



RF Test Report

For

Project No.:	ZKT-250311L4098E-1
Client:	Shenzhen Hip Hop Superman Technology Co., Ltd
Manufacturer:	Shenzhen Hip Hop Superman Technology Co., Ltd
Product Description:	Headphones
Model No.:	SP16
Test Engineer:	Jim Liu
Test Date:	2025-03-10

Test Summary

Item	Result
Bandwidth	Pass
Maximum Conducted Output Power	Pass
Carrier Frequency Separation	Pass
Number of Hopping Frequencies	Pass
Time of Occupancy (Dwell Time)	Pass
Unwanted Emissions In Non-restricted Frequency Bands	Pass
Frequency Error	Pass



1. Bandwidth

1.1 Test Result

1.1.1 OBW

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	99% Occupied Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	0.879	/	Pass
		2441	DH5	1	0.881	/	Pass
		2480	DH5	1	0.880	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.166	/	Pass
		2441	2DH5	1	1.165	/	Pass
		2480	2DH5	1	1.165	/	Pass
8DPSK	SISO	2402	3DH5	1	1.161	/	Pass
		2441	3DH5	1	1.160	/	Pass
		2480	3DH5	1	1.160	/	Pass

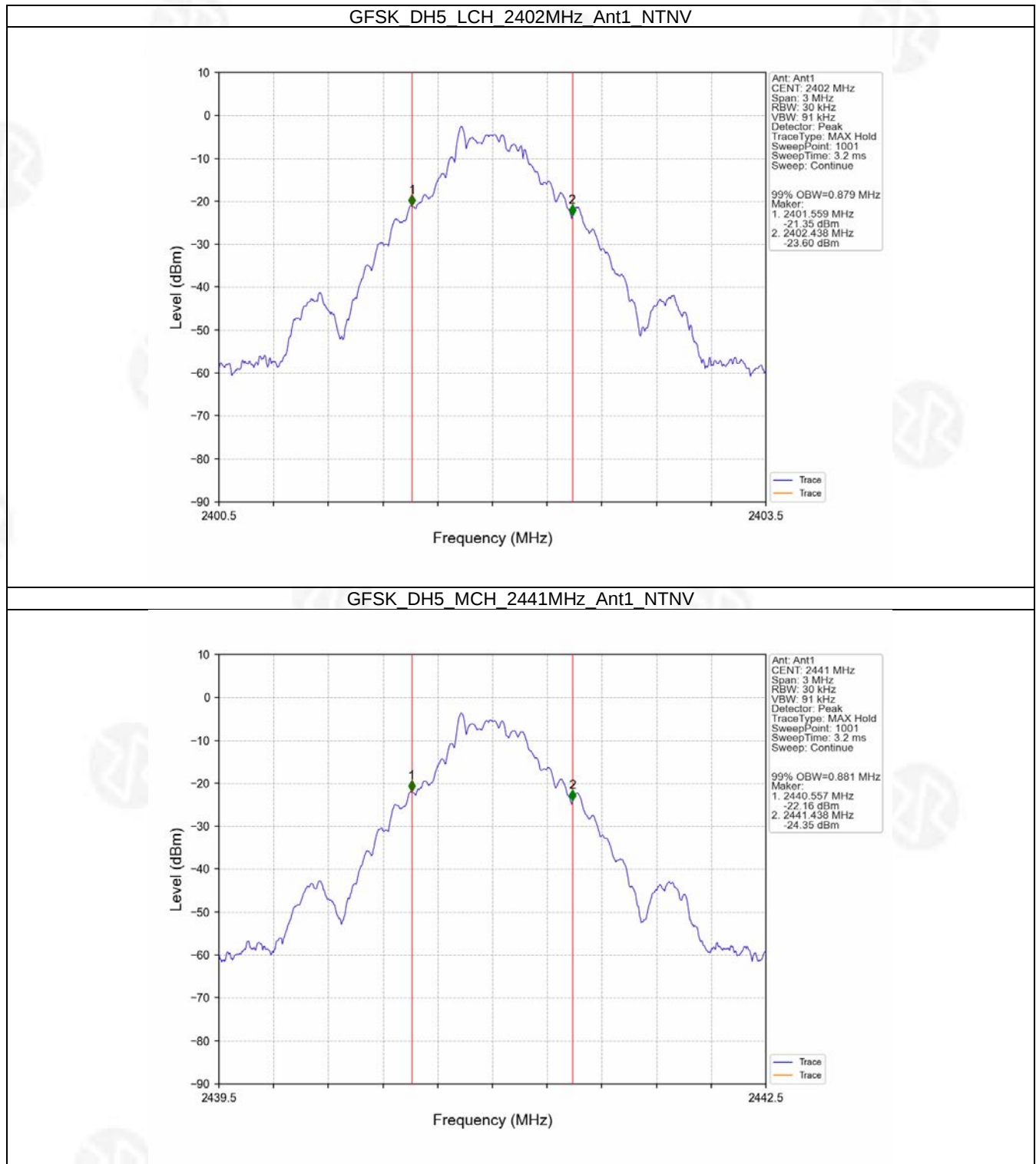
1.1.2 20dB BW

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	20dB Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	0.947	/	Pass
		2441	DH5	1	0.945	/	Pass
		2480	DH5	1	0.949	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.284	/	Pass
		2441	2DH5	1	1.285	/	Pass
		2480	2DH5	1	1.282	/	Pass
8DPSK	SISO	2402	3DH5	1	1.276	/	Pass
		2441	3DH5	1	1.275	/	Pass
		2480	3DH5	1	1.277	/	Pass



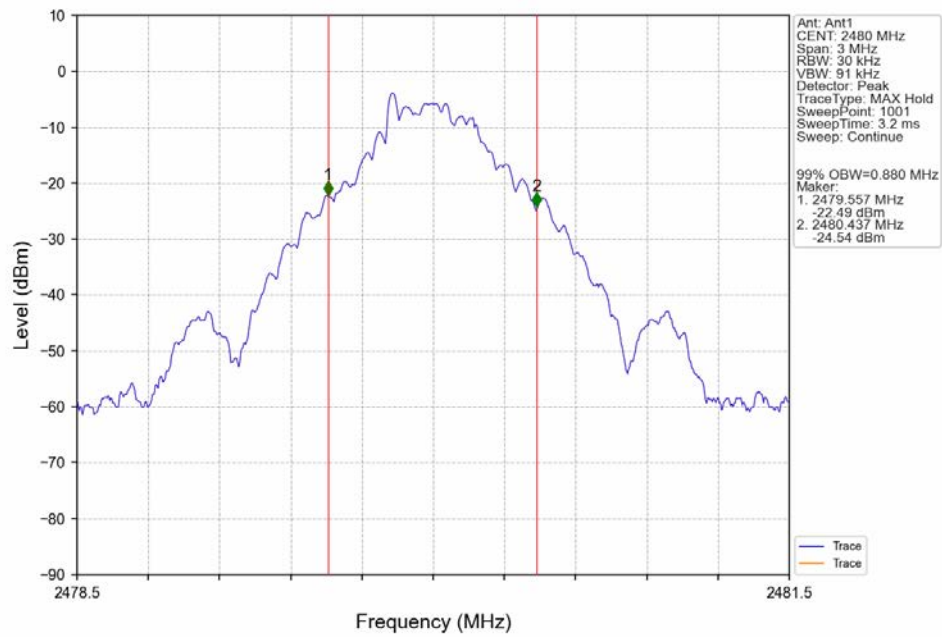
1.2 Test Graph

1.2.1 OBW

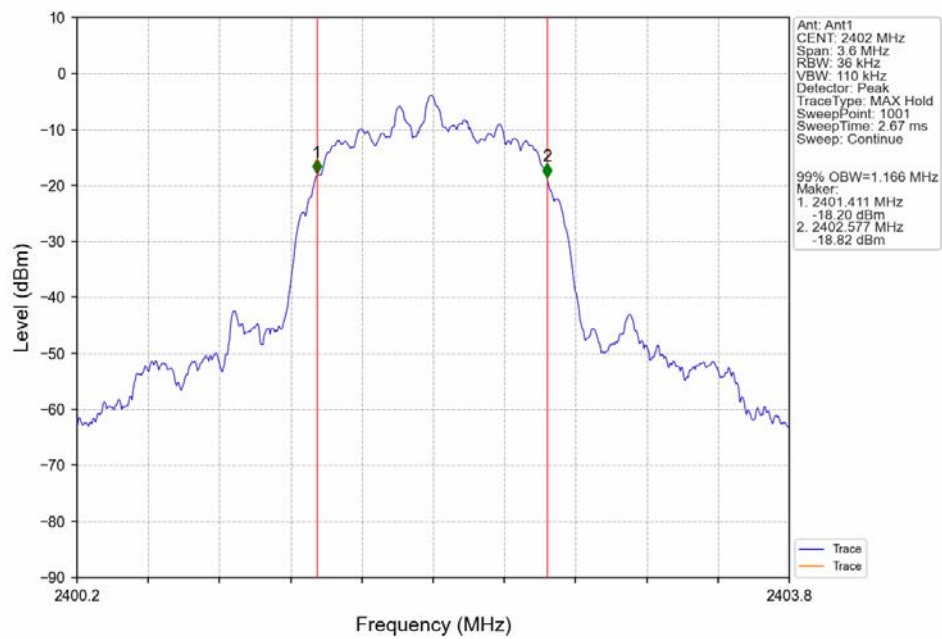




GFSK DH5 HCH 2480MHz Ant1 NTN

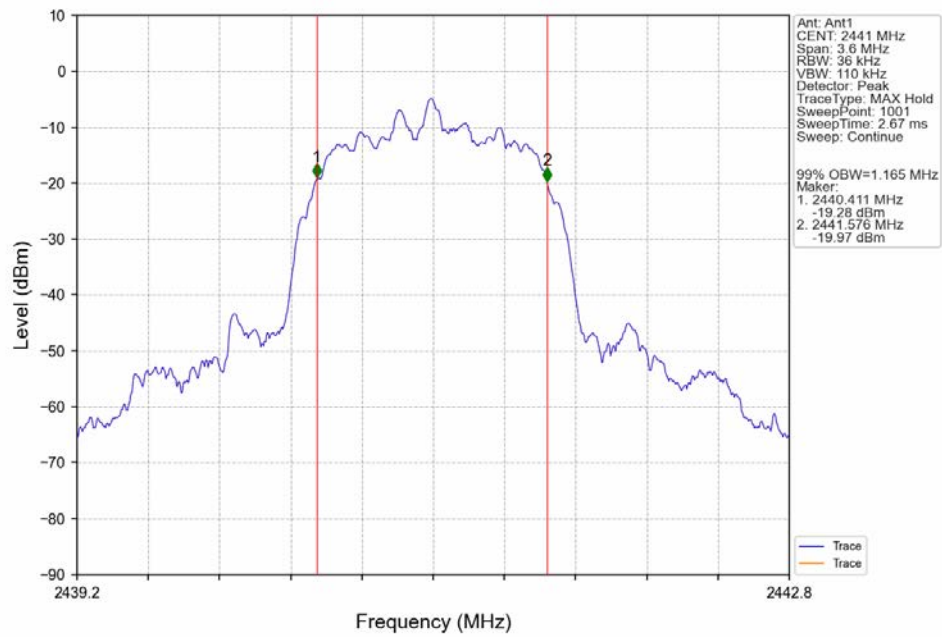


Pi/4DQPSK 2DH5 LCH 2402MHz Ant1 NTN

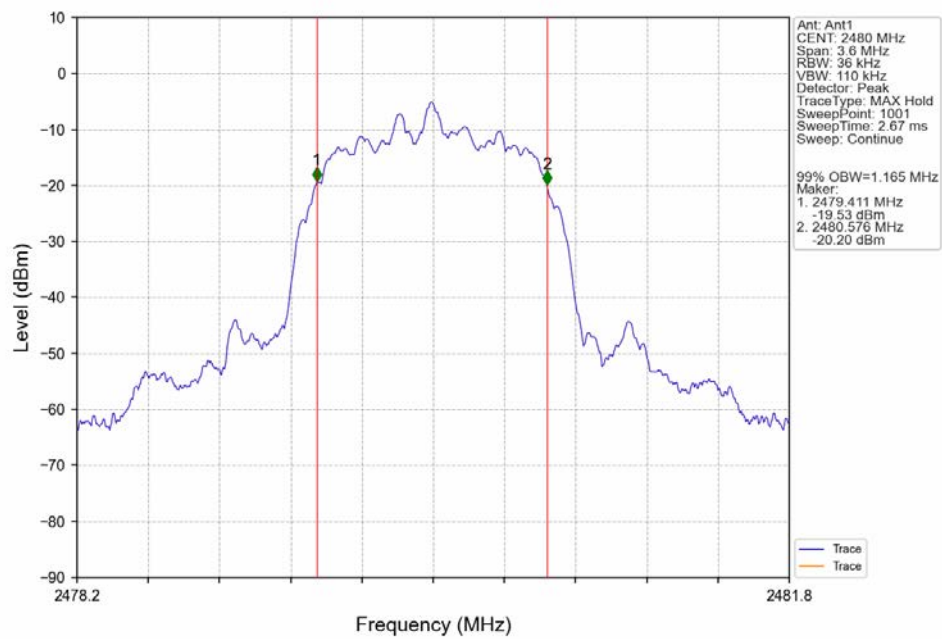




Pi/4DQPSK 2DH5 MCH 2441MHz Ant1 NTN

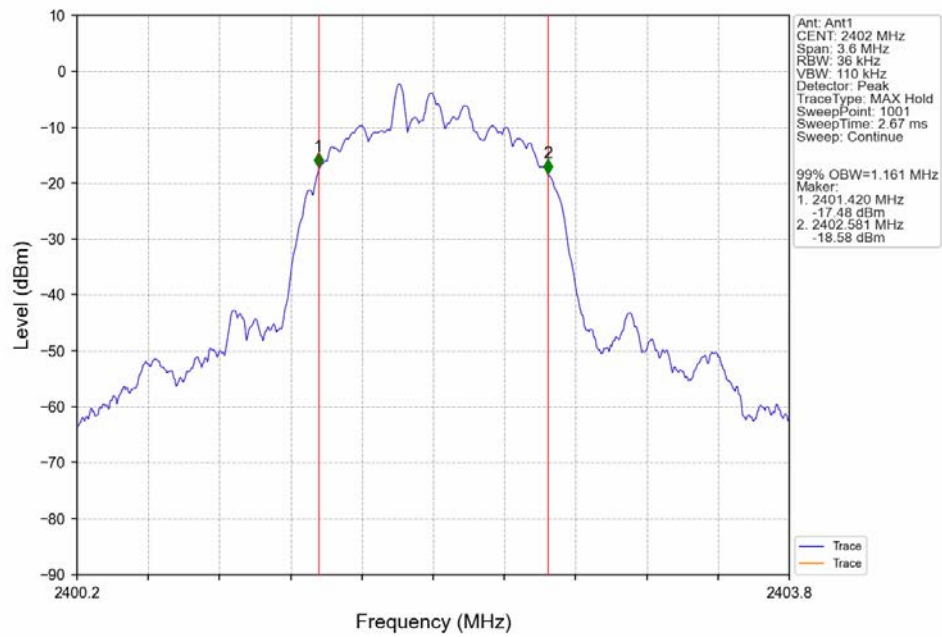


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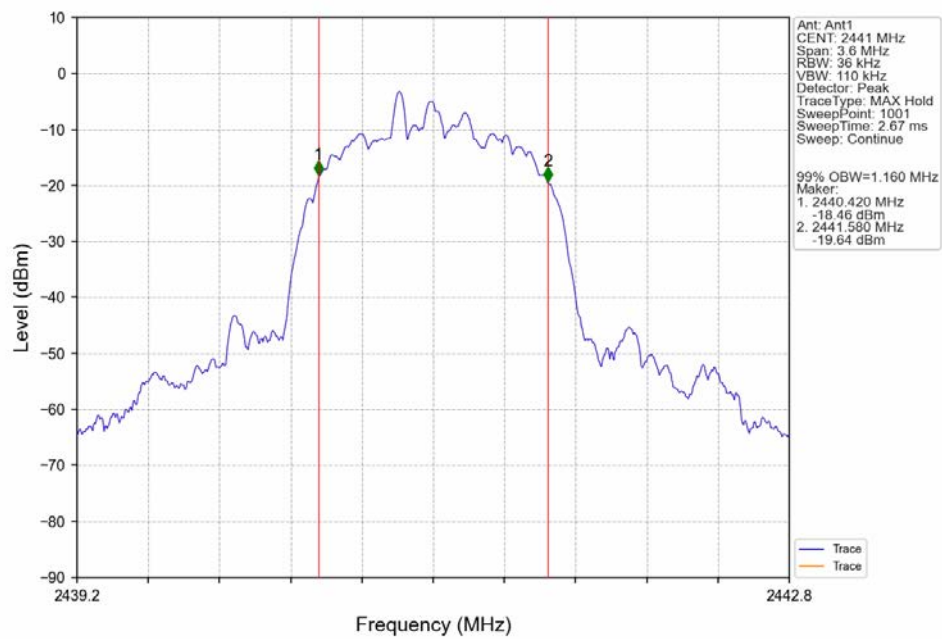




