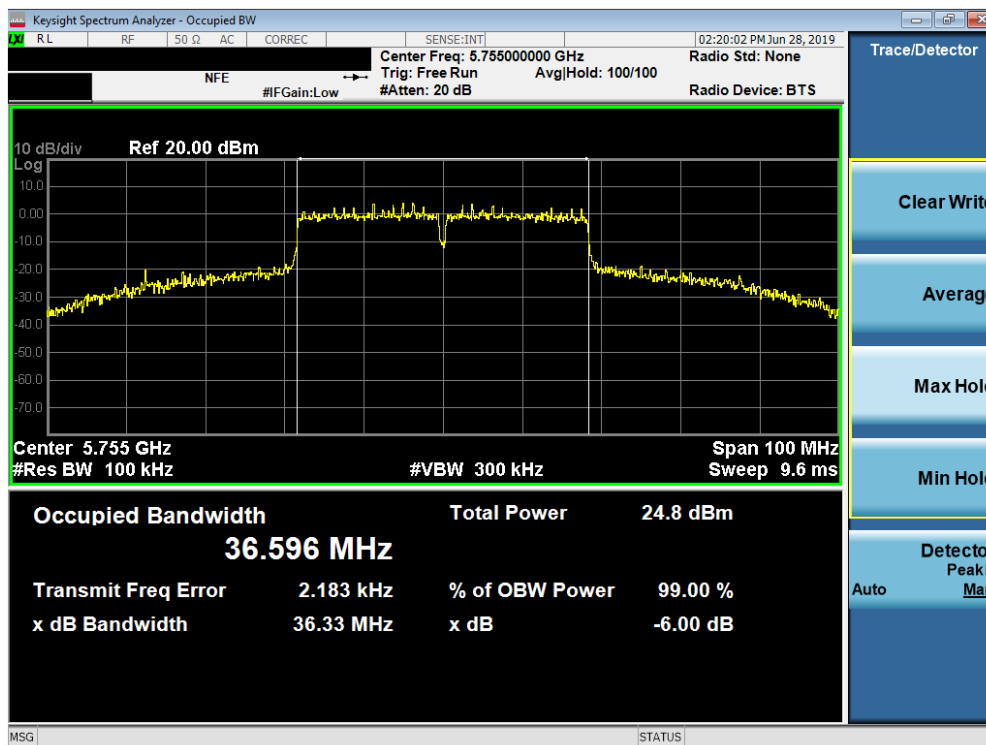
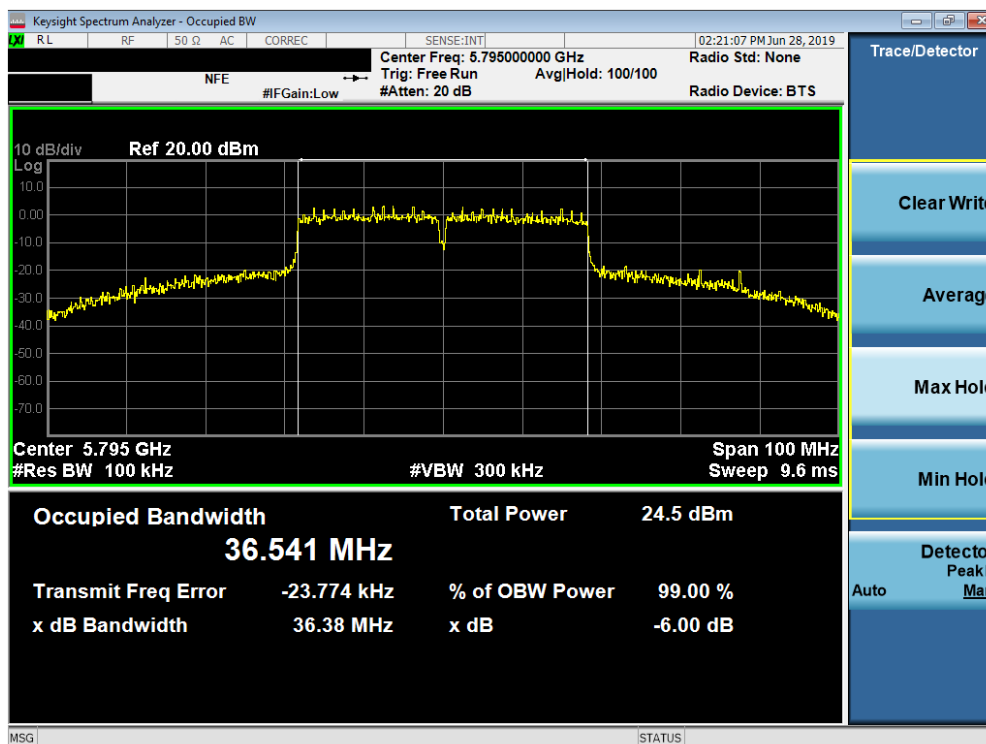


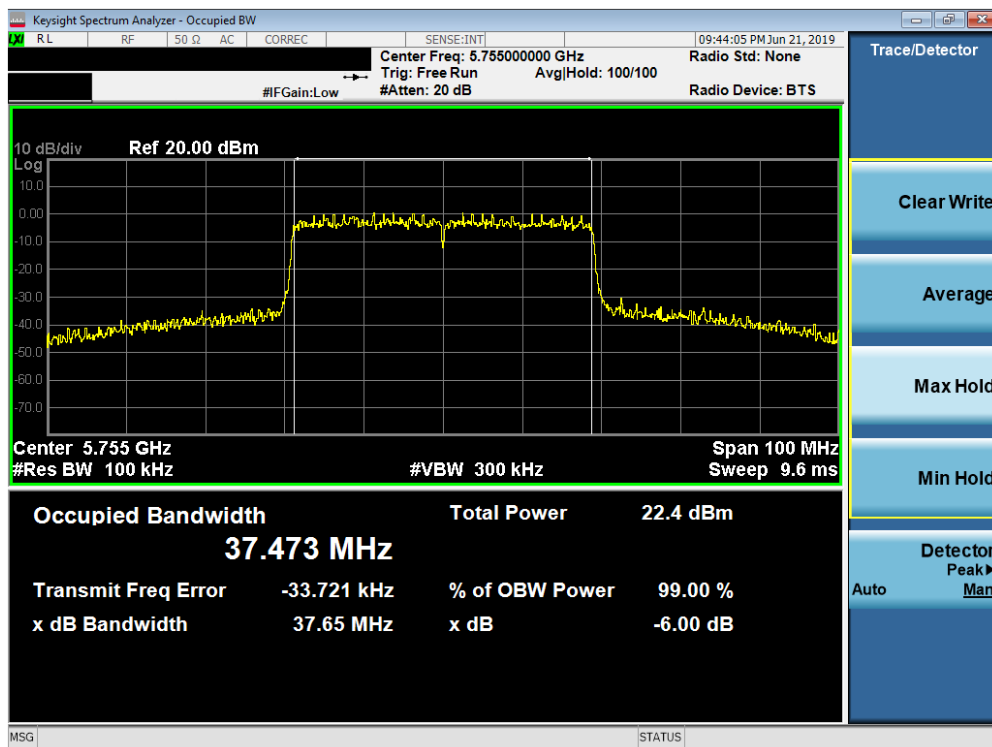


Plot 7-121. 6dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 3) – Ch. 151)

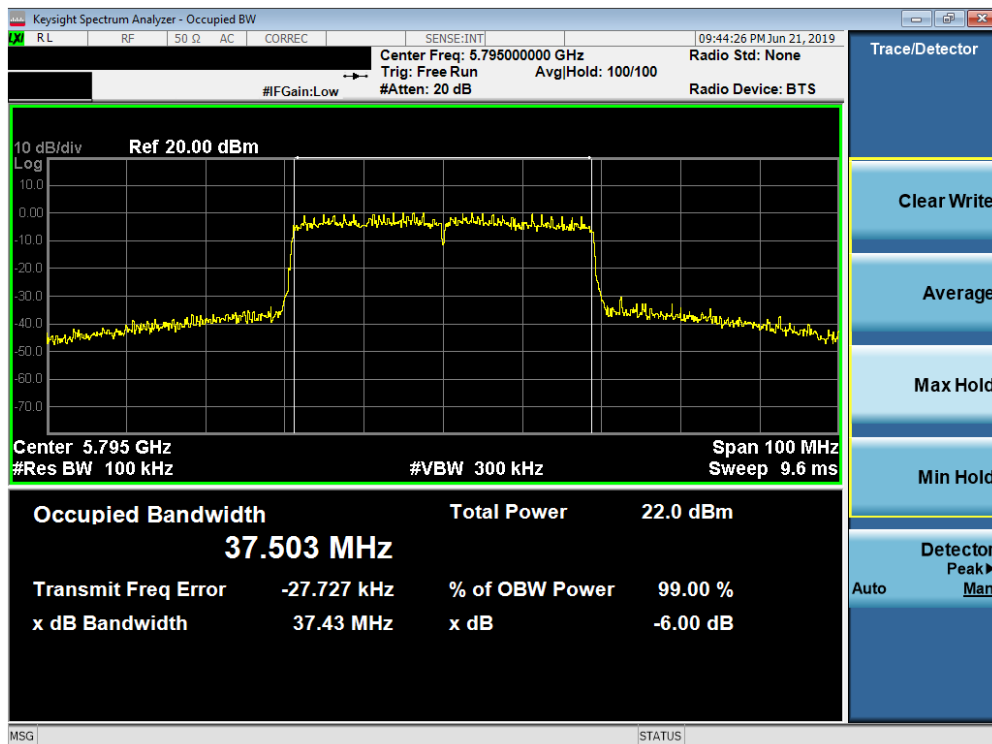


Plot 7-122. 6dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 3) – Ch. 159)

FCC ID: A3LSMN970U	MEASUREMENT REPORT (CERTIFICATION)			Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 83 of 247

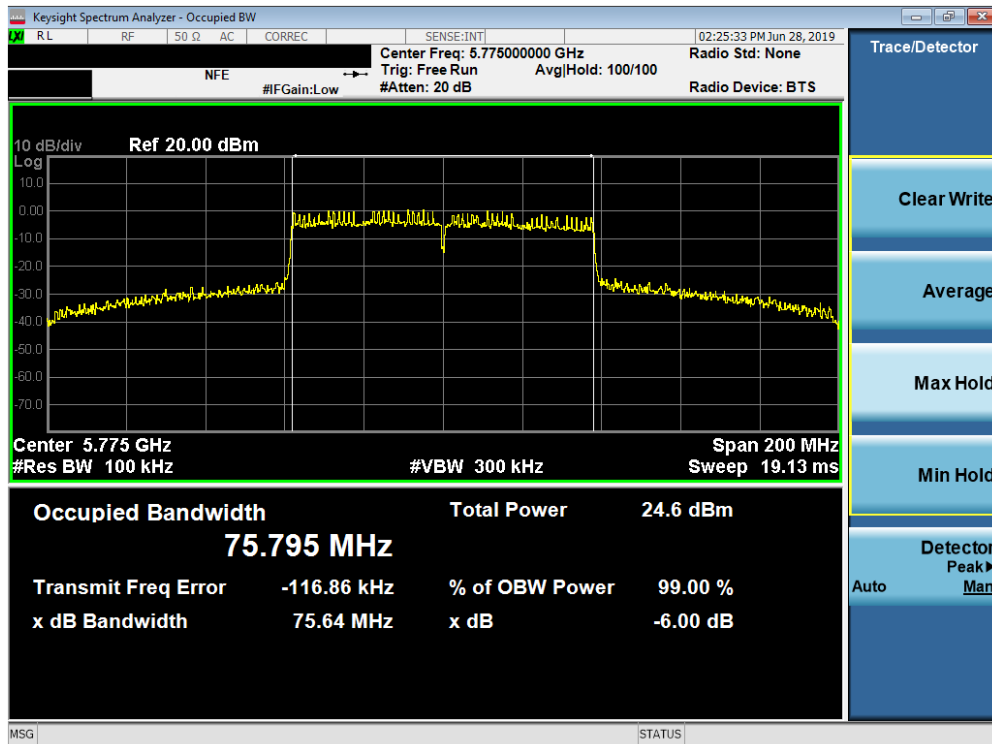


Plot 7-123. 6dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax (UNII Band 3) – Ch. 151)

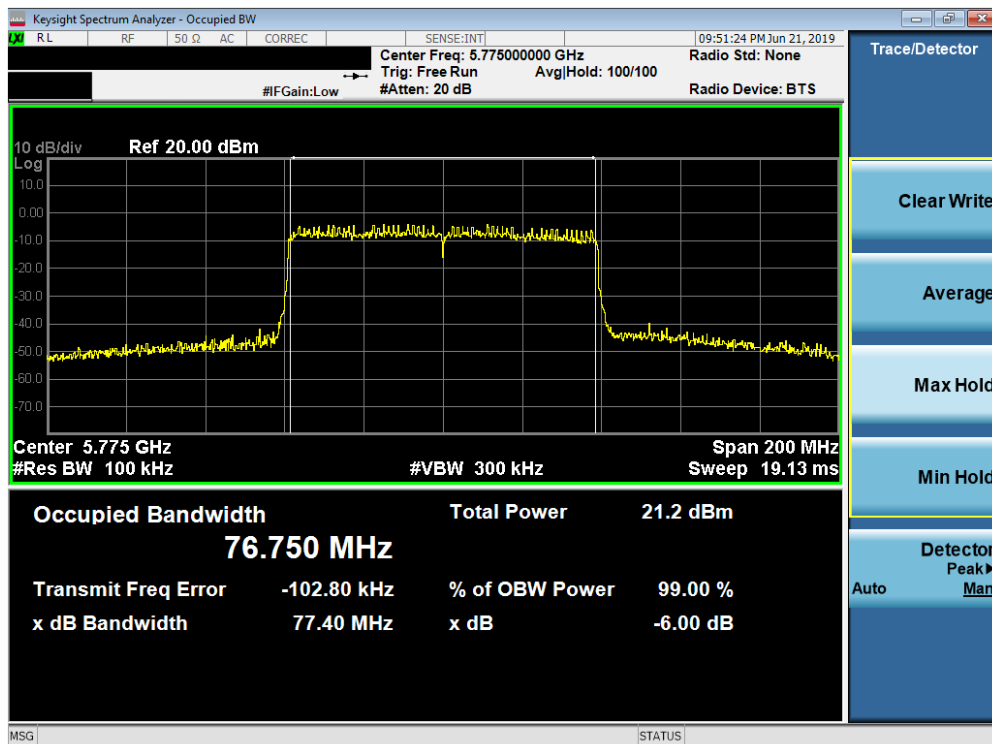


Plot 7-124. 6dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11ax (UNII Band 3) – Ch. 159)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 84 of 247



Plot 7-125. 6dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 3) – Ch. 155)



Plot 7-126. 6dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ax (UNII Band 3) – Ch. 155)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 85 of 247

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 or $10 + 10 \log_{10} B$, dBm.

In the 5.25 – 5.35GHz band, the maximum permissible conducted output power is the lesser of 250mW (23.98dBm) or $11 \text{ dBm} + 10 \log_{10}(26 \text{ dB BW}) = 11 \text{ dBm} + 10 \log_{10}(21.03) = 24.23 \text{ dBm}$. The maximum e.i.r.p. shall not exceed the lesser of 1.0 W or $17 + 10 \log_{10} B$, dBm.

In the 5.47 – 5.725GHz band, the maximum permissible conducted output power is the lesser of 250mW (23.98dBm) or $11 \text{ dBm} + 10 \log_{10}(26 \text{ dB BW}) = 11 \text{ dBm} + 10 \log_{10}(21.19) = 24.26 \text{ dBm}$. The maximum e.i.r.p. shall not exceed the lesser of 1.0 W or $17 + 10 \log_{10} B$, 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 E3)b) Method PM-G
ANSI C63.10-2013 – Section 14.2 Measure-and-Sum Technique
KDB 662911 v02r01 – Section E1) 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

Test Notes

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

FCC ID: A3LSMN970U		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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SISO Antenna-1 Conducted Output Power Measurements

5GHz (20MHz Bandwidth)	Freq [MHz]	Channel	Detector	IEEE Transmission Mode				Conducted Power Limit [dBm]	Conducted Power Margin [dB]	Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
				802.11a	802.11n	802.11ac	802.11ax						
	5180	36	AVG	16.89	16.91	16.96	15.99	23.98	-7.02	-6.48	10.48	23.01	-12.53
	5200	40	AVG	17.72	17.75	17.72	15.96	23.98	-6.23	-6.48	11.27	23.01	-11.74
	5220	44	AVG	17.73	17.78	17.82	15.98	23.98	-6.16	-6.44	11.38	23.01	-11.63
	5240	48	AVG	17.81	17.84	17.83	15.71	23.98	-6.14	-6.44	11.40	23.01	-11.61
	5260	52	AVG	17.87	17.92	17.94	15.85	23.98	-6.04	-6.44	11.50	30.00	-18.50
	5280	56	AVG	17.97	17.99	17.44	15.94	23.98	-5.99	-6.89	11.10	30.00	-18.90
	5300	60	AVG	17.98	17.55	17.62	15.51	23.98	-6.00	-6.89	11.09	30.00	-18.91
	5320	64	AVG	17.57	17.51	17.45	15.37	23.98	-6.41	-6.43	11.14	30.00	-18.86
	5500	100	AVG	17.53	17.52	17.51	15.49	23.98	-6.45	-7.10	10.43	30.00	-19.57
	5580	116	AVG	17.92	17.96	17.52	15.45	23.98	-6.02	-7.10	10.86	30.00	-19.14
	5660	132	AVG	17.87	17.87	17.70	15.86	23.98	-6.11	-7.10	10.77	30.00	-19.23
	5720	144	AVG	17.54	17.60	17.64	15.58	23.98	-6.34	-7.10	10.54	30.00	-19.46
	5745	149	AVG	17.92	17.86	17.92	15.75	30.00	-12.08	-7.10	10.82	-	-
	5785	157	AVG	17.82	17.88	17.89	15.58	30.00	-12.11	-6.21	11.68	-	-
	5825	165	AVG	17.47	17.53	17.45	15.73	30.00	-12.47	-6.21	11.32	-	-

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

5GHz (40MHz Bandwidth)	Freq [MHz]	Channel	Detector	IEEE Transmission Mode			Conducted Power Limit [dBm]	Conducted Power Margin [dB]	Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
				802.11n	802.11ac	802.11ax						
	5190	38	AVG	13.82	13.77	13.83	23.98	-10.16	-6.48	7.34	23.01	-15.67
	5230	46	AVG	16.54	16.62	13.86	23.98	-7.36	-6.44	10.18	23.01	-12.83
	5270	54	AVG	16.95	16.93	13.68	23.98	-7.03	-6.89	10.06	30.00	-19.94
	5310	62	AVG	14.15	14.15	13.64	23.98	-9.83	-6.43	7.72	30.00	-22.28
	5510	102	AVG	16.45	16.43	13.67	23.98	-7.53	-6.43	10.02	30.00	-19.98
	5550	110	AVG	16.52	16.49	13.54	23.98	-7.46	-7.10	9.42	30.00	-20.58
	5670	134	AVG	16.86	16.89	13.70	23.98	-7.09	-7.10	9.79	30.00	-20.21
	5710	142	AVG	16.76	16.77	13.63	23.98	-7.21	-7.10	9.67	30.00	-20.33
	5755	151	AVG	16.85	16.88	13.56	30.00	-13.12	-6.21	10.67	-	-
	5795	159	AVG	16.55	16.50	13.89	30.00	-13.45	-6.21	10.34	-	-

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

5GHz (80MHz Bandwidth)	Freq [MHz]	Channel	Detector	IEEE Transmission Mode		Conducted Power Limit [dBm]	Conducted Power Margin [dB]	Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
				802.11ac	802.11ax						
	5210	42	AVG	14.72	12.75	23.98	-9.26	-6.48	8.24	23.01	-14.77
	5290	58	AVG	13.86	12.96	23.98	-10.12	-6.89	6.97	30.00	-23.03
	5530	106	AVG	14.05	12.89	23.98	-9.93	-7.10	6.95	30.00	-23.05
	5690	138	AVG	15.99	12.91	23.98	-7.99	-7.10	8.89	30.00	-21.11
	5775	155	AVG	15.98	12.81	30.00	-14.02	-6.21	9.77	-	-

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

FCC ID: A3LSMN970U			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 87 of 247	

SISO Antenna-2 Conducted Output Power Measurements

5GHz (20MHz Bandwidth)	Freq [MHz]	Channel	Detector	IEEE Transmission Mode				Conducted Power Limit [dBm]	Conducted Power Margin [dB]	Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
				802.11a	802.11n	802.11ac	802.11ax						
	5180	36	AVG	16.07	16.08	16.07	15.71	23.98	-7.90	-6.44	9.64	23.01	-13.37
	5200	40	AVG	17.57	17.99	17.97	15.72	23.98	-5.99	-6.44	11.55	23.01	-11.46
	5220	44	AVG	17.61	17.98	17.97	15.65	23.98	-6.00	-6.44	11.54	23.01	-11.47
	5240	48	AVG	17.60	17.97	17.94	15.74	23.98	-6.01	-6.44	11.53	23.01	-11.48
	5260	52	AVG	17.47	17.90	17.90	15.89	23.98	-6.08	-6.44	11.46	30.00	-18.54
	5280	56	AVG	17.98	17.84	17.86	15.85	23.98	-6.00	-5.99	11.99	30.00	-18.01
	5300	60	AVG	17.91	17.94	17.57	15.99	23.98	-6.04	-6.12	11.82	30.00	-18.18
	5320	64	AVG	17.97	17.90	17.48	15.96	23.98	-6.01	-6.12	11.85	30.00	-18.15
	5500	100	AVG	17.63	17.51	17.49	15.83	23.98	-6.35	-6.38	11.25	30.00	-18.75
	5580	116	AVG	17.58	17.51	17.53	15.78	23.98	-6.40	-6.38	11.20	30.00	-18.80
	5660	132	AVG	17.55	17.86	17.93	15.57	23.98	-6.05	-6.38	11.55	30.00	-18.45
	5720	144	AVG	17.70	17.66	17.68	15.97	23.98	-6.28	-6.38	11.32	30.00	-18.68
	5745	149	AVG	17.98	17.93	17.91	15.76	30.00	-12.02	-6.38	11.60	-	-
	5785	157	AVG	17.57	17.86	17.89	15.68	30.00	-12.11	-6.87	11.02	-	-
	5825	165	AVG	17.64	17.64	17.53	15.73	30.00	-12.36	-6.87	10.77	-	-

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

5GHz (40MHz Bandwidth)	Freq [MHz]	Channel	Detector	IEEE Transmission Mode			Conducted Power Limit [dBm]	Conducted Power Margin [dB]	Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
				802.11n	802.11ac	802.11ax						
	5190	38	AVG	13.99	13.99	13.65	23.98	-9.99	-6.44	7.55	23.01	-15.46
	5230	46	AVG	16.89	16.72	13.67	23.98	-7.09	-6.44	10.45	23.01	-12.56
	5270	54	AVG	16.92	16.95	13.79	23.98	-7.03	-5.99	10.96	30.00	-19.04
	5310	62	AVG	14.86	14.88	13.76	23.98	-9.10	-6.12	8.76	30.00	-21.24
	5510	102	AVG	16.59	16.97	13.96	23.98	-7.01	-6.12	10.85	30.00	-19.15
	5550	110	AVG	16.58	16.91	13.85	23.98	-7.07	-6.38	10.53	30.00	-19.47
	5670	134	AVG	16.78	16.71	13.70	23.98	-7.20	-6.38	10.40	30.00	-19.60
	5710	142	AVG	16.62	16.56	13.50	23.98	-7.36	-6.38	10.24	30.00	-19.76
	5755	151	AVG	16.96	16.99	13.99	30.00	-13.01	-6.87	10.12	-	-
	5795	159	AVG	16.78	16.77	13.63	30.00	-13.22	-6.87	9.91	-	-

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

5GHz (80MHz Bandwidth)	Freq [MHz]	Channel	Detector	IEEE Transmission Mode		Conducted Power Limit [dBm]	Conducted Power Margin [dB]	Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
				802.11ac	802.11ax						
	5210	42	AVG	15.49	12.76	23.98	-8.49	-6.44	9.05	23.01	-13.96
	5290	58	AVG	14.22	12.51	23.98	-9.76	-6.12	8.10	30.00	-21.90
	5530	106	AVG	14.49	12.77	23.98	-9.49	-6.38	8.11	30.00	-21.89
	5690	138	AVG	15.92	12.81	23.98	-8.06	-6.38	9.54	30.00	-20.46
	5775	155	AVG	15.67	12.62	30.00	-14.33	-6.87	8.80	-	-

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

FCC ID: A3LSMN970U			MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset	Page 88 of 247		

MIMO Maximum Conducted Output Power Measurements

5GHz (20MHz Bandwidth)	Freq [MHz]	Channel	Detector	Conducted Power [dBm]			Conducted Power Limit [dBm]	Conducted Power Margin [dB]	Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
				ANT1	ANT2	MIMO						
	5180	36	AVG	16.89	16.07	19.51	23.98	-4.47	-3.45	16.06	23.01	-6.95
	5200	40	AVG	17.72	17.57	20.66	23.98	-3.32	-3.45	17.21	23.01	-5.80
	5220	44	AVG	17.73	17.61	20.68	23.98	-3.30	-3.43	17.25	23.01	-5.76
	5240	48	AVG	17.81	17.60	20.72	23.98	-3.26	-3.43	17.29	23.01	-5.72
	5260	52	AVG	17.87	17.47	20.68	23.98	-3.30	-3.43	17.25	30.00	-12.75
	5280	56	AVG	17.97	17.98	20.99	23.98	-2.99	-3.42	17.57	30.00	-12.43
	5300	60	AVG	17.98	17.91	20.96	23.98	-3.02	-3.49	17.47	30.00	-12.53
	5320	64	AVG	17.57	17.97	20.78	23.98	-3.20	-3.26	17.52	30.00	-12.48
	5500	100	AVG	17.53	17.63	20.59	23.98	-3.39	-3.72	16.87	30.00	-13.13
	5580	116	AVG	17.92	17.58	20.76	23.98	-3.22	-3.72	17.04	30.00	-12.96
	5660	132	AVG	17.87	17.55	20.72	23.98	-3.26	-3.72	17.00	30.00	-13.00
	5720	144	AVG	17.54	17.70	20.63	23.98	-3.35	-3.72	16.91	30.00	-13.09
	5745	149	AVG	17.92	17.98	20.96	30.00	-9.04	-3.72	17.24	-	-
	5785	157	AVG	17.82	17.57	20.71	30.00	-9.29	-3.52	17.19	-	-
	5825	165	AVG	17.47	17.64	20.57	30.00	-9.43	-3.52	17.05	-	-

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

5GHz (20MHz Bandwidth)	Freq [MHz]	Channel	Detector	Conducted Power [dBm]			Conducted Power Limit [dBm]	Conducted Power Margin [dB]	Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
				ANT1	ANT2	MIMO						
	5180	36	AVG	16.91	16.08	19.53	23.98	-4.45	-3.45	16.08	23.01	-6.93
	5200	40	AVG	17.75	17.99	20.88	23.98	-3.10	-3.45	17.43	23.01	-5.58
	5220	44	AVG	17.78	17.98	20.89	23.98	-3.09	-3.43	17.46	23.01	-5.55
	5240	48	AVG	17.84	17.97	20.92	23.98	-3.06	-3.43	17.49	23.01	-5.52
	5260	52	AVG	17.92	17.90	20.92	23.98	-3.06	-3.43	17.49	30.00	-12.51
	5280	56	AVG	17.99	17.84	20.93	23.98	-3.05	-3.42	17.51	30.00	-12.49
	5300	60	AVG	17.55	17.94	20.76	23.98	-3.22	-3.49	17.27	30.00	-12.73
	5320	64	AVG	17.51	17.90	20.72	23.98	-3.26	-3.26	17.46	30.00	-12.54
	5500	100	AVG	17.52	17.51	20.53	23.98	-3.45	-3.72	16.81	30.00	-13.19
	5580	116	AVG	17.96	17.51	20.75	23.98	-3.23	-3.72	17.03	30.00	-12.97
	5660	132	AVG	17.87	17.86	20.88	23.98	-3.10	-3.72	17.16	30.00	-12.84
	5720	144	AVG	17.60	17.66	20.64	23.98	-3.34	-3.72	16.92	30.00	-13.08
	5745	149	AVG	17.86	17.93	20.91	30.00	-9.09	-3.72	17.19	-	-
	5785	157	AVG	17.88	17.86	20.88	30.00	-9.12	-3.52	17.36	-	-
	5825	165	AVG	17.53	17.64	20.60	30.00	-9.40	-3.52	17.08	-	-

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

FCC ID: A3LSMN970U	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset	Page 89 of 247

5GHz (20MHz Bandwidth)	Freq [MHz]	Channel	Detector	Conducted Power [dBm]			Conducted Power Limit [dBm]	Conducted Power Margin [dB]	Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
				ANT1	ANT2	MIMO						
	5180	36	AVG	16.96	16.07	19.55	23.98	-4.43	-3.45	16.10	23.01	-6.91
	5200	40	AVG	17.72	17.97	20.86	23.98	-3.12	-3.45	17.41	23.01	-5.60
	5220	44	AVG	17.82	17.97	20.91	23.98	-3.07	-3.43	17.48	23.01	-5.53
	5240	48	AVG	17.83	17.94	20.90	23.98	-3.08	-3.43	17.47	23.01	-5.54
	5260	52	AVG	17.94	17.90	20.93	23.98	-3.05	-3.43	17.50	30.00	-12.50
	5280	56	AVG	17.44	17.86	20.67	23.98	-3.31	-3.42	17.25	30.00	-12.75
	5300	60	AVG	17.62	17.57	20.61	23.98	-3.37	-3.49	17.12	30.00	-12.88
	5320	64	AVG	17.45	17.48	20.48	23.98	-3.50	-3.26	17.22	30.00	-12.78
	5500	100	AVG	17.51	17.49	20.51	23.98	-3.47	-3.72	16.79	30.00	-13.21
	5580	116	AVG	17.52	17.53	20.54	23.98	-3.44	-3.72	16.82	30.00	-13.18
	5660	132	AVG	17.70	17.93	20.83	23.98	-3.15	-3.72	17.11	30.00	-12.89
	5720	144	AVG	17.64	17.68	20.67	23.98	-3.31	-3.72	16.95	30.00	-13.05
	5745	149	AVG	17.92	17.91	20.93	30.00	-9.07	-3.72	17.21	-	-
	5785	157	AVG	17.89	17.89	20.90	30.00	-9.10	-3.52	17.38	-	-
	5825	165	AVG	17.45	17.53	20.50	30.00	-9.50	-3.52	16.98	-	-

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

5GHz (20MHz Bandwidth)	Freq [MHz]	Channel	Detector	Conducted Power [dBm]			Conducted Power Limit [dBm]	Conducted Power Margin [dB]	Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
				ANT1	ANT2	MIMO						
	5180	36	AVG	13.18	12.30	15.77	23.98	-8.21	-3.45	12.32	23.01	-10.69
	5200	40	AVG	13.29	12.29	15.83	23.98	-8.15	-3.45	12.38	23.01	-10.63
	5220	44	AVG	13.39	12.34	15.91	23.98	-8.07	-3.43	12.48	23.01	-10.53
	5240	48	AVG	13.47	12.40	15.98	23.98	-8.00	-3.43	12.55	23.01	-10.46
	5260	52	AVG	13.24	11.89	15.63	23.98	-8.35	-3.43	12.20	30.00	-17.80
	5280	56	AVG	13.38	12.06	15.78	23.98	-8.20	-3.42	12.36	30.00	-17.64
	5300	60	AVG	13.48	12.06	15.84	23.98	-8.14	-3.49	12.35	30.00	-17.65
	5320	64	AVG	13.45	12.00	15.80	23.98	-8.18	-3.26	12.54	30.00	-17.46
	5500	100	AVG	13.60	12.25	15.99	23.98	-7.99	-3.72	12.27	30.00	-17.73
	5580	116	AVG	13.63	12.05	15.92	23.98	-8.06	-3.72	12.20	30.00	-17.80
	5660	132	AVG	13.27	11.63	15.54	23.98	-8.44	-3.72	11.82	30.00	-18.18
	5720	144	AVG	13.40	11.80	15.68	23.98	-8.30	-3.72	11.96	30.00	-18.04
	5745	149	AVG	13.25	12.12	15.73	30.00	-14.27	-3.72	12.01	-	-
	5785	157	AVG	12.93	11.96	15.48	30.00	-14.52	-3.52	11.96	-	-
	5825	165	AVG	13.04	12.15	15.63	30.00	-14.37	-3.52	12.11	-	-

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

5GHz (40MHz Bandwidth)	Freq [MHz]	Channel	Detector	Conducted Power [dBm]			Conducted Power Limit [dBm]	Conducted Power Margin [dB]	Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
				ANT1	ANT2	MIMO						
	5190	38	AVG	13.82	13.99	16.92	23.98	-7.06	-3.45	13.47	23.01	-9.54
	5230	46	AVG	16.54	16.89	19.73	23.98	-4.25	-3.43	16.30	23.01	-6.71
	5270	54	AVG	16.95	16.92	19.95	23.98	-4.03	-3.42	16.53	30.00	-13.47
	5310	62	AVG	14.15	14.86	17.53	23.98	-6.45	-3.26	14.27	30.00	-15.73
	5510	102	AVG	16.45	16.59	19.53	23.98	-4.45	-3.26	16.27	30.00	-13.73
	5550	110	AVG	16.52	16.58	19.56	23.98	-4.42	-3.72	15.84	30.00	-14.16
	5670	134	AVG	16.86	16.78	19.83	23.98	-4.15	-3.72	16.11	30.00	-13.89
	5710	142	AVG	16.76	16.62	19.70	23.98	-4.28	-3.72	15.98	30.00	-14.02
	5755	151	AVG	16.85	16.96	19.92	30.00	-10.08	-3.52	16.40	-	-
	5795	159	AVG	16.55	16.78	19.68	30.00	-10.32	-3.52	16.16	-	-

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

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5GHz (40MHz Bandwidth)	Freq [MHz]	Channel	Detector	Conducted Power [dBm]			Conducted Power Limit [dBm]	Conducted Power Margin [dB]	Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
				ANT1	ANT2	MIMO						
	5190	38	AVG	13.77	13.99	16.89	23.98	-7.09	-3.45	13.44	23.01	-9.57
	5230	46	AVG	16.62	16.72	19.68	23.98	-4.30	-3.43	16.25	23.01	-6.76
	5270	54	AVG	16.93	16.95	19.95	23.98	-4.03	-3.42	16.53	30.00	-13.47
	5310	62	AVG	14.15	14.88	17.54	23.98	-6.44	-3.26	14.28	30.00	-15.72
	5510	102	AVG	16.43	16.97	19.72	23.98	-4.26	-3.26	16.46	30.00	-13.54
	5550	110	AVG	16.49	16.91	19.72	23.98	-4.26	-3.72	16.00	30.00	-14.00
	5670	134	AVG	16.89	16.71	19.81	23.98	-4.17	-3.72	16.09	30.00	-13.91
	5710	142	AVG	16.77	16.56	19.68	23.98	-4.30	-3.72	15.96	30.00	-14.04
	5755	151	AVG	16.88	16.99	19.95	30.00	-10.05	-3.52	16.43	-	-
	5795	159	AVG	16.50	16.77	19.65	30.00	-10.35	-3.52	16.13	-	-

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

5GHz (40MHz Bandwidth)	Freq [MHz]	Channel	Detector	Conducted Power [dBm]			Conducted Power Limit [dBm]	Conducted Power Margin [dB]	Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
				ANT1	ANT2	MIMO						
	5190	38	AVG	11.08	10.25	13.70	23.98	-10.28	-3.45	10.25	23.01	-12.76
	5230	46	AVG	11.30	10.26	13.82	23.98	-10.16	-3.43	10.39	23.01	-12.62
	5270	54	AVG	11.49	10.17	13.89	23.98	-10.09	-3.42	10.47	30.00	-19.53
	5310	62	AVG	11.63	10.22	13.99	23.98	-9.99	-3.26	10.73	30.00	-19.27
	5510	102	AVG	11.70	10.04	13.96	23.98	-10.02	-3.26	10.70	30.00	-19.30
	5550	110	AVG	11.63	10.06	13.93	23.98	-10.05	-3.72	10.21	30.00	-19.79
	5670	134	AVG	11.78	9.57	13.82	23.98	-10.16	-3.72	10.10	30.00	-19.90
	5710	142	AVG	11.52	9.41	13.60	23.98	-10.38	-3.72	9.88	30.00	-20.12
	5755	151	AVG	11.07	10.15	13.64	30.00	-16.36	-3.52	10.12	-	-
	5795	159	AVG	11.12	10.36	13.77	30.00	-16.23	-3.52	10.25	-	-

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

5GHz (80MHz Bandwidth)	Freq [MHz]	Channel	Detector	Conducted Power [dBm]			Conducted Power Limit [dBm]	Conducted Power Margin [dB]	Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
				ANT1	ANT2	MIMO						
	5210	42	AVG	14.72	15.49	18.13	23.98	-5.85	-3.45	14.68	23.01	-8.33
	5290	58	AVG	13.86	14.22	17.05	23.98	-6.93	-3.49	13.56	30.00	-16.44
	5530	106	AVG	14.05	14.49	17.29	23.98	-6.69	-3.72	13.57	30.00	-16.43
	5690	138	AVG	15.99	15.92	18.97	23.98	-5.01	-3.72	15.25	30.00	-14.75
	5775	155	AVG	15.98	15.67	18.84	30.00	-11.16	-3.52	15.32	-	-

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

5GHz (80MHz Bandwidth)	Freq [MHz]	Channel	Detector	Conducted Power [dBm]			Conducted Power Limit [dBm]	Conducted Power Margin [dB]	Directional Ant. Gain [dBi]	Max e.i.r.p. [dBm]	Max e.i.r.p. Limit [dBm]	e.i.r.p. Margin [dB]
				ANT1	ANT2	MIMO						
	5210	42	AVG	10.01	8.94	12.52	23.98	-11.46	-3.45	9.07	23.01	-13.94
	5290	58	AVG	10.51	8.65	12.69	23.98	-11.29	-3.49	9.20	30.00	-20.80
	5530	106	AVG	10.45	9.35	12.95	23.98	-11.03	-3.72	9.23	30.00	-20.77
	5690	138	AVG	10.55	8.87	12.80	23.98	-11.18	-3.72	9.08	30.00	-20.92
	5775	155	AVG	9.72	9.35	12.55	30.00	-17.45	-3.52	9.03	-	-

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

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Note:

Per ANSI C63.10-2013 and KDB 662911 v02r01 Section E1), 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.

Per ANSI C63.10-2013 Section 14.4.3, the directional gain is calculated using the following formula, where G_N is the gain of the nth antenna and N_{ANT} , the total number of antennas used.

$$\text{Directional gain} = 10 \log[(10^{G_1/20} + 10^{G_2/20} + \dots + 10^{G_N/20})^2 / N_{ANT}] \text{ dBi}$$

Sample MIMO Calculation:

At 5180MHz in 802.11n (20MHz BW) mode, the average conducted output power was measured to be 16.91 dBm for Antenna-1 and 16.08 dBm for Antenna-2.

