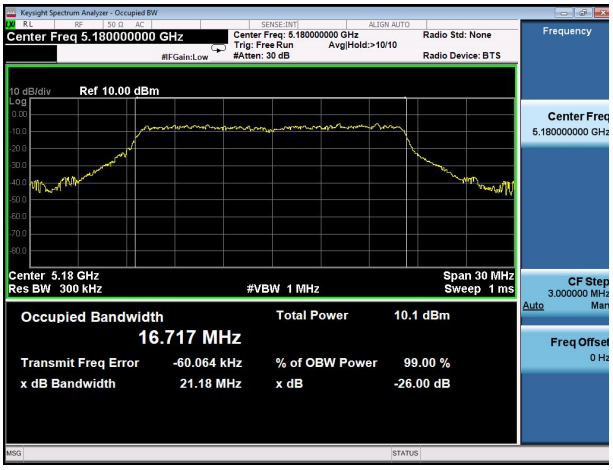
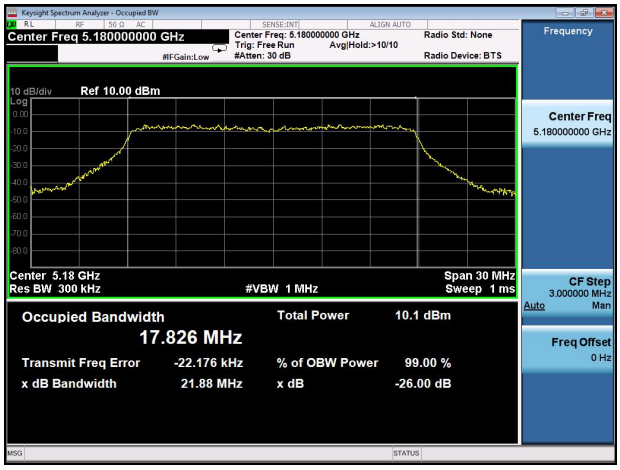
B Antenna

