

8.4 Maximum Power Spectral Density

■ Test requirements

(1) For the band 5.15-5.25 GHz.

(i) For an outdoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1MHz band. ^{note1}

(ii) For an indoor access point operating in the band 5.15-5.25 GHz, the maximum power spectral density shall not exceed 17 dBm in any 1MHz band. ^{note1}

(iii) For fixed point-to-point access points operating in the band 5.15-5.25 GHz, transmitters that employ a directional antenna gain greater than 23 dBi, a 1 dB reduction in maximum power spectral density is required for each 1 dB of antenna gain in excess of 23 dBi.

(iv) For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum power spectral density shall not exceed 11 dBm in any 1MHz band. ^{note1}

(2) For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. ^{note1}

(3) For the band 5.725-5.85 GHz, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band. ^{note1,note2}

Note1: If transmitting antennas of directional gain greater than 6 dBi are used, the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

Note2: fixed point-to-point U-NII devices operating in this band may employ transmitting antennas with directional gain greater than 6 dBi without any corresponding reduction in transmitter conducted power. Fixed, point-to-point operations exclude the use of point-to-multipoint systems, omnidirectional applications, and multiple collocated transmitters transmitting the same information.

- Peak Power Spectral Density Limit Calculation

Band	Limit [dBm]	ANT Gain [dBi]	Determined Limit [dBm]
U-NII 1	11	2.353	11
U-NII 2A	11	2.701	11
U-NII 2C	11	2.653	11
U-NII 3	30	2.418	30

■ Test configuration

Refer to the APPENDIX I.

■ Test procedure

Maximum Power Spectral Density is measured using Measurement Procedure **of KDB789033 D02 V01**

- 1) Create an average power spectrum for the EUT operating mode being tested by following the instructions in section II.E.2. for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-1, SA-2, SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, "Compute power...". (This procedure is required even if the maximum conducted output power measurement was performed using a power meter, method PM.)
- 2) Use the peak search function on the instrument to find the peak of the spectrum and record its value.
- 3) Make the following adjustments to the peak value of the spectrum, if applicable:
 - a) **If Method SA-2 or SA-2 Alternative was used, add $10 \log(1/x)$, where x is the duty cycle, to the peak of the spectrum.**
 - b) If Method SA-3 Alternative was used and the linear mode was used in step II.E.2.g)(viii), add 1 dB to the final result to compensate for the difference between linear averaging and power averaging.
- 4) The result is the Maximum PSD over 1 MHz reference bandwidth.
- 5) For devices operating in the bands 5.15-5.25 GHz, 5.25-5.35 GHz, and 5.47-5.725 GHz, the above procedures make use of 1 MHz RBW to satisfy directly the 1 MHz reference bandwidth specified in §15.407(a)(5). For devices operating in the band 5.725-5.85 GHz, the rules specify a measurement bandwidth of 500 kHz. Many spectrum analyzers do not have 500 kHz RBW, thus a narrower RBW may need to be used. The rules permit the use of a RBWs less than 1 MHz, or 500 kHz, "provided that the measured power is integrated over the full reference bandwidth" to show the total power over the specified measurement bandwidth (i.e., 1 MHz, or 500 kHz). If measurements are performed using a reduced resolution bandwidth (< 1 MHz, or < 500 kHz) and integrated over 1 MHz, or 500 kHz bandwidth, the following adjustments to the procedures apply:
 - a) Set $RBW \geq 1/T$, where T is defined in section II.B.1.a). (Refer to Appendix II)
 - b) Set $VBW \geq 3 RBW$.
 - c) If measurement bandwidth of Maximum PSD is specified in 500 kHz, add $10\log(500\text{kHz}/RBW)$ to the measured result, whereas $RBW (< 500 \text{ kHz})$ is the reduced resolution bandwidth of the spectrum analyzer set during measurement.
 - d) If measurement bandwidth of Maximum PSD is specified in 1 MHz, add $10\log(1\text{MHz}/RBW)$ to the measured result, whereas $RBW (< 1 \text{ MHz})$ is the reduced resolution bandwidth of spectrum analyzer set during measurement.
 - e) Care must be taken to ensure that the measurements are performed during a period of continuous transmission or are corrected upward for duty cycle.

Note: As a practical matter, it is recommended to use reduced RBW of 100 kHz for the sections 5.c) and 5.d) above, since RBW=100 kHz is available on nearly all spectrum analyzers.

■ Test results: **Comply**

Mode	Channel	Frequency [MHz]	Reading [dBm]		T.F [dB] Note 1	Test Result [dBm] Note 2	
			ANT 1	ANT 2		ANT 1	ANT 2
802.11a	36	5180	-7.010	-	10.250	3.240	-
	40	5200	-6.660	-		3.590	-
	48	5240	-6.690	-		3.560	-
	52	5260	-6.880	-		3.370	-
	60	5300	-6.660	-		3.590	-
	64	5320	-7.450	-		2.800	-
	100	5500	-6.760	-		3.490	-
	116	5580	-6.570	-		3.680	-
	140	5700	-6.640	-		3.610	-
	149	5745	-9.030	-	7.240	-1.790	-
	157	5785	-8.870	-		-1.630	-
	165	5825	-9.070	-		-1.830	-
802.11n HT20	36	5180	-6.880	-7.220	10.230	3.350	3.010
	40	5200	-6.260	-6.140		3.970	4.090
	48	5240	-6.900	-6.170		3.330	4.060
	52	5260	-6.200	-6.290		4.030	3.940
	60	5300	-6.470	-7.080		3.760	3.150
	64	5320	-7.660	-7.970		2.570	2.260
	100	5500	-7.080	-7.940		3.150	2.290
	116	5580	-6.290	-6.890		3.940	3.340
	140	5700	-7.270	-7.820		2.960	2.410
	149	5745	-8.380	-9.100	7.220	-1.160	-1.880
	157	5785	-8.280	-8.760		-1.060	-1.540
	165	5825	-8.290	-8.190		-1.070	-0.970
802.11n HT40	38	5190	-15.990	-16.230	10.490	-5.500	-5.740
	46	5230	-9.750	-9.700		0.740	0.790
	54	5270	-8.370	-8.300		2.120	2.190
	62	5310	-12.330	-12.260		-1.840	-1.770
	102	5510	-12.830	-13.290		-2.340	-2.800
	110	5550	-8.610	-9.030		1.880	1.460
	134	5670	-8.380	-9.180		2.110	1.310
	151	5755	-9.340	-9.770	7.480	-1.860	-2.290
	159	5795	-9.370	-9.810		-1.890	-2.330
802.11ac VHT80	42	5210	-18.870	-19.490	10.370	-8.500	-9.120
	58	5290	-17.320	-17.990		-6.950	-7.620
	106	5530	-16.630	-16.880		-6.260	-6.510
	155	5775	-13.490	-15.490	7.360	-6.130	-8.130

Note 1: T.F = $10\log(1\text{MHz}/100\text{kHz}) + \text{D.C.F.}$ for U-NII 1, 2A and 2CT.F = $10\log(0.5\text{MHz}/100\text{kHz}) + \text{D.C.F.}$ for U-NII 3

For D.C.F., please refer to appendix II.

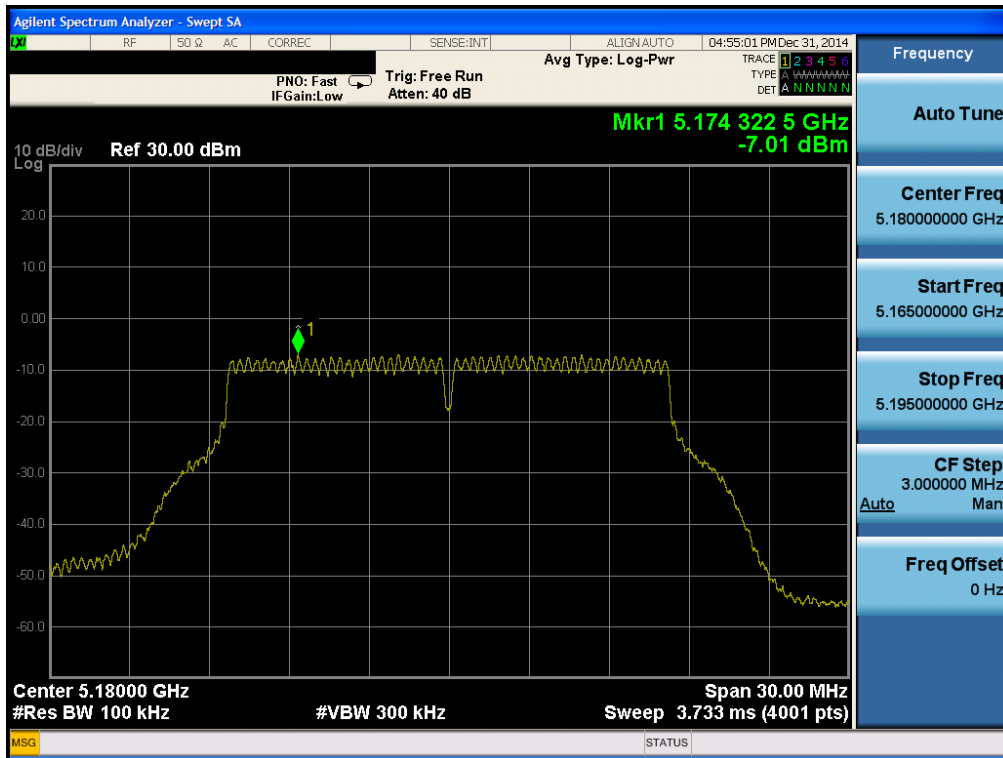
Note 2: Test Result = Measurement Data + T.F

Note 3: This test item was performed at the worst case mode(Single transmitting mode).

■ Result Plots – Single Transmit

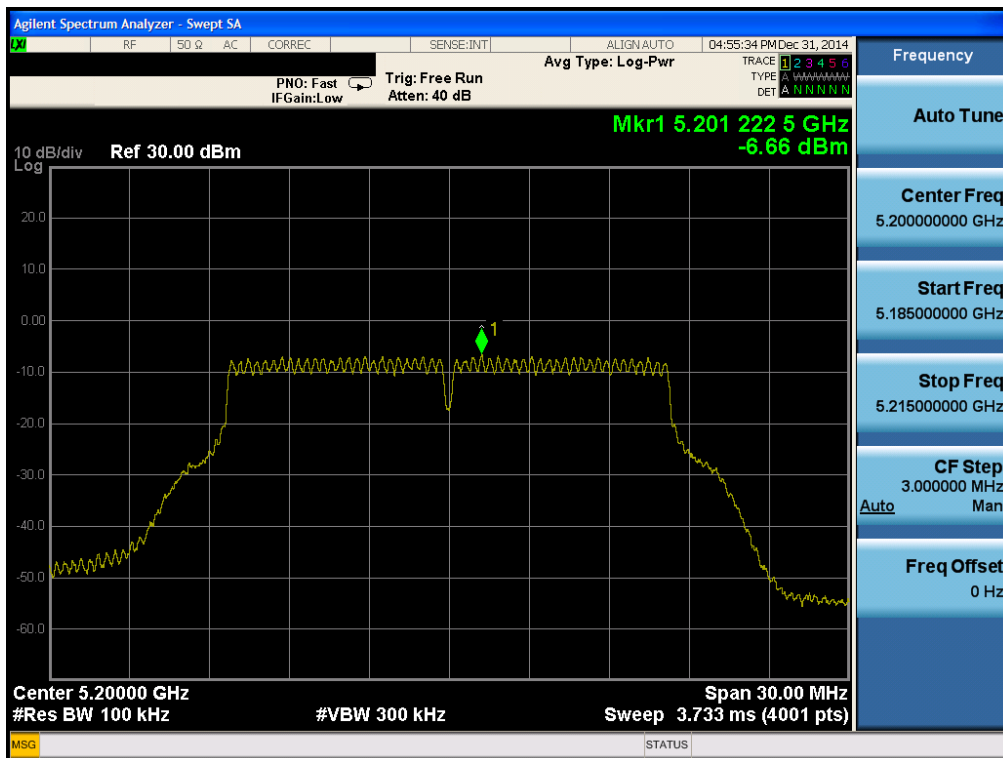
Maximum Power Spectral Density

Test Mode: 802.11a & Ch.36 & ANT 1(SISO)



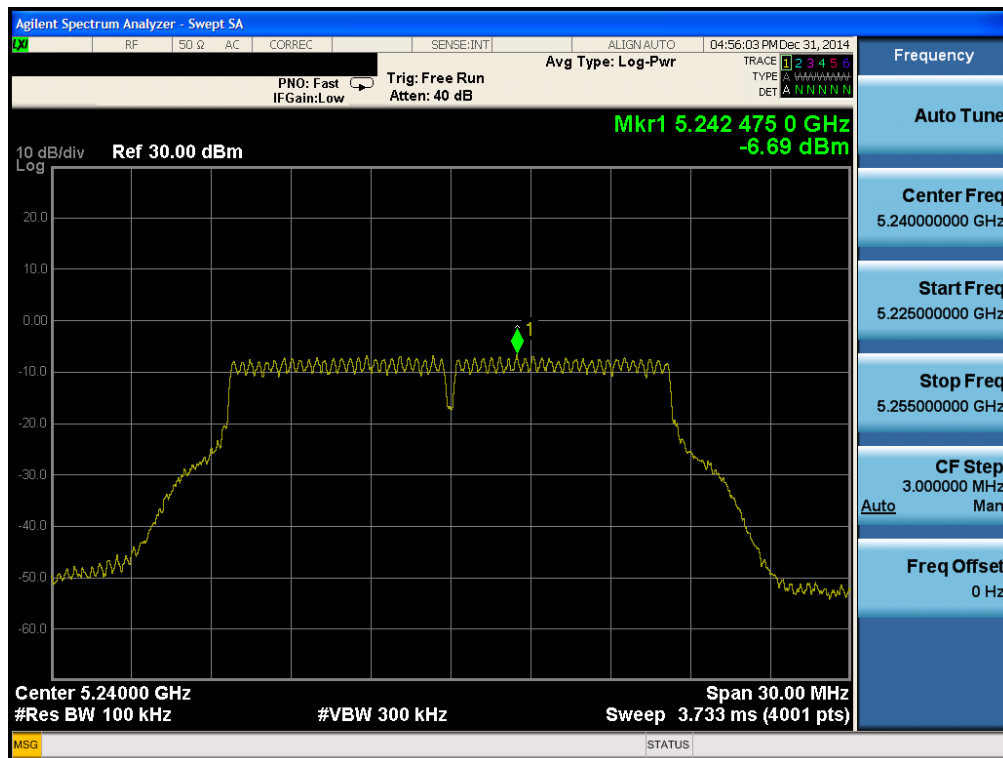
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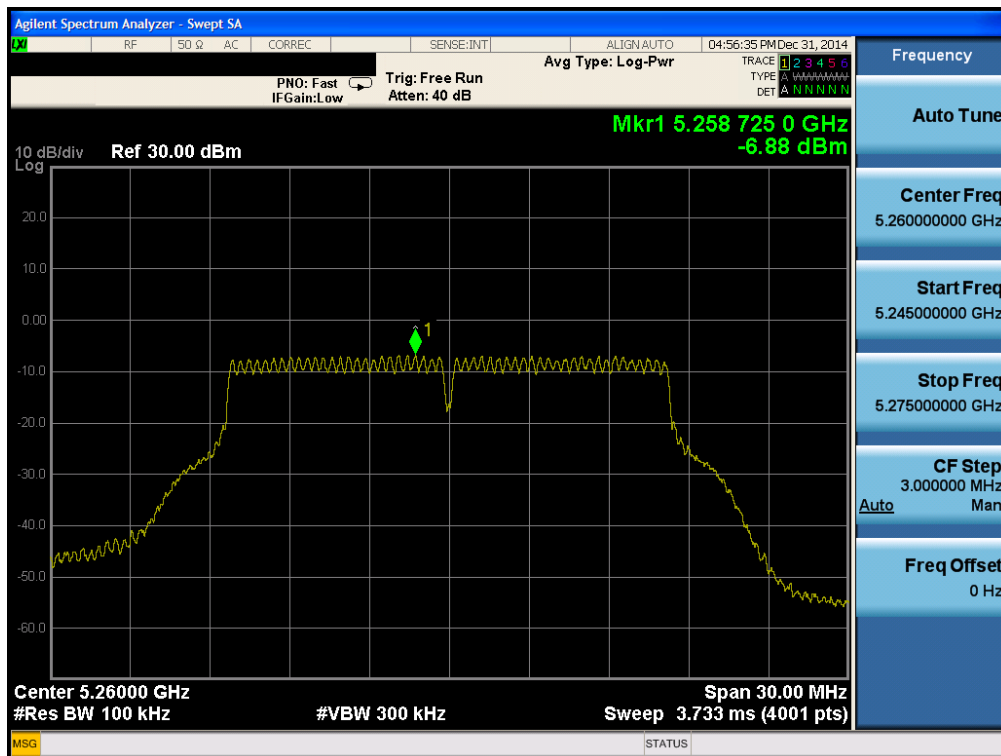
Maximum Power Spectral Density

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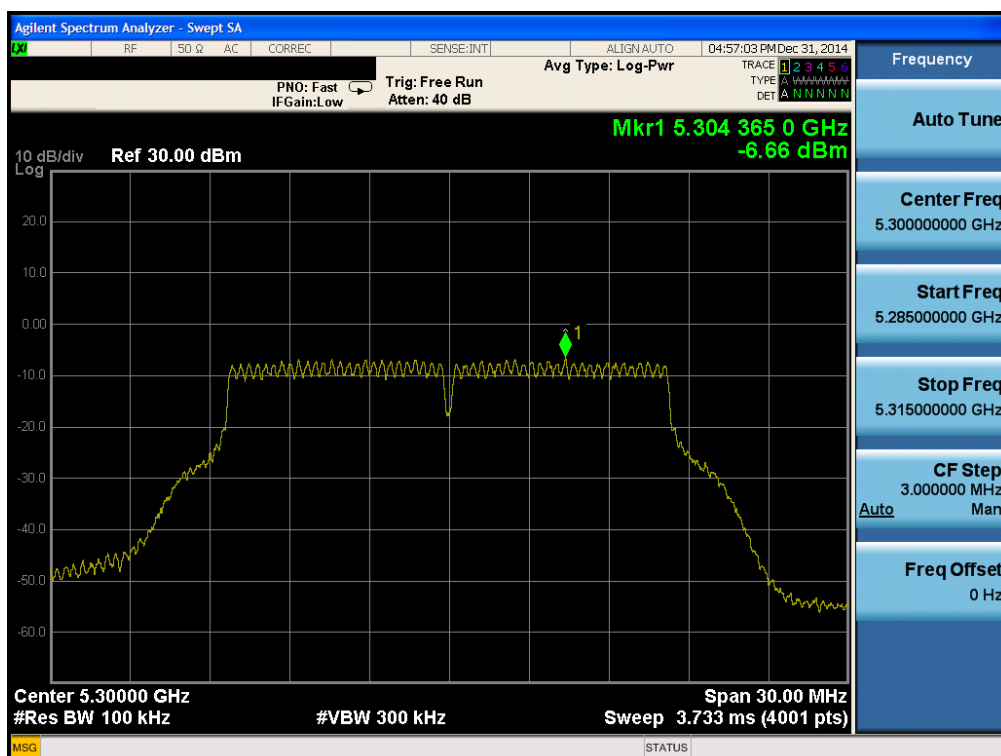
Maximum Power Spectral Density

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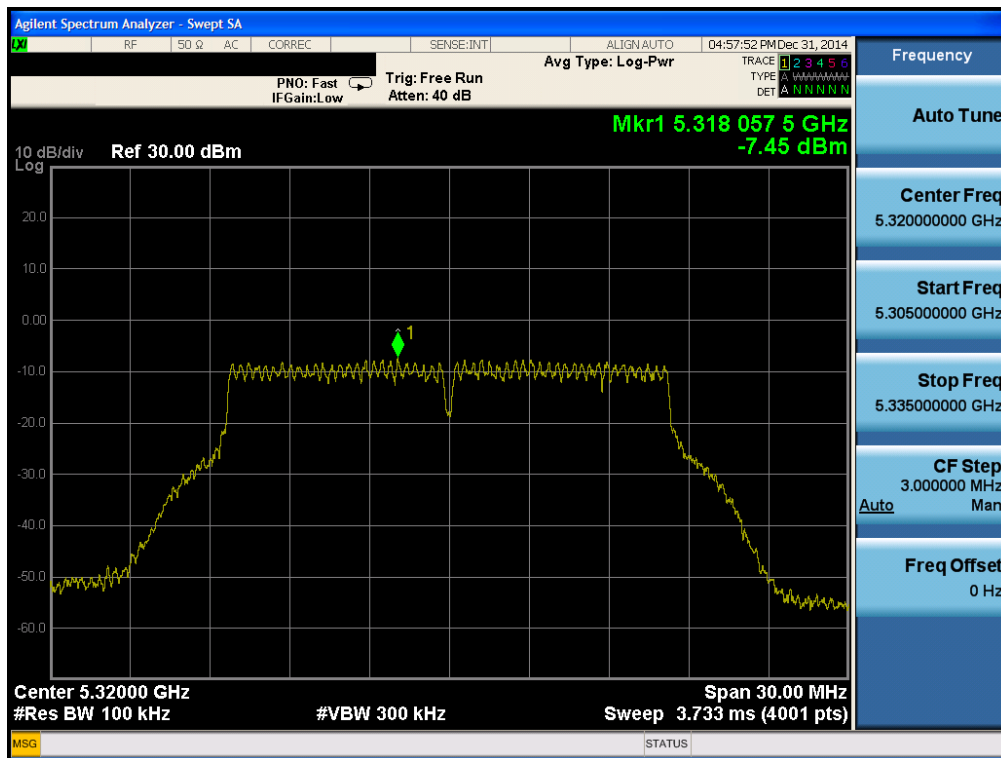
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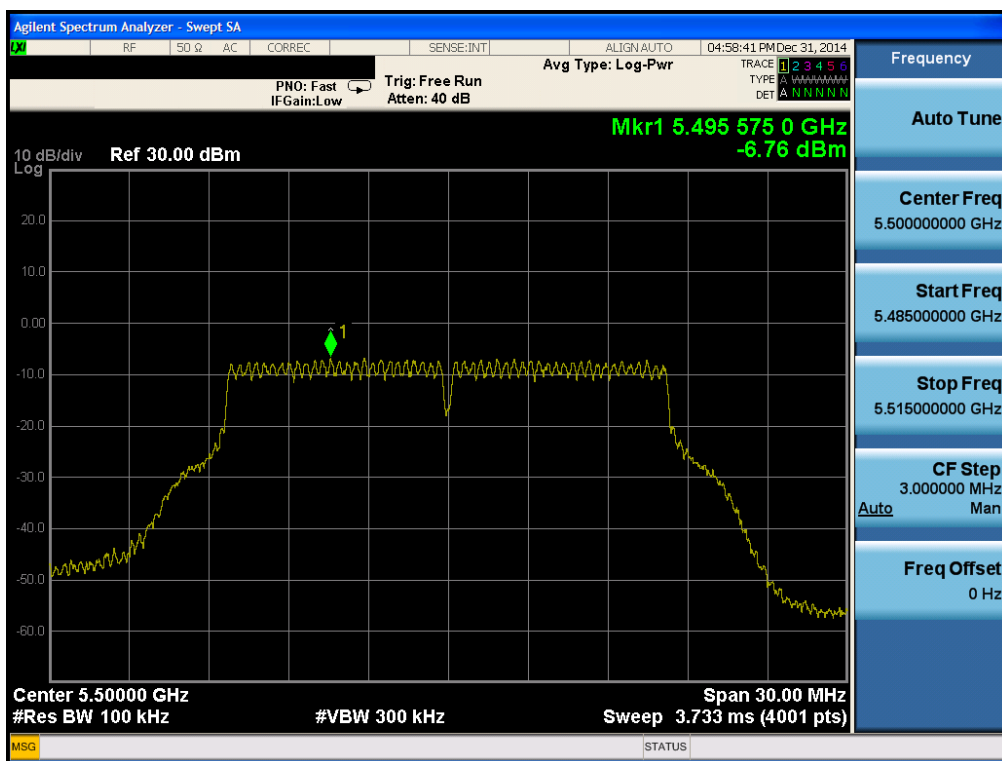
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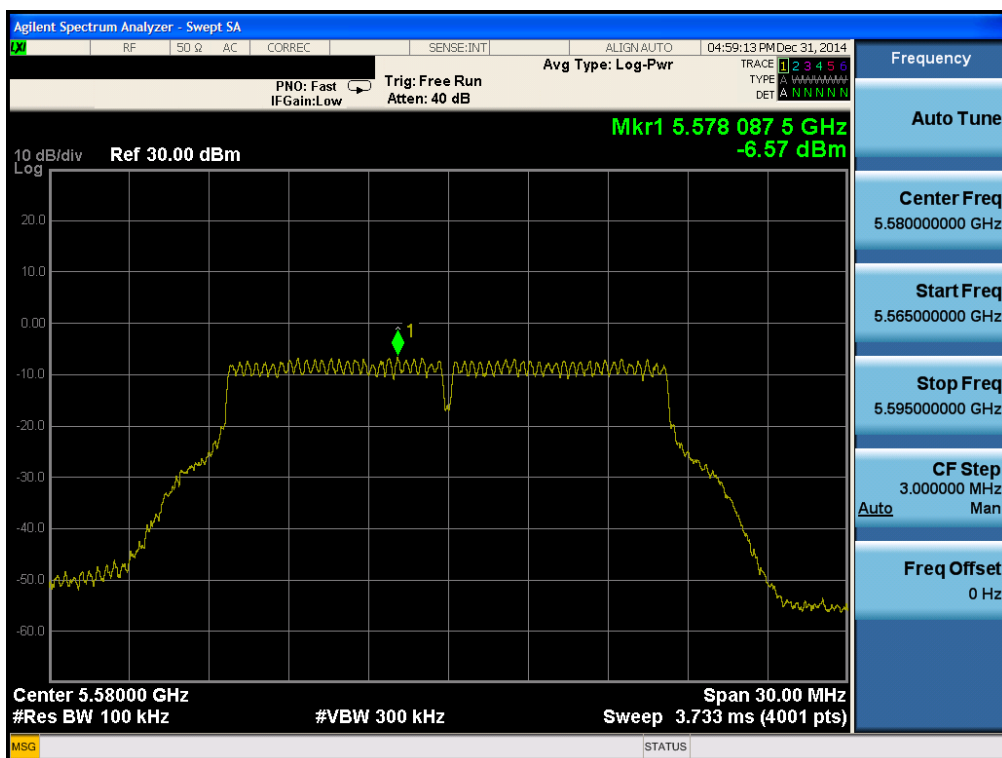
Maximum Power Spectral Density

