.00 dB		
			20100 42		
MSG			STATUS		

Plot 7-74. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - 484 Tones (UNII Band 2A) - Ch. 62)



Plot 7-75. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax - 996 Tones (UNII Band 2A) - Ch. 58)

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Page 57 of 292	
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🔤 Keysight Spectrum Analyzer - Occupied BW							- • ×
X RL RF 50Ω DC	CORREC	SENSE:INT r Freg: 5.500000000 GHz	ALIGN AUTO	11:21:07 PM Radio Std:	Jun 06, 2020	Trace	e/Detector
	Trig: F	ree Run Avg Ho	ld: 100/100				
	#IFGain:Low #Atter	n: 20 dB		Radio Devi	ce: BTS		
10 dB/div Ref 20.00 dBm							
10.0							
	monteralista	าหม่องการกับไห้เกาะโหน่งสายการที่	bay .			c	Clear Write
0.00			<b>1</b>				
-10.0 -20.0 pt after the man of a photon of the man	ala l		Www.www.	<sup>Վ</sup> ուՆյու <sub>Նդերետ</sub>	Mala and the		
-20.0 when the second s					- mar - wheel		
-30.0							Average
-40.0							
-50.0							
-60.0							Max Hold
-70.0							maxinoia
Center 5.50000 GHz					0.00 MHz		
#Res BW 390 kHz	V	'BW 4 MHz		Swe	ep 1 ms		Min Hold
Occupied Bandwidt	b	Total Power	24.4	dBm			
			2-11-1				
21	.182 MHz						Detector
Transmit Freq Error	296.06 kHz	% of OBW Pov	wer 99.(	00 %		Auto	Peak▶ <u>Man</u>
x dB Bandwidth	42.35 MHz	x dB	-26.0	0 dB			
MSG			STATUS				
Dew			STATUS				

Plot 7-76. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 242 Tones (UNII Band 2C) - Ch. 100)



Plot 7-77. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 242 Tones (UNII Band 2C) - Ch. 120)

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga EQ of 202	
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Plot 7-78. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 242 Tones (UNII Band 2C) - Ch. 144)



Plot 7-79. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - 484 Tones (UNII Band 2C) - Ch. 102)

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dege 50 of 202	
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Keysight Spectrum Analyzer - Occupied BW							- 6 <u>- ×</u>
<b>LXX RL</b> RF 50Ω DC CC		SENSE:INT Freq: 5.590000000 GHz	ALIGN AUTO	11:04:43 P Radio Std	M Jun 06, 2020 None	Trace	e/Detector
#1	FGain:Low #Atten:		u. 100/100	Radio Dev	ice: BTS		
10 dB/div Ref 20.00 dBm							
Log 10.0 0.00	president and the president	handhitherfullity and the second	\			c	Clear Write
-10.0	Ń		have an initiation of the	Hermony	pill Night		
-30.0							Average
-60.0							Max Hold
-70.0							
Center 5.59000 GHz #Res BW 680 kHz	VI	BW 6 MHz			00.0 MHz ep 1 ms		Min Hold
Occupied Bandwidth		Total Power	23.8	dBm		_	
	521 MHz						Detector Peak▶
Transmit Freq Error	-43.850 kHz	% of OBW Pow	ver 99	.00 %		Auto	<u>Man</u>
x dB Bandwidth	83.33 MHz	x dB	-26.0	00 dB			
MSG			STATUS				

Plot 7-80. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax – 484 Tones (UNII Band 2C) – Ch. 118)



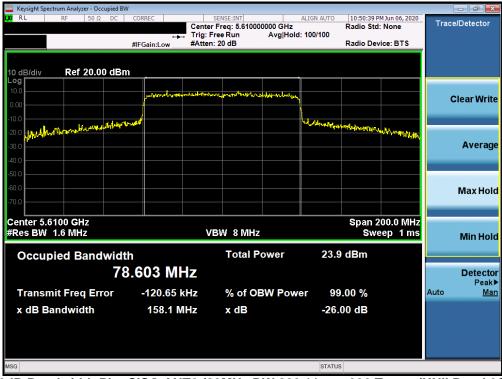
Plot 7-81. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax – 484 Tones (UNII Band 2C) – Ch. 142)

