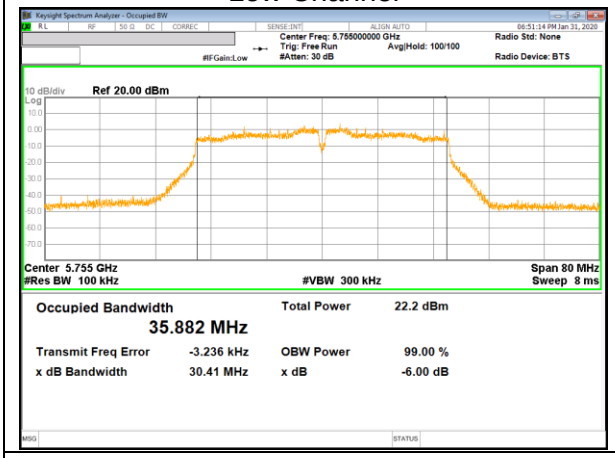
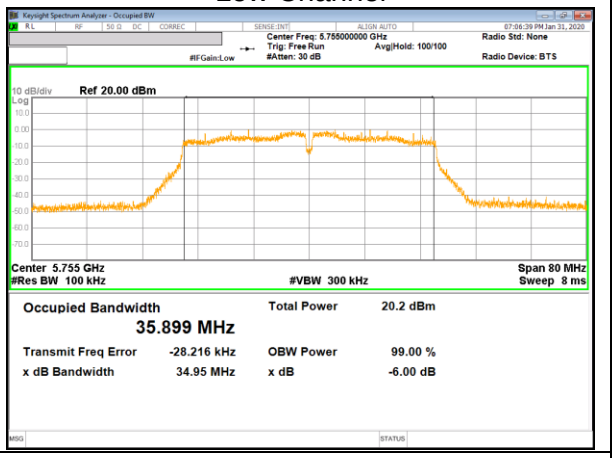
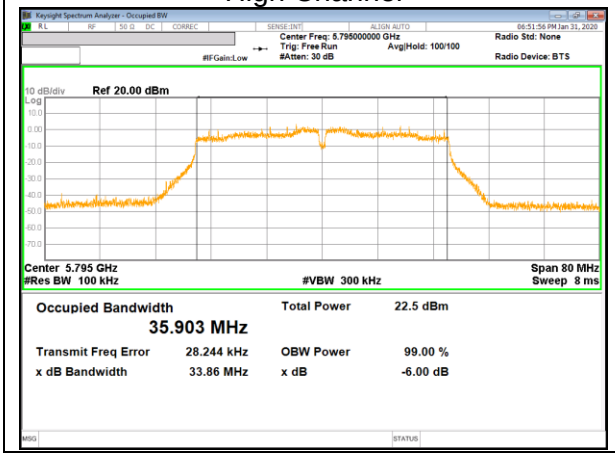
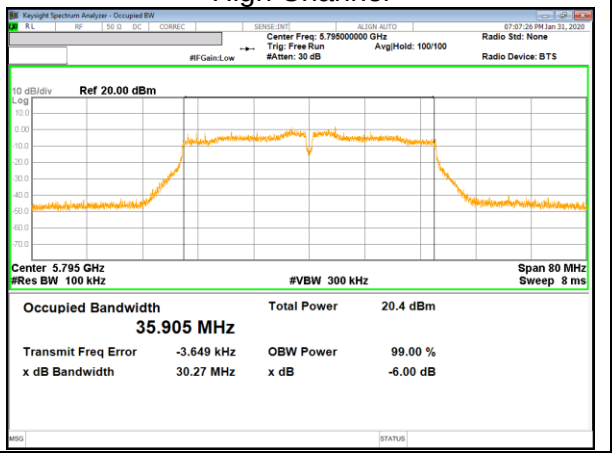
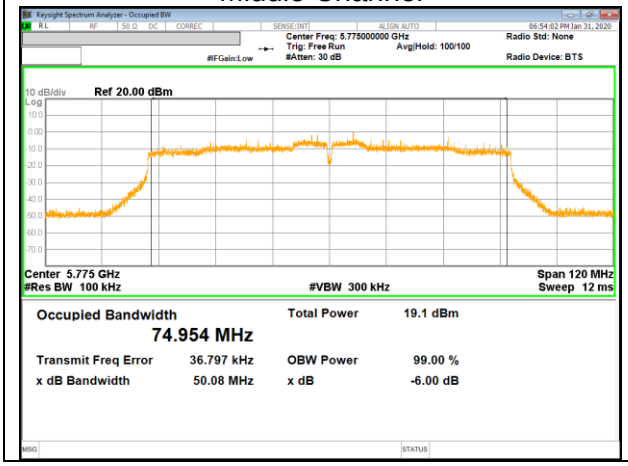
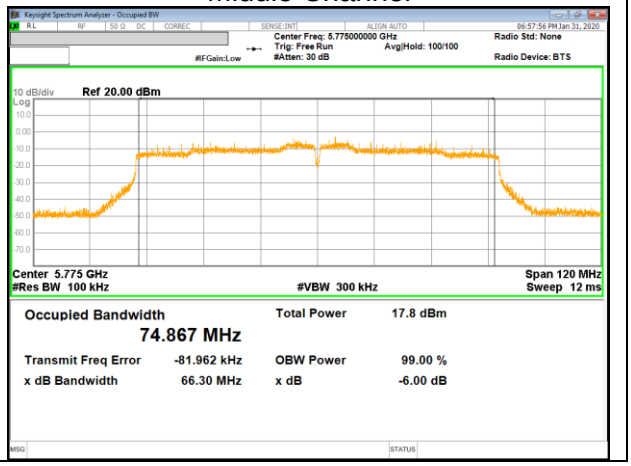
IEEE 802.11n HT40 mode

ANT1	ANT2
Low Channel	Low Channel
	
High Channel	High Channel
	

IEEE 802.11ac VHT80 mode

ANT1	ANT2
Middle Channel	Middle Channel
	

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10.2. OUTPUT POWER AND PPSD

LIMITS

FCC §15.407 (a) (1) (2) (3)

FCC

For the band 5.15–5.25 GHz, the maximum conducted output power over the frequency band of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26dB emission bandwidth in MHz. In addition, the peak power spectral density shall not exceed 11 dBm in any 1 MHz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the peak power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the 5.25-5.35 GHz and 5.47-5.725 GHz bands, the maximum conducted output power over the frequency bands of operation shall not exceed the lesser of 250 mW or 11 dBm + 10 log B, where B is the 26 dB emission bandwidth in megahertz. In addition, the maximum power spectral density shall not exceed 11 dBm in any 1 megahertz band. If transmitting antennas of directional gain greater than 6 dBi are used, both the maximum conducted output power and the maximum power spectral density shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

For the band 5.725-5.85 GHz, the maximum conducted output power over the frequency band of operation shall not exceed 1 W. In addition, the maximum power spectral density shall not exceed 30 dBm in any 500-kHz band.

TEST PROCEDURE

KDB 789033 Method PM is used for output power.

KDB 789033 Method SA-2 is used for only power of straddle Ch. and PPSD. RBW set to 1MHz(500kHz for the band 5.725-5.85 GHz, the VBW >= 3 x RBW, RMS detector and trace averaging). Band power function used for power and peak marker value of the spectrum is used for PSD.

DIRECTIONAL ANTENNA GAIN

For OUTPUT POWER and PSD: The TX chains are correlated and the antenna gains are unequal among the chains. The directional gain is:

Frequency Band [MHz]	ANT1 Gain [dBi]	ANT2 Gain [dBi]	Correlated Chains Directional Gain [dBi]
UNII 1 5150 - 5250	-7.58	-6.12	-3.81
UNII 2A 5250 - 5350	-7.12	-5.94	-3.50
UNII 2C 5470 - 5725	-6.87	-5.07	-2.91
UNII 3 5725 - 5850	-6.54	-4.55	-2.48

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RESULTS

10.2.1. 1Tx MODE IN THE 5.2 GHz BAND

Bandwidth and Antenna Gain, Limits

Band	Mode	Channel	Center Freq. [MHz]	Min 26 dB BW [MHz]	Directional Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/MHz]
UNII-1	802.11a	Low	5180	20.37	-3.81	24.00	11.00
		Mid	5200	20.17	-3.81	24.00	11.00
		High	5240	19.91	-3.81	23.99	11.00
	802.11n HT20	Low	5180	21.86	-3.81	24.00	11.00
		Mid	5200	20.66	-3.81	24.00	11.00
		High	5240	20.79	-3.81	24.00	11.00
	802.11n HT40	Low	5190	39.96	-3.81	24.00	11.00
		High	5230	39.53	-3.81	24.00	11.00
	802.11ac VHT80	Mid	5210	81.50	-3.81	24.00	11.00

Included in Calculations of Corr'd Power & PPSD			
Duty Cycle CF [dB]	802.11a	0.00	dB
	802.11n20	0.00	dB
	802.11n40	0.00	dB
	802.11ac VHT80	0.00	dB

Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Meas Power [dBm]		Corr'd Power [dBm]		Power Limit [dBm]
				ANT1	ANT2	ANT1	ANT2	
UNII-1	802.11a	Low	5180	17.19	16.73	17.19	16.73	24.00
		Mid	5200	16.88	16.71	16.88	16.71	24.00
		High	5240	16.83	16.60	16.83	16.60	23.99
	802.11n HT20	Low	5180	17.01	17.04	17.01	17.04	24.00
		Mid	5200	16.75	17.11	16.75	17.11	24.00
		High	5240	16.68	16.98	16.68	16.98	24.00
	802.11n HT40	Low	5190	16.74	16.89	16.74	16.89	24.00
		High	5230	16.62	16.94	16.62	16.94	24.00
	802.11ac VHT80	Mid	5210	13.58	13.59	13.58	13.59	24.00

* Calculation of Output Power : Corr'd Power = Meas Power + Duty CF [dB]

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PPSD Results

Band	Mode	Channel	Center Freq. [MHz]	Meas PPSD [dBm/MHz]		Corr'd PPSD [dBm/MHz]		PPSD Limit [dBm/1MHz]
				ANT1	ANT2	ANT1	ANT2	
UNII-1	802.11a	Low	5180	7.81	7.85	7.81	7.85	11.00
		Mid	5200	7.96	7.91	7.96	7.91	
		High	5240	7.93	7.78	7.93	7.78	
	802.11n HT20	Low	5180	7.88	7.69	7.88	7.69	
		Mid	5200	7.73	7.86	7.73	7.86	
		High	5240	7.94	7.89	7.94	7.89	
	802.11n HT40	Low	5190	4.92	5.51	4.92	5.51	
		High	5230	4.97	5.37	4.97	5.37	
	802.11ac VHT80	Mid	5210	-0.92	-1.35	-0.92	-1.35	

* Calculation of PPSD result : Corr'd PPSD = Meas PPSD + Duty CF + Corr'd factor [dB]

10.2.2. 1Tx MODE IN THE 5.3 GHz BAND

Bandwidth and Antenna Gain, Limits

Band	Mode	Channel	Center Freq. [MHz]	Min 26 dB BW [MHz]	Directional Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/MHz]
UNII-2A	802.11a	Low	5260	20.36	-3.50	24.00	11.00
		Mid	5300	20.64			
		High	5320	20.19			
	802.11n HT20	Low	5260	21.93			
		Mid	5300	20.90			
		High	5320	20.38			
	802.11n HT40	Low	5270	39.58			
		High	5310	39.67			
	802.11ac VHT80	Mid	5290	81.11			

Included in Calculations of Corr'd Power & PPSD			
Duty Cycle CF [dB]	802.11a	0.00	dB
	802.11n20	0.00	dB
	802.11n40	0.00	dB
	802.11ac VHT80	0.00	dB

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Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Meas Power [dBm]		Corr'd Power [dBm]		Power Limit [dBm]
				ANT1	ANT2	ANT1	ANT2	
UNII-2A	802.11a	Low	5260	16.92	17.09	16.92	17.09	24.00
		Mid	5300	16.76	16.90	16.76	16.90	
		High	5320	16.70	17.10	16.70	17.10	
	802.11n HT20	Low	5260	16.83	16.94	16.83	16.94	
		Mid	5300	16.61	16.78	16.61	16.78	
		High	5320	16.57	16.86	16.57	16.86	
	802.11n HT40	Low	5270	16.60	16.73	16.60	16.73	
		High	5310	16.40	16.73	16.40	16.73	
	802.11ac VHT80	Mid	5290	13.83	13.74	13.83	13.74	

* Calculation of Output Power : Corr'd Power = Meas Power + Duty CF [dB]

PPSD Results

Band	Mode	Channel	Center Freq. [MHz]	Meas PPSD [dBm/MHz]		Corr'd PPSD [dBm/MHz]		PPSD Limit [dBm/1MHz]
				ANT1	ANT2	ANT1	ANT2	
UNII-2A	802.11a	Low	5260	7.89	7.94	7.89	7.94	11.00
		Mid	5300	7.71	7.88	7.71	7.88	
		High	5320	7.82	7.87	7.82	7.87	
	802.11n HT20	Low	5260	7.66	7.70	7.66	7.70	
		Mid	5300	7.92	7.83	7.92	7.83	
		High	5320	7.92	7.85	7.92	7.85	
	802.11n HT40	Low	5270	4.98	4.67	4.98	4.67	
		High	5310	4.51	4.74	4.51	4.74	
	802.11ac VHT80	Mid	5290	-0.93	-1.04	-0.93	-1.04	

* Calculation of PPSD result : Corr'd PPSD = Meas PPSD + Duty CF + Corr'd factor [dB]

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10.2.3. 1Tx MODE IN THE 5.5 GHz BAND

Bandwidth and Antenna Gain, Limits

Band	Mode	Channel	Center Freq. [MHz]	Min 26 dB BW [MHz]	Directional Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/MHz]
UNII-2C	802.11a	Low	5500	19.53	-2.91	23.91	11.00
		Mid	5580	20.89	-2.91	24.00	11.00
		High	5700	20.34	-2.91	24.00	11.00
	802.11n HT20	Low	5500	20.59	-2.91	24.00	11.00
		Mid	5580	21.74	-2.91	24.00	11.00
		High	5700	20.85	-2.91	24.00	11.00
	802.11n HT40	Low	5510	39.74	-2.91	24.00	11.00
		Mid	5590	39.55	-2.91	24.00	11.00
		High	5670	39.82	-2.91	24.00	11.00
	802.11ac VHT80	Low	5530	81.27	-2.91	24.00	11.00
		High	5610	81.14	-2.91	24.00	11.00
Included in Calculations of Corr'd Power & PPSD							
Duty Cycle CF [dB]			802.11a			0.00	dB
			802.11n20			0.00	dB
			802.11n40			0.00	dB
			802.11ac VHT80			0.00	dB

Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Meas Power [dBm]		Corr'd Power [dBm]		Power Limit [dBm]
				ANT1	ANT2	ANT1	ANT2	
UNII-2C	802.11a	Low	5500	16.78	16.87	16.78	16.87	23.91
		Mid	5580	16.79	16.71	16.79	16.71	24.00
		High	5700	16.91	17.11	16.91	17.11	24.00
	802.11n HT20	Low	5500	17.20	17.16	17.20	17.16	24.00
		Mid	5580	16.61	17.12	16.61	17.12	24.00
		High	5700	16.74	16.93	16.74	16.93	24.00
	802.11n HT40	Low	5510	16.74	16.96	16.74	16.96	24.00
		Mid	5590	16.42	16.49	16.42	16.49	24.00
		High	5670	16.74	16.56	16.74	16.56	24.00
	802.11ac VHT80	Low	5530	13.32	13.81	13.32	13.81	24.00
		High	5610	13.43	13.54	13.43	13.54	24.00

* Calculation of Output Power : Corr'd Power = Meas Power + Duty CF [dB]

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PPSD Results

Band	Mode	Channel	Center Freq. [MHz]	Meas PPSD [dBm/MHz]		Corr'd PPSD [dBm/MHz]		PPSD Limit [dBm/1MHz]
				ANT1	ANT2	ANT1	ANT2	
UNII-2C	802.11a	Low	5500	7.89	7.90	7.89	7.90	11.00
		Mid	5580	7.94	7.77	7.94	7.77	
		High	5700	7.98	7.94	7.98	7.94	
	802.11n HT20	Low	5500	7.99	7.87	7.99	7.87	
		Mid	5580	7.96	7.84	7.96	7.84	
		High	5700	7.95	7.78	7.95	7.78	
	802.11n HT40	Low	5510	4.71	4.98	4.71	4.98	
		Mid	5590	4.60	4.83	4.60	4.83	
		High	5670	5.26	5.21	5.26	5.21	
	802.11ac VHT80	Low	5530	-1.74	-0.60	-1.74	-0.60	
		High	5610	-1.26	-1.02	-1.26	-1.02	

* Calculation of PPSD result : Corr'd PPSD = Meas PPSD + Duty CF + Corr'd factor [dB]

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10.2.4. 1Tx MODE IN THE 5.8 GHz BAND

Bandwidth and Antenna Gain, Limits

Included in Calculations of Corr'd Power & PPSD			
Duty Cycle CF [dB]	802.11a	0.00	dB
	802.11n20	0.00	dB
	802.11n40	0.00	dB
	802.11ac VHT80	0.00	dB

Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Meas Power [dBm]		Corr'd Power [dBm]		Power Limit [dBm]
				ANT1	ANT2	ANT1	ANT2	
UNII-3	802.11a	Mid	5745	17.70	17.83	17.70	17.83	30.00
		High	5785	17.48	17.68	17.48	17.68	
		High	5825	17.49	17.82	17.49	17.82	
	802.11n HT20	Low	5745	17.59	17.75	17.59	17.75	
		Mid	5785	17.92	17.56	17.92	17.56	
		High	5825	17.91	17.67	17.91	17.67	
	802.11n HT40	Low	5755	16.96	16.44	16.96	16.44	
		High	5795	16.93	16.75	16.93	16.75	
	802.11ac VHT80	Middle	5775	13.67	13.73	13.67	13.73	

