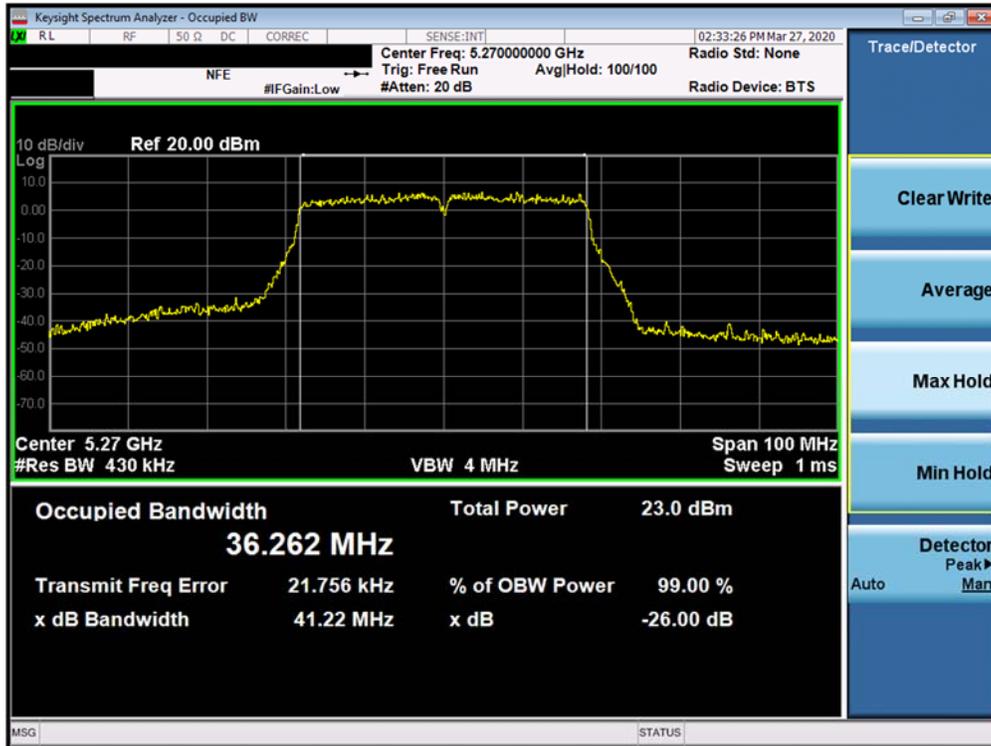
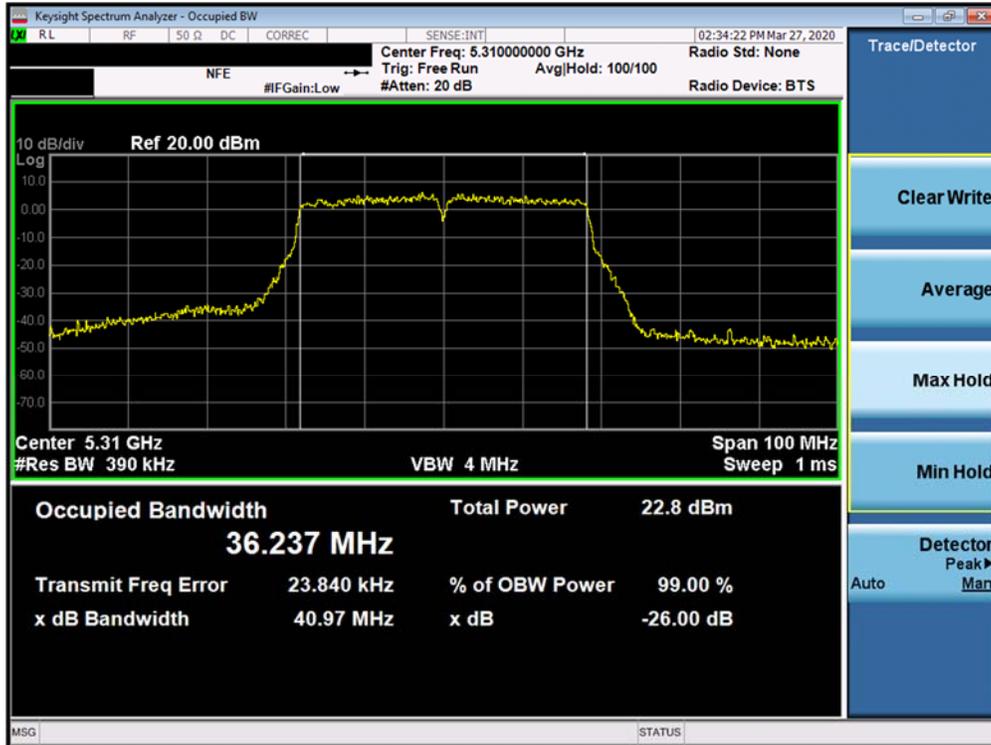


Plot 7-45. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2A) – Ch. 64)

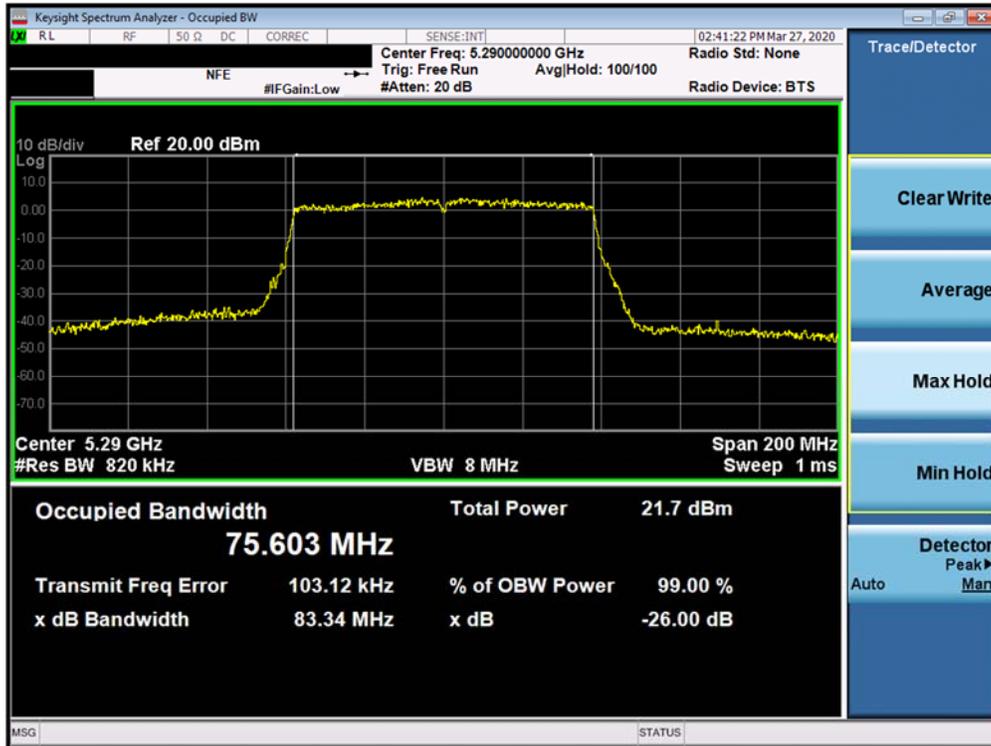


Plot 7-46. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2A) – Ch. 54)

FCC ID: ZNFG900UM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 39 of 178

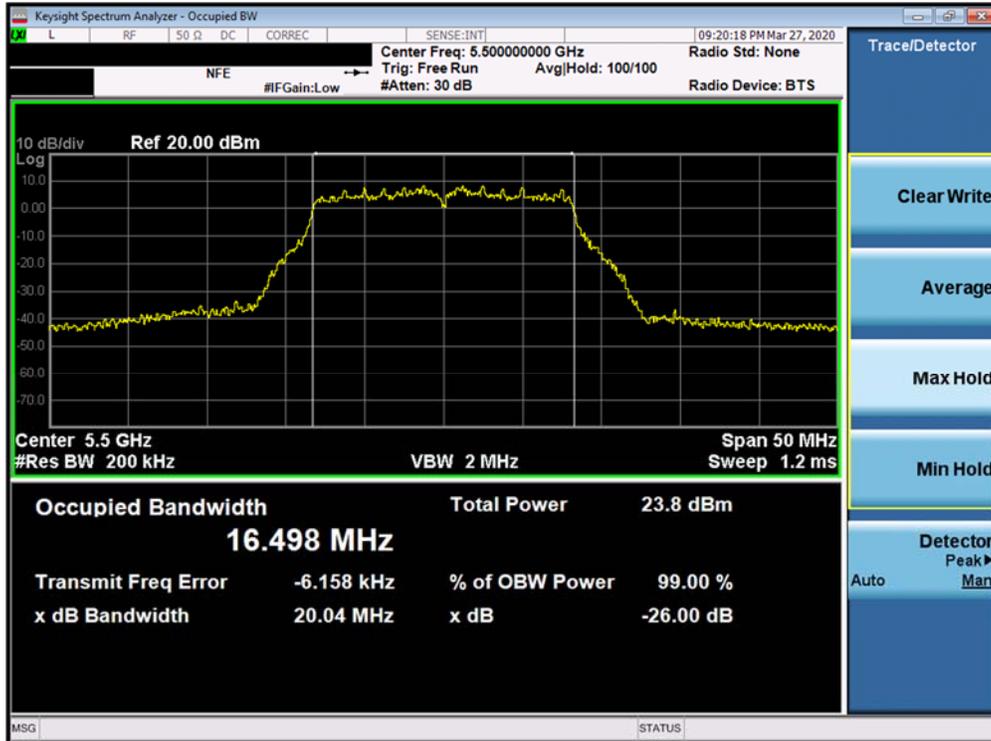


Plot 7-47. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2A) – Ch. 62)

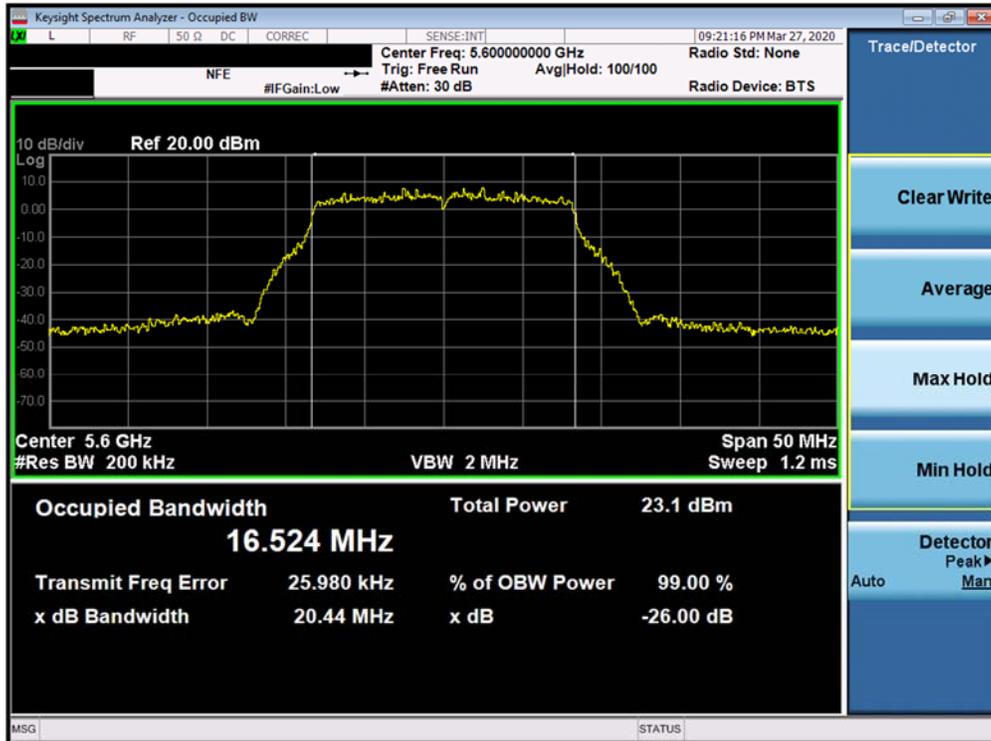


Plot 7-48. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 2A) – Ch. 58)

FCC ID: ZNFG900UM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 40 of 178

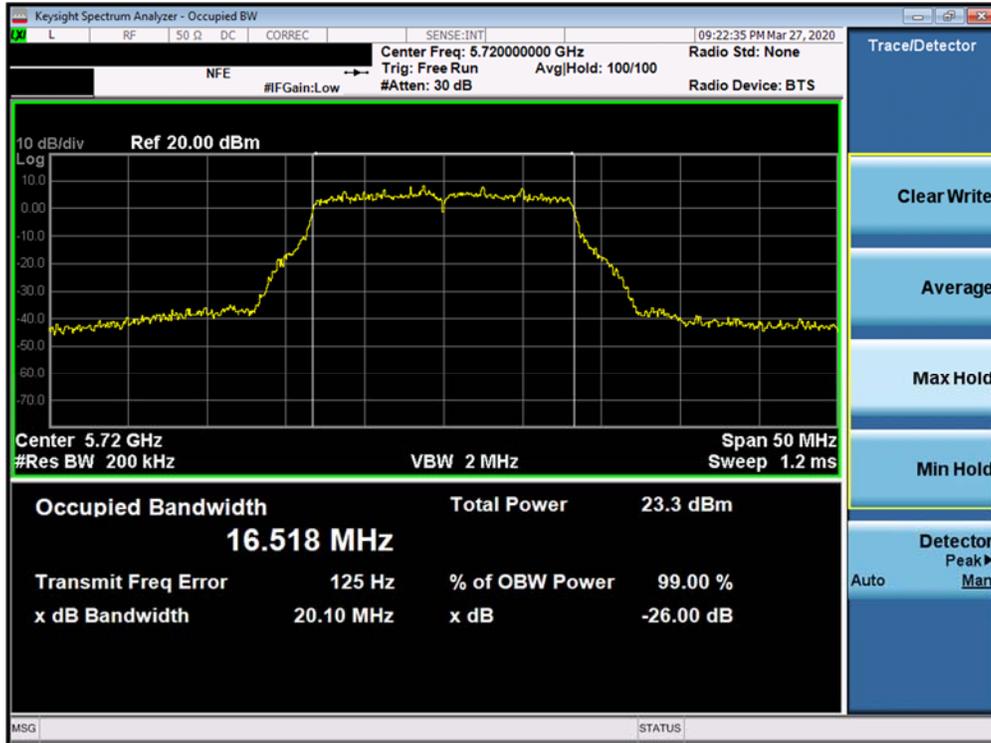


Plot 7-49. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 2C) – Ch. 100)

