

TEST DATA

8.4.3 Maximum Conducted Output Power – U-NII-2C band

FCC §15.407(a)

Test Mode : Set to Lowest channel, Middle channel and Highest channel, Straddle channel

802.11a mode_1TX

Channel	Frequency (MHz)	Measured conducted power (dBm)	Duty Factor (dB)	Maximum Conducted Power (dBm)	FCC Limit (dBm)
Lowest	5500	13.62	0.19	13.81	23.98
Middle	5600	13.77	0.19	13.96	23.98
Highest	5700	14.30	0.19	14.49	23.98
Straddle	5720	13.78	0.19	13.97	23.11

802.11n (20MHz) mode_1TX

Channel	Frequency (MHz)	Measured conducted power (dBm)	Duty Factor (dB)	Maximum Conducted Power (dBm)	FCC Limit (dBm)
Lowest	5500	13.46	0.21	13.67	23.98
Middle	5600	13.78	0.21	13.99	23.98
Highest	5700	14.14	0.21	14.35	23.98
Straddle	5720	13.51	0.21	13.72	23.25

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802.11n (20MHz) mode_2TX

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	Maximum Conducted Power (dBm)	FCC Limit (dBm)
		Ant 0	Ant 1		Total output power	
Lowest	5500	9.81	10.07	0.21	13.16	23.96
Middle	5600	10.1	10.29	0.21	13.42	23.98
Highest	5700	10.45	10.84	0.21	13.87	23.98
Straddle	5720	10.06	10.25	0.21	13.38	23.98

802.11n (40MHz) mode_1TX

Channel	Frequency (MHz)	Measured conducted power (dBm)	Duty Factor (dB)	Maximum Conducted Power (dBm)	FCC Limit (dBm)
Lowest	5510	13.2	0.40	13.60	23.98
Middle	5590	13.36	0.40	13.76	23.98
Highest	5670	13.03	0.40	13.43	23.98
Straddle	5710	13.53	0.40	13.93	23.98

802.11n (40MHz) mode_2TX

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	Maximum Conducted Power (dBm)	FCC Limit (dBm)
		Ant 0	Ant 1		Total output power	
Lowest	5510	10.37	10.58	0.40	13.89	23.98
Middle	5590	10.48	10.66	0.40	13.98	23.98
Highest	5670	10.02	10.19	0.40	13.52	23.98
Straddle	5710	10.77	10.93	0.40	14.26	23.98

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802.11ac (20MHz) mode – 1TX

Channel	Frequency (MHz)	Measured conducted power (dBm)	Duty Factor (dB)	Maximum Conducted Power (dBm)	FCC Limit (dBm)
Lowest	5500	13.55	0.20	13.75	23.98
Middle	5600	13.73	0.20	13.93	23.98
Highest	5700	14.05	0.20	14.25	23.98
Straddle	5720	13.50	0.20	13.70	22.43

802.11ac (20MHz) mode_2TX

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	Maximum Conducted Power (dBm)	FCC Limit (dBm)
		Ant 0	Ant 1		Total output power	
Lowest	5500	9.69	9.76	0.20	12.94	23.98
Middle	5600	9.85	9.95	0.20	13.11	23.98
Highest	5700	10.24	10.58	0.20	13.62	23.98
Straddle	5720	9.65	9.94	0.20	13.01	23.98

802.11ac (40MHz) mode_1TX

Channel	Frequency (MHz)	Measured conducted power (dBm)	Duty Factor (dB)	Maximum Conducted Power (dBm)	FCC Limit (dBm)
Lowest	5510	13.13	0.41	13.54	23.98
Middle	5590	13.16	0.41	13.57	23.98
Highest	5670	12.80	0.41	13.21	23.98
Straddle	5710	13.45	0.41	13.86	23.98

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802.11ac (40MHz) mode_2TX

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	Maximum Conducted Power (dBm)	FCC Limit (dBm)
		Ant 0	Ant 1		Total output power	
Lowest	5510	9.13	9.40	0.41	12.69	23.98
Middle	5590	9.37	9.63	0.41	12.92	23.98
Highest	5670	9.02	9.20	0.41	12.53	23.98
Straddle	5710	9.58	9.89	0.41	13.16	23.98

802.11ac (80MHz) mode_1TX

Channel	Frequency (MHz)	Measured conducted power (dBm)	Duty Factor (dB)	Maximum Conducted Power (dBm)	FCC Limit (dBm)
Lowest	5530	12.08	0.77	12.85	23.98
Highest	5610	12.13	0.77	12.90	23.98
Straddle	5690	11.42	0.77	12.19	23.98

802.11ac (80MHz) mode_2TX

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	Maximum Conducted Power (dBm)	FCC Limit (dBm)
		Ant 0	Ant 1		Total output power	
Lowest	5530	7.51	7.73	0.77	11.40	23.98
Highest	5610	7.63	7.84	0.77	11.52	23.98
Straddle	5690	7.04	7.21	0.77	10.91	23.98

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Note:

1. Maximum Conducted (average) Power = Measured conducted power + Duty Factor
2. Total output power = $10 \log [10^{\{(Chain\ 0\ Power + duty\ factor)/10\}} + 10^{\{(Chain\ 1\ Power + duty\ factor)/10\}} + 10^{\{(Chain\ 2\ Power + duty\ factor)/10\}} + 10^{\{(Chain\ 3\ Power + duty\ factor)/10\}}]$
3. For CDD transmission, directional gain is. **2.8 dBi**.
For MIMO transmission, directional gain is **2.8 dBi**.
Directional gain was calculated according to KDB662911 D01 Multiple Transmitter Output v02r01.
For power measurements on IEEE 802.11 devices employing CDD, directional gain is as follows,
Directional gain = G_{ANT} + Array Gain = 2.8 dBi + 0 dB = 2.8 dBi.
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;
Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less, for 20-MHz channel widths with $N_{ANT} \geq 5$.
For power measurements on all devices employing MIMO, directional gain is as follows,
Directional gain = $G_{ANT} + 10 \log(N_{ANT}/N_{SS})$ dBi = 2.8 dBi + $10 \log(2/2)$ dB = 2.8 dBi.
where N_{SS} = the number of independent spatial streams of data and G_{ANT} is the antenna gain in dBi
For this device, MIMO mode means SM-MIMO(Spatial Multiplexing) transmission and $N_{SS}=2$.
4. FCC conducted output power limit = 250 mW or 11 dBm + $10 \log B$, whichever power is less.
 B is the 26 dB emission bandwidth in megahertz.
5. The following equation was used for spectrum offset:
Spectrum offset (dB) = Attenuator (dB) + Cable Loss (dB) + SMA Type Connector Loss (dB)
6. A TPC mechanism is not required for systems with an e.i.r.p. of less than 500 mW (26.99dBm) for FCC.

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8.4.4 Maximum Conducted Output Power – U-NII-3 band

FCC §15.407(a)

Test Mode : Set to Straddle channel, Lowest channel, Middle channel and Highest channel

802.11a mode_1TX

Channel	Frequency (MHz)	Measured conducted power (dBm)	Duty Factor (dB)	Maximum Conducted Power (dBm)	FCC Limit (dBm)
Straddle	5720	5.98	0.19	6.17	30.00
Lowest	5745	13.45	0.19	13.64	30.00
Middle	5785	13.42	0.19	13.61	30.00
Highest	5825	14.35	0.19	14.54	30.00

802.11n (20MHz) mode_1TX

Channel	Frequency (MHz)	Measured conducted power (dBm)	Duty Factor (dB)	Maximum Conducted Power (dBm)	FCC Limit (dBm)
Straddle	5720	6.23	0.22	6.45	30.00
Lowest	5745	13.41	0.22	13.63	30.00
Middle	5785	13.19	0.22	13.41	30.00
Highest	5825	14.14	0.22	14.36	30.00

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802.11n (20MHz) mode_2TX

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	Maximum Conducted Power (dBm)	FCC Limit (dBm)
		Ant 0	Ant 1		Total output power	
Straddle	5720	2.55	2.83	0.22	5.93	30.00
Lowest	5745	9.88	10.1	0.22	13.22	30.00
Middle	5785	9.95	10.00	0.22	13.21	30.00
Highest	5820	10.47	11.06	0.22	14.01	30.00

802.11n (40MHz) mode_1TX

Channel	Frequency (MHz)	Measured conducted power (dBm)	Duty Factor (dB)	Maximum Conducted Power (dBm)	FCC Limit (dBm)
Straddle	5710	1.81	0.40	2.21	30.00
Lowest	5755	13.01	0.40	13.41	30.00
Highest	5795	13.12	0.40	13.52	30.00

802.11n (40MHz) mode_2TX

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	Maximum Conducted Power (dBm)	FCC Limit (dBm)
		Ant 0	Ant 1		Total output power	
Straddle	5710	-0.72	-0.91	0.40	2.60	30.00
Lowest	5755	10.15	10.4	0.40	13.69	30.00
Highest	5795	10.24	10.53	0.40	13.80	30.00

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802.11ac (20MHz) mode_1TX

Channel	Frequency (MHz)	Measured conducted power (dBm)	Duty Factor (dB)	Maximum Conducted Power (dBm)	FCC Limit (dBm)
Straddle	5720	6.25	0.20	6.45	30.00
Lowest	5745	13.44	0.20	13.64	30.00
Middle	5785	13.17	0.20	13.37	30.00
Highest	5825	14.12	0.20	14.32	30.00

802.11ac (20MHz) mode_2TX

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	Maximum Conducted Power (dBm)	FCC Limit (dBm)
		Ant 0	Ant 1		Total output power	
Straddle	5720	2.37	2.54	0.20	5.67	30.00
Lowest	5745	9.44	9.79	0.20	12.83	30.00
Middle	5785	9.37	9.64	0.20	12.72	30.00
Highest	5825	10.09	10.59	0.20	13.56	30.00

802.11ac (40MHz) mode_1TX

Channel	Frequency (MHz)	Measured conducted power (dBm)	Duty Factor (dB)	Maximum Conducted Power (dBm)	FCC Limit (dBm)
Straddle	5710	1.78	0.40	2.18	30.00
Lowest	5755	13.06	0.40	13.46	30.00
Highest	5795	13.17	0.40	13.57	30.00

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802.11ac (40MHz) mode_2TX

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	Maximum Conducted Power (dBm)	FCC Limit (dBm)
		Ant 0	Ant 1		Total output power	
Straddle	5710	-1.93	-1.71	0.40	1.59	30.00
Lowest	5755	9.05	9.33	0.40	12.60	30.00
Highest	5795	9.31	9.58	0.40	12.86	30.00

802.11ac (80MHz) mode_1TX

Channel	Frequency (MHz)	Measured conducted power (dBm)	Duty Factor (dB)	Maximum Conducted Power (dBm)	FCC Limit (dBm)
Straddle	5690	-2.98	0.79	-2.19	30.00
Middle	5775	7.39	0.79	8.18	30.00

802.11ac (80MHz) mode_2TX

Channel	Frequency (MHz)	Measured conducted power (dBm)		Duty Factor (dB)	Maximum Conducted Power (dBm)	FCC Limit (dBm)
		Ant 0	Ant 1		Total output power	
Straddle	5690	-7.17	-7.05	0.79	-3.31	30.00
Middle	5775	7.46	7.52	0.79	11.29	30.00

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Note:

1. Maximum Conducted (average) Power = Measured conducted power + Duty Factor
2. Total output power = $10 \log [10^{\{(Chain\ 0\ Power + duty\ factor)/10\}} + 10^{\{(Chain\ 1\ Power + duty\ factor)/10\}} + 10^{\{(Chain\ 2\ Power + duty\ factor)/10\}} + 10^{\{(Chain\ 3\ Power + duty\ factor)/10\}}]$
3. For CDD transmission, directional gain is. **2.8 dBi**.
For MIMO transmission, directional gain is **2.8 dBi**.
Directional gain was calculated according to KDB662911 D01 Multiple Transmitter Output v02r01.
For power measurements on IEEE 802.11 devices employing CDD, directional gain is as follows,
Directional gain = G_{ANT} + Array Gain = 2.8 dBi + 0 dB = 2.8 dBi.
Array Gain = 0 dB (i.e., no array gain) for $N_{ANT} \leq 4$;
Array Gain = 0 dB (i.e., no array gain) for channel widths ≥ 40 MHz for any N_{ANT} ;
Array Gain = $5 \log(N_{ANT}/N_{SS})$ dB or 3 dB, whichever is less, for 20-MHz channel widths with $N_{ANT} \geq 5$.
For power measurements on all devices employing MIMO, directional gain is as follows,
Directional gain = $G_{ANT} + 10 \log(N_{ANT}/N_{SS})$ dBi = 2.8 dBi + $10 \log(2/2)$ dB = 2.8 dBi.
where N_{SS} = the number of independent spatial streams of data and G_{ANT} is the antenna gain in dBi
For this device, MIMO mode means SM-MIMO(Spatial Multiplexing) transmission and $N_{SS}=2$.
4. The following equation was used for spectrum offset:
Spectrum offset (dB) = Attenuator (dB) + Cable Loss (dB) + SMA Type Connector Loss (dB)

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8.5 Maximum Power Spectral Density (average)

8.5.1 Maximum Power Spectral Density – U-NII-1 band

FCC §15.407(a)

Test Mode : Set to Lowest channel, Middle channel and Highest channel

802.11a mode_1TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
Lowest	5180	3.65	0.19	3.84	11.00
Middle	5220	3.39	0.19	3.58	11.00
Highest	5240	3.43	0.19	3.62	11.00

802.11n (20MHz) mode_1TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
Lowest	5180	3.13	0.20	3.33	11.00
Middle	5220	2.85	0.20	3.05	11.00
Highest	5240	3.21	0.20	3.41	11.00

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802.11n (20MHz) mode_2TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
				Total PSD	
Lowest	5180	-0.38	0.20	2.83	11.00
Middle	5220	-0.2	0.20	3.01	11.00
Highest	5240	-0.15	0.20	3.06	11.00

802.11n (40MHz) mode_1TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
Lowest	5190	-0.08	0.41	0.33	11.00
Highest	5230	-0.63	0.41	-0.22	11.00

802.11n (40MHz) mode_2TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
				Total PSD	
Lowest	5190	-3.09	0.41	0.33	11.00
Highest	5230	-3.33	0.41	0.09	11.00

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802.11ac (20MHz) mode_1TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
Lowest	5180	3.4	0.21	3.61	11.00
Middle	5220	3.25	0.21	3.46	11.00
Highest	5240	3.29	0.21	3.50	11.00

802.11ac (20MHz) mode_2TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
				Total PSD	
Lowest	5180	-0.44	0.21	2.78	11.00
Middle	5220	-0.84	0.21	2.38	11.00
Highest	5240	-0.39	0.21	2.83	11.00

802.11ac (40MHz) mode_1TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
Lowest	5190	-0.15	0.40	0.25	11.00
Highest	5230	-0.55	0.40	-0.15	11.00

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802.11ac (40MHz) mode_2TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
				Total PSD	
Lowest	5190	-3.76	0.40	-0.35	11.00
Highest	5230	-4.23	0.40	-0.82	11.00

802.11ac (80MHz) mode_1TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
Lowest	5210	-4.9	0.79	-4.11	11.00

802.11ac (80MHz) mode_2TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
				Total PSD	
Lowest	5210	-9.14	0.79	-5.34	11.00

TEST DATA

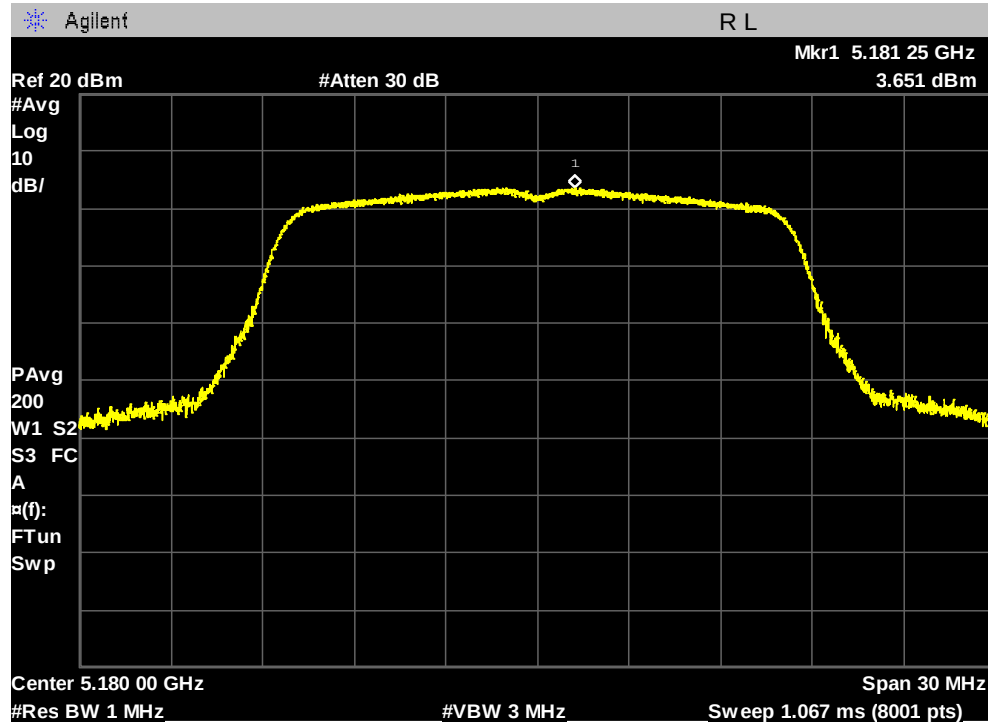
Note:

1. Maximum PSD = Measured PSD + Duty Factor
2. "Measure and add $10 \log(N_{ANT})$ dB, where N_{ANT} is the number of outputs" was used for measuring in-band Total PSD.
Total PSD = Measured PSD + duty factor + $10 \log(N_{ANT})$
3. For CDD transmission, directional gain is. **5.81 dBi**
For MIMO transmission, directional gain is **2.8 dBi**.
Directional gain was calculated according to KDB662911 D01 Multiple Transmitter Output v02r01.
For power spectral density (PSD) measurements on all devices employing CDD, directional gain is as follows,
Directional gain = G_{ANT} + Array Gain = 2.8 dBi + 3.01 dB = 5.81 dBi
Array Gain = $10 \log(N_{ANT}/N_{SS})$ dB = $10 \log(2/1)$ = 3.01 dB.
where N_{SS} = the number of independent spatial streams of data and G_{ANT} is the antenna gain in dBi.
For CDD mode of this device, $N_{SS}=1$.
For power spectral density (PSD) measurements on all devices employing MIMO, directional gain is as follows,
Directional gain = G_{ANT} + $10 \log(N_{ANT}/N_{SS})$ dBi = 2.8 dBi + $10 \log(2/2)$ dB = 2.8 dBi.
where N_{SS} = the number of independent spatial streams of data and G_{ANT} is the antenna gain in dBi
For this device, MIMO mode means SM-MIMO(Spatial Multiplexing) transmission and $N_{SS}=2$.
4. For FCC PSD Limit, If transmitting antennas of directional gain greater than 6 dBi was used, maximum power spectral density was reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
5. Power Spectral Density(PSD) was measured by same method with conducted output power according to II.F.1 in KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
6. The following equation was used for spectrum offset:
Spectrum offset (dB) = Attenuator (dB) + Cable Loss (dB) + SMA Type Connector Loss (dB)

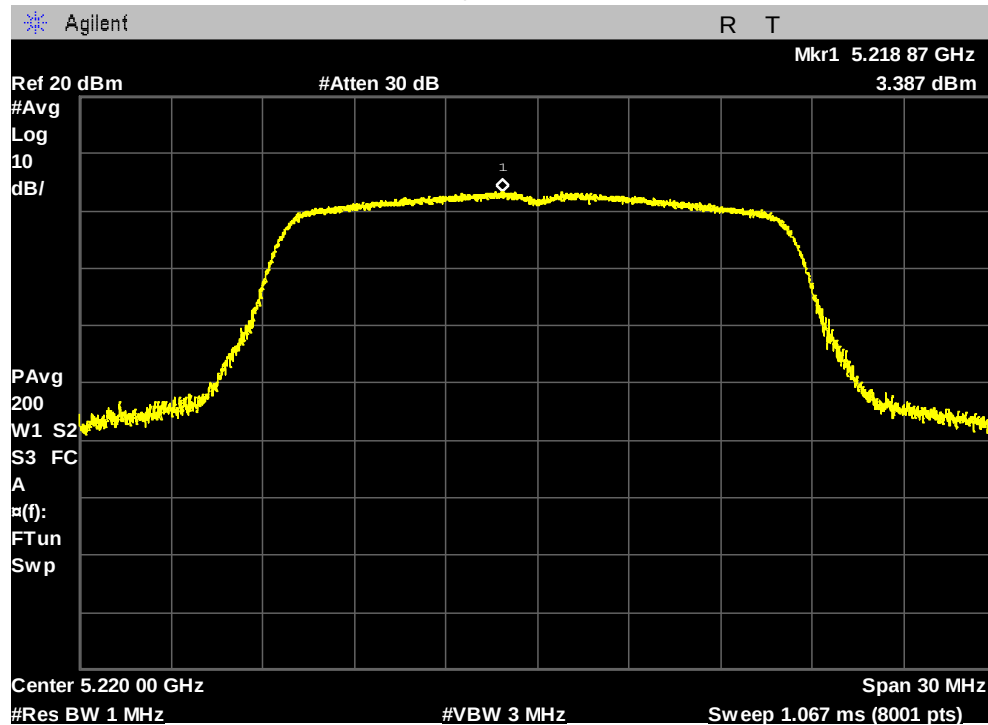
PLOTS OF EMISSIONS

802.11a mode 1TX

Maximum Power Spectral Density, Lowest Channel (5180 MHz)

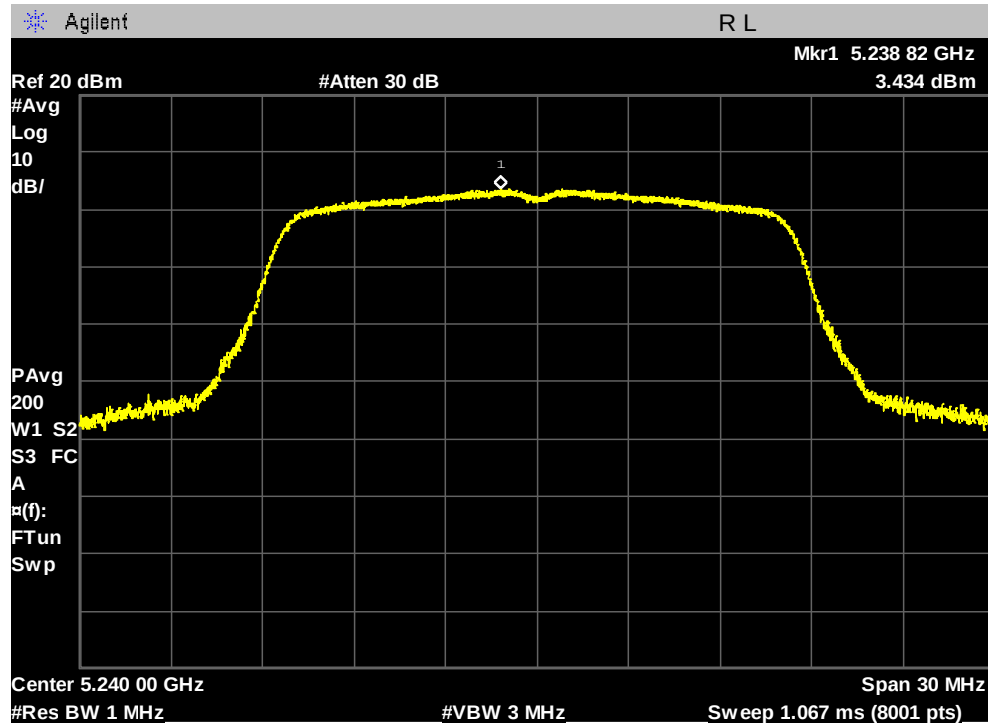


Maximum Power Spectral Density, Middle Channel (5220 MHz)



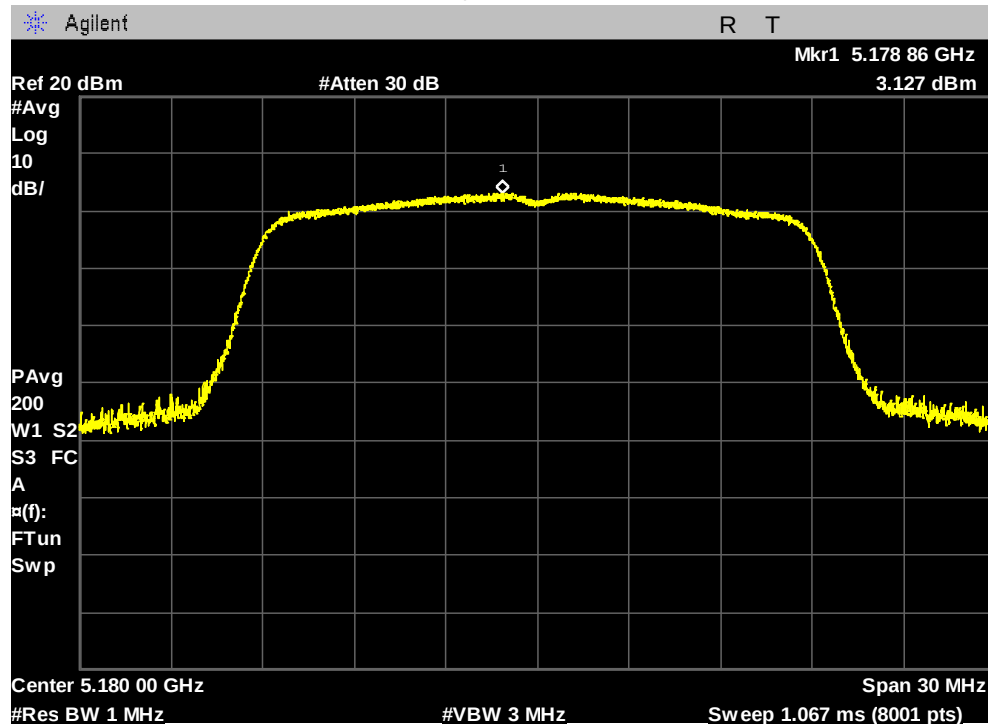
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5240 MHz)



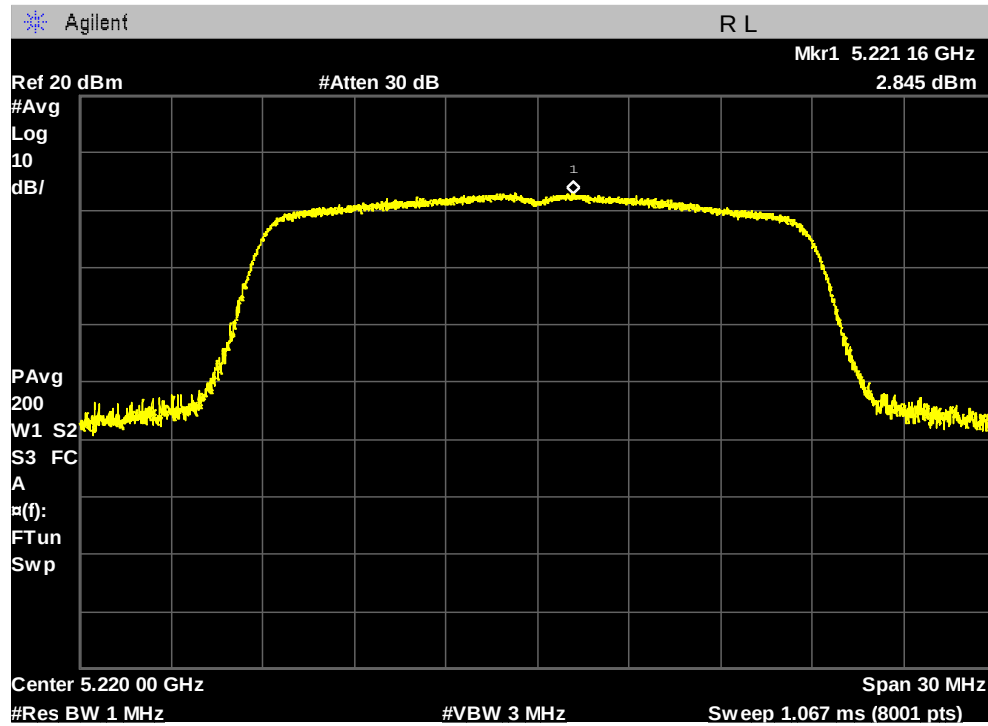
802.11n (20 MHz) mode 1TX

Maximum Power Spectral Density, Lowest Channel (5180 MHz)

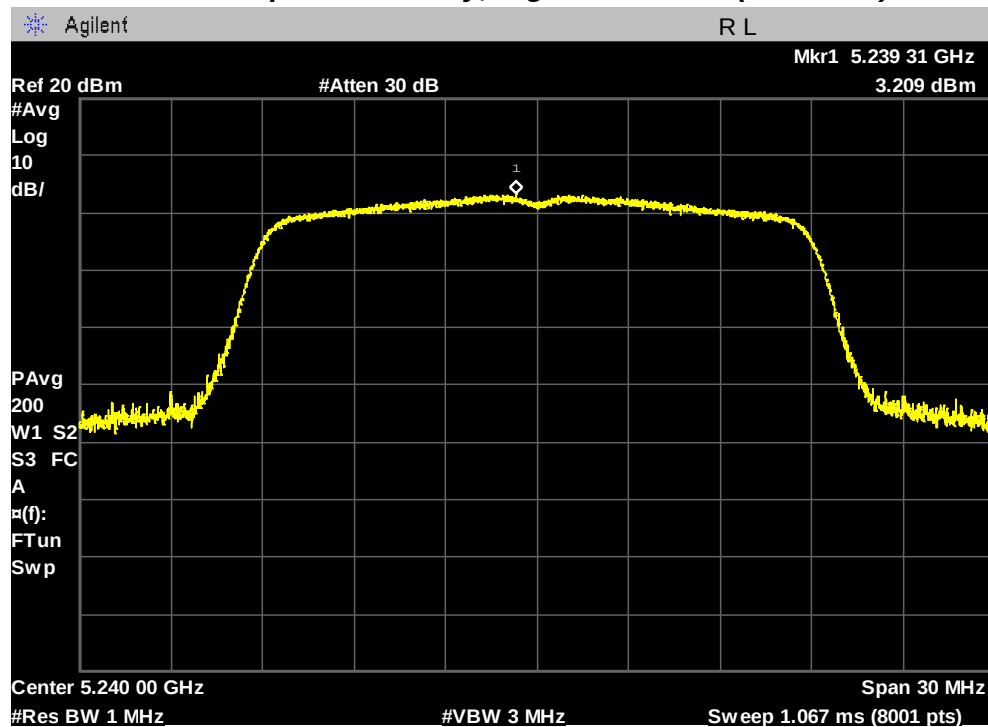


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Middle Channel (5220 MHz)



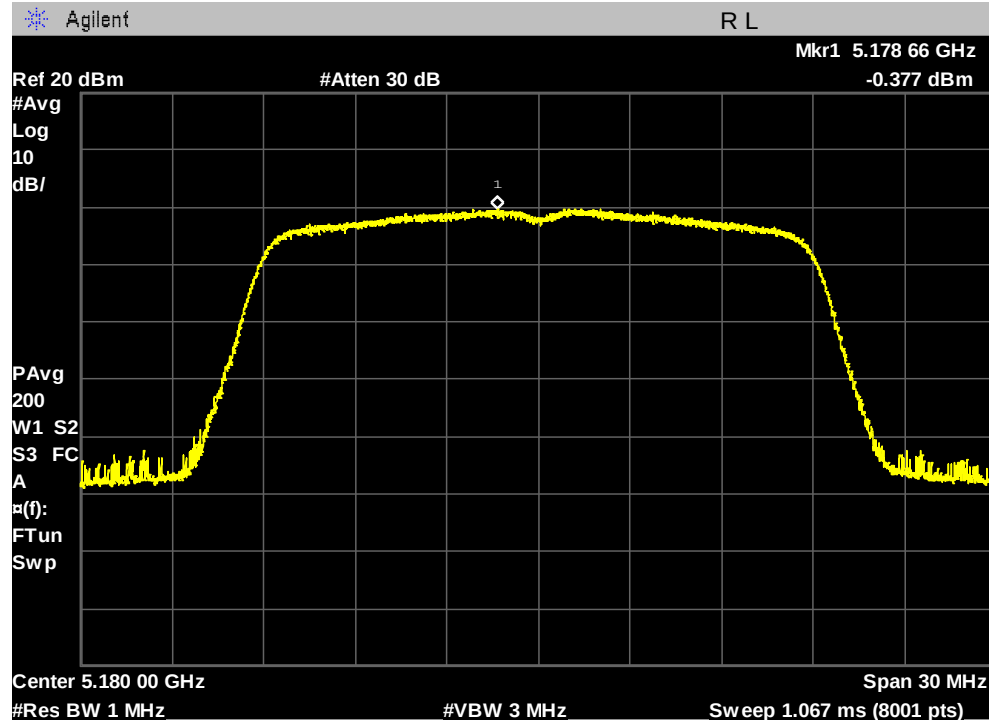
Maximum Power Spectral Density, Highest Channel (5240 MHz)



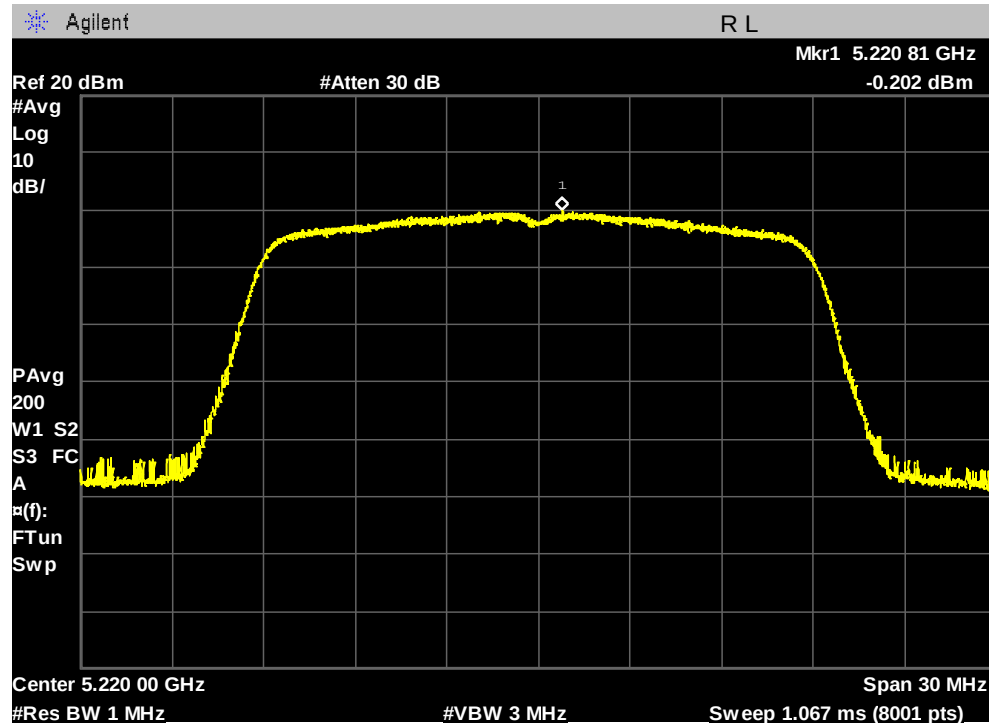
PLOTS OF EMISSIONS

802.11n (20 MHz) mode 2TX

Maximum Power Spectral Density, Lowest Channel (5180 MHz)

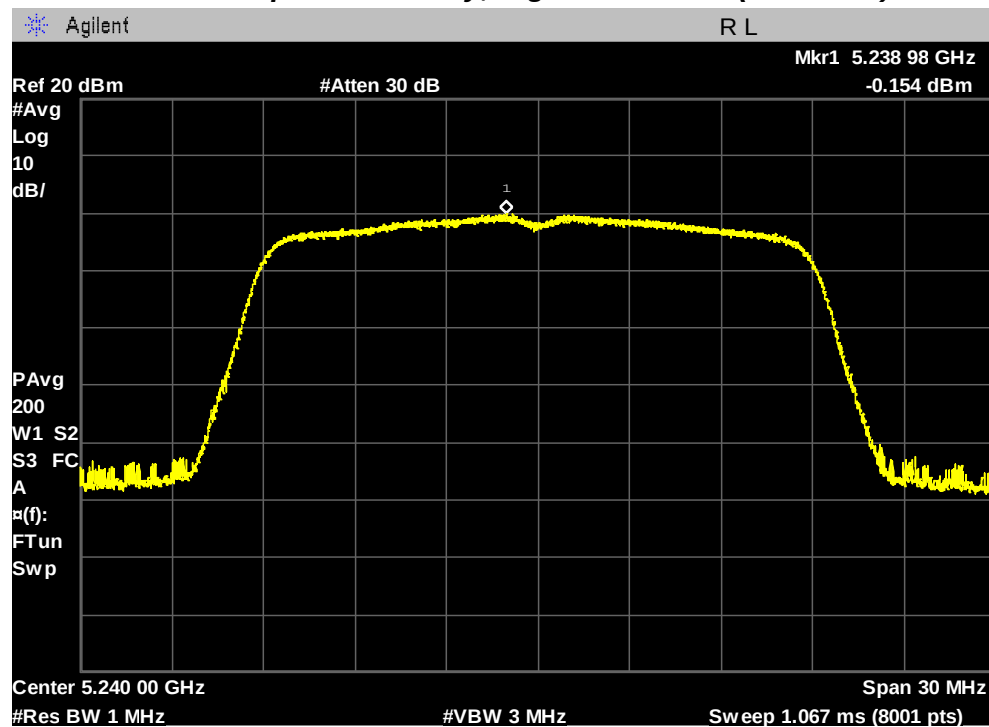


Maximum Power Spectral Density, Middle Channel (5220 MHz)



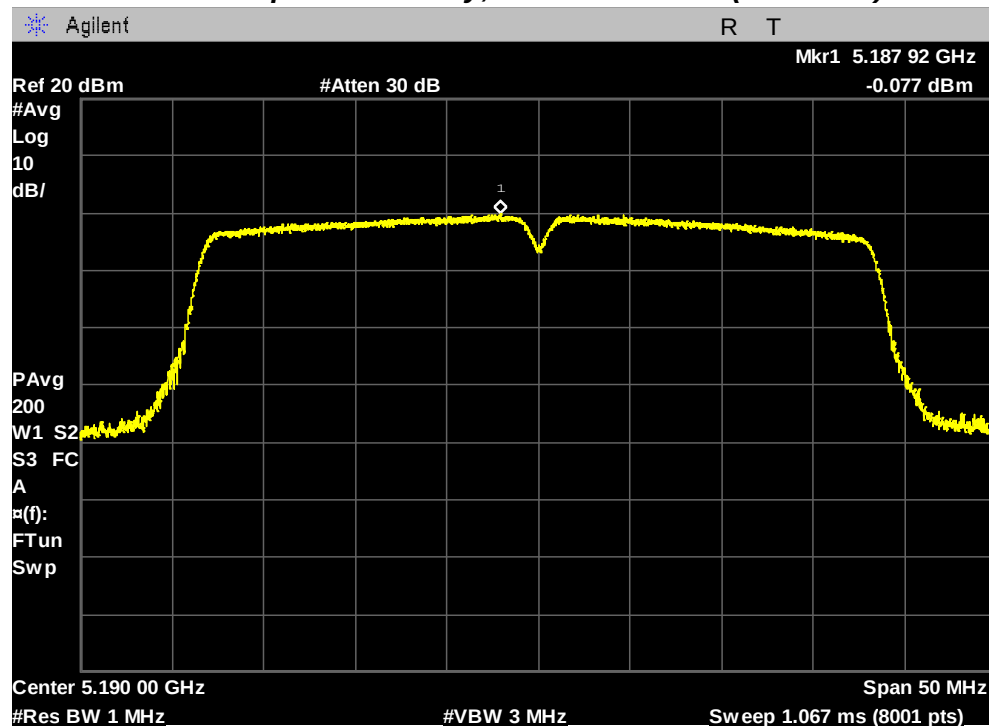
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5240 MHz)



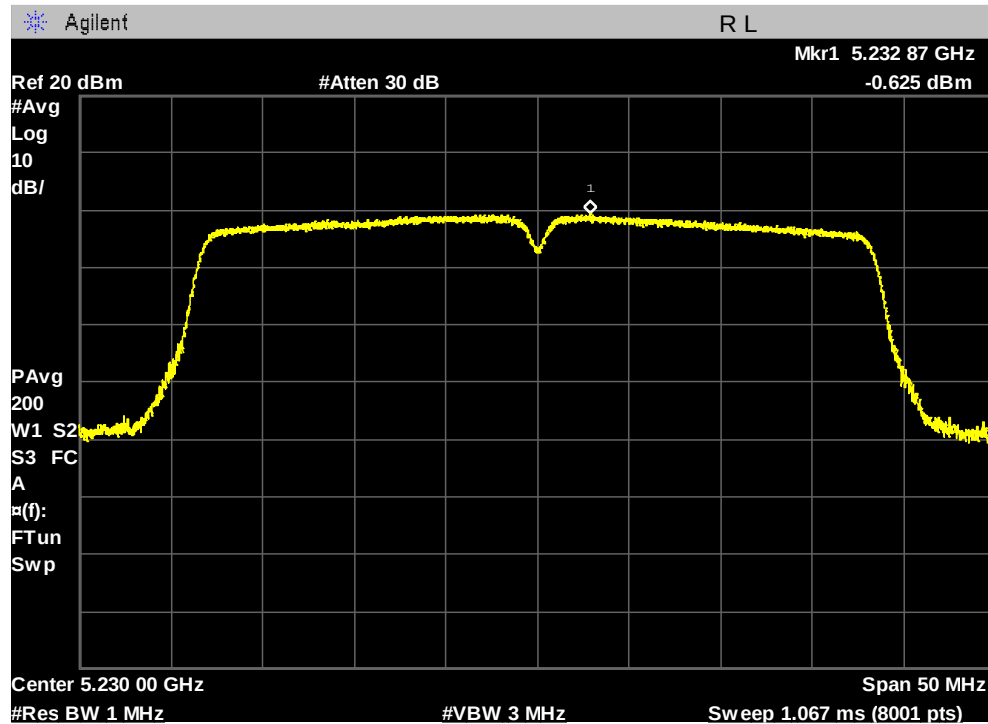
802.11n (40 MHz) mode 1TX

Maximum Power Spectral Density, Lowest Channel (5190 MHz)



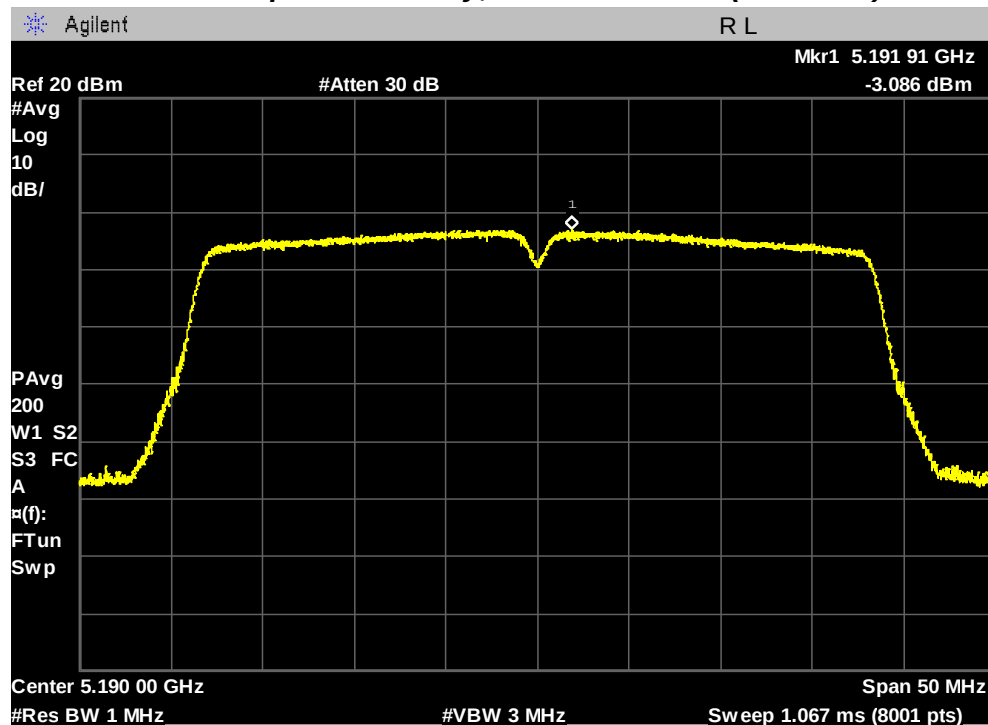
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5230 MHz)



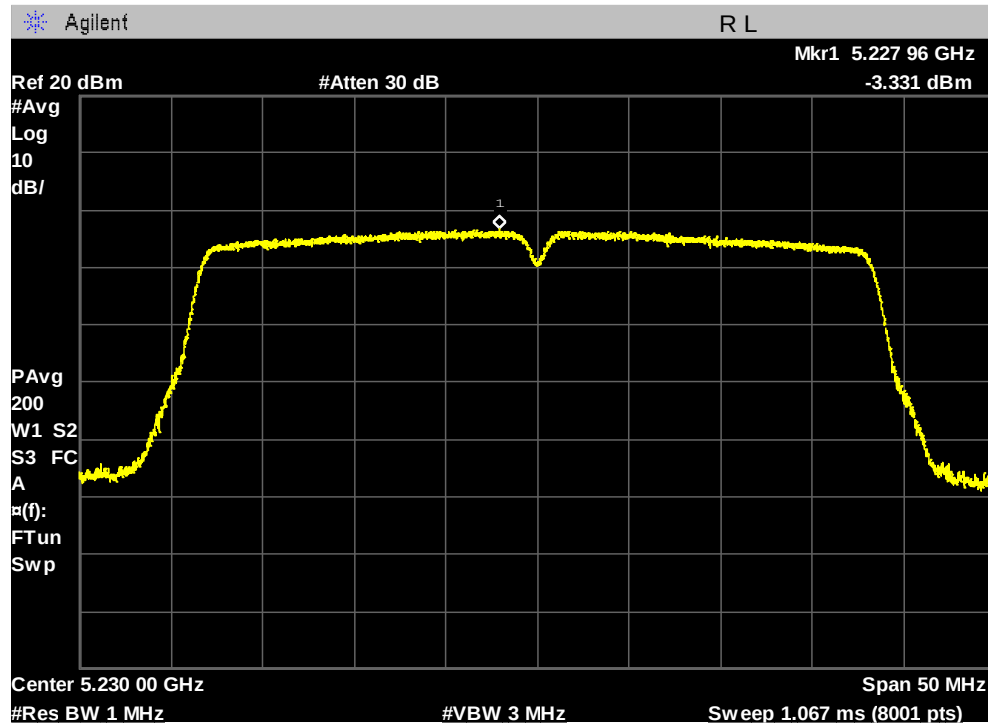
802.11n (40 MHz) mode 2TX

Maximum Power Spectral Density, Lowest Channel (5190 MHz)



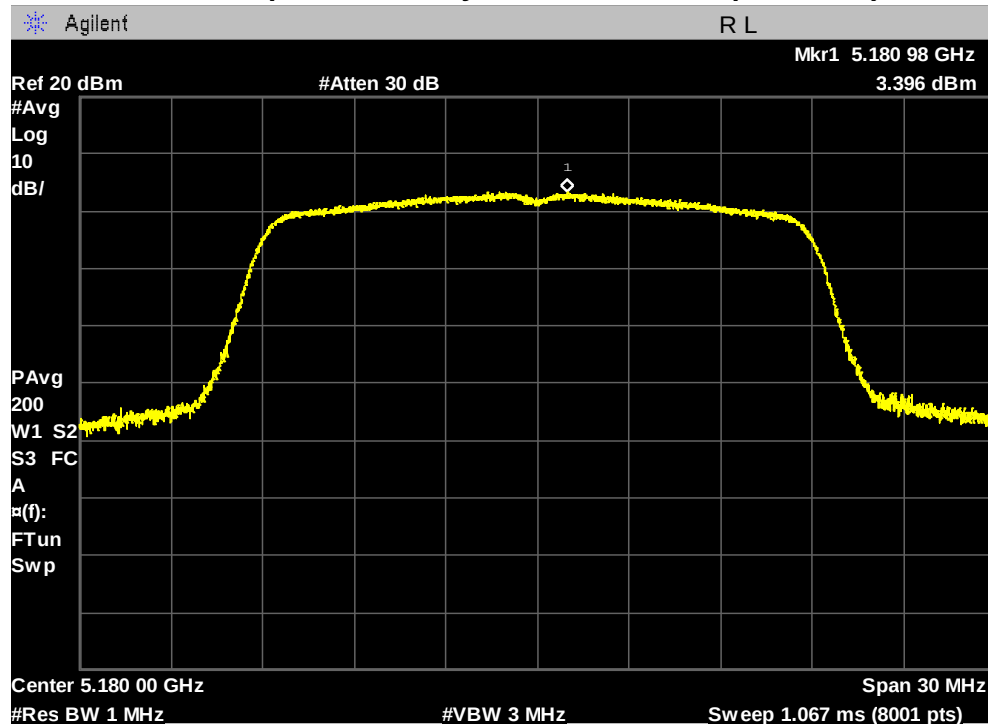
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5230 MHz)



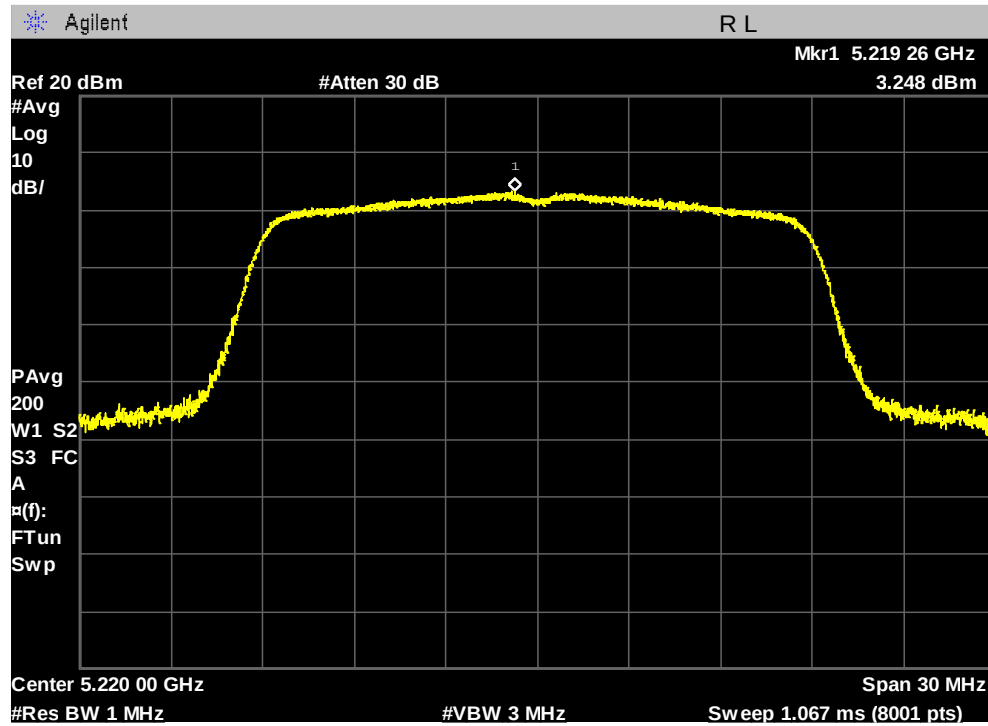
802.11ac (20 MHz) mode 1TX

Maximum Power Spectral Density, Lowest Channel (5180 MHz)

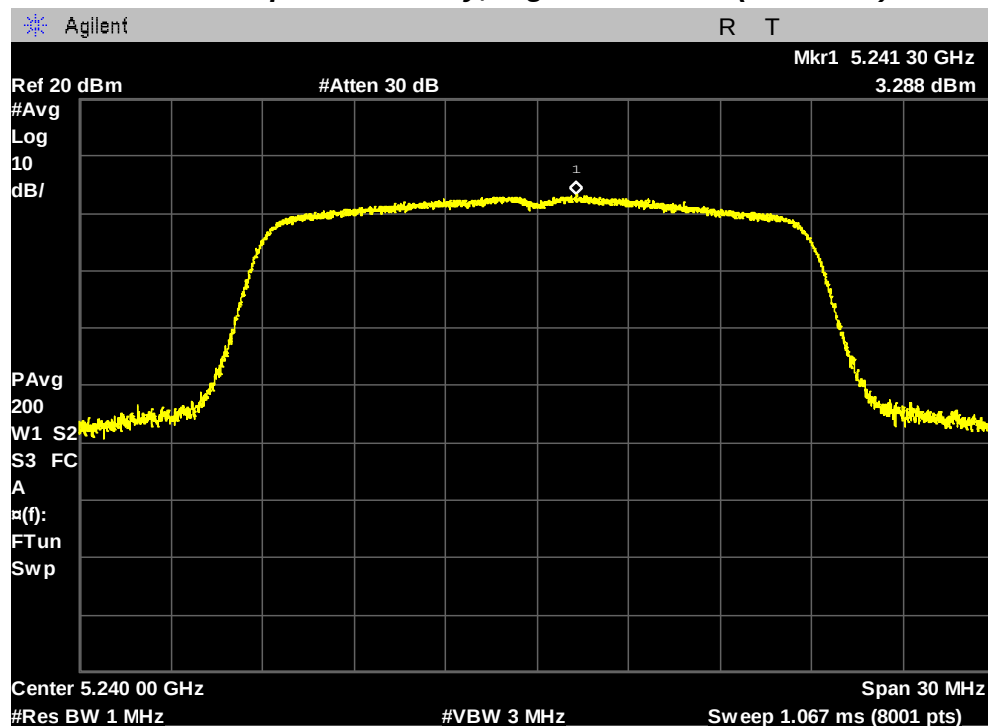


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Middle Channel (5220 MHz)