* Calculation of Output Power : Corr'd Power = Meas Power + Duty CF [dB]

PPSD Results

Band	Mode	Channel	Center Freq. [MHz]	Meas PPSD [dBm/MHz]		Corr'd PPSD [dBm/MHz]		PPSD Limit [dBm/500kHz]
				ANT1	ANT2	ANT1	ANT2	
UNII-3	802.11a	Low	5745	6.70	6.76	6.70	6.76	30.00
		Mid	5785	6.32	6.18	6.32	6.18	
		High	5825	6.45	6.23	6.45	6.23	
	802.11n HT20	Low	5745	6.00	6.44	6.00	6.44	
		Mid	5785	6.30	5.96	6.30	5.96	
		High	5825	5.85	5.99	5.85	5.99	
	802.11n HT40	Low	5755	2.42	2.31	2.42	2.31	
		High	5795	2.28	2.56	2.28	2.56	
	802.11ac VHT80	Middle	5775	-3.77	-3.87	-3.77	-3.87	

* Calculation of PPSD result : Corr'd PPSD = Meas PPSD + Duty CF + Corr'd factor [dB]

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10.2.5. 1Tx Mode Straddle channel IN THE 5.5 GHz BAND

Bandwidth and Antenna Gain, Limits

Band	Mode	Channel	Center Freq. [MHz]	Min 26 dB BW [MHz]	Directional Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/MHz]
UNII-2C	802.11a	Straddle	5720	14.83	-2.91	22.71	11.00
	802.11n HT20	Straddle	5720	15.23	-2.91	22.83	11.00
	802.11n HT40	Straddle	5710	34.48	-2.91	24.00	11.00
	802.11ac VHT80	Straddle	5690	75.31	-2.91	24.00	11.00
Included in Calculations of Corr'd Power & PPSD							
Duty Cycle CF [dB]			802.11a			0.00	dB
			802.11n20			0.00	dB
			802.11n40			0.00	dB
			802.11ac VHT80			0.00	dB

Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Meas Power [dBm]		Corr'd Power [dBm]		Power Limit [dBm]
				ANT1	ANT2	ANT1	ANT2	
UNII-2C	802.11a	Straddle	5720	16.44	16.40	16.44	16.40	22.71
	802.11n HT20	Straddle	5720	16.25	16.66	16.25	16.66	22.83
	802.11n HT40	Straddle	5710	16.63	16.36	16.63	16.36	24.00
	802.11ac VHT80	Straddle	5690	13.37	13.57	13.37	13.57	24.00

* Calculation of Output Power : Corr'd Power = Meas Power + Duty CF [dB]

PPSD Results

Band	Mode	Channel	Center Freq. [MHz]	Meas PPSD [dBm/MHz]		Corr'd PPSD [dBm/MHz]		PPSD Limit [dBm/1MHz]
				ANT1	ANT2	ANT1	ANT2	
UNII-2C	802.11a	Straddle	5720	7.86	7.77	7.86	7.77	11.00
	802.11n HT20	Straddle	5720	7.82	7.91	7.82	7.91	
	802.11n HT40	Straddle	5710	5.25	5.61	5.25	5.61	
	802.11ac VHT80	Straddle	5690	-0.97	-0.27	-0.97	-0.27	

* Calculation of PPSD result : Corr'd PPSD = Meas PPSD + Duty CF + Corr'd factor [dB]

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10.2.6. 1Tx Mode Straddle channel IN THE 5.8 GHz BAND

Bandwidth and Antenna Gain, Limits

Band	Mode	Channel	Center Freq. [MHz]	Min 26 dB BW [MHz]	Directional Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/500kHz]
UNII-3	802.11a	Straddle	5720	4.90	-2.48	30.00	30.00
	802.11n HT20	Straddle	5720	5.35			
	802.11n HT40	Straddle	5710	4.95			
	802.11ac VHT80	Straddle	5690	5.48			
Included in Calculations of Corr'd Power & PPSD							
Duty Cycle CF [dB]			802.11a			0.00	dB
			802.11n20			0.00	dB
			802.11n40			0.00	dB
			802.11ac VHT80			0.00	dB

Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Meas Power [dBm]		Corr'd Power [dBm]		Power Limit [dBm]
				ANT1	ANT2	ANT1	ANT2	
UNII-3	802.11a	Straddle	5720	8.20	8.14	8.20	8.14	30.00
	802.11n HT20	Straddle	5720	8.63	8.99	8.63	8.99	
	802.11n HT40	Straddle	5710	4.29	3.80	4.29	3.80	
	802.11ac VHT80	Straddle	5690	-2.38	-2.47	-2.38	-2.47	

* Calculation of Output Power : Corr'd Power = Meas Power + Duty CF [dB]

PPSD Results

Band	Mode	Channel	Center Freq. [MHz]	Meas PPSD [dBm/MHz]		Corr'd PPSD [dBm/MHz]		PPSD Limit [dBm/500kHz]
				ANT1	ANT2	ANT1	ANT2	
UNII-3	802.11a	Straddle	5720	2.48	2.38	2.48	2.38	30.00
	802.11n HT20	Straddle	5720	7.82	7.91	7.82	7.91	
	802.11n HT40	Straddle	5710	-2.78	-2.30	-2.78	-2.30	
	802.11ac VHT80	Straddle	5690	-8.91	-8.76	-8.91	-8.76	

* Calculation of PPSD result : Corr'd PPSD = Meas PPSD + Duty CF + Corr'd factor [dB]

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10.2.7. 2Tx MODE IN THE 5.2 GHz BAND

Bandwidth and Antenna Gain, Limits

Band	Mode	Channel	Center Freq. [MHz]	Min 26 dB BW [MHz]	Directional Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/MHz]
UNII-1	802.11a	Low	5180	20.37	-3.81	24.00	11.00
		Mid	5200	20.17	-3.81	24.00	11.00
		High	5240	19.91	-3.81	23.99	11.00
	802.11n HT20	Low	5180	21.86	-3.81	24.00	11.00
		Mid	5200	20.66	-3.81	24.00	11.00
		High	5240	20.79	-3.81	24.00	11.00
	802.11n HT40	Low	5190	39.96	-3.81	24.00	11.00
		High	5230	39.53	-3.81	24.00	11.00
	802.11ac VHT80	Mid	5210	81.50	-3.81	24.00	11.00

Included in Calculations of Corr'd Power & PPSD			
Duty Cycle CF [dB]	802.11a	0.00	dB
	802.11n20	0.00	dB
	802.11n40	0.00	dB
	802.11ac VHT80	0.00	dB

Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Meas Power [dBm]		Total Corr'd Power [dBm]	Power Limit [dBm]
				ANT1	ANT2		
UNII-1	802.11a	Low	5180	17.19	16.73	19.98	24.00
		Mid	5200	16.88	16.71	19.81	
		High	5240	16.83	16.60	19.73	
	802.11n HT20	Low	5180	17.01	17.04	20.04	
		Mid	5200	16.75	17.11	19.94	
		High	5240	16.68	16.98	19.84	
	802.11n HT40	Low	5190	16.74	16.89	19.83	
		High	5230	16.62	16.94	19.79	
	802.11ac VHT80	Mid	5210	13.47	13.48	16.60	

* Calculation of Output Power : Corr'd Power = Ant1 Power + Ant2 Power + Duty CF [dB]

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PPSD Results

Band	Mode	Channel	Center Freq. [MHz]	Meas PPSD [dBm/MHz]		Total Corr'd PPSD [dBm/MHz]	PPSD Limit [dBm/MHz]
				ANT1	ANT2		
UNII-1	802.11a	Low	5180	7.81	7.85	10.84	11.00
		Mid	5200	7.96	7.91	10.94	
		High	5240	7.93	7.78	10.87	
	802.11n HT20	Low	5180	7.88	7.69	10.80	
		Mid	5200	7.73	7.86	10.80	
		High	5240	7.94	7.89	10.92	
	802.11n HT40	Low	5190	4.92	5.51	8.23	
		High	5230	4.97	5.37	8.18	
	802.11ac VHT80	Mid	5210	-0.92	-1.35	1.99	

* Calculation of PPSD result : Corr'd PPSD = Ant1 PPSD + Ant2 PPSD + Duty CF [dB] + Corr'd factor [dB]

10.2.8. 2Tx MODE IN THE 5.3 GHz BAND

Bandwidth and Antenna Gain, Limits

Band	Mode	Channel	Center Freq. [MHz]	Min 26 dB BW [MHz]	Directional Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/MHz]
UNII-2A	802.11a	Low	5260	20.36	-3.50	24.00	11.00
		Mid	5300	20.64			
		High	5320	20.19			
	802.11n HT20	Low	5260	21.93			
		Mid	5300	20.90			
		High	5320	20.38			
	802.11n HT40	Low	5270	39.58			
		High	5310	39.67			
	802.11ac VHT80	Mid	5290	81.11			

Included in Calculations of Corr'd Power & PPSD			
Duty Cycle CF [dB]	802.11a	0.00	dB
	802.11n20	0.00	dB
	802.11n40	0.00	dB
	802.11ac VHT80	0.00	dB

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Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Meas Power [dBm]		Total Corr'd Power [dBm]	Power Limit [dBm]
				ANT1	ANT2		
UNII-2A	802.11a	Low	5260	16.92	17.09	20.02	24.00
		Mid	5300	16.76	16.90	19.84	
		High	5320	16.70	17.10	19.91	
	802.11n HT20	Low	5260	16.83	16.94	19.90	
		Mid	5300	16.61	16.78	19.71	
		High	5320	16.57	16.86	19.73	
	802.11n HT40	Low	5270	16.60	16.73	19.68	
		High	5310	16.40	16.73	19.58	
	802.11ac VHT80	Mid	5290	13.83	13.74	16.80	

* Calculation of Output Power : Corr'd Power = Ant1 Power + Ant2 Power + Duty CF [dB]

PPSD Results

Band	Mode	Channel	Center Freq. [MHz]	Meas PPSD [dBm/MHz]		Total Corr'd PPSD [dBm/MHz]	PPSD Limit [dBm/MHz]
				ANT1	ANT2		
UNII-2A	802.11a	Low	5260	7.89	7.94	10.92	11.00
		Mid	5300	7.71	7.88	10.81	
		High	5320	7.82	7.87	10.85	
	802.11n HT20	Low	5260	7.66	7.70	10.69	
		Mid	5300	7.92	7.83	10.89	
		High	5320	7.92	7.85	10.89	
	802.11n HT40	Low	5270	4.98	4.67	7.84	
		High	5310	4.51	4.74	7.64	
	802.11ac VHT80	Mid	5290	-0.93	-1.04	2.14	

* Calculation of PPSD result : Corr'd PPSD = Ant1 PPSD + Ant2 PPSD + Duty CF [dB] + Corr'd factor [dB]

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10.2.9. 2Tx MODE IN THE 5.5 GHz BAND

Bandwidth and Antenna Gain, Limits

Band	Mode	Channel	Center Freq. [MHz]	Min 26 dB BW [MHz]	Directional Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/MHz]
UNII-2C	802.11a	Low	5500	19.53	-2.91	23.91	11.00
		Mid	5580	20.89	-2.91	24.00	11.00
		High	5700	20.34	-2.91	24.00	11.00
	802.11n HT20	Low	5500	20.59	-2.91	24.00	11.00
		Mid	5580	21.74	-2.91	24.00	11.00
		High	5700	20.85	-2.91	24.00	11.00
	802.11n HT40	Low	5510	39.74	-2.91	24.00	11.00
		Mid	5590	39.55	-2.91	24.00	11.00
		High	5670	39.82	-2.91	24.00	11.00
	802.11ac VHT80	Low	5530	81.27	-2.91	24.00	11.00
		High	5610	81.14	-2.91	24.00	11.00

Included in Calculations of Corr'd Power & PPSD			
Duty Cycle CF [dB]	802.11a	0.00	dB
	802.11n20	0.00	dB
	802.11n40	0.00	dB
	802.11ac VHT80	0.00	dB

Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Meas Power [dBm]		Total Corr'd Power [dBm]	Power Limit [dBm]
				ANT1	ANT2		
UNII-2C	802.11a	Low	5500	16.78	16.87	19.84	23.91
		Mid	5580	16.79	16.71	19.76	24.00
		High	5700	16.91	17.11	20.02	24.00
	802.11n HT20	Low	5500	17.20	17.16	20.19	24.00
		Mid	5580	16.61	17.12	19.88	24.00
		High	5700	16.74	16.93	19.85	24.00
	802.11n HT40	Low	5510	16.74	16.96	19.86	24.00
		Mid	5590	16.42	16.49	19.47	24.00
		High	5670	16.74	16.56	19.66	24.00
	802.11ac VHT80	Low	5530	13.21	13.70	16.58	24.00
		High	5610	13.32	13.43	16.50	24.00

* Calculation of Output Power : Corr'd Power = Ant1 Power + Ant2 Power + Duty CF [dB]

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PPSD Results

Band	Mode	Channel	Center Freq. [MHz]	Meas PPSD [dBm/MHz]		Total Corr'd PPSD [dBm/MHz]	PPSD Limit [dBm/MHz]
				ANT1	ANT2		
UNII-2C	802.11a	Low	5500	7.89	7.90	10.90	11.00
		Mid	5580	7.94	7.77	10.87	
		High	5700	7.98	7.94	10.97	
	802.11n HT20	Low	5500	7.99	7.87	10.94	
		Mid	5580	7.96	7.84	10.91	
		High	5700	7.95	7.78	10.87	
	802.11n HT40	Low	5510	4.71	4.98	7.86	
		Mid	5590	4.60	4.83	7.73	
		High	5670	5.26	5.21	8.25	
	802.11ac VHT80	Low	5530	-1.74	-0.60	1.99	
		High	5610	-1.26	-1.02	1.98	

* Calculation of PPSD result : Corr'd PPSD = Ant1 PPSD + Ant2 PPSD + Duty CF [dB] + Corr'd factor [dB]

10.2.10. 2Tx MODE IN THE 5.8 GHz BAND

Bandwidth and Antenna Gain, Limits

Included in Calculations of Corr'd Power & PPSD			
Duty Cycle CF [dB]	802.11a	0.00	dB
	802.11n20	0.00	dB
	802.11n40	0.00	dB
	802.11ac VHT80	0.00	dB

Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Meas Power [dBm]		Total Corr'd Power [dBm]	Power Limit [dBm]
				ANT1	ANT2		
UNII-3	802.11a	Low	5745	17.70	17.83	20.78	30.00
		Mid	5785	17.48	17.68	20.59	
		High	5825	17.49	17.82	20.67	
	802.11n HT20	Low	5745	17.59	17.75	20.68	
		Mid	5785	17.92	17.56	20.75	
		High	5825	17.91	17.67	20.80	
	802.11n HT40	Low	5755	16.96	16.44	19.81	
		High	5795	16.93	16.75	19.85	
	802.11ac VHT80	Middle	5775	13.56	13.62	16.71	

* Calculation of Output Power : Corr'd Power = Ant1 Power + Ant2 Power + Duty CF [dB]

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PPSD Results

Band	Mode	Channel	Center Freq. [MHz]	Meas PPSD [dBm/500kHz]		Total Corr'd PPSD [dBm/500kHz]	PPSD Limit [dBm/500kHz]
				ANT1	ANT2		
UNII-3	802.11a	Low	5745	6.70	6.76	9.74	30.00
		Mid	5785	6.32	6.18	9.26	
		High	5825	6.45	6.23	9.35	
	802.11n HT20	Low	5745	6.00	6.44	9.24	
		Mid	5785	6.30	5.96	9.15	
		High	5825	5.85	5.99	8.93	
	802.11n HT40	Low	5755	2.42	2.31	5.38	
		High	5795	2.28	2.56	5.43	
	802.11ac VHT80	Middle	5775	-3.77	-3.87	-0.69	

* Calculation of PPSD result : Corr'd PPSD = Ant1 PPSD + Ant2 PPSD + Duty CF [dB] + Corr'd factor [dB]

10.2.11. 2Tx Mode Straddle channel IN THE 5.5 GHz BAND

Bandwidth and Antenna Gain, Limits

Band	Mode	Channel	Center Freq. [MHz]	Min 26 dB BW [MHz]	Directional Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/MHz]
UNII-2C	802.11a	Straddle	5720	14.83	-2.91	22.71	11.00
	802.11n HT20	Straddle	5720	15.23	-2.91	22.83	11.00
	802.11n HT40	Straddle	5710	34.48	-2.91	24.00	11.00
	802.11ac VHT80	Straddle	5690	75.31	-2.91	24.00	11.00
Included in Calculations of Corr'd Power & PPSD							
Duty Cycle CF [dB]			802.11a			0.00	dB
			802.11n20			0.00	dB
			802.11n40			0.00	dB
			802.11ac VHT80			0.00	dB

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Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Meas Power [dBm]		Total Corr'd Power [dBm]	Power Limit [dBm]
				ANT1	ANT2		
UNII-2C	802.11a	Straddle	5720	16.44	16.40	19.43	22.71
	802.11n HT20	Straddle	5720	16.25	16.66	19.47	22.83
	802.11n HT40	Straddle	5710	16.63	16.36	19.51	24.00
	802.11ac VHT80	Straddle	5690	13.37	13.57	16.59	24.00

* Calculation of Output Power : Corr'd Power = Meas Power + Duty CF [dB]

PPSD Results

Band	Mode	Channel	Center Freq. [MHz]	Meas PPSD [dBm/MHz]		Total Corr'd PPSD [dBm/MHz]	PPSD Limit [dBm/MHz]
				ANT1	ANT2		
UNII-2C	802.11a	Straddle	5720	7.86	7.77	10.83	11.00
	802.11n HT20	Straddle	5720	7.82	7.91	10.88	
	802.11n HT40	Straddle	5710	5.25	5.61	8.44	
	802.11ac VHT80	Straddle	5690	-0.97	-0.27	2.52	

