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Annex for BT

Test Report No.: CTL2402203061-WF01 & CTL2402203061-IC01

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1. Bandwidth

1.1 Test Result

1.1.1 OBW

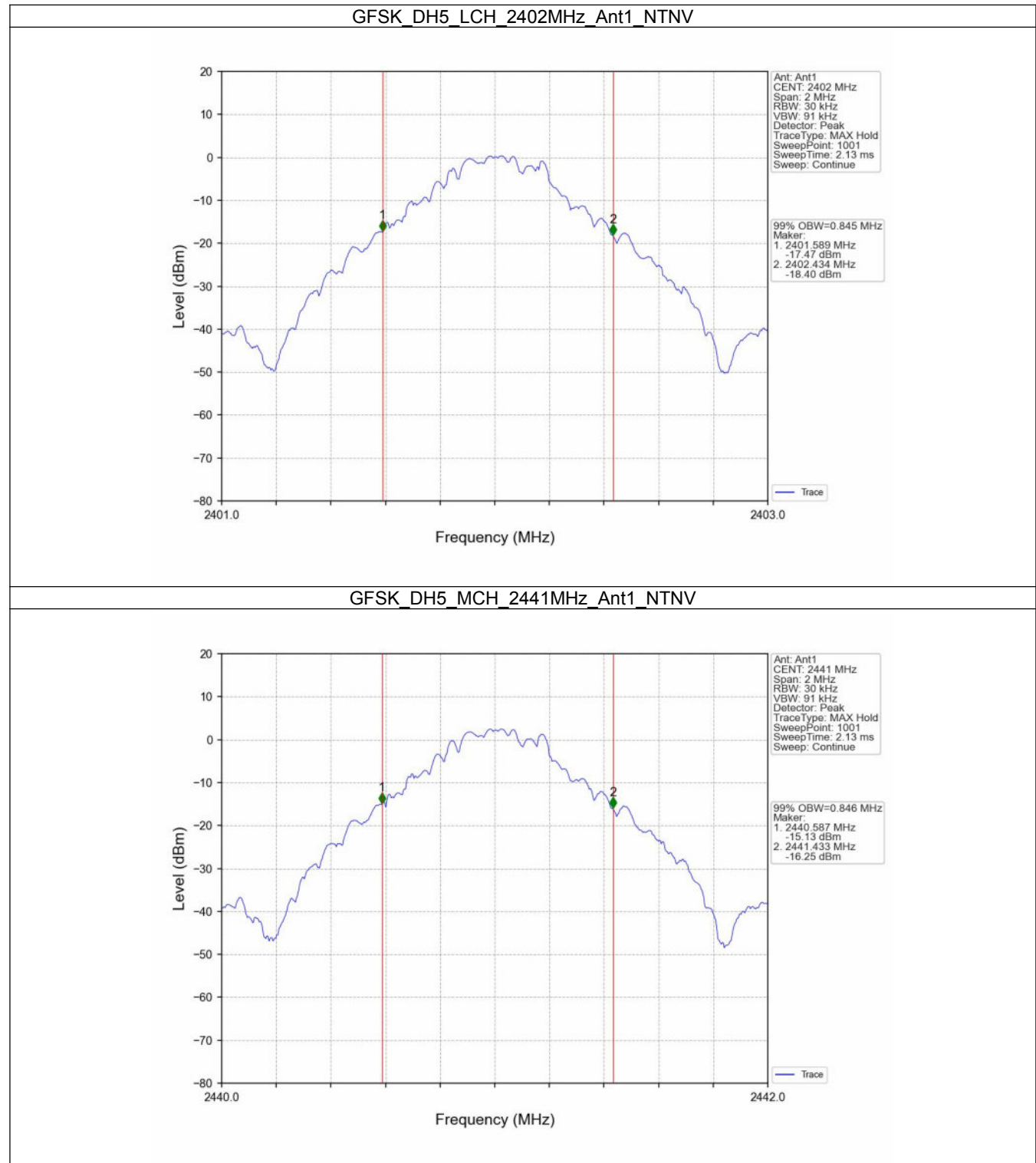
Mode	TX Type	Frequency (MHz)	Packet Type	ANT	99% Occupied Bandwidth (MHz)		Verdict
					Result	Limit	
GFSK	SISO	2402	DH5	1	0.845	/	Pass
		2441	DH5	1	0.846	/	Pass
		2480	DH5	1	0.850	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.147	/	Pass
		2441	2DH5	1	1.149	/	Pass
		2480	2DH5	1	1.152	/	Pass
8DPSK	SISO	2402	3DH5	1	1.161	/	Pass
		2441	3DH5	1	1.162	/	Pass
		2480	3DH5	1	1.163	/	Pass

1.1.2 20dB BW

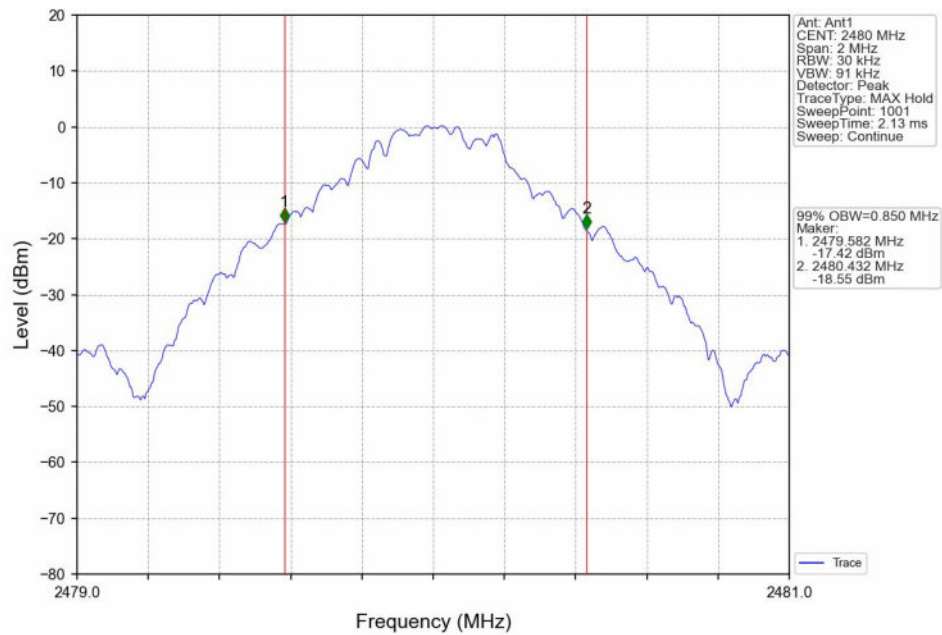
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					Result	Limit	
GFSK	SISO	2402	DH5	1	0.954	/	Pass
		2441	DH5	1	0.955	/	Pass
		2480	DH5	1	0.954	/	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	1.291	/	Pass
		2441	2DH5	1	1.293	/	Pass
		2480	2DH5	1	1.295	/	Pass
8DPSK	SISO	2402	3DH5	1	1.310	/	Pass
		2441	3DH5	1	1.310	/	Pass
		2480	3DH5	1	1.311	/	Pass

1.2 Test Graph

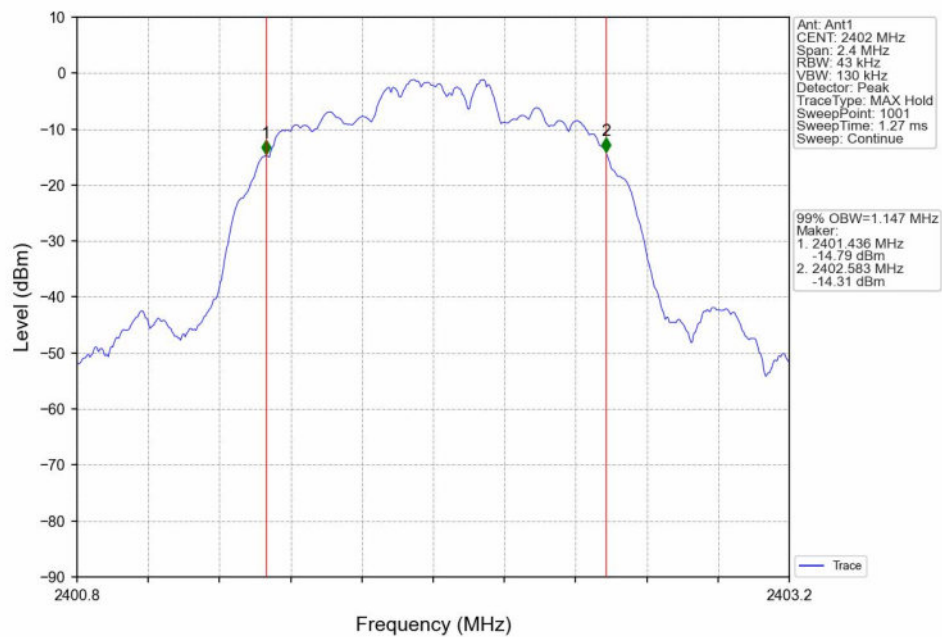
1.2.1 OBW



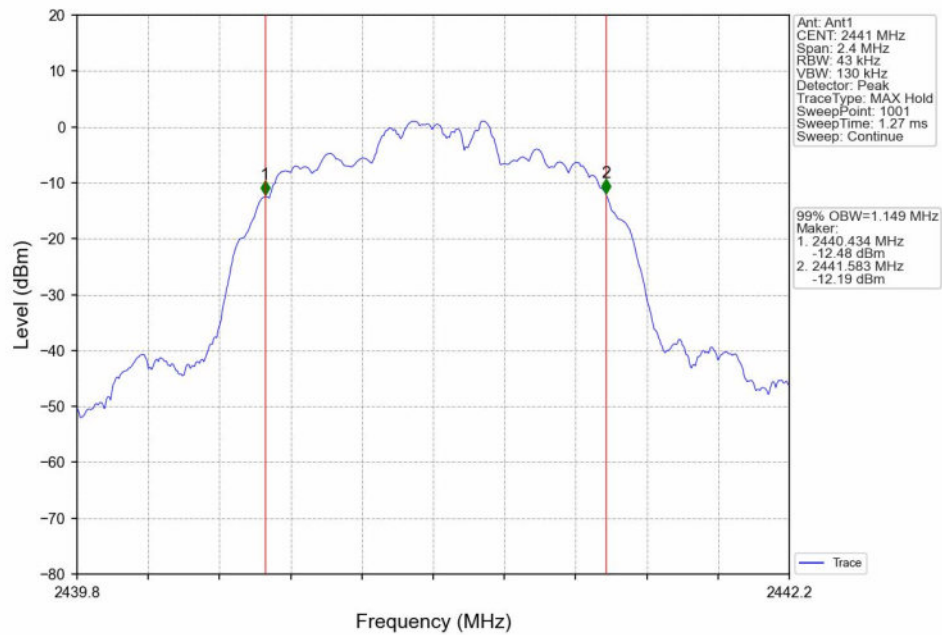
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



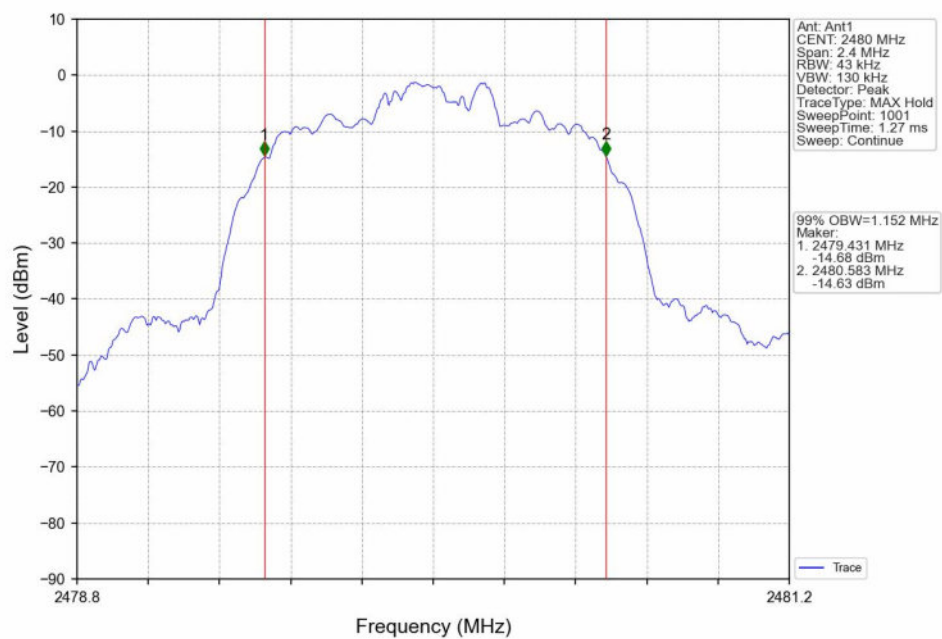
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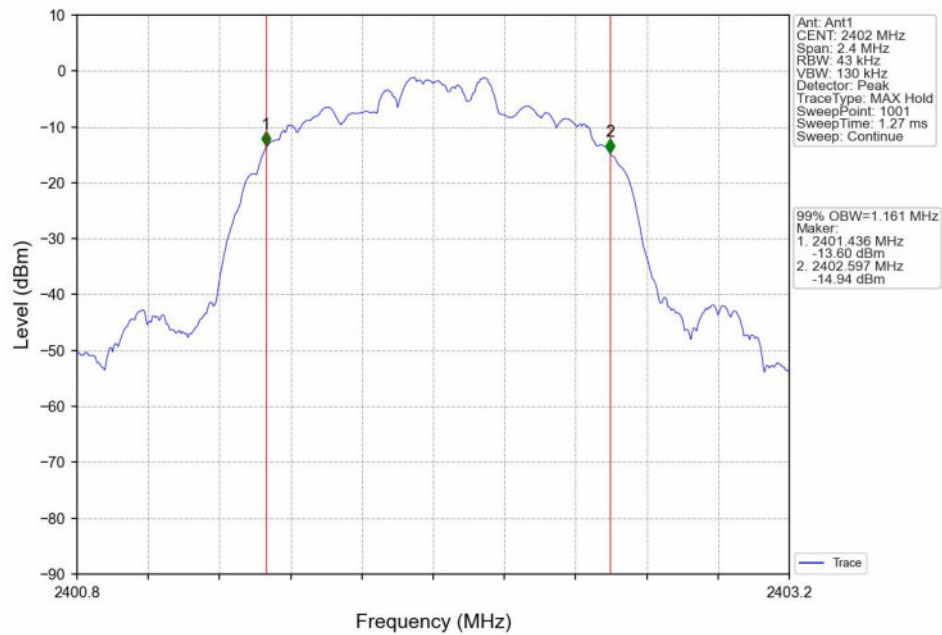
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



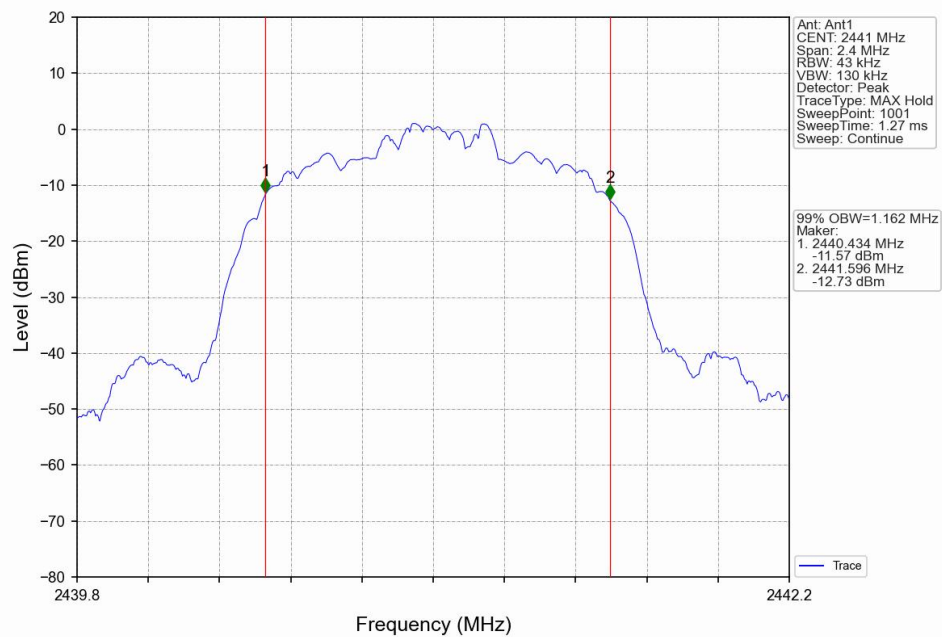
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