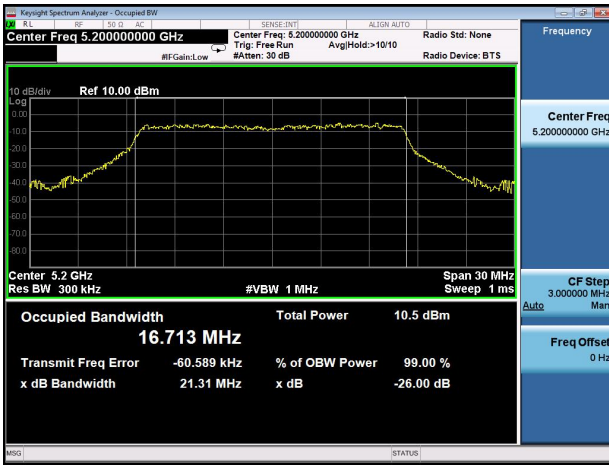
802.11a mode-ch36



802.11n(HT20) mode-ch36

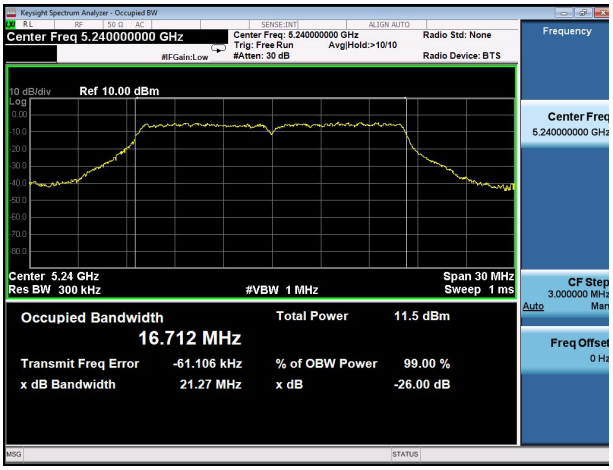


802.11a mode-ch40

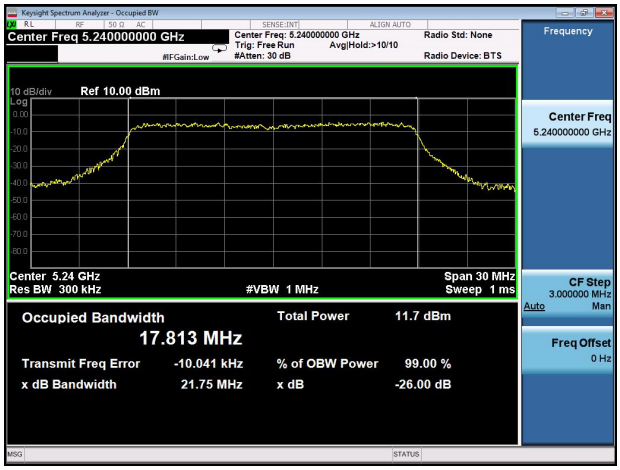


802.11 n(HT20) mode-ch40

802.11a mode-ch48

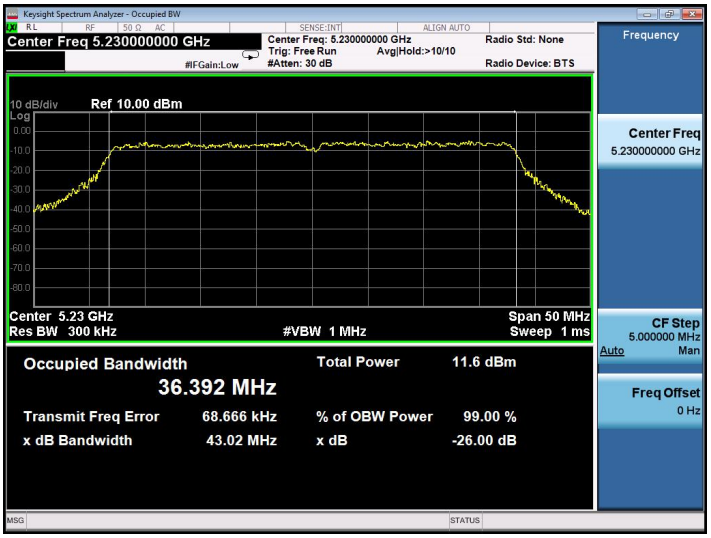


802.11 n(HT20) mode-ch48



802.11n(HT40) mode-ch38

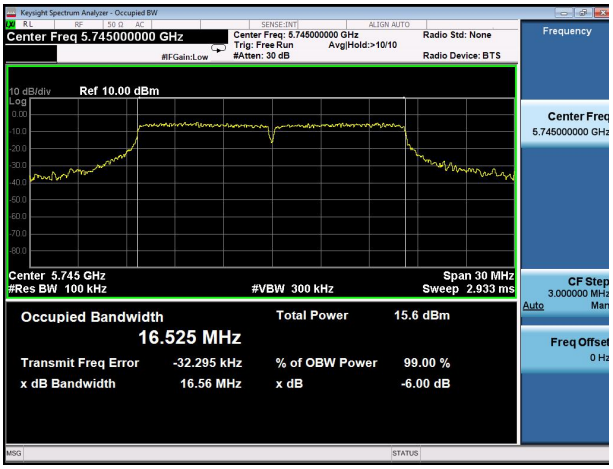
802.11 n(HT40) mode-ch46



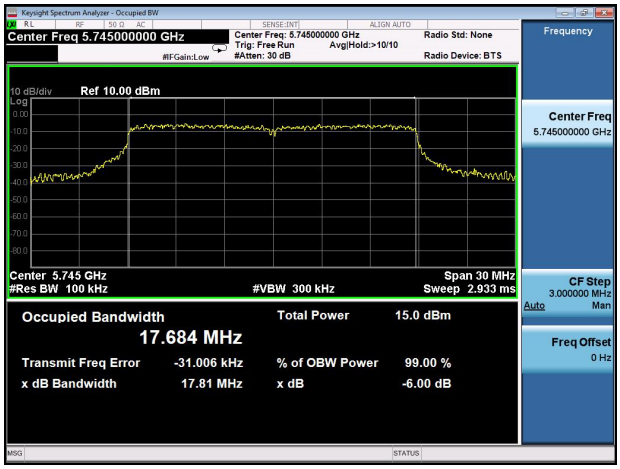
5.8G

A Antenna

802.11a mode-ch149

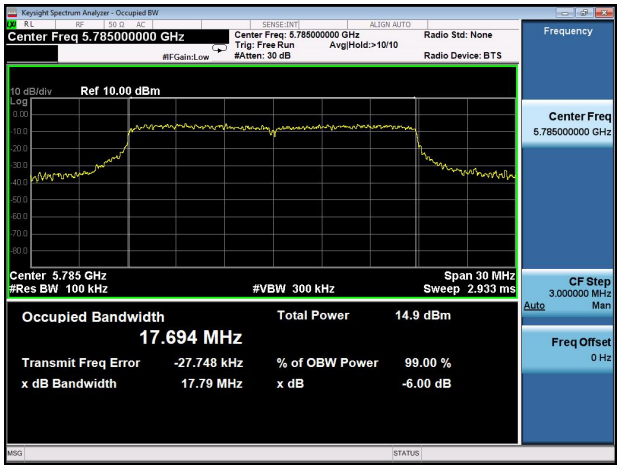


802.11n(HT20) mode-ch149



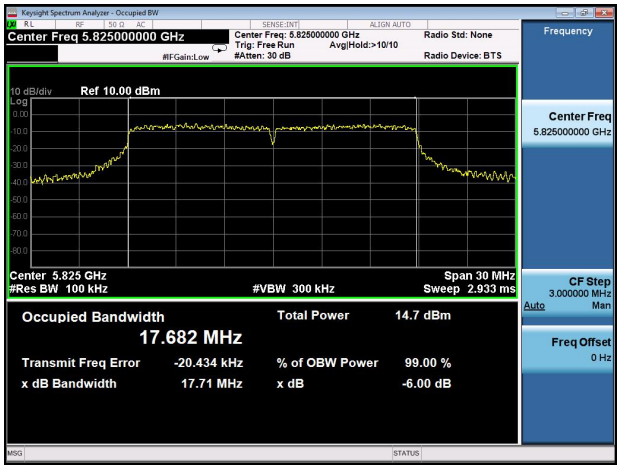
802.11a mode-ch157

802.11 n(HT20) mode-ch157

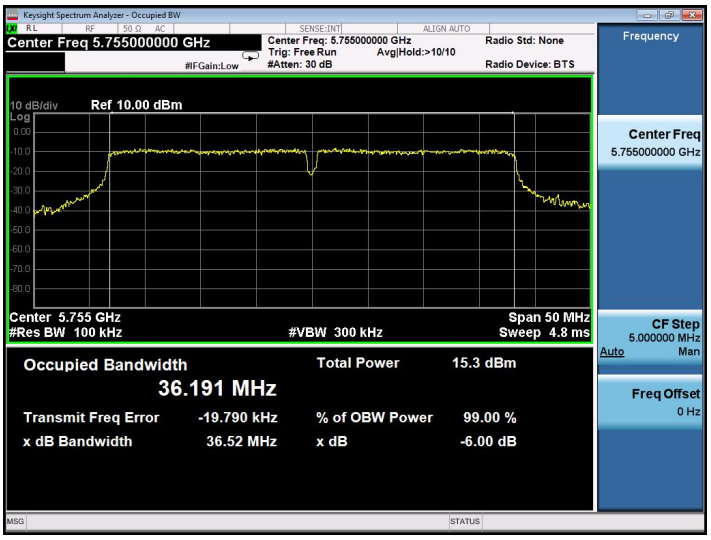


802.11a mode-ch165

802.11 n(HT20) mode-ch165



802.11n(HT40) mode-ch151



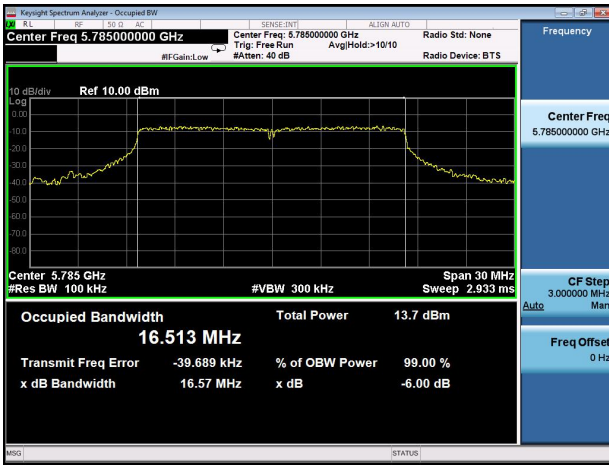
802.11 n(HT40) mode-ch159

B Antenna

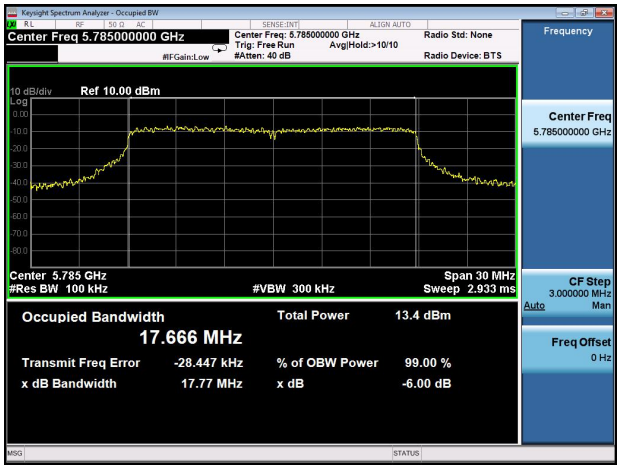
802.11a mode-ch149

802.11n(HT20) mode-ch149

802.11a mode-ch157



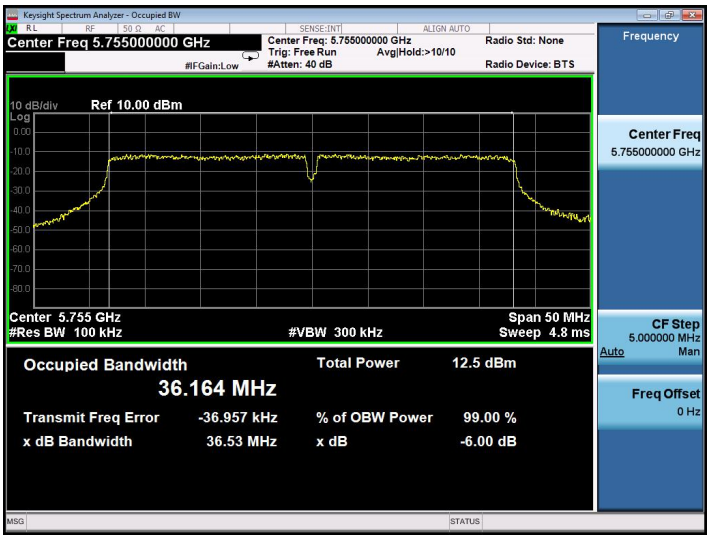
802.11 n(HT20) mode-ch157



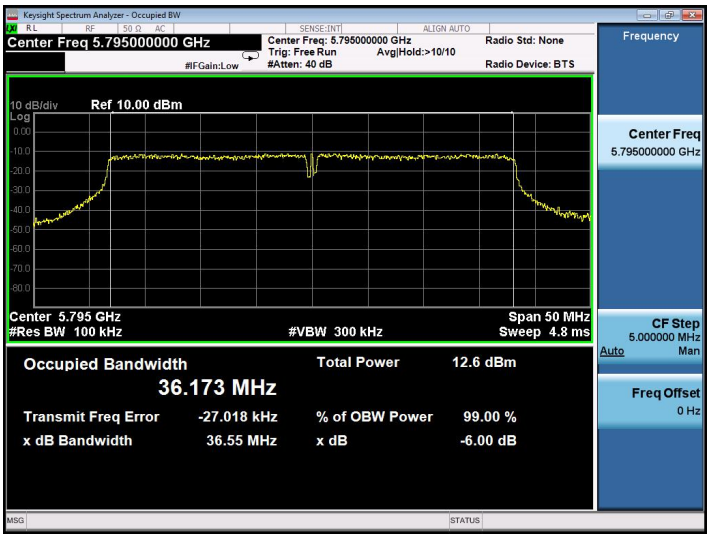
802.11a mode-ch165

802.11 n(HT20) mode-ch165

802.11n(HT40) mode-ch151