* Calculation of PPSD result : Corr'd PPSD = Meas PPSD + Duty CF + Corr'd factor [dB]

10.2.12. 2Tx Mode Straddle channel IN THE 5.8 GHz BAND

Bandwidth and Antenna Gain, Limits

Band	Mode	Channel	Center Freq. [MHz]	Min 26 dB BW [MHz]	Directional Gain [dBi]	Power Limit [dBm]	PPSD Limit [dBm/500kHz]
UNII-3	802.11a	Straddle	5720	4.90	-2.48	30.00	30.00
	802.11n HT20	Straddle	5720	5.35			
	802.11n HT40	Straddle	5710	4.95			
	802.11ac VHT80	Straddle	5690	5.48			
Included in Calculations of Corr'd Power & PPSD							
Duty Cycle CF [dB]			802.11a			0.00	dB
			802.11n20			0.00	dB
			802.11n40			0.00	dB
			802.11ac VHT80			0.00	dB

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Output Power Results

Band	Mode	Channel	Center Freq. [MHz]	Meas Power [dBm]		Total Corr'd Power [dBm]	Power Limit [dBm]
				ANT1	ANT2		
UNII-3	802.11a	Straddle	5720	8.20	8.14	11.18	30.00
	802.11n HT20	Straddle	5720	8.63	8.99	11.83	
	802.11n HT40	Straddle	5710	4.29	3.80	7.06	
	802.11ac VHT80	Straddle	5690	-2.38	-2.47	0.70	

* Calculation of Output Power : Corr'd Power = Meas Power + Duty CF [dB]

PPSD Results

Band	Mode	Channel	Center Freq. [MHz]	Meas PPSD [dBm/500kHz]		Total Corr'd PPSD [dBm/500kHz]	PPSD Limit [dBm/500kHz]
				ANT1	ANT2		
UNII-3	802.11a	Straddle	5720	2.48	2.38	5.44	30.00
	802.11n HT20	Straddle	5720	1.90	2.47	5.20	
	802.11n HT40	Straddle	5710	-2.78	-2.30	0.48	
	802.11ac VHT80	Straddle	5690	-8.91	-8.76	-5.71	

* Calculation of PPSD result : Corr'd PPSD = Meas PPSD + Duty CF + Corr'd factor [dB]

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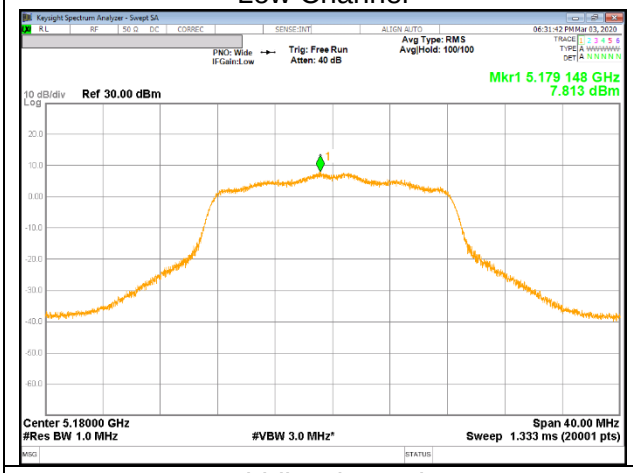
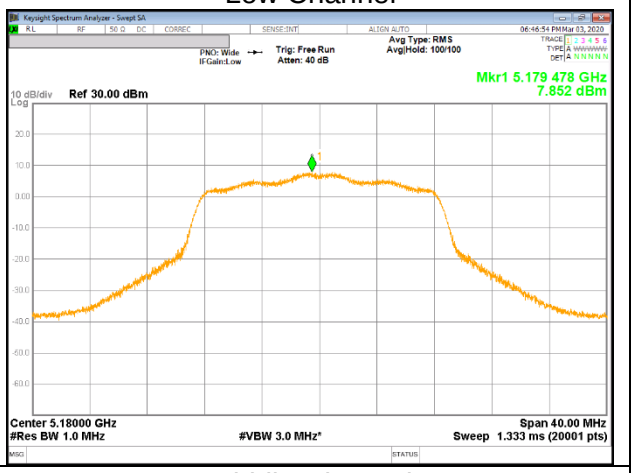
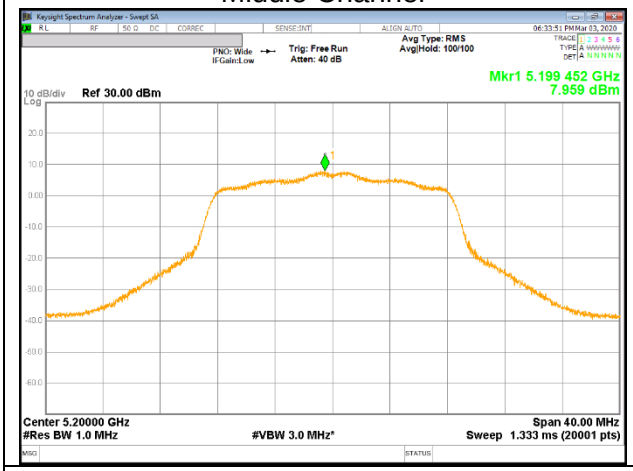
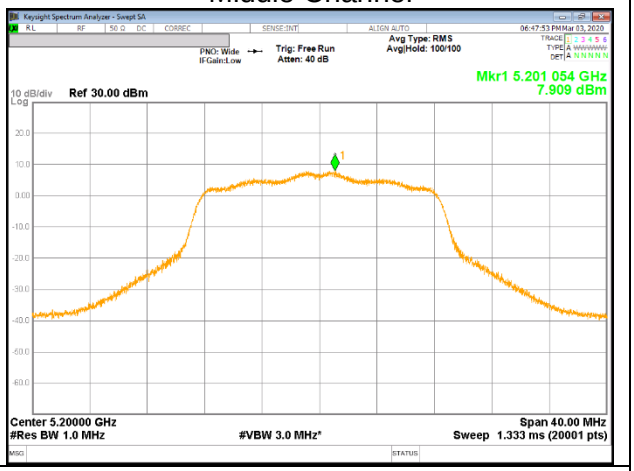
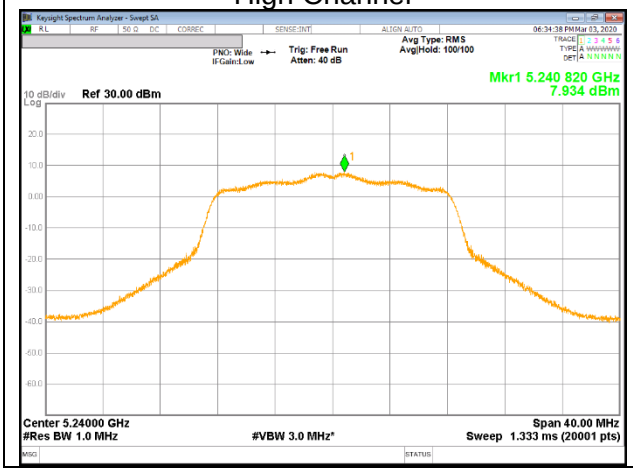
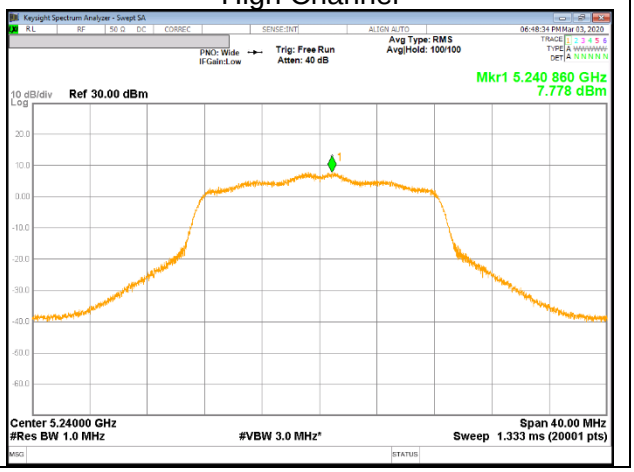
10.2.13. OUTPUT POWER AND PPSD PLOTS

UNII 5.2 GHz IEEE 802.11a mode PSD

ANT1	ANT2
Low Channel	Low Channel
	
Middle Channel	Middle Channel
	
High Channel	High Channel
	

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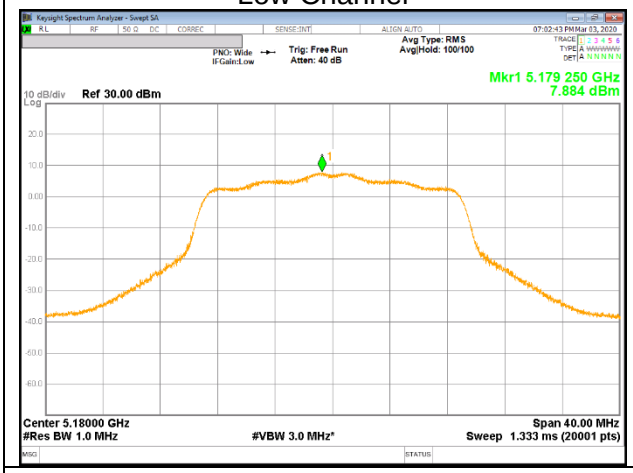
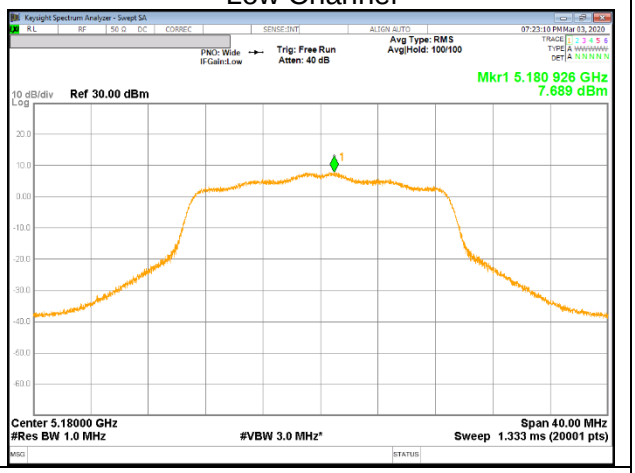
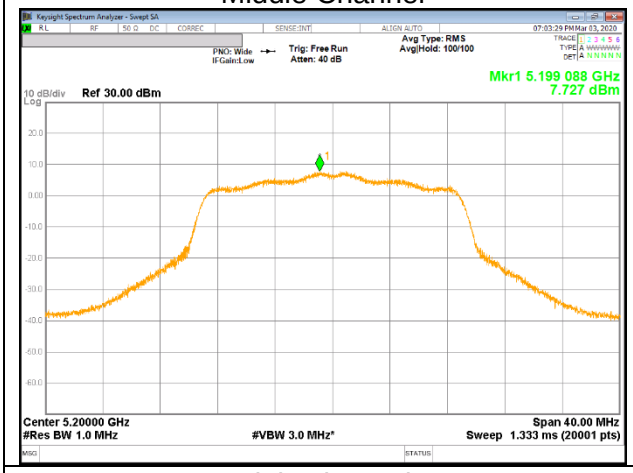
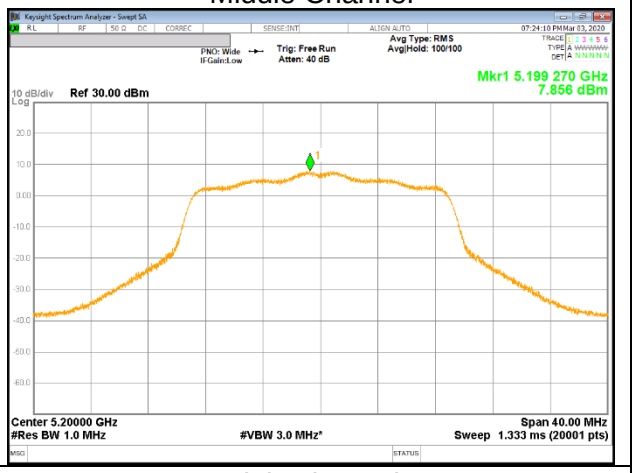
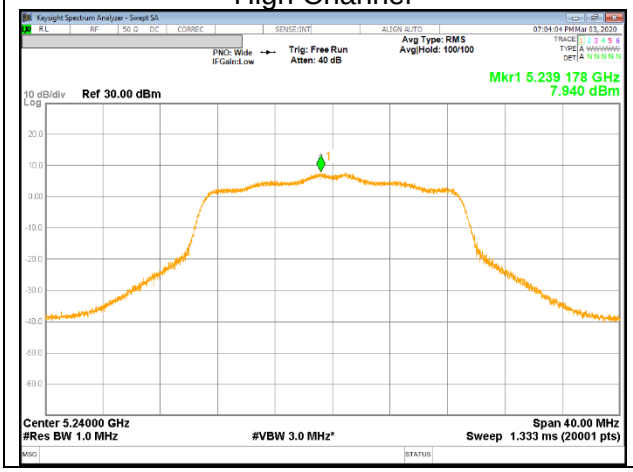
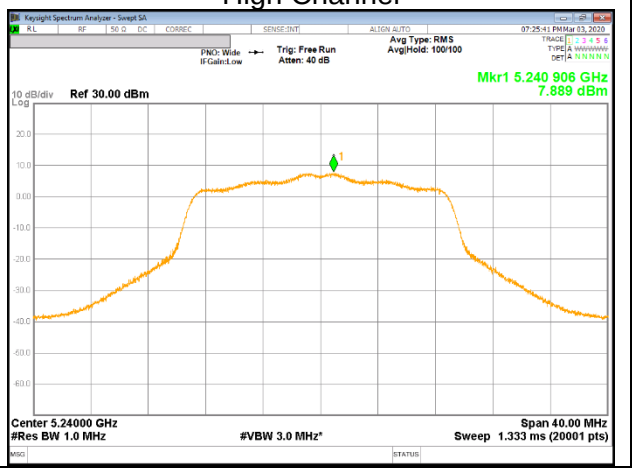
UNII 5.2 GHz IEEE 802.11n HT20 mode PSD

ANT1	ANT2
Low Channel	Low Channel
	
Middle Channel	Middle Channel
	
High Channel	High Channel
	

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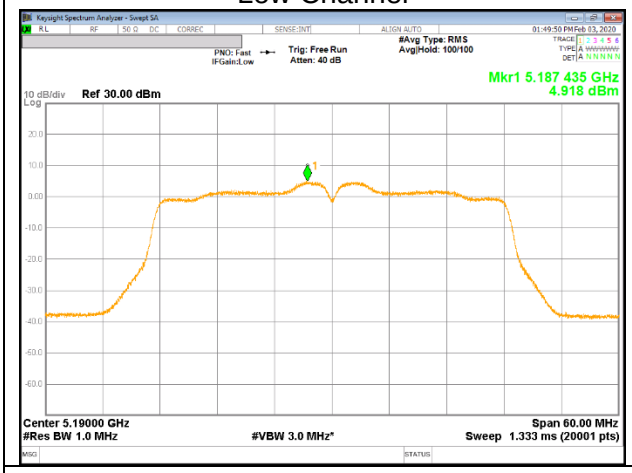
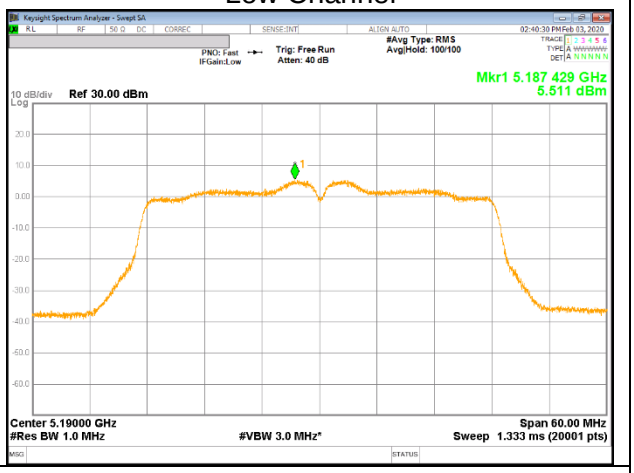
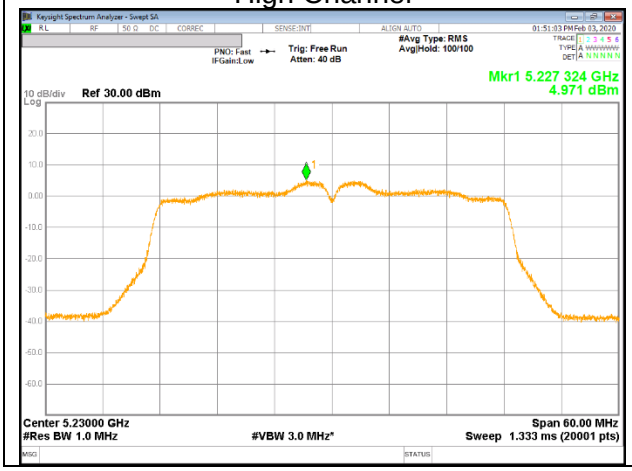
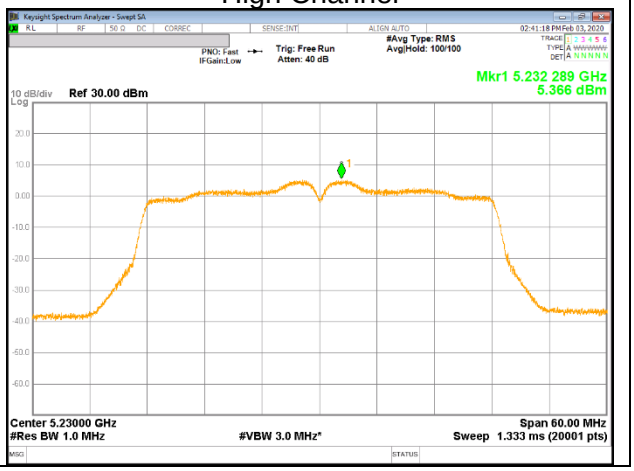
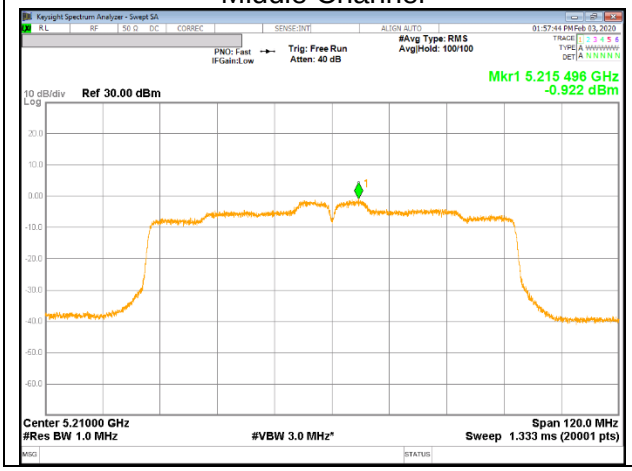
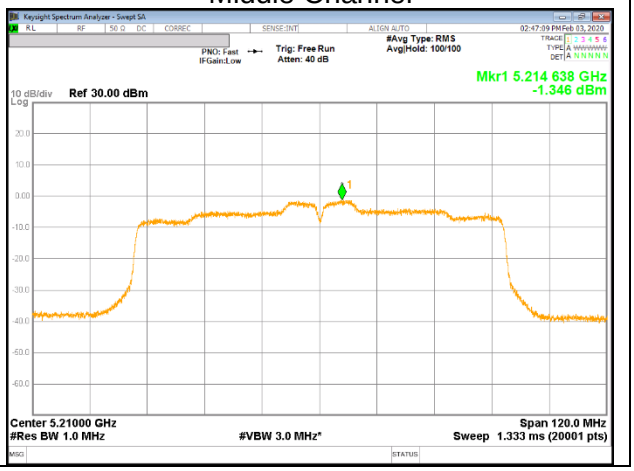
UNII 5.2 GHz IEEE 802.11n HT40 mode PSD