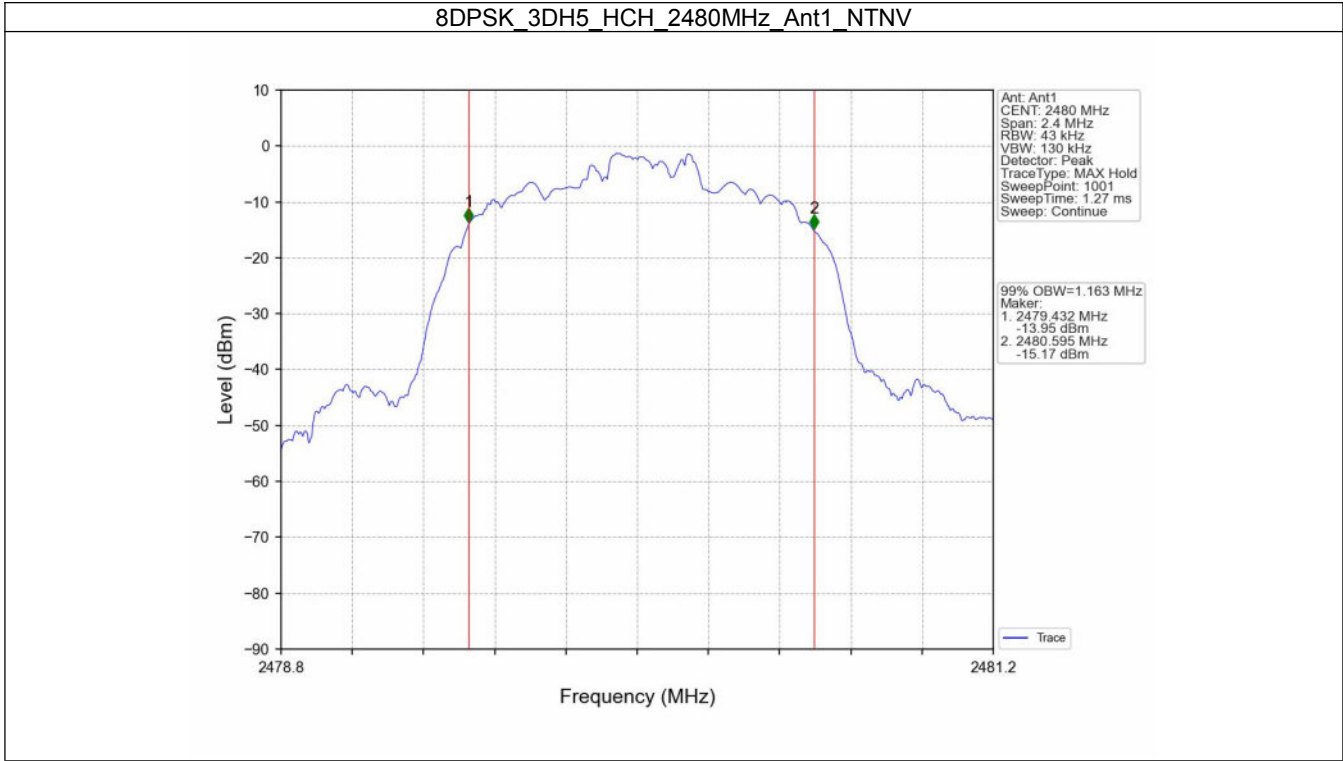


8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV

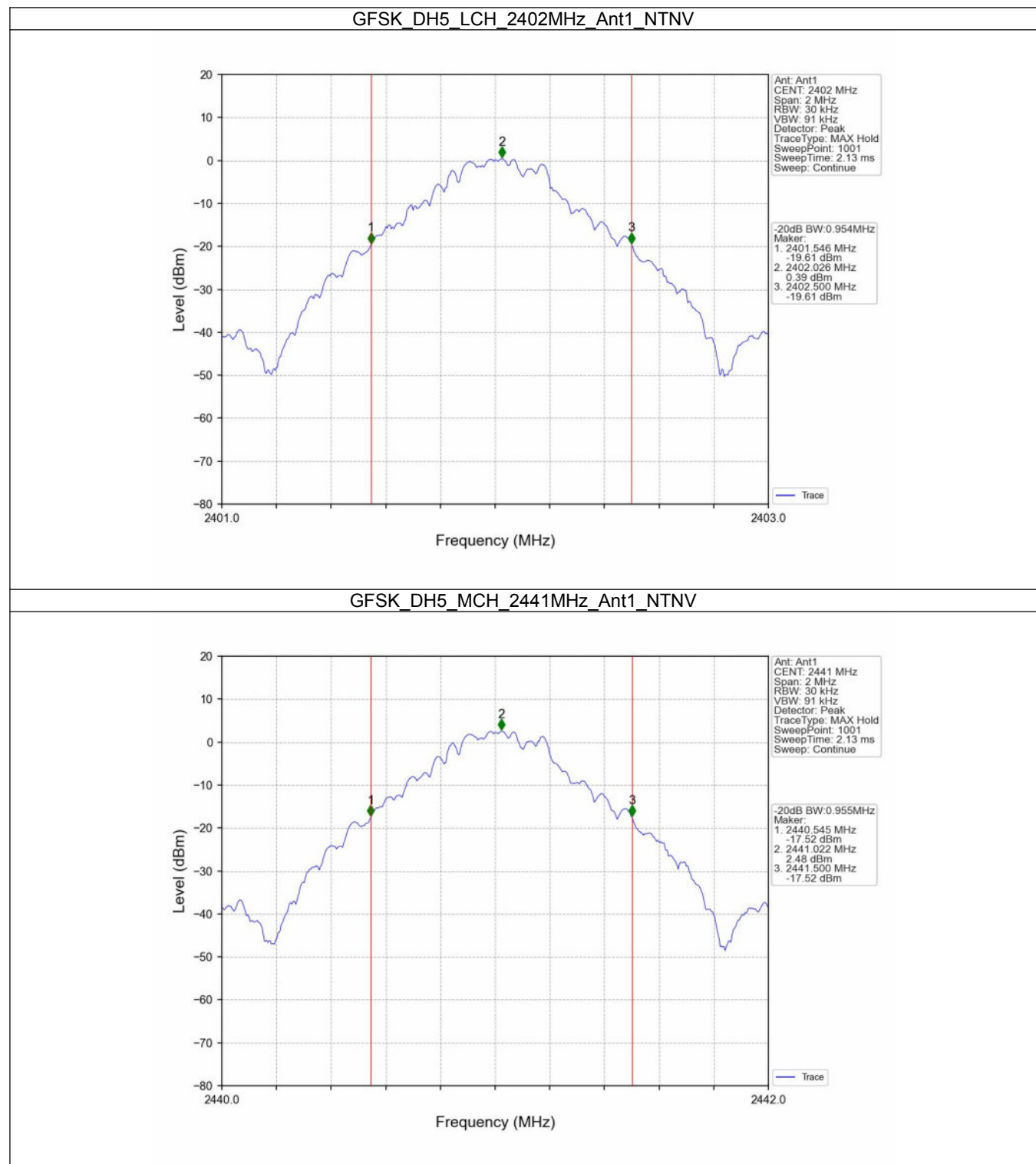


8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV

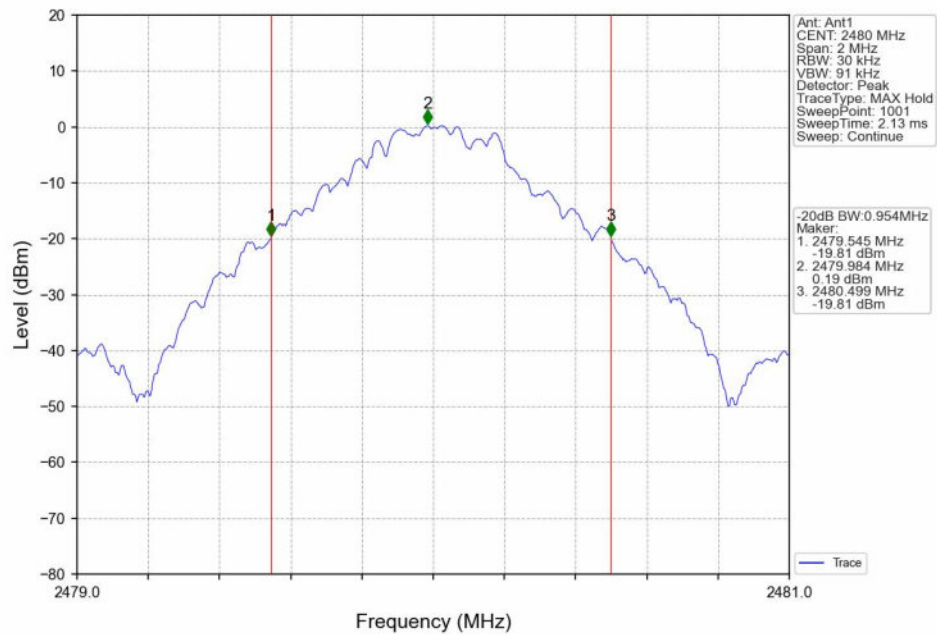




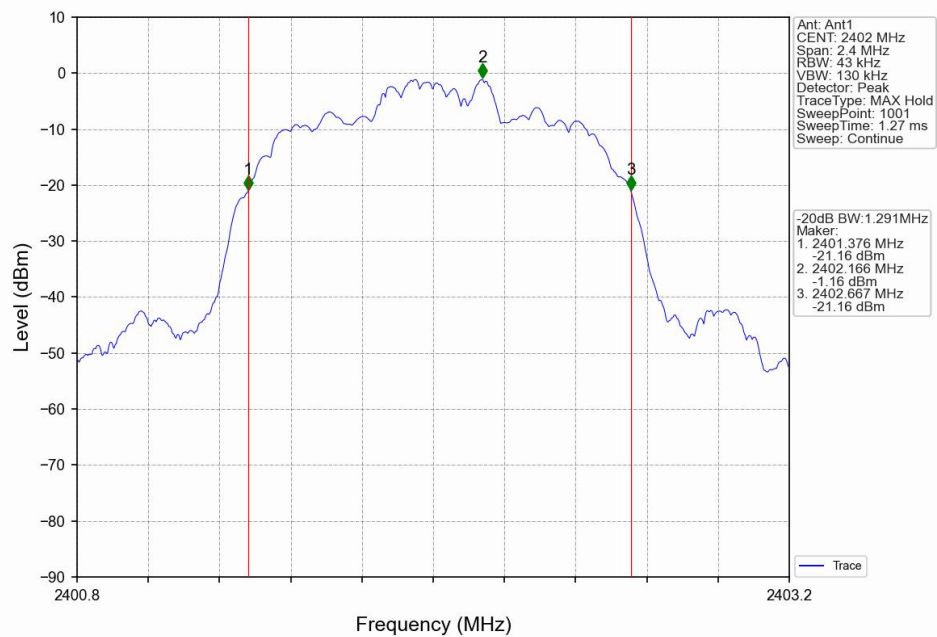
1.2.2 20dB BW



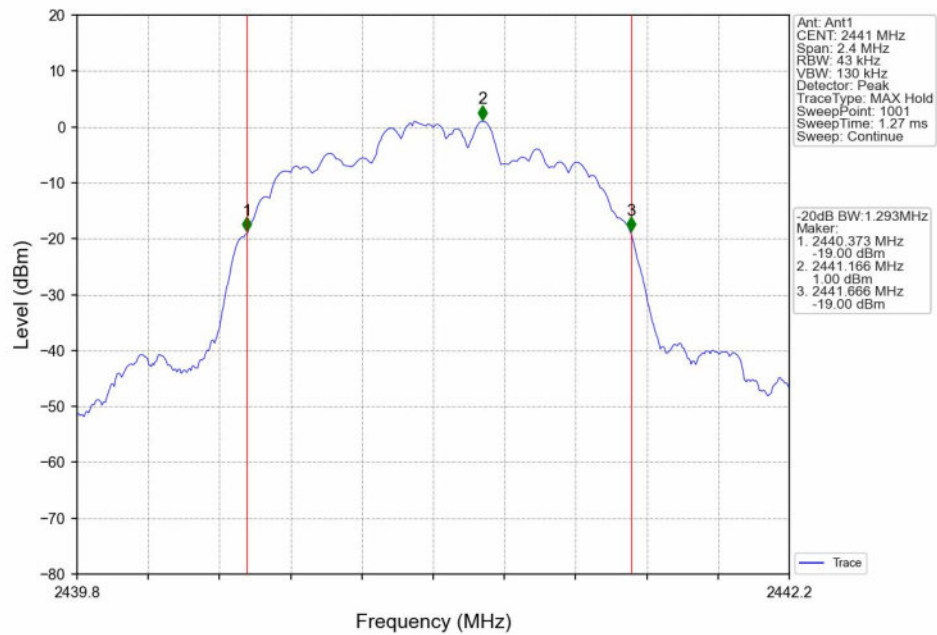
GFSK DH5_HCH_2480MHz_Ant1_NTNV



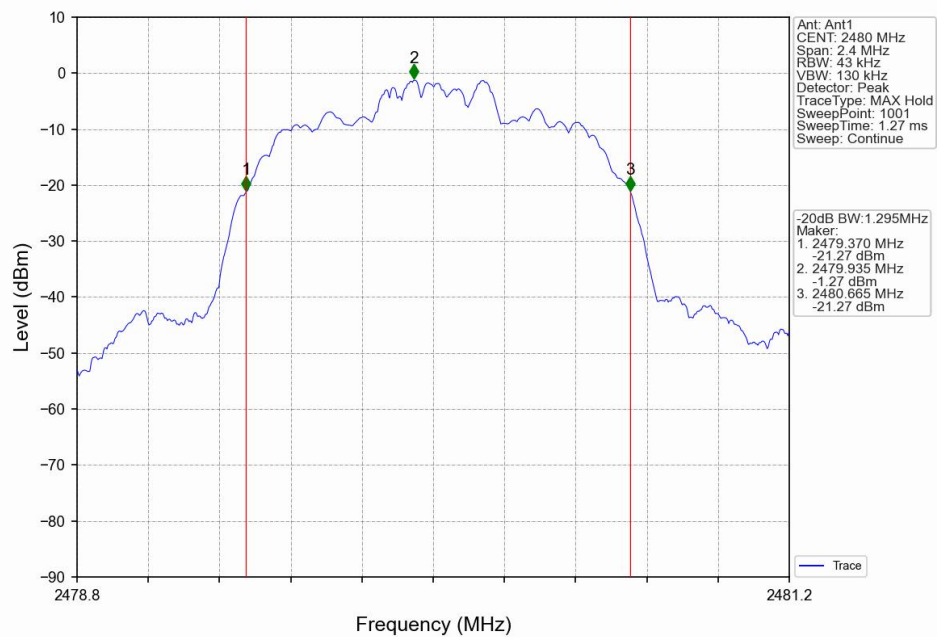
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



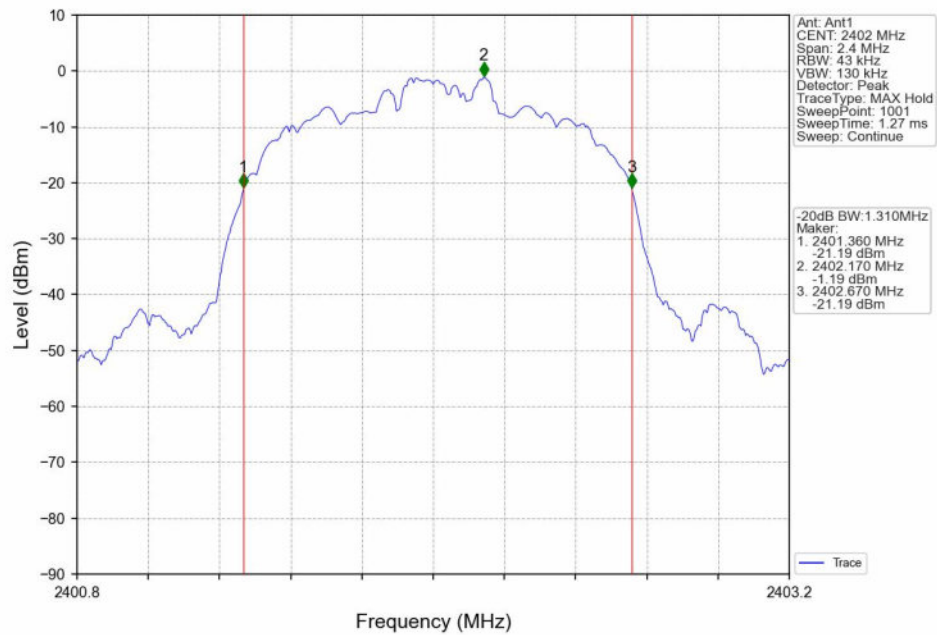
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



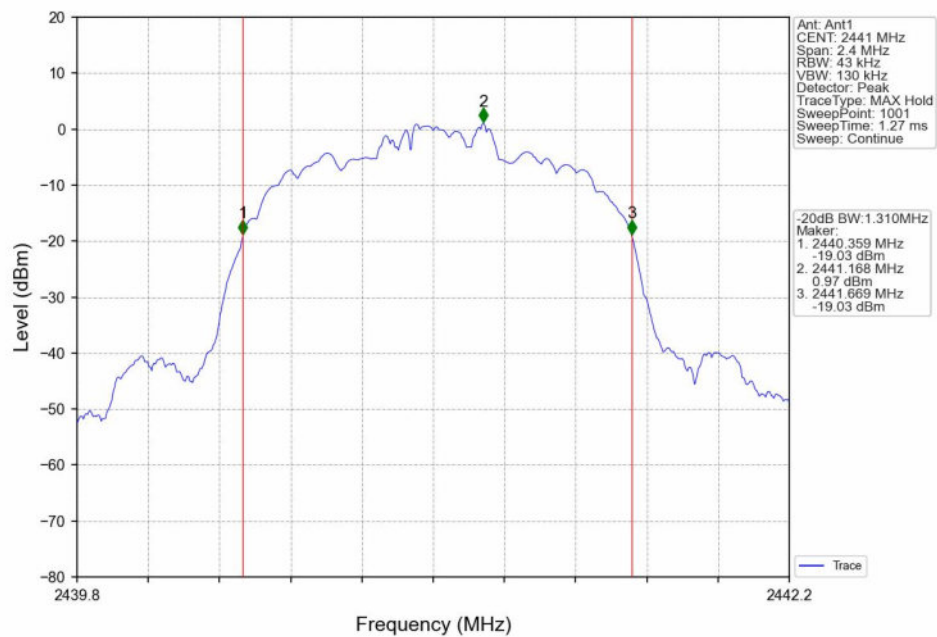
Pi/4DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

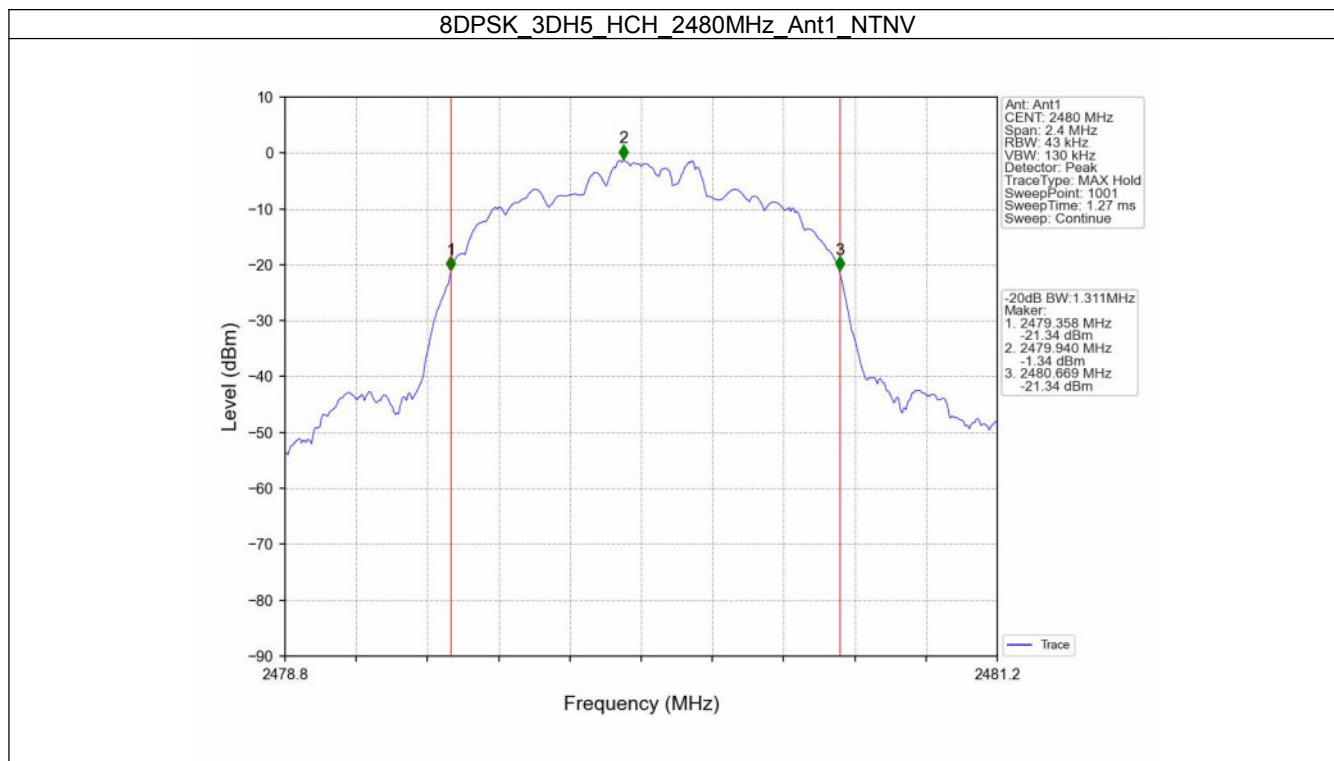


8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV





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	2.84	<=30	Pass
		2441	DH5	4.94	<=30	Pass
		2480	DH5	2.67	<=30	Pass
Pi/4DQPSK	SISO	2402	2DH5	1.69	<=20.97	Pass
		2441	2DH5	3.84	<=20.97	Pass
		2480	2DH5	1.56	<=20.97	Pass
8DPSK	SISO	2402	3DH5	1.85	<=20.97	Pass
		2441	3DH5	3.97	<=20.97	Pass
		2480	3DH5	1.66	<=20.97	Pass

Note1: Antenna Gain: Ant1: -4.60dBi;

