

## 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 / 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: 5/5 - 7/7/2020 Test Site/Location: PCTEST Lab. Columbia, MD, USA Test Report Serial No.: 1M2005050081-09.A3L

### FCC ID:

#### A3LSMN981U

### APPLICANT:

# Samsung Electronics Co., Ltd.

Application Type: Model: Additional Model(s): EUT Type: Frequency Range: Modulation Type: FCC Classification: FCC Rule Part(s): Test Procedure(s): Certification SM-N981U SM-N981U1 Portable Handset 5180 – 5825MHz OFDMA 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.

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: A3LSMN981U	PCTEST Produl Voltes part of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSONS	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 1 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 1 of 296
© 2020 PCTEST				V 9.0 02/01/2019

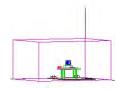


# TABLE OF CONTENTS

1.0	INTRC	DUCTIC	N	4				
	1.1	Scope		4				
	1.2	PCTE	ST Test Location	4				
	1.3	1.3 Test Facility / Accreditations						
2.0	PROD	UCT INF	ORMATION	5				
	2.1	Equipr	nent Description	5				
	2.2	Device	Capabilities	5				
	2.3	Test C	onfiguration	7				
	2.4	EMI S	uppression Device(s)/Modifications	7				
3.0	DESC	RIPTION	OF TESTS	8				
	3.1	Evalua	tion Procedure	8				
	3.2	Radiat	ed Emissions	8				
	3.3	Enviro	nmental Conditions	8				
4.0	ANTE	NNA REO	QUIREMENTS	9				
5.0	MEAS	UREME	NT UNCERTAINTY	10				
6.0	TEST EQUIPMENT CALIBRATION DATA							
7.0	TEST	RESULT	S	12				
	7.1	Summ	ary	12				
	7.2	26dB I	Bandwidth Measurement – 802.11ax OFDMA	14				
	7.3	6dB B	andwidth Measurement – 802.11ax OFDMA	63				
	7.4	UNII C	Output Power Measurement – 802.11ax OFDMA	80				
	7.5	Maxim	um Power Spectral Density – 802.11ax OFDMA	99				
	7.6	Radiat	ed Spurious Emission Measurements – Above 1GHz	221				
		7.6.1	SISO Antenna-1 Radiated Spurious Emission Measurements	224				
		7.6.2	SISO Antenna-2 Radiated Spurious Emission Measurements	242				
		7.6.3	MIMO Radiated Spurious Emission Measurements	260				
		7.6.4	SISO Antenna-1 Radiated Band Edge Measurements (20MHz BW)	278				
		7.6.5	SISO Antenna-1 Radiated Band Edge Measurements (40MHz BW)	280				
		7.6.6	SISO Antenna-1 Radiated Band Edge Measurements (80MHz BW)	282				
		7.6.7	SISO Antenna-2 Radiated Band Edge Measurements (20MHz BW)	284				
		7.6.8	SISO Antenna-2 Radiated Band Edge Measurements (40MHz BW)	286				
		7.6.9	SISO Antenna-2 Radiated Band Edge Measurements (80MHz BW)	288				
		7.6.10	MIMO Radiated Band Edge Measurements (20MHz BW)	290				
		7.6.11	MIMO Radiated Band Edge Measurements (40MHz BW)	292				
		7.6.12	MIMO Radiated Band Edge Measurements (80MHz BW)	294				
8.0	CONC	LUSION		296				

FCC ID: A3LSMN981U	PCTEST Presd Jorbe pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 0 at 000
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 2 of 296
© 2020 PCTEST		·		V 9.0 02/01/2019





# **MEASUREMENT REPORT**



	Channel		AN	JT1	AN	JT2	MIMO		
UNII Band	Channel Bandwidth (MHz)	Tx Frequency (MHz)	Max. Power (mW)	Max. Power (dBm)	Max. Power (mW)	Max. Power (dBm)	Max. Power (mW)	Max. Power (dBm)	
1		5180 - 5240	39.719	15.99	35.563	15.51	37.891	15.79	
2A	20	5260 - 5320	39.719	15.99	34.594	15.39	36.251	15.59	
2C	20	5500 - 5720	36.728	15.65	37.670	15.76	33.231	15.22	
3		5745 - 5825	39.719	15.99	39.719	15.99	34.054	15.32	
1	40	5190 - 5230	24.660	13.92	22.131	13.45	24.967	13.97	
2A		5270 - 5310	24.831	13.95	21.478	13.32	24.442	13.88	
2C	40	5510 - 5710	24.946	13.97	24.946	13.97	21.209	13.27	
3		5755 - 5795	24.491	13.89	24.889	13.96	21.299	13.28	
1		5210	19.907	12.99	19.907	12.99	18.670	12.71	
2A	- 80	5290	18.323	12.63	19.907	12.99	17.269	12.37	
2C		5530 - 5690	19.861	12.98	19.634	12.93	19.351	12.87	
3		5775	19.679	12.94	19.907	12.99	19.670	12.94	

**EUT Overview** 

FCC ID: A3LSMN981U	PCTEST Proof Joine part of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 2 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 3 of 296
© 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: A3LSMN981U		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 4 of 206
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 4 of 296
© 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: A3LSMN981U. The test data contained in this report pertains only to the emissions due to the EUT's UNII transmitter.

Test Device Serial No.: 0514M, 1834M, 1852M, 0276M, 0287M, 1825M

#### 2.2 **Device Capabilities**

This device contains the following capabilities:

800/850/1900 CDMA/EvDO Rev0/A, 1x Advanced (BC0, BC1, BC10), 850/1900 GSM/GPRS/EDGE, 850/1700/1900, WCDMA/HSPA, Multi-band LTE, 5G NR (n5, n12, n71, n41, n66, n2/n25, n260, n261), 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)		Ch.	Frequency (MHz)	С	h.	Frequency (MHz)		Ch.	Frequency (MHz)
36	5180		52	5260	1(	)0	5500		149	5745
:	:		:	:					:	:
42	5210		56	5280	12	20	5600		157	5785
:	:		:	:			:		:	:
48	5240	Ī	64	5320	14	14	5720		165	5825
	Та	hla	210	02 11 av (20MU-) Er	~~		/ Channel Onerati	<b>~ n</b>		<u>,</u>

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

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

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

Band	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)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)	Ch.	Frequency (MHz)
42	5210	58	5290	106	5530	155	5775
				:	:		
				138	5690		

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

FCC ID: A3LSMN981U		MEASUREMENT REPORT (CERTIFICATION)	SAMSONC	Approved by: Quality Manager
Test Report S/N: Test Dates:		EUT Type:		Dage E of 200
1M2005050081-09.A3L	005050081-09.A3L 5/5 - 7/7/2020 Portable Handset		Page 5 of 296	
© 2020 PCTEST	•	•		V 9.0 02/01/2019



#### 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		36	52T	99.7	
NII RU	-		50	106T	99.4	
		20		242T	98.4	
				26T	99.5	
802.11ax	2		36	52T	99.7	
NII RU				106T	99.2	
				242T	98.3	
000.44				26T	99.7	
802.11ax	MIMO CDD	20	36	52T	99.4	
NII RU				106T	98.5	
				242T	96.9	
				26T	99.5	
802.11ax	1		38	52T 106T	99.7 99.2	
NII RU	1		38	242T	99.2	
				484T	96.8	
		40		26T	99.5	
				52T	99.7	
802.11ax	2		38	106T	99.3	
NII RU				242T	98.3	
				484T	96.9	
	MIMO CDD			26T	99.7	
				52T	99.4	
802.11ax		40	38	106T	98.5	
NII RU				242T	96.9	
				484T	94.5	
				26T	99.4	
				52T	99.7	
802.11ax	1		42	106T	99.3	
NII RU	1		42	242T	98.3	
				484T	96.9	
		80		996T	94.0	
				26T	99.4	
				52T	99.7	
802.11ax	2		42	106T	99.3	
NII RU	_		.=	242T	98.2	
				484T	96.8	
				996T	94.1	
				26T	99.7	
				52T	99.3	
802.11ax	MIMO CDD	80	42	106T	98.5	
NII RU			12	242T	96.8	
				484T	94.5	
					996T	90.9

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

FCC ID: A3LSMN981U	PCTEST Prood Jorder part of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N: Test Dates:		EUT Type:		Dama 6 of 000	
1M2005050081-09.A3L 5/5 - 7/7/2020		Portable Handset		Page 6 of 296	
© 2020 PCTEST	•	•		V 9.0 02/01/2019	



	WiFi Configurations		SISO		SDM		MO
WIFI CO			ANT2	ANT1	ANT2	ANT1	ANT2
11ax (20MHz)		✓	$\checkmark$	~	✓	✓	$\checkmark$
5GHz	11ax (40MHz)	✓	$\checkmark$	~	✓	✓	$\checkmark$
	11ax (80MHz)	√	$\checkmark$	√	✓	√	√
Table 2-5. Frequency / Channel Operations							

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

 $\checkmark$  = Support ;  $\times$  = NOT Support

**SISO** = Single Input Single Output

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

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: A3LSMN981U		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 7 of 206
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 7 of 296
© 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 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).

FCC ID: A3LSMN981U	PCTEST Predd Jolie pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: Test Dates: EUT Type:		EUT Type:		Dage 9 of 200
1M2005050081-09.A3L	50081-09.A3L 5/5 - 7/7/2020 Portable Handset		Page 8 of 296	
© 2020 PCTEST	<u>.</u>			V 9.0 02/01/2019



## 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: A3LSMN981U	PCTEST Predd Jolie pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:         Test Dates:           1M2005050081-09.A3L         5/5 - 7/7/2020		EUT Type:		Dage 0 of 200
		Portable Handset	Page 9 of 296	
© 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: A3LSMN981U	PCTEST Preid Joine part of B	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 10 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 10 of 296
© 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	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.

FCC ID: A3LSMN981U	PCTEST Preed to be peet of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dogo 11 of 200	
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 11 of 296	
© 2020 PCTEST	·	•		V 9.0 02/01/2019	



## 7.0 TEST RESULTS

#### 7.1 Summary

Company Name:	Samsung Electronics Co., Ltd.
FCC ID:	A3LSMN981U
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.
- 6) Per RSS-247 Section 6.2.3, transmission on channels which overlap the 5600-5650 MHz is prohibited. This device operates under these frequencies only under the control of a certified master device and does not support active scanning on these channels. This device does not transmit any beacons or initiate any transmissions in UNII Bands 2A or 2C.

FCC ID: A3LSMN981U	PCTEST Prood to De part of B	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 10 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 12 of 296
© 2020 PCTEST	•			V 9.0 02/01/2019



- 802.11ax OFDMA testing was performed for all signal tone configurations as specified by the 802.11ax standard. Worst case results are determined and reported per the guidance provided at the October 2018 TCB Workshop.
- 8) Only one RU index could be selected at a time so no contiguous or non-contiguous RU's were considered for testing.

FCC ID: A3LSMN981U	PCTEST Preid Joine part of B	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 12 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 13 of 296
© 2020 PCTEST			V 9.0 02/01/2019



# 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.

FCC ID: A3LSMN981U	PCTEST Provid Jacks part of B	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Da za 11 af 000	
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 14 of 296	
> 2020 PCTEST V 9.0 02/01/2019				



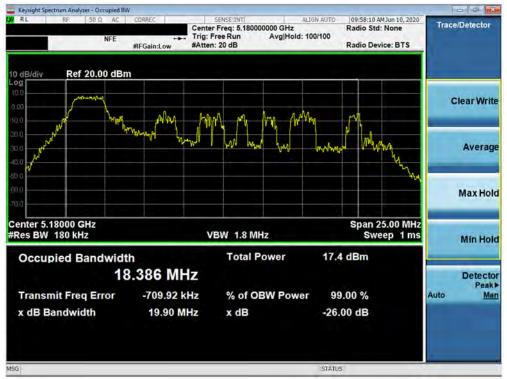
### SISO Antenna-1 26 dB Bandwidth Measurements (26 Tones)

	Frequency [MHz]	Channel No.	802.11 Mode	Tones	Data Rate [Mbps]	Measured 26dB Bandwidth [MHz]
	5180	36	ax (20MHz)	26T	MCS0	19.90
	5200	40	ax (20MHz)	26T	MCS0	19.66
Band 1	5240	48	ax (20MHz)	26T	MCS0	16.42
Bar	5190	38	ax (40MHz)	26T	MCS0	22.31
	5230	46	ax (40MHz)	26T	MCS0	22.17
	5210	42	ax (80MHz)	26T	MCS0	38.11
	5260	52	ax (20MHz)	26T	MCS0	19.75
∢	5280	56	ax (20MHz)	26T	MCS0	19.88
d 2A	5320	64	ax (20MHz)	26T	MCS0	17.75
Band	5270	54	ax (40MHz)	26T	MCS0	19.84
ш	5310	62	ax (40MHz)	26T	MCS0	22.81
	5290	58	ax (80MHz)	26T	MCS0	19.51
	5500	100	ax (20MHz)	26T	MCS0	17.90
	5600	120	ax (20MHz)	26T	MCS0	17.42
	5720	144	ax (20MHz)	26T	MCS0	19.31
2C	5510	102	ax (40MHz)	26T	MCS0	19.41
Band	5590	118	ax (40MHz)	26T	MCS0	22.37
Ba	5710	142	ax (40MHz)	26T	MCS0	19.17
	5530	106	ax (80MHz)	26T	MCS0	38.45
	5610	122	ax (80MHz)	26T	MCS0	38.79
	5690	138	ax (80MHz)	26T	MCS0	39.02

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

FCC ID: A3LSMN981U	PCTEST Proid Joine part of B	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 15 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 15 of 296
© 2020 PCTEST			V 9.0 02/01/2019





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



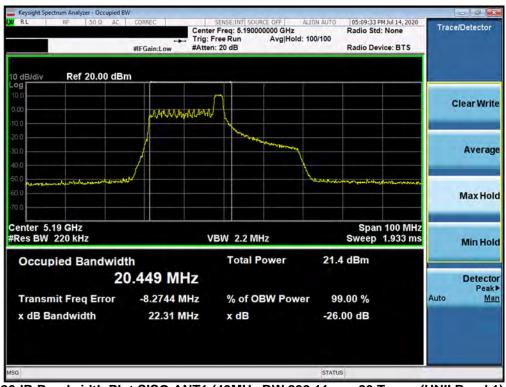
Plot 7-2. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 40)

FCC ID: A3LSMN981U	PCTEST Provid Solar Particle	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Da an 10 at 000	
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 16 of 296	
> 2020 PCTEST V 9.0 02/01/2019				





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: A3LSMN981U	PCTEST Preed to be pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSONS	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 47 of 000
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 17 of 296
© 2020 PCTEST	·	•		V 9.0 02/01/2019





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)

FCC ID: A3LSMN981U	PCTEST Preddjobe pert of B	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Da as 40 at 200	
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 18 of 296	
© 2020 PCTEST V 9.0 02/01/2019				





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



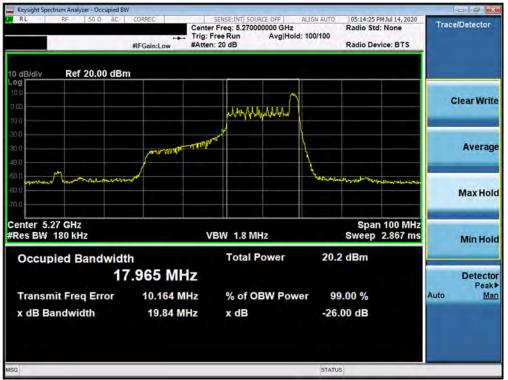
Plot 7-8. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 56)

FCC ID: A3LSMN981U	PCTEST Preddjote pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSONS	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 10 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 19 of 296
0 2020 PCTEST V 9.0 02/01/2019				





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



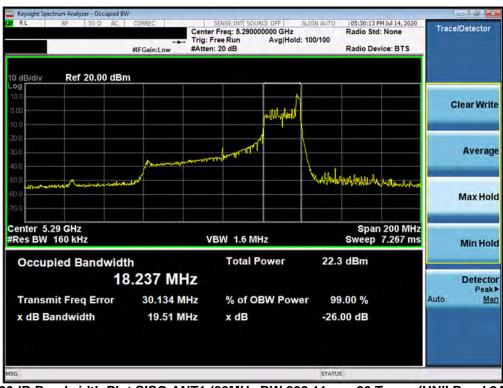
Plot 7-10. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 54)

FCC ID: A3LSMN981U	PCTEST Prood to De part of B	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 00 at 000
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 20 of 296
© 2020 PCTEST	•			V 9.0 02/01/2019





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: A3LSMN981U	PCTEST Proid Joine part of B	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:	Da as 01 of 000		
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 21 of 296		
© 2020 PCTEST V 9.0 02/01/2019					





Plot 7-13. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 100)



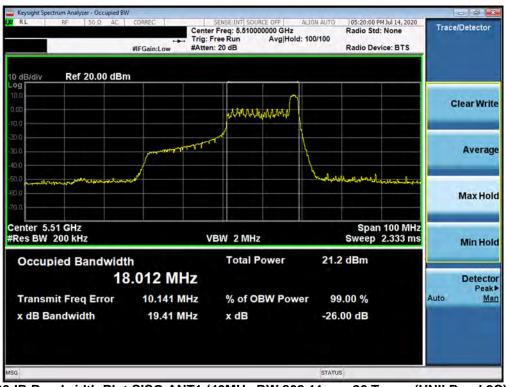
Plot 7-14. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 120)

FCC ID: A3LSMN981U	PCTEST Proid Joine part of B	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:	Da as 00 of 000		
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 22 of 296		
0 2020 PCTEST V 9.0 02/01/2019					





Plot 7-15. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 144)



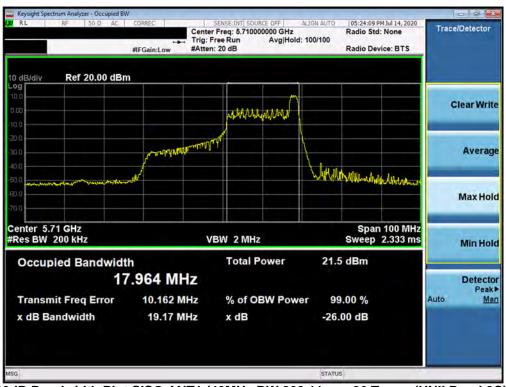
Plot 7-16. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 102)

