

### **PCTEST**

7185 Oakland Mills Road, Columbia, MD 21046 USA Tel. 410.290.6652 / Fax 410.290.6654 http://www.pctest.com



### MEASUREMENT REPORT FCC PART 15.407 UNII

#### **Applicant Name:**

Samsung Electronics Co., Ltd. 129, Samsung-ro, Yeongtong-gu, Suwon-si Gyeonggi-do, 16677, Korea Date of Testing: 5/5 - 7/7/2020 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M2005050082-09-R1.A3L

#### FCC ID:

#### A3LSMN981W

Certification

IC:

### 649E-SMN981W

APPLICANT:

Samsung Electronics Co., Ltd.

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

SM-N981W Portable Handset 5180 – 5825MHz OFDM Unlicensed National Information Infrastructure (UNII) Part 15 Subpart E (15.407) 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.

This revised Test Report (S/N: 1M2005050082-09-R1.A3L) supersedes and replaces the previously issued test report on the same subject device for the same type of testing as indicated. Please discard or destroy the previously issued test report(s) and dispose of it accordingly.

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

Randy Ortanez President



FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 1 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 1 of 224
© 2020 PCTEST		·	V 9.0 02/01/2019

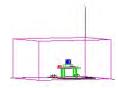


## TABLE OF CONTENTS

1.0	INTR	ODUCTIO	ON	4
	1.1	Scope	e	4
	1.2	PCTE	EST Test Location	4
	1.3	Test F	Facility / Accreditations	4
2.0	PRO	DUCT IN	FORMATION	5
	2.1	Equip	ment Description	5
	2.2	Devic	e Capabilities	5
	2.3	Test (	Configuration	6
	2.4	EMI S	Suppression Device(s)/Modifications	6
3.0	DESC	RIPTION	N OF TESTS	7
	3.1	Evalu	ation Procedure	7
	3.2	AC Li	ne Conducted Emissions	7
	3.3	Radia	ted Emissions	8
	3.4	Enviro	onmental Conditions	8
4.0	ANTE	INNA RE	QUIREMENTS	9
5.0	MEAS	SUREME	NT UNCERTAINTY	10
6.0	TEST	EQUIPN	IENT CALIBRATION DATA	11
7.0	TEST	RESULT	TS	12
	7.1	Sumn	nary	12
	7.2	26dB	Bandwidth Measurement – 802.11a/n/ac/ax	13
	7.3	6dB E	Bandwidth Measurement – 802.11a/n/ac/ax	68
	7.4	UNII	Output Power Measurement – 802.11a/n/ac/ax	86
	7.5	Maxin	num Power Spectral Density – 802.11a/n/ac/ax	94
	7.6	Radia	ted Spurious Emission Measurements – Above 1GHz	168
		7.6.1	SISO Antenna-1 Radiated Spurious Emission Measurements	171
		7.6.2	SISO Antenna-2 Radiated Spurious Emission Measurements	180
		7.6.3	MIMO Radiated Spurious Emission Measurements	189
		7.6.4	SISO Antenna-1 Radiated Band Edge Measurements (20MHz BW)	196
		7.6.5	SISO Antenna-1 Radiated Band Edge Measurements (40MHz BW)	198
		7.6.6	SISO Antenna-1 Radiated Band Edge Measurements (80MHz BW)	200
		7.6.7	SISO Antenna-2 Radiated Band Edge Measurements (20MHz BW)	202
		7.6.8	SISO Antenna-2 Radiated Band Edge Measurements (40MHz BW)	204
		7.6.9	SISO Antenna-2 Radiated Band Edge Measurements (80MHz BW)	206
		7.6.10	MIMO Radiated Band Edge Measurements (20MHz BW)	208
		7.6.11	MIMO Radiated Band Edge Measurements (40MHz BW)	210
		7.6.12	MIMO Radiated Band Edge Measurements (80MHz BW)	212
	7.7	Radia	ted Spurious Emissions Measurements – Below 1GHz	214
	7.8	Line-0	Conducted Test Data	218
8.0	CON	CLUSION	۷	224

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 2 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 2 of 224
© 2020 PCTEST V 9.0 02/01/2019			





# **MEASUREMENT REPORT**



Ohannal		AN	<b>JT</b> 1	AN	IT2	MI	MO
Channel Bandwidth (MHz)	Tx Frequency (MHz)	Max. Power (mW)	Max. Power (dBm)	Max. Power (mW)	Max. Power (dBm)	Max. Power (mW)	Max. Power (dBm)
	5180 - 5240	62.517	17.96	61.660	17.90	123.027	20.90
20	5260 - 5320	62.517	17.96	60.814	17.84	122.180	20.87
20	5500 - 5720	62.806	17.98	62.951	17.99	124.451	20.95
	5745 - 5825	62.806	17.98	58.076	17.64	120.781	20.82
	5190 - 5230	48.195	16.83	41.115	16.14	89.331	19.51
40	5270 - 5310	43.551	16.39	50.003	16.99	93.325	19.70
40	5510 - 5710	50.003	16.99	45.290	16.56	93.541	19.71
	5755 - 5795	50.003	16.99	49.888	16.98	100.000	20.00
	5210	30.761	14.88	26.002	14.15	56.754	17.54
80	5290	22.961	13.61	23.878	13.78	46.881	16.71
	5530 - 5690	38.371	15.84	39.719	15.99	75.858	18.80
	5775	37.757	15.77	37.239	15.71	74.989	18.75
	(MHz) 20 40	Bandwidth (MHz)         Tx Frequency (MHz)           20         5180 - 5240           5260 - 5320         5260           5500 - 5720         5745 - 5825           5190 - 5230         5270 - 5310           40         5270 - 5310           5510 - 5710         5755 - 5795           5210         5210           80         5290           5530 - 5690         5530 - 5690	Channel Bandwidth (MHz)         Tx Frequency (MHz)         Max. Power (mW)           20         5180 - 5240         62.517           5260 - 5320         62.517           5500 - 5720         62.806           5745 - 5825         62.806           5745 - 5825         62.806           5510 - 5720         48.195           5510 - 5730         43.551           5510 - 5710         50.003           5575 - 5795         50.003           5520 - 5290         22.961           5530 - 5690         38.371           5775         5775	Bandwidth (MHz)         Tx Frequency (MHz)         Max.         Max.           Power (mW)         Power (dBm)           20         5180 - 5240         62.517         17.96           5260 - 5320         62.517         17.96           5500 - 5720         62.806         17.98           5745 - 5825         62.806         17.98           5190 - 5230         48.195         16.83           5510 - 5710         50.003         16.99           5755 - 5795         50.003         16.99           5210         30.761         14.88           5290         22.961         13.61           5530 - 5690         38.371         15.84	Channel Bandwidth (MHz)         Tx Frequency (MHz)         Max. Power (mW)         Max. Power (dBm)         Max. Power (mW)           20         5180 - 5240         62.517         17.96         61.660           5260 - 5320         62.517         17.96         60.814           5500 - 5720         62.806         17.98         62.951           5745 - 5825         62.806         17.98         62.951           500 - 5720         62.806         17.98         58.076           5510 - 5720         62.806         17.98         58.076           5510 - 5710         50.003         16.39         41.115           5510 - 5710         50.003         16.99         45.290           5755 - 5795         50.003         16.99         49.888           80         52200         22.961         13.61         23.878           5530 - 5690         38.371         15.84         39.719	Channel Bandwidth (MHz)         Tx Frequency (MHz)         Max. Power (MHz)         Max. Power (mW)         Max. Power (dBm)         Max. Power (mW)         Max. Power (dBm)         Max. Power (mW)         Max. Power (dBm)         Max. Power (mW)         Max. Power (dBm)         Power (dBm)         Powe	Channel Bandwidth (MHz)         Tx Frequency (MHz)         Max.         Power         Power         Power         Power         Power         Power         (dBm)         Power         Power         Power         (dBm)         Max.         Max.         Max.         Max.         Power         Power         Power         Power         Quer         Quer

EUT Overview

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 2 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 3 of 224
© 2020 PCTEST			V 9.0 02/01/2019



### 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.

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 4 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 4 of 224
© 2020 PCTEST			V 9.0 02/01/2019



#### PRODUCT INFORMATION 2.0

#### 2.1 **Equipment Description**

The Equipment Under Test (EUT) is the Samsung Portable Handset FCC ID: A3LSMN981W. The test data contained in this report pertains only to the emissions due to the EUT's UNII transmitter.

Test Device Serial No.: 1852M, 0276M, 0287M

#### 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

	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

Band 1

Denel 0A

3

	Buna 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

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

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

Band 1

Band 2A

		-
	<b>.</b> .	$\gamma c$
d	IU.	2C

5690

Band 3

	Bana						
Ch.	Frequency (MHz)						
42	5210	58	5290	106	5530	155	5775
				:	:		

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

138

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 5 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 5 of 224
© 2020 PCTEST	V 9.0 02/01/2019		



#### Notes:

 5GHz NII operation is possible in 20MHz channel bandwidth. 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						
	а	98.8	98.8	98.8		
	n (HT20)	98.7	98.7	97.6		
	ac (HT20)	98.7	98.7	97.4		
	ax (HT20)	98.4	98.4	96.9		
5GHz	n (HT40)	97.3	97.4	95.1		
	ac (HT40)	97.4	97.3	94.9		
	ax (HT40)	96.9	96.9	94.7		
	ac (HT80)	94.6	94.5	91.1		
	ax (HT80)	94.3	94.2	91.0		

Table 2-4. Measured Duty Cycles

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

WiFi Configurations		SISO		SDM		CDD	
		ANT1	ANT2	ANT1	ANT2	ANT1	ANT2
5GHz	11a	✓	✓	×	×	✓	✓
	11n/ac/ax (20MHz)	✓	✓	✓	✓	✓	✓
	11n/ac/ax (40MHz)	✓	✓	✓	✓	✓	✓
	11ac/ax (80MHz)	✓	$\checkmark$	$\checkmark$	✓	✓	$\checkmark$

Table 2-5. Frequency / Channel Operations

✓= Support ; × = NOT Support

**SISO** = Single Input Single Output

**SDM** = Spatial Diversity Multiplexing – MIMO function

**CDD** = Cyclic Delay Diversity - 2Tx Function

### 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 Sections 3.2 for AC line conducted emissions test setups, 3.3 for radiated emissions test setups, and 7.2, 7.3, 7.4, and 7.5 for antenna port conducted emissions test setups.

This device supports 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.

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 6 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 6 of 224
© 2020 PCTEST	•	·	V 9.0 02/01/2019



## 3.0 DESCRIPTION OF TESTS

### 3.1 Evaluation Procedure

The measurement procedures described in the American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices (ANSI C63.10-2013) and the guidance provided in KDB 789033 D02 v02r01 were used in the measurement of the EUT.

Deviation from measurement procedure.....None

### 3.2 AC Line Conducted Emissions

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

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

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

Line conducted emissions test results are shown in Section 7.8. The EMI Receiver mode of the Agilent MXE was used to perform AC line conducted emissions testing.

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:	Dage 7 of 224			
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 7 of 224			
© 2020 PCTEST	2020 PCTEST					



### 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).

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:	Dage 9 of 224			
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 8 of 224			
© 2020 PCTEST V 9.0						



## 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.

FCC ID: A3LSMN981W	Réud lo be part d @ element	MEASUREMENT REPORT (CERTIFICATION)	P	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Page 9 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset		Page 9 01 224
© 2020 PCTEST				V 9.0 02/01/2019



## 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  $U_{\text{CISPR}}$  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

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 10 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 10 of 224
© 2020 PCTEST			V 9.0 02/01/2019



## 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	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
Solar Electronics	8012-50-R-24-BNC	Line Impedance Stabilization Network	10/1/2019	Biennial	10/1/2021	310233
Sunol	DRH-118	Horn Antenna (1-18GHz)	10/3/2019	Biennial	10/3/2021	A050307

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.

