7. MAXIMUM OUTPUT POWER MEASUREMENT

7.1. Test Equipment

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Period
1.	PXA signal analyzer	Agilent	N9030A	MY53120217	2019-04-12	1 Year

7.2. Block Diagram of Test Setup

The same as section 6.2.

7.3. Specification Limits

Frequency Band (MHz)	Category	Limit
5150 to 5250	Outdoor Access Point	1 W(30 dBm)/ Max e.i.r.p. ≤125 mW(21 dBm) at any elevation angle above 30 degrees as measured from the horizon
	Fixed point-to-point Access Point	1 W(30 dBm)
	Indoor Access Point	1 W(30 dBm)
	Mobile and Portable client device	250 mW(24 dBm)
5250 to 5350	N/A	250 mW or 11 dBm + 10 log B[Note1]
5470 to 5725		250 mW or 11 dBm + 10 log B [Note1]
5725 to 5850		1 W(30 dBm)

Note 1: B is the 26 dB emission bandwidth, which presented in Chapter 6.

7.4. Test Procedure

Following measurement procedure is reference to KDB 789033 D02 General UNII Test Procedures New Rules v02r01:

■ Method AVGSA-2

(i) Set span to encompass the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.
(ii) Set RBW = 1 MHz.

(iii) Set VBW ≥ 3 MHz.

(iv) Number of points in sweep ≥ 2 × span / RBW. (This ensures that bin-to-bin spacing is

≤ RBW/2, so that narrowband signals are not lost between frequency bins.)

(v) Sweep time = auto.

(vi) Detector = power averaging (rms), if available. Otherwise, use sample detector mode.

(vii) Do not use sweep triggering. Allow the sweep to "free run."

(viii) Trace average at least 100 traces in power averaging (rms) mode; however, the number of traces to be averaged shall be increased above 100 as needed to ensure that the average accurately represents the true average over the on and off periods of the transmitter.

(ix) Compute power by integrating the spectrum across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal using the instrument's band power measurement function with band limits set equal to the EBW (or occupied bandwidth) band edges. If the instrument does not have a band power function, sum the spectrum levels (in power units) at 1 MHz intervals extending across the EBW (or, alternatively, the entire 99% occupied bandwidth) of the signal.

(x) Add 10 log (1/x), where x is the duty cycle, to the measured power in order to compute the average power during the actual transmission times.

7.5. Test Results

PASSED. All the test results are attached in next pages.

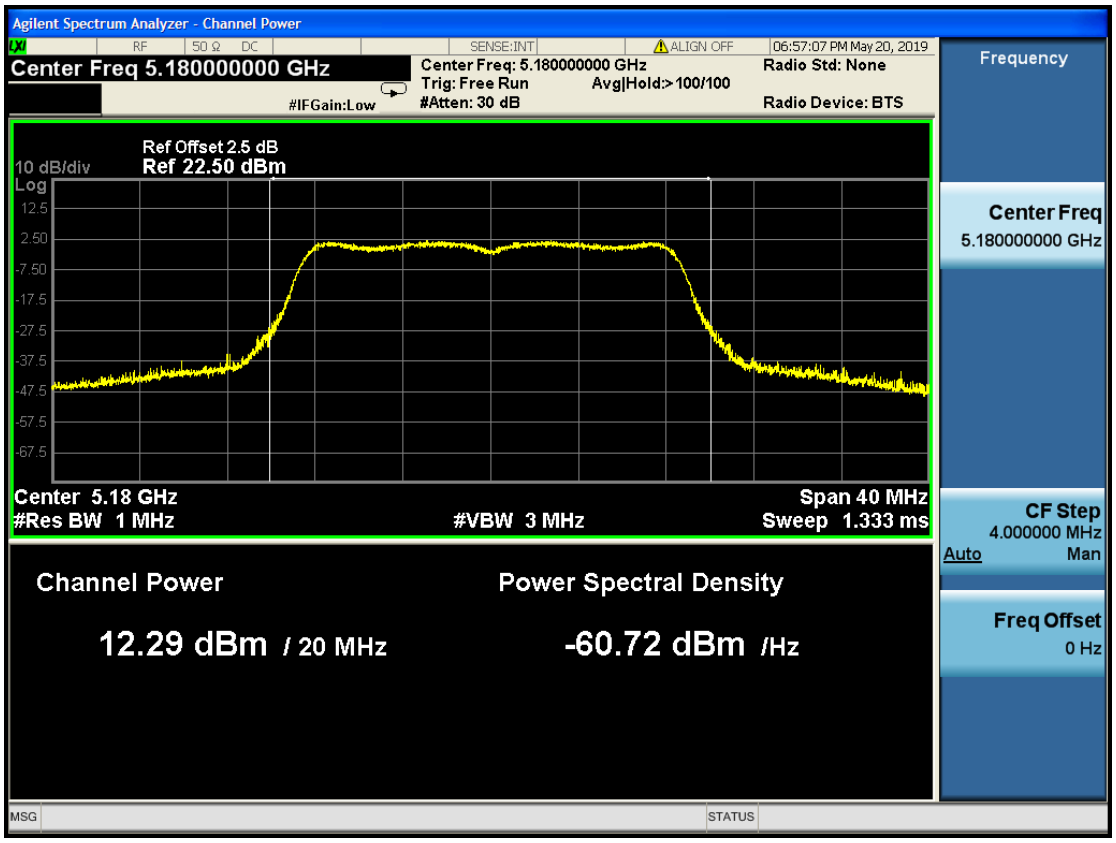
Mode	UII Band	Frequency (MHz)	Duty Cycle Factor	Reading (dBm)	Average Output Power (dBm)	Limit (dBm)
802.11a	I	5180	0.13	12.29	12.42	24
		5200		12.12	12.25	
		5240		12.58	12.71	
	II-2A	5260		12.6	12.73	11dBm+10logB=23.80
		5300		12.63	12.76	
		5320		12.45	12.58	
	II-2C	5500		11.8	11.93	
		5580		12.19	12.32	
		5700		12.47	12.60	
	III	5745		9.45	9.58	30
		5785		9.68	9.81	
		5825		9.85	9.98	

Note: B is 26dB emission bandwidth, B is select the minimum.

Mode	UII Band	Frequency (MHz)	Duty Cycle Factor	Reading (dBm)	Average Output Power (dBm)	Limit (dBm)
802.11n-HT20	I	5180	0.13	12.76	12.89	24
		5200		12.55	12.68	
		5240		13.02	13.15	
	II-2A	5260		13.08	13.21	11dBm+10logB=23.93
		5300		13.16	13.29	
		5320		12.98	13.11	
	II-2C	5500		12.31	12.44	
		5580		12.7	12.83	
		5700		12.86	12.99	
	III	5745		9.82	9.95	30
		5785		10.14	10.27	
		5825		10.33	10.46	
802.11n-HT40	I	5190	0.13	12.44	12.57	24
		5230		12.88	13.01	
	II-2A	5270		13.13	13.26	
		5310		13.13	13.26	
	II-2C	5510		13.46	13.59	
		5550		13.9	14.03	
		5670		13.08	13.21	
	III	5755		10.13	10.26	30
		5795		10.15	10.28	

Note: B is 26dB emission bandwidth, B is select the minimum.

802.11a 5180



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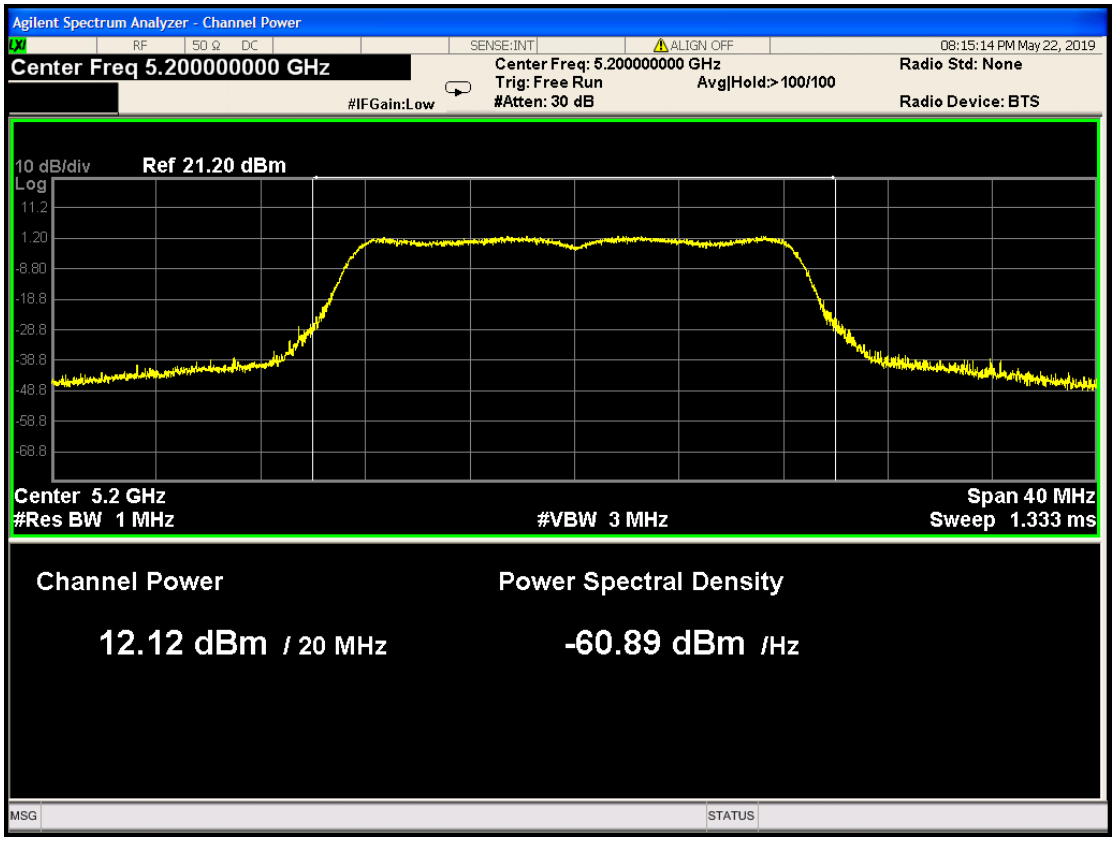

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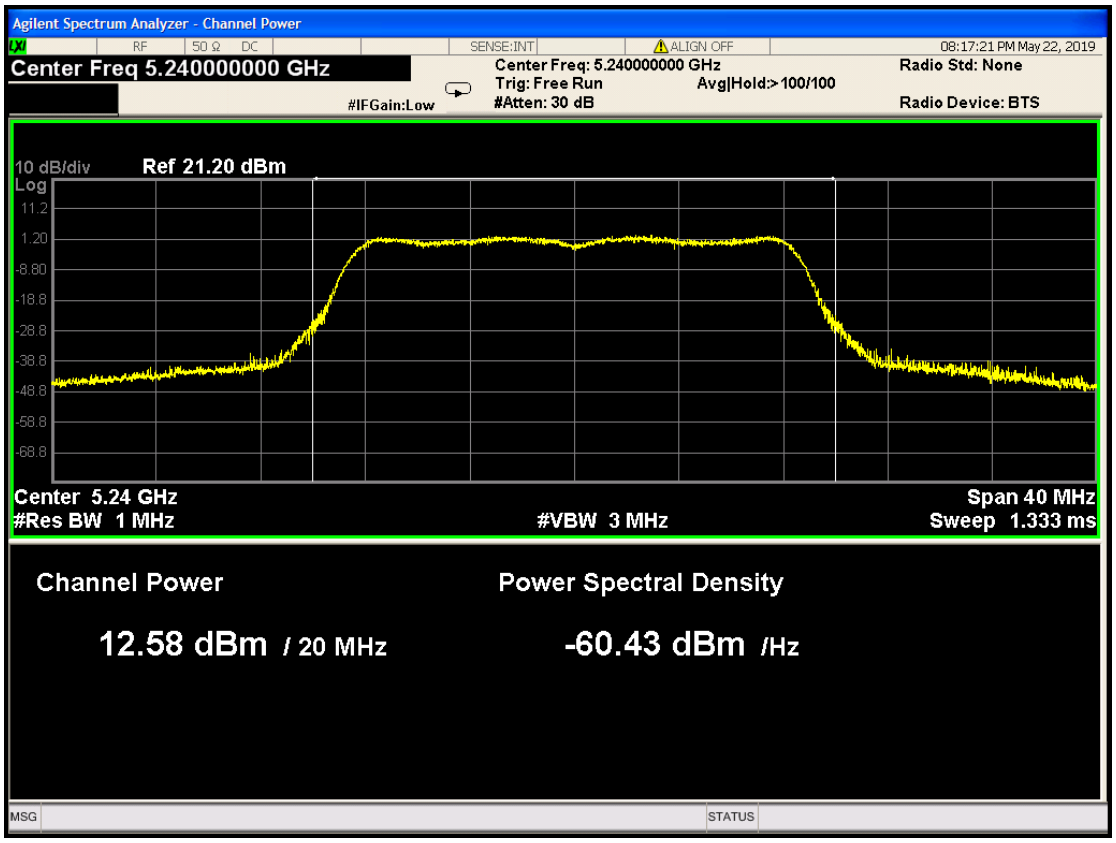

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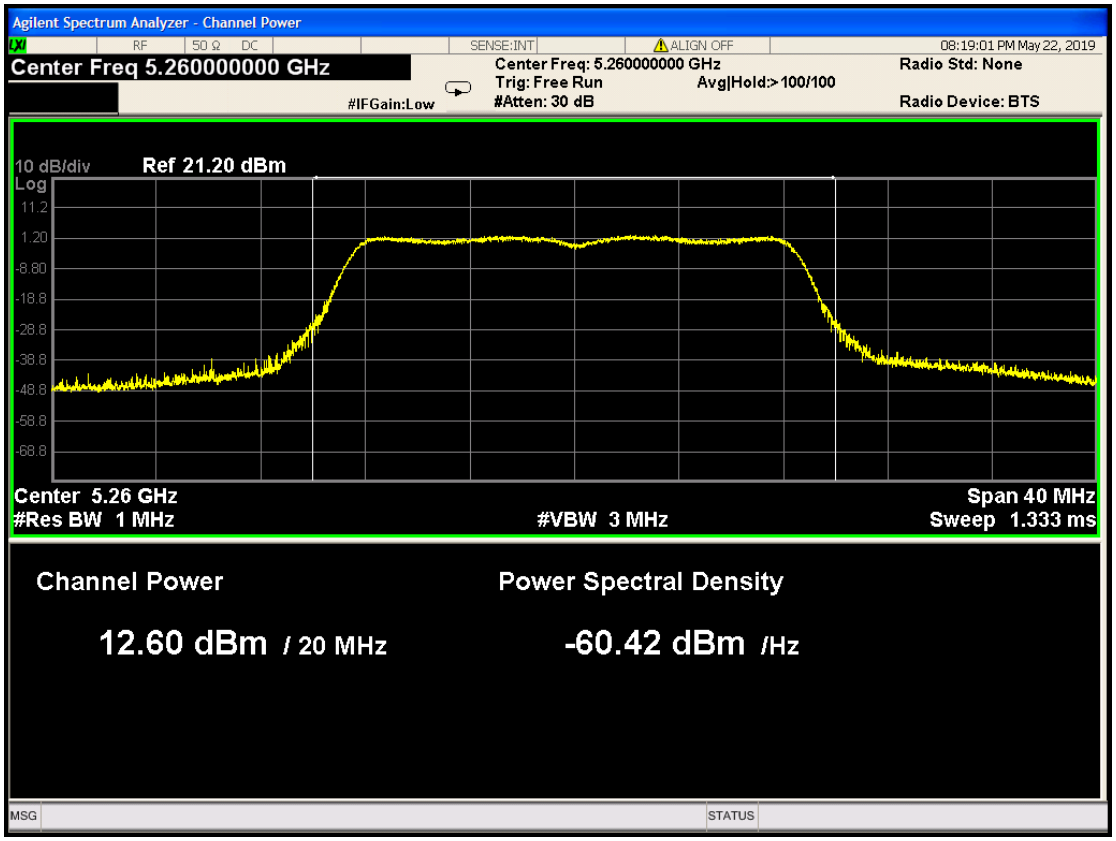

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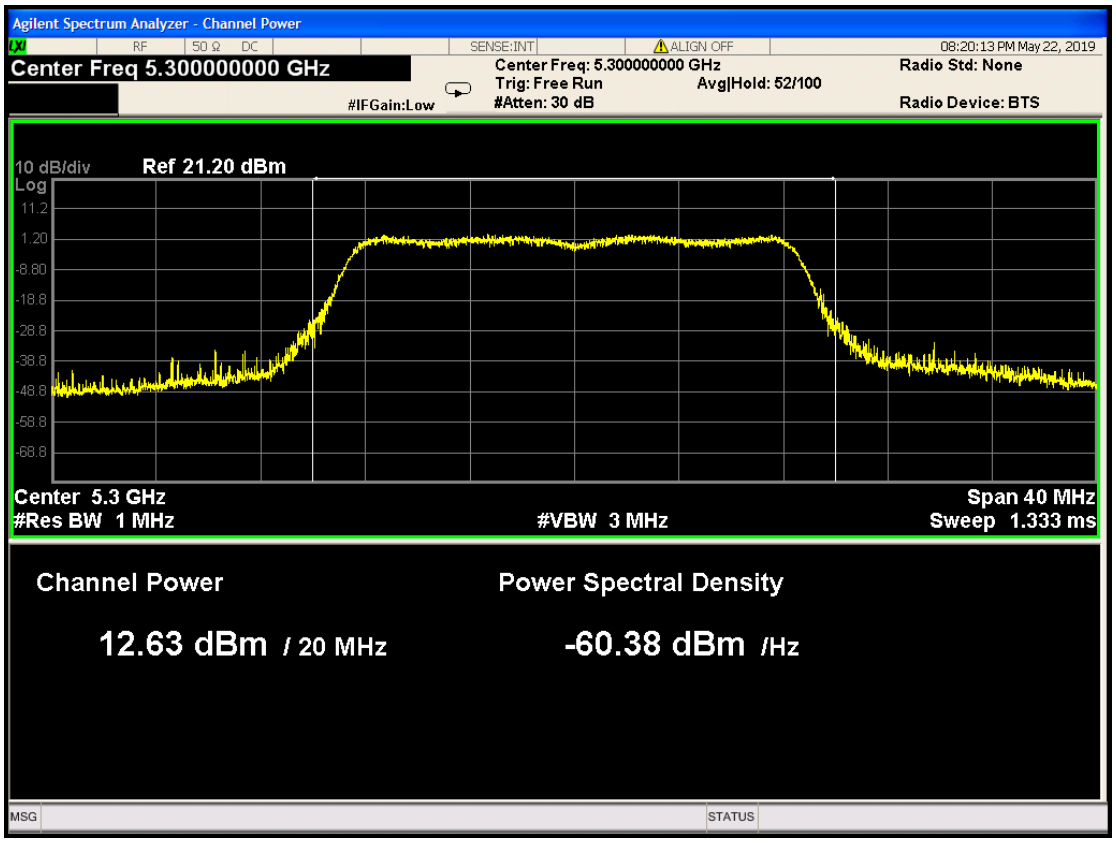

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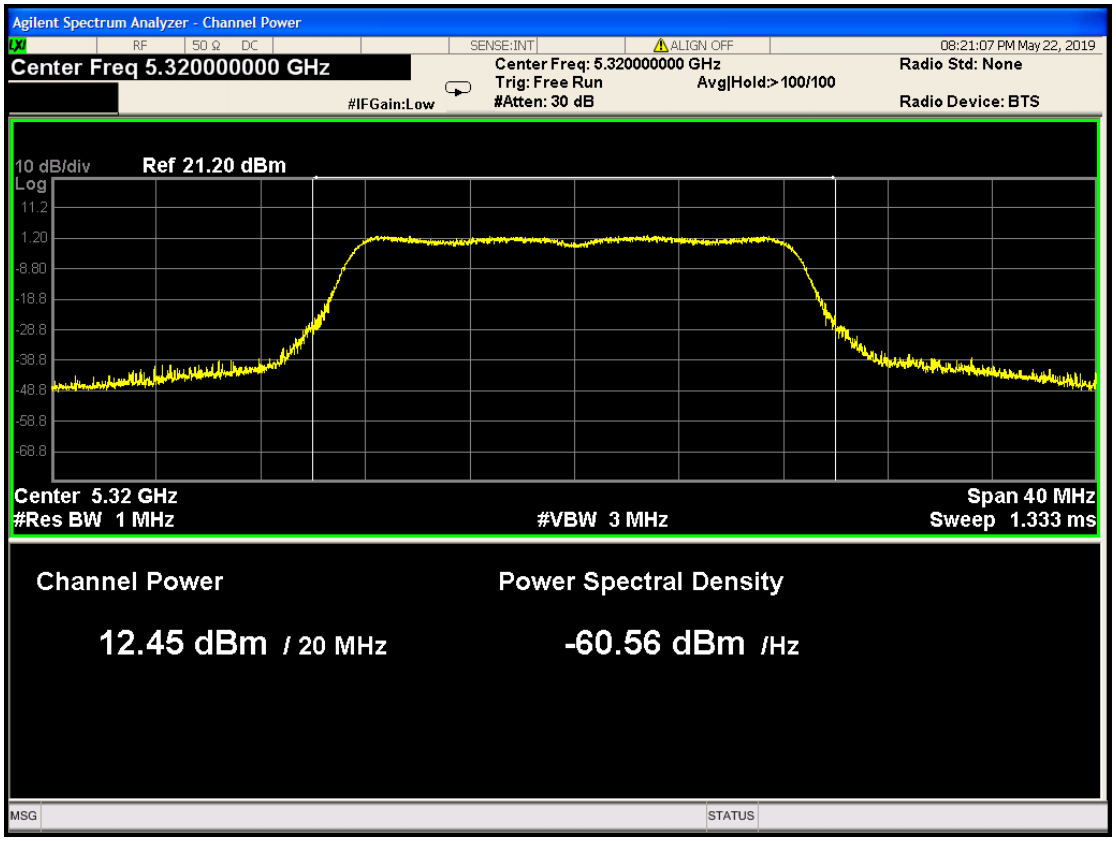

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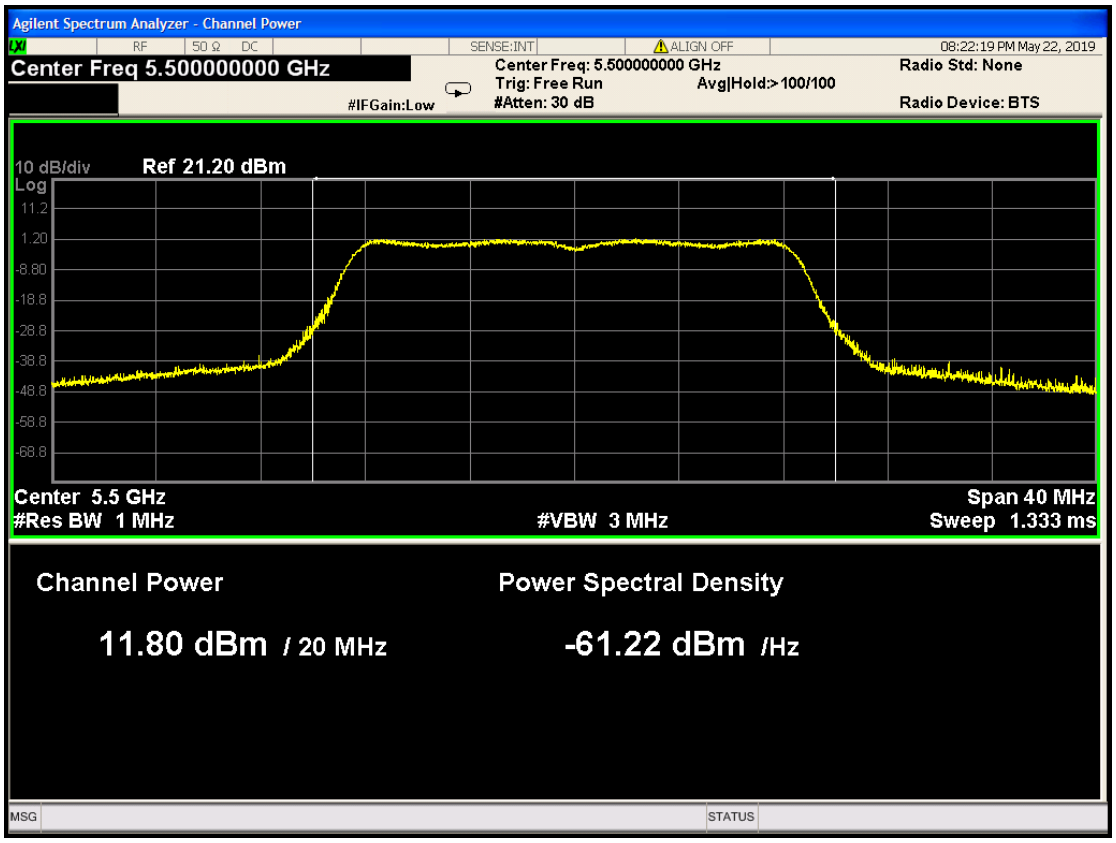

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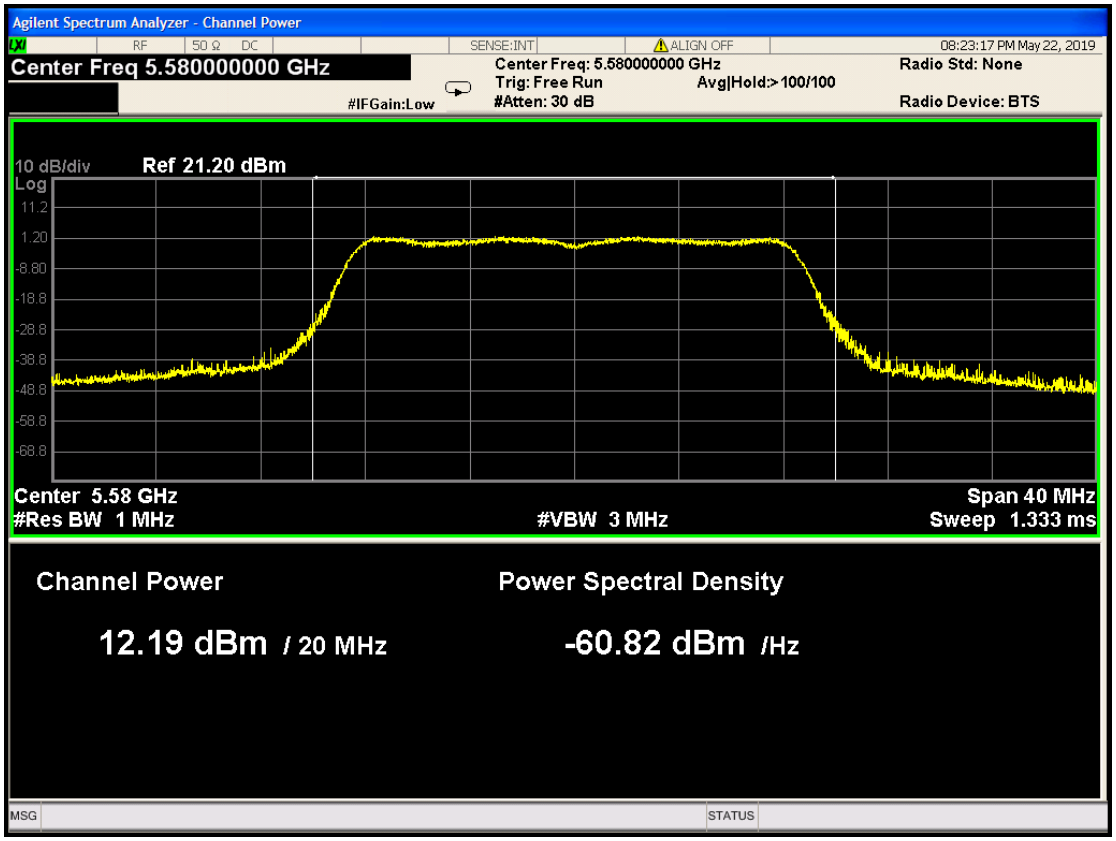