8DPSK 3DH5 LCH 2402MHz Ant1 NTN

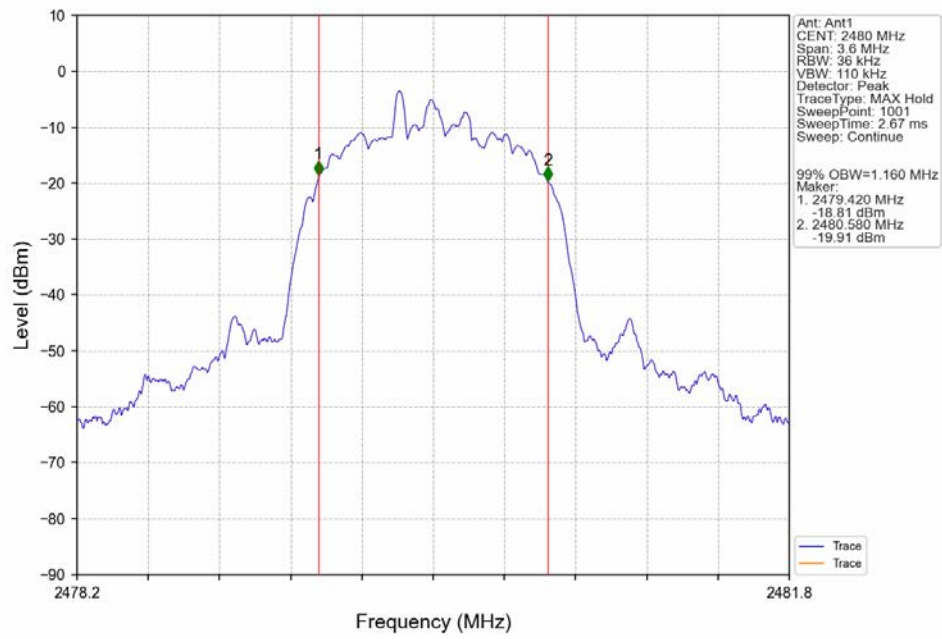


8DPSK 3DH5 MCH 2441MHz Ant1 NTN





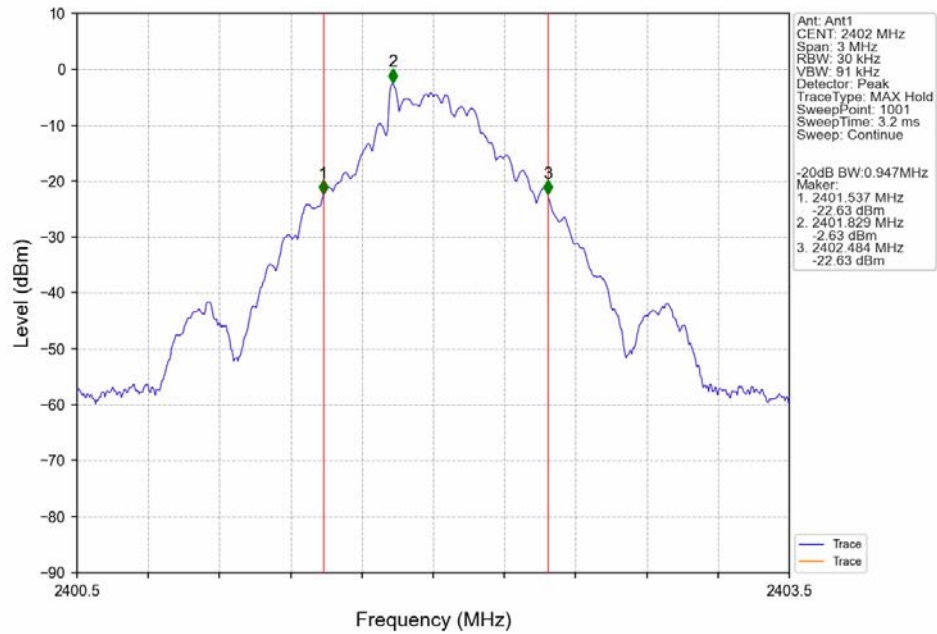
8DPSK 3DH5 HCH 2480MHz Ant1 NTN



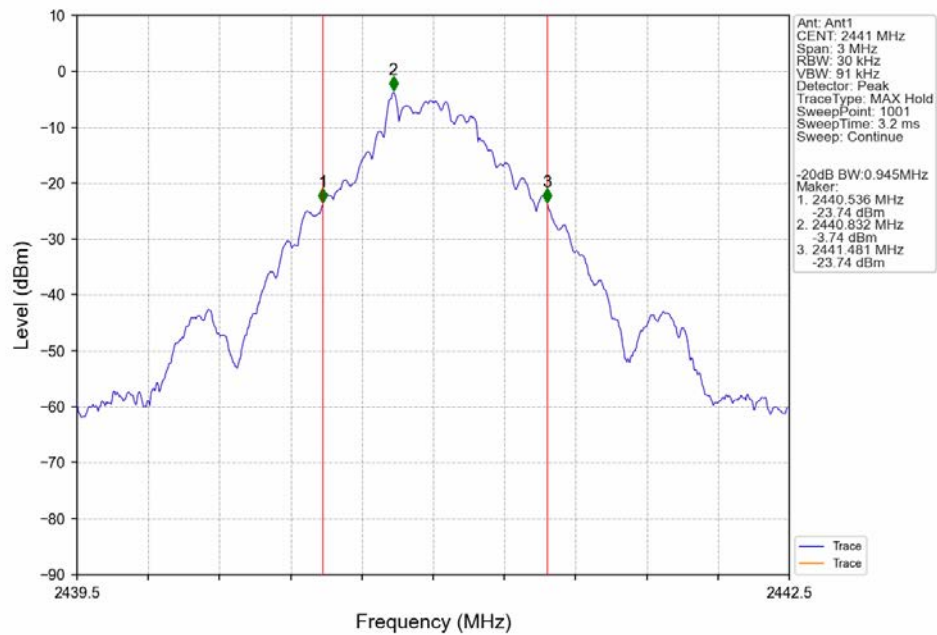


1.2.2 20dB BW

GFSK DH5 LCH 2402MHz Ant1 NTN

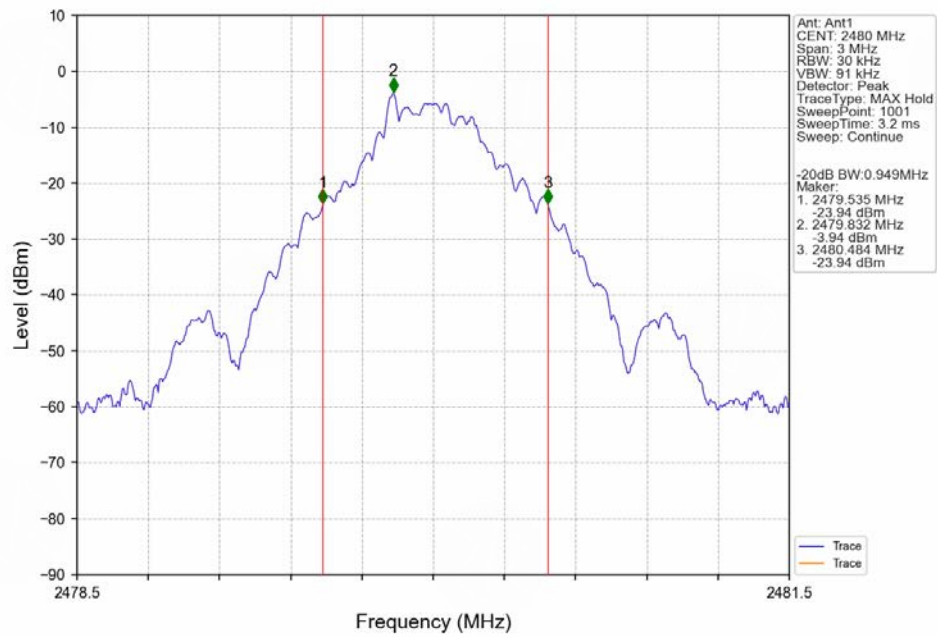


GFSK DH5 MCH 2441MHz Ant1 NTN

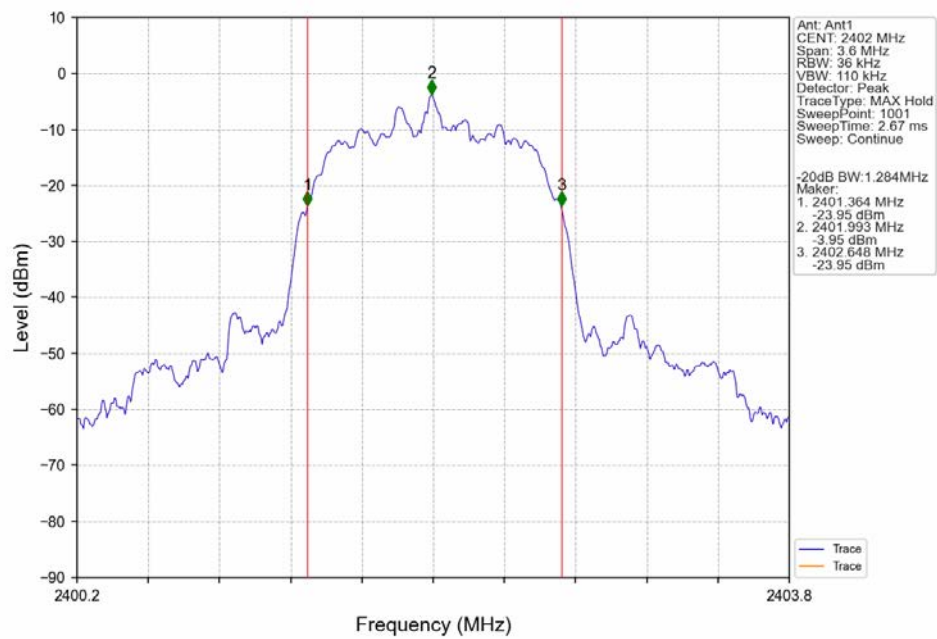




GFSK DH5 HCH 2480MHz Ant1 NTN

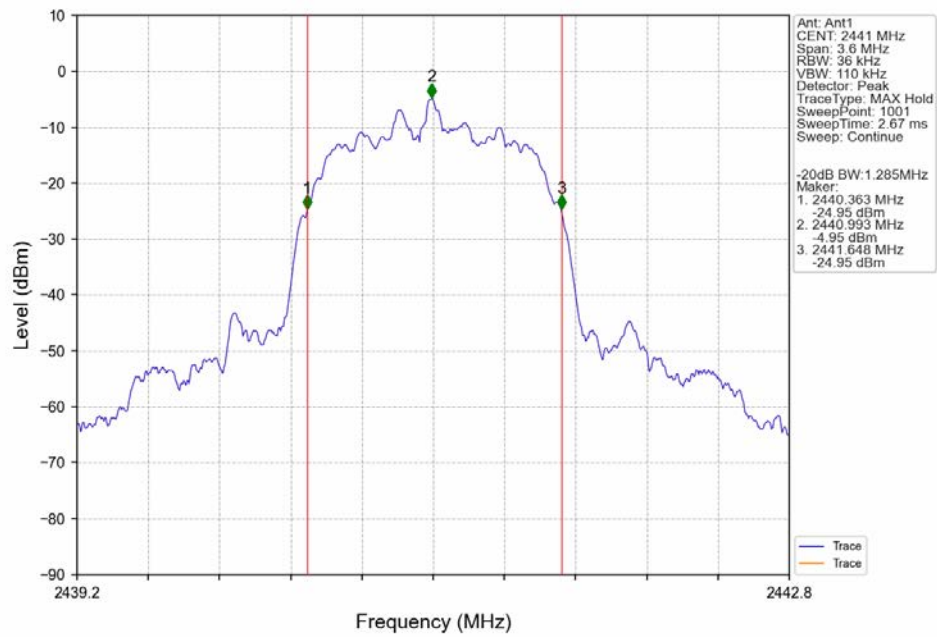


Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTN

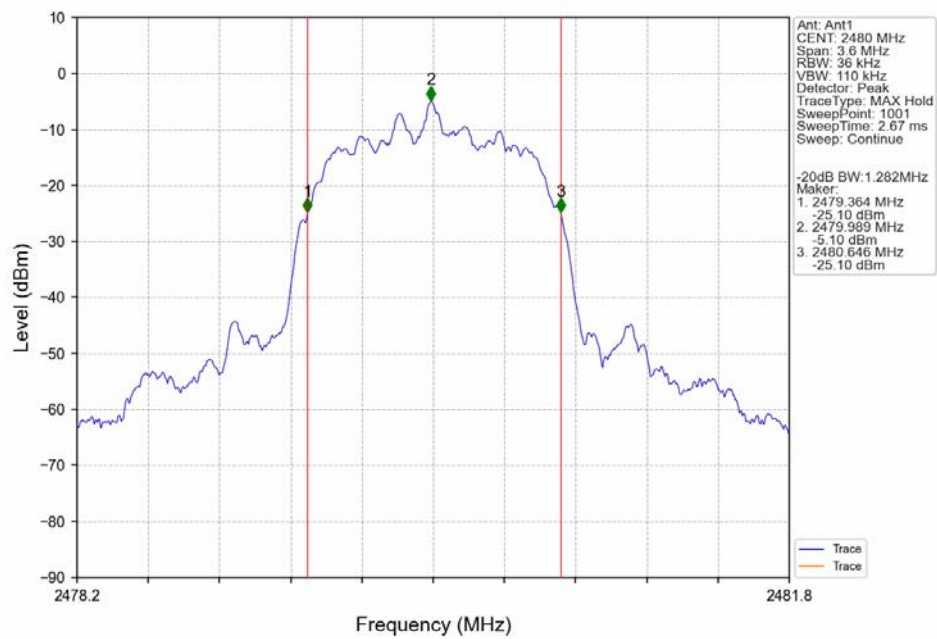




Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV

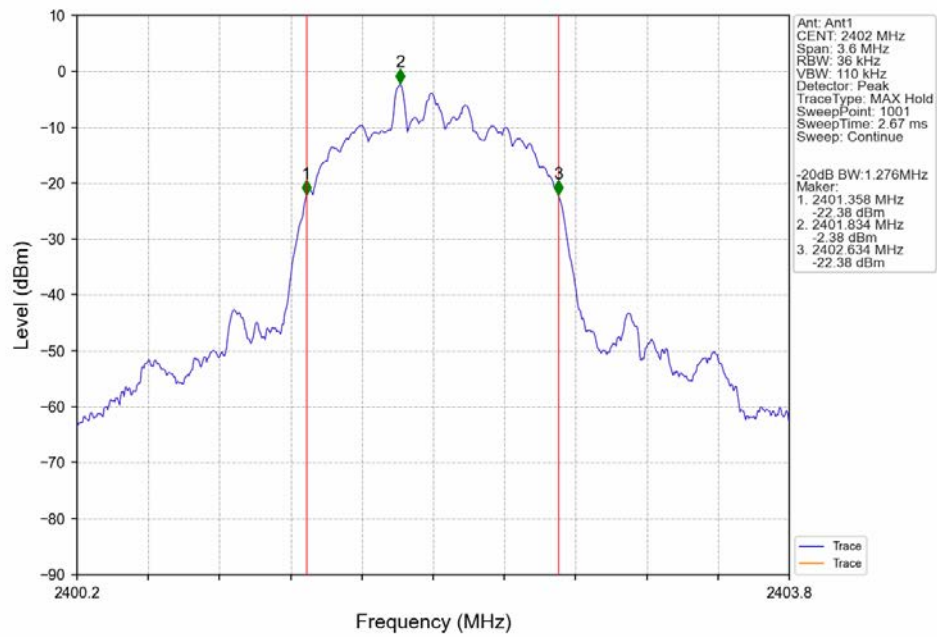


Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

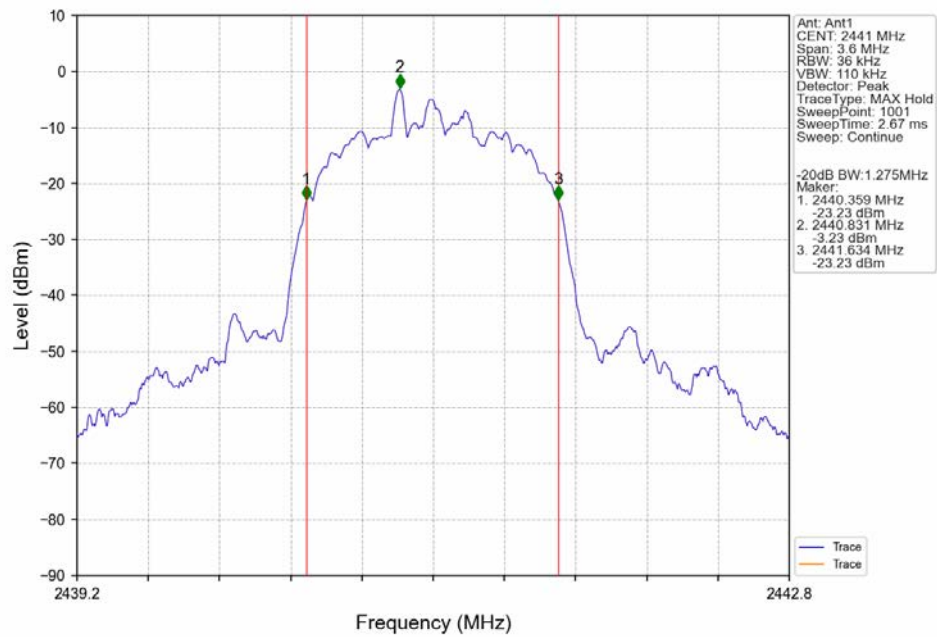




8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV

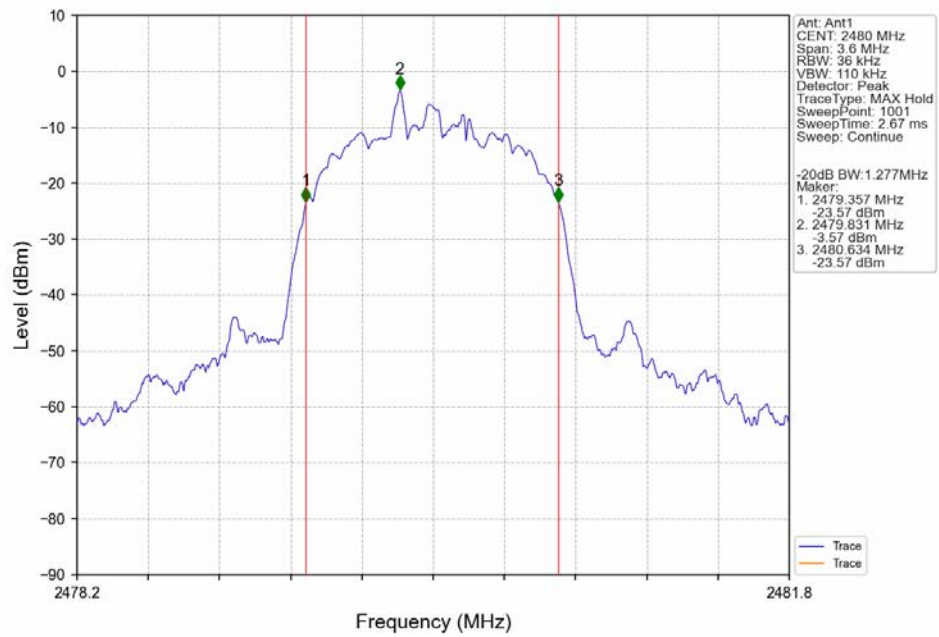


8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV





8DPSK 3DH5 HCH 2480MHz Ant1 NTN





2. Maximum Conducted Output Power

2.1 Test Result

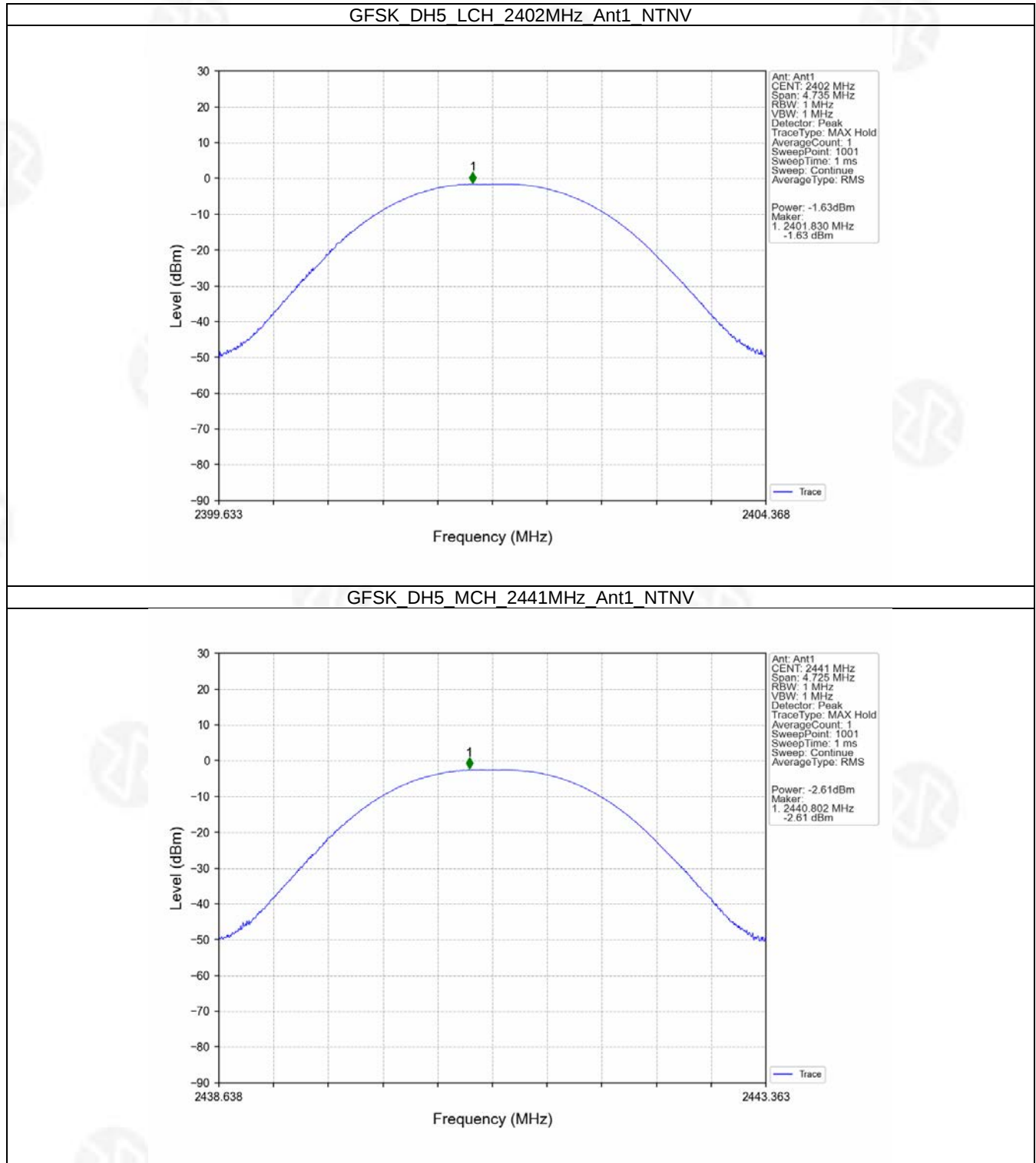
2.1.1 Power

Mode	TX Type	Frequency (MHz)	Packet Type	Maximum Peak Conducted Output Power (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	-1.63	≤ 30	Pass
		2441	DH5	-2.61	≤ 30	Pass
		2480	DH5	-2.90	≤ 30	Pass
Pi/4DQPSK	SISO	2402	2DH5	-0.97	≤ 20.97	Pass
		2441	2DH5	-1.95	≤ 20.97	Pass
		2480	2DH5	-2.22	≤ 20.97	Pass
8DPSK	SISO	2402	3DH5	-0.42	≤ 20.97	Pass
		2441	3DH5	-1.41	≤ 20.97	Pass
		2480	3DH5	-1.66	≤ 20.97	Pass