FCC ID: A3LSMN981U	PCTEST Proid to be part of B	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:	Da za 00 af 000		
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 23 of 296		
© 2020 PCTEST V 9.0 02/01/2019					



Keysight Spectrum Analyzer - Occupied BV						-	- 6 ×
RL RF 50Ω AC	#IFGain:Low #Atte	SENSE:INT  SOURCE OF er Freq: 5.590000000 Free Run Av en: 20 dB		Radio Sto		Trac	e/Detector
10 dB/div Ref 20.00 dBn Log 10.0 .00	n gl/4ka/hlann/hlah						Clear Write
-20 0		New York Control of the Control of t	amay				Average
60.0 allala marka marka marka marka ang kana ang kan Ang kana ang			Annen	der all and a	rallengeton		Max Hold
Center 5.59 GHz #Res BW 200 kHz		VBW 2 MHz		Sweep	n 100 MHz 2.333 ms		Min Hold
Occupied Bandwidt	<sup>th</sup> 9.705 MHz	Total Pow	er 20.	9 dBm			Detector
Transmit Freq Error x dB Bandwidth	-8.6273 MHz 22.37 MHz	% of OBW x dB		9.00 % .00 dB		Auto	Peak∎ <u>Mar</u>
MSG			STATU	IS			

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



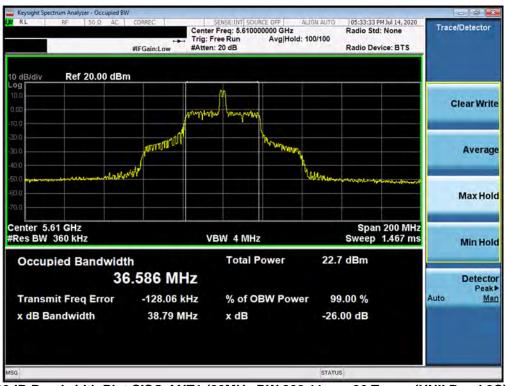
Plot 7-18. 26dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 142)

FCC ID: A3LSMN981U	PCTEST Presd (site pert of (s)	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 0.4 of 000
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 24 of 296
© 2020 PCTEST	·	•		V 9.0 02/01/2019





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: A3LSMN981U	PCTEST Preid Joine part of B	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:	Da an 05 of 000		
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 25 of 296		
© 2020 PCTEST V 9.0 02/01/2019					



RL RF 50 Q AC	Trig		ALIGN AUTO Hz Hold: 100/100	05:34:56 PM Jul Radio Std: No	ne Tra	ce/Detector
	an Gameon and	ten: 20 dB		Radio Device:	BTS	
0 dB/div Ref 20.00 dBn 9g 0.0		with manufactured				Clear Write
	monort	Thorn	Tophy			Average
0.0 0.0 0.0						Max Hold
enter 5.69 GHz Res BW 360 kHz		VBW 4 MHz Total Power	221	Span 20 Sweep 1.4 5 dBm		Min Hole
Occupied Bandwidt 36 Transmit Freq Error x dB Bandwidth	n 5.814 MHz -194.33 kHz 39.02 MHz	% of OBW P	ower 99	9.00 % 00 dB	Auto	Detecto Peak Mar
G			STATU	-		

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

FCC ID: A3LSMN981U	PCTEST Produl Voltes part of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 26 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 26 of 296
© 2020 PCTEST	•	•		V 9.0 02/01/2019



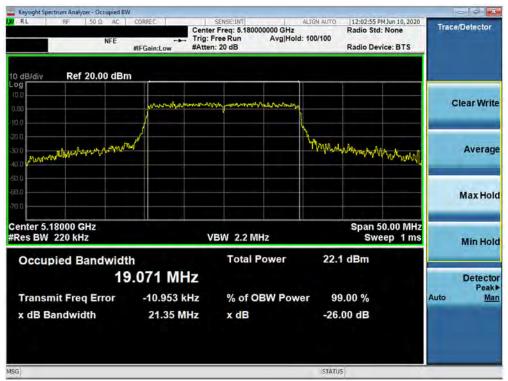
SISO Antenna-1 26 dB Bandwidth Measurements (	(Full Tones)
---	--------------

	Frequency [MHz]	Channel No.	802.11 Mode	Tones	Data Rate [Mbps]	Measured 26dB Bandwidth [MHz]
	5180	36	ax (20MHz)	242T	MCS0	21.35
	5200	40	ax (20MHz)	242T	MCS0	21.72
pd 1	5240	48	ax (20MHz)	242T	MCS0	21.70
Band 1	5190	38	ax (40MHz)	242T	MCS0	39.93
	5230	46	ax (40MHz)	242T	MCS0	40.09
	5210	42	ax (80MHz)	242T	MCS0	80.85
	5260	52	ax (20MHz)	242T	MCS0	21.38
∢	5280	56	ax (20MHz)	242T	MCS0	21.52
q 5	5320	64	ax (20MHz)	242T	MCS0	21.89
Band 2A	5270	54	ax (40MHz)	242T	MCS0	39.81
ш	5310	62	ax (40MHz)	242T	MCS0	39.97
	5290	58	ax (80MHz)	242T	MCS0	81.46
	5500	100	ax (20MHz)	242T	MCS0	21.78
	5600	120	ax (20MHz)	242T	MCS0	21.66
	5720	144	ax (20MHz)	242T	MCS0	21.69
2C	5510	102	ax (40MHz)	242T	MCS0	40.00
Band	5590	118	ax (40MHz)	242T	MCS0	39.95
Ba	5710	142	ax (40MHz)	242T	MCS0	40.04
	5530	106	ax (80MHz)	242T	MCS0	81.75
	5610	122	ax (80MHz)	242T	MCS0	81.32
	5690	138	ax (80MHz)	242T	MCS0	81.38

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

FCC ID: A3LSMN981U	PCTEST Proid Joine part of B	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Page 27 of 296
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 27 01 296
© 2020 PCTEST			V 9.0 02/01/2019





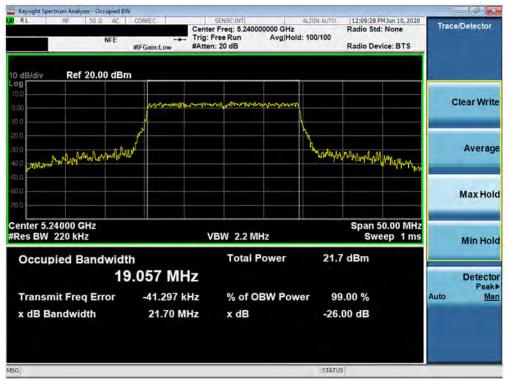
Plot 7-22. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 242 Tones (UNII Band 1) - Ch. 36)



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

FCC ID: A3LSMN981U	PCTEST Prest/site pert al	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 00 at 000
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 28 of 296
© 2020 PCTEST				V 9.0 02/01/2019





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)

FCC ID: A3LSMN981U	PCTEST Proid to be part of B	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:	Da an 00 at 000		
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 29 of 296		
0 2020 PCTEST V 9.0 02/01/2019					



Keysight Spectrum Analyzer - Occupied 8V					- 6 -
RL RF 50 Ω AC			ALIGN AUTO 01:48:43 P Radio Std 8: 100/100 Radio Dev		Trace/Detector
10 dB/div Ref 20.00 dBn	n 	y to the total of the state of			Clear Write
200 300 400 500	w		www.honathabalagovery	Mather Inner Holder	Average
-60.0 -60.0 -70.0					Max Hold
Center 5.23000 GHz #Res BW 390 kHz		W 4 MHz Total Power		00.0 MHz eep 1 ms	Min Hold
Occupied Bandwidt 37 Transmit Freq Error x dB Bandwidth	n 7.584 MHz -48.024 kHz 40.09 MHz	% of OBW Pow			Detector Peak∔ 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)



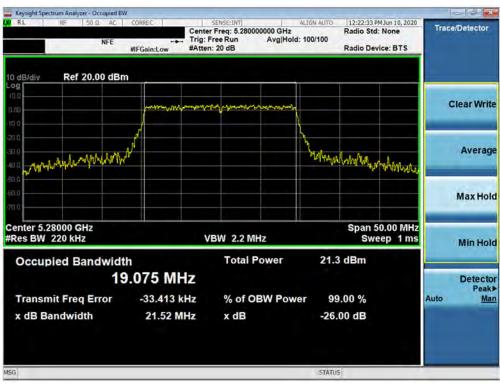
Plot 7-27. 26dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax - 996 Tones (UNII Band 1) - Ch. 42)

FCC ID: A3LSMN981U	PCTEST Presd to be pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	pe:	
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 30 of 296
© 2020 PCTEST				V 9.0 02/01/2019





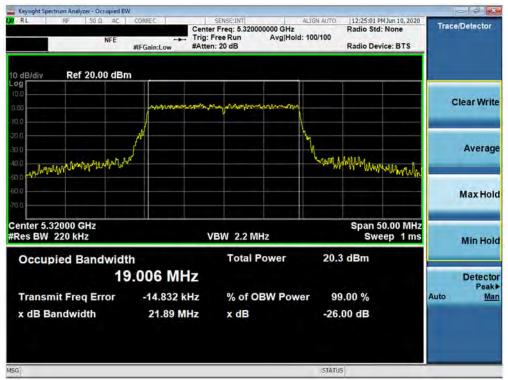
Plot 7-28. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 242 Tones (UNII Band 2A) - Ch. 52)



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

FCC ID: A3LSMN981U	PCTEST Prest/site pet al	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 04 of 000
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 31 of 296
© 2020 PCTEST				V 9.0 02/01/2019





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: A3LSMN981U	PCTEST Prest/site pet al	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 00 of 000
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 32 of 296
© 2020 PCTEST				V 9.0 02/01/2019



Keysight Spectrum Analyzer - Occupied 8W					0 0 💉
NFE	Tri	SENSE:INT Inter Freq: 5.310000000 GHz g: Free Run Avg Ho tten: 20 dB	Radio	:14 PMJun 10, 2020 Std: None Device: BTS	Trace/Detector
10 dB/div Ref 20.00 dBm	Johnskiski der sock	andar francisco natur mansier			Clear Write
200. 300 400	1		Mathalina Maria	Mthalborn	Average
-50 0					Max Hold
Center 5.31000 GHz #Res BW 390 kHz		VBW 4 MHz		an 100.0 MHz Sweep 1 ms	Min Hold
Occupied Bandwidtl 37 Transmit Freq Error x dB Bandwidth	n .556 MHz 16.444 kHz 39.97 MHz	Total Power % of OBW Por x dB	19.2 dBm wer 99.00 % -26.00 dE	6	Detector Peak⊧ Auto <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: A3LSMN981U	PCTEST Prest/site pet al	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 02 of 000
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 33 of 296
© 2020 PCTEST				V 9.0 02/01/2019





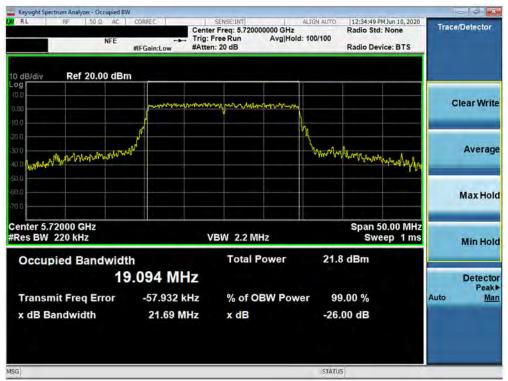
Plot 7-34. 26dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 242 Tones (UNII Band 2C) - Ch. 100)



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

FCC ID: A3LSMN981U	PCTEST PredJobe pert of B	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Da an 0.4 of 000
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 34 of 296
© 2020 PCTEST		-		V 9.0 02/01/2019





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: A3LSMN981U	PCTEST PredJobe pert of B	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 25 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 35 of 296
© 2020 PCTEST		-		V 9.0 02/01/2019



Keysight Spectrum Analyzer - Occupied BW						- 6
NFE	CORREC #FGain:Low	SENSE:INT Center Freq: 5.59000 Trig: Free Run #Atten: 20 dB	ALIGN ALT 00000 GHz Avg Hold: 100/100	Radio Std:		Trace/Detector
10 dB/div Ref 20.00 dBm	_					
10.0 0.00 -10.0		hand here with here with	understa			Clear Write
20 a 30 a 40 a	1		Work	natvilandation	har for nother	Average
50.0 -60.0 -70.0						Max Hold
Center 5.59000 GHz #Res BW 390 kHz		VBW 4 MHz			00.0 MHz ep 1 ms	Min Hold
Occupied Bandwidth 37.	542 MH	Total P	ower 2	0.3 dBm		Detector Peak►
Transmit Freq Error x dB Bandwidth	-5.166 k 39.95 M			99.00 % 6.00 dB		Auto <u>Man</u>
MSG			51/	ATUS		

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: A3LSMN981U	PCTEST PredJobe pert of B	MEASUREMENT REPORT (CERTIFICATION)	AMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 00 at 000
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 36 of 296
© 2020 PCTEST				V 9.0 02/01/2019



Keysight Spectrum Analyzer - Occupied BW						- 6 -
NFE	FGain:Low	SENSE:INT Center Freq: 5.53000 Trig: Free Run #Atten: 20 dB	ALIGN AUTO 0000 GHz Avg Hold: 100/100	02:40:47 P Radio Std: Radio Dev		Trace/Detector
10 dB/div Ref 20.00 dBm	Jud mus present	hundhin shayunna na usas				Clear Write
200 200 400 400 500			Warney	hillimout	oMadawah	Average
-60 0 -60 0 -7α α						Max Hold
Center 5.5300 GHz #Res BW 820 kHz Occupied Bandwidth		VBW 8 MHz Total P			00.0 MHz ep 1 ms	Min Hold
	205 MH 9.082 kH 81.75 MH	Z Hz % of OE	3W Power 99	9.00 % .00 dB		Detector Peak≯ Auto <u>Man</u>
MSG			STATU	5		

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: A3LSMN981U	PCTEST PredJobe pert of B	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 07 of 000	
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 37 of 296	
2020 PCTEST V 9.0 02/01/2019					



Keysight Spectrum Analyzer - Occupied RL RF 50 Ω AC	CORREC	SENSE:INT Center Freq: 5.69000 Trig: Free Run #Atten: 20 dB	ALIGN AUTO 0000 GHz Avg Hold: 100/100	02:49:46 P Radio Std Radio Dev		Trace/Detector
0 dB/div Ref 20.00 dE	اm اردین استان است	∽∽€₽₽∽∽°₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽₽	patrovenue			Clear Write
a a a a a a d a b phone of b of	Jali		William	whiten	alladdrodd	Average
50.0 90.0 10.0						Max Hold
enter 5.6900 GHz Res BW 820 kHz		VBW 8 MHz			200.0 MHz eep 1 ms	Min Hole
Occupied Bandwid	7.023 MH	Total P Z	ower 19	.7 dBm		Detecto
Transmit Freq Error x dB Bandwidth	-91.501 kH 81.38 MH			9.00 % 5.00 dB	4	Auto <u>Mar</u>
G			STAT	U5		

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

FCC ID: A3LSMN981U	PCTEST Predd Jolie pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 20 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 38 of 296
© 2020 PCTEST	-			V 9.0 02/01/2019



# 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	16.31
	5200	40	ax (20MHz)	26T	MCS0	17.77
Band 1	5240	48	ax (20MHz)	26T	MCS0	13.55
Bar	5190	38	ax (40MHz)	26T	MCS0	22.37
	5230	46	ax (40MHz)	26T	MCS0	22.60
	5210	42	ax (80MHz)	26T	MCS0	20.39
	5260	52	ax (20MHz)	26T	MCS0	18.23
∢	5280	56	ax (20MHz)	26T	MCS0	18.71
d 2A	5320	64	ax (20MHz)	26T	MCS0	11.71
Band	5270	54	ax (40MHz)	26T	MCS0	19.25
ш	5310	62	ax (40MHz)	26T	MCS0	22.29
	5290	58	ax (80MHz)	26T	MCS0	38.52
	5500	100	ax (20MHz)	26T	MCS0	18.61
	5600	120	ax (20MHz)	26T	MCS0	18.49
	5720	144	ax (20MHz)	26T	MCS0	19.99
2C	5510	102	ax (40MHz)	26T	MCS0	21.95
Band	5590	118	ax (40MHz)	26T	MCS0	21.88
Ba	5710	142	ax (40MHz)	26T	MCS0	19.42
	5530	106	ax (80MHz)	26T	MCS0	20.96
	5610	122	ax (80MHz)	26T	MCS0	20.03
	5690	138	ax (80MHz)	26T	MCS0	39.11

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

FCC ID: A3LSMN981U		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 20 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 39 of 296
© 2020 PCTEST	•	·	V 9.0 02/01/2019





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: A3LSMN981U	PCTEST Preddjobe pert of B	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Da aa 40 af 000	
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 40 of 296	
2202 PCTEST V 9.0 02/01/2019				





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: A3LSMN981U	PCTEST Pread So The pert of B	MEASUREMENT REPORT (CERTIFICATION)	SAMSONS	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	D	
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 41 of 296
© 2020 PCTEST		•		V 9.0 02/01/2019





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: A3LSMN981U	PCTEST Presd to be pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSONS	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	D	
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 42 of 296
© 2020 PCTEST	*	•		V 9.0 02/01/2019





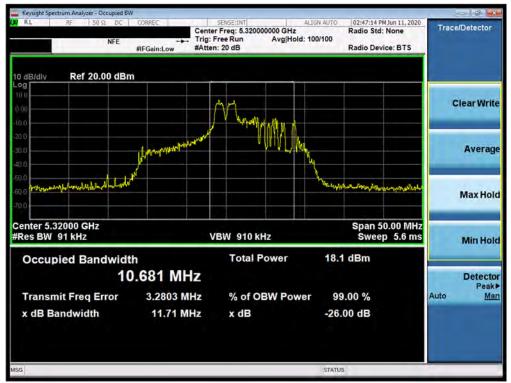
Plot 7-49. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax – 26 Tones (UNII Band 2A) – Ch. 52)