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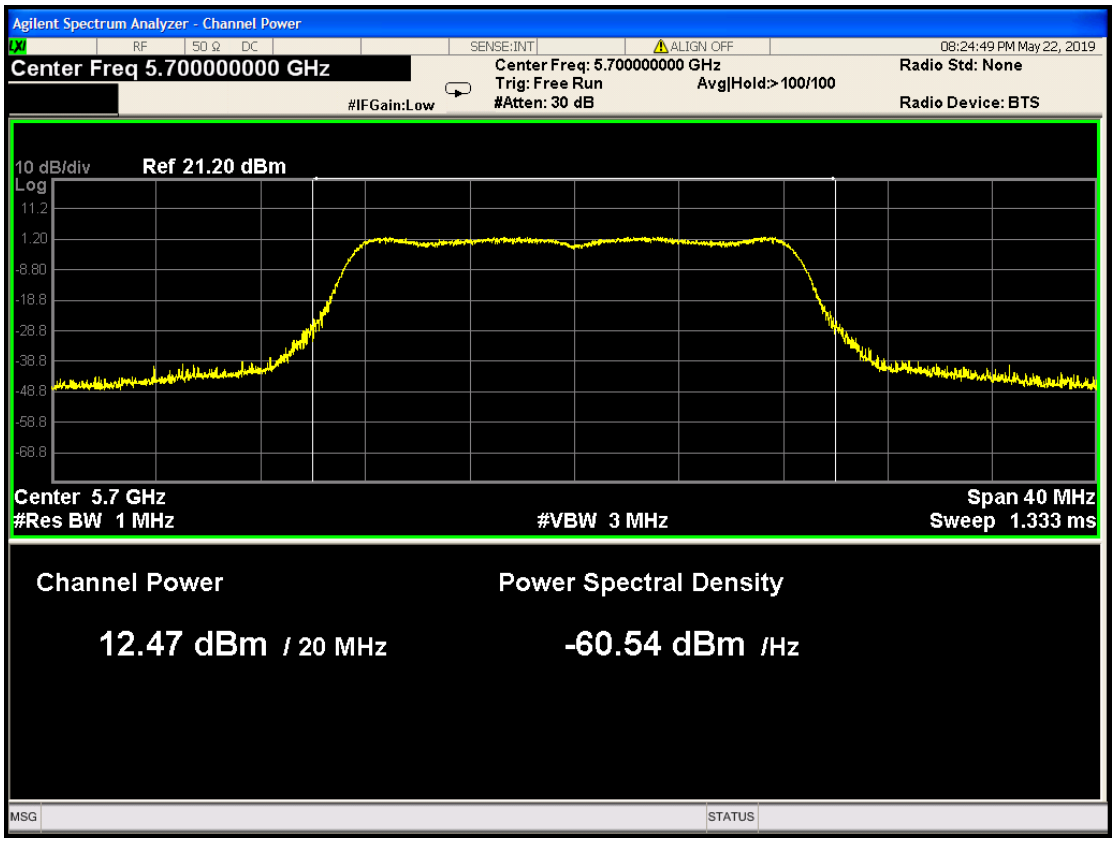

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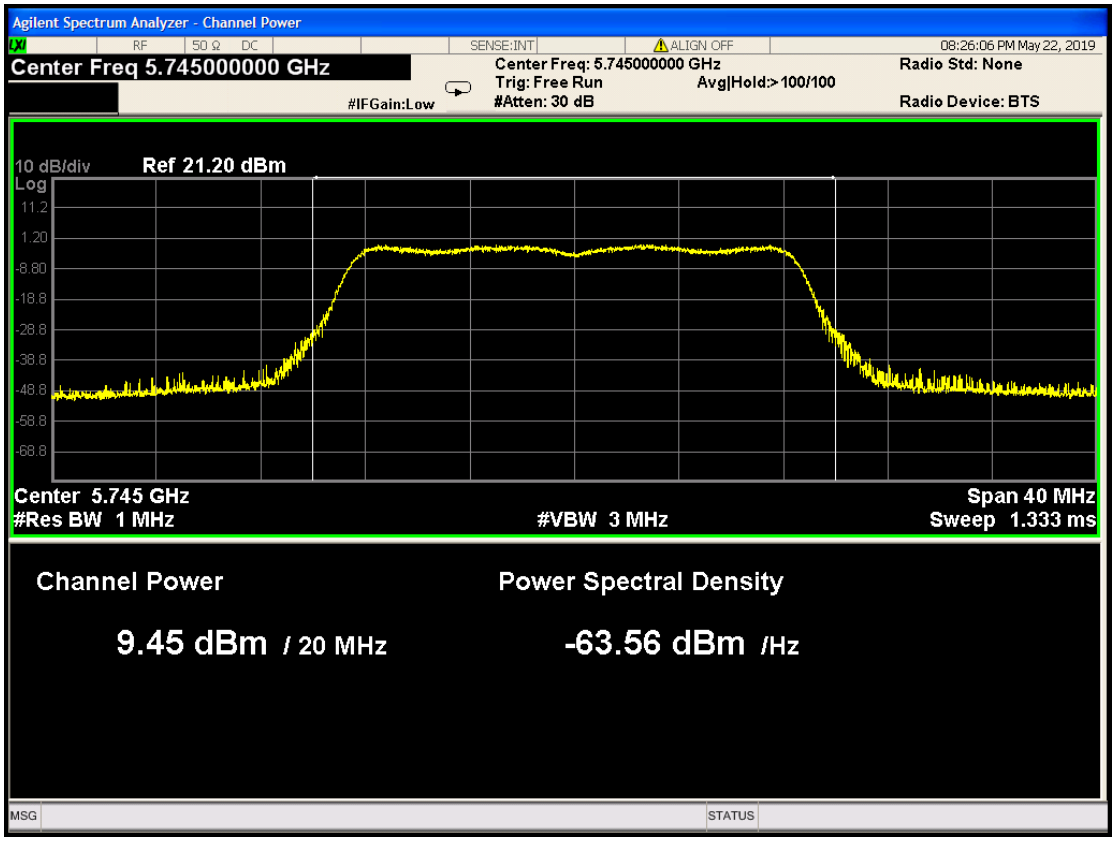

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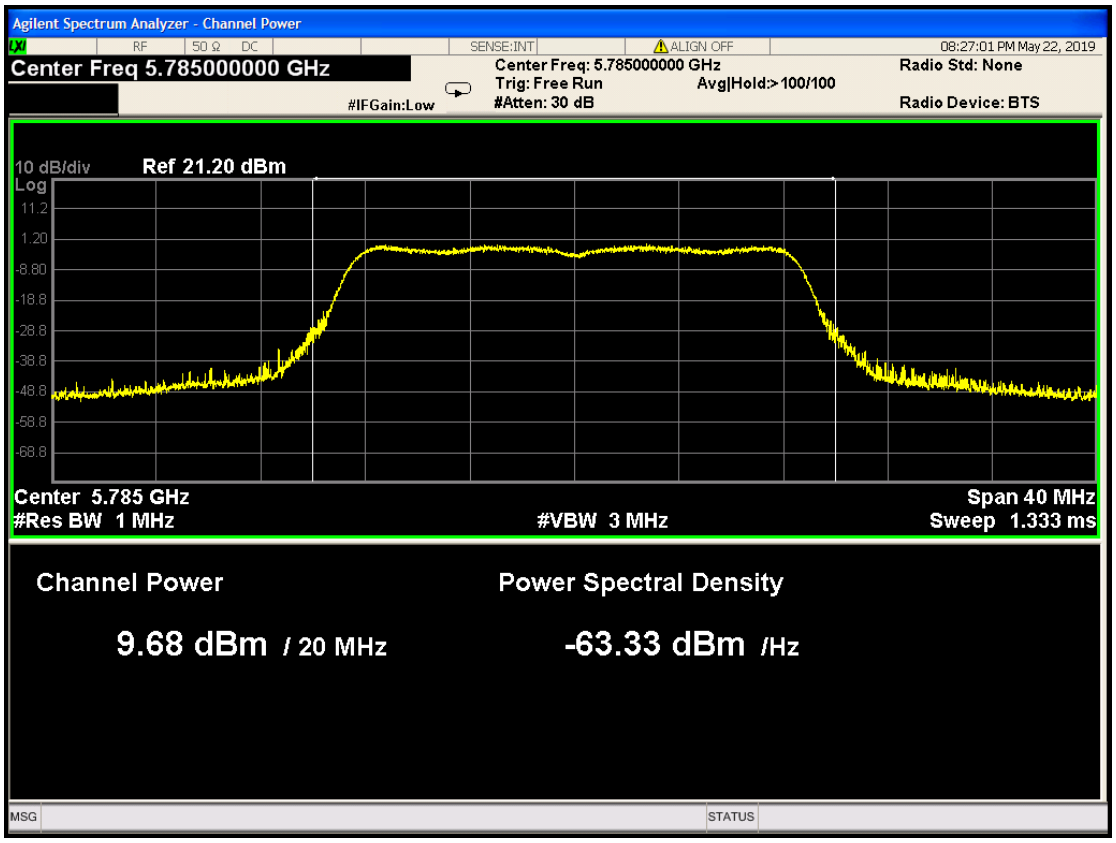

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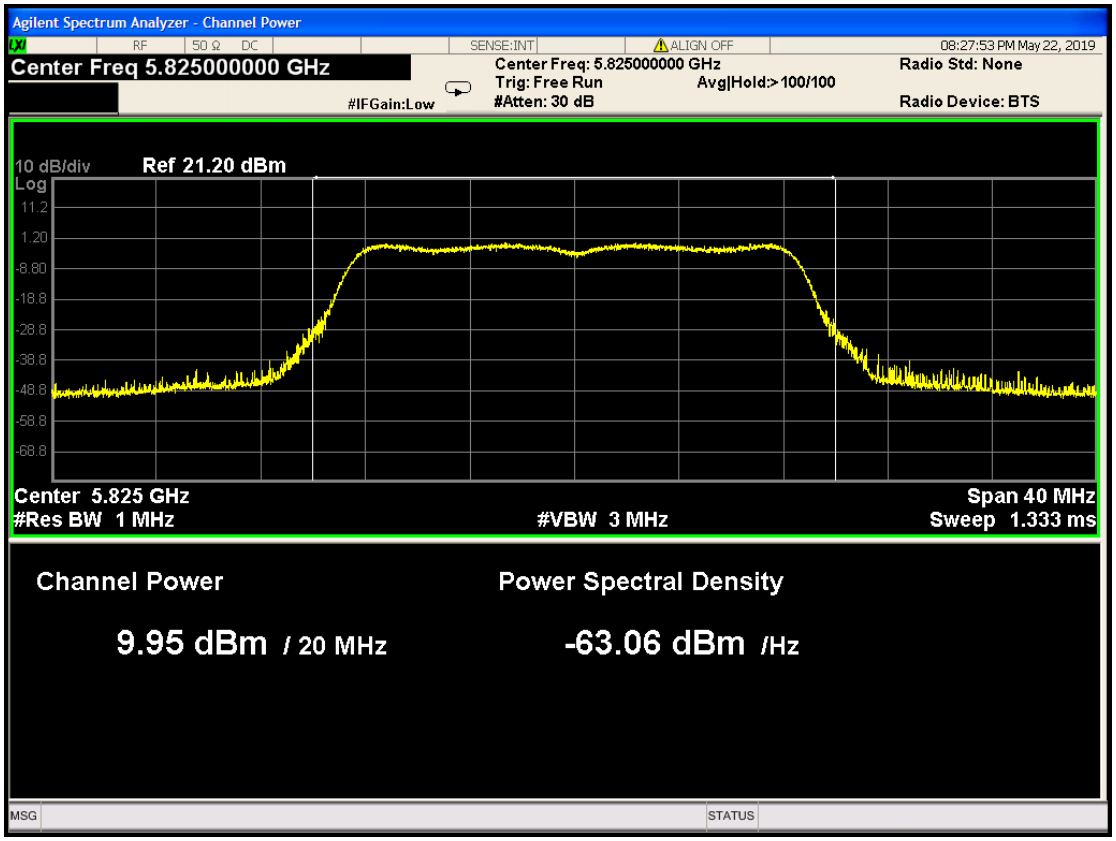

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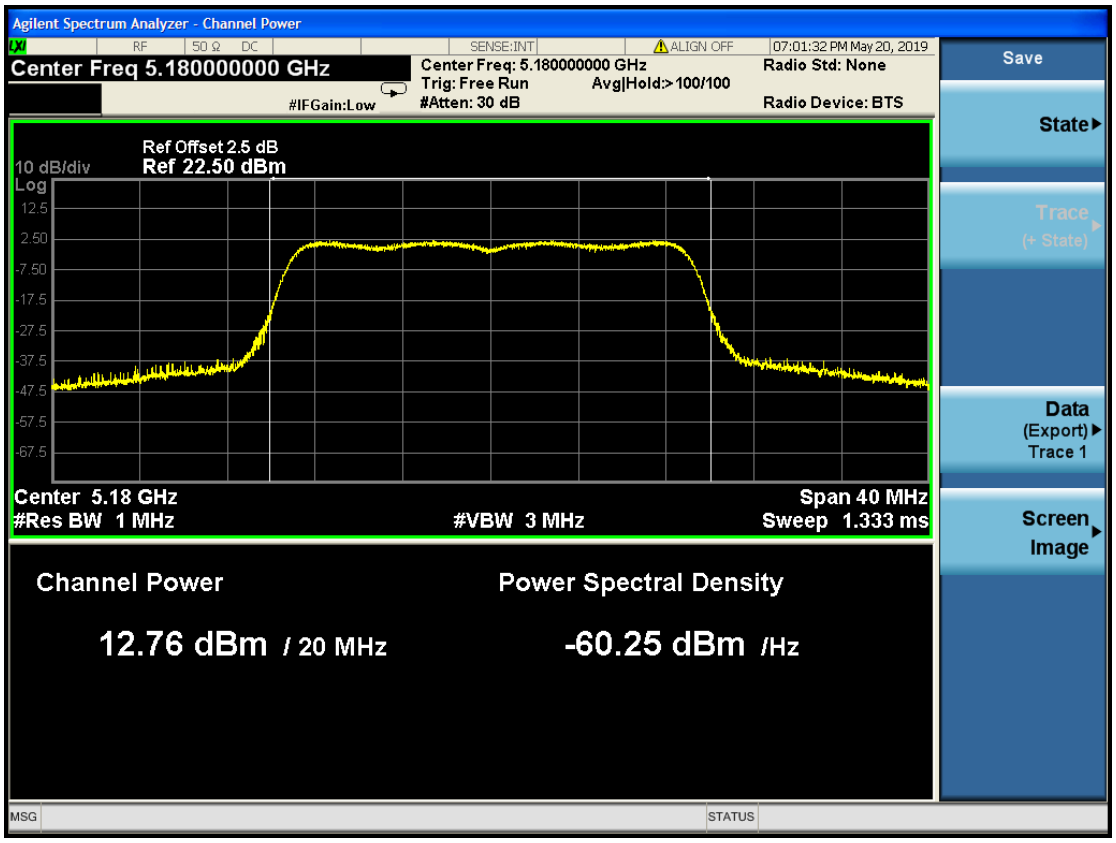

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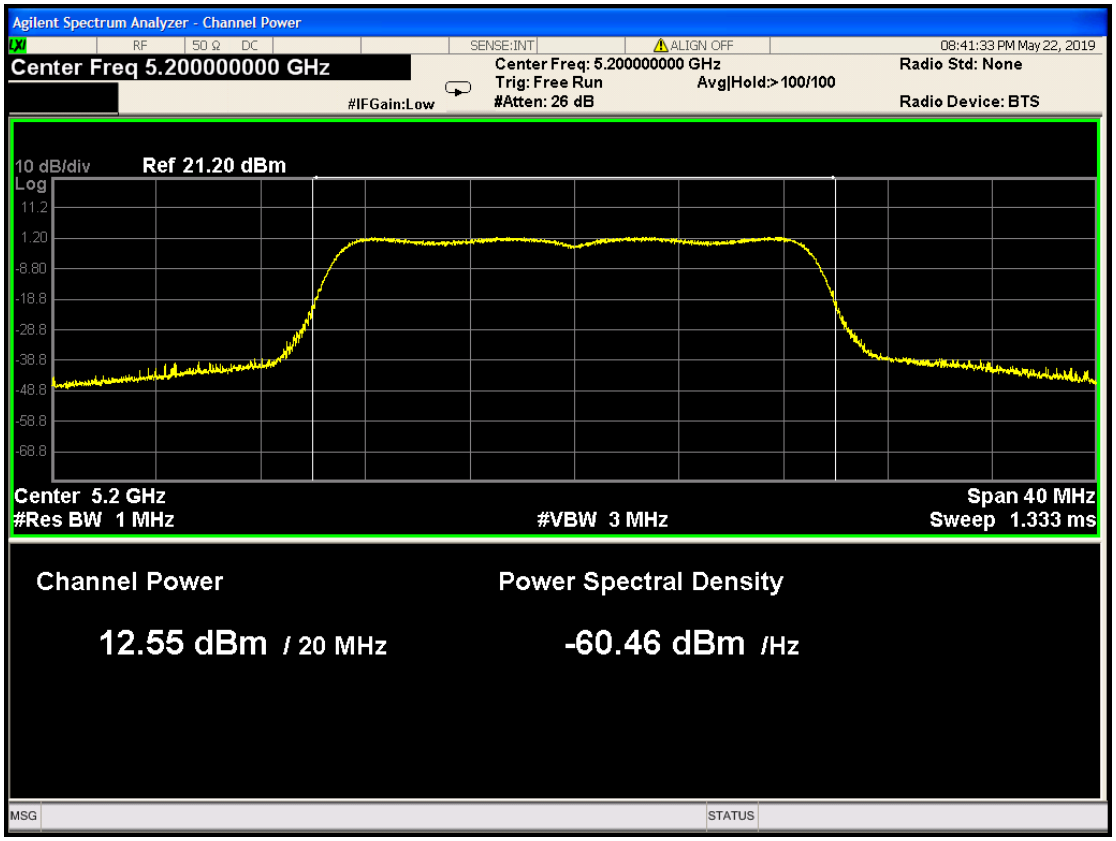

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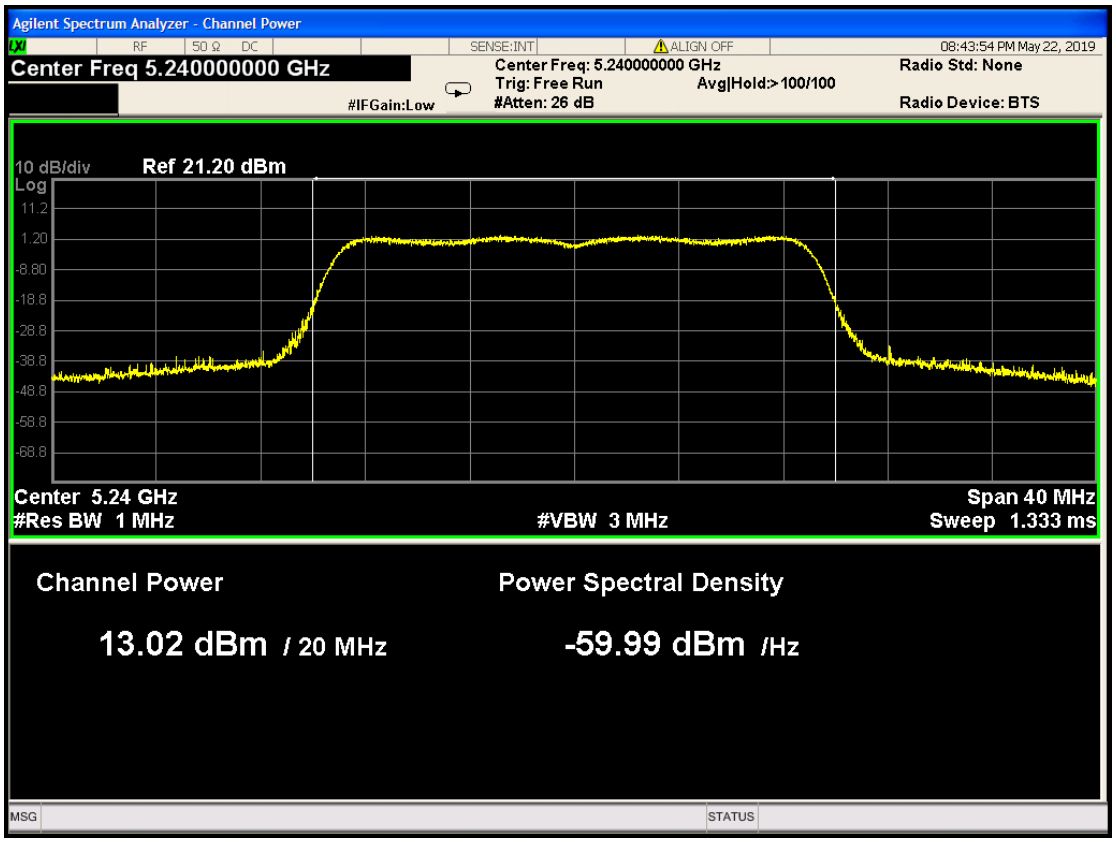

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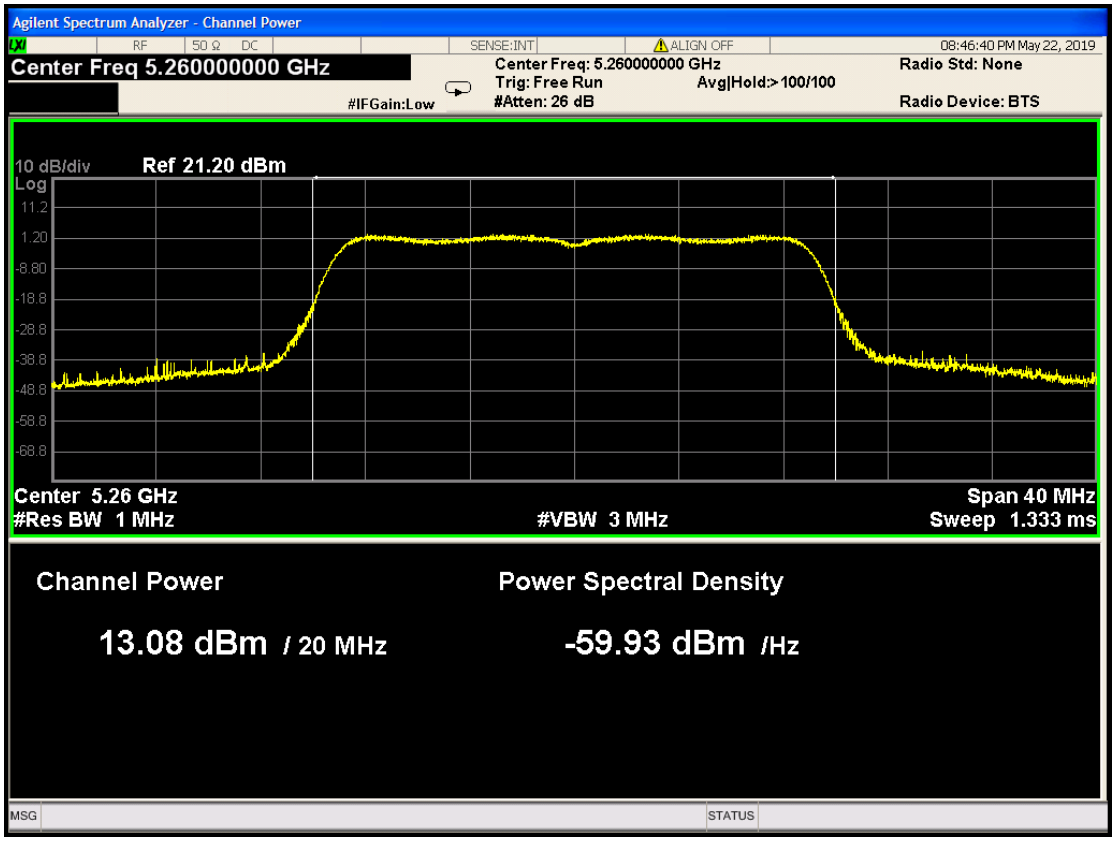

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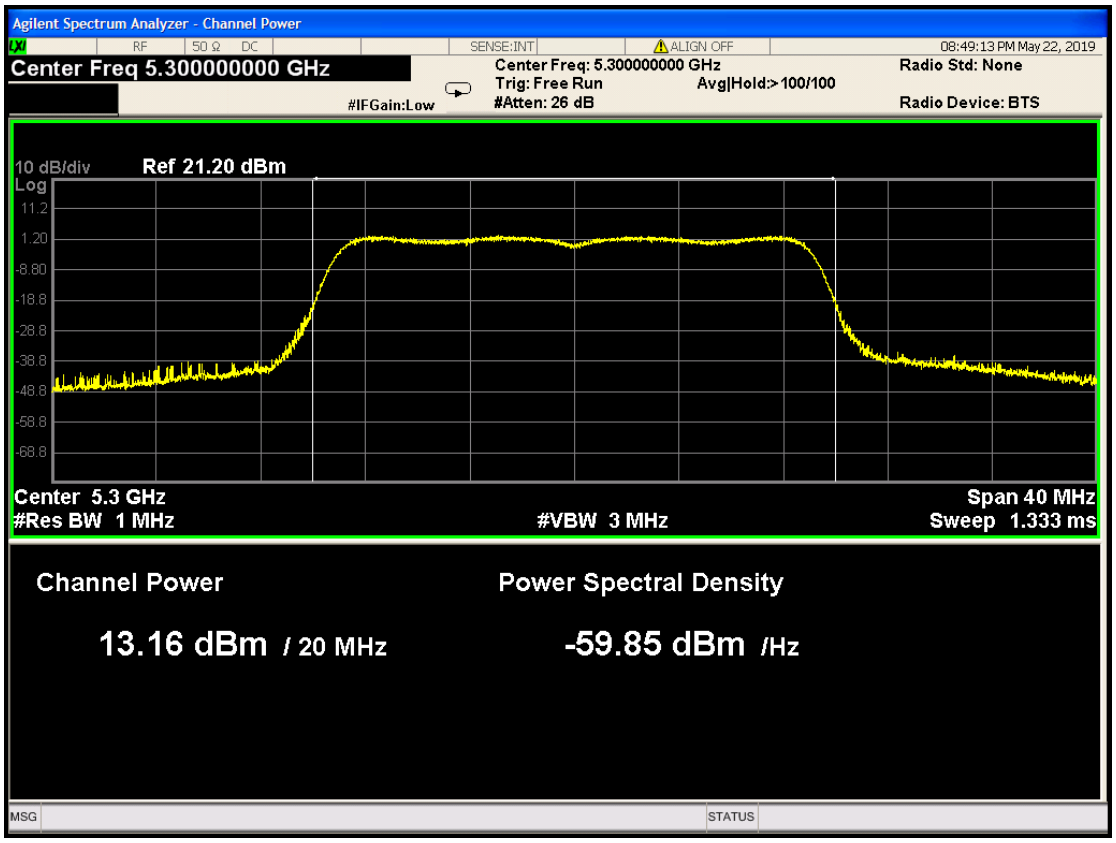

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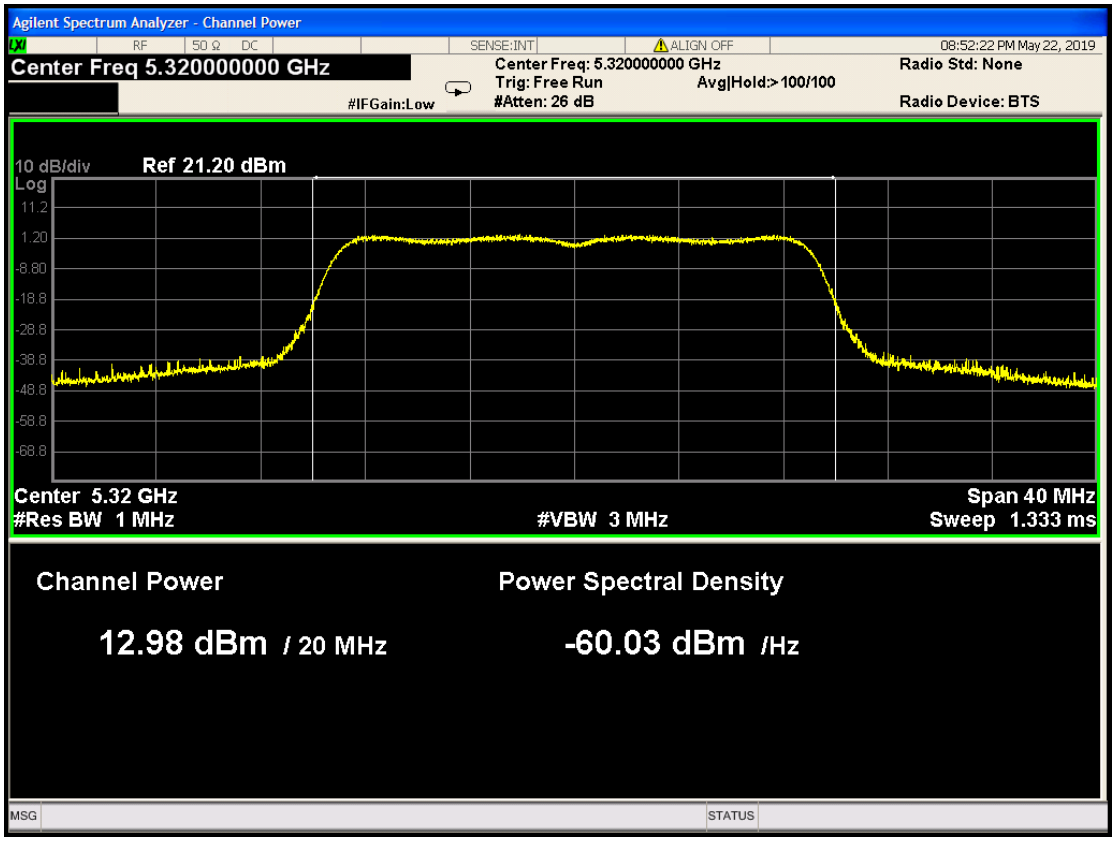

