

PSD NVNT ax20 106@53 5785MHz Ant1 MIMO



PSD NVNT ax20 106@53 5785MHz Ant2 MIMO



PSD NVNT ax20 106@53 5825MHz Ant1 MIMO



PSD NVNT ax20 106@53 5825MHz Ant2 MIMO



PSD NVNT ax40 26@0 5190MHz Ant1 SISO



PSD NVNT ax40 26@0 5190MHz Ant2 SISO



PSD NVNT ax40 26@0 5190MHz Ant1 MIMO



PSD NVNT ax40 26@0 5190MHz Ant2 MIMO



PSD NVNT ax40 52@37 5190MHz Ant1 SISO



PSD NVNT ax40 52@37 5190MHz Ant2 SISO

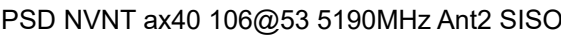


PSD NVNT ax40 52@37 5190MHz Ant1 MIMO



PSD NVNT ax40 52@37 5190MHz Ant2 MIMO





Shenzhen Morlab Communications Technology Co., Ltd.
FL.1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

Tel: 86-755-36698555 Fax: 86-755-36698525
Http://www.morlab.cn E-mail: service@morlab.cn

PSD NVNT ax40 106@53 5190MHz Ant1 MIMO



PSD NVNT ax40 106@53 5190MHz Ant2 MIMO





PSD NVNT ax40 242@61 5190MHz Ant1 SISO



PSD NVNT ax40 242@61 5190MHz Ant2 SISO



PSD NVNT ax40 242@61 5190MHz Ant1 MIMO



PSD NVNT ax40 242@61 5190MHz Ant2 MIMO



PSD NVNT ax80 26@0 5210MHz Ant1 SISO



PSD NVNT ax80 26@0 5210MHz Ant2 SISO



PSD NVNT ax80 26@0 5210MHz Ant1 MIMO



PSD NVNT ax80 26@0 5210MHz Ant2 MIMO





PSD NVNT ax80 52@37 5210MHz Ant1 SISO



PSD NVNT ax80 52@37 5210MHz Ant2 SISO



PSD NVNT ax80 52@37 5210MHz Ant1 MIMO



PSD NVNT ax80 52@37 5210MHz Ant2 MIMO



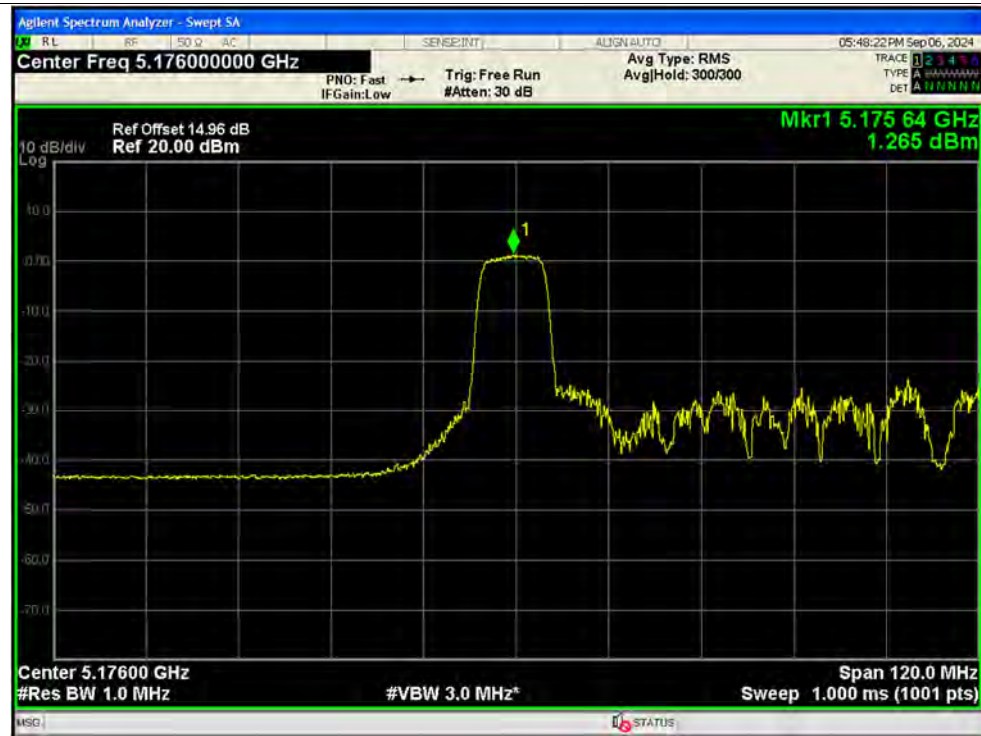
PSD NVNT ax80 106@53 5210MHz Ant1 SISO



PSD NVNT ax80 106@53 5210MHz Ant2 SISO



PSD NVNT ax80 106@53 5210MHz Ant1 MIMO



PSD NVNT ax80 106@53 5210MHz Ant2 MIMO



PSD NVNT ax80 242@61 5210MHz Ant1 SISO



PSD NVNT ax80 242@61 5210MHz Ant2 SISO



PSD NVNT ax80 242@61 5210MHz Ant1 MIMO



PSD NVNT ax80 242@61 5210MHz Ant2 MIMO



PSD NVNT ax80 484@65 5210MHz Ant1 SISO



PSD NVNT ax80 484@65 5210MHz Ant2 SISO



PSD NVNT ax80 484@65 5210MHz Ant1 MIMO



PSD NVNT ax80 484@65 5210MHz Ant2 MIMO



**A.5. Frequency Stability**

Condition	Mode	Frequency (MHz)	Antenna	Measured Frequency (MHz)	Frequency Error (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
20C 3.4V	Carrier	5180	Ant1	5179.968	-32000	-6.18	25	Pass
20C 3.85V	Carrier	5180	Ant1	5179.968	-32000	-6.18	25	Pass
20C 4.2V	Carrier	5180	Ant1	5179.968	-32000	-6.18	25	Pass
-20C 3.85V	Carrier	5180	Ant1	5179.968	-32000	-6.18	25	Pass
-10C 3.85V	Carrier	5180	Ant1	5179.968	-32000	-6.18	25	Pass
0C 3.85V	Carrier	5180	Ant1	5179.968	-32000	-6.18	25	Pass
10C 3.85V	Carrier	5180	Ant1	5179.968	-32000	-6.18	25	Pass
30C 3.85V	Carrier	5180	Ant1	5179.968	-32000	-6.18	25	Pass
40C 3.85V	Carrier	5180	Ant1	5179.968	-32000	-6.18	25	Pass
45C 3.85V	Carrier	5180	Ant1	5179.968	-32000	-6.18	25	Pass
20C 3.4V	Carrier	5745	Ant1	5744.964	-36000	-6.27	25	Pass
20C 3.85V	Carrier	5745	Ant1	5744.964	-36000	-6.27	25	Pass
20C 4.2V	Carrier	5745	Ant1	5744.964	-36000	-6.27	25	Pass
-20C 3.85V	Carrier	5745	Ant1	5744.964	-36000	-6.27	25	Pass
-10C 3.85V	Carrier	5745	Ant1	5744.964	-36000	-6.27	25	Pass
0C 3.85V	Carrier	5745	Ant1	5744.964	-36000	-6.27	25	Pass
10C 3.85V	Carrier	5745	Ant1	5744.964	-36000	-6.27	25	Pass
30C 3.85V	Carrier	5745	Ant1	5744.964	-36000	-6.27	25	Pass
40C 3.85V	Carrier	5745	Ant1	5744.964	-36000	-6.27	25	Pass
45C 3.85V	Carrier	5745	Ant1	5744.964	-36000	-6.27	25	Pass



A.6. Conducted Emission

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. Set RBW=9kHz, VBW=30kHz. 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+PC+PC Adapter+WIFI TX

Test voltage: AC 120V/60Hz

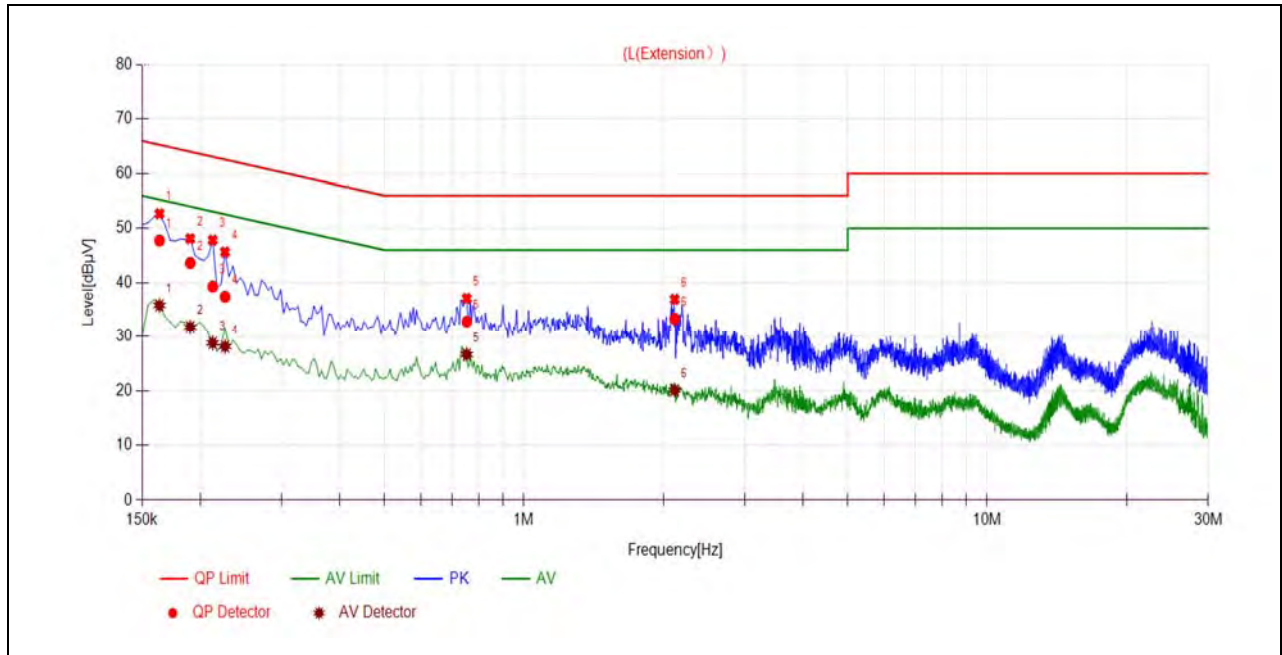
The measurement results are obtained as below:

