

7.5 Maximum Power Spectral Density – 802.11a/n/ac §15.407(a.1)(2.5)

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 KDB 789033 D02 v01, and at the appropriate frequencies. Method SA-1, as defined in KDB 789033 D02 v01, 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

KDB 789033 D02 v01 – Section F
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 $\geq 2 \times (\text{span}/\text{RBW})$
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.

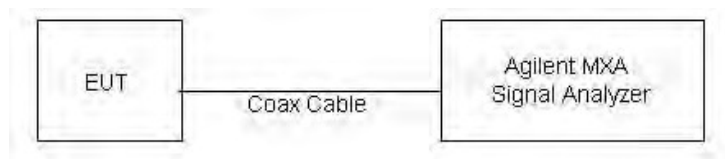


Figure 7-4. Test Instrument & Measurement Setup

Test Notes

None

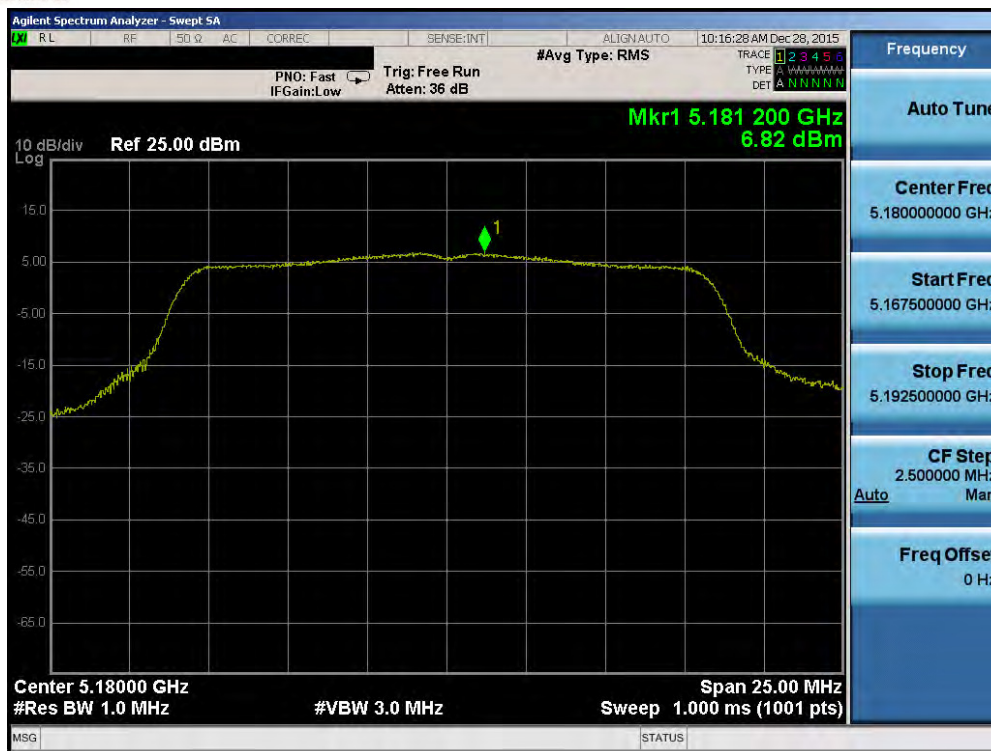
FCC ID: A3LSMG930W8		FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 67 of 261

Antenna-1 Power Spectral Density Measurements

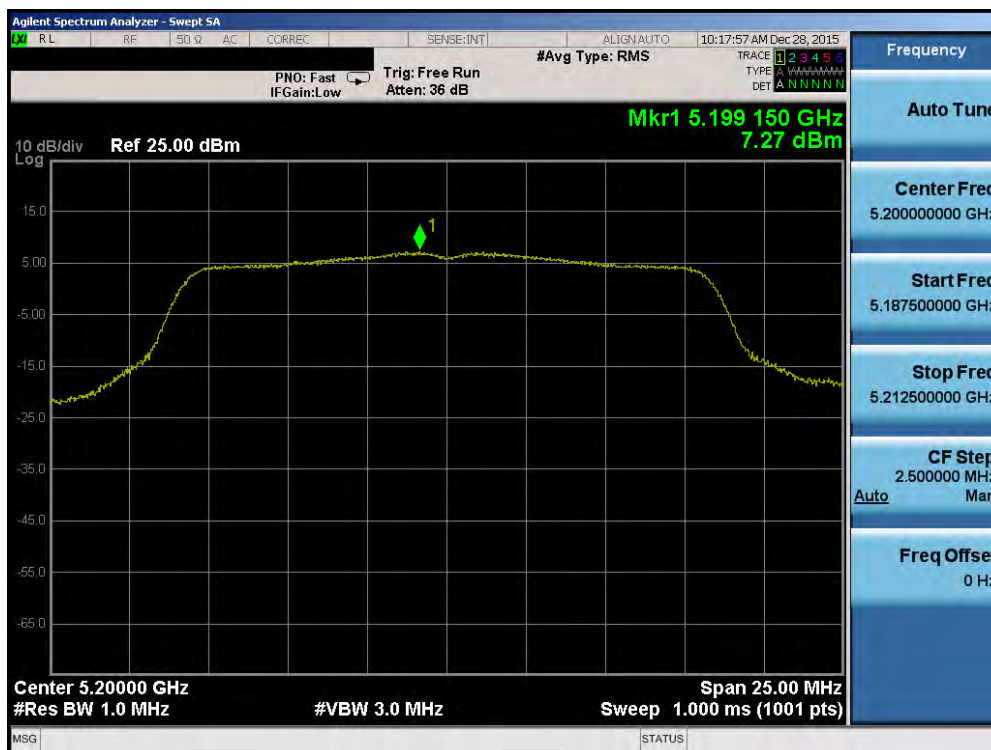
	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Density [dBm]	Max Permissible Power Density [dBm/MHz]	Margin [dB]	Pass / Fail
Band 1	5180	36	a	6	6.82	11.0	-4.18	Pass
	5200	40	a	6	7.27	11.0	-3.73	Pass
	5240	48	a	6	7.27	11.0	-3.74	Pass
	5180	36	n (20MHz)	6.5/7.2 (MCS0)	5.63	11.0	-5.37	Pass
	5200	40	n (20MHz)	6.5/7.2 (MCS0)	5.93	11.0	-5.07	Pass
	5240	48	n (20MHz)	6.5/7.2 (MCS0)	6.23	11.0	-4.77	Pass
	5190	38	n (40MHz)	13.5/15 (MCS0)	3.19	11.0	-7.81	Pass
	5230	46	n (40MHz)	13.5/15 (MCS0)	3.54	11.0	-7.46	Pass
	5210	42	ac (80MHz)	29.3/32.5 (MCS0)	0.19	11.0	-10.81	Pass
Band 2A	5260	52	a	6	7.42	11.0	-3.58	Pass
	5280	56	a	6	7.44	11.0	-3.56	Pass
	5320	64	a	6	8.04	11.0	-2.96	Pass
	5260	52	n (20MHz)	6.5/7.2 (MCS0)	6.19	11.0	-4.81	Pass
	5280	56	n (20MHz)	6.5/7.2 (MCS0)	5.93	11.0	-5.07	Pass
	5320	64	n (20MHz)	6.5/7.2 (MCS0)	6.43	11.0	-4.57	Pass
	5270	54	n (40MHz)	13.5/15 (MCS0)	3.30	11.0	-7.70	Pass
	5310	62	n (40MHz)	13.5/15 (MCS0)	3.54	11.0	-7.46	Pass
	5290	58	ac (80MHz)	29.3/32.5 (MCS0)	0.29	11.0	-10.71	Pass
Band 2C	5500	100	a	6	7.97	11.0	-3.03	Pass
	5600	120	a	6	7.70	11.0	-3.30	Pass
	5720	144	a	6	7.31	11.0	-3.69	Pass
	5500	100	n (20MHz)	6.5/7.2 (MCS0)	6.59	11.0	-4.41	Pass
	5600	120	n (20MHz)	6.5/7.2 (MCS0)	6.38	11.0	-4.62	Pass
	5720	144	n (20MHz)	6.5/7.2 (MCS0)	6.13	11.0	-4.87	Pass
	5510	102	n (40MHz)	13.5/15 (MCS0)	3.86	11.0	-7.14	Pass
	5590	118	n (40MHz)	13.5/15 (MCS0)	3.75	11.0	-7.25	Pass
	5710	142	n (40MHz)	13.5/15 (MCS0)	3.39	11.0	-7.61	Pass
	5530	106	ac (80MHz)	29.3/32.5 (MCS0)	0.39	11.0	-10.61	Pass
	5610	122	ac (80MHz)	29.3/32.5 (MCS0)	-0.10	11.0	-11.10	Pass
	5690	138	ac (80MHz)	29.3/32.5 (MCS0)	-2.84	11.0	-13.84	Pass

Table 7-17. Bands 1, 2A, 2C Conducted Power Spectral Density Measurements

FCC ID: A3LSMG930W8		FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 68 of 261



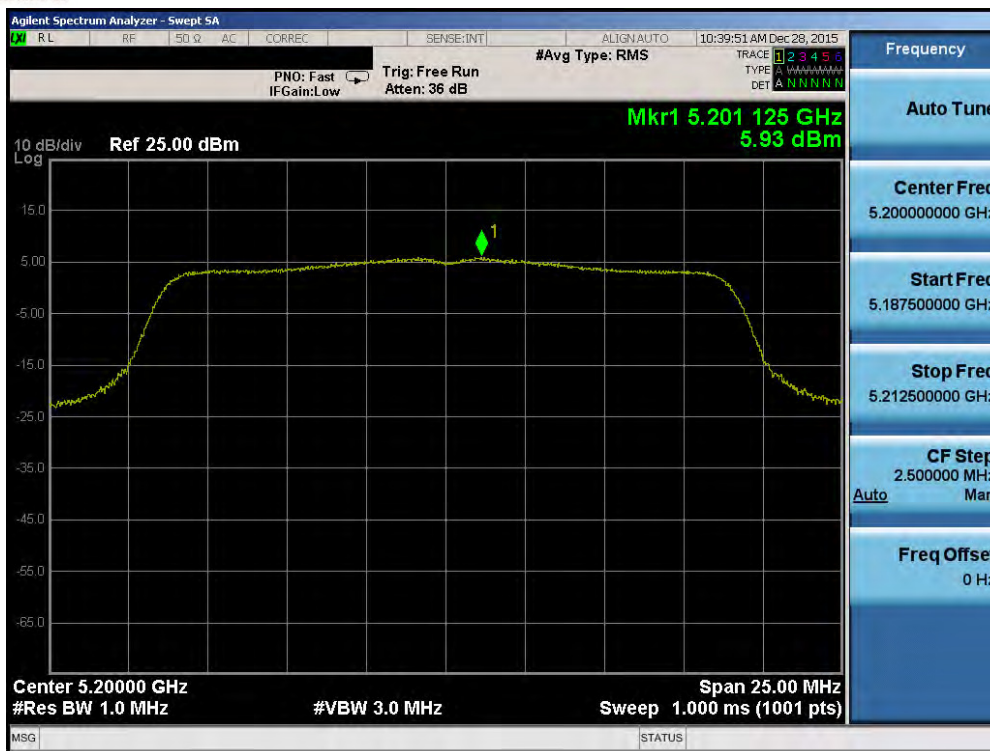
Plot 7-79. Power Spectral Density Plot (802.11a (UNII Band 1) – Ch. 36)



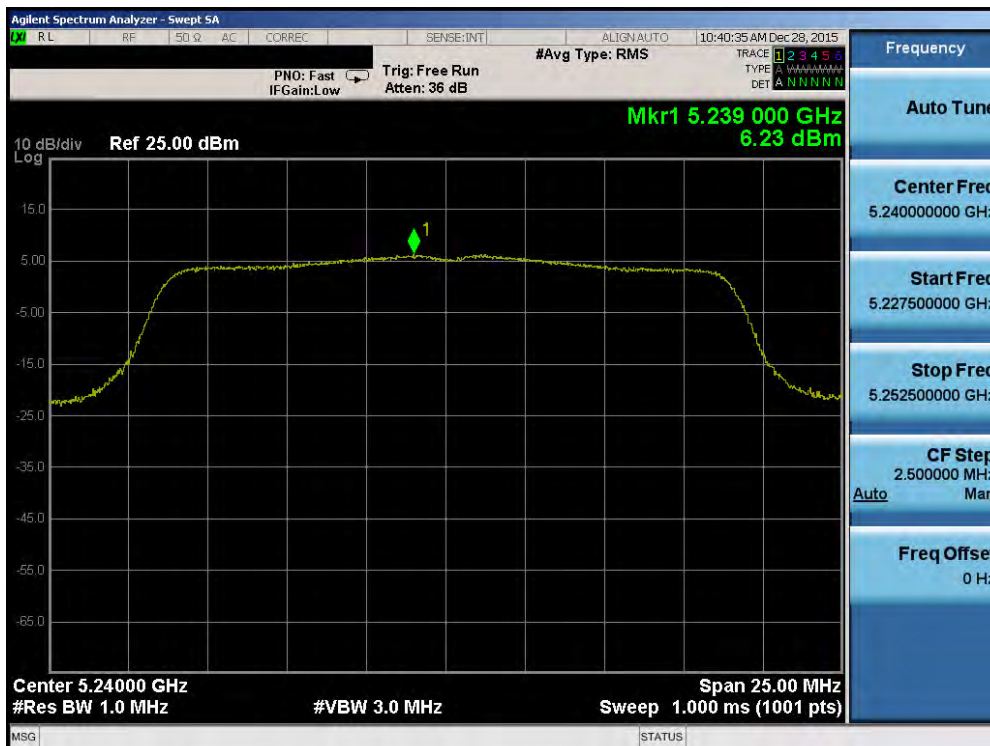
Plot 7-80. Power Spectral Density Plot (802.11a (UNII Band 1) – Ch. 40)

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 69 of 261



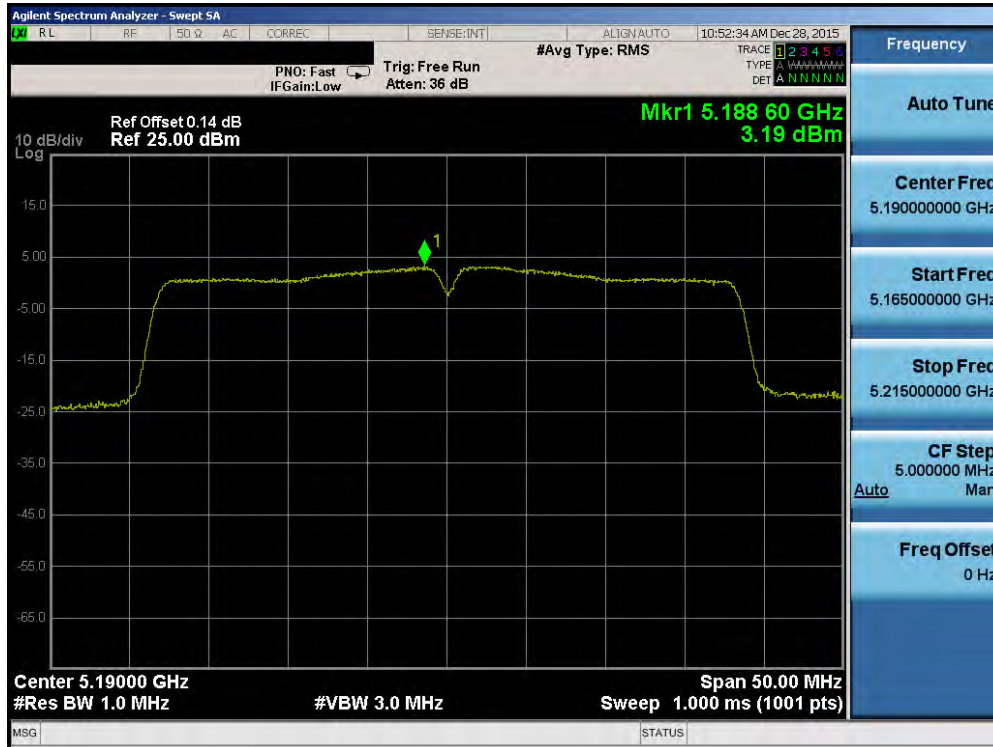


Plot 7-83. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 1) – Ch. 40)

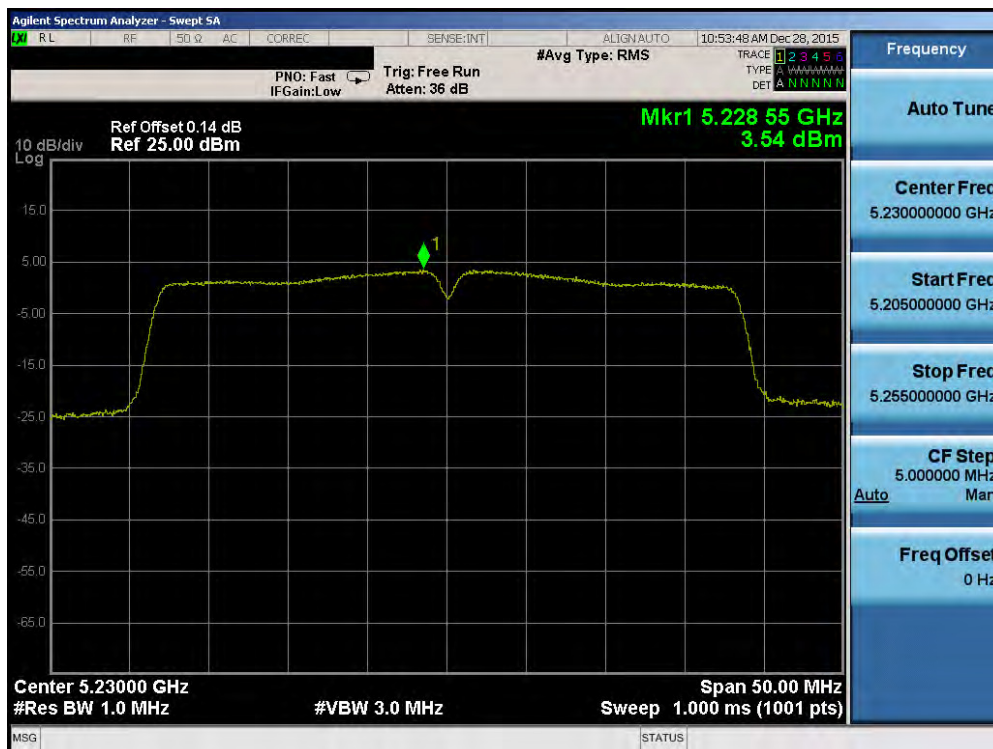


Plot 7-84. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 1) – Ch. 48)

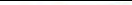
FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 71 of 261

