

Appendix - BLE

USM3:

1. Duty Cycle

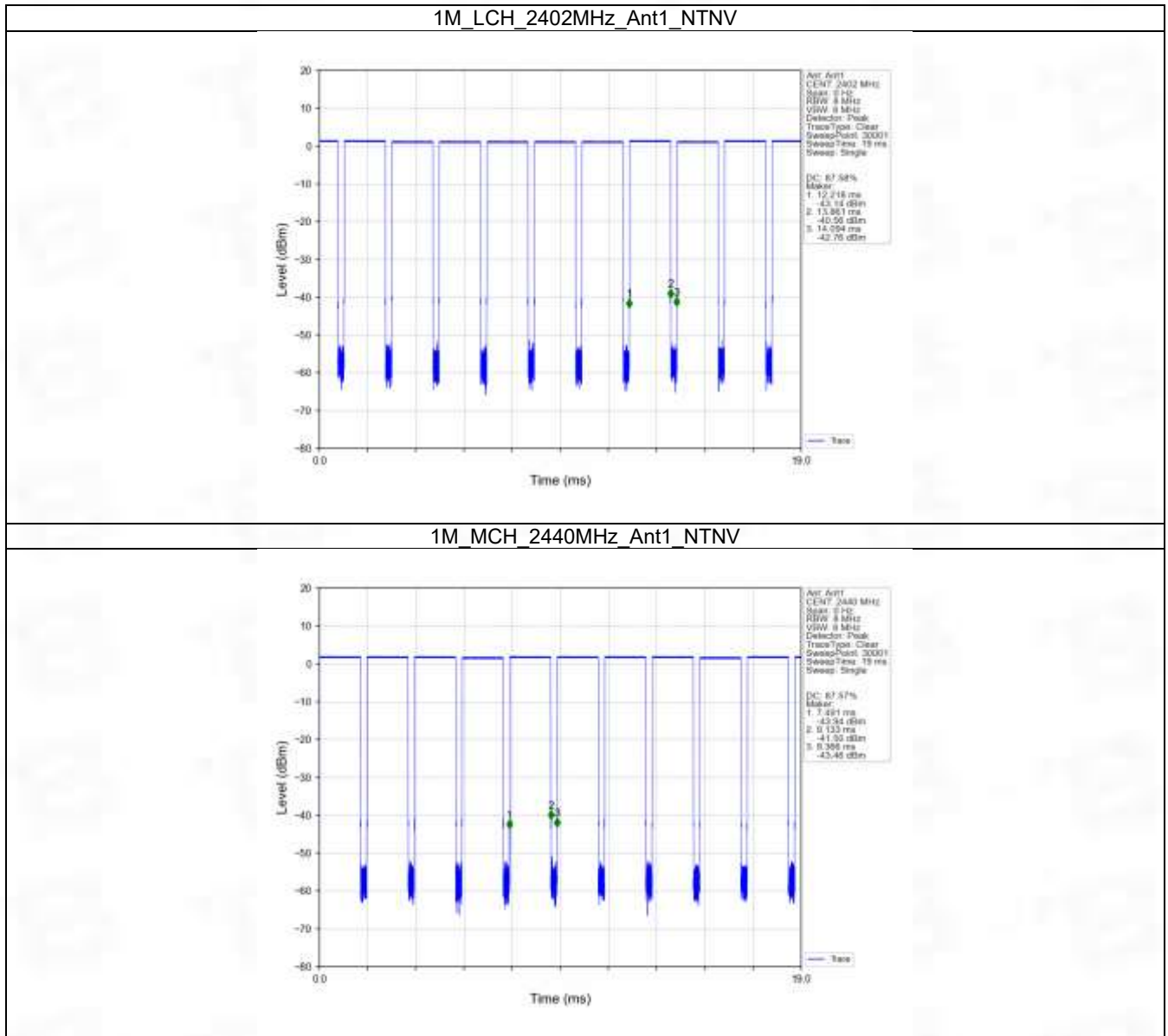
1.1 Test Result

1.1.1 Ant1

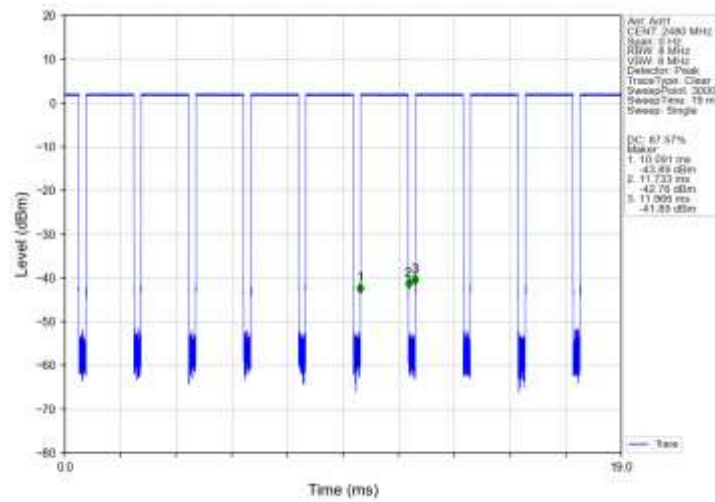
Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
1M	SISO	2402	1.643	1.876	87.58	0.58	0.03
		2440	1.642	1.875	87.57	0.58	0.03
		2480	1.642	1.875	87.57	0.58	0.03
2M	SISO	2402	0.841	1.250	67.28	1.72	0.03
		2440	0.841	1.250	67.28	1.72	0.03
		2480	0.841	1.250	67.28	1.72	0.02

1.2 Test Graph

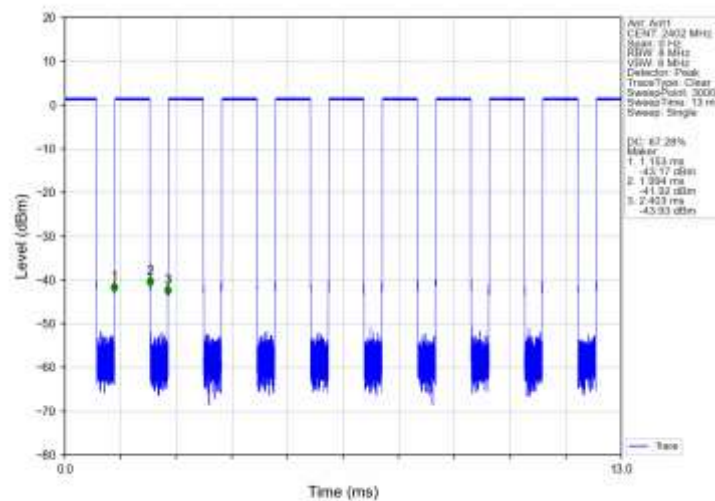
1.2.1 Ant1



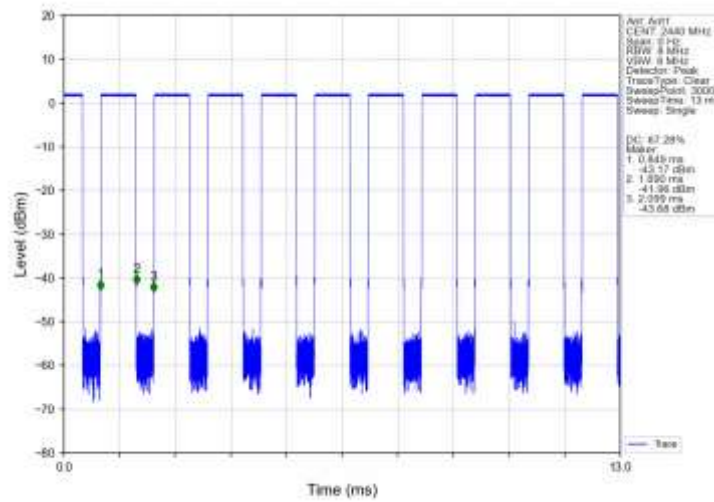
1M_HCH_2480MHz_Ant1_NTNV



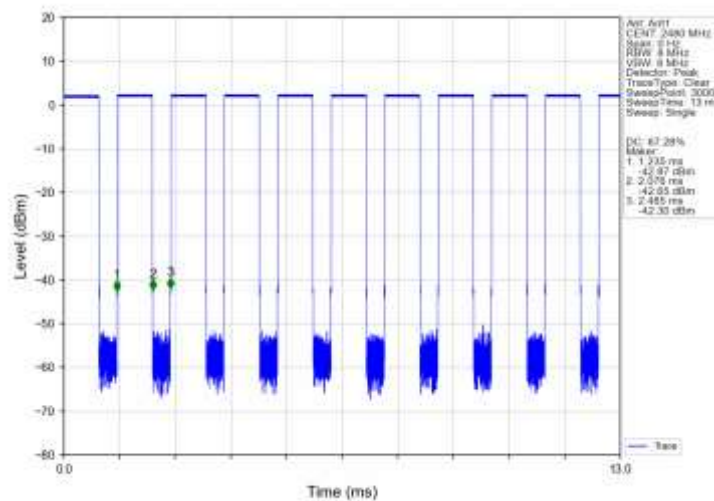
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



2. Bandwidth

2.1 Test Result

2.1.1 OBW

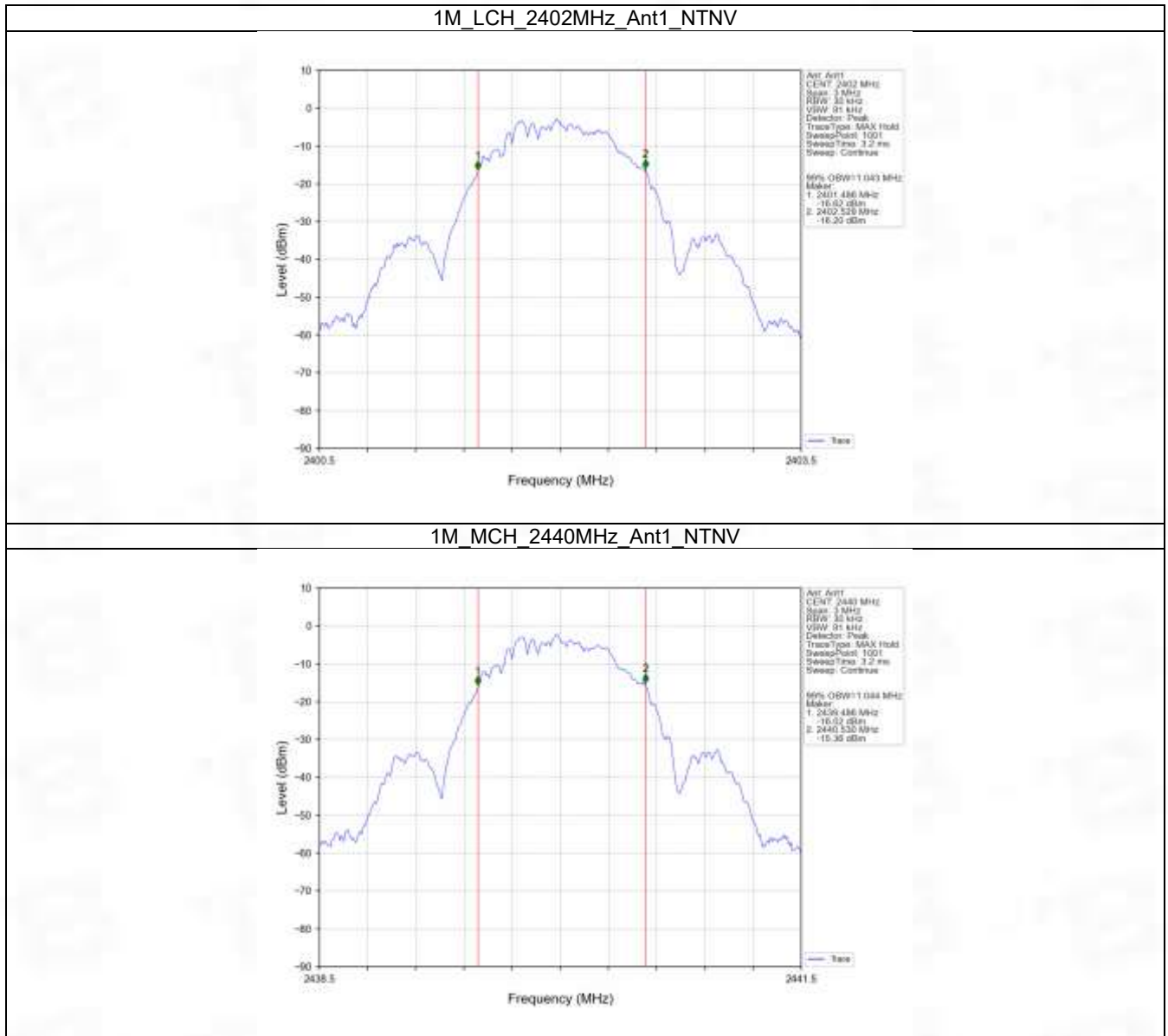
Mode	TX Type	Frequency (MHz)	ANT	99% Occupied Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	1.043	/	Pass
		2440	1	1.044	/	Pass
		2480	1	1.043	/	Pass
2M	SISO	2402	1	2.082	/	Pass
		2440	1	2.085	/	Pass
		2480	1	2.080	/	Pass

2.1.2 6dB BW

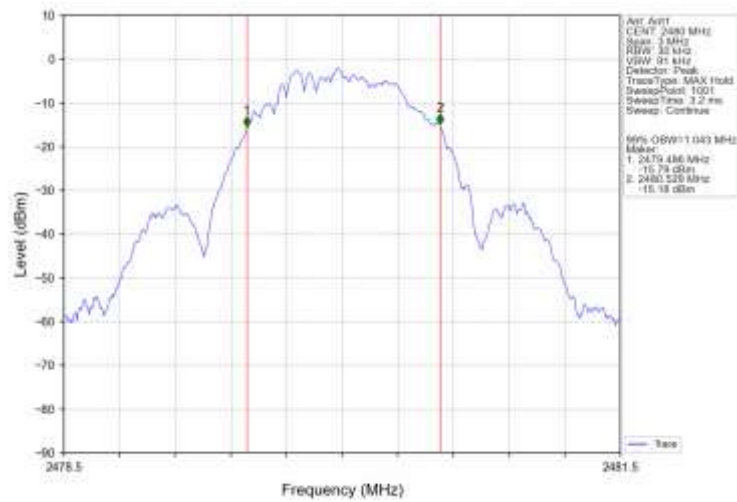
Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	0.681	≥ 0.5	Pass
		2440	1	0.667	≥ 0.5	Pass
		2480	1	0.679	≥ 0.5	Pass
2M	SISO	2402	1	1.198	≥ 0.5	Pass
		2440	1	1.190	≥ 0.5	Pass
		2480	1	1.181	≥ 0.5	Pass

2.2 Test Graph

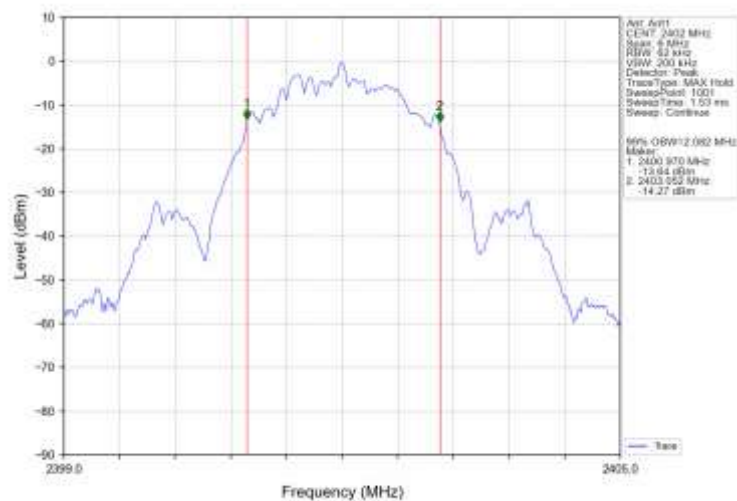
2.2.1 OBW



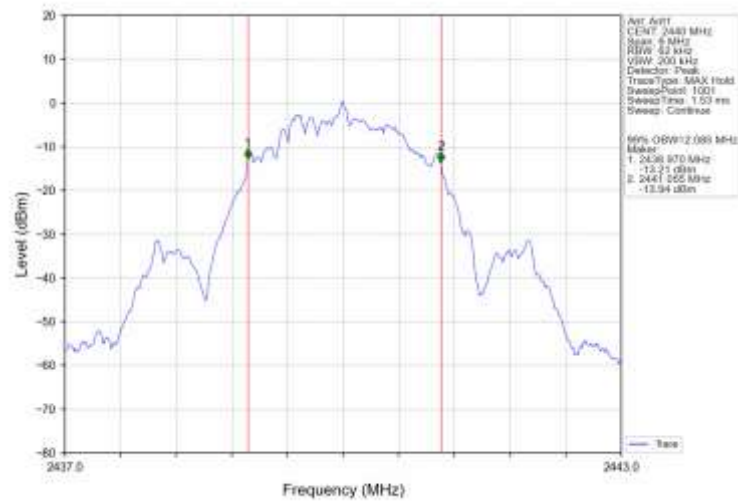
1M_HCH_2480MHz_Ant1_NTNV



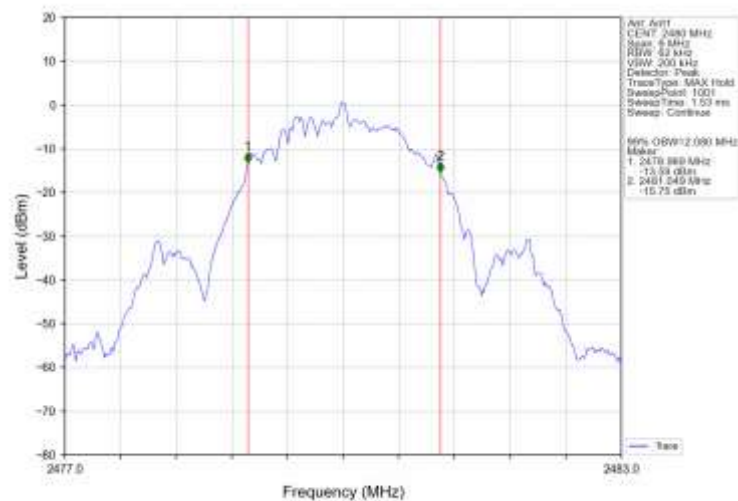
2M_LCH_2402MHz_Ant1_NTNV



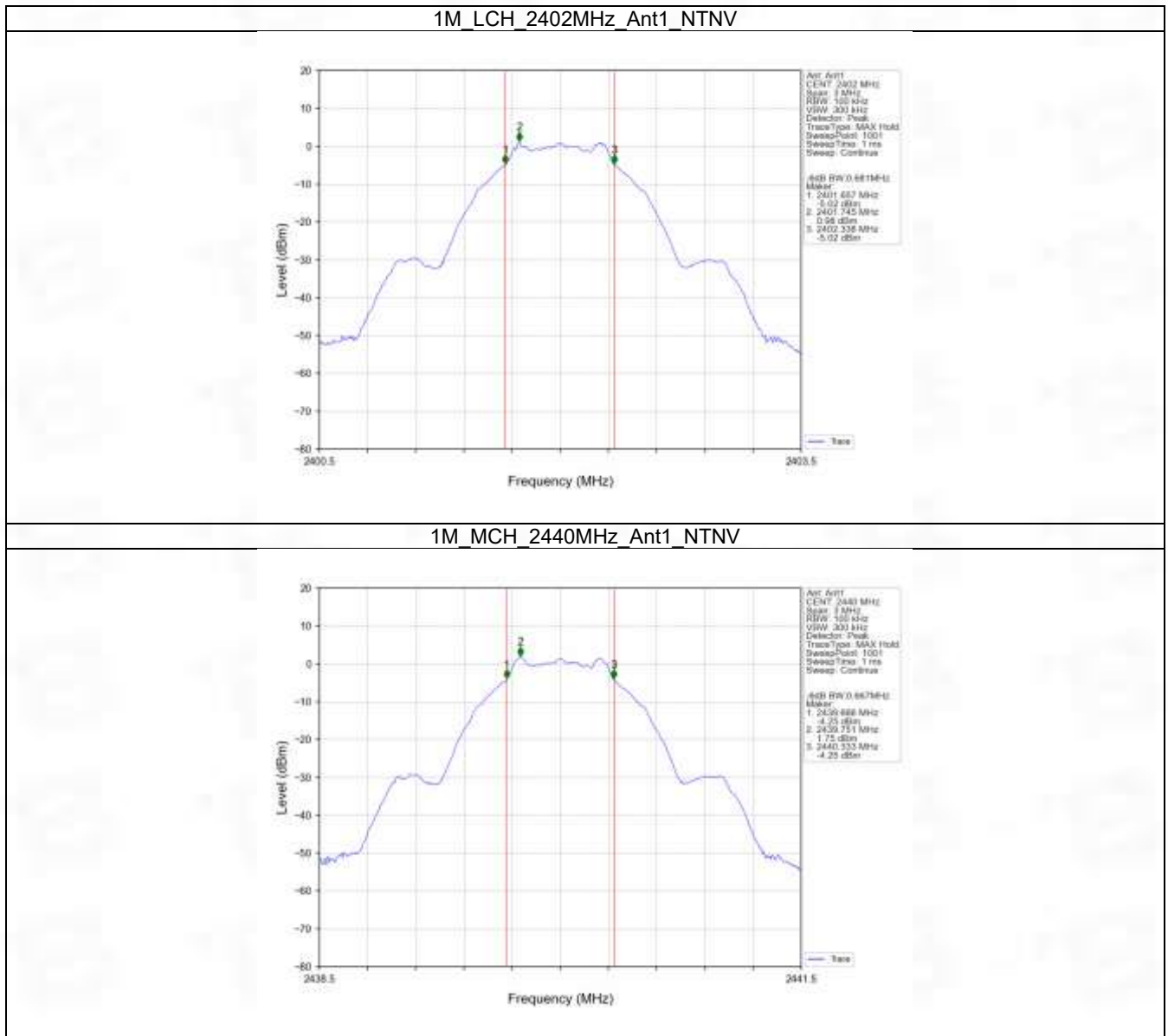
2M_MCH_2440MHz_Ant1_NTNV



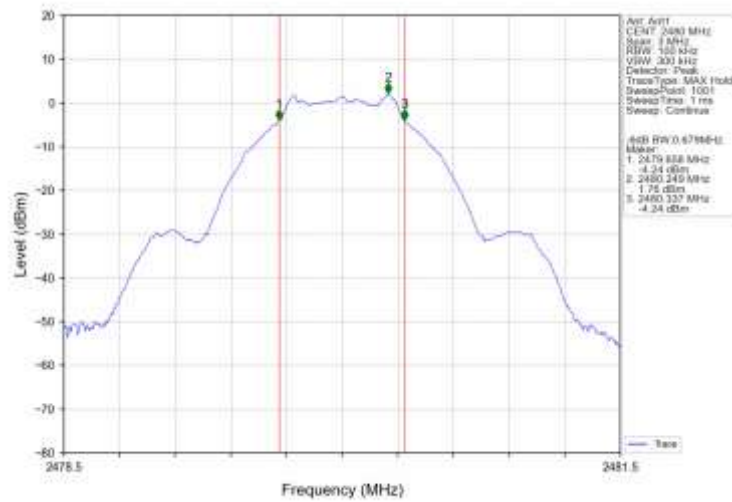
2M_HCH_2480MHz_Ant1_NTNV



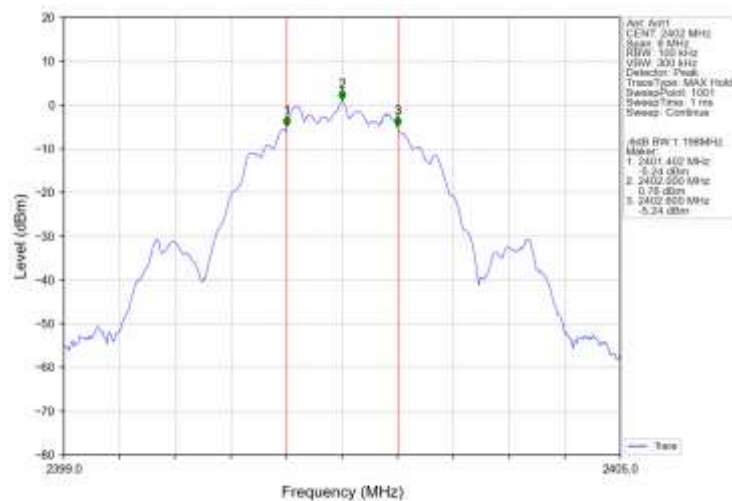
2.2.2 6dB BW



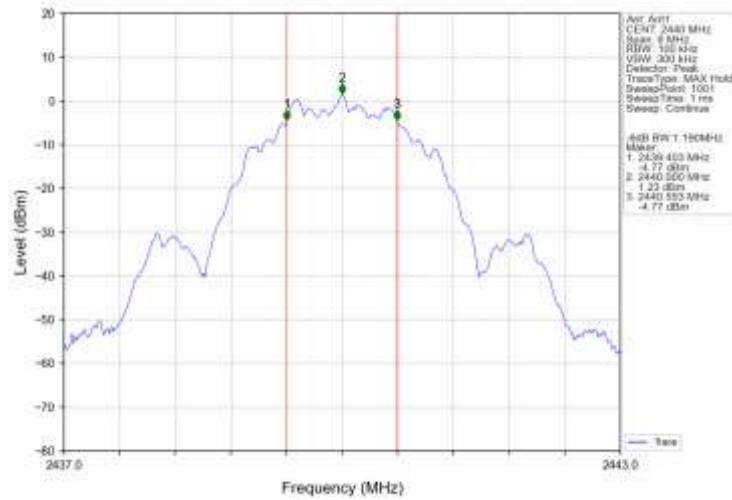
1M_HCH_2480MHz_Ant1_NTNV



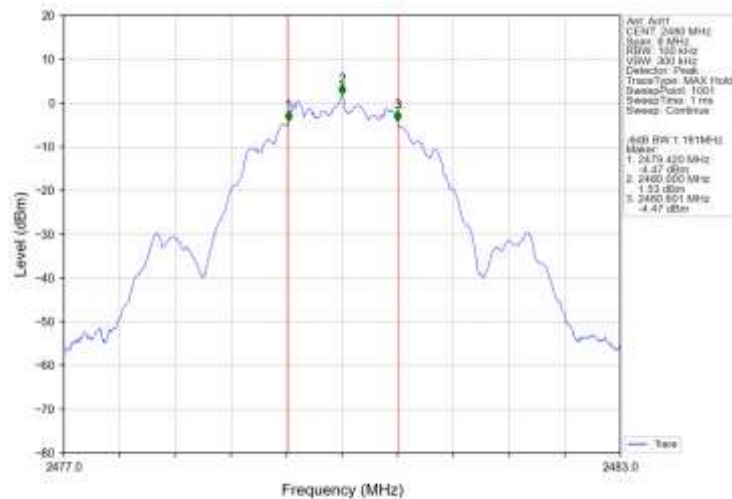
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