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dega 11 of 224	
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 11 of 224	
> 2020 PCTEST V 9.0 02/01/2019				



### 7.0 TEST RESULTS

#### 7.1 Summary

Company Name:	Samsung Electronics Co., Ltd.
FCC ID:	A3LSMN981W
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)	Emissions in restricted bands must meet the radiated limits detailed in 15.209 (RSS-Gen [8.9])	RADIATED	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 4.7.
- 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.

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 10 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 12 of 224
© 2020 PCTEST	•		V 9.0 02/01/2019



# 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 <u>></u> 3 x RBW
- 4. Detector = Peak
- 5. Trace mode = max hold

#### Test Setup

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



Figure 7-1. Test Instrument & Measurement Setup

#### Test Notes

None.

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dama 42 af 004
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 13 of 224
© 2020 PCTEST		· · · · · · · · · · · · · · · · · · ·	V 9.0 02/01/2019



### SISO Antenna-1 26 dB Bandwidth Measurements

					Measured 26dB
	Frequency	Channel	802.11 Mode	Data Rate [Mbps]	Bandwidth
	[MHz]	No.			[MHz]
	5180	36	а	6	21.02
	5200	40	а	6	23.44
	5240	48	а	6	23.23
	5180	36	n (20MHz)	6.5/7.2 (MCS0)	21.44
	5200	40	n (20MHz)	6.5/7.2 (MCS0)	24.12
	5240	48	n (20MHz)	6.5/7.2 (MCS0)	22.80
÷	5180	36	ax (20MHz)	6.5/7.2 (MCS0)	21.53
Band	5200	40	ax (20MHz)	6.5/7.2 (MCS0)	21.30
8	5240	48	ax (20MHz)	6.5/7.2 (MCS0)	21.57
	5190	38	n (40MHz)	13.5/15 (MCS0)	39.55
	5230	46	n (40MHz)	13.5/15 (MCS0)	54.13
	5190	38	ax (40MHz)	13.5/15 (MCS0)	40.49
	5230	46	ax (40MHz)	13.5/15 (MCS0)	39.79
	5210	42	ac (80MHz)	29.3/32.5 (MCS0)	81.61
	5210	42	ax (80MHz)	29.3/32.5 (MCS0)	81.29
	5260	52	а	6	21.40
	5280	56	а	6	21.09
	5320	64	а	6	21.09
	5260	52	n (20MHz)	6.5/7.2 (MCS0)	21.31
	5280	56	n (20MHz)	6.5/7.2 (MCS0)	21.74
	5320	64	n (20MHz)	6.5/7.2 (MCS0)	21.49
2A	5260	52	ax (20MHz)	6.5/7.2 (MCS0)	21.24
Band 2A	5280	56	ax (20MHz)	6.5/7.2 (MCS0)	21.25
Ba	5320	64	ax (20MHz)	6.5/7.2 (MCS0)	21.31
	5270	54	n (40MHz)	13.5/15 (MCS0)	39.78
	5310	62	n (40MHz)	13.5/15 (MCS0)	39.53
	5270	54	ax (40MHz)	13.5/15 (MCS0)	39.99
	5310	62	ax (40MHz)	13.5/15 (MCS0)	40.19
	5290	58	ac (80MHz)	29.3/32.5 (MCS0)	80.89
	5290	58	ax (80MHz)	29.3/32.5 (MCS0)	80.35
	5500	100	а	6	21.18
	5600	120	а	6	21.55
	5720	144	а	6	21.67
	5500	100	n (20MHz)	6.5/7.2 (MCS0)	21.39
	5600	120	n (20MHz)	6.5/7.2 (MCS0)	21.68
	5720	144	n (20MHz)	6.5/7.2 (MCS0)	21.89
	5500	100	ax (20MHz)	6.5/7.2 (MCS0)	21.40
	5600	120	ax (20MHz)	6.5/7.2 (MCS0)	21.41
	5720	144	ax (20MHz)	6.5/7.2 (MCS0)	21.57
ß	5510	102	n (40MHz)	13.5/15 (MCS0)	39.32
Band 2C	5590	118	n (40MHz)	13.5/15 (MCS0)	39.61
Ba	5710	142	n (40MHz)	13.5/15 (MCS0)	39.93
	5510	102	ax (40MHz)	13.5/15 (MCS0)	39.68
	5590	118	ax (40MHz)	13.5/15 (MCS0)	39.93
	5710	142	ax (40MHz)	13.5/15 (MCS0)	39.75
	5530	106	ac (80MHz)	29.3/32.5 (MCS0)	80.92
	5610	122	ac (80MHz)	29.3/32.5 (MCS0)	81.38
	5690	138	ac (80MHz)	29.3/32.5 (MCS0)	81.60
	5530	106	ax (80MHz)	29.3/32.5 (MCS0)	80.74
	5610	122	ax (80MHz)	29.3/32.5 (MCS0)	80.97
	5690	138	ax (80MHz)	29.3/32.5 (MCS0)	80.75
Table	7-2 Con	ducted		Measuremer	ts SISO ANT

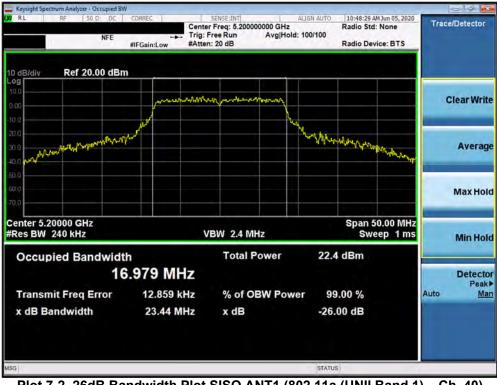
Table 7-2. Conducted Bandwidth Measurements SISO ANT1

FCC ID: A3LSMN981W	Read to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 14 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 14 of 224
© 2020 PCTEST		·	V 9 0 02/01/2019





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)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 15 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 15 of 224
© 2020 PCTEST			V 9.0 02/01/2019





Plot 7-3. 26dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 1) - Ch. 48)



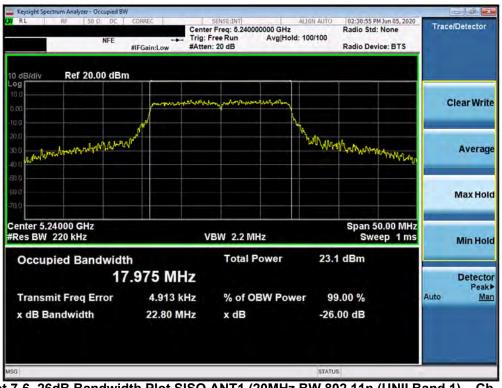
Plot 7-4. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 1) - Ch. 36)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 16 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 16 of 224
© 2020 PCTEST			V 9.0 02/01/2019





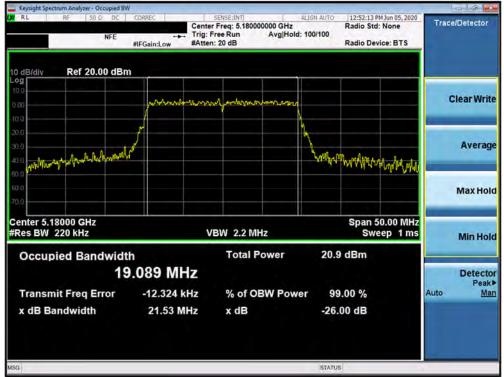
Plot 7-5. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 1) - Ch. 40)



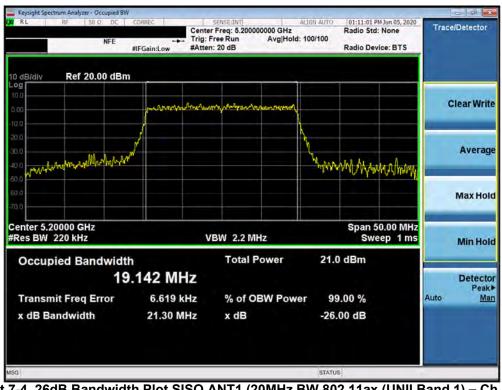
Plot 7-6. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 1) - Ch. 48)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 17 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 17 of 224
© 2020 PCTEST			V 9.0 02/01/2019





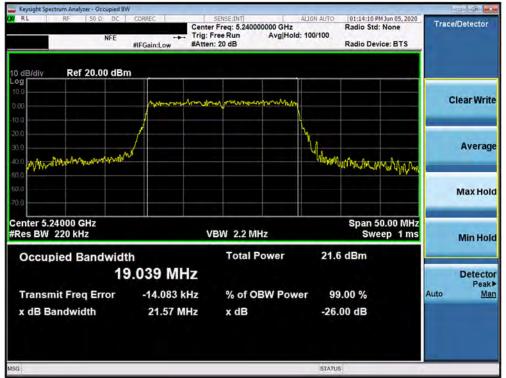
Plot 7-4. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 1) - Ch. 36)



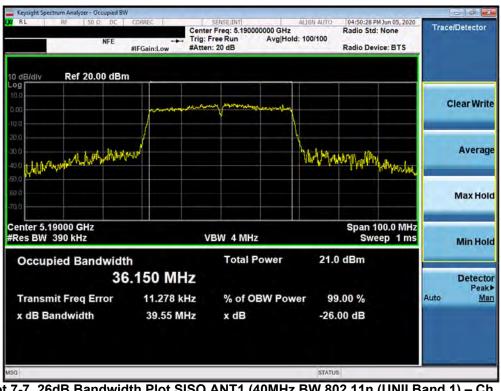
Plot 7-4. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 1) - Ch. 40)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 19 of 224	
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 18 of 224	
0 2020 PCTEST V 9.0 02/01/2019				





Plot 7-4. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 1) - Ch. 48)



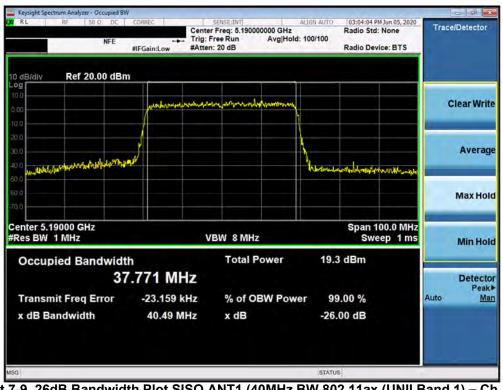
Plot 7-7. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 1) - Ch. 38)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Degs 10 of 224	
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 19 of 224	
0 2020 PCTEST V 9.0 02/01/2019				



Keysight Spectrum Analyzer - Occupied BW RL RF 50 Ω DC	CORREC	SENSE:INT	ALIGN AUTO 04:55:23	PM Jun 05, 2020	×
NFE	#IFGain:Low #Atter	r Freq: 5.230000000 GHz	Radio Sto Id: 100/100		Trace/Detector
10 dB/div Ref 20.00 dBm		a and a second			Clear Write
	mah		withermaniantality	lanic harvallyr	Averag
60.0 60.0 70.0					Max Hole
Center 5.23000 GHz Res BW 1 MHz		/BW 8 MHz Total Power		100.0 MHz eep 1 ms	Min Hol
Occupied Bandwidti 36 Transmit Freq Error x dB Bandwidth	n 5.668 MHz 39.268 kHz 54.13 MHz	% of OBW Pov x dB		,	Detecto Peak Auto <u>Ma</u>
sā			STATUS		

Plot 7-8. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 1) - Ch. 46)



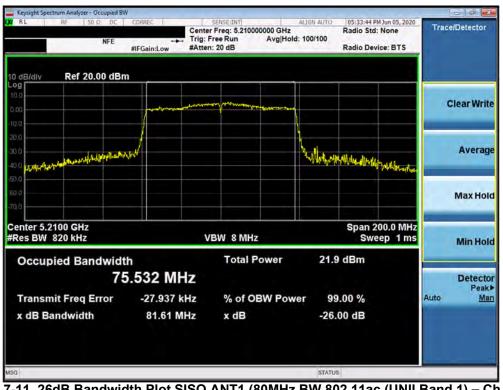
Plot 7-9. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 1) - Ch. 38)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 20 of 224	
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 20 of 224	
© 2020 PCTEST V 9.0 02/01/2019				



