

ANNEX D TEST DATA

For

Project No.:	8235EU120106W
Client:	Beijing Tongyong Technology Co., LTD
Product Description:	Wireless Mechanical Keyboard
Model No.:	MT87
FCC ID:	2BDK7-MT87
Technology:	Bluetooth BLE
Test Engineer:	<i>Mikoy zhu</i>
Test Date:	2024-11-13

Test Summary

Item	Result
Duty Cycle	Pass
Bandwidth	Pass
Maximum Conducted Output Power	Pass
Maximum Power Spectral Density	Pass
Unwanted Emissions In Non-restricted Frequency Bands	Pass
Unwanted Emissions In Restricted Frequency Bands	Pass

1. Duty Cycle

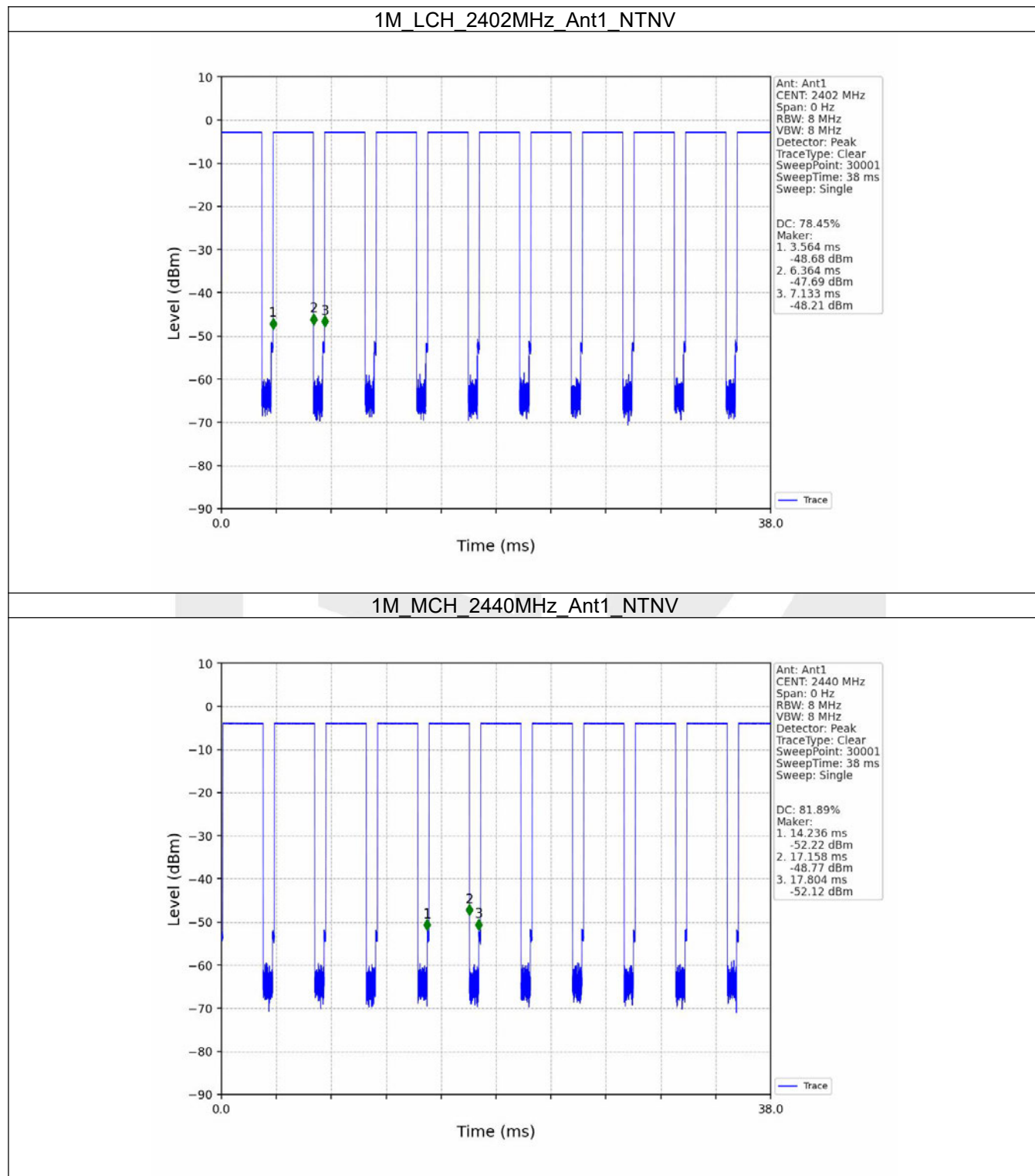
1.1 Test Result

1.1.1 Ant1

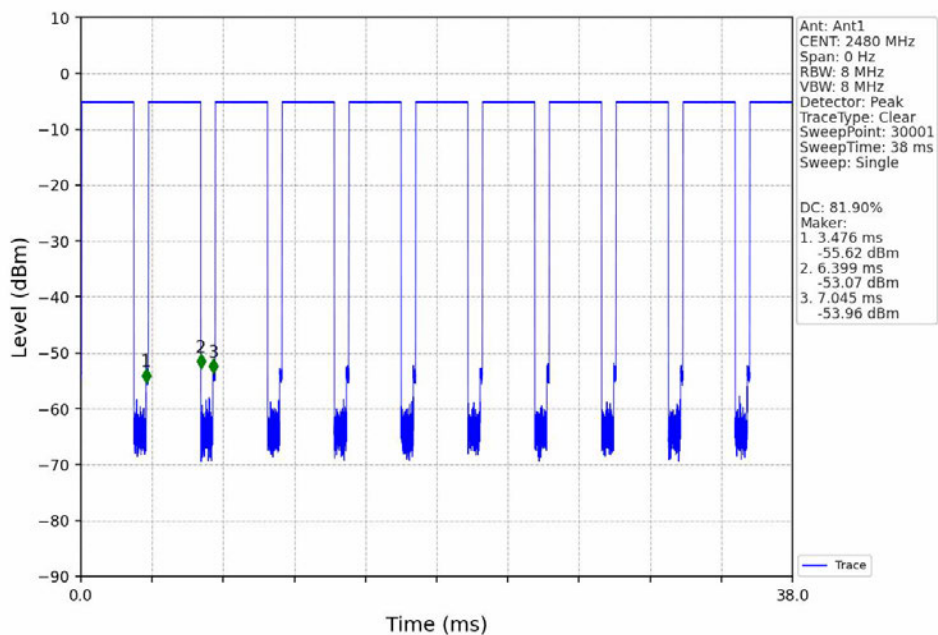
Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
1M	SISO	2402	2.800	3.569	78.45	1.05	0.00
		2440	2.922	3.568	81.89	0.87	0.04
		2480	2.923	3.569	81.90	0.87	0.06
2M	SISO	2402	2.797	3.568	78.39	1.06	0.00
		2440	2.923	3.568	81.92	0.87	0.04
		2480	2.798	3.568	78.42	1.06	0.03

1.2 Test Graph

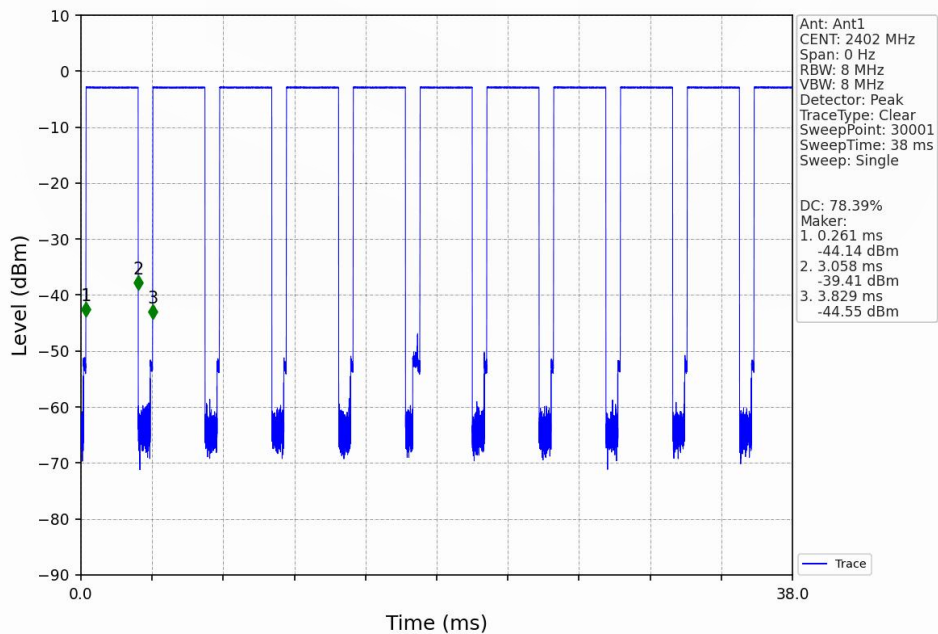
1.2.1 Ant1



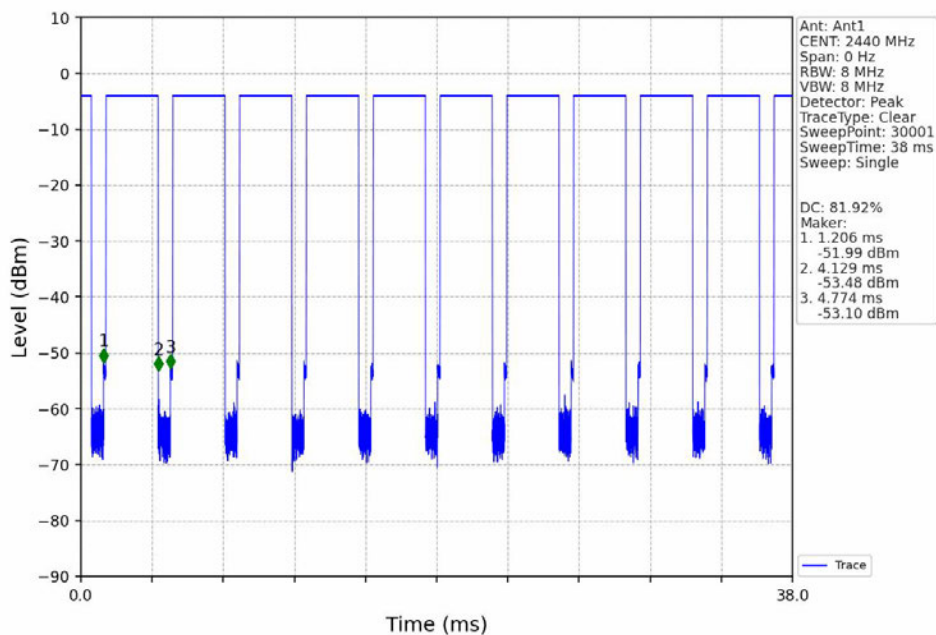
1M_HCH_2480MHz_Ant1_NTNV



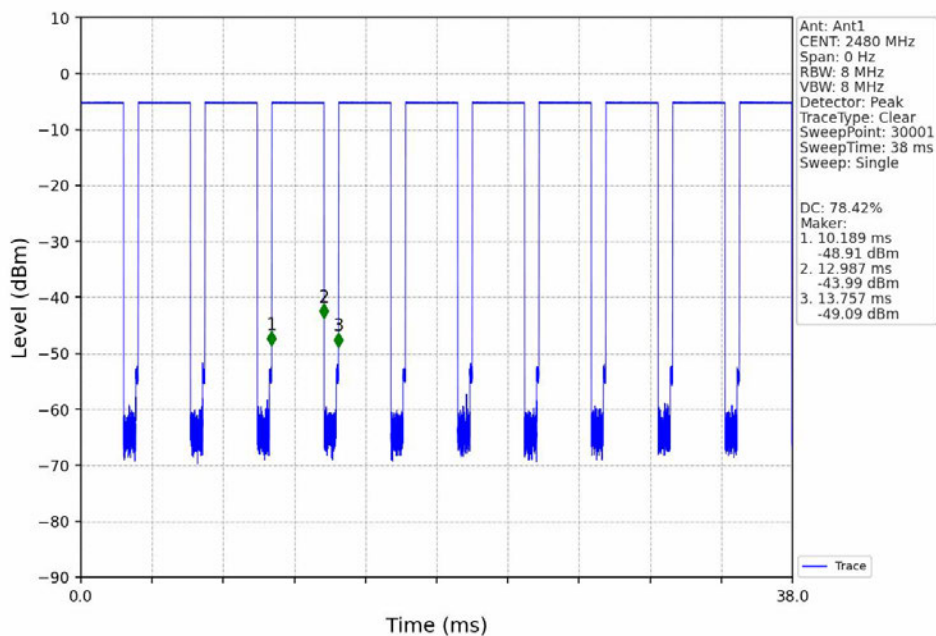
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



2. Bandwidth

2.1 Test Result

2.1.1 OBW

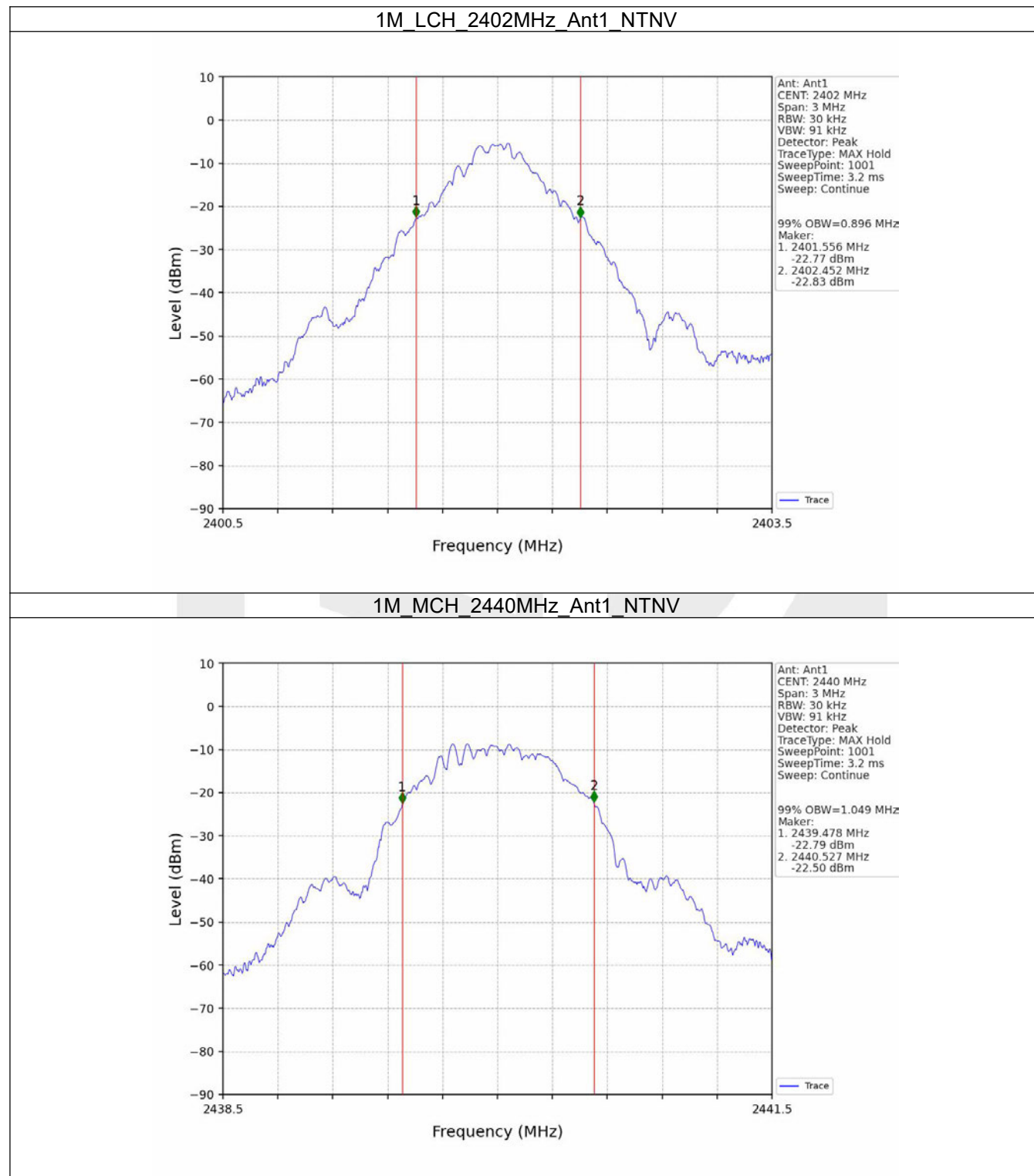
Mode	TX Type	Frequency (MHz)	ANT	99% Occupied Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	0.896	/	Pass
		2440	1	1.049	/	Pass
		2480	1	1.048	/	Pass
2M	SISO	2402	1	1.082	/	Pass
		2440	1	1.059	/	Pass
		2480	1	1.054	/	Pass

