



Appendix A

RF Test Data for BT(BDR/EDR) (Conducted Measurement)

Product Name: karaoke machine

Trade Mark: EAIHW

Test Model: KM01

Environmental Conditions

Temperature:	25.2℃
Relative Humidity:	51.2%
ATM Pressure:	101Kpa
Test Engineer:	Simba Huang
Supervised by:	Seal Chen



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1 Maximum Conducted Peak Output Power

1.1 Test Result

Bluetooth module 1:

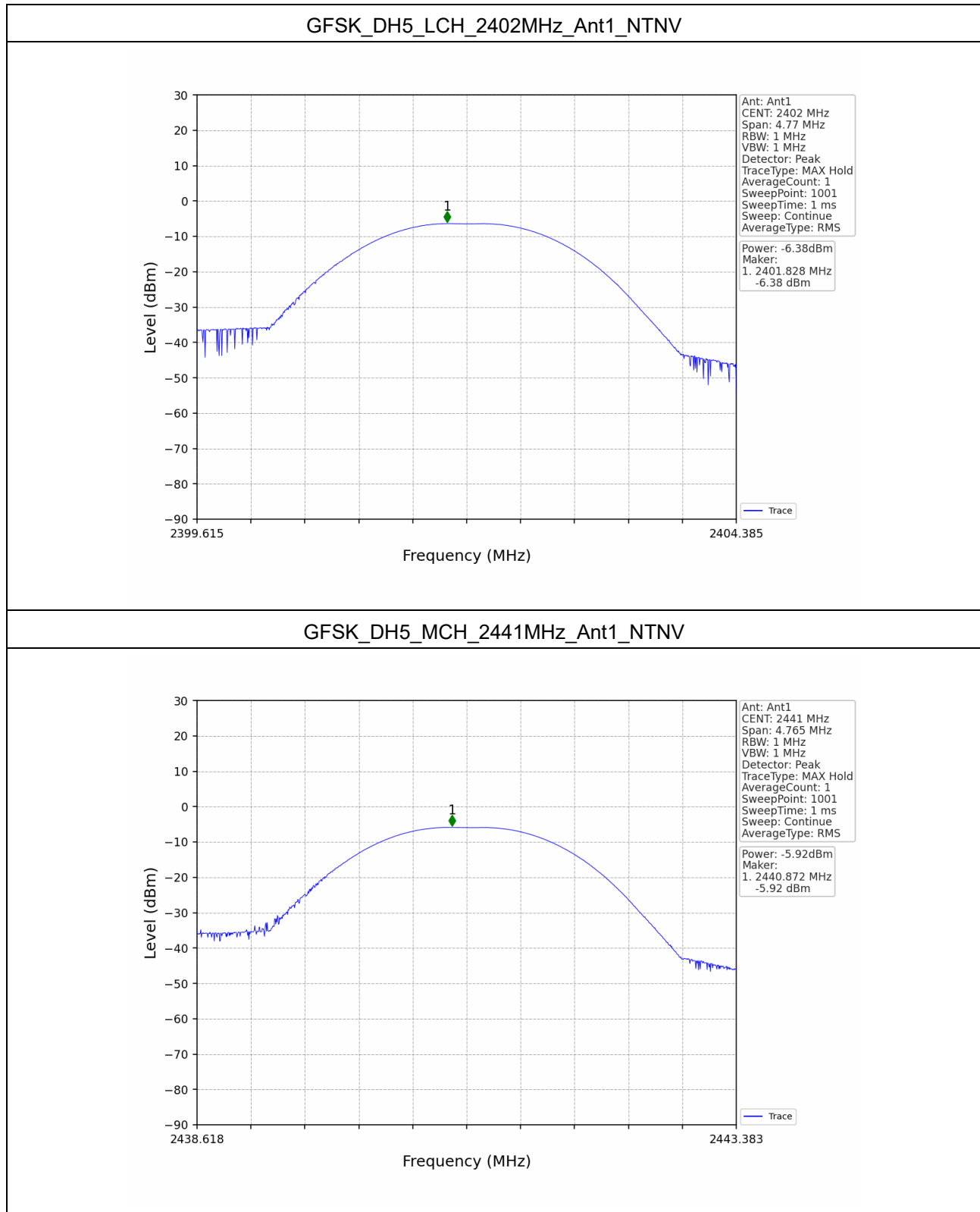
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-6.38	21	Pass
	MCH	-5.92	21	Pass
	HCH	-5.54	21	Pass
$\pi/4$ -DQPSK	LCH	-5.48	21	Pass
	MCH	-4.96	21	Pass
	HCH	-4.64	21	Pass