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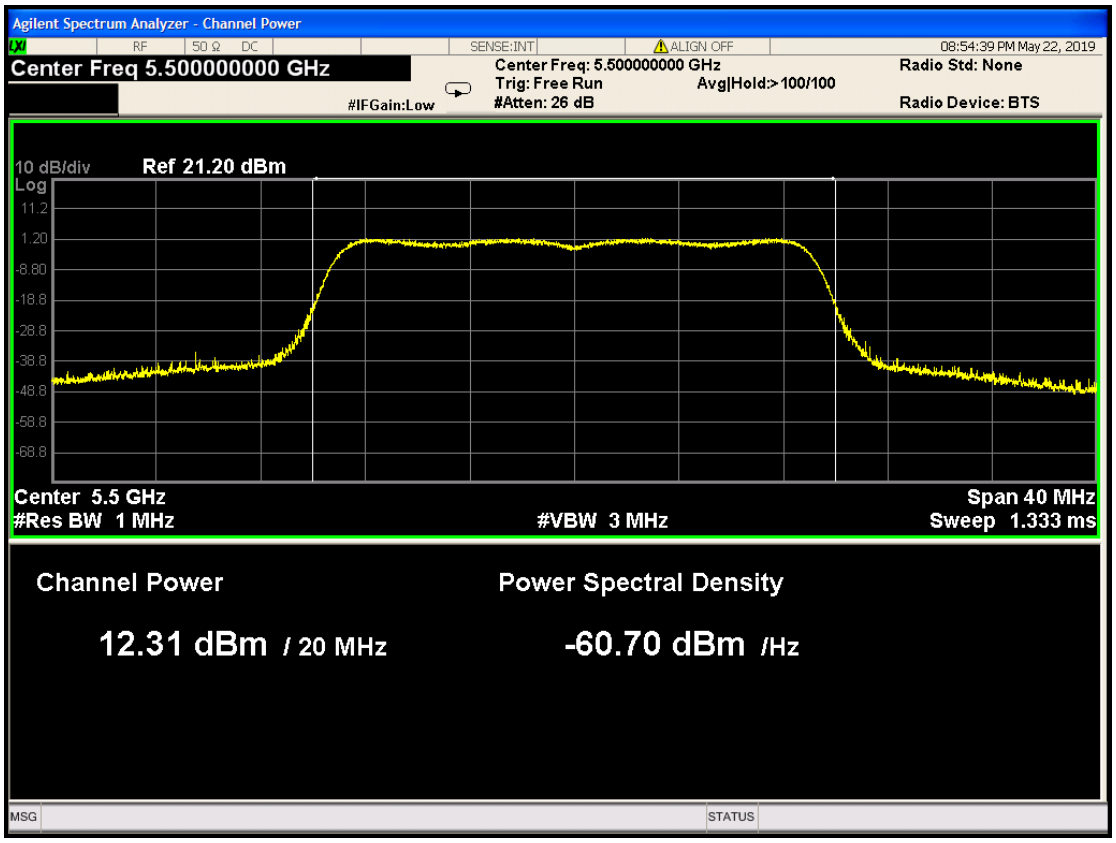

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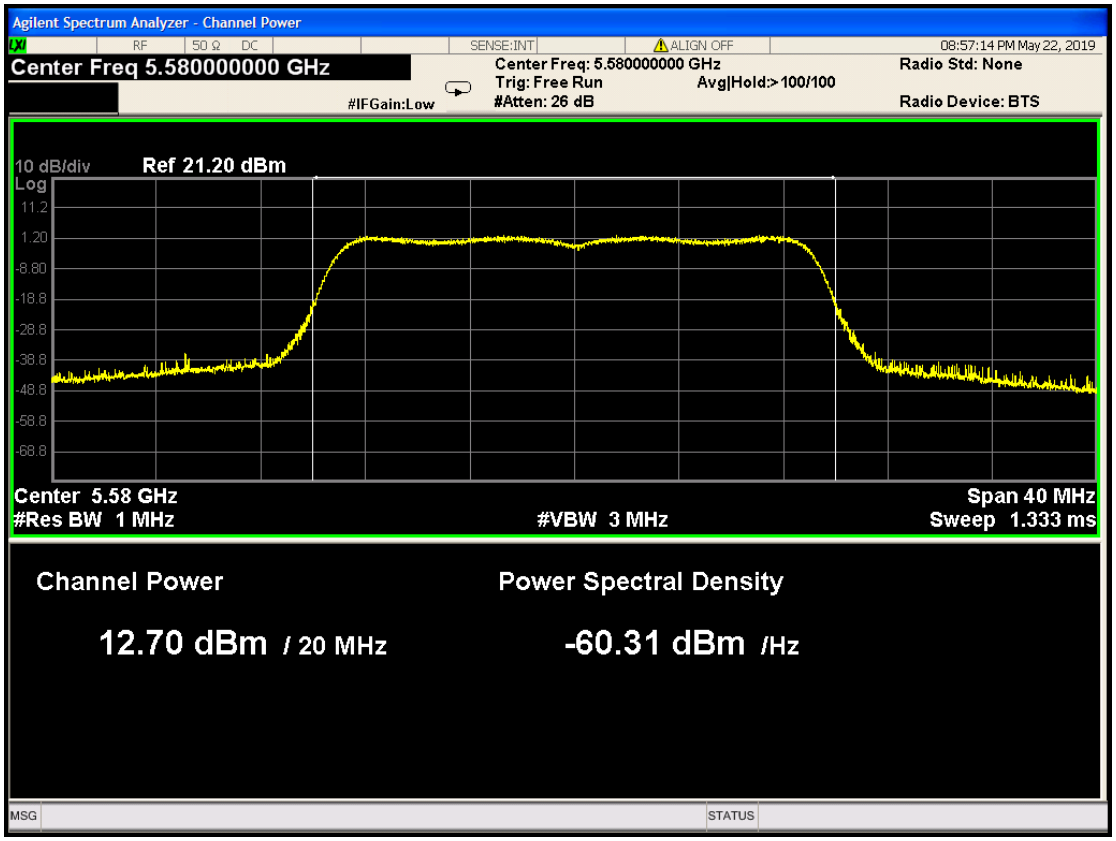

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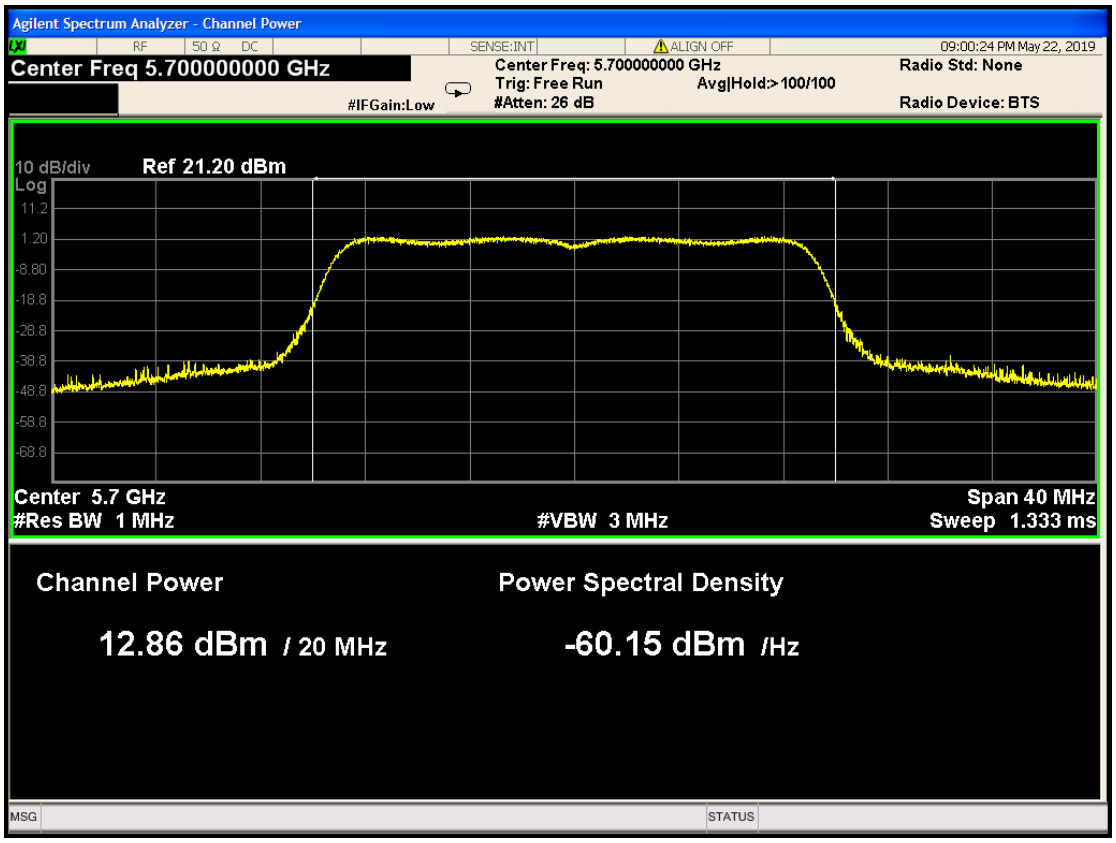

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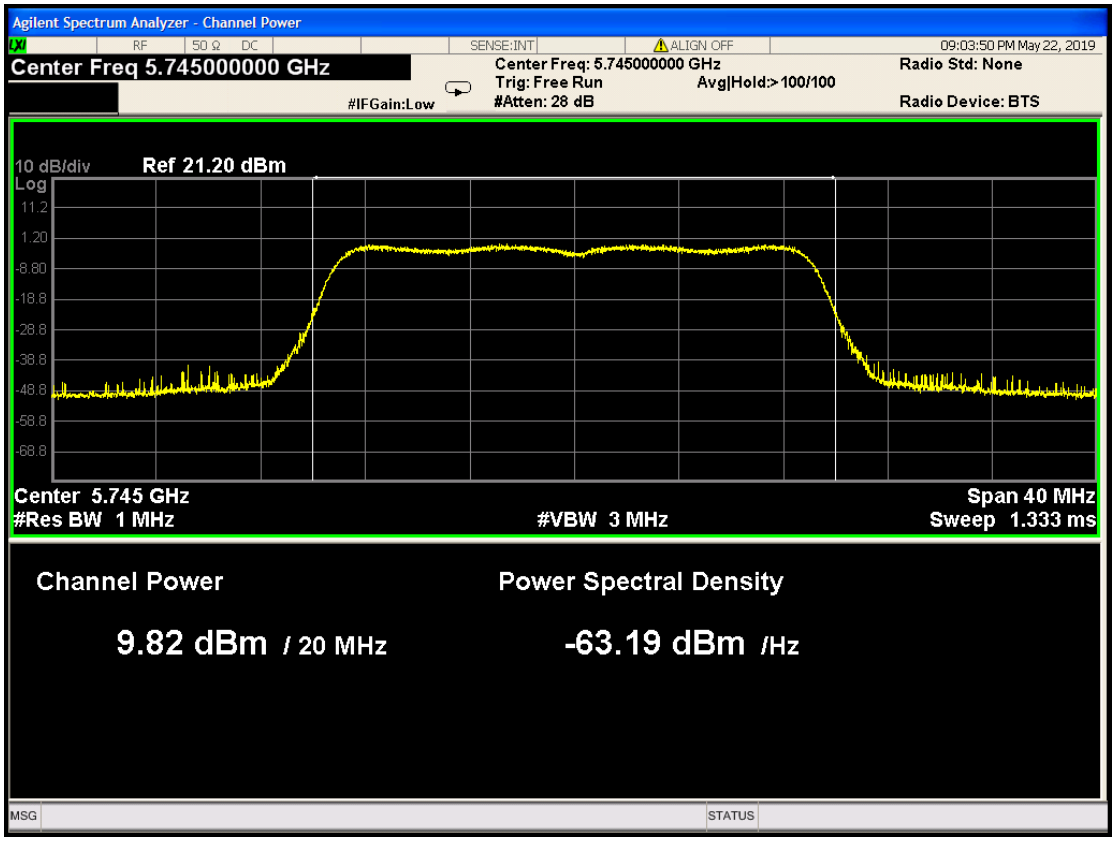

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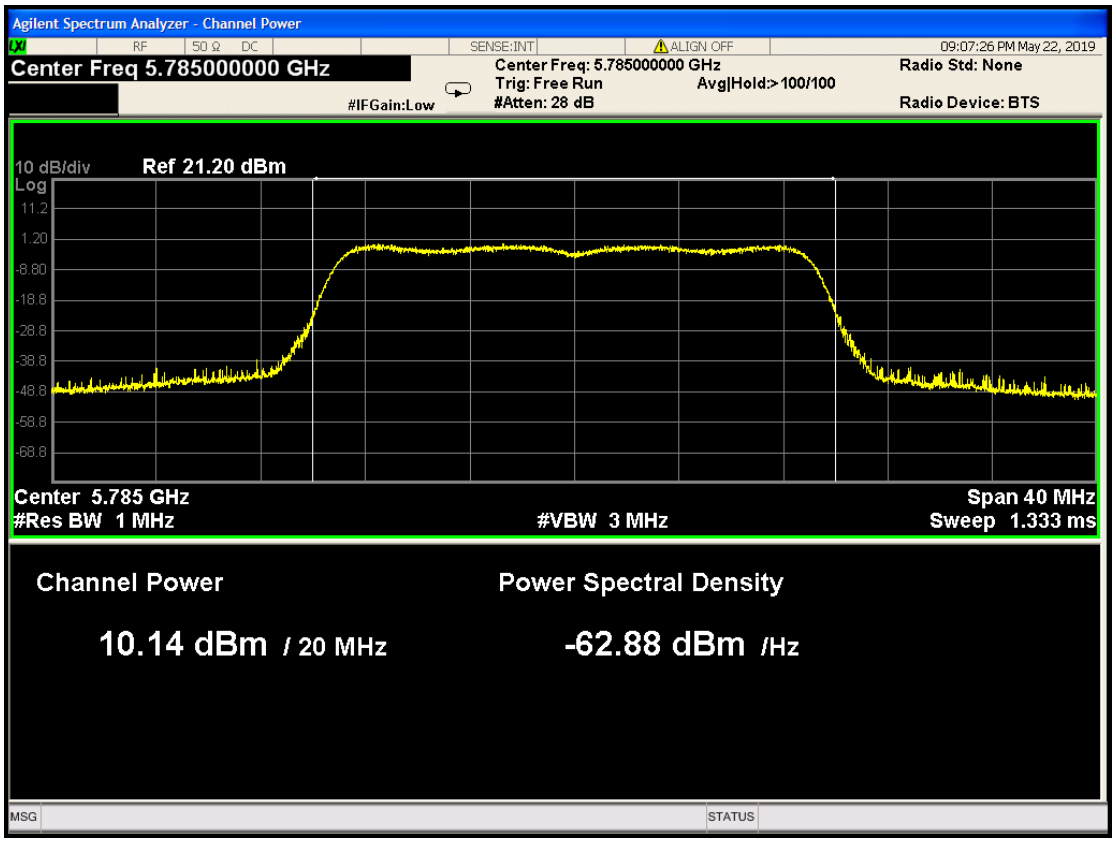

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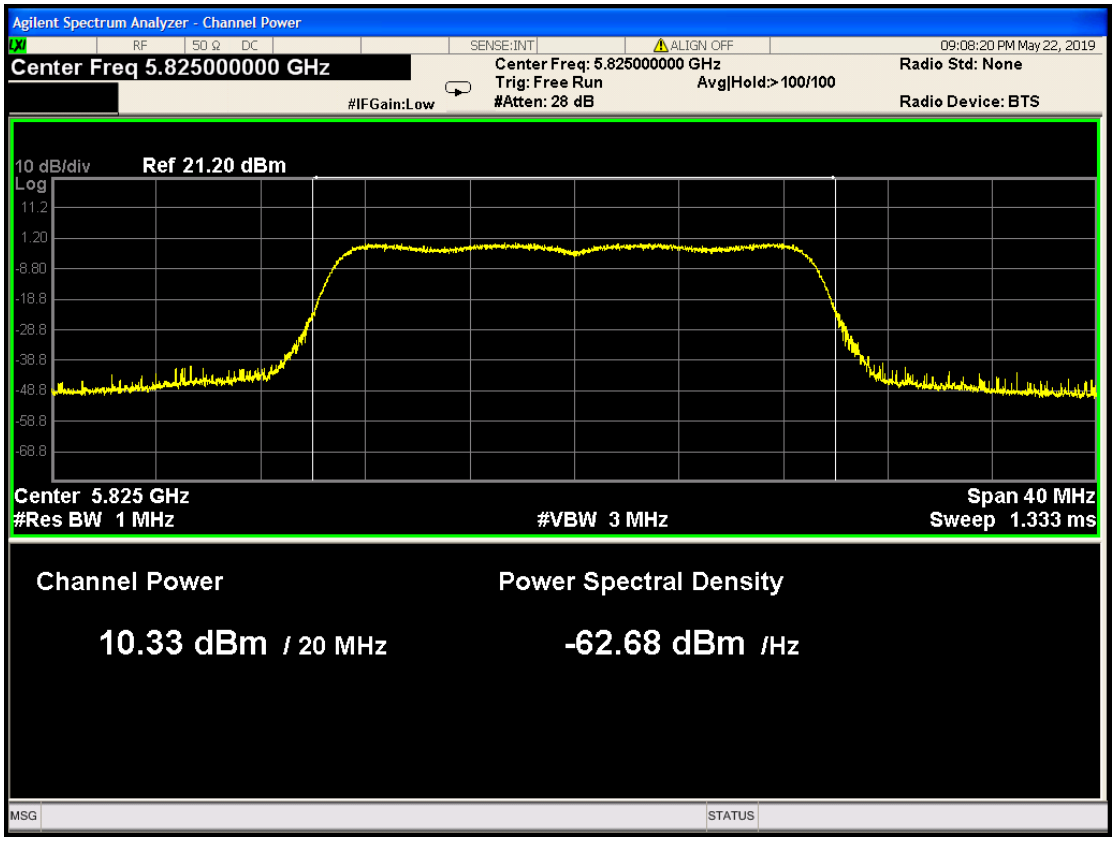

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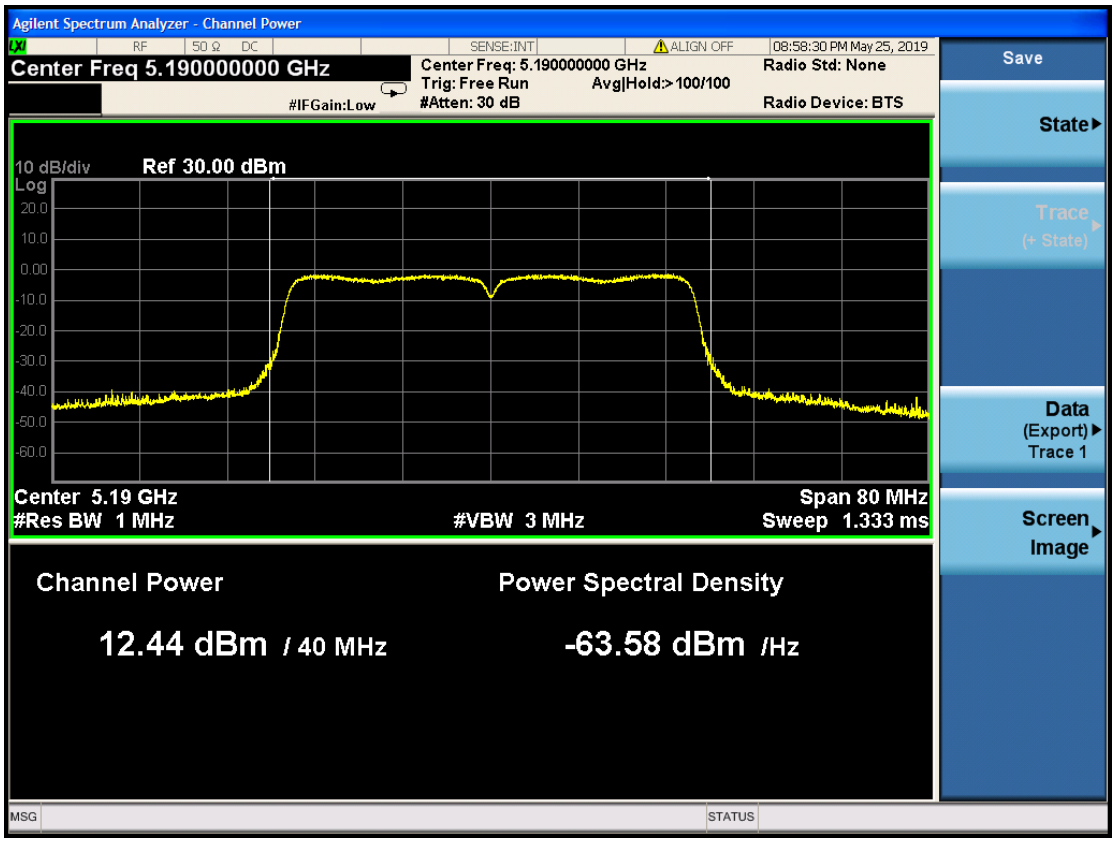

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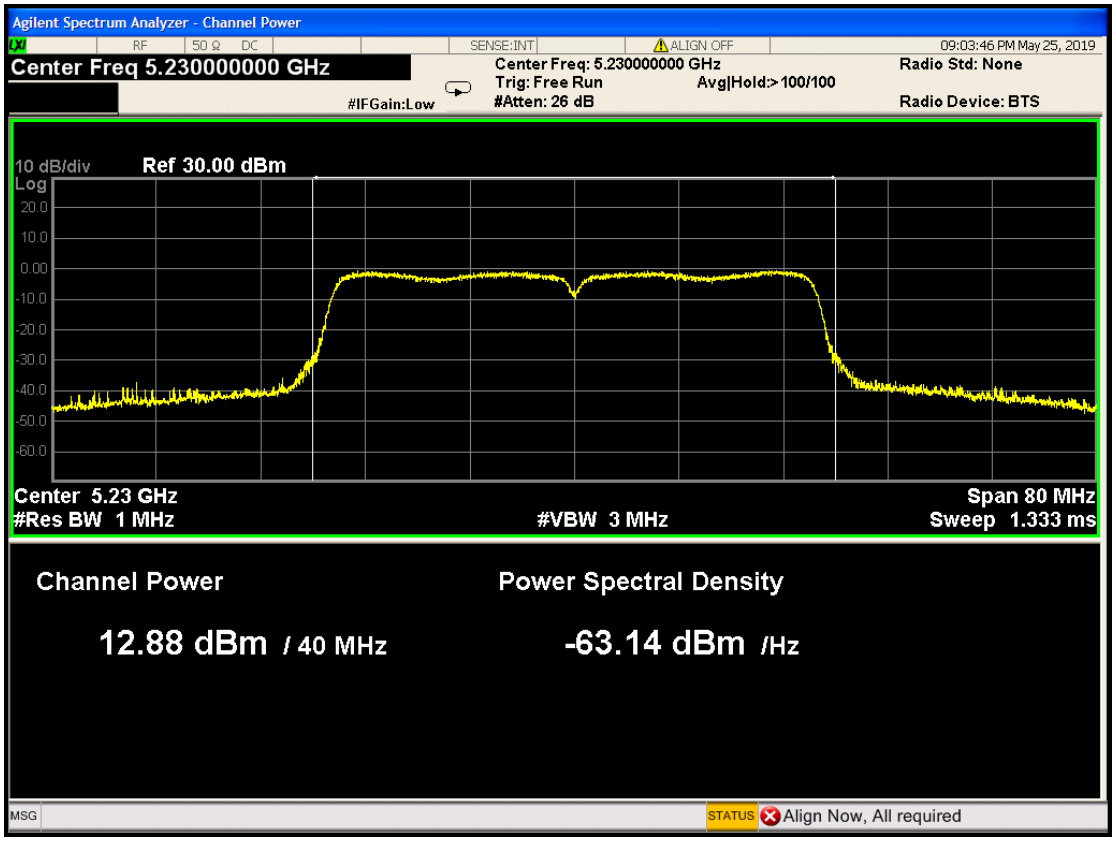

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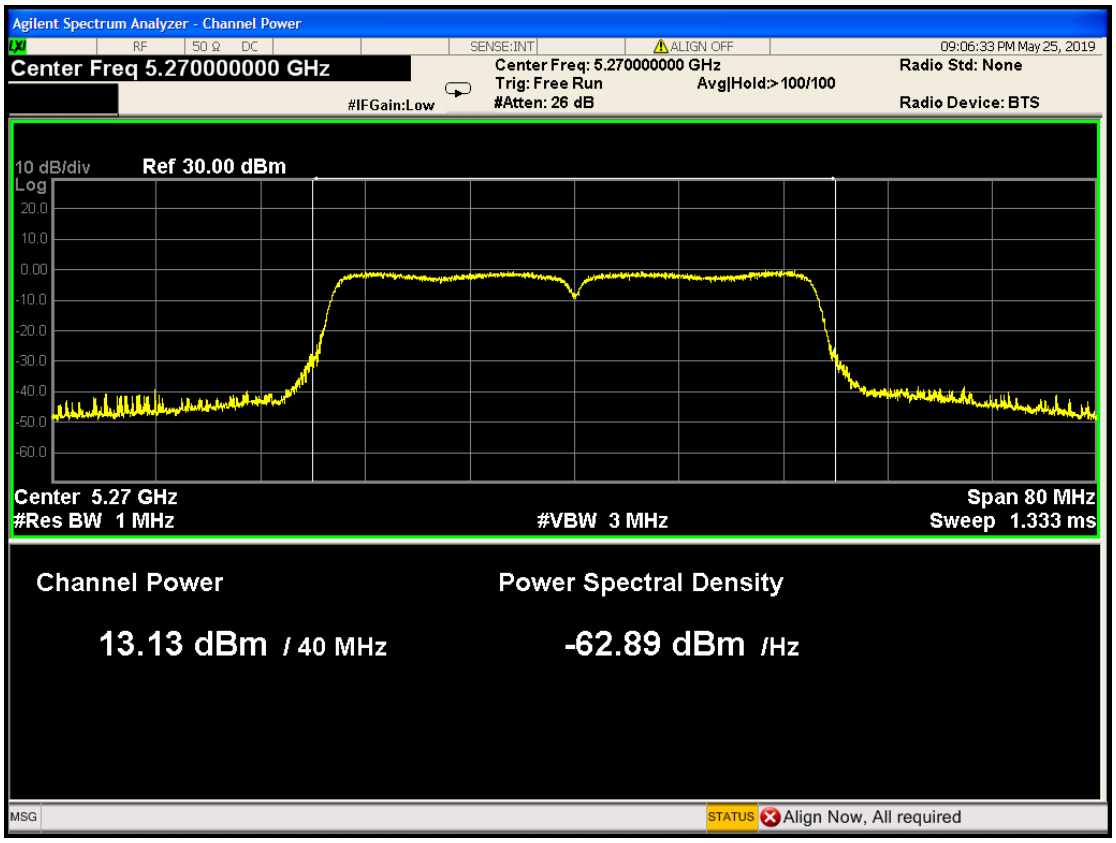