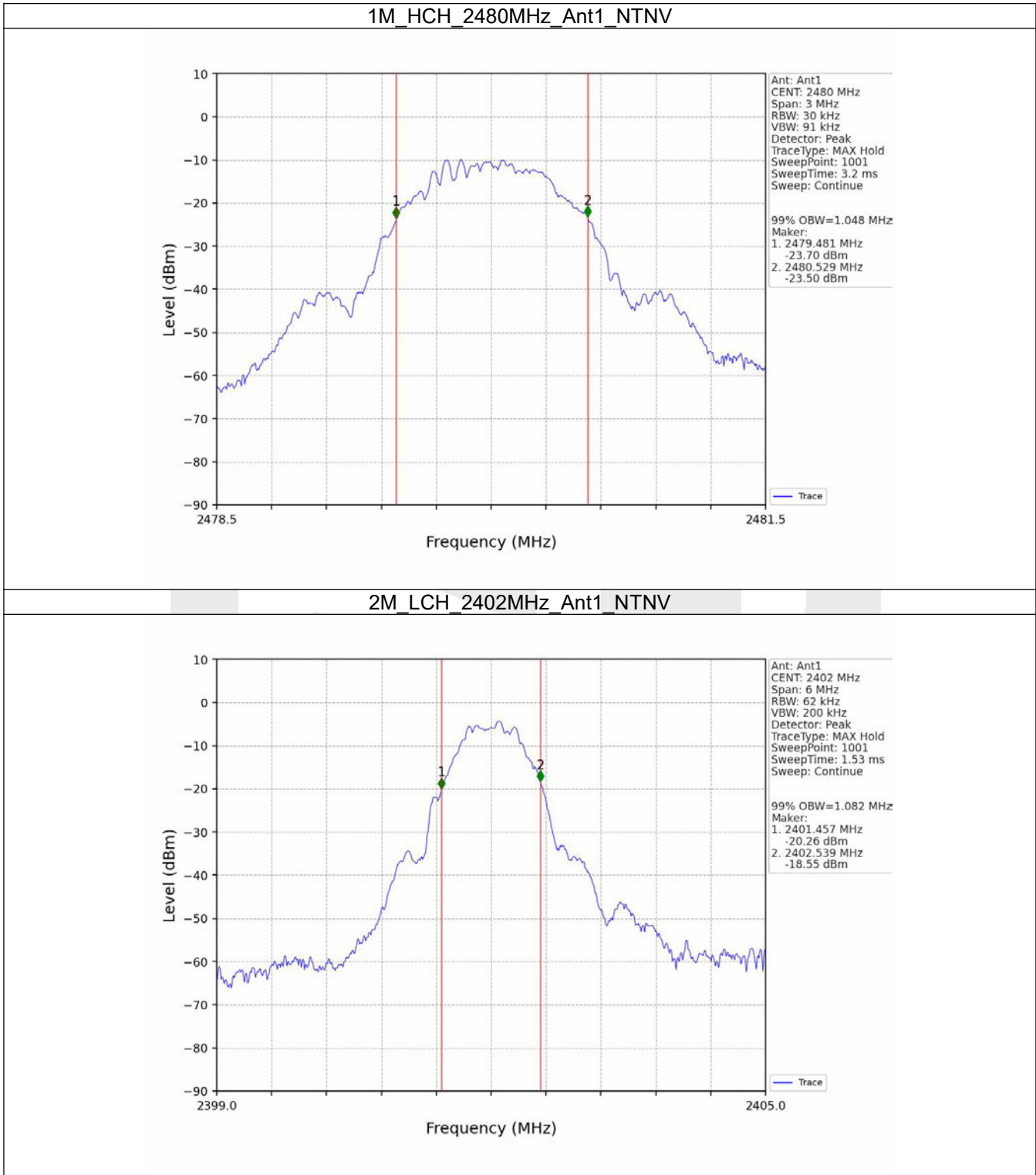
2.1.2 6dB BW

Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	0.571	≥ 0.5	Pass
		2440	1	0.716	≥ 0.5	Pass
		2480	1	0.720	≥ 0.5	Pass
2M	SISO	2402	1	0.747	≥ 0.5	Pass
		2440	1	0.723	≥ 0.5	Pass
		2480	1	0.730	≥ 0.5	Pass

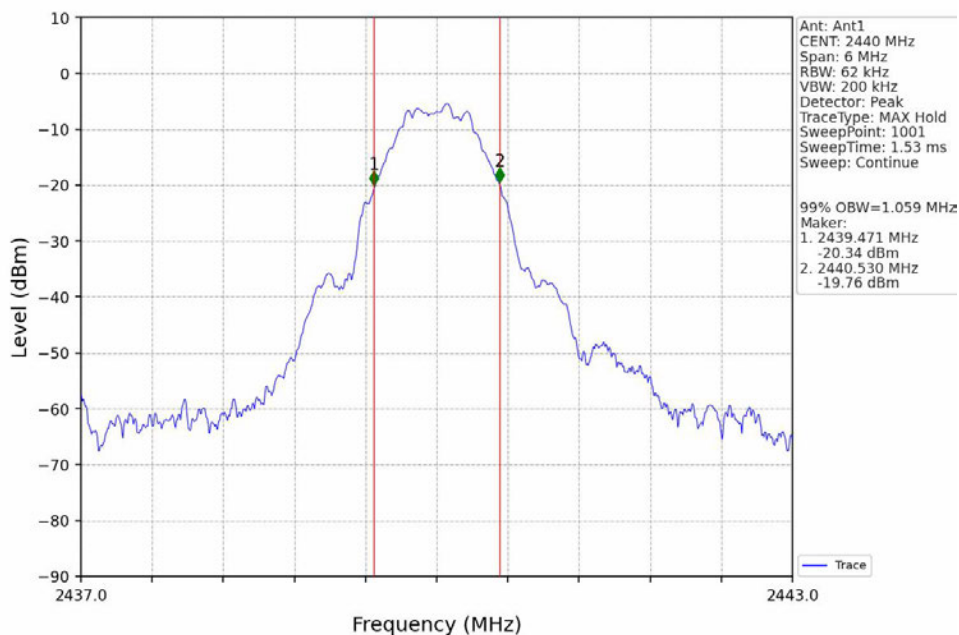
2.2 Test Graph

2.2.1 OBW

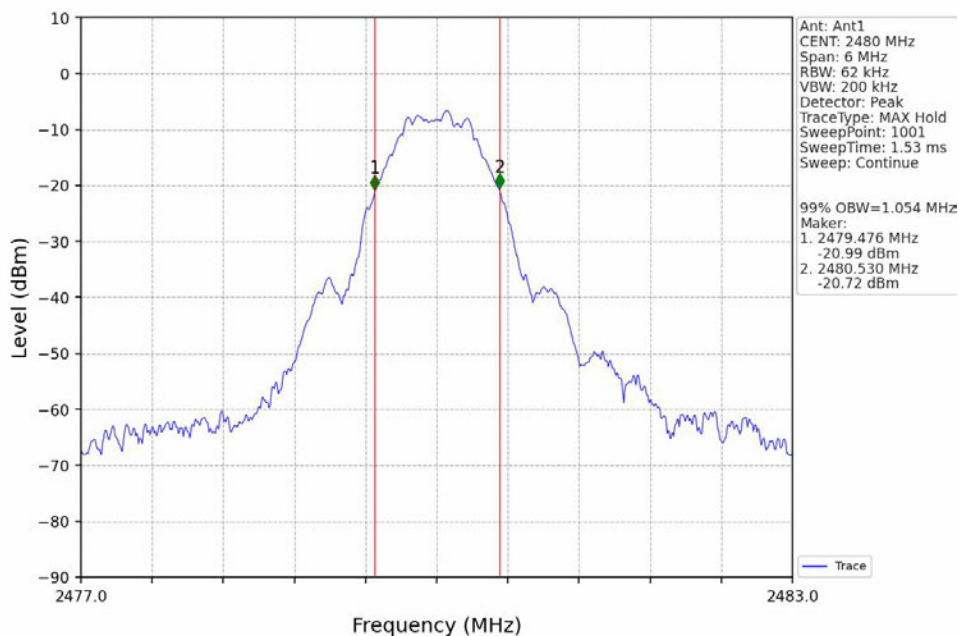




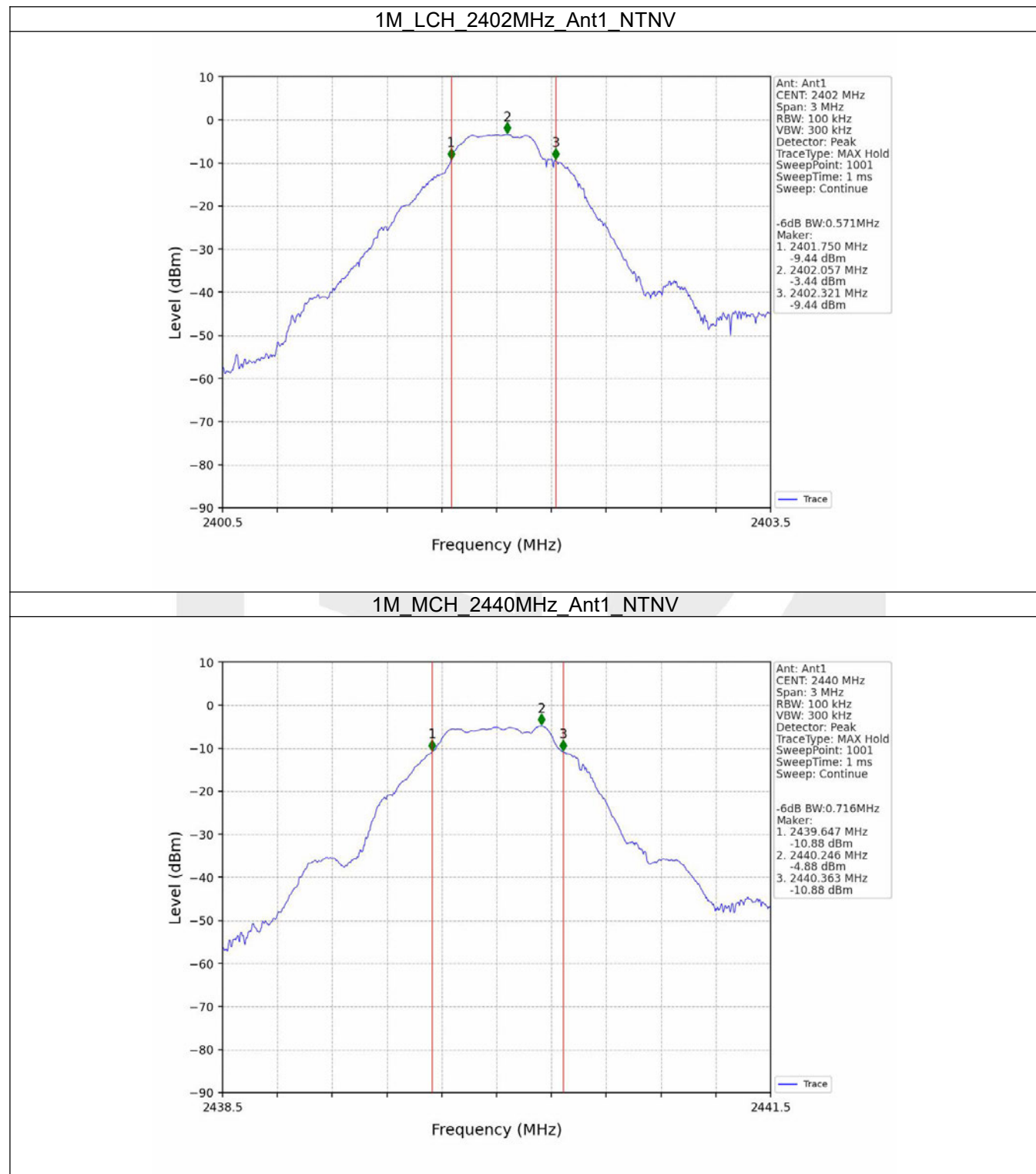
2M_MCH_2440MHz_Ant1_NTNV



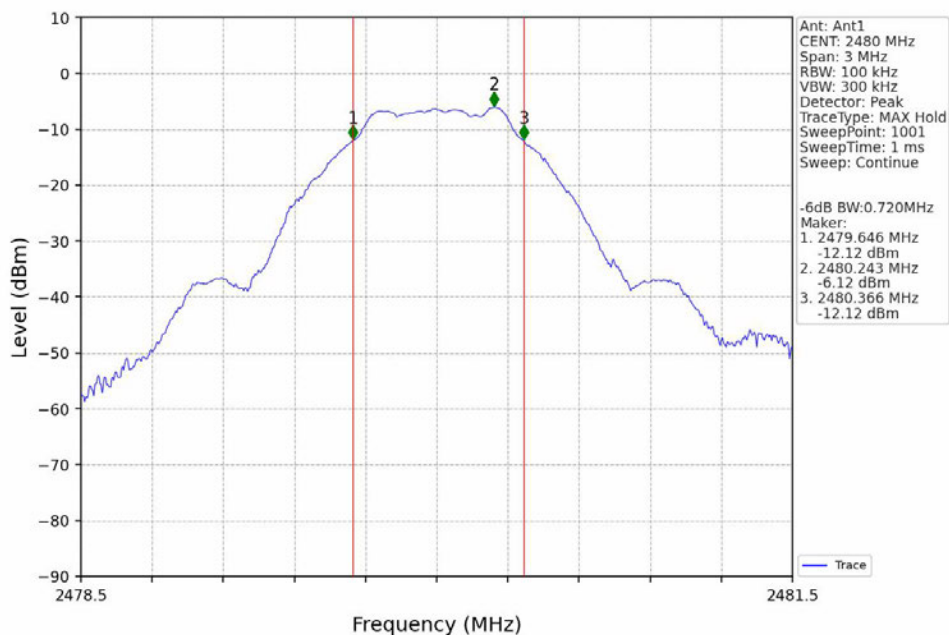
2M_HCH_2480MHz_Ant1_NTNV



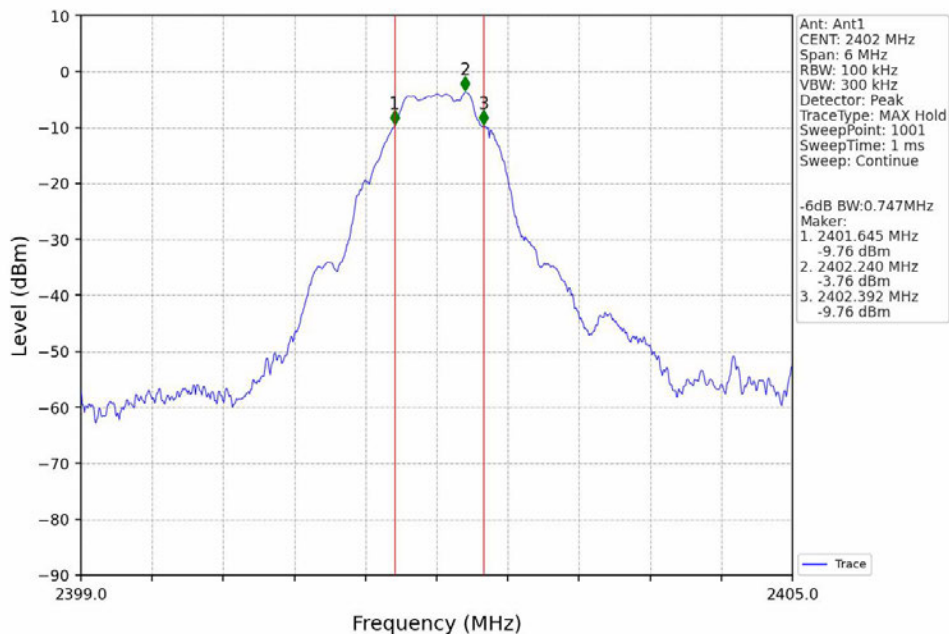
2.2.2 6dB BW



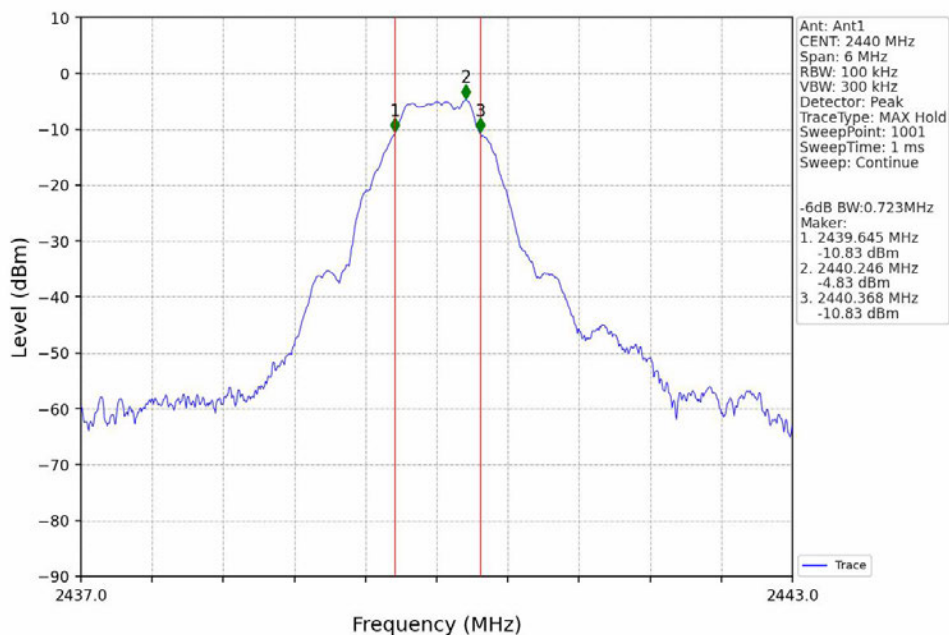
1M_HCH_2480MHz_Ant1_NTNV



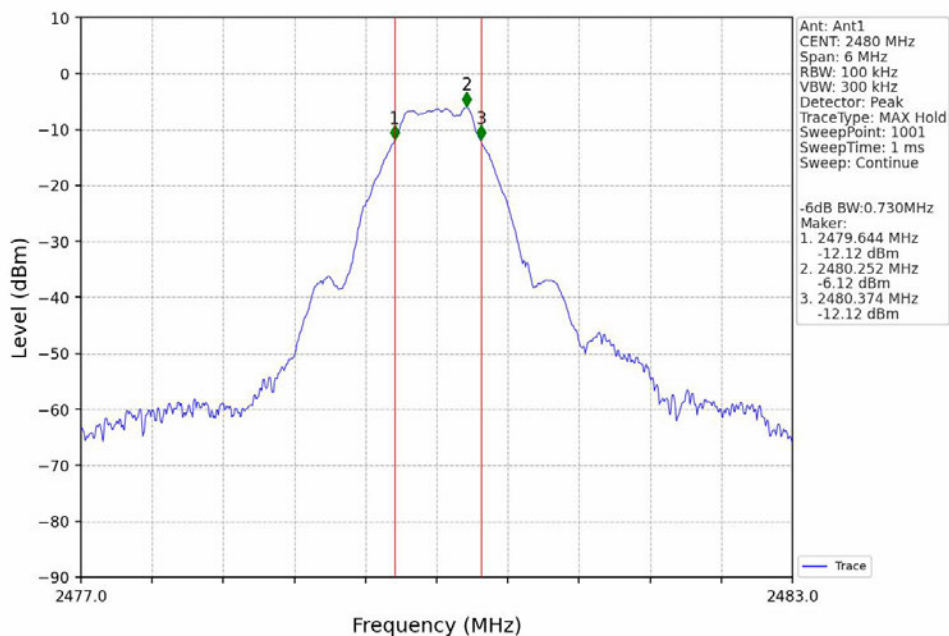
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