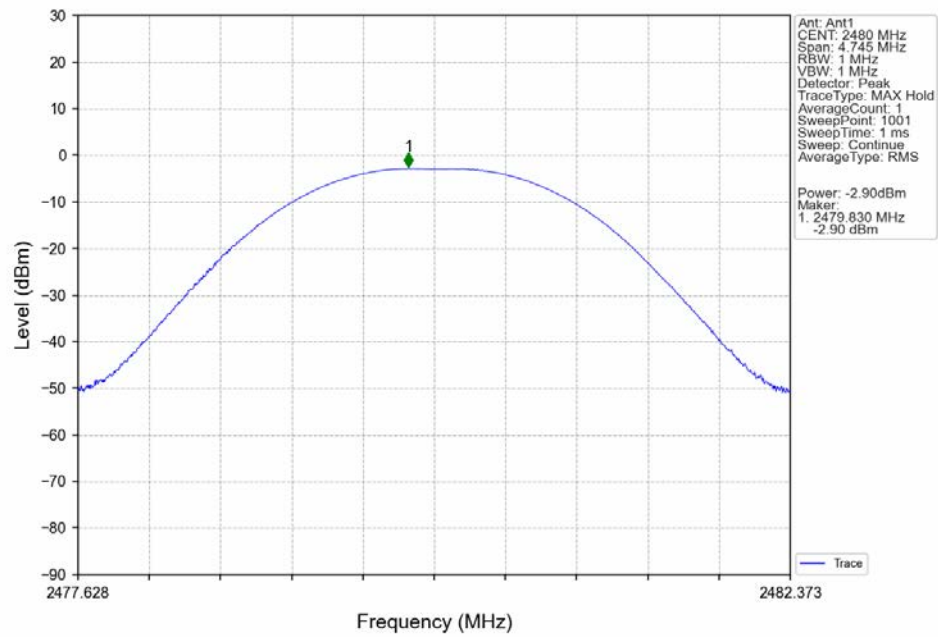
2.2 Test Graph

2.2.1 Power

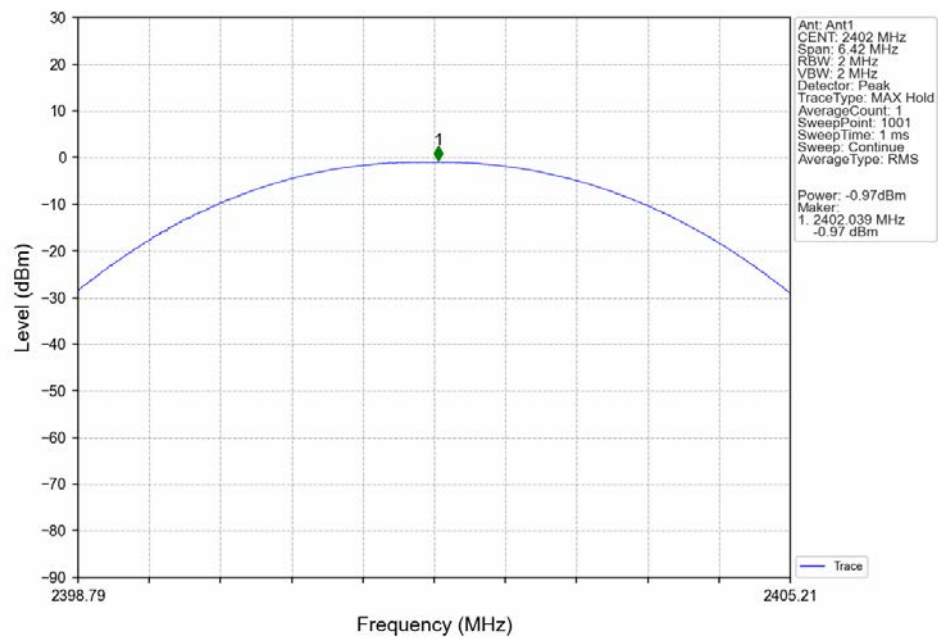




GFSK DH5 HCH 2480MHz Ant1 NTN

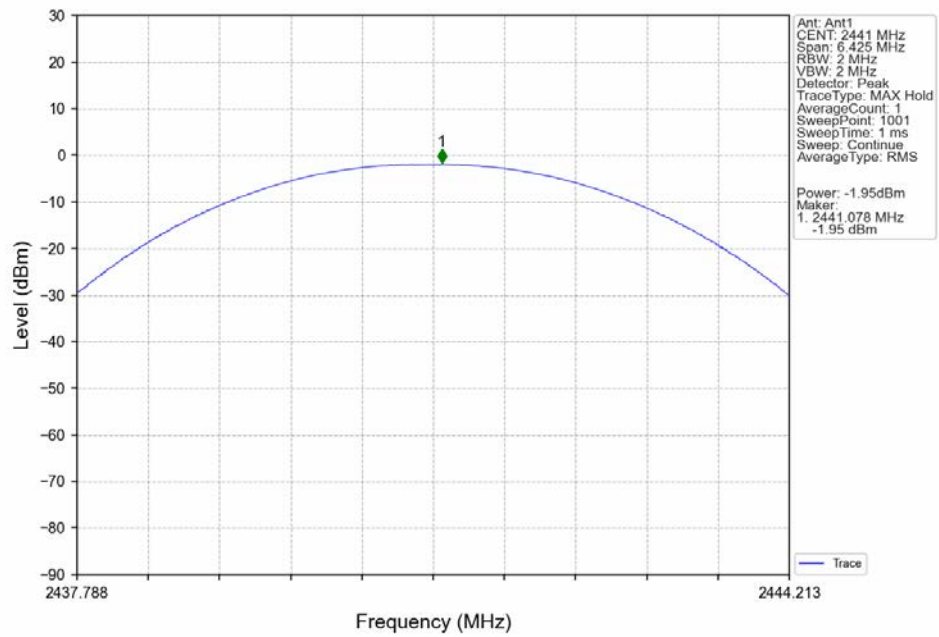


Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1 NTN

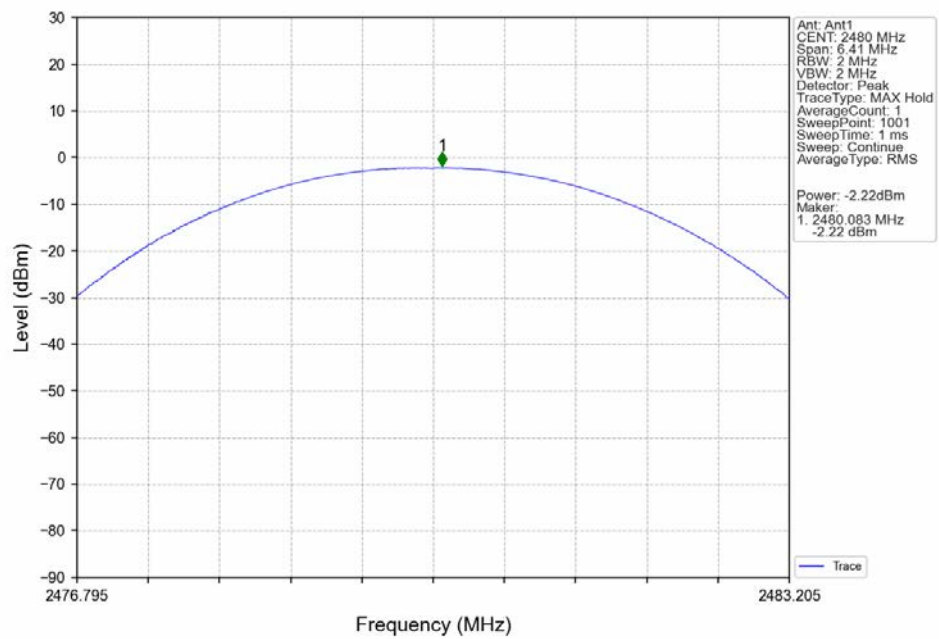




Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV

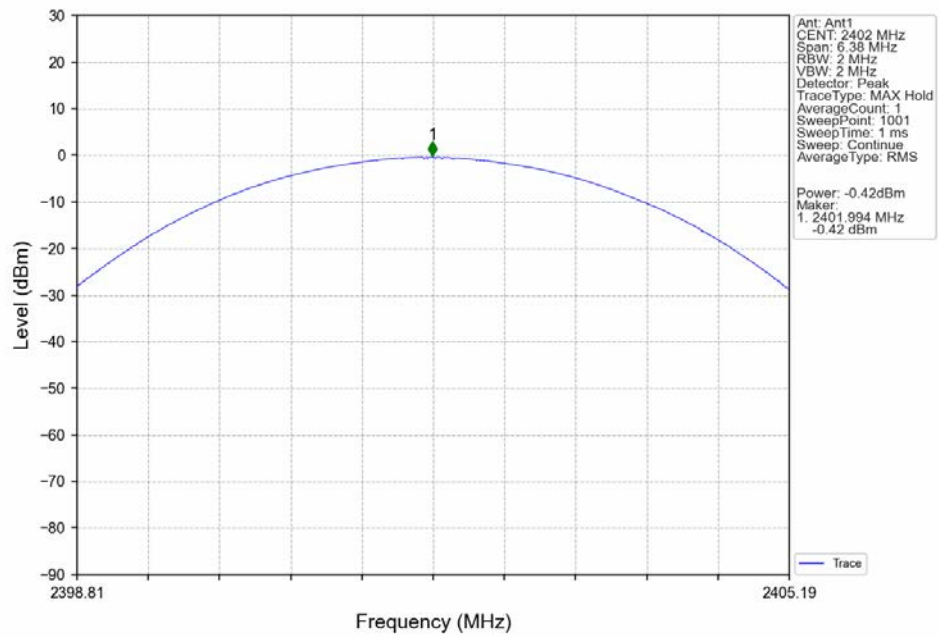


Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

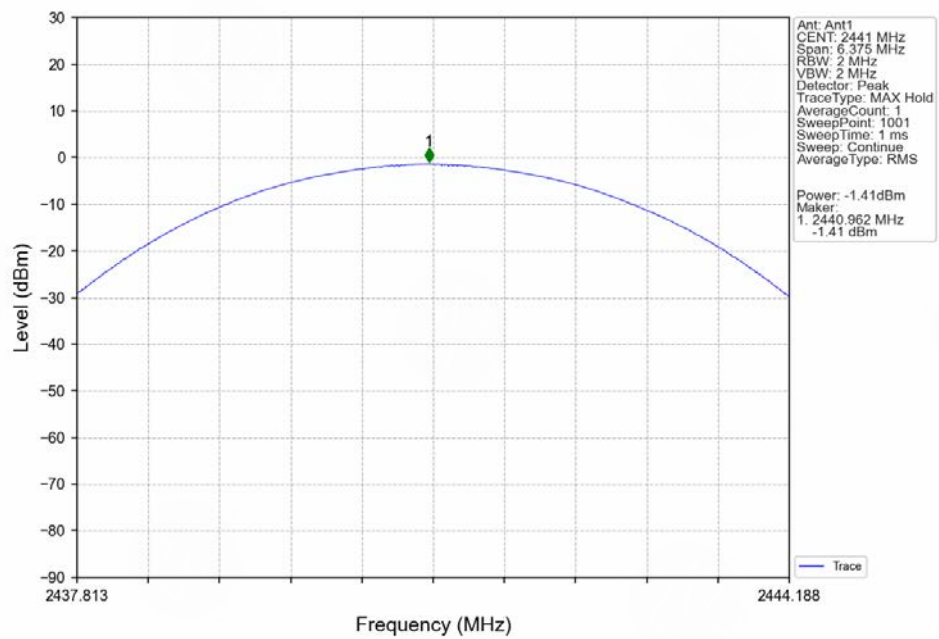




8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV

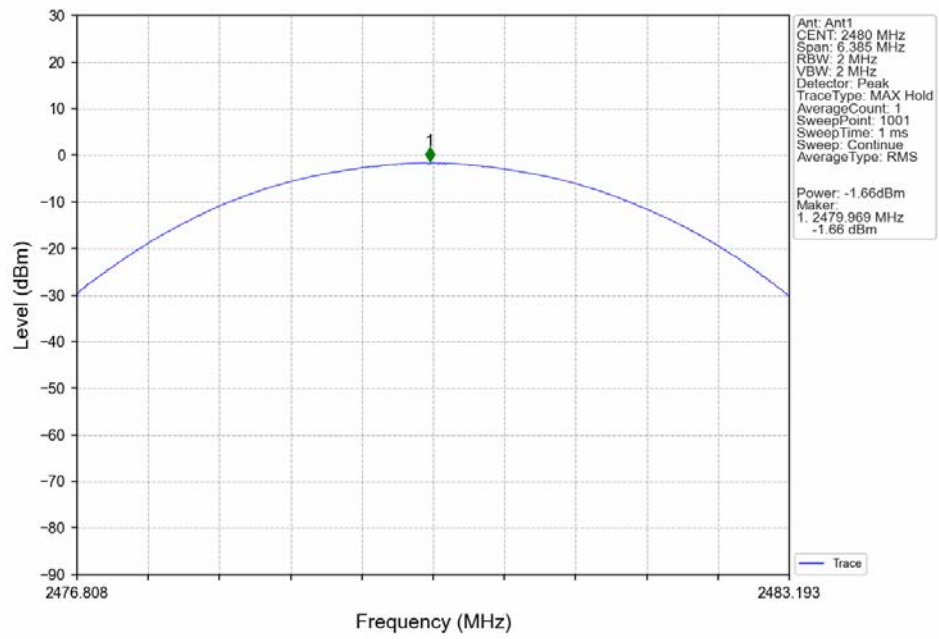


8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV





8DPSK 3DH5 HCH 2480MHz Ant1 NTN





3. Carrier Frequency Separation

3.1 Test Result

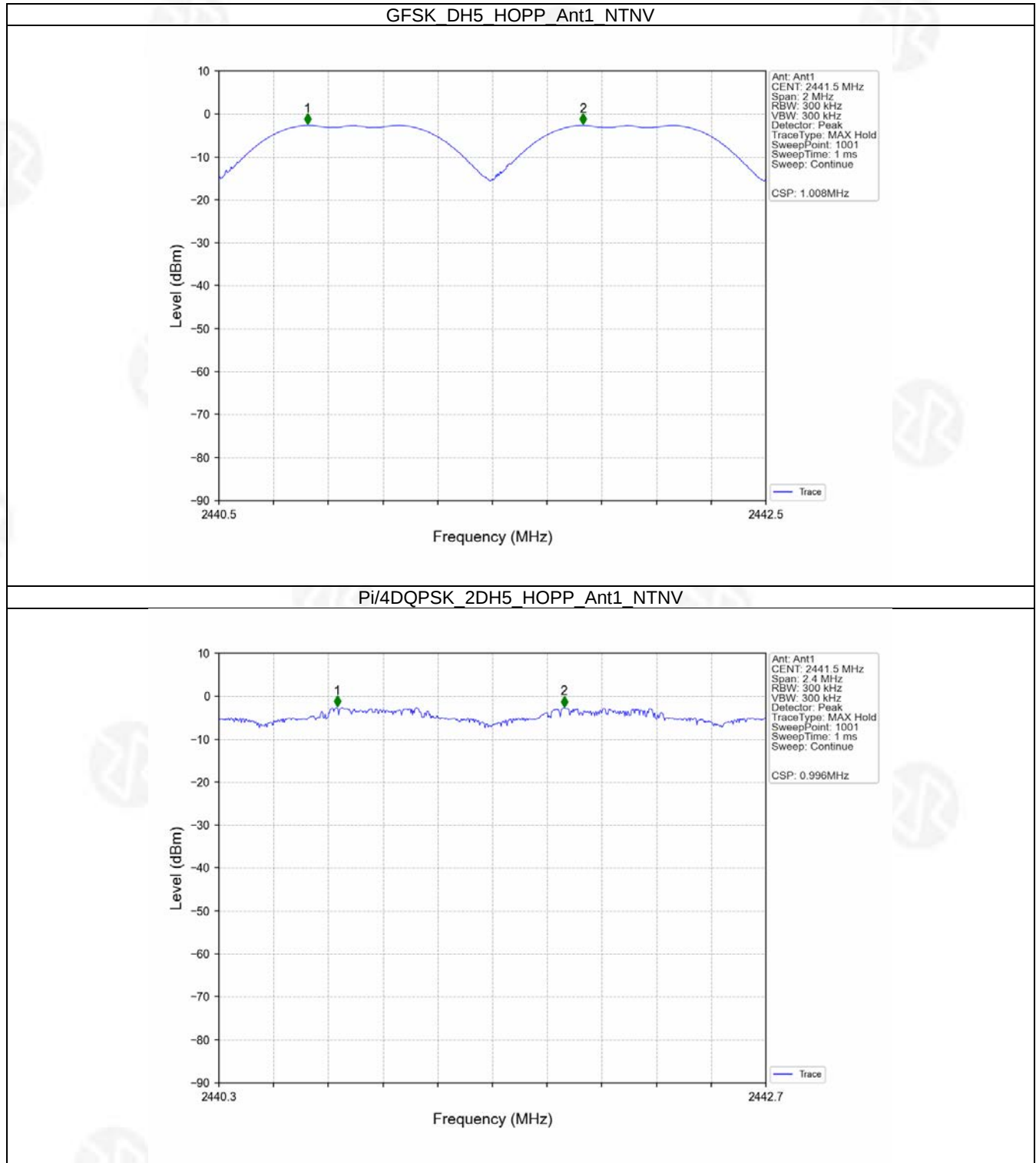
3.1.1 Ant1

Ant1							
Mode	TX Type	Frequency (MHz)	Packet Type	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
GFSK	SISO	HOPP	DH5	1.008	0.949	≥ 0.949	Pass
PI/4DQPSK	SISO	HOPP	2DH5	0.996	1.285	≥ 0.857	Pass
8DPSK	SISO	HOPP	3DH5	1.006	1.277	≥ 0.851	Pass



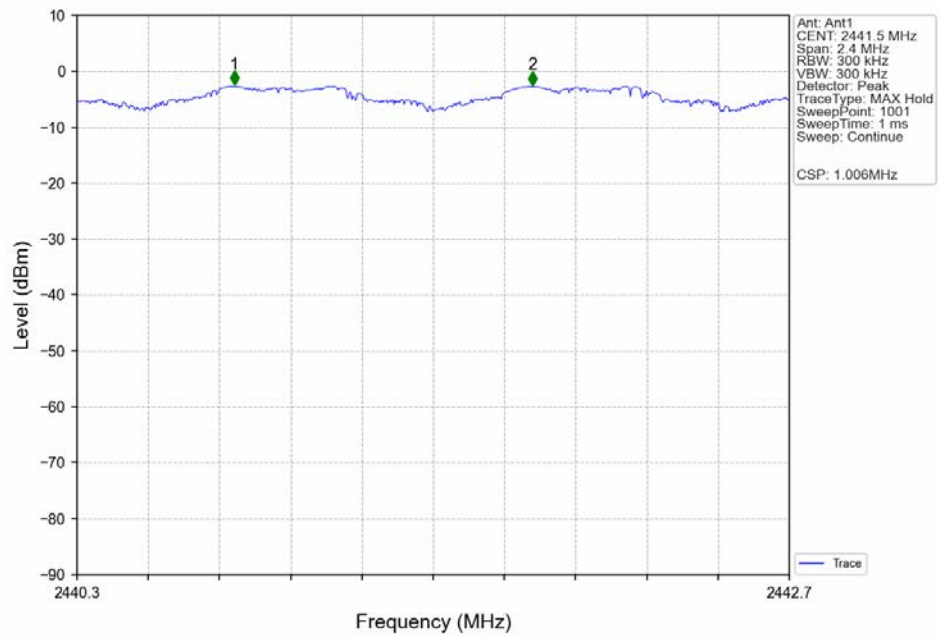
3.2 Test Graph

3.2.1 Ant1





8DPSK 3DH5 HOPP Ant1 NTN





4. Number of Hopping Frequencies

4.1 Test Result

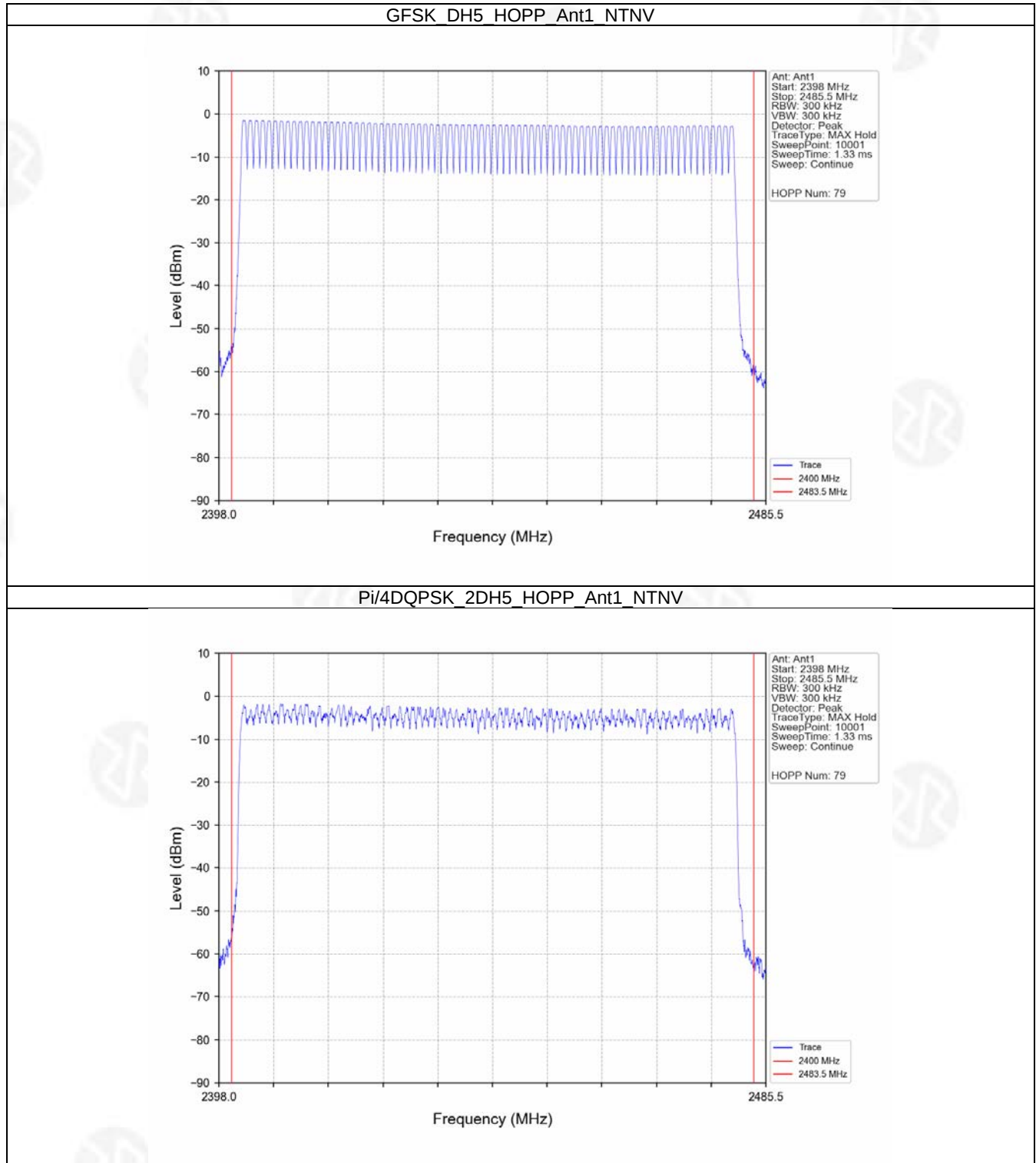
4.1.1 HoppNum

Mode	TX Type	Frequency (MHz)	Packet Type	Num of Hopping Frequencies		Verdict
				ANT1	Limit	
GFSK	SISO	HOPP	DH5	79	>=15	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	79	>=15	Pass
8DPSK	SISO	HOPP	3DH5	79	>=15	Pass



