

Keysight Spectrum Analyzer - Oce										- d -
LXI RF 50 Ω	DC COR	REC		NSE:INT reg: 5.71000	0000 GHz	ALIGN AUTO	07:42:26 P Radio Std	M Jan 28, 2019	Trac	e/Detector
	NFE		Trig: Free	e Run		d:>100/100				
	#IFC	Gain:Low	#Atten: 2	0 dB			Radio Dev	rice: BTS		
10 dB/div Ref 20.0	0 dBm	-								
Log 10.0										
		hannall	mun	بهور المعرار والم	Westhat				(Clear Write
0.00		1								
-10.0										
-20.0						h				
-30.0	Mary Arapha A. M.					monspalym	Mill Pry Indewall	Aller		Average
-40.0 Hurth Add Carton of								* ~~~~		
-50.0										
-60.0										Max Hold
-70.0										Maxinola
Center 5.71000 GHz							Span 1	00.0 MHz		
#Res BW 470 kHz			VBI	N/5MHz			Swe	eep 1 ms		Min Hold
Occupied Band	width			Total P	ower	21 2	dBm			
			-	i otur i		21.2	u Billi			
	37.7	51 MI	TZ							Detector
Transmit Freq Err	ror -	-13.885 I	kHz	% of O	3W Pow	ver 99	.00 %		Auto	Peak▶ <u>Man</u>
x dB Bandwidth		37.73 N	IHz	x dB		-6	00 dB			
		01.101	11 12	A GD		-0.	00 00			
MSG						STATUS	5			

Plot 7-96. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax (UNII Band 2C) – Ch. 142)



Plot 7-97. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 2C) - Ch. 106)

FCC ID: A3LSMG977T	INVIAINAL DADATATATA	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BW							
XX RL RF 50Ω DC COR		NSE:INT reg: 5.610000000 GHz		06:05:01 PM F adio Std: N		Trace	Detector
NFE	Trig: Fre	e Run Avg Holo	d: 100/100				
#IFC	Gain:Low #Atten: 2	0 dB	Ra	adio Devic	e: BTS		
10 dB/div Ref 20.00 dBm							
Log 10.0							
	hall and the free from the second of the second sec	Manus and Mener Starty on Allen and Alle				с	lear Write
0.00							
-10.0							
-20.0			WWW. www.	กไ.			
-30.0 July and Andread Andream and the second			w/mwww.	Wrent Warner	WWW.n		Average
-40.0							
-50.0							
-60.0							Max Hold
-70.0							ίνιαχ ποιά
Center 5.6100 GHz			\$		0.0 MHz		
#Res BW 1 MHz	VBI	N/8 MHz		Swee	p 1 ms		Min Hold
		Total Power	22.8 d	Dana			
Occupied Bandwidth		Total Fower	22.0 U	BIII			
75.8	88 MHz						Detector
Transmit From France	456 47 KU-		00.00	0.0/		Auto	Peak▶ Man
Transmit Freq Error	156.17 kHz	% of OBW Pow	ver 99.00	0 %		Auto	iman
x dB Bandwidth	94.54 MHz	x dB	-26.00	dB			
MSG			STATUS				

Plot 7-98. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 2C) - Ch. 122)



Plot 7-99. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 2C) - Ch. 138)

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Keysight Spectrum Analyzer - Occupied					
ιχι RF 50 Ω DC		SENSE:INT er Freq: 5.530000000 GHz	Radio Std	M Jan 28, 2019 : None	Trace/Detector
NFE		Free Run Avg Holo en: 20 dB	d:>100/100 Radio Dev	rice: BTS	
	WI Guilleow				
10 dB/div Ref 20.00 dl	Bm				
Log 10.0					
0.00	مەرمەلىيە، مىدىمەم مىلى مەرم	- Mary Malath Mr. Alande Bak Mary Mary Rose Rose			Clear Write
-10.0					
-20.0					
-30.0			ι,		Average
-40.0 Automation and a strange	hult w		White way begale to the	Martin B. and	, i i i i i i i i i i i i i i i i i i i
-50.0				waya water of	
-60.0					Max Hold
-70.0					maxilora
Center 5.5300 GHz			Enan 2	:00.0 MHz	
#Res BW 820 kHz	١	VBW 8 MHz		ep 1 ms	Min Hold
	-141	Total Power	20.8 dBm		
Occupied Bandwi		Total Power	20.6 080		
	77.022 MHz				Detector Peak▶
Transmit Freq Error	-154.60 kHz	% of OBW Pow	ver 99.00 %		Auto <u>Man</u>
x dB Bandwidth	77.47 MHz	x dB	-6.00 dB		
MSG			STATUS		

Plot 7-100. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax (UNII Band 2C) - Ch. 106)



Plot 7-101. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax (UNII Band 2C) - Ch. 122)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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RE 50.9 DC CORREC SENSE:INT ALIGN AUTO 07:39:25 PM Jan 28, 2019	
X RF 50 Ω DC CORREC SENSE:INT ALIGN AUTO 07:39:25 PM Jan 28, 2019 Center Freq: 5.690000000 GHz Radio Std: None	e/Detector
NEF C Trig: Free Run Avg Hold:>100/100	
#IFGain:Low #Atten: 20 dB Radio Device: BTS	
10 dB/div Ref 20.00 dBm	
	Clear Write
-20.0	
-30.0	Average
-30.0	
-50.0	
-60.0	Max Hold
-70.0	Max Hold
Center 5.6900 GHz Span 200.0 MHz	
#ResBW 820 kHz VBW 8 MHz Sweep 1 ms	Min Hold
Occupied Bandwidth Total Power 20.8 dBm	
77.006 MHz	Detector
Transmit Freg Error -154.02 kHz % of OBW Power 99.00 %	Peak▶ Man
	ivian
x dB Bandwidth 77.38 MHz x dB -6.00 dB	
MSG STATUS	

Plot 7-102. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax (UNII Band 2C) - Ch. 138)

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7.3 6dB Bandwidth Measurement – 802.11a/n/ac/ax §15.407 (e); RSS-Gen [6.2]

Test Overview and Limit

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

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

Test Procedure Used

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

Test Settings

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

Test Setup

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



Figure 7-2. Test Instrument & Measurement Setup

Test Notes

None.

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SISO Antenna-1 6 dB Bandwidth Measurements

	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured 6dB Bandwidth [MHz]
	5745	149	а	6	16.43
	5785	157	а	6	16.39
	5825	165	а	6	16.41
	5745	149	n (20MHz)	6.5/7.2 (MCS0)	17.64
	5785	157	n (20MHz)	6.5/7.2 (MCS0)	17.63
	5825	165	n (20MHz)	6.5/7.2 (MCS0)	17.62
e	5745	149	ax (20MHz)	6.5/7.2 (MCS0)	19.06
Band	5785	157	ax (20MHz)	6.5/7.2 (MCS0)	19.04
ä	5825	165	ax (20MHz)	6.5/7.2 (MCS0)	19.09
	5755	151	n (40MHz)	13.5/15 (MCS0)	36.41
	5795	159	n (40MHz)	13.5/15 (MCS0)	36.04
	5755	151	ax (40MHz)	13.5/15 (MCS0)	37.68
	5795	159	ax (40MHz)	13.5/15 (MCS0)	37.74
	5775	155	ac (80MHz)	29.3/32.5 (MCS0)	75.72
	5775	155	ax (80MHz)	29.3/32.5 (MCS0)	77.92

Table 7-4. Conducted Bandwidth Measurements SISO ANT1



Plot 7-103. 6dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 3) - Ch. 149)

FCC ID: A3LSMG977T	Invid Miles Laborations, Inc.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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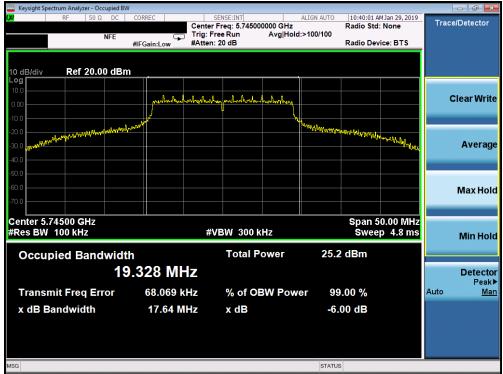
Plot 7-104. 6dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 3) - Ch. 157)



Plot 7-105. 6dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 3) - Ch. 165)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Plot 7-106. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 3) - Ch. 149)



Plot 7-107. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 3) - Ch. 157)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
Test Report S/N:	Test Dates:	EUT Type:		Daga 72 of 250	
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Plot 7-108. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 3) - Ch. 165)



Plot 7-109. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 3) - Ch. 149)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager		
Test Report S/N:	Test Dates:	EUT Type:		Daga 74 of 250		
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Keysight Spectrum Analyzer - Occupied BW						x
IXI RF 50 Ω DC NFE	Trig: F	SENSE:INT r Freq: 5.785000000 GHz Free Run Avg Hol n: 20 dB	ALIGN AUTO 10:57:23 / Radio Std d:>100/100 Radio Dev		Trace/Detector	r
10 dB/div Ref 20.00 dBm						
10.0	prophilipped opposition	Byog protonts with sold in the sheep the			Clear Wr	ite
-10.0 -20.0 -30.0 -40.0			hun washing washing	have an all and and a	Avera	ge
-50.0					Max Ho	old
Center 5.78500 GHz #Res BW 100 kHz		VBW 300 kHz	Swee	50.00 MHz ep 4.8 ms	Min Ho	old
Occupied Bandwidth 19	.066 MHz	Total Power	23.5 d B m		Detect	
Transmit Freq Error x dB Bandwidth	-8.282 kHz 19.04 MHz	% of OBW Pow x dB	ver 99.00 % -6.00 dB			lan
MSG			STATUS			

Plot 7-110. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 3) - Ch. 157)



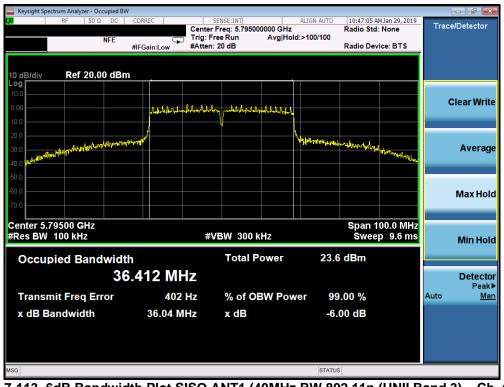
Plot 7-111. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 3) - Ch. 165)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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🔤 Keysight Spectrum Analyzer - Occupied BV	N					×
LXI RF 50 Ω DC	CORREC	SENSE:INT r Freg: 5.755000000 GHz	ALIGN AUTO 10:45:51 A	AM Jan 29, 2019	Trace/Detect	tor
NFE			Radio Sto Id:>100/100	: None		
		n: 20 dB	Radio De	vice: BTS		
10 dB/div Ref 20.00 dBr	n					
Log						
10.0					.	
0.00	Intellater referent of the Party of	And and the also be and the second second and a			ClearW	rite
-10.0						_
-20.0						
, texter, holyadha Ab	heter for		Maple and the second and the		Aver	ane
With the state of				Fight Wardward Superior	Avei	aye
-40.0						
-50.0						
-60.0					MaxH	blol
-70.0					indati	ioia
Center 5.75500 GHz			Span ′	100.0 MHz		
#Res BW 100 kHz	#	VBW 300 kHz	Swee	ep 9.6 ms	Min H	lold
		Tetel Dever	22 Z JD			
Occupied Bandwidt		Total Power	23.7 dBm			
36	6.413 MHz				Dete	ctor
						eak▶
Transmit Freq Error	7.687 kHz	% of OBW Pov	ver 99.00 %		Auto	Man
x dB Bandwidth	36.41 MHz	x dB	-6.00 dB			
MSG			STATUS			