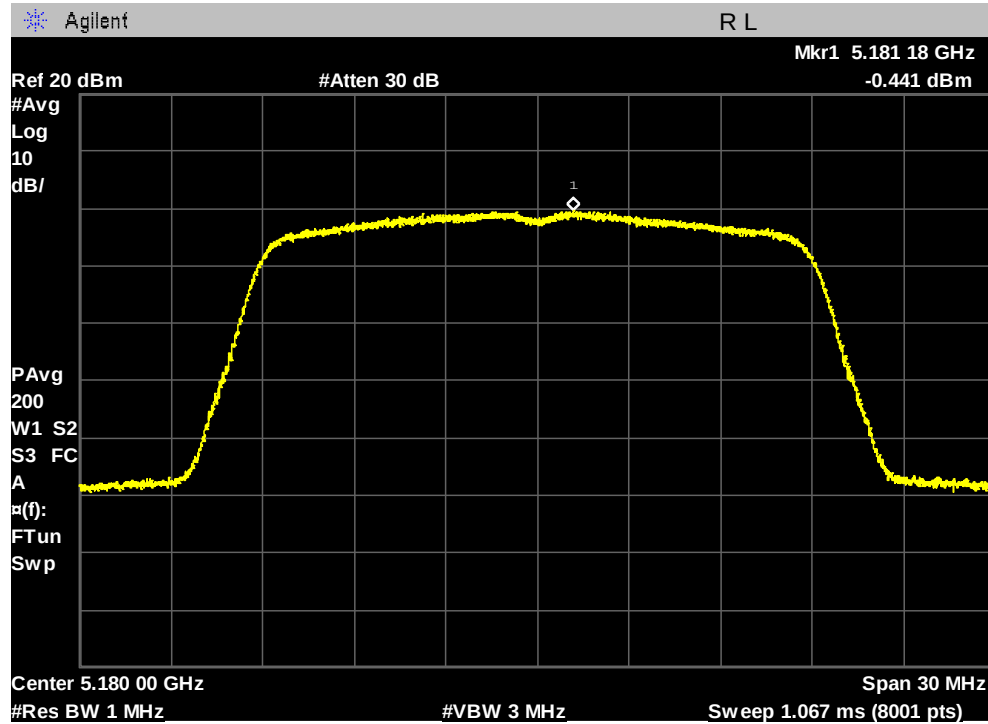
Maximum Power Spectral Density, Highest Channel (5240 MHz)



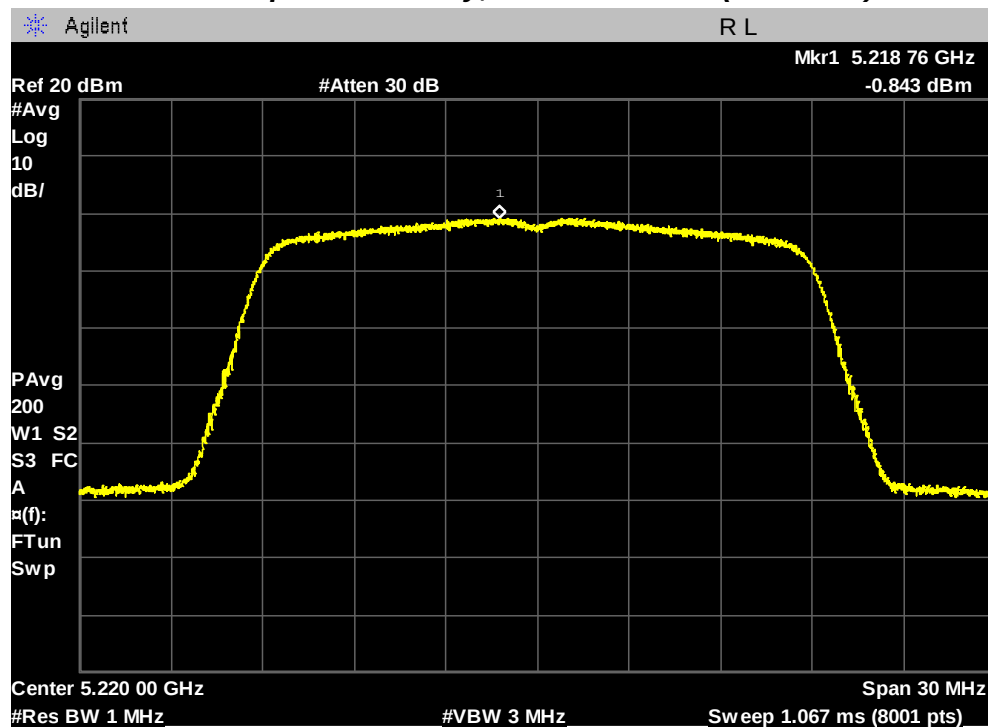
PLOTS OF EMISSIONS

802.11ac (20 MHz) mode 2TX

Maximum Power Spectral Density, Lowest Channel (5180 MHz)

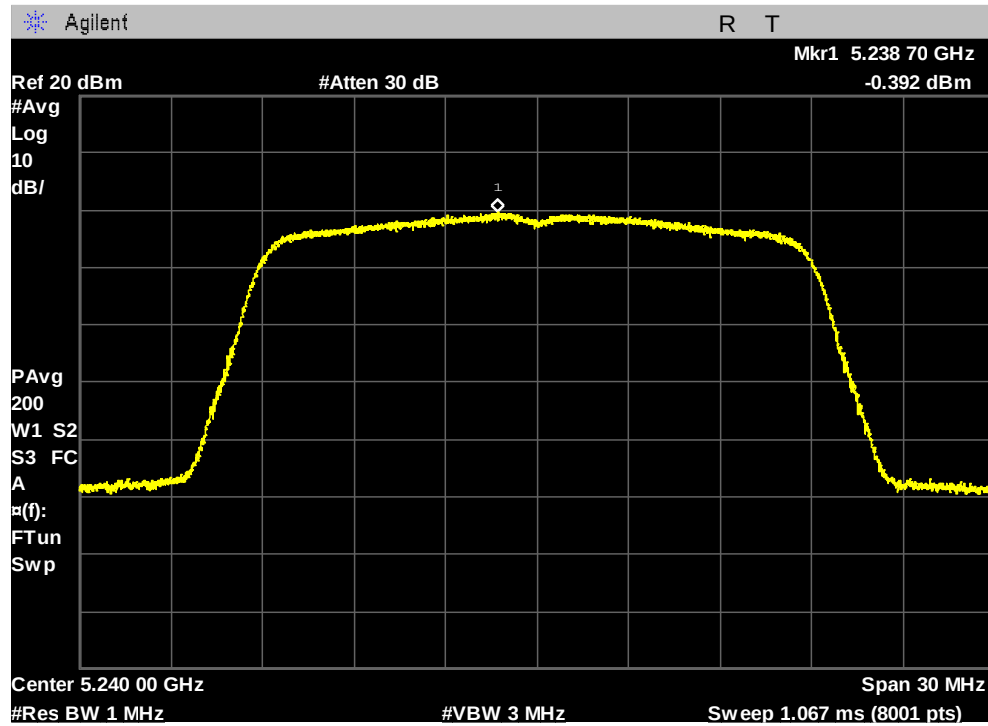


Maximum Power Spectral Density, Middle Channel (5220 MHz)



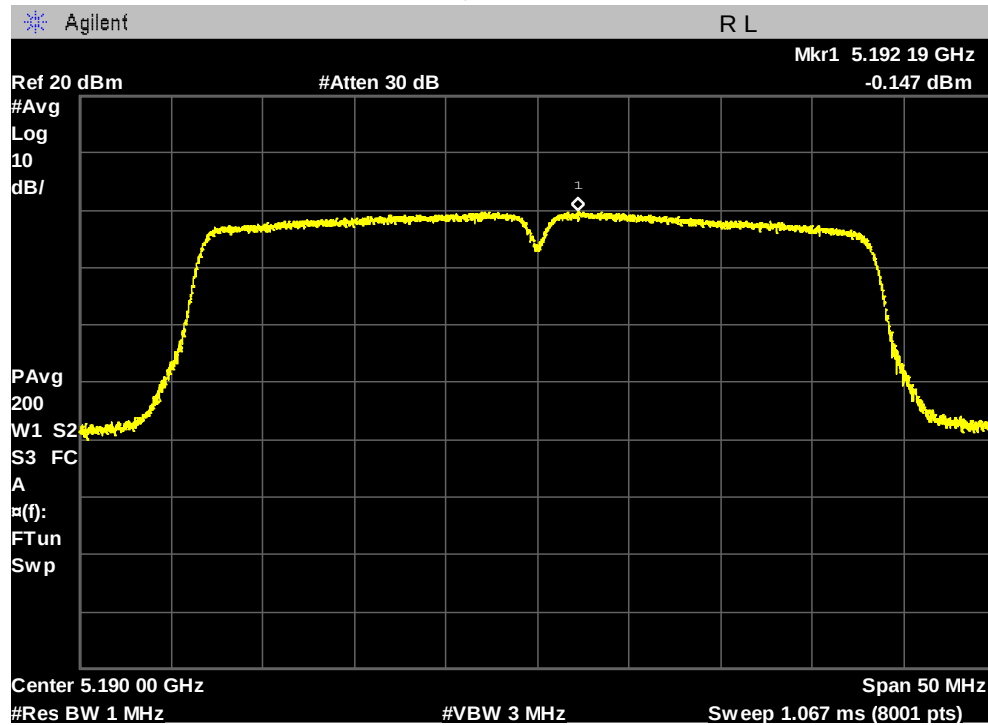
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5240 MHz)



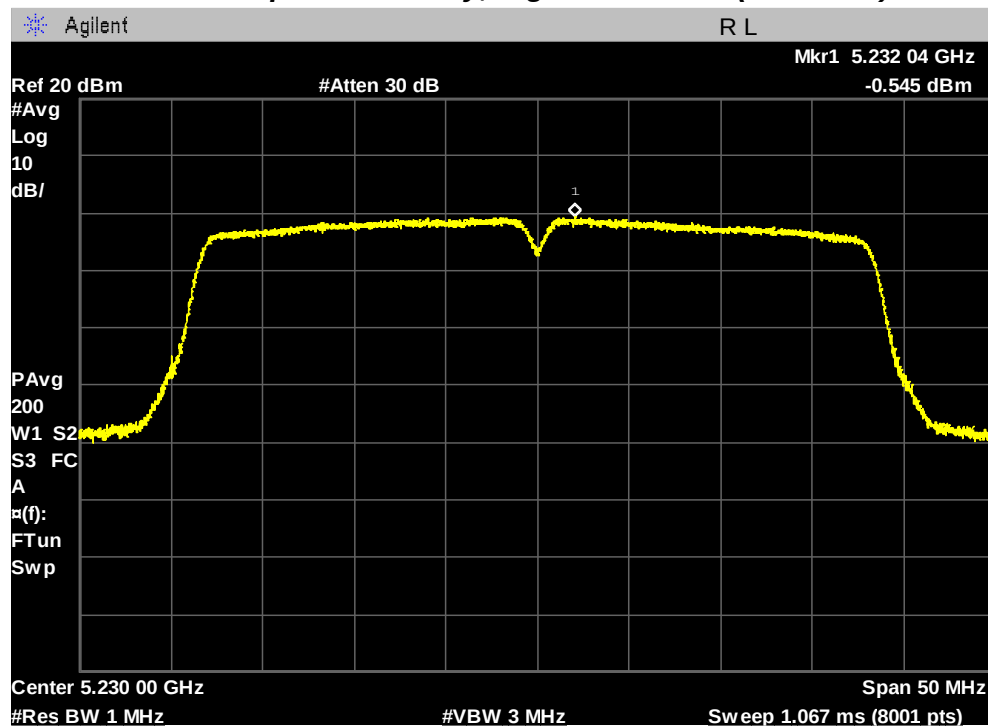
802.11ac (40 MHz) mode 1TX

Maximum Power Spectral Density, Lowest Channel (5190 MHz)



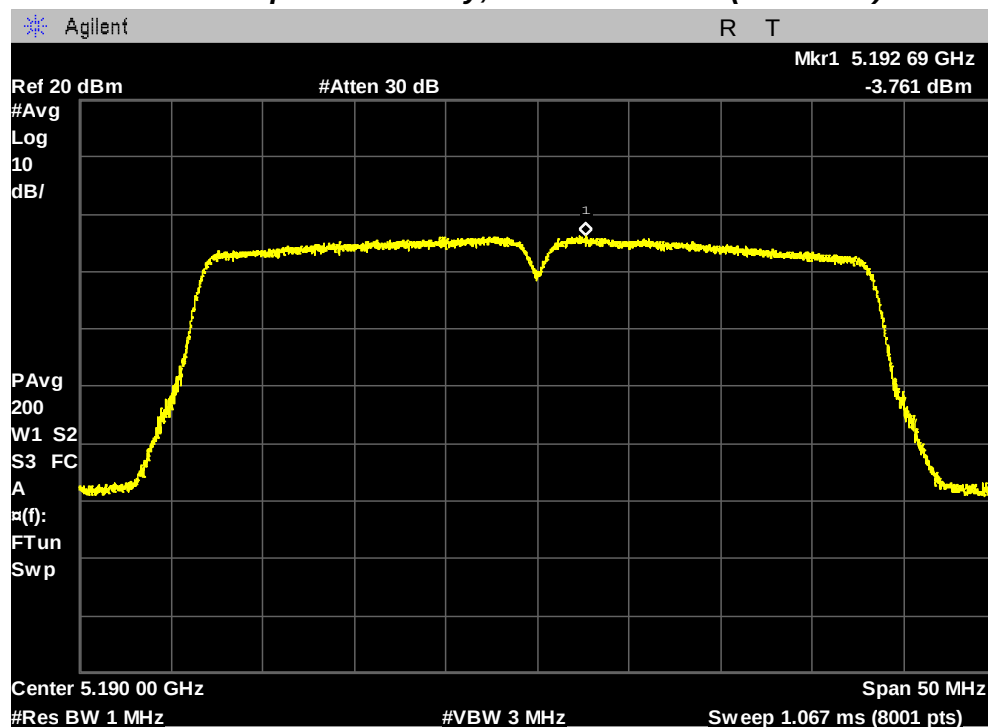
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5230 MHz)



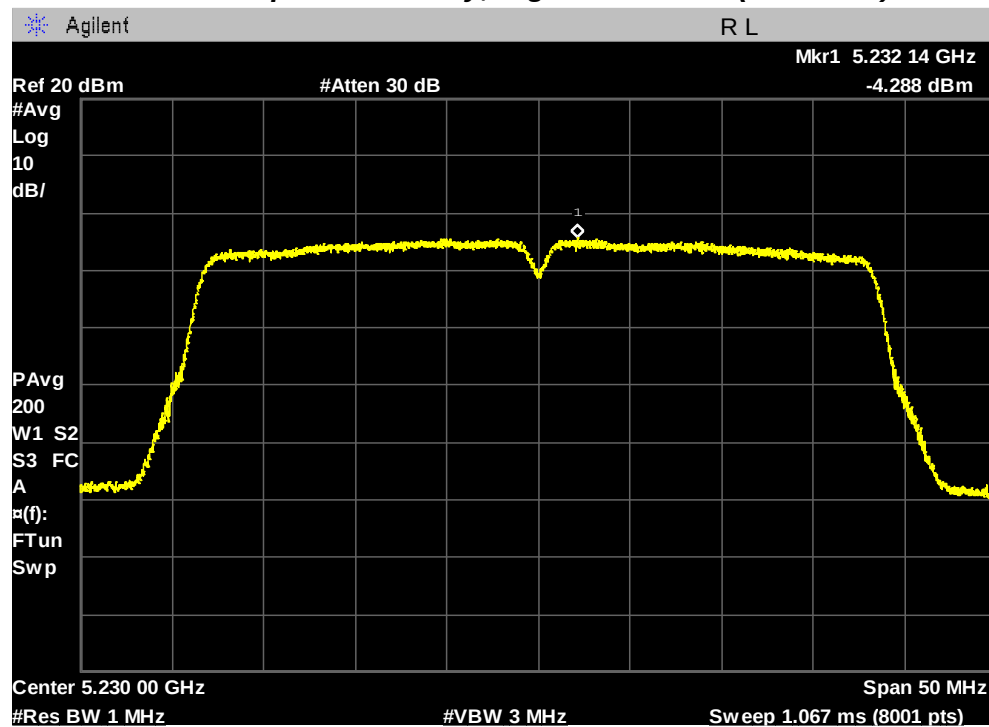
802.11ac (40 MHz) mode 2TX

Maximum Power Spectral Density, Lowest Channel (5190 MHz)



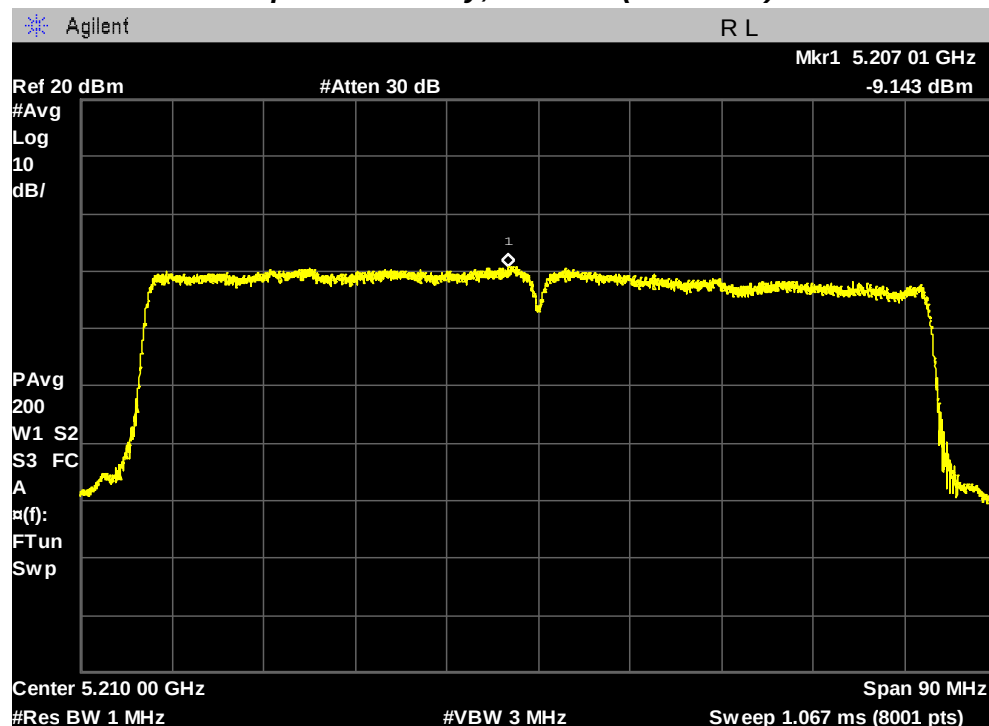
TEST DATA

Maximum Power Spectral Density, Highest Channel (5230 MHz)



802.11ac (80 MHz) mode 1TX

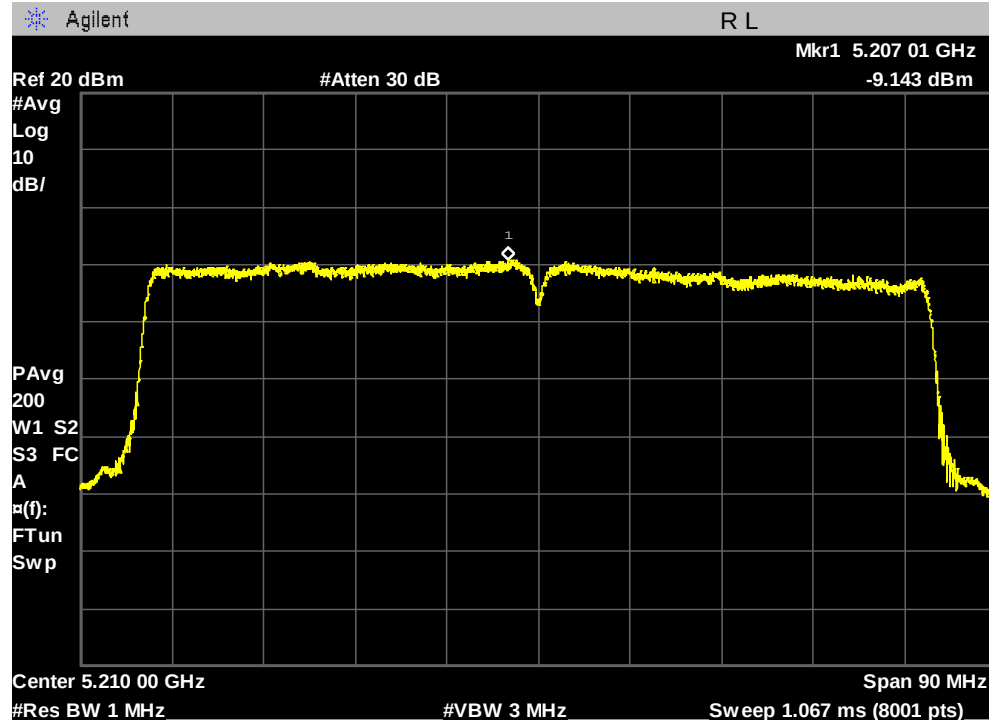
Maximum Power Spectral Density, Channel (5210 MHz)



TEST DATA

802.11ac (80 MHz) mode 2TX

Maximum Power Spectral Density, Channel (5210 MHz)



TEST DATA

8.5.2 Maximum Power Spectral Density – U-NII-2A band

FCC §15.407(a)

Test Mode : Set to Lowest channel, Middle channel and Highest channel

802.11a mode_1TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
Lowest	5260	3.54	0.19	3.73	11.00
Middle	5300	3.59	0.19	3.78	11.00
Highest	5320	3.43	0.19	3.62	11.00

802.11n (20MHz) mode_1TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
Lowest	5260	3.12	0.21	3.33	11.00
Middle	5300	3.15	0.21	3.36	11.00
Highest	5320	3.10	0.21	3.31	11.00

TEST DATA

802.11n (20MHz) mode_2TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
				Total PSD	
Lowest	5260	0.12	0.22	3.35	11.00
Middle	5300	0.13	0.22	3.36	11.00
Highest	5320	-0.26	0.22	2.97	11.00

802.11n (40MHz) mode_1TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
Lowest	5270	-0.41	0.42	0.01	11.00
Highest	5310	-0.26	0.42	0.16	11.00

802.11n (40MHz) mode_2TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
				Total PSD	
Lowest	5270	-3.13	0.42	0.30	11.00
Highest	5310	-3.20	0.42	0.23	11.00

TEST DATA

802.11ac (20MHz) mode_1TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
Lowest	5260	3.5	0.21	3.71	11.00
Middle	5300	3.28	0.21	3.49	11.00
Highest	5320	3.24	0.21	3.45	11.00

802.11ac (20MHz) mode_2TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
				Total PSD	
Lowest	5260	3.35	0.21	6.57	11.00
Middle	5300	3.48	0.21	6.70	11.00
Highest	5320	3.37	0.21	6.59	11.00

802.11ac (40MHz) mode_1TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
Lowest	5270	-0.24	0.41	0.17	11.00
Highest	5310	-0.50	0.41	-0.09	11.00

TEST DATA

802.11ac (40MHz) mode_2TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
				Total PSD	
Lowest	5270	-5.01	0.41	-1.59	11.00
Highest	5310	-5.06	0.41	-1.64	11.00

802.11ac (80MHz) mode_1TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
Lowest	5290	-4.74	0.77	-3.97	11.00

802.11ac (80MHz) mode_2TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
				Total PSD	
Lowest	5290	-9.12	0.77	-5.34	11.00

TEST DATA

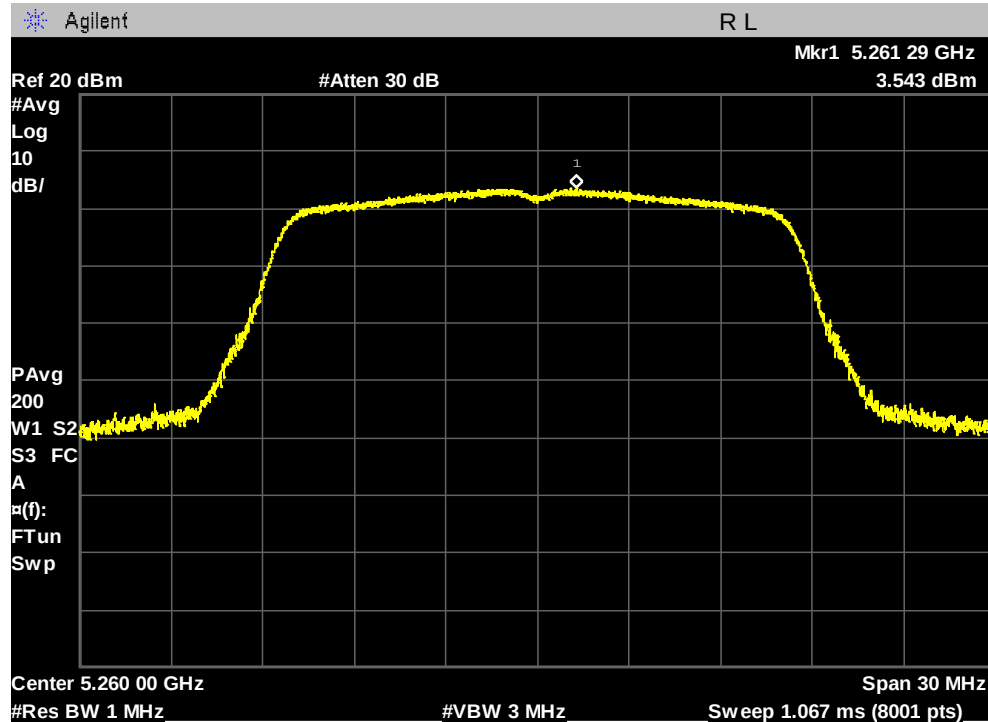
Note:

1. Maximum PSD = Measured PSD + Duty Factor
2. "Measure and add $10 \log(N_{ANT})$ dB, where N_{ANT} is the number of outputs" was used for measuring in-band Total PSD.
 $Total\ PSD = Measured\ PSD + duty\ factor + 10 \log(N_{ANT})$
3. For CDD transmission, directional gain is. **5.81 dBi**
For MIMO transmission, directional gain is **2.8 dBi**.
Directional gain was calculated according to KDB662911 D01 Multiple Transmitter Output v02r01.
For power spectral density (PSD) measurements on all devices employing CDD, directional gain is as follows,
Directional gain = $G_{ANT} + Array\ Gain = 2.8\ dBi + 3.01\ dB = 5.81\ dBi$
Array Gain = $10 \log(N_{ANT}/N_{SS})\ dB = 10 \log(2/1) = 3.01\ dB$.
where N_{SS} = the number of independent spatial streams of data and G_{ANT} is the antenna gain in dBi.
For CDD mode of this device, $N_{SS}=1$.
For power spectral density (PSD) measurements on all devices employing MIMO, directional gain is as follows,
Directional gain = $G_{ANT} + 10 \log(N_{ANT}/N_{SS})\ dB = 2.8\ dBi + 10 \log(2/2)\ dB = 2.8\ dBi$.
where N_{SS} = the number of independent spatial streams of data and G_{ANT} is the antenna gain in dBi
For this device, MIMO mode means SM-MIMO(Spatial Multiplexing) transmission and $N_{SS}=2$.
4. For FCC PSD Limit, If transmitting antennas of directional gain greater than 6 dBi was used, maximum power spectral density was reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
5. Power Spectral Density(PSD) was measured by same method with conducted output power according to II.F.1 in KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
6. The following equation was used for spectrum offset:
 $Spectrum\ offset\ (dB) = Attenuator\ (dB) + Cable\ Loss\ (dB) + SMA\ Type\ Connector\ Loss\ (dB)$

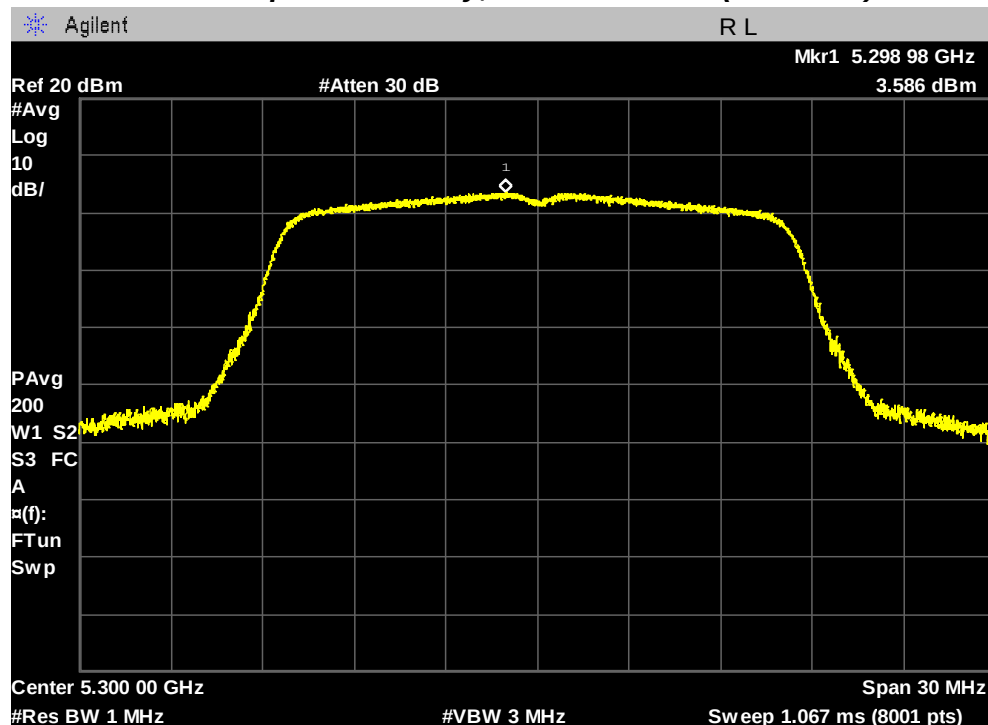
PLOTS OF EMISSIONS

802.11a mode 1TX

Maximum Power Spectral Density, Lowest Channel (5260 MHz)

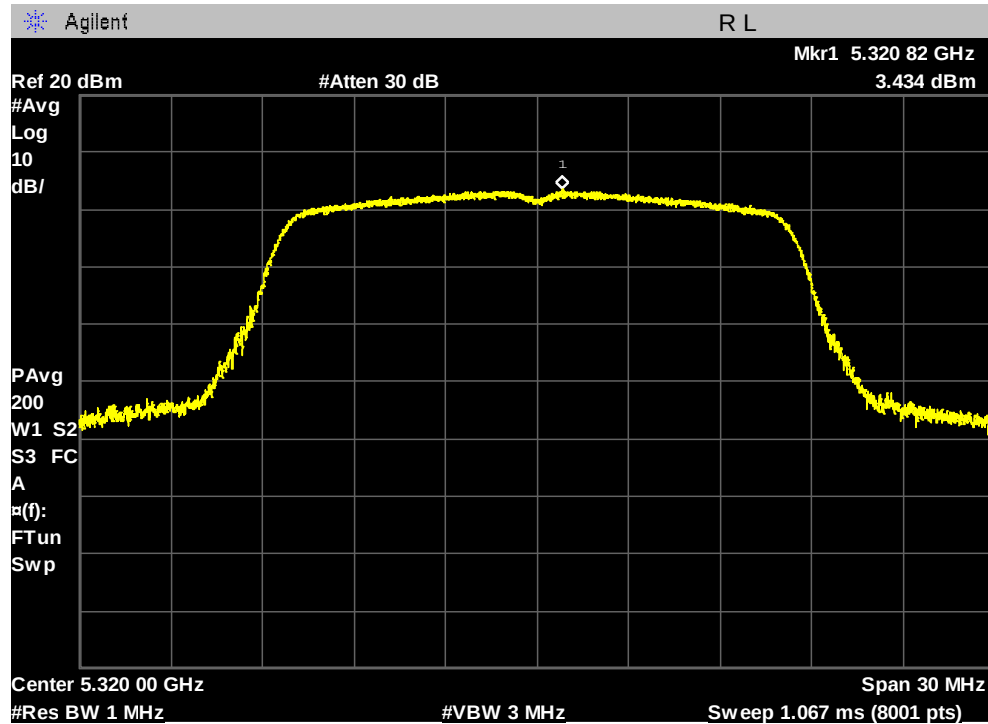


Maximum Power Spectral Density, Middle Channel (5300 MHz)



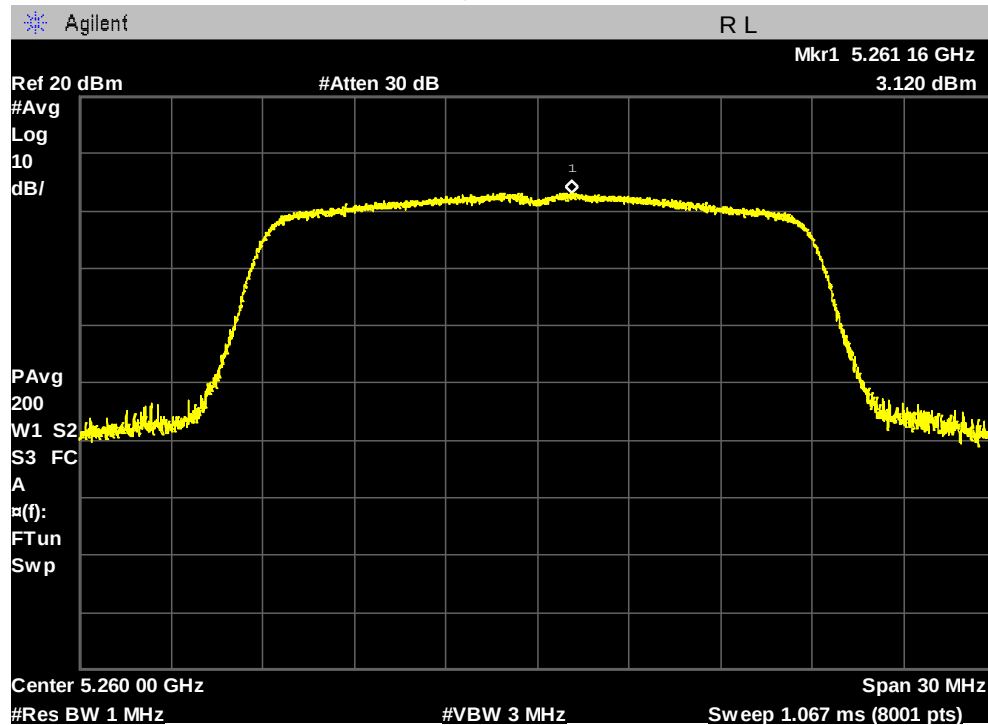
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5320 MHz)



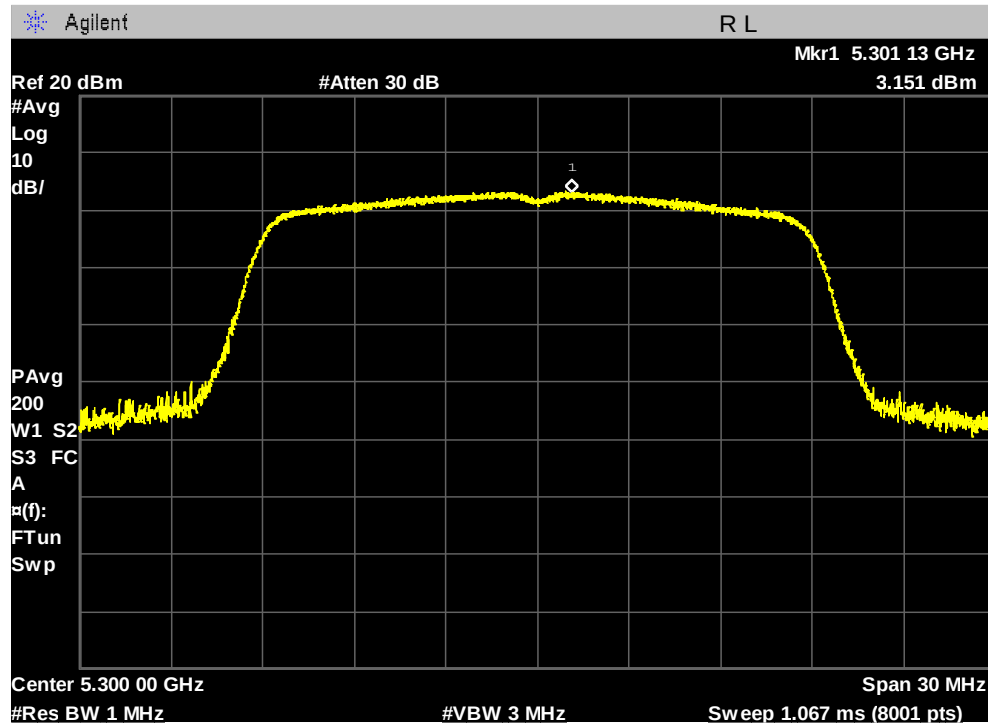
802.11n (20 MHz) mode 1TX

Maximum Power Spectral Density, Lowest Channel (5260 MHz)

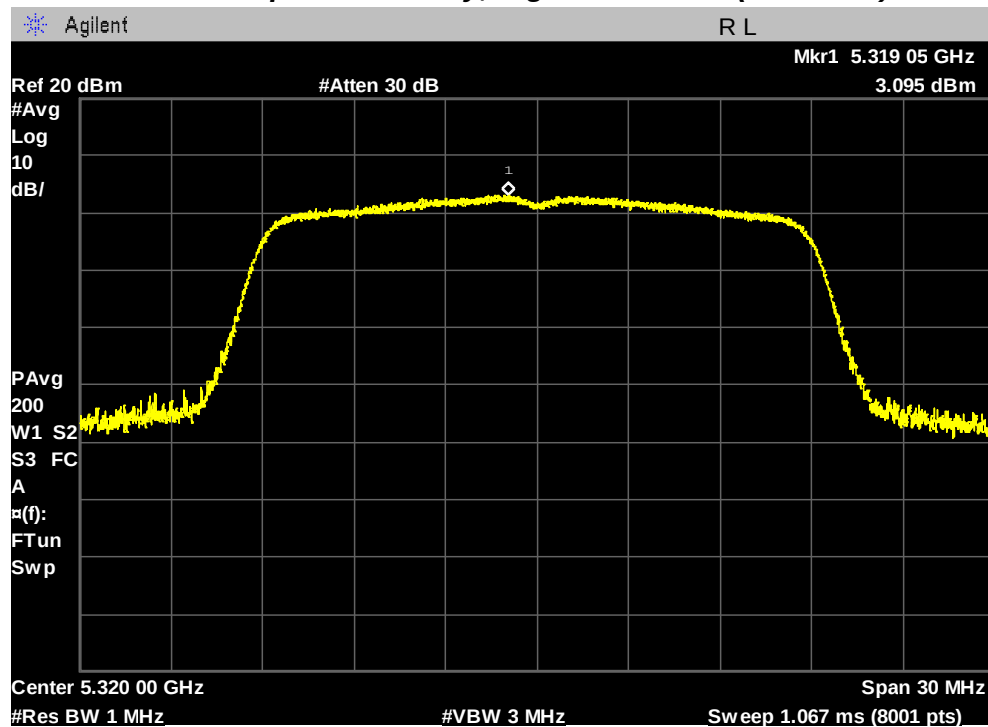


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Middle Channel (5300 MHz)



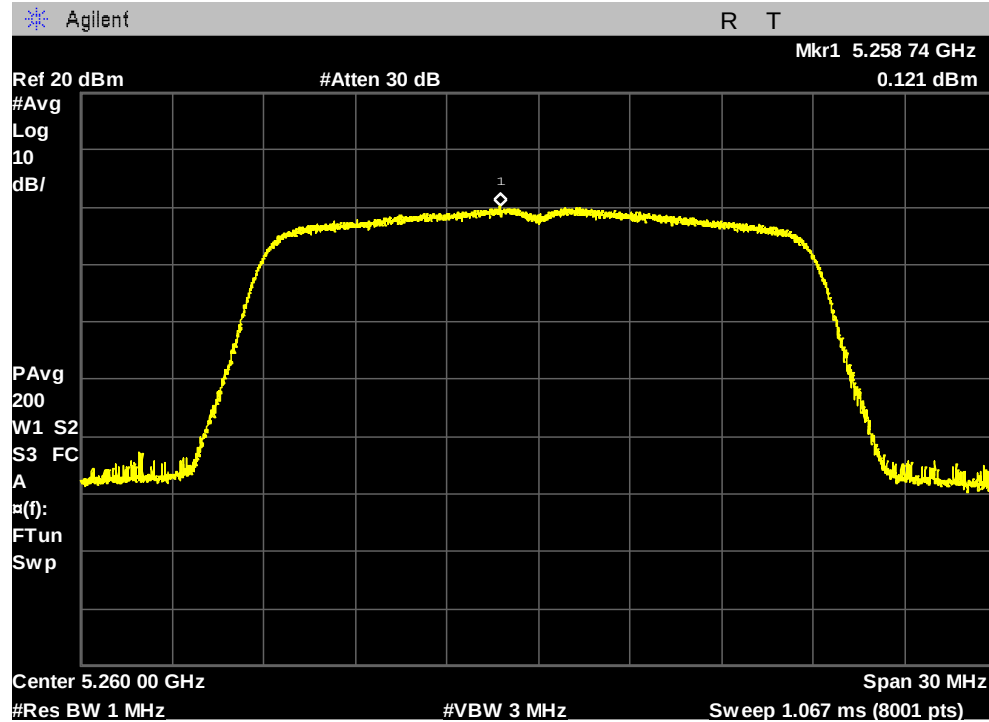
Maximum Power Spectral Density, Highest Channel (5320 MHz)



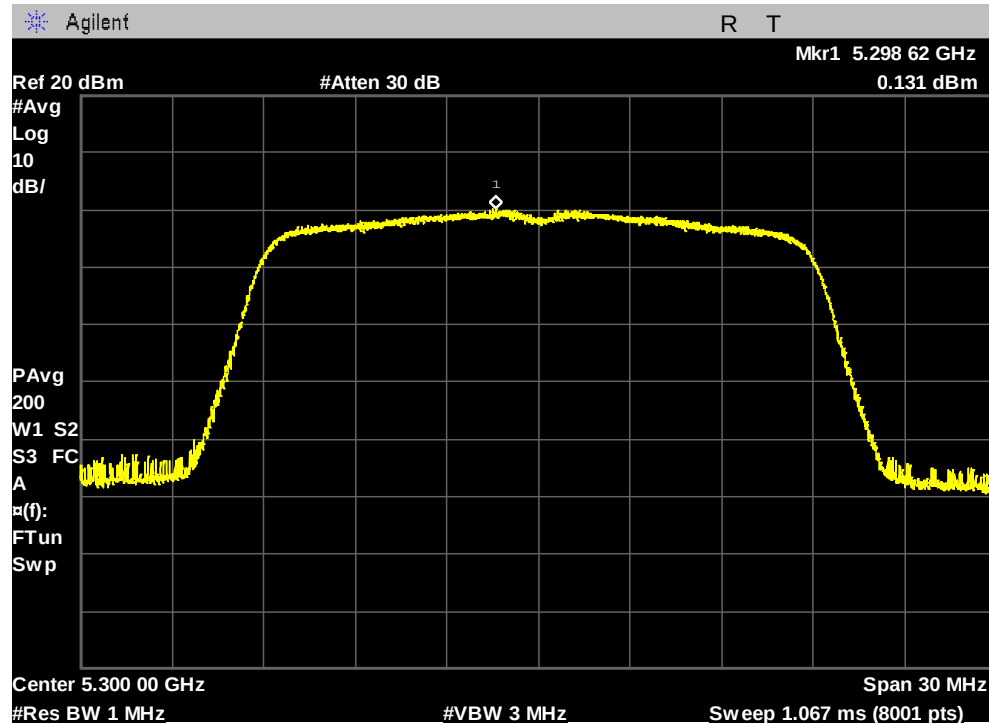
PLOTS OF EMISSIONS

802.11n (20 MHz) mode 2TX

Maximum Power Spectral Density, Lowest Channel (5260 MHz)

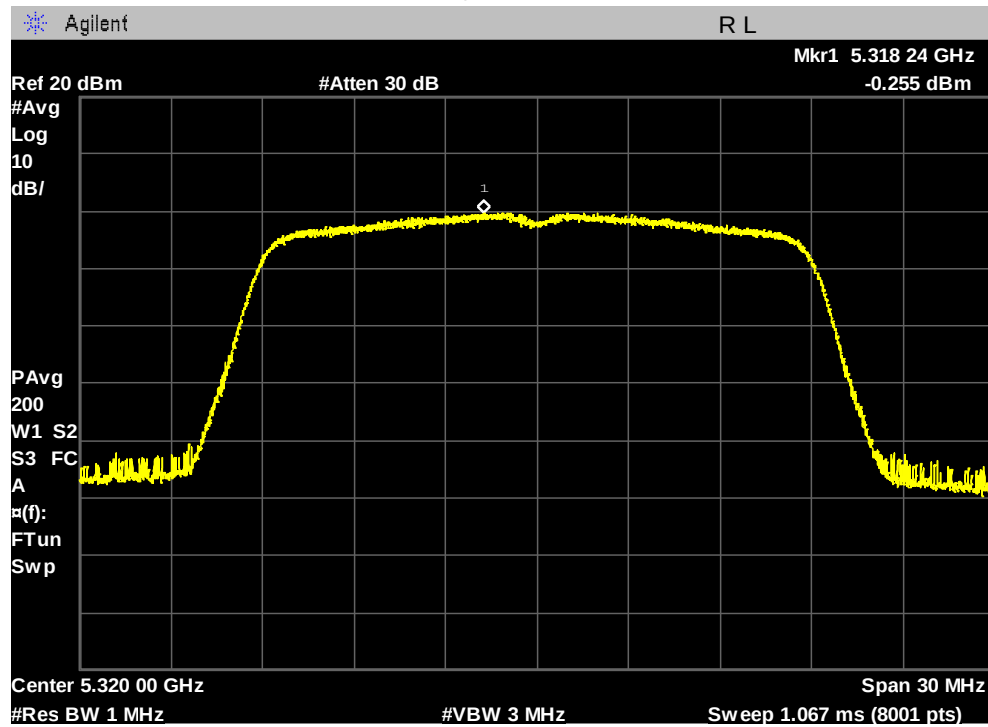


Maximum Power Spectral Density, Middle Channel (5300 MHz)



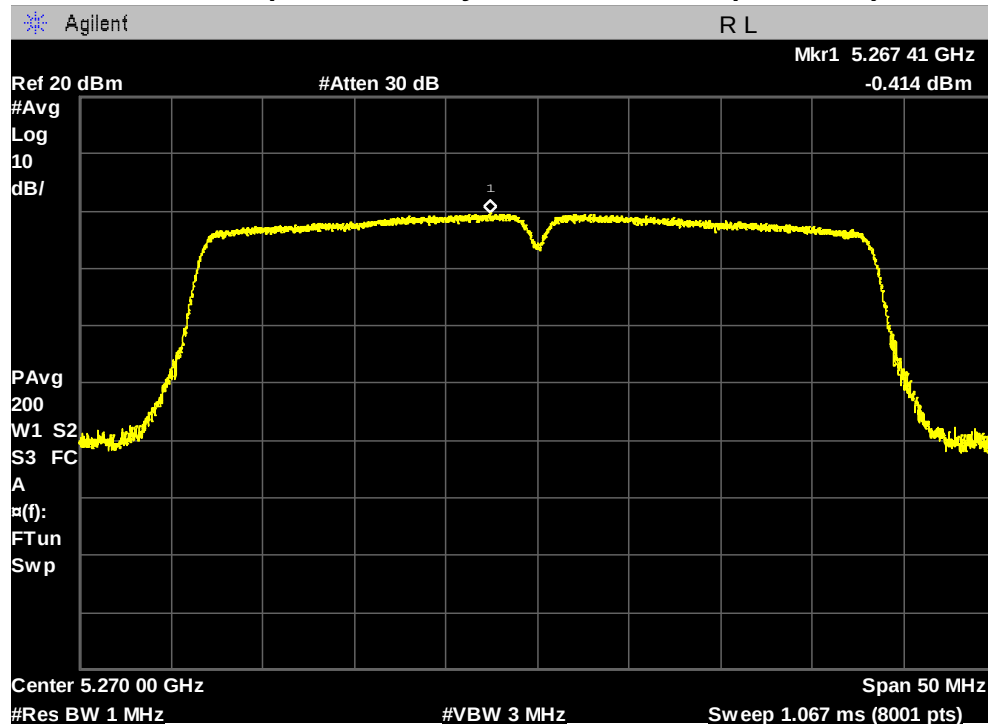
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5320 MHz)



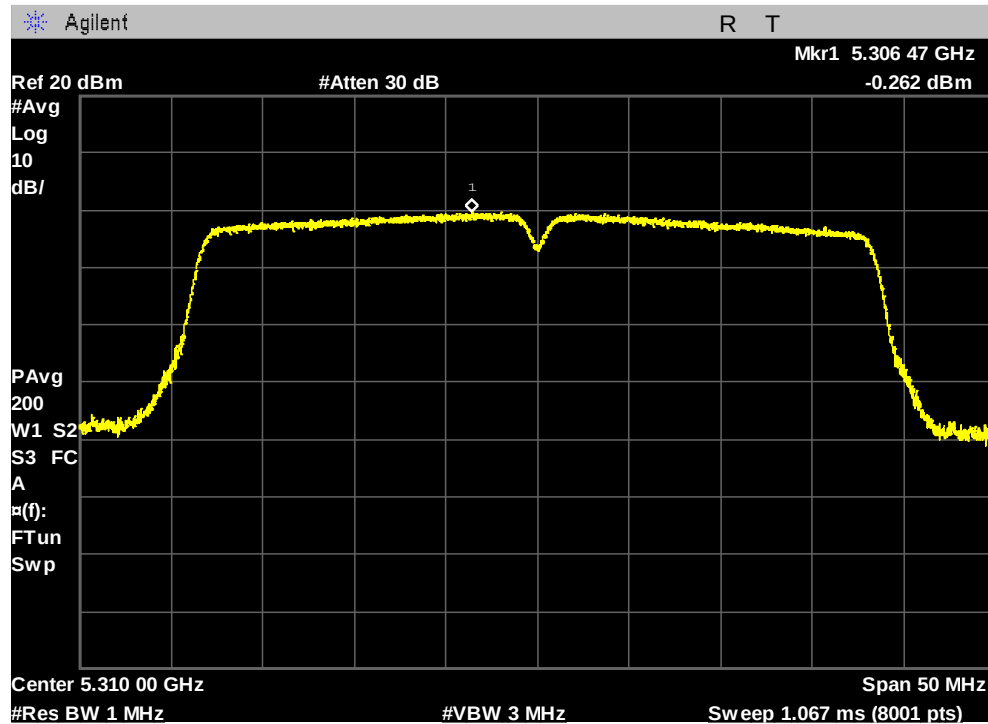
802.11n (40 MHz) mode 1TX

Maximum Power Spectral Density, Lowest Channel (5270 MHz)



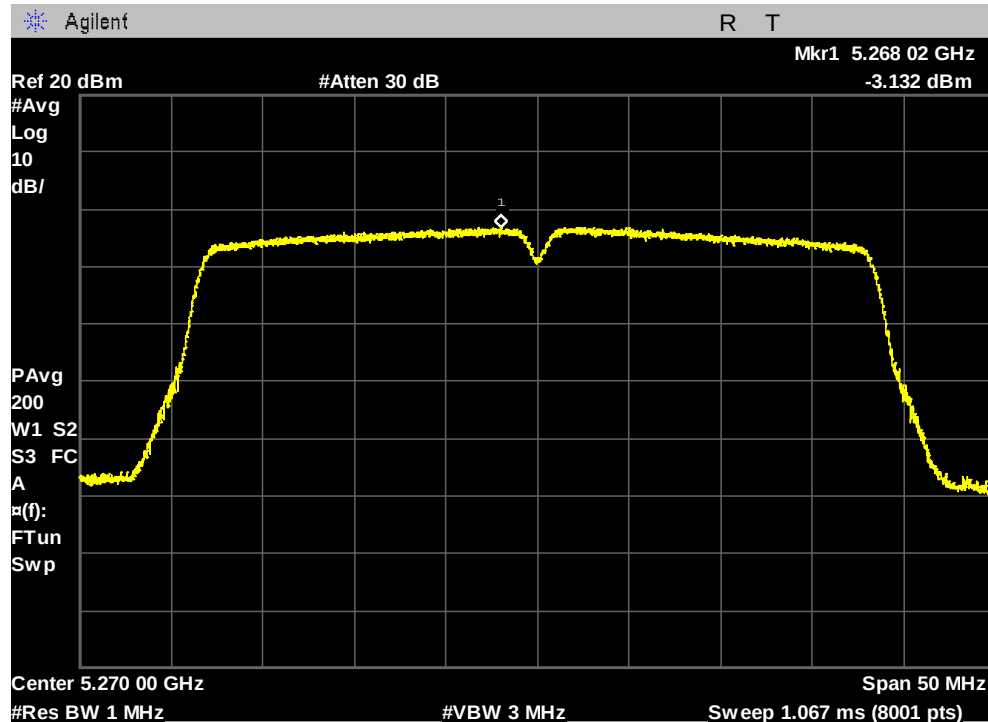
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5310 MHz)