3. Maximum Conducted Output Power

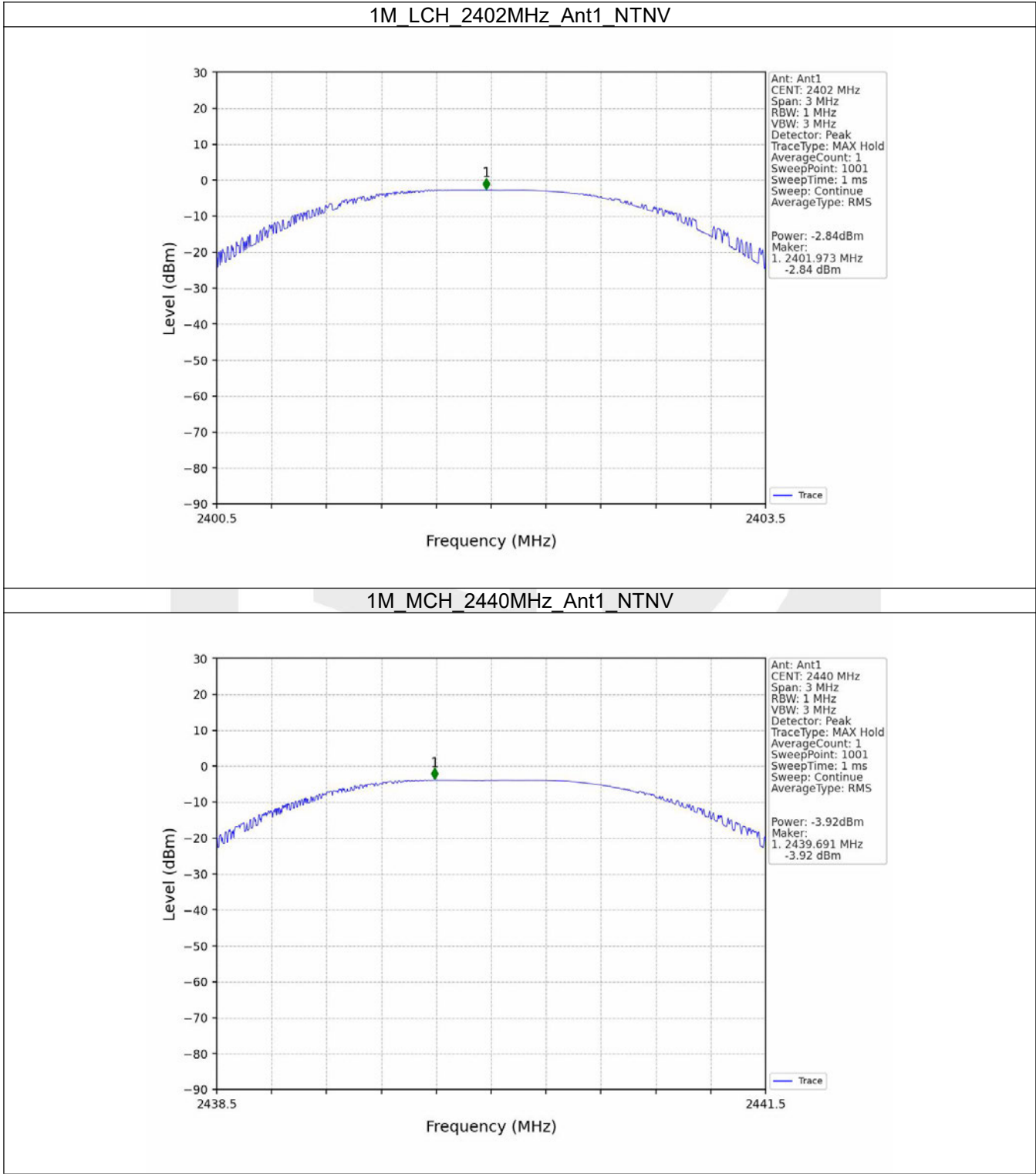
3.1 Test Result

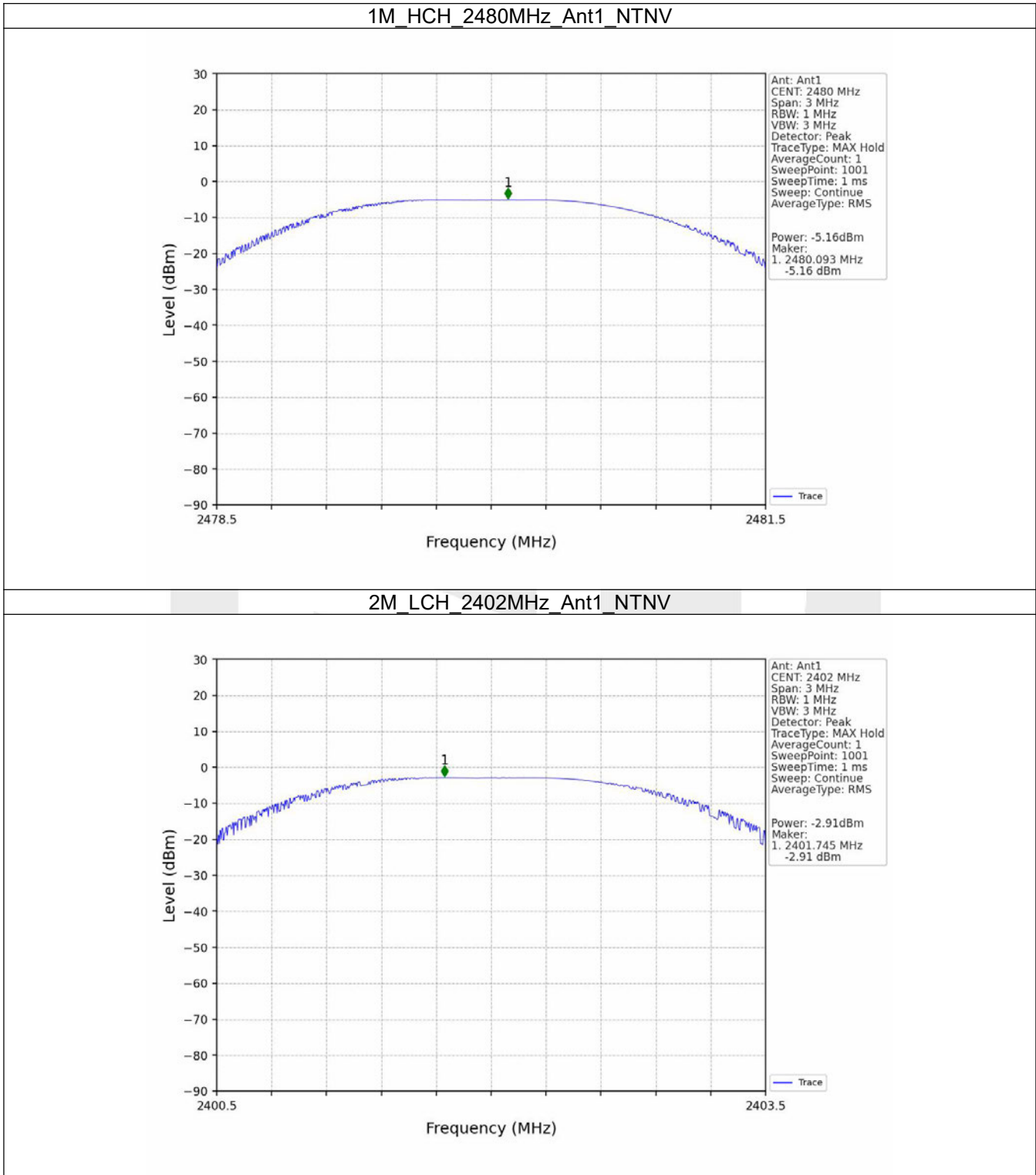
3.1.1 Power

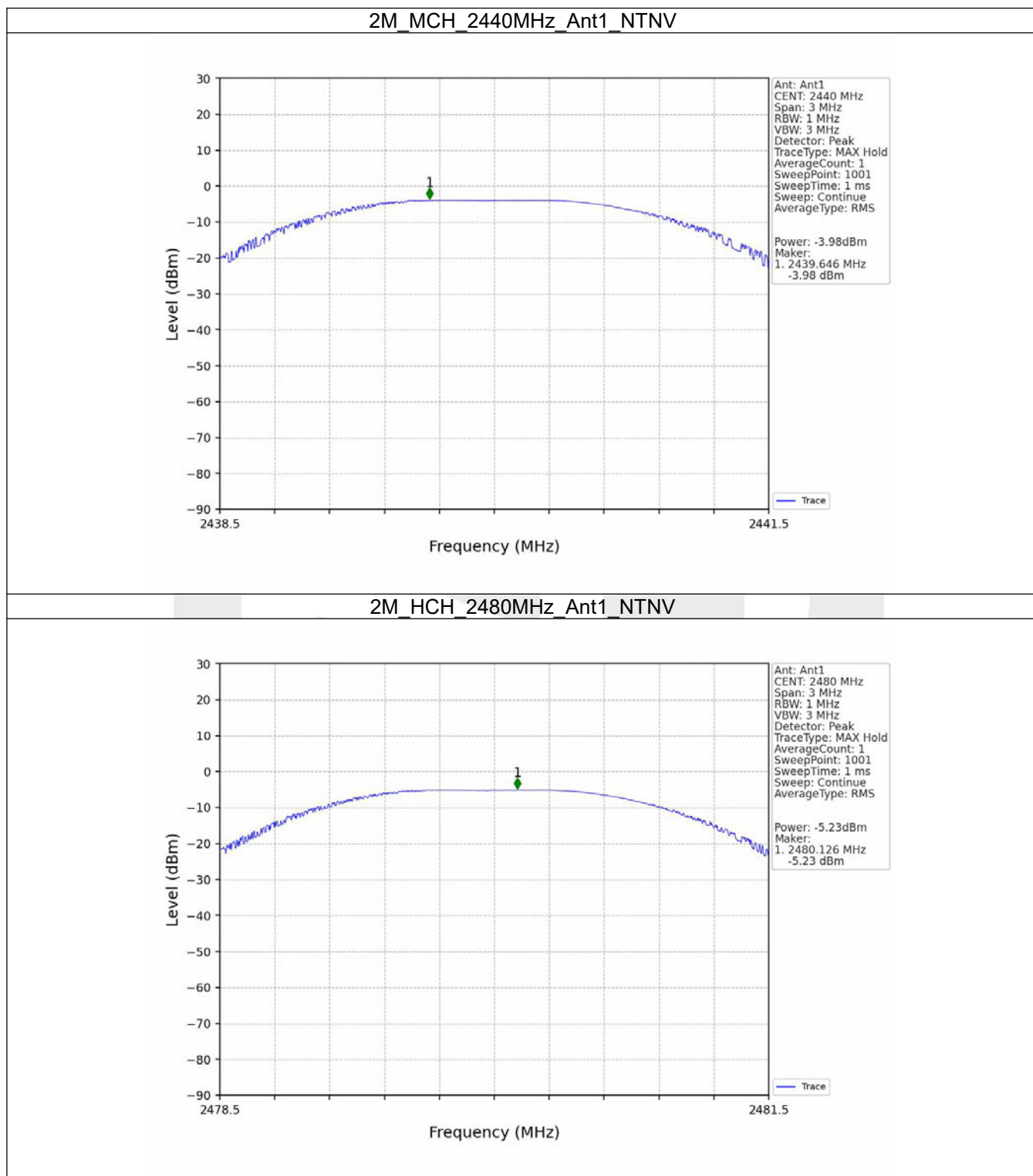
Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
1M	SISO	2402	-2.84	<=30	Pass
		2440	-3.92	<=30	Pass
		2480	-5.16	<=30	Pass
2M	SISO	2402	-2.91	<=30	Pass
		2440	-3.98	<=30	Pass
		2480	-5.23	<=30	Pass
Note1: Antenna Gain: Ant1: 2.34dBi;					