Antenna 1 + Antenna 2 = MIMO

$$(16.91 \text{ dBm} + 16.08 \text{ dBm}) = (49.09 \text{ mW} + 40.55 \text{ mW}) = 89.64 \text{ mW} = 19.53 \text{ dBm}$$

Sample e.i.r.p. Calculation:

At 5180MHz in 802.11n (20MHz BW) mode, the average MIMO conducted power was calculated to be 19.53 dBm with directional gain of N/A dBi.

$$\text{e.i.r.p. (dBm)} = \text{Conducted Power (dBm)} + \text{Ant gain (dBi)}$$

$$19.53 \text{ dBm} + -3.26 \text{ dBi} = 16.27 \text{ dBm}$$

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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

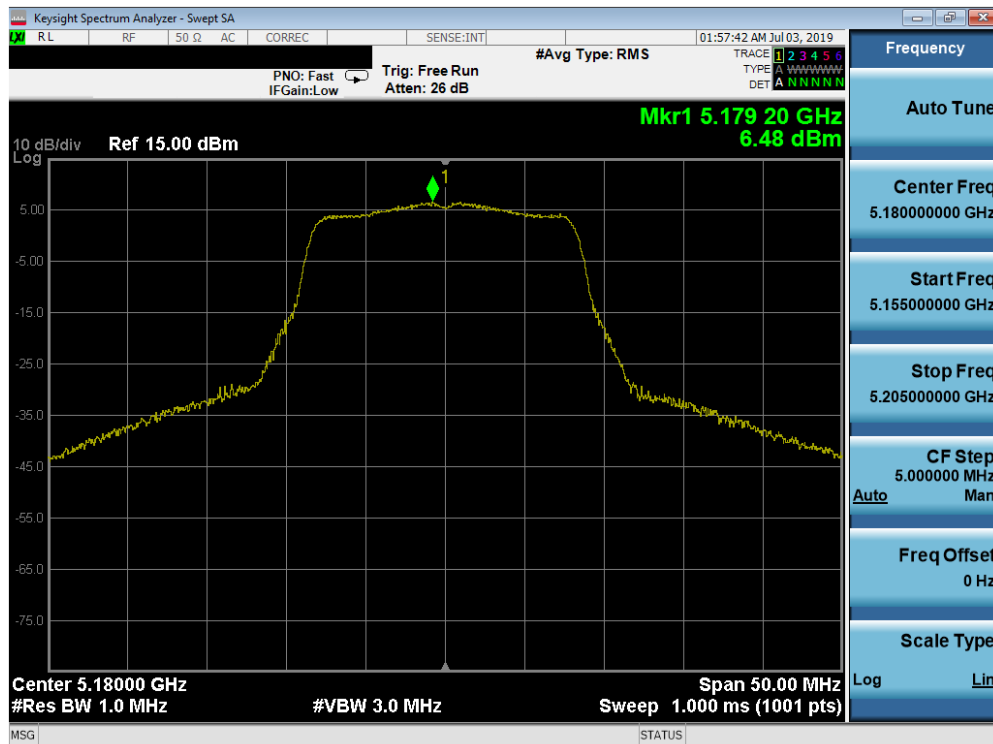
	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Density [dBm]	Max Power Density [dBm/MHz]	Margin [dB]
Band 1	5180	36	a	6	6.48	11.0	-4.52
	5200	40	a	6	6.76	11.0	-4.24
	5240	48	a	6	6.25	11.0	-4.76
	5180	36	n (20MHz)	6.5/7.2 (MCS0)	7.28	11.0	-3.72
	5200	40	n (20MHz)	6.5/7.2 (MCS0)	6.45	11.0	-4.55
	5240	48	n (20MHz)	6.5/7.2 (MCS0)	6.78	11.0	-4.22
	5180	36	ax (20MHz)	6.5/7.2 (MCS0)	2.40	11.0	-8.60
	5200	40	ax (20MHz)	6.5/7.2 (MCS0)	2.71	11.0	-8.29
	5240	48	ax (20MHz)	6.5/7.2 (MCS0)	2.94	11.0	-8.06
	5190	38	n (40MHz)	13.5/15 (MCS0)	1.59	11.0	-9.41
	5230	46	n (40MHz)	13.5/15 (MCS0)	0.95	11.0	-10.05
	5190	38	ax (40MHz)	13.5/15 (MCS0)	-2.45	11.0	-13.45
	5230	46	ax (40MHz)	13.5/15 (MCS0)	-1.97	11.0	-12.97
	5210	42	ac (80MHz)	29.3/32.5 (MCS0)	-2.52	11.0	-13.52
	5210	42	ax (80MHz)	29.3/32.5 (MCS0)	-6.21	11.0	-17.21
Band 2A	5260	52	a	6	6.87	11.0	-4.13
	5280	56	a	6	6.78	11.0	-4.22
	5320	64	a	6	5.80	11.0	-5.20
	5260	52	n (20MHz)	6.5/7.2 (MCS0)	6.58	11.0	-4.42
	5280	56	n (20MHz)	6.5/7.2 (MCS0)	6.55	11.0	-4.45
	5320	64	n (20MHz)	6.5/7.2 (MCS0)	6.68	11.0	-4.32
	5260	52	ax (20MHz)	6.5/7.2 (MCS0)	2.81	11.0	-8.19
	5280	56	ax (20MHz)	6.5/7.2 (MCS0)	2.97	11.0	-8.03
	5320	64	ax (20MHz)	6.5/7.2 (MCS0)	2.93	11.0	-8.07
	5270	54	n (40MHz)	13.5/15 (MCS0)	0.95	11.0	-10.05
	5310	62	n (40MHz)	13.5/15 (MCS0)	1.67	11.0	-9.33
	5270	54	ax (40MHz)	13.5/15 (MCS0)	-1.76	11.0	-12.76
	5310	62	ax (40MHz)	13.5/15 (MCS0)	-2.07	11.0	-13.07
	5290	58	ac (80MHz)	29.3/32.5 (MCS0)	-2.91	11.0	-13.91
	5290	58	ax (80MHz)	29.3/32.5 (MCS0)	-6.34	11.0	-17.34
Band 2C	5500	100	a	6	6.90	11.0	-4.11
	5600	120	a	6	5.97	11.0	-5.03
	5720	144	a	6	7.17	11.0	-3.83
	5500	100	n (20MHz)	6.5/7.2 (MCS0)	6.81	11.0	-4.19
	5600	120	n (20MHz)	6.5/7.2 (MCS0)	6.63	11.0	-4.37
	5720	144	n (20MHz)	6.5/7.2 (MCS0)	6.80	11.0	-4.20
	5500	100	ax (20MHz)	6.5/7.2 (MCS0)	3.08	11.0	-7.92
	5600	120	ax (20MHz)	6.5/7.2 (MCS0)	3.10	11.0	-7.90
	5720	144	ax (20MHz)	6.5/7.2 (MCS0)	3.21	11.0	-7.79
	5510	102	n (40MHz)	13.5/15 (MCS0)	1.67	11.0	-9.33
	5590	118	n (40MHz)	13.5/15 (MCS0)	0.67	11.0	-10.33
	5710	142	n (40MHz)	13.5/15 (MCS0)	1.13	11.0	-9.87
	5510	102	ax (40MHz)	13.5/15 (MCS0)	-1.83	11.0	-12.83
	5590	118	ax (40MHz)	13.5/15 (MCS0)	-1.74	11.0	-12.74
	5710	142	ax (40MHz)	13.5/15 (MCS0)	-1.37	11.0	-12.37
	5530	106	ac (80MHz)	29.3/32.5 (MCS0)	-2.58	11.0	-13.58
	5610	122	ac (80MHz)	29.3/32.5 (MCS0)	-3.89	11.0	-14.89
	5690	138	ac (80MHz)	29.3/32.5 (MCS0)	-3.52	11.0	-14.52
	5530	106	ax (80MHz)	29.3/32.5 (MCS0)	-5.84	11.0	-16.84
	5610	122	ax (80MHz)	29.3/32.5 (MCS0)	-6.38	11.0	-17.38
	5690	138	ax (80MHz)	29.3/32.5 (MCS0)	-5.97	11.0	-16.97

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

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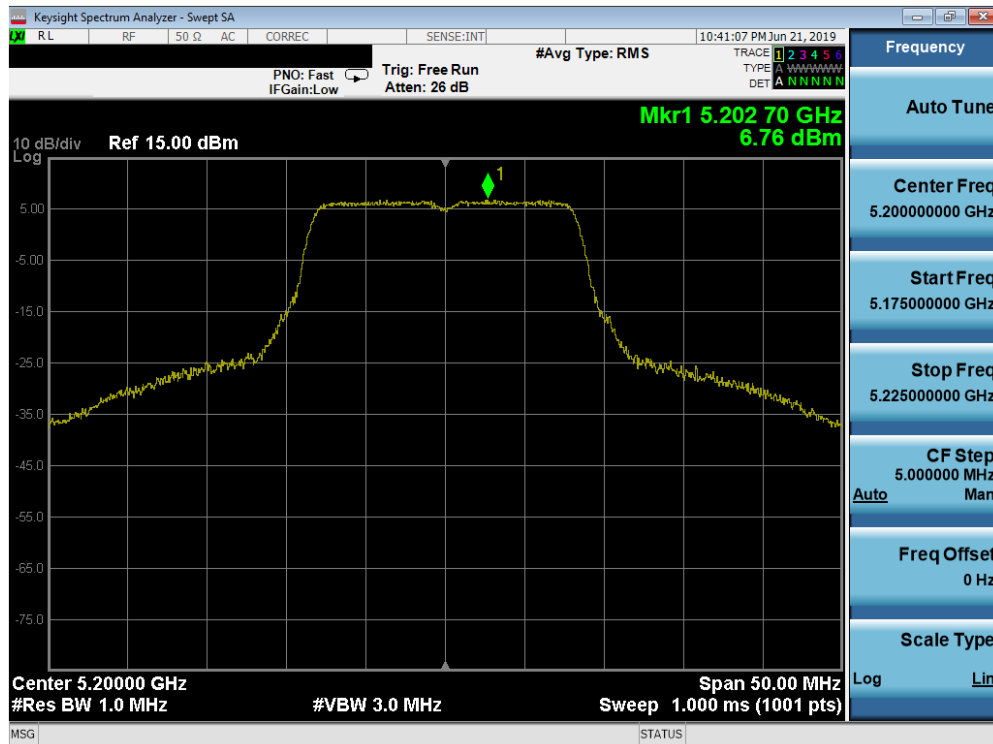
	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Density [dBm]	Antenna Gain [dBi]	e.i.r.p. Power Density [dBm/MHz]	ISED Max e.i.r.p. Power Density [dBm/MHz]	Margin [dB]
Band 1	5180	36	a	6	6.48	-6.48	0.00	10.0	-10.00
	5200	40	a	6	6.76	-6.48	0.28	10.0	-9.72
	5240	48	a	6	6.25	-6.44	-0.20	10.0	-10.20
	5180	36	n (20MHz)	6.5/7.2 (MCS0)	7.28	-6.48	0.80	10.0	-9.20
	5200	40	n (20MHz)	6.5/7.2 (MCS0)	6.45	-6.48	-0.03	10.0	-10.03
	5240	48	n (20MHz)	6.5/7.2 (MCS0)	6.78	-6.44	0.34	10.0	-9.66
	5180	36	ax (20MHz)	6.5/7.2 (MCS0)	2.40	-6.48	-4.08	10.0	-14.08
	5200	40	ax (20MHz)	6.5/7.2 (MCS0)	2.71	-6.48	-3.77	10.0	-13.77
	5240	48	ax (20MHz)	6.5/7.2 (MCS0)	2.94	-6.44	-3.50	10.0	-13.50
	5190	38	n (40MHz)	13.5/15 (MCS0)	1.59	-6.48	-4.89	10.0	-14.89
	5230	46	n (40MHz)	13.5/15 (MCS0)	0.95	-6.44	-5.49	10.0	-15.49
	5190	38	ax (40MHz)	13.5/15 (MCS0)	-2.45	-6.48	-8.93	10.0	-18.93
	5230	46	ax (40MHz)	13.5/15 (MCS0)	-1.97	-6.44	-8.41	10.0	-18.41
	5210	42	ac (80MHz)	29.3/32.5 (MCS0)	-2.52	-6.44	-8.96	10.0	-18.96
	5210	42	ax (80MHz)	29.3/32.5 (MCS0)	-6.21	-6.44	-12.65	10.0	-22.65

Table 7-22. Band 1 e.i.r.p. Conducted Power Spectral Density Measurements (ISED) SISO ANT1

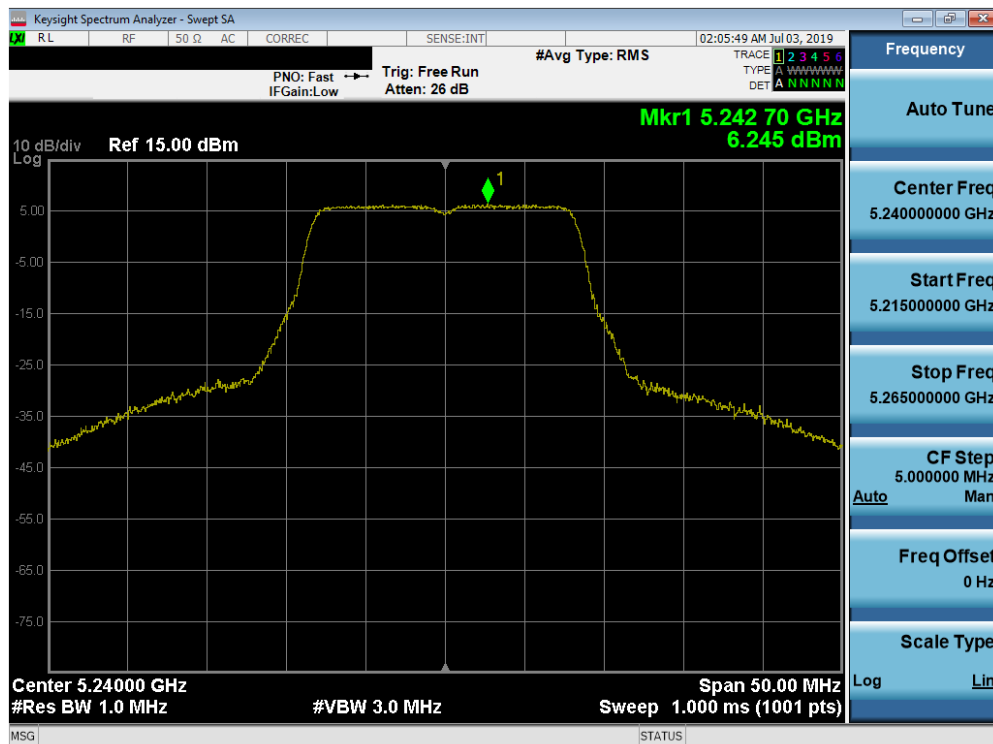


Plot 7-127. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 1) – Ch. 36)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 95 of 247

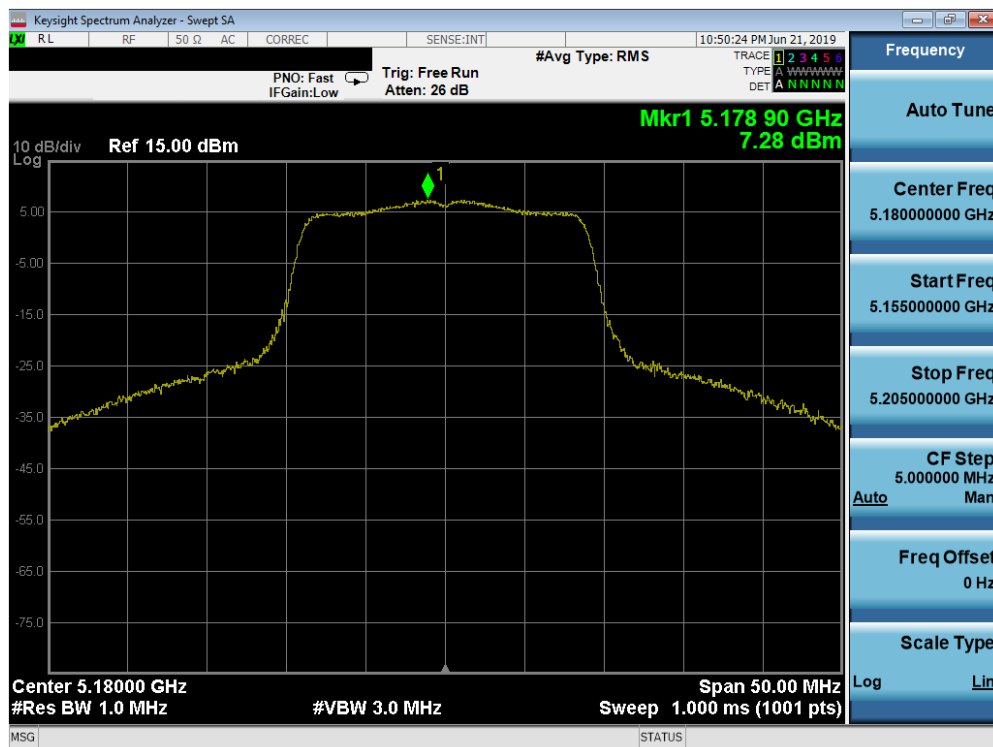


Plot 7-128. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 1) – Ch. 40)

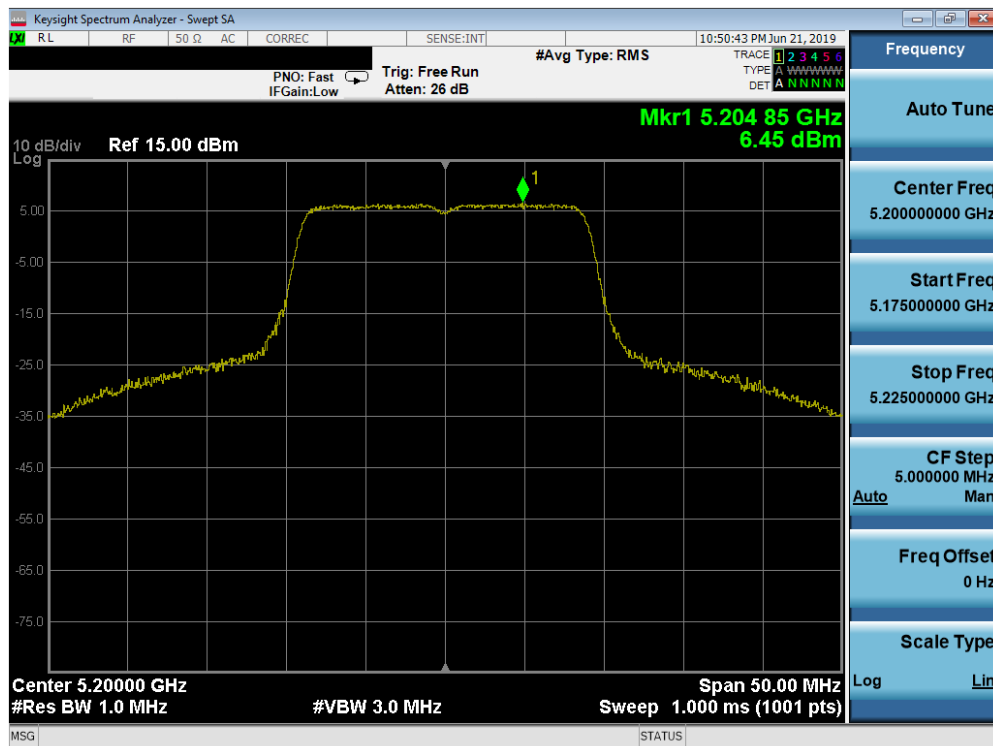


Plot 7-129. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 1) – Ch. 48)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 96 of 247

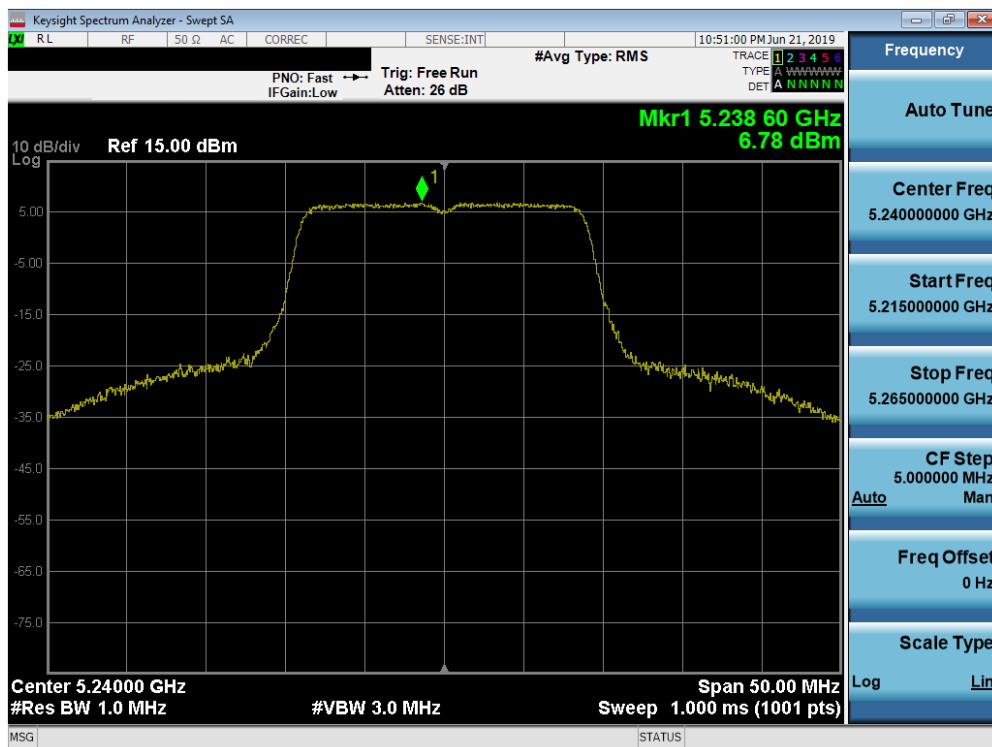


Plot 7-130. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 1) – Ch. 36)

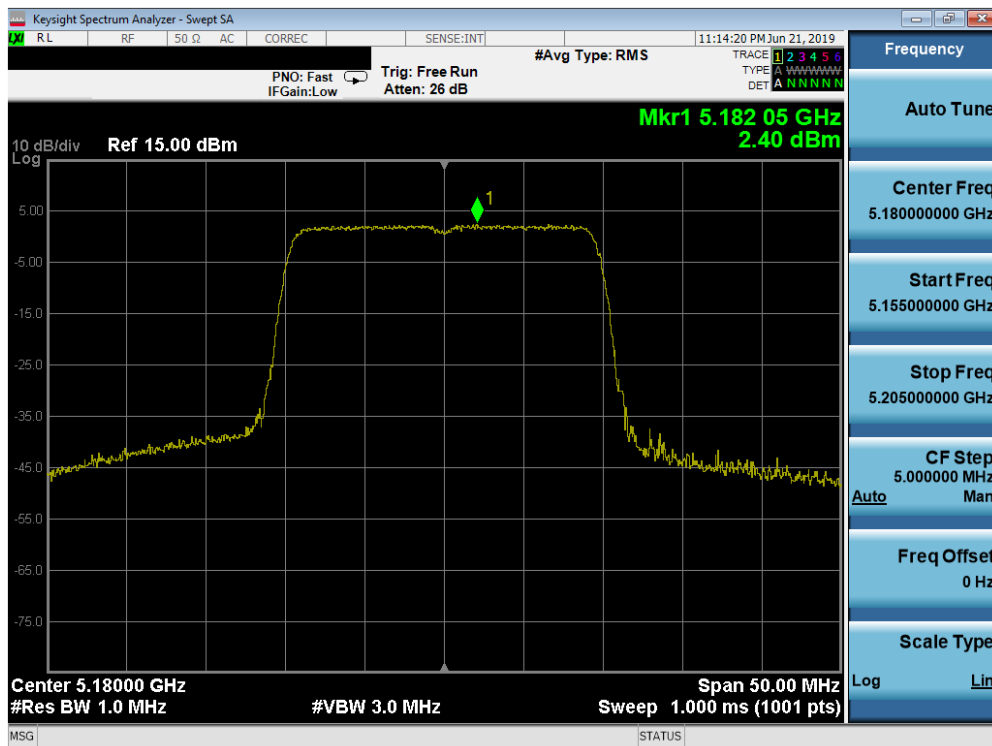


Plot 7-131. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 1) – Ch. 40)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 97 of 247

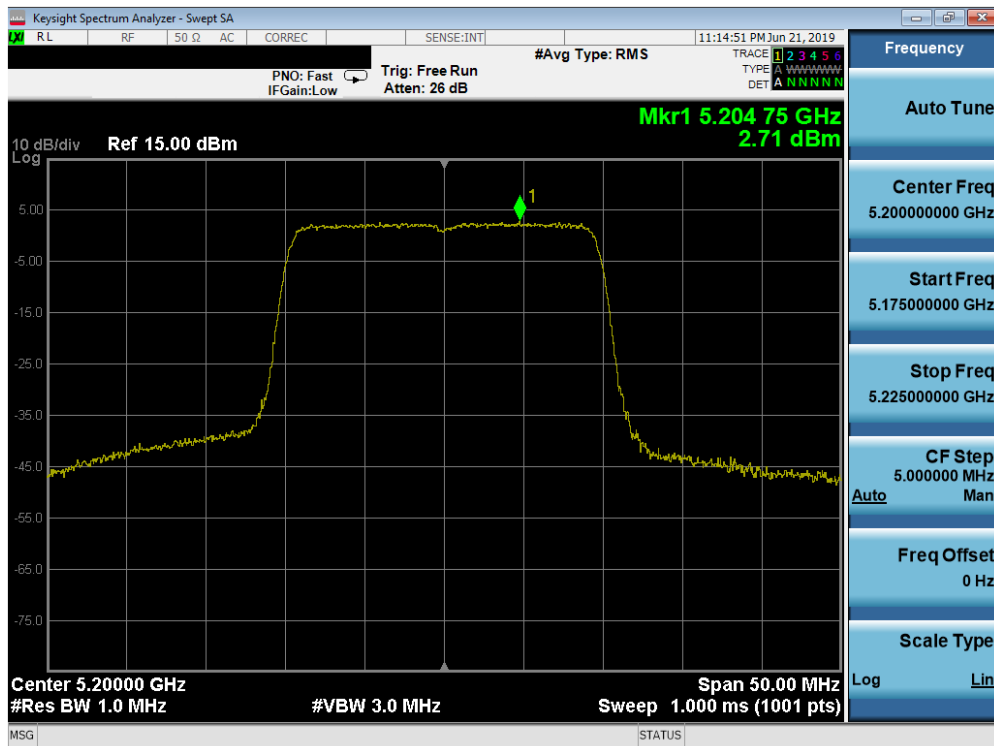


Plot 7-132. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 1) – Ch. 48)

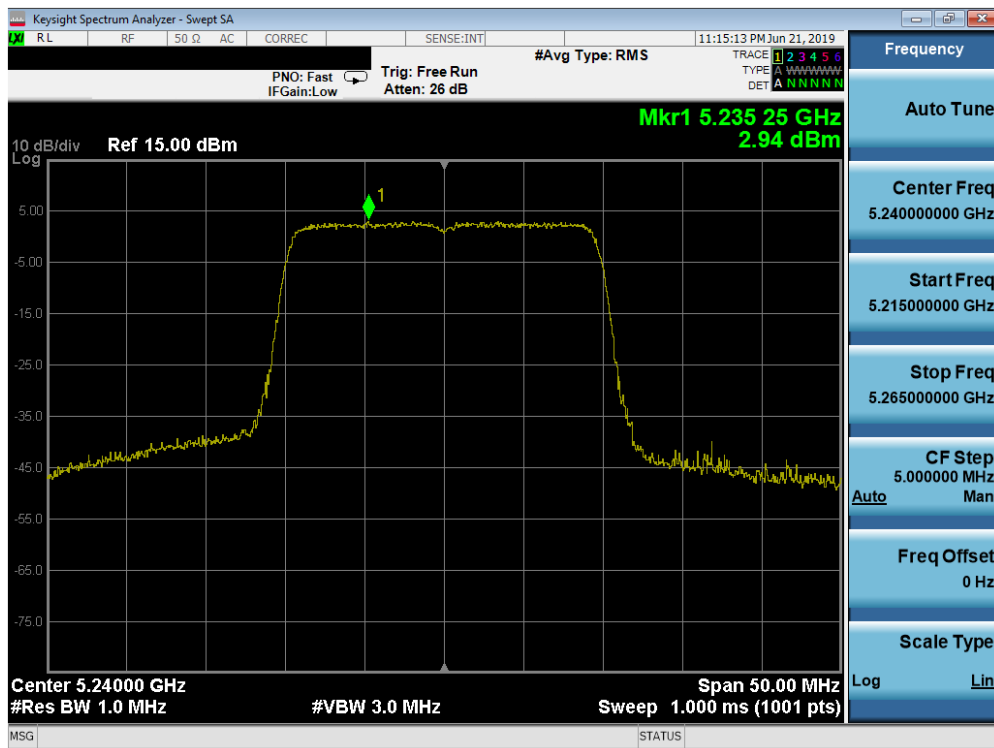


Plot 7-133. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 1) – Ch. 36)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 98 of 247

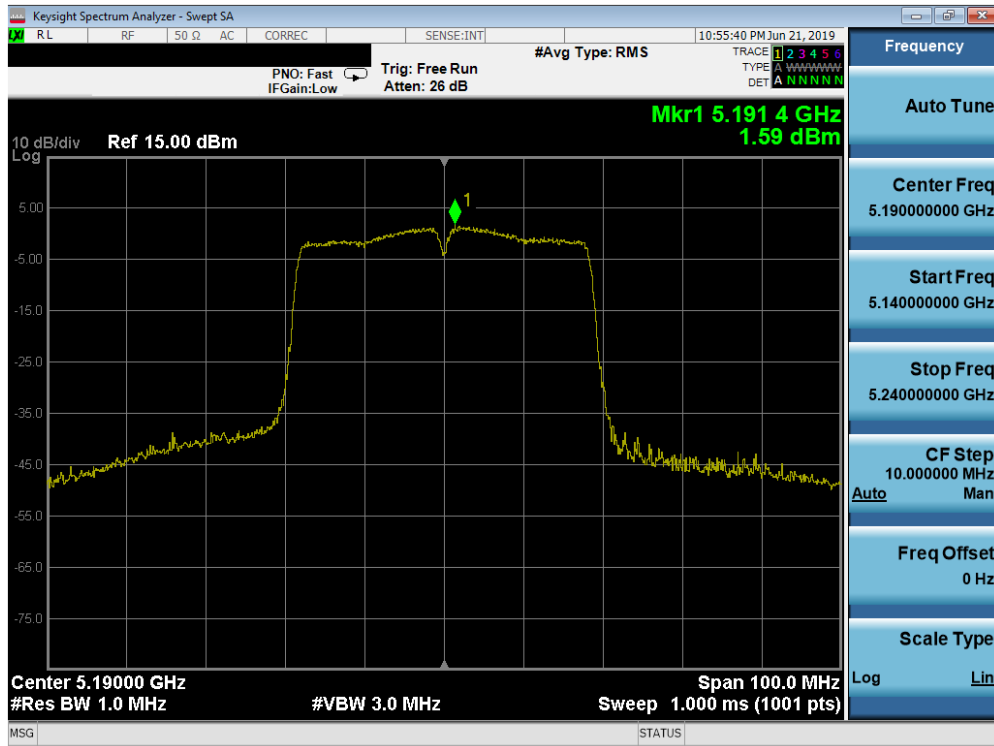


Plot 7-134. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 1) – Ch. 40)

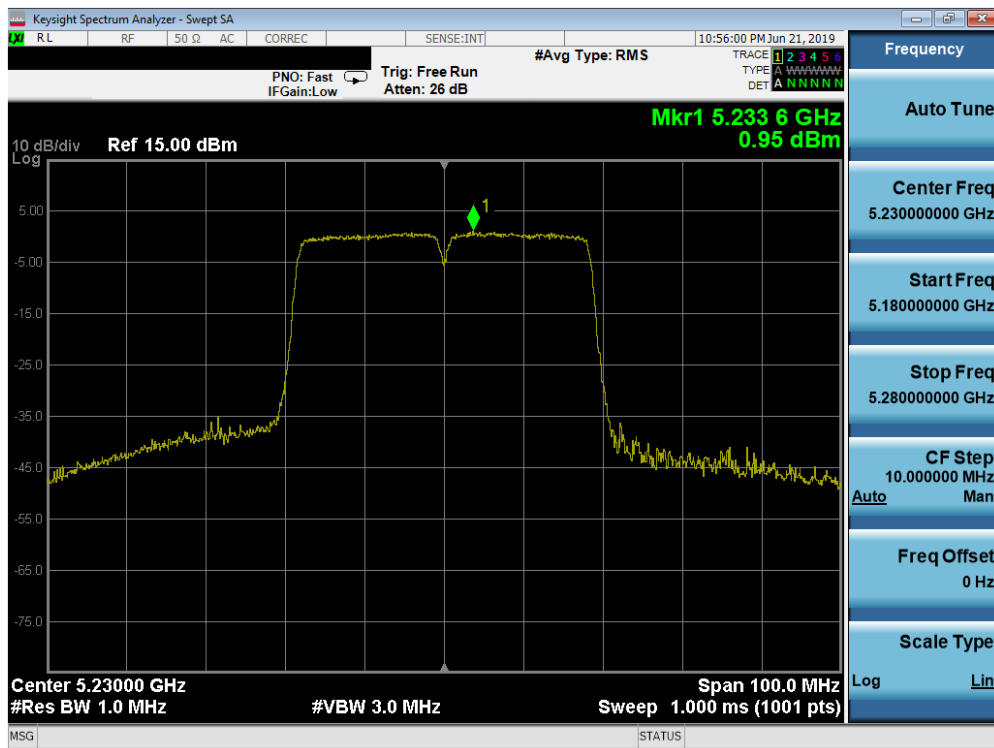


Plot 7-135. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 1) – Ch. 48)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 99 of 247

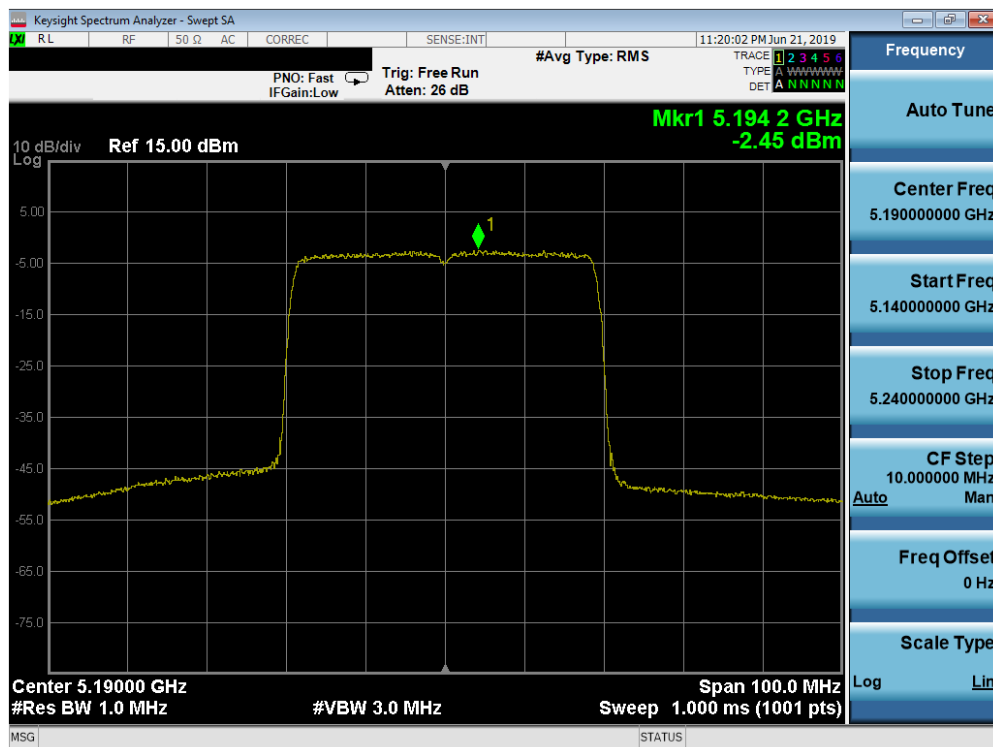


Plot 7-136. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 1) – Ch. 38)

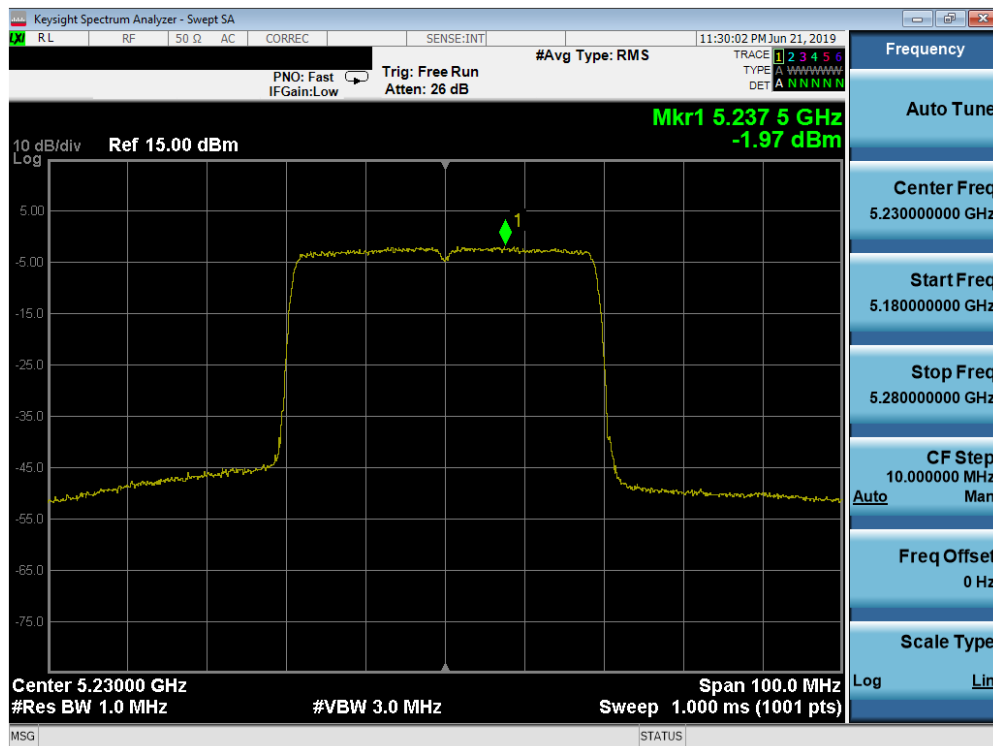


Plot 7-137. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 1) – Ch. 46)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 100 of 247

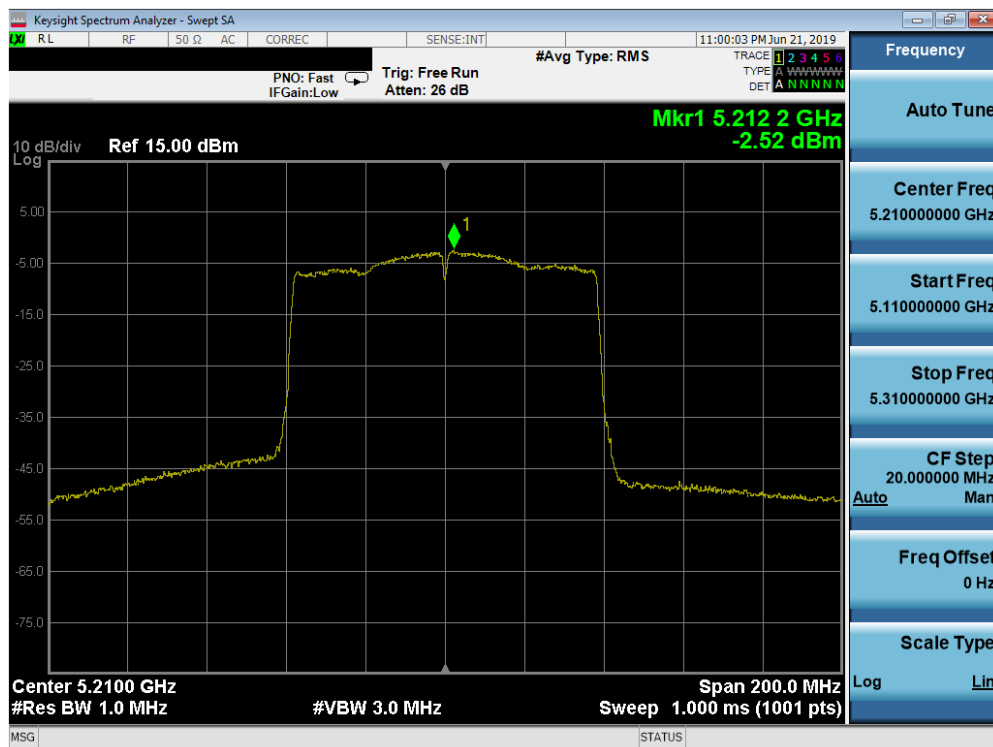


Plot 7-138. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 1) – Ch. 38)

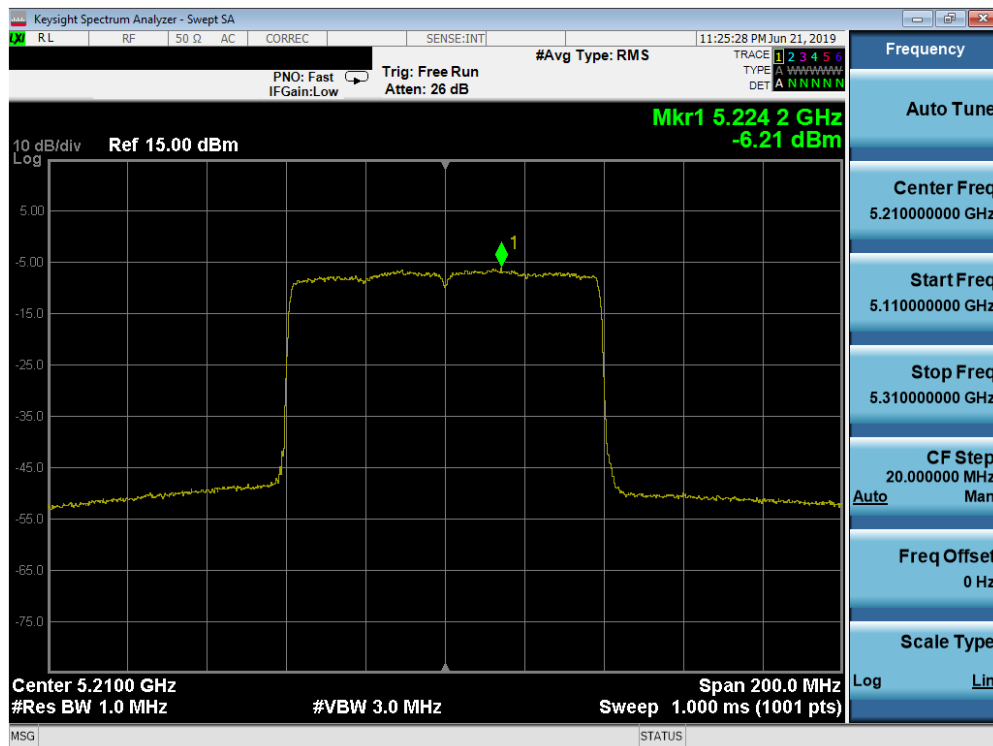


Plot 7-139. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 1) – Ch. 42)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 101 of 247

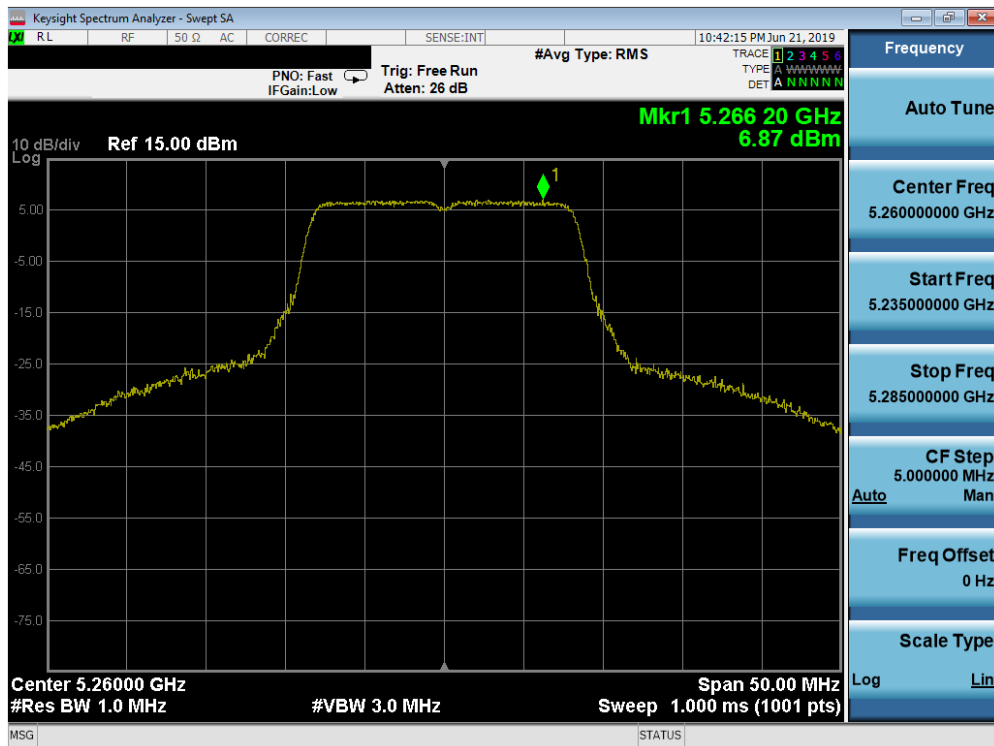


Plot 7-140. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 1) – Ch. 42)