Plot 7-112. 6dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 3) - Ch. 151)



Plot 7-113. 6dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 3) - Ch. 159)

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🔤 Keysight Spectrum Analyzer - Occupied BW					- # -
LXI RF 50 Ω DC		SENSE:INT r Freg: 5.755000000 GHz	ALIGN AUTO 10:53:19 A Radio Std	M Jan 29, 2019	Trace/Detector
NFE	Trig: F	ree Run Avg Hol	d:>100/100		
	#IFGain:Low #Atten	1: 20 dB	Radio Dev	ice: BTS	
10 dB/div Ref 20.00 dBm					
Log 10.0					
0.00					Clear Write
	philippingarchild	here weeter hals have and hall shaked and			
-10.0					
-20.0					
-30.0	kand in the second seco		Waldmanneral Marker		Average
-40.0				h mole that may an	
-50.0					
-60.0					Max Hold
-70.0					
Center 5.75500 GHz	-46			00.0 MHz	
#Res BW 100 kHz	#	VBW 300 kHz	Swee	p 9.6 ms	Min Hold
Occupied Bandwidt	h	Total Power	21.9 dBm		
37	.531 MHz				Detector Peak▶
Transmit Freq Error	-31.263 kHz	% of OBW Pow	ver 99.00 %		Auto <u>Man</u>
x dB Bandwidth	37.68 MHz	x dB	-6.00 dB		
	37.00 MINZ	хив	-0.00 uB		
MSG			STATUS		

Plot 7-114. 6dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 3) - Ch. 151)



Plot 7-115. 6dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 3) - Ch. 159)

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Keysight Spectrum Analyzer - Oc										- 0 -
LXI RF 50 Ω	DC CO	RREC		ISE:INT eq: 5.77500		ALIGN AUTO	10:49:54 A	AM Jan 29, 2019	Trac	e/Detector
	NFE		Trig: Free	Run		d:>100/100	Radio Sto	. None		
		Gain:Low	#Atten: 20	0 dB			Radio De	vice: BTS		
10 dB/div Ref 20.0	0 dBm									
Log										
10.0										Clear Write
0.00		NATES MATTE	.MUL.MILL.	.OALLOO_DOLLAD	, iilaan lissa					
-10.0		000 deriver of								
-20.0										
-30.0	a standard and	8				How Hughlinson	mahlana			Average
-30.0 -40.0							and the second s	My make buyther by		J
-50.0										
-60.0										Max Hold
-70.0										
Center 5.7750 GHz							Ononí			
#Res BW 100 kHz			#\/B	W 300 K	Hz			200.0 MHz 19.13 ms		
WIGS DW TOO KITZ			<i></i>	94 JOON	112		owcep	13,13 113		Min Hold
Occupied Band	width			Total P	ower	24.0	dBm			
			-							
	75.8	316 MI	TZ							Detector Peak▶
Transmit Freq Er	ror	42.912	(Hz	% of O	BW Pow	er 99	.00 %		Auto	Peak <u>Man</u>
x dB Bandwidth		75.72 N	IH7	x dB		-6 (00 dB			
		10/12 1								
							,			
MSG						STATUS				

Plot 7-116. 6dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 3) - Ch. 155)



Plot 7-117. 6dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ax (UNII Band 3) - Ch. 155)

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SISO Antenna-2 6dB Bandwidth Measurements

	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured 6dB Bandwidth [MHz]
	5745	149	а	6	16.38
	5785	157	а	6	16.39
	5825	165	а	6	16.39
	5745	149	n (20MHz)	6.5/7.2 (MCS0)	17.65
	5785	157	n (20MHz)	6.5/7.2 (MCS0)	17.61
	5825	165	n (20MHz)	6.5/7.2 (MCS0)	17.35
e	5745	149	ax (20MHz)	6.5/7.2 (MCS0)	19.07
Band	5785	157	ax (20MHz)	6.5/7.2 (MCS0)	19.09
ä	5825	165	ax (20MHz)	6.5/7.2 (MCS0)	19.04
	5755	151	n (40MHz)	13.5/15 (MCS0)	36.11
	5795	159	n (40MHz)	13.5/15 (MCS0)	36.14
	5755	151	ax (40MHz)	13.5/15 (MCS0)	37.66
	5795	159	ax (40MHz)	13.5/15 (MCS0)	37.62
	5775	155	ac (80MHz)	29.3/32.5 (MCS0)	75.98
	5775	155	ax (80MHz)	29.3/32.5 (MCS0)	76.80

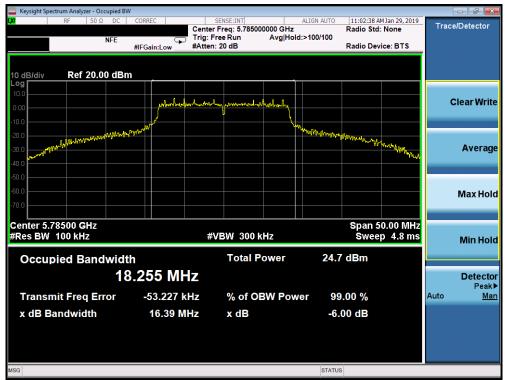
Table 7-5. Conducted Bandwidth Measurements SISO ANT2



Plot 7-118. 6dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 3) - Ch. 149)

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Plot 7-120. 6dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 3) - Ch. 165)

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Plot 7-121. 6dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 3) - Ch. 149)



Plot 7-122. 6dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 3) - Ch. 157)

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Plot 7-123. 6dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 3) - Ch. 165)



Plot 7-124. 6dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 3) - Ch. 149)

FCC ID: A3LSMG977T	INVIGIALINE DEPOSATION INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied BW					- F	X
μα RF 50 Ω DC	Center Trig: F	SENSE:INT r Freq: 5.785000000 GHz Free Run Avg Hol n: 20 dB	ALIGN AUTO 11:18:11 A Radio Std d:>100/100 Radio Dev		Trace/Detect	or
10 dB/div Ref 20.00 dBm						
10.0	Mannharfangh haven lead	lade parte dande denafrase an			Clear W	Irite
-20.0 -30.0 -40.0	m ²		H	maladeujity tiynata	Aver	rage
-50.0 -60.0 -70.0					Max H	lold
Center 5.78500 GHz #Res BW 100 kHz	#	VBW 300 kHz	Swee	50.00 MHz p 4.8 ms	Min H	lold
Occupied Bandwidth 19	ո .061 MHz	Total Power	23.7 dBm		Dete	ector eak ►
Transmit Freq Error x dB Bandwidth	-7.719 kHz 19.09 MHz	% of OBW Pow x dB	ver 99.00 % -6.00 dB			eak► <u>Man</u>
MSG			STATUS			

Plot 7-125. 6dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 3) - Ch. 157)



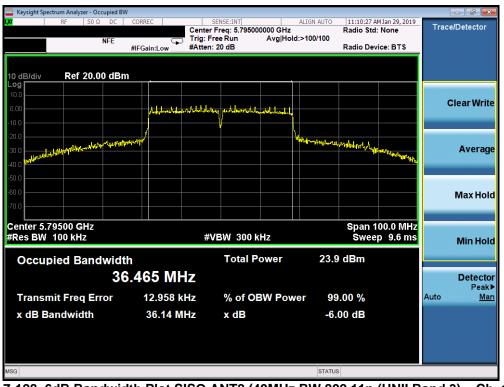
Plot 7-126. 6dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 3) - Ch. 165)

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🔤 Keysight Spectrum Analyzer - Occupie	ed BW				
LX RF 50 Ω D		er Freq: 5.755000000 GHz	Radio Std	M Jan 29, 2019 : None	Trace/Detector
NFE		Free Run Avg Hold en: 20 dB	:>100/100 Radio Dev	rice: BTS	
	WI Gain. Low Witte				
10 dB/div Ref 20.00 d	IBm				
Log 10.0					
0.00	اسرامه الريسانية المارا	hilying perfolabels hily alastated			Clear Write
-10.0	a franka franka standar da a da a da	and a set of the particular parti			
			Malut . I.		
-20.0 -30.0	MIN ARANYANT		Withour date many production of the	Pringing	Average
-40.0					
-50.0					
-60.0					Max Hold
-70.0					
Center 5.75500 GHz			Snan 1	00.0 MHz	
#Res BW 100 kHz	Ę	#VBW 300 kHz		p 9.6 ms	Min Hold
Occupied Bandwi	idth	Total Power	24.6 dBm		
	36.483 MHz				Detector
					Peak►
Transmit Freq Error	-2.255 kHz	% of OBW Powe	er 99.00 %		Auto <u>Man</u>
x dB Bandwidth	36.11 MHz	x dB	-6.00 dB		
MSG			STATUS		

Plot 7-127. 6dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 3) - Ch. 151)



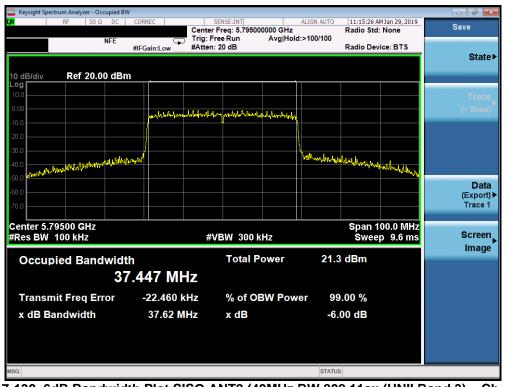
Plot 7-128. 6dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 3) - Ch. 159)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occupied B	W				
LX RF 50 Ω DC	CORREC	SENSE:INT r Freg: 5.755000000 GHz	ALIGN AUTO 11:14:42 A Radio Std	M Jan 29, 2019 None	Trace/Detector
NFE	· · · · · · · · · · · · · · · · · · ·	Free Run Avg Hol 1: 20 dB	d:>100/100 Radio Dev	Inc. DTC	
	#IFGain:Low #Atter	1: 20 08	Radio Dev	ICE: DIS	
10 dB/div Ref 20.00 dBr	<u> </u>				
10.0					Clear Write
0.00	بالمرابط المعالية الم	hon marchertaleshales hitsteladada.			Clear write
-10.0		A TALE A CONTRACTOR OF A			
-20.0					
-30.0					Average
-40.0	www.		moundunter	White way	
-50.0 -50.0				, mit Anna	
-60.0					Max Hold
-70.0					
Center 5.75500 GHz			Snan 1	00.0 MHz	
#Res BW 100 kHz	#	VBW 300 kHz		p 9.6 ms	Min Hold
					WIIITHOID
Occupied Bandwid	th	Total Power	21.9 dBm		
3	7.482 MHz				Detector
Transmit Freq Error	-52.582 kHz	% of OBW Pow	ver 99.00 %		Peak▶ Auto Man
x dB Bandwidth	37.66 MHz	x dB	-6.00 dB		
MSG			STATUS		

Plot 7-129. 6dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax (UNII Band 3) - Ch. 151)



Plot 7-130. 6dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax (UNII Band 3) - Ch. 159)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Keysight Spectrum Analyzer - Occup							×
LXI RF 50 Ω	DC CORREC	SENSE:INT Center Freg: 5.77500	ALIGN AUTO	11:12:35 AM	1 Jan 29, 2019	Trace/Detec	tor
N	FE 😱	Trig: Free Run	Avg Hold:>100/100				
	#IFGain:Low	#Atten: 20 dB		Radio Devi	ice: BTS		
10 dB/div Ref 20.00	dBm						
Log 10.0							
0.00						ClearV	Vrite
-10.0	MINICNALI	Wallin Malila - Malilla Malila	- MINAMINA				
-20.0		l					
	A Decastronal		MU/HTylifeedia			Δνο	rage
-40.0 the same and the same				what all all and all all all all all all all all all al	Antonin Arch.	AVC	ruge
-40.0							
-50.0							
-60.0						Max	Hold
-70.0							_
Center 5.7750 GHz			·	Span 2	00.0 MHz		
#Res BW 100 kHz		#VBW 300 k	Hz		19.13 ms	Min	Hold
							Torta
Occupied Bandw	vidth	Total P	ower 24.4	4 dBm			
	75.857 MH	Z					ector
Tronomit Ero e Erro	74 220 14			9.00 %		P Auto	eak▶ Man
Transmit Freq Erro						Auto	iviar1
x dB Bandwidth	75.98 MI	Hz xdB	-6,	00 dB			
MSG			STATU	s			

Plot 7-131. 6dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 3) - Ch. 155)



Plot 7-132. 6dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax (UNII Band 3) - Ch. 155)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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7.4 UNII Output Power Measurement – 802.11a/n/ac/ax §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 (23.01dBm) or $10 + 10 \log_{10}B = 10 + 10 \log_{10}(21) = 23.22 \text{ dBm}$.

