

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 50 μ H/50 Ω line impedance stabilization network (LISN).

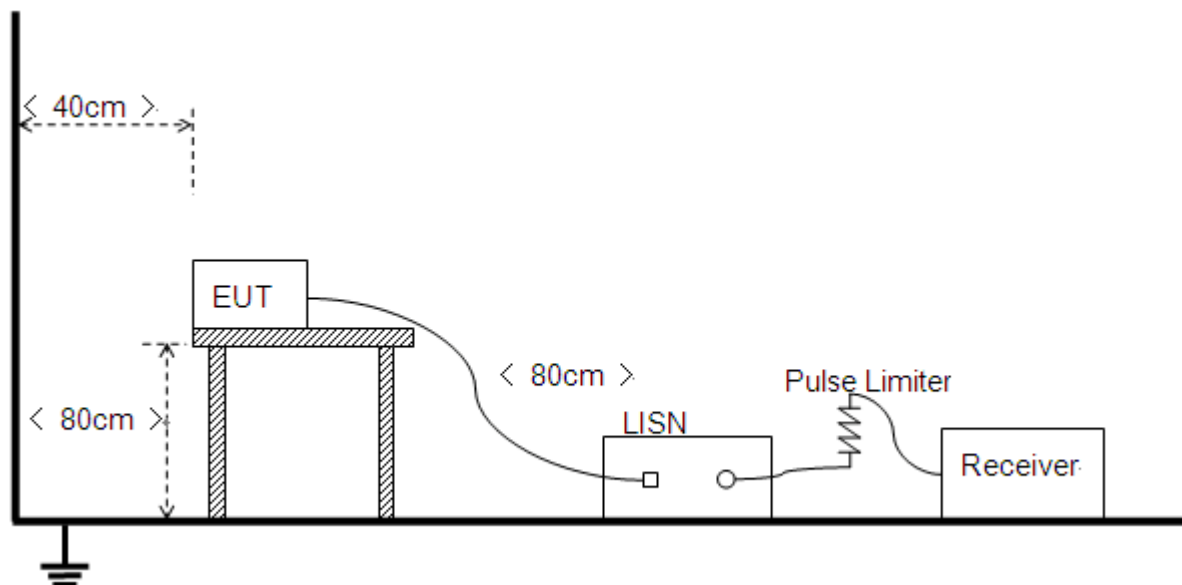
Frequency range (MHz)	Conducted Limit (dB μ V)	
	Quai-peak	Average
0.15 - 0.50	66 to 56	56 to 46
0.50 - 5	56	46
5 - 30	60	50

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 + ADAPTOR + WIFI TX

Test Voltage: AC 120V/60Hz

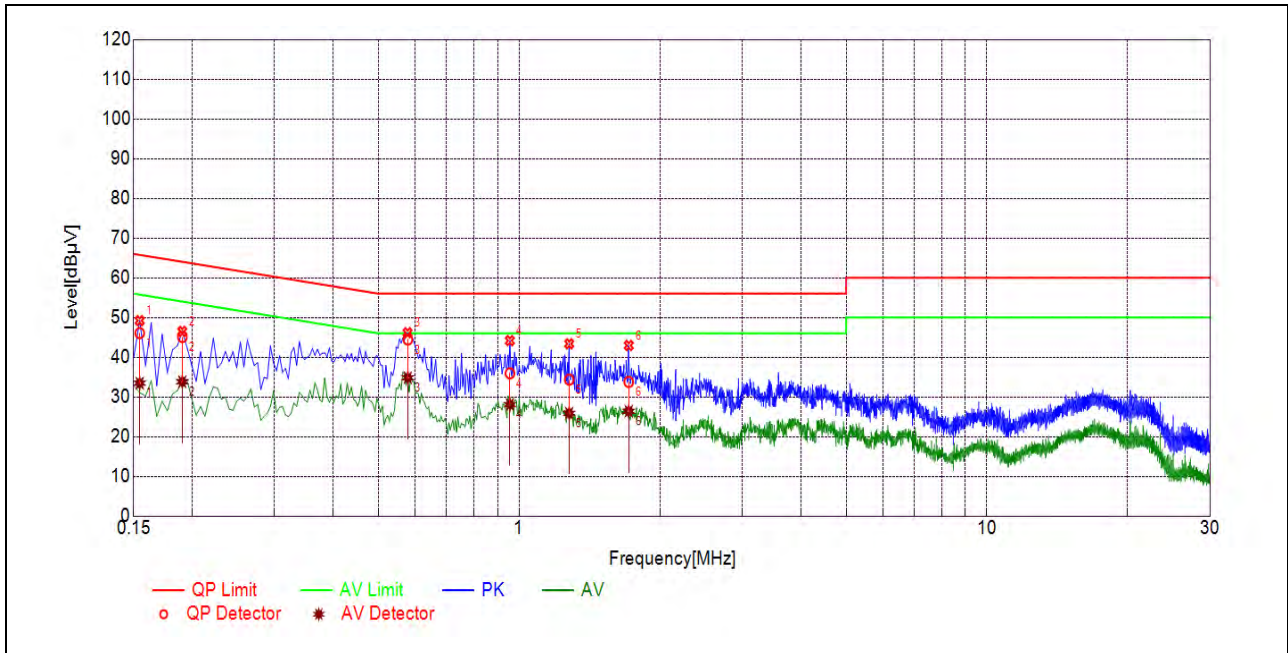
The measurement results are obtained as below:

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

U_R : Receiver Reading

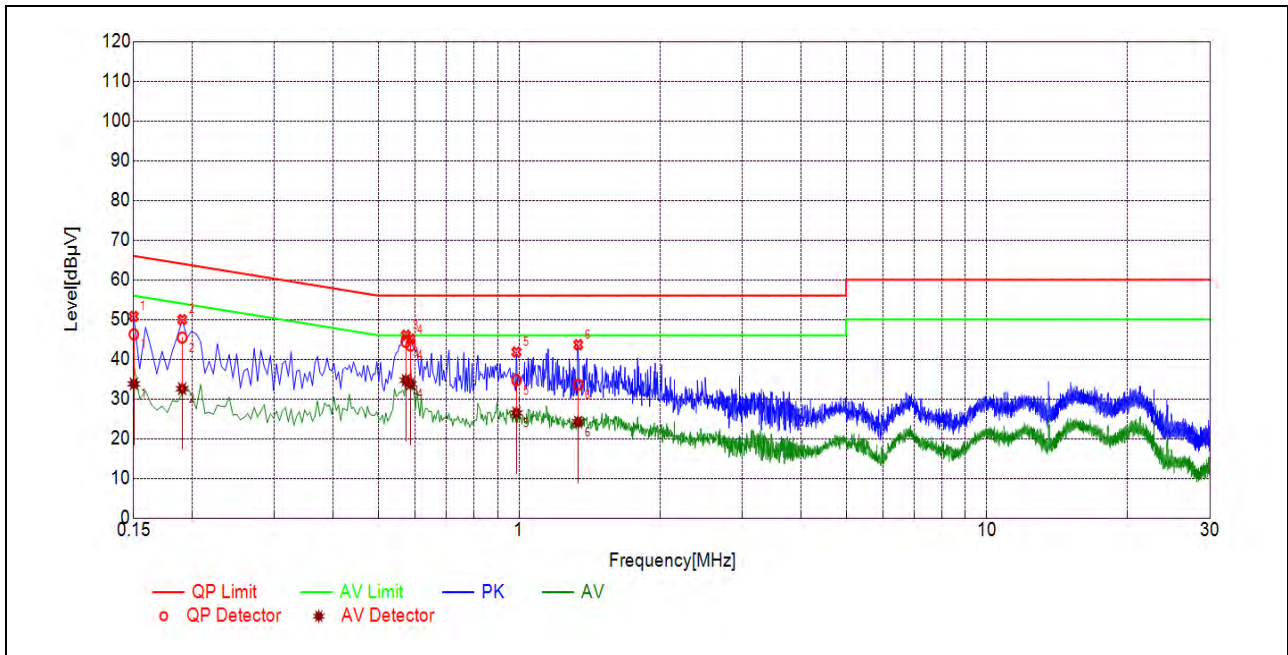
A_{Factor} : Voltage division factor of LISN

B. Test Plots:



(L Phase)

NO.	Fre. (MHz)	Emission Level (dBμV)		Limit (dBμV)		Power-line	Verdict
		Quai-peak	Average	Quai-peak	Average		
1	0.1545	46.07	33.46	65.75	55.75	Line	PASS
2	0.1905	45.10	33.82	64.01	54.01		PASS
3	0.5781	44.45	34.82	56.00	46.00		PASS
4	0.9557	35.93	28.08	56.00	46.00		PASS
5	1.2794	34.35	25.90	56.00	46.00		PASS
6	1.7151	33.77	26.39	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	0.1501	46.28	33.78	65.99	55.99	Neutral	PASS
2	0.1904	45.44	32.57	64.02	54.02		PASS
3	0.5725	44.32	34.68	56.00	46.00		PASS
4	0.5860	43.44	33.78	56.00	46.00		PASS
5	0.9872	34.70	26.48	56.00	46.00		PASS
6	1.3372	33.56	24.19	56.00	46.00		PASS

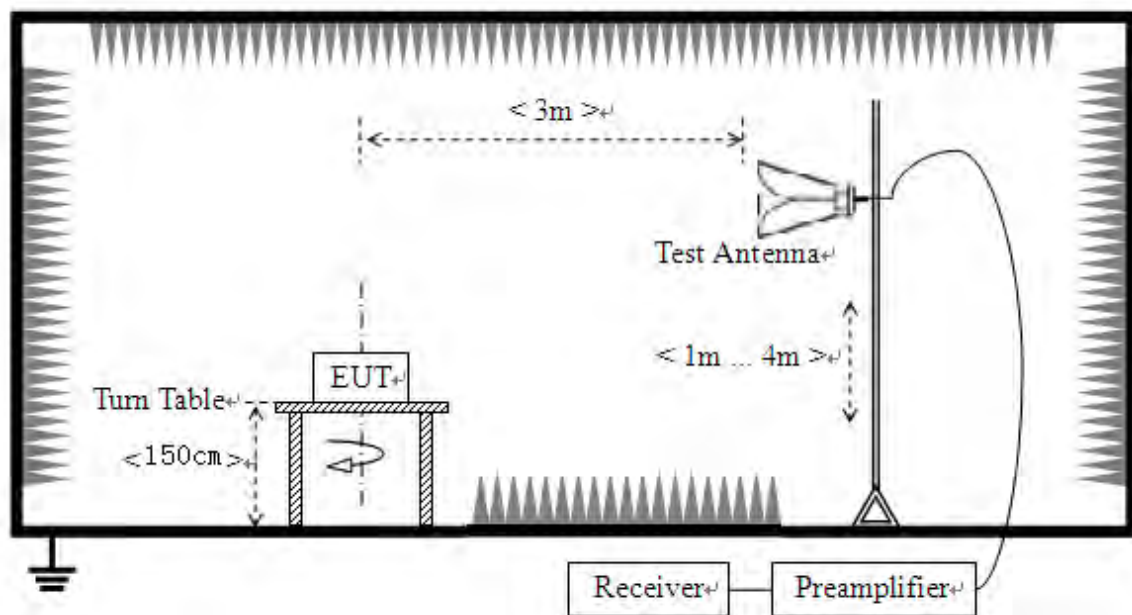
2.8. Restricted Frequency Bands

2.8.1. Requirement

According to FCC section 15.247(d), in any 100kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20dB below that in the 100kHz bandwidth within the band that contains the highest level of the desired power. In addition, radiated emissions which fall in the restricted bands, as defined in 15.205(a), must also comply with the radiated emission limits specified in 15.209(a).

2.8.2. Test Description

A. Test Setup



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:

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 procedure**

KDB 558074 Section 8.6 and 8.7 was used in order to prove compliance.

2.8.4. Test Result

The lowest and highest channels are tested to verify 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

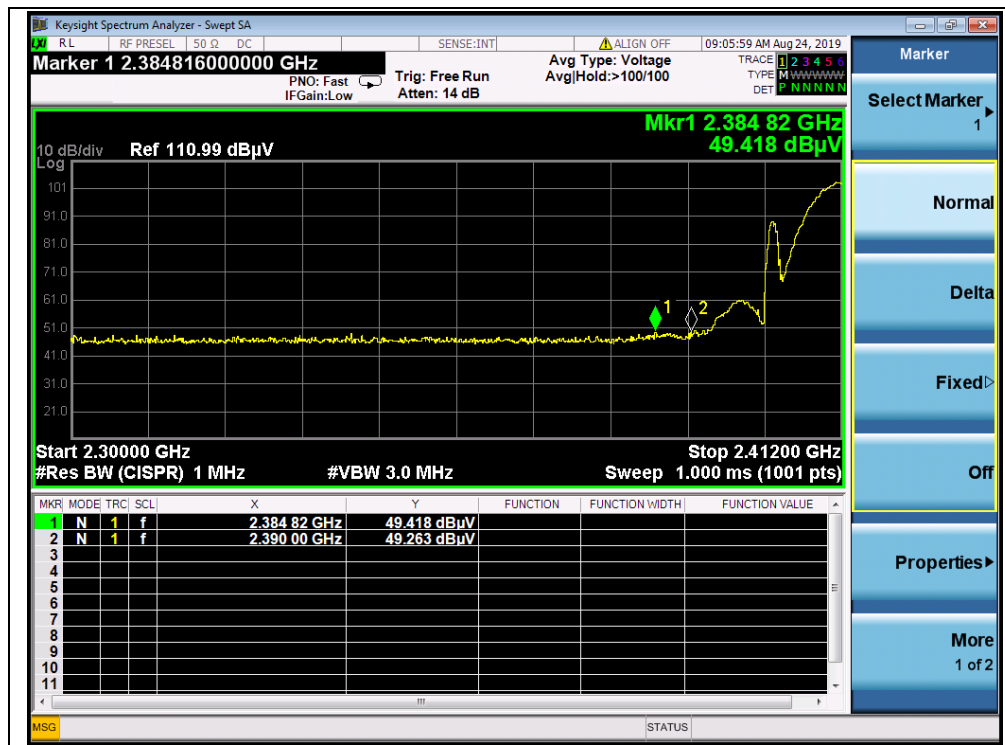
Note: Restricted Frequency Bands were performed when antenna was at vertical and horizontal polarity, and only the worse test condition (vertical) was recorded in this test report.