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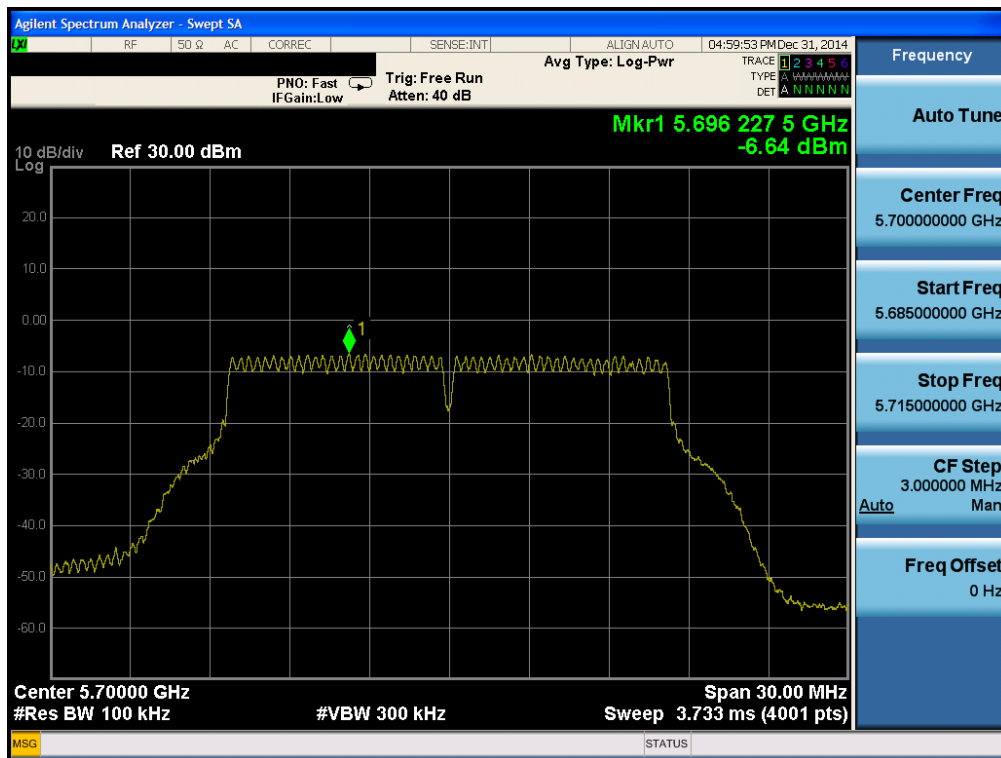
Maximum Power Spectral Density

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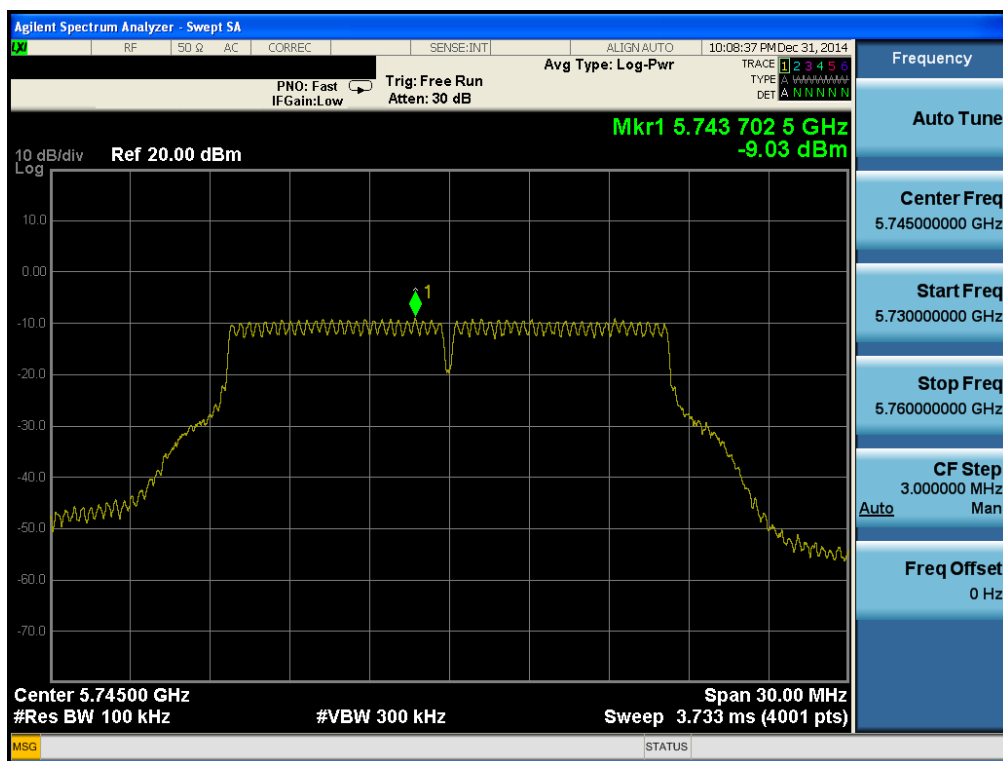
Maximum Power Spectral Density

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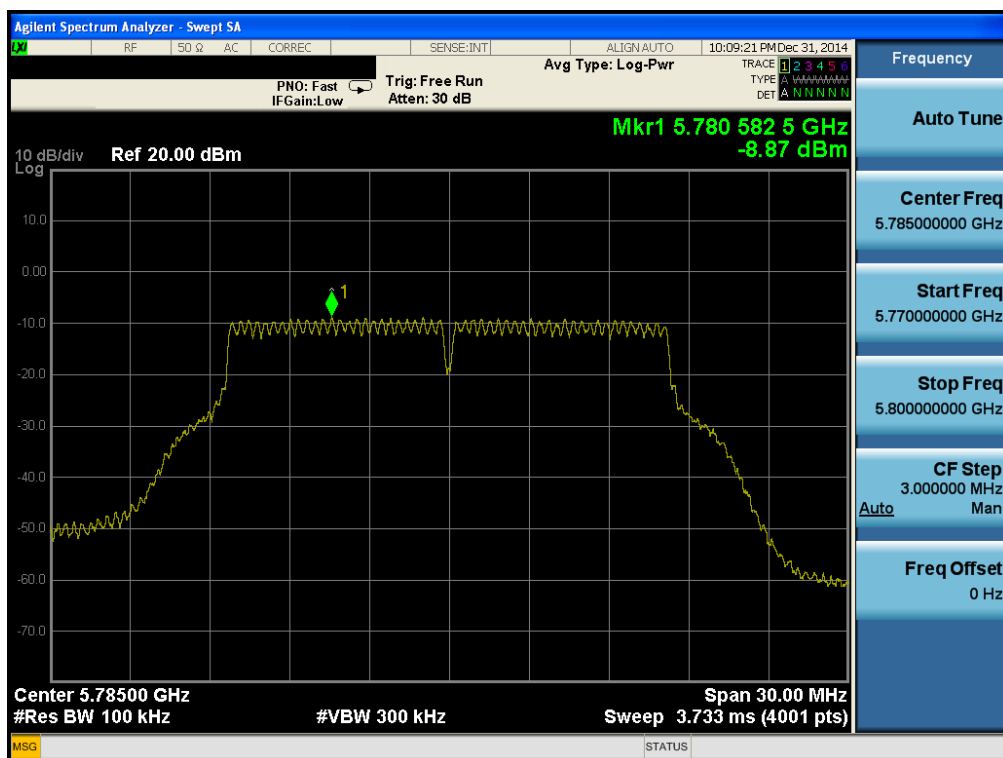
Maximum Power Spectral Density

Test Mode: 802.11a & Ch.149 & ANT 1(SISO)



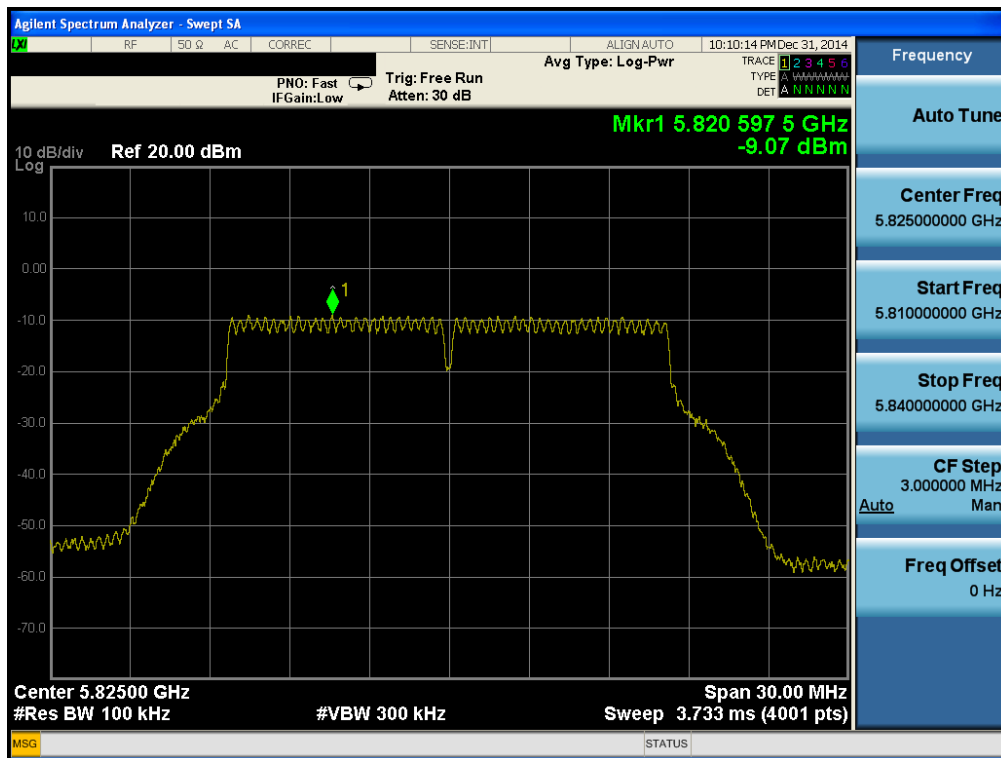
Maximum Power Spectral Density

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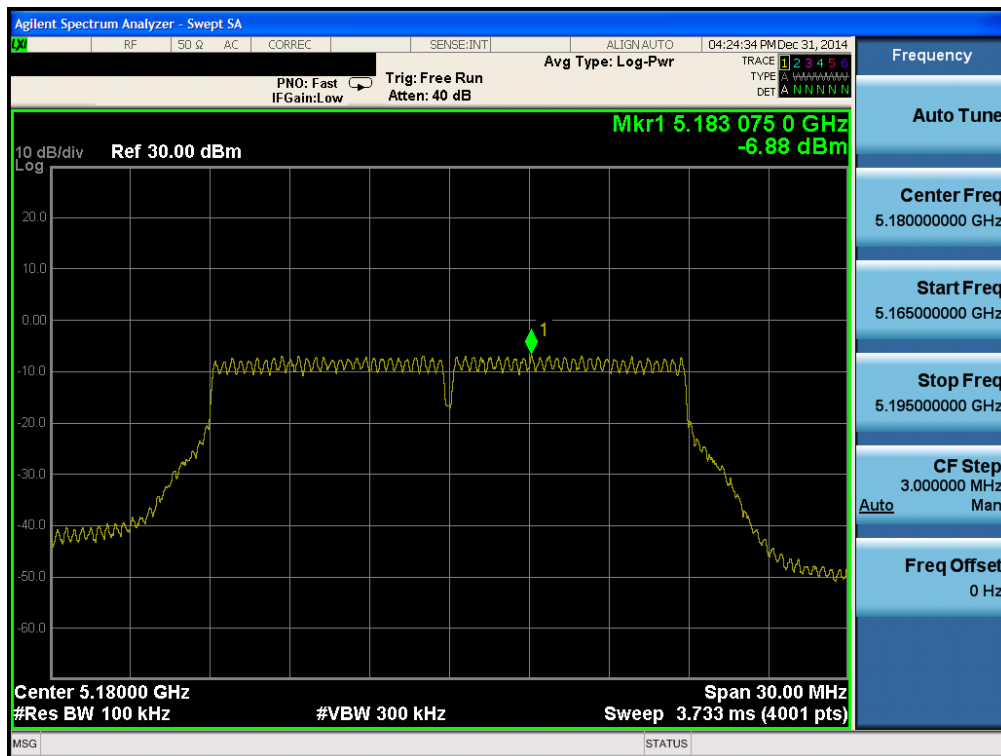
Maximum Power Spectral Density

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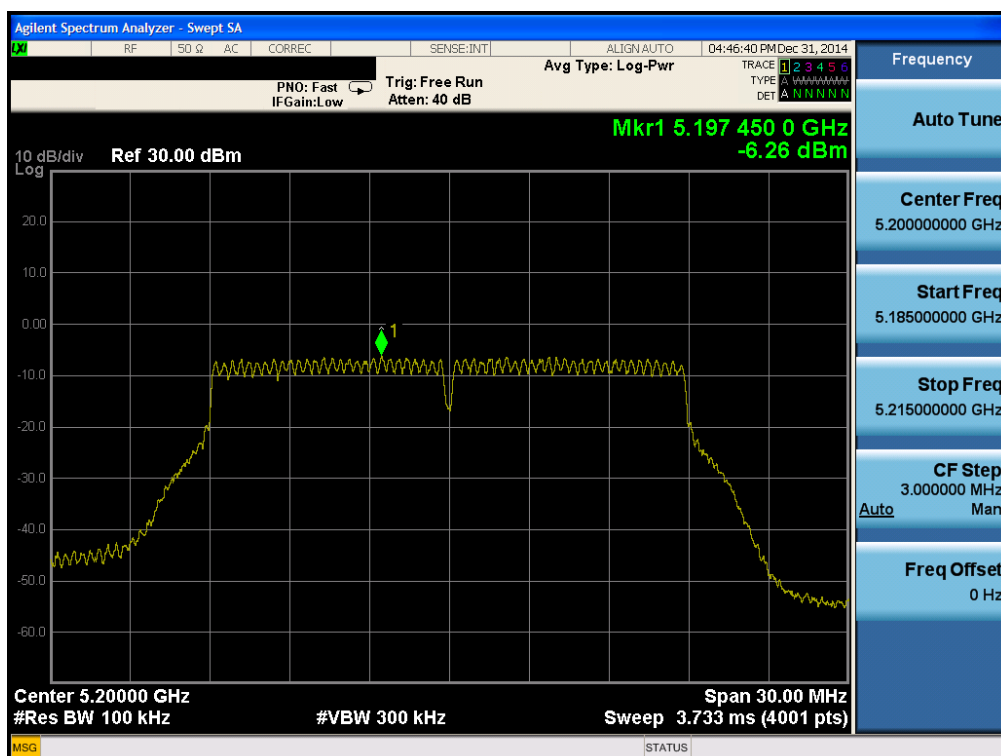
Maximum Power Spectral Density

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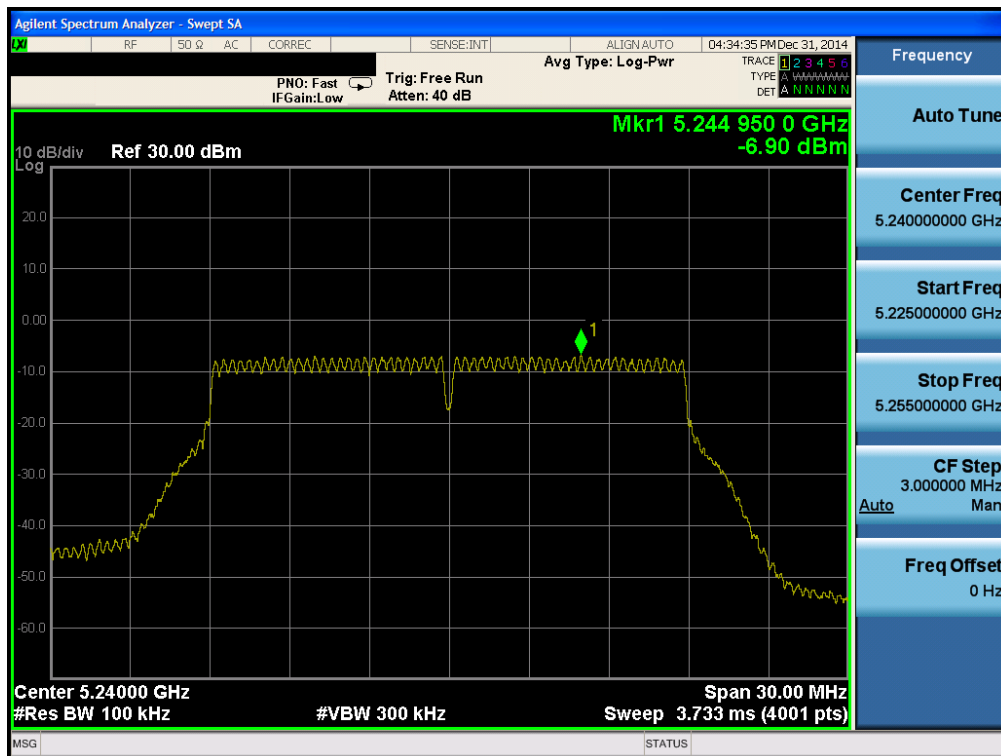
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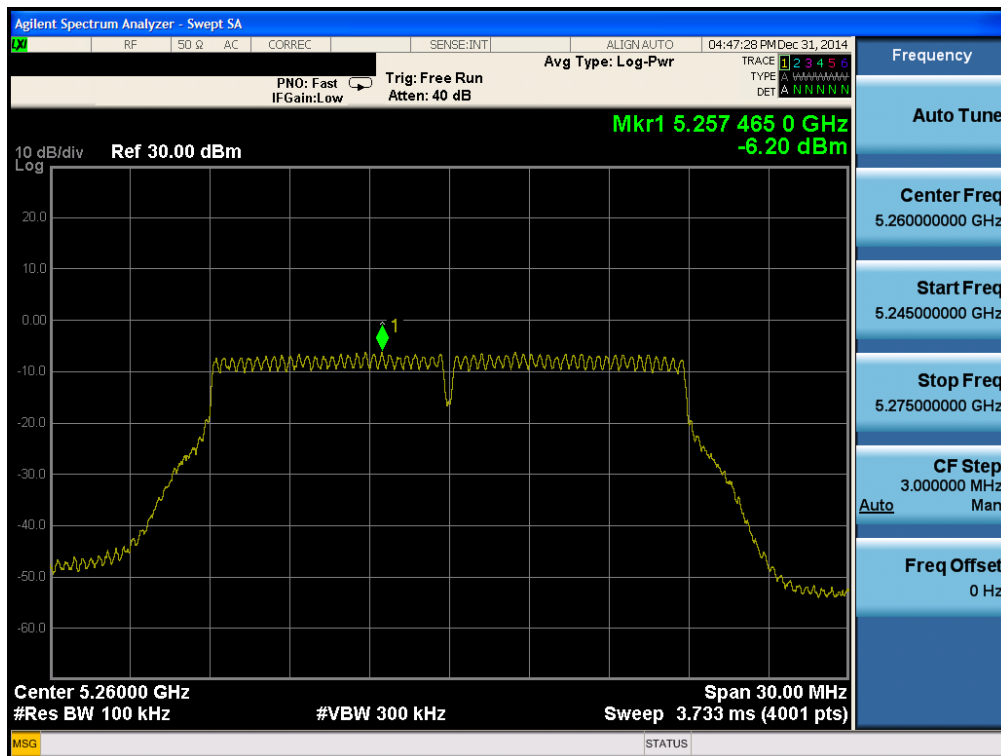
Maximum Power Spectral Density

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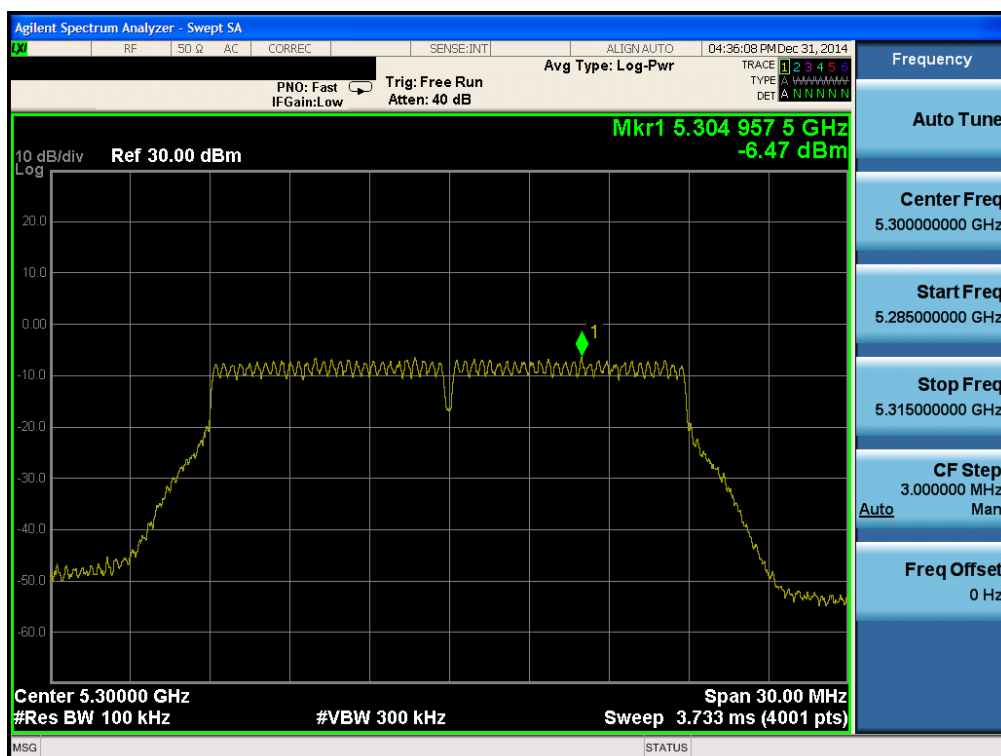
Maximum Power Spectral Density

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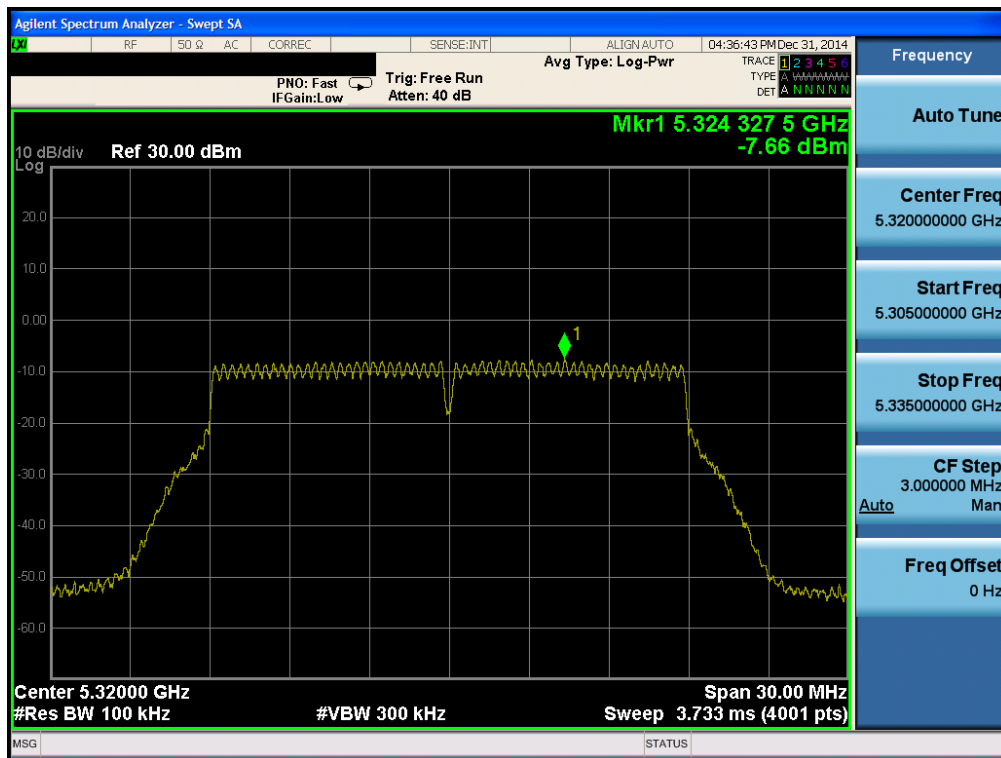
Maximum Power Spectral Density

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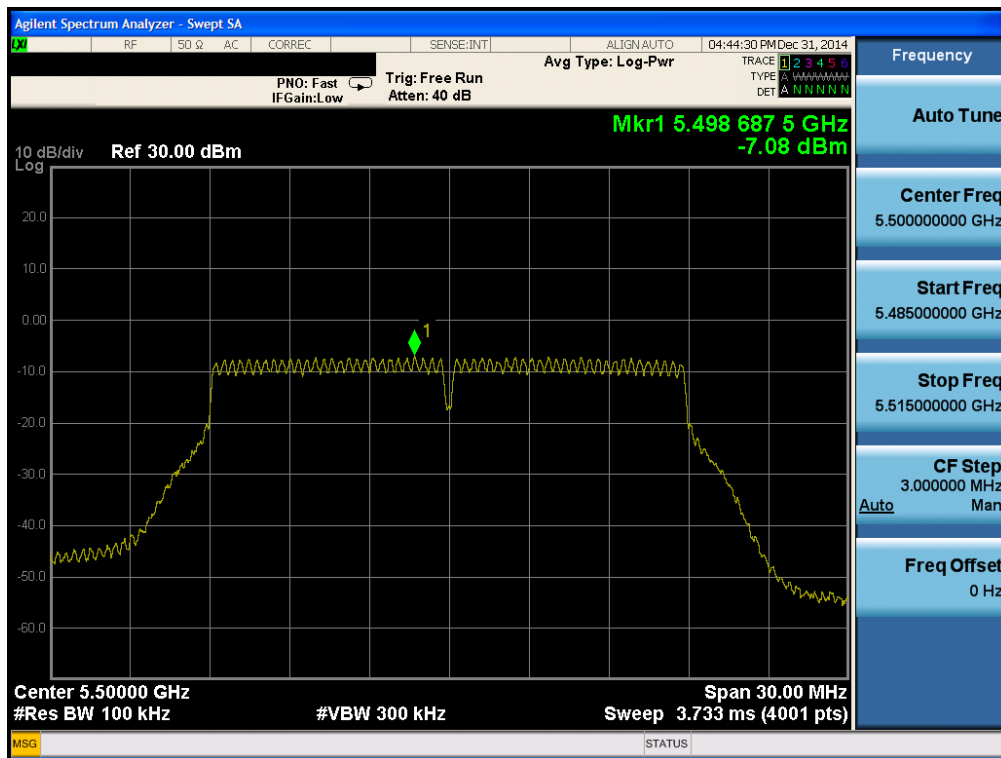
Maximum Power Spectral Density