In the 5.25 – 5.35GHz band, the maximum permissible conducted output power is the lesser of 250mW (23.98dBm) or 11 dBm + $10\log_{10}(26dB BW) = 11 dBm + 10\log_{10}(21.32) = 24.29dBm$. The maximum e.i.r.p. shall not exceed the lesser of 1.0 W (30dBm) or 17 + 10 $\log_{10}B = 17 + 10 \log_{10}(21.32) = 30.29 dBm$.

In the 5.47 – 5.725GHz band, the maximum permissible conducted output power is the lesser of 250mW (23.98dBm) or 11 dBm + $10\log_{10}(26dB BW) = 11 dBm + 10\log_{10}(21.14) = 24.25dBm$. The maximum e.i.r.p. shall not exceed the lesser of 1.0 W (30dBm) or 17 + 10 $\log_{10}B = 17 + 10 \log_{10}(21.14) = 30.25 dBm$.

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

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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.

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SISO Antenna-1 Conducted Output Power Measurements

	Freq [MHz]	Channel	Detector		IEEE Transm	nission Mode		Conducted Power Limit	Conducted Power
~				802.11a	802.11n	802.11ac	802.11ax	[dBm]	Margin [dB]
÷	5180	36	AVG	16.44	16.32	16.31	15.86	23.98	-7.54
i,	5200	40	AVG	17.63	17.54	17.99	15.93	23.98	-5.99
	5220	44	AVG	17.66	17.52	17.93	15.76	23.98	-6.05
Bandwidth)	5240	48	AVG	17.54	17.51	17.92	15.81	23.98	-6.06
â	5260	52	AVG	17.63	17.63	17.98	15.66	23.98	-6.00
	5280	56	AVG	17.68	17.59	17.99	15.62	23.98	-5.99
Î	5300	60	AVG	17.68	17.56	17.62	15.67	23.98	-6.30
(20MHz	5320	64	AVG	16.86	16.76	16.94	15.59	23.98	-7.04
50	5500	100	AVG	17.60	17.83	17.89	15.62	23.98	-6.09
	5600	120	AVG	17.90	17.80	17.84	15.58	23.98	-6.08
Hz	5620	124	AVG	17.84	17.70	17.72	15.59	23.98	-6.14
5G	5720	144	AVG	17.54	17.50	17.98	15.56	23.98	-6.00
S	5745	149	AVG	17.56	17.94	17.56	15.96	30.00	-12.06
	5785	157	AVG	17.53	17.99	17.99	15.85	30.00	-12.01
	5825	165	AVG	17.68	17.73	17.71	15.55	30.00	-12.27

Table 7-6. SISO ANT1 20MHz BW (UNII) Maximum Conducted Output Power

	Freq [MHz] Channel		Detector	IEEE	Transmission	Conducted Power Limit	Conducted Power	
				802.11n	802.11ac	802.11ax	[dBm]	Margin [dB]
	5190	38	AVG	13.96	13.98	13.64	23.98	-10.00
0MH; idth)	5230	46	AVG	16.94	16.93	13.59	23.98	-7.04
(40M widtl	5270	54	AVG	16.61	16.65	13.93	23.98	-7.33
<u>4</u> ¥	5310	62	AVG	14.31	14.39	13.78	23.98	-9.59
lz nd	5510	102	AVG	15.16	15.27	13.83	23.98	-8.71
Ва Ва	5590	118	AVG	16.56	16.99	13.89	23.98	-6.99
50	5630	126	AVG	16.92	16.97	13.84	23.98	-7.01
	5710	142	AVG	16.76	16.73	13.58	23.98	-7.22
	5755	151	AVG	16.70	16.76	13.71	30.00	-13.24
	5795	159	AVG	16.58	16.52	13.58	30.00	-13.42

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

FCC ID: A3LSMG977T	Inside Laborations, lac	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager				
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	Freq [MHz]	Channel	Detector	IEEE Transm	nission Mode	Conducted Power Limit	Conducted Power
(80MHz Iwidth)				802.11ac	802.11ax	[dBm]	Margin [dB]
GHz (80MH Bandwidth)	5210	42	AVG	12.98	12.99	23.98	-11.00
8) 1 vi	5290	58	AVG	12.73	12.79	23.98	-11.25
5GHz Band	5530	106	AVG	13.55	12.51	23.98	-10.43
B. B.	5610	122	AVG	15.64	12.77	23.98	-8.34
	5690	138	AVG	15.51	12.94	23.98	-8.47
	5775	155	AVG	15.75	12.95	30.00	-14.25

Table 7-8. SISO ANT1 80MHz BW (UNII) Maximum Conducted Output Power

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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SISO Antenna-2 Conducted Output Power Measurements

	Freq [MHz]	Channel	Detector		IEEE Transm	nission Mode		Conducted Power Limit	Conducted Power
~				802.11a	802.11n	802.11ac	802.11ax	[dBm]	Margin [dB]
÷	5180	36	AVG	16.15	16.11	16.06	15.81	23.98	-7.83
i,	5200	40	AVG	17.75	17.92	17.92	15.77	23.98	-6.06
	5220	44	AVG	17.72	17.89	17.97	15.72	23.98	-6.01
Bandwidth)	5240	48	AVG	17.73	17.94	17.98	15.73	23.98	-6.00
ma	5260	52	AVG	17.54	17.72	17.75	15.55	23.98	-6.23
	5280	56	AVG	17.61	17.83	17.71	15.66	23.98	-6.15
Î	5300	60	AVG	17.61	17.81	17.90	15.68	23.98	-6.08
(20MHz	5320	64	AVG	16.64	16.71	16.53	15.65	23.98	-7.27
50	5500	100	AVG	17.73	17.88	17.87	15.79	23.98	-6.10
	5600	120	AVG	17.55	17.82	17.73	15.70	23.98	-6.16
Hz	5620	124	AVG	17.50	17.82	17.67	15.62	23.98	-6.16
5G	5720	144	AVG	17.59	17.84	17.83	15.69	23.98	-6.14
S	5745	149	AVG	17.86	17.62	17.65	15.98	30.00	-12.14
	5785	157	AVG	17.89	17.50	17.58	15.85	30.00	-12.11
	5825	165	AVG	17.59	17.73	17.68	15.60	30.00	-12.27

Table 7-9. SISO ANT2 20MHz BW (UNII) Maximum Conducted Output Power

	Freq [MHz] Chann	Channel	Channel Detector		Transmission	Conducted Power Limit	Conducted Power	
				802.11n	802.11ac	802.11ax	[dBm]	Margin [dB]
P C	5190	38	AVG	13.99	13.87	13.80	23.98	-9.99
(40MH; lwidth)	5230	46	AVG	16.92	16.96	13.90	23.98	-7.02
lo pi	5270	54	AVG	16.64	16.77	13.57	23.98	-7.21
<u>4</u> <u>8</u>	5310	62	AVG	14.42	14.49	13.53	23.98	-9.49
tz nd	5510	102	AVG	15.30	15.36	13.83	23.98	-8.62
G Г Ва	5590	118	AVG	16.67	16.79	13.57	23.98	-7.19
50	5630	126	AVG	16.73	16.82	13.55	23.98	-7.16
	5710	142	AVG	16.41	16.55	13.62	23.98	-7.43
	5755	151	AVG	16.94	16.89	13.73	30.00	-13.06
	5795	159	AVG	16.59	16.66	13.54	30.00	-13.34

Table 7-10. SISO ANT2 40MHz BW (UNII) Maximum Conducted Output Power

FCC ID: A3LSMG977T	INVITION LANDALINY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager			
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	Freq [MHz]	Channel	Channel Detector		nission Mode	Conducted Power Limit	Conducted Power
(80MHz Iwidth)				802.11ac	802.11ax	[dBm]	Margin [dB]
(80MH width)	5210	42	AVG	12.64	12.75	23.98	-11.34
(8) 1 vi	5290	58	AVG	12.66	12.88	23.98	-11.32
5GHz (Band	5530	106	AVG	13.64	12.63	23.98	-10.34
B. B.	5610	122	AVG	15.54	12.74	23.98	-8.44
	5690	138	AVG	15.76	12.70	23.98	-8.22
	5775	155	AVG	15.98	12.91	30.00	-14.02

Table 7-11. SISO ANT2 80MHz BW (UNII) Maximum Conducted Output Power

FCC ID: A3LSMG977T	INVESTIGATION IN	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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MIMO Maximum Conducted Output Power Measurements

	Freq [MHz]	Channel	Detector	Conc	lucted Power [dBm]	Conducted Power Limit	Conducted Power
2				ANT1	ANT2	MIMO	[dBm]	Margin [dB]
÷.	5180	36	AVG	12.88	12.82	15.86	23.98	-8.12
÷	5200	40	AVG	17.63	17.75	20.70	23.98	-3.28
andwidth)	5220	44	AVG	17.66	17.72	20.70	23.98	-3.28
<u> </u>	5240	48	AVG	17.54	17.73	20.65	23.98	-3.33
Ba	5260	52	AVG	17.63	17.54	20.60	23.98	-3.38
N	5280	56	AVG	17.68	17.61	20.66	23.98	-3.32
Î	5300	60	AVG	17.68	17.61	20.66	23.98	-3.32
(20MH;	5320	64	AVG	14.25	13.43	16.87	23.98	-7.11
50	5500	100	AVG	17.60	17.73	20.68	23.98	-3.30
) z	5600	120	AVG	17.90	17.55	20.74	23.98	-3.24
Ϊ	5620	124	AVG	17.84	17.50	20.68	23.98	-3.30
U	5720	144	AVG	17.54	17.59	20.58	23.98	-3.40
2 2	5745	149	AVG	17.56	17.86	20.72	30.00	-9.28
	5785	157	AVG	17.53	17.89	20.72	30.00	-9.28
	5825	165	AVG	17.68	17.59	20.65	30.00	-9.35