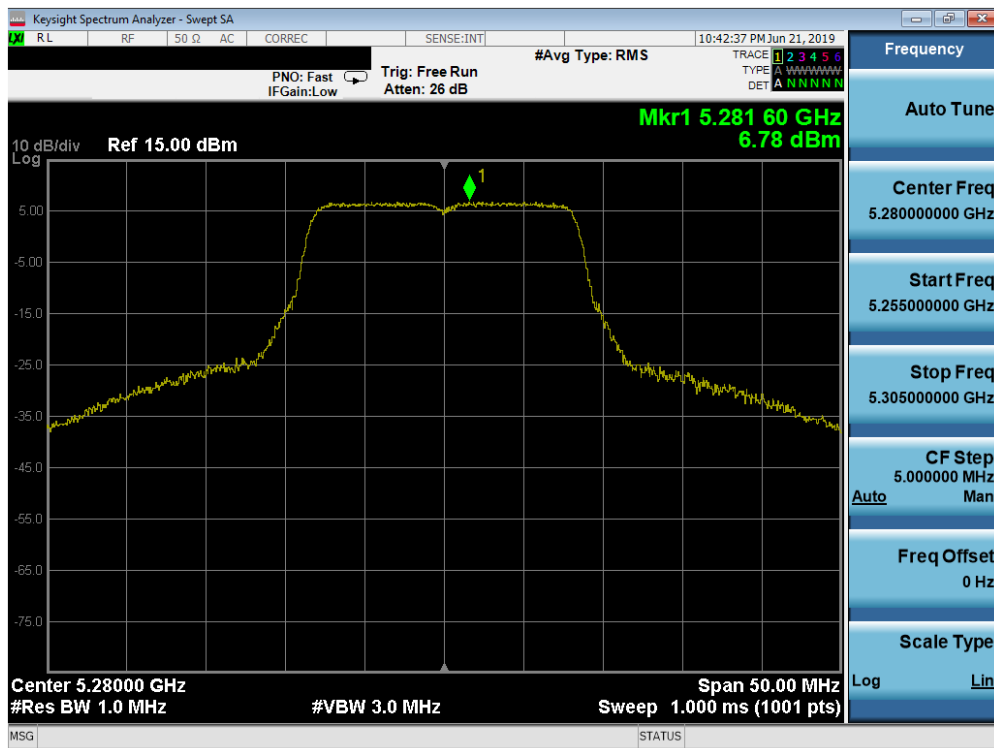


Plot 7-141. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ax (UNII Band 1) – Ch. 42)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 102 of 247

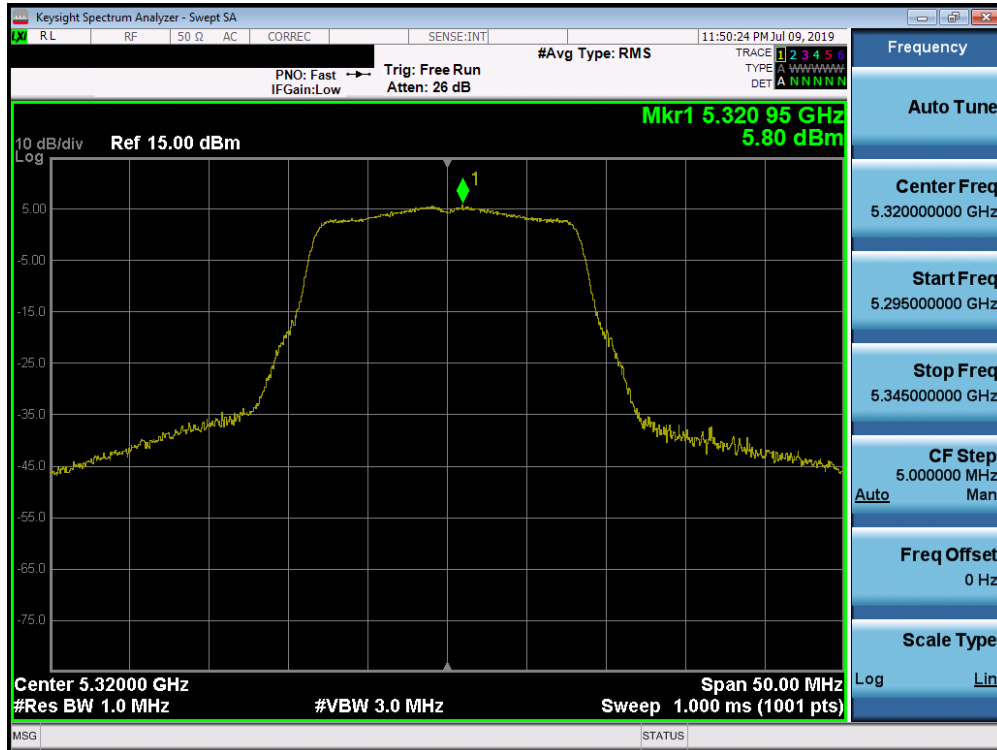


Plot 7-142. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 2A) – Ch. 52)

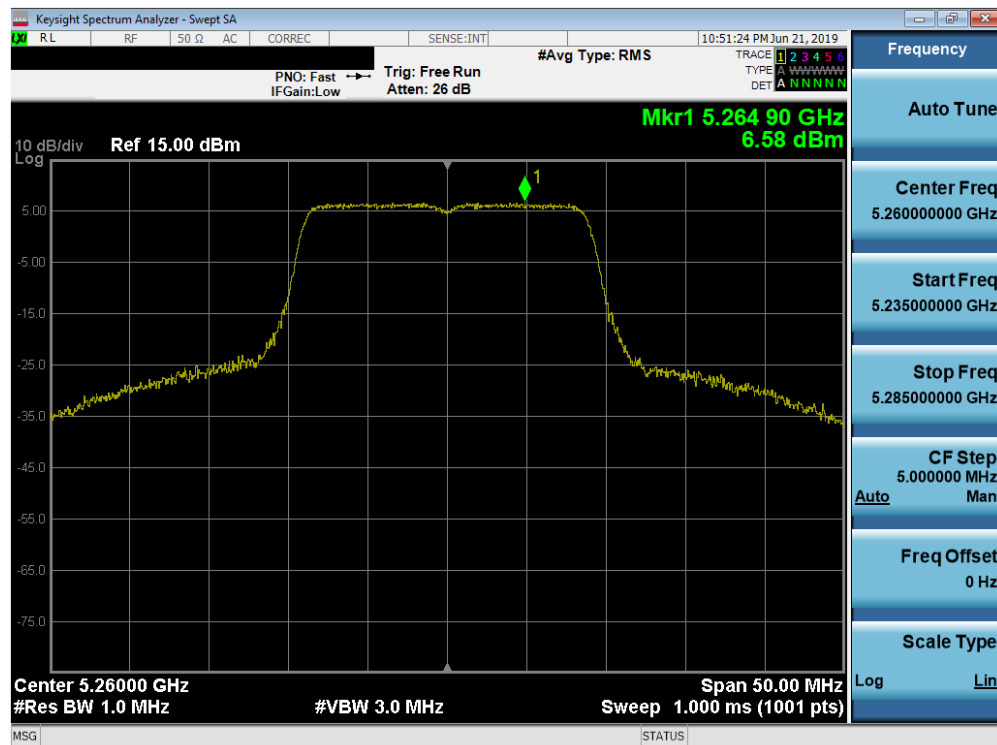


Plot 7-143. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 2A) – Ch. 56)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 103 of 247

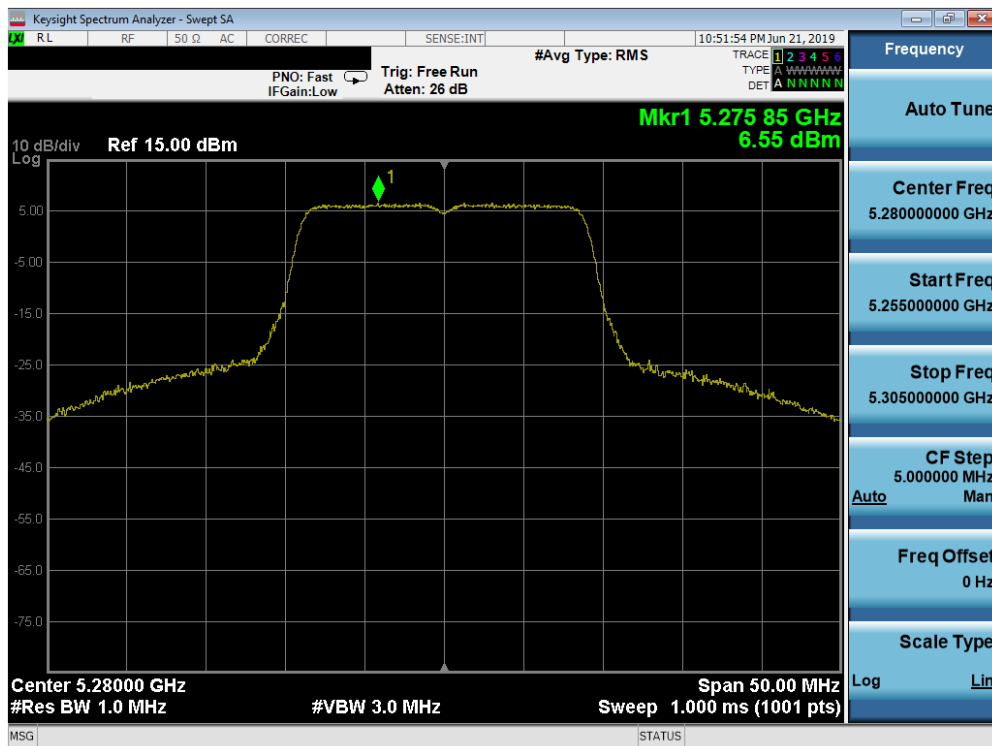


Plot 7-144. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 2A) – Ch. 64)

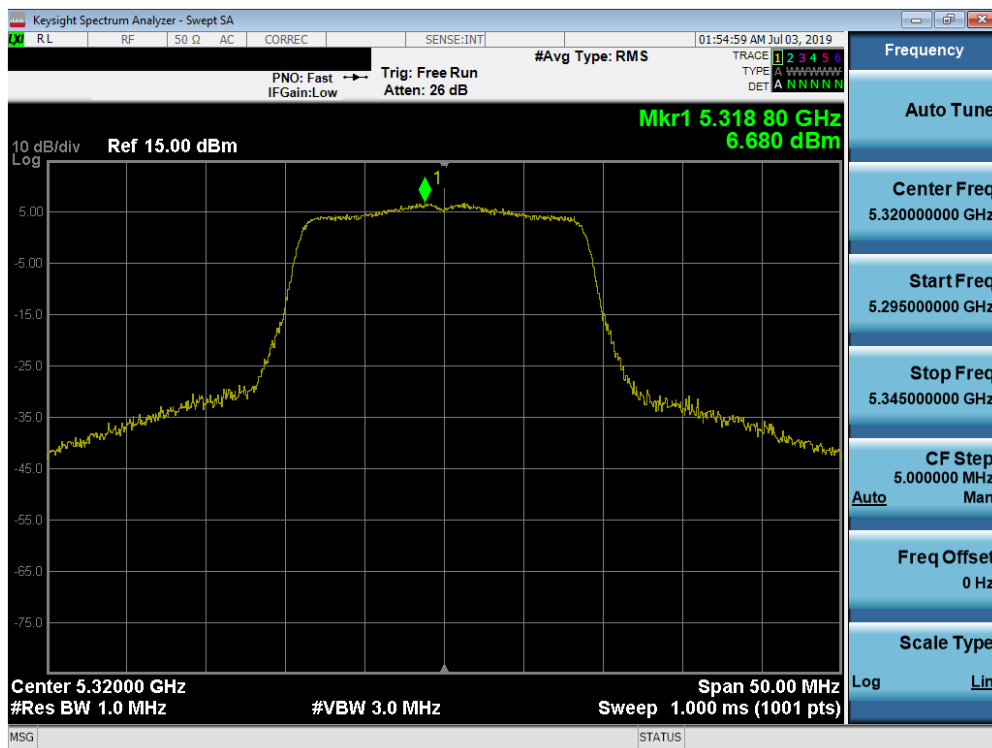


Plot 7-145. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2A) – Ch. 52)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 104 of 247

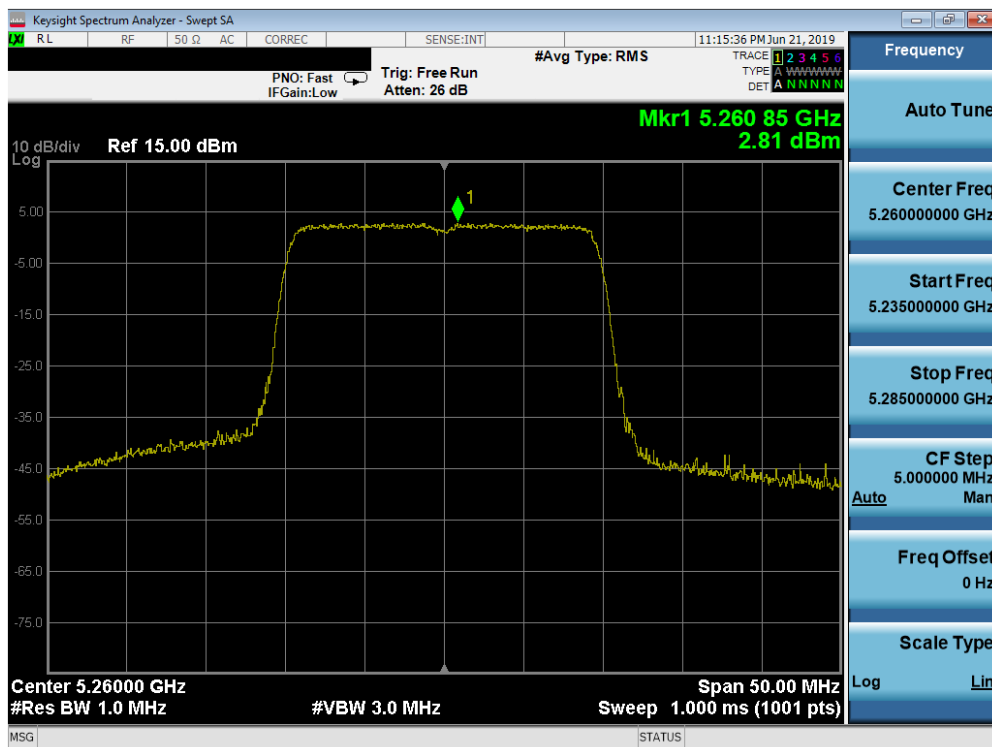


Plot 7-146. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2A) – Ch. 56)

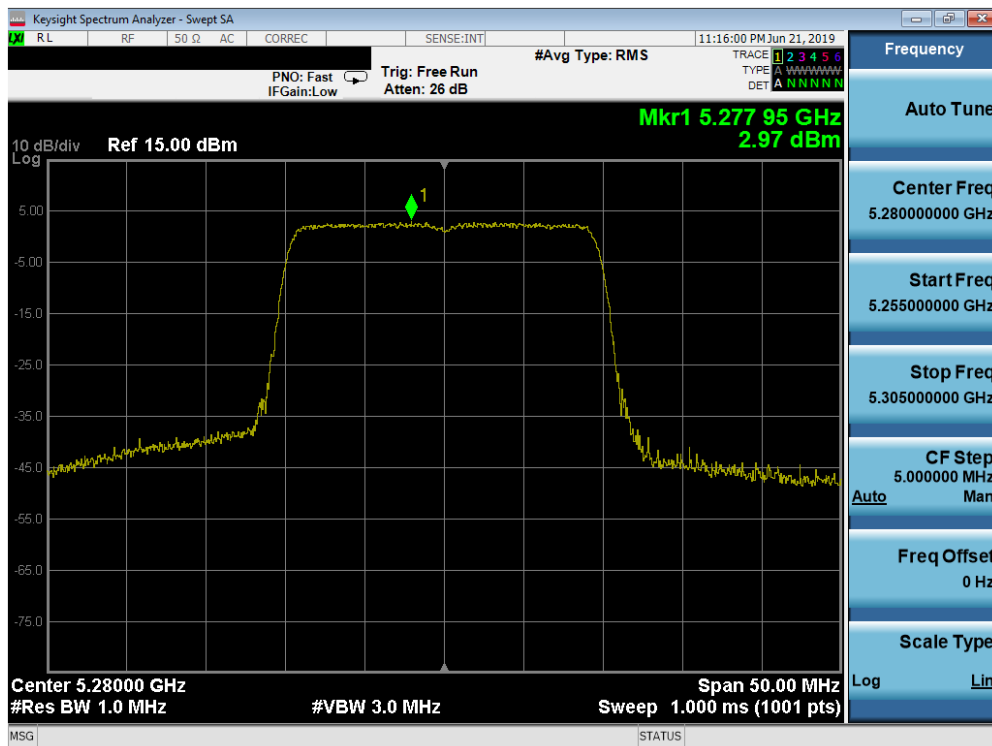


Plot 7-147. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2A) – Ch. 64)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 105 of 247

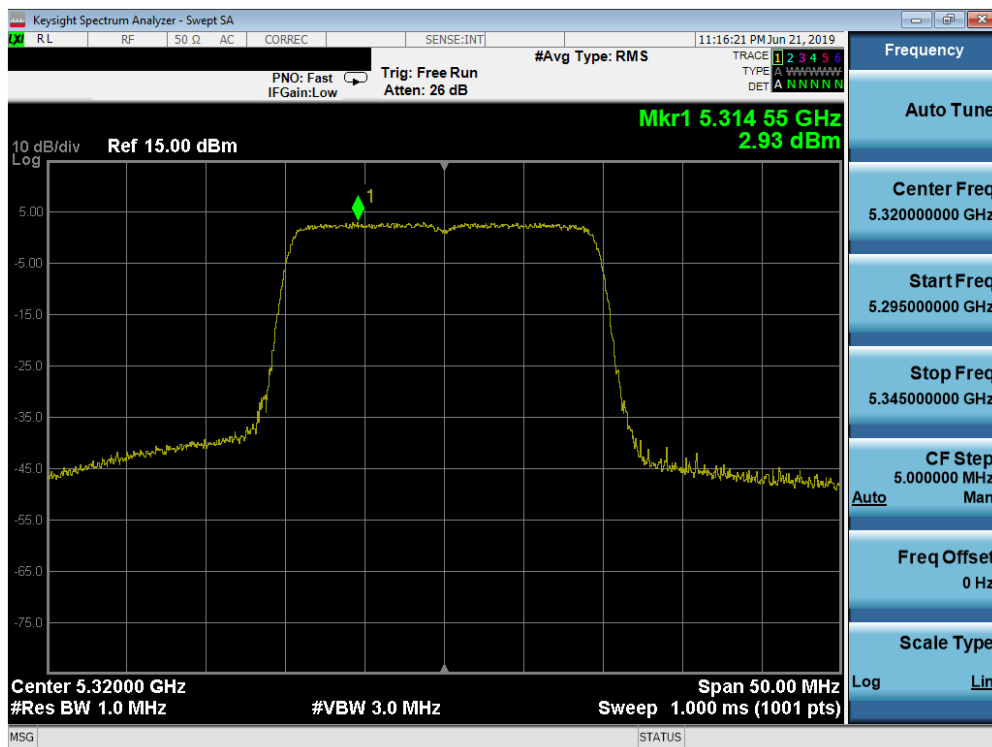


Plot 7-148. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 2A) – Ch. 52)

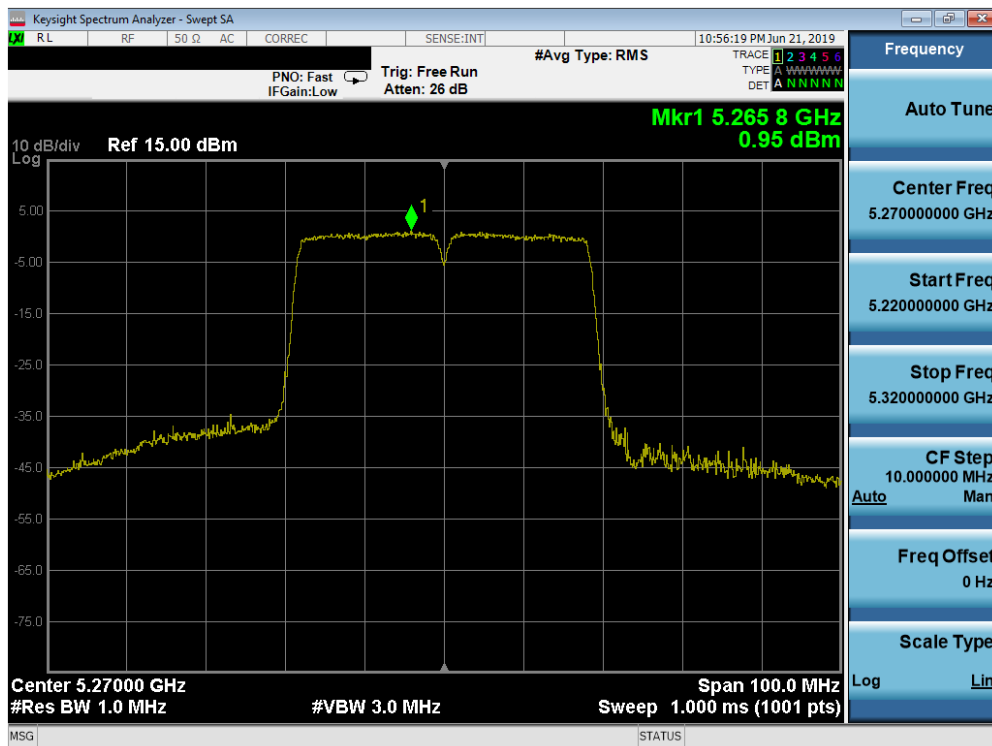


Plot 7-149. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 2A) – Ch. 56)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 106 of 247

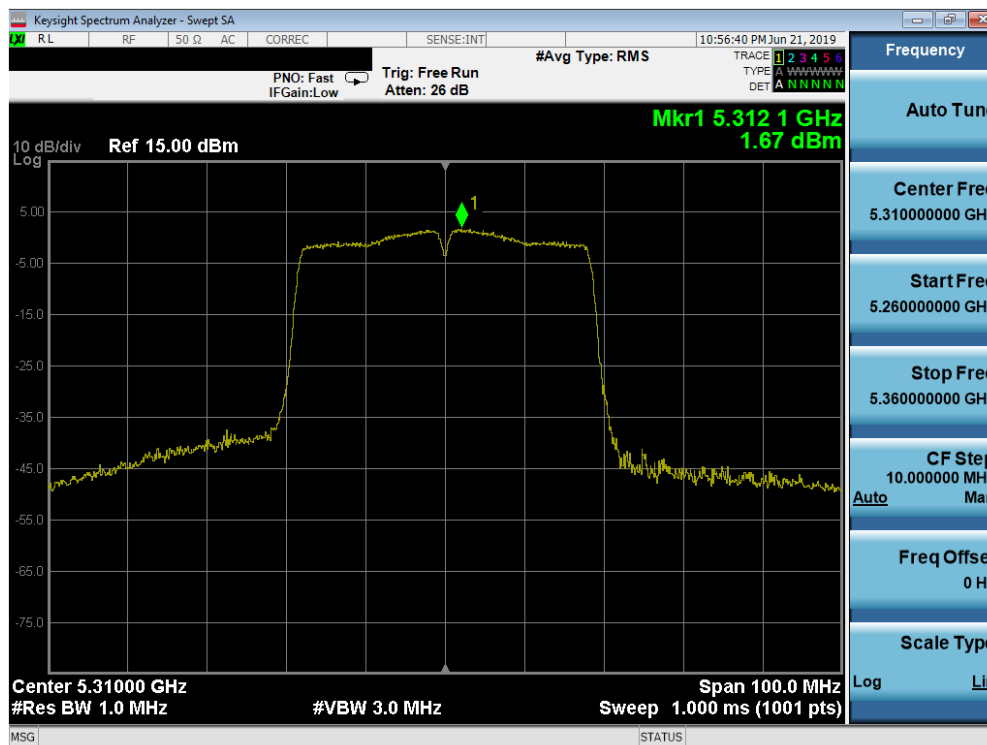


Plot 7-150. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 2A) – Ch. 64)

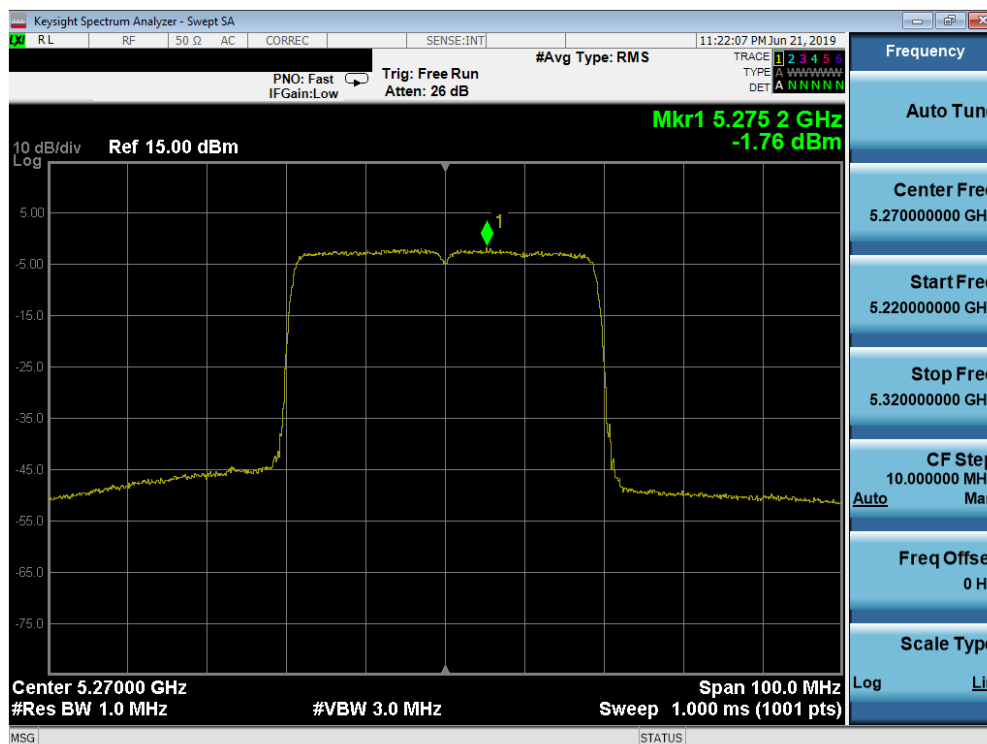


Plot 7-151. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2A) – Ch. 54)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 107 of 247

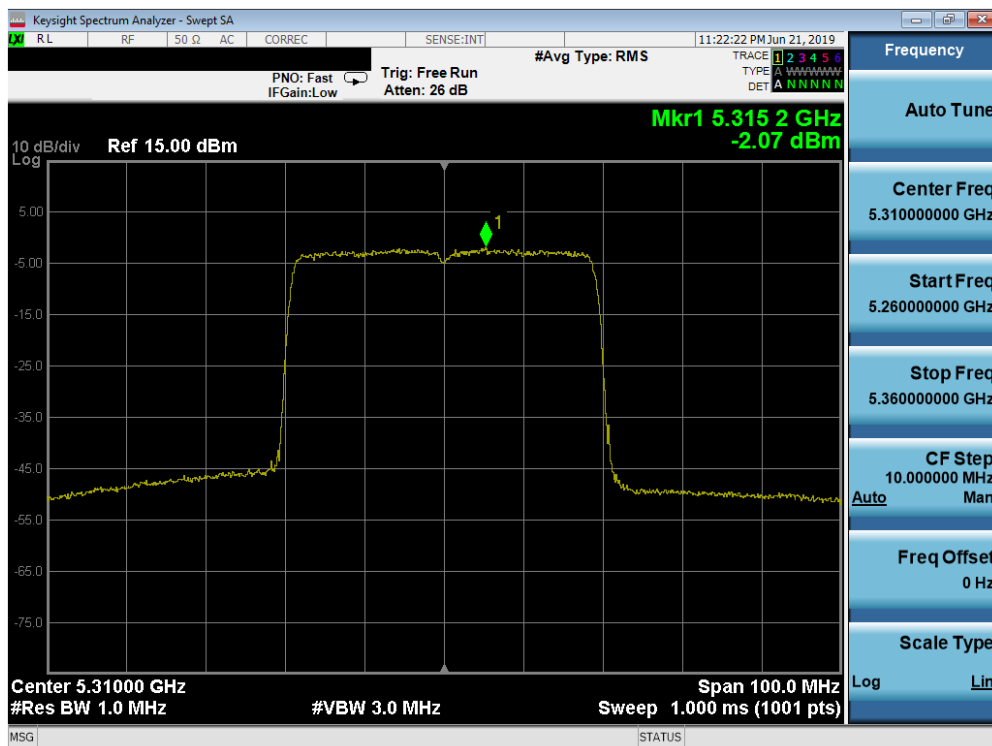


Plot 7-152. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2A) – Ch. 62)

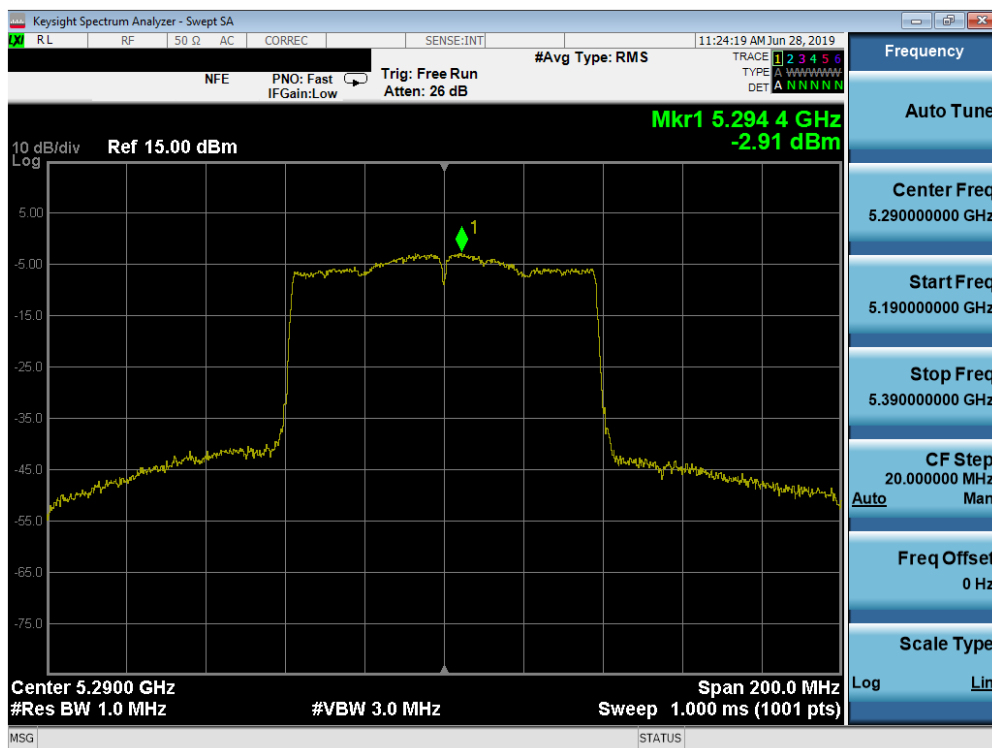


Plot 7-153. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 2A) – Ch. 54)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 108 of 247

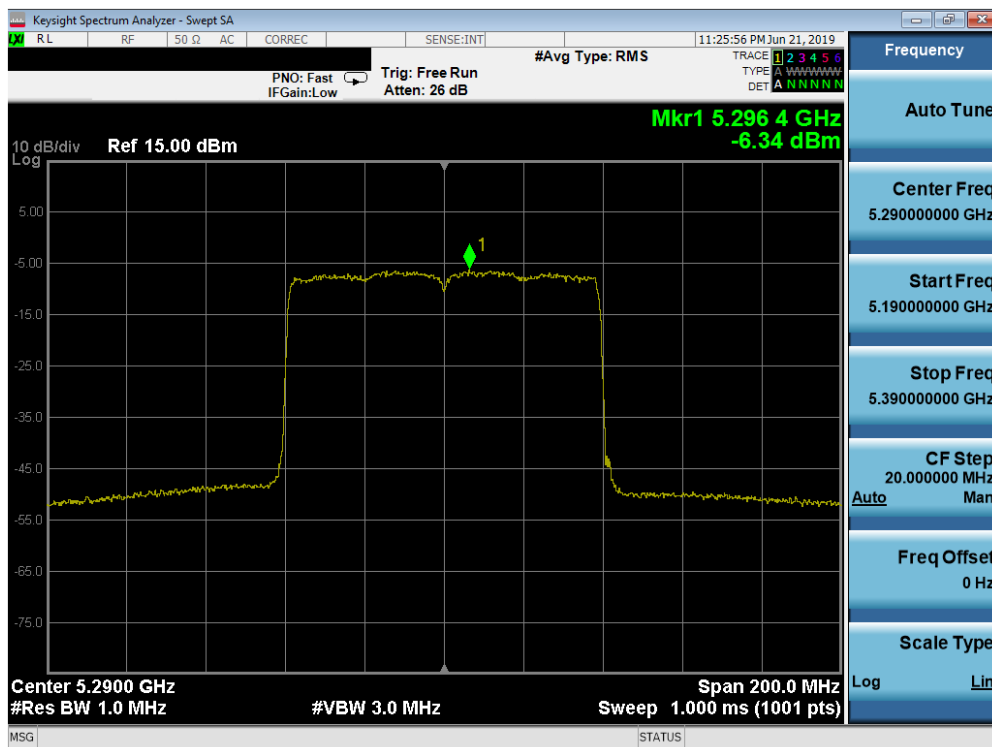


Plot 7-154. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 2A) – Ch. 62)

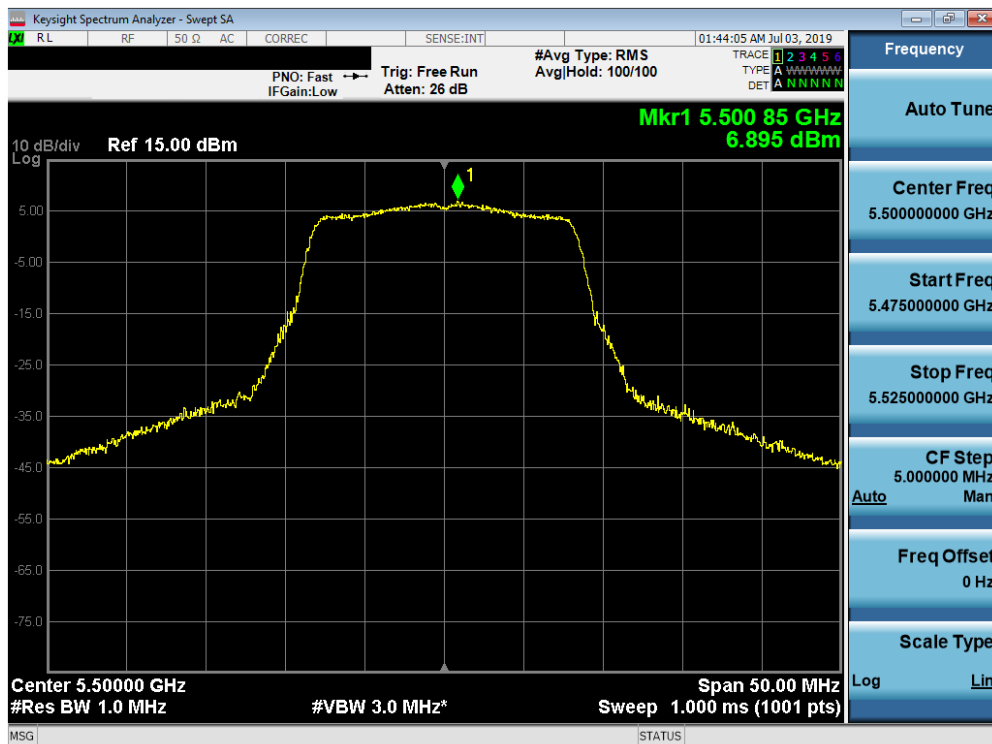


Plot 7-155. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 2A) – Ch. 58)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 109 of 247

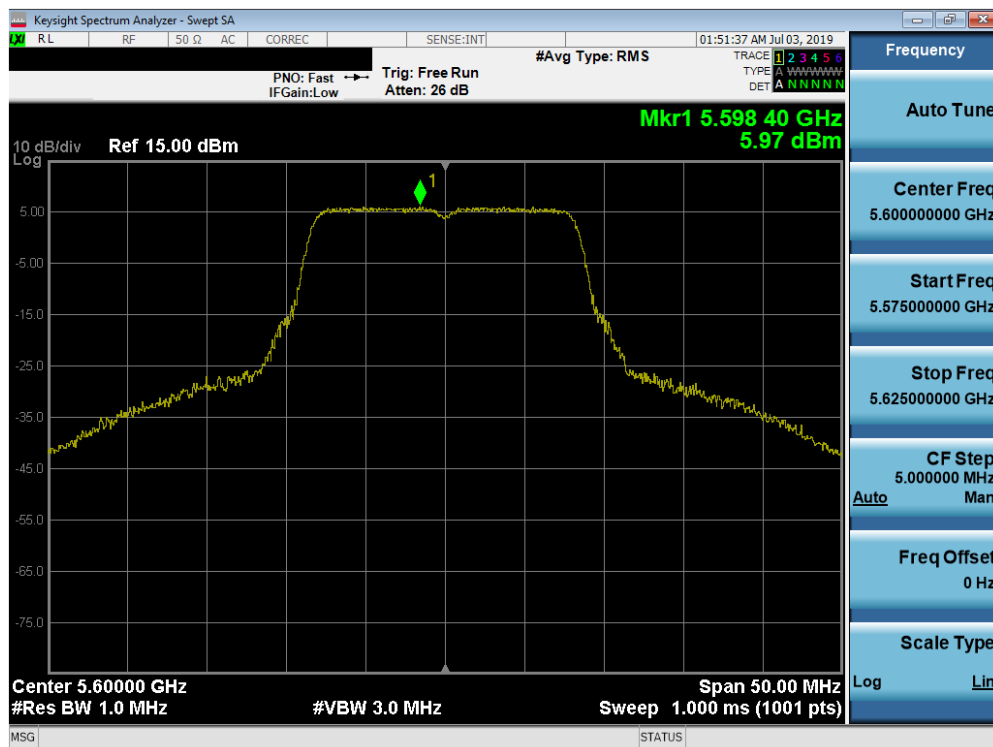


Plot 7-156. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ax (UNII Band 2A) – Ch. 58)

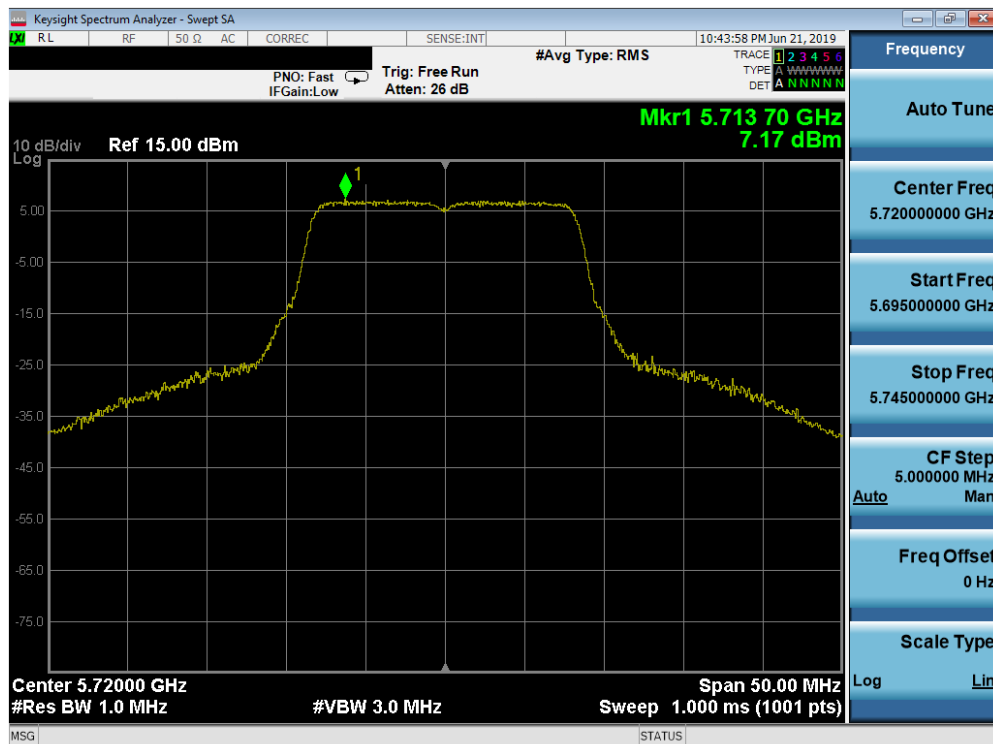


Plot 7-157. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 2C) – Ch. 100)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 110 of 247

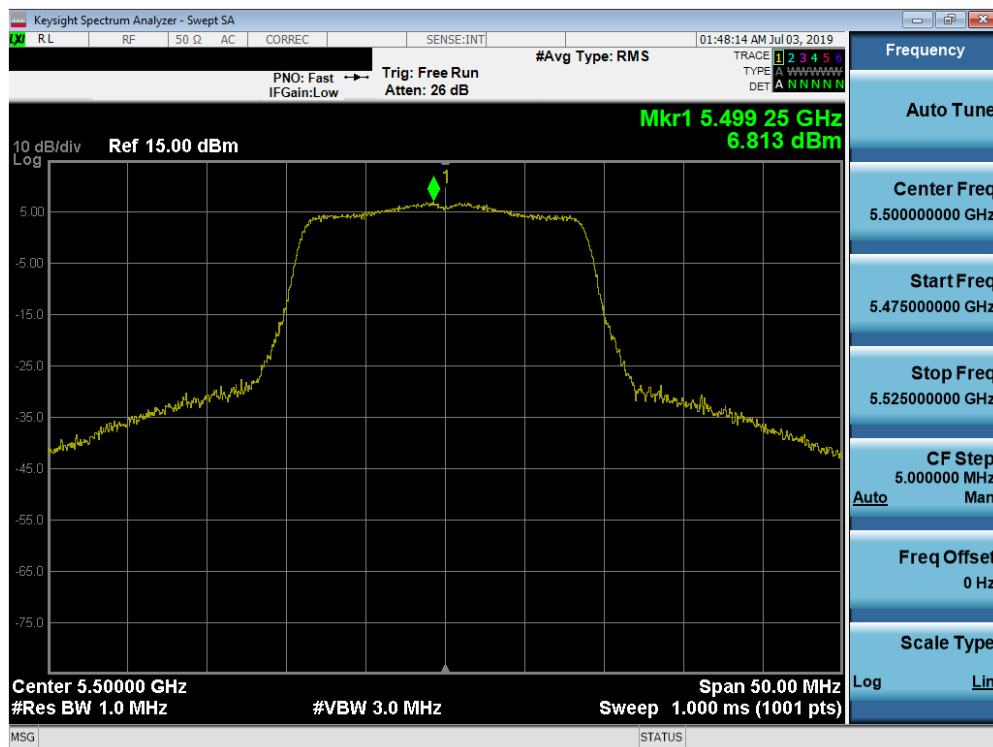


Plot 7-158. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 2C) – Ch. 120)