802.11 n(HT40) mode-ch159



7. OUTPUT POWER TEST

7.1.Limits

Band 5.15-5.25GHz:

FCC: For mobile and portable client devices in the 5.15-5.25 GHz band, the maximum conducted output power over the frequency band of operation shall not exceed 250 mW provided the maximum antenna gain does not exceed 6 dBi.

IC: all emissions outside the band 5150-5350 MHz shall not exceed -27 dBm/MHz e.i.r.p.

Band 5.725-5.85GHz:

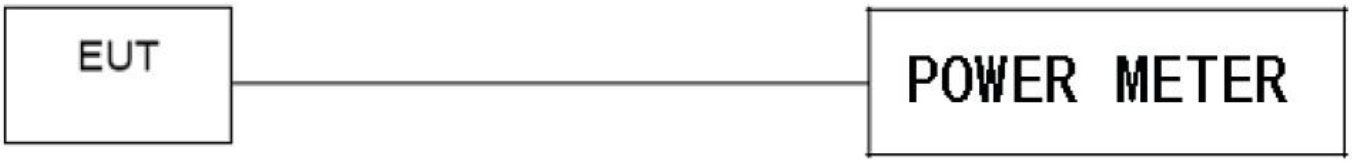
FCC: For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W.

IC: For the band 5725-5825 MHz, emissions within the frequency range from the band edges to 10 MHz above or below the band edges shall not exceed -17 dBm/MHz e.i.r.p. For frequencies more than 10 MHz above or below the band edges, emissions shall not exceed -27 dBm/MHz.

7.2.Test setup

1. The maximum average conducted output power can be measured using Method PM-G (Measurement using a gated RF average power meter):
2. Measurements may be performed using a wideband gated RF power meter provided that the gate parameters are adjusted such that the power is measured only when the EUT is transmitting at its maximum power control level. Since the measurement is made only during the ON time of the transmitter, no duty cycle correction factor is required.