Table 7-12. MIMO 20MHz BW 802.11a (UNII) Maximum Conducted Output Power

	Freq [MHz]	Channel	Detector	Conducted Power [dBm]		Conducted Power Limit	Conducted Power	
~				ANT1	ANT2	MIMO	[dBm]	Margin [dB]
÷	5180	36	AVG	12.85	12.82	15.85	23.98	-8.13
i,	5200	40	AVG	17.54	17.92	20.74	23.98	-3.24
5	5220	44	AVG	17.52	17.89	20.72	23.98	-3.26
andwidth	5240	48	AVG	17.51	17.94	20.74	23.98	-3.24
Ba	5260	52	AVG	17.63	17.72	20.69	23.98	-3.29
	5280	56	AVG	17.59	17.83	20.72	23.98	-3.26
Hz	5300	60	AVG	17.56	17.81	20.70	23.98	-3.28
(20M	5320	64	AVG	13.73	13.09	16.43	23.98	-7.55
20	5500	100	AVG	17.83	17.88	20.87	23.98	-3.11
	5600	120	AVG	17.80	17.82	20.82	23.98	-3.16
HZ	5620	124	AVG	17.70	17.82	20.77	23.98	-3.21
Ċ	5720	144	AVG	17.50	17.84	20.68	23.98	-3.30
2	5745	149	AVG	17.94	17.62	20.79	30.00	-9.21
	5785	157	AVG	17.99	17.50	20.76	30.00	-9.24
	5825	165	AVG	17.73	17.73	20.74	30.00	-9.26

Table 7-13. MIMO 20MHz BW 802.11n (UNII) Maximum Conducted Output Power

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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	Freq [MHz]	Channel	Detector	Conducted Power [dBm]		dBm]	Conducted Power Limit	Conducted Power
~				ANT1	ANT2	MIMO	[dBm]	Margin [dB]
Ę	5180	36	AVG	12.92	12.65	15.80	23.98	-8.18
Ŭ,	5200	40	AVG	17.99	17.92	20.97	23.98	-3.01
5	5220	44	AVG	17.93	17.97	20.96	23.98	-3.02
andwidth)	5240	48	AVG	17.92	17.98	20.96	23.98	-3.02
Ba	5260	52	AVG	17.98	17.75	20.88	23.98	-3.10
	5280	56	AVG	17.99	17.71	20.86	23.98	-3.12
Hz	5300	60	AVG	17.62	17.90	20.77	23.98	-3.21
(20M	5320	64	AVG	14.22	13.48	16.88	23.98	-7.10
50	5500	100	AVG	17.89	17.87	20.89	23.98	-3.09
	5600	120	AVG	17.84	17.73	20.80	23.98	-3.18
Hz	5620	124	AVG	17.72	17.67	20.71	23.98	-3.27
5G	5720	144	AVG	17.98	17.83	20.92	23.98	-3.06
Ŋ	5745	149	AVG	17.56	17.65	20.62	30.00	-9.38
	5785	157	AVG	17.99	17.58	20.80	30.00	-9.20
	5825	165	AVG	17.71	17.68	20.71	30.00	-9.29

Table 7-14. MIMO 20MHz BW 802.11ac (UNII) Maximum Conducted Output Power

	Freq [MHz]	Channel	Detector	Conducted Power [dBm]		Conducted Power Limit	Conducted Power	
Ē				ANT1	ANT2	MIMO	[dBm]	Margin [dB]
Ì	5180	36	AVG	12.71	12.69	15.71	23.98	-8.27
i i i	5200	40	AVG	12.91	12.81	15.87	23.98	-8.11
5	5220	44	AVG	12.82	12.81	15.83	23.98	-8.15
andwidth)	5240	48	AVG	12.78	12.84	15.82	23.98	-8.16
Ba	5260	52	AVG	13.09	12.49	15.81	23.98	-8.17
N	5280	56	AVG	13.03	12.50	15.78	23.98	-8.20
T	5300	60	AVG	13.16	12.55	15.88	23.98	-8.10
(20M	5320	64	AVG	13.19	12.54	15.89	23.98	-8.09
50	5500	100	AVG	12.82	12.27	15.56	23.98	-8.42
) z	5600	120	AVG	13.14	12.38	15.79	23.98	-8.19
Ϊ	5620	124	AVG	13.07	12.33	15.73	23.98	-8.25
5G	5720	144	AVG	12.91	12.14	15.55	23.98	-8.43
L)	5745	149	AVG	12.97	12.70	15.85	30.00	-14.15
	5785	157	AVG	12.86	12.43	15.66	30.00	-14.34
	5825	165	AVG	12.59	12.27	15.44	30.00	-14.56

Table 7-15. MIMO 20MHz BW 802.11ax (UNII) Maximum Conducted Output Power

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	Freq [MHz] Channel		Detector	Conducted Power [dBm]			Conducted Power Limit	Conducted Power
				ANT1	ANT2	MIMO	[dBm]	Margin [dB]
₽ ⊂	5190	38	AVG	10.19	10.13	13.17	23.98	-10.81
0MH; idth)	5230	46	AVG	16.94	16.92	19.94	23.98	-4.04
(40M widtl	5270	54	AVG	16.61	16.64	19.64	23.98	-4.34
<u>4</u> ¥	5310	62	AVG	10.81	10.99	13.91	23.98	-10.07
tz nd	5510	102	AVG	12.53	11.96	15.26	23.98	-8.72
GH Bar	5590	118	AVG	16.56	16.67	19.63	23.98	-4.35
50	5630	126	AVG	16.92	16.73	19.84	23.98	-4.14
	5710	142	AVG	16.76	16.41	19.60	23.98	-4.38
	5755	151	AVG	16.70	16.94	19.83	30.00	-10.17
	5795	159	AVG	16.58	16.59	19.60	30.00	-10.40

Table 7-16. MIMO 40MHz BW 802.11n (UNII) Maximum Conducted Output Power

	Freq [MHz] Ch		Detector	Conc	lucted Power [Conducted Power Limit	Conducted Power	
				ANT1	ANT2	MIMO	[dBm]	Margin [dB]
HZ HC	5190	38	AVG	10.58	10.77	13.69	23.98	-10.29
0MH; idth)	5230	46	AVG	16.93	16.96	19.96	23.98	-4.02
(40MI width	5270	54	AVG	16.65	16.77	19.72	23.98	-4.26
<u>4</u> 3	5310	62	AVG	11.36	10.84	14.12	23.98	-9.86
Hz (and	5510	102	AVG	12.43	11.74	15.11	23.98	-8.87
Ва Ва	5590	118	AVG	16.99	16.79	19.90	23.98	-4.08
5C	5630	126	AVG	16.97	16.82	19.91	23.98	-4.07
	5710	142	AVG	16.73	16.55	19.65	23.98	-4.33
	5755	151	AVG	16.76	16.89	19.84	30.00	-10.16
	5795	159	AVG	16.52	16.66	19.60	30.00	-10.40

Table 7-17. MIMO 40MHz BW 802.11ac (UNII) Maximum Conducted Output Power

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	Freq [MHz] Channel		Detector	Conducted Power [dBm]			Conducted Power Limit	Conducted Power
_				ANT1	ANT2	MIMO	[dBm]	Margin [dB]
₽ ⊂	5190	38	AVG	10.40	10.77	13.60	23.98	-10.38
0MH idth)	5230	46	AVG	10.45	10.83	13.65	23.98	-10.33
1 1 1	5270	54	AVG	10.74	10.33	13.55	23.98	-10.43
(4) dwj	5310	62	AVG	10.66	10.34	13.51	23.98	-10.47
₽ĕ	5510	102	AVG	11.24	10.50	13.90	23.98	-10.08
Ва Ва	5590	118	AVG	10.79	10.20	13.51	23.98	-10.47
50	5630	126	AVG	10.94	10.19	13.59	23.98	-10.39
	5710	142	AVG	11.16	10.40	13.81	23.98	-10.17
	5755	151	AVG	10.33	10.11	13.23	30.00	-16.77
	5795	159	AVG	10.54	10.53	13.55	30.00	-16.45

Table 7-18. MIMO 40MHz BW 802.11ax (UNII) Maximum Conducted Output Power

	Freq [MHz] Channel		Detector	Conducted Power [dBm]			Conducted Power Limit	Conducted Power
(80MHz width)				ANT1	ANT2	MIMO	[dBm]	Margin [dB]
oM	5210	42	AVG	9.69	9.49	12.60	23.98	-11.38
(8) 1 vi	5290	58	AVG	9.63	8.63	12.17	23.98	-11.81
GHz (80MH Bandwidth)	5530	106	AVG	10.59	10.47	13.54	23.98	-10.44
5G Ba	5610	122	AVG	15.64	15.54	18.60	23.98	-5.38
	5690	138	AVG	15.51	15.76	18.65	23.98	-5.33
	5775	155	AVG	15.75	15.98	18.88	30.00	-11.12

Table 7-19. MIMO 80MHz BW 802.11ac (UNII) Maximum Conducted Output Power

	Freq [MHz]	Freq [MHz] Channel		Conducted Power [dBm]			Conducted Power Limit	Conducted Power
Hz (c				ANT1	ANT2	MIMO	[dBm]	Margin [dB]
OM	5210	42	AVG	9.76	9.87	12.83	23.98	-11.15
5GHz (80MHz Bandwidth)	5290	58	AVG	10.04	9.16	12.63	23.98	-11.35
Hz	5530	106	AVG	9.97	9.78	12.89	23.98	-11.09
5GI Ba	5610	122	AVG	9.74	9.52	12.64	23.98	-11.34
	5690	138	AVG	9.45	9.23	12.35	23.98	-11.63
	5775	155	AVG	9.52	9.91	12.73	30.00	-17.27

Table 7-20. MIMO 80MHz BW 802.11ax (UNII) Maximum Conducted Output Power

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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:

Assuming the average conducted power was measured to be 16.32 dBm for Antenna-1 and 16.11 dBm for Antenna-2.