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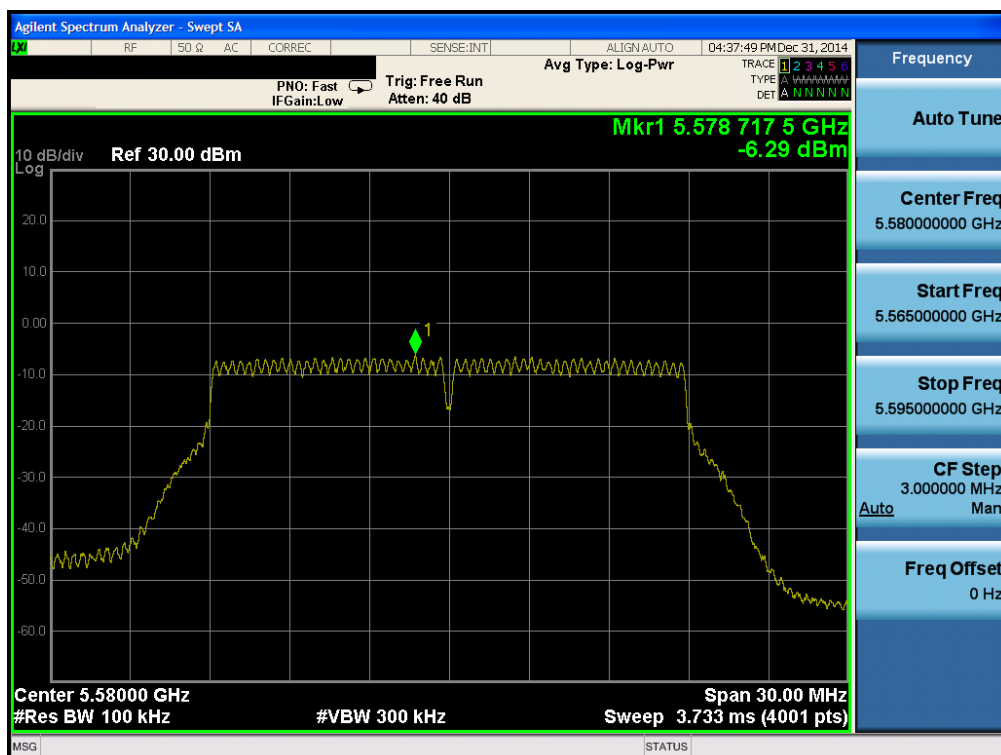
Maximum Power Spectral Density

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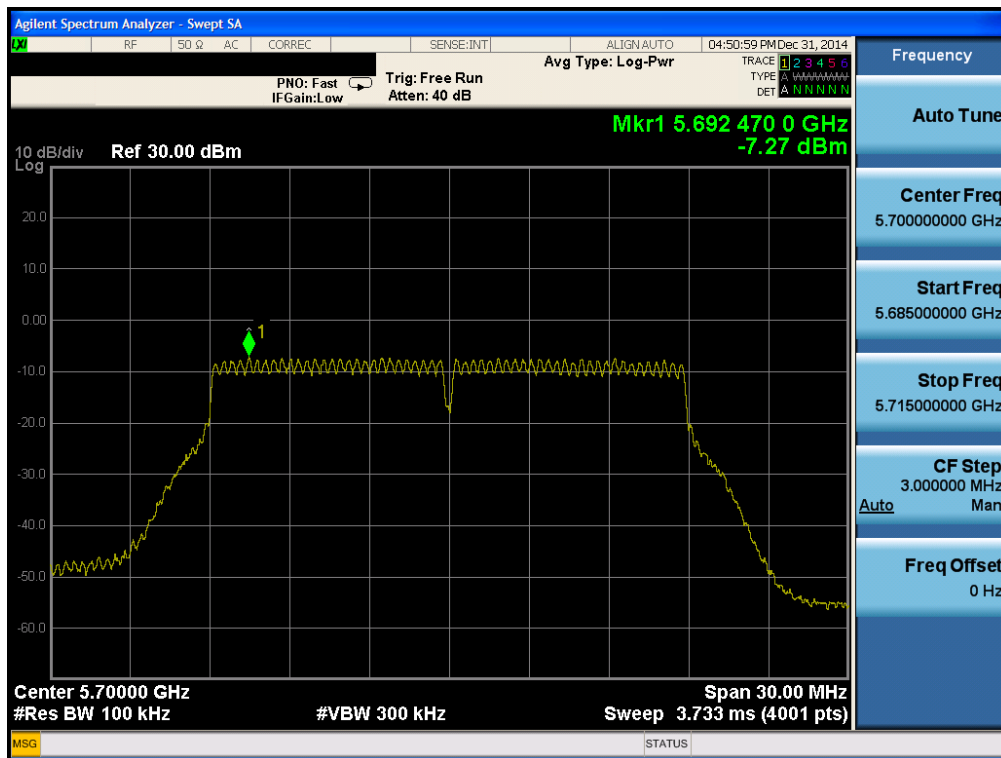
Maximum Power Spectral Density

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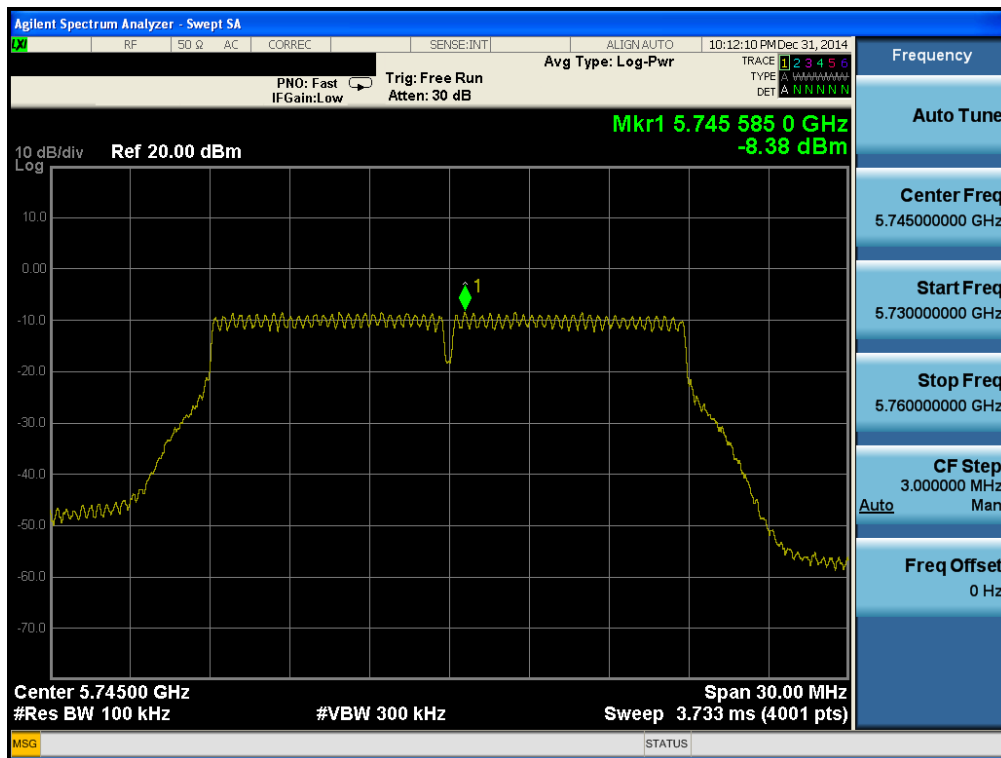
Maximum Power Spectral Density

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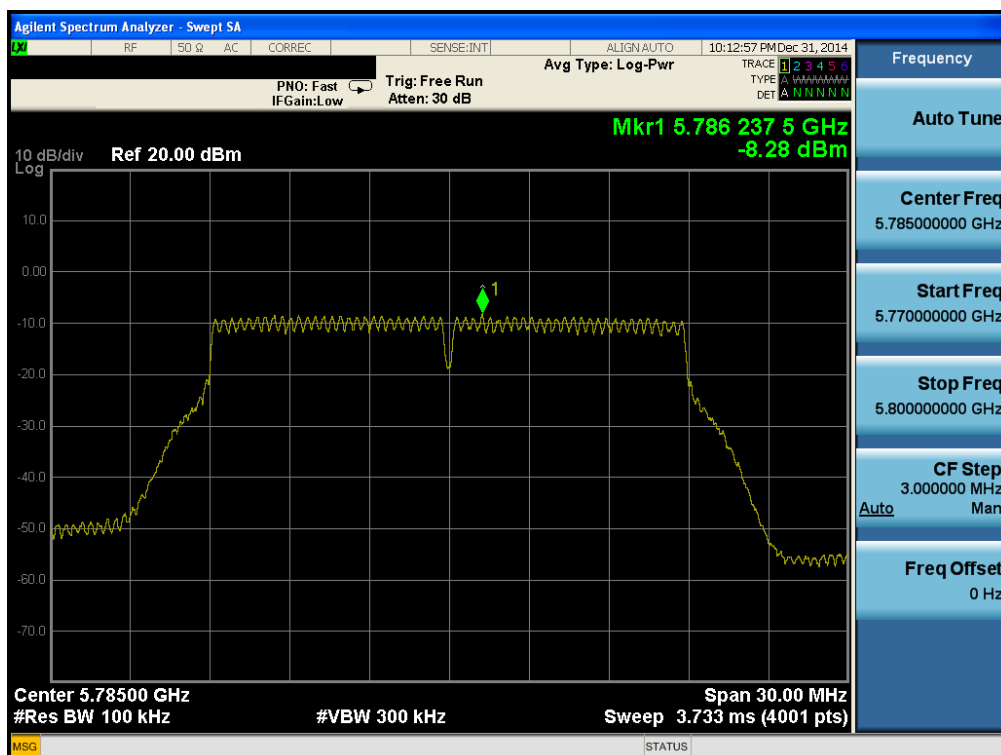
Maximum Power Spectral Density

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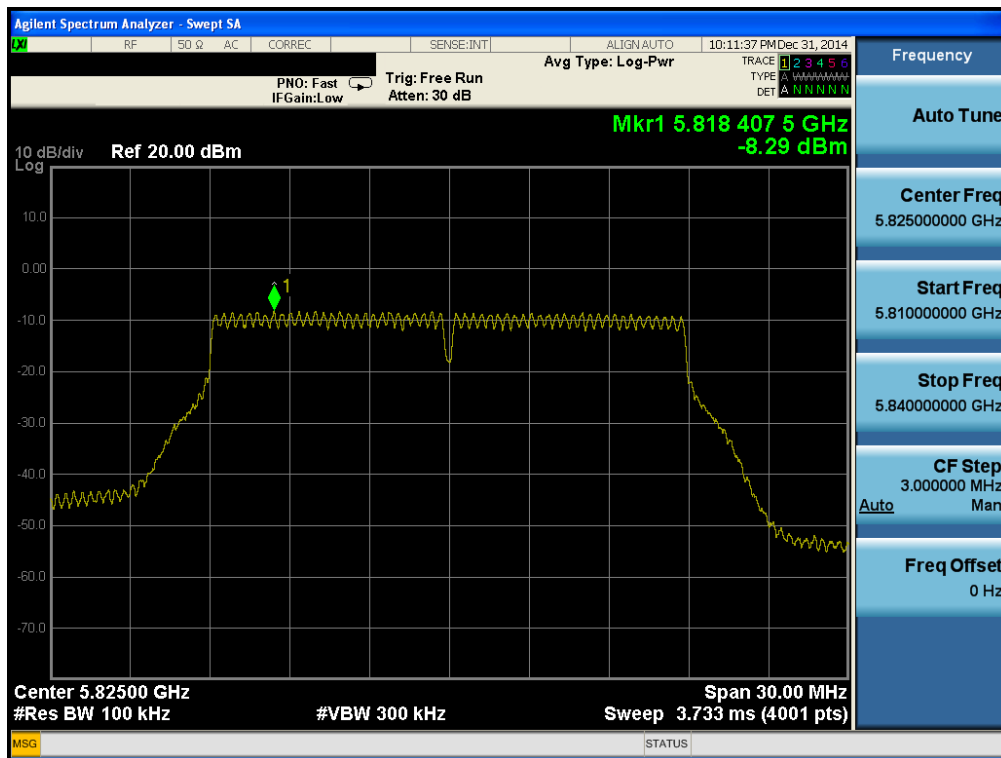
Maximum Power Spectral Density

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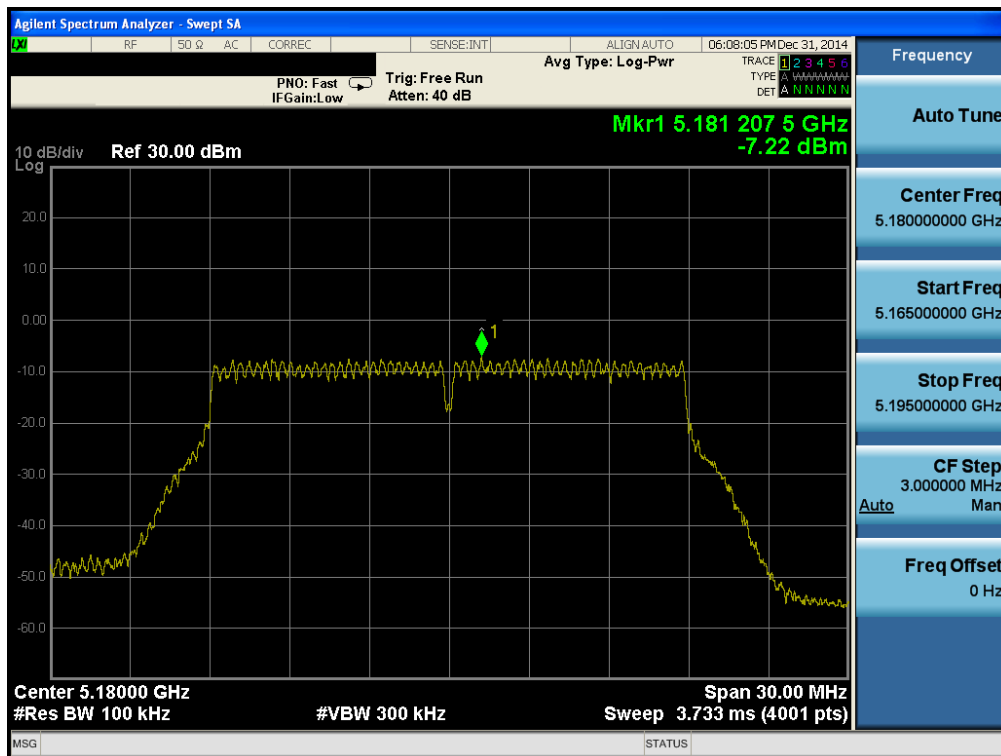
Maximum Power Spectral Density

Test Mode: 802.11n HT20 & Ch.165 & ANT 1(SISO)



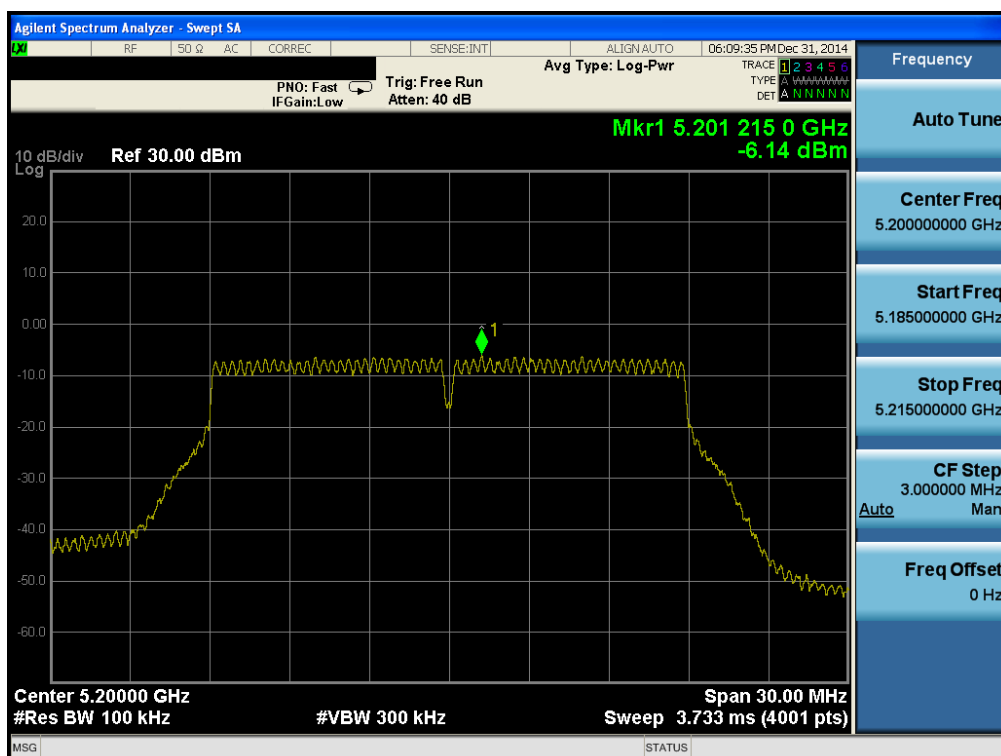
Maximum Power Spectral Density

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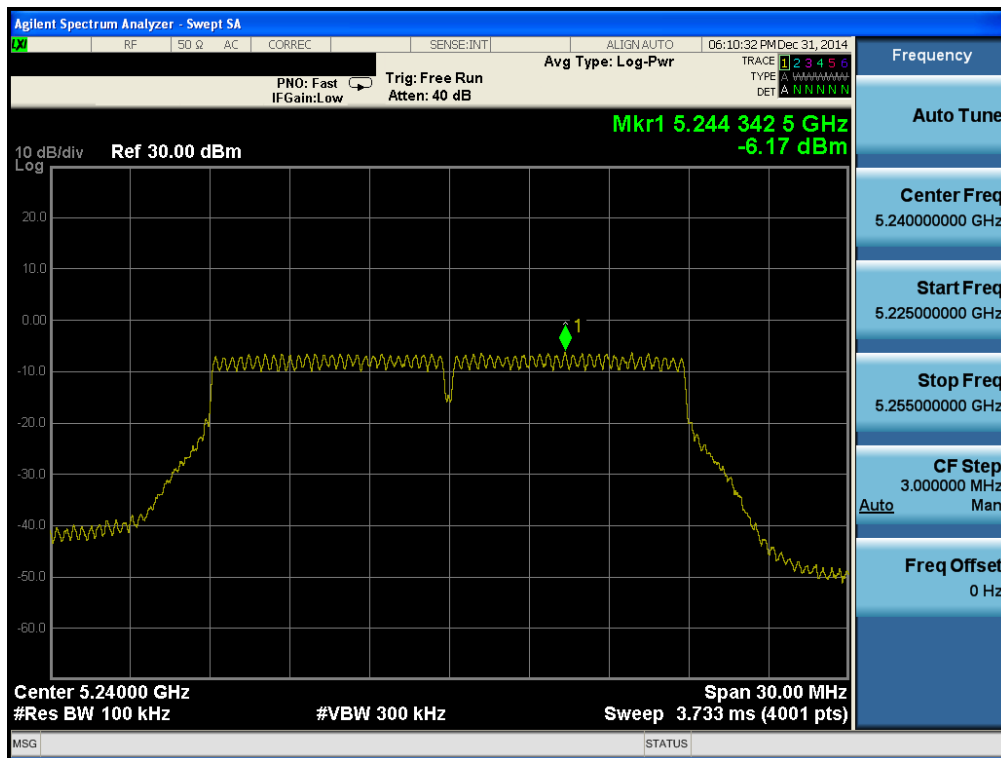
Maximum Power Spectral Density

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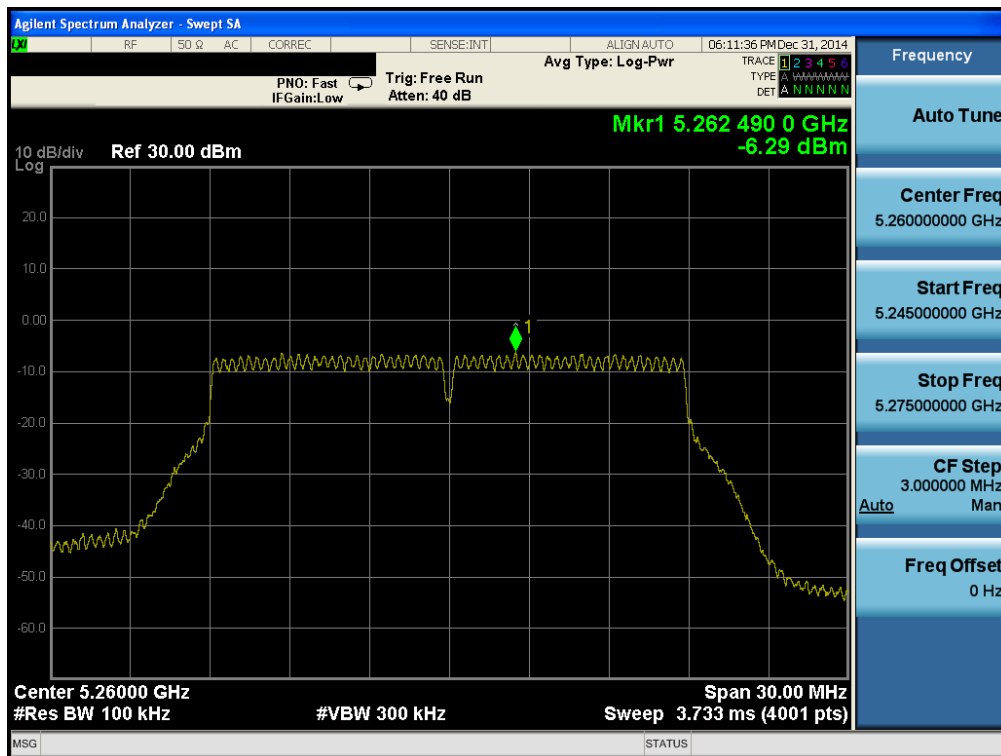
Maximum Power Spectral Density

Test Mode: 802.11n HT20 & Ch.48 & ANT 2(SISO)



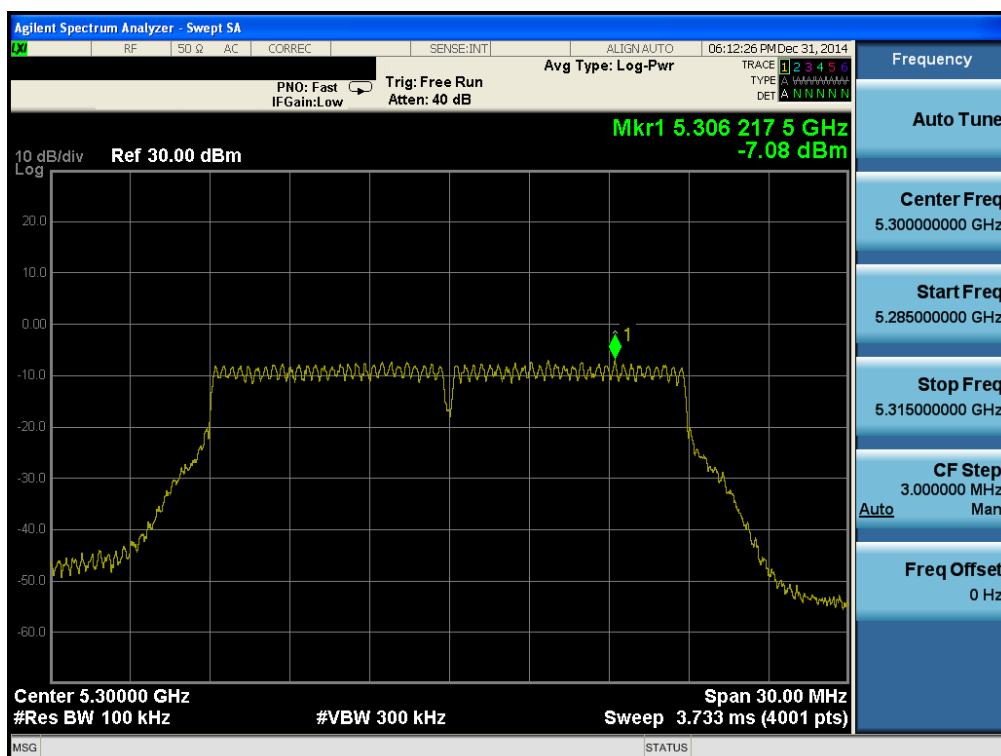
Maximum Power Spectral Density

Test Mode: 802.11n HT20 & Ch.52 & ANT 2(SISO)



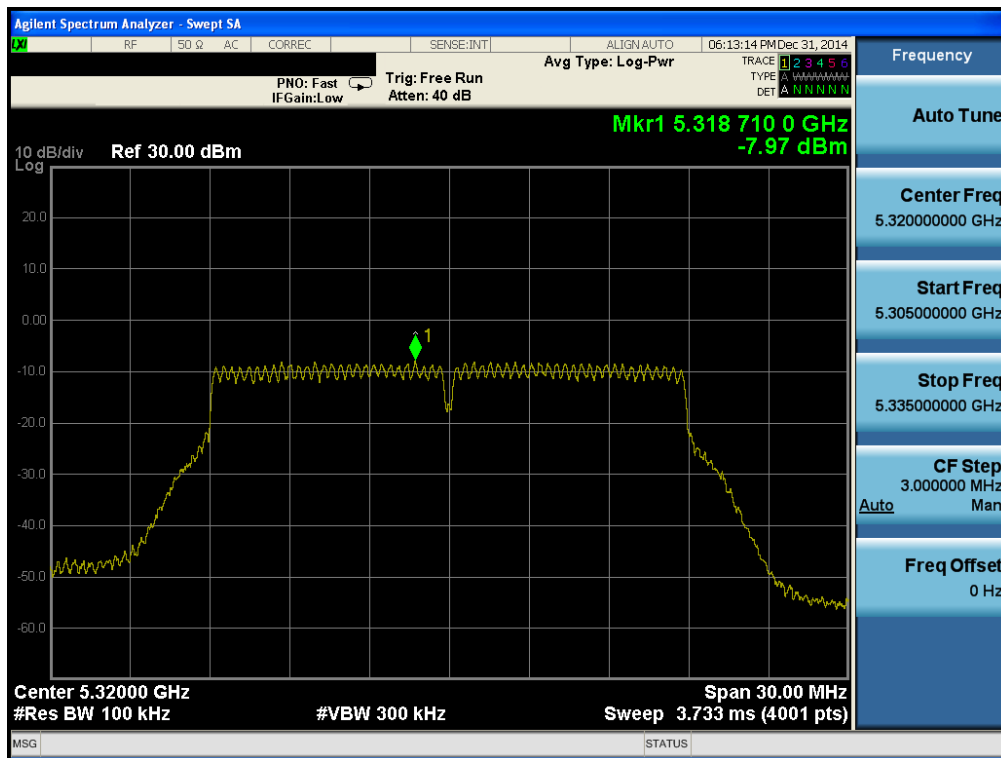
Maximum Power Spectral Density

Test Mode: 802.11n HT20 & Ch.60 & ANT 2(SISO)



