



9. RADIATED TEST RESULTS

LIMITS

Please refer to FCC §15.205 and §15.209

Please refer to RSS-GEN Clause 8.9 (Transmitter)

Radiation Disturbance Test Limit for FCC (Class B)(9KHz-1GHz)

Frequency (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
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
960~1000	500	3

Note: 1) At frequencies at or above 30 MHz, measurements may be performed at a distance other than what is specified provided: measurements are not made in the near field except where it can be shown that near field measurements are appropriate due to the characteristics of the device; and it can be demonstrated that the signal levels needed to be measured at the distance employed can be detected by the measurement equipment. Measurements shall not be performed at a distance greater than 30 meters unless it can be further demonstrated that measurements at a distance of 30 meters or less are impractical. When performing measurements at a distance other than that specified, the results shall be extrapolated to the specified distance using an extrapolation factor of 20 dB/decade (inverse linear-distance for field strength measurements; inverse-linear-distance-squared for power density measurements).

(2) At frequencies below 30 MHz, measurements may be performed at a distance closer than that specified in the regulations; however, an attempt should be made to avoid making measurements in the near field. Pending the development of an appropriate measurement procedure for measurements performed below 30 MHz, when performing measurements at a closer distance than specified, the results shall be extrapolated to the specified distance by either making measurements at a minimum of two distances on at least one radial to determine the proper extrapolation factor or by using the square of an inverse linear distance extrapolation factor (40 dB/decade). This paragraph (f) shall not apply to Access BPL devices operating below 30 MHz.



Radiation Disturbance Test Limit for FCC (Above 1G)

Frequency (MHz)	dB(uV/m) (at 3 meters)	
	Peak	Average
Above 1000	74	54

Restricted bands of operation

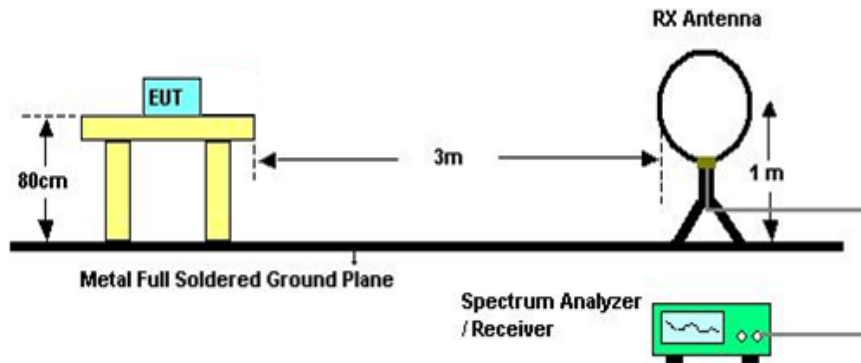
MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
¹ 0.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	108-121.94	1718.8-1722.2	13.25-13.4
6.31175-6.31225	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(²)
13.36-13.41			

Note: ¹Until February 1, 1999, this restricted band shall be 0.490-0.510 MHz.

²Above 38.6c

TEST SETUP AND PROCEDURE

Below 30MHz



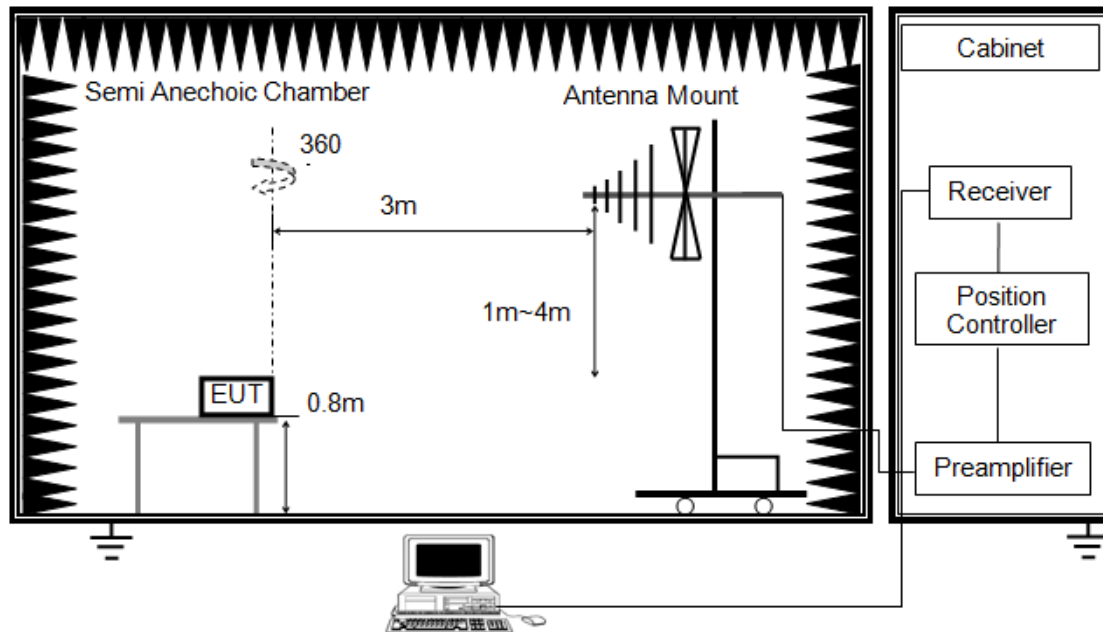
The setting of the spectrum analyser

RBW	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)
VBW	200Hz (From 9kHz to 0.15MHz)/ 9KHz (From 0.15MHz to 30MHz)
Sweep	Auto
Detector	Peak/QP/ Average
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013
2. The EUT was arranged to its worst case and then turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 0.8 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
6. For the actual test configuration, please refer to the related item in this test report (Photographs of the Test Configuration)

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

Below 1G

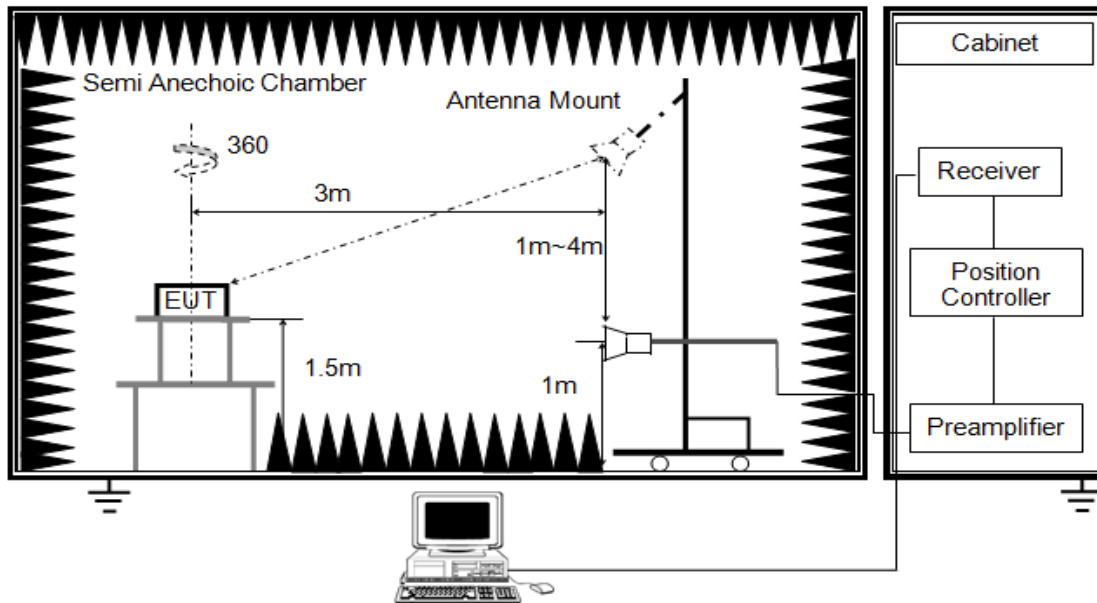


The setting of the spectrum analyser

RBW	120K
VBW	300K
Sweep	Auto
Detector	Peak/QP
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 0.8 meter above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. For measurement below 1GHz, the initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured. If the emission level of the EUT measured by the peak detector is 3 dB lower than the applicable limit, the peak emission level will be reported. Otherwise, the emission measurement will be repeated using the quasi-peak detector and reported.
6. For the actual test configuration, please refer to the related Item in this test report (Photographs of the Test Configuration)

ABOVE 1G

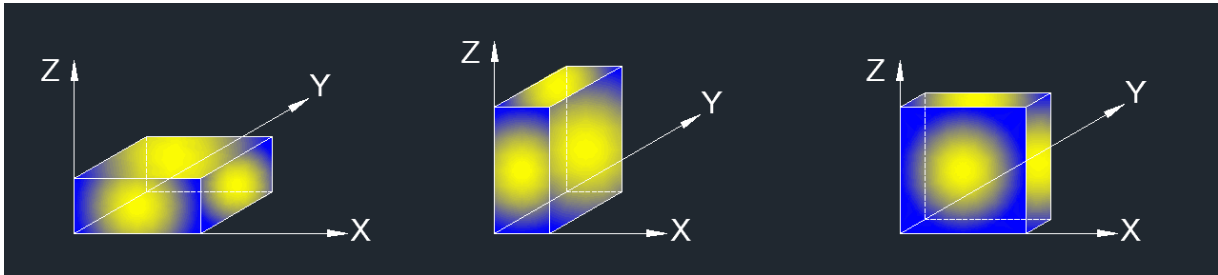


The setting of the spectrum analyser

RBW	1M
VBW	PEAK: 3M AVG: see note 6
Sweep	Auto
Detector	Peak
Trace	Max hold

1. The testing follows the guidelines in ANSI C63.10-2013.
2. The EUT was arranged to its worst case and then tune the antenna tower (from 1 m to 4 m) and turntable (from 0 degree to 360 degrees) to find the maximum reading. A pre-amp and a high pass filter are used for the test in order to get better signal level. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
3. The EUT was placed on a turntable with 1.5m above ground.
4. The EUT was set 3 meters from the interference receiving antenna, which was mounted on the top of a variable height antenna tower.
5. For measurement above 1GHz, the emission measurement will be measured by the peak detector. This peak level, once corrected, must comply with the limit specified in Section 15.209.
6. For peak measurements, the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 3 MHz with peak detector; For average measurements, the resolution bandwidth is set to 1 MHz, then the video bandwidth is set to 2KHz with peak detector.
7. For the actual test configuration, please refer to the related item in this test report (Photographs of the Test Configuration)

X axis, Y axis, Z axis positions:



8.The EUT as shown in Figure 1 is the worst mode, the report only shown the worst mode data.

TEST ENVIRONMENT

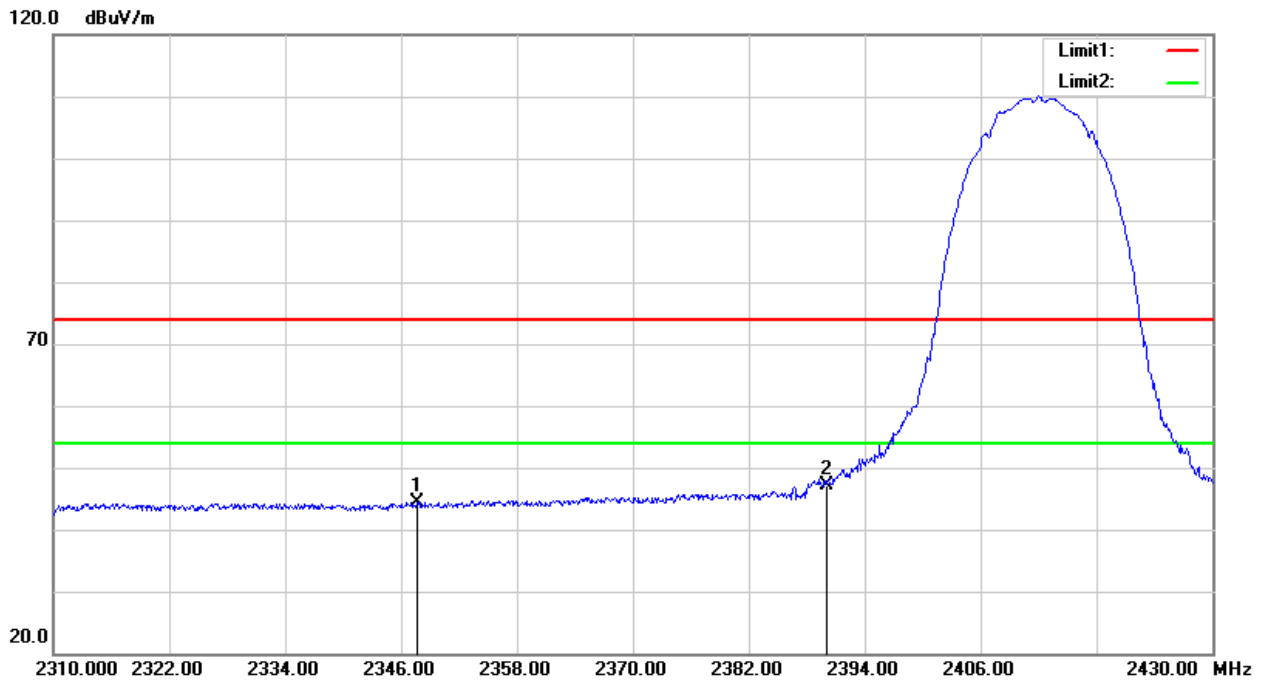
Temperature	25°C	Relative Humidity	60%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.3V



9.1. RESTRICTED BANDEDGE

802.11 b mode

RESTRICTED BANDEDGE (01 CHANNEL, HORIZONTAL)

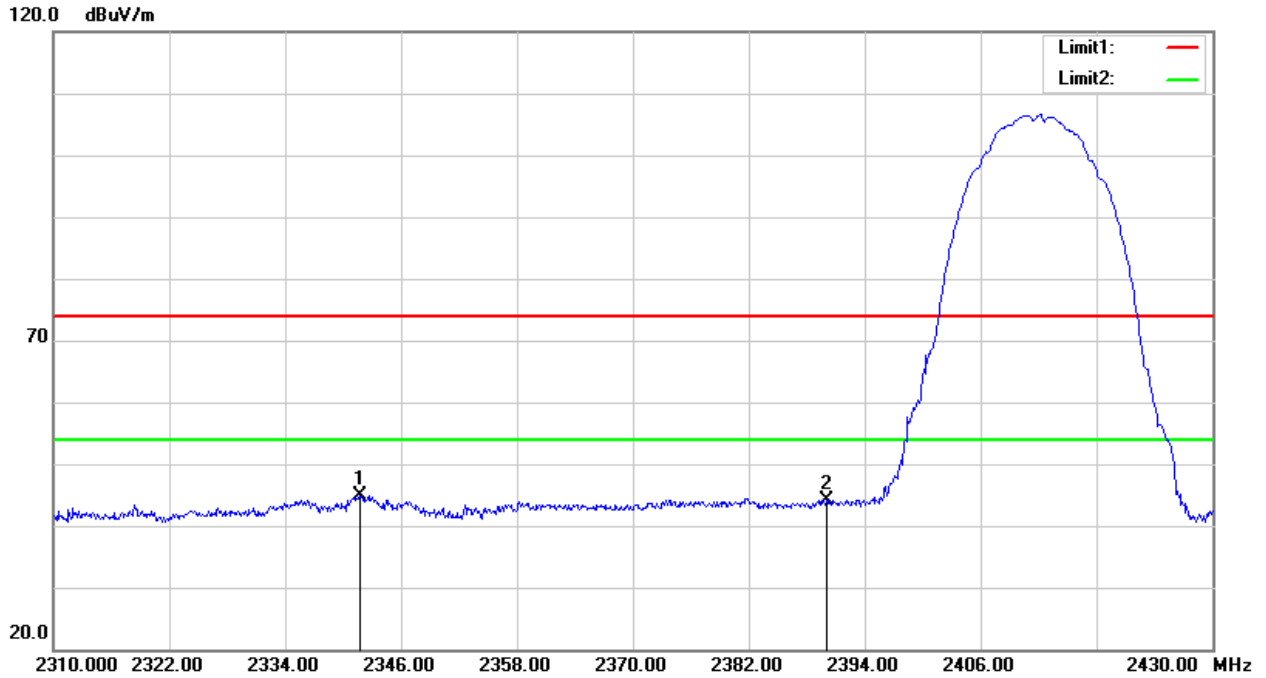


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2347.680	40.77	3.73	44.50	74.00	-29.50	peak
2	2390.000	42.90	4.34	47.24	74.00	-26.76	peak

Note: Measurement = Reading Level + Correct Factor.