802.11b Test mode**A. Test Verdict:**

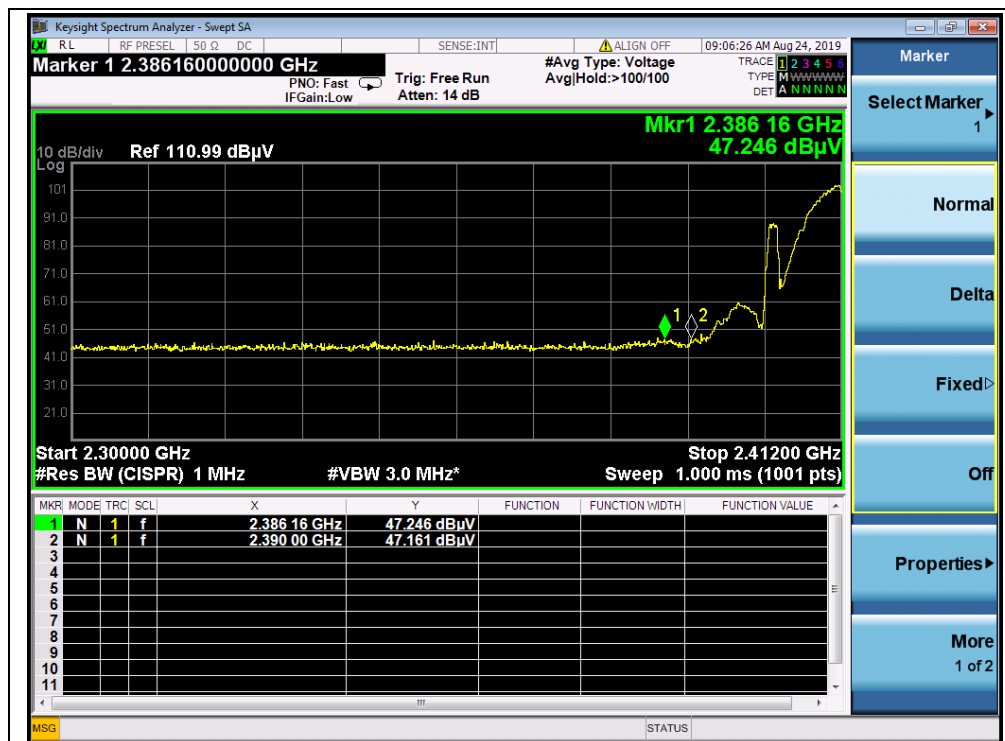
Channel	Frequency (MHz)	Detector	Receiver Reading U_R (dBuV)	A_T (dB)	A_{Factor} (dB@3m)	Max. Emission E (dBμV/m)	Limit (dBμV/m)	Verdict
		PK/ AV						
1	2384.82	PK	49.42	-29.67	32.56	52.31	74	PASS
1	2386.16	AV	47.25	-29.67	32.56	50.14	54	PASS
11	2484.51	PK	48.05	-29.67	32.56	50.94	74	PASS
11	2483.50	AV	45.51	-29.67	32.56	48.40	54	PASS
12	2483.96	PK	63.14	-29.67	32.56	66.03	74	PASS
12	2484.15	AV	42.33	-29.67	32.56	45.22	54	PASS
13	2485.15	PK	63.48	-29.67	32.56	66.37	74	PASS
13	2484.74	AV	49.18	-29.67	32.56	52.07	54	PASS



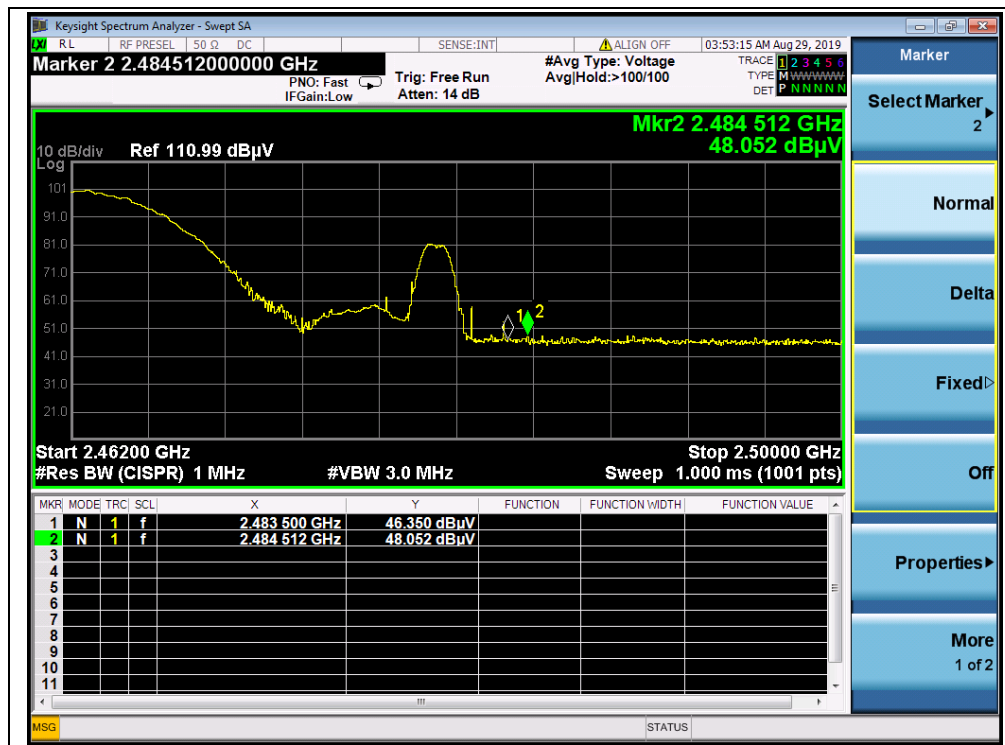
B. Test Plots:



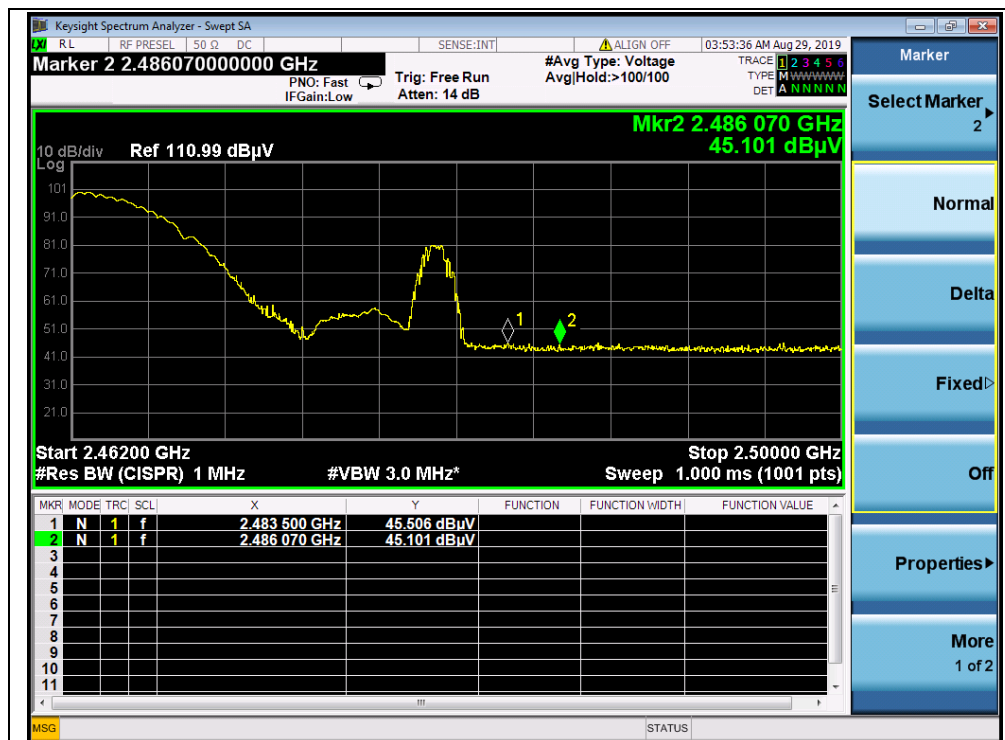
(Channel = 1 PEAK, 802.11b)



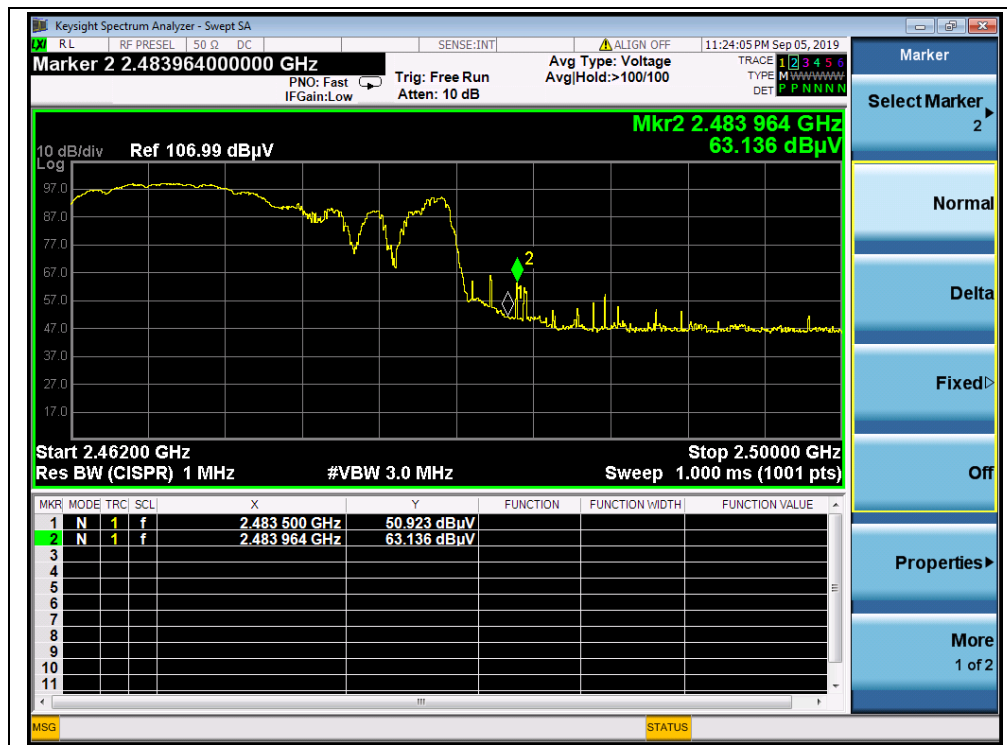
(Channel = 1 AVG, 802.11b)



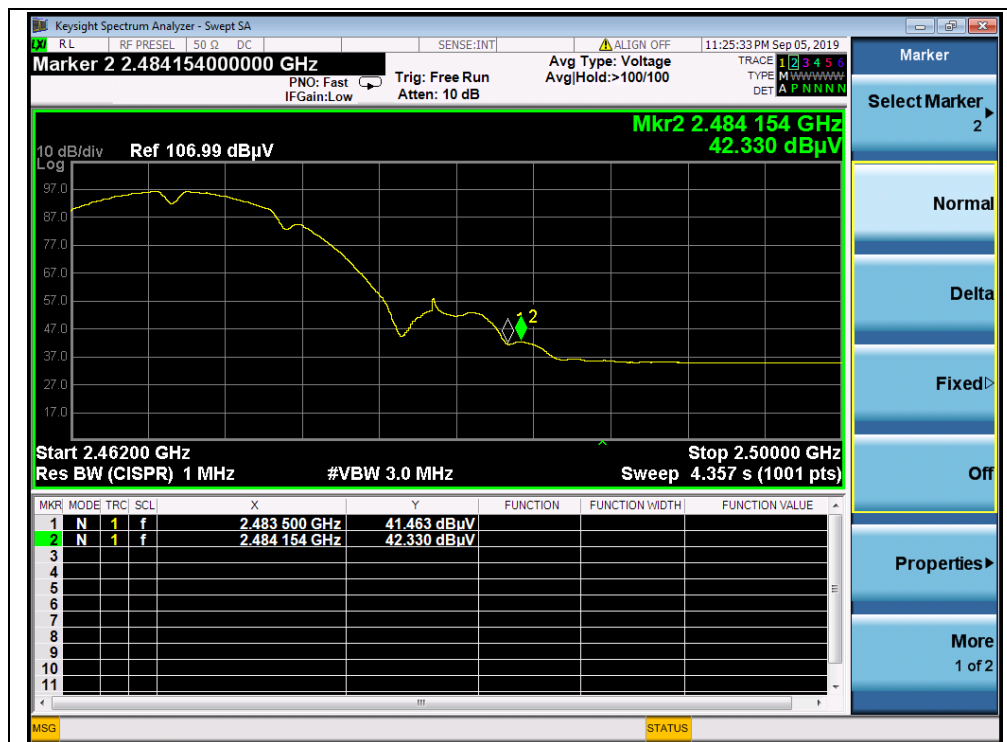
(Channel = 11 PEAK, 802.11b)