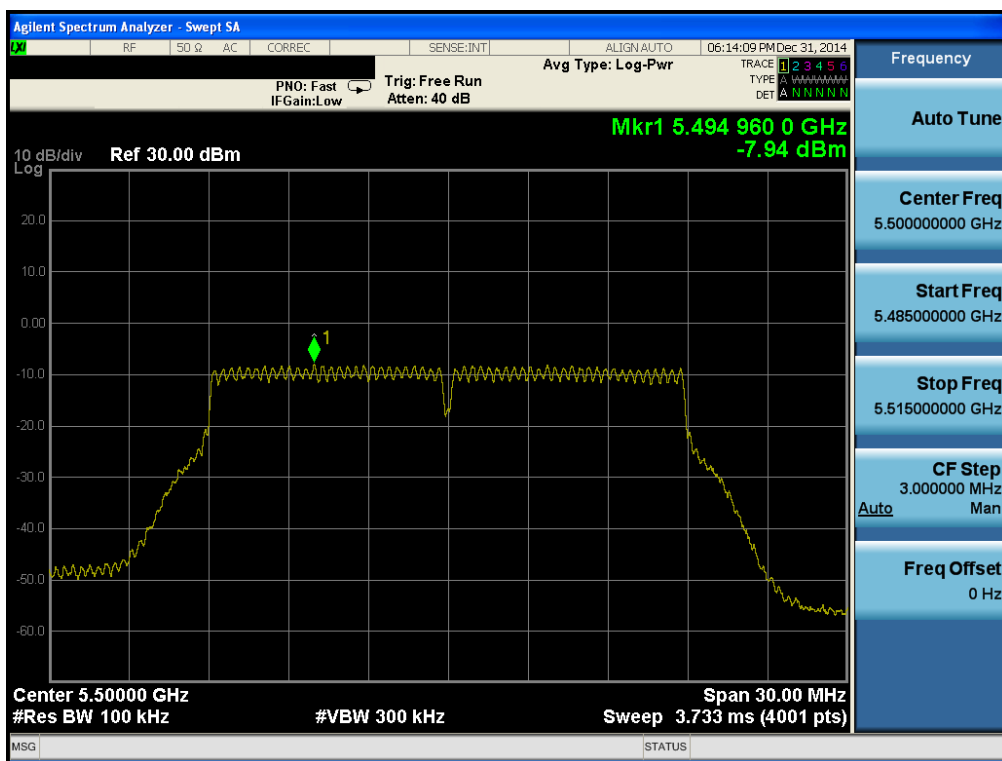
Maximum Power Spectral Density

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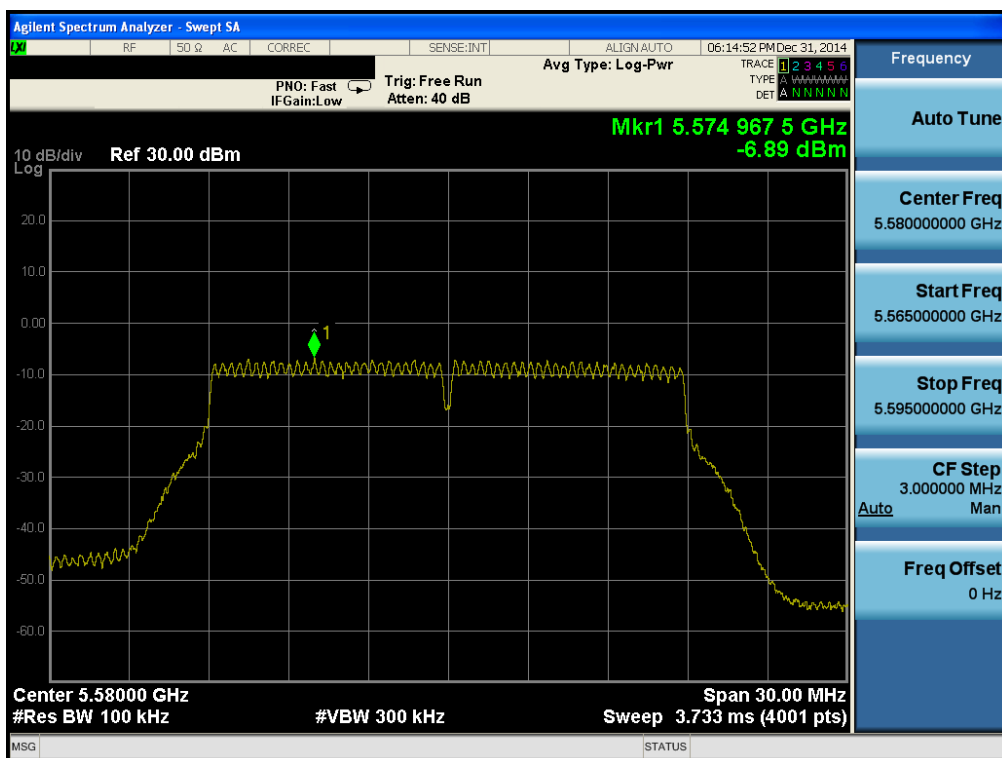
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Test Mode: 802.11n HT20 & Ch.100 & ANT 2(SISO)



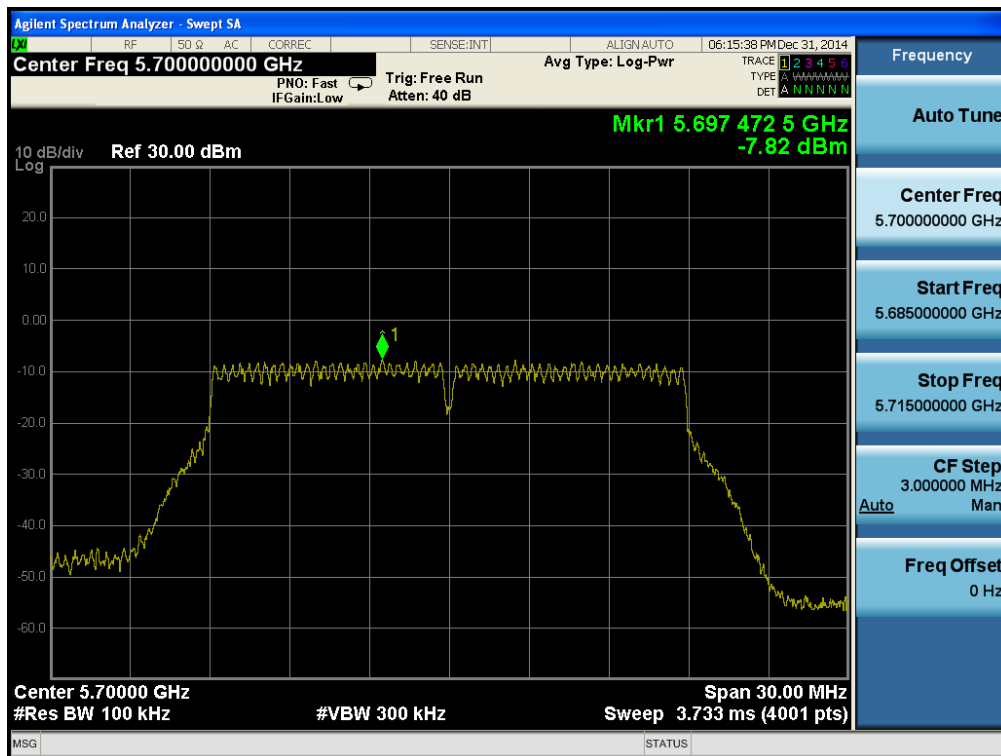
Maximum Power Spectral Density

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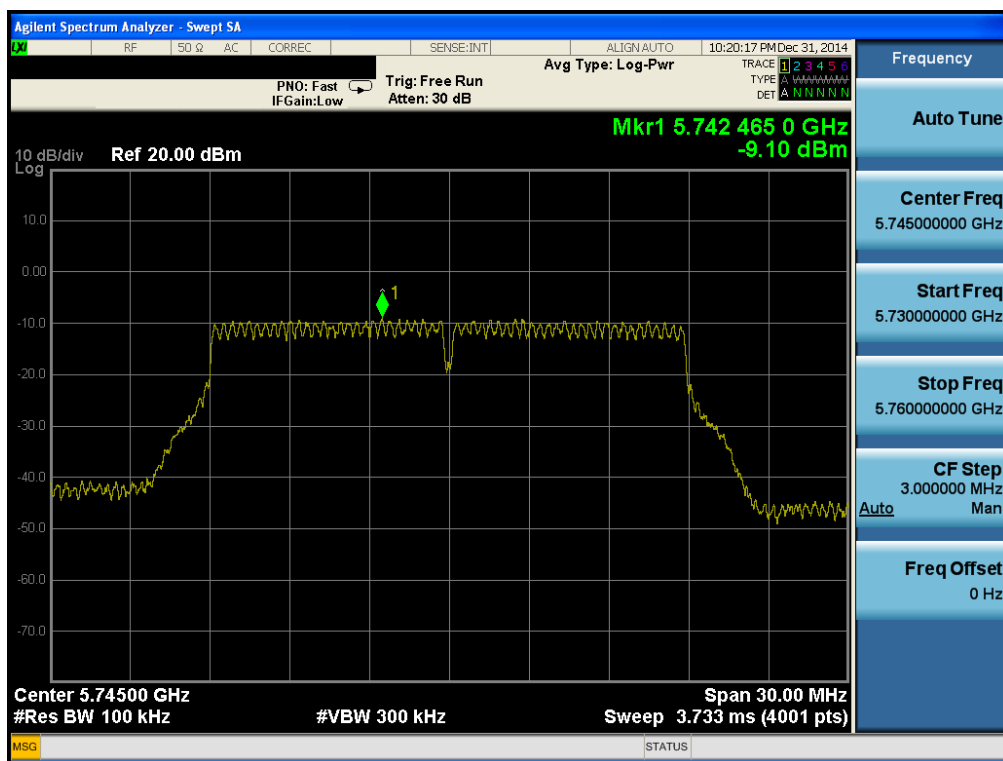
Maximum Power Spectral Density

Test Mode: 802.11n HT20 & Ch.140 & ANT 2(SISO)



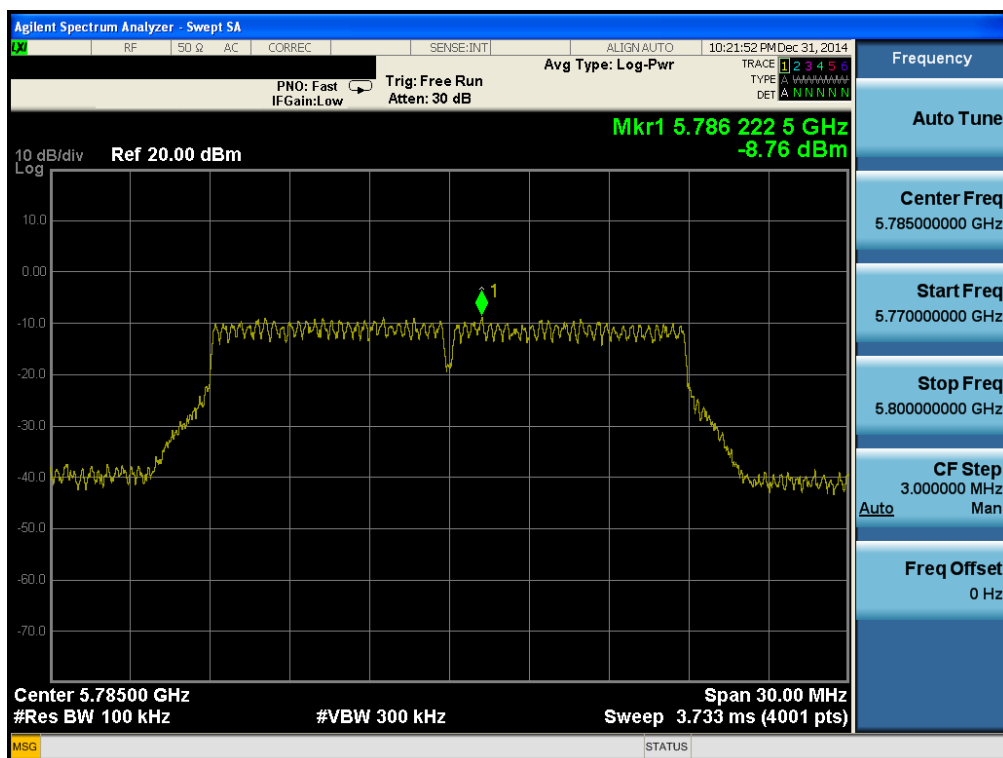
Maximum Power Spectral Density

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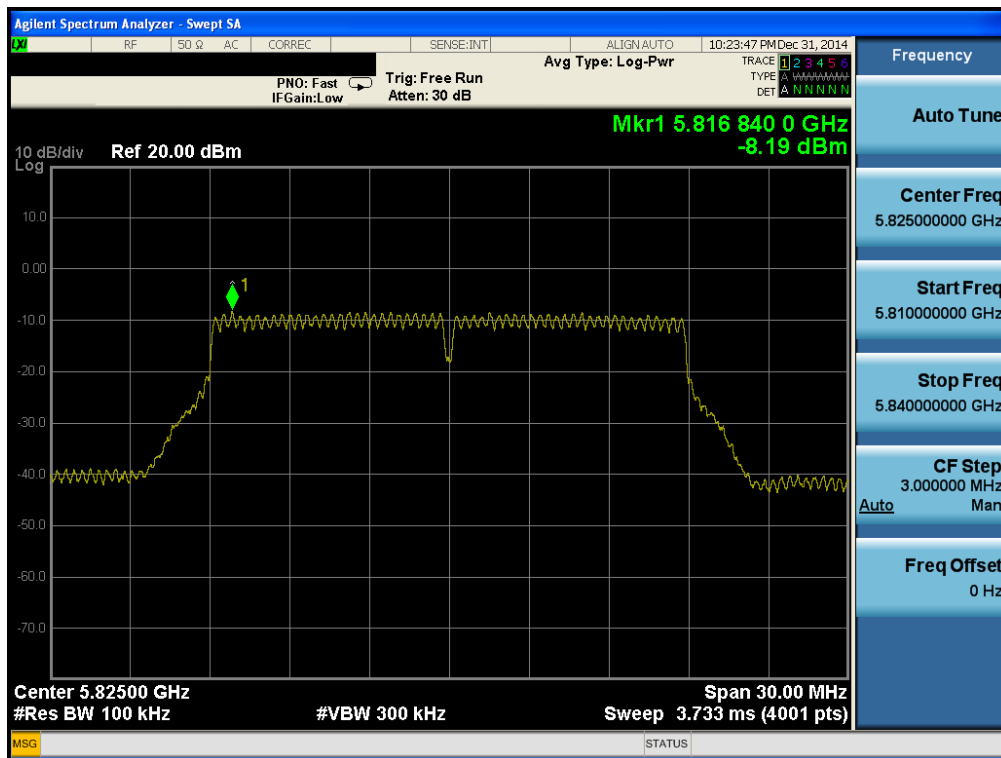
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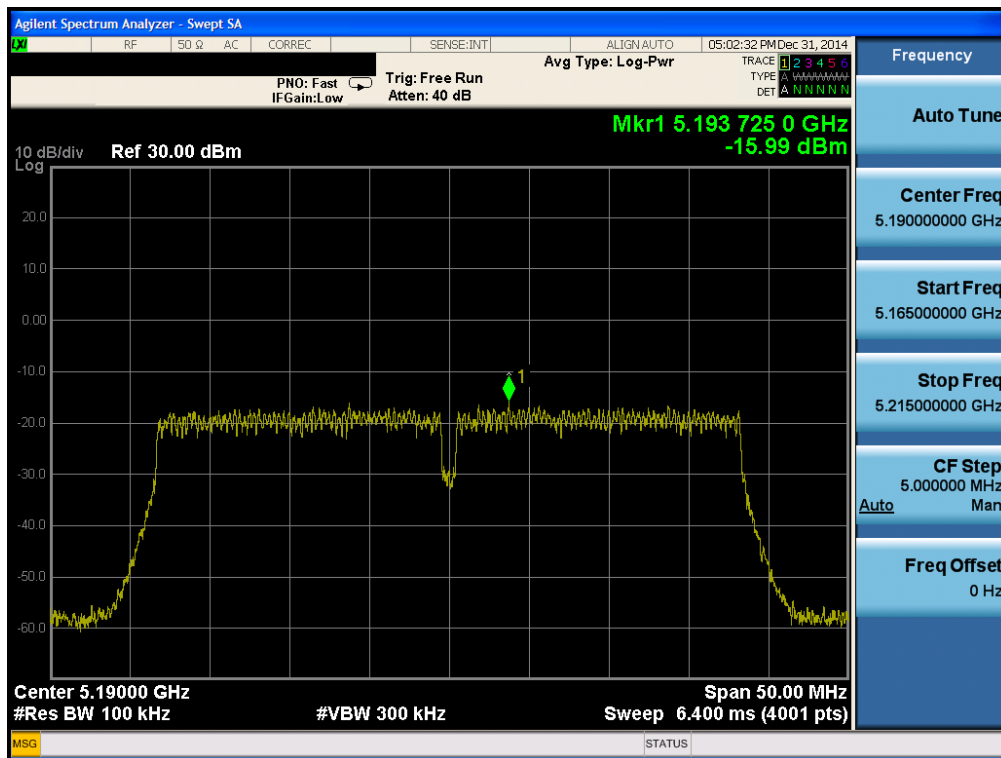
Maximum Power Spectral Density

Test Mode: 802.11n HT20 & Ch.165 & ANT 2(SISO)



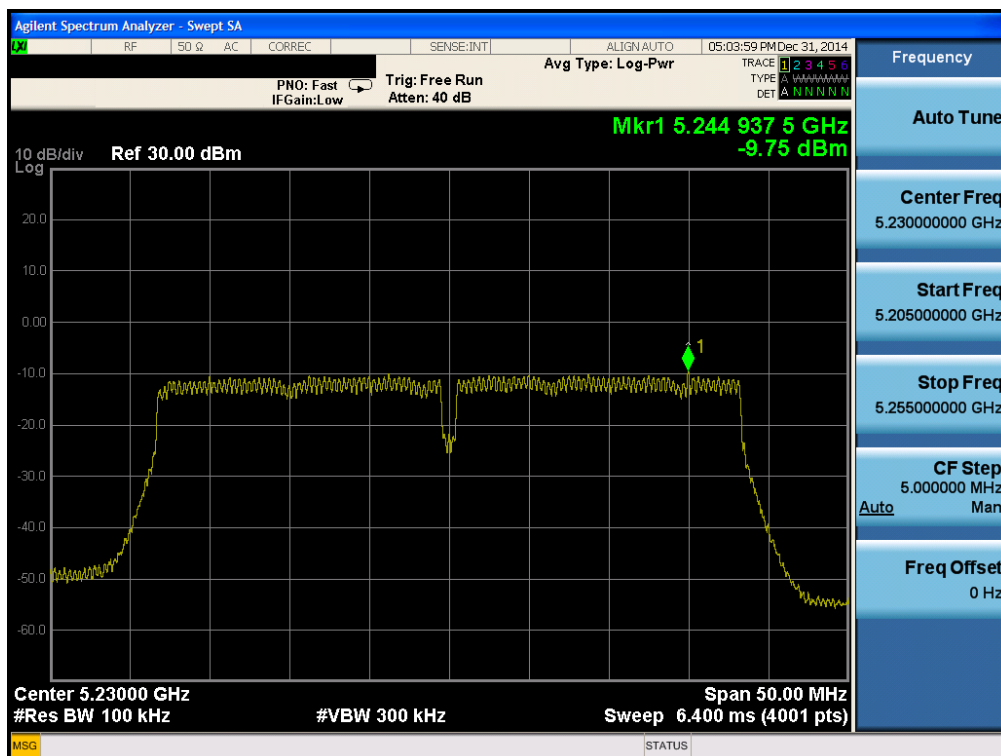
Maximum Power Spectral Density

Test Mode: 802.11n HT40 & Ch.38 & ANT 1(SISO)



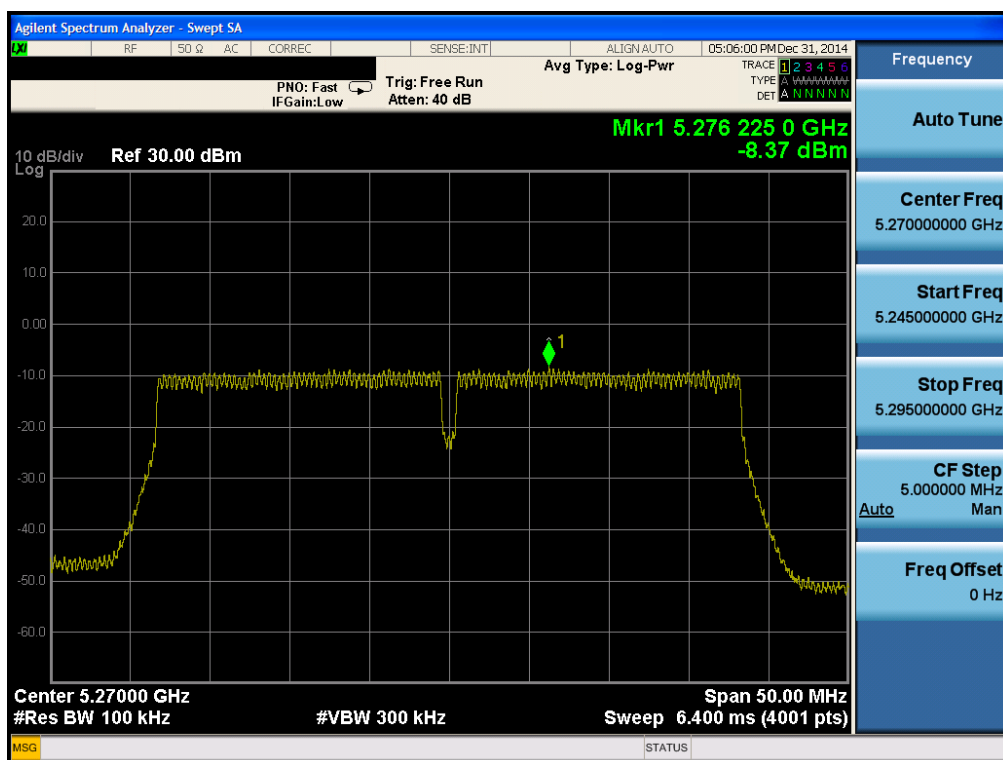
Maximum Power Spectral Density

Test Mode: 802.11n HT40 & Ch.46 & ANT 1(SISO)



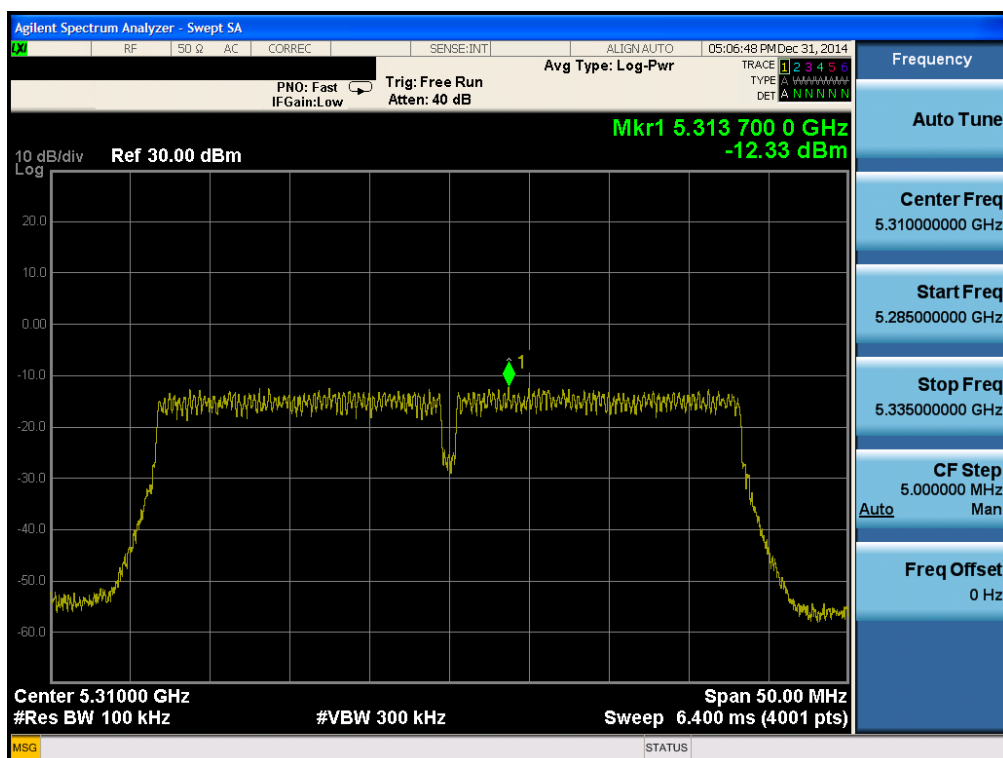
Maximum Power Spectral Density

Test Mode: 802.11n HT40 & Ch.54 & ANT 1(SISO)



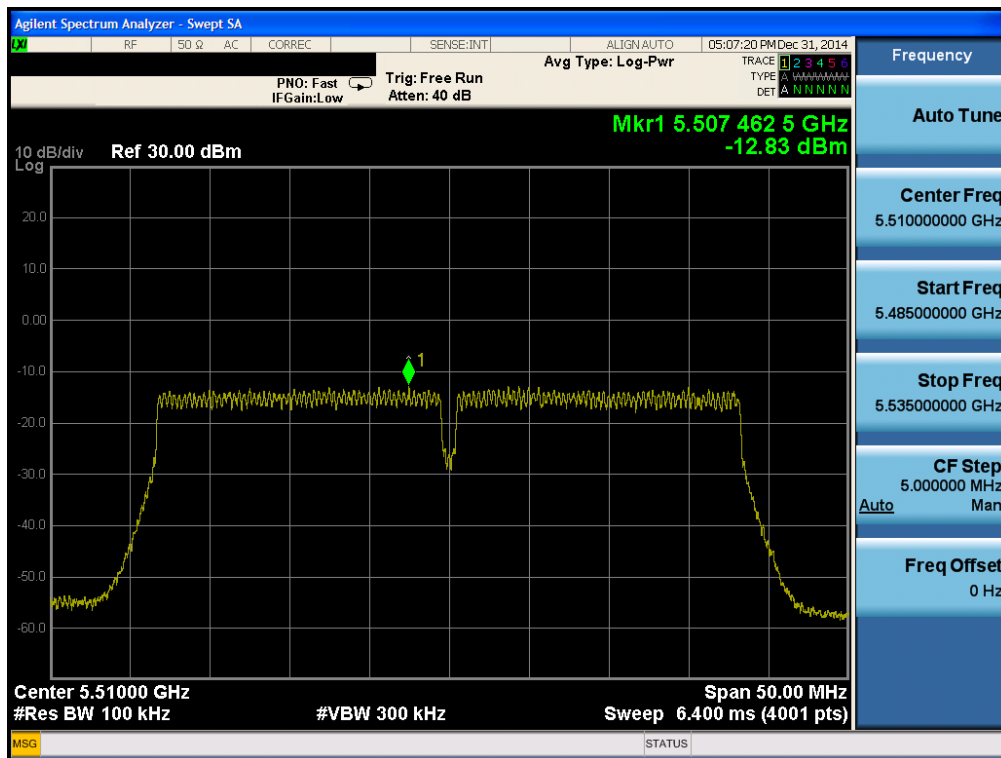
Maximum Power Spectral Density

Test Mode: 802.11n HT40 & Ch.62 & ANT 1(SISO)