RESTRICTED BANDEDGE (01 CHANNEL, VERTICAL)

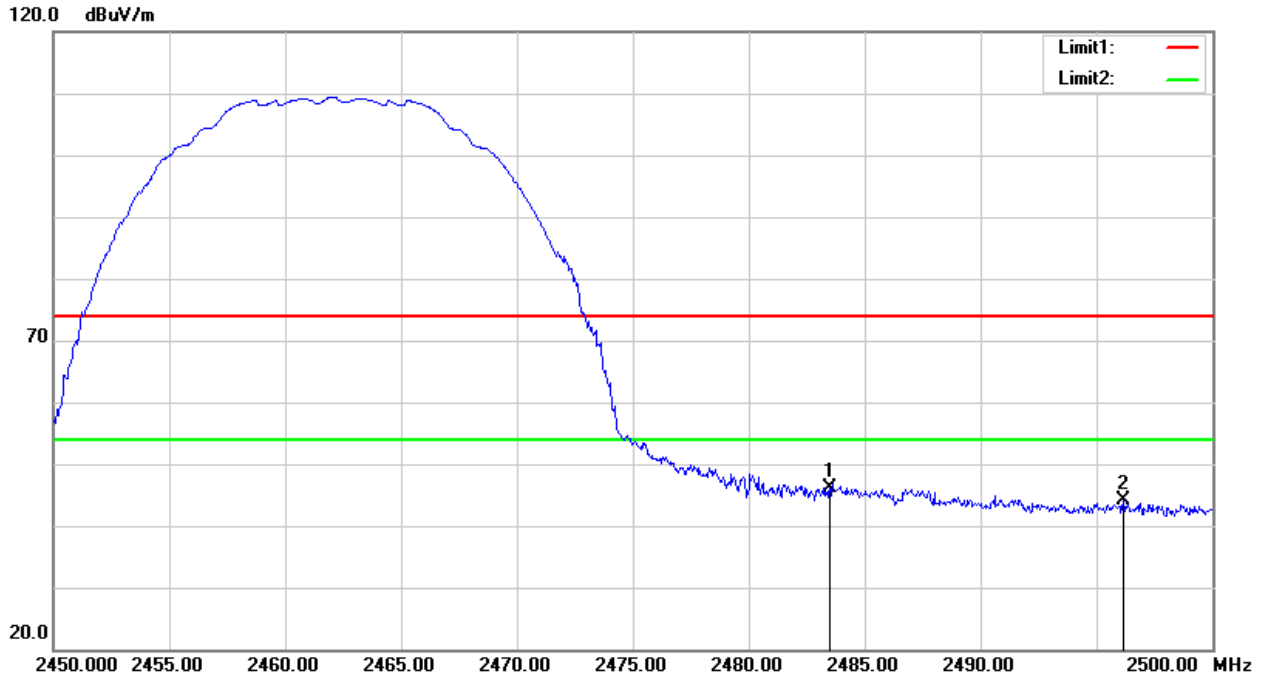


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2341.680	41.23	3.69	44.92	74.00	-29.08	peak
2	2390.000	39.75	4.34	44.09	74.00	-29.91	peak

Note: Measurement = Reading Level + Correct Factor.



RESTRICTED BANDEDGE (11 CHANNEL, HORIZONTAL)

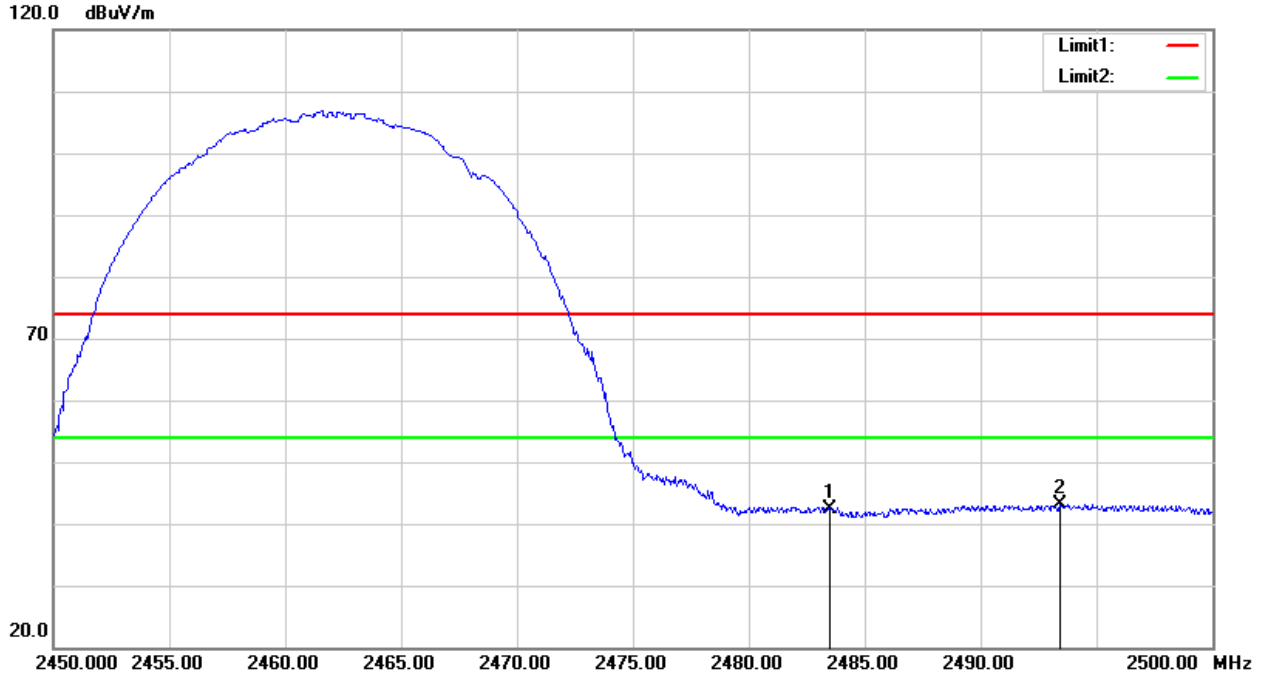


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	41.46	4.60	46.06	74.00	-27.94	peak
2	2496.150	39.50	4.64	44.14	74.00	-29.86	peak

Note: Measurement = Reading Level + Correct Factor.



RESTRICTED BANDEDGE (11 CHANNEL, VERTICAL)



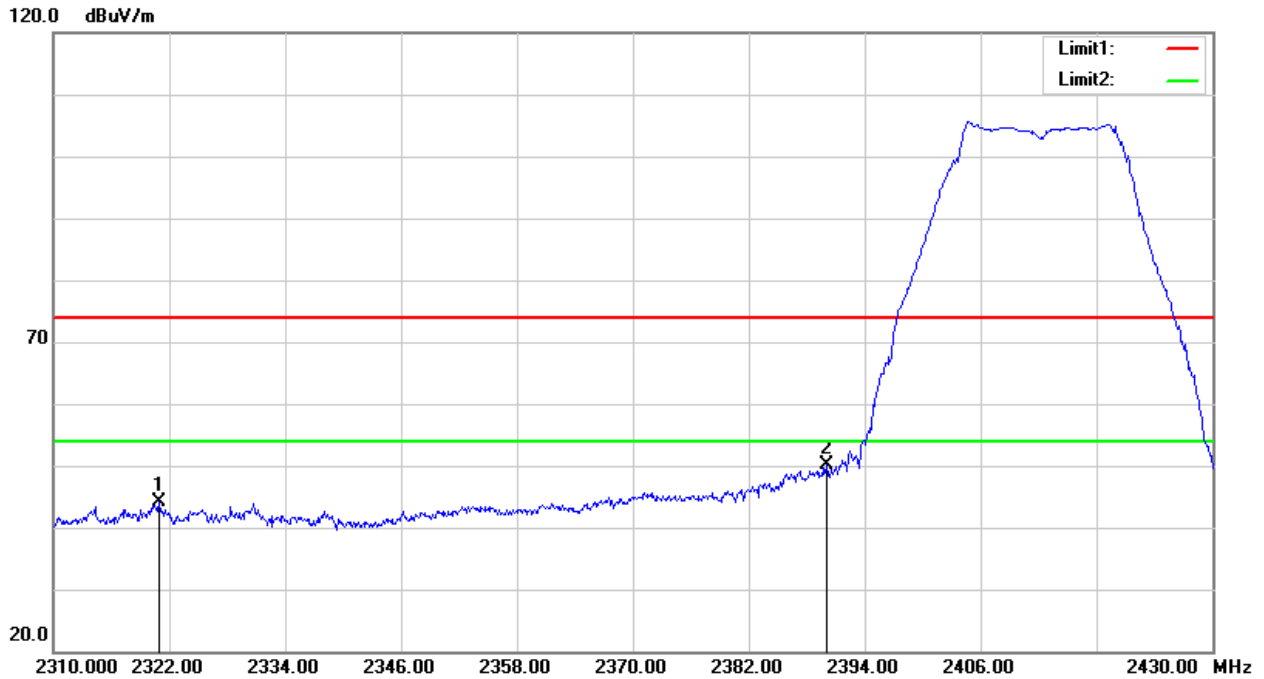
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	37.74	4.60	42.34	74.00	-31.66	peak
2	2493.400	38.51	4.64	43.15	74.00	-30.85	peak

Note: Measurement = Reading Level + Correct Factor.



802.11 g mode

RESTRICTED BANDEDGE (01 CHANNEL, HORIZONTAL)

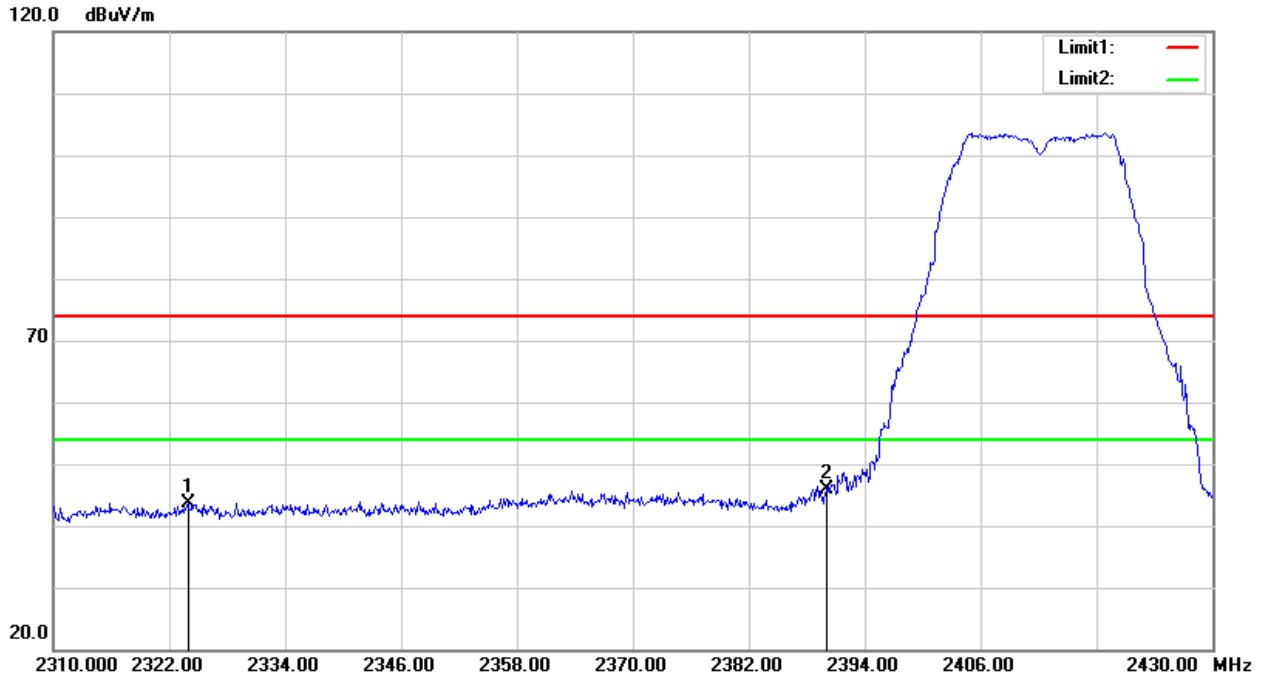


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2320.920	40.49	3.58	44.07	74.00	-29.93	peak
2	2390.000	45.69	4.34	50.03	74.00	-23.97	peak

Note: Measurement = Reading Level + Correct Factor.



RESTRICTED BANDEDGE (01 CHANNEL, VERTICAL)

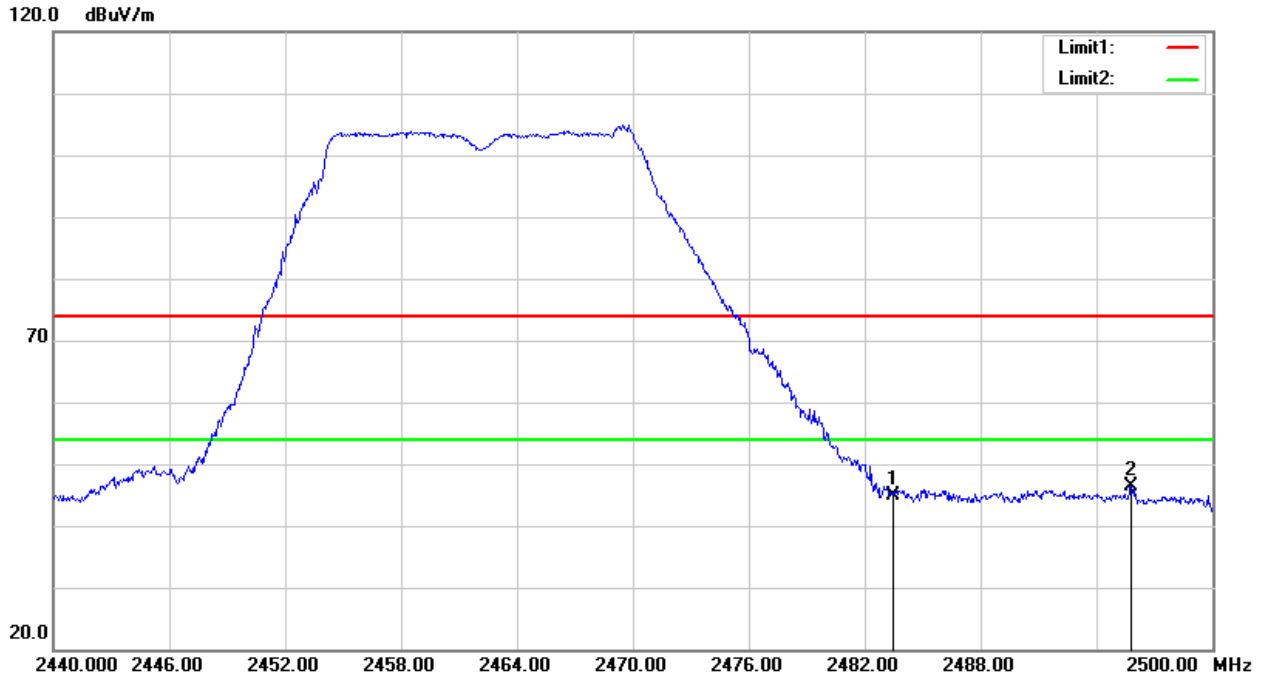


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2323.920	40.03	3.60	43.63	74.00	-30.37	peak
2	2390.000	41.55	4.34	45.89	74.00	-28.11	peak

Note: Measurement = Reading Level + Correct Factor.



RESTRICTED BANDEDGE (11 CHANNEL, HORIZONTAL)

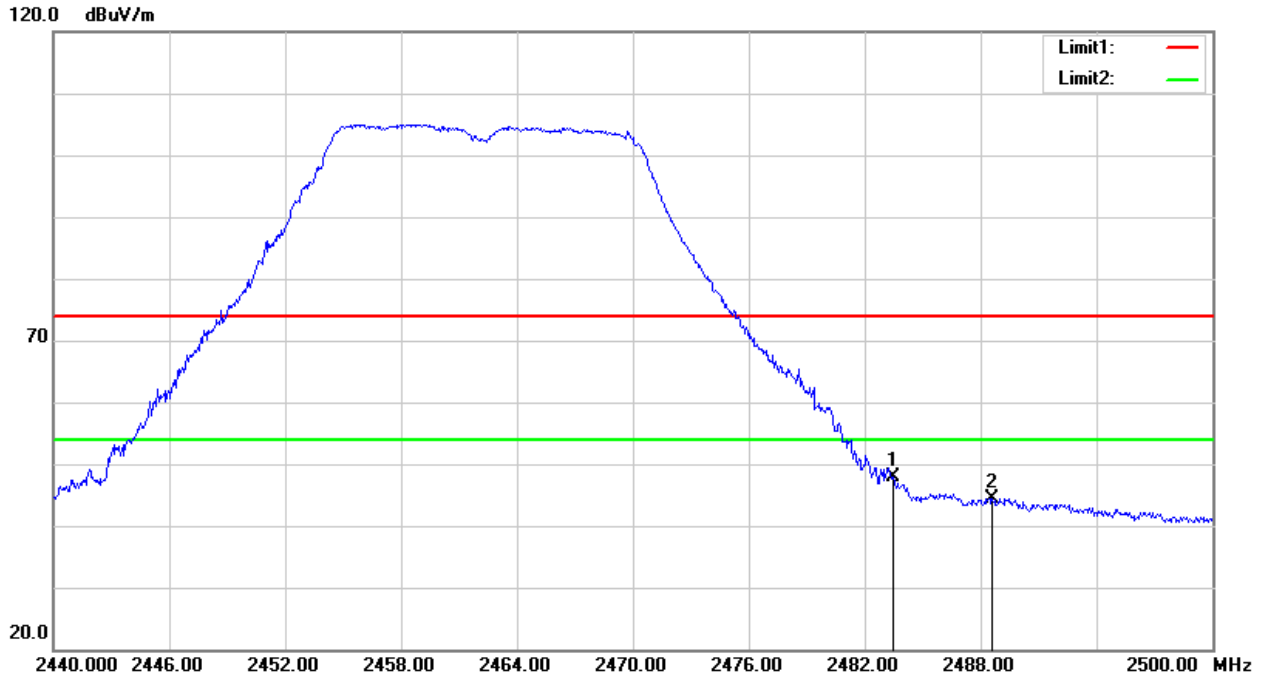


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	40.33	4.60	44.93	74.00	-29.07	peak
2	2495.800	41.84	4.64	46.48	74.00	-27.52	peak

Note: Measurement = Reading Level + Correct Factor.