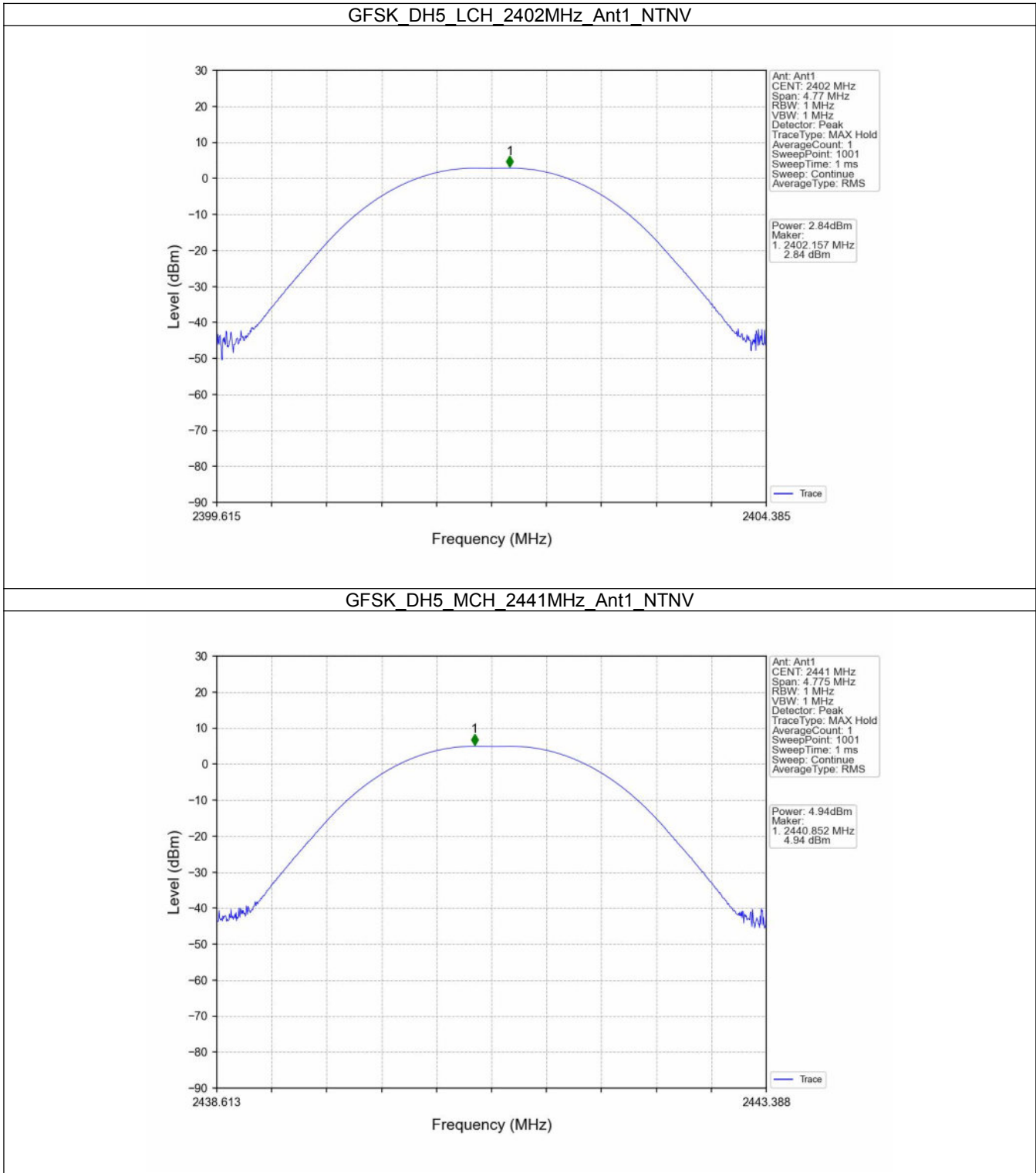
2.1.2 EIRP

Mode	TX Type	Frequency (MHz)	Packet Type	E.I.R.P (dBm)		Verdict
				ANT1	Limit	
GFSK	SISO	2402	DH5	-1.76	<=36.02	Pass
		2441	DH5	0.34	<=36.02	Pass
		2480	DH5	-1.93	<=36.02	Pass
Pi/4DQPSK	SISO	2402	2DH5	-2.91	<=36.02	Pass
		2441	2DH5	-0.76	<=36.02	Pass
		2480	2DH5	-3.04	<=36.02	Pass
8DPSK	SISO	2402	3DH5	-2.75	<=36.02	Pass
		2441	3DH5	-0.63	<=36.02	Pass
		2480	3DH5	-2.94	<=36.02	Pass

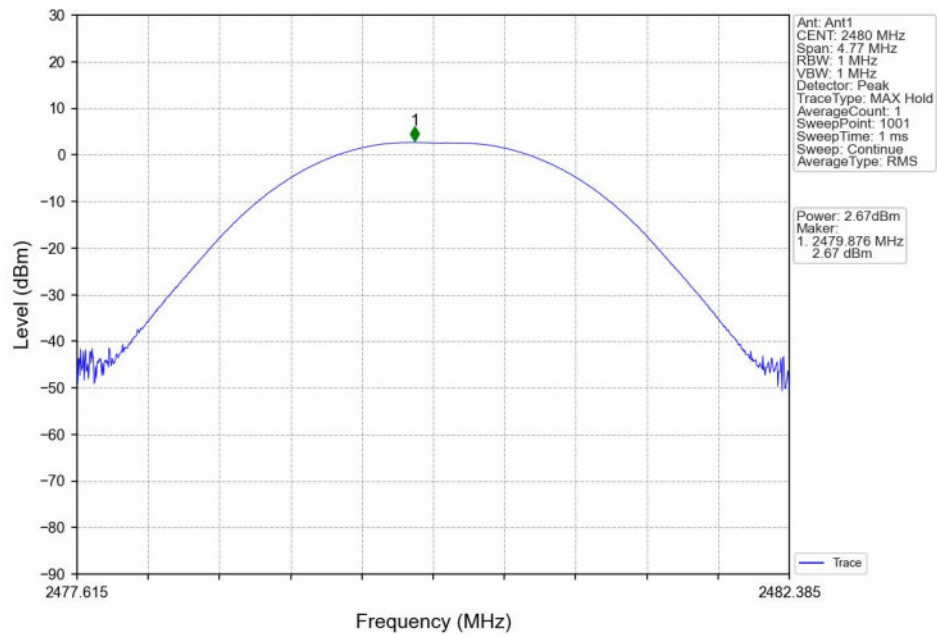
Note1: Antenna Gain: Ant1: -4.60dBi;
Note2: E.I.R.P = Measured Power + Antenna Gain

2.2 Test Graph

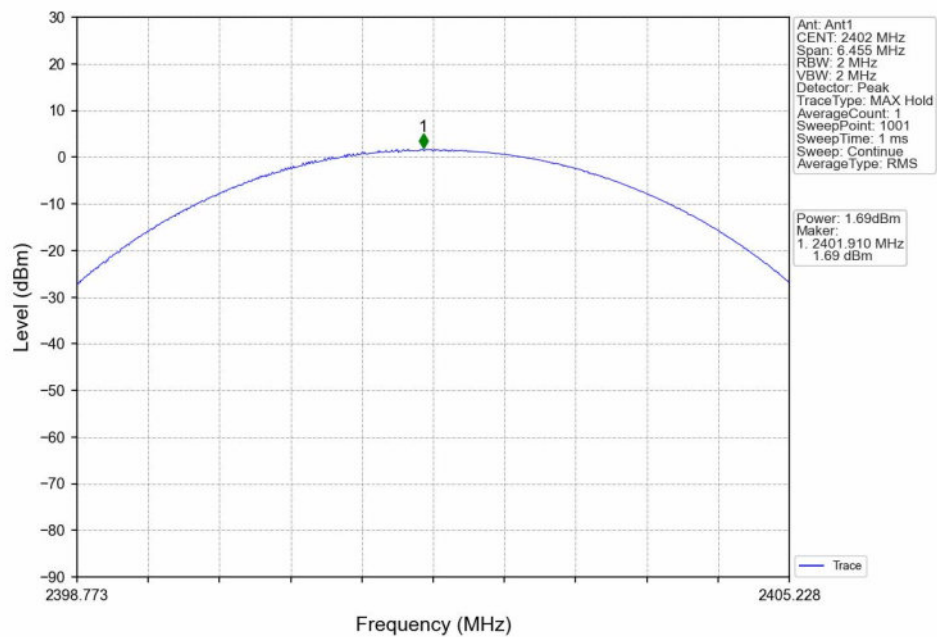
2.2.1 Power



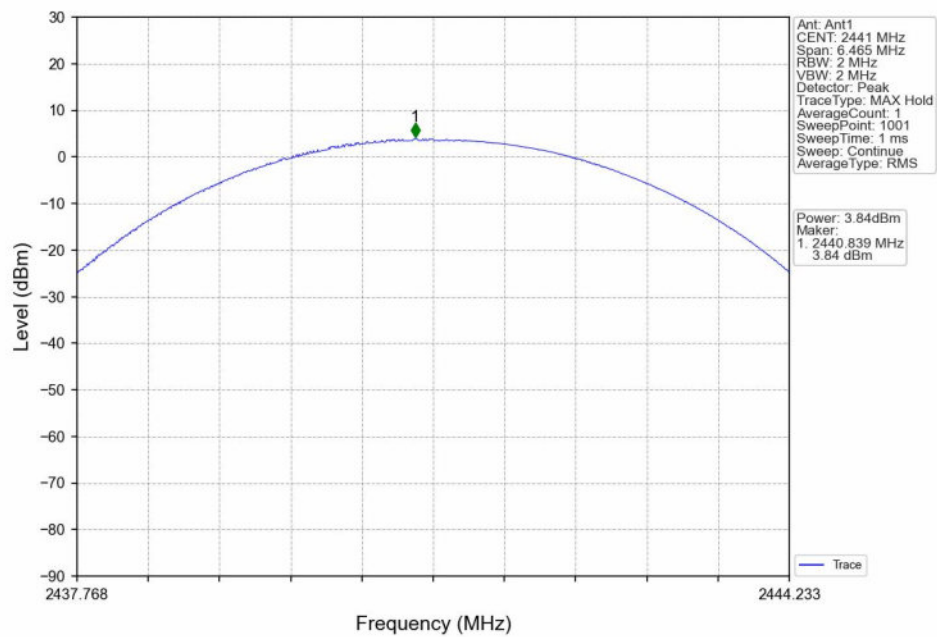
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



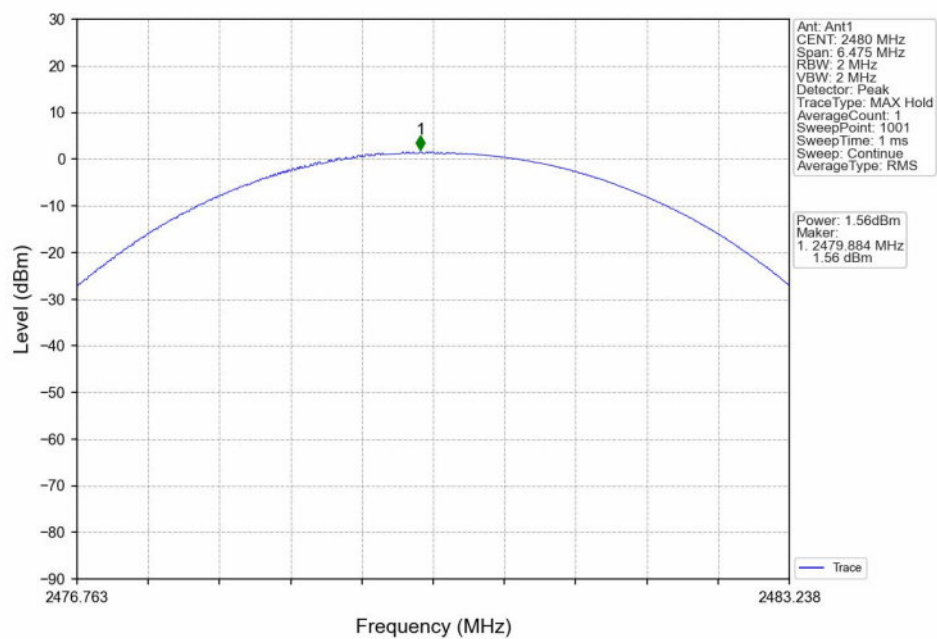
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



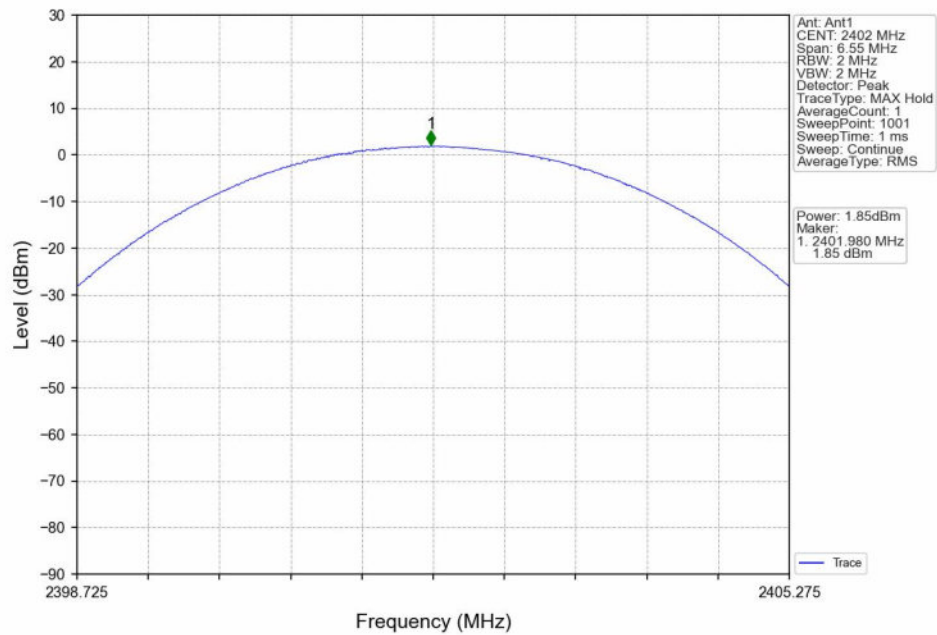
Pi/4DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



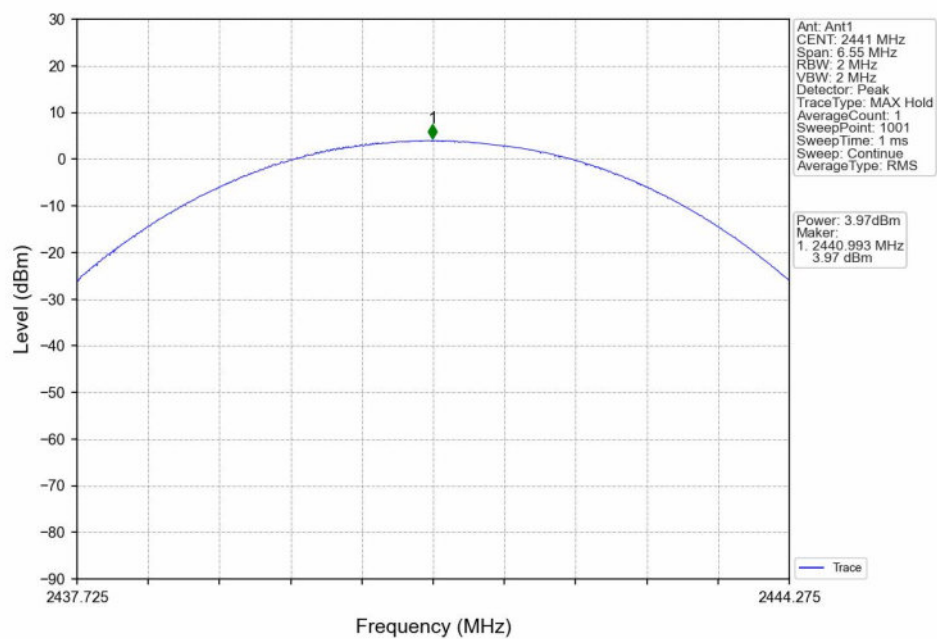
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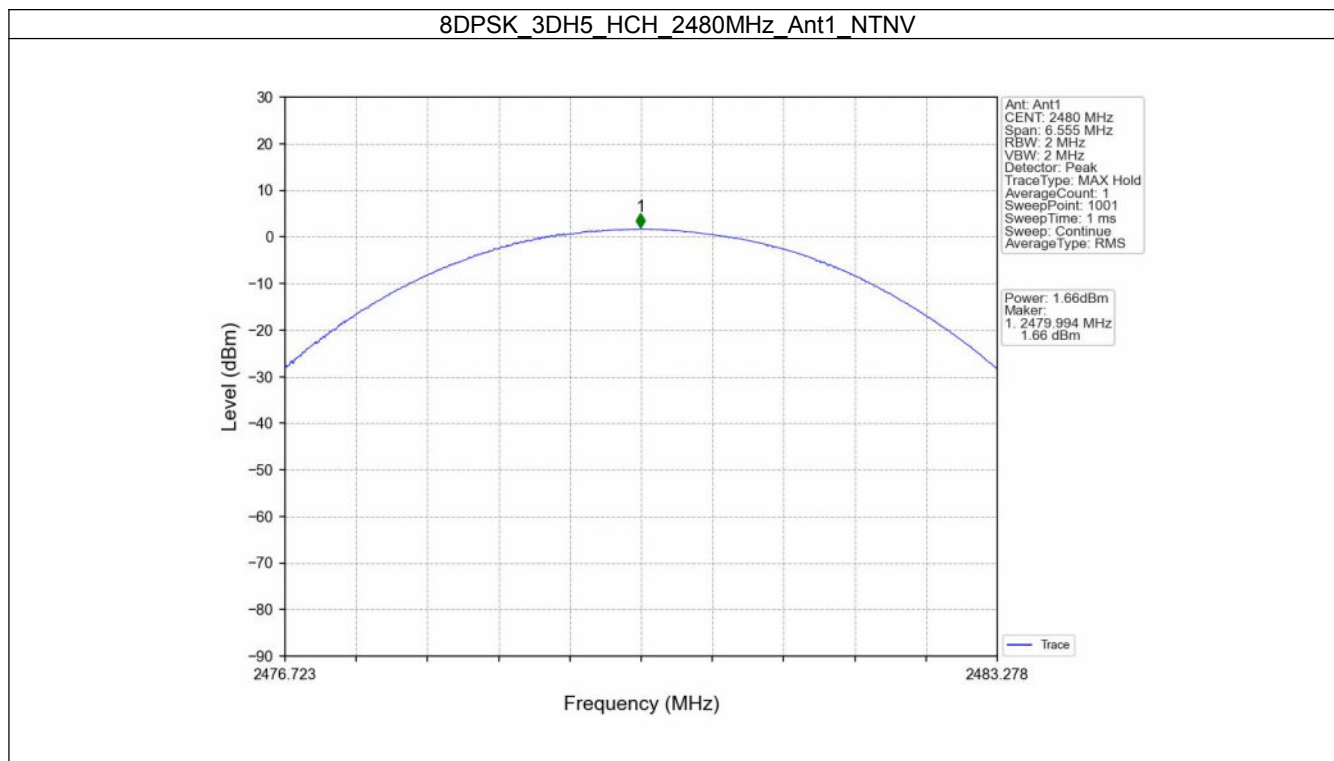


