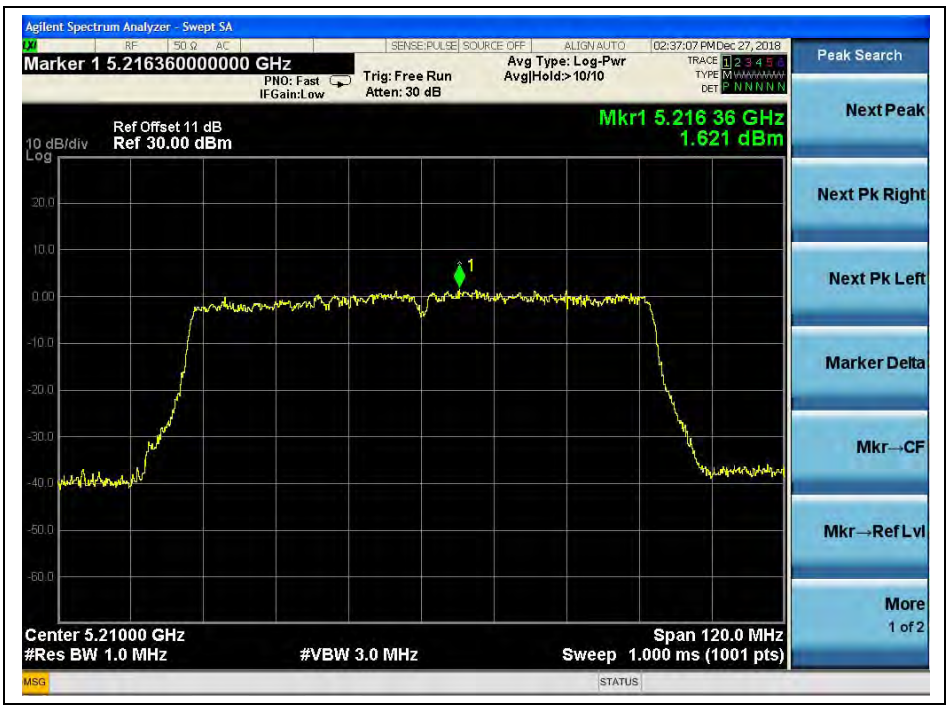
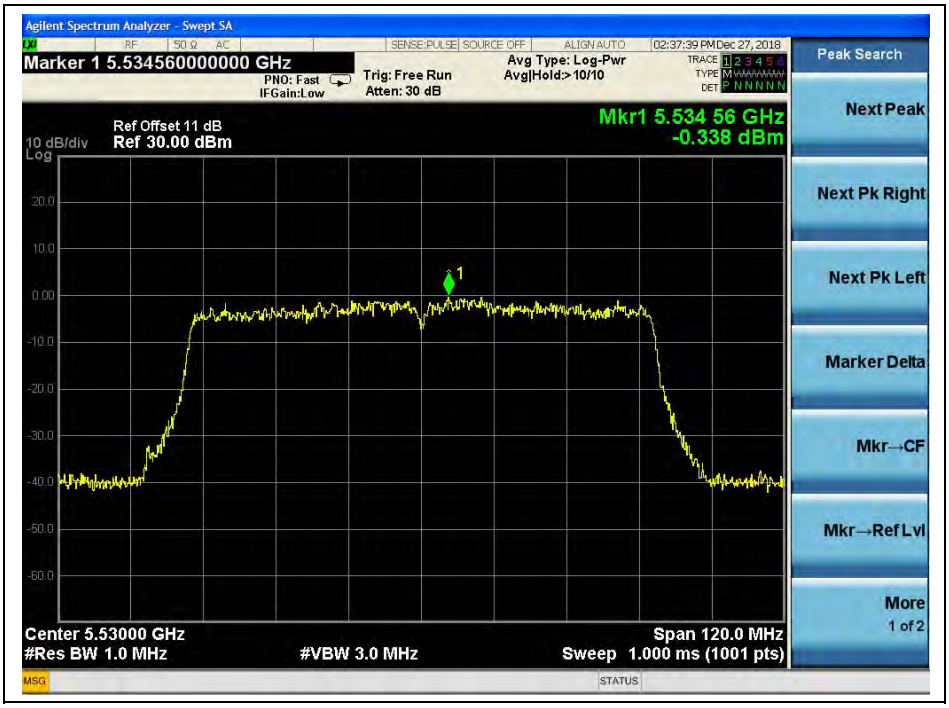
B. Test Plots



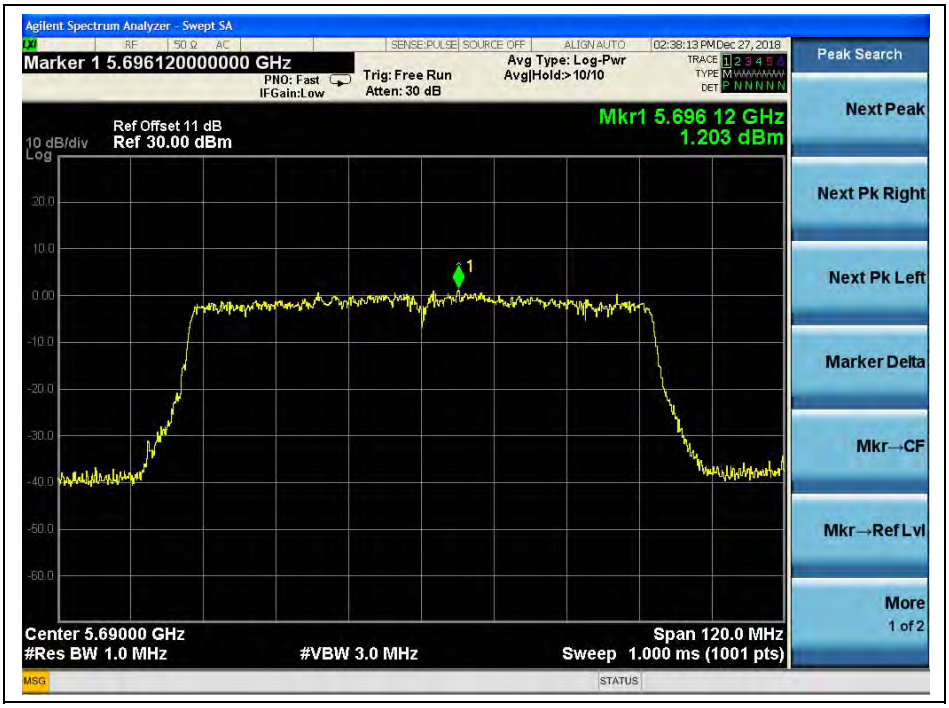
(Channel 42, 5210MHz, 802.11ac (VHT80), ANT0)

(Channel 58, 5290 MHz, 802.11 ac (VHT80), ANT0)

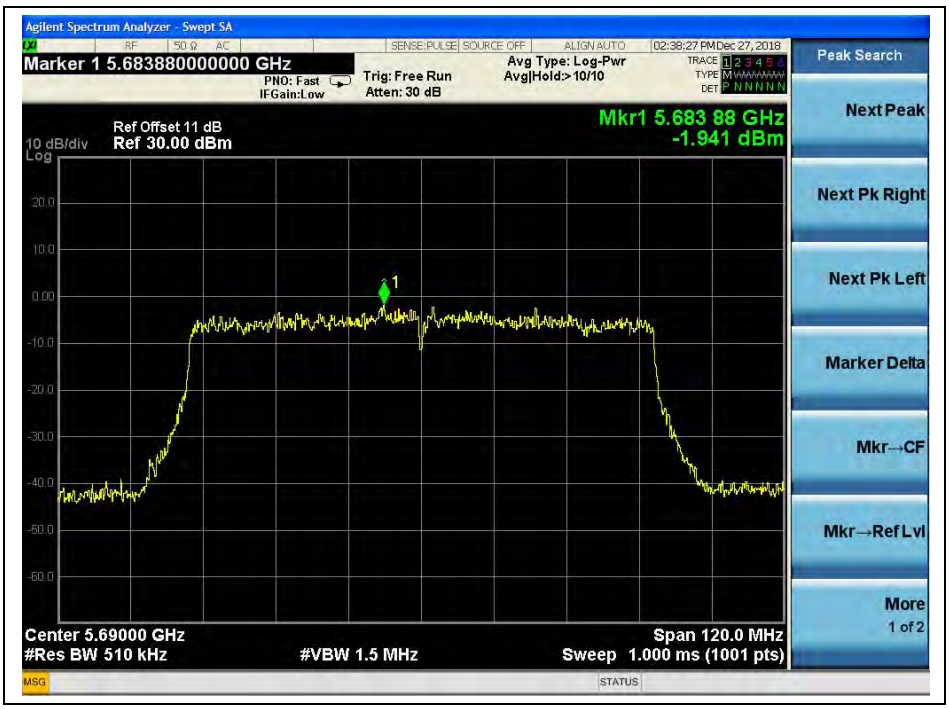


(Channel 106, 5530MHz, 802.11 ac (VHT80), ANT0)

(Channel 122, 5610 MHz, 802.11 ac (VHT80), ANT0)



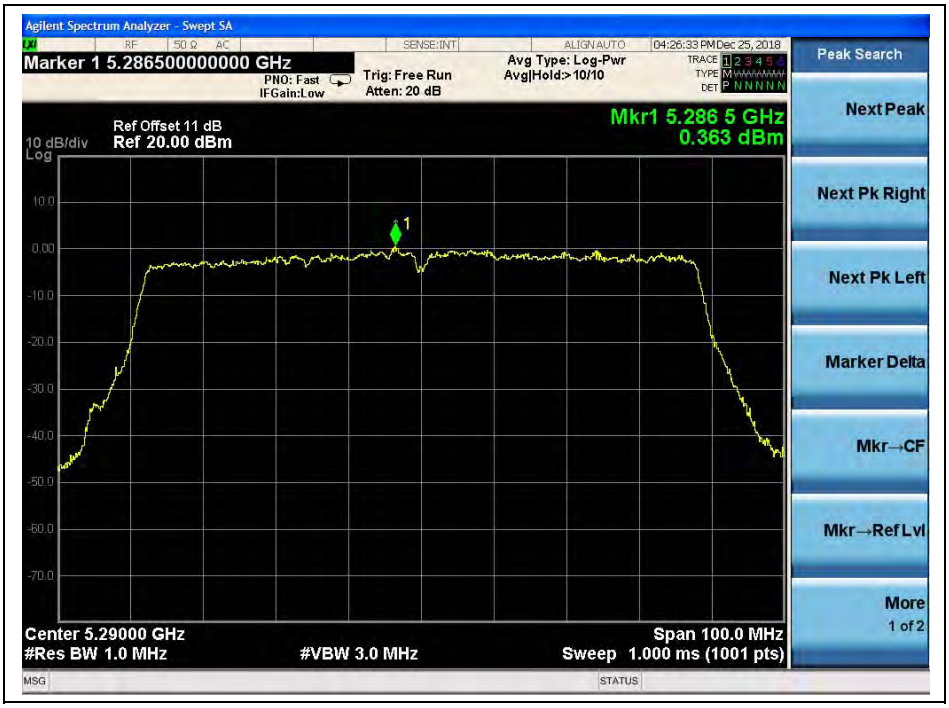
(Channel 138, 5690MHz, 802.11 ac (VHT80), ANT0)



(Channel 138, 5690 MHz, 802.11 ac (VHT80), ANT0)

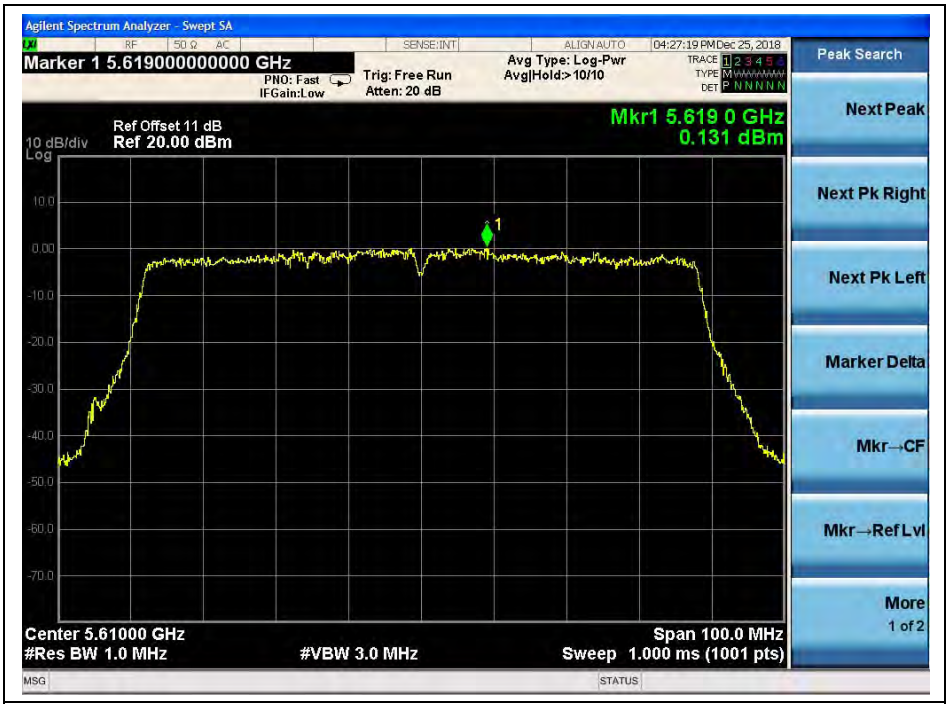
(Channel 155, 5775MHz, 802.11 ac (VHT80), ANT0)

(Channel 42, 5210MHz, 802.11ac (VHT80), ANT1)



(Channel 58, 5290 MHz, 802.11 ac (VHT80), ANT1)

(Channel 106, 5530MHz, 802.11 ac (VHT80), ANT1)



(Channel 122, 5610 MHz, 802.11 ac (VHT80), ANT1)

(Channel 138, 5690MHz, 802.11 ac (VHT80), ANT1)

(Channel 138, 5690 MHz, 802.11 ac (VHT80), ANT1)

(Channel 155, 5775MHz, 802.11 ac (VHT80), ANT1)

2.6. Frequency Stability

2.6.1. Requirement

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

2.6.2. Test Procedure

The EUT was placed inside of an environmental chamber as the temperature in the chamber was varied between 5°C to 40°C. The temperature was incremented by 10° intervals and the unit was allowed to stabilize at each temperature before each measurement. The center frequency of the transmitting channel was evaluated at each temperature and the frequency deviation from the channel's center frequency was recorded. Data for the worst case channel is shown below.

2.6.3. Test Result

U-NII-1 (Ch. 36) 5180MHz				
VOLTAGE (%)	POWER (VDC)	TEMP (°C)	Freq Dev. (Hz)	Deviation (ppm)
100%	3.85	+20(Ref)	9	0.002
100%		-30	44	0.008
100%		-20	36	0.007
100%		-10	30	0.006
100%		0	27	0.005
100%		+10	20	0.004
100%		+20	21	0.004
100%		+30	38	0.007
100%		+40	39	0.008
100%		+50	42	0.008
85%	3.27	+20	46	0.009
115%	4.43	+20	41	0.008

U-NII-2A (Ch. 52) 5260MHz				
VOLTAGE (%)	POWER (VDC)	TEMP (°C)	Freq Dev. (Hz)	Deviation (ppm)
100%	3.85	+20(Ref)	30	0.006
100%		-30	55	0.010
100%		-20	45	0.009
100%		-10	37	0.007
100%		0	33	0.006
100%		+10	31	0.006
100%		+20	38	0.007
100%		+30	44	0.008
100%		+40	50	0.010
100%		+50	51	0.010
85%	3.27	+20	24	0.005
115%	4.43	+20	28	0.005

U-NII-2C (Ch. 100) 5500MHz				
VOLTAGE (%)	POWER (VDC)	TEMP (°C)	Freq Dev. (Hz)	Deviation (ppm)
100%	3.85	+20(Ref)	21	0.004
100%		-30	50	0.009
100%		-20	37	0.007
100%		-10	25	0.005
100%		0	18	0.003
100%		+10	17	0.003
100%		+20	20	0.004
100%		+30	26	0.005
100%		+40	33	0.006
100%		+50	42	0.008
85%	3.27	+20	20	0.004
115%	4.43	+20	30	0.005

U-NII-3 (Ch. 149) 5745MHz				
VOLTAGE (%)	POWER (VDC)	TEMP (°C)	Freq Dev. (Hz)	Deviation (ppm)
100%	3.85	+20(Ref)	22	0.004
100%		-30	52	0.009
100%		-20	41	0.007
100%		-10	32	0.006
100%		0	38	0.007
100%		+10	25	0.004
100%		+20	50	0.009
100%		+30	36	0.006
100%		+40	47	0.008
100%		+50	42	0.007
85%	3.27	+20	45	0.008
115%	4.43	+20	25	0.004

2.7. Conducted Emission

2.7.1. Requirement

According to FCC section 15.207, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency within the band 150kHz to 30MHz shall not exceed the limits in the following table, as measured using a 50μH/50Ω line impedance stabilization network (LISN).

Frequency range (MHz)	Conducted Limit (dBμV)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

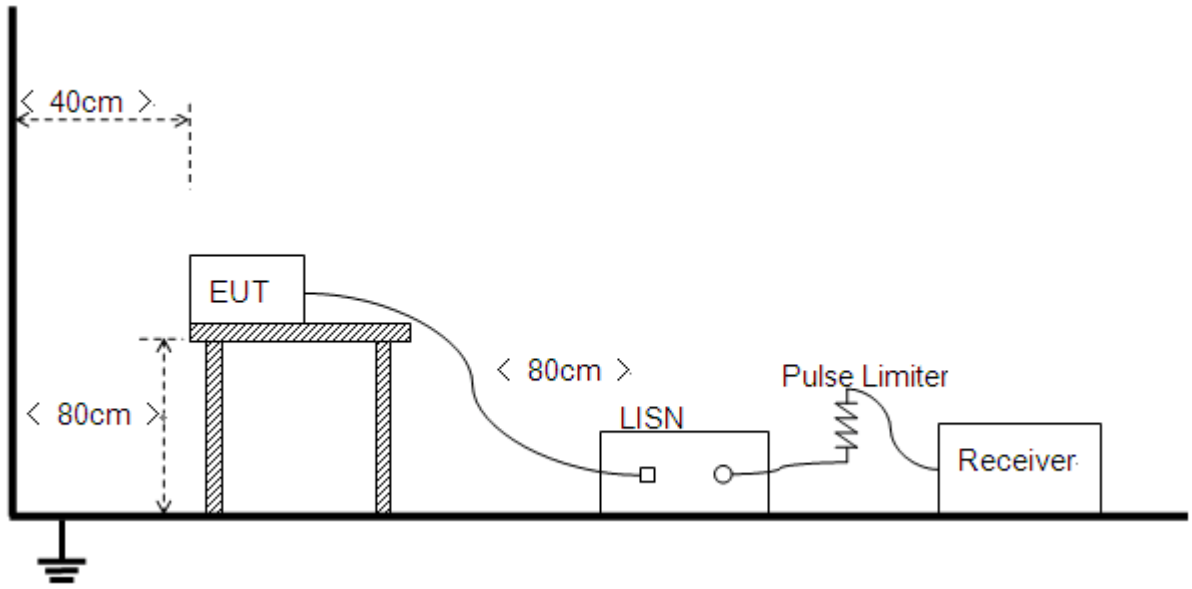
NOTE:

(a) The lower limit shall apply at the band edges.

(b) The limit decreases linearly with the logarithm of the frequency in the range 0.15 - 0.50MHz.

2.7.2. Test Description

A. Test Setup:



The Table-top EUT was placed upon a non-metallic table 0.8m above the horizontal metal reference ground plane. EUT was connected to LISN and LISN was connected to reference Ground Plane. EUT was 80cm from LISN. The set-up and test methods were according to ANSI C63.10 (2013).

2.7.3. Test Result

The maximum conducted interference is searched using Peak (PK), if the emission levels more than the AV and QP limits, and that have narrow margins from the AV and QP limits will be re-measured with AV and QP detectors. Tests for both L phase and N phase lines of the power mains connected to the EUT are performed. Refer to recorded points and plots below.

Note: Both of the test voltage AC 120V/60Hz and AC 230V/50Hz were considered and tested respectively, only the results of the worst case AC 120V/60Hz were recorded in this report.

A. Test setup:

Test Mode: EUT+USB Cable + Adapter + WIFI TX

Test Voltage: AC 120V/60Hz

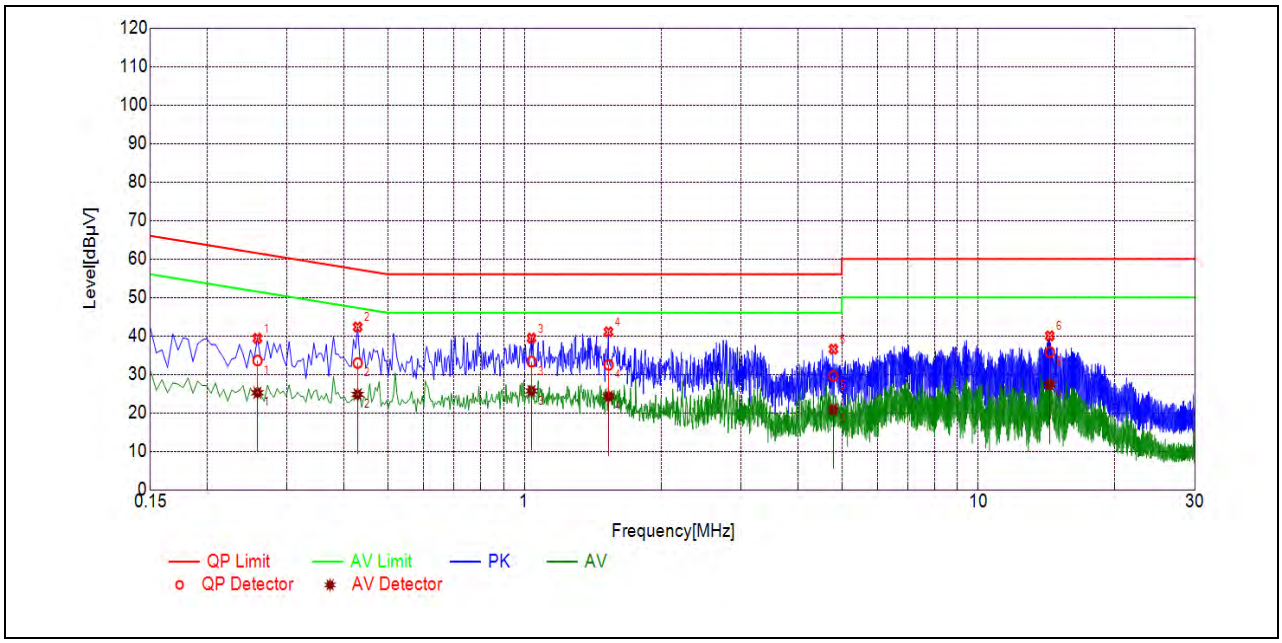
The measurement results are obtained as below:

$E\ [dB\mu V] = U_R + L_{Cable\ loss}\ [dB] + A_{Factor}$

U_R: Receiver Reading

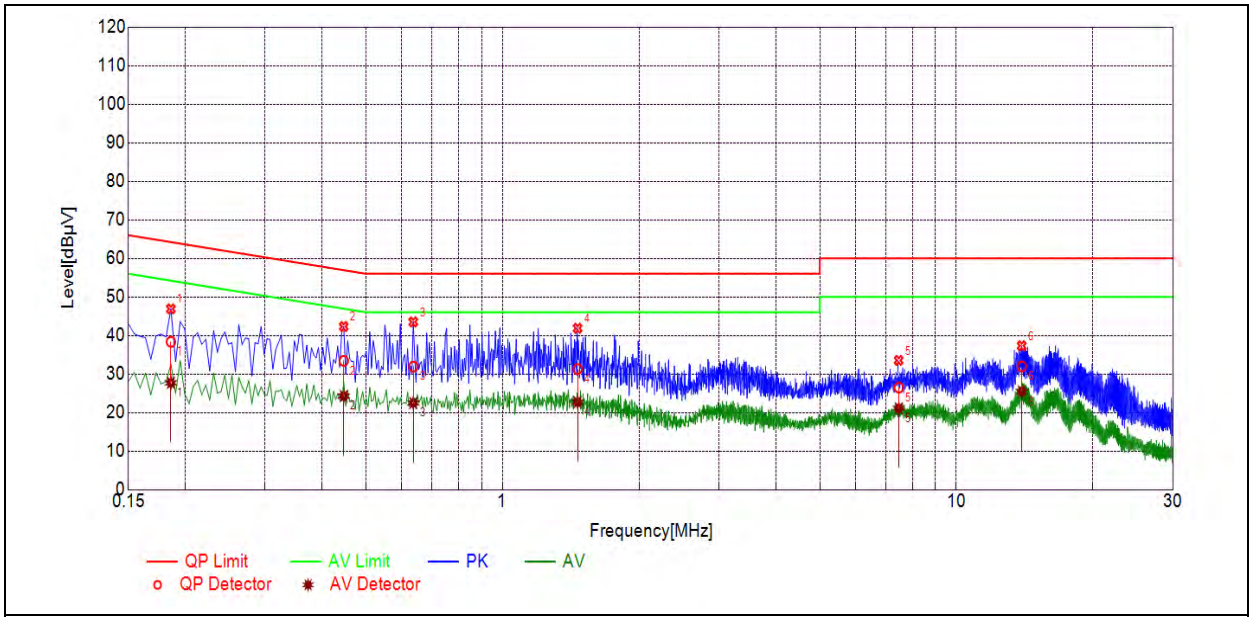
A_{Factor}: Voltage division factor of LISN

B. Test Plots:



(L Phase)

NO.	Fre. (MHz)	Emission Level (dBµV)		Limit (dBµV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.2581	33.60	25.24	61.49	51.49	Line	PASS
2	0.4291	32.93	24.79	57.27	47.27		PASS
3	1.0364	33.33	25.70	56.00	46.00		PASS
4	1.5328	32.47	24.22	56.00	46.00		PASS
5	4.7929	29.60	20.89	56.00	46.00		PASS
6	14.3718	35.82	27.33	60.00	50.00		PASS



(N Phase)

NO.	Fre. (MHz)	Emission Level (dBµV)		Limit (dBµV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1860	38.37	27.71	64.22	54.22	Neutral	PASS
2	0.4470	33.42	24.27	56.93	46.93		PASS
3	0.6361	31.93	22.48	56.00	46.00		PASS
4	1.4641	31.28	22.67	56.00	46.00		PASS
5	7.4678	26.46	21.09	60.00	50.00		PASS
6	13.9345	31.97	25.48	60.00	50.00		PASS

2.8. Restricted Frequency Bands

2.8.1. Requirement

The peak emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:
(1) For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of -27dBm/MHz.
(2) For transmitters operating in the 5.25–5.35 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of -27dBm/MHz.
(3) For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of -27dBm/MHz.
(4) For transmitters operating in the 5.725-5.85 GHz band: 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.The following formula is used to convert the equipment isotropic radiated power(eirp) to field strength (dBμV/m);

$$E = 1000000 \times \sqrt{30P} / 3 \ \mu V/m$$

where P is the EIRP in Watts

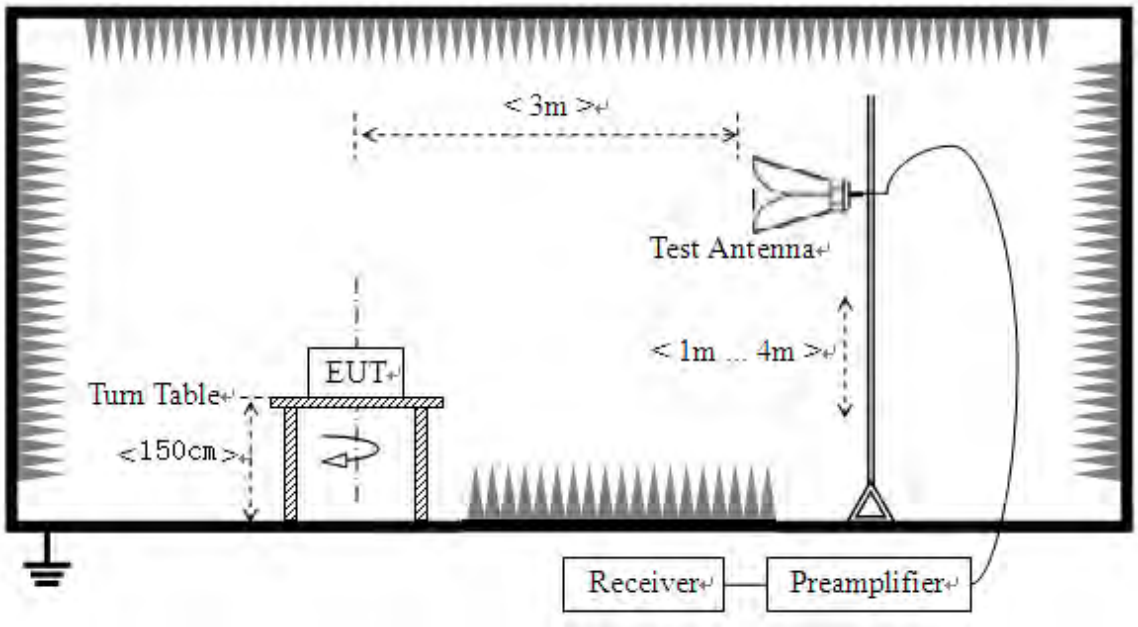
Therefore: -27 dBm/MHz = 68.23 dBuV/m

All out of band emissions appearing in a restricted band as specified in Section 15.205 of Part 15 C must not exceed the limits shown in Table as below per Section 15.209.