RL RE SOΩ DC	#IFGain:Low #Atter	sense:INT r Freq: 5.230000000 GH Free Run Avg H n: 20 dB	ALIGN AUTO Iz fold: 100/100	03:07:39 PM Jun 05, 2 Radio Std: None Radio Device: BTS	Trace/Detector
10 dB/div Ref 20.00 dBm	perniture where	homena	~		ClearWrite
200 200 400 200	w.		home		Average
50.0 50.0 70.0				and the second	Max Hold
Center 5.23000 GHz Res BW 390 kHz		/BW 4 MHz Total Power	40	Span 100.0 M Sweep 1 r 7 dBm	
Occupied Bandwidt 37 Transmit Freg Error	n 7.614 MHz 16.290 kHz	% of OBW Po		9.00 %	Detector Peak
x dB Bandwidth	39.79 MHz	x dB		.00 dB	Parto Inter
Đ			STATL	15	

Plot 7-10. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 1) - Ch. 46)



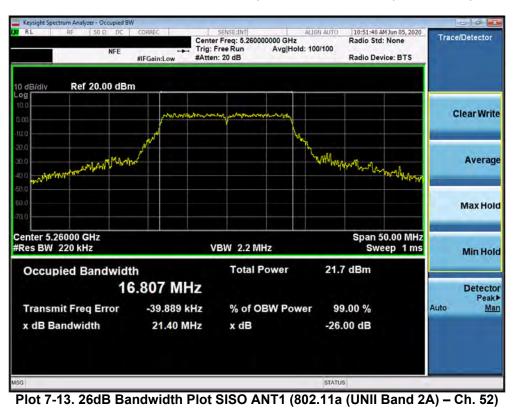
Plot 7-11. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 1) - Ch. 42)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N: Test Dates:		EUT Type:	Dago 21 of 224	
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 21 of 224	
© 2020 PCTEST V 9.0 02/01/2019				



Keysight Spectrum Analyzer - Occupied  RL RF 50 Ω DC		SENSE:INT	ALIGN AUTO	05:11:57 PM Jun 05, 2020	
NFE	#IFGain:Low #Atter	r Freq: 5.210000000 GH Free Run Avg H n: 20 dB	z old: 100/100	Radio Std: None Radio Device: BTS	Trace/Detector
10 dB/div Ref 20.00 dE	Sm		~		ClearWrite
20.0 30.0 40.0	Anna anna anna anna anna anna anna anna		harman	moundates mound	Average
50.0 60.0 70.0					Max Hold
Center 5.2100 GHz #Res BW 820 kHz		/BW 8 MHz		Span 200.0 MHz Sweep 1 ms	Min Hold
Occupied Bandwid	5.544 MHz	Total Power	18.	8 dBm	Detector Peak
Transmit Freq Error x dB Bandwidth	-1.002 kHz 81.29 MHz	% of OBW Po x dB		9.00 % .00 dB	Auto <u>Man</u>
sg			STATU	15	

Plot 7-12. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax (UNII Band 1) - Ch. 42)



FCC ID: A3LSMN981W	Roud to be part of Selenced	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Daga 22 of 224	
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 22 of 224	
0 2020 PCTEST V 9.0 02/01/2019				





Plot 7-14. 26dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 2A) - Ch. 56)



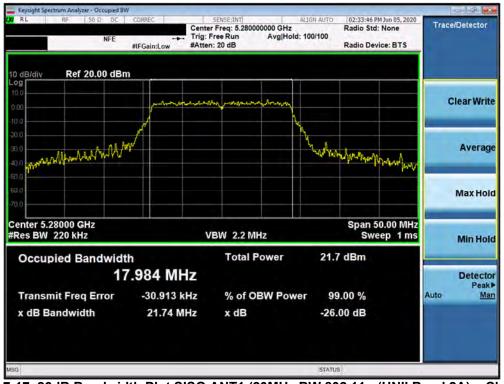
Plot 7-15. 26dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 2A) - Ch. 64)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dama 22 of 224	
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 23 of 224	
© 2020 PCTEST V 9.0 02/01/2019				





Plot 7-16. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2A) - Ch. 52)



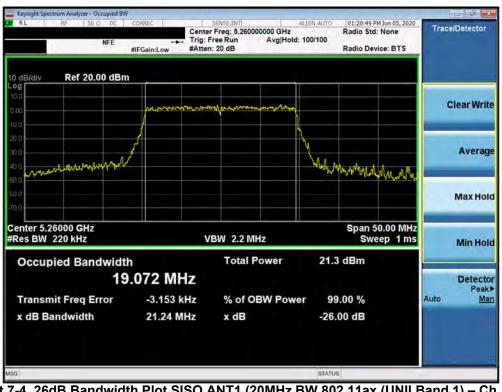
Plot 7-17. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2A) - Ch. 56)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 24 of 224	
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 24 of 224	
2 2020 PCTEST V 9.0 02/01/2019				





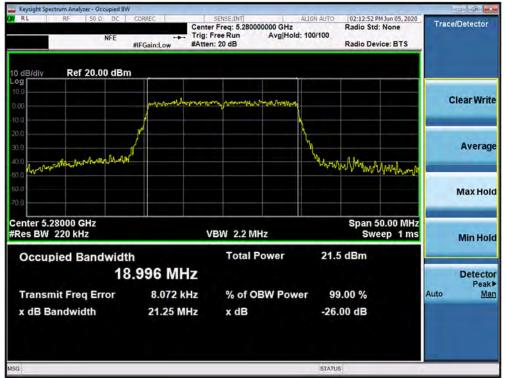
Plot 7-18. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2A) - Ch. 64)



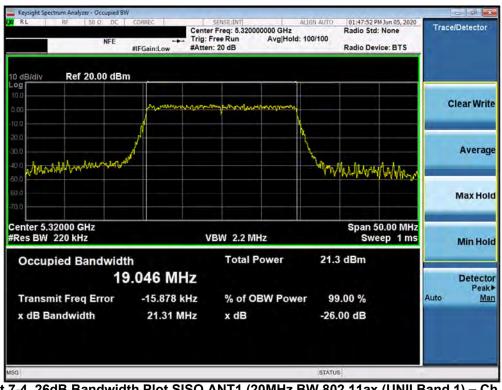
Plot 7-4. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 1) - Ch. 52)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 25 of 224	
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 25 of 224	
© 2020 PCTEST V 9.0 02/01/2019				





Plot 7-4. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 1) - Ch. 56)



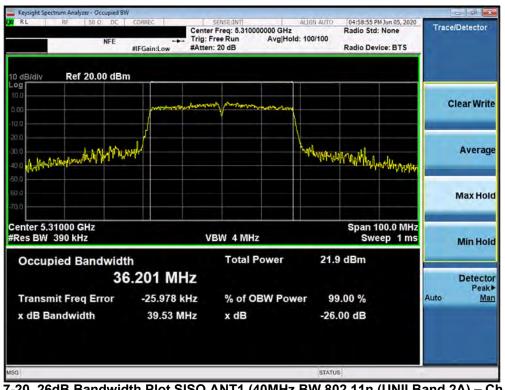
Plot 7-4. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 1) - Ch. 64)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 26 of 224	
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 26 of 224	
© 2020 PCTEST V 9.0 02/01/2019				





Plot 7-19. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2A) - Ch. 54)



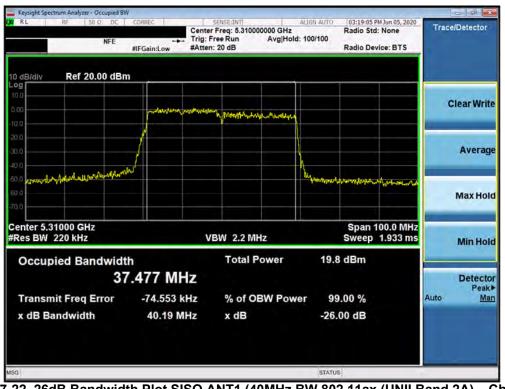
Plot 7-20. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2A) - Ch. 62)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N: Test Dates:		EUT Type:	Dage 07 of 204	
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 27 of 224	
© 2020 PCTEST V 9.0 02/01/2019				



Keysight Spectrum Analyzer - Occupied BV RL RF 50 Ω DC	CORREC	SENSE:INT	ALIGN AUTO 03:13:28 PM Jun 05.	2020
NFE	#IFGain:Low #Atter	Freq S.270000000 GHz Free Run Avg Hold: h: 20 dB	Radio Std: None	Trace/Detector
10 dB/div Ref 20.00 dBr	n www.handeventourieus	un manna and		ClearWrite
20.0 30.0 40.0	ad		Wallinguinging manufing	Averag
20.0 <b>keyetyte ugi 400</b> 20.0 0.0				Max Hol
enter 5.27000 GHz Res BW 390 kHz		BW 4 MHz	Span 100.0 I Sweep 1 19.4 dBm	
Occupied Bandwidt	n 7.448 MHz	Total Power	19.4 dBm	Detecto
Transmit Freq Error x dB Bandwidth	19.815 kHz 39.99 MHz	% of OBW Powe x dB	er 99.00 % -26.00 dB	Auto <u>Ma</u>
36			STATUS	_

Plot 7-21. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 2A) - Ch. 54)



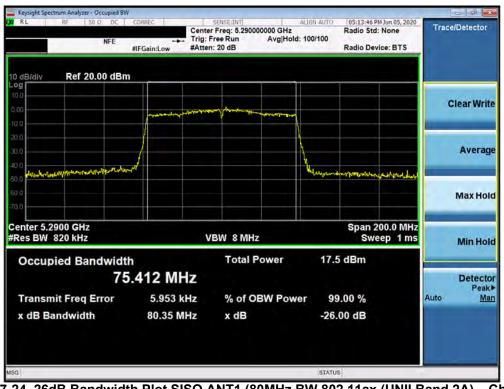
Plot 7-22. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 2A) - Ch. 54)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:	Dage 29 of 224		
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 28 of 224		
© 2020 PCTEST V 9.0 02/01/2019					





Plot 7-23. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 2A) - Ch. 58)



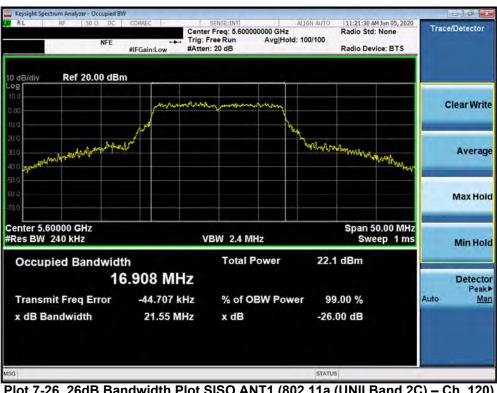
Plot 7-24. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax (UNII Band 2A) - Ch. 58)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:	Dage 20 of 224		
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 29 of 224		
© 2020 PCTEST V 9.0 02/01/2019					





Plot 7-25. 26dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 2C) - Ch. 100)



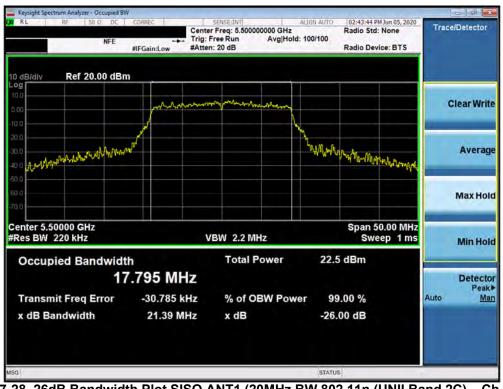
Plot 7-26. 26dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 2C) - Ch. 120)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 20 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 30 of 224
© 2020 PCTEST			V 9.0 02/01/2019





Plot 7-27. 26dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 2C) - Ch. 144)