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

U_R : Receiver Reading

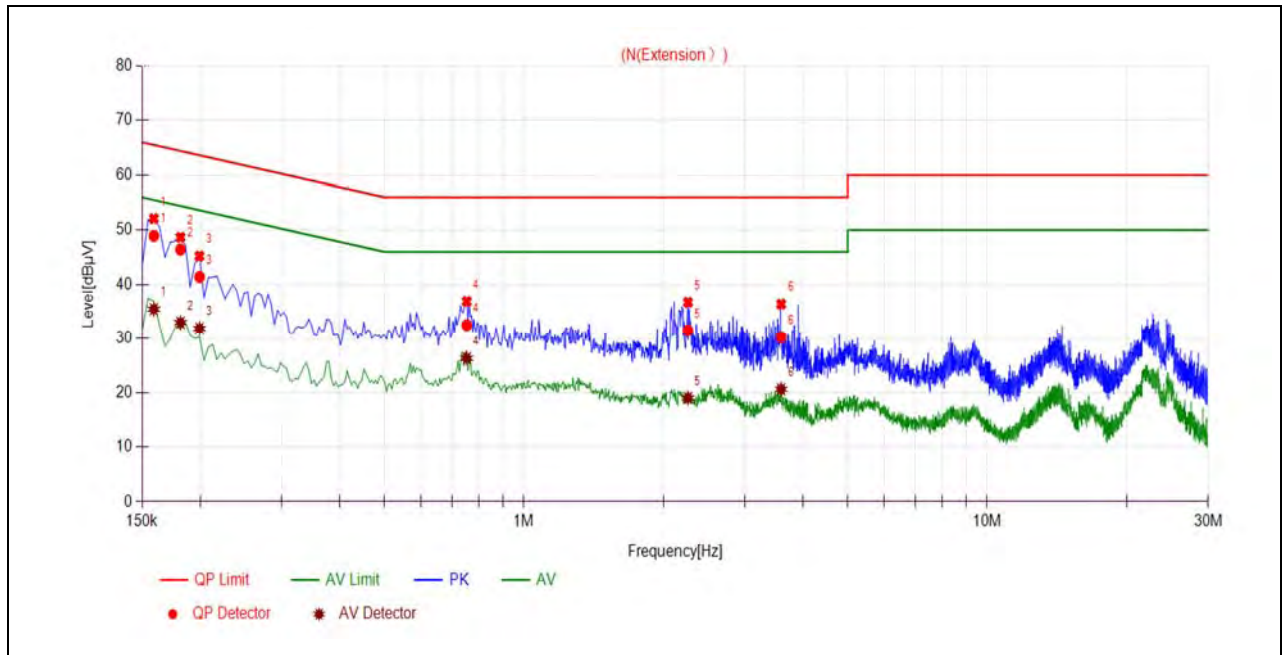
A_{Factor} : Voltage division factor of LISN

B. Test Plot:



(L Phase)

No.	Fre. (MHz)	Emission Level (dBμV)		Limit (dBμV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1635	47.76	35.82	65.28	55.28	Line	PASS
2	0.1905	43.64	31.79	64.01	54.01		PASS
3	0.2130	39.28	28.77	63.09	53.09		PASS
4	0.2265	37.40	28.12	62.58	52.58		PASS
5	0.7531	32.81	26.66	56.00	46.00		PASS
6	2.1164	33.32	20.09	56.00	46.00		PASS



(N Phase)

No.	Fre. (MHz)	Emission Level (dBμV)		Limit (dBμV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1590	48.95	35.48	65.52	55.52	Neutral	PASS
2	0.1815	46.45	33.00	64.42	54.42		PASS
3	0.1995	41.40	31.90	63.63	53.63		PASS
4	0.7530	32.52	26.33	56.00	46.00		PASS
5	2.2605	31.52	18.98	56.00	46.00		PASS
6	3.5921	30.25	20.59	56.00	46.00		PASS



A.7. Restricted Frequency Bands

The lowest and highest channels are tested to verify the Restricted Frequency Bands.

The measurement results are obtained as below:

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

A_T : Total correction Factor except Antenna

U_R : Receiver Reading

G_{preamp} : Preamplifier Gain

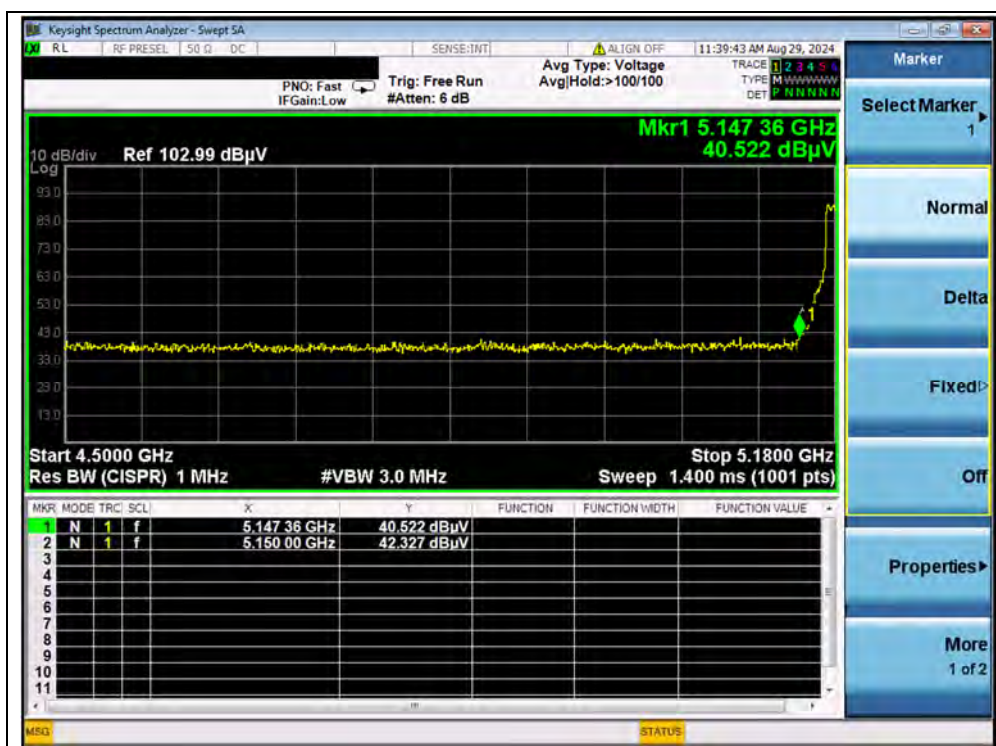
A_{Factor} : Antenna Factor at 3m

Note 1: 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.

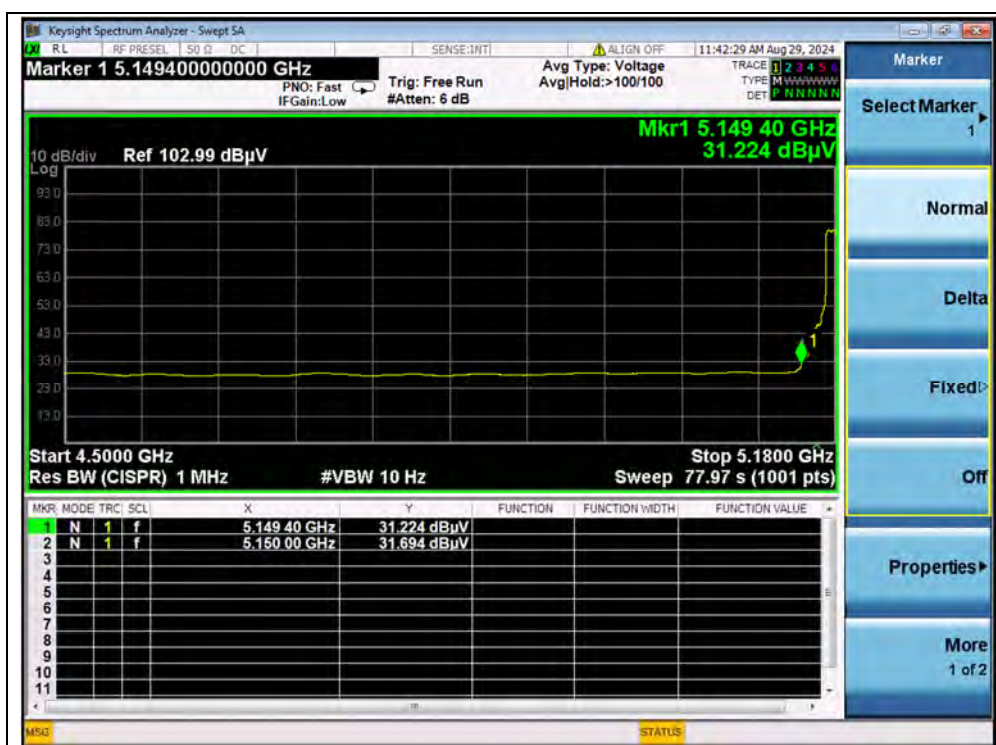
Note 2 All test modes and bandwidth were considered and evaluated respectively by performing full test, only the worst data were recorded for each bandwidth.