Frequency (MHz)	Field Strength (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

2.8.2. Test Description

A. Test Setup



The Module is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading.
KDB 789033 Section H) 3)5)6(d)) was used in order to prove compliance
For the Test Antenna:
Test Antenna is 3m away from the EUT. Test Antenna height is varied from 1m to 4m above the ground to determine the maximum value of the field strength.

2.8.3. Test Result

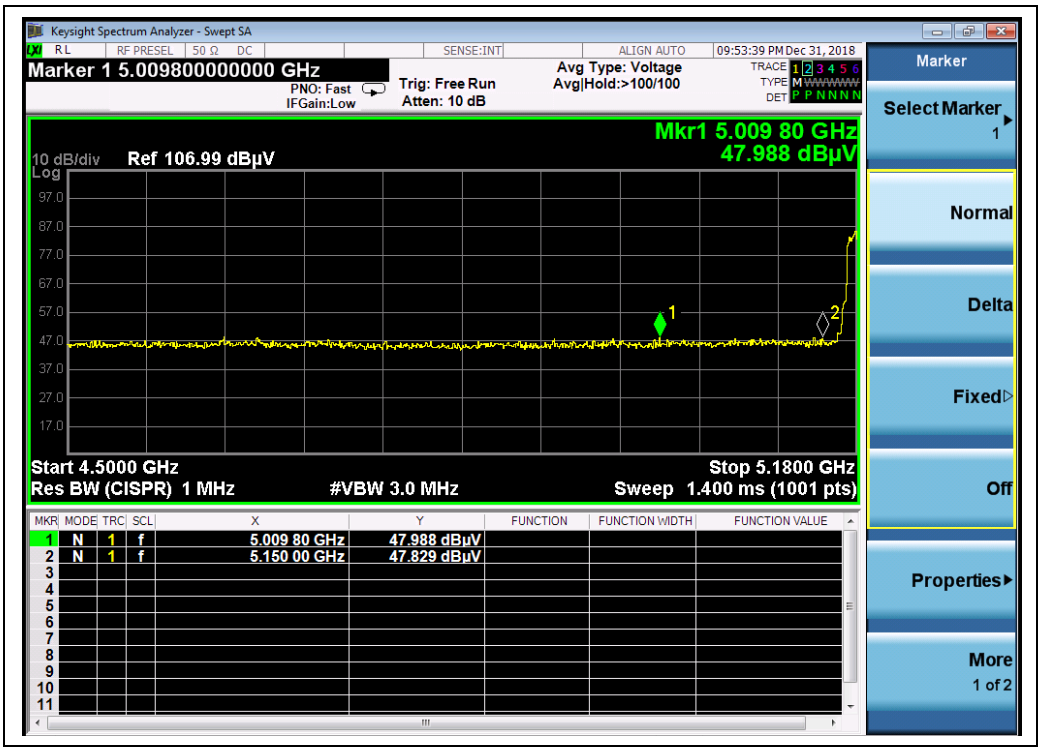
The lowest and highest channels are tested to verify Restricted Frequency Bands.
The measurement results are obtained as below:
E [dBμV/m] =U_R + A_T + A_{Factor} [dB]; A_T =$L_{Cable\ loss}$ [dB]-G_{preamp} [dB]
A_T: Total correction Factor except Antenna; U_R: Receiver Reading
G_{preamp}: Preamplifier Gain; A_{Factor}: Antenna Factor at 3m
Note: Restricted Frequency Bands were performed when antenna was at vertical and horizontal polarity, and only the worse test condition (vertical) was recorded in this test report.

802.11a Test mode

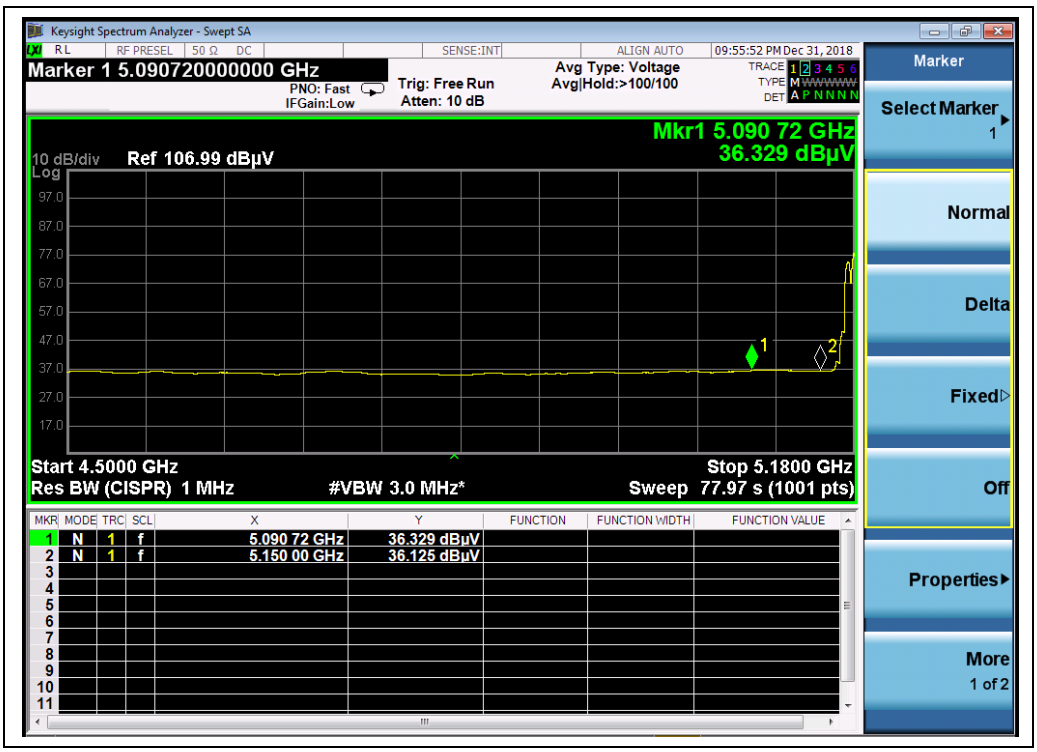
A. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
		PK/ AV						
36	5009.80	PK	47.99	-49.53	32.20	30.66	74	PASS
36	5090.72	AV	36.33	-49.53	32.20	19.00	54	PASS
64	5372.22	PK	44.12	-49.53	32.20	26.79	74	PASS
64	5350.00	AV	33.85	-49.53	32.20	16.52	54	PASS
100	5447.50	PK	44.22	-49.53	32.20	26.89	74	PASS
100	5470.00	AV	34.52	-49.53	32.20	17.19	54	PASS
144	5803.50	PK	46.93	-49.53	32.20	29.60	68.23	PASS
144	5735.40	AV	35.64	-49.53	32.20	18.31	54	PASS
149	5720.00	PK	45.20	-49.53	32.20	27.87	110.83	PASS
149	5725.00	AV	36.00	-49.53	32.20	18.67	54	PASS
165	5855.00	PK	45.20	-49.53	32.20	27.87	110.83	PASS
165	5850.00	AV	35.49	-49.53	32.20	18.16	54	PASS

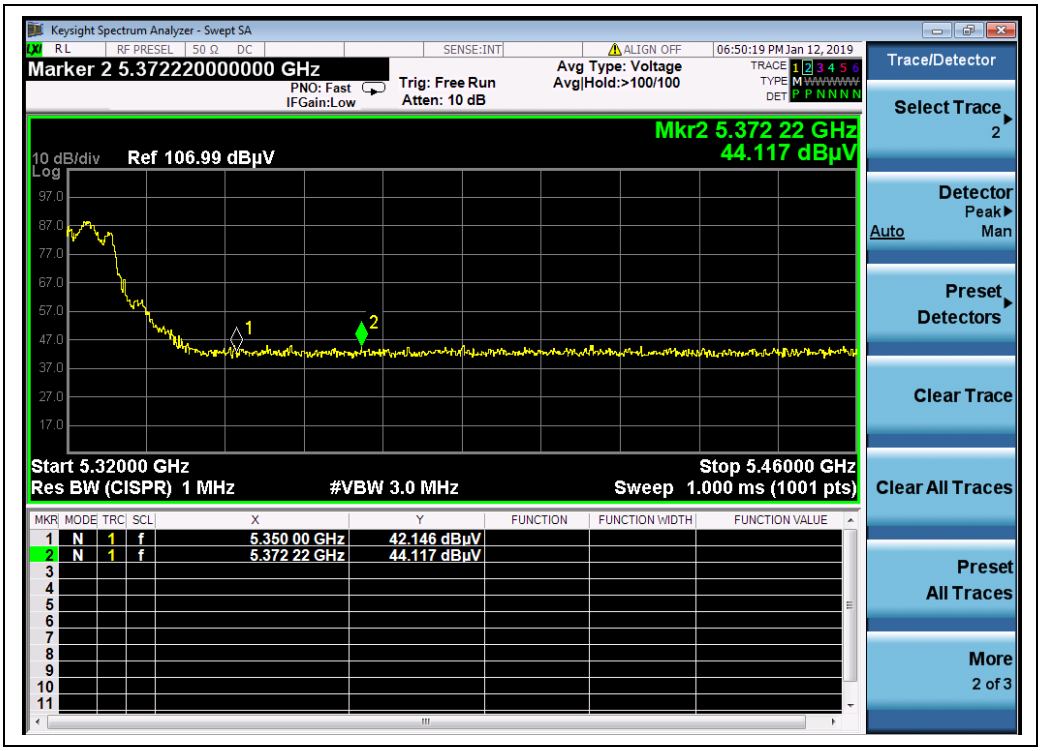
B. Test Plots:



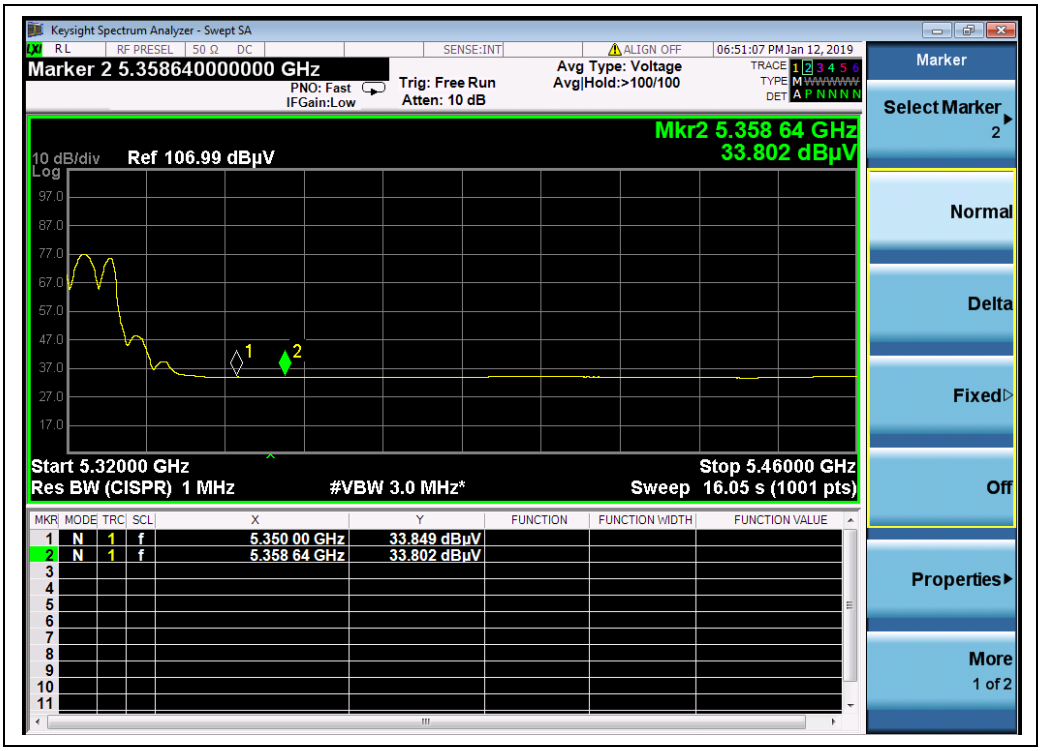
(Channel 36, PEAK, 802.11a)



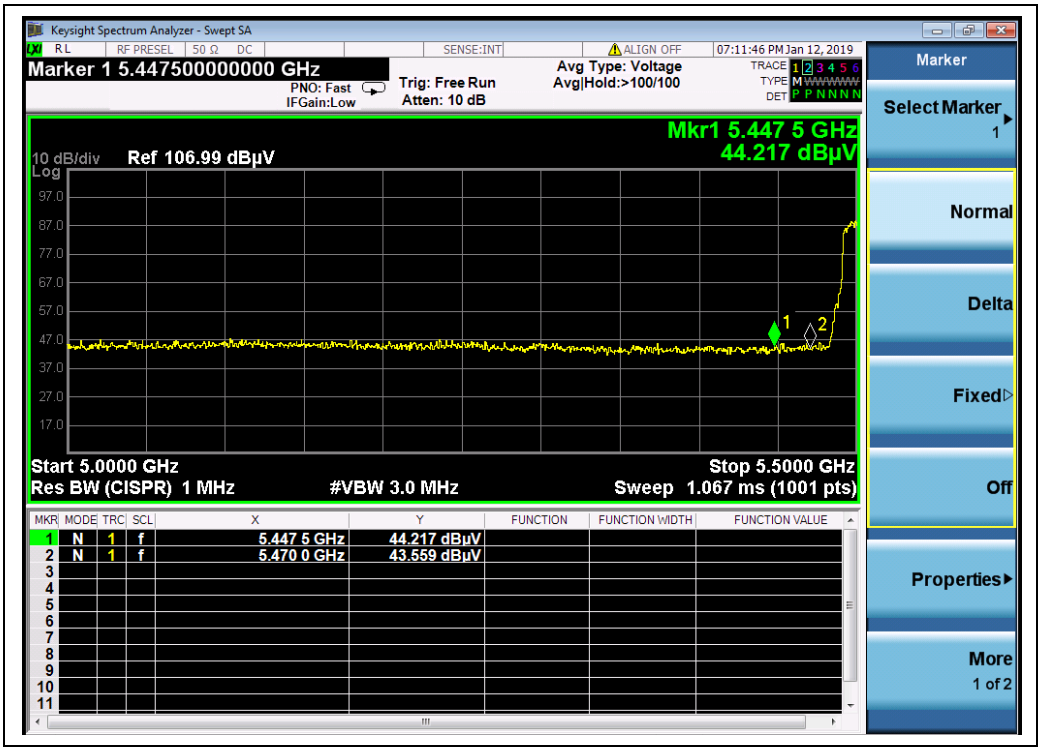
(Channel 36, AVG, 802.11a)



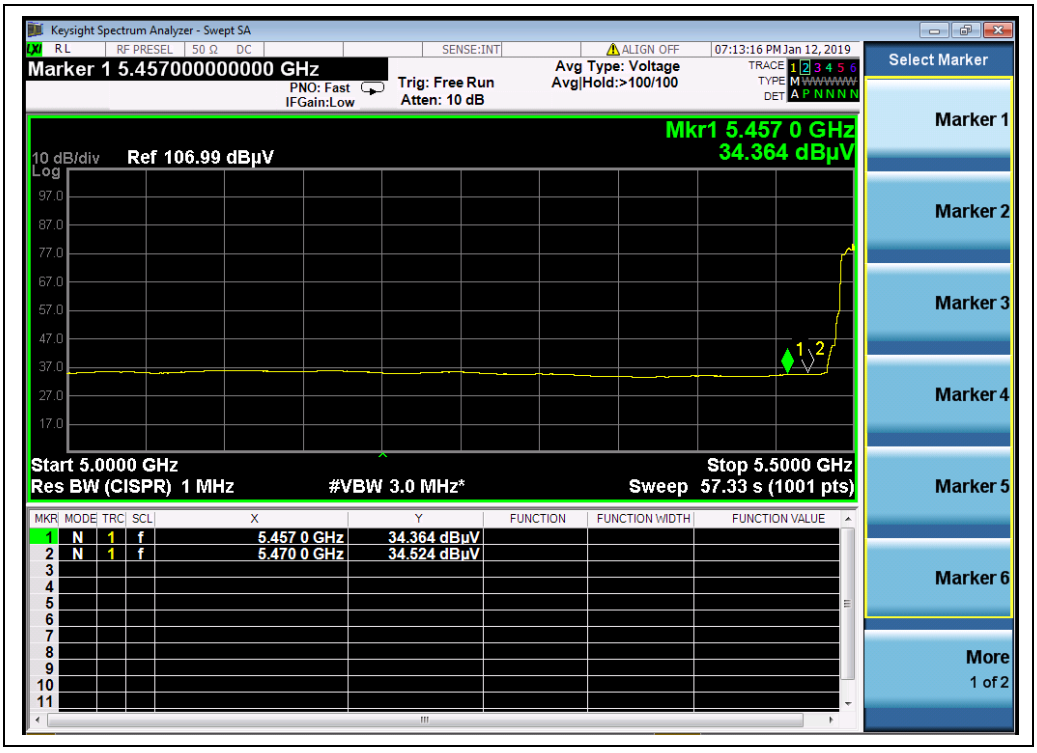
(Channel 64, PEAK, 802.11a)



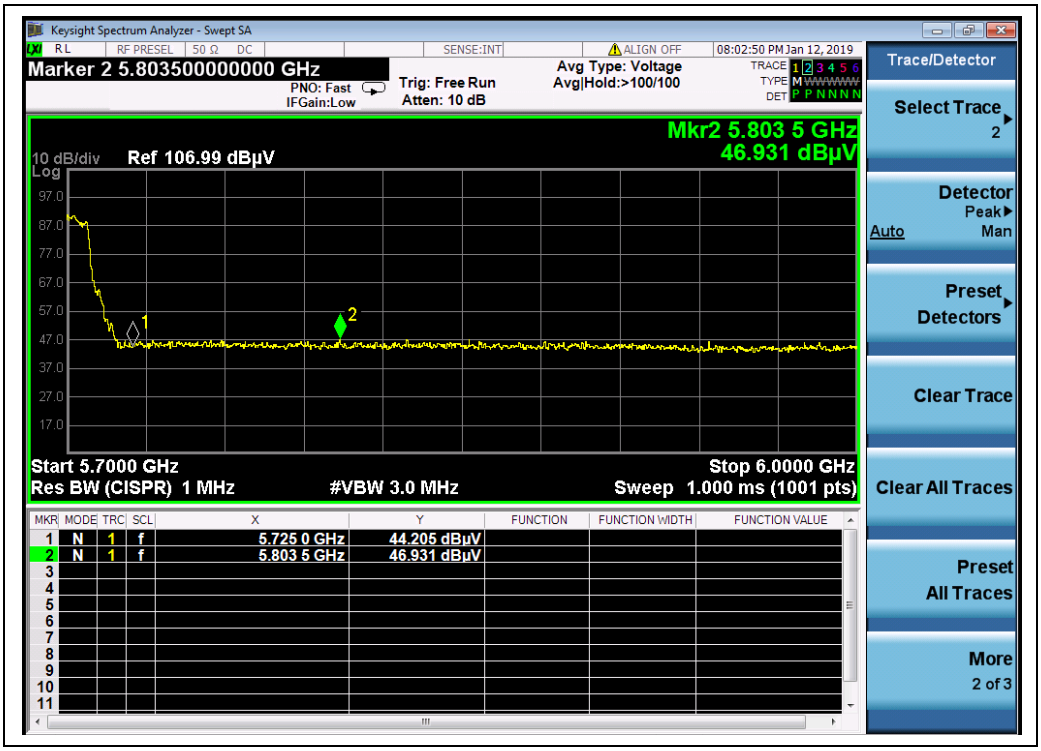
(Channel 64, AVG, 802.11a)



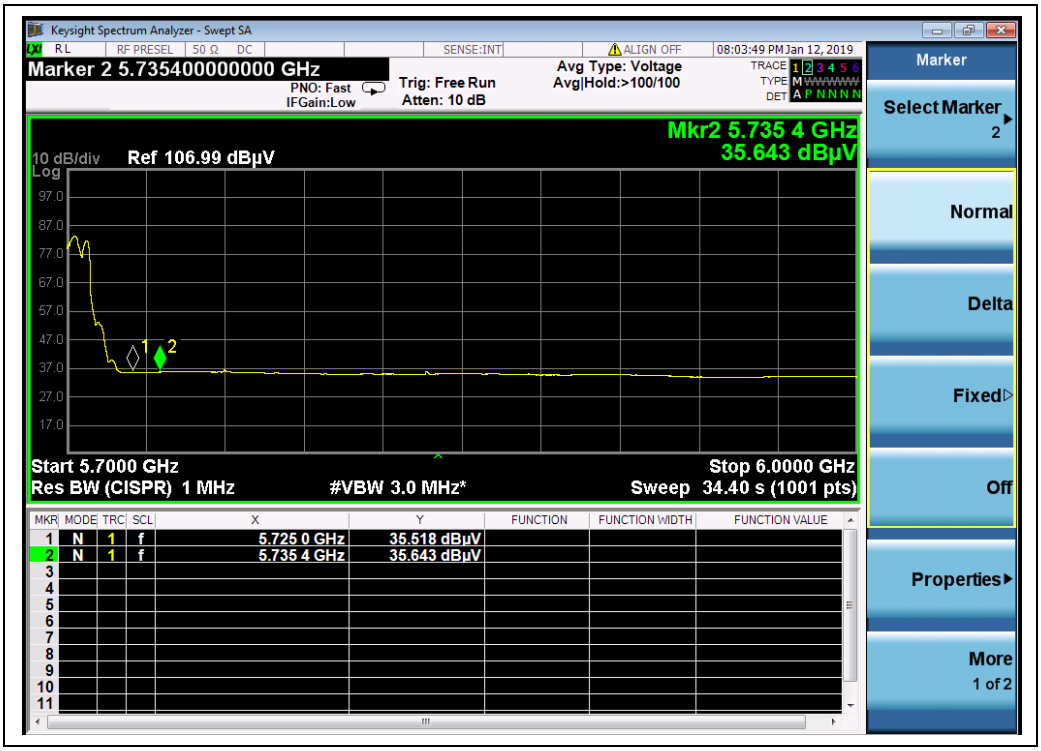
(Channel 100, PEAK, 802.11a)



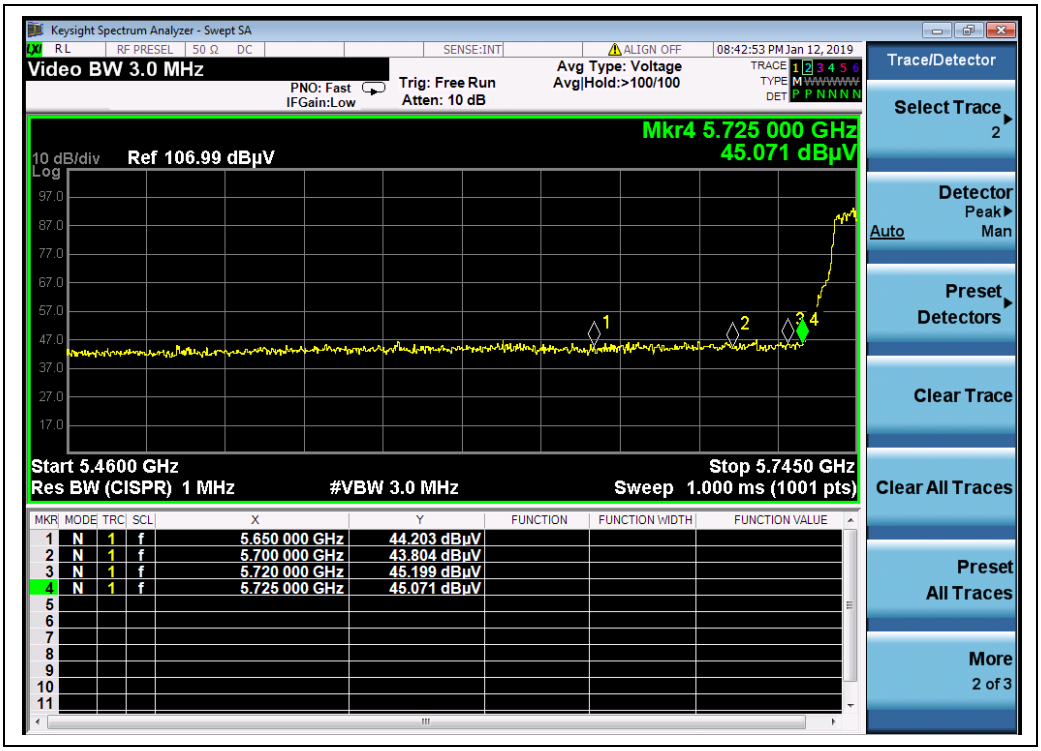
(Channel 100, AVG, 802.11a)



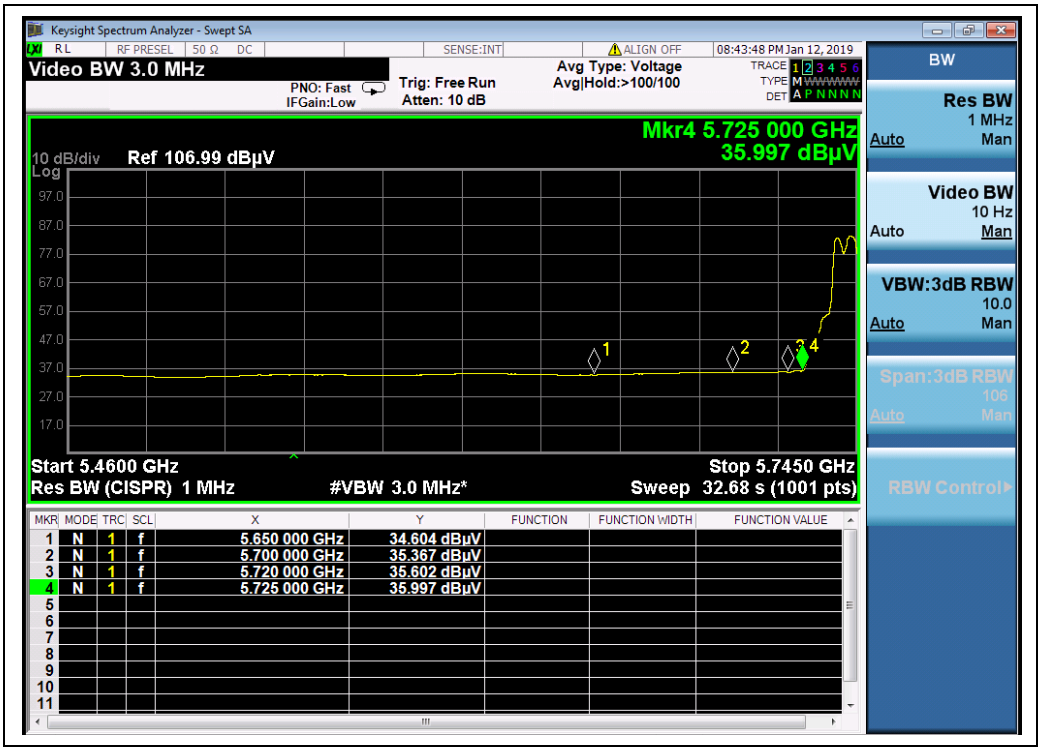
(Channel 144, PEAK, 802.11a)



