Standard:	FCC Part 15.407	Test Distance:	3m
Test item:	Band edge	Power:	AC 120V/60Hz
Frequency:	5795MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 4	Date:	09/02/2017
Ant.Polar.:	Vertical		

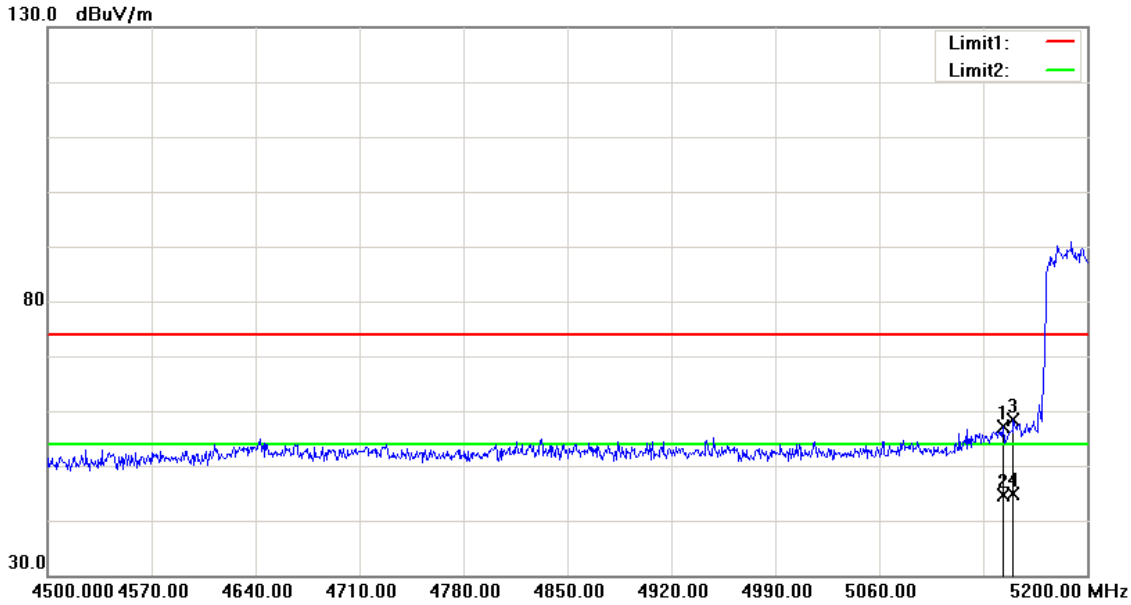
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5858.040	73.24	7.01	80.25	109.95	-29.70	peak
2	5888.070	63.43	7.08	70.51	95.53	-25.02	peak
3	5906.760	59.00	7.12	66.12	81.70	-15.58	peak
4	5919.360	56.44	7.15	63.59	72.37	-8.78	peak
5	5933.850	53.65	7.18	60.83	68.20	-7.37	peak
6	5941.830	53.12	7.19	60.31	68.20	-7.89	peak
7	5948.970	52.08	7.21	59.29	68.20	-8.91	peak
8	5963.460	50.69	7.24	57.93	68.20	-10.27	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.407	Test Distance:	3m
Test item:	Band edge	Power:	AC 120V/60Hz
Frequency:	5210MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 5	Date:	09/01/2017
Ant.Polar.:	Horizontal		



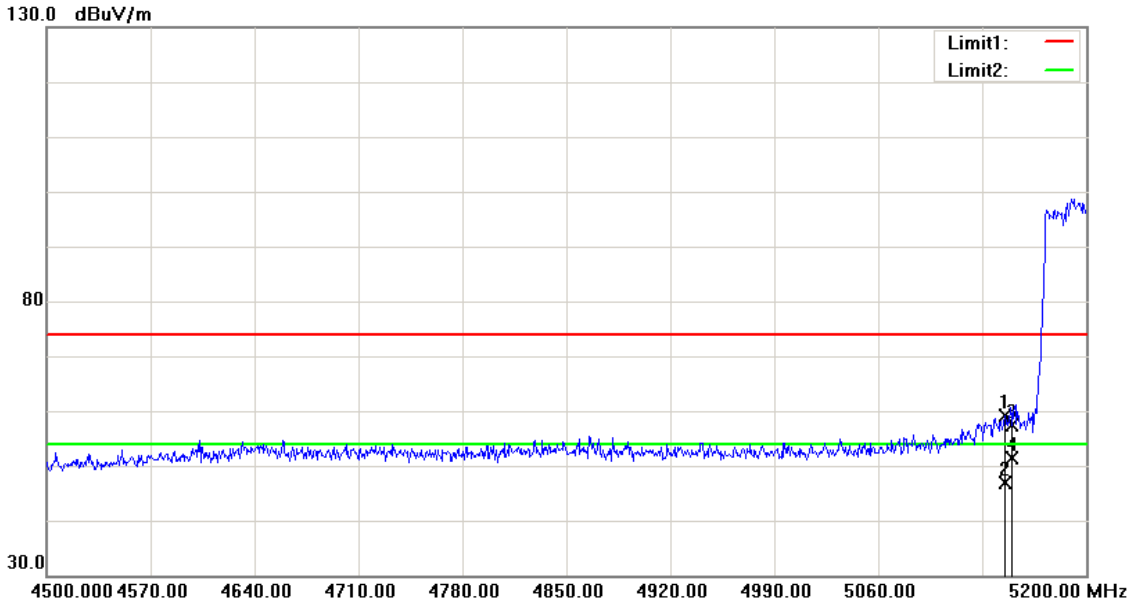
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5143.300	51.31	5.74	57.05	74.00	-16.95	peak
2	5143.300	38.95	5.74	44.69	54.00	-9.31	AVG
3	5150.000	52.57	5.75	58.32	74.00	-15.68	peak
4	5150.000	39.07	5.75	44.82	54.00	-9.18	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.407	Test Distance:	3m
Test item:	Band edge	Power:	AC 120V/60Hz
Frequency:	5210MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 5	Date:	09/01/2017
Ant.Polar.:	Vertical		



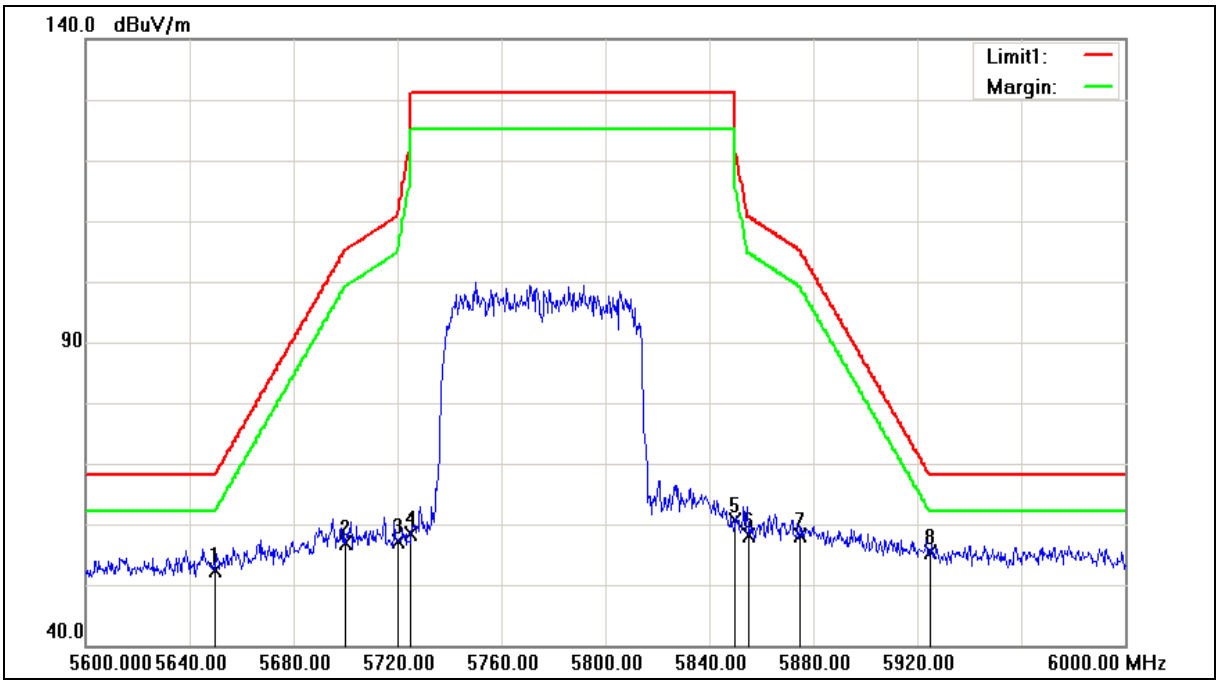
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5145.400	53.33	5.74	59.07	74.00	-14.93	peak
2	5145.400	41.07	5.74	46.81	54.00	-7.19	AVG
3	5150.000	51.62	5.75	57.37	74.00	-16.63	peak
4	5150.000	45.73	5.75	51.48	54.00	-2.52	AVG

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.407	Test Distance:	3m
Test item:	Band edge	Power:	AC 120V/60Hz
Frequency:	5775MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 5	Date:	09/02/2017
Ant.Polar.:	Horizontal		



Standard:	FCC Part 15.407	Test Distance:	3m
Test item:	Band edge	Power:	AC 120V/60Hz
Frequency:	5775MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 5	Date:	09/02/2017
Ant.Polar.:	Horizontal		

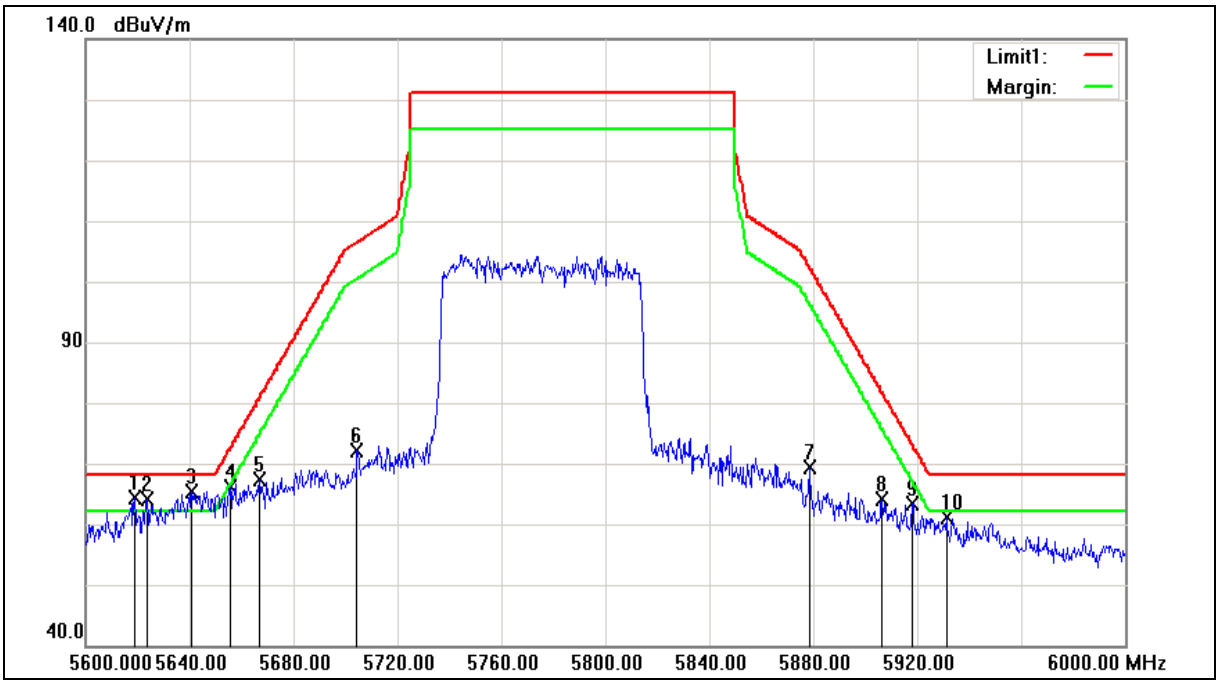
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5650.000	45.69	6.58	52.27	68.20	-15.93	peak
2	5700.000	50.12	6.68	56.80	105.20	-48.40	peak
3	5720.000	50.51	6.73	57.24	110.80	-53.56	peak
4	5725.000	51.75	6.74	58.49	122.20	-63.71	peak
5	5850.000	53.53	6.99	60.52	122.20	-61.68	peak
6	5855.000	51.06	7.00	58.06	110.80	-52.74	peak
7	5875.000	50.97	7.05	58.02	105.20	-47.18	peak
8	5925.000	48.33	7.16	55.49	68.20	-12.71	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

Standard:	FCC Part 15.407	Test Distance:	3m
Test item:	Band edge	Power:	AC 120V/60Hz
Frequency:	5775MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 5	Date:	09/02/2017
Ant.Polar.:	Vertical		



Standard:	FCC Part 15.407	Test Distance:	3m
Test item:	Band edge	Power:	AC 120V/60Hz
Frequency:	5775MHz	Temp.(℃)/Hum.(%RH):	26(℃)/60%RH
Mode:	Mode 5	Date:	09/02/2017
Ant.Polar.:	Vertical		

No.	Frequency (MHz)	Reading (dBuV)	Correct Factor (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	5618.800	57.95	6.51	64.46	68.20	-3.74	peak
2	5623.600	57.50	6.51	64.01	68.20	-4.19	peak
3	5640.800	58.82	6.56	65.38	68.20	-2.82	peak
4	5655.600	59.44	6.59	66.03	72.34	-6.31	peak
5	5666.800	60.67	6.61	67.28	80.63	-13.35	peak
6	5704.400	65.50	6.69	72.19	106.43	-34.24	peak
7	5878.400	62.38	7.06	69.44	102.68	-33.24	peak
8	5906.400	57.00	7.12	64.12	81.96	-17.84	peak
9	5918.000	56.22	7.15	63.37	73.38	-10.01	peak
10	5931.200	53.93	7.16	61.09	68.20	-7.11	peak

Note:1.Result (dBuV/m) = Correct Factor (dB/m) + Reading(dBuV).

2.Correction factor (dB/m) = Antenna Factor (dB/m) + Cable loss (dB) – Pre-Amplifier gain (dB).

3. When the peak results are less than average limit, so not need to evaluate the average.

4.4. Maximum Conducted Output Power Measurement & Additional Rule For Outdoor Operation

■ **Limit**

Frequency Range (MHz)	FCC Maximum Conducted Output Power Limit	Max_EIRP at any elevation angle > 30° form horizon
	Master	Outdoor AP Operation
5.150 ~ 5.250 GHz	The lesser of 1W (30dBm)	< 125 mW(21 dBm)
5.725 ~ 5.850 GHz	The lesser of 1W (30dBm)	NA

According FCC KDB 662911 D01 v02r01 – for power measurements on IEEE802.11 devices

∗ CDD mode : Max. Gain = 6.18 dBi > 6dBi (5.150 ~ 5.250 GHz)

∗ CDD mode : Max. Gain = 6.05 dBi > 6dBi (5.725 ~ 5.850 GHz)

CCD mode power limit shall be reduced = 30 – 0.18 = 29.82 dBm (5.150 ~ 5.250 GHz)

CCD mode power limit shall be reduced = 30 – 0.05 = 29.95 dBm (5.725 ~ 5.850 GHz)

CDD mode : Max EIRP = Max. Total Output Power + Directional Gain (5.150 ~ 5.250 GHz)

∗ BF mode：Directional Gain =10*log{[10^(G1/20)+10^(G2/20)+…+10^(Gn/20)]^2/NANT}
= 9.19 dBi > 6dBi (5.150 ~ 5.250 GHz)

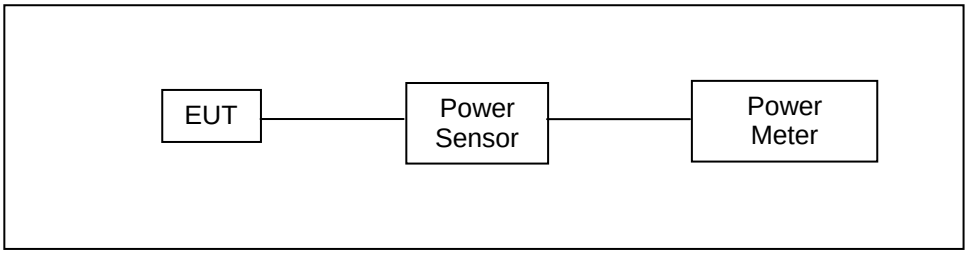
∗ BF mode：Directional Gain = 10*log{[10^(G1/20)+10^(G2/20)+…+10^(Gn/20)]^2/NANT}
= 9.06 dBi > 6dBi (5.725 ~ 5.850 GHz)

BF mode power limit shall be reduced = 30 – 3.19 = 26.81 dBm (5.150 ~ 5.250 GHz)

BF mode power limit shall be reduced = 30 – 3.06 = 26.94 dBm (5.725 ~ 5.850 GHz)

BF mode : Max EIRP = Max. Total Output Power + Directional Gain (5.150 ~ 5.250 GHz)

■ **Test Setup**



■ **Test Instruments**

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Power Sensor	Anritsu	MA2411B	1126022	08/28/2017	1 year
Power Meter	Anritsu	ML2495A	1135009	08/28/2017	1 year
Microwave Cable	EMCI	EMC104-SM-SM-1500	140303	02/22/2017	1 year
Test Site	ATL	TE05	TE05	N.C.R.	-----

Note: N.C.R. = No Calibration Request.

■ **Test Procedure**

The test is performed in accordance with KDB789033: D02 General UNII Test Procedures New Rules v01r04, Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices
Section (E) Maximum Conducted Output Power
3. Measurement using a Power Meter (PM)
b) Method PM-G (Measurement using a gated RF average power meter)

EIRP evaluation according to 789033 D02 General UNII Test Procedures New Rules v02r01 H.(1)(b)
Antenna measurement results such as antenna report presentation.
H. Measurement of emission at elevation angle higher than 30° from horizon
1. For fixed infrastructure, not electrically or mechanically steerable beam antenna

b) If elevation plane radiation pattern is not available, but the antenna type (such as dipole omnidirectional, Yagi, parabolic, or sector antenna) has symmetrical elevation plane pattern referenced at main beam and all lobes on the main beam elevation plane have highest gains, then the following measurement method is acceptable to determine compliance:
(i) Determine the device’ s intended mounting elevation angle referenced to the horizon.
(ii) Rotate EUT antenna by 90° around the main beam axis in horizontal position to transform measurement in elevation angle into azimuth angle and define 0° reference angle based on device’ s intended mounting elevation angle.
(iii) Move test antenna along the horizontal arc, or rotate the turn table with EUT antenna placed at the center, between 30° and 90° relative to the 0° reference angle, and then continuing down from 90° to 30° on the other side of the pattern, while maintaining the test antenna pointing with constant distance to the EUT antenna and search for the spot which
has the highest measured emission. Both horizontal and vertical polarization shall be investigated to find out the maximum radiated emission level.
Note: Moving of test antenna along the horizontal arc, or rotating the turn table, shall be performed in angular step size as small as possible, but not larger than 3°.
(iv) Calculate the EIRP based on the highest measured emission and compare to the limit of 125 mW to determine compliance.
(v) The antenna pattern measurements should be included in the filing.