RESTRICTED BANDEDGE (11 CHANNEL, VERTICAL)



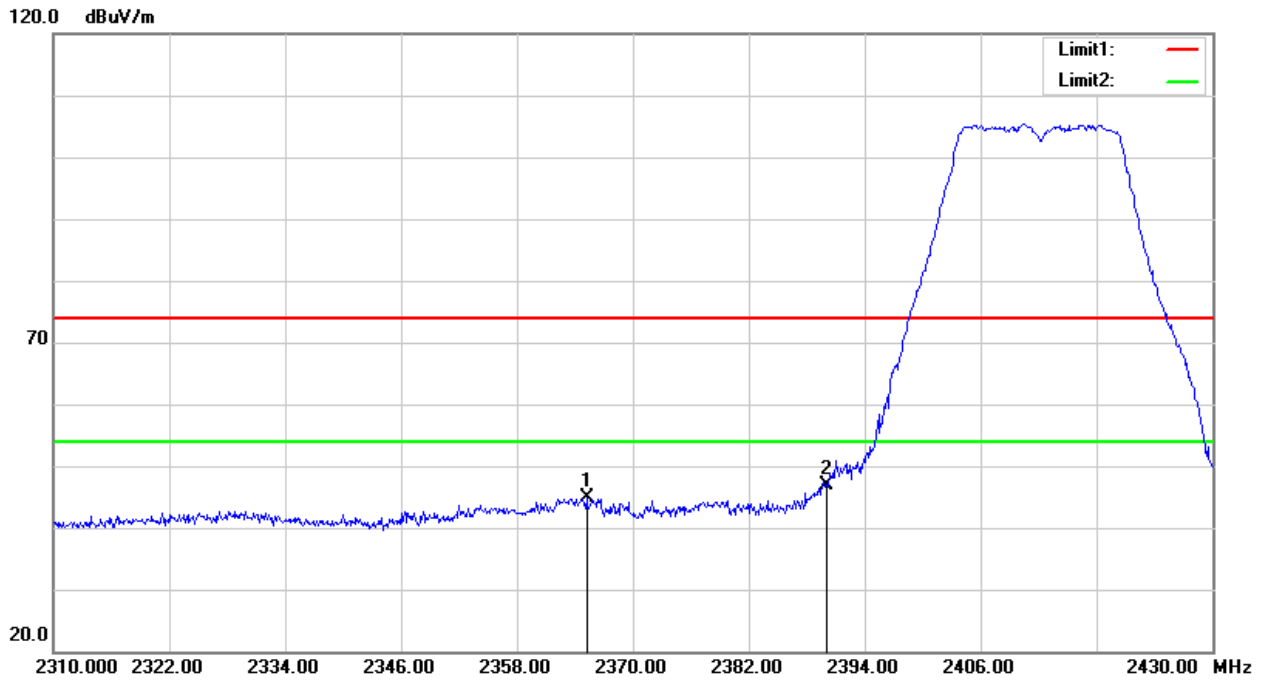
No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	43.28	4.60	47.88	74.00	-26.12	peak
2	2488.600	39.86	4.62	44.48	74.00	-29.52	peak

Note: Measurement = Reading Level + Correct Factor.



802.11 n20 mode

RESTRICTED BANDEDGE (01 CHANNEL, HORIZONTAL)

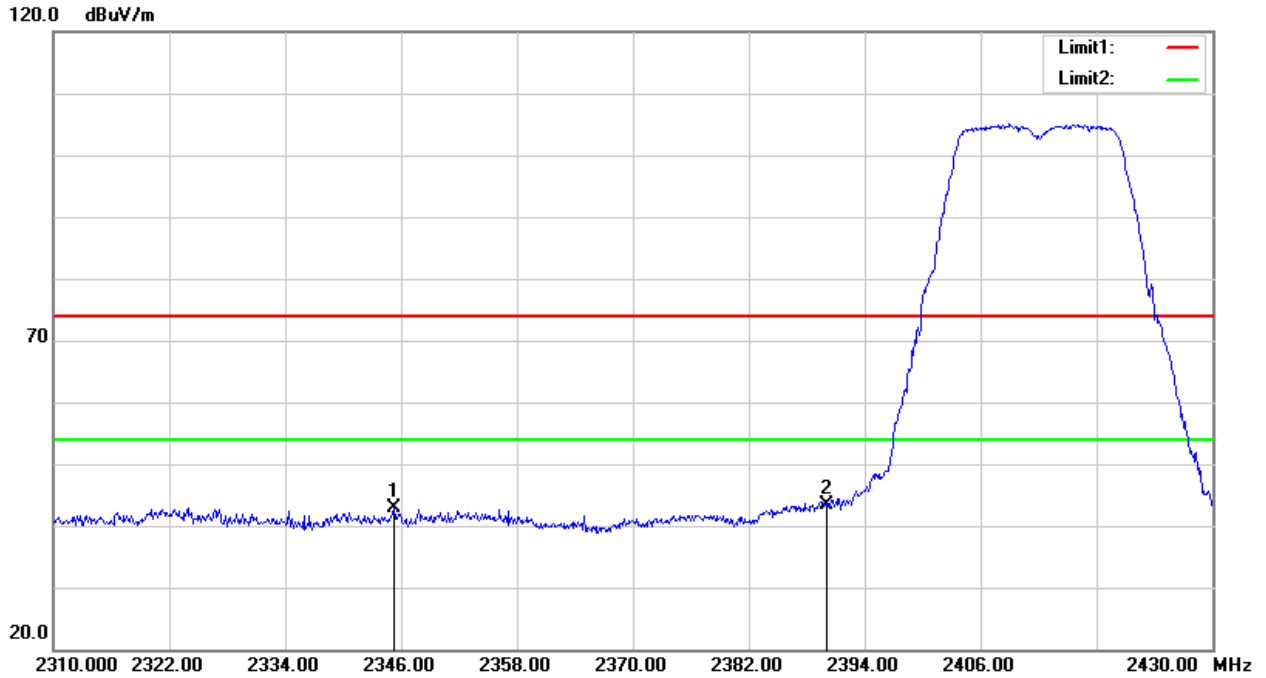


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2365.200	40.80	3.97	44.77	74.00	-29.23	peak
2	2390.000	42.52	4.34	46.86	74.00	-27.14	peak

Note: Measurement = Reading Level + Correct Factor.



RESTRICTED BANDEDGE (01 CHANNEL, VERTICAL)

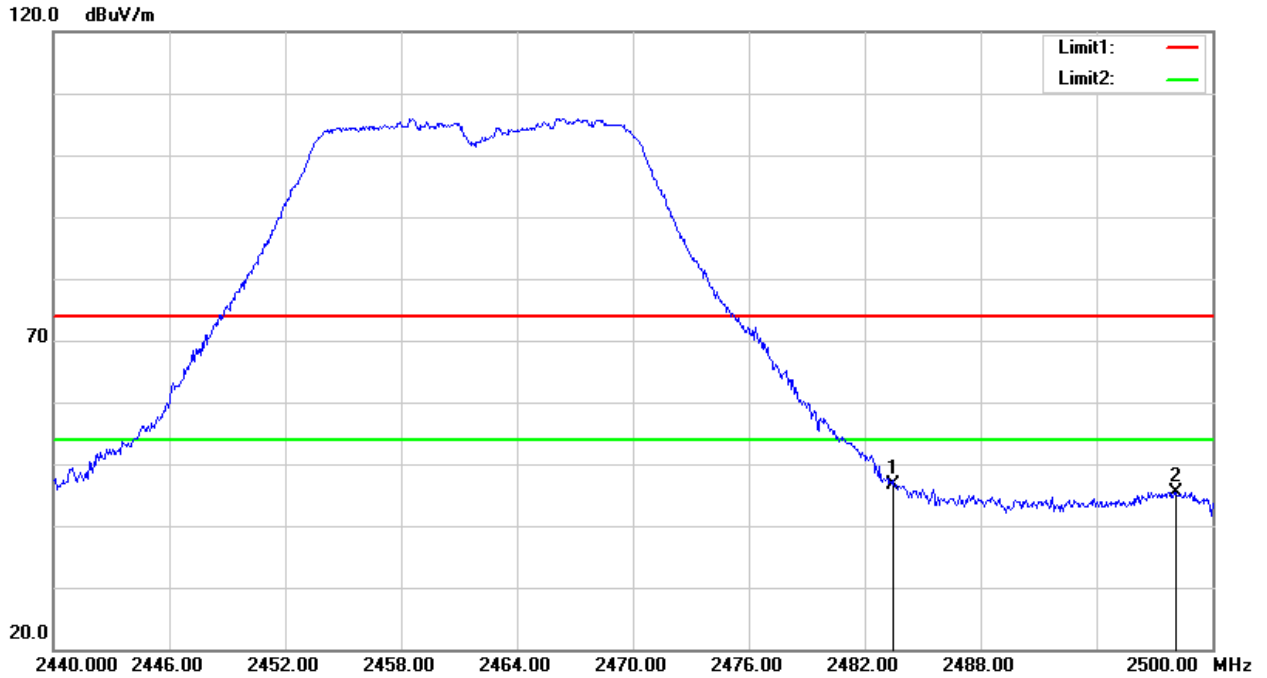


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2345.280	39.19	3.71	42.90	74.00	-31.10	peak
2	2390.000	39.16	4.34	43.50	74.00	-30.50	peak

Note: Measurement = Reading Level + Correct Factor.



RESTRICTED BANDEDGE (11 CHANNEL, HORIZONTAL)

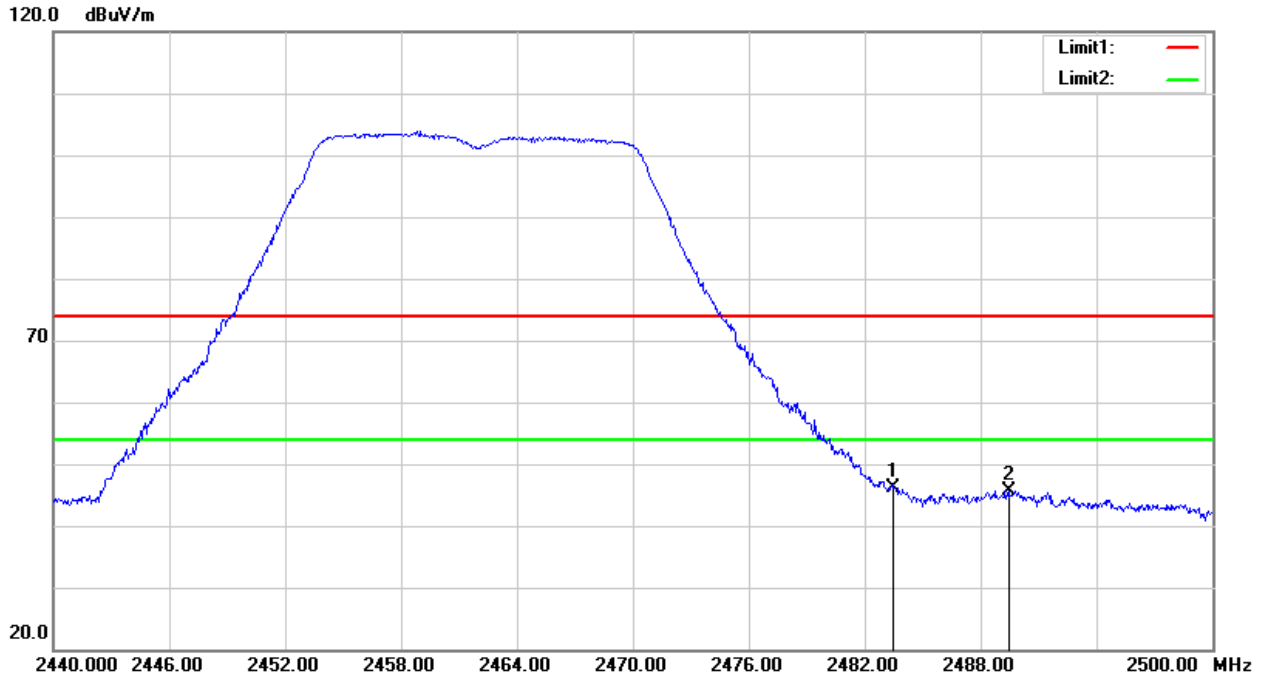


No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	42.03	4.60	46.63	74.00	-27.37	peak
2	2498.140	40.85	4.64	45.49	74.00	-28.51	peak

Note: Measurement = Reading Level + Correct Factor.



RESTRICTED BANDEDGE (11 CHANNEL, VERTICAL)



No.	Frequency (MHz)	Reading (dBuV)	Correct Factor(dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	2483.500	41.45	4.60	46.05	74.00	-27.95	peak
2	2489.440	41.05	4.62	45.67	74.00	-28.33	peak

Note: Measurement = Reading Level + Correct Factor.

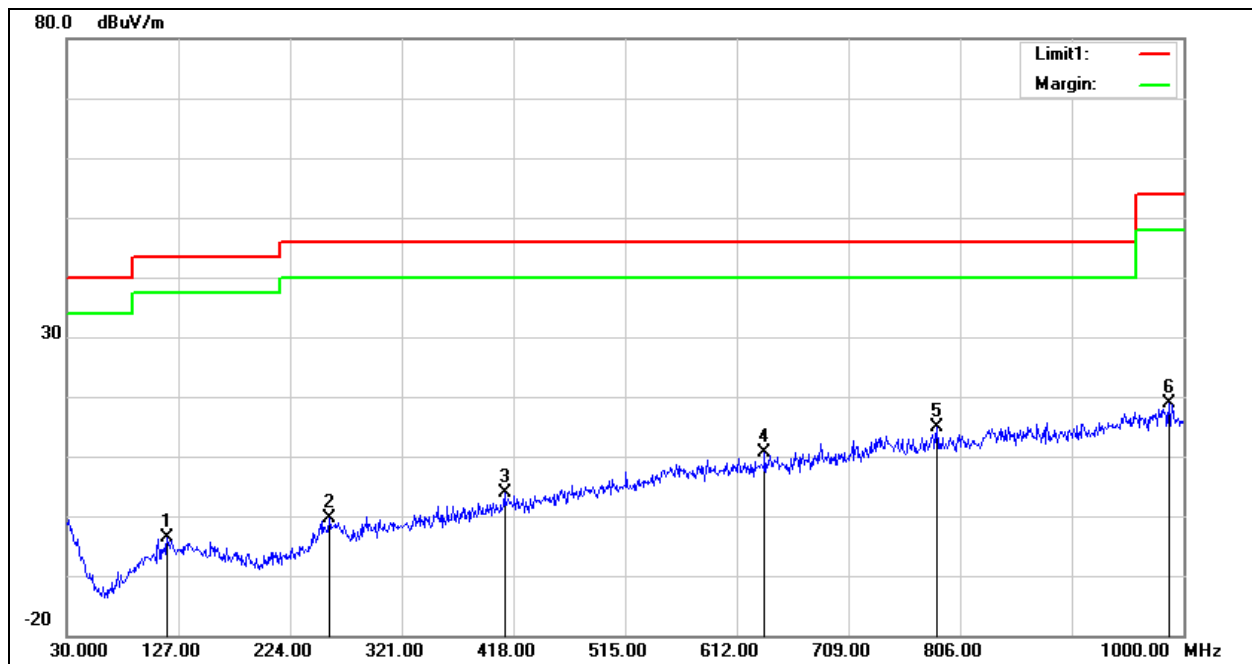


9.2. SPURIOUS EMISSIONS (30-1GHz)

Note: All the channels had been tested, but only the worst data recorded in the report.