8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV



8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV





3. Carrier Frequency Separation

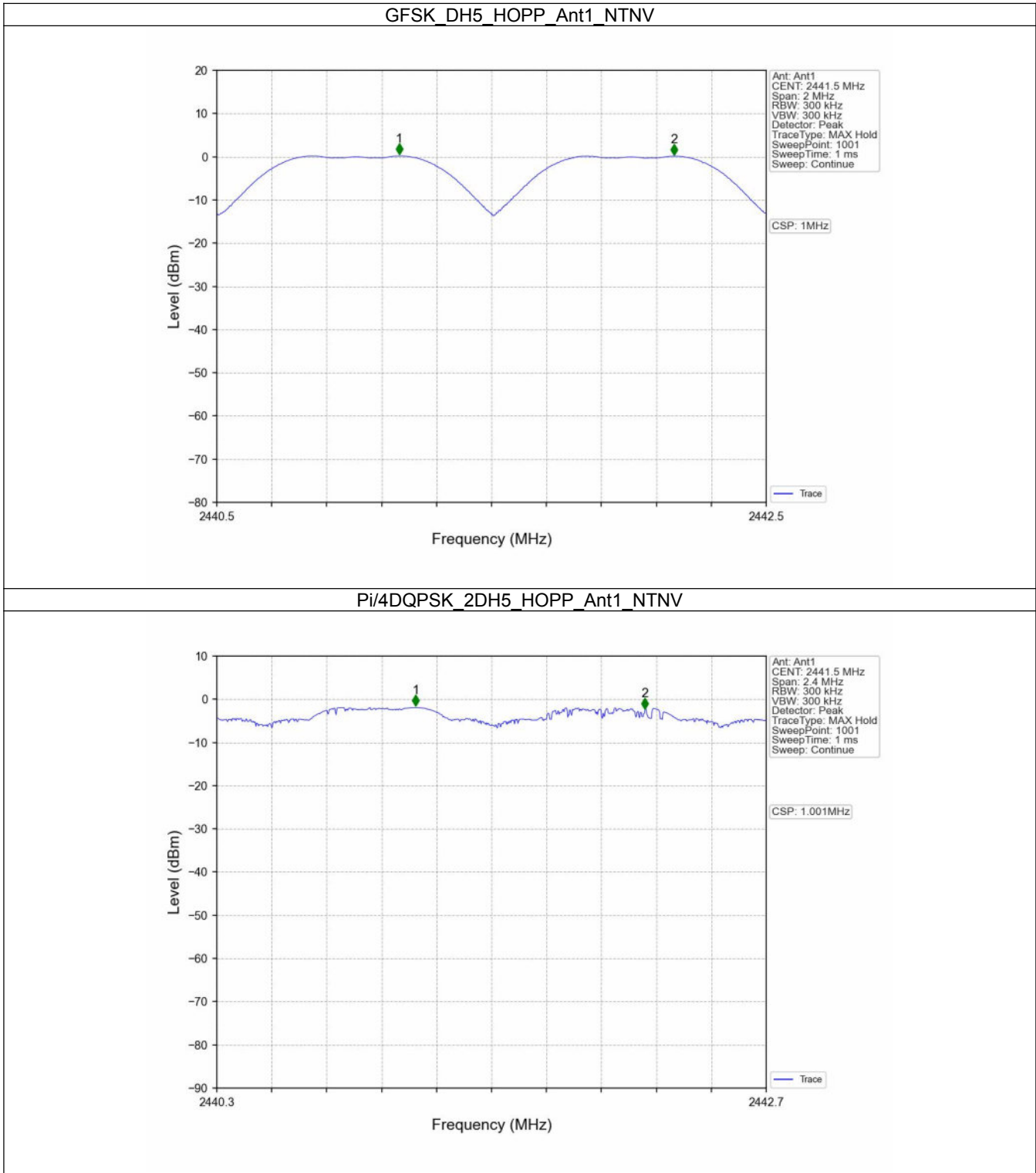
3.1 Test Result

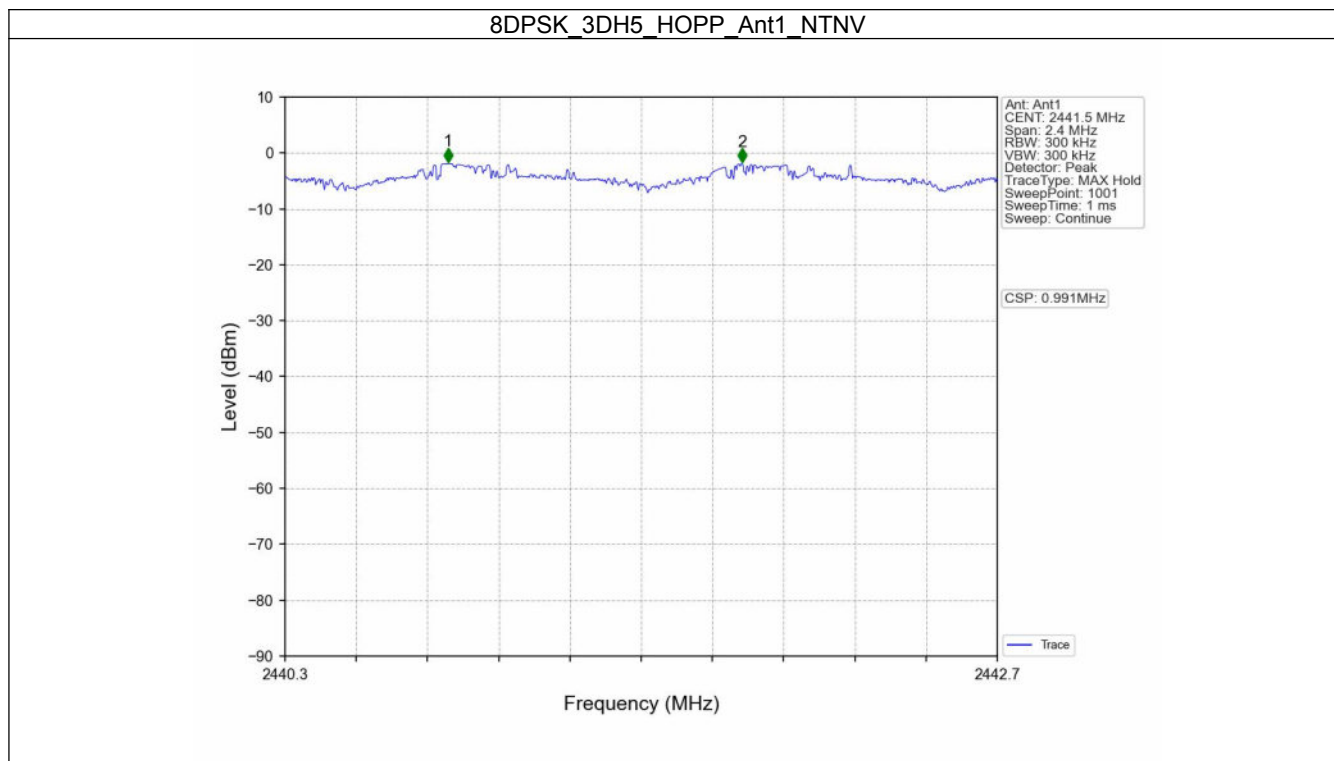
3.1.1 Ant1

Ant1							
Mode	TX Type	Frequency (MHz)	Packet Type	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limit (MHz)	Verdict
GFSK	SISO	HOPP	DH5	1.000	0.954	≥ 0.954	Pass
Pi/4DQPSK	SISO	HOPP	2DH5	1.001	1.296	≥ 0.864	Pass
8DPSK	SISO	HOPP	3DH5	0.991	1.310	≥ 0.873	Pass

3.2 Test Graph

3.2.1 Ant1





4. Number of Hopping Frequencies

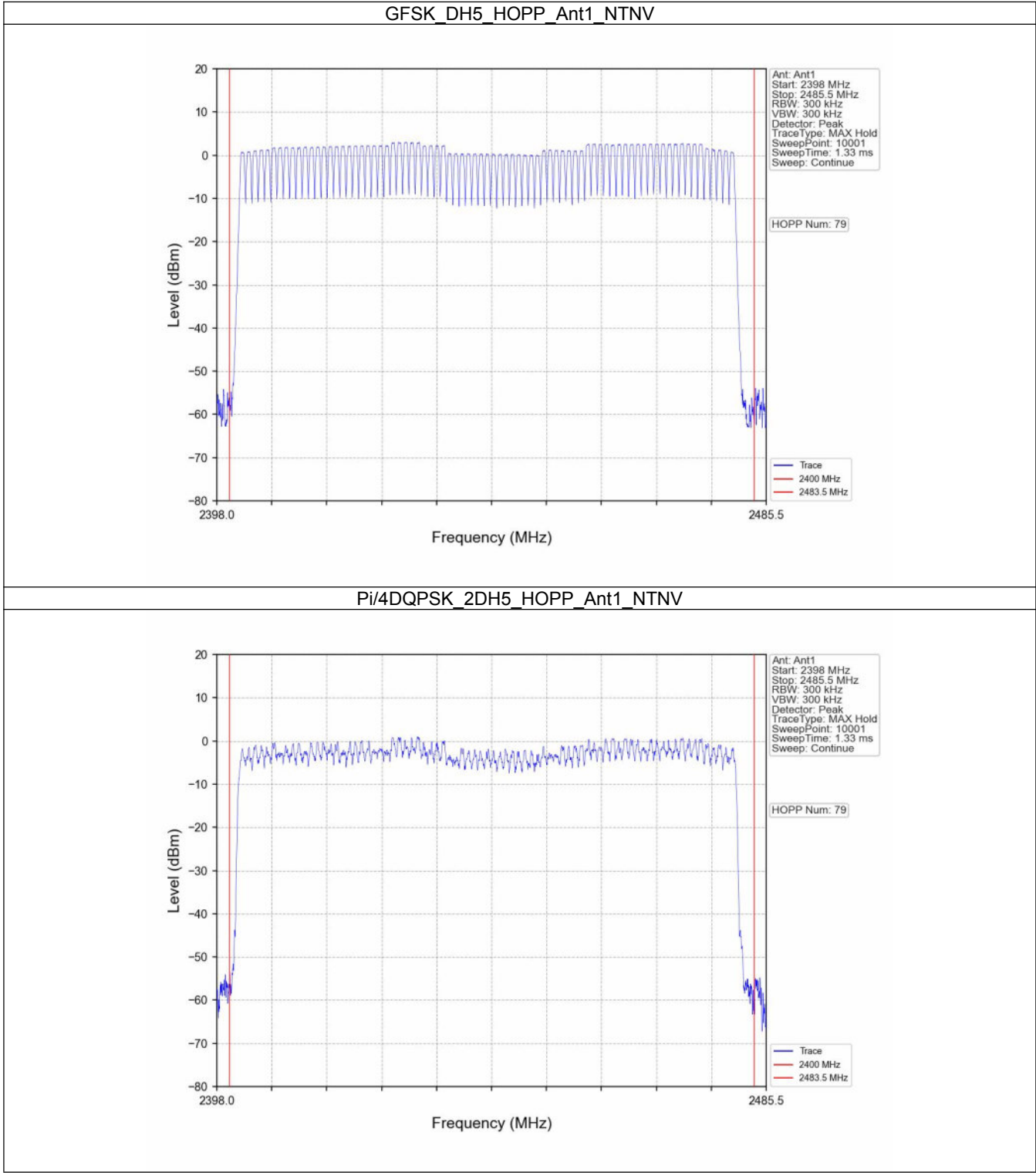
4.1 Test Result

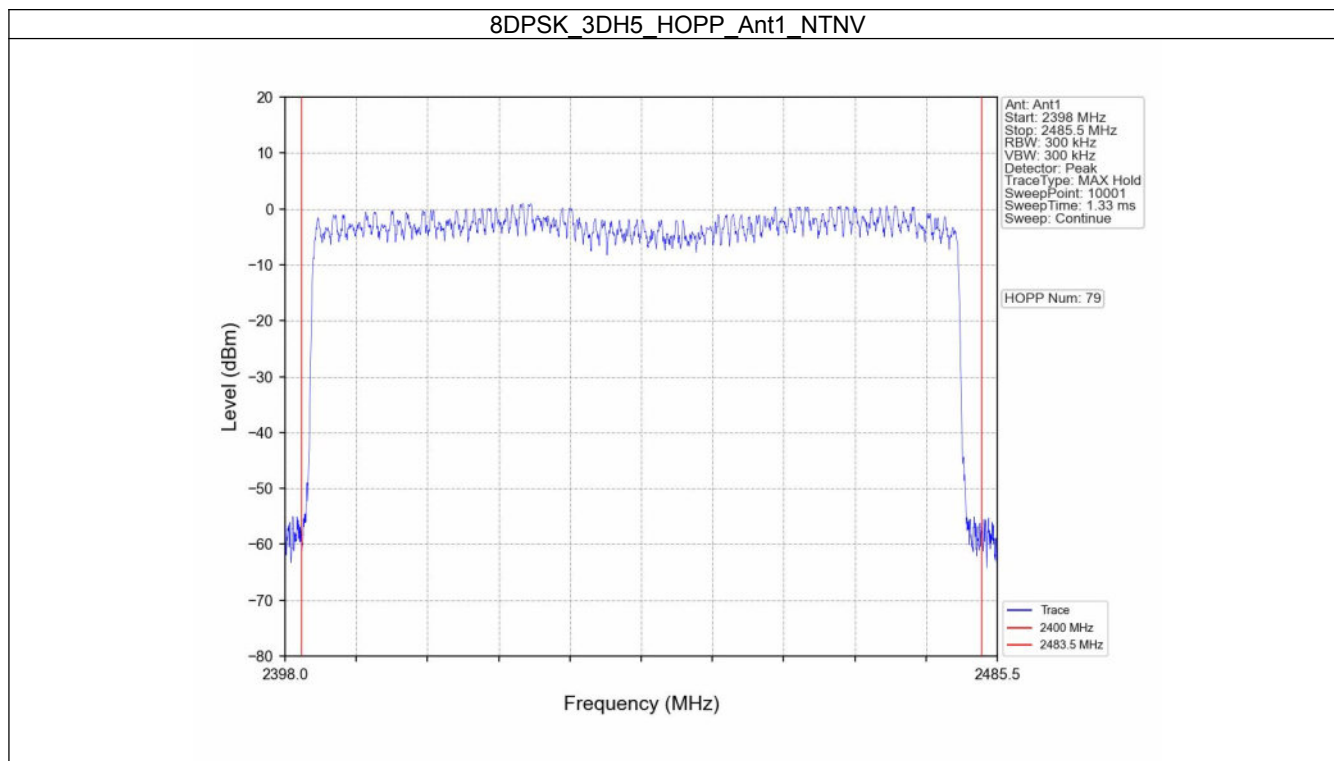
4.1.1 HoppNum

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





5. Time of Occupancy (Dwell Time)

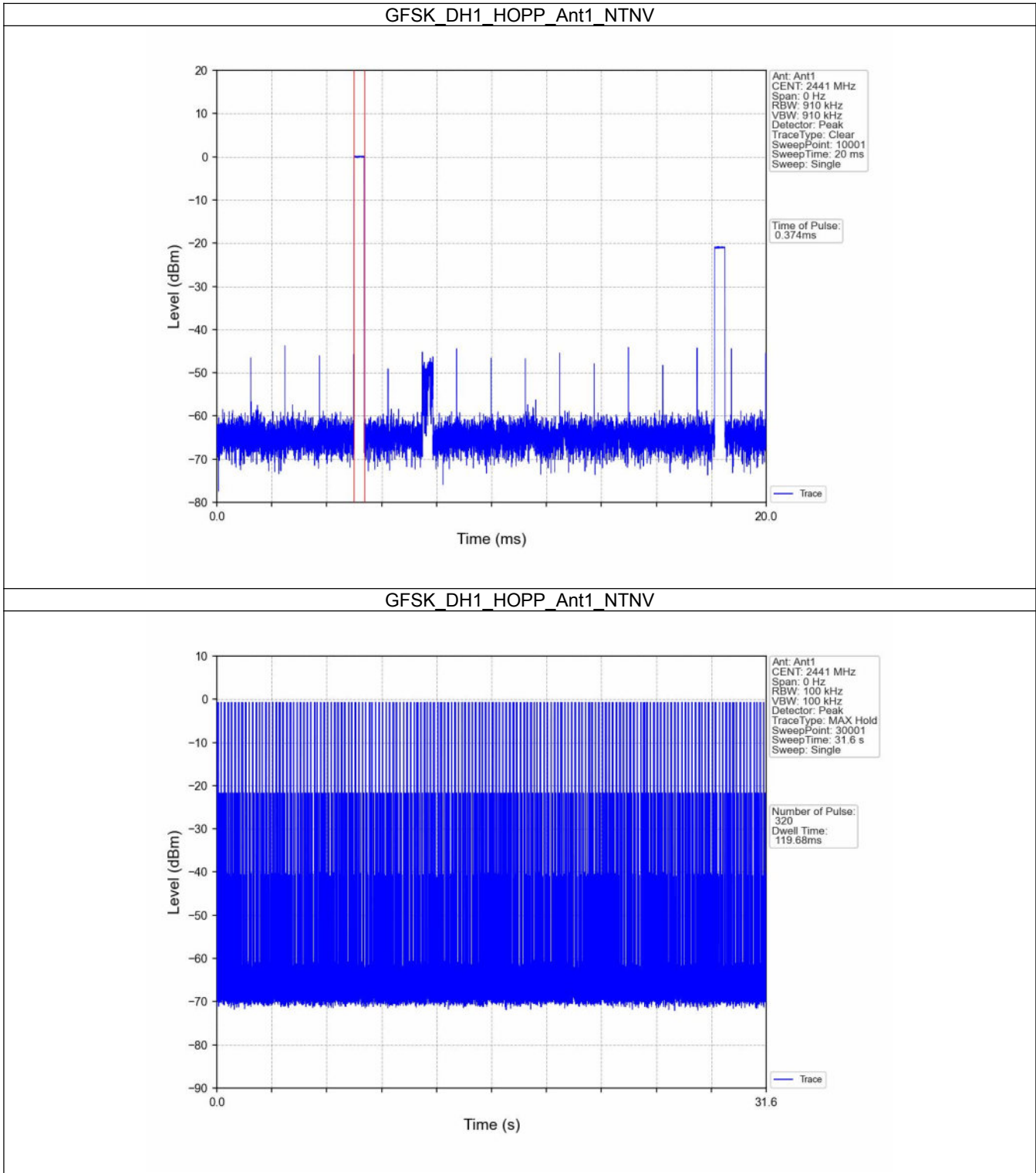
5.1 Test Result

5.1.1 Ant1

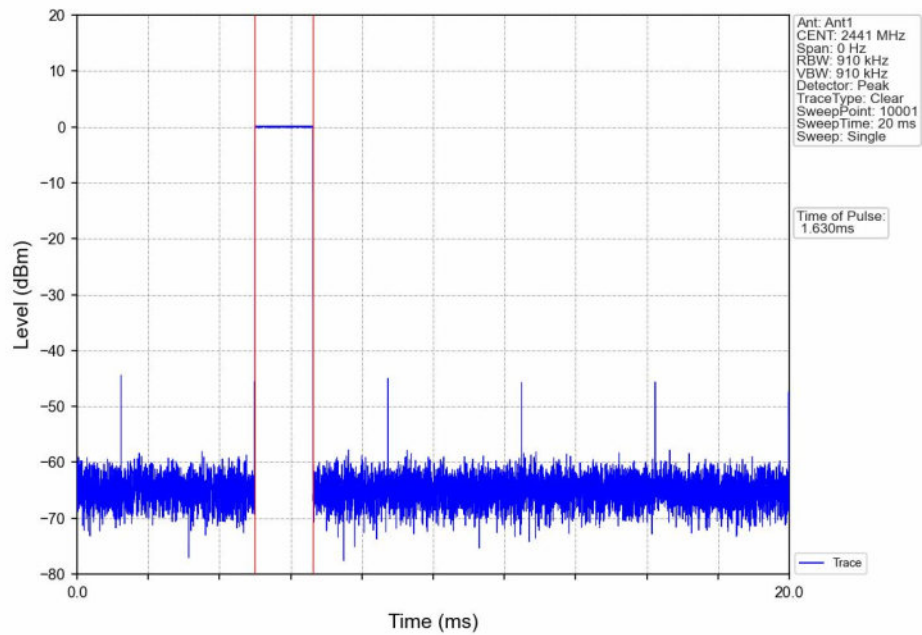
Ant1									
Mode	Tx Type	Frequency (MHz)	Packet Type	Duration of Single Pulse (ms)	Observation Period (s)	Num of Pulse in Observation Period	Dwell Time (ms)	Limit (ms)	Verdict
GFSK	SISO	HOPP	DH1	0.374	31.600	320	119.680	<=400	Pass
			DH3	1.630	31.600	113	184.190	<=400	Pass
			DH5	2.878	31.600	72	207.216	<=400	Pass
Pi/4DQPSK	SISO	HOPP	2DH1	0.382	31.600	320	122.240	<=400	Pass
			2DH3	1.634	31.600	109	178.106	<=400	Pass
			2DH5	2.882	31.600	68	195.976	<=400	Pass
8DPSK	SISO	HOPP	3DH1	0.382	31.600	320	122.240	<=400	Pass
			3DH3	1.634	31.600	110	179.740	<=400	Pass
			3DH5	2.884	31.600	68	196.112	<=400	Pass