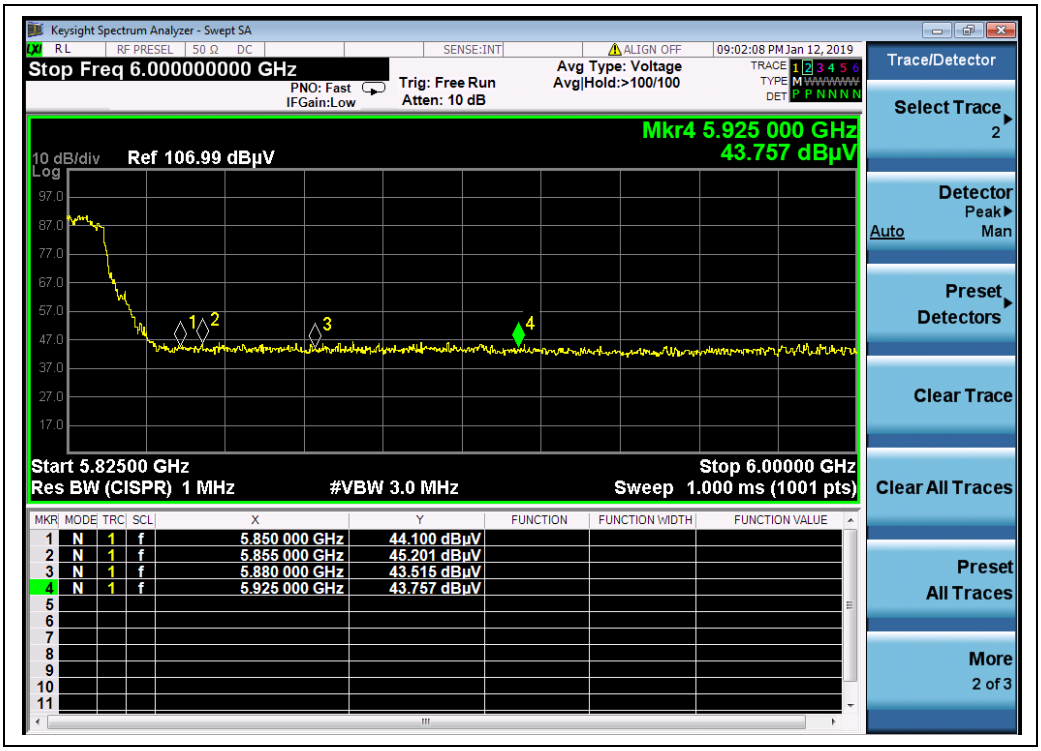
(Channel 144, AVG, 802.11a)



(Channel 149, PEAK, 802.11a)



(Channel 149, AVG, 802.11a)



(Channel 165, PEAK, 802.11a)

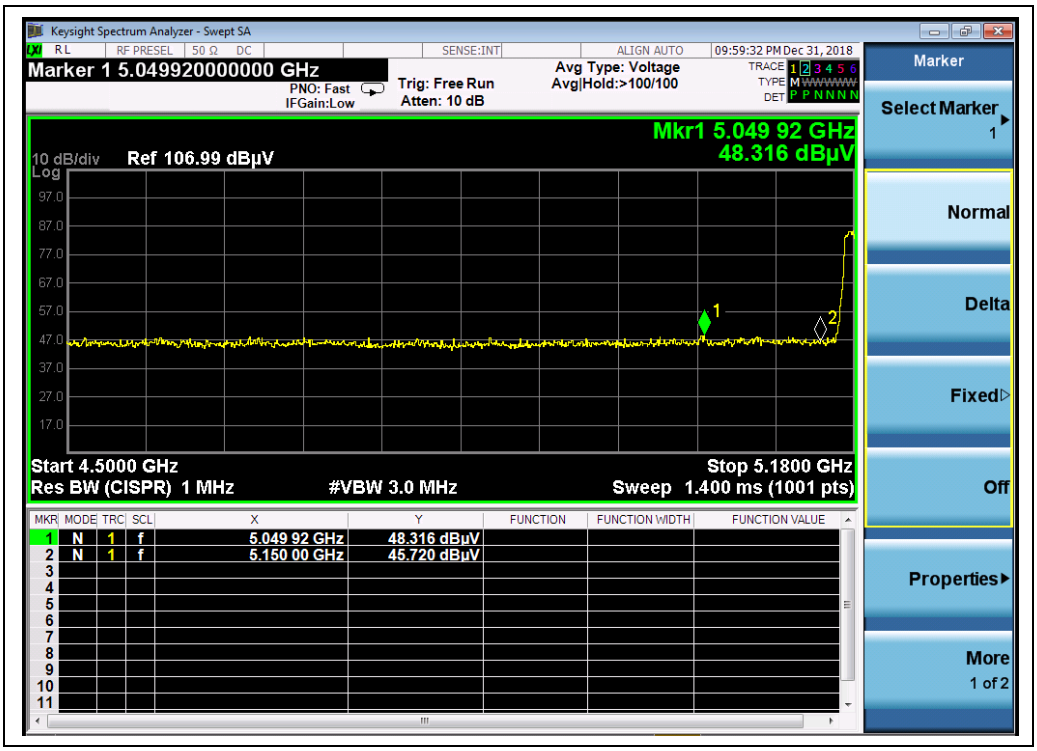
(Channel 165, AVG, 802.11a)

802.11n (HT20) Test mode

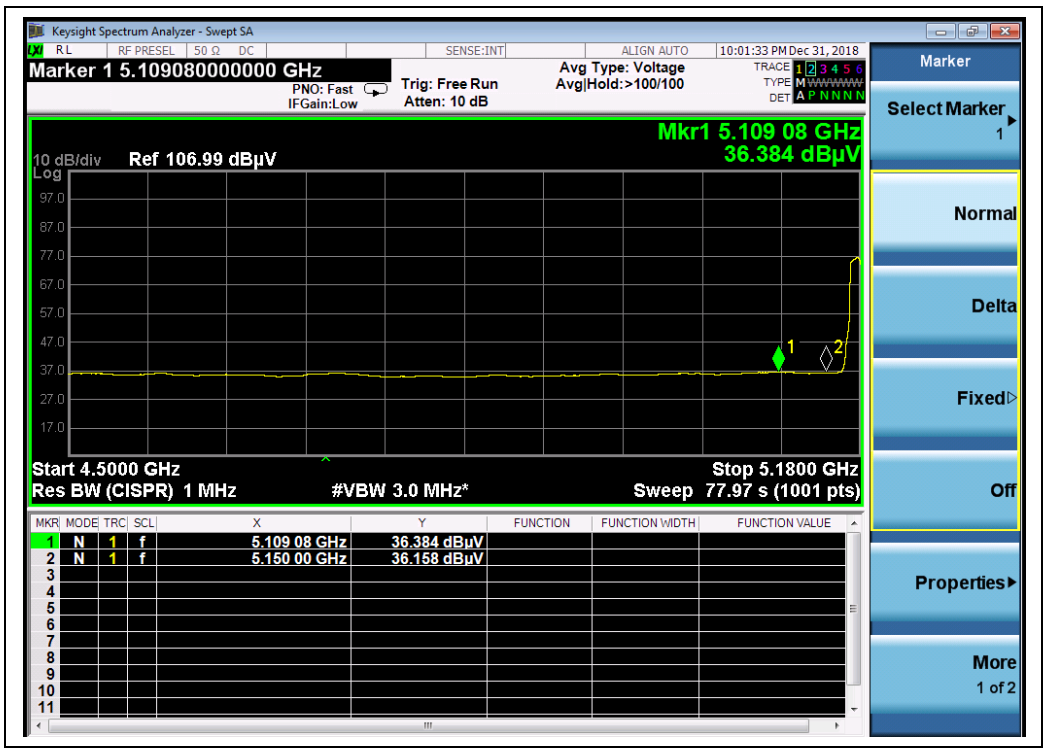
A. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
		PK/ AV						
36	5049.92	PK	48.32	-49.53	32.20	30.99	74	PASS
36	5109.08	AV	36.38	-49.53	32.20	19.05	54	PASS
64	5361.16	PK	43.85	-49.53	32.20	26.52	74	PASS
64	5352.62	AV	33.94	-49.53	32.20	16.61	54	PASS
100	5470.00	PK	45.74	-49.53	32.20	28.41	68.23	PASS
100	5470.00	AV	34.53	-49.53	32.20	17.20	54	PASS
144	5727.60	PK	46.03	-49.53	32.20	28.70	68.23	PASS
144	5732.40	AV	35.71	-49.53	32.20	18.38	54	PASS
149	5725.00	PK	46.60	-49.53	32.20	29.27	122.23	PASS
149	5725.00	AV	36.25	-49.53	32.20	18.92	54	PASS
165	5855.00	PK	44.85	-49.53	32.20	27.52	110.83	PASS
165	5850.00	AV	36.74	-49.53	32.20	19.41	54	PASS

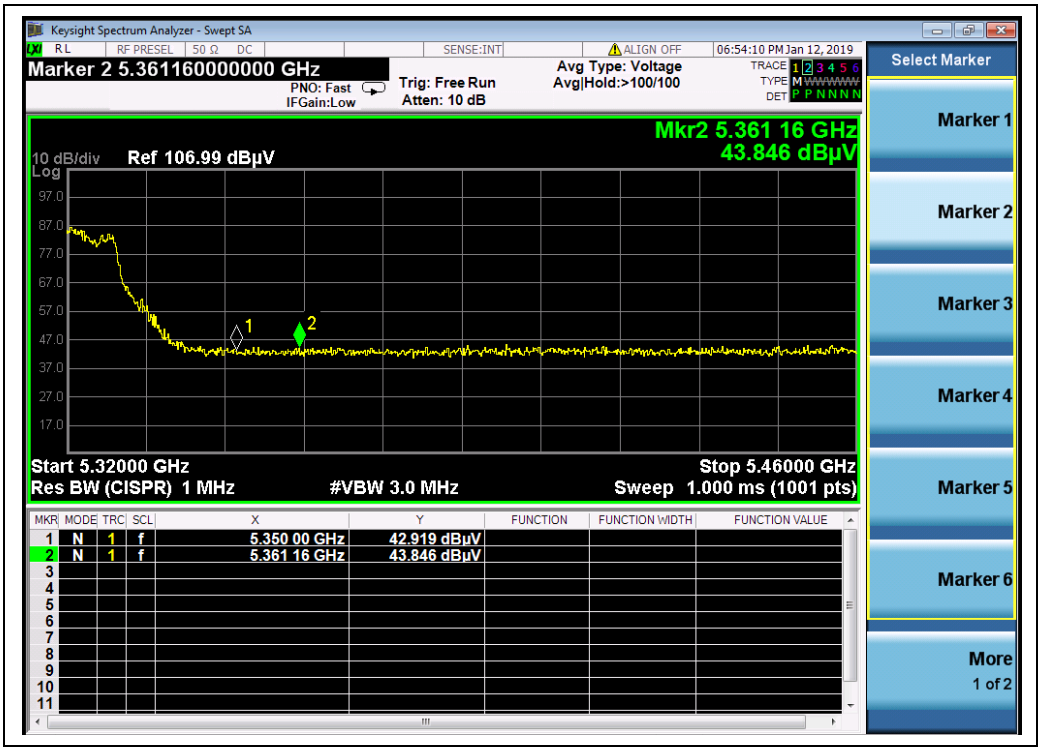
B. Test Plots:



(Channel 36, PEAK, 802.11n (HT20))

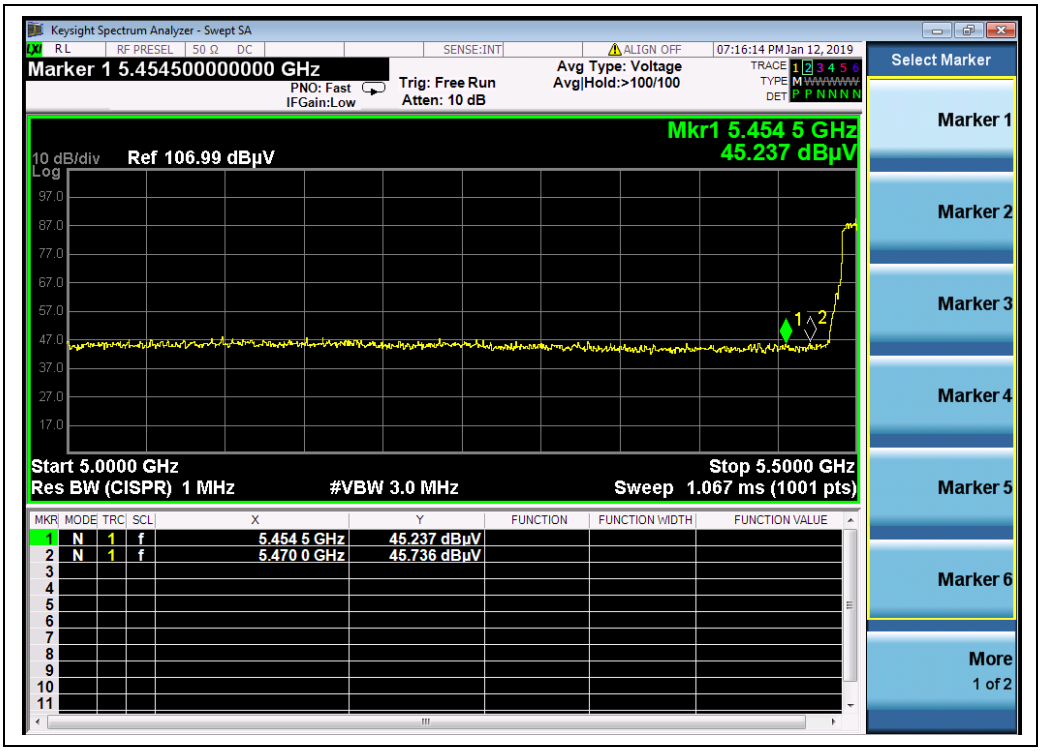


(Channel 36, AVG, 802.11 n (HT20))

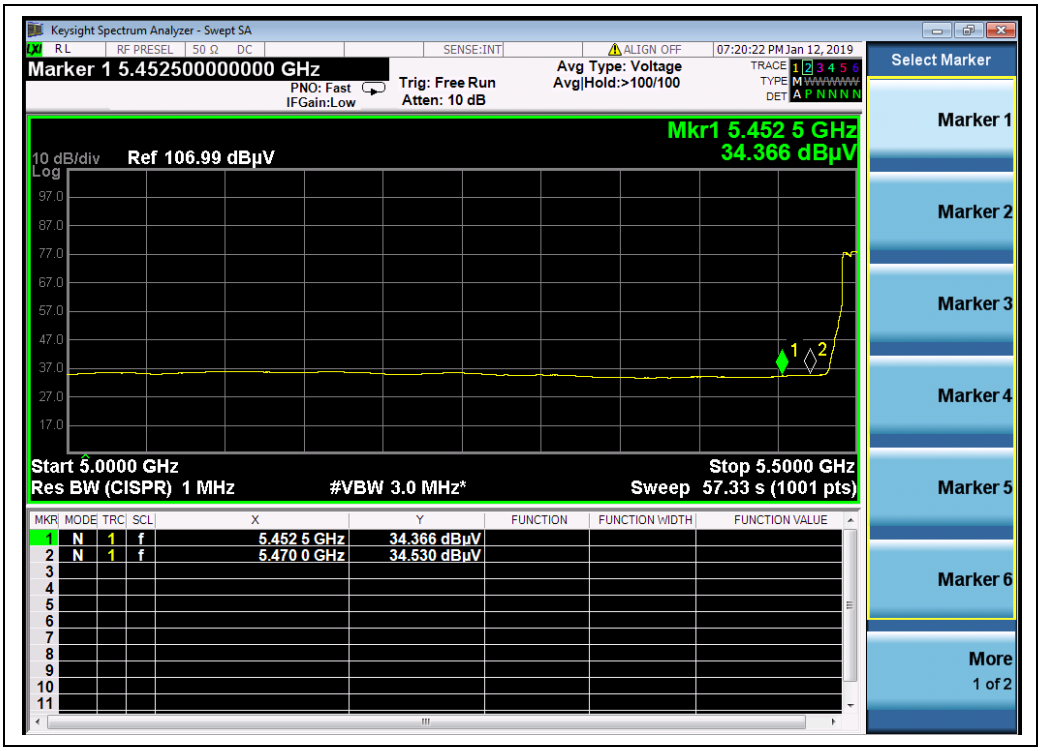


(Channel 64, PEAK, 802.11 n (HT20))

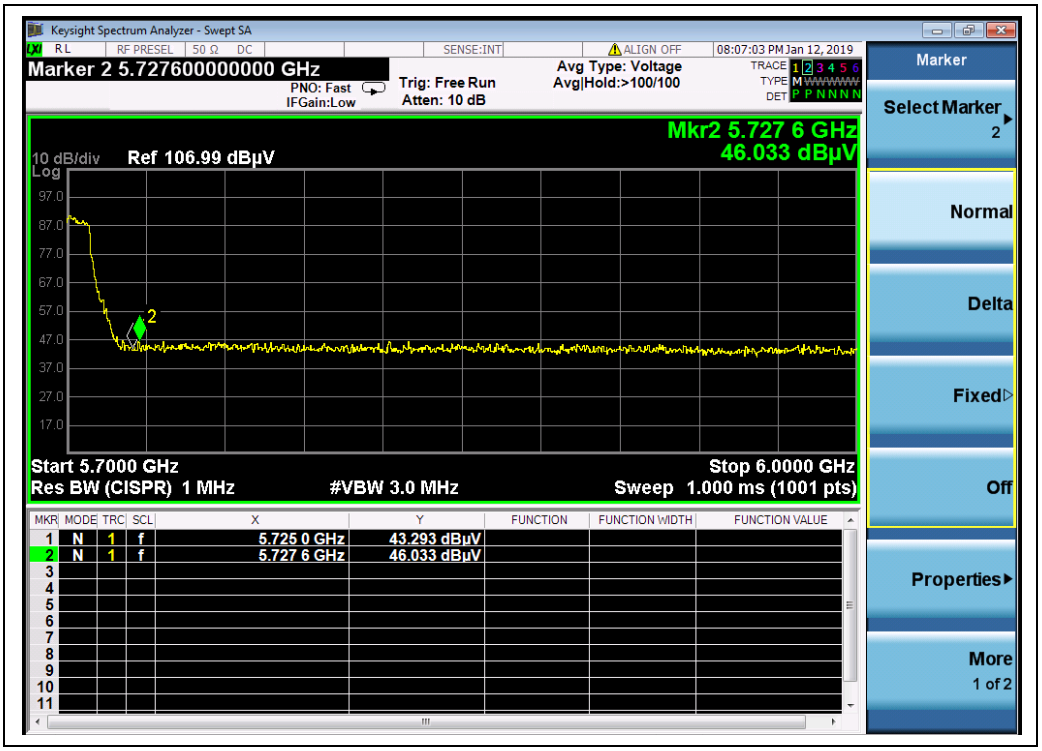
(Channel 64, AVG, 802.11n (HT20))



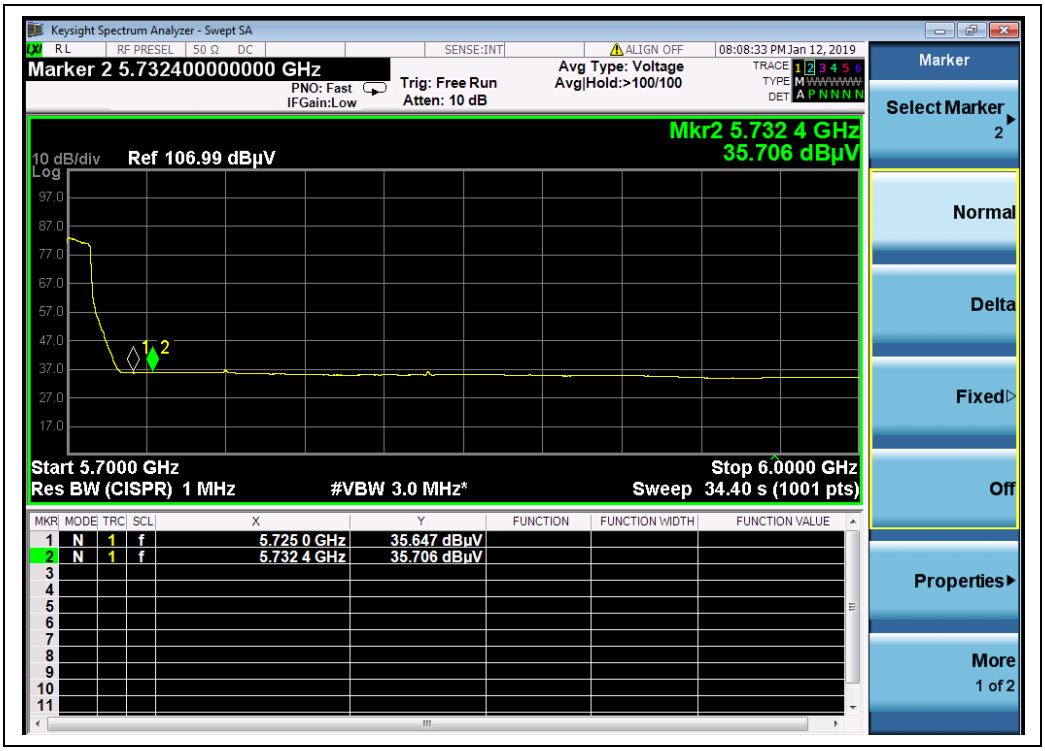
(Channel 100, PEAK, 802.11n (HT20))



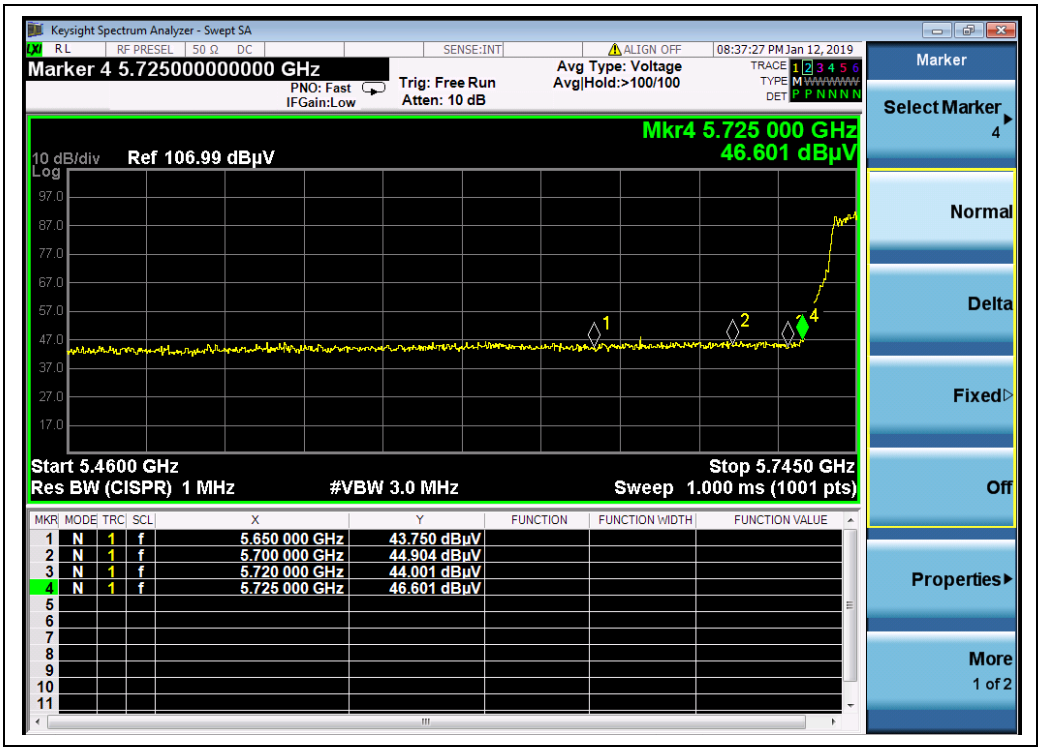
(Channel 100, AVG, 802.11 n (HT20))



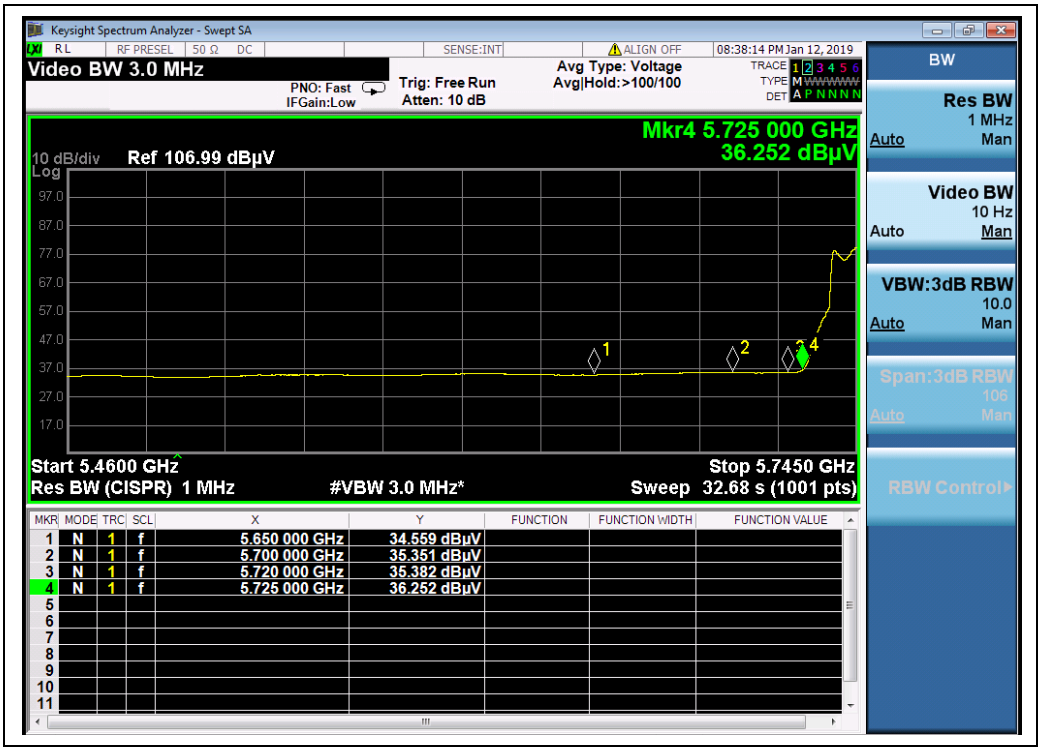
(Channel 140, PEAK, 802.11 n (HT20))



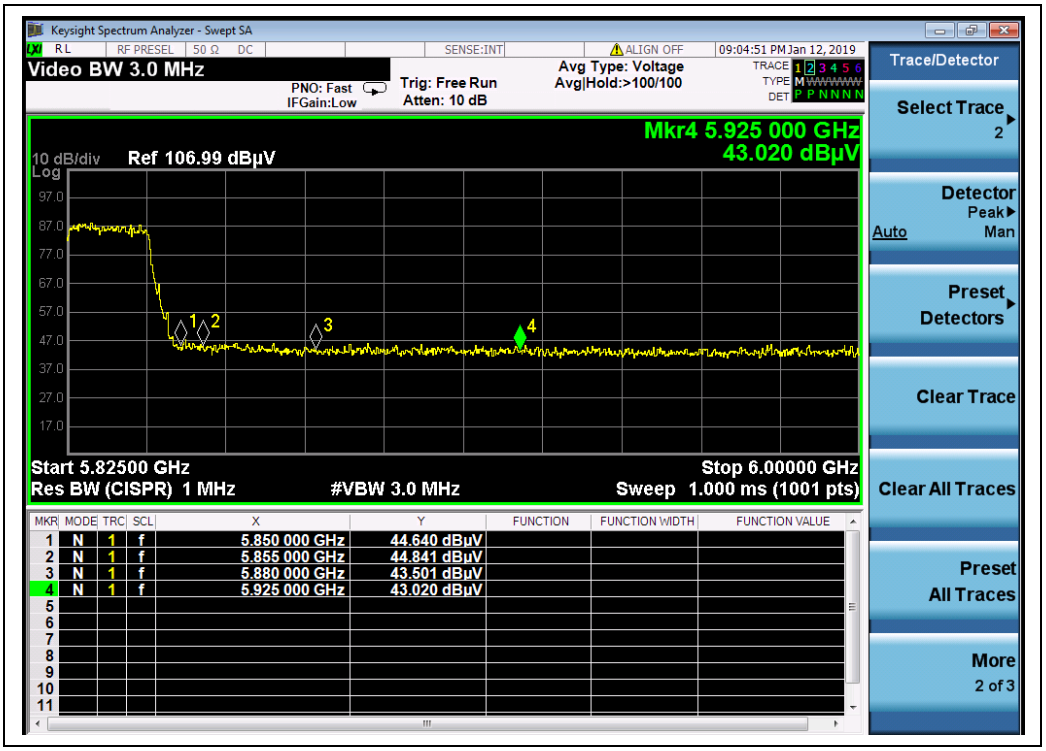
(Channel 140, AVG, 802.11n (HT20))



(Channel 149, PEAK, 802.11 n (HT20))



(Channel 149, AVG, 802.11 n (HT20))



(Channel 165, PEAK, 802.11 n (HT20))