802.11a Mode

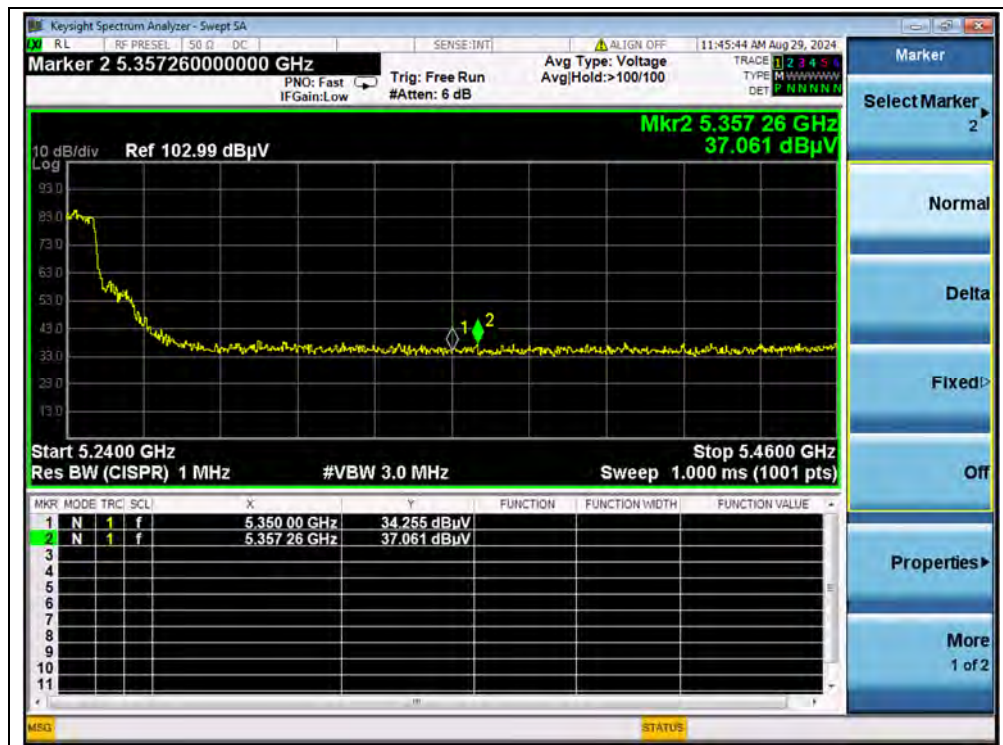
Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dB μ V)	A_T (dB)	A_{Factor} (dB@ 3m)	Max. Emission E (dB μ V/m)	Limit (dB μ V/m)	Verdict
		PK/ AV						
36	5150.00	PK	42.33	-21.29	32.20	53.24	74	PASS
36	5150.00	AV	31.69	-21.29	32.20	42.60	54	PASS
48	5357.26	PK	37.06	-21.29	32.20	47.97	74	PASS
48	5353.74	AV	26.68	-21.29	32.20	37.59	54	PASS
149	5725.00	PK	40.42	-21.11	32.20	51.51	122.23	PASS
165	5850.00	PK	40.37	-21.11	32.20	51.46	122.23	PASS



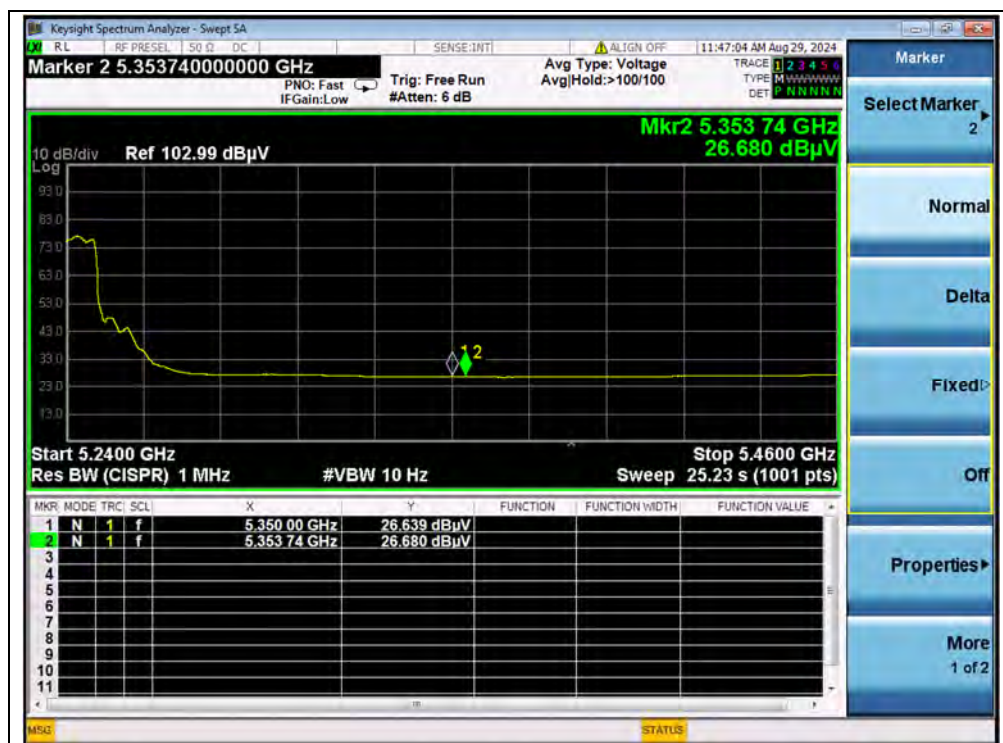
(PEAK, Channel 36, 802.11a)



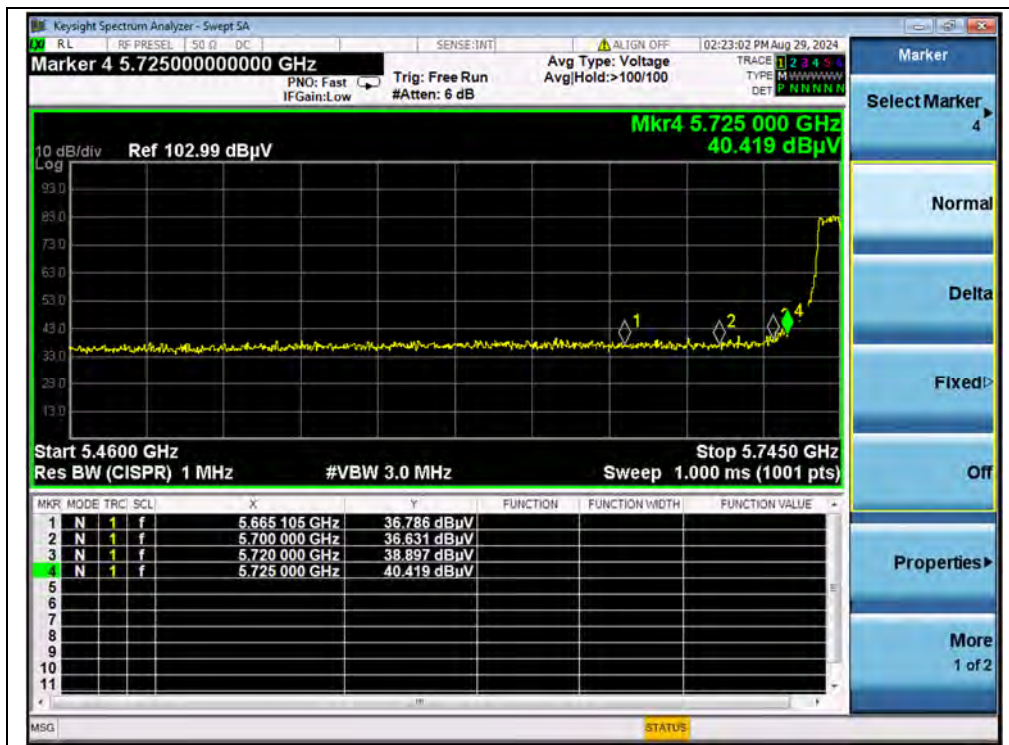
(AVERAGE, Channel 36, 802.11a)