3. Maximum Conducted Output Power

3.1 Test Result

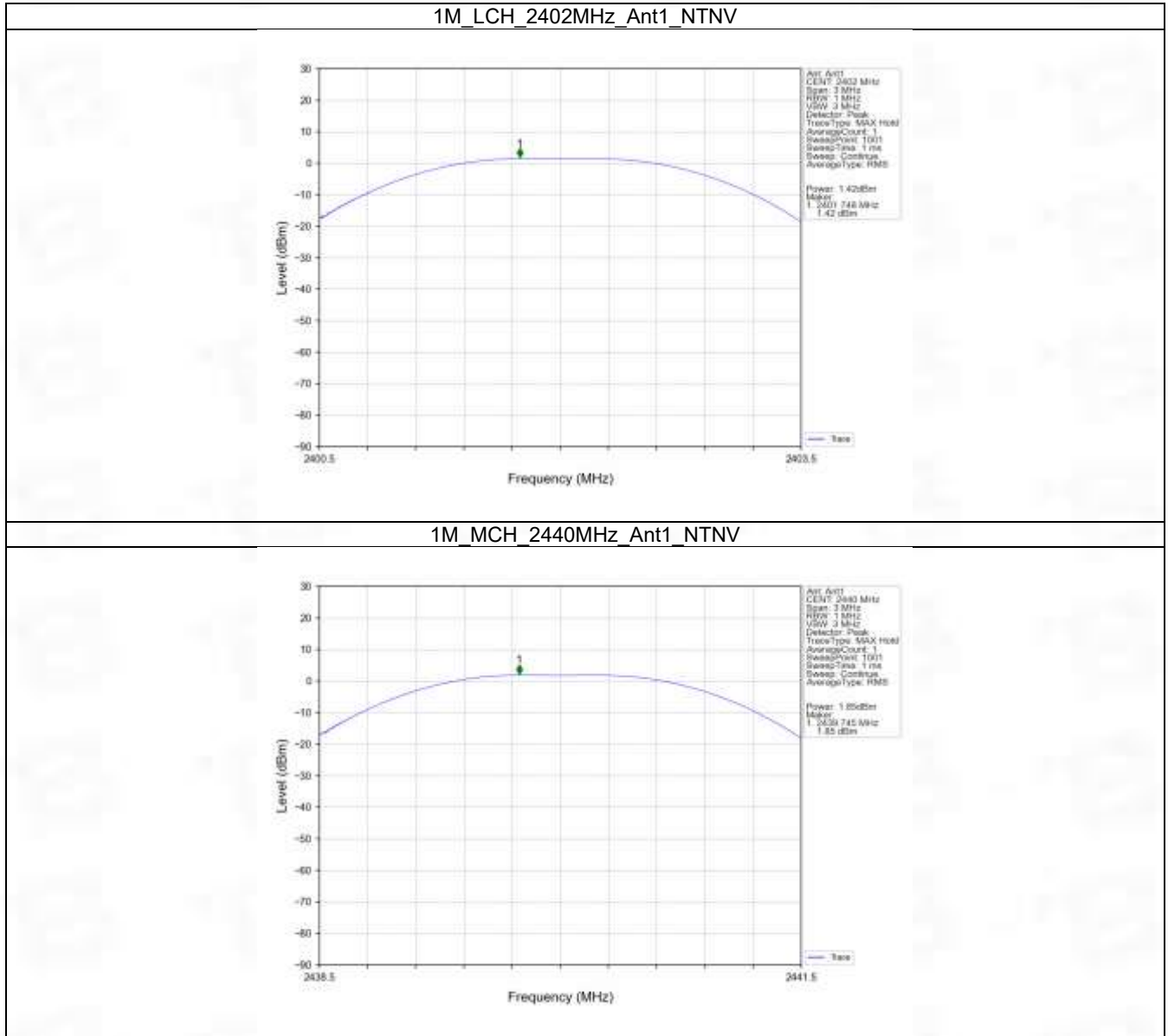
3.1.1 Power

Mode	TX Type	Frequency (MHz)	Maximum Peak Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
1M	SISO	2402	1.42	<=30	Pass
		2440	1.85	<=30	Pass
		2480	2.14	<=30	Pass
2M	SISO	2402	1.67	<=30	Pass
		2440	2.12	<=30	Pass
		2480	2.44	<=30	Pass

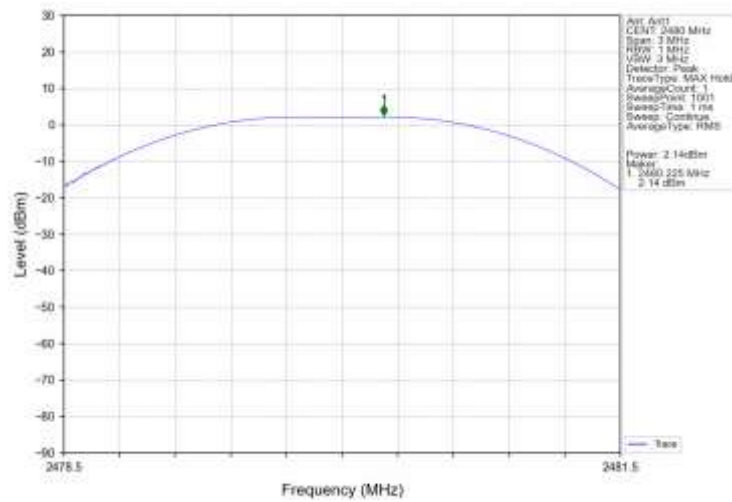
Note1: Antenna Gain: Ant1: 3.00dBi;

3.2 Test Graph

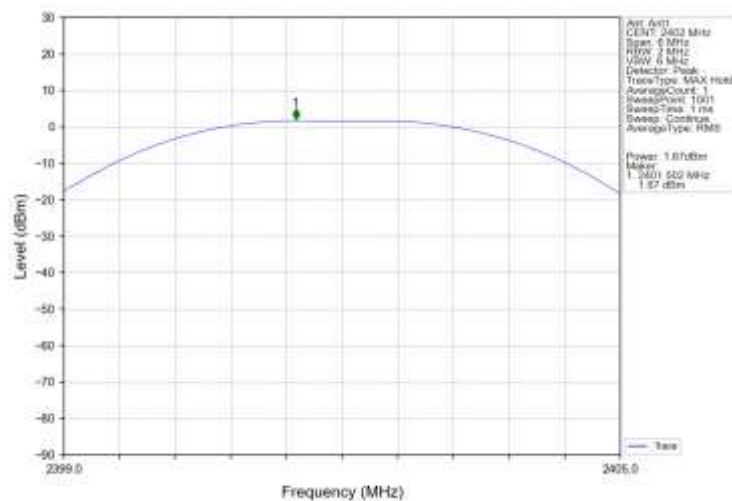
3.2.1 Power



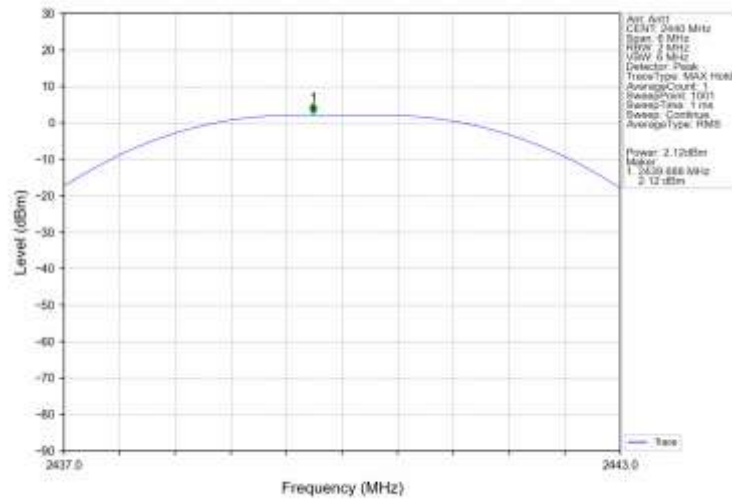
1M_HCH_2480MHz_Ant1_NTNV



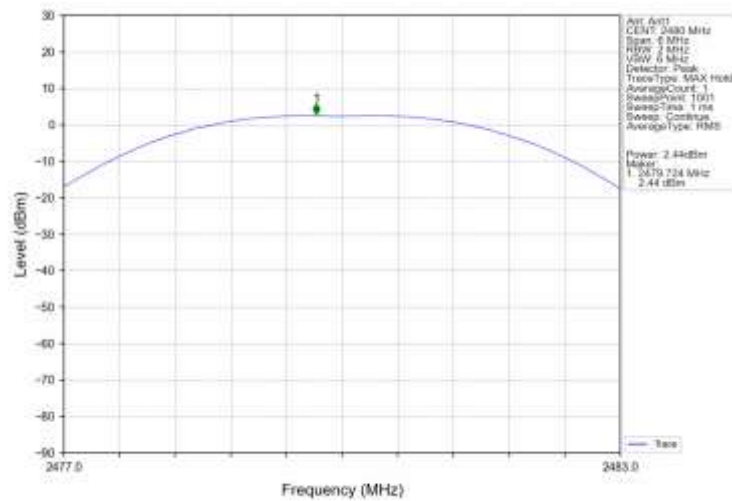
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



4. Maximum Power Spectral Density

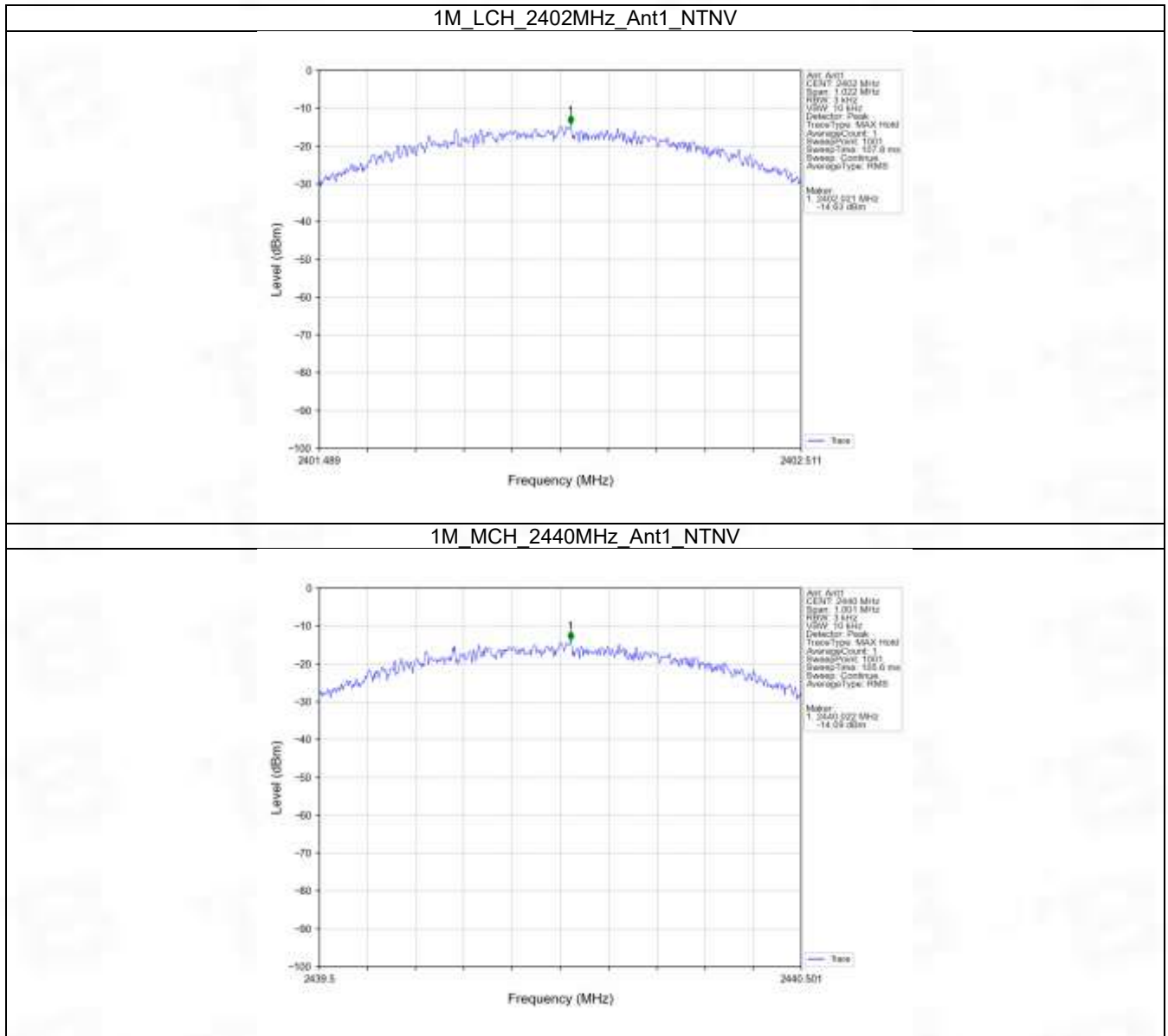
4.1 Test Result

4.1.1 PSD

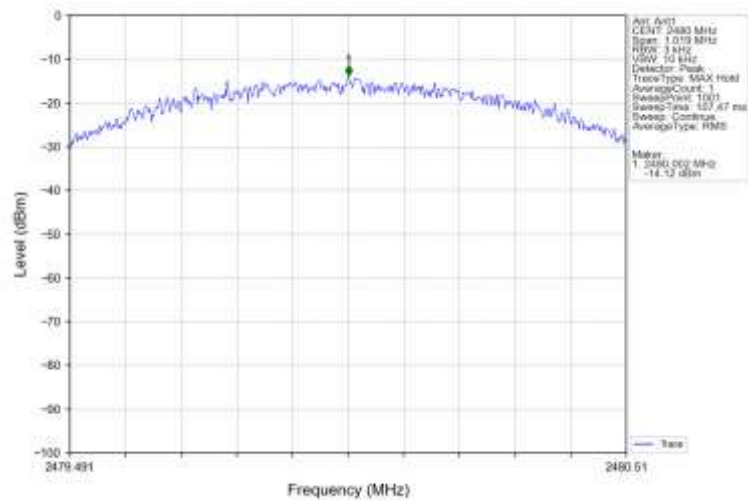
Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/3kHz)		Verdict
			ANT1	Limit	
1M	SISO	2402	-14.63	<=8	Pass
		2440	-14.09	<=8	Pass
		2480	-14.12	<=8	Pass
2M	SISO	2402	-17.65	<=8	Pass
		2440	-17.22	<=8	Pass
		2480	-16.89	<=8	Pass
Note1: Antenna Gain: Ant1: 3.00dBi;					

4.2 Test Graph

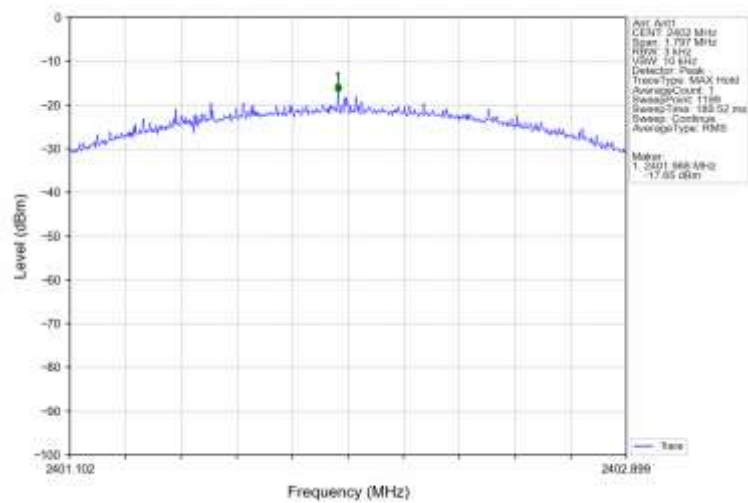
4.2.1 PSD



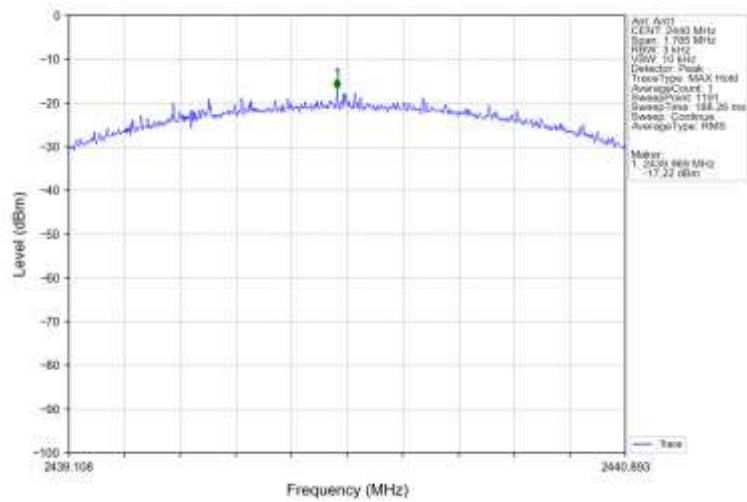
1M_HCH_2480MHz_Ant1_NTNV



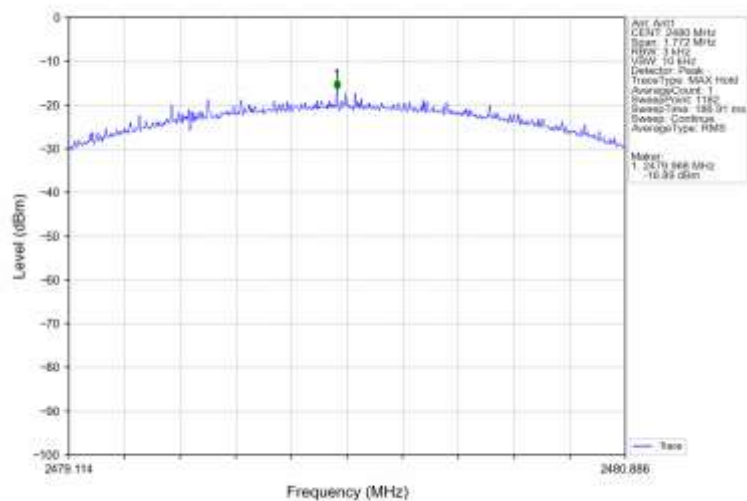
2M_LCH_2402MHz_Ant1_NTNV



2M_MCH_2440MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



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	1.28
		2440	1	1.75
		2480	1	2.03
2M	SISO	2402	1	0.74
		2440	1	1.41
		2480	1	1.51

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.

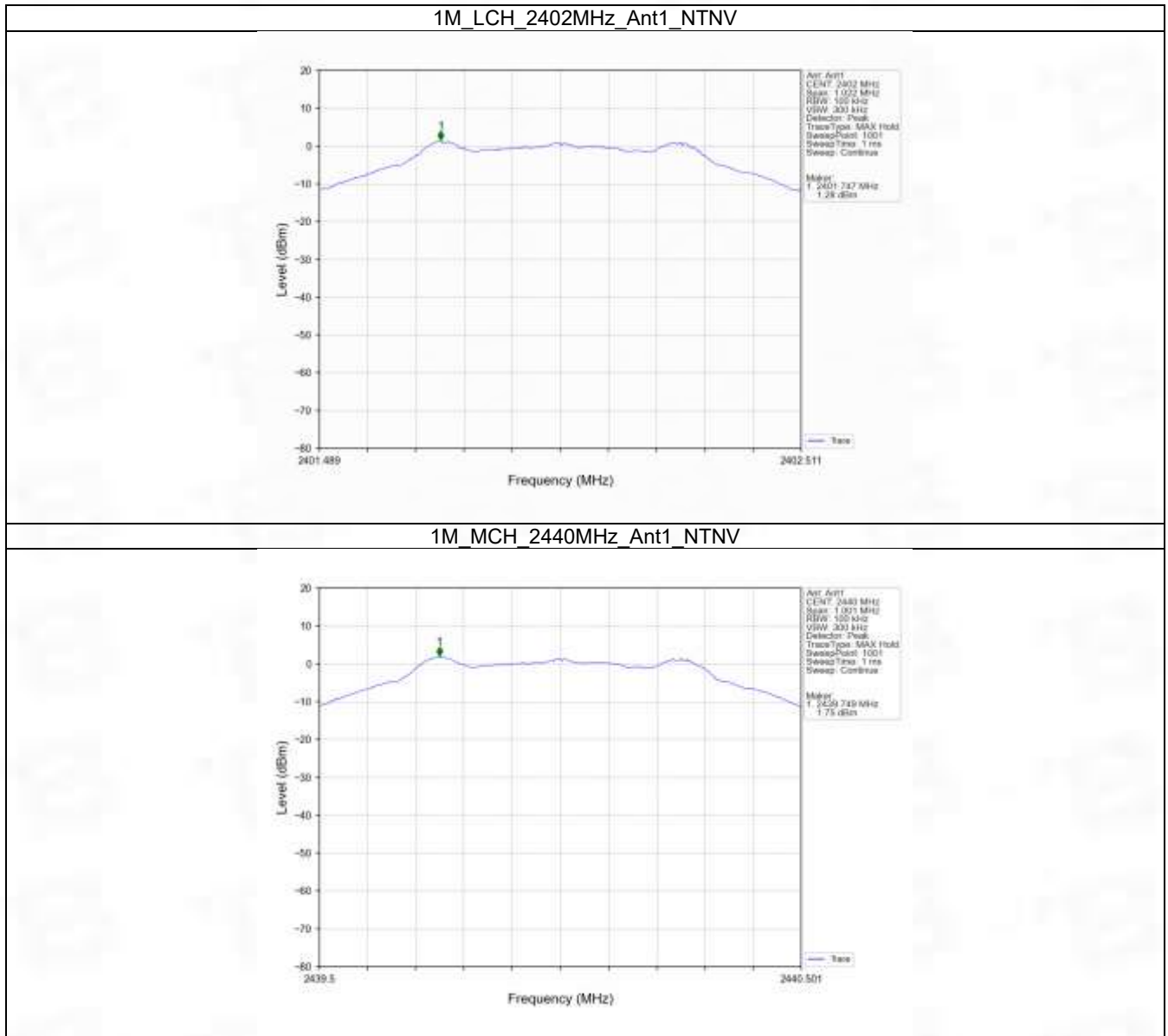
5.1.2 CSE

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
1M	SISO	2402	1	1.28	-18.72	Pass
		2440	1	1.75	-18.25	Pass
		2480	1	2.03	-17.97	Pass
2M	SISO	2402	1	0.74	-19.26	Pass
		2440	1	1.41	-18.59	Pass
		2480	1	1.51	-18.49	Pass

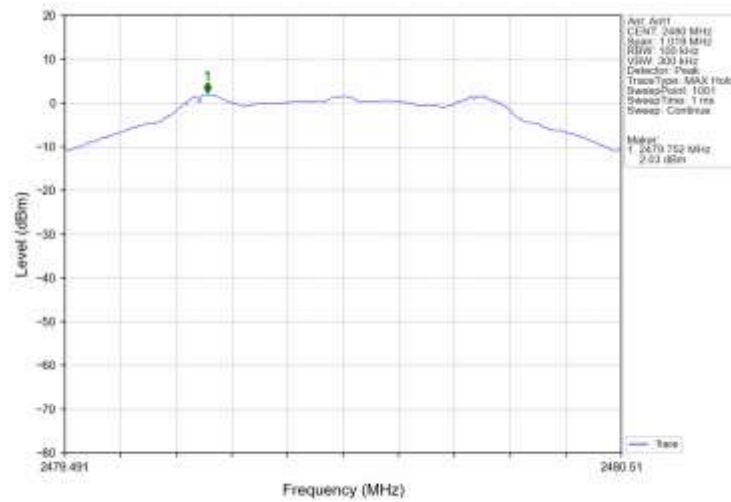
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020, the channel contains the maximum PSD level was used to establish the reference level.