3.2 Test Graph

3.2.1 Power







4. Maximum Power Spectral Density

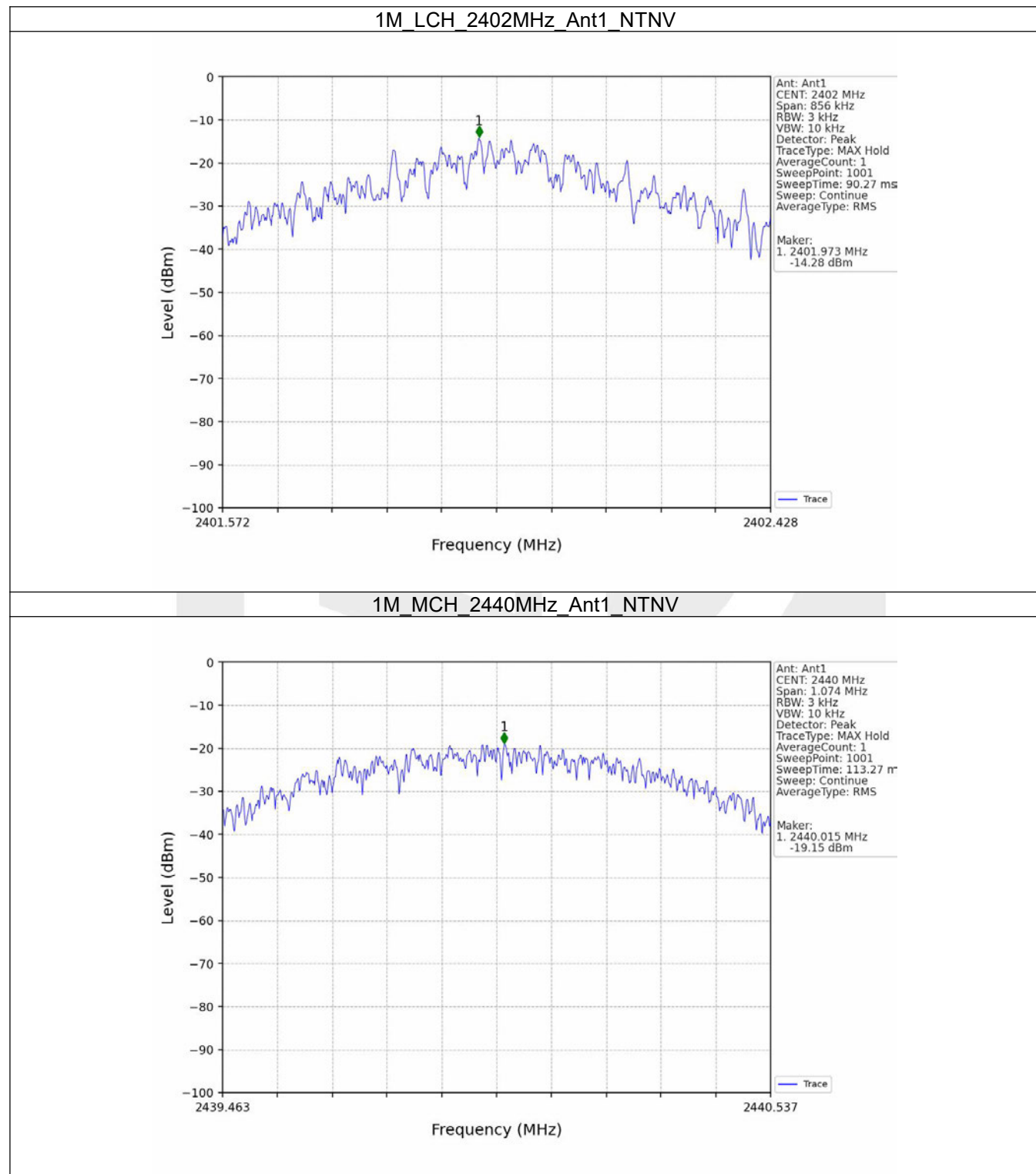
4.1 Test Result

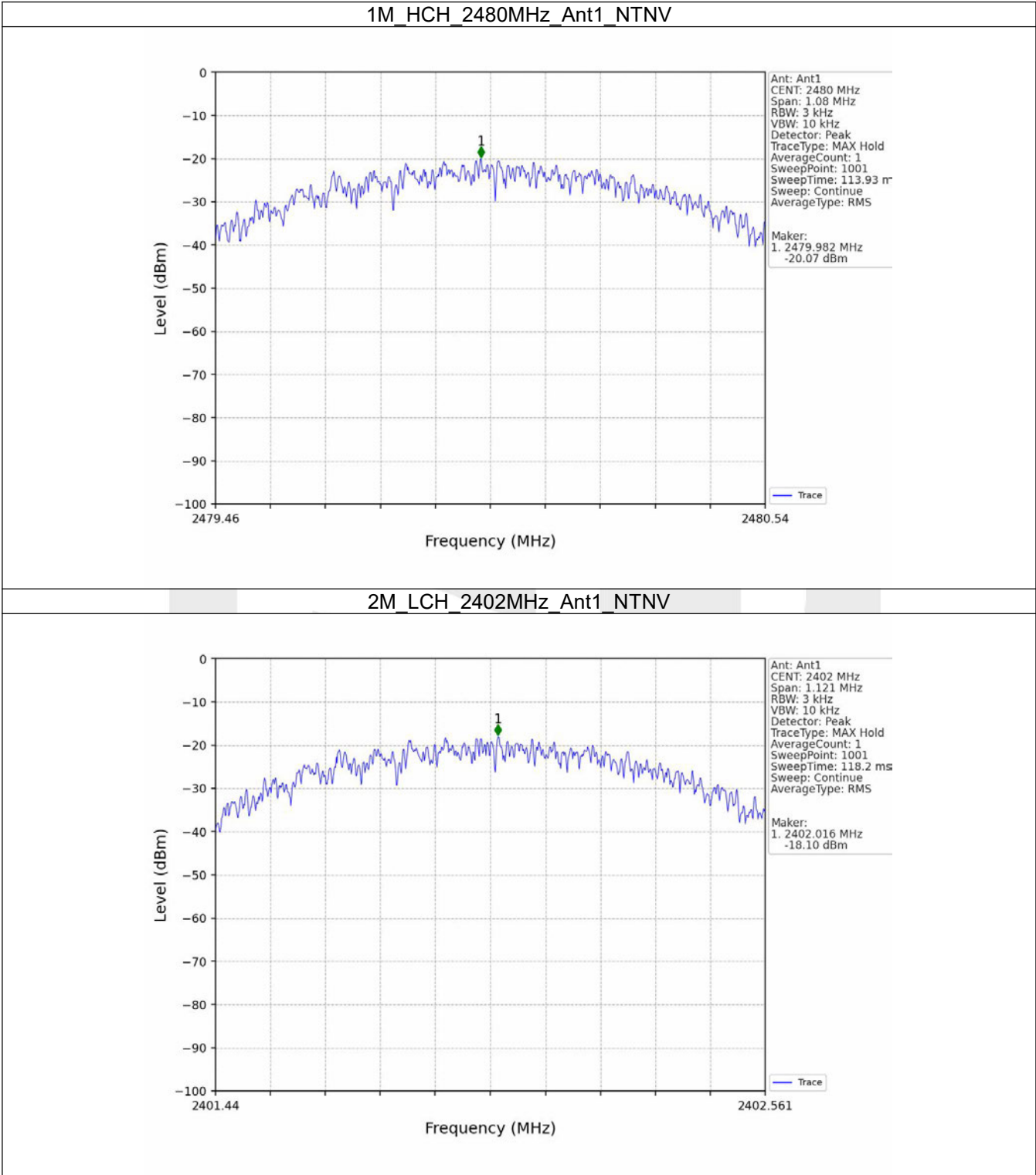
4.1.1 PSD

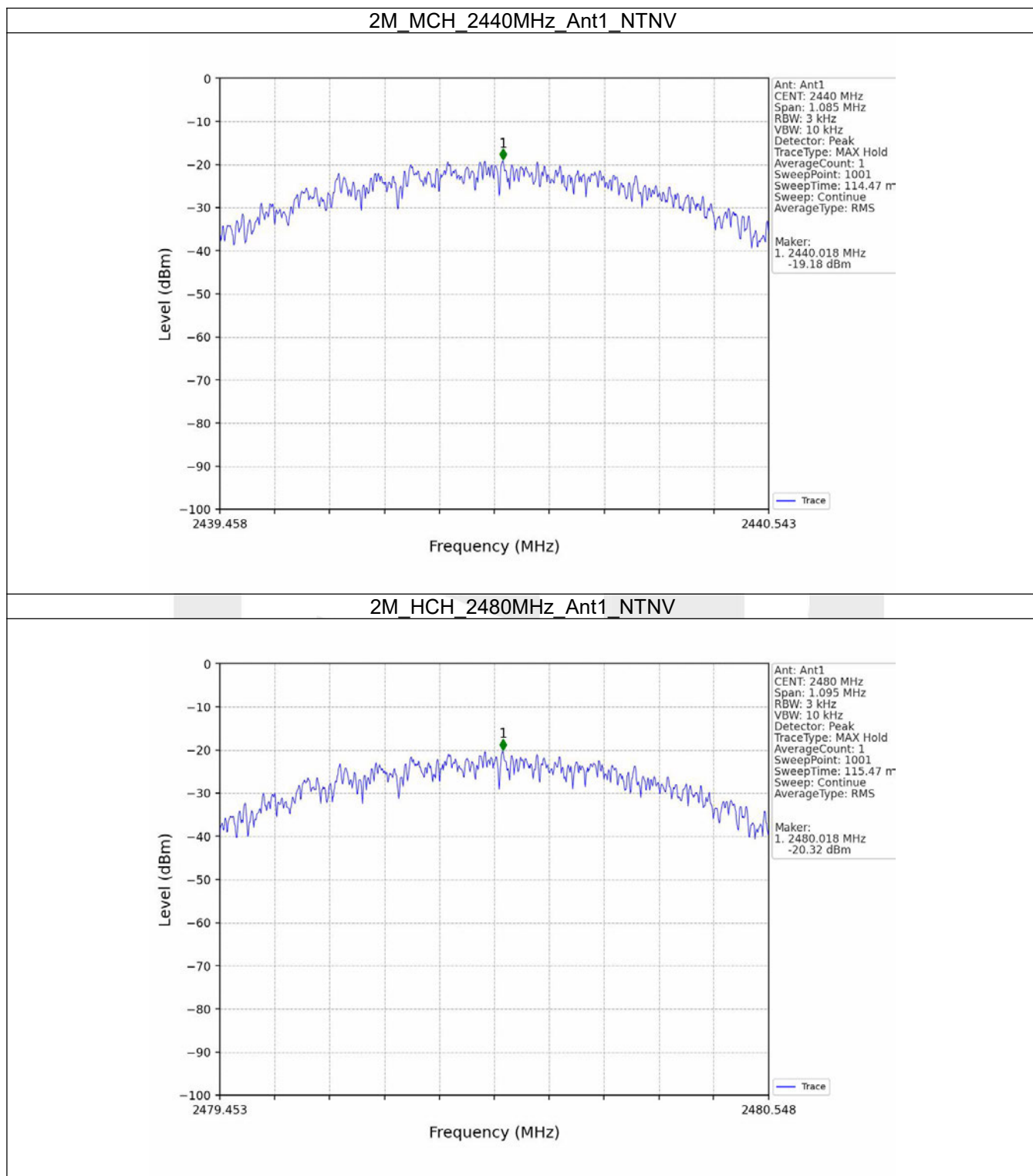
Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/3kHz)		Verdict
			ANT1	Limit	
1M	SISO	2402	-14.28	<=8	Pass
		2440	-19.15	<=8	Pass
		2480	-20.07	<=8	Pass
2M	SISO	2402	-18.10	<=8	Pass
		2440	-19.18	<=8	Pass
		2480	-20.32	<=8	Pass
Note1: Antenna Gain: Ant1:2.34dBi;					

4.2 Test Graph

4.2.1 PSD







5. Unwanted Emissions In Non-restricted Frequency Bands

5.1 Test Result

5.1.1 Ref

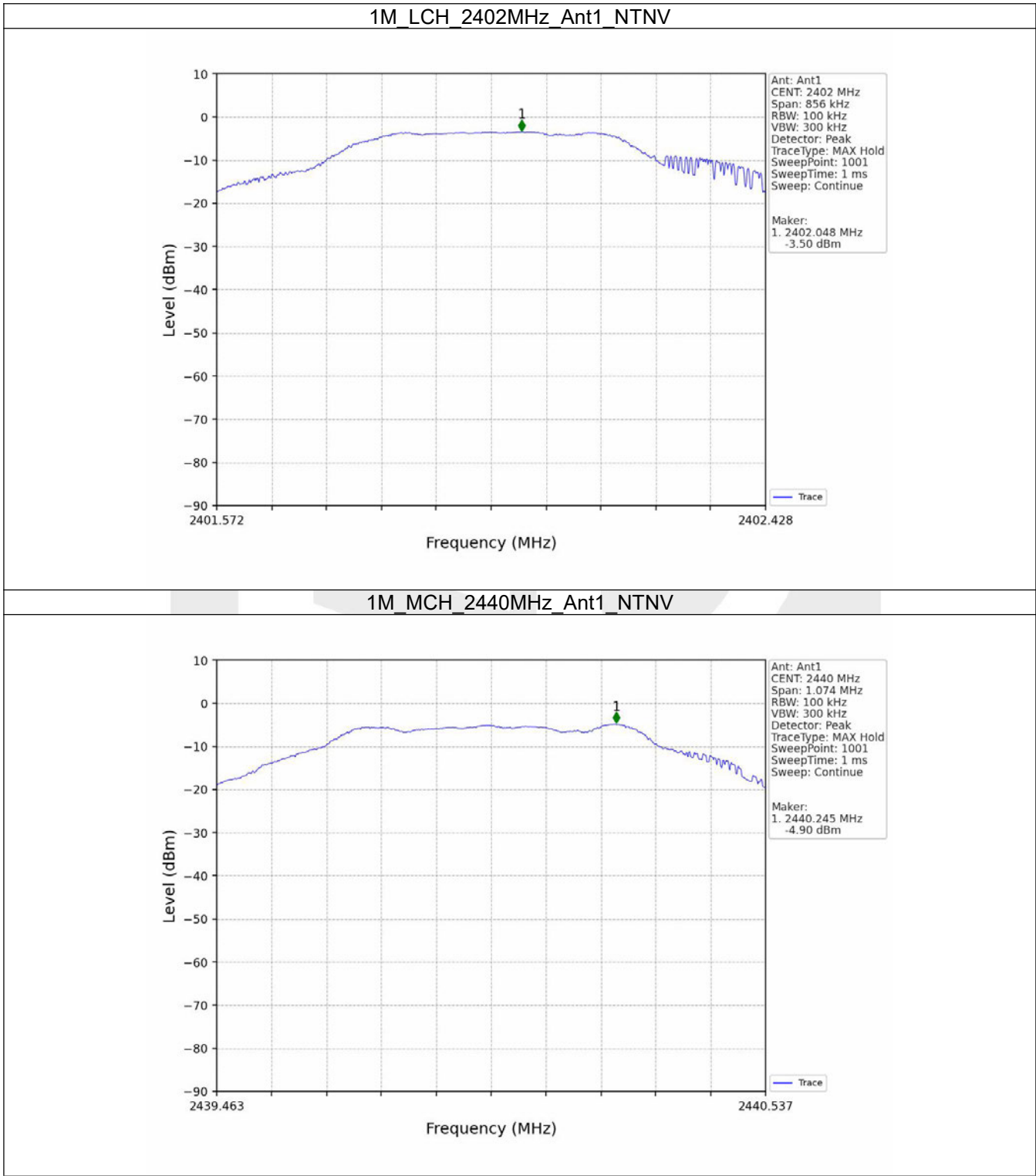
Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)
1M	SISO	2402	1	-3.50
		2440	1	-4.90
		2480	1	-6.11
2M	SISO	2402	1	-3.86
		2440	1	-4.94
		2480	1	-6.19
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020, the channel contains the maximum PSD level was used to establish the reference level.				

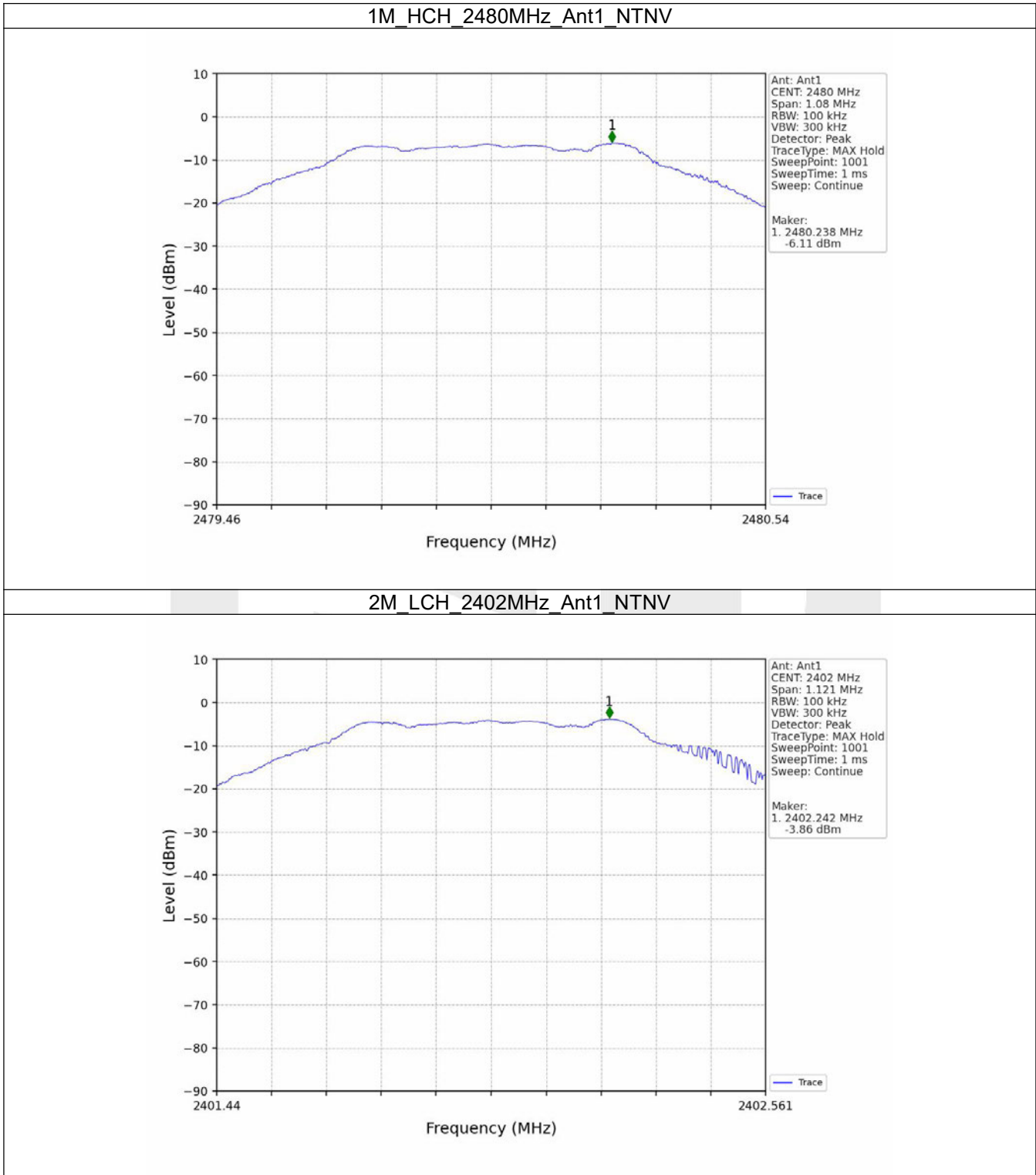
5.1.2 CSE

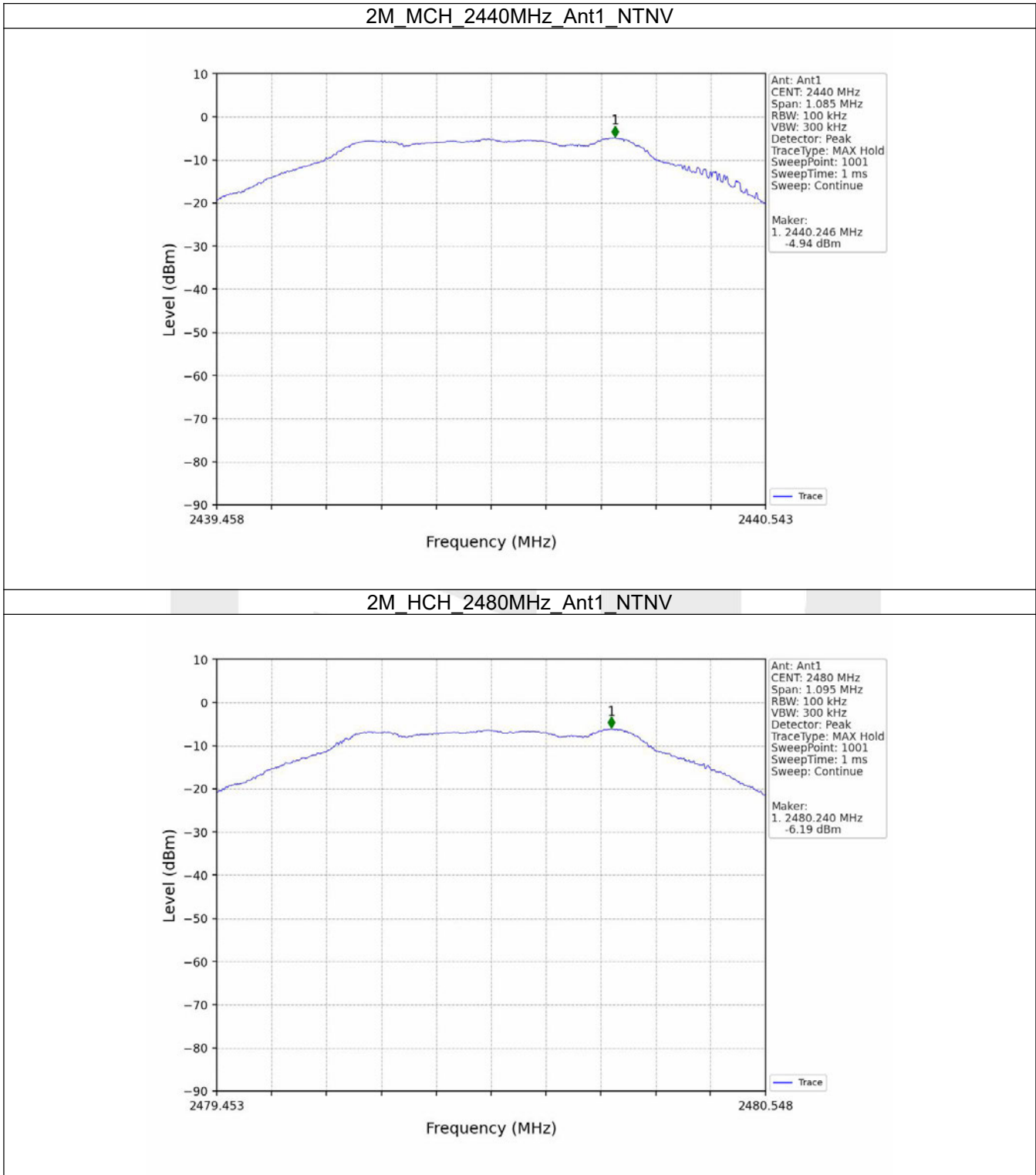
Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
1M	SISO	2402	1	-3.50	-23.50	Pass
		2440	1	-4.90	-24.90	Pass
		2480	1	-6.11	-26.11	Pass
2M	SISO	2402	1	-3.86	-23.86	Pass
		2440	1	-4.94	-24.94	Pass
		2480	1	-6.19	-26.19	Pass
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020, the channel contains the maximum PSD level was used to establish the reference level.						