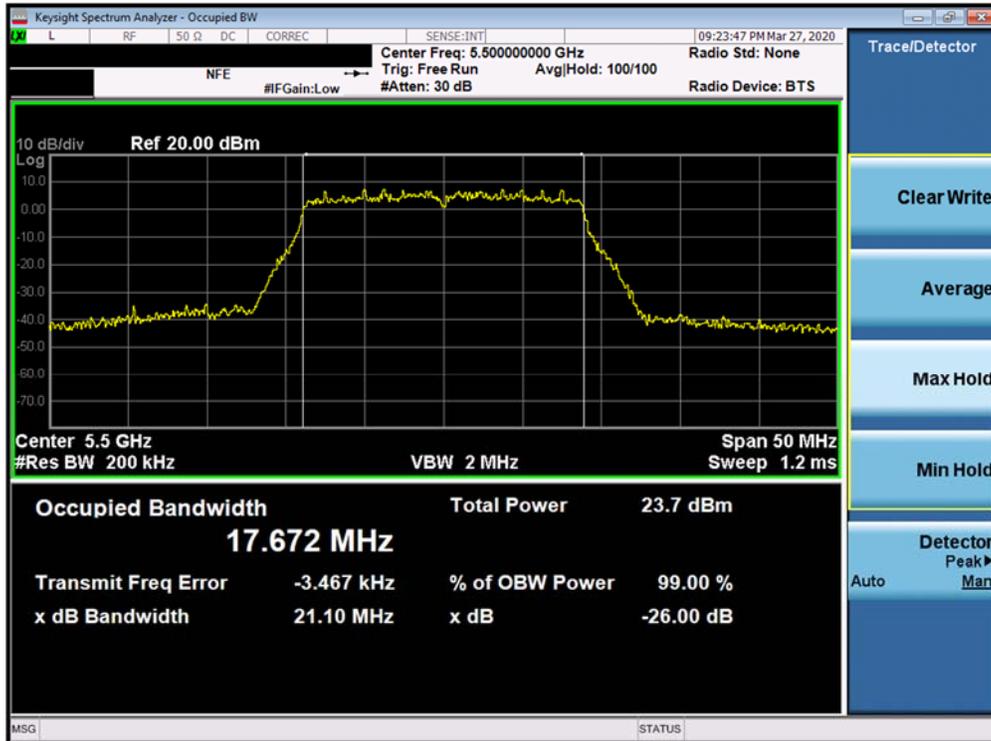


Plot 7-50. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 2C) – Ch. 120)

FCC ID: ZNFG900UM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 41 of 178

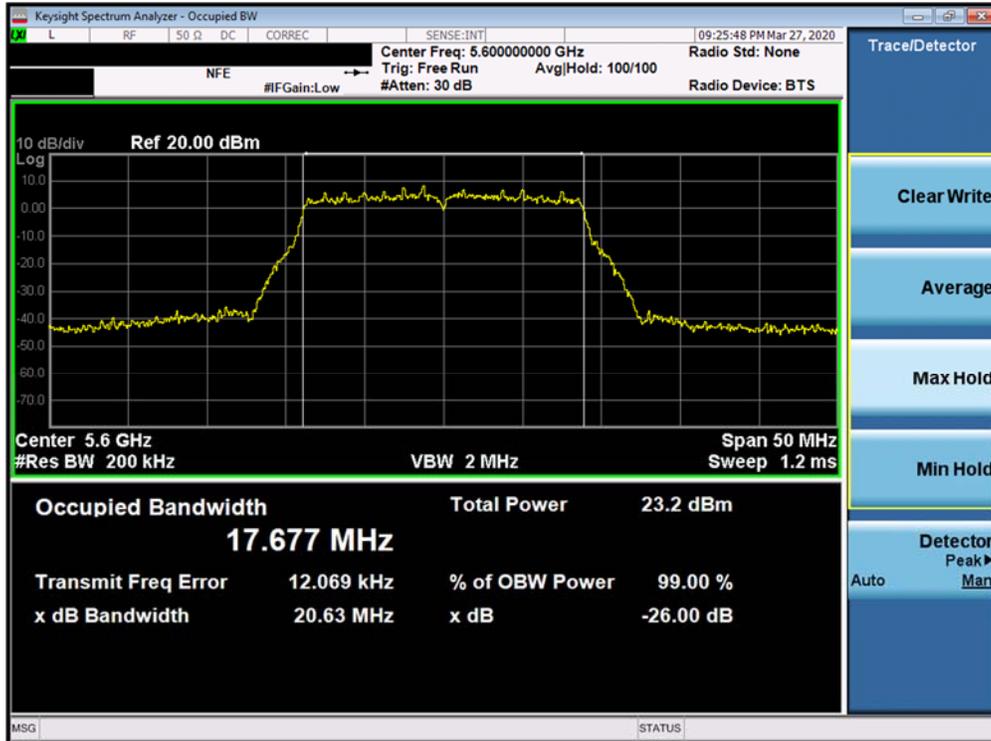


Plot 7-51. 26dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 2C) – Ch. 144)

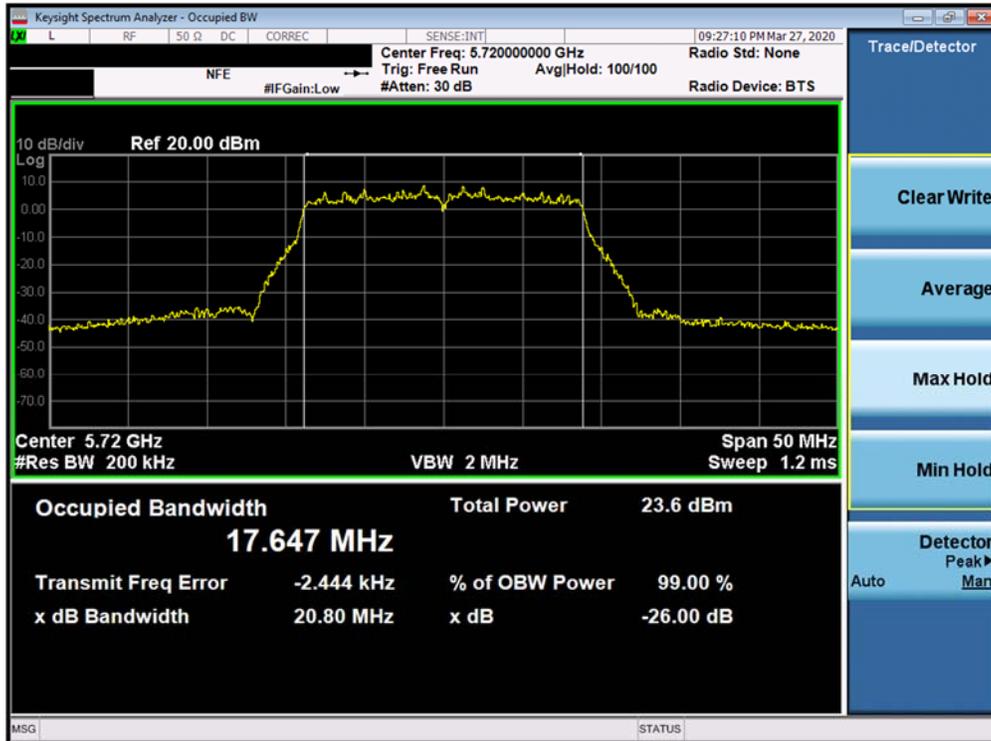


Plot 7-52. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2C) – Ch. 100)

FCC ID: ZNFG900UM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 42 of 178

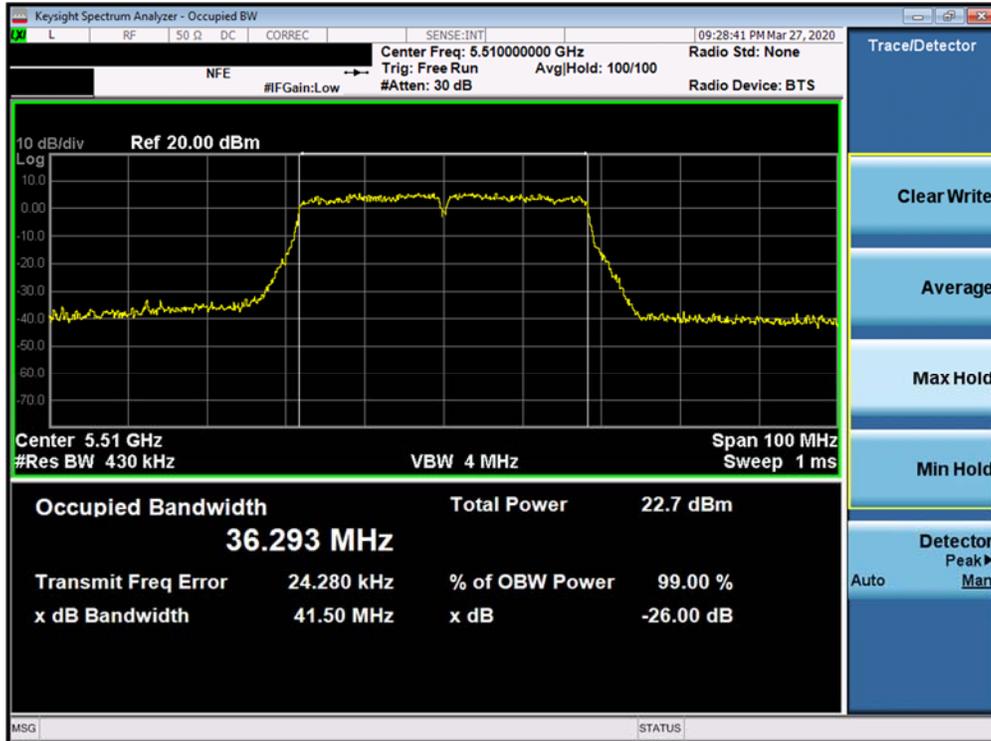


Plot 7-53. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2C) – Ch. 120)

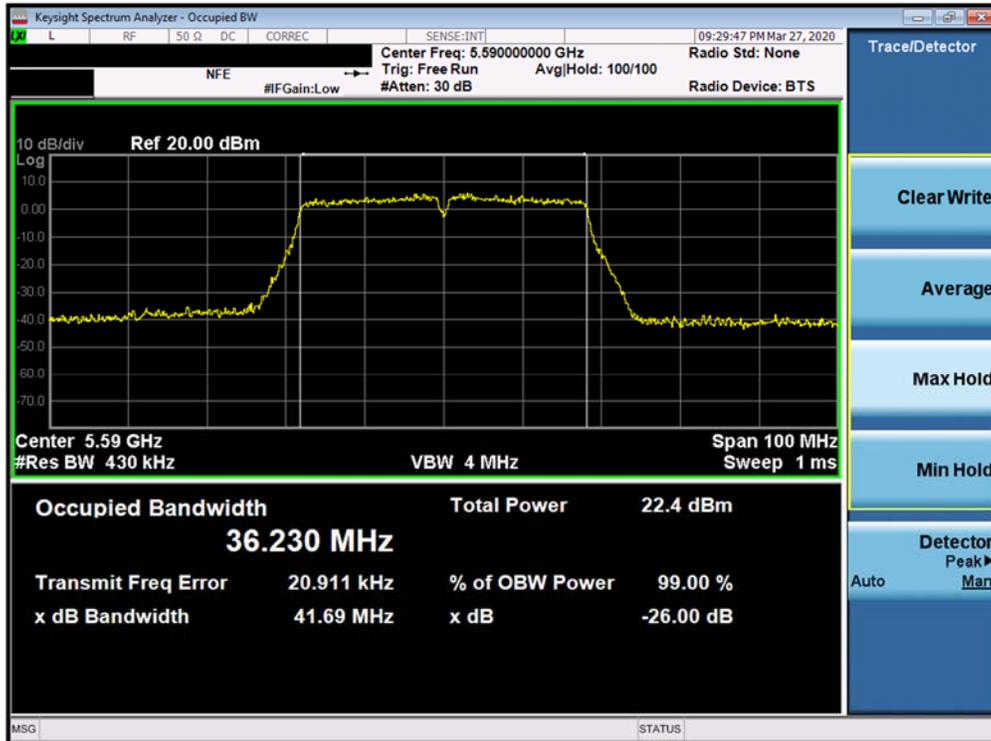


Plot 7-54. 26dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 2C) – Ch. 144)

FCC ID: ZNFG900UM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 43 of 178

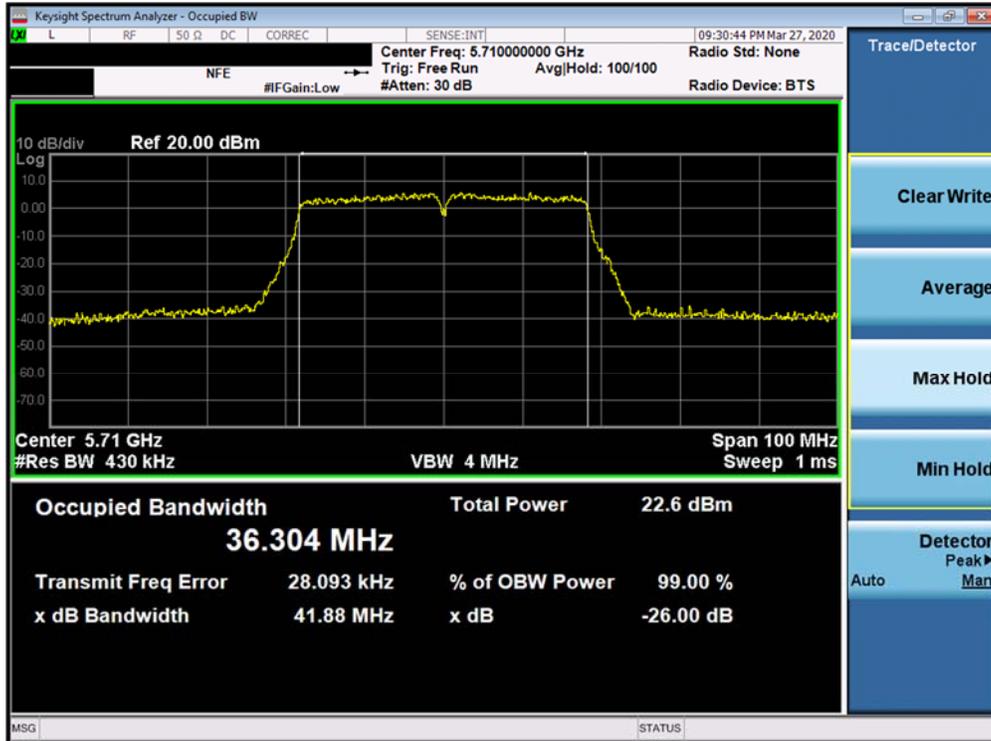


Plot 7-55. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2C) – Ch. 102)

