

Test Mode:	802.11b	Test Date:	2023-11-13
Test Channel:	2462	Test Engineer:	Guangze Ding
Remark:	<ol style="list-style-type: none"> 1. Average measurement was not performed if peak level lower than average limit. 2. Other frequency was 20dB below limit line within 1-18GHz, there is not show in the report. 3. This is the worst case of Radiated Emission for 1-18GHz. 		

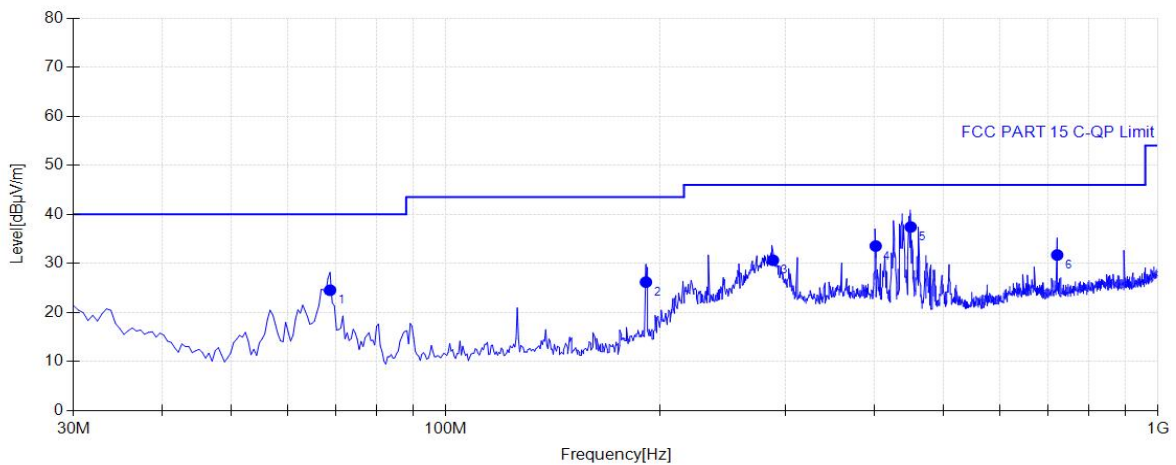
Frequency (MHz)	Level (dB μ V/m)	Factor (dB)	Limit (dB μ V/m)	Margin (dB)	Detector	Polarization
1913.0000	40.24	-11.56	74.00	33.76	Peak	Horizontal
2034.0000	34.13	-11.04	54.00	19.87	Peak	Horizontal
2490.5000	46.67	-7.16	74.00	27.33	Peak	Horizontal
2567.5000	39.84	-7.77	54.00	14.16	Peak	Horizontal
3832.5000	37.16	-4.56	54.00	16.84	Peak	Horizontal
3992.0000	44.41	-4.22	74.00	29.59	Peak	Horizontal
1946.0000	41.41	-11.42	74.00	32.59	Peak	Vertical
2160.5000	33.80	-10.23	54.00	20.20	Peak	Vertical
3854.5000	36.14	-4.49	54.00	17.86	Peak	Vertical
3953.5000	43.93	-4.45	74.00	30.07	Peak	Vertical
6126.0000	41.11	1.71	54.00	12.89	Peak	Vertical
6412.0000	50.76	3.17	74.00	23.24	Peak	Vertical

The worst case of Radiated Emission below 1GHz:

30MHz – 1GHz Test Data

EUT:	2.4GHz Wi-Fi/BLE Module	Polarity:	Horizontal
Model:	EMC6069-P	S/N:	/
Mode:	Transmit by 802.11b at Channel 2412MHz	Voltage:	DC3.3V
Environment:	Temp: 18°C; Humi:31%	Engineer:	Guangze Ding

Test Graph

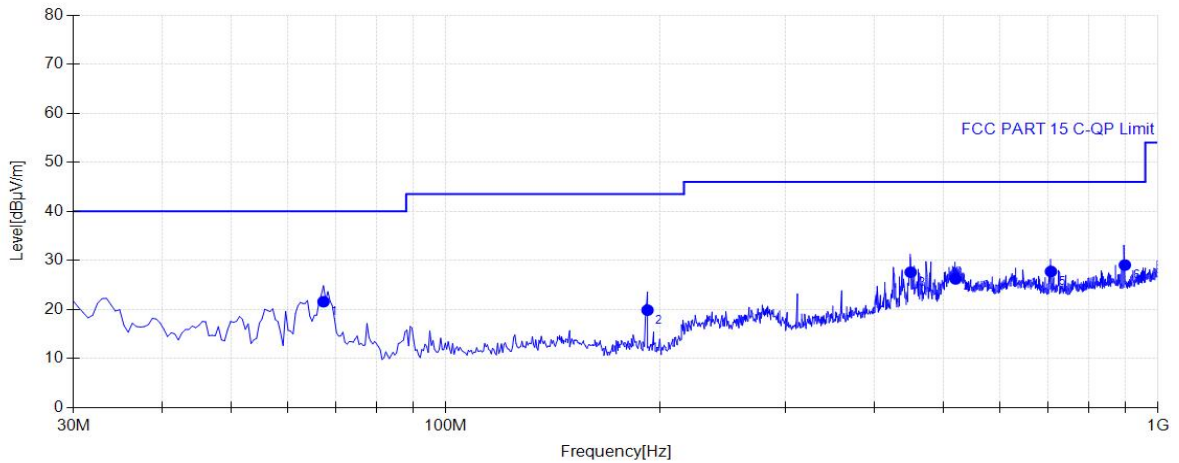


Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	68.8000	8.21	24.55	40.00	15.45	100	345	Horizontal
2	191.0200	10.14	26.19	43.50	17.31	100	16	Horizontal
3	288.0200	13.23	30.65	46.00	15.35	100	255	Horizontal
4	401.5100	15.82	33.55	46.00	12.45	100	44	Horizontal
5	449.5250	17.59	37.43	46.00	8.57	100	249	Horizontal
6	722.0950	22.21	31.72	46.00	14.28	100	214	Horizontal