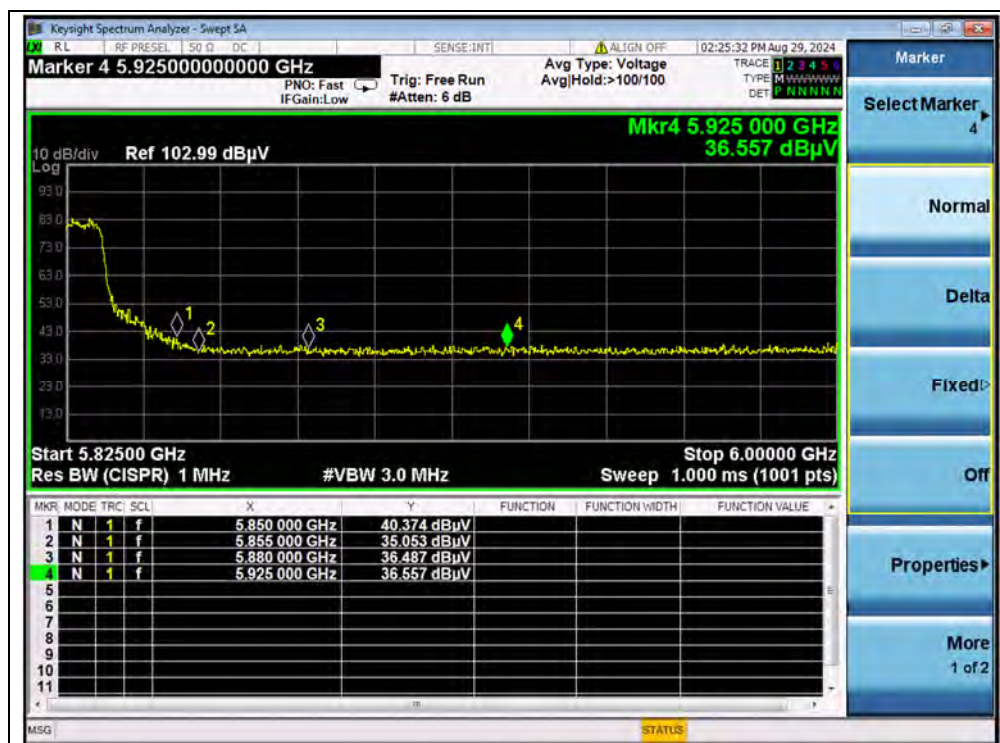
(PEAK, Channel 48, 802.11a)



(AVERAGE, Channel 48, 802.11a)



(PEAK, Channel 149, 802.11a)

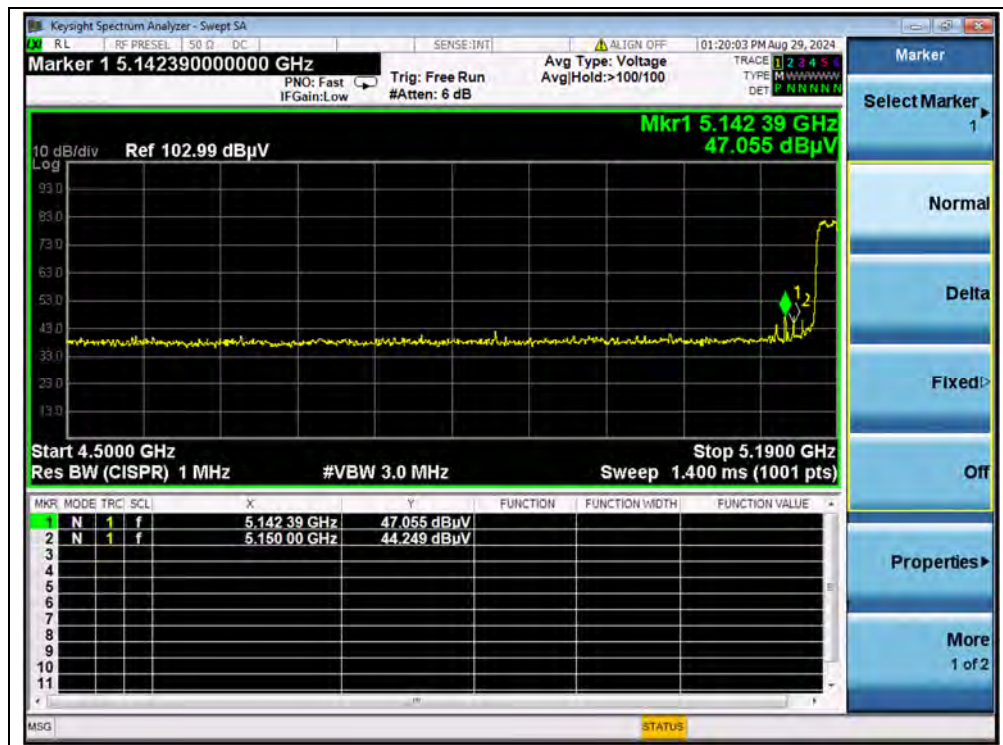


(PEAK, Channel 165, 802.11a)

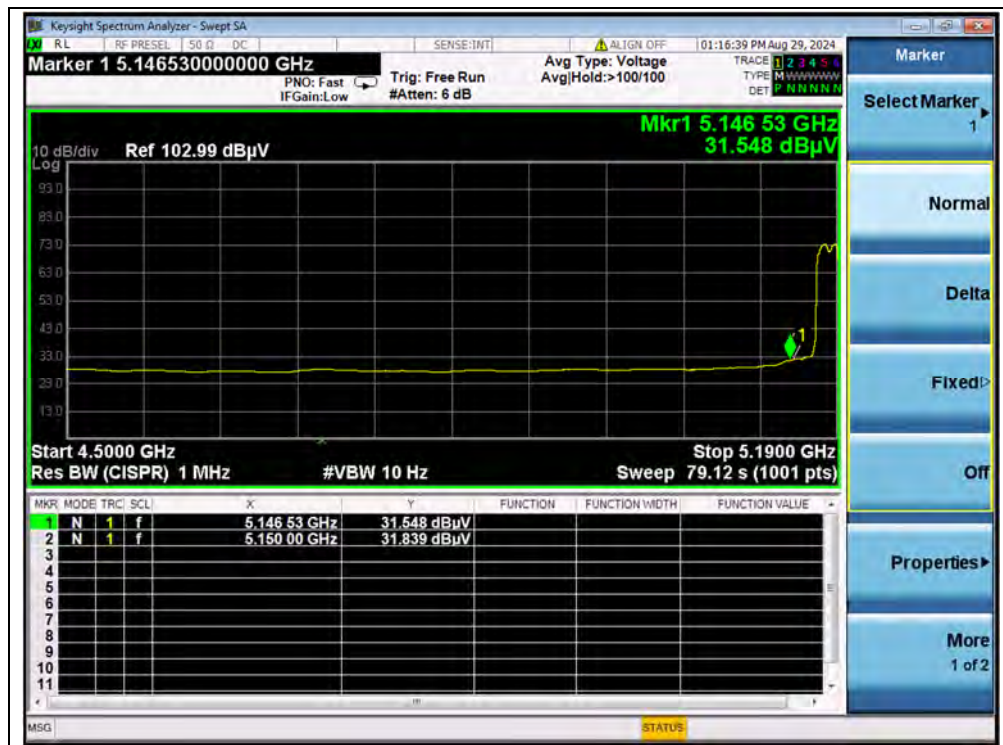


802.11n (HT40) Mode

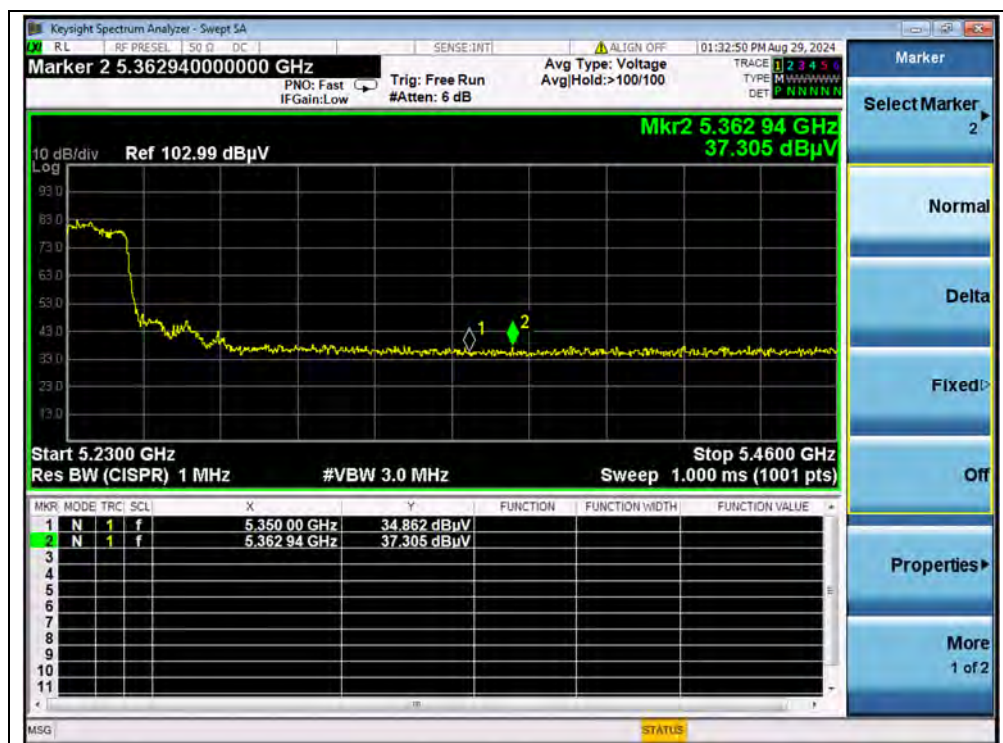
Channel	Frequency (MHz)	Detector	Receiver Reading	A _T (dB)	A _{Factor} (dB@3m)	Max. Emission E	Limit (dBμV/m)	Verdict
		PK/ AV	U _R (dBμV)			(dBμV/m)		
38	5142.39	PK	47.06	-21.29	32.20	57.97	74	PASS
38	5150.00	AV	31.84	-21.29	32.20	42.75	54	PASS
46	5362.94	PK	37.31	-21.29	32.20	48.22	74	PASS
46	5352.13	AV	26.37	-21.29	32.20	37.28	54	PASS
151	5725.00	PK	45.32	-21.11	32.20	56.41	122.23	PASS
159	5850.00	PK	38.17	-21.11	32.20	49.26	122.23	PASS