a. The Transmitter output (antenna port) was connected to the power meter.
b. Turn on the EUT and power meter and then record the power value.
c. Repeat above procedures on all channels needed to be tested.



Duty cycle

7.3. Test result

	Frequency (MHz)	Maximum Conducted Output Power (dBm)		Total power (dBm)	FCC Limit (dBm)	IC Limit (dBm)
		Ant A	Ant B			
TX 802.11a Mode						
802.11a	5180	12.43	12.18	--	24.0	--
	5200	11.72	11.54	--	24.0	--
	5240	11.59	11.63	--	24.0	--
	5745	11.67	11.65	--	30.0	30.0
	5785	11.46	11.39	--	30.0	30.0
	5825	11.28	11.47	--	30.0	30.0
TX 802.11n(20) Mode						
802.11n (HT20)	5180	11.36	11.45	14.42	23.75	--
	5200	11.29	11.26	14.29	23.75	--
	5240	11.13	10.87	14.01	23.75	--
	5745	11.28	11.09	14.20	30.0	30.0
	5785	10.97	10.86	13.93	30.0	30.0
	5825	10.65	10.75	13.71	30.0	30.0
TX 802.11n(40) Mode						
802.11n (HT40)	5190	9.89	9.84	12.88	23.75	--
	5230	9.64	9.53	12.60	23.75	--
	5755	9.87	9.72	12.81	30.0	30.0
	5795	9.57	9.85	12.72	30.0	30.0