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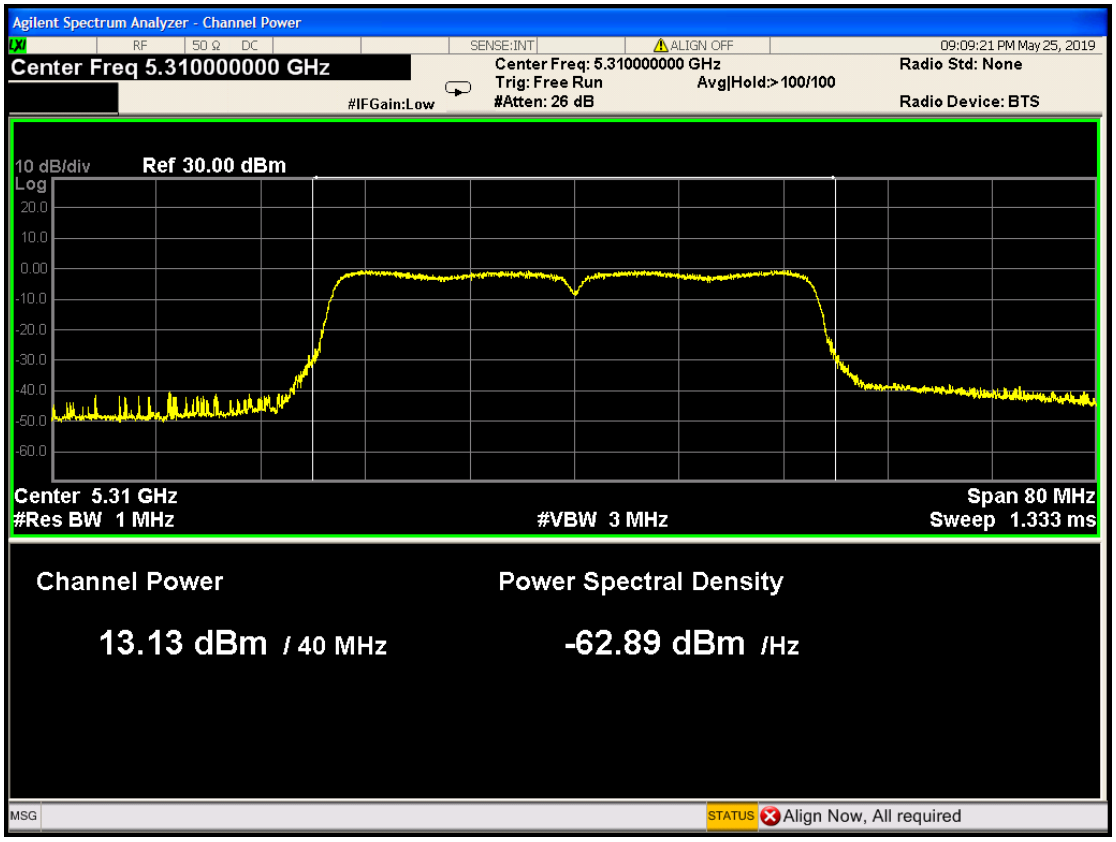

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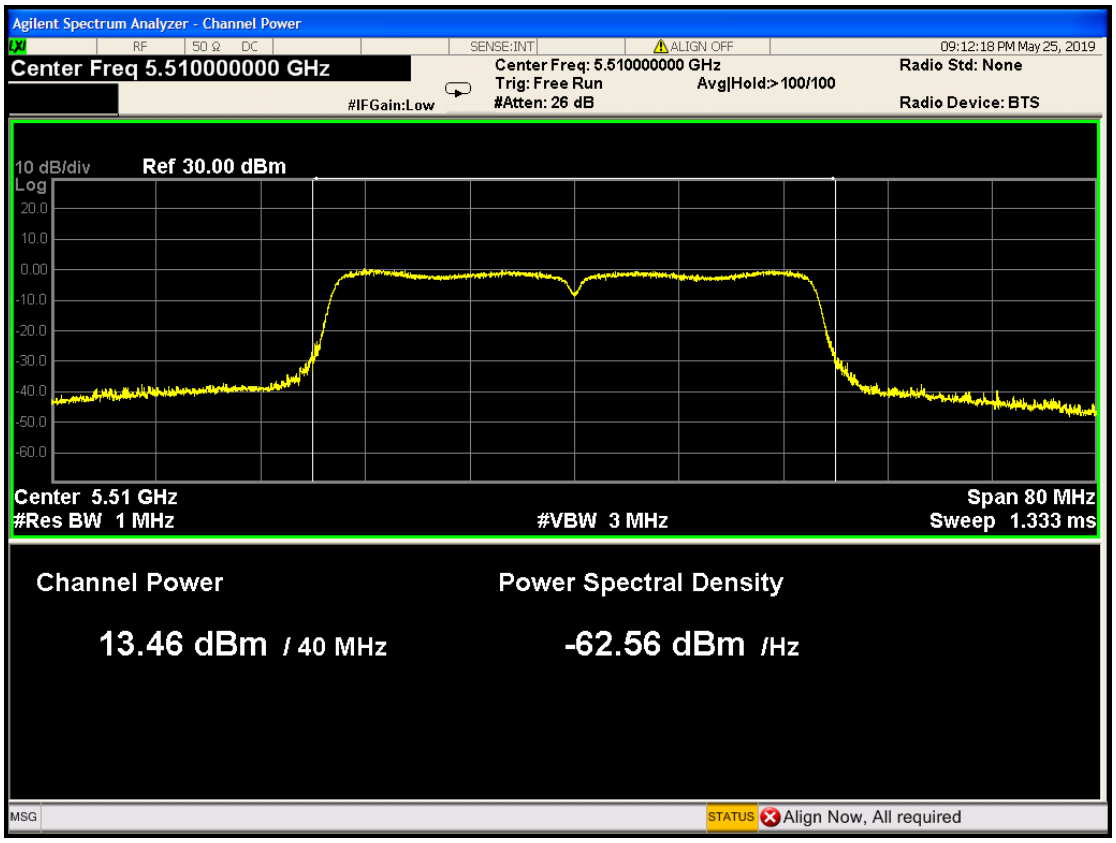

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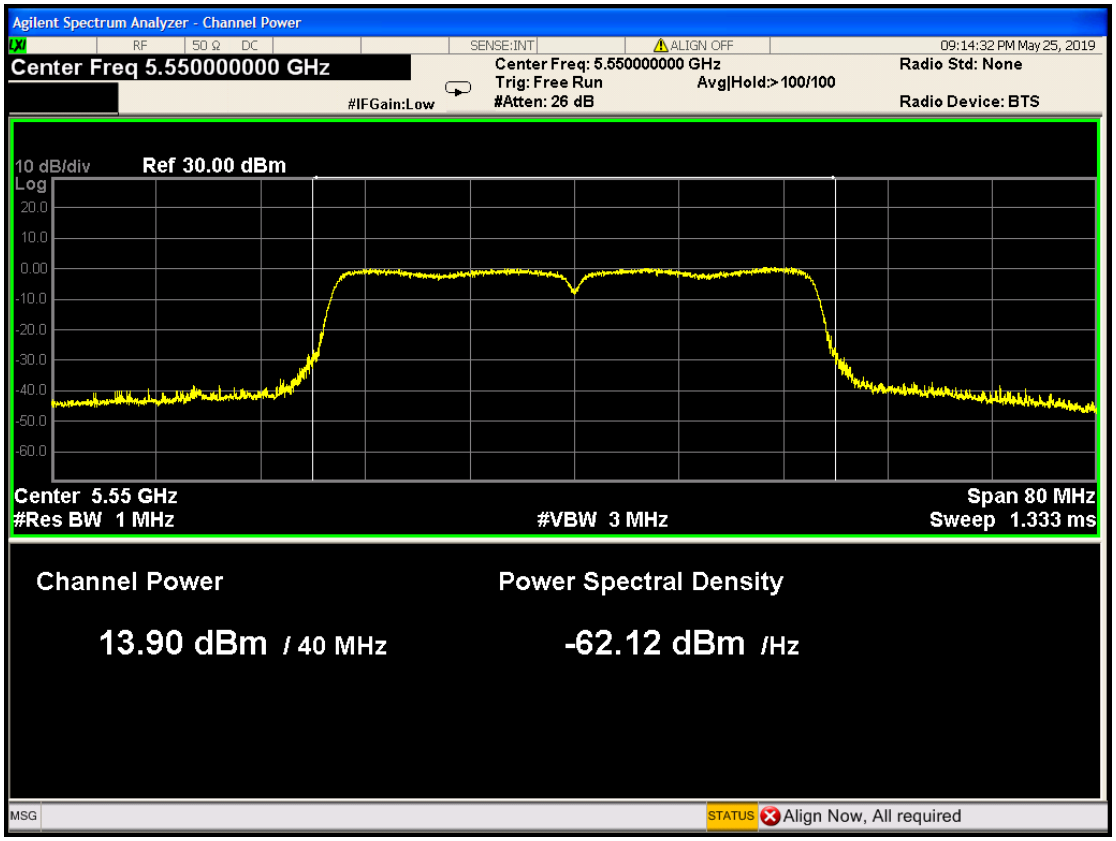

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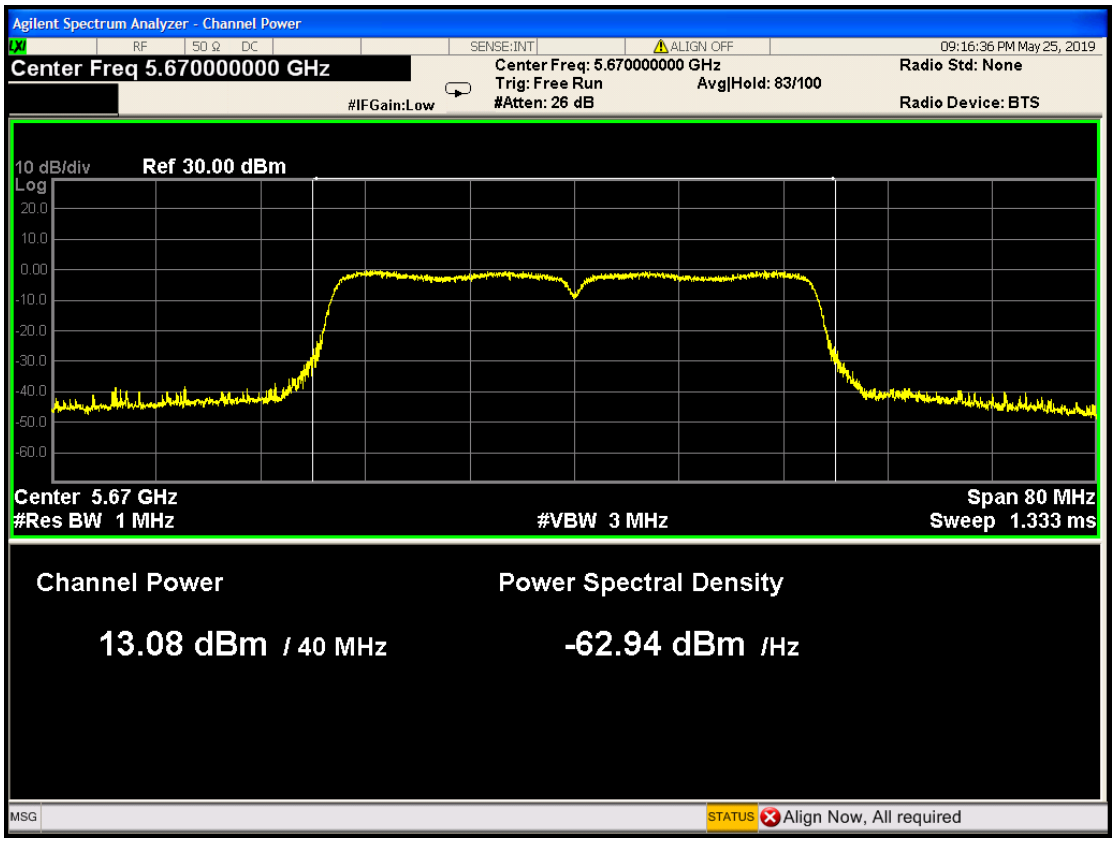

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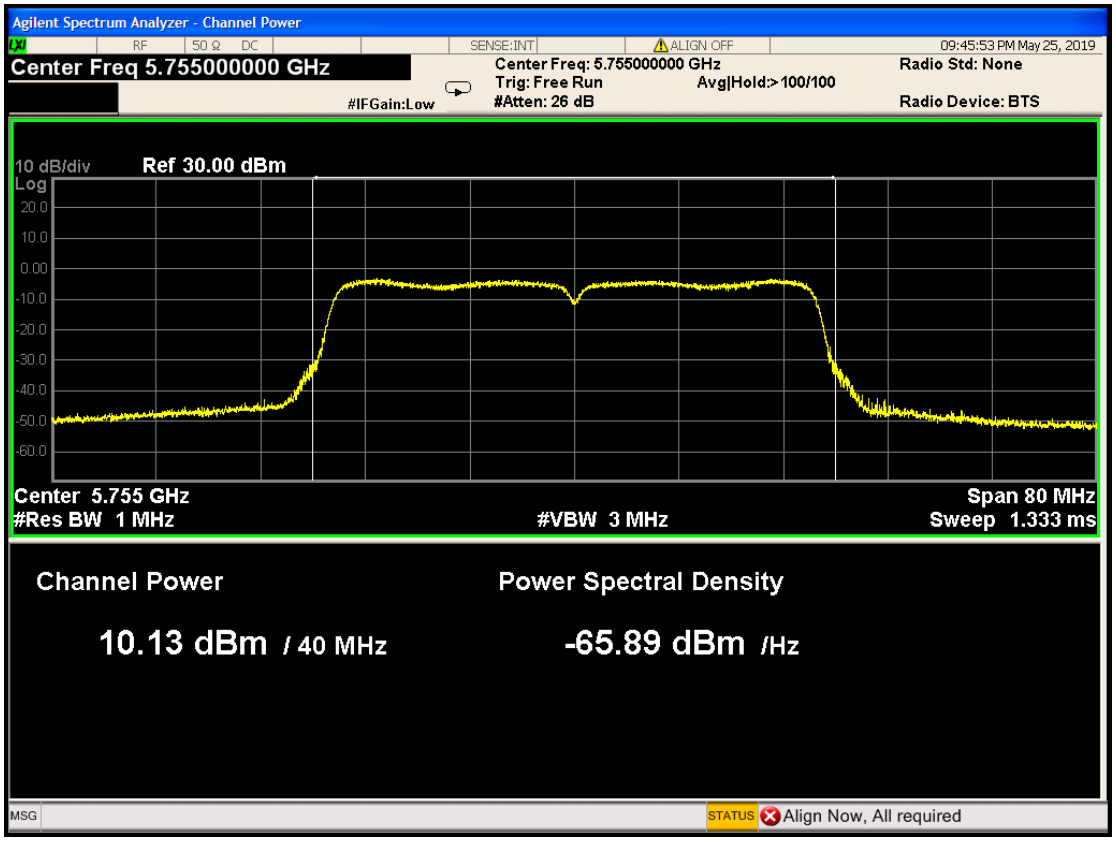

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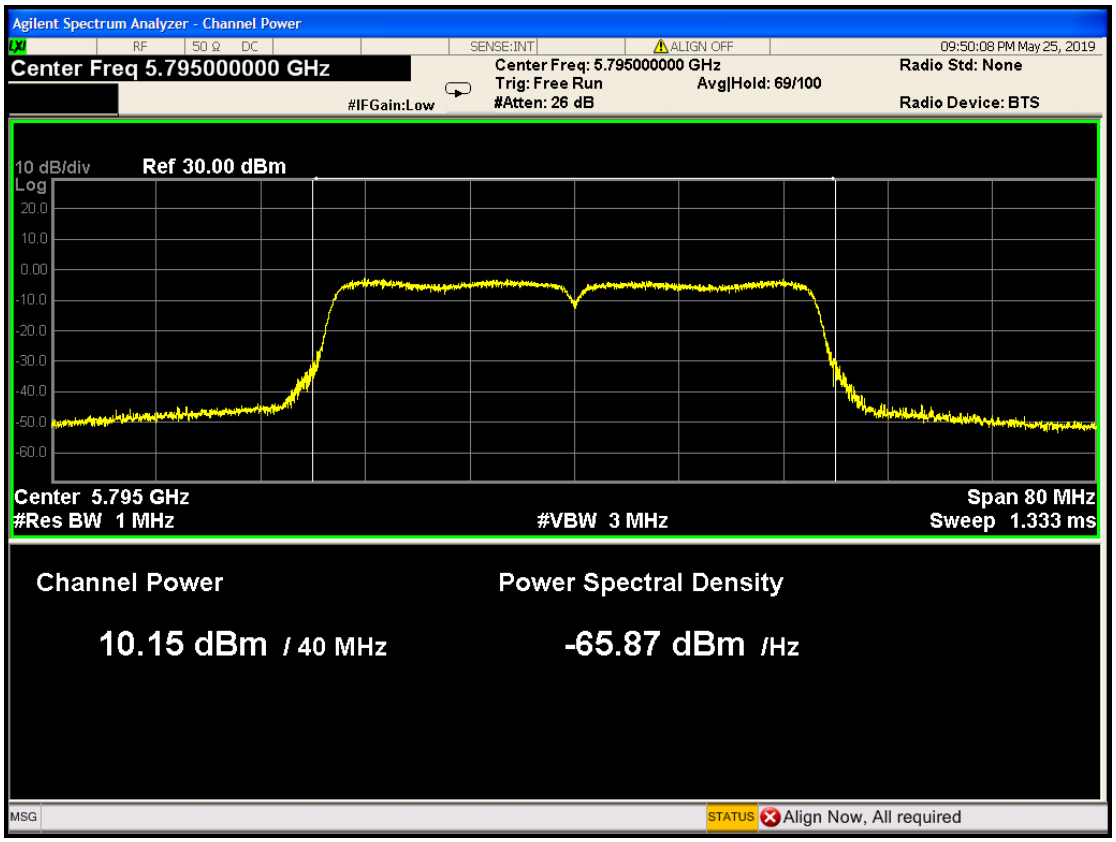


8. EMISSION LIMITATIONS MEASUREMENT

8.1. Test Equipment

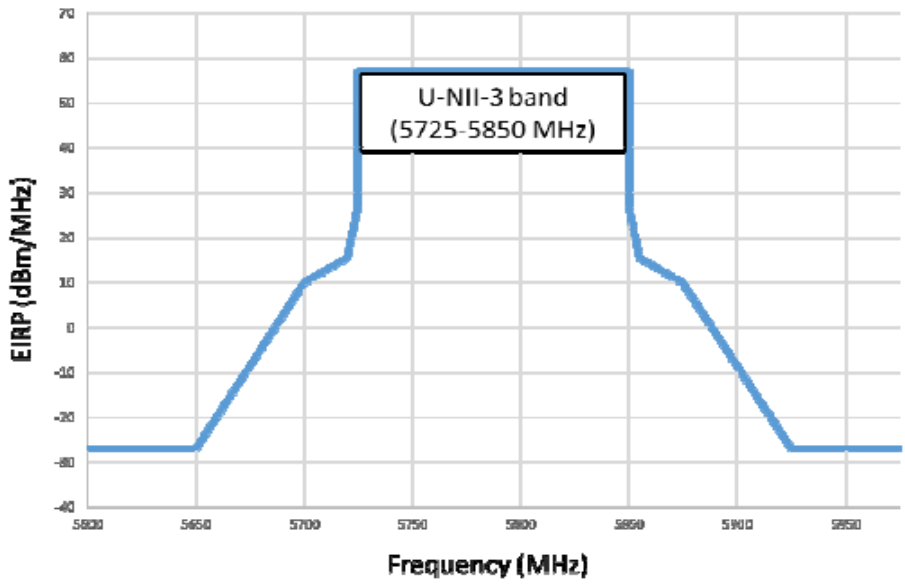
Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Period
1.	PXA signal analyzer	Agilent	N9030A	MY53120217	2019-04-12	1 Year

8.2. Block Diagram of Test Setup

The same as section 6.2.

8.3. Specification Limits

Frequency Band (MHz)	E.I.R.P. Limit
5150 to 5250	-27 dBm
5250 to 5350	
5470 to 5725	

Frequency Band (MHz)	E.I.R.P. Limit	
5725 to 5850	☒	15.407(b)(4)(i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.
	☐	15.407(b)(4)(ii) ,compliance with the emission limits in § 15.247(d) Shall be at least 30dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power,. Attenuation below the general limits specified in §15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c))
		

8.4. Test Procedure

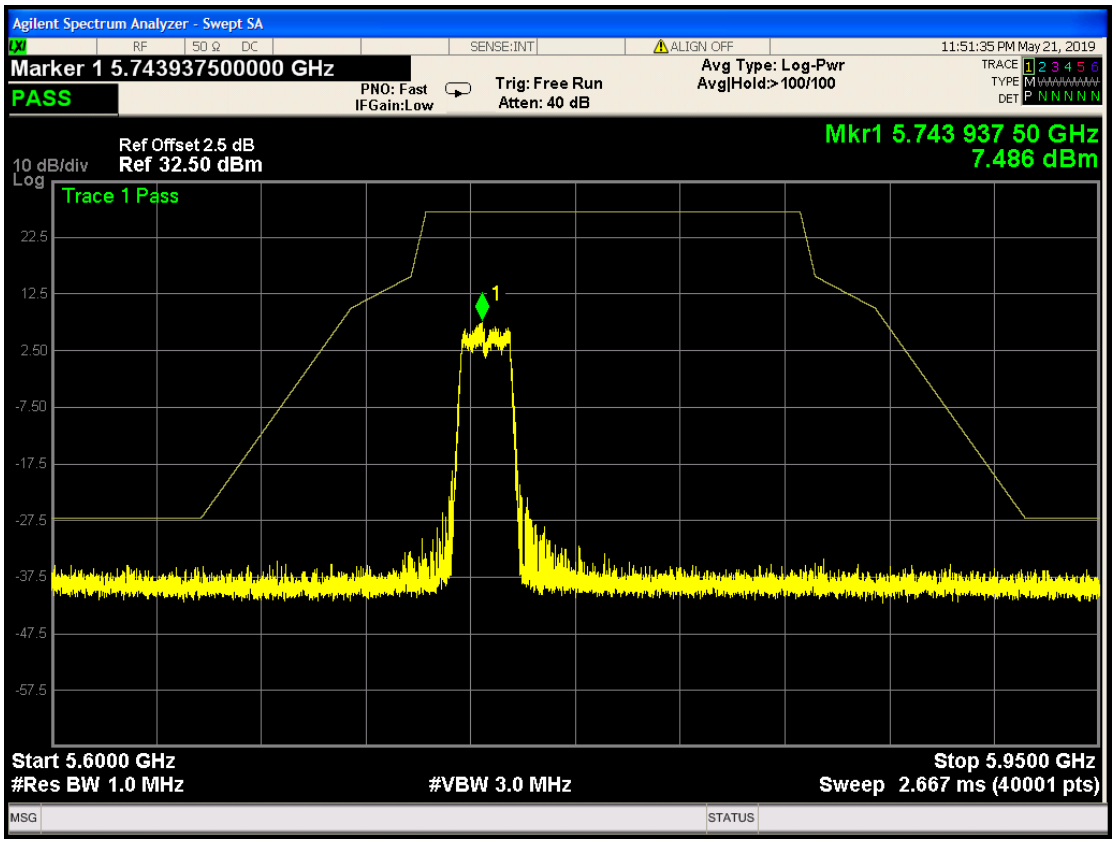
Following measurement procedure is reference to KDB 789033 D02 General UNII Test Procedures New Rules v02r01:

(1) RBW = 1 MHz
(2) VBW ≥ 3 x RBW
(3) Detector = Peak
(4) Sweep time = auto
(5) Trace mode = max hold
(6) Allow sweeps to continue until the trace stabilizes.

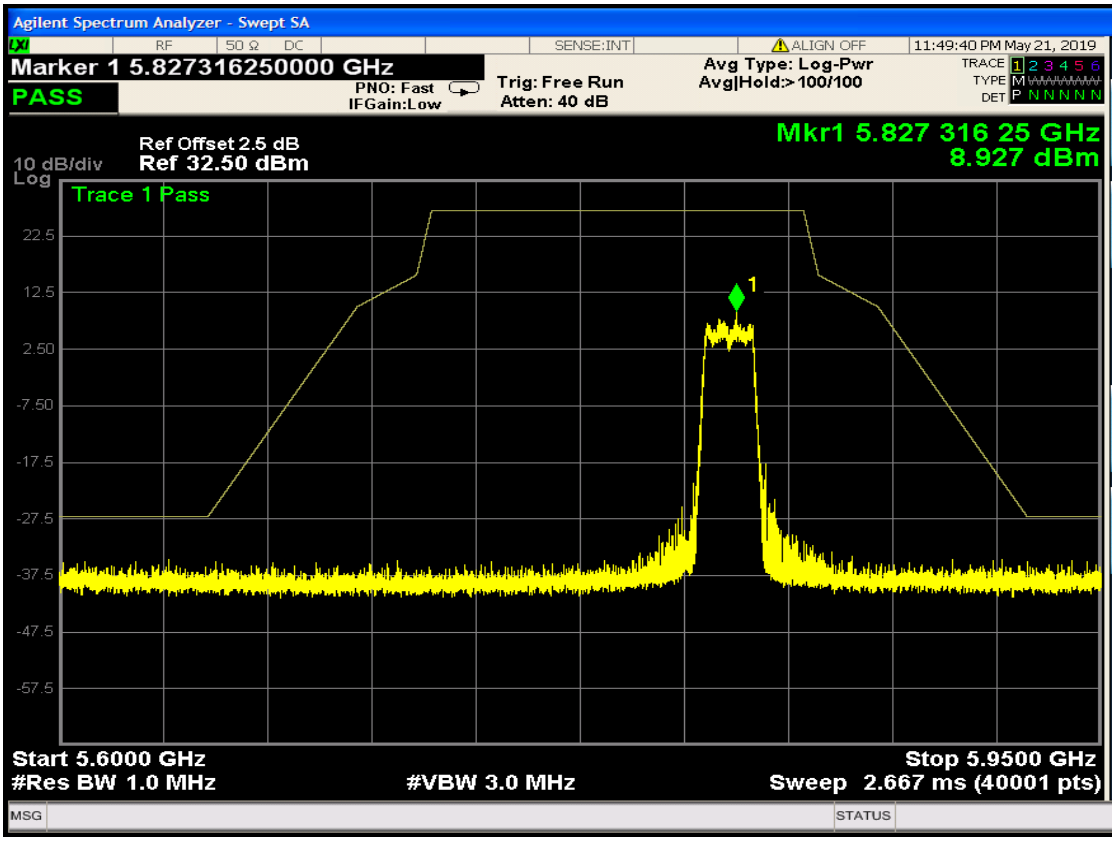
8.5. Test Results

PASSED. All the test results are attached in next page.