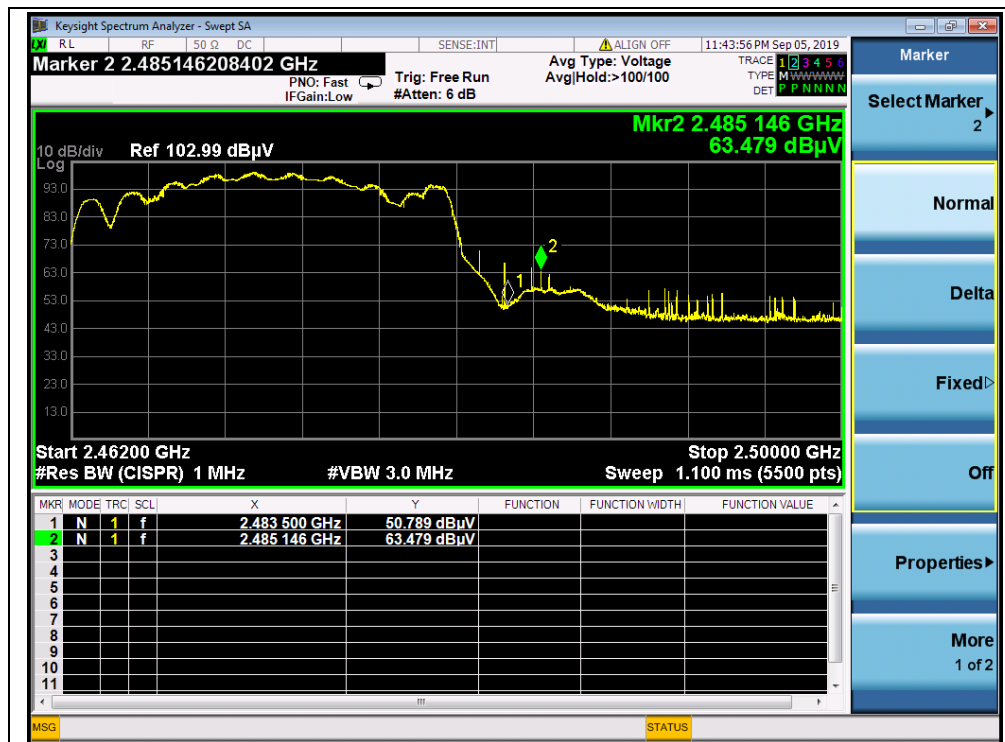
(Channel = 11 AVG, 802.11b)



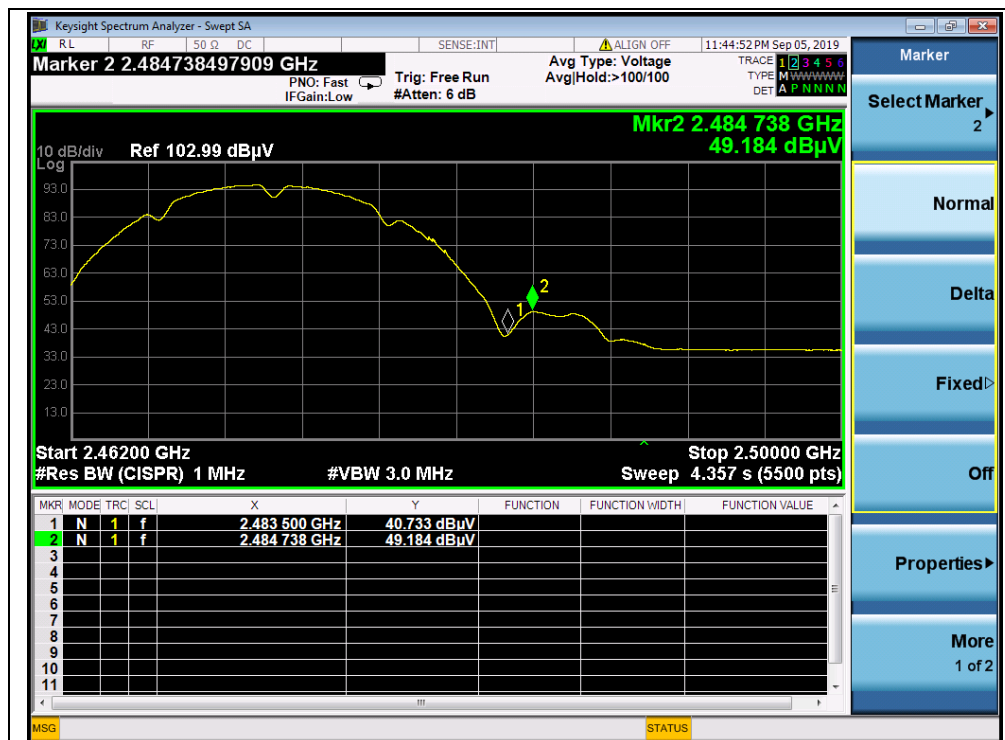
(Channel = 12 PEAK, 802.11b)



(Channel = 12 AVG, 802.11b)



(Channel = 13 PEAK, 802.11b)



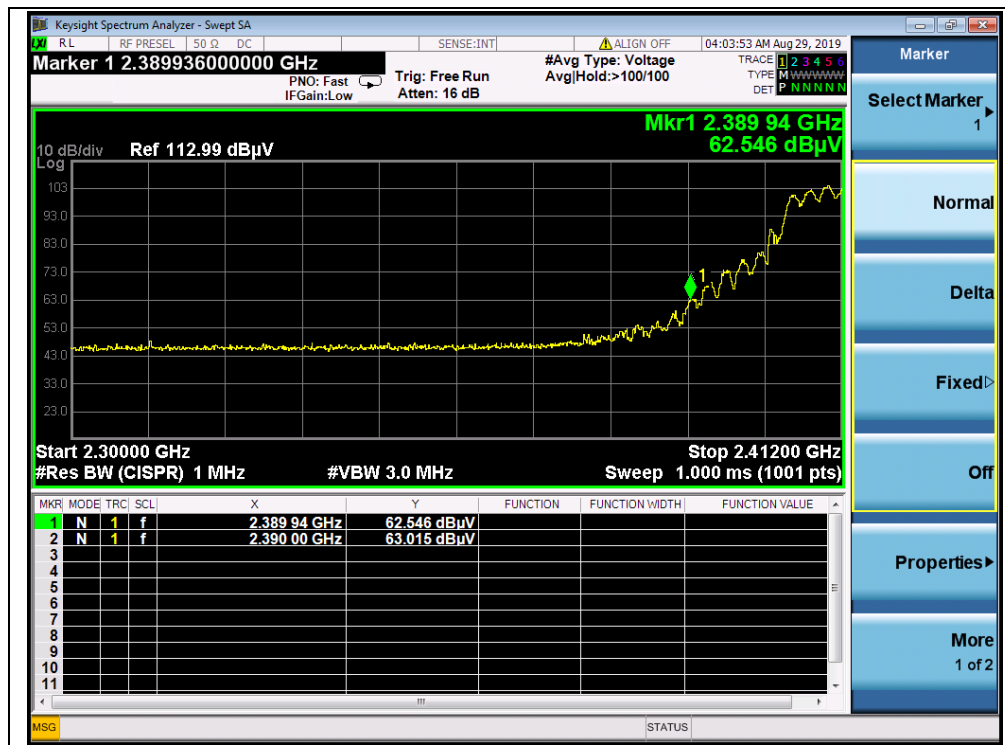
(Channel = 13 AVG, 802.11b)

**802.11g 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						
1	2390.00	PK	63.02	-29.67	32.56	65.91	74	PASS
1	2390.00	AV	47.95	-29.67	32.56	50.84	54	PASS
11	2484.46	PK	58.52	-29.67	32.56	61.41	74	PASS
11	2484.46	AV	41.92	-29.67	32.56	44.81	54	PASS
12	2483.66	PK	63.57	-29.67	32.56	66.46	74	PASS
12	2483.50	AV	43.64	-29.67	32.56	46.53	54	PASS
13	2483.50	PK	67.21	-29.67	32.56	70.10	74	PASS
13	2483.50	AV	48.51	-29.67	32.56	51.40	54	PASS



B. Test Plots:



(Channel = 1 PEAK, 802.11g)



(Channel = 1 AVG, 802.11g)



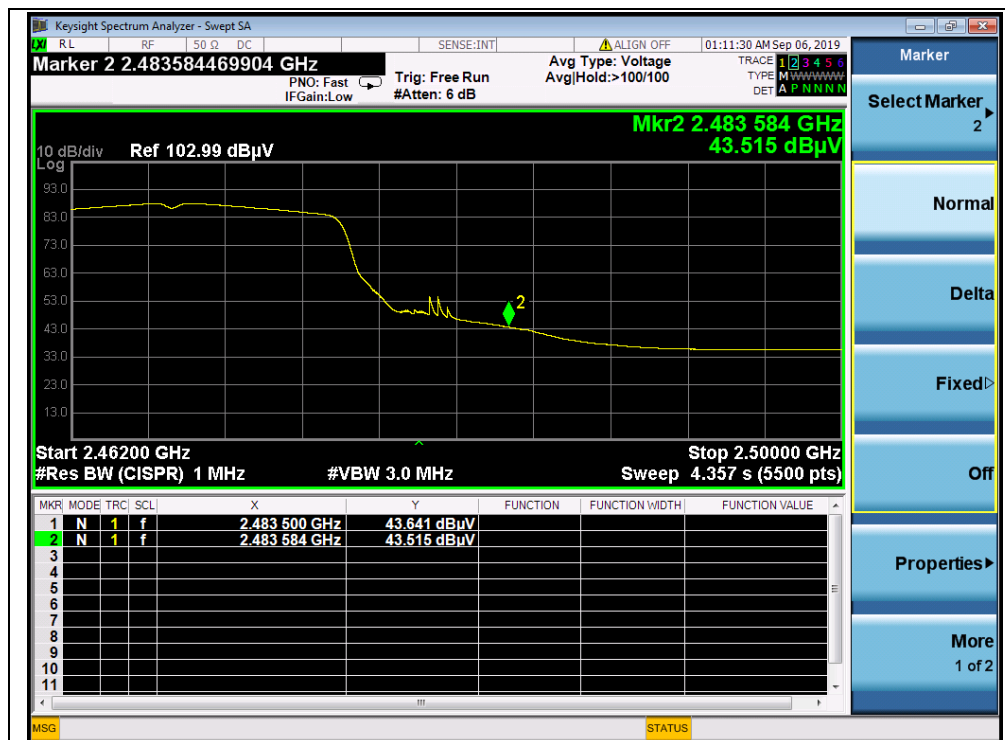
(Channel = 11 PEAK, 802.11g)



(Channel = 11 AVG, 802.11g)



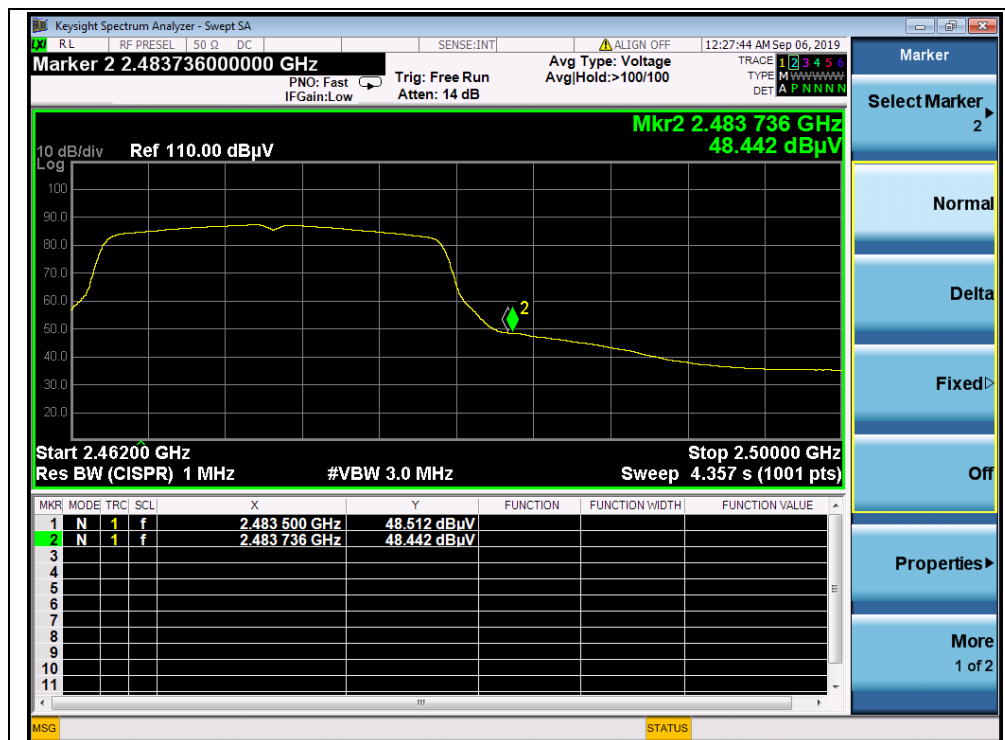
(Channel = 12 PEAK, 802.11g)



(Channel = 12 AVG, 802.11g)



(Channel = 13 PEAK, 802.11g)