Note:1. 802.11a mode the ANT A and ANT B can not TX and RX at the same time;

2. 802.11n(20),802.11n(40) mode the ANT A and ANT B can TX and RX at the same time;

3. Directional gain=GANT +10log(N)dBi =3.25+10log2=6.25dBi;

4. For power test the duty cycle is 100% in continous transmitting mode.

For IC **For 5.15~5.25GHz**, the limit=200 mW or 10 +10logB dBm, whichever power is less

For 5.725-5.85GHz, the limit=1 W
EIRP=output power+antenna gain

	Freq (MHz)	**Peak Output Power (dBm)**		Total power (dBm)	**Antenna Gain (dBi)**	**EIRP (dBm)**	**99% Bandwidth (MHz)**	**IC Limit (dBm)**
		Ant A	Ant B					
802.11a	5180	12.43	12.18	12.43	3.25	15.68	16.790	23.0
	5200	11.72	11.54	11.72	3.25	14.97	16.803	23.0
	5240	11.59	11.63	11.63	3.25	14.88	16.784	23.0
802.11n (HT20)	5180	11.36	11.45	14.42	3.25	17.67	17.875	22.75
	5200	11.29	11.26	14.29	3.25	17.54	17.858	22.75
	5240	11.13	10.87	14.01	3.25	17.26	17.851	22.75
802.11n (HT40)	5190	9.89	9.84	12.88	3.25	16.13	36.222	22.75
	5230	9.64	9.53	12.60	3.25	15.85	36.209	22.75

8. DUTY CYCLE

8.1. Test Procedure

The zero-span mode on a spectrum analyzer or EMI receiver if the response time and spacing between bins on the sweep are sufficient to permit accurate measurements of the on and off times of the transmitted signal. Set the center frequency of the instrument to the center frequency of the transmission. Set RBW ≥ OBW if possible; otherwise, set RBW to the largest available value. Set VBW ≥ RBW. Set detector = peak or average. The zero-span measurement method shall not be used unless both RBW and VBW are > 50/T and the number of sweep points across duration T exceeds 100. (For example, if VBW and/or RBW are limited to3 MHz, then the zero-span method of measuring duty cycle shall not be used if T ≤ 16.7 microseconds.)

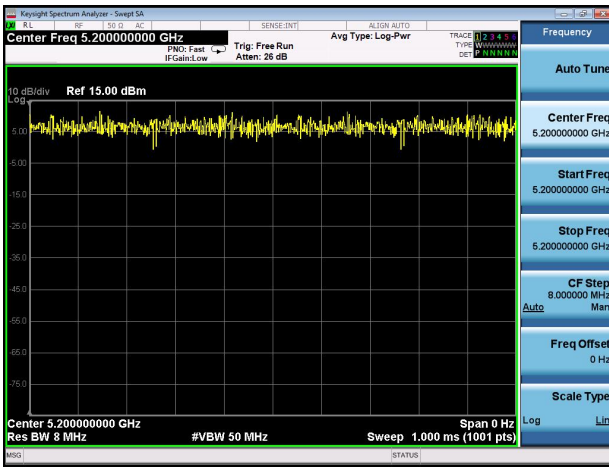
The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator.
The path loss was compensated to the results for each measurement.
Set to the maximum power setting and enable the EUT transmit continuously.
The EUT was operating in controlled its channel.
Use the following spectrum analyzer settings:
Span = Zero Span
RBW = 8MHz
VBW = 50MHz
Number of points in Sweep >100
Detector function = peak
Trace = Clear write Measure Ttotal and Ton
Calculate Duty Cycle = Ton / Ttotal and Duty Cycle Factor=10*log(1/Duty Cycle)