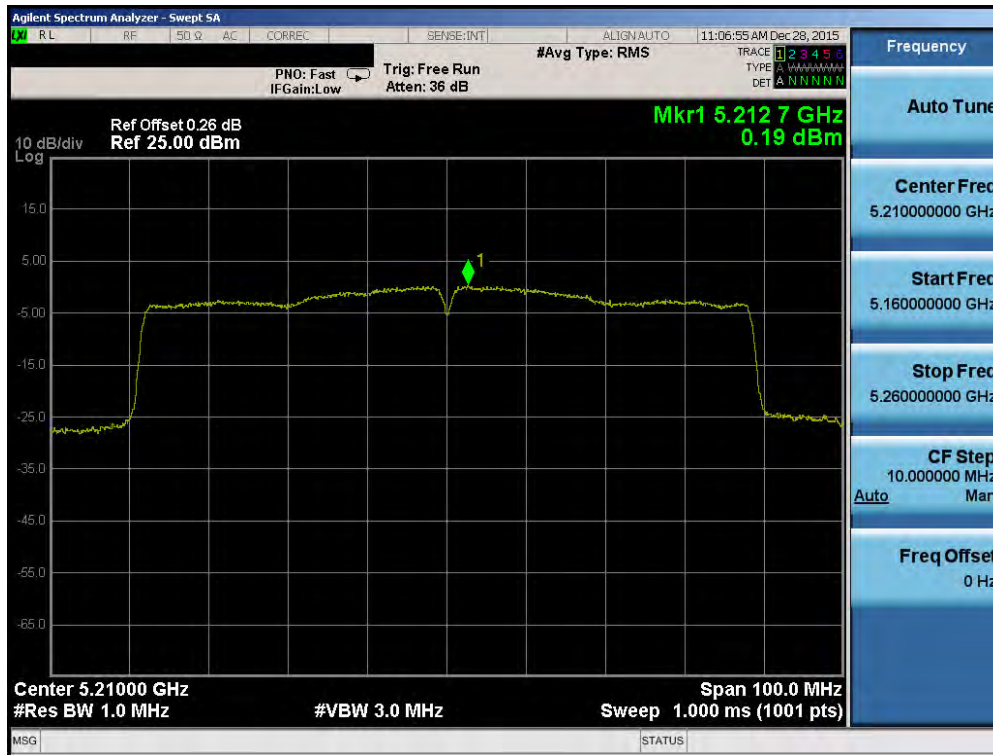


Plot 7-85. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 1) – Ch. 38)

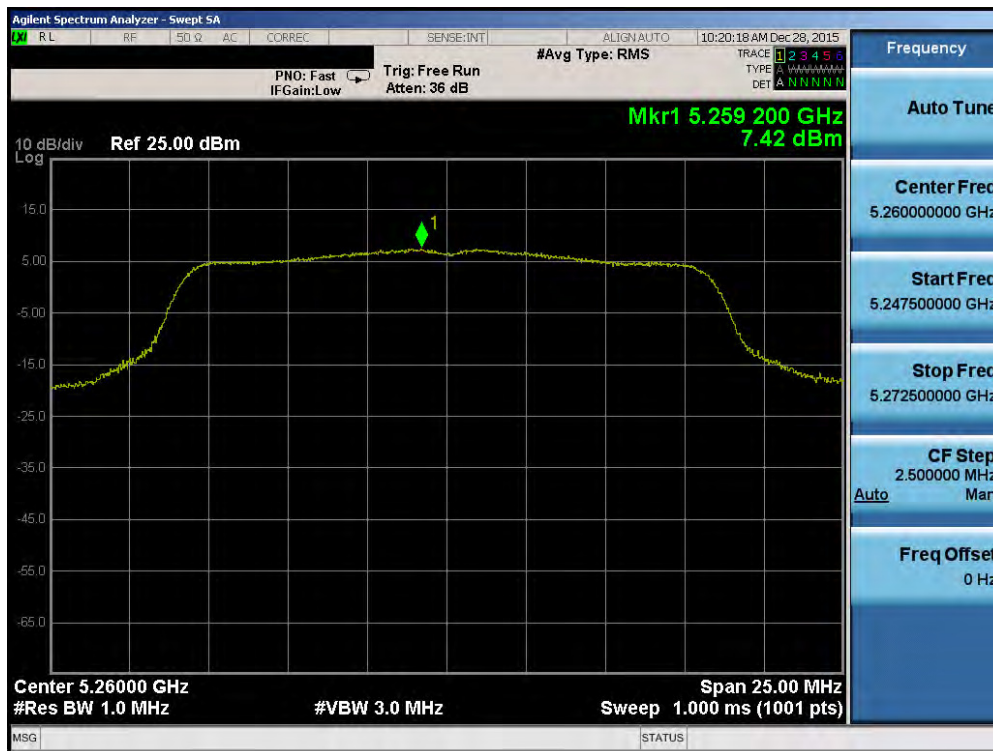


Plot 7-86. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 1) – Ch. 46)

FCC ID: A3LSMG930W8	 FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION) 		Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset	Page 72 of 261

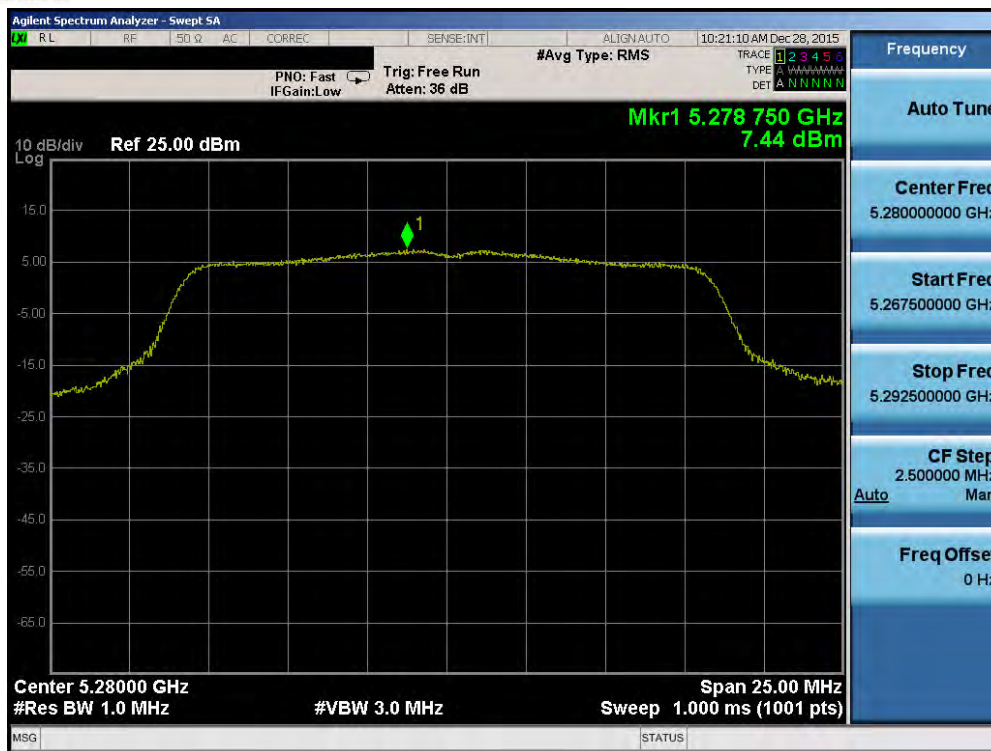


Plot 7-87. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 1) – Ch. 42)

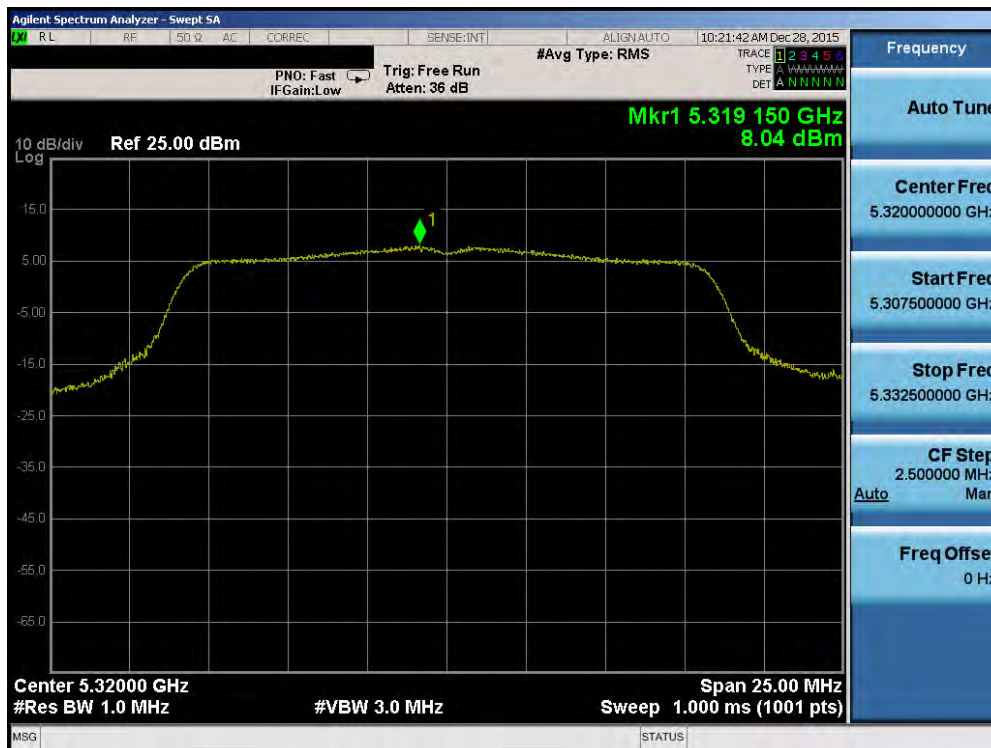


Plot 7-88. Power Spectral Density Plot (802.11a (UNII Band 2A) – Ch. 52)

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 73 of 261

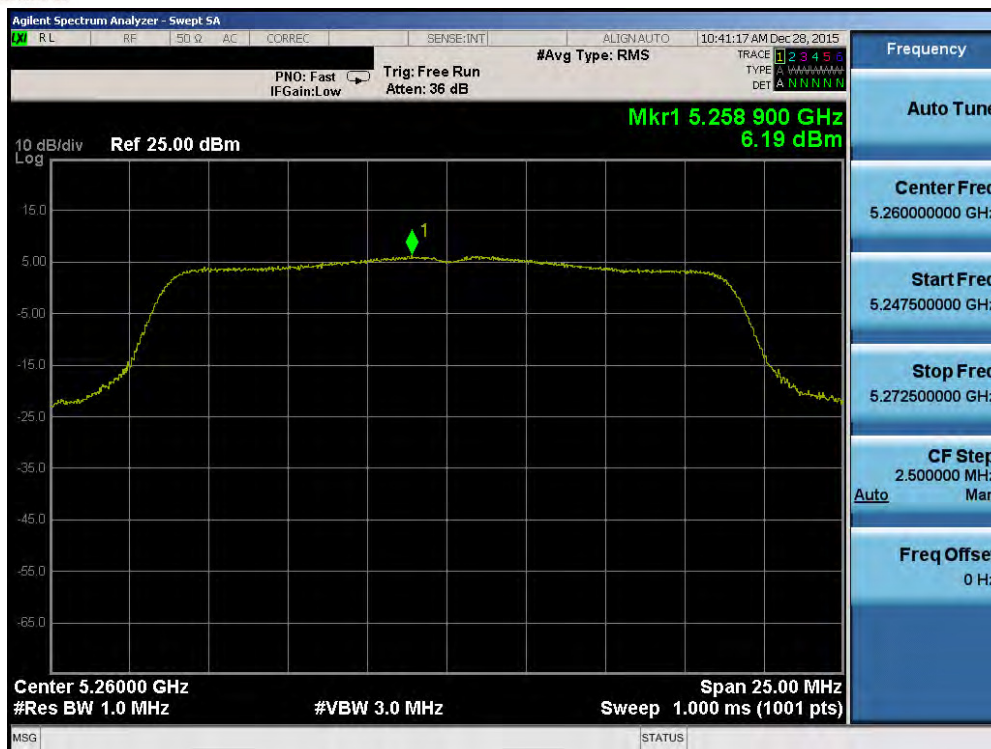


Plot 7-89. Power Spectral Density Plot (802.11a (UNII Band 2A) – Ch. 56)

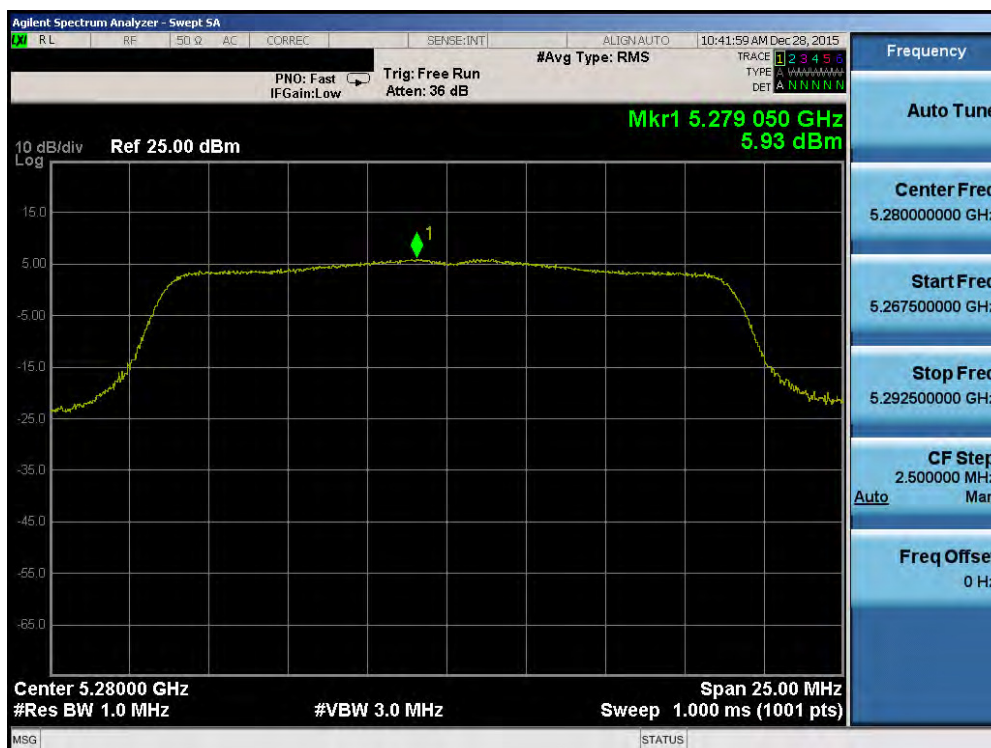


Plot 7-90. Power Spectral Density Plot (802.11a (UNII Band 2A) – Ch. 64)

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 74 of 261

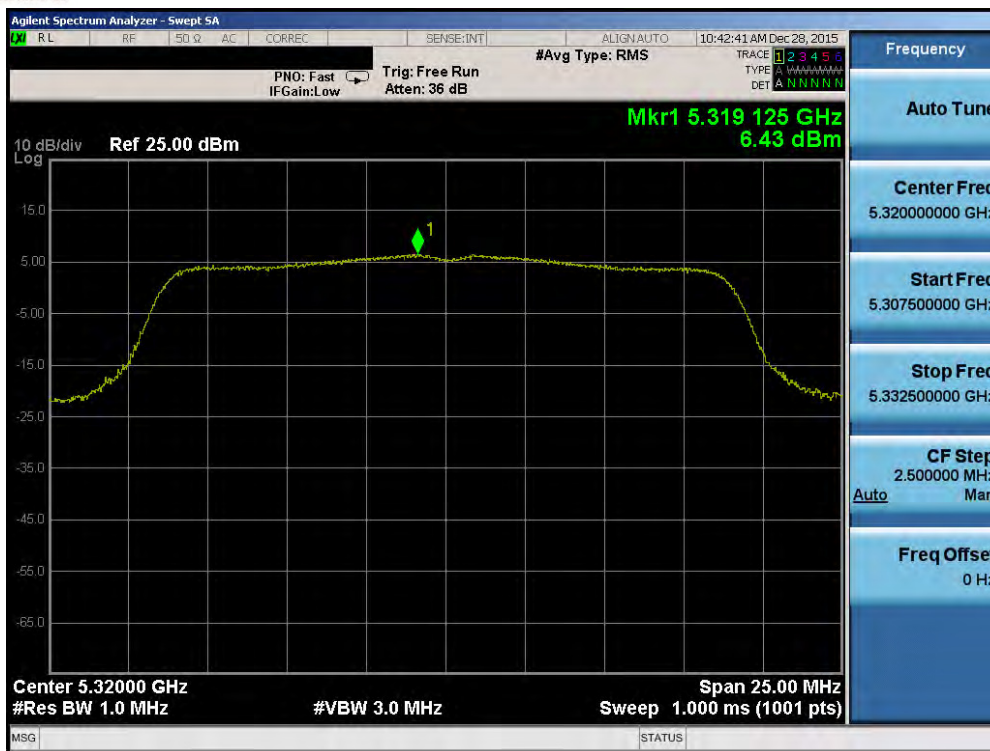


Plot 7-91. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 2A) – Ch. 52)

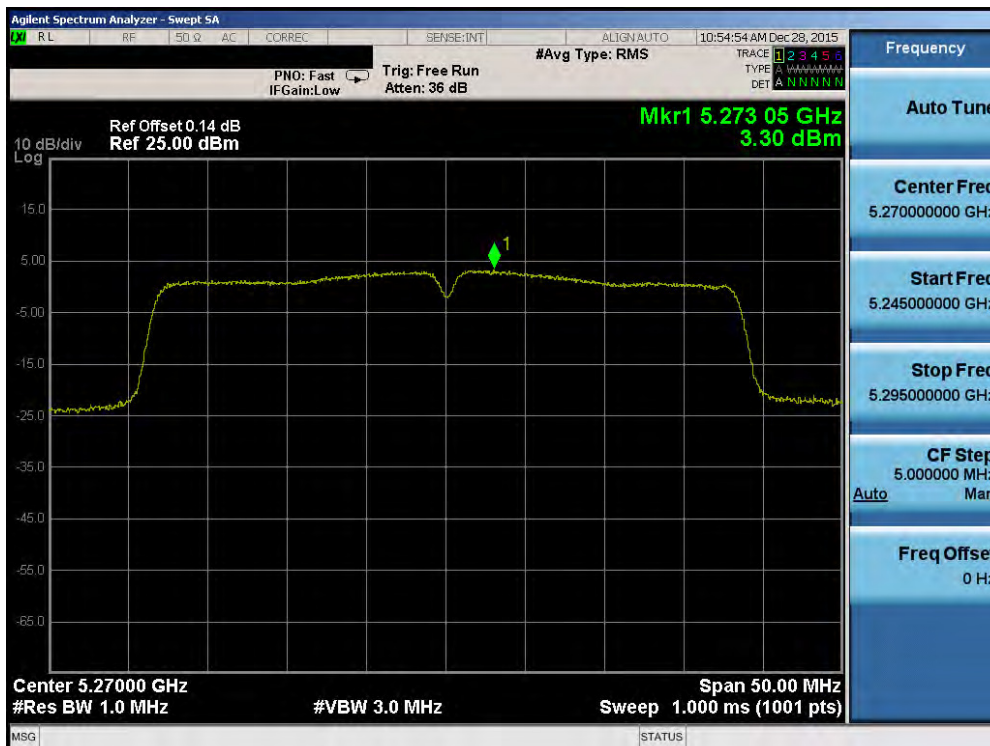


Plot 7-92. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 2A) – Ch. 56)