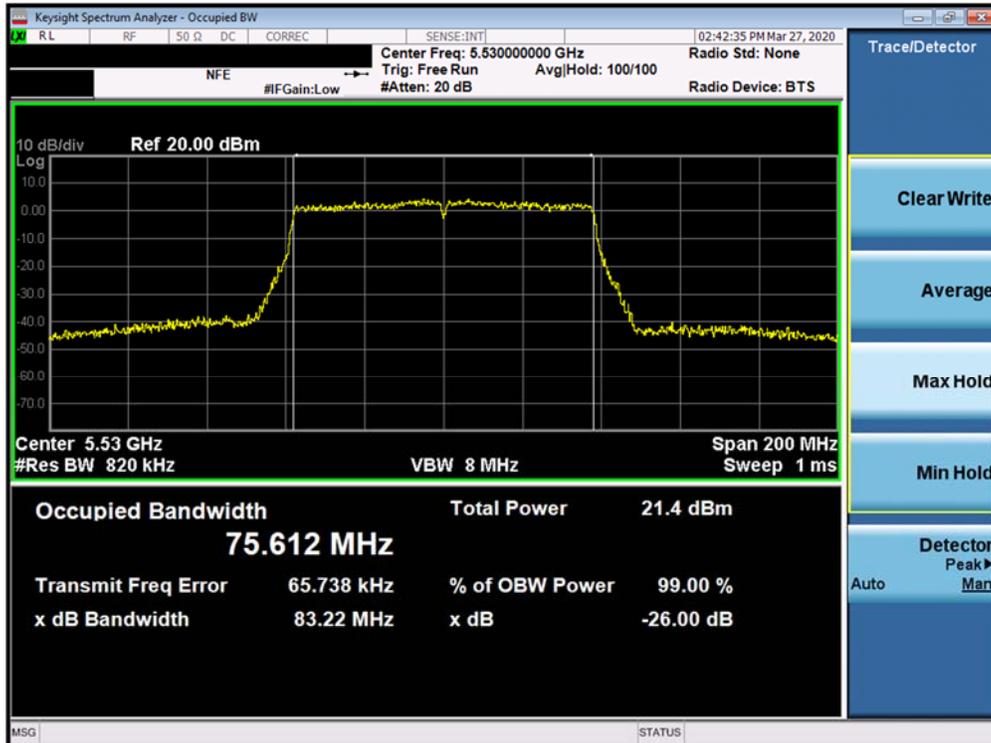


Plot 7-56. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2C) – Ch. 118)

FCC ID: ZNFG900UM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 44 of 178

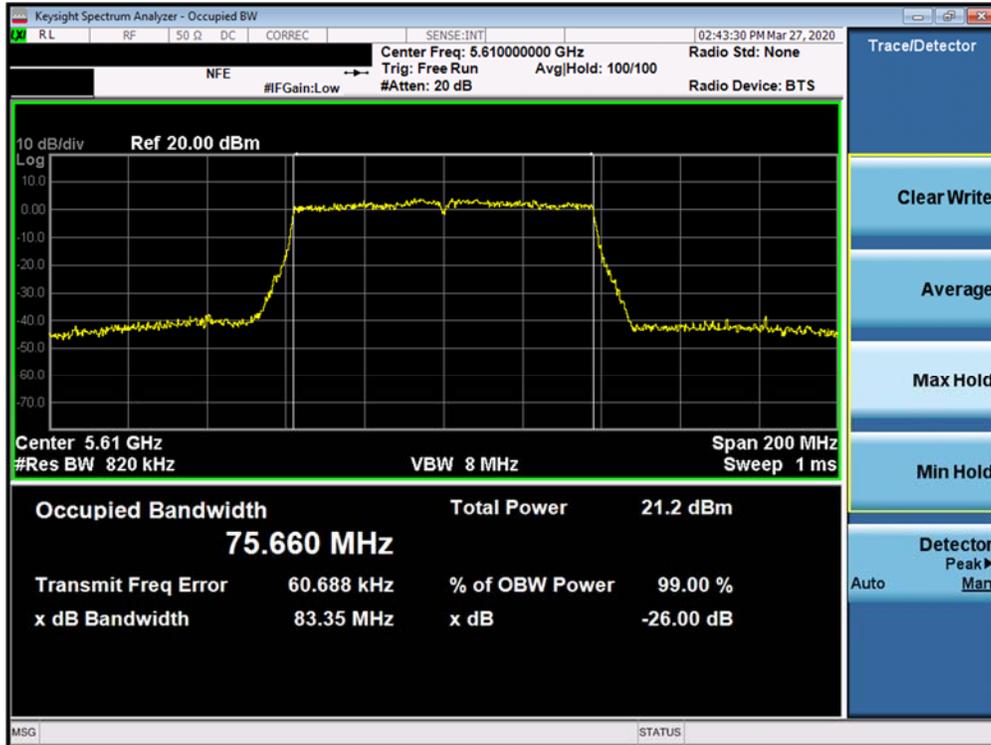


Plot 7-57. 26dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 2C) – Ch. 142)

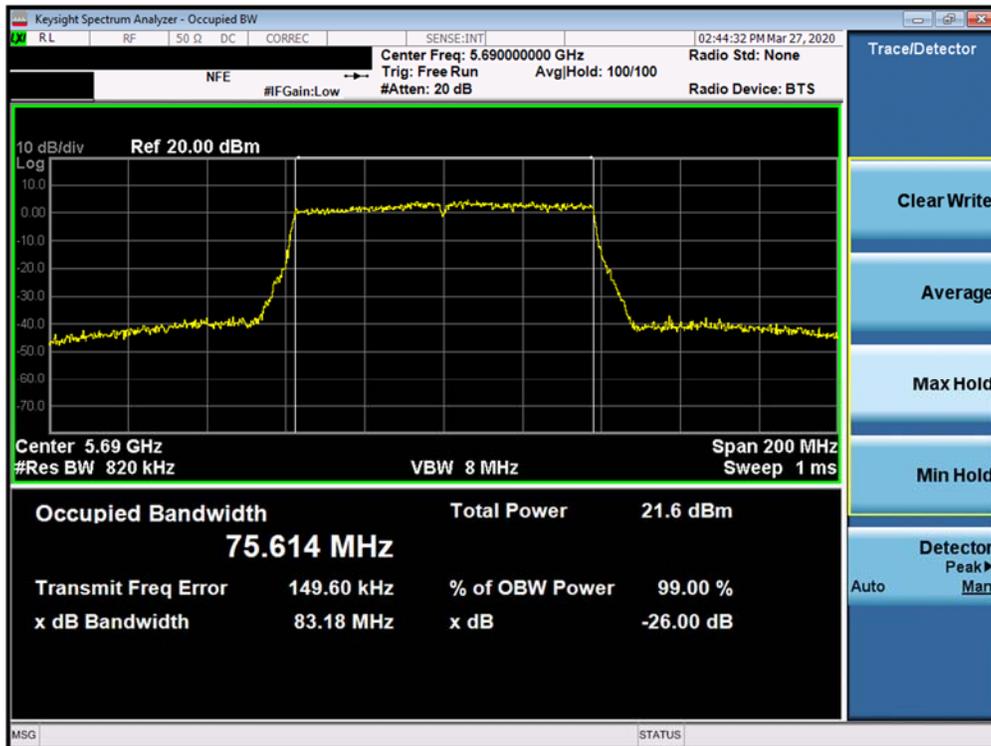


Plot 7-58. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 2C) – Ch. 106)

FCC ID: ZNFG900UM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 45 of 178



Plot 7-59. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 2C) – Ch. 122)



Plot 7-60. 26dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 2C) – Ch. 138)

FCC ID: ZNFG900UM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 46 of 178

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

Test Overview and Limit

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

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

Test Procedure Used

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

Test Settings

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

Test Setup

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



Figure 7-2. Test Instrument & Measurement Setup

Test Notes

None.

FCC ID: ZNFG900UM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 47 of 178

SISO Antenna-1 6 dB Bandwidth Measurements

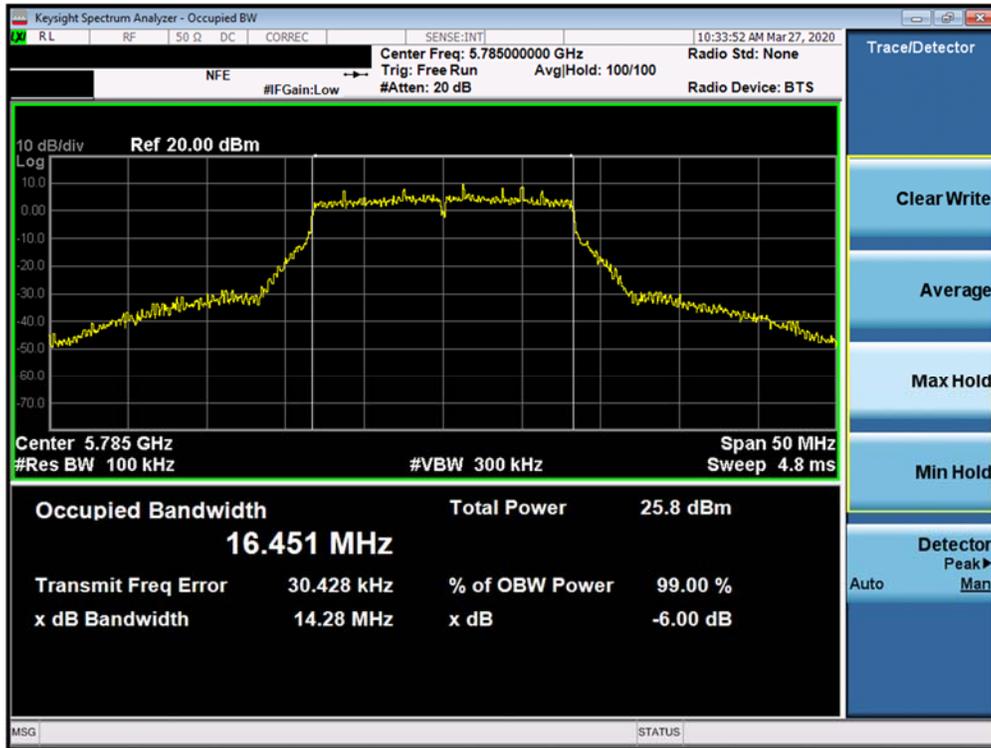
	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured 6dB Bandwidth [MHz]
Band 3	5745	149	a	6	13.45
	5785	157	a	6	14.28
	5825	165	a	6	15.82
	5745	149	n (20MHz)	6.5/7.2 (MCS0)	13.85
	5785	157	n (20MHz)	6.5/7.2 (MCS0)	15.74
	5825	165	n (20MHz)	6.5/7.2 (MCS0)	15.95
	5755	151	n (40MHz)	13.5/15 (MCS0)	35.39
	5795	159	n (40MHz)	13.5/15 (MCS0)	36.06
	5775	155	ac (80MHz)	29.3/32.5 (MCS0)	74.16

Table 7-4. Conducted Bandwidth Measurements SISO ANT1



Plot 7-61. 6dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 3) - Ch. 149)

FCC ID: ZNFG900UM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 48 of 178

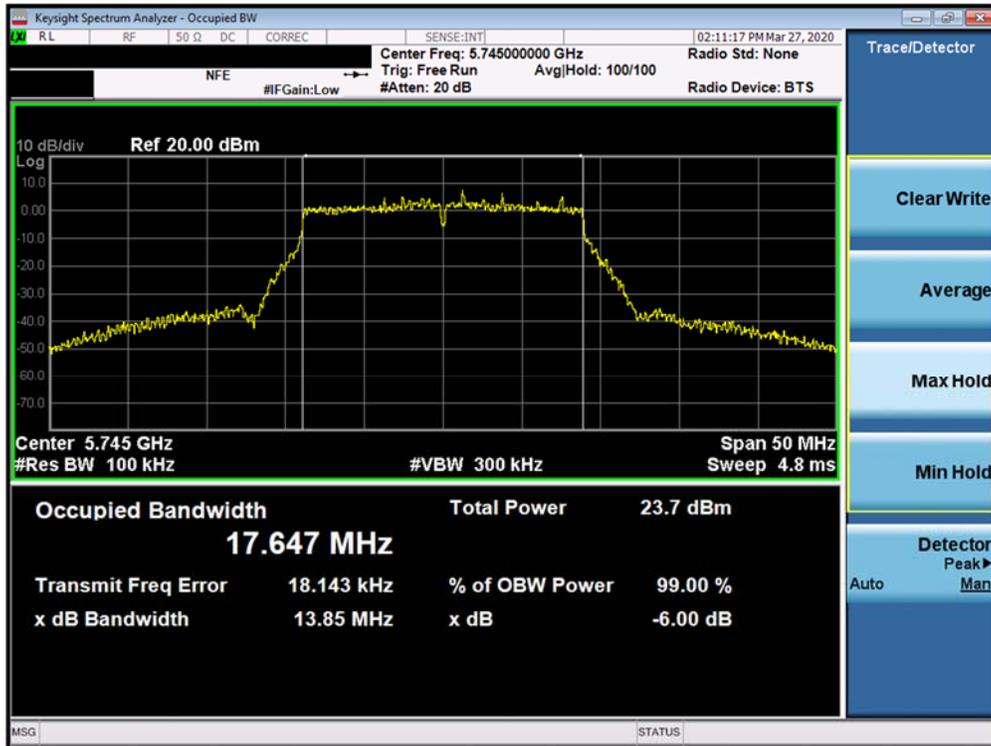


Plot 7-62. 6dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 3) – Ch. 157)