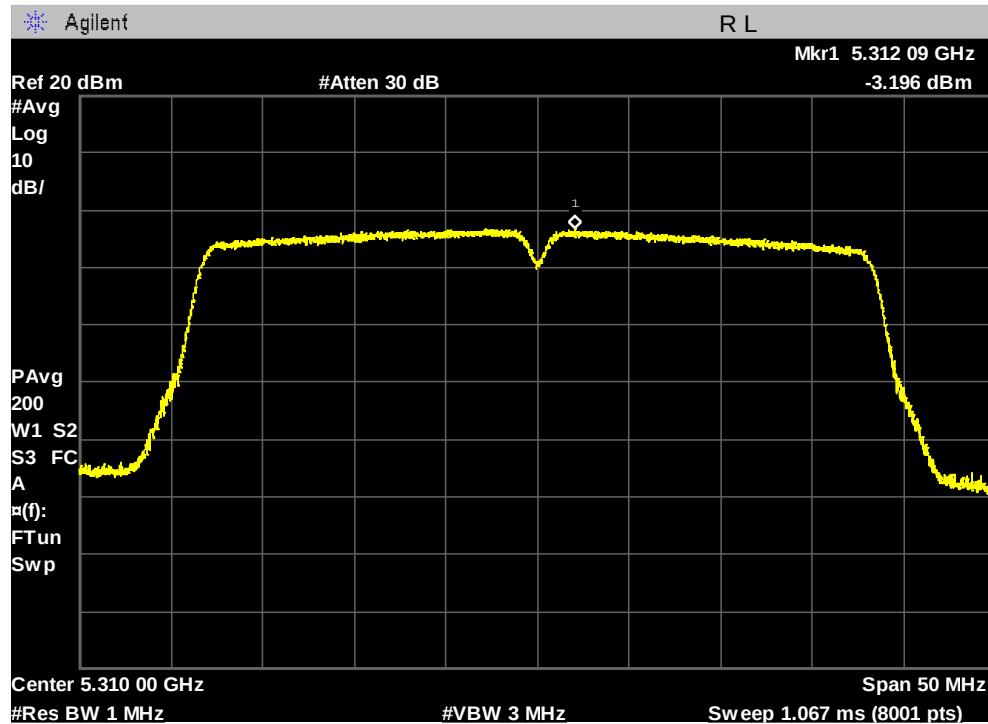
802.11n (40 MHz) mode 2TX

Maximum Power Spectral Density, Lowest Channel (5270 MHz)



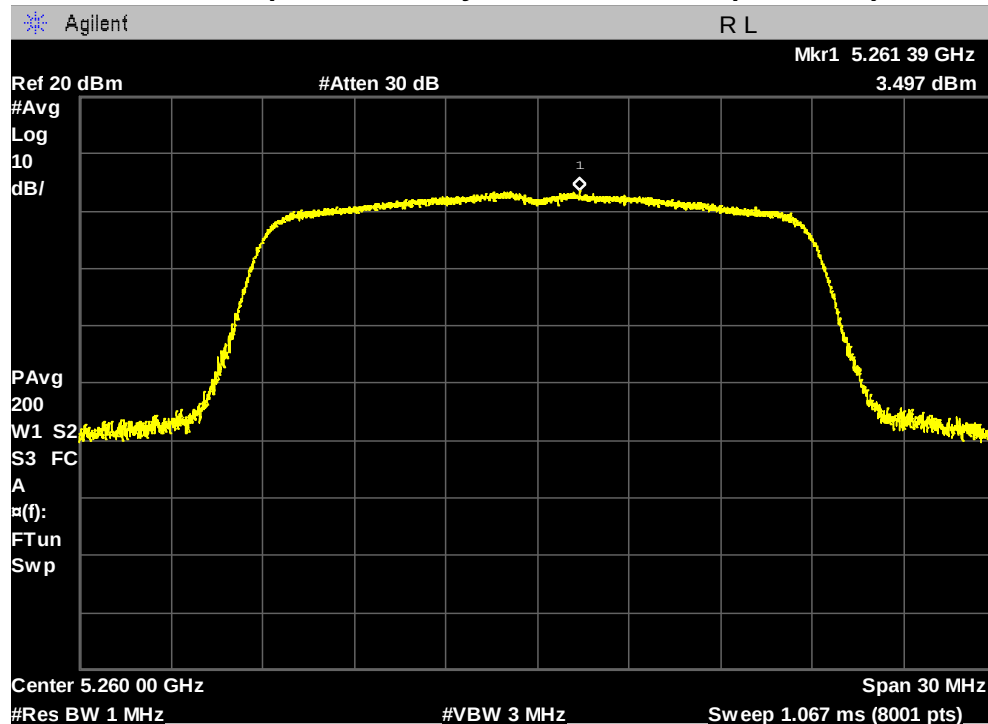
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5310 MHz)



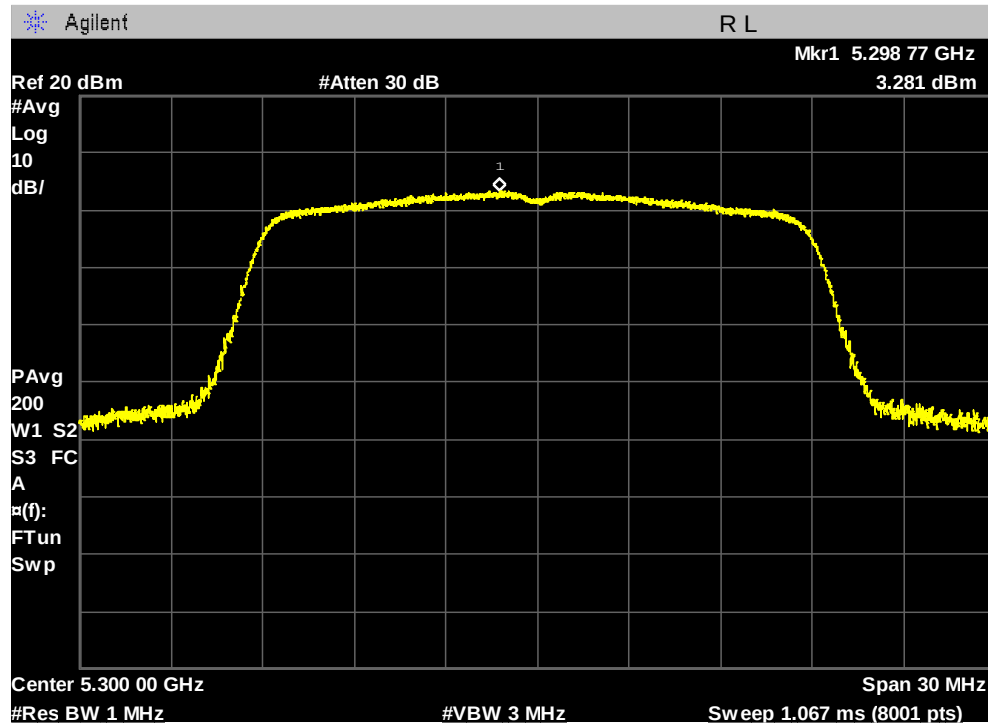
802.11ac (20 MHz) mode 1TX

Maximum Power Spectral Density, Lowest Channel (5260 MHz)

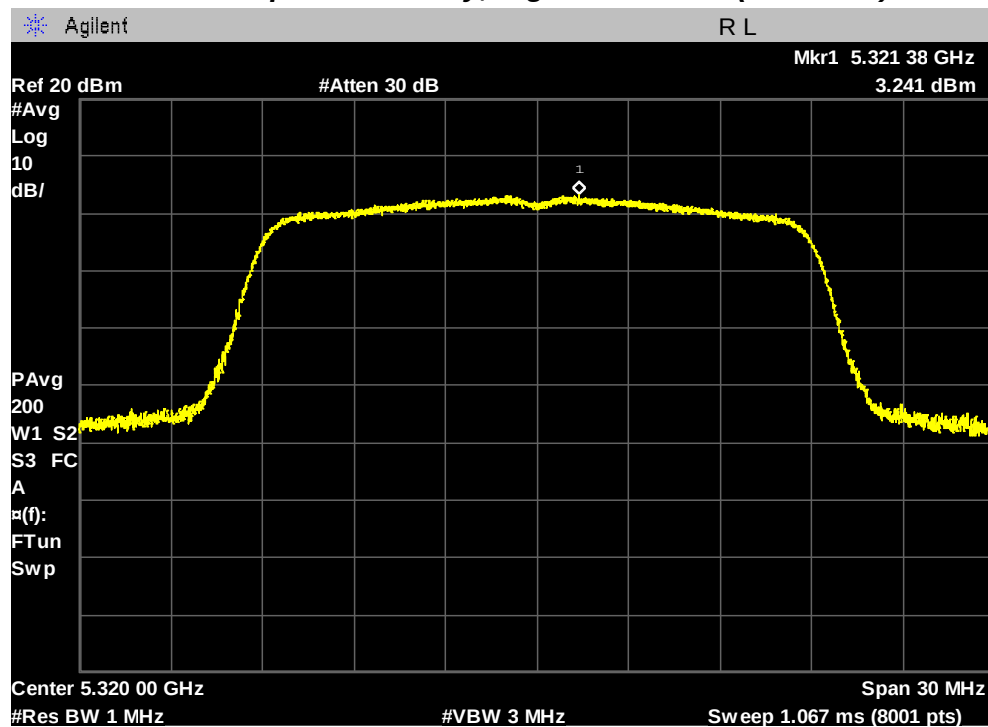


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Middle Channel (5300 MHz)



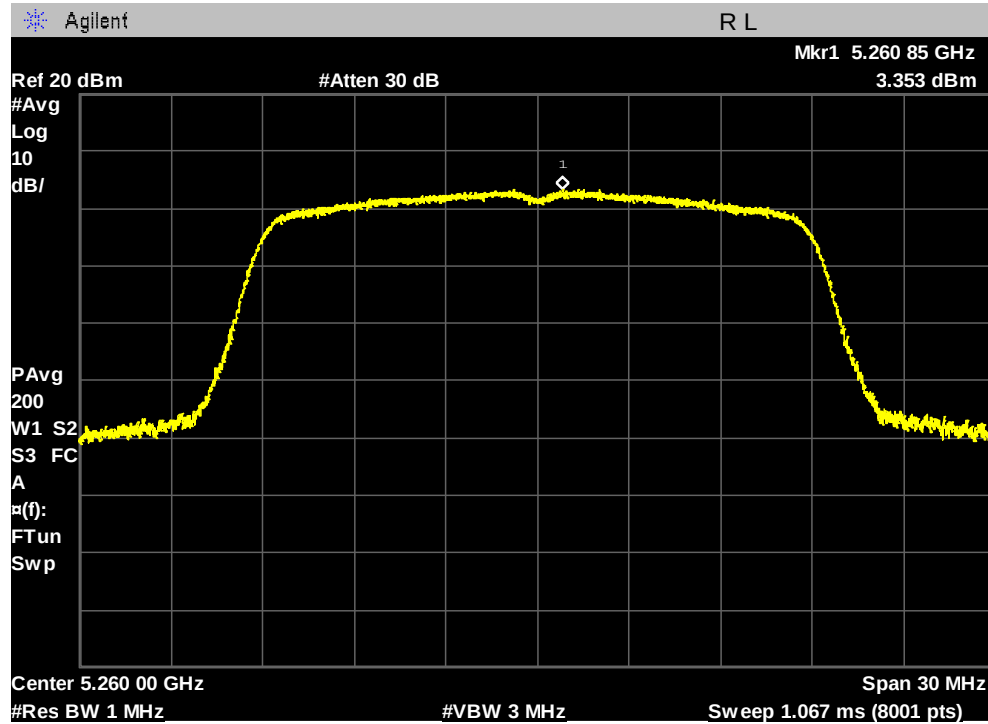
Maximum Power Spectral Density, Highest Channel (5320 MHz)



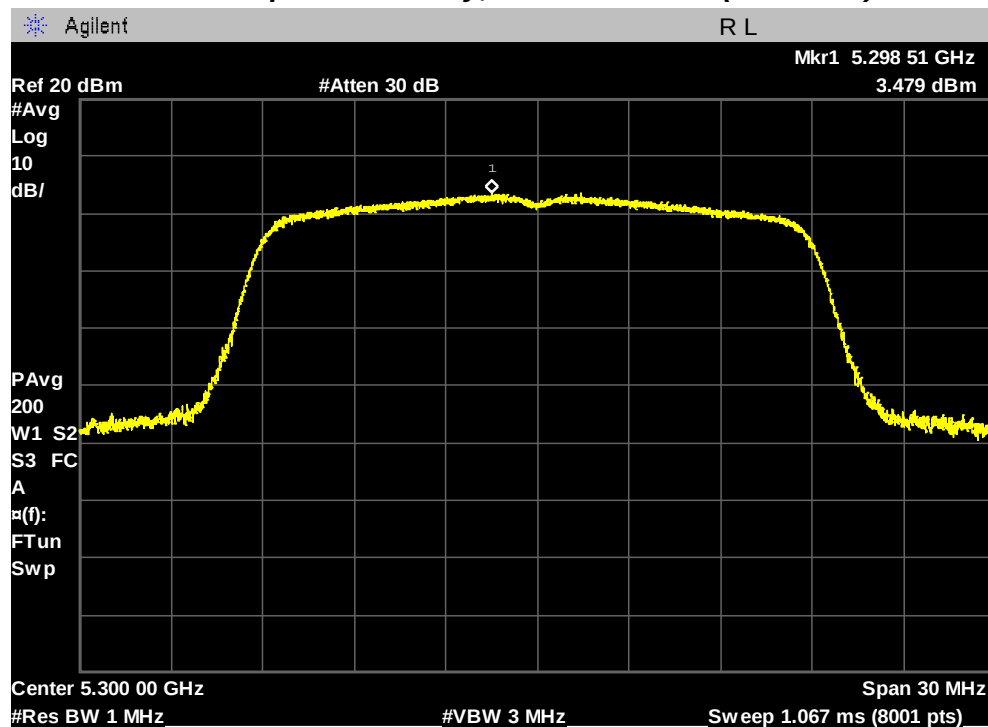
PLOTS OF EMISSIONS

802.11ac (20 MHz) mode 2TX

Maximum Power Spectral Density, Lowest Channel (5260 MHz)

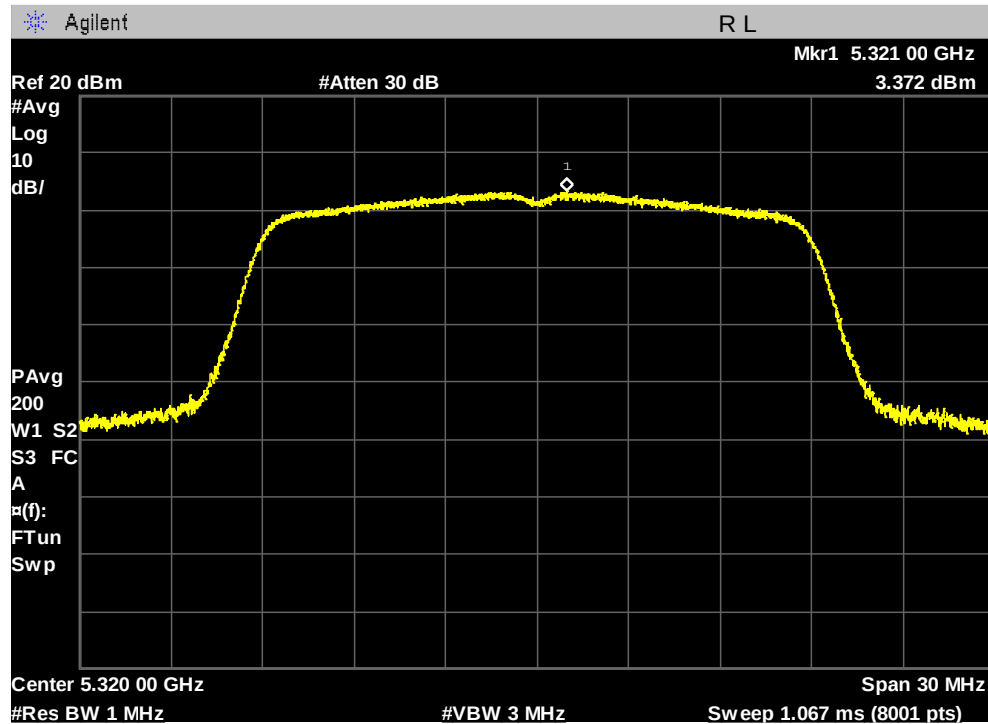


Maximum Power Spectral Density, Middle Channel (5300 MHz)



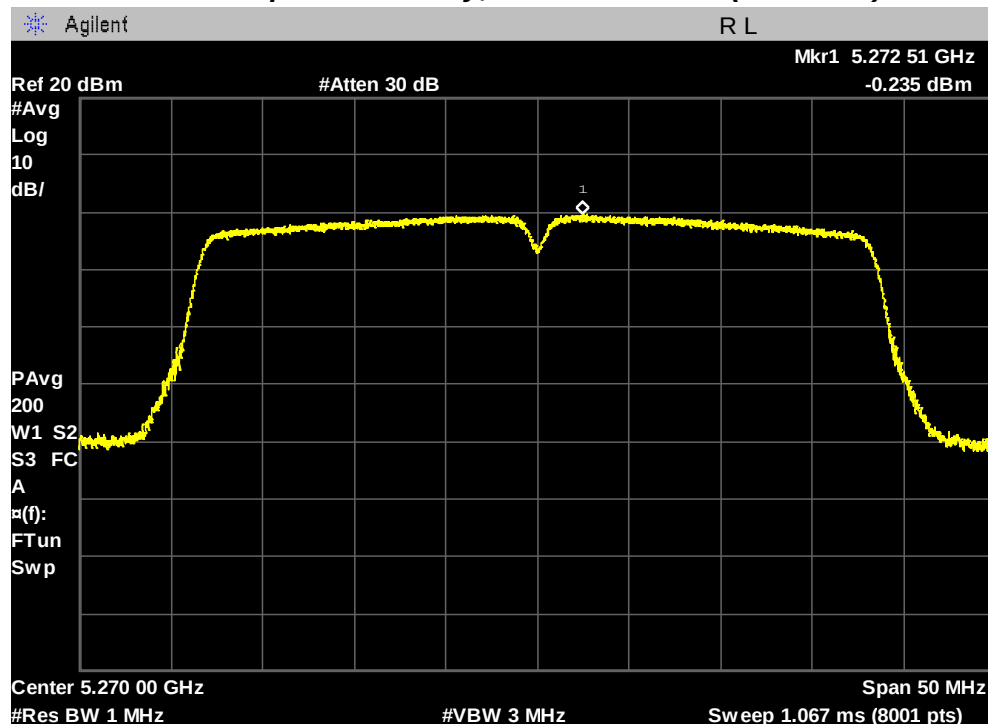
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5320 MHz)



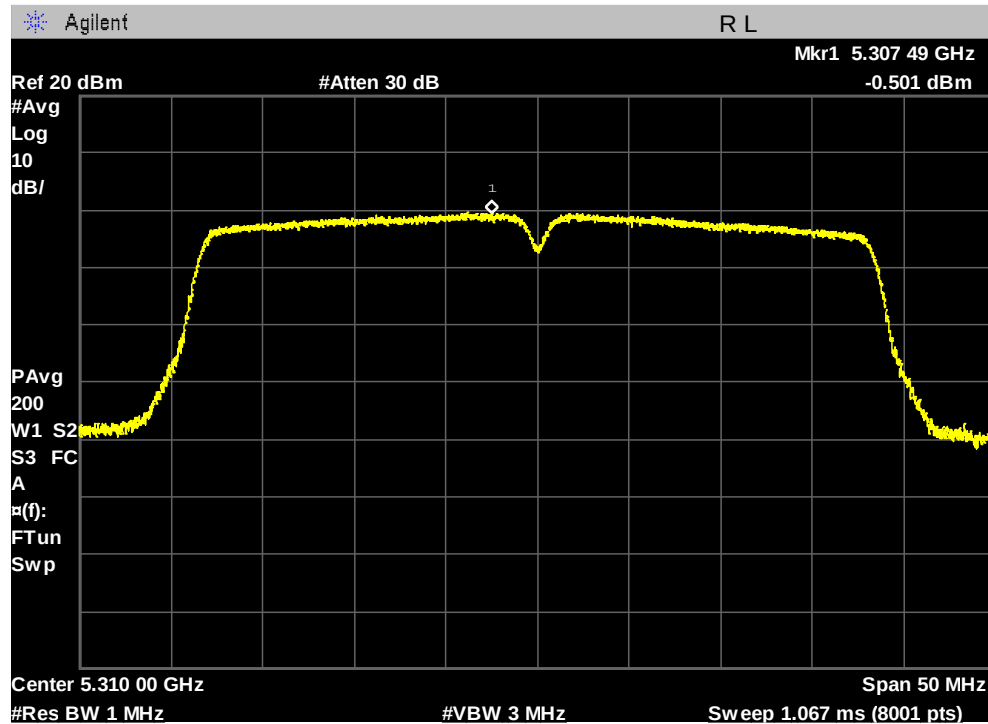
802.11ac (40 MHz) mode 1TX

Maximum Power Spectral Density, Lowest Channel (5270 MHz)



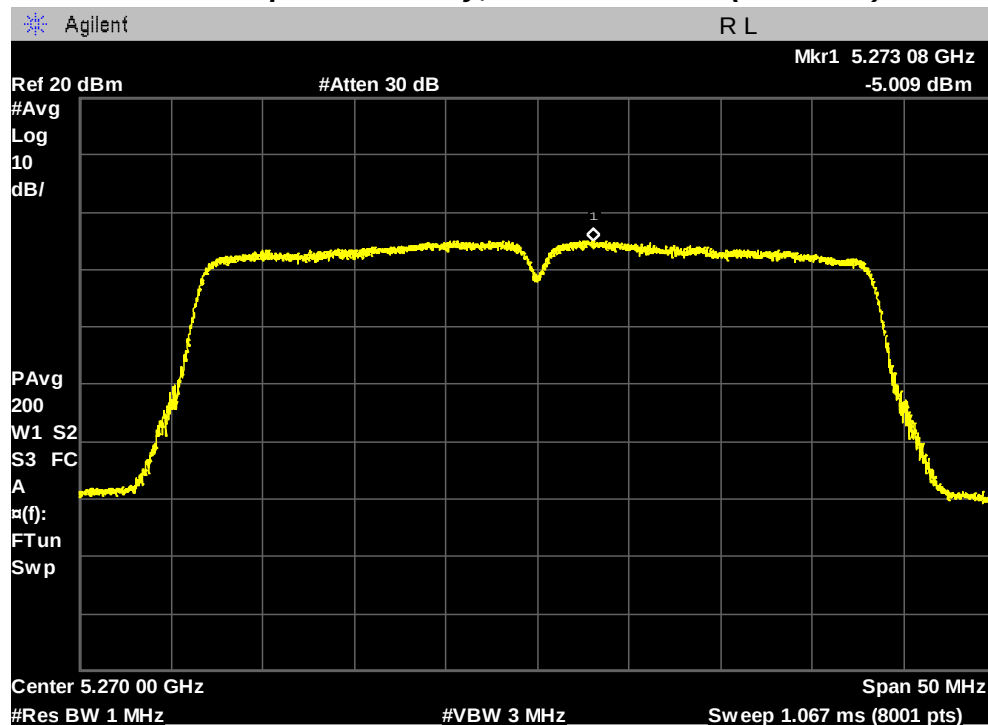
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5310 MHz)



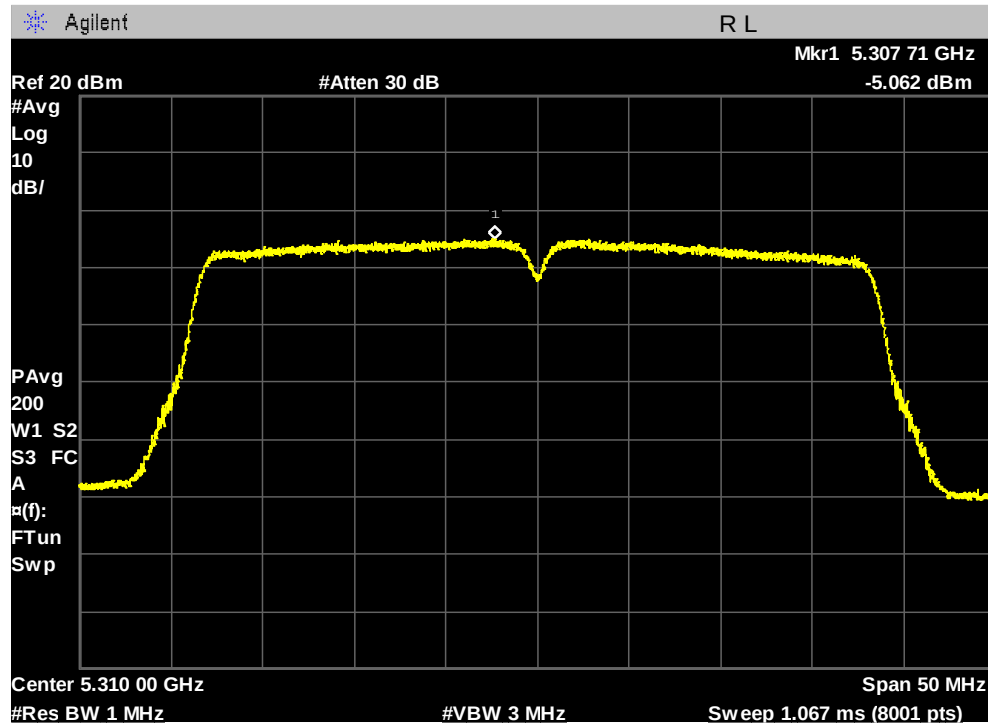
802.11ac (40 MHz) mode 2TX

Maximum Power Spectral Density, Lowest Channel (5270 MHz)



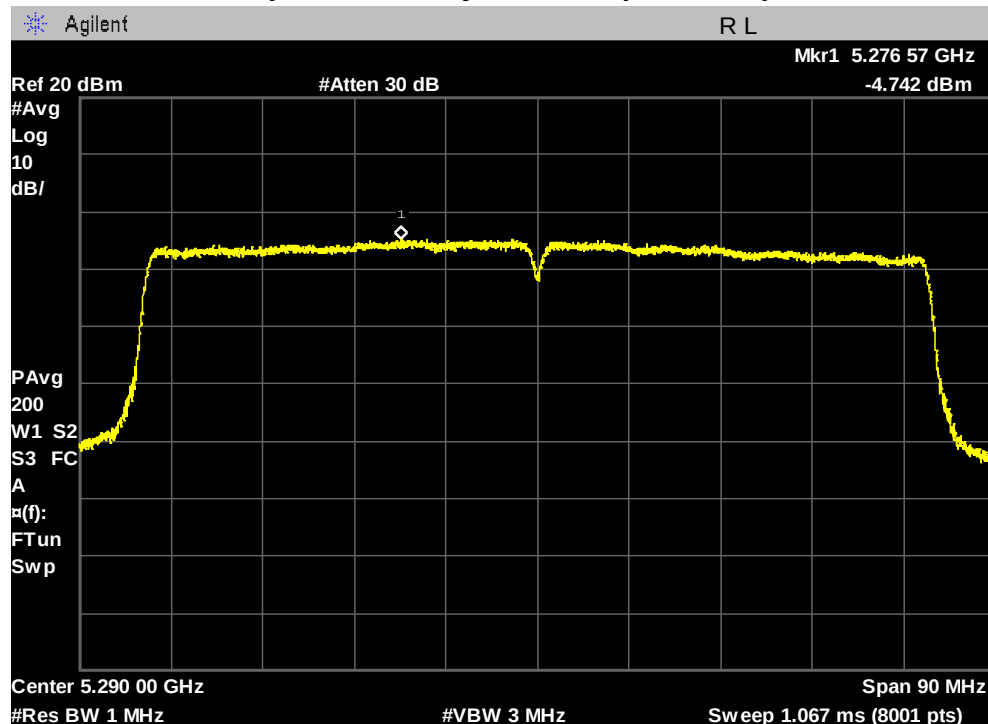
TEST DATA

Maximum Power Spectral Density, Highest Channel (5310 MHz)



802.11ac (80 MHz) mode 1TX

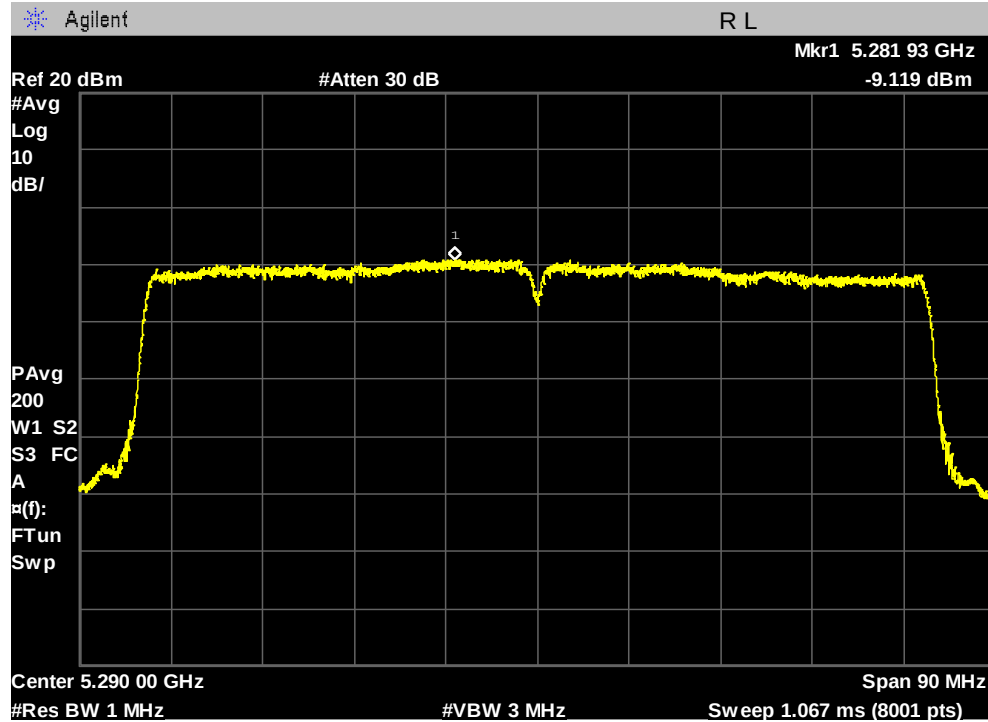
Maximum Power Spectral Density, Channel (5290 MHz)



TEST DATA

802.11ac (80 MHz) mode 2TX

Maximum Power Spectral Density, Channel (5290 MHz)



TEST DATA

8.5.3 Maximum Power Spectral Density – U-NII-2C band

FCC §15.407(a)

Test Mode : Set to Lowest channel, Middle channel and Highest channel, Straddle channel

802.11a mode_1TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
Lowest	5500	3.63	0.19	3.82	11.00
Middle	5600	4.23	0.19	4.42	11.00
Highest	5700	4.43	0.19	4.62	11.00
Straddle	5720	4.73	0.19	4.92	11.00

802.11n (20MHz) mode_1TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
Lowest	5500	3.73	0.21	3.94	11.00
Middle	5600	3.69	0.21	3.90	11.00
Highest	5700	4.14	0.21	4.35	11.00
Straddle	5720	4.38	0.21	4.59	11.00

TEST DATA

802.11n (20MHz) mode_2TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
				Total PSD	
Lowest	5500	0.23	0.21	3.45	11.00
Middle	5600	0.33	0.21	3.55	11.00
Highest	5700	0.77	0.21	3.99	11.00
Straddle	5720	1.15	0.21	4.37	11.00

802.11n (40MHz) mode_1TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
Lowest	5510	-0.09	0.40	0.31	11.00
Middle	5590	-0.04	0.40	0.36	11.00
Highest	5670	-0.54	0.40	-0.14	11.00
Straddle	5710	0.83	0.40	1.23	11.00

802.11n (40MHz) mode_2TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
				Total PSD	
Lowest	5510	-2.87	0.40	0.54	11.00
Middle	5590	-3.02	0.40	0.39	11.00
Highest	5670	-3.09	0.40	0.32	11.00
Straddle	5710	-2.00	0.40	1.41	11.00

TEST DATA

802.11ac (20MHz) mode_1TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
Lowest	5500	3.21	0.20	3.41	11.00
Middle	5600	3.79	0.20	3.99	11.00
Highest	5700	4.03	0.20	4.23	11.00
Straddle	5720	4.30	0.20	4.50	11.00

802.11ac (20MHz) mode_2TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
				Total PSD	
Lowest	5500	-0.34	0.20	2.87	11.00
Middle	5600	-0.03	0.20	3.18	11.00
Highest	5700	0.16	0.20	3.37	11.00
Straddle	5720	1.09	0.20	4.30	11.00

802.11ac (40MHz) mode_1TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
Lowest	5510	-0.12	0.41	0.29	11.00
Middle	5590	-0.26	0.41	0.15	11.00
Highest	5670	-0.76	0.41	-0.35	11.00
Straddle	5710	0.63	0.41	1.04	11.00

TEST DATA

802.11ac (40MHz) mode_2TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
				Total PSD	
Lowest	5510	-3.93	0.41	-0.51	11.00
Middle	5590	-3.87	0.41	-0.45	11.00
Highest	5670	-4.40	0.41	-0.98	11.00
Straddle	5710	-2.97	0.41	0.45	11.00

802.11ac (80MHz) mode_1TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
Lowest	5530	-4.65	0.77	-3.88	11.00
Highest	5610	-4.46	0.77	-3.69	11.00
Straddle	5690	-4.92	0.77	-4.15	11.00

802.11ac (80MHz) mode_2TX

Channel	Frequency (MHz)	Measured PSD (dBm/MHz)	Duty Factor (dB)	Maximum PSD (dBm/MHz)	FCC Limit (dBm/MHz)
				Total PSD	
Lowest	5530	-8.4	0.77	-4.62	11.00
Highest	5610	-8.82	0.77	-5.04	11.00
Straddle	5690	-9.36	0.77	-5.58	11.00

TEST DATA

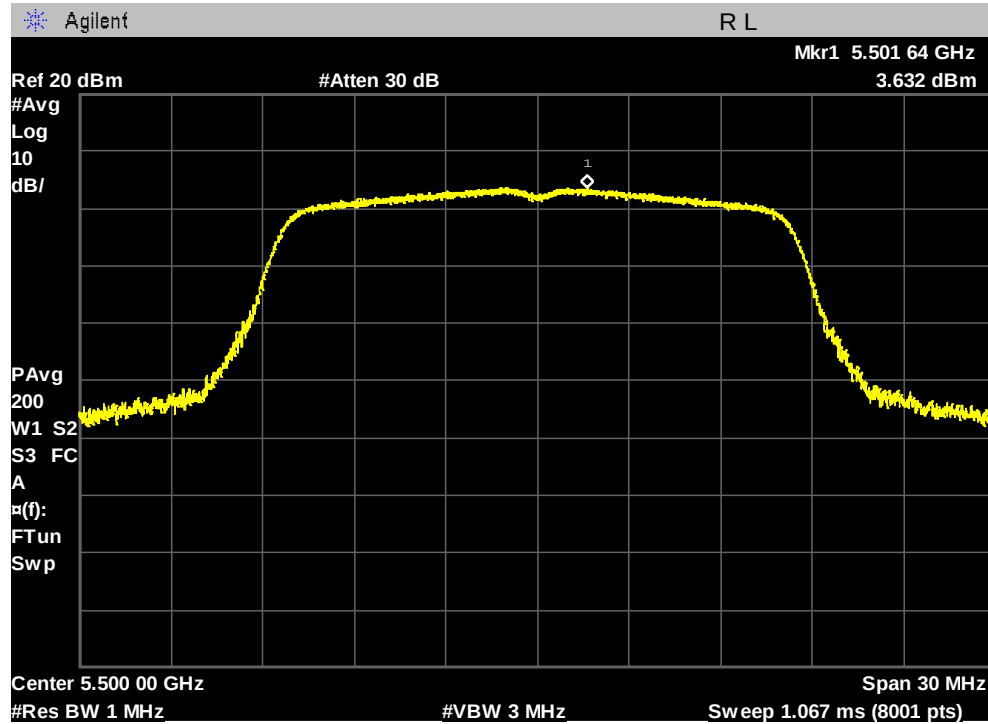
Note:

1. Maximum PSD = Measured PSD + Duty Factor
2. "Measure and add $10 \log(N_{ANT})$ dB, where N_{ANT} is the number of outputs" was used for measuring in-band Total PSD.
 $Total\ PSD = Measured\ PSD + duty\ factor + 10 \log(N_{ANT})$
3. For CDD transmission, directional gain is. **5.81 dBi**
For MIMO transmission, directional gain is **2.8 dBi**.
Directional gain was calculated according to KDB662911 D01 Multiple Transmitter Output v02r01.
For power spectral density (PSD) measurements on all devices employing CDD, directional gain is as follows,
Directional gain = $G_{ANT} + Array\ Gain = 2.8\ dBi + 3.01\ dB = 5.81\ dBi$
Array Gain = $10 \log(N_{ANT}/N_{SS})\ dB = 10 \log(2/1) = 3.01\ dB$
where N_{SS} = the number of independent spatial streams of data and G_{ANT} is the antenna gain in dBi.
For CDD mode of this device, $N_{SS}=1$.
For power spectral density (PSD) measurements on all devices employing MIMO, directional gain is as follows,
Directional gain = $G_{ANT} + 10 \log(N_{ANT}/N_{SS})\ dB = 2.8\ dBi + 10 \log(2/2)\ dB = 2.8\ dBi$
where N_{SS} = the number of independent spatial streams of data and G_{ANT} is the antenna gain in dBi
For this device, MIMO mode means SM-MIMO(Spatial Multiplexing) transmission and $N_{SS}=2$.
4. For FCC PSD Limit, If transmitting antennas of directional gain greater than 6 dBi was used, maximum power spectral density was reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
5. Power Spectral Density(PSD) was measured by same method with conducted output power according to II.F.1 in KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
6. The following equation was used for spectrum offset:
 $Spectrum\ offset\ (dB) = Attenuator\ (dB) + Cable\ Loss\ (dB) + SMA\ Type\ Connector\ Loss\ (dB)$

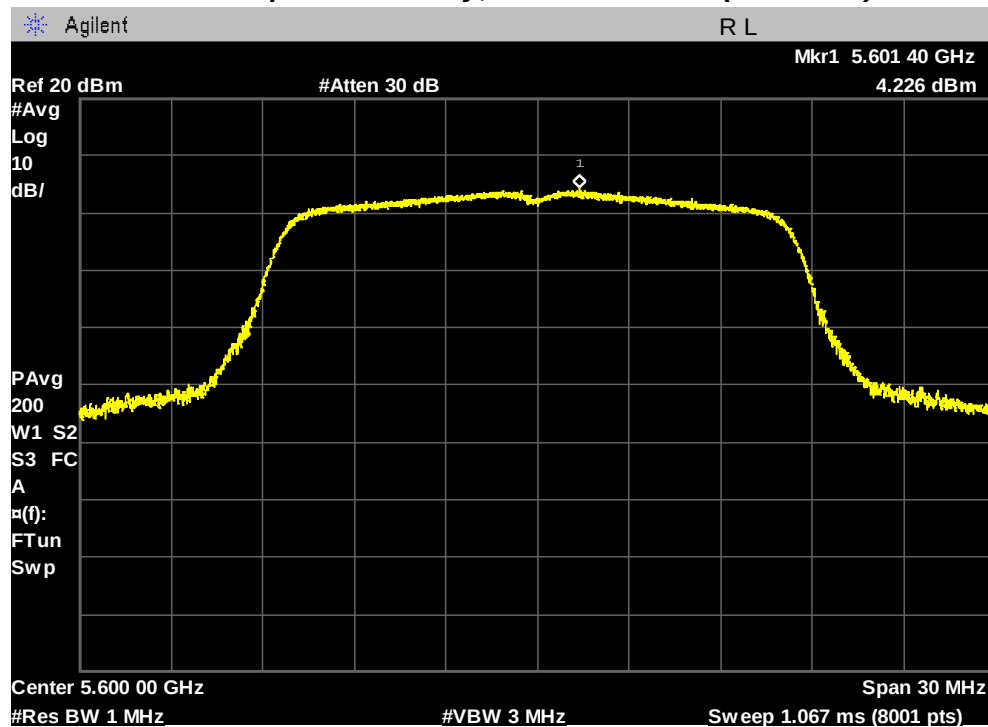
PLOTS OF EMISSIONS

802.11a mode 1TX

Maximum Power Spectral Density, Lowest Channel (5500 MHz)

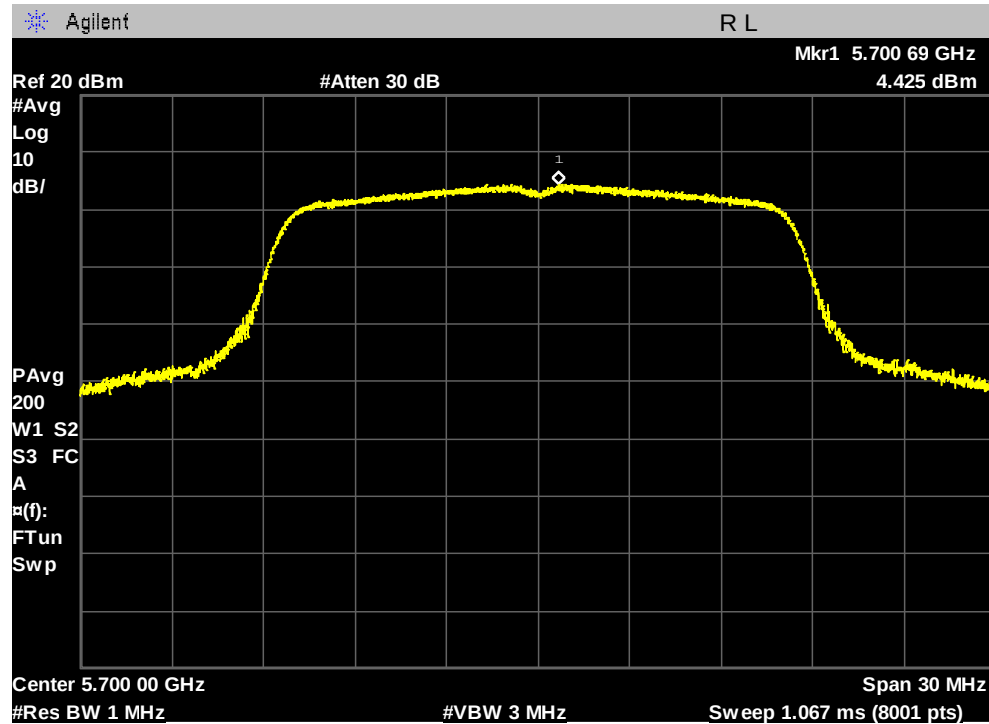


Maximum Power Spectral Density, Middle Channel (5600 MHz)

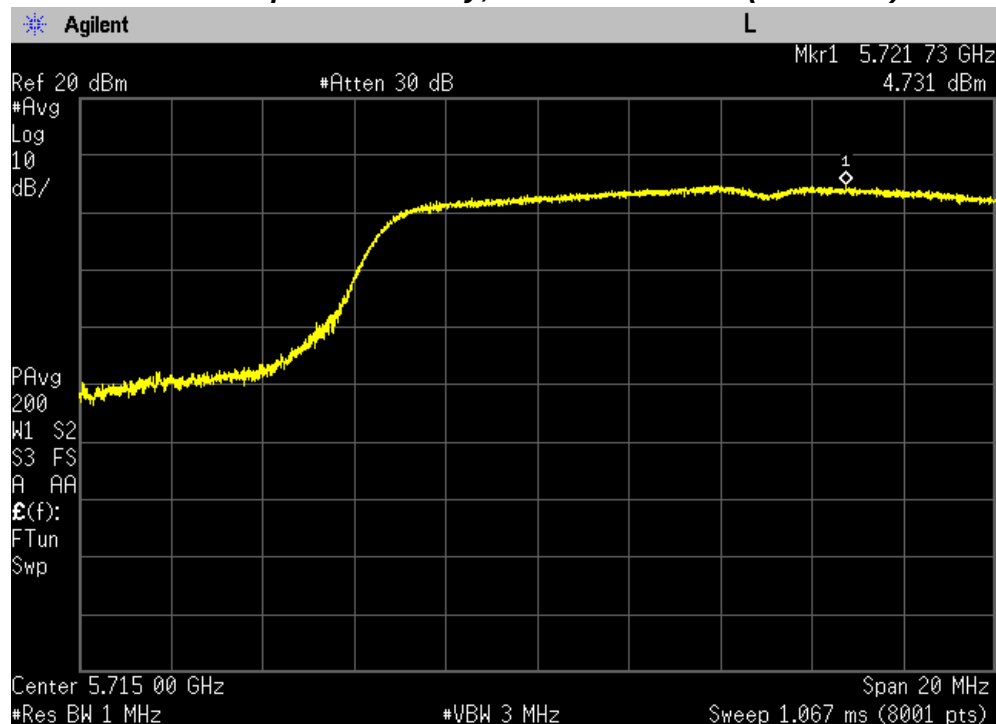


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5700 MHz)



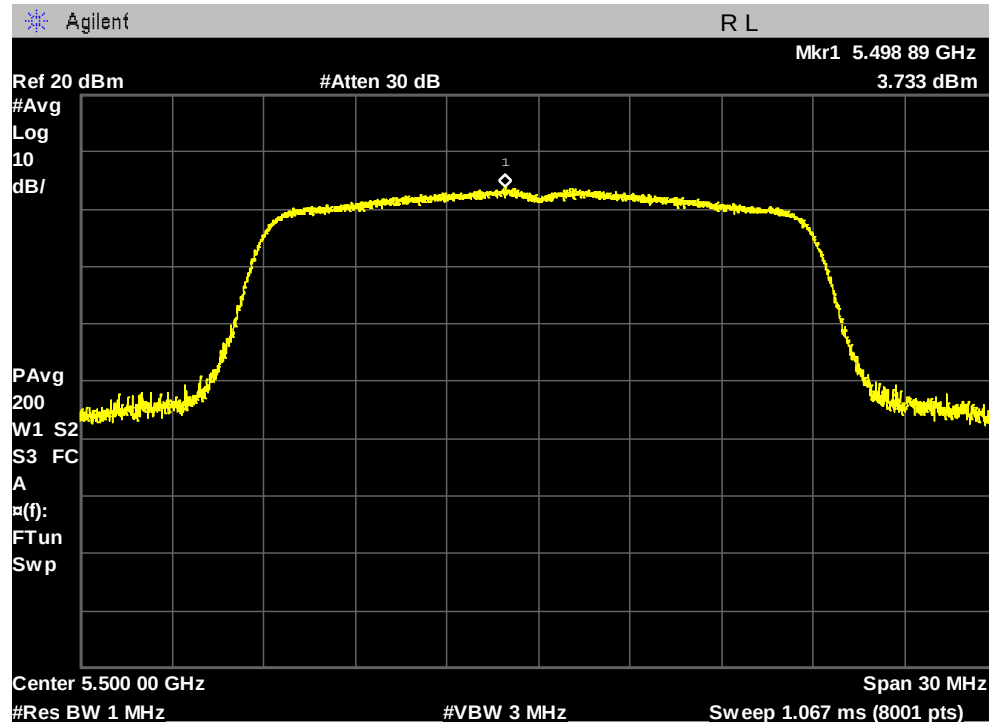
Maximum Power Spectral Density, Straddle Channel (5720 MHz)



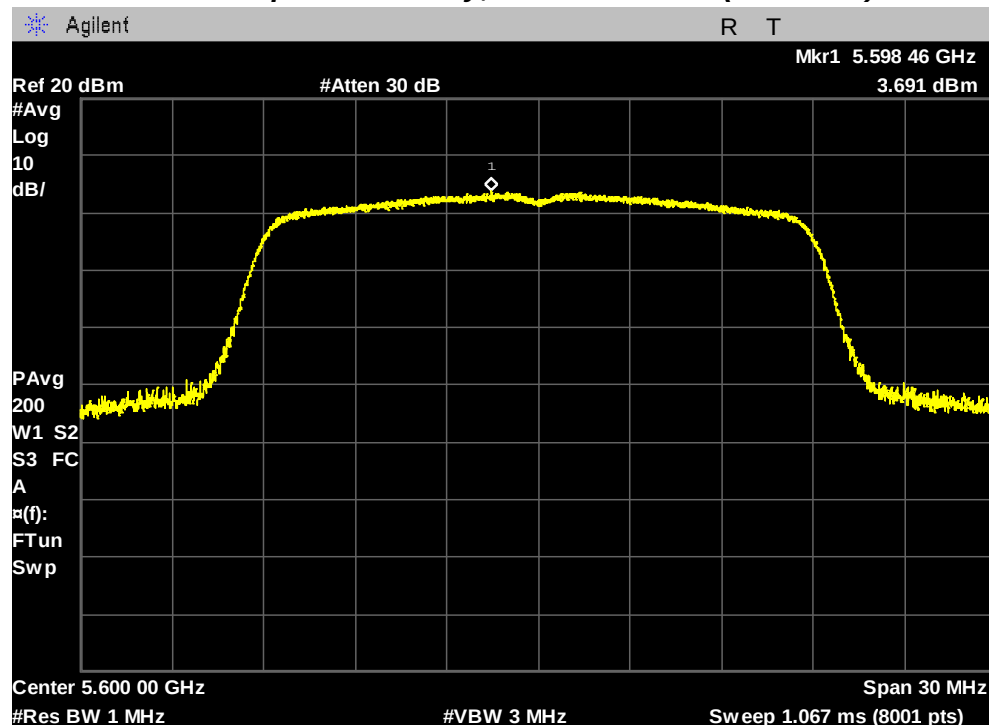
PLOTS OF EMISSIONS

802.11n (20 MHz) mode 1TX

Maximum Power Spectral Density, Lowest Channel (5500 MHz)

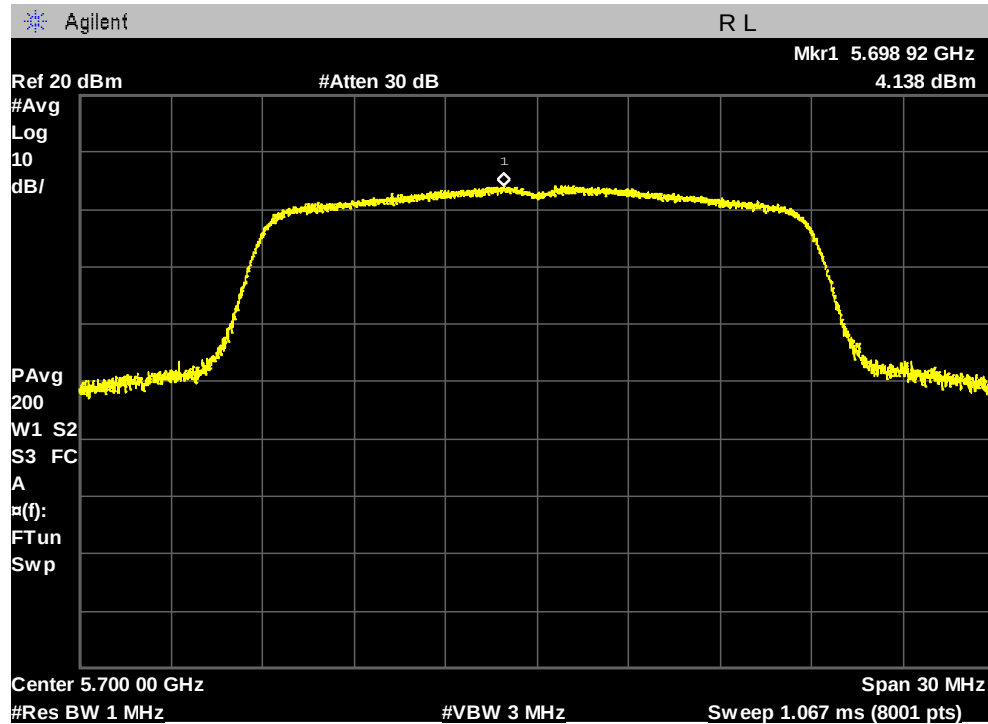


Maximum Power Spectral Density, Middle Channel (5600 MHz)

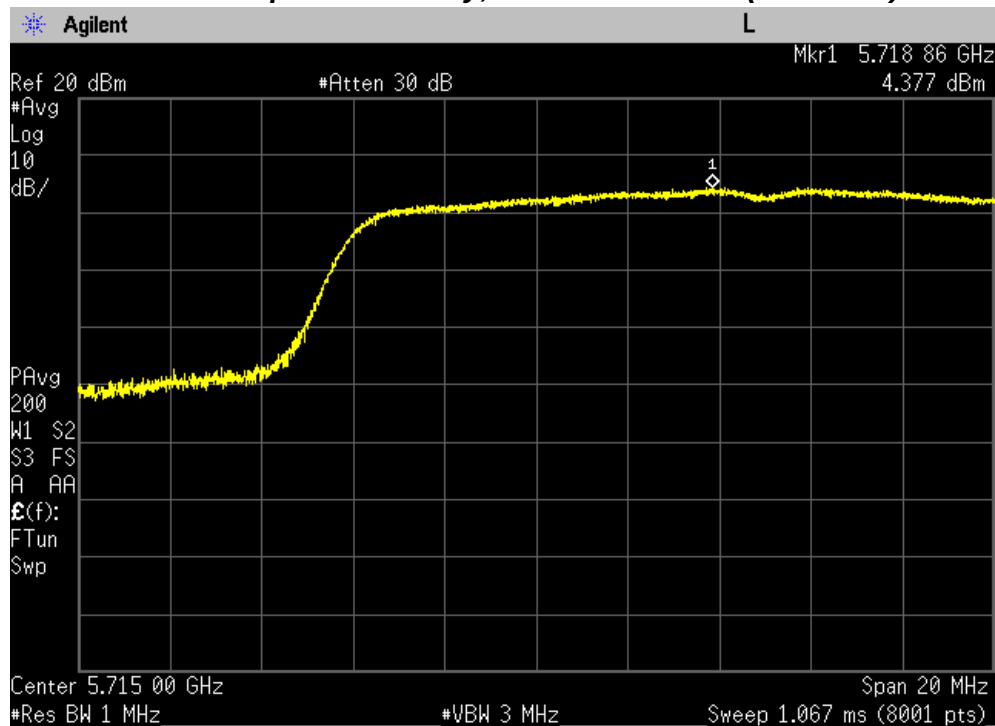


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5700 MHz)