5.2 Test Graph

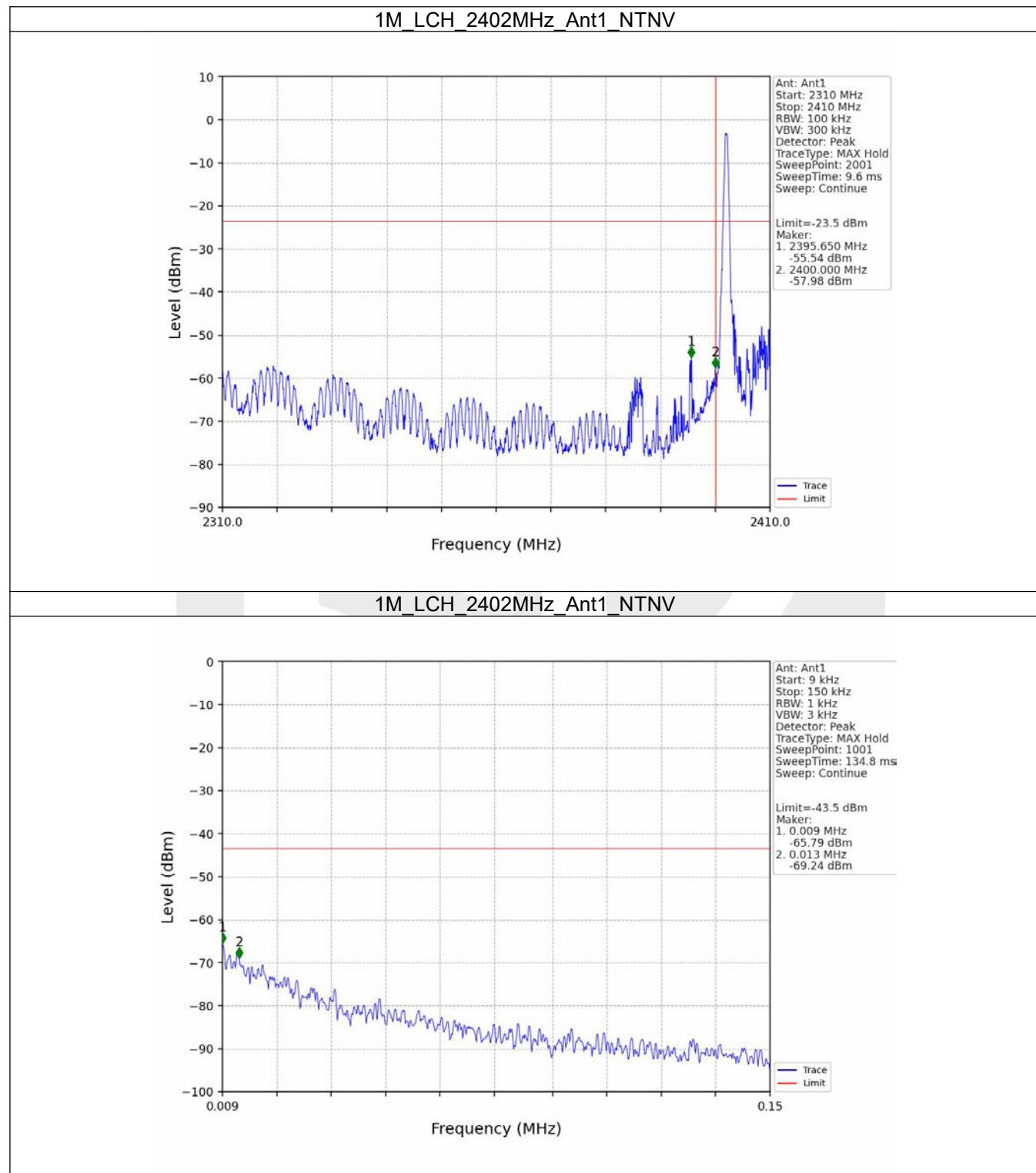
5.2.1 Ref

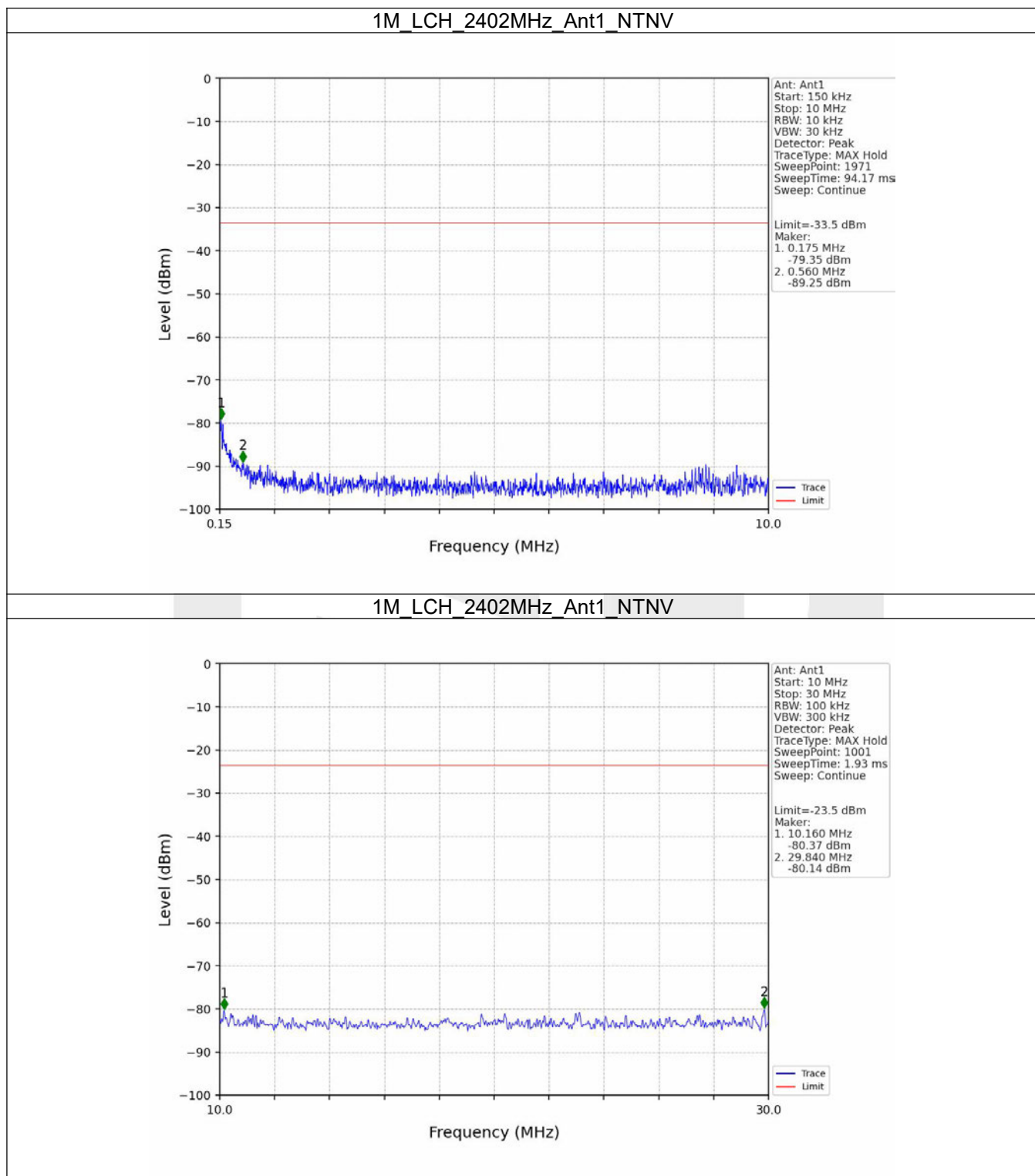


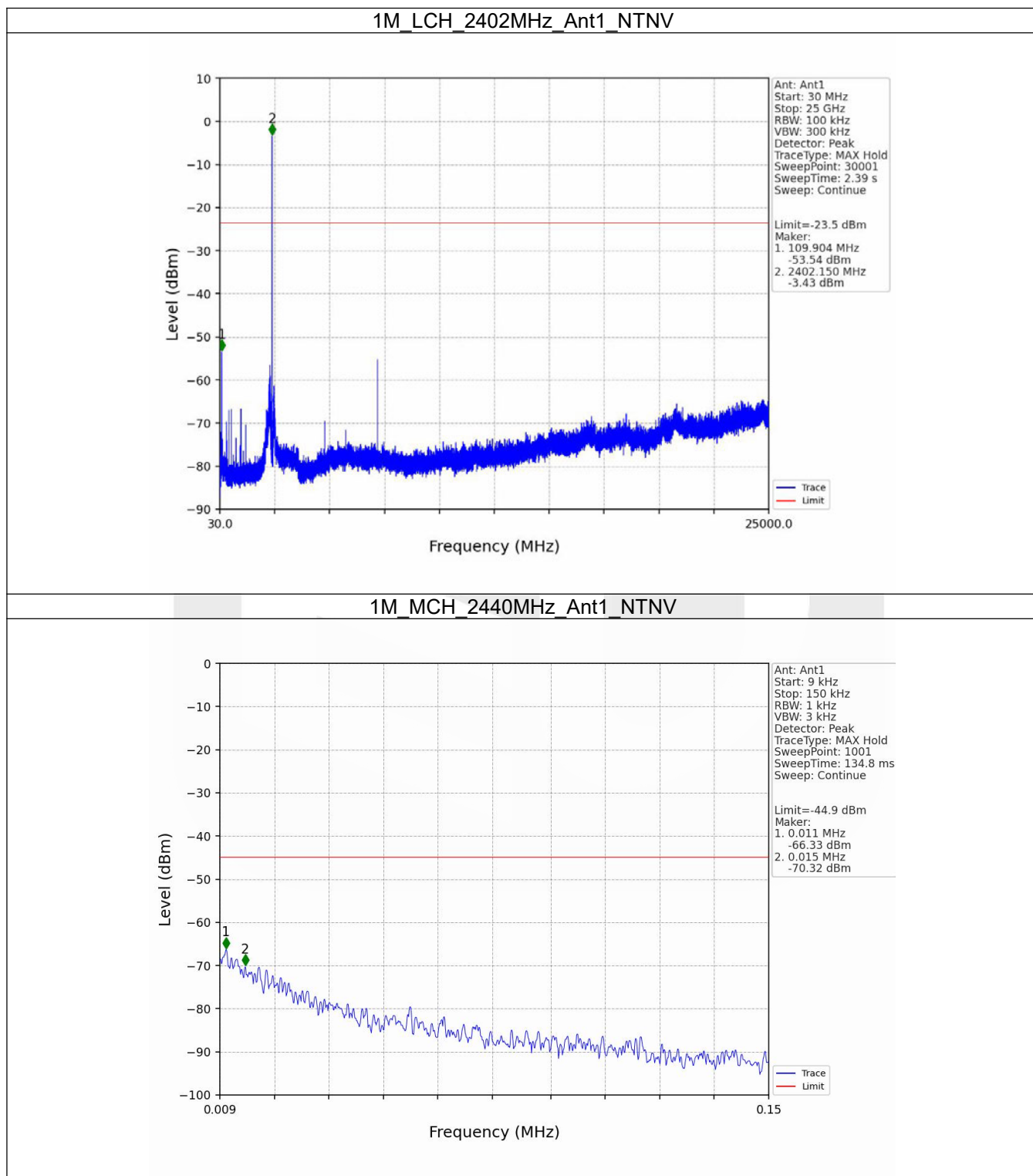


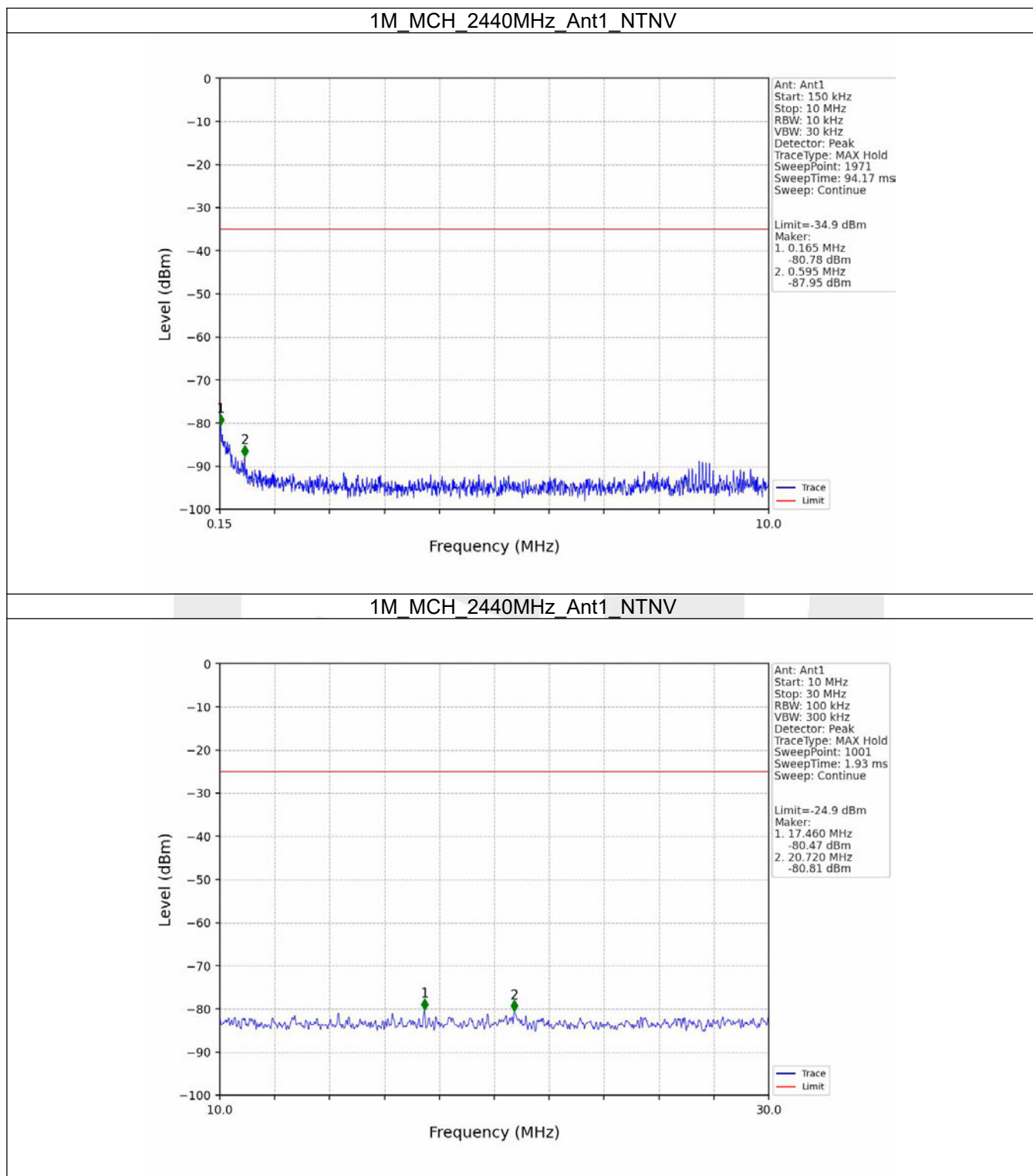


5.2.2 CSE

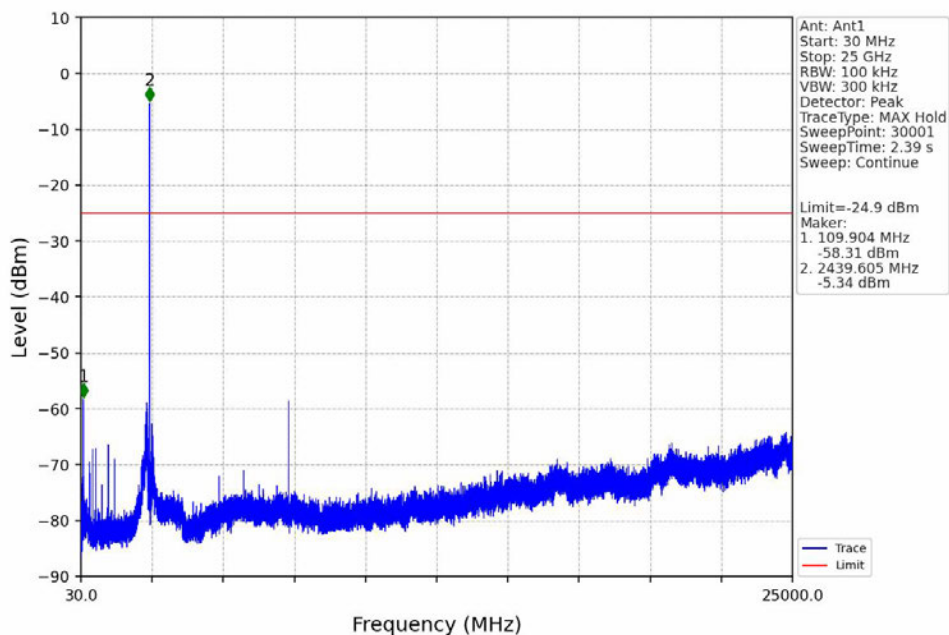




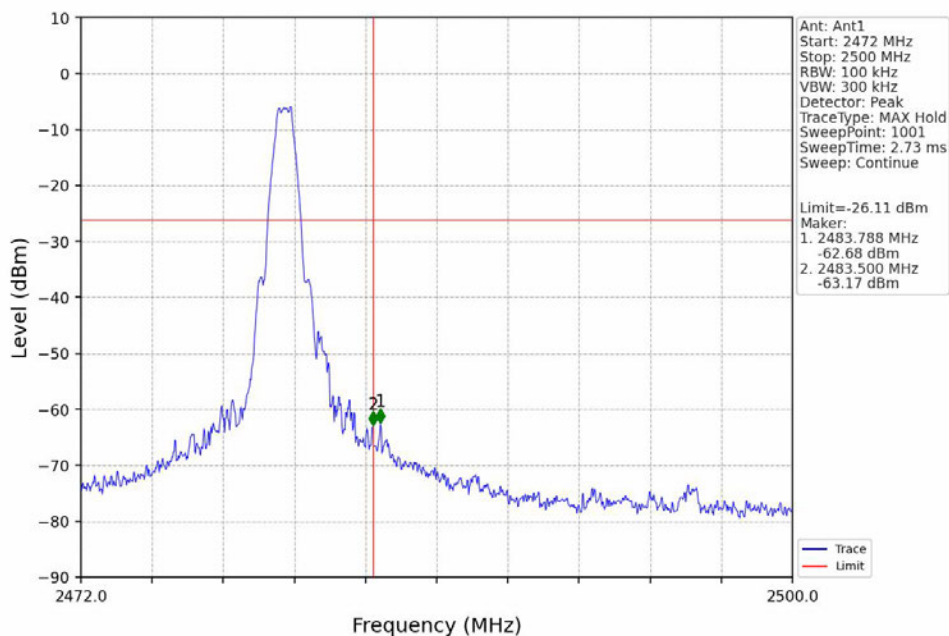


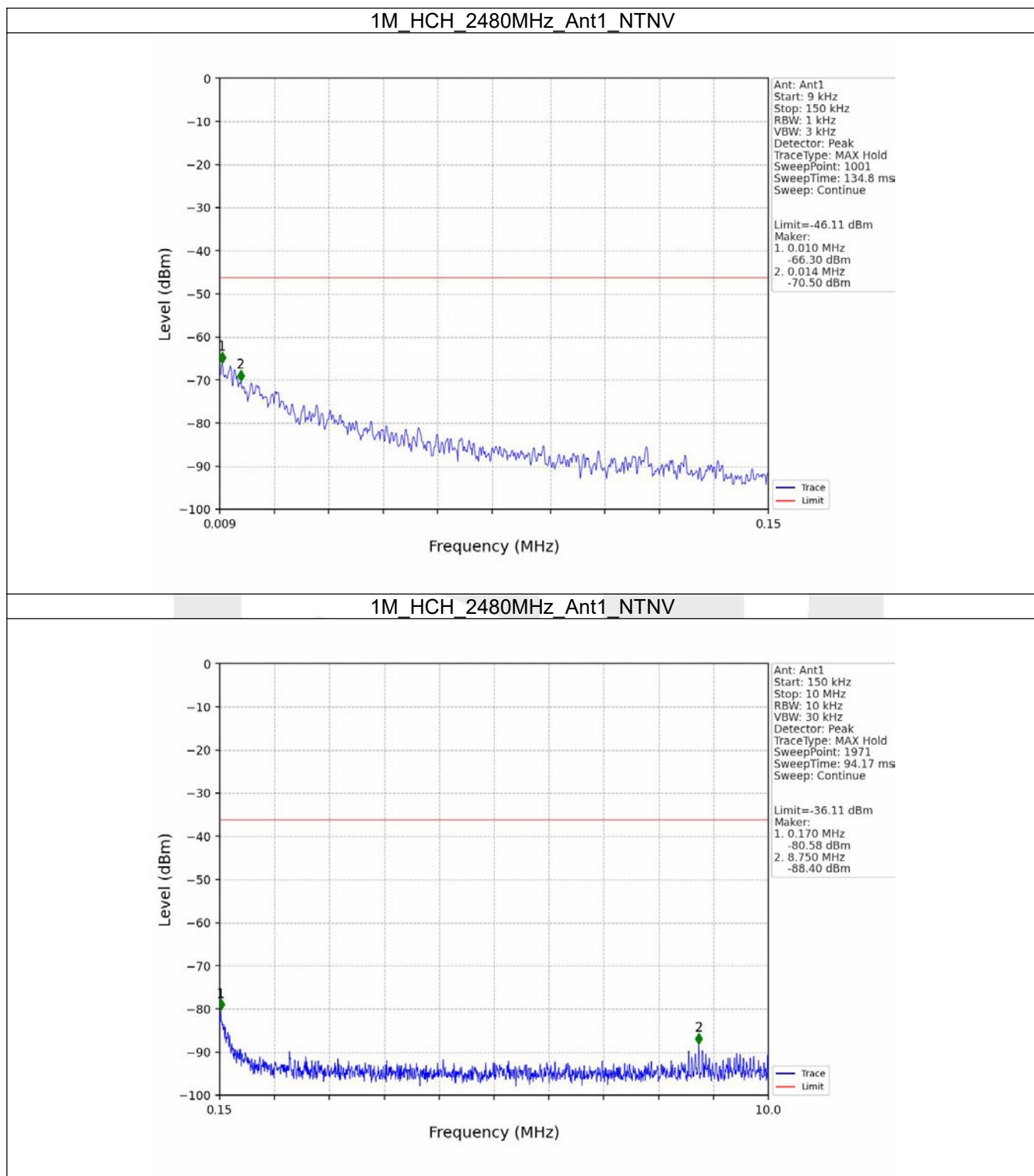


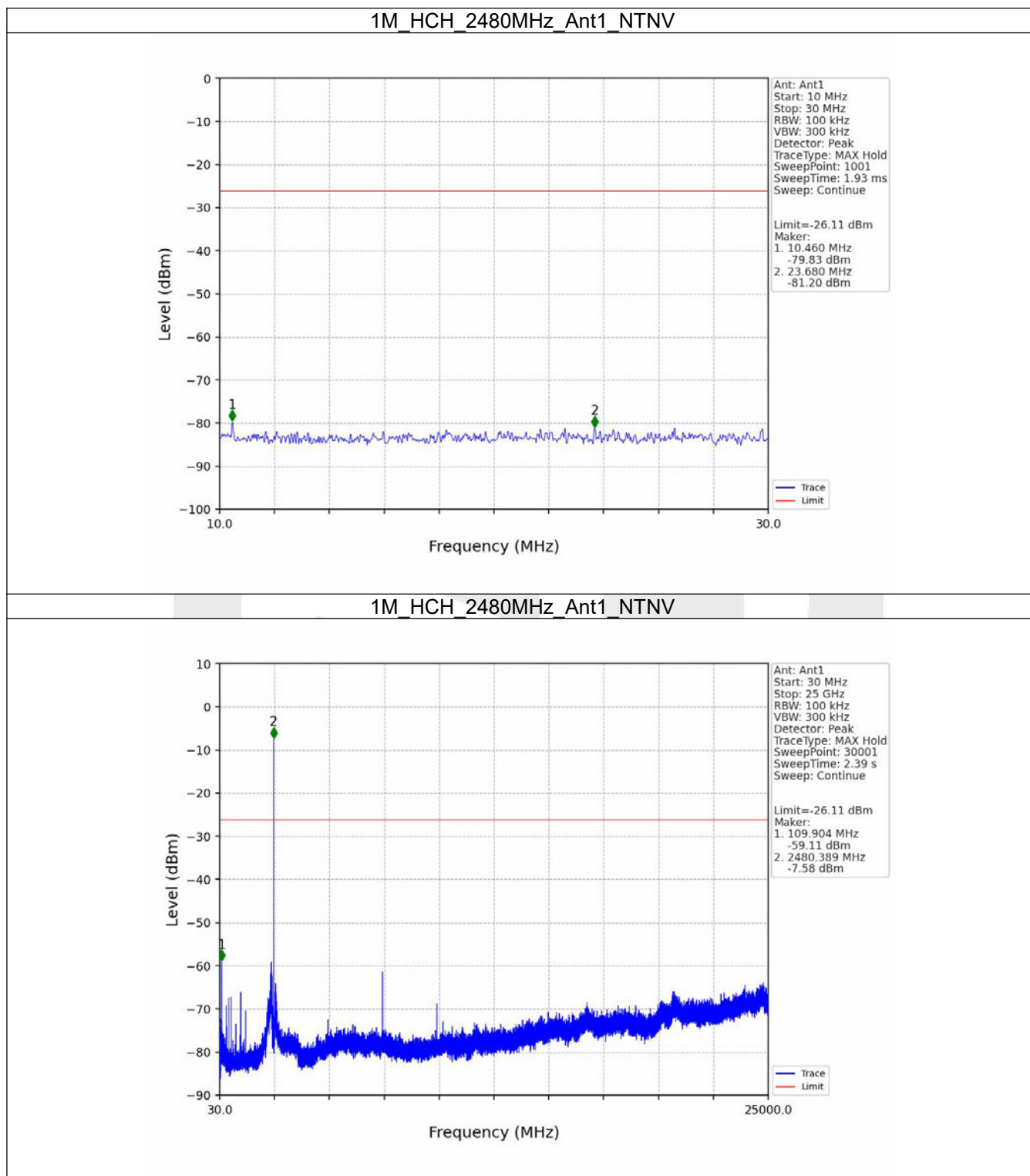
1M_MCH_2440MHz_Ant1_NTNV

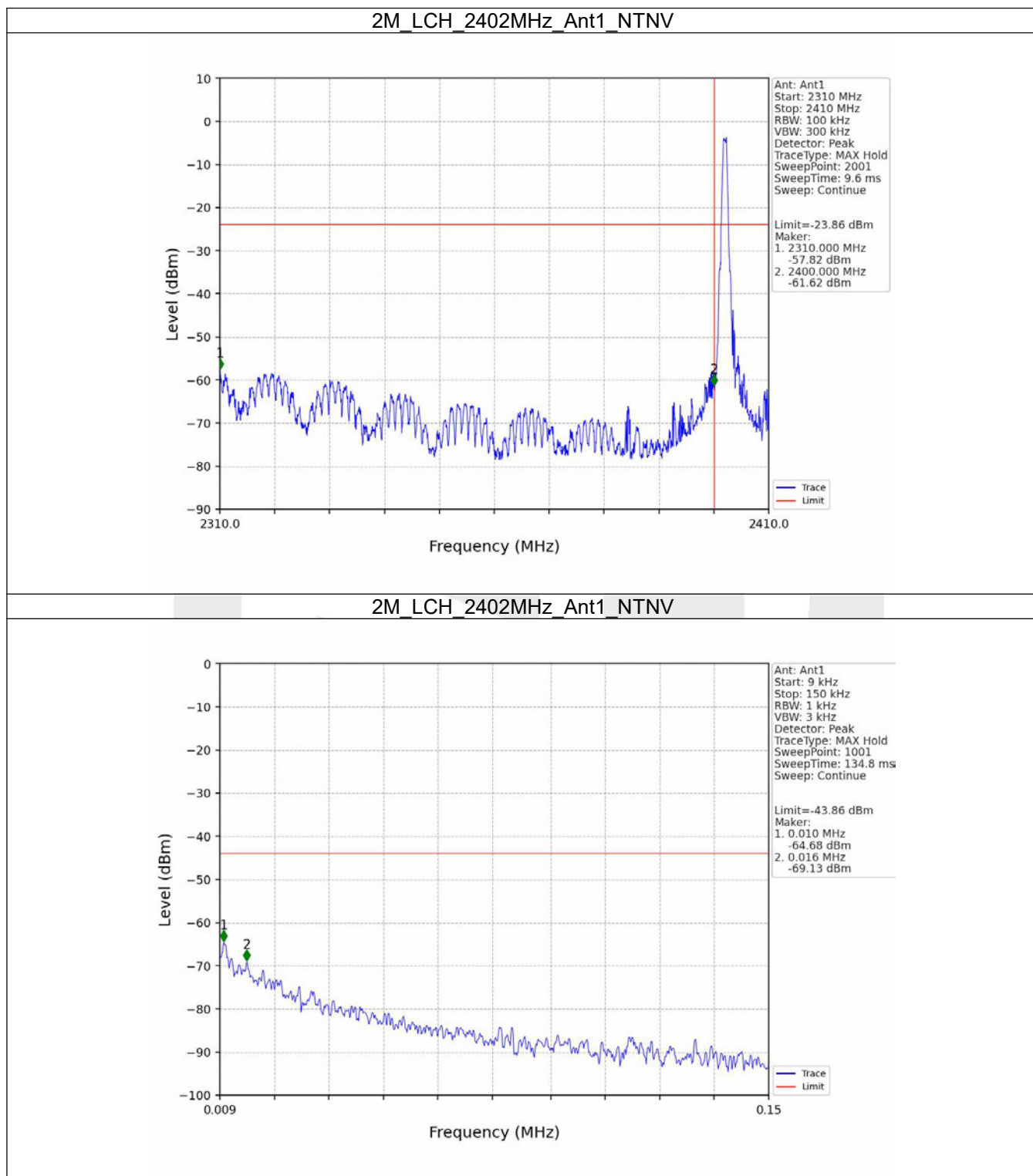


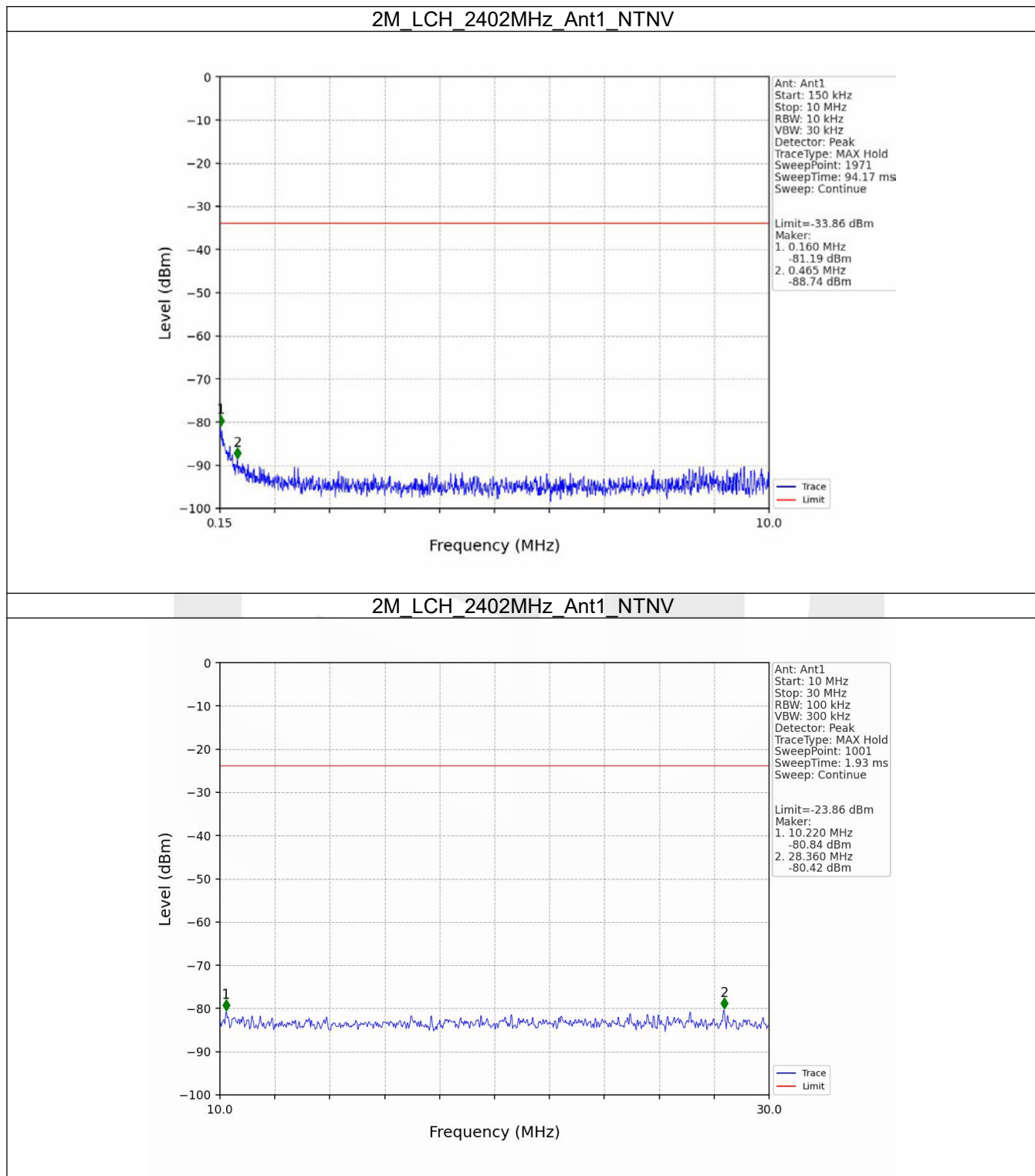
1M_HCH_2480MHz_Ant1_NTNV