Note 1: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

EUT:	2.4GHz Wi-Fi/BLE Module	Polarity:	Vertical
Model:	EMC6069-P	S/N:	/
Mode:	Transmit by 802.11b at Channel 2412MHz	Voltage:	DC3.3V
Environment:	Temp: 18°C; Humi:31%	Engineer:	Guangze Ding

Test Graph

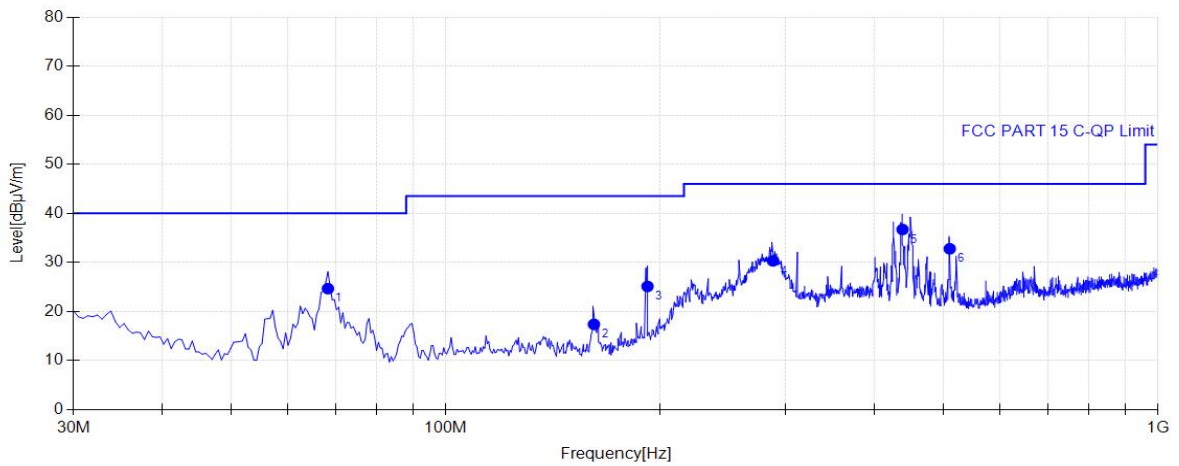


Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	67.3450	7.95	21.59	40.00	18.41	100	44	Vertical
2	191.9900	10.09	19.87	43.50	23.63	100	125	Vertical
3	449.5250	17.59	27.60	46.00	18.40	100	132	Vertical
4	519.8500	19.22	26.24	46.00	19.76	100	187	Vertical
5	707.5450	21.95	27.75	46.00	18.25	100	206	Vertical
6	898.6350	23.99	29.06	46.00	16.94	100	336	Vertical

30MHz – 1GHz Test Data

EUT:	2.4GHz Wi-Fi/BLE Module	Polarity:	Horizontal
Model:	EMC6069-P	S/N:	/
Mode:	Transmit by 802.11b at Channel 2462MHz	Voltage:	DC3.3V
Environment:	Temp: 18°C; Humi:31%	Engineer:	Guangze Ding

Test Graph

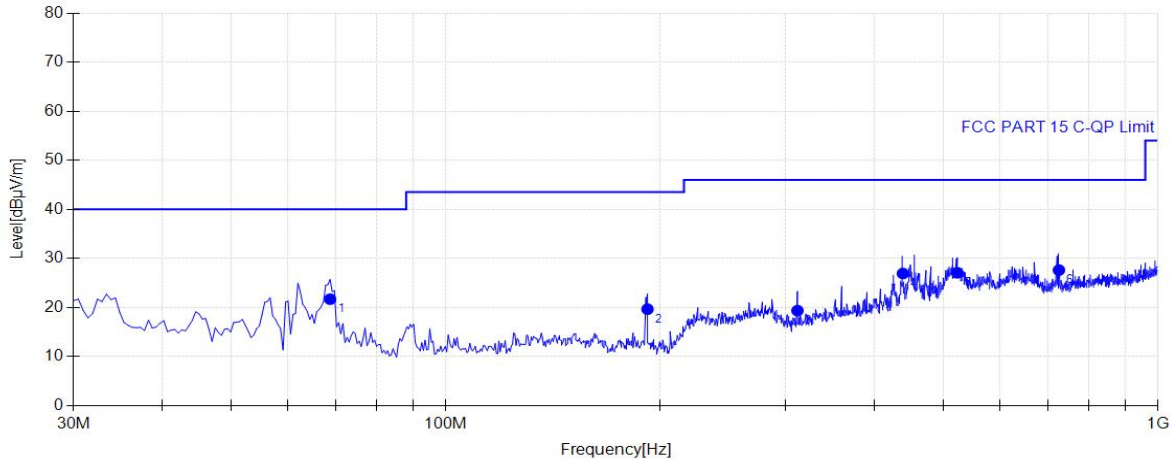


Final Data List

NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	68.3150	8.13	24.66	40.00	15.34	100	1	Horizontal
2	161.4350	10.34	17.39	43.50	26.11	100	199	Horizontal
3	191.9900	10.09	25.12	43.50	18.38	100	4	Horizontal
4	288.0200	13.23	30.33	46.00	15.67	100	261	Horizontal
5	437.8850	17.16	36.72	46.00	9.28	100	248	Horizontal
6	510.1500	19.07	32.79	46.00	13.21	100	295	Horizontal