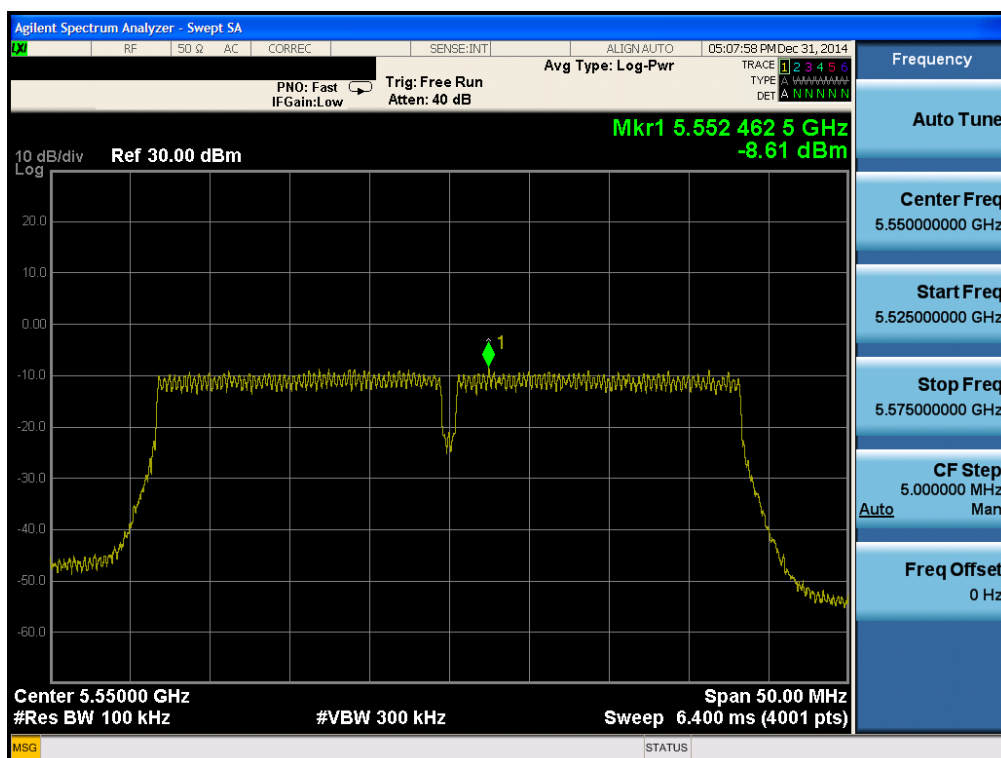
Maximum Power Spectral Density

Test Mode: 802.11n HT40 & Ch.102 & ANT 1(SISO)



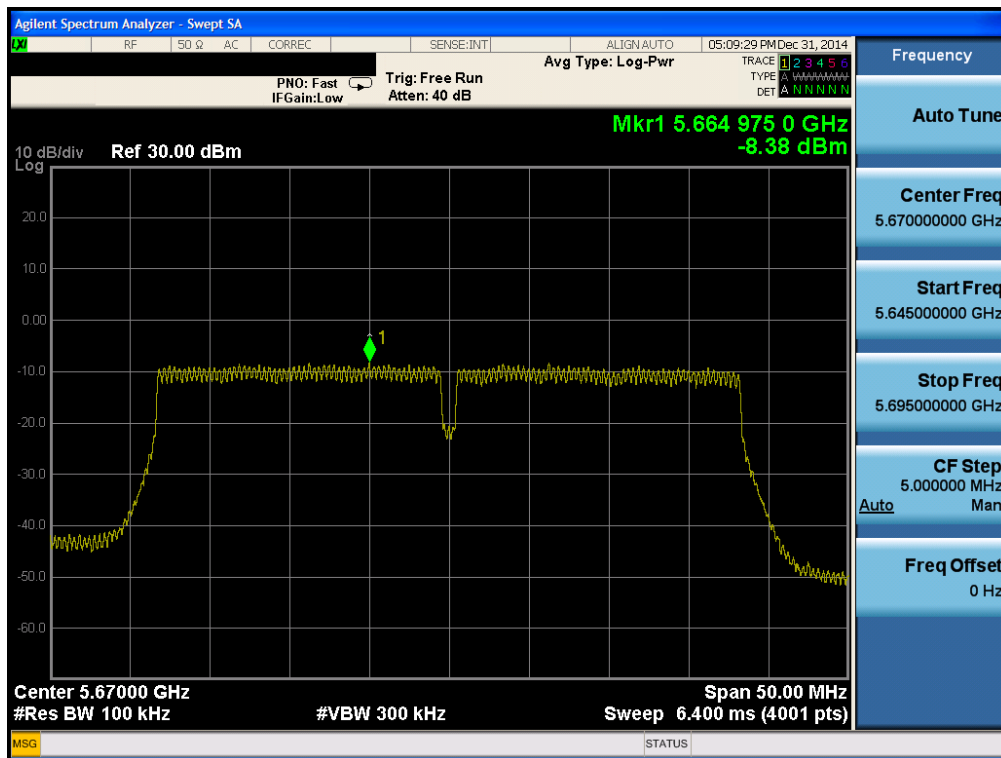
Maximum Power Spectral Density

Test Mode: 802.11n HT40 & Ch.110 & ANT 1(SISO)



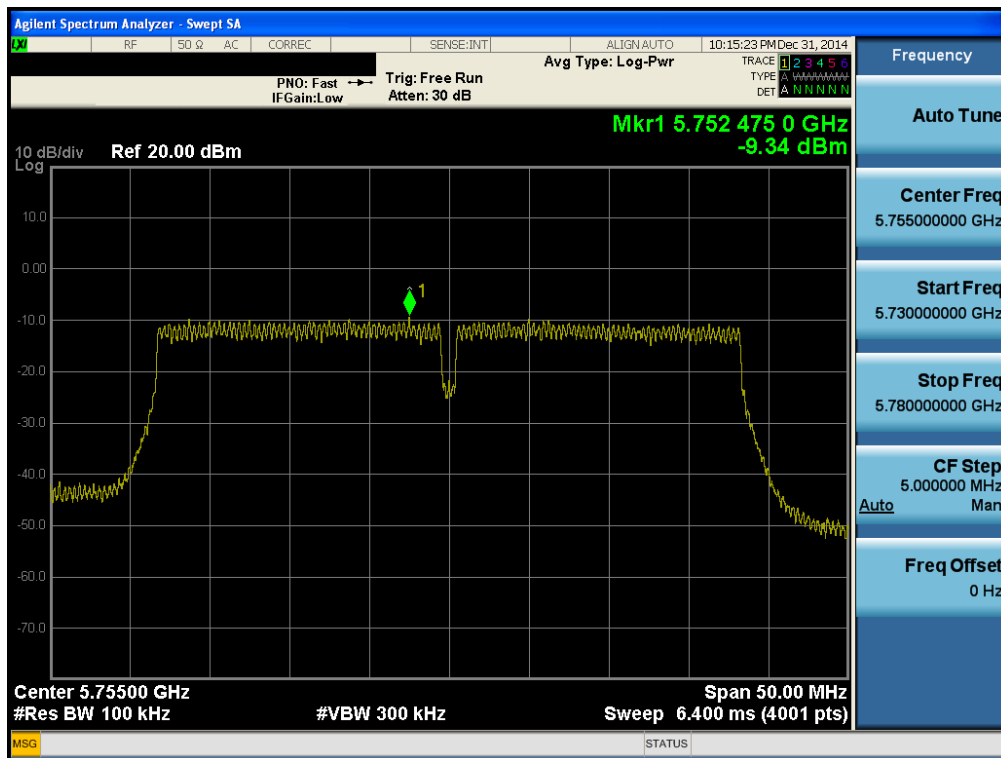
Maximum Power Spectral Density

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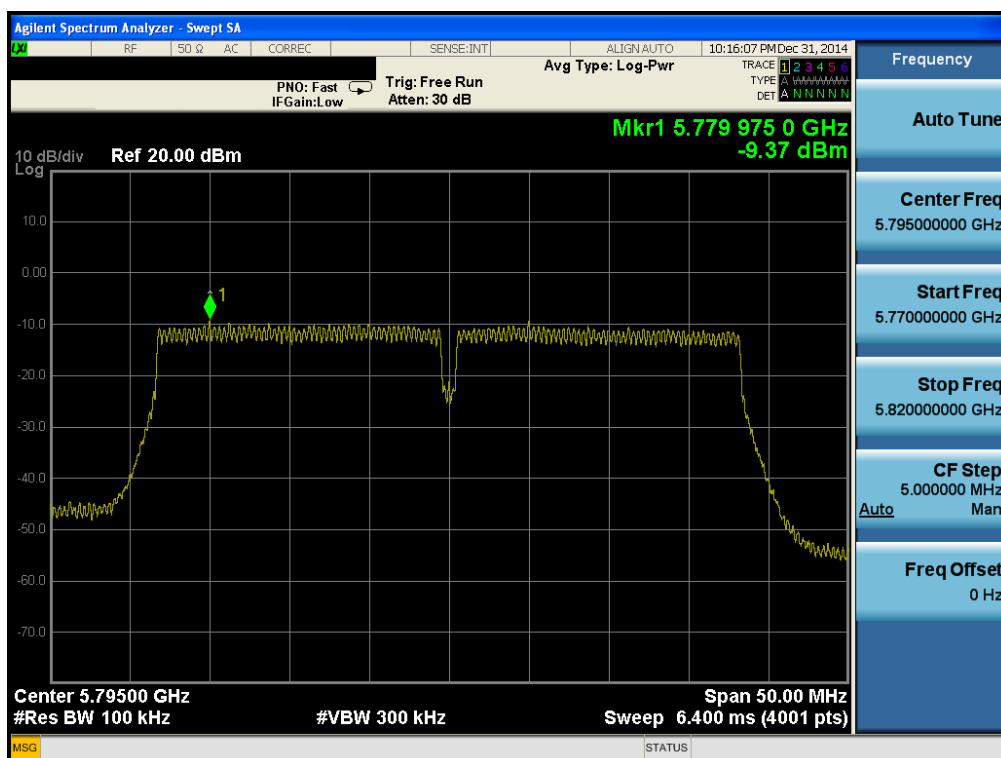
Maximum Power Spectral Density

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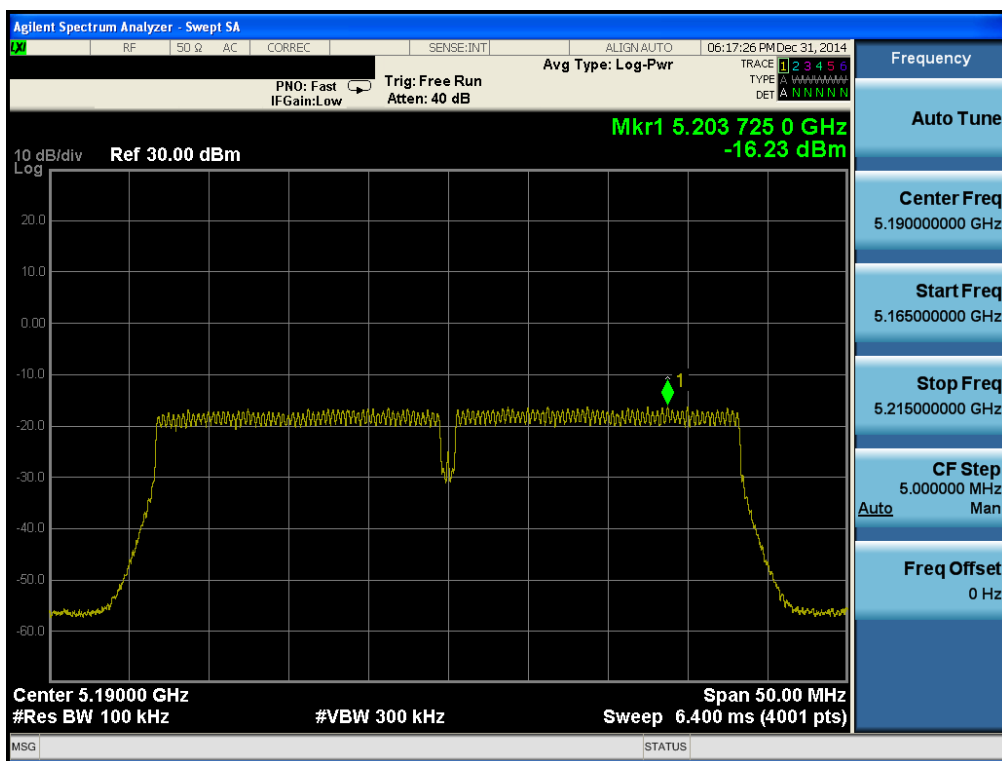
Maximum Power Spectral Density

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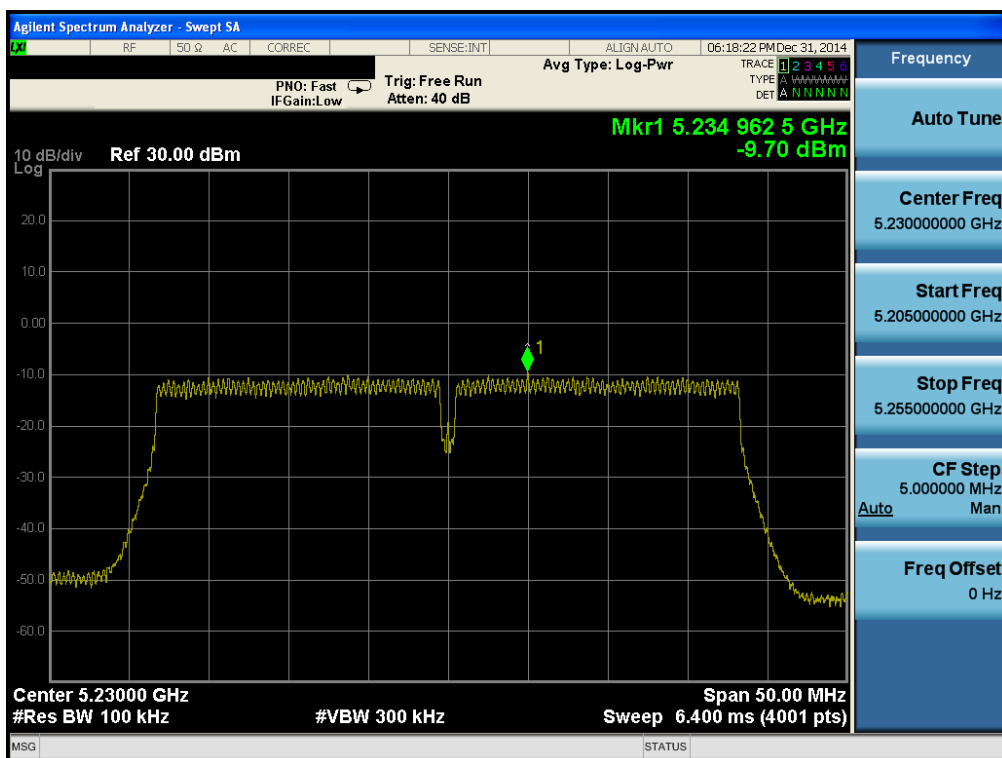
Maximum Power Spectral Density

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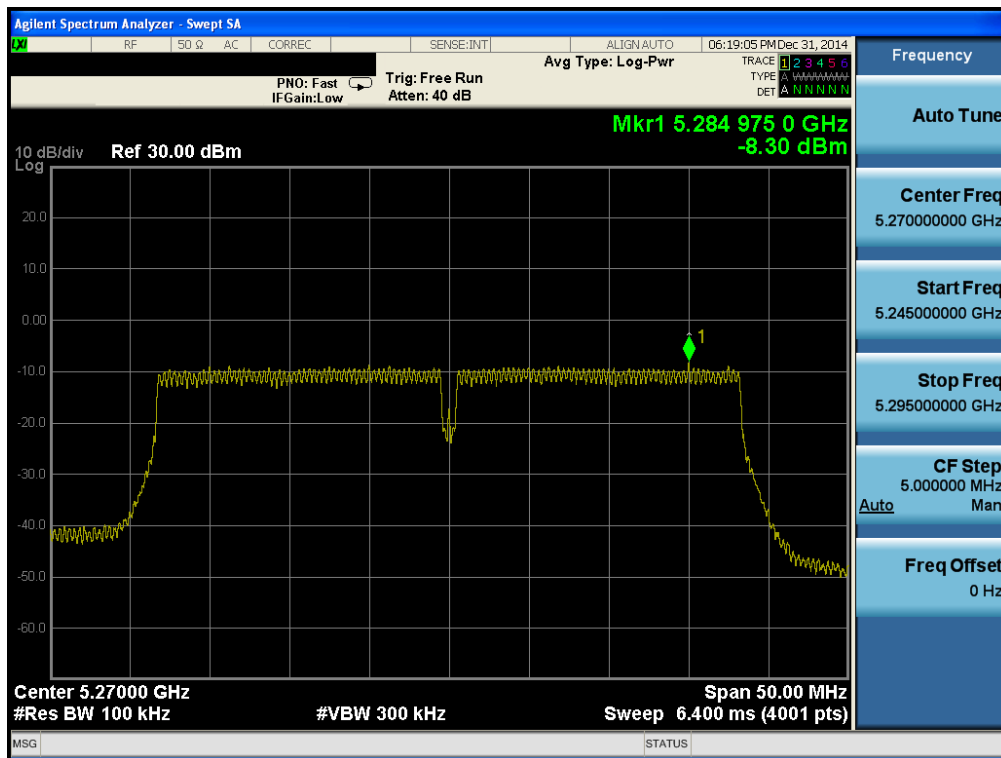
Maximum Power Spectral Density

Test Mode: 802.11n HT40 & Ch.46 & ANT 2(SISO)



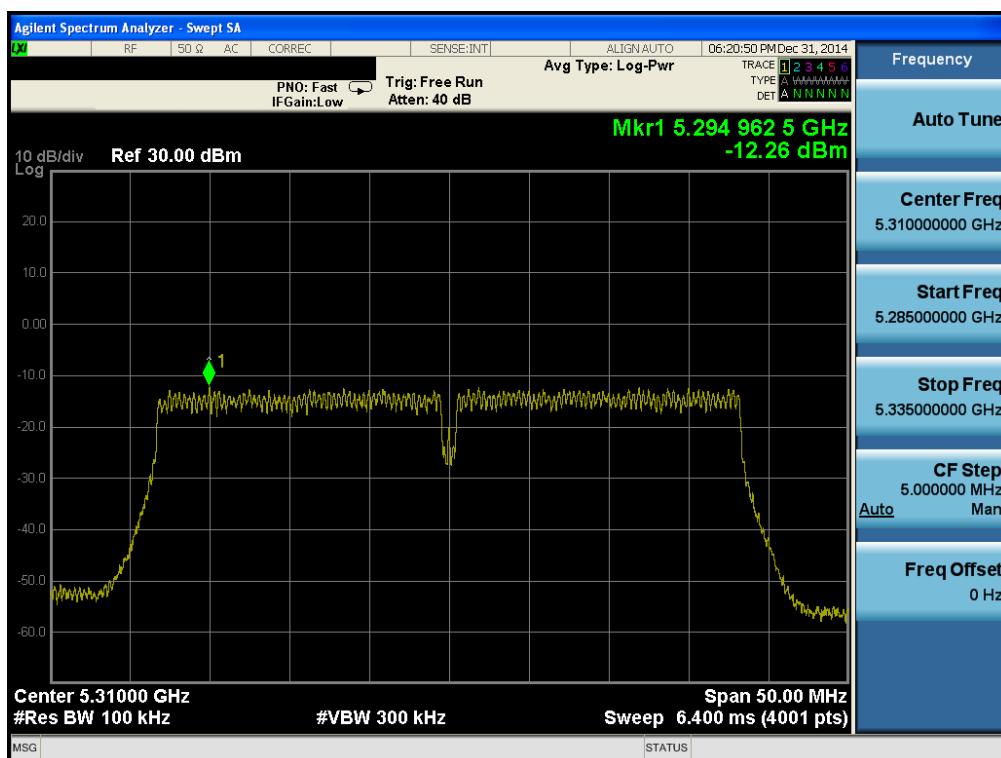
Maximum Power Spectral Density

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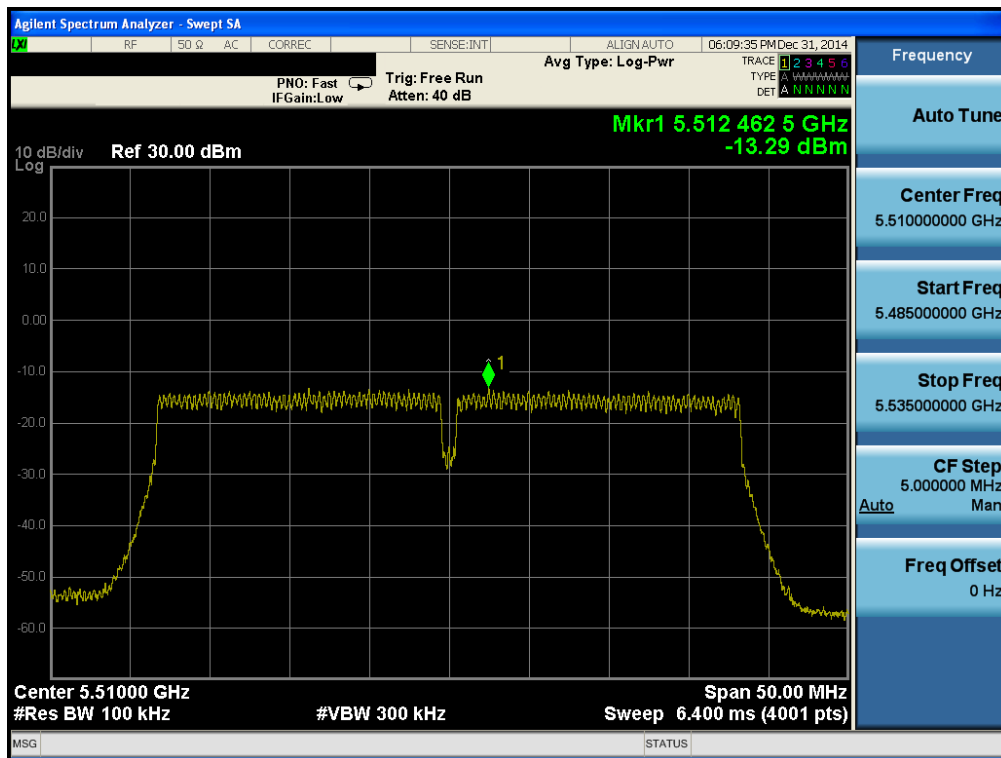
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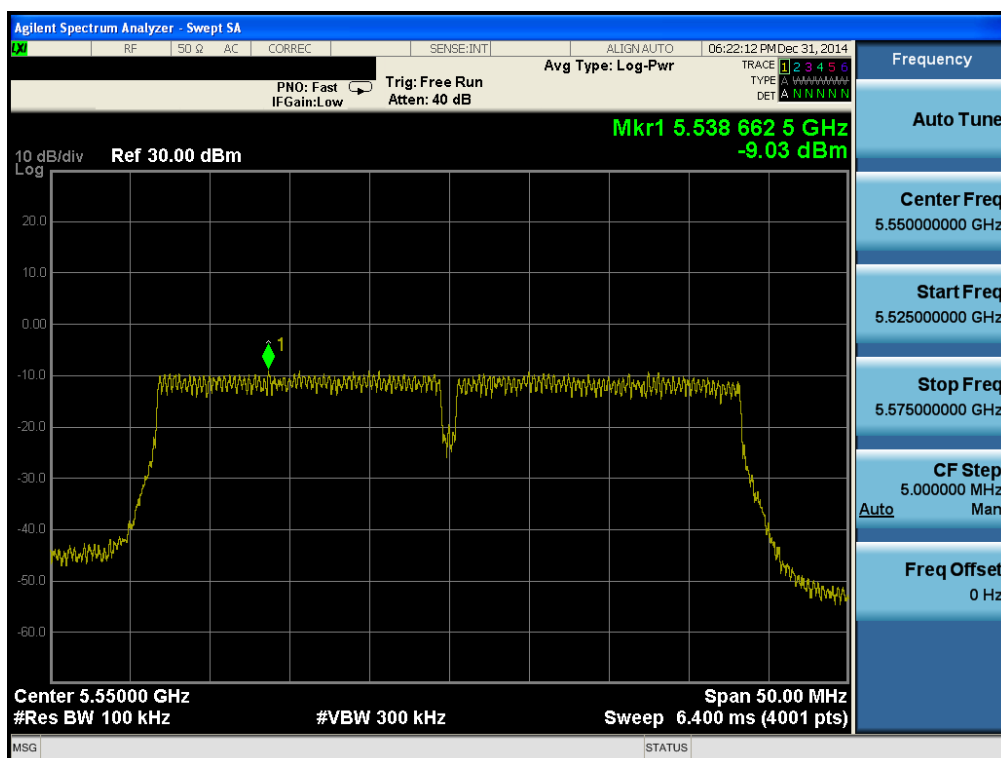
Maximum Power Spectral Density

Test Mode: 802.11n HT40 & Ch.102 & ANT 2(SISO)



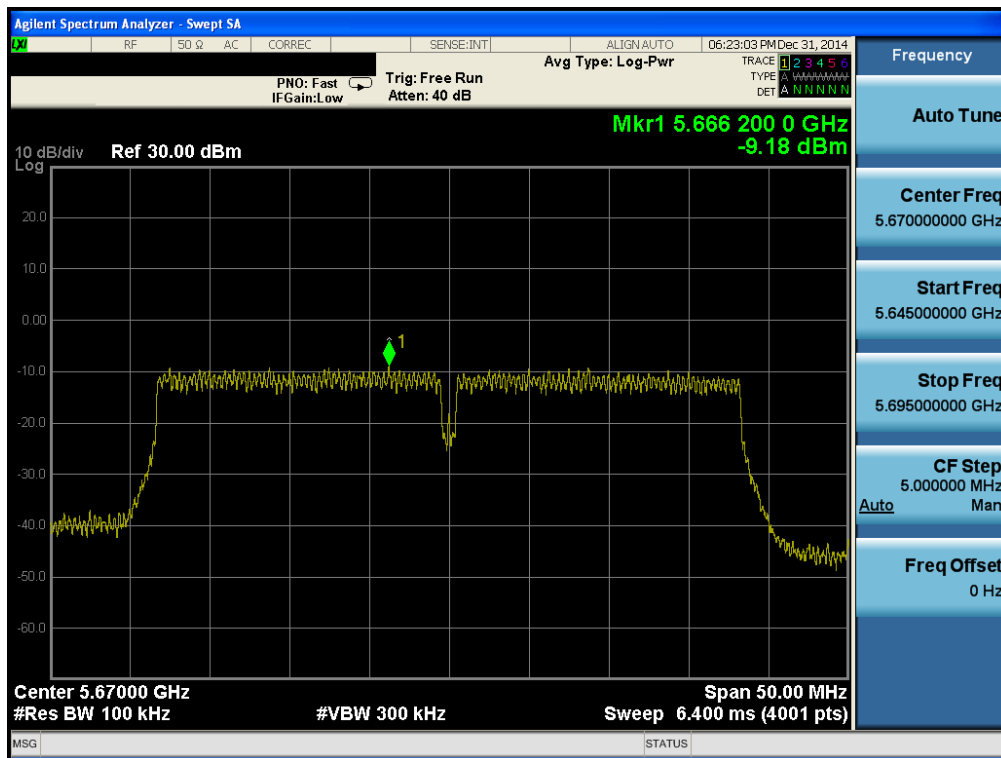
Maximum Power Spectral Density

Test Mode: 802.11n HT40 & Ch.110 & ANT 2(SISO)