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 75 of 261

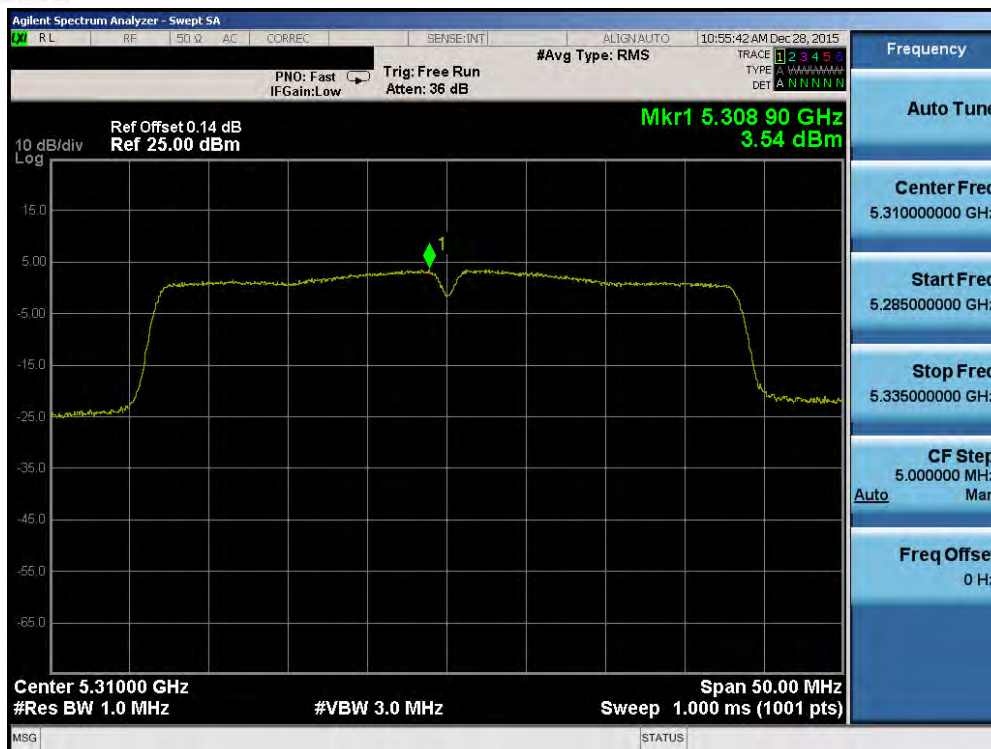


Plot 7-93. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 2A) – Ch. 64)



Plot 7-94. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 2A) – Ch. 54)

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 76 of 261

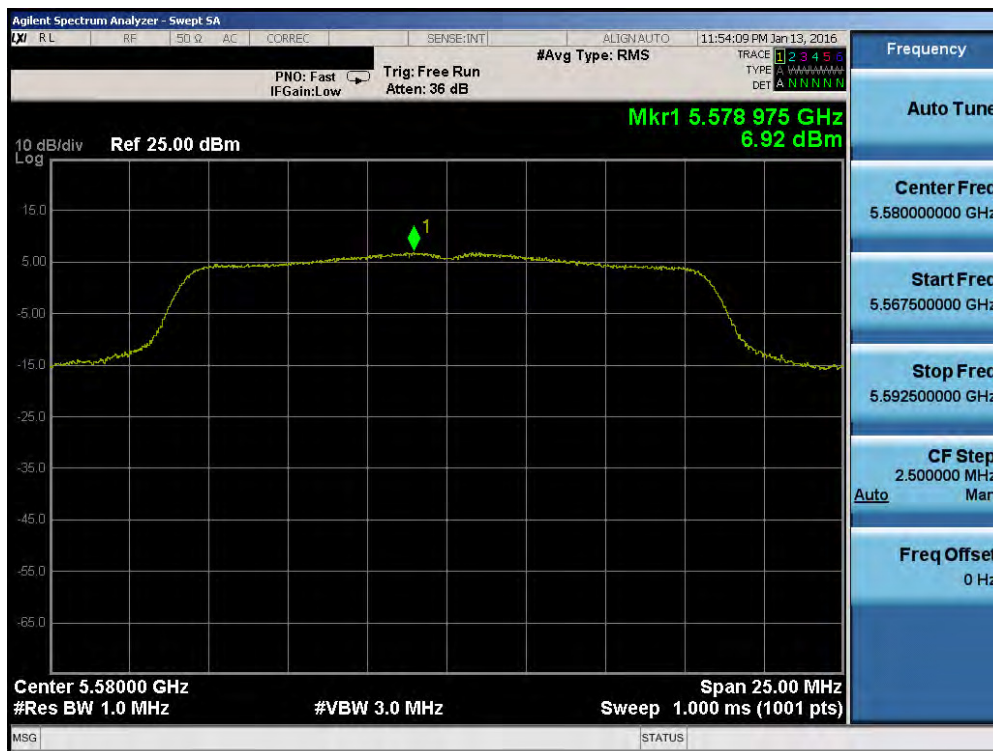
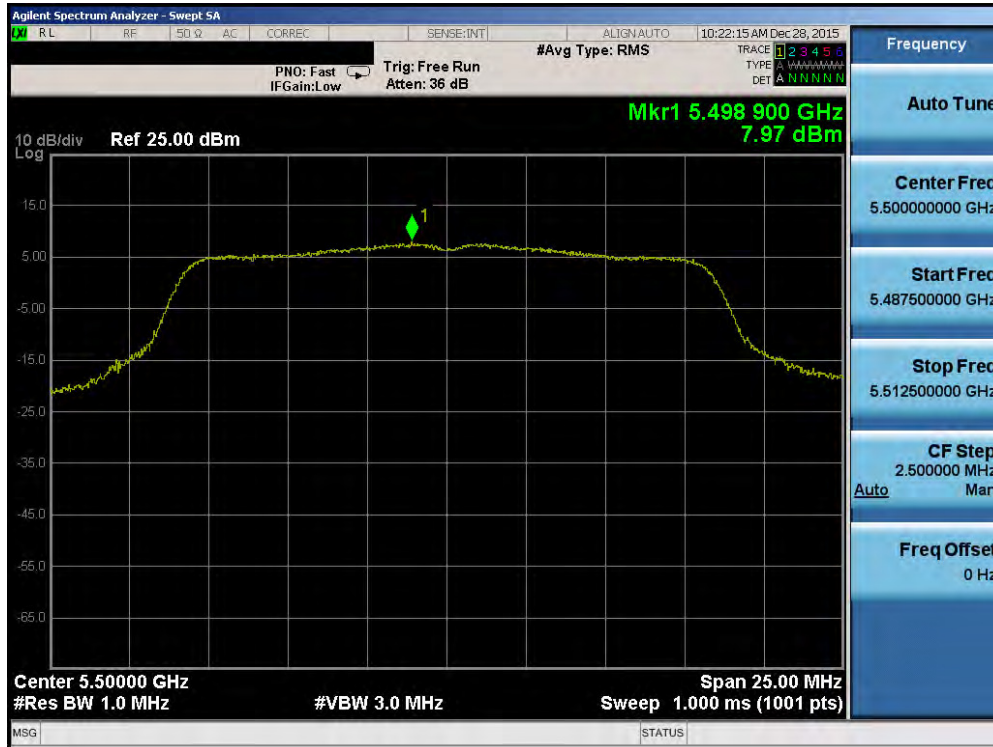


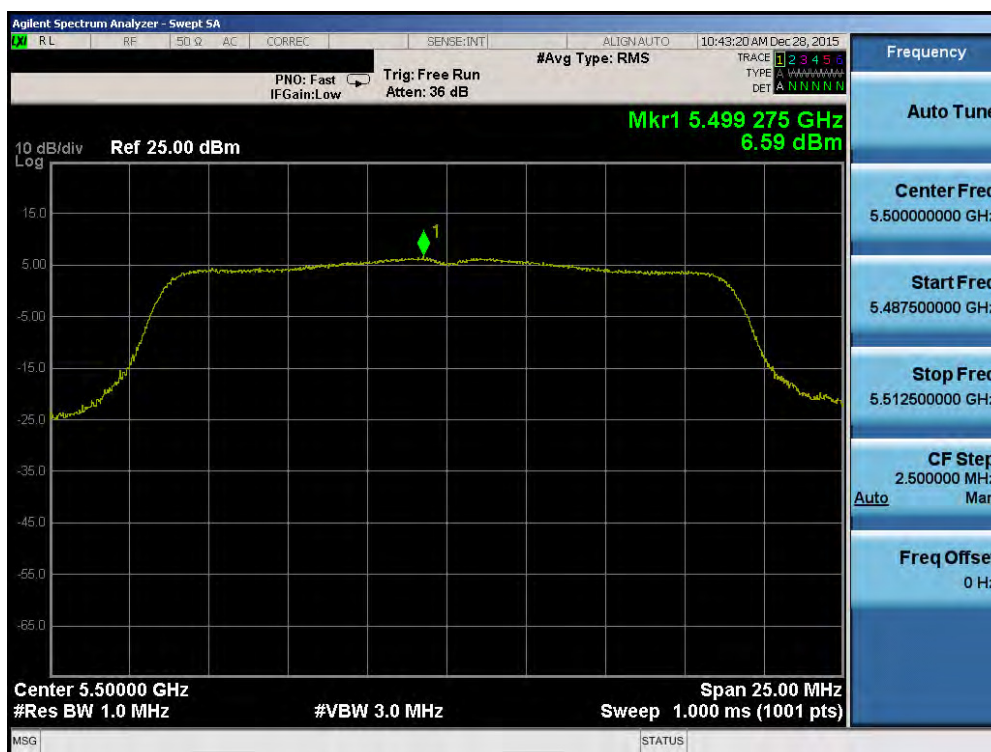
Plot 7-95. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 2A) – Ch. 62)

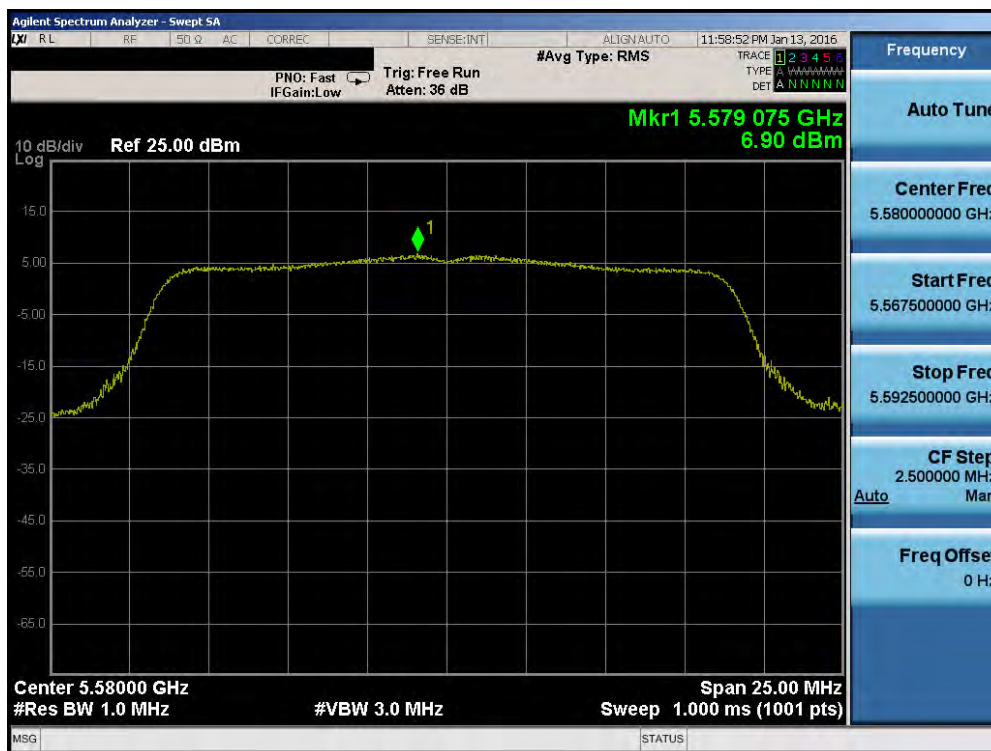


Plot 7-96. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 2A) – Ch. 58)

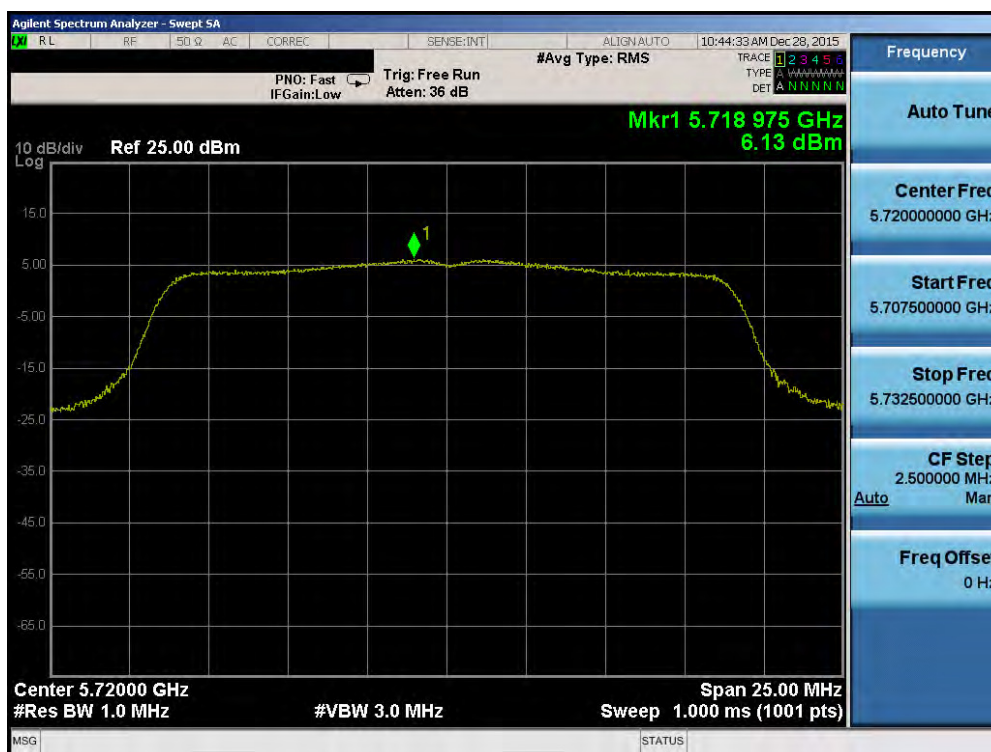
FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 77 of 261







Plot 7-101. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 2C) – Ch. 120)



Plot 7-102. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 2C) – Ch. 144)

FCC ID: A3LSMG930W8	  		Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset	Page 80 of 261



Plot 7-103. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 2C) – Ch. 102)



Plot 7-104. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 2C) – Ch. 118)

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 81 of 261



Plot 7-105. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 2C) – Ch. 142)



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

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 82 of 261



Plot 7-107. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 2C) – Ch. 122)

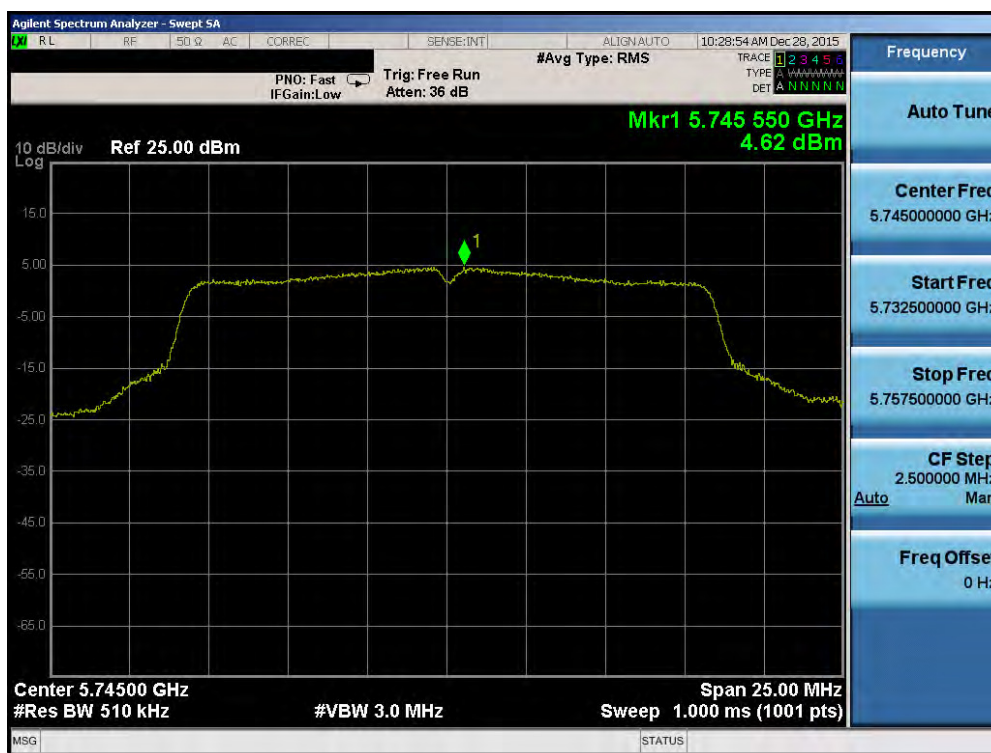


Plot 7-108. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 2C) – Ch. 138)

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 83 of 261

	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Density [dBm]	Max Permissible Power Density [dBm/500kHz]	Margin [dB]	Pass / Fail
Band 3	5745	149	a	6	4.62	30.0	-25.38	Pass
	5785	157	a	6	4.79	30.0	-25.21	Pass
	5825	165	a	6	4.69	30.0	-25.32	Pass
	5745	149	n (20MHz)	6.5/7.2 (MCS0)	3.29	30.0	-26.71	Pass
	5785	157	n (20MHz)	6.5/7.2 (MCS0)	3.59	30.0	-26.41	Pass
	5825	165	n (20MHz)	6.5/7.2 (MCS0)	3.19	30.0	-26.81	Pass
	5755	151	n (40MHz)	13.5/15 (MCS0)	0.33	30.0	-29.67	Pass
	5795	159	n (40MHz)	13.5/15 (MCS0)	0.82	30.0	-29.18	Pass
	5775	155	ac (80MHz)	29.3/32.5 (MCS0)	-0.17	30.0	-30.17	Pass

Table 7-18. Band 3 Conducted Power Spectral Density Measurements



Plot 7-109. Power Spectral Density Plot (802.11a (UNII Band 3) – Ch. 149)

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 84 of 261



Plot 7-112. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 149)



Plot 7-113. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 157)

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 86 of 261

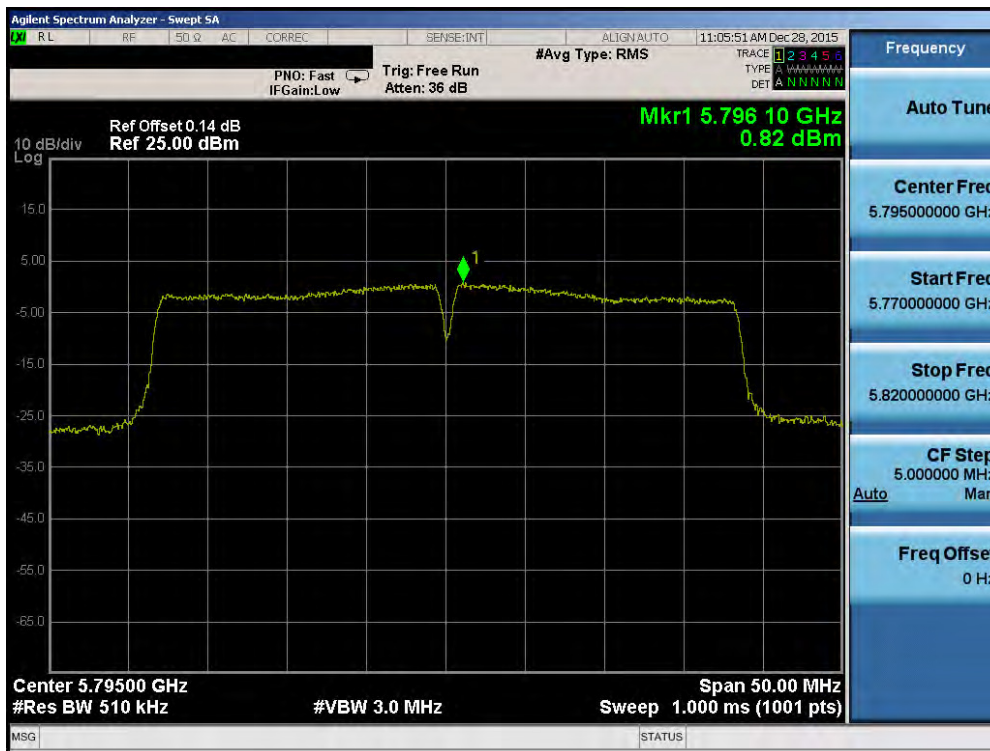


Plot 7-114. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 165)