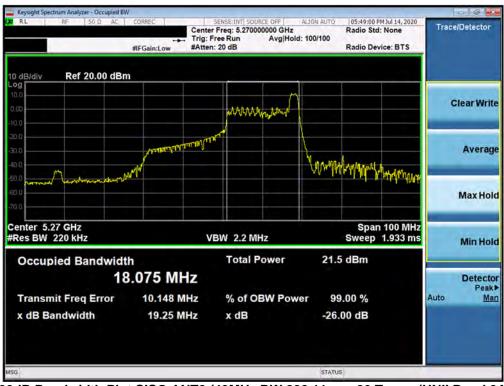
Plot 7-50. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 56)

FCC ID: A3LSMN981U	PCTEST Predition De pert al	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 40 at 000
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 43 of 296
© 2020 PCTEST	· · ·	•		V 9.0 02/01/2019





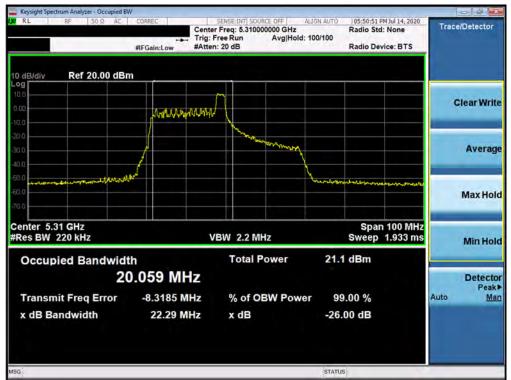
Plot 7-51. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 64)



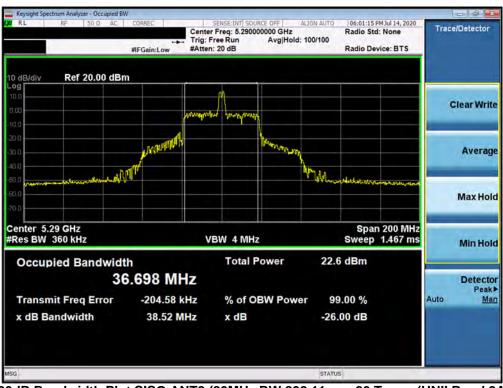
Plot 7-52. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 54)

FCC ID: A3LSMN981U	PCTEST Presd to be pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	D	
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 44 of 296
© 2020 PCTEST		•		V 9.0 02/01/2019





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: A3LSMN981U	PCTEST Proid to be part of B	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:	Dama 45 at 000		
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 45 of 296		
0 2020 PCTEST V 9.0 02/01/2019					





Plot 7-55. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 100)



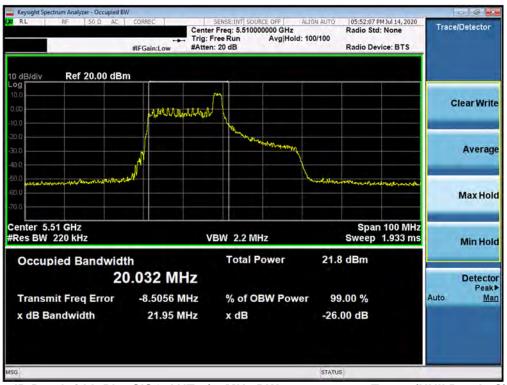
Plot 7-56. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 120)

FCC ID: A3LSMN981U	PCTEST Pread Solice peet of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 40 at 000
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 46 of 296
© 2020 PCTEST				V 9.0 02/01/2019



Keysight Spectrum Analyzer - Occupied BV					
RL         RF         50 Ω         DC           NFE         NFE         NFE           10 dB/div         Ref 20.00 dBn	#IFGain:Low #Atten	SENSE:INT F Freq: 5.720000000 GHz Free Run Avg Hold h: 20 dB	Radio S d: 100/100	td: None	Trace/Detector
10 alsaiv Ref 20.00 alsa Log 18:0 -10:0	ind intervention	alla dibu sebada da f			Clear Write
-20.0 -30.0 -40.0	MIMM		1 -		Average
-50.0 -60.0 Hannington or too Havelland -70.0	y		hourselfinated	hallalanta	Max Hold
Center 5.72000 GHz #Res BW 56 kHz		BW 560 kHz	Sweep	50.00 MHz 0 14.73 ms	Min Hold
Occupied Bandwidt 17 Transmit Freq Error	h 7.865 MHz 653.52 kHz	Total Power % of OBW Pow	18.6 dBm ver 99.00 %		Detector Peak≯ Auto <u>Man</u>
x dB Bandwidth	19.99 MHz	x dB	-26.00 dB		
MSG			STATUS		

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: A3LSMN981U	PCTEST Presd to be pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Dama 47 at 000	
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 47 of 296	
© 2020 PCTEST		•		V 9.0 02/01/2019	



Keysight Spectrum Analyzer - Occupied BV			Startin make		
20 RL RF 50Ω AC	#IFGain:Low #Atter	SENSEINT SOURCE OFF  r Freq 5.590000000 GHz Free Run Avg Hold n: 20 dB	Radio Sto 1: 100/100	PMJul 14, 2020 d: None vice: BTS	Trace/Detector
10.0 Ker 20.00 dBr	- mont Many Workston				Clear Write
-20.0	/				Average
50.0			handman	Merto, antimberse offi	Max Hold
Center 5.59 GHz #Res BW 220 kHz		/BW 2.2 MHz Total Power		n 100 MHz 1.933 ms	Min Hold
	.937 MHz				Detector Peak
Transmit Freq Error x dB Bandwidth	-8.4850 MHz 21.88 MHz	% of OBW Pow x dB	er 99.00 % -26.00 dB		Auto <u>Mar</u>
MSG			STATUS		

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



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

FCC ID: A3LSMN981U	PCTEST Proid to be part of B	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:	Dama 40 of 000		
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 48 of 296		
© 2020 PCTEST V 9.0 02/01/2019					



Keysight Spectrum Analyzer - Occupied B Keysight Spectrum Analyzer - Occupied B	W CORREC	SENSE:INT SOUR	CE OFF	ALIGN AUTO	06:02:40 0	PM Jul 14, 2020	-	
	Ce	ig: Free Run Atten: 20 dB			Radio Std Radio Dev	i: None	Trac	e/Detector
10 dB/div Ref 20.00 dBr	n							
Log 10.0 0.00			tonnarium					Clear Write
-20 0	for white our feloret	molandin		withing	Want and			Average
-50.0 increased and in the second sec						Alan Andrean		Max Hold
Center 5.53 GHz #Res BW 270 kHz		VBW 2.7 MH			Sweep	200 MHz 2.533 ms		Min Hold
Occupied Bandwid	<sup>th</sup> 8. <b>656 MHz</b>	Total P	ower	21.9	dBm			Detecto
Transmit Freq Error x dB Bandwidth	29.998 MHz 20.96 MHz		BW Powe		0.00 % 00 dB		Auto	Ma
MSG				STATUS	3			

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: A3LSMN981U	PCTEST Pread Solice peet of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNC	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 40 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 49 of 296
© 2020 PCTEST				V 9.0 02/01/2019





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

FCC ID: A3LSMN981U	PCTEST Predd Jolie pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga E0 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 50 of 296
© 2020 PCTEST	-			V 9.0 02/01/2019



# 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	21.32
	5200	40	ax (20MHz)	242T	MCS0	21.57
۲ pc	5240	48	ax (20MHz)	242T	MCS0	21.54
Band 1	5190	38	ax (40MHz)	242T	MCS0	39.98
	5230	46	ax (40MHz)	242T	MCS0	39.90
	5210	42	ax (80MHz)	242T	MCS0	80.62
	5260	52	ax (20MHz)	242T	MCS0	21.53
∢	5280	56	ax (20MHz)	242T	MCS0	21.54
d 2	5320	64	ax (20MHz)	242T	MCS0	21.43
Band 2A	5270	54	ax (40MHz)	242T	MCS0	40.12
ш	5310	62	ax (40MHz)	242T	MCS0	39.85
	5290	58	ax (80MHz)	242T	MCS0	81.04
	5500	100	ax (20MHz)	242T	MCS0	22.32
	5600	120	ax (20MHz)	242T	MCS0	30.57
	5720	144	ax (20MHz)	242T	MCS0	25.84
2C	5510	102	ax (40MHz)	242T	MCS0	39.88
Band 2C	5590	118	ax (40MHz)	242T	MCS0	39.84
Ba	5710	142	ax (40MHz)	242T	MCS0	39.95
	5530	106	ax (80MHz)	242T	MCS0	81.25
	5610	122	ax (80MHz)	242T	MCS0	81.00
	5690	138	ax (80MHz)	242T	MCS0	81.14

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

FCC ID: A3LSMN981U		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage E1 of 200	
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 51 of 296	
© 2020 PCTEST			V 9.0 02/01/2019	



Keysight Spectrum Analyzer - Occupi					- 6 -
Х RL RF 50Ω I	E #IFGain:Low	SENSEINT Center Freq: 5,180000 Trig: Free Run #Atten: 20 dB	ALIGN AUTO 0000 GHz Avg[Hold: 100/100	03:53:57 PMJun 11, 2020 Radio Std: None Radio Device: BTS	Trace/Detector
10 dB/div Ref 20.00 d Log 100 000		wysman y wysmania			Clear Write
-200 -300 -400 mm m	Arman		Marris	followship hand the read	Average
-60.0 -60.0 -70.0					Max Hold
Center 5.18000 GHz #Res BW 220 kHz	1.141	VBW 2.2 MH Total Po		Span 50.00 MHz Sweep 1 ms 0 dBm	
Occupied Bandw Transmit Freq Error x dB Bandwidth	19.074 MI	HZ KHz % of OB	W Power 99	9.00 % .00 dB	Detector Peak≽ Auto <u>Man</u>
ASG			STATU	S	

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: A3LSMN981U	PCTEST Proid to be part of B	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:	Dama 50 at 000		
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 52 of 296		
© 2020 PCTEST V 9.0 02/01/2019					



Keysight Spectrum Analyzer - Occupied BV	8					- 6 ×
NFE	#IFGain:Low #Atte	SENSE:INT ler Freq: 5.240000000 G Free Run Avg en: 20 dB	ALIGN AUTO Hz Hold: 100/100	04:07:40 PM Radio Std: Radio Devi		Trace/Detector
10 dB/div Ref 20.00 dBr		www.partherester.du	~~~~~			Clear Write
200 30.0 40.0 mm/hullunitan	and the second s		Multura	New York Andro	Malana	Average
-60.0 -60.0 -70.0						Max Hold
Center 5.24000 GHz #Res BW 220 kHz Occupied Bandwidt		VBW 2.2 MHz Total Power	22.		0.00 MHz ep 1 ms	Min Hold
	9.046 MHz -36.885 kHz 21.54 MHz	% of OBW F x dB	ower 9	9.00 % .00 dB		Detector Peak≯ Auto <u>Man</u>
MSG			STATL	JS		

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: A3LSMN981U	PCTEST Presd Jorbe pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSONS	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 52 af 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 53 of 296
© 2020 PCTEST	·	·		V 9.0 02/01/2019



Keysight Spectrum Analyzer - Occupied BW						- 6 - <del>X</del>
RL RF 50 Q DC	#IFGain:Low #Att	SENSE:INT ter Freq: 5.230000000 GF : Free Run Avg F en: 20 dB	ALIGN AUTO Hz Hold: 100/100	04:50:10 PM Radio Std: Radio Devi		Trace/Detector
10 dB/div Ref 20.00 dBm - 09 0 09 0 09 20 0 20 0 20 0 		and and mountains				Clear Write
200	- add		Vindential	her Alexandren	helingthouse	Average
00						Max Hold
enter 5.23000 GHz Res BW 390 kHz		VBW 4 MHz		Swe	00.0 MHz ep 1 ms	Min Hold
Occupied Bandwidth 37 Transmit Freq Error x dB Bandwidth	1 .578 МН <b>Z</b> -49.133 кНz 39.90 МНz	Total Power % of OBW Po x dB	ower 9	4 dBm 9.00 % .00 dB		Detector Peak) Auto <u>Mar</u>
G			STATU	IS		

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: A3LSMN981U	PCTEST Presd Jorbe pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSONS	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 54 at 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 54 of 296
© 2020 PCTEST	·	•		V 9.0 02/01/2019



Keysight Spectrum Analyzer - Occupied BW	100 m					- 6 -
NFE	Trig: F	sense:INT r Freq: 5.260000000 Free Run Avg n: 20 dB	ALIGN AUTO GHz g Hold: 100/100	04:10:34 PMJ Radio Std: N Radio Device	lone	Trace/Detector
10 dB/div Ref 20.00 dBm	ariestystermetermeter	wymmm	line			Clear Write
-10.0 -20.0 -30.0 -40.0	/		higher	mmm	Werning	Average
-50.0 -60.0 -70.0						Max Hold
Center 5.26000 GHz #Res BW 200 kHz		/BW 2 MHz Total Powe	r 23	Span 50. Sweep 0 dBm		Min Hold
Occupied Bandwidth 19. Transmit Freq Error x dB Bandwidth	084 MHz -6.034 kHz 21.53 MHz	% of OBW I x dB	Power 9	9.00 % .00 dB	A	Detector Peak⊧ uuto <u>Man</u>
MSG			STATI	JS		

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: A3LSMN981U	PCTEST Preed to be pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Daga EE of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 55 of 296
© 2020 PCTEST	·	·		V 9.0 02/01/2019



Keysight Spectrum Analyzer - Occupied BW						a 6 X
XX RL RF 50Ω DC	#IFGain:Low #Atter	sense:int] ir Freq: 5.320000000 GH2 Free Run Avg He n: 20 dB	ALIGN AUTO 2 bid: 100/100	04:17:51 PM Jur Radio Std: No Radio Device:	one	Trace/Detector
10 dB/div Ref 20.00 dBn		Mal-annar Marcana				Clear Write
-10.0 -20.0 -30.0 -40.0			Au Warman	Winterneytedian	Mray	Average
-50.0 -60.0 -70.0						Max Hold
Center 5.32000 GHz #Res BW 220 kHz Occupied Bandwidt		/BW 2.2 MHz Total Power	22	Span 50.0 Sweep 7 dBm		Min Hold
	9.117 MHz -25.010 kHz 21.43 MHz	% of OBW Po x dB	wer 99	9.00 % .00 dB	Au	Detector Peak► ito <u>Man</u>
MSG			STATU	s		

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: A3LSMN981U	PCTEST Preed to be pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSONS	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 50 at 000
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 56 of 296
© 2020 PCTEST	·	•		V 9.0 02/01/2019



Keysight Spectrum Analyzer - Occupied BW		1	1			a 6 8
X RL RF 50 Ω DC		SENSE:INT Center Freq: 5.31000 Trig: Free Run #Atten: 20 dB	ALIGN AUTO 0000 GHz Avg[Hold: 100/100	Radio Std: N Radio Devic	lone	Trace/Detector
10 dB/div Ref 20.00 dBm		Mattackin Incomentation	-Mana A-			Clear Write
100 000 						Average
				and the second second	\$Arvdaikadda	Max Hold
Center 5.31000 GHz #Res BW 390 kHz		VBW 4 MHz			0.0 MHz p 1 ms	Min Hold
	.493 MH			.8 dBm		Detector Peak▶
Transmit Freq Error x dB Bandwidth	-39.753 kH 39.85 MH			9.00 % 5.00 dB	Au	ito <u>Man</u>
MSG			STAT	US		

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: A3LSMN981U	PCTEST Presd Jorbe pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSONS	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		D 57 (000	
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 57 of 296	
© 2020 PCTEST	·	•		V 9.0 02/01/2019	





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: A3LSMN981U	PCTEST Presd to be pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNC	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 50 of 000
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 58 of 296
© 2020 PCTEST	· · ·	•		V 9.0 02/01/2019





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: A3LSMN981U	PCTEST Presd to be pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 50 at 000
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 59 of 296
© 2020 PCTEST	· · ·	·		V 9.0 02/01/2019



Keysight Spectrum Analyzer - Occupied BW						- 6 - 3
NFE	Trig:	SENSE:INT er Freq: 5.590000000 Free Run Av n: 20 dB	ALIGN AUTO GHz g Hold: 100/100	04:59:40 PM Jur Radio Std: No Radio Device:	ine	race/Detector
10 dB/div Ref 20.00 dBm	puturpresident	mystritendersees	a.,			Clear Write
200 200 200 mm Mr Man Julian Star Man Mr Mark	AN CONTRACTOR		Sheedings	nd montaneous	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Average
-60.0						Max Hold
Center 5.59000 GHz #Res BW 390 kHz		/BW 4 MHz		Span 100. Sweep		Min Hold
Occupied Bandwidth 37. Transmit Freq Error x dB Bandwidth	601 MHz -86.791 kHz 39.84 MHz	Total Powe % of OBW x dB	Power 9	0 dBm 9.00 % .00 dB	Auto	Detector Peak≯ Man
MSG			STATL	15		

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: A3LSMN981U	PCTEST Preed to be pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Da za 60 at 000
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 60 of 296
© 2020 PCTEST	•	•		V 9.0 02/01/2019



👝 Keysight Spectrum Analyzer - Oce										06 8
	NFE #IFG	REC Sain:Low			00000 GHz Avg Hold	ALIGN AUTO	05:45:54 Pl Radio Std: Radio Dev		Trac	ce/Detector
10 dB/div Ref 20.00	0 dBm		selent tertenents	Juneyloganga	angenterson					Clear Write
40.0 Martin Minter while	Alland					Millellowy	White	y Judiy		Average
-50.0 -60.0 -70.0										Max Hold
Center 5.5300 GHz #Res BW 820 kHz			VBV	N 8 MHz Total P		20.2		00.0 MHz ep 1 ms		Min Hold
Occupied Band	77.00	05 MH					9.00 %		Auto	Detector Peak▶ Man
Transmit Freq Err x dB Bandwidth		165.57 k 81.25 M		x dB	BW Pow		00 %		Auto	Man
MSG						STATU	5			

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: A3LSMN981U	PCTEST Preed to be pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 64 af 000
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 61 of 296
© 2020 PCTEST	•	·		V 9.0 02/01/2019



Keysight Spectrum Analyzer - Occup						-			- 6 8
	FE #IFGair	Ce Tri	SENSE:INT nter Freq: 5.6900 g: Free Run tten: 20 dB	00000 GHz Avg Hold	ALIGN AUTO	Radio Std Radio Dev		Trace	/Detector
10 dB/div Ref 20.00	dBm	and a group of	usyndythinethingn	gut my life year				c	lear Write
-200 -200 -40.0 JUM by W W Br A	MINAN				Whythere	mat Magazan	r.H. July		Average
-60.0 -60.0 -70.0									Max Hold
Center 5.6900 GHz #Res BW 820 kHz Occupied Bandw	vidth		VBW 8 MHz		20.5		200.0 MHz 200 1 ms		Min Hold
Transmit Freq Erro x dB Bandwidth	<b>76.98</b>	8 MHz 3.125 kHz 1.14 MHz		BW Pow	er 99	0.00 % 00 dB		Auto	Detector Peak► <u>Man</u>
MSG					STATUS	3			

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

FCC ID: A3LSMN981U	PCTEST Proof Joine part of B	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 62 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 62 of 296
© 2020 PCTEST	•			V 9.0 02/01/2019



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

## **Test Overview and Limit**

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

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

#### **Test Procedure Used**

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

#### **Test Settings**

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

#### Test Setup

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



Figure 7-2. Test Instrument & Measurement Setup

#### Test Notes

The 6dB Bandwidth measurement for each channel was measured with the RU index showing the highest conducted power.