■ **Test Result**

Test Item		Maximum Conducted Output Power						
Test Mode		Mode 2: IEEE 802.11a Continuous TX mode						
Frequency (MHz)	Data Rate	ANT-0		ANT-1		ANT-0+1		FCC Limit (dBm)
		Max. Output Power						
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	
5180	6M	12.91	0.020	9.66	0.009	14.59	0.029	≤ 29.82
5200		13.07	0.020	9.80	0.010	**14.75**	**0.030**	
5220		12.86	0.019	9.58	0.009	14.53	0.028	
5240		13.07	0.020	9.76	0.009	14.73	0.030	
5745		16.73	0.047	15.10	0.032	19.00	0.079	≤ 29.95
5765		16.91	0.049	15.36	0.034	**19.21**	**0.083**	
5785		16.40	0.044	14.70	0.030	18.64	0.073	
5805		16.59	0.046	15.05	0.032	18.90	0.078	
5825		16.50	0.045	15.34	0.034	18.97	0.079	
5180	54M	12.66	0.018	9.45	0.009	14.36	0.027	≤ 29.82
5200		12.85	0.019	9.52	0.009	14.51	0.028	
5220		12.60	0.018	9.40	0.009	14.30	0.027	
5240		12.80	0.019	9.52	0.009	14.47	0.028	
5745		16.50	0.045	14.91	0.031	18.79	0.076	≤ 29.95
5765		16.67	0.046	15.12	0.033	18.97	0.079	
5785		16.12	0.041	14.45	0.028	18.38	0.069	
5805		16.28	0.042	14.74	0.030	18.59	0.072	
5825		16.32	0.043	15.10	0.032	18.76	0.075	

Note: The relevant measured result has the offset with cable loss already.

Test Item		Maximum Conducted Output Power						
Test Mode		Mode 3: IEEE 802.11ac 20MHz Continuous TX mode						
Frequency (MHz)	Data Rate	ANT-0		ANT-1		ANT-0+1		FCC Limit (dBm)
		Max. Output Power						
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	
5180	13M	12.92	0.020	9.85	0.010	14.66	0.029	≤ 29.82
5200		12.72	0.019	9.51	0.009	14.42	0.028	
5220		12.86	0.019	9.76	0.009	14.59	0.029	
5240		13.03	0.020	9.88	0.010	**14.74**	**0.030**	
5745		17.01	0.050	15.50	0.035	19.33	0.086	≤ 29.95
5765		17.26	0.053	15.83	0.038	19.61	0.091	
5785		17.53	0.057	16.26	0.042	19.95	0.099	
5805		17.78	0.060	16.65	0.046	**20.26**	**0.106**	
5825		17.20	0.052	16.41	0.044	19.83	0.096	
5180	173.4M	12.67	0.018	9.52	0.009	14.38	0.027	≤ 29.82
5200		12.48	0.018	9.26	0.008	14.17	0.026	
5220		12.58	0.018	9.52	0.009	14.32	0.027	
5240		12.71	0.019	9.62	0.009	14.44	0.028	
5745		16.79	0.048	15.28	0.034	19.11	0.081	≤ 29.95
5765		17.01	0.050	15.53	0.036	19.34	0.086	
5785		17.24	0.053	15.95	0.039	19.65	0.092	
5805		17.54	0.057	16.41	0.044	20.02	0.101	
5825		16.99	0.050	16.21	0.042	19.63	0.092	

Note: The relevant measured result has the offset with cable loss already.

Test Item		Maximum Conducted Output Power						
Test Mode		Mode 4: IEEE 802.11ac 40MHz Continuous TX mode						
Frequency (MHz)	Data Rate	ANT-0		ANT-1		ANT-0+1		FCC Limit (dBm)
		Max. Output Power						
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	
5190	27M	12.40	0.017	9.12	0.008	14.07	0.026	≤ 29.82
5230		12.93	0.020	9.56	0.009	**14.57**	**0.029**	
5755		18.27	0.067	16.29	0.043	20.40	0.110	≤ 29.95
5795		18.85	0.077	19.40	0.087	**22.14**	**0.164**	
5190	400M	12.15	0.016	8.85	0.008	13.82	0.024	≤ 29.82
5230		12.62	0.018	9.32	0.009	14.29	0.027	
5755		17.98	0.063	16.02	0.040	20.12	0.103	≤ 29.95
5755		18.52	0.071	19.14	0.082	21.85	0.153	

Test Item		Maximum Conducted Output Power						
Test Mode		Mode 5: IEEE 802.11ac 80MHz Continuous TX mode						
Frequency (MHz)	Data Rate	ANT-0		ANT-1		ANT-0+1		FCC Limit (dBm)
		Max. Output Power						
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	
5210	58.6M	9.15	0.008	6.33	0.004	**10.98**	**0.013**	≤ 29.82
5775		15.20	0.033	13.27	0.021	**17.35**	**0.054**	≤ 29.95
5210	866.6M	8.82	0.008	6.12	0.004	10.69	0.012	≤ 29.82
5775		14.91	0.031	12.95	0.020	17.05	0.051	≤ 29.95

Note: The relevant measured result has the offset with cable loss already.

Test Item		Max_EIRP at any elevation angle > 30° form horizon				
Test Mode		Mode 2: IEEE 802.11a Continuous TX mode				
Frequency (MHz)	Data Rate	ANT-0+1 Max. Output Power (dBm)	Directional Gain (dBi)	Max_EIRP (dBm)	Max_EIRP (W)	FCC Limit (dBm)
5180	6M	14.59	6.18	20.77	0.119	< 21
5200		14.75	6.18	20.93	0.124	
5220		14.53	6.18	20.71	0.118	
5240		14.73	6.18	20.91	0.123	
5180	54M	14.36	6.18	20.54	0.113	< 21
5200		14.51	6.18	20.69	0.117	
5220		14.30	6.18	20.48	0.112	
5240		14.47	6.18	20.65	0.116	

Test Item		Max_EIRP at any elevation angle > 30° form horizon				
Test Mode		Mode 3: IEEE 802.11ac 20MHz Continuous TX mode				
Frequency (MHz)	Data Rate	ANT-0+1 Max. Output Power (dBm)	Directional Gain (dBi)	Max_EIRP (dBm)	Max_EIRP (W)	FCC Limit (dBm)
5180	13M	14.66	6.18	20.84	0.121	< 21
5200		14.42	6.18	20.60	0.115	
5220		14.59	6.18	20.77	0.119	
5240		14.74	6.18	20.92	0.124	
5180	173.4M	14.38	6.18	20.56	0.114	< 21
5200		14.17	6.18	20.35	0.108	
5220		14.32	6.18	20.50	0.112	
5240		14.44	6.18	20.62	0.115	

Note: The relevant measured result has the offset with cable loss already.

Test Item		Max_EIRP at any elevation angle > 30° form horizon				
Test Mode		Mode 4: IEEE 802.11ac 40MHz Continuous TX mode				
Frequency (MHz)	Data Rate	ANT-0+1 Max. Output Power (dBm)	Directional Gain (dBi)	Max_EIRP (dBm)	Max_EIRP (W)	FCC Limit (dBm)
5190	27M	14.07	6.18	20.25	0.106	< 21
5230		14.57	6.18	20.75	0.119	
5190	400M	13.82	6.18	20.00	0.100	< 21
5230		14.29	6.18	20.47	0.111	

Test Item		Max_EIRP at any elevation angle > 30° form horizon				
Test Mode		Mode 5: IEEE 802.11ac 80MHz Continuous TX mode				
Frequency (MHz)	Data Rate	ANT-0+1 Max. Output Power (dBm)	Directional Gain (dBi)	Max_EIRP (dBm)	Max_EIRP (W)	FCC Limit (dBm)
5210	58.6M	10.98	6.18	17.16	0.052	< 21
5210	866.6M	10.69	6.18	16.87	0.049	< 21

Note: The relevant measured result has the offset with cable loss already.

Beamforming on

Test Item		Maximum Conducted Output Power						
Test Mode		Mode 3: IEEE 802.11ac 20MHz Continuous TX mode						
Frequency (MHz)	Data Rate	ANT-0		ANT-1		ANT-0+1		FCC Limit (dBm)
		Max. Output Power						
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	
5180	13M	9.64	0.009	6.89	0.005	11.49	0.014	≤ 26.81
5200		10.01	0.010	7.03	0.005	**11.78**	**0.015**	
5220		9.78	0.010	6.82	0.005	11.56	0.014	
5240		9.98	0.010	6.89	0.005	11.71	0.015	
5745		15.85	0.038	13.90	0.025	17.99	0.063	≤ 26.94
5765		16.11	0.041	14.28	0.027	18.30	0.068	
5785		16.41	0.044	14.64	0.029	18.62	0.073	
5805		16.64	0.046	15.01	0.032	**18.91**	**0.078**	
5825		15.66	0.037	14.36	0.027	18.07	0.064	
5180	173.4M	9.37	0.009	6.64	0.005	11.23	0.013	≤ 26.81
5200		9.71	0.009	6.81	0.005	11.51	0.014	
5220		9.52	0.009	6.57	0.005	11.30	0.013	
5240		9.73	0.009	6.62	0.005	11.46	0.014	
5745		15.53	0.036	13.68	0.023	17.71	0.059	≤ 26.94
5765		15.78	0.038	13.96	0.025	17.97	0.063	
5785		16.17	0.041	14.40	0.028	18.38	0.069	
5805		16.43	0.044	14.74	0.030	18.68	0.074	
5825		15.47	0.035	14.13	0.026	17.86	0.061	

Note: The relevant measured result has the offset with cable loss already.

Test Item		Maximum Conducted Output Power						
Test Mode		Mode 4: IEEE 802.11ac 40MHz Continuous TX mode						
Frequency (MHz)	Data Rate	ANT-0		ANT-1		ANT-0+1		FCC Limit (dBm)
		Max. Output Power						
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	
5190	27M	9.72	0.009	6.60	0.005	11.44	0.014	≤ 26.81
5230		9.77	0.009	6.53	0.004	**11.46**	**0.014**	
5755		16.74	0.047	14.67	0.029	18.84	0.077	≤ 26.94
5795		18.29	0.067	16.97	0.050	**20.69**	**0.117**	
5190	400M	9.52	0.009	6.31	0.004	11.22	0.013	≤ 26.81
5230		9.50	0.009	6.29	0.004	11.20	0.013	
5755		16.50	0.045	14.36	0.027	18.57	0.072	≤ 26.94
5755		17.98	0.063	16.68	0.047	20.39	0.109	

Test Item		Maximum Conducted Output Power						
Test Mode		Mode 5: IEEE 802.11ac 80MHz Continuous TX mode						
Frequency (MHz)	Data Rate	ANT-0		ANT-1		ANT-0+1		FCC Limit (dBm)
		Max. Output Power						
		(dBm)	(W)	(dBm)	(W)	(dBm)	(W)	
5210	58.6M	7.69	0.006	4.78	0.003	9.48	0.009	≤ 26.81
5775		13.76	0.024	11.72	0.015	15.87	0.039	≤ 26.94
5210	866.6M	7.45	0.006	4.55	0.003	9.25	0.008	≤ 26.81
5775		13.50	0.022	11.48	0.014	15.62	0.036	≤ 26.94

Note: The relevant measured result has the offset with cable loss already.

Test Item		Max_EIRP at any elevation angle > 30° form horizon				
Test Mode		Mode 3: IEEE 802.11ac 20MHz Continuous TX mode				
Frequency (MHz)	Data Rate	ANT-0+1 Max. Output Power (dBm)	Directional Gain (dBi)	Max_EIRP (dBm)	Max_EIRP (W)	FCC Limit (dBm)
5180	13M	11.49	9.19	20.68	0.117	< 21
5200		11.78	9.19	20.97	0.125	
5220		11.56	9.19	20.75	0.119	
5240		11.71	9.19	20.90	0.123	
5180	173.4M	11.23	9.19	20.42	0.110	< 21
5200		11.51	9.19	20.70	0.117	
5220		11.30	9.19	20.49	0.112	
5240		11.46	9.19	20.65	0.116	

Test Item		Max_EIRP at any elevation angle > 30° form horizon				
Test Mode		Mode 4: IEEE 802.11ac 40MHz Continuous TX mode				
Frequency (MHz)	Data Rate	ANT-0+1 Max. Output Power (dBm)	Directional Gain (dBi)	Max_EIRP (dBm)	Max_EIRP (W)	FCC Limit (dBm)
5190	27M	11.44	9.19	20.63	0.116	< 21
5230		11.46	9.19	20.65	0.116	
5190	400M	11.22	9.19	20.41	0.110	< 21
5230		11.20	9.19	20.39	0.109	

Test Item		Max_EIRP at any elevation angle > 30° form horizon				
Test Mode		Mode 5: IEEE 802.11ac 80MHz Continuous TX mode				
Frequency (MHz)	Data Rate	ANT-0+1 Max. Output Power (dBm)	Directional Gain (dBi)	Max_EIRP (dBm)	Max_EIRP (W)	FCC Limit (dBm)
5210	58.6M	9.48	9.19	18.67	0.074	< 21
5210	866.6M	9.25	9.19	18.44	0.070	< 21

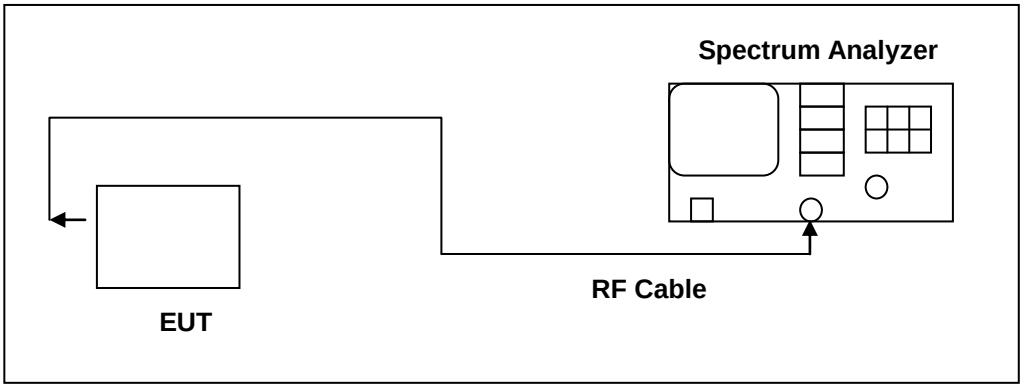
Note: The relevant measured result has the offset with cable loss already.

4.5. 26dB RF Bandwidth & 99 % Occupied Bandwidth Measurement

■ **Limit**

N/A

■ **Test Setup**



■ **Test Instruments**

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/19/2016	1 year
Microwave Cable	EMCI	EMC104-SM-SM-1500	140303	02/22/2017	1 year
Test Site	ATL	TE05	TE05	N.C.R.	-----

Note: N.C.R. = No Calibration Request.

■ **Test Procedure**

The test is performed in accordance with KDB789033: D02 General UNII Test Procedures New Rules v01r04, Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	>26dB Bandwidth
RBW	Approximately 1% of the emission bandwidth
VBW	VBW > RBW
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

■ **Test Result**

Test Item	26dB RF Bandwidth & 99 % Occupied Bandwidth Measurement			
Test Mode	Mode 2: IEEE 802.11a Continuous TX mode			
Frequency (MHz)	ANT-0		ANT-1	
	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
5180	19.270	16.458	18.840	16.389
5200	19.120	16.465	18.750	16.401
5240	19.210	16.470	18.880	16.389

Test Item	26dB RF Bandwidth & 99 % Occupied Bandwidth Measurement			
Test Mode	Mode 3: IEEE 802.11ac 20MHz Continuous TX mode			
Frequency (MHz)	ANT-0		ANT-1	
	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
5180	20.050	17.616	19.810	17.544
5200	20.080	17.611	19.930	17.542
5240	20.180	17.613	19.990	17.524

Test Item	26dB RF Bandwidth & 99 % Occupied Bandwidth Measurement			
Test Mode	Mode 4: IEEE 802.11ac 40MHz Continuous TX mode			
Frequency (MHz)	ANT-0		ANT-1	
	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
5190	40.260	36.008	40.440	36.144
5230	40.300	36.018	40.480	36.151

Test Item	26dB RF Bandwidth & 99 % Occupied Bandwidth Measurement			
Test Mode	Mode 5: IEEE 802.11ac 80MHz Continuous TX mode			
Frequency (MHz)	ANT-0		ANT-1	
	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
5210	82.600	75.537	82.210	75.655

Note: The 99% occupied bandwidth not crossed 5250MHz.

Beamforming on

Test Item	26dB RF Bandwidth & 99 % Occupied Bandwidth Measurement			
Test Mode	Mode 3: IEEE 802.11ac 20MHz Continuous TX mode			
Frequency (MHz)	ANT-0		ANT-1	
	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
5180	20.100	17.621	19.960	17.560
5200	20.120	17.615	19.930	17.552
5240	20.140	17.614	19.820	17.537

Test Item	26dB RF Bandwidth & 99 % Occupied Bandwidth Measurement			
Test Mode	Mode 4: IEEE 802.11ac 40MHz Continuous TX mode			
Frequency (MHz)	ANT-0		ANT-1	
	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
5190	40.240	35.986	40.110	36.169
5230	40.330	36.026	40.540	36.152

Test Item	26dB RF Bandwidth & 99 % Occupied Bandwidth Measurement			
Test Mode	Mode 5: IEEE 802.11ac 80MHz Continuous TX mode			
Frequency (MHz)	ANT-0		ANT-1	
	26dB Bandwidth (MHz)	99% Bandwidth (MHz)	26dB Bandwidth (MHz)	99% Bandwidth (MHz)
5210	82.960	75.542	82.700	75.680

Note: The 99% occupied bandwidth not crossed 5250MHz.