802.11 b mode CH01

HARMONICS AND SPURIOUS EMISSIONS (HORIZONTAL)

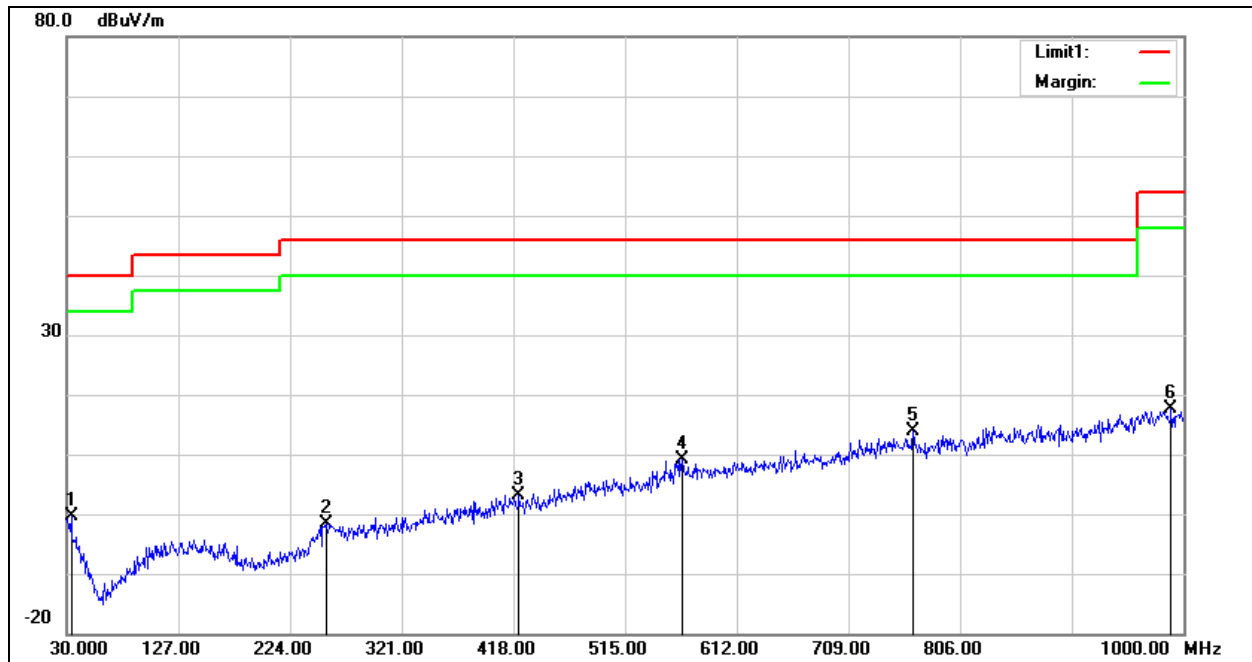


No.	Frequency (MHz)	Reading (dBuV/m)	Correct dB/m	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	117.3000	14.77	-18.47	-3.70	43.50	-47.20	QP
2	257.9500	14.64	-15.02	-0.38	46.00	-46.38	QP
3	410.2400	14.45	-10.55	3.90	46.00	-42.10	QP
4	636.2500	15.51	-4.92	10.59	46.00	-35.41	QP
5	785.6300	16.93	-2.07	14.86	46.00	-31.14	QP
6	987.3900	16.61	2.21	18.82	54.00	-35.18	QP

Note: Measurement = Reading Level + Correct Factor.



HARMONICS AND SPURIOUS EMISSIONS (VERTICAL)



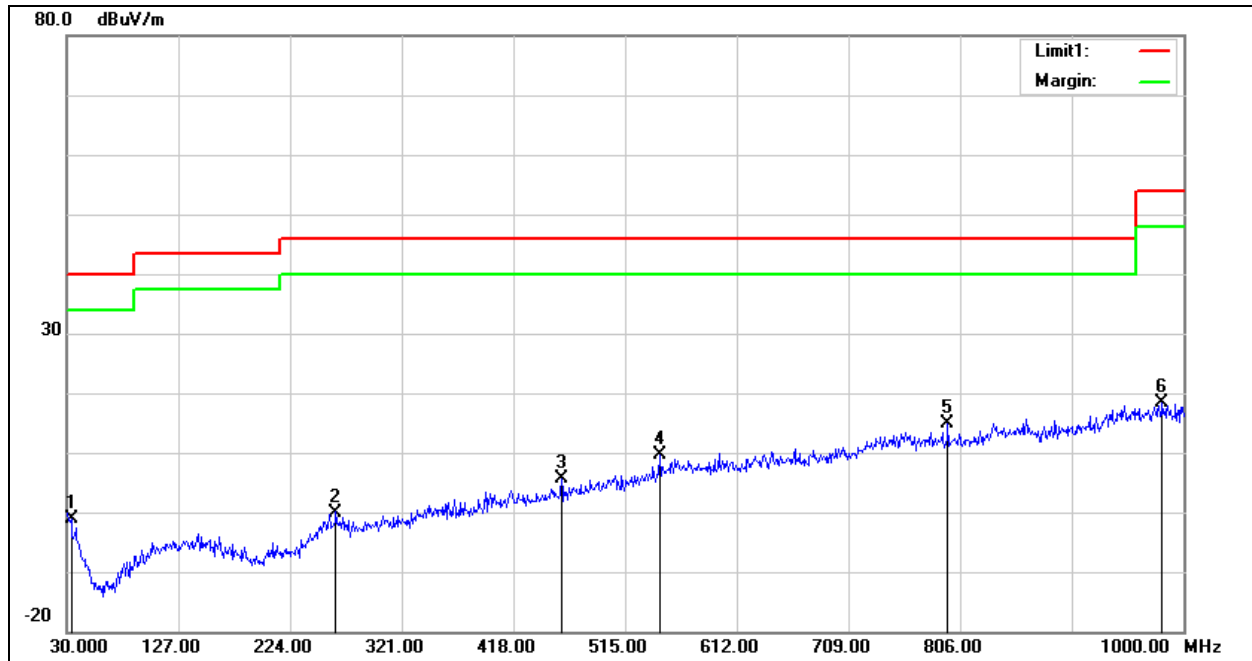
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	33.8800	14.34	-14.80	-0.46	40.00	-40.46	QP
2	255.0400	13.74	-15.35	-1.61	46.00	-47.61	QP
3	422.8500	13.34	-10.11	3.23	46.00	-42.77	QP
4	564.4700	14.66	-5.54	9.12	46.00	-36.88	QP
5	765.2600	16.17	-2.25	13.92	46.00	-32.08	QP
6	989.3300	15.46	2.09	17.55	54.00	-36.45	QP

Note: Measurement = Reading Level + Correct Factor.



802.11 g mode CH11

HARMONICS AND SPURIOUS EMISSIONS (HORIZONTAL)

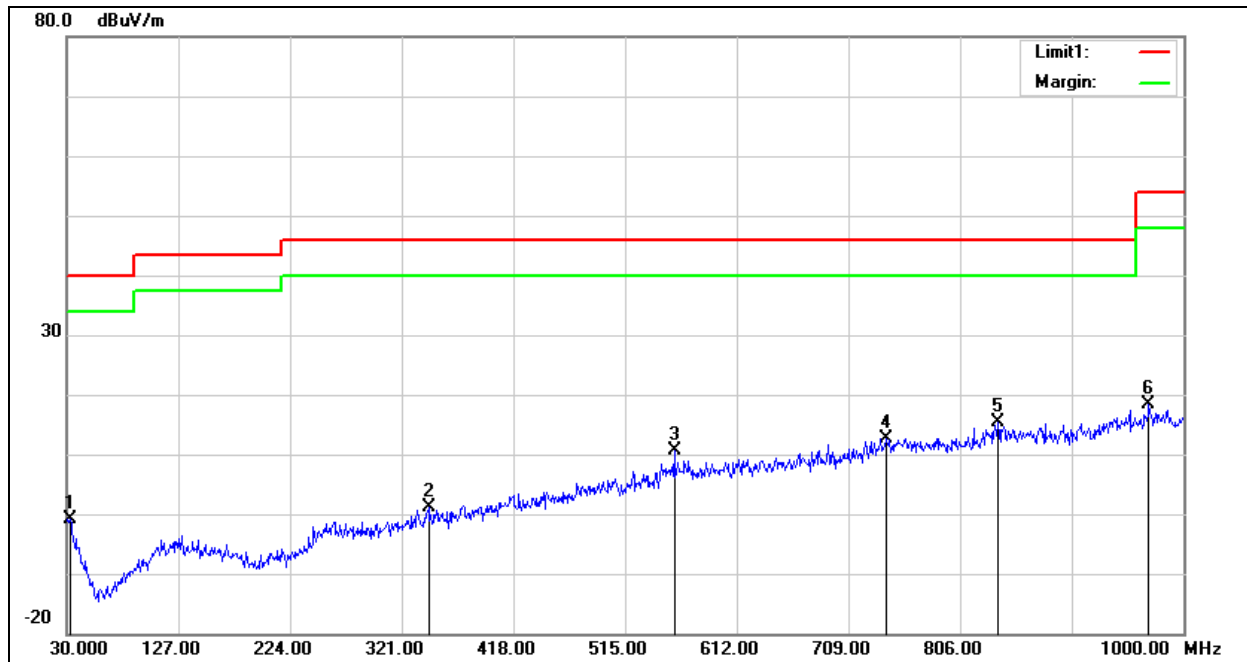


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	33.8800	13.61	-14.80	-1.19	40.00	-41.19	QP
2	263.7700	14.75	-14.75	0.00	46.00	-46.00	QP
3	459.7100	15.06	-9.47	5.59	46.00	-40.41	QP
4	545.0700	15.98	-6.31	9.67	46.00	-36.33	QP
5	795.3300	16.89	-2.01	14.88	46.00	-31.12	QP
6	981.5700	15.77	2.57	18.34	54.00	-35.66	QP

Note: Measurement = Reading Level + Correct Factor.



HARMONICS AND SPURIOUS EMISSIONS (VERTICAL)



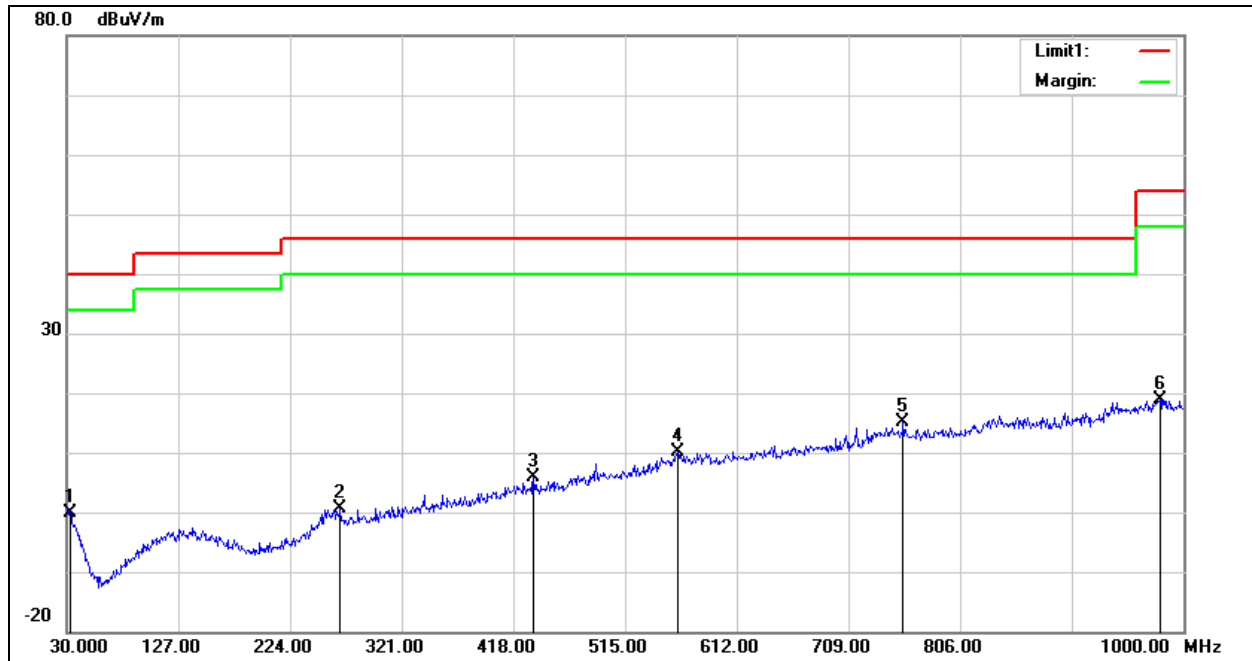
No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	32.9100	13.37	-14.33	-0.96	40.00	-40.96	QP
2	344.2800	14.31	-13.26	1.05	46.00	-44.95	QP
3	557.6800	16.11	-5.55	10.56	46.00	-35.44	QP
4	741.9800	14.86	-2.12	12.74	46.00	-33.26	QP
5	838.9800	15.73	-0.39	15.34	46.00	-30.66	QP
6	969.9300	16.49	2.00	18.49	54.00	-35.51	QP

Note: Measurement = Reading Level + Correct Factor.



802.11 n20 mode CH06

HARMONICS AND SPURIOUS EMISSIONS (HORIZONTAL)

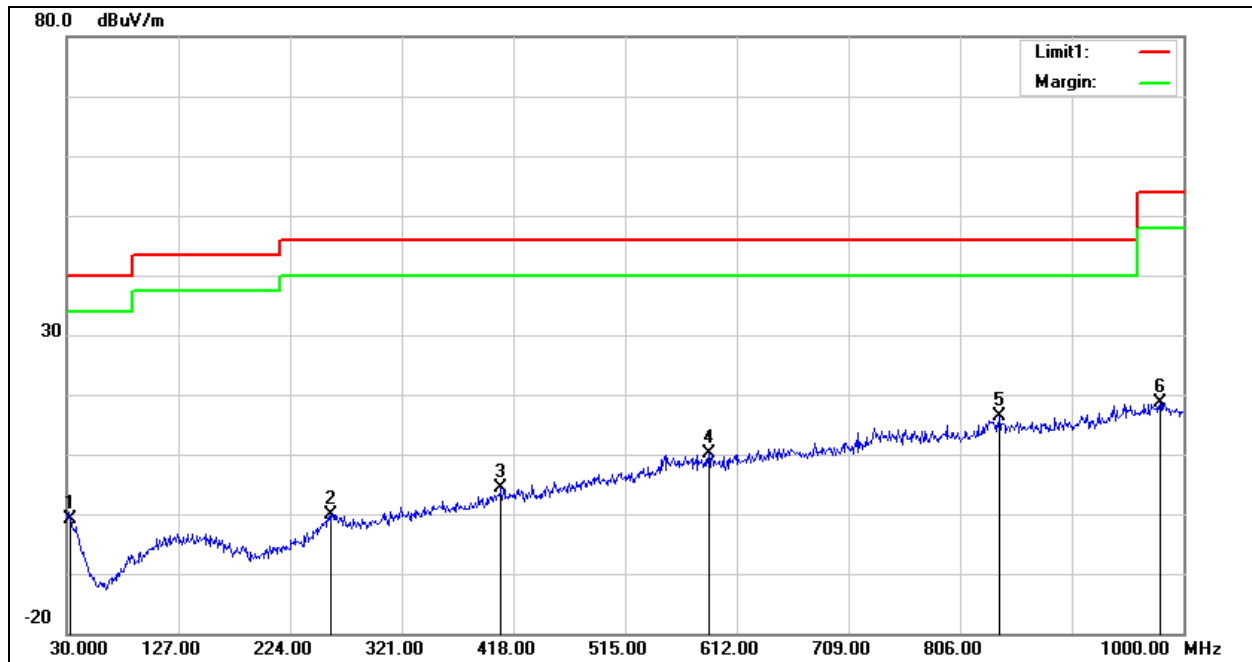


No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	32.9100	14.19	-14.33	-0.14	40.00	-40.14	QP
2	267.6500	15.61	-15.06	0.55	46.00	-45.45	QP
3	435.4600	15.93	-10.12	5.81	46.00	-40.19	QP
4	560.5900	15.75	-5.50	10.25	46.00	-35.75	QP
5	756.5300	17.27	-2.17	15.10	46.00	-30.90	QP
6	979.6300	16.32	2.65	18.97	54.00	-35.03	QP

Note: Measurement = Reading Level + Correct Factor.