ANT1	ANT2
Low Channel	Low Channel
	
High Channel	High Channel
	

UNII 5.2 GHz IEEE 802.11ac VHT80 mode PSD

ANT1	ANT2
Middle Channel	Middle Channel
	

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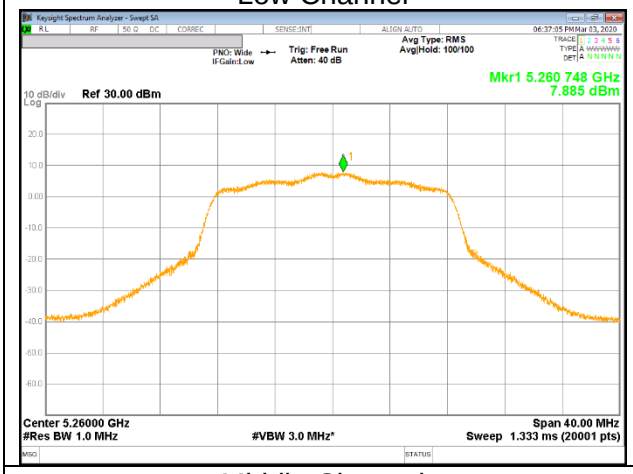
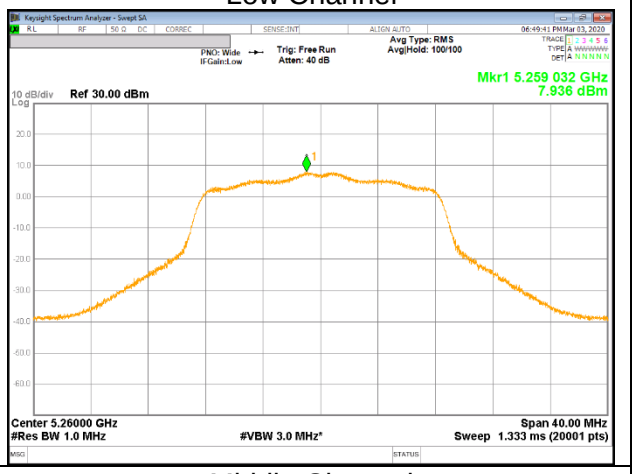
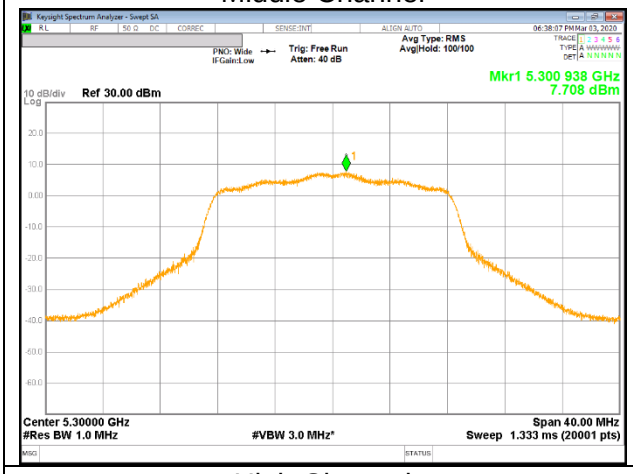
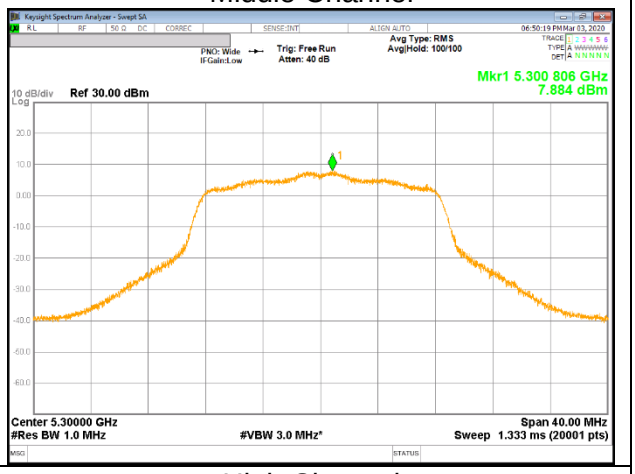
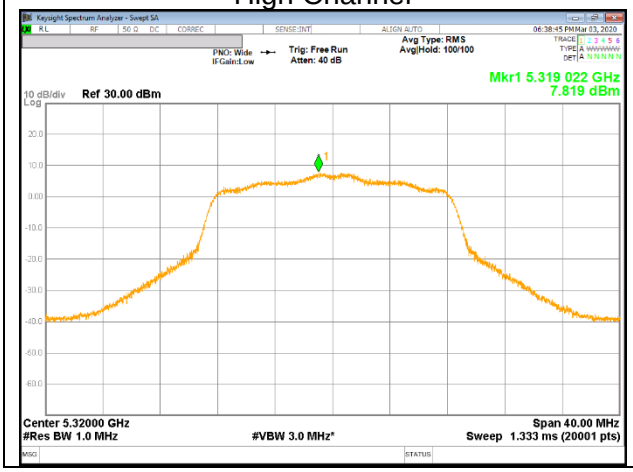
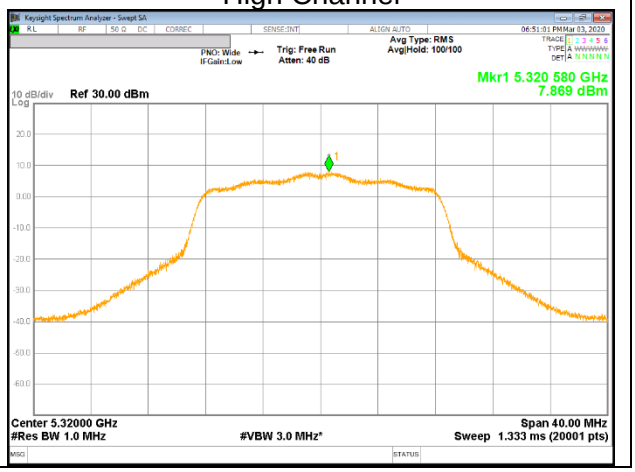
UNII 5.3 GHz IEEE 802.11a mode PSD

ANT1	ANT2
Low Channel	Low Channel
	
Mkr1 5.260 748 GHz 7.885 dBm; Ref 30.00 dBm; Center 5.26000 GHz; #Res BW 1.0 MHz; #VBW 3.0 MHz*; Span 40.00 MHz; Sweep 1.333 ms (20001 pts)	Mkr1 5.259 032 GHz 7.936 dBm; Ref 30.00 dBm; Center 5.26000 GHz; #Res BW 1.0 MHz; #VBW 3.0 MHz*; Span 40.00 MHz; Sweep 1.333 ms (20001 pts)
Middle Channel	Middle Channel
	
Mkr1 5.300 938 GHz 7.708 dBm; Ref 30.00 dBm; Center 5.30000 GHz; #Res BW 1.0 MHz; #VBW 3.0 MHz*; Span 40.00 MHz; Sweep 1.333 ms (20001 pts)	Mkr1 5.300 806 GHz 7.884 dBm; Ref 30.00 dBm; Center 5.30000 GHz; #Res BW 1.0 MHz; #VBW 3.0 MHz*; Span 40.00 MHz; Sweep 1.333 ms (20001 pts)
High Channel	High Channel
	
Mkr1 5.319 022 GHz 7.819 dBm; Ref 30.00 dBm; Center 5.32000 GHz; #Res BW 1.0 MHz; #VBW 3.0 MHz*; Span 40.00 MHz; Sweep 1.333 ms (20001 pts)	Mkr1 5.320 580 GHz 7.869 dBm; Ref 30.00 dBm; Center 5.32000 GHz; #Res BW 1.0 MHz; #VBW 3.0 MHz*; Span 40.00 MHz; Sweep 1.333 ms (20001 pts)

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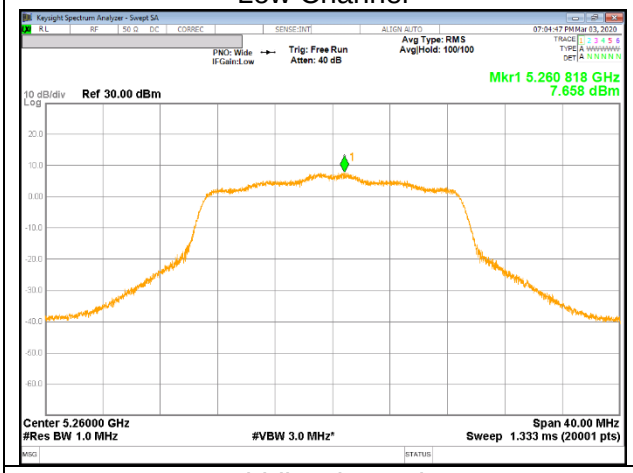
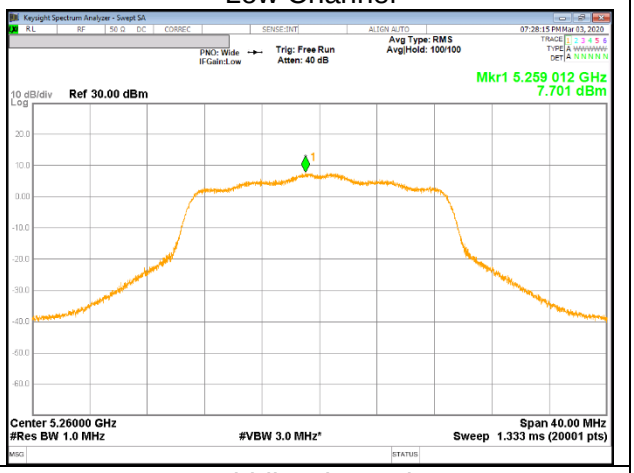
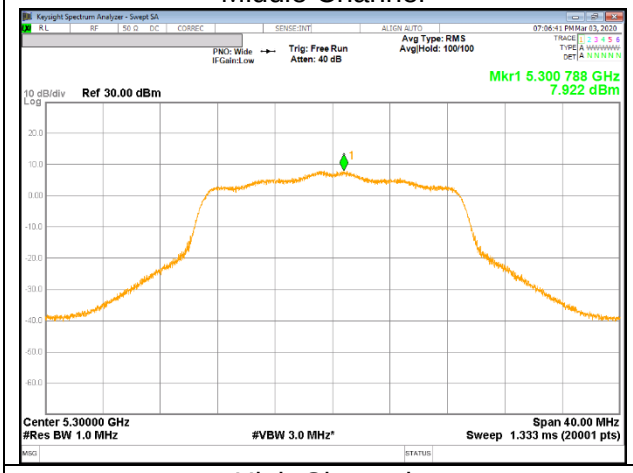
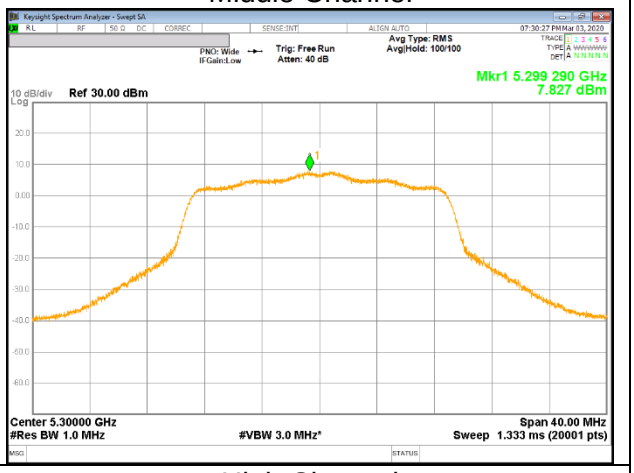
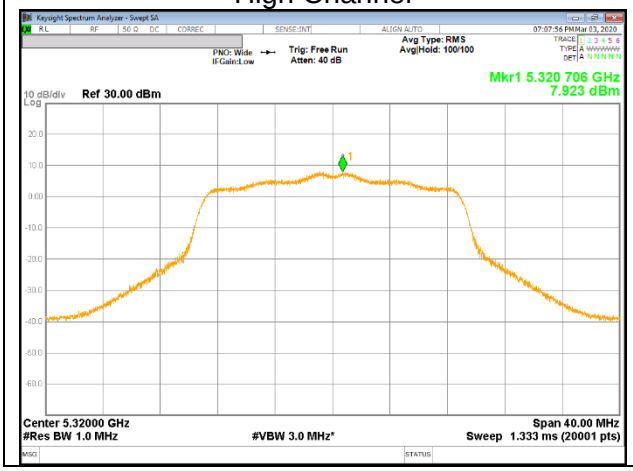
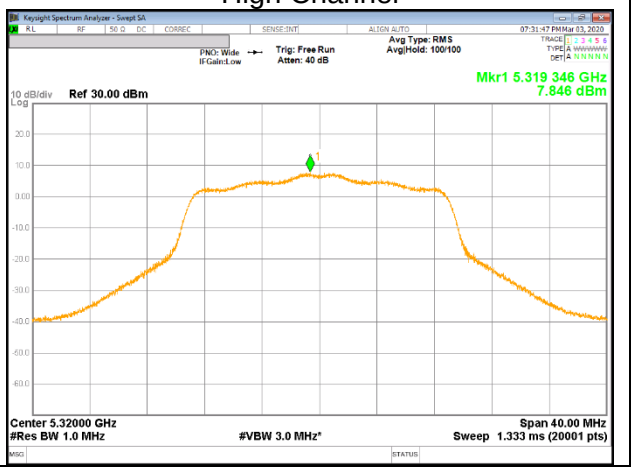
UNII 5.3 GHz IEEE 802.11n HT20 mode PSD