EUT:	2.4GHz Wi-Fi/BLE Module	Polarity:	Vertical
Model:	EMC6069-P	S/N:	/
Mode:	Transmit by 802.11b at Channel 2462MHz	Voltage:	DC3.3V
Environment:	Temp: 18°C; Humi:31%	Engineer:	Guangze Ding

Test Graph



Final Data List								
NO.	Freq. [MHz]	Factor [dB]	QP Value [dBµV/m]	QP Limit [dBµV/m]	QP Margin [dB]	Height [cm]	Angle [°]	Polarity
1	68.8000	8.21	21.70	40.00	18.30	100	50	Vertical
2	191.9900	10.09	19.67	43.50	23.83	100	126	Vertical
3	311.7850	14.02	19.37	46.00	26.63	100	356	Vertical
4	438.3700	17.18	26.93	46.00	19.07	100	304	Vertical
5	522.7600	19.26	27.07	46.00	18.93	100	187	Vertical
6	725.9750	22.28	27.63	46.00	18.37	100	84	Vertical

Note 1: The test trace is same as the ambient noise and the amplitude of the emissions are attenuated more than 20dB below the permissible (the test frequency range: 9kHz ~ 30MHz, 18GHz ~ 25GHz), therefore no data appear in the report.

7.7. Restricted Band Edge Measurement

7.7.1. Test Limit

For 15.205 requirement:

Radiated emissions which fall in the restricted bands, as defined in Section 15.205(a) of FCC part 15, must also comply with the radiated emission limits specified in Section 15.209(a).

Frequency (MHz)	Frequency (MHz)	Frequency (MHz)	Frequency (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	8.25 - 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 - 156.525	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	--	--	--

All out of band emissions appearing in a restricted band as specified in Section 15.205 of the Title 47CFR must not exceed the limits shown in Table per Section 15.209.

FCC Part 15 Subpart C Paragraph 15.209		
Frequency [MHz]	Field Strength [uV/m]	Measured Distance [Meters]
0.009 - 0.490	2400/F (kHz)	300
0.490 - 1.705	24000/F (kHz)	30
1.705 - 30	30	30
30 - 88	100	3
88 - 216	150	3
216 - 960	200	3
Above 960	500	3

7.7.2. Test Procedure Used

ANSI C63.10 Section 6.3 (General Requirements)

ANSI C63.10 Section 6.6 (Standard test method above 1GHz)

7.7.3. Test Setting

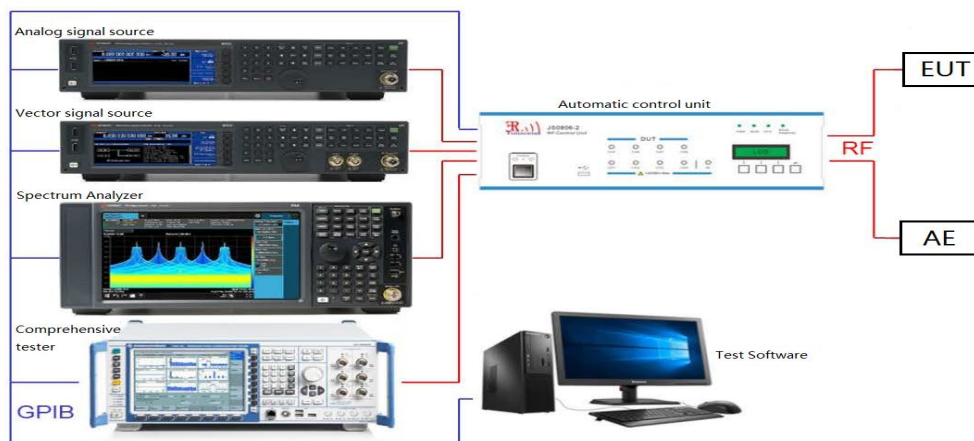
Peak Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = peak
5. Sweep time = auto couple
6. Trace mode = max hold
7. Trace was allowed to stabilize

Average Field Strength Measurements

1. Analyzer center frequency was set to the frequency of the radiated spurious emission of interest
2. RBW = 1MHz
3. VBW = 3MHz
4. Detector = Power Average (RMS)
5. Number of sweep point = 2001 (Number of sweep points must be $\geq 2 \times \text{span} / \text{RBW}$)
6. Sweep time = auto
7. Trace (RMS) averaging was performed over at least 100 traces.