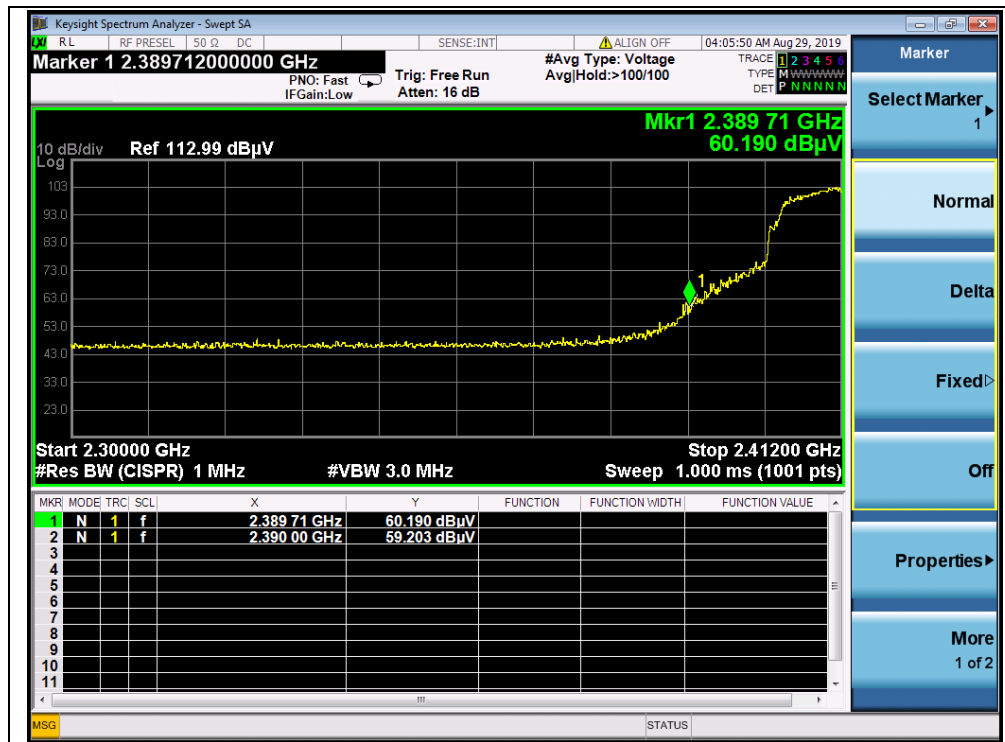
(Channel = 13 AVG, 802.11g)

**802.11 n(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 (dBuV/m)	Limit (dBuV/m)	Verdict
		PK/ AV						
1	2389.71	PK	60.19	-29.67	32.56	63.08	74	PASS
1	2390.00	AV	44.63	-29.67	32.56	47.52	54	PASS
11	2483.85	PK	60.52	-29.67	32.56	63.41	74	PASS
11	2483.50	AV	43.68	-29.67	32.56	46.57	54	PASS
12	2483.51	PK	63.69	-29.67	32.56	66.58	74	PASS
12	2483.50	AV	45.39	-29.67	32.56	48.28	54	PASS
13	2483.50	PK	69.17	-29.67	32.56	72.06	74	PASS
13	2483.50	AV	48.01	-29.67	32.56	50.90	54	PASS



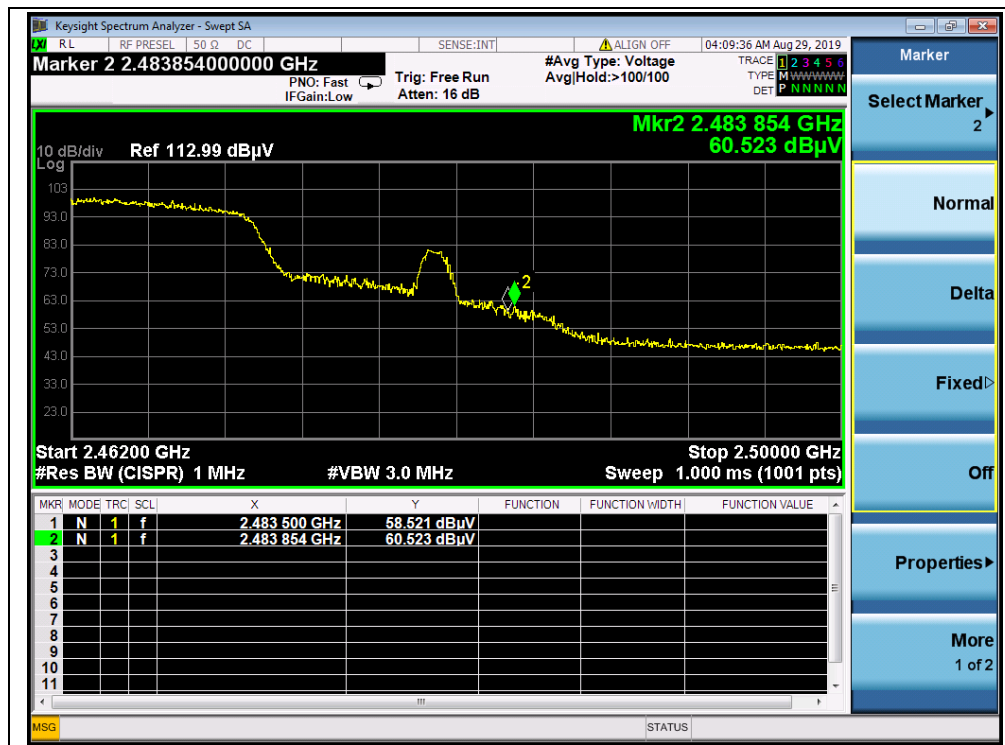
B. Test Plots:



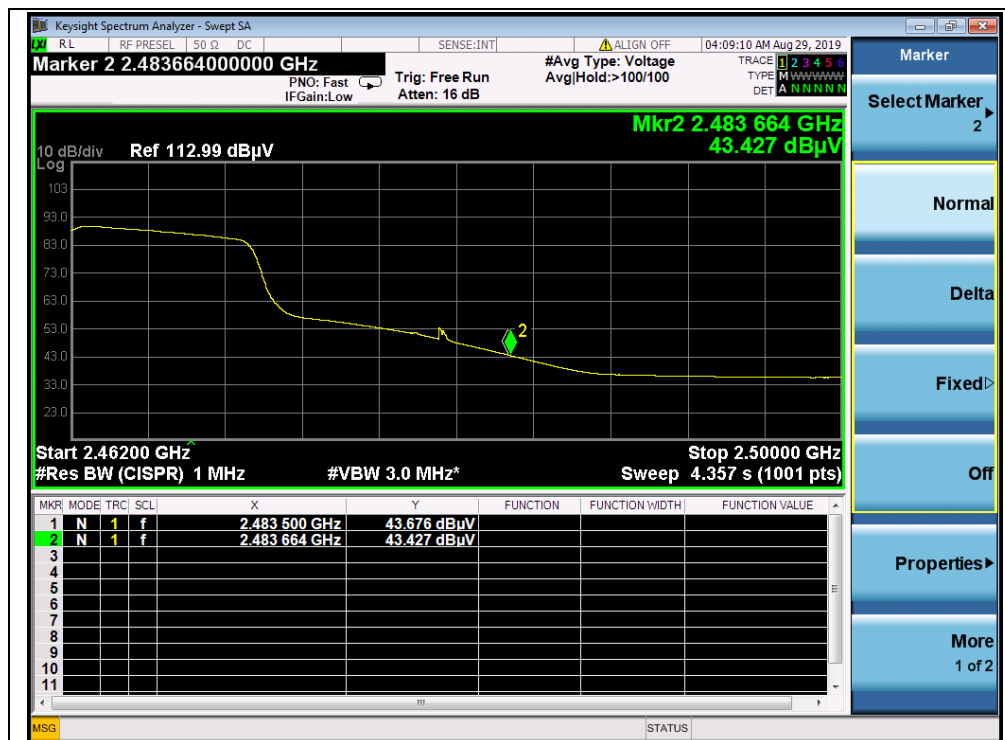
(Channel = 1 PEAK, 802.11n(HT20))



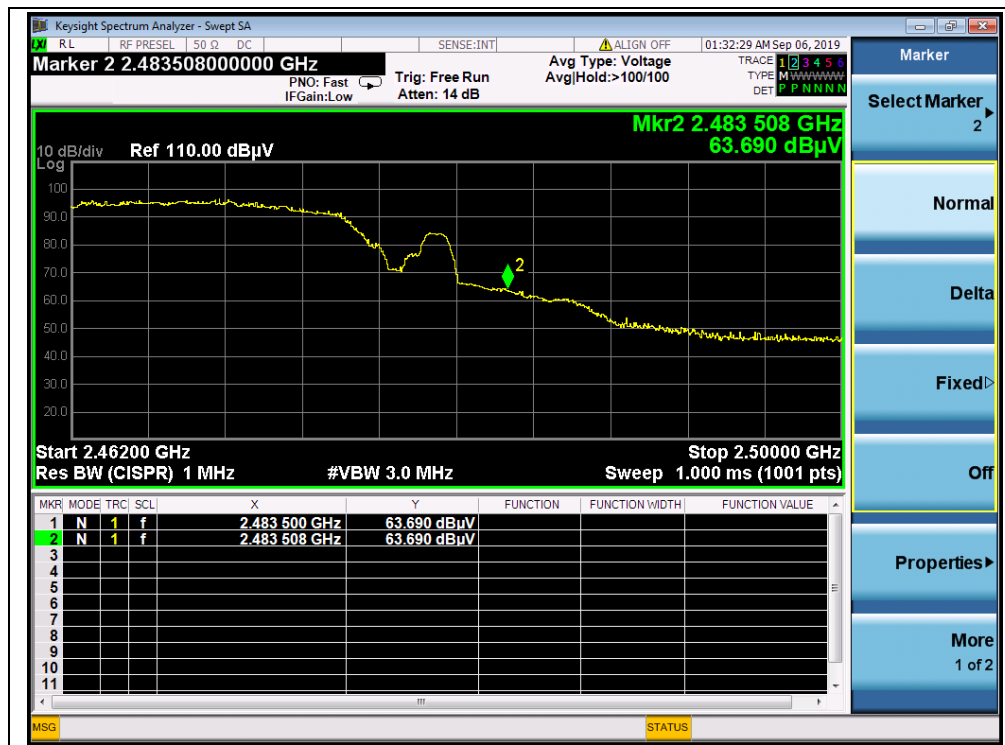
(Channel = 1 AVG, 802.11n(HT20))



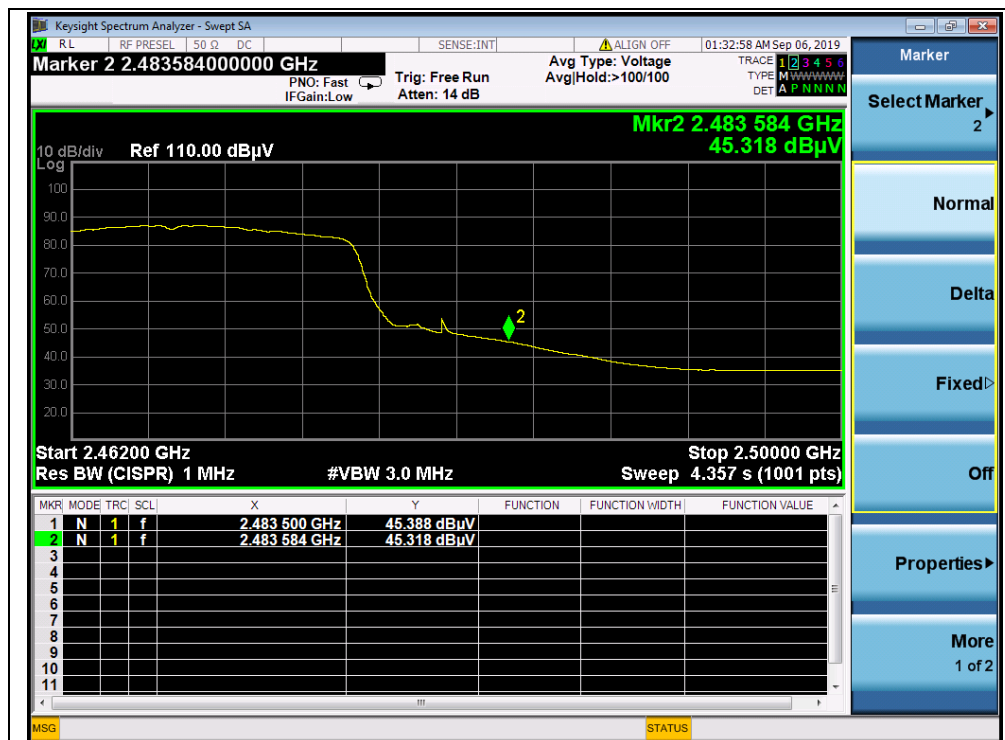
(Channel = 11 PEAK, 802.11n(HT20))



(Channel = 11 AVG, 802.11n(HT20))



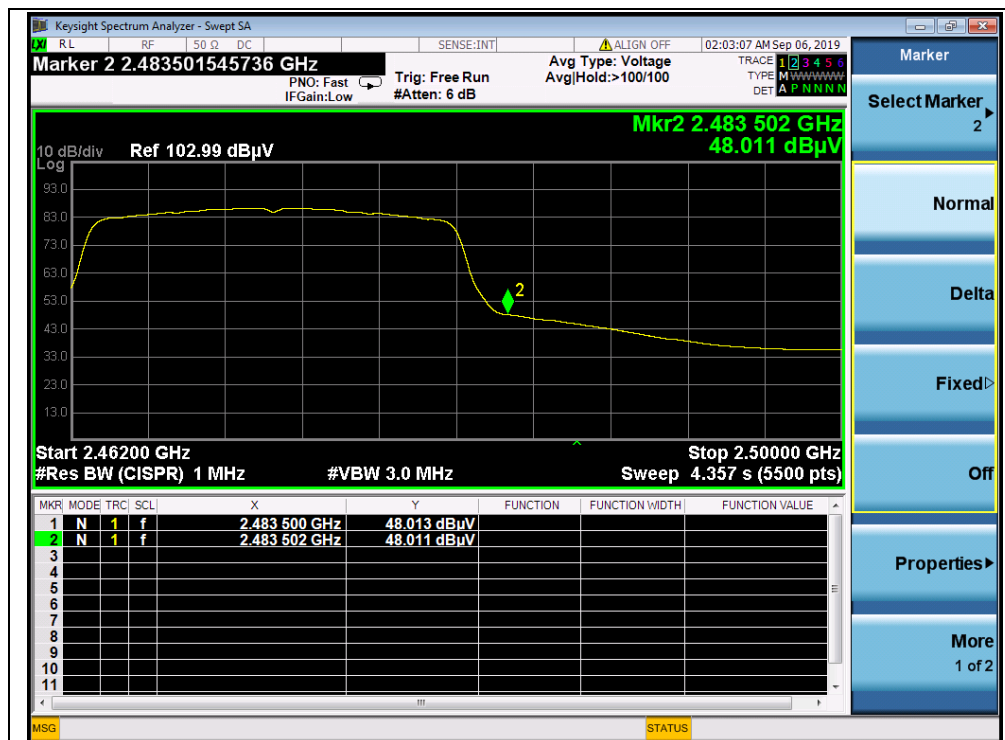
(Channel = 12 PEAK, 802.11n(HT20))



(Channel = 12 AVG, 802.11n(HT20))



(Channel = 13 PEAK, 802.11n(HT20))



(Channel = 13 AVG, 802.11n(HT20))

2.9. Radiated Emission

2.9.1. Requirement

According to FCC section 15.247(d), radiated emission outside the frequency band attenuation below the general limits specified in FCC section 15.209(a) is not required. In addition, radiated emissions which fall in the restricted bands, as defined in FCC section 15.205(a), must also comply with the radiated emission limits specified in FCC section 15.209(a).