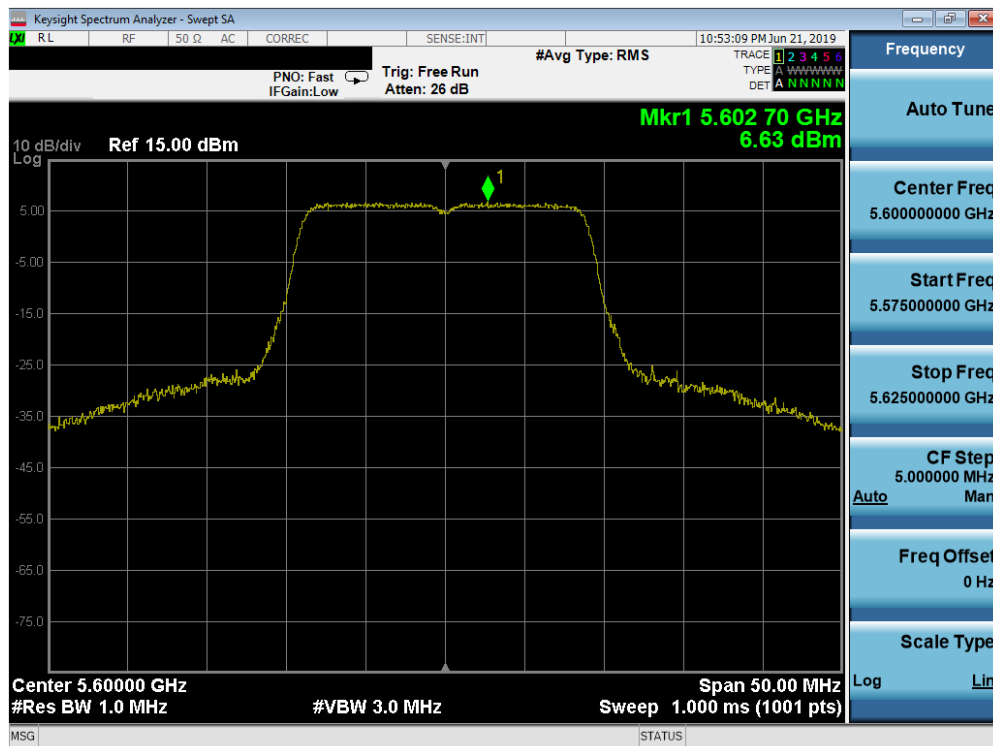


Plot 7-159. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 2C) – Ch. 144)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 111 of 247

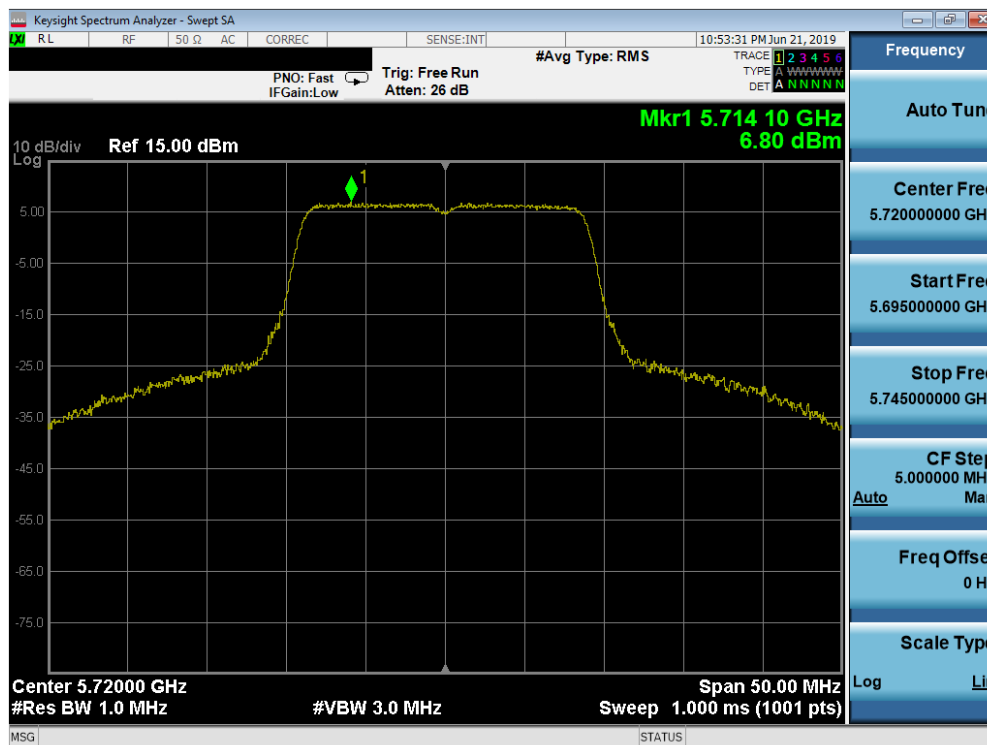


Plot 7-160. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2C) – Ch. 100)

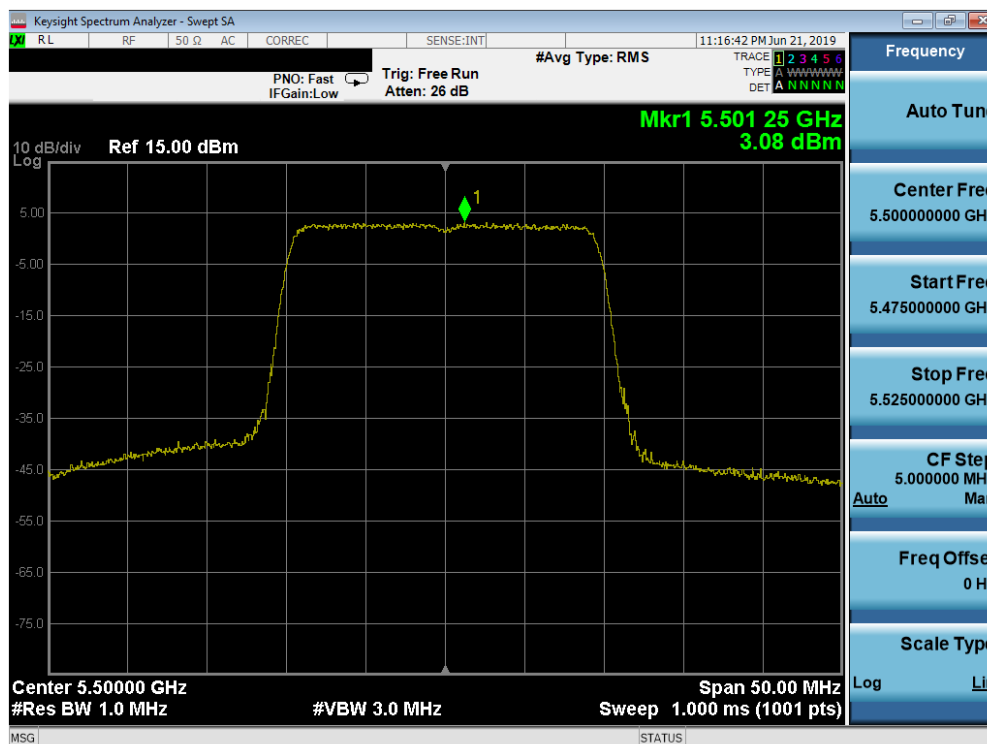


Plot 7-161. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2C) – Ch. 120)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 112 of 247

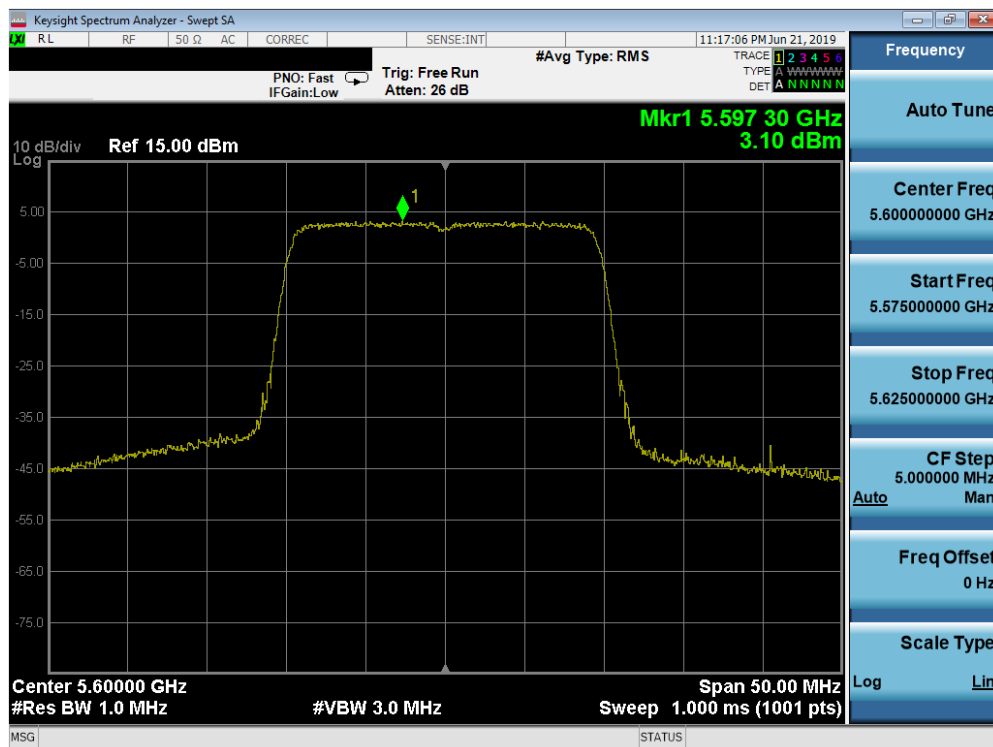


Plot 7-162. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 2C) – Ch. 144)

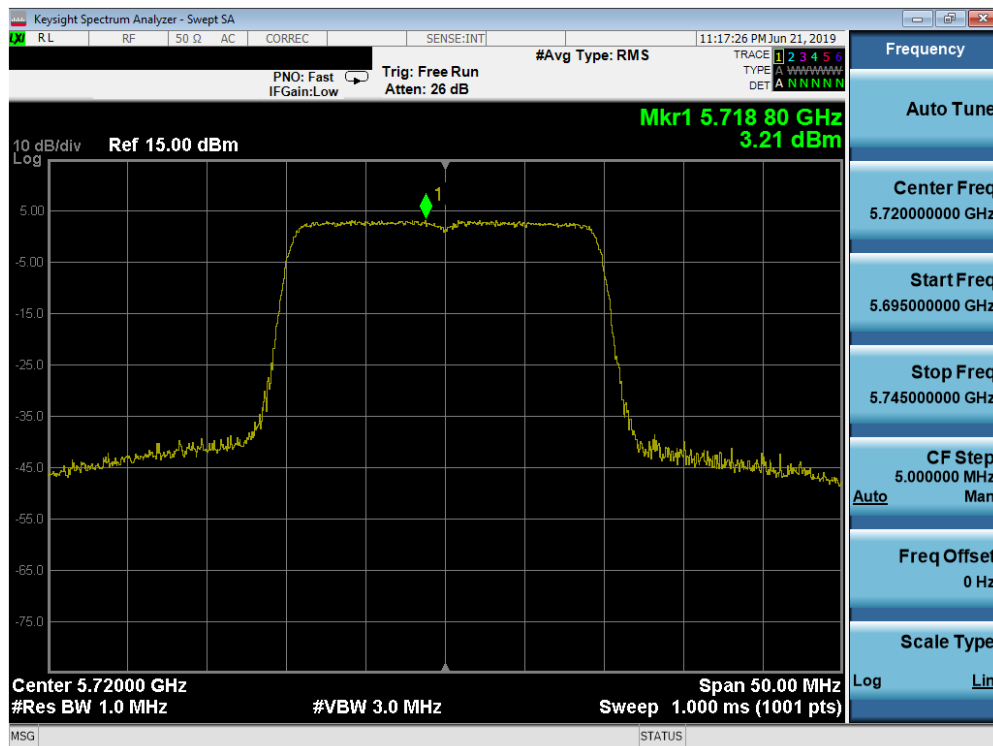


Plot 7-163. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 2C) – Ch. 100)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 113 of 247

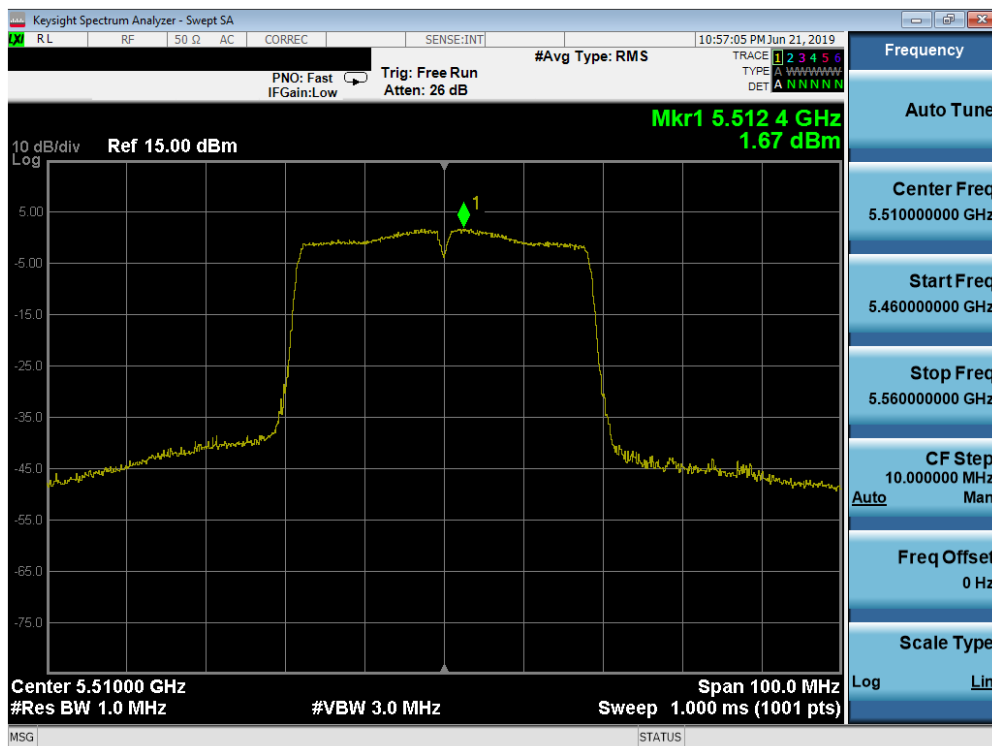


Plot 7-164. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 2C) – Ch. 120)

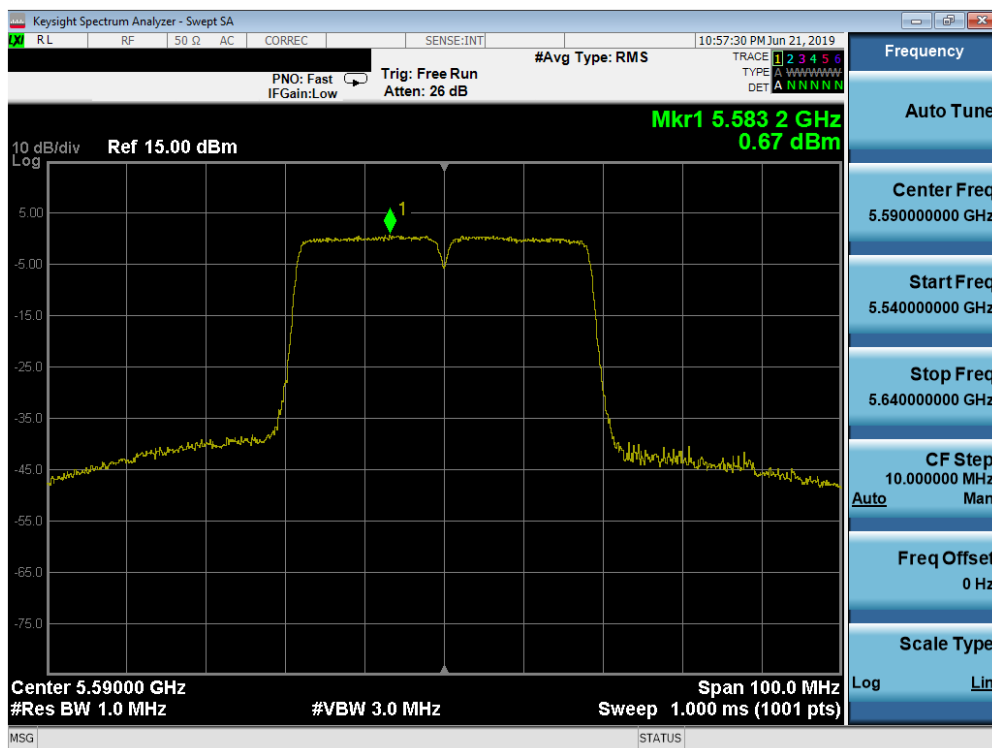


Plot 7-165. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 2C) – Ch. 120)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 114 of 247

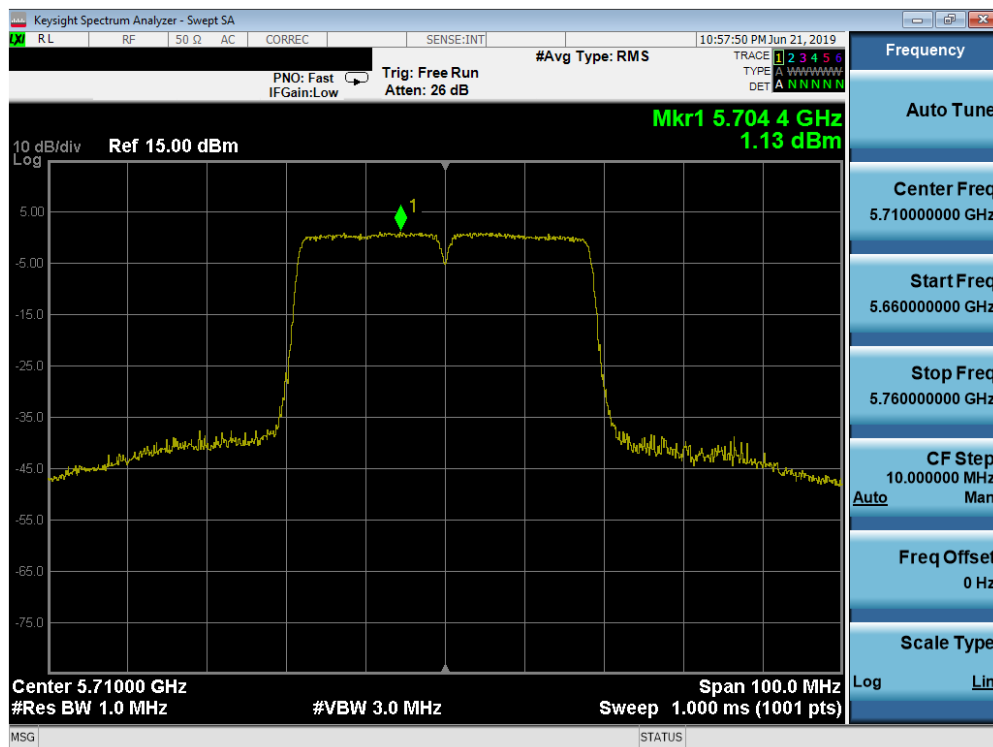


Plot 7-166. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2C) – Ch. 102)

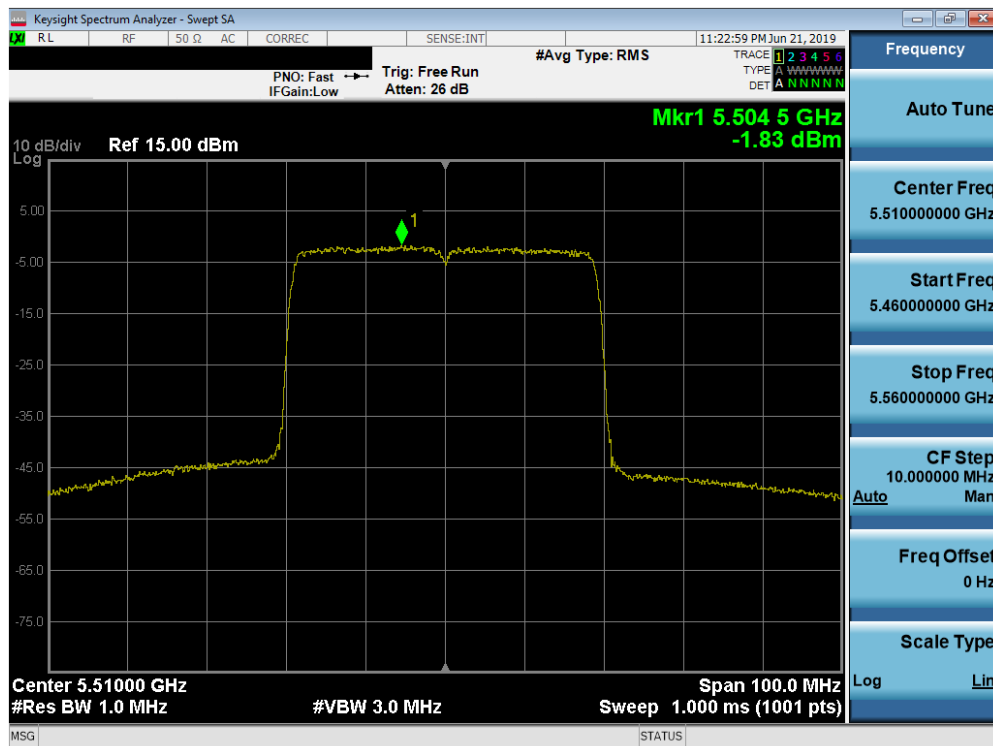


Plot 7-167. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2C) – Ch. 118)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 115 of 247

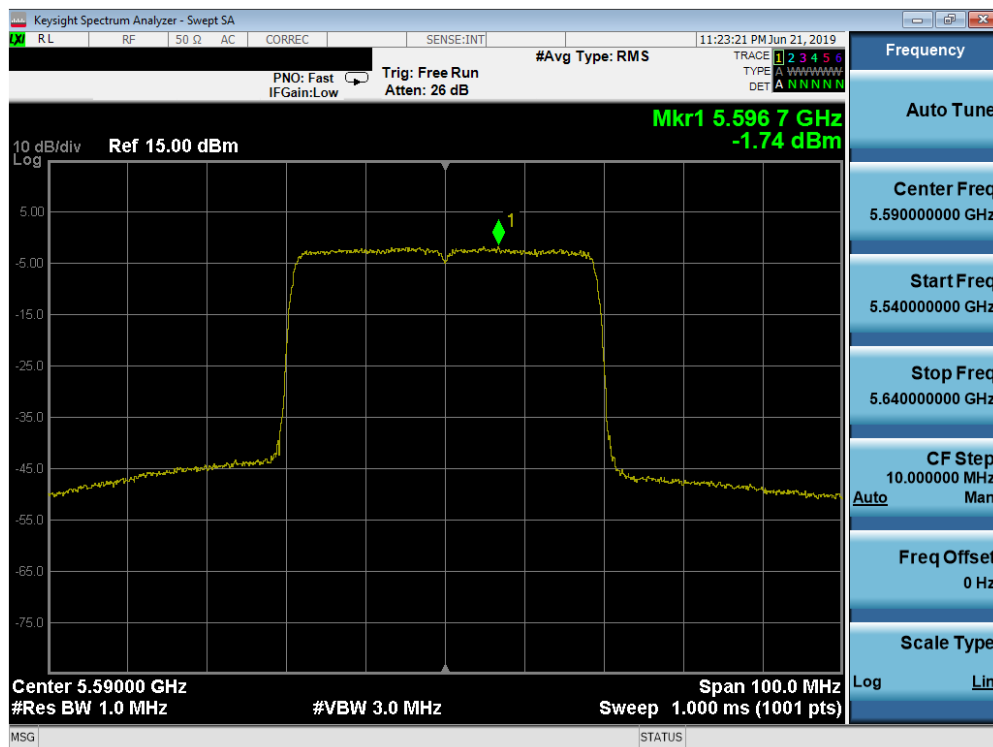


Plot 7-168. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2C) – Ch. 142)

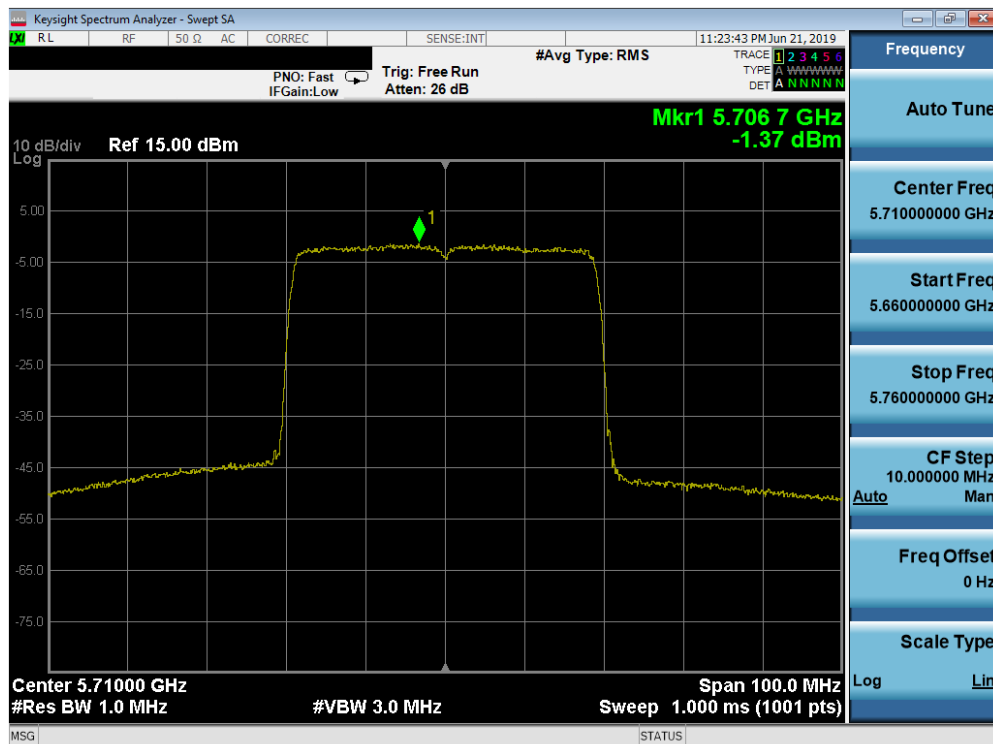


Plot 7-169. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2C) – Ch. 102)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 116 of 247

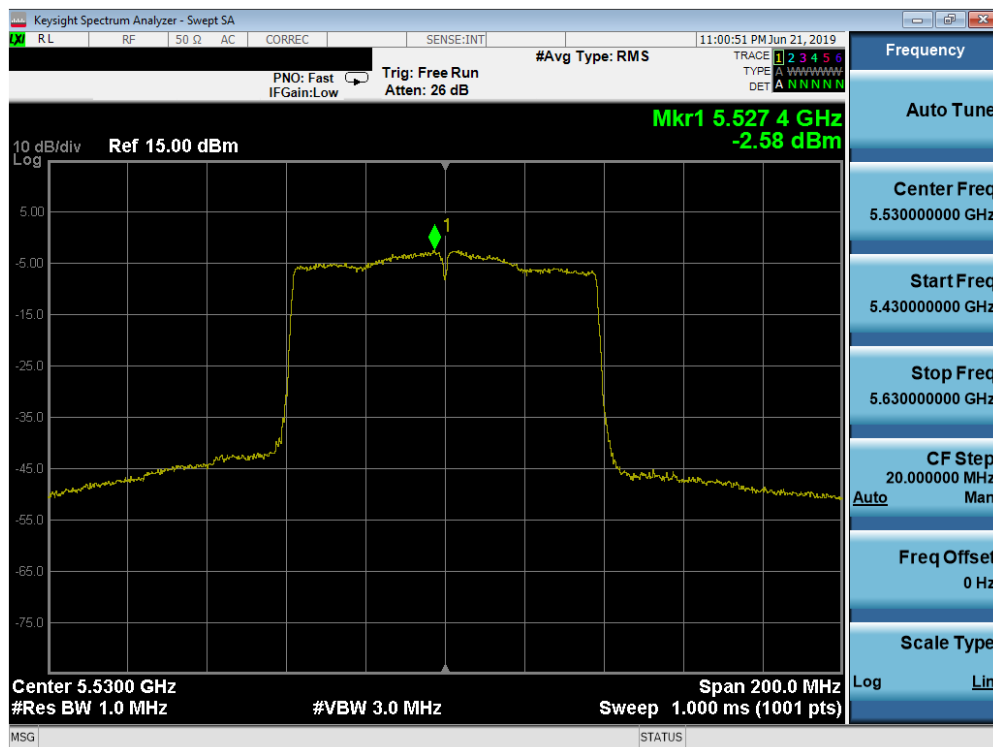


Plot 7-170. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2C) – Ch. 118)

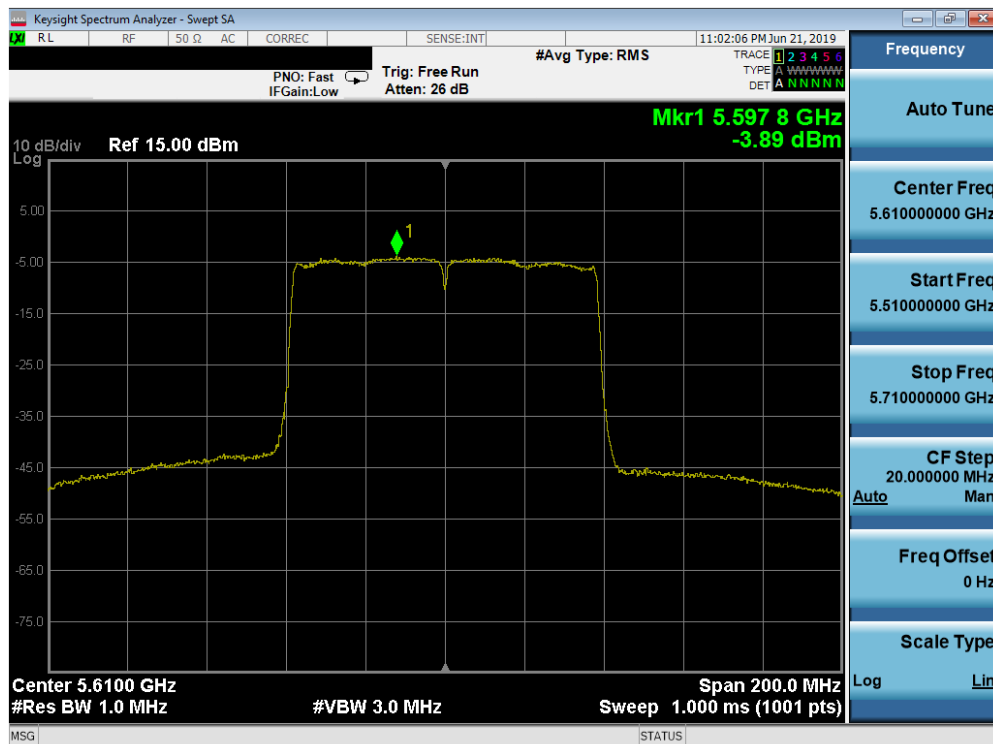


Plot 7-171. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 2C) – Ch. 142)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 117 of 247

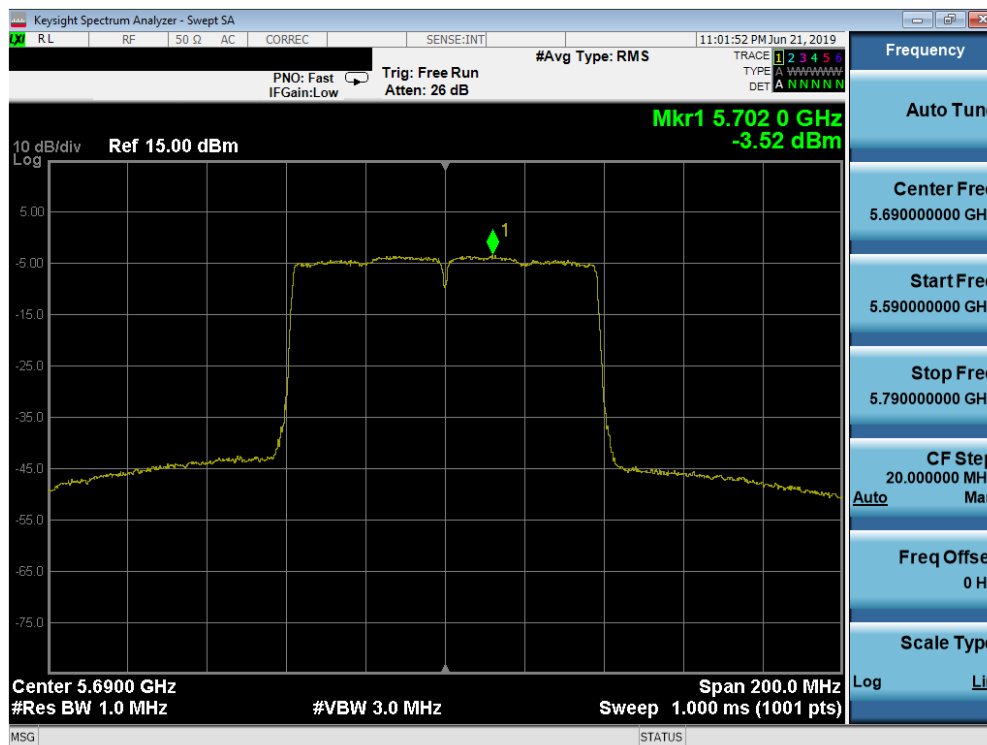


Plot 7-172. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 2C) – Ch. 106)

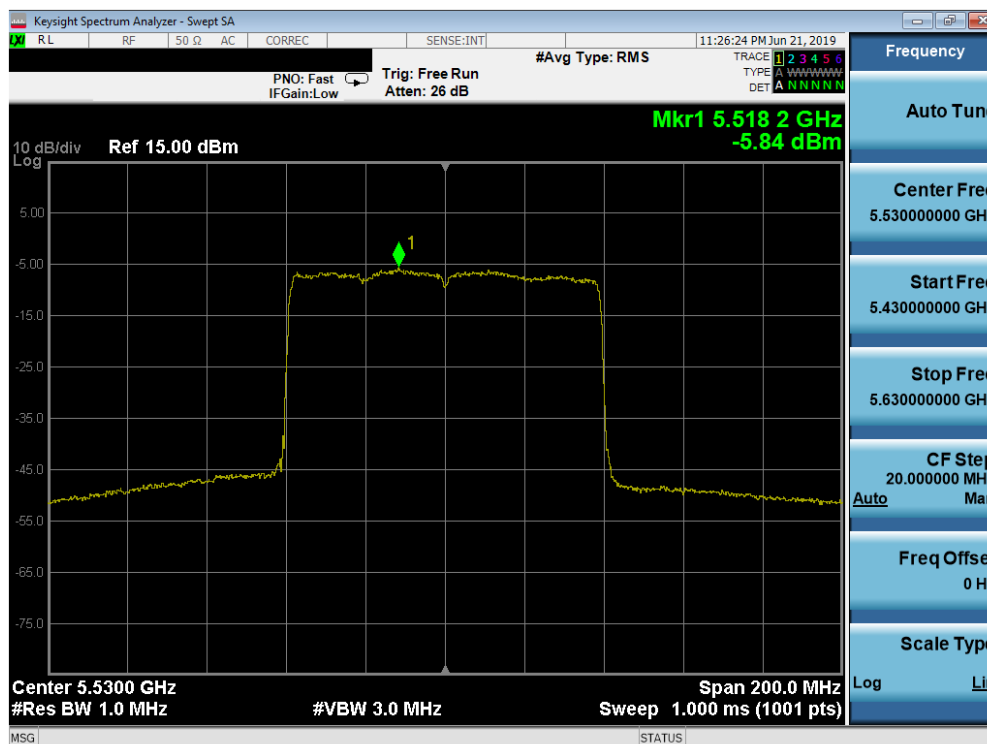


Plot 7-173. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 2C) – Ch. 122)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 118 of 247

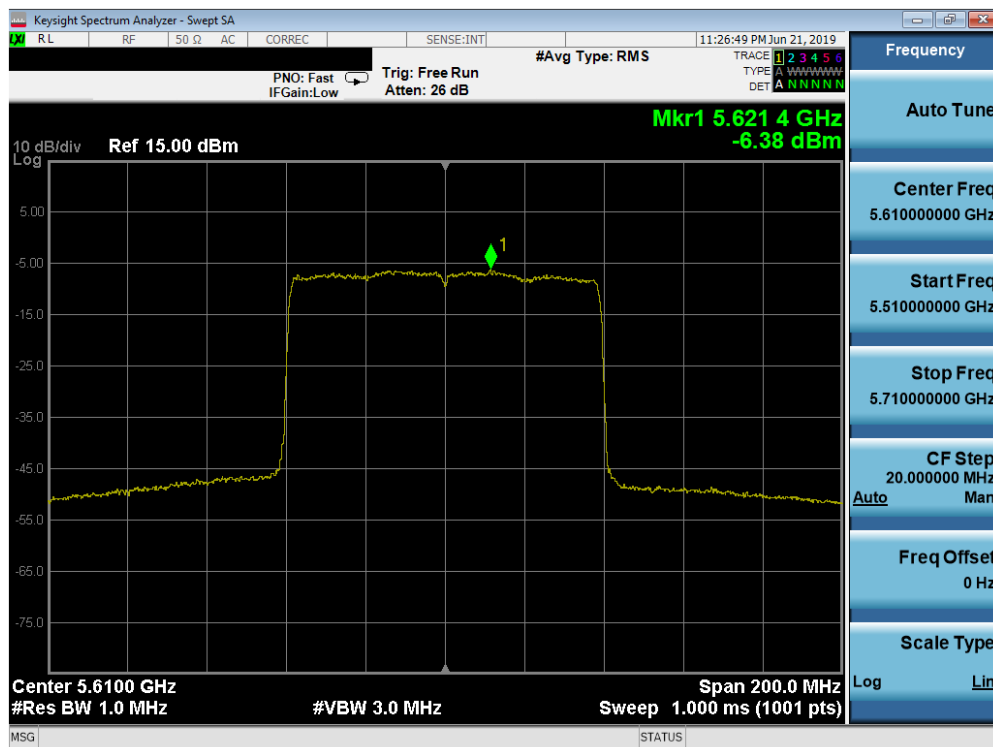


Plot 7-174. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 2C) – Ch. 138)

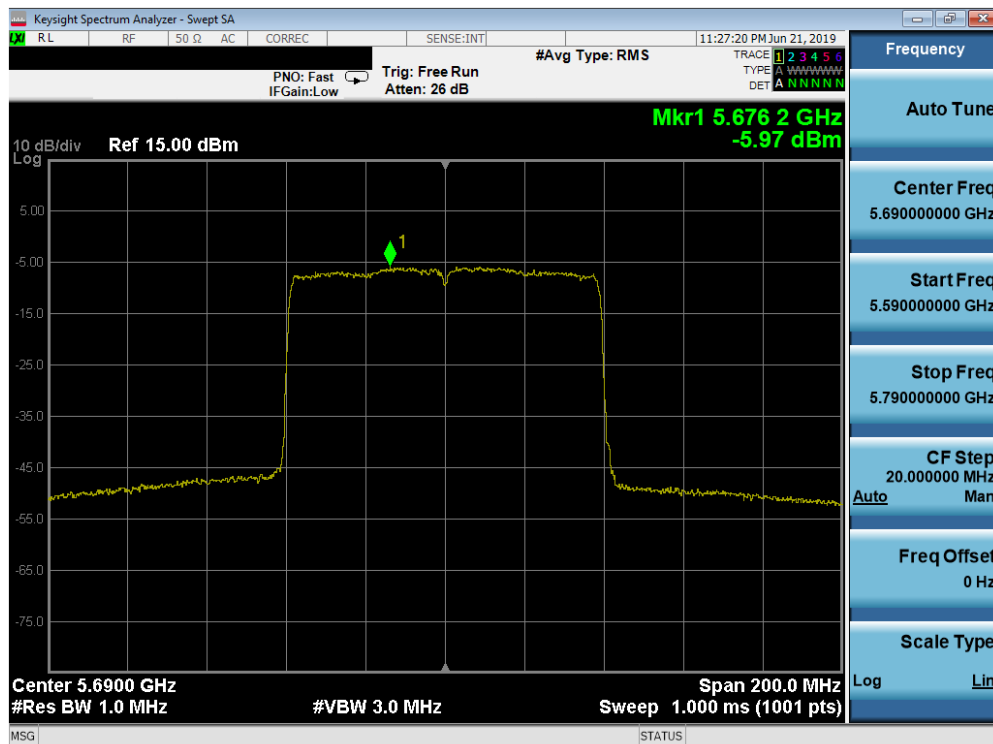


Plot 7-175. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ax (UNII Band 2C) – Ch. 106)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 119 of 247



Plot 7-176. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ax (UNII Band 2C) – Ch. 122)

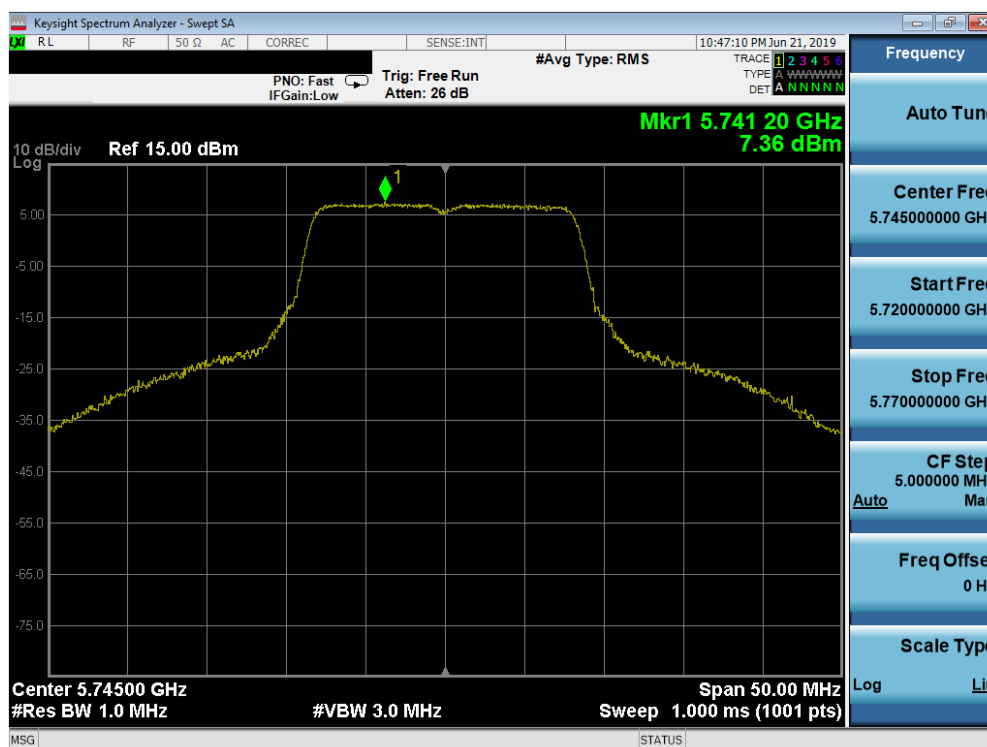


Plot 7-177. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ax (UNII Band 2C) – Ch. 138)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 120 of 247