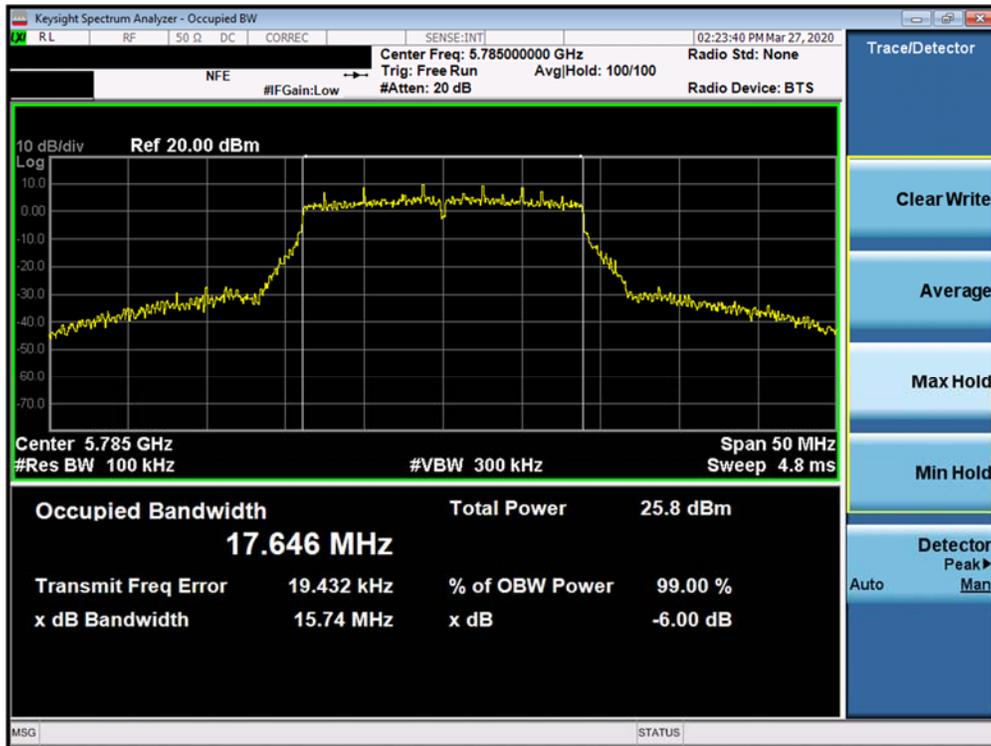


Plot 7-63. 6dB Bandwidth Plot SISO ANT1 (802.11a (UNII Band 3) – Ch. 165)

FCC ID: ZNFG900UM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 49 of 178



Plot 7-64. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 3) – Ch. 149)

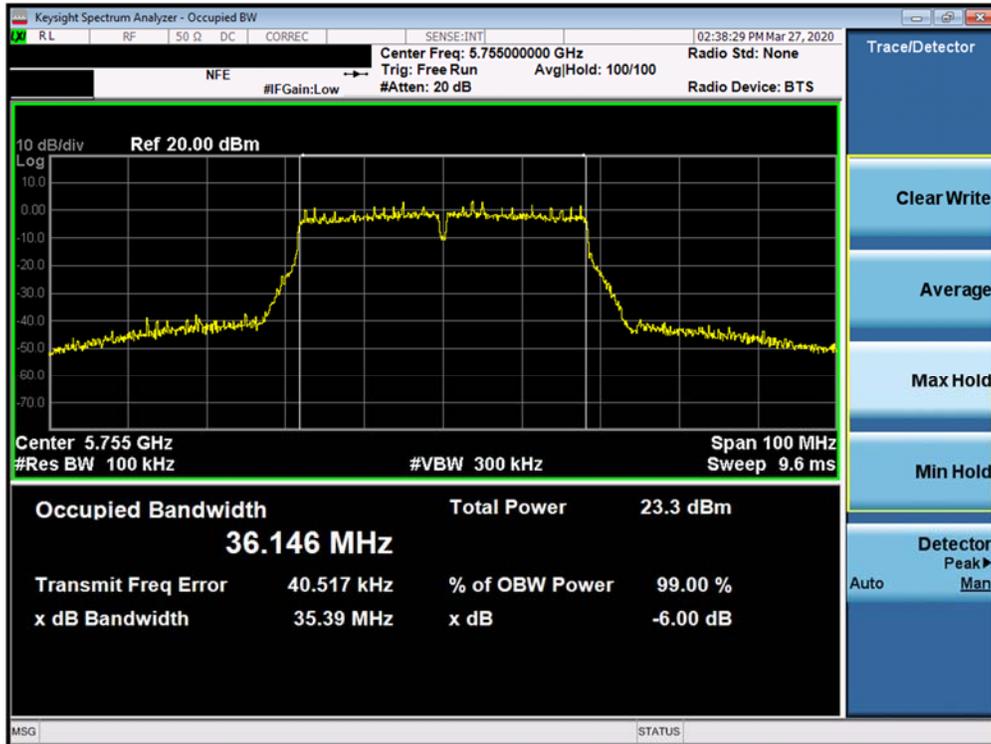


Plot 7-65. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 3) – Ch. 157)

FCC ID: ZNFG900UM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 50 of 178

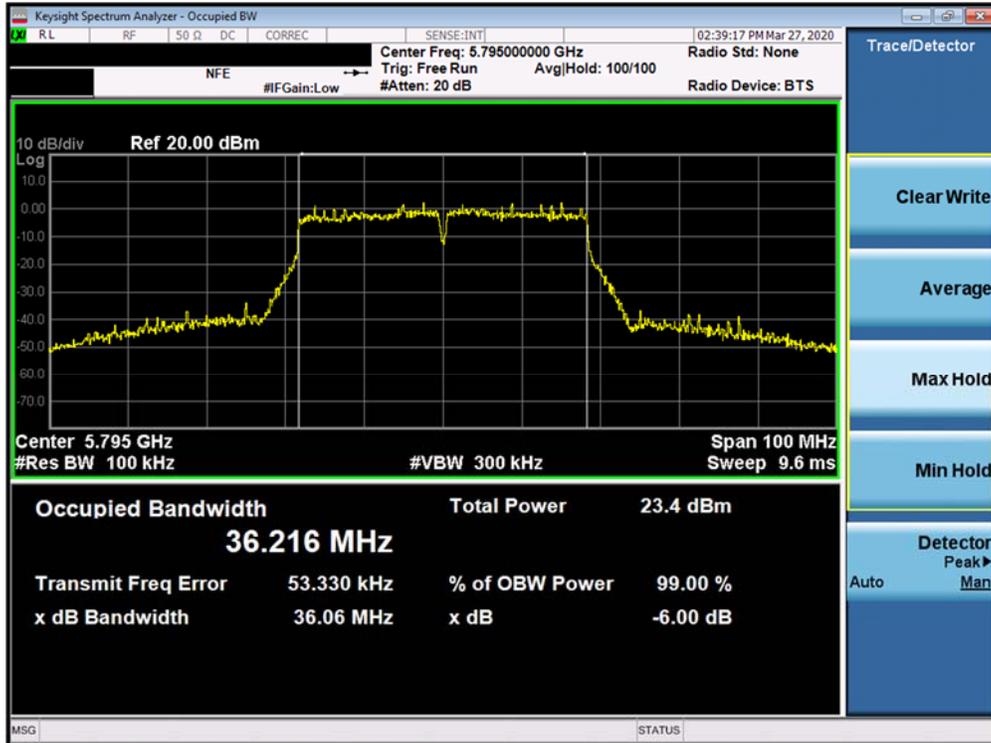


Plot 7-66. 6dB Bandwidth Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 3) – Ch. 165)

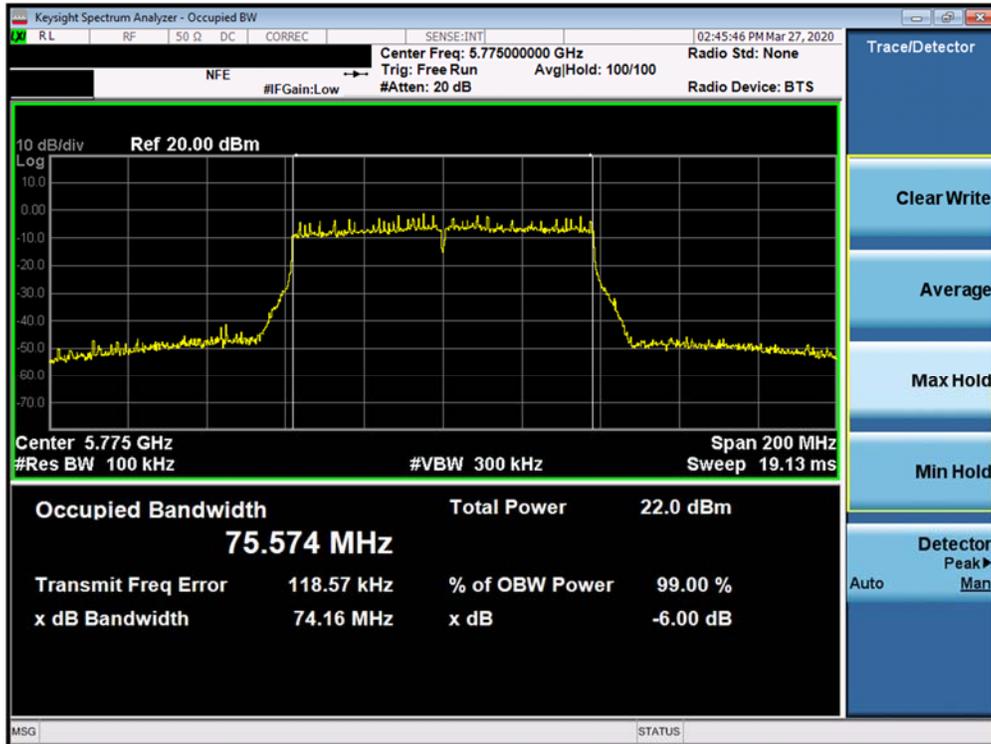


Plot 7-67. 6dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 3) – Ch. 151)

FCC ID: ZNFG900UM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 51 of 178



Plot 7-68. 6dB Bandwidth Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 3) – Ch. 159)



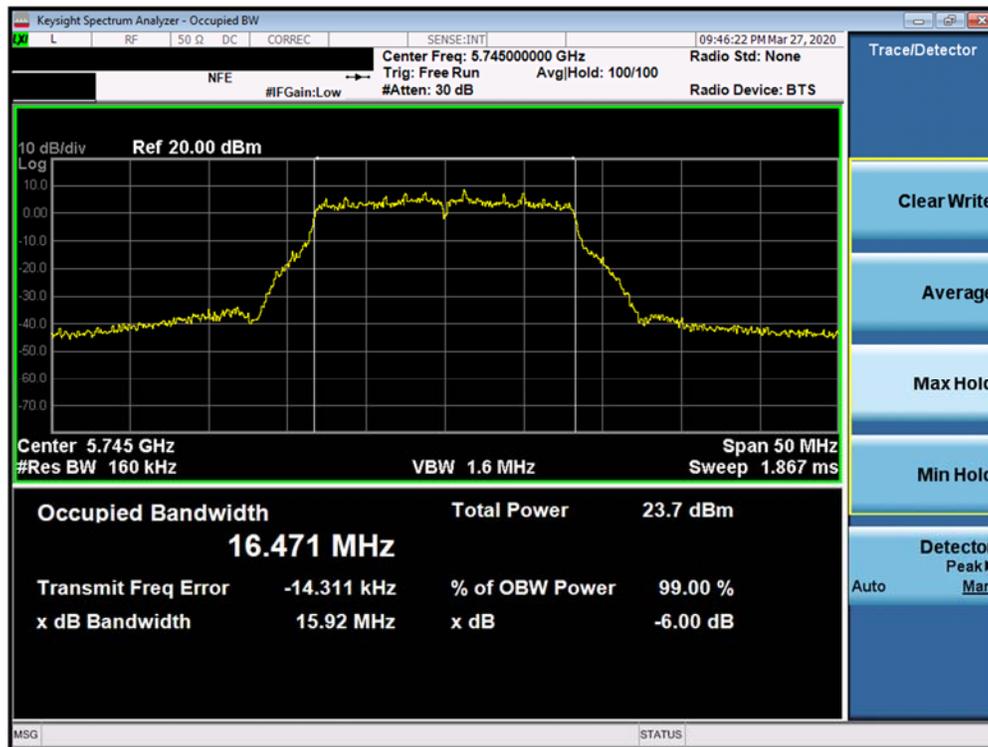
Plot 7-69. 6dB Bandwidth Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 3) – Ch. 155)

FCC ID: ZNFG900UM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 52 of 178

SISO Antenna-2 6dB Bandwidth Measurements

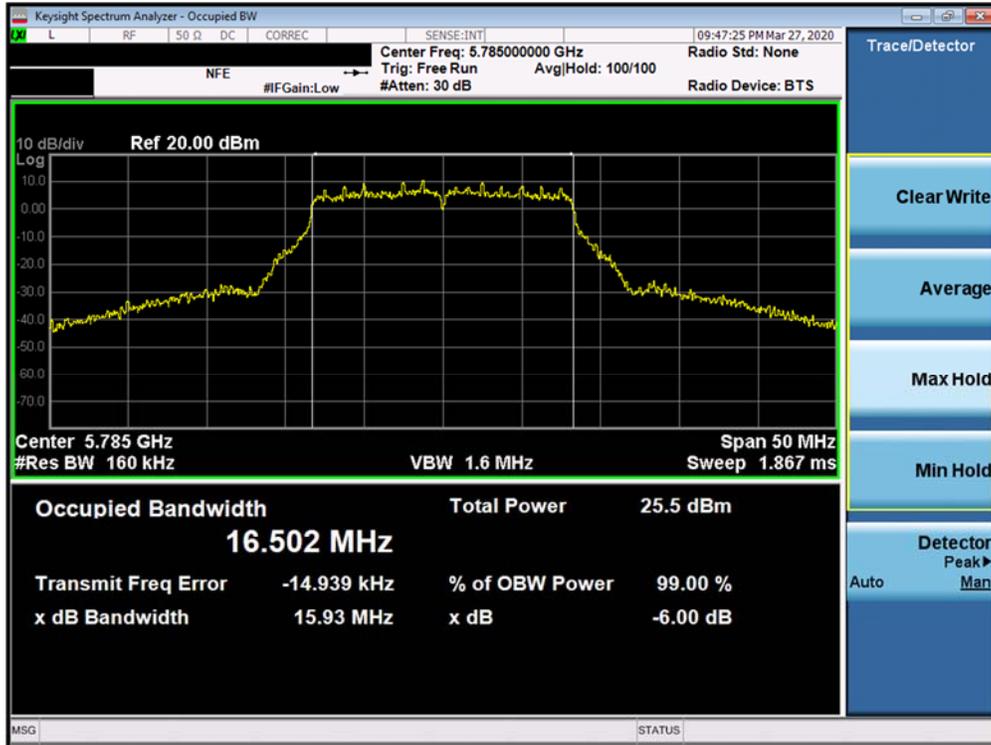
	Frequency [MHz]	Channel No.	802.11 Mode	Data Rate [Mbps]	Measured 6dB Bandwidth [MHz]
Band 3	5745	149	a	6	15.92
	5785	157	a	6	15.93
	5825	165	a	6	15.97
	5745	149	n (20MHz)	6.5/7.2 (MCS0)	16.29
	5785	157	n (20MHz)	6.5/7.2 (MCS0)	17.32
	5825	165	n (20MHz)	6.5/7.2 (MCS0)	17.15
	5755	151	n (40MHz)	13.5/15 (MCS0)	36.08
	5795	159	n (40MHz)	13.5/15 (MCS0)	36.43
	5775	155	ac (80MHz)	29.3/32.5 (MCS0)	76.21