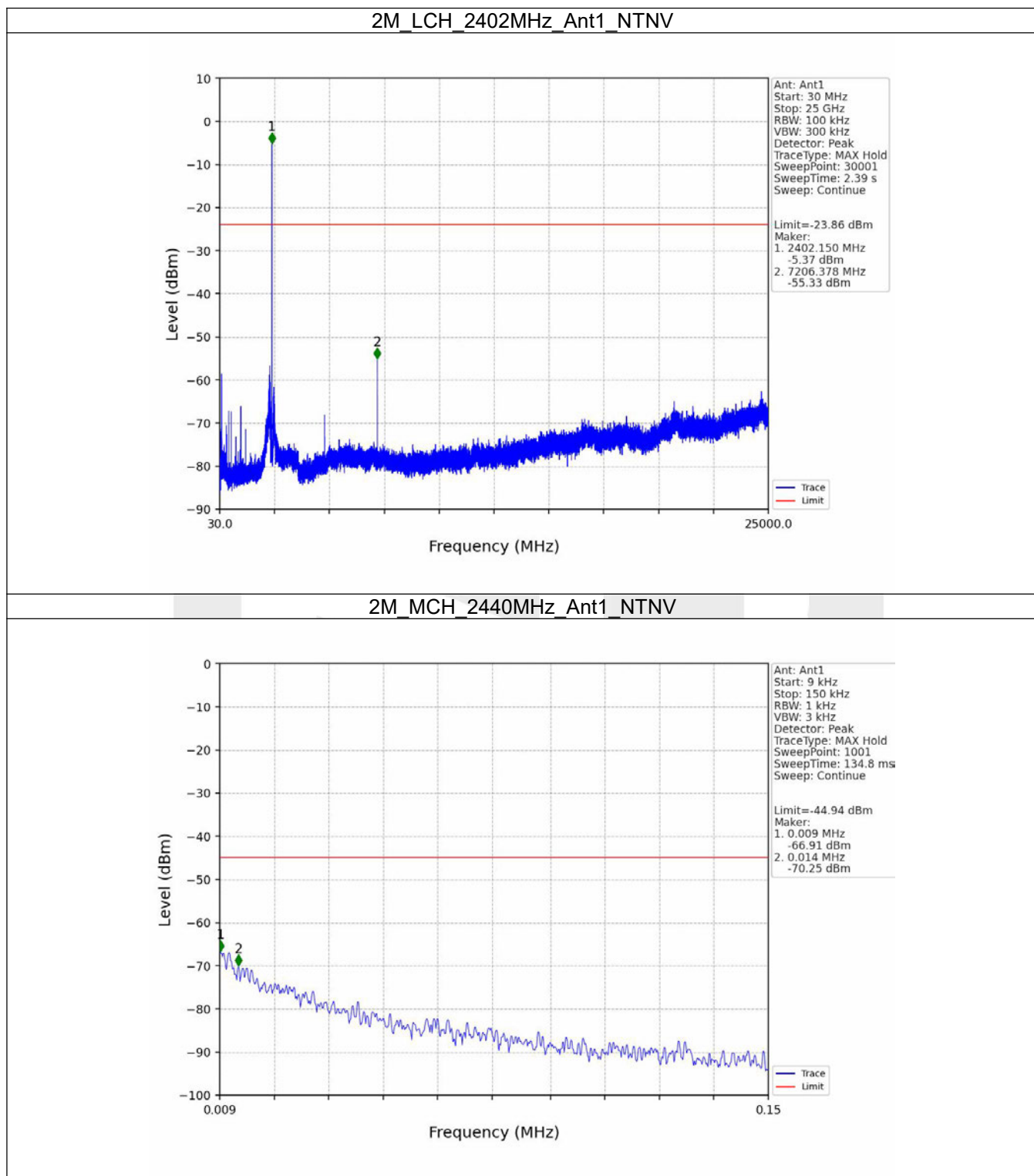




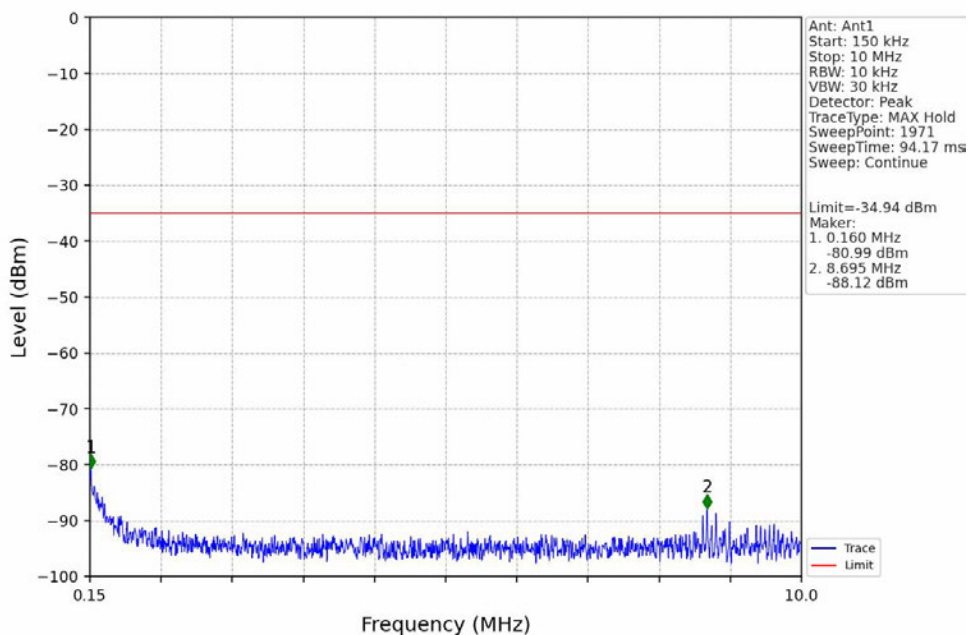




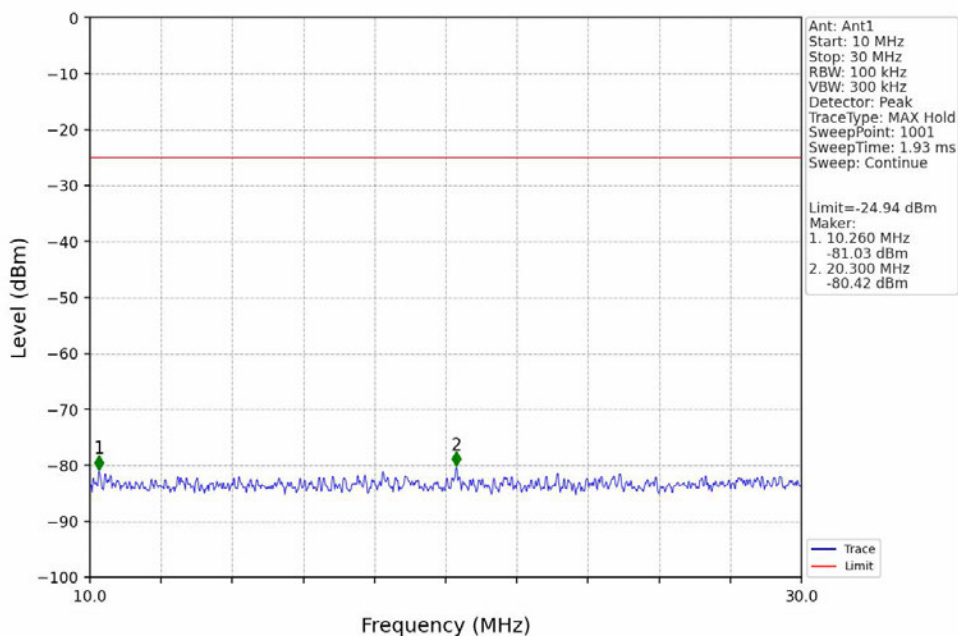




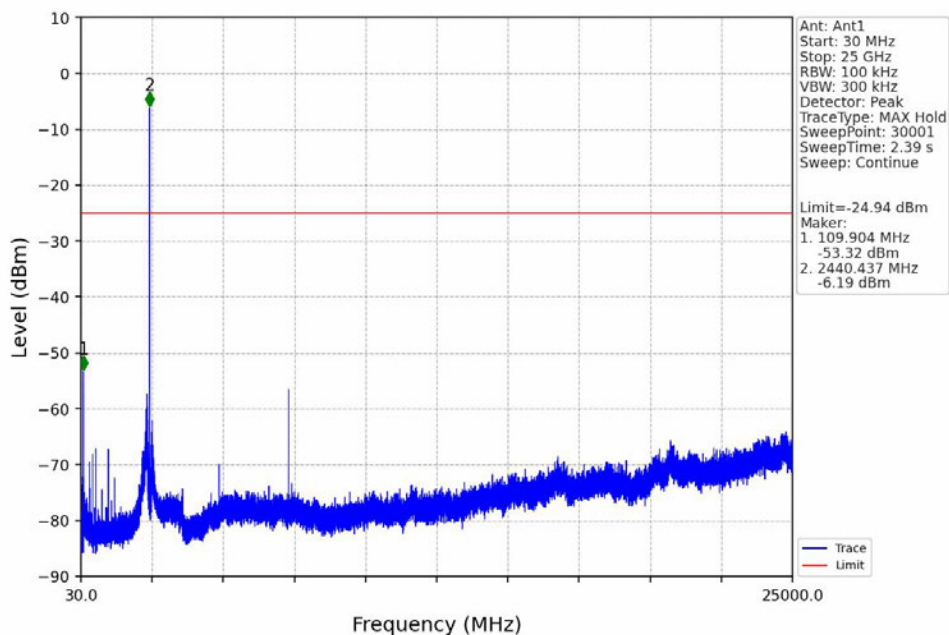
2M_MCH_2440MHz_Ant1_NTNV



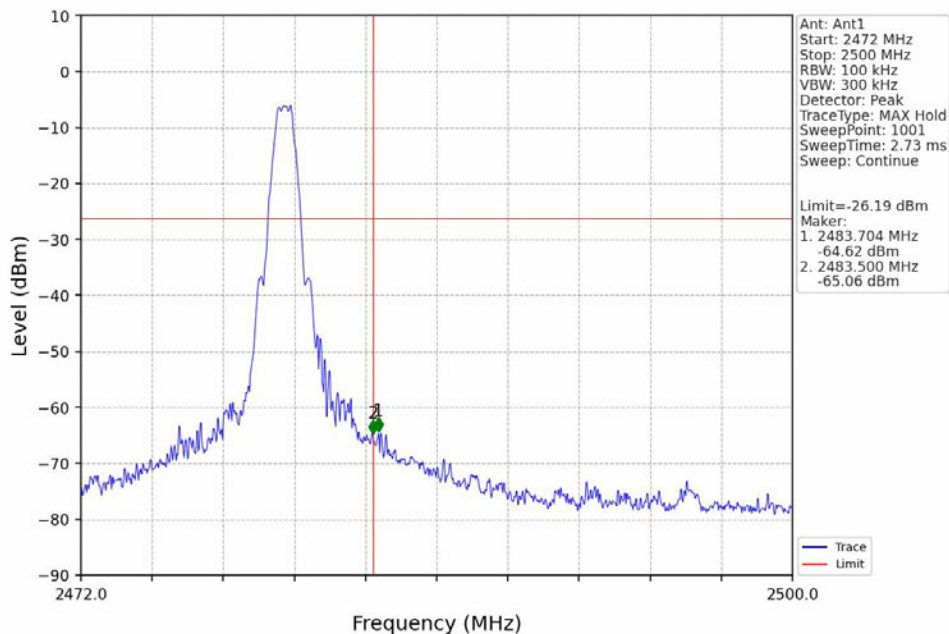
2M_MCH_2440MHz_Ant1_NTNV



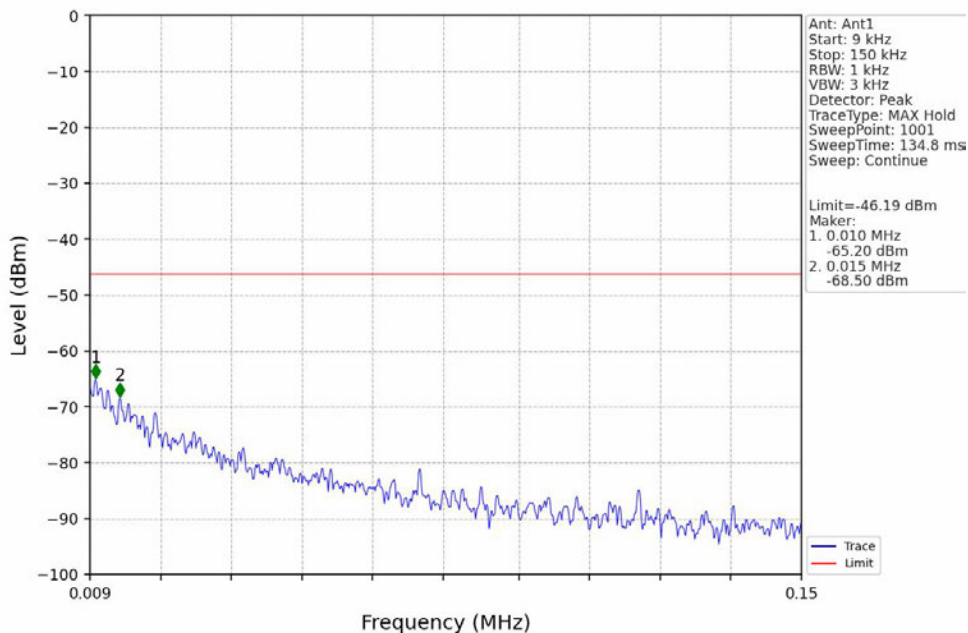
2M_MCH_2440MHz_Ant1_NTNV



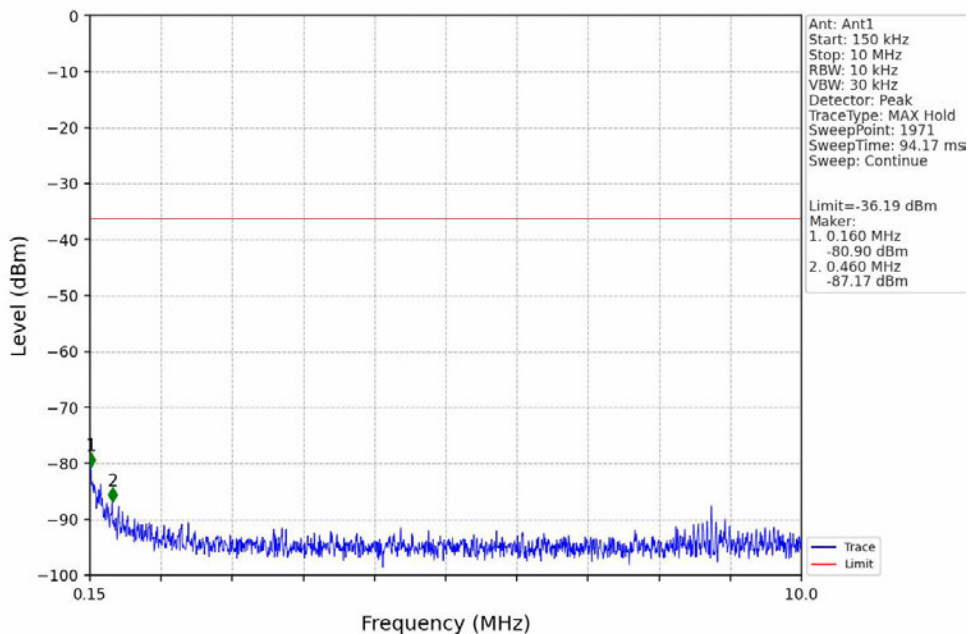
2M_HCH_2480MHz_Ant1_NTNV

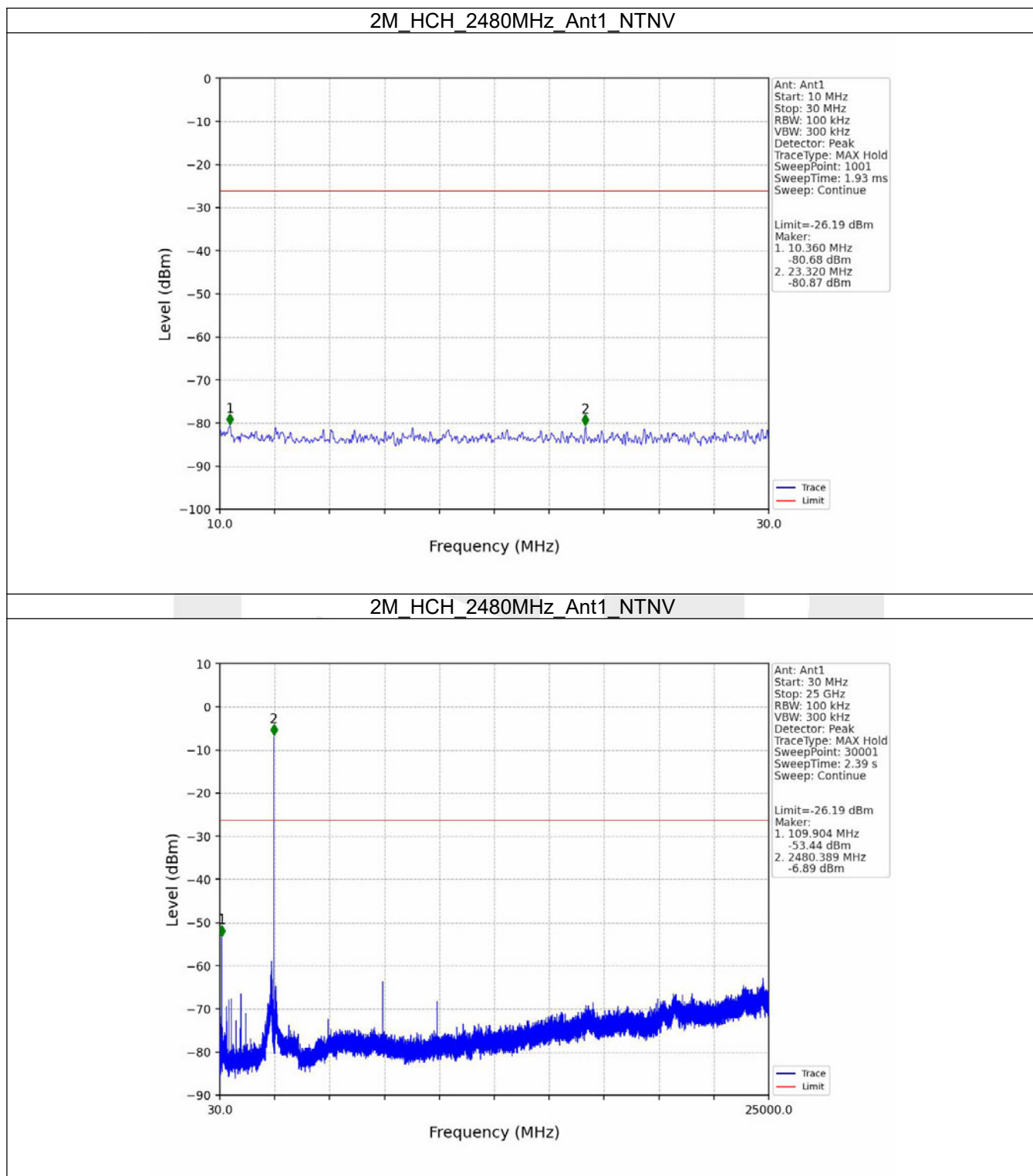


2M_HCH_2480MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV





6. Unwanted Emissions In Restricted Frequency Bands

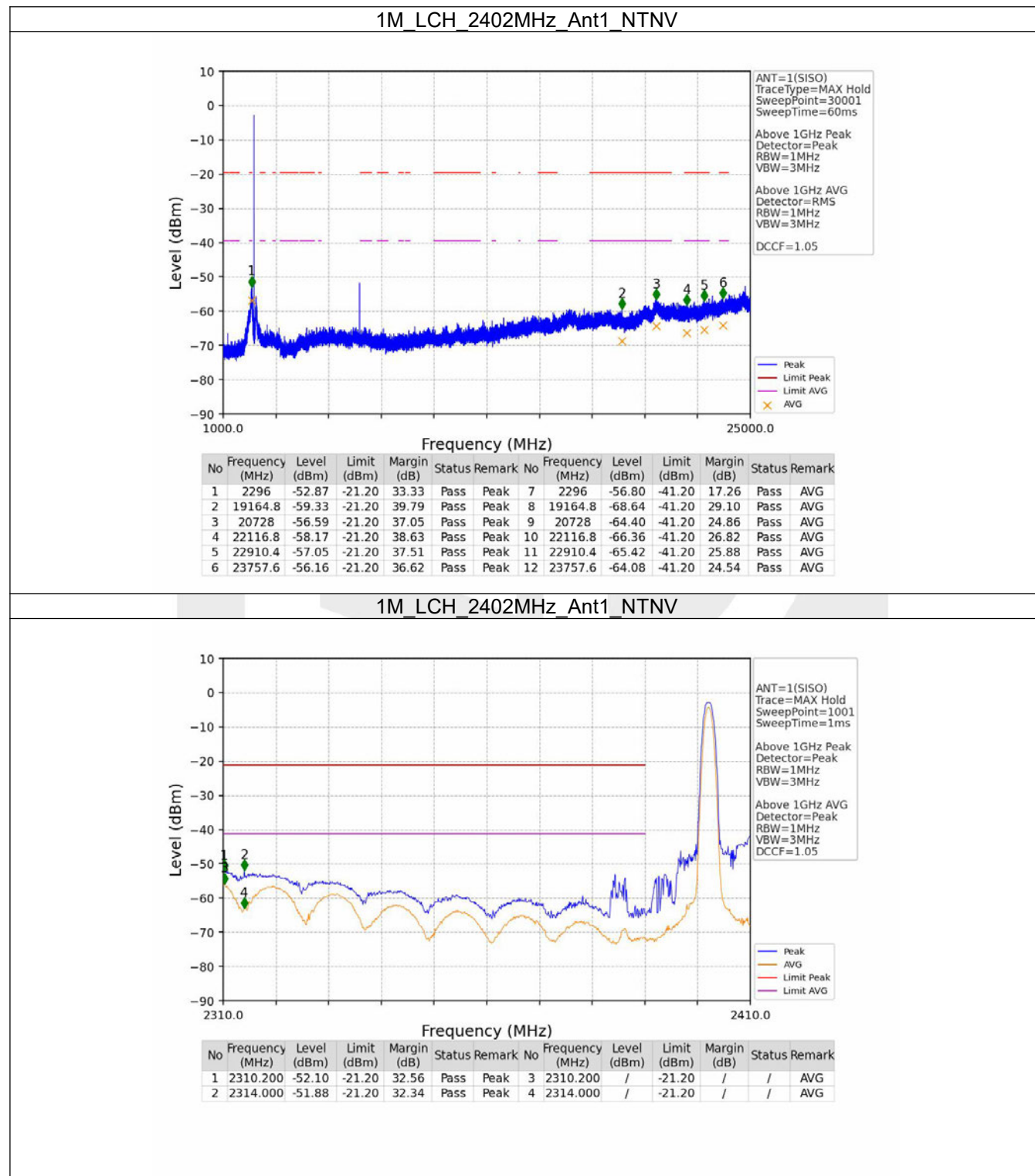
6.1 Test Result

6.1.1 RSE

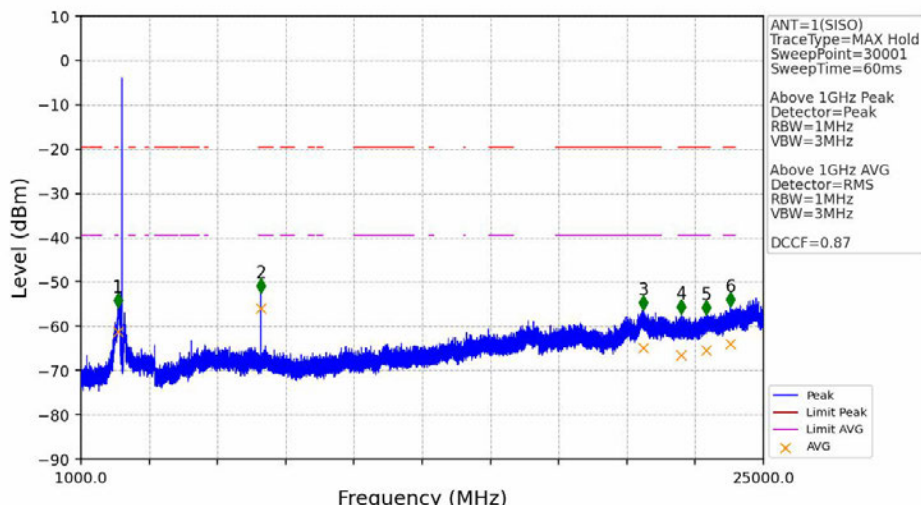
Mode	TX Type	Frequency (MHz)	ANT	Level of Unwanted Emissions (dBm)		Verdict
				Result	Limit	
1M	SISO	2402	1	Refer To Test Graph		Pass
		2440	1	Refer To Test Graph		Pass
		2480	1	Refer To Test Graph		Pass
2M	SISO	2402	1	Refer To Test Graph		Pass
		2440	1	Refer To Test Graph		Pass
		2480	1	Refer To Test Graph		Pass