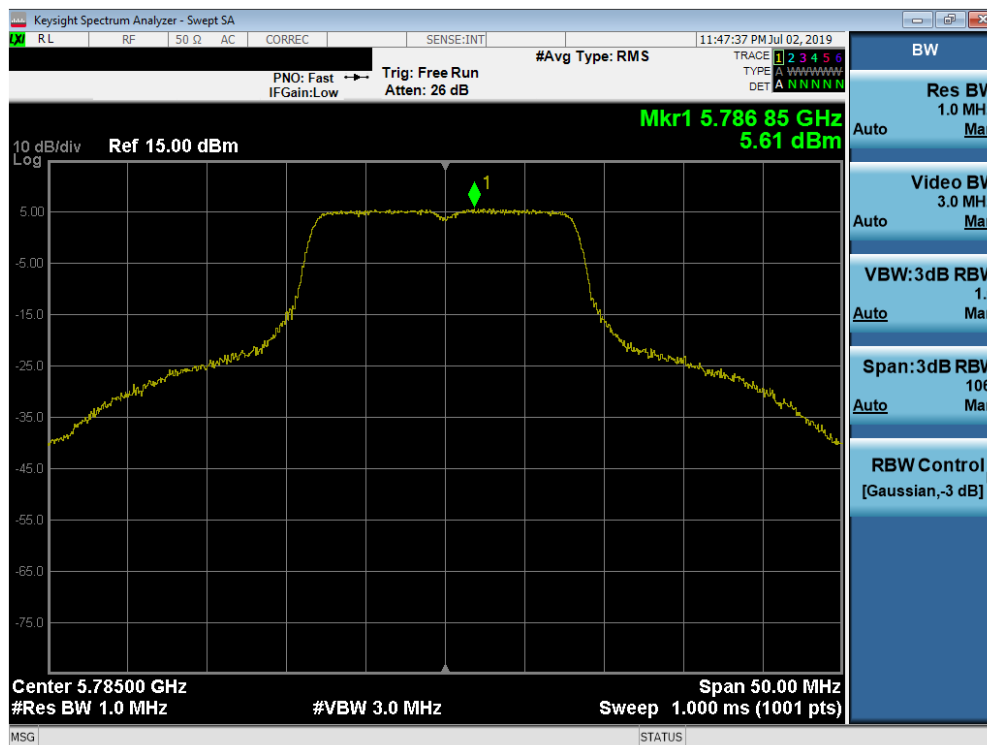
	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Density [dBm]	Max Permissible Power Density [dBm/500kHz]	Margin [dB]
Band 3	5745	149	a	6	7.36	30.0	-22.64
	5785	157	a	6	5.61	30.0	-24.39
	5825	165	a	6	7.26	30.0	-22.74
	5745	149	n (20MHz)	6.5/7.2 (MCS0)	6.84	30.0	-23.16
	5785	157	n (20MHz)	6.5/7.2 (MCS0)	6.90	30.0	-23.10
	5825	165	n (20MHz)	6.5/7.2 (MCS0)	6.73	30.0	-23.27
	5745	149	ax (20MHz)	6.5/7.2 (MCS0)	2.88	30.0	-27.12
	5785	157	ax (20MHz)	6.5/7.2 (MCS0)	3.04	30.0	-26.96
	5825	165	ax (20MHz)	6.5/7.2 (MCS0)	2.70	30.0	-27.30
	5755	151	n (40MHz)	13.5/15 (MCS0)	0.92	30.0	-29.08
	5795	159	n (40MHz)	13.5/15 (MCS0)	0.85	30.0	-29.15
	5755	151	ax (40MHz)	13.5/15 (MCS0)	-1.78	30.0	-31.78
	5795	159	ax (40MHz)	13.5/15 (MCS0)	-1.80	30.0	-31.80
	5775	155	ac (80MHz)	29.3/32.5 (MCS0)	-3.48	30.0	-33.48
	5775	155	ax (80MHz)	29.3/32.5 (MCS0)	-6.08	30.0	-36.08

Table 7-23. Band 3 Conducted Power Spectral Density Measurements SISO ANT1

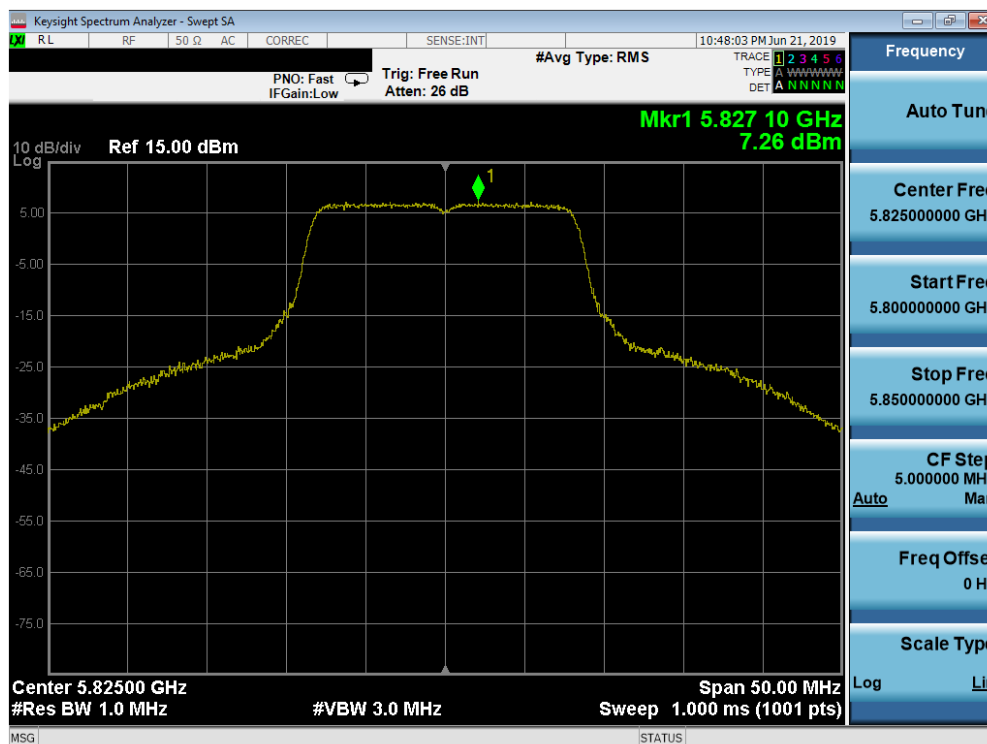


Plot 7-178. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 3) – Ch. 149)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 121 of 247

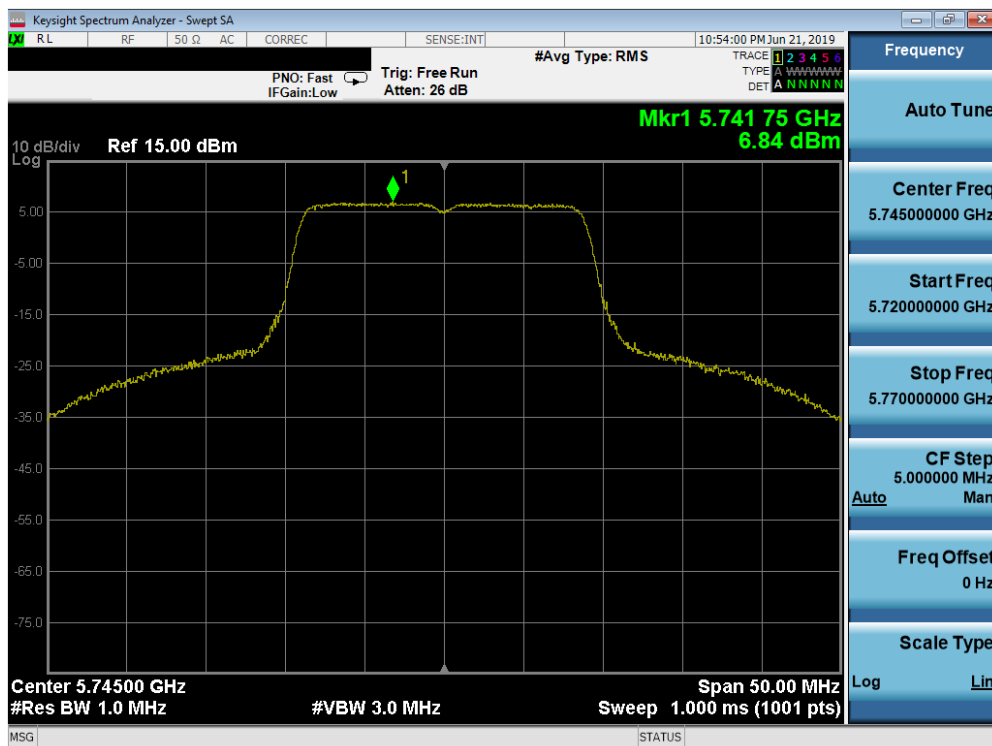


Plot 7-179. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 3) – Ch. 157)

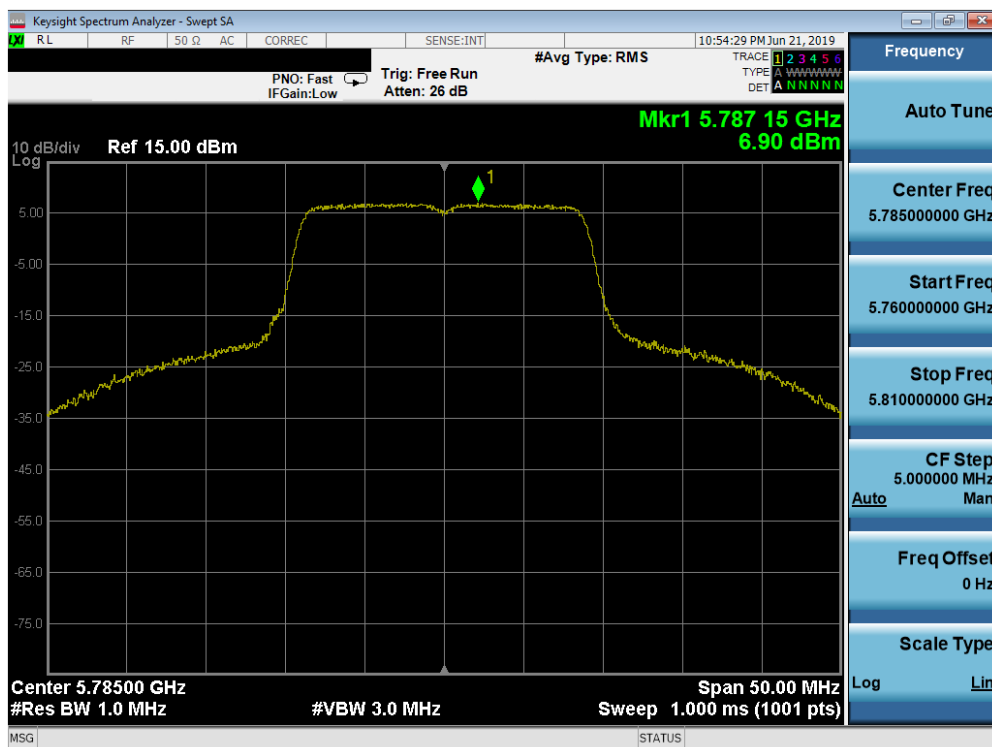


Plot 7-180. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 3) – Ch. 165)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 122 of 247

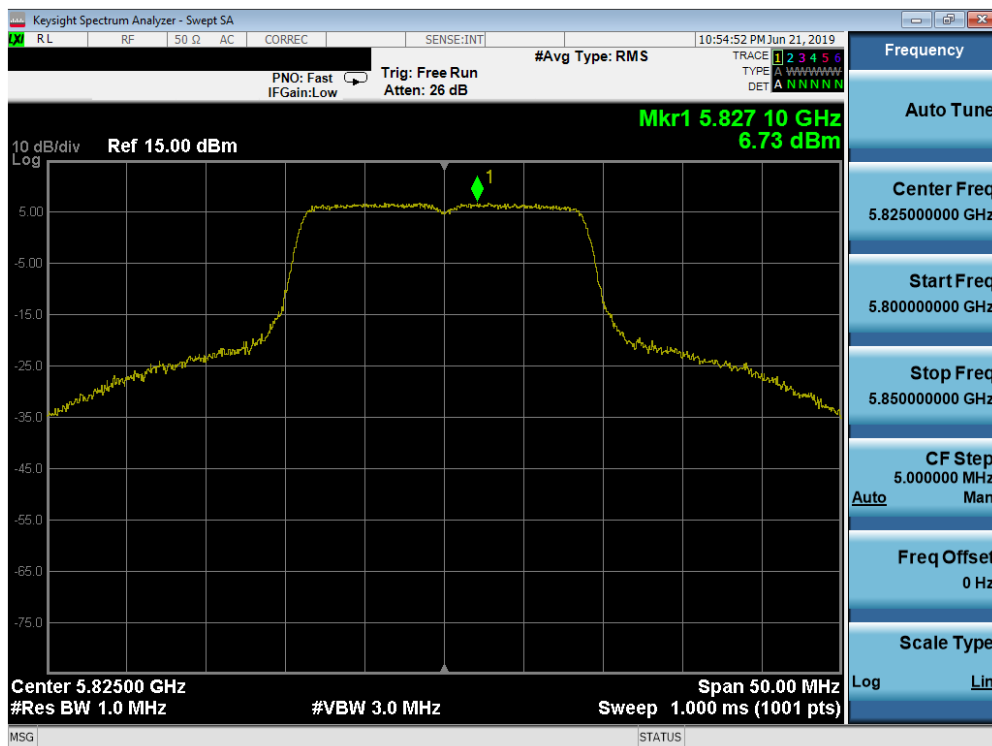


Plot 7-181. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 3) – Ch. 149)

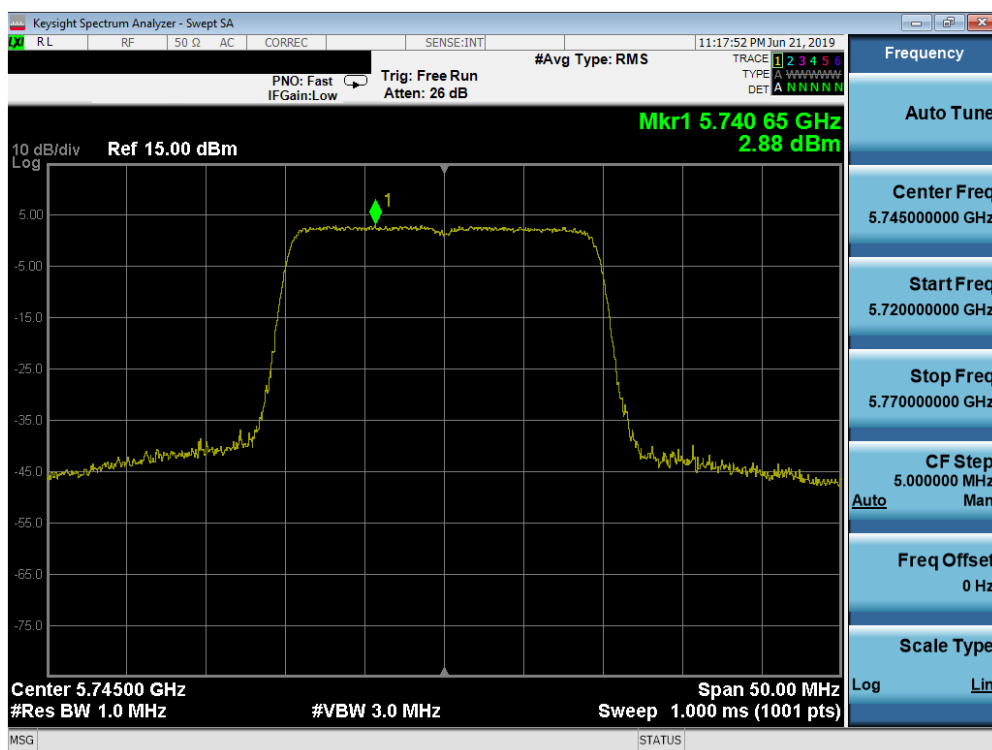


Plot 7-182. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 3) – Ch. 157)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 123 of 247

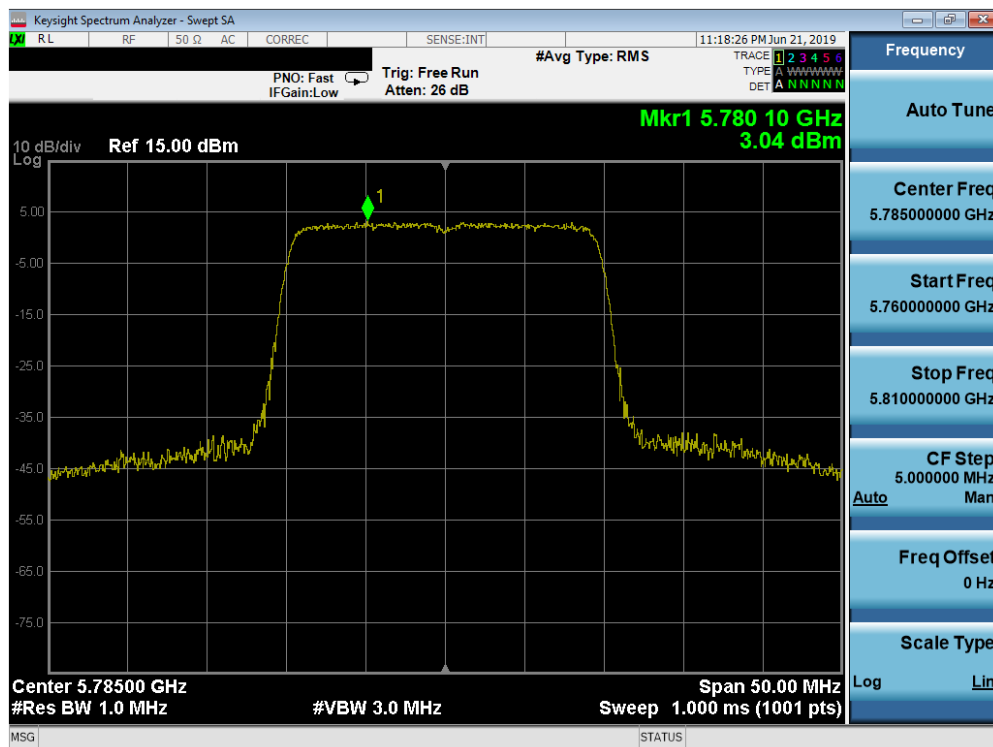


Plot 7-183. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 3) – Ch. 165)

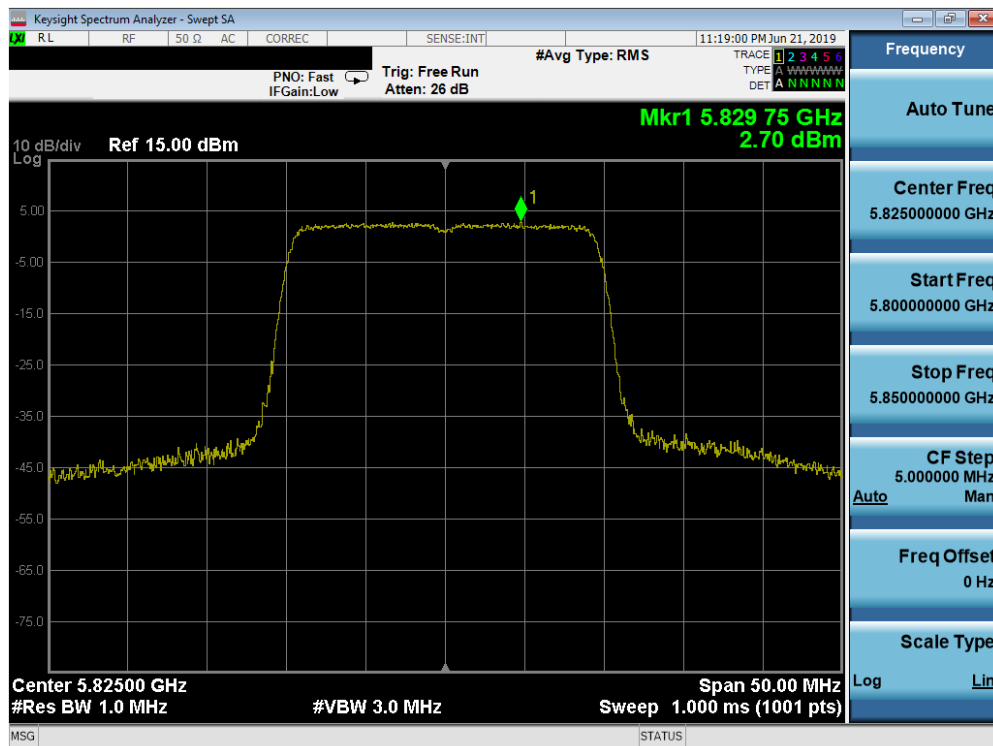


Plot 7-184. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 3) – Ch. 149)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 124 of 247

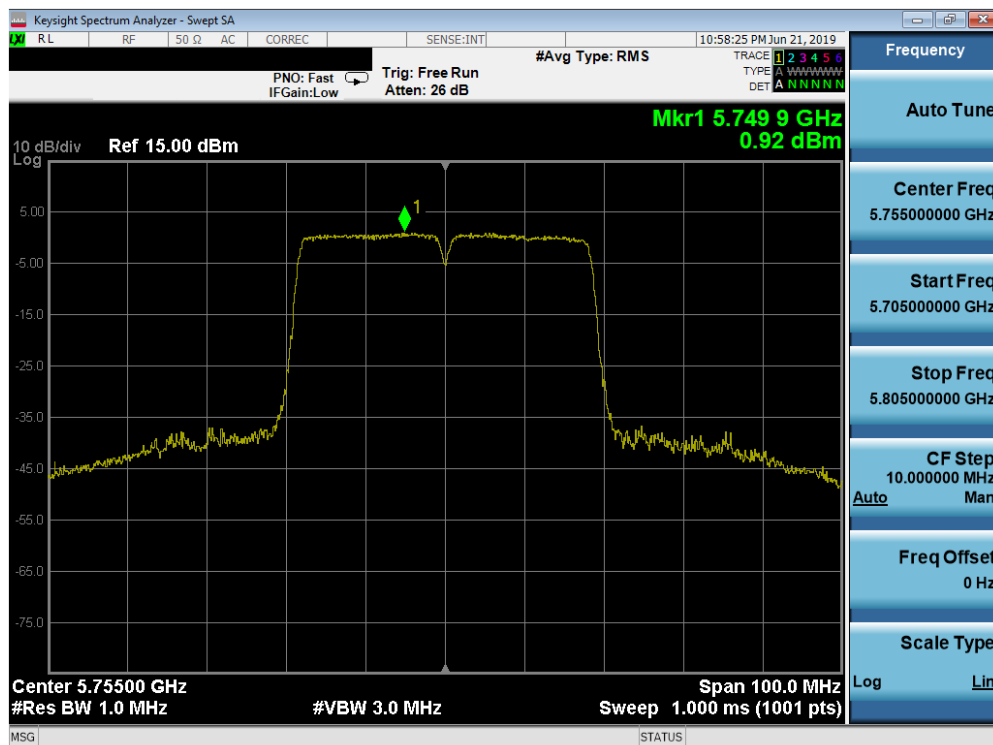


Plot 7-185. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 3) – Ch. 157)

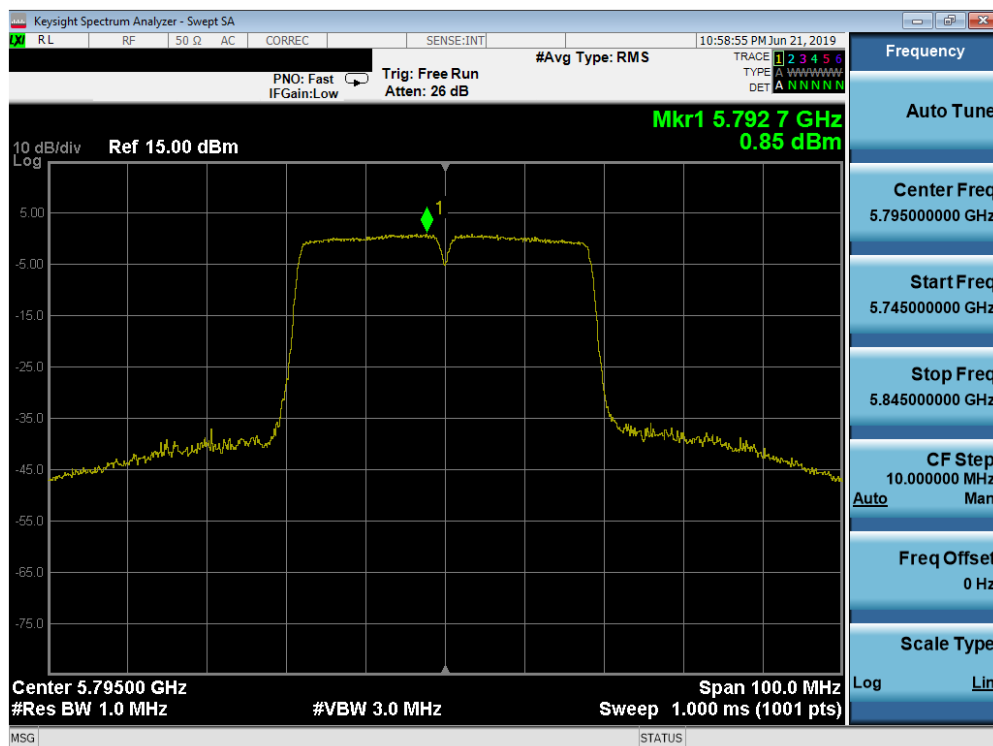


Plot 7-186. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11ax (UNII Band 3) – Ch. 165)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 125 of 247

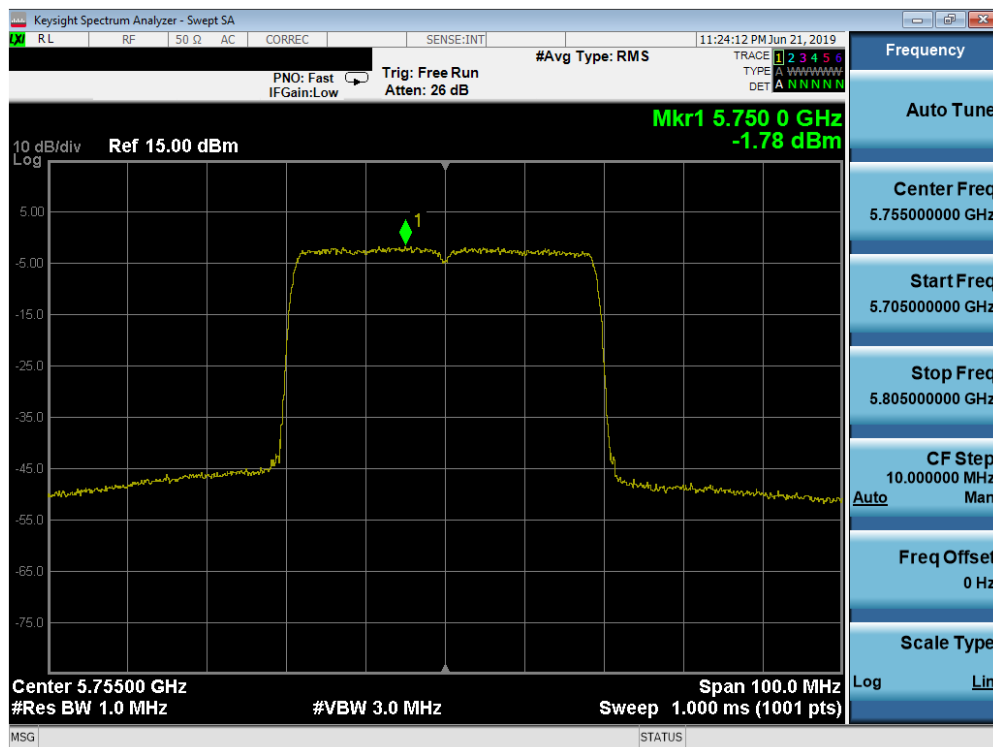


Plot 7-187. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 3) – Ch. 151)

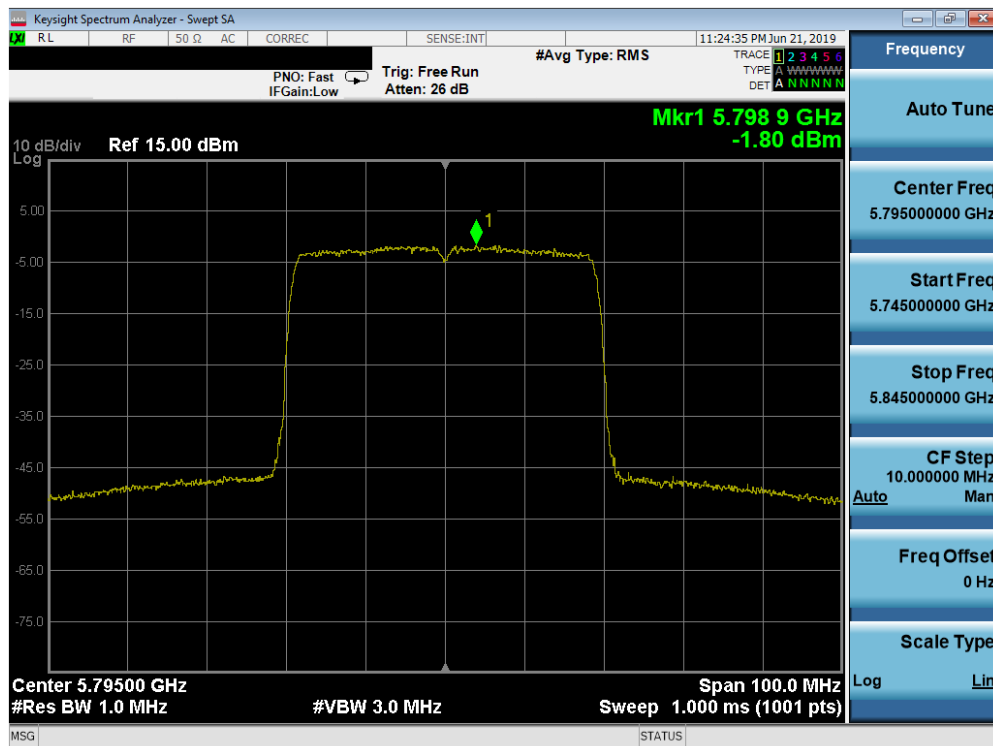


Plot 7-188. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 3) – Ch. 159)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 126 of 247

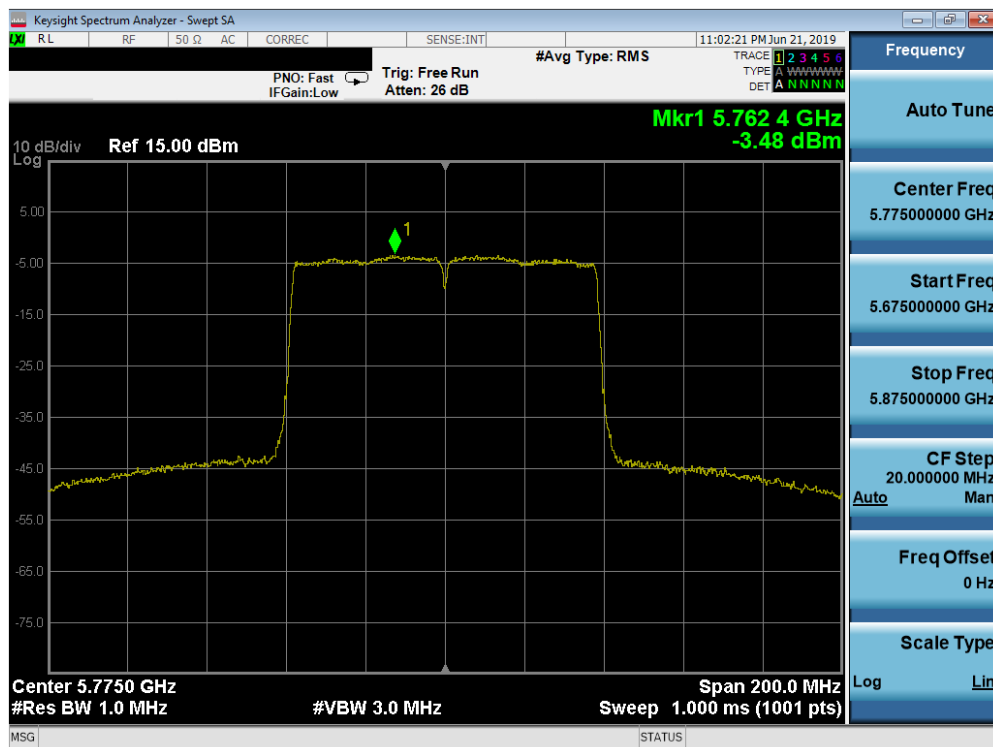


Plot 7-189. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 3) – Ch. 151)

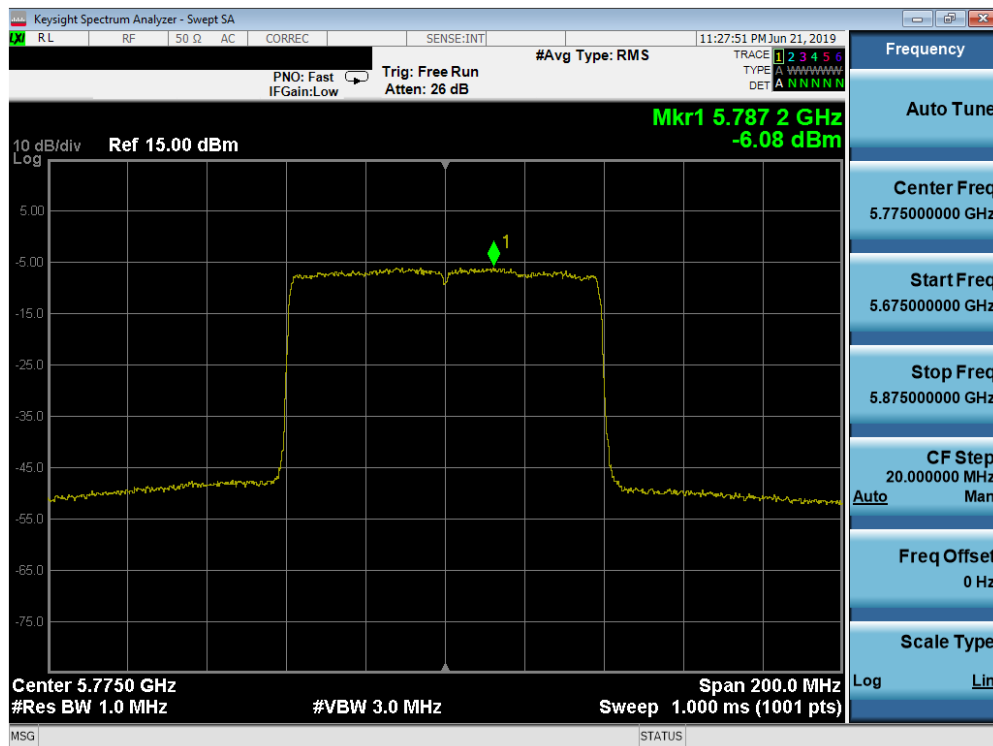


Plot 7-190. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11ax (UNII Band 3) – Ch. 159)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 127 of 247



Plot 7-191. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 3) – Ch. 155)



Plot 7-192. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ax (UNII Band 3) – Ch. 155)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 128 of 247

SISO Antenna-2 Power Spectral Density Measurements

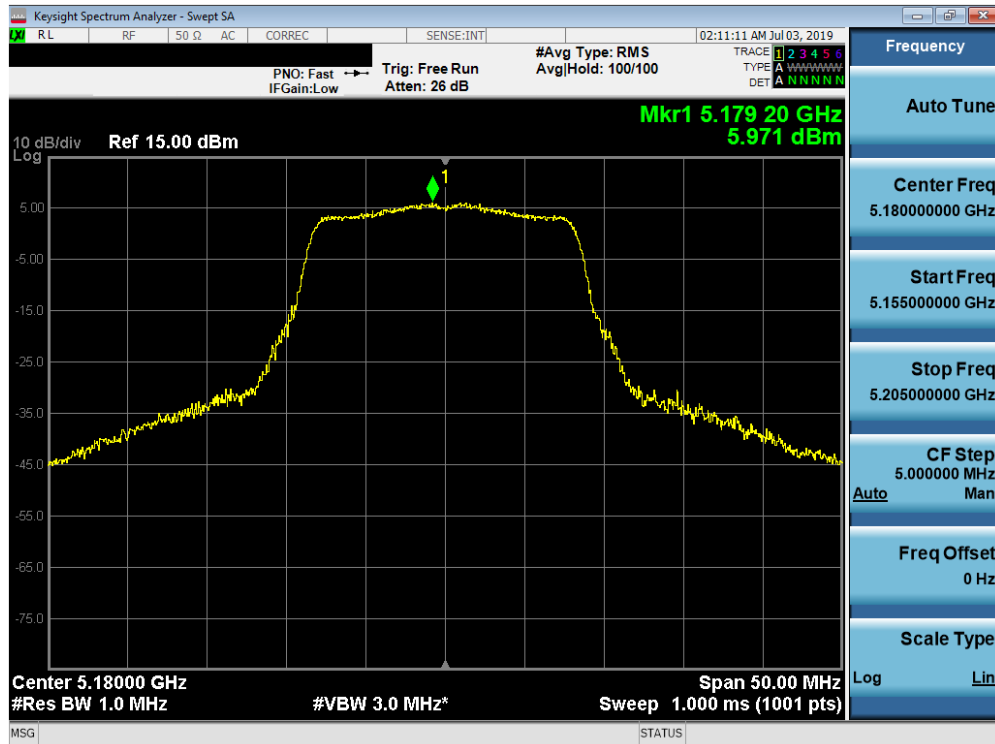
	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Density [dBm]	Max Power Density [dBm/MHz]	Margin [dB]
Band 1	5180	36	a	6	5.97	11.0	-5.03
	5200	40	a	6	6.84	11.0	-4.16
	5240	48	a	6	6.70	11.0	-4.31
	5180	36	n (20MHz)	6.5/7.2 (MCS0)	6.39	11.0	-4.61
	5200	40	n (20MHz)	6.5/7.2 (MCS0)	6.62	11.0	-4.38
	5240	48	n (20MHz)	6.5/7.2 (MCS0)	6.73	11.0	-4.27
	5180	36	ax (20MHz)	6.5/7.2 (MCS0)	4.56	11.0	-6.44
	5200	40	ax (20MHz)	6.5/7.2 (MCS0)	4.44	11.0	-6.56
	5240	48	ax (20MHz)	6.5/7.2 (MCS0)	4.43	11.0	-6.57
	5190	38	n (40MHz)	13.5/15 (MCS0)	0.27	11.0	-10.73
	5230	46	n (40MHz)	13.5/15 (MCS0)	2.43	11.0	-8.57
	5190	38	ax (40MHz)	13.5/15 (MCS0)	-2.41	11.0	-13.41
	5230	46	ax (40MHz)	13.5/15 (MCS0)	-1.83	11.0	-12.83
	5210	42	ac (80MHz)	29.3/32.5 (MCS0)	-3.46	11.0	-14.46
Band 2A	5210	42	ax (80MHz)	29.3/32.5 (MCS0)	-4.62	11.0	-15.62
	5260	52	a	6	6.77	11.0	-4.23
	5280	56	a	6	6.81	11.0	-4.19
	5320	64	a	6	7.10	11.0	-3.90
	5260	52	n (20MHz)	6.5/7.2 (MCS0)	6.63	11.0	-4.37
	5280	56	n (20MHz)	6.5/7.2 (MCS0)	6.19	11.0	-4.81
	5320	64	n (20MHz)	6.5/7.2 (MCS0)	7.26	11.0	-3.74
	5260	52	ax (20MHz)	6.5/7.2 (MCS0)	4.30	11.0	-6.70
	5280	56	ax (20MHz)	6.5/7.2 (MCS0)	4.23	11.0	-6.77
	5320	64	ax (20MHz)	6.5/7.2 (MCS0)	4.46	11.0	-6.54
	5270	54	n (40MHz)	13.5/15 (MCS0)	2.02	11.0	-8.98
	5310	62	n (40MHz)	13.5/15 (MCS0)	1.07	11.0	-9.93
	5270	54	ax (40MHz)	13.5/15 (MCS0)	-0.23	11.0	-11.23
	5310	62	ax (40MHz)	13.5/15 (MCS0)	-0.59	11.0	-11.59
Band 2C	5290	58	ac (80MHz)	29.3/32.5 (MCS0)	-4.67	11.0	-15.67
	5290	58	ax (80MHz)	29.3/32.5 (MCS0)	-5.23	11.0	-16.23
	5500	100	a	6	6.68	11.0	-4.32
	5600	120	a	6	6.88	11.0	-4.12
	5720	144	a	6	6.42	11.0	-4.58
	5500	100	n (20MHz)	6.5/7.2 (MCS0)	6.78	11.0	-4.22
	5600	120	n (20MHz)	6.5/7.2 (MCS0)	6.56	11.0	-4.44
	5720	144	n (20MHz)	6.5/7.2 (MCS0)	6.48	11.0	-4.52
	5500	100	ax (20MHz)	6.5/7.2 (MCS0)	4.89	11.0	-6.11
	5600	120	ax (20MHz)	6.5/7.2 (MCS0)	4.68	11.0	-6.32
	5720	144	ax (20MHz)	6.5/7.2 (MCS0)	4.77	11.0	-6.23
	5510	102	n (40MHz)	13.5/15 (MCS0)	3.40	11.0	-7.60
	5590	118	n (40MHz)	13.5/15 (MCS0)	2.61	11.0	-8.39
	5710	142	n (40MHz)	13.5/15 (MCS0)	2.59	11.0	-8.41
	5510	102	ax (40MHz)	13.5/15 (MCS0)	0.00	11.0	-11.00
	5590	118	ax (40MHz)	13.5/15 (MCS0)	-0.04	11.0	-11.04
	5710	142	ax (40MHz)	13.5/15 (MCS0)	0.20	11.0	-10.80
	5530	106	ac (80MHz)	29.3/32.5 (MCS0)	-3.51	11.0	-14.51
	5610	122	ac (80MHz)	29.3/32.5 (MCS0)	-2.84	11.0	-13.84
	5690	138	ac (80MHz)	29.3/32.5 (MCS0)	-4.86	11.0	-15.86
	5530	106	ax (80MHz)	29.3/32.5 (MCS0)	-4.37	11.0	-15.37
	5610	122	ax (80MHz)	29.3/32.5 (MCS0)	-4.94	11.0	-15.94
	5690	138	ax (80MHz)	29.3/32.5 (MCS0)	-3.82	11.0	-14.82

Table 7-24. Conducted Power Spectral Density Measurements SISO ANT2

FCC ID: A3LSMN970U		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 129 of 247