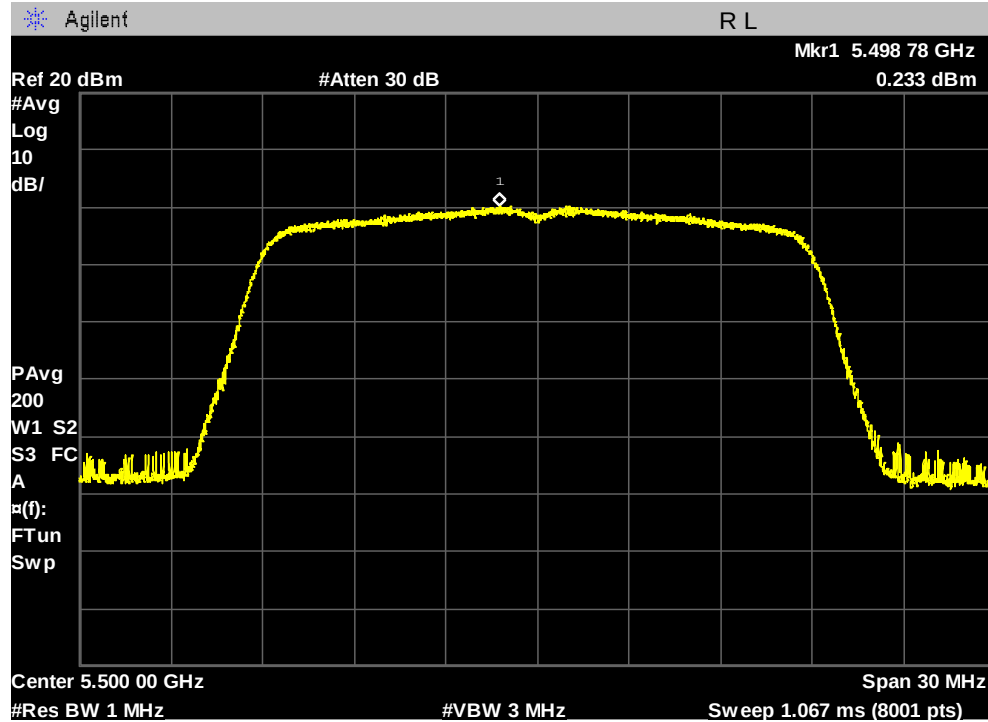
Maximum Power Spectral Density, Straddle Channel (5720 MHz)



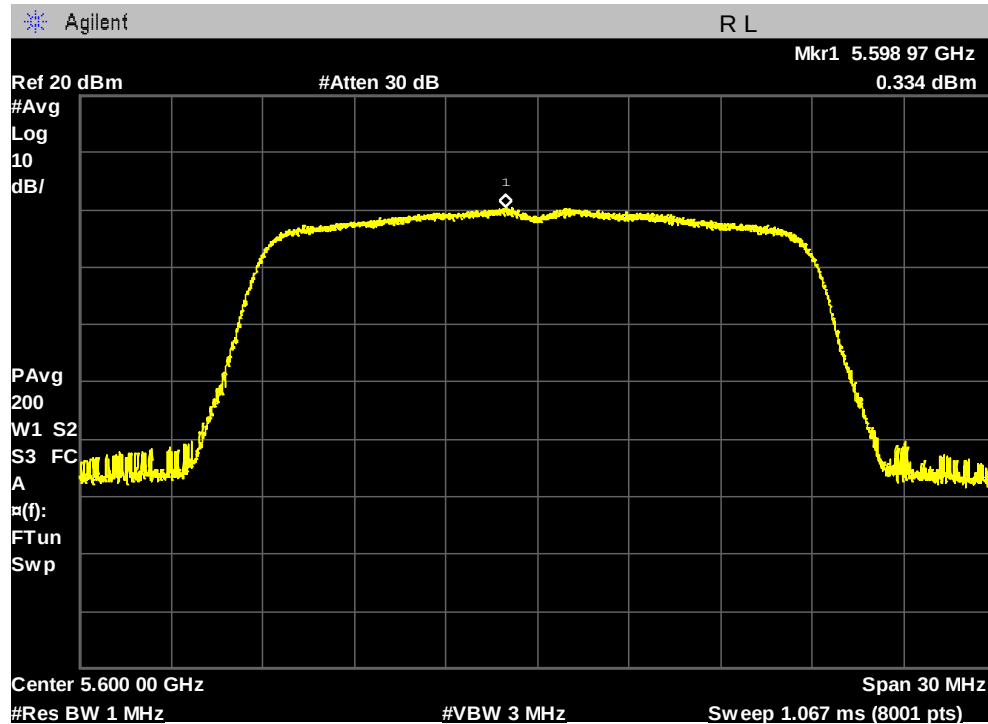
PLOTS OF EMISSIONS

802.11n (20 MHz) mode 2TX

Maximum Power Spectral Density, Lowest Channel (5500 MHz)

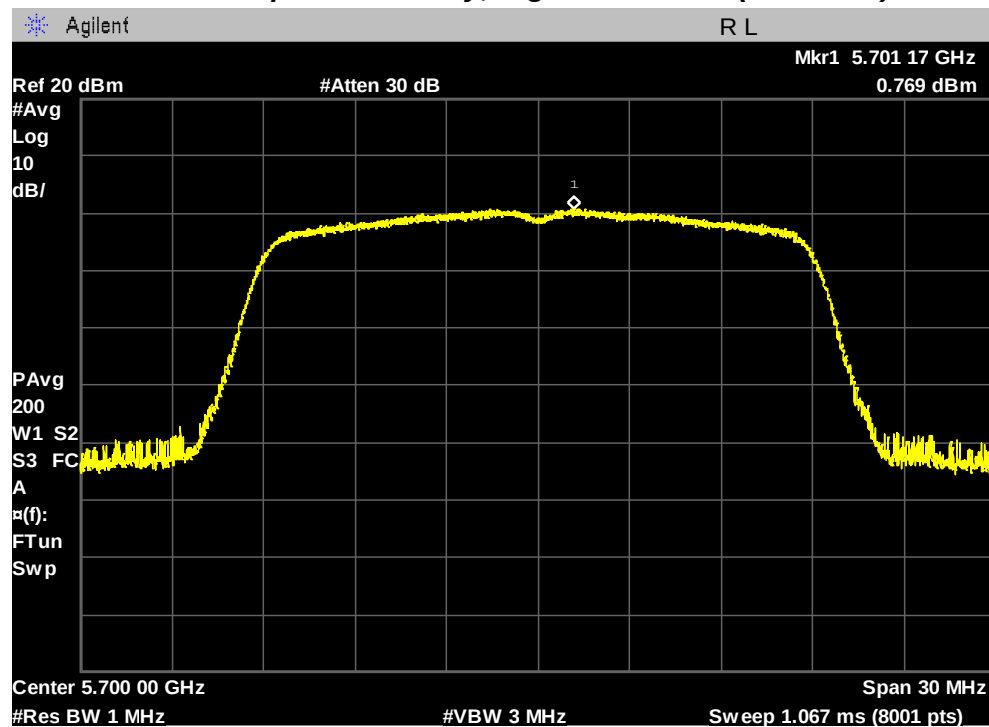


Maximum Power Spectral Density, Middle Channel (5600 MHz)

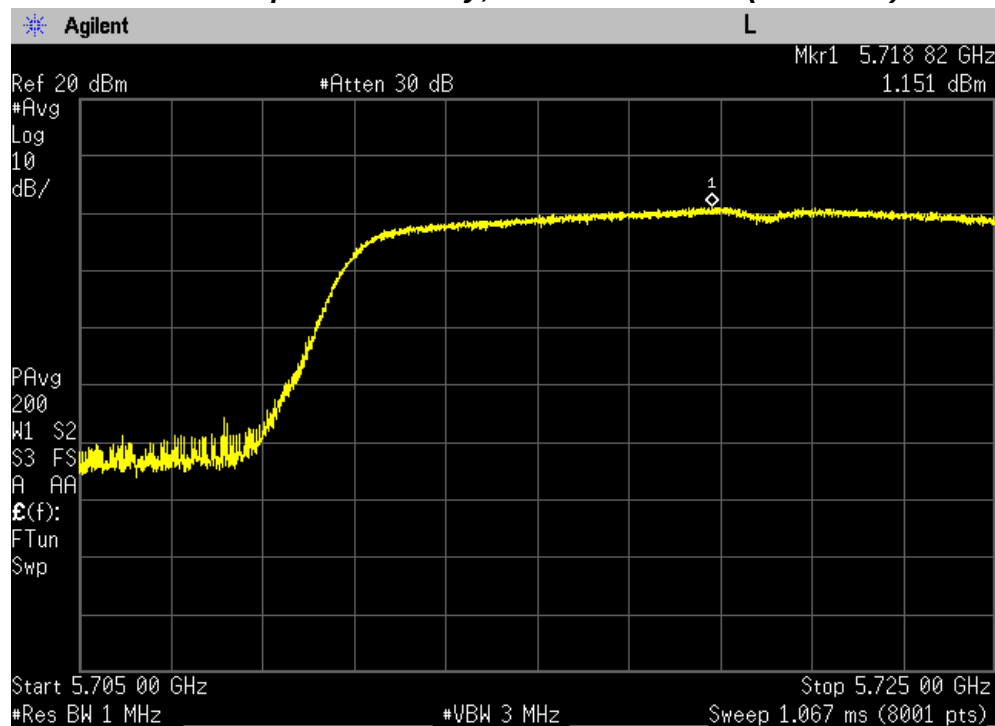


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5700 MHz)



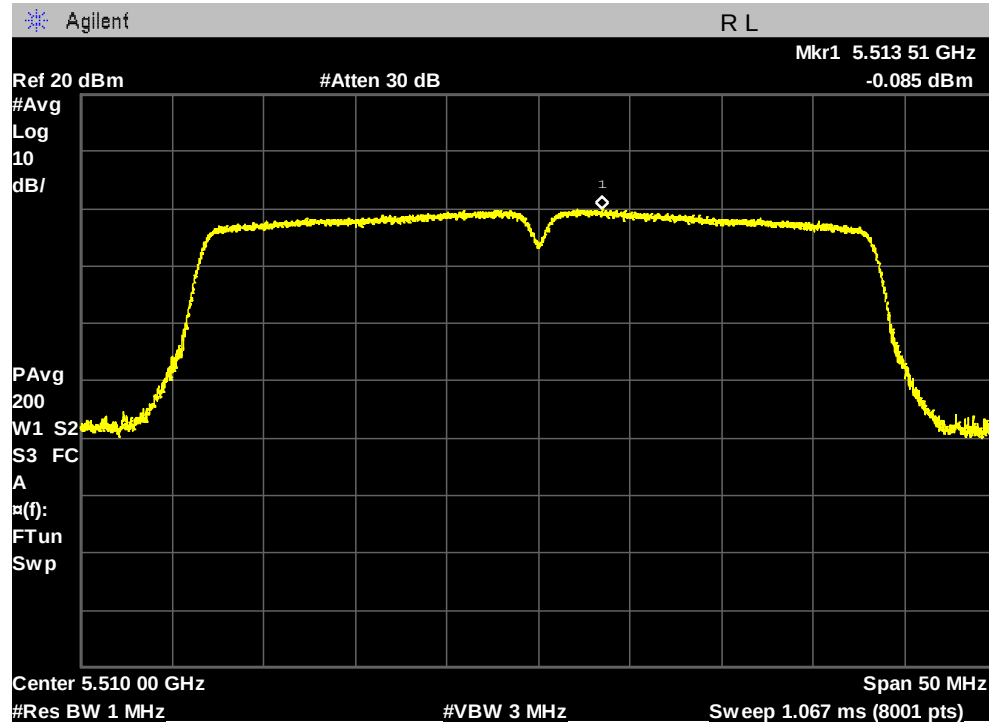
Maximum Power Spectral Density, Straddle Channel (5720 MHz)



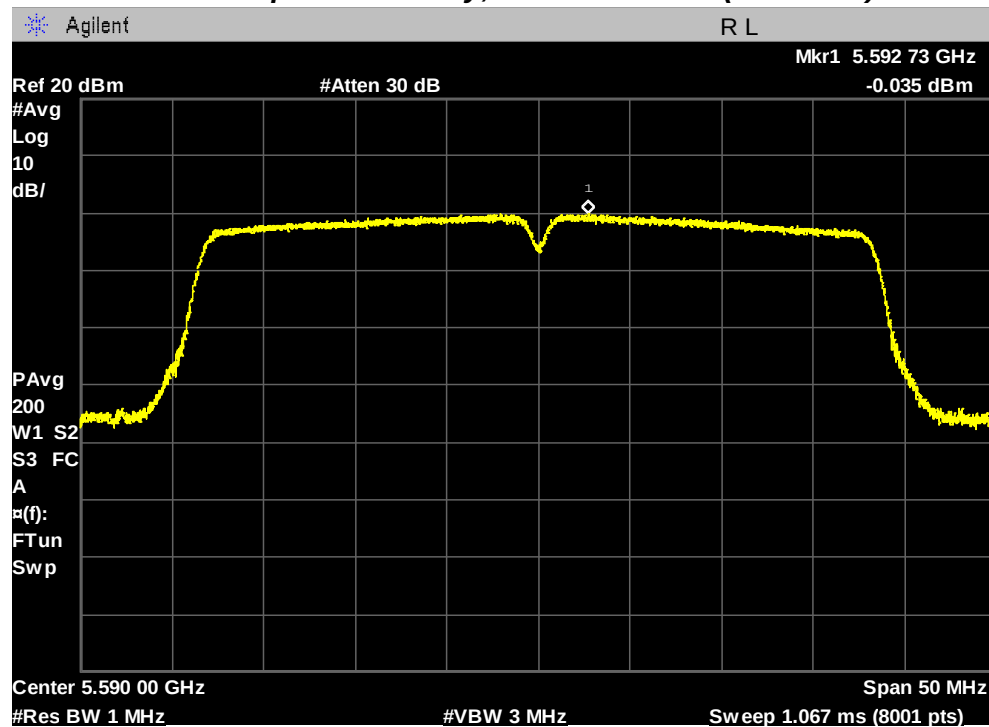
PLOTS OF EMISSIONS

802.11n (40 MHz) mode 1TX

Maximum Power Spectral Density, Lowest Channel (5510 MHz)

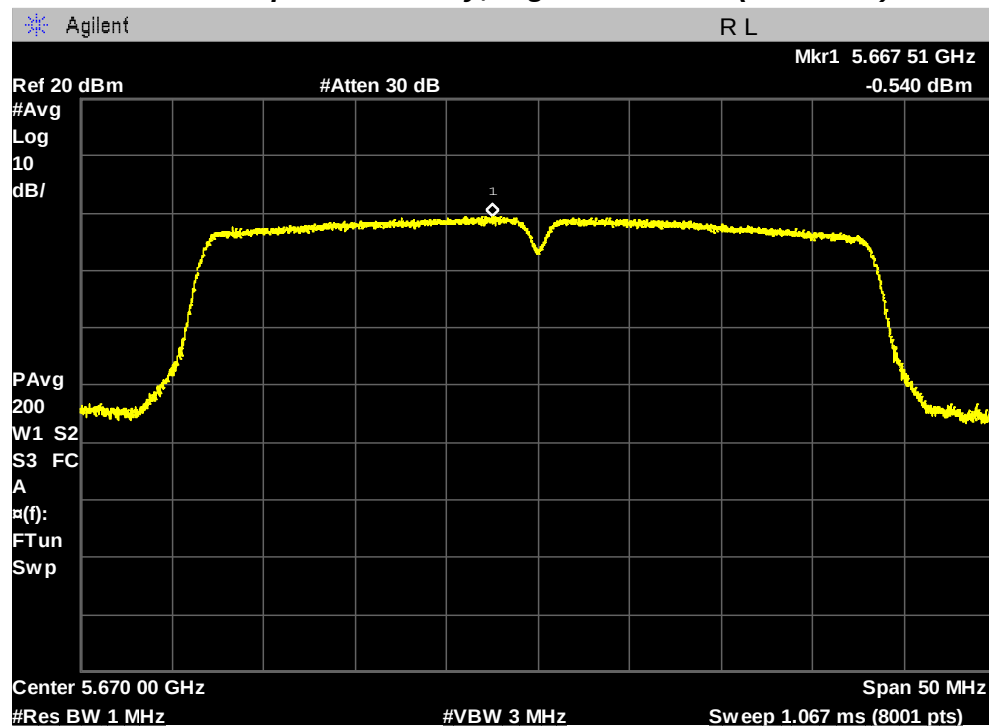


Maximum Power Spectral Density, Middle Channel (5590 MHz)

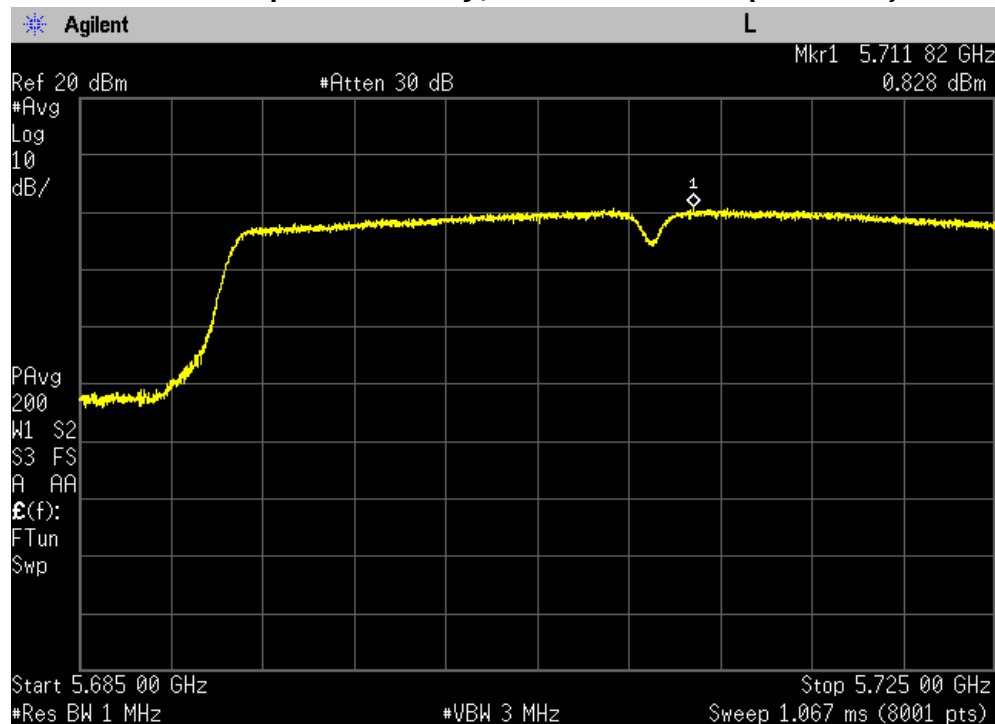


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5670 MHz)



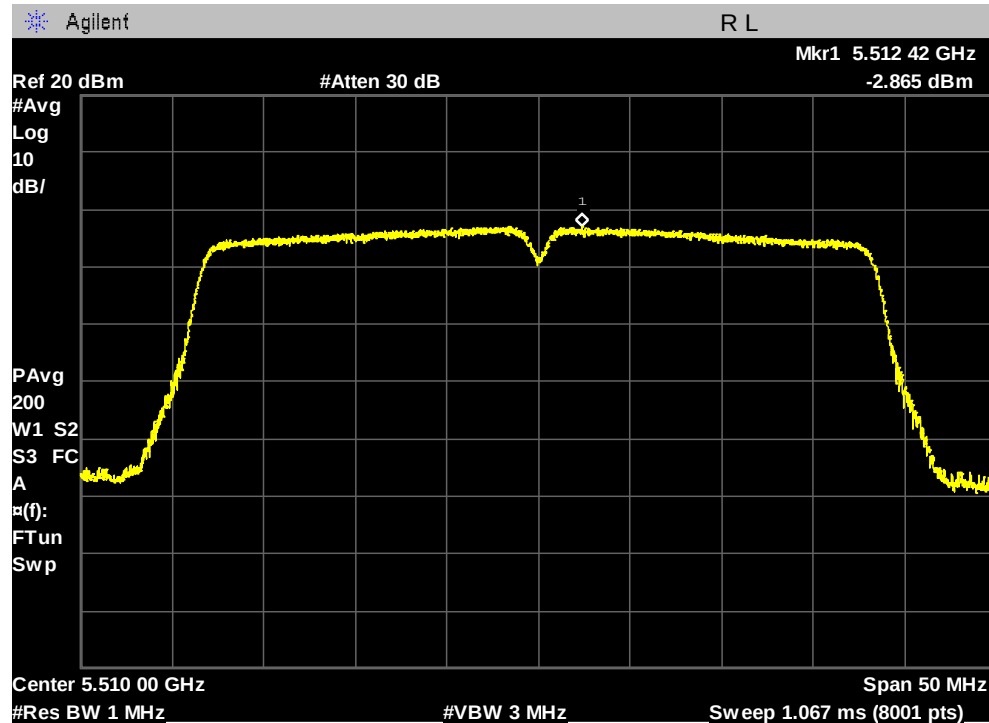
Maximum Power Spectral Density, Straddle Channel (5710 MHz)



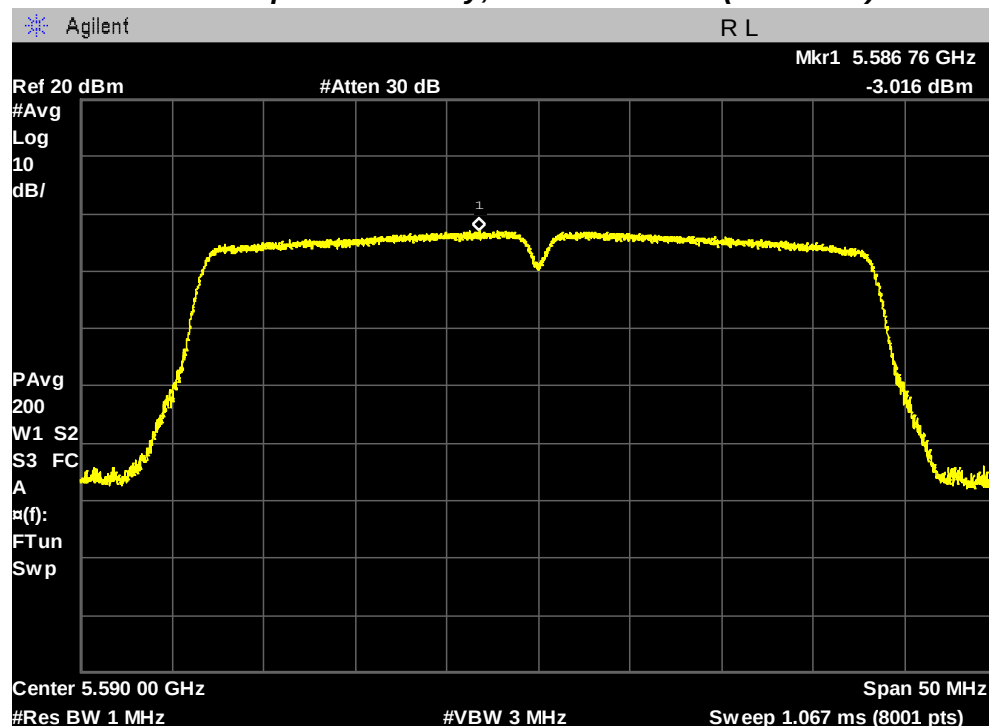
PLOTS OF EMISSIONS

802.11n (40 MHz) mode 2TX

Maximum Power Spectral Density, Lowest Channel (5510 MHz)

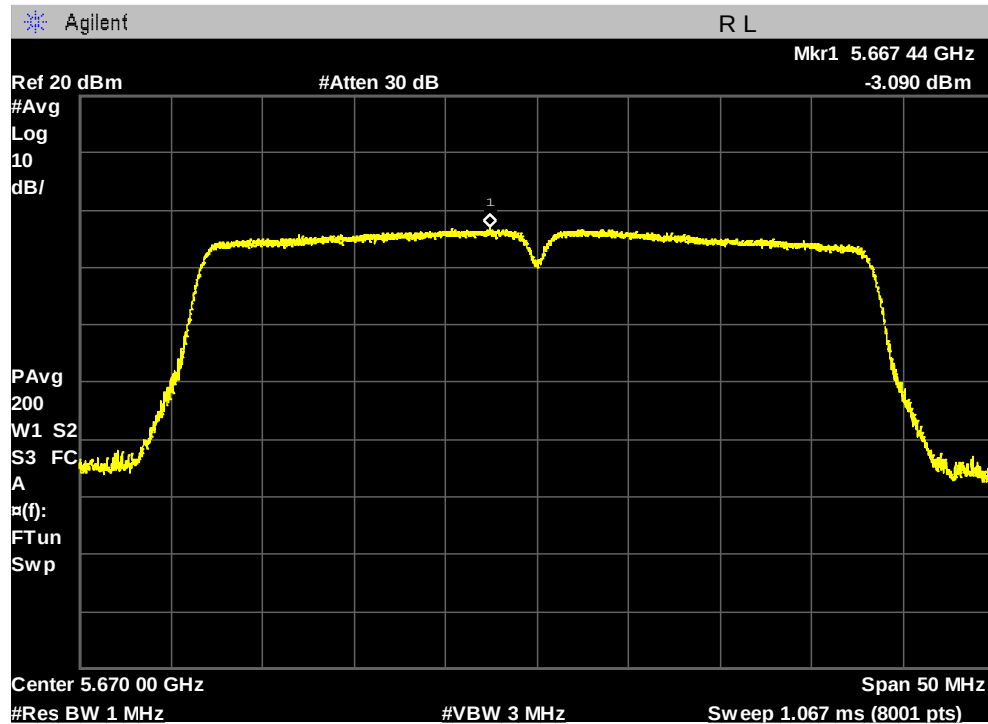


Maximum Power Spectral Density, Middle Channel (5590 MHz)

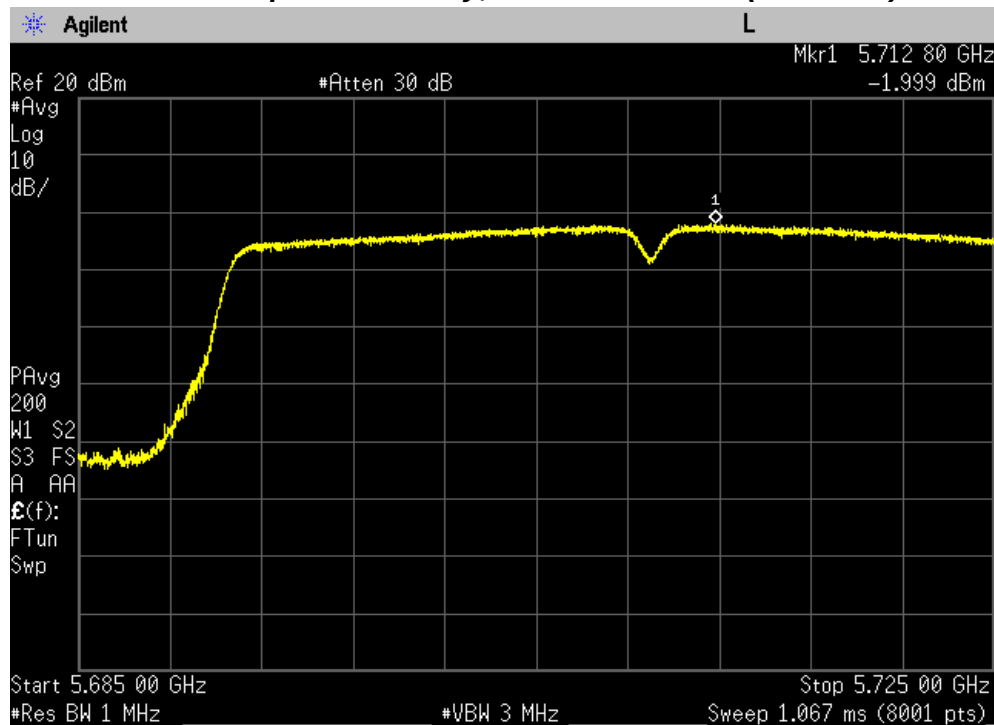


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5670 MHz)



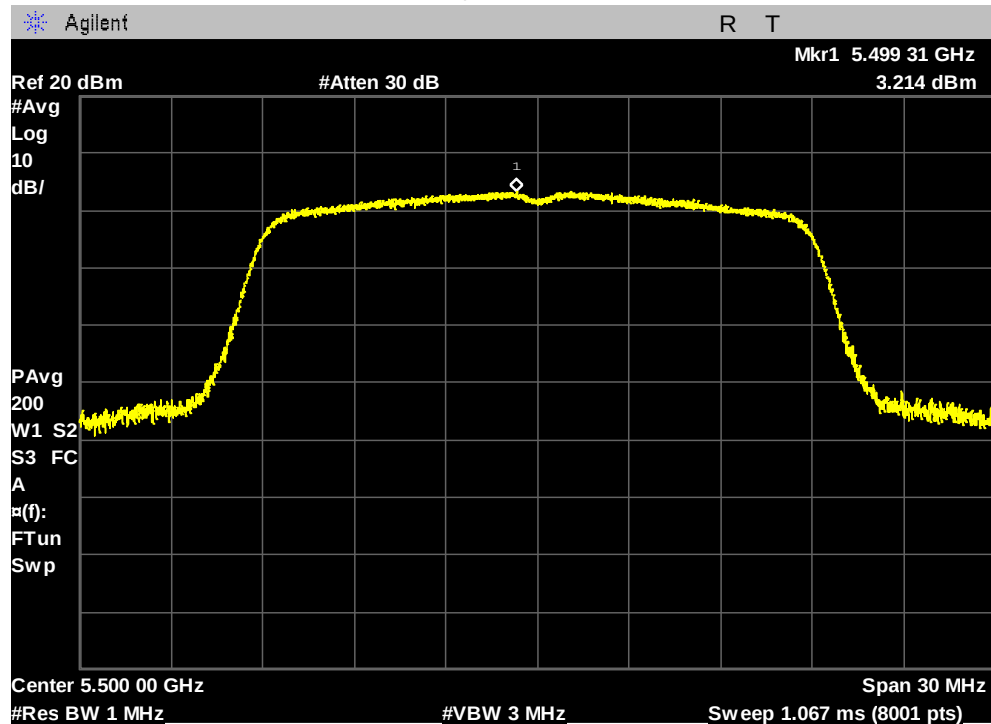
Maximum Power Spectral Density, Straddle Channel (5710 MHz)



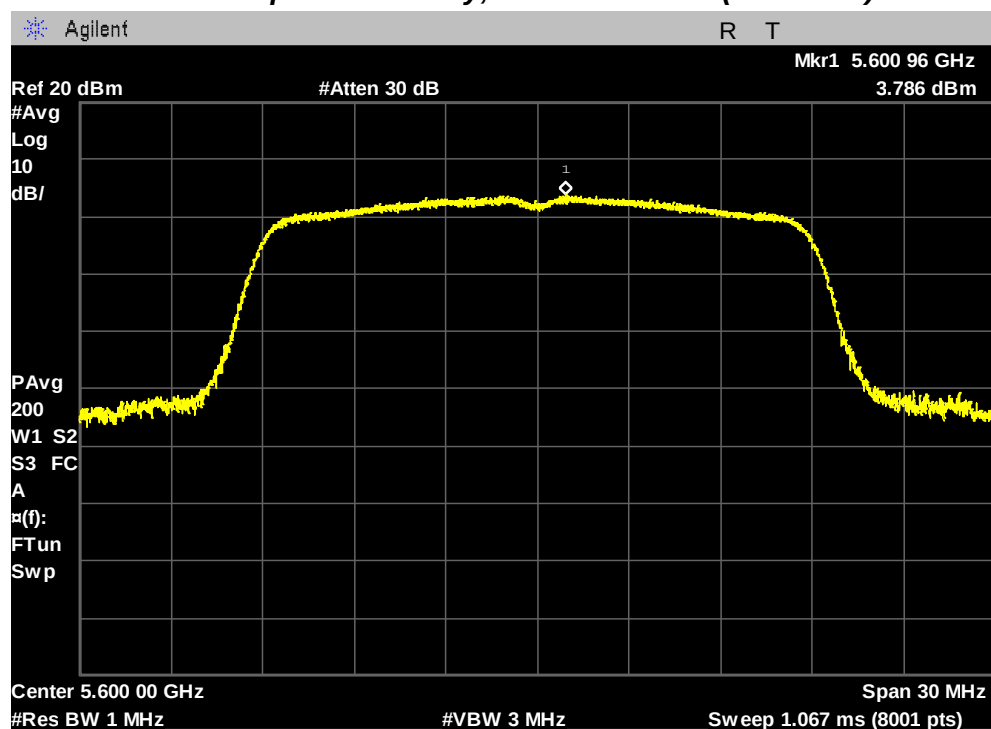
PLOTS OF EMISSIONS

802.11ac (20 MHz) mode 1TX

Maximum Power Spectral Density, Lowest Channel (5500 MHz)

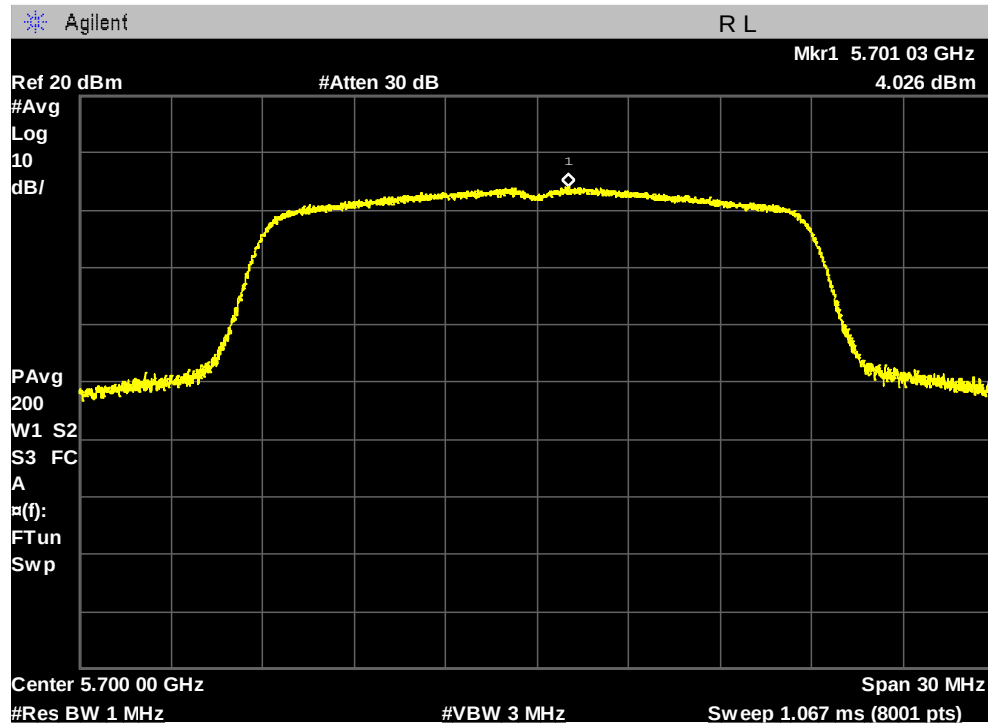


Maximum Power Spectral Density, Middle Channel (5600 MHz)

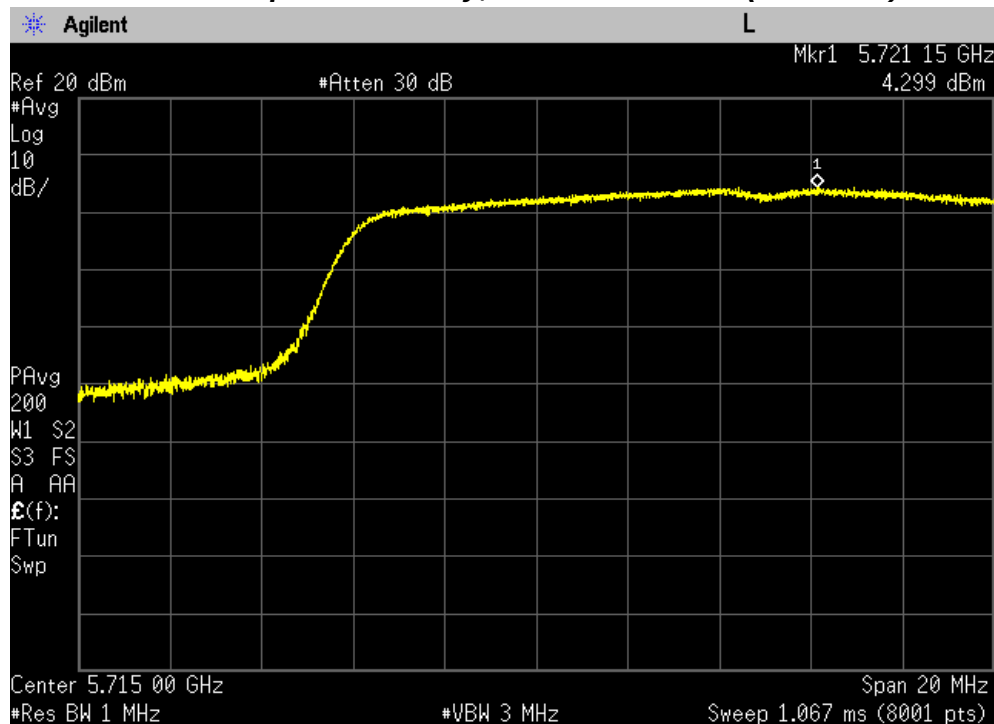


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5700 MHz)



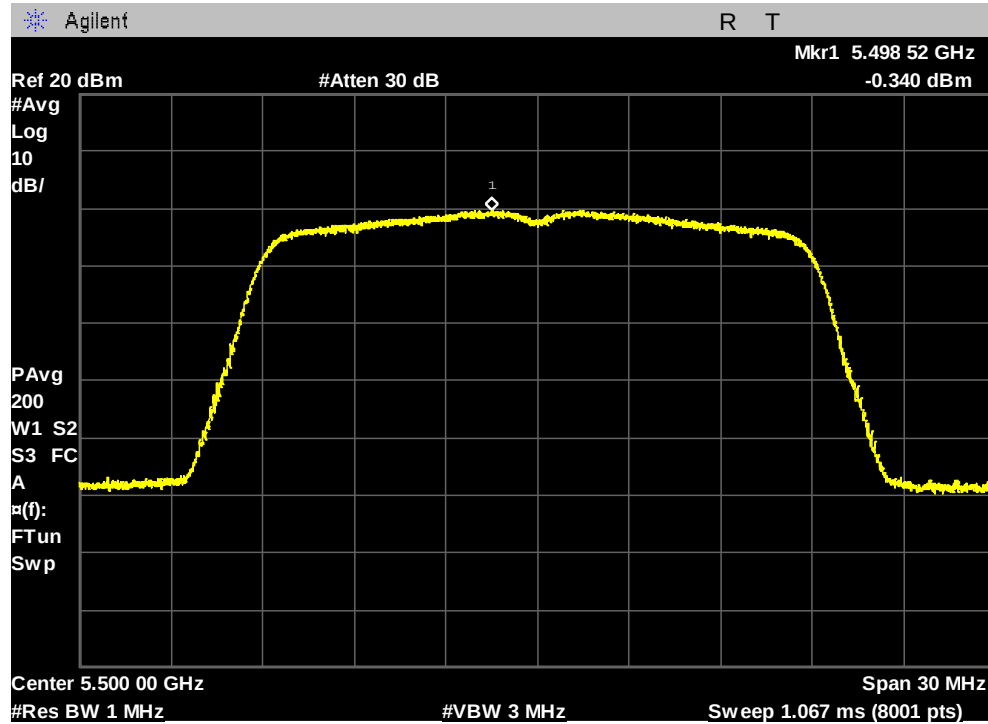
Maximum Power Spectral Density, Straddle Channel (5720 MHz)



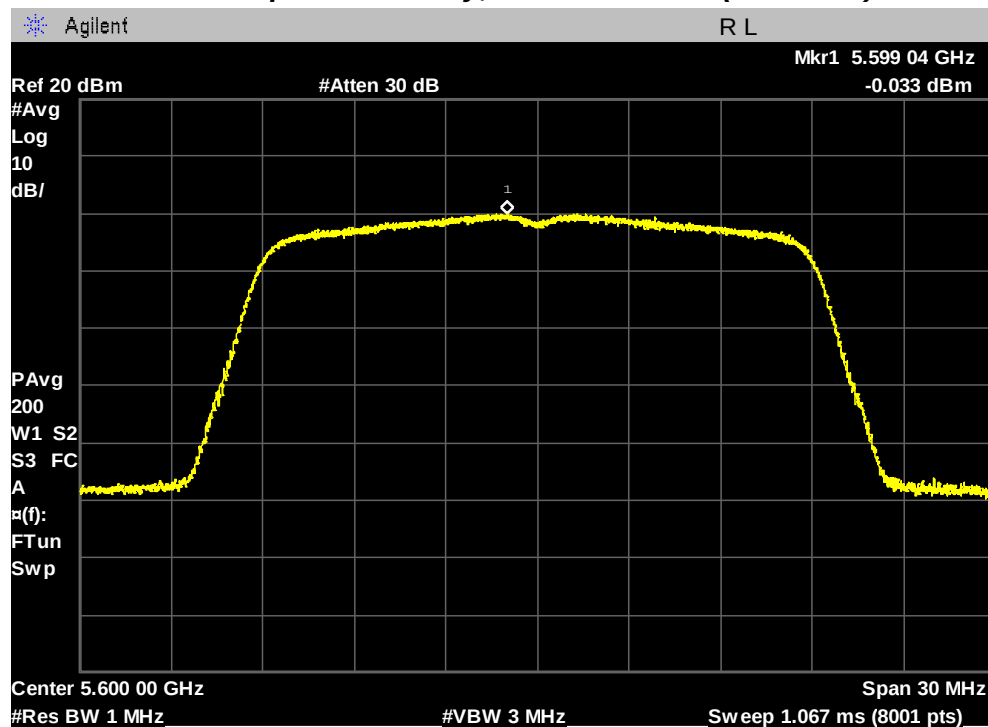
PLOTS OF EMISSIONS

802.11ac (20 MHz) mode 2TX

Maximum Power Spectral Density, Lowest Channel (5500 MHz)

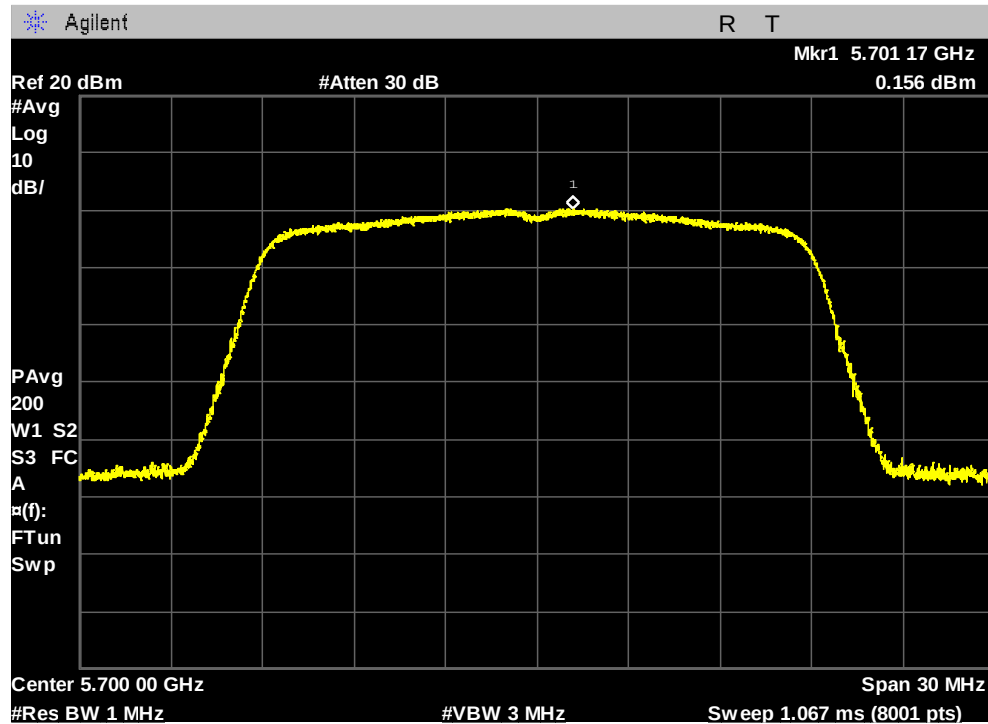


Maximum Power Spectral Density, Middle Channel (5600 MHz)

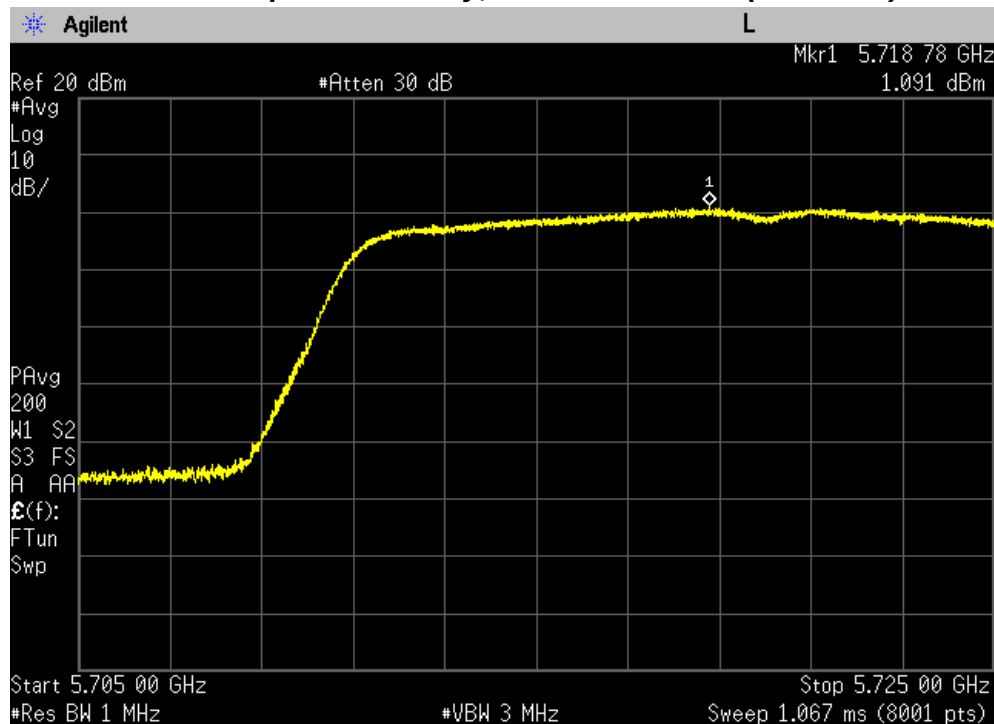


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5700 MHz)



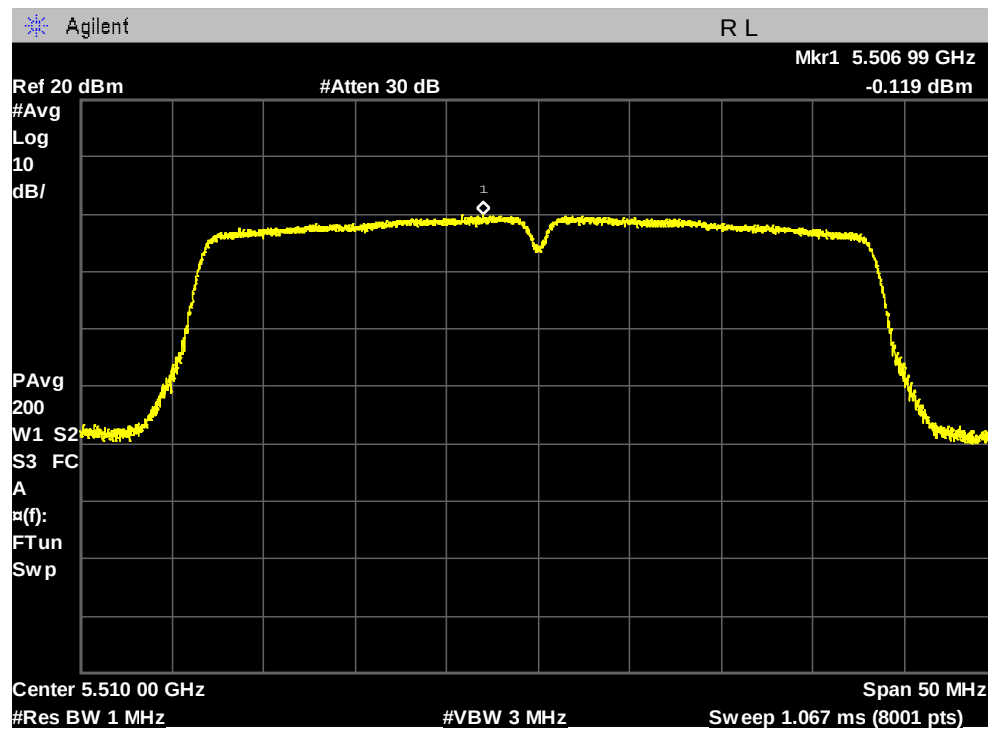
Maximum Power Spectral Density, Straddle Channel (5720 MHz)



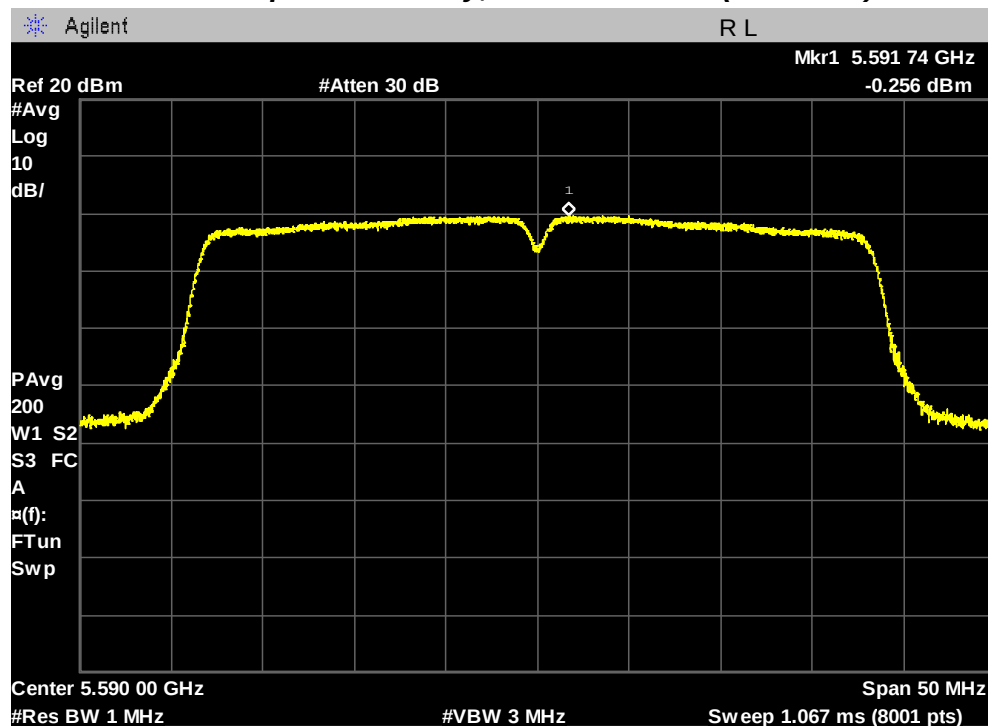
PLOTS OF EMISSIONS

802.11ac (40 MHz) mode 1TX

Maximum Power Spectral Density, Lowest Channel (5510 MHz)

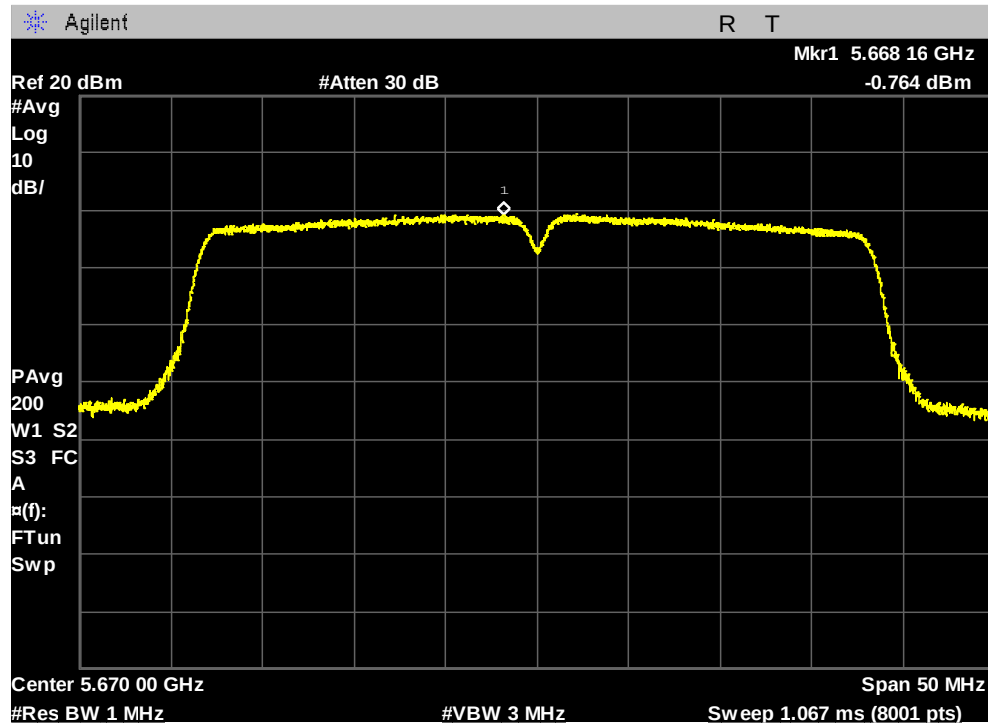


Maximum Power Spectral Density, Middle Channel (5590 MHz)