5.2 Test Graph

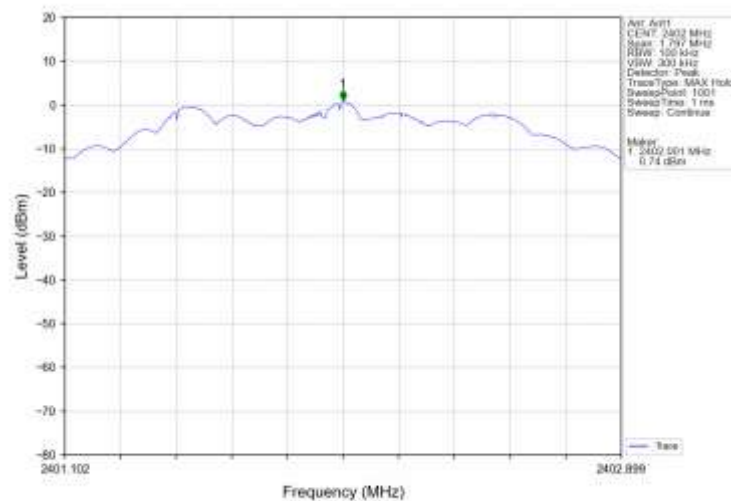
5.2.1 Ref



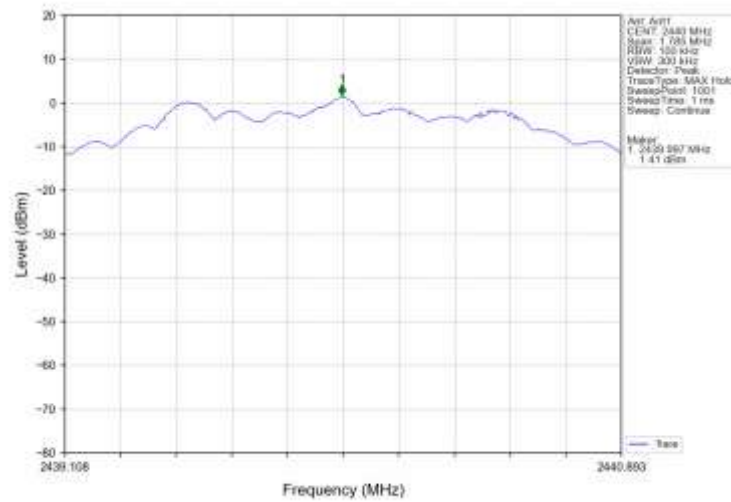
1M_HCH_2480MHz_Ant1_NTNV



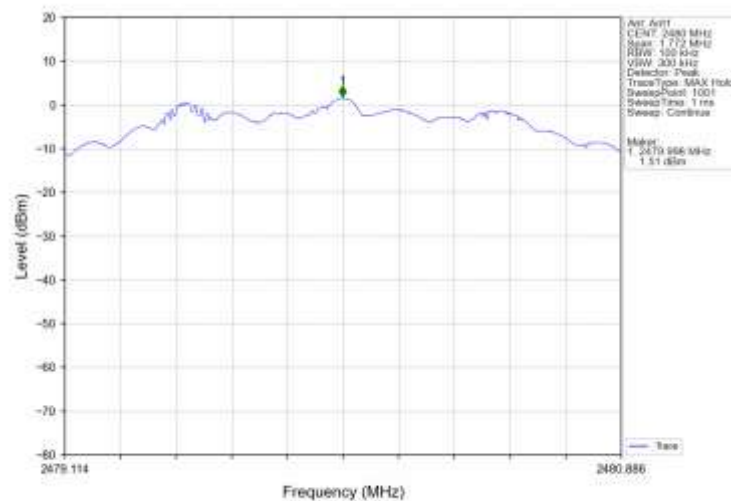
2M_LCH_2402MHz_Ant1_NTNV



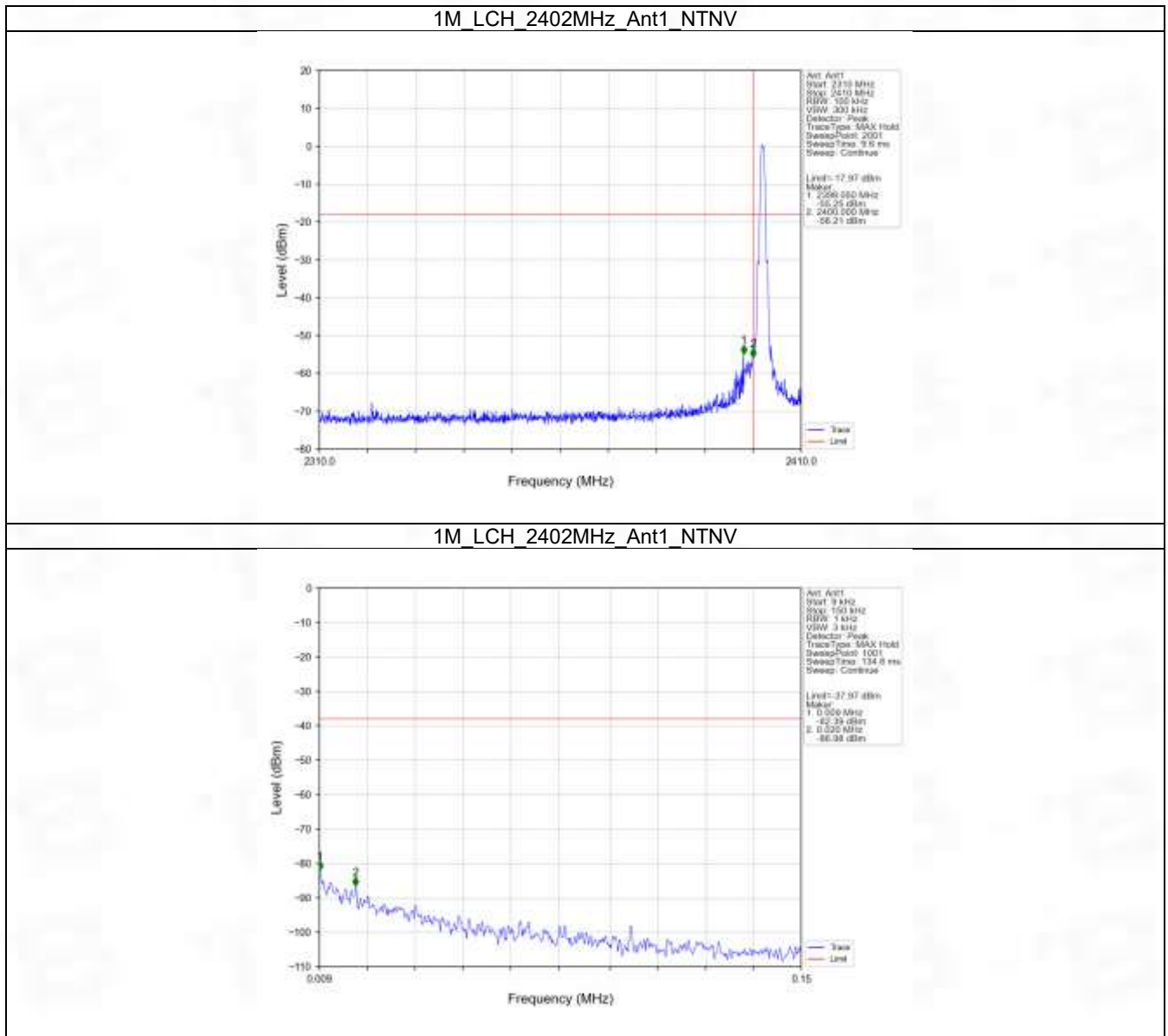
2M_MCH_2440MHz_Ant1_NTNV



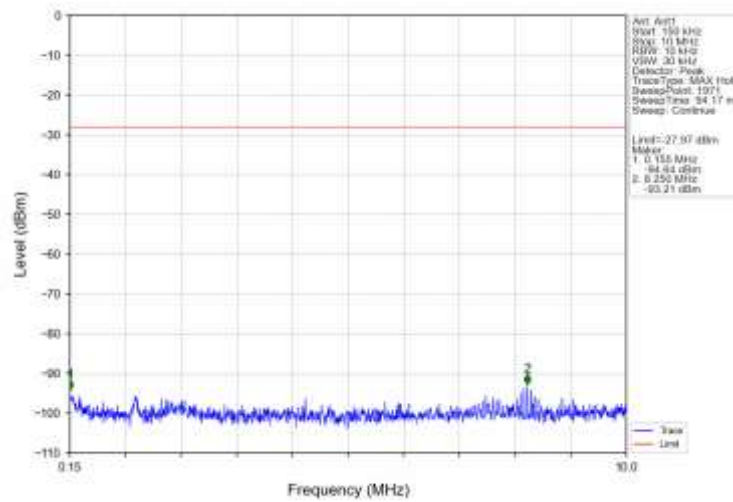
2M_HCH_2480MHz_Ant1_NTNV



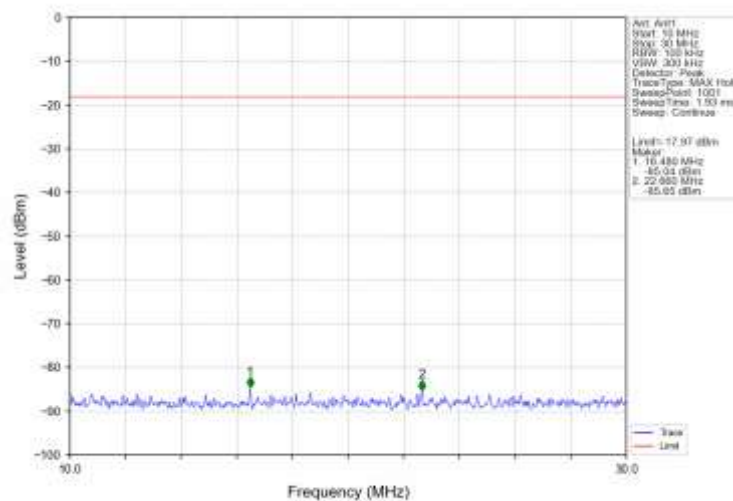
5.2.2 CSE



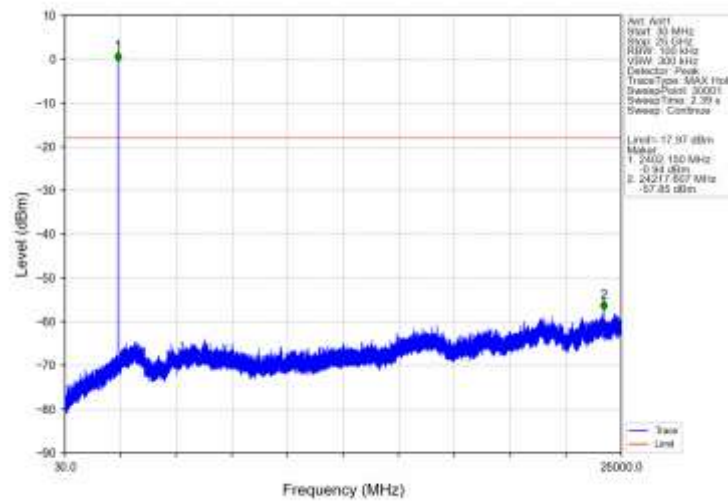
1M_LCH_2402MHz_Ant1_NTNV



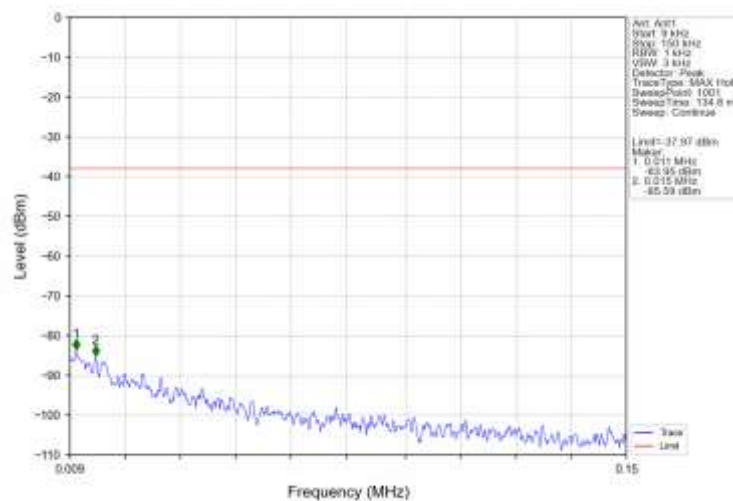
1M_LCH_2402MHz_Ant1_NTNV



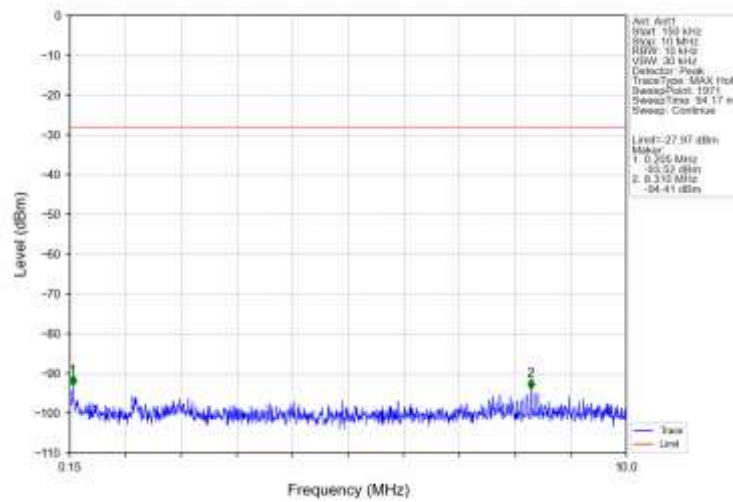
1M_LCH_2402MHz_Ant1_NTNV



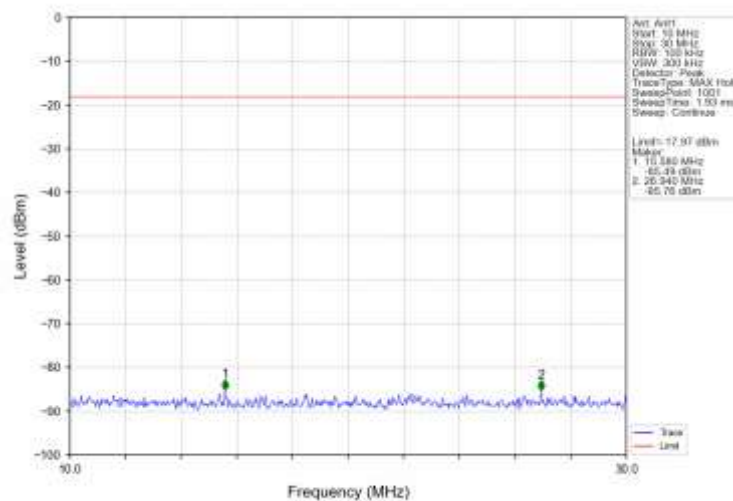
1M_MCH_2440MHz_Ant1_NTNV



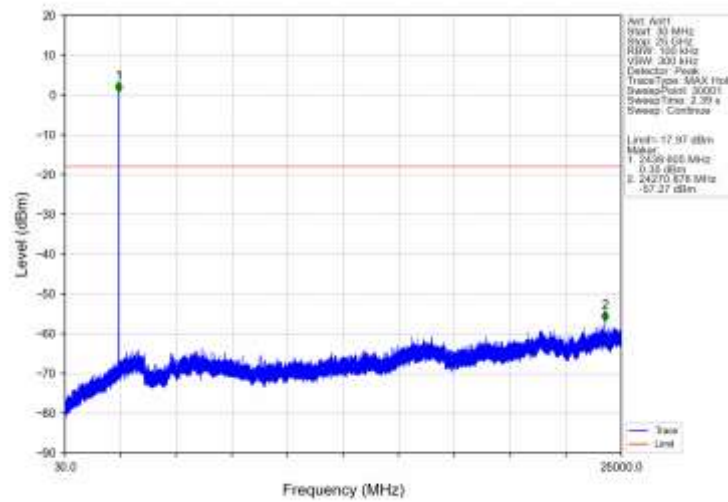
1M_MCH_2440MHz_Ant1_NTNV



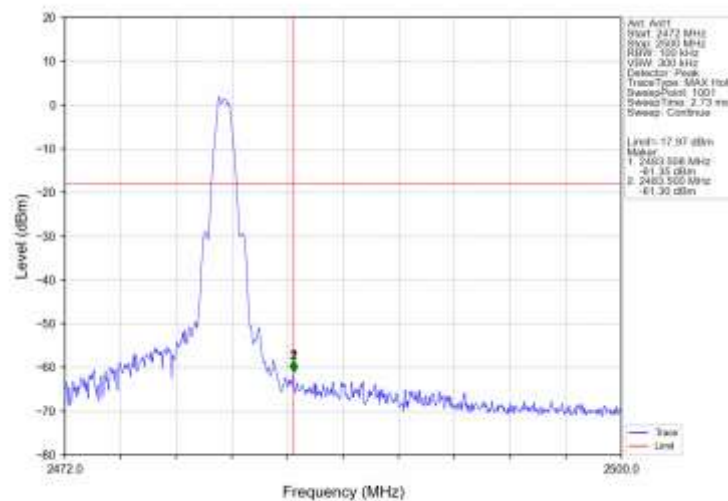
1M_MCH_2440MHz_Ant1_NTNV



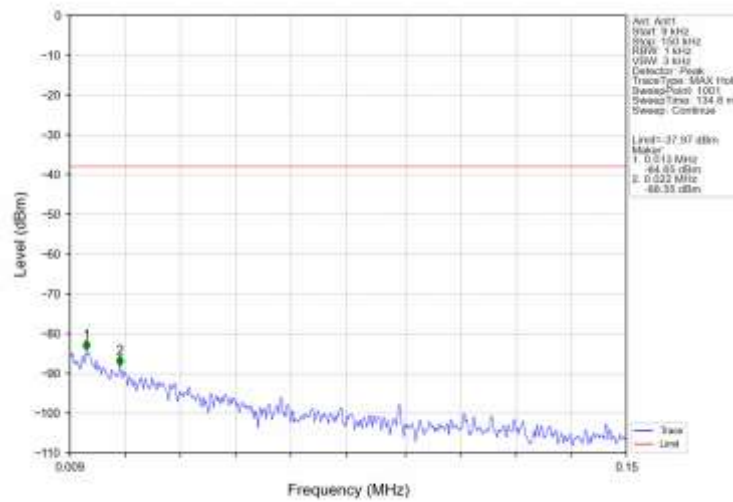
1M_MCH_2440MHz_Ant1_NTNV



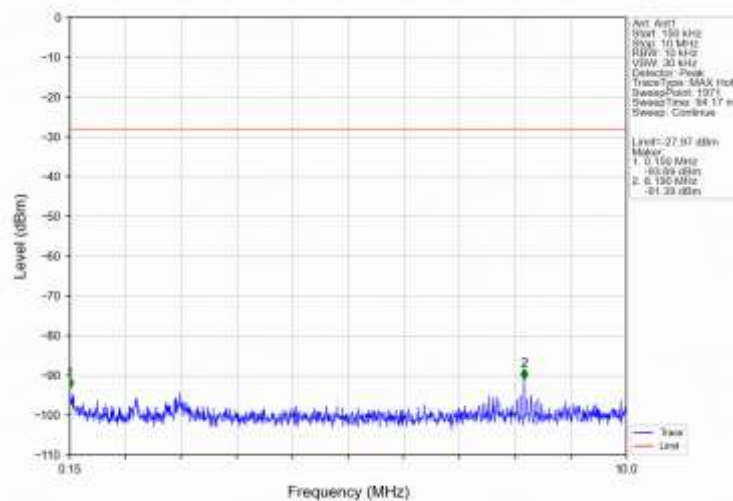
1M_HCH_2480MHz_Ant1_NTNV



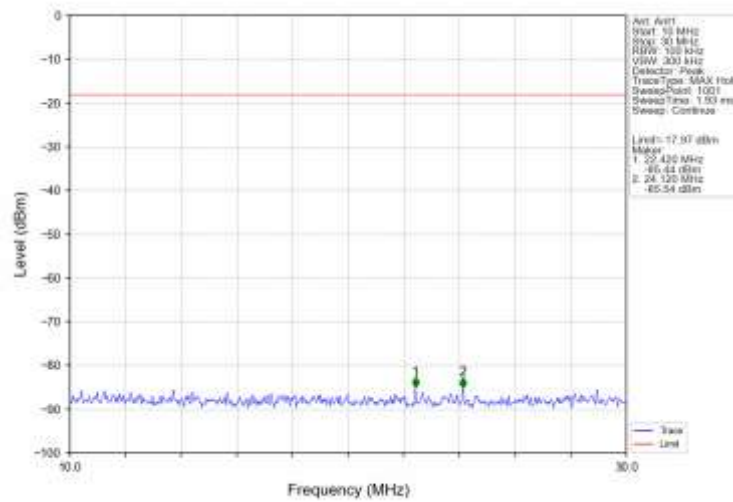
1M_HCH_2480MHz_Ant1_NTNV



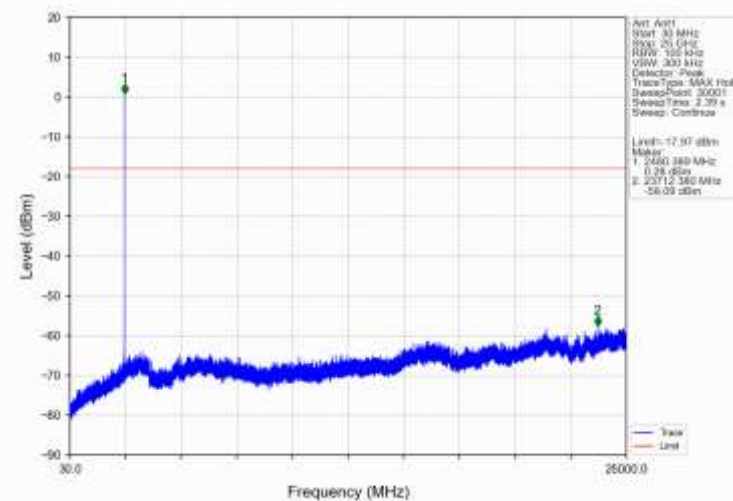
1M_HCH_2480MHz_Ant1_NTNV



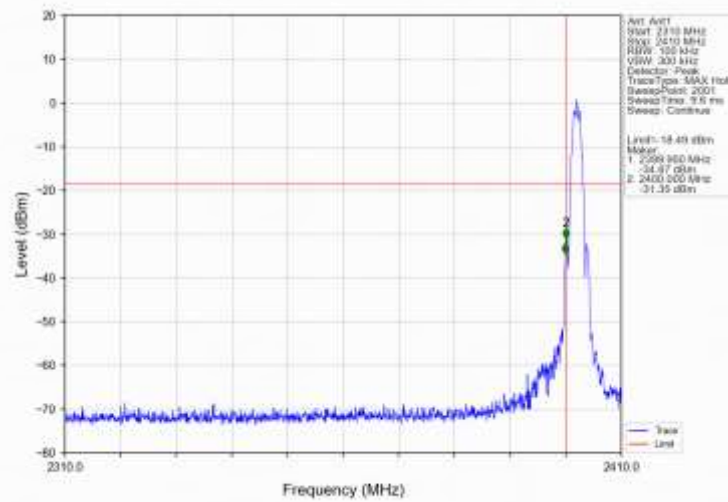
1M_HCH_2480MHz_Ant1_NTNV



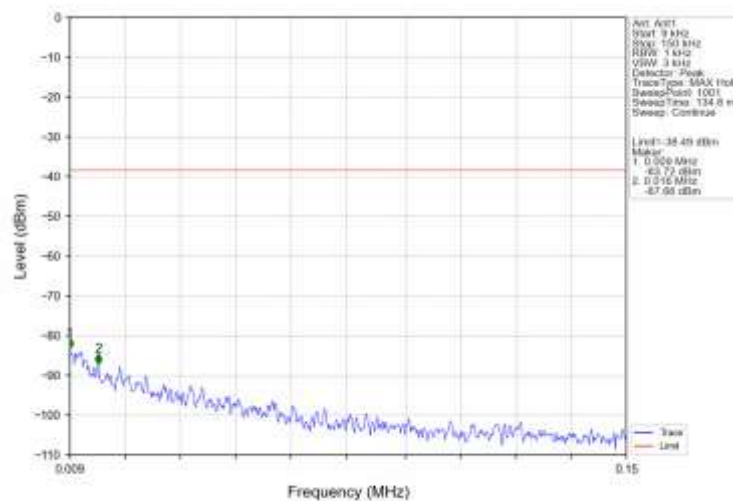
1M_HCH_2480MHz_Ant1_NTNV



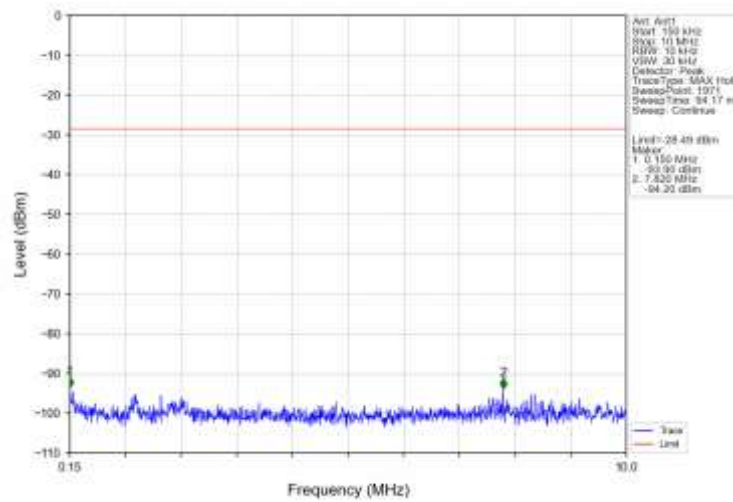
2M_LCH_2402MHz_Ant1_NTNV



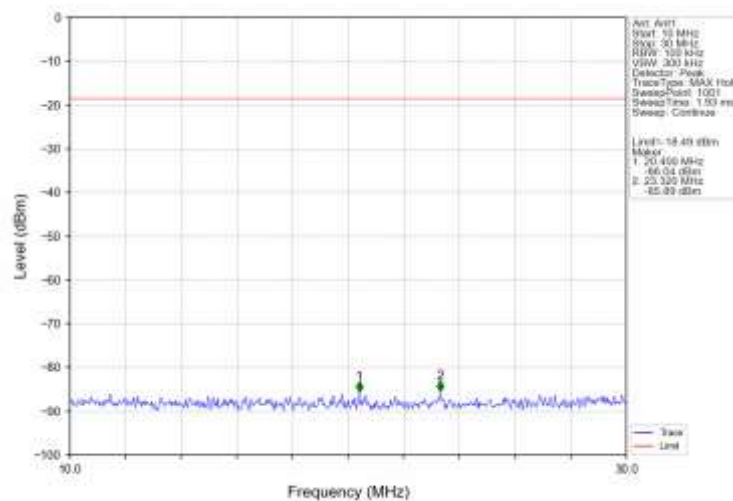
2M_LCH_2402MHz_Ant1_NTNV



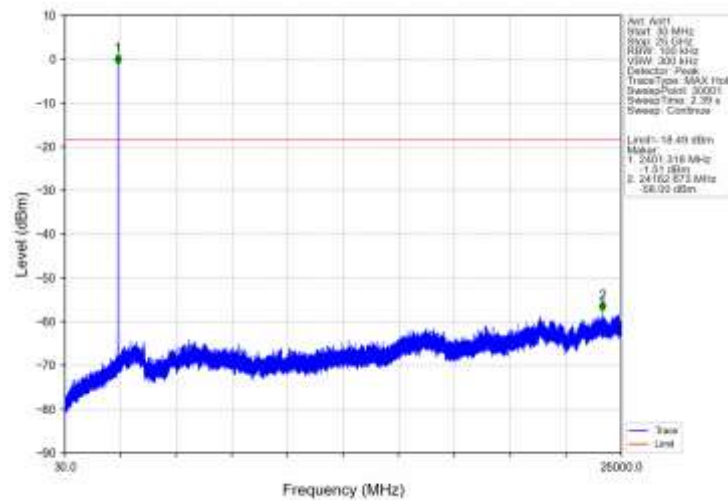
2M_LCH_2402MHz_Ant1_NTNV



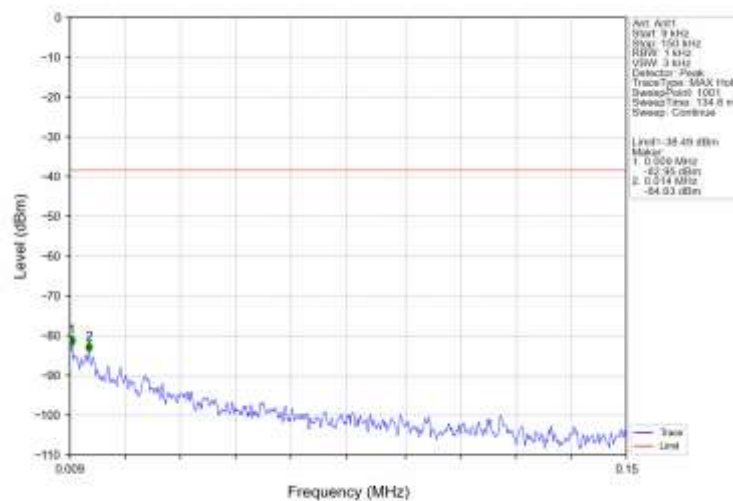
2M_LCH_2402MHz_Ant1_NTNV



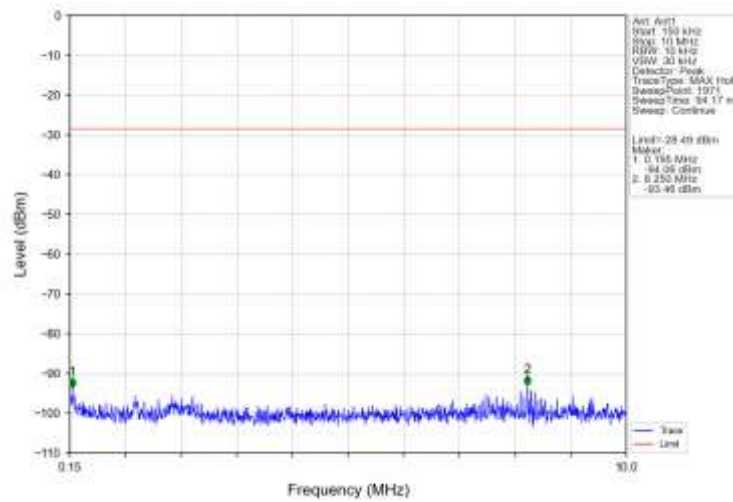
2M_LCH_2402MHz_Ant1_NTNV



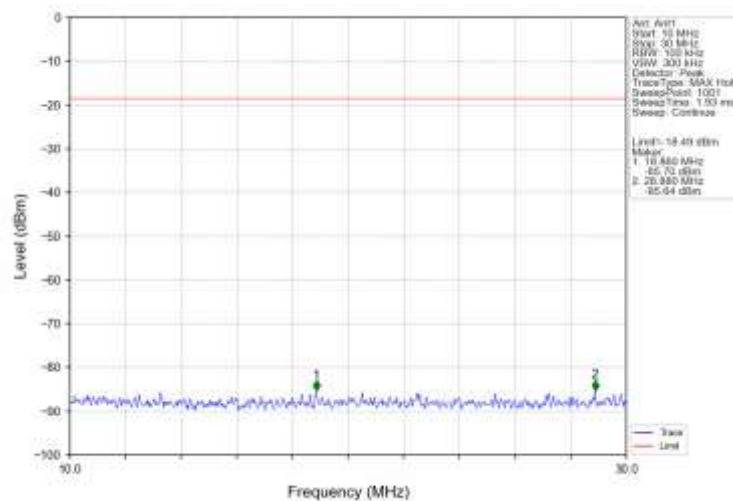
2M_MCH_2440MHz_Ant1_NTNV



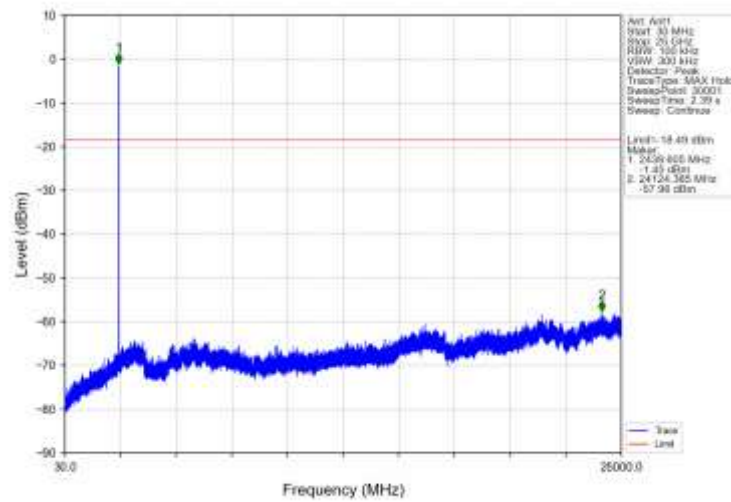