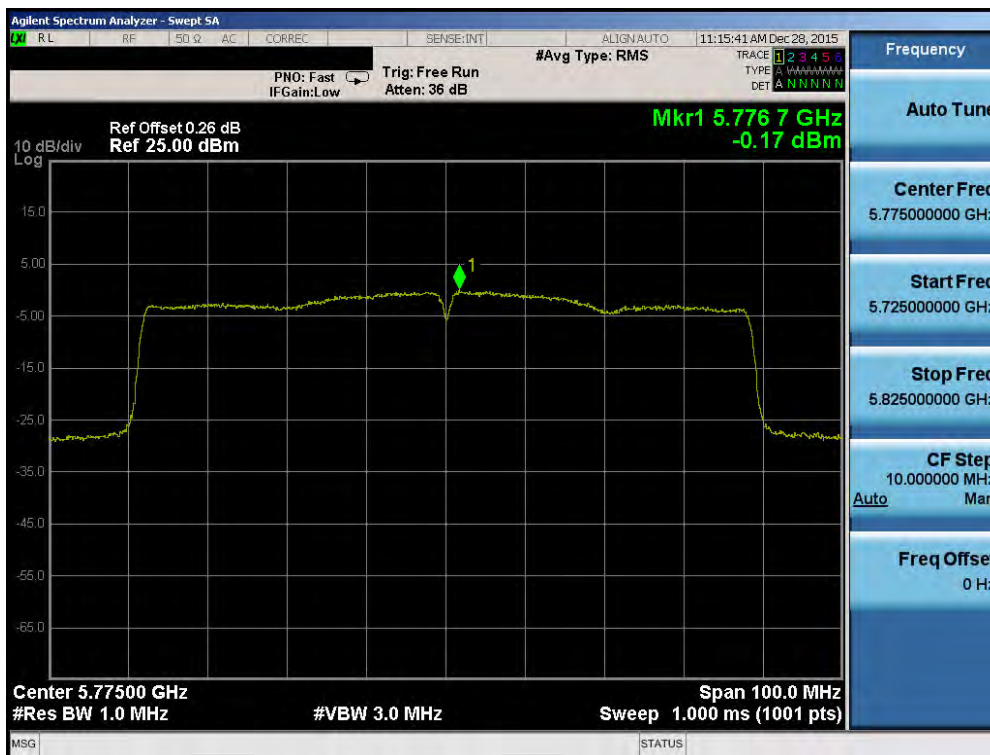


Plot 7-115. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 3) – Ch. 151)

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 87 of 261



Plot 7-116. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 3) – Ch. 159)



Plot 7-117. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 3) – Ch. 155)

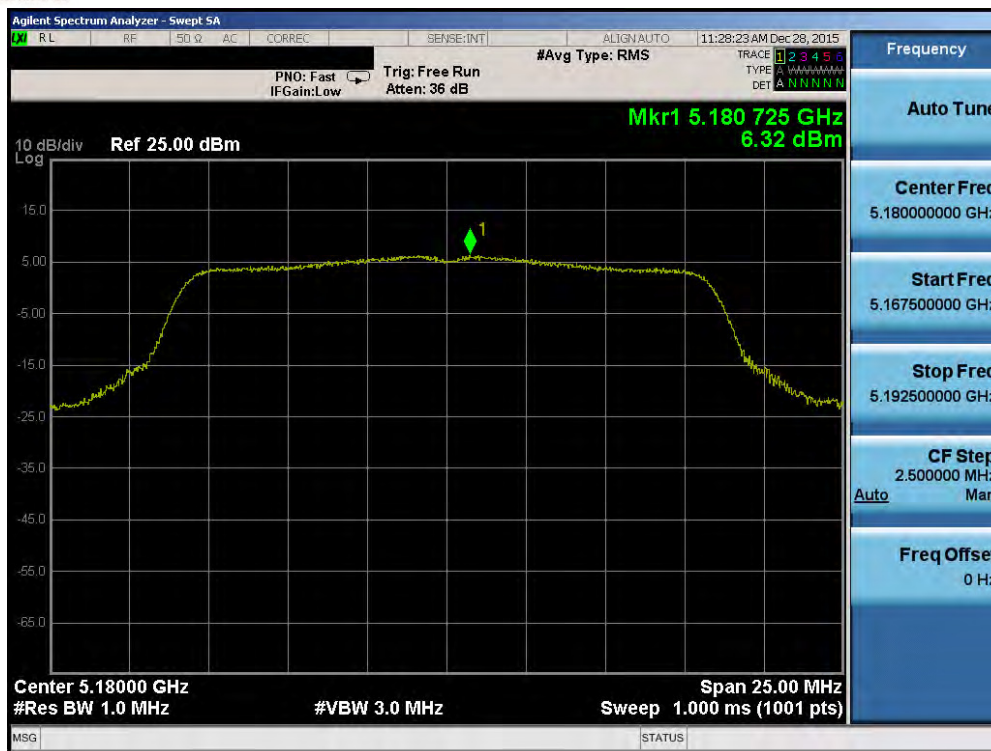
FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 88 of 261

Antenna-2 Power Spectral Density Measurements

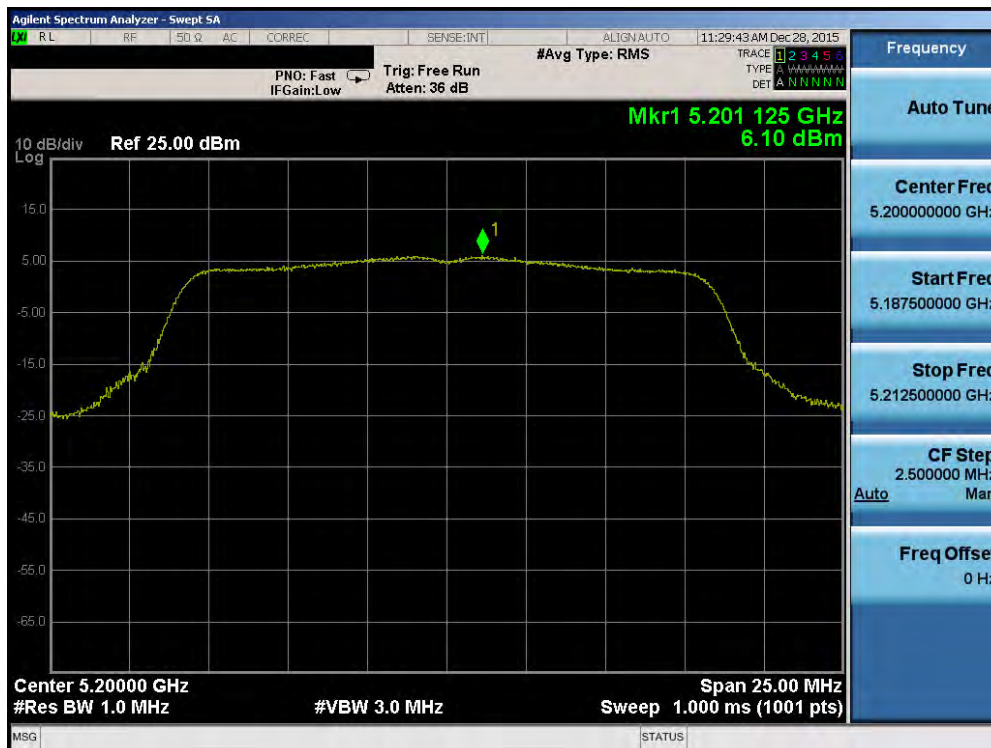
	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Density [dBm]	Max Permissible Power Density [dBm/MHz]	Margin [dB]	Pass / Fail
Band 1	5180	36	a	6	6.32	11.0	-4.69	Pass
	5200	40	a	6	6.10	11.0	-4.90	Pass
	5240	48	a	6	6.12	11.0	-4.88	Pass
	5180	36	n (20MHz)	6.5/7.2 (MCS0)	5.80	11.0	-5.20	Pass
	5200	40	n (20MHz)	6.5/7.2 (MCS0)	5.79	11.0	-5.21	Pass
	5240	48	n (20MHz)	6.5/7.2 (MCS0)	5.46	11.0	-5.54	Pass
	5190	38	n (40MHz)	13.5/15 (MCS0)	3.16	11.0	-7.84	Pass
	5230	46	n (40MHz)	13.5/15 (MCS0)	2.79	11.0	-8.21	Pass
	5210	42	ac (80MHz)	29.3/32.5 (MCS0)	-2.12	11.0	-13.12	Pass
Band 2A	5260	52	a	6	6.06	11.0	-4.95	Pass
	5280	56	a	6	6.21	11.0	-4.79	Pass
	5320	64	a	6	6.28	11.0	-4.72	Pass
	5260	52	n (20MHz)	6.5/7.2 (MCS0)	5.73	11.0	-5.27	Pass
	5280	56	n (20MHz)	6.5/7.2 (MCS0)	5.96	11.0	-5.04	Pass
	5320	64	n (20MHz)	6.5/7.2 (MCS0)	6.01	11.0	-4.99	Pass
	5270	54	n (40MHz)	13.5/15 (MCS0)	2.92	11.0	-8.08	Pass
	5310	62	n (40MHz)	13.5/15 (MCS0)	3.23	11.0	-7.77	Pass
	5290	58	ac (80MHz)	29.3/32.5 (MCS0)	-1.98	11.0	-12.98	Pass
Band 2C	5500	100	a	6	6.52	11.0	-4.48	Pass
	5600	120	a	6	6.49	11.0	-4.51	Pass
	5720	144	a	6	6.55	11.0	-4.45	Pass
	5500	100	n (20MHz)	6.5/7.2 (MCS0)	6.13	11.0	-4.87	Pass
	5600	120	n (20MHz)	6.5/7.2 (MCS0)	6.06	11.0	-4.94	Pass
	5720	144	n (20MHz)	6.5/7.2 (MCS0)	6.25	11.0	-4.75	Pass
	5510	102	n (40MHz)	13.5/15 (MCS0)	3.27	11.0	-7.73	Pass
	5590	118	n (40MHz)	13.5/15 (MCS0)	3.10	11.0	-7.90	Pass
	5710	142	n (40MHz)	13.5/15 (MCS0)	3.27	11.0	-7.73	Pass
	5530	106	ac (80MHz)	29.3/32.5 (MCS0)	-2.11	11.0	-13.11	Pass
	5610	122	ac (80MHz)	29.3/32.5 (MCS0)	-2.37	11.0	-13.37	Pass
	5690	138	ac (80MHz)	29.3/32.5 (MCS0)	-5.13	11.0	-16.13	Pass

Table 7-19. Conducted Power Spectral Density Measurements

FCC ID: A3LSMG930W8		FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)		Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 89 of 261

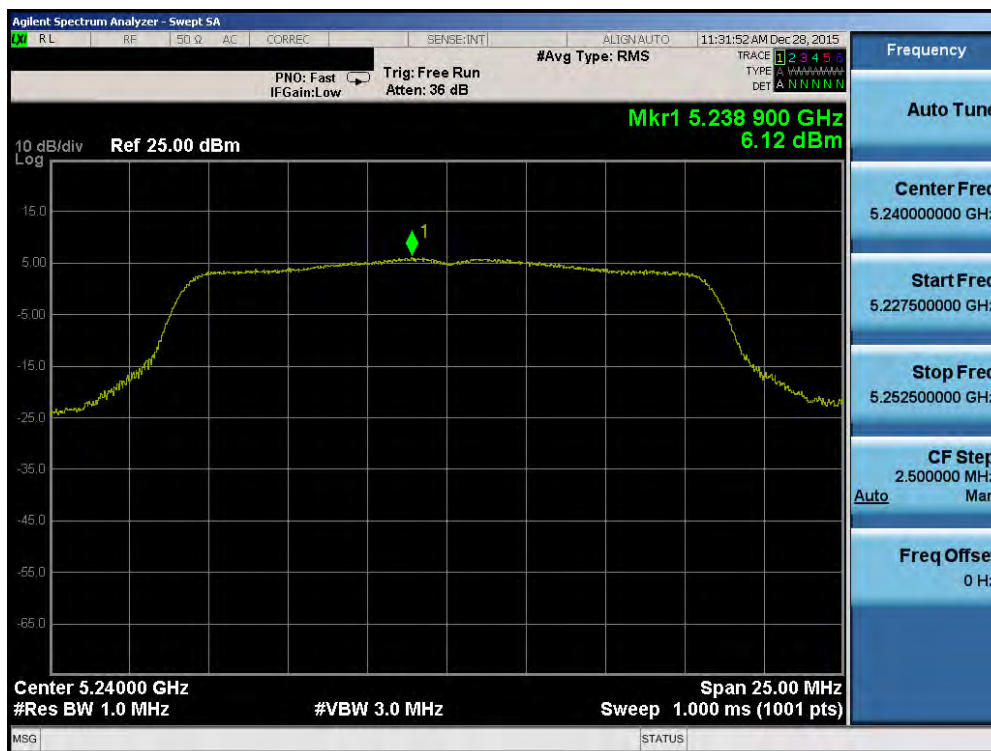


Plot 7-118. Power Spectral Density Plot (802.11a (UNII Band 1) – Ch. 36)

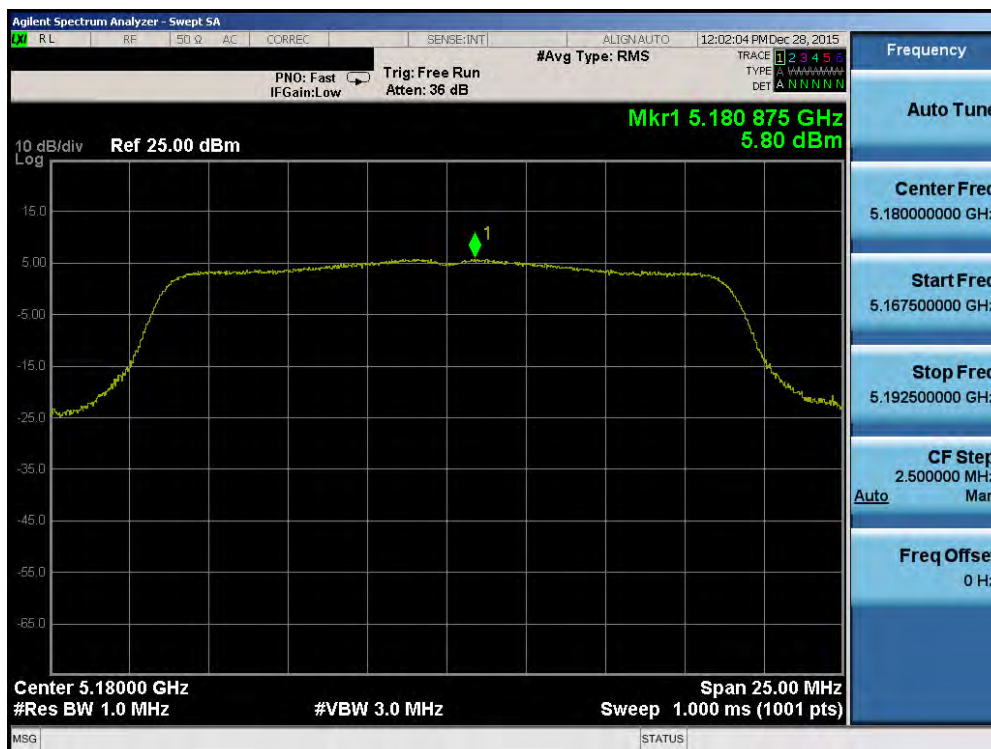


Plot 7-119. Power Spectral Density Plot (802.11a (UNII Band 1) – Ch. 40)

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 90 of 261

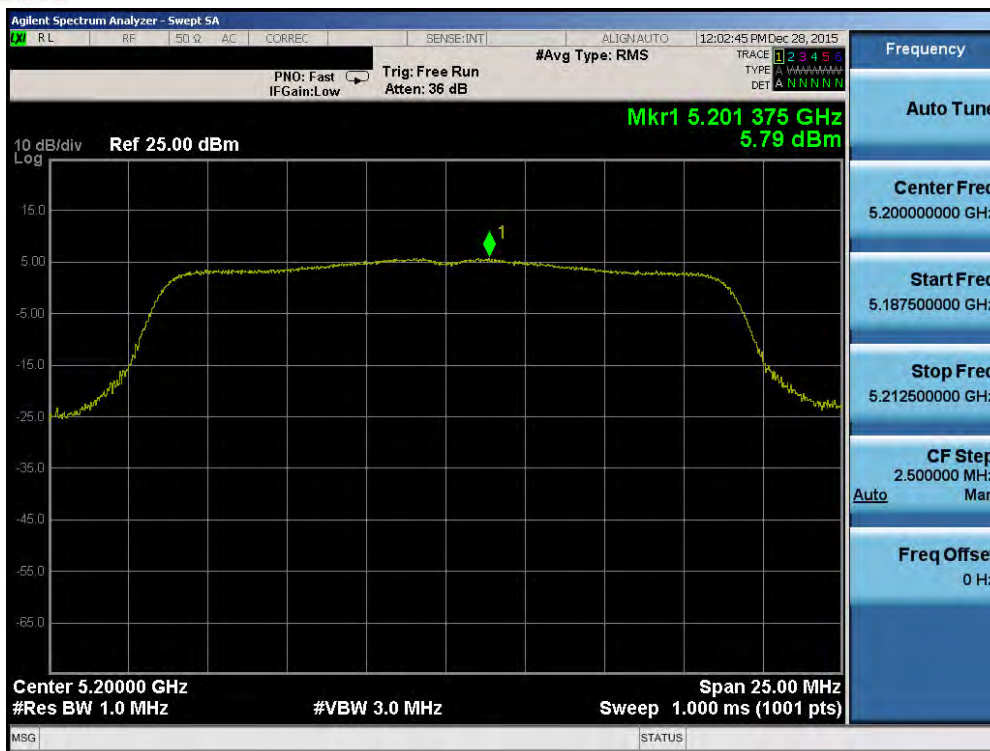


Plot 7-120. Power Spectral Density Plot (802.11a (UNII Band 1) – Ch. 48)