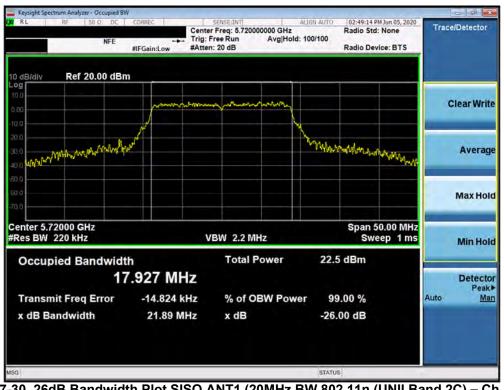
Plot 7-28. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2C) - Ch. 100)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 21 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 31 of 224
© 2020 PCTEST	V 9.0 02/01/2019		





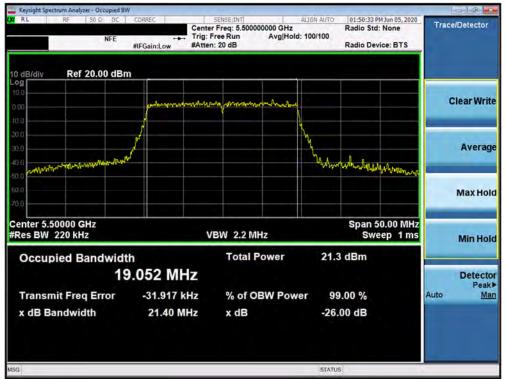
Plot 7-29. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2C) - Ch. 120)



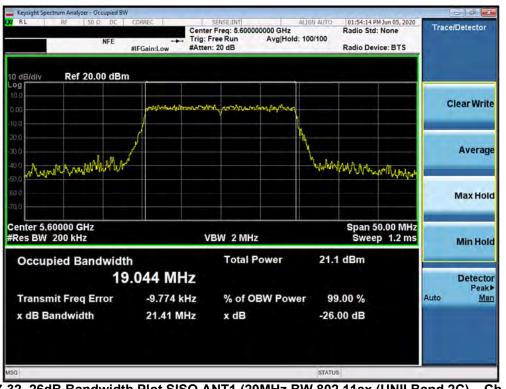
Plot 7-30. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2C) - Ch. 144)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:	Dage 22 of 224		
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 32 of 224		
© 2020 PCTEST V 9.0 02/01/2019					





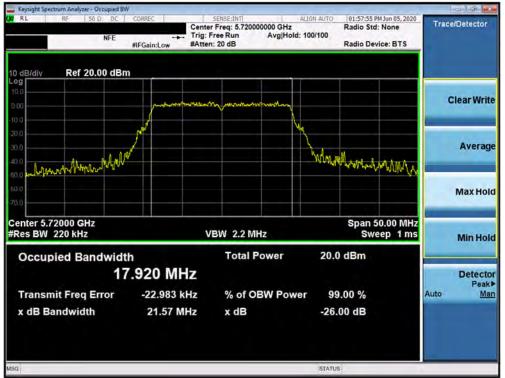
Plot 7-31. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 2C) - Ch. 100)



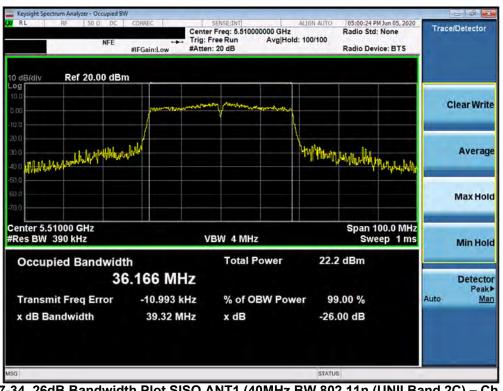
Plot 7-32. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 2C) - Ch. 120)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:	Dage 22 of 224		
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 33 of 224		
© 2020 PCTEST V 9.0 02/01/2019					





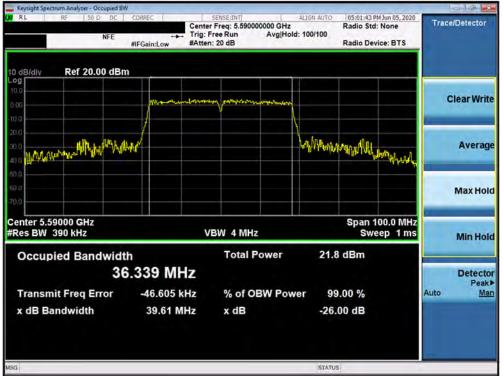
Plot 7-33. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 2C) - Ch. 144)



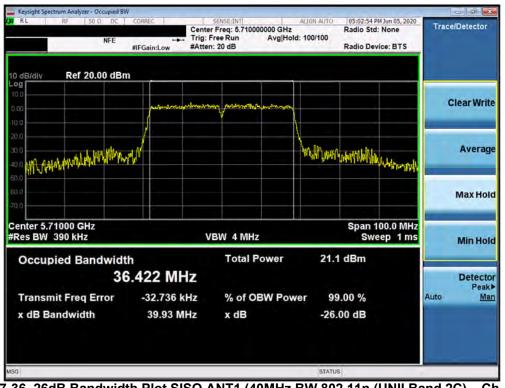
Plot 7-34. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2C) - Ch. 102)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:	Dage 24 of 224		
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 34 of 224		
© 2020 PCTEST V 9.0 02/01/2019					





Plot 7-35. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2C) - Ch. 118)



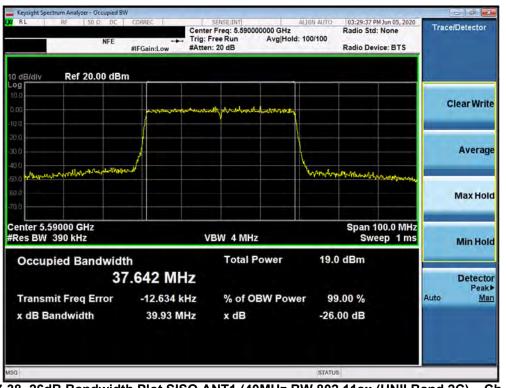
Plot 7-36. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2C) - Ch. 142)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:	Dage 25 of 224		
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 35 of 224		
© 2020 PCTEST V 9.0 02/01/2019					



RL RF 50 Ω DC	Trig:	SENSE:INT r Freq: 5.510000000 G Free Run Avg  n: 20 dB	ALIGN AUTO Hz Hold: 100/100	Radio Std: Radio Devi		Trace/Detector
0 dB/div Ref 20.00 dBr	n					
og 0.00	provinderman	ally season and and south				Clear Write
0.0						Average
000 10.0 Man milense wie wie wie wie wie wie 10.0 10.0			1944 AL	nunun	Markand	Max Hold
enter 5.51000 GHz Res BW 390 kHz	V	/BW 4 MHz			00.0 MHz ep 1 ms	Min Hole
Occupied Bandwid	<sup>th</sup> 7.585 MHz	Total Power	19.	6 dBm		Detecto
Transmit Freq Error x dB Bandwidth	51.083 kHz 39.68 MHz	% of OBW P x dB		9.00 % .00 dB		Auto <u>Mar</u>
G			STATL	15		

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



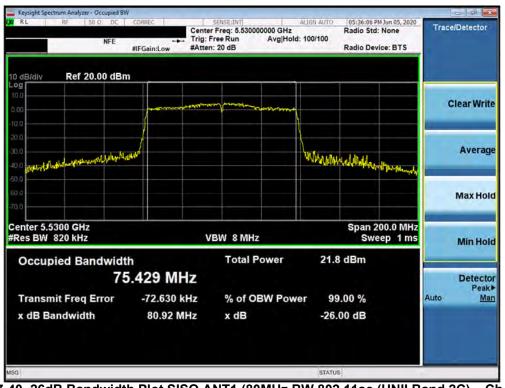
Plot 7-38. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 2C) - Ch. 118)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:	Dage 26 of 224		
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 36 of 224		
© 2020 PCTEST V 9.0 02/01/2019					



Keysight Spectrum Analyzer - Occupied B				- Anna Anna	×
X RL RF 50Ω DC	#IFGain:Low #Atter	sense;INT r Freq: 5.710000000 G Free Run Avg  h: 20 dB	ALIGN AUTO Hz Hold: 100/100	03:31:04 PM Jun 05, 2 Radio Std: None Radio Device: BTS	Trace/Detector
10 dB/div Ref 20.00 dBr	n 	ulay ne share and share and	ad .		ClearWrite
20.0 30.0 40.0 50.0 <b></b>			hattand	matriavardian	Average
50.0					Max Hold
Center 5.71000 GHz #Res BW 390 kHz		/BW 4 MHz	40	Span 100.0 M Sweep 1 r	
Occupied Bandwidt	n 7.639 MHz	Total Power	19.	4 dBm	Detector
Transmit Freq Error x dB Bandwidth	-17.960 kHz 39.75 MHz	% of OBW P x dB		9.00 % .00 dB	Auto <u>Mar</u>
tSG			STATU	15	

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



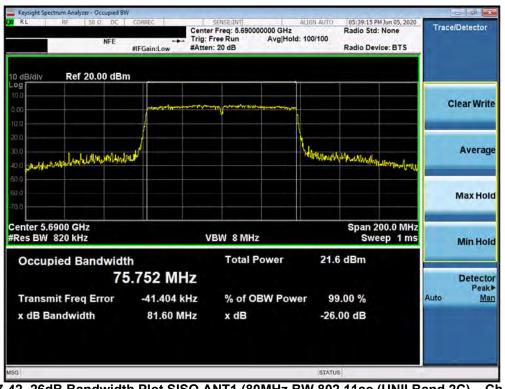
Plot 7-40. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 2C) - Ch. 106)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 27 of 224	
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 37 of 224	
0 2020 PCTEST V 9.0 02/01/2019				





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



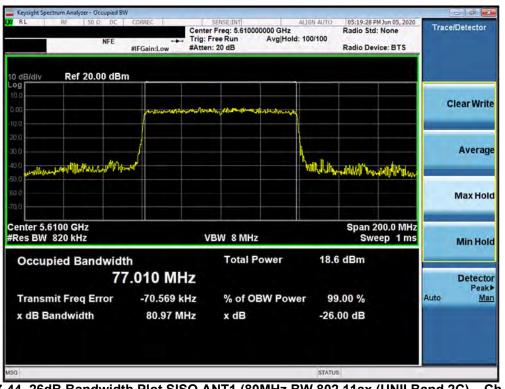
Plot 7-42. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 2C) - Ch. 138)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 29 of 224	
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 38 of 224	
0 2020 PCTEST V 9.0 02/01/2019				



RL RF 50 Ω DC	CORREC Cente	SENSE:INT r Freq: 5.530000000 GH	ALIGN AUTO	Radio Std:	1 Jun 05, 2020 None	Trace/Detector
NFE		Free Run Avg H n: 20 dB	lold: 100/100	Radio Devi	ce: BTS	
0 dB/div Ref 20.00 dBn	n		-10			
0.0	pageonourden	Monutantinoticement	**			ClearWrite
0.0 0.0 0.0						Average
a a www.www.light.hamment.ha	woł		white the	no-MARIA Maxino	whitten	
0.0						Max Hold
enter 5.5300 GHz Res BW 820 kHz	N	/BW 8 MHz			00.0 MHz ep 1 ms	Min Hold
Occupied Bandwidt	h	<b>Total Power</b>	18.	9 dBm		
77	7.062 MHz					Detector
Transmit Freq Error x dB Bandwidth	-23.584 kHz 80.74 MHz	% of OBW Po x dB		9.00 % .00 dB		Auto <u>Mar</u>
D			STATU	15		

Plot 7-43. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax (UNII Band 2C) - Ch. 106)



Plot 7-44. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax (UNII Band 2C) - Ch. 122)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 20 of 224	
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 39 of 224	
2020 PCTEST V 9.0 02/01/2019				