■ **Test Graphs**

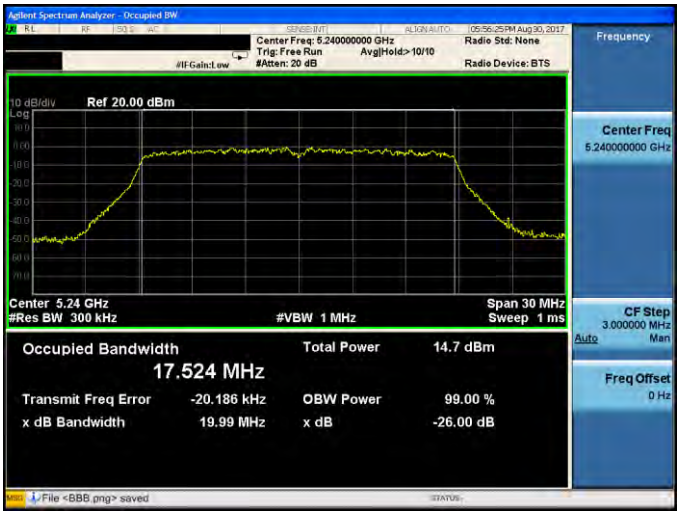
Mode 2: IEEE 802.11a Continuous TX mode_ ANT-0	
5180 MHz	
5200 MHz	
5240 MHz	

Mode 3: IEEE 802.11ac 20MHz Continuous TX mode_ ANT-0	
5180 MHz	
5200 MHz	
5240 MHz	

Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ ANT-0	
5190 MHz	
5230 MHz	

Mode 5: IEEE 802.11ac 80MHz Continuous TX mode_ ANT-0	
5210 MHz	

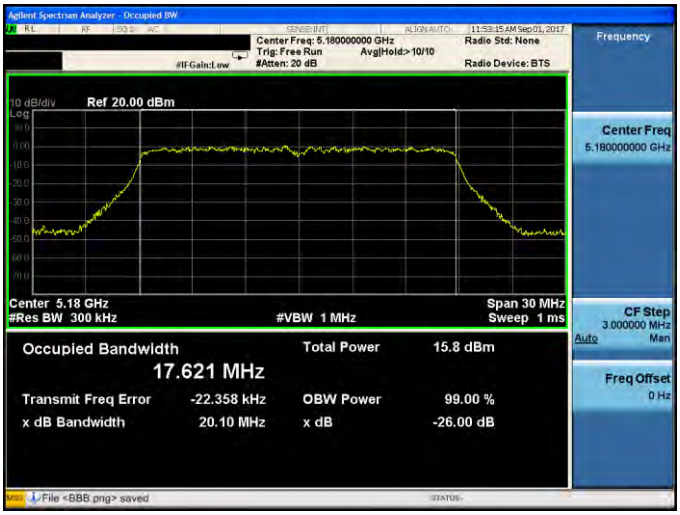
Mode 2: IEEE 802.11a Continuous TX mode_ ANT-1	
5180 MHz	
5200 MHz	
5240 MHz	

Mode 3: IEEE 802.11ac 20MHz Continuous TX mode_ ANT-1	
5180 MHz	
5200 MHz	
5240 MHz	

Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ ANT-1	
5190 MHz	
5230 MHz	

Mode 5: IEEE 802.11ac 80MHz Continuous TX mode_ ANT-1	
5210 MHz	

Beamforming on

Mode 3: IEEE 802.11ac 20MHz Continuous TX mode_ ANT-0	
5180 MHz	
5200 MHz	
5240 MHz	

Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ ANT-0	
5190 MHz	
5230 MHz	

Mode 5: IEEE 802.11ac 80MHz Continuous TX mode_ ANT-0	
5210 MHz	

Mode 3: IEEE 802.11ac 20MHz Continuous TX mode_ ANT-1	
5180 MHz	
5200 MHz	
5240 MHz	

Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ ANT-1	
5190 MHz	
5230 MHz	

Mode 5: IEEE 802.11ac 80MHz Continuous TX mode_ ANT-1	
5210 MHz	

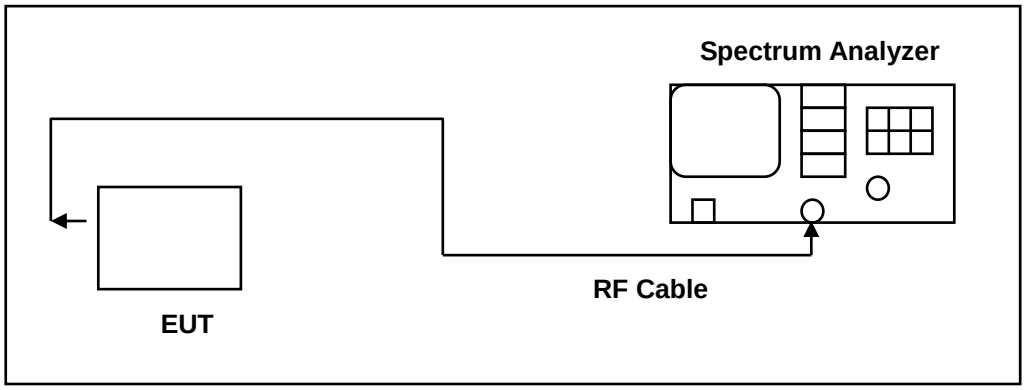
4.6. 6dB RF Bandwidth Measurement

■ **Limit**

6dB RF Bandwidth

Systems using digital modulation techniques may operate in the 5725~5850MHz bands. The minimum 6 dB band-width shall be at least 500 kHz.

■ **Test Setup**



■ **Test Instruments**

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Cal. Period
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/19/2016	1 year
Test Site	ATL	TE05	TE05	N.C.R.	-----

Note: N.C.R. = No Calibration Request.

■ **Test Procedure**

6dB RF Bandwidth

The EUT tested to UNII test procedure of KDB789033 D02 for compliance to FCC 47CFR 15.407 requirements. The antenna port of the EUT was connected to the input of a spectrum analyzer. Analyzer RES BW was set to 100 kHz. For each RF output channel investigated, the spectrum analyzer center frequency was set to the channel carrier. A peak output reading was taken, a DISPLAY line was drawn 6 dB lower than peak level. The 6 dB bandwidth was determined from where the channel output spectrum intersected the display line.

The test was performed at 3 channels.

■ **Test Result**

Test Item	6dB RF Bandwidth		
Test Mode	Mode 2: IEEE 802.11a Continuous TX mode		
Frequency (MHz)	6dB Bandwidth (kHz)		Limit (kHz)
	ANT-0	ANT-1	
5745	16340	16350	> 500
5785	16370	16370	> 500
5825	16320	16390	> 500

Test Item	6dB RF Bandwidth		
Test Mode	Mode 3: IEEE 802.11ac 20MHz Continuous TX mode		
Frequency (MHz)	6dB Bandwidth (kHz)		Limit (kHz)
	ANT-0	ANT-1	
5745	17560	17630	> 500
5785	17590	17590	> 500
5825	17580	17610	> 500

Test Item	6dB RF Bandwidth		
Test Mode	Mode 4: IEEE 802.11ac 40MHz Continuous TX mode		
Frequency (MHz)	6dB Bandwidth (kHz)		Limit (kHz)
	ANT-0	ANT-1	
5755	35130	35110	> 500
5795	35030	35090	> 500

Test Item	6dB RF Bandwidth		
Test Mode	Mode 5: IEEE 802.11ac 80MHz Continuous TX mode		
Frequency (MHz)	6dB Bandwidth (kHz)		Limit (kHz)
	ANT-0	ANT-1	
5775	75410	75250	> 500

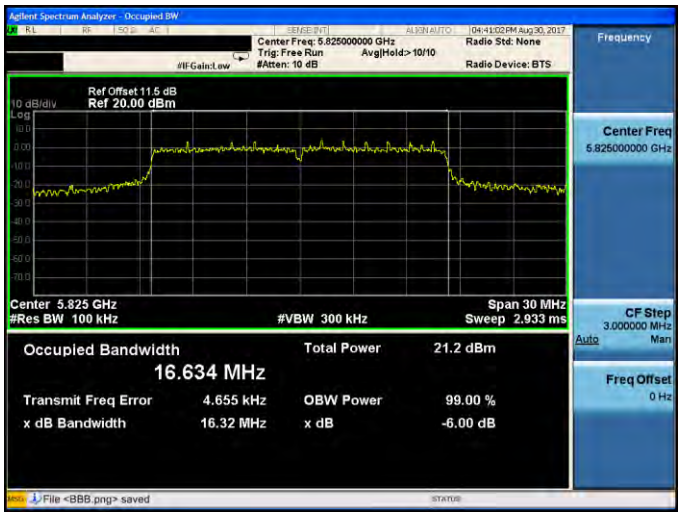
Beamforming on

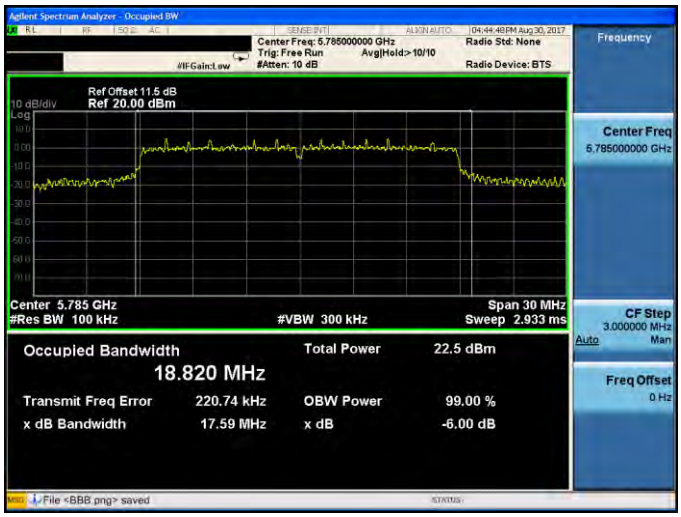
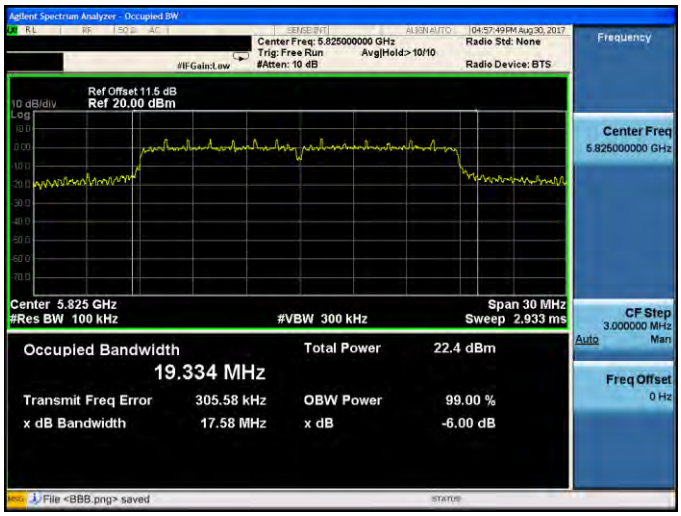
Test Item	6dB RF Bandwidth		
Test Mode	Mode 3: IEEE 802.11ac 20MHz Continuous TX mode		
Frequency (MHz)	6dB Bandwidth (kHz)		Limit (kHz)
	ANT-0	ANT-1	
5745	17600	17640	> 500
5785	17620	17650	> 500
5825	17600	17610	> 500

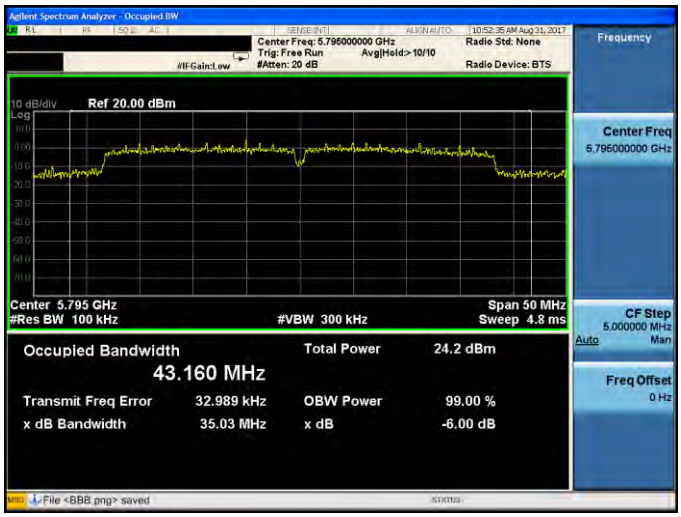
Test Item	6dB RF Bandwidth		
Test Mode	Mode 4: IEEE 802.11ac 40MHz Continuous TX mode		
Frequency (MHz)	6dB Bandwidth (kHz)		Limit (kHz)
	ANT-0	ANT-1	
5755	35100	34960	> 500
5795	35100	34460	> 500

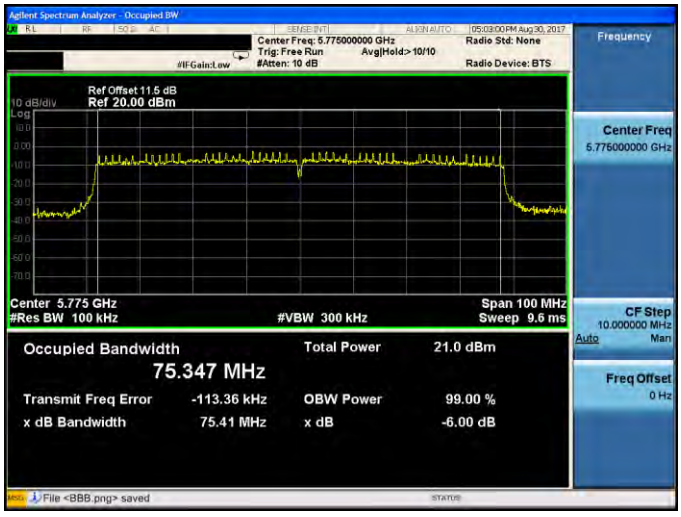
Test Item	6dB RF Bandwidth		
Test Mode	Mode 5: IEEE 802.11ac 80MHz Continuous TX mode		
Frequency (MHz)	6dB Bandwidth (kHz)		Limit (kHz)
	ANT-0	ANT-1	
5775	75410	75260	> 500

■ **Test Graphs**

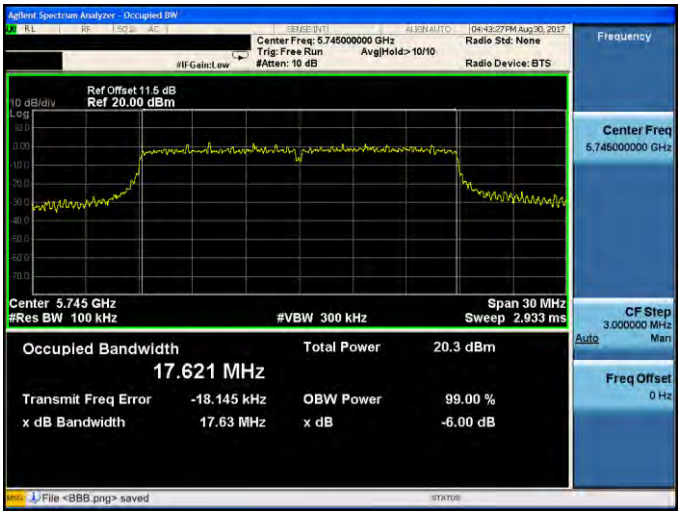
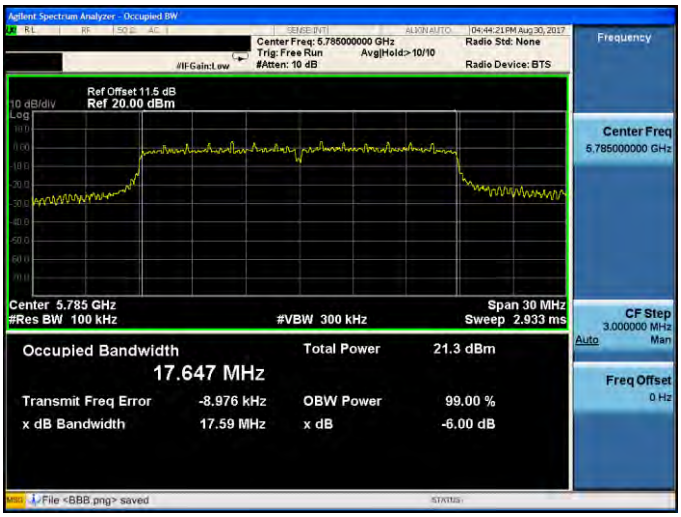
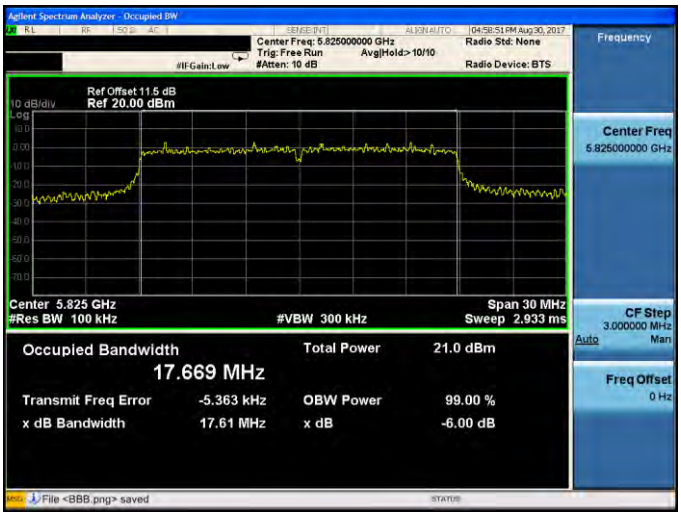
Mode 2: IEEE 802.11a Continuous TX mode_ANT-0	
5745 MHz	
5785 MHz	
5825 MHz	

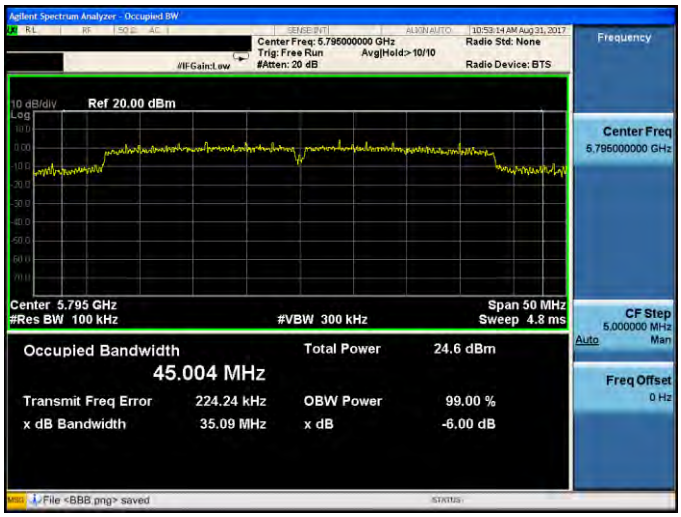
Mode 3: IEEE 802.11ac 20MHz Continuous TX mode_ANT-0	
5745 MHz	
5785 MHz	
5825 MHz	

Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ANT-0	
5755 MHz	
5795 MHz	

Mode 5: IEEE 802.11ac 80MHz Continuous TX mode_ANT-0	
5775 MHz	

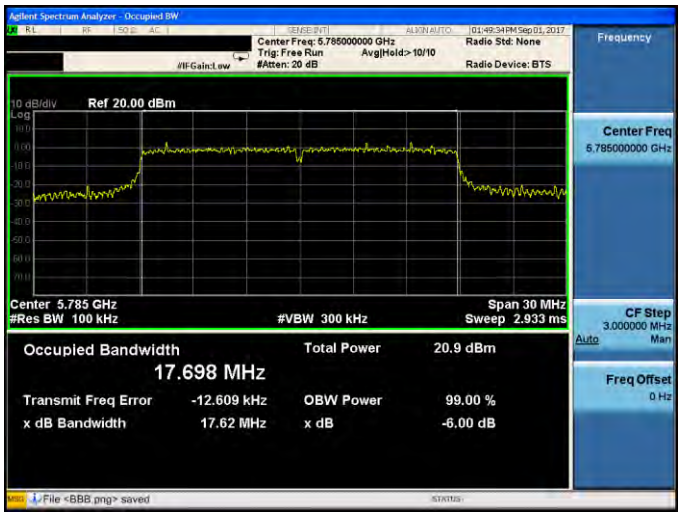
Mode 2: IEEE 802.11a Continuous TX mode_ANT-1	
5745 MHz	
5785 MHz	
5825 MHz	