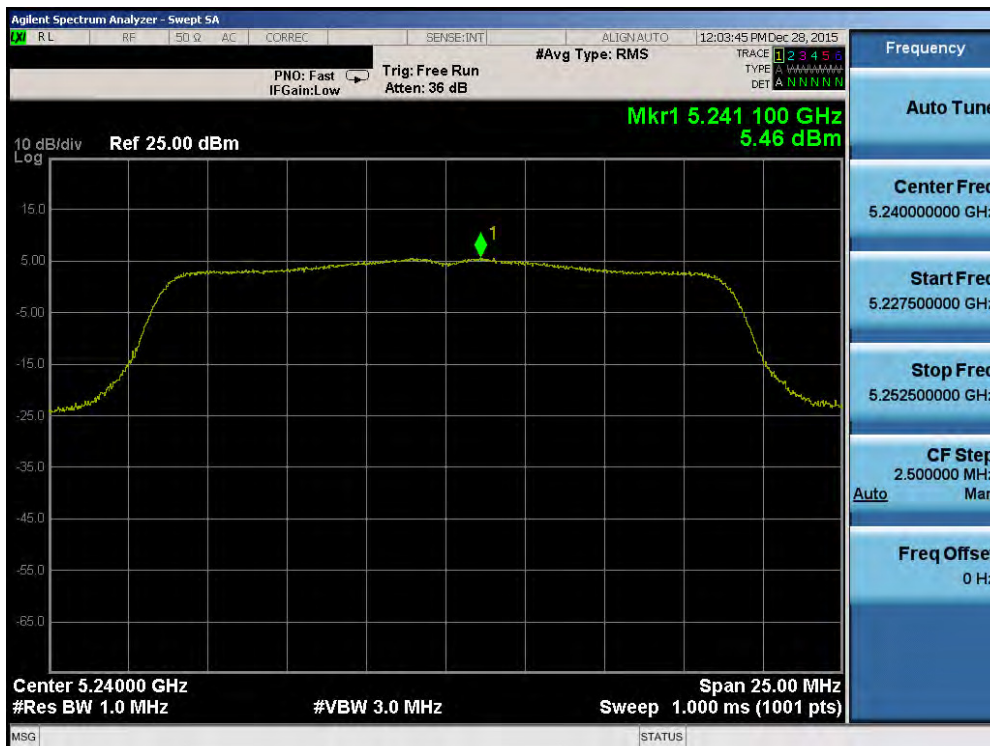


Plot 7-121. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 1) – Ch. 36)

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 91 of 261

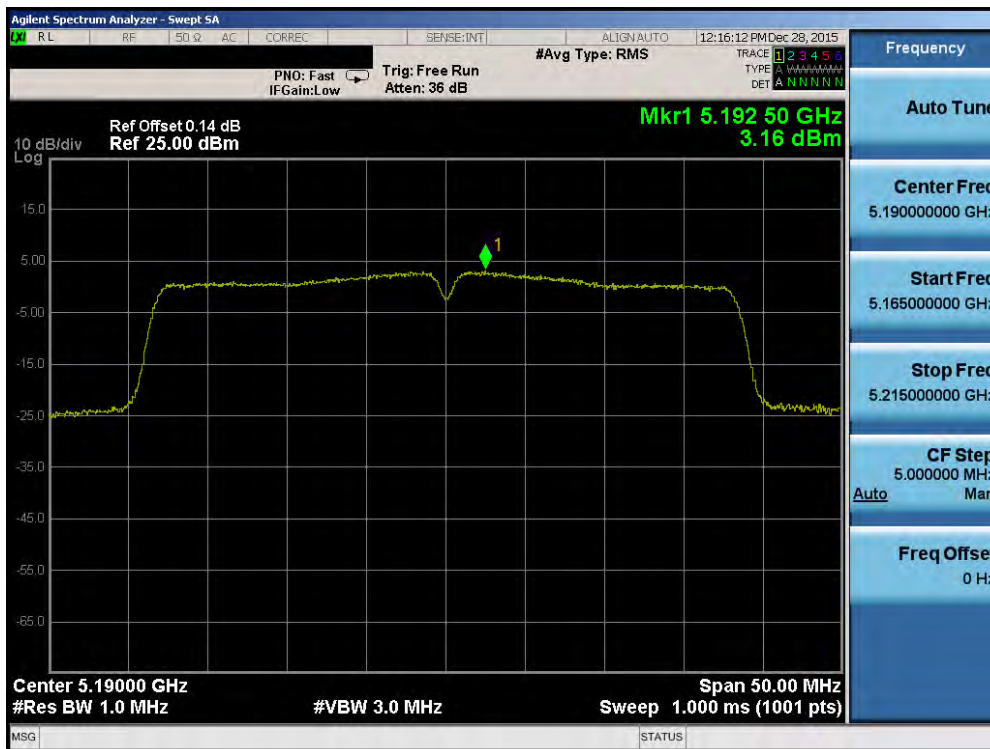


Plot 7-122. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 1) – Ch. 40)



Plot 7-123. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 1) – Ch. 48)

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 92 of 261

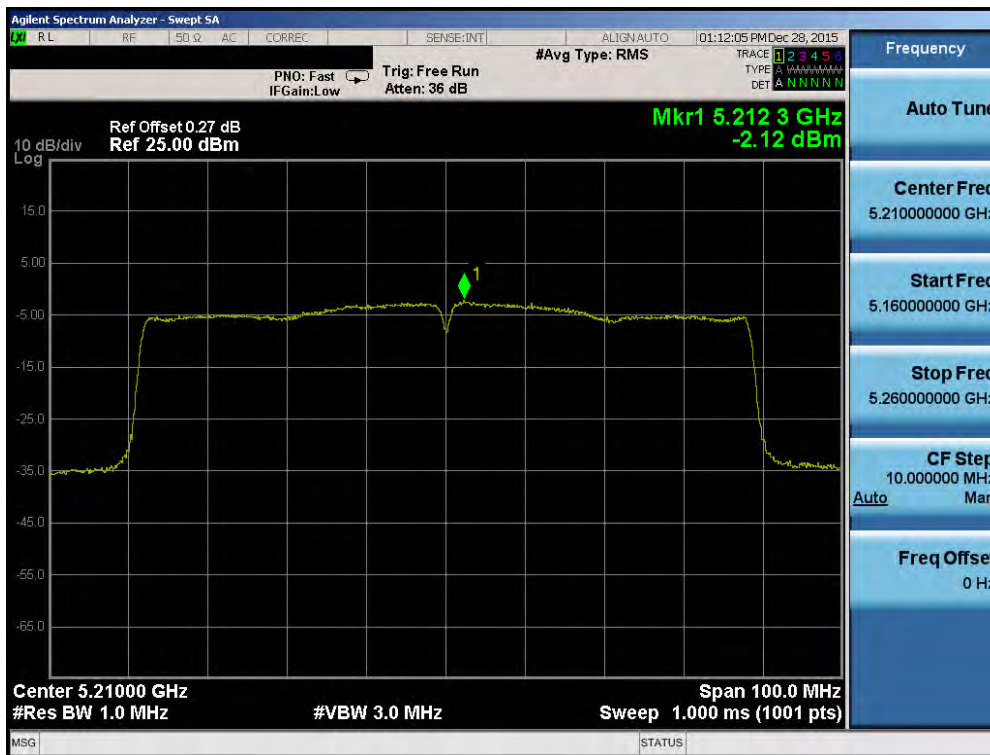


Plot 7-124. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 1) – Ch. 38)

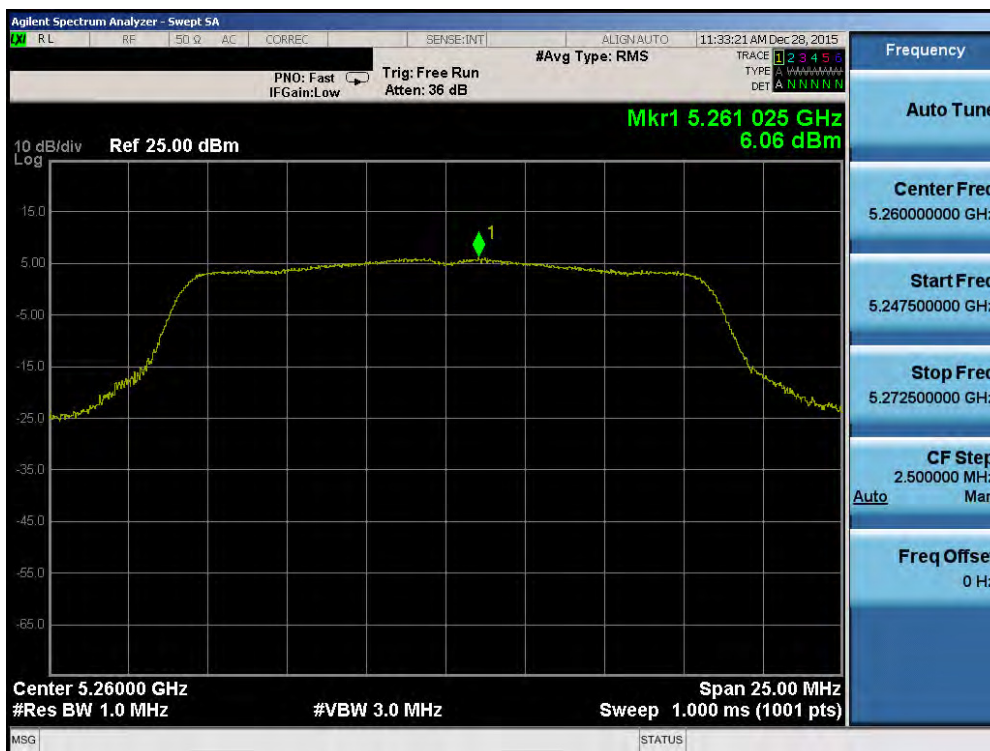


Plot 7-125. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 1) – Ch. 46)

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 93 of 261

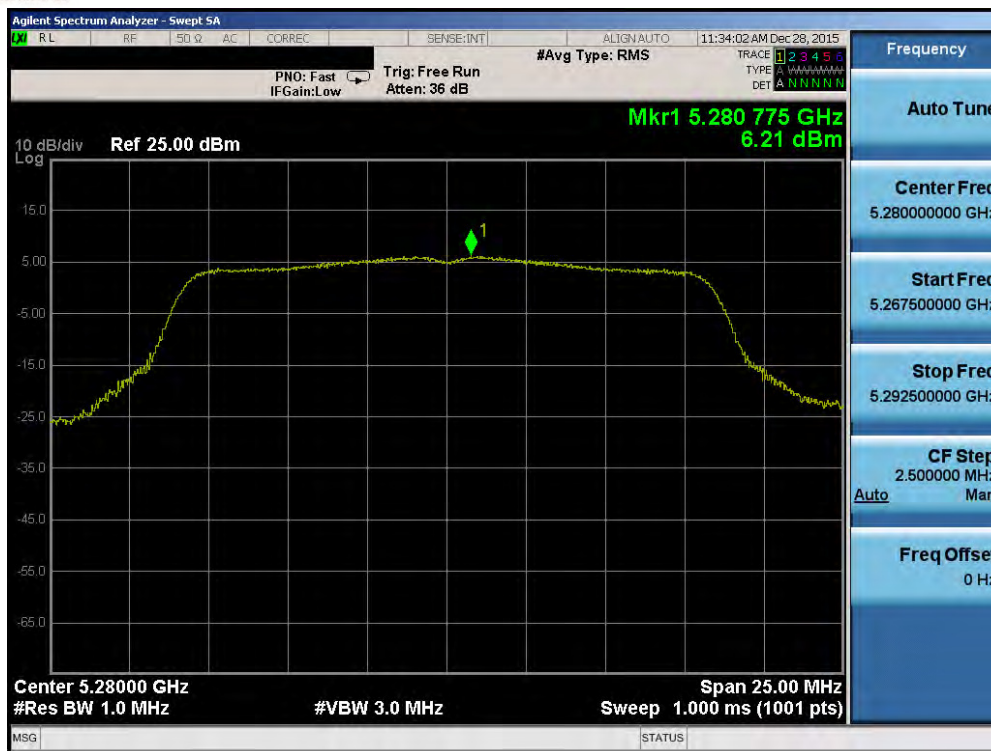


Plot 7-126. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 1) – Ch. 42)

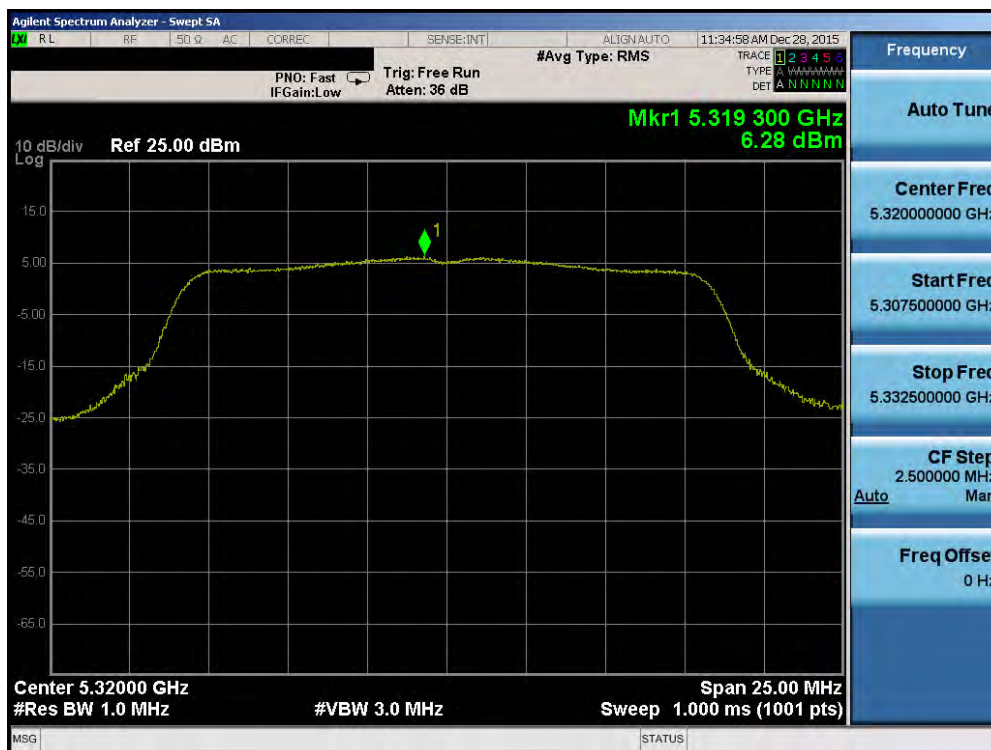


Plot 7-127. Power Spectral Density Plot (802.11a (UNII Band 2A) – Ch. 52)

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 94 of 261

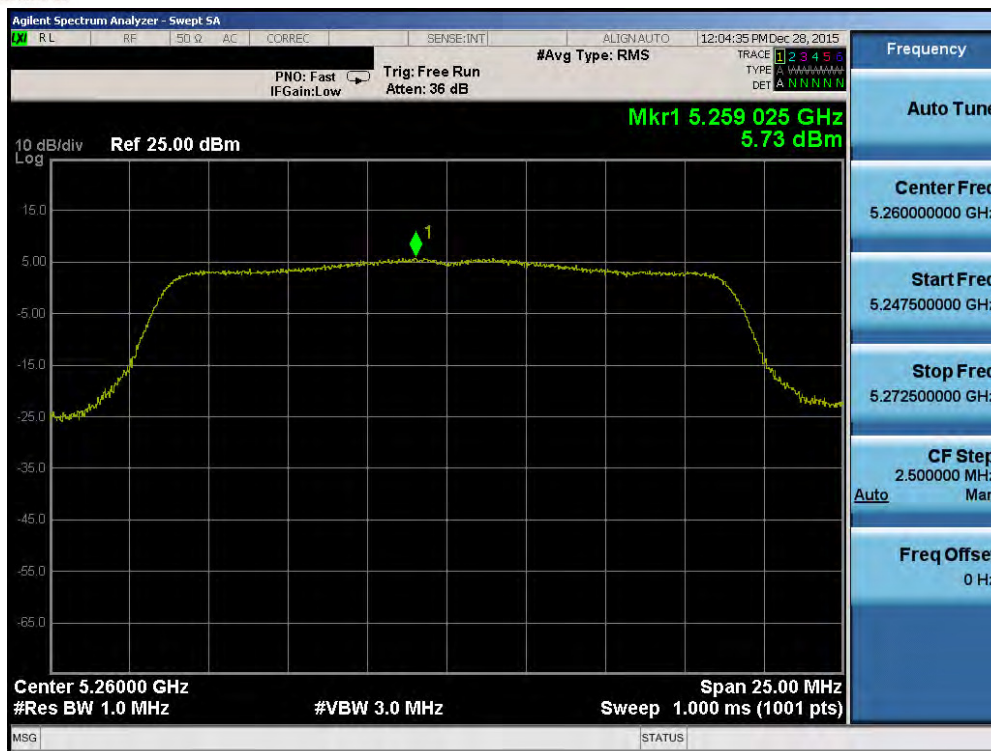


Plot 7-128. Power Spectral Density Plot (802.11a (UNII Band 2A) – Ch. 56)

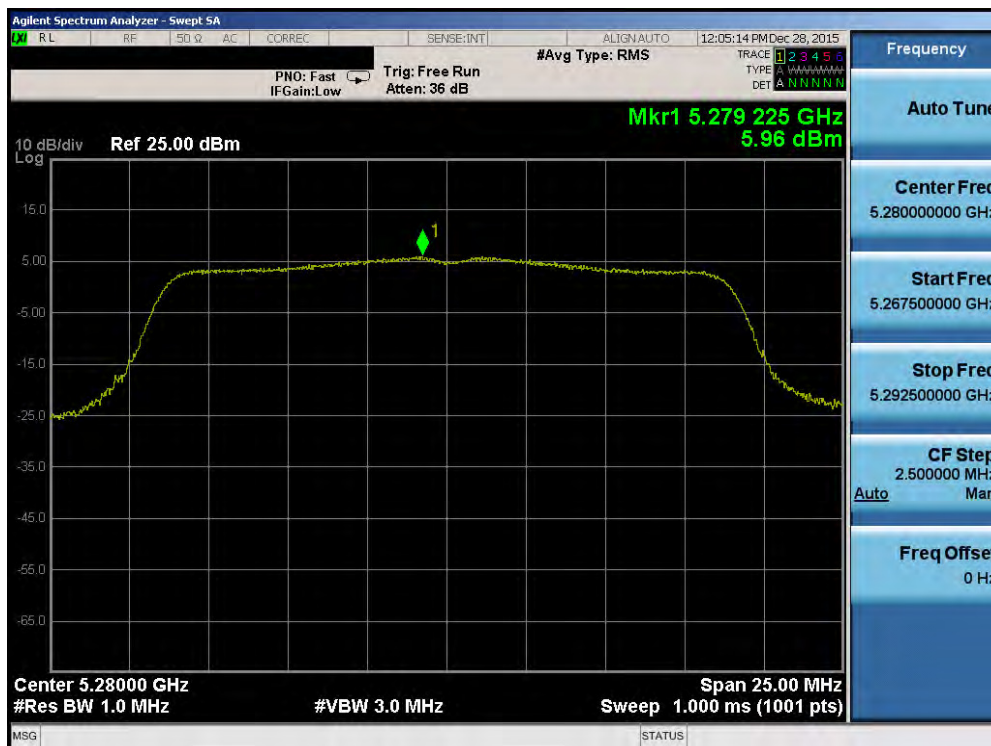


Plot 7-129. Power Spectral Density Plot (802.11a (UNII Band 2A) – Ch. 64)