802.11a 5745



802.11a 5825



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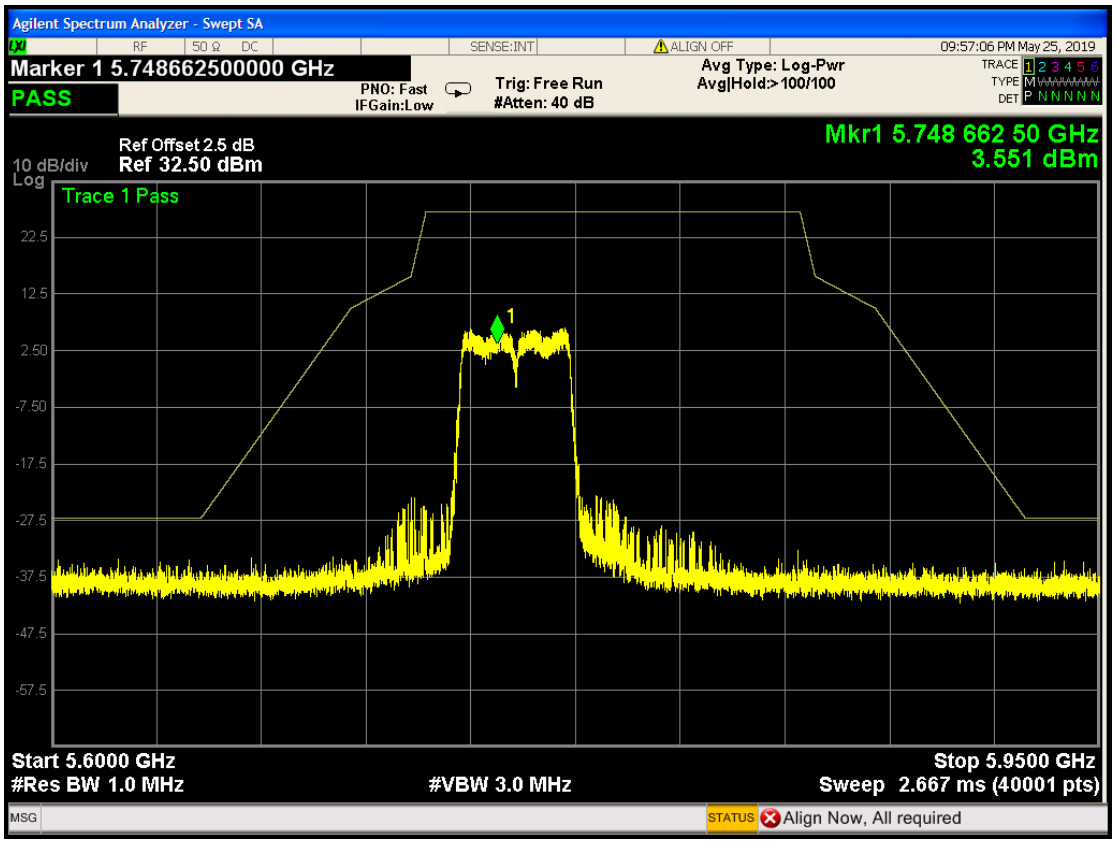

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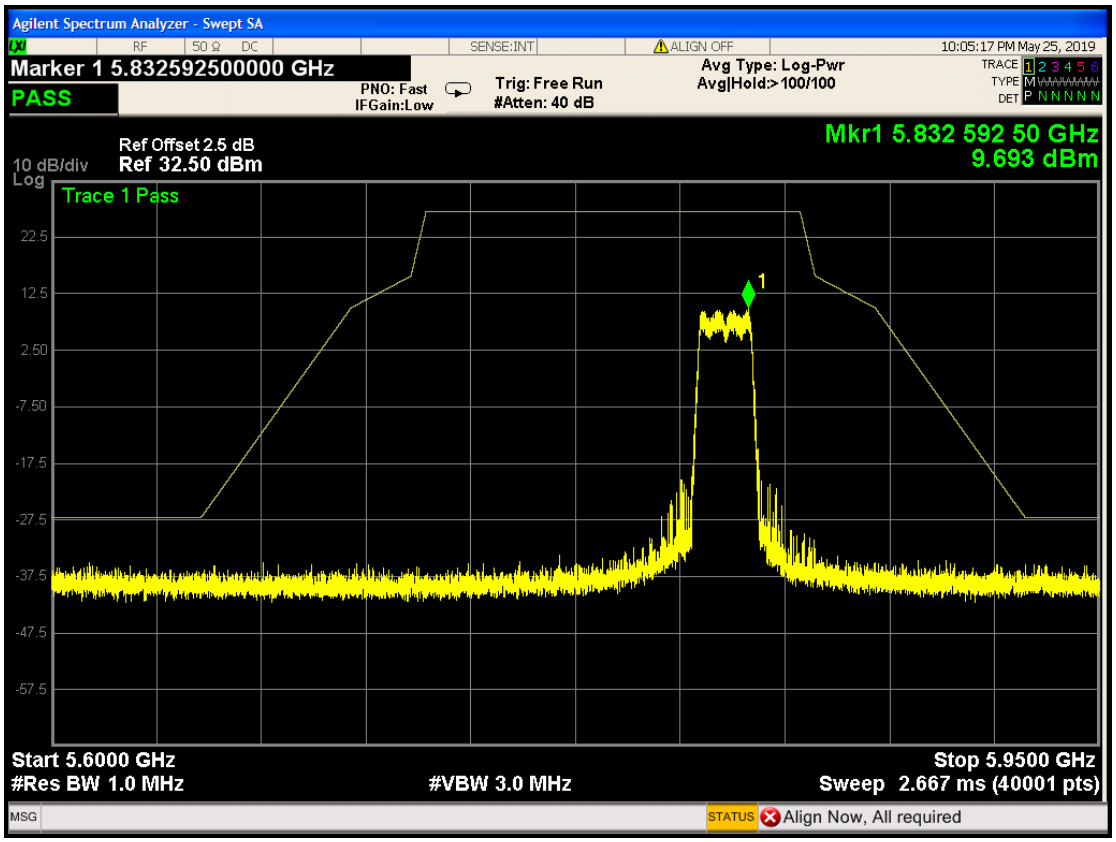

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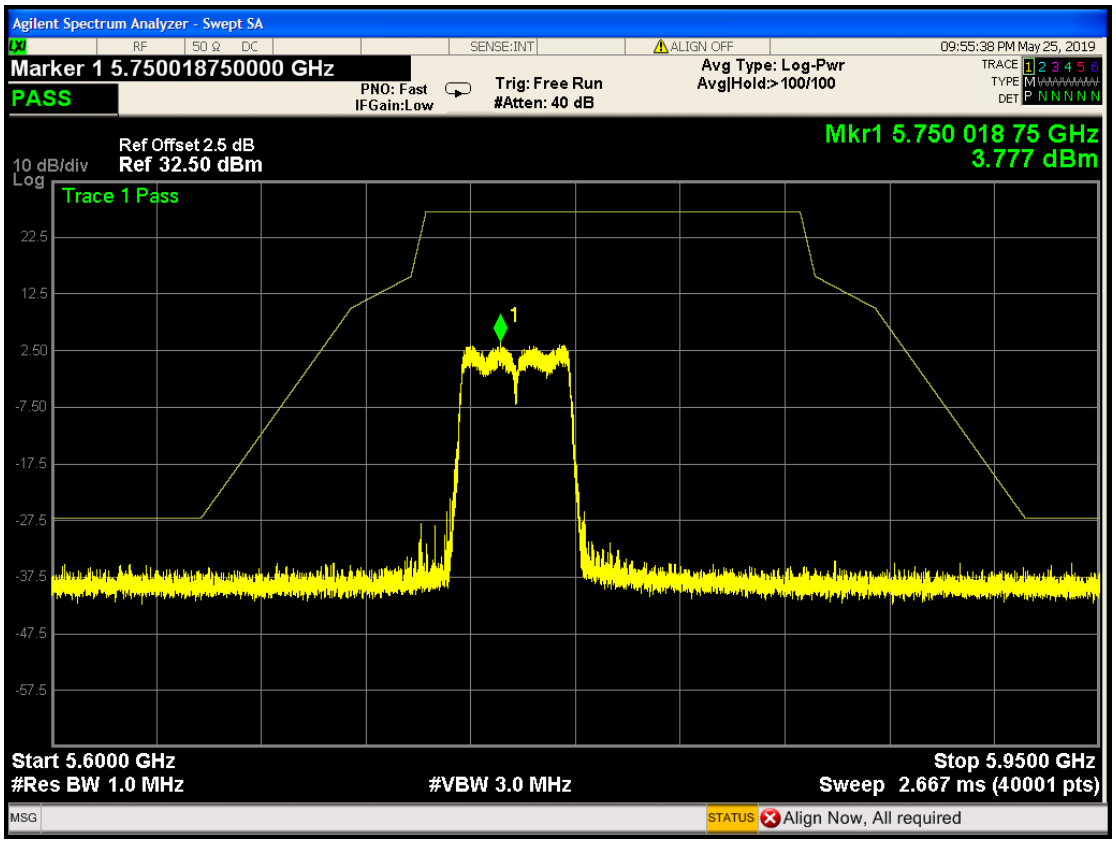

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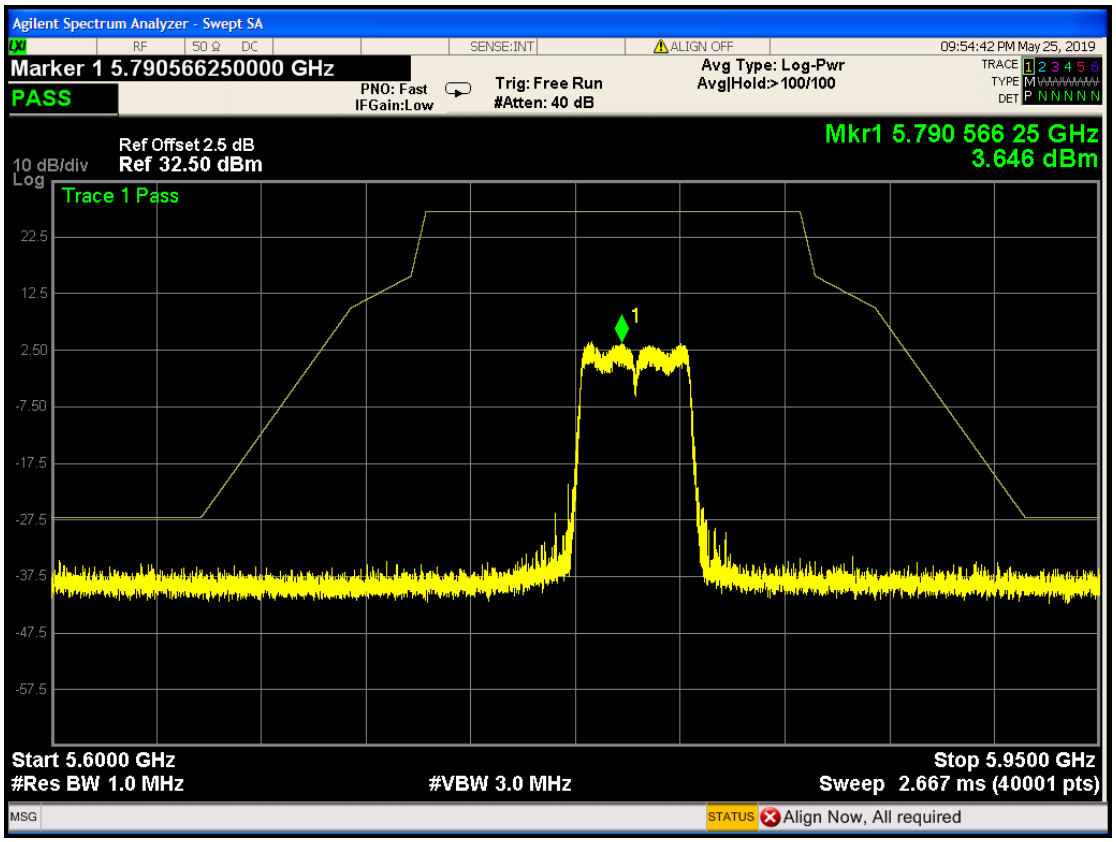


9. POWER SPECTRAL DENSITY MEASUREMENT

9.1. Test Equipment

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Period
1.	PXA signal analyzer	Agilent	N9030A	MY53120217	2019-04-12	1 Year

9.2. Block Diagram of Test Setup

The same as section 6.2.

9.3. Specification Limits

Frequency Band (MHz)	Category	Limit
5150 to 5250	Outdoor Access Point	17dBm/MHz
	Fixed point-to-point Access Point	
	Indoor Access Point	
	Mobile and Portable client device	11 dBm/MHz
5250 to 5350	N/A	11 dBm/MHz
5470 to 5725		11 dBm/MHz
5725 to 5850		30dBm/500 kHz

9.4. Test Procedure

Following measurement procedure is reference to KDB 789033 D02 General UNII Test Procedures New Rules v02r01:

■Method AVGSA-2 (Spectrum channel power)

(1) Set span to at least 1.5 times the OBW
(2) Set RBW = 1 MHz
(3) Set the video bandwidth (VBW) ≥ 3 MHz.
(4) Detector = RMS.
(5) Trace mode = trace average at least 100 traces
(6) Sweep = auto couple.
(7) Use peak search function to find out the maximum power density.
(8) Duty cycle factor is added when duty cycle presented in chapter3.5 is < 98%.

9.5. Test Results

PASSED. All the test results are attached in next page.

Mode	UII Band	Frequency (MHz)	Duty Cycle Factor	Reading (dBm)	Power Density (dBm)	Limit
802.11a	I	5180	0.13	1.615	1.745	11 dBm/MHz
		5200		1.752	1.882	
		5240		2.243	2.373	
	II-2A	5260		2.359	2.489	
		5300		2.666	2.796	
		5320		2.211	2.341	
	II-2C	5500		1.419	1.549	
		5580		1.616	1.746	
		5700		2.558	2.688	

Mode	UII Band	Frequency (MHz)	Duty Cycle Factor	Reading (dBm)	Power Density (dBm)	Limit
802.11a	III	5745	0.13	-8.923	-1.893	30dBm/500kHz
		5785		-9.499	-2.469	
		5825		-9.273	-2.243	

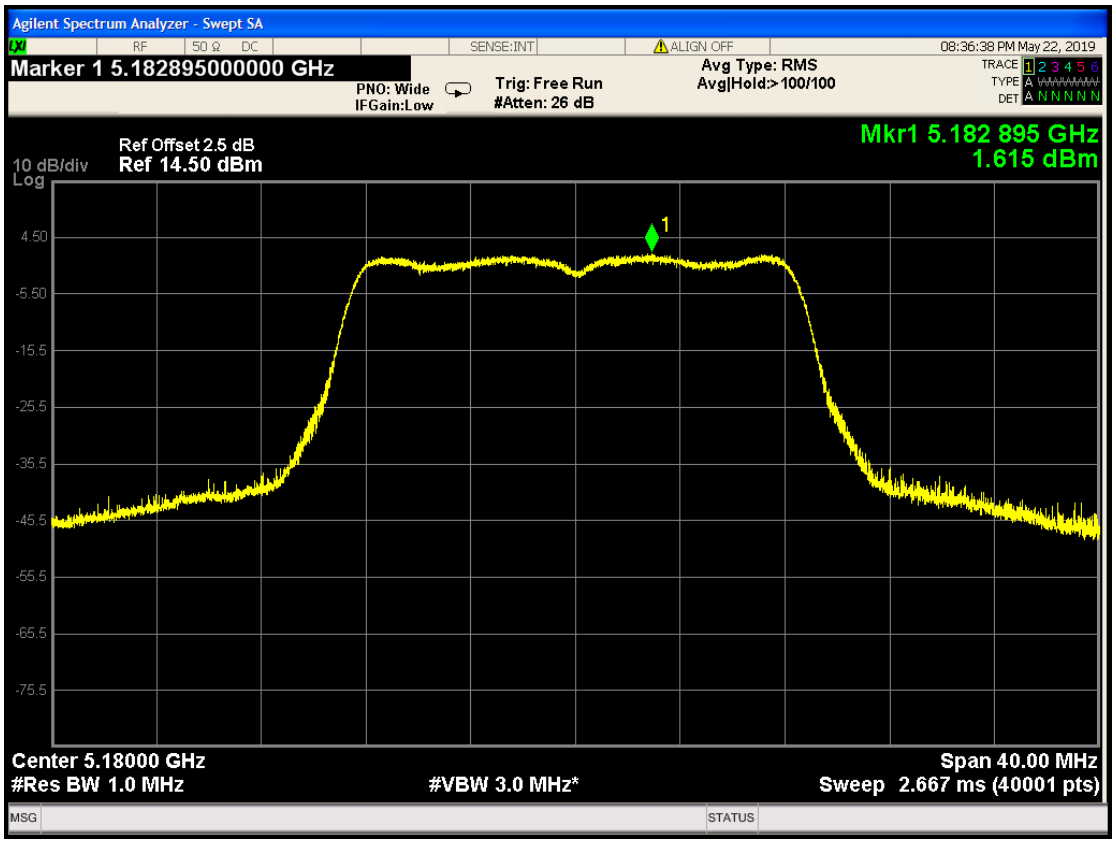
Mode	UII Band	Frequency (MHz)	Duty Cycle Factor	Reading (dBm)	Power Density (dBm)	Limit
802.11nHT20	I	5180	0.13	2.653	2.783	11 dBm/MHz
		5200		2.109	2.239	
		5240		2.112	2.242	
	II-2A	5260		2.634	2.764	
		5300		2.509	2.639	
		5320		2.358	2.488	
	II-2C	5500		1.635	1.765	
		5580		1.894	2.024	
		5700		2.482	2.612	

Mode	UII Band	Frequency (MHz)	Duty Cycle Factor	Reading (dBm)	Power Density (dBm)	Limit
802.11nHT20	III	5745	0.13	-9.046	-2.016	30dBm/500kHz
		5785		-9.241	-2.211	
		5825		-9.284	-2.254	

Mode	UII Band	Frequency (MHz)	Duty Cycle Factor	Reading (dBm)	Power Density (dBm)	Limit
802.11nHT40	I	5190	0.13	-1.321	-1.191	11 dBm/MHz
		5230		-0.869	-0.739	
	II-2A	5270		-0.663	-0.533	
		5310		-0.949	-0.819	
	II-2C	5510		-0.359	-0.229	
		5550		0.092	0.222	
		5670		-0.576	-0.446	

Mode	UII Band	Frequency (MHz)	Duty Cycle Factor	Reading (dBm)	Power Density (dBm)	Limit
802.11nHT40	III	5755	0.13	-12.369	-5.339	30dBm/500kHz
		5795		-11.416	-4.386	

802.11a 5180



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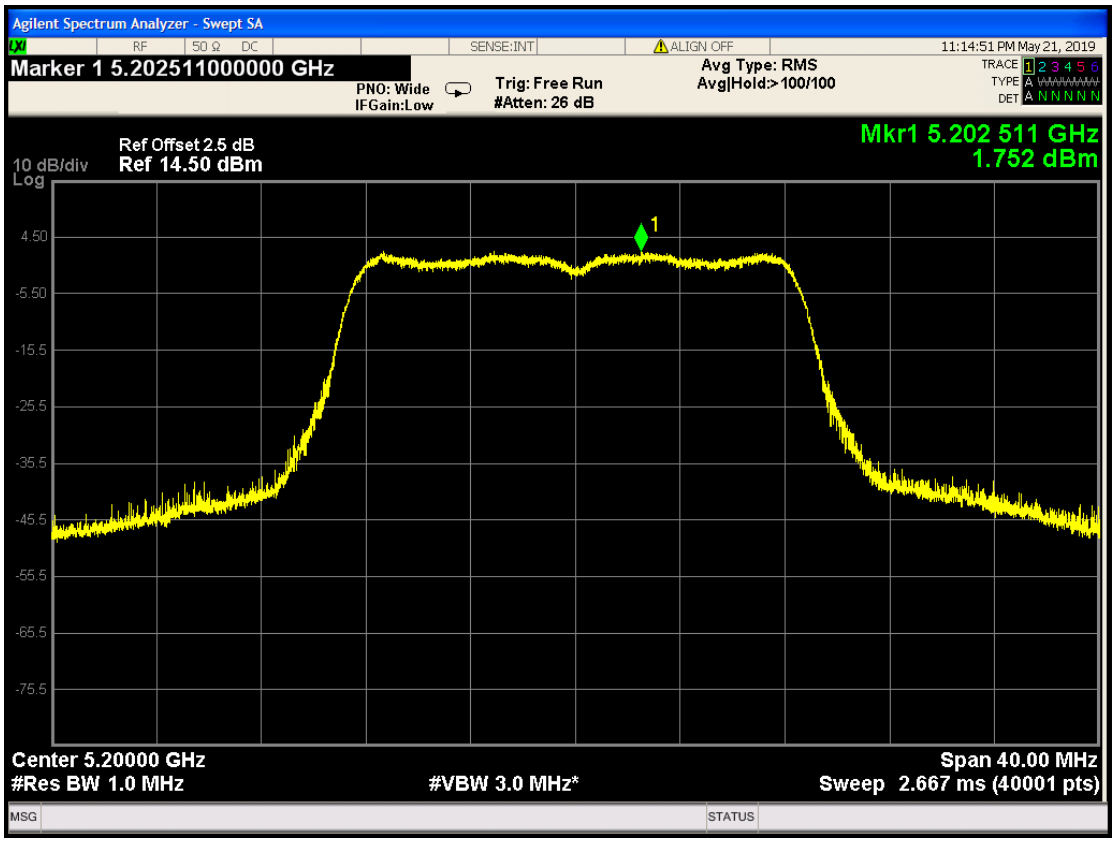

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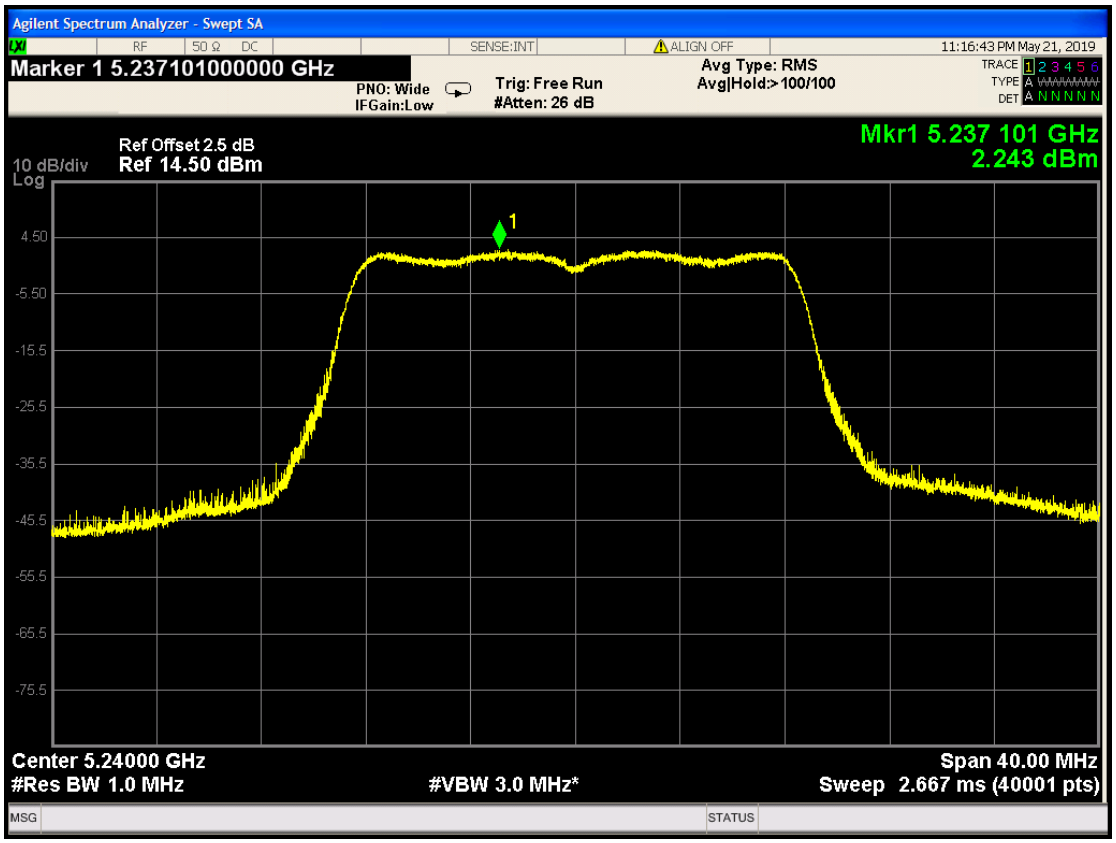

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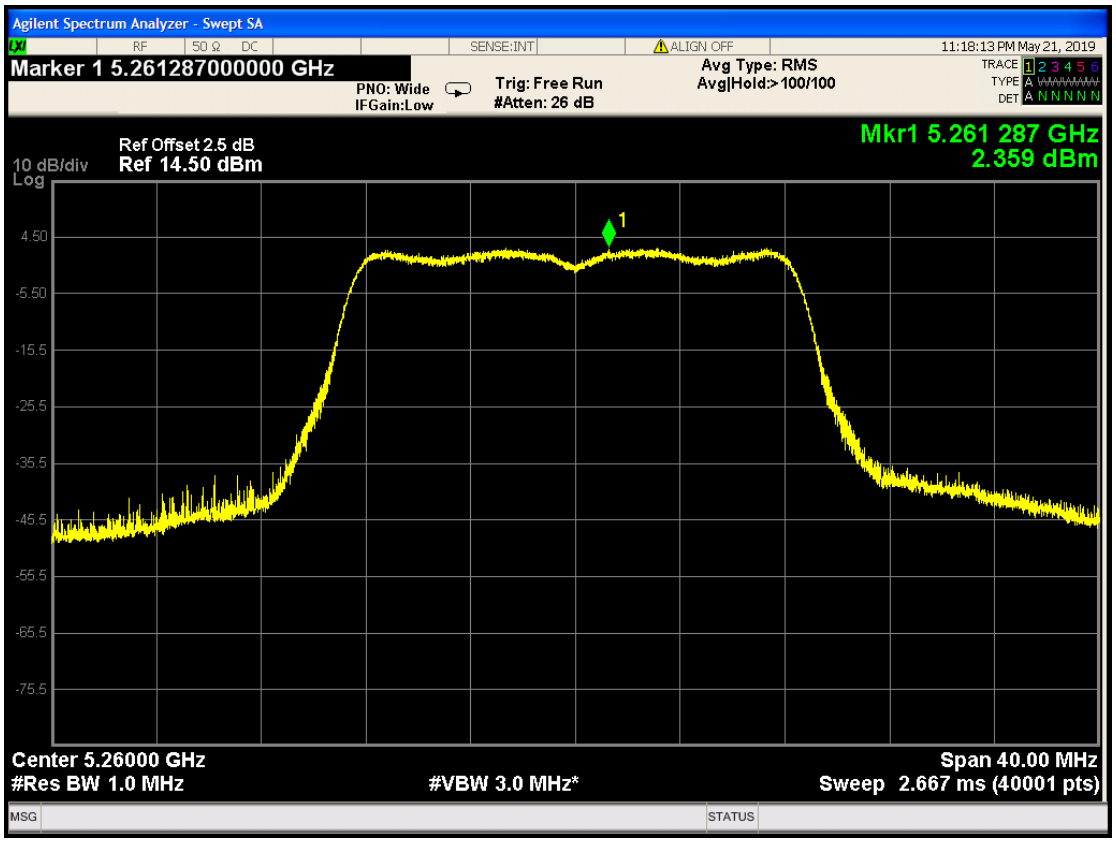

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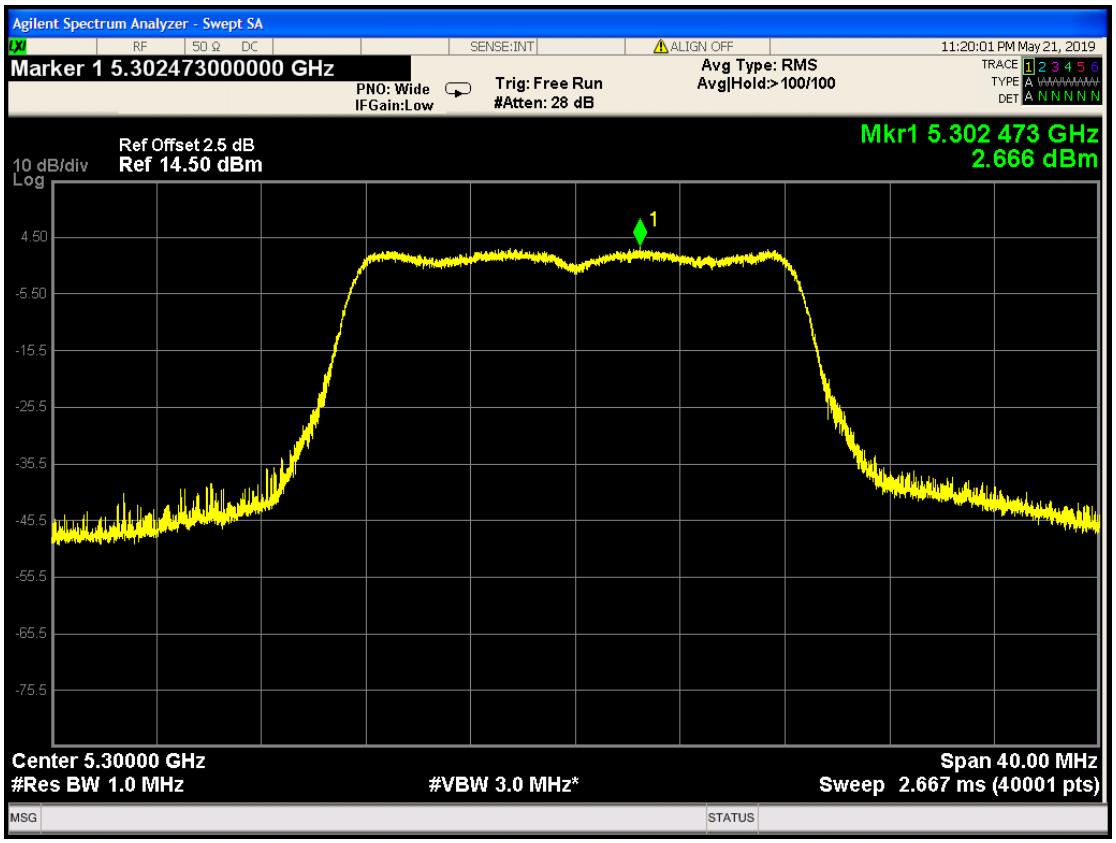
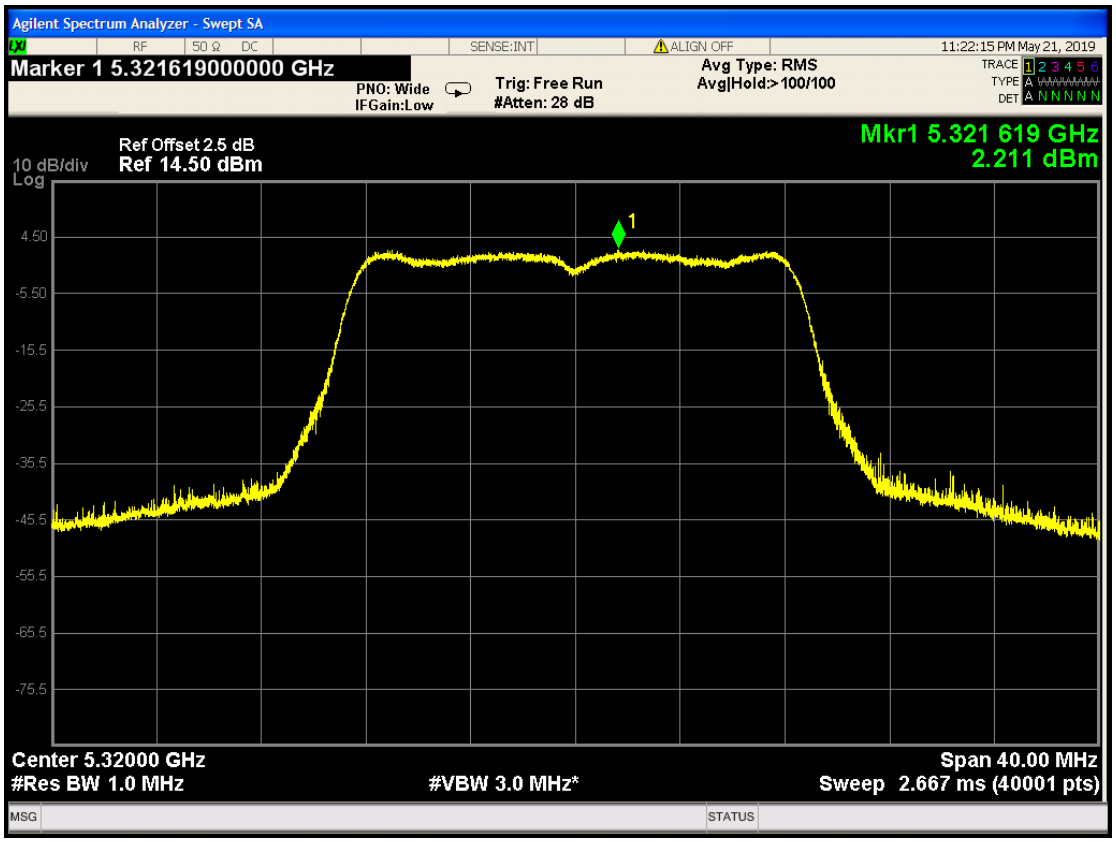