7.7.4. Test Setup



7.7.5. Test Result

Test Mode	Antenna	Channel	Detector	Freq [MHz]	Result [dBm]	Limit [dBm]	Result [dBuV/m]	Limit [dBuV/m]	Verdict
11B	Ant1	2412	AV	2310.000	-49.32	≤-41.20	45.88	≤54	PASS
			AV	2382.680	-44.31	≤-41.20	50.89	≤54	PASS
			AV	2390.000	-45.04	≤-41.20	50.16	≤54	PASS
			Peak	2310.000	-40.2	≤-21.20	55.00	≤74	PASS
			Peak	2388.010	-34.45	≤-21.20	60.75	≤74	PASS
			Peak	2390.000	-35.29	≤-21.20	59.91	≤74	PASS
		2462	AV	2483.500	-47.48	≤-41.20	47.72	≤54	PASS
			AV	2488.510	-43.08	≤-41.20	52.12	≤54	PASS
			AV	2500.000	-47.72	≤-41.20	47.48	≤54	PASS
			Peak	2483.500	-36.72	≤-21.20	58.48	≤74	PASS
			Peak	2489.280	-34.61	≤-21.20	60.59	≤74	PASS
			Peak	2500.000	-38.52	≤-21.20	56.68	≤74	PASS
11G	Ant1	2412	AV	2310.000	-49.34	≤-41.20	45.86	≤54	PASS
			AV	2389.960	-43.2	≤-41.20	52.00	≤54	PASS
			AV	2390.000	-43.2	≤-41.20	52.00	≤54	PASS
			Peak	2310.000	-39.21	≤-21.20	55.99	≤74	PASS
			Peak	2389.960	-32.2	≤-21.20	63.00	≤74	PASS
			Peak	2390.000	-32.2	≤-21.20	63.00	≤74	PASS
		2462	AV	2483.500	-41.55	≤-41.20	53.65	≤54	PASS
			AV	2483.560	-41.64	≤-41.20	53.56	≤54	PASS
			AV	2500.000	-48.14	≤-41.20	47.06	≤54	PASS
			Peak	2483.500	-30.68	≤-21.20	64.52	≤74	PASS
			Peak	2483.560	-30.38	≤-21.20	64.82	≤74	PASS
			Peak	2500.000	-37.63	≤-21.20	57.57	≤74	PASS
11N20 SISO	Ant1	2412	AV	2310.000	-49.34	≤-41.20	45.86	≤54	PASS
			AV	2389.960	-42.21	≤-41.20	52.99	≤54	PASS
			AV	2390.000	-42.21	≤-41.20	52.99	≤54	PASS
			Peak	2310.000	-38.87	≤-21.20	56.33	≤74	PASS
			Peak	2389.050	-29.46	≤-21.20	65.74	≤74	PASS
			Peak	2390.000	-29.96	≤-21.20	65.24	≤74	PASS
		2462	AV	2483.500	-42.13	≤-41.20	53.07	≤54	PASS
			AV	2483.560	-42.22	≤-41.20	52.98	≤54	PASS
			AV	2500.000	-48.21	≤-41.20	46.99	≤54	PASS