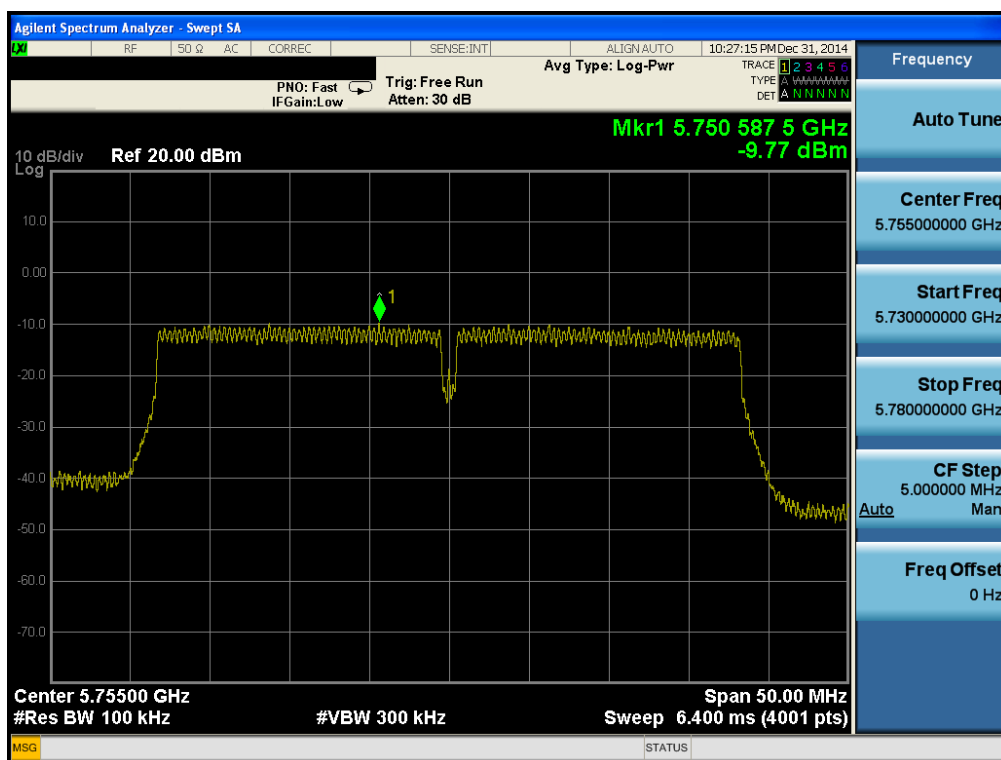
Maximum Power Spectral Density

Test Mode: 802.11n HT40 & Ch.134 & ANT 2(SISO)



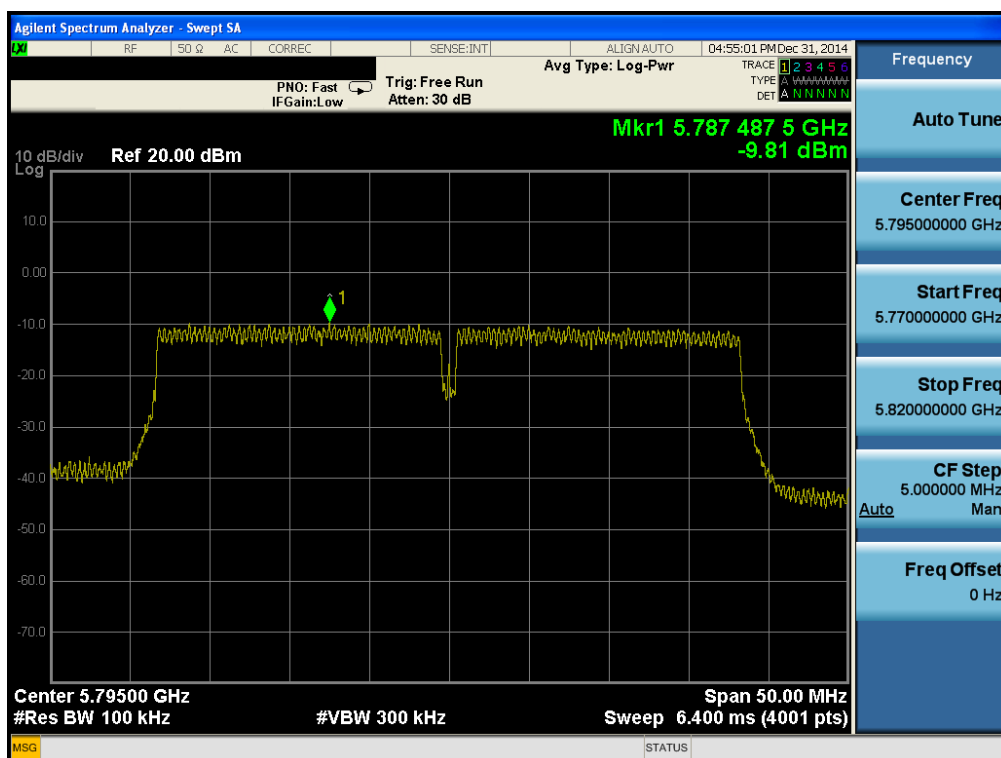
Maximum Power Spectral Density

Test Mode: 802.11n HT40 & Ch.151 & ANT 2(SISO)



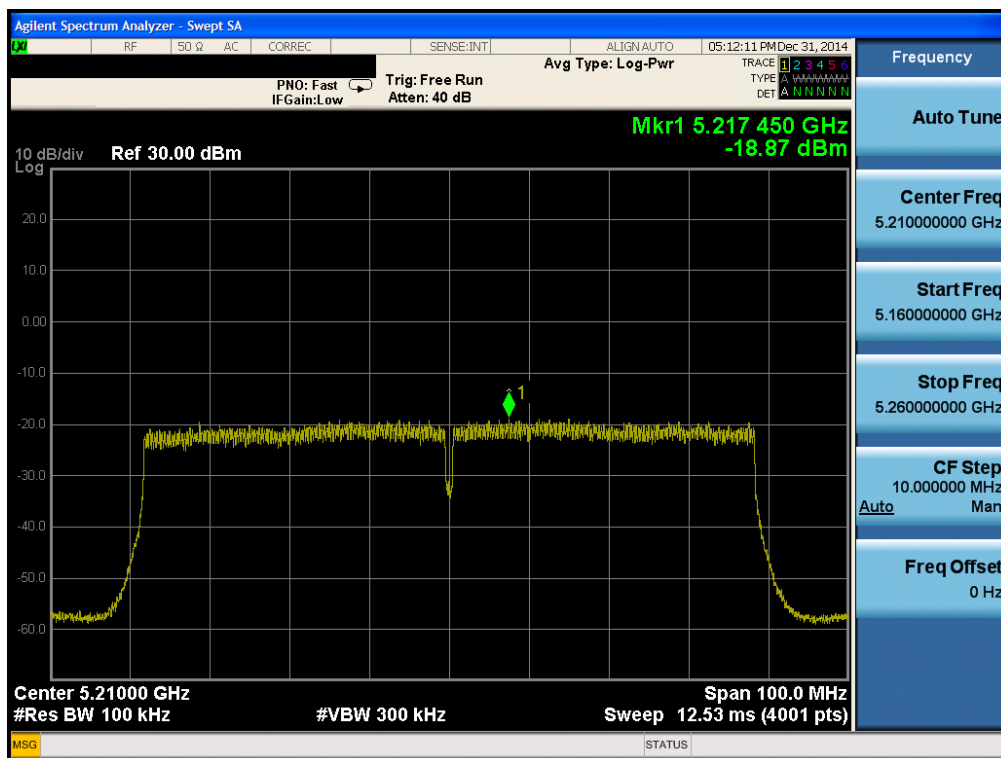
Maximum Power Spectral Density

Test Mode: 802.11n HT40 & Ch.159 & ANT 2(SISO)



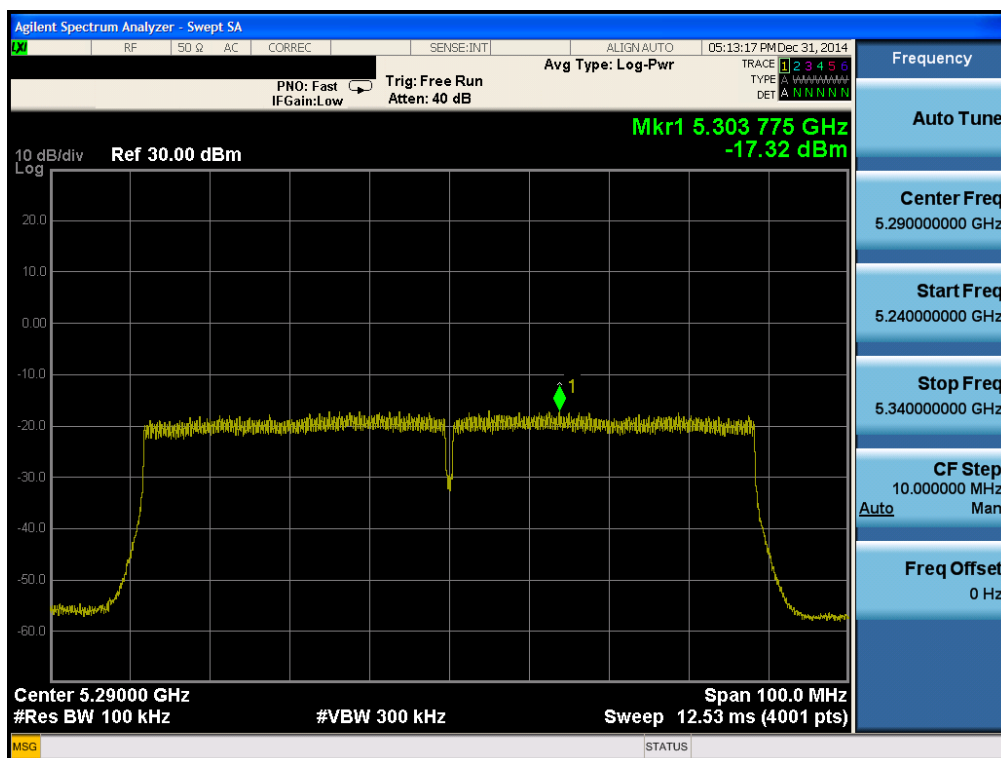
Maximum Power Spectral Density

Test Mode: 802.11ac VHT80 & Ch.42 & ANT 1(SISO)



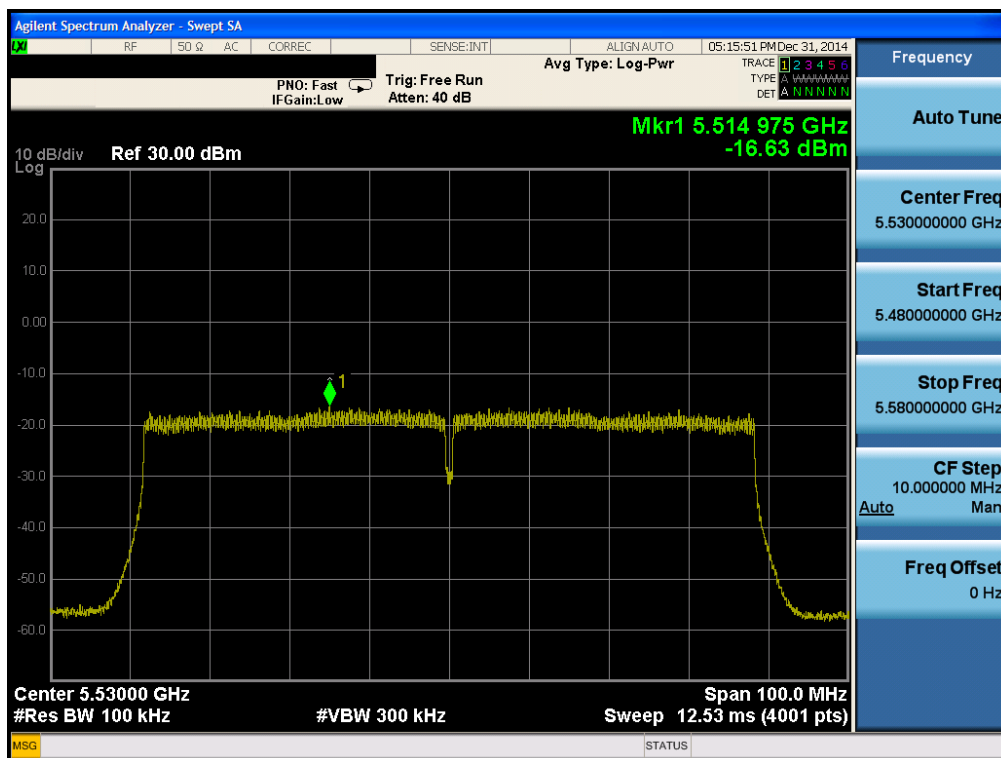
Maximum Power Spectral Density

Test Mode: 802.11ac VHT80 & Ch.58 & ANT 1(SISO)



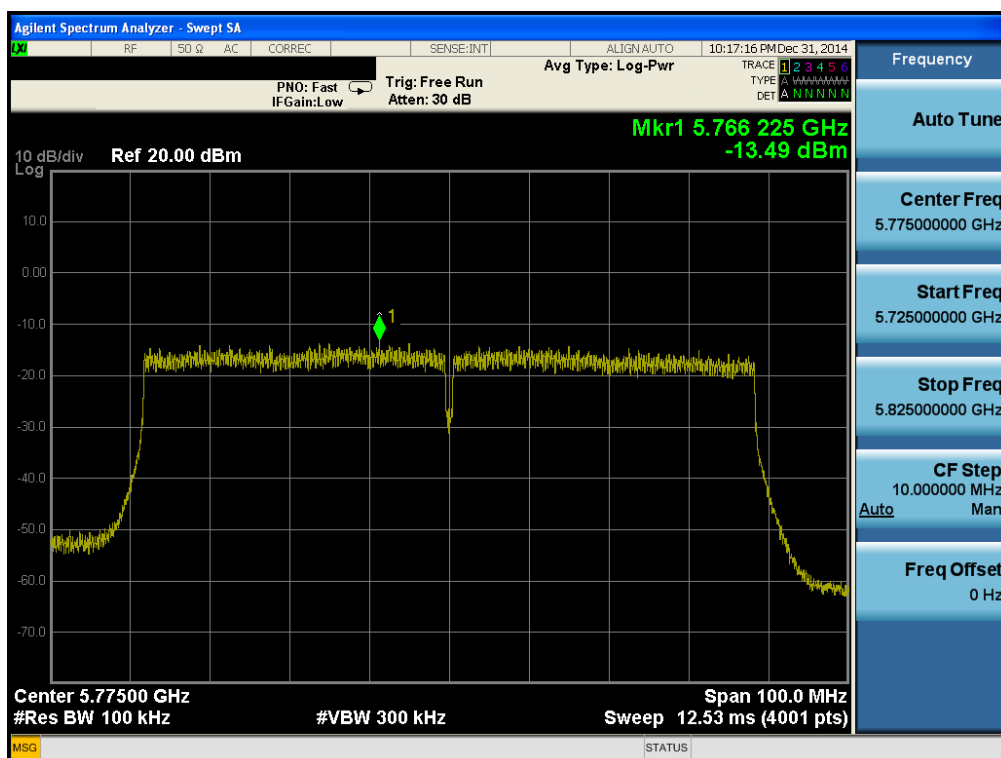
Maximum Power Spectral Density

Test Mode: 802.11ac VHT80 & Ch.106 & ANT 1(SISO)



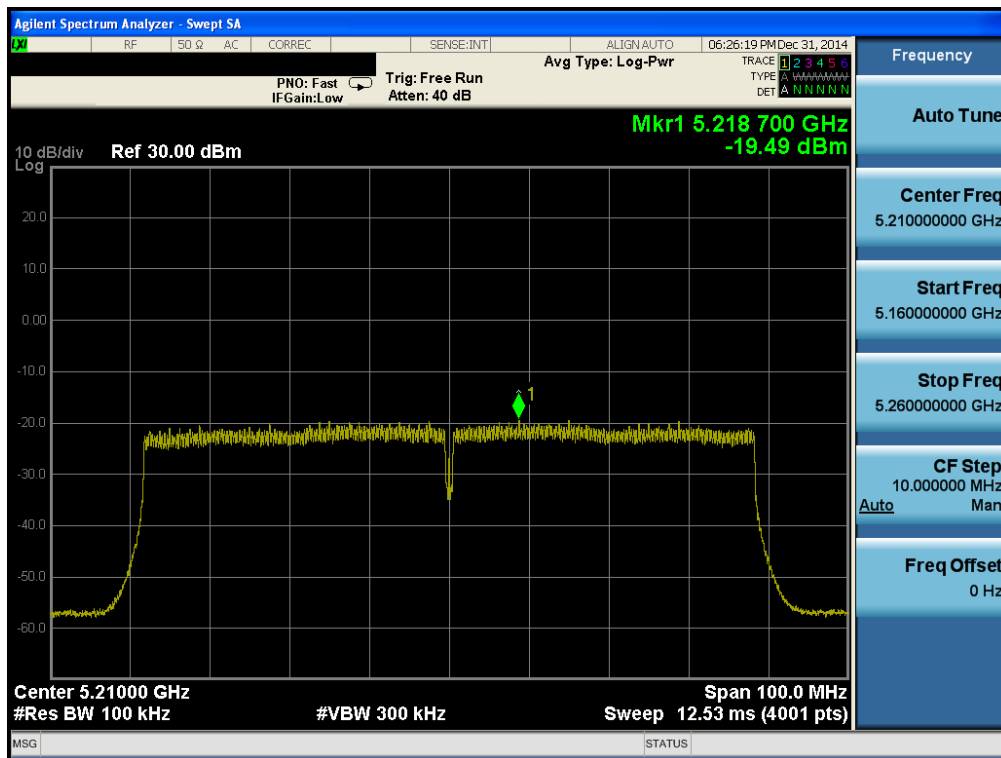
Maximum Power Spectral Density

Test Mode: 802.11ac VHT80 & Ch.155 & ANT 1(SISO)



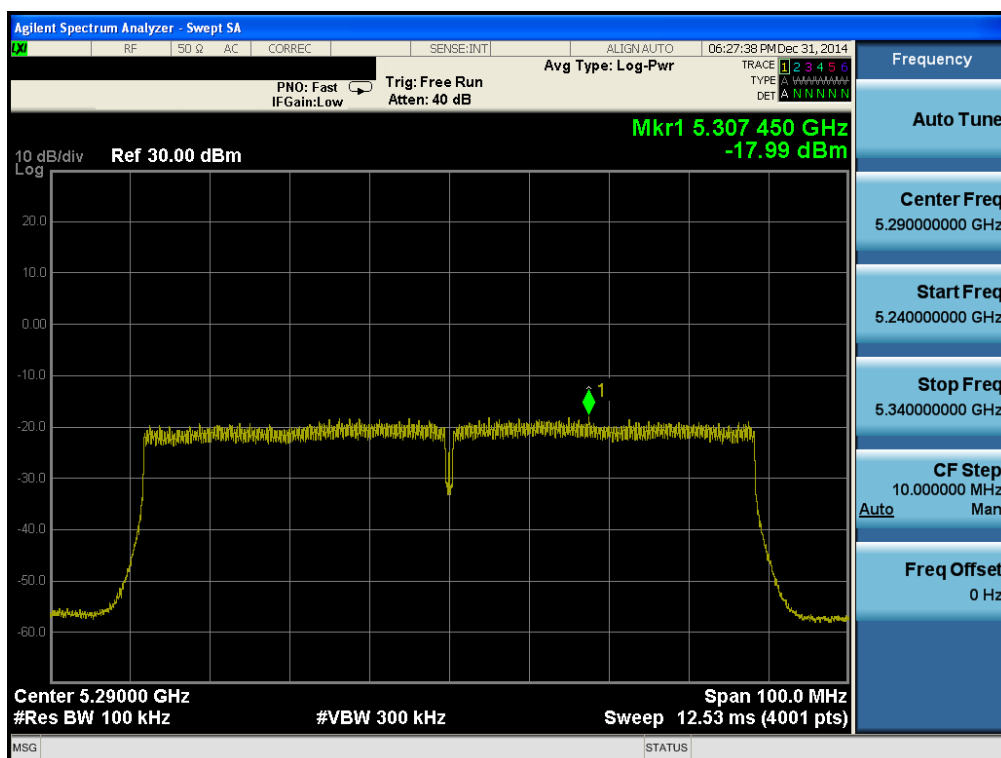
Maximum Power Spectral Density

Test Mode: 802.11ac VHT80 & Ch.42 & ANT 2(SISO)



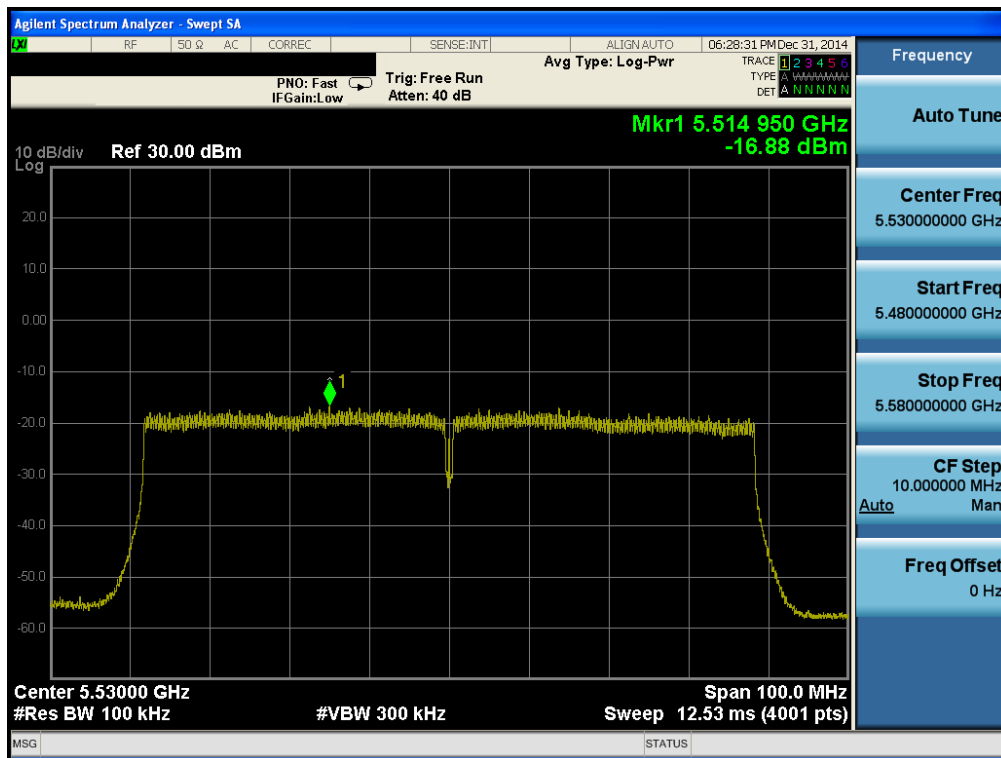
Maximum Power Spectral Density

Test Mode: 802.11ac VHT80 & Ch.58 & ANT 2(SISO)



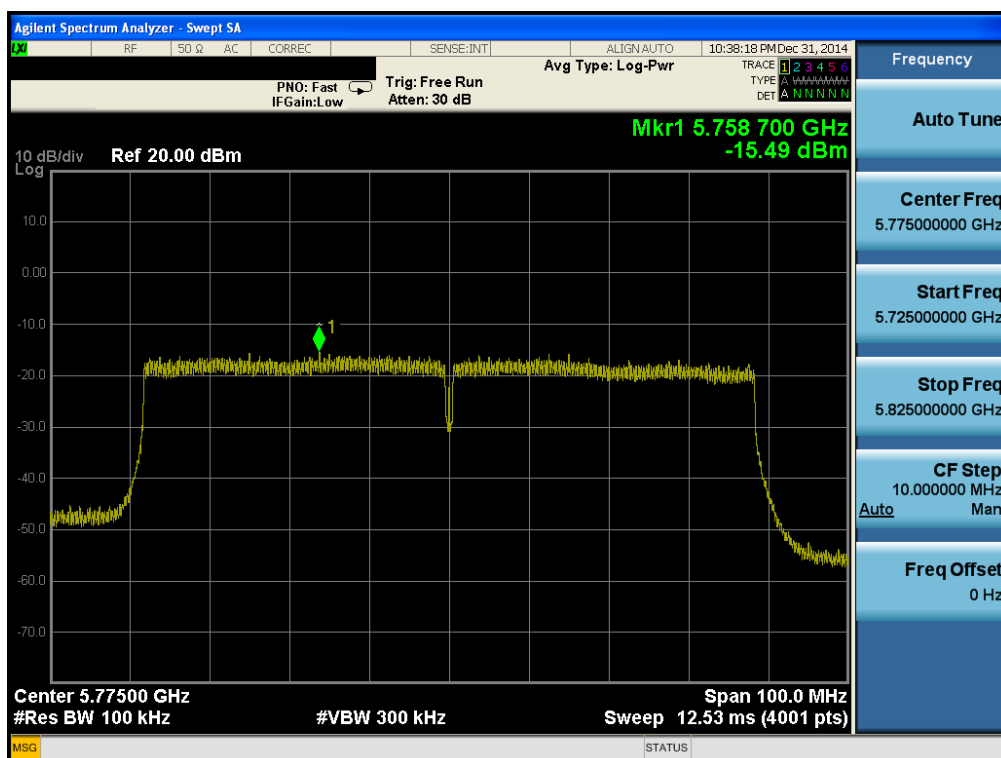
Maximum Power Spectral Density

Test Mode: 802.11ac VHT80 & Ch.106 & ANT 2(SISO)



Maximum Power Spectral Density

Test Mode: 802.11ac VHT80 & Ch.155 & ANT 2(SISO)



8.5 Frequency Stability

■ Test requirements

Manufacturers of U-NII devices are responsible for ensuring frequency stability such that an emission is maintained within the band of operation under all conditions of normal operation as specified in the user's manual.

■ Test Procedure

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

■ Test Results: **Comply**

Supply Voltage (V DC)	TEMP (°C)	U-NII 1 Operating freq.: 5180MHz		U-NII 2A Operating freq.: 5180MHz		U-NII 2C Operating freq.: 5180MHz		U-NII 3 Operating freq.: 5745MHz	
		Frequency (Hz)	Deviation (%)	Frequency (Hz)	Deviation (%)	Frequency (Hz)	Deviation (%)	Frequency (Hz)	Deviation (%)
5.00 (100%)	+25	5,180,006,135	0.000118	5,180,004,885	0.000094	5,180,005,273	0.000102	5,745,006,036	0.000105
	+50	5,180,010,326	0.000199	5,180,010,043	0.000194	5,180,010,373	0.000200	5,745,010,050	0.000175
	+40	5,180,015,369	0.000297	5,180,015,133	0.000292	5,180,015,541	0.000300	5,745,015,121	0.000263
	+30	5,180,020,384	0.000394	5,180,020,116	0.000388	5,180,020,667	0.000399	5,745,020,731	0.000361
	+20	5,180,025,325	0.000489	5,180,025,388	0.000490	5,180,025,758	0.000497	5,745,025,630	0.000446
	+10	5,180,030,359	0.000586	5,180,030,423	0.000587	5,180,030,851	0.000596	5,745,030,448	0.000530
	0	5,180,035,418	0.000684	5,180,035,494	0.000685	5,180,035,779	0.000691	5,745,035,239	0.000613
	-10	5,180,040,532	0.000782	5,180,040,502	0.000782	5,180,040,943	0.000790	5,745,040,014	0.000696
	-20	5,180,038,820	0.000749	5,180,038,954	0.000752	5,180,039,154	0.000756	5,745,040,258	0.000701
	-30	5,180,045,412	0.000877	5,180,045,648	0.000881	5,180,045,527	0.000879	5,745,045,025	0.000784
4.25 (85%)	+25	5,180,045,102	0.000871	5,180,045,215	0.000873	5,180,045,125	0.000871	5,745,045,414	0.000790
5.75 (115%)	+25	5,180,010,422	0.000201	5,180,010,622	0.000205	5,180,010,512	0.000203	5,745,010,381	0.000181

8.6 Radiated Spurious Emission Measurements

■ Test Procedure

• FCC Part 15.209(a) and (b)

Frequency (MHz)	Limit (uV/m)	Measurement Distance (meter)
0.009 – 0.490	2400/F(KHz)	300
0.490 – 1.705	24000/F(KHz)	30
1.705 – 30.0	30	30
30 ~ 88	100 **	3
88 ~ 216	150 **	3
216 ~ 960	200 **	3
Above 960	500	3

** Except as provided in 15.209(g), fundamental emissions from intentional radiators operating under this Section shall not be located in the frequency bands 54-72 MHz, 76-88MHz, 174-216MHz or 470-806MHz. However, operation within these frequency bands is permitted under other sections of this Part, e.g. 15.231 and 15.241.