2M_MCH_2440MHz_Ant1_NTNV



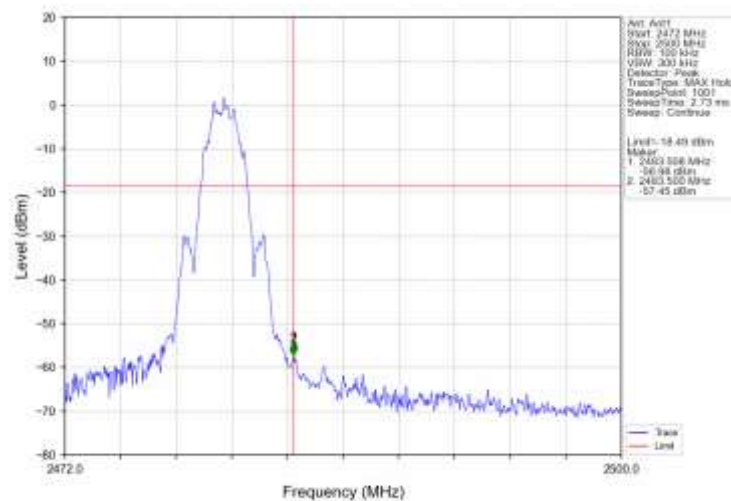
2M_MCH_2440MHz_Ant1_NTNV



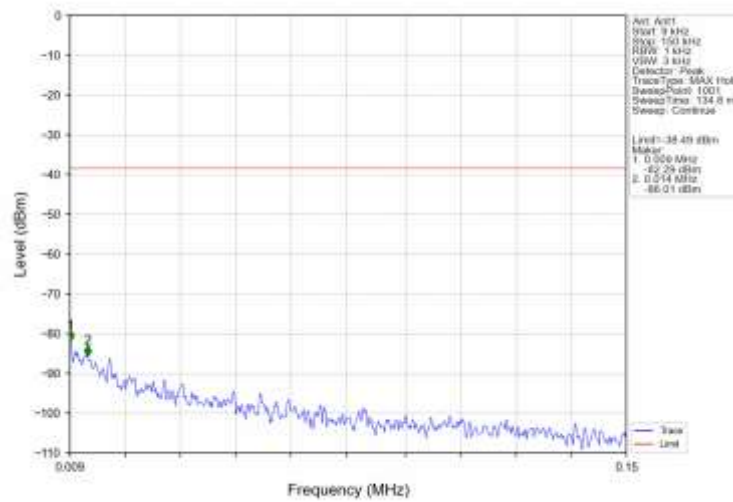
2M_MCH_2440MHz_Ant1_NTNV



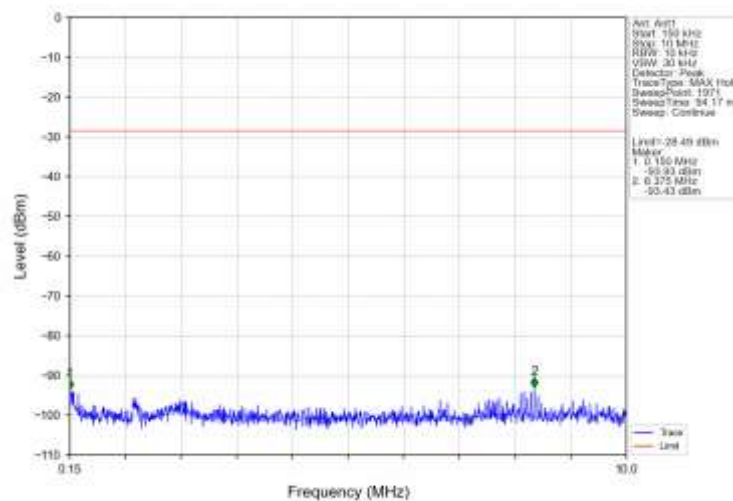
2M_HCH_2480MHz_Ant1_NTNV



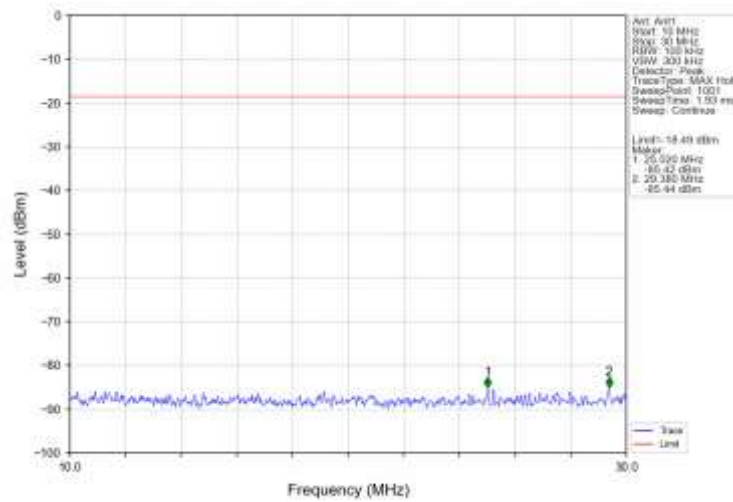
2M_HCH_2480MHz_Ant1_NTNV



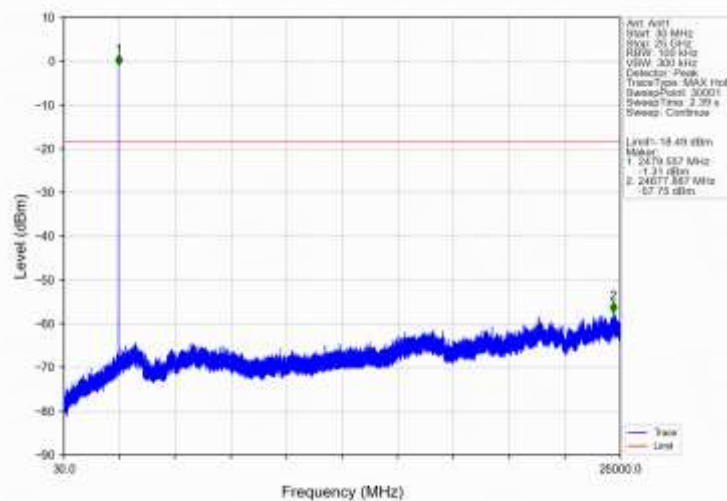
2M_HCH_2480MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



2M_HCH_2480MHz_Ant1_NTNV



6. Form731

6.1 Test Result

6.1.1 Form731

Lower Freq (MHz)	High Freq (MHz)	MAX Power (W)	MAX Power (dBm)
2402	2480	0.0018	2.44

USM2:

1. Duty Cycle

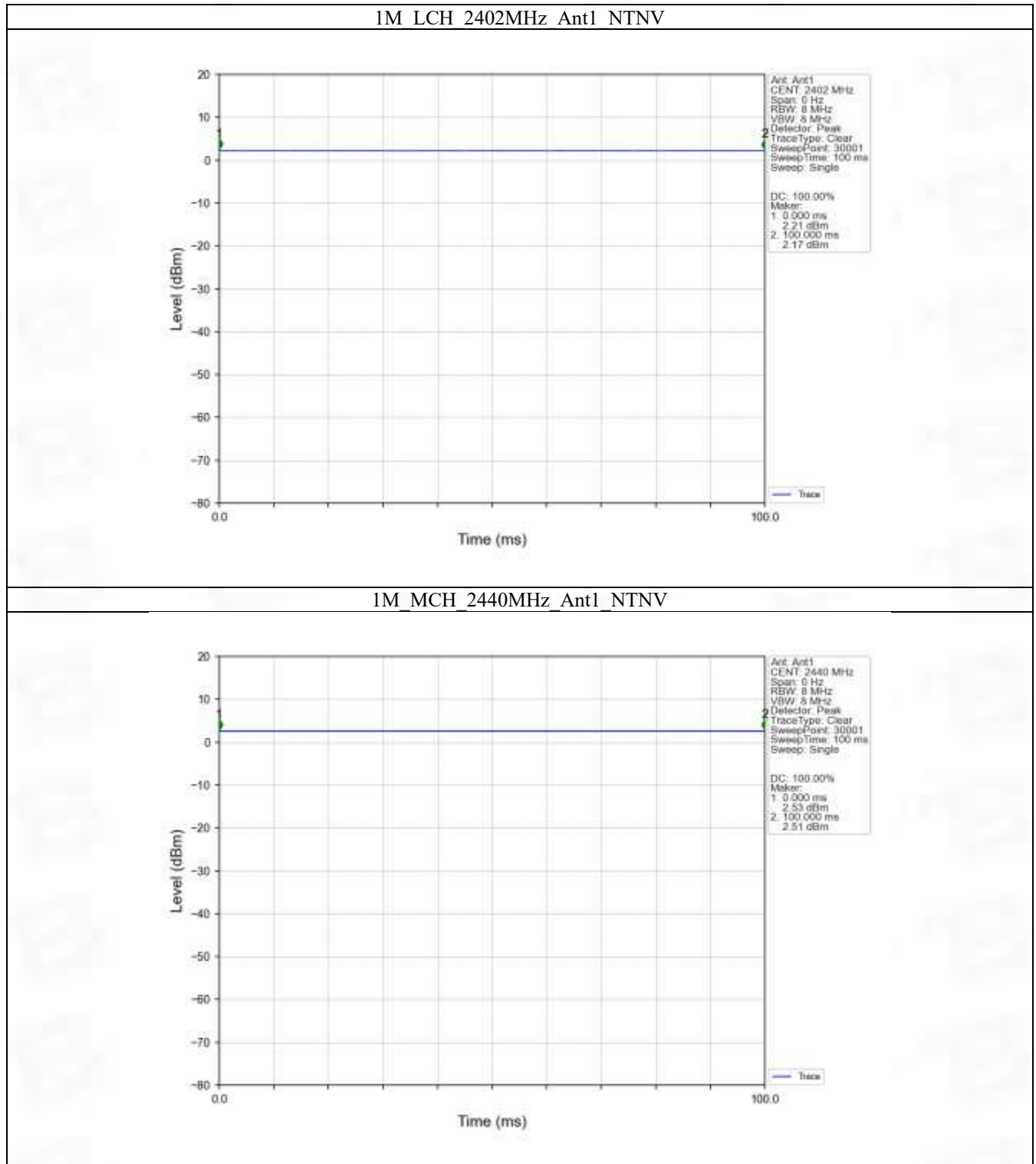
1.1 Test Result

1.1.1 Ant1

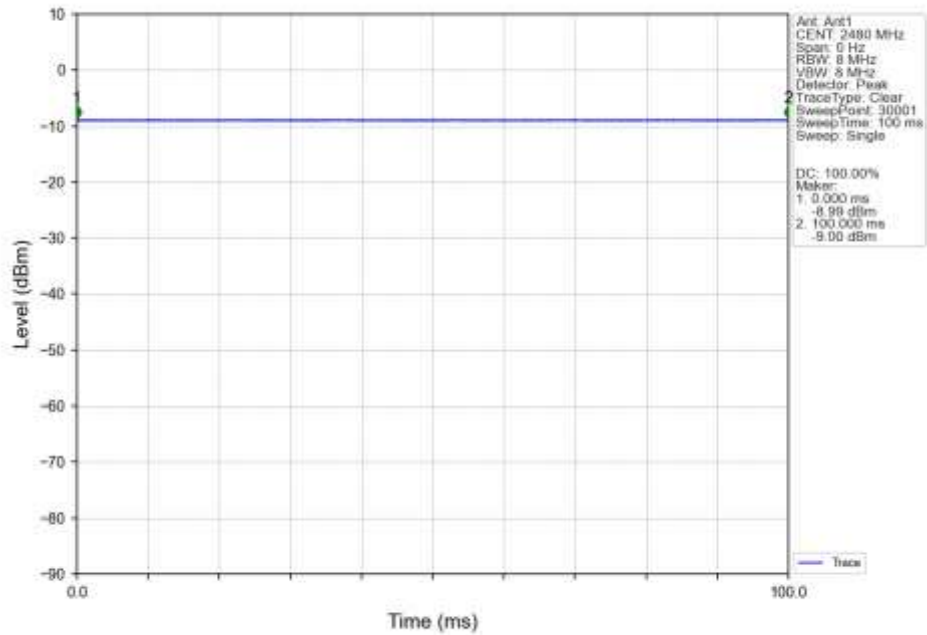
Ant1							
Mode	TX Type	Frequency (MHz)	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)	Max. DC Variation (%)
1M	SISO	2402	100.000	100.000	100.00	0.00	0.00
		2440	100.000	100.000	100.00	0.00	0.00
		2480	100.000	100.000	100.00	0.00	0.00
2M	SISO	2402	100.000	100.000	100.00	0.00	0.00
		2440	100.000	100.000	100.00	0.00	0.00
		2480	100.000	100.000	100.00	0.00	0.00

1.2 Test Graph

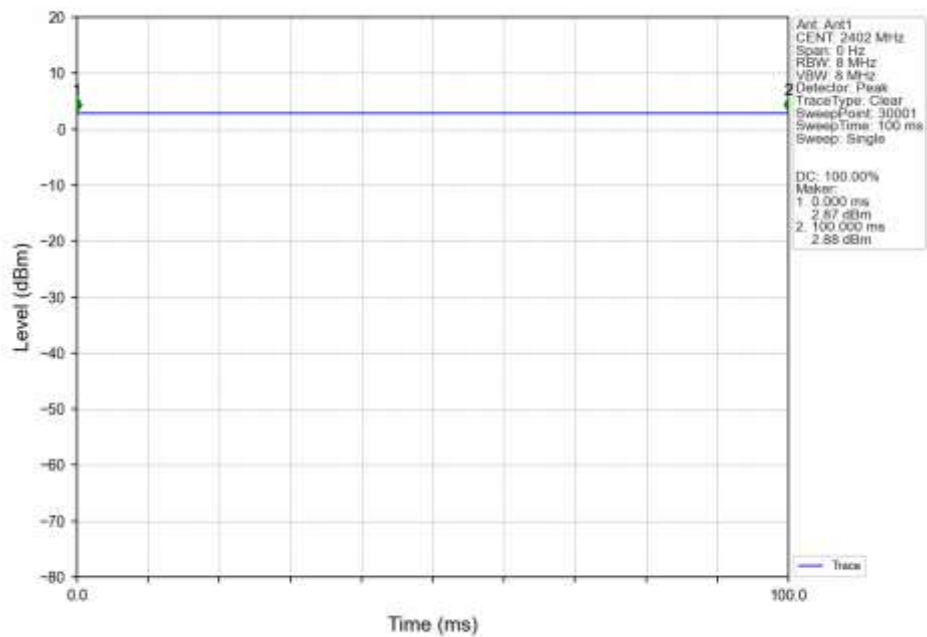
1.2.1 Ant1



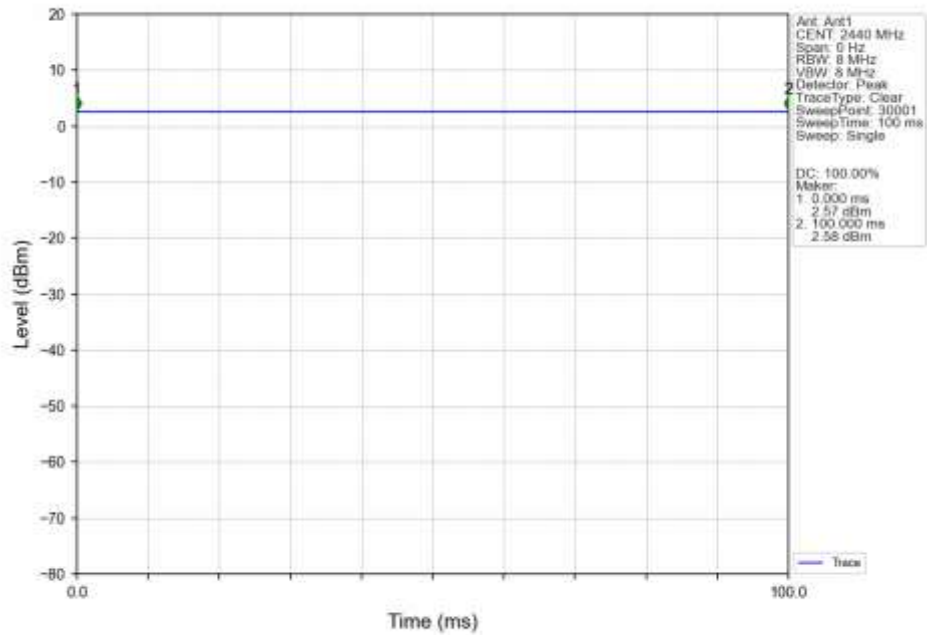
1M HCH 2480MHz Ant1 NTV



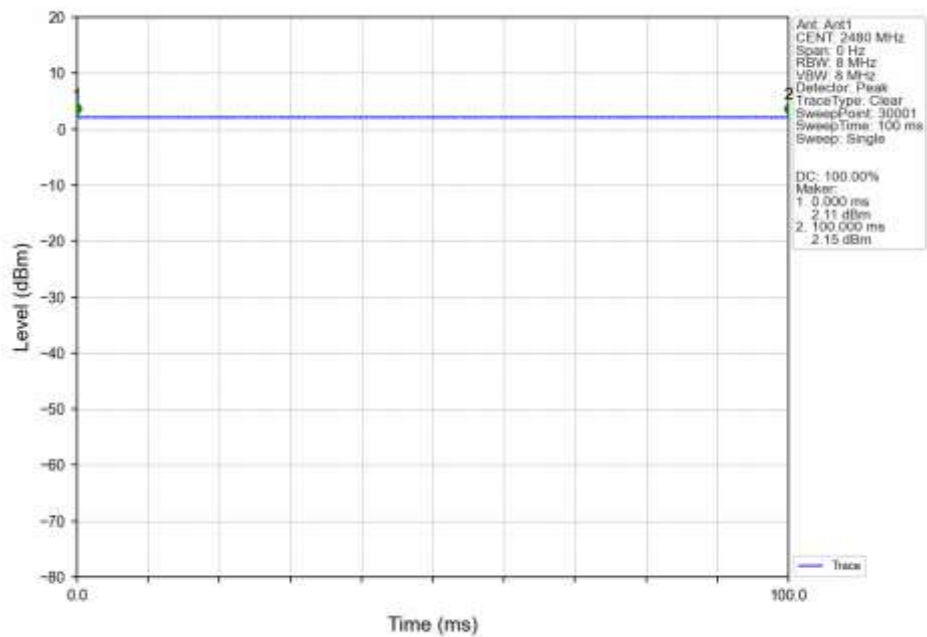
2M LCH 2402MHz Ant1 NTV



2M MCH 2440MHz Ant1 NTV



2M HCH 2480MHz Ant1 NTV



2. Bandwidth

2.1 Test Result

2.1.1 OBW

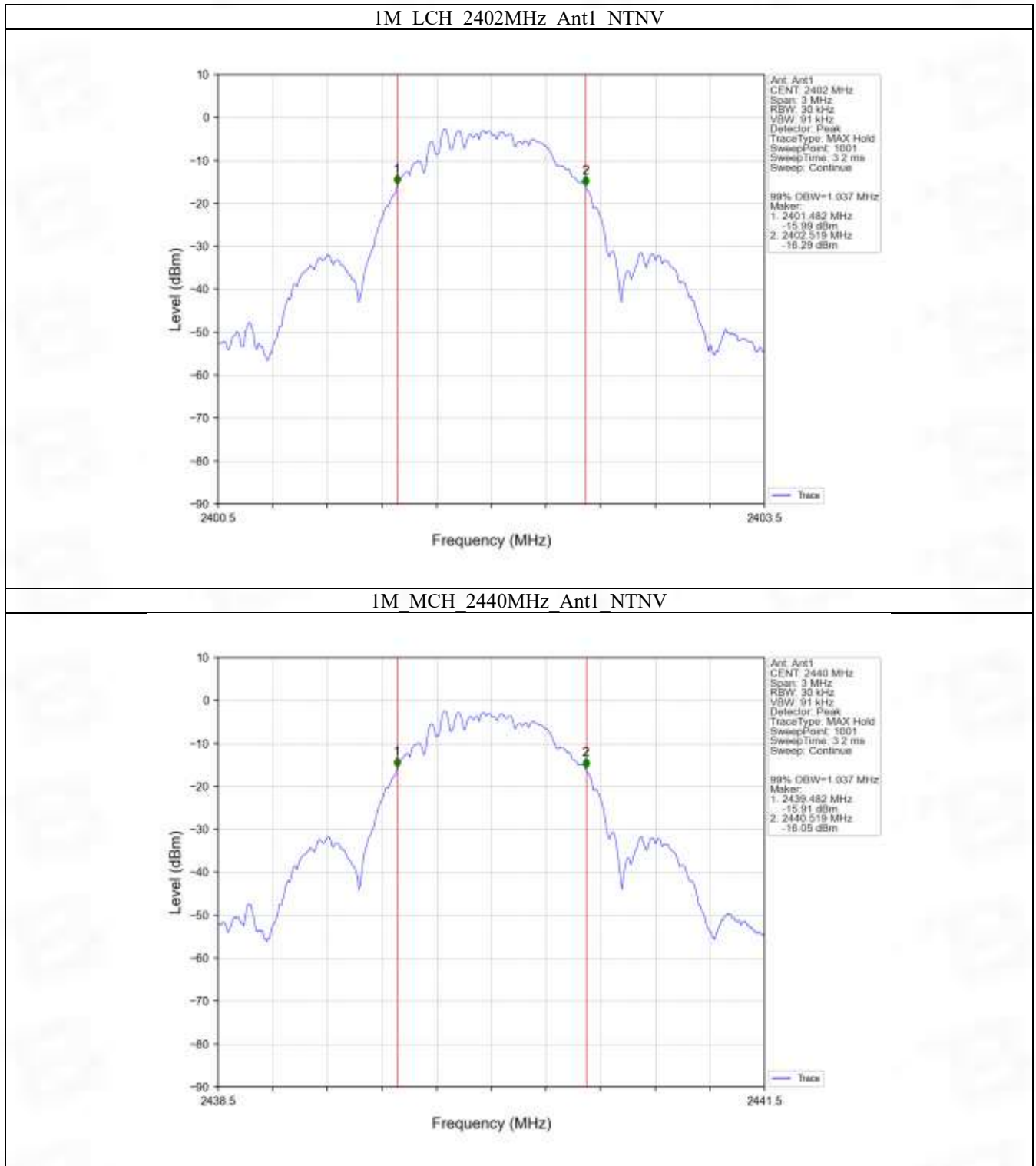
Mode	TX Type	Frequency (MHz)	ANT	99% Occupied Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	1.037	/	Pass
		2440	1	1.037	/	Pass
		2480	1	1.041	/	Pass
2M	SISO	2402	1	2.067	/	Pass
		2440	1	2.070	/	Pass
		2480	1	2.077	/	Pass