FCC ID: A3LSMN981U	PCTEST Prest/site pert al	MEASUREMENT REPORT (CERTIFICATION)	SAMSONS	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Da an 02 of 000
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 63 of 296
© 2020 PCTEST				V 9.0 02/01/2019



	Frequency [MHz]	Channel No.	802.11 Mode	Tones	Data Rate [Mbps]	Measured 6dB Bandwidth [MHz]
	5745	149	ax (20MHz)	26T	MCS0	2.089
e	5785	157	ax (20MHz)	26T	MCS0	2.056
	5825	165	ax (20MHz)	26T	MCS0	2.059
Band	5755	151	ax (40MHz)	26T	MCS0	2.064
	5795	159	ax (40MHz)	26T	MCS0	2.135
	5775	155	ax (80MHz)	26T	MCS0	2.205

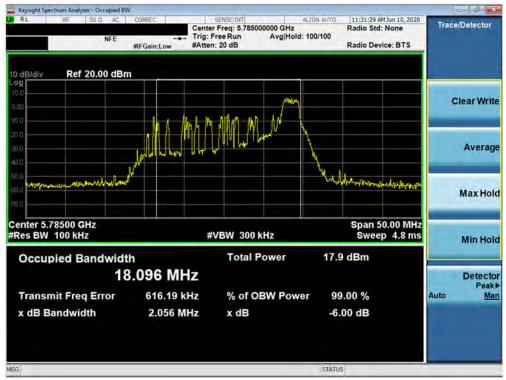
Table 7-6. Conducted Bandwidth Measurements SISO ANT1 (26 Tones)

FCC ID: A3LSMN981U	PCTEST Preed to be pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSONS	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 64 of 206
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 64 of 296
© 2020 PCTEST	·	·		V 9.0 02/01/2019





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



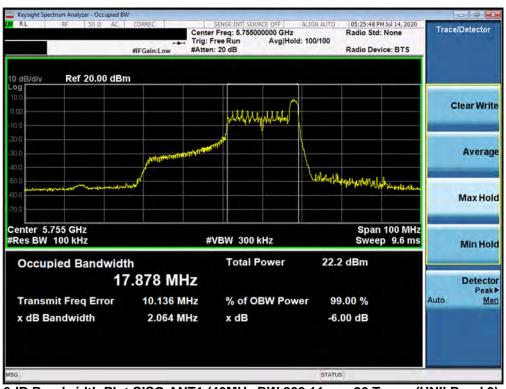
Plot 7-86. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 3) - Ch. 157)

FCC ID: A3LSMN981U	PCTEST Predd Isibe part of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Da 22 05 of 000		
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 65 of 296		
> 2020 PCTEST V 9.0 02/01/2019						





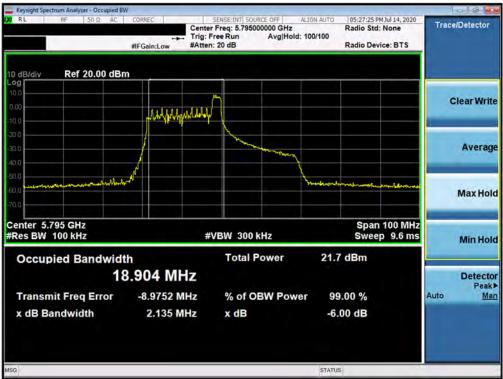
Plot 7-87. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 3) - Ch. 165)



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

FCC ID: A3LSMN981U	PCTEST Presd Jorbe pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSONS	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		B 00 (000	
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 66 of 296	
© 2020 PCTEST	·	·		V 9.0 02/01/2019	





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



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

FCC ID: A3LSMN981U	PCTEST Presd to be pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNC	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 07 of 000
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 67 of 296
© 2020 PCTEST	*	·		V 9.0 02/01/2019



	Frequency [MHz]	Channel No.	802.11 Mode	Tones	Data Rate [Mbps]	Measured 6dB Bandwidth [MHz]
	5745	149	ax (20MHz)	242T	MCS0	19.06
	5785	157	ax (20MHz)	242T	MCS0	18.96
d 3	5825	165	ax (20MHz)	242T	MCS0	18.91
Band	5755	151	ax (40MHz)	242T	MCS0	37.60
	5795	159	ax (40MHz)	242T	MCS0	37.49
	5775	155	ax (80MHz)	242T	MCS0	77.53

# SISO Antenna-1 6 dB Bandwidth Measurements (Full Tones)

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

FCC ID: A3LSMN981U		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 69 of 206
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 68 of 296
© 2020 PCTEST	•		V 9.0 02/01/2019



Keysight Spectrum Analyzer - Oc										
LX/RL RF 50Ω	2 AC COF	RREC		NSE:INT rea: <b>5.7450</b> 0	0000 GHz	ALIGN AUTO	12:36:55 P Radio Std	MJun 10, 2020	Trac	e/Detector
	NFE	+	Trig: Fre	e Run		d: 100/100				
	#IF(	Gain:Low	#Atten: 2	0 dB			Radio Dev	vice: BTS		
10 dB/div Ref 20.0	00 dBm									
10.0										
0.00		ad a stadion	Laman A.		معداهد					Clear Write
-10.0		and a state	A. 6 and 1 and 1 and 1	A TOOL & BANK	, and an a Ordalin .					
-20.0	(	/								
	کمل					h				Avorago
-30.0	human and the					and the start way	erron warden	manula of		Average
-50.0										
-60.0										Max Hold
-70.0										
Center 5.74500 GHz							Snan 5	0.00 MHz		
#Res BW 100 kHz			#VE	300 I	Hz			p 4.8 ms		Min Hold
<u></u>										
Occupied Banc	dwidth			Total P	ower	22.5	i dBm			
	19.0	43 MI	17							Detector
										Peak▶
Transmit Freq Er	ror	-12.072	kHz	% of O	BW Pow	ver 99	.00 %		Auto	<u>Man</u>
x dB Bandwidth		19.06 N	IHz	x dB		-6.	00 dB			
MSG						STATUS	5			

Plot 7-91. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 242 Tones (UNII Band 3) - Ch. 149)



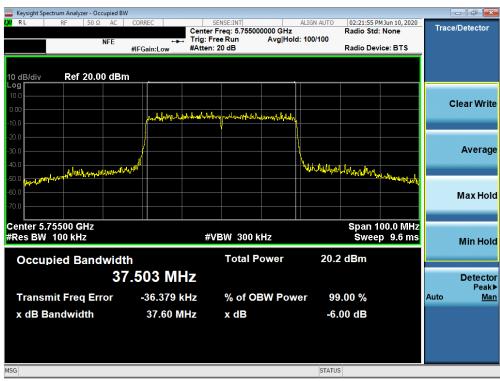
Plot 7-92. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 242 Tones (UNII Band 3) - Ch. 157)

FCC ID: A3LSMN981U	PCTEST Prest/site pert al	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 00 at 000
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 69 of 296
© 2020 PCTEST	·	·		V 9.0 02/01/2019



🔤 Keysight Spectrum Analyzer - Oce										
<mark>LX/</mark> RL RF 50 Ω	AC COR	REC		ISE:INT eq: 5.82500		ALIGN AUTO	12:41:43 P Radio Std	M Jun 10, 2020	Trac	e/Detector
	NFE	÷+-	. Trig: Free	Run		d: 100/100	Raulo Stu	. None		
		ain:Low	#Atten: 2	0 dB			Radio Dev	ice: BTS		
10 dB/div Ref 20.0	0 dBm									
Log										
10.0				ha ha da i						Clear Write
0.00		waybywa	hartanteration	and which of the	all and a grant of the second					
-10.0		(				\ \				
-20.0	ال					1. N. 1				
-30.0	1 CAN NO					Wundarda	mannah			Average
-40.0							A A A A A A A A A A A A A A A A A A A	her the Bardlen		
-50.0										
-60.0										Maylald
-70.0										Max Hold
-70.0										
Center 5.82500 GHz								0.00 MHz		
#Res BW 100 kHz			#VE	W 300 k	κHz		Swee	p 4.8 m s		Min Hold
				Total P		22.4	dBm			
Occupied Band				Total P	ower	22.4	авт			
	18.9	57 MI	-IZ							Detector
<b>T</b>		0.505.		0/ - <b>F O</b>			00.0/			Peak▶
Transmit Freq Err	TOT	-9.585	(HZ	% of OI	BW Pow	er 99	.00 %		Auto	<u>Man</u>
x dB Bandwidth		18.91 M	IHz	x dB		-6.	00 dB			
MSG						STATUS				
MSG						STATUS				

Plot 7-93. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax - 242 Tones (UNII Band 3) - Ch. 165)



Plot 7-94. 6dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - 484 Tones (UNII Band 3) - Ch. 151)

FCC ID: A3LSMN981U	PCTEST Prest/site pet al	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 70 of 000
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 70 of 296
© 2020 PCTEST				V 9.0 02/01/2019



Keysight Spectrum Analyzer - Oo										
<mark>LX/</mark> RL RF 50 ດ	2 AC COR	REC		ISE:INT eq: 5.79500	0000 GHz	ALIGN AUTO	02:27:30 P Radio Std	M Jun 10, 2020	Trac	e/Detector
	NFE	+	Trig: Free	Run		d: 100/100				
	#IF(	Gain:Low	#Atten: 20	) dB			Radio Dev	vice: BTS		
10 dB/div Ref 20.0	00 dBm	_								
10.0										
0.00										Clear Write
-10.0		mindalaha	www.haladoneeas	manderman	ordonabilisticus					
-20.0										
-30.0						\				Average
	. In the second					WI ALLIN				
-40.0	dov do an					hurflydhyddirhad		hamehres-		
-50.0 <b>Televice</b>								11100		
										Max Hold
-70.0										
Center 5.79500 GHz							Span 1	00.0 MHz		
#Res BW 100 kHz			#VB	W 300 k	Hz		Swee	p 9.6 ms		Min Hold
				Total P	owor	20.7	dBm			
Occupied Band				TOLAT	ower	20.7	авш			
	37.4	11 MF	Z							Detector
Transmit Freq Er	ror -	-31.014 k	Hz	% of O	3W Pow	ver 99	.00 %		Auto	Peak▶ <u>Man</u>
x dB Bandwidth		37.49 M	Hz	x dB		-6	00 dB			
		01.40 11	11 12	A GD		-0.				
MSG						STATUS				
mod						STATUS				

Plot 7-95. 6dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax - 484 Tones (UNII Band 3) - Ch. 159)



Plot 7-96. 6dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax - 996 Tones (UNII Band 3) - Ch. 155)

FCC ID: A3LSMN981U	PCTEST Prest/site pert al	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Da na 74 af 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 71 of 296
© 2020 PCTEST				V 9.0 02/01/2019



## SISO Antenna-2 6dB Bandwidth Measurements (26 Tones)

	Frequency [MHz]	Channel No.	802.11 Mode	Tones	Data Rate [Mbps]	Measured 6dB Bandwidth [MHz]
	5745	149	ax (20MHz)	26T	MCS0	2.629
e	5785	157	ax (20MHz)	26T	MCS0	2.681
	5825	165	ax (20MHz)	26T	MCS0	2.628
Band	5755	151	ax (40MHz)	26T	MCS0	2.055
	5795	159	ax (40MHz)	26T	MCS0	2.093
	5775	155	ax (80MHz)	26T	MCS0	2.177

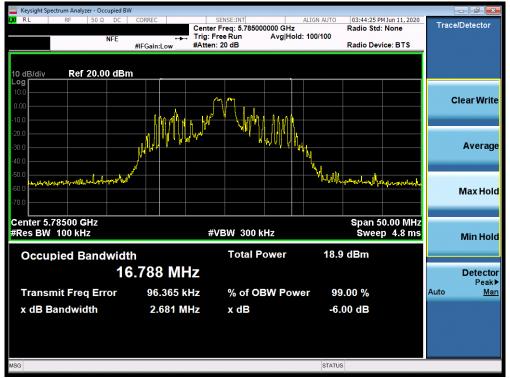
Table 7-8. Conducted Bandwidth Measurements SISO ANT2 (26 Tones)

FCC ID: A3LSMN981U	PCTEST Predd Jobe part of B	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 70 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 72 of 296
© 2020 PCTEST			V 9.0 02/01/2019





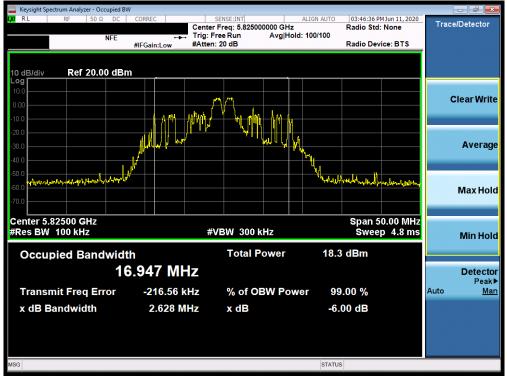
Plot 7-97. 6dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 26 Tones (UNII Band 3) - Ch. 149)



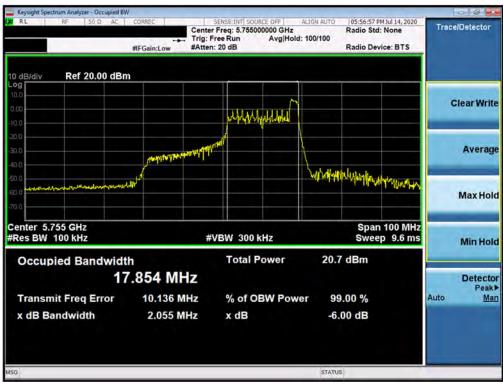
Plot 7-98. 6dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 26 Tones (UNII Band 3) - Ch. 157)

FCC ID: A3LSMN981U	PCTEST Presd Jorbe pert of @	(CERTIFICATION)	SAMSONS	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 72 at 200
1M2005050081-09.A3L	5/5 - 7/7/2020 Portable Handset			Page 73 of 296
© 2020 PCTEST	·	•		V 9.0 02/01/2019





Plot 7-99. 6dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 26 Tones (UNII Band 3) - Ch. 165)



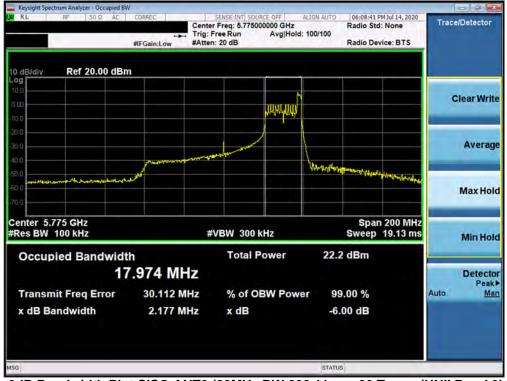
Plot 7-100. 6dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - 26 Tones (UNII Band 3) - Ch. 151)

FCC ID: A3LSMN981U	PCTEST Preat/site pert of	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dama 74 af 000
1M2005050081-09.A3L	50081-09.A3L 5/5 - 7/7/2020 Portable Handset			Page 74 of 296
© 2020 PCTEST	•	•		V 9.0 02/01/2019





Plot 7-101. 6dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - 26 Tones (UNII Band 3) - Ch. 159)



Plot 7-102. 6dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax - 26 Tones (UNII Band 3) - Ch. 155)

FCC ID: A3LSMN981U		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Data 75 af 000
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 75 of 296
© 2020 PCTEST		·	V 9.0 02/01/2019



## SISO Antenna-2 6dB Bandwidth Measurements (Full Tones)

	Frequency [MHz]	Channel No.	802.11 Mode	Tones	Data Rate [Mbps]	Measured 6dB Bandwidth [MHz]
	5745	149	ax (20MHz)	242T	MCS0	19.05
e	5785	157	ax (20MHz)	242T	MCS0	19.02
	5825	165	ax (20MHz)	242T	MCS0	18.92
Band	5755	151	ax (40MHz)	242T	MCS0	37.52
	5795	159	ax (40MHz)	242T	MCS0	37.12
	5775	155	ax (80MHz)	242T	MCS0	77.51

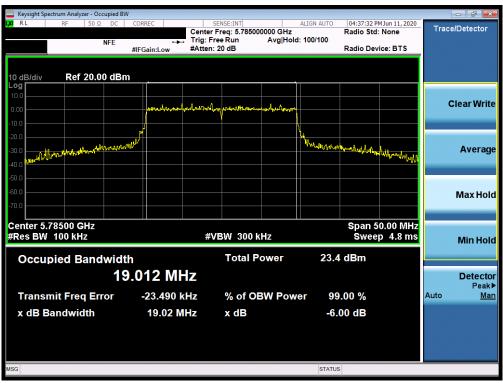
Table 7-9. Conducted Bandwidth Measurements SISO ANT2 (Full Tones)

FCC ID: A3LSMN981U	PCTEST Prest/site pert al	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 76 of 206
1M2005050081-09.A3L	5/5 - 7/7/2020	0 Portable Handset		Page 76 of 296
© 2020 PCTEST	<u>.</u>	·		V 9.0 02/01/2019