ANT1	ANT2
Low Channel	Low Channel
	
Middle Channel	Middle Channel
	
High Channel	High Channel
	

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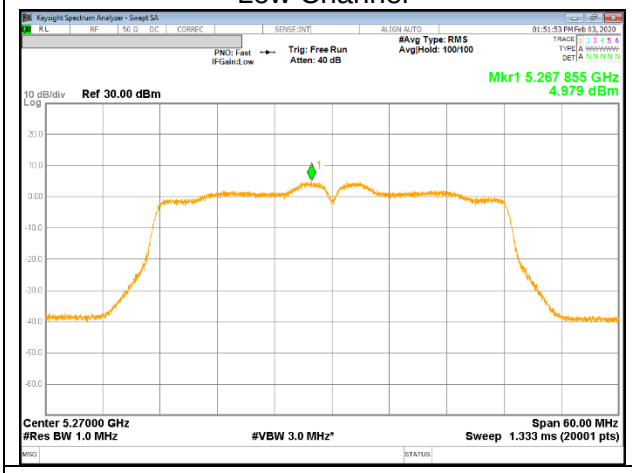
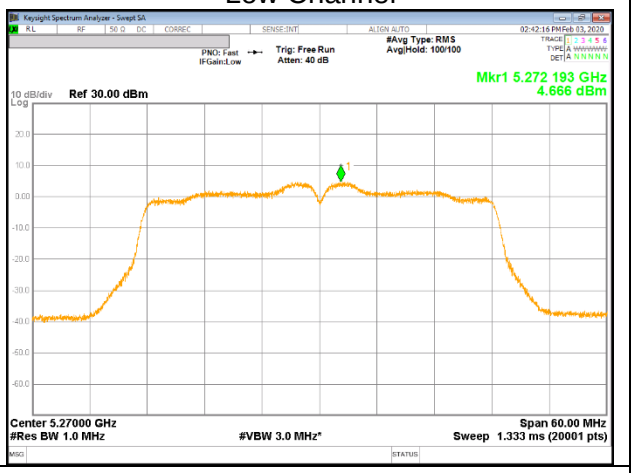
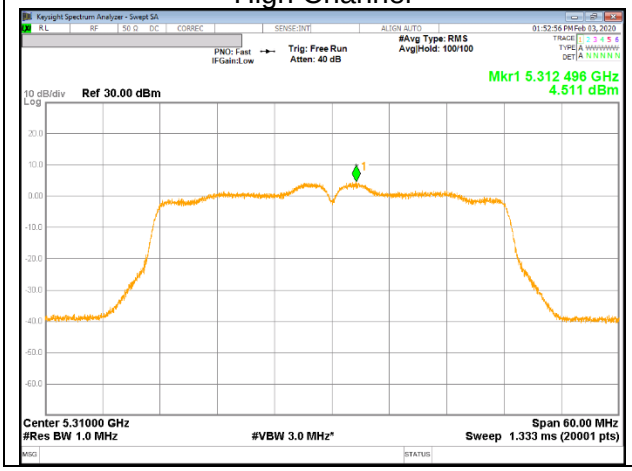
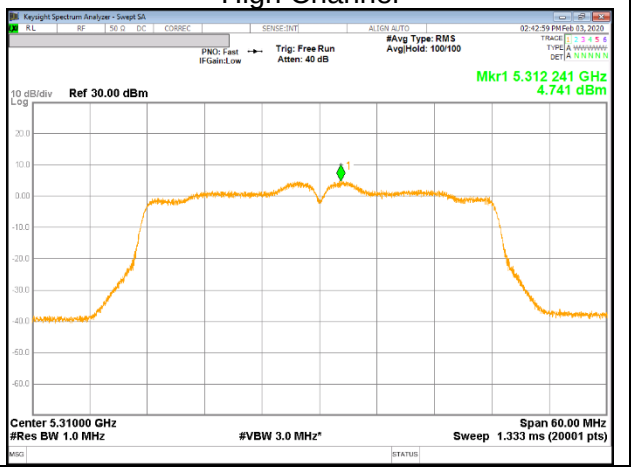
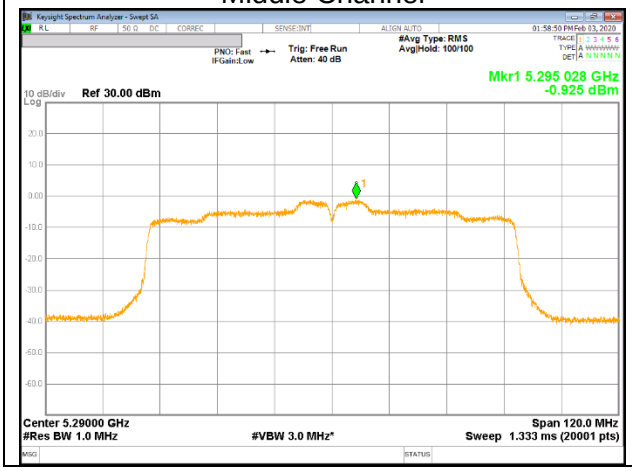
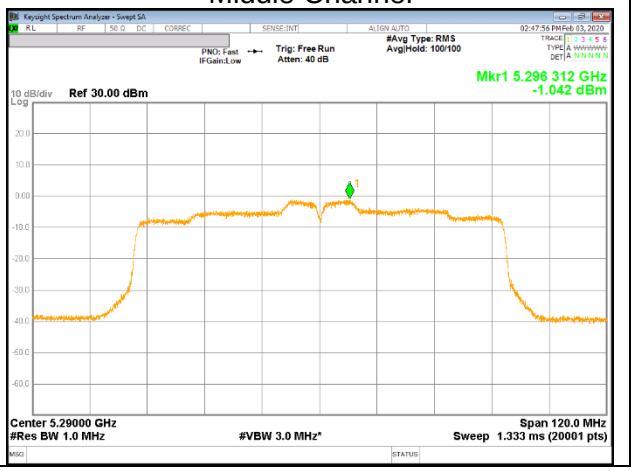
UNII 5.3 GHz IEEE 802.11n HT40 mode PSD

ANT1	ANT2
Low Channel	Low Channel
	
High Channel	High Channel
	

UNII 5.3 GHz IEEE 802.11ac VHT80 mode PSD

ANT1	ANT2
Middle Channel	Middle Channel
	

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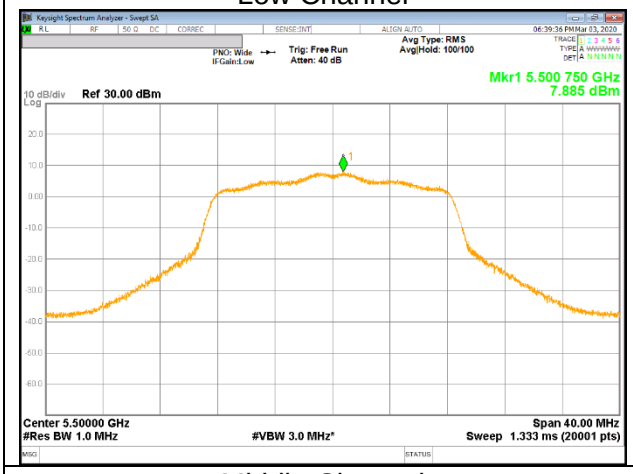
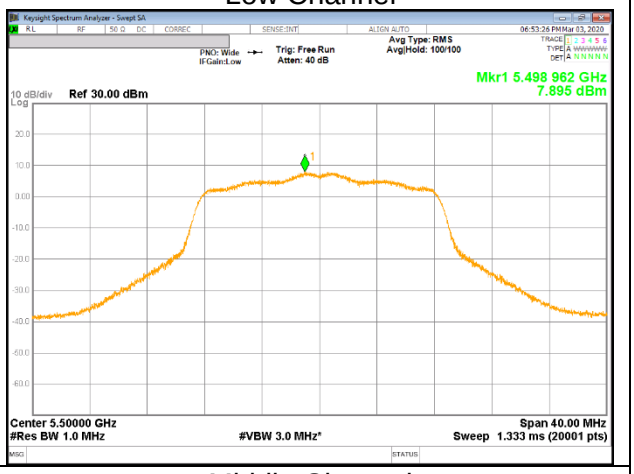
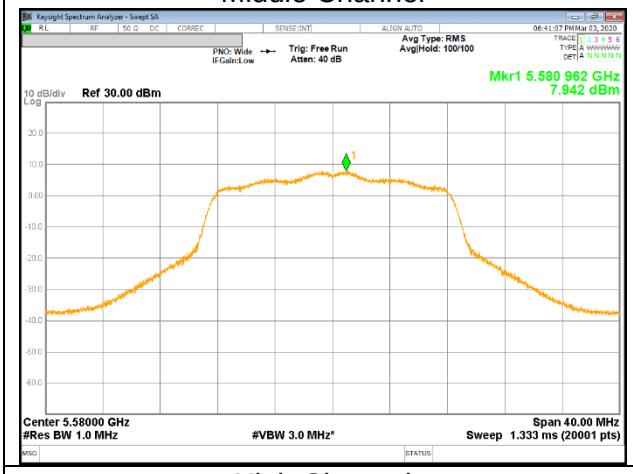
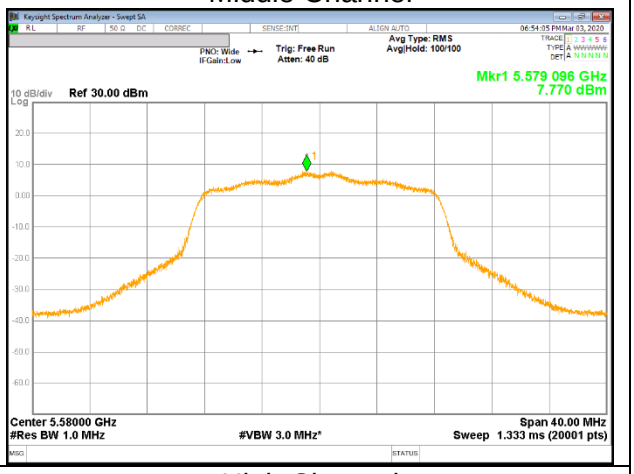
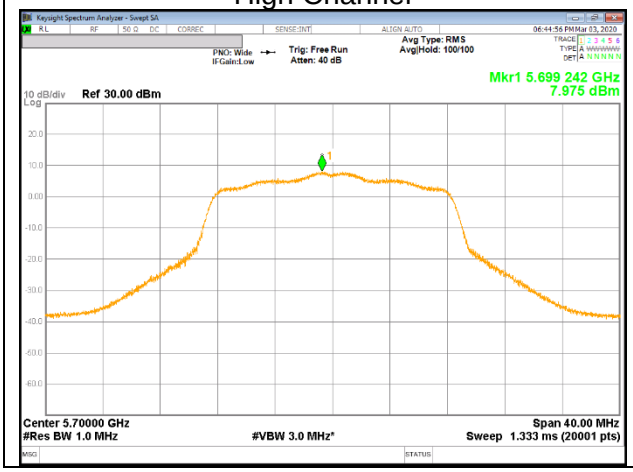
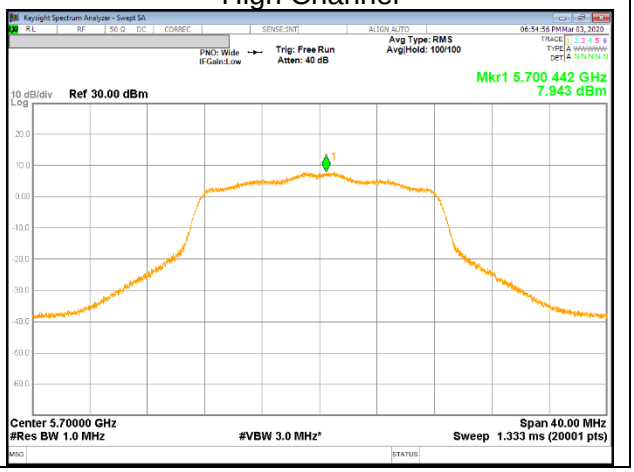
UNII 5.5 GHz IEEE 802.11a mode PSD

ANT1	ANT2
Low Channel	Low Channel
	
Middle Channel	Middle Channel
	
High Channel	High Channel
	

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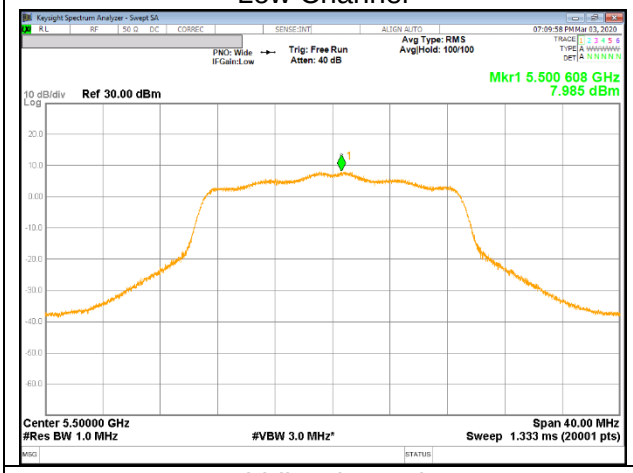
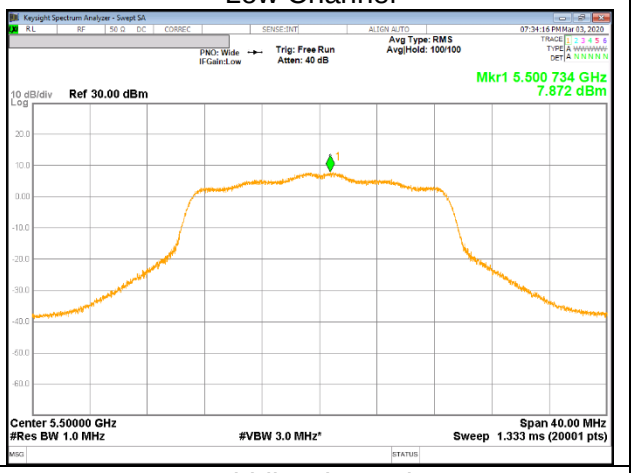
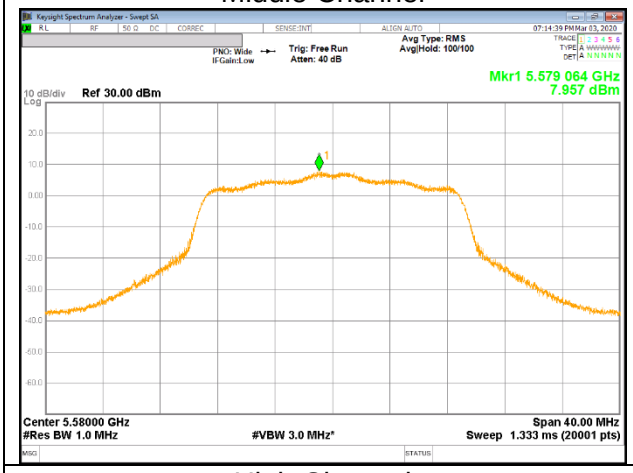
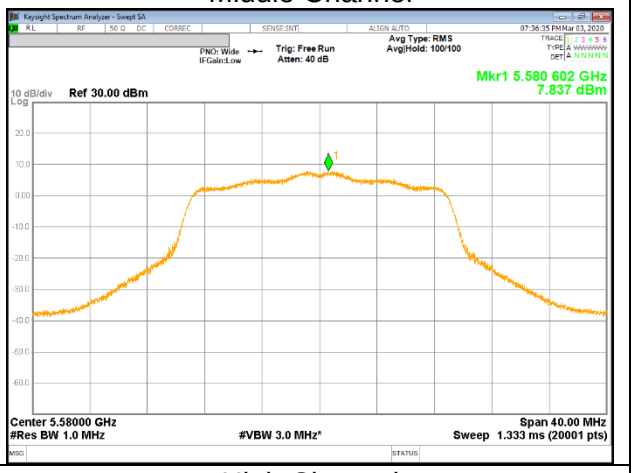
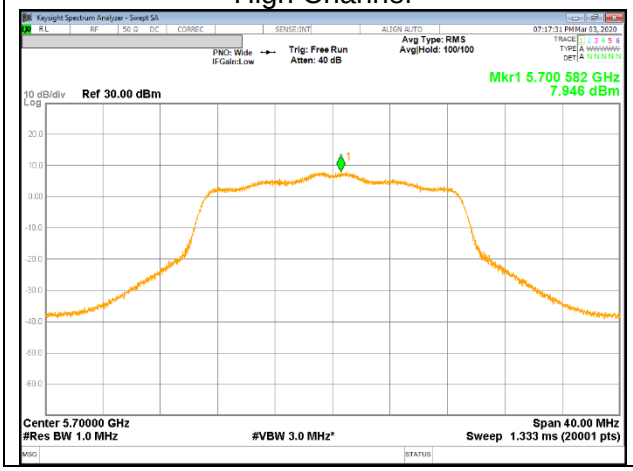
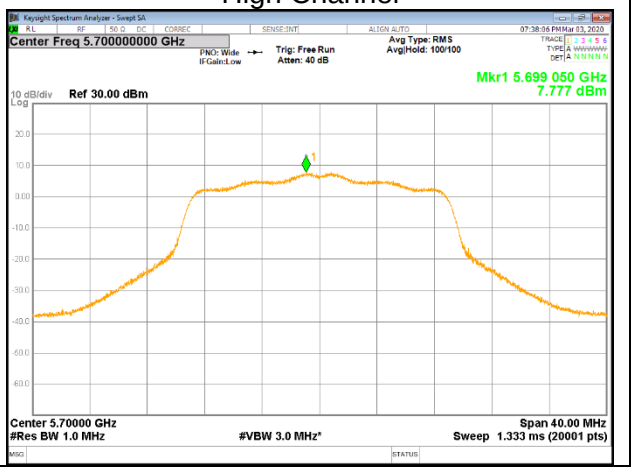
UNII 5.5 GHz IEEE 802.11n HT20 mode PSD