2.1.2 6dB BW

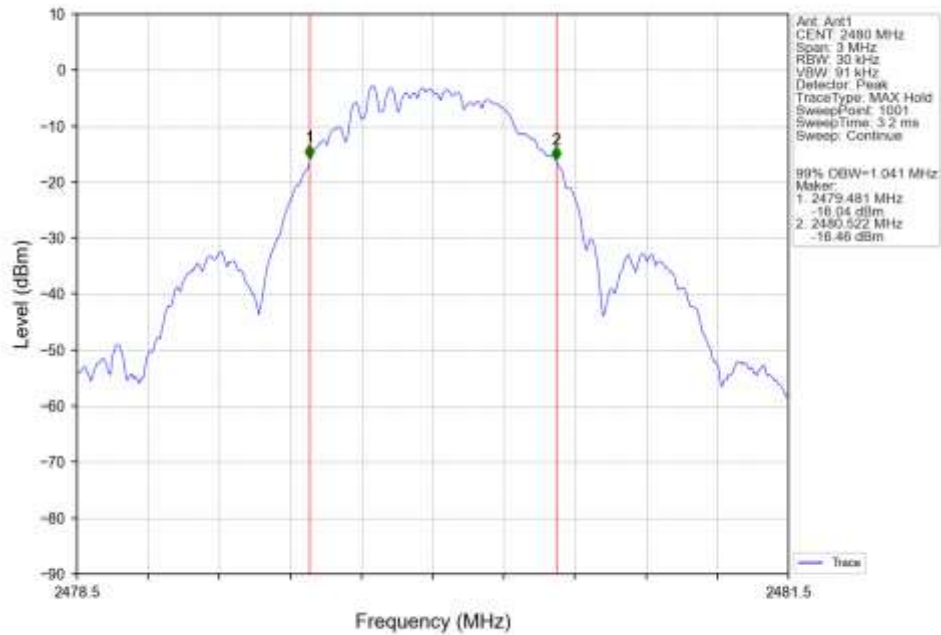
Mode	TX Type	Frequency (MHz)	ANT	6dB Bandwidth (MHz)		Verdict
				Result	Limit	
1M	SISO	2402	1	0.715	≥ 0.5	Pass
		2440	1	0.715	≥ 0.5	Pass
		2480	1	0.720	≥ 0.5	Pass
2M	SISO	2402	1	1.383	≥ 0.5	Pass
		2440	1	1.385	≥ 0.5	Pass
		2480	1	1.388	≥ 0.5	Pass

2.2 Test Graph

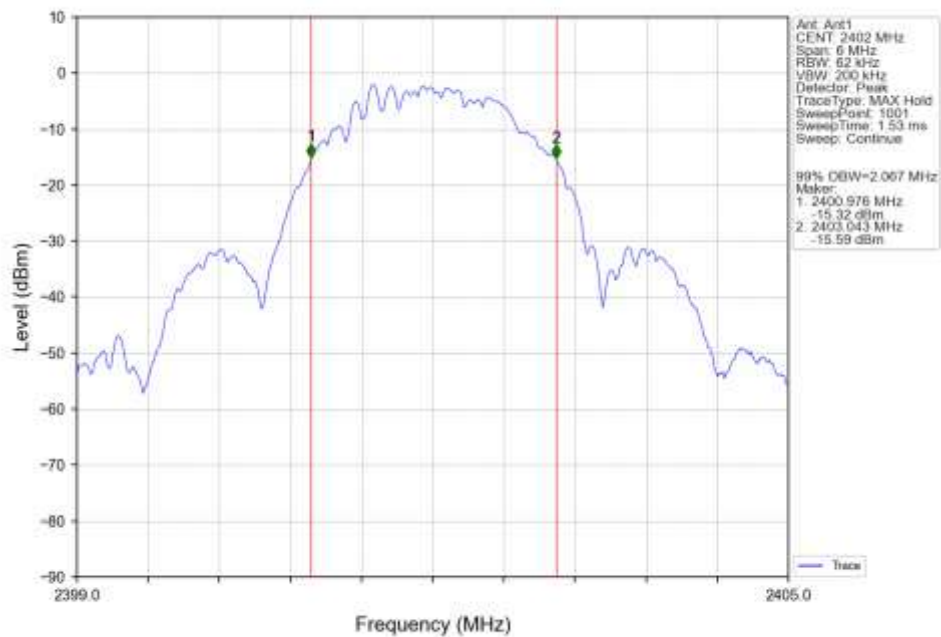
2.2.1 OBW



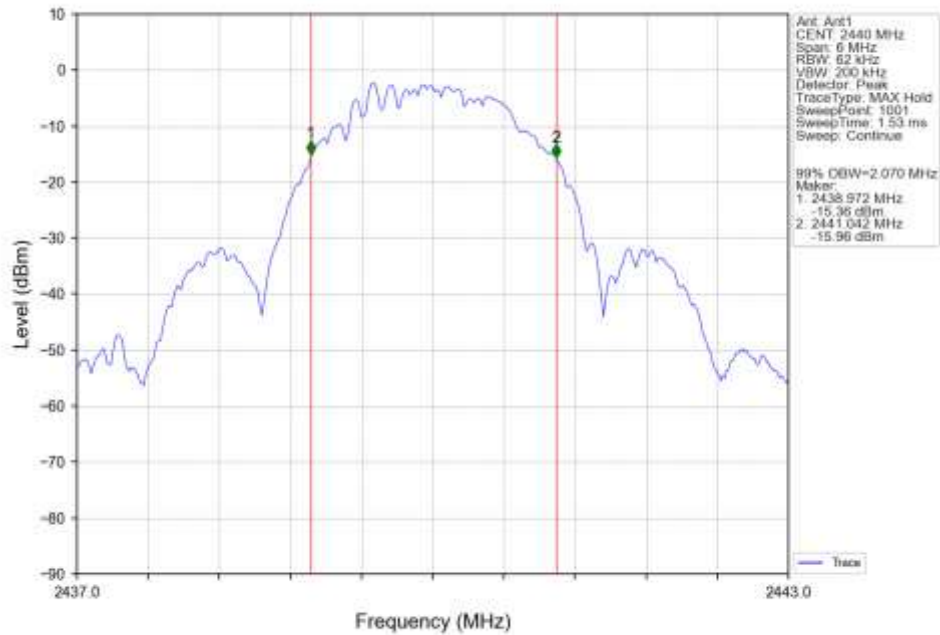
1M HCH 2480MHz Ant1 NTV



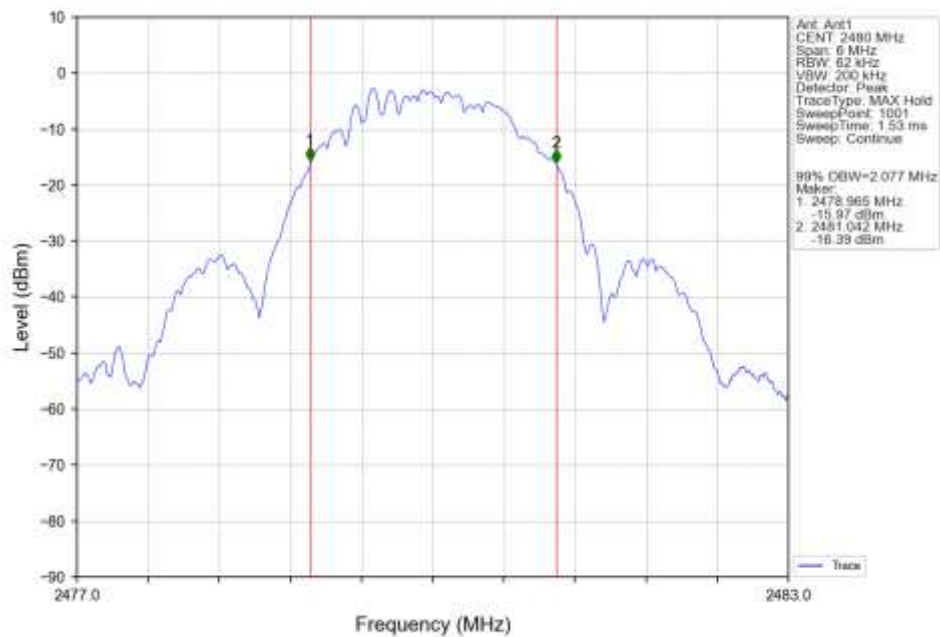
2M LCH 2402MHz Ant1 NTV



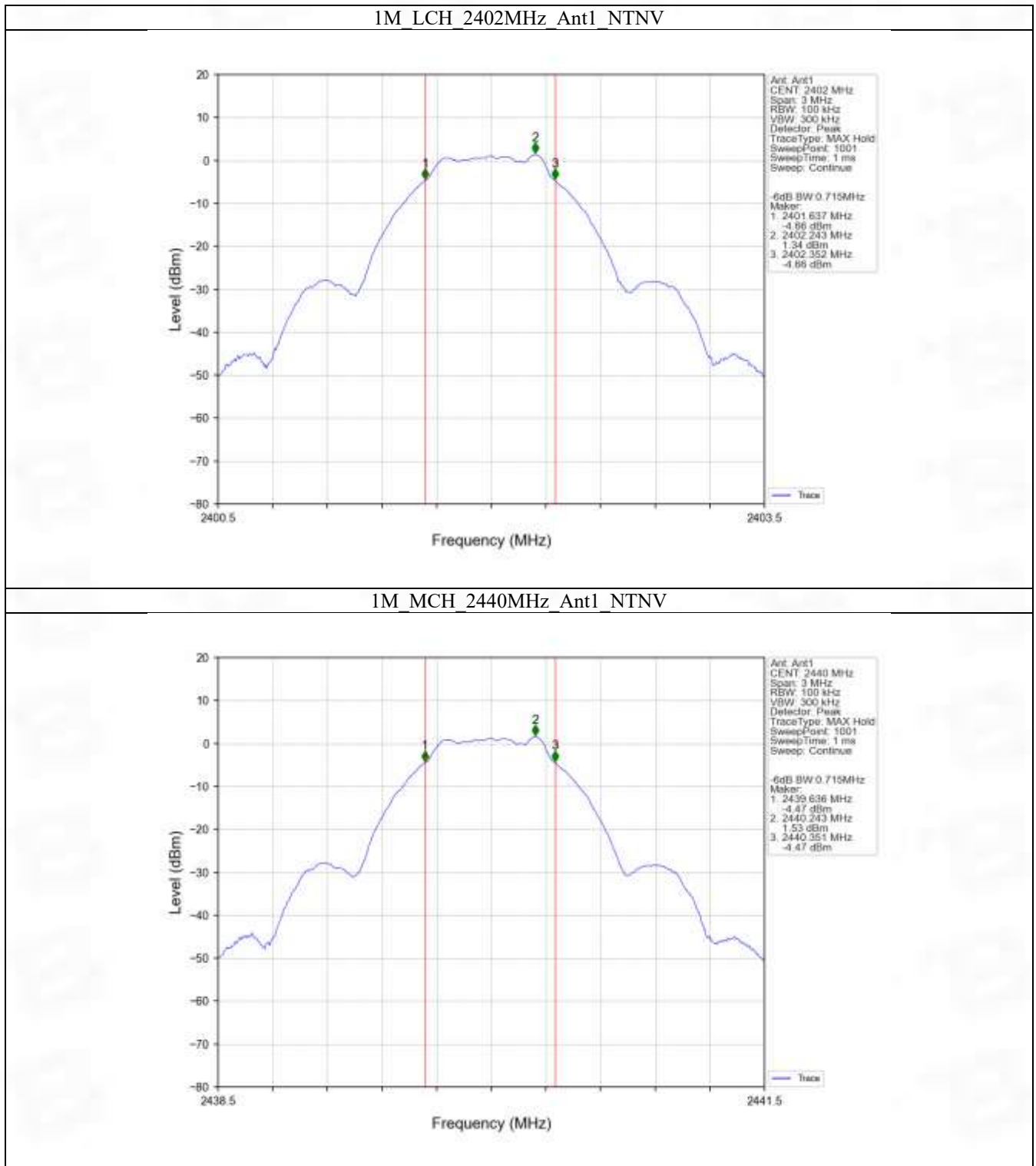
2M MCH 2440MHz Ant1 NTNV



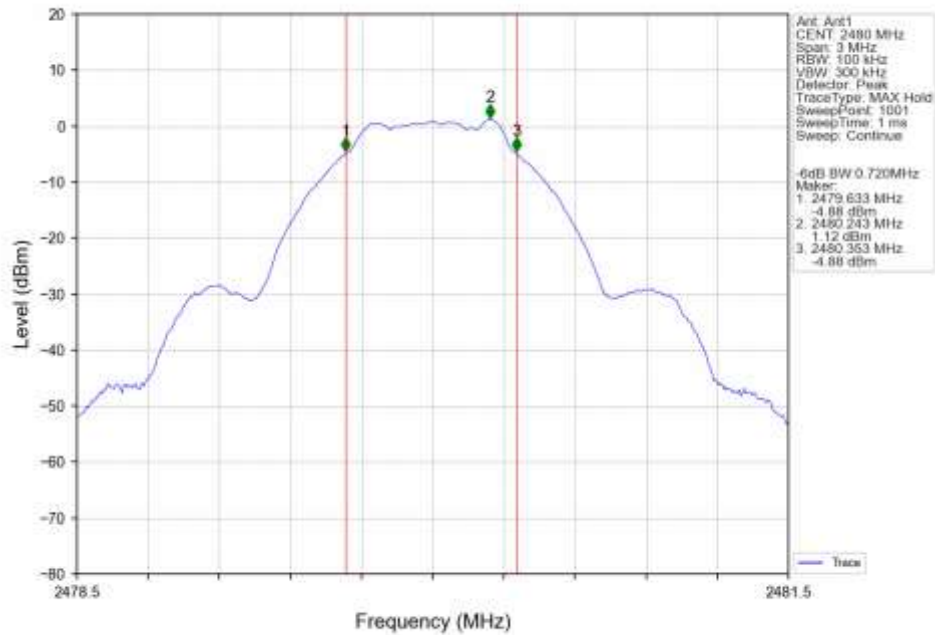
2M HCH 2480MHz Ant1 NTNV



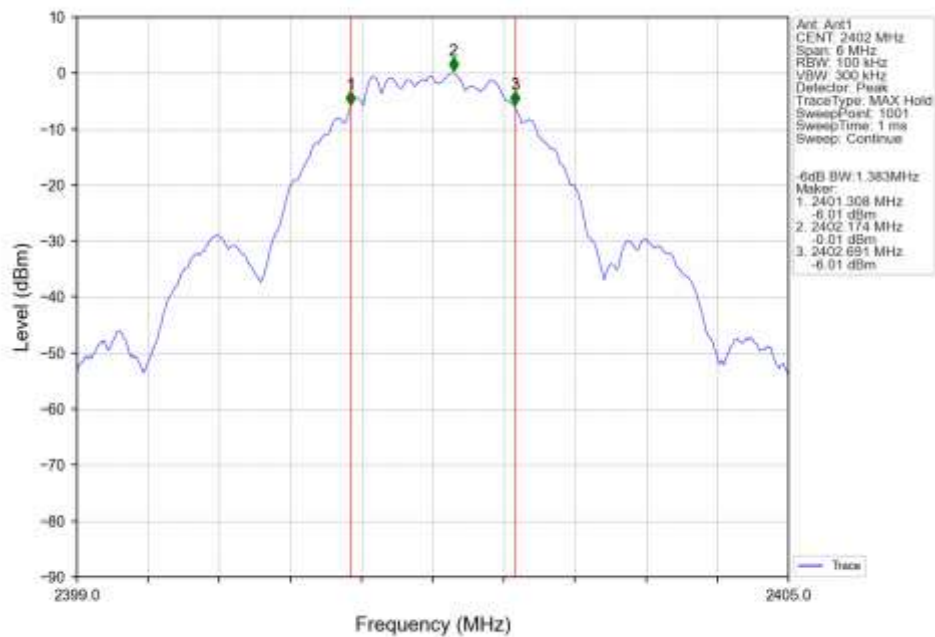
2.2.2 6dB BW



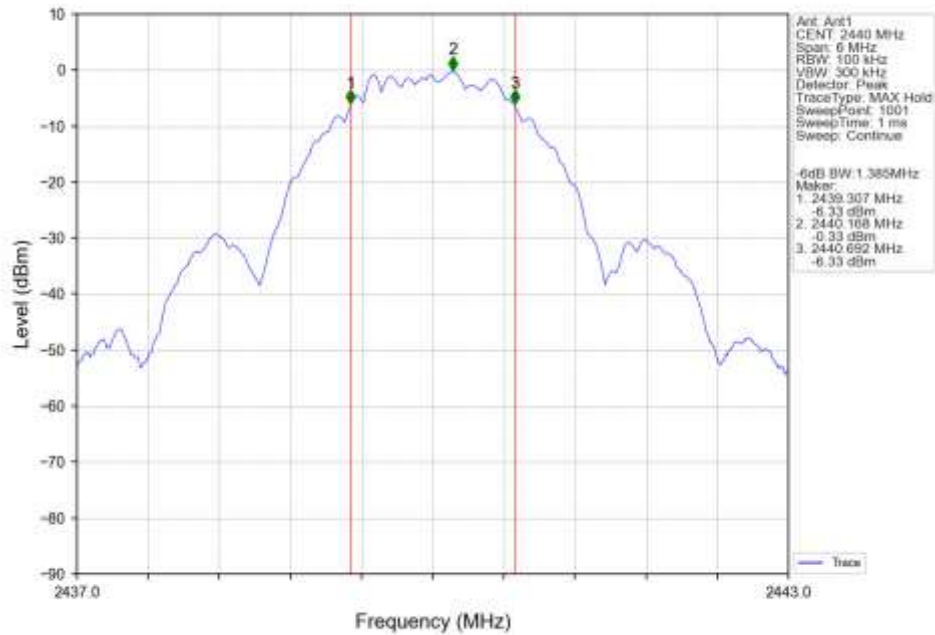
1M HCH 2480MHz Ant1 NTV



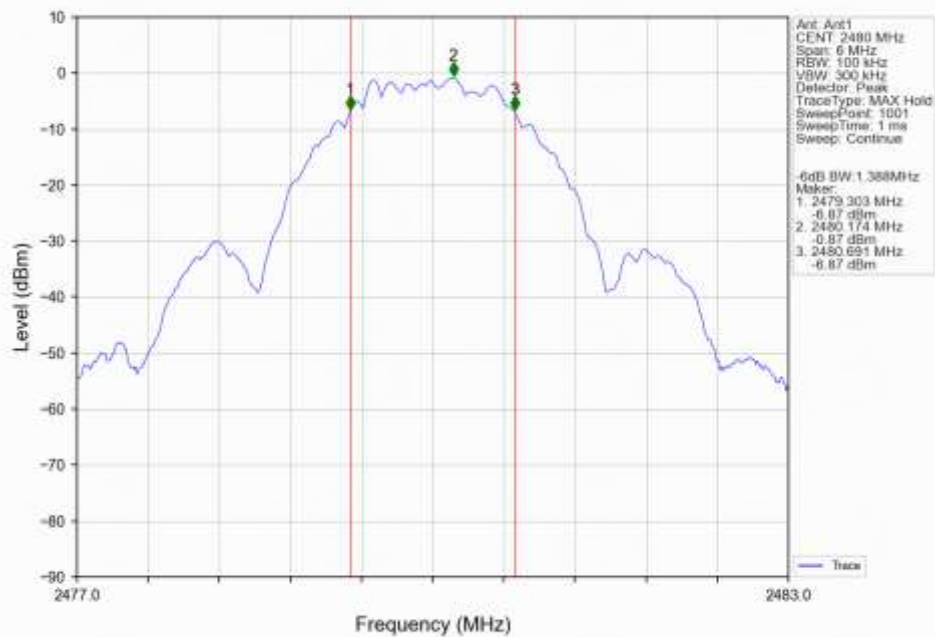
2M LCH 2402MHz Ant1 NTV



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 Average Conducted Output Power (dBm)		Verdict
			ANT1	Limit	
1M	SISO	2402	2.06	≤ 30	Pass
		2440	2.24	≤ 30	Pass
		2480	1.84	≤ 30	Pass
2M	SISO	2402	2.60	≤ 30	Pass
		2440	2.35	≤ 30	Pass
		2480	1.83	≤ 30	Pass

Note1: Antenna Gain: Ant1: 3.00dBi;