5.2 Test Graph

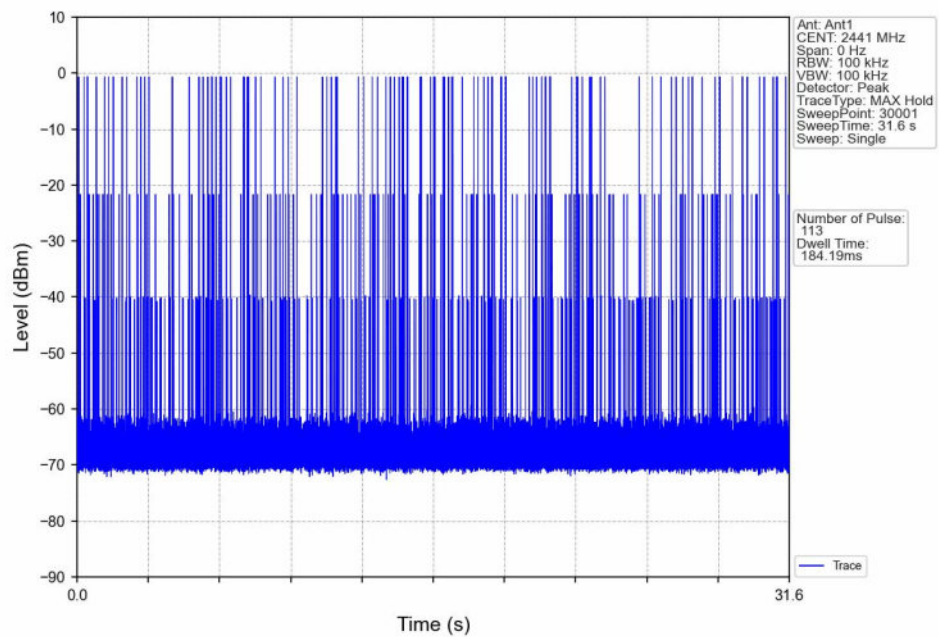
5.2.1 Ant1



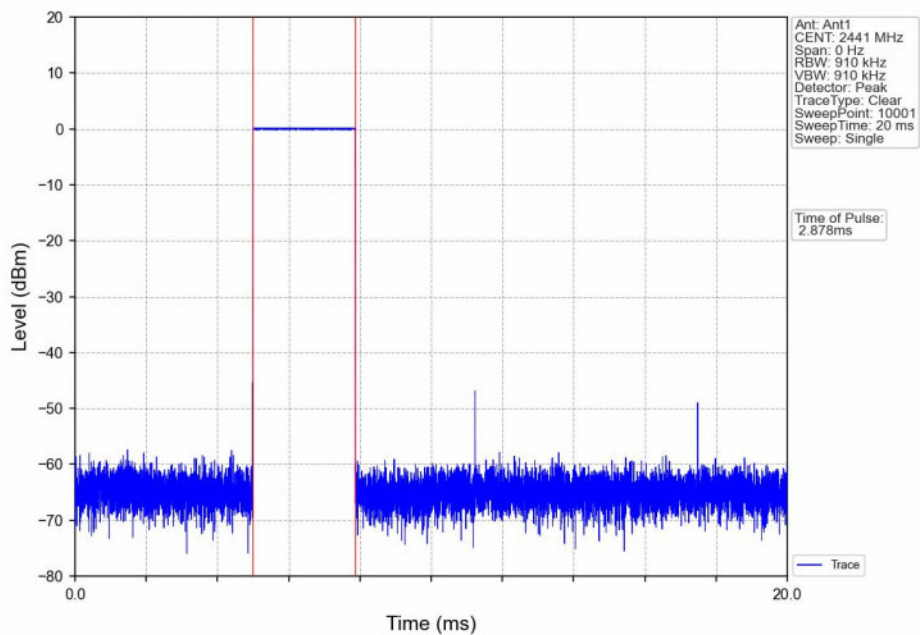
GFSK_DH3_HOPP_Ant1_NTNV



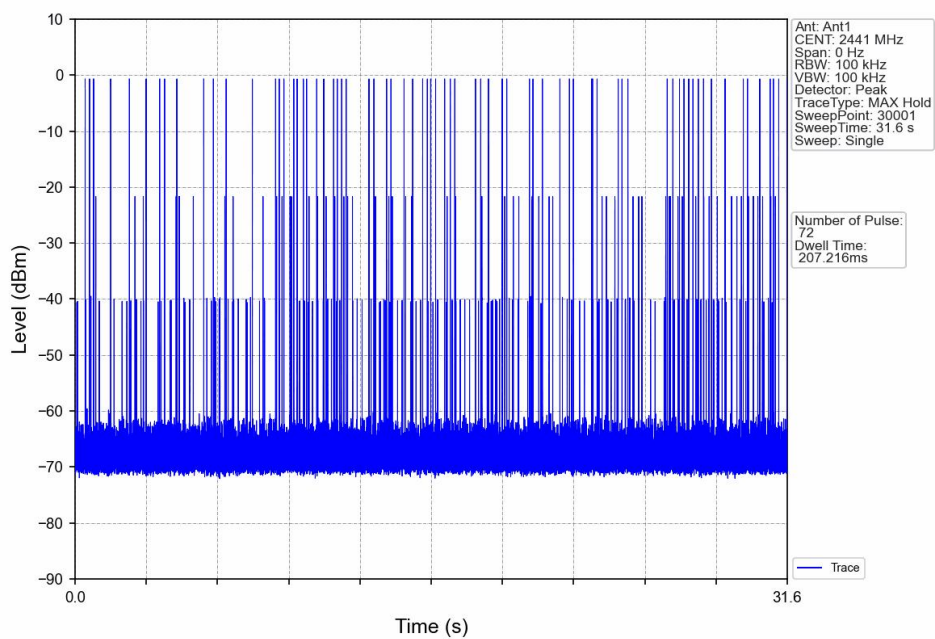
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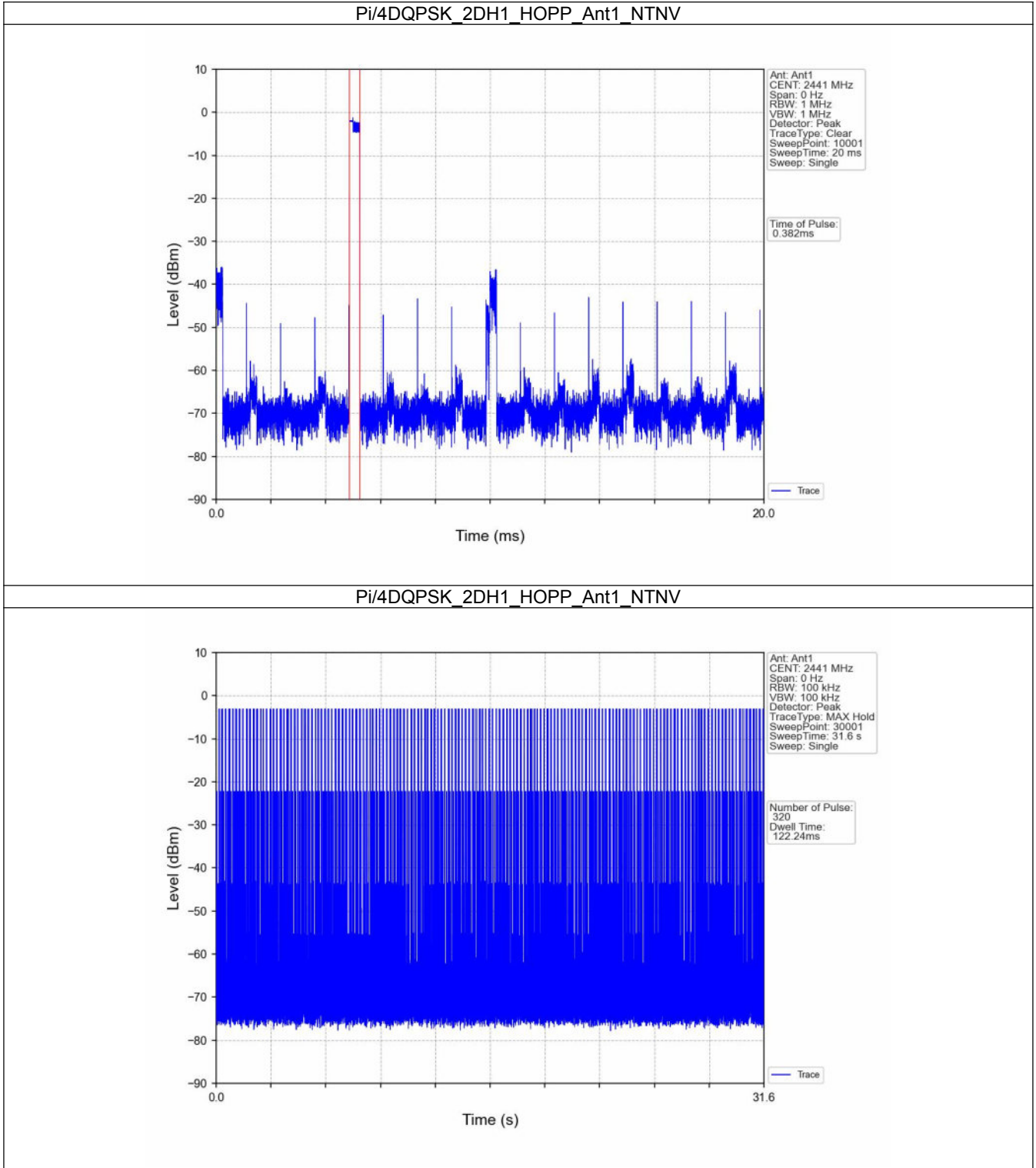


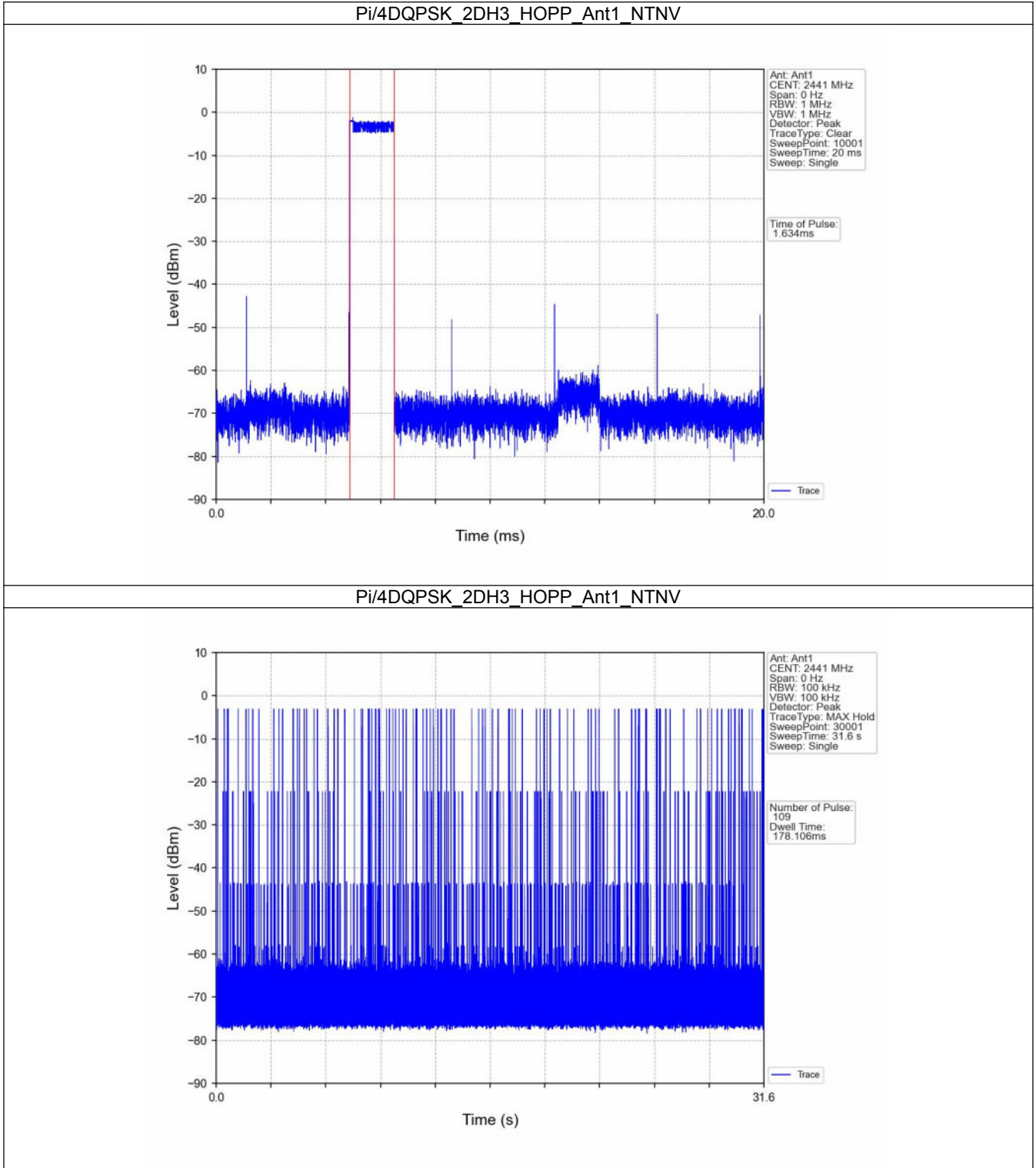
GFSK_DH5_HOPP_Ant1_NTNV



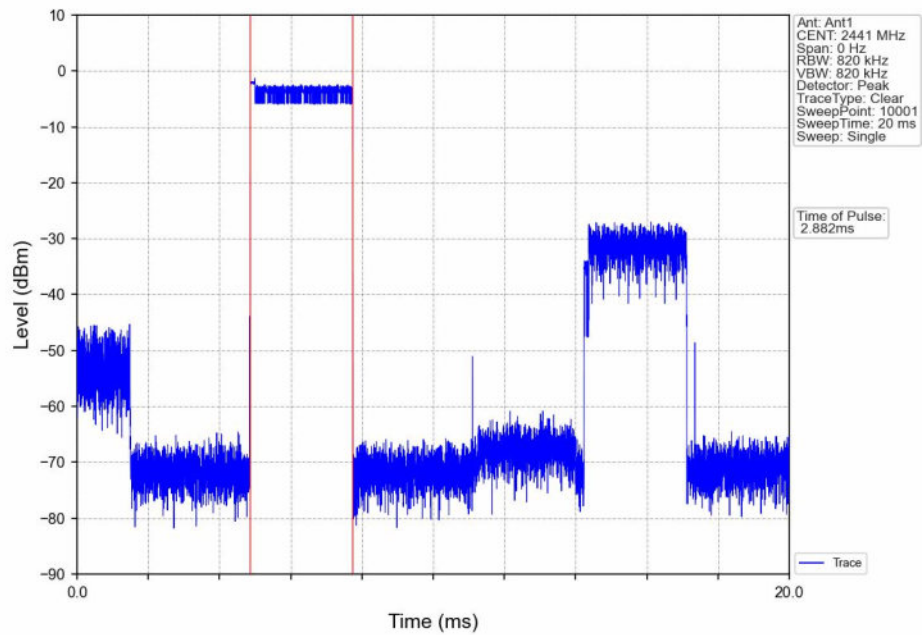
GFSK_DH5_HOPP_Ant1_NTNV



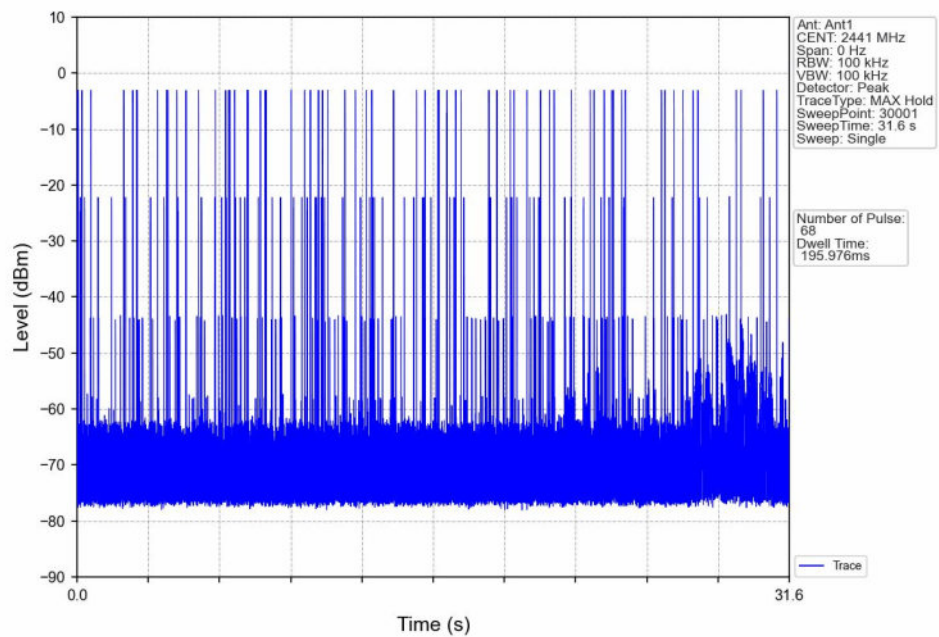




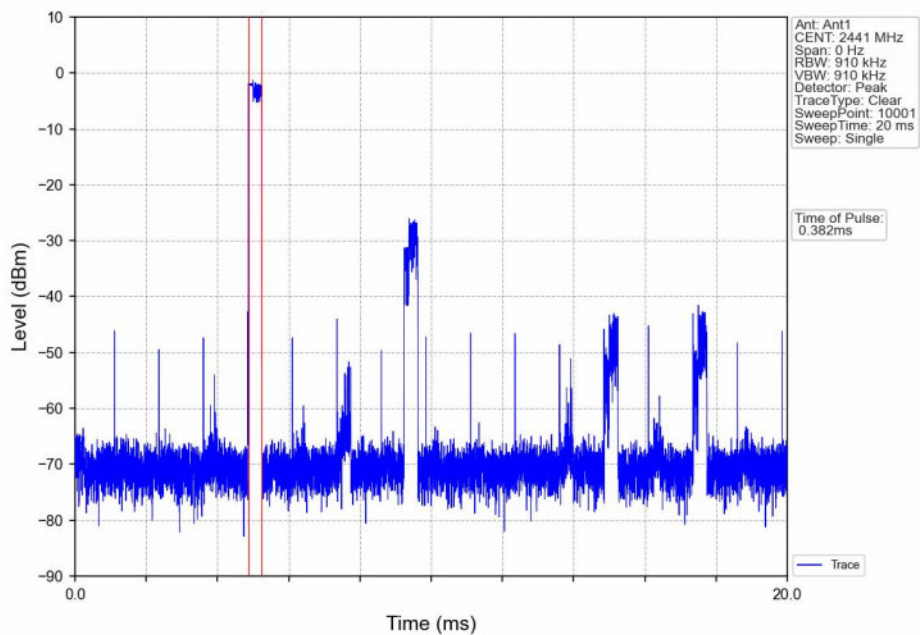
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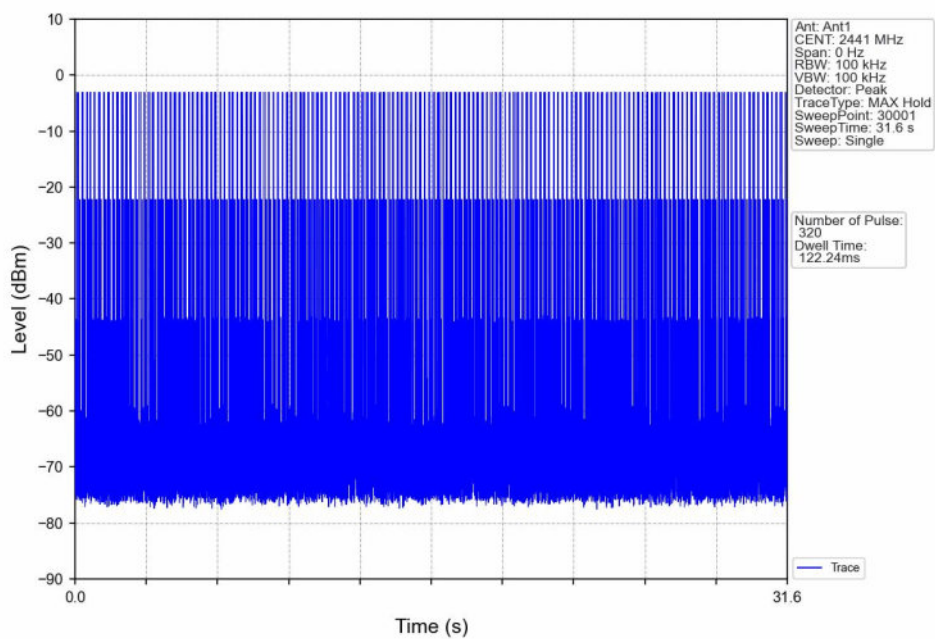
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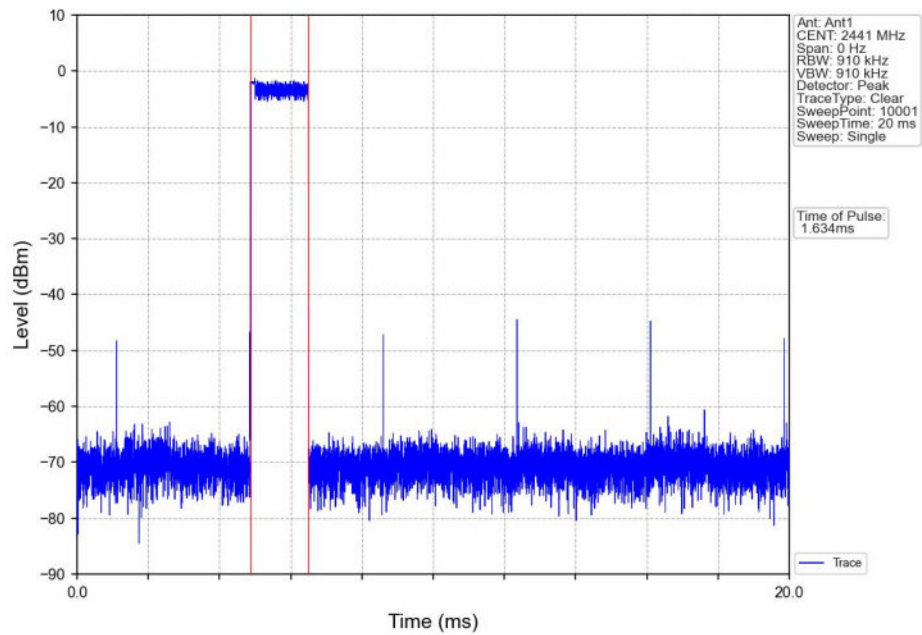
8DPSK_3DH1_HOPP_Ant1_NTNV