8.2. Test Setup

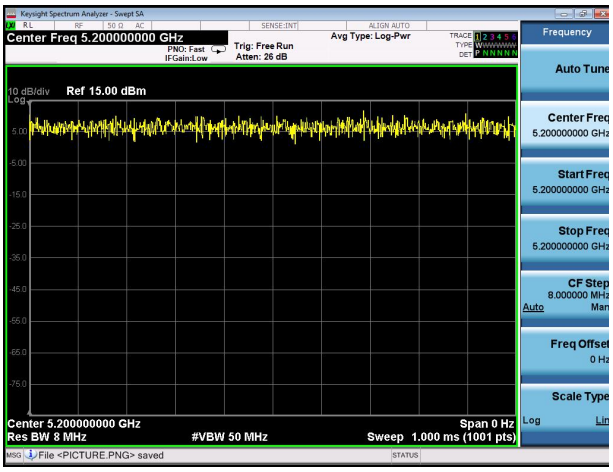
5.2G

A Antenna

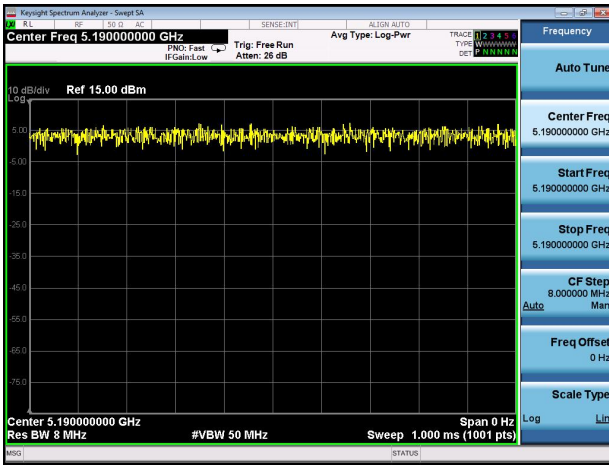
Test plot of Duty Cycle for 802.11a



Test plot of Duty Cycle for 802.11n(HT20)

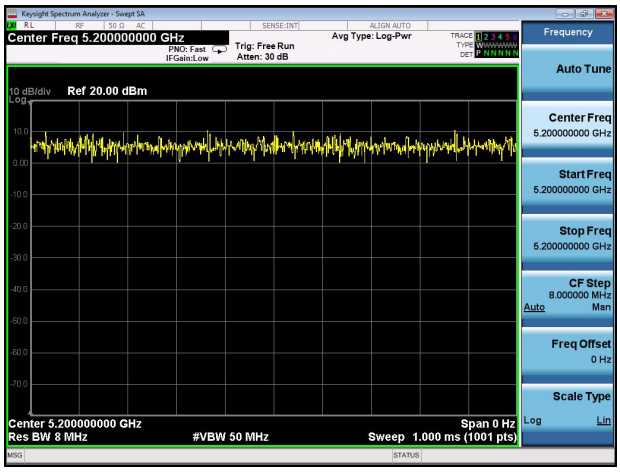


Test plot of Duty Cycle for 802.11n(HT40)

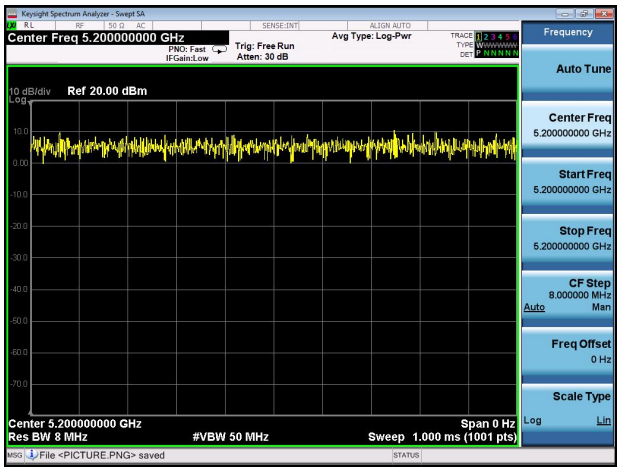


B Antenna

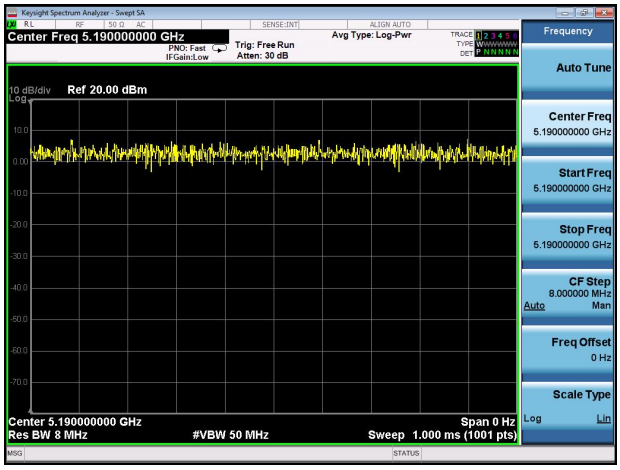
Test plot of Duty Cycle for 802.11a



Test plot of Duty Cycle for 802.11n(HT20)



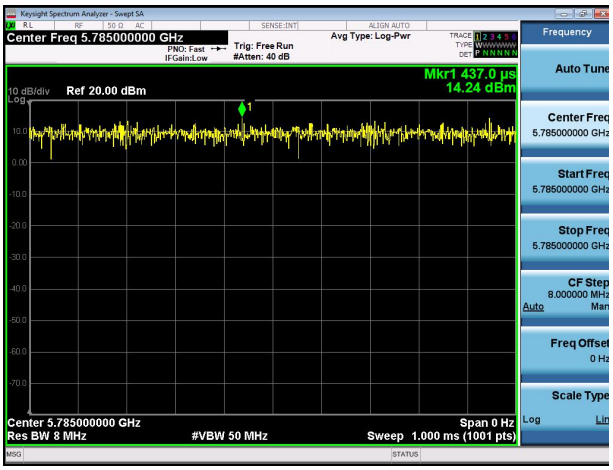
Test plot of Duty Cycle for 802.11n(HT40)