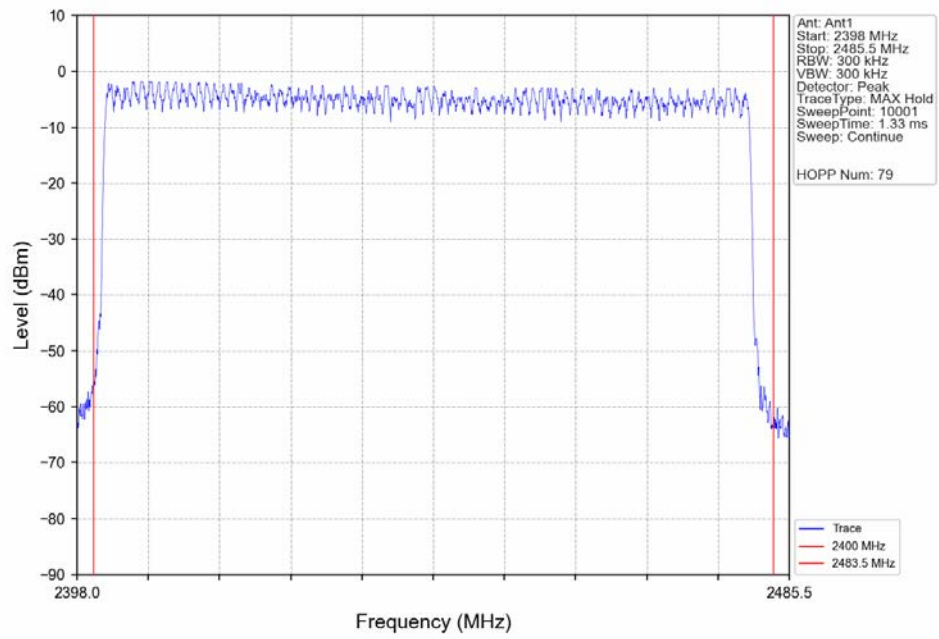
4.2 Test Graph

4.2.1 HoppNum





8DPSK 3DH5 HOPP Ant1 NTN





5. Time of Occupancy (Dwell Time)

5.1 Test Result

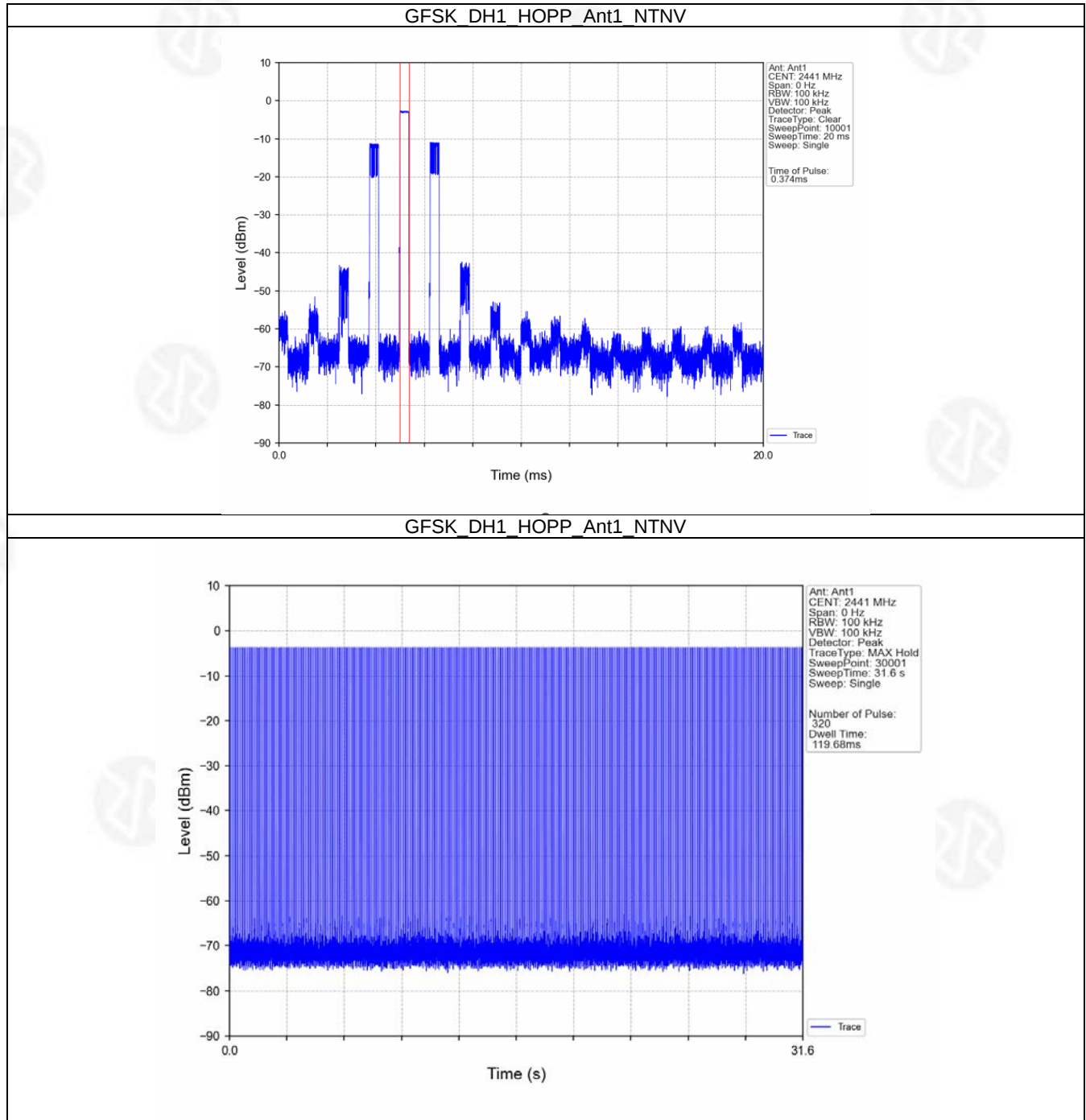
5.1.1 Ant1

Ant1									
Mode	Tx Type	Frequency (MHz)	Packet Type	Duration of Single Pulse (ms)	Observation Period (s)	Num of Pulse in Observation Period	Dwell Time (ms)	Limit (ms)	Verdict
GFSK	SISO	HOPP	DH1	0.374	31.600	320	119.680	<=400	Pass
			DH3	1.650	31.600	160	264.000	<=400	Pass
			DH5	2.898	31.600	106	307.188	<=400	Pass
Pi/4DQPSK	SISO	HOPP	2DH1	0.382	31.600	320	122.240	<=400	Pass
			2DH3	1.662	31.600	160	265.920	<=400	Pass
			2DH5	2.910	31.600	106	308.460	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.382	31.600	320	122.240	<=400	Pass
			3DH3	1.660	31.600	160	265.600	<=400	Pass
			3DH5	2.910	31.600	107	311.370	<=400	Pass



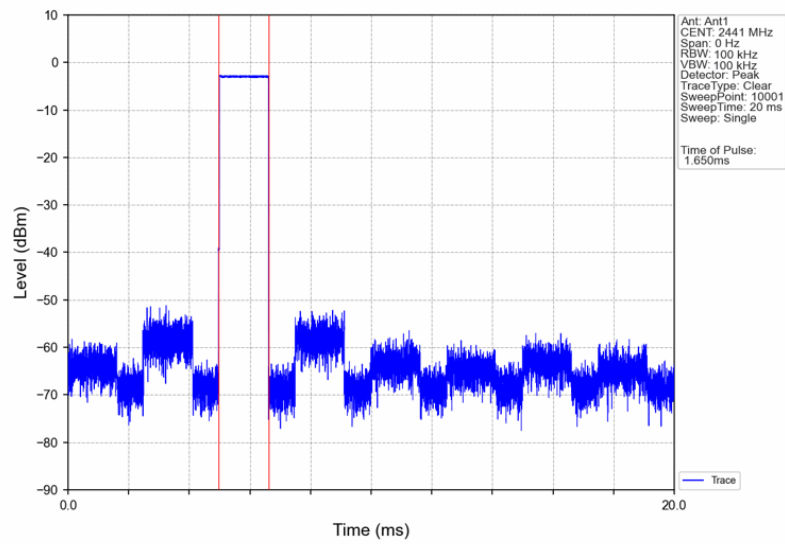
5.2 Test Graph

5.2.1 Ant1

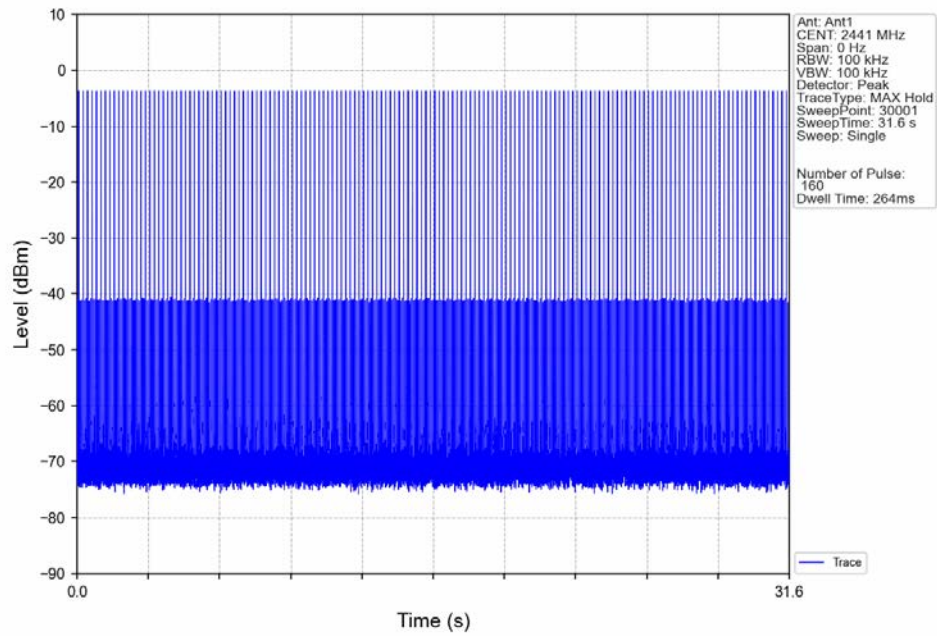




GFSK_DH3_HOPP_Ant1_NTNV

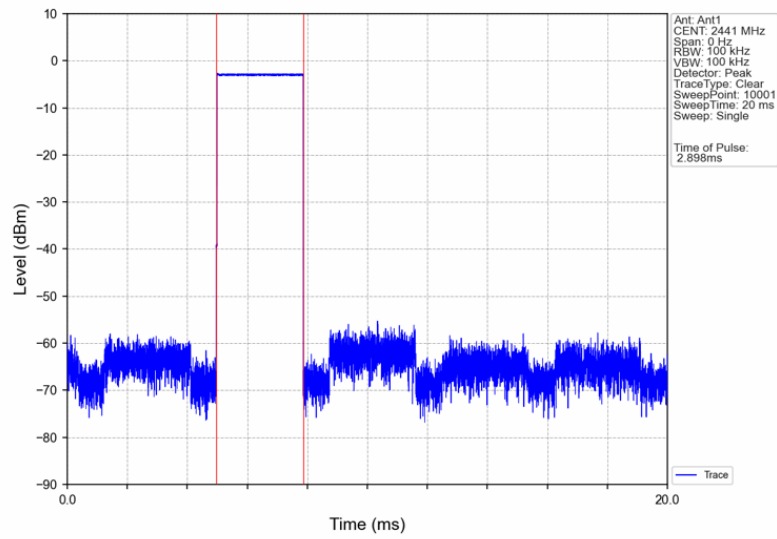


GFSK_DH3_HOPP_Ant1_NTNV

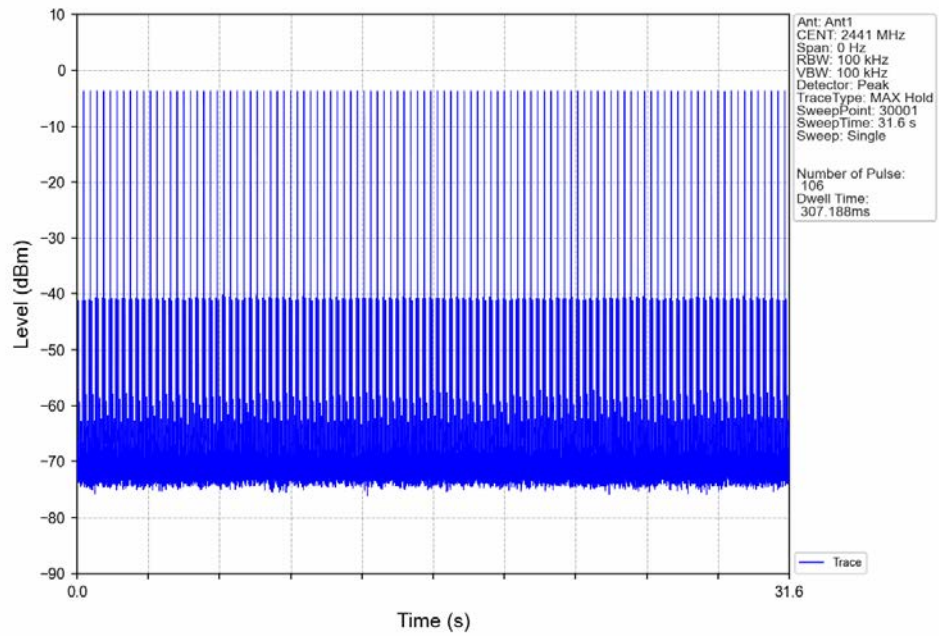




GFSK_DH5_HOPP_Ant1_NTNV

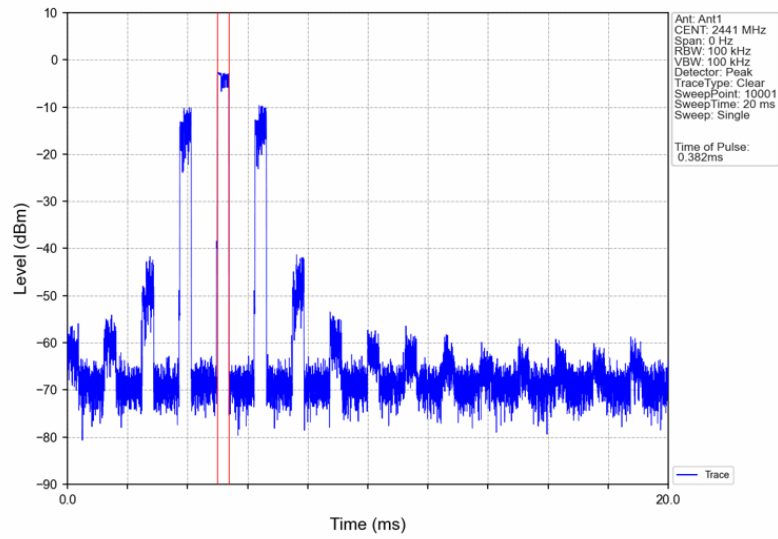


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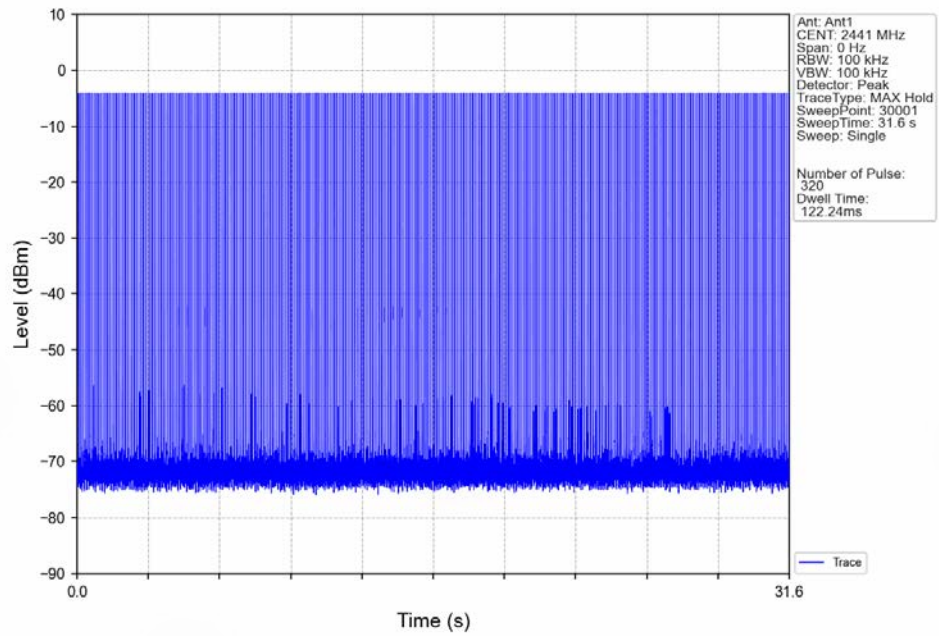




Pi/4DQPSK_2DH1_HOPP_Ant1_NTNV

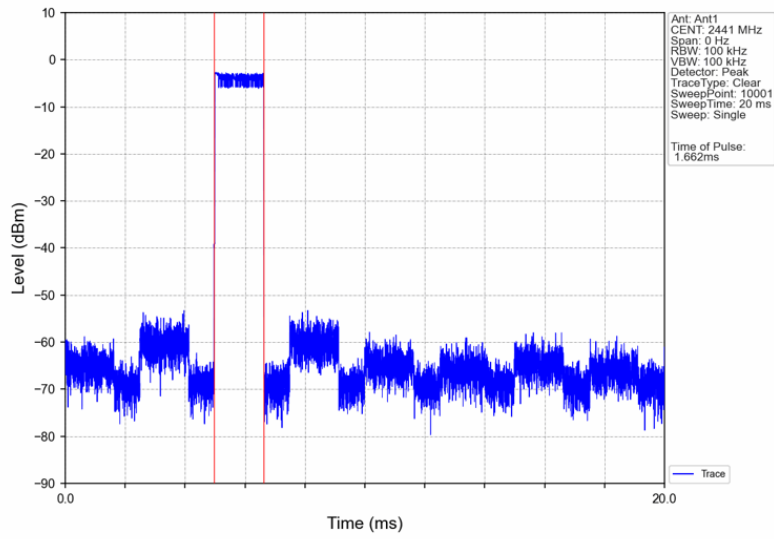


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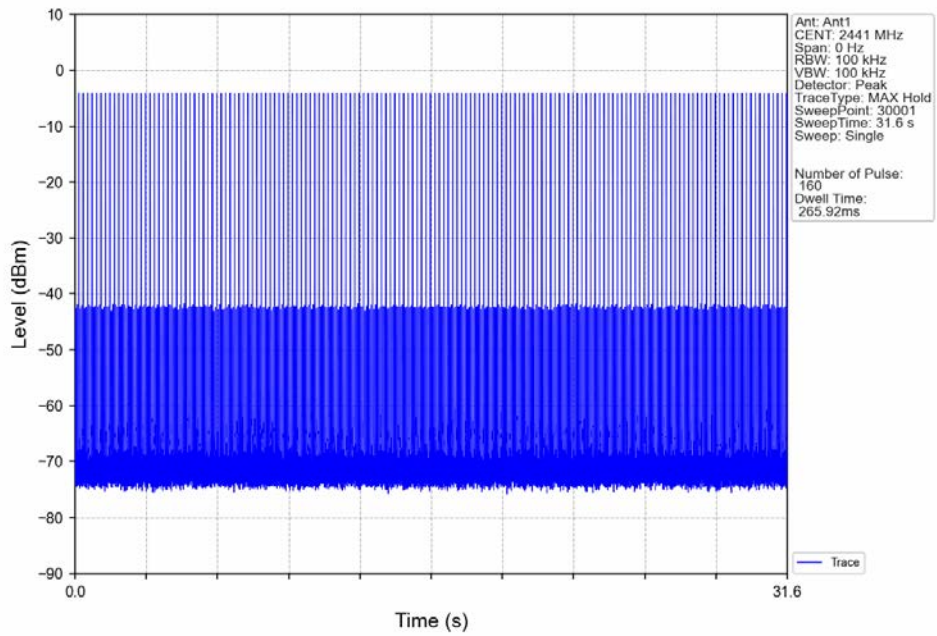