802.11a 5320



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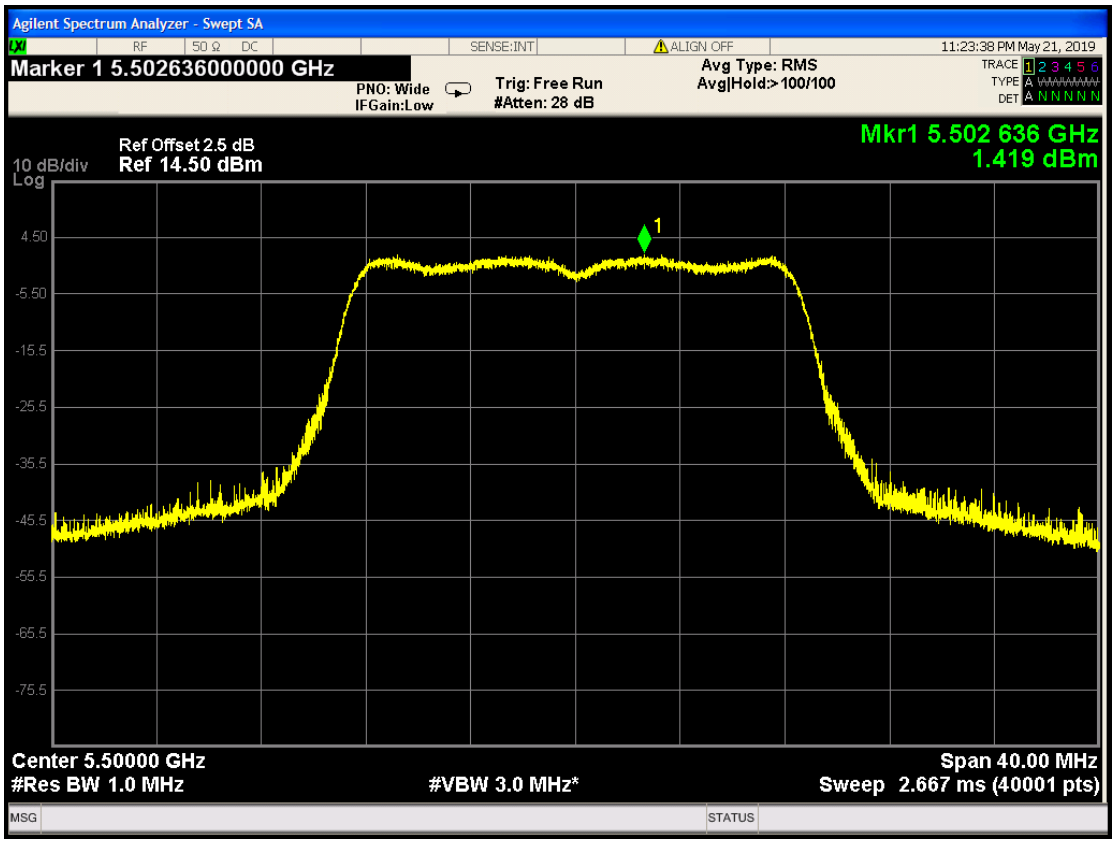
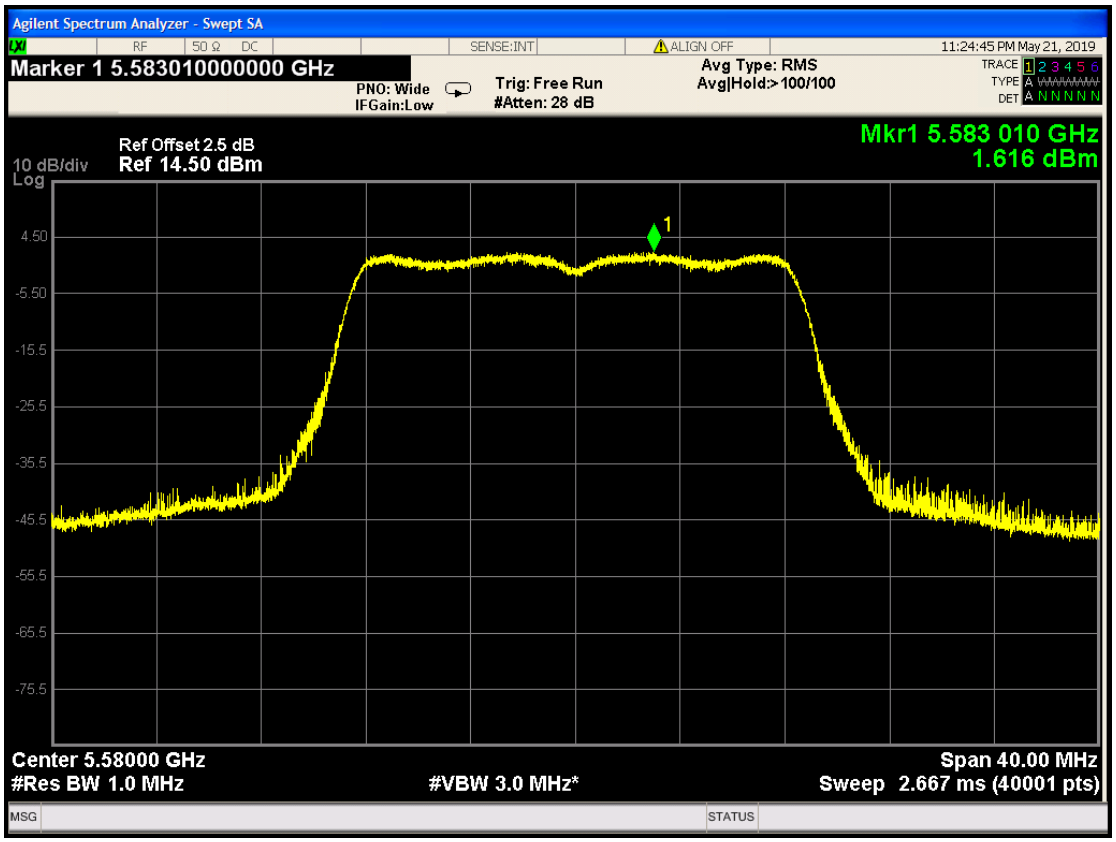


802.11a 5580



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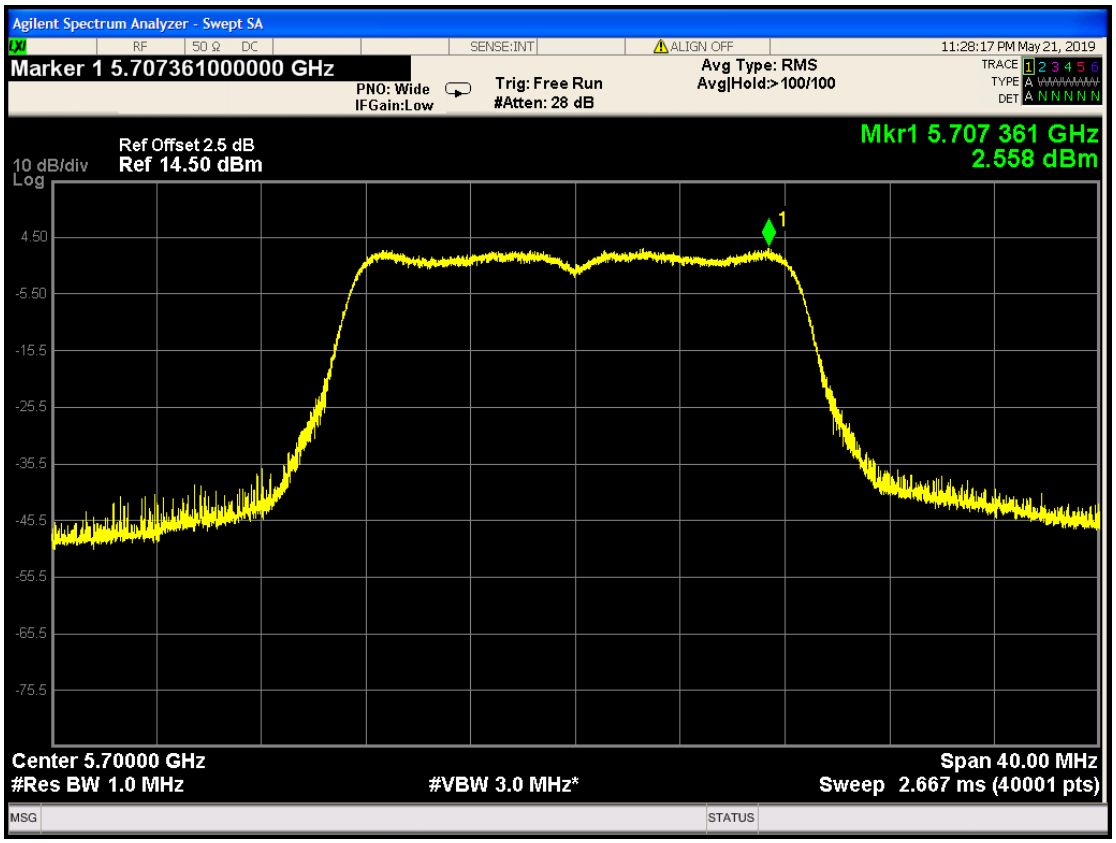

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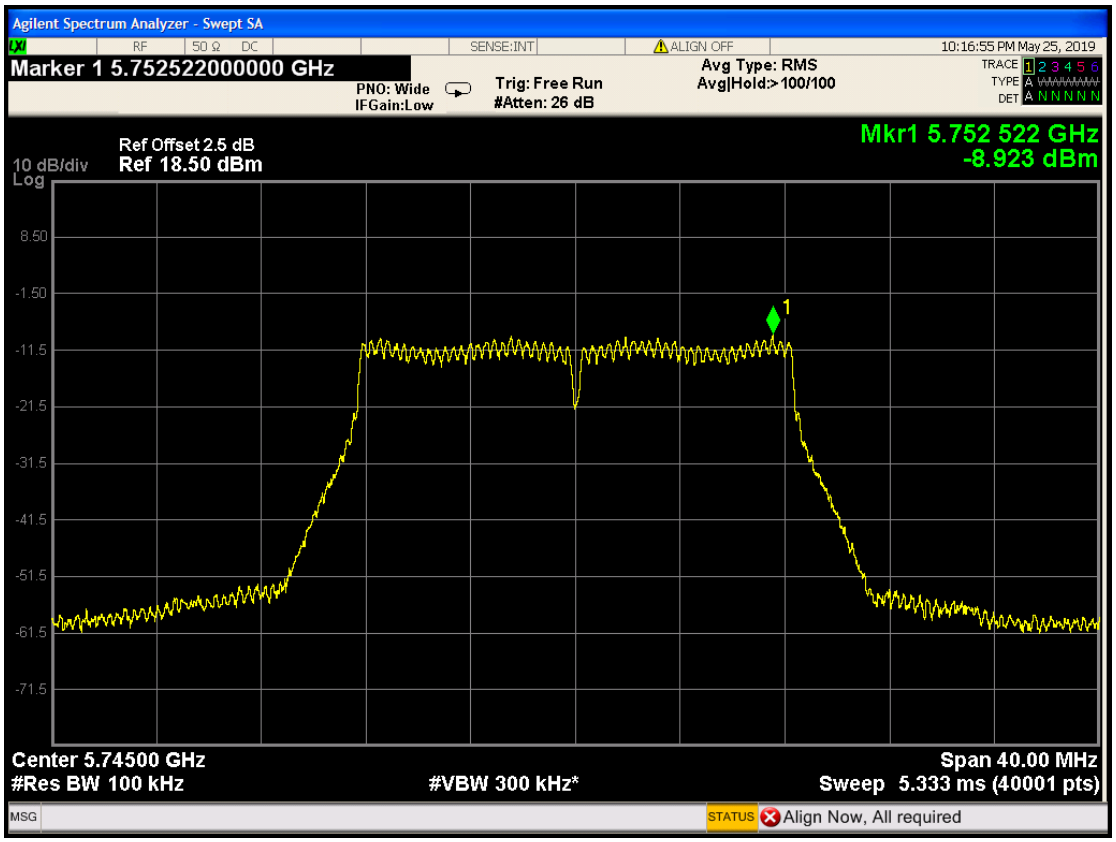

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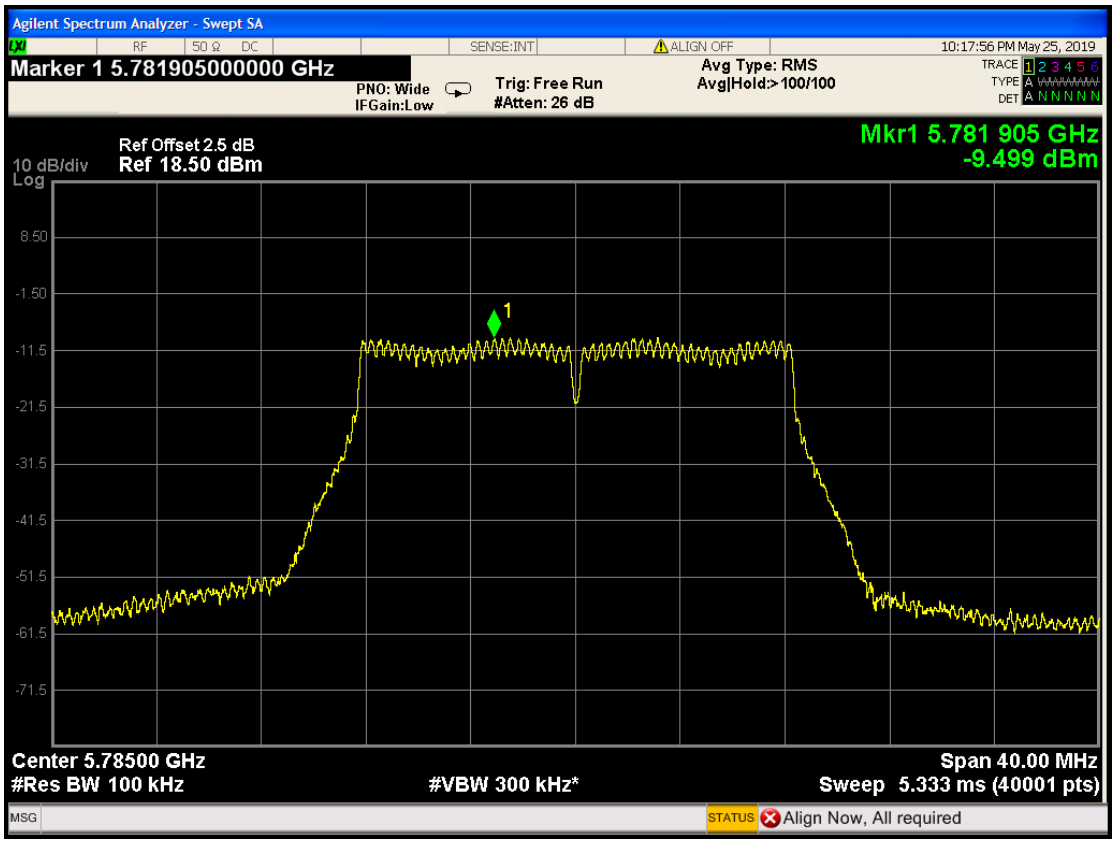

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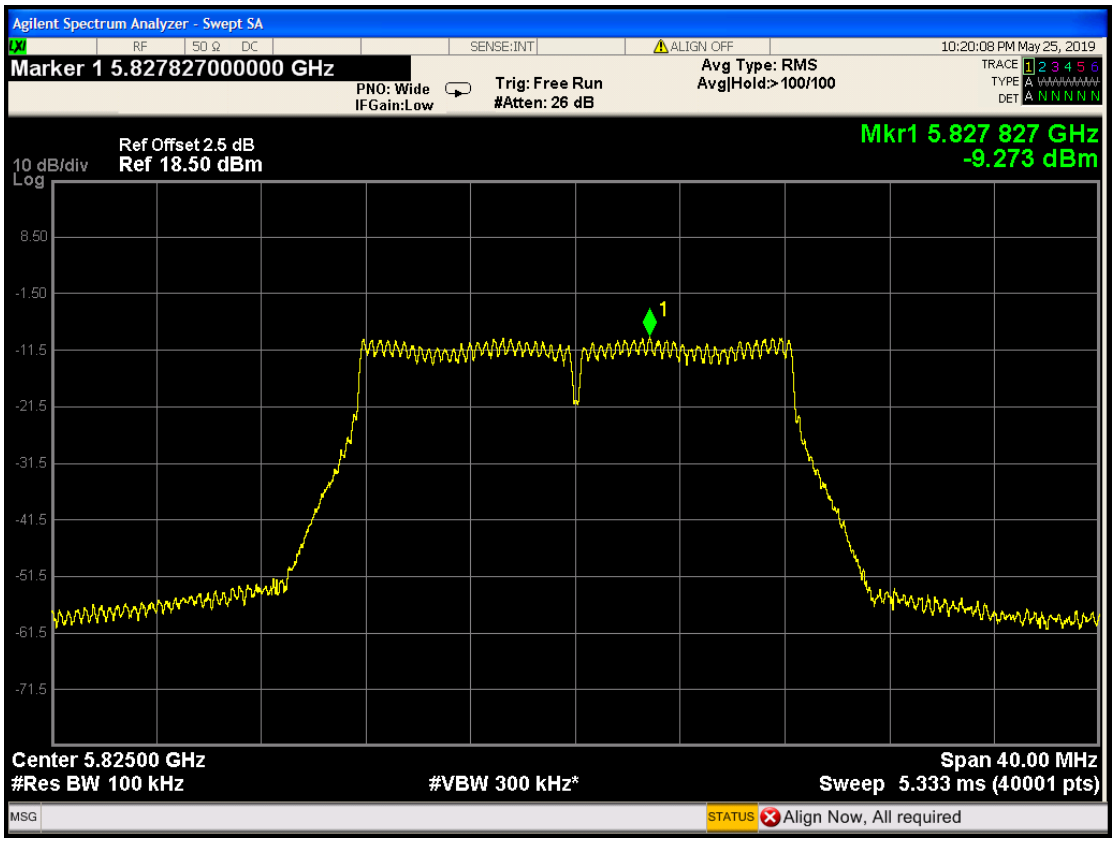

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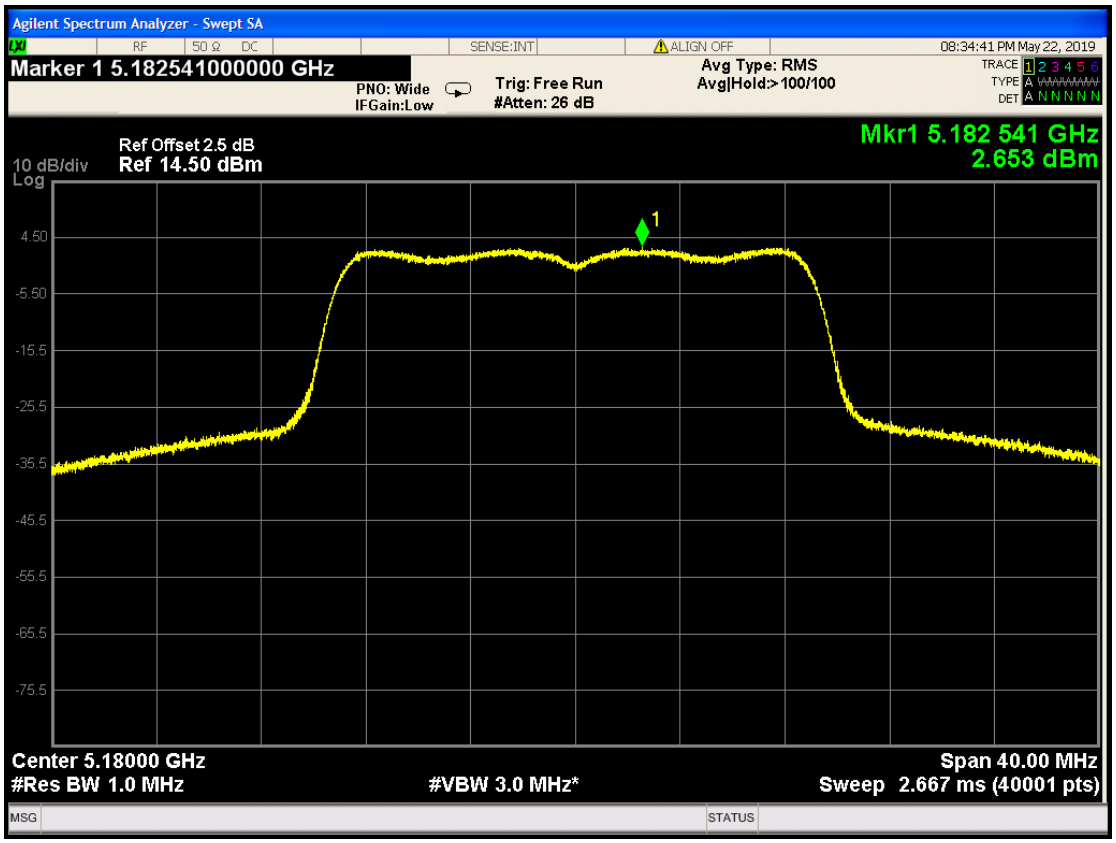

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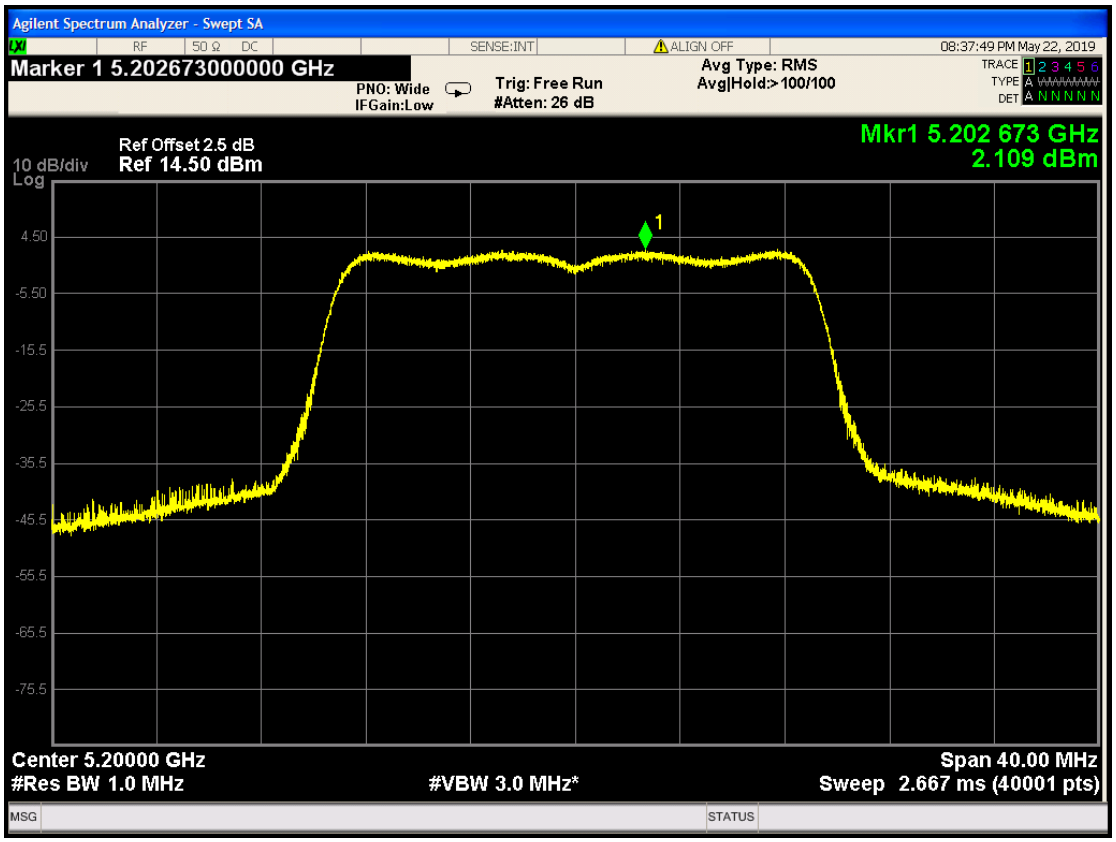

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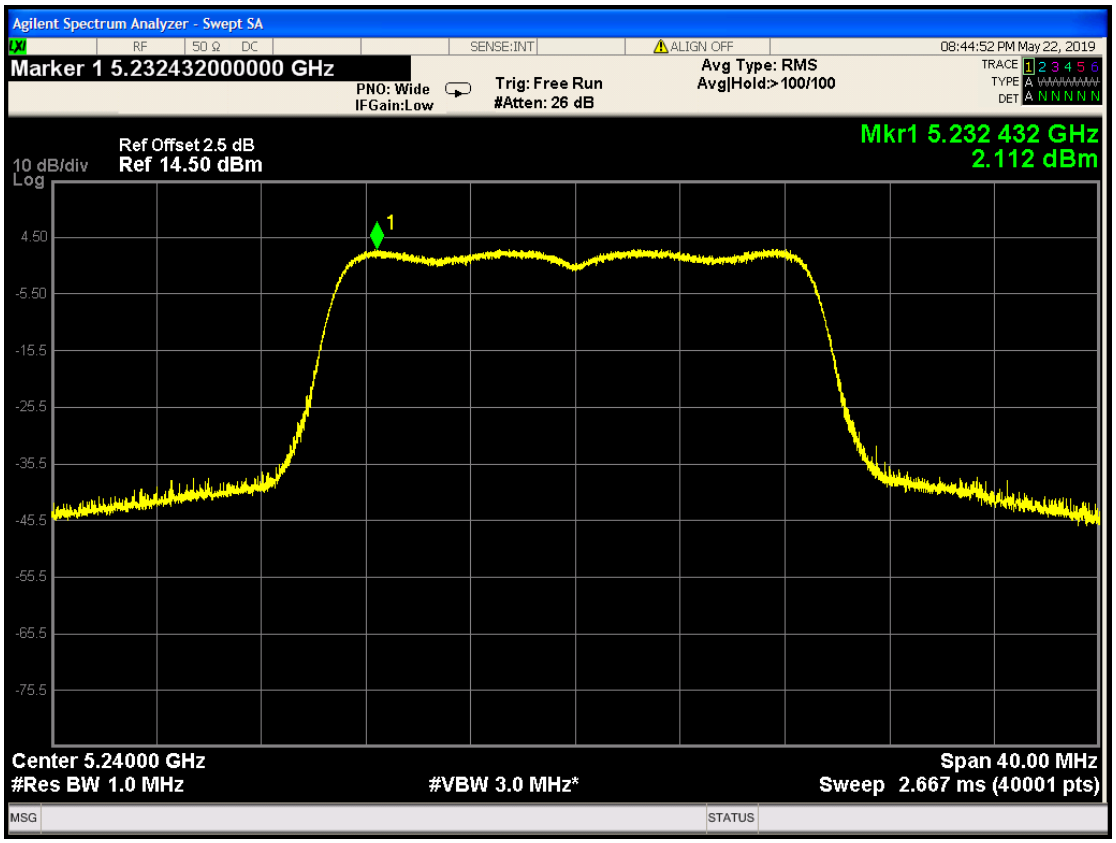