According to FCC section 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 ($\mu\text{V/m}$)	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

Note:

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.

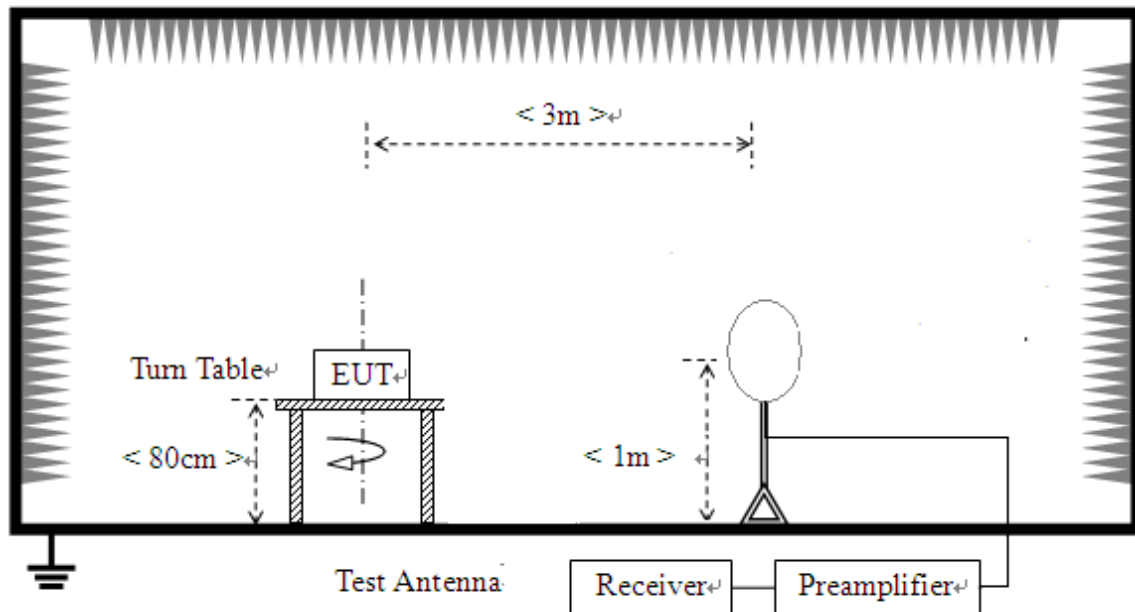
For above 1000MHz, limit field strength of harmonics: 54dBuV/m@3m (AV) and 74dBuV/m@3m (PK)

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)

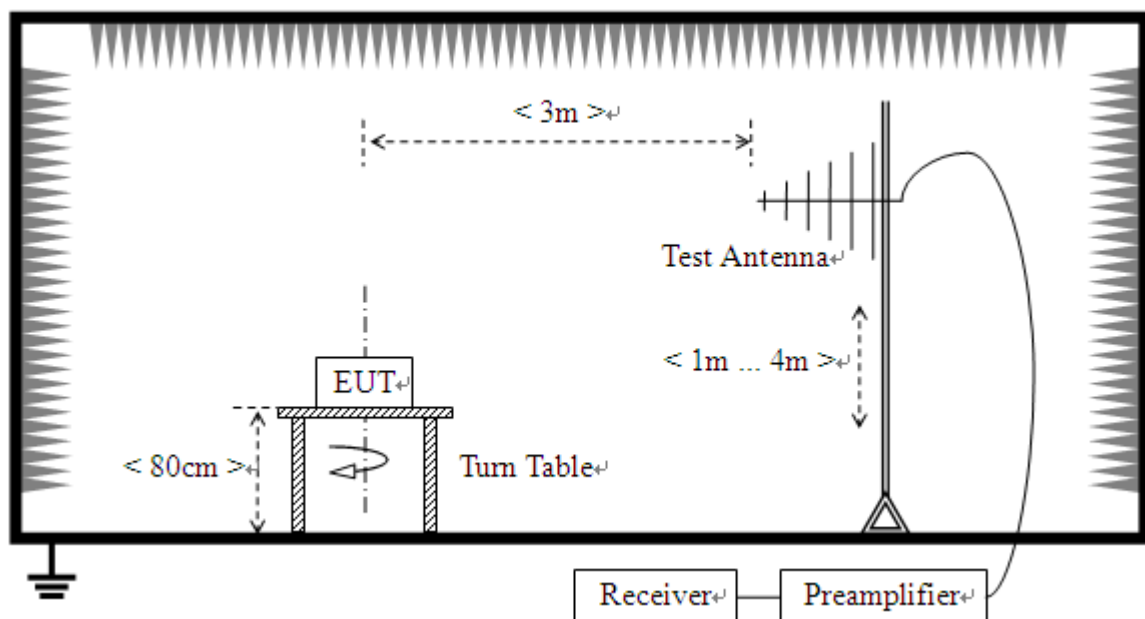
2.9.2. Test Description

A. Test Setup:

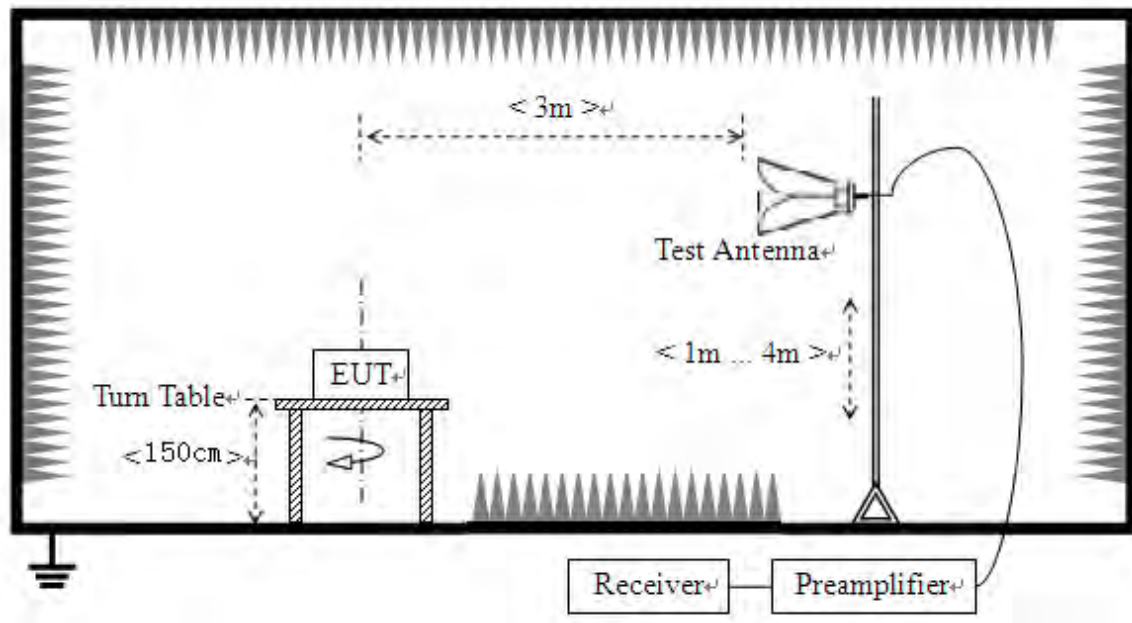
- 1) For radiated emissions from 9kHz to 30MHz



- 2) For radiated emissions from 30MHz to 1GHz



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. Test site have a minimum area of the ground plane covered with RF absorbing material as specified in Figure 6 of ANSI C63.4: 2014.

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

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 C63.10, 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 limit, it is unnecessary to perform an quasi-peak measurement.

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.

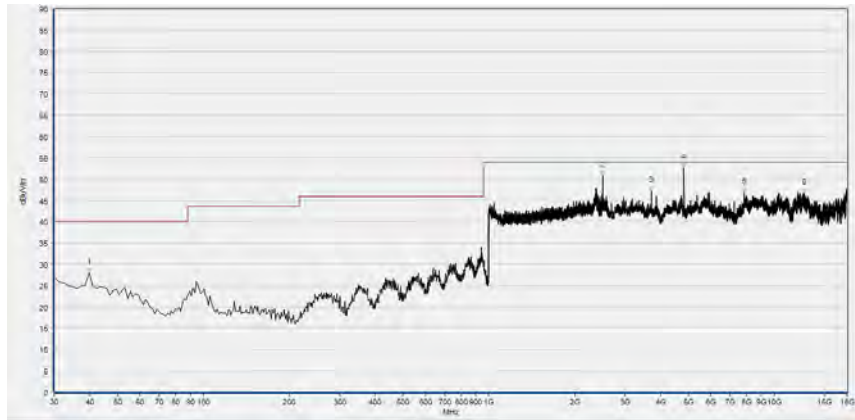
Note1: All radiated emission tests were performed in X, Y, Z axis direction. And only the worst axis test condition was recorded in this test report.

Note2: For the frequency, which started from 9 kHz 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 25GHz to 40GHz, was pre-scanned and the result which was 20dB lower than the limit was not recorded.

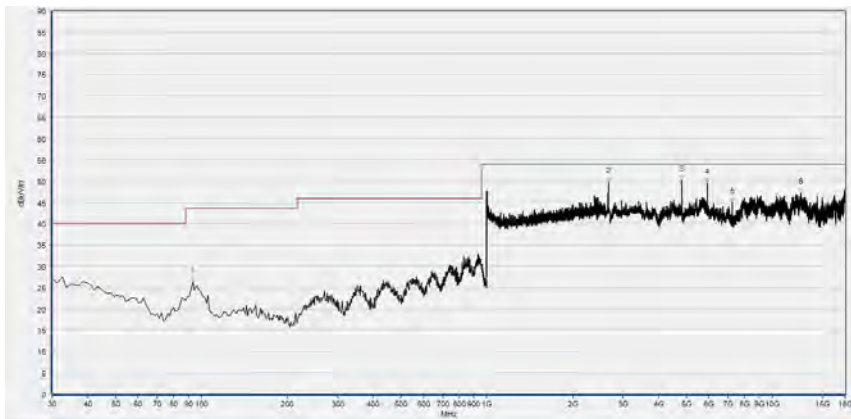
**802.11b Test mode**

Plots for Channel = 1



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
39.712	27.96	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
2504.602	50.86	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
3709.002	47.28	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4824.000	53.34	N/A	49.50	74.00	N/A	54.00	Horizontal	PASS
7850.955	46.86	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12746.245	46.72	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)

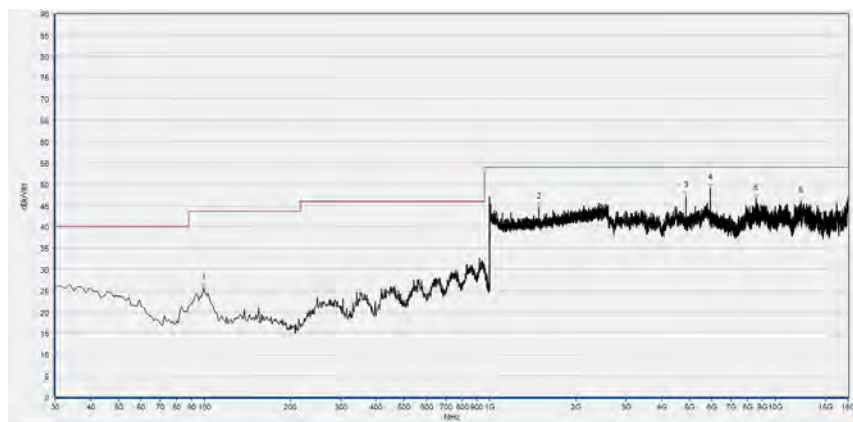


Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
93.129	26.28	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
2664.412	49.84	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4823.604	50.20	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5932.606	49.53	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
7234.843	45.07	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12564.212	47.30	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)