Antenna 1 + Antenna 2 = MIMO

(16.32 dBm + 16.11 dBm) = (42.85 mW + 40.83 mW) = 83.68 mW = 19.23 dBm

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7.5 Maximum Power Spectral Density – 802.11a/n/ac/ax §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

None

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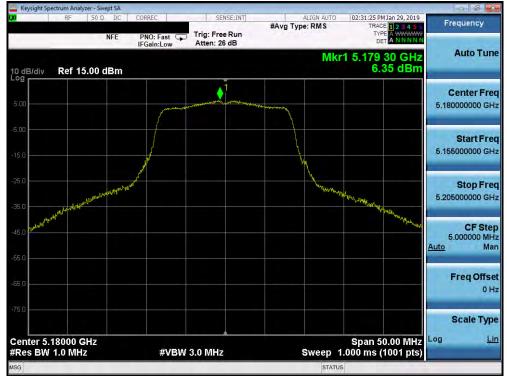
SISO Antenna-1 Power Spectral Density Measurements

	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Density [dBm]	Max Power Density [dBm/MHz]	Margin [dB]
	5180	36	а	6	6.35	11.0	-4.65
	5200	40	а	6	5.30	11.0	-5.70
	5240	48	а	6	5.80	11.0	-5.20
	5180	36	n (20MHz)	6.5/7.2 (MCS0)	6.40	11.0	-4.60
	5200	40	n (20MHz)	6.5/7.2 (MCS0)	4.87	11.0	-6.13
Band 1	5240	48	n (20MHz)	6.5/7.2 (MCS0)	5.48	11.0	-5.52
	5180	36	ax (20MHz)	6.5/7.2 (MCS0)	2.89	11.0	-8.11
	5200	40	ax (20MHz)	6.5/7.2 (MCS0)	3.11	11.0	-7.89
ä	5240	48	ax (20MHz)	6.5/7.2 (MCS0)	3.37	11.0	-7.63
	5190	38	n (40MHz)	13.5/15 (MCS0)	3.29	11.0	-7.71
	5230	46	n (40MHz)	13.5/15 (MCS0)	2.57	11.0	-8.43
	5190	38	ax (40MHz)	13.5/15 (MCS0)	-1.21	11.0	-12.21
	5230	46	ax (40MHz)	13.5/15 (MCS0)	-0.86	11.0	-11.86
	5210	42	ac (80MHz)	29.3/32.5 (MCS0)	-0.56	11.0	-11.56
	5210	42	ax (80MHz)	29.3/32.5 (MCS0)	-4.63	11.0	-15.63
	5260	52	a	6	5.97	11.0	-5.03
	5280	56	a	6	5.91	11.0	-5.09
	5320	64	a	6	6.44	11.0	-4.56
nd 2A	5260	52	n (20MHz)	6.5/7.2 (MCS0)	5.56	11.0	-5.44
	5280	56	n (20MHz)	6.5/7.2 (MCS0)	5.50	11.0	-5.50
	5320	64	n (20MHz)	6.5/7.2 (MCS0)	7.01	11.0	-3.99
۲	5260	52	ax (20MHz)	6.5/7.2 (MCS0)	3.48	11.0	-7.52
Band 2A	5280	56	ax (20MHz)	6.5/7.2 (MCS0)	3.35	11.0	-7.65
	5320	64	ax (20MHz)	6.5/7.2 (MCS0)	3.57	11.0	-7.43
	5270	54	n (40MHz)	13.5/15 (MCS0)	2.13	11.0	-8.87
	5310	62	n (40MHz)	13.5/15 (MCS0)	3.85	11.0	-7.15
	5270	54	ax (40MHz)	13.5/15 (MCS0)	-0.40	11.0	-11.40
	5310	62	ax (40MHz)	13.5/15 (MCS0)	-1.10	11.0	-12.10
	5290	58	ac (80MHz)	29.3/32.5 (MCS0)	-0.51	11.0	-11.51
	5290	58	ax (80MHz)	29.3/32.5 (MCS0)	-4.98	11.0	-15.98
	5500	100	a (oolwii iz)	6	6.90	11.0	-4.10
	5600	120	a	6	5.59	11.0	-5.41
	5720	144	a	6	5.49	11.0	-5.51
	5500	100	n (20MHz)	6.5/7.2 (MCS0)	6.68	11.0	-4.32
	5600	120	n (20MHz)	6.5/7.2 (MCS0)	5.29	11.0	-5.71
	5720	144	n (20MHz)	6.5/7.2 (MCS0)	5.27	11.0	-5.73
	5500	100	ax (20MHz)	6.5/7.2 (MCS0)	3.48	11.0	-7.52
	5600	120	ax (20MHz)	6.5/7.2 (MCS0)	2.89	11.0	-8.11
	5720	144	ax (20MHz)	6.5/7.2 (MCS0)	3.20	11.0	-7.80
с	5510	102	n (40MHz)	13.5/15 (MCS0)	3.51	11.0	-7.49
d 2	5590	118	n (40MHz)	13.5/15 (MCS0)	1.49	11.0	-9.51
Band 2C	5710	142	n (40MHz)	13.5/15 (MCS0)	2.19	11.0	-8.81
	5510	102	ax (40MHz)	13.5/15 (MCS0)	-0.64	11.0	-11.64
	5590	118	ax (40MHz)	13.5/15 (MCS0)	-1.04	11.0	-12.04
	5710	142	ax (40MHz)	13.5/15 (MCS0)	-1.17	11.0	-12.04
	5530	106	ac (80MHz)	29.3/32.5 (MCS0)	-0.29	11.0	-11.29
	5610	100	ac (80MHz)	29.3/32.5 (MCS0)	-0.29	11.0	-13.18
	5690	138	ac (80MHz)	29.3/32.5 (MCS0)	-2.18	11.0	-13.18
				. ,			-15.92
	5530 5610	106	ax (80MHz) ax (80MHz)	29.3/32.5 (MCS0)	-4.92	11.0	
	5610	122	, ,	29.3/32.5 (MCS0)	-5.01	11.0	-16.01
	5690	138	ax (80MHz)	29.3/32.5 (MCS0)	-4.65	11.0	-15.65

Table 7-21. Bands 1, 2A, 2C Conducted Power Spectral Density Measurements SISO ANT1

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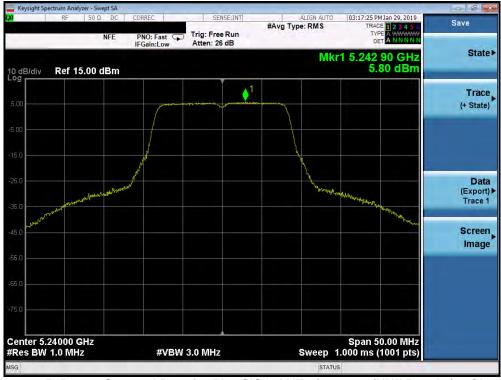


Plot 7-133. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 1) - Ch. 36)

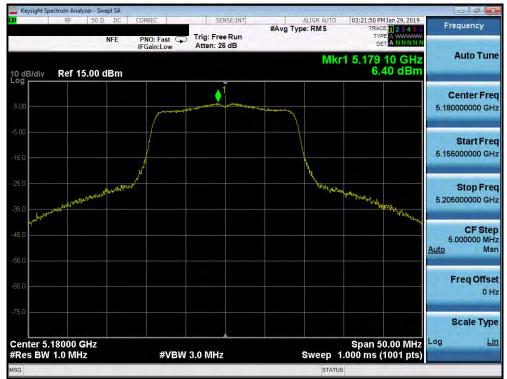


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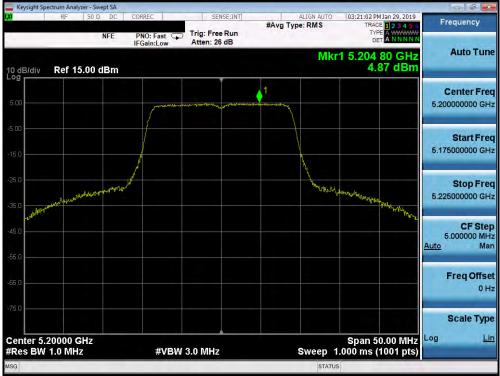
Plot 7-135. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 1) - Ch. 48)



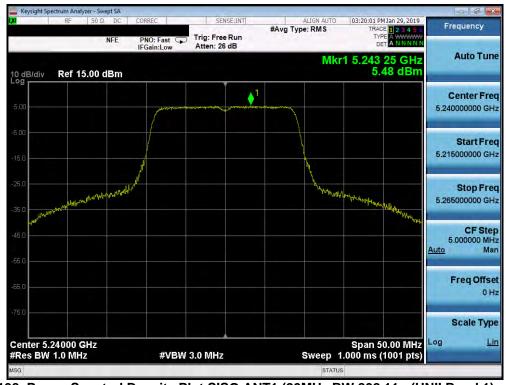
Plot 7-136. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 1) - Ch. 36)

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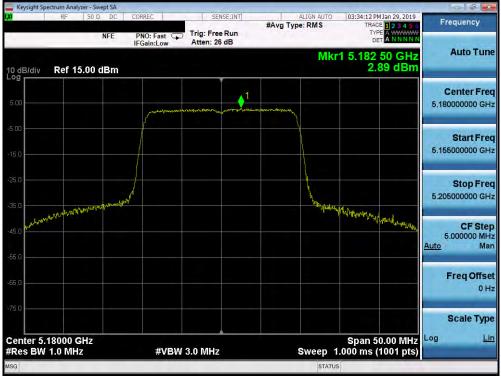
Plot 7-137. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 1) - Ch. 40)



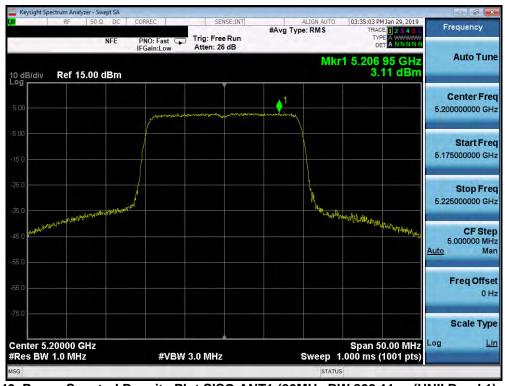
Plot 7-138. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 1) - Ch. 48)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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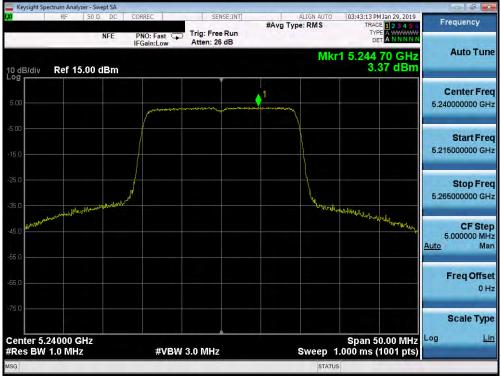
Plot 7-139. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 1) - Ch. 36)



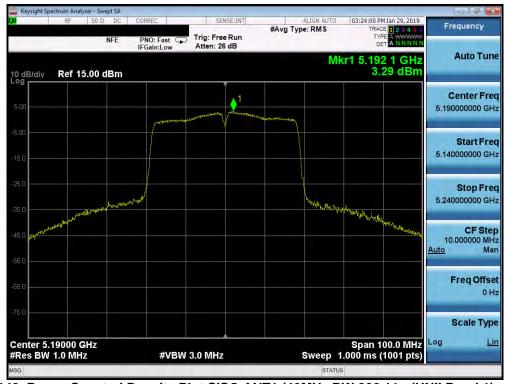
Plot 7-140. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 1) - Ch. 40)

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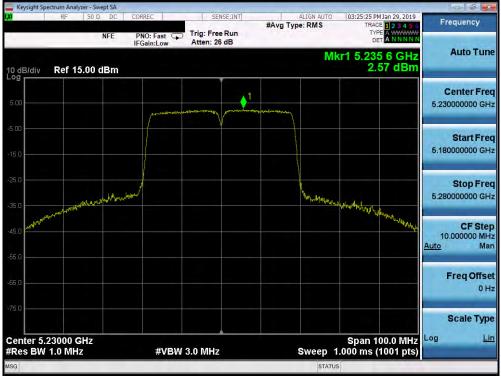
Plot 7-141. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 1) - Ch. 48)