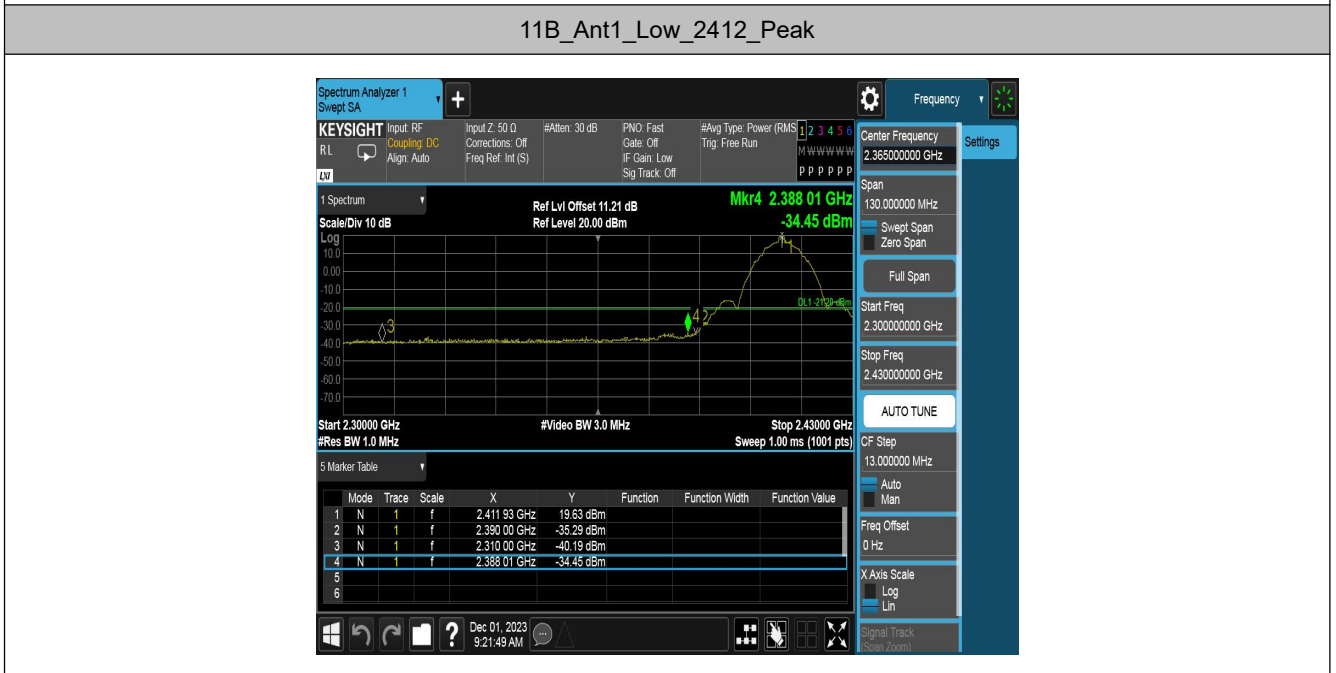
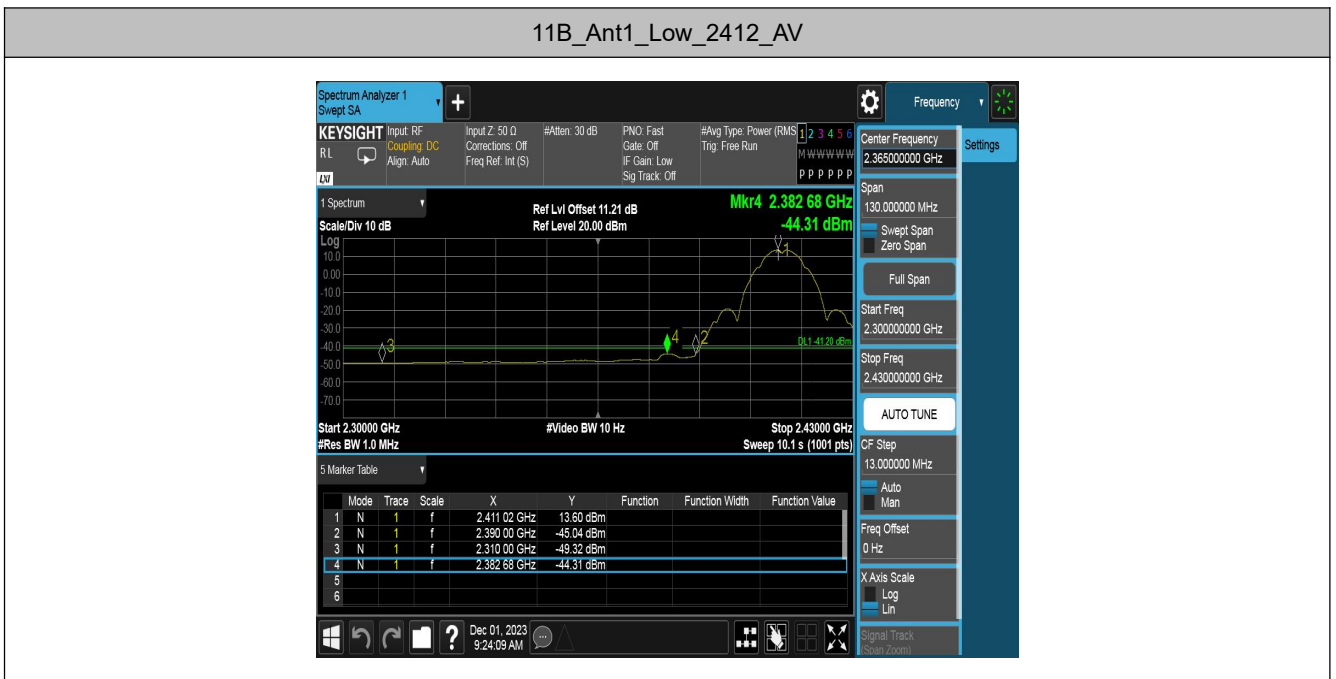
			Peak	2483.500	-29.84	≤-21.20	65.36	≤74	PASS
			Peak	2483.560	-30.08	≤-21.20	65.12	≤74	PASS
			Peak	2500.000	-37.1	≤-21.20	58.10	≤74	PASS
11N40 SISO	Ant1	2422	AV	2310.000	-49.26	≤-41.20	45.94	≤54	PASS
			AV	2389.960	-43.36	≤-41.20	51.84	≤54	PASS
			AV	2390.000	-43.36	≤-41.20	51.84	≤54	PASS
			Peak	2310.000	-39.83	≤-21.20	55.37	≤74	PASS
			Peak	2389.570	-24.52	≤-21.20	70.68	≤74	PASS
			Peak	2390.000	-25.07	≤-21.20	70.13	≤74	PASS
		2452	AV	2483.500	-45.85	≤-41.20	49.35	≤54	PASS
			AV	2483.560	-45.89	≤-41.20	49.31	≤54	PASS
			AV	2500.000	-48.46	≤-41.20	46.74	≤54	PASS
			Peak	2483.500	-21.48	≤-21.20	73.72	≤74	PASS
			Peak	2483.670	-21.41	≤-21.20	73.79	≤74	PASS
			Peak	2500.000	-35.99	≤-21.20	59.21	≤74	PASS
11AX2 0SISO	Ant1	2412	AV	2310.000	-48.91	≤-41.20	46.29	≤54	PASS
			AV	2389.830	-41.82	≤-41.20	53.38	≤54	PASS
			AV	2390.000	-41.84	≤-41.20	53.36	≤54	PASS
			Peak	2310.000	-40.14	≤-21.20	55.06	≤74	PASS
			Peak	2389.960	-30.17	≤-21.20	65.03	≤74	PASS
			Peak	2390.000	-30.17	≤-21.20	65.03	≤74	PASS
		2462	AV	2483.500	-41.58	≤-41.20	53.62	≤54	PASS
			AV	2483.670	-41.6	≤-41.20	53.60	≤54	PASS
			AV	2500.000	-47.71	≤-41.20	47.49	≤54	PASS
			Peak	2483.500	-29.81	≤-21.20	65.39	≤74	PASS
			Peak	2485.430	-29.49	≤-21.20	65.71	≤74	PASS
			Peak	2500.000	-38.19	≤-21.20	57.01	≤74	PASS
11AX4 0SISO	Ant1	2422	AV	2310.000	-49.56	≤-41.20	45.64	≤54	PASS
			AV	2389.960	-42.03	≤-41.20	53.17	≤54	PASS
			AV	2390.000	-42.03	≤-41.20	53.17	≤54	PASS
			Peak	2310.000	-39.12	≤-21.20	56.08	≤74	PASS
			Peak	2389.960	-22.33	≤-21.20	72.87	≤74	PASS
			Peak	2390.000	-22.33	≤-21.20	72.87	≤74	PASS
		2452	AV	2483.500	-42.36	≤-41.20	52.84	≤54	PASS
			AV	2483.560	-42.4	≤-41.20	52.80	≤54	PASS
			AV	2500.000	-46.23	≤-41.20	48.97	≤54	PASS

			Peak	2483.500	-24.05	≤-21.20	71.15	≤74	PASS
			Peak	2483.670	-23.68	≤-21.20	71.52	≤74	PASS
			Peak	2500.000	-36.18	≤-21.20	59.02	≤74	PASS

Note:

1. The Antenna Gain is compensated in the graph.
2. The limit in dBm for average detector is conversion from 54dBuV/m, according to 15.209(a). The limit in dBm for peak detector is 20dB above the limit of average detector in dBm.