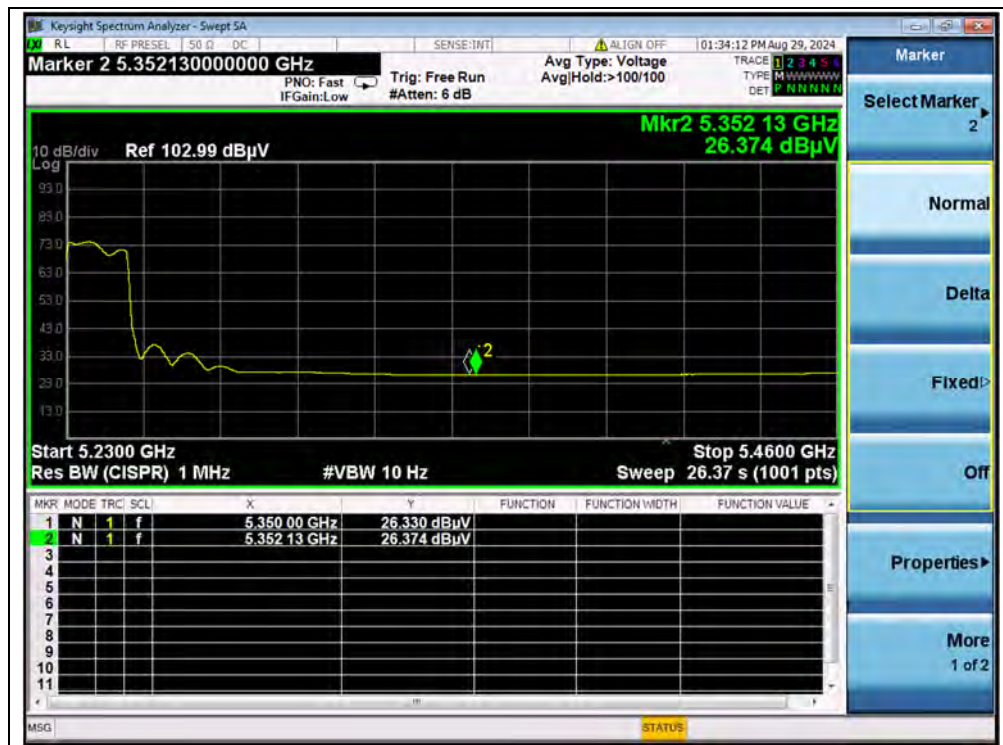
(PEAK, Channel 38, 802.11n (HT40))



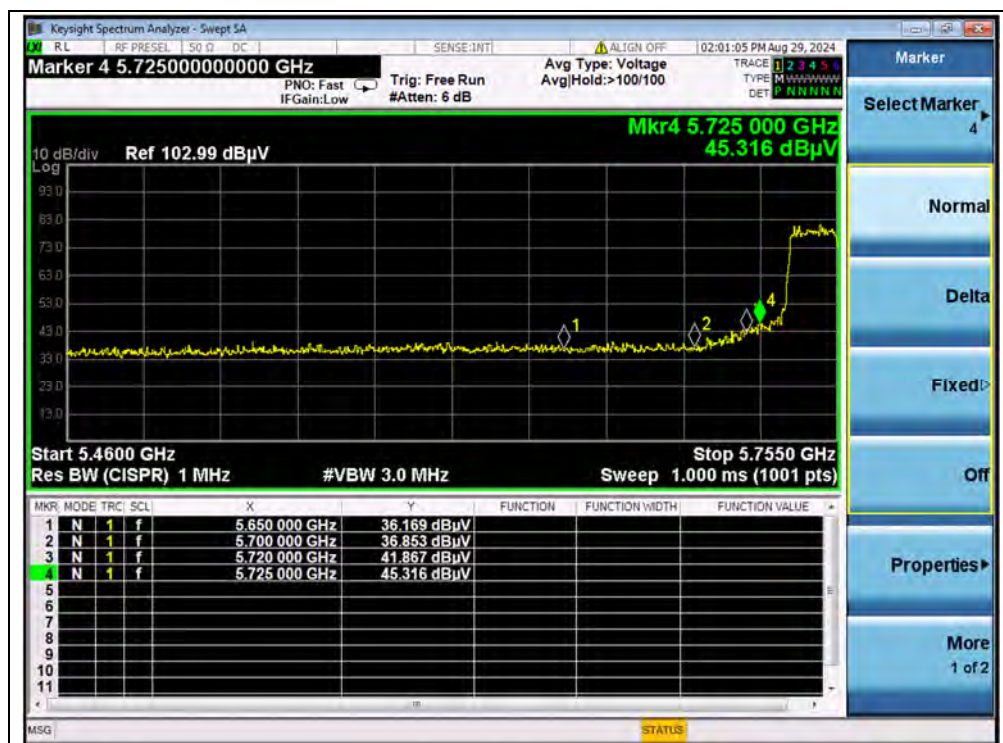
(AVERAGE, Channel 38, 802.11n (HT40))



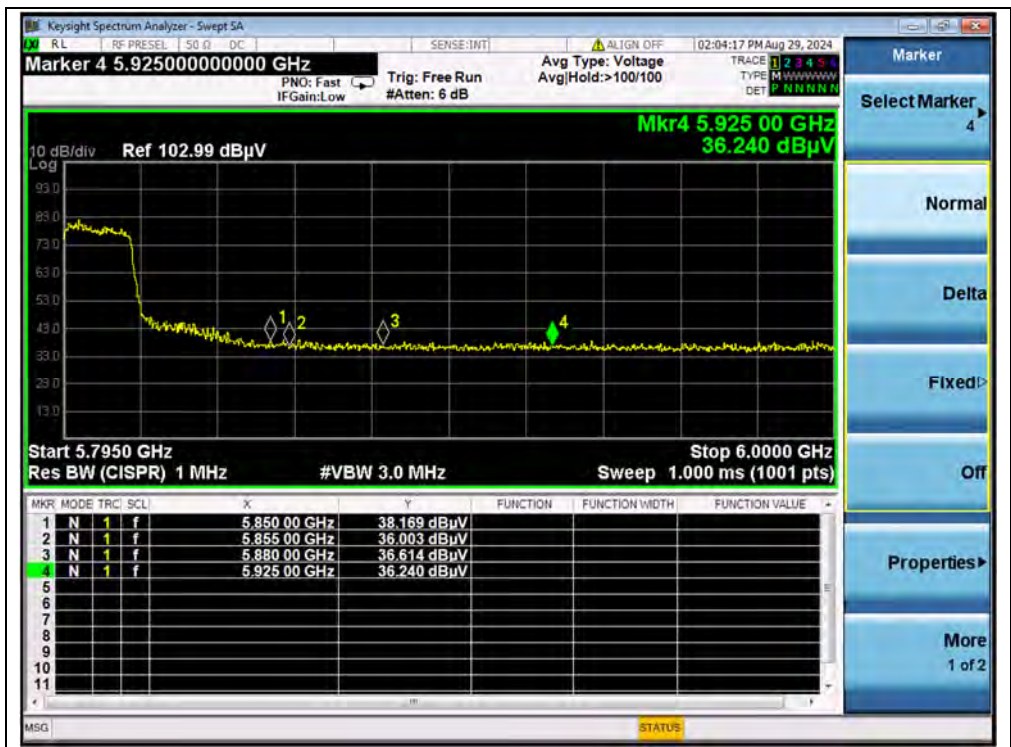
(PEAK, Channel 46, 802.11n (HT40))



(AVERAGE, Channel 46, 802.11n (HT40))