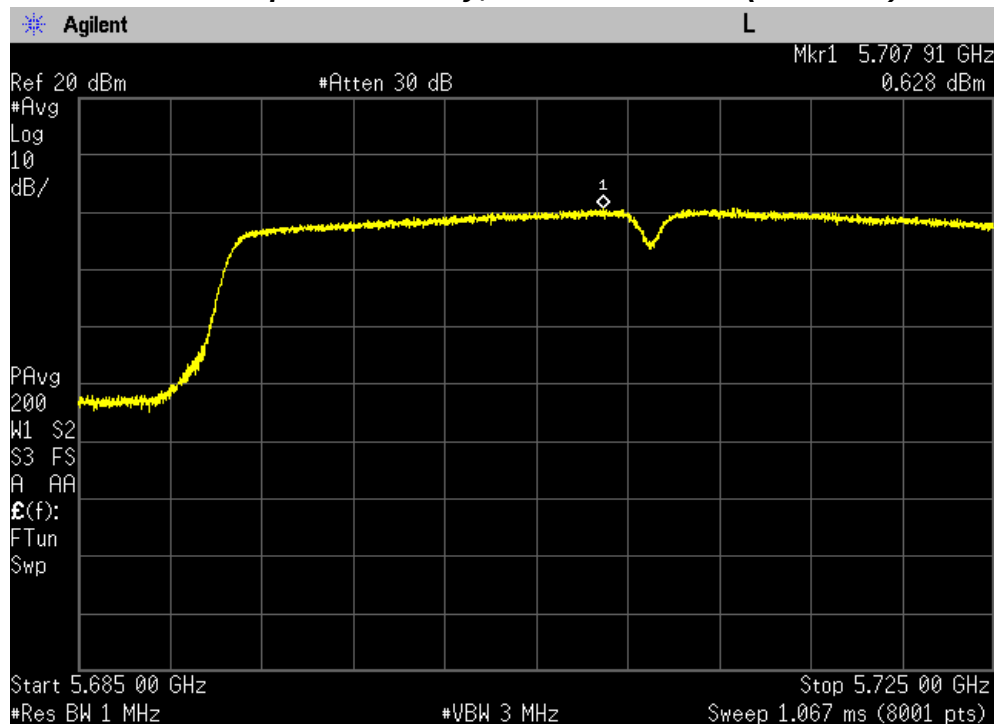


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5670 MHz)



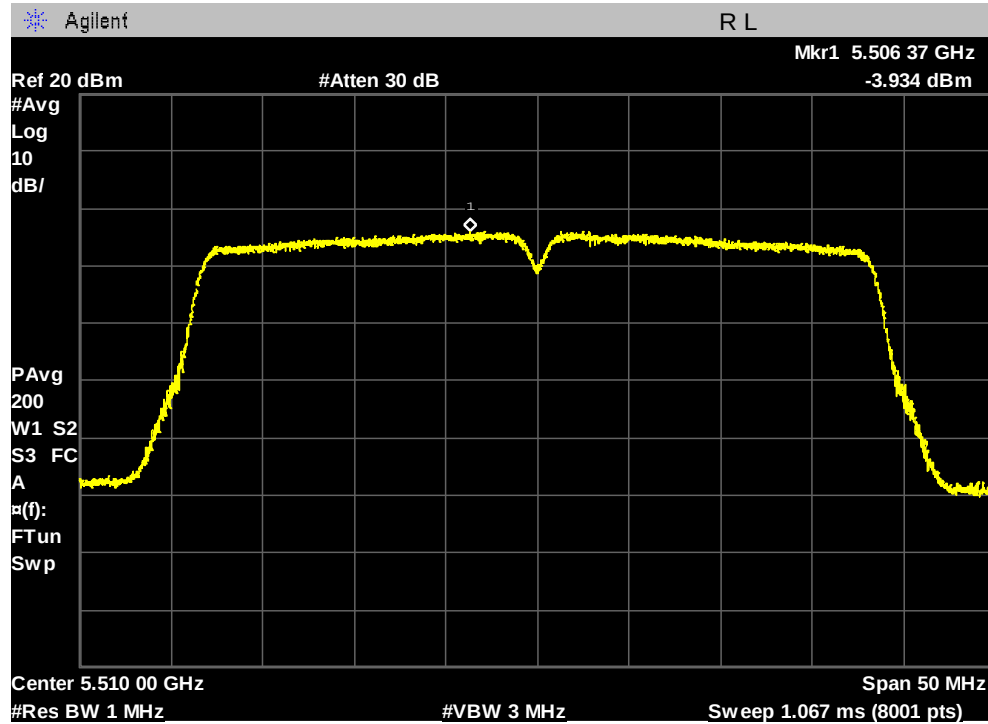
Maximum Power Spectral Density, Straddle Channel (5710 MHz)



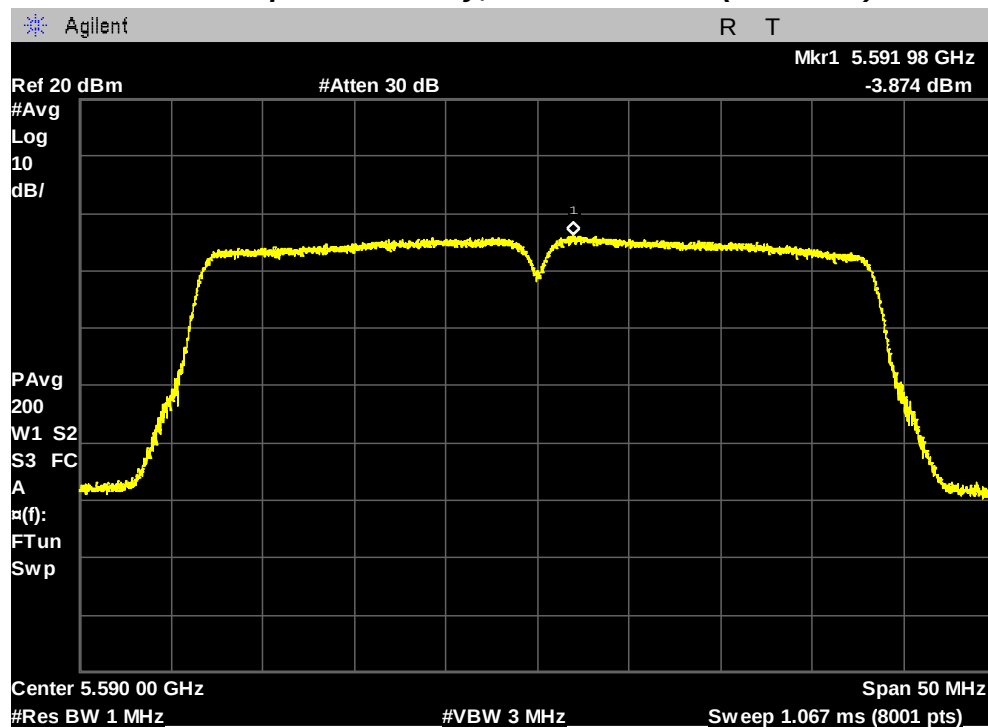
PLOTS OF EMISSIONS

802.11ac (40 MHz) mode 2TX

Maximum Power Spectral Density, Lowest Channel (5510 MHz)

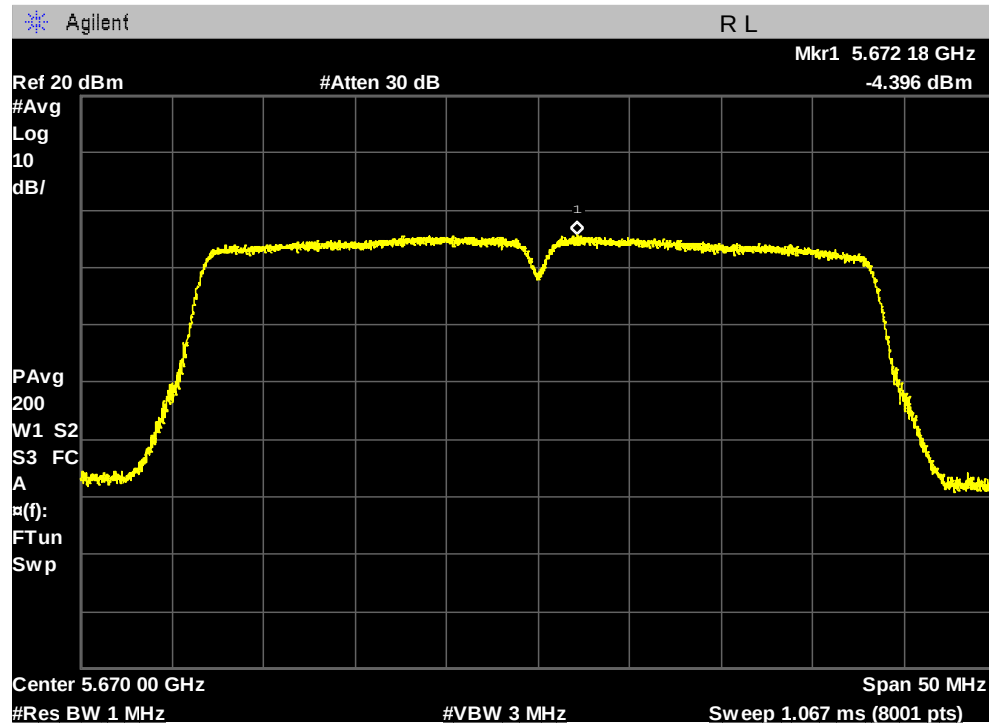


Maximum Power Spectral Density, Middle Channel (5590 MHz)

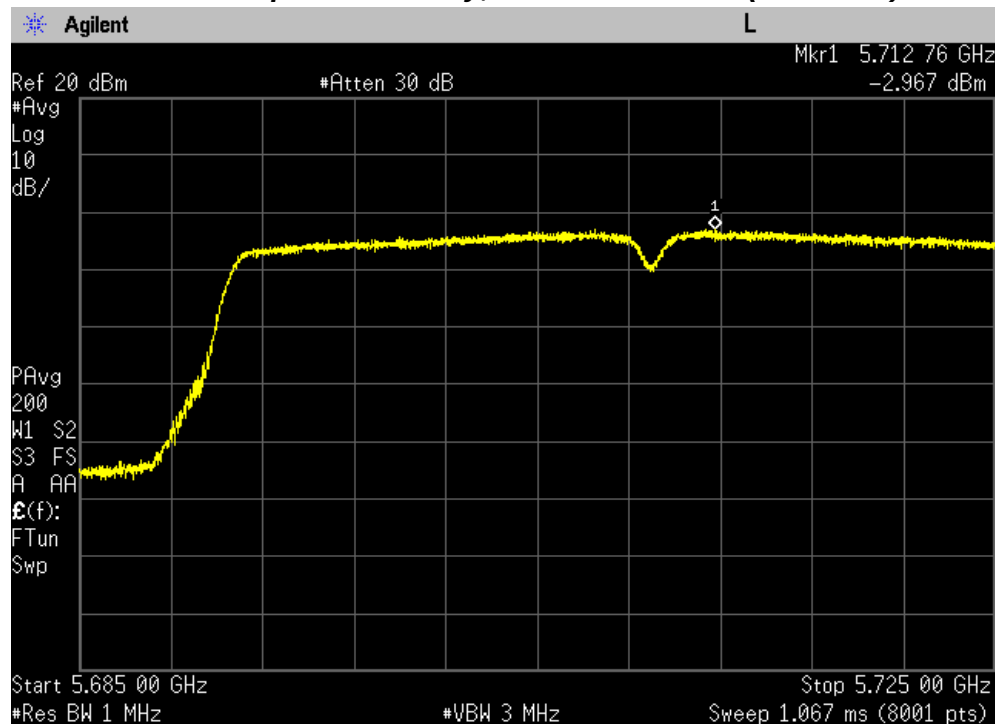


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5670 MHz)



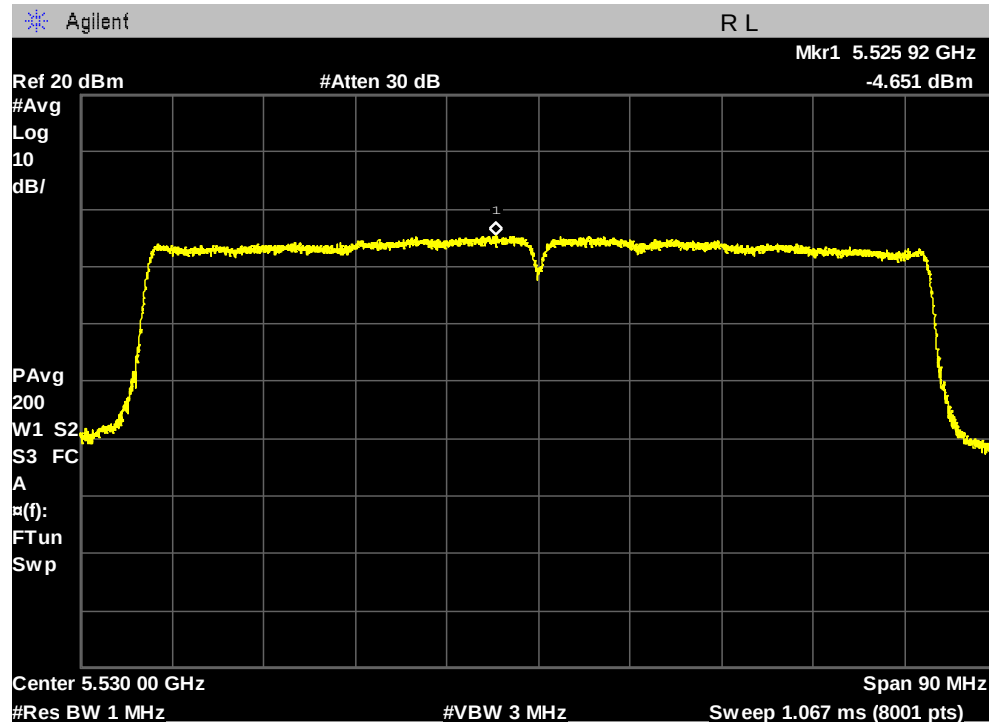
Maximum Power Spectral Density, Straddle Channel (5710 MHz)



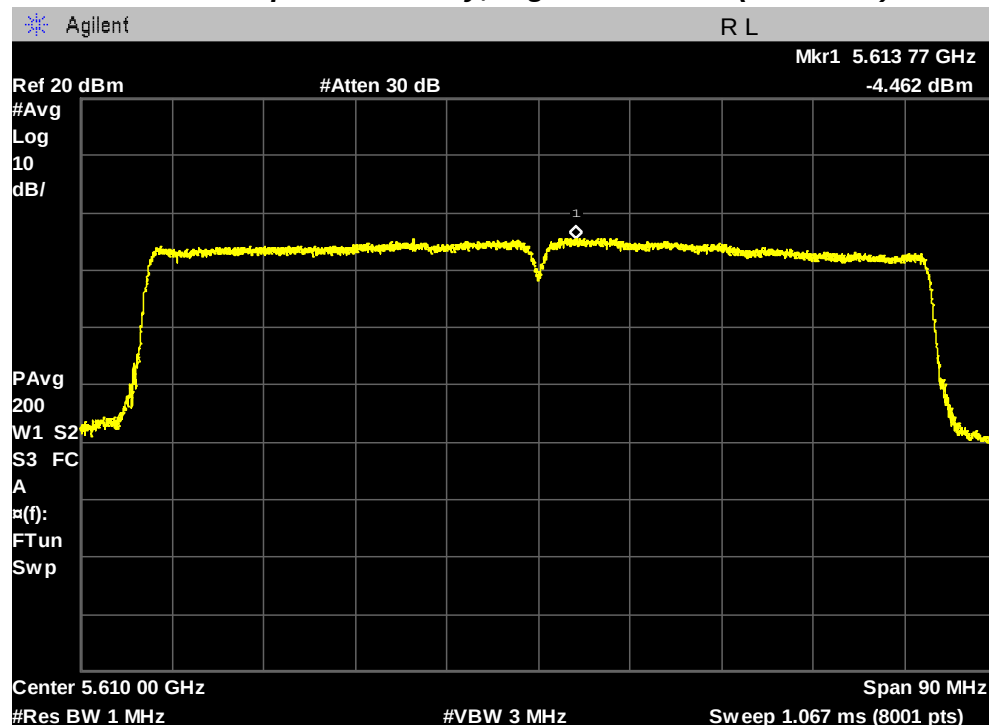
PLOTS OF EMISSIONS

802.11ac (80 MHz) mode 1TX

Maximum Power Spectral Density, Lowest Channel (5530 MHz)

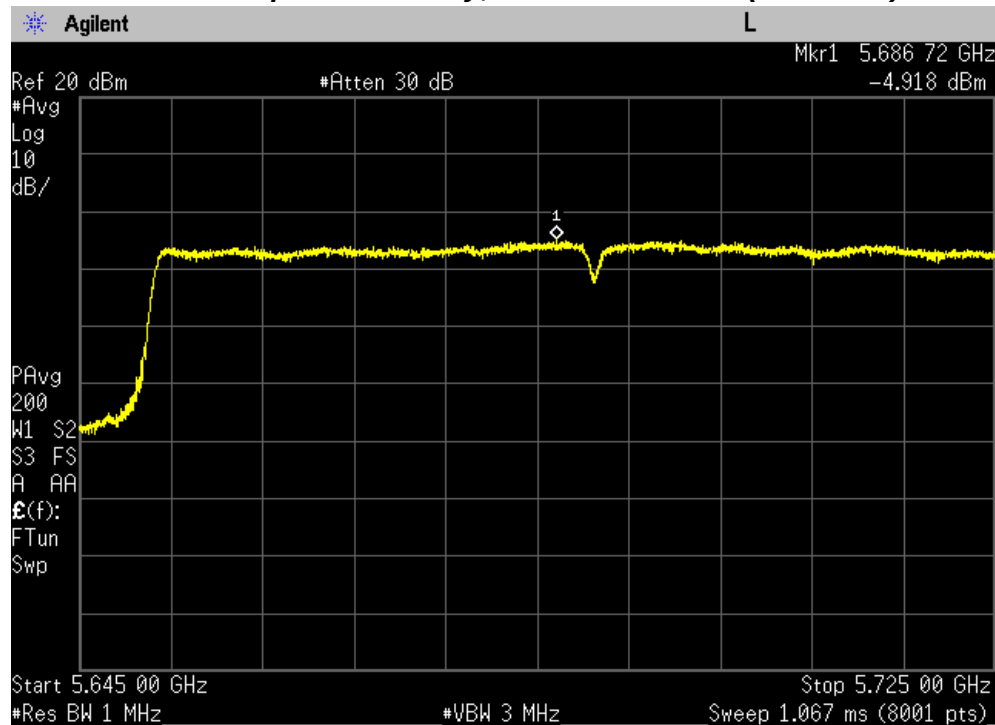


Maximum Power Spectral Density, Highest Channel (5610 MHz)



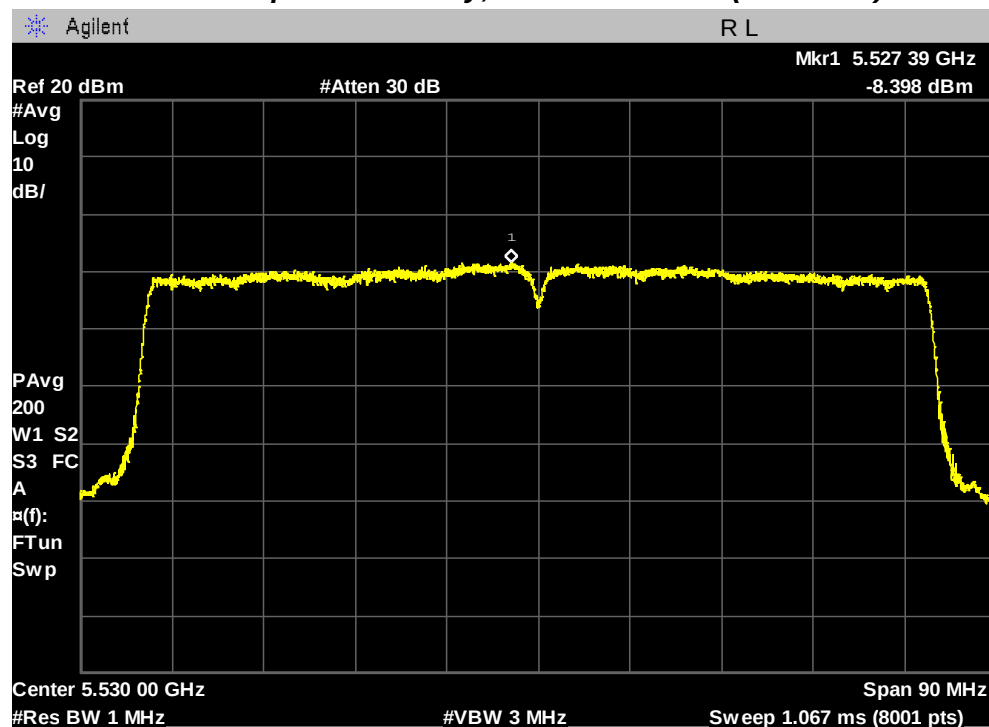
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Straddle Channel (5690 MHz)



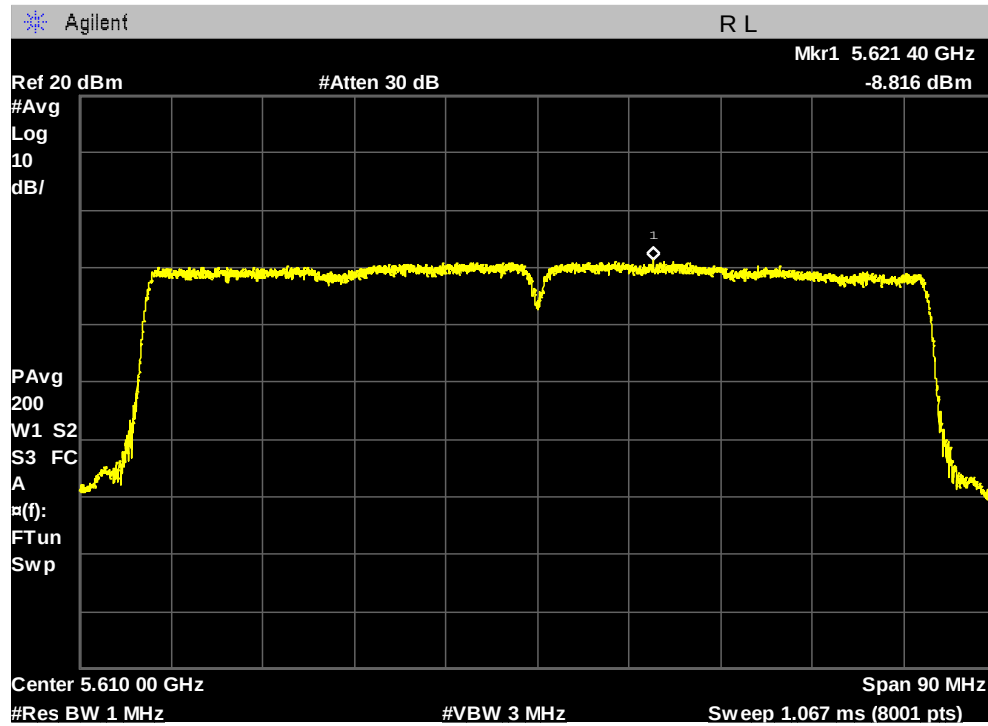
802.11ac (80 MHz) mode 2TX

Maximum Power Spectral Density, Lowest Channel (5530 MHz)

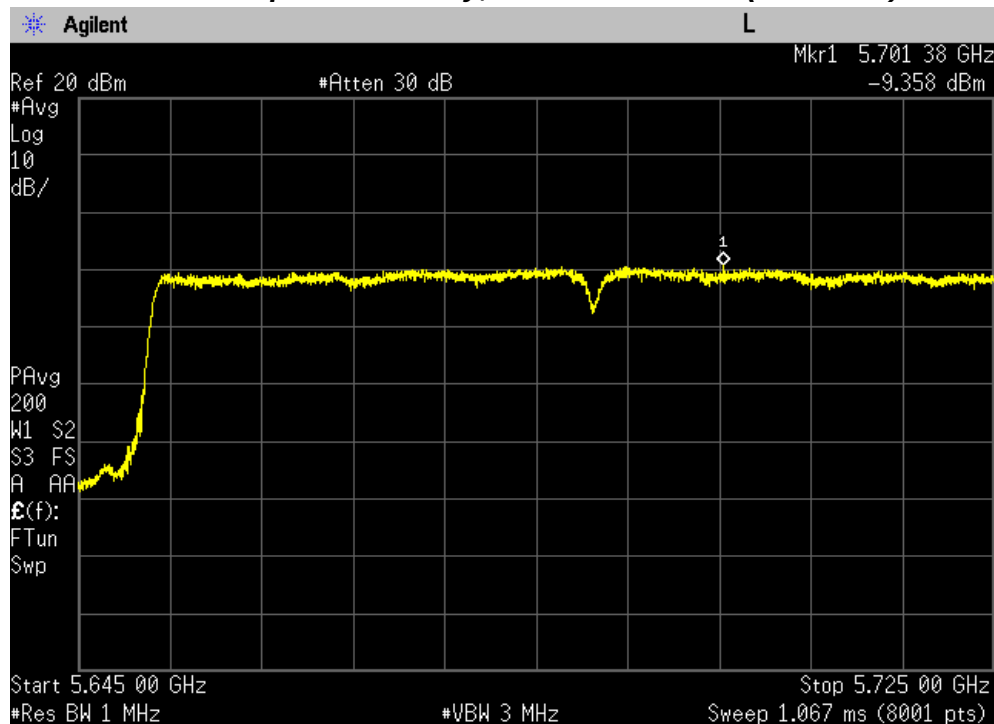


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5610 MHz)



Maximum Power Spectral Density, Straddle Channel (5690 MHz)



TEST DATA

8.5.4 Maximum Power Spectral Density – U-NII-3 band

FCC §15.407(a)

Test Mode : Set to Straddle channel, Lowest channel, Middle channel and Highest channel

802.11a mode_1TX

Channel	Frequency (MHz)	Measured PSD (dBm/500kHz)	Duty Factor (dB)	Maximum PSD (dBm/500kHz)	FCC Limit (dBm/500kHz)
Straddle	5720	-0.14	0.19	0.05	30.00
Lowest	5745	0.80	0.19	0.99	30.00
Middle	5785	0.64	0.19	0.83	30.00
Highest	5825	1.74	0.19	1.93	30.00

802.11n (20MHz) mode_1TX

Channel	Frequency (MHz)	Measured PSD (dBm/500kHz)	Duty Factor (dB)	Maximum PSD (dBm/500kHz)	FCC Limit (dBm/500kHz)
Straddle	5720	-0.16	0.22	0.06	30.00
Lowest	5745	0.51	0.22	0.73	30.00
Middle	5785	0.42	0.22	0.64	30.00
Highest	5825	1.75	0.22	1.97	30.00

TEST DATA

802.11n (20MHz) mode_2TX

Channel	Frequency (MHz)	Measured PSD (dBm/500kHz)	Duty Factor (dB)	Maximum PSD (dBm/500kHz)	FCC Limit (dBm/500kHz)
				Total PSD	
Straddle	5720	-3.59	0.22	-0.36	30.00
Lowest	5745	-2.7	0.22	0.53	30.00
Middle	5785	-2.64	0.22	0.59	30.00
Highest	5825	-1.92	0.22	1.31	30.00

802.11n (40MHz) mode_1TX

Channel	Frequency (MHz)	Measured PSD (dBm/500kHz)	Duty Factor (dB)	Maximum PSD (dBm/500kHz)	FCC Limit (dBm/500kHz)
Straddle	5710	-4.64	0.40	-4.24	30.00
Lowest	5755	-3.55	0.40	-3.15	30.00
Highest	5795	-3.22	0.40	-2.82	30.00

802.11n (40MHz) mode_2TX

Channel	Frequency (MHz)	Measured PSD (dBm/500kHz)	Duty Factor (dB)	Maximum PSD (dBm/500kHz)	FCC Limit (dBm/500kHz)
				Total PSD	
Straddle	5710	-6.57	0.40	-3.16	30.00
Lowest	5755	-5.92	0.40	-2.51	30.00
Highest	5795	-5.74	0.40	-2.33	30.00

TEST DATA

802.11ac (20MHz) mode_1TX

Channel	Frequency (MHz)	Measured PSD (dBm/500kHz)	Duty Factor (dB)	Maximum PSD (dBm/500kHz)	FCC Limit (dBm/500kHz)
Straddle	5720	-0.44	0.20	-0.24	30.00
Lowest	5745	0.80	0.20	1.00	30.00
Middle	5785	0.32	0.20	0.52	30.00
Highest	5825	1.33	0.20	1.53	30.00

802.11ac (20MHz) mode_2TX

Channel	Frequency (MHz)	Measured PSD (dBm/500kHz)	Duty Factor (dB)	Maximum PSD (dBm/500kHz)	FCC Limit (dBm/500kHz)
				Total PSD	
Straddle	5720	-4.08	0.20	-0.87	30.00
Lowest	5745	-2.8	0.20	0.41	30.00
Middle	5785	-3.15	0.20	0.06	30.00
Highest	5825	-2.10	0.20	1.11	30.00

802.11ac (40MHz) mode_1TX

Channel	Frequency (MHz)	Measured PSD (dBm/500kHz)	Duty Factor (dB)	Maximum PSD (dBm/500kHz)	FCC Limit (dBm/500kHz)
Straddle	5710	-4.57	0.40	-4.17	30.00
Lowest	5755	-3.23	0.40	-2.83	30.00
Highest	5795	-3.25	0.40	-2.85	30.00

TEST DATA

802.11ac (40MHz) mode_2TX

Channel	Frequency (MHz)	Measured PSD (dBm/500kHz)	Duty Factor (dB)	Maximum PSD (dBm/500kHz)	FCC Limit (dBm/500kHz)
				Total PSD	
Straddle	5710	-7.79	0.40	-4.38	30.00
Lowest	5755	-6.59	0.40	-3.18	30.00
Highest	5795	-6.63	0.40	-3.22	30.00

802.11ac (80MHz) mode_1TX

Channel	Frequency (MHz)	Measured PSD (dBm/500kHz)	Duty Factor (dB)	Maximum PSD (dBm/500kHz)	FCC Limit (dBm/500kHz)
Straddle	5690	-8.74	0.79	-7.95	30.00
Middle	5775	-12.04	0.79	-11.25	30.00

802.11ac (80MHz) mode_2TX

Channel	Frequency (MHz)	Measured PSD (dBm/500kHz)	Duty Factor (dB)	Maximum PSD (dBm/500kHz)	FCC Limit (dBm/500kHz)
				Total PSD	
Straddle	5690	-13.34	0.79	-9.54	30.00
Middle	5775	-12.28	0.79	-8.48	30.00

TEST DATA

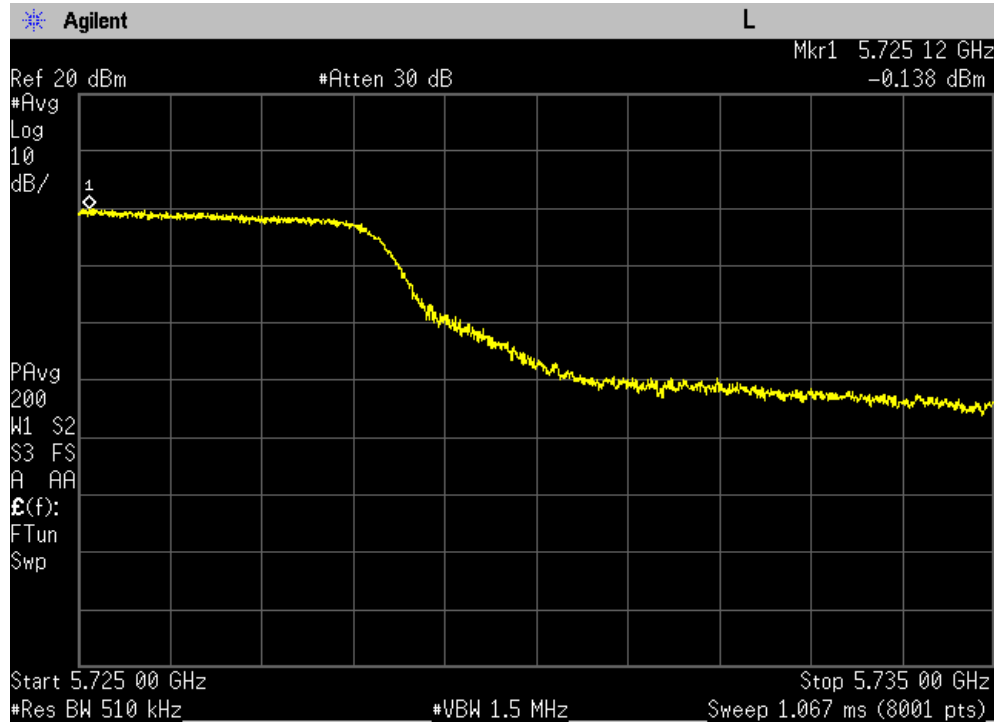
Note:

1. Maximum PSD = Measured PSD + Duty Factor
2. "Measure and add $10 \log(N_{ANT})$ dB, where N_{ANT} is the number of outputs" was used for measuring in-band Total PSD.
Total PSD = Measured PSD + duty factor + $10 \log(N_{ANT})$
3. For CDD transmission, directional gain is. **5.81 dBi**
For MIMO transmission, directional gain is **2.8 dBi**.
Directional gain was calculated according to KDB662911 D01 Multiple Transmitter Output v02r01.
For power spectral density (PSD) measurements on all devices employing CDD, directional gain is as follows,
Directional gain = $G_{ANT} + \text{Array Gain} = 2.8 \text{ dBi} + 3.01 \text{ dB} = 5.81 \text{ dBi}$
Array Gain = $10 \log(N_{ANT}/N_{SS}) \text{ dB} = 10 \log(2/1) = 3.01 \text{ dB}$
where N_{SS} = the number of independent spatial streams of data and G_{ANT} is the antenna gain in dBi.
For CDD mode of this device, $N_{SS}=1$.
For power spectral density (PSD) measurements on all devices employing MIMO, directional gain is as follows,
Directional gain = $G_{ANT} + 10 \log(N_{ANT}/N_{SS}) \text{ dBi} = 2.8 \text{ dBi} + 10 \log(2/2) \text{ dB} = 2.8 \text{ dBi}$
where N_{SS} = the number of independent spatial streams of data and G_{ANT} is the antenna gain in dBi
For this device, MIMO mode means SM-MIMO(Spatial Multiplexing) transmission and $N_{SS}=2$.
4. For FCC PSD Limit, If transmitting antennas of directional gain greater than 6 dBi was used, maximum power spectral density was reduced by the amount in dB that the directional gain of the antenna exceeds 6 dBi.
5. Power Spectral Density(PSD) was measured by same method with conducted output power according to II.F.1 in KDB 789033 D02 General UNII Test Procedures New Rules v02r01.
6. The following equation was used for spectrum offset:
Spectrum offset (dB) = Attenuator (dB) + Cable Loss (dB) + SMA Type Connector Loss (dB)

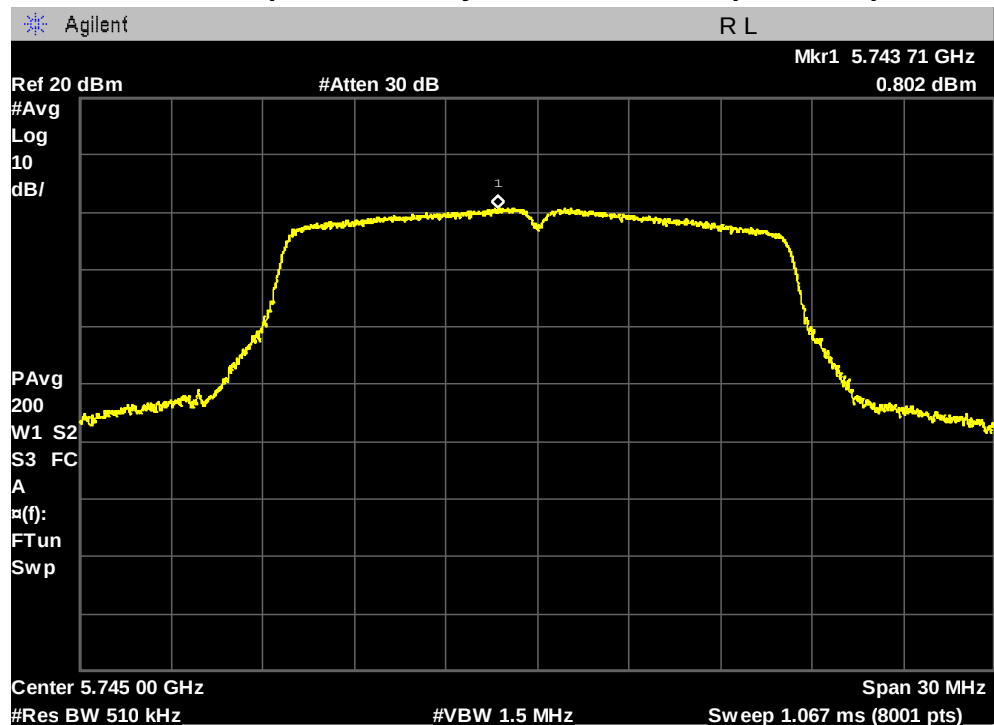
PLOTS OF EMISSIONS

802.11a mode 1TX

Maximum Power Spectral Density, Straddle Channel (5720 MHz)

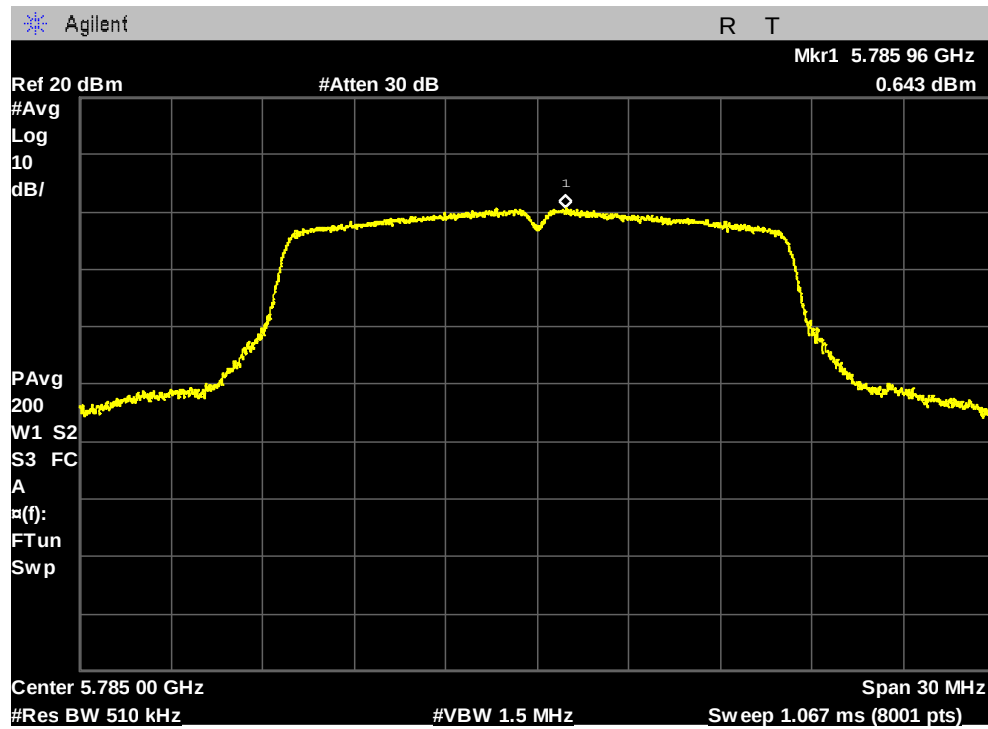


Maximum Power Spectral Density, Lowest Channel (5745 MHz)

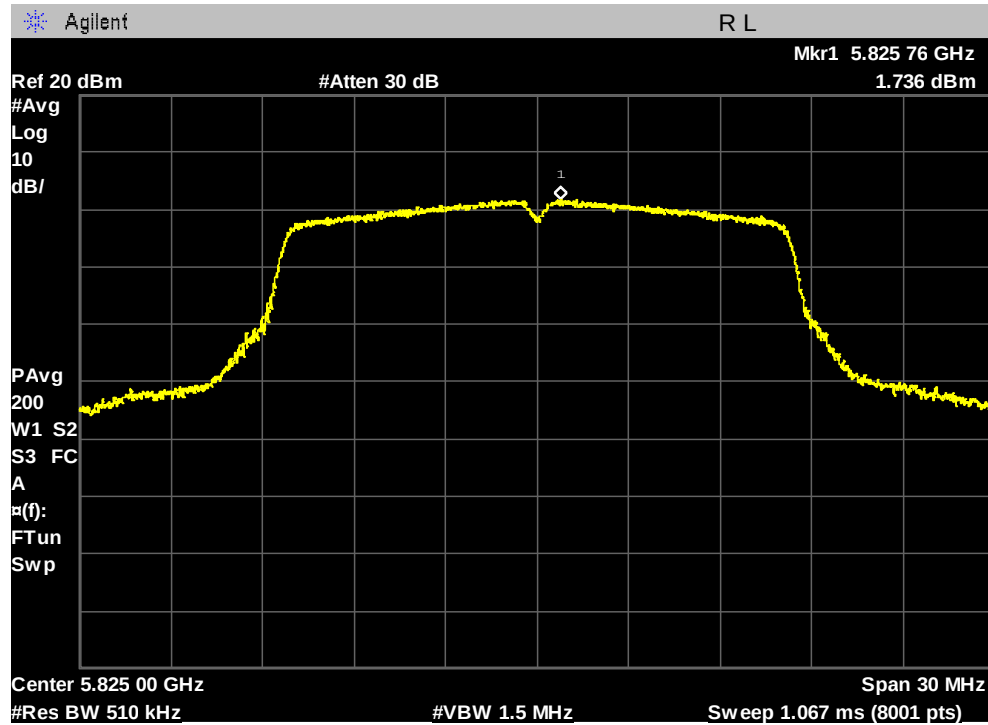


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Middle Channel (5785 MHz)



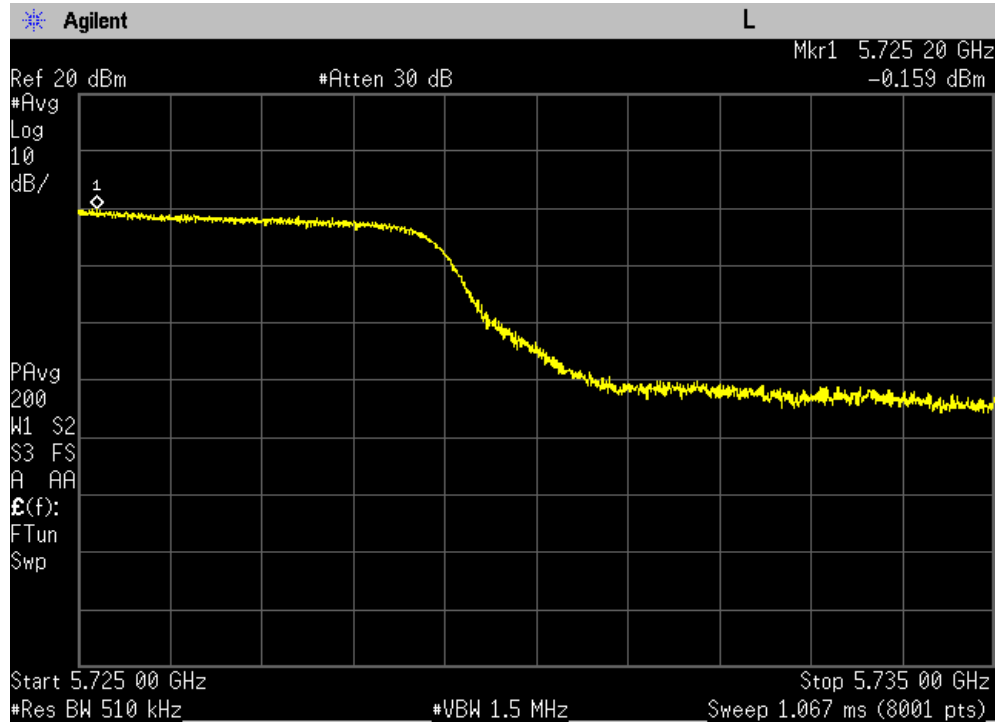
Maximum Power Spectral Density, Highest Channel (5825 MHz)



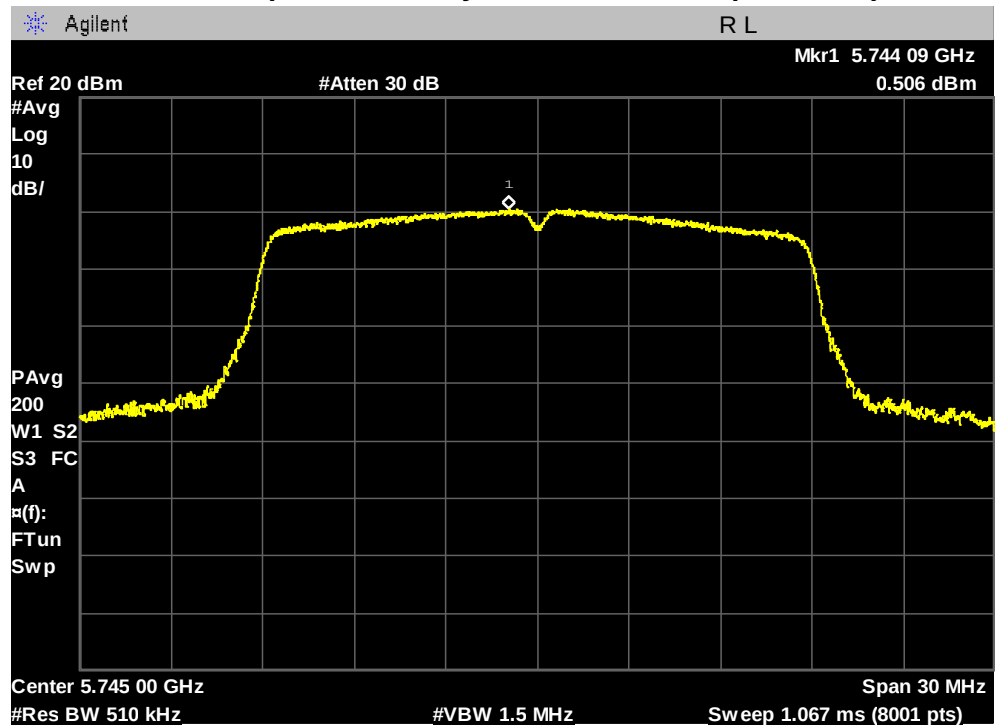
PLOTS OF EMISSIONS

802.11n (20 MHz) mode 1TX

Maximum Power Spectral Density, Straddle Channel (5720 MHz)

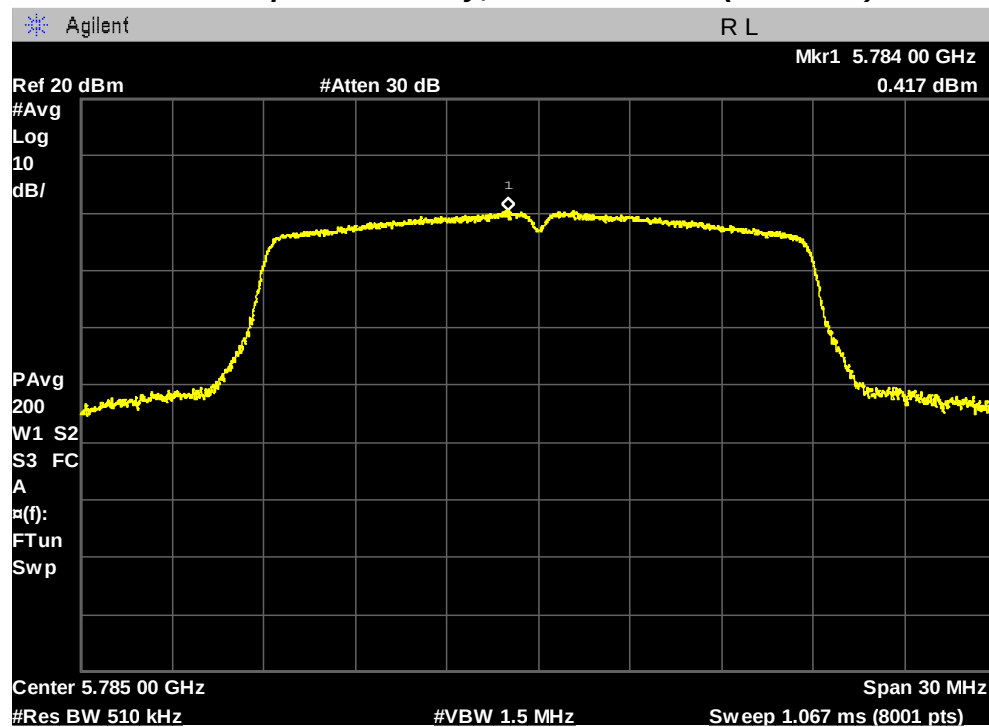


Maximum Power Spectral Density, Lowest Channel (5745 MHz)

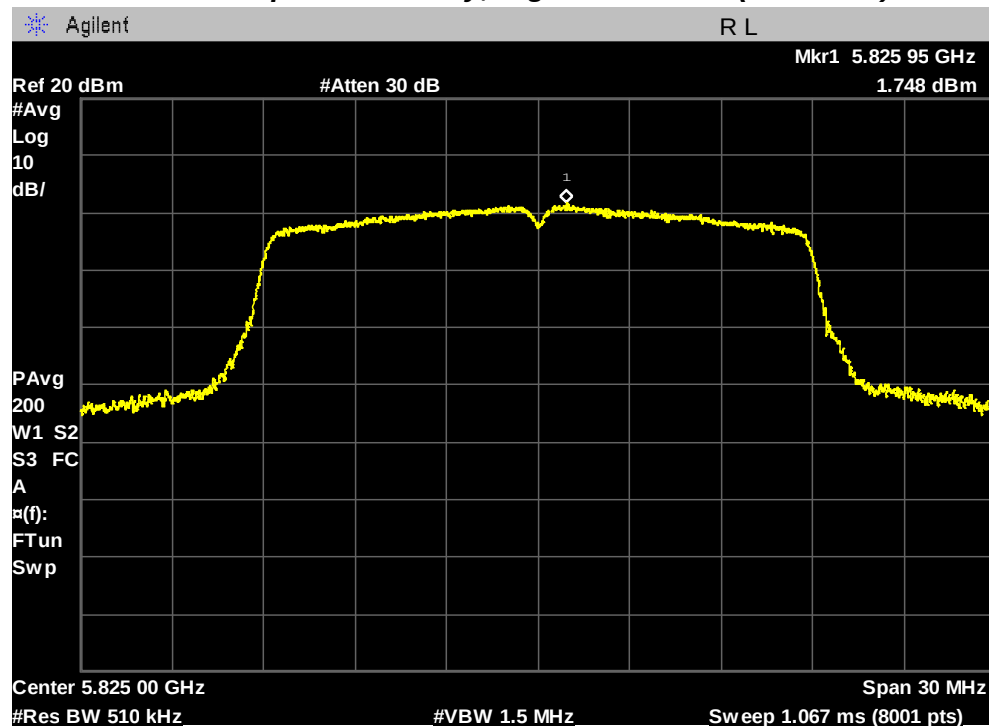


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Middle Channel (5785 MHz)



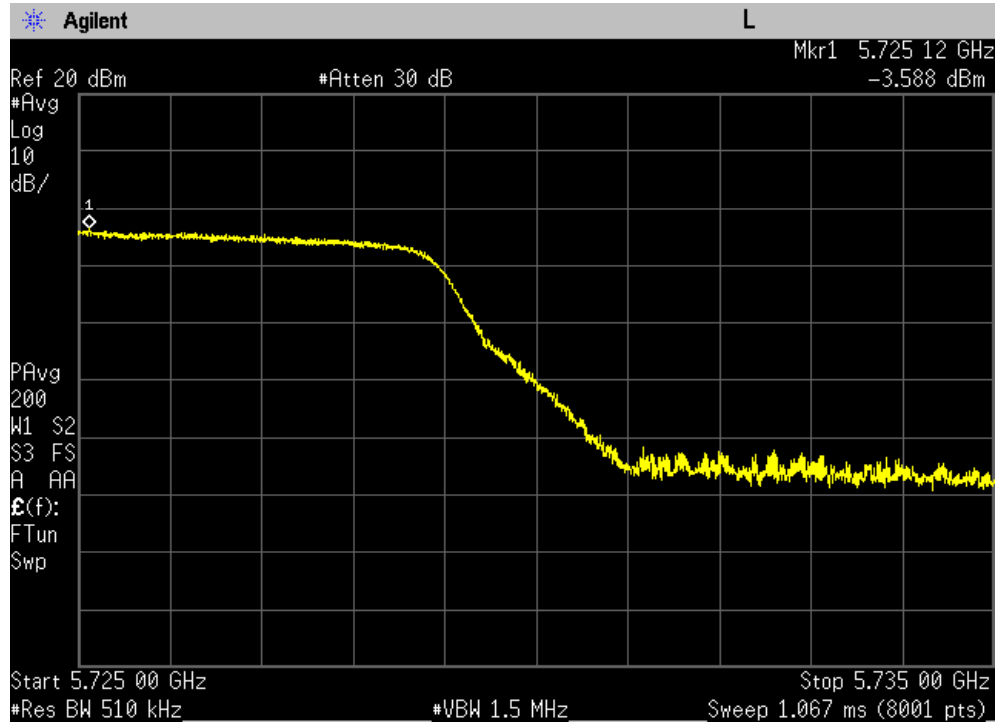
Maximum Power Spectral Density, Highest Channel (5825 MHz)