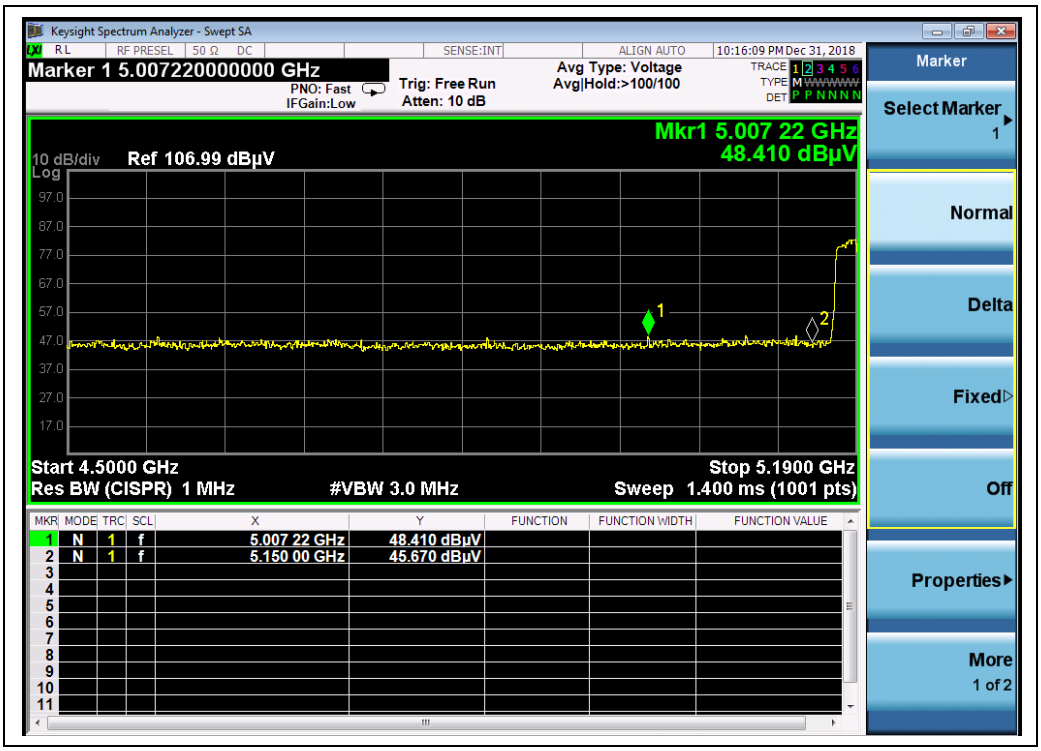
(Channel 165, AVG, 802.11 n (HT20))

802.11n (HT40) Test mode

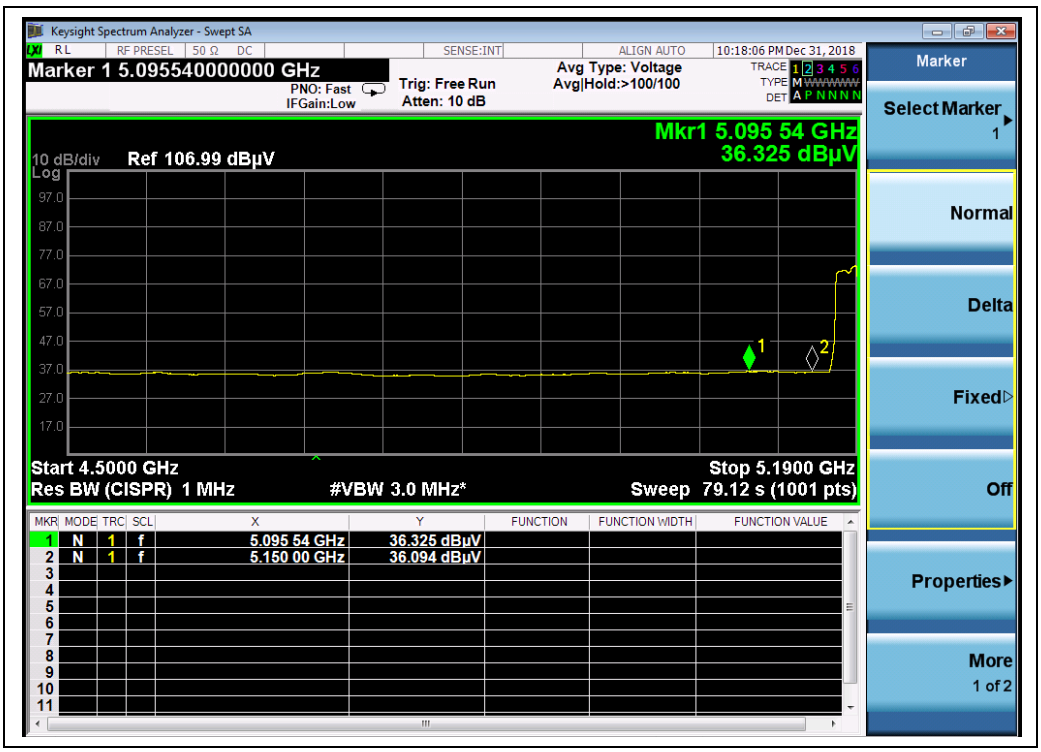
A. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
		PK/ AV						
38	5007.22	PK	48.41	-49.53	32.20	31.08	74	PASS
38	5095.54	AV	36.33	-49.53	32.20	19.00	54	PASS
62	5350.00	PK	44.34	-49.53	32.20	27.01	74	PASS
62	5350.00	AV	35.76	-49.53	32.20	18.43	54	PASS
102	5445.14	PK	45.01	-49.53	32.20	27.68	74	PASS
102	5470.00	AV	34.51	-49.53	32.20	17.18	54	PASS
142	5733.21	PK	46.10	-49.53	32.20	28.77	68.23	PASS
142	5759.61	AV	35.75	-49.53	32.20	18.42	54	PASS
151	5725.00	PK	44.94	-49.53	32.20	27.61	122.23	PASS
151	5725.00	AV	36.64	-49.53	32.20	19.31	54	PASS
159	5850.00	PK	44.11	-49.53	32.20	26.78	122.23	PASS
159	5850.00	AV	35.44	-49.53	32.20	18.11	54	PASS

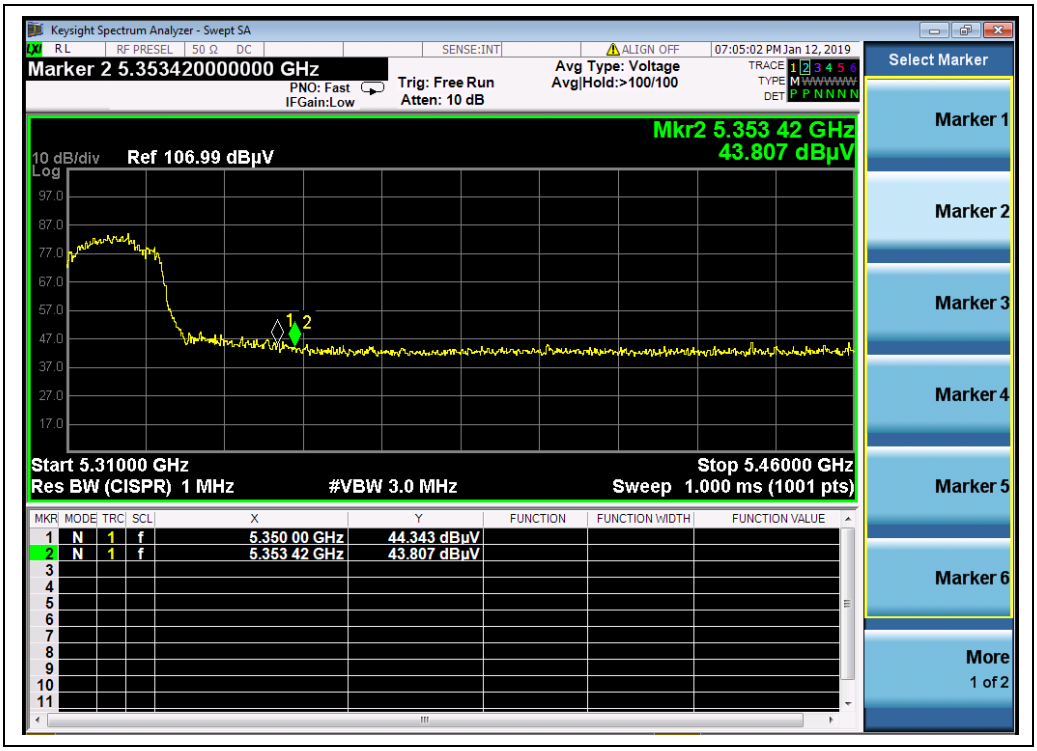
B. Test Plots:



(Channel 38, PEAK, 802.11n (HT40))

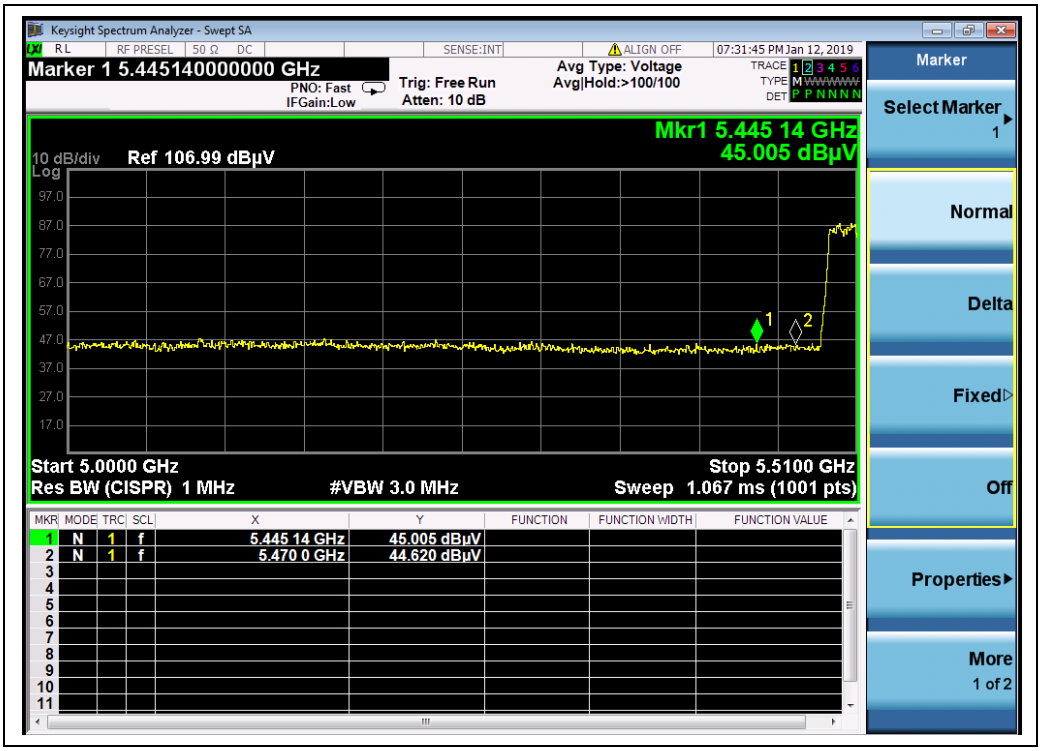


(Channel 38, AVG, 802.11n (HT40))

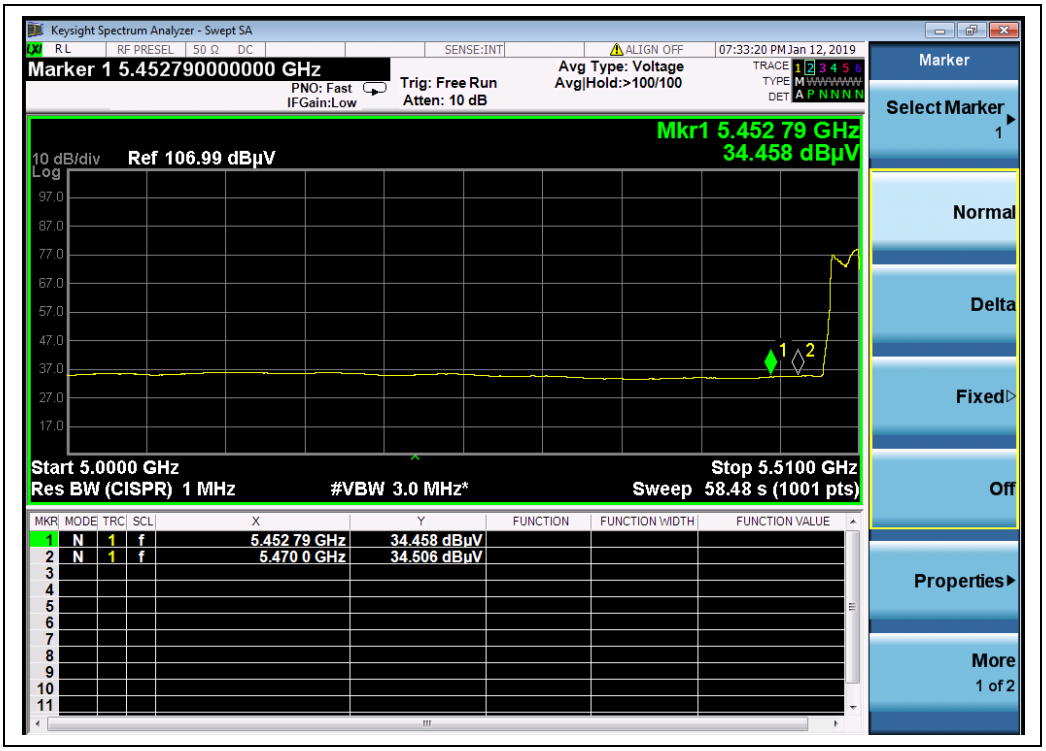


(Channel 62, PEAK, 802.11n (HT40))

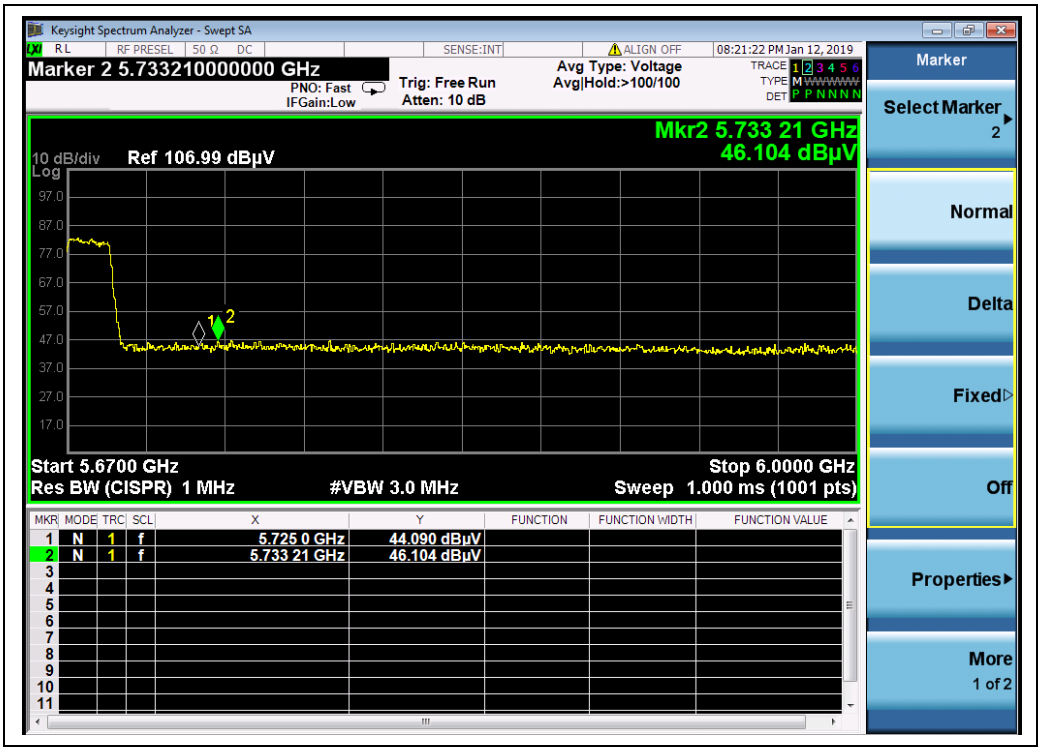
(Channel 62, AVG, 802.11n (HT40))



(Channel 102, PEAK, 802.11n (HT40))

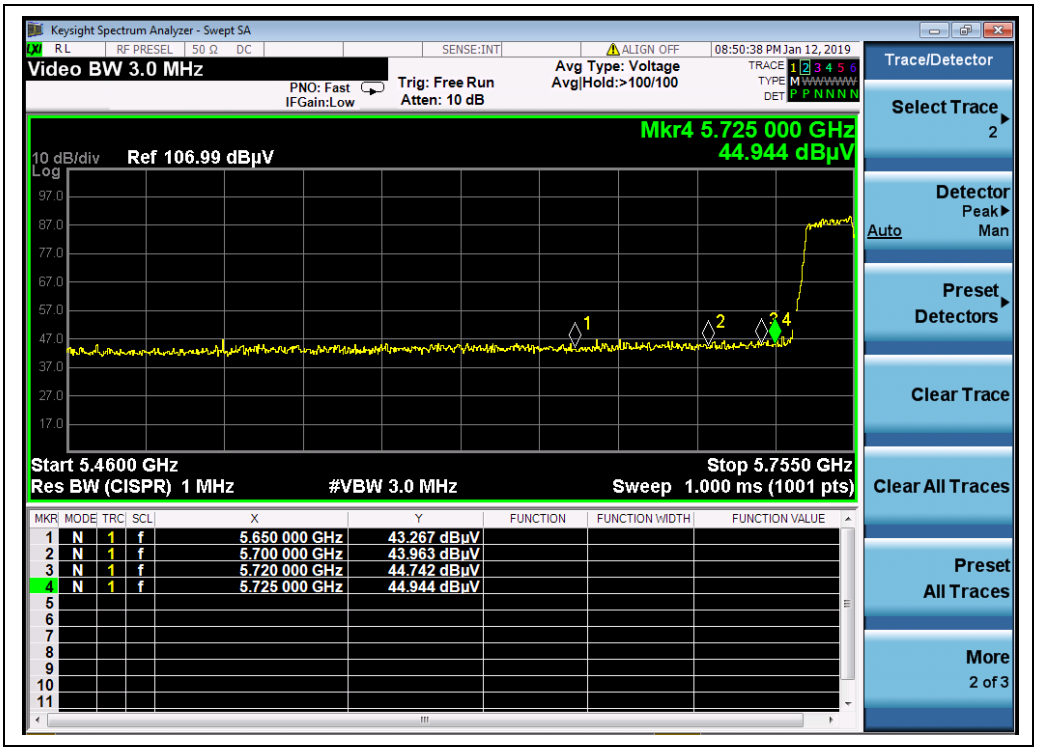


(Channel 102, AVG, 802.11n (HT40))

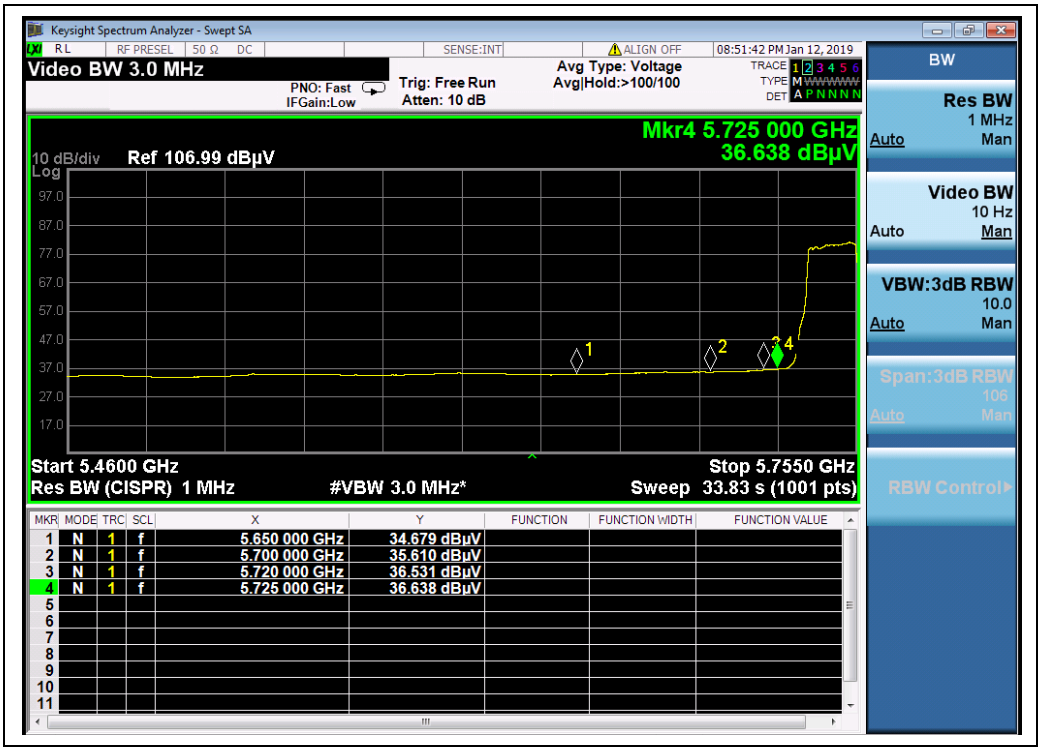


(Channel 142, PEAK, 802.11n (HT40))

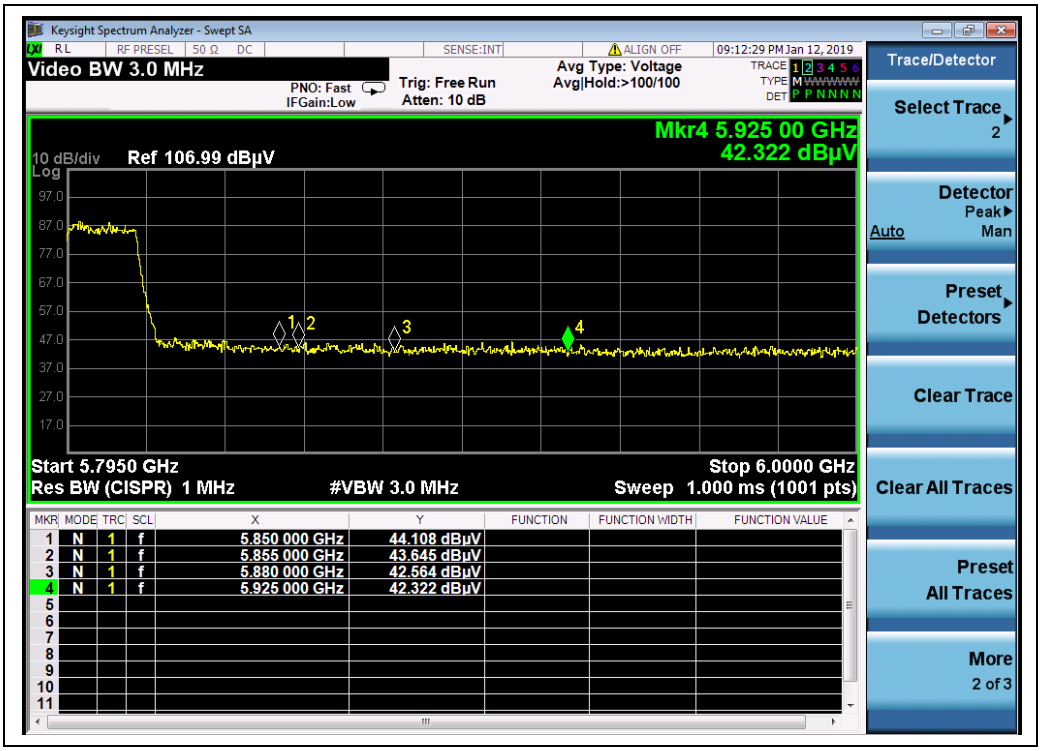
(Channel 142, AVG, 802.11n (HT40))



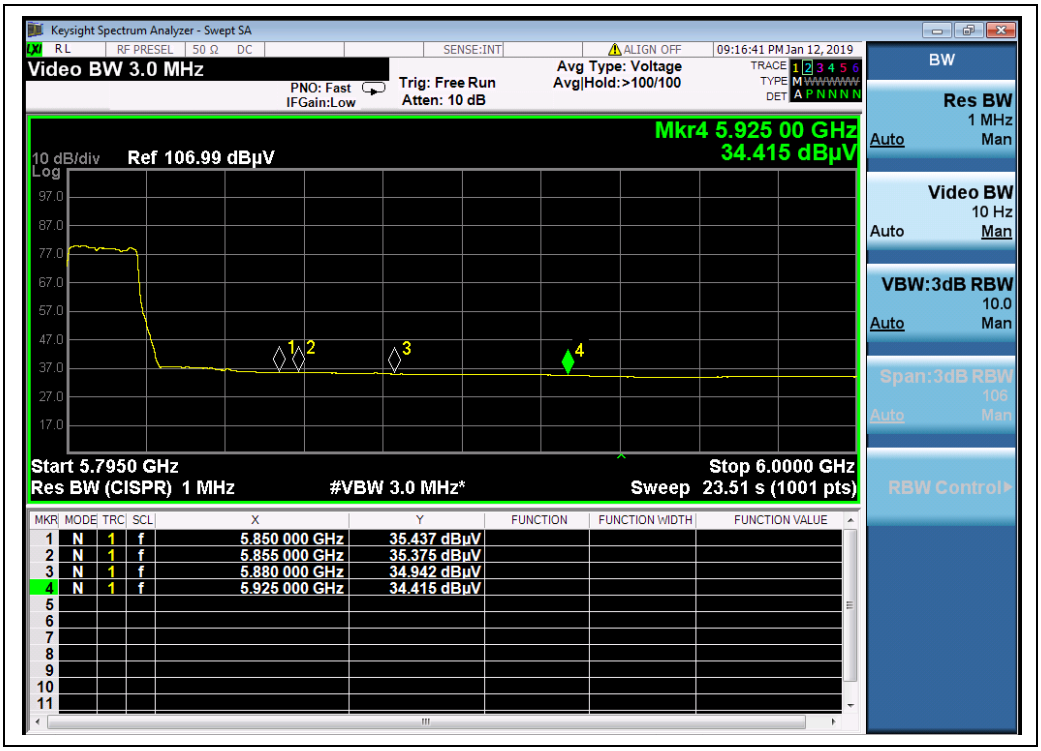
(Channel 151, PEAK, 802.11n (HT40))



(Channel 151, AVG, 802.11n (HT40))



(Channel 159, PEAK, 802.11n (HT40))



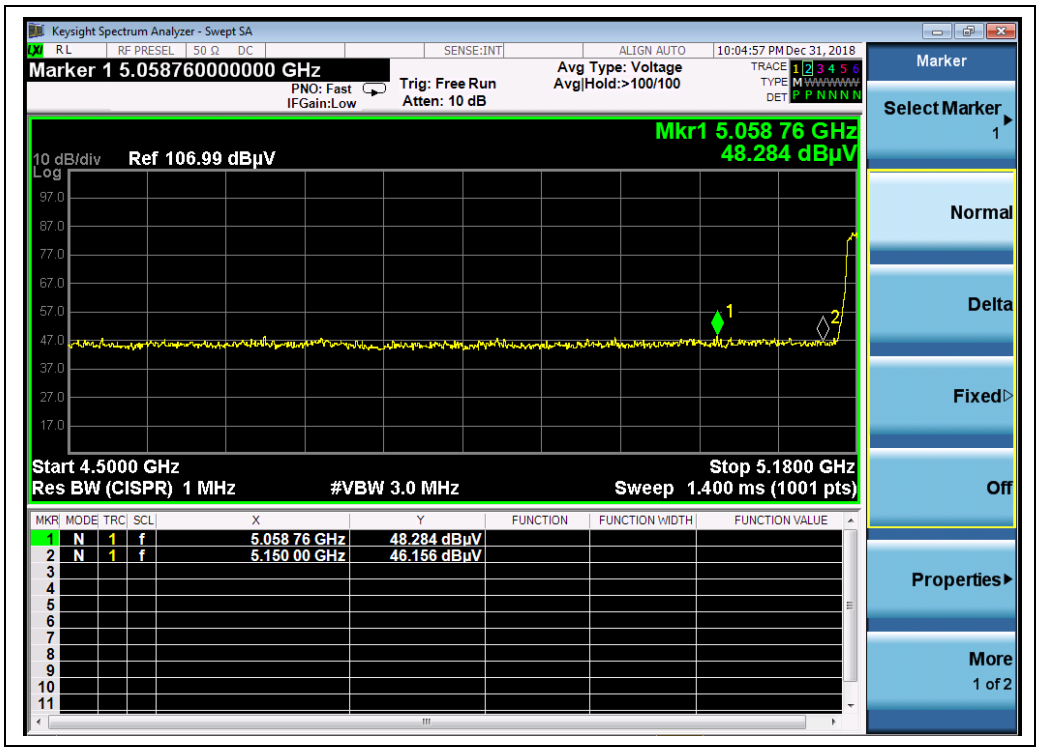
(Channel 159, AVG, 802.11n (HT40))