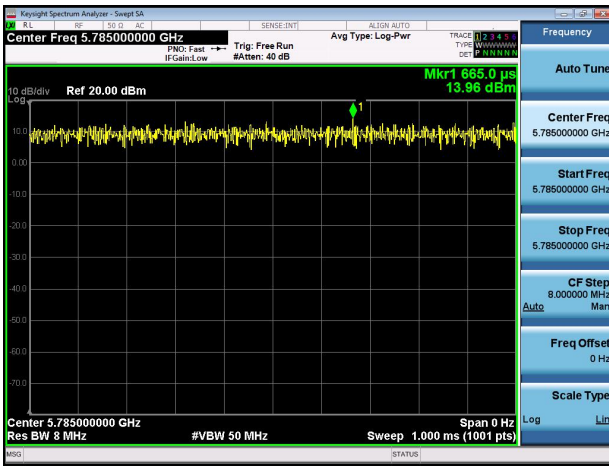
5.8G

A Antenna

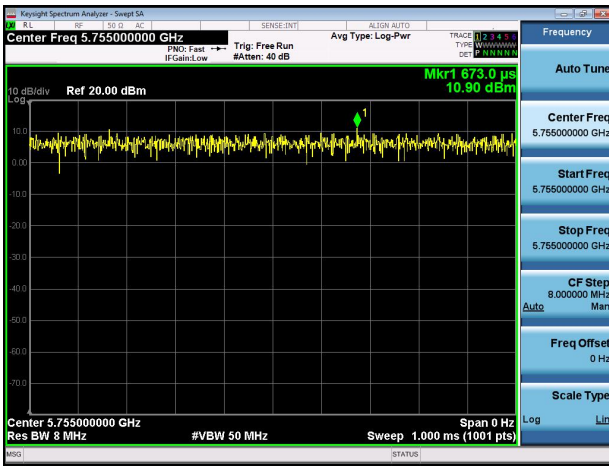
Test plot of Duty Cycle for 802.11a



Test plot of Duty Cycle for 802.11n(HT20)

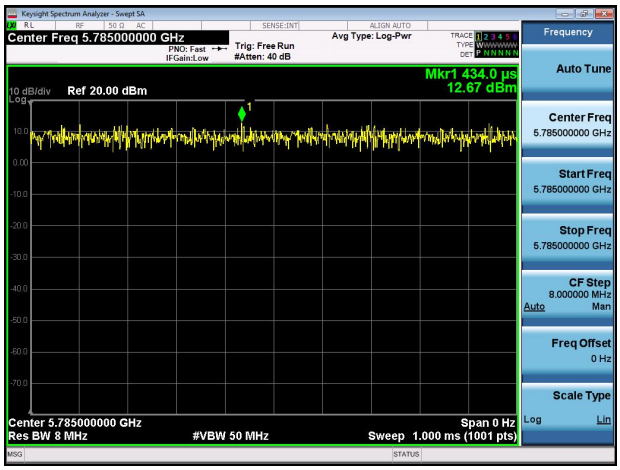


Test plot of Duty Cycle for 802.11n(HT40)

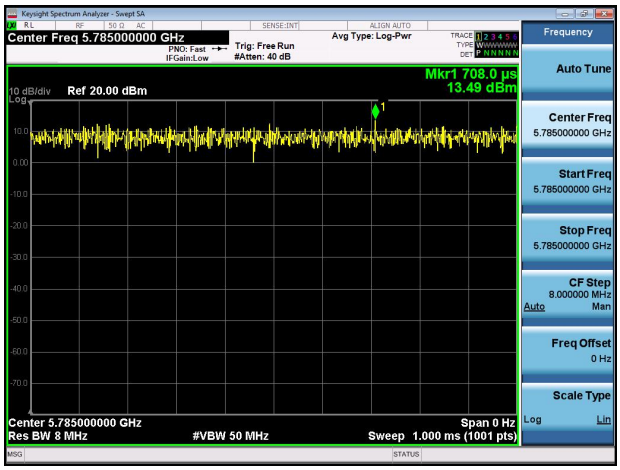


B Antenna

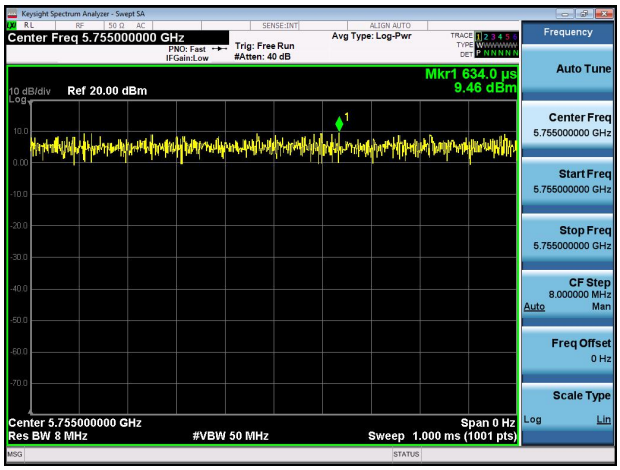
Test plot of Duty Cycle for 802.11a



Test plot of Duty Cycle for 802.11n(HT20)



Test plot of Duty Cycle for 802.11n(HT40)



9. PEAK POWER SPECTRAL DENSITY TEST

9.1.Limits

Band 5.15-5.25GHz:

FCC: In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band.