• FCC Part 15.205 (a): Only spurious emissions are permitted in any of the frequency bands listed below:

MHz	MHz	MHz	MHz	GHz	GHz
0.009 ~ 0.110	8.41425 ~ 8.41475	108 ~ 121.94	1300 ~ 1427	4.5 ~ 5.15	14.47 ~ 14.5
0.495 ~ 0.505	12.29 ~ 12.293	123 ~ 138	1435 ~ 1626.5	5.35 ~ 5.46	15.35 ~ 16.2
2.1735 ~ 2.1905	12.51975 ~	149.9 ~ 150.05	1645.5 ~ 1646.5	7.25 ~ 7.75	17.7 ~ 21.4
4.125 ~ 4.128	12.52025	160.52475 ~	1660 ~ 1710	8.025 ~ 8.5	22.01 ~ 23.12
4.17725 ~ 4.17775	12.57675 ~	160.52525	1718.8 ~ 1722.2	9.0 ~ 9.2	23.6 ~ 24.0
4.20725 ~ 4.20775	12.57725	160.7 ~ 160.9	2200 ~ 2300	9.3 ~ 9.5	31.2 ~ 31.8
6.215 ~ 6.218	13.36 ~ 13.41	162.0125 ~ 167.17	2310 ~ 2390	10.6 ~ 12.7	36.43 ~ 36.5
6.26775 ~ 6.26825	16.42 ~ 16.423	167.72 ~ 173.2	2483.5 ~ 2500	13.25 ~ 13.4	Above 38.6
6.31175 ~ 6.31225	16.69475 ~	240 ~ 285	2655 ~ 2900		
8.291 ~ 8.294	16.69525	322 ~ 335.4	3260 ~ 3267		
8.362 ~ 8.366	16.80425 ~	399.90 ~ 410	3332 ~ 3339		
8.37625 ~ 8.38675	16.80475	608 ~ 614	3345.8 ~ 3358		
	25.5 ~ 25.67	960 ~ 1240	3600 ~ 4000		
	37.5 ~ 38.25				
	73 ~ 74.6				
	74.8 ~ 75.2				

• **FCC Part 15.205(b):** The field strength of emissions appearing within these frequency bands shall not exceed the limits shown in §15.209. At frequencies equal to or less than 1000 MHz, compliance with the limits in §15.209 shall be demonstrated using measurement instrumentation employing a CISPR quasi-peak detector. Above 1000 MHz, compliance with the emission limits in §15.209 shall be demonstrated based on the average value of the measured emissions. The provisions in §15.35 apply to these measurements.

• **FCC Part 15.407 (b):** Undesirable emission limits. Except as shown in paragraph (b)(7) of this section, the maximum emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:

- (1) For transmitters operating in the **5.15-5.25 GHz band**: all emissions outside of the **5.15-5.35 GHz band** shall not exceed an **EIRP of -27 dBm/MHz**.
- (2) For transmitters operating in the **5.25-5.35 GHz band**: all emissions outside of the **5.15-5.35 GHz band** shall not exceed an **EIRP of -27 dBm/MHz**.
- (3) For transmitters operating in the **5.47-5.725 GHz band**: all emissions outside of the **5.47-5.725 GHz band** shall not exceed an **EIRP of -27 dBm/MHz**.
- (4) For transmitters operating in the **5.725-5.85 GHz band**: All emissions within the frequency range from the band edge to 10 MHz above or below the band edge shall not exceed an e.i.r.p. of -17 dBm/MHz; for frequencies 10 MHz or greater above or below the band edge, emissions shall not exceed an e.i.r.p. of -27 dBm/MHz.
- (5) The emission measurements shall be performed using a minimum resolution bandwidth of 1 MHz. A lower resolution bandwidth may be employed near the band edge, when necessary, provided the measured energy is integrated to show the total power over 1 MHz.
- (6) Unwanted emissions **below 1 GHz** must comply with the general field strength limits set forth in **Section 15.209**. Further, any U-NII devices using an **AC power line** are required to comply also with the conducted limits set forth in **Section 15.207**.
- (7) The provisions of §15.205 apply to intentional radiators operating under this section
- (8) When measuring the emission limits, the nominal carrier frequency shall be adjusted as close to the upper and lower frequency band edges as the design of the equipment permits.

■ Test Procedure

The EUT was placed on a 0.8m high non-conductive table inside a shielded enclosure. An antenna was placed near the EUT and measurements of frequencies and amplitudes of field strengths were recorded for reference during final measurements. For final radiated testing, measurements were performed in semi anechoic chamber. Measurements were performed with the EUT oriented in 3 orthogonal axis and rotated 360 degrees to determine the worst-case orientation for maximum emissions.

Radiated spurious emission measured using following Measurement Procedure of KDB789033 D02 V01

► General Requirements for Unwanted Emissions Measurements

The following requirements apply to all unwanted emissions measurements, both in and outside of the restricted bands:

▪ EUT Duty Cycle

- (1) The EUT shall be configured or modified to **transmit continuously** except as stated in (ii), below. The intent is to test at 100 percent duty cycle; however a small reduction in duty cycle (**to no lower than 98 percent**) is permitted if required by the EUT for amplitude control purposes. Manufacturers are expected to provide software to the test lab to permit such continuous operation.
- (2) If **continuous transmission (or at least 98 percent duty cycle) cannot be achieved** due to hardware limitations of the EUT (e.g., overheating), the following additions to the measurement and reporting procedures are required:
 - The EUT shall be configured to operate at the maximum achievable duty cycle.
 - Measure the duty cycle, x, of the transmitter output signal.
 - Adjustments to measurement procedures (e.g., increasing test time and number of traces averaged) shall be performed as described in the procedures below.
 - The test report shall include the following additional information:
 - The reason for the duty cycle limitation.
 - The duty cycle achieved for testing and the associated transmit duration and interval between transmissions.
 - The sweep time and the amount of time used for trace stabilization during max-hold measurements for peak emission measurements.
- (3) **Reduction of the measured emission amplitude levels to account for operational duty factor is not permitted. Compliance is based on emission levels occurring during transmission - not on an average across on and off times of the transmitter.**

► Measurements below 1000 MHz

- a) Follow the requirements in section II.G.3, "General Requirements for Unwanted Emissions Measurements".
- b) Compliance shall be demonstrated using **CISPR quasi-peak detection**; however, **peak detection** is permitted as an alternative to quasi-peak detection.

► Measurements Above 1000MHz(Peak)

- a) Follow the requirements in section II.G.3, "General Requirements for Unwanted Emissions Measurements".
- b) Peak emission levels are measured by setting the analyzer as follows:
 - (i) **RBW = 1 MHz.**
 - (ii) **VBW $\geq$ 3 MHz.**
 - (iii) **Detector = Peak.**
 - (iv) Sweep time = auto.
 - (v) Trace mode = max hold.
 - (vi) Allow sweeps to continue until the trace stabilizes. Note that if the transmission is not continuous, the time required for the trace to stabilize will increase by a factor of approximately $1/x$, where x is the duty cycle. For example, at 50 percent duty cycle, the measurement time will increase by a factor of two relative to measurement time for continuous transmission.

► Measurements Above 1000MHz(Method AD)

- (i) **RBW = 1 MHz.**
- (ii) **VBW $\geq$ 3 MHz.**
- (iii) **Detector = RMS**, if $\text{span}/(\# \text{ of points in sweep}) \leq \text{RBW}/2$. Satisfying this condition may require increasing the number of points in the sweep or reducing the span. If the condition is not satisfied, the detector mode shall be set to peak.
- (iv) Averaging type = power (i.e., RMS)
 - As an alternative, the detector and averaging type may be set for linear voltage averaging. Some analyzers require linear display mode in order to use linear voltage averaging. Log or dB averaging shall not be used.
- (v) Sweep time = auto.
- (vi) Perform a trace average of at least 100 traces if the transmission is continuous. If the transmission is not continuous, the number of traces shall be increased by a factor of $1/x$, where x is the duty cycle. For example, with 50 percent duty cycle, at least 200 traces shall be averaged.
- (vii) If tests are performed with the EUT transmitting at a duty cycle less than 98 percent, a correction factor shall be added to the measurement results prior to comparing to the emission limit in order to compute the emission level that would have been measured had the test been performed at 100 percent duty cycle. The correction factor is computed as follows:
 - **If power averaging (RMS) mode was used in step (iv) above, the correction factor is $10 \log(1/x)$, where x is the duty cycle.**
For example, if the transmit duty cycle was 50 percent, then 3 dB must be added to the measured emission levels.
 - If linear voltage averaging mode was used in step (iv) above, the correction factor is $20 \log(1/x)$, where x is the duty cycle. For example, if the transmit duty cycle was 50 percent, then 6 dB must be added to the measured emission levels.
 - If a specific emission is demonstrated to be continuous (100 percent duty cycle) rather than turning on and off with the transmit cycle, no duty cycle correction is required for that emission.

■ **Measurement Data:****Radiated Spurious Emissions data(9kHz ~ 40GHz) : 802.11a & ANT 1**

Band	Tested Channel	Freq. (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
U-NII 1	36 (5180MHz)	5149.78	V	Z	PK	54.69	8.45	N/A	N/A	63.14	74.00	10.86
		5149.94	V	Z	AV	41.45	8.45	0.25	N/A	50.15	54.00	3.85
		-	-	-	-	-	-	-	-	-	-	-
	40 (5200MHz)	5147.78	V	Z	PK	47.53	8.45	N/A	N/A	55.98	74.00	18.02
		5149.78	V	Z	AV	37.57	8.45	0.25	N/A	46.27	54.00	7.73
		-	-	-	-	-	-	-	-	-	-	-
	48 (5240MHz)	10479.52	H	Z	PK	45.73	9.60	N/A	-9.54	45.79	68.20	22.41
		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
U-NII 2A	52 (5260MHz)	10518.12	H	Z	PK	53.13	9.69	N/A	-9.54	53.28	68.20	14.92
		10518.44	V	Z	PK	52.86	9.69	N/A	-9.54	53.01	68.20	15.19
		-	-	-	-	-	-	-	-	-	-	-
	60 (5300MHz)	5354.33	H	Z	PK	50.61	8.81	N/A	N/A	59.42	74.00	14.58
		5350.16	H	Z	AV	40.58	8.81	0.25	N/A	49.64	54.00	4.36
		-	-	-	-	-	-	-	-	-	-	-
	64 (5320MHz)	5351.44	V	Z	PK	51.87	8.81	N/A	N/A	60.68	74.00	13.32
		5351.59	V	Z	AV	41.02	8.81	0.25	N/A	50.08	54.00	3.92
		-	-	-	-	-	-	-	-	-	-	-
U-NII 2C	100 (5500MHz)	5459.00	V	Z	PK	50.70	9.09	N/A	N/A	59.79	74.00	14.21
		5458.69	V	Z	AV	39.99	9.09	0.25	N/A	49.33	54.00	4.67
		-	-	-	-	-	-	-	-	-	-	-
	116 (5580MHz)	11159.01	V	Z	PK	52.39	11.60	N/A	-9.54	54.45	74.00	19.55
		11159.89	V	Z	AV	40.30	11.60	0.25	-9.54	42.61	54.00	11.39
		-	-	-	-	-	-	-	-	-	-	-
	140 (5700MHz)	11399.21	V	Z	PK	56.61	12.02	N/A	-9.54	59.09	74.00	14.91
		11400.19	V	Z	AV	45.62	12.02	0.25	-9.54	48.35	54.00	5.65
		-	-	-	-	-	-	-	-	-	-	-
U-NII 3	149 (5745MHz)	11489.26	H	Y	PK	59.39	12.26	N/A	-9.54	62.11	74.00	11.89
		11489.85	H	Y	AV	47.79	12.26	0.25	-9.54	50.76	54.00	3.24
		-	-	-	-	-	-	-	-	-	-	-
	157 (5785MHz)	11569.01	H	Y	PK	59.06	12.49	N/A	-9.54	62.01	74.00	11.99
		11570.41	H	Y	AV	47.25	12.49	0.25	-9.54	50.45	54.00	3.55
		-	-	-	-	-	-	-	-	-	-	-
	165 (5825MHz)	11649.06	H	Y	PK	58.66	12.72	N/A	-9.54	61.84	74.00	12.16
		11651.54	H	Y	AV	47.37	12.72	0.25	-9.54	50.80	54.00	3.20
		-	-	-	-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.
2. Sample Calculation.
 $\text{Margin} = \text{Limit} - \text{Result}$ / $\text{Result} = \text{Reading} + \text{T.F} + \text{DCCF} + \text{DCF}$ / $\text{T.F} = \text{AF} + \text{CL} - \text{AG}$
 Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
 DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor
3. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz.
 Therefore Distance Correction Factor(DCF) : - 9.54 dB = $20 \cdot \log(1\text{m}/3\text{m})$
4. The limit is converted to field strength.
 $E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2 \text{ dB} = -27\text{dBm} + 95.2 = 68.2\text{dBuV/m}$
 $E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2 \text{ dB} = -17\text{dBm} + 95.2 = 78.2\text{dBuV/m}$ (within 5715~5725 MHz and 5850~5860 MHz)
5. If peak measurement satisfy the average limit, then average measurement are not required.

Radiated Spurious Emissions data(9kHz ~ 40GHz) : 802.11n(HT20) & ANT 1

Band	Tested Channel	Freq. (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
U-NII 1	36 (5180MHz)	5148.19	H	Y	PK	47.40	8.45	N/A	N/A	55.85	74.00	18.15
		5148.73	H	Y	AV	37.69	8.45	0.23	N/A	46.37	54.00	7.63
		-	-	-	-	-	-	-	-	-	-	-
	40 (5200MHz)	5148.28	V	Z	PK	47.62	8.45	N/A	N/A	56.07	74.00	17.93
		5149.09	V	Z	AV	37.15	8.45	0.23	N/A	45.83	54.00	8.17
		-	-	-	-	-	-	-	-	-	-	-
	48 (5240MHz)	10478.00	V	Z	PK	46.35	9.60	N/A	-9.54	46.41	68.20	21.79
		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
U-NII 2A	52 (5260MHz)	10520.20	H	Y	PK	46.61	9.70	N/A	-9.54	46.77	68.20	21.43
		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
	60 (5300MHz)	5351.42	V	Z	PK	47.37	8.81	N/A	N/A	56.18	74.00	17.82
		5352.89	V	Z	AV	36.97	8.81	0.23	N/A	46.01	54.00	7.99
		-	-	-	-	-	-	-	-	-	-	-
	64 (5320MHz)	5350.28	V	Z	PK	47.77	8.81	N/A	N/A	56.58	74.00	17.42
		5350.18	V	Z	AV	37.72	8.81	0.23	N/A	46.76	54.00	7.24
		-	-	-	-	-	-	-	-	-	-	-
U-NII 2C	100 (5500MHz)	5458.98	V	Z	PK	50.40	9.09	N/A	N/A	59.49	74.00	14.51
		5456.40	V	Z	AV	37.94	9.09	0.23	N/A	47.26	54.00	6.74
		-	-	-	-	-	-	-	-	-	-	-
	116 (5580MHz)	11159.41	H	Y	PK	55.93	11.39	N/A	-9.54	57.78	74.00	16.22
		11161.09	H	Y	AV	45.55	11.39	0.23	-9.54	47.63	54.00	6.37
		-	-	-	-	-	-	-	-	-	-	-
	140 (5700MHz)	11400.05	H	Y	PK	58.84	12.02	N/A	-9.54	61.32	74.00	12.68
		11400.77	H	Y	AV	47.75	12.02	0.23	-9.54	50.46	54.00	3.54
		-	-	-	-	-	-	-	-	-	-	-
U-NII 3	149 (5745MHz)	11490.58	H	Y	PK	58.95	12.26	N/A	-9.54	61.67	74.00	12.33
		11490.19	H	Y	AV	47.67	12.26	0.23	-9.54	50.62	54.00	3.38
		-	-	-	-	-	-	-	-	-	-	-
	157 (5785MHz)	11571.03	H	Y	PK	59.10	12.49	N/A	-9.54	62.05	74.00	11.95
		11570.21	H	Y	AV	47.72	12.49	0.23	-9.54	50.90	54.00	3.10
		-	-	-	-	-	-	-	-	-	-	-
	165 (5825MHz)	11649.42	H	Y	PK	58.12	12.72	N/A	-9.54	61.30	74.00	12.70
		11649.67	H	Y	AV	47.14	12.72	0.23	-9.54	50.55	54.00	3.45
		-	-	-	-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.
2. Sample Calculation.
 $\text{Margin} = \text{Limit} - \text{Result}$ / $\text{Result} = \text{Reading} + \text{T.F} + \text{DCCF} + \text{DCF}$ / $\text{T.F} = \text{AF} + \text{CL} - \text{AG}$
 Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
 DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor
3. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz.
 Therefore Distance Correction Factor(DCF) : - 9.54 dB = $20 \cdot \log(1\text{m}/3\text{m})$
4. The limit is converted to field strength.
 $E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2 \text{ dB} = -27\text{dBm} + 95.2 = 68.2\text{dBuV/m}$
 $E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2 \text{ dB} = -17\text{dBm} + 95.2 = 78.2\text{dBuV/m}$ (within 5715~5725 MHz and 5850~5860 MHz)
5. If peak measurement satisfy the average limit, then average measurement are not required.

Radiated Spurious Emissions data(9kHz ~ 40GHz) : 802.11n(HT20) & ANT 2

Band	Tested Channel	Freq. (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
U-NII 1	36 (5180MHz)	5148.50	H	Y	PK	54.47	8.45	N/A	N/A	62.92	74.00	11.08
		5149.49	H	Y	AV	42.39	8.45	0.23	N/A	51.07	54.00	2.93
		-	-	-	-	-	-	-	-	-	-	-
	40 (5200MHz)	5148.12	H	Y	PK	53.16	8.45	N/A	N/A	61.61	74.00	12.39
		5149.30	H	Y	AV	42.22	8.45	0.23	N/A	50.90	54.00	3.10
		-	-	-	-	-	-	-	-	-	-	-
	48 (5240MHz)	10479.65	H	Y	PK	54.54	9.60	N/A	-9.54	54.60	68.20	13.60
		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
U-NII 2A	52 (5260MHz)	10519.69	H	Y	PK	56.40	9.70	N/A	-9.54	56.56	68.20	11.64
		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
	60 (5300MHz)	5350.04	H	Y	PK	51.10	8.81	N/A	N/A	59.91	74.00	14.09
		5350.21	H	Y	AV	40.86	8.81	0.23	N/A	49.90	54.00	4.10
		-	-	-	-	-	-	-	-	-	-	-
	64 (5320MHz)	5350.79	H	Y	PK	51.10	8.81	N/A	N/A	59.91	74.00	14.09
		5351.38	H	Y	AV	40.79	8.81	0.23	N/A	49.83	54.00	4.17
		-	-	-	-	-	-	-	-	-	-	-
U-NII 2C	100 (5500MHz)	5457.09	V	Z	PK	50.03	9.09	N/A	N/A	59.12	74.00	14.88
		5459.01	V	Z	AV	40.41	9.09	0.23	N/A	49.73	54.00	4.27
		-	-	-	-	-	-	-	-	-	-	-
	116 (5580MHz)	11160.05	H	Y	PK	54.51	11.39	N/A	-9.54	56.36	74.00	17.64
		11160.37	H	Y	AV	43.70	11.39	0.23	-9.54	45.78	54.00	8.22
		-	-	-	-	-	-	-	-	-	-	-
	140 (5700MHz)	11398.95	H	Y	PK	53.16	12.02	N/A	-9.54	55.64	74.00	18.36
		11400.40	H	Y	AV	43.36	12.02	0.23	-9.54	46.07	54.00	7.93
		-	-	-	-	-	-	-	-	-	-	-
U-NII 3	149 (5745MHz)	11488.47	H	Z	PK	55.63	12.26	N/A	-9.54	58.35	74.00	15.65
		11491.04	H	Z	AV	44.54	12.26	0.23	-9.54	47.49	54.00	6.51
		-	-	-	-	-	-	-	-	-	-	-
	157 (5785MHz)	11570.87	V	X	PK	55.92	12.49	N/A	-9.54	58.87	74.00	15.13
		11571.91	V	X	AV	45.46	12.49	0.23	-9.54	48.64	54.00	5.36
		-	-	-	-	-	-	-	-	-	-	-
	165 (5825MHz)	11650.10	V	X	PK	56.45	12.72	N/A	-9.54	59.63	74.00	14.37
		11651.52	V	X	AV	46.06	12.72	0.23	-9.54	49.47	54.00	4.53
		-	-	-	-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.
2. Sample Calculation.
 $\text{Margin} = \text{Limit} - \text{Result}$ / $\text{Result} = \text{Reading} + \text{T.F} + \text{DCCF} + \text{DCF}$ / $\text{T.F} = \text{AF} + \text{CL} - \text{AG}$
 Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
 DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor
3. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz.
 Therefore Distance Correction Factor(DCF) : - 9.54 dB = $20 \cdot \log(1\text{m}/3\text{m})$
4. The limit is converted to field strength.
 $E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2 \text{ dB} = -27\text{dBm} + 95.2 = 68.2\text{dBuV/m}$
 $E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2 \text{ dB} = -17\text{dBm} + 95.2 = 78.2\text{dBuV/m}$ (within 5715~5725 MHz and 5850~5860 MHz)
5. If peak measurement satisfy the average limit, then average measurement are not required.

Radiated Spurious Emissions data(9kHz ~ 40GHz) : 802.11n(HT40) & ANT 1

Band	Tested Channel	Freq. (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
U-NII 1	38 (5190MHz)	5149.19	H	Y	PK	46.03	8.45	N/A	N/A	54.48	74.00	19.52
		5148.68	H	Y	AV	36.66	8.45	0.49	N/A	45.60	54.00	8.40
		-	-	-	-	-	-	-	-	-	-	-
	46 (5230MHz)	5147.74	V	Y	PK	45.45	8.45	N/A	N/A	53.90	74.00	20.10
		5148.52	V	Y	AV	35.29	8.45	0.49	N/A	44.23	54.00	9.77
		-	-	-	-	-	-	-	-	-	-	-
U-NII 2A	54 (5270MHz)	10541.59	H	Y	PK	47.01	9.75	N/A	-9.54	47.22	68.20	20.98
		10537.71	V	Y	PK	43.38	9.75	N/A	-9.54	43.59	68.20	24.61
		-	-	-	-	-	-	-	-	-	-	-
	62 (5310MHz)	5351.09	H	Y	PK	48.44	8.81	N/A	N/A	57.25	74.00	16.75
		5351.28	H	Y	AV	37.66	8.81	0.49	N/A	46.96	54.00	7.04
		-	-	-	-	-	-	-	-	-	-	-
U-NII 2C	102 (5510MHz)	5459.57	V	Y	PK	46.20	9.09	N/A	N/A	55.29	74.00	18.71
		5459.98	V	Y	AV	36.77	9.09	0.49	N/A	46.35	54.00	7.65
		-	-	-	-	-	-	-	-	-	-	-
	110 (5550MHz)	5458.13	V	Y	PK	44.44	9.09	N/A	N/A	53.53	74.00	20.47
		5458.17	V	Y	AV	35.12	9.09	0.49	N/A	44.70	54.00	9.30
		-	-	-	-	-	-	-	-	-	-	-
	134 (5670MHz)	11339.08	H	Y	PK	56.25	11.87	N/A	-9.54	58.58	74.00	15.42
		11340.06	H	Y	AV	45.64	11.87	0.49	-9.54	48.46	54.00	5.54
		-	-	-	-	-	-	-	-	-	-	-
U-NII 3	151 (5755MHz)	11508.32	H	Y	PK	58.44	12.31	N/A	-9.54	61.21	74.00	12.79
		11511.54	H	Y	AV	46.94	12.31	0.49	-9.54	50.20	54.00	3.80
		-	-	-	-	-	-	-	-	-	-	-
	159 (5795MHz)	11591.46	H	Y	PK	56.57	12.55	N/A	-9.54	59.58	74.00	14.42
		11591.47	H	Y	AV	46.87	12.55	0.49	-9.54	50.37	54.00	3.63
		-	-	-	-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.
2. Sample Calculation.
Margin = Limit – Result / Result = Reading + T.F+ DCCF + DCF / T.F = AF + CL – AG
Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor
3. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz.
Therefore Distance Correction Factor(DCF) : - 9.54 dB = 20*log(1m/3m)
4. The limit is converted to field strength.
 $E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2 \text{ dB} = -27\text{dBm} + 95.2 = 68.2\text{dBuV/m}$
 $E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2 \text{ dB} = -17\text{dBm} + 95.2 = 78.2\text{dBuV/m}$ (within 5715~5725 MHz and 5850~5860 MHz)
5. If peak measurement satisfy the average limit, then average measurement are not required.