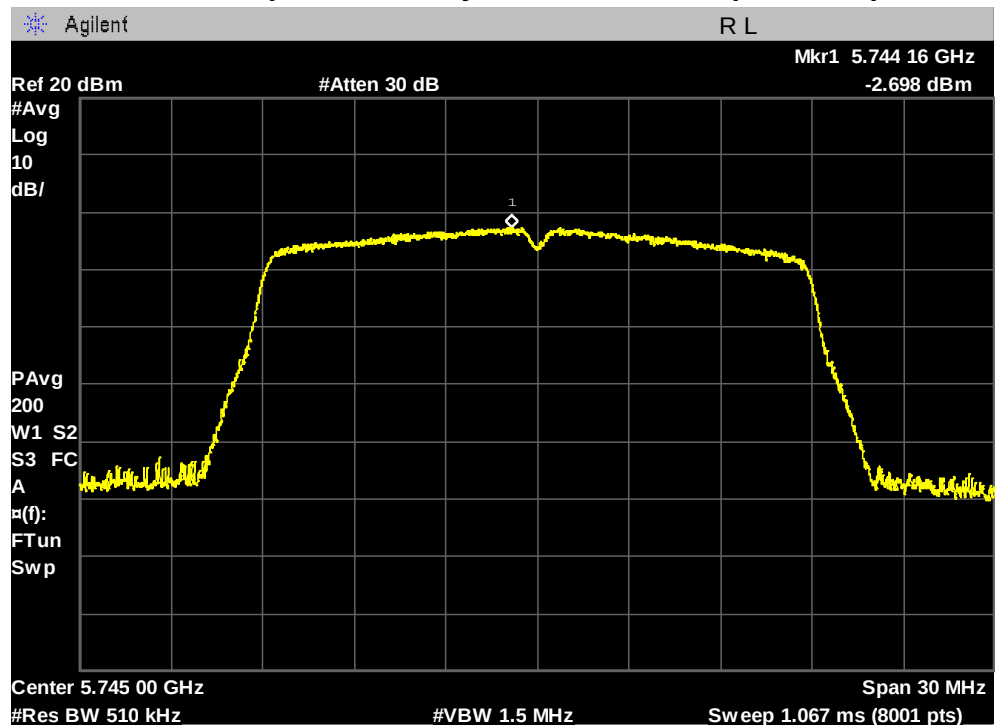
PLOTS OF EMISSIONS

802.11n (20 MHz) mode 2TX

Maximum Power Spectral Density, Straddle Channel (5720 MHz)

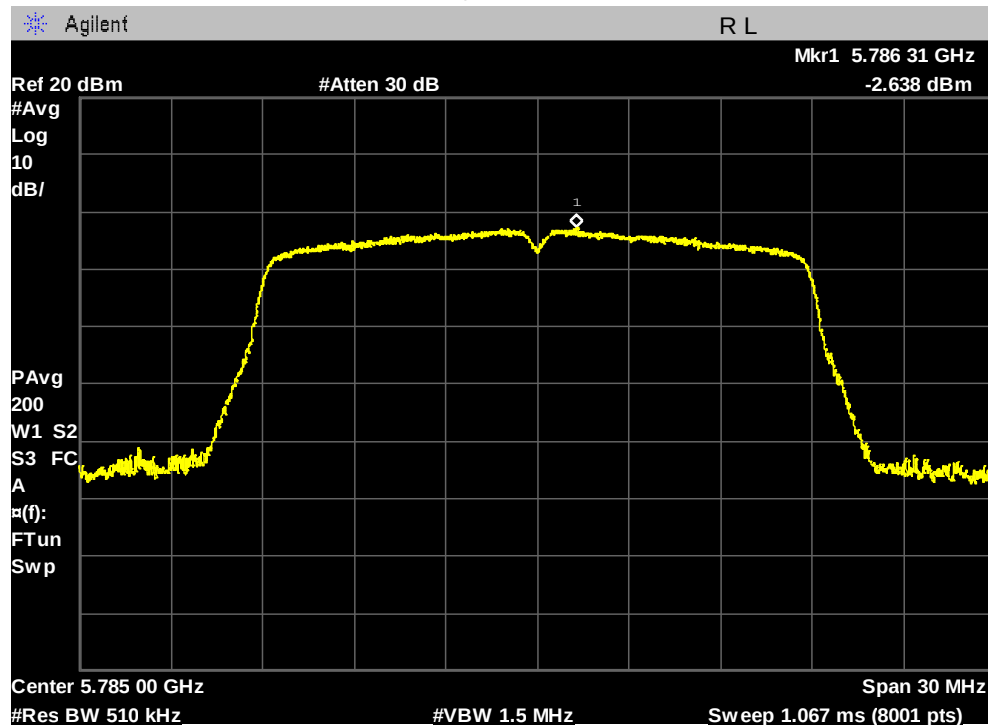


Maximum Power Spectral Density, Lowest Channel (5745 MHz)

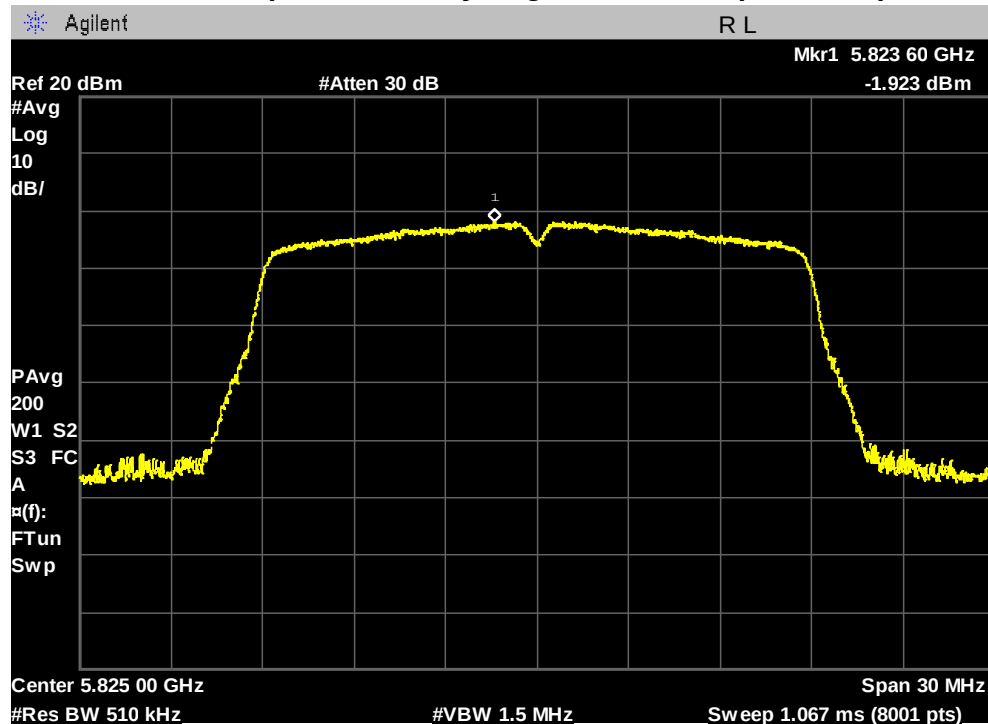


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Middle Channel (5785 MHz)



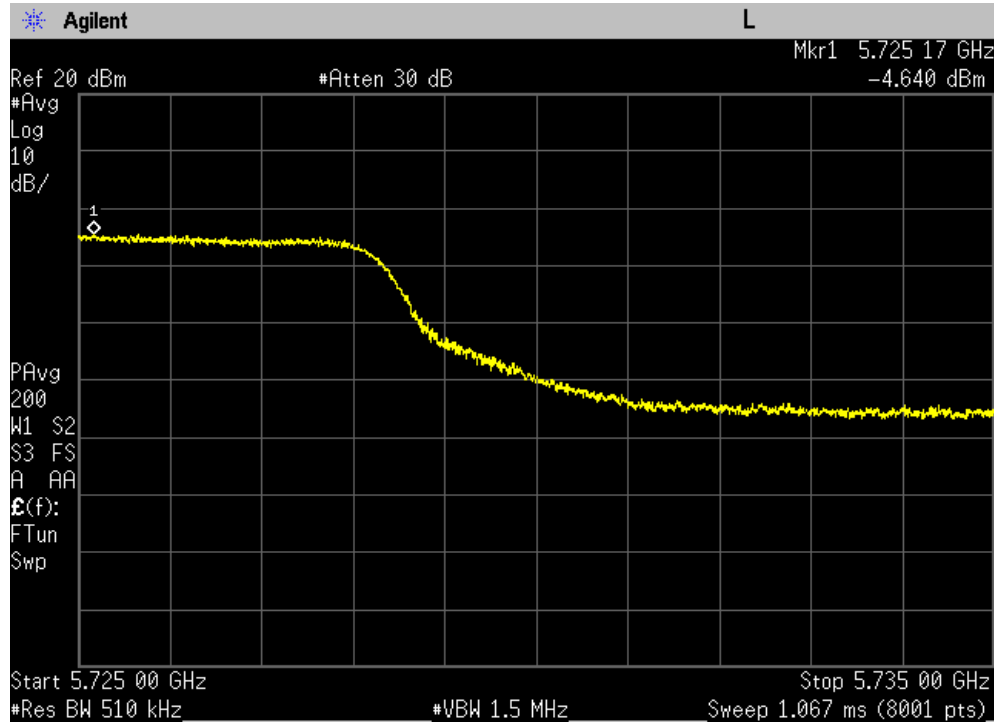
Maximum Power Spectral Density, Highest Channel (5825 MHz)



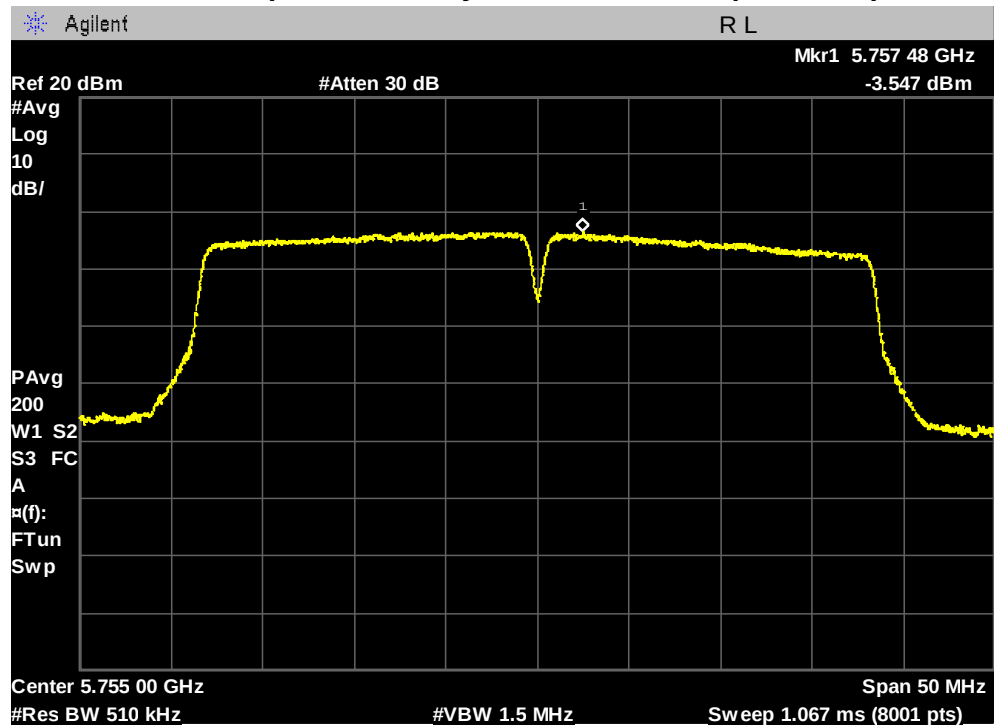
PLOTS OF EMISSIONS

802.11n (40 MHz) mode 1TX

Maximum Power Spectral Density, Straddle Channel (5710 MHz)

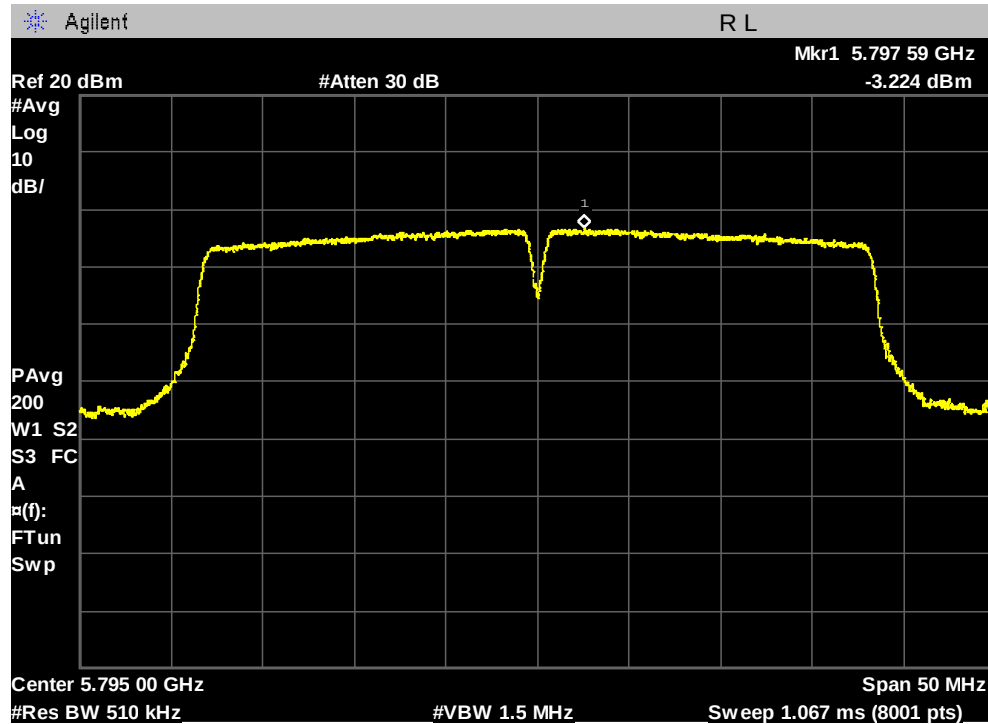


Maximum Power Spectral Density, Lowest Channel (5755 MHz)



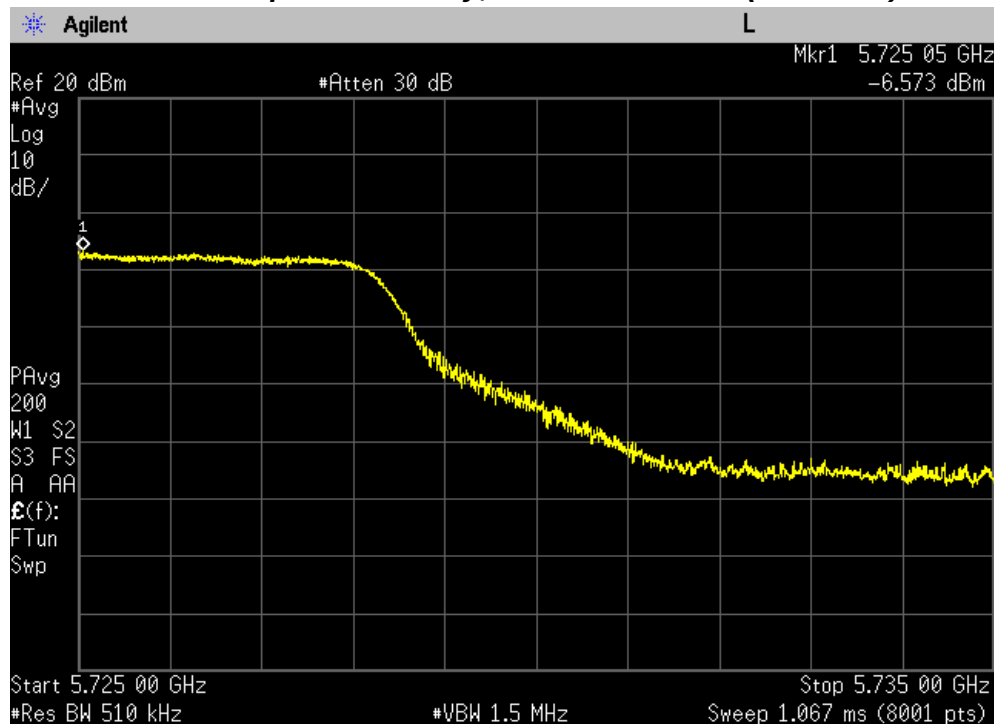
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5795 MHz)



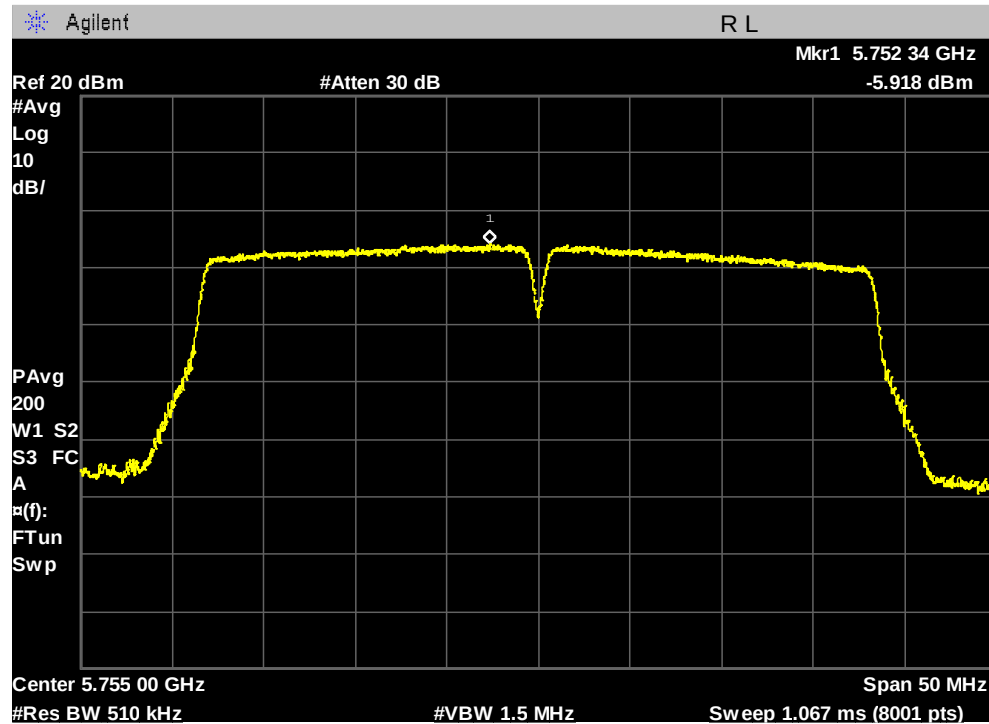
802.11n (40 MHz) mode 2TX

Maximum Power Spectral Density, Straddle Channel (5710 MHz)

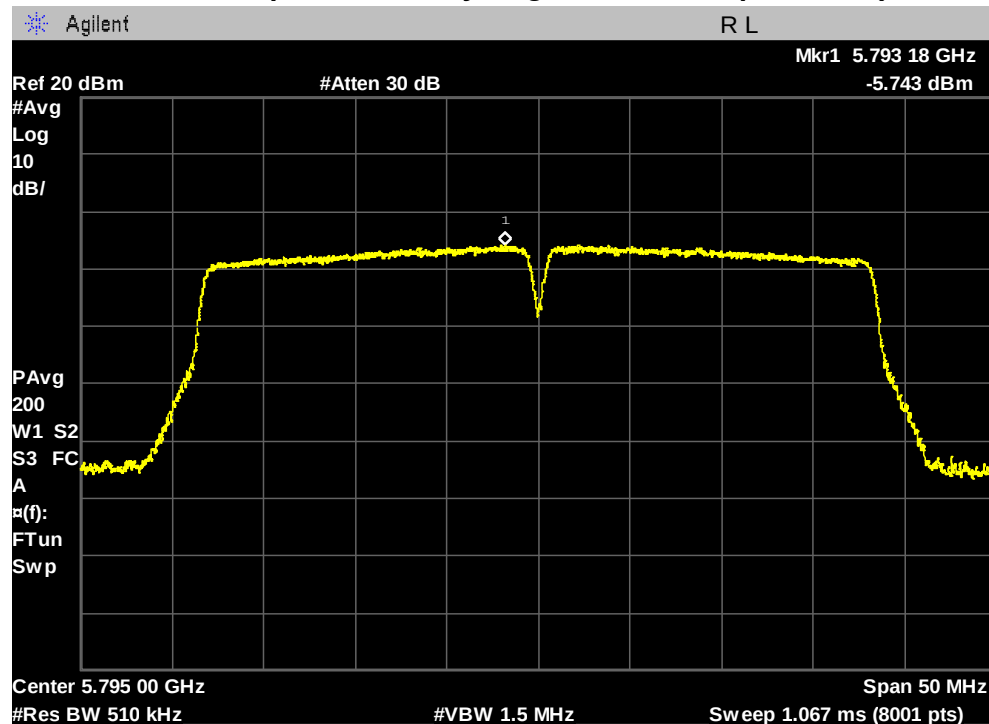


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Lowest Channel (5755 MHz)



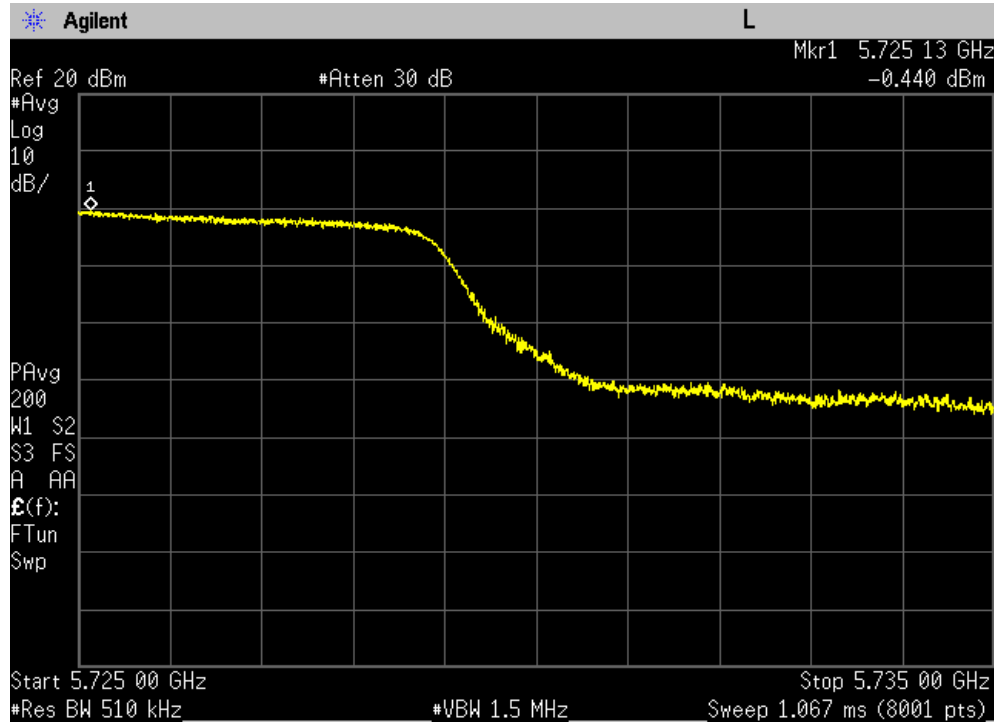
Maximum Power Spectral Density, Highest Channel (5795 MHz)



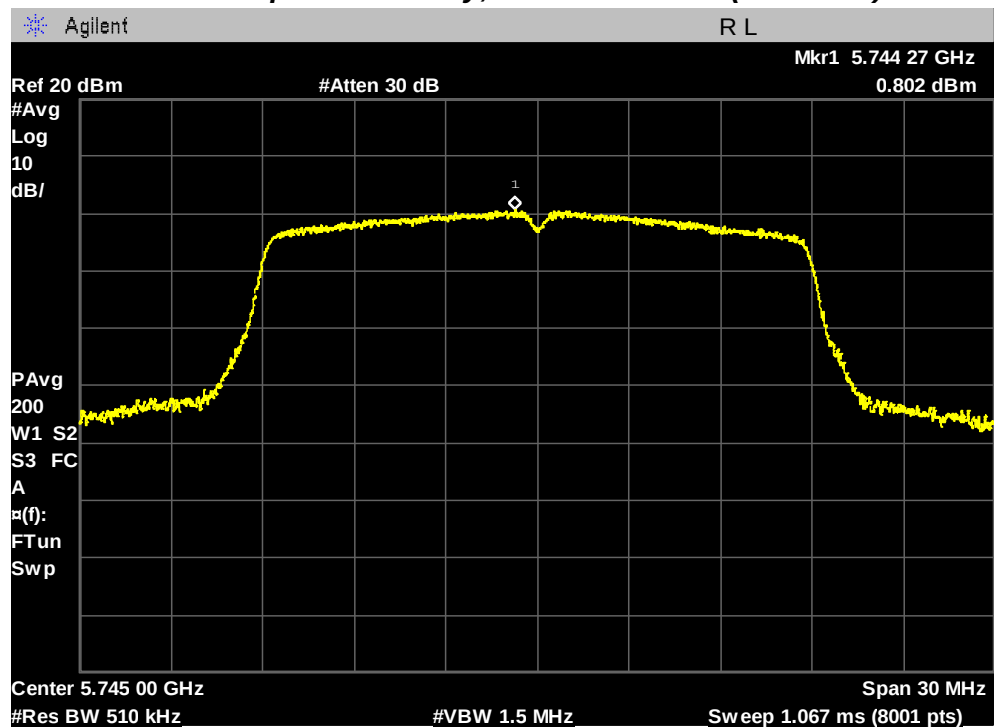
PLOTS OF EMISSIONS

802.11ac (20 MHz) mode 1TX

Maximum Power Spectral Density, Straddle Channel (5720 MHz)

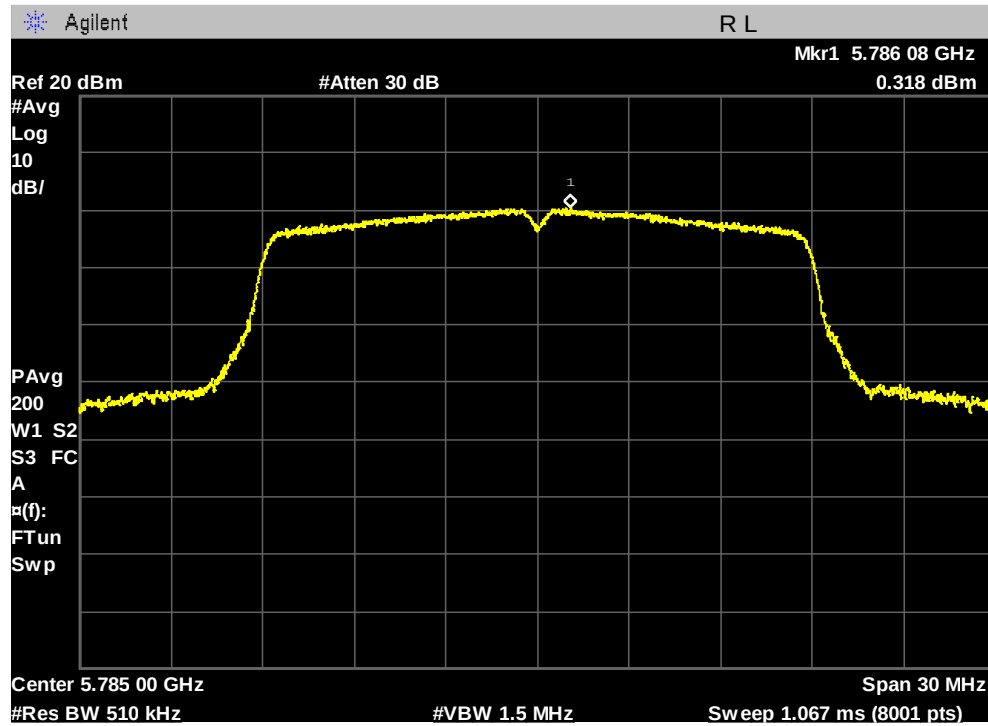


Maximum Power Spectral Density, Lowest Channel (5745 MHz)

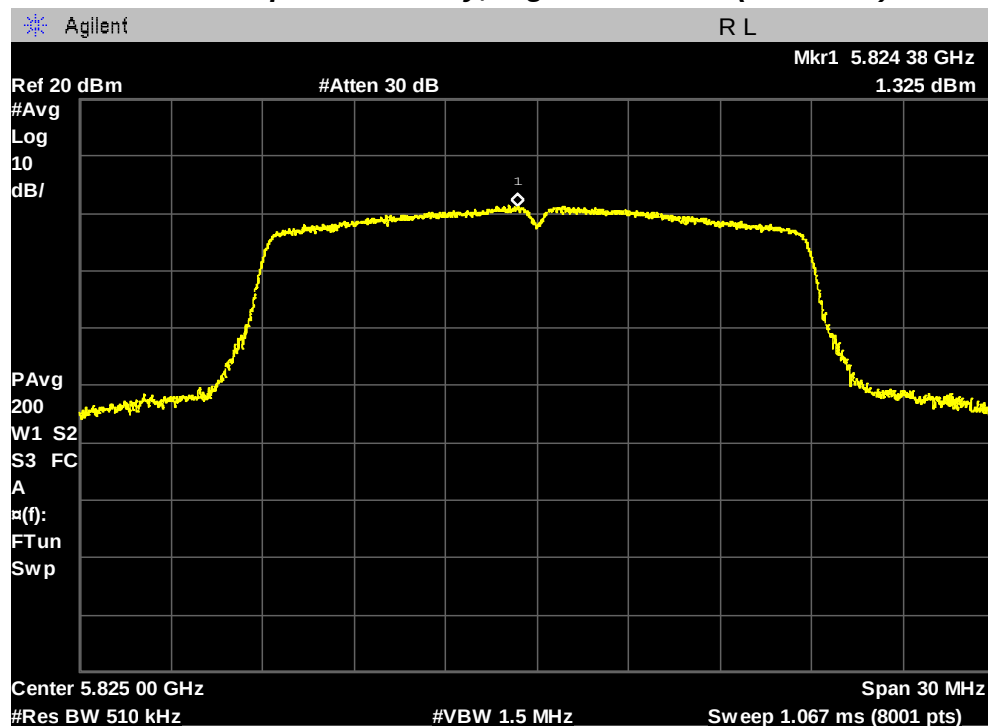


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Middle Channel (5785 MHz)



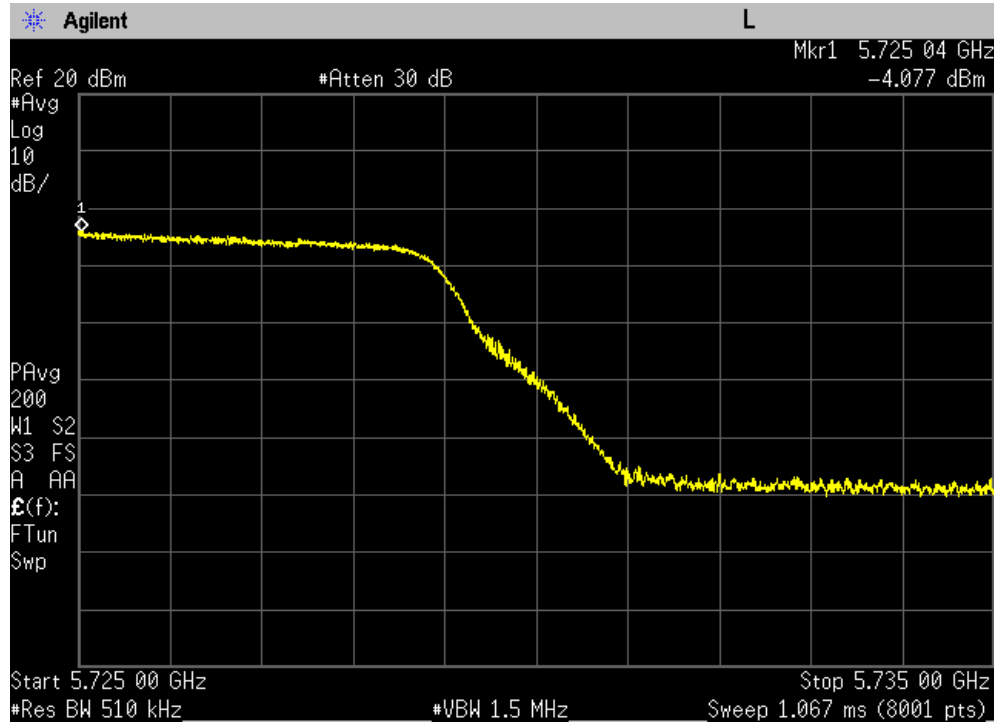
Maximum Power Spectral Density, Highest Channel (5825 MHz)



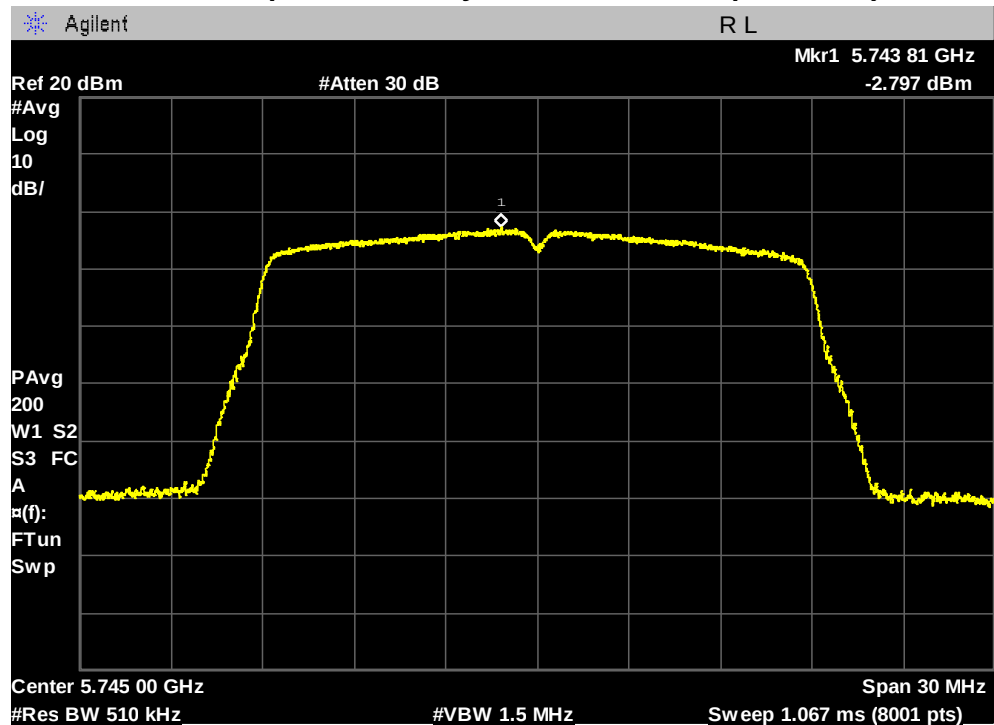
PLOTS OF EMISSIONS

802.11ac (20 MHz) mode 2TX

Maximum Power Spectral Density, Straddle Channel (5720 MHz)

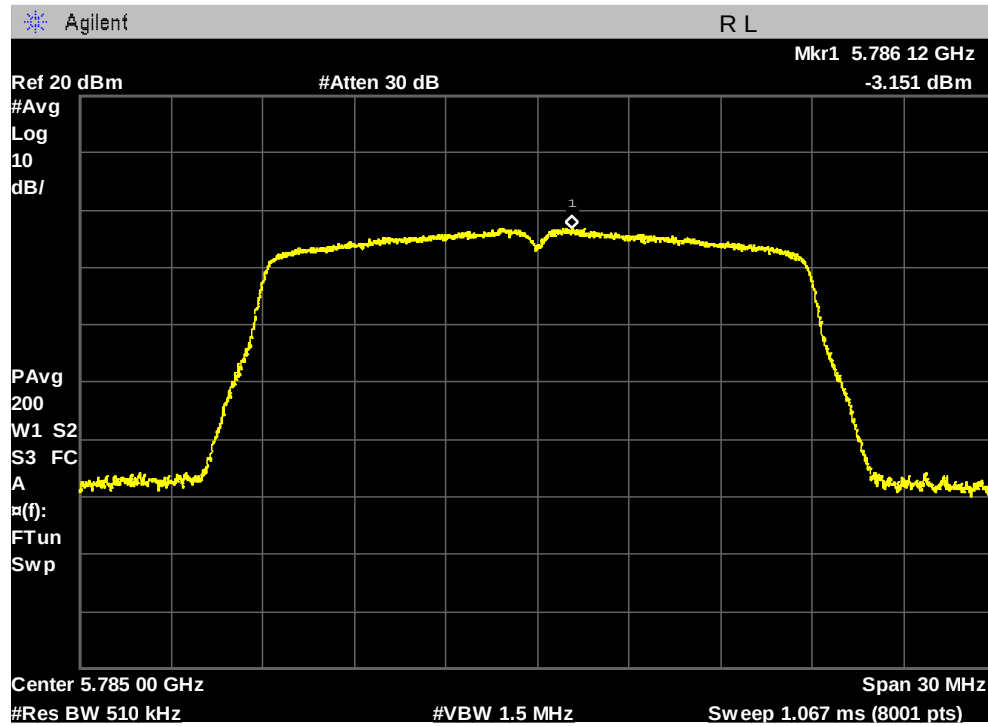


Maximum Power Spectral Density, Lowest Channel (5745 MHz)

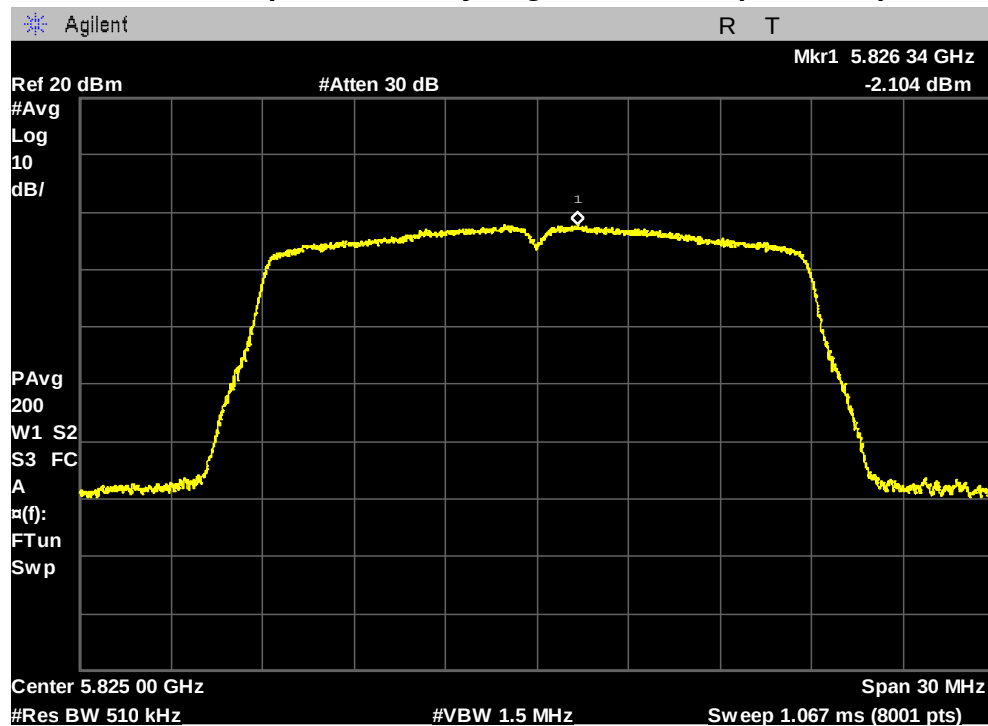


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Middle Channel (5785 MHz)



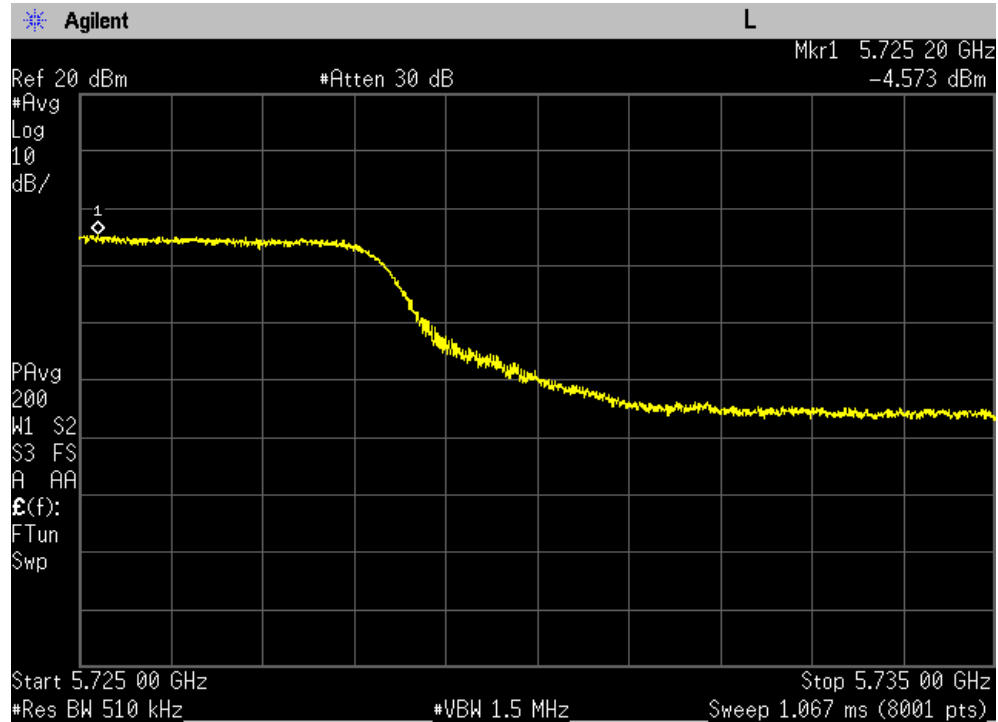
Maximum Power Spectral Density, Highest Channel (5825 MHz)



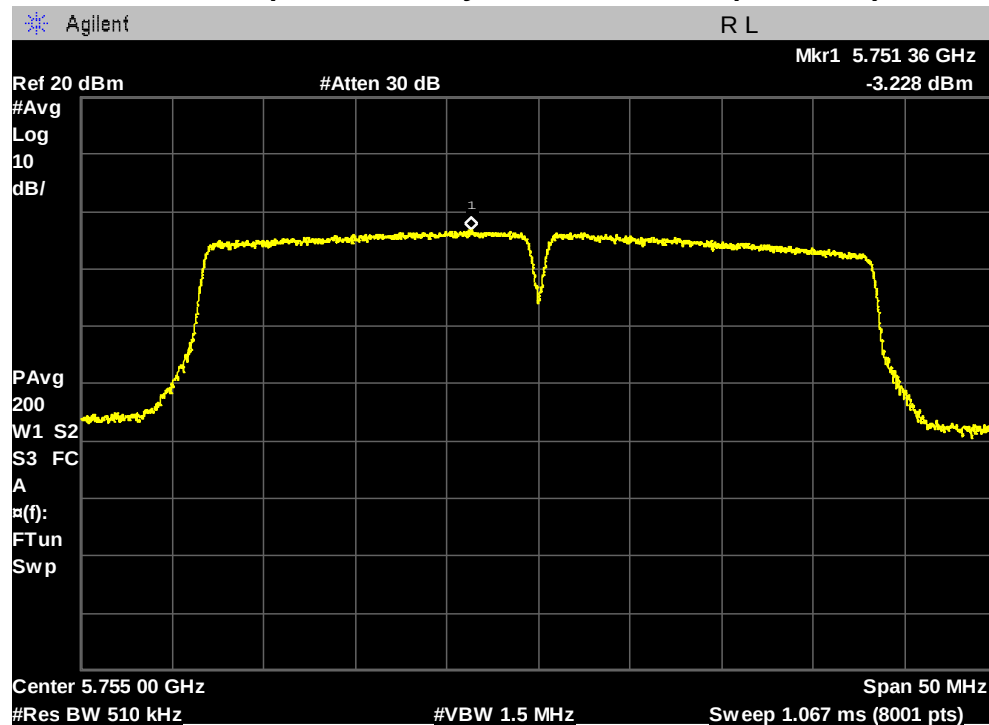
PLOTS OF EMISSIONS

802.11ac (40 MHz) mode 1TX

Maximum Power Spectral Density, Straddle Channel (5710 MHz)

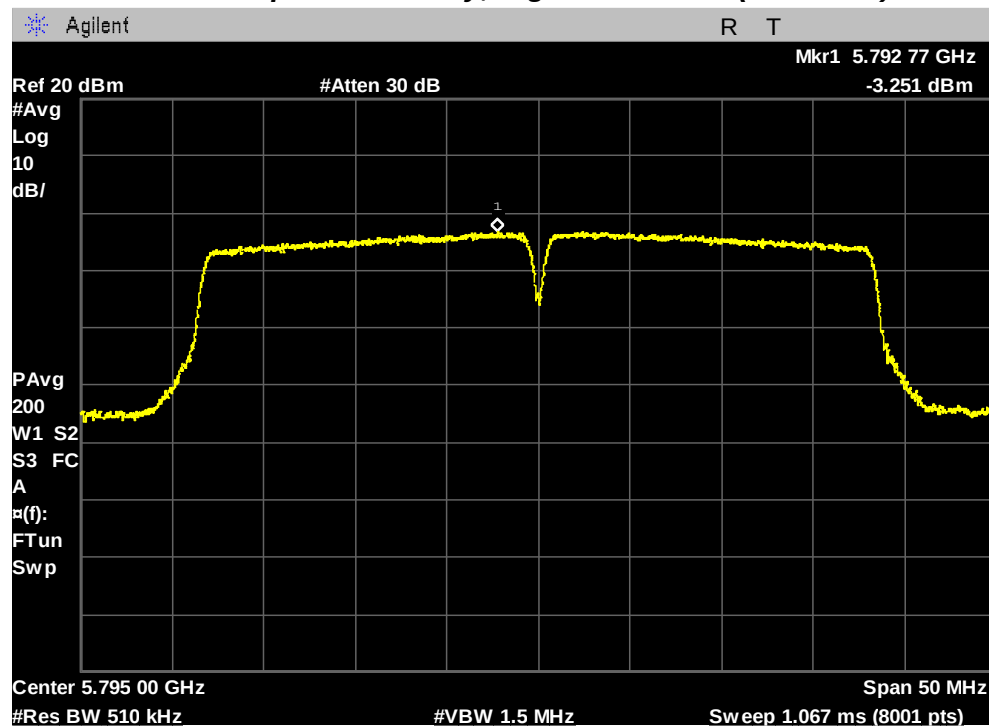


Maximum Power Spectral Density, Lowest Channel (5755 MHz)



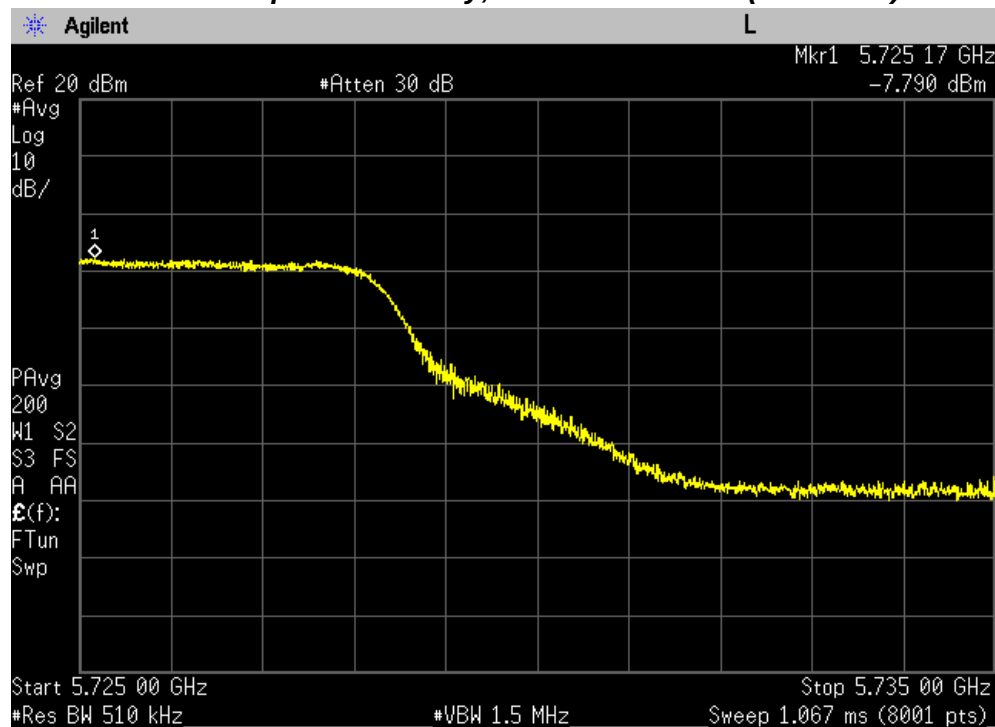
PLOTS OF EMISSIONS

Maximum Power Spectral Density, Highest Channel (5795 MHz)



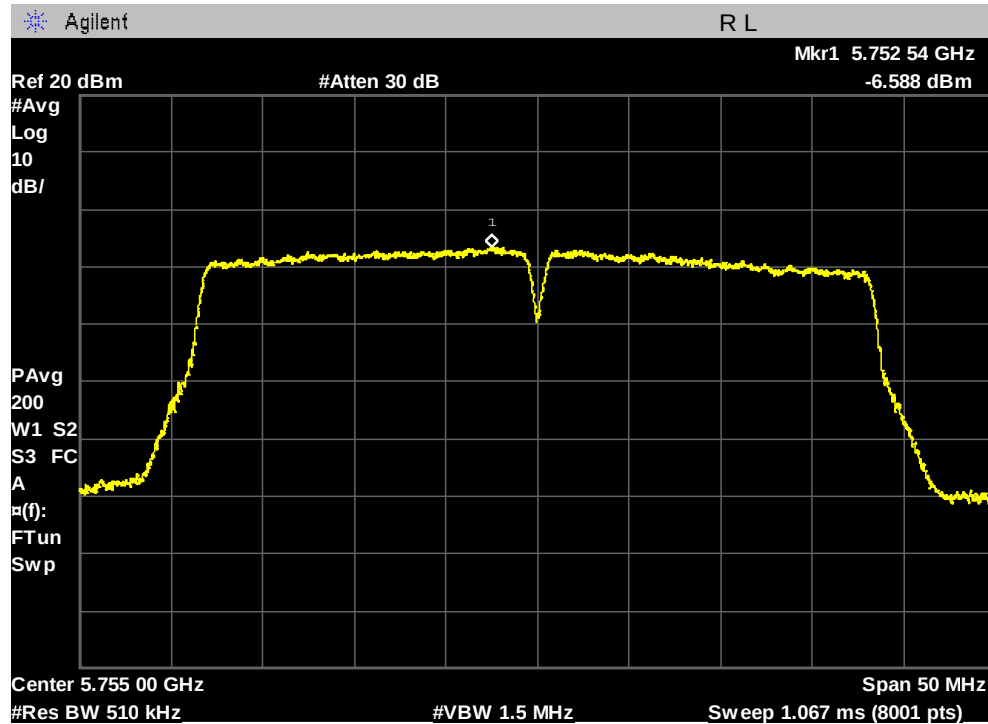
802.11ac (40 MHz) mode 2TX

Maximum Power Spectral Density, Straddle Channel (5710 MHz)

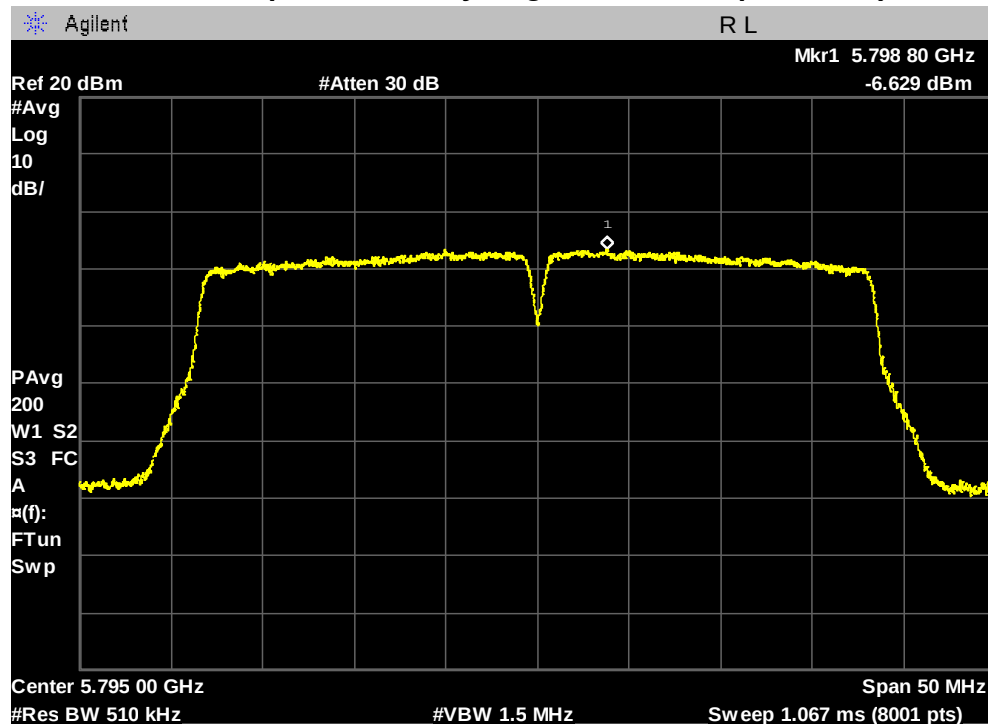


PLOTS OF EMISSIONS

Maximum Power Spectral Density, Lowest Channel (5755 MHz)