IC: The e.i.r.p. spectral density shall not exceed 10 dBm in any 1.0 MHz band..

Band 5.725-5.85GHz:

FCC: In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

IC: The power spectral density shall not exceed 30 dBm in any 500 kHz band. If transmitting antennas of directional gain greater than 6 dBi are used.

9.2.Test setup

Methods refer to FCC KDB 789033

1) Create an average power spectrum for the EUT operating mode being tested by following the instructions in section E)2) for measuring maximum conducted output power using a spectrum analyzer or EMI receiver: select the appropriate test method (SA-3, or alternatives to each) and apply it up to, but not including, the step labeled, “Compute power…”.

2) Use the peak search function on the instrument to find the peak of the spectrum.

3) The result is the PPSD.

4) The above procedures make use of 1 MHz resolution bandwidth to satisfy the 1 MHz measurement bandwidth specified in the 15.407(a)(5). That rule section also permits use of resolution bandwidths less than 1 MHz “provided that the measured power is integrated to show the total power over the measurement bandwidth” (i.e., 1 MHz). If measurements are performed using a reduced resolution bandwidth and integrated over 1 MHz bandwidth

9.3.Test data

For FCC

Model	Channel Frequency (MHz)	Power density (dBm/1MHz)		Total PSD	Limit (dBm/1MHz)	Result
		Ant A	Ant B			
802.11a	5180	1.187	0.042	-	11.0	Pass
	5200	1.663	0.998	-	11.0	Pass
	5240	2.998	2.218	-	11.0	Pass
	5745	5.297	4.094	-	30.0	Pass
	5785	4.792	3.892	-	30.0	Pass
	5825	4.642	3.518	-	30.0	Pass
802.11n (HT20)	5180	1.014	0.350	3.70	10.75	Pass
	5200	1.519	0.839	4.20	10.75	Pass
	5240	2.981	1.722	5.41	10.75	Pass
	5745	4.992	3.544	7.34	29.75	Pass
	5785	4.641	3.636	7.18	29.75	Pass
	5825	4.534	3.535	7.07	29.75	Pass
802.11n (HT40)	5190	-1.936	-2.904	0.62	10.75	Pass
	5230	-0.373	-1.124	2.28	10.75	Pass
	5755	1.018	-0.570	3.31	29.75	Pass
	5795	1.106	-0.133	3.54	29.75	Pass

For IC

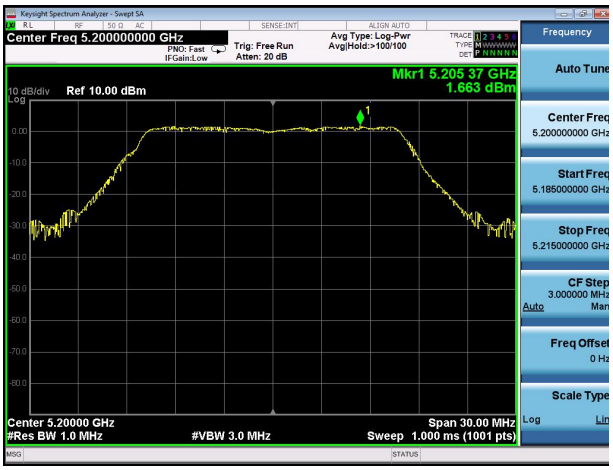
	Frequency (MHz)	Output Power (dBm)		Total PSD	IC Limit (dBm)	Result
		Ant A	Ant B			
802.11a	5180	1.187	0.042	-	10.0	Pass
	5200	1.663	0.998	-	10.0	Pass
	5240	2.998	2.218	-	10.0	Pass
	5745	5.297	4.094	-	30.0	Pass
	5785	4.792	3.892	-	30.0	Pass
	5825	4.642	3.518	-	30.0	Pass
802.11n (HT20)	5180	1.014	0.350	3.70	10.0	Pass
	5200	1.519	0.839	4.20	10.0	Pass
	5240	2.981	1.722	5.41	10.0	Pass
	5745	4.992	3.544	7.34	30.0	Pass
	5785	4.641	3.636	7.18	30.0	Pass
	5825	4.534	3.535	7.07	30.0	Pass
802.11n (HT40)	5190	-1.936	-2.904	0.62	10.0	Pass
	5230	-0.373	-1.124	2.28	10.0	Pass
	5755	1.018	-0.570	3.31	30.0	Pass
	5795	1.106	-0.133	3.54	30.0	Pass

5.2G A Antenna

802.11a 5180MHz

802.11n(HT20) 5180MHz

802.11a 5200MHz



802.11n(HT20) 5200MHz

802.11a 5240MHz

802.11n(HT20) 5240MHz

802.11n (HT40) 5190MHz

802.11n (HT40) 5230MHz