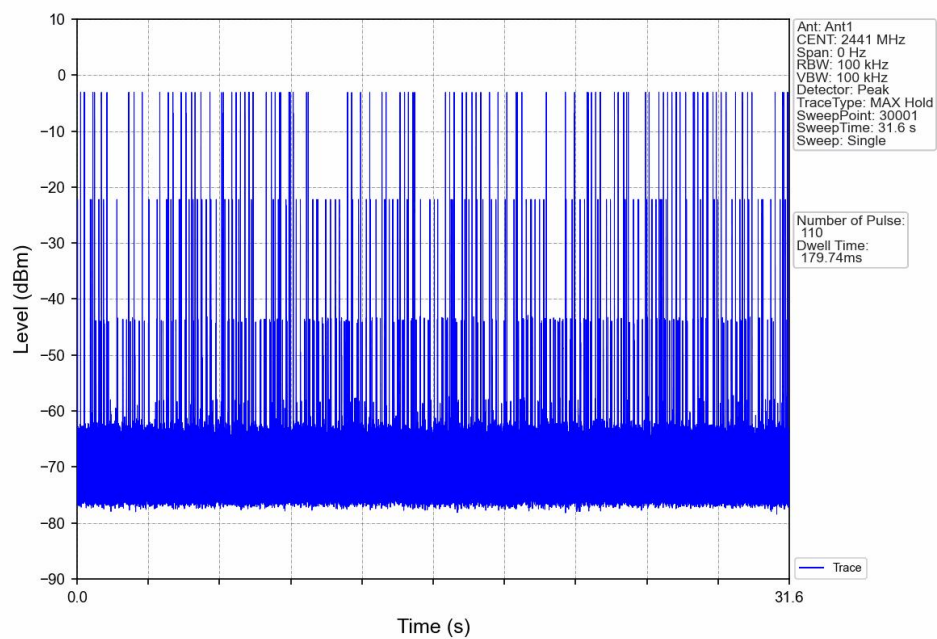
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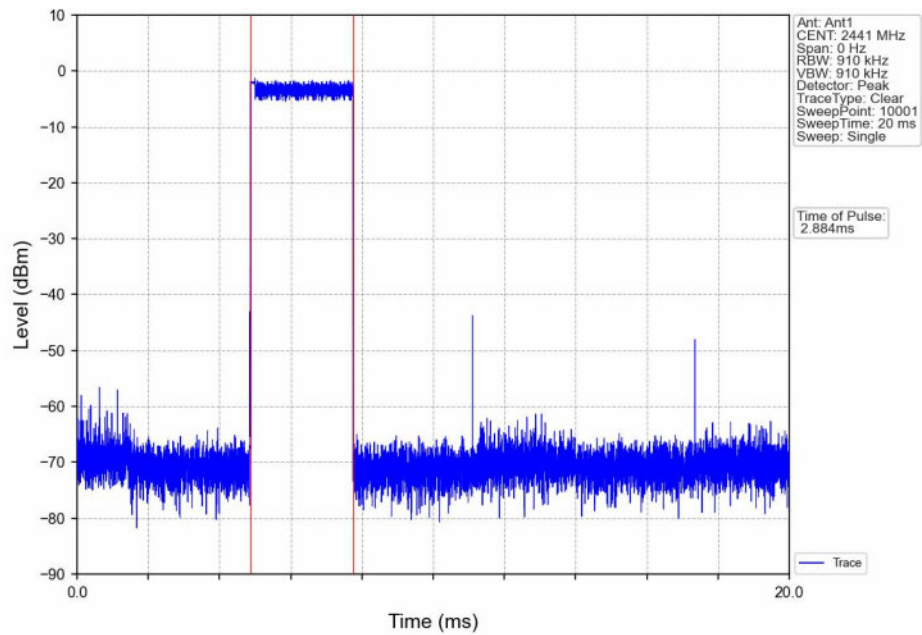
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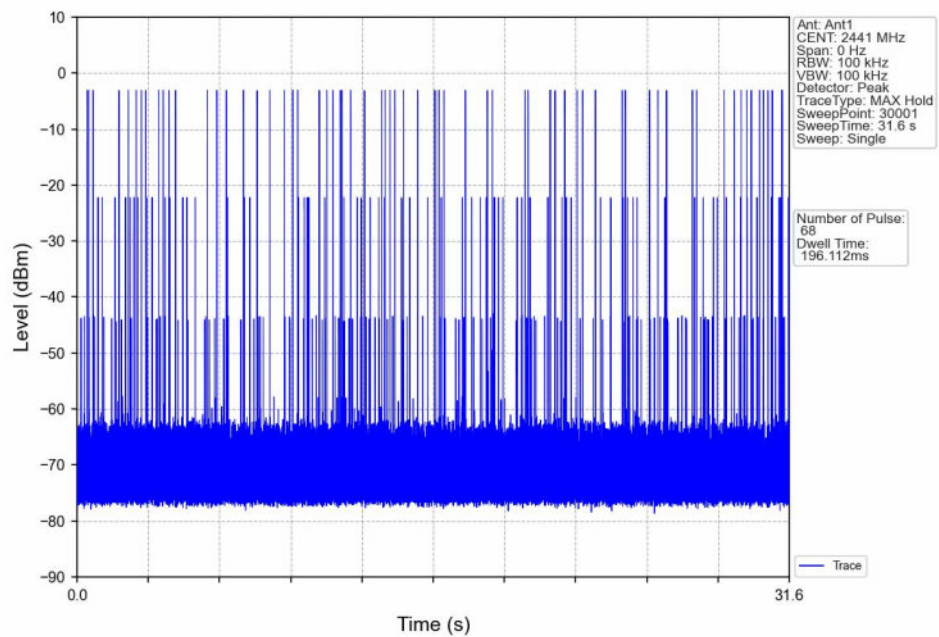
8DPSK_3DH3_HOPP_Ant1_NTNV



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	2.63
		2441	DH5	1	4.90
		2480	DH5	1	2.46
Pi/4DQPSK	SISO	2402	2DH5	1	0.72
		2441	2DH5	1	2.89
		2480	2DH5	1	0.50
8DPSK	SISO	2402	3DH5	1	0.77
		2441	3DH5	1	2.90
		2480	3DH5	1	0.51

Note1: Refer to RSS-247 Issue 3 section 5.5, FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.

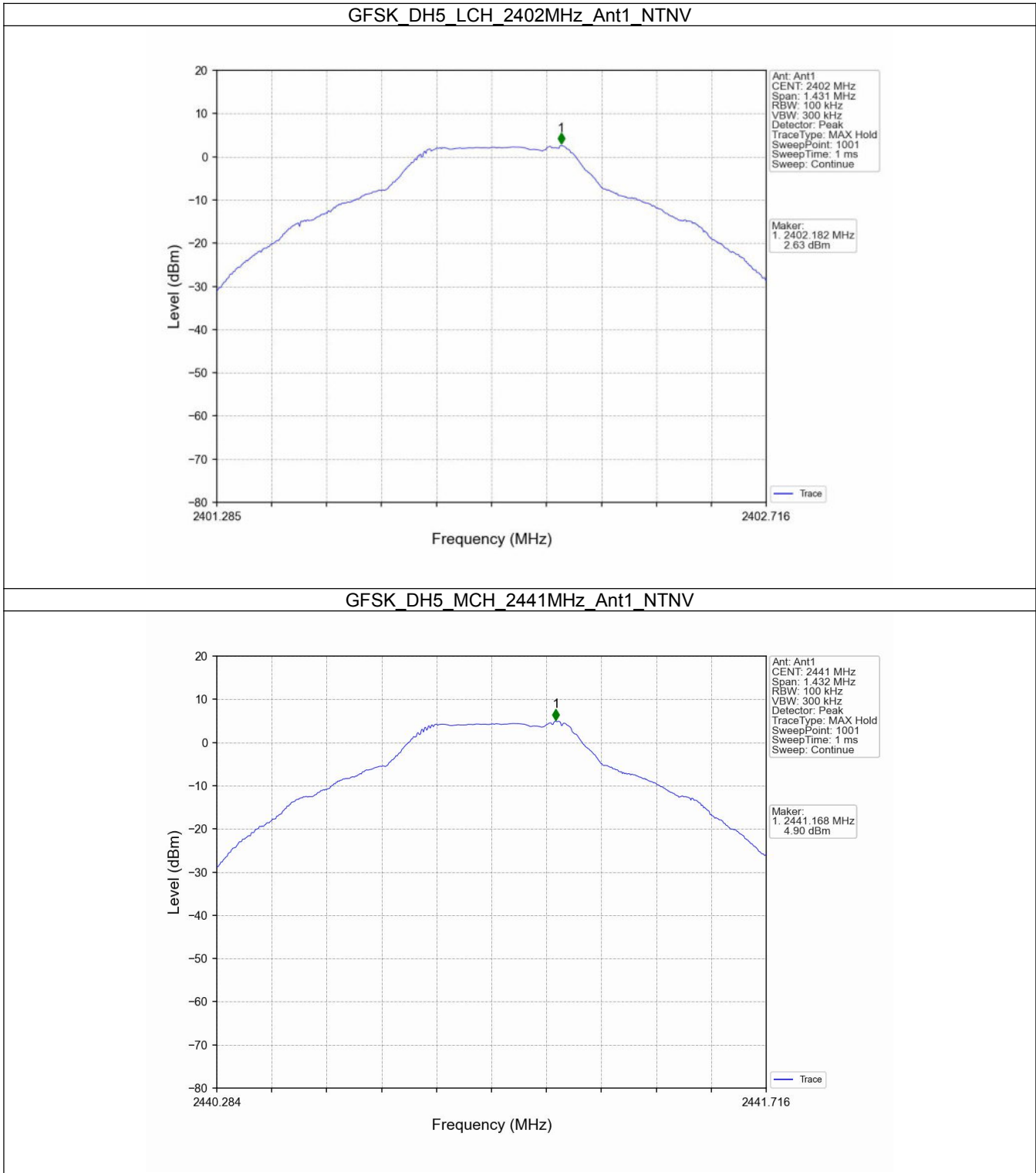
6.1.2 CSE

Mode	TX Type	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	SISO	2402	DH5	1	4.90	-15.10	Pass
		2441	DH5	1	4.90	-15.10	Pass
		2480	DH5	1	4.90	-15.10	Pass
		HOPP	DH5	1	4.90	-15.10	Pass
					4.90	-15.10	Pass
Pi/4DQPSK	SISO	2402	2DH5	1	2.89	-17.11	Pass
		2441	2DH5	1	2.89	-17.11	Pass
		2480	2DH5	1	2.89	-17.11	Pass
		HOPP	2DH5	1	2.89	-17.11	Pass
					2.89	-17.11	Pass
8DPSK	SISO	2402	3DH5	1	2.90	-17.10	Pass
		2441	3DH5	1	2.90	-17.10	Pass
		2480	3DH5	1	2.90	-17.10	Pass
		HOPP	3DH5	1	2.90	-17.10	Pass
					2.90	-17.10	Pass

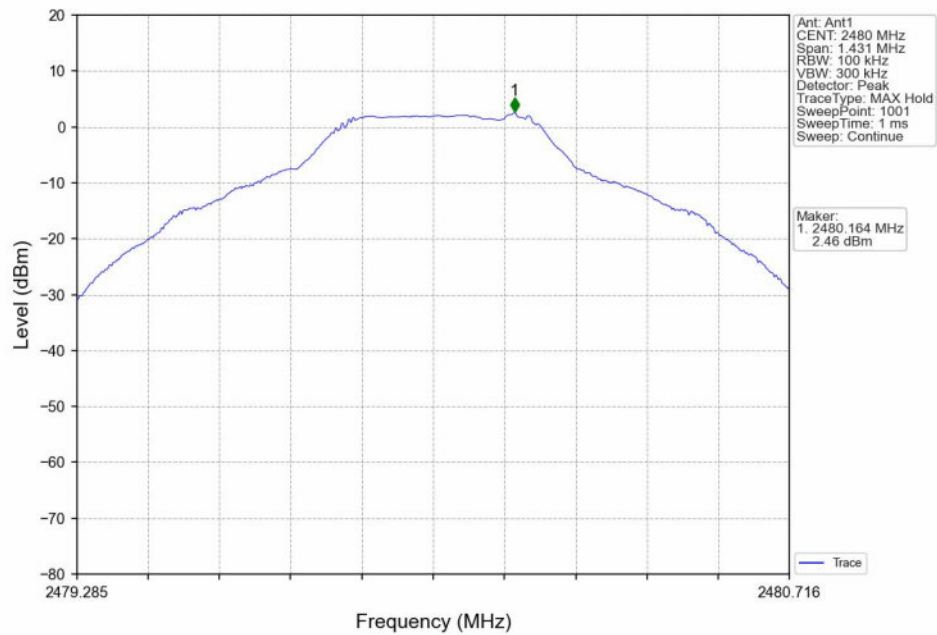
Note1: Refer to RSS-247 Issue 3 section 5.5, FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.

6.2 Test Graph

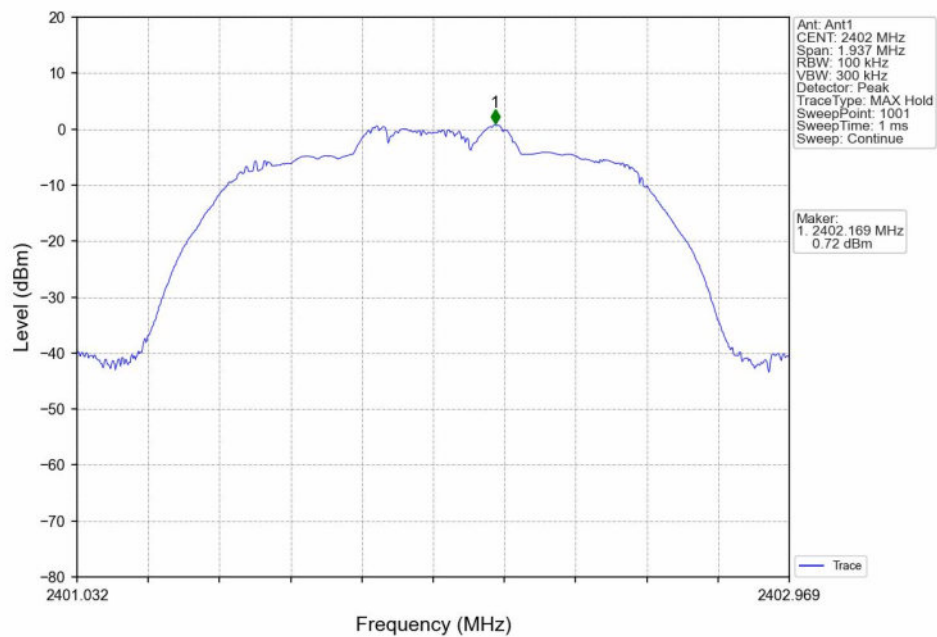
6.2.1 Ref



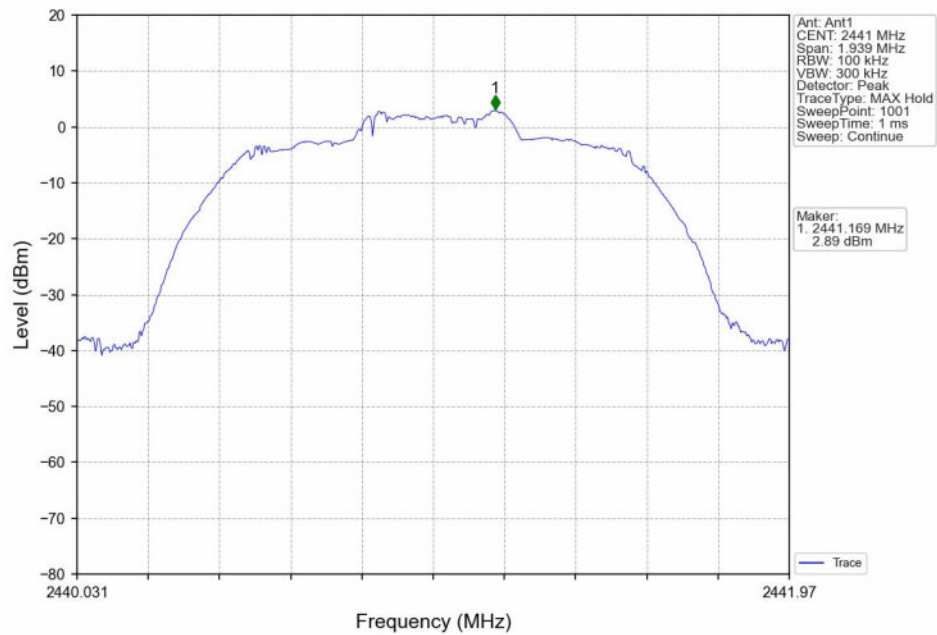
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



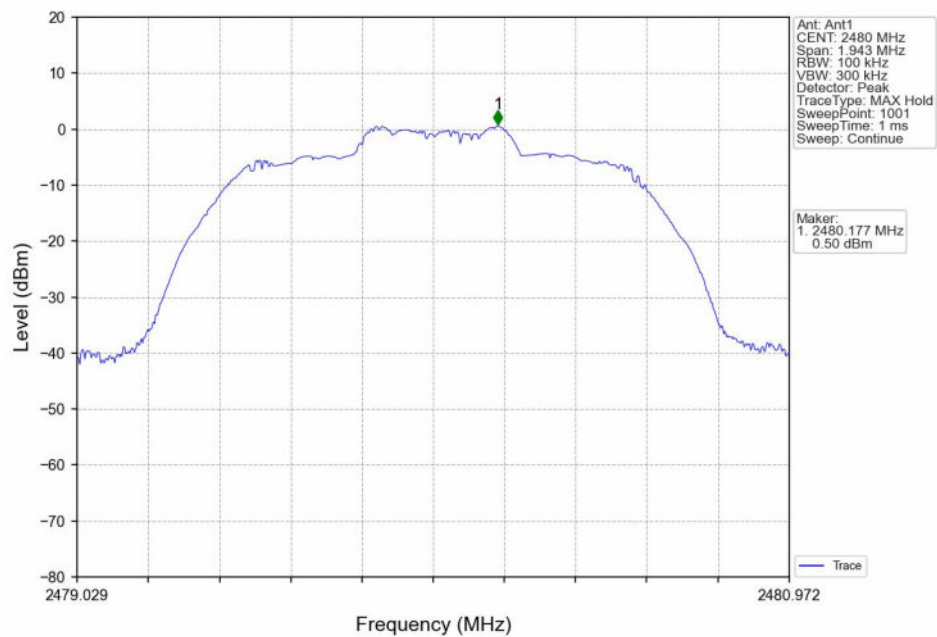
Pi/4DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