Keysight Spectrum Analyzer - Occupied BW					
UM2 RL RF 50Ω DC NFE			Radio d: 100/100	Std: None	Trace/Detector
10 dB/div Ref 20.00 dBm Log 10.0 0.00 -10.0		or production of the moderne			Clear Write
-20 0 -30 0 -40 0 -50 0	or of the second s		hundren and a start and a star	- Jaliphy to With a March	Average
-60.0					Max Hold
Center 5.74500 GHz #Res BW 100 kHz Occupied Bandwidt		/BW 300 kHz Total Power		an 50.00 MHz veep 4.8 ms 1	Min Hold
Transmit Freq Error	-25.475 kHz	% of OBW Pow			Detector Peak▶ Auto <u>Man</u>
x dB Bandwidth	19.05 MHz	x dB	-6.00 de		

Plot 7-103. 6dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 242 Tones (UNII Band 3) - Ch. 149)



Plot 7-104. 6dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 242 Tones (UNII Band 3) - Ch. 157)

FCC ID: A3LSMN981U	PCTEST Pred Joine part of B	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNE	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Da
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 77 of 296
© 2020 PCTEST				V 9.0 02/01/2019



🔤 Keysight Spectrum Analyz	zer - Occupied B\	N								- 6 💌
LXI R.L RF	50 Ω DC	CORREC		ISE:INT eq: 5.82500	0000 GHz	ALIGN AUTO	04:41:24 P Radio Std	M Jun 11, 2020	Trace	e/Detector
	NFE	<b>↔</b>	Trig: Free	Run		d: 100/100				
		#IFGain:Low	#Atten: 2	0 dB			Radio Dev	rice: BTS		
	20.00 dBr	n								
Log 10.0										
0.00			mohardeshee	with and a dame					C	Clear Write
-10.0			and here the		- 100 - 100 V					
20.0		1								
-30.0	the filler strictly	w				Whatmand	u.L			Average
-3U.U	dent view fairs a	·					. A. 1996 (	regarden Mariller		Average
-40.0										
-50.0										
-60.0										Max Hold
-70.0										
Center 5.82500 G	H7						Snan 5	0.00 MHz		
#Res BW 100 kH			#VE	W 300 k	Hz		Swee	p 4.8 ms		Min Hold
										MIII HOIU
Occupied B	andwidt	th		Total P	ower	23.2	dBm			
	18	3.991 MI	17							Detector
										Peak►
Transmit Free	q Error	-26.797	<b>kHz</b>	% of O	<b>3W Pow</b>	ver 99	.00 %		Auto	<u>Man</u>
x dB Bandwid	lth	18.92 N	IHz	x dB		-6.	00 dB			
MSG						STATUS				
mod						314103				

Plot 7-105. 6dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax - 242 Tones (UNII Band 3) - Ch. 165)



Plot 7-106. 6dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - 484 Tones (UNII Band 3) - Ch. 151)

FCC ID: A3LSMN981U	PCTEST Preat/site pert of	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Da az 70 at 000	
1M2005050081-09.A3L	81-09.A3L 5/5 - 7/7/2020 Portable Handset			Page 78 of 296	
© 2020 PCTEST				V 9.0 02/01/2019	



Keysight Spectrum Analyzer - Occup										
LX/ RL RF 50 Ω	DC CORRE	C		ISE:INT eq: 5.79500	0000 GHz	ALIGN AUTO	05:15:44 P	M Jun 11, 2020	Trac	e/Detector
N	FE	• <b>•</b> •	Trig: Free	Run		d: 100/100				
	#IFGai	n:Low	#Atten: 20	) dB			Radio Dev	ice: BTS		
10 dB/div Ref 20.00	dBm									
Log 10.0										
0.00									(	Clear Write
-10.0	M	onlowww.	while mark mark	mandlewaluty	-l-hybeles					
-20.0										
-30.0										Average
-40.0	Lunderwood					Hundrew	-			Average
								Marynahman		
-60.0										Max Hold
-70.0										
Center 5.79500 GHz							Span 1	00.0 MHz		
#Res BW 100 kHz			#VB	W 300 k	Hz			p 9.6 ms		Min Hold
				_						minin
Occupied Bandw				Total P	ower	21.8	dBm			
	37.45	5 MH	z							Detector
<b>T</b>	- 7	4 507 1		0/ - f OF			00.0/		Auto	Peak►
Transmit Freq Erro		1.527 k		% of OE	SW POW		.00 %		Auto	Man
x dB Bandwidth	3	7.12 M	Hz	x dB		-6.	00 dB			
MSG						STATUS	;			

Plot 7-107. 6dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax - 484 Tones (UNII Band 3) - Ch. 159)



Plot 7-108. 6dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax - 996 Tones (UNII Band 3) - Ch. 155)

FCC ID: A3LSMN981U	PCTEST Proof Joine part of B	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dama 70 of 000
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 79 of 296
© 2020 PCTEST		· · · · · · · · · · · · · · · · · · ·	V 9.0 02/01/2019



# 7.4 UNII Output Power Measurement – 802.11ax OFDMA §15.407(a.1.iv) §15.407(a.2) §15.407(a.3); RSS-247 [6.2]

#### **Test Overview and Limits**

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

In the 5.15 – 5.25GHz band, the maximum permissible conducted output power is 250mW (23.98dBm). The maximum e.i.r.p. shall not exceed the lesser of 200 mW or 10 + 10 log10B, dBm.

In the 5.25 – 5.35GHz band, the maximum permissible conducted output power is the lesser of 250mW (23.98dBm) or 11 dBm +  $10\log_{10}(26dB BW) = 11 dBm + 10\log_{10}(21.09) = 24.24dBm$ . The maximum e.i.r.p. shall not exceed the lesser of 1.0 W or 17 + 10 log10B, dBm.

In the 5.47 – 5.725GHz band, the maximum permissible conducted output power is the lesser of 250mW (23.98dBm) or 11 dBm +  $10\log_{10}(26dB BW) = 11 dBm + 10\log_{10}(21.18) = 24.26dBm$ . The maximum e.i.r.p. shall not exceed the lesser of 1.0 W or 17 + 10 log10B, dBm.

In the 5.725 – 5.850GHz band, the maximum permissible conducted output power is 1W (30dBm). The maximum e.i.r.p. is 36 dBm.

#### Test Procedure Used

ANSI C63.10-2013 – Section 12.3.3.2 Method PM-G KDB 789033 D02 v02r01 – Section E)3)b) Method PM-G ANSI C63.10-2013 – Section 14.2 Measure-and-Sum Technique KDB 662911 v02r01 – Section E)1) Measure-and-Sum Technique

#### Test Settings

Average power measurements were performed only when the EUT was transmitting at its maximum power control level using a broadband power meter with a pulse sensor. The power meter implemented triggering and gating capabilities which were set up such that power measurements were recorded only during the ON time of the transmitter. The trace was averaged over 100 traces to obtain the final measured average power.

#### Test Setup

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



Figure 7-3. Test Instrument & Measurement Setup

FCC ID: A3LSMN981U	PCTEST Prood Jories part of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSONE	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Da as 00 at 000	
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 80 of 296	
© 2020 PCTEST	·			V 9.0 02/01/2019	



## SISO Antenna-1 Conducted Output Power Measurements (26 Tones)

	Freq [MHz]	Channel	hannel Detector 1			RU Index		Conducted Power Limit	Conducted Power
					0	4	8	[dBm]	Margin [dB]
N	5180	36	AVG	26T	10.65	10.07	10.07	23.98	-13.33
E E	5200	40	AVG	26T	10.76	10.11	10.11	23.98	-13.22
Ξŧ	5240	48	AVG	26T	10.70	10.30	10.30	23.98	-13.28
0		52	AVG	26T	10.79	10.06	10.06	23.47	-12.68
	5280	56	AVG	26T	10.84	10.22	10.22	23.47	-12.63
N	5320	64	AVG	26T	10.99	10.17	10.17	23.47	-12.48
T a	5500	100	AVG	26T	10.89	10.31	10.31	22.80	-11.91
C a	5600	120	AVG	26T	10.43	10.73	10.73	22.80	-12.07
5	5720	144	AVG	26T	10.96	10.18	10.18	22.80	-11.84
	5745	149	AVG	26T	10.03	10.32	10.32	30.00	-19.68
	5785	157	AVG	26T	10.93	10.45	10.45	30.00	-19.07
	5825	165	AVG	26T	10.96	10.26	10.26	30.00	-19.04

 Table 7-10. SISO ANT1 20MHz BW (UNII) Maximum Conducted Output Power (26 Tones)

N	Freq [MHz]	Channel	hannel Detector T			RU Index	Conducted Power Limit	Conducted Power	
T C					0	8	17	[dBm]	Margin [dB]
t Z	5190	38	AVG	26T	10.15	10.50	10.36	23.98	-13.48
0M idt	5230	46	AVG	26T	10.25	10.64	10.53	23.98	-13.34
₹ (4	5270	54	AVG	26T	10.35	10.42	10.54	23.47	-12.93
	5310	62	AVG	26T	10.39	10.57	10.48	23.47	-12.90
P T	5510	102	AVG	26T	10.42	10.72	10.78	22.80	-12.02
G Ba	5590	118	AVG	26T	10.25	10.26	10.24	22.80	-12.54
D D D	5710	142	AVG	26T	10.48	10.42	10.54	22.80	-12.26
	5755	151	AVG	26T	10.65	10.71	10.81	30.00	-19.19
	5795	159	AVG	26T	10.12	10.67	10.16	30.00	-19.33

Table 7-11. SISO ANT1 40MHz BW (UNII) Maximum Conducted Output Power (26 Tones)

N	Freq [MHz] Channel Detector			el Detector Tones		RU Index	Conducted Power Limit	Conducted Power	
l ₹ €					0	18	36	[dBm]	Margin [dB]
(80MHz width)	5210	42	AVG	26T	10.21	10.87	10.50	23.98	-13.11
	5290	58	AVG	26T	10.80	10.51	10.90	23.47	-12.57
5GHz Band	5530	106	AVG	26T	10.44	10.93	10.30	22.80	-11.87
Ba	5610	122	AVG	26T	10.24	10.72	10.30	22.80	-12.08
5	5690	138	AVG	26T	10.40	10.94	10.36	22.80	-11.86
	5775	155	AVG	26T	10.54	10.39	10.58	30.00	-19.42

Table 7-12. SISO ANT1 80MHz BW (UNII) Maximum Conducted Output Power (26 Tones)

FCC ID: A3LSMN981U	PCTEST Produl Soltes part of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dege 91 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 81 of 296
© 2020 PCTEST	•	•		V 9.0 02/01/2019



	Freq [MHz]	Channel	hannel Detector			RU Index	Conducted Power Limit	Conducted Power	
					37	39	40	[dBm]	Margin [dB]
N	5180	36	AVG	52T	12.74	12.15	12.15	23.98	-11.24
E E	5200	40	AVG	52T	12.77	12.18	12.18	23.98	-11.21
E E	5240	48	AVG	52T	12.86	12.23	12.23	23.98	-11.12
<u>,                                    </u>	5260	52	AVG	52T	12.86	12.21	12.21	23.47	-10.61
<u>S</u>	5280	56	AVG	52T	12.86	12.28	12.28	23.47	-10.61
N C	5320	64	AVG	52T	12.23	12.34	12.34	23.47	-11.13
a T	5500	100	AVG	52T	12.83	12.29	12.29	22.80	-9.97
C B B	5600	120	AVG	52T	12.33	12.56	12.56	22.80	-10.24
5	5720	144	AVG	52T	12.96	12.05	12.05	22.80	-9.84
	5745	149	AVG	52T	12.16	12.18	12.18	30.00	-17.82
	5785	157	AVG	52T	12.98	12.40	12.40	30.00	-17.02
	5825	165	AVG	52T	12.92	12.26	12.26	30.00	-17.08

 Table 7-13. SISO ANT1 20MHz BW (UNII) Maximum Conducted Output Power (52 Tones)

N	Freq [MHz]	Channel	Detector	Tones		RU Index		Conducted Power Limit	Conducted Power
T C					37	40	44	[dBm]	Margin [dB]
It M	5190	38	AVG	52T	11.52	11.56	11.56	23.98	-12.42
e b	5230	46	AVG	52T	11.57	11.66	11.66	23.98	-12.32
4	5270	54	AVG	52T	11.67	11.45	11.45	23.47	-11.80
	5310	62	AVG	52T	11.67	11.58	11.58	23.47	-11.80
P E	5510	102	AVG	52T	11.70	11.74	11.74	22.80	-11.06
Ba Ba	5590	118	AVG	52T	11.45	11.28	11.28	22.80	-11.35
D SG	5710	142	AVG	52T	11.64	11.50	11.50	22.80	-11.16
	5755	151	AVG	52T	11.98	11.69	11.69	30.00	-18.02
	5795	159	AVG	52T	11.46	11.72	11.72	30.00	-18.28

Table 7-14. SISO ANT1 40MHz BW (UNII) Maximum Conducted Output Power (52 Tones)

N	Freq [MHz] Channel Detector			Tones		RU Index	Conducted Power Limit	Conducted Power	
l ₹ £					37	44	52	[dBm]	Margin [dB]
(80MHz width)	5210	42	AVG	52T	10.44	10.94	10.59	23.98	-13.04
	5290	58	AVG	52T	10.98	10.48	10.09	23.47	-12.49
5GHz Band	5530	106	AVG	52T	10.55	10.85	10.43	22.80	-11.95
Ba Ba	5610	122	AVG	52T	10.44	10.77	10.40	22.80	-12.03
5	5690	138	AVG	52T	10.60	10.88	10.52	22.80	-11.92
	5775	155	AVG	52T	10.72	10.25	10.75	30.00	-19.25

Table 7-15. SISO ANT1 80MHz BW (UNII) Maximum Conducted Output Power (52 Tones)

FCC ID: A3LSMN981U	PCTEST Produl Soltes part of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 82 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 82 of 296
© 2020 PCTEST	•	•		V 9.0 02/01/2019



	Freq [MHz]	Channel	Detector	Tones	RU I	ndex	Conducted Power Limit	Conducted Power
					53	54	[dBm]	Margin [dB]
N	5180	36	AVG	106T	14.90	14.15	23.98	-9.08
E E	5200	40	AVG	106T	14.76	14.99	23.98	-8.99
dt N	5240	48	AVG	106T	14.96	14.20	23.98	-9.02
	5260	52	AVG	106T	14.74	14.92	23.47	-8.55
<u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u>	5280	56	AVG	106T	14.92	14.20	23.47	-8.55
N C	5320	64	AVG	106T	14.99	14.99	23.47	-8.48
a I	5500	100	AVG	106T	14.78	14.99	22.80	-7.81
C m	5600	120	AVG	106T	14.44	14.36	22.80	-8.36
5	5720	144	AVG	106T	14.79	14.75	22.80	-8.01
	5745	149	AVG	106T	14.15	14.10	30.00	-15.85
	5785	157	AVG	106T	14.14	14.21	30.00	-15.79
	5825	165	AVG	106T	14.98	14.08	30.00	-15.02

## SISO Antenna-1 Conducted Output Power Measurements (106 Tones)

 Table 7-16. SISO ANT1 20MHz BW (UNII) Maximum Conducted Output Power (106 Tones)

N	Freq [MHz]	Channel Detector		Tones		RU Index	Conducted Power Limit	Conducted Power	
lΫ 🤶					53	54	56	[dBm]	Margin [dB]
E E	5190	38	AVG	106T	12.78	12.59	12.97	23.98	-11.01
E D	5230	46	AVG	106T	12.80	12.55	12.93	23.98	-11.05
4 2	5270	54	AVG	106T	12.80	12.52	12.96	23.47	-10.51
	5310	62	AVG	106T	12.97	12.64	12.91	23.47	-10.50
P č	5510	102	AVG	106T	12.96	12.60	12.26	22.80	-9.84
Ba G	5590	118	AVG	106T	12.55	12.12	12.54	22.80	-10.25
5 5 0	5710	142	AVG	106T	12.79	12.34	12.84	22.80	-9.96
	5755	151	AVG	106T	12.22	12.69	12.36	30.00	-17.31
	5795	159	AVG	106T	12.62	12.67	12.76	30.00	-17.24

Table 7-17. SISO ANT1 40MHz BW (UNII) Maximum Conducted Output Power (106 Tones)

N				el Detector Tones		RU Index	Conducted Power Limit	Conducted Power	
I E €					53	56	60	[dBm]	Margin [dB]
(80MH: width)	5210	42	AVG	106T	11.40	11.90	11.72	23.98	-12.08
	5290	58	AVG	106T	11.26	11.70	11.26	23.47	-11.77
5GHz Band	5530	106	AVG	106T	11.60	11.95	11.64	22.80	-10.85
Ba G	5610	122	AVG	106T	11.52	11.78	11.50	22.80	-11.02
5	5690	138	AVG	106T	11.65	11.94	11.67	22.80	-10.86
	5775	155	AVG	106T	11.94	11.27	11.98	30.00	-18.02

Table 7-18. SISO ANT1 80MHz BW (UNII) Maximum Conducted Output Power (106 Tones)

FCC ID: A3LSMN981U	PCTEST Produl yolite, part of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Page 83 of 296		
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	ortable Handset			
© 2020 PCTEST	•			V 9.0 02/01/2019		



	Freq [MHz]	Channel	Detector	Tones	RU Index	Conducted Power Limit	Conducted Power
					61	[dBm]	Margin [dB]
N	5180	36	AVG	242T	15.99	23.98	-7.99
E E	5200	40	AVG	242T	15.99	23.98	-7.99
(20MH width)	5240	48	AVG	242T	15.07	23.98	-8.91
j. S	5260	52	AVG	242T	15.90	23.47	-7.57
<u>S</u> <u>S</u>	5280	56	AVG	242T	15.99	23.47	-7.48
	5320	64	AVG	242T	15.01	23.47	-8.46
Hz	5500	100	AVG	242T	15.65	22.80	-7.15
C m	5600	120	AVG	242T	15.40	22.80	-7.40
5	5720	144	AVG	242T	15.56	22.80	-7.24
	5745	149	AVG	242T	15.99	30.00	-14.01
	5785	157	AVG	242T	15.99	30.00	-14.01
	5825	165	AVG	242T	15.90	30.00	-14.10