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 95 of 261

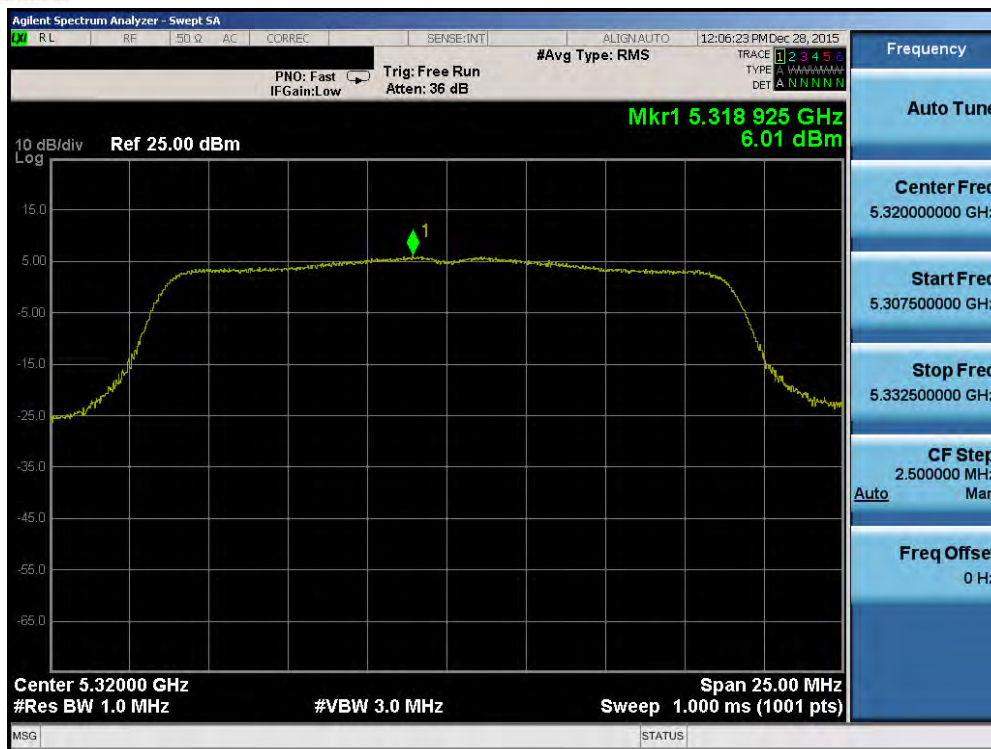


Plot 7-130. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 2A) – Ch. 52)

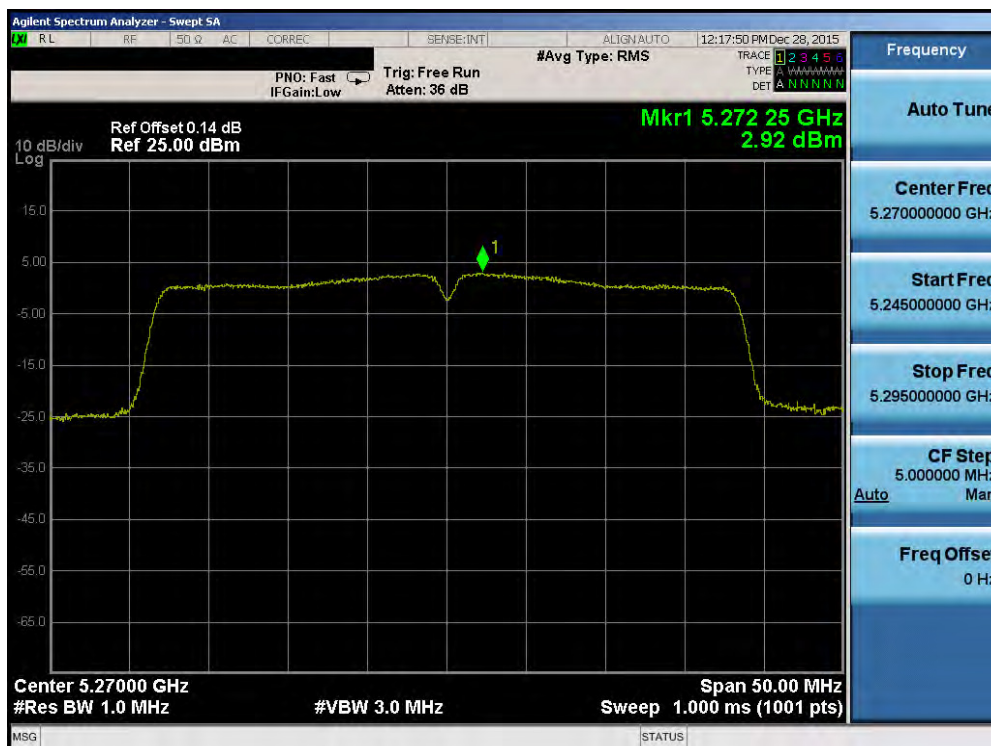


Plot 7-131. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 2A) – Ch. 56)

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 96 of 261

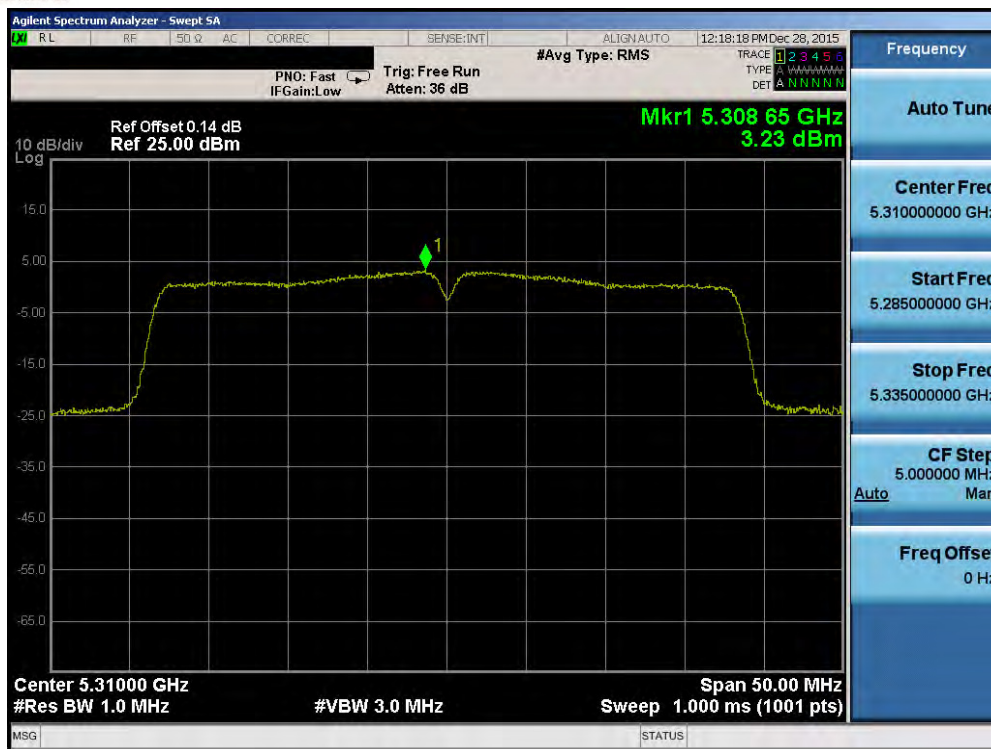


Plot 7-132. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 2A) – Ch. 64)

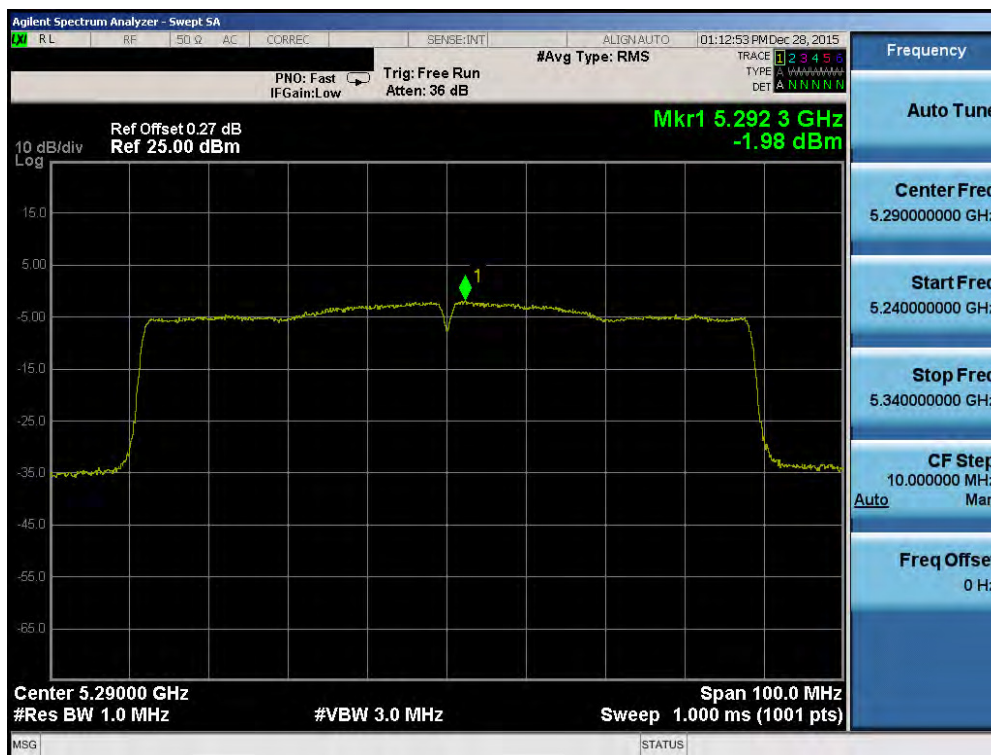


Plot 7-133. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 2A) – Ch. 54)

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 97 of 261

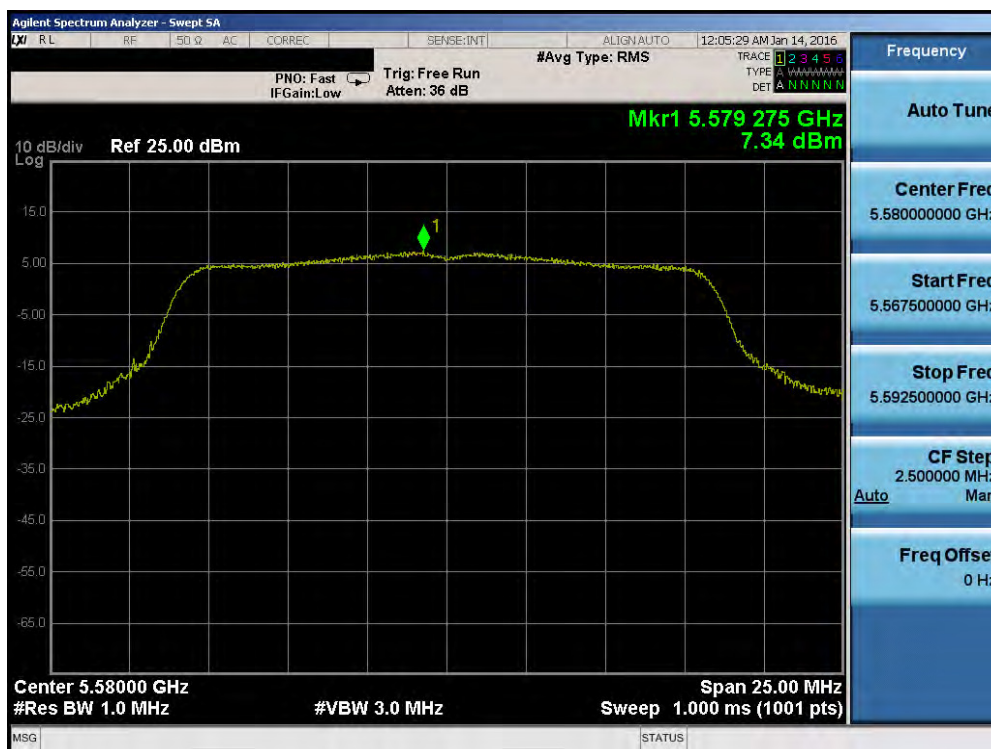
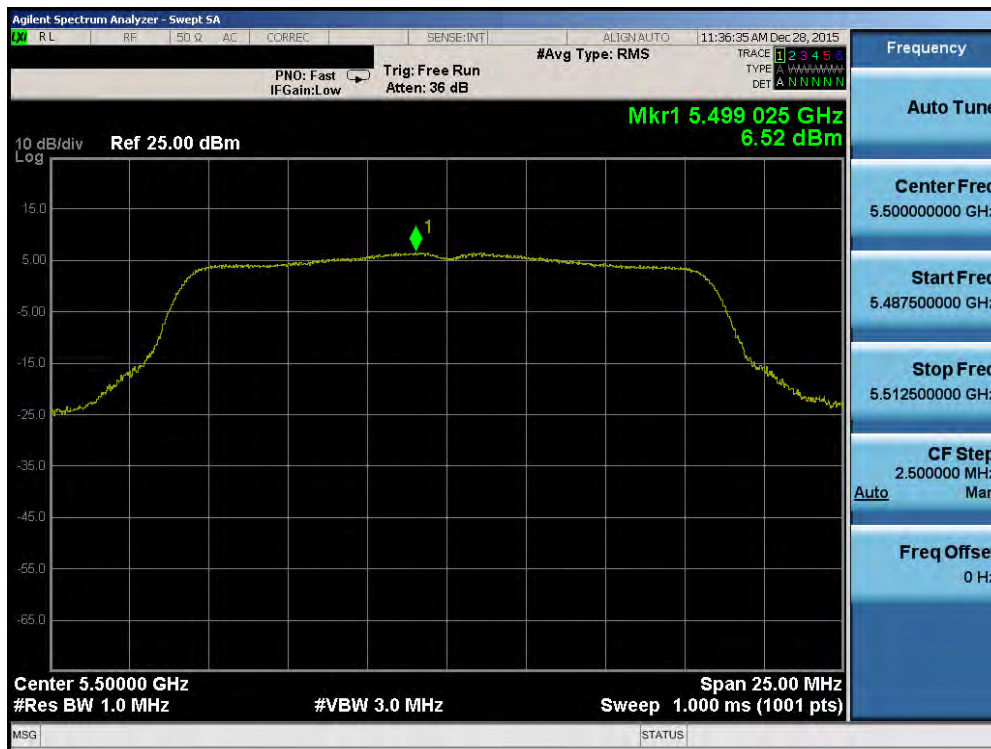


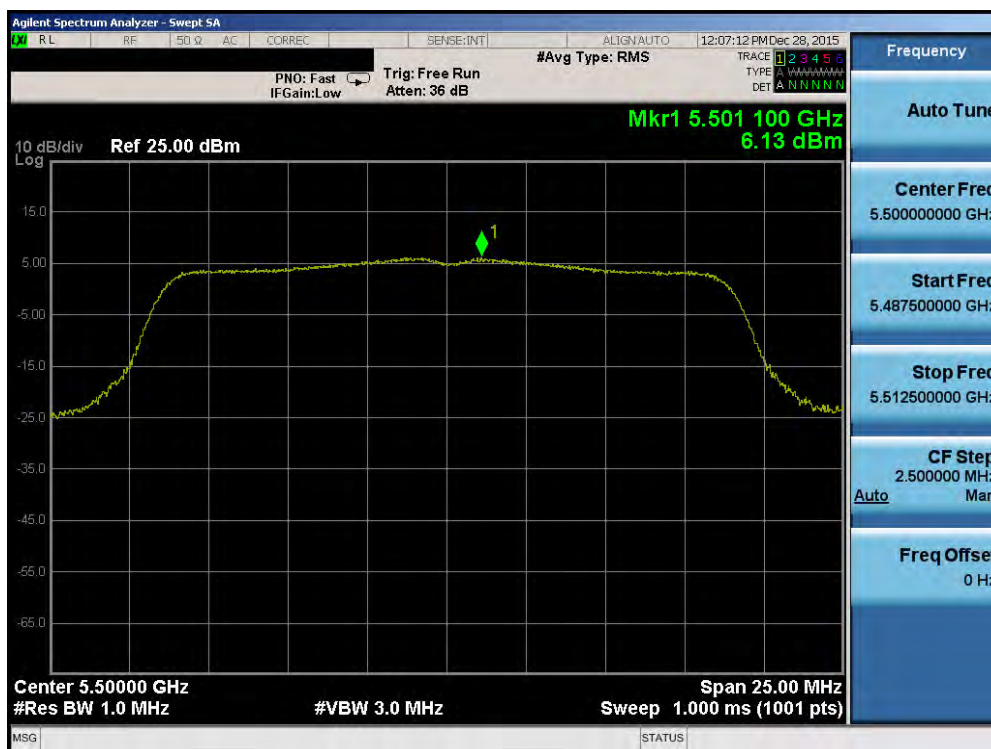
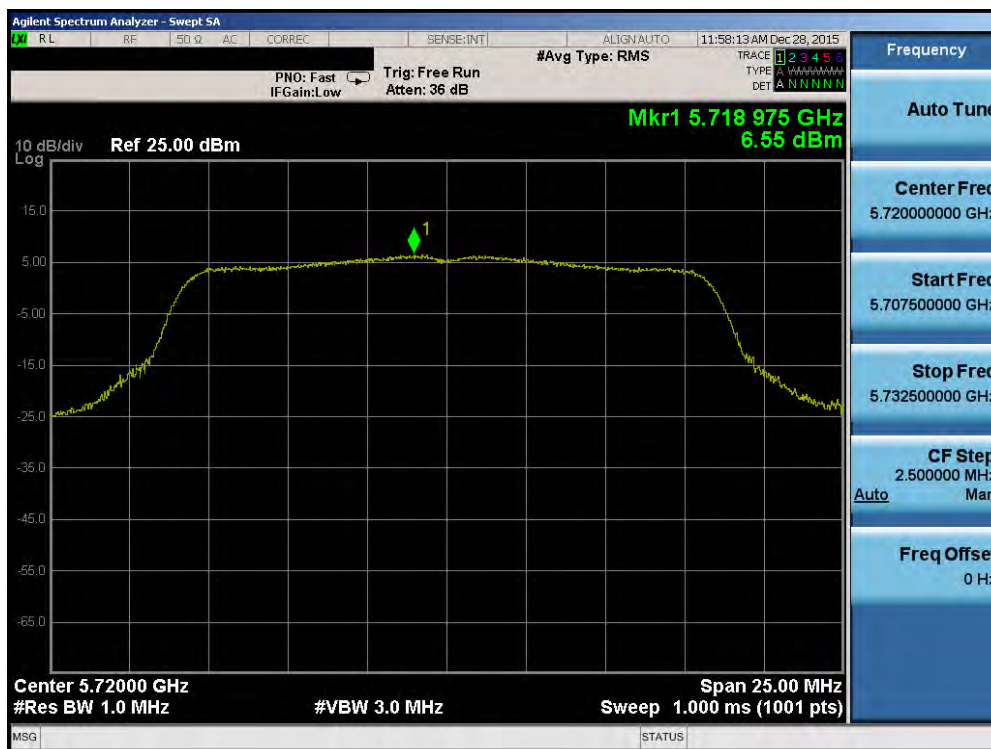
Plot 7-134. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 2A) – Ch. 62)