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Keysight Spectrum Analyzer - Occup	pied BW								
<mark>(X)</mark> RL RF 50 Ω	DC CORREC		INSE:INT reg: 5.53000	0000 GH-	ALIGN AUTO	10:49:21 P Radio Std	M Jun 06, 2020	Trac	e/Detector
		+++ Trig: Fre	e Run	Avg Hold	: 100/100	Radio Stu	. None		
	#IFGain:Low	#Atten: :	20 dB			Radio Dev	vice: BTS		
10 dB/div Ref 20.00	dBm								
Log 10.0									
	marth	far with the most	and the second	here have a far					Clear Write
0.00									
-10.0	hyment				harden	allasta a			
-20.0						and the second	where the second		
-30.0									Average
-40.0									
-50.0									
-60.0									Max Hold
-70.0									Maxilolu
Center 5.5300 GHz							200.0 MHz		
#Res BW 1.6 MHz		VB	W 8 MHz			Swe	eep 1 ms		Min Hold
Occupied Bandy	ridth		Total P	ower	24.2	dBm			
Occupied Bandw			Total I	ower	2-1.2	ubiii			
	78.309	MHZ							Detector Peak▶
Transmit Freq Erro	or -47.84	4 kHz	% of O	3W Pow	er 99	.00 %		Auto	Peak► <u>Man</u>
x dB Bandwidth	161.	2 MHz	x dB		-26.	00 dB			
MSG					STATUS				
mod					314103				

Plot 7-82. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax - 996 Tones (UNII Band 2C) - Ch. 106)



Plot 7-83. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax - 996 Tones (UNII Band 2C) - Ch. 122)

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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	pectrum Analyzer		· · · · · · · · · · · · · · · · · · ·									_	
LXI RL	RF	50 Ω	DC	CORRE	C		SENSE:INT	000000 GHz	ALIGN AUTO	10:51:51 P Radio Std	M Jun 06, 2020	Trac	e/Detector
					÷	, Trig: F	ree Run		d: 100/100				
				#IFGai	in:Low	#Atten:	20 dB			Radio Dev	ice: BTS		
10 dB/div Log	Ref 2	0.00	dBm	<b>ا</b>									
10.0					السعصاب	and descriptions	the articles the set	and white land on the second					
0.00													Clear Write
-10.0			يەر يال						No. Share				
-20.0	Juniorman	uplum	(hravkat))a k						And A AND A	H-hr. Mullerye	4-handerliketer		
-30.0													Average
-40.0													
-50.0													
-60.0													Max Hold
-70.0													Muxitolu
	5.6900 GHz V 1.6 MHz					V	SW 8 MH	7			00.0 MHz ep 1 ms		
#Res by						v	3VV 8 IVIN	2		SWG	ep Tills		Min Hold
Οςςι	ipied Ba	nd	widt	h			Total	Power	24.2	2 dBm			
					0 M	47							Detector
			10	.00		112							Peak►
Trans	smit Freq	Erro	or	-2	3.402	kHz	% of C	BW Pow	er 99	.00 %		Auto	<u>Man</u>
x dB	Bandwidt	h		1	37.0	ЛНz	x dB		-26.	00 dB			
MSG									STATUS	3			

Plot 7-84. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax – 996 Tones (UNII Band 2C) – Ch. 138)

FCC ID: A3LSMN986W	PCTEST	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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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  $\geq$  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 RU index showing the highest conducted power.

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SISO Antenna-1 6 dB Bandwidth Measurements (20	26 Tones)
--	-----------

	Frequency [MHz]	Channel No.	802.11 Mode	Tones	Data Rate [Mbps]	Measured 6dB Bandwidth [MHz]
	5745	149	ax (20MHz)	26T	MCS0	2.09
e	5785	157	ax (20MHz)	26T	MCS0	2.07
	5825	165	ax (20MHz)	26T	MCS0	2.64
Band	5755	151	ax (40MHz)	26T	MCS0	2.15
	5795	159	ax (40MHz)	26T	MCS0	2.11
	5775	155	ax (80MHz)	26T	MCS0	2.88

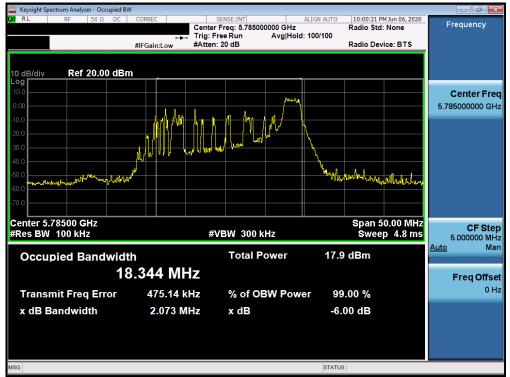
Table 7-6. Conducted Bandwidth Measurements SISO ANT1 (26 Tones)

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-85. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax – 26 Tones (UNII Band 3) – Ch. 149)



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

FCC ID: A3LSMN986W		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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