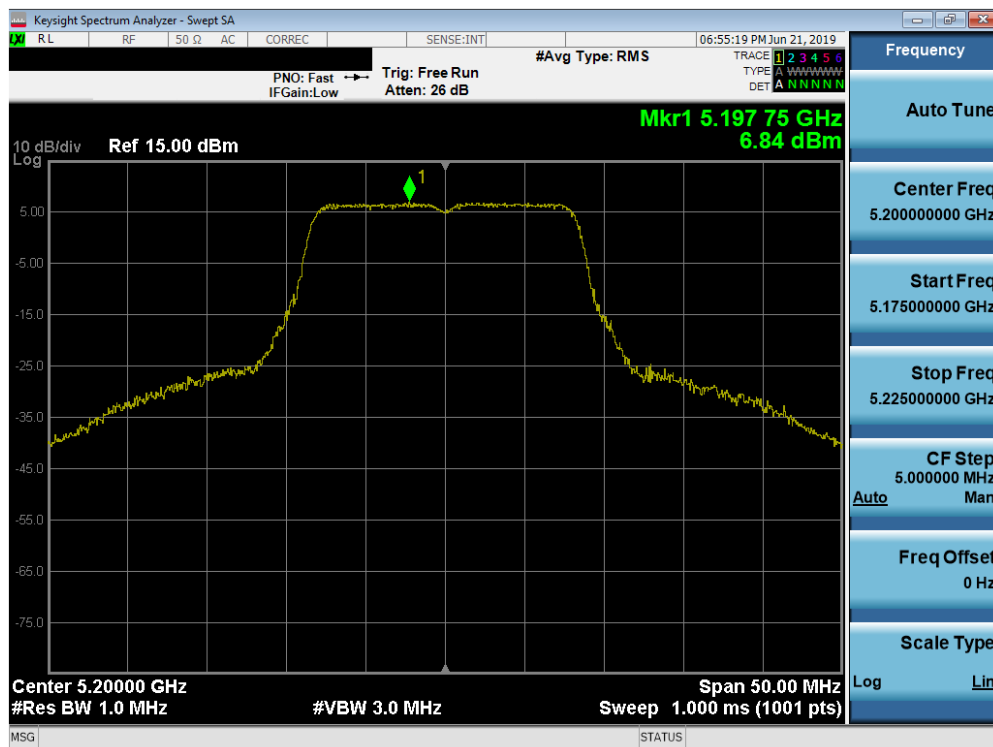
	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Density [dBm]	Antenna Gain [dBi]	e.i.r.p. Power Density [dBm/MHz]	ISED Max e.i.r.p. Power Density [dBm/MHz]	Margin [dB]
Band 1	5180	36	a	6	5.97	-6.44	-0.47	10.0	-10.47
	5200	40	a	6	6.84	-6.44	0.40	10.0	-9.60
	5240	48	a	6	6.70	-6.82	-0.13	10.0	-10.13
	5180	36	n (20MHz)	6.5/7.2 (MCS0)	6.39	-6.44	-0.05	10.0	-10.05
	5200	40	n (20MHz)	6.5/7.2 (MCS0)	6.62	-6.44	0.18	10.0	-9.82
	5240	48	n (20MHz)	6.5/7.2 (MCS0)	6.73	-6.82	-0.09	10.0	-10.09
	5180	36	ax (20MHz)	6.5/7.2 (MCS0)	4.56	-6.44	-1.88	10.0	-11.88
	5200	40	ax (20MHz)	6.5/7.2 (MCS0)	4.44	-6.44	-2.00	10.0	-12.00
	5240	48	ax (20MHz)	6.5/7.2 (MCS0)	4.43	-6.82	-2.39	10.0	-12.39
	5190	38	n (40MHz)	13.5/15 (MCS0)	0.27	-6.44	-6.17	10.0	-16.17
	5230	46	n (40MHz)	13.5/15 (MCS0)	2.43	-6.82	-4.39	10.0	-14.39
	5190	38	ax (40MHz)	13.5/15 (MCS0)	-2.41	-6.44	-8.85	10.0	-18.85
	5230	46	ax (40MHz)	13.5/15 (MCS0)	-1.83	-6.82	-8.65	10.0	-18.65
	5210	42	ac (80MHz)	29.3/32.5 (MCS0)	-3.46	-6.82	-10.28	10.0	-20.28
	5210	42	ax (80MHz)	29.3/32.5 (MCS0)	-4.62	-6.82	-11.44	10.0	-21.44

Table 7-25. Band 1 e.i.r.p. Conducted Power Spectral Density Measurements (ISED) SISO ANT2

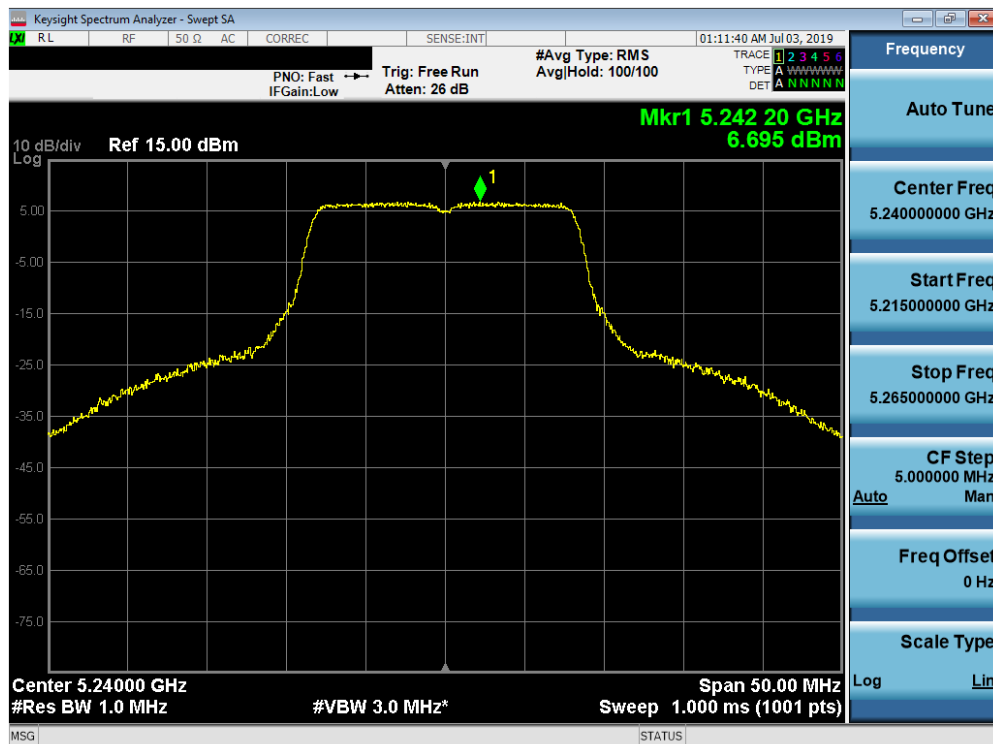


Plot 7-193. Power Spectral Density Plot SISO ANT2 (802.11a (UNII Band 1) – Ch. 36)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 130 of 247

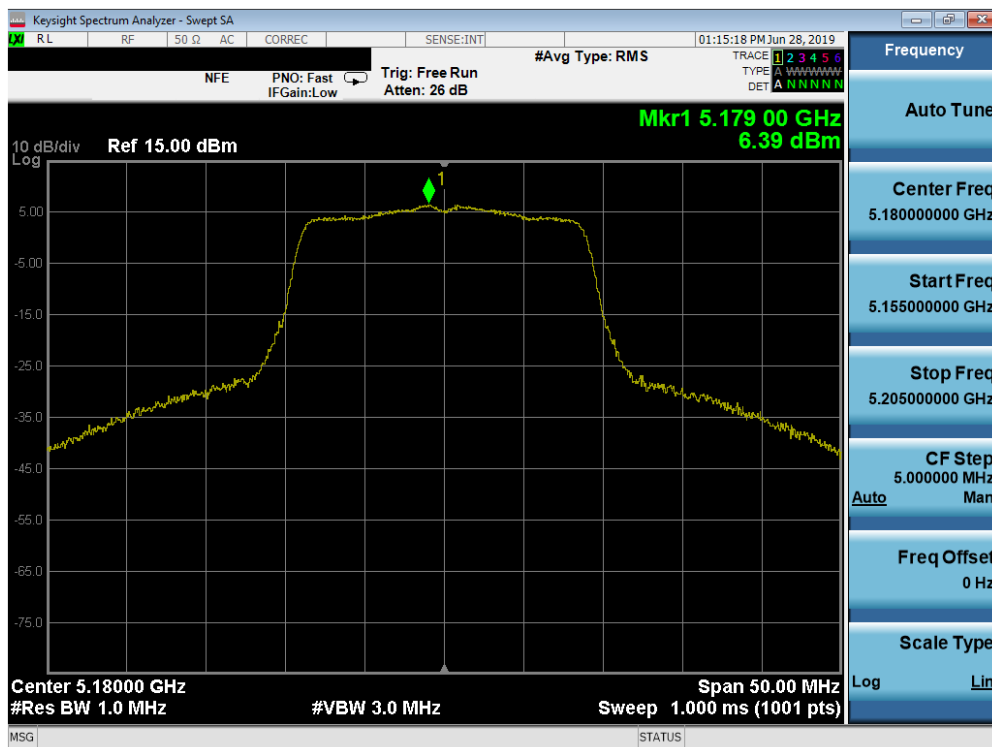


Plot 7-194. Power Spectral Density Plot SISO ANT2 (802.11a (UNII Band 1) – Ch. 40)

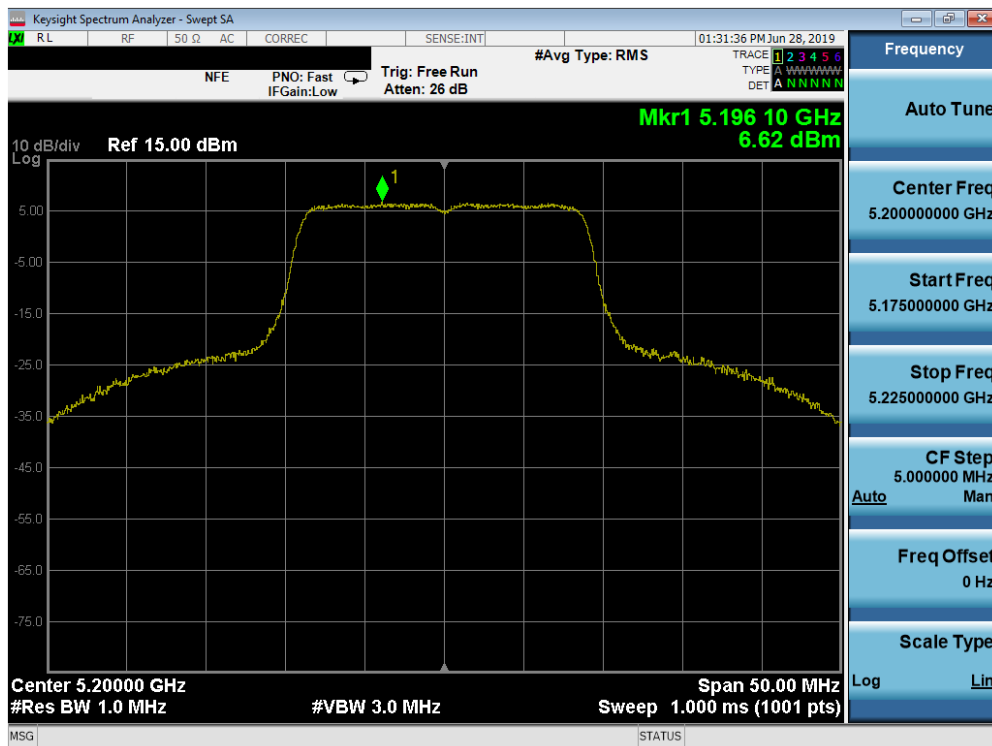


Plot 7-195. Power Spectral Density Plot SISO ANT2 (802.11a (UNII Band 1) – Ch. 48)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 131 of 247

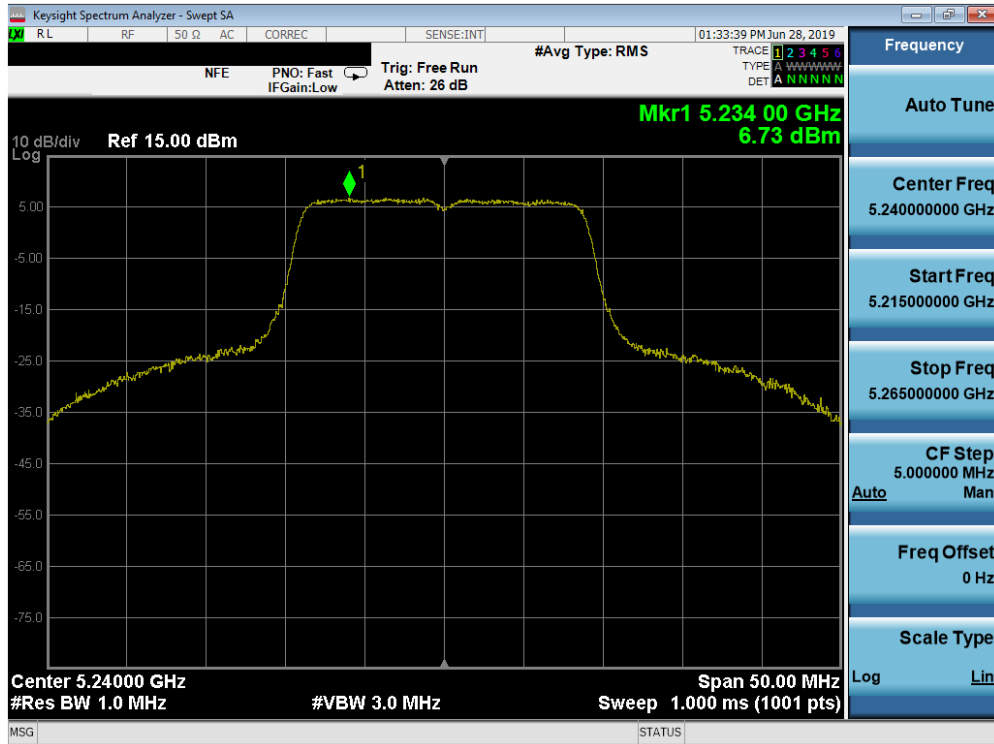


Plot 7-196. Power Spectral Density Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 1) – Ch. 36)

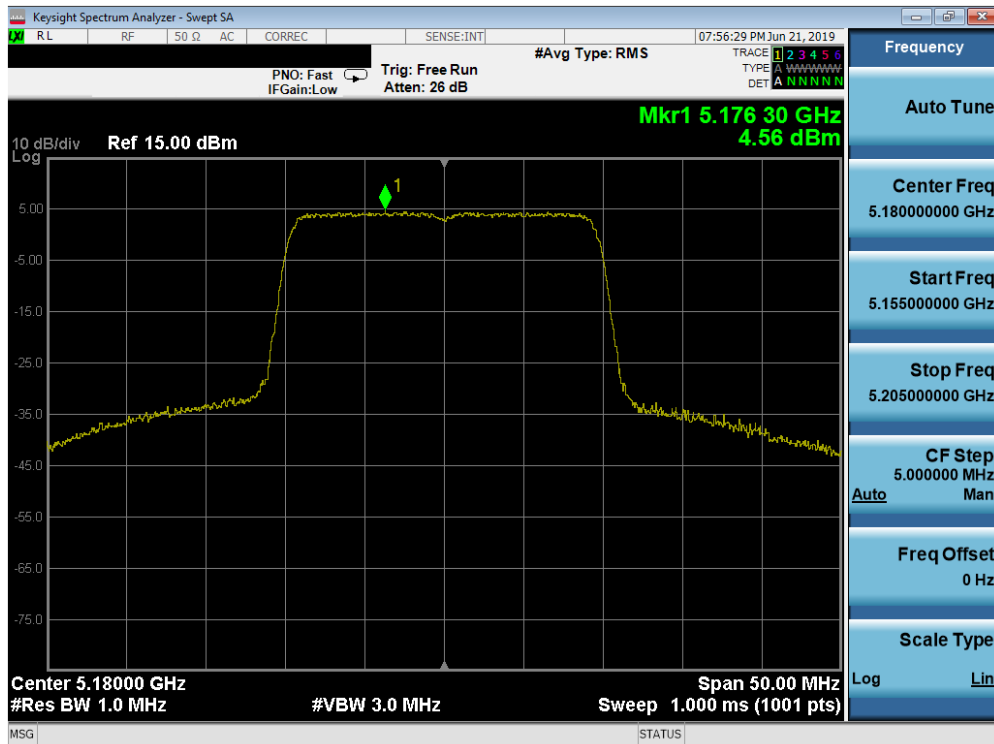


Plot 7-197. Power Spectral Density Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 1) – Ch. 40)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 132 of 247

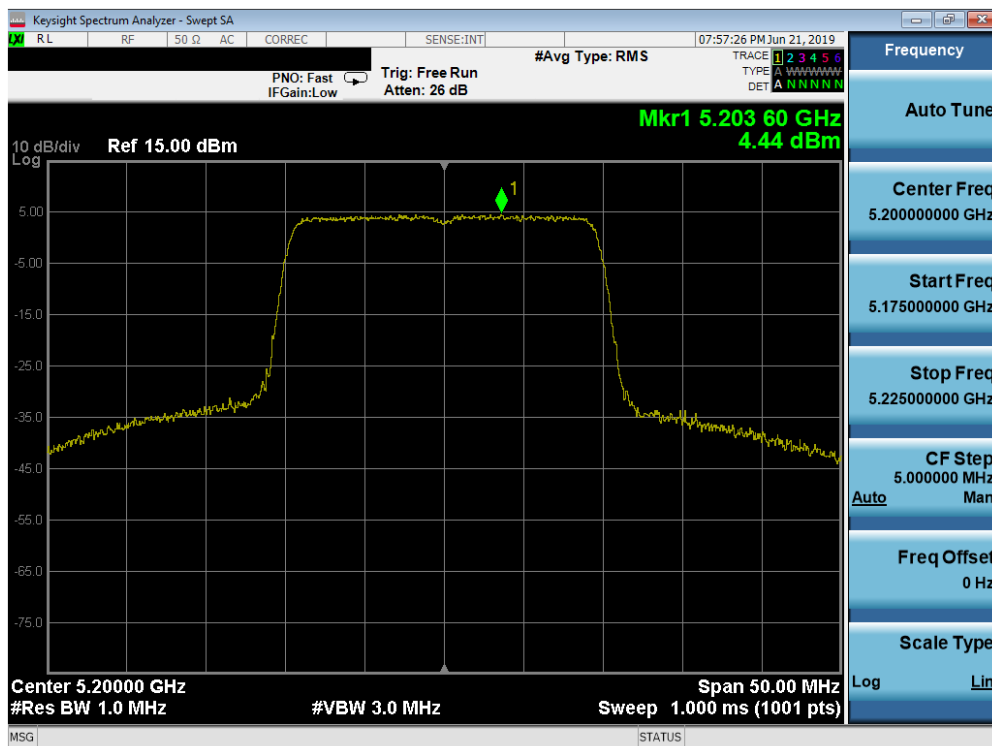


Plot 7-198. Power Spectral Density Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 1) – Ch. 48)

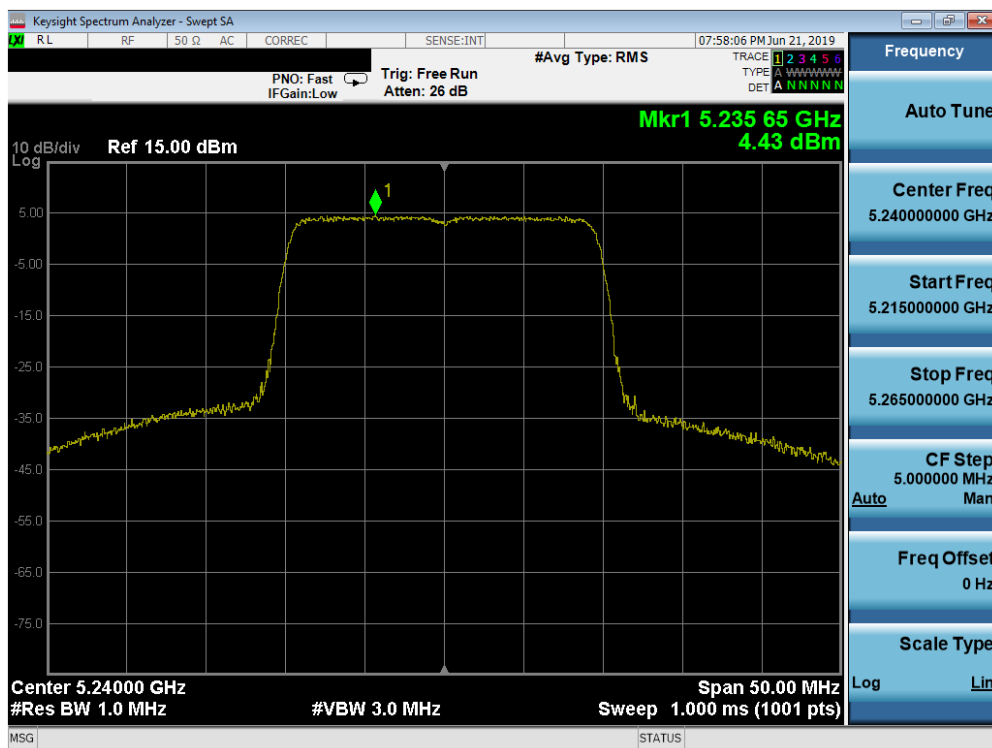


Plot 7-199. Power Spectral Density Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 1) – Ch. 36)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 133 of 247

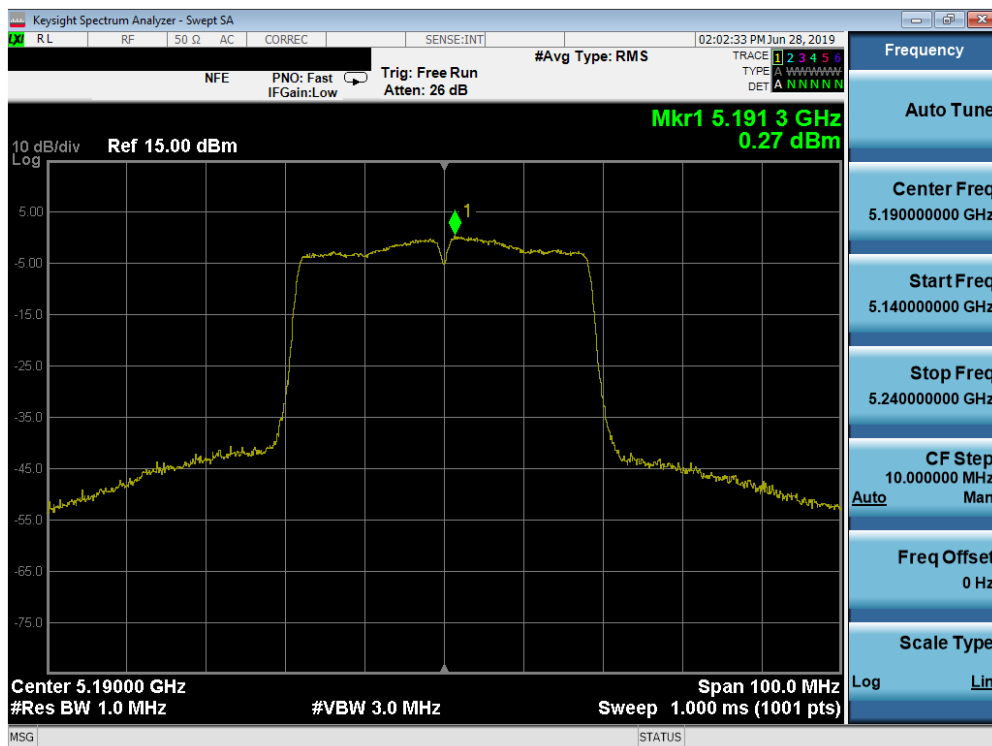


Plot 7-200. Power Spectral Density Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 1) – Ch. 40)

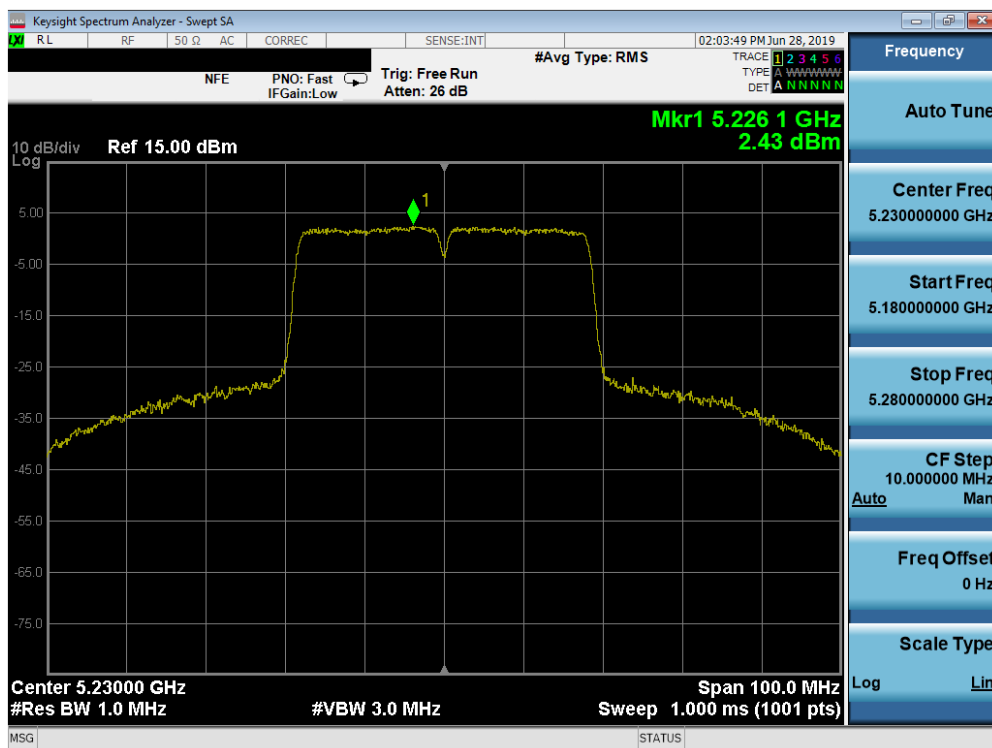


Plot 7-201. Power Spectral Density Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 1) – Ch. 48)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 134 of 247

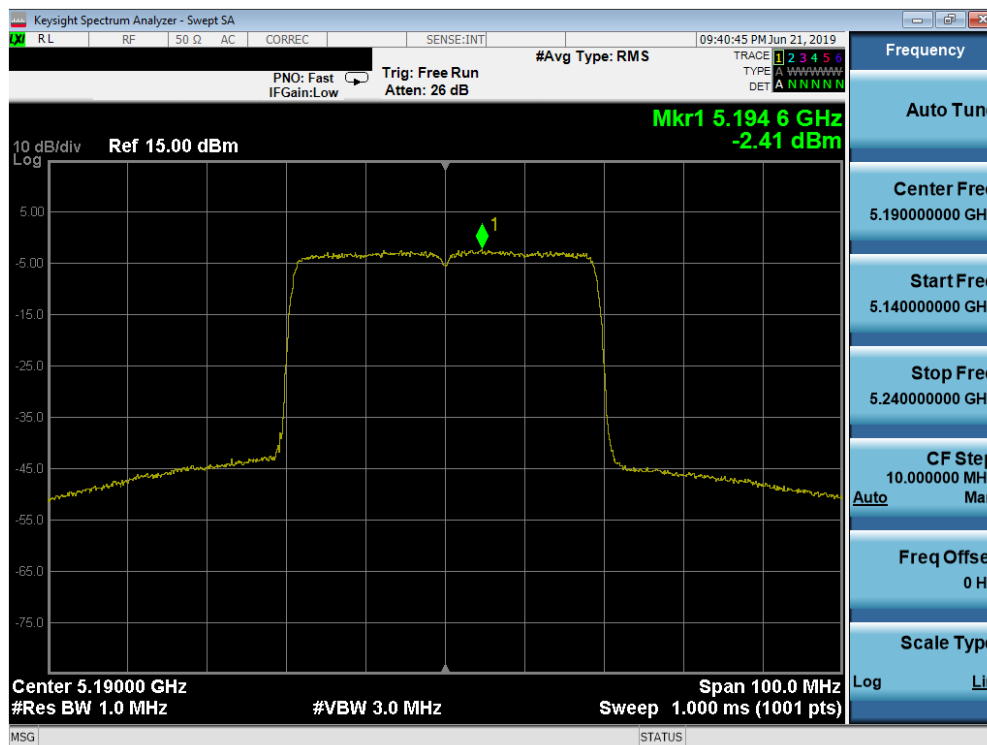


Plot 7-202. Power Spectral Density Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 1) – Ch. 38)

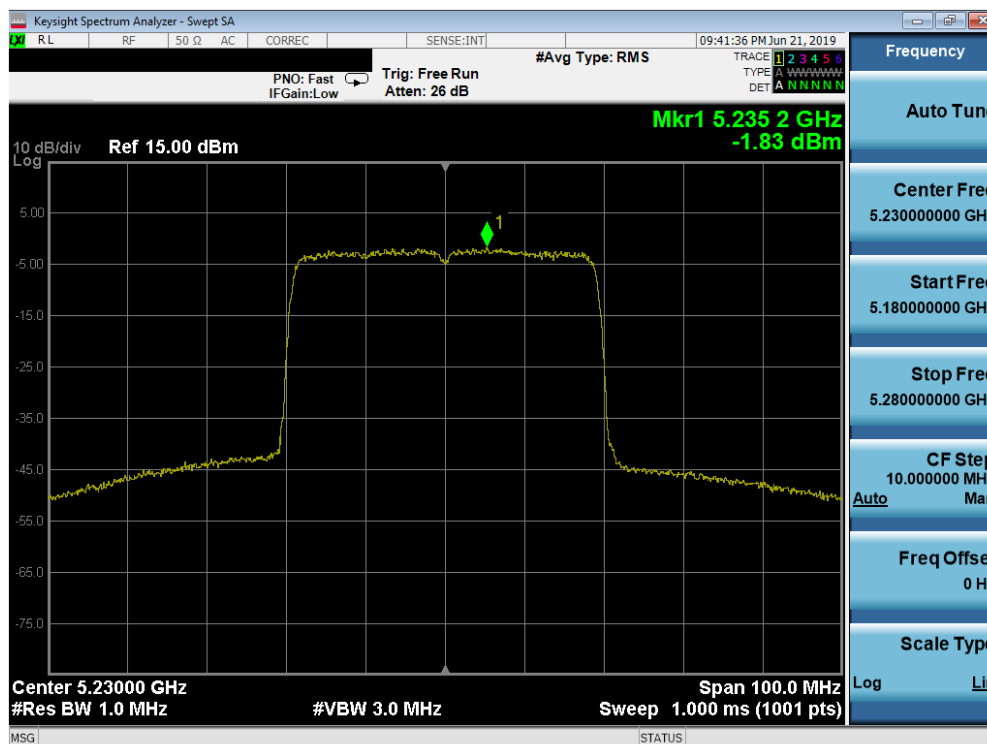


Plot 7-203. Power Spectral Density Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 1) – Ch. 46)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 135 of 247

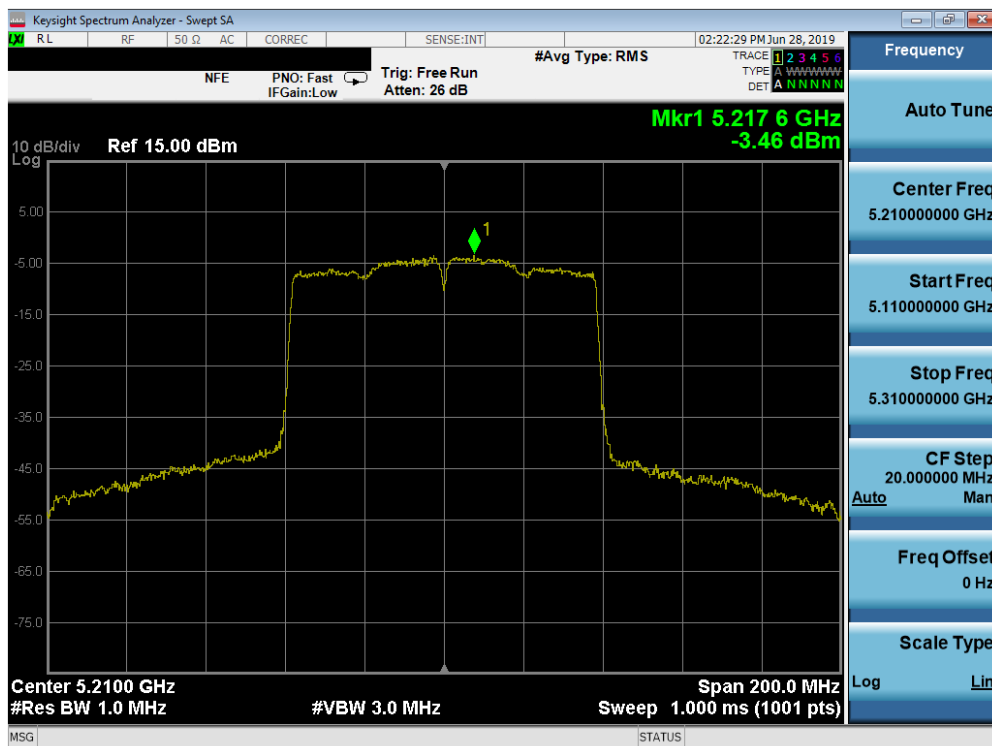


Plot 7-204. Power Spectral Density Plot SISO ANT2 (40MHz BW 802.11ax (UNII Band 1) – Ch. 38)

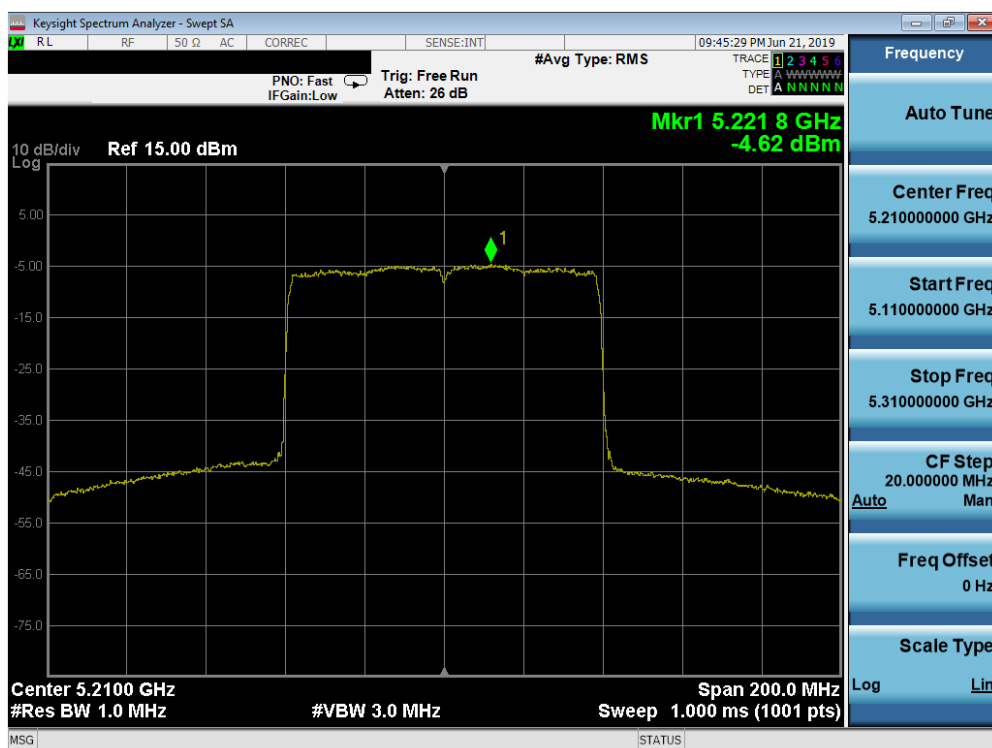


Plot 7-205. Power Spectral Density Plot SISO ANT2 (40MHz BW 802.11ax (UNII Band 1) – Ch. 46)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 136 of 247

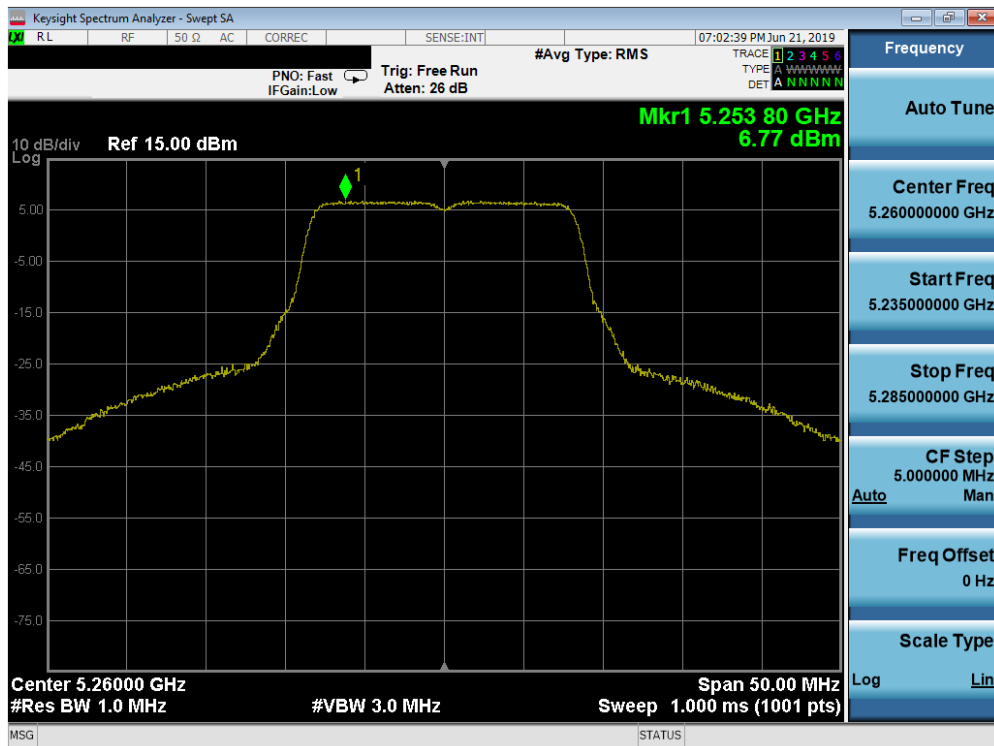


Plot 7-206. Power Spectral Density Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 1) – Ch. 42)

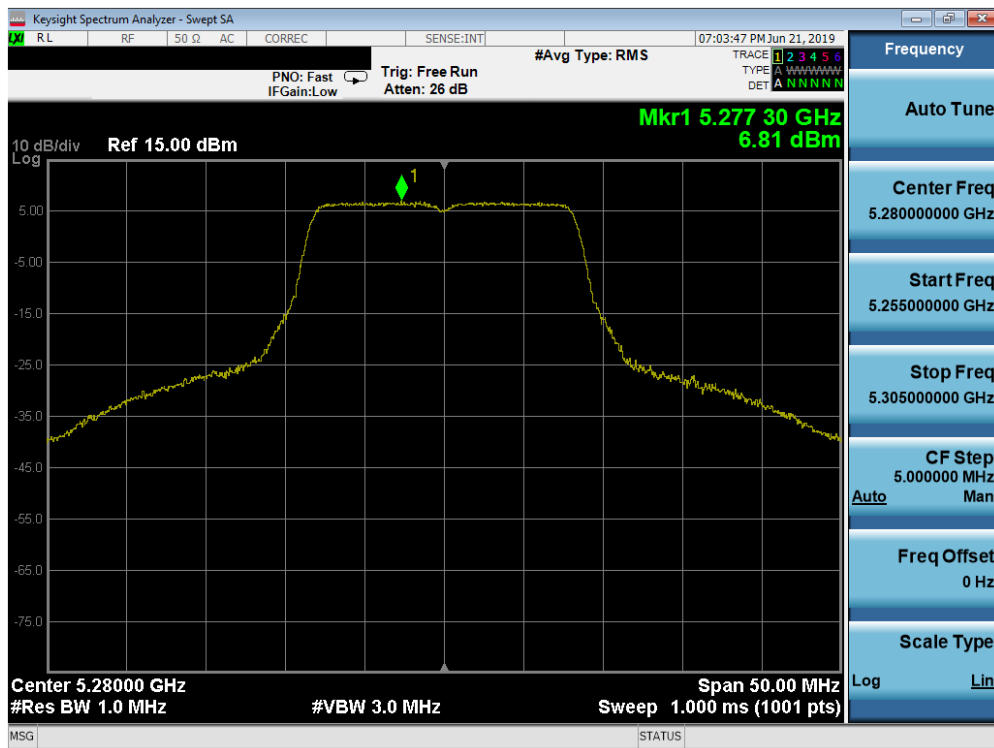


Plot 7-207. Power Spectral Density Plot SISO ANT2 (80MHz BW 802.11ax (UNII Band 1) – Ch. 42)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 137 of 247

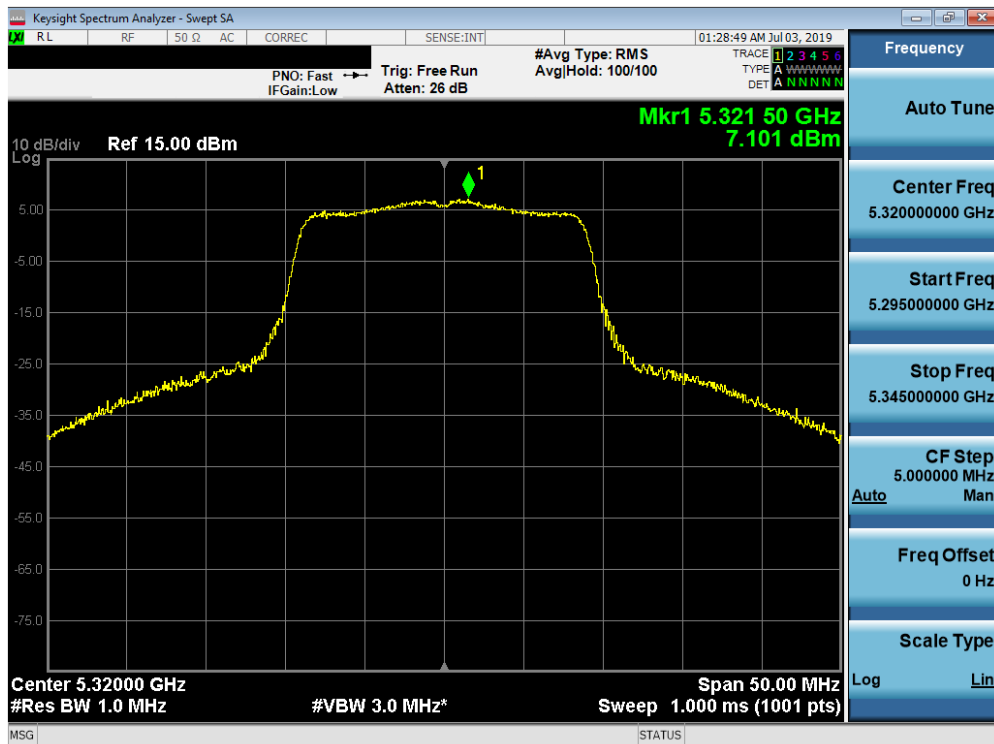


Plot 7-208. Power Spectral Density Plot SISO ANT2 (802.11a (UNII Band 2A) – Ch. 52)