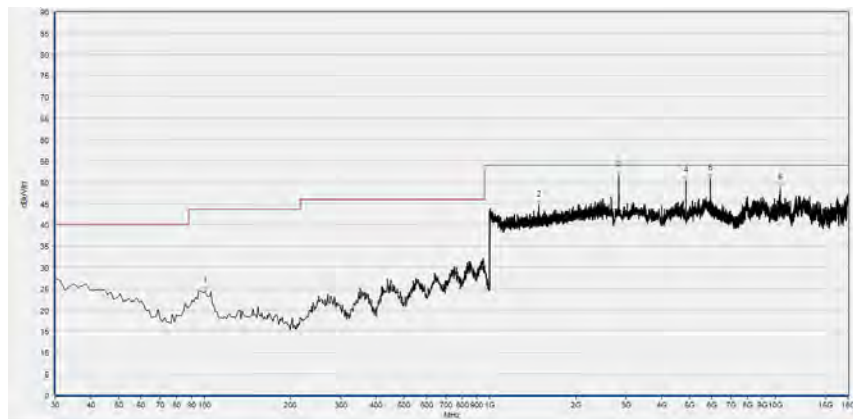


Plot for Channel = 6



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
99.199	25.66	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
1483.393	44.57	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4874.013	47.20	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5932.606	49.09	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8567.885	46.62	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12275.759	45.89	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)

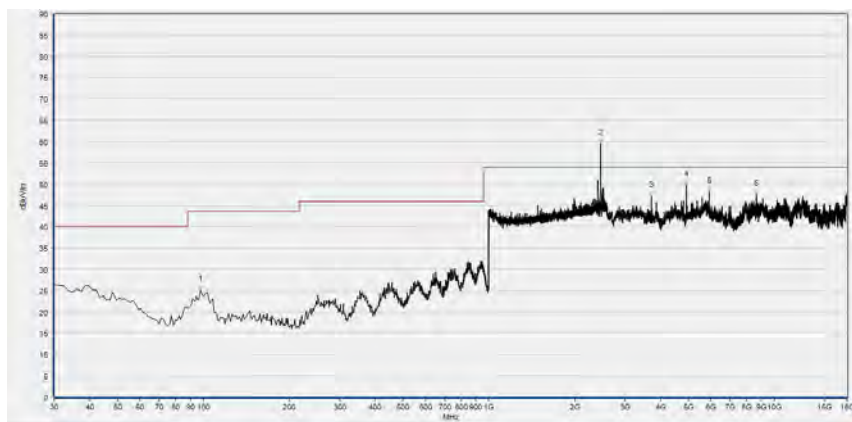


Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
100.413	24.41	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
1483.393	44.52	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
2832.442	51.61	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4874.013	50.21	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5935.406	50.71	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
10424.623	48.63	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)

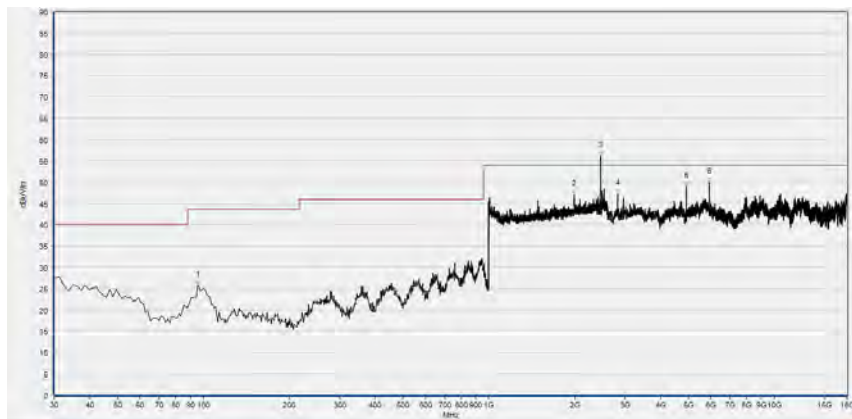


Plot for Channel = 11



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
97.985	25.13	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2462.985	59.43	N/A	N/A	74.00	N/A	54.00	Horizontal	N/A
3709.002	47.26	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4924.423	49.71	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5932.606	48.31	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8657.501	47.63	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)

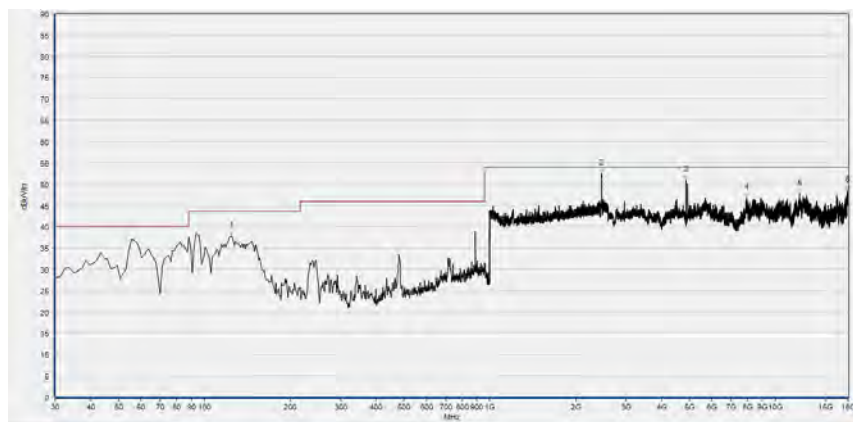


Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
95.557	25.79	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
1992.397	47.05	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
2462.985	56.11	N/A	N/A	74.00	N/A	54.00	Vertical	N/A
2824.041	47.21	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4924.423	48.99	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5932.606	49.86	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)

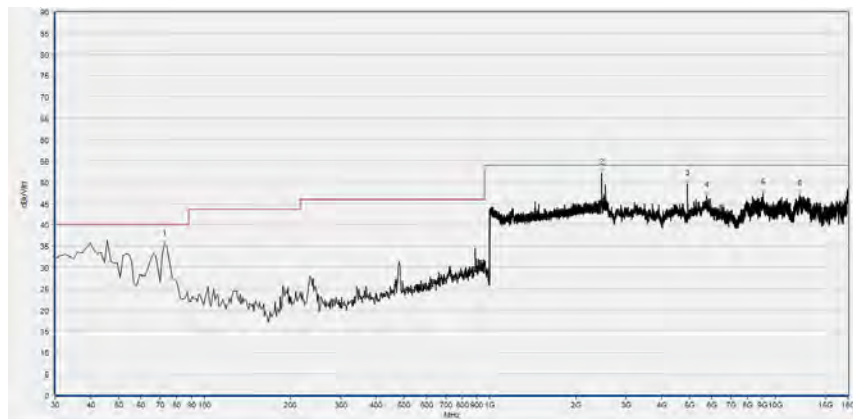


Plot for Channel = 12



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
124.693	37.80	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2465.546	52.46	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4871.213	50.98	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
7960.175	46.73	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12188.943	47.69	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
17932.788	48.35	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

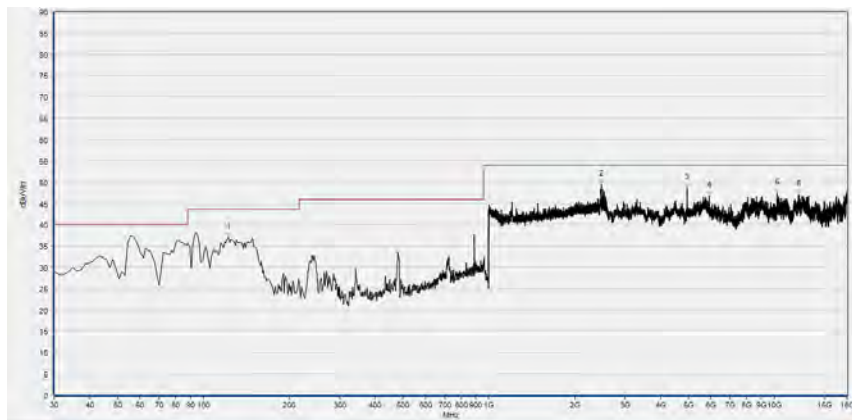
(Antenna Horizontal, 30MHz to 25GHz)



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
72.491	35.37	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
2463.625	52.04	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4932.824	49.53	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5750.573	46.74	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
9057.974	47.41	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12174.941	47.10	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

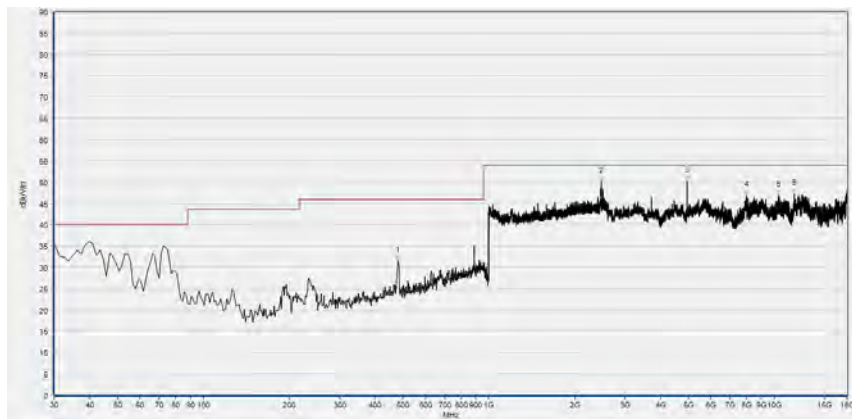
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 13



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
122.265	37.07	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2473.870	49.36	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4944.026	48.68	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5932.606	46.80	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
10250.991	47.48	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12186.143	47.05	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)

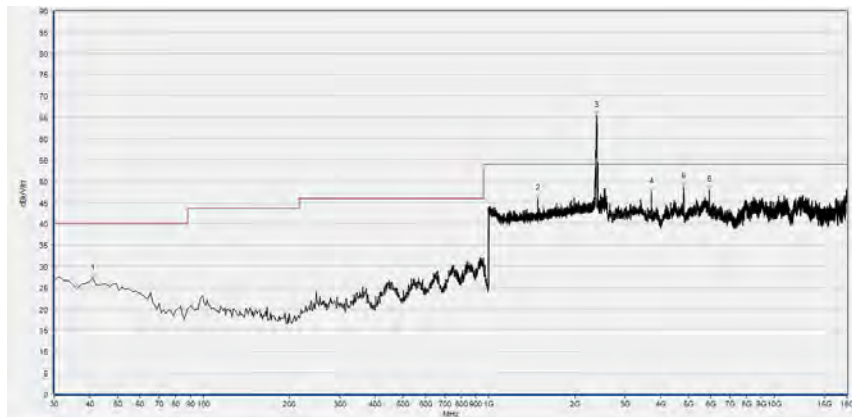


Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
480.401	31.43	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2475.150	50.04	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4944.026	50.24	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8002.182	46.93	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
10363.011	46.97	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
11735.261	47.30	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)

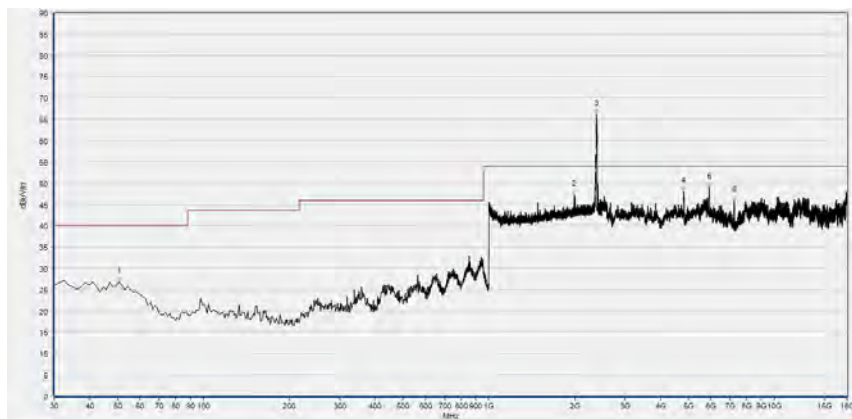
**802.11g Test mode**

Plots for Channel = 1



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
40.926	27.16	N/A	N/A	N/A	40.00	N/A	Horizontal	PASS
1483.393	45.88	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
2383.800	65.35	N/A	47.09	74.00	N/A	54.00	Horizontal	PASS
3709.002	47.45	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4823.604	48.64	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5932.606	47.89	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

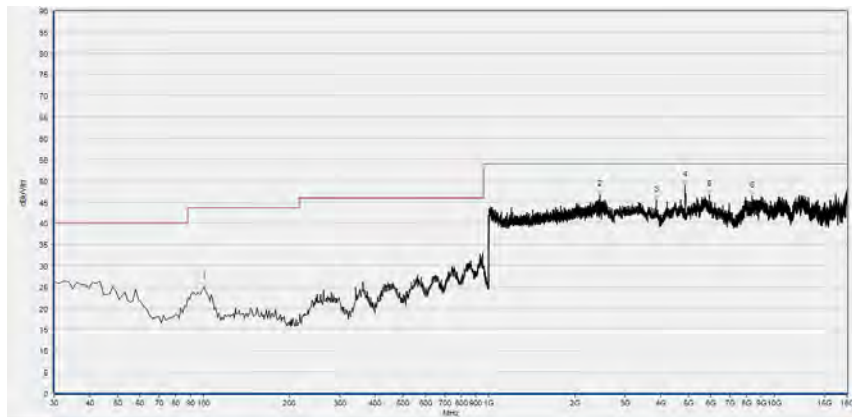
(Antenna Horizontal, 30MHz to 25GHz)



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
50.638	26.81	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
1996.879	47.27	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
2387.100	65.78	N/A	47.82	74.00	N/A	54.00	Vertical	PASS
4823.604	48.12	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5932.606	48.87	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
7226.441	45.96	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

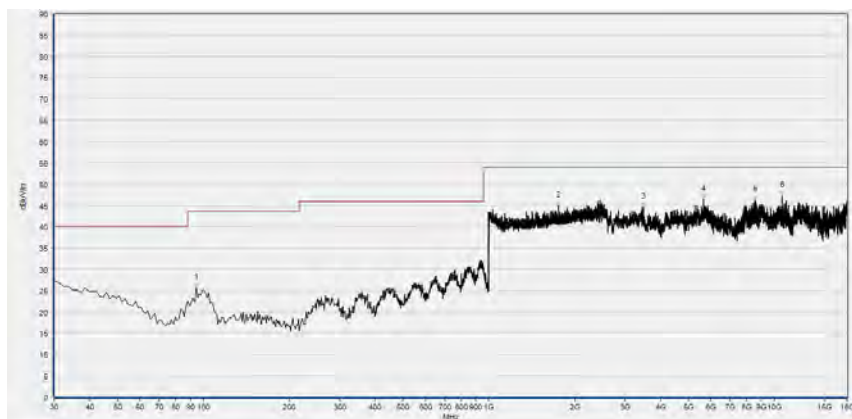
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 6