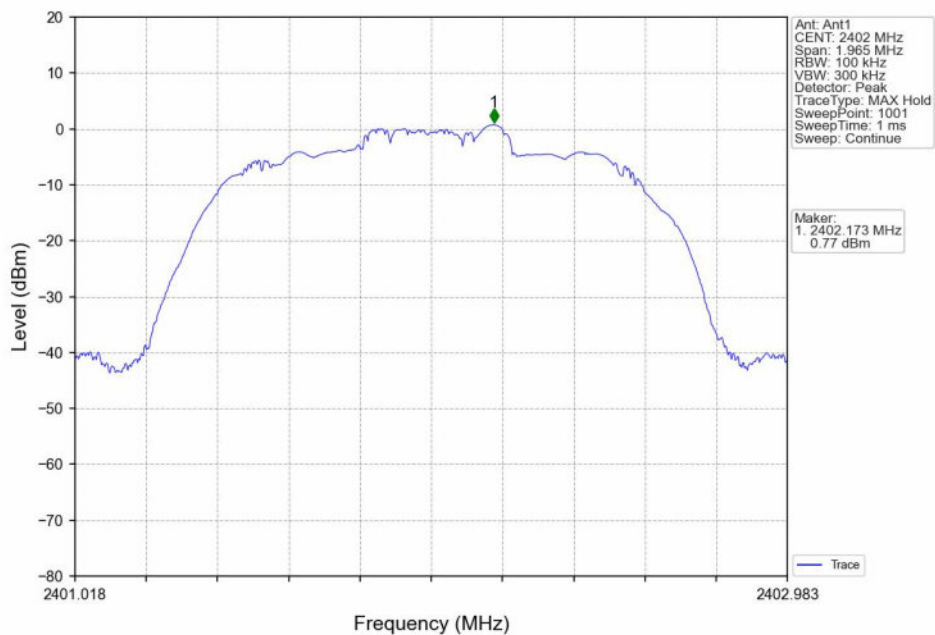
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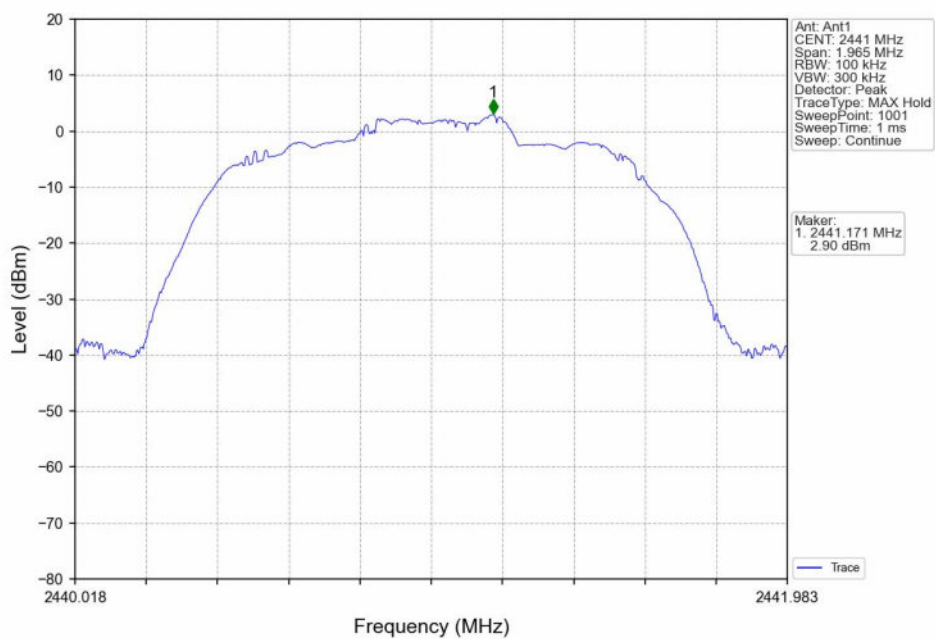
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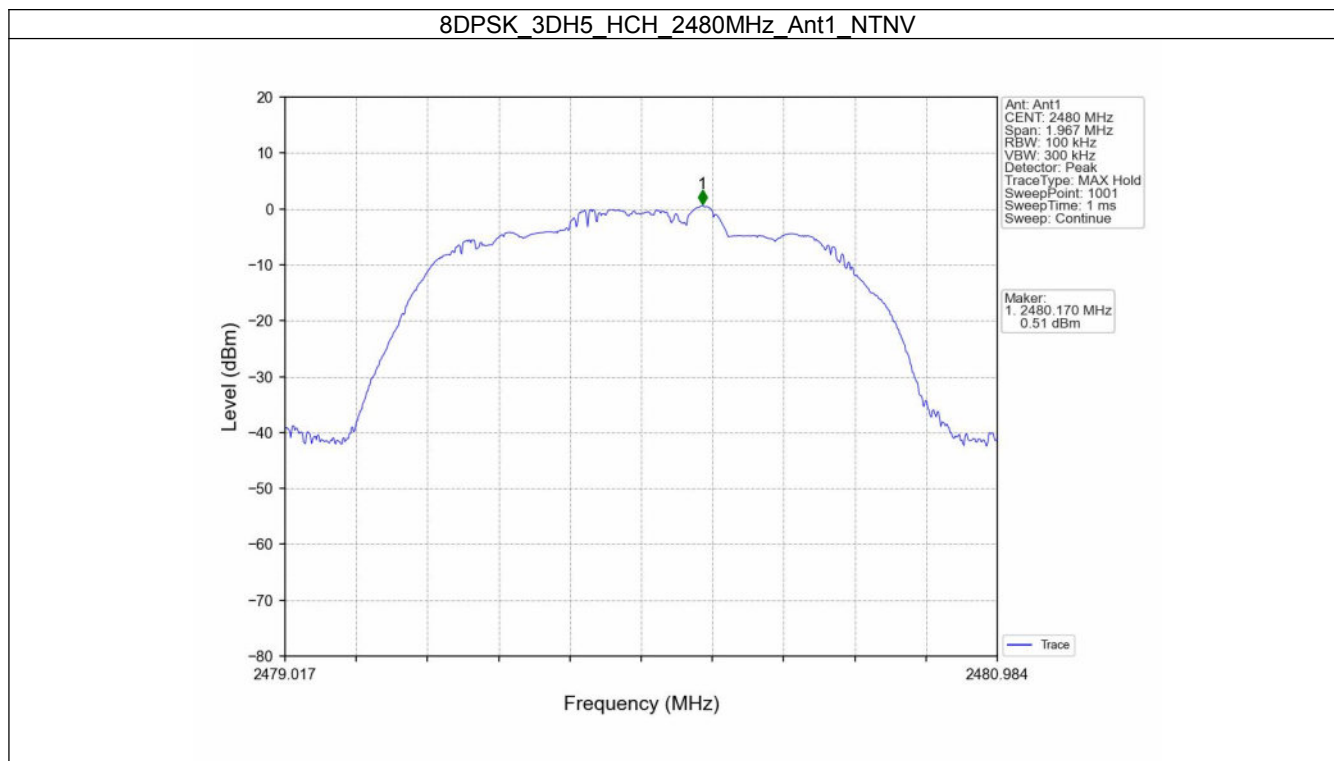