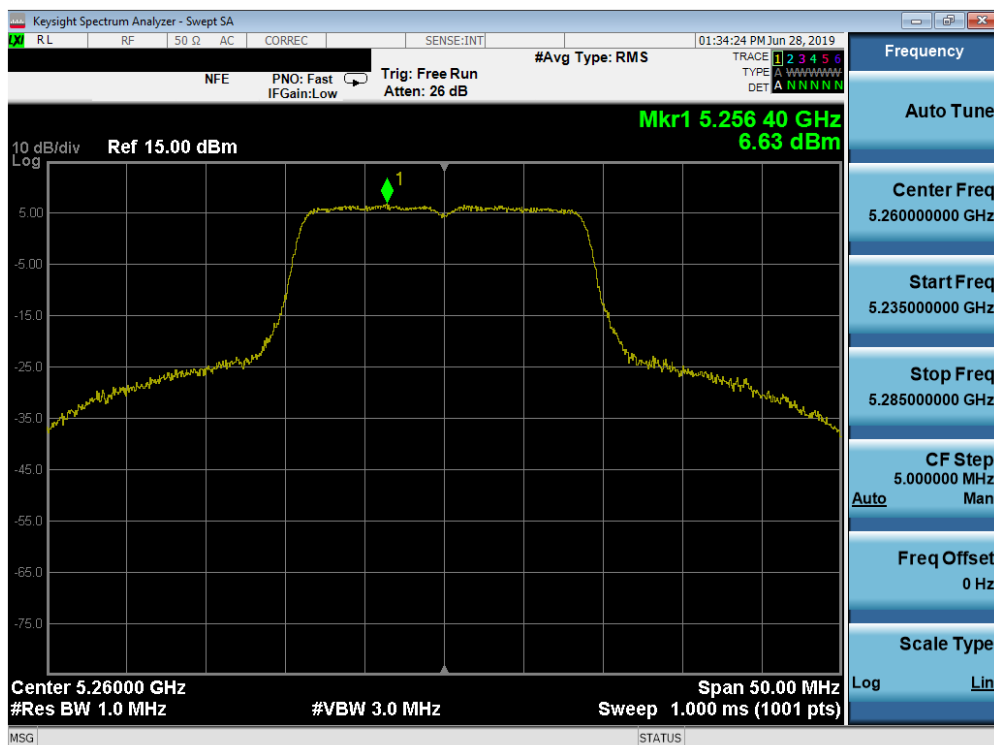


Plot 7-209. Power Spectral Density Plot SISO ANT2 (802.11a (UNII Band 2A) – Ch. 56)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 138 of 247

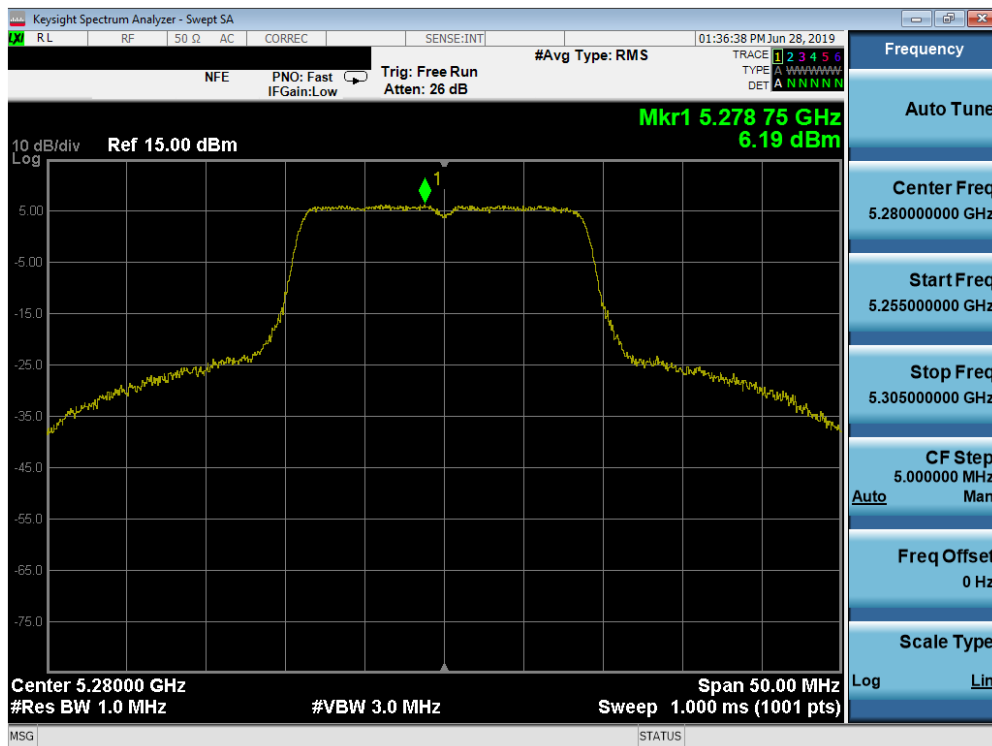


Plot 7-210. Power Spectral Density Plot SISO ANT2 (802.11a (UNII Band 2A) – Ch. 64)

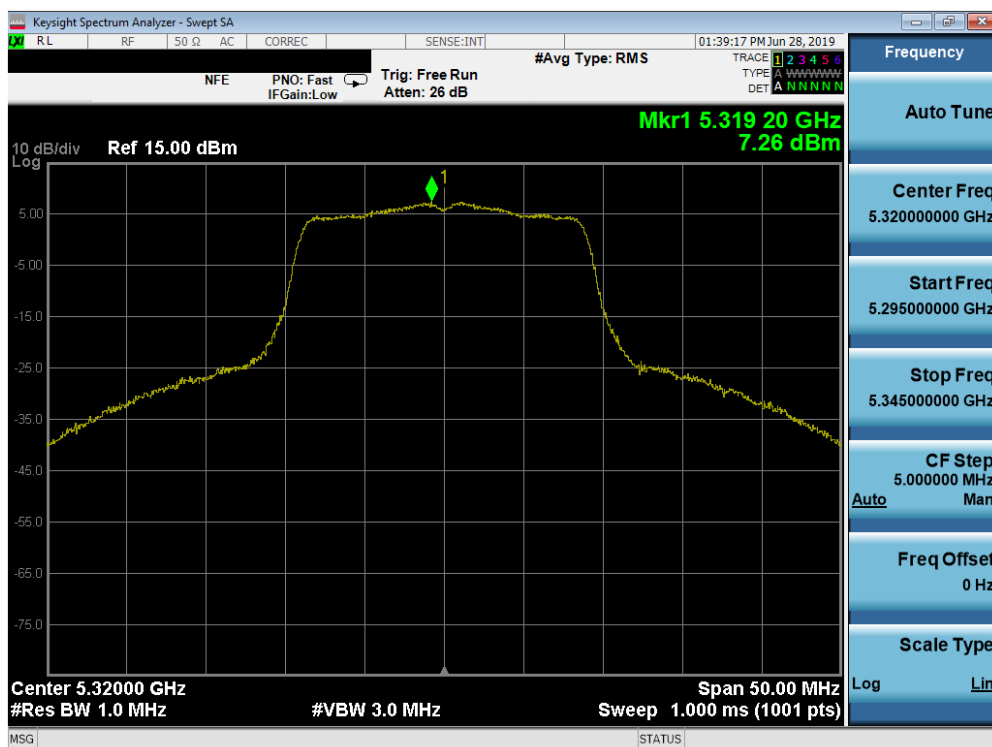


Plot 7-211. Power Spectral Density Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2A) – Ch. 52)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 139 of 247

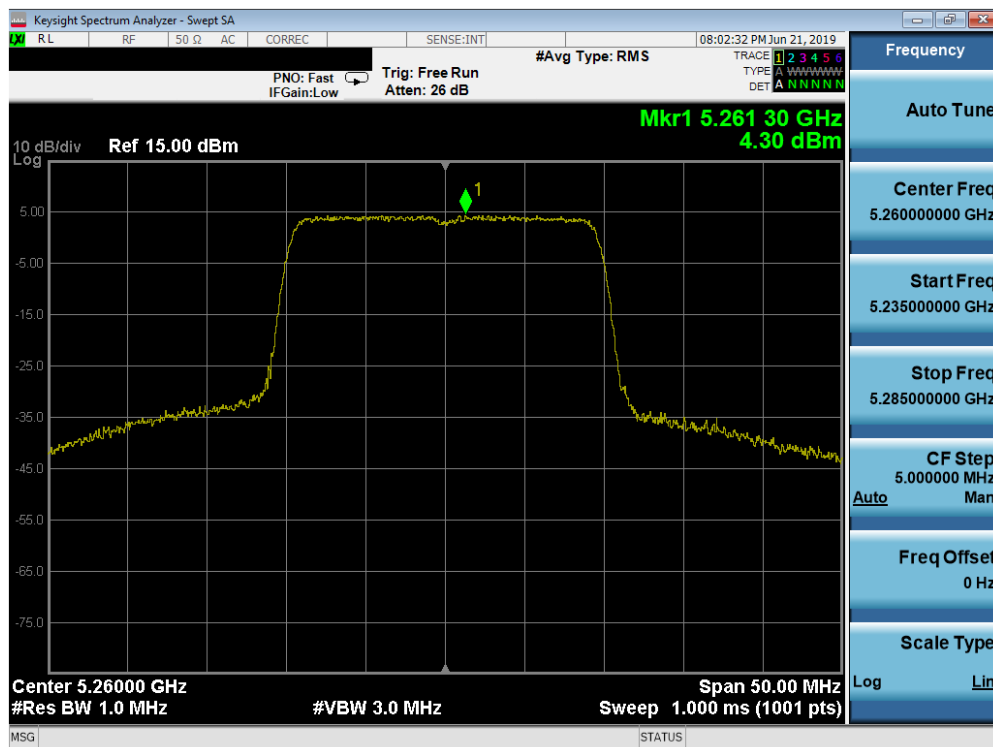


Plot 7-212. Power Spectral Density Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2A) – Ch. 56)

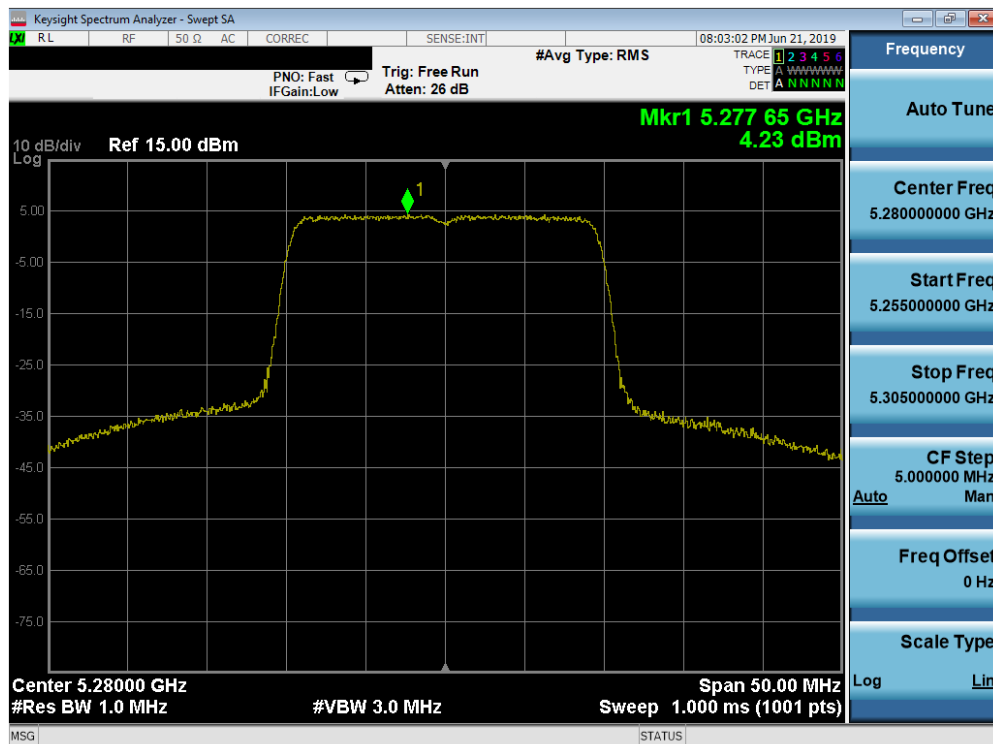


Plot 7-213. Power Spectral Density Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2A) – Ch. 64)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 140 of 247

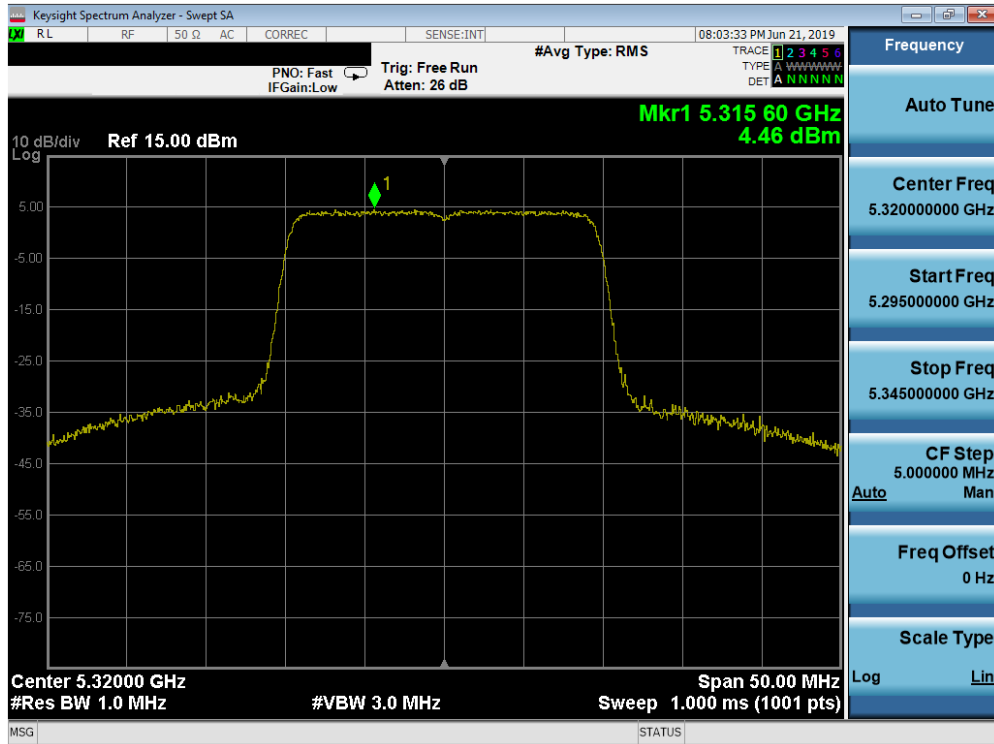


Plot 7-214. Power Spectral Density Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 2A) – Ch. 52)

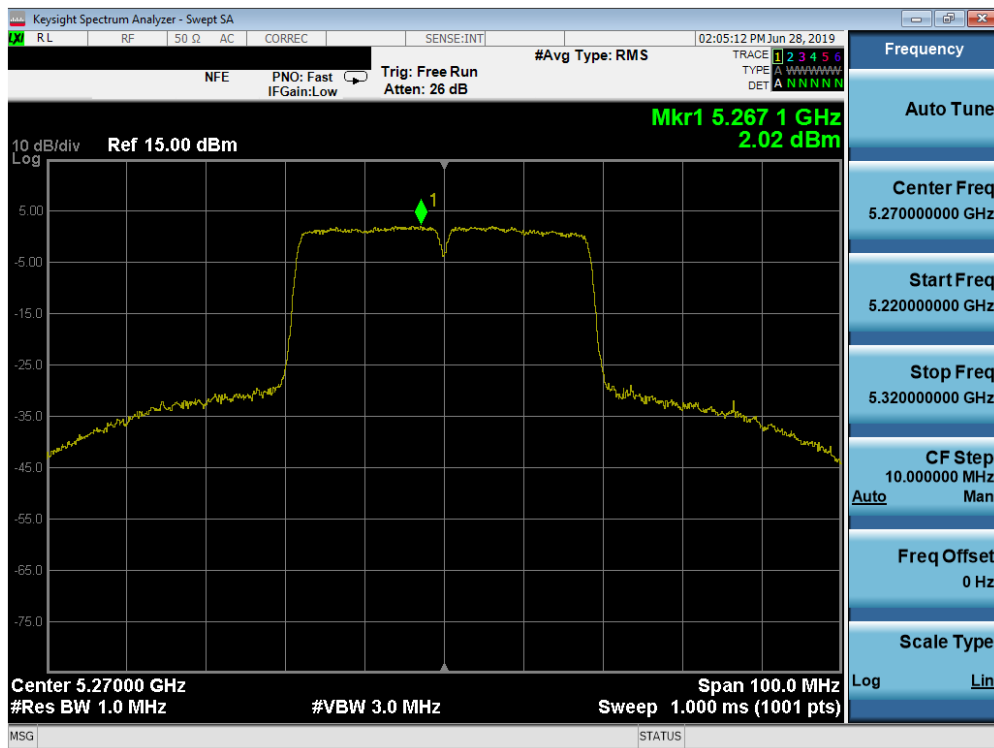


Plot 7-215. Power Spectral Density Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 2A) – Ch. 56)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 141 of 247

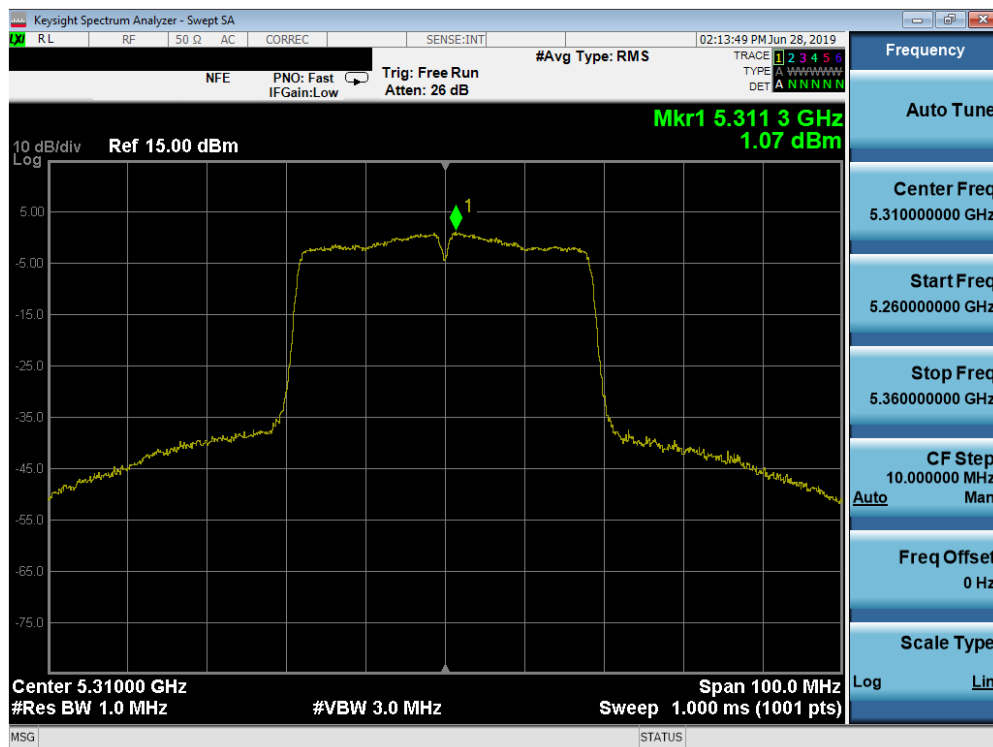


Plot 7-216. Power Spectral Density Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 2A) – Ch. 64)

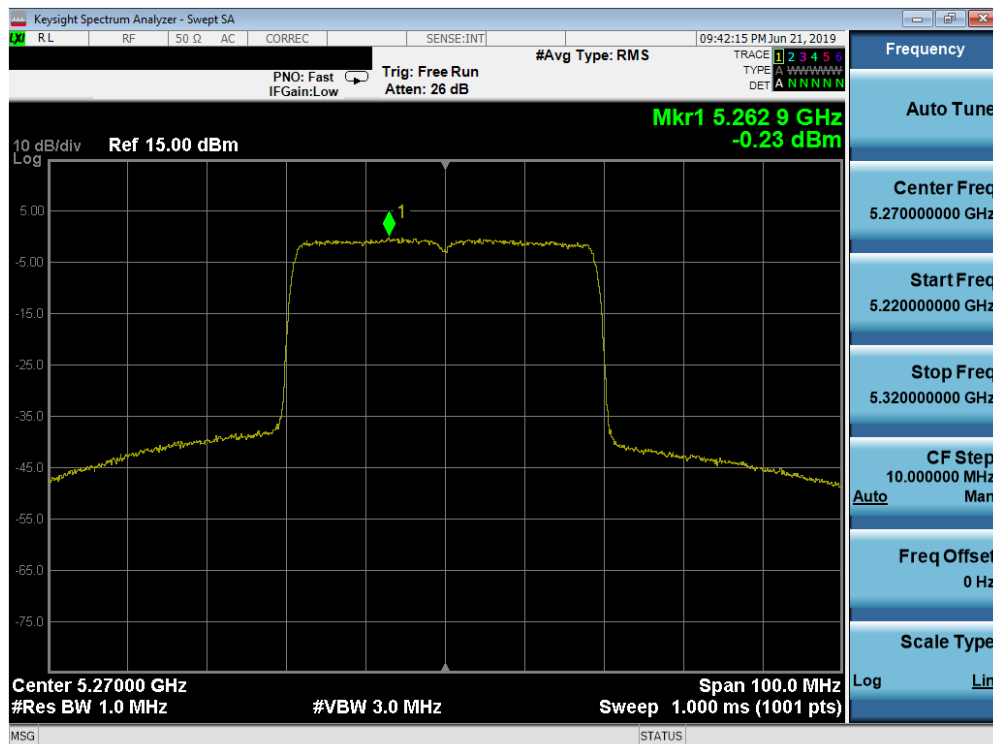


Plot 7-217. Power Spectral Density Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2A) – Ch. 54)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 142 of 247

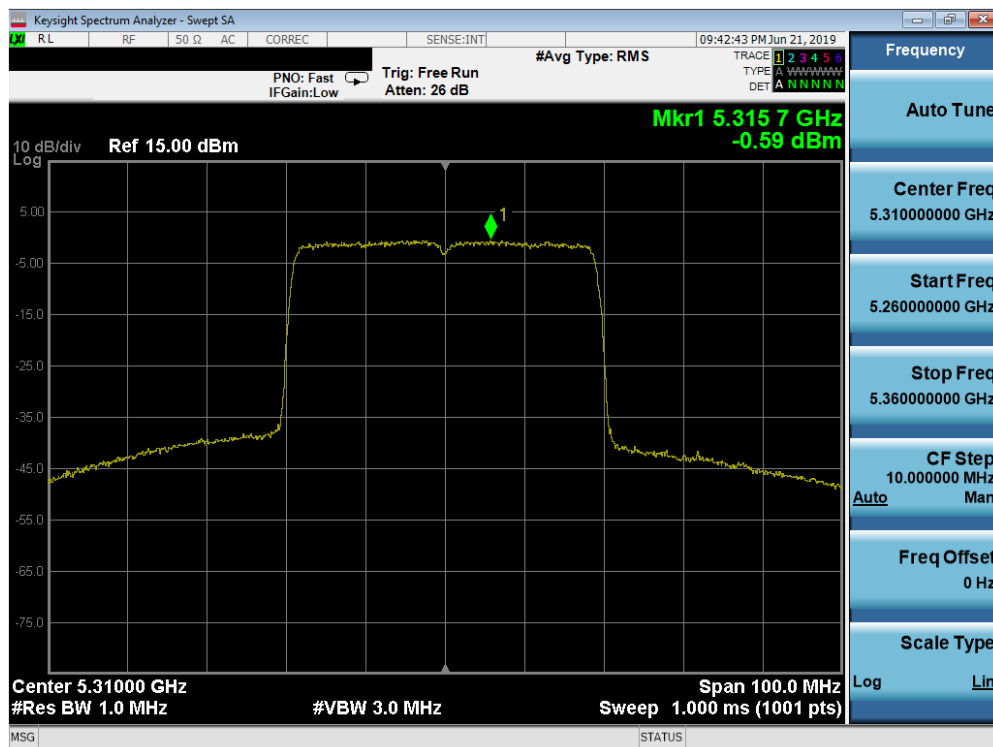


Plot 7-218. Power Spectral Density Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2A) – Ch. 62)

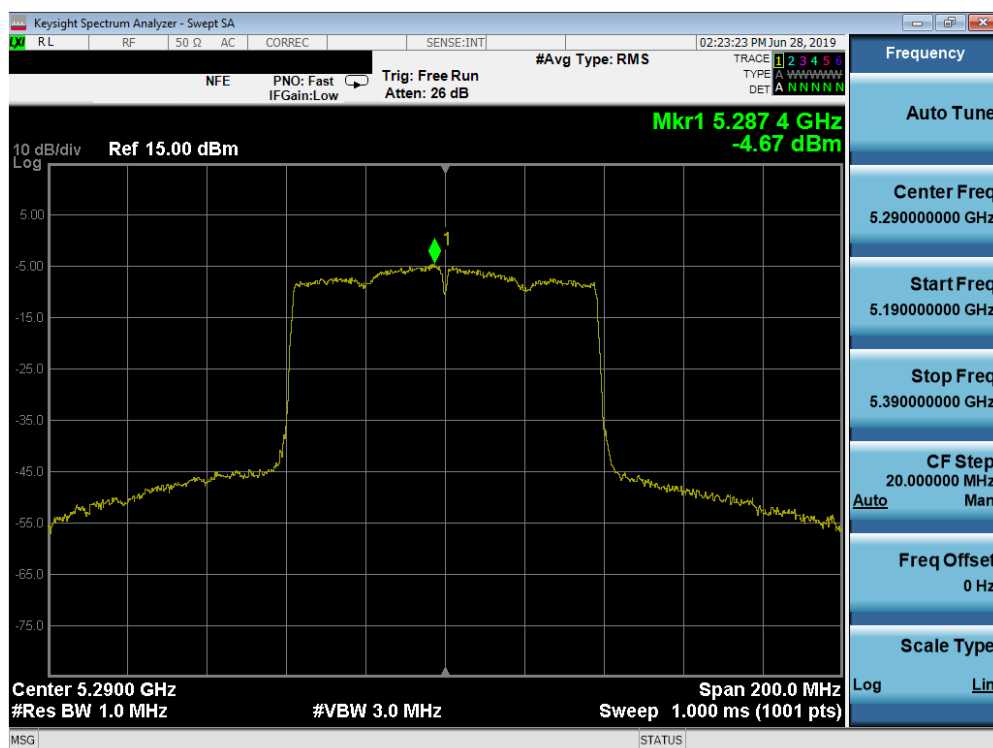


Plot 7-219. Power Spectral Density Plot SISO ANT2 (40MHz BW 802.11ax (UNII Band 2A) – Ch. 54)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 143 of 247

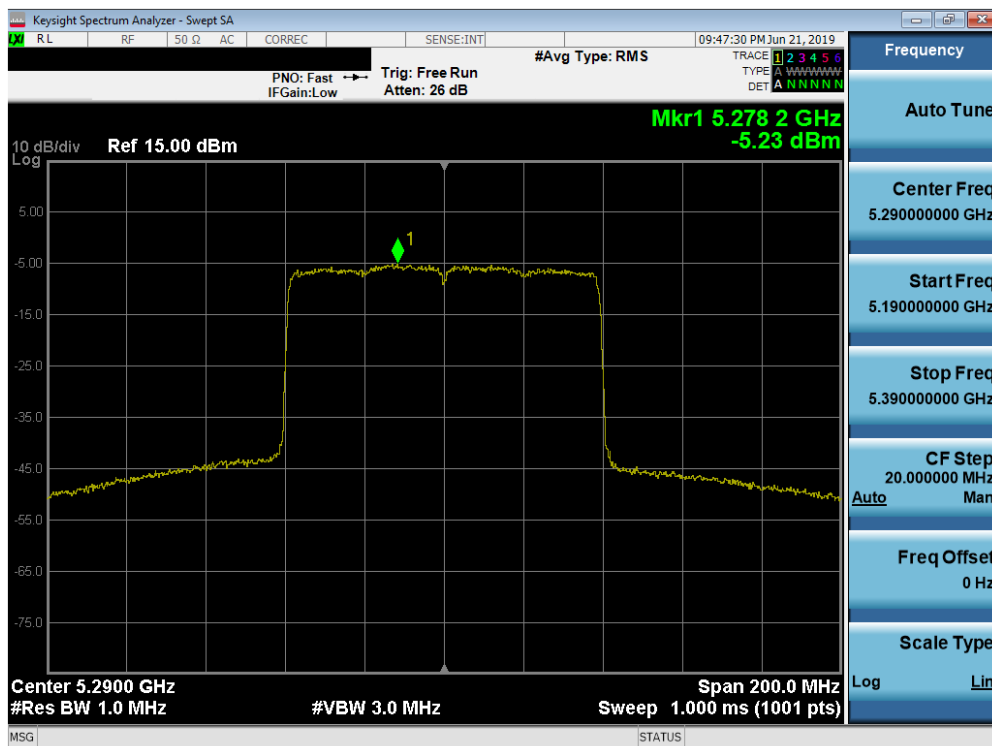


Plot 7-220. Power Spectral Density Plot SISO ANT2 (40MHz BW 802.11ax (UNII Band 2A) – Ch. 62)

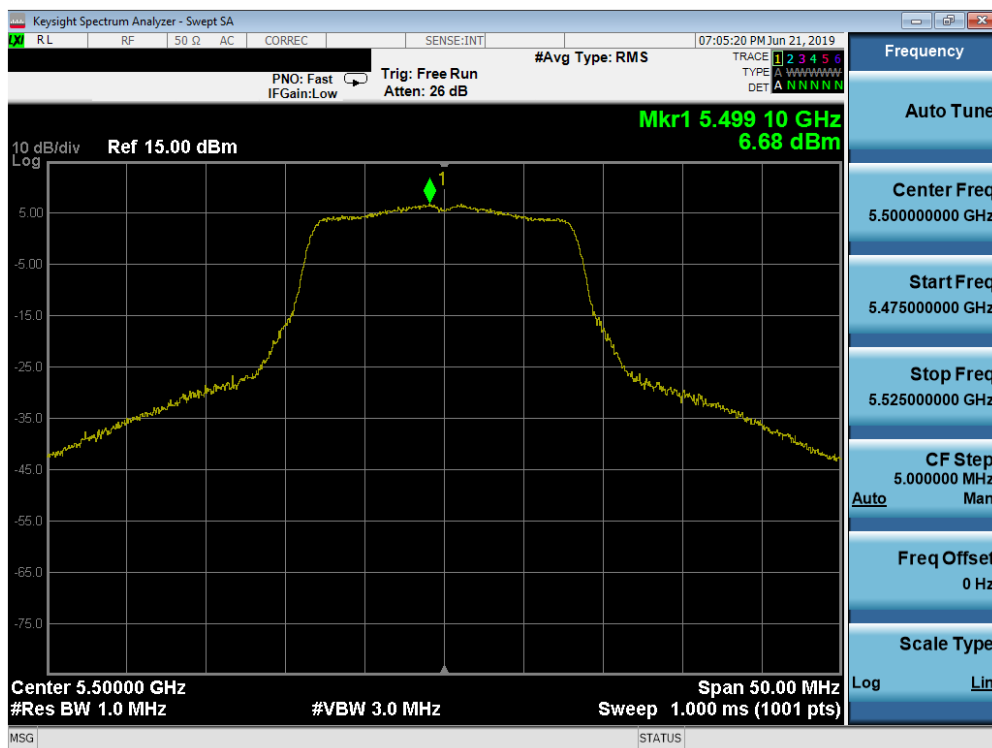


Plot 7-221. Power Spectral Density Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 2A) – Ch. 58)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 144 of 247

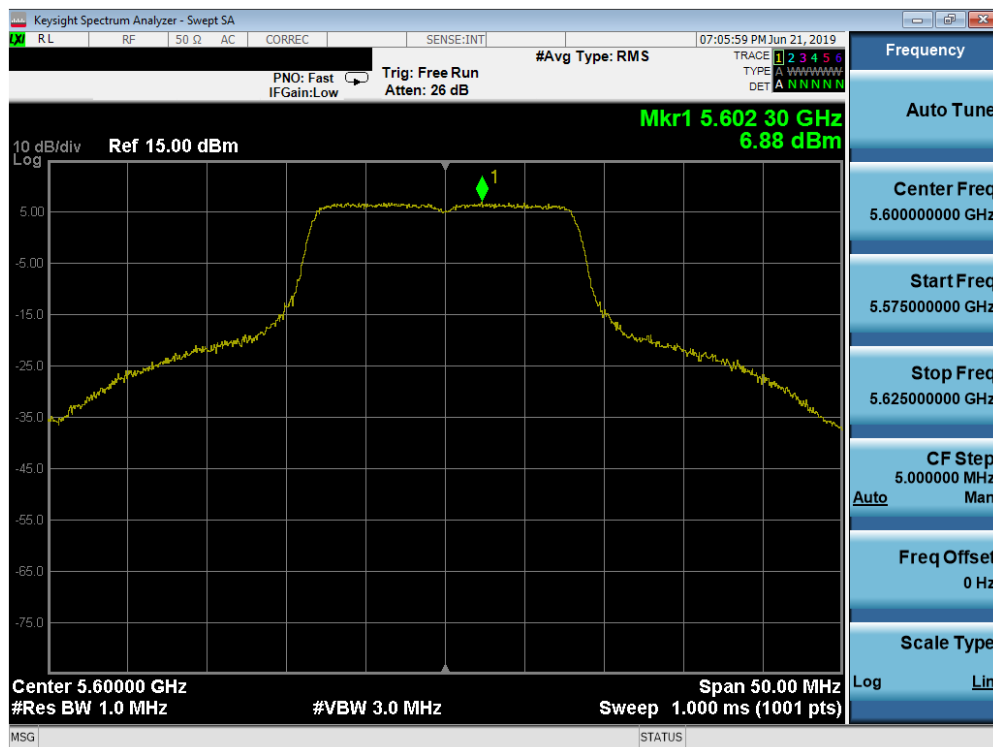


Plot 7-222. Power Spectral Density Plot SISO ANT2 (80MHz BW 802.11ax (UNII Band 2A) – Ch. 58)

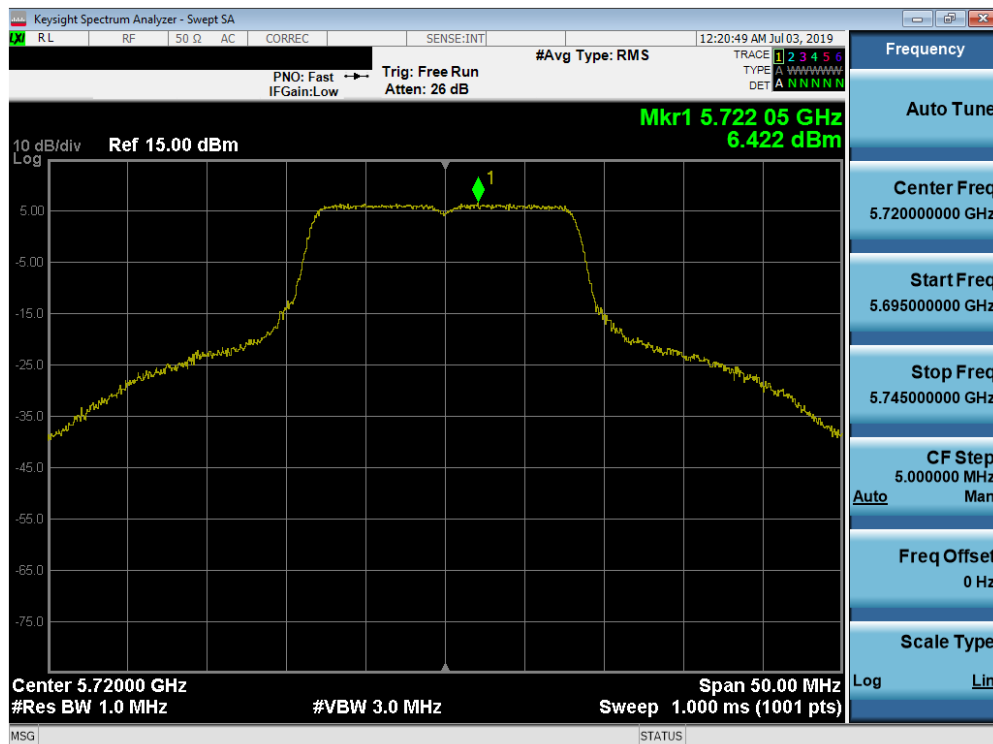


Plot 7-223. Power Spectral Density Plot SISO ANT2 (802.11a (UNII Band 2C) – Ch. 100)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 145 of 247

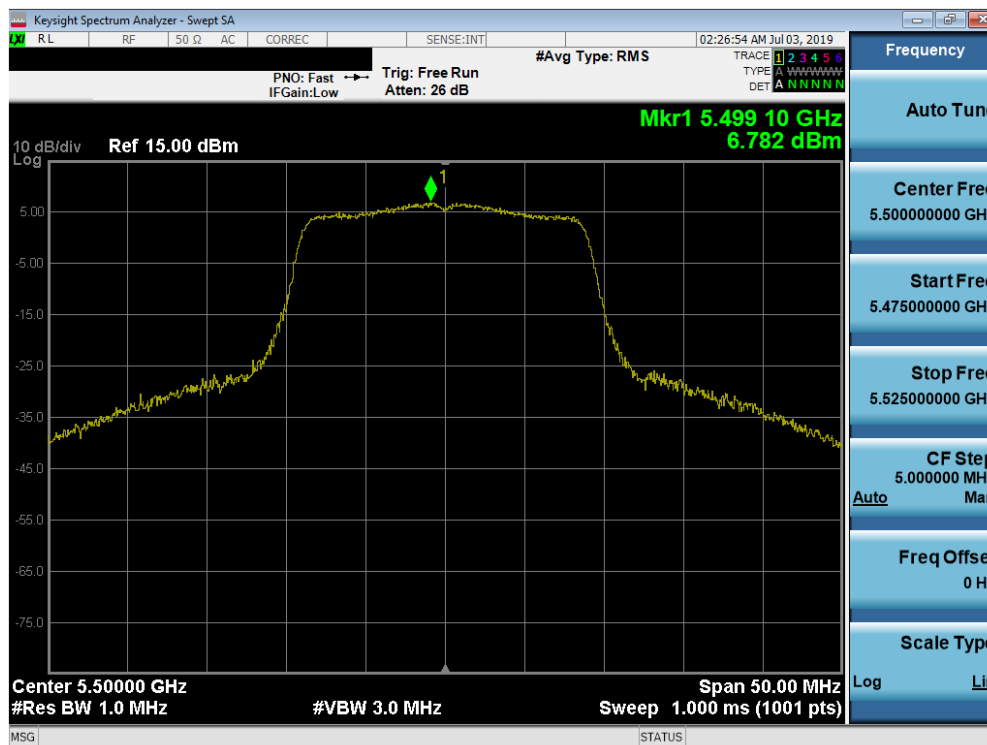


Plot 7-224. Power Spectral Density Plot SISO ANT2 (802.11a (UNII Band 2C) – Ch. 120)

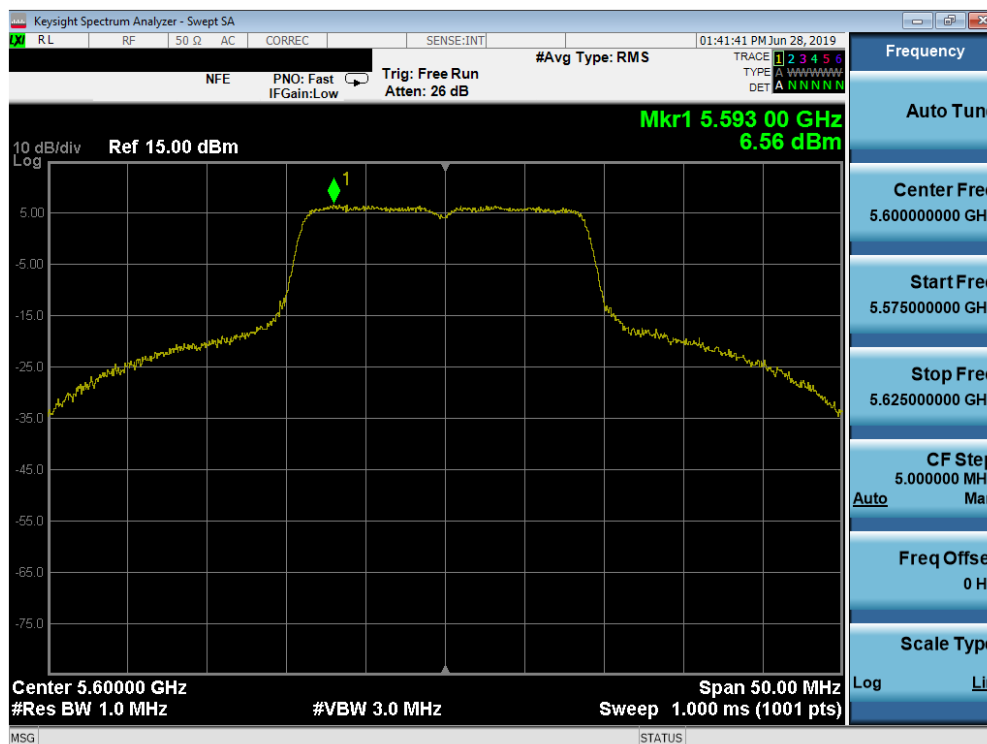


Plot 7-225. Power Spectral Density Plot SISO ANT2 (802.11a (UNII Band 2C) – Ch. 144)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 146 of 247