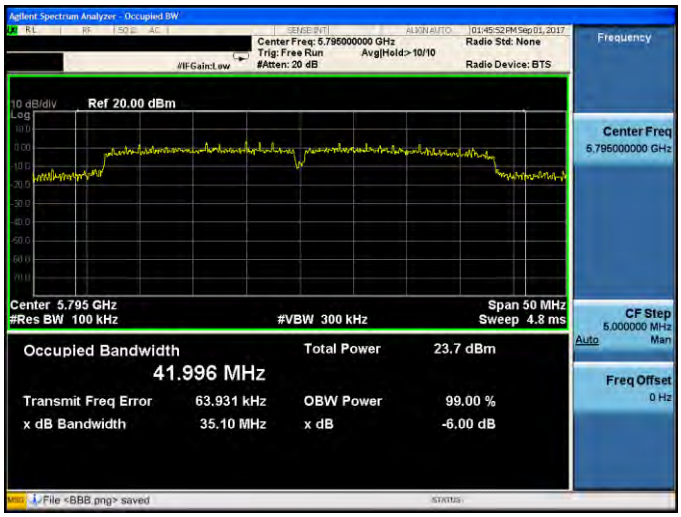
Mode 3: IEEE 802.11ac 20MHz Continuous TX mode_ANT-1	
5745 MHz	
5785 MHz	
5825 MHz	

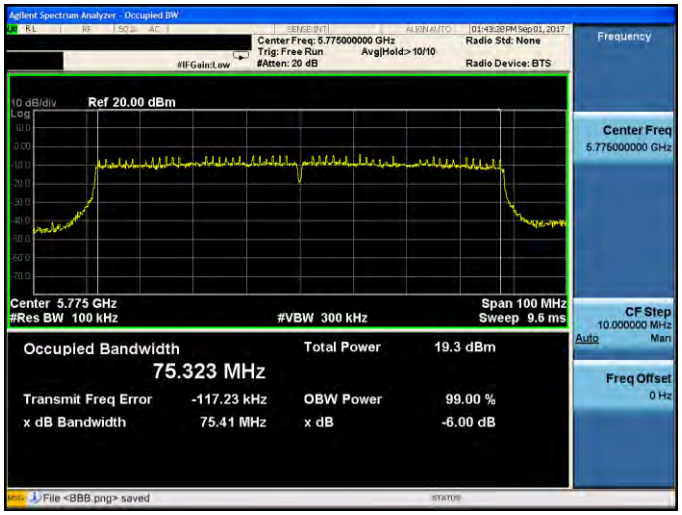
Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ANT-1	
5755 MHz	
5795 MHz	

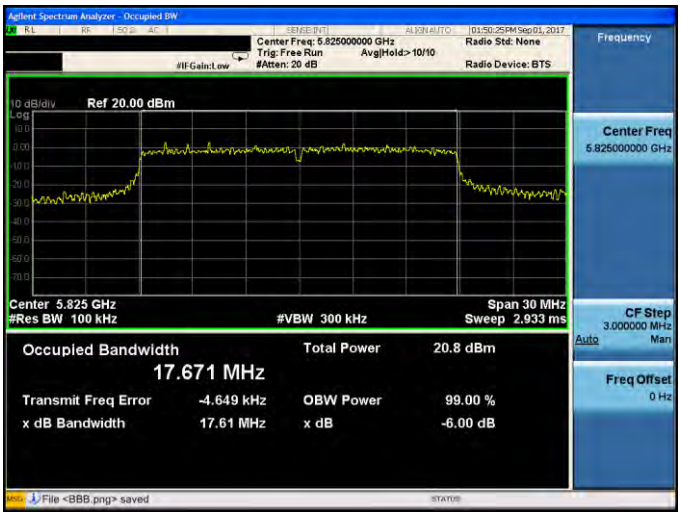
Mode 5: IEEE 802.11ac 80MHz Continuous TX mode_ANT-1	
5775 MHz	

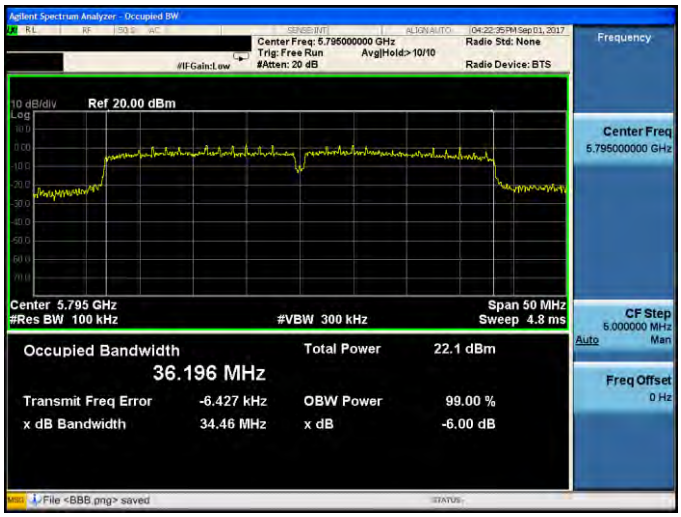
Beamforming on

Mode 3: IEEE 802.11ac 20MHz Continuous TX mode_ANT-0	
5745 MHz	
5785 MHz	
5825 MHz	

Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ANT-0	
5755 MHz	
5795 MHz	

Mode 5: IEEE 802.11ac 80MHz Continuous TX mode_ANT-0	
5775 MHz	

Mode 3: IEEE 802.11ac 20MHz Continuous TX mode_ANT-1	
5745 MHz	
5785 MHz	
5825 MHz	

Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ANT-1	
5755 MHz	
5795 MHz	

Mode 5: IEEE 802.11ac 80MHz Continuous TX mode_ANT-1	
5775 MHz	

4.7. Peak Power Spectral Density Measurement

■ **Limit**

Conducted power spectral density

Frequency Range (MHz)	FCC Limit
	Master
5.150 ~ 5.250 GHz	17 dBm/MHz
5.725 ~ 5.850 GHz	30 dBm/500KHz

According FCC KDB 662911 D01 v02r01 – for power spectral density measurements on IEEE802.11 devices,

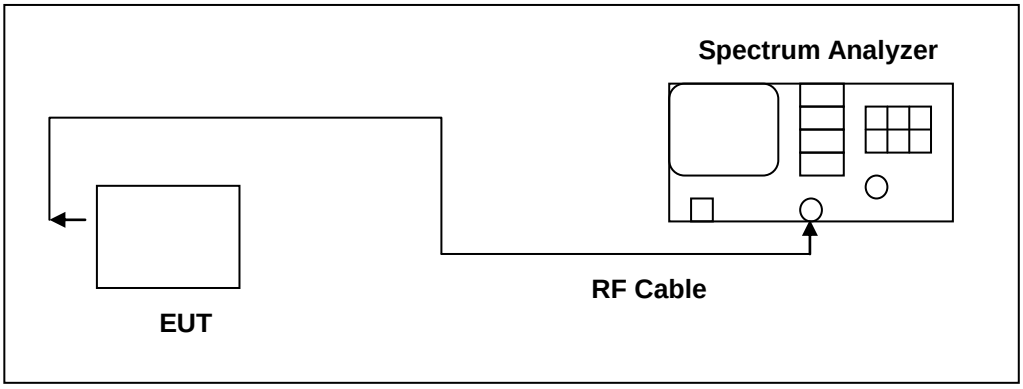
∗ CDD/BF mode：Directional Gain = 10*log{[10^(G1/20)+10^(G2/20)+…+10^(Gn/20)]^2/NANT}
= 9.19 dBi > 6dBi (5.150 ~ 5.250 GHz)

∗ CDD/BF mode：Directional Gain = 10*log{[10^(G1/20)+10^(G2/20)+…+10^(Gn/20)]^2/NANT}
= 9.06 dBi > 6dBi (5.725 ~ 5.850 GHz)

∗ CDD/BF mode power limit shall be reduced = 17 – 3.19 = 13.81 dBm/MHz (5.150 ~ 5.250 GHz)

∗ CDD/BF mode power limit shall be reduced = 30 – 3.06 = 26.94 dBm/500KHz (5.725 ~ 5.850 GHz)

■ **Test Setup**



■ **Test Instruments**

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4445A	MY45300744	12/19/2016	1 year
Test Site	ATL	TE05	TE05	N.C.R.	-----

Note: N.C.R. = No Calibration Request.

■ **Test Procedure**

The test is performed in accordance with KDB789033: D02 General UNII Test Procedures New Rules v01r04, Guidelines for Compliance Testing of Unlicensed National Information Infrastructure (U-NII) Devices - Part 15, Subpart E.

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	Encompass the entire emissions bandwidth (EBW) of the signal
RBW	1 MHz (5725 ~ 5850MHz use 100 kHz)
VBW	3 MHz (5725 ~ 5850MHz use 300 kHz)
Detector	RMS
Trace	AVERAGE
Sweep Time	Auto
Trace Average	100 times
Note: If measurement bandwidth of Maximum PSD is specified in 500 kHz, add 10log(500kHz/100kHz) to the measured result.	

■ **Test Result**

Test Item	Conducted power spectral density			
Test Mode	Mode 2: IEEE 802.11a link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5180	0.377	0.124	0.501	< 13.81
5200	0.536	0.124	0.660	
5240	0.800	0.124	0.924	
Frequency (MHz)	ANT-1			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5180	-2.431	0.124	-2.307	< 13.81
5200	-2.474	0.124	-2.350	
5240	-2.340	0.124	-2.216	
Frequency (MHz)	ANT-0+1			
	Calculated (dBm/MHz)			Limit (dBm/MHz)
5180	2.330			< 13.81
5200	2.421			
5240	2.642			

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

Test Item	Conducted power spectral density			
Test Mode	Mode 2: IEEE 802.11a link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5745	-4.97	0.124	2.14	< 26.94
5785	-5.59	0.124	1.52	
5825	-5.33	0.124	1.79	
Frequency (MHz)	ANT-1			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5745	-6.71	0.124	0.40	< 26.94
5785	-7.28	0.124	-0.17	
5825	-6.59	0.124	0.53	
Frequency (MHz)	ANT-0+1			
	Calculated (dBm/500KHz)			Limit (dBm/500KHz)
5745	4.37			< 26.94
5785	3.77			
5825	4.21			

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

Conversion ratio = 10*Log(500k/100k)

Test Item	Conducted power spectral density			
Test Mode	Mode 3: IEEE 802.11ac 20MHz link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5180	0.277	0.060	0.337	< 13.81
5200	0.026	0.060	0.086	
5240	0.079	0.060	0.139	
Frequency (MHz)	ANT-1			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5180	-2.405	0.060	-2.345	< 13.81
5200	-2.498	0.060	-2.438	
5240	-2.773	0.060	-2.713	
Frequency (MHz)	ANT-0+1			
	Calculated (dBm/MHz)			Limit (dBm/MHz)
5180	2.210			< 13.81
5200	2.015			
5240	1.953			

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

Test Item	Conducted power spectral density			
Test Mode	Mode 3: IEEE 802.11ac 20MHz link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5745	-4.90	0.060	2.15	< 26.94
5785	-4.22	0.060	2.83	
5825	-4.93	0.060	2.12	
Frequency (MHz)	ANT-1			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5745	-6.31	0.060	0.74	< 26.94
5785	-5.88	0.060	1.17	
5825	-5.69	0.060	1.36	
Frequency (MHz)	ANT-0+1			
	Calculated (dBm/500KHz)			Limit (dBm/500KHz)
5745	4.51			< 26.94
5785	5.09			
5825	4.77			

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

Conversion ratio = 10*Log(500k/100k)

Test Item	Conducted power spectral density			
Test Mode	Mode 4: IEEE 802.11ac 40MHz link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5190	-3.123	0.105	-3.018	< 13.81
5230	-2.518	0.105	-2.413	
Frequency (MHz)	ANT-1			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5190	-5.831	0.105	-5.726	< 13.81
5230	-5.200	0.105	-5.095	
Frequency (MHz)	ANT-0+1			
	Calculated (dBm/MHz)			Limit (dBm/MHz)
5190	-1.154			< 13.81
5230	-0.540			

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

Test Item	Conducted power spectral density			
Test Mode	Mode 4: IEEE 802.11ac 40MHz link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5755	-5.80	0.105	1.29	< 26.94
5795	-6.30	0.105	0.79	
Frequency (MHz)	ANT-1			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5755	-8.11	0.105	-1.02	< 26.94
5795	-5.45	0.105	1.65	
Frequency (MHz)	ANT-0+1			
	Calculated (dBm/500KHz)			Limit (dBm/500KHz)
5755	3.30			< 26.94
5795	4.25			

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

Conversion ratio = 10*Log(500k/100k)

Test Item	Conducted power spectral density			
Test Mode	Mode 5: IEEE 802.11ac 80MHz link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5210	-9.340	0.272	-9.068	< 13.81
Frequency (MHz)	ANT-1			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5210	-11.834	0.272	-11.562	< 13.81
Frequency (MHz)	ANT-0+1			
	Calculated (dBm/MHz)			Limit (dBm/MHz)
5210	-7.128			< 13.81

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

Test Item	Conducted power spectral density			
Test Mode	Mode 5: IEEE 802.11ac 80MHz link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/MHz)
5775	-12.33	0.272	-5.07	< 26.94
Frequency (MHz)	ANT-1			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/MHz)
5775	-14.34	0.272	-7.08	< 26.94
Frequency (MHz)	ANT-0+1			
	Calculated (dBm/500KHz)			Limit (dBm/MHz)
5775	-2.95			< 26.94

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

Conversion ratio = 10*Log(500k/100k)

Beamforming on

Test Item	Conducted power spectral density			
Test Mode	Mode 3: IEEE 802.11ac 20MHz link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5180	-1.182	0.051	-1.131	< 13.81
5200	-1.459	0.051	-1.408	
5240	-1.051	0.051	-1.000	
Frequency (MHz)	ANT-1			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5180	-4.047	0.051	-3.996	< 13.81
5200	-4.223	0.051	-4.172	
5240	-3.628	0.051	-3.577	
Frequency (MHz)	ANT-0+1			
	Calculated (dBm/MHz)			Limit (dBm/MHz)
5180	0.679			< 13.81
5200	0.437			
5240	0.911			

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

Test Item	Conducted power spectral density			
Test Mode	Mode 3: IEEE 802.11ac 20MHz link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5745	-5.56	0.051	1.48	< 26.94
5785	-5.28	0.051	1.76	
5825	-6.11	0.051	0.93	
Frequency (MHz)	ANT-1			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5745	-7.80	0.051	-0.76	< 26.94
5785	-6.91	0.051	0.13	
5825	-7.24	0.051	-0.20	
Frequency (MHz)	ANT-0+1			
	Calculated (dBm/500KHz)			Limit (dBm/500KHz)
5745	3.52			< 26.94
5785	4.03			
5825	3.41			

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

Conversion ratio = 10*Log(500k/100k)

Test Item	Conducted power spectral density			
Test Mode	Mode 4: IEEE 802.11ac 40MHz link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5190	-4.901	0.105	-4.796	< 13.81
5230	-4.207	0.105	-4.102	
Frequency (MHz)	ANT-1			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5190	-7.563	0.105	-7.458	< 13.81
5230	-7.141	0.105	-7.036	
Frequency (MHz)	ANT-0+1			
	Calculated (dBm/MHz)			Limit (dBm/MHz)
5190	-2.916			< 13.81
5230	-2.316			

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

Test Item	Conducted power spectral density			
Test Mode	Mode 4: IEEE 802.11ac 40MHz link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5755	-7.27	0.105	-0.18	< 26.94
5795	-6.20	0.105	0.90	
Frequency (MHz)	ANT-1			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/500KHz)
5755	-9.79	0.105	-2.69	< 26.94
5795	-7.43	0.105	-0.34	
Frequency (MHz)	ANT-0+1			
	Calculated (dBm/500KHz)			Limit (dBm/500KHz)
5755	1.76			< 26.94
5795	3.33			

Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

Conversion ratio = 10*Log(500k/100k)

Test Item	Conducted power spectral density			
Test Mode	Mode 5: IEEE 802.11ac 80MHz link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5210	-11.305	0.252	-11.053	< 13.81
Frequency (MHz)	ANT-1			
	Measurement (dBm/MHz)	Duty Factor (dB)	Calculated (dBm/MHz)	Limit (dBm/MHz)
5210	-13.715	0.252	-13.463	< 13.81
Frequency (MHz)	ANT-0+1			
	Calculated (dBm/MHz)			Limit (dBm/MHz)
5210	-9.082			< 13.81

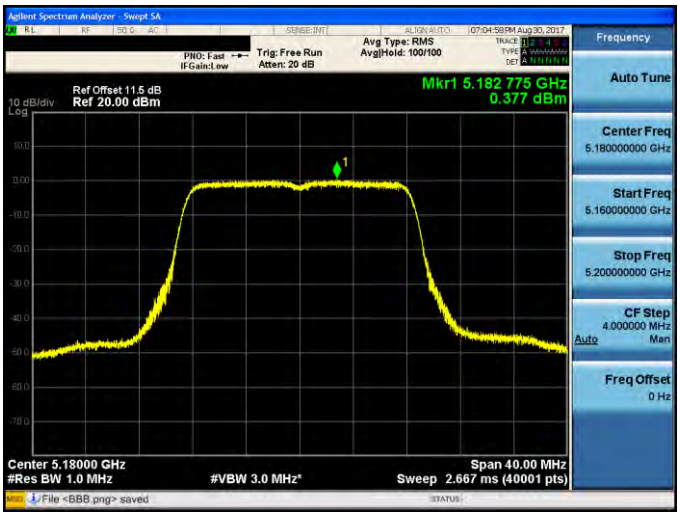
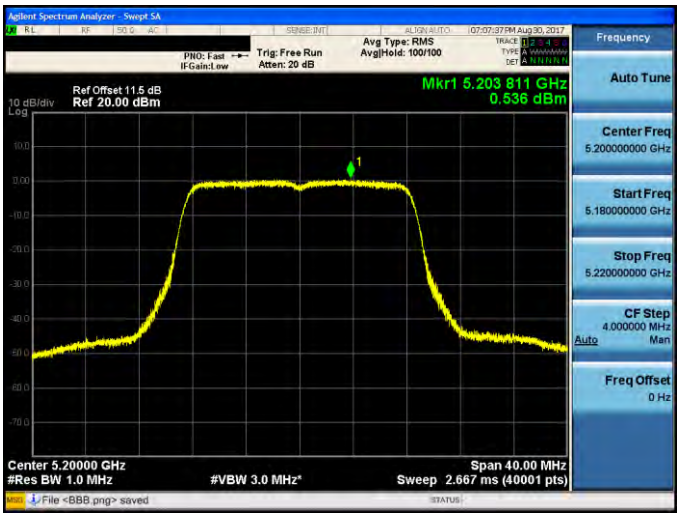
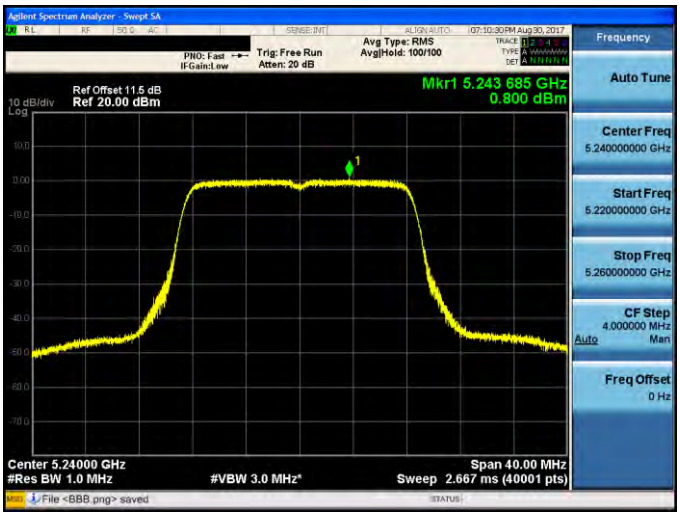
Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