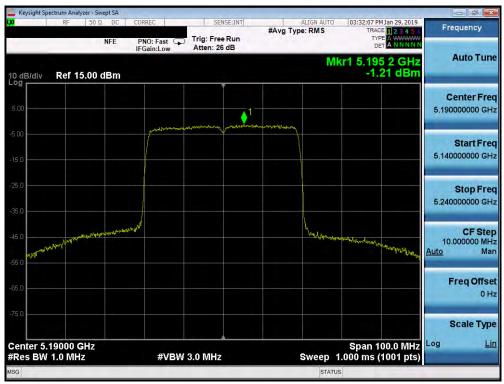
Plot 7-142. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 1) - Ch. 38)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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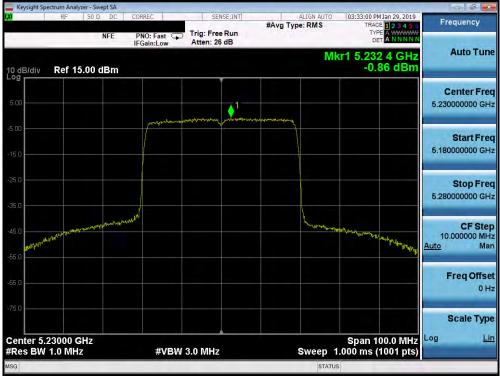
Plot 7-143. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 1) - Ch. 46)



Plot 7-144. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 1) - Ch. 38)

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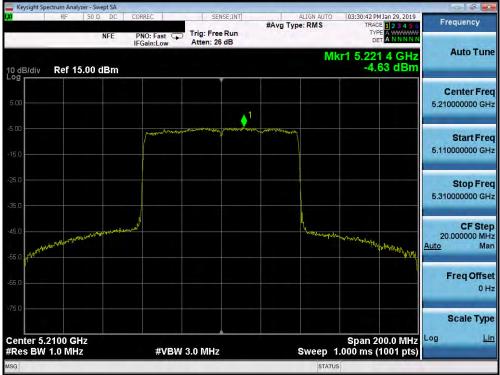
Plot 7-145. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 1) - Ch. 46)



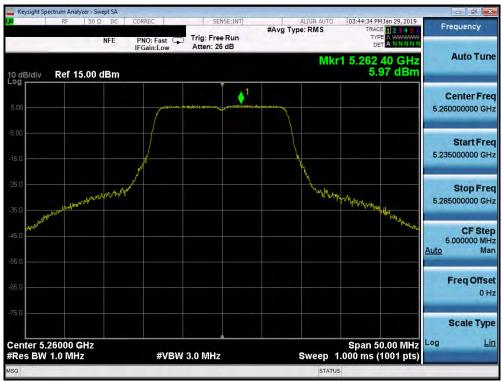
Plot 7-146. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 1) - Ch. 42)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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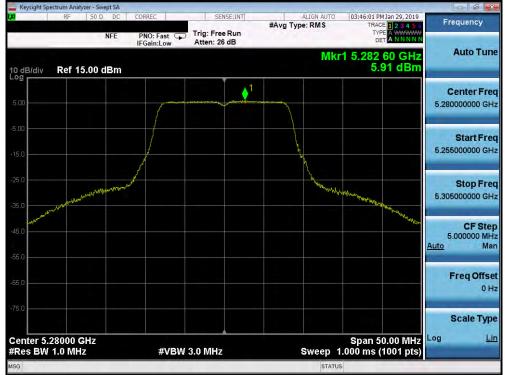
Plot 7-147. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ax (UNII Band 1) - Ch. 42)



Plot 7-148. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 2A) - Ch. 52)

FCC ID: A3LSMG977T	Therest	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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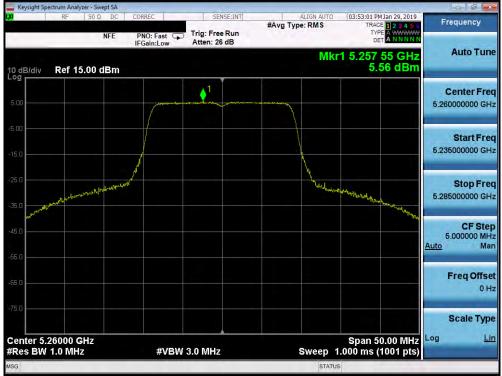
Plot 7-149. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 2A) - Ch. 56)



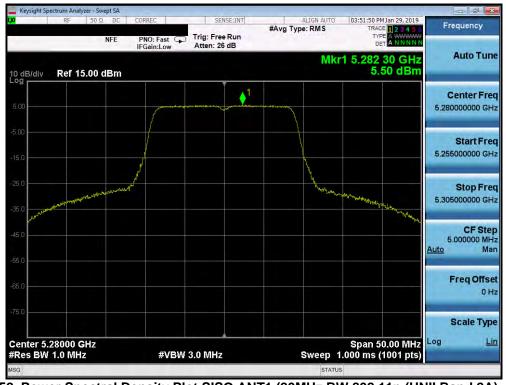
Plot 7-150. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 2A) - Ch. 64)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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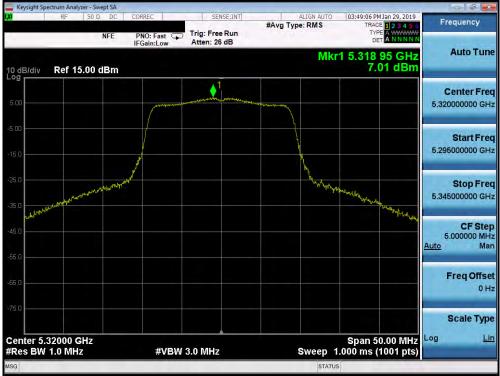
Plot 7-151. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2A) - Ch. 52)



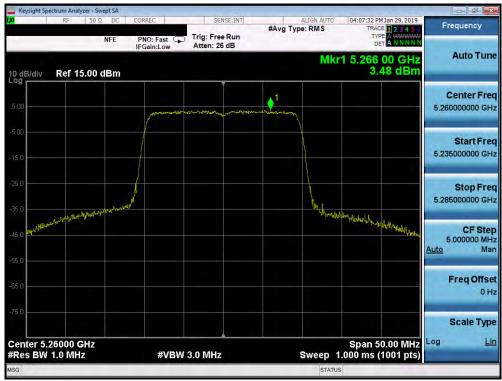
Plot 7-152. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2A) - Ch. 56)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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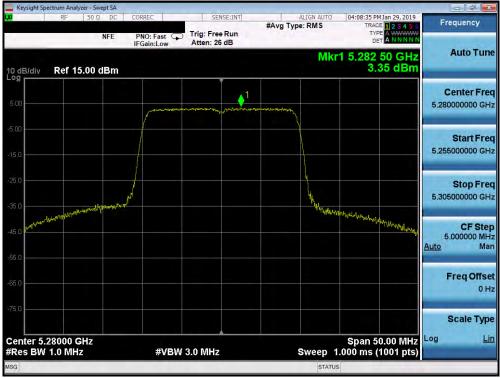
Plot 7-153. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2A) - Ch. 64)



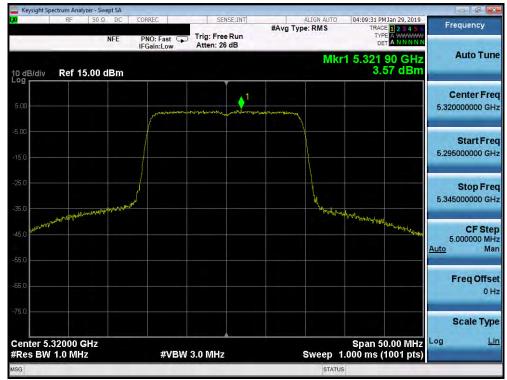
Plot 7-154. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 2A) - Ch. 52)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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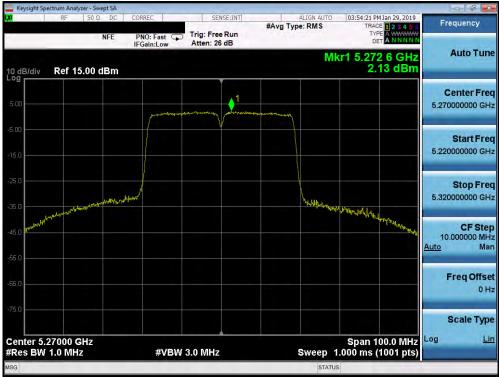
Plot 7-155. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 2A) - Ch. 56)



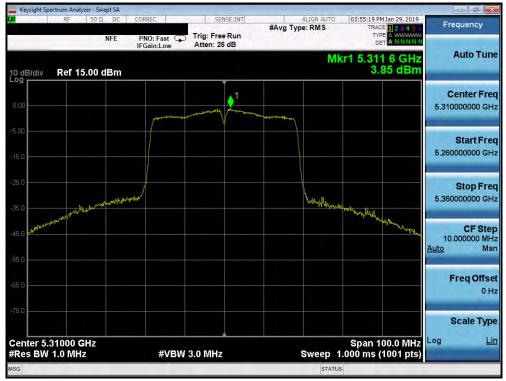
Plot 7-156. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 2A) - Ch. 64)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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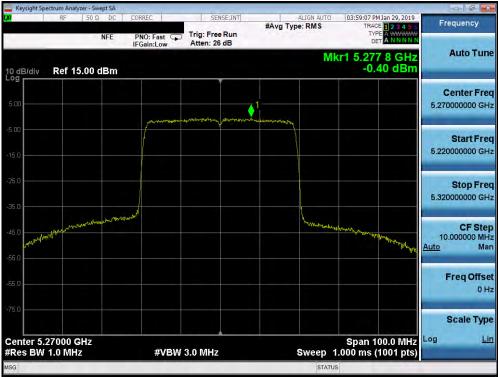
Plot 7-157. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2A) - Ch. 54)



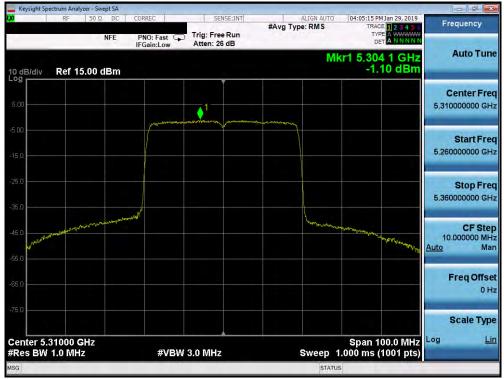
Plot 7-158. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2A) - Ch. 62)

FCC ID: A3LSMG977T	INVITING LANDALING	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-159. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 2A) - Ch. 54)



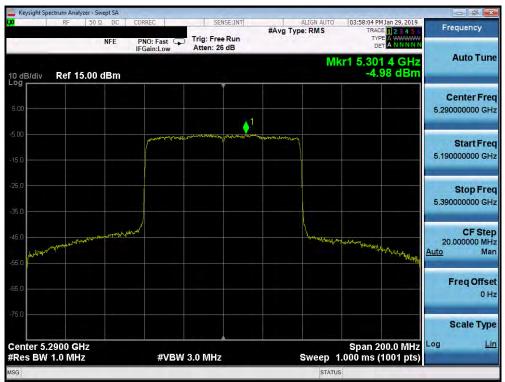
Plot 7-160. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 2A) - Ch. 62)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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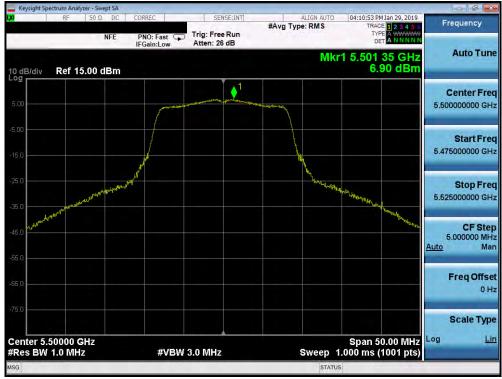
Plot 7-161. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 2A) - Ch. 58)