Test Graphs



11B_Ant1_High_2462_AV



11B_Ant1_High_2462_Peak



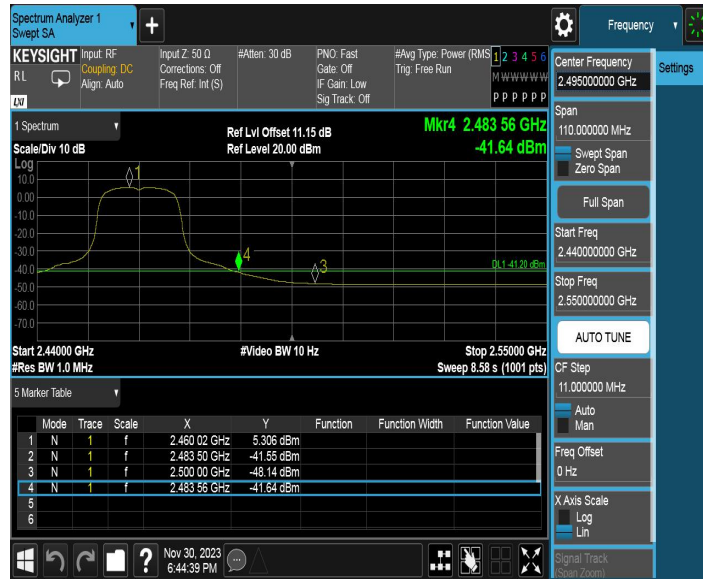
11G_Ant1_Low_2412_AV



11G_Ant1_Low_2412_Peak



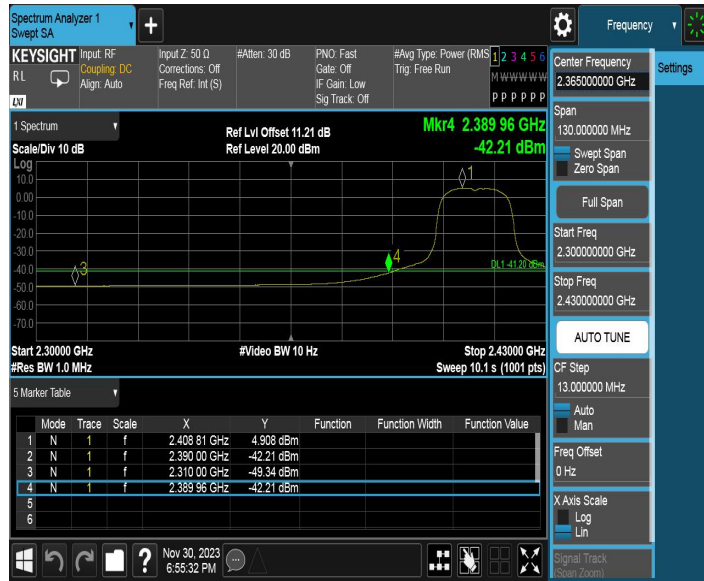
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11G_Ant1_High_2462_Peak



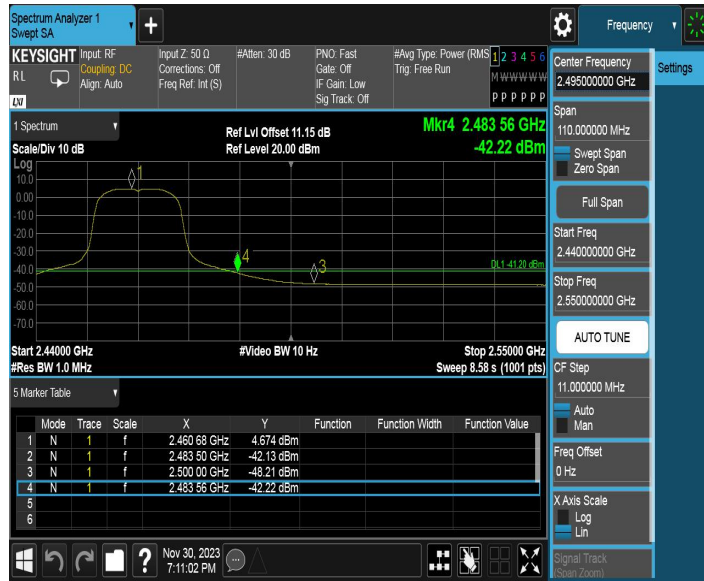
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11N20SISO_Ant1_Low_2412_Peak



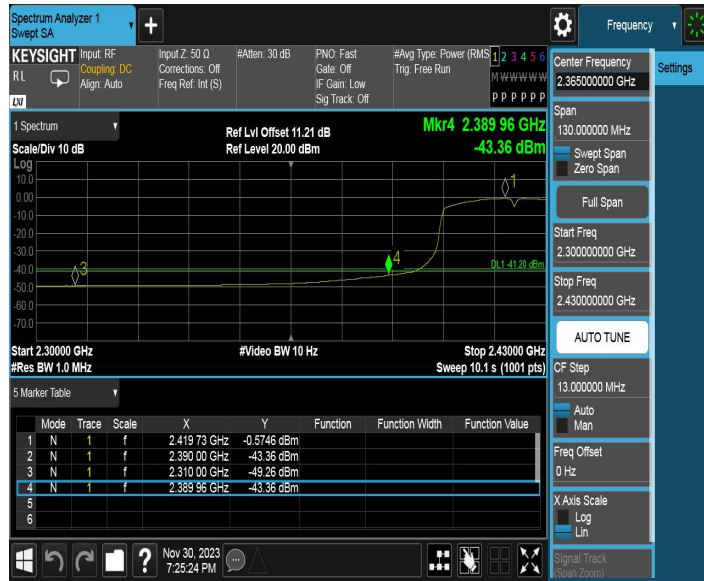
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11N20SISO_Ant1_High_2462_Peak