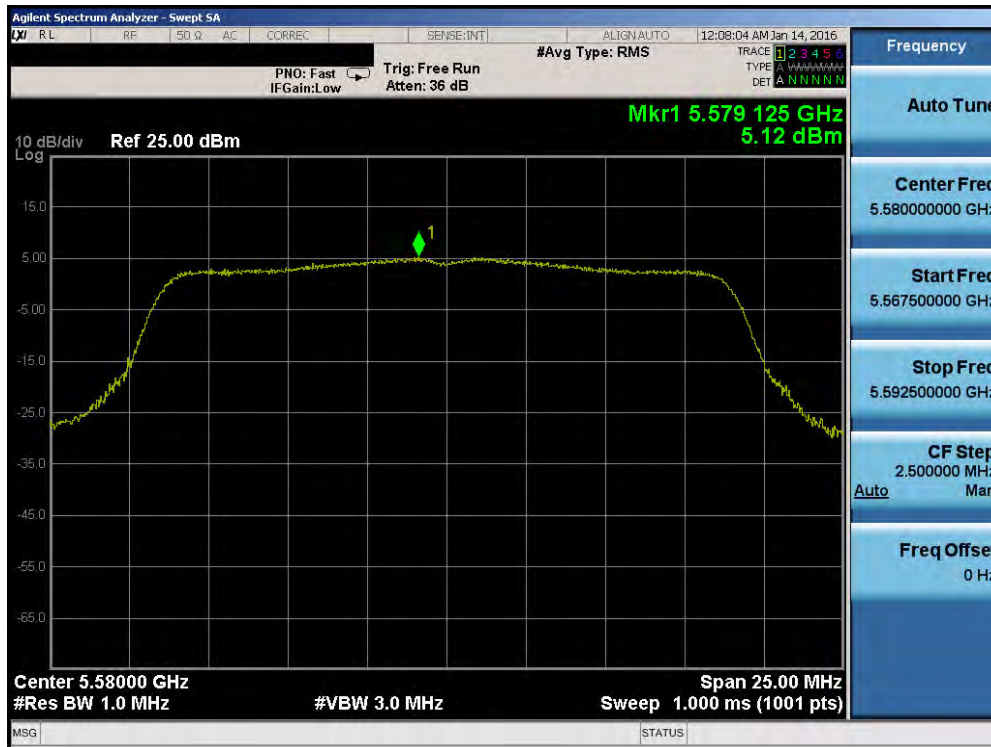


Plot 7-135. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 2A) – Ch. 58)

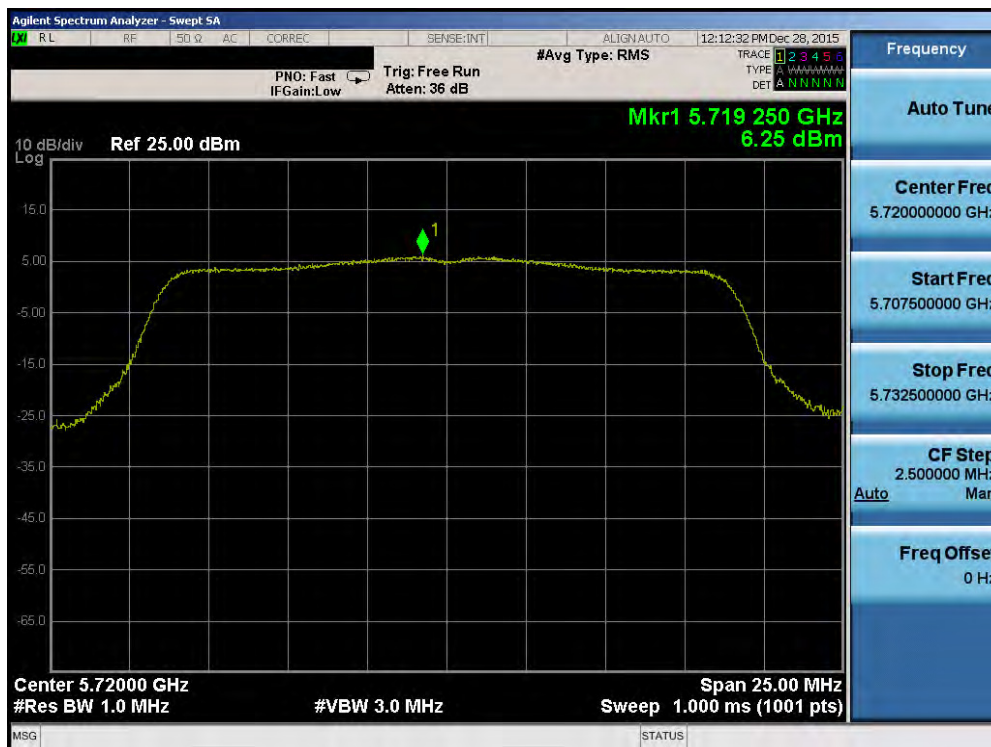
FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 98 of 261





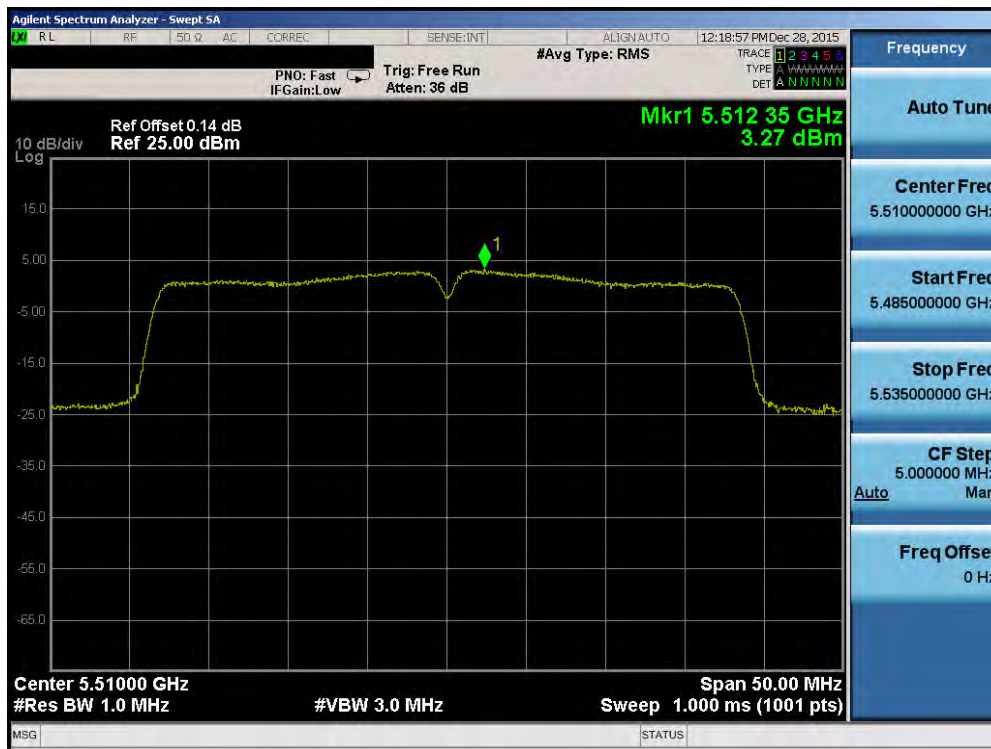


Plot 7-140. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 2C) – Ch. 120)

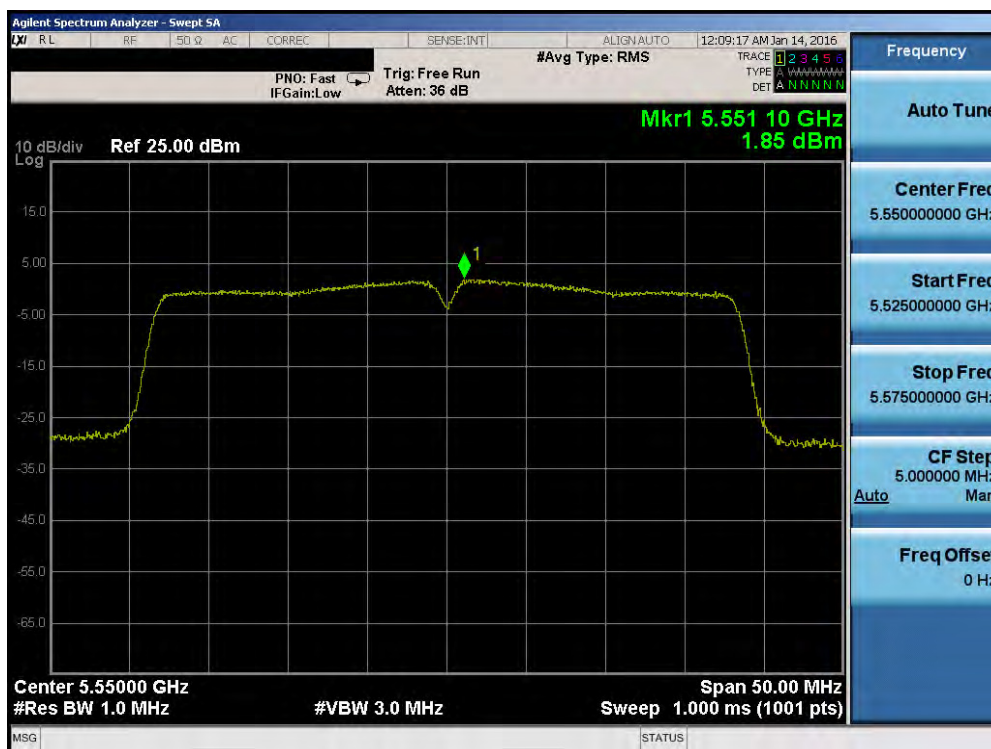


Plot 7-141. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 2C) – Ch. 144)

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 101 of 261

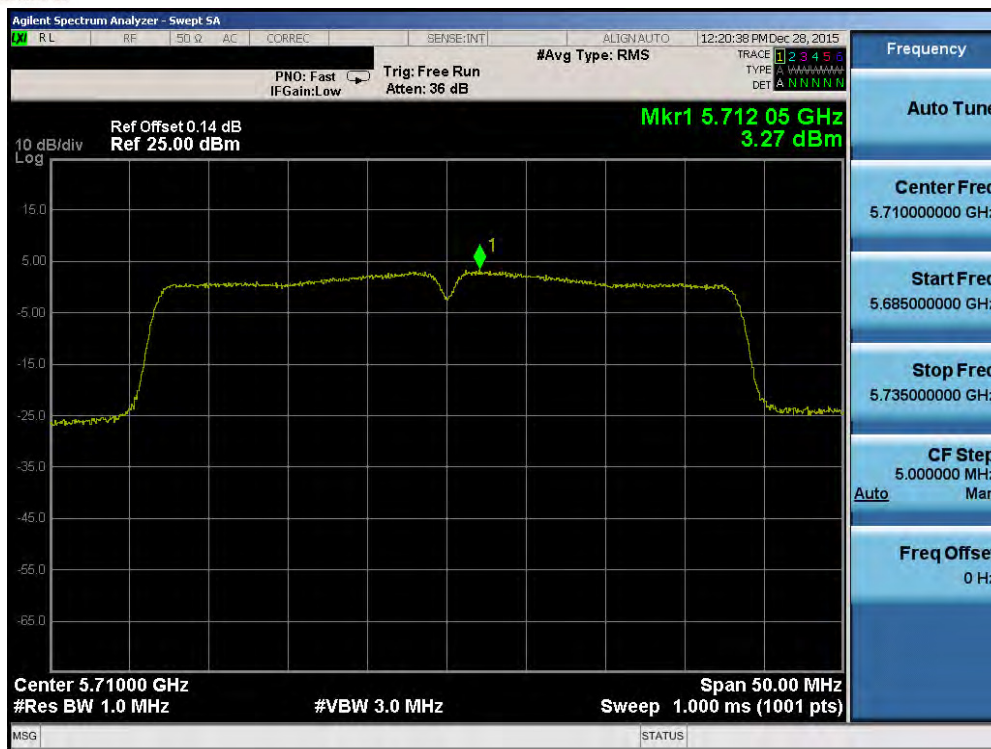


Plot 7-142. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 2C) – Ch. 102)

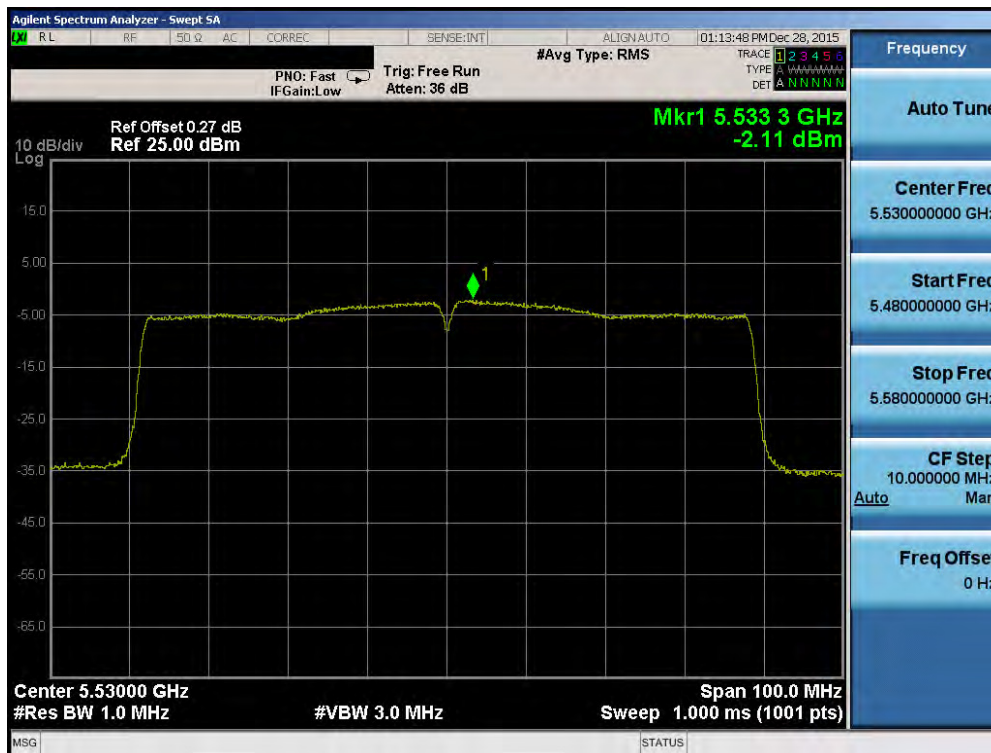


Plot 7-143. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 2C) – Ch. 118)

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Plot 7-144. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 2C) – Ch. 142)



Plot 7-145. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 2C) – Ch. 106)

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 103 of 261

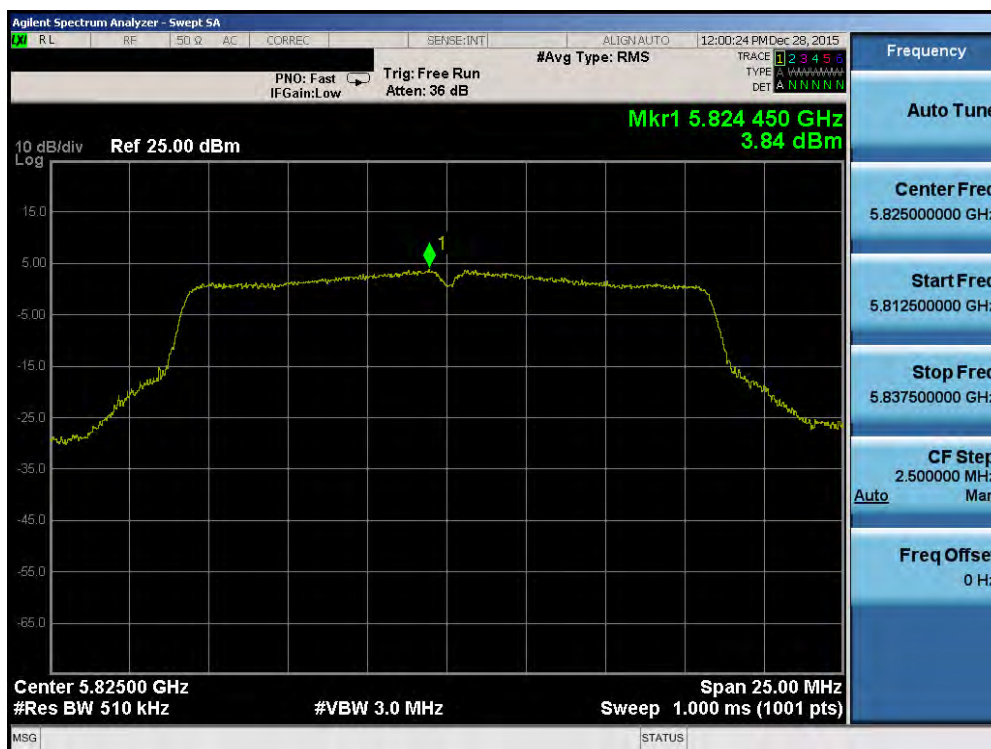
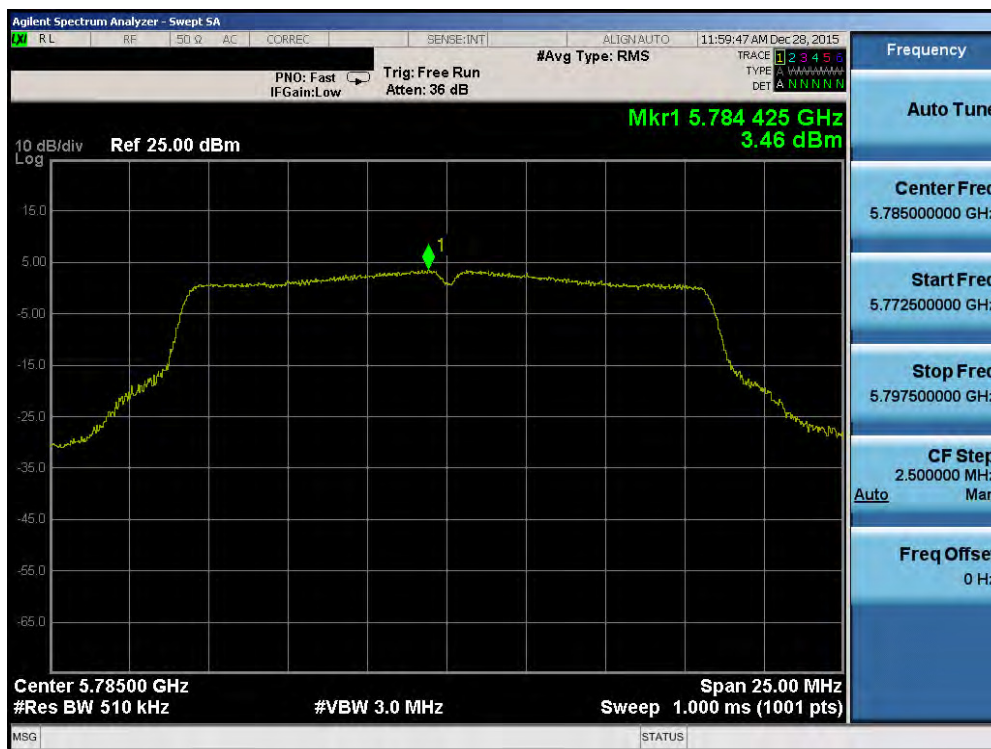