Table 7-5. Conducted Bandwidth Measurements SISO ANT2



Plot 7-70. 6dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 3) – Ch. 149)

FCC ID: ZNFG900UM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 53 of 178

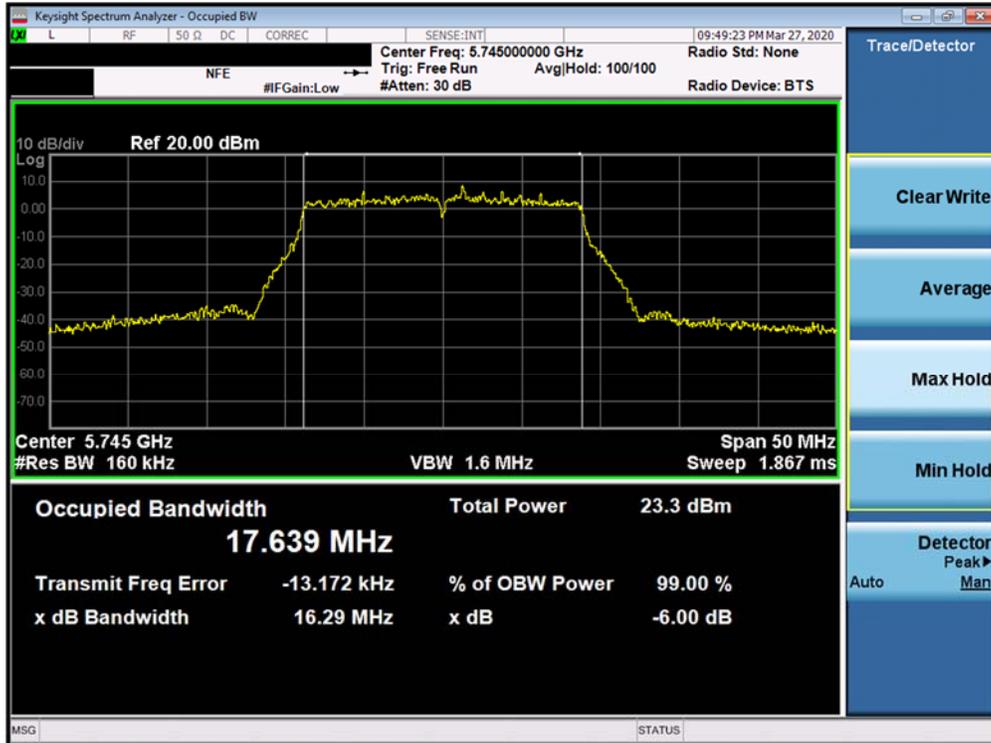


Plot 7-71. 6dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 3) – Ch. 157)

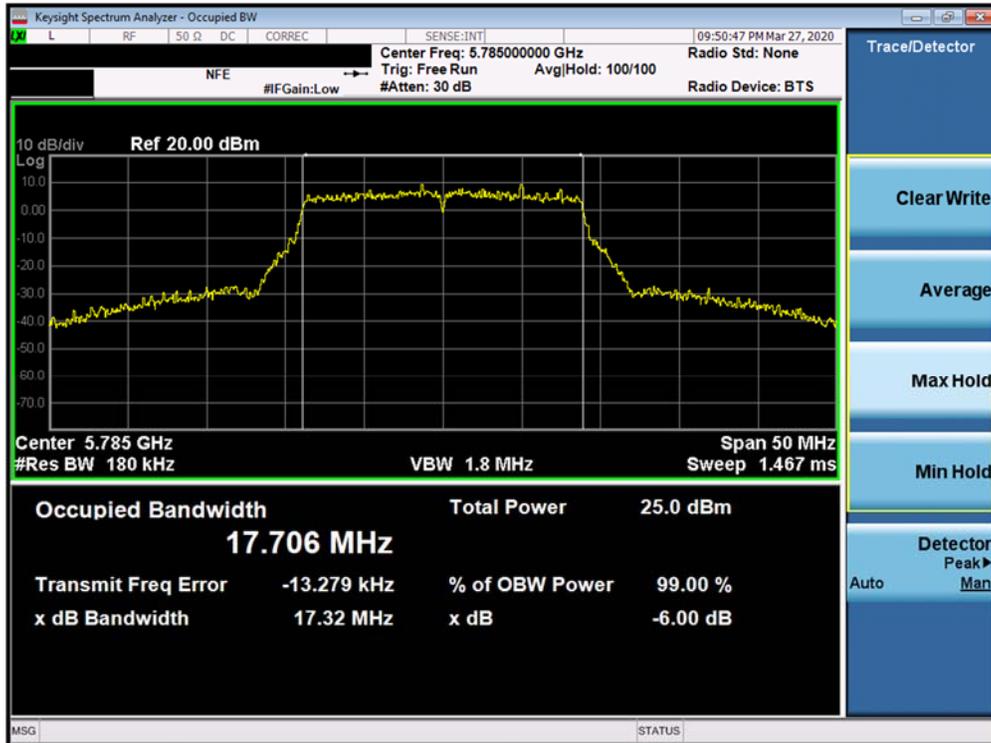


Plot 7-72. 6dB Bandwidth Plot SISO ANT2 (802.11a (UNII Band 3) – Ch. 165)

FCC ID: ZNFG900UM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 54 of 178

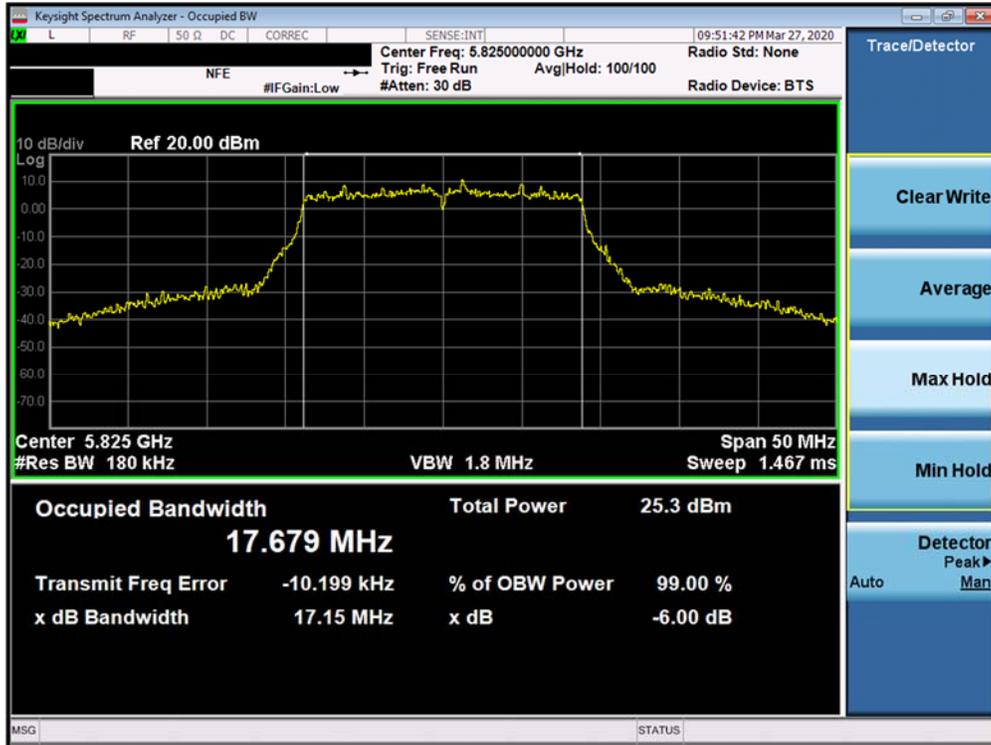


Plot 7-73. 6dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 3) – Ch. 149)

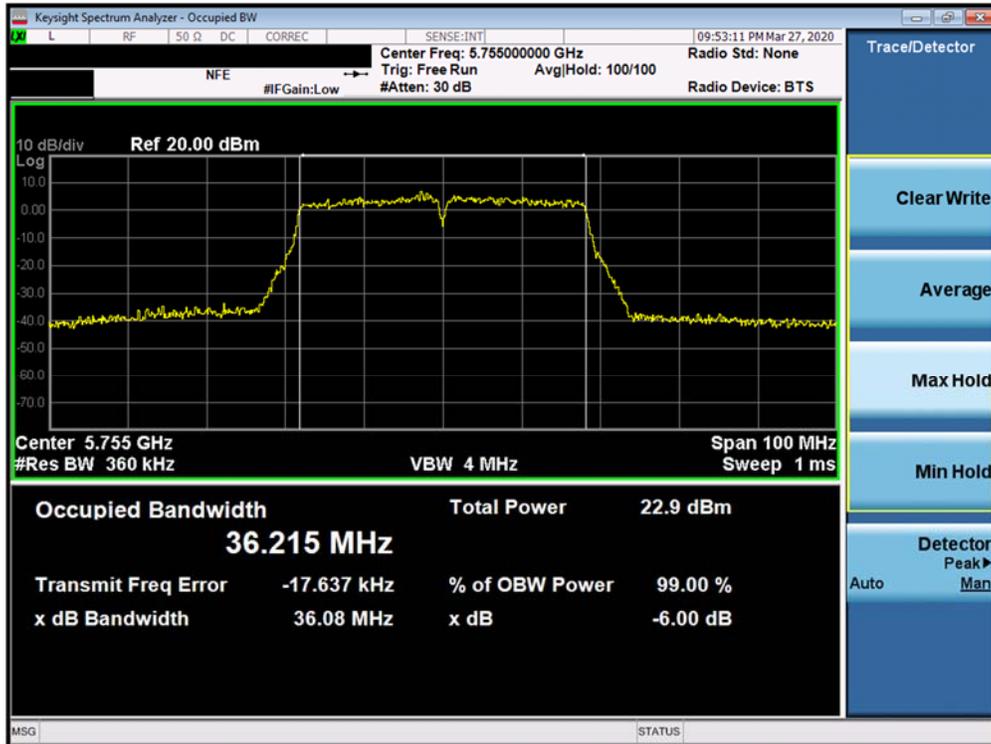


Plot 7-74. 6dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 3) – Ch. 157)

FCC ID: ZNFG900UM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 55 of 178

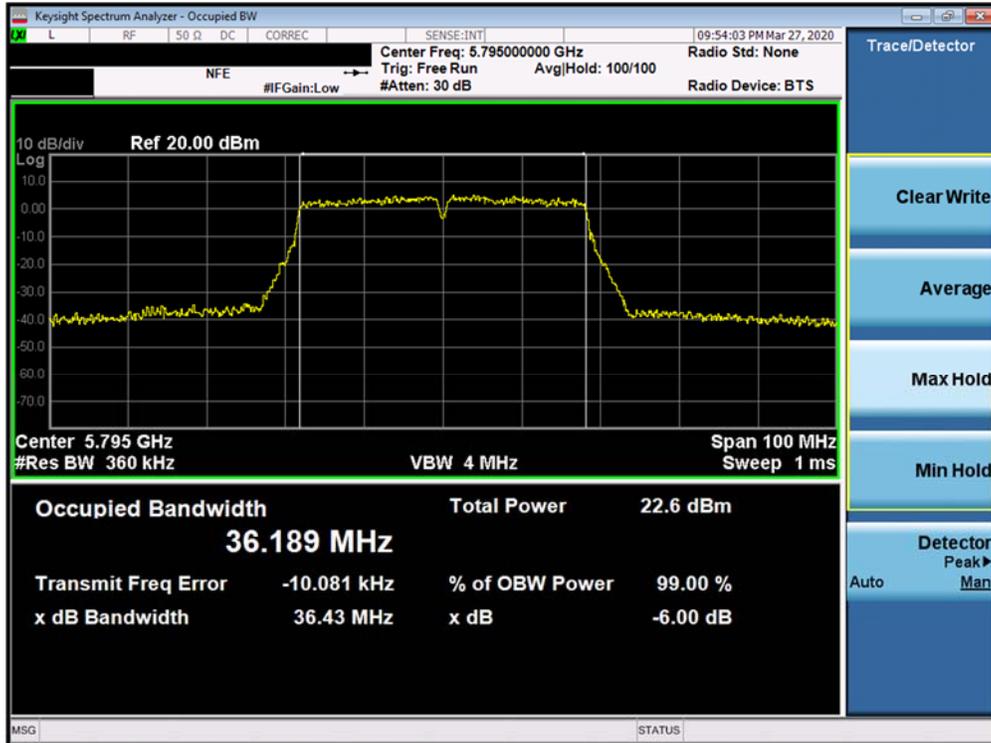


Plot 7-75. 6dB Bandwidth Plot SISO ANT2 (20MHz BW 802.11n (UNII Band 3) – Ch. 165)