## SISO Antenna-1 Conducted Output Power Measurements (242 Tones)

Table 7-19. SISO ANT1 20MHz BW (UNII) Maximum Conducted Output Power (242 Tones)

N	Freq [MHz]	Channel	Detector	Tones	Tones RU Ind		Conducted Power Limit	Conducted Power
					61	62	[dBm]	Margin [dB]
E E	5190	38	AVG	242T	13.15	13.03	23.98	-10.83
<u>e</u>	5230	46	AVG	242T	13.21	13.14	23.98	-10.77
4	5270	54	AVG	242T	13.14	13.31	23.47	-10.16
	5310	62	AVG	242T	13.37	13.18	23.47	-10.10
HZ an C	5510	102	AVG	242T	13.18	13.38	22.80	-9.42
	5590	118	AVG	242T	13.64	13.84	22.80	-8.96
5 2 2	5710	142	AVG	242T	13.90	13.97	22.80	-8.83
	5755	151	AVG	242T	13.30	13.38	30.00	-16.62
	5795	159	AVG	242T	13.08	13.15	30.00	-16.85

Table 7-20. SISO ANT1 40MHz BW (UNII) Maximum Conducted Output Power (242 Tones)

Hz (c	Freq [MHz] Channel Detector		Detector	Tones		RU Index	Conducted Power Limit	Conducted Power	
ا با کے ا					61	62	64	[dBm]	Margin [dB]
(80MI width	5210	42	AVG	242T	12.79	12.99	12.98	23.98	-10.99
	5290	58	AVG	242T	12.41	12.63	12.44	23.47	-10.84
rd Ta	5530	106	AVG	242T	12.83	12.96	12.90	22.80	-9.84
5GHz Band	5610	122	AVG	242T	12.64	12.86	12.74	22.80	-9.94
5	5690	138	AVG	242T	12.74	12.98	12.79	22.80	-9.82
	5775	155	AVG	242T	12.24	12.41	12.23	30.00	-17.59

Table 7-21. SISO ANT1 80MHz BW (UNII) Maximum Conducted Output Power (242 Tones)

FCC ID: A3LSMN981U	PCTEST Preed laibe pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 94 of 200
1M2005050081-09.A3L 5/5 - 7/7/2020		Portable Handset	Page 84 of 296	
© 2020 PCTEST	<u>.</u>	•		V 9.0 02/01/2019



N	Freq [MHz]	Channel	Detector	Tones	RU Index	Conducted Power Limit	Conducted Power
ÎÎ Î					65	[dBm]	Margin [dB]
(40MHz width)	5190	38	AVG	484T	13.66	23.98	-10.32
id <u>t</u>	5230	46	AVG	484T	13.92	23.98	-10.06
4 3	5270	54	AVG	484T	13.95	23.47	-9.52
	5310	62	AVG	484T	13.84	23.47	-9.63
	5510	102	AVG	484T	13.45	22.80	-9.35
GHz Banc	5590	118	AVG	484T	13.46	22.80	-9.34
D C	5710	142	AVG	484T	13.66	22.80	-9.14
	5755	151	AVG	484T	13.01	30.00	-16.99
	5795	159	AVG	484T	13.89	30.00	-16.11

## SISO Antenna-1 Conducted Output Power Measurements (484 Tones)

Table 7-22. SISO ANT1 40MHz BW (UNII) Maximum Conducted Output Power (484 Tones)

N	Freq [MHz]	Channel	Detector	Tones	RU li	ndex	Conducted Power Limit	Conducted Power
(80MH width)					65	66	[dBm]	Margin [dB]
NO IP	5210	42	AVG	484T	12.59	12.78	23.98	-11.20
	5290	58	AVG	484T	12.24	12.30	23.47	-11.17
GHz Band	5530	106	AVG	484T	12.58	12.75	22.80	-10.05
Ba	5610	122	AVG	484T	12.44	12.67	22.80	-10.13
5	5690	138	AVG	484T	12.62	12.79	22.80	-10.01
	5775	155	AVG	484T	12.89	12.06	30.00	-17.11

Table 7-23. SISO ANT1 80MHz BW (UNII) Maximum Conducted Output Power (484 Tones)

FCC ID: A3LSMN981U		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Daga 85 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 85 of 296
© 2020 PCTEST			V 9.0 02/01/2019



N	Freq [MHz]	Channel	Detector	Tones	RU Index	Conducted Power Limit	Conducted Power
l ₹ €					67	[dBm]	Margin [dB]
(80MHz width)	5210	42	AVG	996T	12.64	23.98	-11.34
	5290	58	AVG	996T	12.37	23.47	-11.10
GHz 3and	5530	106	AVG	996T	12.61	22.80	-10.19
Ba Ba	5610	122	AVG	996T	12.54	22.80	-10.26
2	5690	138	AVG	996T	12.68	22.80	-10.12
	5775	155	AVG	996T	12.94	30.00	-17.06

## SISO Antenna-1 Conducted Output Power Measurements (996 Tones)

Table 7-24. SISO ANT1 80MHz BW (UNII) Maximum Conducted Output Power (996 Tones)

FCC ID: A3LSMN981U	PCTEST Preid Joine part of B	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:	Dage 86 of 200	
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 86 of 296	
© 2020 PCTEST		·	V 9.0 02/01/2019	



## SISO Antenna-2 Conducted Output Power Measurements (26 Tones)

	Freq [MHz]	Channel	Detector	Tones	RU Index			Conducted Power Limit	Conducted Power
					0	4	8	[dBm]	Margin [dB]
N	5180	36	AVG	26T	10.34	10.61	10.37	23.98	-13.37
T S	5200	40	AVG	26T	10.32	10.58	10.40	23.98	-13.40
Σŧ		48	AVG	26T	10.37	10.68	10.43	23.98	-13.30
$\mathbf{O}$	5260	52	AVG	26T	10.36	10.65	10.36	23.47	-12.82
2	5280	56	AVG	26T	10.37	10.62	10.42	23.47	-12.85
N	5320	64	AVG	26T	10.36	10.65	10.44	23.47	-12.82
T à	5500	100	AVG	26T	10.75	10.91	10.50	22.80	-11.89
C d		120	AVG	26T	10.95	10.99	10.71	22.80	-11.81
S	5720	144	AVG	26T	10.12	10.17	10.84	22.80	-11.96
	5745	149	AVG	26T	10.65	10.75	10.41	30.00	-19.25
	5785	157	AVG	26T	10.74	10.93	10.55	30.00	-19.07
	5825	165	AVG	26T	10.59	10.96	10.57	30.00	-19.04

Table 7-25. SISO ANT2 20MHz BW (UNII) Maximum Conducted Output Power (26 Tones)

N	Freq [MHz]	Channel	Detector	Tones	RU Index			Conducted Power Limit	Conducted Power
T C					0	8	17	[dBm]	Margin [dB]
E E	5190	38	AVG	26T	10.61	10.74	10.61	23.98	-13.24
<u>P</u>	5230	46	AVG	26T	10.70	10.80	10.70	23.98	-13.18
4	5270	54	AVG	26T	10.57	10.52	10.59	23.47	-12.88
5	5310	62	AVG	26T	10.66	10.68	10.50	23.47	-12.79
Ϋ́	5510	102	AVG	26T	10.20	10.90	10.20	22.80	-11.90
ы Ва	5590	118	AVG	26T	10.20	10.98	10.02	22.80	-11.82
D D D	5710	142	AVG	26T	10.53	10.27	10.42	22.80	-12.27
	5755	151	AVG	26T	10.11	10.14	10.21	30.00	-19.79
	5795	159	AVG	26T	10.60	10.24	10.70	30.00	-19.30

Table 7-26. SISO ANT2 40MHz BW (UNII) Maximum Conducted Output Power (26 Tones)

N	Freq [MHz] Channe		Channel Detector			RU Index	Conducted Power Limit	Conducted Power	
E E					0	18	36	[dBm]	Margin [dB]
(80MHz width)	5210	42	AVG	26T	10.41	10.24	10.57	23.98	-13.41
	5290	58	AVG	26T	10.34	10.99	10.35	23.47	-12.48
5GHz Band	5530	106	AVG	26T	10.22	10.67	10.99	22.80	-11.81
Ba G	5610	122	AVG	26T	10.14	10.60	10.98	22.80	-11.82
5	5690	138	AVG	26T	10.48	10.85	10.31	22.80	-11.95
	5775	155	AVG	26T	10.80	10.54	10.84	30.00	-19.16

Table 7-27. SISO ANT2 80MHz BW (UNII) Maximum Conducted Output Power (26 Tones)

FCC ID: A3LSMN981U	PCTEST Produl Voltes part of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dega 97 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 87 of 296
© 2020 PCTEST	•	·		V 9.0 02/01/2019



	Freq [MHz]	Channel	Detector	Tones				Conducted Power Limit	Conducted Power
					37	39	40	[dBm]	Margin [dB]
N	5180	36	AVG	52T	12.36	12.60	12.50	23.98	-11.38
Ξ í	5200	40	AVG	52T	12.50	12.70	12.56	23.98	-11.28
	5240	48	AVG	52T	12.57	12.76	12.58	23.98	-11.22
$\mathbf{O}$	5260	52	AVG	52T	12.45	12.60	12.44	23.47	-10.87
2	5280	56	AVG	52T	12.54	12.63	12.54	23.47	-10.84
N a	5320	64	AVG	52T	12.52	12.64	12.48	23.47	-10.83
II d	5500	100	AVG	52T	12.84	12.86	12.70	22.80	-9.94
C D		120	AVG	52T	12.99	12.99	12.87	22.80	-9.81
5	5720	144	AVG	52T	12.09	12.16	12.99	22.80	-9.81
	5745	149	AVG	52T	12.45	12.50	12.27	30.00	-17.50
	5785	157	AVG	52T	12.52	12.71	12.44	30.00	-17.29
	5825	165	AVG	52T	12.36	12.61	12.30	30.00	-17.39

Table 7-28. SISO ANT2 20MHz BW (UNII) Maximum Conducted Output Power (52 Tones)

N	Freq [MHz]	Channel	Detector	Tones	RU Index			Conducted Power Limit	Conducted Power
ΪÏ Ĉ					37	40	44	[dBm]	Margin [dB]
t Z	5190	38	AVG	52T	11.87	11.76	11.84	23.98	-12.11
<b>D</b>	5230	46	AVG	52T	11.95	11.84	11.96	23.98	-12.02
(40MI width	5270	54	AVG	52T	11.97	11.65	11.89	23.47	-11.50
	5310	62	AVG	52T	11.94	11.73	11.94	23.47	-11.53
P č	5510	102	AVG	52T	11.43	11.99	11.42	22.80	-10.81
Ba G	5590	118	AVG	52T	11.30	11.99	11.28	22.80	-10.81
D C	5710	142	AVG	52T	11.65	11.31	11.61	22.80	-11.15
	5755	151	AVG	52T	11.23	11.93	11.24	30.00	-18.07
	5795	159	AVG	52T	11.53	11.78	11.58	30.00	-18.22

Table 7-29. SISO ANT2 40MHz BW (UNII) Maximum Conducted Output Power (52 Tones)

N	Freq [MHz]	Channel Detector		tor Tones		RU Index	Conducted Power Limit	Conducted Power	
₹ €					37	44	52	[dBm]	Margin [dB]
(80MHz width)	5210	42	AVG	52T	10.68	10.99	10.73	23.98	-12.99
	5290	58	AVG	52T	10.47	10.97	10.49	23.47	-12.50
5GHz Band	5530	106	AVG	52T	10.40	10.55	10.16	22.80	-12.25
Ba	5610	122	AVG	52T	10.40	10.50	10.22	22.80	-12.30
5	5690	138	AVG	52T	10.67	10.66	10.44	22.80	-12.13
	5775	155	AVG	52T	10.95	10.38	10.98	30.00	-19.02

Table 7-30. SISO ANT2 80MHz BW (UNII) Maximum Conducted Output Power (52 Tones)

FCC ID: A3LSMN981U	PCTEST Proof Joine part of B	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 89 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 88 of 296
© 2020 PCTEST		·		V 9.0 02/01/2019



	Freq [MHz] Channel		Channel Detector		RUI	ndex	Conducted Power Limit	Conducted Power
					53	54	[dBm]	Margin [dB]
N	5180	36	AVG	106T	14.33	14.39	23.98	-9.59
E E	5200	40	AVG	106T	14.37	14.47	23.98	-9.51
dt N	5240	48	AVG	106T	14.47	14.49	23.98	-9.49
	5260	52	AVG	106T	14.25	14.28	23.47	-9.19
<u>S</u>	5280	56	AVG	106T	14.33	14.38	23.47	-9.09
NC	5320	64	AVG	106T	14.41	14.34	23.47	-9.06
a I	5500	100	AVG	106T	14.70	14.65	22.80	-8.10
C m	5600	120	AVG	106T	14.84	14.73	22.80	-7.96
5	5720	144	AVG	106T	14.99	14.84	22.80	-7.81
	5745	149	AVG	106T	14.30	14.16	30.00	-15.70
	5785	157	AVG	106T	14.38	14.37	30.00	-15.62
	5825	165	AVG	106T	14.23	14.18	30.00	-15.77

## SISO Antenna-2 Conducted Output Power Measurements (106 Tones)

Table 7-31. SISO ANT2 20MHz BW (UNII) Maximum Conducted Output Power (106 Tones)

N	Freq [MHz]	Channel	Detector	Tones	RU Index		Conducted Power Limit	Conducted Power	
T C					53	54	56	[dBm]	Margin [dB]
t Z	5190	38	AVG	106T	12.11	12.64	12.09	23.98	-11.34
id <u>f</u>	5230	46	AVG	106T	12.19	12.87	12.27	23.98	-11.11
4 8	5270	54	AVG	106T	12.17	12.68	12.98	23.47	-10.49
5	5310	62	AVG	106T	12.31	12.74	12.98	23.47	-10.49
₽ ĕ	5510	102	AVG	106T	12.66	12.99	12.71	22.80	-9.81
Ba G	5590	118	AVG	106T	12.65	12.01	12.65	22.80	-10.15
D C	5710	142	AVG	106T	12.99	12.20	12.93	22.80	-9.81
	5755	151	AVG	106T	12.44	12.87	12.40	30.00	-17.13
	5795	159	AVG	106T	12.68	12.57	12.73	30.00	-17.27

Table 7-32. SISO ANT2 40MHz BW (UNII) Maximum Conducted Output Power (106 Tones)

N	Freq [MHz]	Channel	Detector	Tones	RU Index		Conducted Power Limit	Conducted Power	
(80MHz width)					53	56	60	[dBm]	Margin [dB]
idt O	5210	42	AVG	106T	11.91	11.21	11.99	23.98	-11.99
	5290	58	AVG	106T	11.71	11.07	11.84	23.47	-11.63
5GHz Band	5530	106	AVG	106T	11.44	11.60	11.33	22.80	-11.20
Ba Ba	5610	122	AVG	106T	11.45	11.66	11.40	22.80	-11.14
5	5690	138	AVG	106T	11.64	11.70	11.51	22.80	-11.10
	5775	155	AVG	106T	11.98	11.30	11.19	30.00	-18.02

Table 7-33. SISO ANT2 80MHz BW (UNII) Maximum Conducted Output Power (106 Tones)

FCC ID: A3LSMN981U	PCTEST Produl yolite, part of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 90 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 89 of 296
© 2020 PCTEST	•			V 9.0 02/01/2019



	Freq [MHz]	Channel	Detector	Tones	RU Index	Conducted Power Limit	Conducted Power
					61	[dBm]	Margin [dB]
N	5180	36	AVG	242T	15.37	23.98	-8.61
T T	5200	40	AVG	242T	15.40	23.98	-8.58
(20MH) Iwidth)	5240	48	AVG	242T	15.51	23.98	-8.47
j. S	5260	52	AVG	242T	15.25	23.47	-8.22
<u>S</u>	5280	56	AVG	242T	15.34	23.47	-8.13
N C	5320	64	AVG	242T	15.39	23.47	-8.08
Hzanc	5500	100	AVG	242T	15.45	22.80	-7.35
С Ш Ш	5600	120	AVG	242T	15.61	22.80	-7.19
5	5720	144	AVG	242T	15.76	22.80	-7.04
	5745	149	AVG	242T	15.96	30.00	-14.04
	5785	157	AVG	242T	15.99	30.00	-14.01
	5825	165	AVG	242T	15.90	30.00	-14.10

## SISO Antenna-2 Conducted Output Power Measurements (242 Tones)

Table 7-34. SISO ANT2 20MHz BW (UNII) Maximum Conducted Output Power (242 Tones)

N	Freq [MHz]	Channel	Detector	Tones	RU Index		Conducted Power Limit	Conducted Power	
Ϊ C					61	62	[dBm]	Margin [dB]	
It N	5190	38	AVG	242T	13.42	13.41	23.98	-10.56	
o bi	5230	46	AVG	242T	13.45	13.41	23.98	-10.53	
<b>4</b>	5270	54	AVG	242T	13.28	13.30	23.47	-10.17	
	5310	62	AVG	242T	13.32	13.21	23.47	-10.15	
	5510	102	AVG	242T	13.77	13.97	22.80	-8.83	
G Ba	5590	118	AVG	242T	13.78	13.81	22.80	-8.99	
5 2 2	5710	142	AVG	242T	13.97	13.27	22.80	-8.83	
-/	5755	151	AVG	242T	13.40	13.49	30.00	-16.51	
	5795	159	AVG	242T	13.96	13.21	30.00	-16.04	

 Table 7-35. SISO ANT2 40MHz BW (UNII) Maximum Conducted Output Power (242 Tones)

N	Freq [MHz]	Channel	Detector	Tones		RU Index	Conducted Power Limit	Conducted Power	
th)					61	62	[dBm]	Margin [dB]	
(80MHz width)	5210	42	AVG	242T	12.12	12.25	12.18	23.98	-11.73
	5290	58	AVG	242T	12.97	12.24	12.90	23.47	-10.50
5GHz Band	5530	106	AVG	242T	12.75	12.78	12.83	22.80	-9.97
Ba Ba	5610	122	AVG	242T	12.79	12.77	12.86	22.80	-9.94
5	5690	138	AVG	242T	12.93	12.88	12.99	22.80	-9.81
	5775	155	AVG	242T	12.21	12.39	12.43	30.00	-17.57