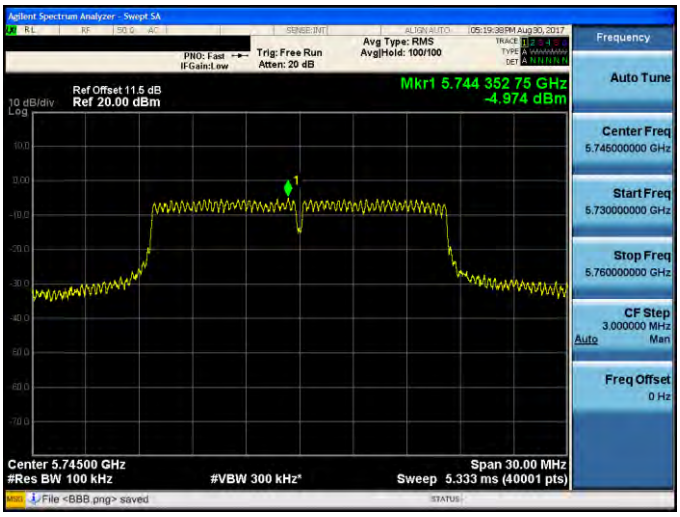
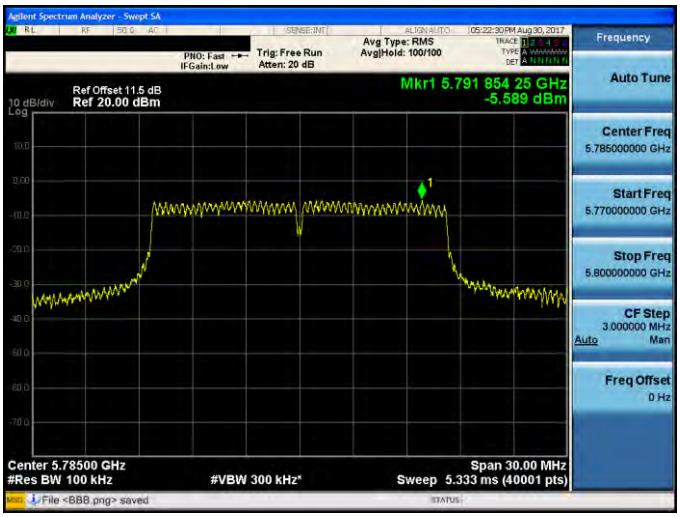
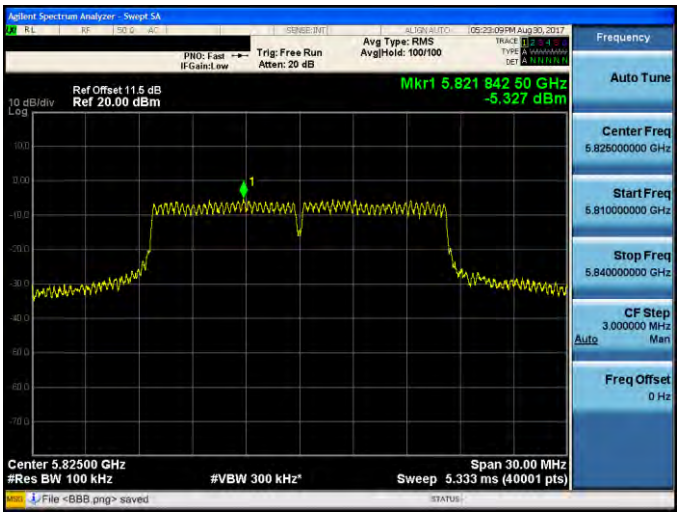
Test Item	Conducted power spectral density			
Test Mode	Mode 5: IEEE 802.11ac 80MHz link mode			
Frequency (MHz)	ANT-0			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/MHz)
5775	-13.68	0.252	-6.44	< 26.94
Frequency (MHz)	ANT-1			
	Measurement (dBm/100KHz)	Duty Factor (dB)	Calculated (dBm/500KHz)	Limit (dBm/MHz)
5775	-15.70	0.252	-8.46	< 26.94
Frequency (MHz)	ANT-0+1			
	Calculated (dBm/500KHz)			Limit (dBm/MHz)
5775	-4.32			< 26.94

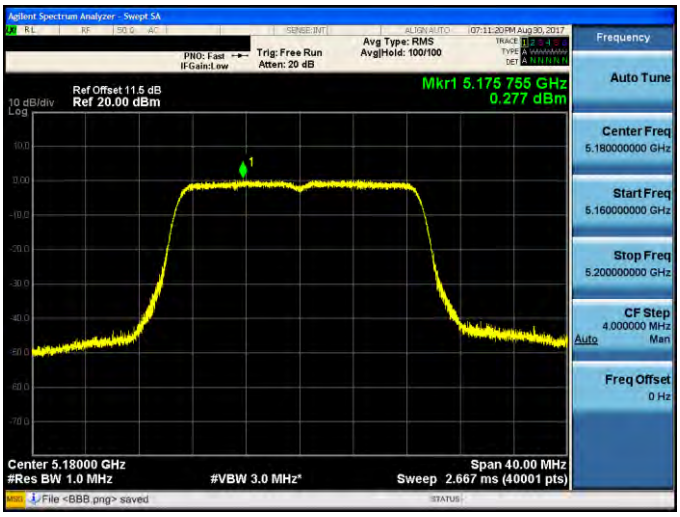
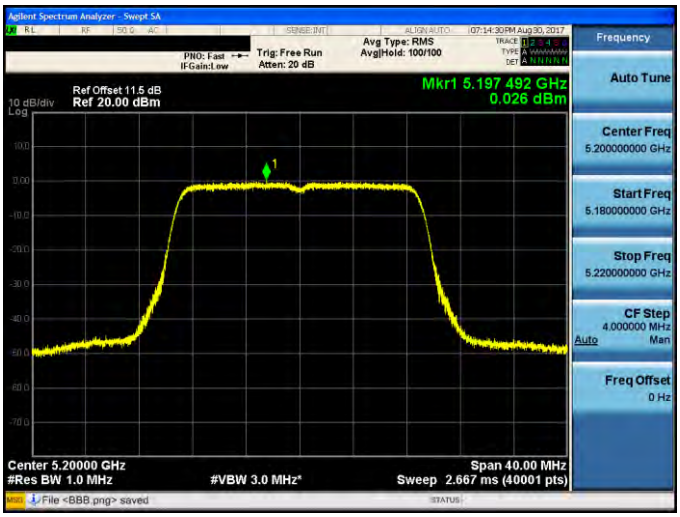
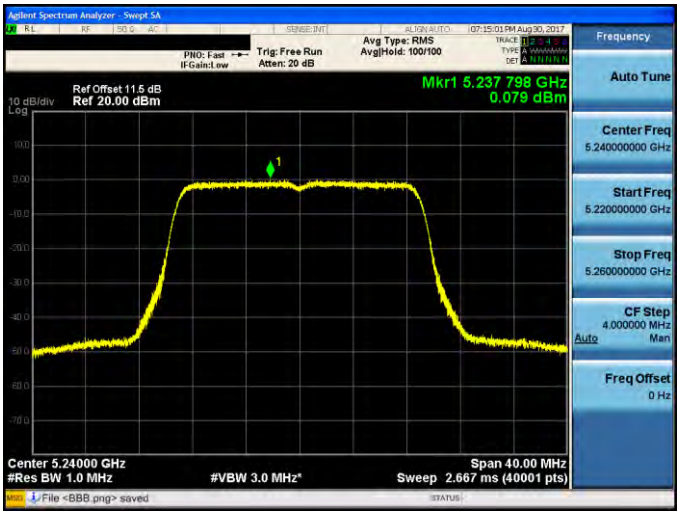
Note: Method SA-2, Power density = measured result + 10log(1/duty cycle) + Conversion ratio = measured result + duty factor.

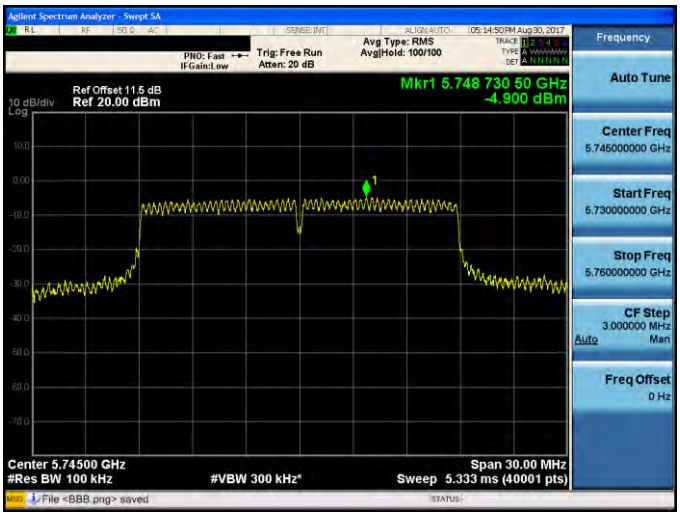
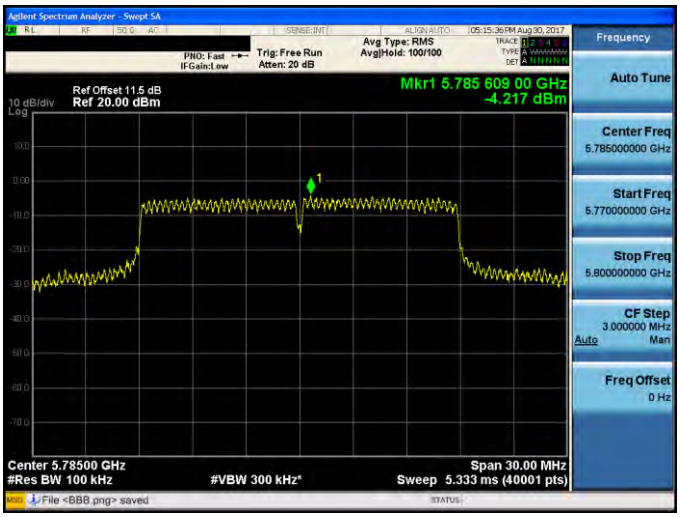
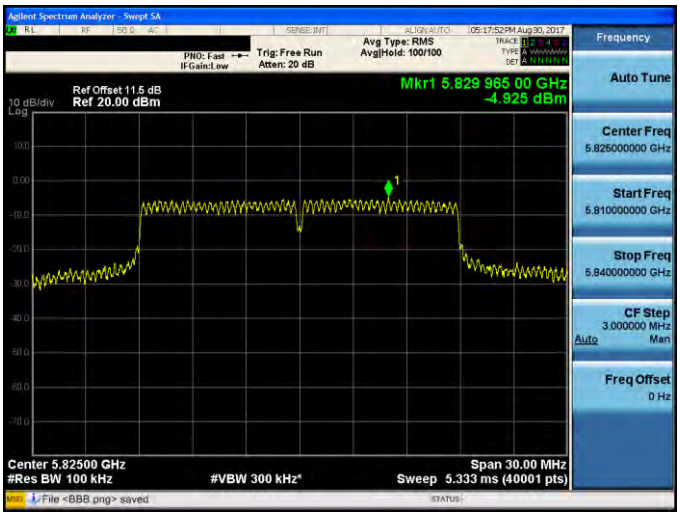
Conversion ratio = 10*Log(500k/100k)

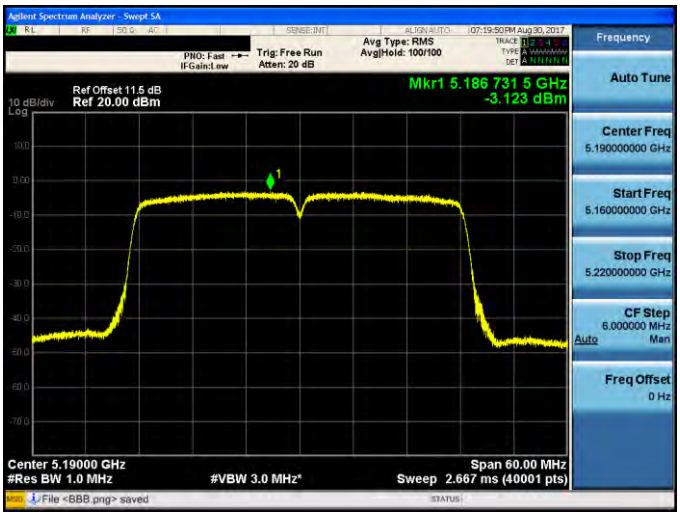
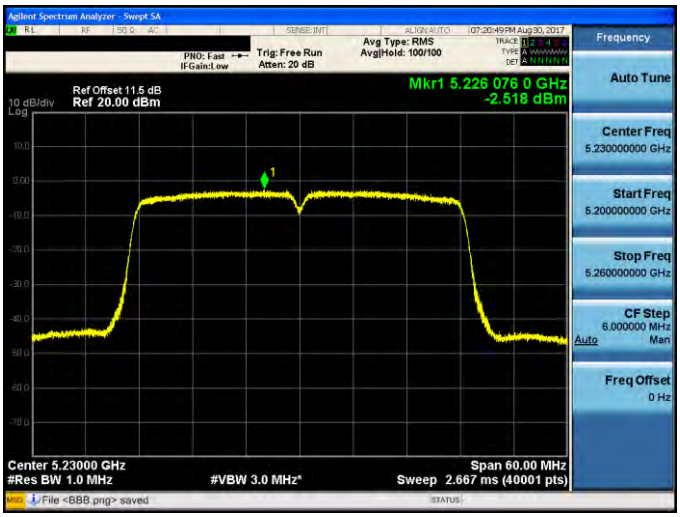
■ **Test Graphs**

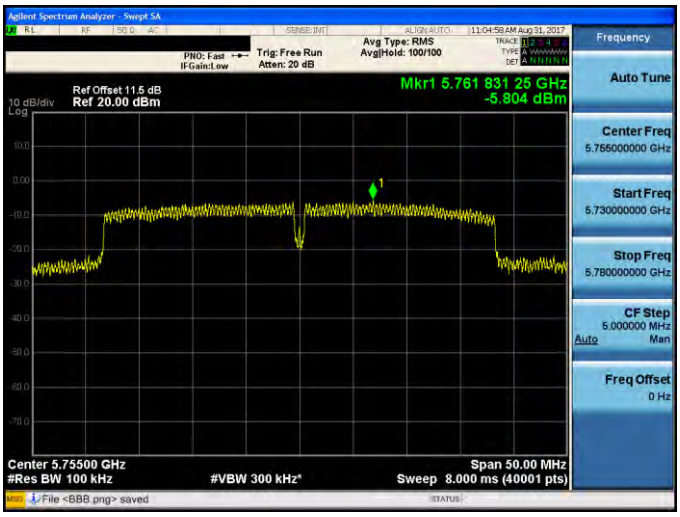
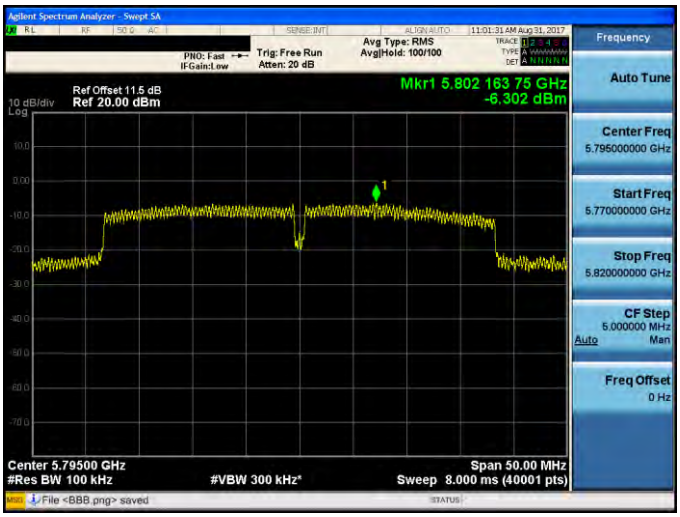
Mode 2: IEEE 802.11a Continuous TX mode_ ANT-0	
5180 MHz	
5200 MHz	
5240 MHz	

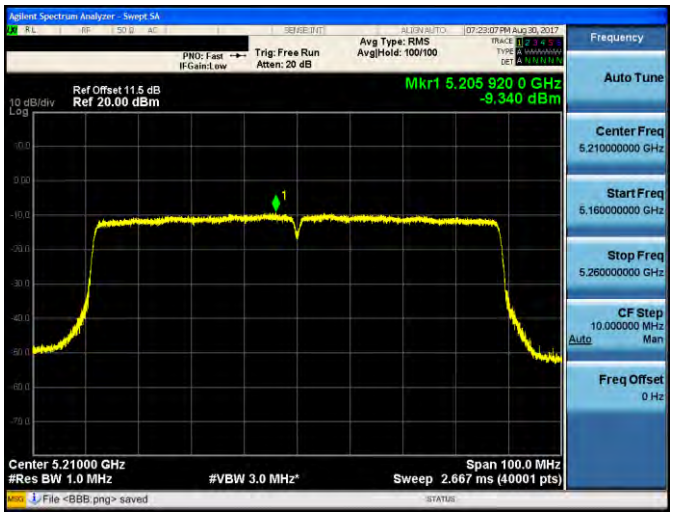
Mode 2: IEEE 802.11a Continuous TX mode_ ANT-0	
5745 MHz	
5785 MHz	
5825 MHz	

Mode 3: IEEE 802.11ac 20MHz Continuous TX mode _ ANT-0	
5180 MHz	
5200 MHz	
5240 MHz	