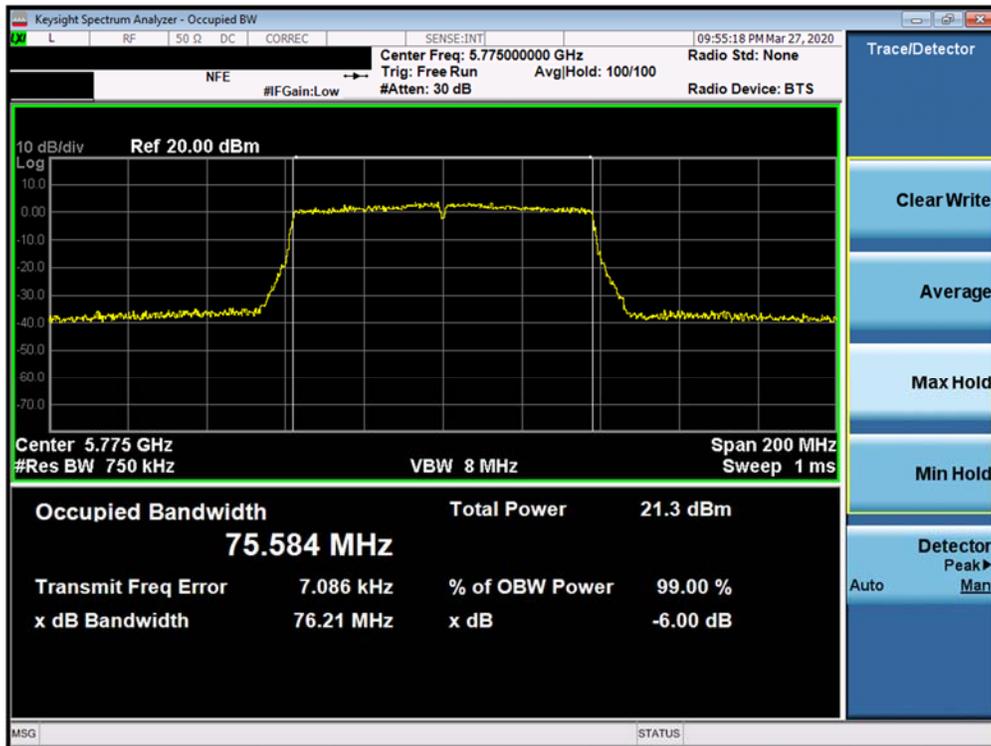


Plot 7-76. 6dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 3) – Ch. 151)

FCC ID: ZNFG900UM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 56 of 178



Plot 7-77. 6dB Bandwidth Plot SISO ANT2 (40MHz BW 802.11n (UNII Band 3) – Ch. 159)



Plot 7-78. 6dB Bandwidth Plot SISO ANT2 (80MHz BW 802.11ac (UNII Band 3) – Ch. 155)

FCC ID: ZNFG900UM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 57 of 178

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

Test Overview and Limits

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

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

In the 5.25 – 5.35GHz band, the maximum permissible conducted output power is the lesser of 250mW (23.98dBm) or 11 dBm + 10log₁₀(26dB BW) = 11 dBm + 10log₁₀(19.90) = 23.99dBm. The maximum e.i.r.p. shall not exceed the lesser of 1.0 W or 17 + 10 log10B, dBm.

In the 5.47 – 5.725GHz band, the maximum permissible conducted output power is the lesser of 250mW (23.98dBm) or 11 dBm + 10log₁₀(26dB BW) = 11 dBm + 10log₁₀(19.51) = 23.90dBm. The maximum e.i.r.p. shall not exceed the lesser of 1.0 W or 17 + 10 log10B, dBm.

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

Test Procedure Used

ANSI C63.10-2013 – Section 12.3.3.2 Method PM-G
KDB 789033 D02 v02r01 – Section 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

FCC ID: ZNFG900UM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 58 of 178

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]
				802.11a	802.11n	802.11ac		
	5180	36	AVG	16.88	16.93	16.46	23.98	-7.05
5200	40	AVG	18.92	18.88	18.59	23.98	-5.06	
5220	44	AVG	16.90	16.91	16.58	23.98	-7.07	
5240	48	AVG	16.82	16.89	16.51	23.98	-7.09	
5260	52	AVG	16.87	16.89	16.51	23.98	-7.09	
5280	56	AVG	18.87	18.76	18.46	23.98	-5.11	
5300	60	AVG	16.85	16.83	16.47	23.98	-7.13	
5320	64	AVG	16.85	16.87	16.59	23.98	-7.11	
5500	100	AVG	16.86	16.88	16.70	23.98	-7.10	
5600	120	AVG	16.92	16.93	16.68	23.98	-7.05	
5620	124	AVG	16.91	16.89	16.61	23.98	-7.07	
5720	144	AVG	16.96	16.98	16.70	23.98	-7.00	
5745	149	AVG	16.89	16.87	16.58	30.00	-13.11	
5785	157	AVG	18.86	18.89	18.58	30.00	-11.11	
5825	165	AVG	18.82	18.88	18.50	30.00	-11.12	

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]
				802.11n	802.11ac		
	5190	38	AVG	15.93	15.99	23.98	-7.99
5230	46	AVG	15.78	15.85	23.98	-8.13	
5270	54	AVG	15.87	15.91	23.98	-8.07	
5310	62	AVG	14.30	14.33	23.98	-9.65	
5510	102	AVG	13.82	13.81	23.98	-10.16	
5590	118	AVG	15.73	15.68	23.98	-8.25	
5630	126	AVG	15.85	15.82	23.98	-8.13	
5710	142	AVG	15.90	15.83	23.98	-8.08	
5755	151	AVG	15.78	15.69	30.00	-14.22	
5795	159	AVG	15.89	15.83	30.00	-14.11	

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

FCC ID: ZNFG900UM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 59 of 178

5GHz (80MHz Bandwidth)	Freq [MHz]	Channel	Detector	IEEE Transmission Mode	Conducted Power Limit [dBm]	Conducted Power Margin [dB]
				802.11ac		
	5210	42	AVG	13.56	23.98	-10.42
	5290	58	AVG	13.50	23.98	-10.48
	5530	106	AVG	13.40	23.98	-10.58
	5610	122	AVG	13.53	23.98	-10.45
	5690	138	AVG	13.56	23.98	-10.42
	5775	155	AVG	13.75	30.00	-16.25

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

FCC ID: ZNFG900UM	 MEASUREMENT REPORT (CERTIFICATION) 		Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset	Page 60 of 178

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]
				802.11a	802.11n	802.11ac		
	5180	36	AVG	16.89	16.79	16.81	23.98	-7.09
5200	40	AVG	18.98	18.91	18.91	23.98	-5.00	
5220	44	AVG	16.86	16.64	16.66	23.98	-7.12	
5240	48	AVG	16.87	16.74	16.70	23.98	-7.11	
5260	52	AVG	16.73	16.63	16.61	23.98	-7.25	
5280	56	AVG	18.85	18.61	18.70	23.98	-5.13	
5300	60	AVG	16.71	16.64	16.58	23.98	-7.27	
5320	64	AVG	16.82	16.73	16.70	23.98	-7.16	
5500	100	AVG	16.77	16.59	16.64	23.98	-7.21	
5600	120	AVG	16.78	16.66	16.61	23.98	-7.20	
5620	124	AVG	16.77	16.53	16.56	23.98	-7.21	
5720	144	AVG	16.71	16.56	16.52	23.98	-7.27	
5745	149	AVG	16.89	16.68	16.67	30.00	-13.11	
5785	157	AVG	18.93	18.93	18.96	30.00	-11.04	
5825	165	AVG	18.92	18.78	18.72	30.00	-11.08	

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]
				802.11n	802.11ac		
	5190	38	AVG	15.74	15.79	23.98	-8.19
5230	46	AVG	15.85	15.86	23.98	-8.12	
5270	54	AVG	15.79	15.80	23.98	-8.18	
5310	62	AVG	14.51	14.50	23.98	-9.47	
5510	102	AVG	14.02	14.01	23.98	-9.96	
5590	118	AVG	15.69	15.71	23.98	-8.27	
5630	126	AVG	15.78	15.81	23.98	-8.17	
5710	142	AVG	15.89	15.99	23.98	-7.99	
5755	151	AVG	15.94	15.93	30.00	-14.06	
5795	159	AVG	15.96	15.96	30.00	-14.04	

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

FCC ID: ZNFG900UM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 61 of 178

5GHz (80MHz Bandwidth)	Freq [MHz]	Channel	Detector	IEEE Transmission Mode	Conducted Power Limit [dBm]	Conducted Power Margin [dB]
				802.11ac		
	5210	42	AVG	13.84	23.98	-10.14
	5290	58	AVG	13.59	23.98	-10.39
	5530	106	AVG	13.4	23.98	-10.58
	5610	122	AVG	13.33	23.98	-10.65
5690	138	AVG	13.54	23.98	-10.44	
5775	155	AVG	13.59	30.00	-16.41	

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

FCC ID: ZNFG900UM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset	Page 62 of 178	

MIMO Maximum Conducted Output Power Measurements

5GHz (20MHz Bandwidth)	Freq [MHz]	Channel	Detector	Conducted Power [dBm]			Conducted Power Limit [dBm]	Conducted Power Margin [dB]
				ANT1	ANT2	MIMO		
	5180	36	AVG	16.88	16.89	19.90	23.98	-4.08
	5200	40	AVG	18.92	18.98	21.96	23.98	-2.02
	5220	44	AVG	16.90	16.86	19.89	23.98	-4.09
	5240	48	AVG	16.82	16.87	19.86	23.98	-4.12
	5260	52	AVG	16.87	16.73	19.81	23.98	-4.17
	5280	56	AVG	18.87	18.85	21.87	23.98	-2.11
	5300	60	AVG	16.85	16.71	19.79	23.98	-4.19
	5320	64	AVG	16.85	16.82	19.85	23.98	-4.13
	5500	100	AVG	16.86	16.77	19.83	23.98	-4.15
	5600	120	AVG	16.92	16.78	19.86	23.98	-4.12
	5620	124	AVG	16.91	16.77	19.85	23.98	-4.13
	5720	144	AVG	16.96	16.71	19.85	23.98	-4.13
	5745	149	AVG	16.89	16.89	19.90	30.00	-10.10
5785	157	AVG	18.86	18.93	21.91	30.00	-8.09	
5825	165	AVG	18.82	18.92	21.88	30.00	-8.12	

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]
				ANT1	ANT2	MIMO		
	5180	36	AVG	16.93	16.79	19.87	23.98	-4.11
	5200	40	AVG	18.88	18.91	21.91	23.98	-2.07
	5220	44	AVG	16.91	16.64	19.79	23.98	-4.19
	5240	48	AVG	16.89	16.74	19.83	23.98	-4.15
	5260	52	AVG	16.89	16.63	19.77	23.98	-4.21
	5280	56	AVG	18.76	18.61	21.70	23.98	-2.28
	5300	60	AVG	16.83	16.64	19.75	23.98	-4.23
	5320	64	AVG	16.87	16.73	19.81	23.98	-4.17
	5500	100	AVG	16.88	16.59	19.75	23.98	-4.23
	5600	120	AVG	16.93	16.66	19.81	23.98	-4.17
	5620	124	AVG	16.89	16.53	19.72	23.98	-4.26
	5720	144	AVG	16.98	16.56	19.79	23.98	-4.19
	5745	149	AVG	16.87	16.68	19.79	30.00	-10.21
5785	157	AVG	18.89	18.93	21.92	30.00	-8.08	
5825	165	AVG	18.88	18.78	21.84	30.00	-8.16	

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

FCC ID: ZNFG900UM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset	Page 63 of 178	

5GHz (20MHz Bandwidth)	Freq [MHz]	Channel	Detector	Conducted Power [dBm]			Conducted Power Limit [dBm]	Conducted Power Margin [dB]
				ANT1	ANT2	MIMO		
	5180	36	AVG	16.46	16.81	19.65	23.98	-4.33
	5200	40	AVG	18.59	18.91	21.76	23.98	-2.22
	5220	44	AVG	16.58	16.66	19.63	23.98	-4.35
	5240	48	AVG	16.51	16.70	19.62	23.98	-4.36
	5260	52	AVG	16.51	16.61	19.57	23.98	-4.41
	5280	56	AVG	18.46	18.70	21.59	23.98	-2.39
	5300	60	AVG	16.47	16.58	19.54	23.98	-4.44
	5320	64	AVG	16.59	16.70	19.66	23.98	-4.32
	5500	100	AVG	16.70	16.64	19.68	23.98	-4.30
	5600	120	AVG	16.68	16.61	19.66	23.98	-4.32
	5620	124	AVG	16.61	16.56	19.60	23.98	-4.38
	5720	144	AVG	16.70	16.52	19.62	23.98	-4.36
	5745	149	AVG	16.58	16.67	19.64	30.00	-10.36
5785	157	AVG	18.58	18.96	21.78	30.00	-8.22	
5825	165	AVG	18.50	18.72	21.62	30.00	-8.38	

Table 7-14. MIMO 20MHz 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]
				ANT1	ANT2	MIMO		
	5190	38	AVG	15.93	15.74	18.85	23.98	-5.13
	5230	46	AVG	15.78	15.85	18.83	23.98	-5.15
	5270	54	AVG	15.87	15.79	18.84	23.98	-5.14
	5310	62	AVG	14.30	14.51	17.42	23.98	-6.56
	5510	102	AVG	13.82	14.02	16.93	23.98	-7.05
	5590	118	AVG	15.73	15.69	18.72	23.98	-5.26
	5630	126	AVG	15.85	15.78	18.83	23.98	-5.15
	5710	142	AVG	15.90	15.89	18.91	23.98	-5.07
5755	151	AVG	15.78	15.94	18.87	30.00	-11.13	
5795	159	AVG	15.89	15.96	18.94	30.00	-11.06	

Table 7-15. MIMO 40MHz BW 802.11n (UNII) Maximum Conducted Output Power

FCC ID: ZNFG900UM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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5GHz (40MHz Bandwidth)	Freq [MHz]	Channel	Detector	Conducted Power [dBm]			Conducted Power Limit [dBm]	Conducted Power Margin [dB]
				ANT1	ANT2	MIMO		
	5190	38	AVG	15.99	15.79	18.90	23.98	-5.08
	5230	46	AVG	15.85	15.86	18.87	23.98	-5.11
	5270	54	AVG	15.91	15.80	18.87	23.98	-5.11
	5310	62	AVG	14.33	14.50	17.43	23.98	-6.55
	5510	102	AVG	13.81	14.01	16.92	23.98	-7.06
	5590	118	AVG	15.68	15.71	18.71	23.98	-5.27
	5630	126	AVG	15.82	15.81	18.83	23.98	-5.15
	5710	142	AVG	15.83	15.99	18.92	23.98	-5.06
5755	151	AVG	15.69	15.93	18.82	30.00	-11.18	
5795	159	AVG	15.83	15.96	18.91	30.00	-11.09	

Table 7-16. MIMO 40MHz 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]
				ANT1	ANT2	MIMO		
	5210	42	AVG	13.56	13.84	16.71	23.98	-7.27
	5290	58	AVG	13.50	13.59	16.56	23.98	-7.42
	5530	106	AVG	13.40	13.40	16.41	23.98	-7.57
	5610	122	AVG	13.53	13.33	16.44	23.98	-7.54
	5690	138	AVG	13.56	13.54	16.56	23.98	-7.42
5775	155	AVG	13.75	13.59	16.68	30.00	-13.32	

Table 7-17. MIMO 80MHz BW 802.11ac (UNII) Maximum Conducted Output Power

FCC ID: ZNFG900UM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 65 of 178

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.