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

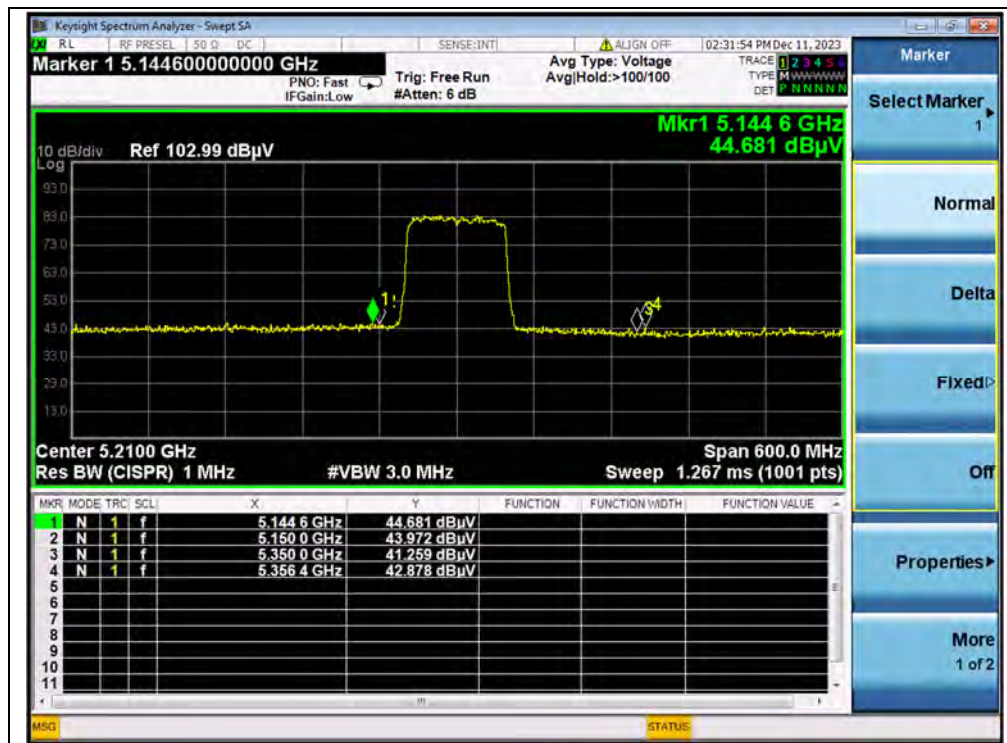


(PEAK, Channel 159, 802.11n (HT40))

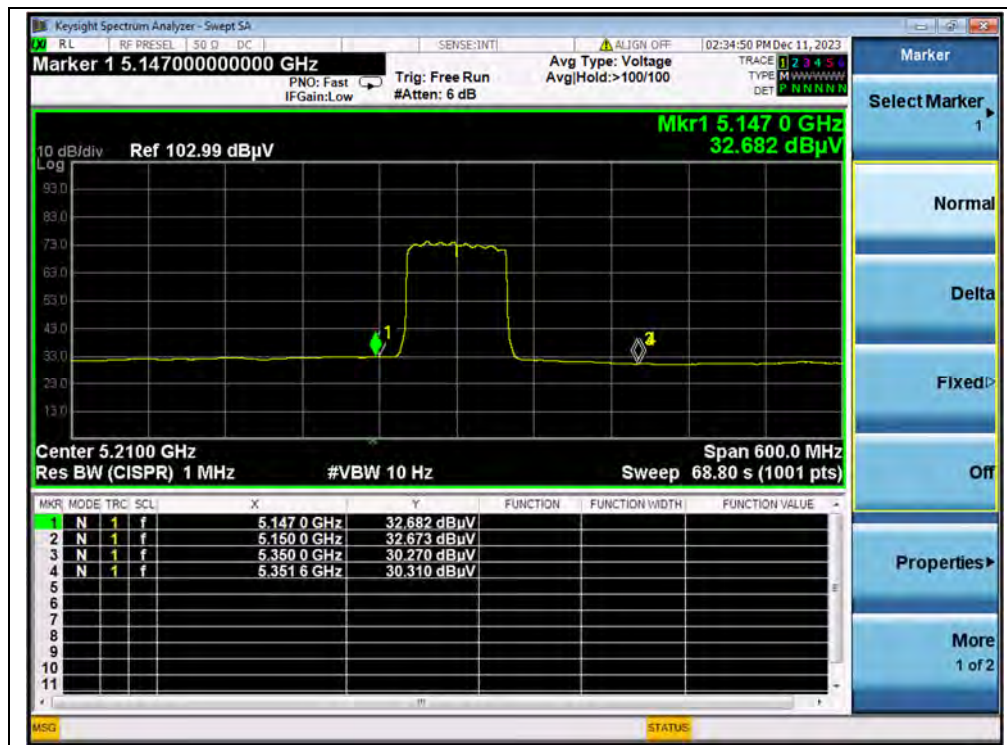


802.11ac (VHT80) Mode

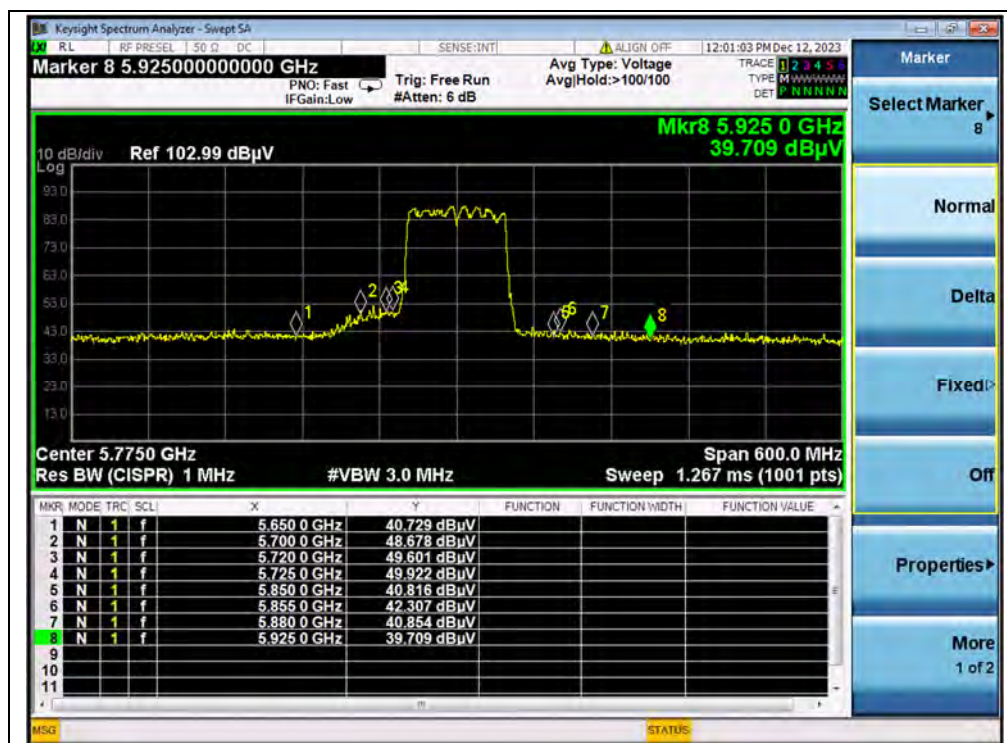
Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dBμV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
		PK/ AV						
42	5145.20	PK	48.29	-21.29	32.20	59.20	74	PASS
42	5150.00	AV	36.26	-21.29	32.20	47.17	54	PASS
42	5378.00	PK	39.13	-21.29	32.20	50.04	74	PASS
42	5350.00	AV	26.45	-21.29	32.20	37.36	54	PASS
155	5720.00	PK	45.95	-21.11	32.20	57.04	110.83	PASS
155	5850.00	PK	41.74	-21.11	32.20	52.83	122.23	PASS



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



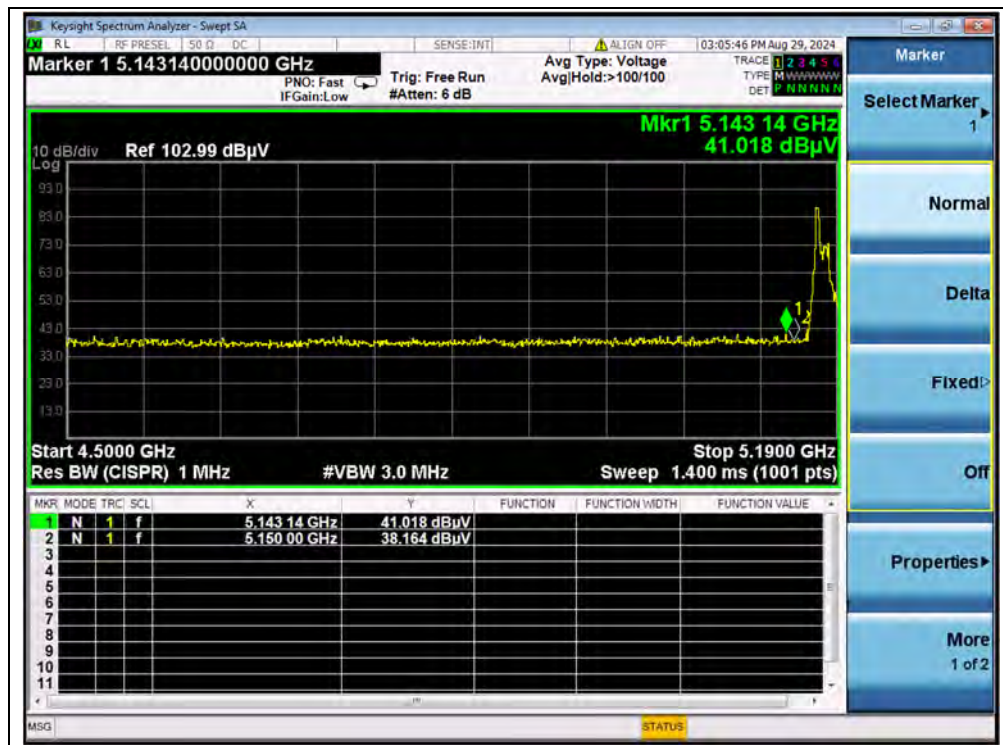
(AVERAGE, Channel 42, 802.11ac (VHT80))