4. Maximum Power Spectral Density

4.1 Test Result

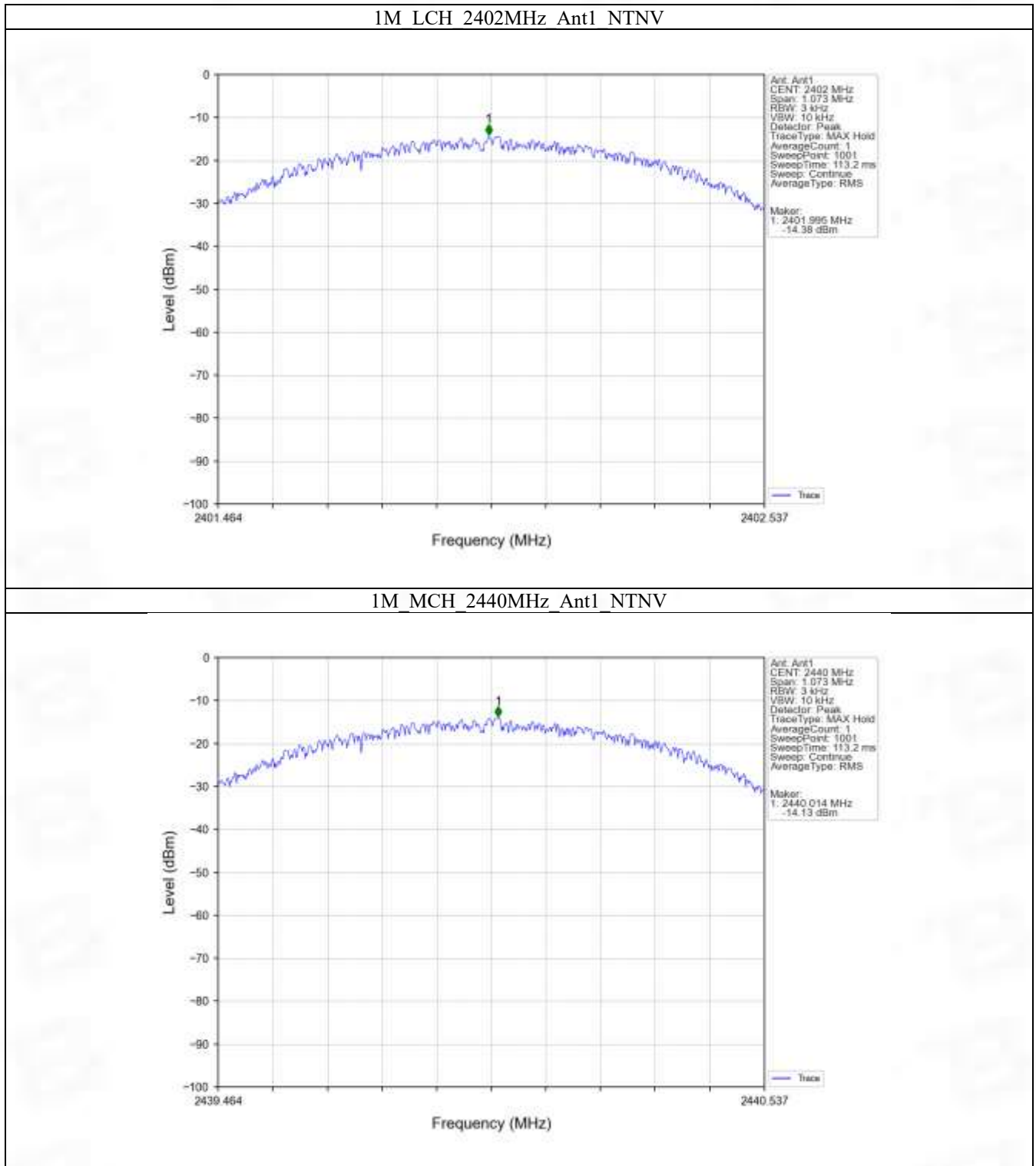
4.1.1 PSD

Mode	TX Type	Frequency (MHz)	Maximum PSD (dBm/3kHz)		Verdict
			ANT1	Limit	
1M	SISO	2402	-14.38	≤ 8	Pass
		2440	-14.13	≤ 8	Pass
		2480	-14.51	≤ 8	Pass
2M	SISO	2402	-19.37	≤ 8	Pass
		2440	-19.61	≤ 8	Pass
		2480	-20.29	≤ 8	Pass

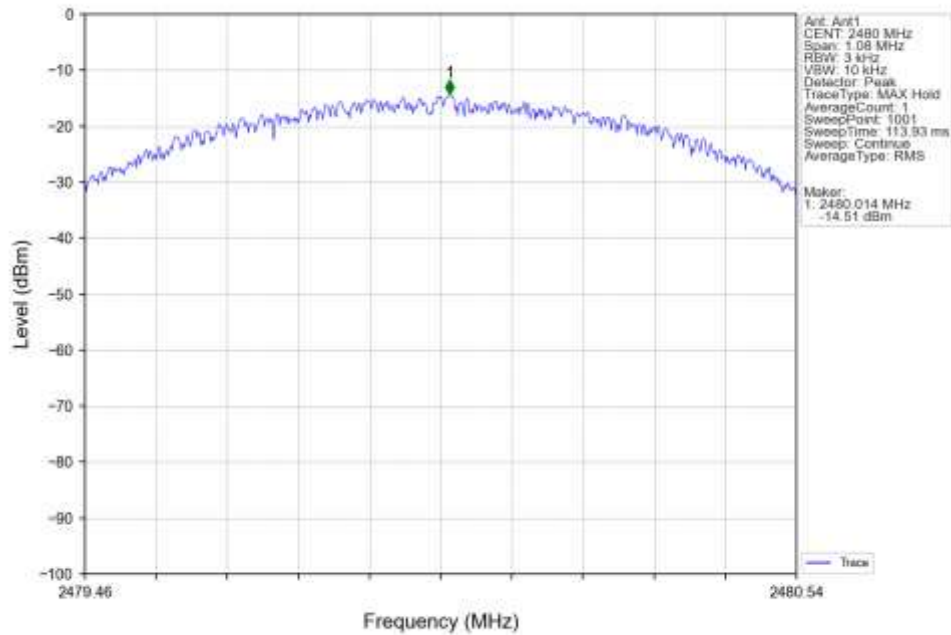
Note1: Antenna Gain: Ant1: 3.00dBi;

4.2 Test Graph

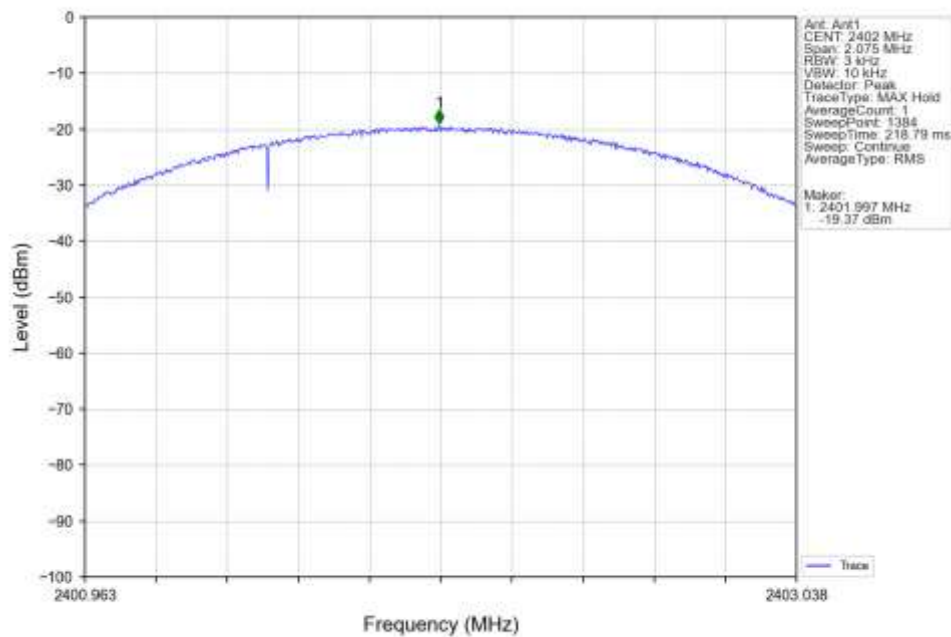
4.2.1 PSD



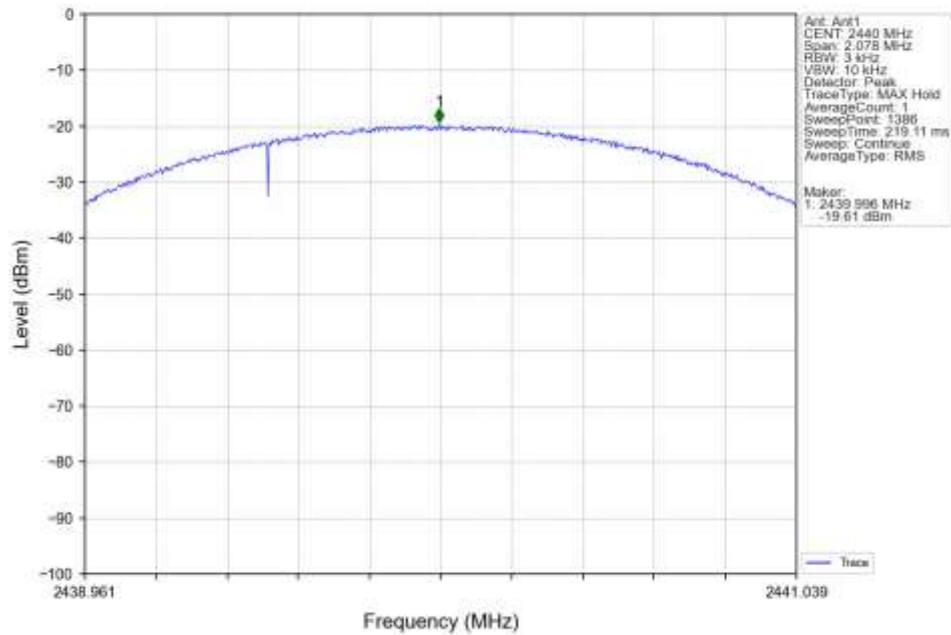
1M HCH 2480MHz Ant1 NTV



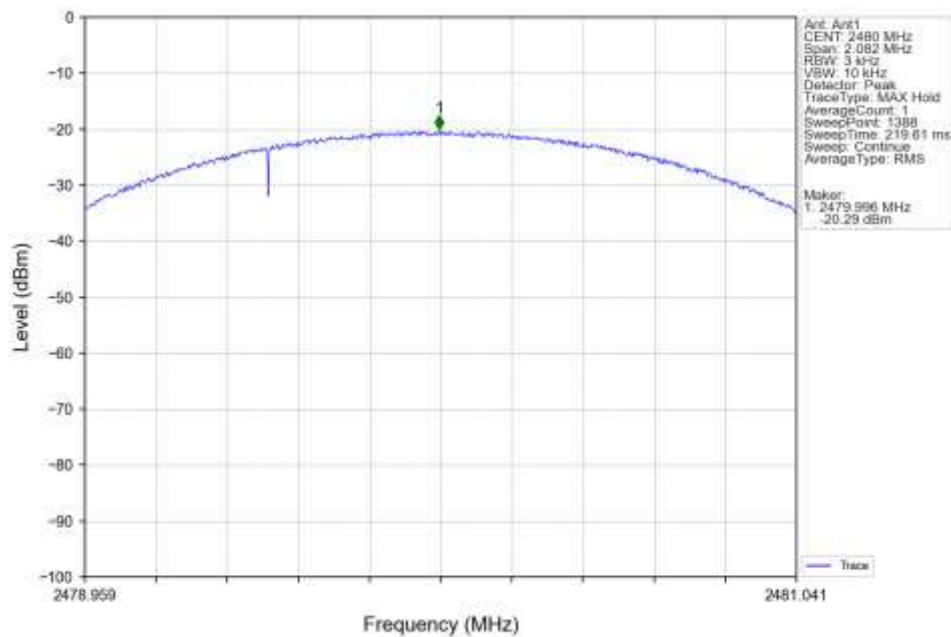
2M LCH 2402MHz Ant1 NTV



2M MCH 2440MHz Ant1 NTV



2M HCH 2480MHz Ant1 NTV



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	1.33
		2440	1	1.51
		2480	1	1.10
2M	SISO	2402	1	-0.35
		2440	1	-0.64
		2480	1	-1.20

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.

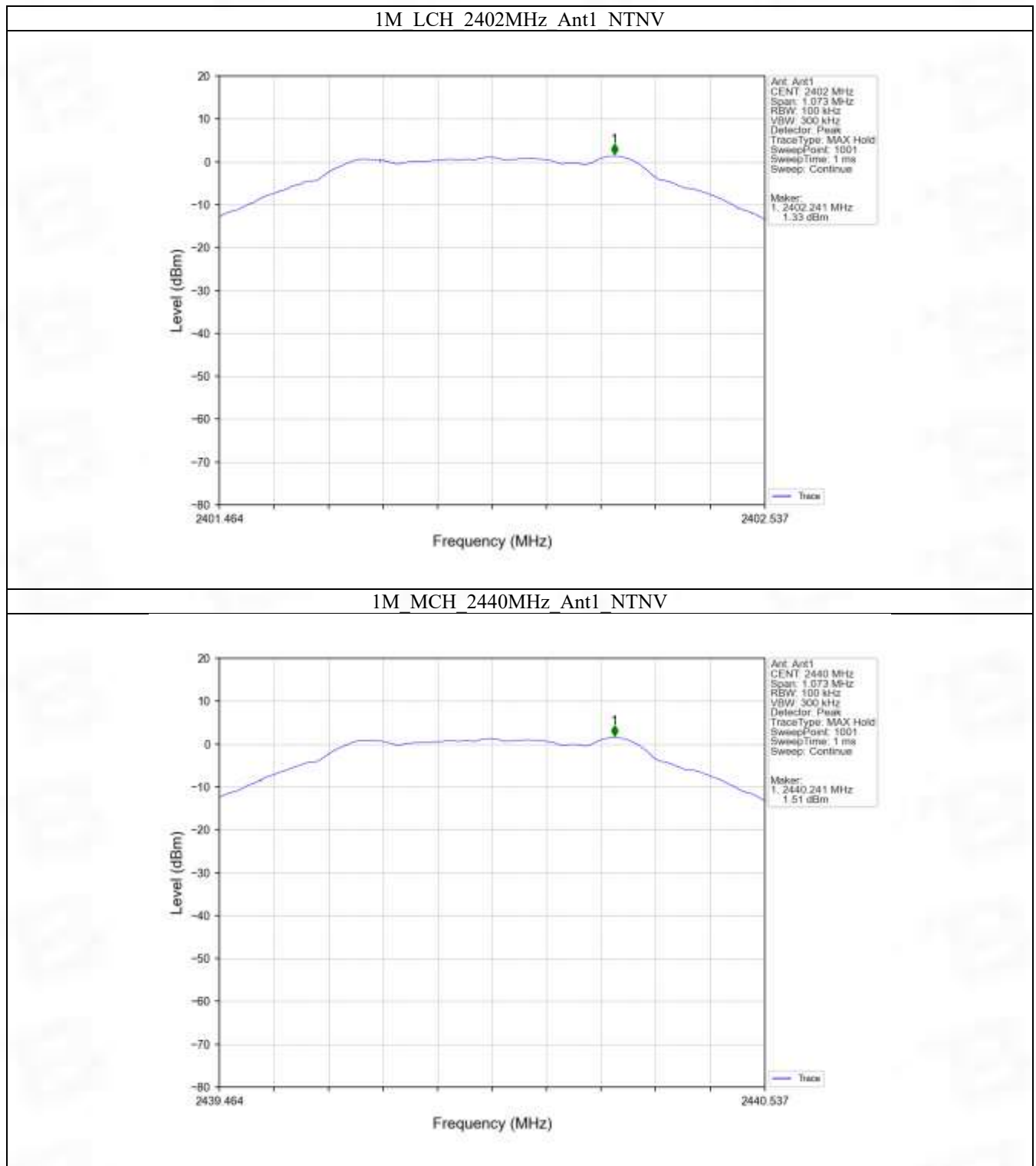
5.1.2 CSE

Mode	TX Type	Frequency (MHz)	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
1M	SISO	2402	1	1.33	-28.67	Pass
		2440	1	1.51	-28.49	Pass
		2480	1	1.10	-28.90	Pass
2M	SISO	2402	1	-0.35	-30.35	Pass
		2440	1	-0.64	-30.64	Pass
		2480	1	-1.20	-31.20	Pass

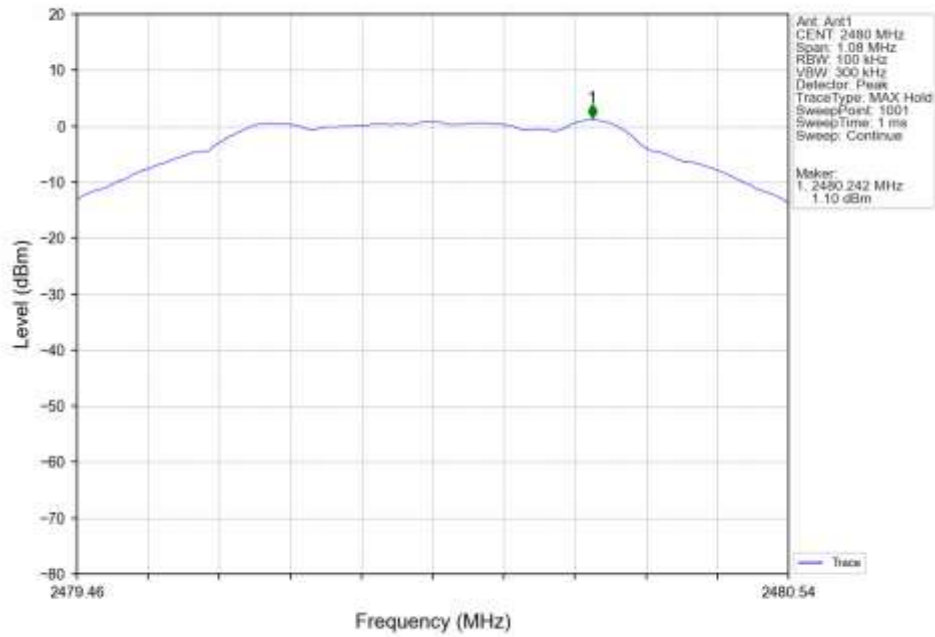
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2020, the channel contains the maximum PSD level was used to establish the reference level.