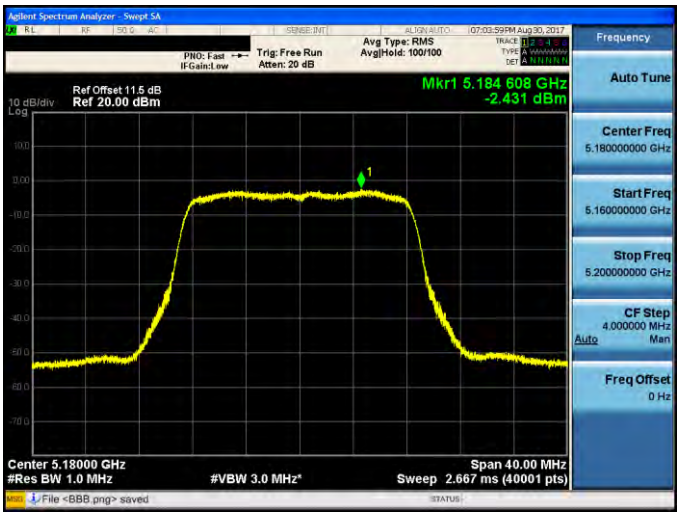
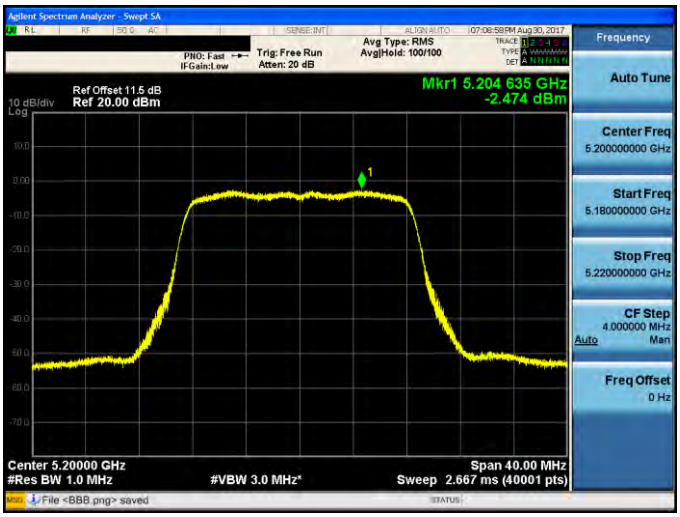
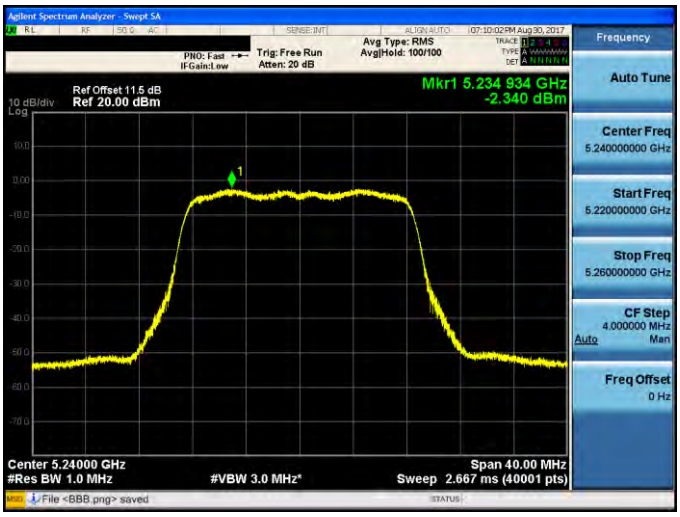
Mode 3: IEEE 802.11ac 20MHz Continuous TX mode _ ANT-0	
5745 MHz	
5785 MHz	
5825 MHz	

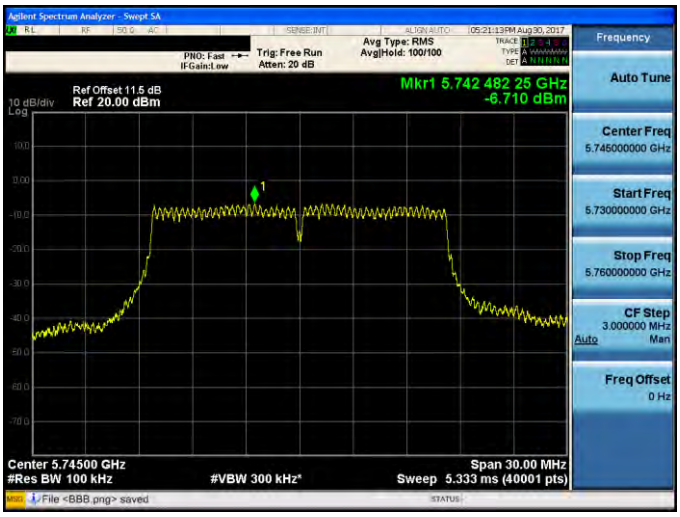
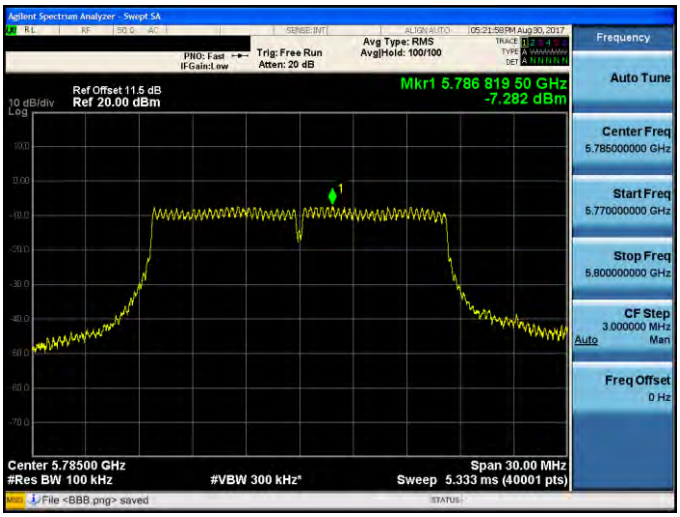
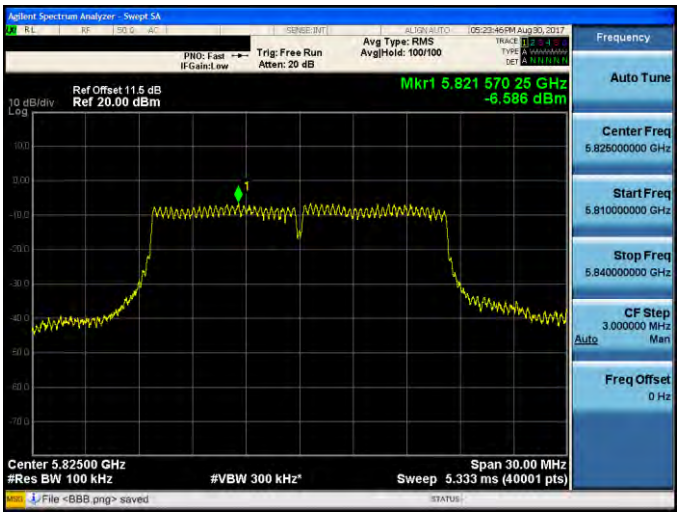
Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ ANT-0	
5190 MHz	
5230 MHz	

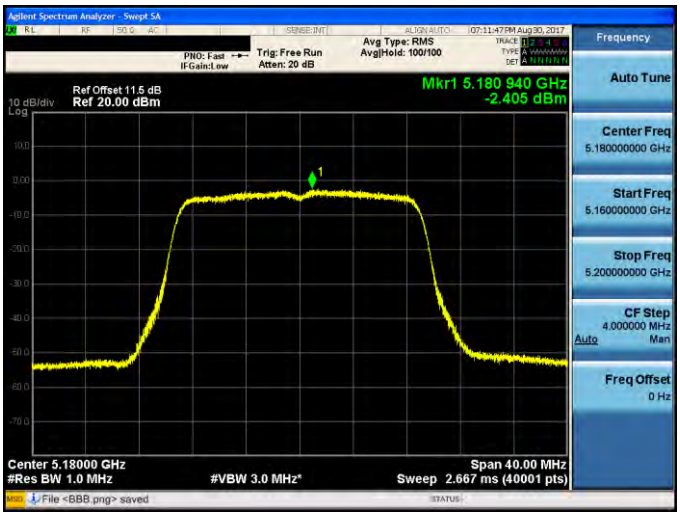
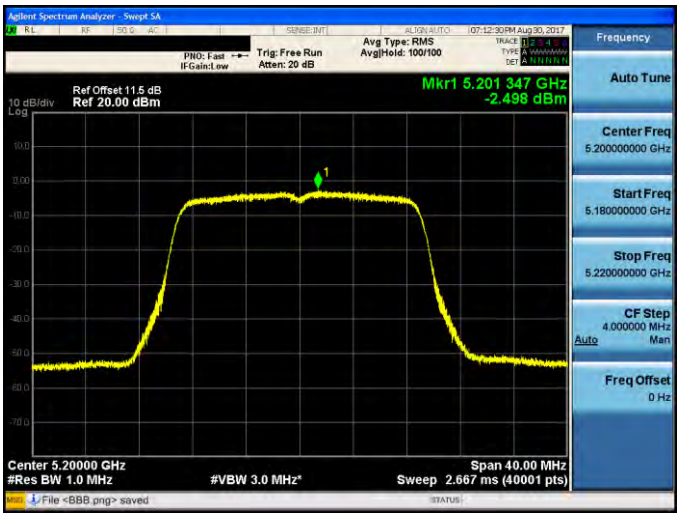
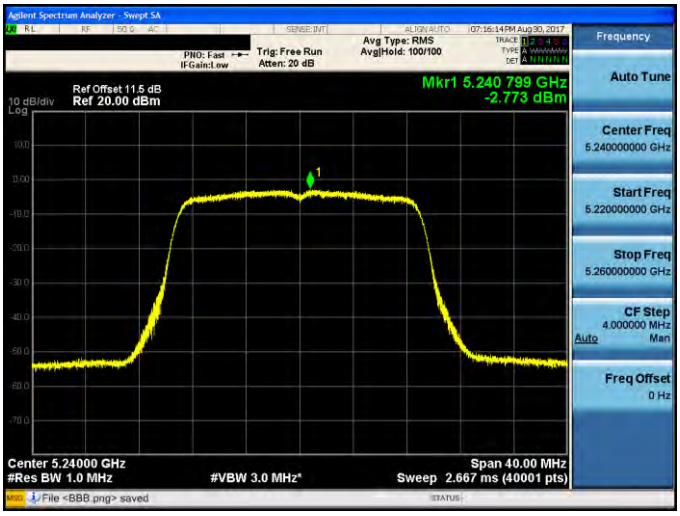
Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ ANT-0	
5755 MHz	
5795 MHz	

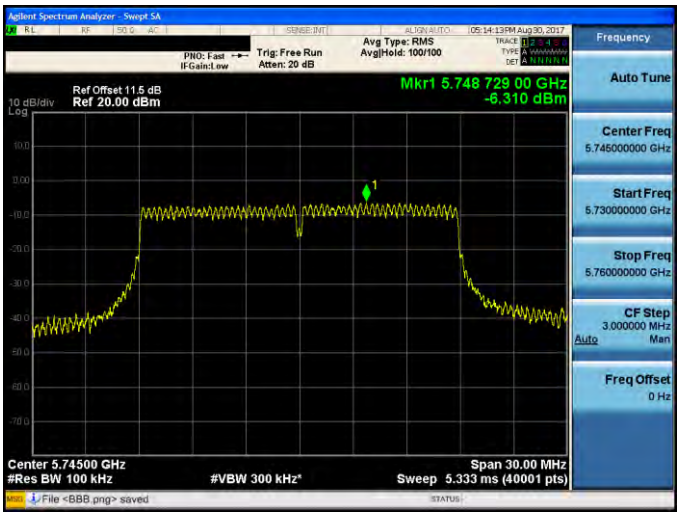
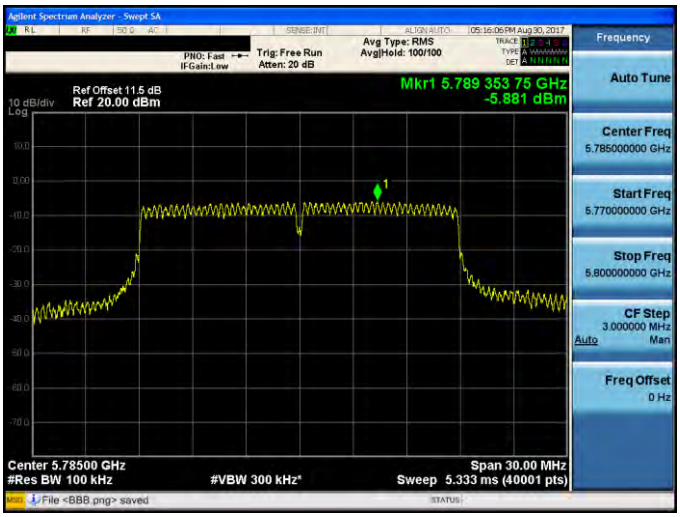
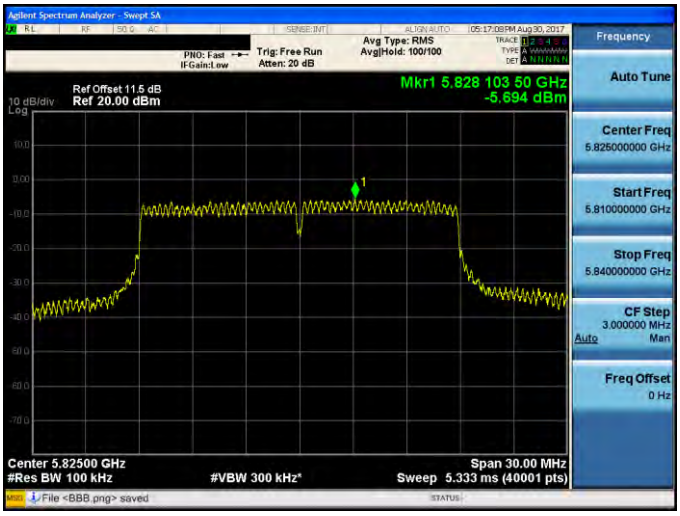
Mode 5: IEEE 802.11ac 80MHz Continuous TX mode _ ANT-0	
5210 MHz	

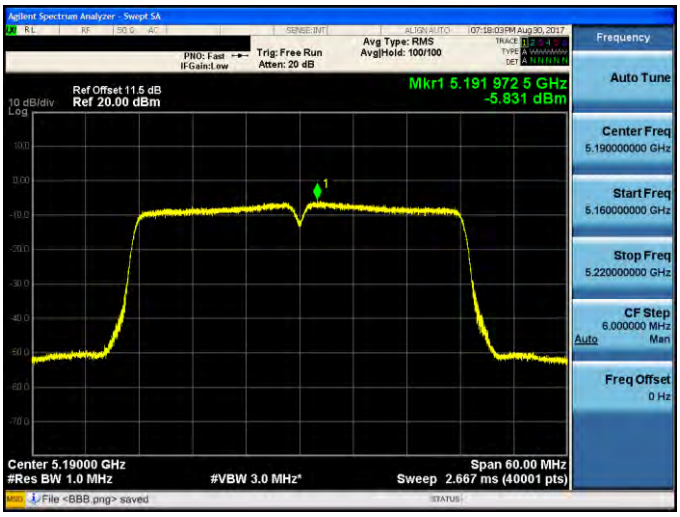
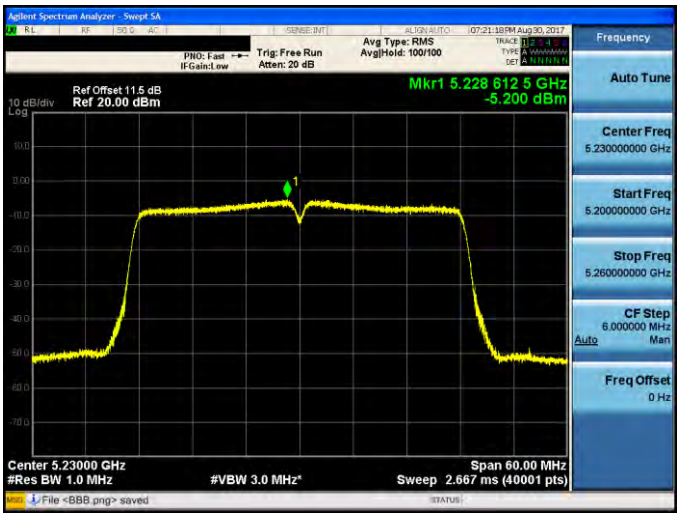
Mode 5: IEEE 802.11ac 80MHz Continuous TX mode _ ANT-0	
5775 MHz	

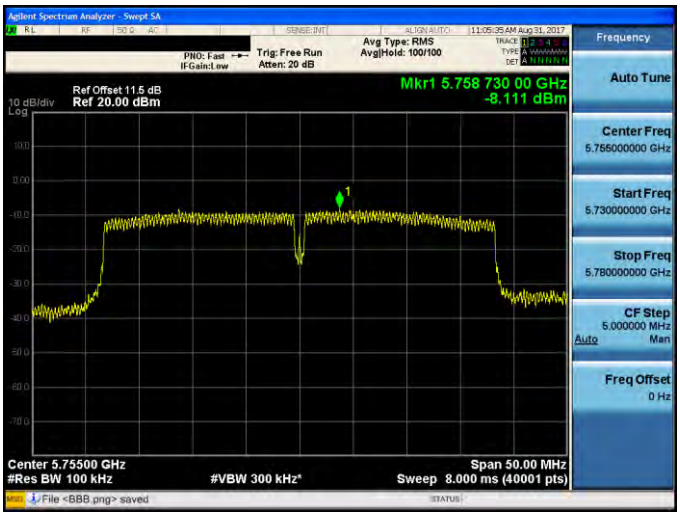
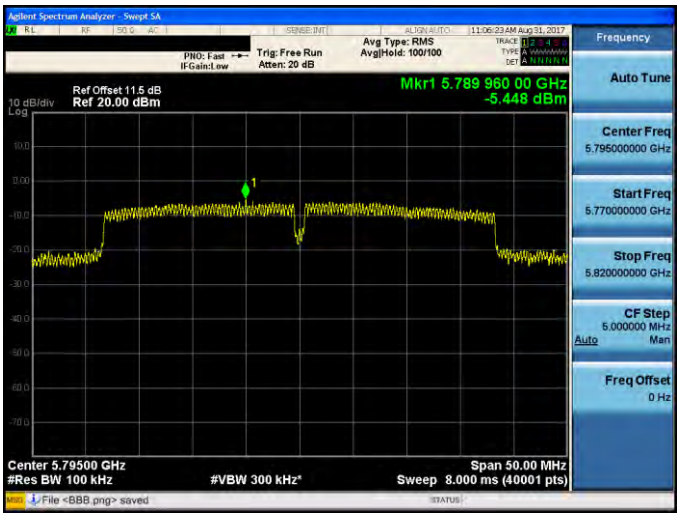
Mode 2: IEEE 802.11a Continuous TX mode_ ANT-1	
5180 MHz	
5200 MHz	
5240 MHz	