Plot 7-162. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ax (UNII Band 2A) - Ch. 58)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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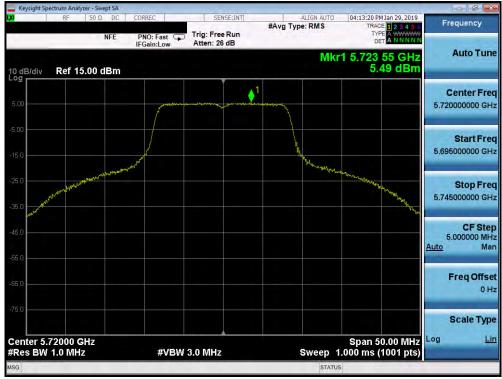
Plot 7-163. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 2C) – Ch. 100)



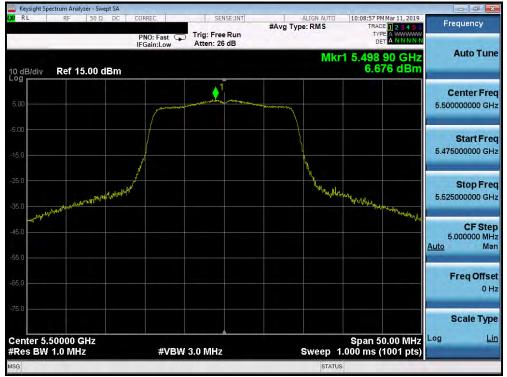
Plot 7-164. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 2C) - Ch. 120)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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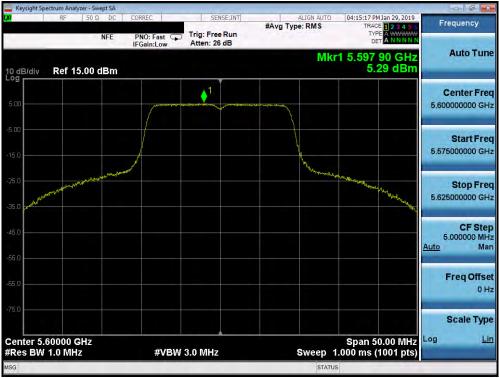
Plot 7-165. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 2C) - Ch. 144)



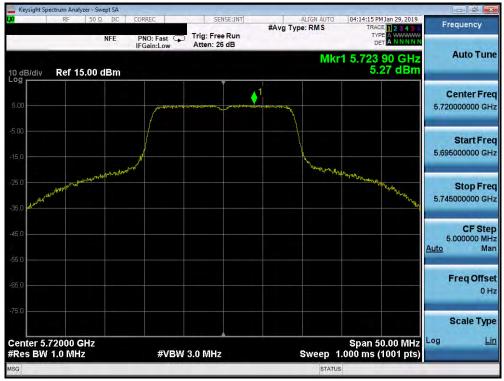
Plot 7-166. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2C) - Ch. 100)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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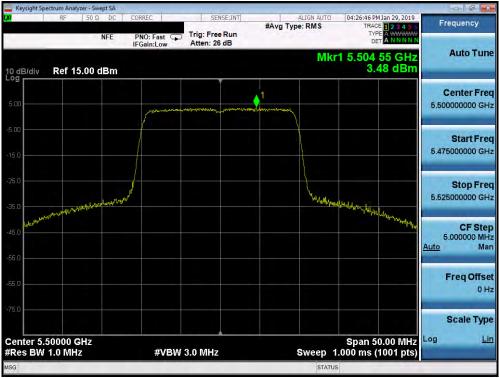
Plot 7-167. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2C) - Ch. 120)



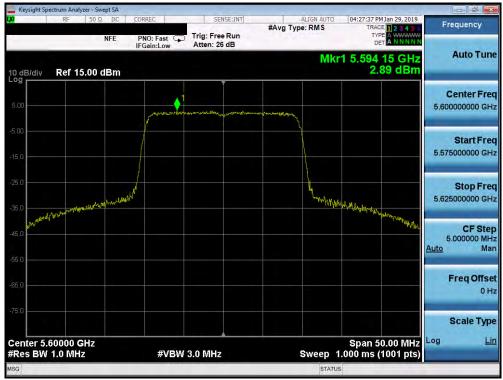
Plot 7-168. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2C) - Ch. 144)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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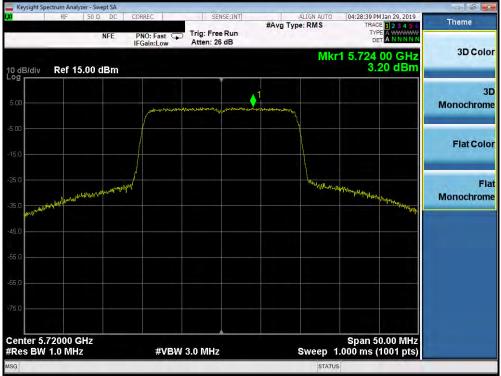
Plot 7-169. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 2C) - Ch. 100)



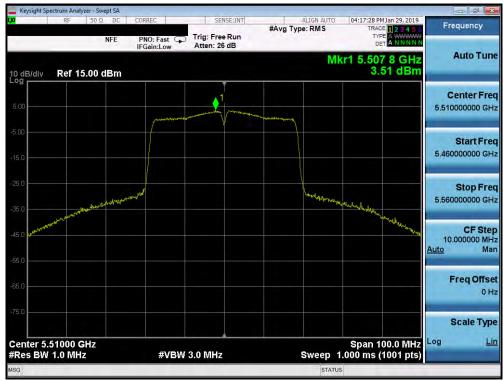
Plot 7-170. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 2C) - Ch. 120)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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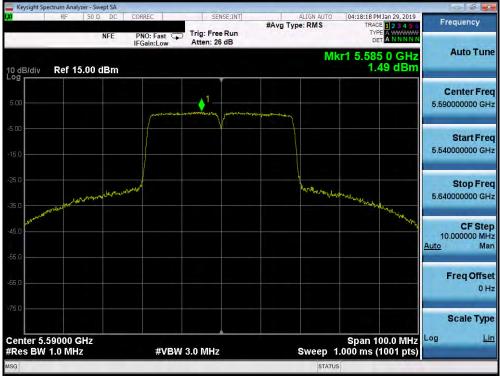
Plot 7-171. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 2C) - Ch. 144)



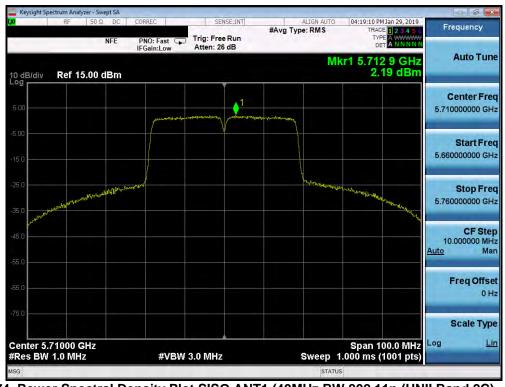
Plot 7-172. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2C) - Ch. 102)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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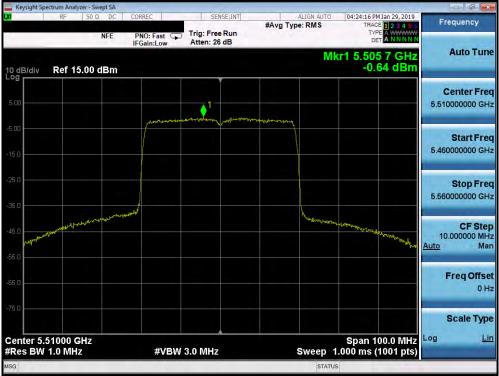
Plot 7-173. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2C) - Ch. 118)



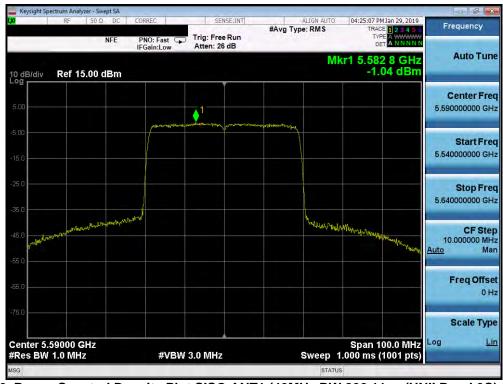
Plot 7-174. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2C) - Ch. 142)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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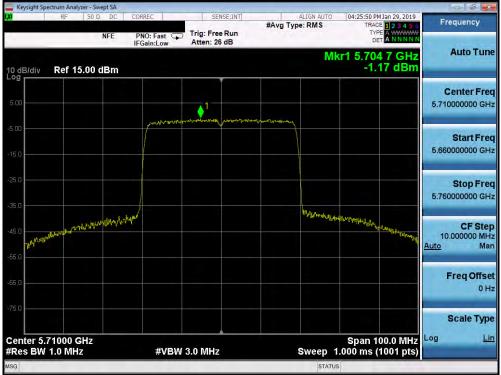
Plot 7-175. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 2C) - Ch. 102)



Plot 7-176. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 2C) - Ch. 118)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-177. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 2C) - Ch. 142)



Plot 7-178. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 2C) - Ch. 106)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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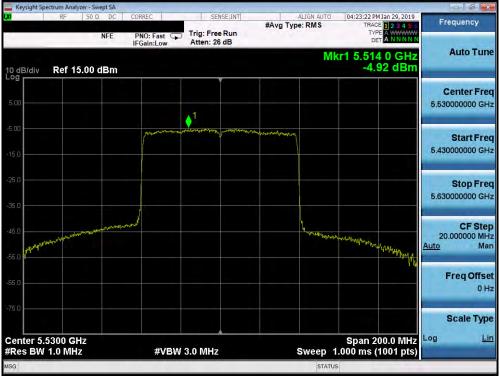
Plot 7-179. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 2C) - Ch. 122)



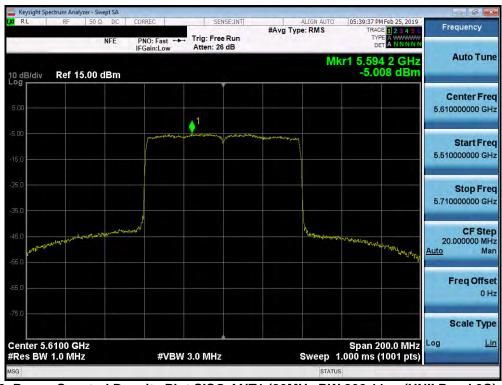
Plot 7-180. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 2C) - Ch. 138)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager	
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Plot 7-181. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ax (UNII Band 2C) - Ch. 106)



Plot 7-182. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ax (UNII Band 2C) - Ch. 122)

FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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RF 50 9	DC COR	REC	SENSE:INT		ALIGN AUTO	04:22:29 PI	M Jan 29, 2019	Constant of the last
	NFE PN	IO: Fast 😱	Trig: Free Run Atten: 26 dB	#Avg Typ	e:RMS	TYP	DE 1 2 3 4 5 6 PE A WWWWW ET A NNNNN	Frequency
0 dB/div Ref 15.00					MI	kr1 5.67 -4.	8 4 GHz 65 dBm	Auto Tune
5.00			<u>1</u>					Center Fred 5,69000000 GHz
5.0			and the second second	and the second second				Start Fred 5.590000000 GH2
5.0								Stop Fre 5.790000000 GH
5.0					hime designed	and the second	Verretra gib Waysa	CF Stej 20.000000 MH <u>Auto</u> Ma
5.0								Freq Offse 0 H
enter 5.6900 GHz						Span 2	00.0 MHz	Scale Type
Res BW 1.0 MHz		#VBW 3	S.U IVIHZ		sweep 1	1.000 ms ((1001 pts)	