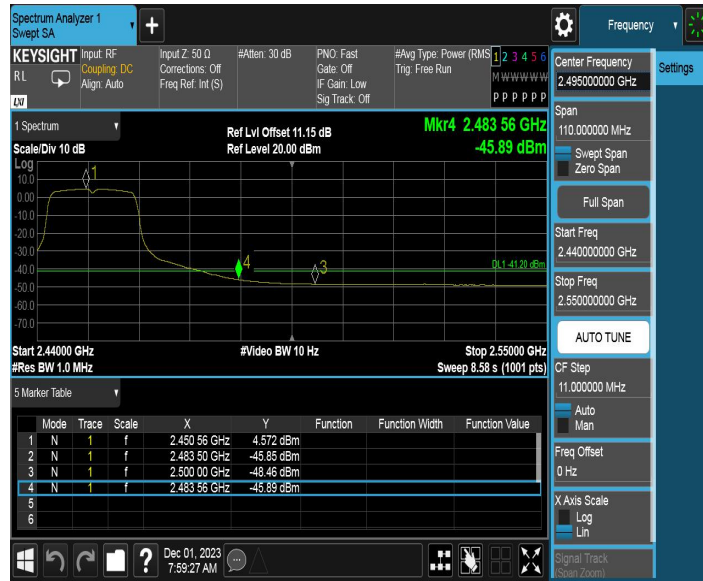
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11N40SISO_Ant1_Low_2422_Peak



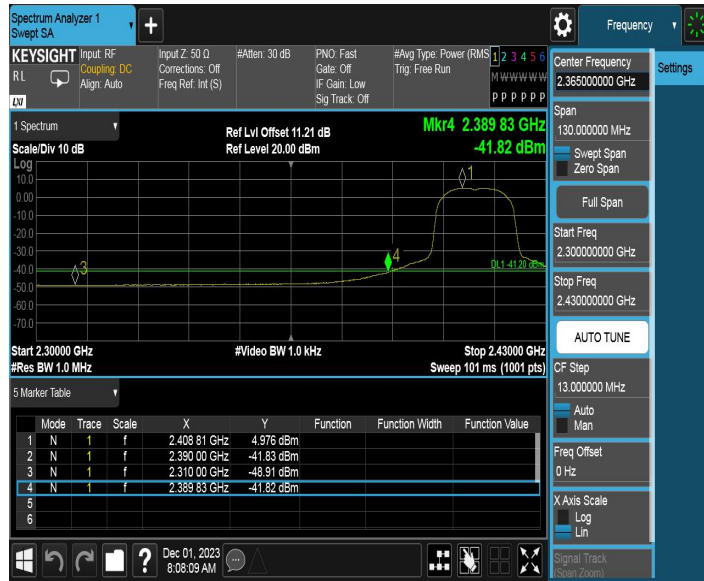
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11N40SISO_Ant1_High_2452_Peak