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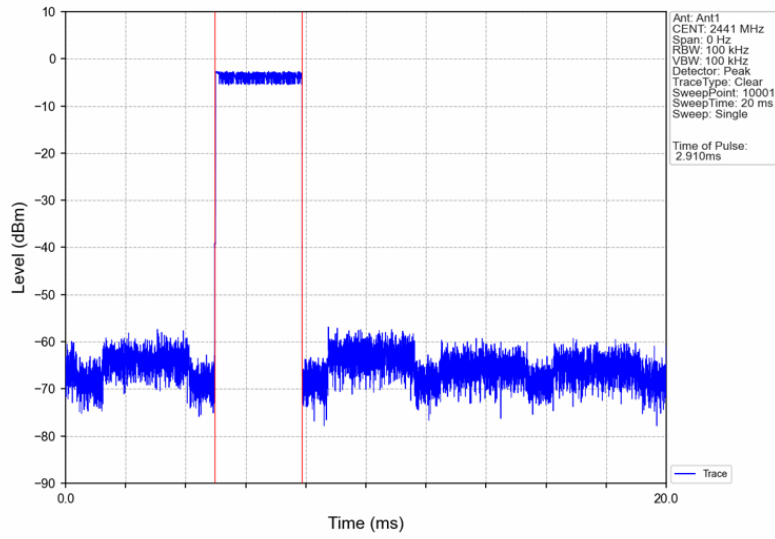


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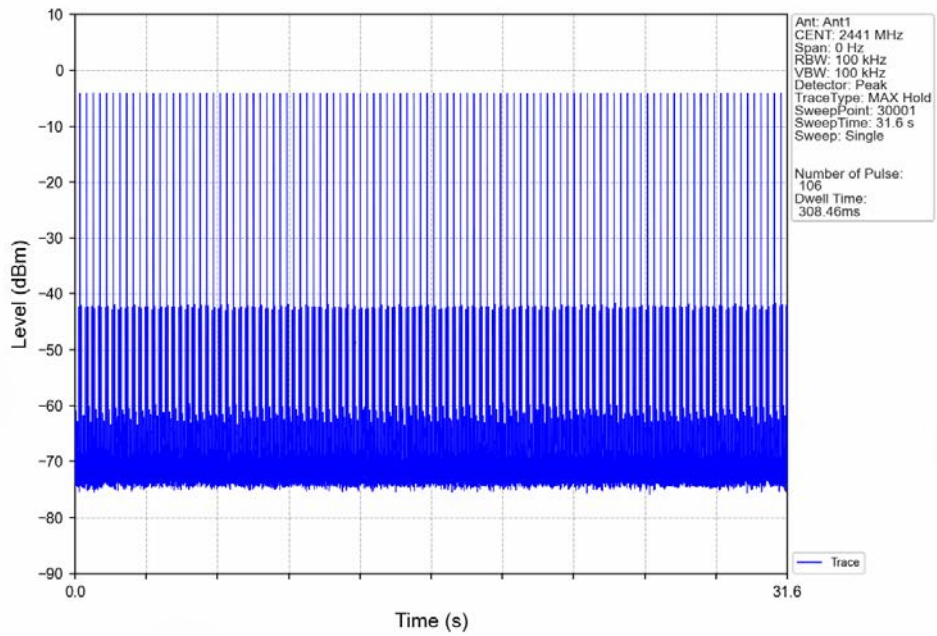




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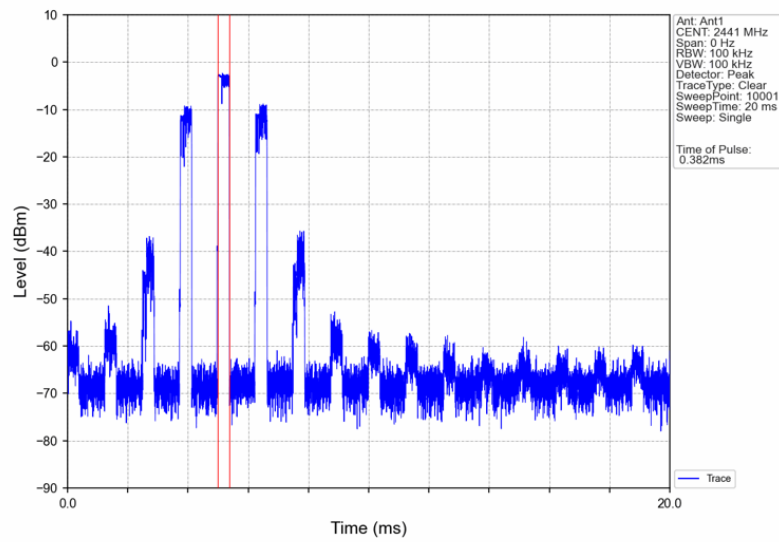


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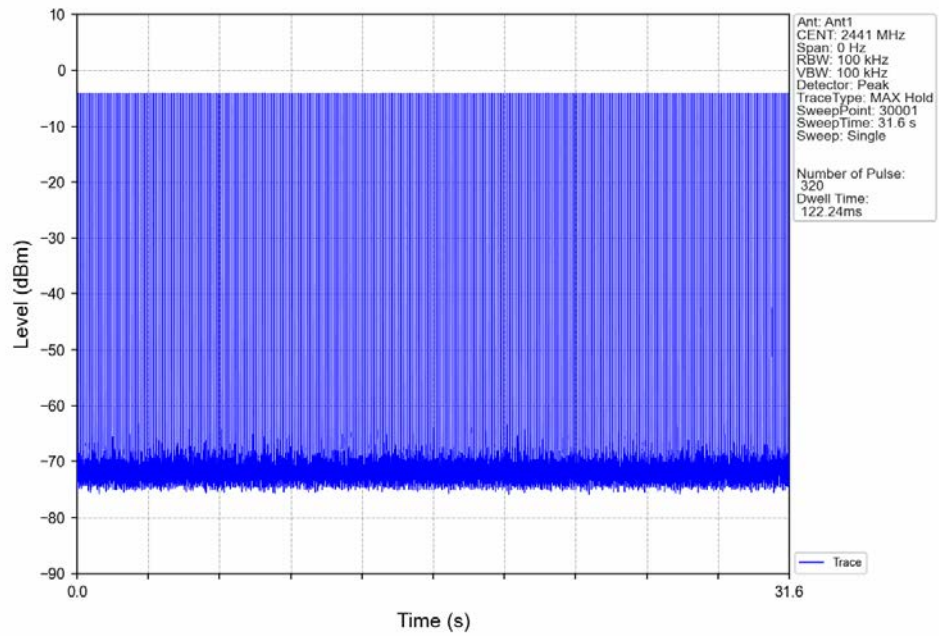




8DPSK_3DH1_HOPP_Ant1_NTNV

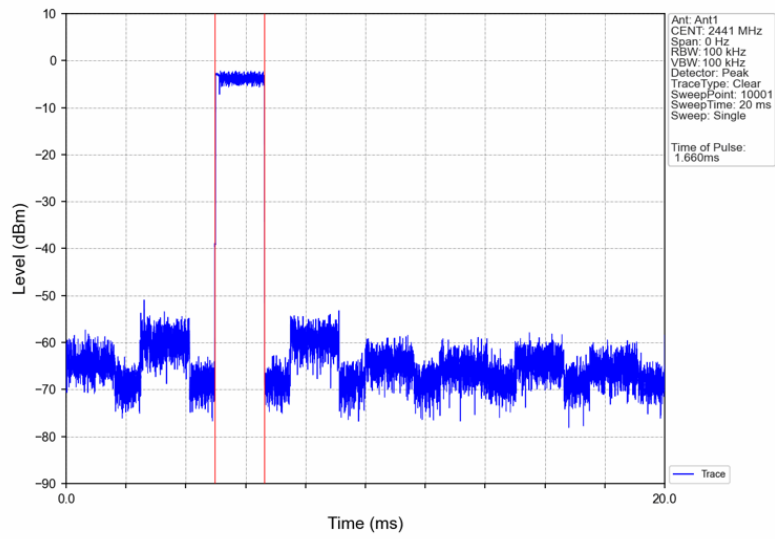


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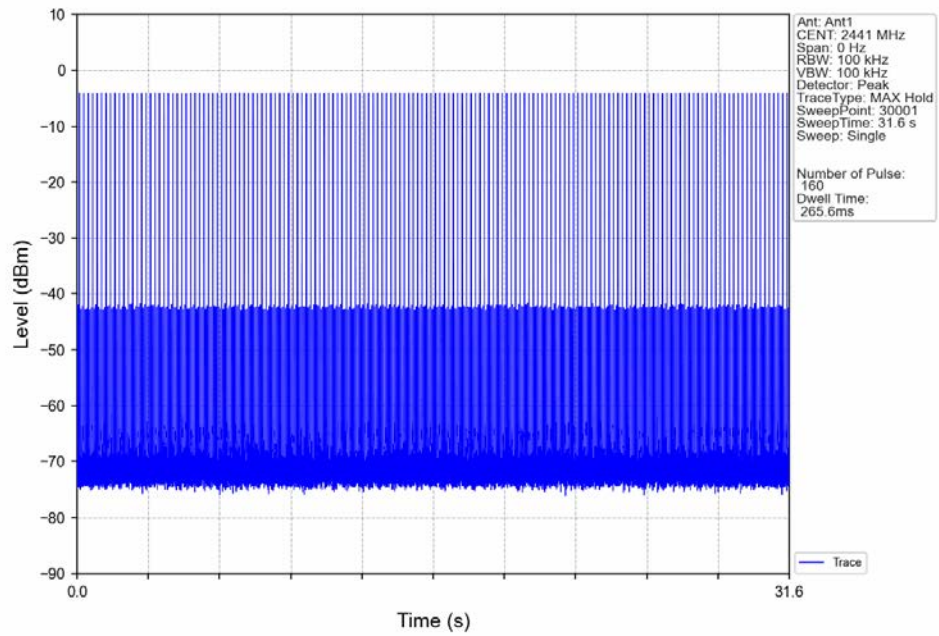




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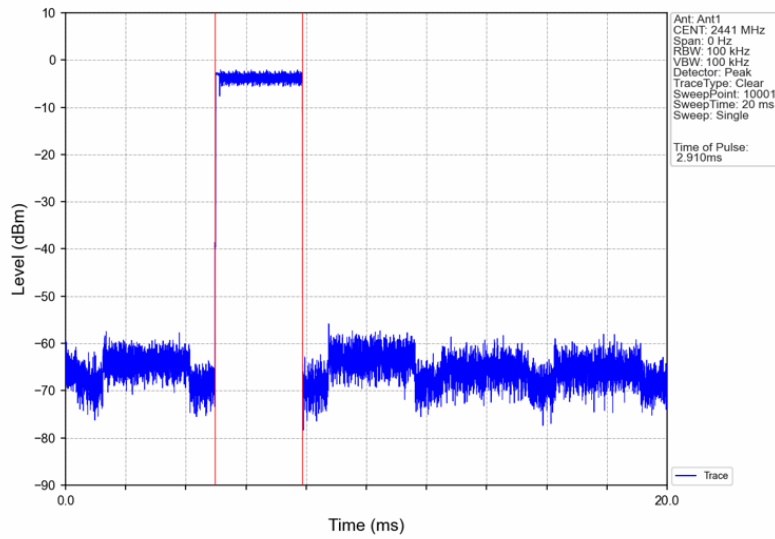


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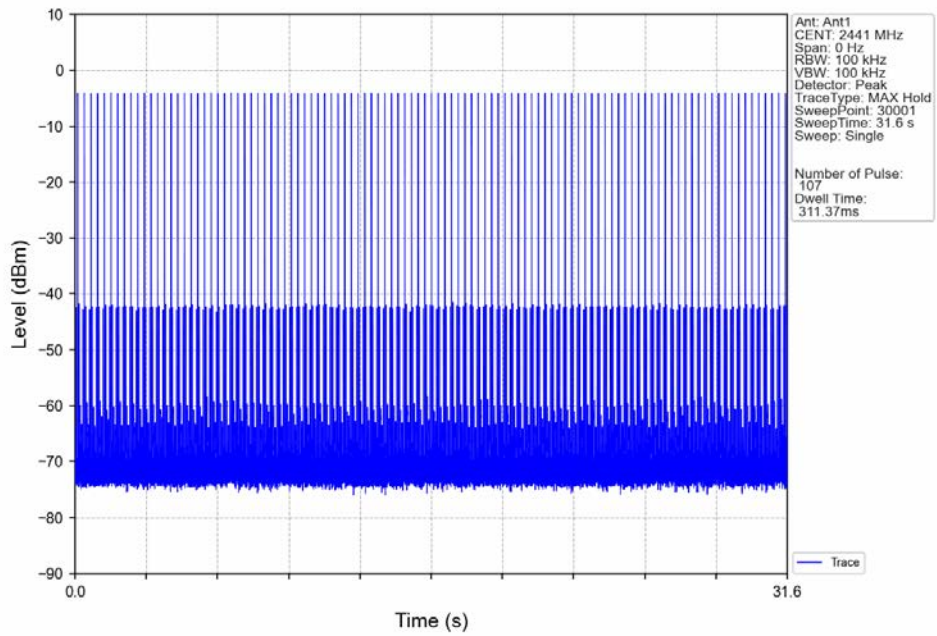




8DPSK_3DH5_HOPP_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV



6. Unwanted Emissions In Non-restricted Frequency Bands

6.1 Test Result

6.1.1 Ref

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)
GFSK	SISO	2402	DH5	1	-1.87
		2441	DH5	1	-2.86
		2480	DH5	1	-3.11
		HOPP	DH5	1	-1.93
					-1.93
Pi/4DQPSK	SISO	2402	2DH5	1	-2.05
		2441	2DH5	1	-3.08
		2480	2DH5	1	-3.28
		HOPP	2DH5	1	-2.44
					-2.44
8DPSK	SISO	2402	3DH5	1	-1.86
		2441	3DH5	1	-2.83
		2480	3DH5	1	-3.12
		HOPP	3DH5	1	-1.95
					-1.95
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.					

6.1.2 CSE

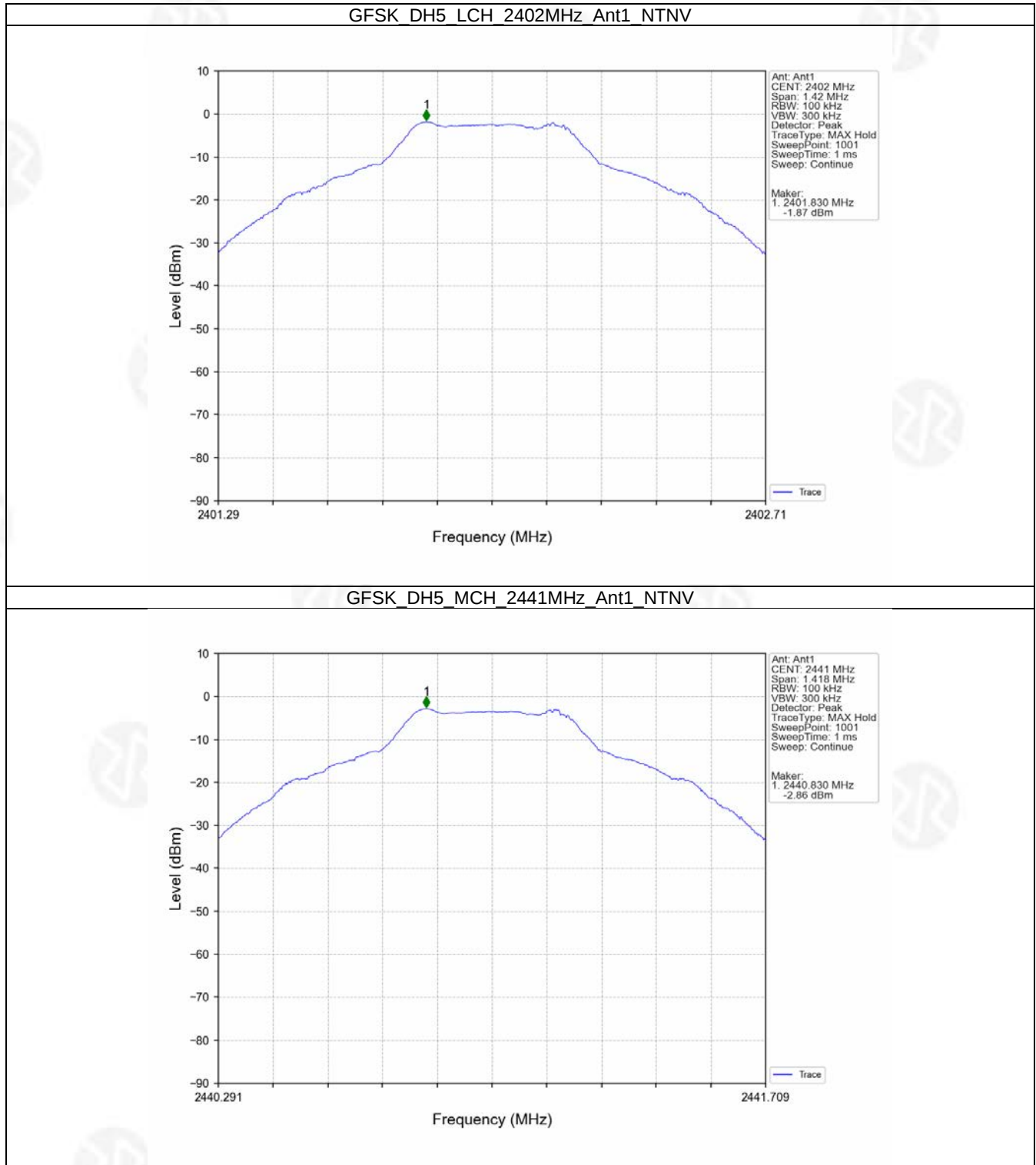
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	-1.87	-21.87	Pass
		2441	DH5	1	-2.86	-22.86	Pass
		2480	DH5	1	-3.11	-23.11	Pass
		HOPP	DH5	1	-1.93	-21.93	Pass
					-1.93	-21.93	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	-2.05	-22.05	Pass
		2441	2DH5	1	-3.08	-23.08	Pass
		2480	2DH5	1	-3.28	-23.28	Pass
		HOPP	2DH5	1	-2.44	-22.44	Pass
					-2.44	-22.44	Pass
8DPSK	SISO	2402	3DH5	1	-1.86	-21.86	Pass
		2441	3DH5	1	-2.83	-22.83	Pass
		2480	3DH5	1	-3.12	-23.12	Pass
		HOPP	3DH5	1	-1.95	-21.95	Pass
					-1.95	-21.95	Pass

Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.