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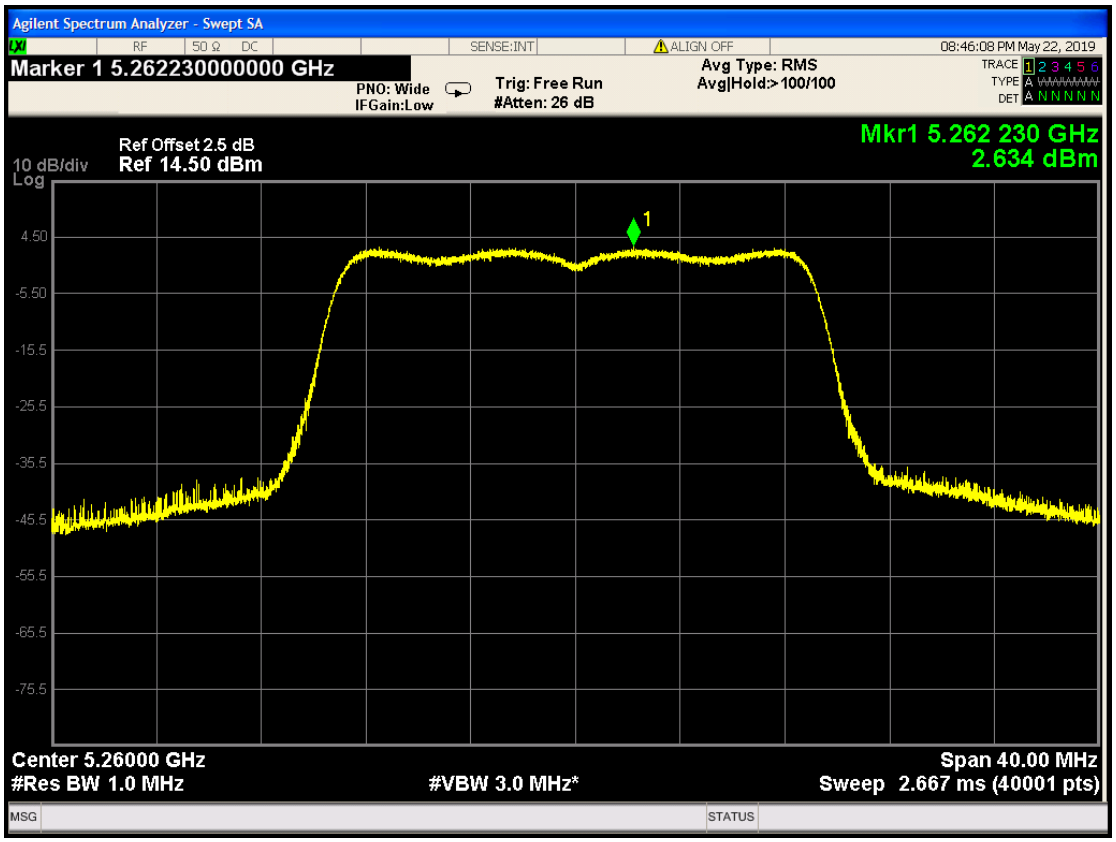

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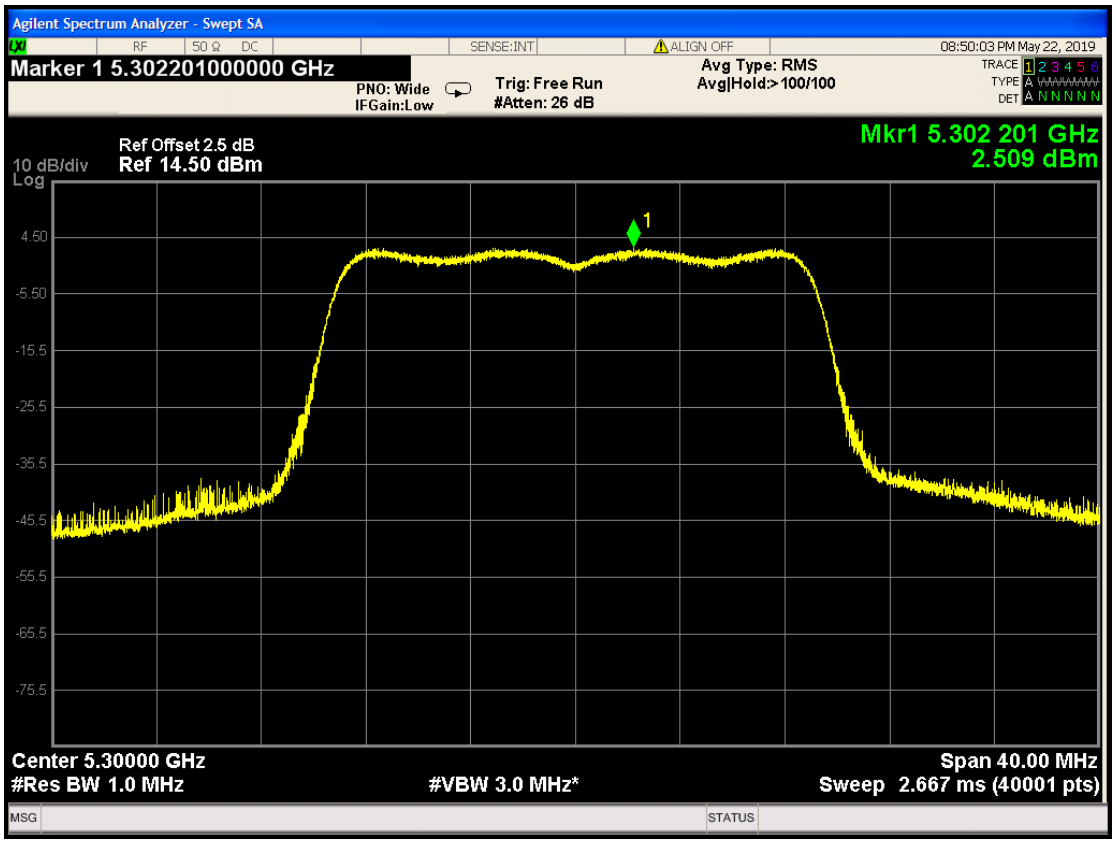

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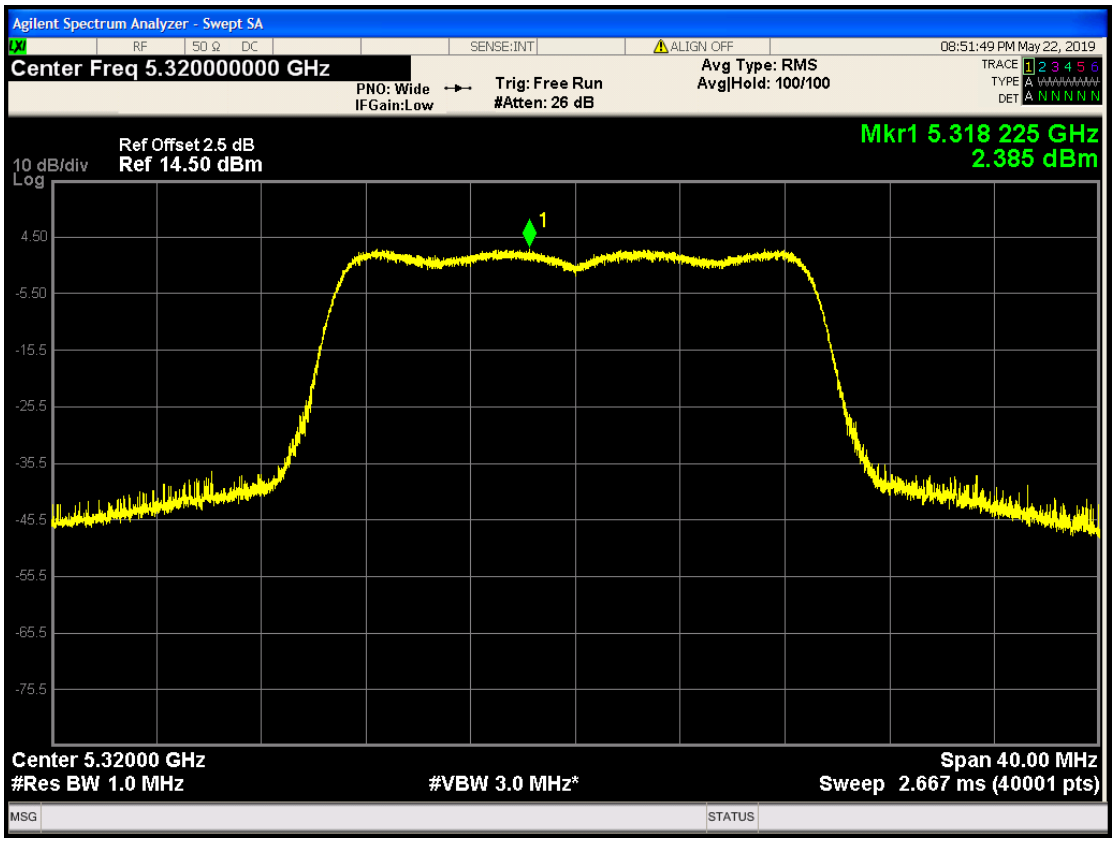

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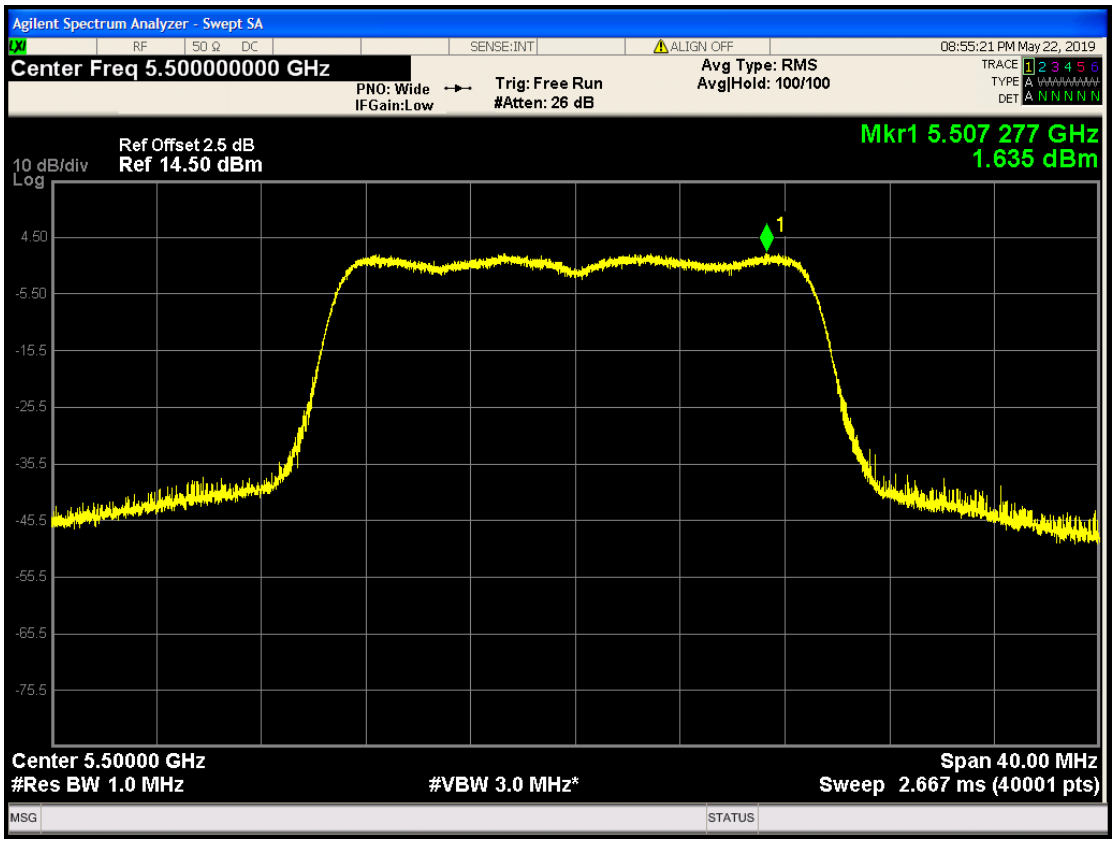

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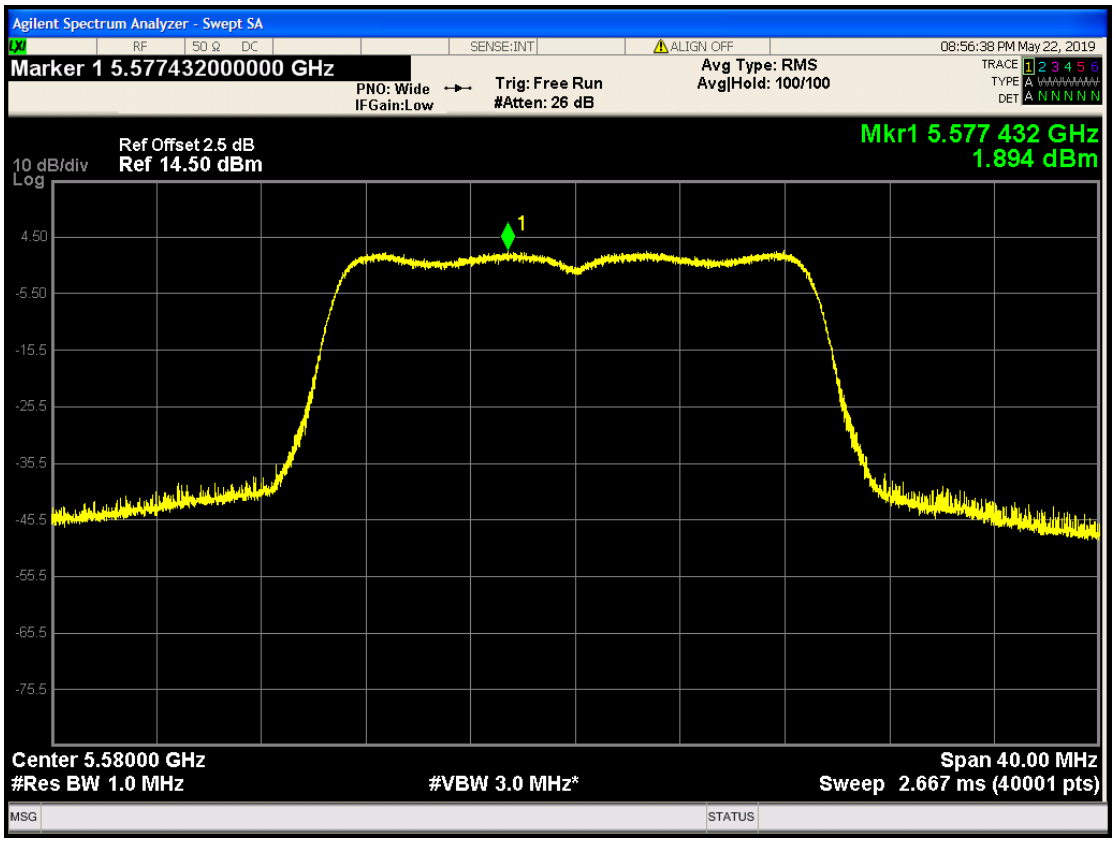

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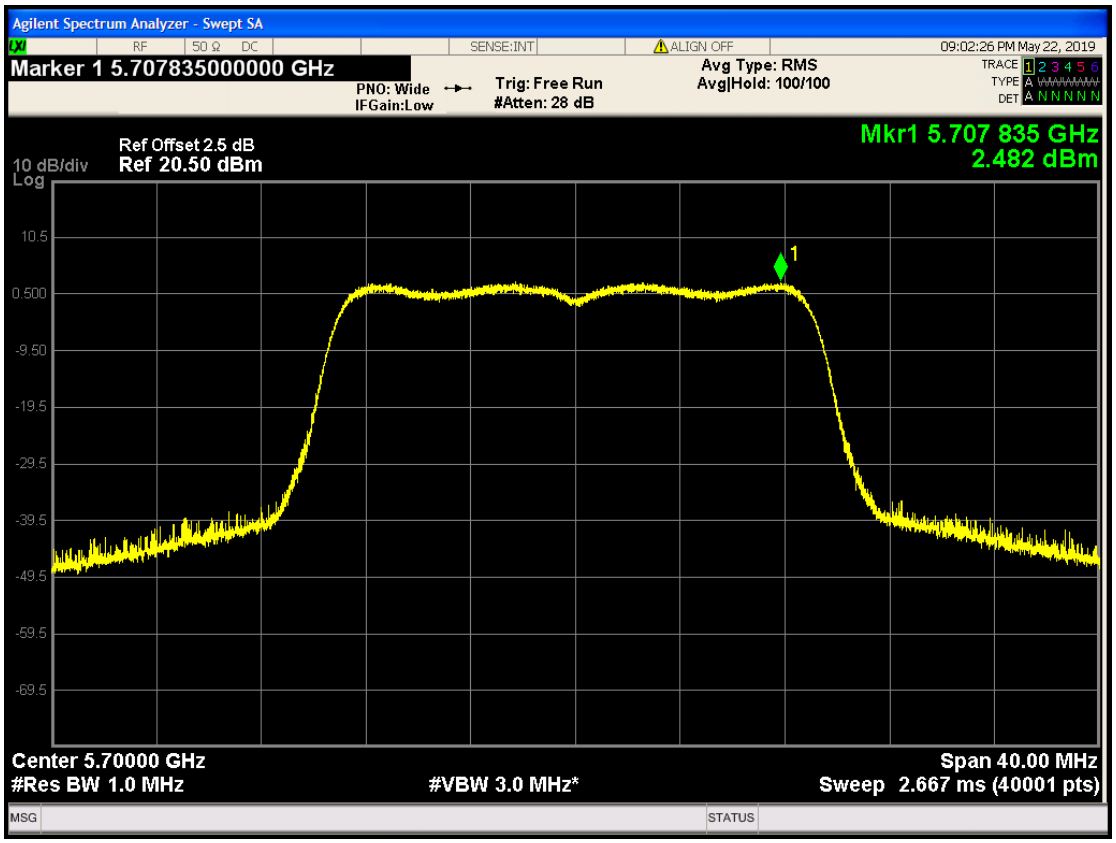

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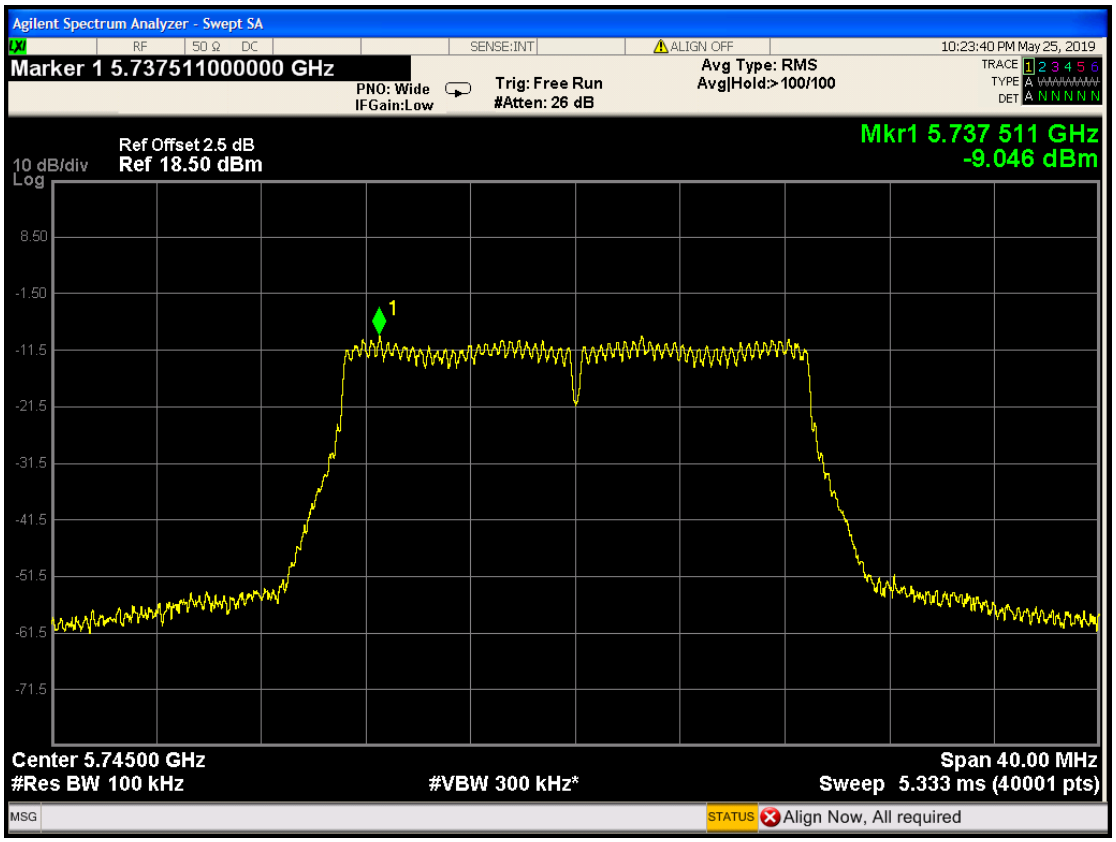

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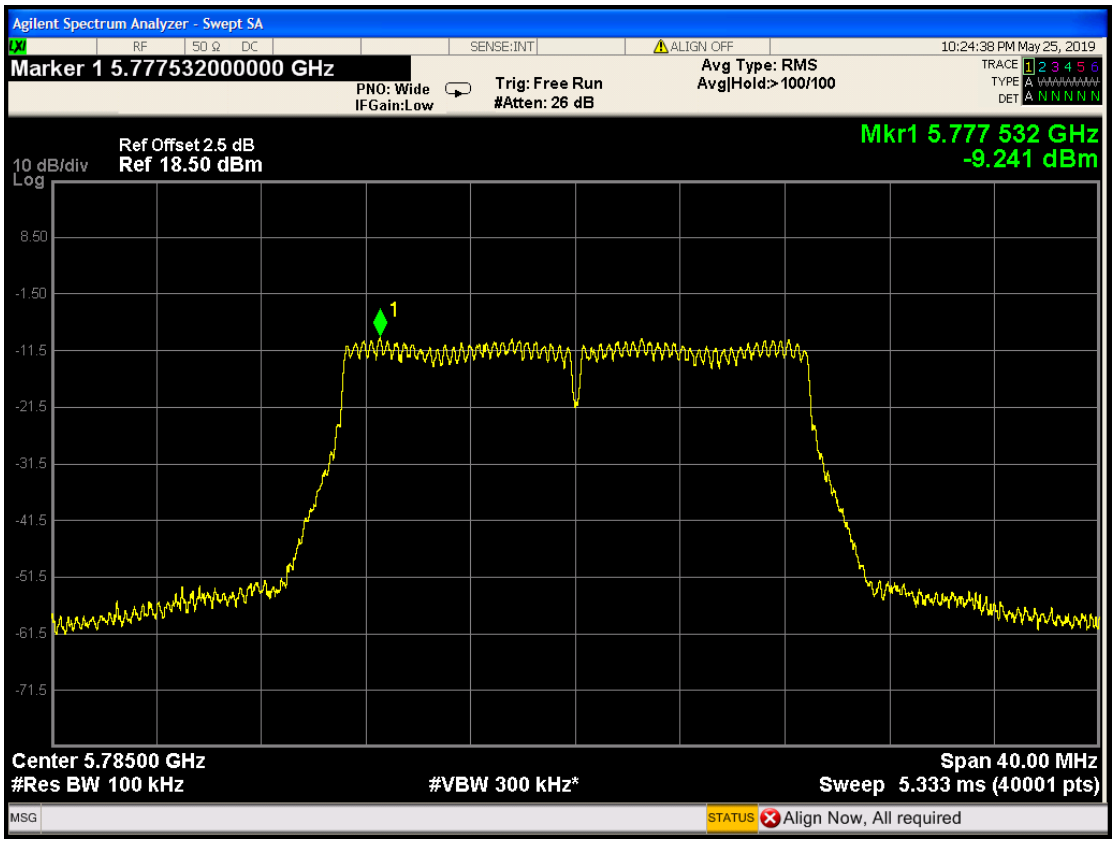

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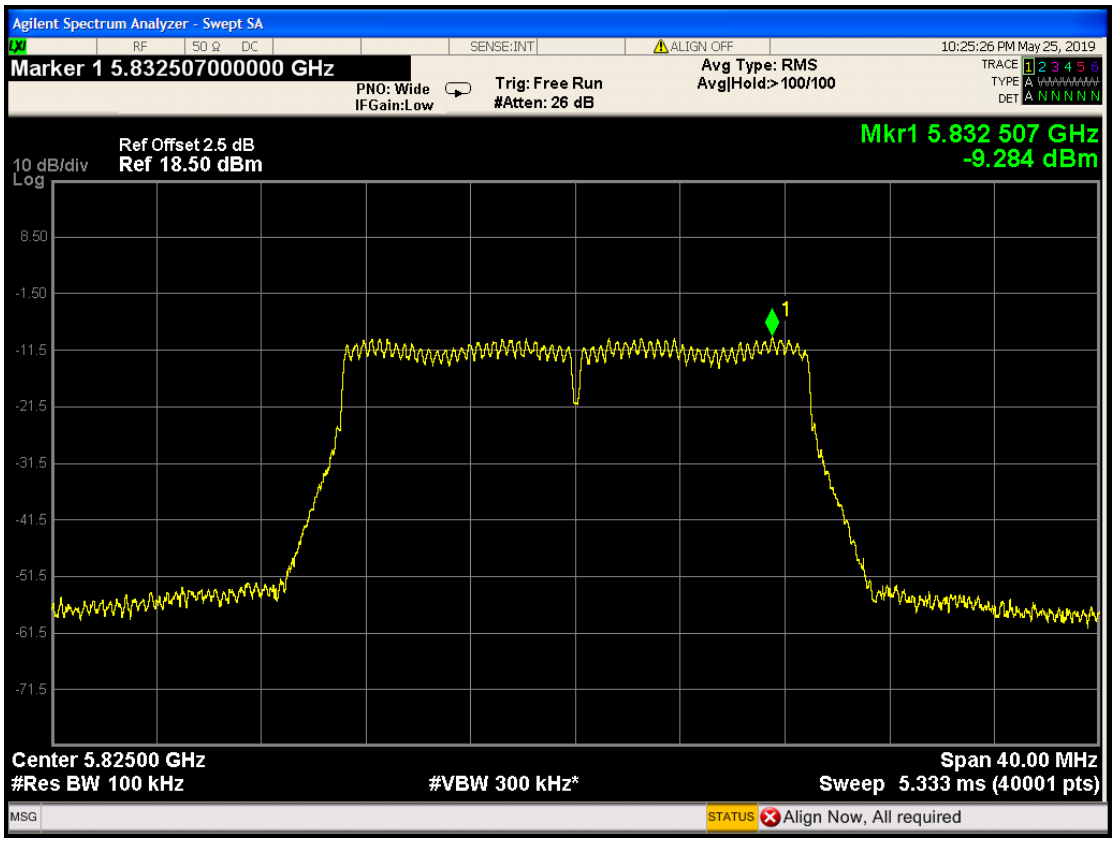