6.2 Test Graph

6.2.1 RSE

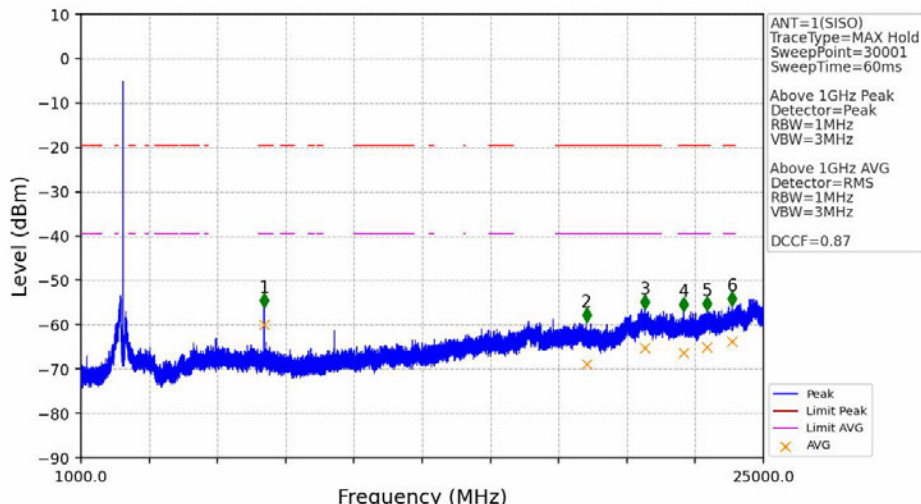


1M_MCH_2440MHz_Ant1_NTNV



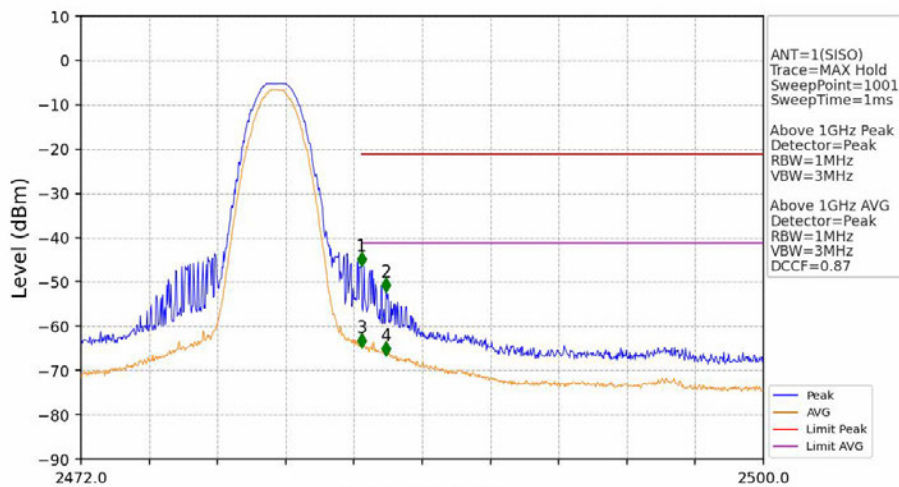
No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status Remark	No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status Remark
1	2297.6	-55.75	-21.20	36.21	Pass Peak	7	2297.6	-61.26	-41.20	21.72	Pass AVG
2	7320.8	-52.46	-21.20	32.92	Pass Peak	8	7320.8	-55.96	-41.20	16.42	Pass AVG
3	20784	-56.24	-21.20	36.70	Pass Peak	9	20784	-64.94	-41.20	25.39	Pass AVG
4	22120	-57.24	-21.20	37.70	Pass Peak	10	22120	-66.49	-41.20	26.95	Pass AVG
5	22996	-57.30	-21.20	37.76	Pass Peak	11	22996	-65.38	-41.20	25.84	Pass AVG
6	23834.4	-55.59	-21.20	36.05	Pass Peak	12	23834.4	-63.93	-41.20	24.39	Pass AVG

1M_HCH_2480MHz_Ant1_NTNV



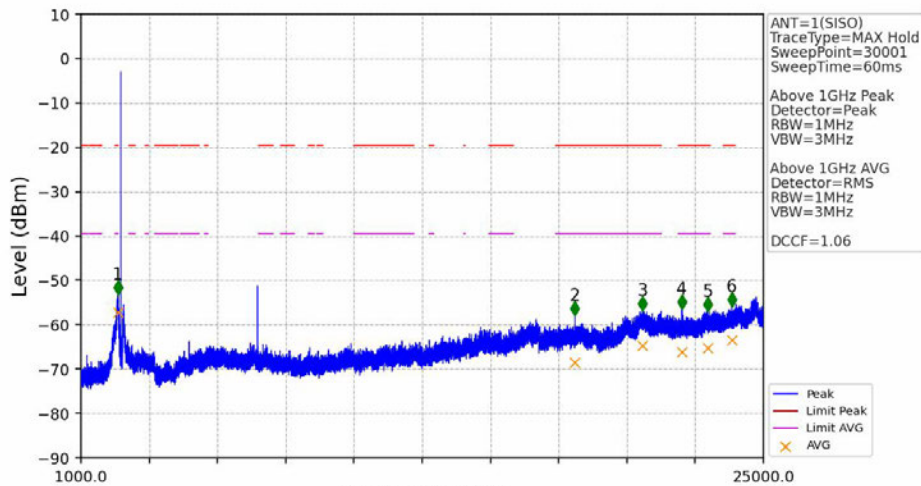
No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status Remark	No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status Remark
1	7440	-56.08	-21.20	36.54	Pass Peak	7	7440	-59.91	-41.20	20.36	Pass AVG
2	18774.4	-59.42	-21.20	39.88	Pass Peak	8	18774.4	-68.92	-41.20	29.38	Pass AVG
3	20824.8	-56.39	-21.20	36.85	Pass Peak	9	20824.8	-65.16	-41.20	25.62	Pass AVG
4	22195.2	-57.02	-21.20	37.48	Pass Peak	10	22195.2	-66.33	-41.20	26.79	Pass AVG
5	23018.4	-56.83	-21.20	37.29	Pass Peak	11	23018.4	-65.09	-41.20	25.55	Pass AVG
6	23906.4	-55.64	-21.20	36.10	Pass Peak	12	23906.4	-63.70	-41.20	24.16	Pass AVG

1M_HCH_2480MHz_Ant1_NTNV



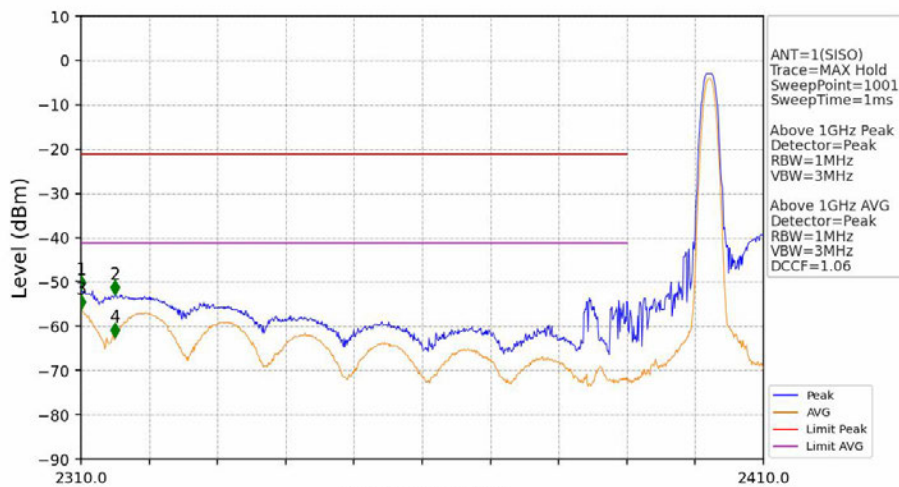
No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status Remark	No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status Remark
1	2483.508	-46.41	-21.20	26.87	Pass Peak	3	2483.508	/	-21.20	/	/ AVG
2	2484.516	-52.29	-21.20	32.75	Pass Peak	4	2484.516	/	-21.20	/	/ AVG

2M_LCH_2402MHz_Ant1_NTNV



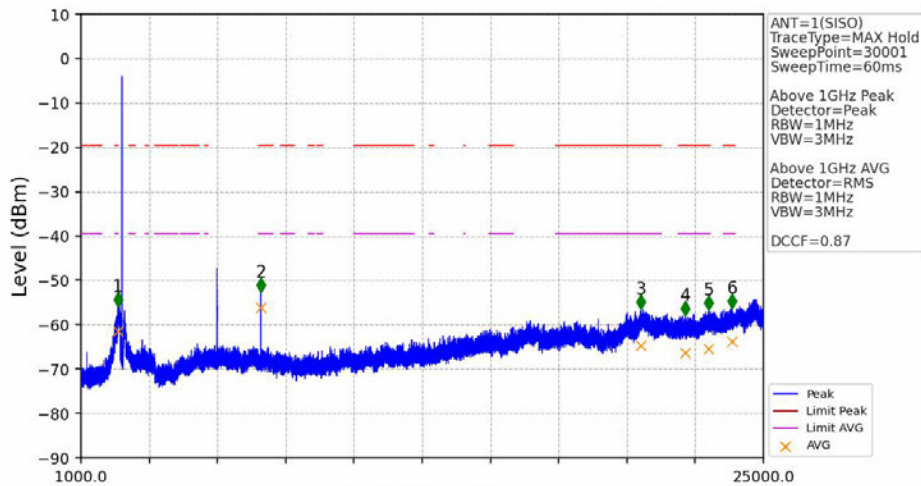
No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status Remark	No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status Remark
1	2297.6	-53.12	-21.20	33.58	Pass Peak	7	2297.6	-57.22	-41.20	17.68	Pass AVG
2	18374.4	-57.92	-21.20	38.38	Pass Peak	8	18374.4	-68.49	-41.20	28.95	Pass AVG
3	20754.4	-56.78	-21.20	37.24	Pass Peak	9	20754.4	-64.75	-41.20	25.21	Pass AVG
4	22134.4	-56.50	-21.20	36.96	Pass Peak	10	22134.4	-66.23	-41.20	26.69	Pass AVG
5	23032.8	-56.91	-21.20	37.37	Pass Peak	11	23032.8	-65.26	-41.20	25.72	Pass AVG
6	23884	-55.96	-21.20	36.42	Pass Peak	12	23884	-63.46	-41.20	23.92	Pass AVG

2M_LCH_2402MHz_Ant1_NTNV



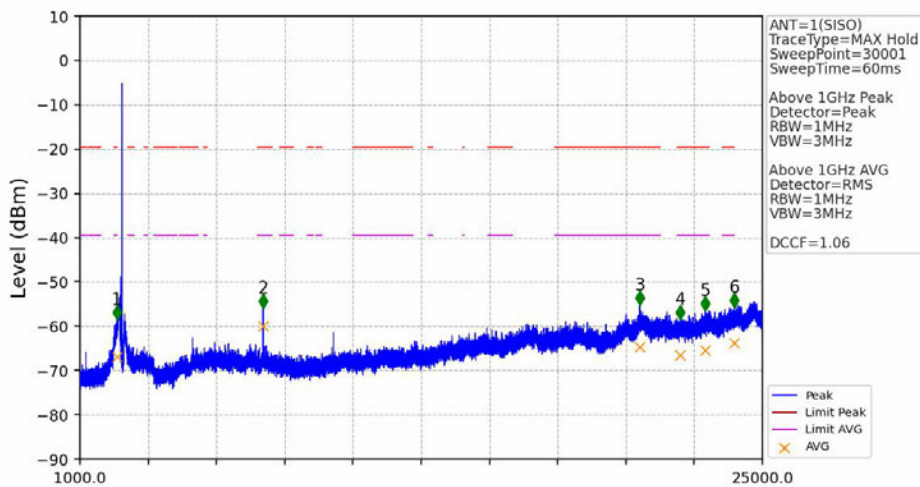
No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status	Remark	No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status	Remark
1	2310.000	-51.77	-21.20	32.23	Pass	Peak	3	2310.000	/	-21.20	/	/	AVG
2	2315.000	-52.87	-21.20	33.33	Pass	Peak	4	2315.000	/	-21.20	/	/	AVG

2M_MCH_2440MHz_Ant1_NTNV



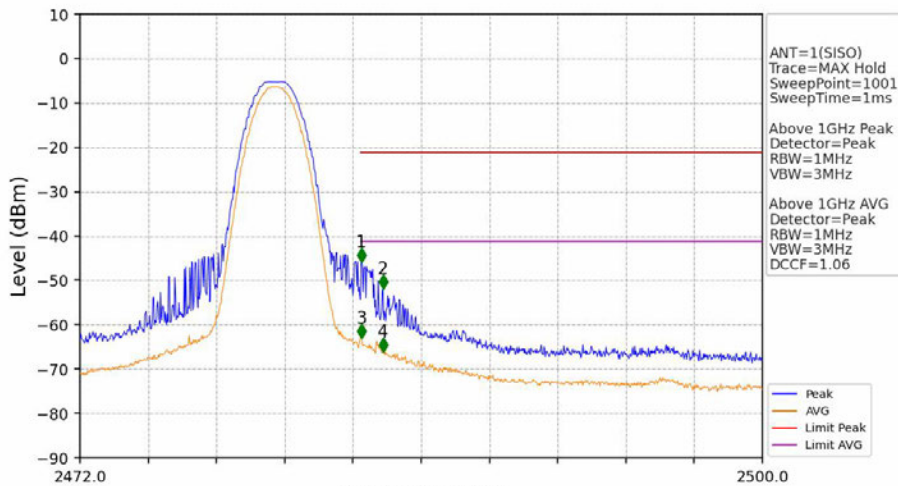
No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status	Remark	No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status	Remark
1	2296	-55.80	-21.20	36.26	Pass	Peak	7	2296	-61.34	-41.20	21.80	Pass	AVG
2	7320.8	-52.53	-21.20	32.99	Pass	Peak	8	7320.8	-56.16	-41.20	16.62	Pass	AVG
3	20698.4	-56.49	-21.20	36.95	Pass	Peak	9	20698.4	-64.61	-41.20	25.07	Pass	AVG
4	22256.8	-57.89	-21.20	38.35	Pass	Peak	10	22256.8	-66.38	-41.20	26.84	Pass	AVG
5	23084.8	-56.57	-21.20	37.03	Pass	Peak	11	23084.8	-65.47	-41.20	25.93	Pass	AVG
6	23888.8	-56.33	-21.20	36.79	Pass	Peak	12	23888.8	-63.84	-41.20	24.30	Pass	AVG

2M_HCH_2480MHz_Ant1_NTNV



No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status Remark	No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status Remark
1	2291.2	-58.39	-21.20	38.85	Pass Peak	7	2291.2	-66.78	-41.20	27.24	Pass AVG
2	7440.8	-55.83	-21.20	36.29	Pass Peak	8	7440.8	-59.93	-41.20	20.39	Pass AVG
3	20685.6	-55.15	-21.20	35.61	Pass Peak	9	20685.6	-64.69	-41.20	25.15	Pass AVG
4	22115.2	-58.48	-21.20	38.94	Pass Peak	10	22115.2	-66.50	-41.20	26.96	Pass AVG
5	22988	-56.37	-21.20	36.83	Pass Peak	11	22988	-65.33	-41.20	25.79	Pass AVG
6	23998.4	-55.65	-21.20	36.10	Pass Peak	12	23998.4	-63.73	-41.20	24.20	Pass AVG

2M_HCH_2480MHz_Ant1_NTNV



No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status Remark	No	Frequency (MHz)	Level (dBm)	Limit (dBm)	Margin (dB)	Status Remark
1	2483.536	-45.83	-21.20	26.29	Pass Peak	3	2483.536	/	-21.20	/	AVG
2	2484.432	-51.81	-21.20	32.27	Pass Peak	4	2484.432	/	-21.20	/	AVG

----- End of Report -----