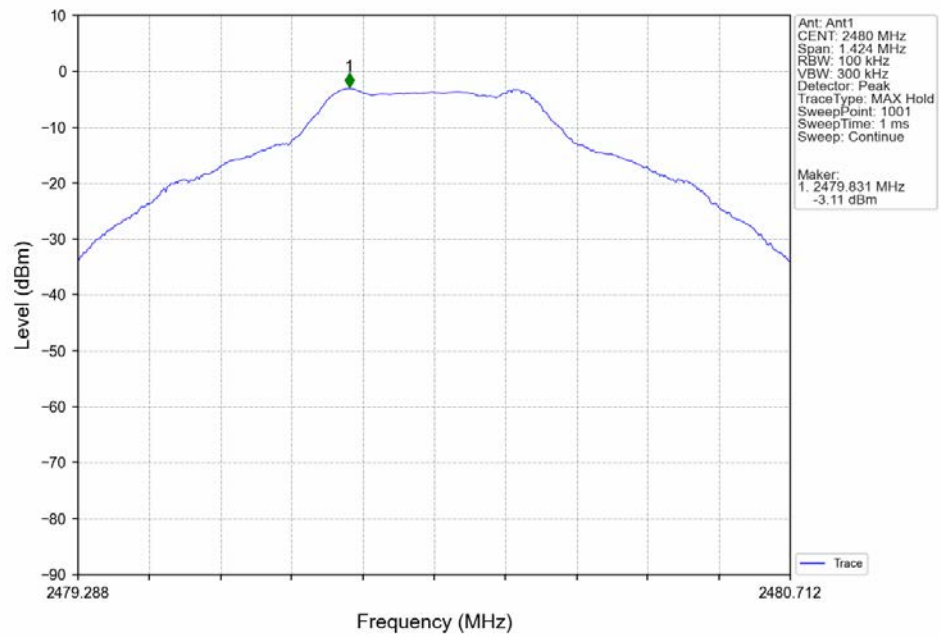
6.2 Test Graph

6.2.1 Ref

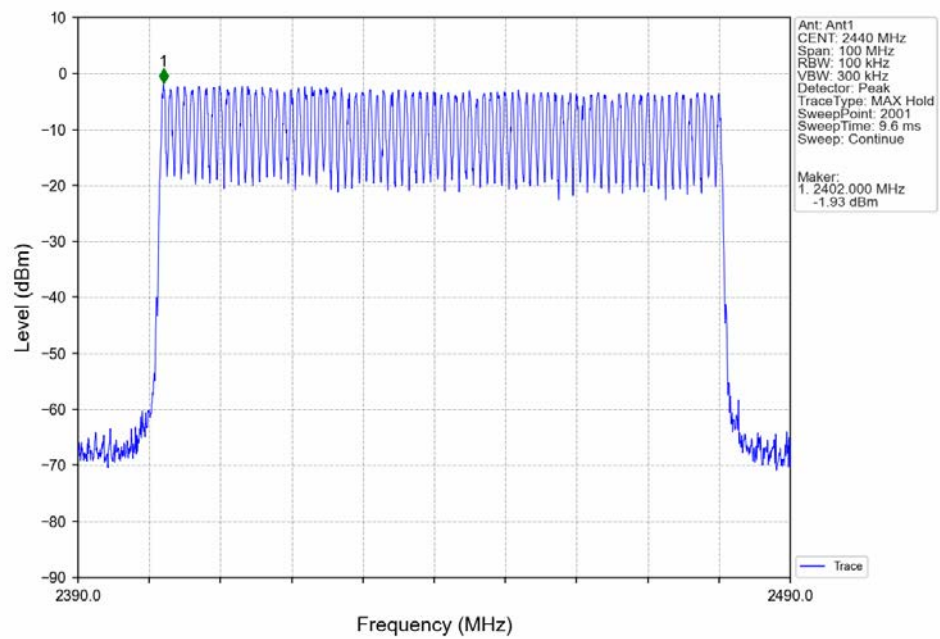




GFSK DH5 HCH 2480MHz Ant1 NTN

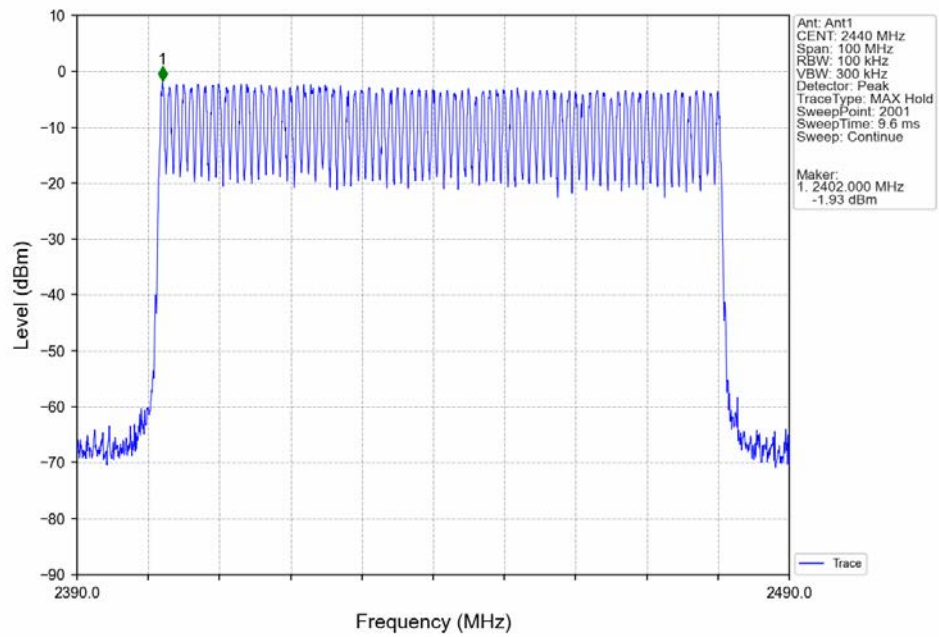


GFSK_DH5_HOPP_Ant1_NTN

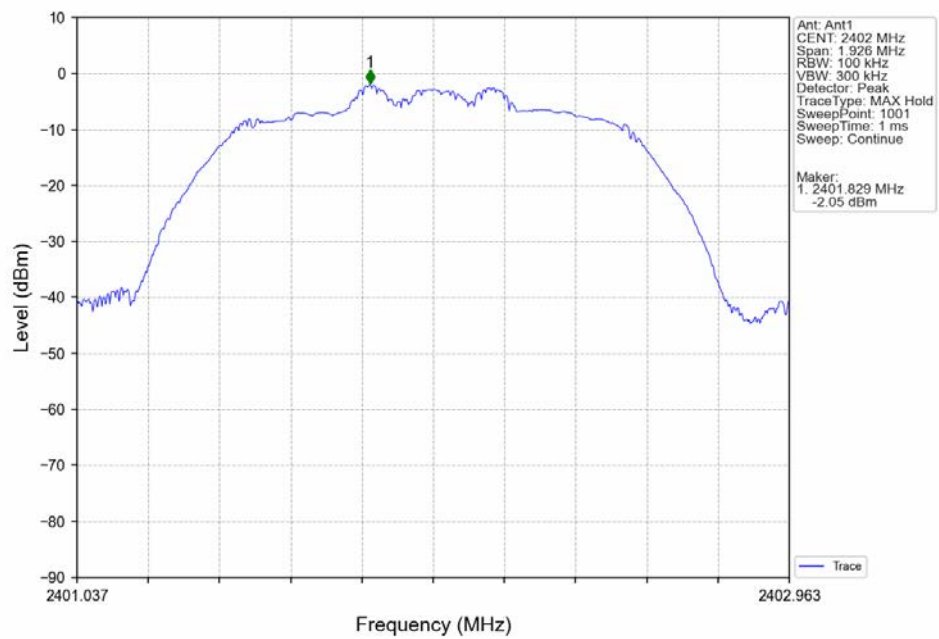




GFSK DH5 HOPP Ant1 NTN

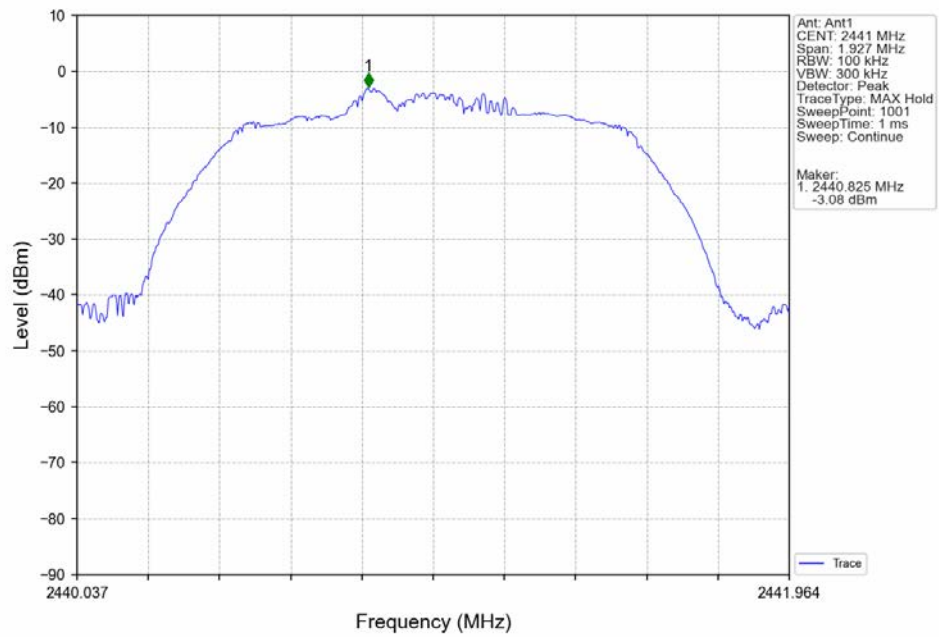


Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1 NTN

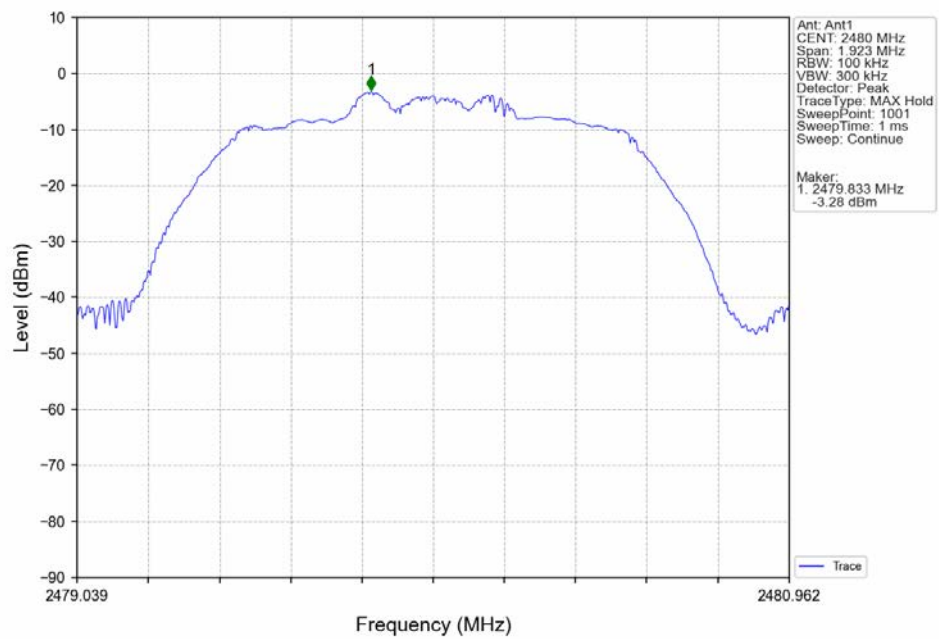




Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV

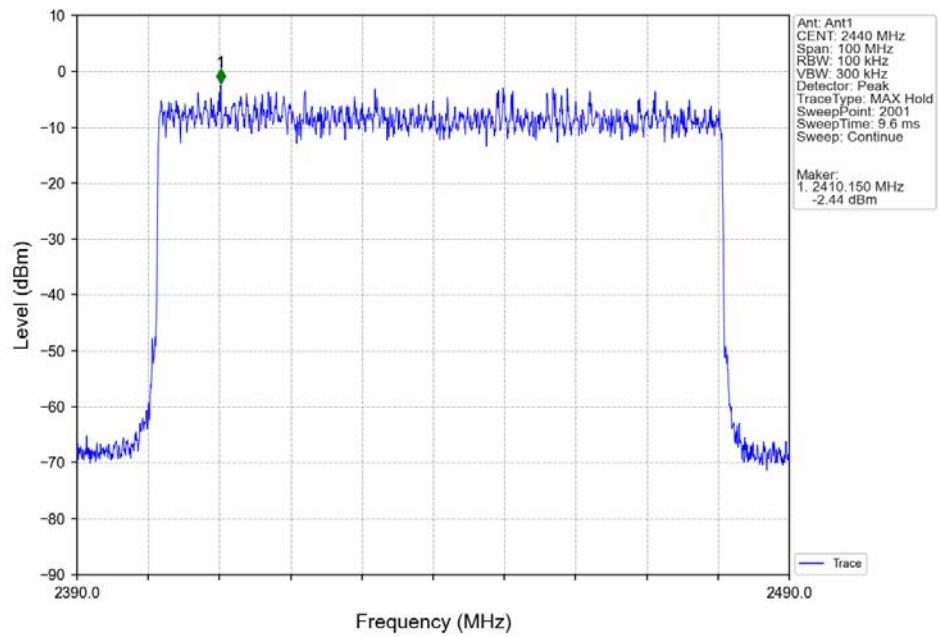


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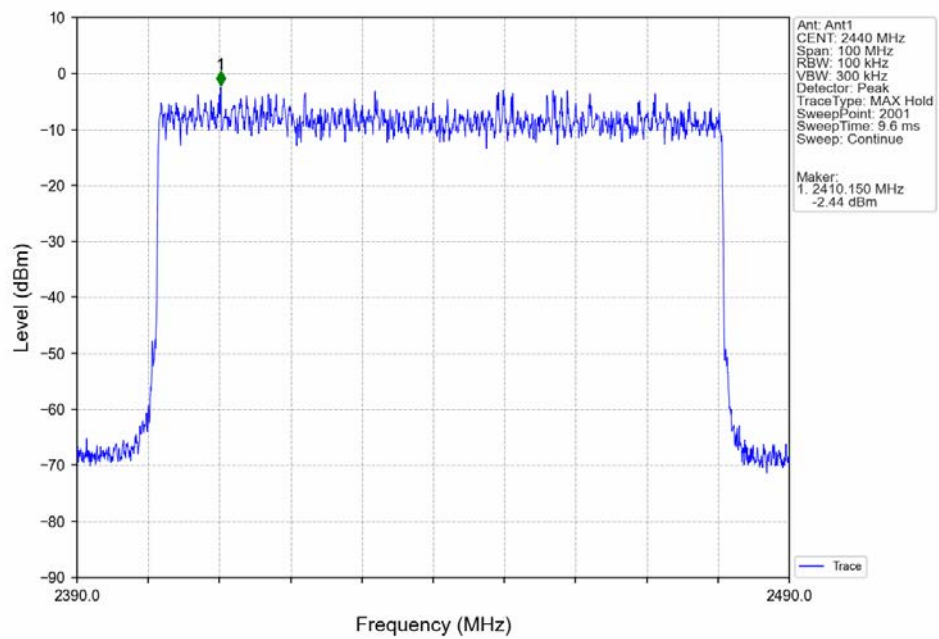




Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV

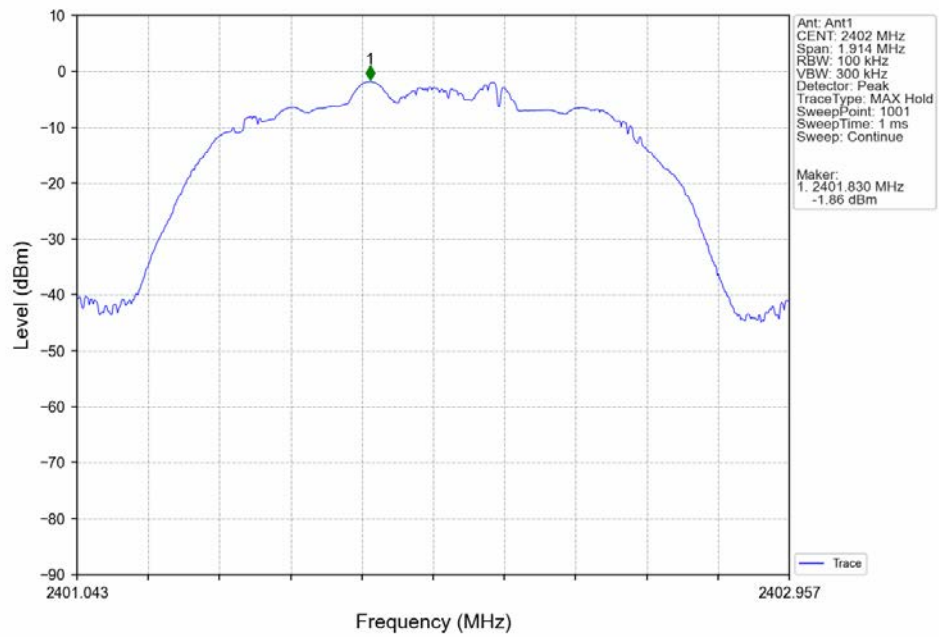


Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV

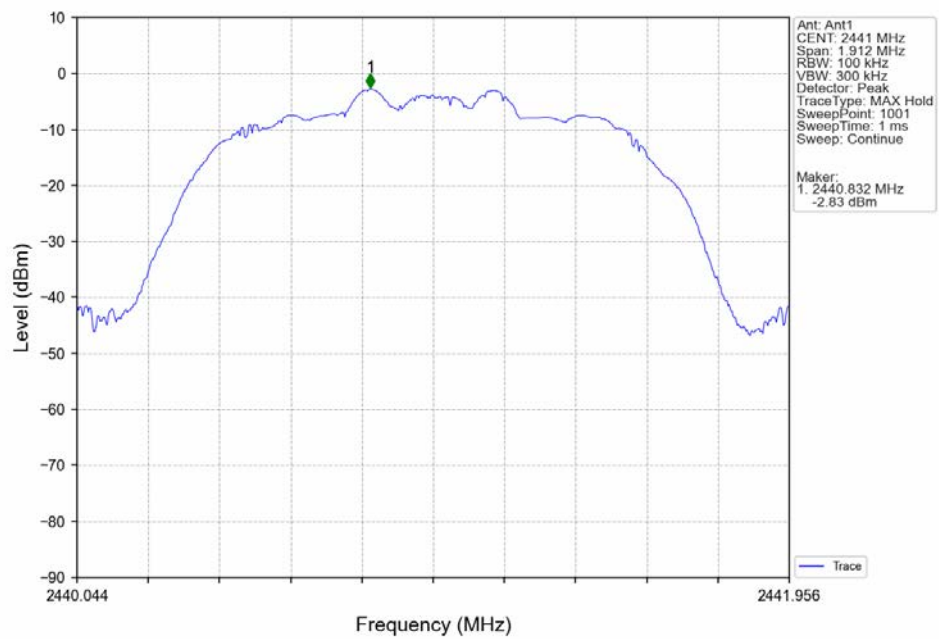




8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV

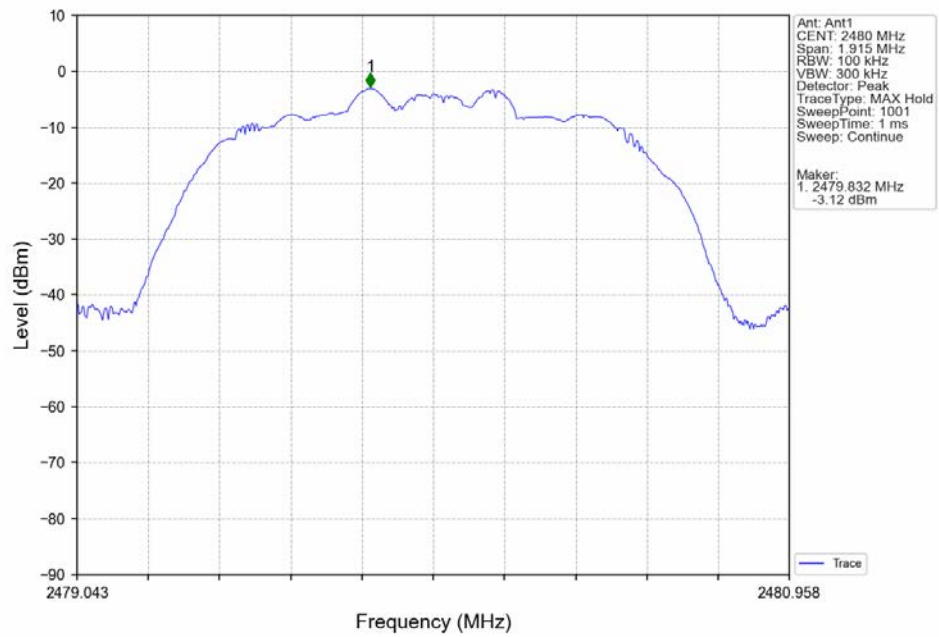


8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV

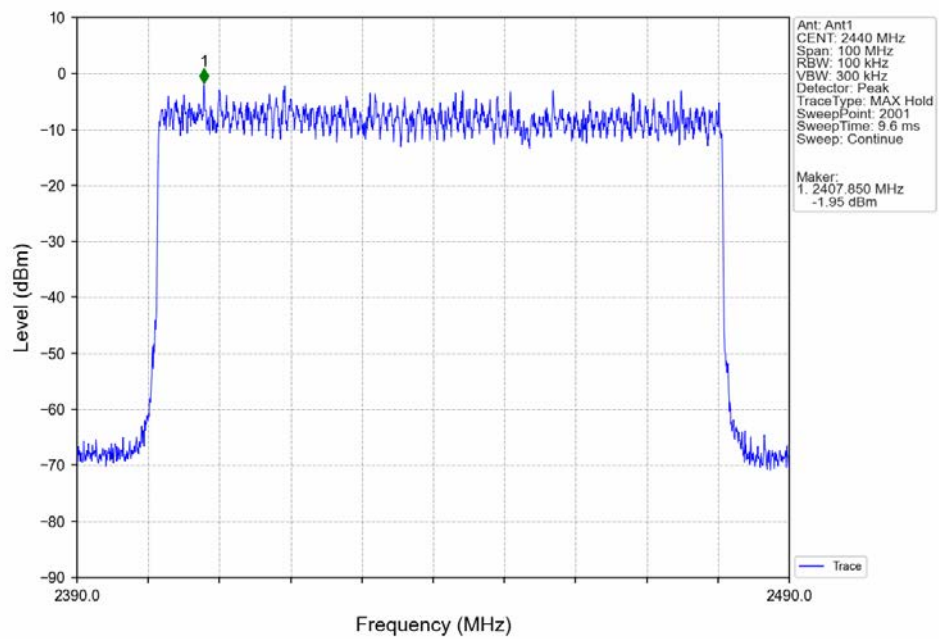




8DPSK 3DH5 HCH 2480MHz Ant1 NTN

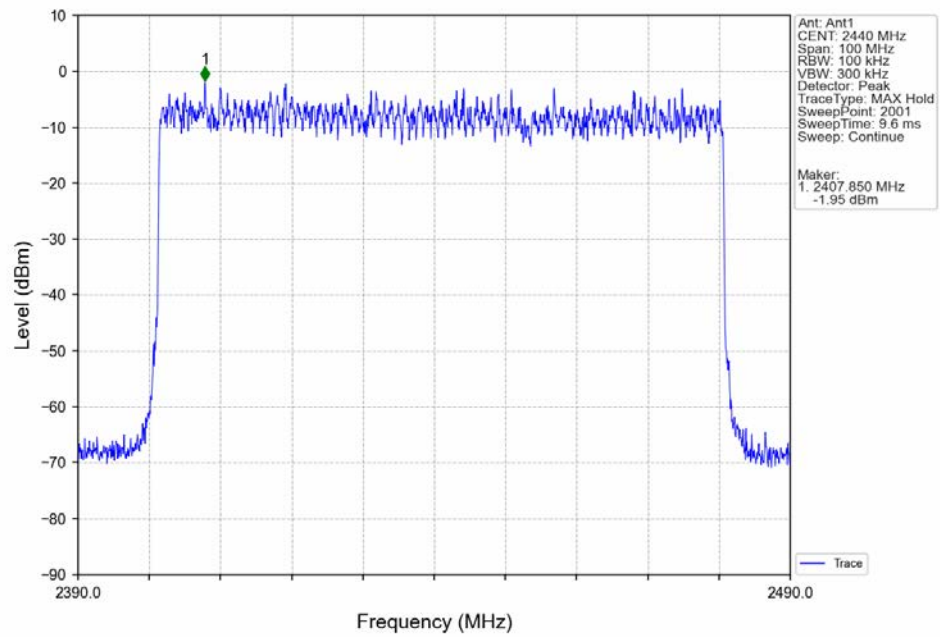


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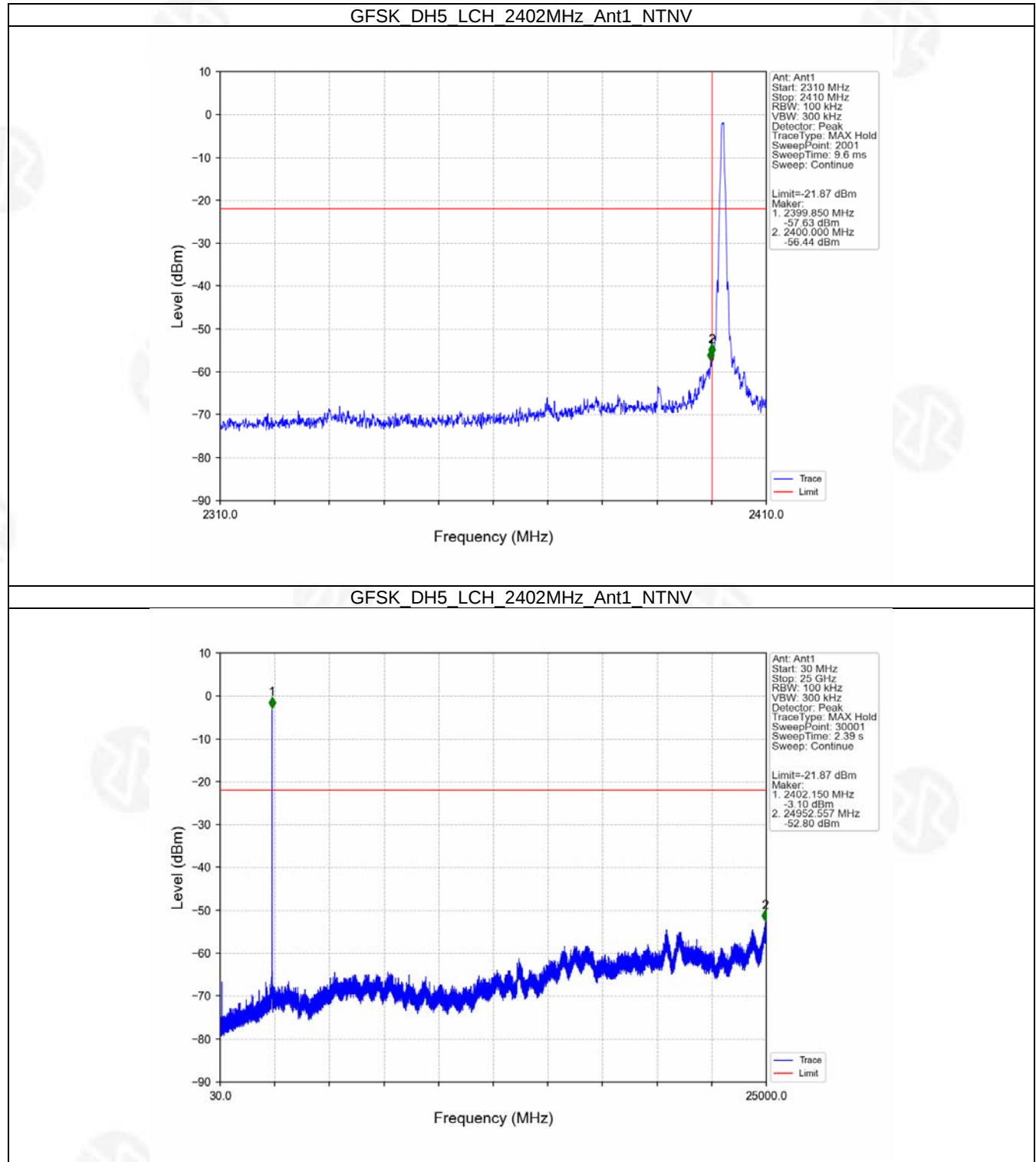


8DPSK 3DH5 HOPP Ant1 NTNV



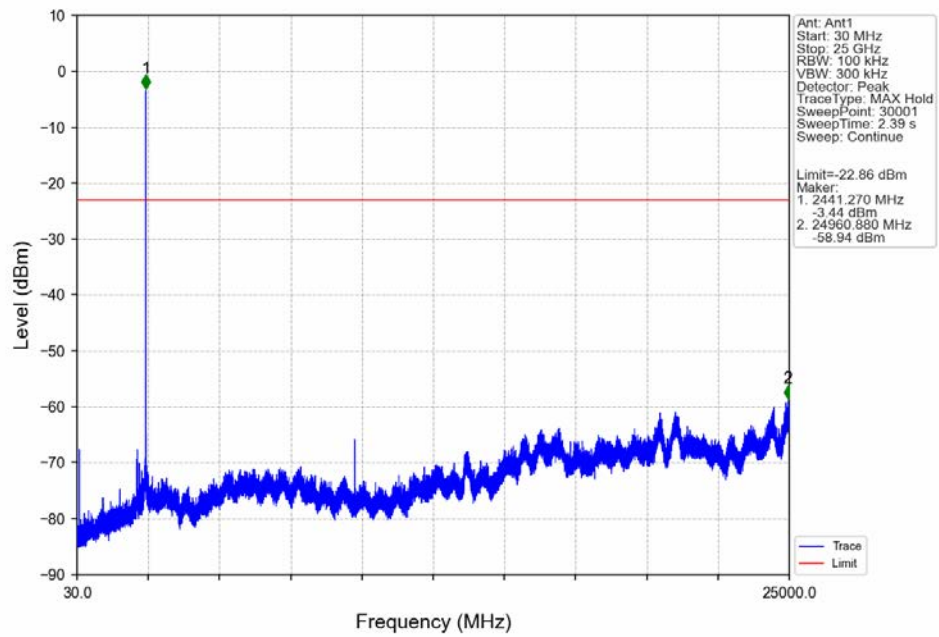


6.2.2 CSE

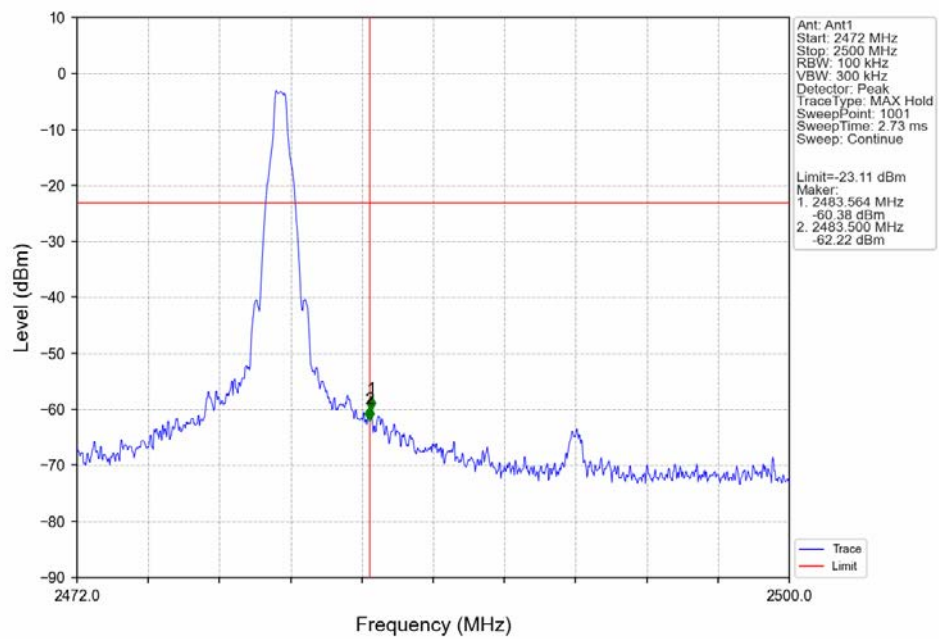




GFSK_DH5_MCH_2441MHz_Ant1_NTNV

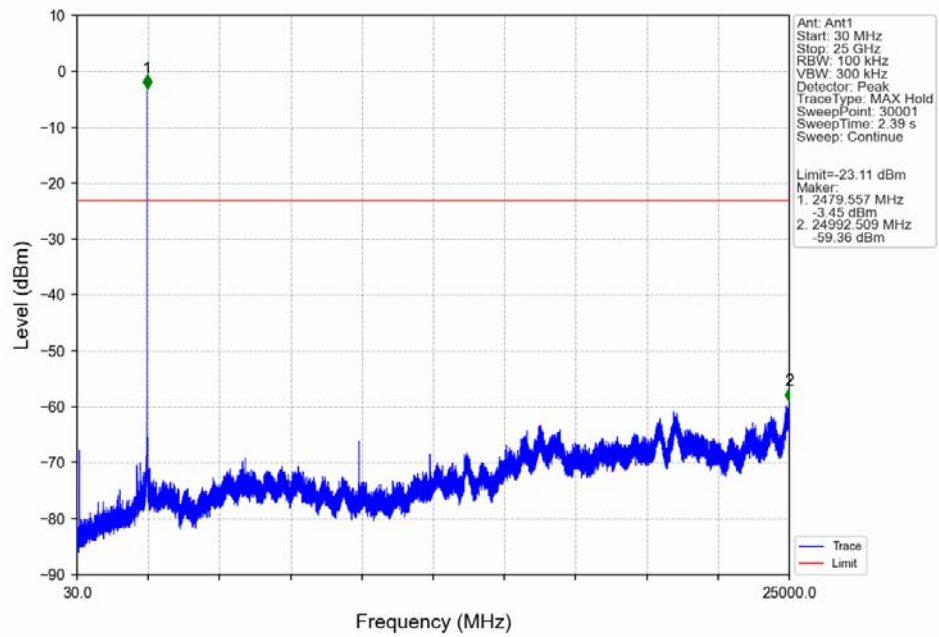


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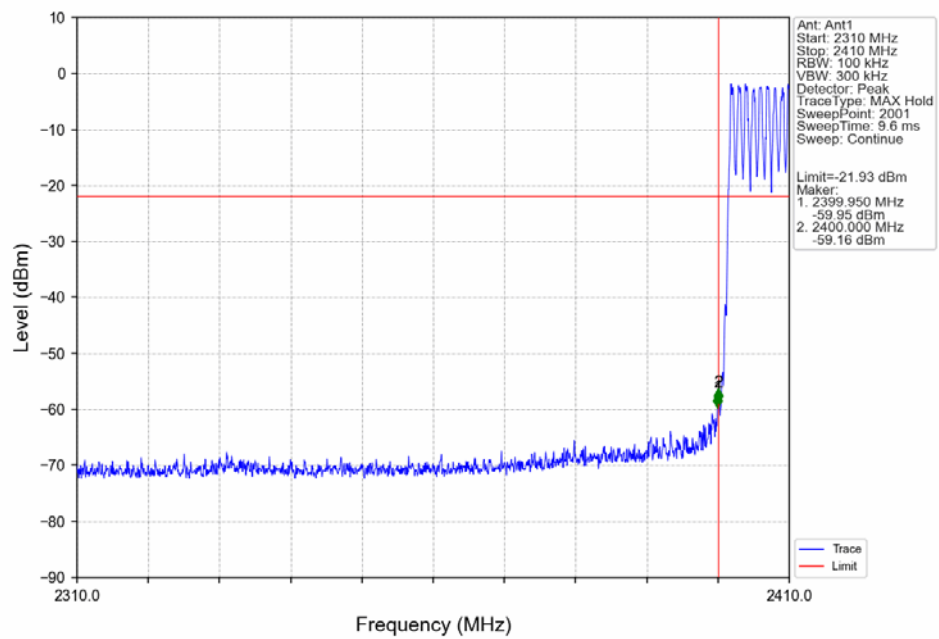




GFSK DH5 HCH 2480MHz Ant1 NTN

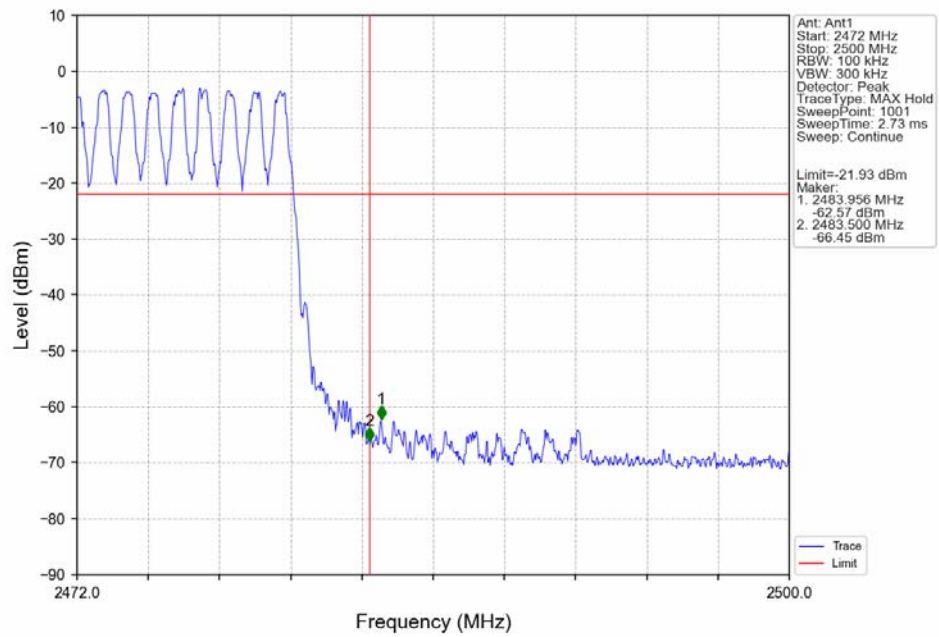


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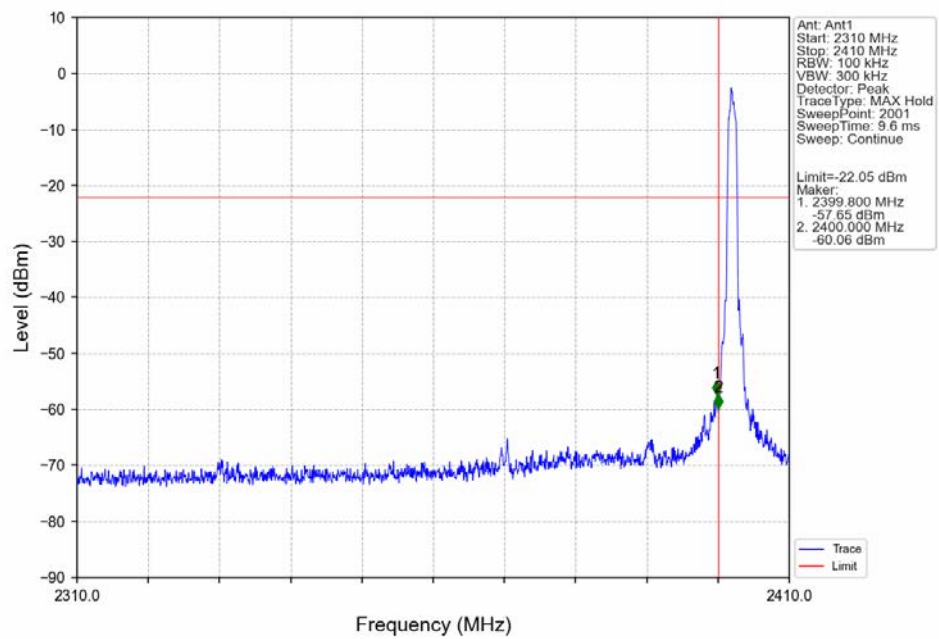