ANT1	ANT2
Low Channel	Low Channel
	
Middle Channel	Middle Channel
	
High Channel	High Channel
	

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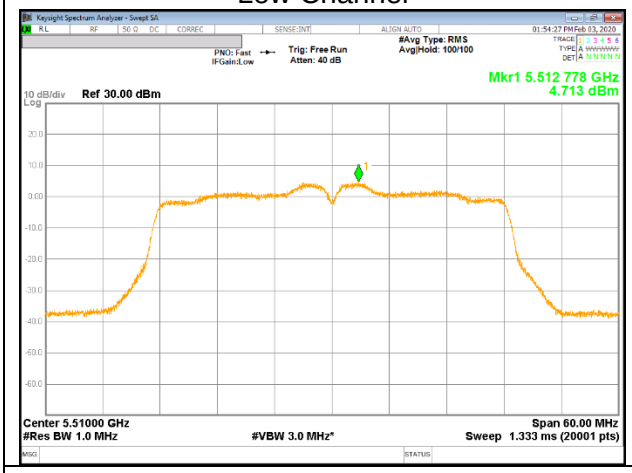
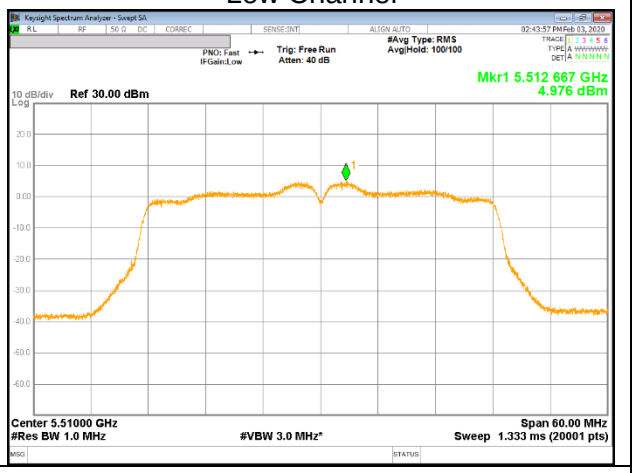
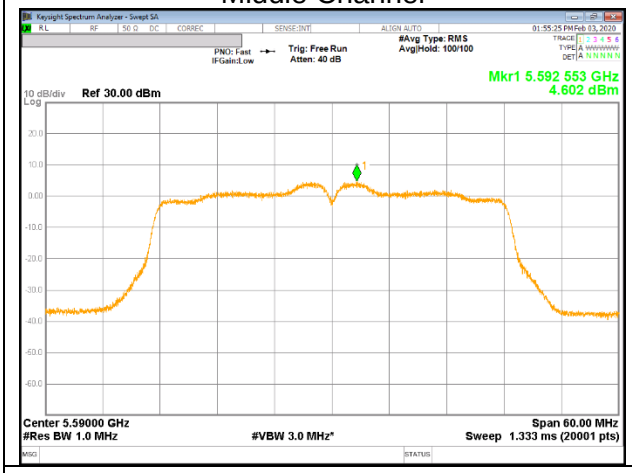
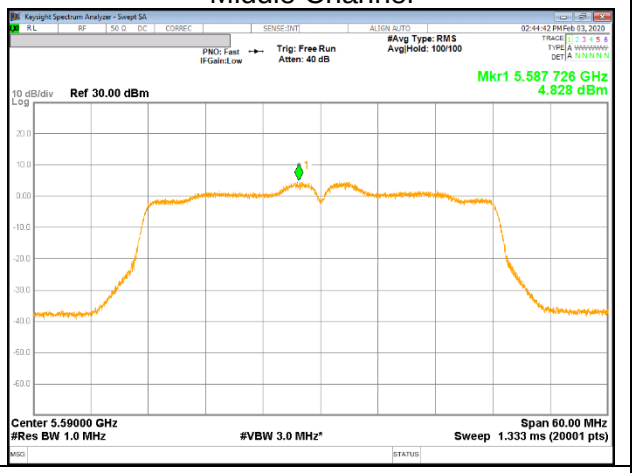
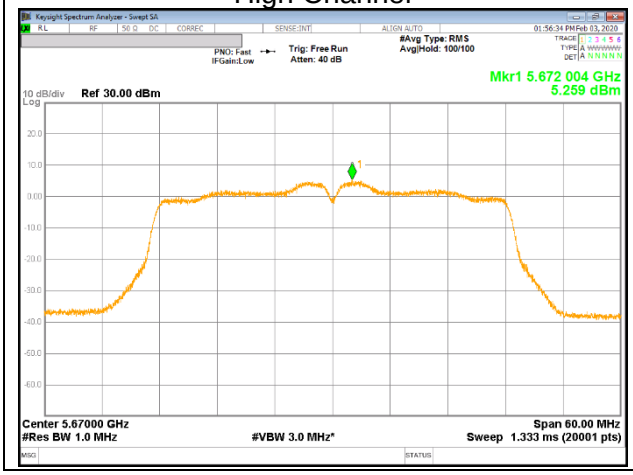
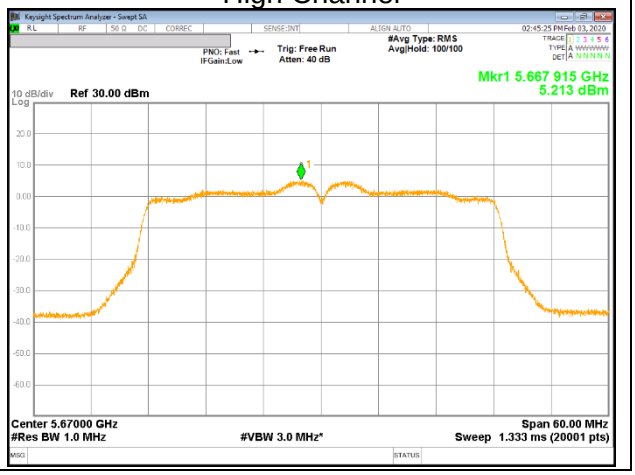
UNII 5.5 GHz IEEE 802.11n HT40 mode PSD

ANT1	ANT2
Low Channel	Low Channel
	
Middle Channel	Middle Channel
	
High Channel	High Channel
	

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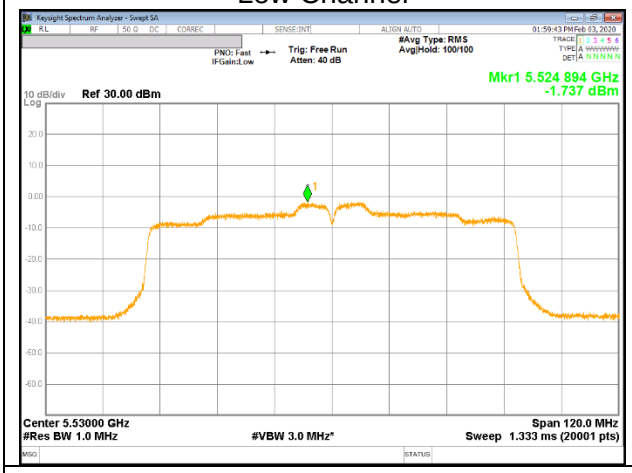
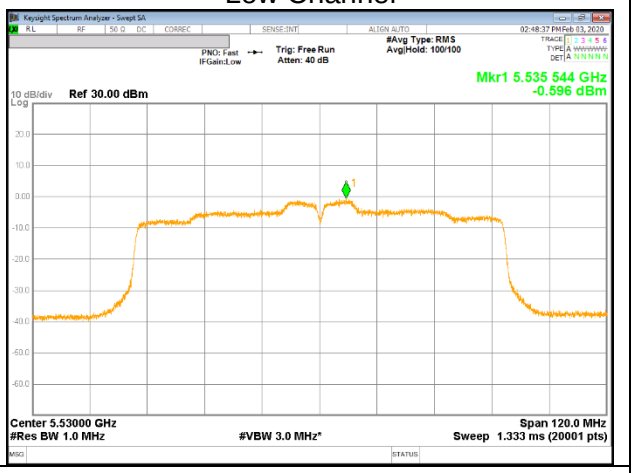
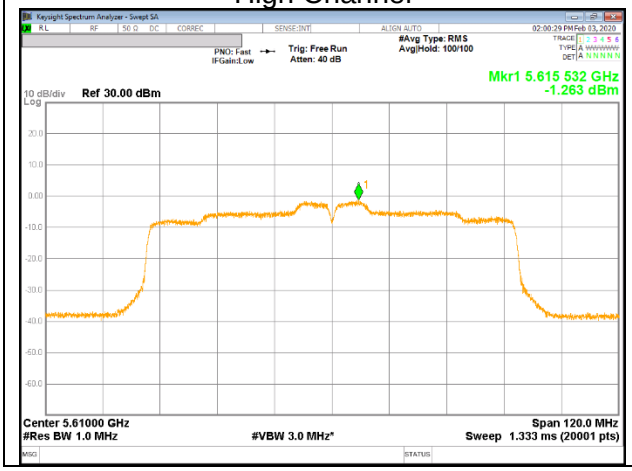
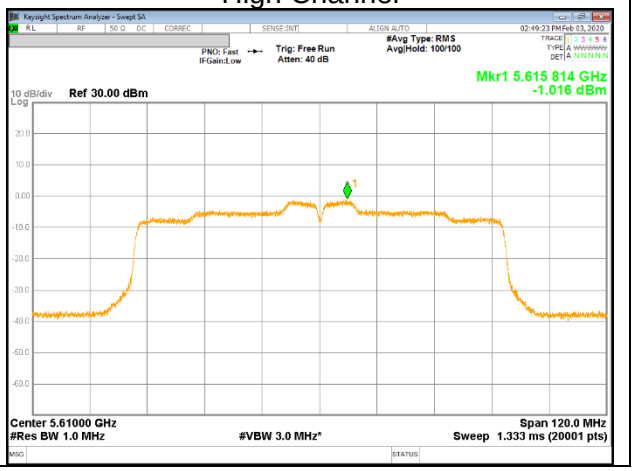
UNII 5.5 GHz IEEE 802.11ac VHT80 mode PSD

ANT1	ANT2
Low Channel	Low Channel
	
High Channel	High Channel
	

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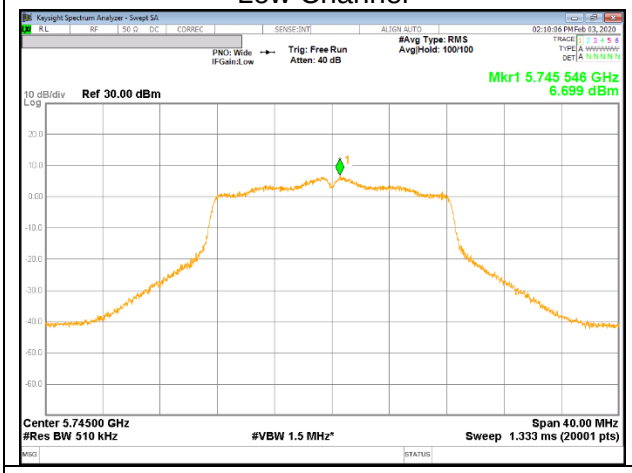
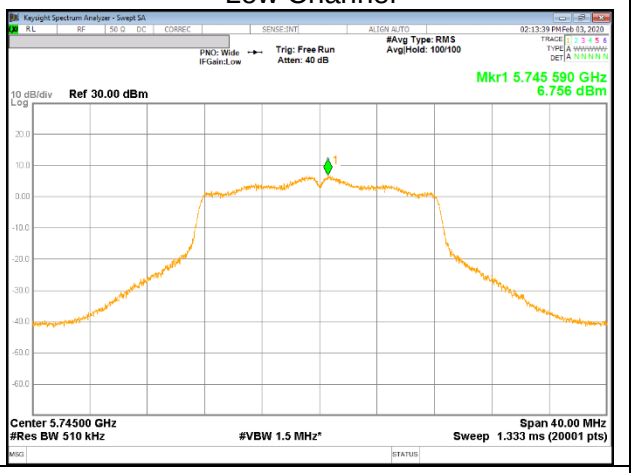
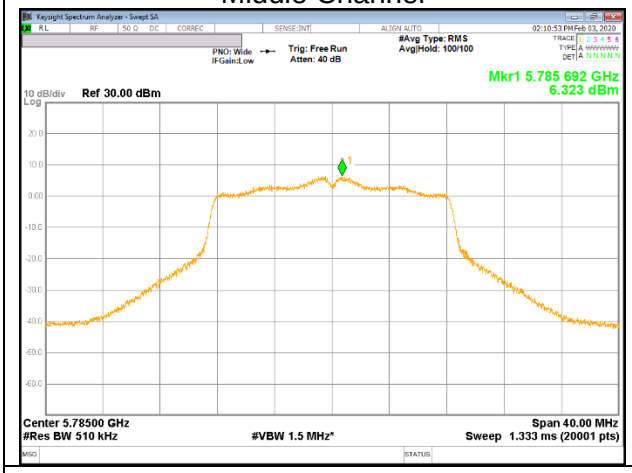
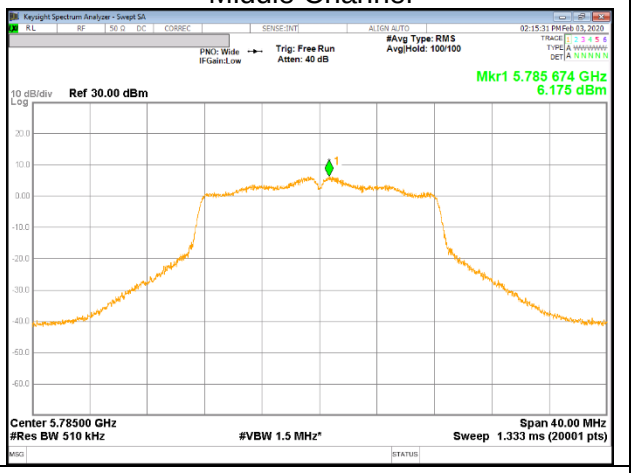
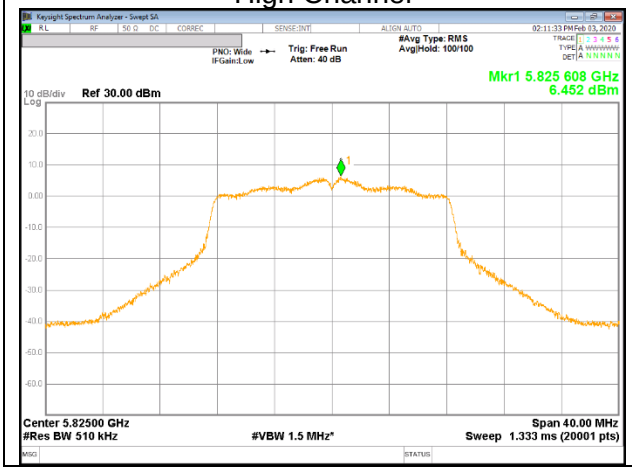
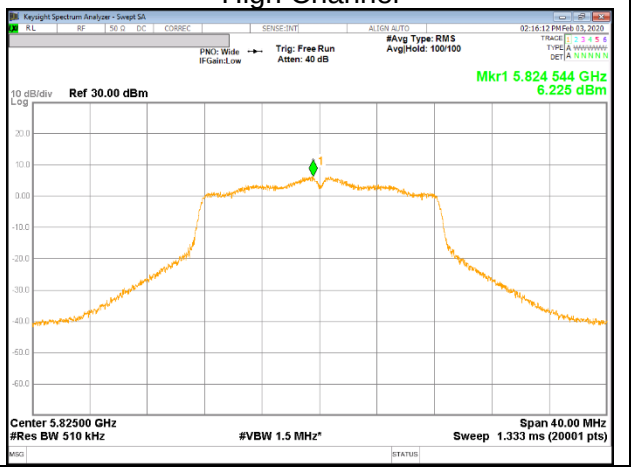
UNII 5.8 GHz IEEE 802.11a mode PSD

ANT1	ANT2
Low Channel	Low Channel
	
Middle Channel	Middle Channel
	
High Channel	High Channel
	

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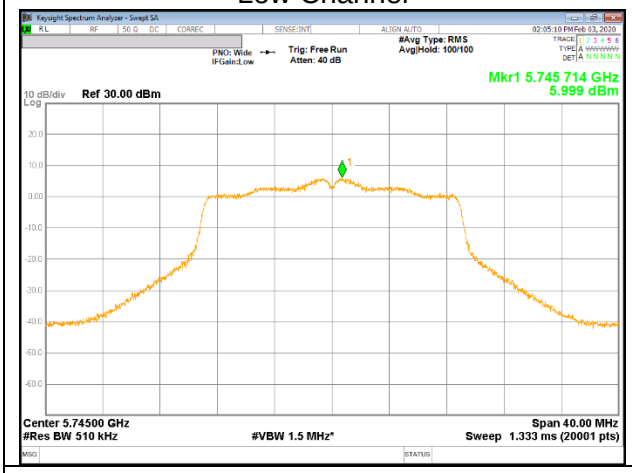
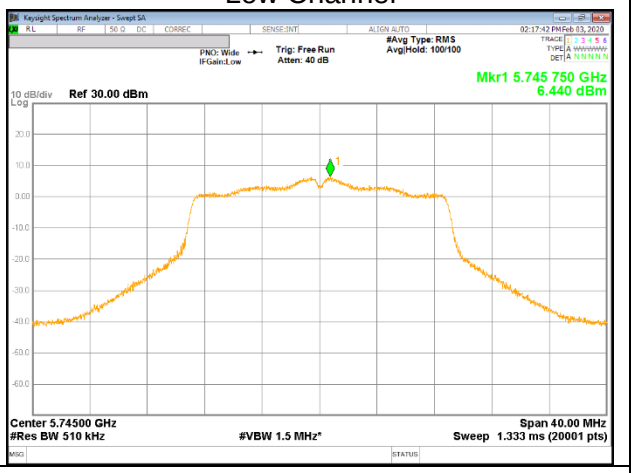
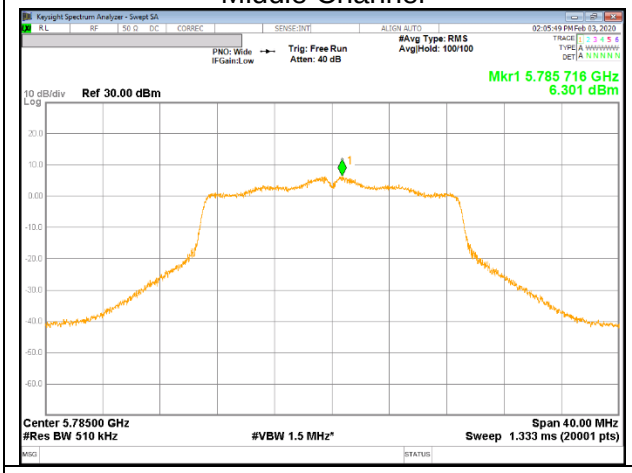
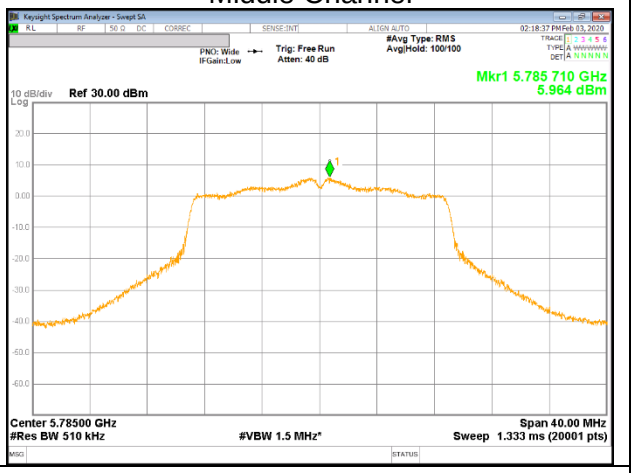
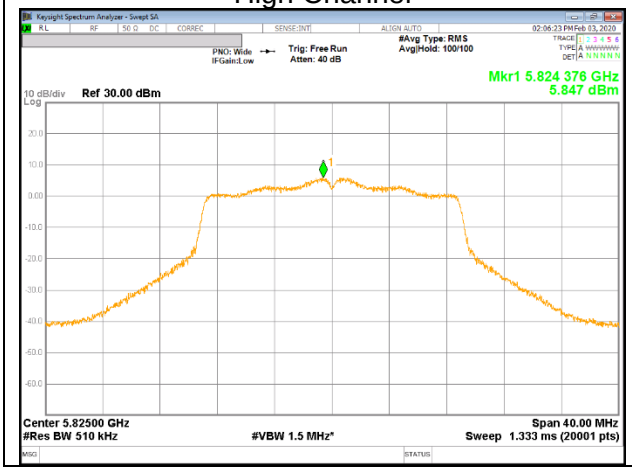
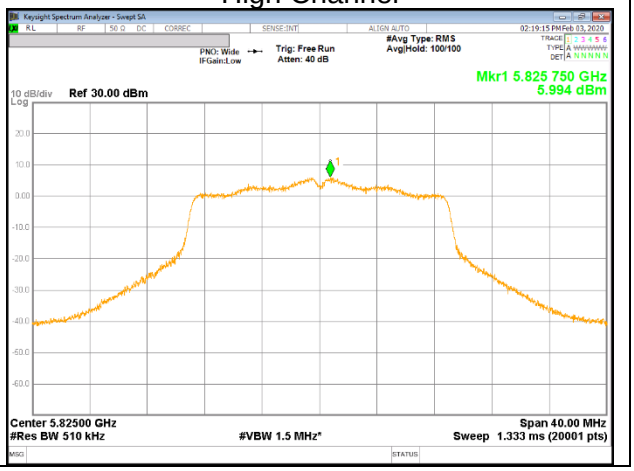
UNII 5.8 GHz IEEE 802.11n HT20 mode mode PSD