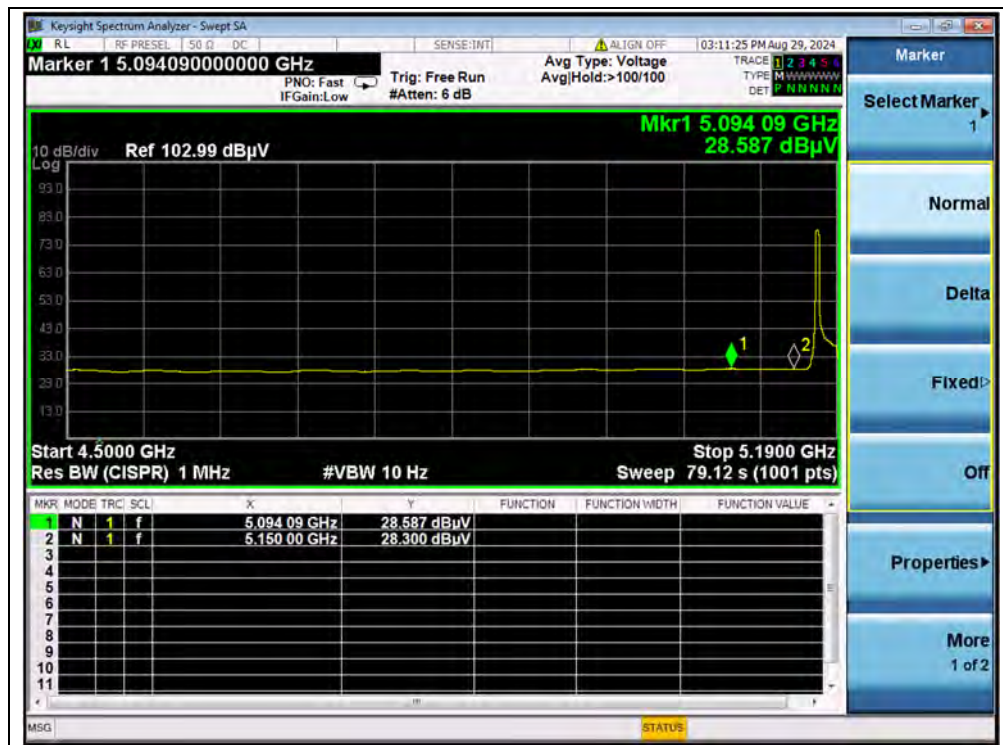
(PEAK, Channel 155, 802.11ac (VHT80))

**802.11ax (HEW20) RU26 Mode**

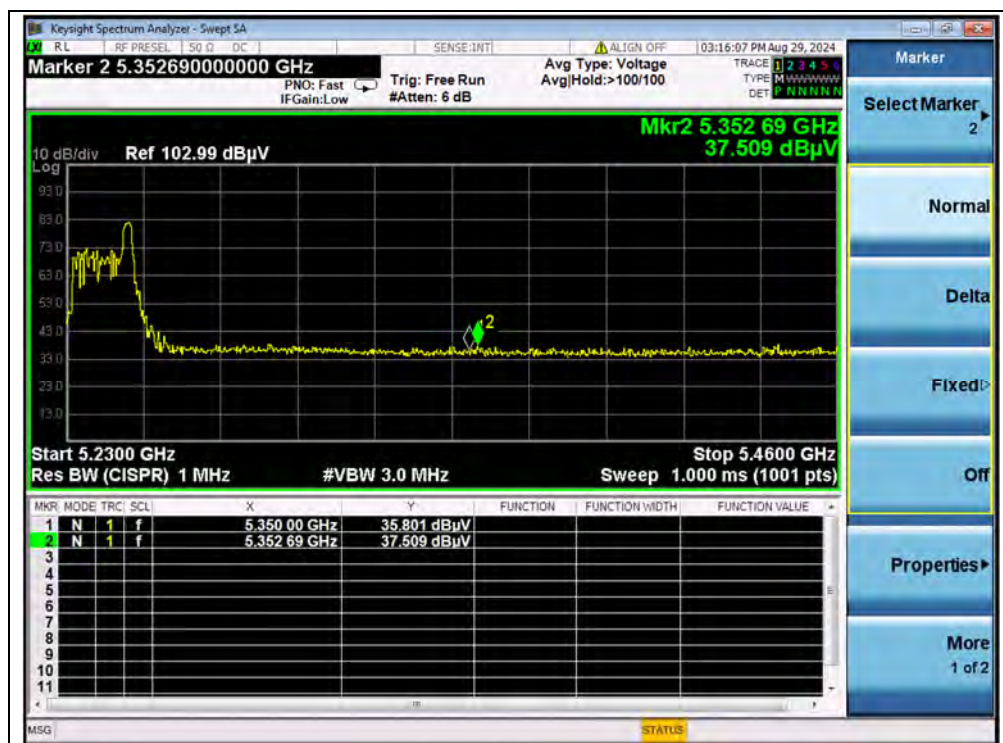
Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dB μ V)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dB μ V/m)	Limit (dB μ V/m)	Verdict
		PK/ AV						
36	5143.14	PK	41.02	-21.29	32.20	51.93	74	PASS
36	5094.09	AV	28.59	-21.29	32.20	39.50	54	PASS
48	5352.69	PK	37.51	-21.29	32.20	48.42	74	PASS
48	5351.08	AV	26.26	-21.29	32.20	37.17	54	PASS
149	5720.00	PK	38.26	-21.11	32.20	49.35	110.83	PASS
165	5855.00	PK	36.84	-21.11	32.20	47.93	110.83	PASS



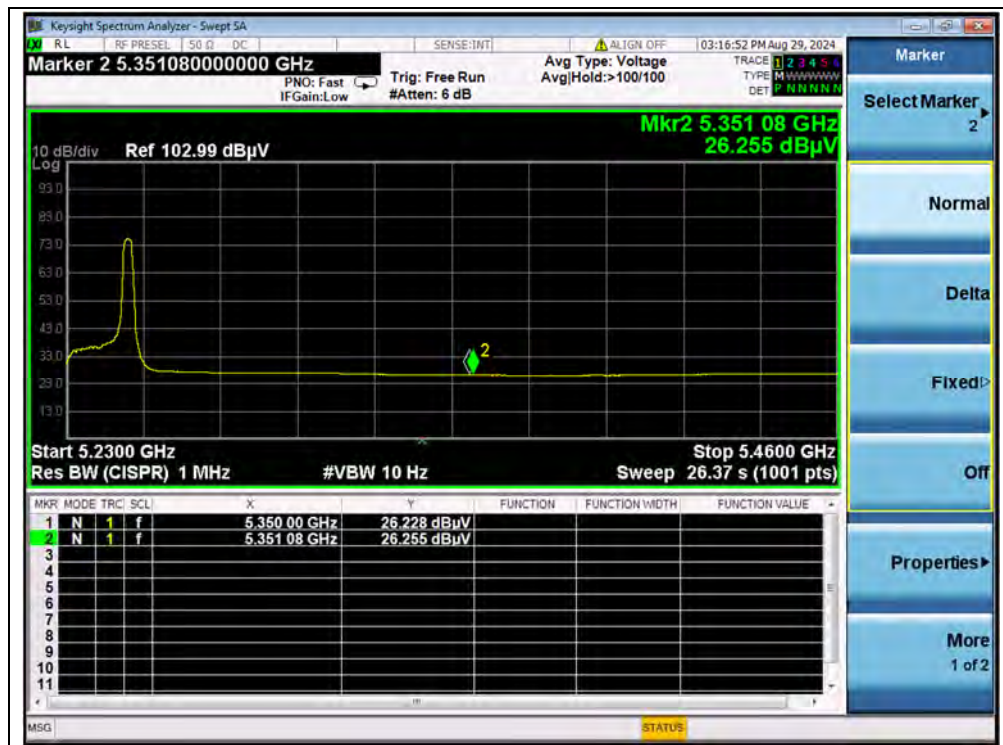
(PEAK, Channel 36, 802.11ax (HEW20) RU26)



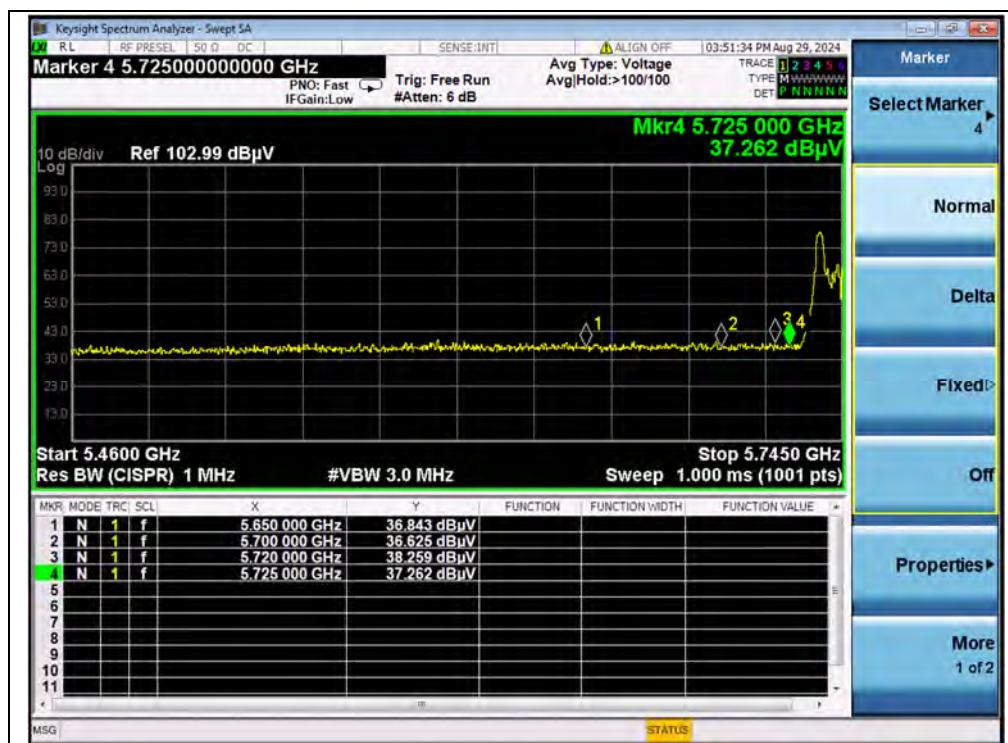
(AVERAGE, Channel 36, 802.11ax (HEW20) RU26)