GFSK DH5 HOPP Ant1 NTN

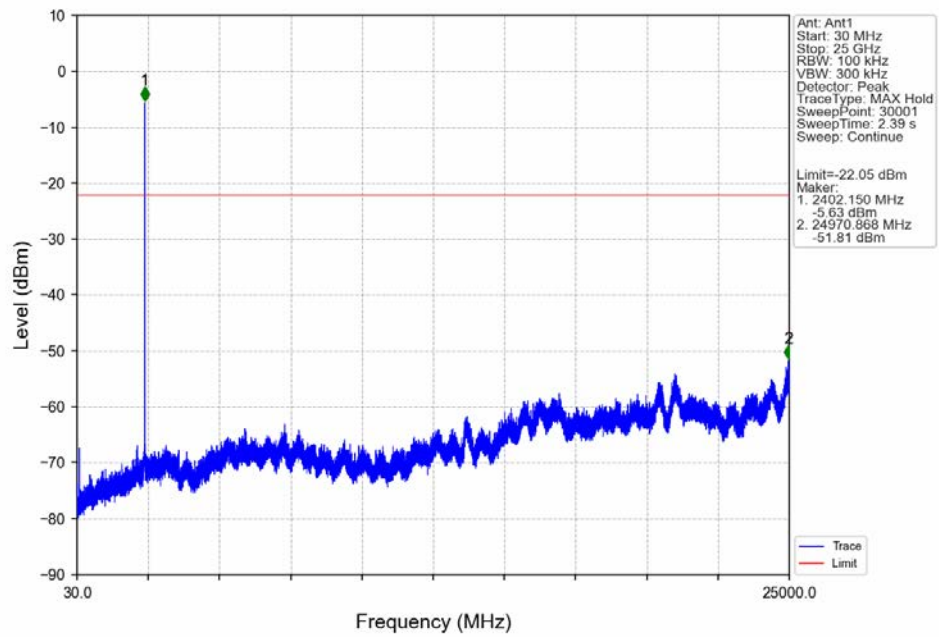


Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTN

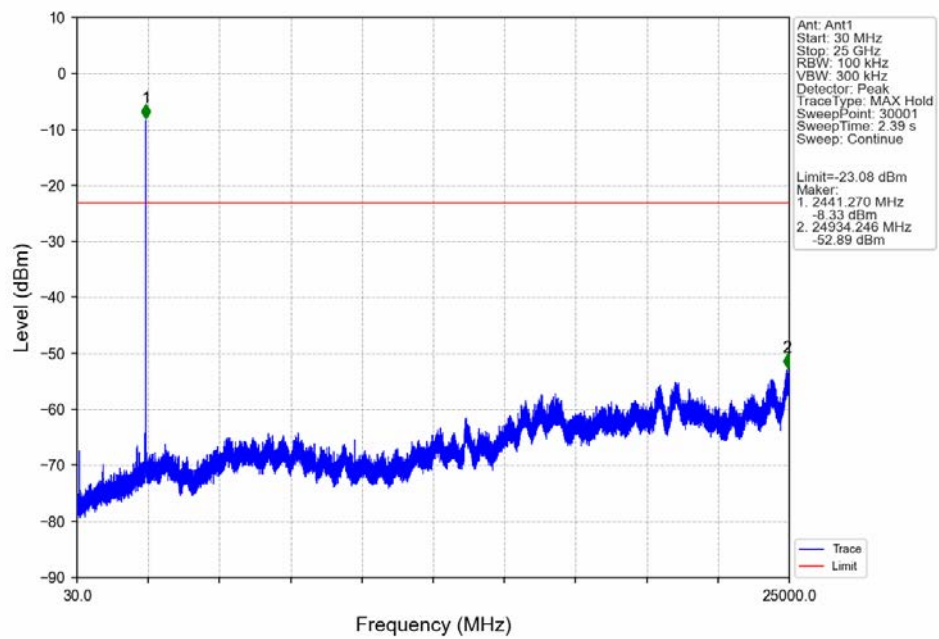




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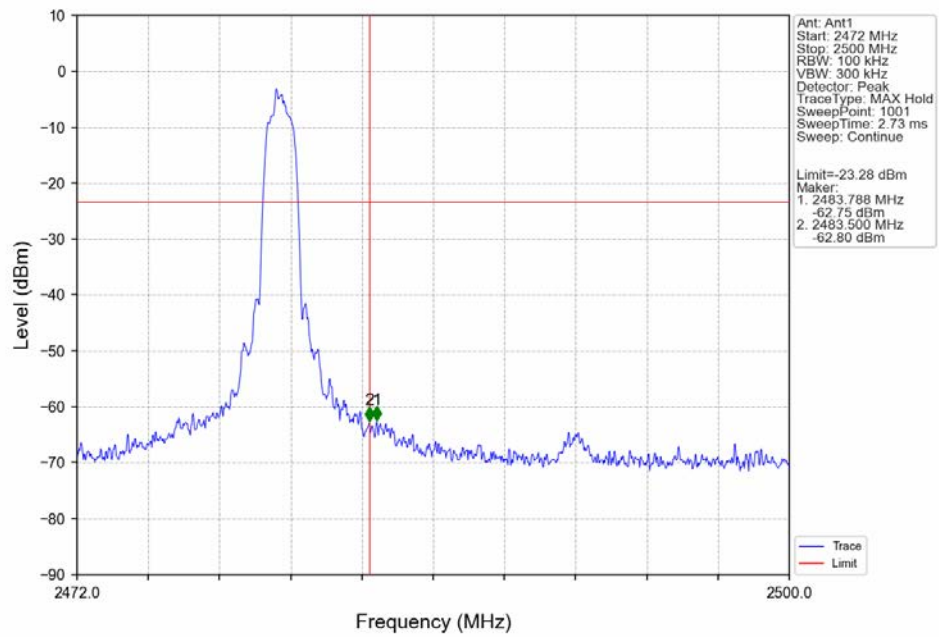


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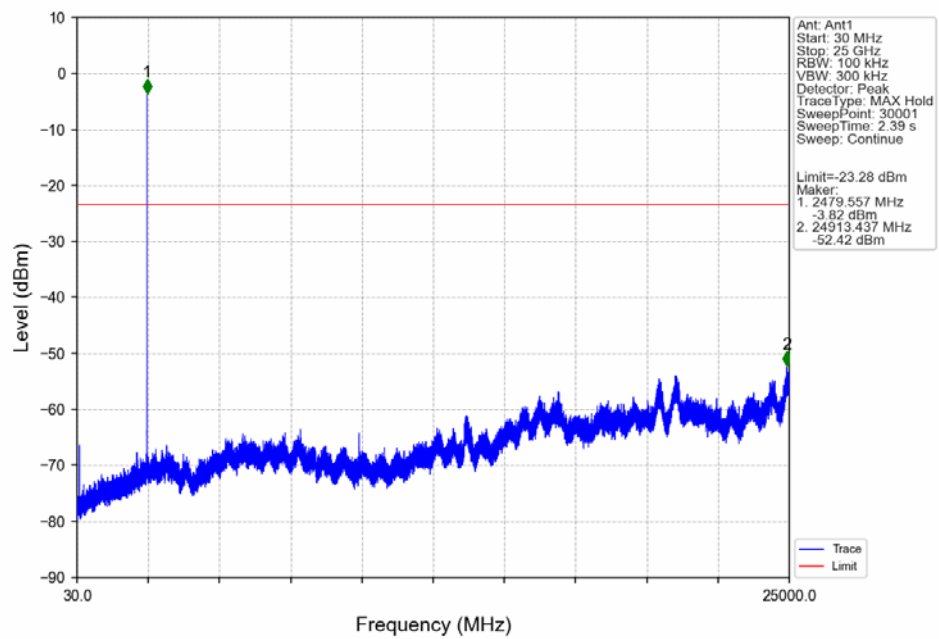




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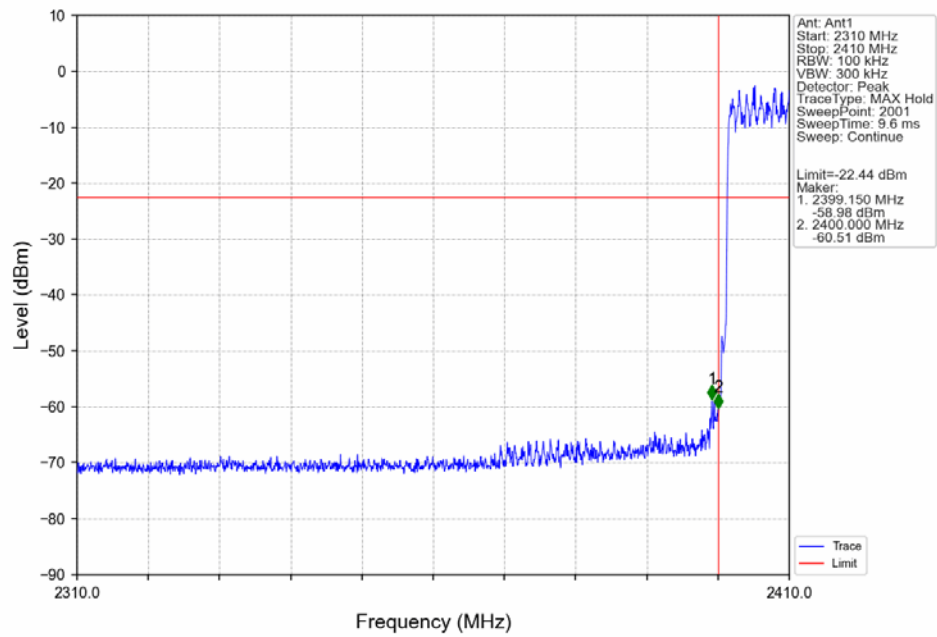


Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

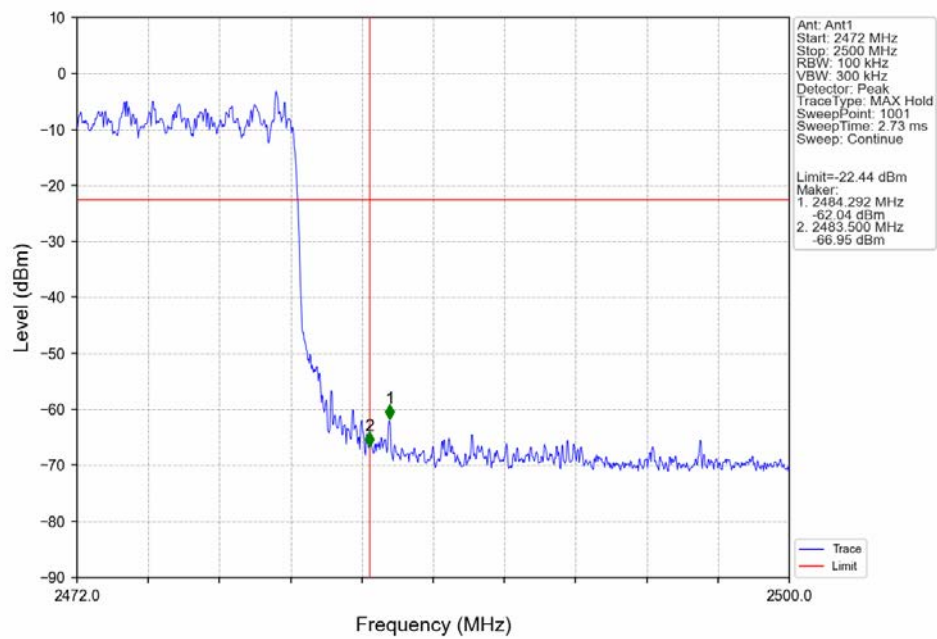




Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV

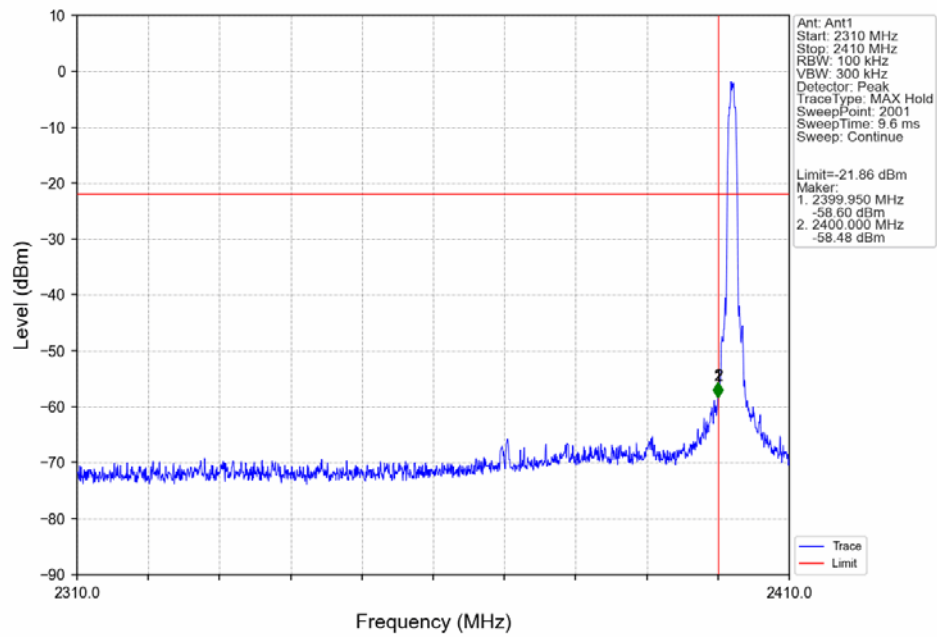


Pi/4DQPSK_2DH5_HOPP_Ant1_NTNV

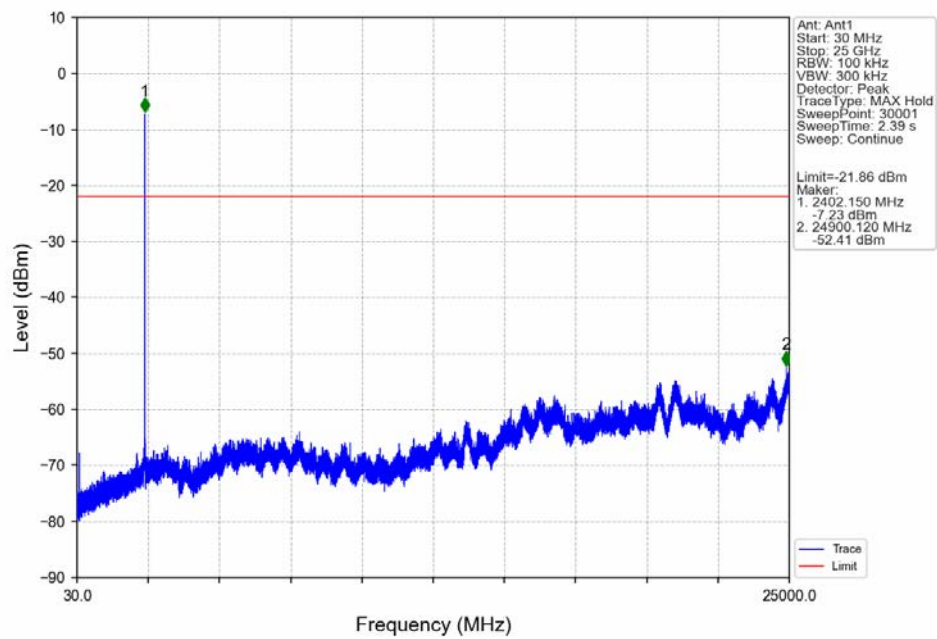




8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV

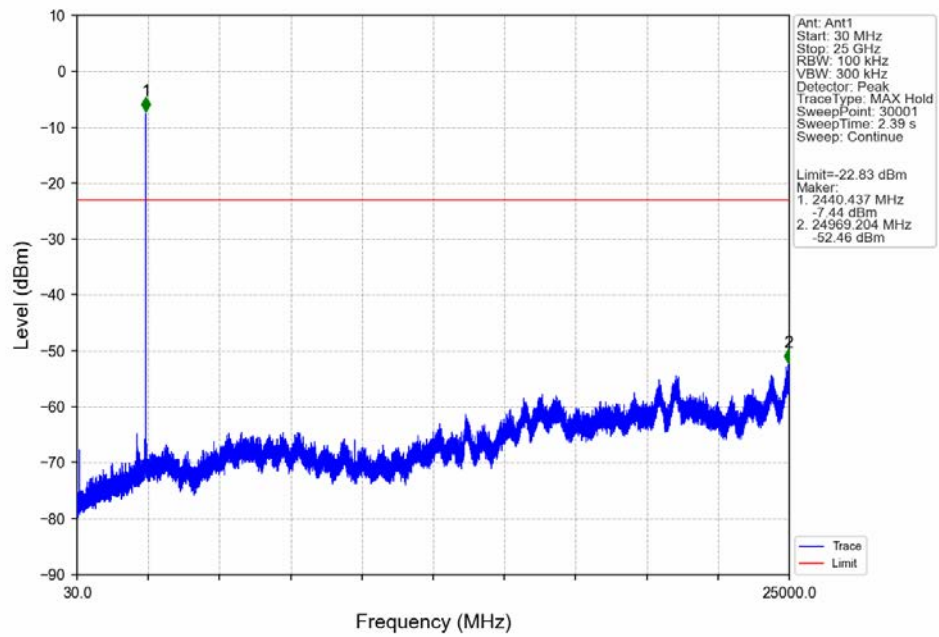


8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV

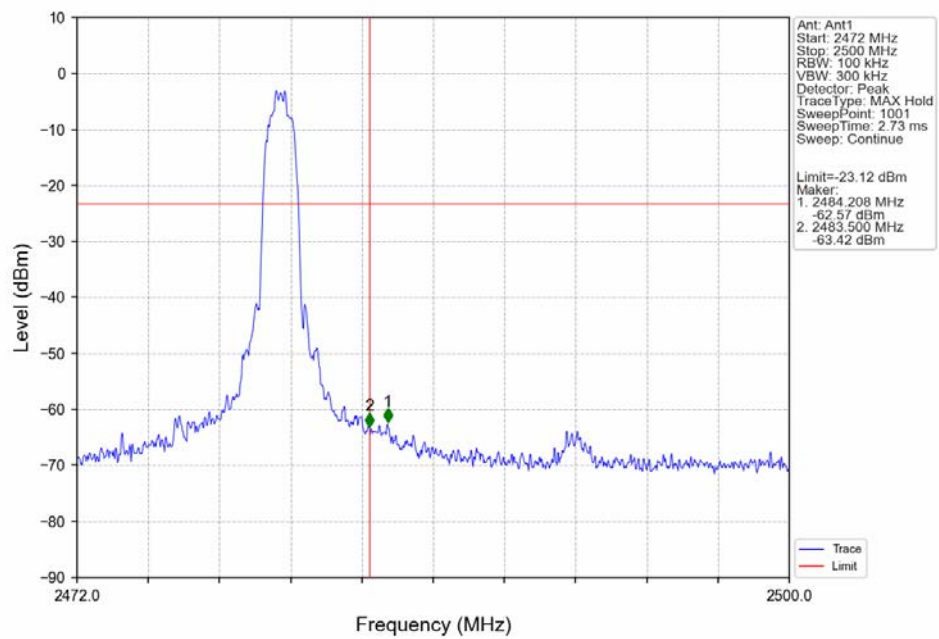




8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV

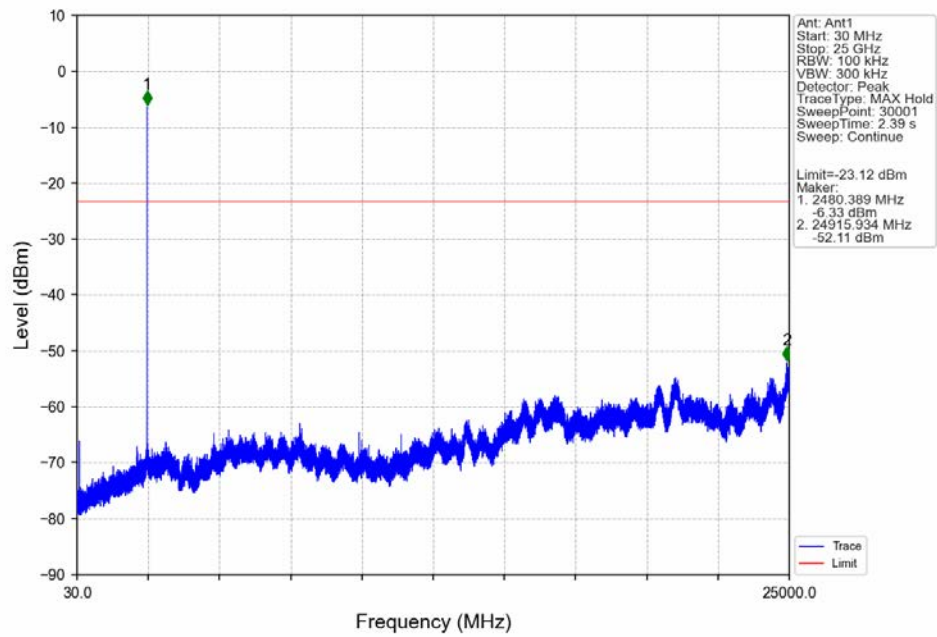


8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV

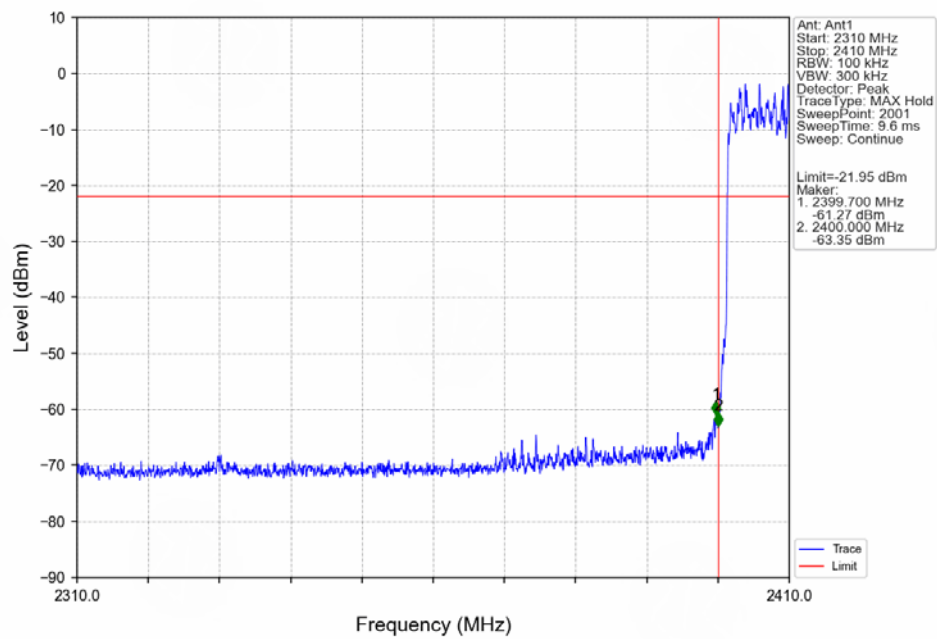




8DPSK 3DH5 HCH 2480MHz Ant1 NTN



8DPSK 3DH5 HOPP Ant1 NTN





8DPSK 3DH5 HOPP Ant1 NTNV