ANT1	ANT2
Low Channel	Low Channel
	
Middle Channel	Middle Channel
	
High Channel	High Channel
	

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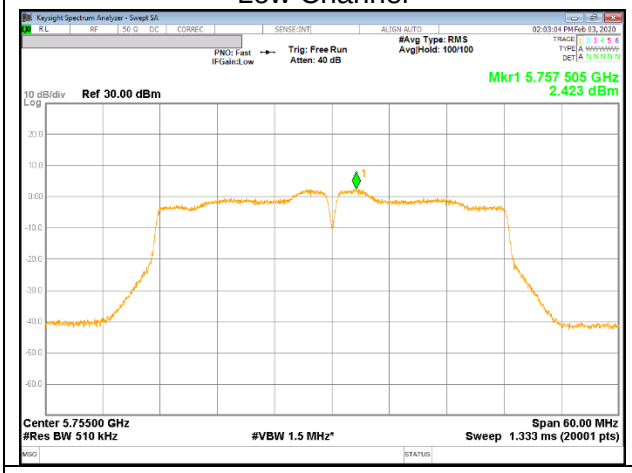
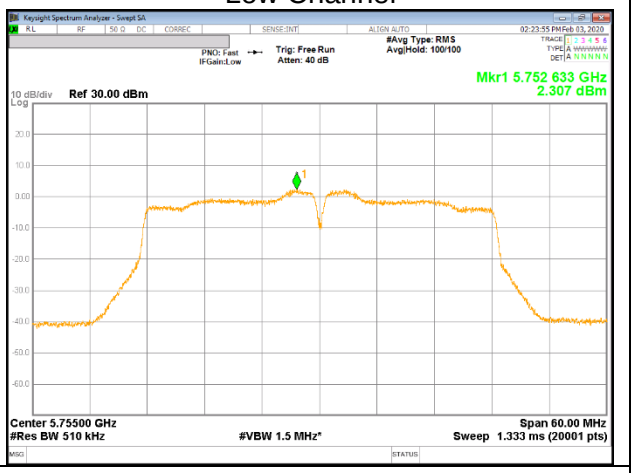
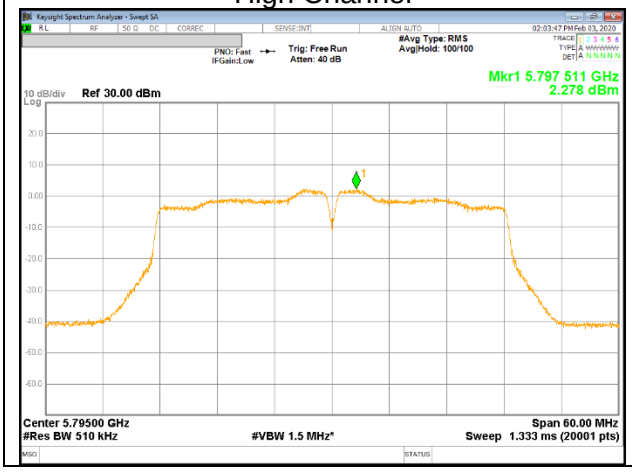
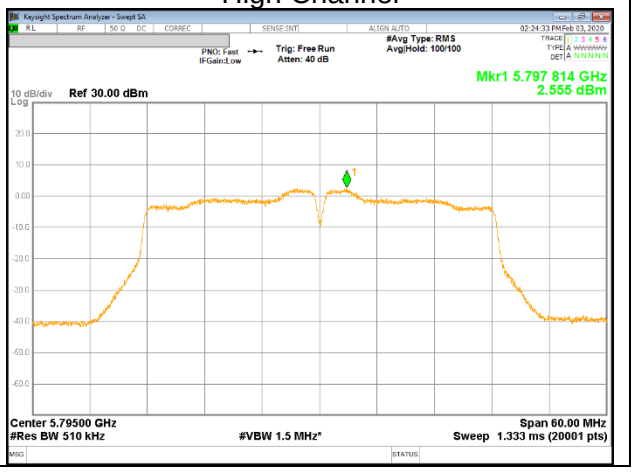
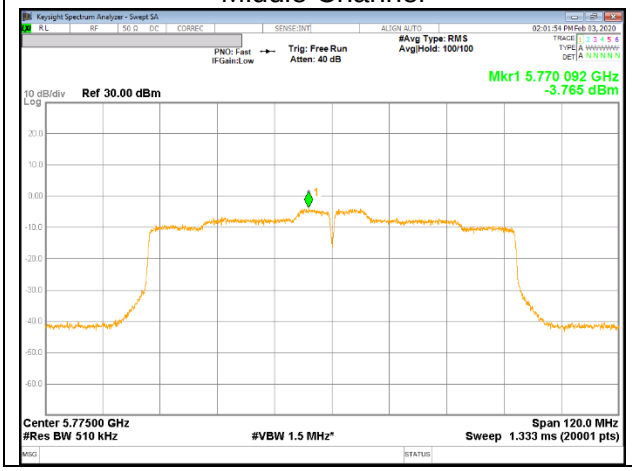
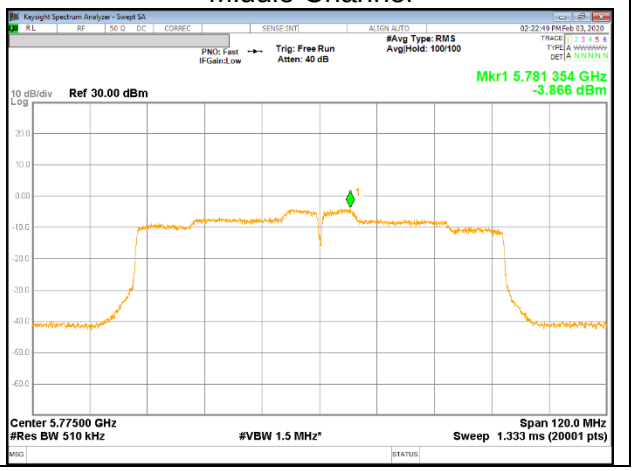
UNII 5.8 GHz IEEE 802.11n HT40 mode mode PSD

ANT1	ANT2
Low Channel	Low Channel
	
High Channel	High Channel
	

UNII 5.8 GHz IEEE 802.11ac VHT80 mode mode PSD

ANT1	ANT2
Middle Channel	Middle Channel
	

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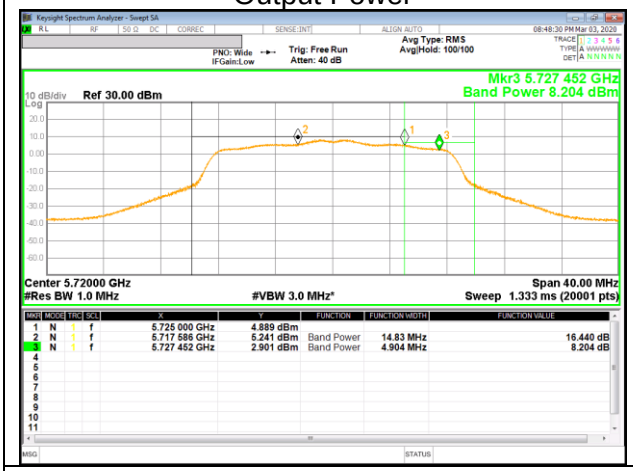
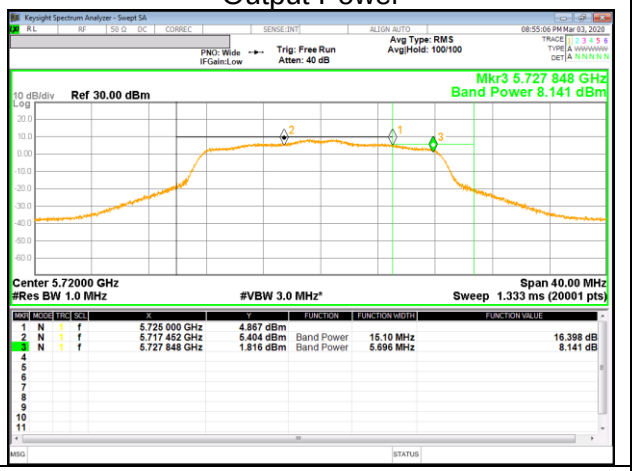
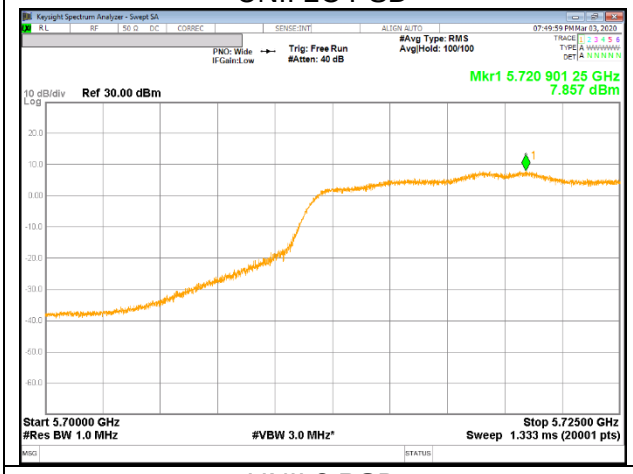
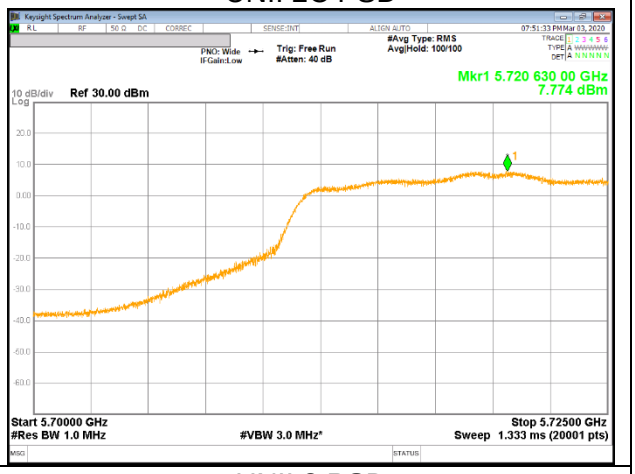
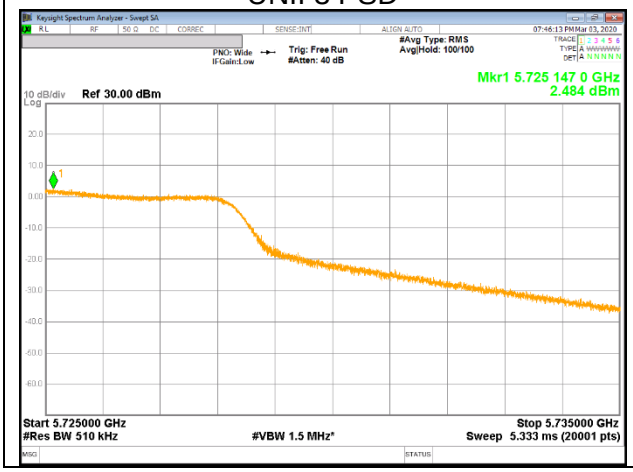
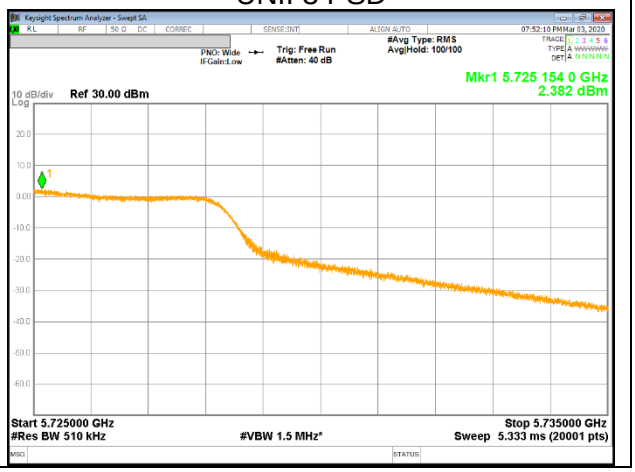
UNII Straddle Ch. IEEE 802.11a mode Ourput Power and PSD

ANT1	ANT2
Output Power	Output Power
	
UNII 2C PSD	UNII 2C PSD
	
UNII 3 PSD	UNII 3 PSD
	

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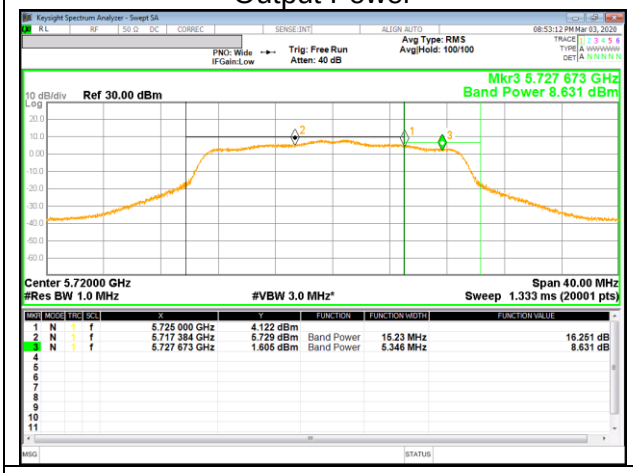
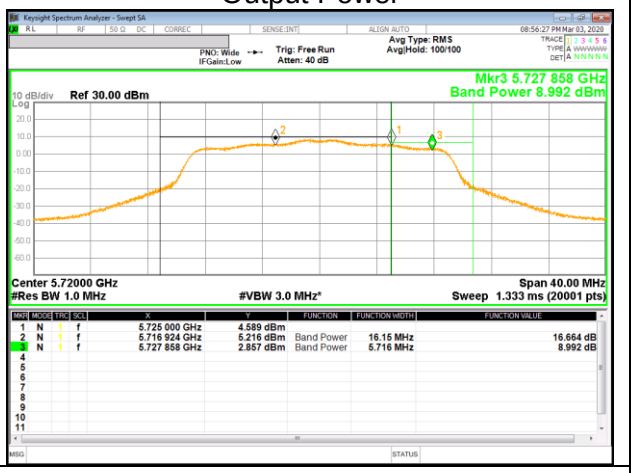
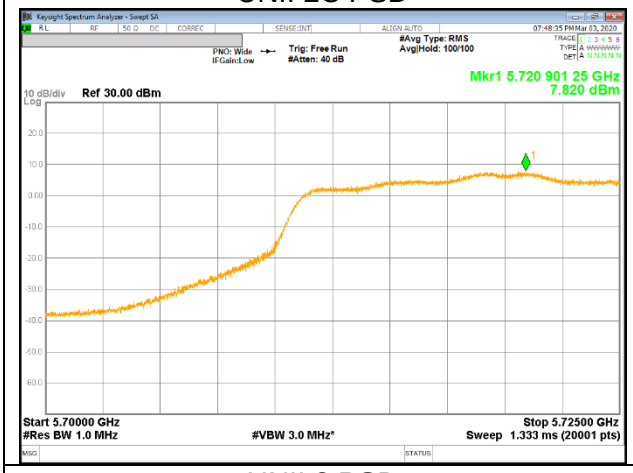
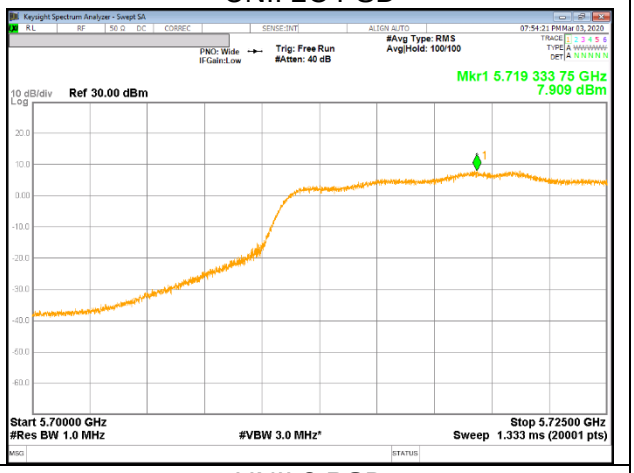
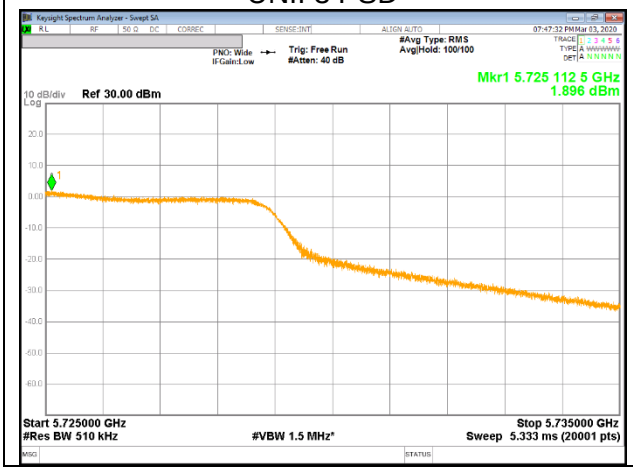
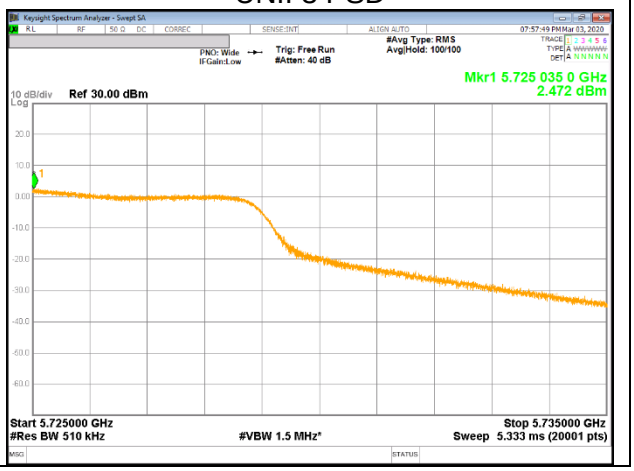
UNII Straddle Ch. IEEE 802.11n HT20 mode Ourput Power and PSD