HARMONICS AND SPURIOUS EMISSIONS (VERTICAL)



No.	Frequency (MHz)	Reading (dBuV/m)	Correct (dB/m)	Result (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Remark
1	32.9100	13.38	-14.33	-0.95	40.00	-40.95	QP
2	259.8900	14.78	-14.79	-0.01	46.00	-46.01	QP
3	407.3300	15.13	-10.72	4.41	46.00	-41.59	QP
4	587.7500	16.03	-5.81	10.22	46.00	-35.78	QP
5	839.9500	16.60	-0.34	16.26	46.00	-29.74	QP
6	979.6300	16.05	2.65	18.70	54.00	-35.30	QP

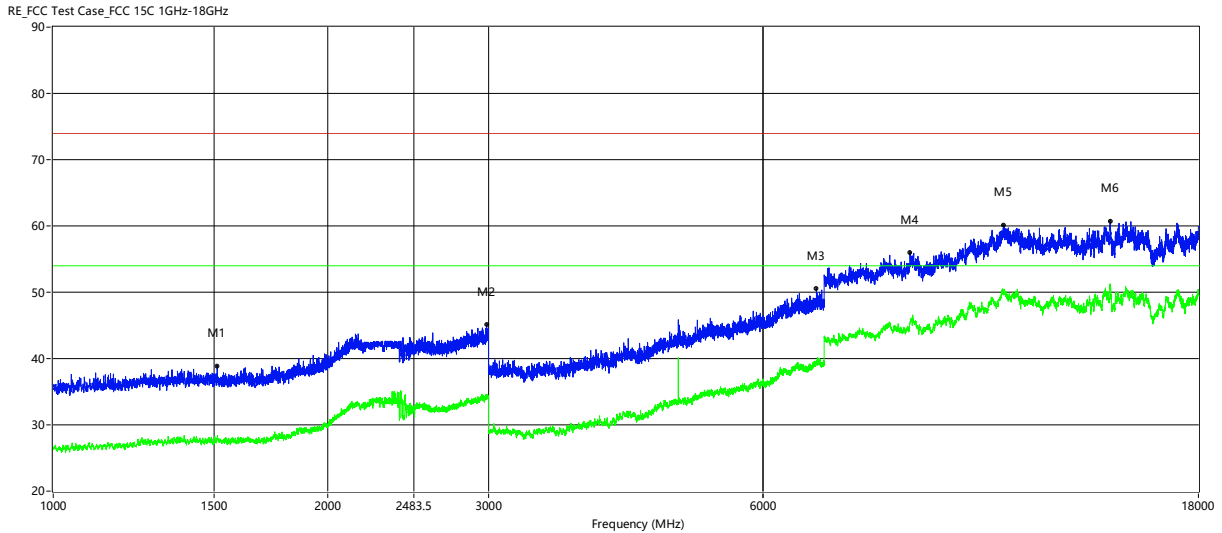
Note: Measurement = Reading Level + Correct Factor.



9.3. SPURIOUS EMISSIONS (1GHz-18GHz)

802.11 b mode

HARMONICS AND SPURIOUS EMISSIONS (01 CHANNEL, HORIZONTAL)



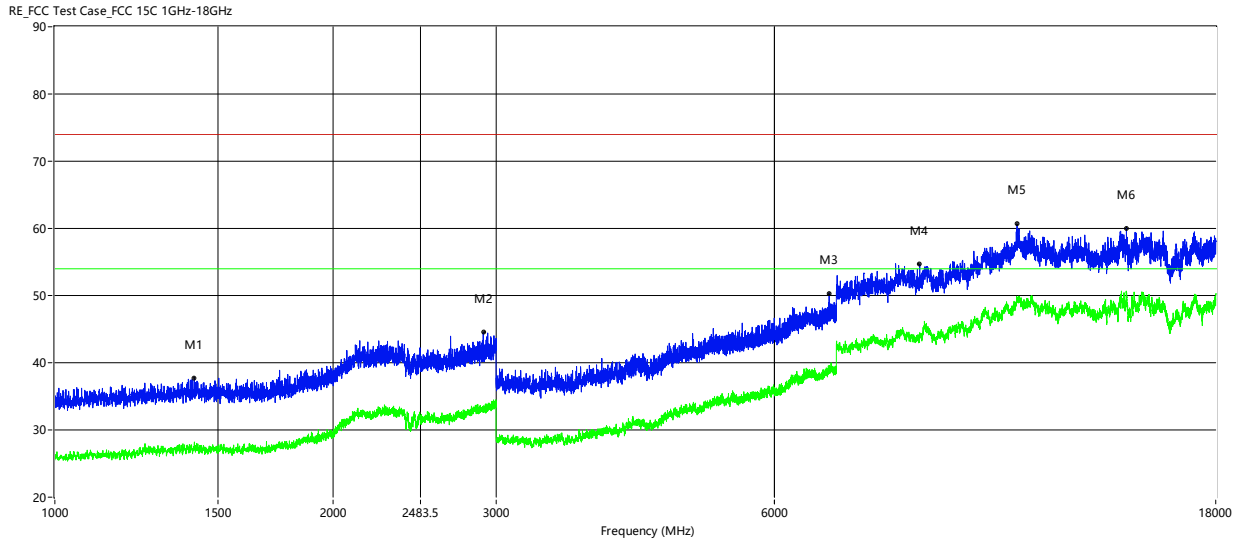
Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)	ANT	Verdict
1512.500	38.83	27.74	-0.57	74.0	54.0	-26.26	Horizontal	Pass
2986.000	45.10	34.14	6.05	74.0	54.0	-19.86	Horizontal	Pass
6865.000	50.52	39.29	0.29	74.0	54.0	-14.71	Horizontal	Pass
8694.000	56.01	45.49	5.09	74.0	54.0	-8.51	Horizontal	Pass
11015.000	60.14	49.57	10.14	74.0	54.0	-4.43	Horizontal	Pass
14411.250	60.66	50.43	11.29	74.0	54.0	-3.57	Horizontal	Pass

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier + BRF Factor.
2. Margin = Limit - Emission Level
3. Tests were performed in three frequency range 1GHz~3GHz, 3GHz~13GHz, 13GHz~18GHz.
4. Above 18GHz emissions are mainly from the environment noise, not show in report.



HARMONICS AND SPURIOUS EMISSIONS (01 CHANNEL, VERTICAL)



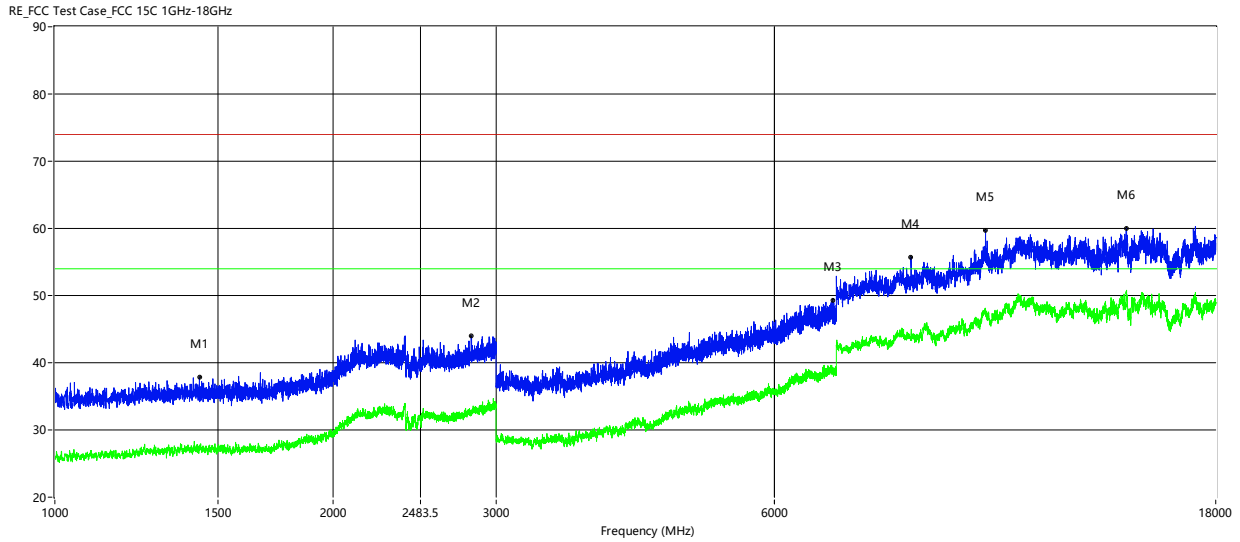
Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)	ANT	Verdict
1415.500	37.77	28.21	-0.64	74.0	54.0	-25.79	Vertical	Pass
2905.500	44.53	33.19	5.64	74.0	54.0	-20.81	Vertical	Pass
6875.000	50.34	39.15	0.34	74.0	54.0	-14.85	Vertical	Pass
8614.250	54.68	44.48	4.20	74.0	54.0	-9.52	Vertical	Pass
10976.500	60.67	49.43	10.04	74.0	54.0	-4.57	Vertical	Pass
14414.000	60.03	50.56	11.26	74.0	54.0	-3.44	Vertical	Pass

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier + BRF Factor.
2. Margin = Limit - Emission Level
3. Tests were performed in three frequency range 1GHz~3GHz, 3GHz~13GHz, 13GHz~18GHz.
4. Above 18GHz emissions are mainly from the environment noise, not show in report.



HARMONICS AND SPURIOUS EMISSIONS (06 CHANNEL, HORIZONTAL)



Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)	ANT	Verdict
1433.000	37.83	27.70	-0.61	74.0	54.0	-26.30	Horizontal	Pass
2820.000	44.03	32.73	5.41	74.0	54.0	-21.27	Horizontal	Pass
6933.000	49.35	38.58	0.48	74.0	54.0	-15.42	Horizontal	Pass
8430.000	55.73	44.08	4.38	74.0	54.0	-9.92	Horizontal	Pass
10148.750	59.74	47.71	7.15	74.0	54.0	-6.29	Horizontal	Pass
14416.750	59.99	50.79	11.23	74.0	54.0	-3.21	Horizontal	Pass

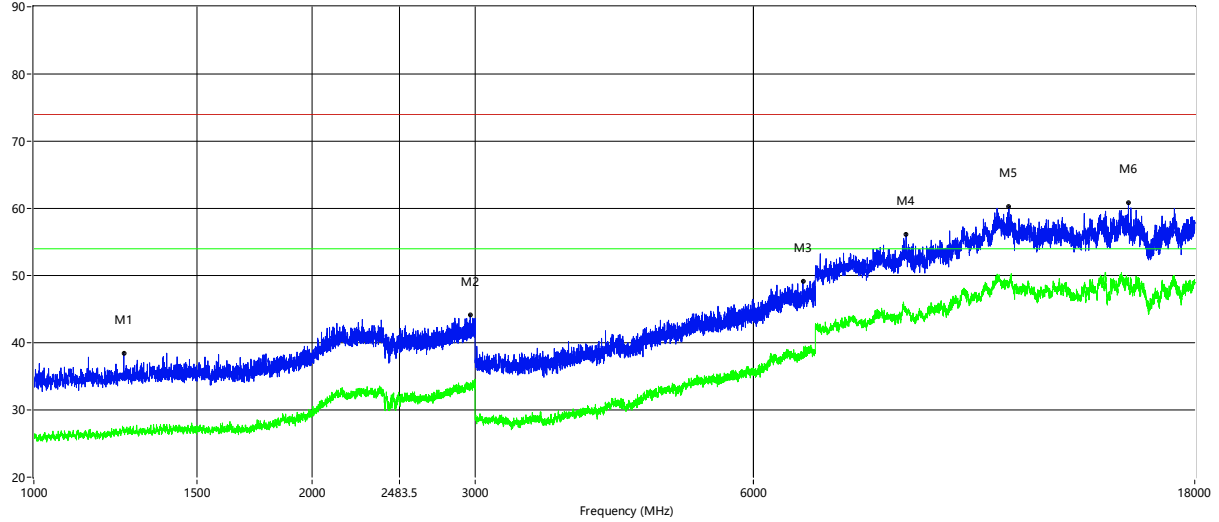
Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier + BRF Factor.
2. Margin = Limit - Emission Level
3. Tests were performed in three frequency range 1GHz~3GHz, 3GHz~13GHz, 13GHz~18GHz.
4. Above 18GHz emissions are mainly from the environment noise, not show in report.



HARMONICS AND SPURIOUS EMISSIONS (06 CHANNEL, VERTICAL)

RE_FCC Test Case_FCC 15C 1GHz-18GHz



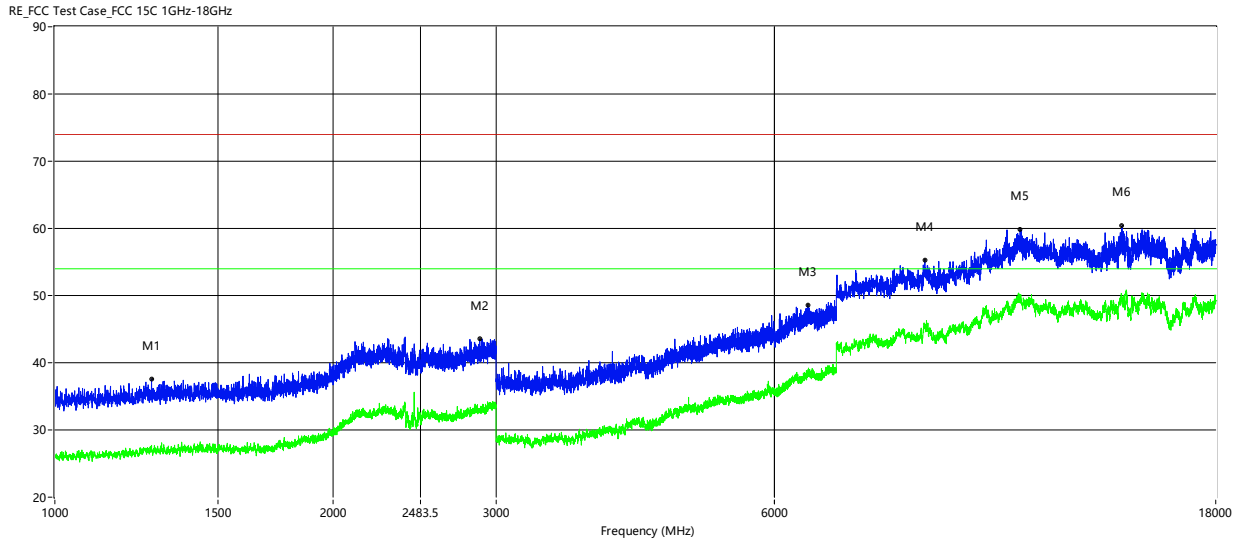
Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)	ANT	Verdict
1251.000	38.43	27.30	-0.91	74.0	54.0	-26.70	Vertical	Pass
2964.000	44.17	33.21	5.96	74.0	54.0	-20.79	Vertical	Pass
6786.000	49.18	38.24	-0.07	74.0	54.0	-15.76	Vertical	Pass
8773.750	56.14	45.09	4.93	74.0	54.0	-8.91	Vertical	Pass
11334.000	60.23	48.88	9.60	74.0	54.0	-5.12	Vertical	Pass
15261.000	60.86	49.68	10.39	74.0	54.0	-4.32	Vertical	Pass

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier + BRF Factor.
2. Margin = Limit - Emission Level
3. Tests were performed in three frequency range 1GHz~3GHz, 3GHz~13GHz, 13GHz~18GHz.
4. Above 18GHz emissions are mainly from the environment noise, not show in report.



HARMONICS AND SPURIOUS EMISSIONS (11 CHANNEL, HORIZONTAL)



Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)	ANT	Verdict
1272.000	37.56	27.72	-0.92	74.0	54.0	-26.28	Horizontal	Pass
2880.500	43.56	32.94	5.61	74.0	54.0	-21.06	Horizontal	Pass
6521.000	48.54	38.41	-0.41	74.0	54.0	-15.59	Horizontal	Pass
8724.250	55.31	45.80	5.08	74.0	54.0	-8.20	Horizontal	Pass
11061.750	59.83	49.78	9.89	74.0	54.0	-4.22	Horizontal	Pass
14254.500	60.38	49.81	11.18	74.0	54.0	-4.19	Horizontal	Pass

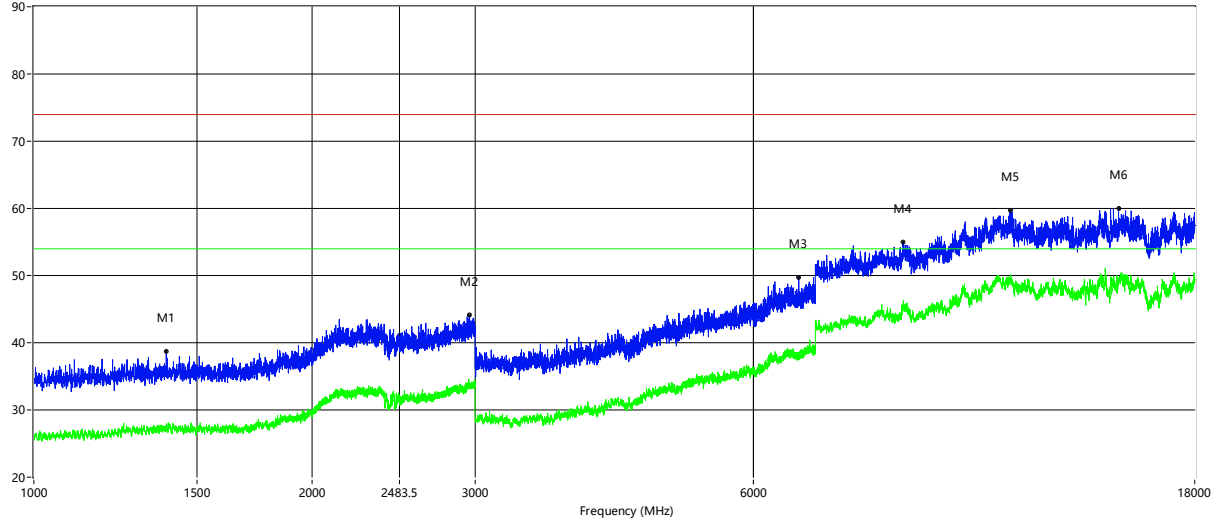
Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier + BRF Factor.
2. Margin = Limit - Emission Level
3. Tests were performed in three frequency range 1GHz~3GHz, 3GHz~13GHz, 13GHz~18GHz.
4. Above 18GHz emissions are mainly from the environment noise, not show in report.