5.2 Test Graph

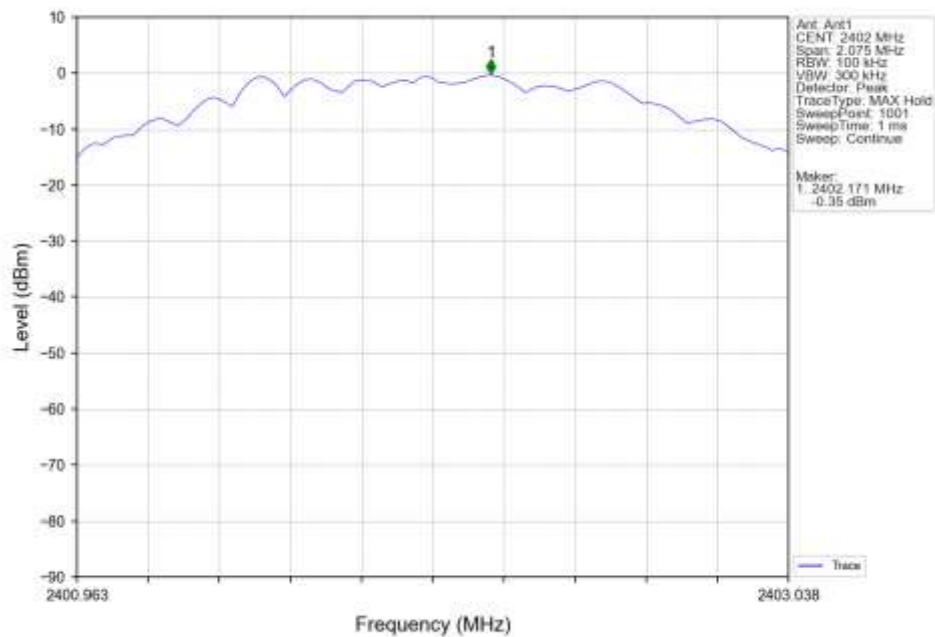
5.2.1 Ref



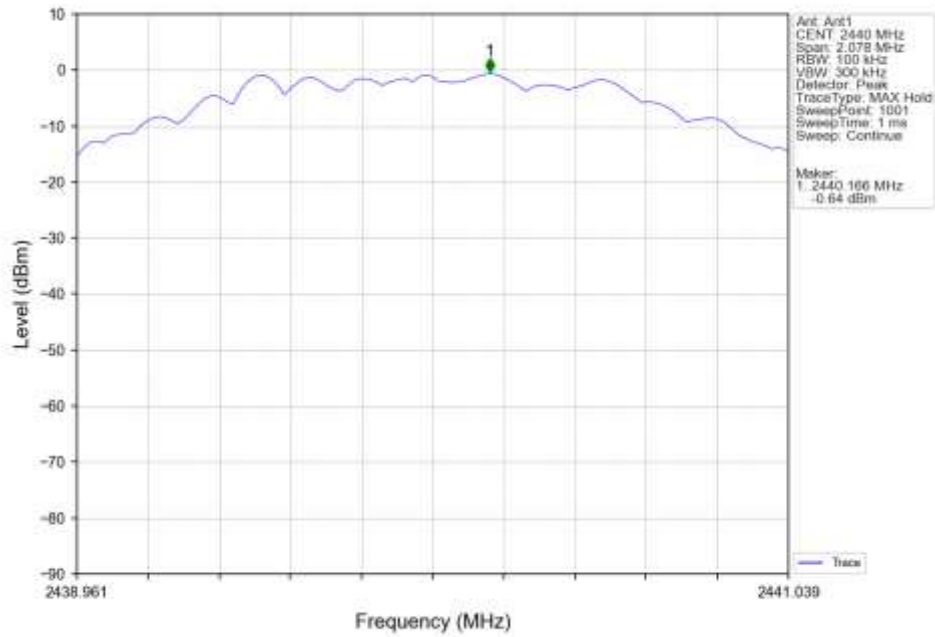
1M HCH 2480MHz Ant1 NTV



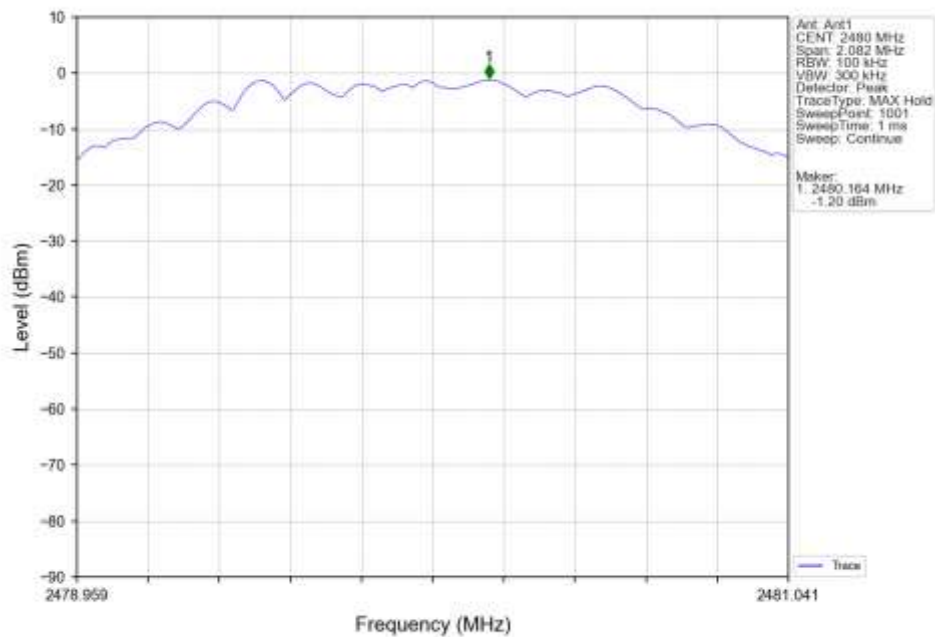
2M LCH 2402MHz Ant1 NTV



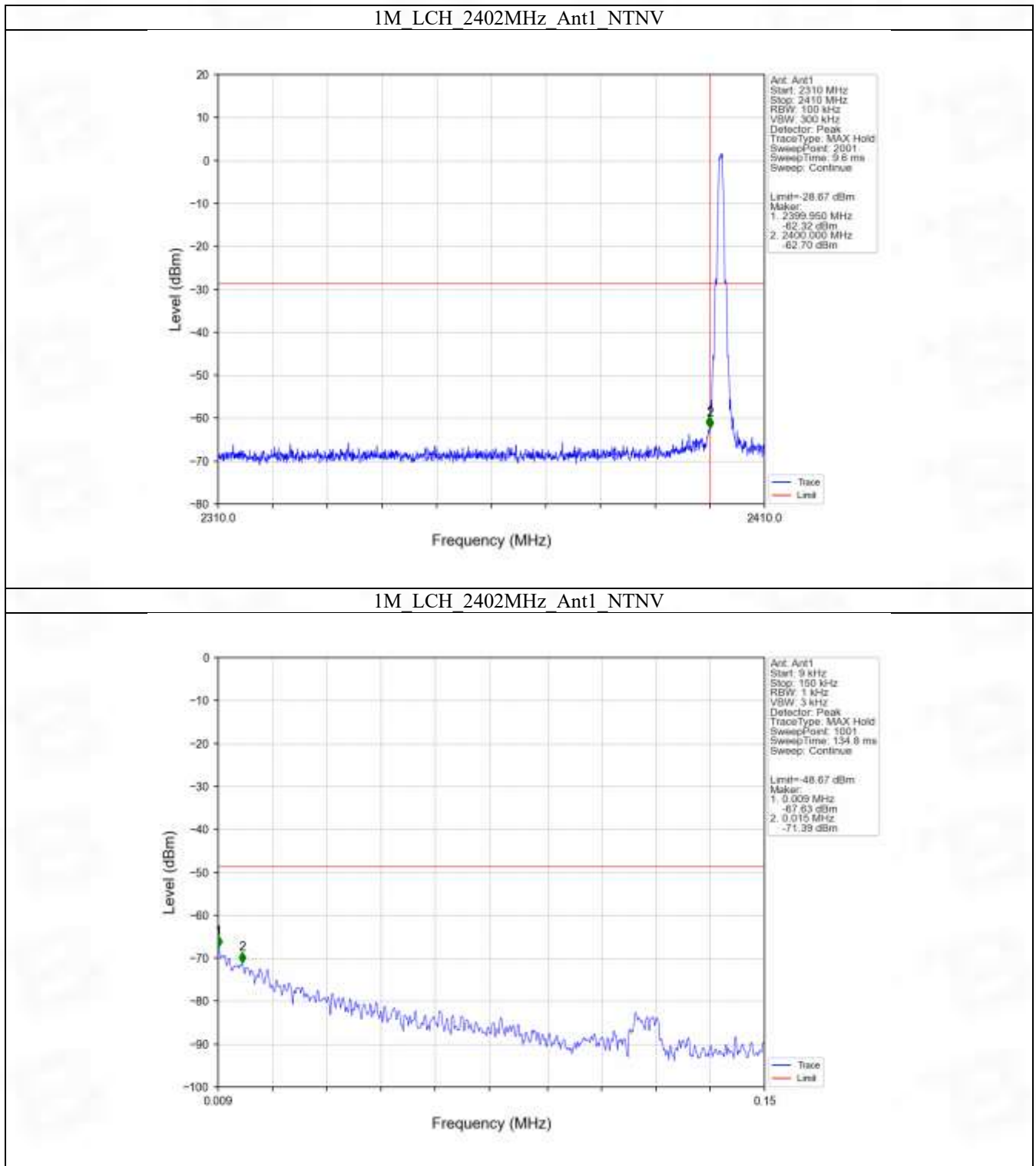
2M MCH 2440MHz Ant1 NTV



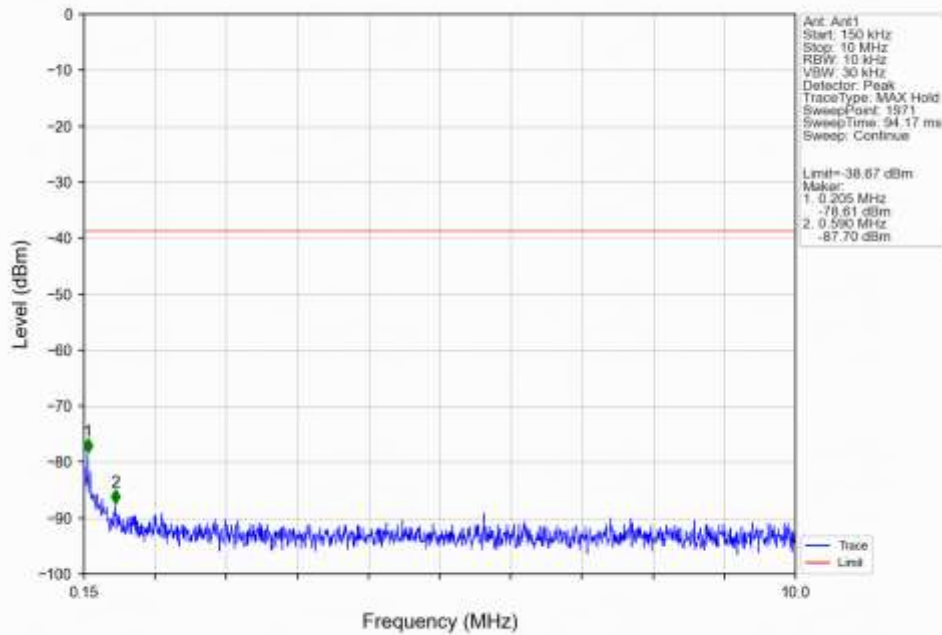
2M HCH 2480MHz Ant1 NTV



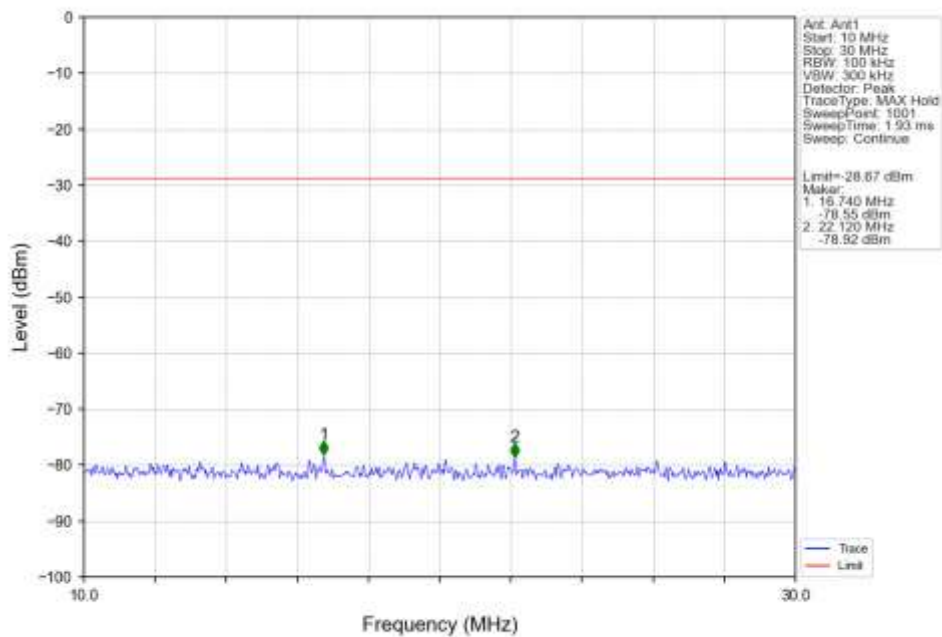
5.2.2 CSE



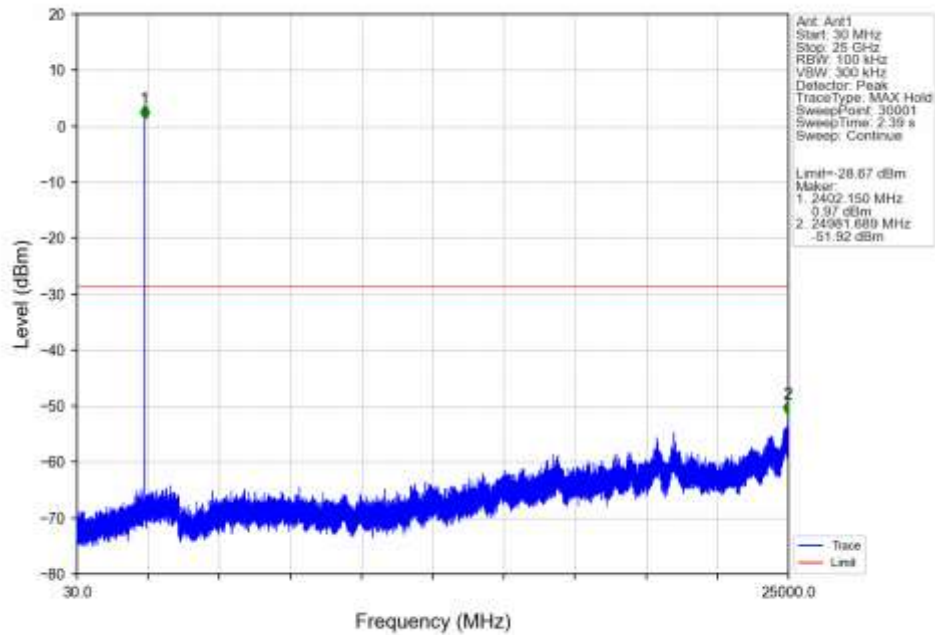
1M LCH 2402MHz Ant1 NTV



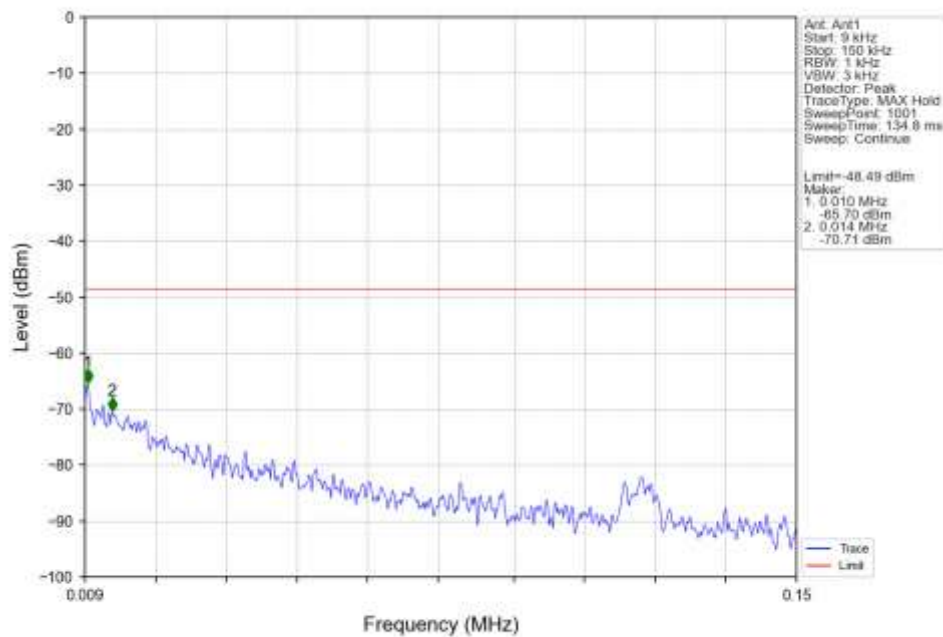
1M LCH 2402MHz Ant1 NTV



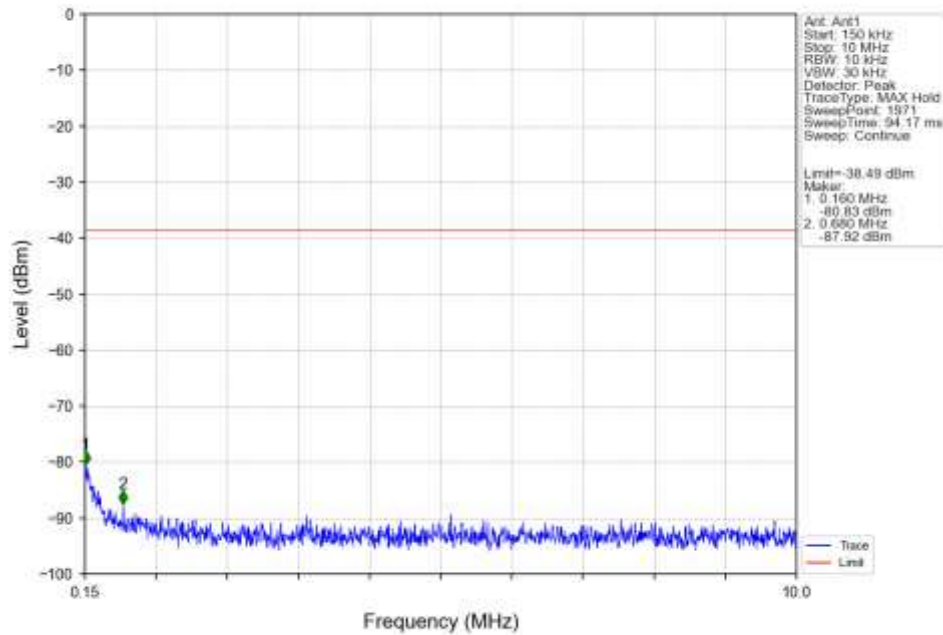
1M LCH 2402MHz Ant1 NTNV



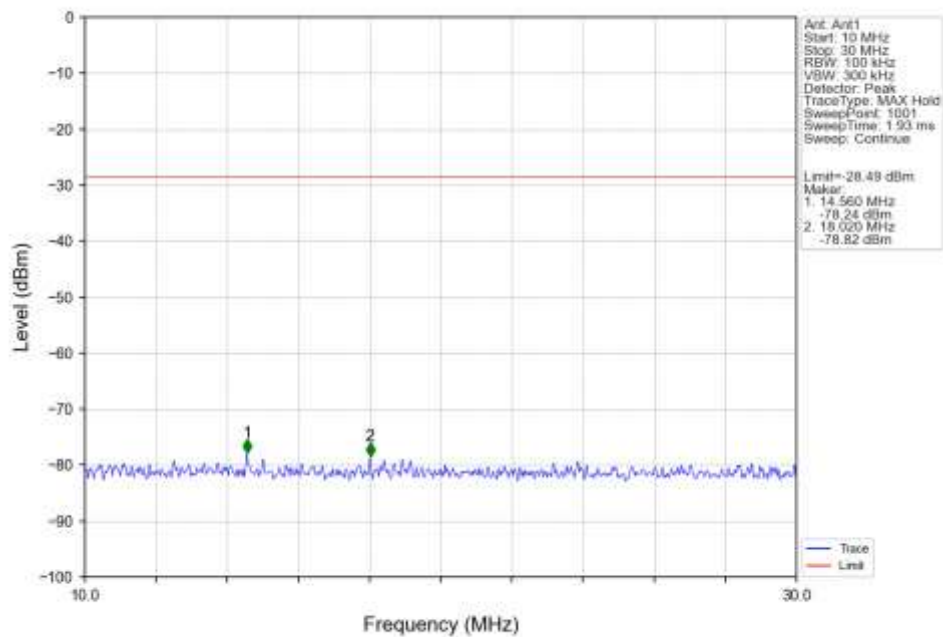
1M MCH 2440MHz Ant1 NTNV



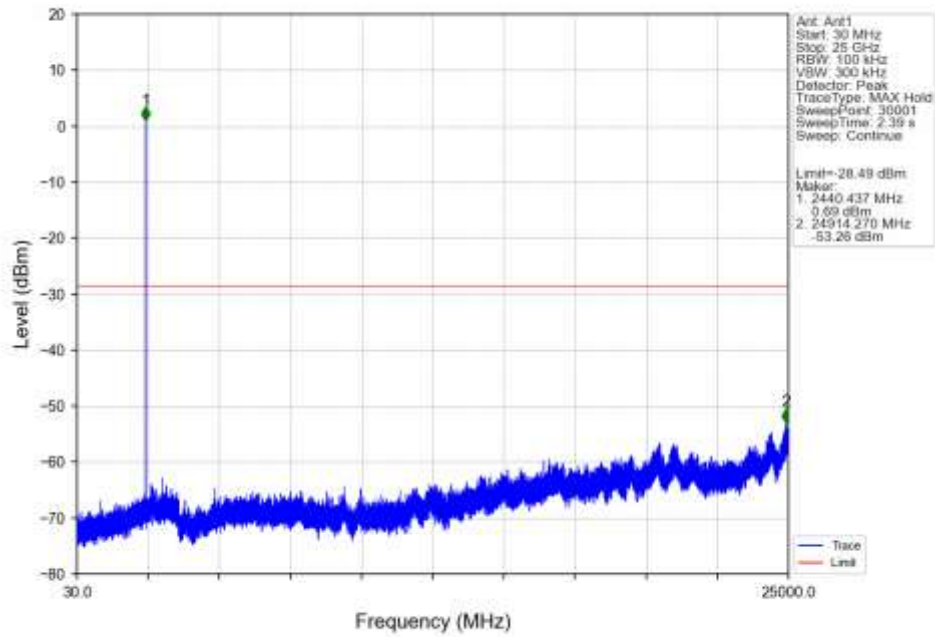
1M MCH 2440MHz Ant1 NTNV



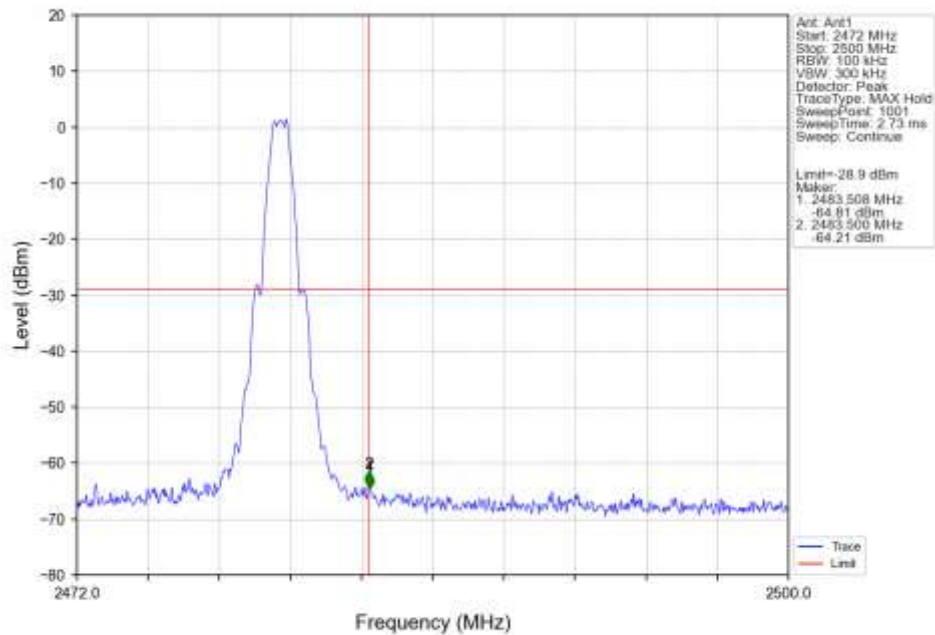
1M MCH 2440MHz Ant1 NTNV



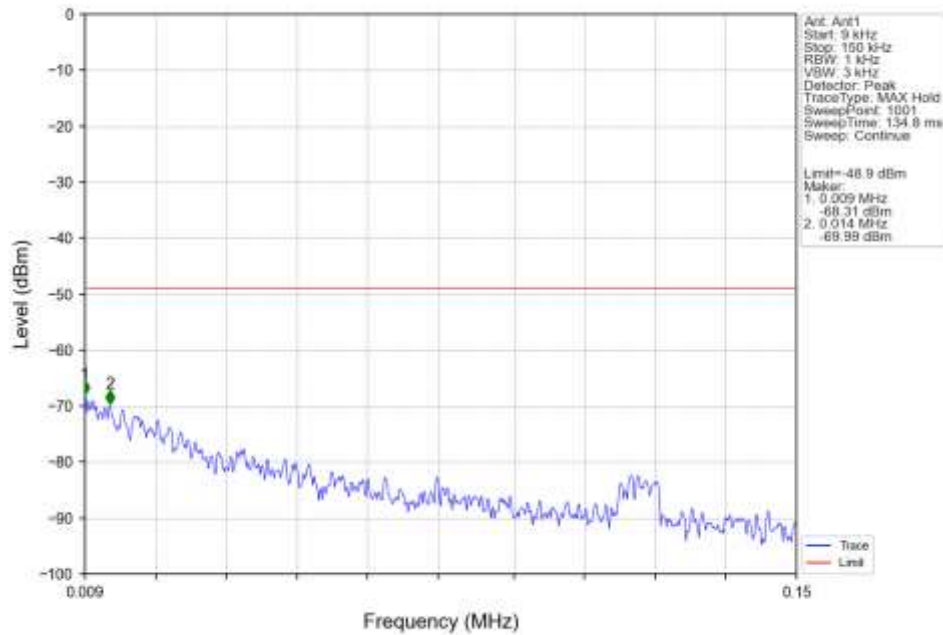
1M MCH 2440MHz Ant1 NTNV



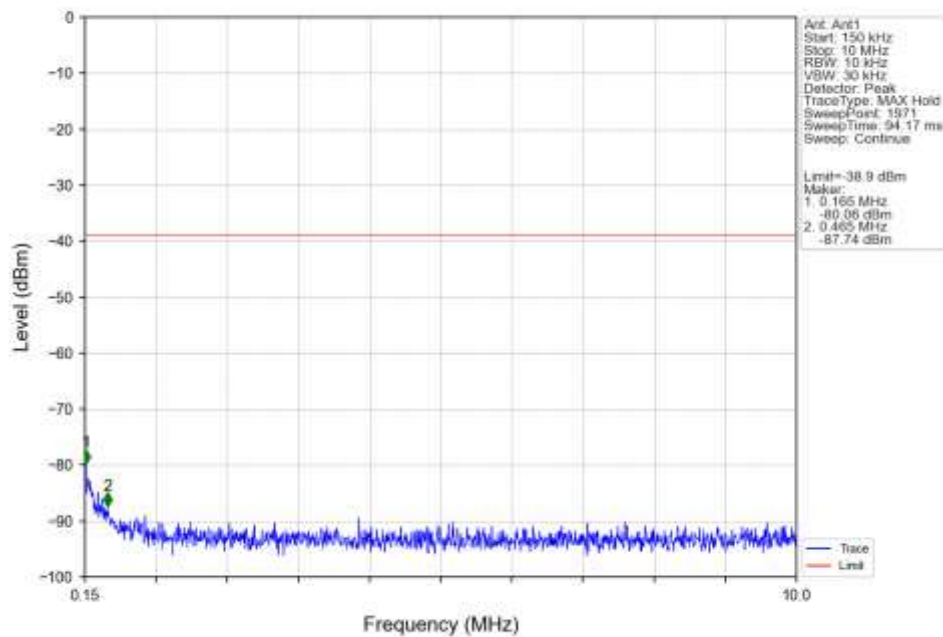
1M HCH 2480MHz Ant1 NTNV



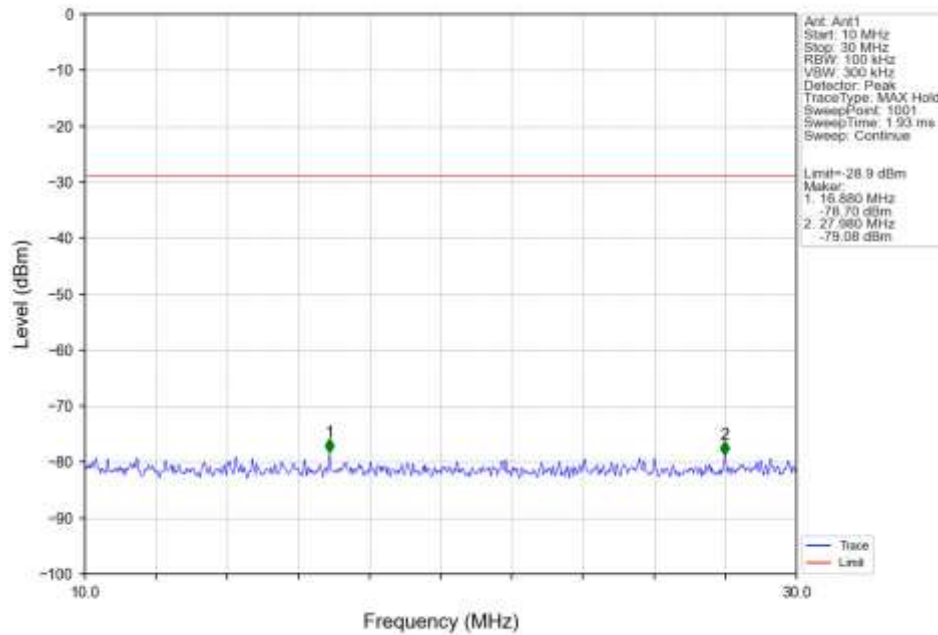
1M HCH 2480MHz Ant1 NTN



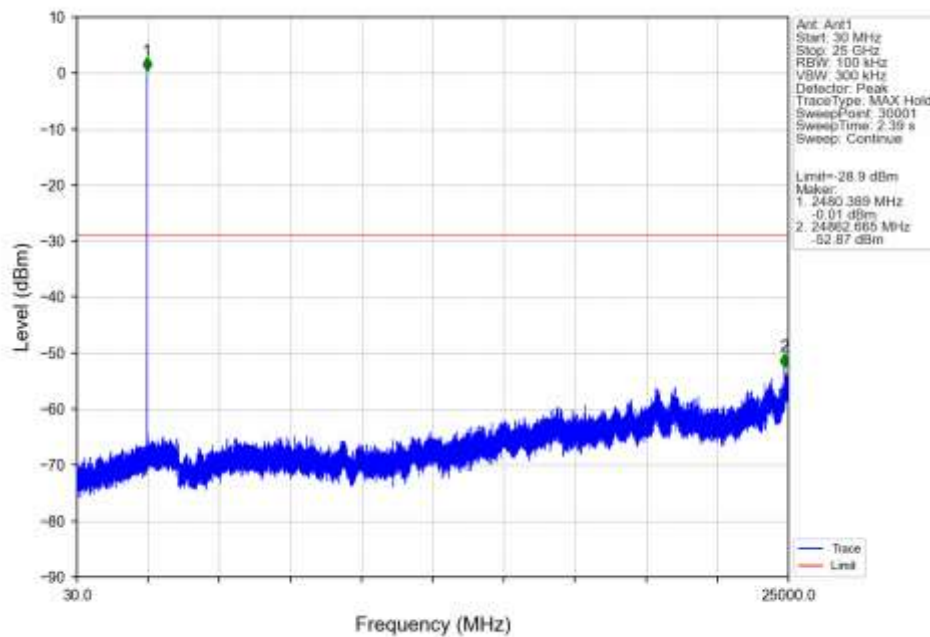
1M HCH 2480MHz Ant1 NTN



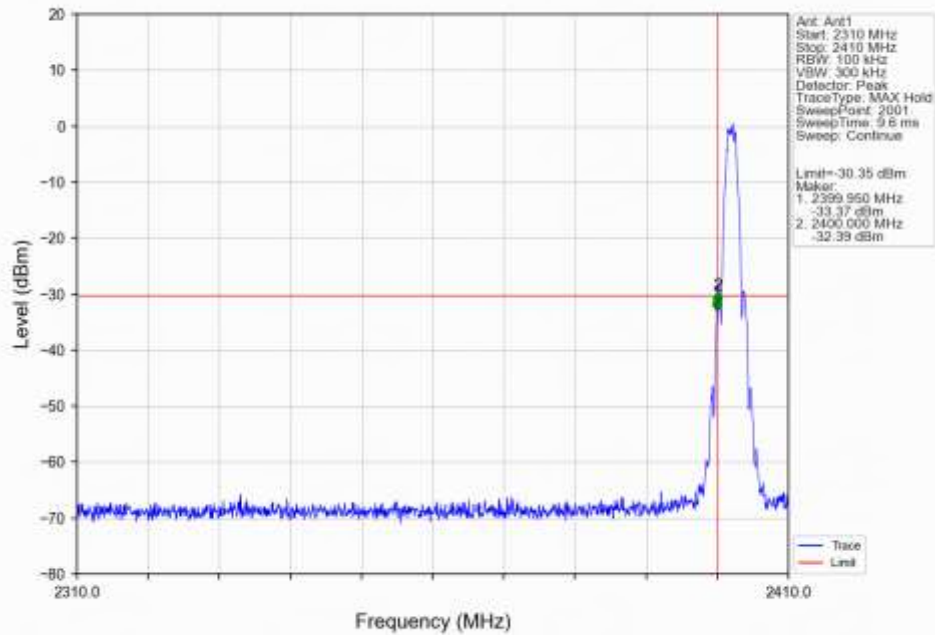