RL RF 50Ω DC	Trig:	SENSE;INT r Freq: 5.690000000 GH Free Run Avg H n: 20 dB	ALIGN AUTO Iz Iold: 100/100	Radio Std		Trace/Detector
10 dB/div Ref 20.00 dBr	m					Characteristic
0.00	manna	nerelytown new police	***			Clear Write
30.0 40.0	sed		- ANNUT AN	en al Million	WWW.	Average
60.0 70.0						Max Hold
Center 5.6900 GHz #Res BW 820 kHz		/BW 8 MHz			200.0 MHz eep 1 ms	Min Hold
Occupied Bandwid	<sup>th</sup> 6.997 MHz	Total Power	18.	7 dBm		Detector
Transmit Freq Error x dB Bandwidth	-40.087 kHz 80.75 MHz	% of OBW Po x dB		9.00 % .00 dB		Peak≯ Auto <u>Man</u>
SG			STATU	5		

Plot 7-45. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax (UNII Band 2C) - Ch. 138)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 40 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 40 01 224
© 2020 PCTEST			V 9.0 02/01/2019



## SISO Antenna-2 26dB Bandwidth Measurements

	_				Measured 26dB
	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Bandwidth
		NO.			[MHz]
	5180	36	а	6	20.91
	5200	40	а	6	31.53
	5240	48	а	6	29.59
	5180	36	n (20MHz)	6.5/7.2 (MCS0)	25.33
	5200	40	n (20MHz)	6.5/7.2 (MCS0)	31.58
	5240	48	n (20MHz)	6.5/7.2 (MCS0)	29.70
÷	5180	36	ax (20MHz)	6.5/7.2 (MCS0)	21.49
Band	5200	40	ax (20MHz)	6.5/7.2 (MCS0)	21.54
8	5240	48	ax (20MHz)	6.5/7.2 (MCS0)	21.41
	5190	38	n (40MHz)	13.5/15 (MCS0)	54.66
	5230	46	n (40MHz)	13.5/15 (MCS0)	68.36
	5190	38	ax (40MHz)	13.5/15 (MCS0)	39.54
	5230	46	ax (40MHz)	13.5/15 (MCS0)	39.80
	5210	42	ac (80MHz)	29.3/32.5 (MCS0)	81.50
	5210	42	ax (80MHz)	29.3/32.5 (MCS0)	80.48
	5260	52	а	6	29.64
	5280	56	а	6	30.79
	5320	64	а	6	21.69
	5260	52	n (20MHz)	6.5/7.2 (MCS0)	27.99
	5280	56	n (20MHz)	6.5/7.2 (MCS0)	25.39
	5320	64	n (20MHz)	6.5/7.2 (MCS0)	23.65
2A	5260	52	ax (20MHz)	6.5/7.2 (MCS0)	21.52
Band 2A	5280	56	ax (20MHz)	6.5/7.2 (MCS0)	21.80
Ba	5320	64	ax (20MHz)	6.5/7.2 (MCS0)	21.33
	5270	54	n (40MHz)	13.5/15 (MCS0)	62.21
	5310	62	n (40MHz)	13.5/15 (MCS0)	43.58
	5270	54	ax (40MHz)	13.5/15 (MCS0)	39.54
	5310	62	ax (40MHz)	13.5/15 (MCS0)	39.65
	5290	58	ac (80MHz)	29.3/32.5 (MCS0)	80.82
	5290	58	ax (80MHz)	29.3/32.5 (MCS0)	82.05
	5500	100	а	6	22.52
	5600	120	а	6	33.03
	5720	144	а	6	30.54
	5500	100	n (20MHz)	6.5/7.2 (MCS0)	28.10
	5600	120	n (20MHz)	6.5/7.2 (MCS0)	32.76
	5720	144	n (20MHz)	6.5/7.2 (MCS0)	31.51
	5500	100	ax (20MHz)	6.5/7.2 (MCS0)	21.45
	5600	120	ax (20MHz)	6.5/7.2 (MCS0)	22.77
	5720	144	ax (20MHz)	6.5/7.2 (MCS0)	22.85
20	5510	102	n (40MHz)	13.5/15 (MCS0)	71.35
Band 2C	5590	118	n (40MHz)	13.5/15 (MCS0)	73.96
Ba	5710	142	n (40MHz)	13.5/15 (MCS0)	74.90
	5510	102	ax (40MHz)	13.5/15 (MCS0)	39.44
	5590	118	ax (40MHz)	13.5/15 (MCS0)	39.69
	5710	142	ax (40MHz)	13.5/15 (MCS0)	39.58
	5530	106	ac (80MHz)	29.3/32.5 (MCS0)	88.49
	5610	122	ac (80MHz)	29.3/32.5 (MCS0)	139.00
	5690	138	ac (80MHz)	29.3/32.5 (MCS0)	102.70
	5530	106	ax (80MHz)	29.3/32.5 (MCS0)	95.88
	5610	122	ax (80MHz)	29.3/32.5 (MCS0)	81.04
	5690	138	ax (80MHz)	29.3/32.5 (MCS0)	81.46
Table				h Measuremer	

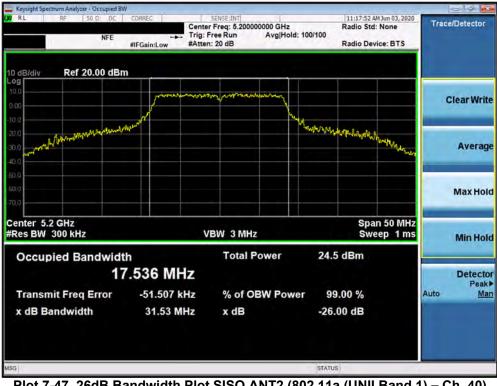
Table 7-3. Conducted Bandwidth Measurements SISO ANT2

FCC ID: A3LSMN981W	Read to be part of @ element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 41 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 41 of 224
© 2020 PCTEST		·	V 9 0 02/01/2019





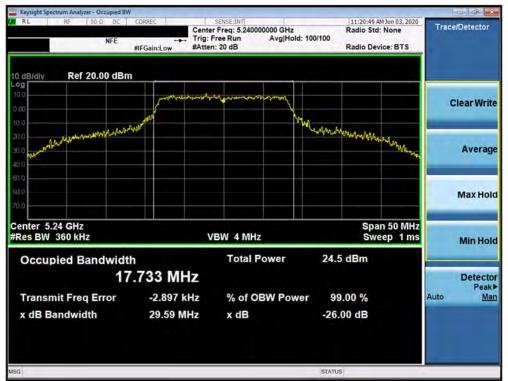
Plot 7-46. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 1) - Ch. 36)



Plot 7-47. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 1) - Ch. 40)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 42 of 224	
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 42 of 224	
© 2020 PCTEST V 9.0 02/01/2019				





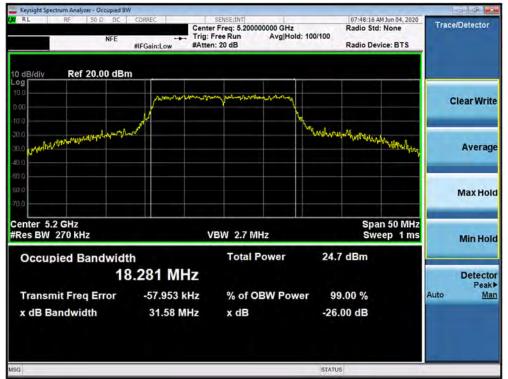
Plot 7-48. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 1) - Ch. 48)



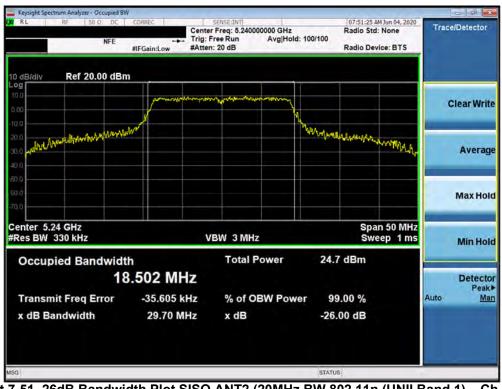
Plot 7-49. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 1) - Ch. 36)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 42 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 43 of 224
© 2020 PCTEST			V 9.0 02/01/2019





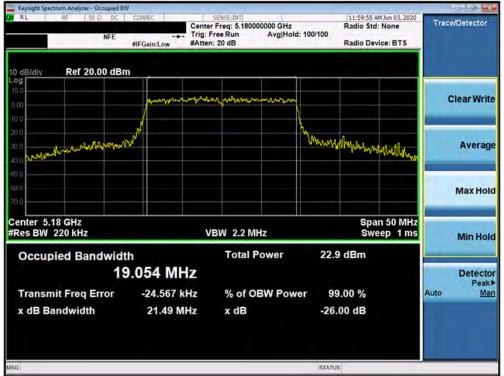
Plot 7-50. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 1) - Ch. 40)



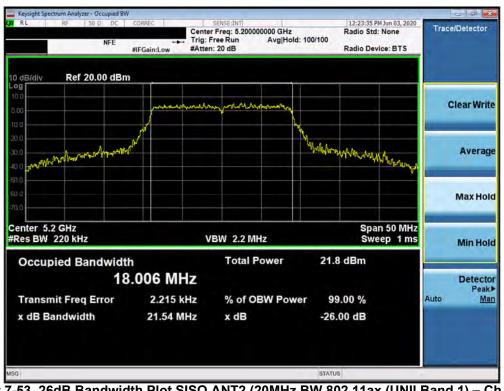
Plot 7-51. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 1) - Ch. 48)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 44 of 224	
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 44 of 224	
0 2020 PCTEST V 9.0 02/01/2019				





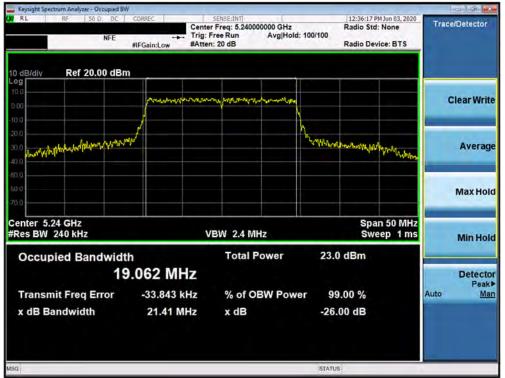
Plot 7-52. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 1) - Ch. 36)



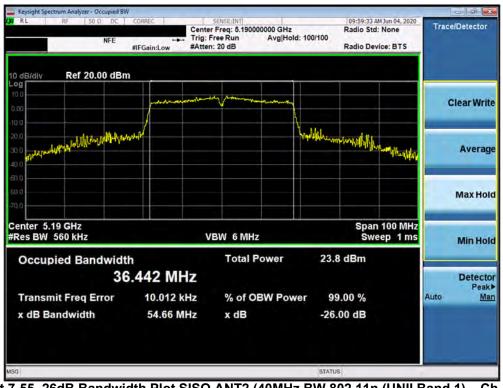
Plot 7-53. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 1) - Ch. 40)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 45 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 45 of 224
© 2020 PCTEST	•		V 9.0 02/01/2019





Plot 7-54. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 1) - Ch. 48)



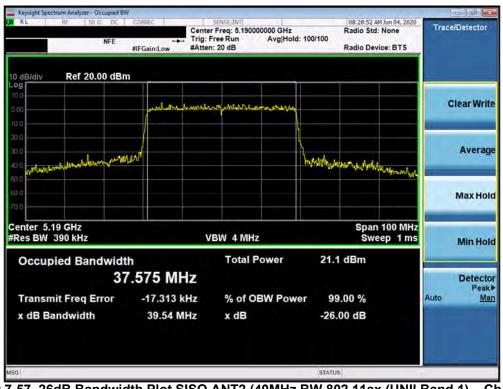
Plot 7-55. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 1) - Ch. 38)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 46 of 224	
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 46 of 224	
© 2020 PCTEST V 9.0 02/01/2019				





Plot 7-56. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 1) - Ch. 46)



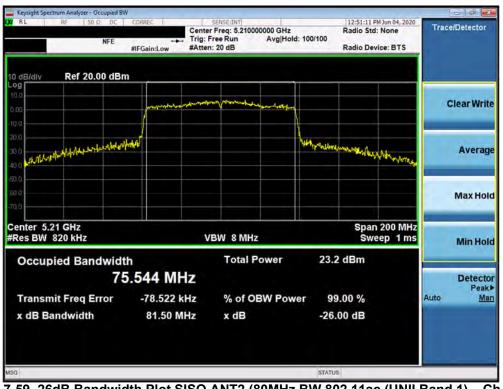
Plot 7-57. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax (UNII Band 1) - Ch. 38)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 47 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 47 of 224
© 2020 PCTEST			V 9.0 02/01/2019