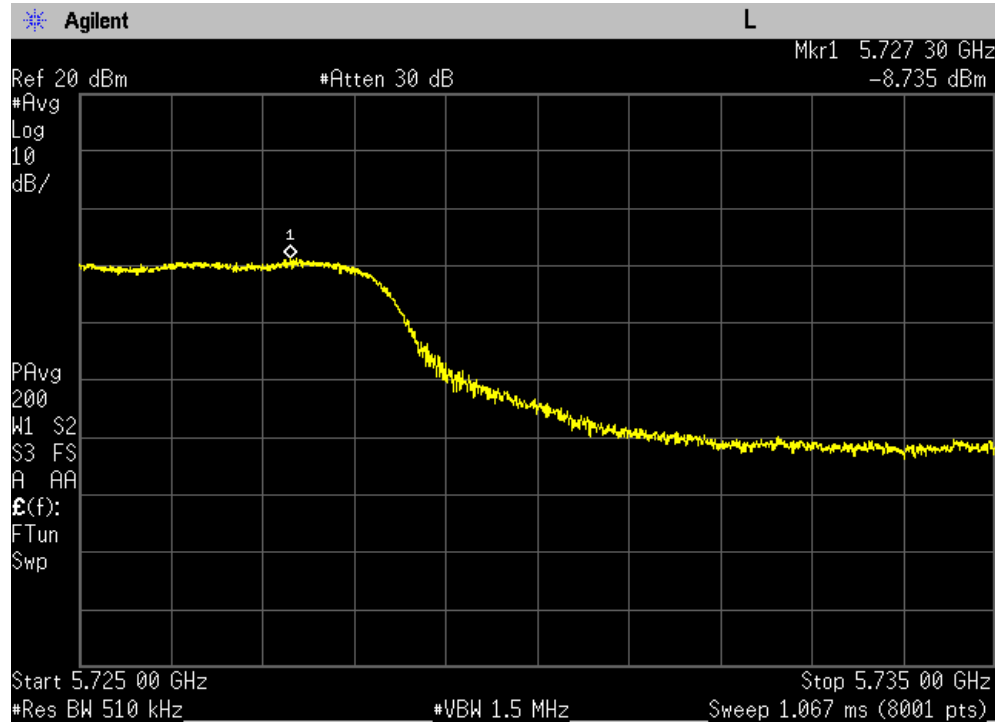
Maximum Power Spectral Density, Highest Channel (5795 MHz)



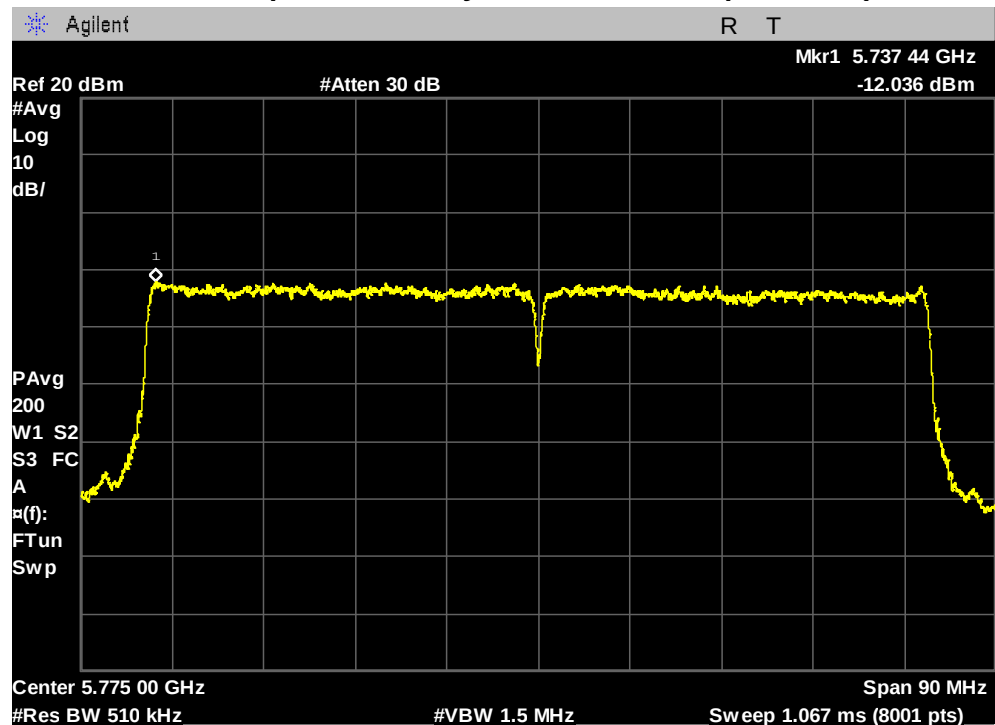
PLOTS OF EMISSIONS

802.11ac (80 MHz) mode 1TX

Maximum Power Spectral Density, Straddle Channel (5690 MHz)



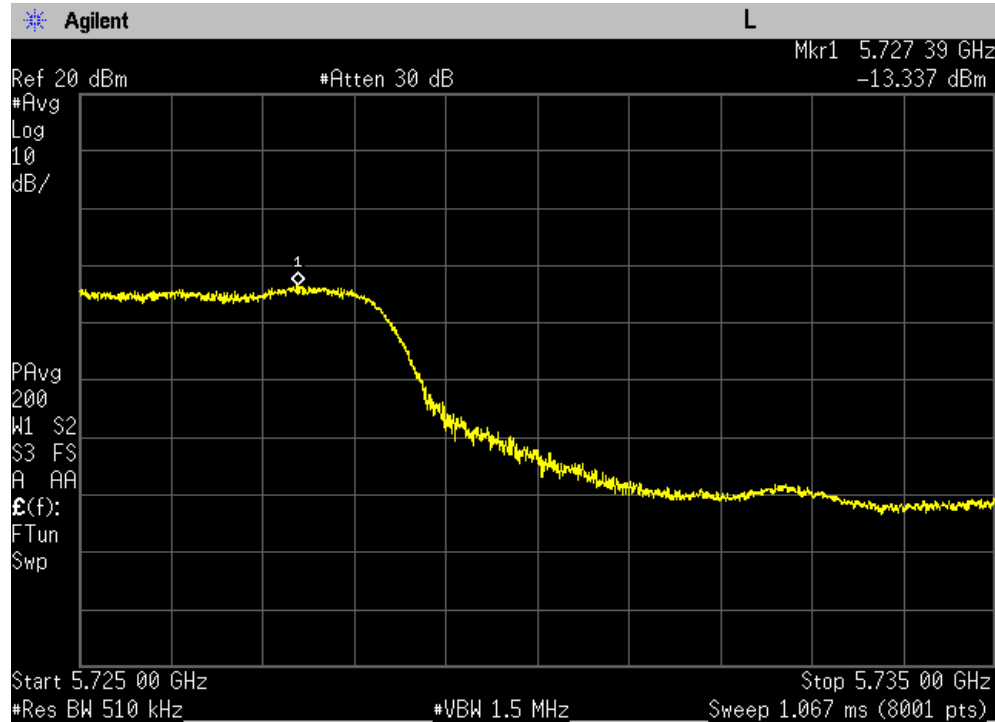
Maximum Power Spectral Density, Middle Channel (5775 MHz)



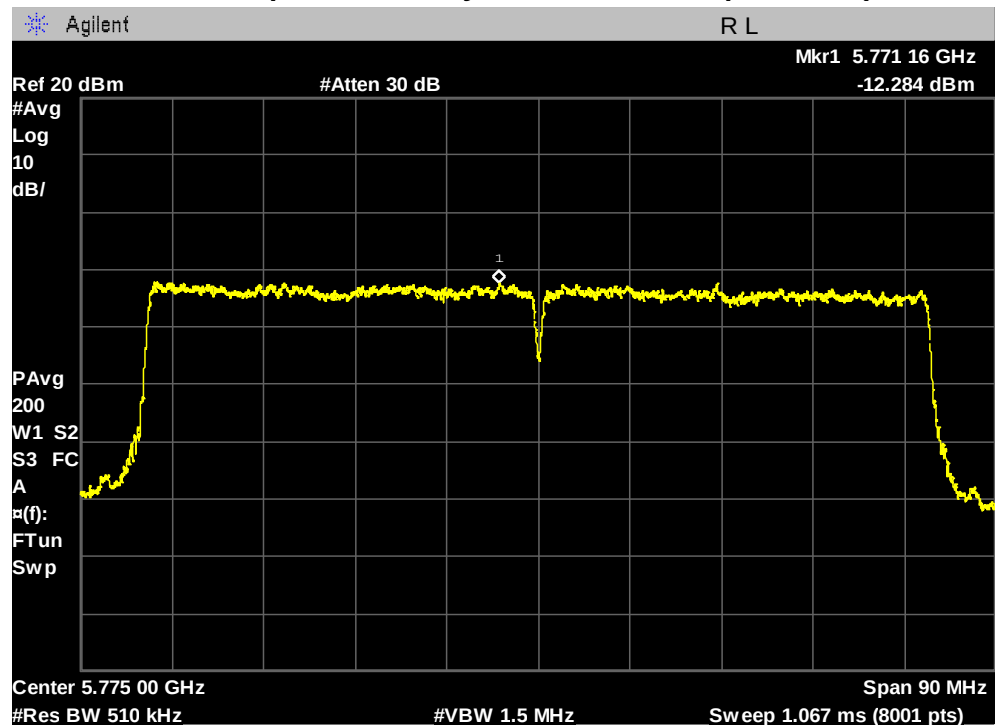
PLOTS OF EMISSIONS

802.11ac (80 MHz) mode 2TX

Maximum Power Spectral Density, Straddle Channel (5690 MHz)



Maximum Power Spectral Density, Middle Channel (5775 MHz)



TEST DATA

8.6 Radiated Spurious Emissions

8.6.1 Radiated Spurious Emissions – U-NII-1 band

FCC §15.407(b)

Test Mode : Set to Lowest channel, Middle channel and Highest channel

802.11ac (20MHz) mode

Lowest Channel (5180 MHz)

Frequency (M Hz)	Reading (dBμV)	Polarization (H/V)	Mode	Attenuation (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
10357.00	44.2	V	peak	13.0	57.2	68.2	11.0
10357.00	32.3	V	average	13.0	45.3	54.0	8.7

Middle Channel (5220 MHz)

Frequency (M Hz)	Reading (dBμV)	Polarization (H/V)	Mode	Attenuation (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
3964.50	49.7	V	peak	-3.7	46.0	68.2	22.2
7136.50	45.5	V	peak	8.2	53.7	68.2	14.5
10441.50	40.2	V	peak	13.3	53.5	68.2	14.7

Highest Channel (5240 MHz)

Frequency (M Hz)	Reading (dBμV)	Polarization (H/V)	Mode	Attenuation (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
10481.50	41.6	V	peak	13.4	55.0	68.2	13.2
10481.50	29.7	V	average	13.4	43.1	54.0	10.9

TEST DATA

Note:

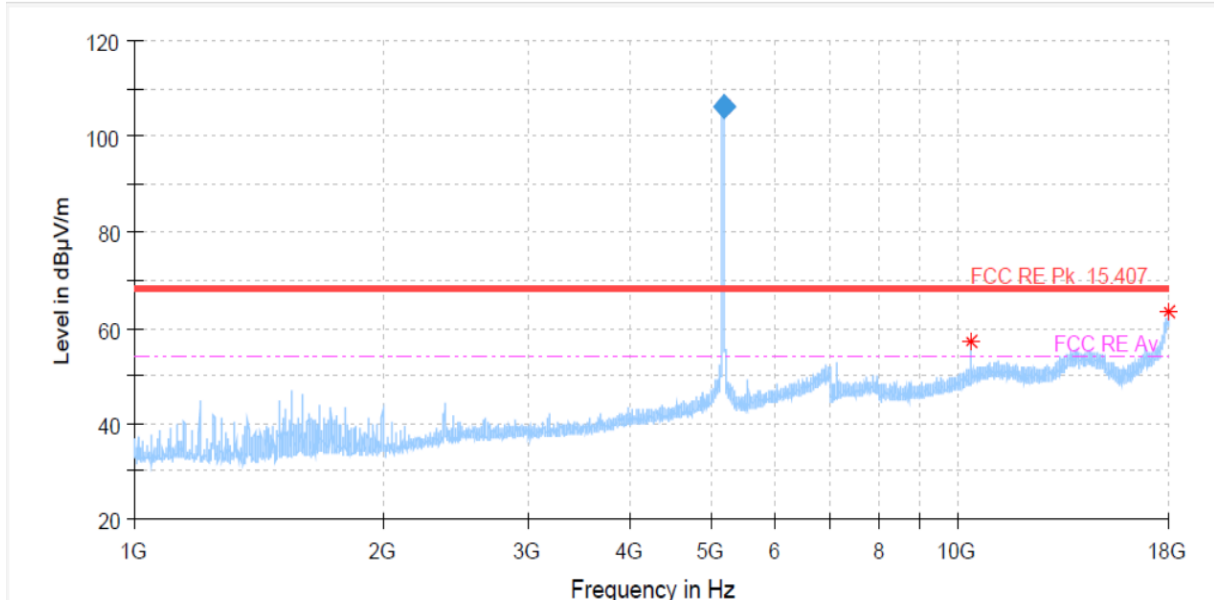
1. *Pol. H = Horizontal V = Vertical
2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.
3. At frequencies above 1 GHz, peak emissions were measured using RBW = 1 MHz, VBW = 3 MHz, Detector = Peak.
4. As the EUT was configured to transmit with duty cycles < 98 percent, at frequencies above 1 GHz, average emission levels were measured using the "Method VB" by setting the analyzer RBW = 1 MHz, VBW = 10 kHz (VBW $\geq 1/T$), Detector = Peak.
5. The spectrum is measured from 9 kHz to 10th harmonic and the worst-case emissions are reported. No significant emissions were found beyond the Second harmonic for this device.
6. ***For outside of the restricted band, the peak limit is applied according to Part 15.407(b).
Peak limit is 68.2 dB μ V/m. ($E[\text{dB}\mu\text{V/m}] = \text{EIRP}[\text{dBm/MHz}] + 95.2 = 68.2 \text{ dB}\mu\text{V/m}$, for $\text{EIPR}[\text{dBm/MHz}] = -27\text{dBm}$.)
7. For restricted band, the peak limit is 68.2 dB μ V/m, the average limit is 54 dB μ V/m per FCC §15.209.
8. Lowest channel(5180MHz) in ac (20MHz) mode was the worst channel with respect to spurious emission.
9. The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, Vertical polarization. The worst data was recorded.
10. At frequencies above 1 GHz, EUT was placed at a height of 1.5m above the floor on a support according to ANSI 63.10-2013.

PLOTS OF EMISSIONS

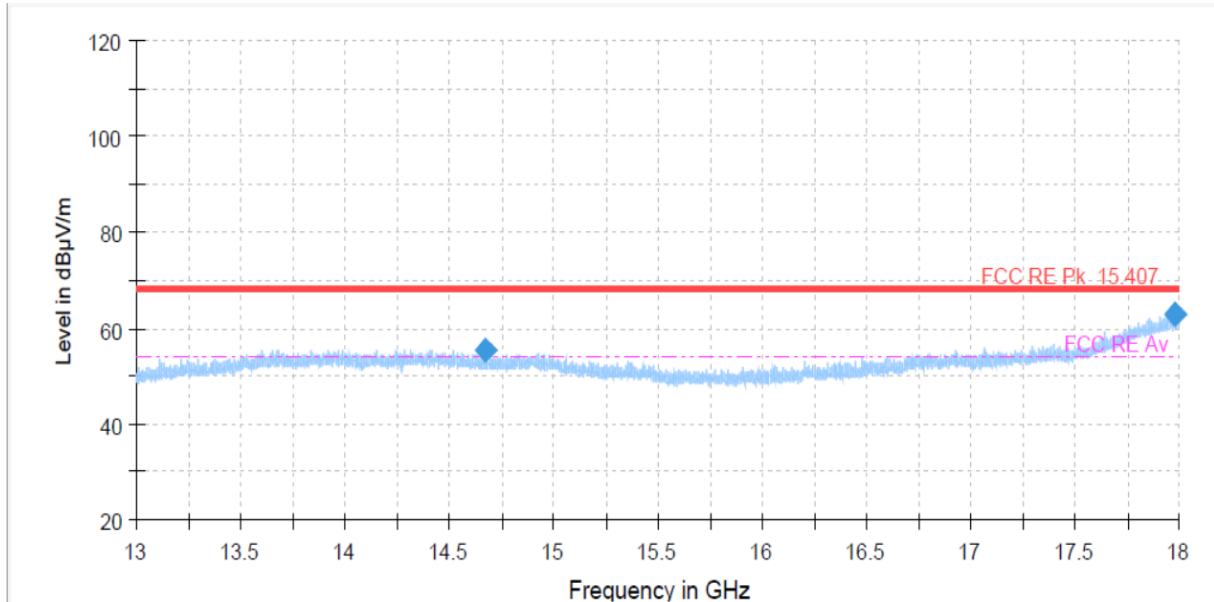
Worst Case

802.11ac (20MHz) mode

Lowest channel : 1 GHz to 18 GHz_Peak

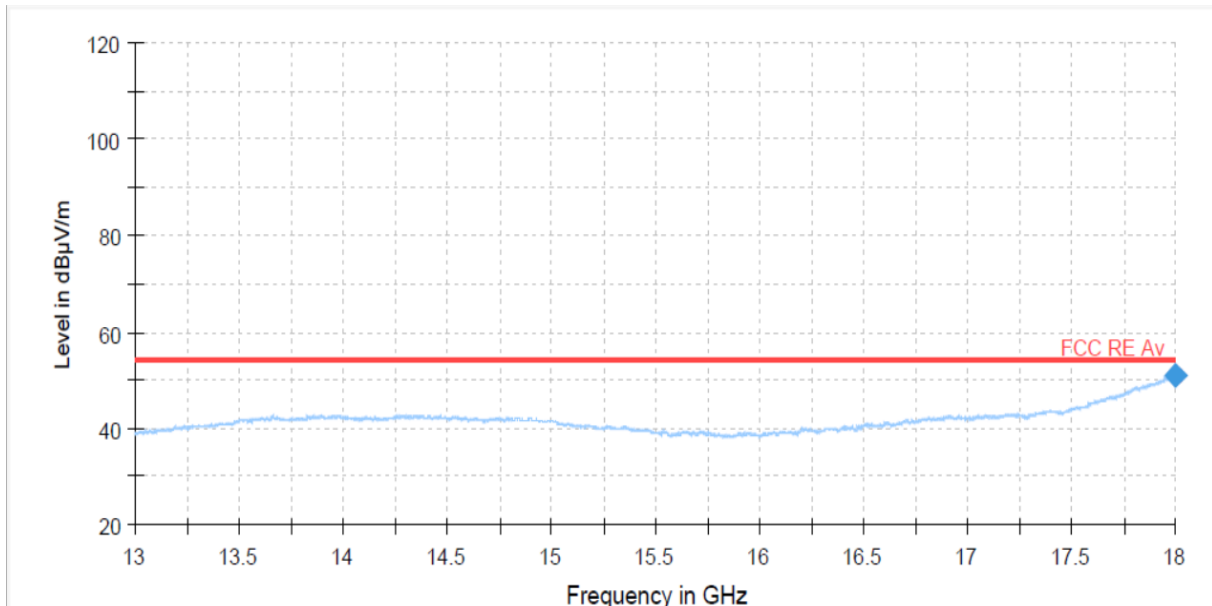


Lowest channel : 13 GHz to 18 GHz_Peak

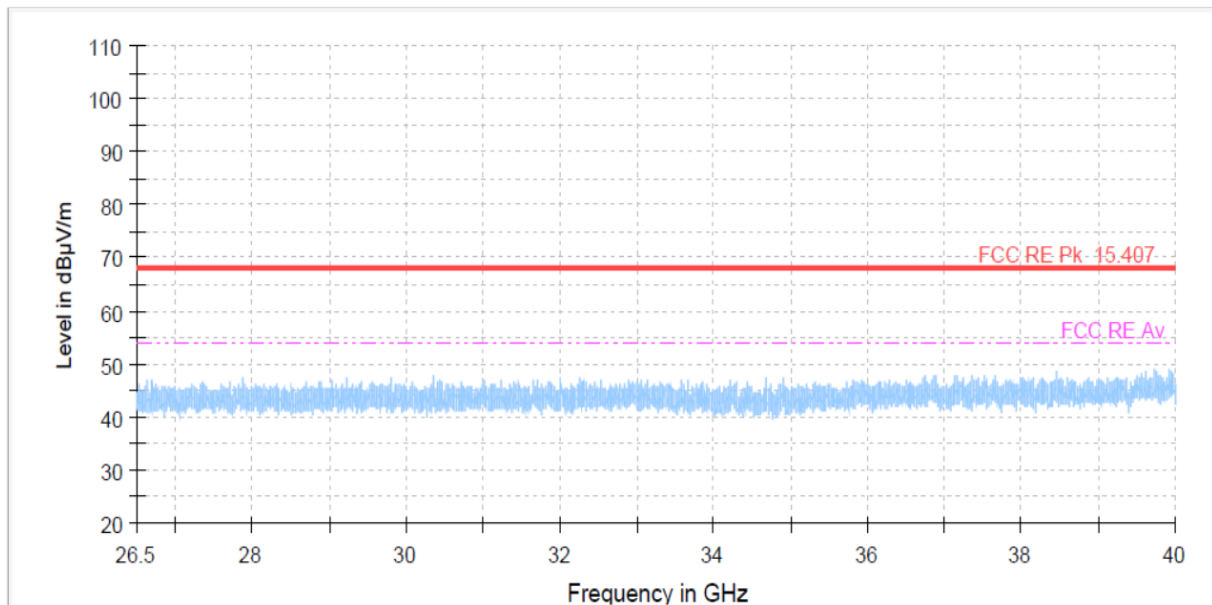


PLOTS OF EMISSIONS

Lowest channel : 13 GHz to 18 GHz_Average



Middle channel : 26.5 GHz to 40 GHz_Peak



TEST DATA

8.6.2 Radiated Spurious Emissions – U-NII-2A band

FCC §15.407(b)

Test Mode : Set to Lowest channel, Middle channel and Highest channel

802.11ac (20MHz) mode

Lowest Channel (5260 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
7136.50	45.7	V	peak	8.2	53.9	68.2	14.3
7136.50	41.2	V	average	8.2	49.4	54.0	4.6

Middle Channel (5300 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
10595.00	43.5	V	peak	13.6	57.1	68.2	11.1
10595.00	29.6	V	average	13.6	43.2	54.0	10.8

Highest Channel (5320 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
10642.50	43.1	V	peak	13.8	56.9	68.2	11.3
10642.50	31.2	V	average	13.8	45.0	54.0	9.0

TEST DATA

Note:

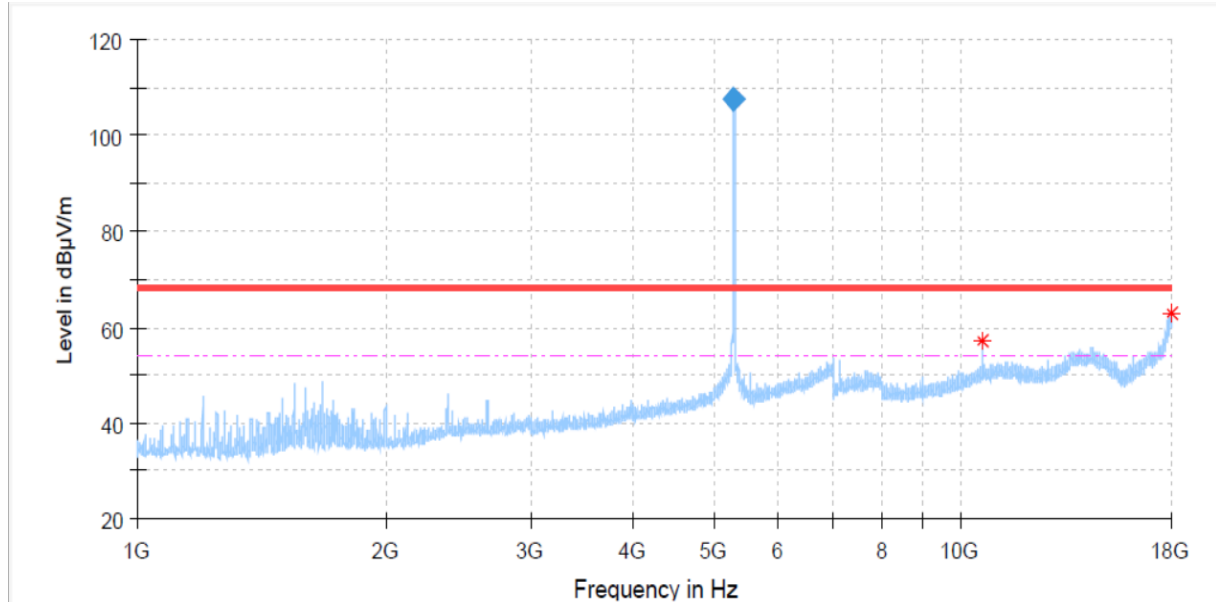
1. *Pol. H = Horizontal V = Vertical
2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.
3. At frequencies above 1 GHz, peak emissions were measured using RBW = 1 MHz, VBW = 3 MHz, Detector = Peak.
4. As the EUT was configured to transmit with duty cycles < 98 percent, at frequencies above 1 GHz, average emission levels were measured using the "Method VB" by setting the analyzer RBW = 1 MHz, VBW = 10 kHz (VBW $\geq 1/T$), Detector = Peak.
5. The spectrum is measured from 9 kHz to 10th harmonic and the worst-case emissions are reported. No significant emissions were found beyond the Third harmonic for this device.
6. ***For outside of the restricted band, the peak limit is applied according to Part 15.407(b).
Peak limit is 68.2 dB μ V/m. ($E[\text{dB}\mu\text{V/m}] = \text{EIRP}[\text{dBm/MHz}] + 95.2 = 68.2 \text{ dB}\mu\text{V/m}$, for $\text{EIPR}[\text{dBm/MHz}] = -27\text{dBm}$.)
7. For restricted band, the peak limit is 68.2 dB μ V/m, the average limit is 54 dB μ V/m per FCC §15.209.
8. Middle channel(5300MHz) in ac (20MHz) mode was the worst channel with respect to spurious emission.
9. The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, Vertical polarization. The worst data was recorded.
10. At frequencies above 1 GHz, EUT was placed at a height of 1.5m above the floor on a support according to ANSI 63.10-2013.

PLOTS OF EMISSIONS

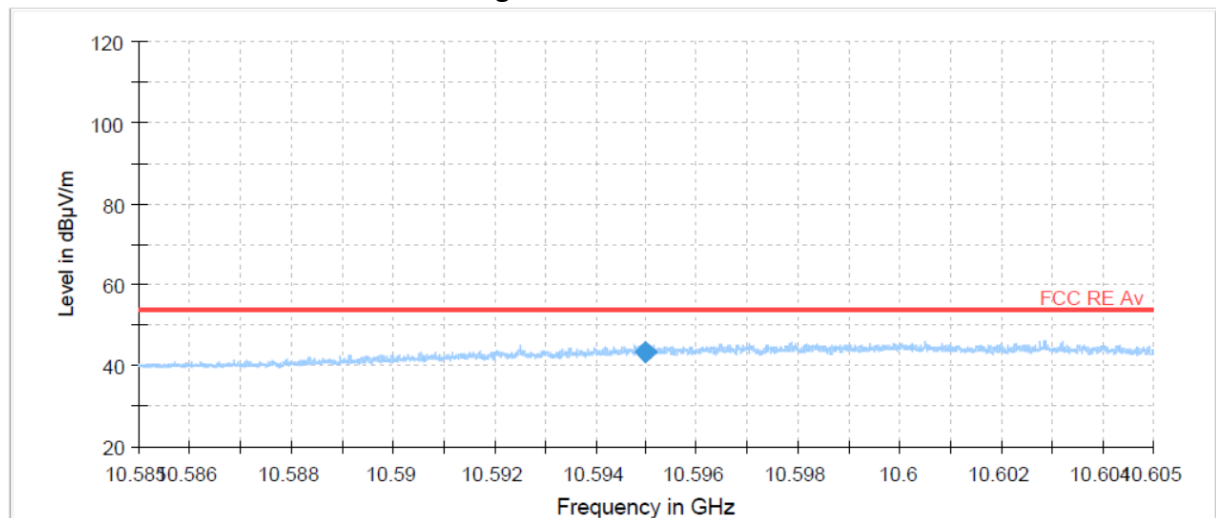
Worst Case

802.11ac (20MHz) mode

Middle channel : 1 GHz to 18 GHz_Peak

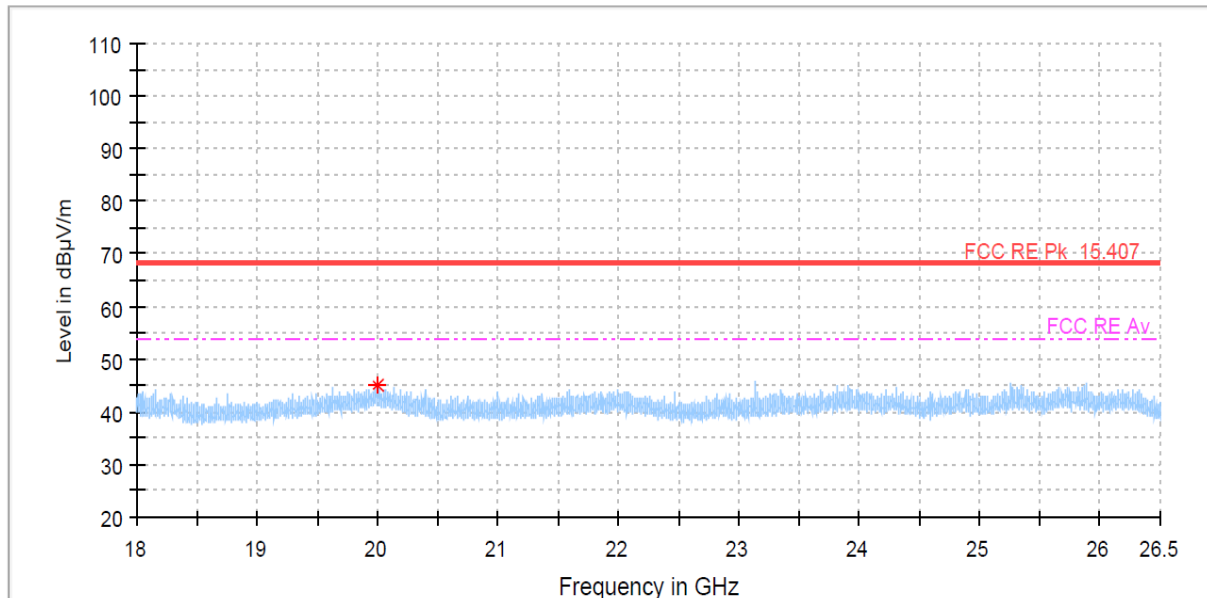


Middle channel : 10595 MHz_Average

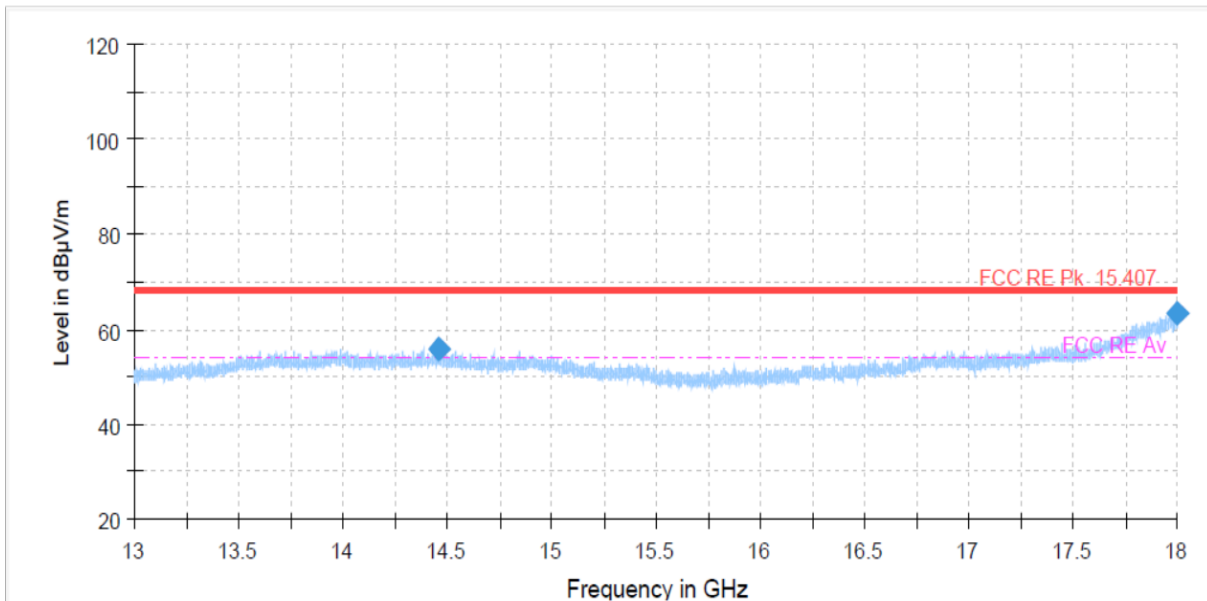


PLOTS OF EMISSIONS

Middle channel : 18 GHz to 26.5 GHz_Peak

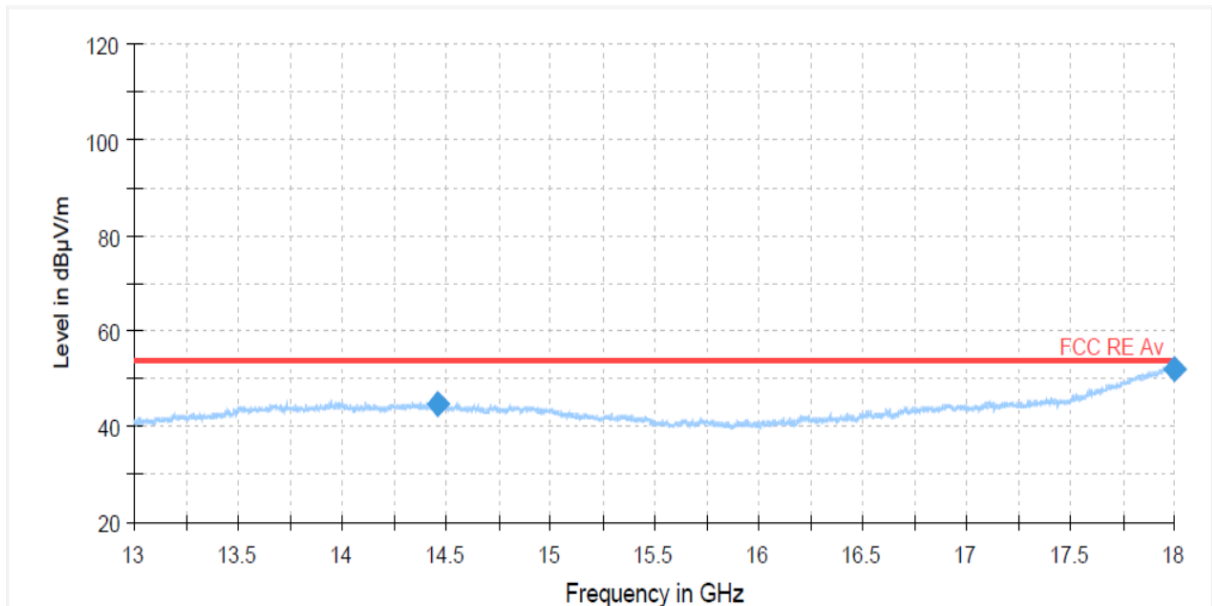


Lowest channel : 13 GHz to 18 GHz_Peak

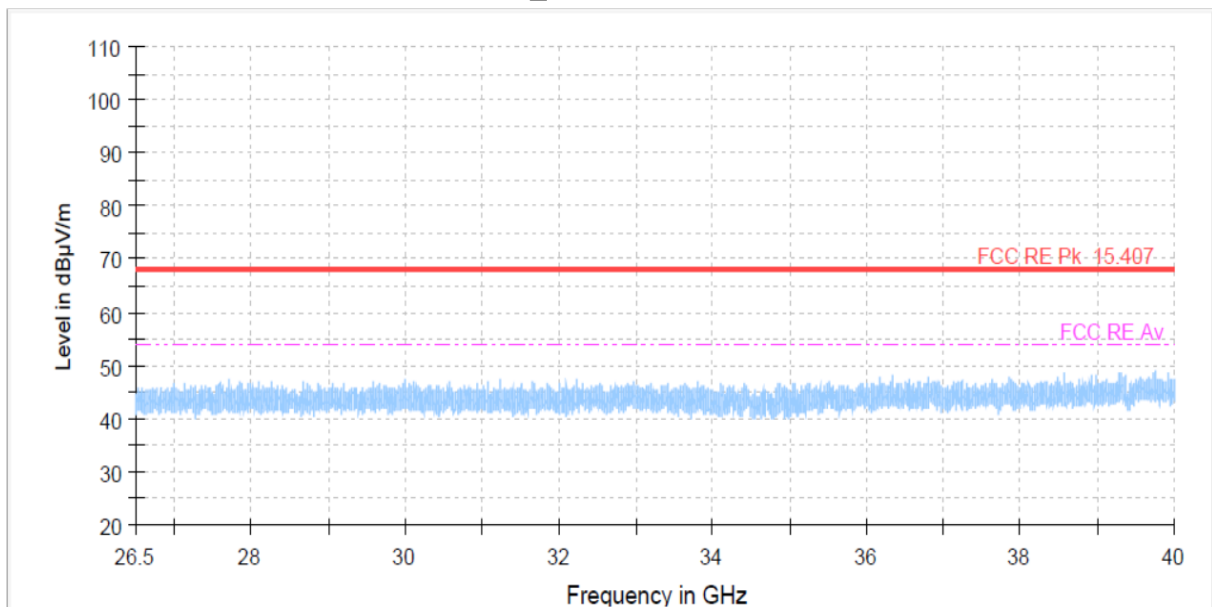


PLOTS OF EMISSIONS

Lowest channel : 13 GHz to 18 GHz_Average



Lowest channel : 26.5 GHz to 40 GHz_Peak



TEST DATA

8.6.3 Radiated Spurious Emissions – U-NII-2C band

FCC §15.407(b)

Test Mode : Set to Lowest channel, Middle channel and Highest channel, Straddle channel

802.11ac (20MHz) mode

Lowest Channel (5500 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
10997.00	48.2	V	peak	14.5	62.7	68.2	5.5
10997.00	35.8	V	average	14.5	50.3	54.0	3.7

Middle Channel (5600 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
11198.50	48.4	V	peak	14.6	63.0	68.2	5.2
11198.50	36.9	V	average	14.7	51.6	54.0	2.5

Highest Channel (5700 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
7136.50	45.7	V	peak	8.2	53.9	68.2	14.3
7136.50	40.1	V	average	8.2	48.3	54.0	5.7
11397.00	45.9	V	peak	14.5	60.4	68.2	7.8
11397.00	33.7	V	average	14.5	48.2	54.0	5.8

TEST DATA

Straddle Channel (5720 MHz)

Frequency (M Hz)	Reading (dBμV)	Pol* (H/V)	m ode	AF+CL+Amp (dB)**	Result (dBμV/m)	Lim it (dBμV/m)	M arg in (dB)
11437.00	47.7	V	peak	14.5	62.2	68.2	6.0
11437.00	35.6	V	average	14.5	50.1	54.0	3.9

Note:

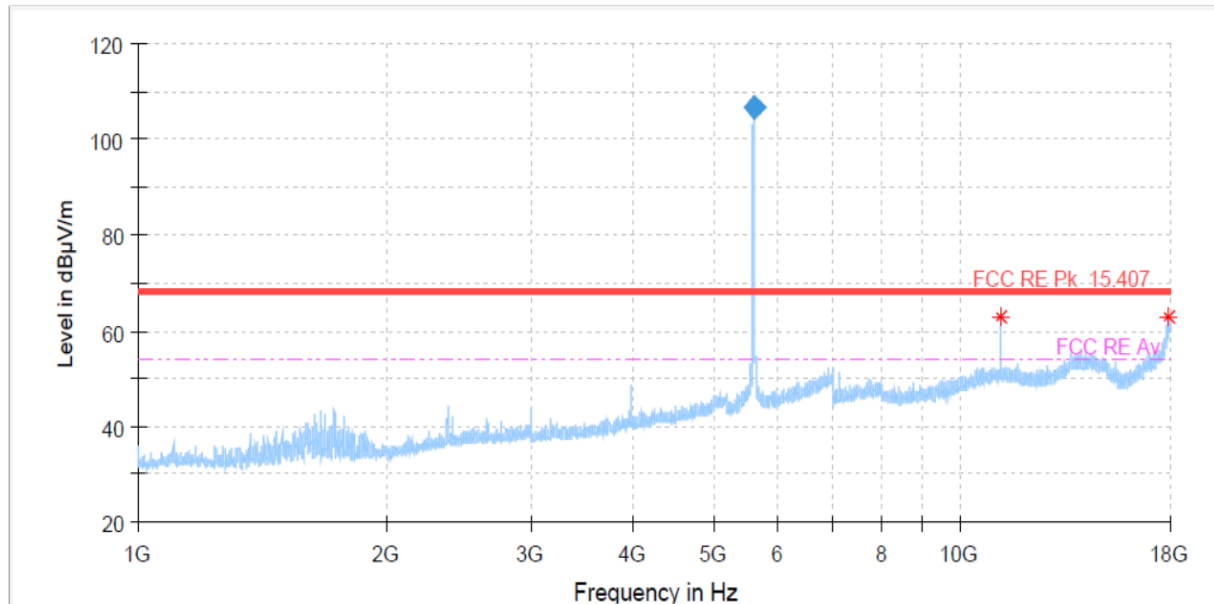
- *Pol. H = Horizontal V = Vertical
- **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.
- At frequencies above 1 GHz, peak emissions were measured using RBW = 1 MHz, VBW = 3 MHz, Detector = Peak.
- As the EUT was configured to transmit with duty cycles < 98 percent, at frequencies above 1 GHz, average emission levels were measured using the "Method VB" by setting the analyzer RBW = 1 MHz, VBW = 10 kHz (VBW ≥ 1/T), Detector = Peak.
- The spectrum is measured from 9 kHz to 10th harmonic and the worst-case emissions are reported.
No significant emissions were found beyond the Third harmonic for this device.
- ***For outside of the restricted band, the peak limit is applied according to Part 15.407(b).
Peak limit is 68.2 dBμV/m. ($E[dBμV/m] = EIRP[dBm/MHz] + 95.2 = 68.2 \text{ dBμV/m}$, for $EIRP[dBm/MHz] = -27\text{dBm}$.)
- For restricted band, the peak limit is 68.2 dBμV/m, the average limit is 54 dBμV/m per FCC §15.209.
- Middle channel(5600MHz) in ac (20MHz) mode was the worst channel with respect to spurious emission.
- The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, Vertical polarization. The worst data was recorded.
- At frequencies above 1 GHz, EUT was placed at a height of 1.5m above the floor on a support according to ANSI 63.10-2013.

PLOTS OF EMISSIONS

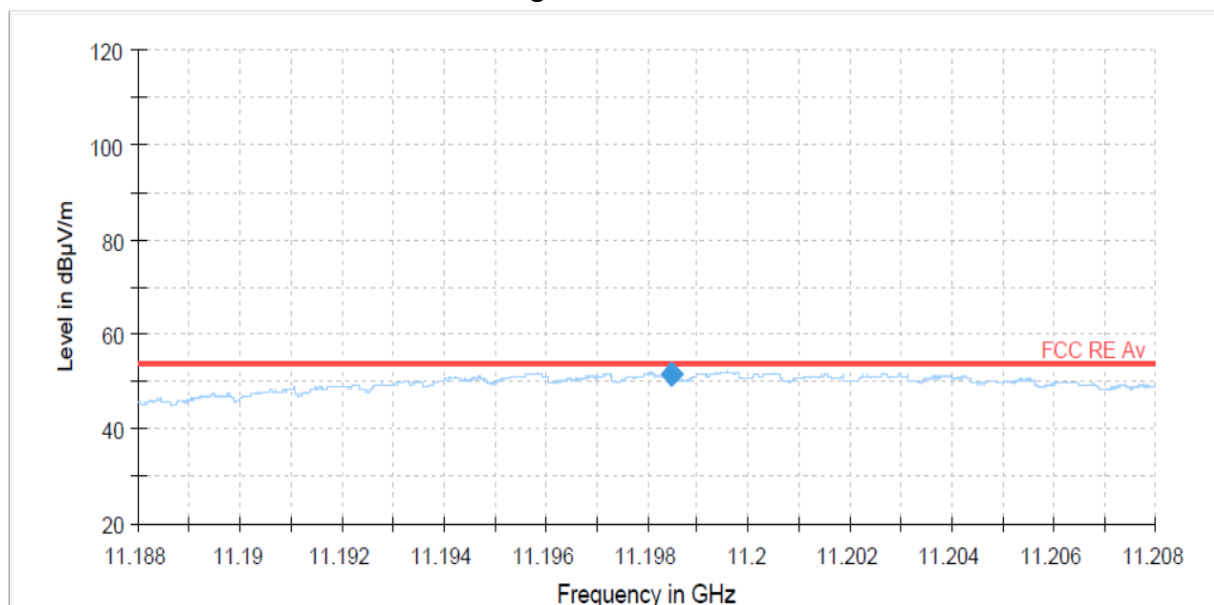
Worst Case

802.11ac (20MHz) mode

Middle channel : 1 GHz to 18 GHz_Peak

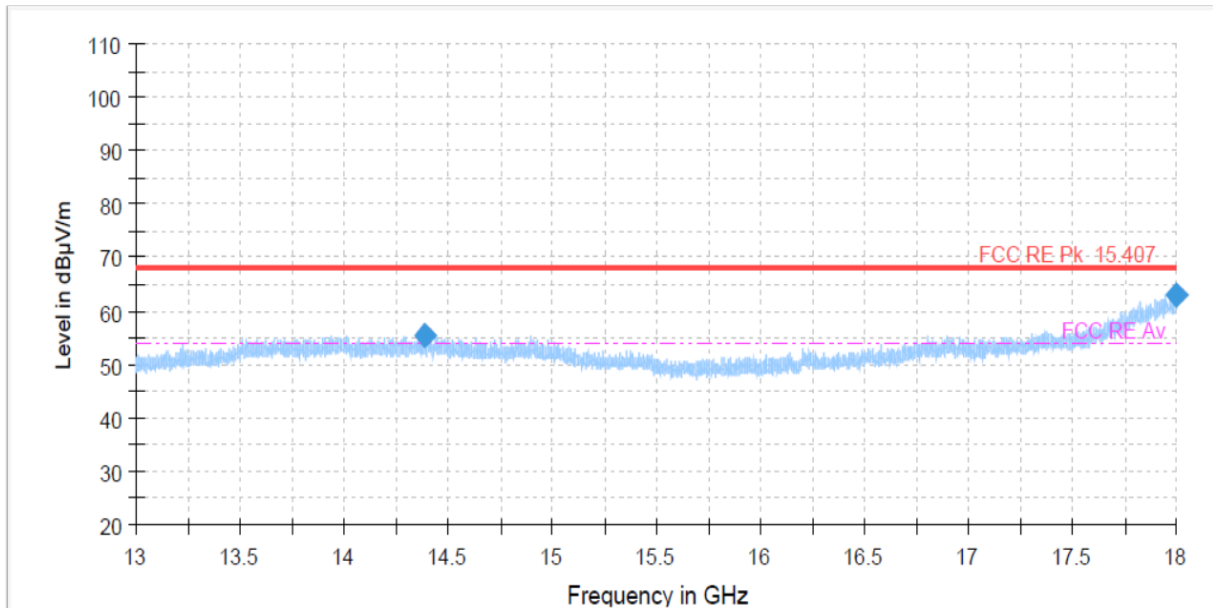


Middle channel : 2nd Harmonic_Average

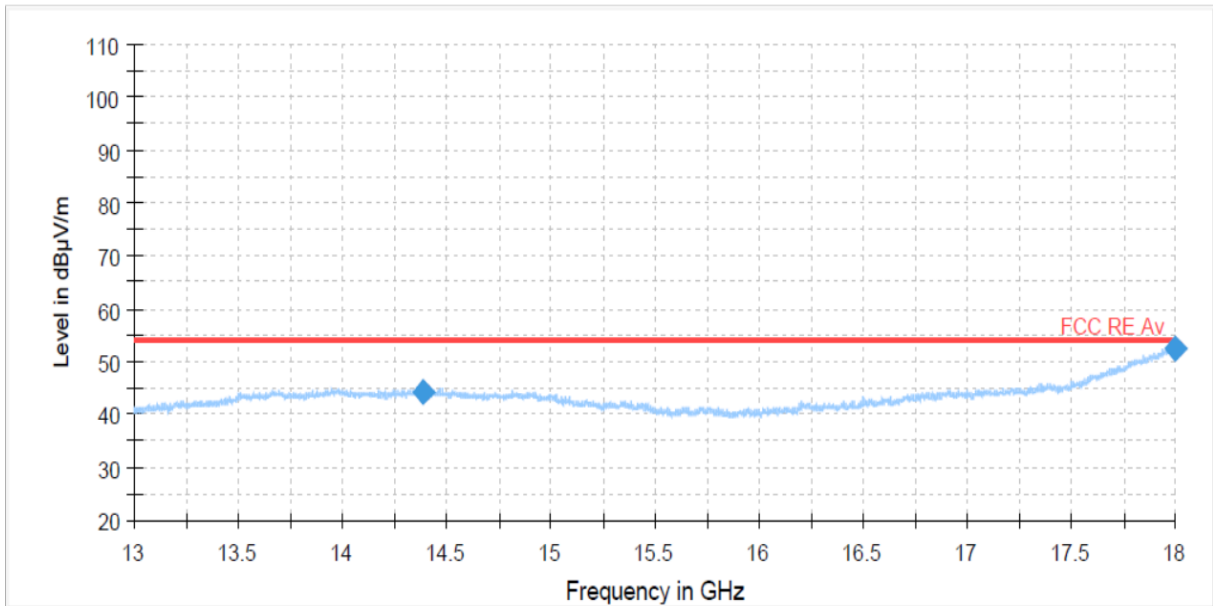


PLOTS OF EMISSIONS

Middle channel : 13 GHz to 18 GHz_Peak

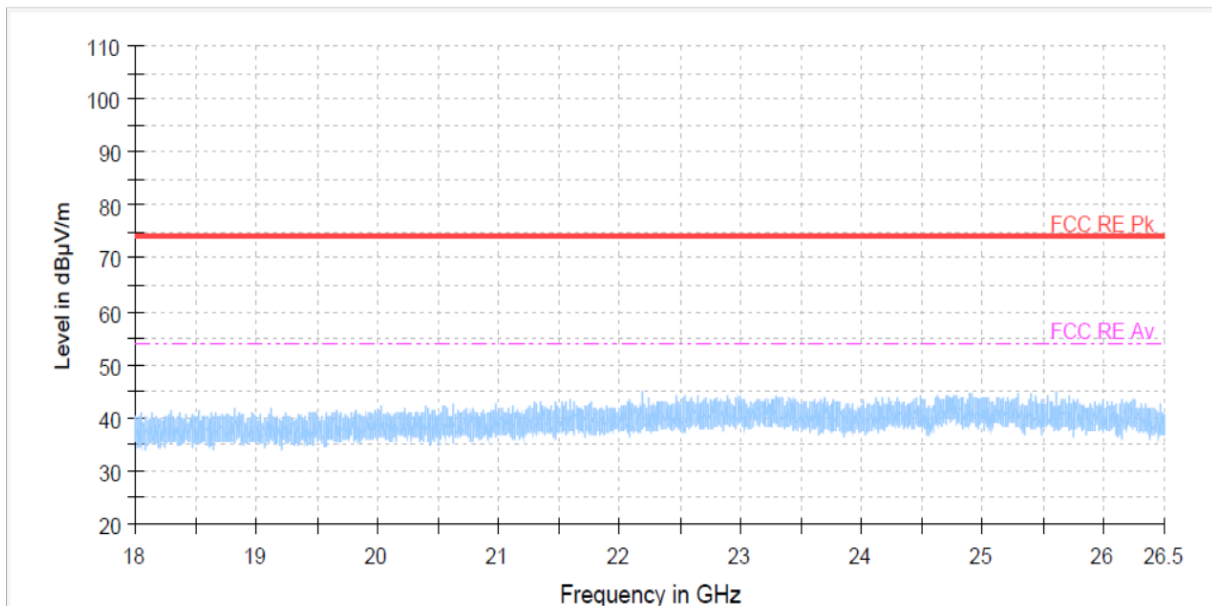


Middle channel : 13 GHz to 18 GHz_Average

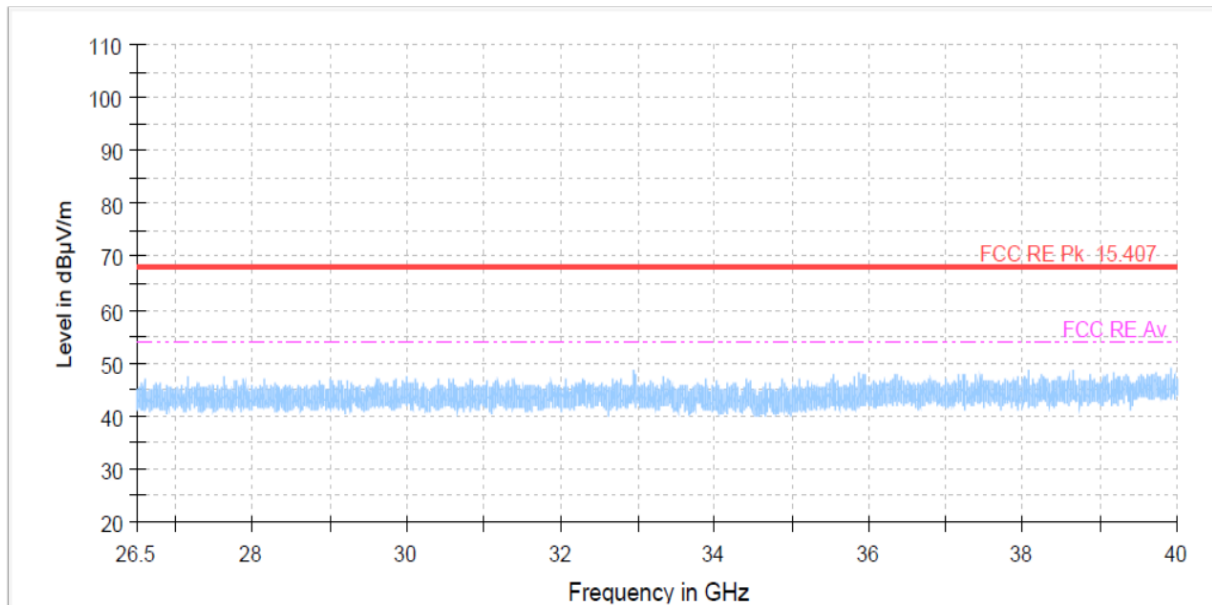


PLOTS OF EMISSIONS

Middle channel : 18 GHz to 26.5 GHz_Peak



Lowest channel : 26.5 GHz to 40 GHz_Peak



TEST DATA

8.6.4 Radiated Spurious Emissions – U-NII-3 band

FCC §15.407(b)

Test Mode : Set to Lowest channel, Middle channel and Highest channel

802.11ac (20MHz) mode

Lowest Channel (5745 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
11487.50	46.6	V	peak	14.5	61.1	68.2	7.1
11487.50	36.2	V	average	14.5	50.7	54.0	3.3

Middle Channel (5785 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
7136.50	45.2	V	peak	8.2	53.4	68.2	14.8
11566.00	50.0	V	peak	14.4	64.4	68.2	3.9
11566.00	36.1	V	average	14.4	50.5	54.0	3.5

Highest Channel (5825 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
7137.00	52.2	V	peak	8.2	60.4	68.2	7.8
11652.50	40.2	V	peak	14.4	54.6	68.2	13.6
11652.50	34.8	V	average	14.4	49.2	54.0	4.8

TEST DATA

Note:

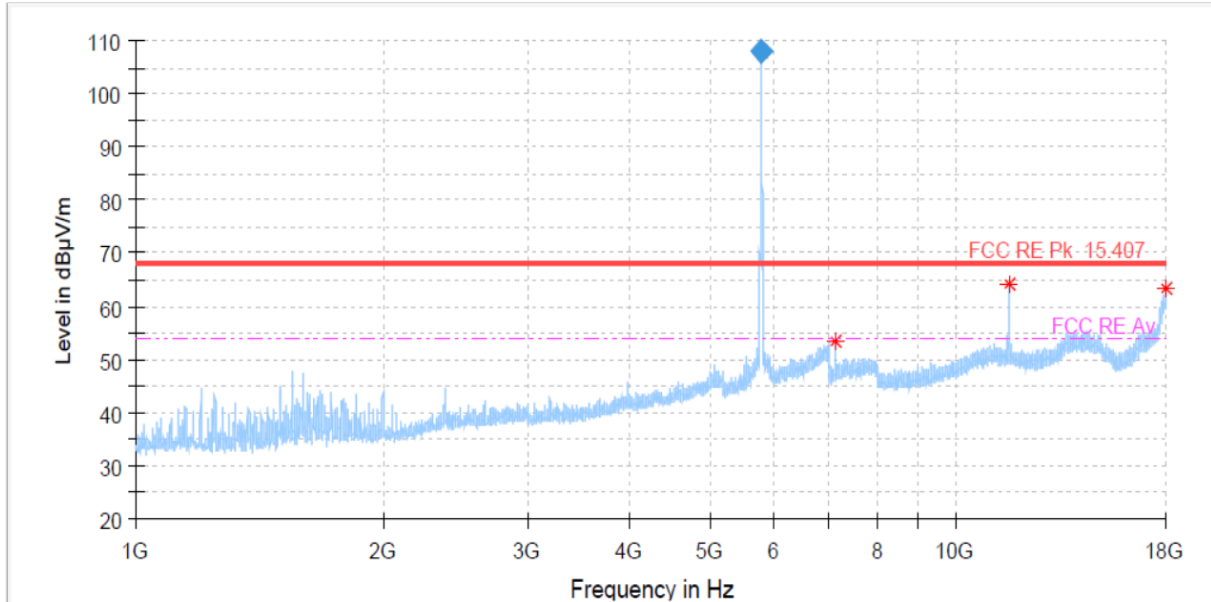
1. *Pol. H = Horizontal V = Vertical
2. **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.
3. At frequencies above 1 GHz, peak emissions were measured using RBW = 1 MHz, VBW = 3 MHz, Detector = Peak.
4. As the EUT was configured to transmit with duty cycles < 98 percent, at frequencies above 1 GHz, average emission levels were measured using the "Method VB" by setting the analyzer RBW = 1 MHz, VBW = 10 kHz (VBW $\geq 1/T$), Detector = Peak.
5. The spectrum is measured from 9 kHz to 10th harmonic and the worst-case emissions are reported. No significant emissions were found beyond the Third harmonic for this device.
6. ***For outside of the restricted band, the peak limit is applied according to Part 15.407(b).
Peak limit is 68.2 dB μ V/m. ($E[\text{dB}\mu\text{V/m}] = \text{EIRP}[\text{dBm/MHz}] + 95.2 = 68.2 \text{ dB}\mu\text{V/m}$, for $\text{EIPR}[\text{dBm/MHz}] = -27\text{dBm}$.)
7. For restricted band, the peak limit is 68.2 dB μ V/m, the average limit is 54 dB μ V/m per FCC §15.209.
8. Middle channel(5785MHz) in ac (20MHz) mode was the worst channel with respect to spurious emission.
9. The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, Vertical polarization. The worst data was recorded.
10. At frequencies above 1 GHz, EUT was placed at a height of 1.5m above the floor on a support according to ANSI 63.10-2013.