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
100.413	24.96	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2443.778	46.69	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
3854.628	45.41	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4871.213	48.87	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5935.406	46.74	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8380.251	46.36	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

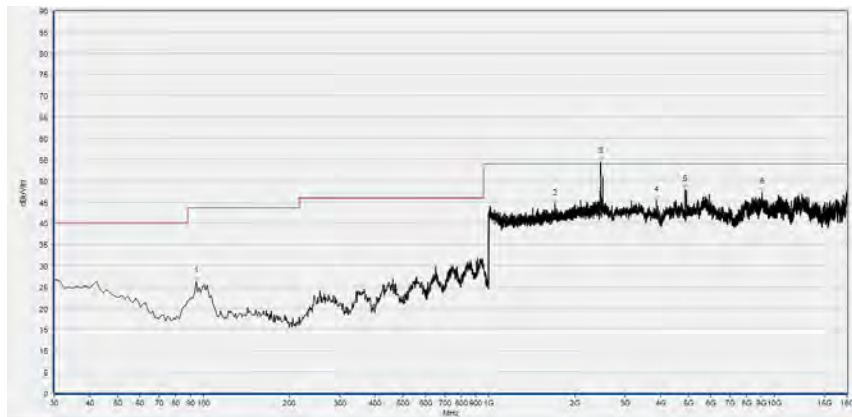
(Antenna Horizontal, 30MHz to 25GHz)



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
94.343	25.58	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
1758.703	44.91	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
3482.160	44.58	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5660.957	46.49	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8567.885	46.30	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
10629.060	47.31	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

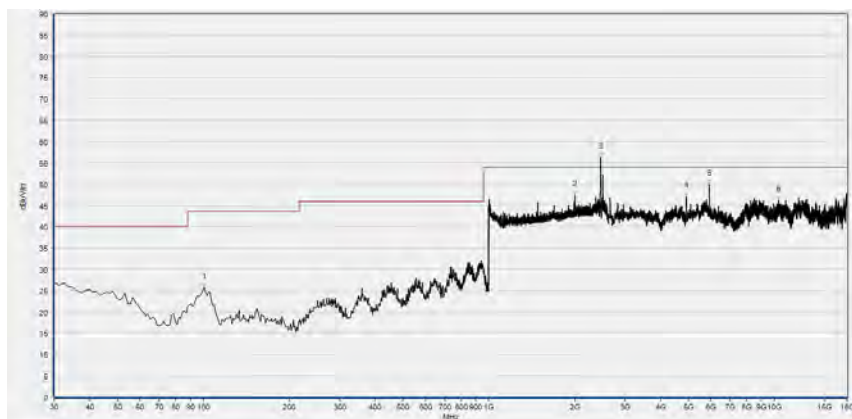
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 11



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
94.343	26.38	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
1703.001	44.57	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
2461.064	54.43	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
3857.429	45.41	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4851.609	47.99	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
9069.176	47.27	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

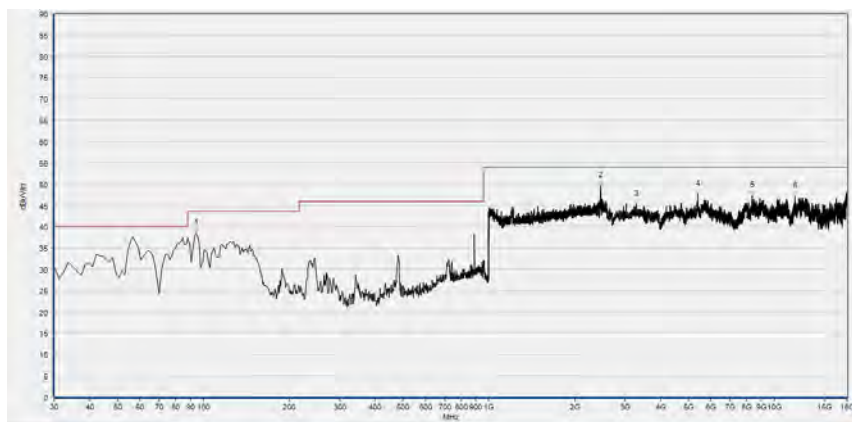
(Antenna Horizontal, 30MHz to 25GHz)



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
100.413	25.88	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
1998.800	47.40	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
2463.625	56.32	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4924.423	47.17	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5932.606	49.95	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
10360.211	46.19	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

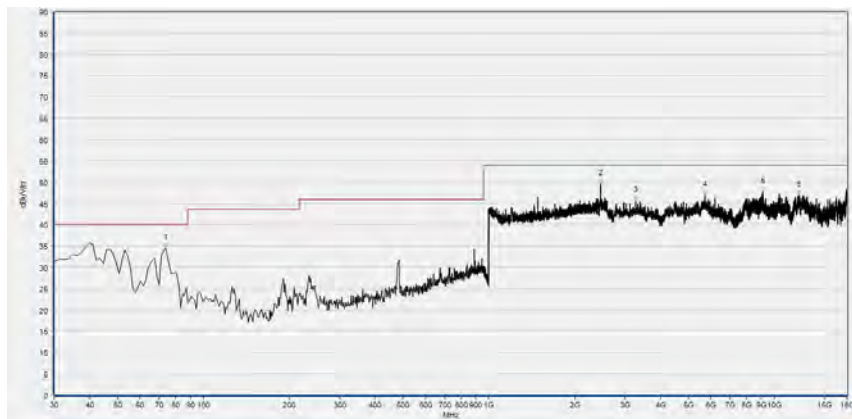
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 12



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
94.343	38.37	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2463.625	49.68	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
3288.925	45.33	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5392.108	47.62	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8383.051	47.19	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
11830.478	47.04	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

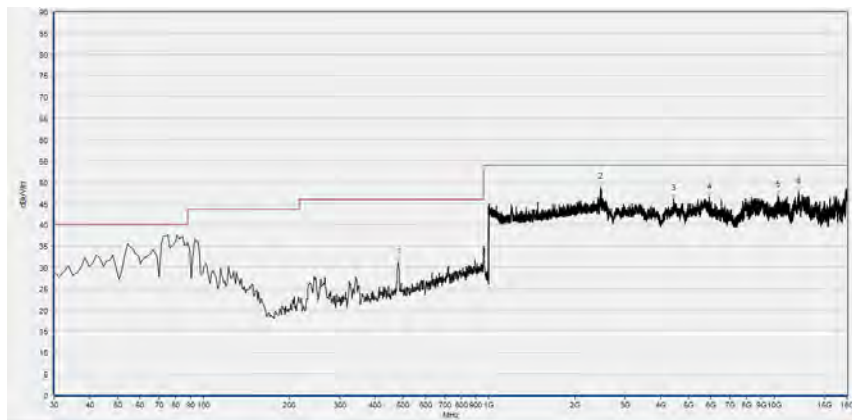
(Antenna Horizontal, 30MHz to 25GHz)



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
73.705	34.57	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
2464.906	49.64	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
3277.723	45.54	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5728.169	46.87	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
9144.790	47.74	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12174.941	47.00	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

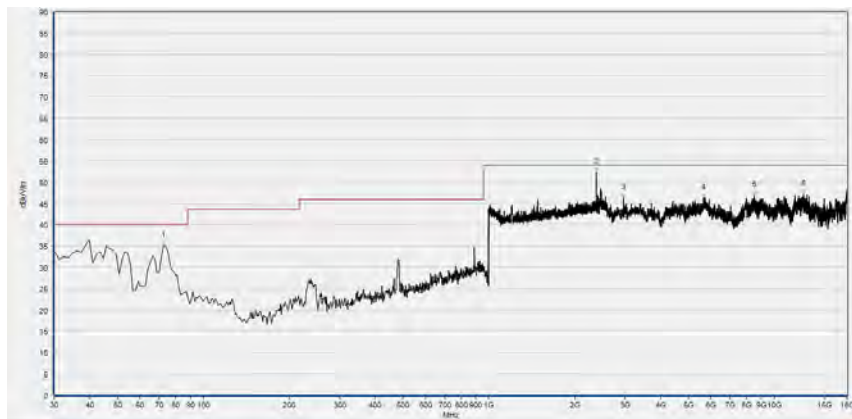
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 13



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
481.615	31.18	N/A	N/A	N/A	46.00	N/A	Horizontal	PASS
2466.186	48.81	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4439.935	46.06	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5935.406	46.39	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
10276.196	46.85	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12188.943	47.71	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)

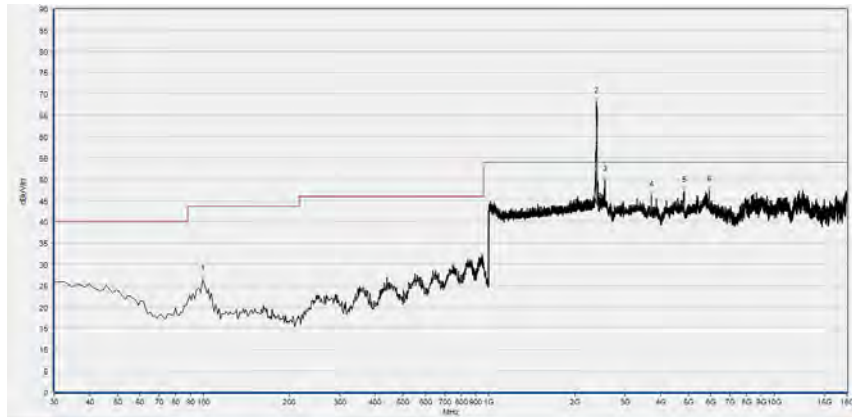


Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
72.491	35.04	N/A	N/A	N/A	40.00	N/A	Vertical	PASS
2383.593	52.28	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
2966.867	46.20	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5652.555	46.33	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8497.872	46.96	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12634.224	47.03	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)

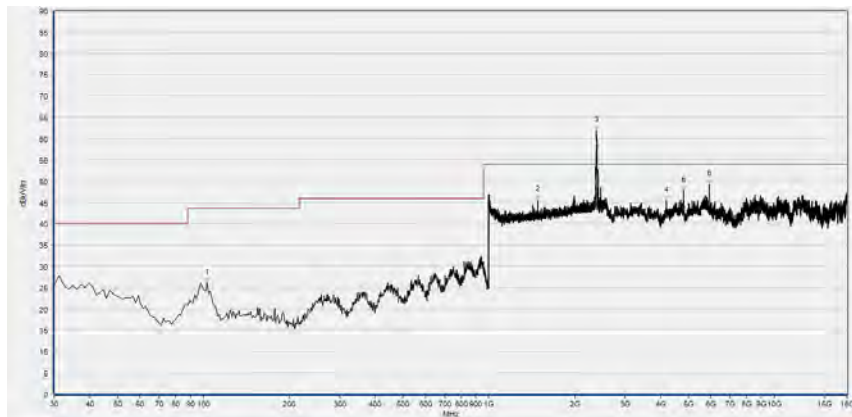
**802.11n(HT20) Test mode**

Plots for Channel = 1



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
99.199	26.42	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2388.600	67.80	N/A	47.91	74.00	N/A	54.00	Horizontal	PASS
2547.499	49.70	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
3709.002	46.24	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4832.006	47.21	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5932.606	47.37	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

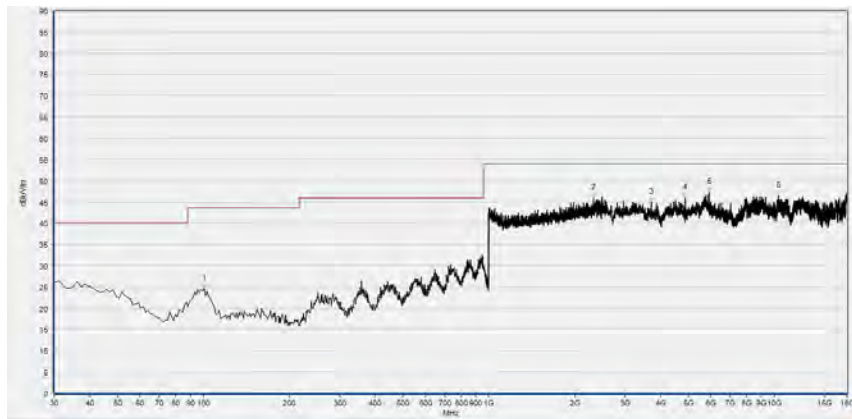
(Antenna Horizontal, 30MHz to 25GHz)



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
102.841	26.17	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
1483.393	45.57	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
2385.900	61.10	N/A	41.17	74.00	N/A	54.00	Vertical	PASS
4190.689	45.42	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4815.203	47.81	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5932.606	49.21	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

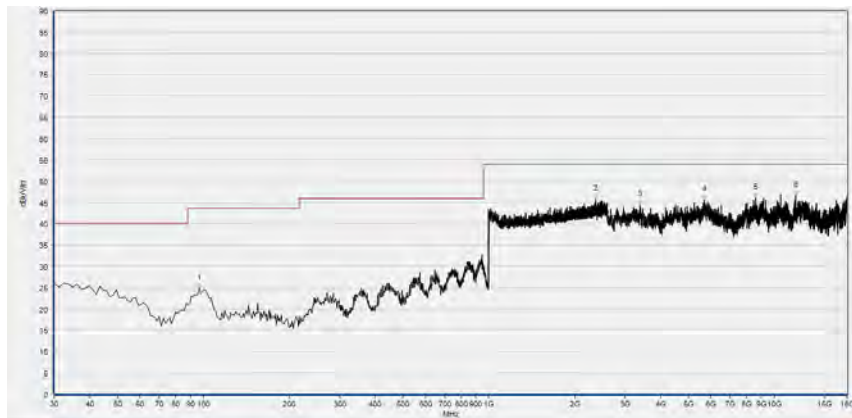
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 6