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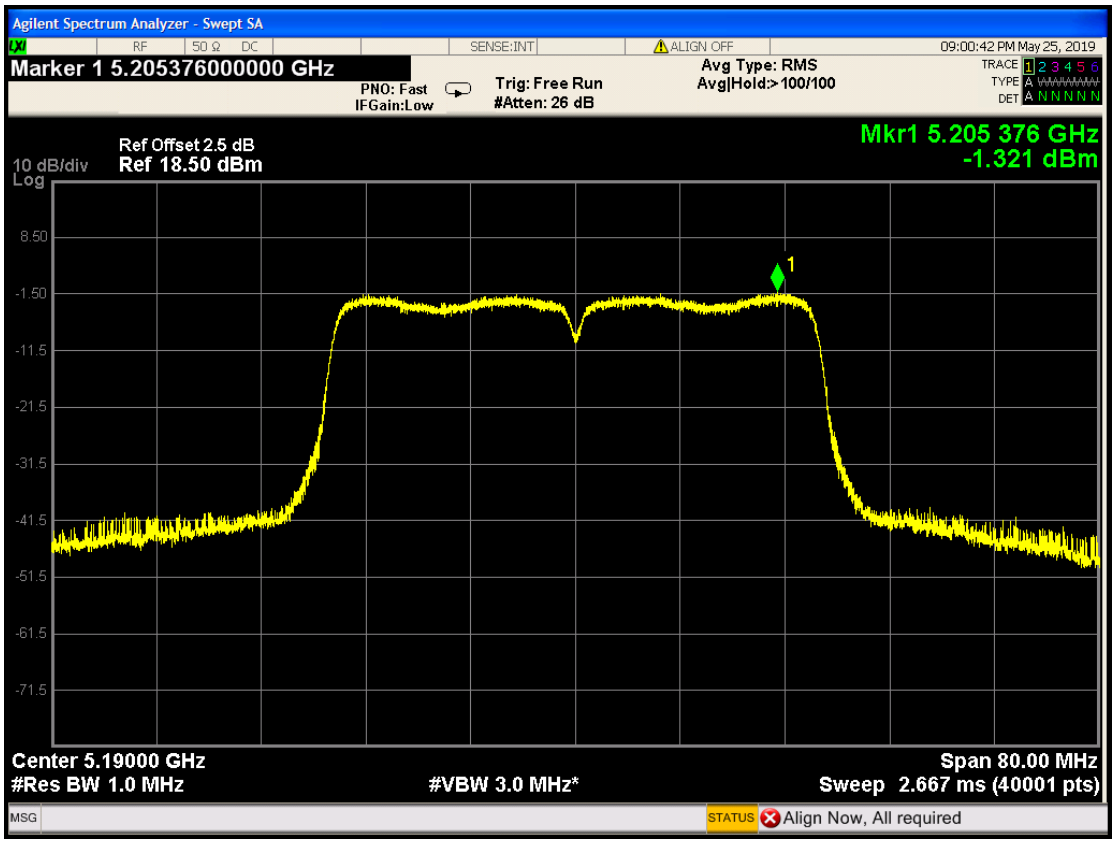

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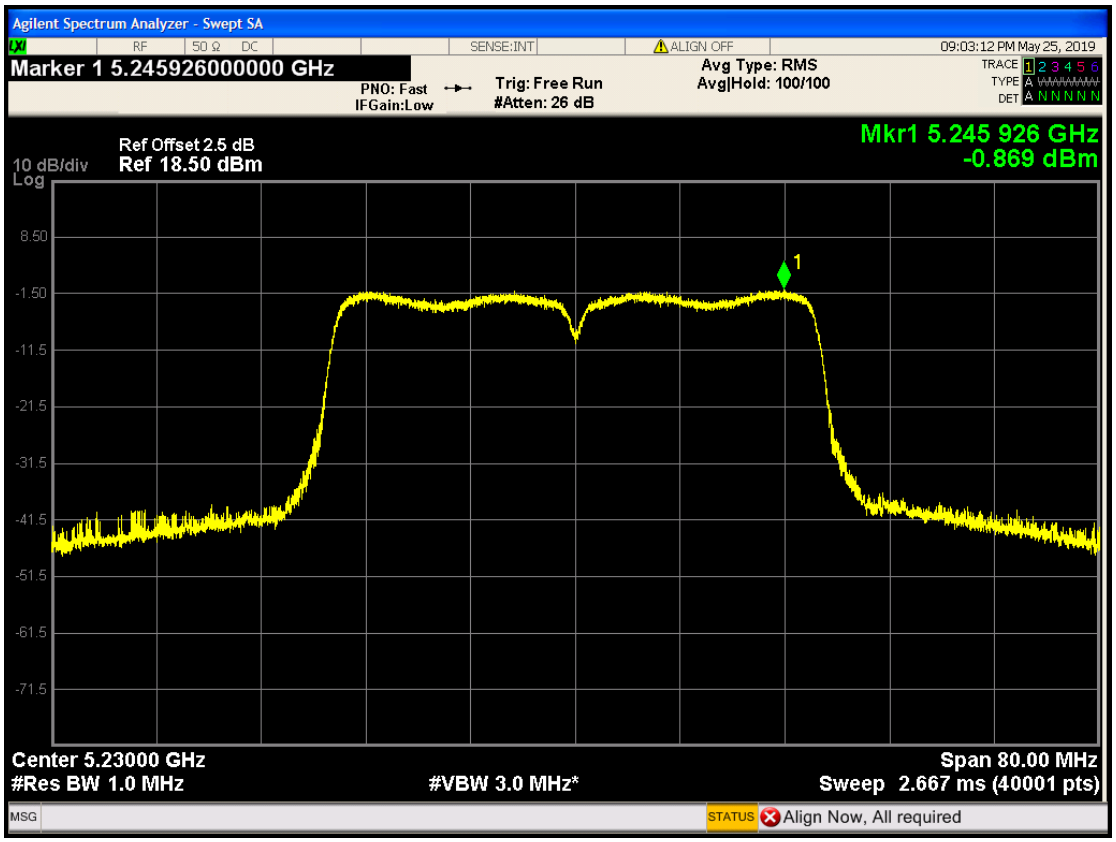

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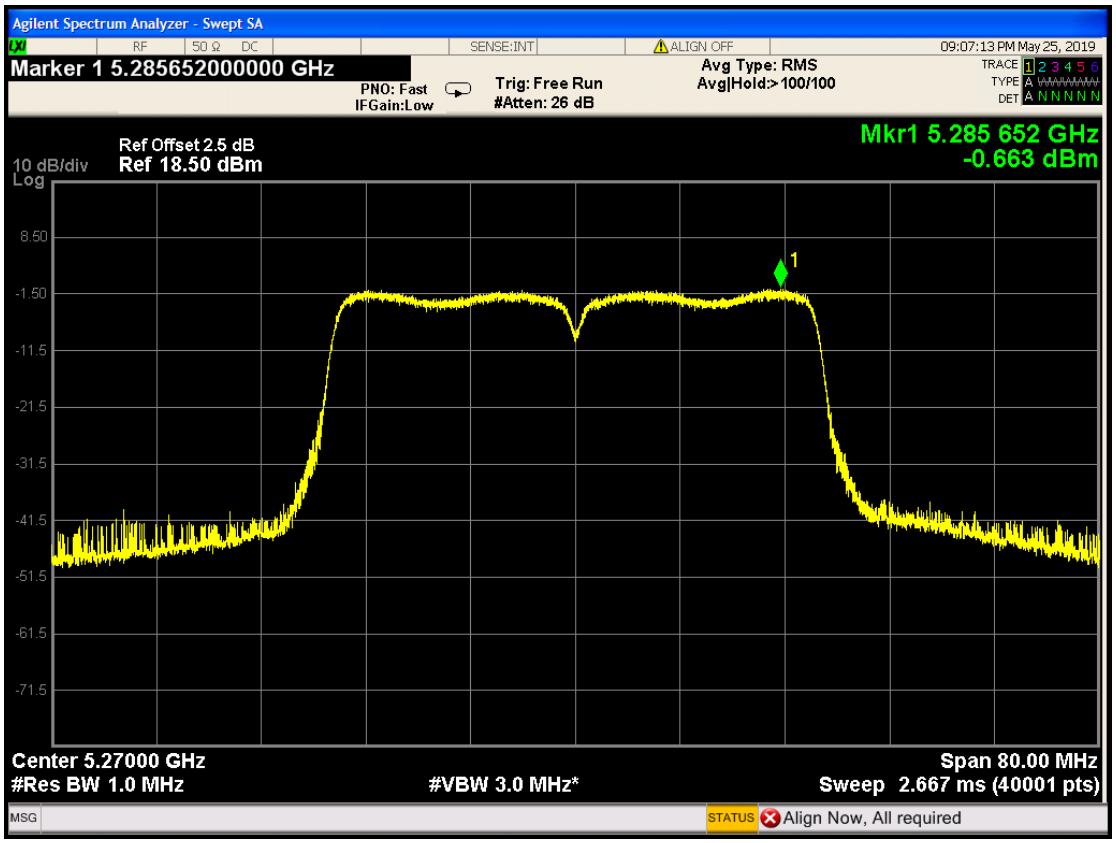

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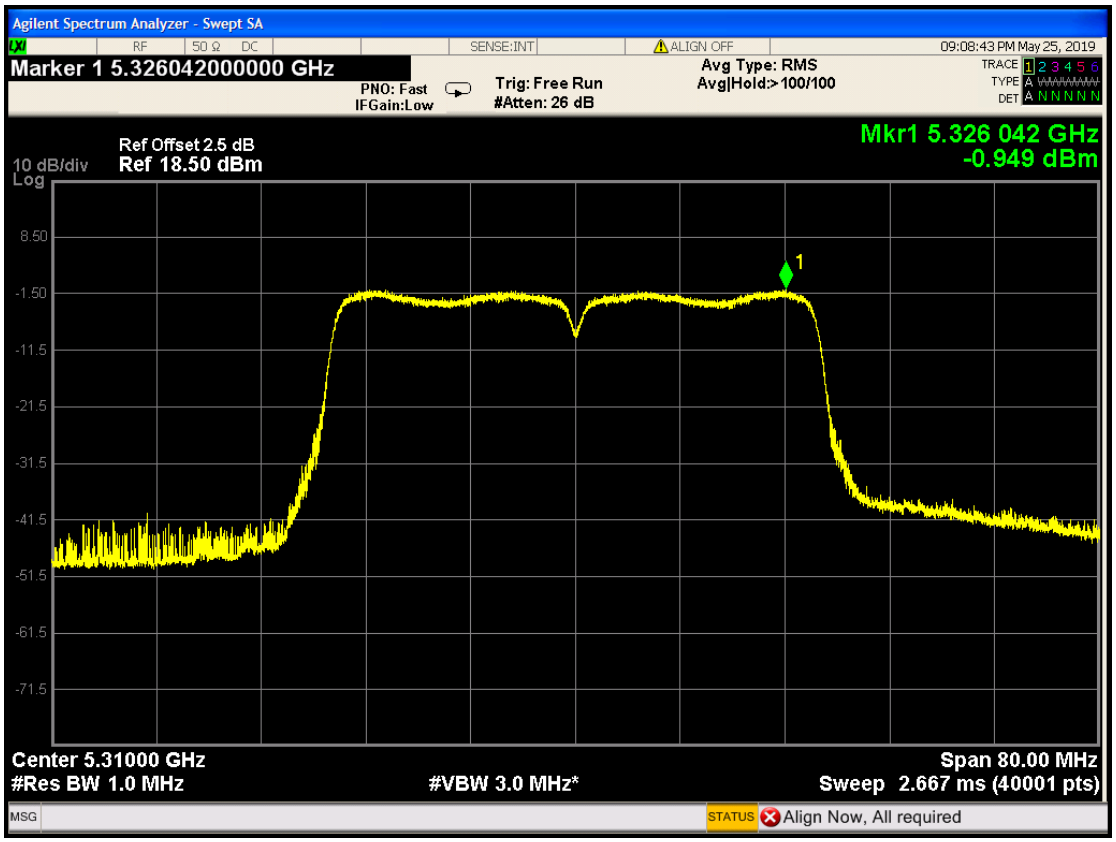

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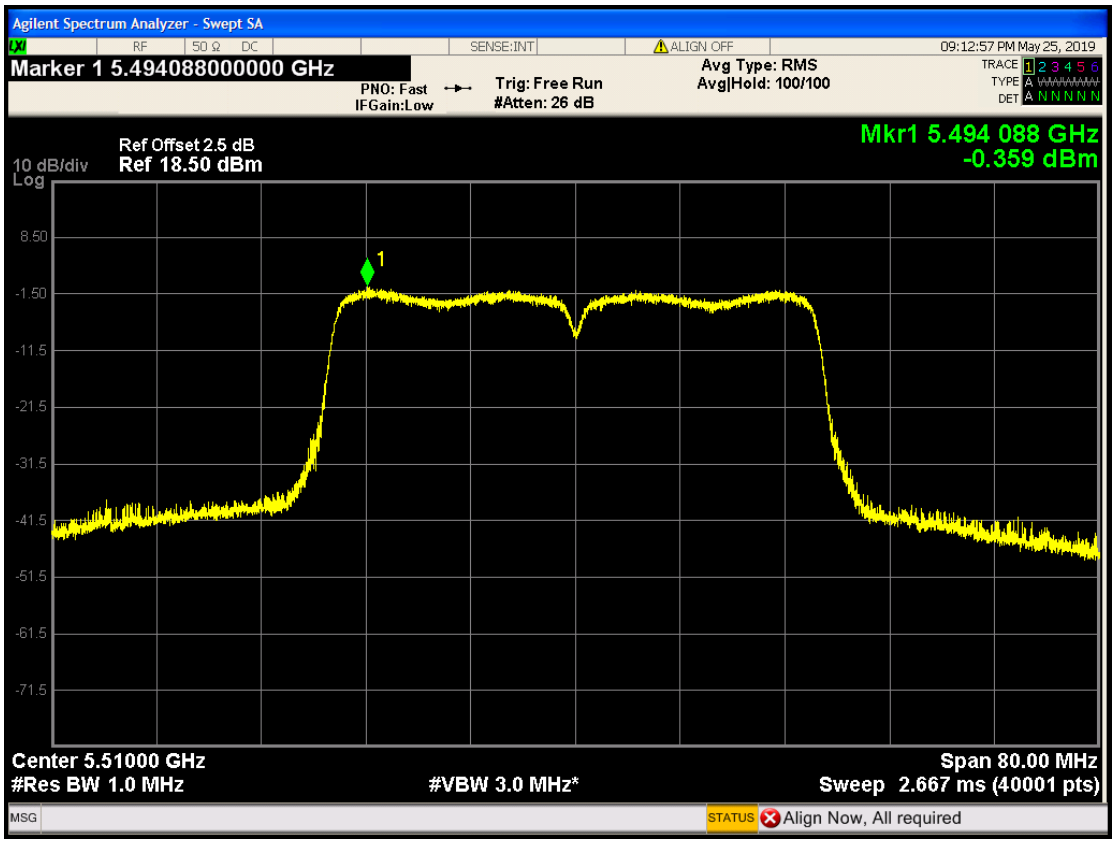

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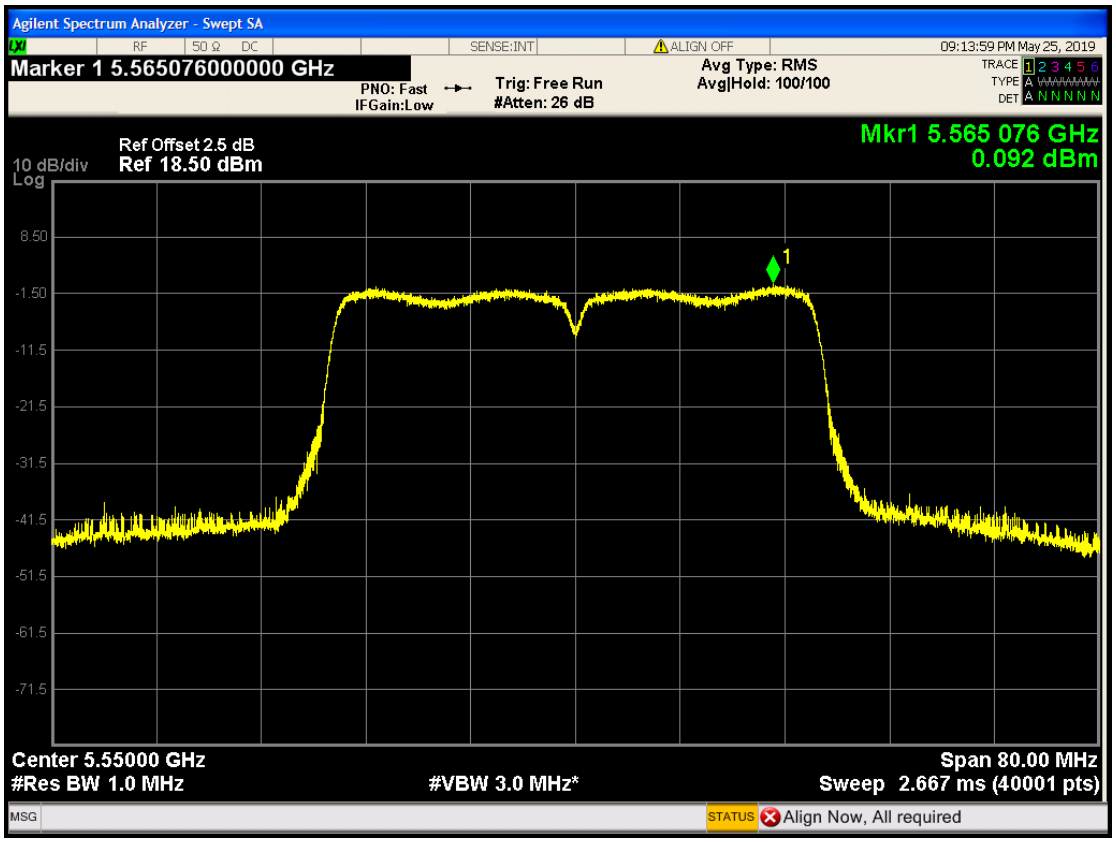

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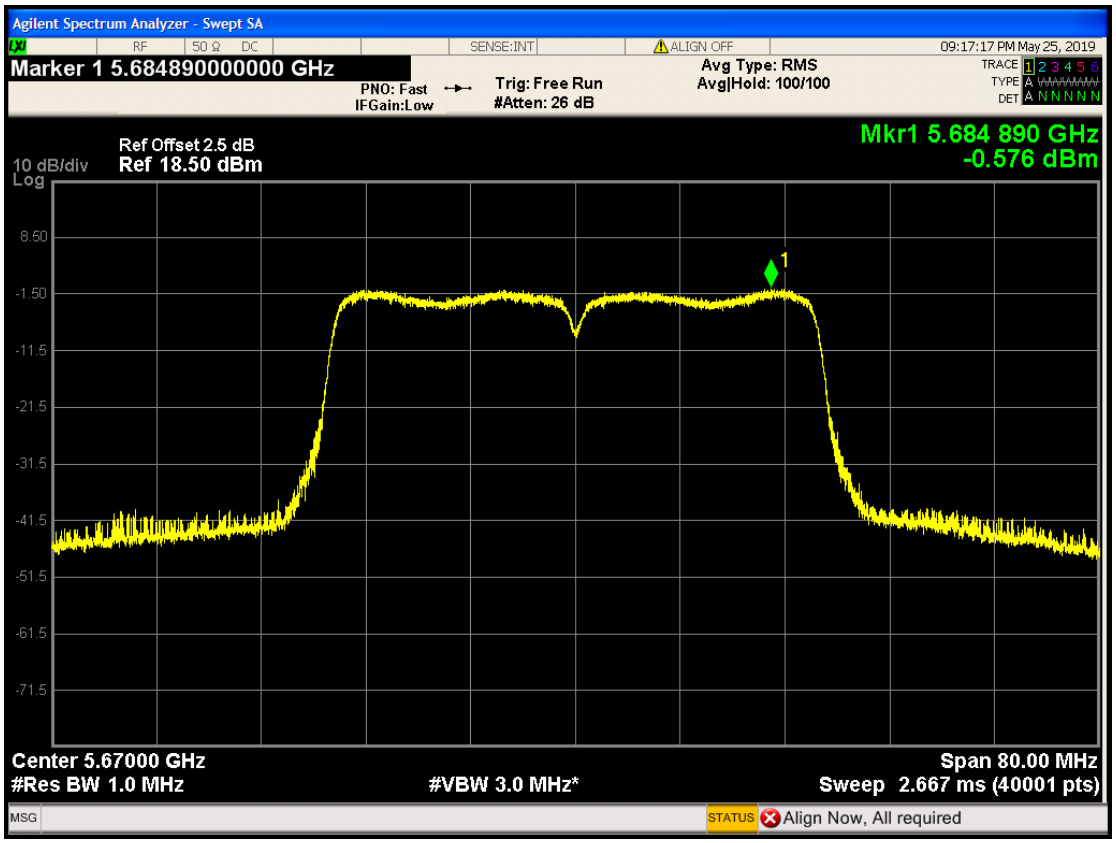

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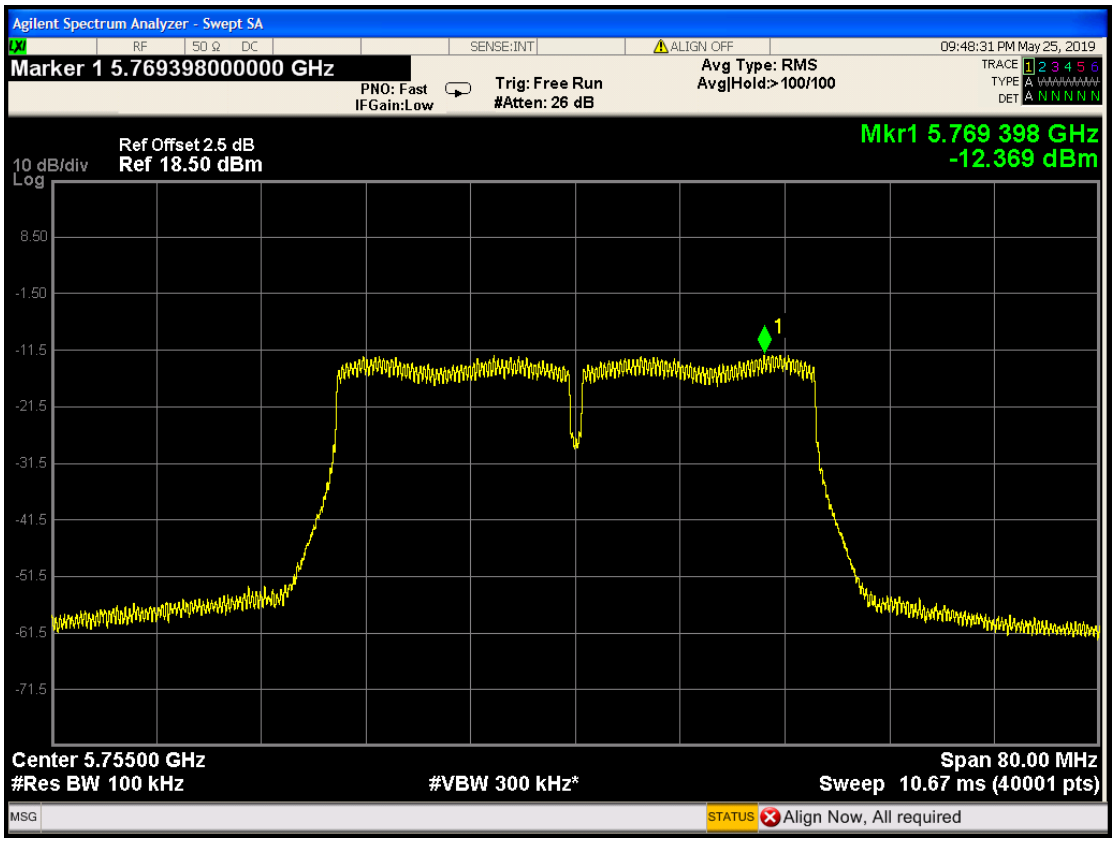

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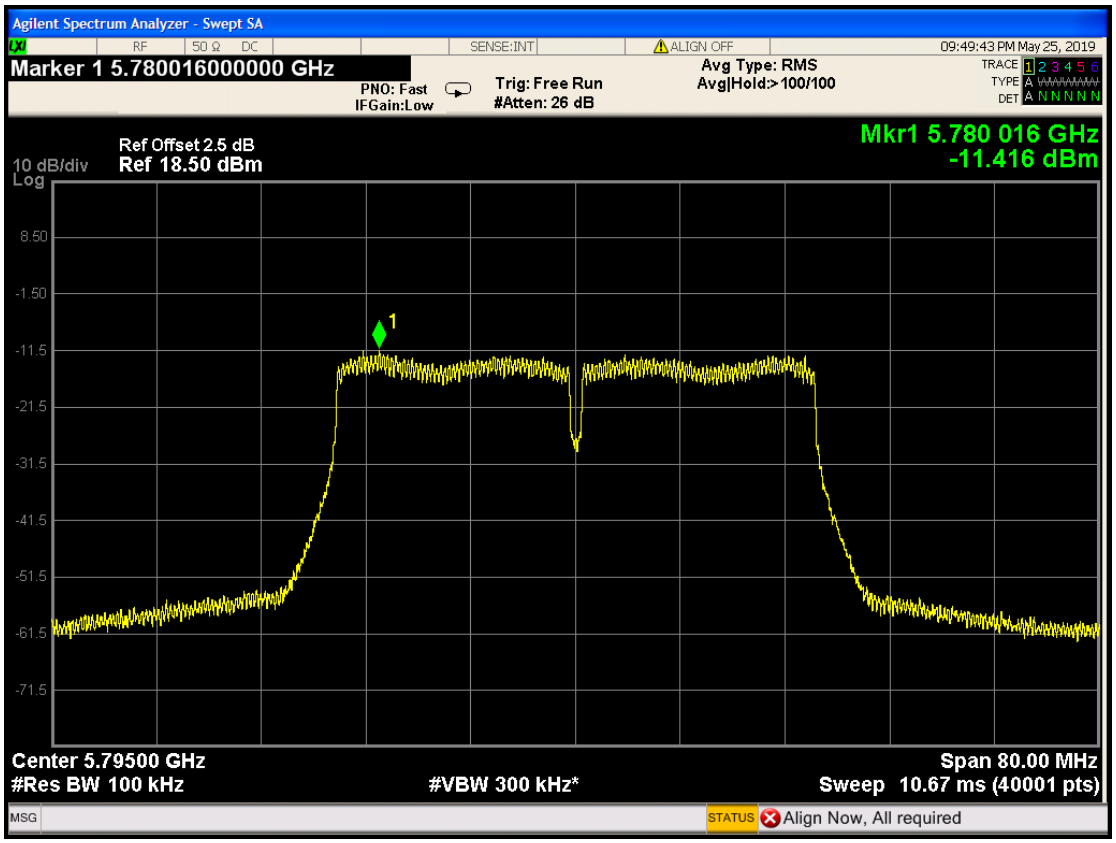
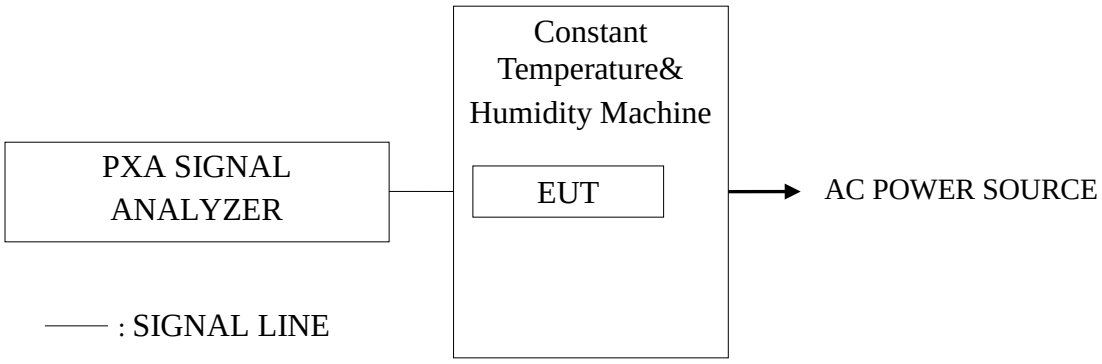


10.FREQUENCY STABILITY MEASUREMENT

10.1.Test Equipment

Item	Type	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Period
1.	PXA signal analyzer	Agilent	N9030A	MY53120217	2019-04-12	1 Year
2.	Constant Temperature& Humidity Machine (HP series)	Titech	MHQ-120 CLUB	A60614	2019-04-04	1 Year

10.2.Block Diagram of Test Setup



10.3.Specification Limits

None.

10.4.Test Procedure

(1) Frequency: Test frequency.
(2) Span: enough to cover the complete power envelope
(3) RBW: 1MHz(modulation ON) ; 10KHz(CW)
(4) VBW: 1MHz(modulation ON) ; 10KHz(CW)
(5) Detector Mode: Positive Peak
(6) Indication mode: Max hold
(7) Find the peak frequency and take calculate by the formula:
(Measurement Value-declaration frequency)/ declaration frequency)

10.5.Test Results

PASSED. All the test results are attached in next pages.

Temperature (℃)	Voltage (Vac)	Centre Frequency (MHz)	Measurement Value (MHz)	Frequency Stability (ppm)
-10	120	5180	5179.997	-0.58
0			5179.989	-2.12
10			5180.011	2.12
20			5180.013	2.510
30			5180.033	6.371
40			5180.038	7.336
50			5180.016	3.08
60			5180.021	4.05
25	102		5180.028	5.41
	138		5180.031	5.98

11. DEVIATION TO TEST SPECIFICATIONS

【NONE】