Sample MIMO Calculation:

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

Antenna 1 + Antenna 2 = MIMO

$$(16.93 \text{ dBm} + 16.79 \text{ dBm}) = (49.32 \text{ mW} + 47.75 \text{ mW}) = 97.07 \text{ mW} = 19.87 \text{ dBm}$$

FCC ID: ZNFG900UM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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7.5 Maximum Power Spectral Density – 802.11a/n/ac
§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 $\geq 2 \times$ (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

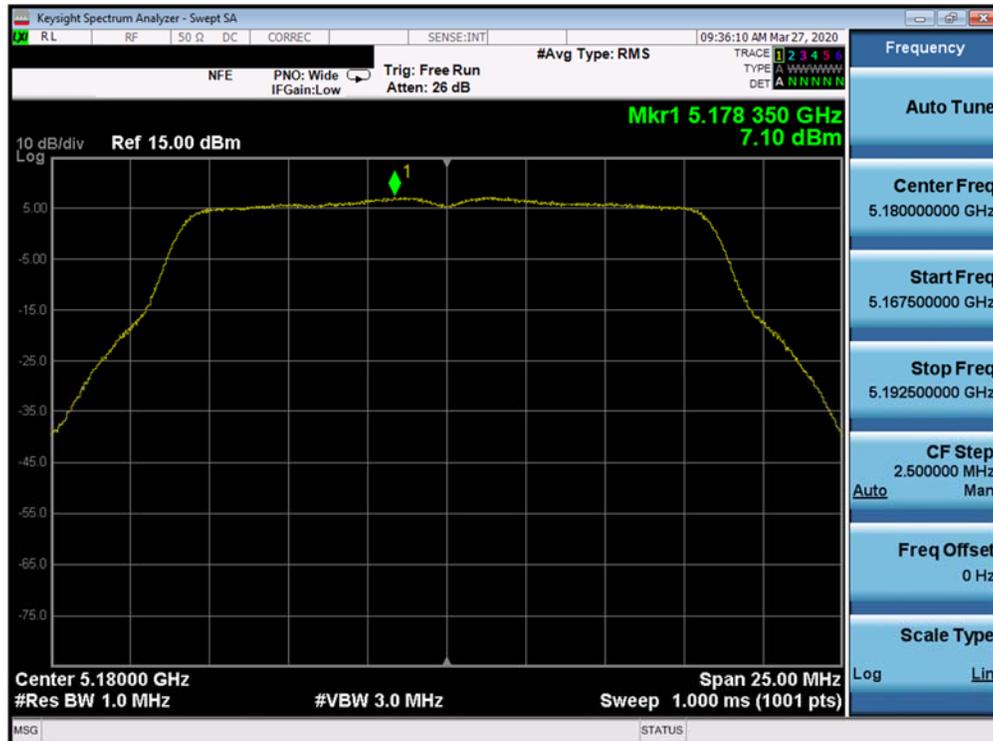
FCC ID: ZNFG900UM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 67 of 178

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	7.10	11.0	-3.90
	5200	40	a	6	9.54	11.0	-1.46
	5240	48	a	6	7.41	11.0	-3.59
	5180	36	n (20MHz)	6.5/7.2 (MCS0)	7.03	11.0	-3.97
	5200	40	n (20MHz)	6.5/7.2 (MCS0)	8.94	11.0	-2.06
	5240	48	n (20MHz)	6.5/7.2 (MCS0)	6.73	11.0	-4.27
	5190	38	n (40MHz)	13.5/15 (MCS0)	3.42	11.0	-7.59
	5230	46	n (40MHz)	13.5/15 (MCS0)	3.26	11.0	-7.74
	5210	42	ac (80MHz)	29.3/32.5 (MCS0)	-2.03	11.0	-13.03
Band 2A	5260	52	a	6	7.20	11.0	-3.80
	5280	56	a	6	8.99	11.0	-2.01
	5320	64	a	6	6.71	11.0	-4.29
	5260	52	n (20MHz)	6.5/7.2 (MCS0)	6.72	11.0	-4.29
	5280	56	n (20MHz)	6.5/7.2 (MCS0)	8.58	11.0	-2.42
	5320	64	n (20MHz)	6.5/7.2 (MCS0)	6.54	11.0	-4.46
	5270	54	n (40MHz)	13.5/15 (MCS0)	2.81	11.0	-8.19
	5310	62	n (40MHz)	13.5/15 (MCS0)	3.12	11.0	-7.88
	5290	58	ac (80MHz)	29.3/32.5 (MCS0)	-2.60	11.0	-13.60
Band 2C	5500	100	a	6	7.21	11.0	-3.79
	5600	120	a	6	6.26	11.0	-4.74
	5720	144	a	6	7.05	11.0	-3.95
	5500	100	n (20MHz)	6.5/7.2 (MCS0)	6.86	11.0	-4.14
	5600	120	n (20MHz)	6.5/7.2 (MCS0)	6.25	11.0	-4.75
	5720	144	n (20MHz)	6.5/7.2 (MCS0)	6.88	11.0	-4.12
	5510	102	n (40MHz)	13.5/15 (MCS0)	2.94	11.0	-8.06
	5590	118	n (40MHz)	13.5/15 (MCS0)	2.52	11.0	-8.48
	5710	142	n (40MHz)	13.5/15 (MCS0)	3.25	11.0	-7.75
	5530	106	ac (80MHz)	29.3/32.5 (MCS0)	-2.45	11.0	-13.45
	5610	122	ac (80MHz)	29.3/32.5 (MCS0)	-2.91	11.0	-13.91
	5690	138	ac (80MHz)	29.3/32.5 (MCS0)	-5.28	11.0	-16.28

Table 7-18. Bands 1, 2A, 2C Conducted Power Spectral Density Measurements SISO ANT1

FCC ID: ZNFG900UM		MEASUREMENT REPORT (CERTIFICATION)		Approved by: Quality Manager
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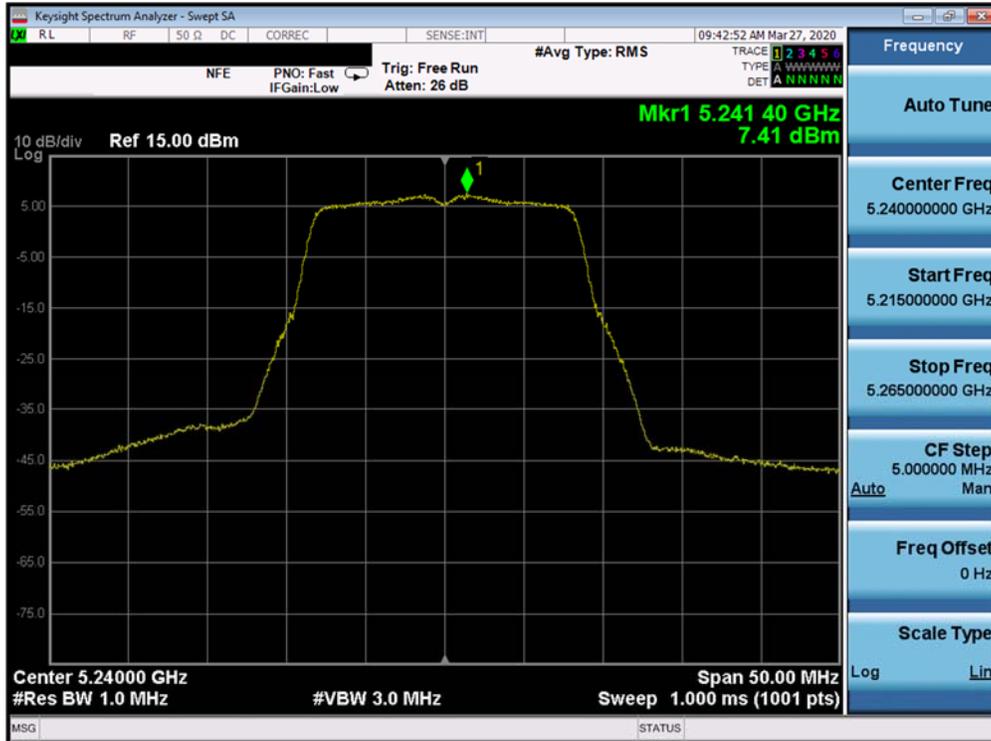


Plot 7-79. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 1) – Ch. 36)

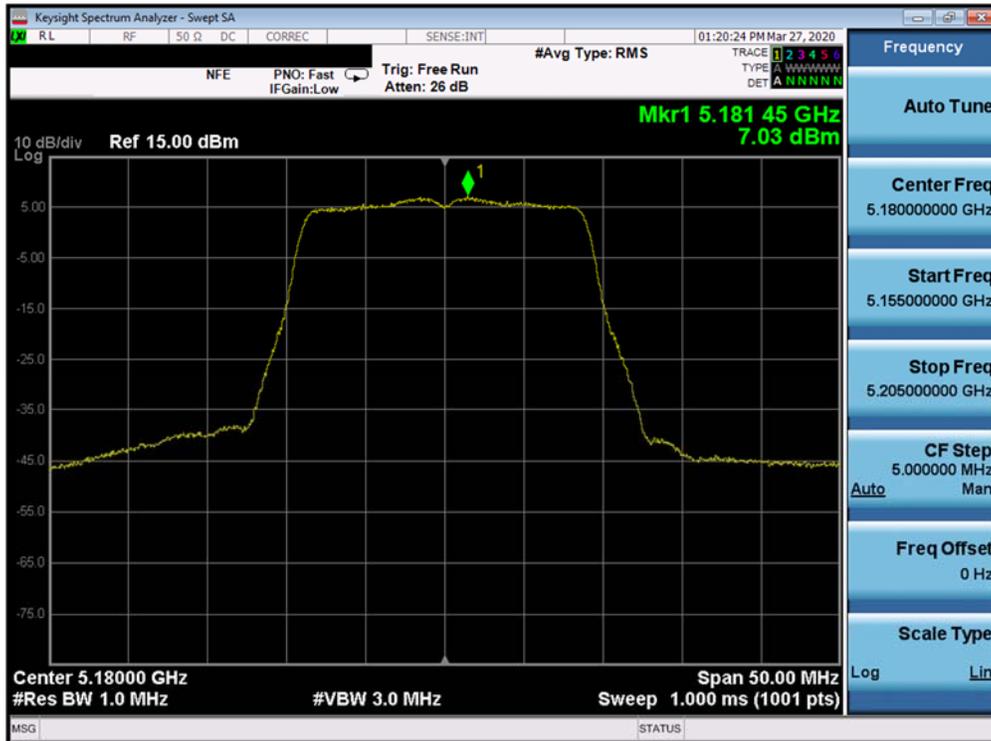


Plot 7-80. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 1) – Ch. 40)

FCC ID: ZNFG900UM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 69 of 178



Plot 7-81. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 1) – Ch. 48)

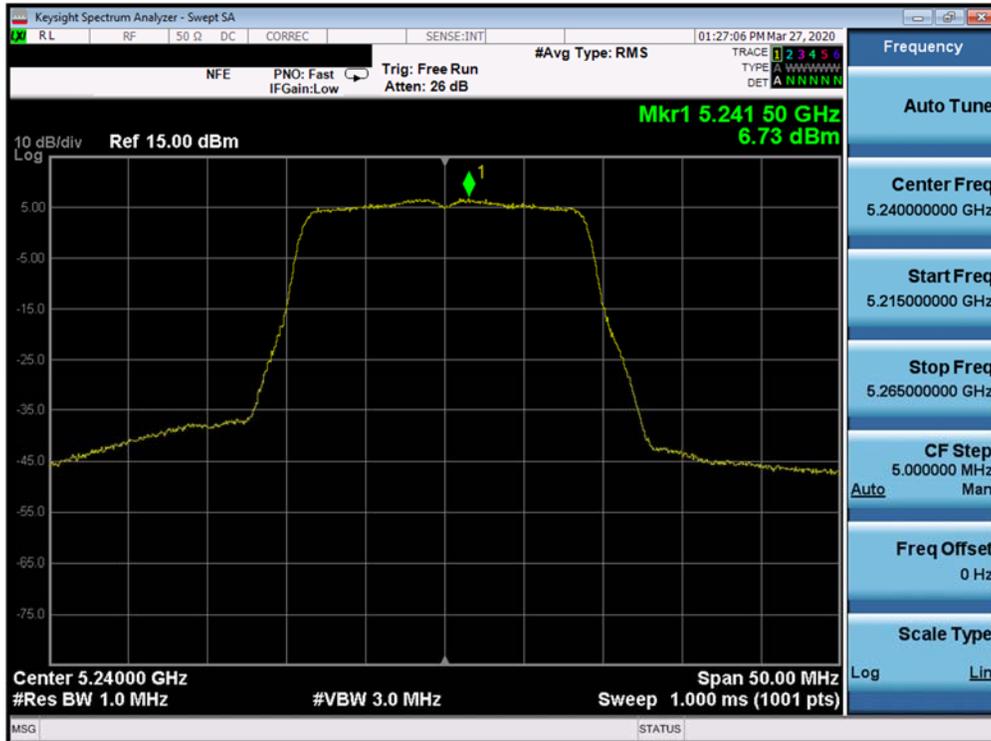


Plot 7-82. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 1) – Ch. 36)