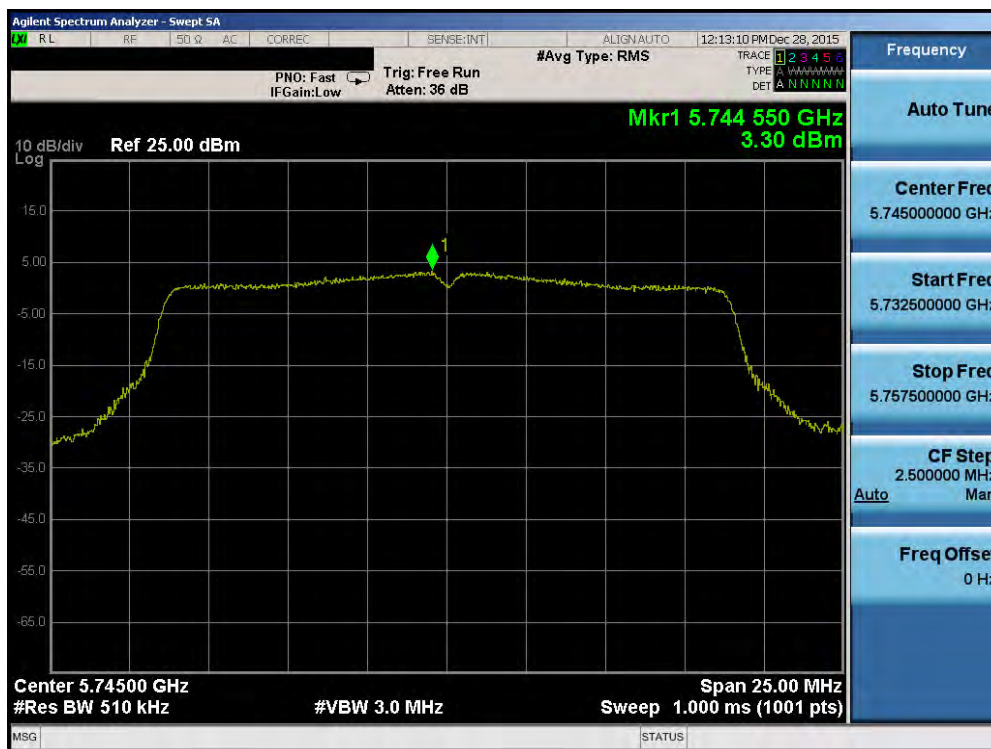
Plot 7-146. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 2C) – Ch. 122)



Plot 7-147. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 2C) – Ch. 138)

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 104 of 261



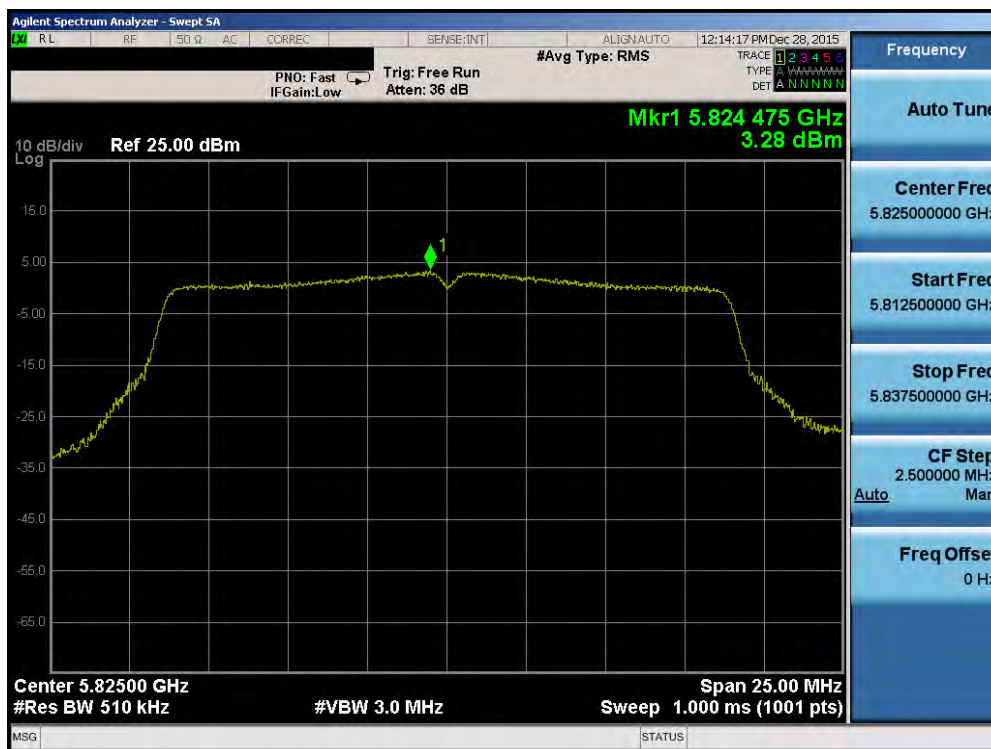


Plot 7-151. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 149)



Plot 7-152. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 157)

FCC ID: A3LSMG930W8	  		Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset	Page 107 of 261

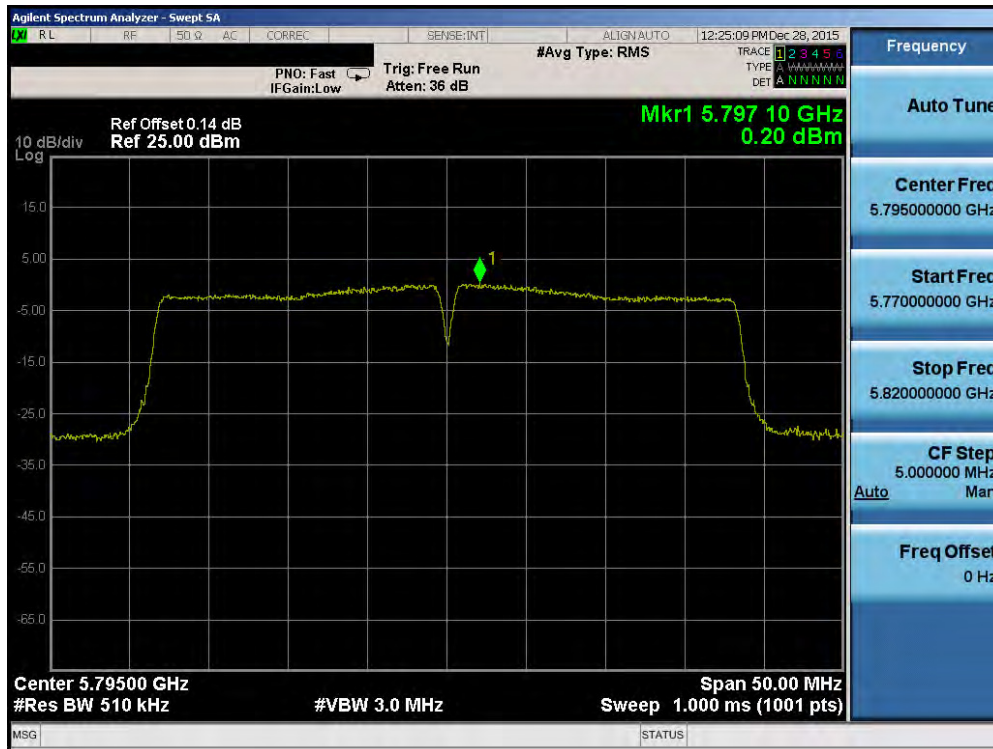


Plot 7-153. Power Spectral Density Plot (20MHz BW 802.11n (UNII Band 3) – Ch. 165)

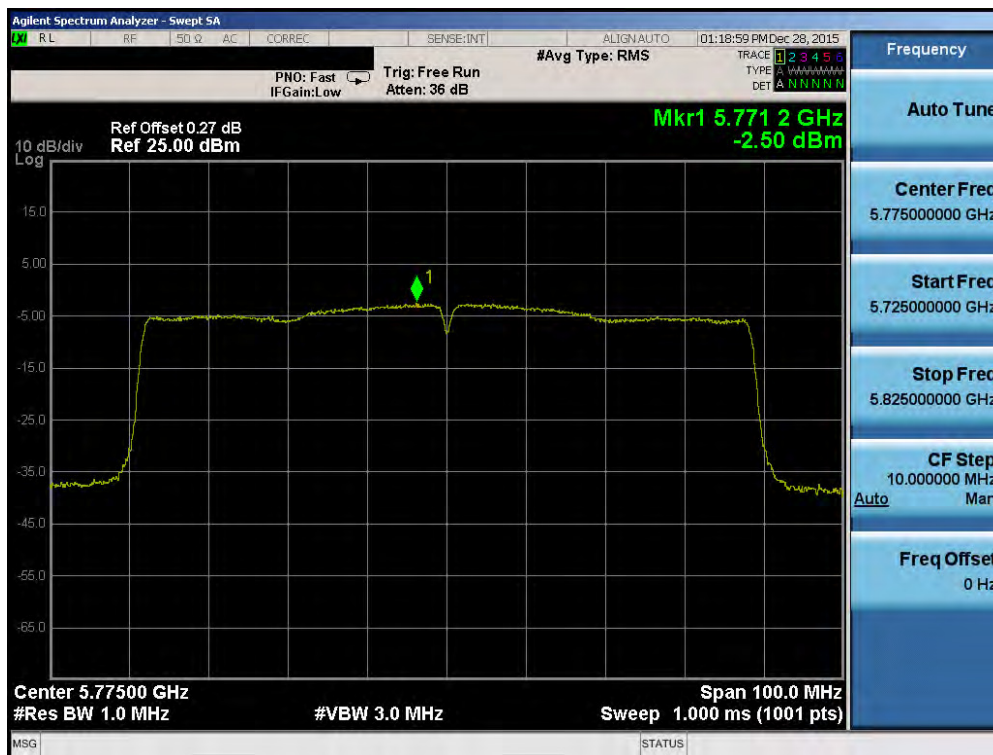


Plot 7-154. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 3) – Ch. 151)

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
Test Report S/N: 0Y1512232221.A3L	Test Dates: 12/22/2015-1/11/2016, 1/15/2016	EUT Type: Portable Handset		Page 108 of 261



Plot 7-155. Power Spectral Density Plot (40MHz BW 802.11n (UNII Band 3) – Ch. 159)



Plot 7-156. Power Spectral Density Plot (80MHz BW 802.11ac (UNII Band 3) – Ch. 155)

FCC ID: A3LSMG930W8	PCTEST ENGINEERING LABORATORY, INC.	FCC Pt. 15.407 802.11a/n/ac UNII MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Reviewed by: Quality Manager
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Summed MIMO Power Spectral Density Measurements

	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Antenn-1 Power Density [dBm]	Antenn-2 Power Density [dBm]	Summed MIMO Power Density [dBm]	Max Permissible Power Density [dBm/MHz]	Margin [dB]	Pass / Fail
Band 1	5180	36	n (20MHz)	6.5/7.2 (MCS0)	5.63	5.80	8.72	11.0	-2.28	Pass
	5200	40	n (20MHz)	6.5/7.2 (MCS0)	5.93	5.79	8.87	11.0	-2.13	Pass
	5240	48	n (20MHz)	6.5/7.2 (MCS0)	6.23	5.46	8.88	11.0	-2.12	Pass
	5190	38	n (40MHz)	13.5/15 (MCS0)	3.19	3.16	6.18	11.0	-4.82	Pass
	5230	46	n (40MHz)	13.5/15 (MCS0)	3.54	2.79	6.19	11.0	-4.81	Pass
	5210	42	ac (80MHz)	29.3/32.5 (MCS0)	0.19	-2.12	2.20	11.0	-8.80	Pass
Band 2A	5260	52	n (20MHz)	6.5/7.2 (MCS0)	6.19	5.73	8.98	11.0	-2.02	Pass
	5280	56	n (20MHz)	6.5/7.2 (MCS0)	5.93	5.96	8.96	11.0	-2.04	Pass
	5320	64	n (20MHz)	6.5/7.2 (MCS0)	6.43	6.01	9.24	11.0	-1.76	Pass
	5270	54	n (40MHz)	13.5/15 (MCS0)	3.30	2.92	6.12	11.0	-4.88	Pass
	5310	62	n (40MHz)	13.5/15 (MCS0)	3.54	3.23	6.40	11.0	-4.60	Pass
	5290	58	ac (80MHz)	29.3/32.5 (MCS0)	0.29	-1.98	2.32	11.0	-8.68	Pass
Band 2C	5500	100	n (20MHz)	6.5/7.2 (MCS0)	6.59	6.13	9.38	11.0	-1.62	Pass
	5600	120	n (20MHz)	6.5/7.2 (MCS0)	6.38	6.06	9.24	11.0	-1.76	Pass
	5720	144	n (20MHz)	6.5/7.2 (MCS0)	6.13	6.25	9.20	11.0	-1.80	Pass
	5510	102	n (40MHz)	13.5/15 (MCS0)	3.86	3.27	6.59	11.0	-4.41	Pass
	5590	118	n (40MHz)	13.5/15 (MCS0)	3.75	3.10	6.45	11.0	-4.55	Pass
	5710	142	n (40MHz)	13.5/15 (MCS0)	3.39	3.27	6.34	11.0	-4.66	Pass
	5530	106	ac (80MHz)	29.3/32.5 (MCS0)	0.39	-2.11	2.33	11.0	-8.67	Pass
	5610	122	ac (80MHz)	29.3/32.5 (MCS0)	-0.10	-2.37	1.92	11.0	-9.08	Pass
	5690	138	ac (80MHz)	29.3/32.5 (MCS0)	-2.84	-5.13	-0.83	11.0	-11.83	Pass

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

	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Antenn-1 Power Density [dBm]	Antenn-2 Power Density [dBm]	Summed MIMO Power Density [dBm]	Max Permissible Power Density [dBm/500kHz]	Margin [dB]	Pass / Fail
Band 3	5745	149	n (20MHz)	6.5/7.2 (MCS0)	3.29	3.30	6.31	30.0	-23.69	Pass
	5785	157	n (20MHz)	6.5/7.2 (MCS0)	3.59	3.43	6.52	30.0	-23.48	Pass
	5825	165	n (20MHz)	6.5/7.2 (MCS0)	3.19	3.28	6.25	30.0	-23.75	Pass
	5755	151	n (40MHz)	13.5/15 (MCS0)	0.33	0.47	3.41	30.0	-26.59	Pass
	5795	159	n (40MHz)	13.5/15 (MCS0)	0.82	0.20	3.53	30.0	-26.47	Pass
	5775	155	ac (80MHz)	29.3/32.5 (MCS0)	-0.17	-2.50	1.83	30.0	-28.17	Pass

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

Note:

Per KDB 662911 v02r01 Section E)2), the power spectral density at Antenna 1 and Antenna 2 were first measured separately 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 the average conducted power spectral density was measured to be 5.63 dBm for Antenna-1 and 5.80 dBm for Antenna-2.

$$\text{Antenna 1} + \text{Antenna 2} = \text{MIMO}$$

$$(5.63 \text{ dBm} + 5.80 \text{ dBm}) = (3.65 \text{ mW} + 3.80 \text{ mW}) = 7.45 \text{ mW} = 8.72 \text{ dBm}$$

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7.6 Frequency Stability

§15.407(g)

The EUT was placed inside of an environmental chamber as the temperature in the chamber was varied between -30°C and +50°C. The temperature was incremented by 10° intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded. Data for the worst case channel is shown below.

OPERATING FREQUENCY: 5,180,000,000 Hz
 CHANNEL: 36
 REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	5,180,000,223	223	0.00000431
100 %		- 30	5,180,000,020	20	0.00000039
100 %		- 20	5,179,999,589	-411	-0.00000793
100 %		- 10	5,179,999,555	-445	-0.00000859
100 %		0	5,180,000,293	293	0.00000566
100 %		+ 10	5,180,000,095	95	0.00000183
100 %		+ 20	5,180,000,010	10	0.00000019
100 %		+ 30	5,179,999,959	-41	-0.00000079
100 %		+ 40	5,180,000,086	86	0.00000166
100 %		+ 50	5,179,999,745	-255	-0.00000492
BATT. ENDPOINT	3.45	+ 20	5,179,999,903	-97	-0.00000187

Table 7-23. Frequency Stability Measurements for UNII Band 1 (Ch. 36)

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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Frequency Stability

§15.407(g)

The EUT was placed inside of an environmental chamber as the temperature in the chamber was varied between -30°C and +50°C. The temperature was incremented by 10° intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded. Data for the worst case channel is shown below.

OPERATING FREQUENCY: 5,260,000,000 Hz
 CHANNEL: 52
 REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	5,259,999,742	-258	-0.00000490
100 %		- 30	5,259,999,971	-29	-0.00000055
100 %		- 20	5,259,999,796	-204	-0.00000388
100 %		- 10	5,260,000,220	220	0.00000418
100 %		0	5,260,000,069	69	0.00000131
100 %		+ 10	5,259,999,939	-61	-0.00000116
100 %		+ 20	5,260,000,162	162	0.00000308
100 %		+ 30	5,259,999,880	-120	-0.00000228
100 %		+ 40	5,260,000,385	385	0.00000732
100 %		+ 50	5,259,999,820	-180	-0.00000342
BATT. ENDPOINT	3.45	+ 20	5,259,999,849	-151	-0.00000287

Table 7-24. Frequency Stability Measurements for UNII Band 2A (Ch. 52)

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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Frequency Stability

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The EUT was placed inside of an environmental chamber as the temperature in the chamber was varied between -30°C and +50°C. The temperature was incremented by 10° intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded. Data for the worst case channel is shown below.

OPERATING FREQUENCY: 5,500,000,000 Hz
 CHANNEL: 100
 REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	5,499,999,723	-277	-0.00000504
100 %		- 30	5,499,999,827	-173	-0.00000315
100 %		- 20	5,499,999,790	-210	-0.00000382
100 %		- 10	5,499,999,727	-273	-0.00000496
100 %		0	5,499,999,849	-151	-0.00000275
100 %		+ 10	5,499,999,954	-46	-0.00000084
100 %		+ 20	5,499,999,885	-115	-0.00000209
100 %		+ 30	5,499,999,891	-109	-0.00000198
100 %		+ 40	5,500,000,099	99	0.00000180
100 %		+ 50	5,500,000,042	42	0.00000076
BATT. ENDPOINT	3.45	+ 20	5,499,999,888	-112	-0.00000204

Table 7-25. Frequency Stability Measurements for UNII Band 2C (Ch. 100)

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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Frequency Stability

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The EUT was placed inside of an environmental chamber as the temperature in the chamber was varied between -30°C and +50°C. The temperature was incremented by 10° intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded. Data for the worst case channel is shown below.

OPERATING FREQUENCY: 5,745,000,000 Hz

CHANNEL: 149

REFERENCE VOLTAGE: 3.85 VDC

VOLTAGE (%)	POWER (VDC)	TEMP (°C)	FREQUENCY (Hz)	Freq. Dev. (Hz)	Deviation (%)
100 %	3.85	+ 20 (Ref)	5,745,000,160	160	0.00000279
100 %		- 30	5,745,000,024	24	0.00000042
100 %		- 20	5,745,000,117	117	0.00000204
100 %		- 10	5,745,000,055	55	0.00000096
100 %		0	5,744,999,733	-267	-0.00000465
100 %		+ 10	5,745,000,175	175	0.00000305
100 %		+ 20	5,744,999,804	-196	-0.00000341
100 %		+ 30	5,745,000,119	119	0.00000207
100 %		+ 40	5,744,999,990	-10	-0.00000017
100 %		+ 50	5,744,999,673	-327	-0.00000569
BATT. ENDPOINT	3.45	+ 20	5,744,999,751	-249	-0.00000433

Table 7-26. Frequency Stability Measurements for UNII Band 3 (Ch. 149)

Note:

Based on the results of the frequency stability test shown above the frequency deviation results measured are very small. As such it is determined that the channels at the band edge would remain in-band when the maximum measured frequency deviation noted during the frequency stability tests is applied. Therefore the device is determined to remain operating in band over the temperature and voltage range as tested.

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