HARMONICS AND SPURIOUS EMISSIONS (11 CHANNEL, VERTICAL)

RE_FCC Test Case_FCC 15C 1GHz-18GHz



Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)	ANT	Verdict
1390.500	38.73	27.72	-0.69	74.0	54.0	-26.28	Vertical	Pass
2957.500	44.14	33.86	5.93	74.0	54.0	-20.14	Vertical	Pass
6717.000	49.78	38.43	-0.28	74.0	54.0	-15.57	Vertical	Pass
8713.250	54.98	46.27	5.12	74.0	54.0	-7.73	Vertical	Pass
11378.000	59.68	49.09	9.70	74.0	54.0	-4.91	Vertical	Pass
14895.250	60.02	49.24	9.89	74.0	54.0	-4.76	Vertical	Pass

Remark:

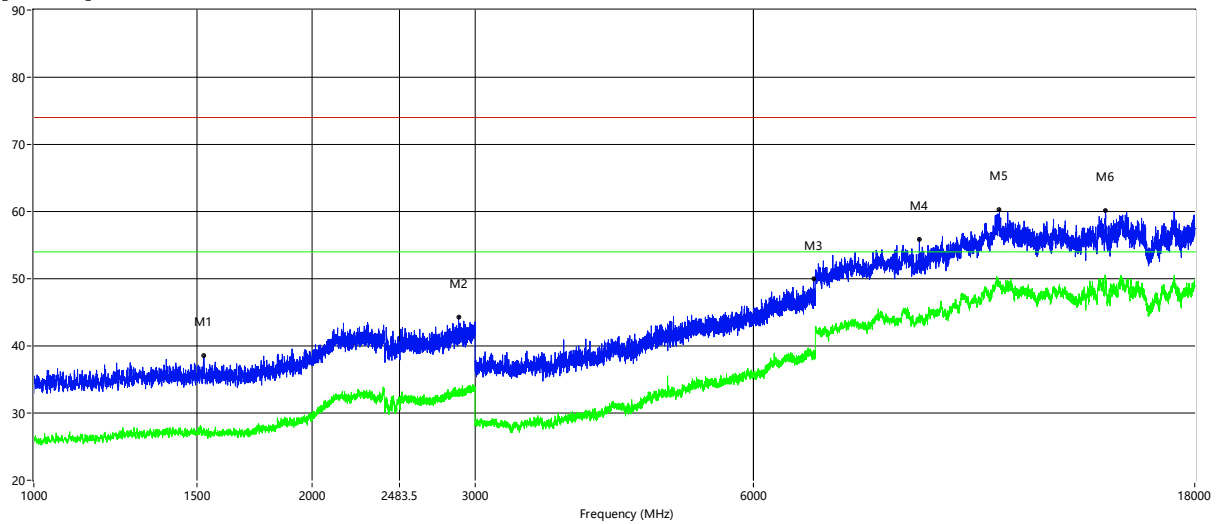
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier + BRF Factor.
2. Margin = Limit - Emission Level
3. Tests were performed in three frequency range 1GHz~3GHz, 3GHz~13GHz, 13GHz~18GHz.
4. Above 18GHz emissions are mainly from the environment noise, not show in report.



802.11 g mode

HARMONICS AND SPURIOUS EMISSIONS (01 CHANNEL, HORIZONTAL)

RE_FCC Test Case_FCC 15C 1GHz-18GHz



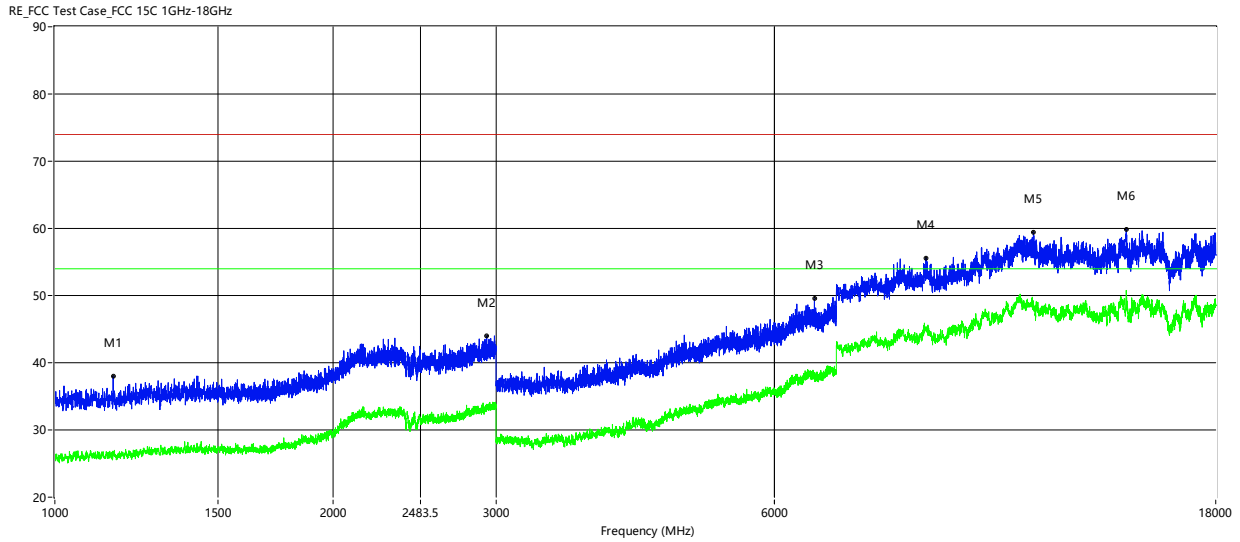
Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)	ANT	Verdict
1527.000	38.52	26.82	-0.59	74.0	54.0	-27.18	Horizontal	Pass
2879.000	44.28	33.15	5.61	74.0	54.0	-20.85	Horizontal	Pass
6972.000	49.96	38.25	0.51	74.0	54.0	-15.75	Horizontal	Pass
9068.000	55.85	44.77	4.64	74.0	54.0	-9.23	Horizontal	Pass
11070.000	60.35	49.24	9.84	74.0	54.0	-4.76	Horizontal	Pass
14414.000	60.21	49.25	11.26	74.0	54.0	-4.75	Horizontal	Pass

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier + BRF Factor.
2. Margin = Limit - Emission Level
3. Tests were performed in three frequency range 1GHz~3GHz, 3GHz~13GHz, 13GHz~18GHz.
4. Above 18GHz emissions are mainly from the environment noise, not show in report.



HARMONICS AND SPURIOUS EMISSIONS (01 CHANNEL, VERTICAL)



Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)	ANT	Verdict
1156.000	38.03	26.11	-1.36	74.0	54.0	-27.89	Vertical	Pass
2930.500	44.03	33.42	5.78	74.0	54.0	-20.58	Vertical	Pass
6627.000	49.55	38.22	-0.42	74.0	54.0	-15.78	Vertical	Pass
8751.750	55.61	45.19	5.00	74.0	54.0	-8.81	Vertical	Pass
11433.000	59.39	48.60	9.81	74.0	54.0	-5.40	Vertical	Pass
14403.000	59.84	50.10	11.39	74.0	54.0	-3.90	Vertical	Pass

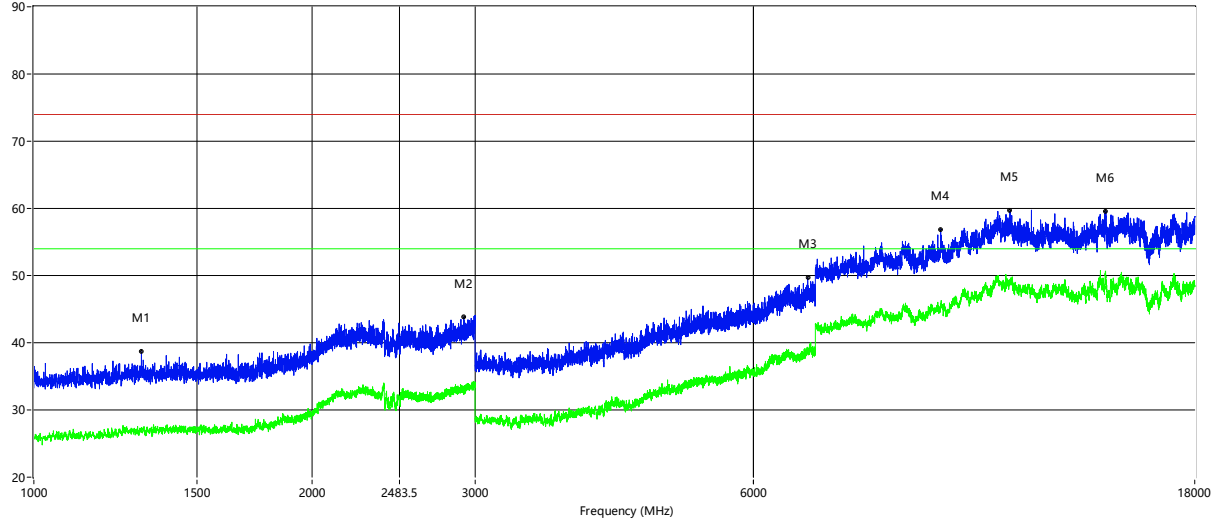
Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier + BRF Factor.
2. Margin = Limit - Emission Level
3. Tests were performed in three frequency range 1GHz~3GHz, 3GHz~13GHz, 13GHz~18GHz.
4. Above 18GHz emissions are mainly from the environment noise, not show in report.



HARMONICS AND SPURIOUS EMISSIONS (06 CHANNEL, HORIZONTAL)

RE_FCC Test Case_FCC 15C 1GHz-18GHz



Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)	ANT	Verdict
1307.000	38.66	27.40	-0.92	74.0	54.0	-26.60	Horizontal	Pass
2916.500	43.87	33.26	5.70	74.0	54.0	-20.74	Horizontal	Pass
6868.000	49.67	38.52	0.30	74.0	54.0	-15.48	Horizontal	Pass
9563.000	56.89	45.60	5.52	74.0	54.0	-8.40	Horizontal	Pass
11364.250	59.67	49.47	9.67	74.0	54.0	-4.53	Horizontal	Pass
14427.750	59.57	49.89	11.10	74.0	54.0	-4.11	Horizontal	Pass

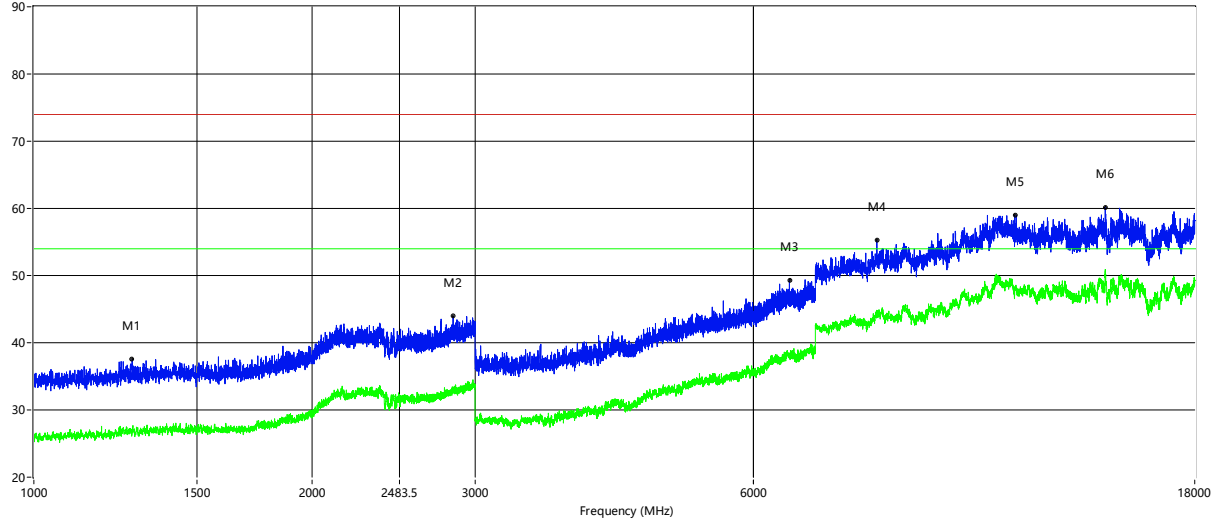
Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier + BRF Factor.
2. Margin = Limit - Emission Level
3. Tests were performed in three frequency range 1GHz~3GHz, 3GHz~13GHz, 13GHz~18GHz.
4. Above 18GHz emissions are mainly from the environment noise, not show in report.



HARMONICS AND SPURIOUS EMISSIONS (06 CHANNEL, VERTICAL)

RE_FCC Test Case_FCC 15C 1GHz-18GHz



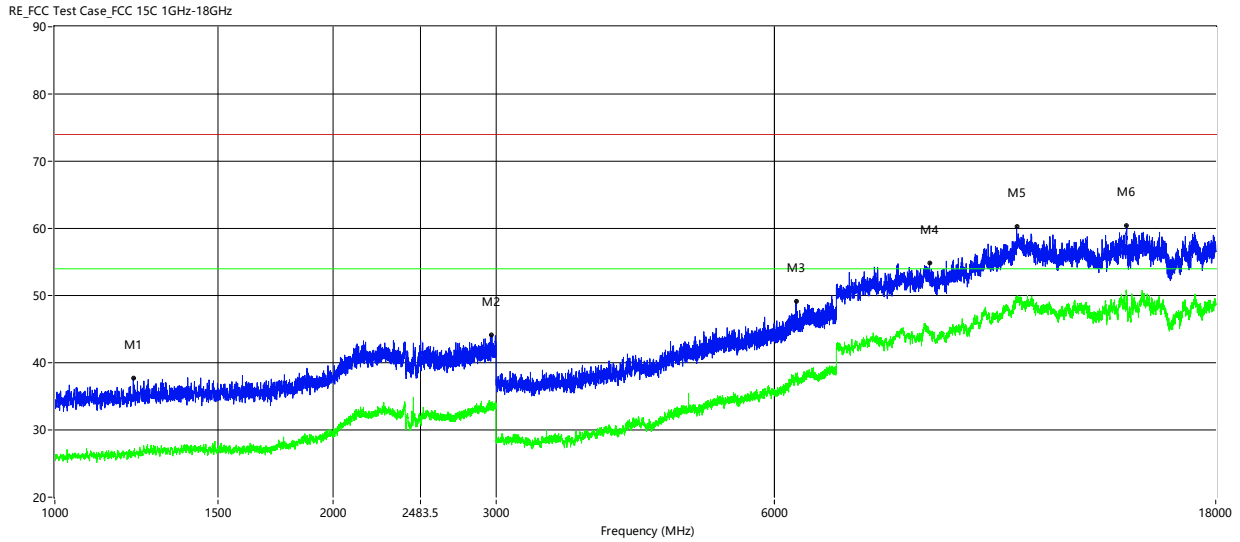
Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)	ANT	Verdict
1277.000	37.51	26.73	-0.92	74.0	54.0	-27.27	Vertical	Pass
2840.000	43.94	33.27	5.54	74.0	54.0	-20.73	Vertical	Pass
6561.000	49.30	37.75	-0.43	74.0	54.0	-16.25	Vertical	Pass
8157.750	55.26	43.89	4.19	74.0	54.0	-10.11	Vertical	Pass
11501.750	59.02	47.93	9.96	74.0	54.0	-6.07	Vertical	Pass
14405.750	60.21	50.89	11.36	74.0	54.0	-3.11	Vertical	Pass

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier + BRF Factor.
2. Margin = Limit - Emission Level
3. Tests were performed in three frequency range 1GHz~3GHz, 3GHz~13GHz, 13GHz~18GHz.
4. Above 18GHz emissions are mainly from the environment noise, not show in report.