Table 7-36. SISO ANT2 80MHz BW (UNII) Maximum Conducted Output Power (242 Tones)

FCC ID: A3LSMN981U	PCTEST Produl Soltes part of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 00 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 90 of 296
© 2020 PCTEST	·			V 9.0 02/01/2019



N	Freq [MHz]	Channel	Detector	Tones	RU Index	Conducted Power Limit	Conducted Power
Р НZ					65	[dBm]	Margin [dB]
	5190	38	AVG	484T	13.24	23.98	-10.74
(40M widtl	5230	46	AVG	484T	13.34	23.98	-10.64
4 3	5270	54	AVG	484T	13.23	23.47	-10.24
	5310	62	AVG	484T	13.21	23.47	-10.26
GHz Banc	5510	102	AVG	484T	13.77	22.80	-9.03
	5590	118	AVG	484T	13.65	22.80	-9.15
D D D	5710	142	AVG	484T	13.95	22.80	-8.85
	5755	151	AVG	484T	13.31	30.00	-16.69
	5795	159	AVG	484T	13.86	30.00	-16.14

## SISO Antenna-2 Conducted Output Power Measurements (484 Tones)

Table 7-37. SISO ANT2 40MHz BW (UNII) Maximum Conducted Output Power (484 Tones)

N	Freq [MHz]	Channel	Detector	Tones	RU Index		Conducted Power Limit	Conducted Power
(80MH width)					65	66	[dBm]	Margin [dB]
id1	5210	42	AVG	484T	12.90	12.99	23.98	-10.99
	5290	58	AVG	484T	12.99	12.13	23.47	-10.48
GHz Band	5530	106	AVG	484T	12.44	12.61	22.80	-10.19
Ba Ba	5610	122	AVG	484T	12.44	12.58	22.80	-10.22
5	5690	138	AVG	484T	12.65	12.79	22.80	-10.01
	5775	155	AVG	484T	12.99	12.29	30.00	-17.01

Table 7-38. SISO ANT2 80MHz BW (UNII) Maximum Conducted Output Power (484 Tones)

FCC ID: A3LSMN981U		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 01 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 91 of 296
© 2020 PCTEST		·	V 9.0 02/01/2019



N	Freq [MHz]	Channel	Detector	Tones	RU Index	Conducted Power Limit	Conducted Power
l ₹ €					67	[dBm]	Margin [dB]
(80MH) width)	5210	42	AVG	996T	12.74	23.98	-11.24
	5290	58	AVG	996T	12.68	23.47	-10.79
Hz	5530	106	AVG	996T	12.04	22.80	-10.76
Ba Ba	5610	122	AVG	996T	12.01	22.80	-10.79
5	5690	138	AVG	996T	12.22	22.80	-10.58
	5775	155	AVG	996T	12.58	30.00	-17.42

## SISO Antenna-2 Conducted Output Power Measurements (996 Tones)

Table 7-39. SISO ANT2 80MHz BW (UNII) Maximum Conducted Output Power (996 Tones)

FCC ID: A3LSMN981U	PCTEST Preid Joine part of B	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 02 of 206
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 92 of 296
© 2020 PCTEST		·	V 9.0 02/01/2019



## MIMO Maximum Conducted Output Power Measurements (26 Tones)

						RU Index									Conducted
	Freq [MHz]	Channel	Detector	Tones		0			4			8		Power Limit	Power
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	[dBm]	Margin [dB]
<u>N</u>	5180	36	AVG	26T	7.47	7.57	10.53	7.33	6.99	10.17	7.74	7.61	10.69	23.98	-13.29
ΞΞ	5200	40	AVG	26T	7.37	7.51	10.45	7.50	7.02	10.28	7.73	7.62	10.69	23.98	-13.29
Σ₩	5240	48	AVG	26T	7.60	7.68	10.65	7.44	7.00	10.24	7.40	6.85	10.14	23.98	-13.33
S .≦	5260	52	AVG	26T	7.18	7.32	10.26	8.02	7.63	10.84	7.31	7.21	10.27	23.47	-12.63
<u>S</u>	5280	56	AVG	26T	7.31	7.29	10.31	8.13	7.59	10.88	7.45	7.32	10.40	23.47	-12.59
NZ	5320	64	AVG	26T	7.48	7.21	10.36	8.23	7.55	10.91	7.50	7.18	10.35	23.47	-12.56
ш	5500	100	AVG	26T	7.28	7.04	10.17	7.14	6.95	10.06	7.20	6.80	10.01	22.80	-12.63
ЮË	5600	120	AVG	26T	7.28	7.83	10.57	7.19	6.98	10.10	7.25	6.79	10.04	22.80	-12.23
<u>ں</u>	5720	144	AVG	26T	6.91	7.36	10.15	6.98	7.51	10.26	6.85	7.21	10.04	22.80	-12.54
	5745	149	AVG	26T	7.06	7.31	10.20	7.25	7.57	10.42	7.03	7.22	10.14	30.00	-19.58
	5785	157	AVG	26T	7.08	7.32	10.21	7.45	7.69	10.58	7.02	7.24	10.14	30.00	-19.42
	5825	165	AVG	26T	6.94	7.36	10.17	7.27	7.72	10.51	6.89	7.25	10.08	30.00	-19.49

Table 7-40. MIMO 20MHz BW (UNII) Maximum Conducted Output Power (26 Tones)

						RU Index									
N	Freq [MHz]	Channel	Detector	Tones		0		8			17			Power Limit	Power
ΪĈ	•				ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	[dBm]	Margin [dB]
Ξ÷	5190	38	AVG	26T	7.43	6.84	10.16	7.67	7.15	10.43	7.56	7.15	10.37	23.98	-13.55
S P	5230	46	AVG	26T	7.42	6.79	10.13	7.75	7.05	10.42	7.71	7.18	10.46	23.98	-13.52
4 ≥	5270	54	AVG	26T	8.18	7.73	10.97	8.18	7.70	10.96	8.15	7.69	10.94	23.47	-12.50
<u> </u>	5310	62	AVG	26T	7.22	6.85	10.05	7.29	6.71	10.02	8.17	7.75	10.98	23.47	-12.49
<b>₽</b> ⊆	5510	102	AVG	26T	7.64	7.43	10.55	7.57	7.21	10.40	7.78	7.51	10.66	22.80	-12.14
는 S	5590	118	AVG	26T	7.63	7.38	10.52	7.44	7.07	10.27	7.70	7.44	10.58	22.80	-12.22
ЮШ	5710	142	AVG	26T	7.59	7.66	10.64	7.50	7.39	10.46	7.54	7.62	10.59	22.80	-12.16
~	5755	151	AVG	26T	7.96	7.60	10.79	7.70	7.44	10.58	7.93	7.59	10.77	30.00	-19.21
	5795	159	AVG	26T	7.46	7.32	10.40	7.91	7.76	10.85	7.64	7.32	10.49	30.00	-19.15

#### Table 7-41. MIMO 40MHz BW (UNII) Maximum Conducted Output Power (26 Tones)

						RU Index									Conducted
N	Freq [MHz]	Channel	Detector	Tones		0			18			36		Power Limit	Power
⊺ ਦੁ ਦੁ					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	[dBm]	Margin [dB]
S E	5210	42	AVG	26T	8.26	7.67	10.99	7.91	7.43	10.69	7.47	6.85	10.18	23.98	-12.99
<u>s</u> <u>s</u>	5290	58	AVG	26T	7.80	7.50	10.66	7.44	7.05	10.26	8.08	7.36	10.75	23.47	-12.72
P P	5530	106	AVG	26T	7.70	7.44	10.58	8.10	7.82	10.97	7.70	7.37	10.55	22.80	-11.83
Ba	5610	122	AVG	26T	7.76	7.40	10.59	7.94	7.76	10.86	7.47	7.34	10.42	22.80	-11.94
ъ Ш	5690	138	AVG	26T	7.71	7.56	10.65	7.92	7.84	10.89	7.49	7.45	10.48	22.80	-11.91
	5775	155	AVG	26T	7.78	7.40	10.60	7.40	7.04	10.23	8.06	7.50	10.80	30.00	-19.20

Table 7-42. MIMO 80MHz BW (UNII) Maximum Conducted Output Power (26 Tones)

FCC ID: A3LSMN981U	PCTEST Predd Jolie part of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dogo 02 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 93 of 296
© 2020 PCTEST	•	•		V 9.0 02/01/2019



## MIMO Conducted Output Power Measurements (52 Tones)

					RU Index										Conducted
	Freq [MHz]	Channel	Detector	Tones		37			39			40		Power Limit	Power
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	[dBm]	Margin [dB]
N	5180	36	AVG	52T	9.96	9.76	12.87	9.26	9.05	12.17	10.19	9.70	12.96	23.98	-11.02
ΞĒ	5200	40	AVG	52T	9.57	9.77	12.68	9.26	8.91	12.10	9.67	9.79	12.74	23.98	-11.24
ξŧ	5240	48	AVG	52T	9.74	9.78	12.77	9.43	9.86	12.66	9.37	8.96	12.18	23.98	-11.21
0	5260	52	AVG	52T	9.22	9.43	12.34	9.55	9.64	12.61	9.32	9.50	12.42	23.47	-10.86
<u>5</u> (2)	5280	56	AVG	52T	9.40	9.53	12.48	9.54	9.63	12.60	9.50	9.54	12.53	23.47	-10.87
N 2	5320	64	AVG	52T	9.53	9.47	12.51	9.71	9.60	12.67	9.50	9.40	12.46	23.47	-10.80
E E	5500	100	AVG	52T	9.29	9.14	12.23	9.42	9.16	12.30	9.24	9.04	12.15	22.80	-10.50
ЮÄ	5600	120	AVG	52T	9.45	9.26	12.37	8.95	9.25	12.11	9.37	8.97	12.18	22.80	-10.43
S	5720	144	AVG	52T	9.08	9.60	12.36	9.16	9.65	12.42	9.03	9.48	12.27	22.80	-10.38
	5745	149	AVG	52T	9.22	9.27	12.26	9.24	9.34	12.30	8.95	9.16	12.07	30.00	-17.70
	5785	157	AVG	52T	9.12	9.32	12.23	9.36	9.44	12.41	9.14	9.12	12.14	30.00	-17.59
	5825	165	AVG	52T	9.39	9.20	12.31	9.16	9.45	12.32	9.35	9.26	12.32	30.00	-17.68

#### Table 7-43. MIMO 20MHz BW (UNII) Maximum Conducted Output Power (52 Tones)

									RU Index					Conducted	Conducted
	Freq [MHz]	Channel	Detector	Tones		37			40			44		Power Limit	Power
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	[dBm]	Margin [dB]
: ÷	5190	38	AVG	52T	8.57	8.30	11.45	8.65	8.06	11.38	8.71	8.59	11.66	23.98	-12.32
5 2	5230	46	AVG	52T	8.79	8.27	11.55	8.70	8.04	11.39	8.81	8.51	11.67	23.98	-12.31
ξt	5270	54	AVG	52T	8.39	8.01	11.21	8.24	7.75	11.01	8.31	8.09	11.21	23.47	-12.26
. 6	5310	62	AVG	52T	8.46	8.19	11.34	8.32	7.81	11.08	8.50	8.04	11.29	23.47	-12.13
Ž	5510	102	AVG	52T	8.98	8.77	11.89	8.67	8.24	11.47	9.11	8.77	11.95	22.80	-10.85
a l	5590	118	AVG	52T	8.87	8.64	11.77	8.55	8.21	11.39	8.82	8.71	11.78	22.80	-11.02
ЗШ	5710	142	AVG	52T	8.90	8.85	11.89	8.57	8.52	11.56	8.83	9.01	11.93	22.80	-10.87
<b>'</b>	5755	151	AVG	52T	9.11	8.72	11.93	8.85	8.50	11.69	9.14	8.77	11.97	30.00	-18.03
	5795	159	AVG	52T	8.80	8.56	11.69	8.97	8.61	11.80	8.84	8.49	11.68	30.00	-18.20

#### Table 7-44. MIMO 40MHz BW (UNII) Maximum Conducted Output Power (52 Tones)

									RU Index					Conducted	Conducted
N	Freq [MHz]	Channel	Detector	Tones		37			44			52		Power Limit	Power
₹£					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	[dBm]	Margin [dB]
<u> </u>	5210	42	AVG	52T	7.48	6.69	10.11	7.93	7.30	10.64	7.64	7.07	10.37	23.98	-13.34
<u>®</u> <u>&gt;</u>	5290	58	AVG	52T	8.05	7.68	10.88	7.52	6.91	10.24	8.27	7.63	10.97	23.47	-12.50
우입	5530	106	AVG	52T	7.85	7.60	10.74	8.15	7.80	10.99	7.84	7.54	10.70	22.80	-11.81
ы Ba	5610	122	AVG	52T	7.94	7.54	10.75	8.06	7.72	10.90	7.65	7.65	10.66	22.80	-11.90
ũ III	5690	138	AVG	52T	7.83	7.69	10.77	7.90	7.80	10.86	7.63	7.68	10.67	22.80	-11.94
	5775	155	AVG	52T	7.89	7.55	10.73	7.31	7.01	10.17	8.20	7.65	10.94	30.00	-19.06

Table 7-45. MIMO 80MHz BW (UNII) Maximum Conducted Output Power (52 Tones)

FCC ID: A3LSMN981U	PCTEST Predd Jolie pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 04 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 94 of 296
© 2020 PCTEST	•			V 9.0 02/01/2019



## MIMO Conducted Output Power Measurements (106 Tones)

							RU I	ndex			Conducted	Conducted
	Freq [MHz]	Channel	Detector	Tones		53			54		Power Limit	Power
					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	[dBm]	Margin [dB]
N	5180	36	AVG	106T	11.55	11.72	14.65	12.19	11.75	14.99	23.98	-8.99
E E	5200	40	AVG	106T	11.66	11.68	14.68	11.70	11.71	14.72	23.98	-9.26
ן ב ב	5240	48	AVG	106T	12.22	11.72	14.99	11.74	11.75	14.76	23.98	-8.99
<b>O</b> .=	5260	52	AVG	106T	11.35	11.71	14.54	11.44	11.64	14.55	23.47	-8.92
<u>S</u>	5280	56	AVG	106T	11.43	11.66	14.56	11.55	11.63	14.60	23.47	-8.87
N	5320	64	AVG	106T	11.52	11.57	14.56	11.53	11.56	14.56	23.47	-8.91
E I	5500	100	AVG	106T	11.27	11.25	14.27	11.28	11.10	14.20	22.80	-8.53
C m	5600	120	AVG	106T	11.29	11.18	14.25	11.32	11.15	14.25	22.80	-8.55
S_	5720	144	AVG	106T	10.93	11.57	14.27	10.96	11.50	14.25	22.80	-8.53
	5745	149	AVG	106T	11.11	11.33	14.23	11.55	11.15	14.36	30.00	-15.64
	5785	157	AVG	106T	11.02	11.20	14.12	11.11	11.18	14.16	30.00	-15.84
	5825	165	AVG	106T	11.36	11.31	14.35	11.37	11.18	14.29	30.00	-15.65

Table 7-46. MIMO 20MHz BW (UNII) Maximum Conducted Output Power (106 Tones)

									RU Index					Conducted	Conducted
	Freq [MHz]	Channel	Detector	Tones		53			54			56		Power Limit	Power
7 🕤					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	[dBm]	Margin [dB]
들는	5190	38	AVG	106T	9.81	9.50	12.67	9.46	9.15	12.32	9.97	9.69	12.84	23.98	-11.14
	5230	46	AVG	106T	9.95	9.44	12.71	9.69	9.09	12.41	10.13	9.74	12.95	23.98	-11.03
4 ≥	5270	54	AVG	106T	9.52	9.20	12.37	9.21	8.88	12.06	9.56	9.30	12.44	23.47	-11.03
<u> </u>	5310	62	AVG	106T	9.79	9.45	12.63	9.35	8.91	12.15	9.67	9.36	12.53	23.47	-10.84
Ρč	5510	102	AVG	106T	9.24	9.04	12.15	9.81	9.47	12.65	9.37	9.06	12.23	22.80	-10.15
т B	5590	118	AVG	106T	9.18	8.92	12.06	9.72	9.38	12.56	9.04	9.10	12.08	22.80	-10.24
ЮШ	5710	142	AVG	106T	9.10	9.18	12.15	9.63	9.62	12.64	9.08	9.23	12.17	22.80	-10.16
	5755	151	AVG	106T	9.38	8.89	12.15	9.85	9.39	12.64	9.42	9.02	12.23	30.00	-17.36
	5795	159	AVG	106T	9.10	8.92	12.02	9.94	9.68	12.82	9.30	8.88	12.11	30.00	-17.18

Table 7-47. MIMO 40MHz BW (UNII) Maximum Conducted Output Power (106 Tones)

									RU Index					Conducted	Conducted
N	Freq [MHz]	Channel	Detector	Tones		53			56			60		Power Limit	Power
<u>₹</u> €					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	[dBm]	Margin [dB]
<u>0</u>	5210	42	AVG	106T	8.70	8.08	11.41	8.93	8.52	11.74	8.68	8.36	11.53	23.98	-12.24
∞≥	5290	58	AVG	106T	8.17	7.83	11.01	8.65	8.11	11.40	8.42	7.89	11.17	23.47	-12.07
P 2	5530	106	AVG	106T	8.99	8.77	11.89	8.32	7.93	11.14	9.07	8.75	11.92	22.80	-10.88
a a	5610	122	AVG	106T	9.01	8.66	11.85	9.12	8.83	11.99	8.94	8.85	11.91	22.80	-10.81
5	5690	138	AVG	106T	8.92	8.82	11.88	8.12	8.01	11.08	8.80	8.96	11.89	22.80	-10.91
	5775	155	AVG	106T	9.05	8.64	11.86	8.39	8.01	11.21	8.30	7.89	11.11	30.00	-18.14

Table 7-48. MIMO 80MHz BW (UNII) Maximum Conducted Output Power (106 Tones)

FCC ID: A3LSMN981U		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo OF of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 95 of 296
© 2020 PCTEST			V 9.0 02/01/2019