8DPSK_3DH5_LCH_2402MHz_Ant1_NTNV

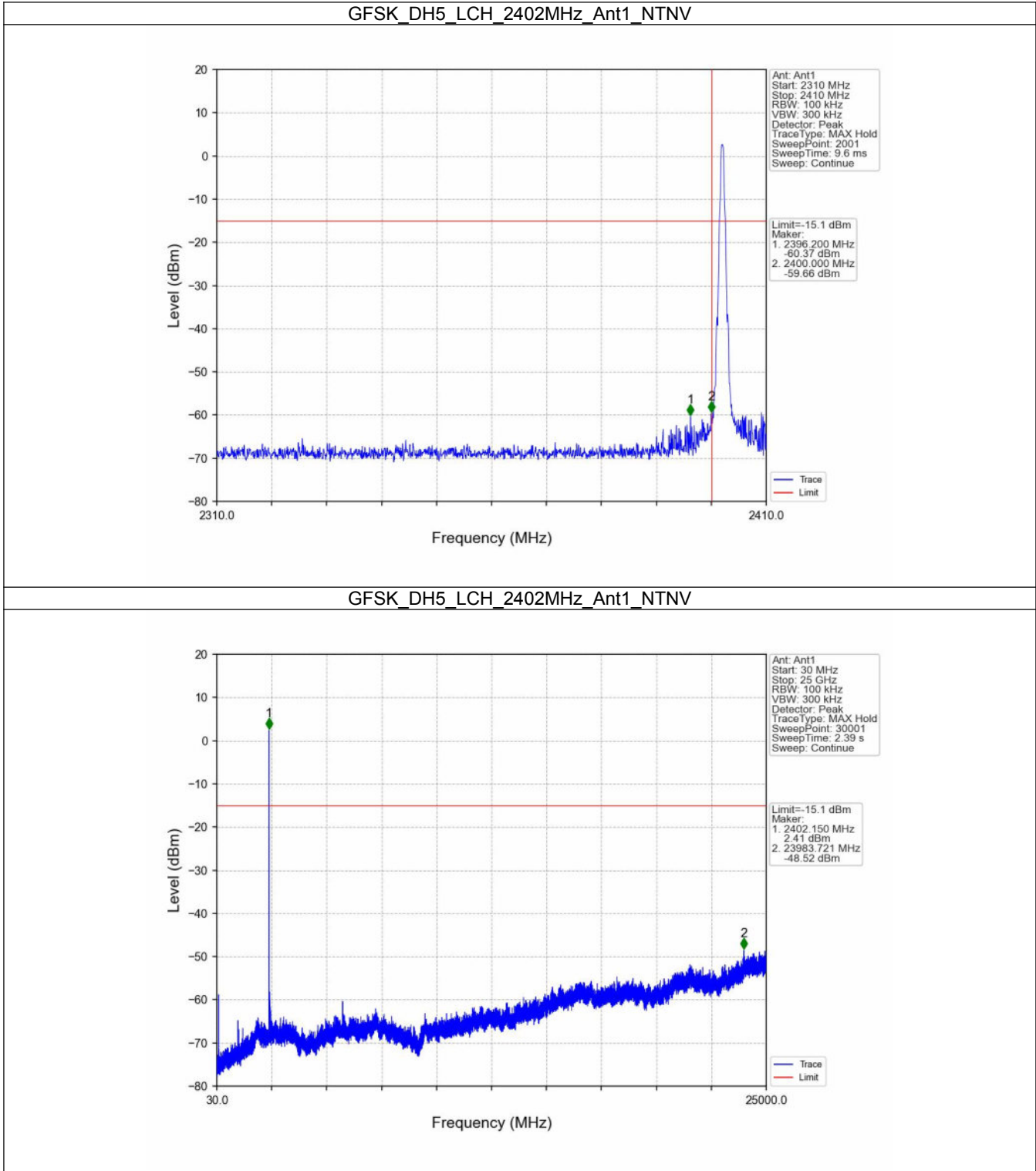


8DPSK_3DH5_MCH_2441MHz_Ant1_NTNV

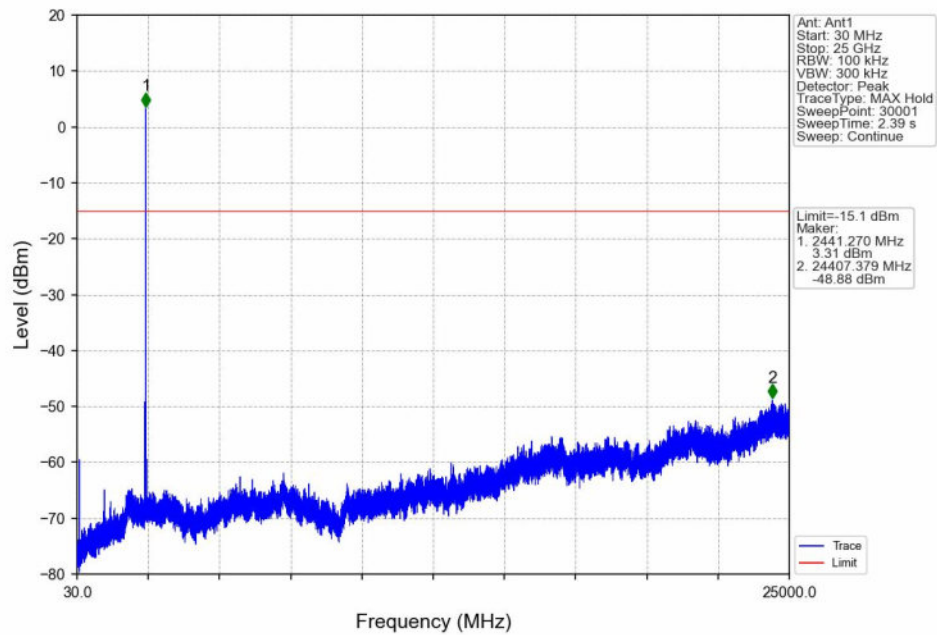




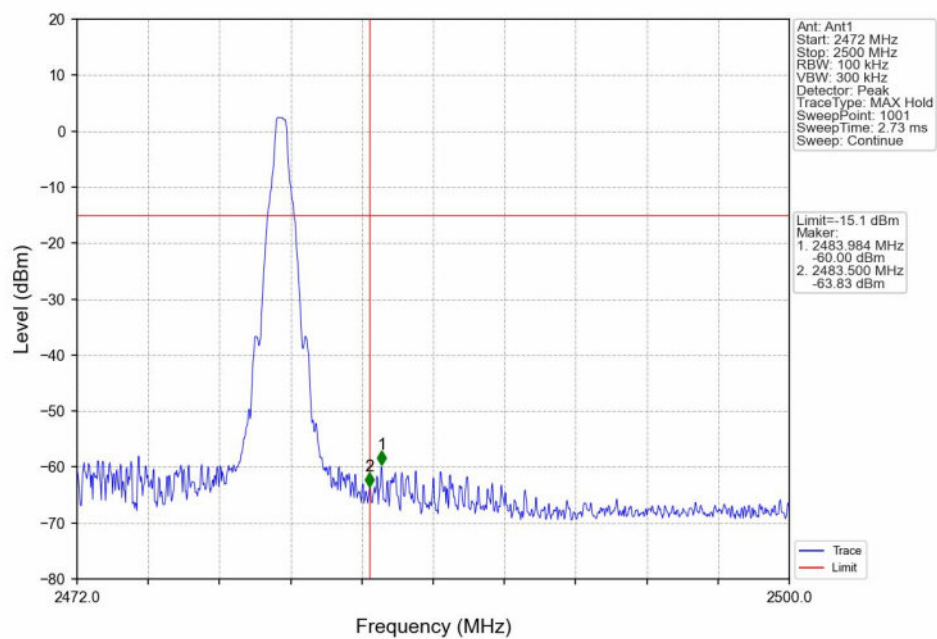
6.2.2 CSE



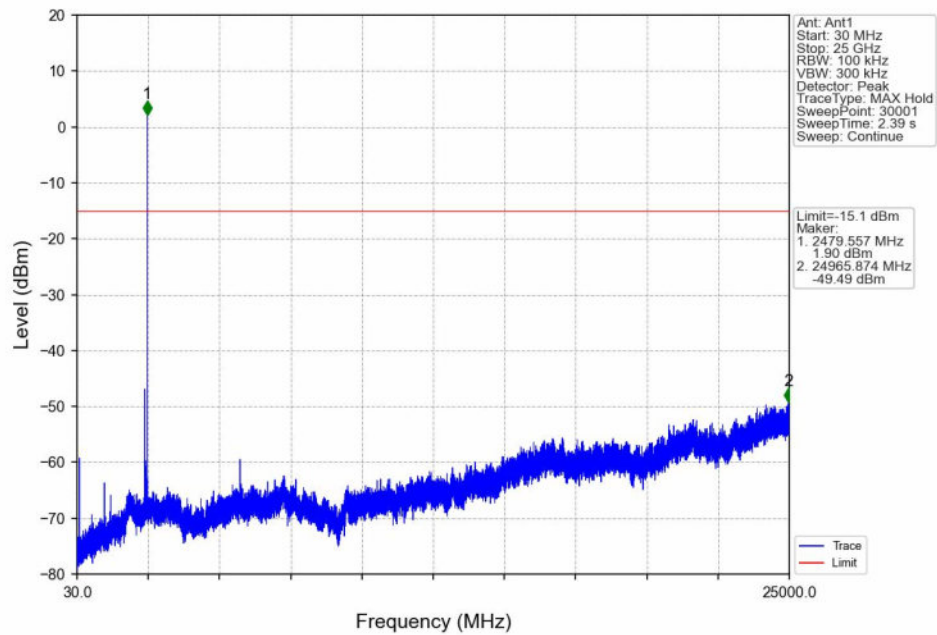
GFSK_DH5_MCH_2441MHz_Ant1_NTNV



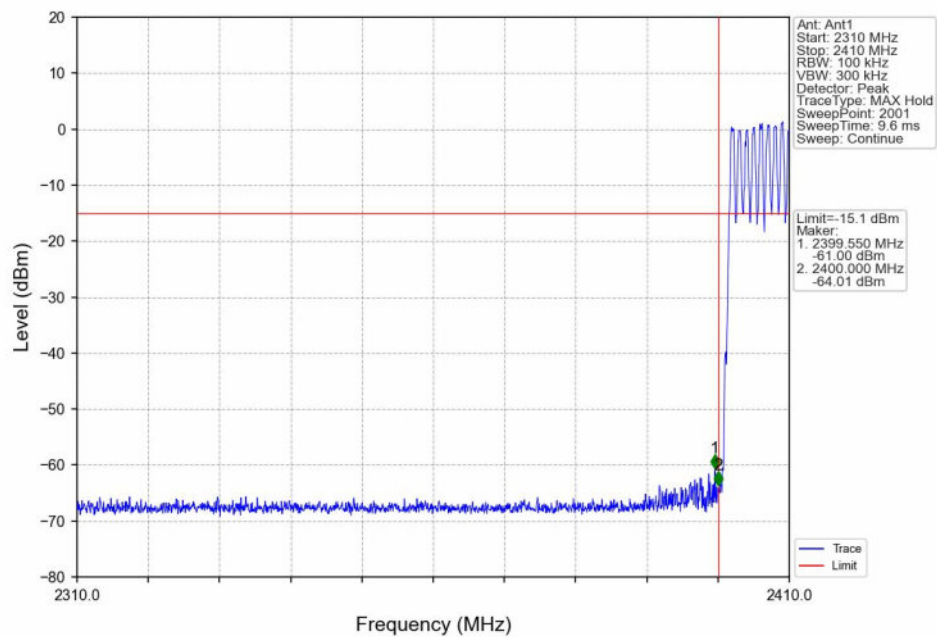
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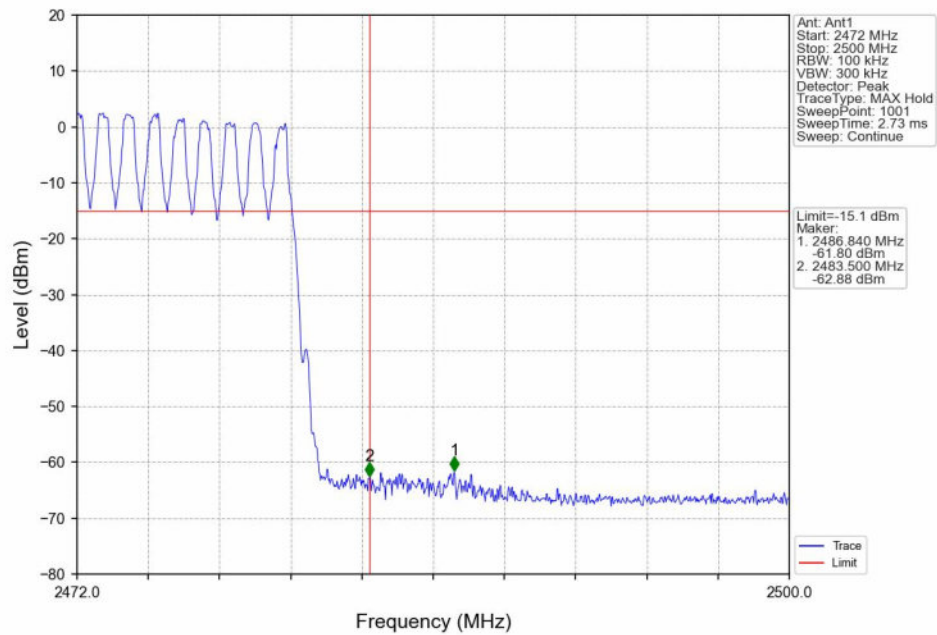
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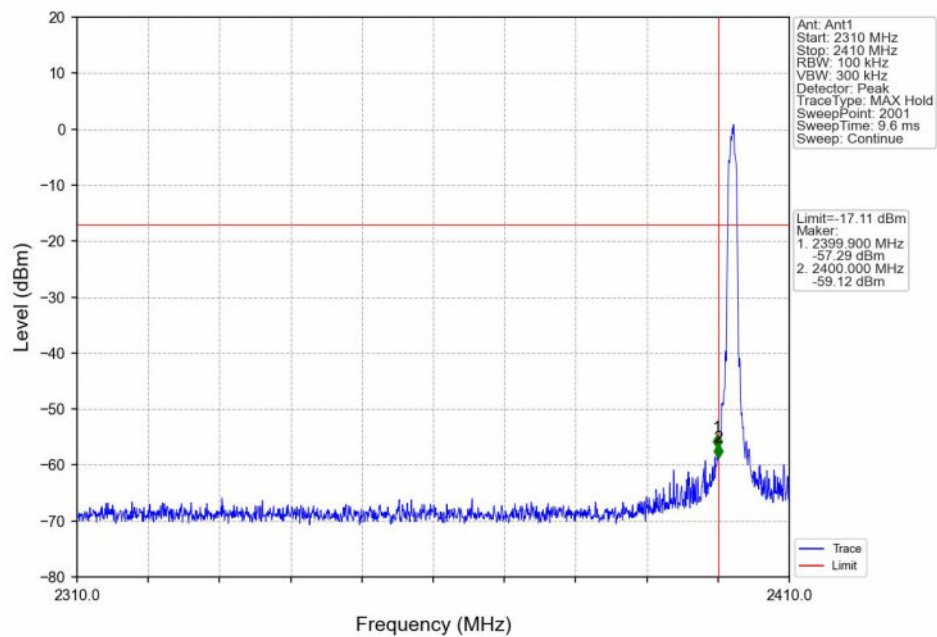
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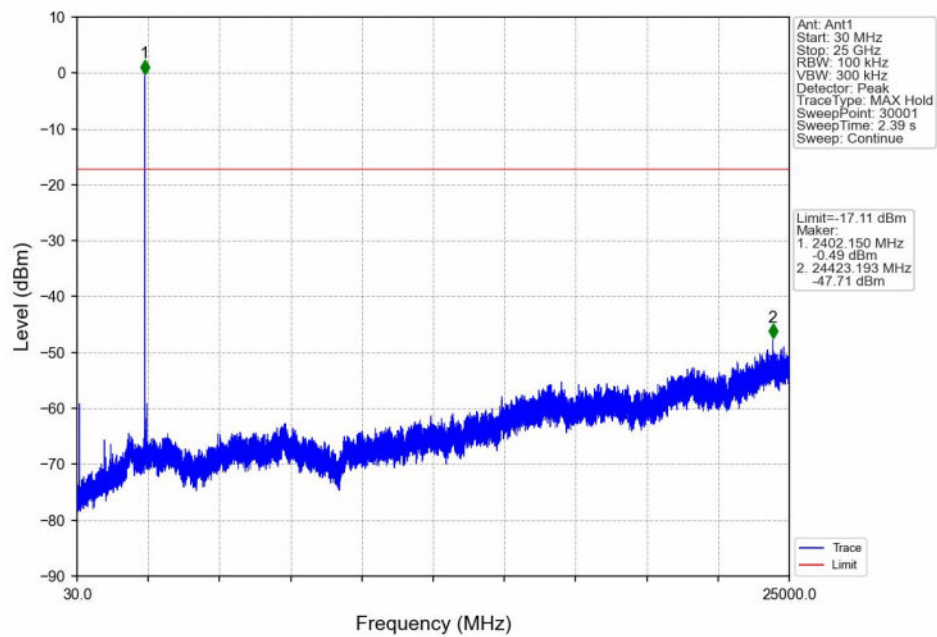
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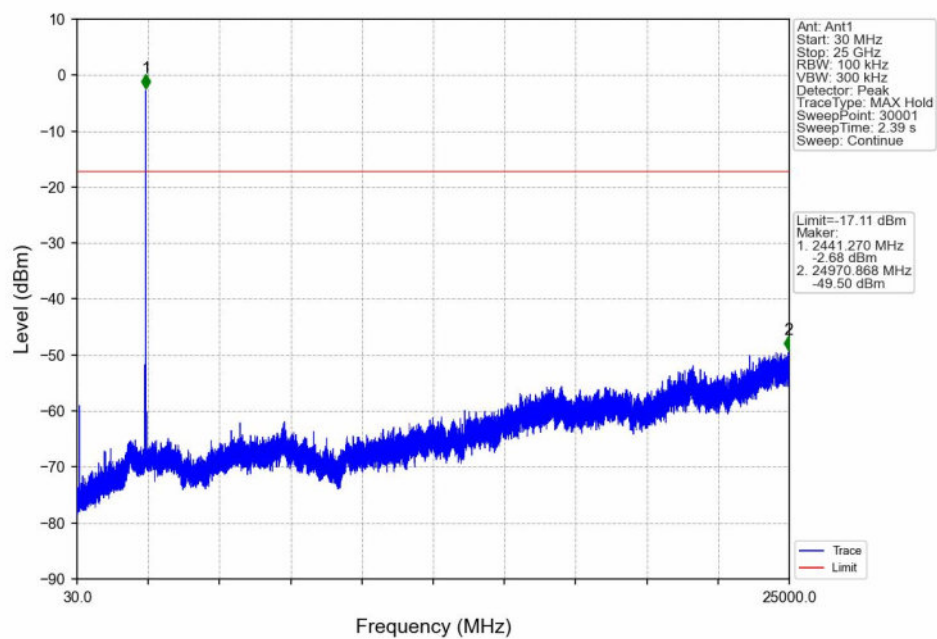
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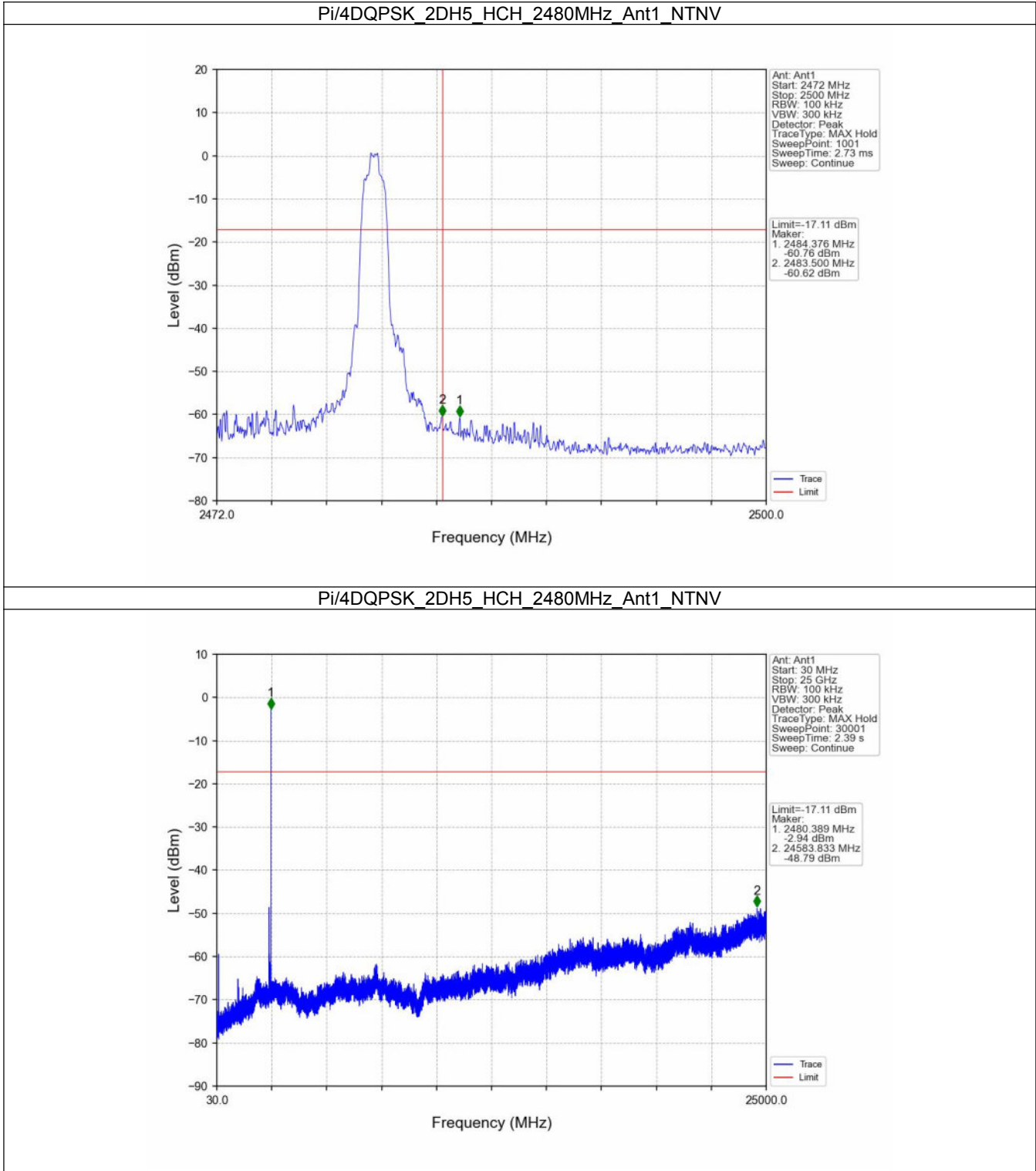


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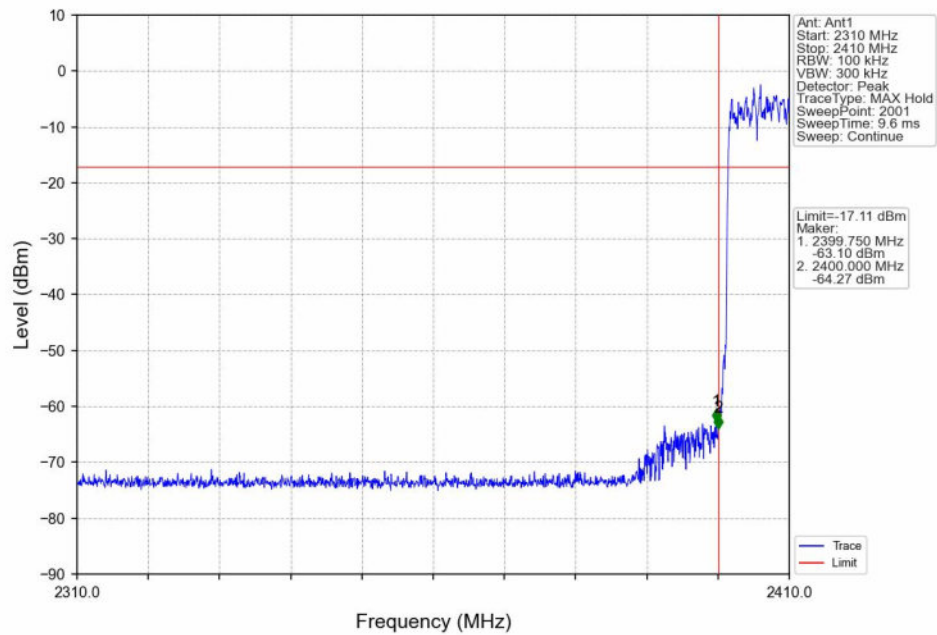


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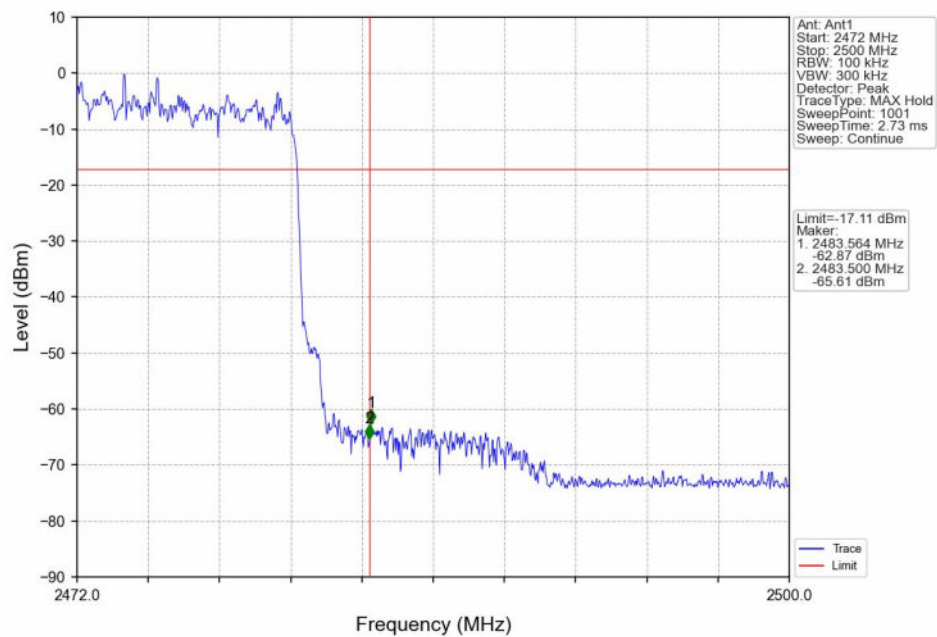




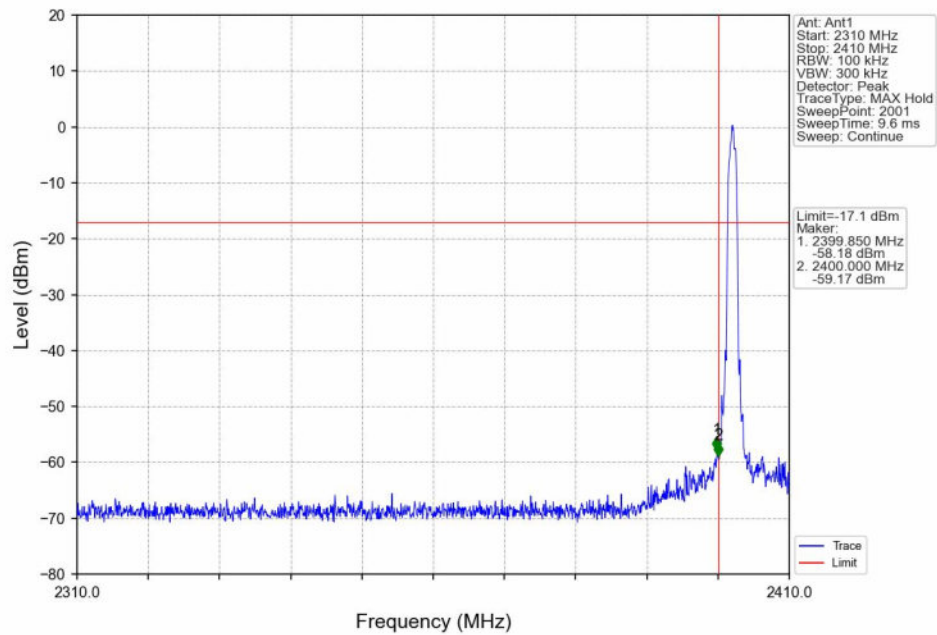
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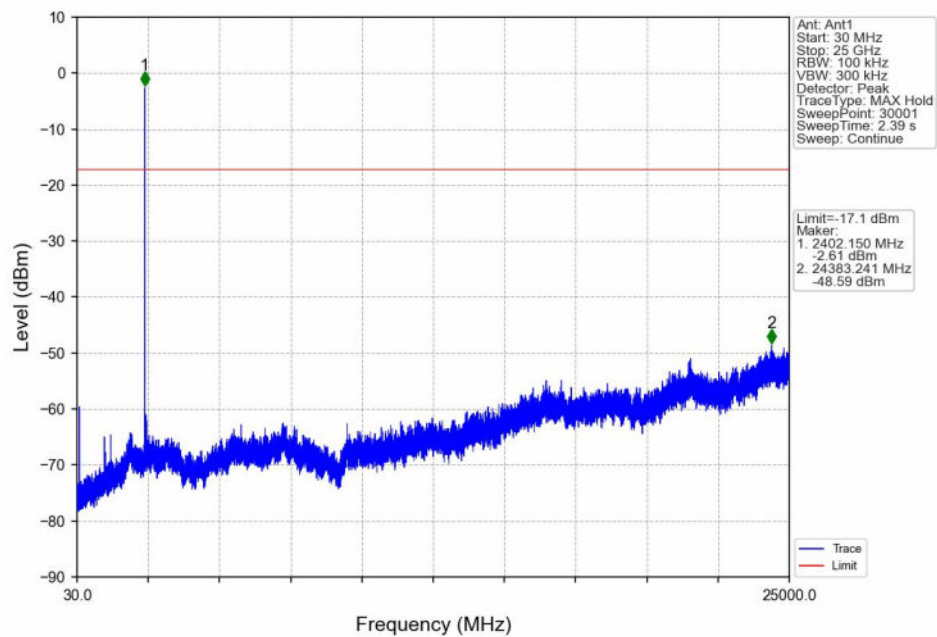
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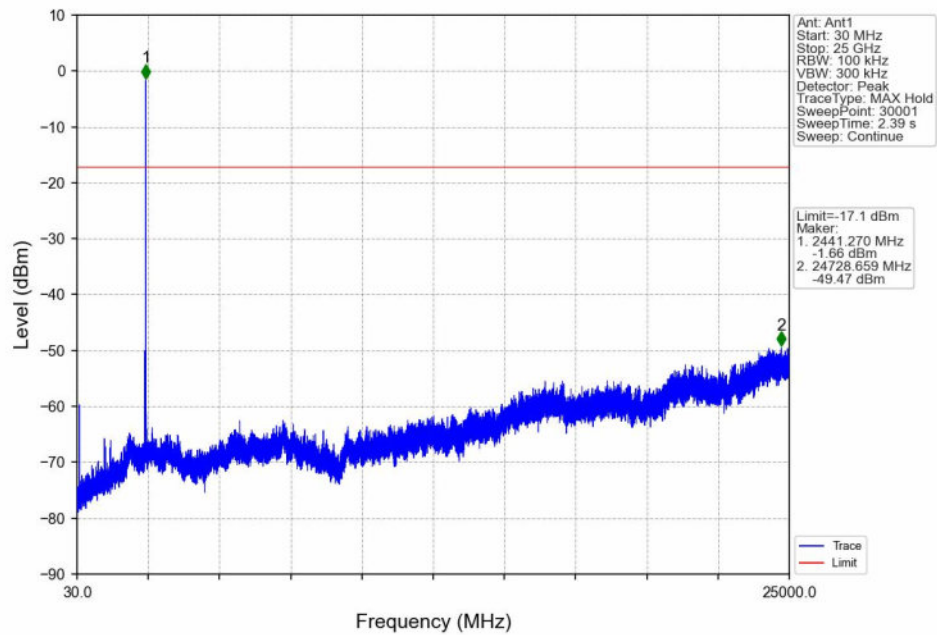
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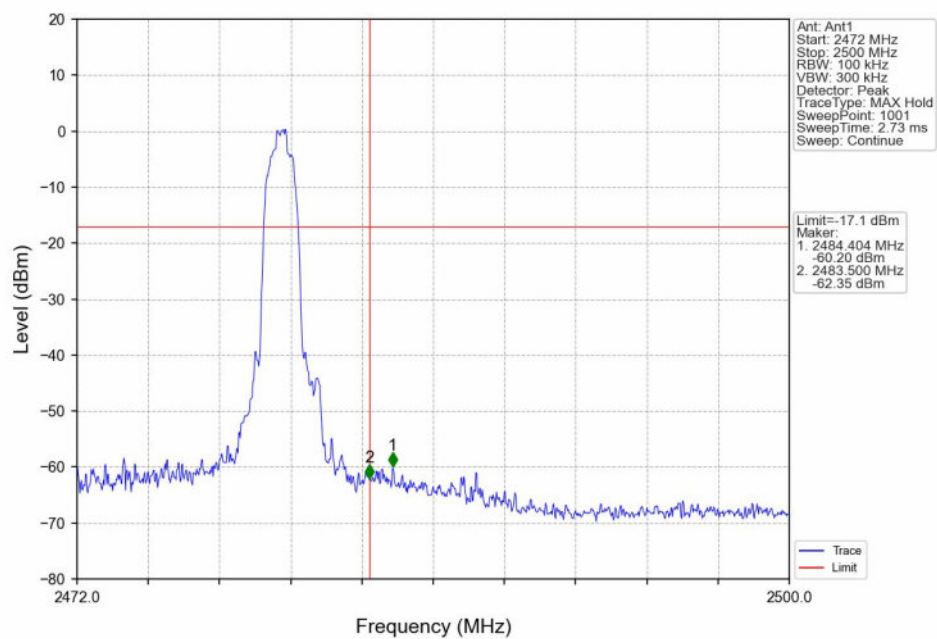
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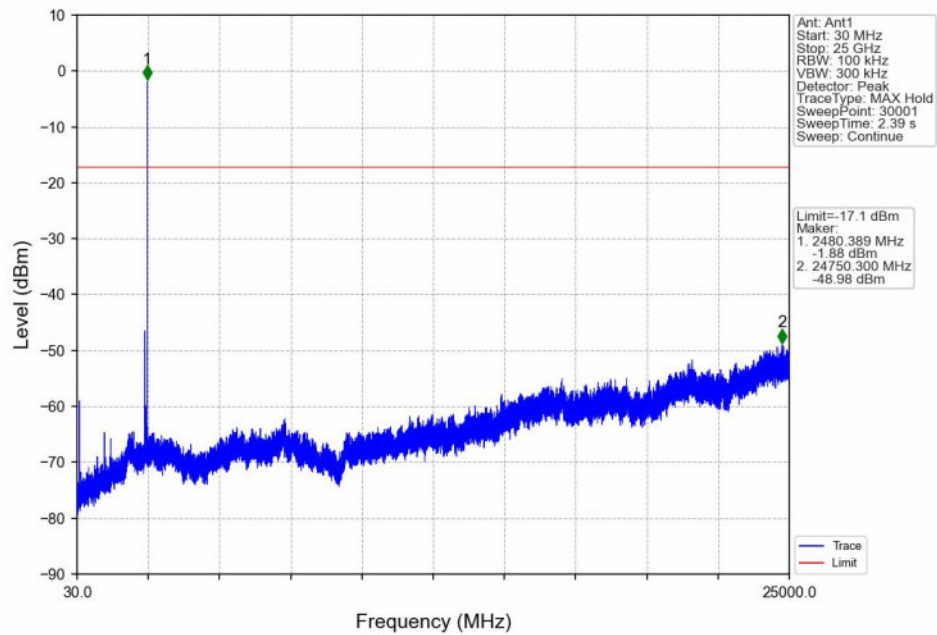
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8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



8DPSK_3DH5_HCH_2480MHz_Ant1_NTNV



8DPSK_3DH5_HOPP_Ant1_NTNV