Radiated Spurious Emissions data(9kHz ~ 40GHz) : 802.11n(HT40) & ANT 2

Band	Tested Channel	Freq. (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
U-NII 1	38 (5190MHz)	5148.29	H	Y	PK	51.32	8.45	N/A	N/A	59.77	74.00	14.23
		5149.39	H	Y	AV	42.44	8.45	0.49	N/A	51.38	54.00	2.62
		-	-	-	-	-	-	-	-	-	-	-
	46 (5230MHz)	5148.91	H	Y	PK	51.95	8.45	N/A	N/A	60.40	74.00	13.60
		5148.03	H	Y	AV	41.42	8.45	0.49	N/A	50.36	54.00	3.64
		-	-	-	-	-	-	-	-	-	-	-
U-NII 2A	54 (5270MHz)	10541.24	H	Y	PK	56.27	9.75	N/A	-9.54	56.48	68.20	11.72
		10538.54	V	Z	PK	51.14	9.75	N/A	-9.54	51.35	68.20	16.85
		-	-	-	-	-	-	-	-	-	-	-
	62 (5310MHz)	5350.28	H	Y	PK	52.53	8.81	N/A	N/A	61.34	74.00	12.66
		5351.82	H	Y	AV	41.15	8.81	0.49	N/A	50.45	54.00	3.55
		-	-	-	-	-	-	-	-	-	-	-
U-NII 2C	102 (5510MHz)	5459.12	H	Y	PK	53.35	9.09	N/A	N/A	62.44	74.00	11.56
		5459.04	H	Y	AV	41.75	9.09	0.49	N/A	51.33	54.00	2.67
		-	-	-	-	-	-	-	-	-	-	-
	110 (5550MHz)	5459.06	V	Y	PK	45.82	9.09	N/A	N/A	54.91	74.00	19.09
		5458.99	V	Y	AV	36.18	9.09	0.49	N/A	45.76	54.00	8.24
		-	-	-	-	-	-	-	-	-	-	-
	134 (5670MHz)	11339.57	H	Y	PK	56.34	11.87	N/A	-9.54	58.67	74.00	15.33
		11339.95	H	Y	AV	45.71	11.87	0.49	-9.54	48.53	54.00	5.47
		-	-	-	-	-	-	-	-	-	-	-
U-NII 3	151 (5755MHz)	11507.88	H	Y	PK	54.08	12.31	N/A	-9.54	56.85	74.00	17.15
		11509.42	H	Y	AV	43.34	12.31	0.49	-9.54	46.60	54.00	7.40
		-	-	-	-	-	-	-	-	-	-	-
	159 (5795MHz)	11592.61	H	Y	PK	53.79	12.55	N/A	-9.54	56.80	74.00	17.20
		11588.70	H	Y	AV	43.49	12.55	0.49	-9.54	46.99	54.00	7.01
		-	-	-	-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.
2. Sample Calculation.
 $\text{Margin} = \text{Limit} - \text{Result}$ / $\text{Result} = \text{Reading} + \text{T.F} + \text{DCCF} + \text{DCF}$ / $\text{T.F} = \text{AF} + \text{CL} - \text{AG}$
 Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
 DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor
3. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz.
 Therefore Distance Correction Factor(DCF) : - 9.54 dB = $20 \cdot \log(1\text{m}/3\text{m})$
4. The limit is converted to field strength.
 $E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2 \text{ dB} = -27\text{dBm} + 95.2 = 68.2\text{dBuV/m}$
 $E[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2 \text{ dB} = -17\text{dBm} + 95.2 = 78.2\text{dBuV/m}$ (within 5715~5725 MHz and 5850~5860 MHz)
5. If peak measurement satisfy the average limit, then average measurement are not required.

Radiated Spurious Emissions data(9kHz ~ 40GHz) : 802.11ac(VHT80) & ANT 1

Band	Tested Channel	Freq. (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
U-NII 1	42 (5210MHz)	5146.61	H	Y	PK	46.27	8.45	N/A	N/A	54.72	74.00	19.28
		5146.32	H	Y	AV	36.41	8.45	0.37	N/A	45.23	54.00	8.77
		-	-	-	-	-	-	-	-	-	-	-
U-NII 2A	58 (5290MHz)	5352.10	H	Y	PK	48.77	8.81	N/A	N/A	57.58	74.00	16.42
		5353.07	H	Y	AV	37.60	8.81	0.37	N/A	46.78	54.00	7.22
		-	-	-	-	-	-	-	-	-	-	-
U-NII 2C	106 (5530MHz)	5453.10	V	Z	PK	50.39	9.09	N/A	N/A	59.48	74.00	14.52
		5455.70	V	Z	AV	39.78	9.09	0.37	N/A	49.24	54.00	4.76
		-	-	-	-	-	-	-	-	-	-	-
U-NII 3	155 (5775MHz)	11550.28	H	Y	PK	52.92	12.43	N/A	-9.54	55.81	74.00	18.19
		11550.00	H	Y	AV	42.51	12.43	0.37	-9.54	45.77	54.00	8.23
		-	-	-	-	-	-	-	-	-	-	-

Radiated Spurious Emissions data(9kHz ~ 40GHz) : 802.11ac(VHT80) & ANT 2

Band	Tested Channel	Freq. (MHz)	ANT Pol	EUT Position (Axis)	Detector Mode	Reading (dBuV)	T.F (dB/m)	DCCF (dB)	DCF (dB)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)
U-NII 1	42 (5210MHz)	5142.01	V	Z	PK	52.39	8.45	N/A	N/A	60.84	74.00	13.16
		5143.82	V	Z	AV	42.21	8.45	0.37	N/A	51.03	54.00	2.97
		-	-	-	-	-	-	-	-	-	-	-
U-NII 2A	58 (5290MHz)	5352.28	H	Y	PK	49.61	8.81	N/A	N/A	58.42	74.00	15.58
		5351.76	H	Y	AV	41.03	8.81	0.37	N/A	50.21	54.00	3.79
		-	-	-	-	-	-	-	-	-	-	-
U-NII 2C	106 (5530MHz)	5457.08	H	Y	PK	51.41	9.09	N/A	N/A	60.50	74.00	13.50
		5459.62	H	Y	AV	41.15	9.09	0.37	N/A	50.61	54.00	3.39
		-	-	-	-	-	-	-	-	-	-	-
U-NII 3	155 (5775MHz)	11548.80	H	Z	PK	51.45	12.43	N/A	-9.54	54.34	74.00	19.66
		11552.69	H	Z	AV	40.54	12.43	0.37	-9.54	43.80	54.00	10.20
		-	-	-	-	-	-	-	-	-	-	-

Note.

1. No other spurious and harmonic emissions were found greater than listed emissions on above table.
2. Sample Calculation.
 $\text{Margin} = \text{Limit} - \text{Result}$ / $\text{Result} = \text{Reading} + \text{T.F} + \text{DCCF} + \text{DCF}$ / $\text{T.F} = \text{AF} + \text{CL} - \text{AG}$
 Where, T.F = Total Factor, AF = Antenna Factor, CL = Cable Loss, AG = Amplifier Gain,
 DCCF = Duty Cycle Correction Factor, DCF = Distance Correction Factor
3. Measurement Distance = 3 m for below 10 GHz, Measurement Distance = 1 m for above 10 GHz.
 Therefore Distance Correction Factor(DCF) : $-9.54 \text{ dB} = 20 \cdot \log(1\text{m}/3\text{m})$
4. The limit is converted to field strength.
 $\text{E}[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2 \text{ dB} = -27\text{dBm} + 95.2 = 68.2\text{dBuV/m}$
 $\text{E}[\text{dBuV/m}] = \text{EIRP}[\text{dBm}] + 95.2 \text{ dB} = -17\text{dBm} + 95.2 = 78.2\text{dBuV/m}$ (within 5715~5725 MHz and 5850~5860 MHz)
5. If peak measurement satisfy the average limit, then average measurement are not required.

8.7 AC Conducted Emissions

■ Test Procedure

The conducted emissions are measured in the shielded room with a spectrum analyzer in peak hold. Emissions closest to the limit are measured in the quasi-peak mode (QP) and average mode (AV) with the tuned receiver using a bandwidth of 9 kHz. The emissions are maximized further by cable manipulation and Exerciser operation. The highest emissions relative to the limit are listed.

■ Measurement Data: **Comply**

Note 1: See next pages for actual measured spectrum plots and data for worst case result.

■ Minimum Standard: FCC Part 15.207(a)/EN 55022

Frequency Range (MHz)	Conducted Limit (dBuV)	
	Quasi-Peak	Average
0.15 ~ 0.5	66 to 56 *	56 to 46 *
0.5 ~ 5	56	46
5 ~ 30	60	50

* Decreases with the logarithm of the frequency

AC Line Conducted Emissions (Graph)

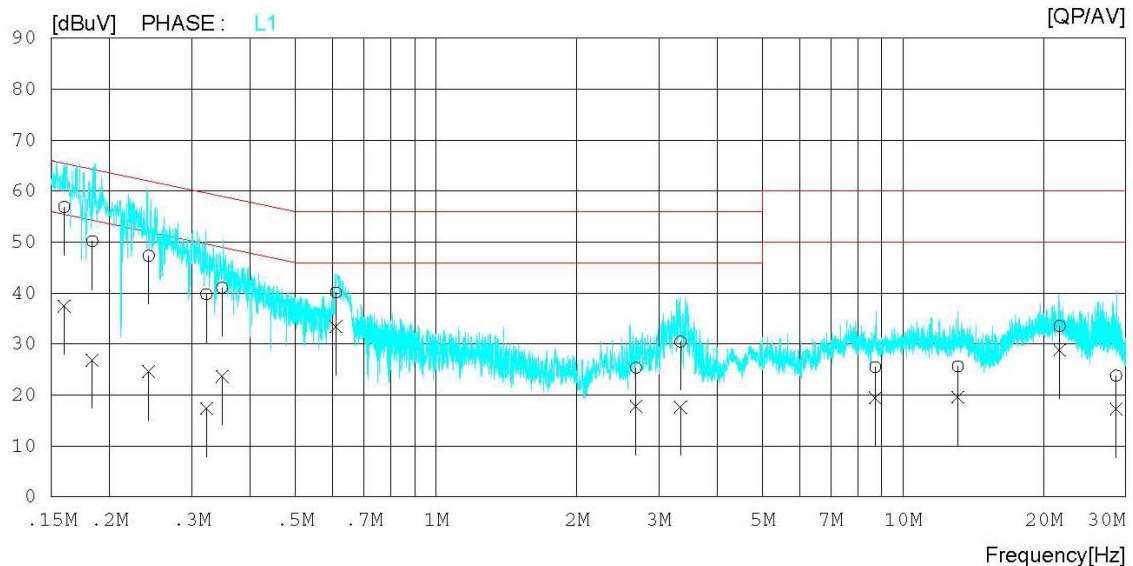
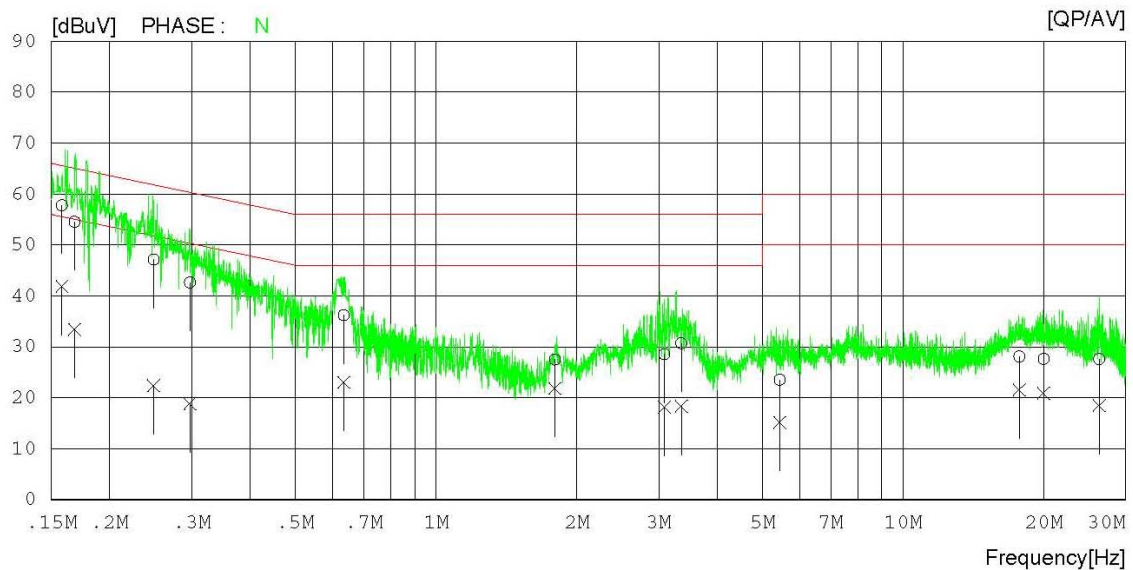
Test Mode: U-NII 3 & 802.11ac VHT80 & ANT 1

Results of Conducted Emission

Date : 2014-12-15

Model No.	: WCH730B	Reference No.	:
Type	: WiFi Transmitter	Power Supply	: 120 V 60 Hz
Serial No.	: Identical prototype	Temp/Humi.	: 22 'C 44 % R.H.
Test Condition	: 802.11ac(VHT80)	Operator	: JongHa Choi

Memo : 5GHz_802.11ac(VHT80)_U-NII 3_Antenna 1

LIMIT : FCC P15.207 QP
FCC P15.207 AV

AC Line Conducted Emissions (Data List)

Test Mode: U-NII 3 & 802.11ac VHT80 & ANT 1

Results of Conducted Emission

Date : 2014-12-15

Model No.	: WCH730B	Reference No.	:
Type	: WiFi Transmitter	Power Supply	: 120 V 60 Hz
Serial No.	: Identical prototype	Temp/Humi.	: 22 'C 44 % R.H.
Test Condition	: 802.11ac(VHT80)	Operator	: JongHa Choi

Memo : 5GHz_802.11ac(VHT80)_U-NII 3_Antenna 1

LIMIT : FCC P15.207 QP
FCC P15.207 AV

NO	FREQ [MHz]	READING		C. FACTOR [dB]	RESULT		LIMIT		MARGIN		PHASE
		QP [dBuV]	AV [dBuV]		QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	QP [dBuV]	AV [dBuV]	
1	0.15802	47.9	32.0	9.9	57.8	41.9	65.6	55.6	7.8	13.7	N
2	0.16818	44.6	23.5	9.9	54.5	33.4	65.0	55.0	10.5	21.6	N
3	0.24858	37.2	12.5	9.9	47.1	22.4	61.8	51.8	14.7	29.4	N
4	0.29695	32.7	8.9	9.9	42.6	18.8	60.3	50.3	17.7	31.5	N
5	0.63408	26.3	13.1	9.9	36.2	23.0	56.0	46.0	19.8	23.0	N
6	1.79780	17.5	11.8	10.0	27.5	21.8	56.0	46.0	28.5	24.2	N
7	3.08160	18.4	8.1	10.1	28.5	18.2	56.0	46.0	27.5	27.8	N
8	3.35040	20.6	8.2	10.1	30.7	18.3	56.0	46.0	25.3	27.7	N
9	5.44300	13.4	5.1	10.1	23.5	15.2	60.0	50.0	36.5	34.8	N
10	17.74640	17.7	11.2	10.4	28.1	21.6	60.0	50.0	31.9	28.4	N
11	20.00200	17.2	10.5	10.4	27.6	20.9	60.0	50.0	32.4	29.1	N
12	26.29980	17.0	7.9	10.6	27.6	18.5	60.0	50.0	32.4	31.5	N
13	0.15985	47.0	27.5	9.9	56.9	37.4	65.5	55.5	8.6	18.1	L1
14	0.18350	40.3	17.0	9.9	50.2	26.9	64.3	54.3	14.1	27.4	L1
15	0.24250	37.4	14.7	9.9	47.3	24.6	62.0	52.0	14.7	27.4	L1
16	0.32205	29.9	7.5	9.9	39.8	17.4	59.7	49.7	19.9	32.3	L1
17	0.34820	31.1	13.7	9.9	41.0	23.6	59.0	49.0	18.0	25.4	L1
18	0.61050	30.2	23.5	9.9	40.1	33.4	56.0	46.0	15.9	12.6	L1
19	2.68120	15.2	7.7	10.1	25.3	17.8	56.0	46.0	30.7	28.2	L1
20	3.33760	20.4	7.5	10.1	30.5	17.6	56.0	46.0	25.5	28.4	L1
21	8.72000	15.3	9.2	10.2	25.5	19.4	60.0	50.0	34.5	30.6	L1
22	13.11340	15.4	9.4	10.2	25.6	19.6	60.0	50.0	34.4	30.4	L1
23	21.66120	23.1	18.4	10.4	33.5	28.8	60.0	50.0	26.5	21.2	L1
24	28.62280	13.2	6.6	10.6	23.8	17.2	60.0	50.0	36.2	32.8	L1

8.8 Occupied Bandwidth

■ Test Requirements

When an occupied bandwidth value is not specified in the applicable RSS, the transmitted signal bandwidth to be reported is to be its 99% emission bandwidth, as calculated or measured

■ Test Configuration

Refer to the APPENDIX I.

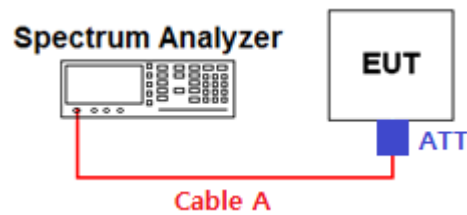
■ Test Procedure

The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used given that a peak or peak hold may produce a wider bandwidth than actual

■ Test Results: **NA**

9. LIST OF TEST EQUIPMENT

Type	Manufacturer	Model	Cal.Date (yy/mm/dd)	Next.Cal.Date (yy/mm/dd)	S/N
MXA Signal Analyzer	Agilent	N9030A	14/10/21	15/10/21	MY53310140
Digital Multimeter	H.P	34401A	14/02/27	15/02/27	3146A13475
Dynamic Measurement DC Source	Agilent	66332A	14/10/20	15/10/20	MY43000394
Thermohygrometer	BODYCOM	BJ5478	14/05/13	15/05/13	120612-1
Vector Signal Generator	Rohde Schwarz	SMBV100A	14/01/07	15/01/07	255571
Signal Generator	Rohde Schwarz	SMF100A	14/07/01	15/07/01	102341
Attenuator	SMAJK	SMAJK-2-3	14/10/21	15/10/21	1
High-pass filter	Wainwright	WHNX8.5	14/09/11	15/09/11	1
High-pass filter	Wainwright	WHKX3.0	14/09/11	15/09/11	9
LOOP Antenna	Schwarzbeck	FMZB1513	14/04/29	16/04/29	1513-128
BILOG ANTENNA	Schwarzbeck	VULB 9160	14/07/10	16/07/10	3151
Horn Antenna	ETS-LINDGREN	3117	14/05/12	16/05/12	00140394
Horn Antenna	A.H.Systems	SAS-574	13/03/20	15/03/20	154
Amplifier	H.P	8447E	14/01/08	15/01/08	2945A02865
Amplifier	Agilent	8449B	14/02/27	15/02/27	3008A00370
EMI TEST RECEIVER	Rohde Schwarz	ESU	14/01/08	15/01/08	100014
EMI TEST RECEIVER	Rohde Schwarz	ESCi7	14/02/27	15/02/27	100910
Temp & Humi Test Chamber	SJ Science	TEMI850-10	14/02/28	15/02/28	SJ-TH-S50-120203
CVCf	NF	4420	14/05/26	15/05/26	3049354420023
LISN	Schwarzbeck	NNLK8121	14/08/18	15/08/18	NNLK8121-580
Power Meter & Wide Bandwidth Sensor	Anritsu	ML2495A/ MA2490A	14/03/12	15/03/12	1306007 / 1249001

APPENDIX I**Conducted Test set up Diagram**■ **Conducted Measurement****APPENDIX II****Duty Cycle Information**■ **Test Procedure**

Duty Cycle [$X = \text{On Time} / (\text{On} + \text{Off time})$] is measured using Measurement Procedure of KDB789033 D02 V01

1. Set the center frequency of the spectrum analyzer to the center frequency of the transmission.
2. Set RBW $\geq$ EBW if possible; otherwise, set RBW to the largest available value.
3. Set VBW $\geq$ RBW. Set detector = peak.
4. Note : The zero-span measurement method shall not be used unless both **RBW and VBW are $> 50/T$** , where T is defined in section II.B.1.a), and **the number of sweep points across duration T exceeds 100**. (For example, if VBW and/or RBW are limited to 3 MHz, then the zero-span method of measuring duty cycle shall not be used if $T \leq 16.7$ microseconds.)

T : The minimum transmission duration over which the transmitter is on and is transmitting at its maximum power control level for the tested mode of operation.

($T = \text{On time}$ of the above table since the EUT operates with above fixed Duty Cycle and it is the minimum On time)

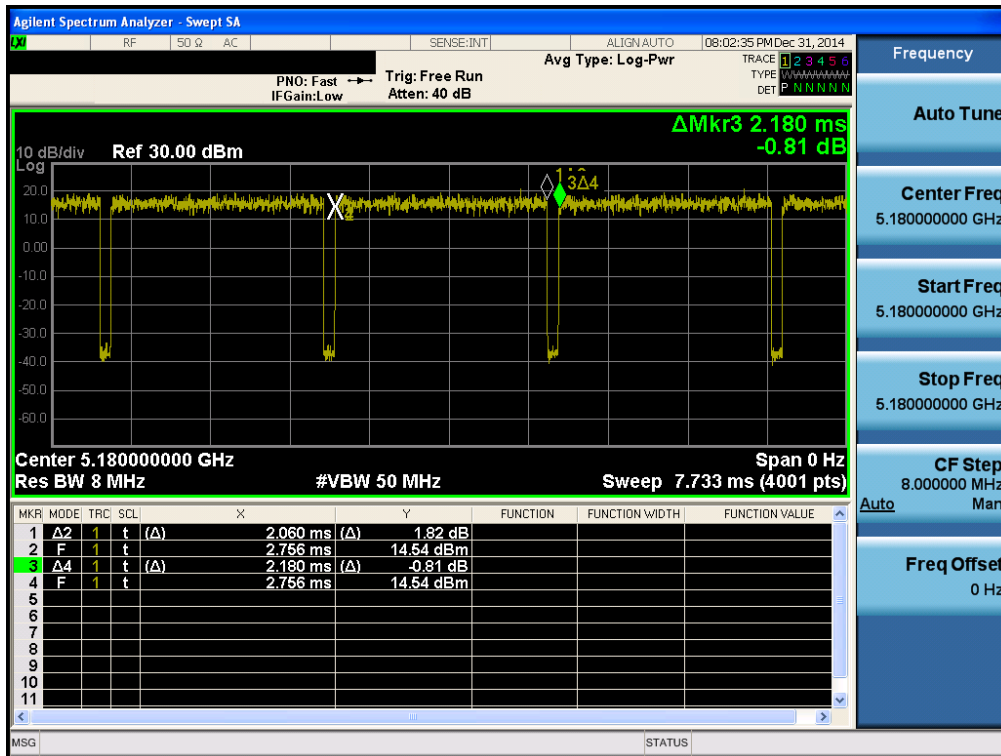
■ **Test Results:**

Mode	Channel	Tested Frequency [MHz]	Maximum Achievable Duty Cycle (x) = On / (On+Off)			Duty Cycle Correction Factor [dB]	1/ T [Hz]
			On Time [ms]	On+Off Time [ms]	x		
802.11a SISO	36	5180	2.06	2.18	0.9450	0.25	485.44
802.11n (HT20) SISO	36	5180	1.92	2.02	0.9505	0.23	520.84
802.11n (HT40) SISO	38	5190	0.94	1.05	0.8952	0.49	1063.83
802.11ac (VHT80) SISO	42	5210	0.45	0.49	0.9184	0.37	2222.23

■ Result Plots

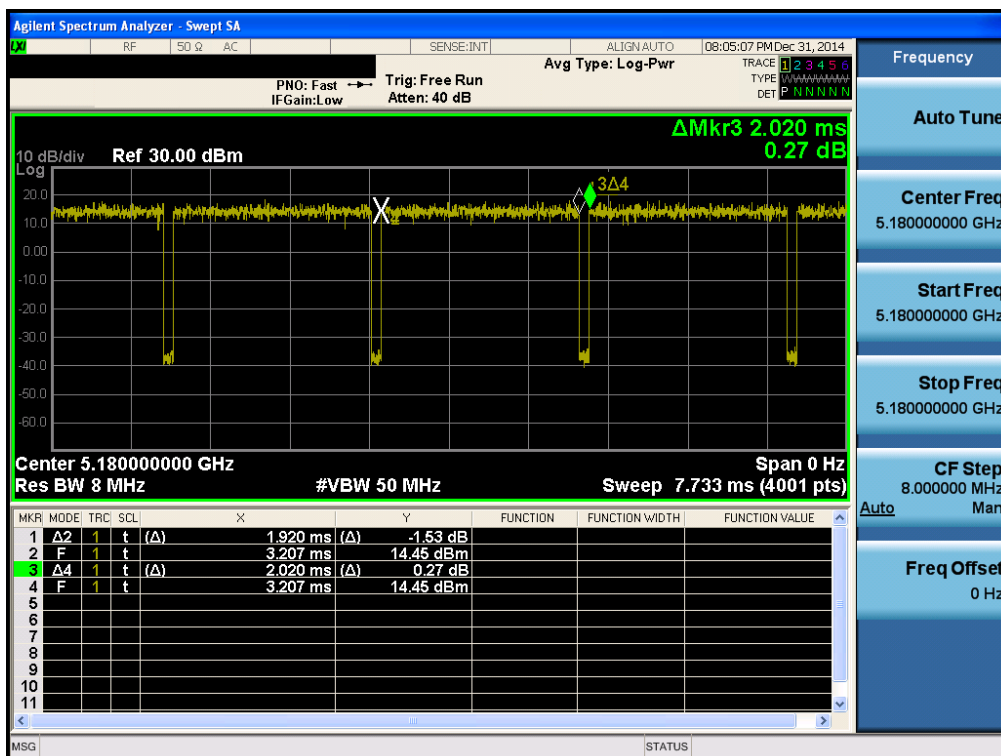
Duty Cycle

Test Mode: 802.11a & Ch.36 & SISO



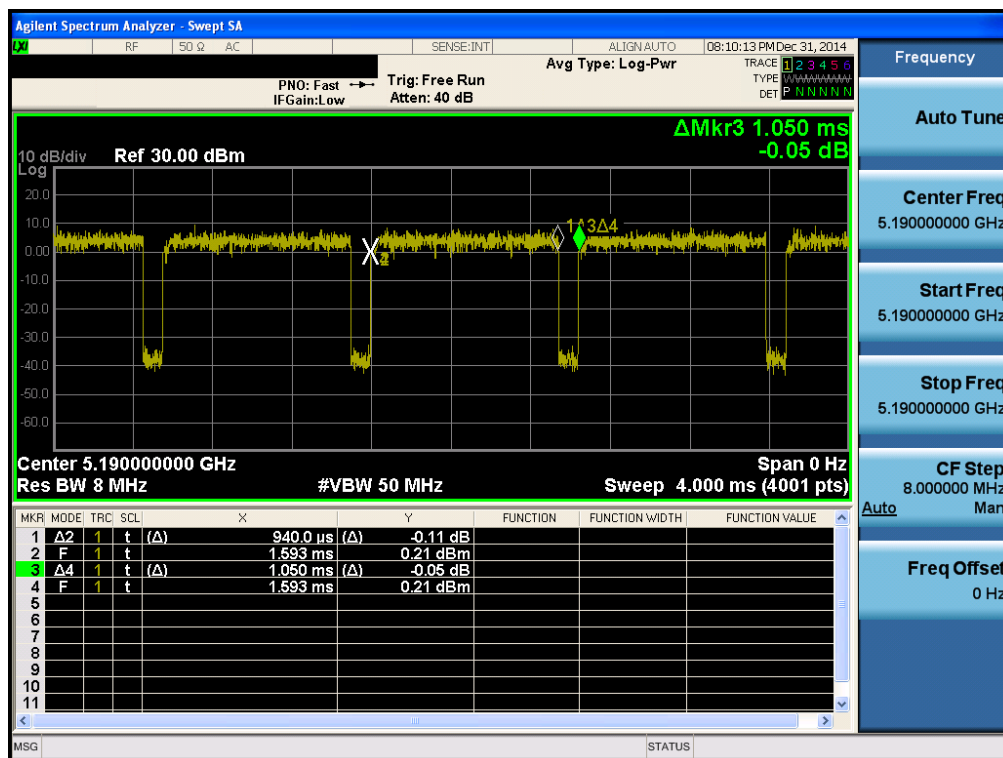
Duty Cycle

Test Mode: 802.11n HT20 & Ch.36 & SISO



Duty Cycle

Test Mode: 802.11n HT40 & Ch.38 & SISO



Duty Cycle

Test Mode: 802.11ac VHT80 & Ch.42 & SISO