## MIMO Conducted Output Power Measurements (242 Tones)

						RU Index		Conducted	Conducted
	Freq [MHz]	Channel	Detector	Tones		61		Power Limit	Power
					ANT1	ANT2	MIMO	[dBm]	Margin [dB]
N	5180	36	AVG	242T	12.76	12.79	15.79	23.98	-8.19
E E	5200	40	AVG	242T	12.77	12.74	15.77	23.98	-8.21
	5240	48	AVG	242T	12.32	11.82	15.09	23.98	-8.89
j. i	5260	52	AVG	242T	12.35	12.61	15.49	23.47	-7.98
<u>&lt;</u> (2)	5280	56	AVG	242T	12.42	12.74	15.59	23.47	-7.88
	5320	64	AVG	242T	12.53	12.60	15.58	23.47	-7.89
a T	5500	100	AVG	242T	12.19	12.10	15.16	22.80	-7.64
C m	5600	120	AVG	242T	12.18	12.23	15.22	22.80	-7.58
5	5720	144	AVG	242T	11.87	12.47	15.19	22.80	-7.61
	5745	149	AVG	242T	12.54	12.07	15.32	30.00	-14.68
	5785	157	AVG	242T	12.55	12.02	15.30	30.00	-14.70
	5825	165	AVG	242T	12.37	12.10	15.25	30.00	-14.75

Table 7-49. MIMO 20MHz BW (UNII) Maximum Conducted Output Power (242 Tones)

							RU I	ndex			Conducted	Conducted
N	Freq [MHz]	Channel	Detector	Tones		61			62		Power Limit	Power
Τ̈́					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	[dBm]	Margin [dB]
国家	5190	38	AVG	242T	10.19	9.84	13.03	10.18	9.93	13.07	23.98	-10.91
5.0	5230	46	AVG	242T	10.34	9.77	13.07	10.37	10.10	13.25	23.98	-10.73
4 8	5270	54	AVG	242T	10.90	10.67	13.80	10.86	10.70	13.79	23.47	-9.67
<u></u> б	5310	62	AVG	242T	10.97	10.77	13.88	10.84	10.64	13.75	23.47	-9.59
ΡČ	5510	102	AVG	242T	10.32	10.16	13.25	10.56	10.27	13.43	22.80	-9.37
G Sa	5590	118	AVG	242T	10.34	10.12	13.24	10.40	10.40	13.41	22.80	-9.39
B B	5710	142	AVG	242T	10.26	10.25	13.27	10.21	10.41	13.32	22.80	-9.48
47	5755	151	AVG	242T	10.43	10.05	13.25	10.59	10.23	13.42	30.00	-16.58
	5795	159	AVG	242T	10.44	10.10	13.28	10.57	10.39	13.49	30.00	-16.51

Table 7-50. MIMO 40MHz BW (UNII) Maximum Conducted Output Power (242 Tones)

									RU Index					Conducted	Conducted
N	Freq [MHz]	Channel	Detector	Tones		61			62			64		Power Limit	Power
∃ ਦੇ					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	[dBm]	Margin [dB]
e te	5210	42	AVG	242T	10.06	9.31	12.71	10.10	9.59	12.86	10.14	9.62	12.90	23.98	-11.08
≥ <u>≥</u>	5290	58	AVG	242T	9.61	9.10	12.37	9.80	9.31	12.57	9.74	9.13	12.46	23.47	-10.90
2 4	5530	106	AVG	242T	9.32	8.89	12.12	9.34	8.97	12.17	9.45	9.14	12.31	22.80	-10.49
ы B	5610	122	AVG	242T	9.35	8.93	12.16	9.34	9.02	12.19	9.25	9.21	12.24	22.80	-10.56
ũ III	5690	138	AVG	242T	9.20	8.98	12.10	9.14	9.11	12.14	9.11	9.34	12.24	22.80	-10.56
	5775	155	AVG	242T	9.37	8.90	12.15	9.50	9.15	12.34	9.60	9.22	12.42	30.00	-17.58

Table 7-51. MIMO 80MHz BW (UNII) Maximum Conducted Output Power (242 Tones)

FCC ID: A3LSMN981U	PCTEST Preddjote pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 06 of 206
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 96 of 296
© 2020 PCTEST	*	•		V 9.0 02/01/2019



### MIMO Conducted Output Power Measurements (484 Tones)

					RU Index			Conducted Co	Conducted
N	Freq [MHz]	Channel	Detector	Tones		65		Power Limit	Power
Ϊ C	•				ANT1	ANT2	MIMO	[dBm]	Margin [dB]
5 7	5190	38	AVG	484T	10.61	9.51	13.11	23.98	-10.87
<u>e</u> b	5230	46	AVG	484T	11.13	10.79	13.97	23.98	-10.01
<u>4</u>	5270	54	AVG	484T	10.77	10.35	13.58	23.47	-9.89
- 5	5310	62	AVG	484T	10.69	10.30	13.51	23.47	-9.96
Υŭ	5510	102	AVG	484T	10.24	9.95	13.11	22.80	-9.69
ы В	5590	118	AVG	484T	10.17	10.03	13.11	22.80	-9.69
D C D	5710	142	AVG	484T	9.97	10.14	13.07	22.80	-9.73
	5755	151	AVG	484T	10.27	9.96	13.13	30.00	-16.87
	5795	159	AVG	484T	10.26	10.05	13.17	30.00	-16.83
	Table 7 5	O MIMO	AOMU- D	\A/ /I INIII\	Maxim	and ustad O	Amerik Derver	(404 Tomos)	<u> </u>

Table 7-52. MIMO 40MHz BW (UNII) Maximum Conducted Output Power (484 Tones)

						RU Index				Conducted	Conducted	
N	Freq [MHz]	Channel	Detector	Tones		65			66		Power Limit	Power
E E					ANT1	ANT2	MIMO	ANT1	ANT2	MIMO	[dBm]	Margin [dB]
d S	5210	42	AVG	484T	9.76	9.21	12.50	9.90	9.49	12.71	23.98	-11.27
<u>8</u>	5290	58	AVG	484T	9.16	8.85	12.02	9.42	9.01	12.23	23.47	-11.24
р С	5530	106	AVG	484T	9.93	9.73	12.84	9.18	9.00	12.10	22.80	-9.96
Ba	5610	122	AVG	484T	9.98	9.73	12.87	10.00	9.93	12.98	22.80	-9.82
2	5690	138	AVG	484T	9.82	9.83	12.84	9.95	10.00	12.99	22.80	-9.81
	5775	155	AVG	484T	10.08	9.77	12.94	9.31	8.94	12.14	30.00	-17.06

Table 7-53. MIMO 80MHz BW (UNII) Maximum Conducted Output Power (484 Tones)

FCC ID: A3LSMN981U	PCTEST Preid Joine part of B	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dago 07 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 97 of 296
© 2020 PCTEST		·		V 9.0 02/01/2019



						RU Index		Conducted	Conducted
N	Freq [MHz]	Channel	Detector	Tones		67			Power
(80MHz width)					ANT1	ANT2	MIMO	[dBm]	Margin [dB]
idto	5210	42	AVG	996T	9.80	9.09	12.47	23.98	-11.51
	5290	58	AVG	996T	9.47	8.59	12.06	23.47	-11.41
5GHz Band	5530	106	AVG	996T	9.02	9.28	12.16	22.80	-10.64
Ba Ba	5610	122	AVG	996T	8.95	9.36	12.17	22.80	-10.63
5	5690	138	AVG	996T	8.86	9.42	12.16	22.80	-10.64
	5775	155	AVG	996T	9.19	9.35	12.28	30.00	-17.72

#### MIMO Conducted Output Power Measurements (996 Tones)

Table 7-54. MIMO 80MHz BW (UNII) Maximum Conducted Output Power (996 Tones)

#### Note:

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

#### Sample MIMO Calculation:

At 5180MHz in 802.11n (20MHz BW) mode, the average conducted output power was measured to be 17.48 dBm for Antenna-1 and 17.59 dBm for Antenna-2.

Antenna 1 + Antenna 2 = MIMO

(17.48 dBm + 17.59 dBm) = (55.98 mW + 57.41 mW) = 113.39 mW = 20.55 dBm

FCC ID: A3LSMN981U	PCTEST Proof Jorbe pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 09 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 98 of 296
© 2020 PCTEST	•			V 9.0 02/01/2019



# 7.5 Maximum Power Spectral Density – 802.11ax OFDMA §15.407(a.1.iv) §15.407(a.2) §15.407(a.3); RSS-247 [6.2]

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

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

## In the 5.15 – 5.25GHz, 5.25 – 5.35GHz, 5.47 – 5.725GHz bands, the maximum permissible power spectral density is 11dBm/MHz.

In the 5.725 – 5.850GHz band, the maximum permissible power spectral density is 30dBm/500kHz.

#### Test Procedure Used

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

#### Test Settings

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

#### Test Setup

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



Figure 7-4. Test Instrument & Measurement Setup

#### Test Notes

The power spectral density for each channel was measured with the RU index showing the highest conducted power

FCC ID: A3LSMN981U	PCTEST Pred Jobe part of @	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 00 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 99 of 296
© 2020 PCTEST		•	V 9.0 02/01/2019



_	Frequency [MHz]	Channel No.	802.11 Mode	Tones	Data Rate [Mbps]	Measured Power Density [dBm]	Max Power Density [dBm/MHz]	Margin [dB]
	5180	36	ax (20MHz)	26T	MCS0	7.54	11.0	-3.46
	5200	40	ax (20MHz)	26T	MCS0	7.93	11.0	-3.07
þ	5240	48	ax (20MHz)	26T	MCS0	8.15	11.0	-2.85
Band 1	5190	38	ax (40MHz)	26T	MCS0	8.52	11.0	-2.48
	5230	46	ax (40MHz)	26T	MCS0	8.79	11.0	-2.21
	5210	42	ax (80MHz)	26T	MCS0	7.94	11.0	-3.06
	5260	52	ax (20MHz)	26T	MCS0	6.90	11.0	-4.10
∢	5280	56	ax (20MHz)	26T	MCS0	6.63	11.0	-4.37
Band 2A	5320	64	ax (20MHz)	26T	MCS0	6.70	11.0	-4.30
gan	5270	54	ax (40MHz)	26T	MCS0	7.49	11.0	-3.51
ш	5310	62	ax (40MHz)	26T	MCS0	7.25	11.0	-3.75
	5290	58	ax (80MHz)	26T	MCS0	9.23	11.0	-1.77
	5500	100	ax (20MHz)	26T	MCS0	6.99	11.0	-4.01
	5600	120	ax (20MHz)	26T	MCS0	5.24	11.0	-5.76
	5720	144	ax (20MHz)	26T	MCS0	7.62	11.0	-3.38
SC	5510	102	ax (40MHz)	26T	MCS0	8.40	11.0	-2.60
Band 2C	5590	118	ax (40MHz)	26T	MCS0	8.58	11.0	-2.42
Ba	5710	142	ax (40MHz)	26T	MCS0	8.64	11.0	-2.36
	5530	106	ax (80MHz)	26T	MCS0	8.56	11.0	-2.44
	5610	122	ax (80MHz)	26T	MCS0	8.30	11.0	-2.70
	5690	138	ax (80MHz)	26T	MCS0	7.91	11.0	-3.09

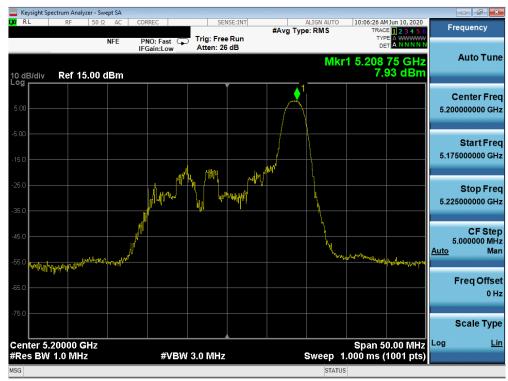
Table 7-55. Bands 1, 2A, 2C Conducted Power Spectral Density Measurements SISO ANT1 (26 Tones)

FCC ID: A3LSMN981U		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 100 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 100 of 296
© 2020 PCTEST			V 9.0 02/01/2019





Plot 7-109. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 36)



Plot 7-110. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 40)

FCC ID: A3LSMN981U	PCTEST head Joine part of B	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 101 of 206
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 101 of 296
© 2020 PCTEST			V 9.0 02/01/2019





Plot 7-111. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 48)



Plot 7-112. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 38)

FCC ID: A3LSMN981U	PCTEST Proof Joine pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSONE	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 102 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 102 of 296
© 2020 PCTEST	-	·		V 9.0 02/01/2019





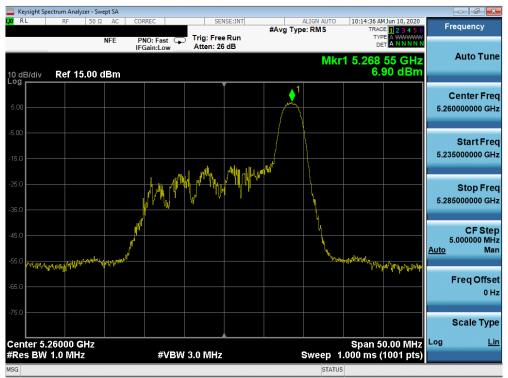
Plot 7-113. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 46)



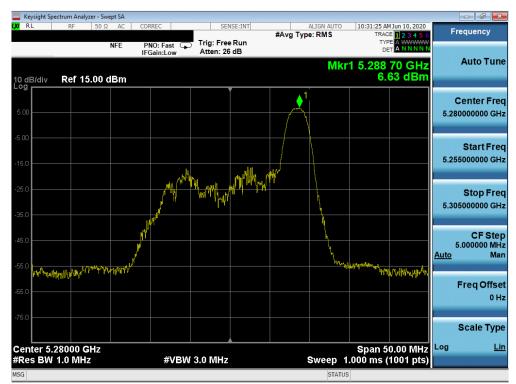
Plot 7-114. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ax - 26 Tones (UNII Band 1) - Ch. 42)

FCC ID: A3LSMN981U	PCTEST Pread (site pert of (s)	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNC	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 102 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 103 of 296
© 2020 PCTEST				V 9.0 02/01/2019





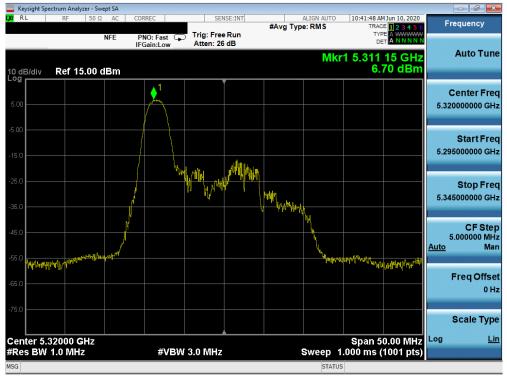
Plot 7-115. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 52)



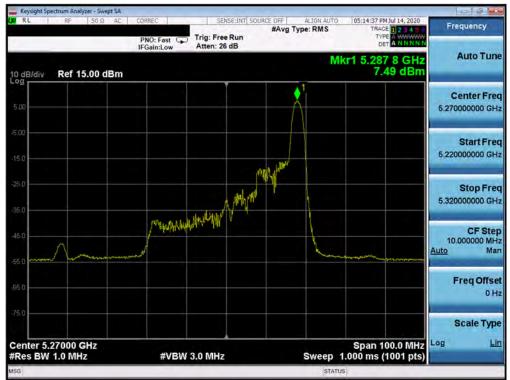
Plot 7-116. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 56)

FCC ID: A3LSMN981U	PCTEST Proof Joile pert of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNE	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 104 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 104 of 296
© 2020 PCTEST				V 9.0 02/01/2019





Plot 7-117. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 64)



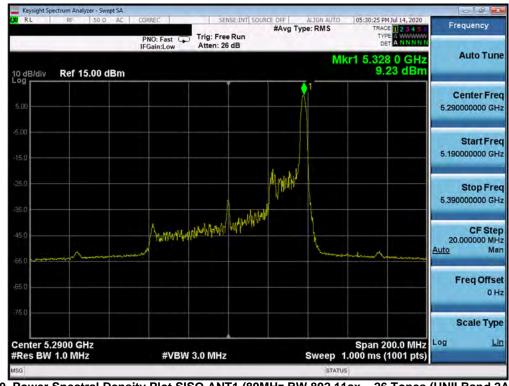
Plot 7-118. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 54)

FCC ID: A3LSMN981U		MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 105 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 105 of 296
© 2020 PCTEST		·	V 9.0 02/01/2019





Plot 7-119. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 62)



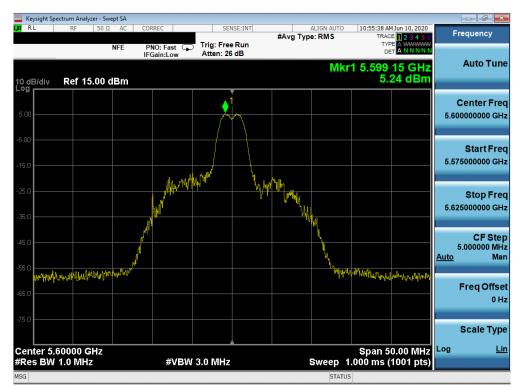
Plot 7-120. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ax - 26 Tones (UNII Band 2A) - Ch. 58)

FCC ID: A3LSMN981U	PCTEST Tread Jarba part of B	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dage 106 of 206
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 106 of 296
© 2020 PCTEST			V 9.0 02/01/2019





Plot 7-121. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 100)



Plot 7-122. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 120)

FCC ID: A3LSMN981U	PCTEST Preed to be part of @	MEASUREMENT REPORT (CERTIFICATION)	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:	Dogo 107 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset	Page 107 of 296
© 2020 PCTEST			V 9.0 02/01/2019





Plot 7-123. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 144)



Plot 7-124. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11ax - 26 Tones (UNII Band 2C) - Ch. 102)

FCC ID: A3LSMN981U	PCTEST Presid to be part of @	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNE	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 100 of 200
1M2005050081-09.A3L	5/5 - 7/7/2020	Portable Handset		Page 108 of 296
© 2020 PCTEST	<u>.</u>	•		V 9.0 02/01/2019