802.11ac (VHT20) Test mode

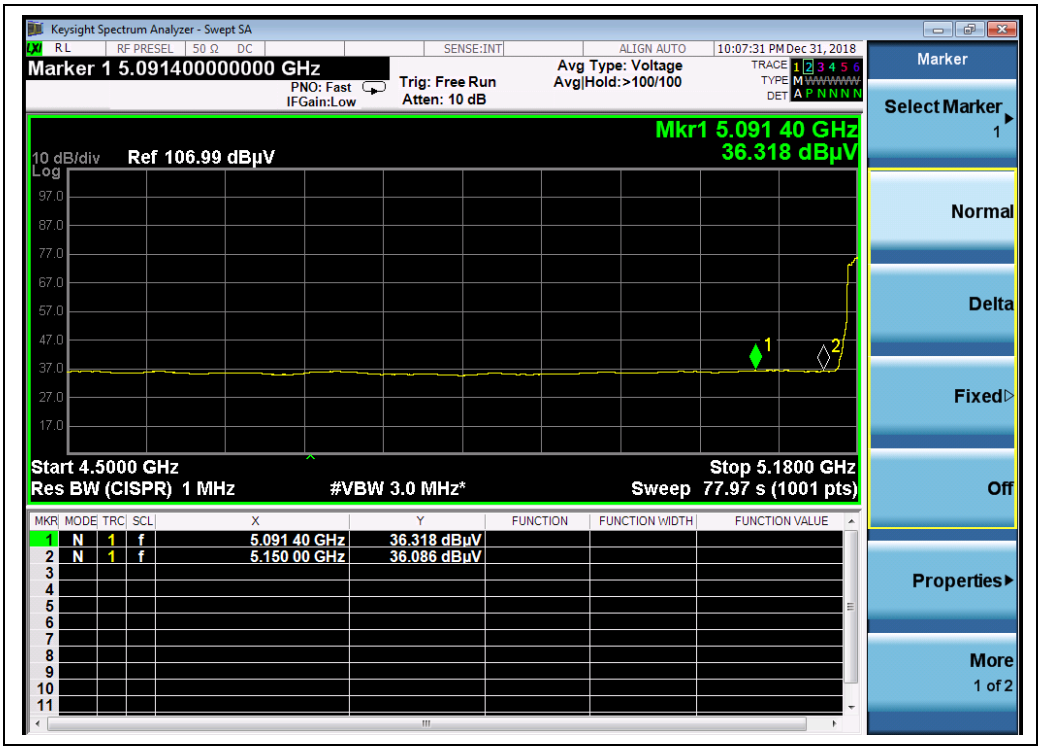
A. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
		PK/ AV						
36	5058.76	PK	48.28	-49.53	32.20	30.95	74	PASS
36	5091.40	AV	36.32	-49.53	32.20	18.99	54	PASS
64	5367.60	PK	43.71	-49.53	32.20	26.38	74	PASS
64	5350.00	AV	34.00	-49.53	32.20	16.67	54	PASS
100	5462.50	PK	45.26	-49.53	32.20	27.93	68.23	PASS
100	5470.00	AV	34.51	-49.53	32.20	17.18	54	PASS
144	5731.50	PK	45.66	-49.53	32.20	28.33	68.23	PASS
144	5740.80	AV	35.75	-49.53	32.20	18.42	54	PASS
149	5725.00	PK	46.48	-49.53	32.20	29.15	122.23	PASS
149	5725.00	AV	37.56	-49.53	32.20	20.23	54	PASS
165	5850.00	PK	46.25	-49.53	32.20	28.92	122.23	PASS
165	5850.00	AV	36.63	-49.53	32.20	19.30	54	PASS

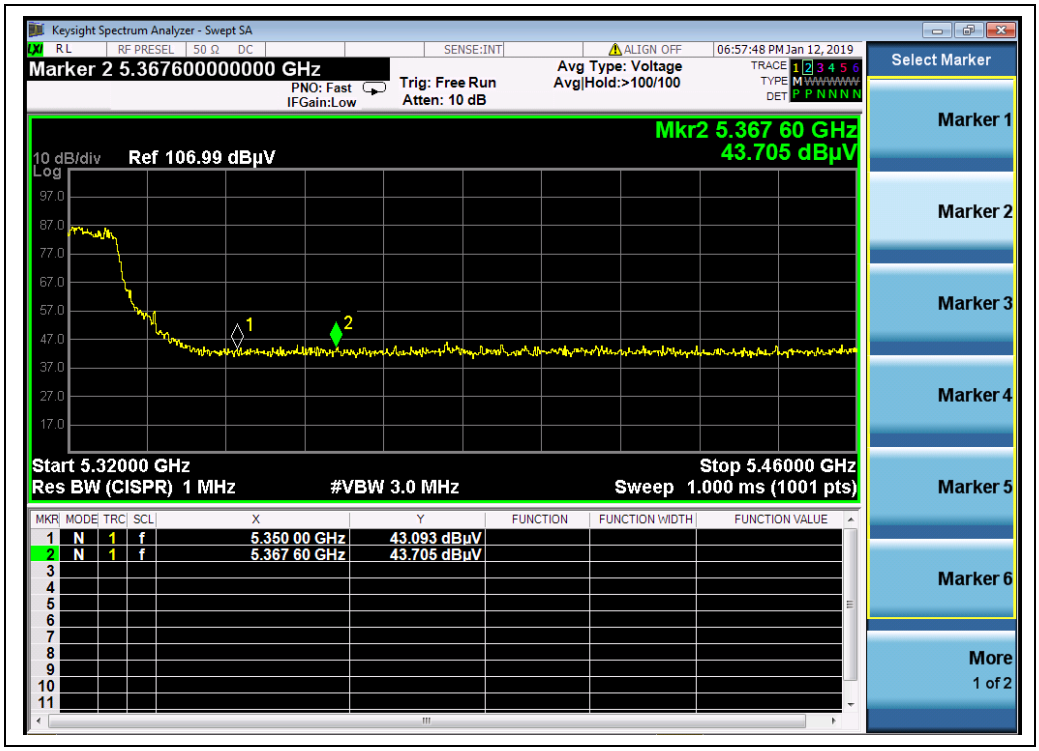
B. Test Plots:



(Channel 36, PEAK, 802.11 ac (VHT20))

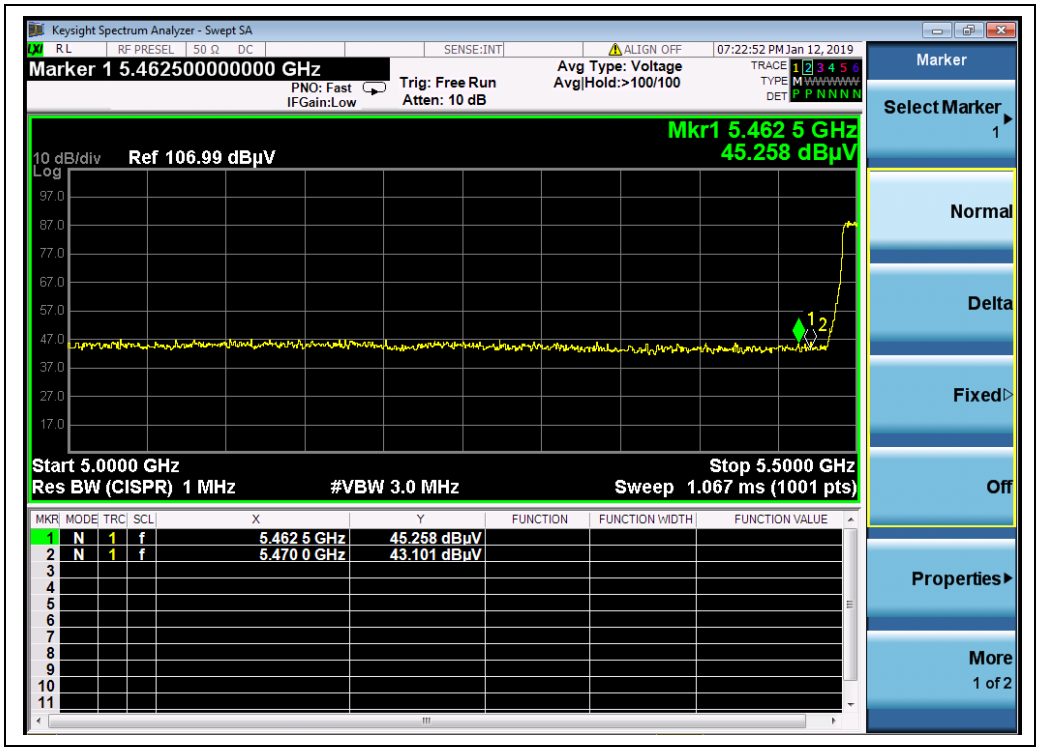


(Channel 36, AVG, 802.11 ac (VHT20))

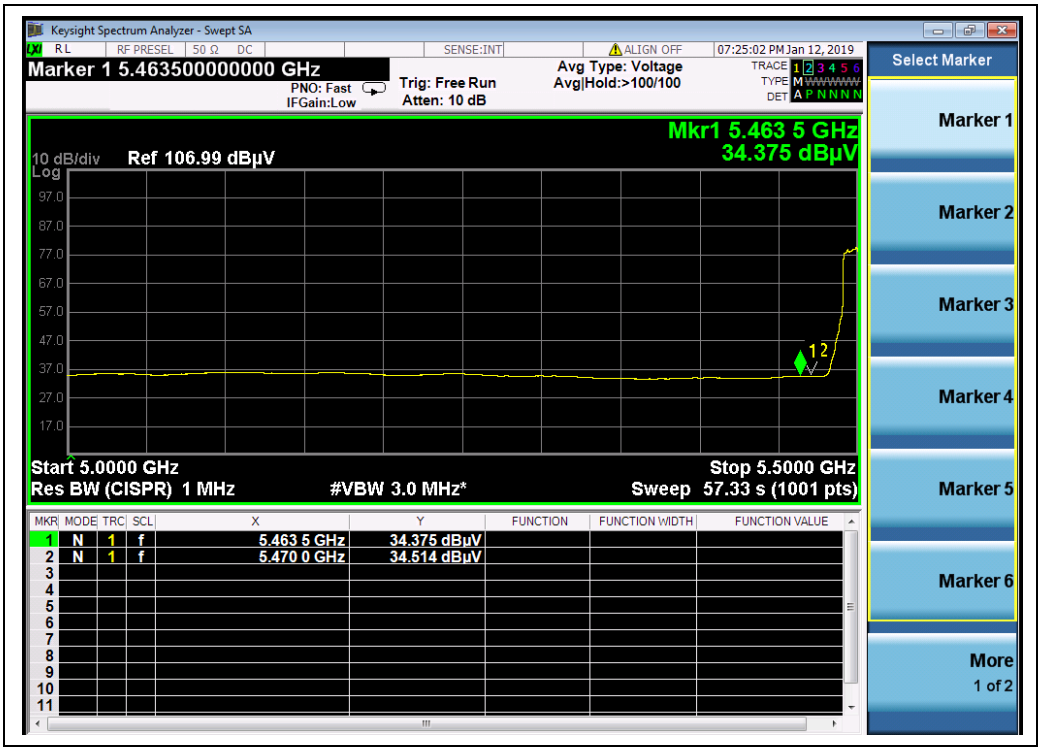


(Channel 64, PEAK, 802.11 ac (VHT20))

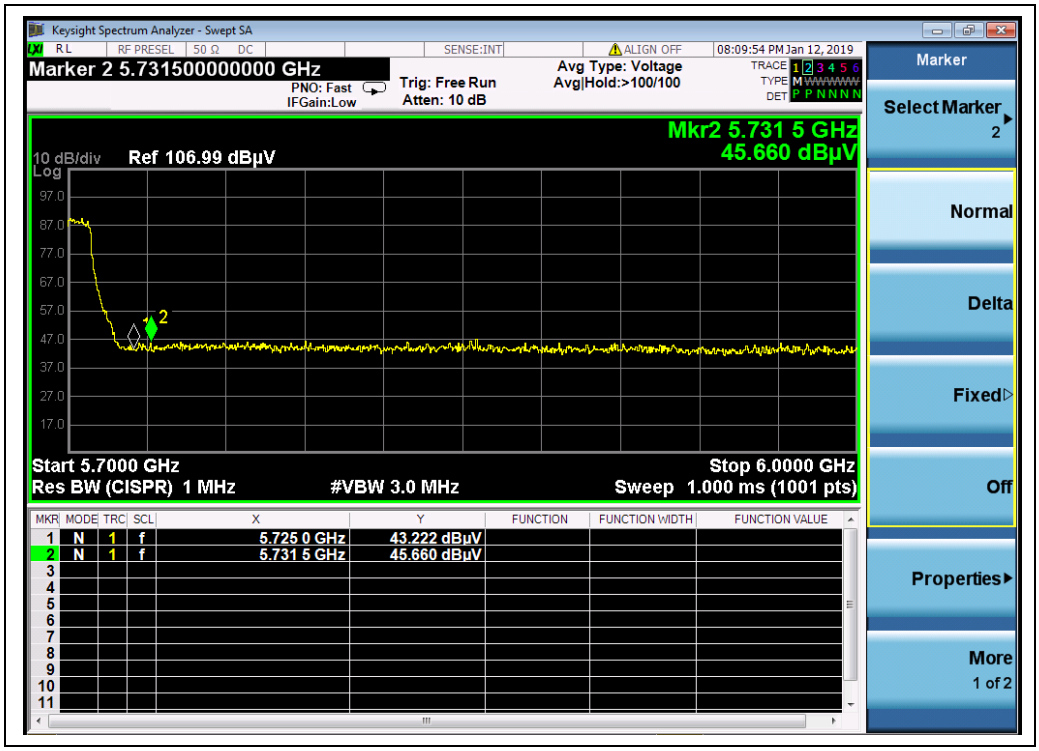
(Channel 64, AVG, 802.11 ac (VHT20))



(Channel 100, PEAK, 802.11 ac (VHT20))

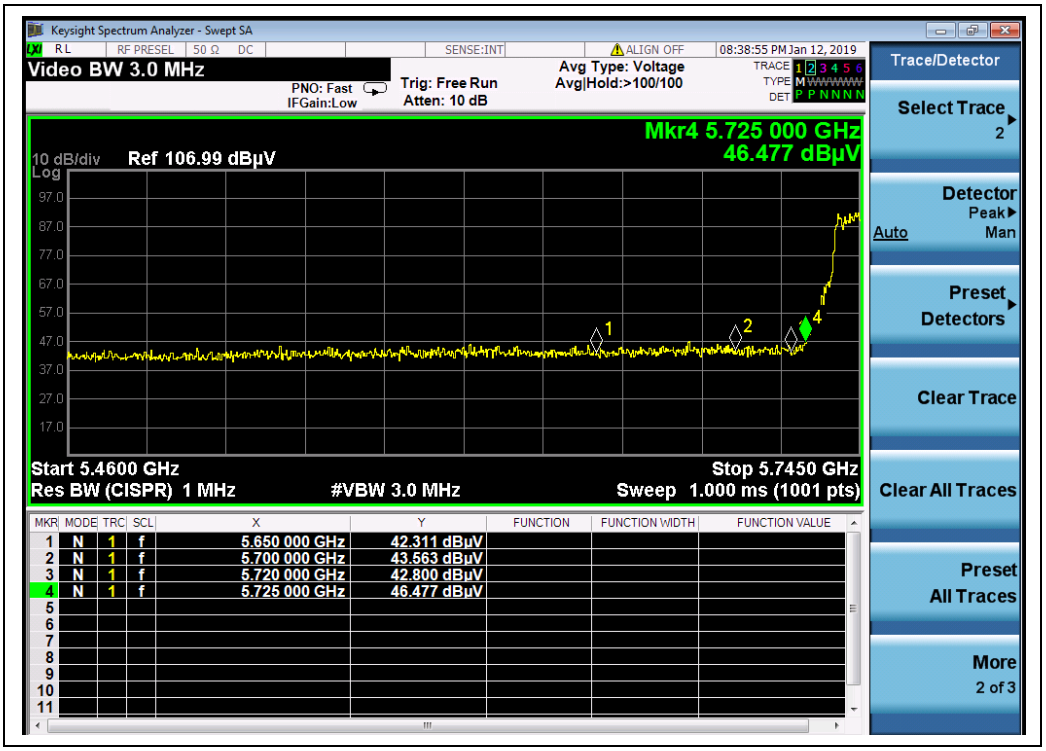


(Channel 100, AVG, 802.11 ac (VHT20))

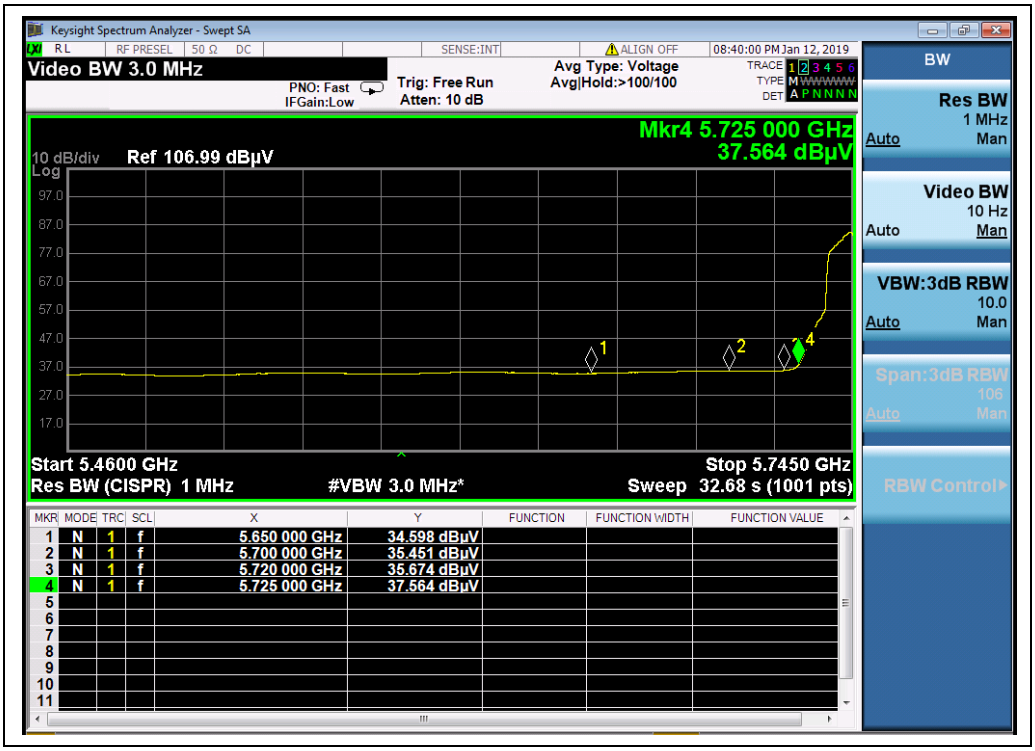


(Channel 144, PEAK, 802.11 ac (VHT20))

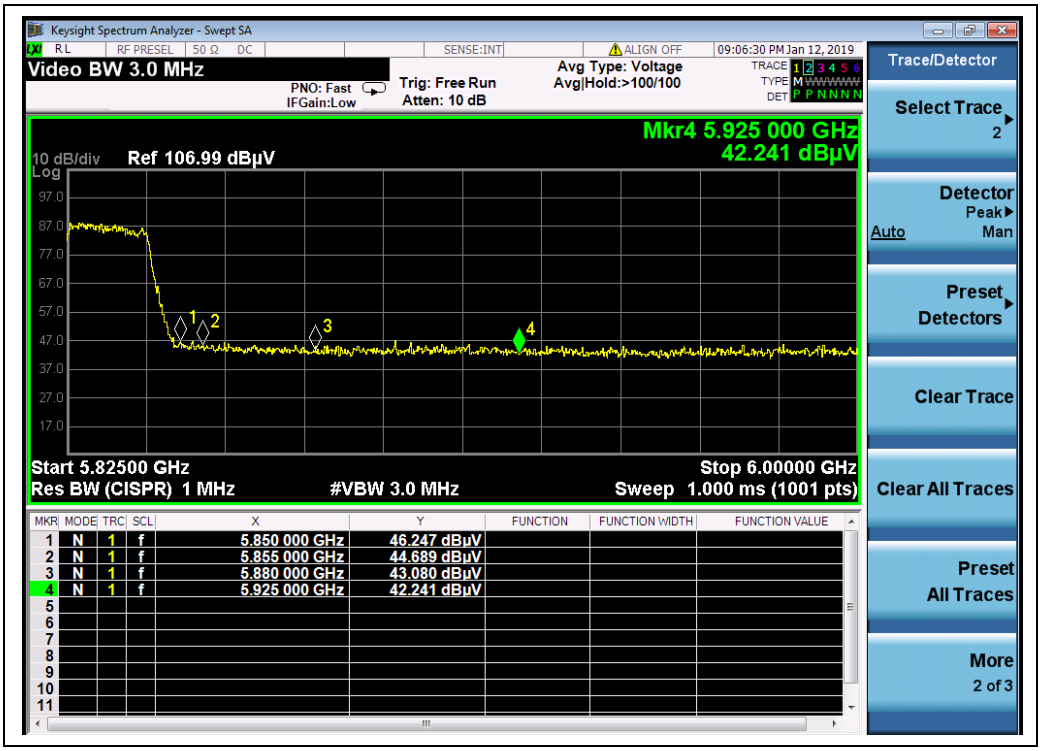
(Channel 144, AVG, 802.11 ac (VHT20))



(Channel 149, PEAK, 802.11 ac (VHT20))



(Channel 149, AVG, 802.11 ac (VHT20))



(Channel 165, PEAK, 802.11 ac (VHT20))

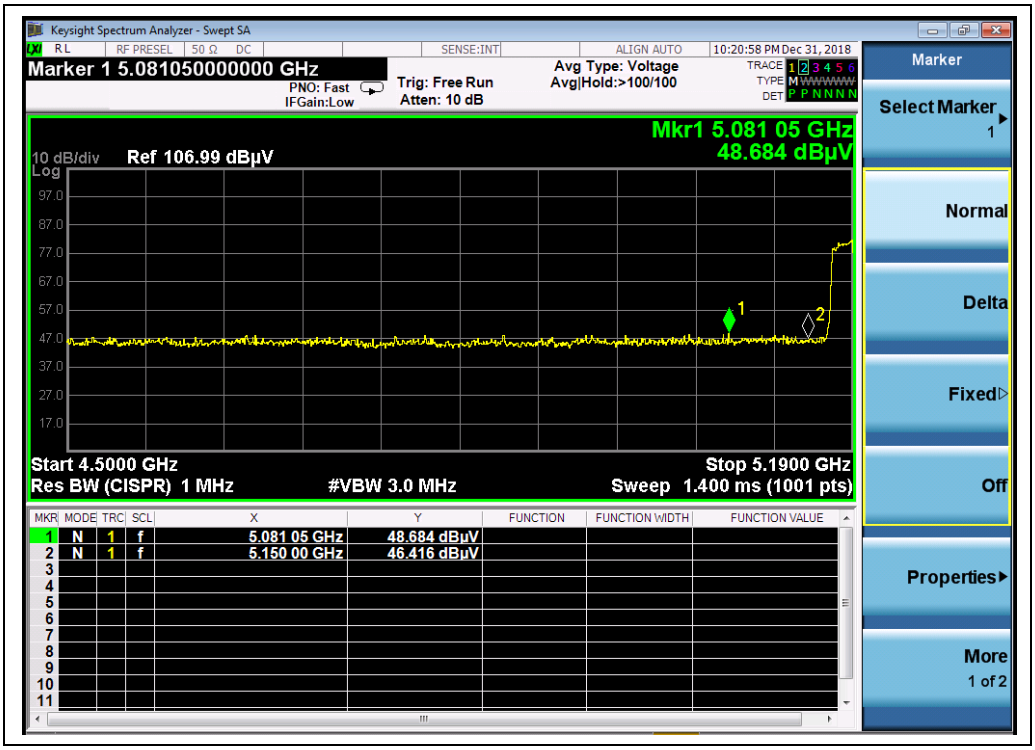
(Channel 165, AVG, 802.11 ac (VHT20))

802.11ac (VHT40) Test mode

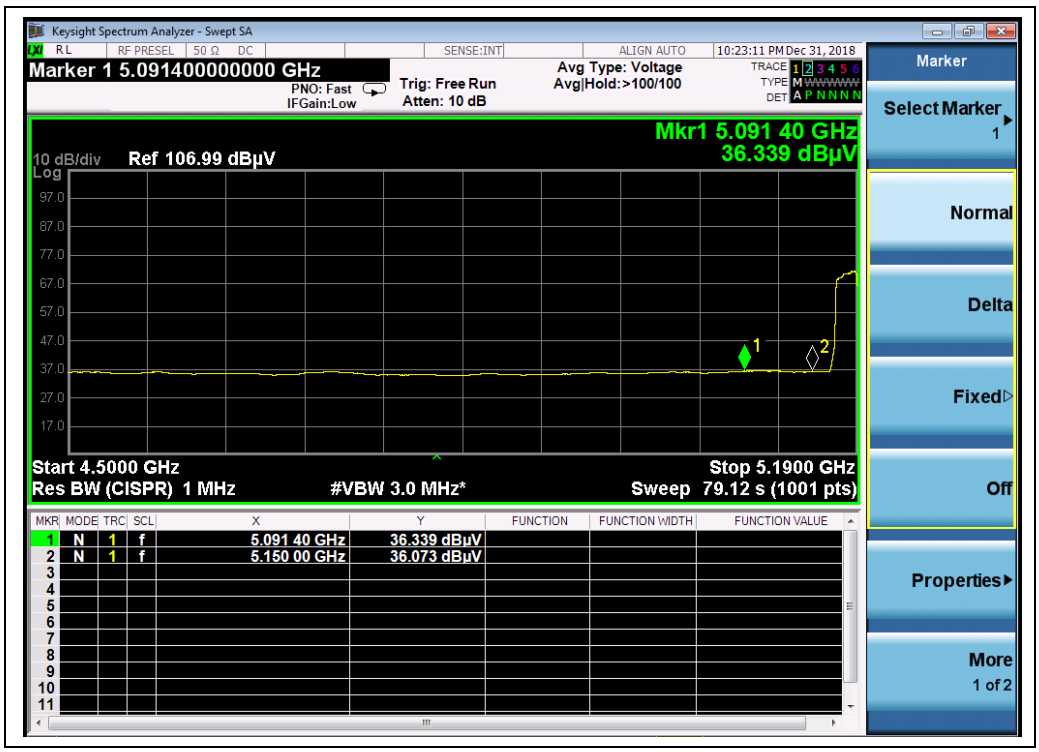
A. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
		PK/ AV						
38	5081.05	PK	48.68	-49.53	32.20	31.35	74	PASS
38	5091.40	AV	36.34	-49.53	32.20	19.01	54	PASS
62	5353.12	PK	48.20	-49.53	32.20	30.87	74	PASS
62	5350.00	AV	36.25	-49.53	32.20	18.92	54	PASS
102	5452.28	PK	45.95	-49.53	32.20	28.62	74	PASS
102	5452.79	AV	34.72	-49.53	32.20	17.39	54	PASS
142	5725.00	PK	46.71	-49.53	32.20	29.38	68.23	PASS
142	5749.38	AV	35.68	-49.53	32.20	18.35	54	PASS
151	5725.00	PK	46.48	-49.53	32.20	29.15	122.23	PASS
151	5725.00	AV	36.62	-49.53	32.20	19.29	54	PASS
159	5850.00	PK	45.62	-49.53	32.20	28.29	122.23	PASS
159	5850.00	AV	35.25	-49.53	32.20	17.92	54	PASS

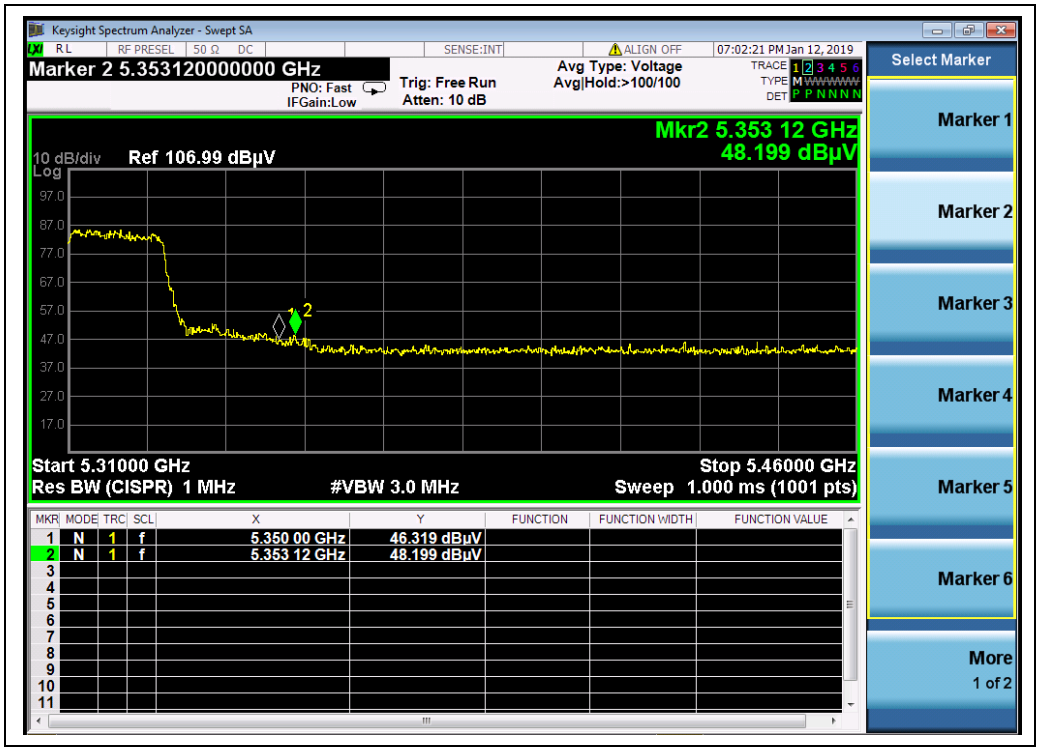
B. Test Plots:



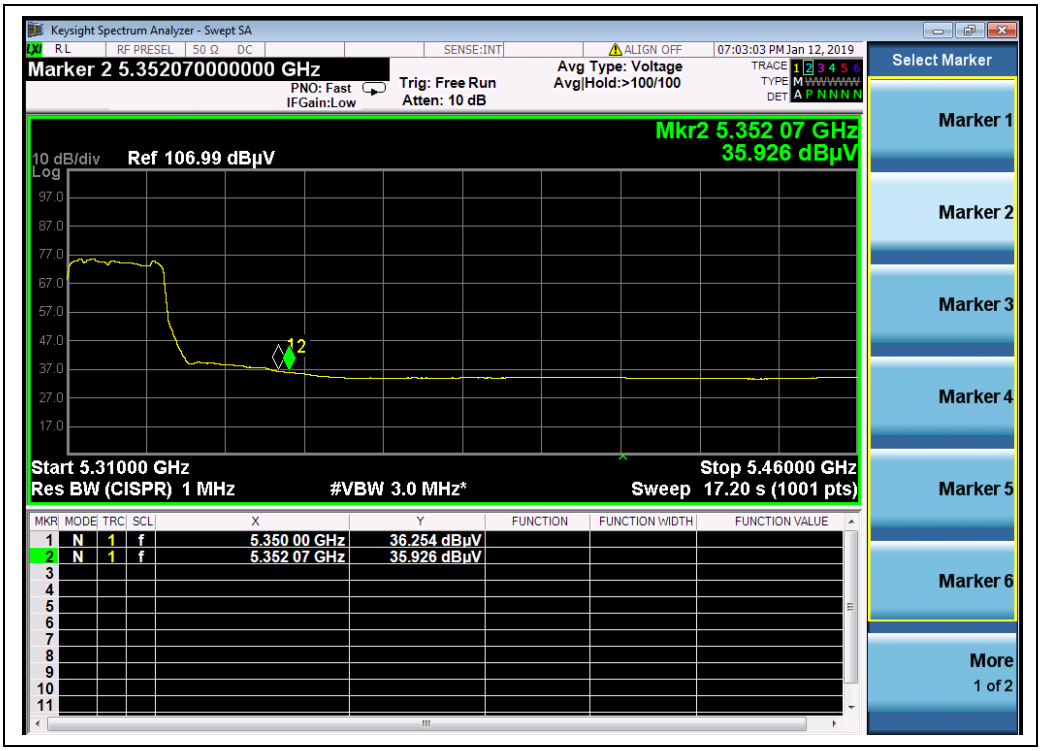
(Channel 38, PEAK, 802.11ac (VHT40))



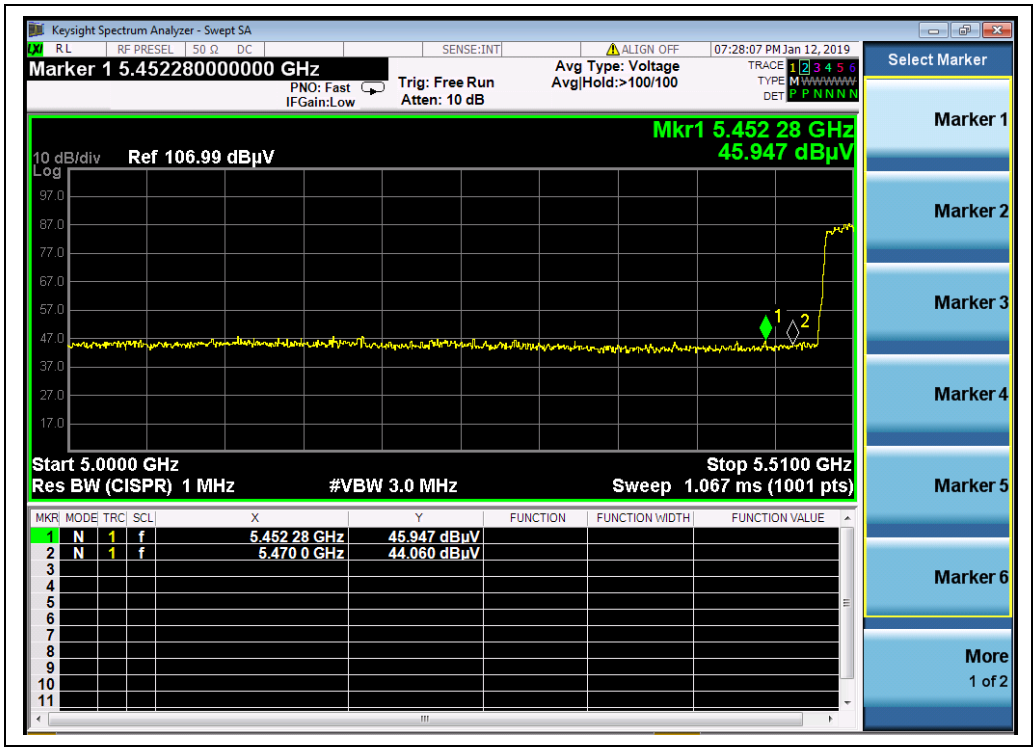
(Channel 38, AVG, 802.11ac (VHT40))



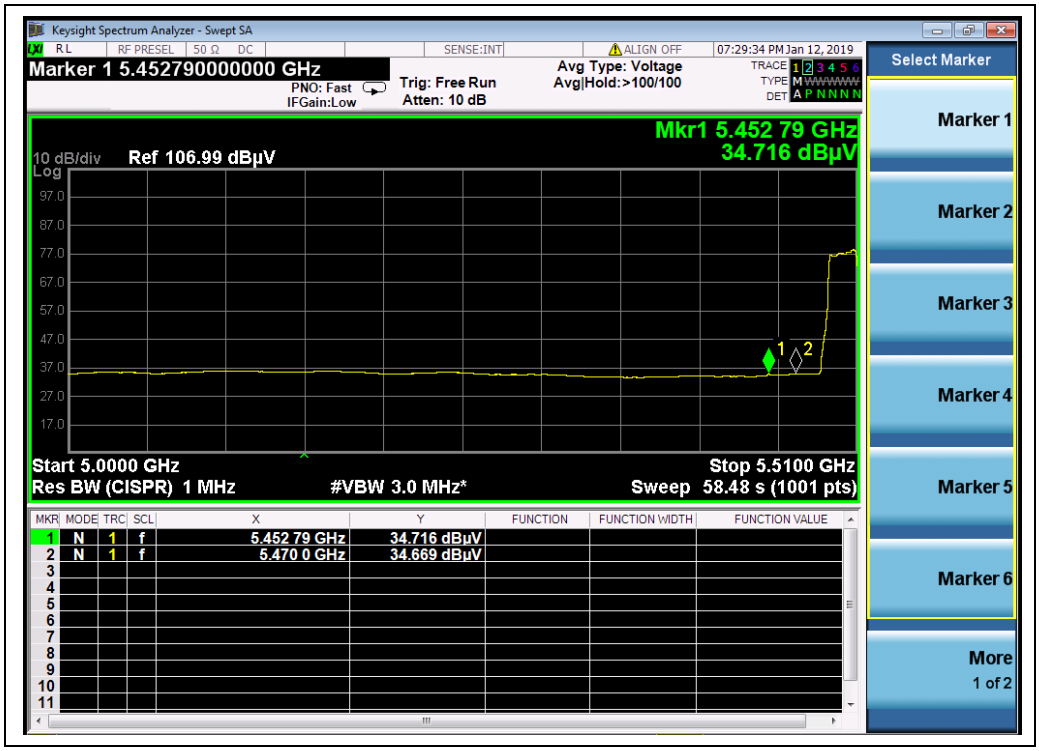
(Channel 62, PEAK, 802.11ac (VHT40))



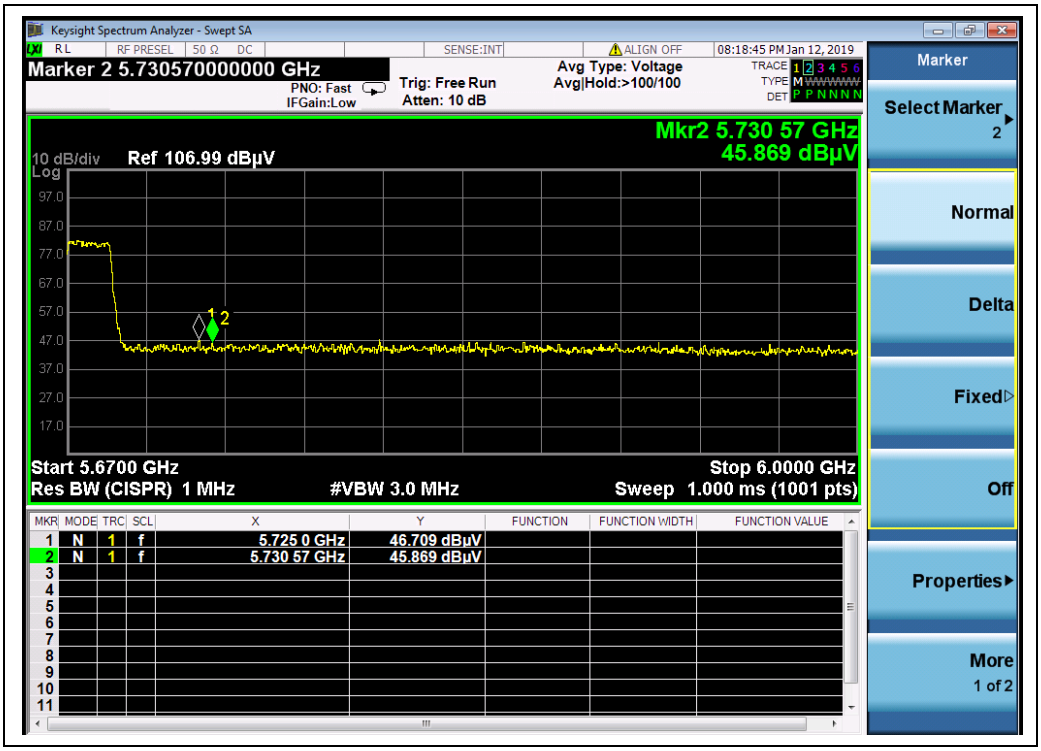
(Channel 62, AVG, 802.11ac (VHT40))



(Channel 102, PEAK, 802.11ac (VHT40))

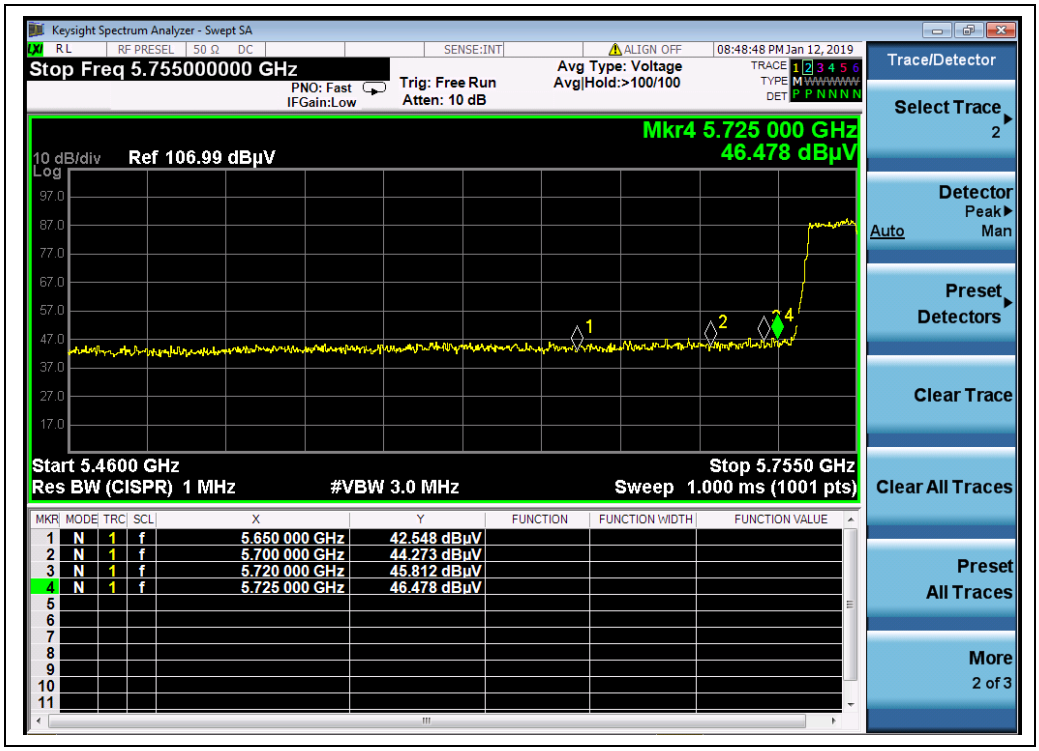


(Channel 102, AVG, 802.11ac (VHT40))

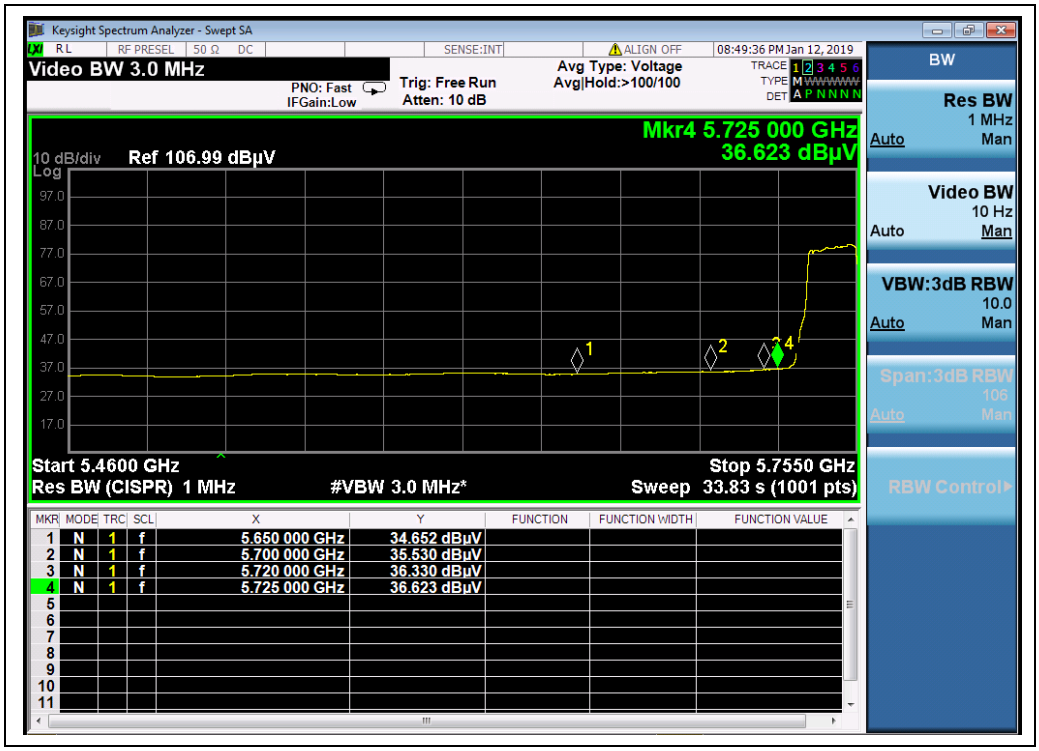


(Channel 142, PEAK, 802.11ac (VHT40))

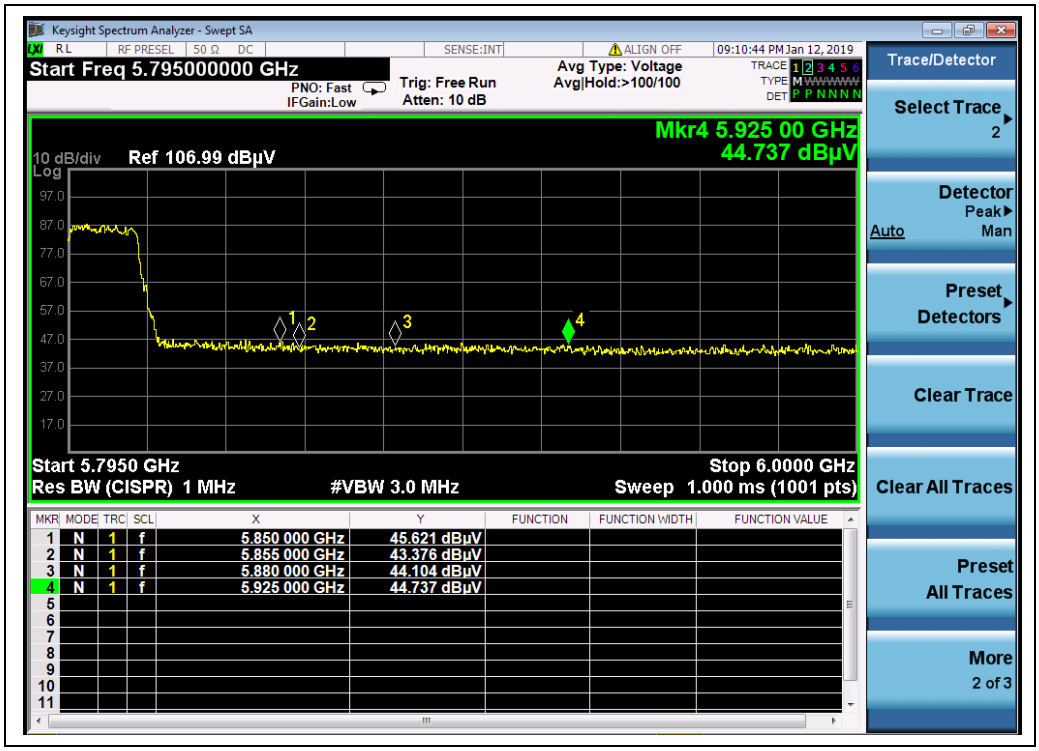
(Channel 142, AVG, 802.11ac (VHT40))



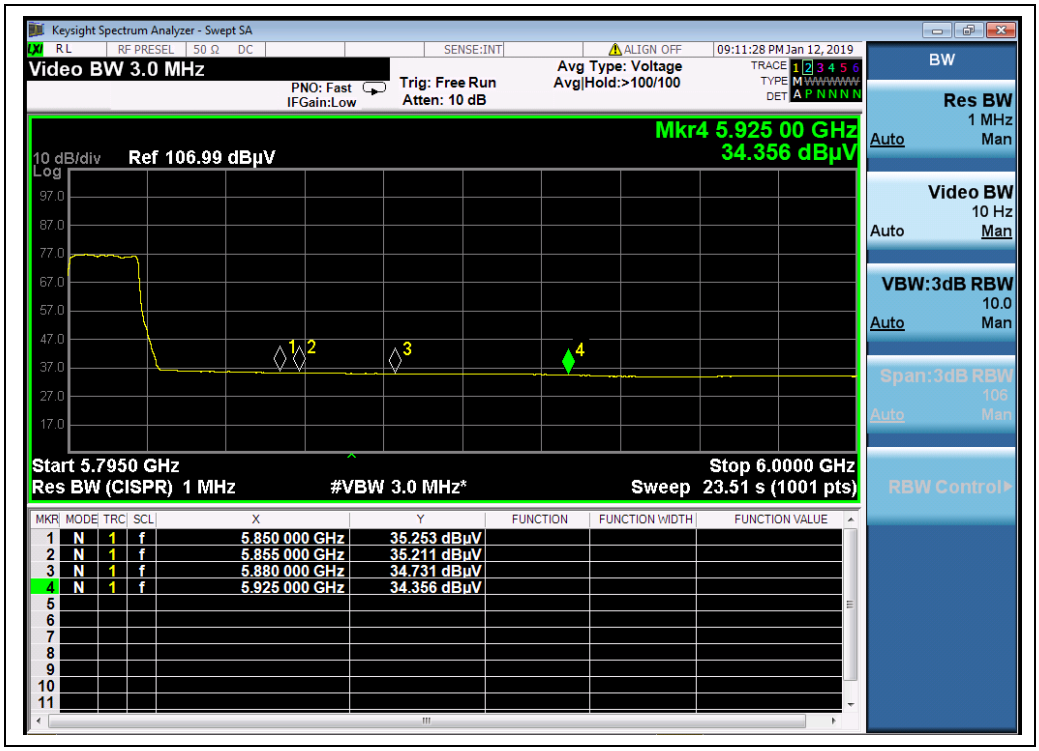
(Channel 151, PEAK, 802.11ac (VHT40))



(Channel 151, AVG, 802.11ac (VHT40))



(Channel 159, PEAK, 802.11ac (VHT40))



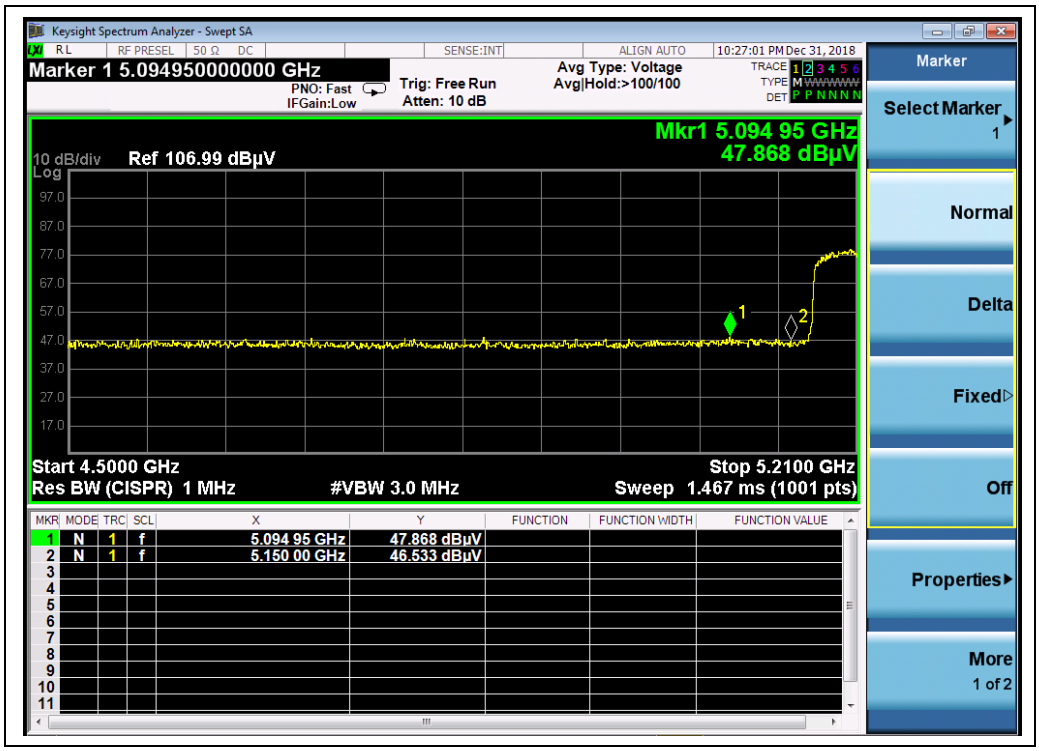
(Channel 159, AVG, 802.11ac (VHT40))

802.11ac (VHT80) Test mode

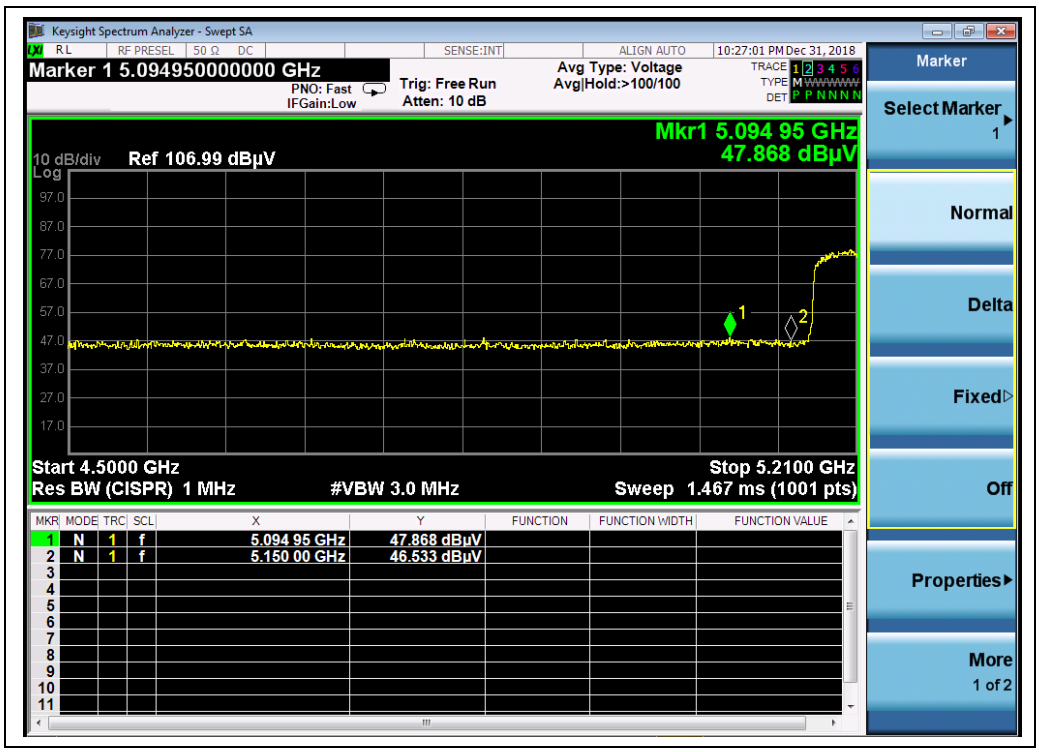
A. Test Verdict:

Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
		PK/ AV						
42	5094.95	PK	47.87	-49.53	32.20	30.54	74	PASS
42	5106.31	AV	36.35	-49.53	32.20	19.02	54	PASS
58	5365.60	PK	47.37	-49.53	32.20	30.04	74	PASS
58	5377.00	AV	34.27	-49.53	32.20	16.94	54	PASS
106	5457.37	PK	44.84	-49.53	32.20	27.51	68.23	PASS
106	5470.00	AV	34.77	-49.53	32.20	17.44	54	PASS
138	5745.15	PK	46.67	-49.53	32.20	29.34	68.23	PASS
138	5760.00	AV	35.81	-49.53	32.20	18.48	54	PASS
155	5725.00	PK	46.96	-49.53	32.20	29.63	122.23	PASS
155	5720.00	AV	35.95	-49.53	32.20	18.62	54	PASS
155	5725.00	PK	46.60	-49.53	32.20	29.27	96.83	PASS
155	5725.00	AV	36.25	-49.53	32.20	18.92	54	PASS

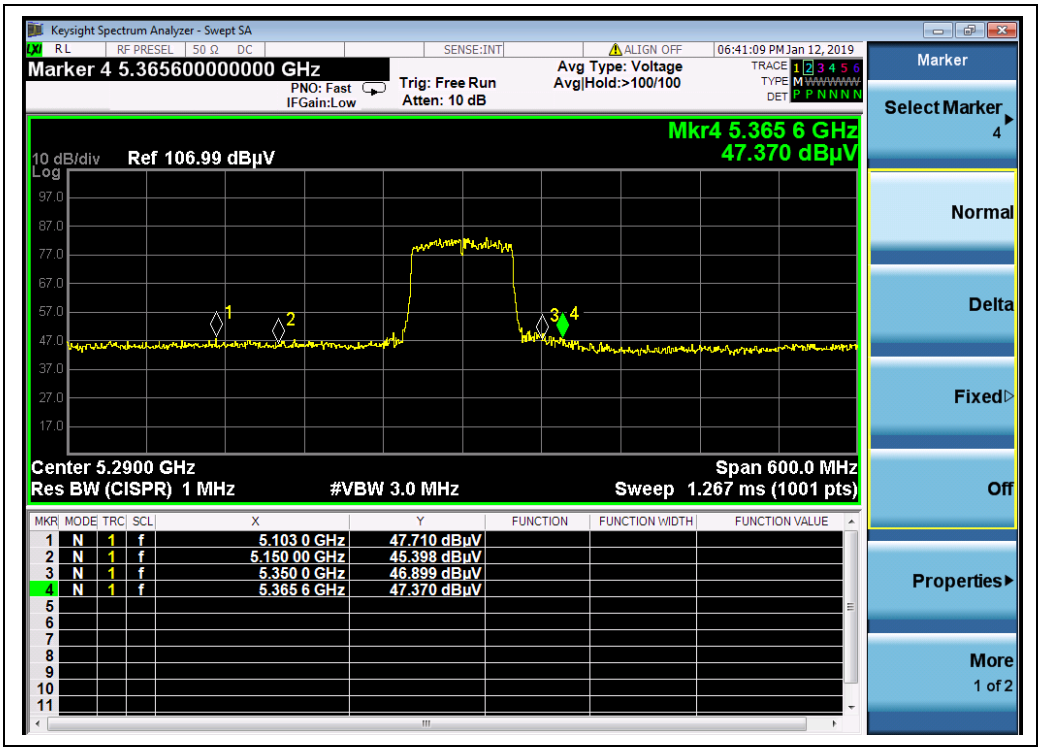
B. Test Plots:



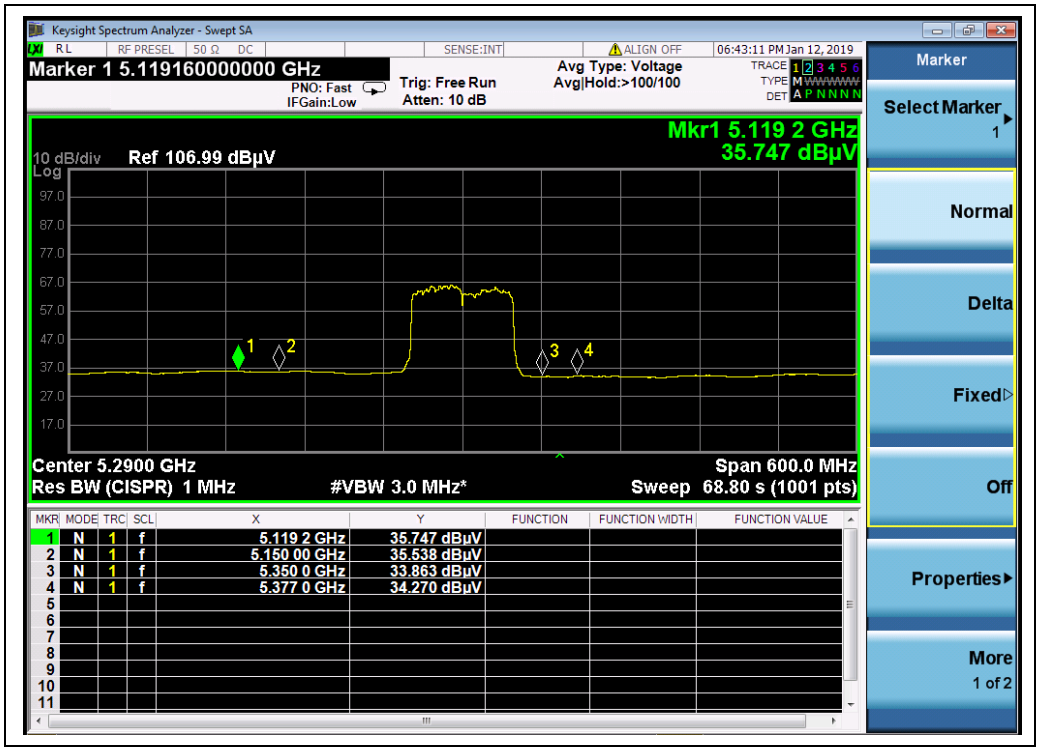
(Channel 42, PEAK, 802.11ac (VHT80))



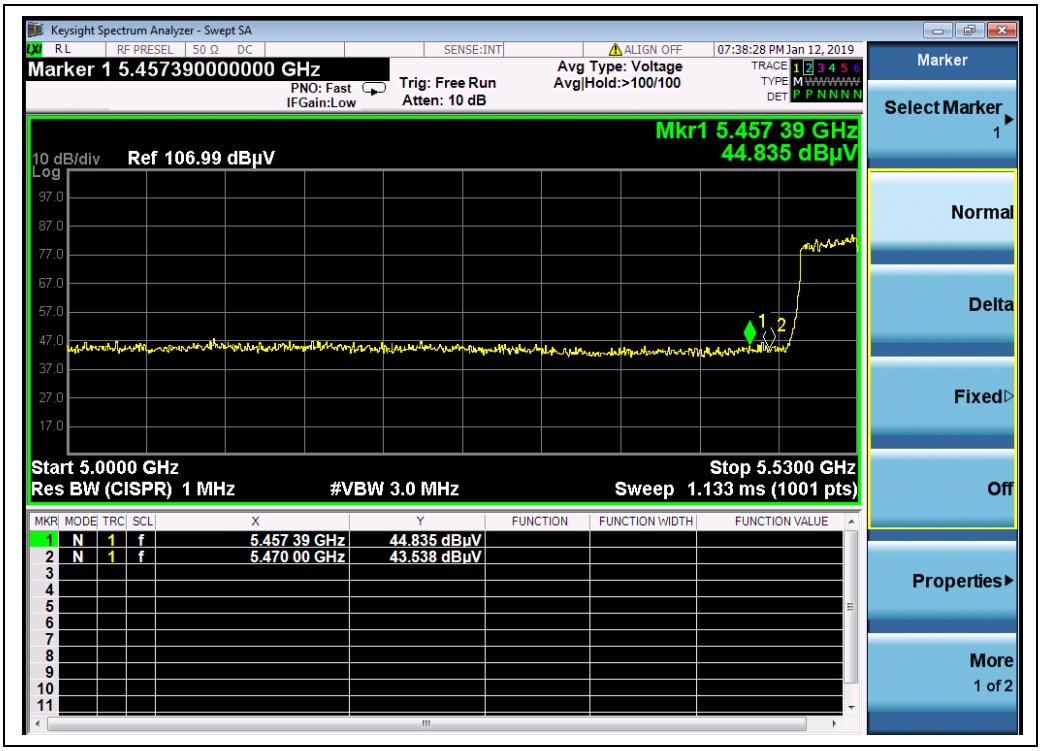
(Channel 42, AVG, 802.11ac (VHT80))



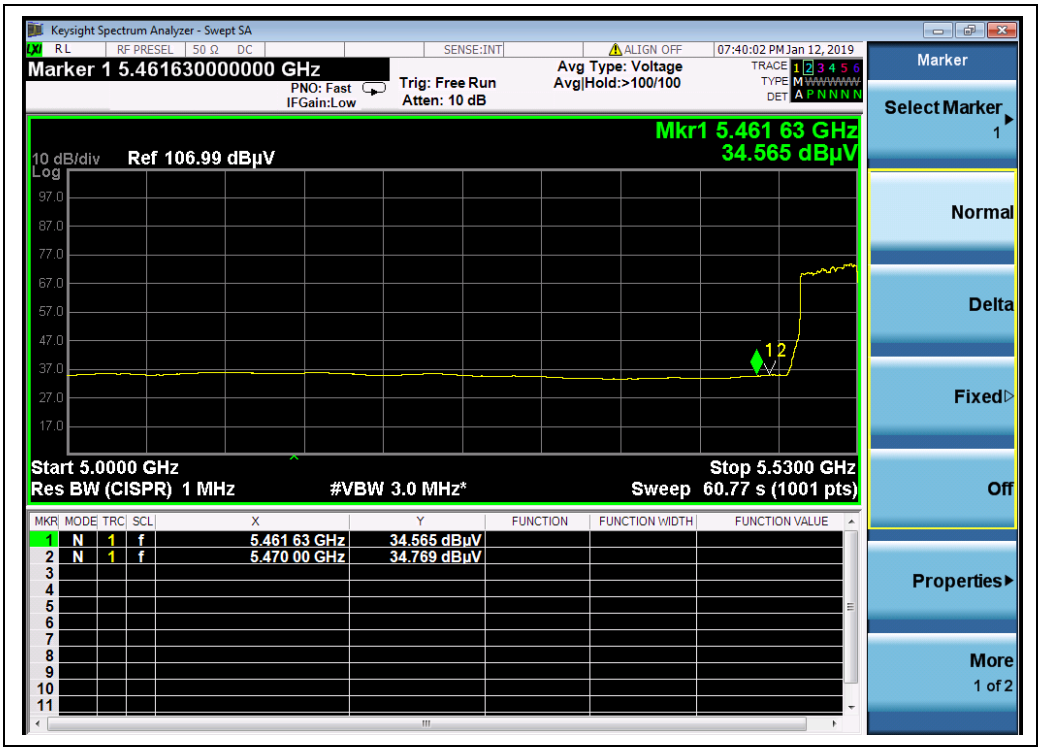
(Channel 58, PEAK, 802.11ac (VHT80))



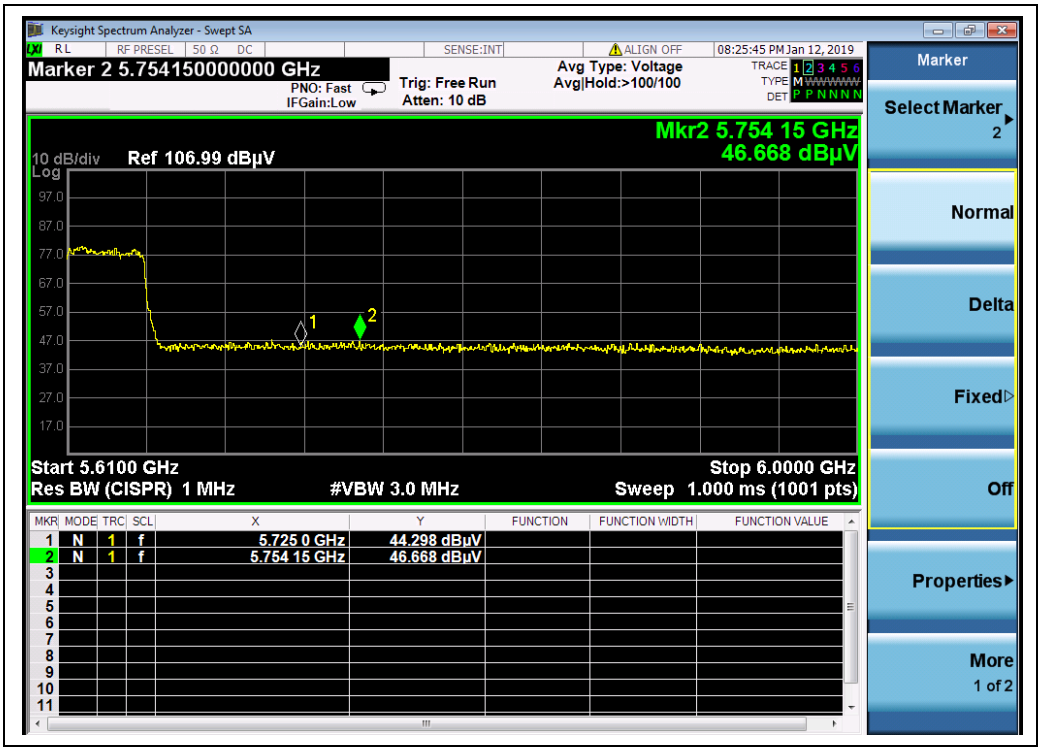
(Channel 58, AVG, 802.11ac (VHT80))



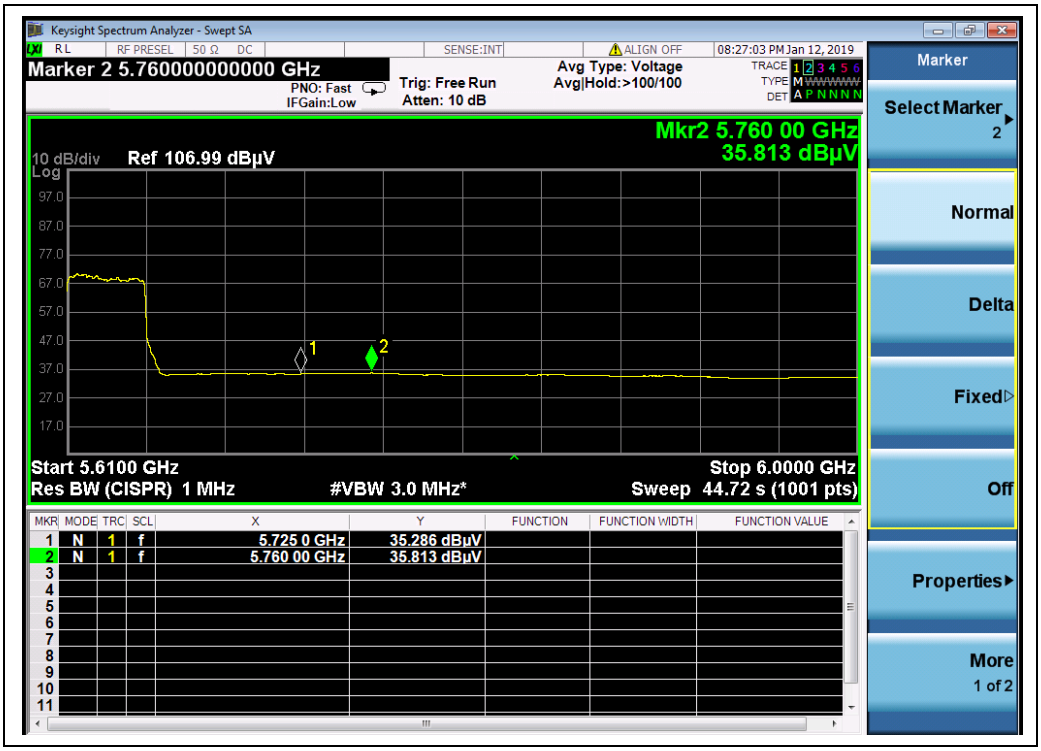
(Channel 106, PEAK, 802.11ac (VHT80))



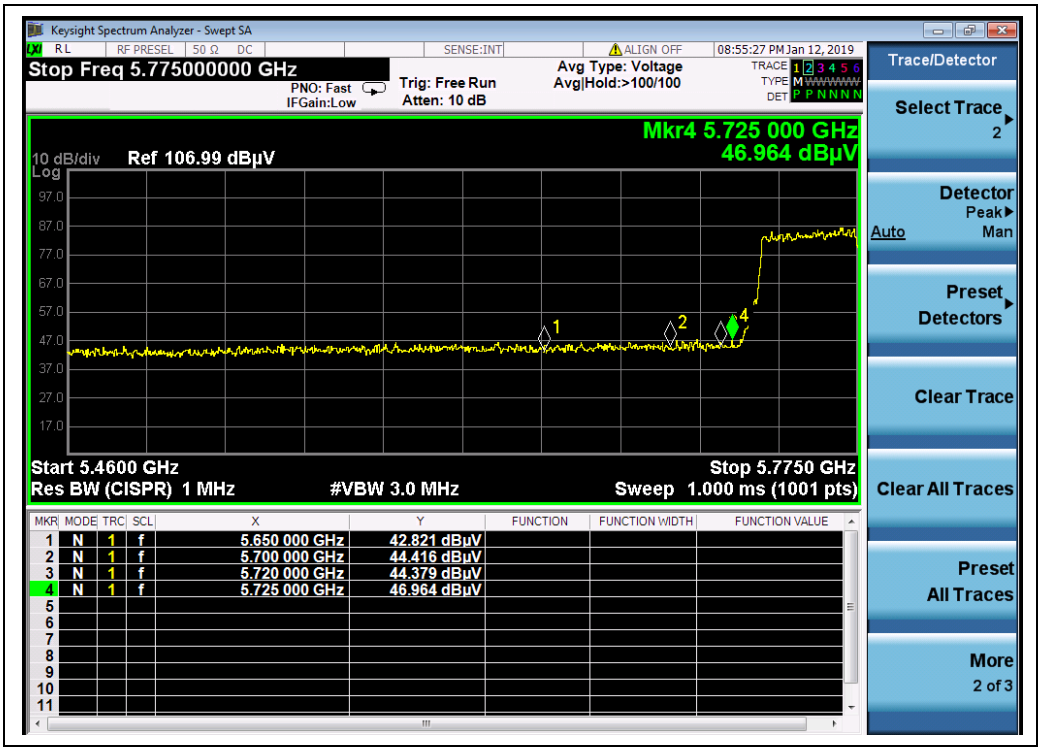
(Channel 106, AVG, 802.11ac (VHT80))



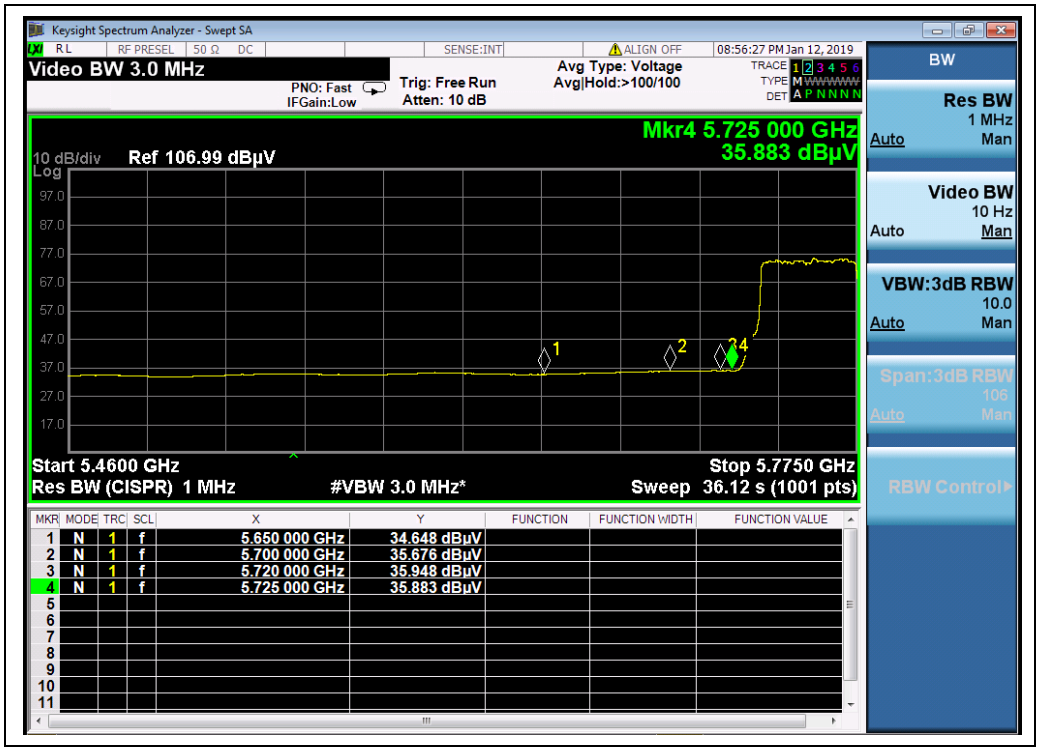
(Channel 138, PEAK, 802.11ac (VHT80))



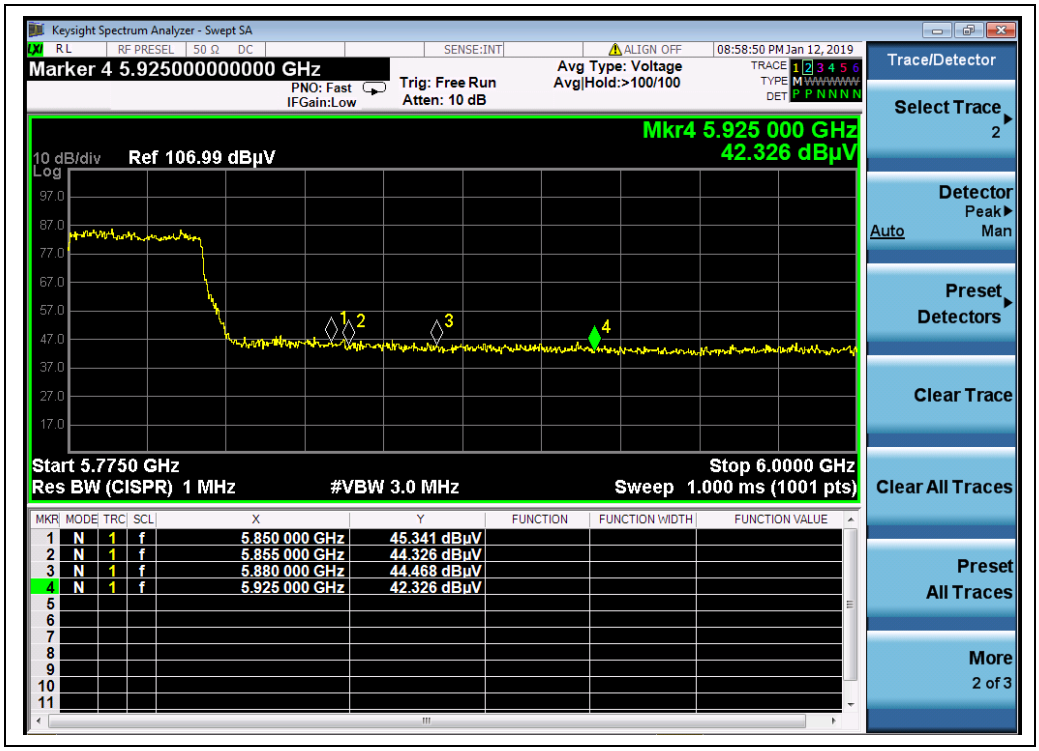
(Channel 138, AVG, 802.11ac (VHT80))



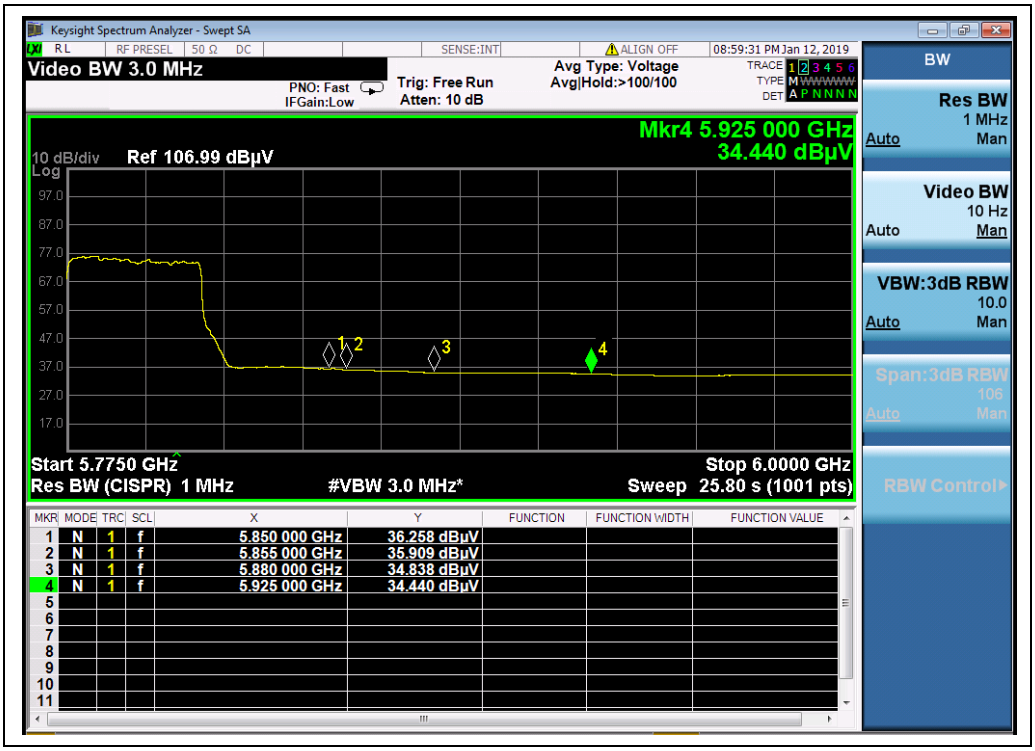
(Channel 155, PEAK, 802.11ac (VHT80))



(Channel 155, AVG, 802.11ac (VHT80))



(Channel 155, PEAK, 802.11ac (VHT80))



(Channel 155, AVG, 802.11ac (VHT80))

2.9. Radiated Emission

2.9.1. Requirement

The peak emissions outside of the frequency bands of operation shall be attenuated in accordance with the following limits:
(1) For transmitters operating in the 5.15–5.25 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of -27dBm/MHz.
(2) For transmitters operating in the 5.25–5.35 GHz band: all emissions outside of the 5.15–5.35 GHz band shall not exceed an EIRP of -27dBm/MHz.
(3) For transmitters operating in the 5.47–5.725 GHz band: all emissions outside of the 5.47–5.725 GHz band shall not exceed an EIRP of -27dBm/MHz.
(4) For transmitters operating in the 5.725-5.85 GHz band: 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.The following formula is used to convert the equipment isotropic radiated power(eirp) to field strength (dBμV/m);

$$E = 1000000 \times \sqrt{30P} / 3 \ \mu V/m$$

where P is the EIRP in Watts

Therefore: -27 dBm/MHz = 68.23 dBuV/m

Unwanted emissions below 1 GHz must comply with the general field strength limits set forth in § 15.209 (a), except as provided elsewhere in this subpart, the emissions from an intentional radiator shall not exceed the field strength levels specified in the following table:

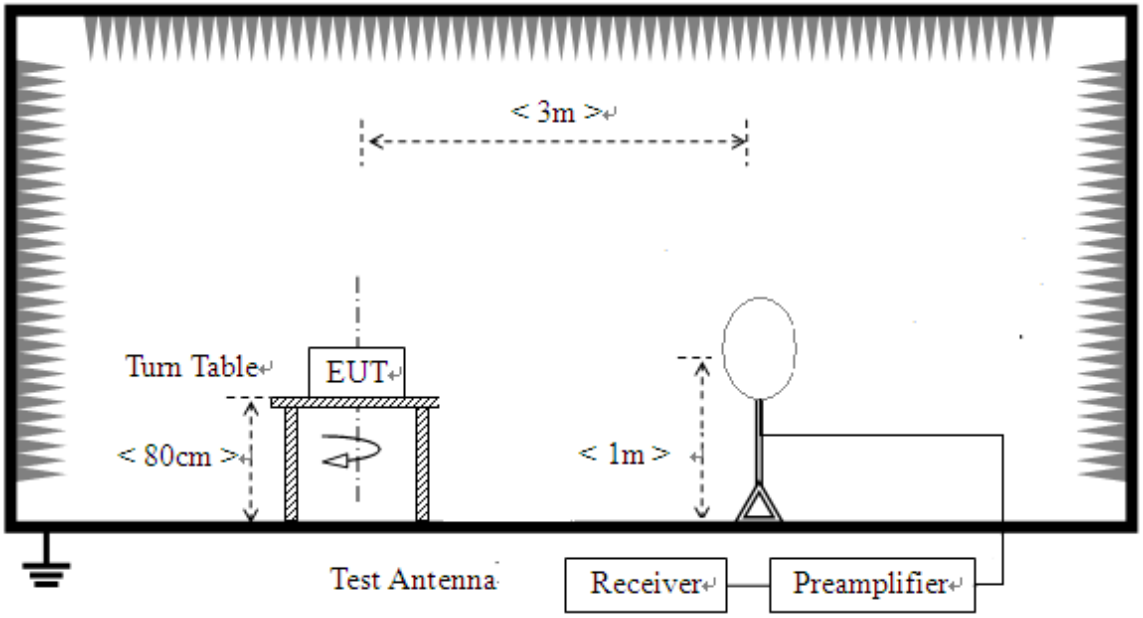
Frequency (MHz)	Field Strength (μV/m)	Measurement Distance (m)
0.009 - 0.490	2400/F(kHz)	300
0.490 - 1.705	24000/F(kHz)	30
1.705 - 30.0	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

For Above 1000MHz, the emission limit in this paragraph is based on measurement instrumentation employing an average detector, measurement using instrumentation with a peak detector function, corresponding to 20dB above the maximum permitted average limit.
In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), also should comply with the radiated emission limits specified in Section 15.209(a)(above table)

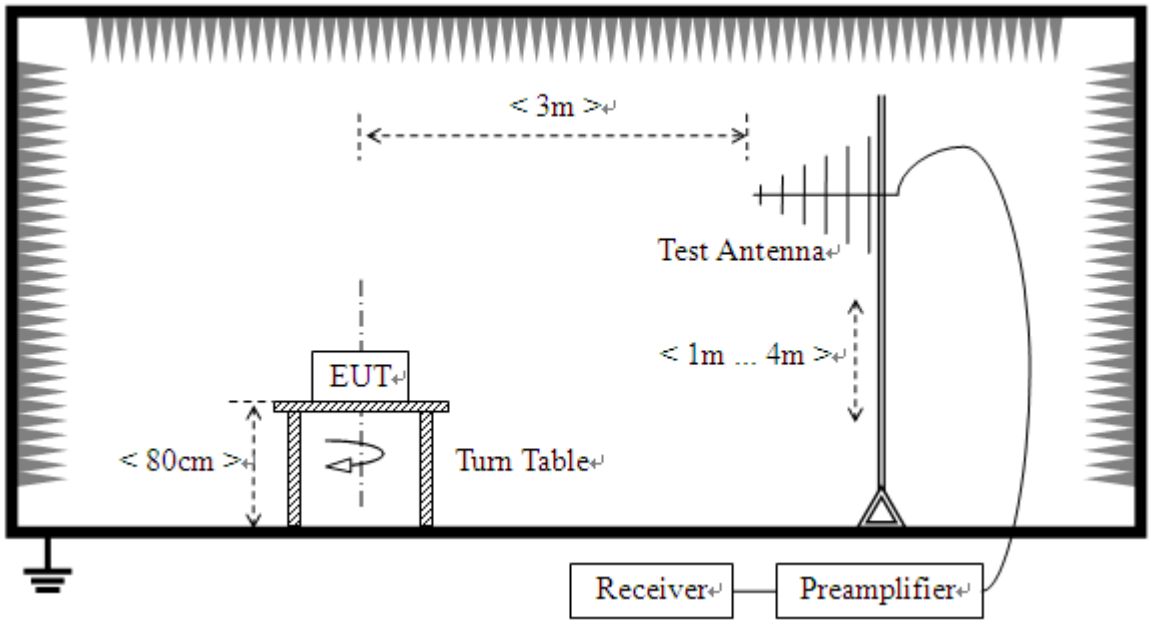
2.9.2. Test Description

A. Test Setup:

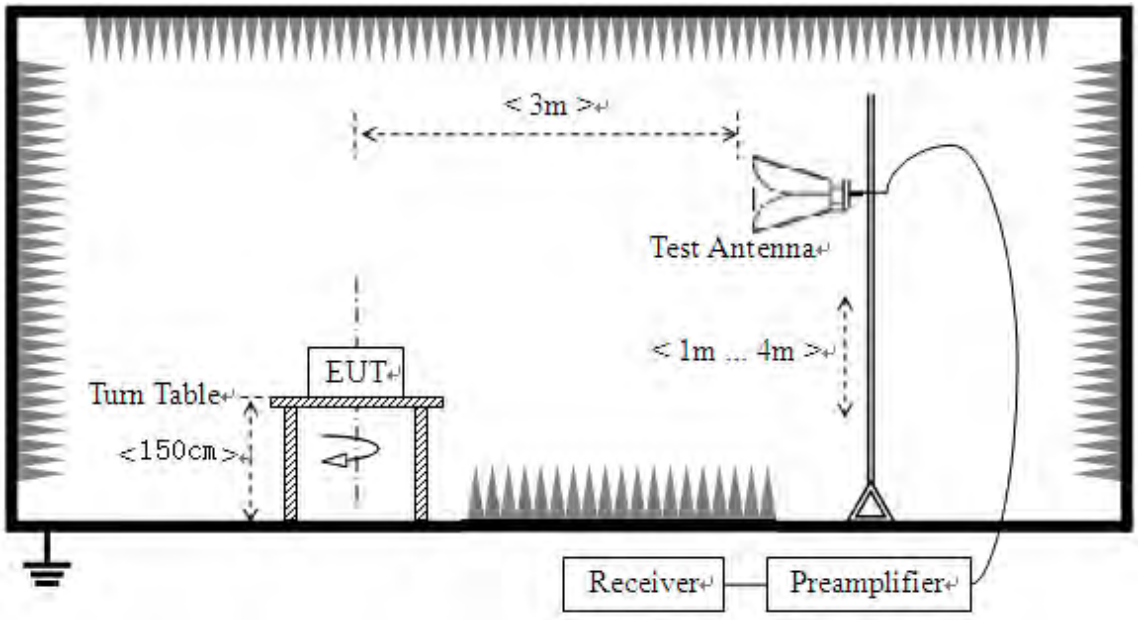
1) For radiated emissions from 9kHz to 30MHz



2) For radiated emissions from 30MHz to1GHz



3) For radiated emissions above 1GHz



The RF absorbing material used on the reference ground plane and on the turntable have a maximum height (thickness) of 30 cm (12 in) and have a minimum-rated attenuation of 20 dB at all frequencies from 1 GHz to 18 GHz.