PLOTS OF EMISSIONS

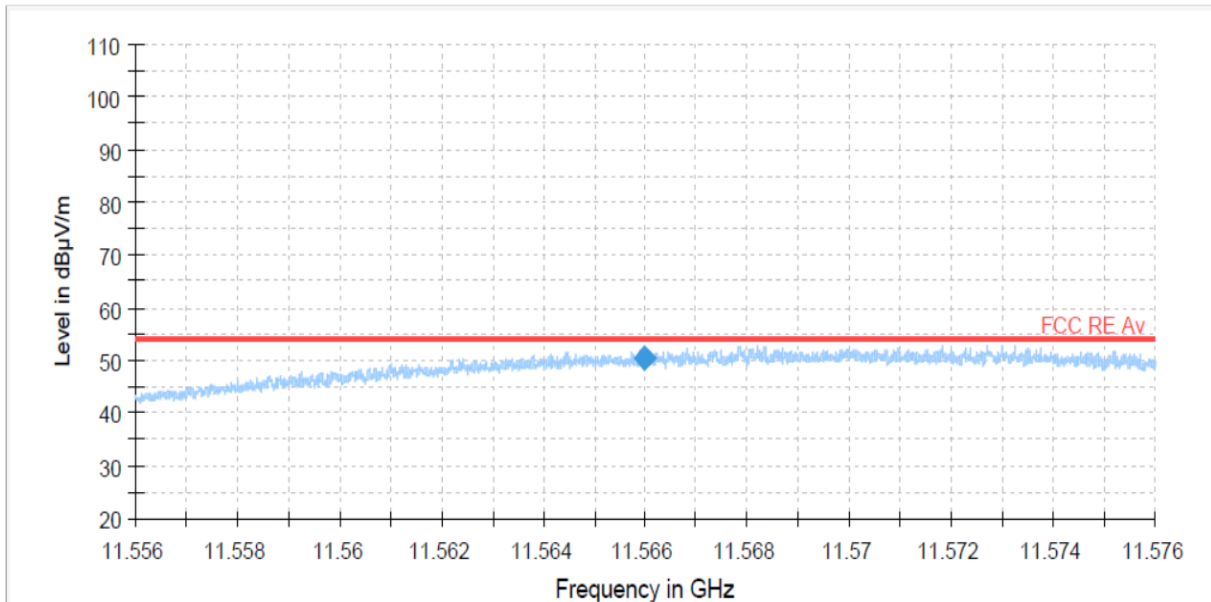
Worst Case

802.11ac (20MHz) mode

Middle channel : 1 GHz to 18 GHz_Peak

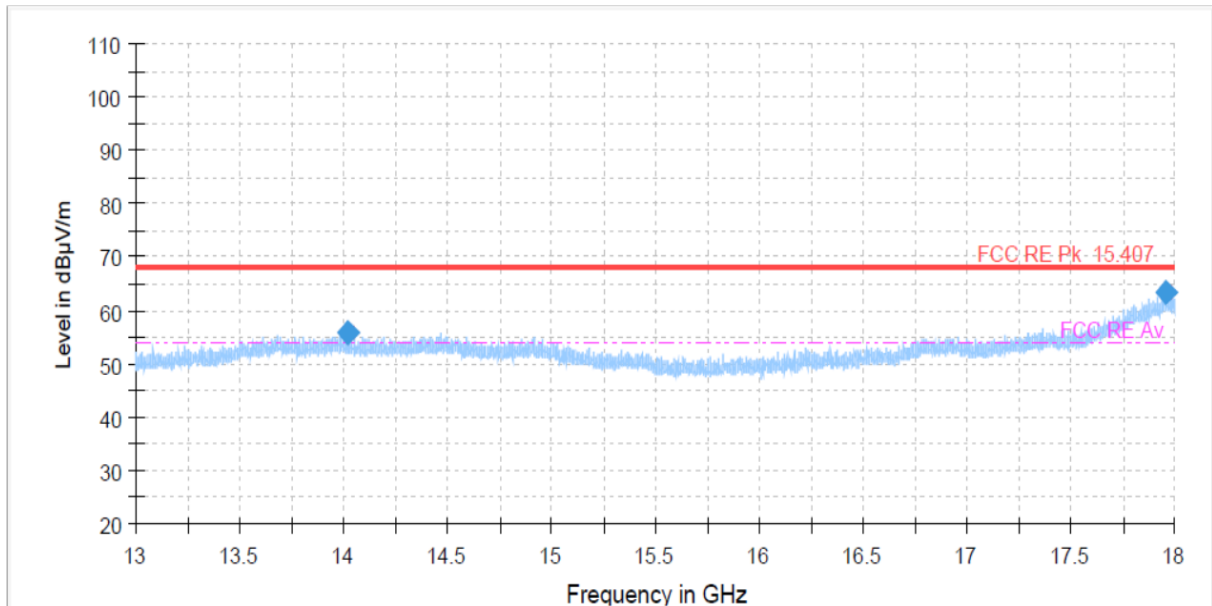


Middle channel : 2nd Harmonic_Average

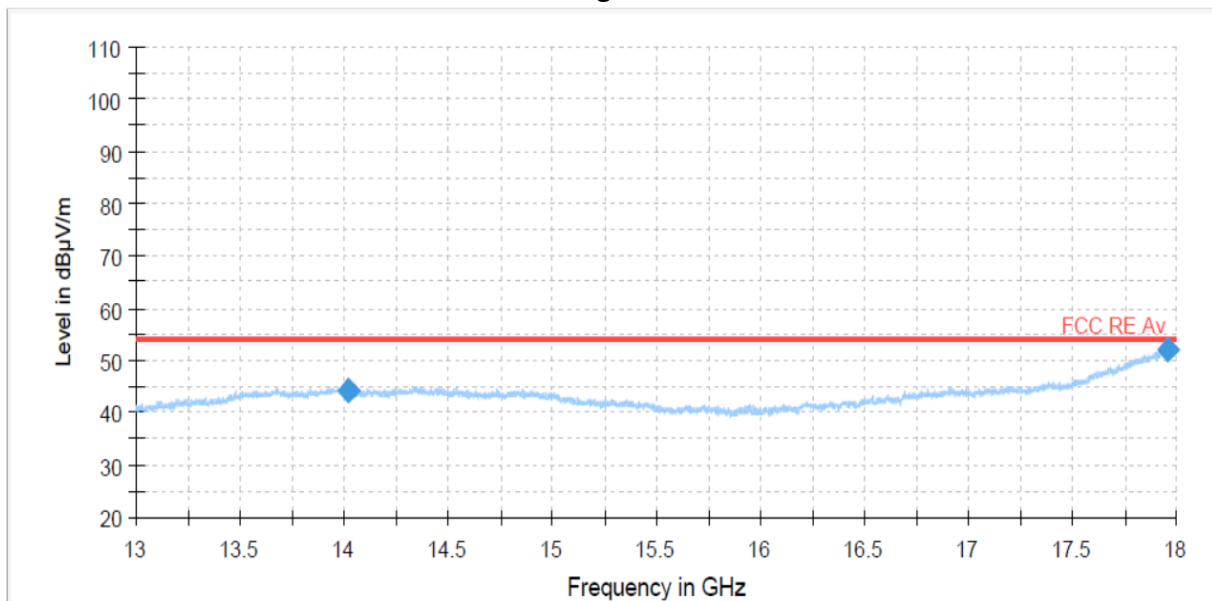


PLOTS OF EMISSIONS

Middle channel : 13 GHz to 18 GHz_Peak

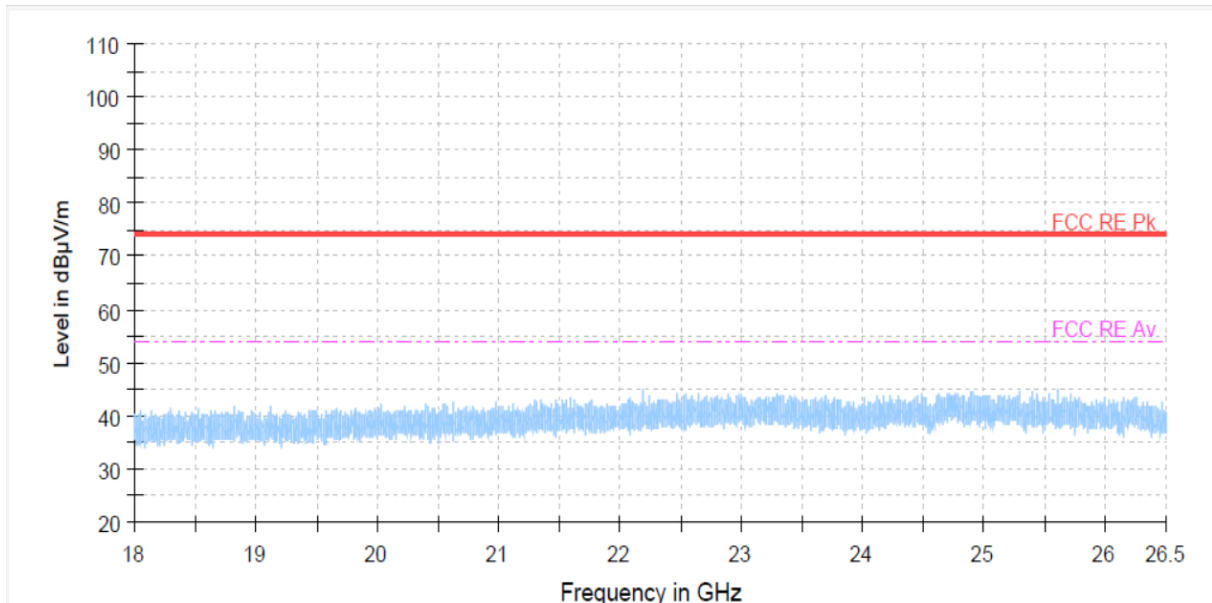


Middle channel : 13 GHz to 18 GHz_Average

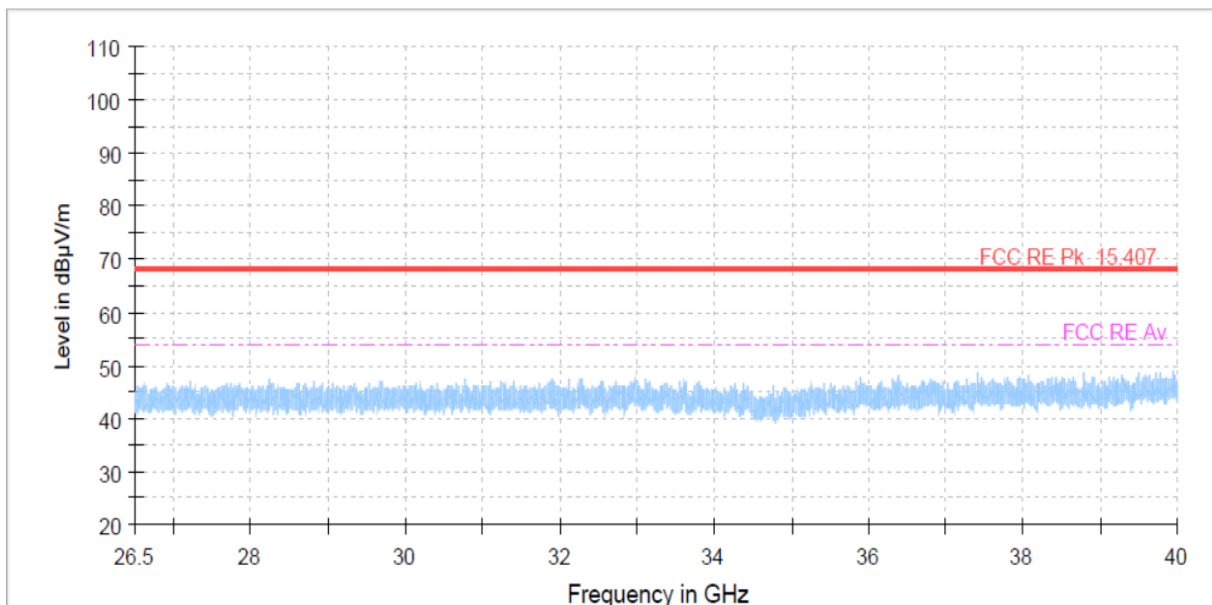


PLOTS OF EMISSIONS

Middle channel : 18 GHz to 26.5 GHz_Peak



Middle channel : 26.5 GHz to 40 GHz_Peak



TEST DATA

8.7 Radiated Band Edge

8.7.1 Radiated Band Edge – U-NII-1 band and UNII-2A band

FCC §15.407(b)

Test Mode : Set to Lowest channel and Highest channel

802.11ac (20MHz) mode

Lowest Channel (5180 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5149.20	51.6	H	peak	0.4	52.0	68.2	3.5
5150.10	52.5	H	peak	0.4	52.9	68.2	15.3

Highest Channel (5320 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5350.01	54.2	V	peak	0.7	54.9	68.2	13.4
5350.01	41.3	V	average	0.7	42.0	54.0	12.0
5350.64	54.2	V	peak	0.7	54.9	68.2	13.4
5350.64	41.0	V	average	0.7	41.7	54.0	3.2

802.11ac (40 MHz) mode

Lowest Channel (5190 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5147.70	61.1	V	peak	0.4	61.5	68.2	6.7
5147.70	43.9	V	average	0.4	44.3	54.0	9.7
5150.10	61.3	V	peak	0.4	61.7	68.2	6.5
5150.10	46.3	V	average	0.4	46.7	54.0	7.3

TEST DATA

Highest Channel (5310 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5350.01	56.9	V	peak	0.7	57.6	68.2	10.6
5350.01	45.6	V	average	0.7	46.3	54.0	7.7
5352.04	60.4	V	peak	0.7	61.1	68.2	7.1
5352.04	45.8	V	average	0.7	46.5	54.0	7.5

802.11ac (80MHz) mode

Lowest Channel (5210 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5128.50	49.0	H	peak	0.4	49.4	68.2	18.9
5150.10	46.7	H	peak	0.4	47.1	68.2	21.1

Highest Channel (5290 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5350.01	47.3	H	peak	0.7	48.0	68.2	20.2
5352.11	49.4	H	peak	0.7	50.1	68.2	18.1

TEST DATA

8.7.2 Radiated Band Edge – UNII-2C band

FCC §15.407(b)

Test Mode : Set to Lowest channel and Highest channel, Straddle channel

802.11ac (20MHz) mode

Lowest Channel (5500 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5459.99	48.4	V	peak	1.3	49.7	68.2	18.6

Highest Channel (5700 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5724.98	57.8	V	peak	1.8	59.6	68.2	11.8
5724.98	46.0	V	average	1.8	47.8	54.0	6.2
5725.07	59.1	V	peak	1.8	60.9	68.2	11.8
5725.07	46.0	V	average	1.8	47.8	54.0	6.2

Straddle Channel (5720 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5451.74	48.1	V	peak	1.2	49.3	68.2	18.9
5460.00	44.1	V	peak	1.3	45.4	68.2	22.8
5830.37	50.8	V	peak	2.0	52.8	68.2	15.4
5850.00	46.1	V	peak	2.1	48.2	68.2	20.0

TEST DATA

802.11ac (40MHz) mode

Lowest Channel (5510 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5459.48	55.5	V	peak	1.3	56.8	68.2	11.4
5459.48	43.1	V	average	1.3	44.4	54.0	12.4
5459.99	53.8	V	peak	1.3	55.1	68.2	13.1
5459.99	43.4	V	average	1.3	44.7	54.0	9.3

Highest Channel (5670 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5725.01	52.1	V	peak	1.8	53.9	68.2	14.4
5725.01	39.0	V	peak	1.8	40.8	54.0	3.0
5725.64	56.1	V	peak	1.8	57.9	68.2	10.3
5725.64	38.7	V	peak	1.8	40.5	54.0	3.0

Straddle Channel (5710 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5460.00	44.5	V	peak	1.3	45.8	68.2	22.4
5475.71	49.1	V	peak	1.2	50.3	68.2	17.9
5838.94	49.3	V	peak	2.1	51.4	68.2	16.9
5850.00	46.1	V	peak	2.1	48.2	68.2	20.0

802.11ac (80MHz) mode

Lowest Channel (5530 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5459.99	48.1	V	peak	1.3	49.4	68.2	18.8

TEST DATA

Highest Channel (5610 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Lim it (dBμV/m)	M arg in (dB)
5445.89	49.2	V	peak	1.2	50.4	68.2	17.9
5459.99	45.6	V	peak	1.3	46.9	68.2	16.5
5725.01	44.8	H	peak	1.8	46.6	68.2	21.6
5740.97	48.3	V	peak	1.9	50.2	68.2	18.0

Straddle Channel (5690 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Lim it (dBμV/m)	M arg in (dB)
5460.00	45.0	V	peak	1.3	46.3	68.2	21.9
5476.84	48.2	V	peak	1.2	49.4	68.2	18.8
5850.00	45.3	V	peak	2.1	47.4	68.2	20.8
5864.18	49.4	V	peak	2.2	51.6	68.2	16.6

TEST DATA

8.7.3 Radiated Band Edge – U-NII-3 band

FCC §15.407(b)

Test Mode : Set to Lowest channel and Highest channel

802.11ac (20MHz) mode

Lowest Channel (5745 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5725.01	67.0	V	peak	1.8	68.8	125.2	56.4

Highest Channel (5825 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5850.00	57.4	V	peak	2.1	59.5	122.2	62.7

802.11ac (40 MHz) mode

Lowest Channel (5755 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5725.01	67.2	V	peak	1.8	69.0	125.2	56.2

Highest Channel (5795 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar (H/V)	mode	AF+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5850.00	51.4	V	peak	2.1	53.5	122.2	68.6

TEST DATA

802.11ac (80 MHz) mode

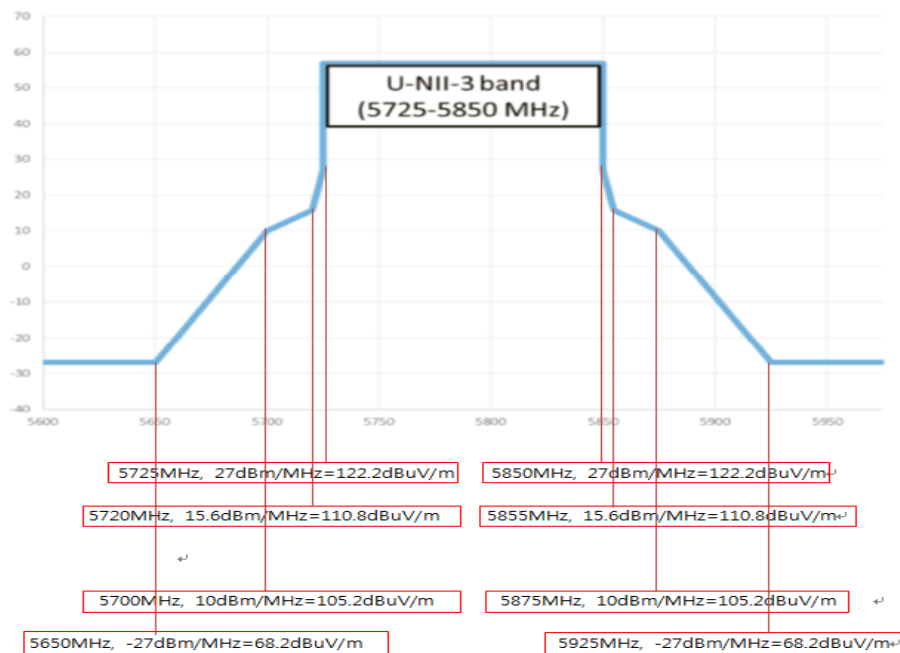
Lowest Channel (5775 MHz)

Frequency (M Hz)	Reading (dBμV)	Polar* (H/V)	mode	Att+CL+Am p (dB)**	Result (dBμV/m)	Limit (dBμV/m)	Margin (dB)
5725.01	54.0	V	peak	1.8	55.8	125.2	69.4
5741.97	73.0	V	peak	1.9	74.9	125.2	50.3
5804.08	72.3	V	peak	2.0	74.3	125.2	50.9
5850.00	47.2	V	peak	2.1	49.3	122.2	72.9

TEST DATA

Note:

- *Pol. H = Horizontal V = Vertical
- **AF + CL + Amp. = Antenna Factor + Cable Loss + Amplifier.
- ***Average measurement was not performed because peak-detected emission complies with the average limit.
- At frequencies above 1 GHz, peak emissions were measured using RBW = 1 MHz, VBW = 3 MHz, Detector = Peak.
- As the EUT was configured to transmit with duty cycles < 98 percent, at frequencies above 1 GHz, average emission levels were measured using the "Method VB" by setting the analyzer RBW = 1 MHz, VBW = 10kHz (VBW ≥ 1/T), Detector = Peak.
- The radiated emissions testing were made by rotating EUT through three orthogonal axes and rotating the receive antenna with horizontal, Vertical polarization. The worst data was recorded.
- At frequencies above 1 GHz, EUT was placed at a height of 1.5m above the floor on a support according to ANSI 63.10-2013.
- Lowest channel (5190MHz) in ac (40MHz) mode for UNII-1 band, Highest channel (5310MHz) in ac (40MHz) mode for UNII-2A band, Highest channel (5700MHz) in ac (20MHz) mode and Straddle channel (5720MHz) in ac (80MHz) mode for UNII-2C band, Lowest channel (5775MHz) in ac (80MHz) mode for UNII-3 band were the worst channels in each band.
- For restricted band, the peak limit is 68.2 dBμV/m, the average limit is 54 dBμV/m per FCC §15.209.
- For outside of the restricted band, the peak limit is applied according to Part 15.407(b).
For UNII-1, UNII-2A, UNII-2C band, peak limit is 68.2 dBμV/m. ($E[dB\mu V/m] = EIRP[dBm/MHz] + 95.2 = 68.2 dB\mu V/m$, for $EIRP[dBm/MHz] = -27dBm$.)
For UNII 3 band, the peak limit of bandedge to 75MHz above or below bandedge is specified in 15.407(b)(4)(i) as below.



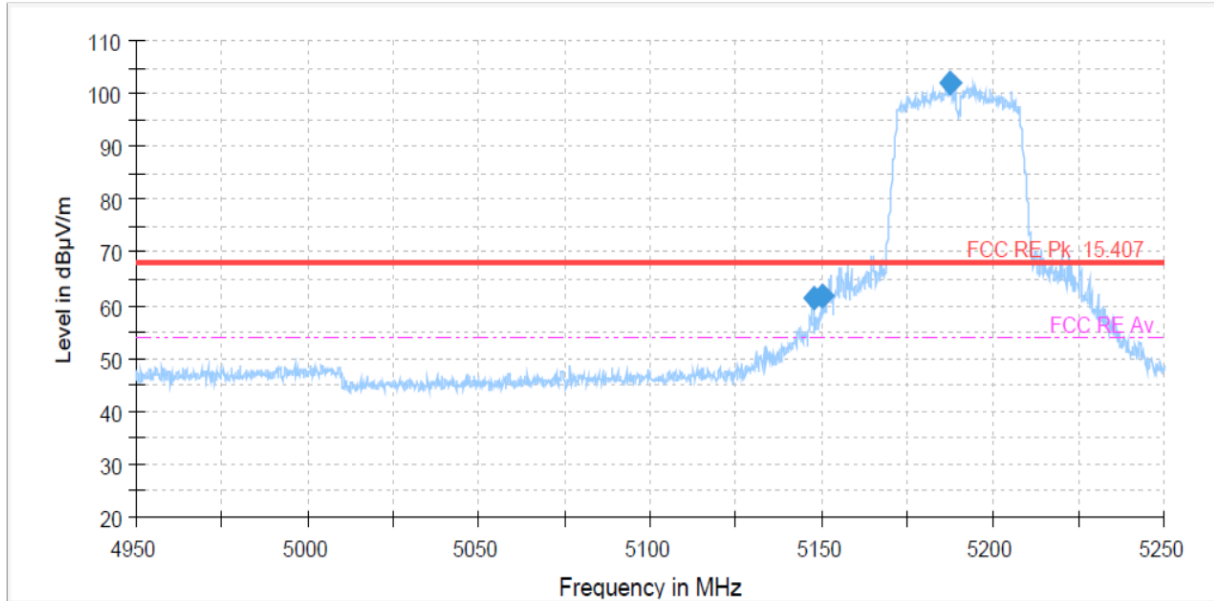
PLOTS OF EMISSIONS

Worst Case

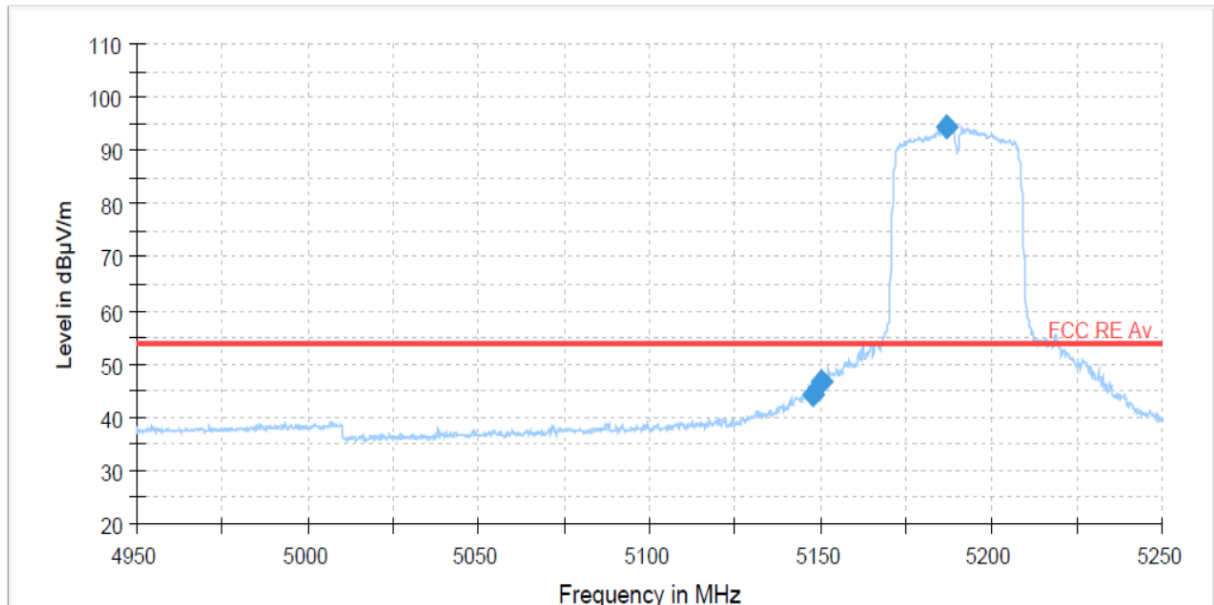
Radiated Band Edge – U-NII-1 band

802.11ac (40MHz) mode

Lowest channel (5190 MHz) _Peak



Lowest channel (5190 MHz) _Average

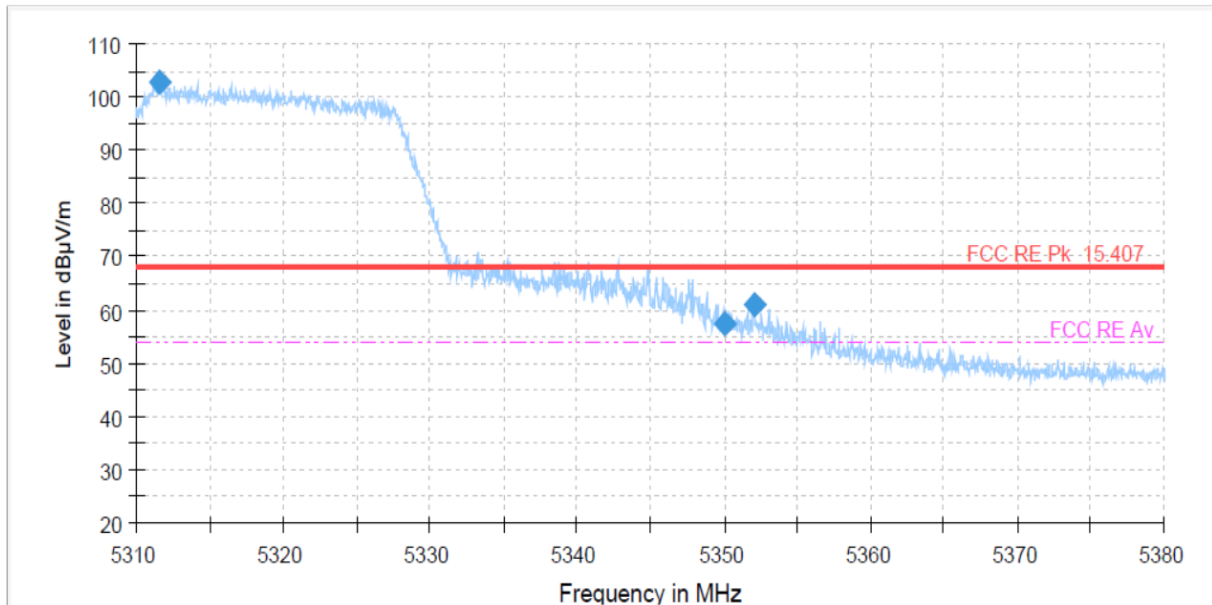


PLOTS OF EMISSIONS

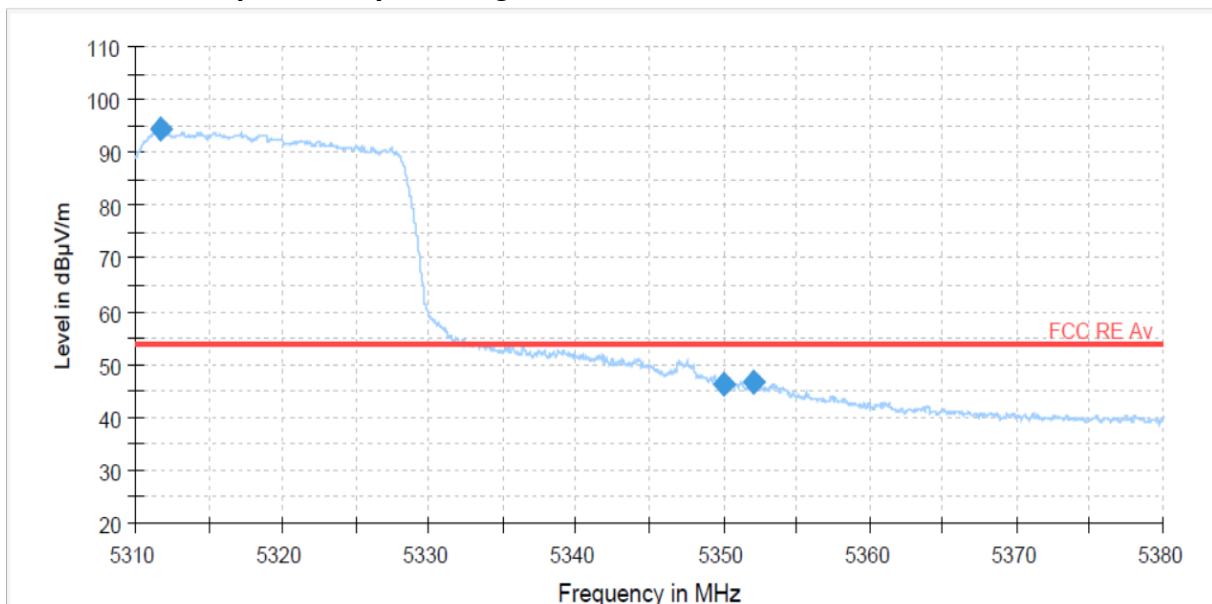
Radiated Band Edge – U-NII-2A band

802.11ac (40MHz) mode

Lowest channel (5310 MHz) _Peak



Lowest channel (5310 MHz) _Average

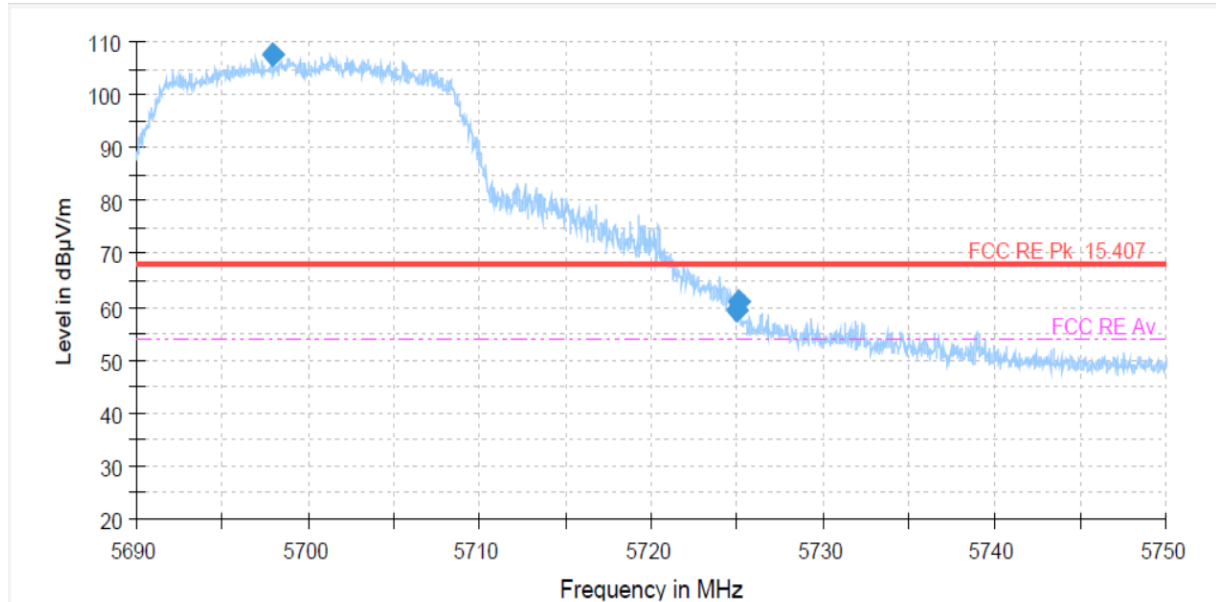


PLOTS OF EMISSIONS

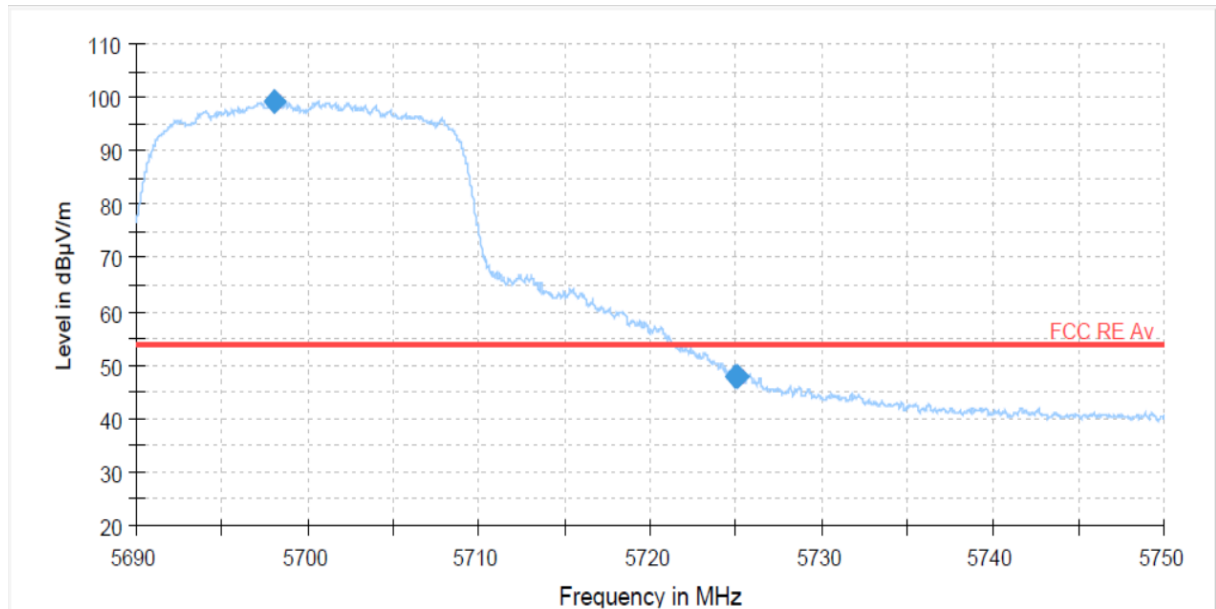
Radiated Band Edge – U-NII-2C band

802.11ac (20MHz) mode

Highest channel (5700 MHz) _Peak



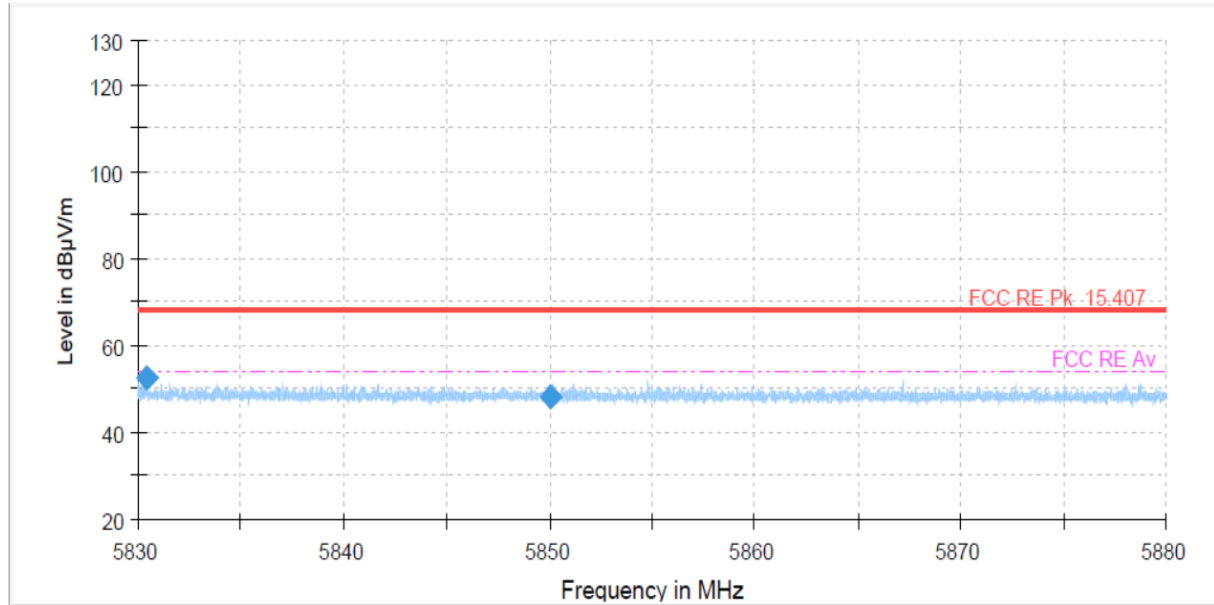
Highest channel (5700 MHz) _Average



PLOTS OF EMISSIONS

802.11ac (20MHz) mode

Straddle channel Upper (5720 MHz) _Peak

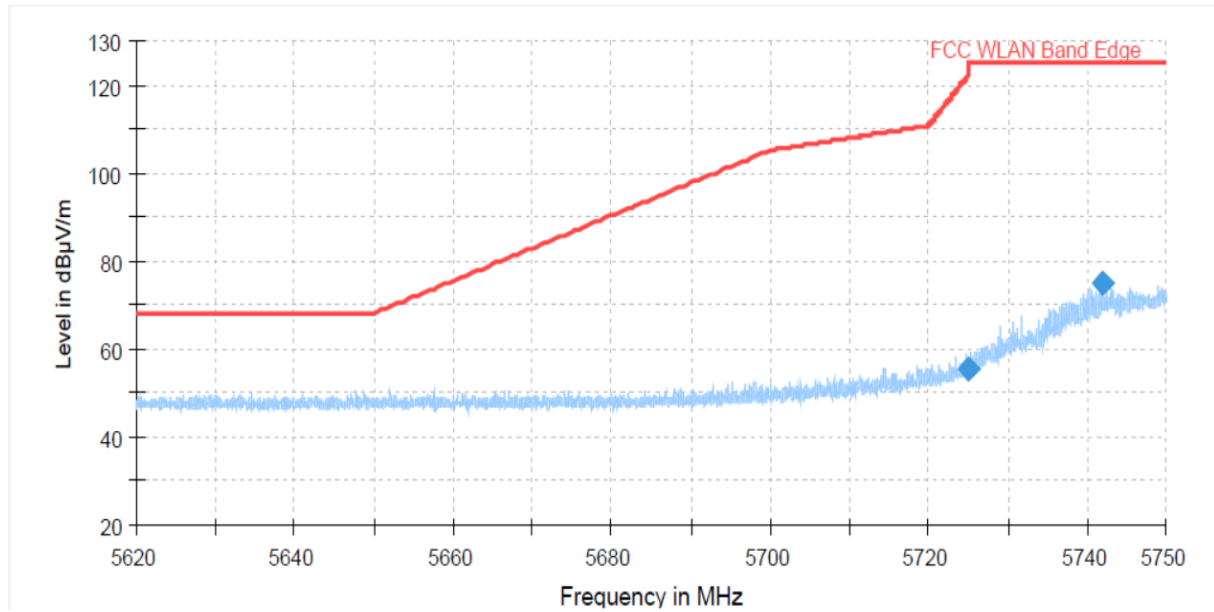


PLOTS OF EMISSIONS

Radiated Band Edge – U-NII-3 band

802.11ac mode(80MHz)

Middle channel Lower (5775 MHz) _Peak



9. TEST EQUIPMENT

No.	Instrument	Manufacturer	Model	Serial No.	Calibration Date	Calibration Interval
1	*Test Receiver	R & S	ESU 40	100202	Apr. 02 2019	1 year
2	Test Receiver	R & S	ESCS30	100302	Oct. 11 2018	1 year
3	*Attenuator	PASTERNAK	PE7395-10	1441-1	Jul. 11 2019	1 year
4	*Attenuator	FAIRVIEW	SA3N5W-06	N/A	Apr. 03 2019	1 year
5	*Attenuator	FAIRVIEW	SA3N5W-10	N/A	Apr. 03 2019	1 year
6	Attenuator	WEINSCHL	56-10	58765	Oct. 12 2018	1 year
7	*Amplifier	R & S	SCU 01	10029	Apr. 02 2019	1 year
8	*Amplifier	R & S	SCU18F	180025	Apr. 02 2019	1 year
9	*Amplifier	R & S	SCU26	10011	Jul. 15 2019	1 year
10	*Amplifier	R & S	SCU40	100380	Jul. 15 2019	1 year
11	Spectrum Analyzer	R & S	FSW43	100732	Apr. 02 2019	1 year
12	*Spectrum Analyzer	Agilent	E4440A	MY44022567	Oct. 11 2018	1 year
13	*Spectrum Analyzer	R & S	FSW43	104084	Apr. 02 2019	1 year
14	*Loop Antenna	R & S	HFH2-Z2	100279	Feb. 13 2019	2 year
15	*Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-474	Jun. 28 2019	2 year
16	*Horn Antenna	Q-par Angus	QSH20S20	8179	Aug. 01 2017	2 year
17	*Horn Antenna	Q-par Angus	QSH22K20	8180	Aug. 02 2017	2 year
18	*Trilog-Broadband Antenna	SCHWARZBECK	VULB 9163	946	May. 18 2019	2 year
19	LISN	R & S	ESH3-Z5	833874/006	Oct. 12 2018	1 year
20	*Position Controller	INNCO	CO2000	12480406/L	N/A	N/A
21	*Controller	INNCO	CO3000	CO3000/937/38330516/L	N/A	N/A
22	*Turn Table	INNCO	DS1200S	N/A	N/A	N/A
23	*Turn Table	INNCO	DT2000-2t	N/A	N/A	N/A
24	*Antenna Mast	INNCO	MA4000	N/A	N/A	N/A
25	*TILT Antenna Mast	INNCO	MA4640-XP-EP	N/A	N/A	N/A
26	*Open Switch And Control Unit	R & S	OSP-120	100081	N/A	N/A
27	*Open Switch And Control Unit	R & S	OSP-120	101766	N/A	N/A
28	*Shielded Room	Seo-Young EMC	N/A	N/A	N/A	N/A
29	*Anechoic Chamber	Seo-Young EMC	N/A	N/A	N/A	N/A
30	*WiFi Filter Bank	R & S	U083	N/A	N/A	N/A
31	*WiFi Filter Bank	R & S	U082	N/A	N/A	N/A

*) Test equipment used during the test

10. ACCURACY OF MEASUREMENT

The Measurement Uncertainties stated were calculated in accordance with the requirements of measurement uncertainty contained in CISPR 16-4-2 with the confidence level of 95%

1. Conducted Uncertainty Calculation

Source of Uncertainty	X_i	Uncertainty of X_i		Coverage factor k	$u(X_i)$ (dB)	C_i	$C_i u(X_i)$ (dB)
		Value (dB)	Probability Distribution				
Receiver reading	RI	± 0.1	normal 1	1.000	0.1	1	0.1
Attenuation AMN-Receiver	LC	± 0.08	normal 2	2.000	0.04	1	0.04
AMN Voltage division factor	LAMN	± 0.8	normal 2	2.000	0.4	1	0.4
Sine wave voltage	dVSW	± 2.00	normal 2	2.000	1.00	1	1.00
Pulse amplitude response	dVPA	± 1.50	rectangular	1.732	0.87	1	0.87
Pulse repetition rate response	dVPR	± 1.50	rectangular	1.732	0.87	1	0.87
Noise floor proximity	dVNF	± 0.00	-	-	0.00	1	0.00
AMN Impedance	dZ	± 1.80	triangular	2.449	0.73	1	0.73
Ⓐ Mismatch	M	+ 0.70	U-Shaped	1.414	0.49	1	0.49
Ⓑ Mismatch	M	- 0.80	U-Shaped	1.414	- 0.56	1	- 0.56
Measurement System Repeatability	RS	0.05	normal 1	1.000	0.05	1	0.05
Remark	Ⓐ: AMN-Receiver Mismatch : + Ⓑ: AMN-Receiver Mismatch : -						
Combined Standard Uncertainty	Normal			± 1.88			
Expanded Uncertainty U	Normal ($k = 2$)			± 3.76			

2. Radiation Uncertainty Calculation

Source of Uncertainty	X_i	Uncertainty of X_i		Coverage factor k	$u(X_i)$ (dB)	C_i	$C_i u(X_i)$ (dB)
		Value (dB)	Probability Distribution				
Measurement System Repeatability	RS	0.34	normal 1	1.00	0.34	1	0.34
Receiver reading	Ri	± 0.02	normal 2	2.00	0.01	1	0.01
Sine wave voltage	dVsw	± 0.17	normal 2	2.00	0.09	1	0.09
Pulse amplitude response	dVpa	± 0.92	normal 2	2.00	0.46	1	0.46
Pulse repetition rate response	dVpr	± 0.35	normal 2	2.00	0.18	1	0.18
Noise floor proximity	dVnf	± 0.50	normal 2	2.00	0.25	1	0.25
Antenna Factor Calibration	AF	± 2.00	rectangular	$\sqrt{3}$	1.15	1	1.15
Cable Loss	CL	± 1.00	normal 2	2.00	0.50	1	0.50
Antenna Directivity	AD	± 0.00	rectangular	$\sqrt{3}$	0.00	1	0.00
Antenna Factor Height Dependence	AH	± 2.00	rectangular	$\sqrt{3}$	1.15	1	1.15
Antenna Phase Centre Variation	AP	± 0.20	rectangular	$\sqrt{3}$	0.12	1	0.12
Antenna Factor Frequency Interpolation	Ai	± 0.25	rectangular	$\sqrt{3}$	0.14	1	0.14
Site Imperfections	Si	± 4.00	triangular	$\sqrt{6}$	1.63	1	1.63
Measurement Distance Variation	DV	± 0.60	rectangular	$\sqrt{3}$	0.35	1	0.35
Antenna Balance	Dbal	± 0.90	rectangular	$\sqrt{3}$	0.52	1	0.52
Cross Polarisation	DCross	± 0.00	rectangular	$\sqrt{3}$	0.00	1	0.18
Mismatch	M	+ 0.98 - 1.11	U-Shaped	$\sqrt{2}$	0.74	1	0.74
EUT Volume Diameter	Vd	0.33	normal 1	1.00	0.33	1	0.11
Remark							
Combined Standard Uncertainty	Normal						
Expanded Uncertainty U	Normal ($k = 2$)						