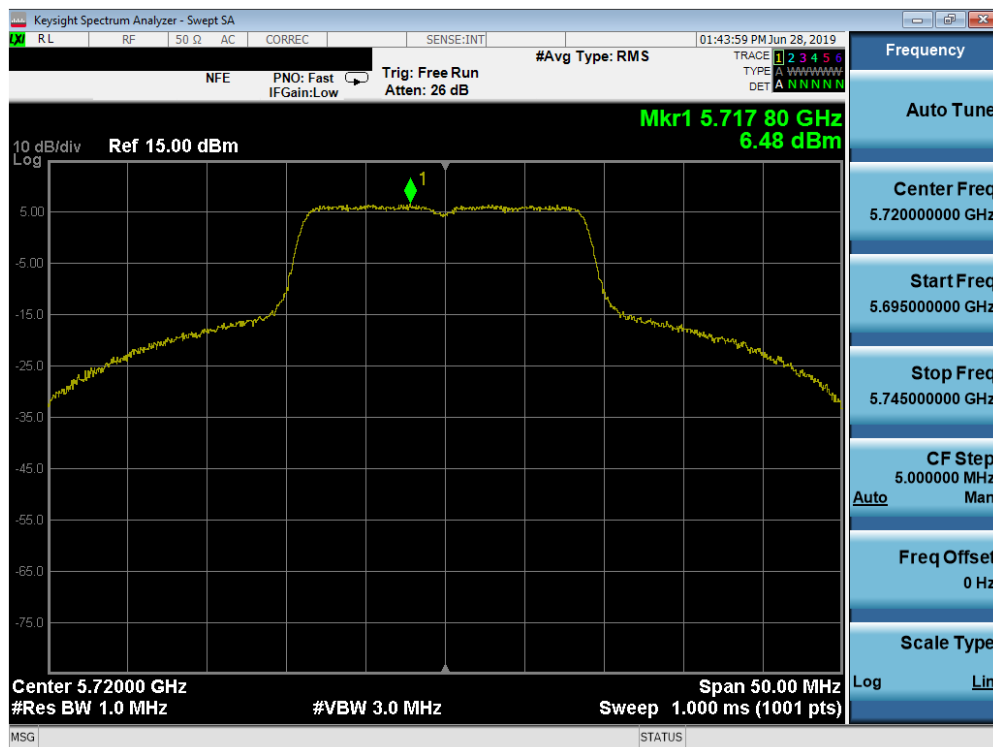


Plot 7-226. Power Spectral Density Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2C) – Ch. 100)

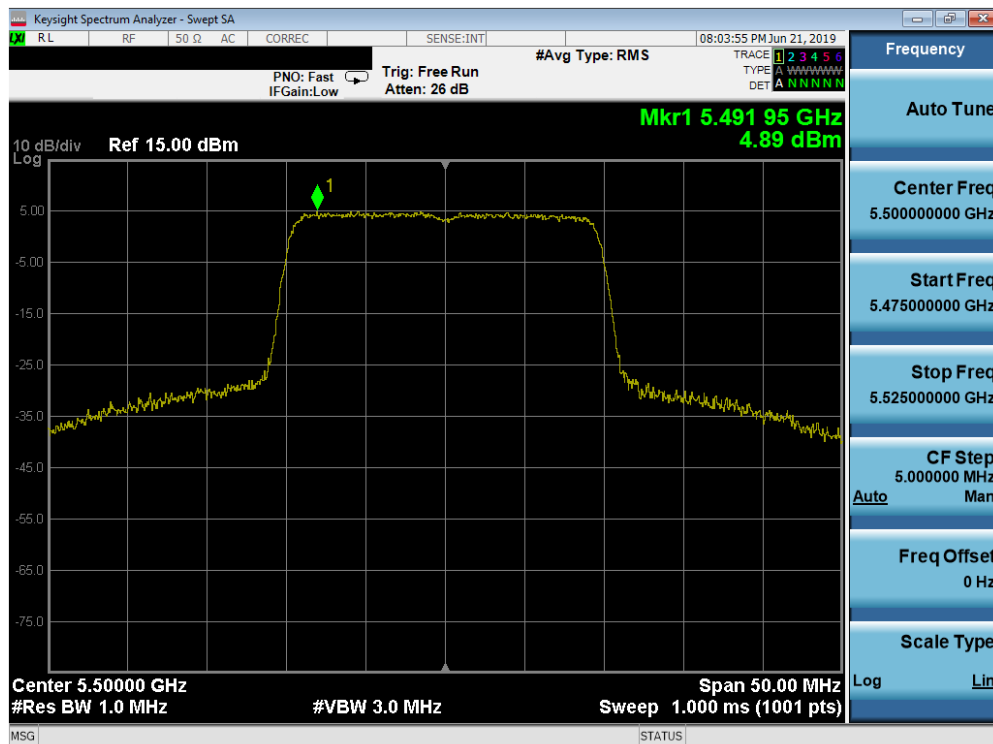


Plot 7-227. Power Spectral Density Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2C) – Ch. 120)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 147 of 247

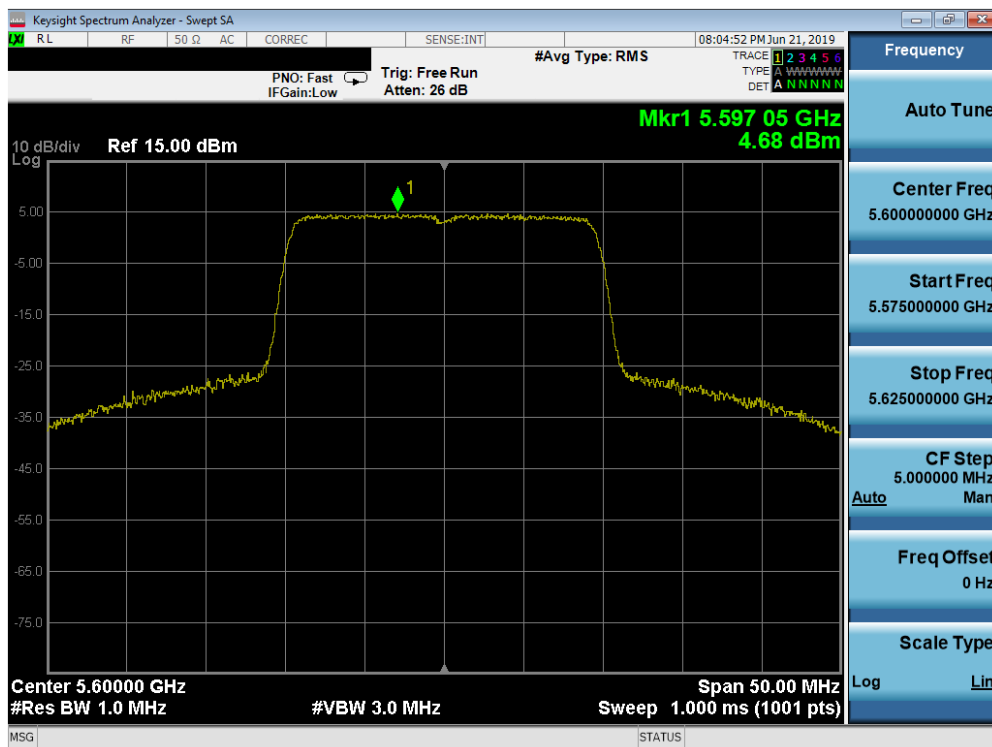


Plot 7-228. Power Spectral Density Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2C) – Ch. 144)

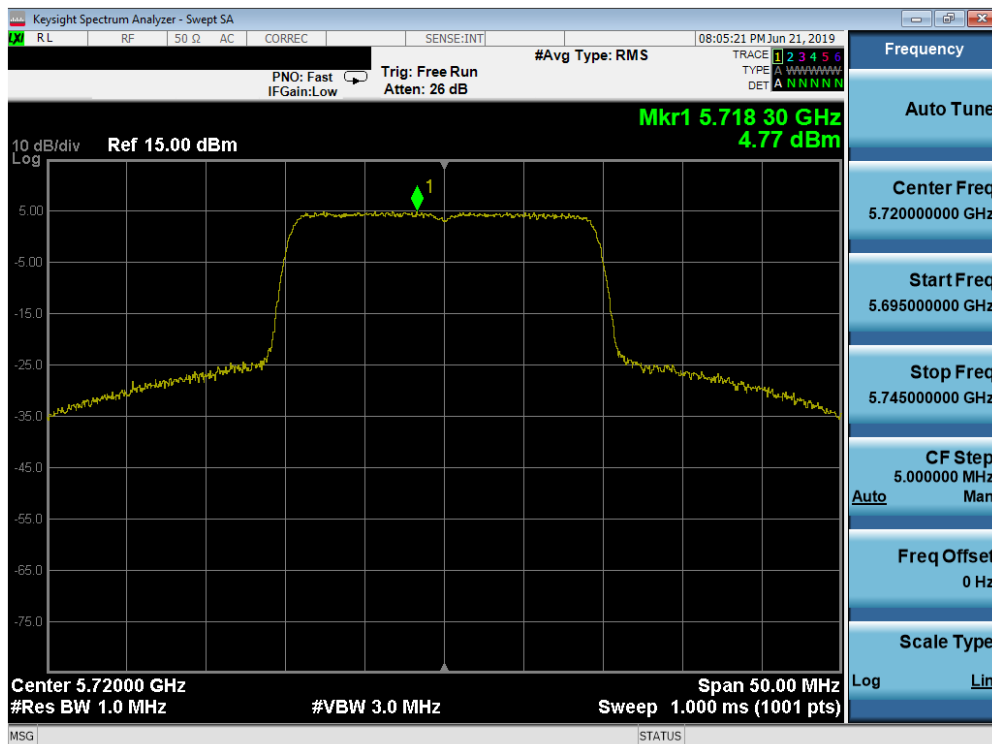


Plot 7-229. Power Spectral Density Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 2C) – Ch. 100)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 148 of 247

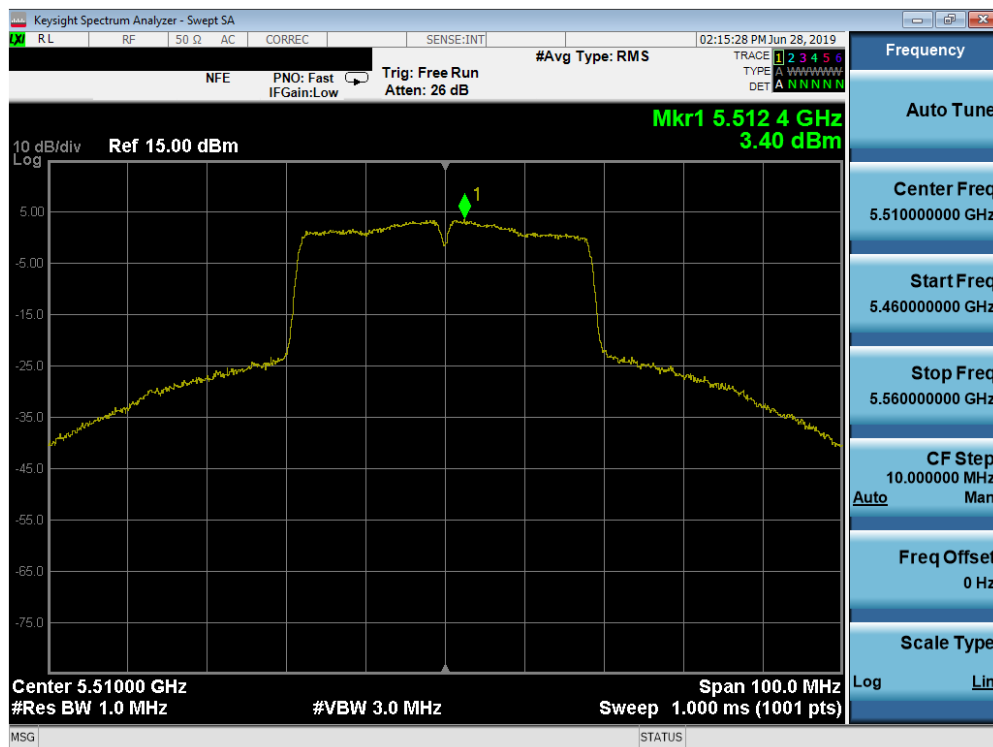


Plot 7-230. Power Spectral Density Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 2C) – Ch. 120)

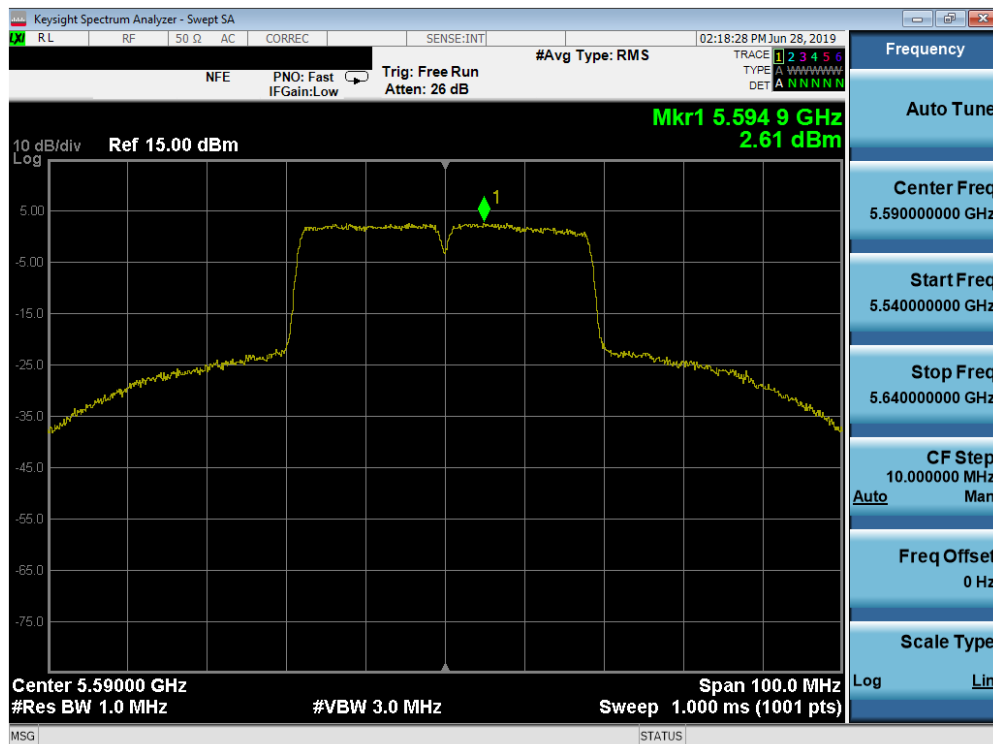


Plot 7-231. Power Spectral Density Plot SISO ANT2 (20MHz BW 802.11ax (UNII Band 2C) – Ch. 144)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 149 of 247

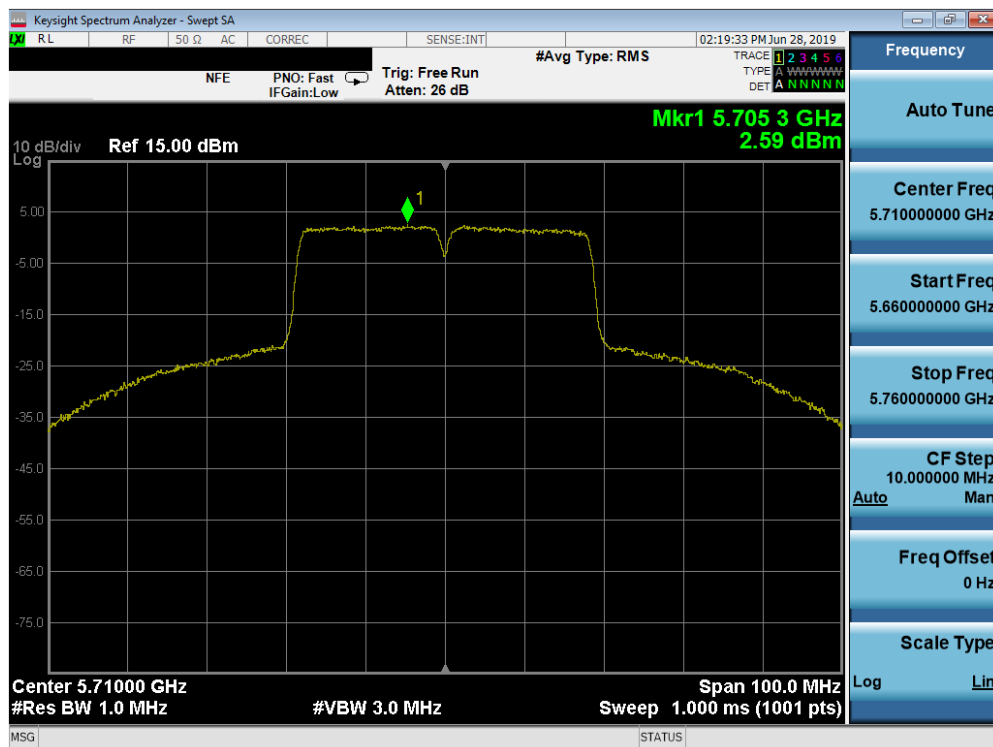


Plot 7-232. Power Spectral Density Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2C) – Ch. 102)

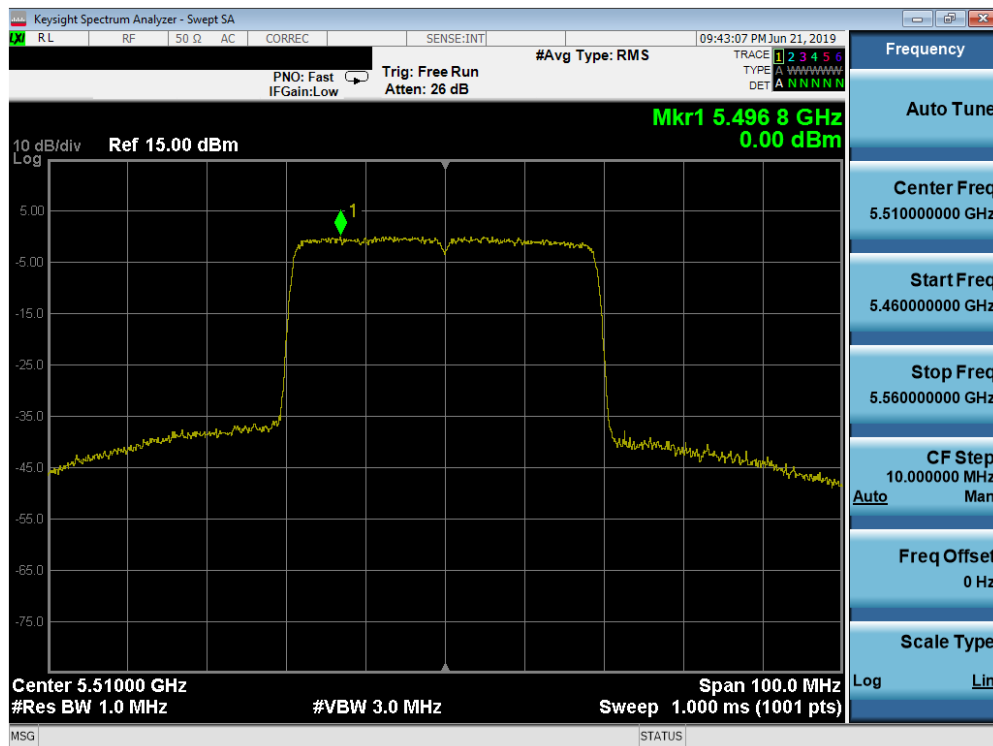


Plot 7-233. Power Spectral Density Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2C) – Ch. 118)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 150 of 247

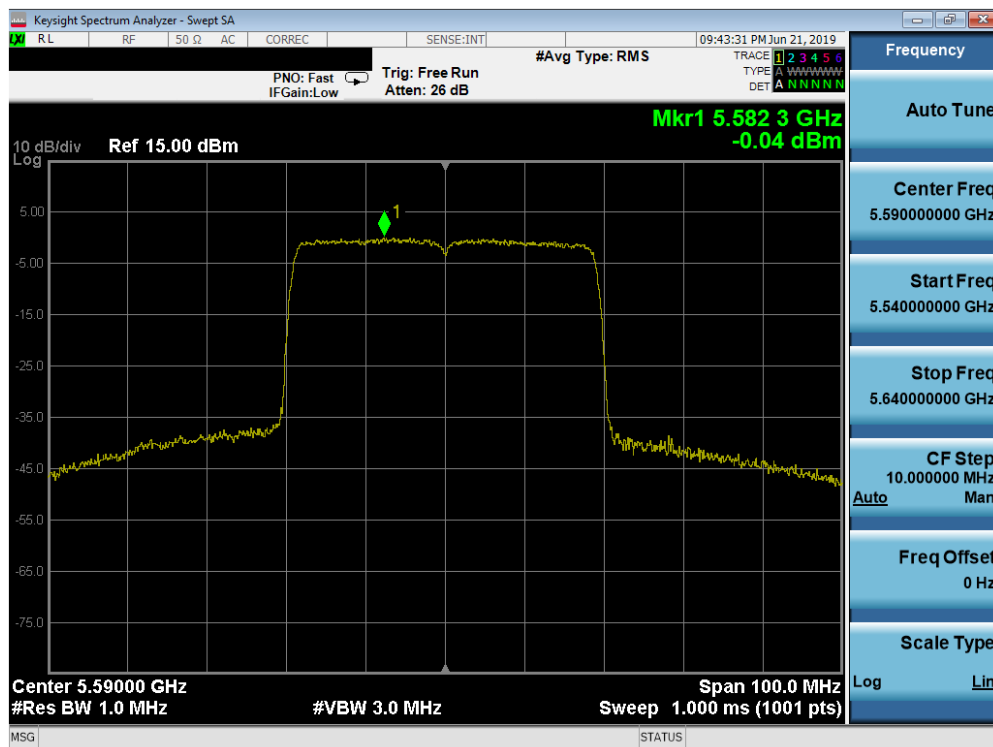


Plot 7-234. Power Spectral Density Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2C) – Ch. 142)

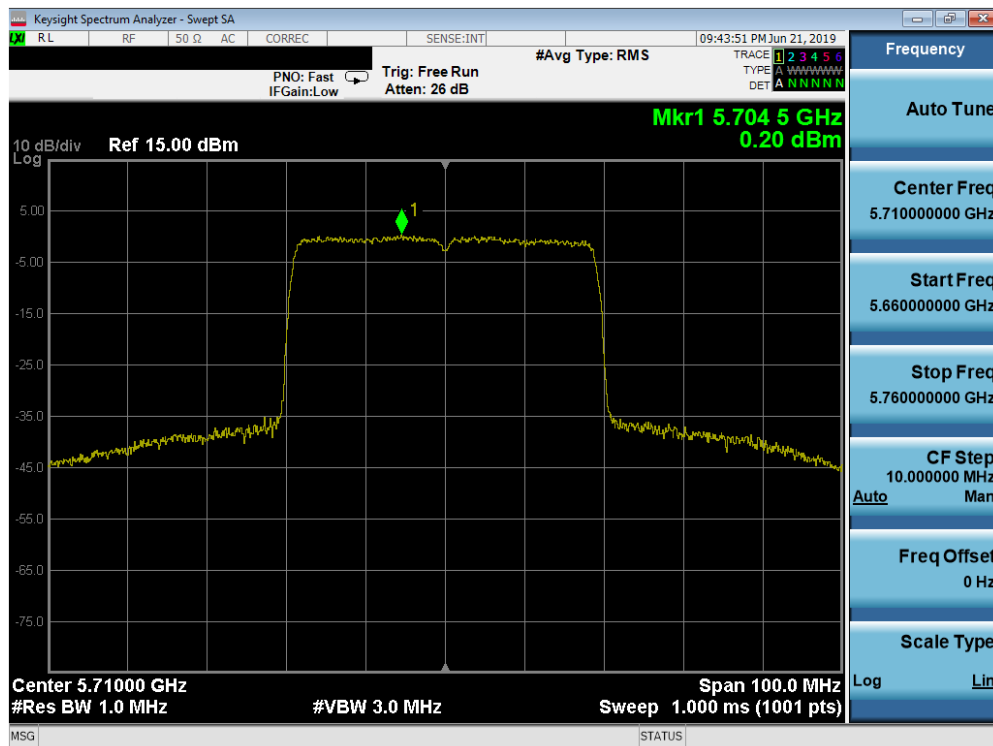


Plot 7-235. Power Spectral Density Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2C) – Ch. 102)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 151 of 247

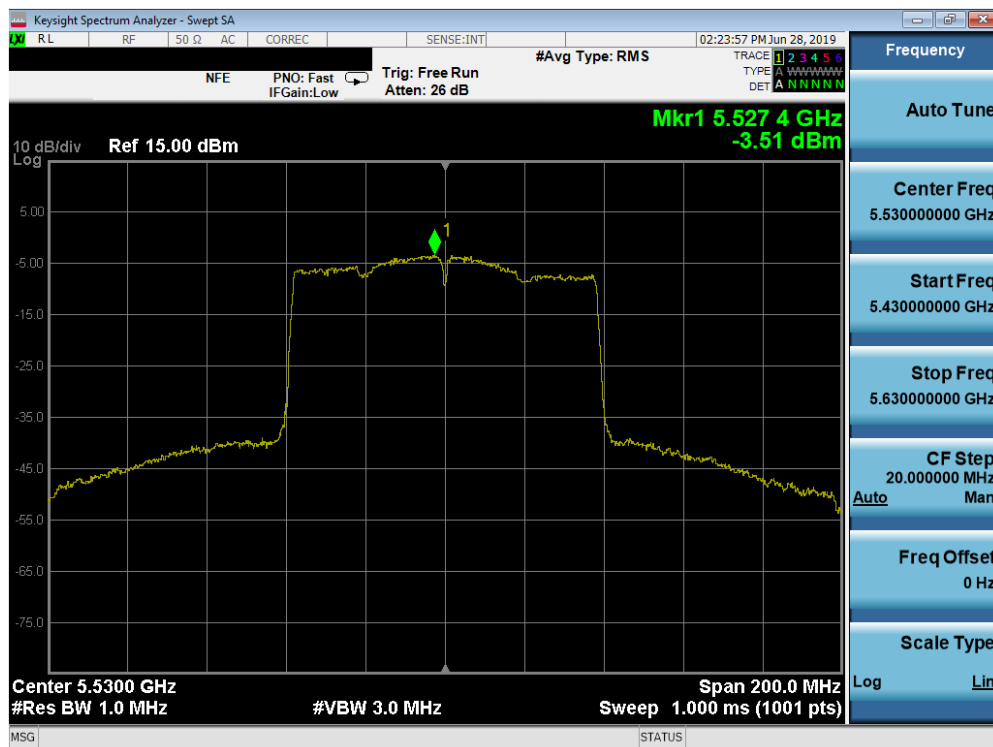


Plot 7-236. Power Spectral Density Plot SISO ANT2 (40MHz BW 802.11ax (UNII Band 2C) – Ch. 118)

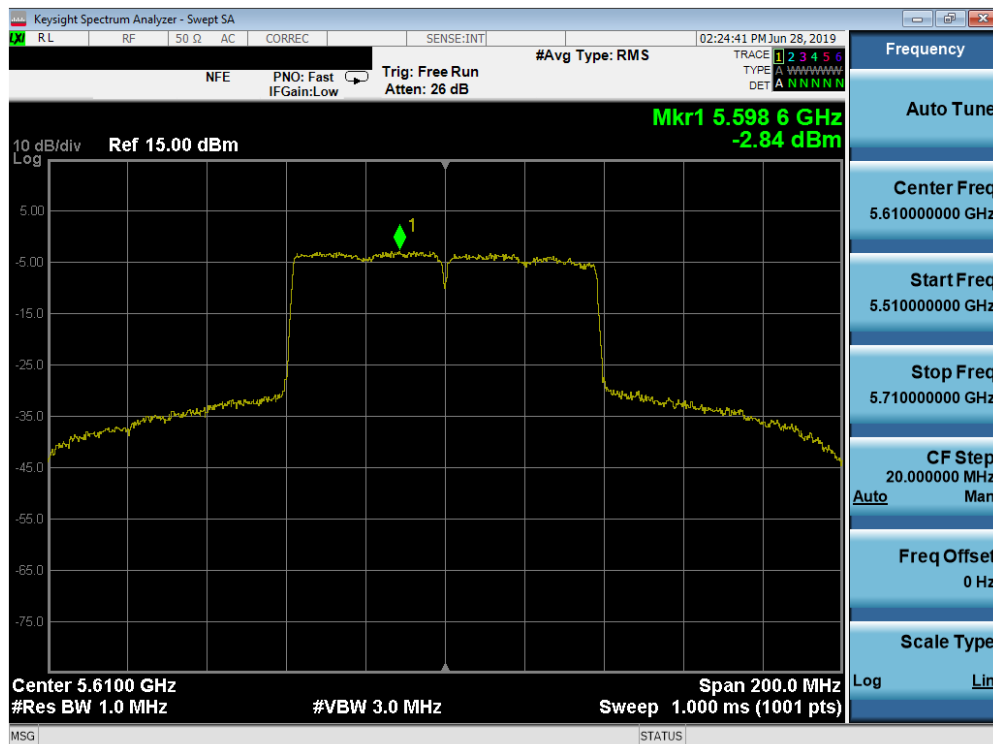


Plot 7-237. Power Spectral Density Plot SISO ANT2 (40MHz BW 802.11ax (UNII Band 2C) – Ch. 142)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 152 of 247

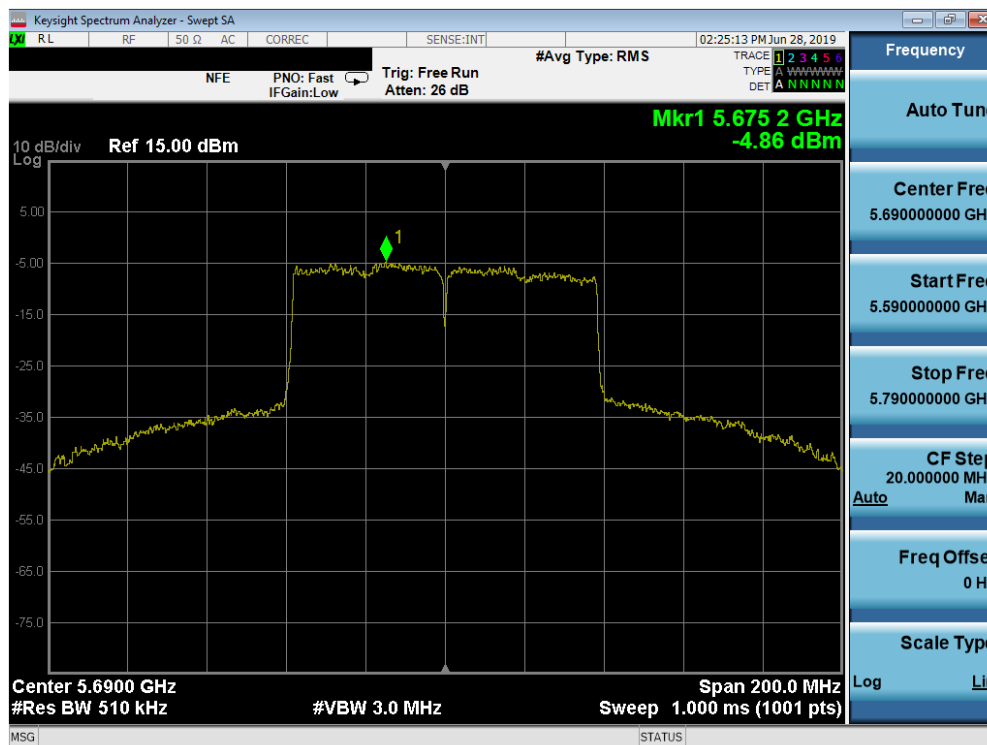


Plot 7-238. Power Spectral Density Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 2C) – Ch. 106)

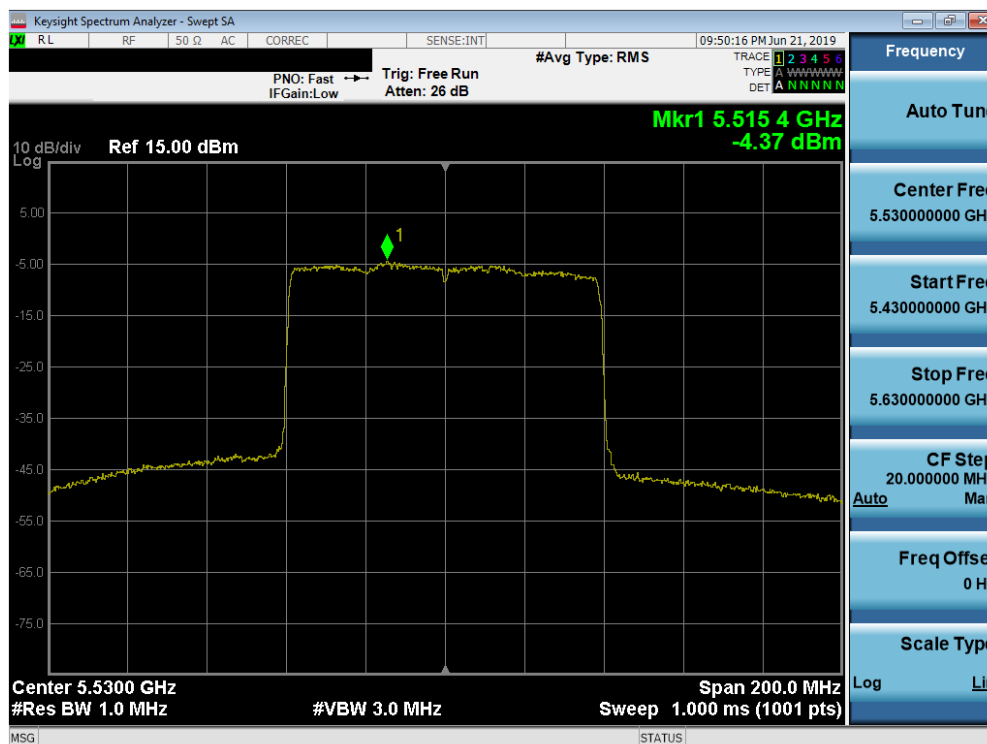


Plot 7-239. Power Spectral Density Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 2C) – Ch. 122)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 153 of 247

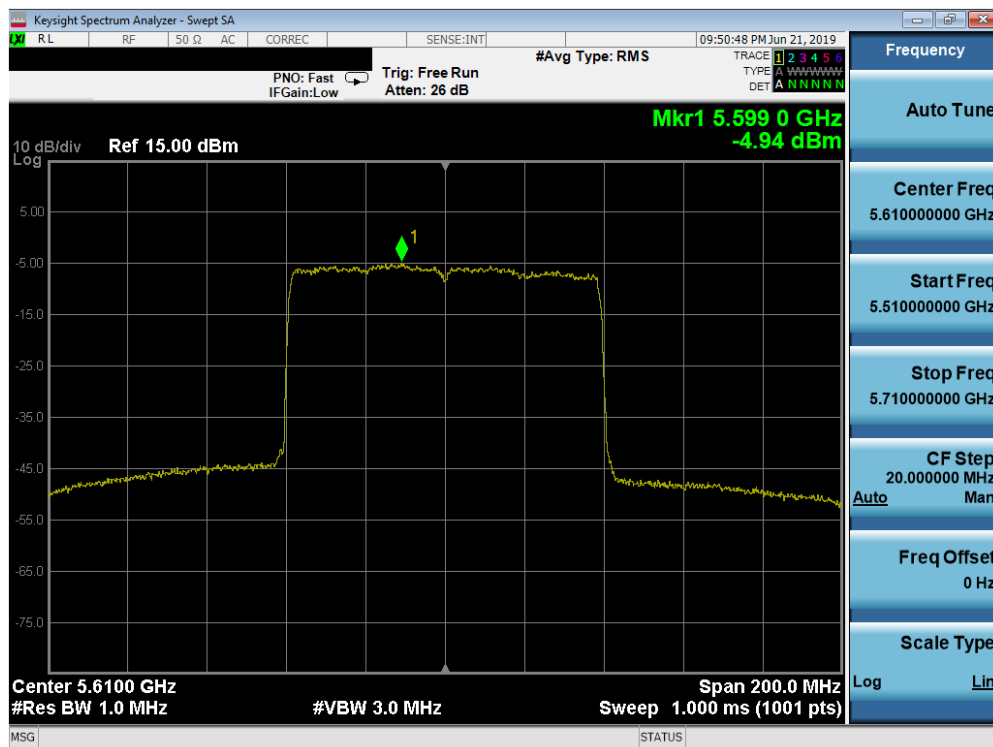


Plot 7-240. Power Spectral Density Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 2C) – Ch. 138)

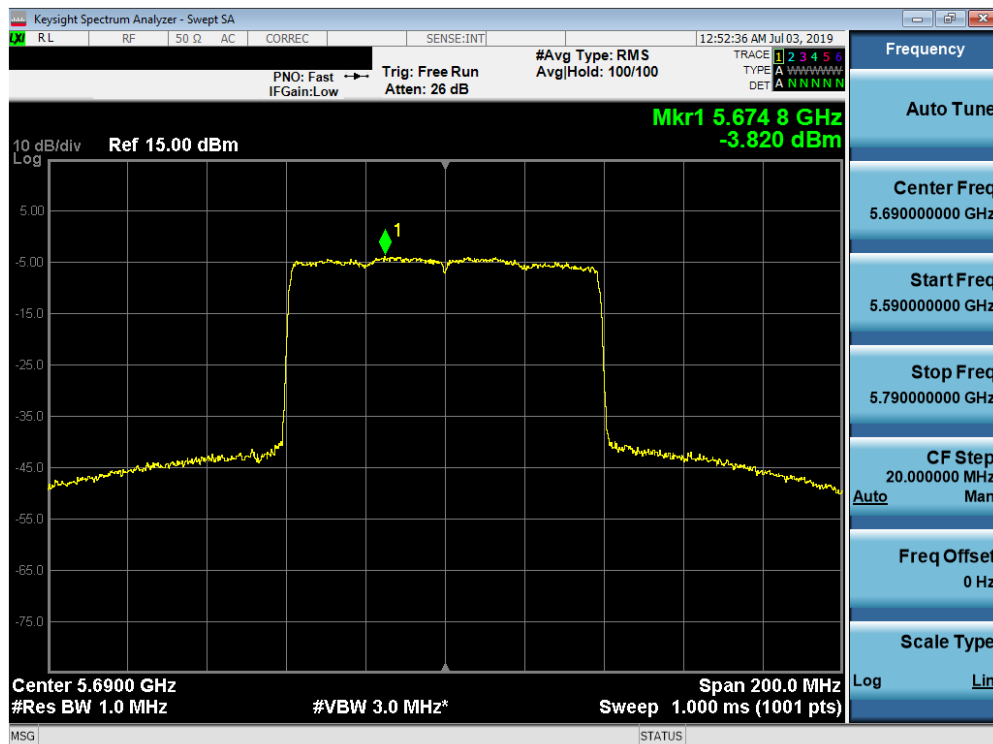


Plot 7-241. Power Spectral Density Plot SISO ANT2 (80MHz BW 802.11ax (UNII Band 2C) – Ch. 106)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 154 of 247



Plot 7-242. Power Spectral Density Plot SISO ANT2 (80MHz BW 802.11ax (UNII Band 2C) – Ch. 122)

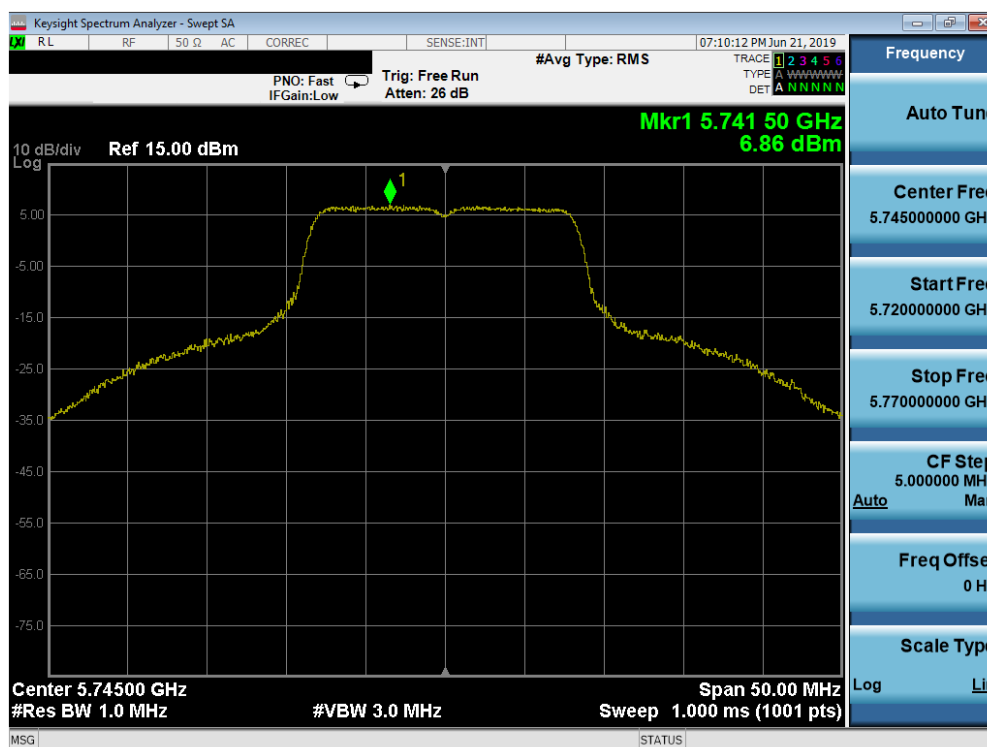


Plot 7-243. Power Spectral Density Plot SISO ANT2 (80MHz BW 802.11ax (UNII Band 2C) – Ch. 138)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 155 of 247

	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured Power Density [dBm]	Max Permissible Power Density [dBm/500kHz]	Margin [dB]
Band 3	5745	149	a	6	6.86	30.0	-23.14
	5785	157	a	6	6.67	30.0	-23.33
	5825	165	a	6	6.37	30.0	-23.63
	5745	149	n (20MHz)	6.5/7.2 (MCS0)	3.84	30.0	-26.16
	5785	157	n (20MHz)	6.5/7.2 (MCS0)	3.44	30.0	-26.56
	5825	165	n (20MHz)	6.5/7.2 (MCS0)	3.15	30.0	-26.85
	5745	149	ax (20MHz)	6.5/7.2 (MCS0)	4.79	30.0	-25.21
	5785	157	ax (20MHz)	6.5/7.2 (MCS0)	4.79	30.0	-25.21
	5825	165	ax (20MHz)	6.5/7.2 (MCS0)	4.22	30.0	-25.78
	5755	151	n (40MHz)	13.5/15 (MCS0)	-0.02	30.0	-30.02
	5795	159	n (40MHz)	13.5/15 (MCS0)	-0.17	30.0	-30.17
	5755	151	ax (40MHz)	13.5/15 (MCS0)	-2.49	30.0	-32.49
	5795	159	ax (40MHz)	13.5/15 (MCS0)	-2.67	30.0	-32.67
	5775	155	ac (80MHz)	29.3/32.5 (MCS0)	-1.98	30.0	-31.98
	5775	155	ax (80MHz)	29.3/32.5 (MCS0)	-4.30	30.0	-34.30

Table 7-26. Band 3 Conducted Power Spectral Density Measurements SISO ANT2



Plot 7-244. Power Spectral Density Plot SISO ANT2 (802.11a (UNII Band 3) – Ch. 149)

FCC ID: A3LSMN970U	PCTEST ENGINEERING LABORATORY, INC.	MEASUREMENT REPORT (CERTIFICATION)	SAMSUNG	Approved by: Quality Manager
Test Report S/N: 1M1905220084-08.A3L	Test Dates: 05/22 - 07/10/2019	EUT Type: Portable Handset		Page 156 of 247