FCC ID: ZNFG900UM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 70 of 178

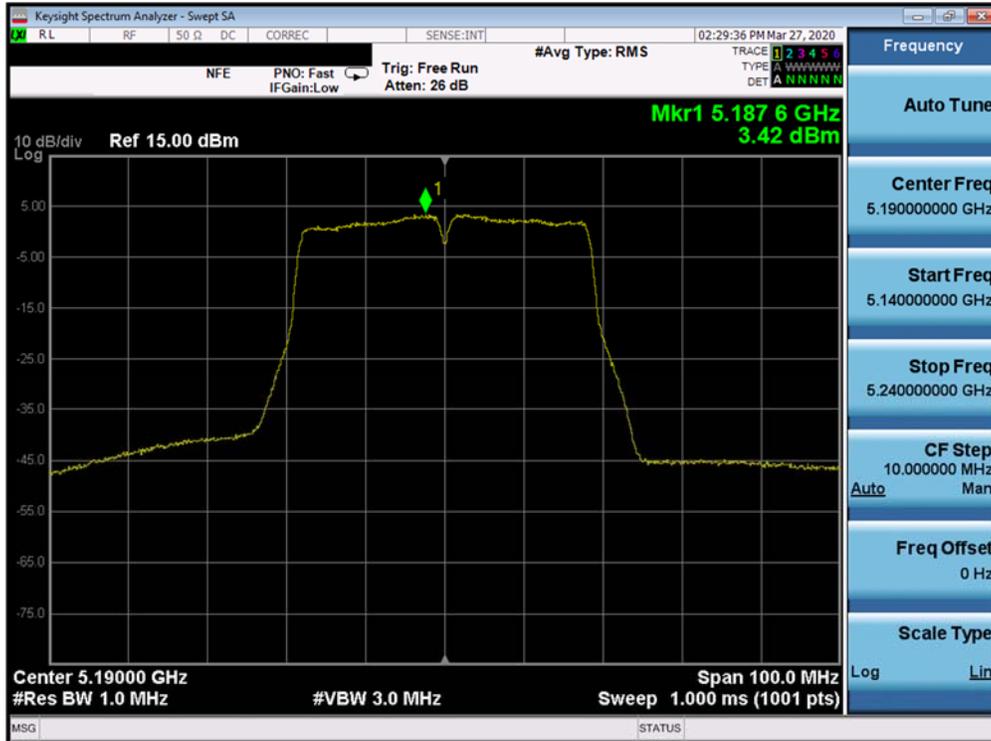


Plot 7-83. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 1) – Ch. 40)

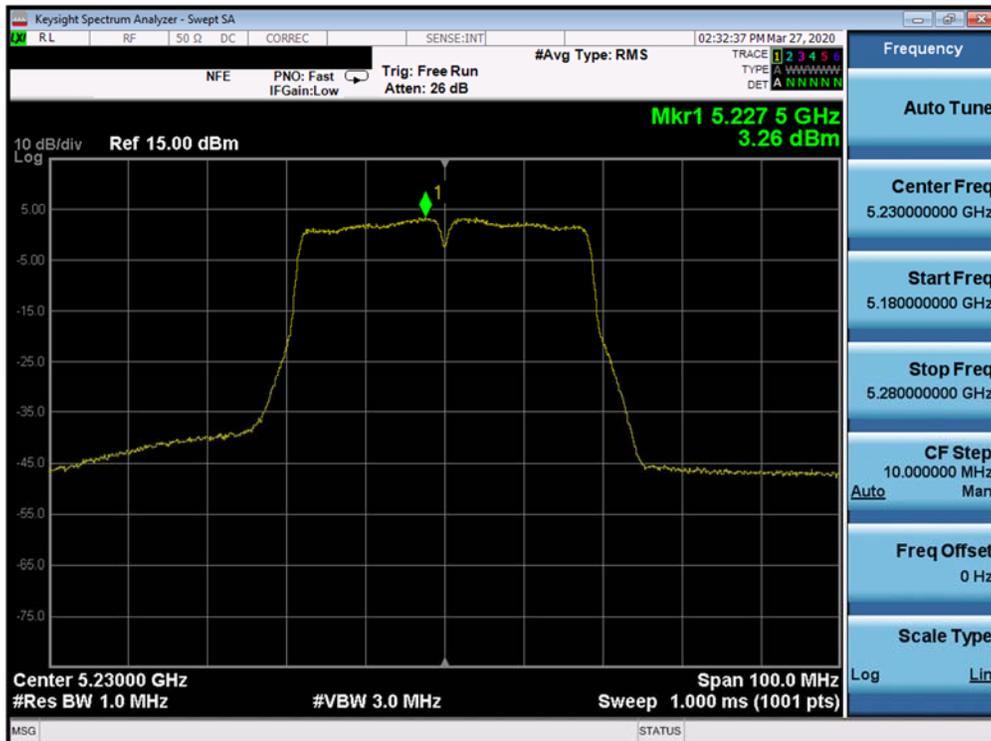


Plot 7-84. Power Spectral Density Plot SISO ANT1 (20MHz BW 802.11n (UNII Band 1) – Ch. 48)

FCC ID: ZNFG900UM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 71 of 178

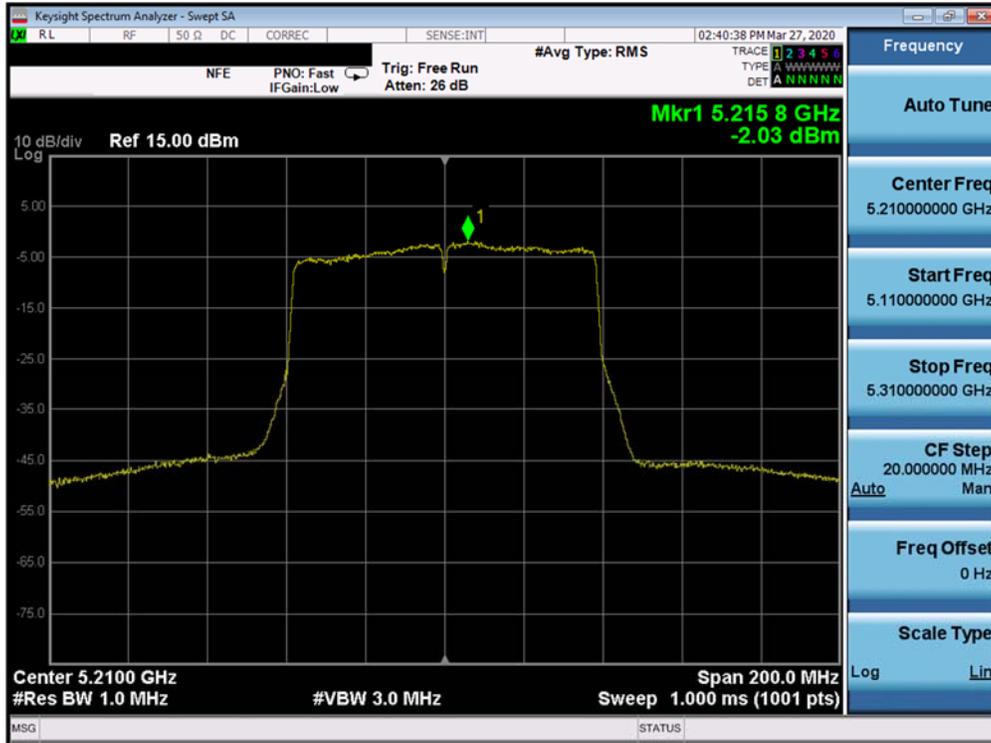


Plot 7-85. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 1) – Ch. 38)

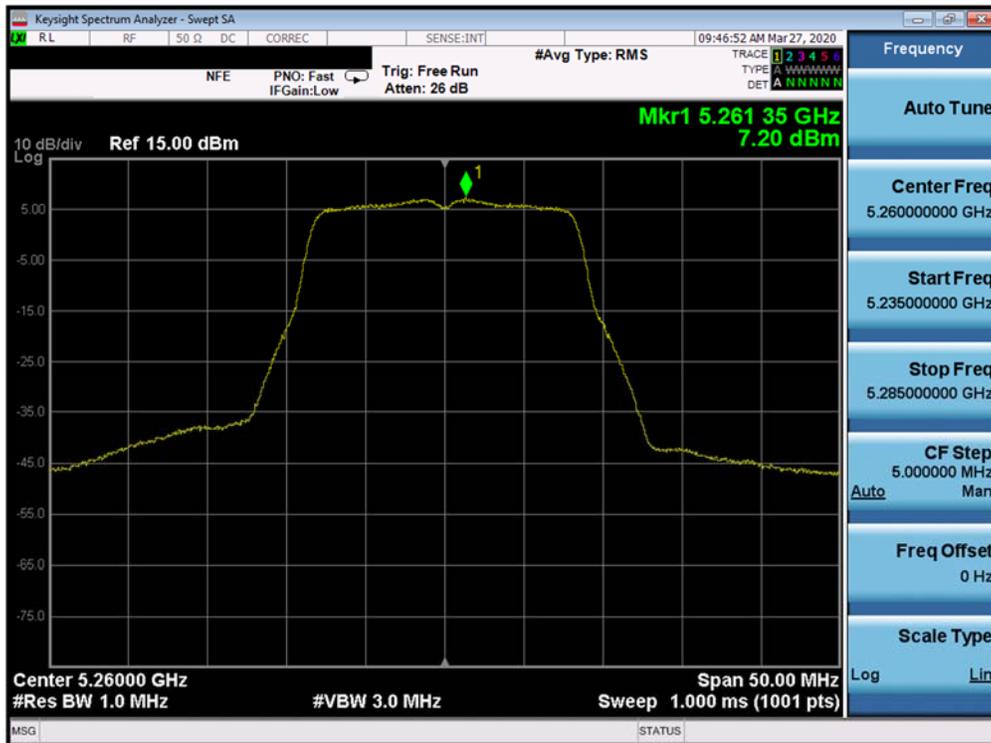


Plot 7-86. Power Spectral Density Plot SISO ANT1 (40MHz BW 802.11n (UNII Band 1) – Ch. 46)

FCC ID: ZNFG900UM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 72 of 178

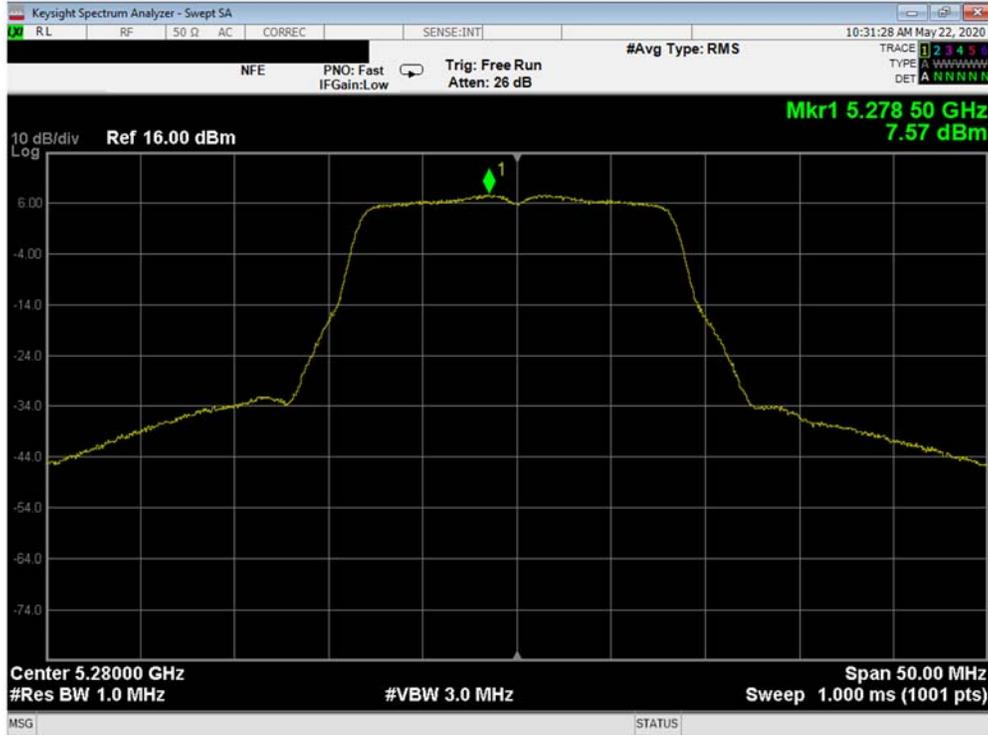


Plot 7-87. Power Spectral Density Plot SISO ANT1 (80MHz BW 802.11ac (UNII Band 1) – Ch. 42)

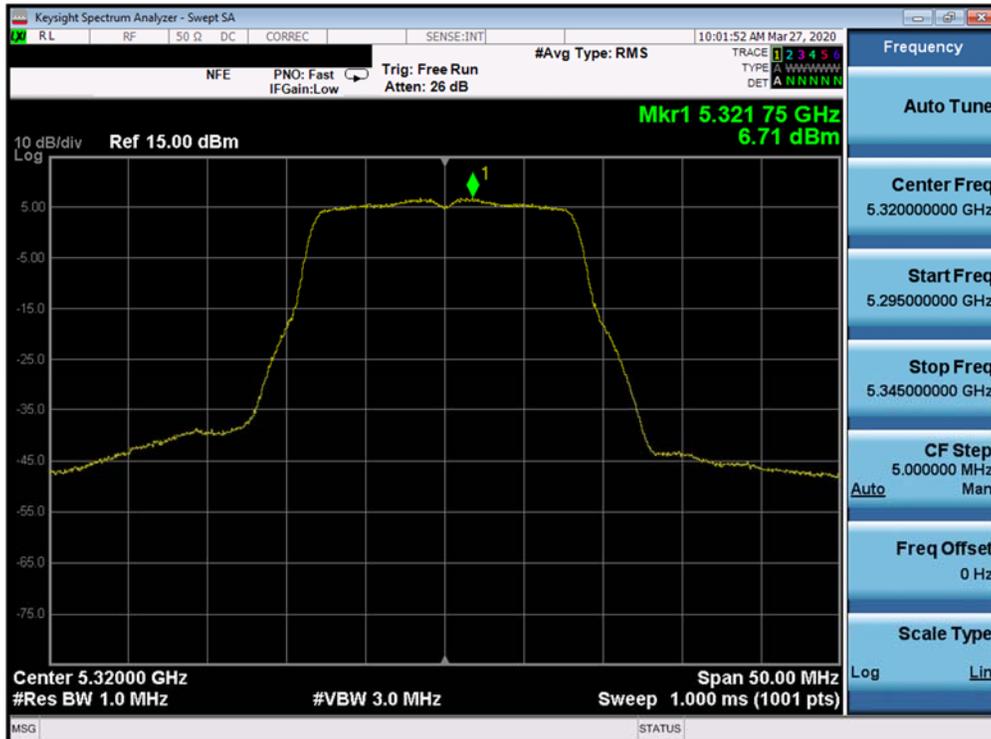


Plot 7-88. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 2A) – Ch. 52)

FCC ID: ZNFG900UM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 73 of 178



Plot 7-89. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 2A) – Ch. 56)



Plot 7-90. Power Spectral Density Plot SISO ANT1 (802.11a (UNII Band 2A) – Ch. 64)

FCC ID: ZNFG900UM	PCTEST Proud to be part of element	MEASUREMENT REPORT (CERTIFICATION)	LG	Approved by: Quality Manager
Test Report S/N: 1M2003200048-06.ZNF	Test Dates: 3/23-5/23/2020	EUT Type: Portable Handset		Page 74 of 178