RL RE S0 Ω DC	#IFGain:Low #Atten	sense:INT r Freq: 5.230000000 G Free Run Avg  n: 20 dB	Hz Hold: 100/100	09:08:51 AM Jun ( Radio Std: Non Radio Device: E	e Trace	/Detector
0 dB/div Ref 20.00 dBm		sally Instrum Mily and my			c	lear Write
00 00 00 00 00	que la companya de la		Verson	WWW.moupout		Average
ภ.0 อ.0 (0.0						Max Hold
enter 5.23 GHz Res BW 390 kHz		/BW 4 MHz		Span 100 Sweep	MHz 1 ms	Min Hold
Occupied Bandwidt	<sup>h</sup> 7.647 MHz	Total Power	21.	1 dBm		Detecto
Transmit Freq Error x dB Bandwidth	-21.669 kHz 39.80 MHz	% of OBW P x dB		9.00 % 5.00 dB	Auto	Peak∙ <u>Man</u>
G			STAT	US		

Plot 7-58. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax (UNII Band 1) - Ch. 46)



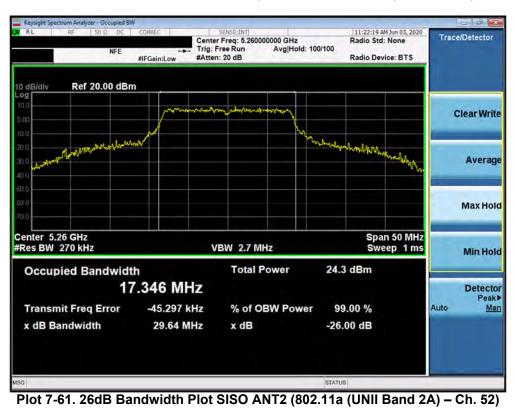
Plot 7-59. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 1) - Ch. 42)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 49 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 48 of 224
© 2020 PCTEST	•		V 9.0 02/01/2019



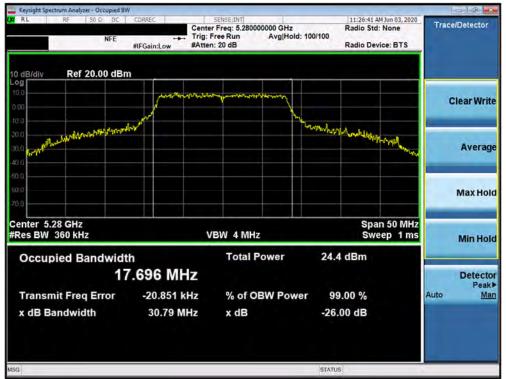


Plot 7-60. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax (UNII Band 1) - Ch. 42)

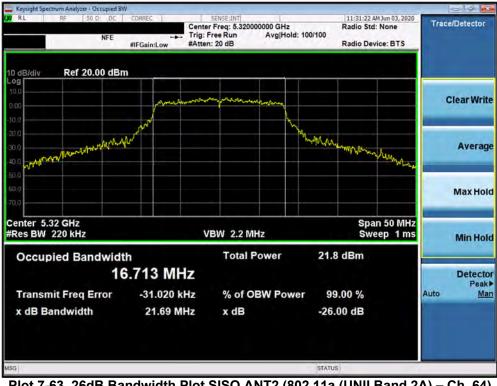


FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: Test Dates:		EUT Type:	Dage 40 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 49 of 224
© 2020 PCTEST			V 9.0 02/01/2019





Plot 7-62. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 2A) - Ch. 56)



Plot 7-63. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 2A) - Ch. 64)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 50 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 50 of 224
© 2020 PCTEST	•		V 9.0 02/01/2019





Plot 7-64. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2A) - Ch. 52)



Plot 7-65. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2A) - Ch. 56)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N: Test Dates:		EUT Type:	Dama 54 -6 004
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 51 of 224
© 2020 PCTEST			V 9.0 02/01/2019





Plot 7-66. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2A) - Ch. 64)



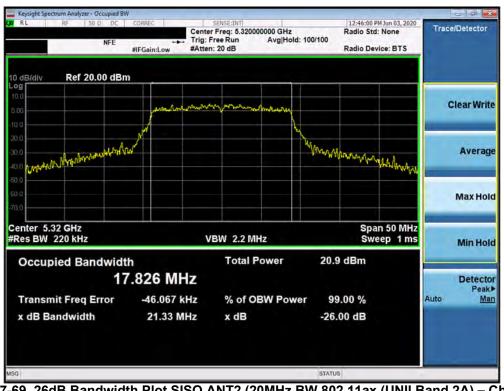
Plot 7-67. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 2A) - Ch. 52)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 52 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 52 of 224
© 2020 PCTEST			V 9.0 02/01/2019





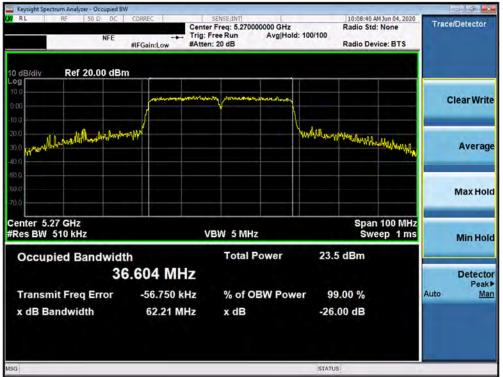
Plot 7-68. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 2A) - Ch. 56)



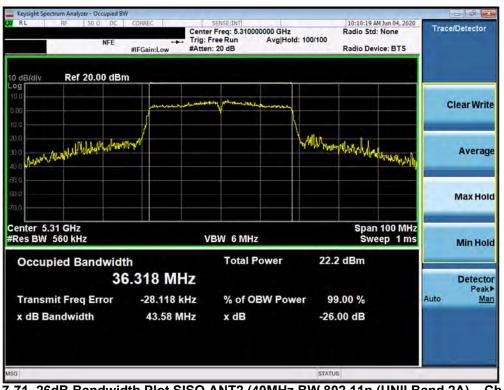
Plot 7-69. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 2A) - Ch. 64)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Daga 52 of 224	
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 53 of 224	
© 2020 PCTEST V 9.0 02/01/2019				





Plot 7-70. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2A) - Ch. 54)



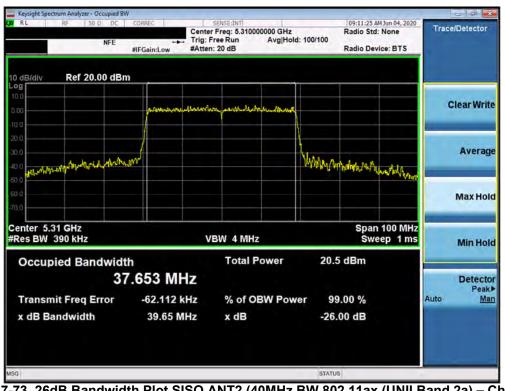
Plot 7-71. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2A) - Ch. 62)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Daga 54 of 224	
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 54 of 224	
© 2020 PCTEST V 9.0 02/01/2019				



Keysight Spectrum Analyzer - Occupied BV RL RF 50 Ω DC	CORREC	SENSE;INT		09:10:11 AM Jun 04	. 2020
NFE	Trig:	er Freq: 5.27000000 G Free Run Avg n: 20 dB	Hz Hold: 100/100	Radio Std: None Radio Device: B	
0 dB/div Ref 20.00 dBn		alley en tratecture daar			ClearWrite
0.0 0.0 0.0 0.0 0.0	المريط		Juryha	Westringhown	Average
0.0 0.0					Max Hold
enter 5.27 GHz Res BW 390 kHz		VBW 4 MHz		Span 100 Sweep	
Occupied Bandwidt	n 7.557 MHz	Total Power	20.	9 dBm	Detector Peak
Transmit Freq Error x dB Bandwidth	-44.814 kHz 39.54 MHz	% of OBW P x dB		9.00 % .00 dB	Auto <u>Man</u>
D			STAT	15	

Plot 7-72. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax (UNII Band 2a) - Ch. 54)



Plot 7-73. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax (UNII Band 2a) - Ch. 62)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage FE of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 55 of 224
© 2020 PCTEST	•		V 9.0 02/01/2019



RL RF 50 Ω DC	Trig:	sense;INT r Freq: 5.290000000 GH Free Run Avg F n: 20 dB	lz lold: 100/100	Radio Dev		Trace/Detector
10 dB/div Ref 20.00 dBn	n					
• <b>0</b> g 10.0 0.00		-all and a start and a start and a start and a start a				Clear Writ
000 000 000 Wheenholler the half and the second	alwa -		himan	with intervitions	mmulto	Averag
0.0 0.0						Max Hol
enter 5.29 GHz Res BW 820 kHz		/BW 8 MHz			n 200 MHz eep 1 ms	Min Hol
Occupied Bandwidt		Total Power	22.	1 dBm		
Transmit Freq Error x dB Bandwidth	5.560 MHz -69.958 kHz 80.82 MHz	% of OBW Po x dB		9.00 % .00 dB		Detecto Peak Auto <u>Ma</u>
G			STAT	15		

Plot 7-74. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 2A) - Ch. 58)



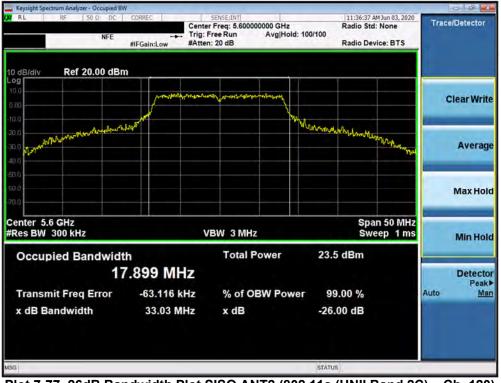
Plot 7-75. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax (UNII Band 2A) - Ch. 58)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 56 of 224	
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 56 of 224	
© 2020 PCTEST			V 9.0 02/01/2019	





Plot 7-76. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 2C) – Ch. 100)



Plot 7-77. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 2C) – Ch. 120)

FCC ID: A3LSMN981W	Réud lo be part d & element	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 57 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 57 of 224
© 2020 PCTEST	•		V 9.0 02/01/2019





Plot 7-78. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 2C) - Ch. 144)



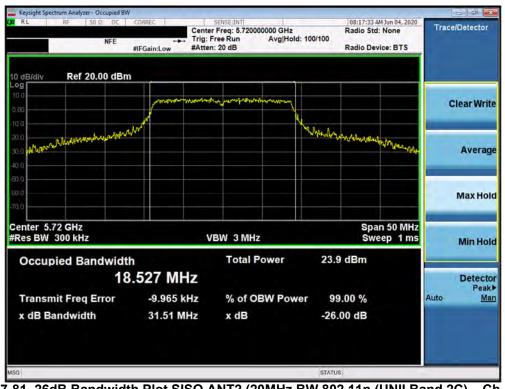
Plot 7-79. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2C) - Ch. 100)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:	Dogo 59 of 224		
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 58 of 224		
© 2020 PCTEST V 9.0 02/01/2019					





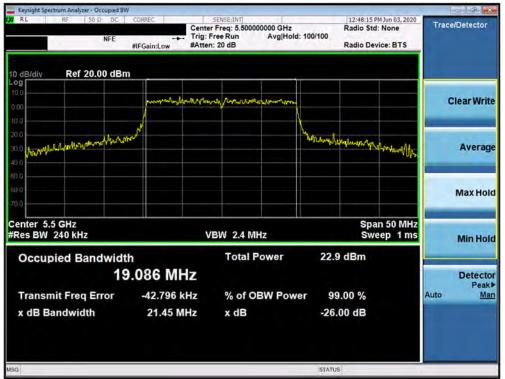
Plot 7-80. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2C) - Ch. 120)