1M HCH 2480MHz Ant1 NTNV



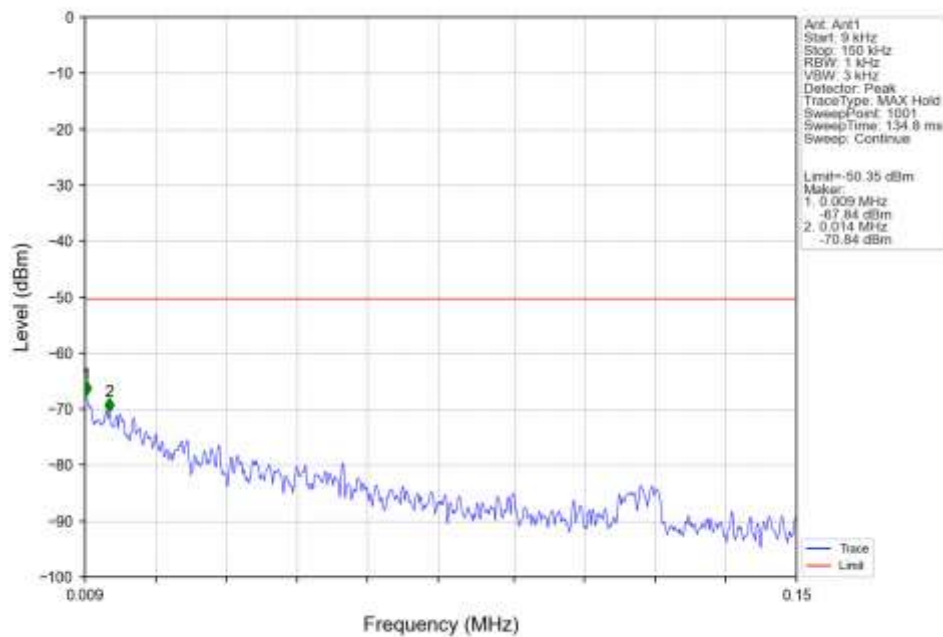
1M HCH 2480MHz Ant1 NTNV



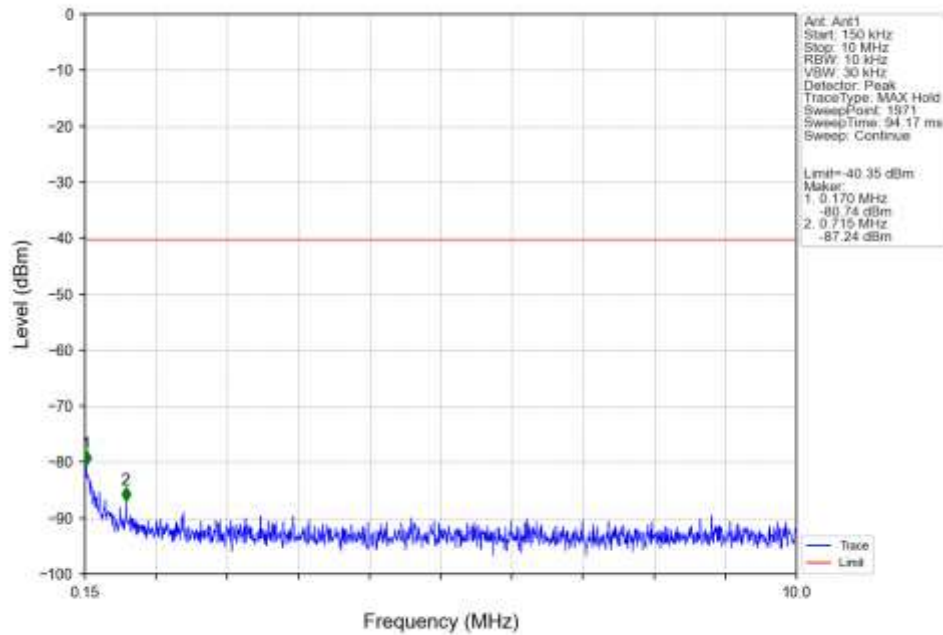
2M LCH 2402MHz Ant1 NTNV



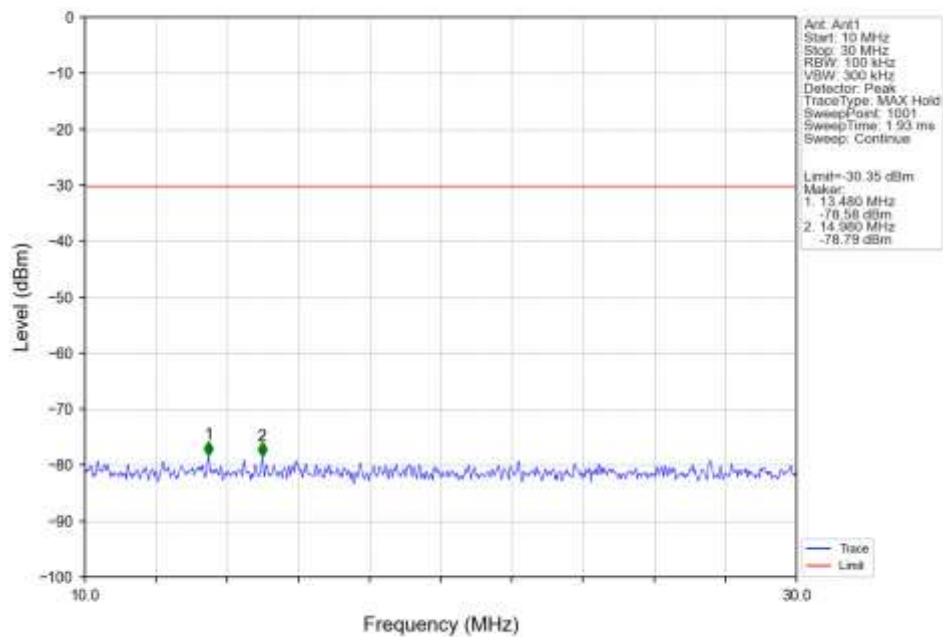
2M LCH 2402MHz Ant1 NTNV



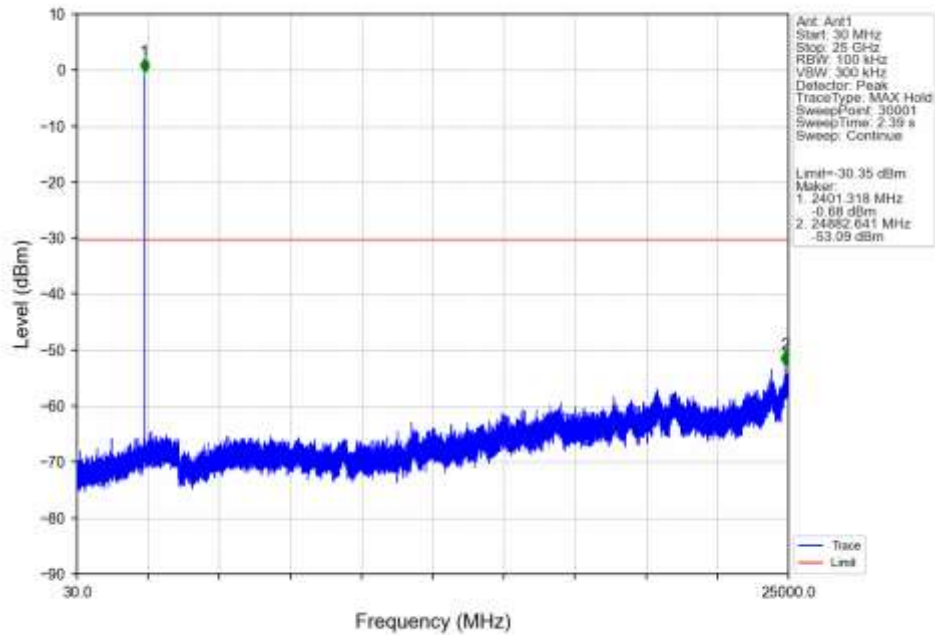
2M LCH 2402MHz Ant1 NTNV



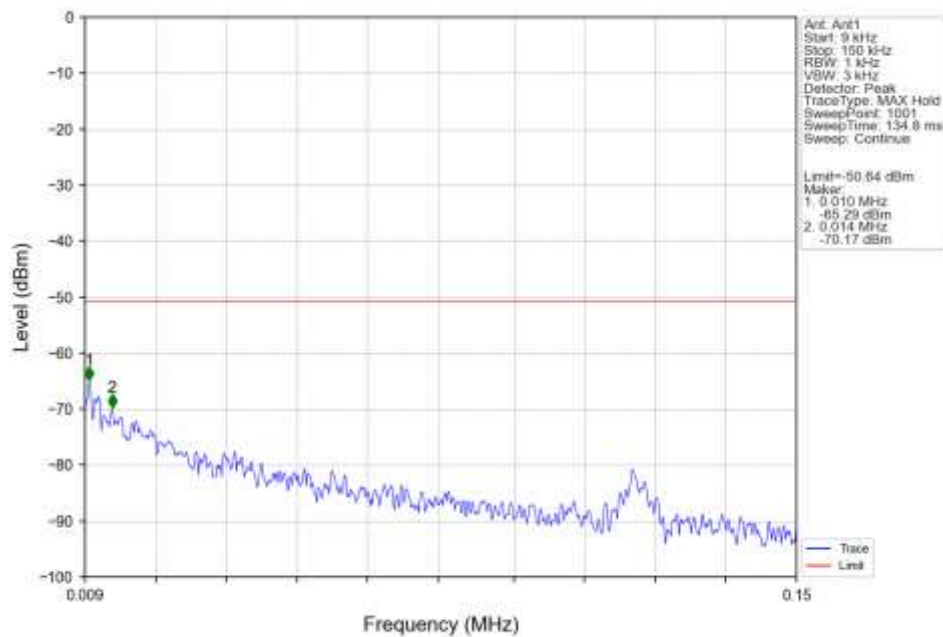
2M LCH 2402MHz Ant1 NTNV



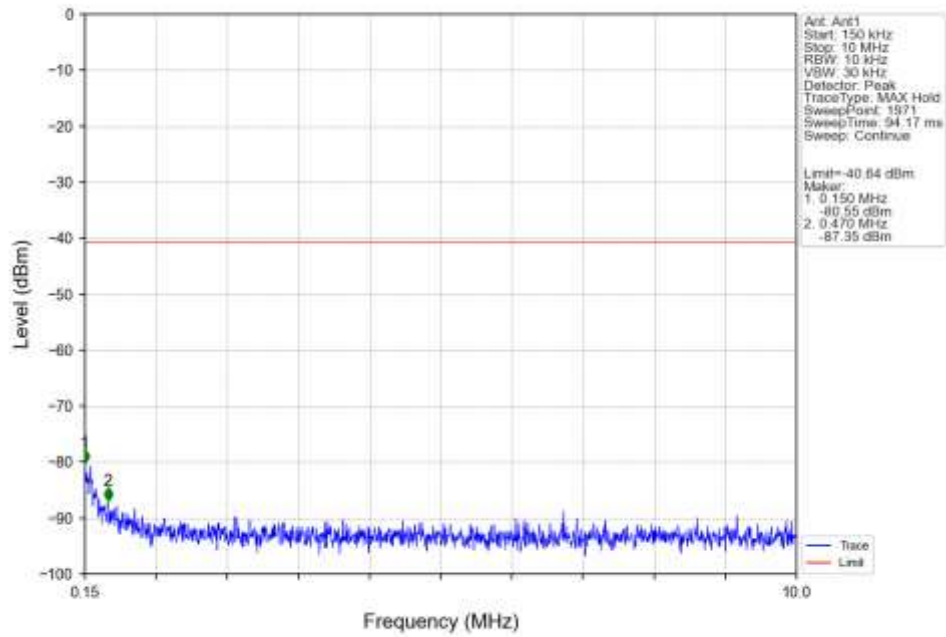
2M LCH 2402MHz Ant1 NTNV



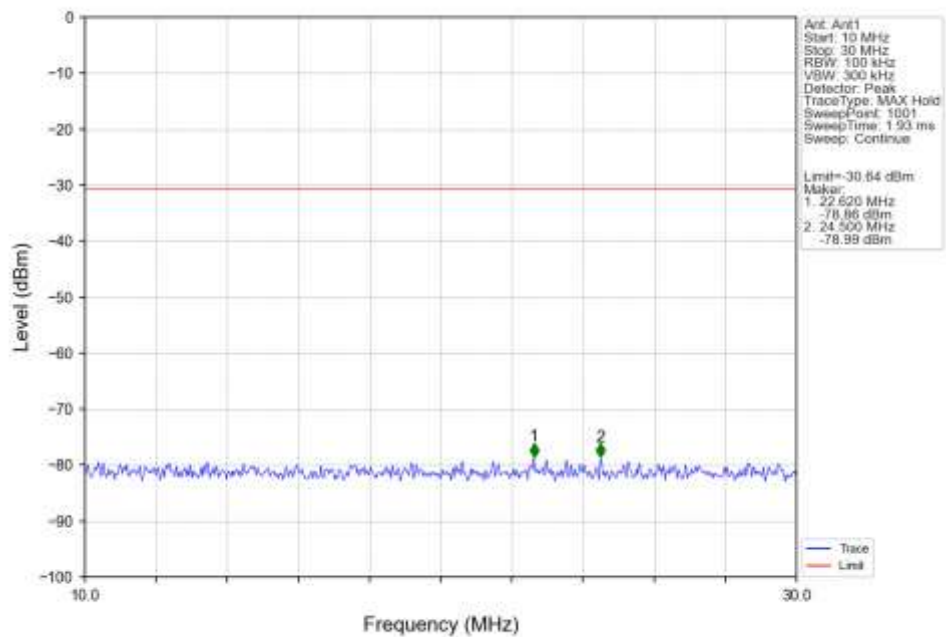
2M MCH 2440MHz Ant1 NTNV



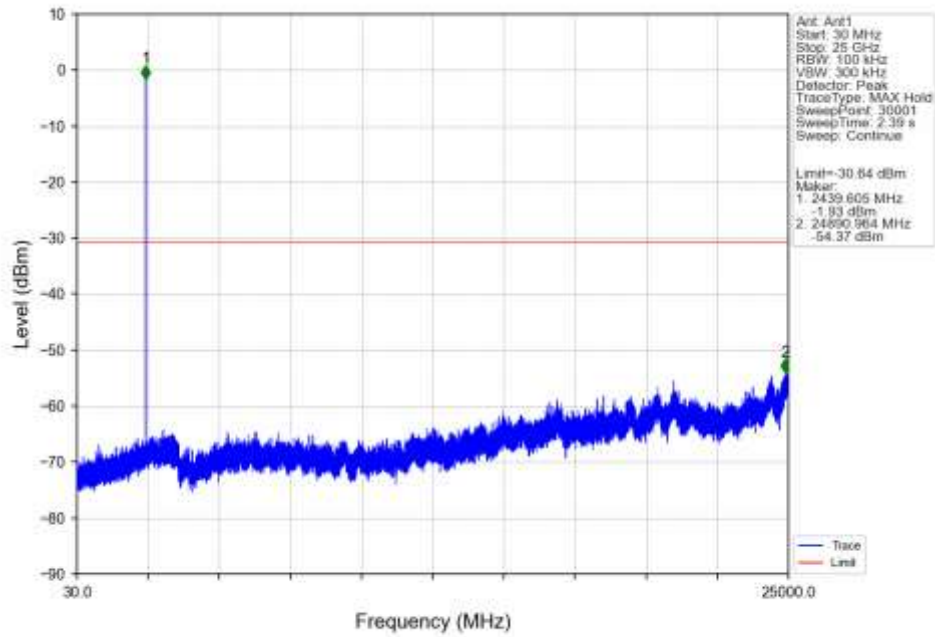
2M MCH 2440MHz Ant1 NTNV



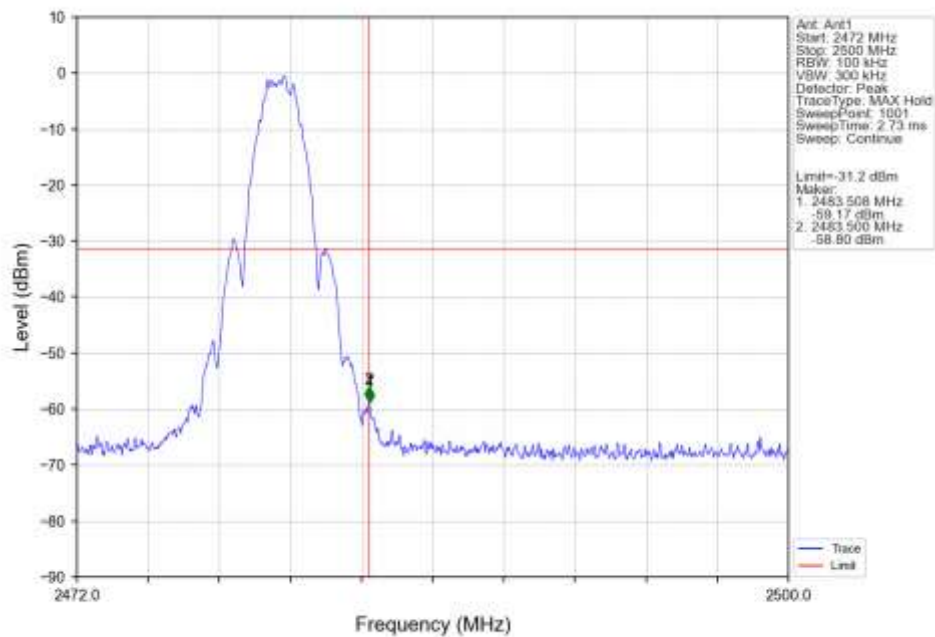
2M MCH 2440MHz Ant1 NTNV



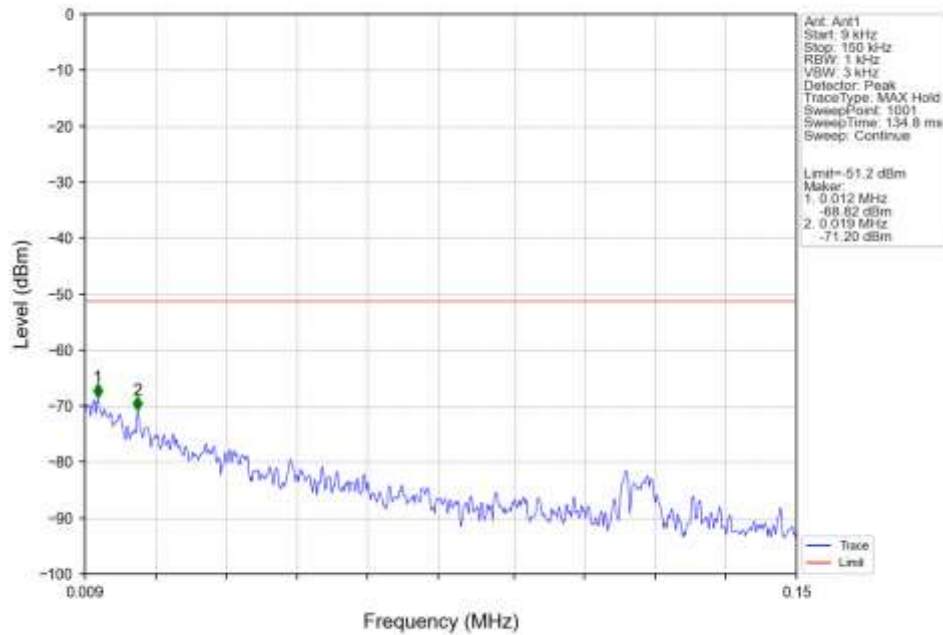
2M MCH 2440MHz Ant1 NTNV



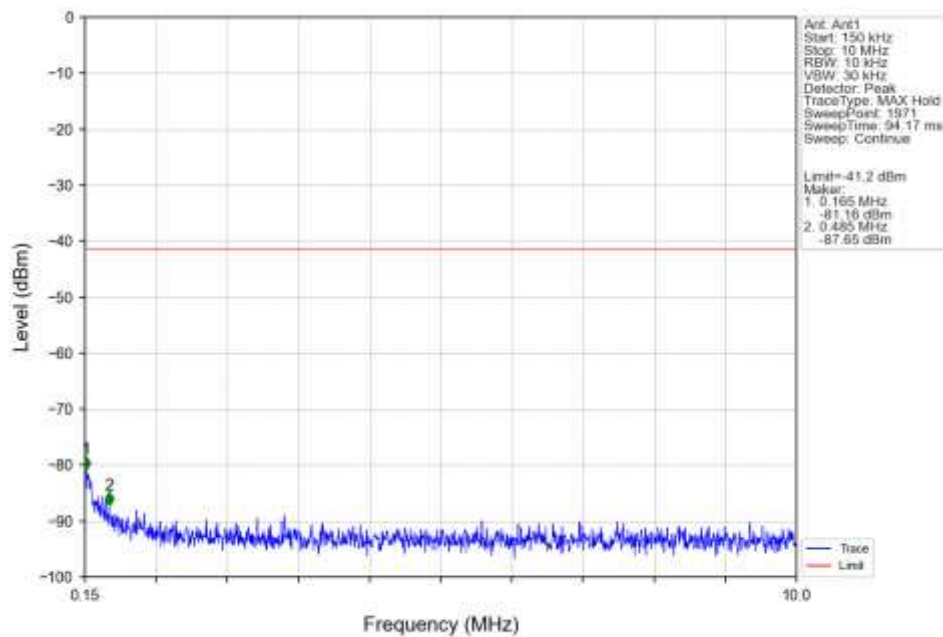
2M HCH 2480MHz Ant1 NTNV



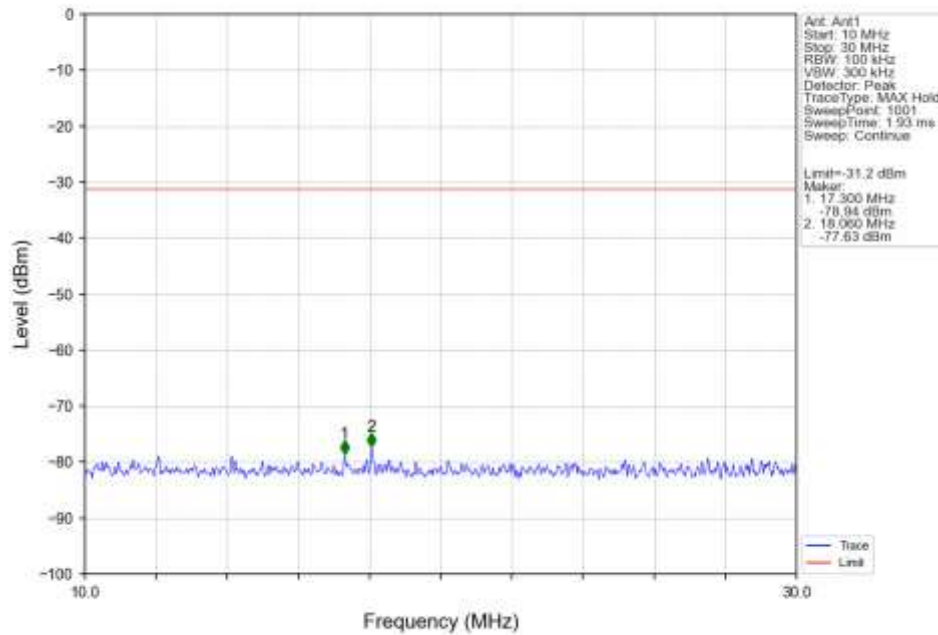
2M HCH 2480MHz Ant1 NTNV



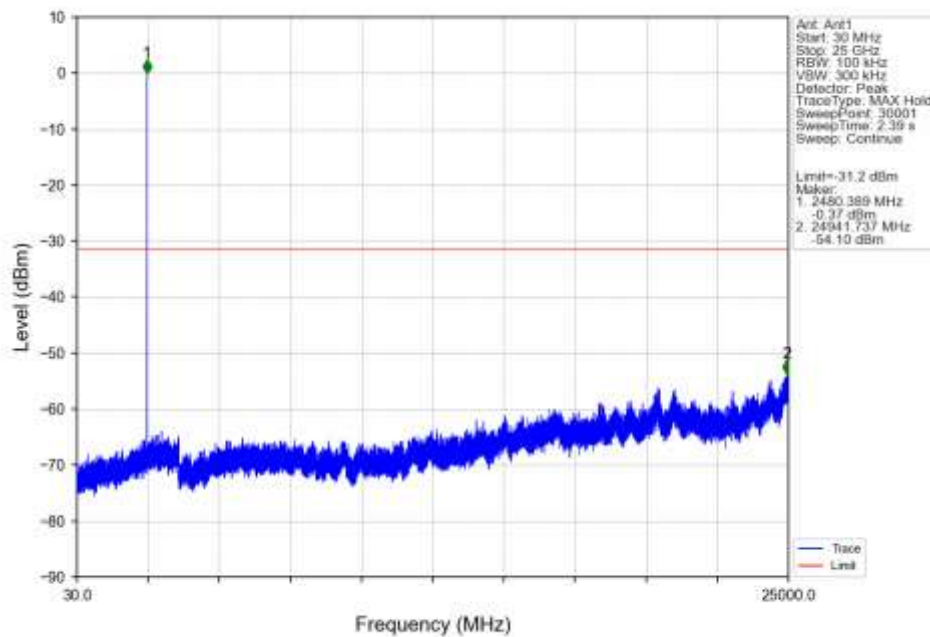
2M HCH 2480MHz Ant1 NTNV



2M HCH 2480MHz Ant1 NTV



2M HCH 2480MHz Ant1 NTV



6. Form731

6.1 Test Result

6.1.1 Form731

Lower Freq (MHz)	High Freq (MHz)	MAX Power (W)	MAX Power (dBm)
2402	2480	0.0018	2.60