HARMONICS AND SPURIOUS EMISSIONS (11 CHANNEL, HORIZONTAL)



Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)	ANT	Verdict
1215.500	37.76	26.53	-1.12	74.0	54.0	-27.47	Horizontal	Pass
2968.500	44.19	33.28	5.97	74.0	54.0	-20.72	Horizontal	Pass
6331.000	49.15	37.70	-1.41	74.0	54.0	-16.30	Horizontal	Pass
8826.000	54.89	44.82	4.69	74.0	54.0	-9.18	Horizontal	Pass
10965.500	60.27	49.89	9.95	74.0	54.0	-4.11	Horizontal	Pass
14419.500	60.43	50.05	11.19	74.0	54.0	-3.95	Horizontal	Pass

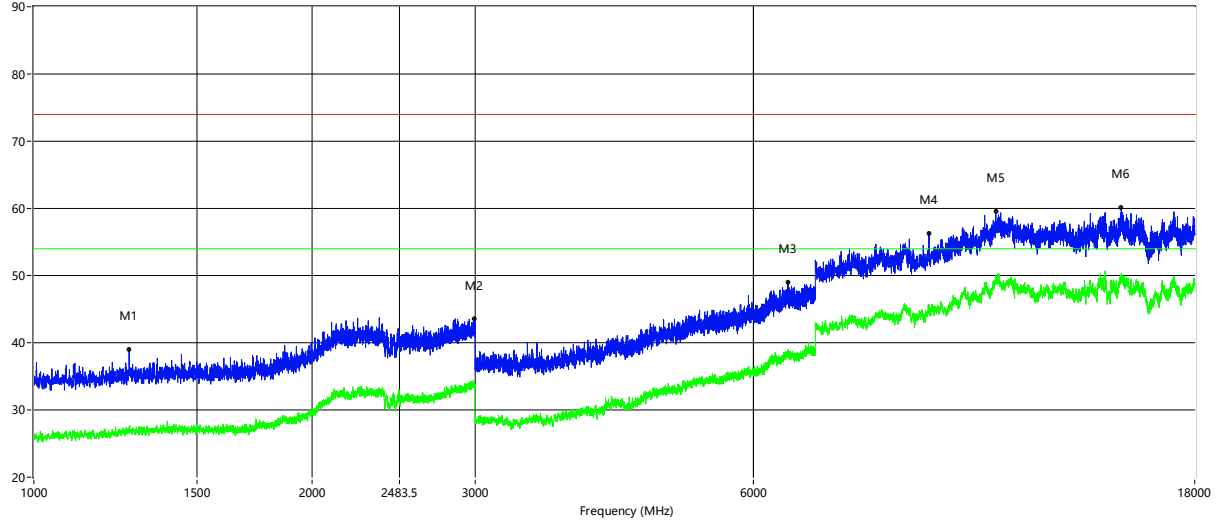
Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier + BRF Factor.
2. Margin = Limit - Emission Level
3. Tests were performed in three frequency range 1GHz~3GHz, 3GHz~13GHz, 13GHz~18GHz.
4. Above 18GHz emissions are mainly from the environment noise, not show in report.



HARMONICS AND SPURIOUS EMISSIONS (11 CHANNEL, VERTICAL)

RE_FCC Test Case_FCC 15C 1GHz-18GHz



Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)	ANT	Verdict
1267.500	39.07	27.45	-0.92	74.0	54.0	-26.55	Vertical	Pass
2994.500	43.55	33.28	6.09	74.0	54.0	-20.72	Vertical	Pass
6538.000	48.99	38.36	-0.42	74.0	54.0	-15.64	Vertical	Pass
9287.999	56.29	45.74	5.27	74.0	54.0	-8.26	Vertical	Pass
10971.000	59.50	49.82	10.00	74.0	54.0	-4.18	Vertical	Pass
14991.500	60.15	49.85	10.36	74.0	54.0	-4.15	Vertical	Pass

Remark:

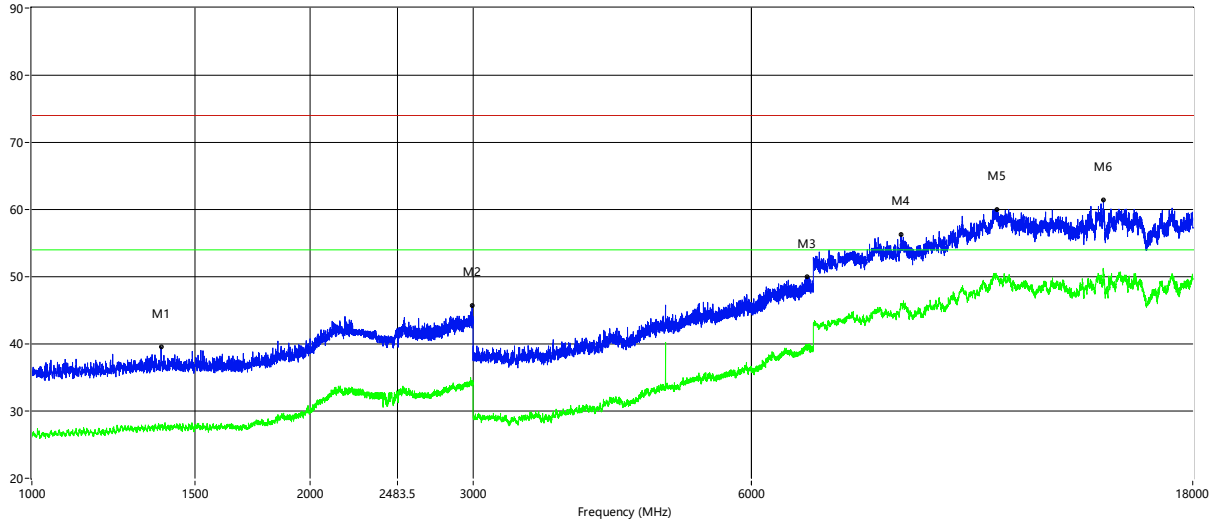
1. Factor = Antenna Factor + Cable Loss – Pre-amplifier + BRF Factor.
2. Margin = Limit - Emission Level
3. Tests were performed in three frequency range 1GHz~3GHz, 3GHz~13GHz, 13GHz~18GHz.
4. Above 18GHz emissions are mainly from the environment noise, not show in report.



802.11 n20 mode

HARMONICS AND SPURIOUS EMISSIONS (01 CHANNEL, HORIZONTAL)

RE_FCC Test Case_FCC 15C 1GHz-18GHz



Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)	ANT	Verdict
1379.500	39.50	28.00	-0.71	74.0	54.0	-26.00	Horizontal	Pass
2992.500	45.69	33.95	6.08	74.0	54.0	-20.05	Horizontal	Pass
6893.000	49.93	39.38	0.43	74.0	54.0	-14.62	Horizontal	Pass
8710.500	56.24	46.04	5.13	74.0	54.0	-7.96	Horizontal	Pass
11050.750	60.07	49.84	9.95	74.0	54.0	-4.16	Horizontal	Pass
14414.000	61.40	51.16	11.26	74.0	54.0	-2.84	Horizontal	Pass

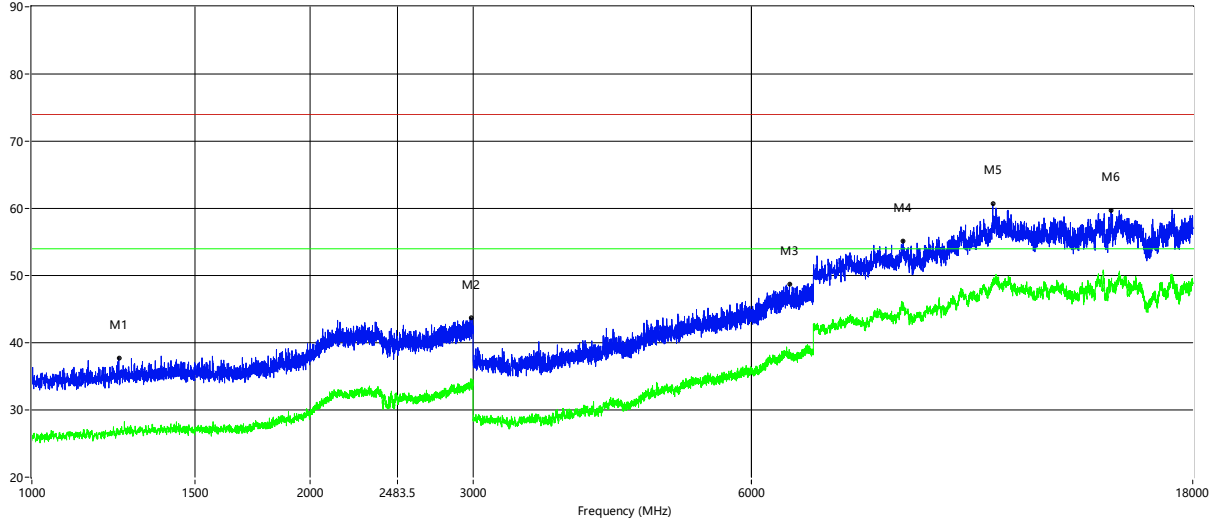
Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier + BRF Factor.
2. Margin = Limit - Emission Level
3. Tests were performed in three frequency range 1GHz~3GHz, 3GHz~13GHz, 13GHz~18GHz.
4. Above 18GHz emissions are mainly from the environment noise, not show in report.



HARMONICS AND SPURIOUS EMISSIONS (01 CHANNEL, VERTICAL)

RE_FCC Test Case_FCC 15C 1GHz-18GHz



Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)	ANT	Verdict
1241.500	37.72	26.43	-0.96	74.0	54.0	-27.57	Vertical	Pass
2984.000	43.68	34.66	6.04	74.0	54.0	-19.34	Vertical	Pass
6595.000	48.66	38.74	-0.45	74.0	54.0	-15.26	Vertical	Pass
8754.500	55.20	45.57	4.99	74.0	54.0	-8.43	Vertical	Pass
10940.750	60.68	49.42	9.76	74.0	54.0	-4.58	Vertical	Pass
14689.000	59.70	49.10	11.25	74.0	54.0	-4.90	Vertical	Pass

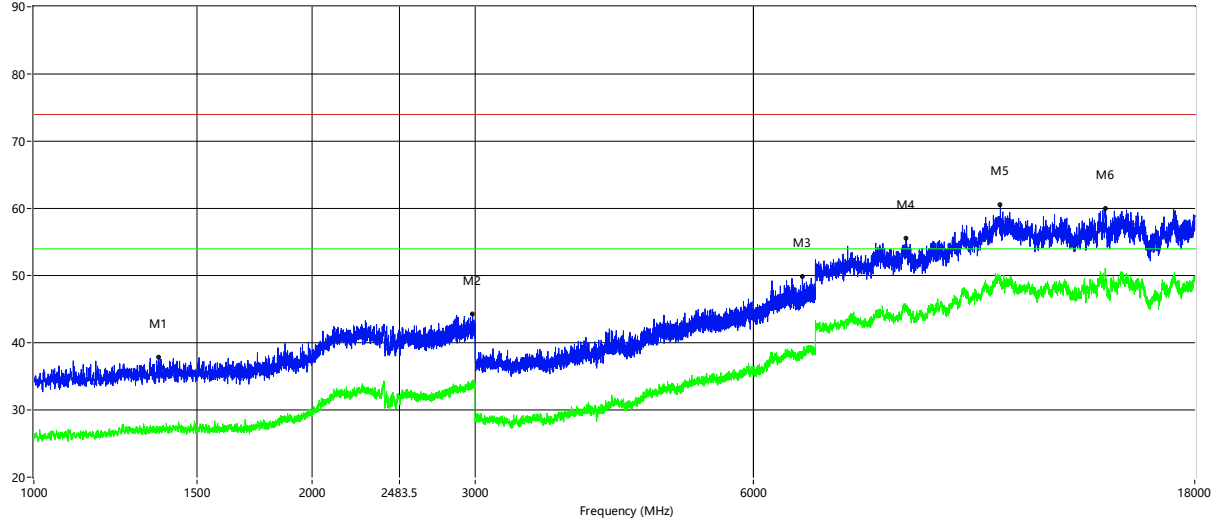
Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier + BRF Factor.
2. Margin = Limit - Emission Level
3. Tests were performed in three frequency range 1GHz~3GHz, 3GHz~13GHz, 13GHz~18GHz.
4. Above 18GHz emissions are mainly from the environment noise, not show in report.



HARMONICS AND SPURIOUS EMISSIONS (06 CHANNEL, HORIZONTAL)

RE_FCC Test Case_FCC 15C 1GHz-18GHz



Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)	ANT	Verdict
1365.000	37.82	26.92	-0.75	74.0	54.0	-27.08	Horizontal	Pass
2982.000	44.31	34.13	6.03	74.0	54.0	-19.87	Horizontal	Pass
6777.000	49.79	38.74	-0.10	74.0	54.0	-15.26	Horizontal	Pass
8773.750	55.52	45.18	4.93	74.0	54.0	-8.82	Horizontal	Pass
11094.750	60.54	50.04	9.71	74.0	54.0	-3.96	Horizontal	Pass
14405.750	60.03	50.77	11.36	74.0	54.0	-3.23	Horizontal	Pass

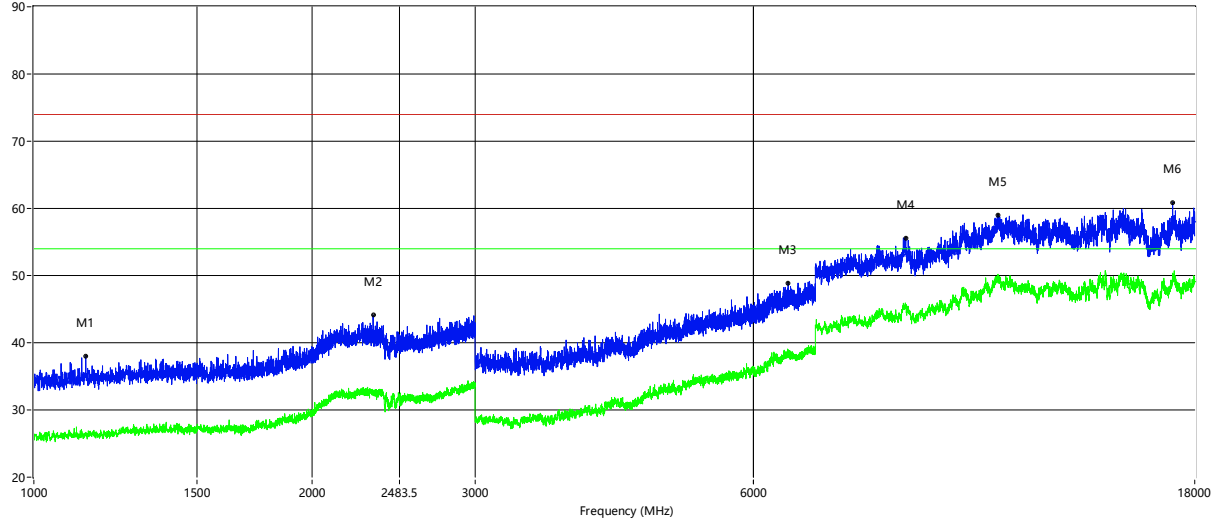
Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier + BRF Factor.
2. Margin = Limit - Emission Level
3. Tests were performed in three frequency range 1GHz~3GHz, 3GHz~13GHz, 13GHz~18GHz.
4. Above 18GHz emissions are mainly from the environment noise, not show in report.



HARMONICS AND SPURIOUS EMISSIONS (06 CHANNEL, VERTICAL)

RE_FCC Test Case_FCC 15C 1GHz-18GHz



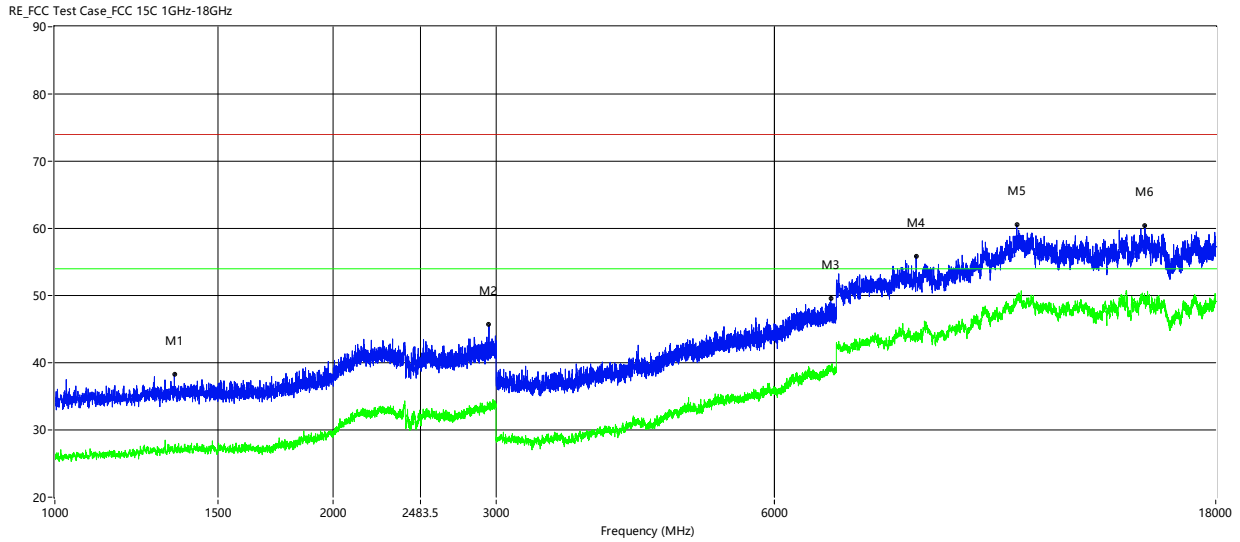
Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)	ANT	Verdict
1138.000	38.05	26.65	-1.41	74.0	54.0	-27.35	Vertical	Pass
2327.000	44.10	32.25	4.47	74.0	54.0	-21.75	Vertical	Pass
6541.000	48.88	38.12	-0.42	74.0	54.0	-15.88	Vertical	Pass
8765.500	55.62	45.72	4.96	74.0	54.0	-8.28	Vertical	Pass
11031.500	59.06	49.82	10.05	74.0	54.0	-4.18	Vertical	Pass
17040.250	60.91	49.59	10.05	74.0	54.0	-4.41	Vertical	Pass

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier + BRF Factor.
2. Margin = Limit - Emission Level
3. Tests were performed in three frequency range 1GHz~3GHz, 3GHz~13GHz, 13GHz~18GHz.
4. Above 18GHz emissions are mainly from the environment noise, not show in report.