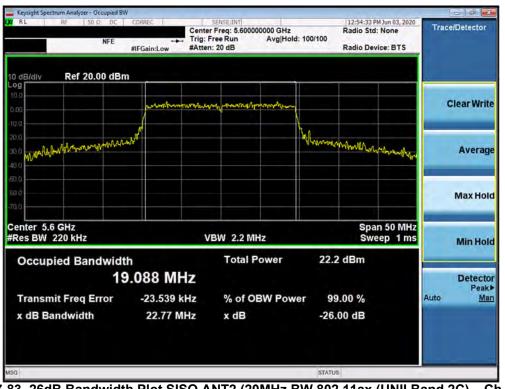
Plot 7-81. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2C) - Ch. 144)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Degre 50 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 59 of 224
© 2020 PCTEST		· · · · · · · · · · · · · · · · · · ·	V 9.0 02/01/2019





Plot 7-82. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 2C) - Ch. 100)



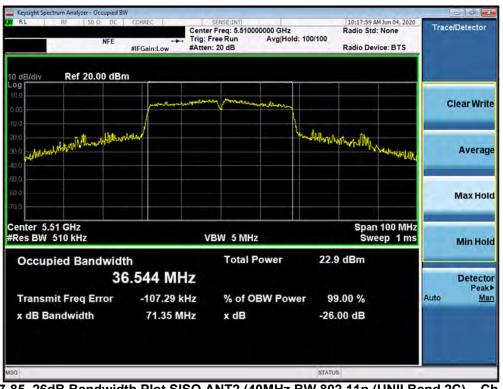
Plot 7-83. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 2C) - Ch. 120)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:	Dage 60 of 224			
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 60 of 224			
© 2020 PCTEST V 9.0 02/01/2019						



Keysight Spectrum Analyzer - Occupied BW		Anna the second second				0	a 3
K RL RE S0Ω DC NFE	#IFGain:Low #Atter	sense:INT  r Freq: 5.720000000 GHz Free Run Avg Ho n: 20 dB	ld: 100/100	12:56:18 Pi Radio Std: Radio Dev		Trace/De	tector
10 dB/div Ref 20.00 dBn	1 getweelsonrivestationse	m. and marked and and				Clea	ar Write
200 30.0 manghallannallannantha	w		Whom	hunny	Alwann	A	verage
50 0 50 0 70,0						Mi	ax Hold
Center 5.72 GHz #Res BW 240 kHz		/BW 2.4 MHz Total Power	22.0		n 50 MHz ep 1 ms	м	in Hold
Occupied Bandwidt 19	n 0.088 MHz	Total Power	22.3	авт		D	etector Peak
Transmit Freq Error x dB Bandwidth	-30.265 kHz 22.85 MHz	% of OBW Pov x dB		9.00 % .00 dB		Auto	Man
ISG			STATU	5			

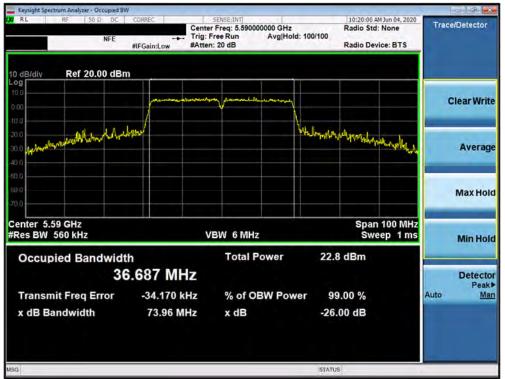
Plot 7-84. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 2C) - Ch. 144)



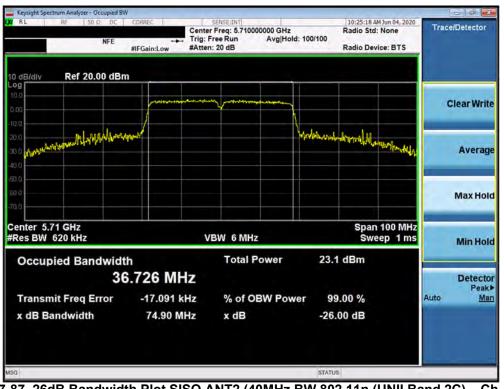
Plot 7-85. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2C) - Ch. 102)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 61 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 61 of 224
© 2020 PCTEST	•		V 9.0 02/01/2019





Plot 7-86. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2C) - Ch. 118)



Plot 7-87. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2C) - Ch. 142)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:	Page 62 of 224		
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset			
© 2020 PCTEST V 9.0 02/01/2019					



NFE #L		SENS Center Free Trig: Free #Atten: 20	Run		d: 100/100	Radio Dev		Trac	e/Detector
10 dB/div Ref 20.00 dBm	punterstard	nunurq	Junion	ament					Clear Write
100 200 30.0 40.0 pulkylained a lwyalt lytywit liter	<u></u>				holuhan	Mound	nlakyoung		Average
50.0 50.0 70.0									Max Hold
Center 5.51 GHz Res BW 390 kHz		VBW	4 MHz				100 MHz ep 1 ms		Min Hold
Occupied Bandwidth 37.	540 MH		Total P	ower	21.2	2 dBm			Detector
Transmit Freq Error x dB Bandwidth	-81.420 kH 39.44 MH		% of OE x dB	BW Pow		0.00 % 00 dB		Auto	Peak▶ <u>Man</u>
36					STATUS	5		-	

Plot 7-88. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax (UNII Band 2C) - Ch. 102)



Plot 7-89. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax (UNII Band 2C) - Ch. 118)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager			
Test Report S/N:	Test Dates:	EUT Type:	Dage 62 of 224			
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 63 of 224			
© 2020 PCTEST V 9.0 02/01/2019						



Keysight Spectrum Analyzer - Occupied BW				and the second	- 8 ×
NFE	Trig: I	SENSE:INT r Freq: 5.710000000 GHz Free Run Avg Hol 1: 20 dB	Radio : d: 100/100	10 AM Jun 04, 2020 Std: None Device: BTS	Trace/Detector
10 dB/div Ref 20.00 dBm	midninkerrally	mpadeistratution			Clear Write
-20.0 30.0 -40.0 Malmaral Arrow Anterported W	n <sup>yk</sup>		Unhoustouthout	+horstore	Average
-90.0 -60.0 -70.0					Max Hold
Center 5.71 GHz #Res BW 390 kHz		/BW 4 MHz	Ś	an 100 MHz weep 1 ms	Min Hold
Occupied Bandwidth 37.	616 MHz	Total Power	21.3 dBm		Detector Peak▶
Transmit Freq Error x dB Bandwidth	-74.689 kHz 39.58 MHz	% of OBW Pow x dB	ver 99.00 % -26.00 dB		Auto <u>Man</u>
MSG			STATUS		

Plot 7-90. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax (UNII Band 2C) - Ch. 142)



Plot 7-91. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 2C) - Ch. 106)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 64 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 64 of 224
© 2020 PCTEST			V 9.0 02/01/2019



Keysight Spectrum Analyzer - Occupied BV		the terms of the		Sec. and	
NRL RE SO DO DO	#IFGain:Low #Atten	sense:INT r Freq: 5.610000000 GHz Free Run Avg Hol n: 20 dB	d: 100/100 Radio Std Radio Dev		Trace/Detector
10 dB/div Ref 20.00 dBr	n Jowwww.wara				Clear Write
100 -200 -30.0 			L The ATMANES AND	ter markey	Average
60.0 60.0 					Max Hold
Center 5.61 GHz #Res BW 1.2 MHz		/BW 8 MHz Total Power		200 MHz ep 1 ms	Min Hold
Occupied Bandwidt 76 Transmit Freq Error x dB Bandwidth	5.428 MHz -128.97 kHz 139.0 MHz	% of OBW Pow x dB			Detector Peak⊁ Auto <u>Man</u>
MSG			STATUS		

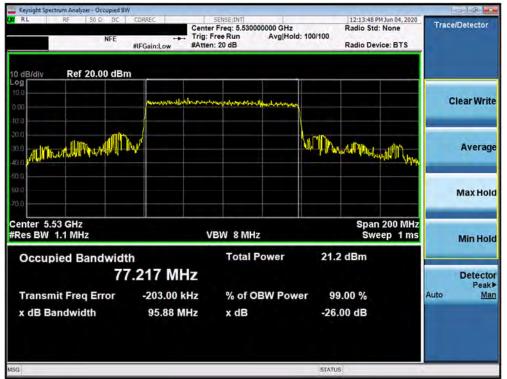
Plot 7-92. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 2C) – Ch. 122)



Plot 7-93. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 2C) - Ch. 138)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 65 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 65 of 224
© 2020 PCTEST			V 9.0 02/01/2019





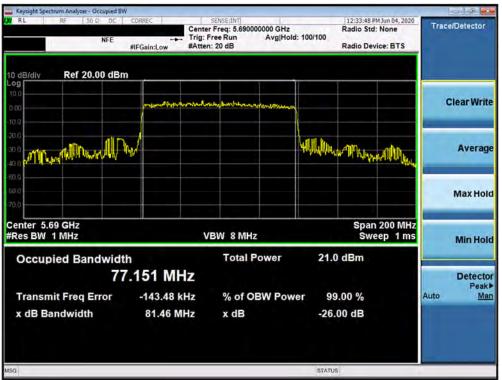
Plot 7-94. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax (UNII Band 2C) - Ch. 106)



Plot 7-95. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax (UNII Band 2C) - Ch. 122)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 66 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 66 of 224
© 2020 PCTEST			V 9.0 02/01/2019





Plot 7-96. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax (UNII Band 2C) - Ch. 138)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 67 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 67 01 224
© 2020 PCTEST			V 9.0 02/01/2019



# 7.3 6dB Bandwidth Measurement – 802.11a/n/ac/ax

## §15.407 (e); RSS-Gen [6.2]

#### **Test Overview and Limit**

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

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

#### **Test Procedure Used**

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

#### **Test Settings**

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

#### Test Setup

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



Figure 7-2. Test Instrument & Measurement Setup

#### Test Notes

None.

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 69 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 68 of 224
2020 PCTEST V 9.0 02/01/2019			



	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured 6dB Bandwidth [MHz]
	5745	149	а	6	16.40
	5785	157	а	6	16.40
	5825	165	а	6	16.39
	5745	149	n (20MHz)	6.5/7.2 (MCS0)	17.66
	5785	157	n (20MHz)	6.5/7.2 (MCS0)	17.61
	5825	165	n (20MHz)	6.5/7.2 (MCS0)	17.62
e	5745	149	ax (20MHz)	6.5/7.2 (MCS0)	18.98
Band	5785	157	ax (20MHz)	6.5/7.2 (MCS0)	18.96
ä	5825	165	ax (20MHz)	6.5/7.2 (MCS0)	17.63
	5755	151	n (40MHz)	13.5/15 (MCS0)	36.34
	5795	159	n (40MHz)	13.5/15 (MCS0)	36.06
	5755	151	ax (40MHz)	13.5/15 (MCS0)	37.58
	5795	159	ax (40MHz)	13.5/15 (MCS0)	36.94
	5775	155	ac (80MHz)	29.3/32.5 (MCS0)	75.87
	5775	155	ax (80MHz)	29.3/32.5 (MCS0)	76.60

### SISO Antenna-1 6 dB Bandwidth Measurements

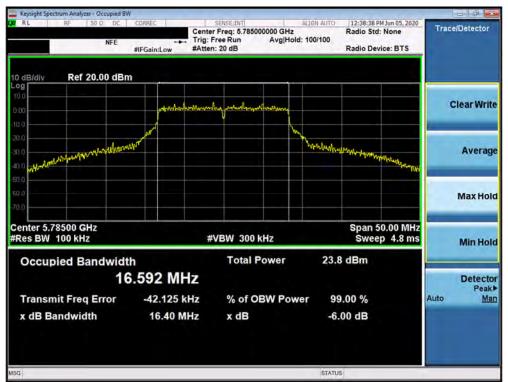
Table 7-4. Conducted Bandwidth Measurements SISO ANT1