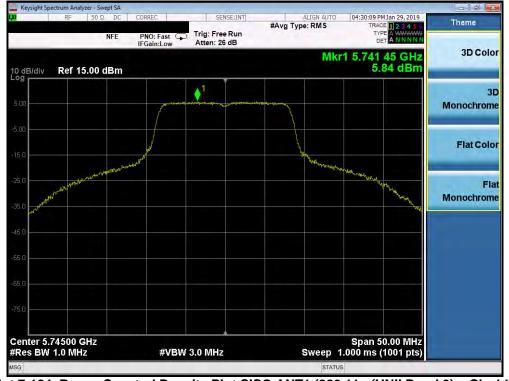
Plot 7-183. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ax (UNII Band 2C) – Ch. 138)

FCC ID: A3LSMG977T	INVIAINE LANGATINE IA	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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·	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Density [dBm]	Max Permissible Power Density [dBm/500kHz]	Margin [dB]
	5745	149	а	6	5.84	30.0	-24.16
	5785	157	а	6	6.14	30.0	-23.86
	5825	165	а	6	6.15	30.0	-23.85
	5745	149	n (20MHz)	6.5/7.2 (MCS0)	6.01	30.0	-23.99
	5785	157	n (20MHz)	6.5/7.2 (MCS0)	6.25	30.0	-23.75
	5825	165	n (20MHz)	6.5/7.2 (MCS0)	5.73	30.0	-24.27
3	5745	149	ax (20MHz)	6.5/7.2 (MCS0)	3.70	30.0	-26.30
Band	5785	157	ax (20MHz)	6.5/7.2 (MCS0)	4.08	30.0	-25.92
ä	5825	165	ax (20MHz)	6.5/7.2 (MCS0)	3.34	30.0	-26.66
	5755	151	n (40MHz)	13.5/15 (MCS0)	2.15	30.0	-27.85
	5795	159	n (40MHz)	13.5/15 (MCS0)	2.20	30.0	-27.80
	5755	151	ax (40MHz)	13.5/15 (MCS0)	-0.80	30.0	-30.80
	5795	159	ax (40MHz)	13.5/15 (MCS0)	-0.71	30.0	-30.71
	5775	155	ac (80MHz)	29.3/32.5 (MCS0)	-1.62	30.0	-31.62
	5775	155	ax (80MHz)	29.3/32.5 (MCS0)	-4.60	30.0	-34.60

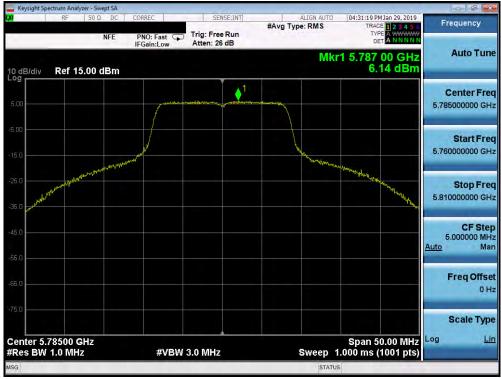
 Table 7-22. Band 3 Conducted Power Spectral Density Measurements SISO ANT1



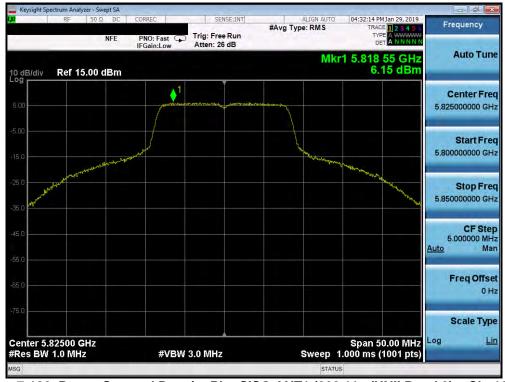
Plot 7-184. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 3) - Ch. 149)

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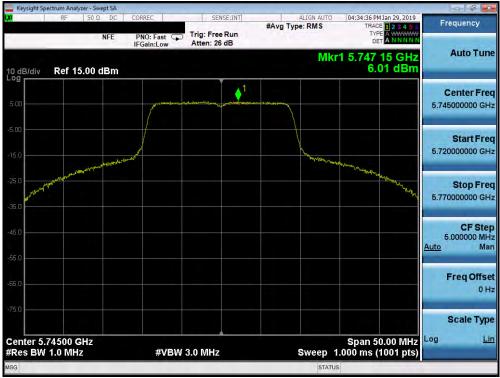
Plot 7-185. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 3) – Ch. 157)



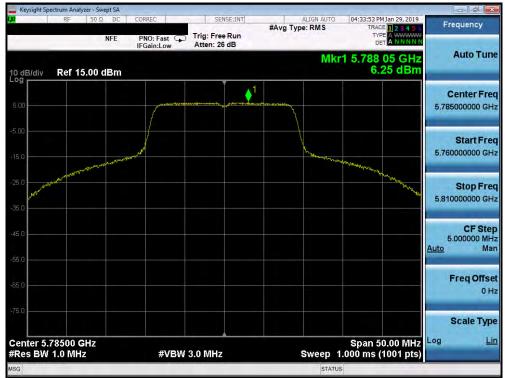
Plot 7-186. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 3) - Ch. 165)

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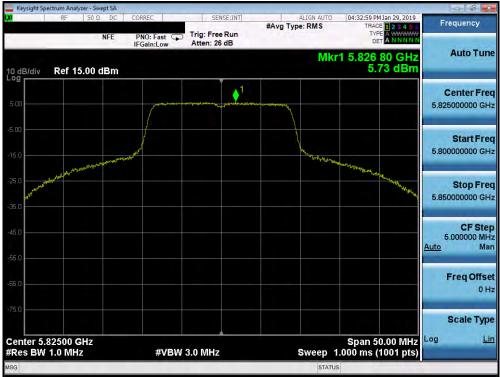
Plot 7-187. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 3) - Ch. 149)



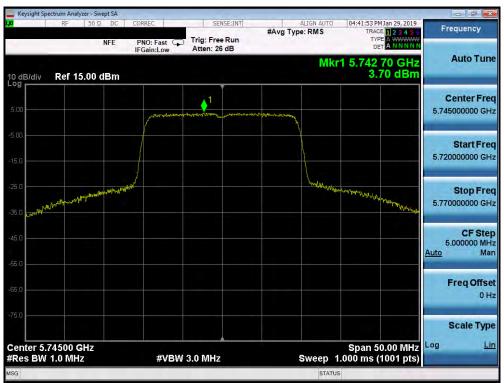
Plot 7-188. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 3) - Ch. 157)

FCC ID: A3LSMG977T	INVESTORATION, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
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Plot 7-189. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 3) - Ch. 165)

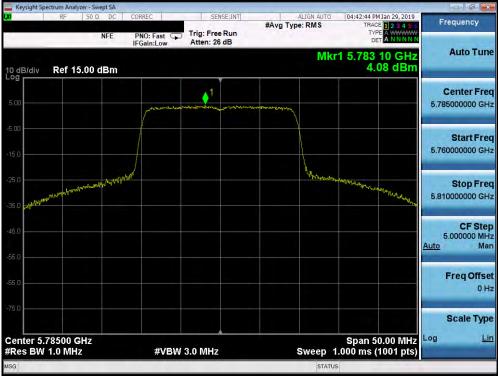


Plot 7-190. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 3) - Ch. 149)

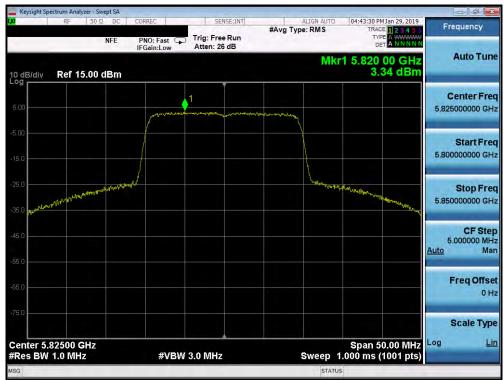
FCC ID: A3LSMG977T		MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 100 of 250
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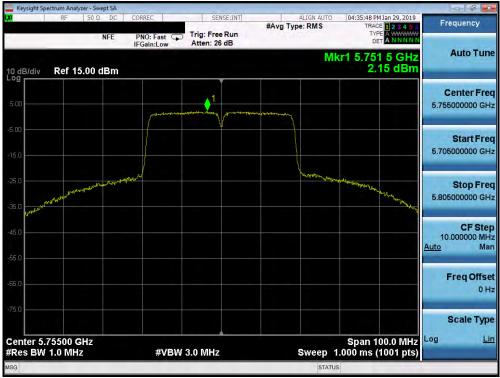
Plot 7-191. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 3) - Ch. 157)



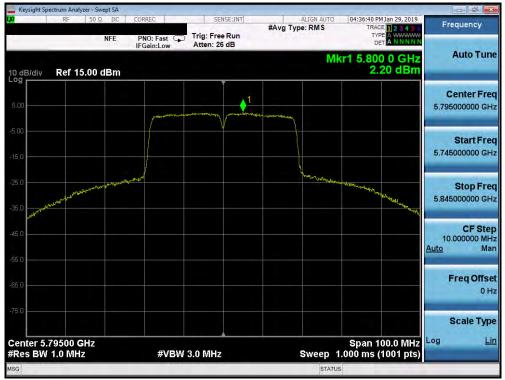
Plot 7-192. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 3) - Ch. 165)

FCC ID: A3LSMG977T	INVESTOR DEPENDENCE	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Bage 120 of 250
1M1903060032-08.A3L	01/22 - 05/08/2019	Portable Handset		Page 130 of 259
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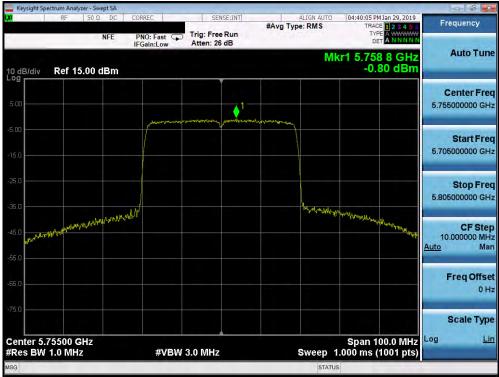
Plot 7-193. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 3) - Ch. 151)



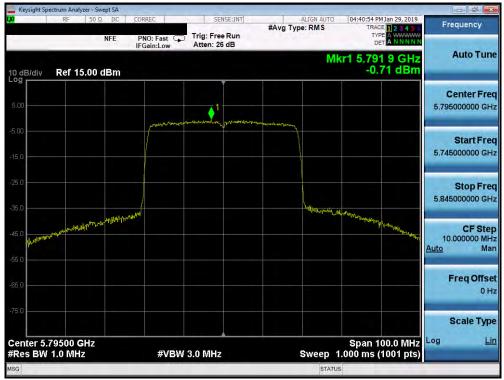
Plot 7-194. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 3) - Ch. 159)

FCC ID: A3LSMG977T	INVESTIGATION IN	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 121 of 250
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Plot 7-195. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 3) - Ch. 151)



Plot 7-196. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 3) - Ch. 159)

FCC ID: A3LSMG977T	Inside Laborations, Inc.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N:	Test Dates:	EUT Type:		Dage 122 of 250
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