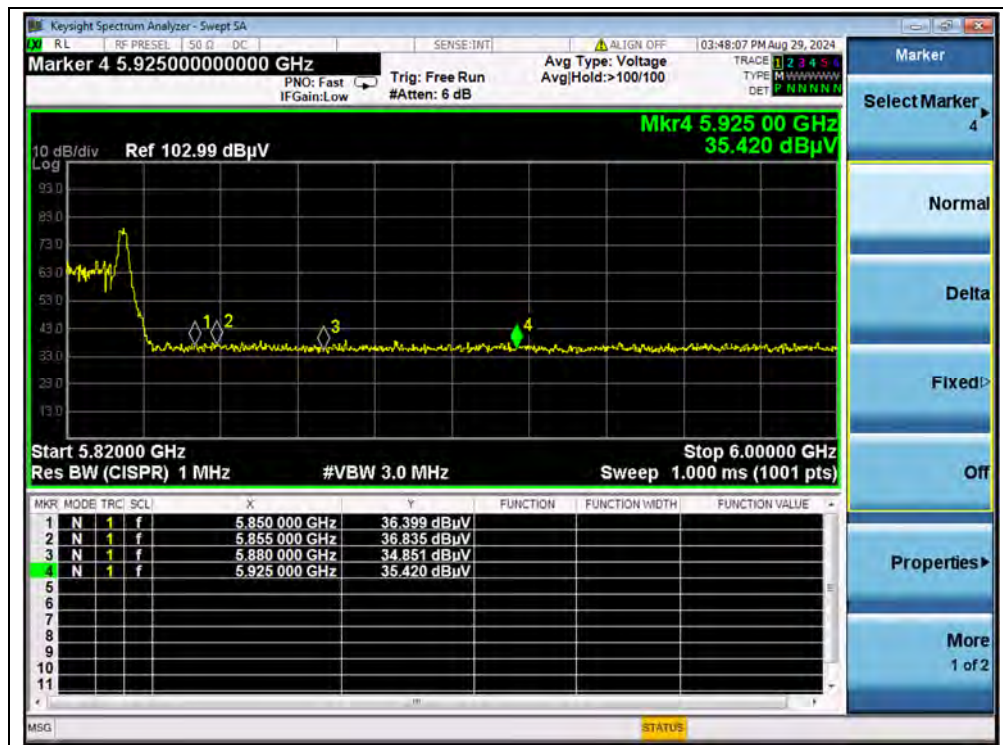
(PEAK, Channel 48, 802.11ax (HEW20) RU26)



(AVERAGE, Channel 48, 802.11ax (HEW20) RU26)



(PEAK, Channel 149, 802.11ax (HEW20) RU26)



(PEAK, Channel 165, 802.11ax (HEW20) RU26)



A.8. Radiated Emission

According to ANSI C63.10, 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 (or average) limit, it is unnecessary to perform an quasi-peak measurement (or average).

The measurement results are obtained as below:

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

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.

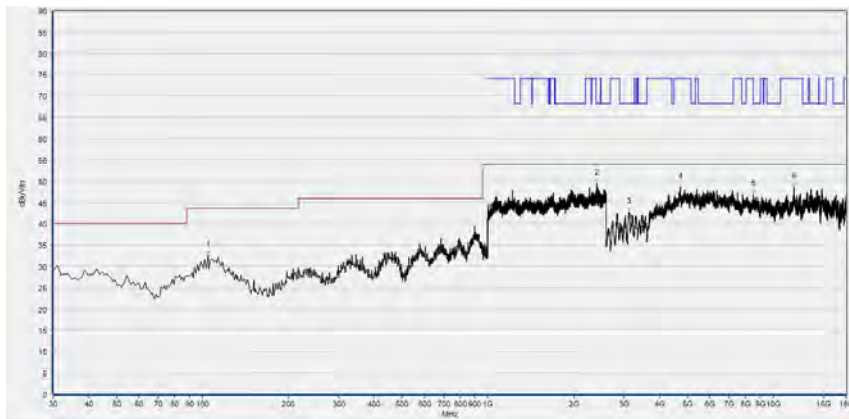
Note2: For the frequency, which started from 9kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

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.

Note 4: All test modes and bandwidth were considered and evaluated respectively by performing full test, only the worst data were recorded.

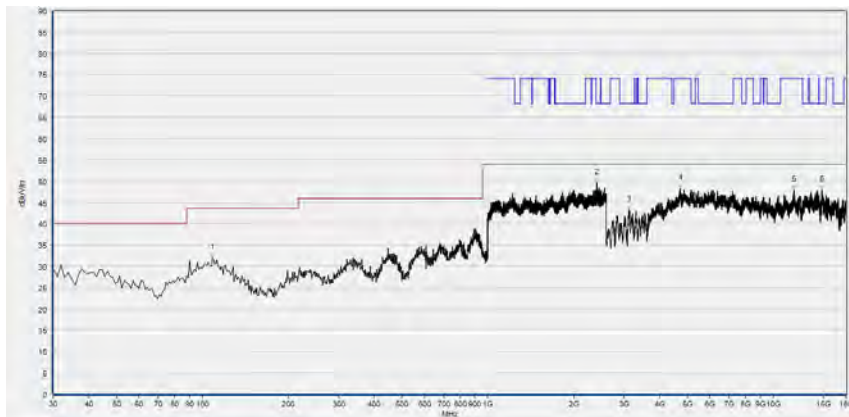
**802.11a Mode**

Plot 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
104.690	32.44	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2406.933	49.40	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
3117.440	42.70	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
4722.120	48.53	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8495.120	46.91	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
11790.720	48.67	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 18GHz)

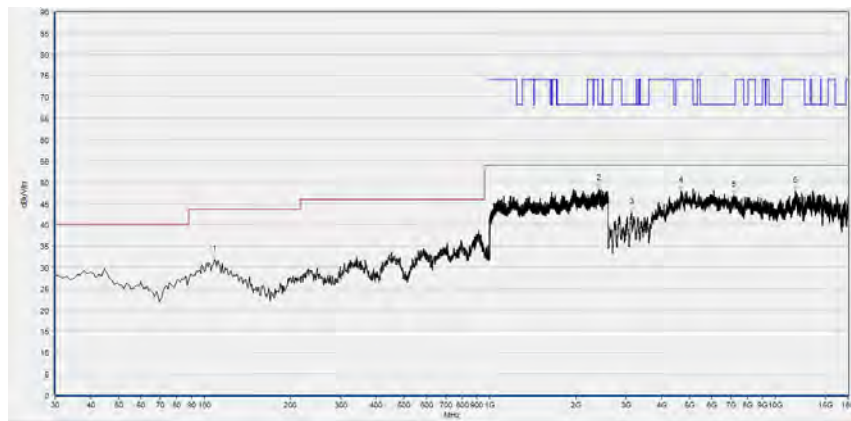


Fre. (MHz)	PK (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
108.570	32.07	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
2403.733	49.58	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
3129.760	43.29	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
4734.440	48.25	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
11790.720	47.87	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
14802.960	47.91	N/A	N/A	68.23	N/A	N/A	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

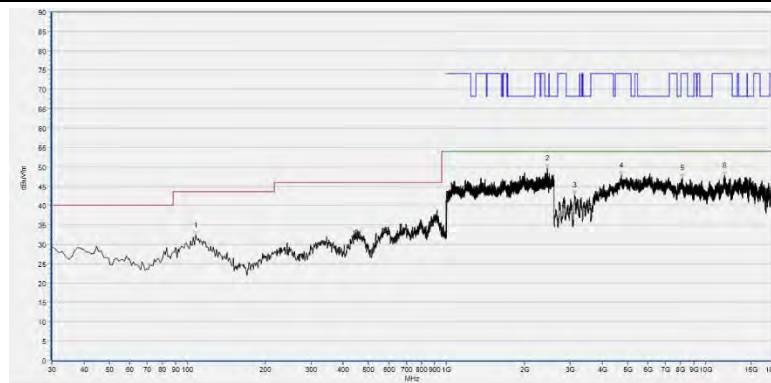


Plot for Channel 157



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
108.570	31.83	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2406.400	48.37	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
3139.000	42.90	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
4679.000	48.01	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
7167.640	46.91	N/A	N/A	68.23	N/A	N/A	Horizontal	PASS
11784.560	47.85	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
107.600	32.36	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
2452.800	49.54	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
3126.680	42.74	N/A	N/A	68.23	N/A	N/A	Vertical	PASS
4715.960	47.71	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8107.040	47.05	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
11793.800	47.75	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 18GHz)

END OF REPORT