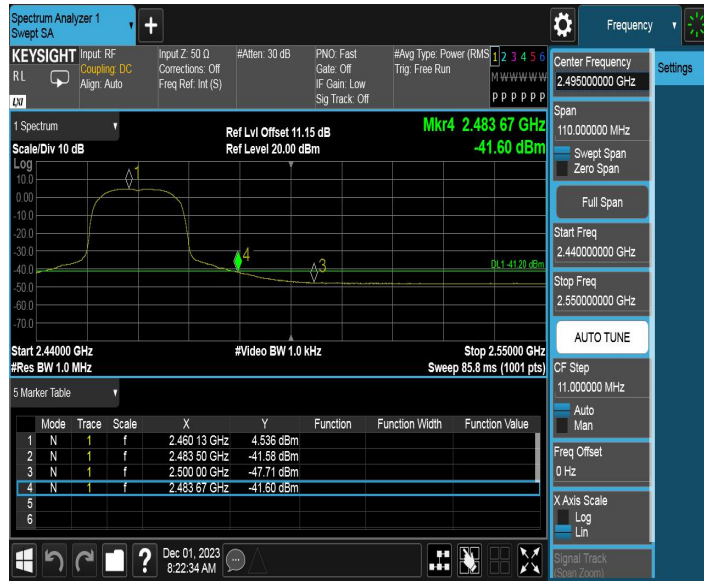
11AX20SISO_Ant1_Low_2412_AV



11AX20SISO_Ant1_Low_2412_Peak



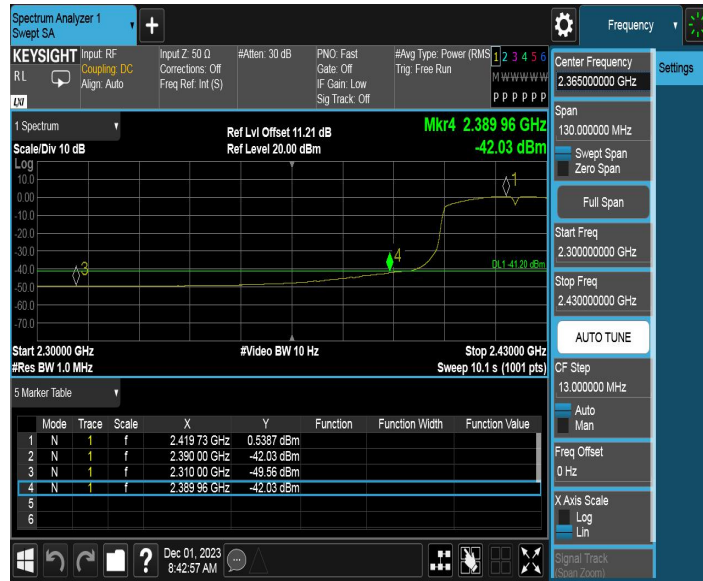
11AX20SISO_Ant1_High_2462_AV



11AX20SISO_Ant1_High_2462_Peak



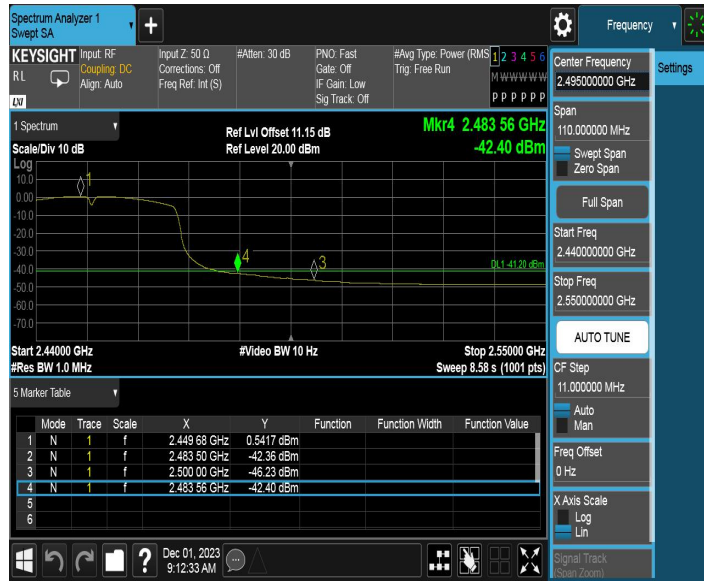
11AX40SISO_Ant1_Low_2422_AV



11AX40SISO_Ant1_Low_2422_Peak



11AX40SISO_Ant1_High_2452_AV



11AX40SISO_Ant1_High_2452_Peak



7.8. AC Conducted Emissions Measurement

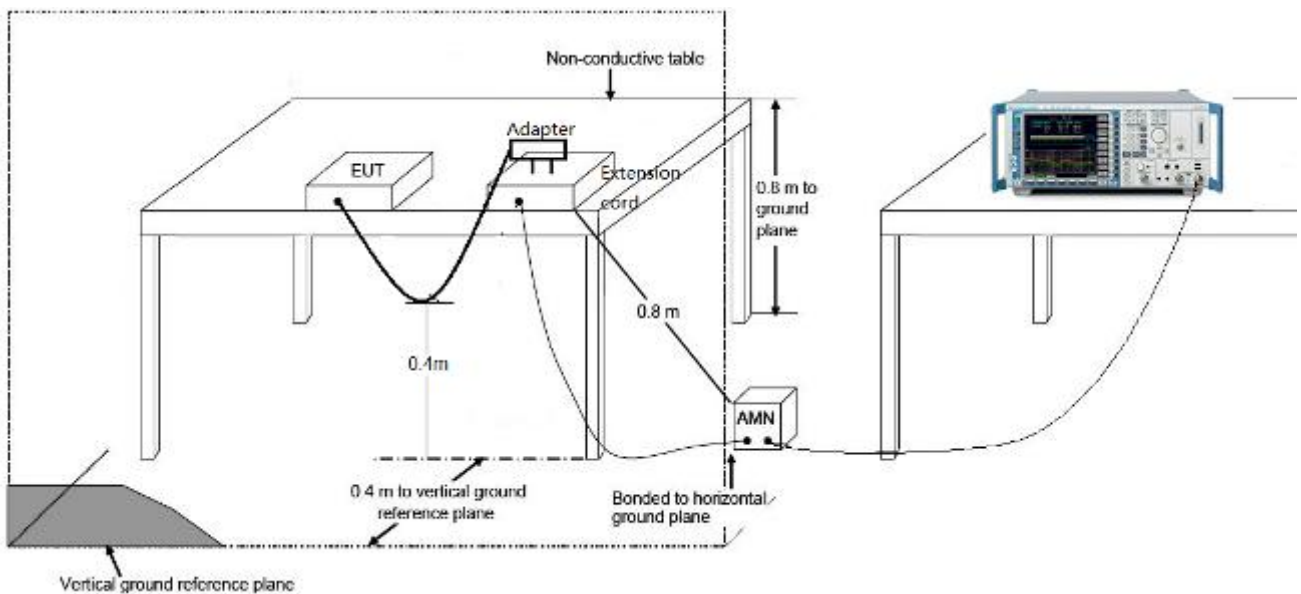
7.8.1. Test Limit

FCC Part 15 Subpart C Paragraph 15.207 Limits		
Frequency (MHz)	QP (dBuV)	AV (dBuV)
0.15 - 0.50	66 - 56	56 - 46
0.50 - 5.0	56	46
5.0 - 30	60	50

Note 1: The lower limit shall apply at the transition frequencies.

Note 2: The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to 0.5MHz.

7.8.2. Test Setup



7.8.3. Test Result

Not Applicable, The EUT is powered only by DC 3.3V.

8. CONCLUSION

The data collected relate only the item(s) tested and show that the **2.4GHz Wi-Fi/BLE Module** is in compliance with Part 15C of the FCC Rules.

————— The End —————