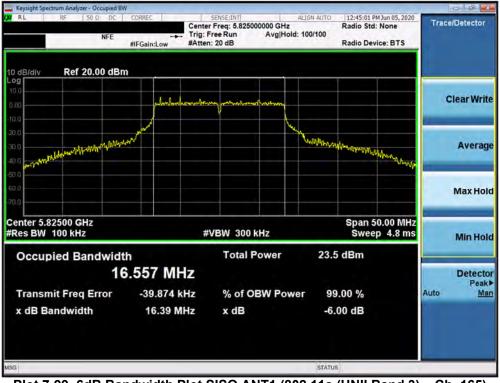
Plot 7-97. 6dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 3) – Ch. 149)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 60 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 69 of 224
© 2020 PCTEST	•		V 9.0 02/01/2019





Plot 7-98. 6dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 3) - Ch. 157)



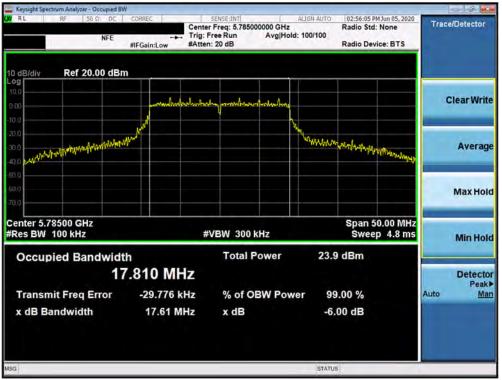
Plot 7-99. 6dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 3) - Ch. 165)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dega 70 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 70 of 224
© 2020 PCTEST			V 9.0 02/01/2019





Plot 7-100. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 3) - Ch. 149)



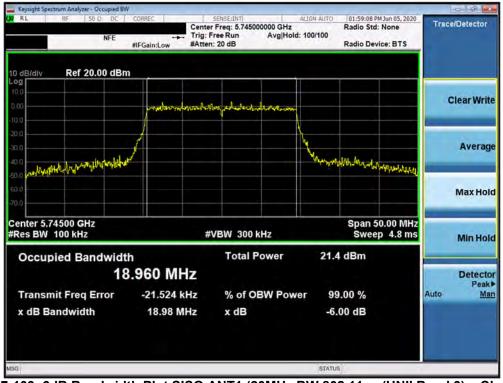
Plot 7-101. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 3) - Ch. 157)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dega 71 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 71 of 224
© 2020 PCTEST	•		V 9.0 02/01/2019





Plot 7-102. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 3) - Ch. 165)



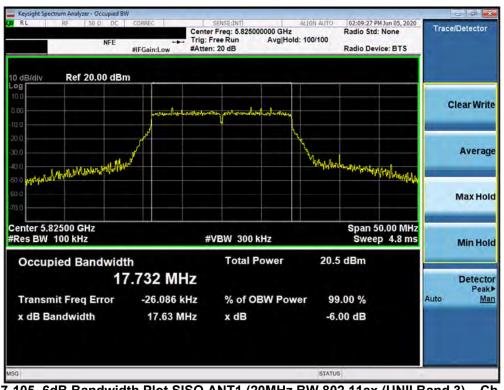
Plot 7-103. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 3) - Ch. 149)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 70 of 004
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 72 of 224
© 2020 PCTEST	•		V 9.0 02/01/2019





Plot 7-104. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 3) - Ch. 157)



Plot 7-105. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 3) - Ch. 165)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Daga 72 of 224	
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 73 of 224	
0 2020 PCTEST V 9.0 02/01/2019				



RL RF 50 Ω DC	CORREC	SENSE;INT	ALIGN AUTO		M Jun 05, 2020	Trace/Detector
NFE	Trig:	rr Freq: 5.755000000 GI Free Run Avgji n: 20 dB	Hz Hold: 100/100	Radio Std		
0 dB/div Ref 20.00 dBn	n .					
og 10.0 0.00	- Indersty of the first	In president and the second	4			ClearWrite
000 000 000 000	hrost		WP of And They was	and the last of th	All Dogo and a star	Average
0.0					- noting	Max Hold
enter 5.75500 GHz Res BW 100 kHz		VBW 300 kHz			00.0 MHz p 9.6 ms	Min Hold
Occupied Bandwidt		Total Power	22.	1 dBm		
36	5.197 MHz					Detector
<b>Transmit Freq Error</b>	-33.715 kHz	% of OBW P	ower 99	9.00 %		Auto Man
x dB Bandwidth	36.34 MHz	x dB	-6	.00 dB		
D			STATU	5		

Plot 7-106. 6dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 3) - Ch. 151)



Plot 7-107. 6dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 3) - Ch. 159)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Daga 74 of 224	
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 74 of 224	
2 2020 PCTEST V 9.0 02/01/2019				



X RL RE 50 Ω DC NFE	Tr	SENSE;INT Inter Freq: 5.755000000 GHz ig: Free Run Avg Hol Atten: 20 dB	Rac Id: 100/100	::35:05 PM Jun 05, 2020 dio Std: None dio Device: BTS	Trace/Detector
10 dB/div Ref 20.00 dBr	m		Y		
0.00	111441 41				Clear Write
10.0	Antiphala and a start and a	old low production design have been been been been been been been be	\		0
20.0					Average
40.0 50.0 50.0 70.0	ant		hydrownorth	advontinentee	Max Hold
Center 5.75500 GHz Res BW 100 kHz		#VBW 300 kHz	S	pan 100.0 MHz Sweep   9.6 ms	Min Hold
Occupied Bandwid	th	Total Power	19.8 dB	ßm	
3	7.510 MHz				Detector
Transmit Freq Error	-17.952 kHz	% of OBW Pov	ver 99.00	%	Auto Man
x dB Bandwidth	37.58 MHz	x dB	-6.00 c	iΒ	
sg			STATUS		

Plot 7-108. 6dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 3) - Ch. 151)



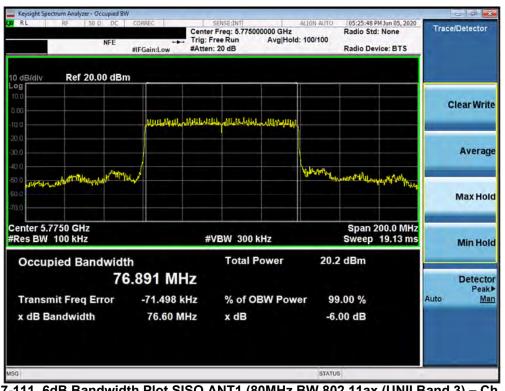
Plot 7-109. 6dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 3) - Ch. 159)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 75 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 75 of 224
© 2020 PCTEST			V 9.0 02/01/2019



RL RE 50Ω DC	CORREC	SENSE:INT er Freg: 5.775000000 GH	ALIGN AUTO	05:44:40 PM Jur Radio Std: No		Trace/Detector
NFE	Trig:		old: 100/100	Radio Device:		
10 dB/div Ref 20.00 dBn	n It					
10.0	And the film	Mist Johnskildt, Johnson				Clear Write
.10.0						
30.0			Unempire	unarter to the speler		Average
40 0 50 0 มุษุปารโมซินุสารณ์เทศการให้เหลืองได้ได้ 60 0				and the state of t	-tropical labor	Marchield
-70,0						Max Hold
Center 5.7750 GHz #Res BW 100 kHz		#VBW 300 kHz		Span 200. Sweep 19		Min Hold
Occupied Bandwidt		Total Power	22.	8 dBm		
	5.546 MHz					Detector Peak
Transmit Freq Error	-3.189 kHz	% of OBW Po		9.00 %	A	uto <u>Man</u>
x dB Bandwidth	75.87 MHz	x dB	-6.	.00 dB		
ISG			STATU	5		

Plot 7-110. 6dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 3) - Ch. 155)



Plot 7-111. 6dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax (UNII Band 3) - Ch. 155)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 76 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 76 of 224
© 2020 PCTEST			V 9.0 02/01/2019



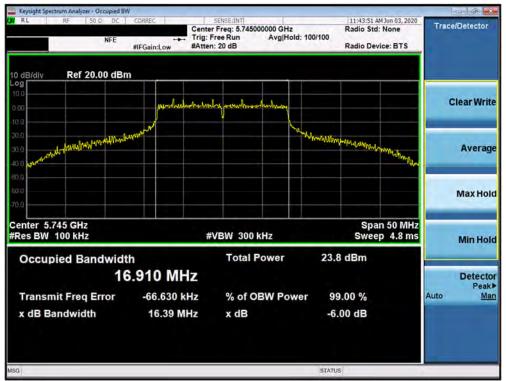
## SISO Antenna-2 6dB Bandwidth Measurements

	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured 6dB Bandwidth [MHz]
	5745	149	а	6	16.39
	5785	157	а	6	16.38
	5825	165	а	6	16.37
	5745	149	n (20MHz)	6.5/7.2 (MCS0)	17.59
	5785	157	n (20MHz)	6.5/7.2 (MCS0)	17.60
	5825	165	n (20MHz)	6.5/7.2 (MCS0)	17.61
e	5745	149	ax (20MHz)	6.5/7.2 (MCS0)	18.94
Band	5785	157	ax (20MHz)	6.5/7.2 (MCS0)	19.06
ä	5825	165	ax (20MHz)	6.5/7.2 (MCS0)	19.00
	5755	151	n (40MHz)	13.5/15 (MCS0)	36.33
	5795	159	n (40MHz)	13.5/15 (MCS0)	36.35
	5755	151	ax (40MHz)	13.5/15 (MCS0)	37.65
	5795	159	ax (40MHz)	13.5/15 (MCS0)	36.86
	5775	155	ac (80MHz)	29.3/32.5 (MCS0)	75.59
	5775	155	ax (80MHz)	29.3/32.5 (MCS0)	77.29

Table 7-5. Conducted Bandwidth Measurements SISO ANT2

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 77 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 77 01 224
© 2020 PCTEST			V 9.0 02/01/2019





Plot 7-112. 6dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 3) - Ch. 149)

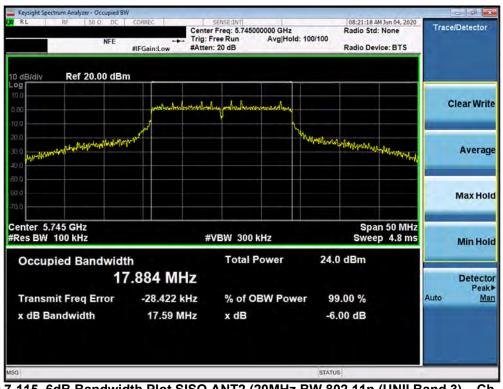


FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dega 79 of 224
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 78 of 224
© 2020 PCTEST	•		V 9.0 02/01/2019





Plot 7-114. 6dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 3) - Ch. 165)



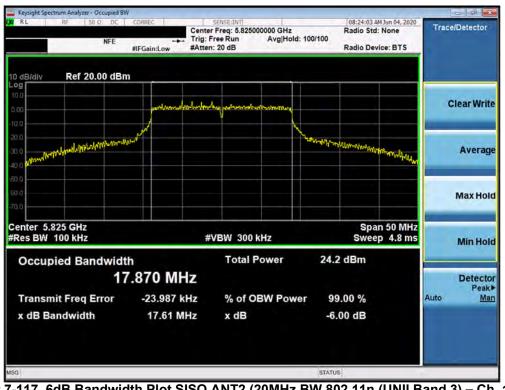
Plot 7-115. 6dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 3) - Ch. 149)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Daga 70 of 224	
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 79 of 224	
0 2020 PCTEST V 9.0 02/01/2019				





Plot 7-116. 6dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 3) - Ch. 157)



Plot 7-117. 6dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 3) - Ch. 165)

FCC ID: A3LSMN981W		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dama 00 af 004
1M2005050082-09-R1.A3L	5/5 - 7/7/2020	Portable Handset	Page 80 of 224
© 2020 PCTEST			V 9.0 02/01/2019