Mode 2: IEEE 802.11a Continuous TX mode_ ANT-1	
5745 MHz	
5785 MHz	
5825 MHz	

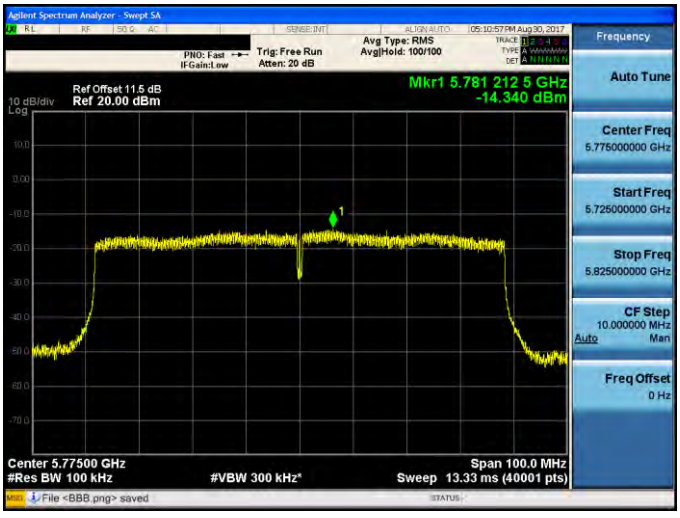
Mode 3: IEEE 802.11ac 20MHz Continuous TX mode _ ANT-1	
5180 MHz	
5200 MHz	
5240 MHz	

Mode 3: IEEE 802.11ac 20MHz Continuous TX mode _ ANT-1	
5745 MHz	
5785 MHz	
5825 MHz	

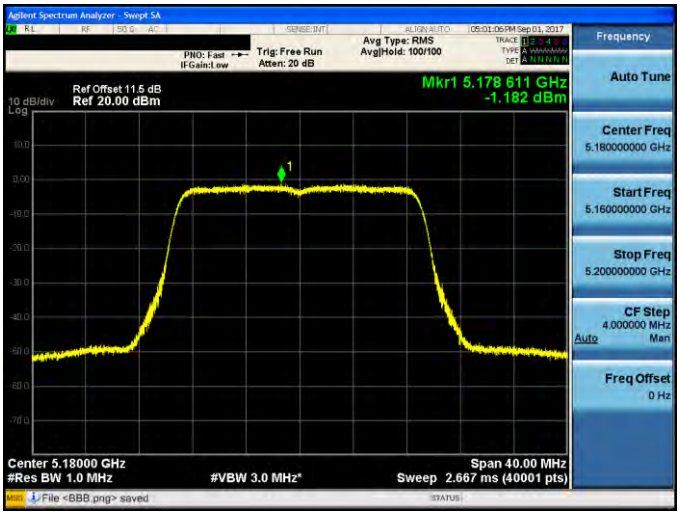
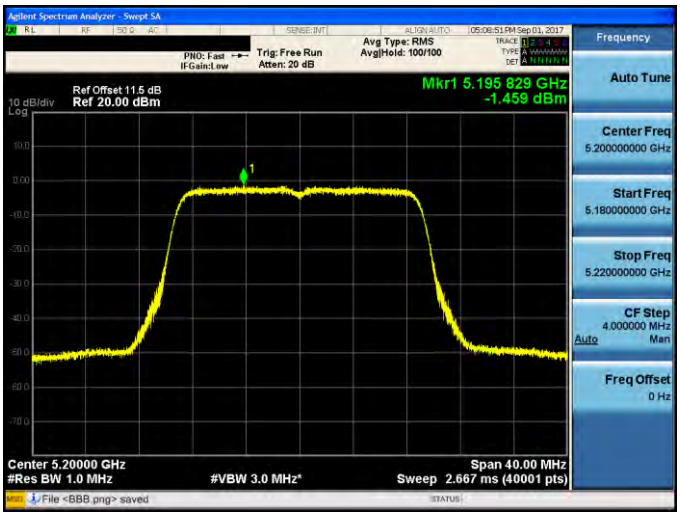
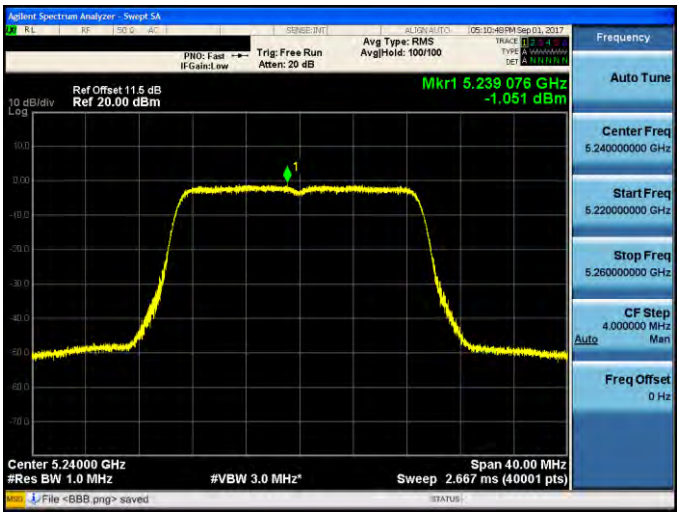
Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ ANT-1	
5190 MHz	
5230 MHz	

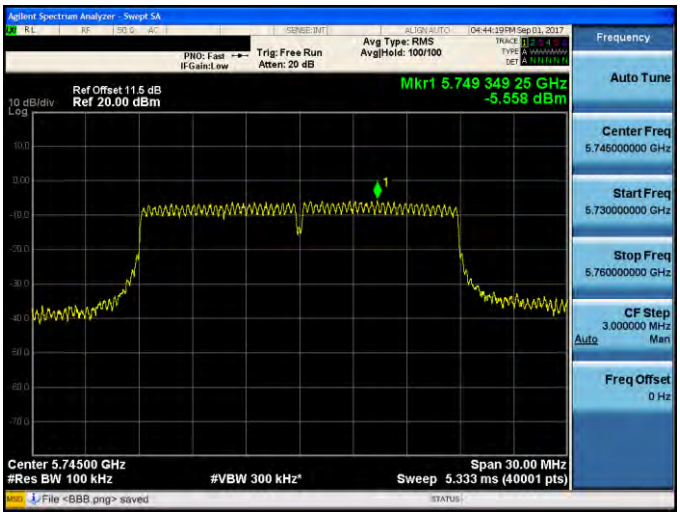
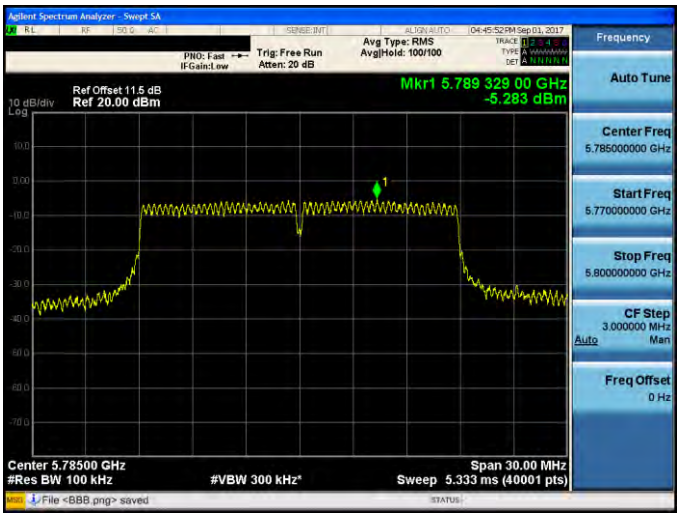
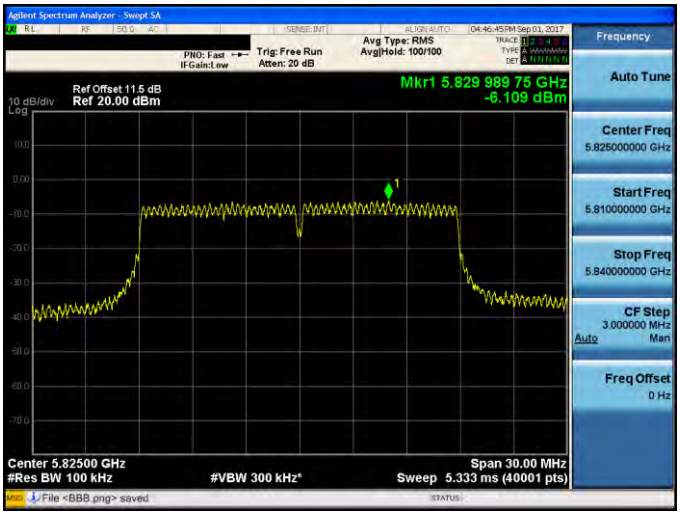
Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ ANT-1	
5755 MHz	
5795 MHz	

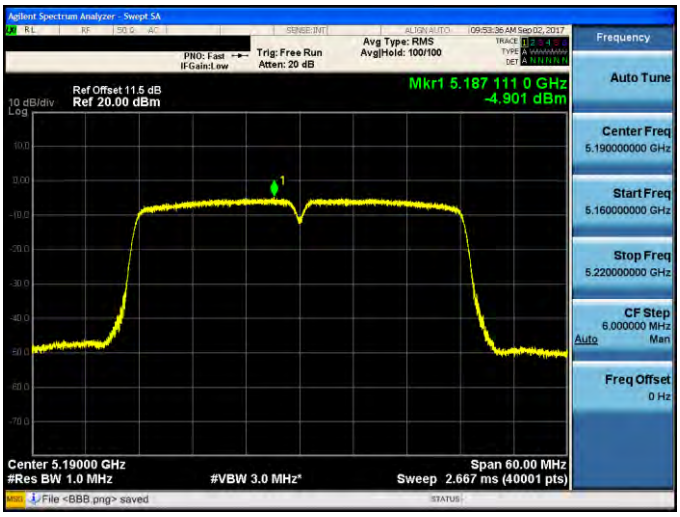
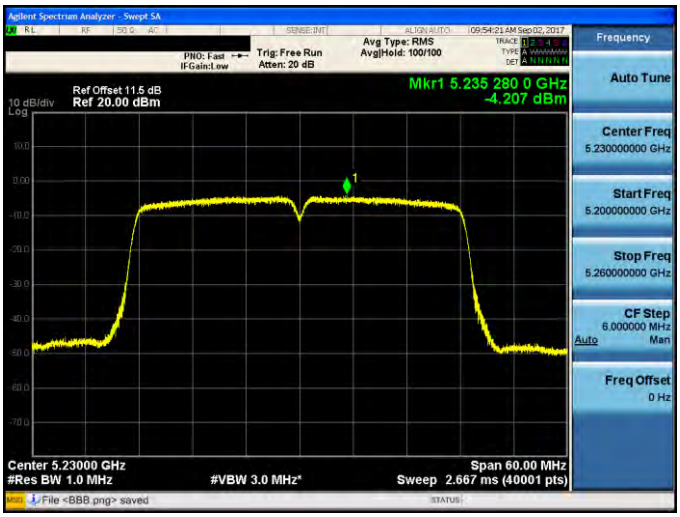
Mode 5: IEEE 802.11ac 80MHz Continuous TX mode _ ANT-1	
5210 MHz	

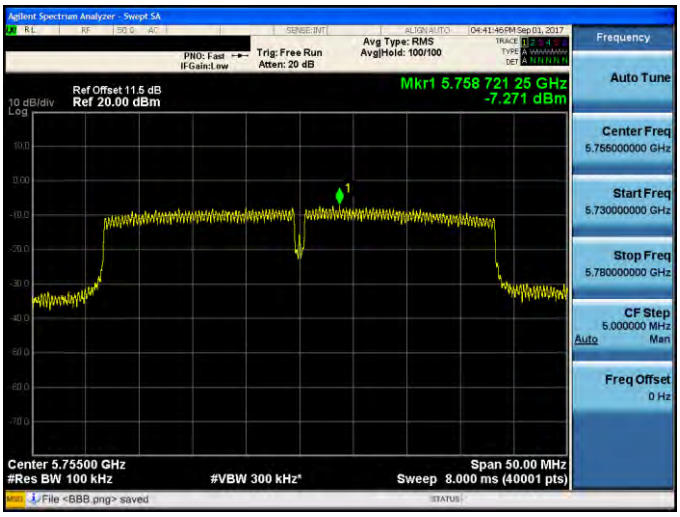
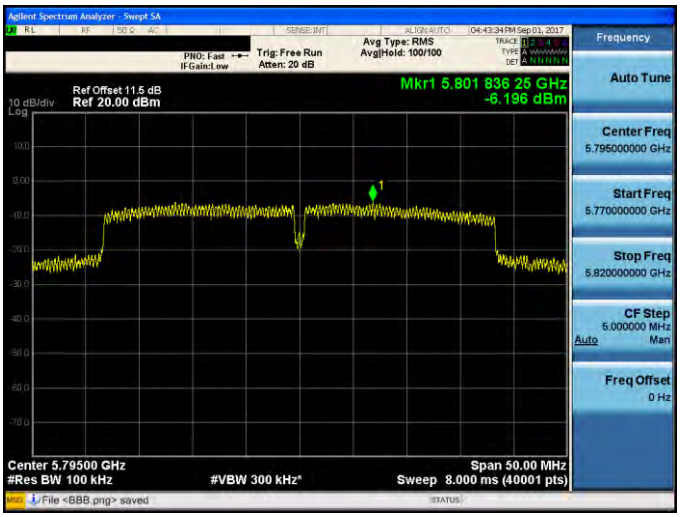
Mode 5: IEEE 802.11ac 80MHz Continuous TX mode _ ANT-1	
5775 MHz	

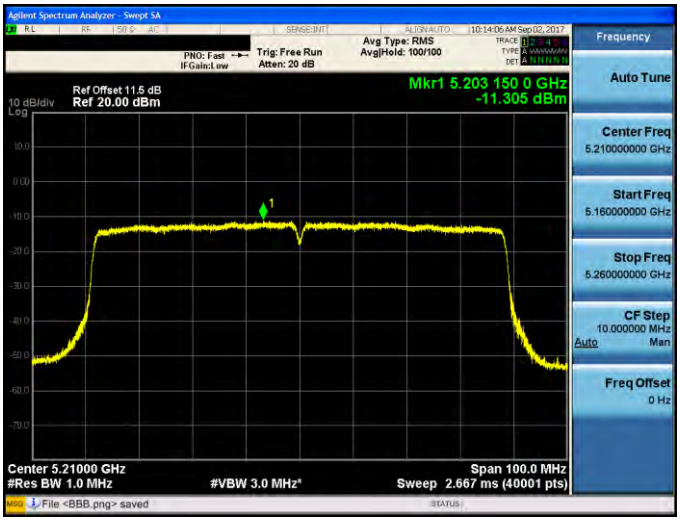
Beamforming on

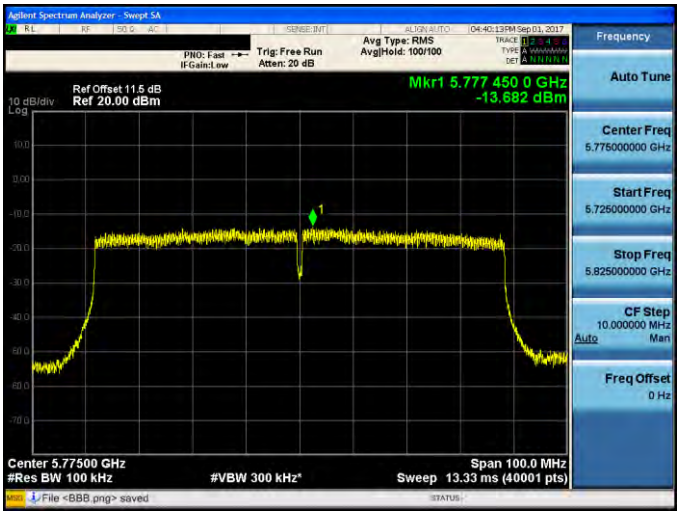
Mode 3: IEEE 802.11ac 20MHz Continuous TX mode _ ANT-0	
5180 MHz	
5200 MHz	
5240 MHz	

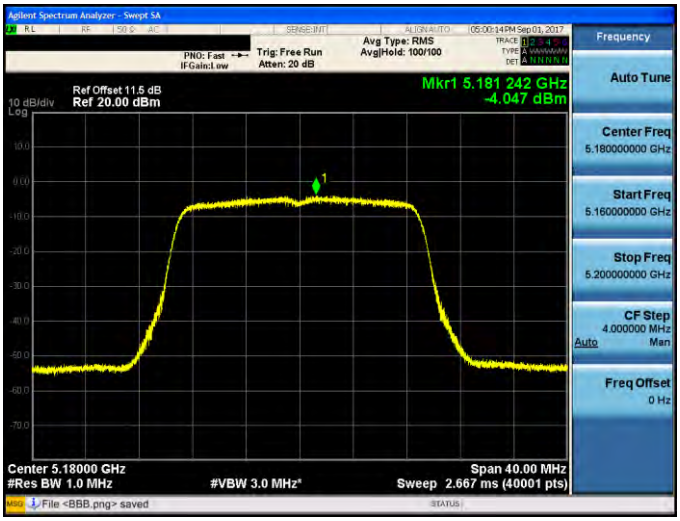
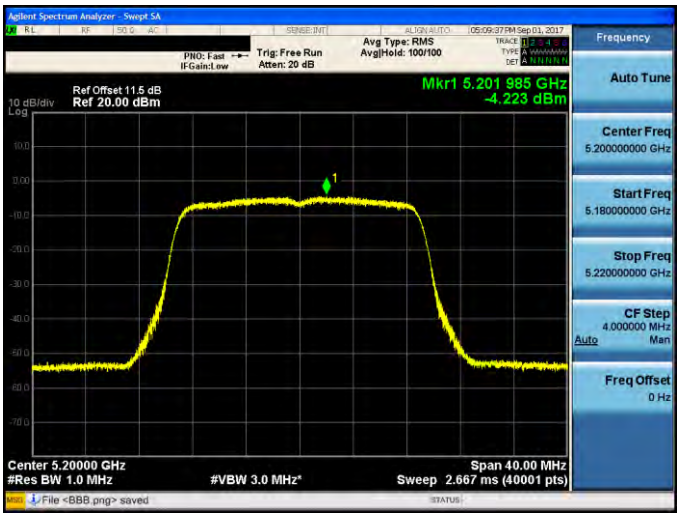
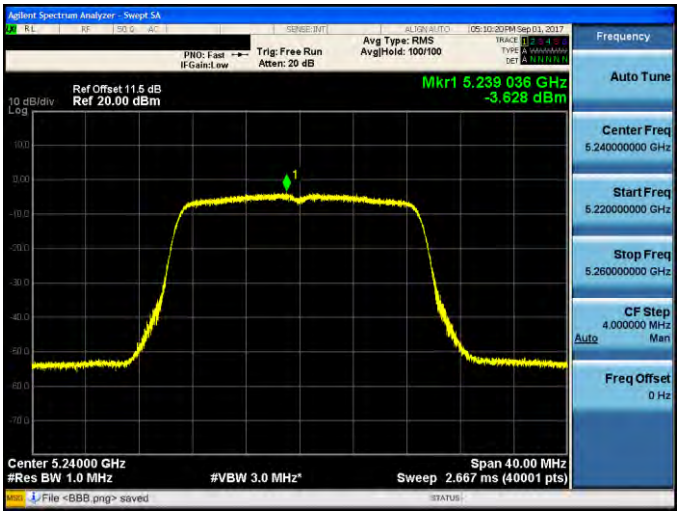
Mode 3: IEEE 802.11ac 20MHz Continuous TX mode _ ANT-0	
5745 MHz	
5785 MHz	
5825 MHz	