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
100.413	24.57	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2321.489	45.93	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
3709.002	44.94	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4876.814	45.97	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5932.606	47.25	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
10363.011	46.50	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

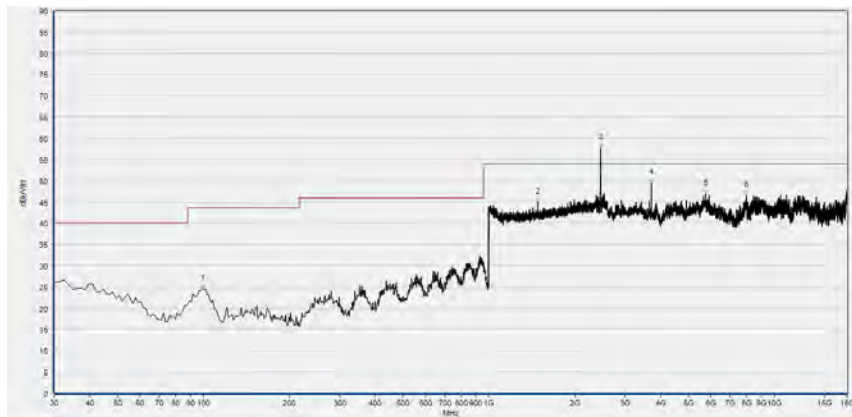
(Antenna Horizontal, 30MHz to 25GHz)



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
96.771	24.74	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
2372.709	45.76	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
3392.544	44.39	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5694.563	45.54	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8593.090	46.01	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
11872.486	46.62	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

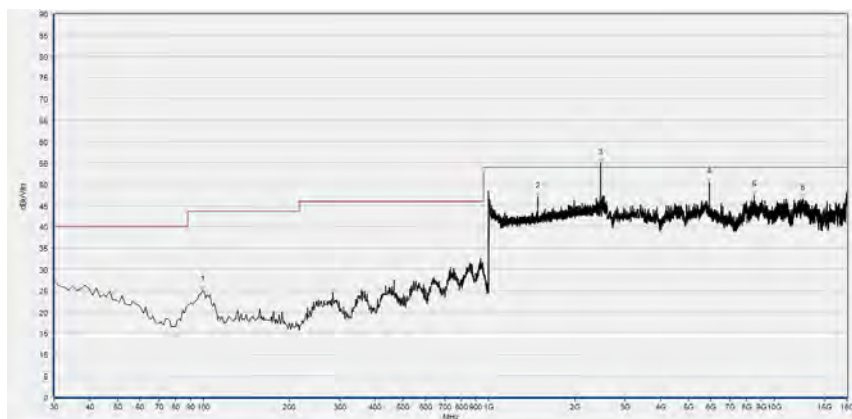
(Antenna Vertical, 30MHz to 25GHz)

Plot for Channel = 11



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
99.199	24.70	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
1483.393	44.88	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
2462.985	57.65	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
3709.002	49.52	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5750.573	46.96	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
7993.781	46.59	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)

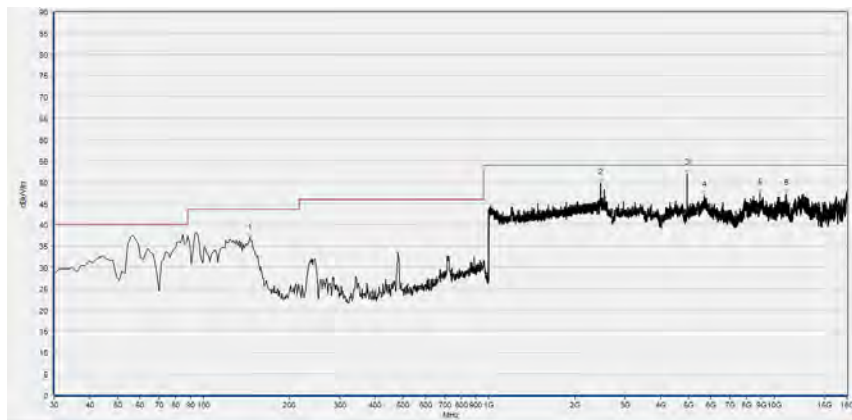


Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
99.199	25.15	N/A	N/A	N/A	43.50	N/A	Vertical	PASS
1483.393	47.05	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
2462.985	54.94	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5932.606	50.43	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8492.271	47.42	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12614.621	46.52	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)

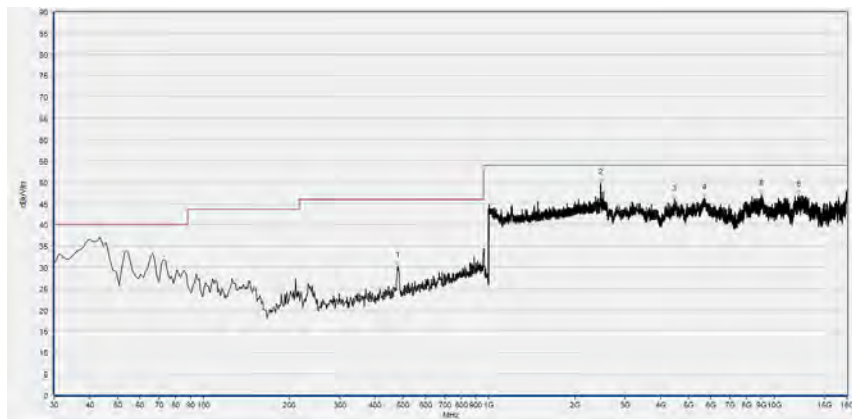


Plot for Channel = 12



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
145.332	36.88	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
2463.625	49.75	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
4960.700	52.95	N/A	31.94	74.00	N/A	54.00	Horizontal	PASS
5686.161	46.84	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8926.350	47.36	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
10998.727	47.18	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)

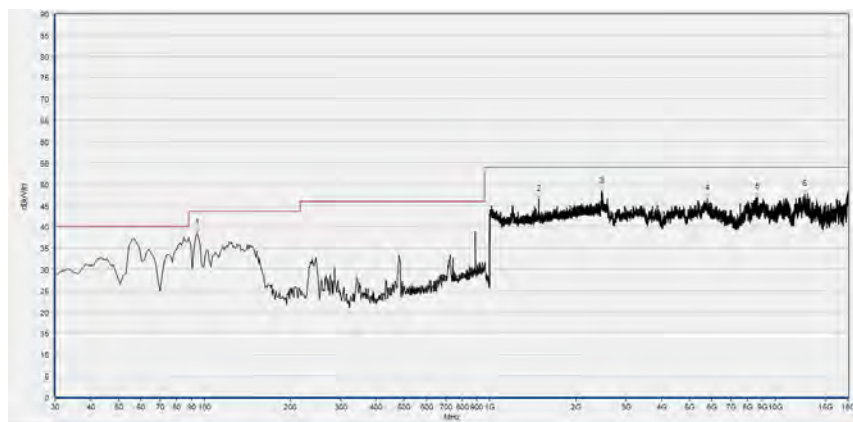


Fre. (MHz)	Pk (dBμV/m)	QP (dBμV/m)	AV (dBμV/m)	Limit-PK (dBμV/m)	Limit-QP (dBμV/m)	Limit-AV (dBμV/m)	Antenna	Verdict
479.186	30.38	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2464.266	49.78	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
4473.541	45.95	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5688.962	46.26	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
9021.568	47.08	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12186.143	46.88	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)

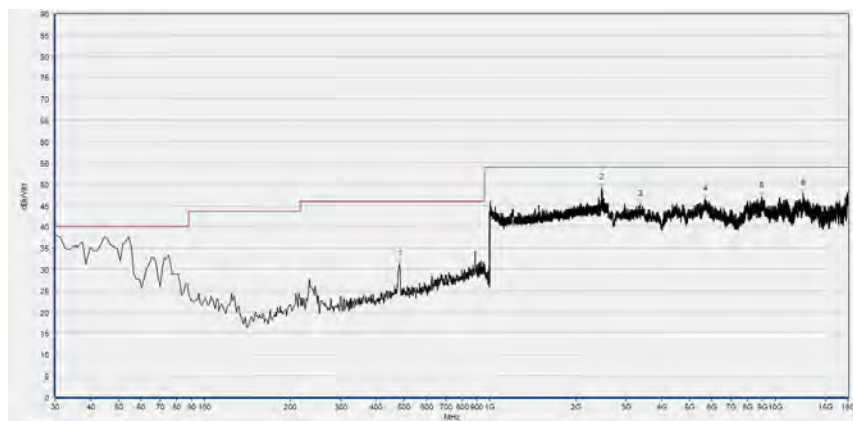


Plot for Channel = 13



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
94.343	38.33	N/A	N/A	N/A	43.50	N/A	Horizontal	PASS
1483.393	46.46	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
2463.625	48.28	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
5767.376	46.57	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
8651.900	46.93	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS
12639.825	47.56	N/A	N/A	74.00	N/A	54.00	Horizontal	PASS

(Antenna Horizontal, 30MHz to 25GHz)



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
482.829	31.11	N/A	N/A	N/A	46.00	N/A	Vertical	PASS
2464.906	49.18	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
3358.938	45.22	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
5677.760	46.45	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
8951.555	47.02	N/A	N/A	74.00	N/A	54.00	Vertical	PASS
12553.010	47.77	N/A	N/A	74.00	N/A	54.00	Vertical	PASS

(Antenna Vertical, 30MHz to 25GHz)

Annex A Test Uncertainty

Where relevant, the following measurement uncertainty levels have been estimated for test performed on the EUT as specified in CISPR 16-1-2:

Test items	Uncertainty
Peak Output Power	$\pm 2.22\text{dB}$
Power spectral density (PSD)	$\pm 2.22\text{dB}$
Bandwidth	$\pm 5\%$
Conducted Spurious Emission	$\pm 2.77\text{ dB}$
Restricted Frequency Bands	$\pm 5\%$
Radiated Emission	$\pm 2.95\text{dB}$
Conducted Emission	$\pm 2.44\text{dB}$

This uncertainty represent an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of $k=2$



Annex B Testing Laboratory Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Laboratory Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

3. Facilities and Accreditations

All measurement facilities used to collect the measurement data are located at FL.3, Building A, FeiYang Science Park, Block 67, BaoAn District, Shenzhen, 518101 P. R. China. The test site is constructed in conformance with the requirements of ANSI C63.10-2013 and CISPR Publication 22; the FCC designation number is CN1192, the test firm registration number is 226174.



4. Test Equipments Utilized

4.1 Conducted Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal. Due
Attenuator 1	(N/A.)	10dB	Resnet	N/A	N/A
EXA Signal Analyzer	MY53470836	N9010A	Agilent	2019.04.09	2020.04.08
USB Wideband Power Sensor	MY54210011	U2021XA	Agilent	2019.04.16	2020.04.15
RF cable (30MHz-26GHz)	CB01	RF01	Morlab	N/A	N/A
Coaxial cable	CB02	RF02	Morlab	N/A	N/A
SMA connector	CN01	RF03	HUBER-SUHNER	N/A	N/A
Computer	T430i	Think Pad	Lenovo	N/A	N/A

4.2 Conducted Emission Test Equipments

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal. Due
Receiver	MY56400093	N9038A	KEYSIGHT	2019.05.08	2020.05.09
LISN	812744	NSLK 8127	Schwarzbeck	2019.05.08	2020.05.09
Pulse Limiter (20dB)	9391	VTSD 9561-D	Schwarzbeck	2019.05.08	2020.05.09
Coaxial cable(BNC) (30MHz-26GHz)	CB01	EMC01	Morlab	N/A	N/A
Adapter	N/A	HKC00550 10-3E	ViVo	N/A	N/A

4.3 List of Software Used

Description	Manufacturer	Software Version
Test system	Tonscend	V2.6
Power Panel	Agilent	V3.8
MORLAB EMCR V1.2	MORLAB	V 1.0

**4.4 Radiated Test Equipments**

Equipment Name	Serial No.	Type	Manufacturer	Cal. Date	Cal. Due
Receiver	MY54130016	N9038A	Agilent	2019.07.26	2020.07.25
Test Antenna - Bi-Log	9163-519	VULB 9163	Schwarzbeck	2019.05.08	2020.05.09
Test Antenna - Loop	1519-022	FMZB1519	Schwarzbeck	2019.02.15	2020.02.14
Test Antenna – Horn	01774	BBHA 9120D	Schwarzbeck	2019.07.26	2020.07.25
Test Antenna – Horn	BBHA9170 #774	BBHA9170	Schwarzbeck	2019.07.26	2020.07.25
Coaxial cable (N male) (9KHz-30MHz)	CB04	EMC04	Morlab	N/A	N/A
Coaxial cable (N male) (30MHz-26GHz)	CB02	EMC02	Morlab	N/A	N/A
Coaxial cable (N male) (30MHz-26GHz)	CB03	EMC03	Morlab	N/A	N/A
1-18GHz pre-Amplifier	MA02	TS-PR18	Rohde& Schwarz	2019.05.08	2020.05.09
18-26.5GHz pre-Amplifier	MA03	TS-PR18	Rohde& Schwarz	2019.05.08	2020.05.09
Notch Filter	N/A	WRCG-2400-2483.5-60SS	Wainwright	2018.12.01	2019.11.30
Anechoic Chamber	N/A	9m*6m*6m	CRT	2017.11.19	2020.11.18

————— END OF REPORT —————