HARMONICS AND SPURIOUS EMISSIONS (11 CHANNEL, HORIZONTAL)



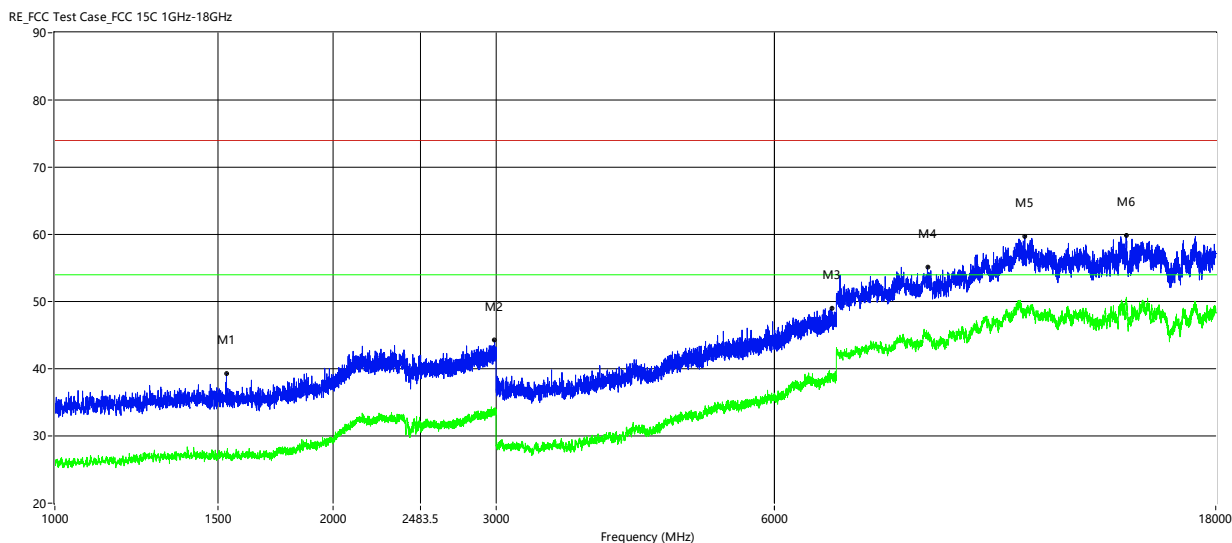
Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)	ANT	Verdict
1346.500	38.27	27.28	-0.80	74.0	54.0	-26.72	Horizontal	Pass
2947.000	45.69	33.71	5.88	74.0	54.0	-20.29	Horizontal	Pass
6901.000	49.54	39.35	0.46	74.0	54.0	-14.65	Horizontal	Pass
8537.250	55.88	44.69	4.42	74.0	54.0	-9.31	Horizontal	Pass
10971.000	60.58	49.79	10.00	74.0	54.0	-4.21	Horizontal	Pass
15079.500	60.49	49.60	10.33	74.0	54.0	-4.40	Horizontal	Pass

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier + BRF Factor.
2. Margin = Limit - Emission Level
3. Tests were performed in three frequency range 1GHz~3GHz, 3GHz~13GHz, 13GHz~18GHz.
4. Above 18GHz emissions are mainly from the environment noise, not show in report.



HARMONICS AND SPURIOUS EMISSIONS (11 CHANNEL, VERTICAL)



Frequency (MHz)	Peak Level (dBuV/m)	Average Level (dBuV/m)	Factor (dB)	PK Limit (dBuV/m)	AV Limit (dBuV/m)	Over Limit (dB)	ANT	Verdict
1533.000	39.28	27.73	-0.60	74.0	54.0	-26.27	Vertical	Pass
2989.000	44.25	33.65	6.06	74.0	54.0	-20.35	Vertical	Pass
6918.000	48.95	38.87	0.47	74.0	54.0	-15.13	Vertical	Pass
8782.000	55.18	44.87	4.91	74.0	54.0	-9.13	Vertical	Pass
11191.000	59.78	48.39	9.61	74.0	54.0	-5.61	Vertical	Pass
14400.250	59.88	50.39	11.42	74.0	54.0	-3.61	Vertical	Pass

Remark:

1. Factor = Antenna Factor + Cable Loss – Pre-amplifier + BRF Factor.
2. Margin = Limit - Emission Level
3. Tests were performed in three frequency range 1GHz~3GHz, 3GHz~13GHz, 13GHz~18GHz.
4. Above 18GHz emissions are mainly from the environment noise, not show in report.



9.4. SPURIOUS EMISSIONS BELOW 30M

Freq. (MHz)	Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	State P/F	Test Result
--	--	--	--	--	PASS
--	--	--	--	--	PASS

Note:

The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

Distance extrapolation factor = $40 \log (\text{specific distance}/\text{test distance})$ (dB);

Limit line = specific limits (dBuV) + distance extrapolation factor.

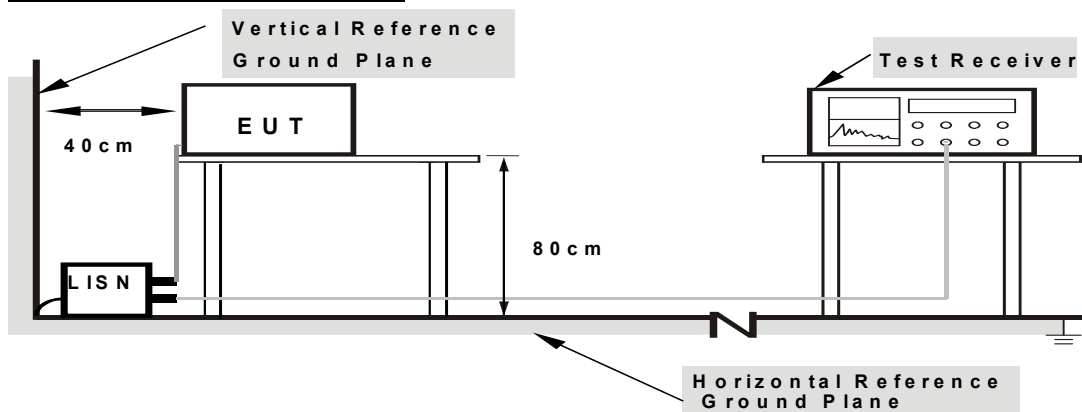
10. AC POWER LINE CONDUCTED EMISSIONS

LIMITS

Please refer to FCC §15.207 (a) and RSS-Gen Clause 8.8

FREQUENCY (MHz)	Quasi-peak	Average
0.15 -0.5	66 - 56 *	56 - 46 *
0.50 -5.0	56.00	46.00
5.0 -30.0	60.00	50.00

TEST SETUP AND PROCEDURE



- Note: 1.Support units were connected to second LISN .
2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes

The EUT is put on a table of non-conducting material that is 80cm high. The vertical conducting wall of shielding is located 40cm to the rear of the EUT. The power line of the EUT is connected to the AC mains through a Artificial Mains Network (A.M.N.). A EMI Measurement Receiver (R&S Test Receiver ESR3) is used to test the emissions from both sides of AC line. According to the requirements in Section 7 and 13 of ANSI C63.10-2013.Conducted emissions from the EUT measured in the frequency range between 0.15 MHz and 30MHz using CISPR Quasi-Peak and average detector mode. The bandwidth of EMI test receiver is set at 9kHz.

The arrangement of the equipment is installed to meet the standards and operating in a manner, which tends to maximize its emission characteristics in a normal application.

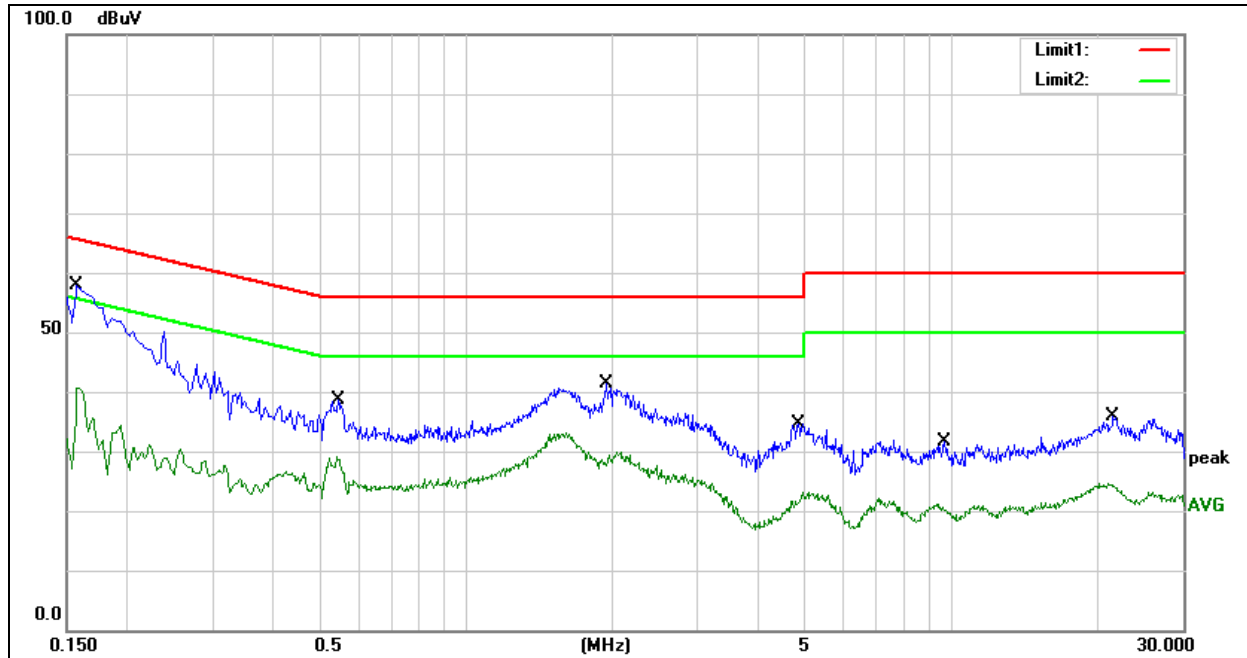
TEST ENVIRONMENT

Temperature	25°C	Relative Humidity	60%
Atmosphere Pressure	101kPa	Test Voltage	DC 3.3V



TEST RESULTS

NEUTRAL N RESULTS

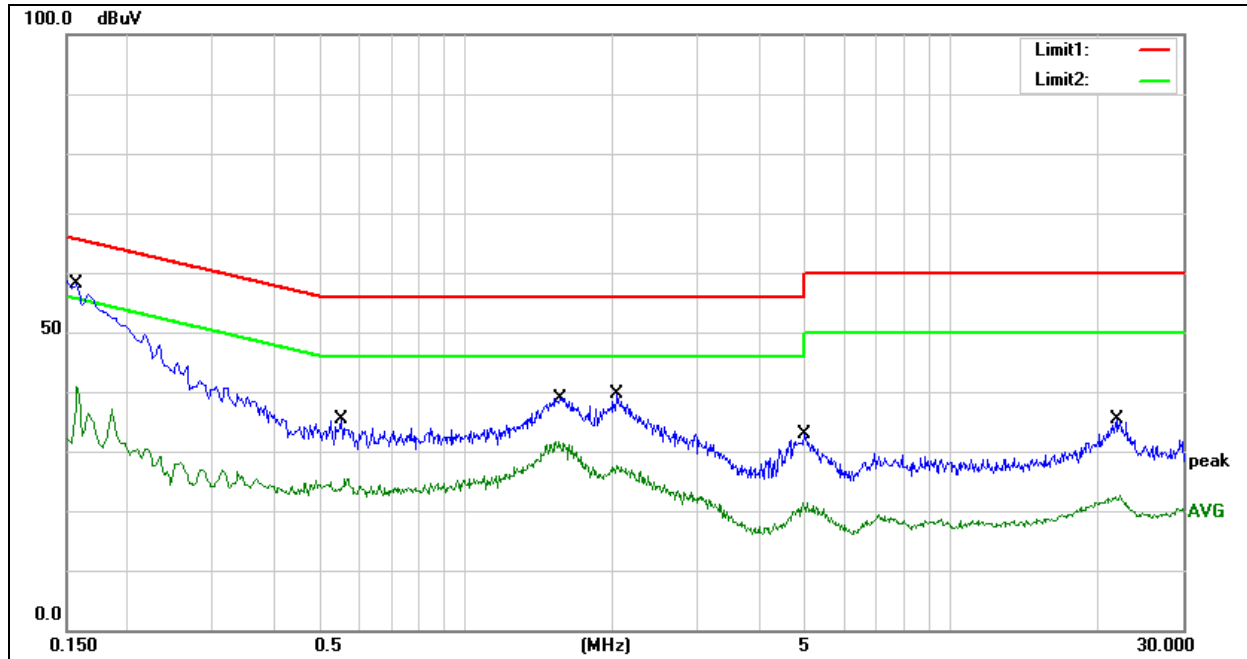


No.	Frequency (MHz)	Reading (dBuV)	Correct (dB)	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1580	37.61	20.21	57.82	65.57	-7.75	QP
2	0.1580	20.50	20.21	40.71	55.57	-14.86	AVG
3	0.5460	18.14	20.39	38.53	56.00	-17.47	QP
4	0.5460	8.62	20.39	29.01	46.00	-16.99	AVG
5	1.9460	21.19	20.15	41.34	56.00	-14.66	QP
6	1.9460	9.72	20.15	29.87	46.00	-16.13	AVG
7	4.8260	14.67	20.03	34.70	56.00	-21.30	QP
8	4.8260	3.06	20.03	23.09	46.00	-22.91	AVG
9	9.6620	11.71	19.86	31.57	60.00	-28.43	QP
10	9.6620	0.62	19.86	20.48	50.00	-29.52	AVG
11	21.5500	16.10	19.82	35.92	60.00	-24.08	QP
12	21.5500	4.34	19.82	24.16	50.00	-25.84	AVG

- Note: 1. Result = Reading +Correct Factor.
 2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
 3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
 4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.



LINE L RESULTS



No.	Frequency (MHz)	Reading (dBuV)	Correct dB	Result (dBuV)	Limit (dBuV)	Margin (dB)	Remark
1	0.1580	37.80	20.21	58.01	65.57	-7.56	QP
2	0.1580	20.77	20.21	40.98	55.57	-14.59	AVG
3	0.5540	14.99	20.39	35.38	56.00	-20.62	QP
4	0.5540	5.01	20.39	25.40	46.00	-20.60	AVG
5	1.5660	18.67	20.15	38.82	56.00	-17.18	QP
6	1.5660	11.41	20.15	31.56	46.00	-14.44	AVG
7	2.0500	19.36	20.15	39.51	56.00	-16.49	QP
8	2.0500	7.39	20.15	27.54	46.00	-18.46	AVG
9	4.9740	12.87	20.02	32.89	56.00	-23.11	QP
10	4.9740	1.30	20.02	21.32	46.00	-24.68	AVG
11	21.9060	15.70	19.79	35.49	60.00	-24.51	QP
12	21.9060	2.80	19.79	22.59	50.00	-27.41	AVG

- Note: 1. Result = Reading +Correct Factor.
 2. If QP Result complies with AV limit, AV Result is deemed to comply with AV limit.
 3. Test setup: RBW: 200 Hz (9 kHz—150 kHz), 9 kHz (150 kHz—30 MHz).
 4. Step size: 80Hz (0.009MHz-0.15MHz), 4 kHz (0.15MHz-30MHz), Scan time: auto.



11. ANTENNA REQUIREMENTS

APPLICABLE REQUIREMENTS

Please refer to FCC §15.203

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

Please refer to FCC §15.247(b)(4)

The conducted output power limit specified in paragraph (b) of this section is based on the use of antennas with directional gains that do not exceed 6 dBi. Except as shown in paragraph (c) of this section, if transmitting antennas of directional gain greater than 6 dBi are used, the conducted output power from the intentional radiator shall be reduced below the stated values in paragraphs (b)(1), (b)(2), and (b)(3) of this section, as appropriate, by the amount in dB that the directional gain of the antenna exceeds 6 dBi.

ANTENNA CONNECTOR

EUT has a PCB Antenna without antenna connector.

ANTENNA GAIN

The antenna gain of EUT is less than 6 dBi.



Test photos

Note: See test photos in setup photo document for the actual connections between Product and support equipment.

END OF REPORT