The test site semi-anechoic chamber has met the requirement of NSA tolerance 4dB according to the standards: ANSI C63.10 (2013). For radiated emissions below or equal to 1GHz, The EUT was set-up on insulator 80cm above the Ground Plane, For radiated emissions above 1GHz, The EUT

was set-up on insulator 150cm above the Ground Plane. The set-up and test methods were according to ANSI C63.10 (2013).

For the radiated emission test above 1GHz:

Place the measurement antenna away from each area of the EUT determined to be a source of emissions at the specified measurement distance, while keeping the measurement antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The measurement antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final measurement antenna elevation shall be that which maximizes the emissions. The measurement antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane.

The EUT is located in a 3m Semi-Anechoic Chamber; the antenna factors, cable loss and so on of the site as factors are calculated to correct the reading

For the Test Antenna:

(a) In the frequency range of 9kHz to 30MHz, magnetic field is measured with Loop Test Antenna. The Test Antenna is positioned with its plane vertical at 1m distance from the EUT. The center of the Loop Test Antenna is 1m above the ground. During the measurement the Loop Test Antenna rotates about its vertical axis for maximum response at each azimuth about the EUT.
(b) In the frequency range above 30MHz, Bi-Log Test Antenna (30MHz to 1GHz) and Horn Test Antenna (above 1GHz) are used. Place the test antenna at 3m away from area of the EUT, while keeping the test antenna aimed at the source of emissions at each frequency of significant emissions, with polarization oriented for maximum response. The test antenna may have to be higher or lower than the EUT, depending on the radiation pattern of the emission and staying aimed at the emission source for receiving the maximum signal. The final test antenna elevation shall be that which maximizes the emissions. The test antenna elevation for maximum emissions shall be restricted to a range of heights of from 1 m to 4 m above the ground or reference ground plane. The emission levels at both horizontal and vertical polarizations should be tested.

2.9.3. Test Result

According to ANSI C63.4 selection 4.2.2, because of peak detection will yield amplitudes equal to or greater than amplitudes measured with the quasi-peak (or average) detector, the measurement data from a spectrum analyzer peak detector will represent the worst-case results, if the peak measured value complies with the quasi-peak limit, it is unnecessary to perform an quasi-peak measurement.

The measurement results are obtained as below:

$E\ [dB\mu V/m] = U_R + A_T + A_{Factor}\ [dB]$; $A_T = L_{Cable\ loss}\ [dB] - G_{preamp}\ [dB]$

A_T: Total correction Factor except Antenna

U_R: Receiver Reading

G_{preamp}: Preamplifier Gain

A_{Factor}: Antenna Factor at 3m

During the test, the total correction Factor A_T and A_{Factor} were built in test software.

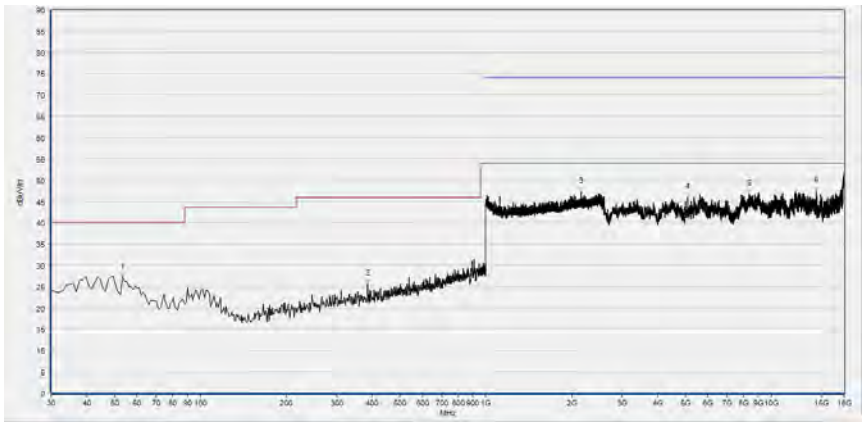
Note1: All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Note2: For the frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not recorded.

Note3: For the frequency, which started from 18GHz to 40GHz, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

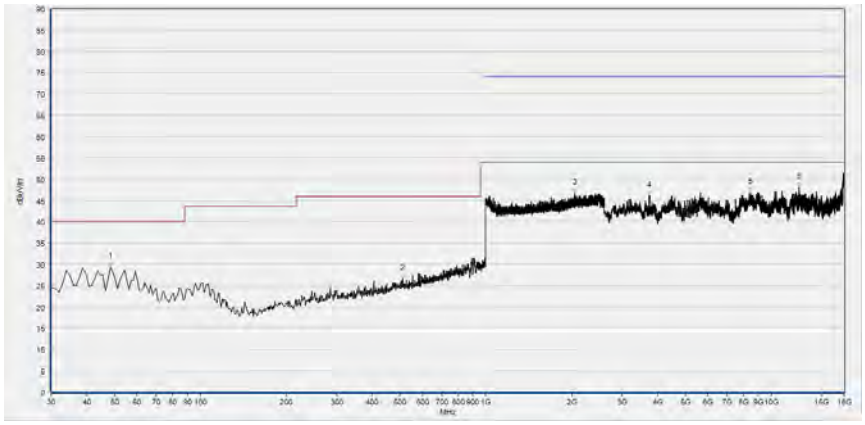
802.11a Test mode

Plots for Channel = 36



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
53.303	27.07	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
385.375	25.70	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2153.451	47.30	N/A	N/A	68.23	N/A	54.00	Horizontal	PASS
5092.218	45.99	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8373.075	46.71	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
14340.228	47.39	N/A	N/A	68.23	N/A	54.00	Horizontal	PASS

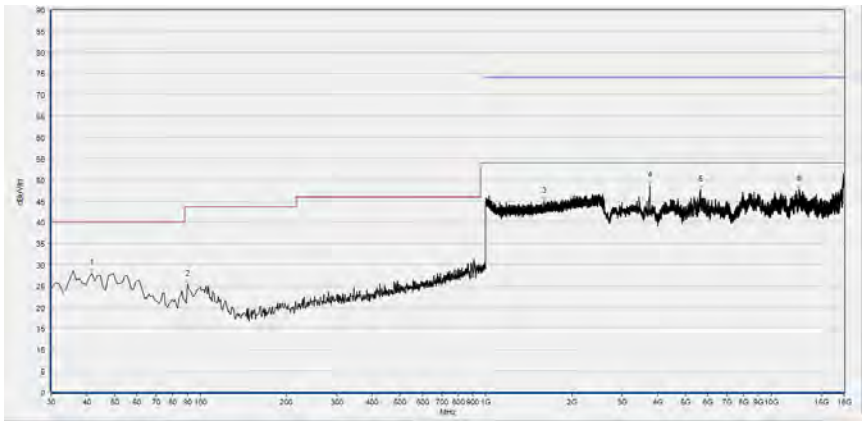
(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
48.448	29.30	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
512.573	26.58	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2047.816	46.77	N/A	N/A	68.23	N/A	54.00	Vertical	PASS
3739.828	46.08	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8462.412	46.99	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12513.423	48.12	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

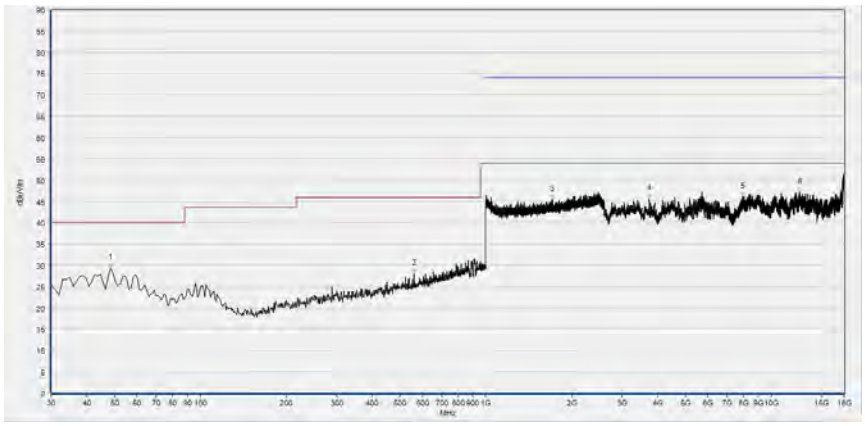
(Antenna Vertical, 30MHz to 18GHz)

Plots for Channel = 44



Fre. (MHz)	Pk (dBµV/m)	QP (dBµV/m)	AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-QP (dBµV/m)	Limit-AV (dBµV/m)	Antenna	Verdict
41.652	28.03	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
90.200	25.32	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
1598.600	44.96	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
3749.070	48.57	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5640.568	47.56	N/A	N/A	68.23	N/A	54.00	Horizontal	PASS
12516.503	47.72	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

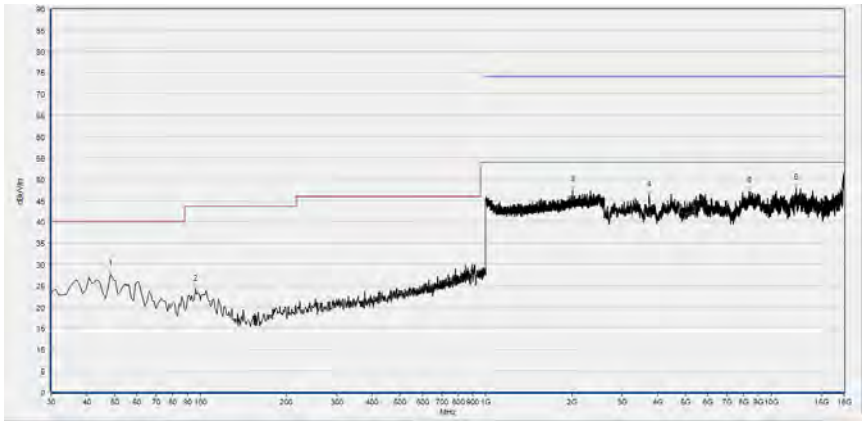
(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	Pk (dBµV/m)	QP (dBµV/m)	AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-QP (dBµV/m)	Limit-AV (dBµV/m)	Antenna	Verdict
48.448	29.33	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
561.121	27.97	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1704.768	45.49	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
3736.747	45.52	N/A	N/A	68.23	N/A	54.00	Vertical	PASS
7929.466	46.08	N/A	N/A	68.23	N/A	54.00	Vertical	PASS
12621.244	47.06	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

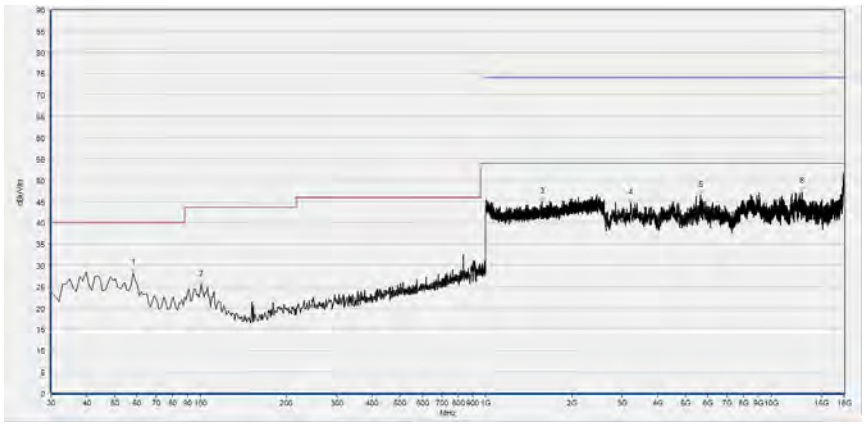
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel = 48



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
48.448	27.64	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
96.026	24.07	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2019.006	47.37	N/A	N/A	68.23	N/A	54.00	Horizontal	PASS
3736.747	46.22	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8376.155	47.02	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12257.732	47.86	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

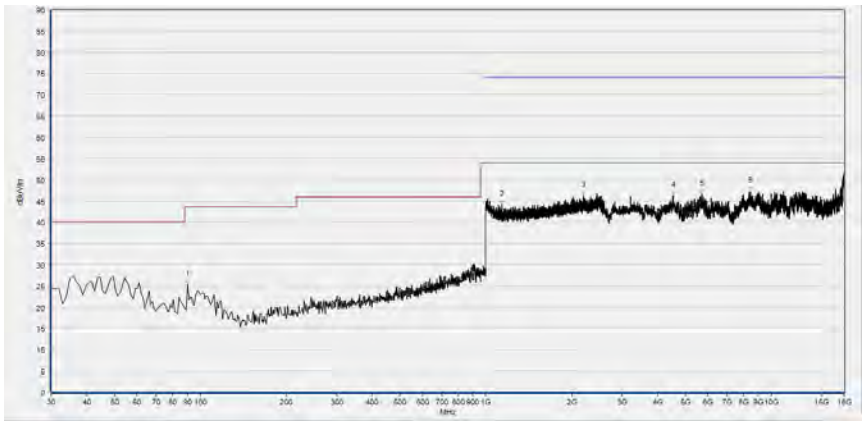
(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
58.158	28.17	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
100.881	25.54	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
1573.525	45.00	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
3222.284	44.61	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5637.487	46.40	N/A	N/A	68.23	N/A	54.00	Vertical	PASS
12784.517	47.34	N/A	N/A	68.23	N/A	54.00	Vertical	PASS

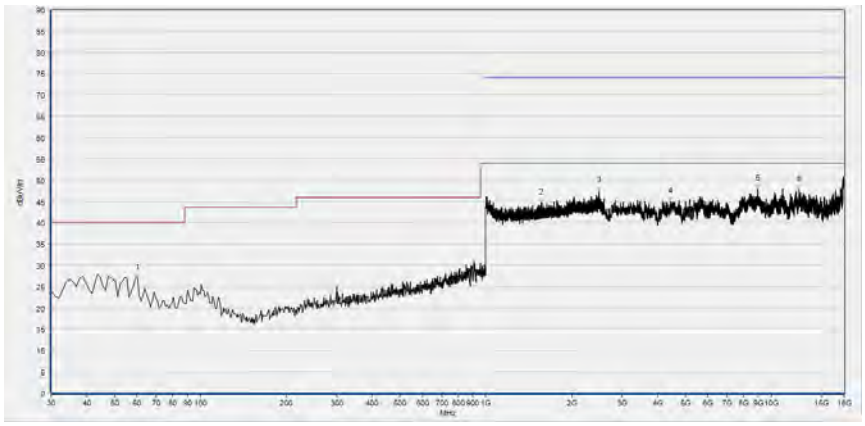
(Antenna Vertical, 30MHz to 18GHz)

Plots for Channel = 52



Fre. (MHz)	Pk (dBµV/m)	QP (dBµV/m)	AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-QP (dBµV/m)	Limit-AV (dBµV/m)	Antenna	Verdict
90.200	25.24	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
1138.713	44.13	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
2193.464	46.23	N/A	N/A	68.23	N/A	54.00	Horizontal	PASS
4528.466	46.20	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5717.584	46.53	N/A	N/A	68.23	N/A	54.00	Horizontal	PASS
8443.929	47.19	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

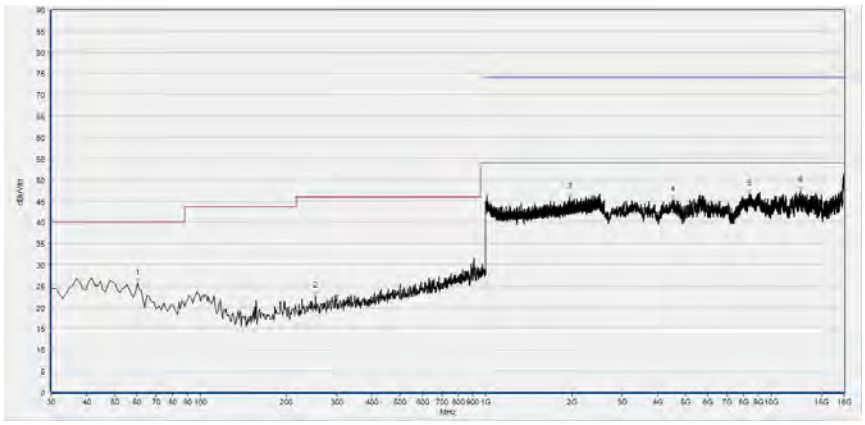
(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	Pk (dBµV/m)	QP (dBµV/m)	AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-QP (dBµV/m)	Limit-AV (dBµV/m)	Antenna	Verdict
60.100	27.00	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
1559.120	44.56	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
2494.365	47.35	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4432.967	44.97	N/A	N/A	68.23	N/A	54.00	Vertical	PASS
8986.117	47.94	N/A	N/A	68.23	N/A	54.00	Vertical	PASS
12513.423	47.72	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

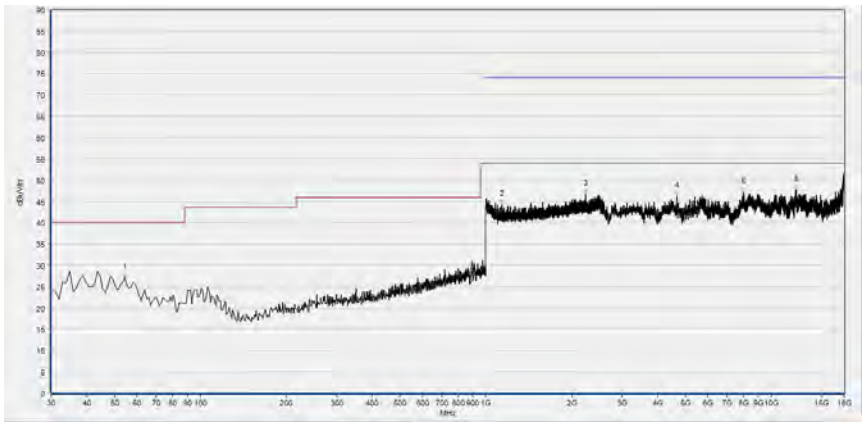
(Antenna Vertical, 30MHz to 18GHz)

Plots for Channel = 60



Fre. (MHz)	Pk (dBµV/m)	QP (dBµV/m)	AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-QP (dBµV/m)	Limit-AV (dBµV/m)	Antenna	Verdict
60.100	25.60	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
253.323	22.59	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
1963.521	45.86	N/A	N/A	68.23	N/A	54.00	Horizontal	PASS
4509.982	45.21	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8354.591	46.52	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12630.486	47.35	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

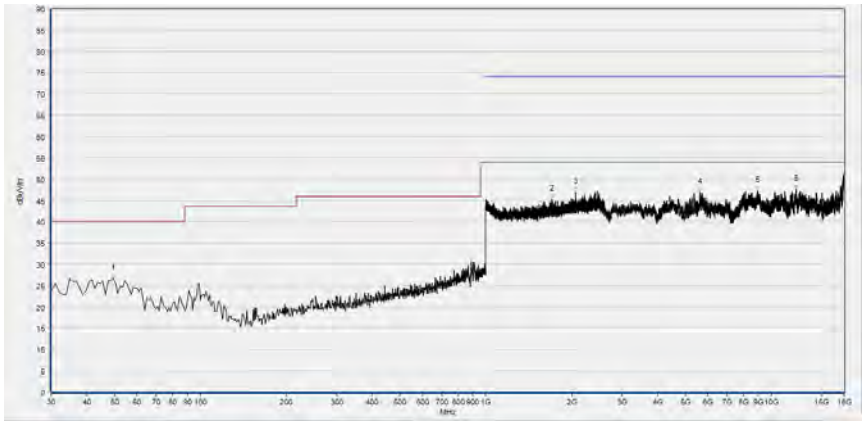
(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	Pk (dBµV/m)	QP (dBµV/m)	AV (dBµV/m)	Limit-PK (dBµV/m)	Limit-QP (dBµV/m)	Limit-AV (dBµV/m)	Antenna	Verdict
54.274	27.09	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
1139.246	44.22	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
2233.478	46.76	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4667.093	46.19	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8000.320	47.15	N/A	N/A	68.23	N/A	54.00	Vertical	PASS
12245.409	47.75	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

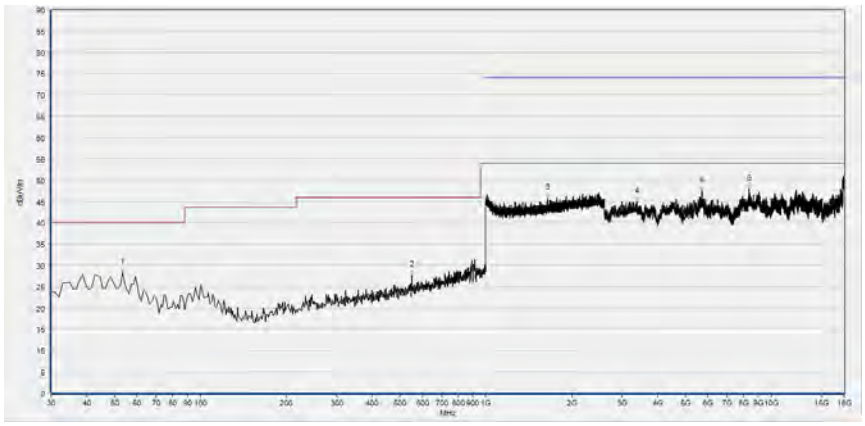
(Antenna Vertical, 30MHz to 18GHz)

Plot for Channel = 64



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
49.419	26.72	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
1703.168	45.17	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
2063.288	46.89	N/A	N/A	68.23	N/A	54.00	Horizontal	PASS
5615.923	46.84	N/A	N/A	68.23	N/A	54.00	Horizontal	PASS
8958.392	47.20	N/A	N/A	68.23	N/A	54.00	Horizontal	PASS
12245.409	47.63	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

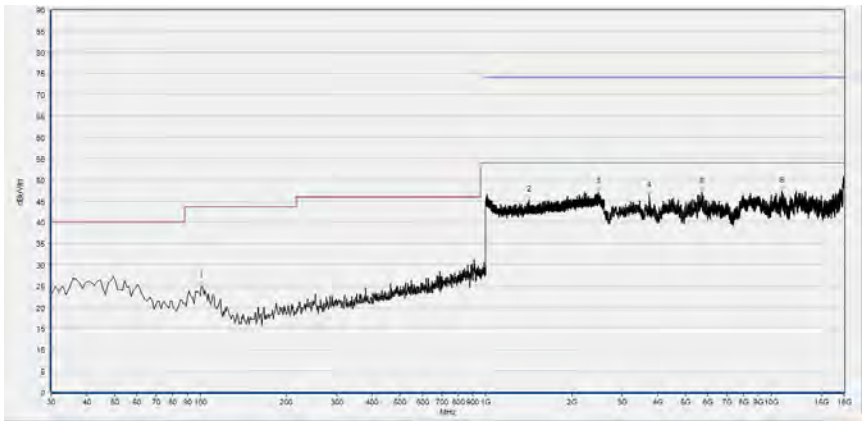
(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
53.303	28.38	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
549.469	27.57	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
1650.350	45.70	N/A	N/A	68.23	N/A	54.00	Vertical	PASS
3388.638	44.85	N/A	N/A	68.23	N/A	54.00	Vertical	PASS
5714.503	47.41	N/A	N/A	68.23	N/A	54.00	Vertical	PASS
8382.316	47.91	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

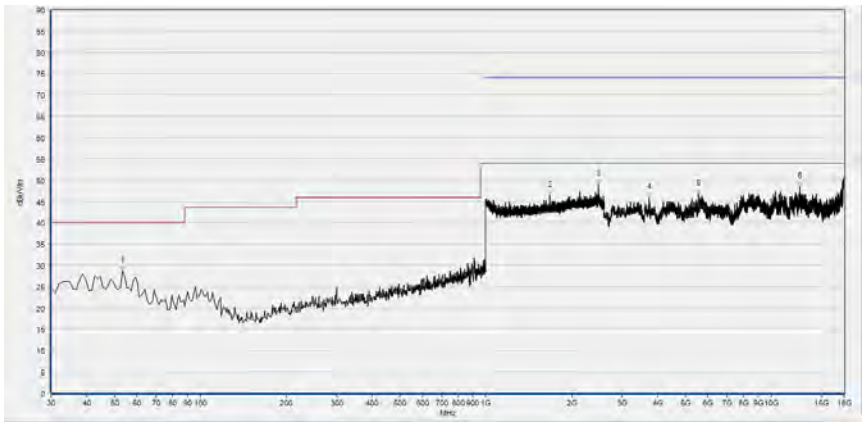
(Antenna Vertical, 30MHz to 18GHz)

Plots for Channel = 100



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
100.881	25.01	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
1417.206	45.23	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
2480.493	47.17	N/A	N/A	68.23	N/A	54.00	Horizontal	PASS
3742.909	46.24	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5708.342	47.12	N/A	N/A	68.23	N/A	54.00	Horizontal	PASS
10880.696	47.32	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)



Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
53.303	28.59	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
1678.093	46.36	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
2479.960	48.89	N/A	N/A	68.23	N/A	54.00	Vertical	PASS
3739.828	45.94	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5551.230	46.76	N/A	N/A	68.23	N/A	54.00	Vertical	PASS
12608.922	48.46	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)