ANT1	ANT2
Output Power	Output Power
	
UNII 2C PSD	UNII 2C PSD
	
UNII 3 PSD	UNII 3 PSD
	

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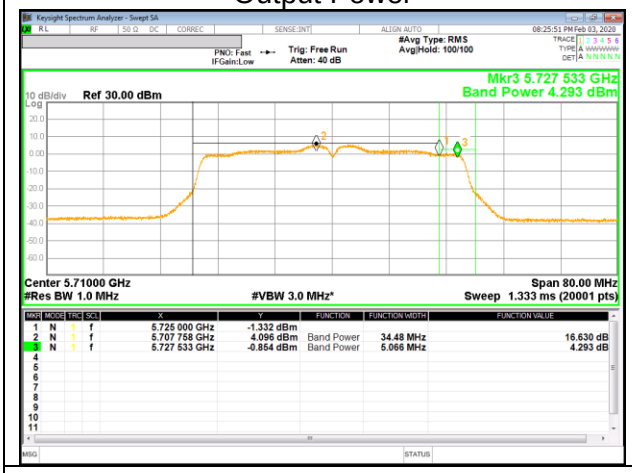
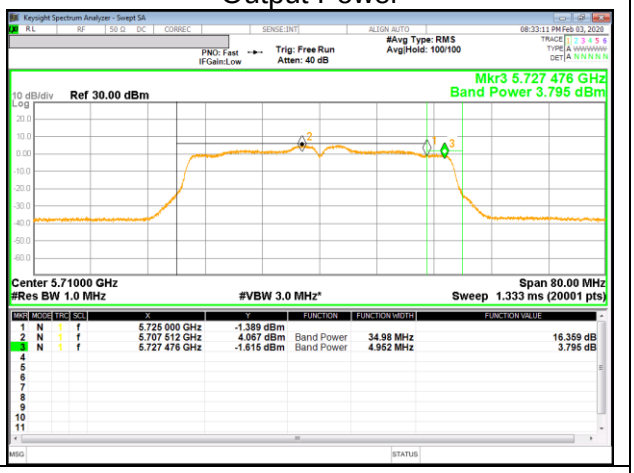
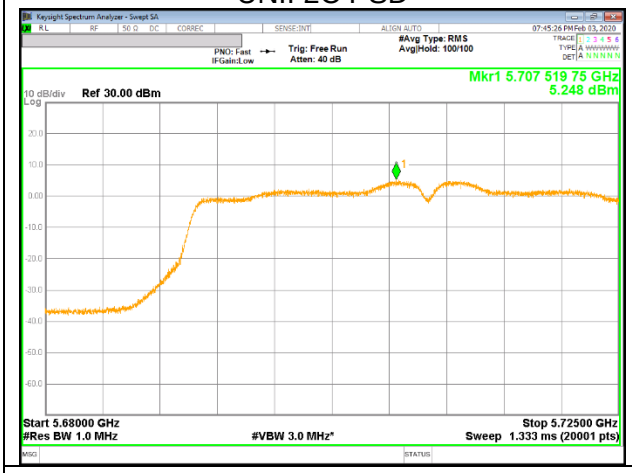
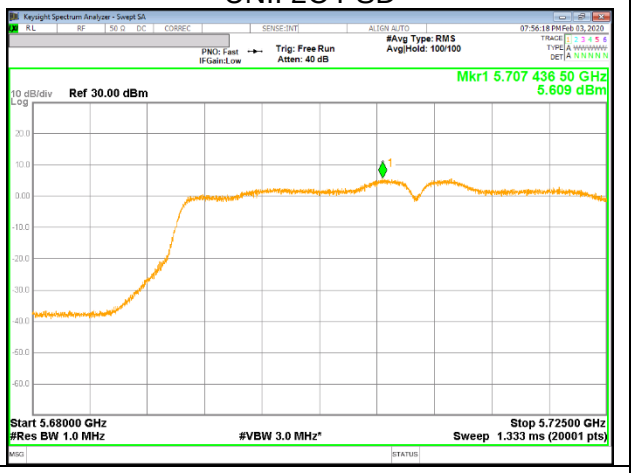
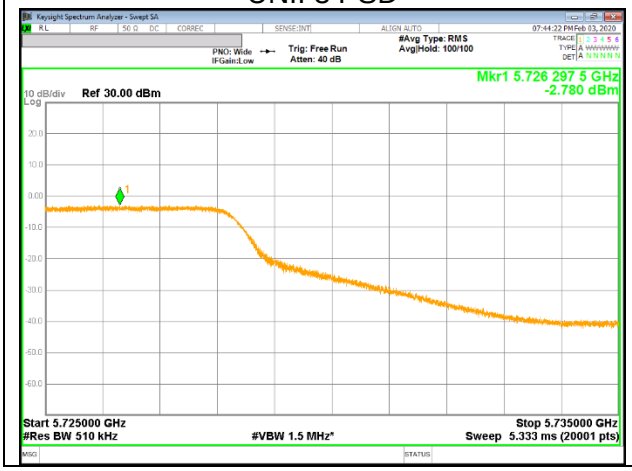
UNII Straddle Ch. IEEE 802.11n HT40 mode Ourput Power and PSD

ANT1	ANT2
Output Power	Output Power
	
UNII 2C PSD	UNII 2C PSD
	
UNII 3 PSD	UNII 3 PSD
	

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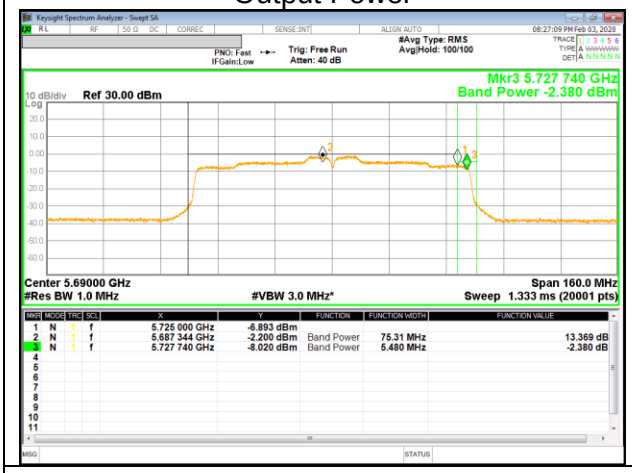
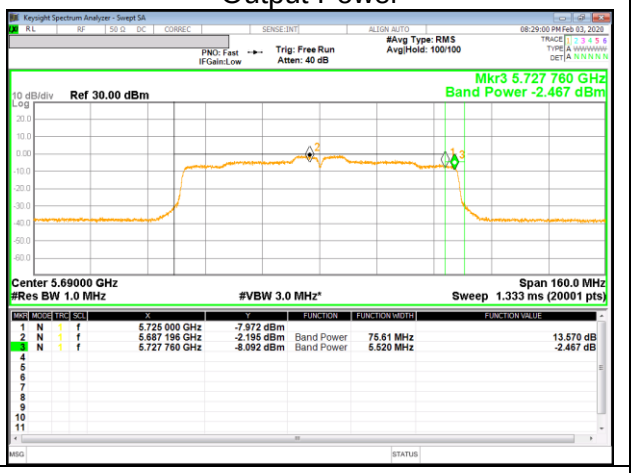
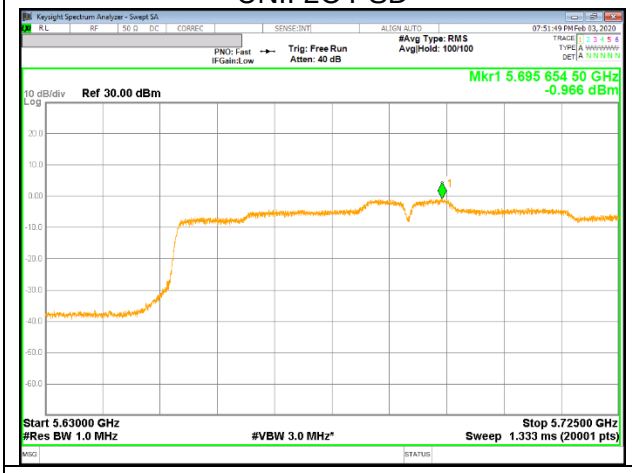
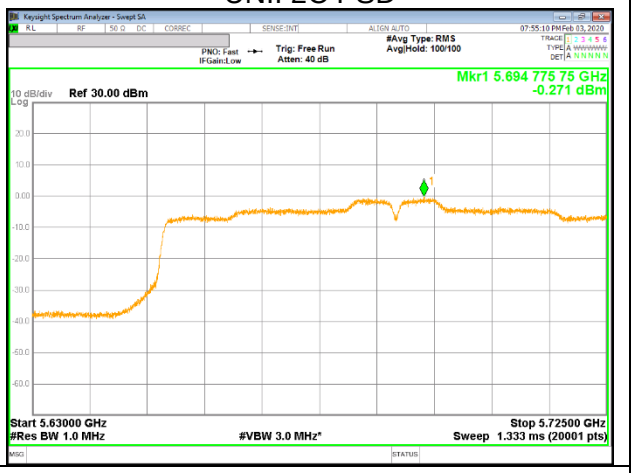
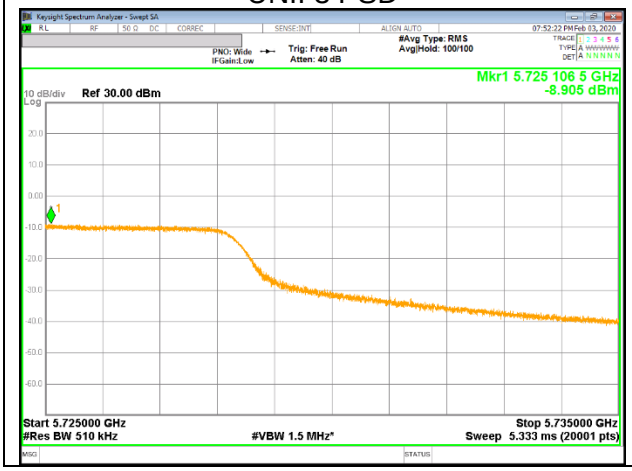
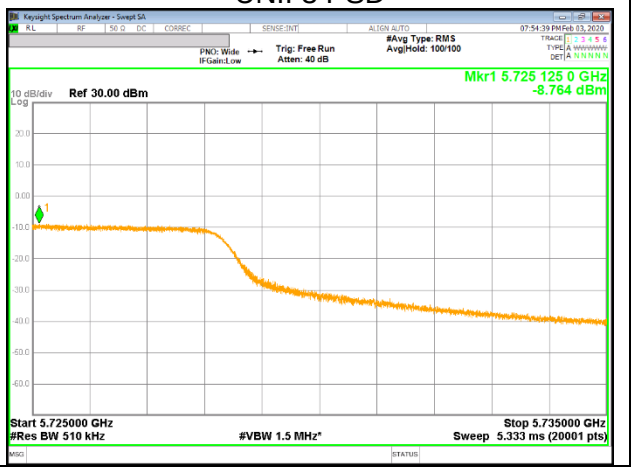
UNII Straddle Ch. IEEE 802.11ac VHT80 mode Ourput Power and PSD

ANT1	ANT2
Output Power	Output Power
	
UNII 2C PSD	UNII 2C PSD
	
UNII 3 PSD	UNII 3 PSD
	

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11. TRANSMITTER ABOVE 1 GHz

LIMITS

FCC §15.205 and §15.209

Limits for radiated disturbance of an intentional radiator		
Frequency range (MHz)	Limits (µV/m)	Measurement Distance (m)
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 paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. 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 ~ 12.52025	149.9 ~ 150.05	1645.5 ~ 1646.5	7.25 ~ 7.75	17.7 ~ 21.4
4.125 ~ 4.128	12.57675 ~ 12.57725	156.52475 ~ 156.52525	1660 ~ 1710	8.025 ~ 8.5	22.01 ~ 23.12
4.17725 ~ 4.17775	13.36 ~ 13.41	156.7 ~ 156.9	1718.8 ~ 1722.2	9.0 ~ 9.2	23.6 ~ 24.0
4.20725 ~ 4.20775	16.42 ~ 16.423	162.0125 ~ 167.17	2200 ~ 2300	9.3 ~ 9.5	31.2 ~ 31.8
6.215 ~ 6.218	16.69475 ~ 16.69525	167.72 ~ 173.2	2310 ~ 2390	10.6 ~ 12.7	36.43 ~ 36.5
6.26775 ~ 6.26825	16.80425 ~ 16.80475	240 ~ 285	2483.5 ~ 2500	13.25 ~ 13.4	Above 38.6
6.31175 ~ 6.31225	25.5 ~ 25.67	322 ~ 335.4	2655 ~ 2900		
8.291 ~ 8.294	37.5 ~ 38.25	399.90 ~ 410	3260 ~ 3267		
8.362 ~ 8.366	73 ~ 74.6	608 ~ 614	3332 ~ 3339		
8.37625 ~ 8.38675	74.8 ~ 75.2	960 ~ 1240	3345.8 ~ 3358		
			3600 ~ 4400		

▪ 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.

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FCC §15.407 (b)

(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 e.i.r.p. 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 e.i.r.p. 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 e.i.r.p. of −27 dBm/MHz.
(4) For transmitters operating in the 5.725-5.85 GHz band:

(i) All emissions shall be limited to a level of −27 dBm/MHz at 75 MHz or more above or below the band edge increasing linearly to 10 dBm/MHz at 25 MHz above or below the band edge, and from 25 MHz above or below the band edge increasing linearly to a level of 15.6 dBm/MHz at 5 MHz above or below the band edge, and from 5 MHz above or below the band edge increasing linearly to a level of 27 dBm/MHz at the band edge.

(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 §15.209. Further, any U-NII devices using an AC power line are required to comply also with the conducted limits set forth in §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.

Note

- Limit translation to field strength level (FCC §15.407)

E[dBuV/m] = EIRP[dBm] + 95.2 = -27dBm + 95.2 = 68.2dBuV/m

E[dBuV/m] = EIRP[dBm] + 95.2 = -17dBm + 95.2 = 78.2dBuV/m

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TEST PROCEDURE

The EUT is placed on a non-conducting table 80 cm above the ground plane for below 1GHz and 100 cm for above 1GHz. The antenna to EUT distance is 3 meters. The EUT is configured in accordance with ANSI C63.10. The EUT is set to transmit in a continuous mode.

For measurements below 1 GHz the resolution bandwidth is set to 100 kHz for peak detection measurements or 120 kHz for quasi-peak detection measurements. Peak detection is used unless otherwise noted as quasi-peak.

Reference to KDB 789033 D02 v02r01 UNII part G) 6) c) Method AD:
For measurements above 1 GHz the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 3 MHz for peak measurements and add duty cycle factor to the reading offset for average measurements.

Pre-scans to detect harmonic and spurious emissions, the resolution bandwidth is set to 1 MHz; the video bandwidth is set to 30 KHz for peak measurements.

The spectrum from 1GHz to 40 GHz is investigated with the transmitter set to the lowest, middle, and highest channels in each applicable band.
(From 30MHz to 1GHz, test was performed with the EUT set to transmit at the channel with highest output power)

The frequency range of interest is monitored at a fixed antenna height and EUT azimuth. The EUT is rotated through 360 degrees to maximize emissions received. The antenna is scanned from 1 to 4 meters above the ground plane to further maximize the emission. Measurements are made with the antenna polarized in both the vertical and the horizontal positions.

Note : Emission was pre-scanned from 9KHz to 30MHz; No emissions were detected which was at least 20dB below the specification limit (consider distance correction factor).
Per FCC part 15.31(o), test results were not reported.

Although these tests were performed other than open field test site, adequate comparison measurements were confirmed against 30 m open are test site.
Therefore sufficient tests were made to demonstrate that the alternative site produces results that correlate with the one of tests made in an open field based on KDB 414788.

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