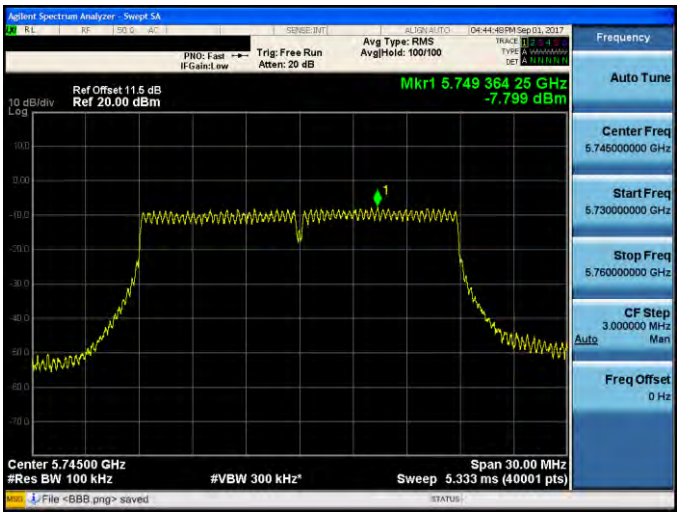
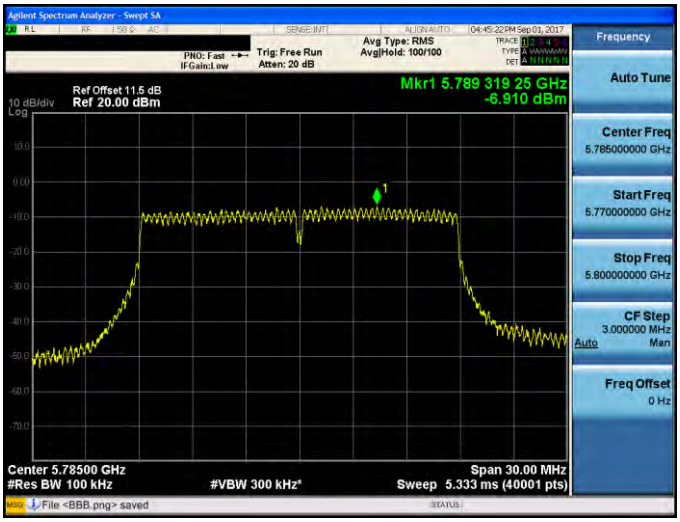
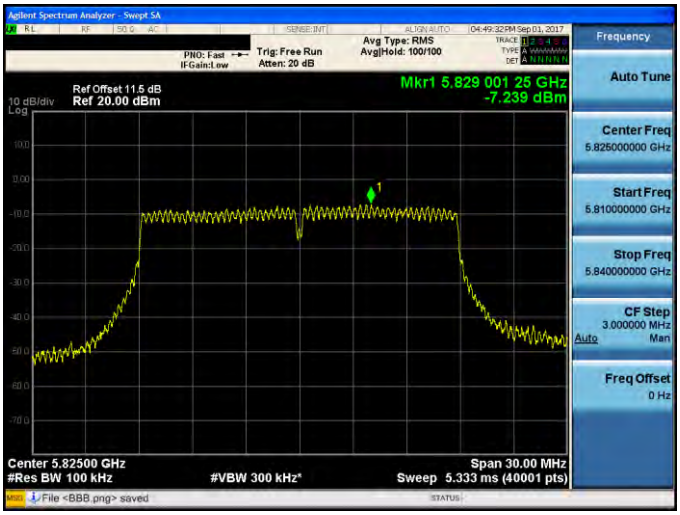
Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ ANT-0	
5190 MHz	
5230 MHz	

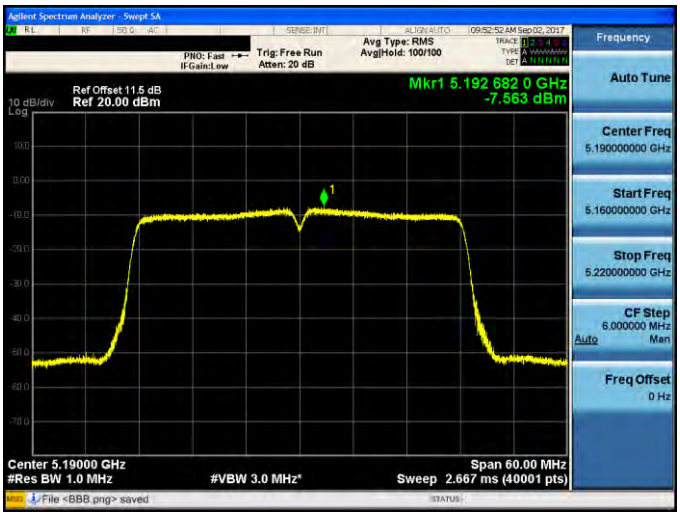
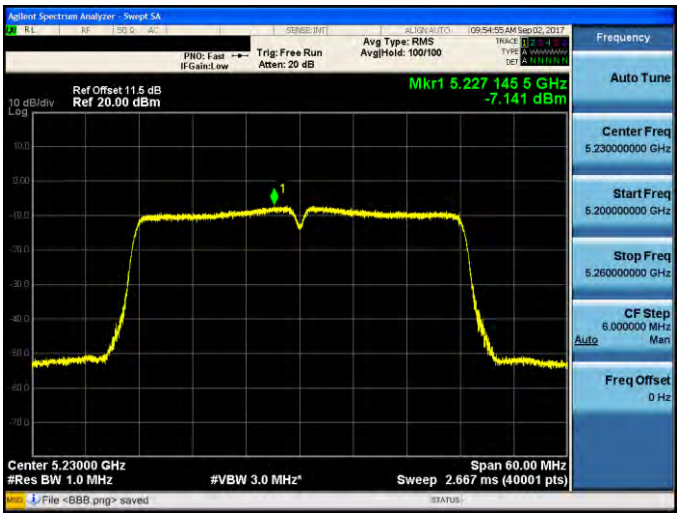
Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ ANT-0	
5755 MHz	
5795 MHz	

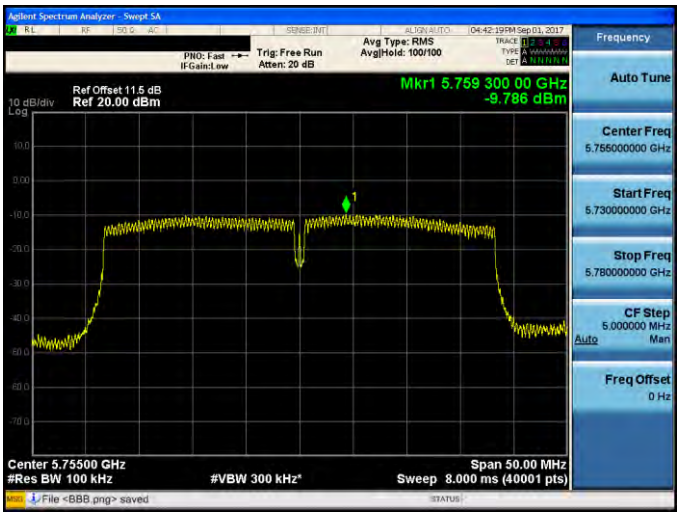
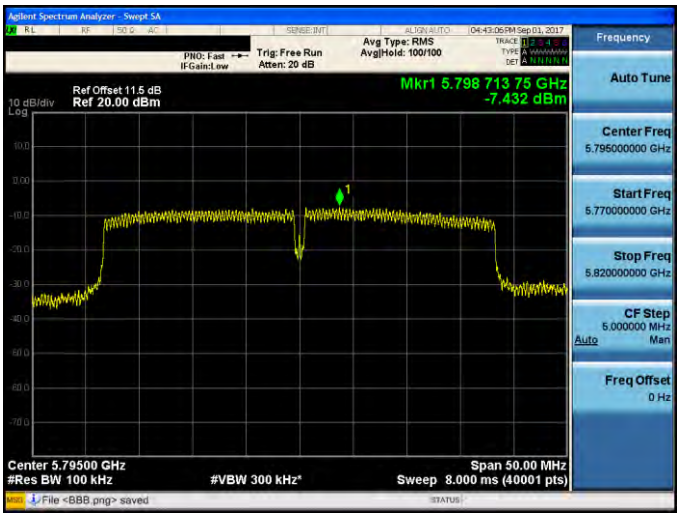
Mode 5: IEEE 802.11ac 80MHz Continuous TX mode _ ANT-0	
5210 MHz	

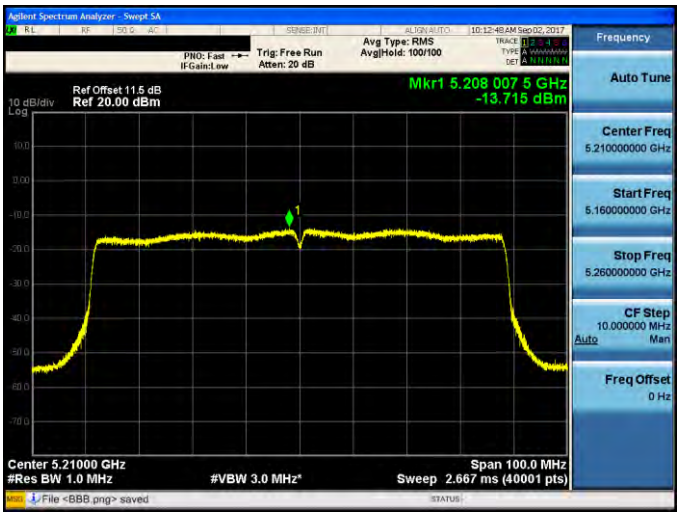
Mode 5: IEEE 802.11ac 80MHz Continuous TX mode _ ANT-0	
5775 MHz	

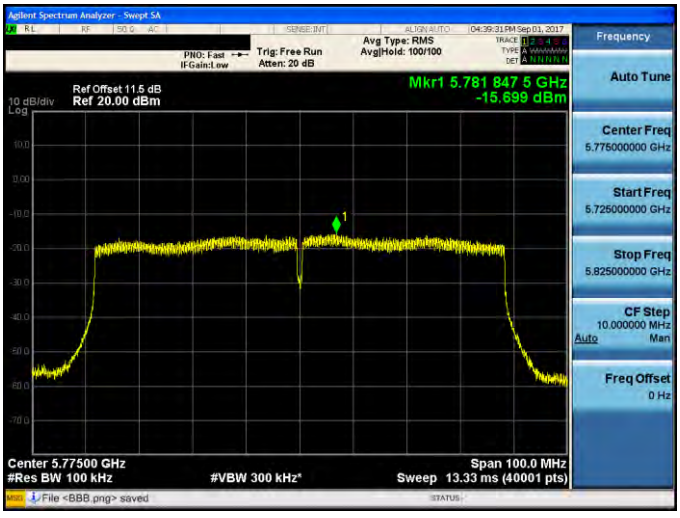
Mode 3: IEEE 802.11ac 20MHz Continuous TX mode _ ANT-1	
5180 MHz	
5200 MHz	
5240 MHz	

Mode 3: IEEE 802.11ac 20MHz Continuous TX mode _ ANT-1	
5745 MHz	
5785 MHz	
5825 MHz	

Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ ANT-1	
5190 MHz	
5230 MHz	

Mode 4: IEEE 802.11ac 40MHz Continuous TX mode_ ANT-1	
5755 MHz	
5795 MHz	

Mode 5: IEEE 802.11ac 80MHz Continuous TX mode _ ANT-1	
5210 MHz	

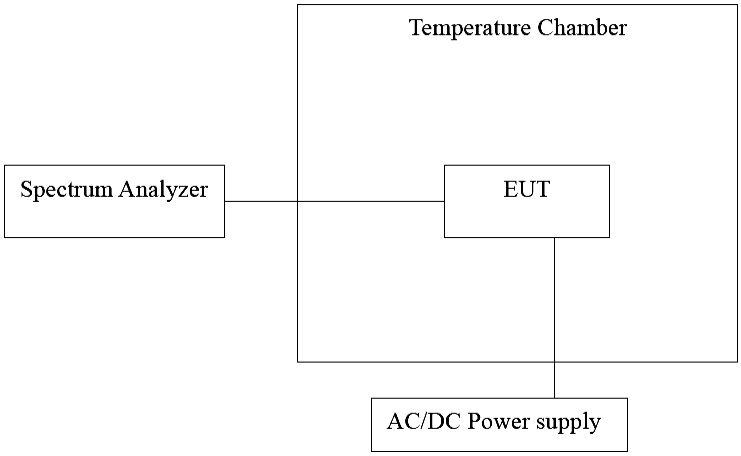
Mode 5: IEEE 802.11ac 80MHz Continuous TX mode _ ANT-1	
5775 MHz	

4.8. Frequency Stability Measurement

■ **Limit**

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 users manual.

■ **Test Setup**



■ **Test Instruments**

Equipment	Manufacturer	Model Number	Serial Number	Cal. Date	Remark
Spectrum Analyzer	Agilent	E4408B	MY45107753	08/14/2017	1 year
Temperature & Humidity Chamber	TAICHY	MHU-225LA	980729	04/17/2017	1 year
Test Site	ATL	TE05	TE05	N.C.R.	-----

Note: N.C.R. = No Calibration Request.

■ **Test Procedure**

1. The EUT was placed inside the environmental test chamber and powered by nominal AC/DC voltage.
2. Turn the EUT on and couple its output to a spectrum analyzer.
3. Turn the EUT off and set the chamber to the highest temperature specified.
4. Allow sufficient time (approximately 30 min) for the temperature of the chamber to stabilize.
5. Repeat step 2 and 3 with the temperature chamber set to the lowest temperature.
6. The test chamber was allowed to stabilize at +20 degree C for a minimum of 30 minutes. The supply voltage was then adjusted on the EUT from 85% to 115% and the frequency record.

■ **Test Result**

Temperature Variations

Test Item	Frequency Stability					
Frequency	Temp. (°C)	Voltage (Vac)	Measured Freq. (MHz)	Delta Freq. (Hz)	Tolerance (ppm)	Result (Pass/Fail)
5200 MHz	-40	120	5199.944	-56000	-10.769	Pass
	-30		5199.9496	-50400	-9.692	Pass
	-20		5199.9508	-49200	-9.462	Pass
	-10		5199.956	-44000	-8.462	Pass
	0		5199.9566	-43400	-8.346	Pass
	10		5199.9622	-37800	-7.269	Pass
	20		5199.9694	-30600	-5.885	Pass
	30		5199.9713	-28700	-5.519	Pass
	40		5199.9885	-11500	-2.212	Pass
	50		5200.0002	200	0.038	Pass
	60		5200.0084	8400	1.615	Pass
5785 MHz	-40	120	5784.9387	-61300	-10.596	Pass
	-30		5784.9428	-57200	-9.888	Pass
	-20		5784.9495	-50500	-8.729	Pass
	-10		5784.9565	-43500	-7.519	Pass
	0		5784.9598	-40200	-6.949	Pass
	10		5784.9627	-37300	-6.448	Pass
	20		5784.9655	-34500	-5.964	Pass
	30		5784.9725	-27500	-4.754	Pass
	40		5784.9824	-17600	-3.042	Pass
	50		5784.9964	-3600	-0.622	Pass
	60		5785.0031	3100	0.536	Pass

Voltage Variations

Test Item	Frequency Stability					
Frequency	Temp. (°C)	Voltage (Vac)	Measured Freq. (MHz)	Delta Freq. (Hz)	Tolerance (ppm)	Result (Pass/Fail)
5200 MHz	20	138.00	5199.9449	-55100	-10.596	Pass
		120.00	5199.9694	-30600	-5.885	Pass
		102.00	5199.9853	-14700	-2.827	Pass
5785 MHz	20	138.00	5784.9372	-62800	-10.856	Pass
		120.00	5784.9655	-34500	-5.964	Pass
		102.00	5785.0037	3700	0.640	Pass

Note: The manufacturer's frequency stability specification is better then 20ppm.

Beamforming on

Temperature Variations

Test Item	Frequency Stability					
Frequency	Temp. (°C)	Voltage (Vac)	Measured Freq. (MHz)	Delta Freq. (Hz)	Tolerance (ppm)	Result (Pass/Fail)
5200 MHz	-40	120	5199.944	-56000	-10.769	Pass
	-30		5199.9496	-50400	-9.692	Pass
	-20		5199.9508	-49200	-9.462	Pass
	-10		5199.956	-44000	-8.462	Pass
	0		5199.9566	-43400	-8.346	Pass
	10		5199.9622	-37800	-7.269	Pass
	20		5199.9694	-30600	-5.885	Pass
	30		5199.9713	-28700	-5.519	Pass
	40		5199.9885	-11500	-2.212	Pass
	50		5200.0002	200	0.038	Pass
	60		5200.0084	8400	1.615	Pass
5785 MHz	-40	120	5784.9387	-61300	-10.596	Pass
	-30		5784.9428	-57200	-9.888	Pass
	-20		5784.9495	-50500	-8.729	Pass
	-10		5784.9565	-43500	-7.519	Pass
	0		5784.9598	-40200	-6.949	Pass
	10		5784.9627	-37300	-6.448	Pass
	20		5784.9655	-34500	-5.964	Pass
	30		5784.9725	-27500	-4.754	Pass
	40		5784.9824	-17600	-3.042	Pass
	50		5784.9964	-3600	-0.622	Pass
	60		5785.0031	3100	0.536	Pass

Voltage Variations

Test Item	Frequency Stability					
Frequency	Temp. (°C)	Voltage (Vac)	Measured Freq. (MHz)	Delta Freq. (Hz)	Tolerance (ppm)	Result (Pass/Fail)
5200 MHz	20	138.00	5199.9449	-55100	-10.596	Pass
		120.00	5199.9694	-30600	-5.885	Pass
		102.00	5199.9853	-14700	-2.827	Pass
5785 MHz	20	138.00	5784.9372	-62800	-10.856	Pass
		120.00	5784.9655	-34500	-5.964	Pass
		102.00	5785.0037	3700	0.640	Pass

Note: The manufacturer's frequency stability specification is better then 20ppm.

4.9. Antenna Requirement

■ **Limit**

For intentional device, according to 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device.

And According to 15.407 (a), if transmitting antennas of directional gain greater than 6 dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

■ **Antenna Connector Construction**

See section 2 – antenna information.

■ **Directional Gain Calculated**

Directional Gain = 10*log{[10^(G1/20)+10^(G2/20)+…+10^(Gn/20)]^2/NANT}

= 9.19 dBi > 6dBi (5.150 ~ 5.250 GHz)

Directional Gain = 10*log{[10^(G1/20)+10^(G2/20)+…+10^(Gn/20)]^2/NANT}

= 9.06 dBi > 6dBi (5.725 ~ 5.850 GHz)

Operate Freq. Band		Directional Gain (dBi)
IEEE 802.11a	U-NII Band I	9.19
	U-NII Band III	9.06
IEEE 802.11ac 20MHz	U-NII Band I	9.19
	U-NII Band III	9.06
IEEE 802.11ac 40MHz	U-NII Band I	9.19
	U-NII Band III	9.06
IEEE 802.11ac 80MHz	U-NII Band I	9.19
	U-NII Band III	9.06