Bluetooth module 2:

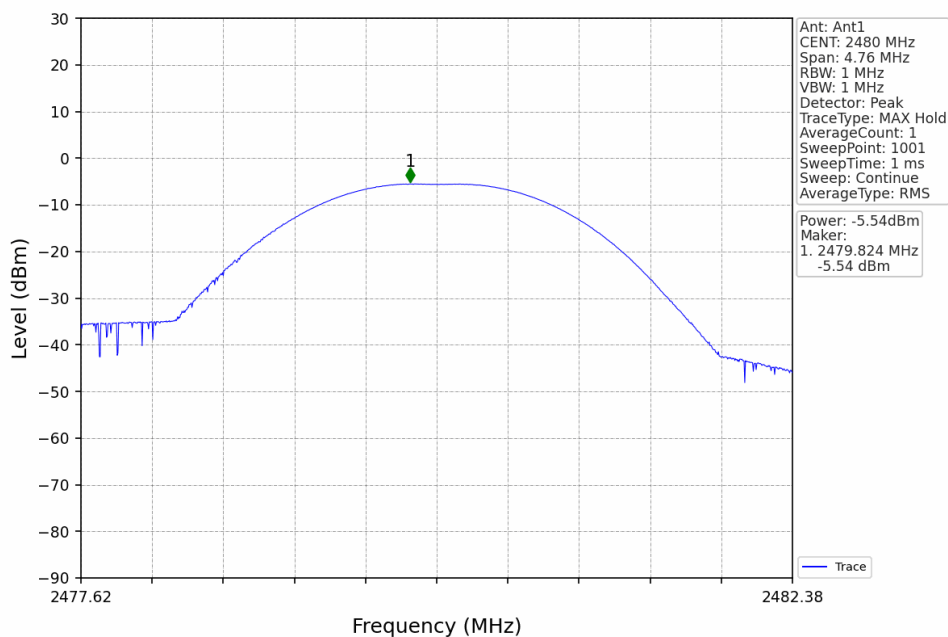
Mode	Channel.	Maximum Peak Output Power [dBm]	Limit [dBm]	Verdict
GFSK	LCH	-6.32	21	Pass
	MCH	-5.85	21	Pass
	HCH	-6.21	21	Pass
$\pi/4$ -DQPSK	LCH	-4.13	21	Pass
	MCH	-3.77	21	Pass
	HCH	-4.06	21	Pass

1.2 Test Graphs

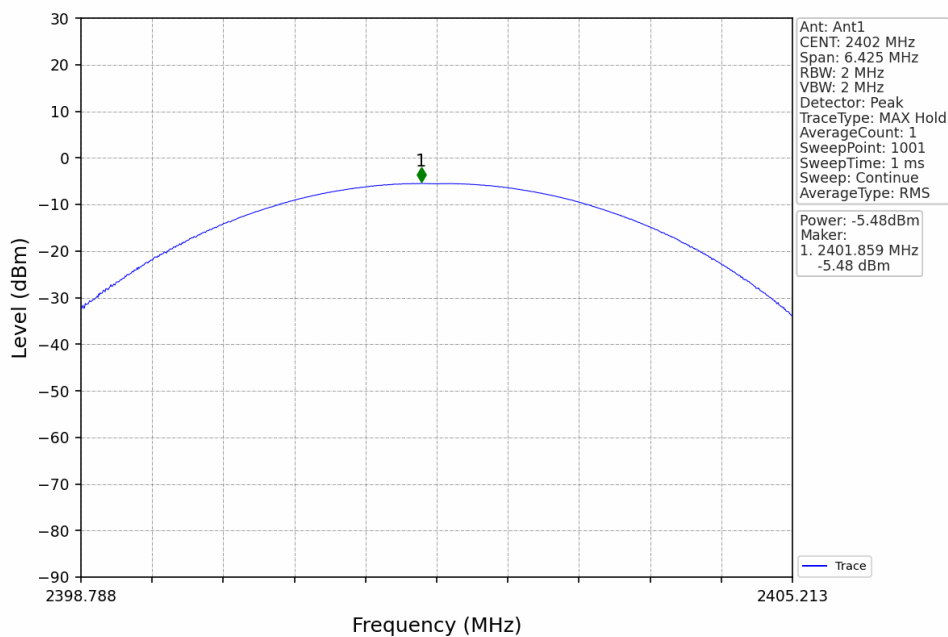
Bluetooth module 1:



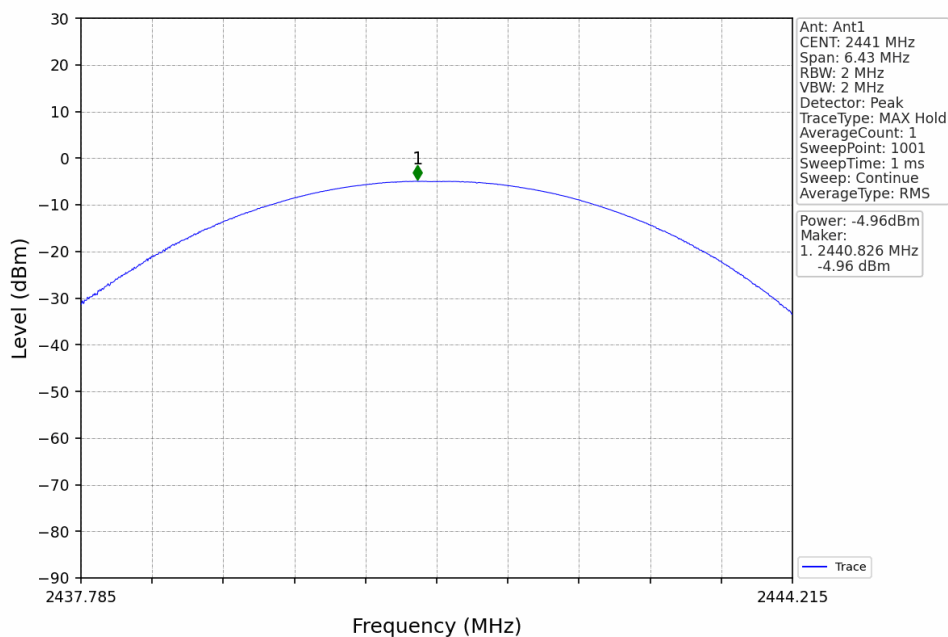
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



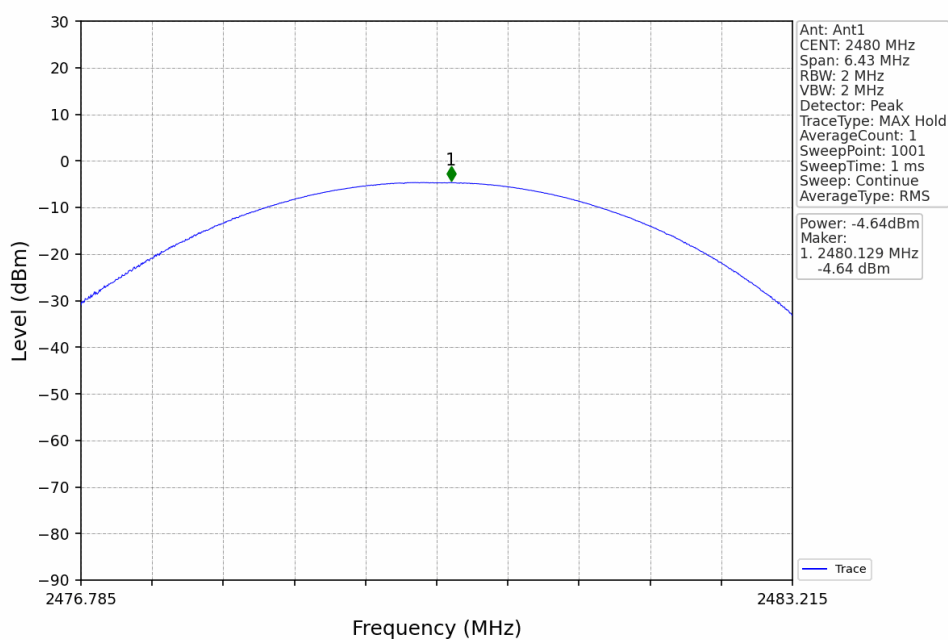
$\pi/4$ -DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



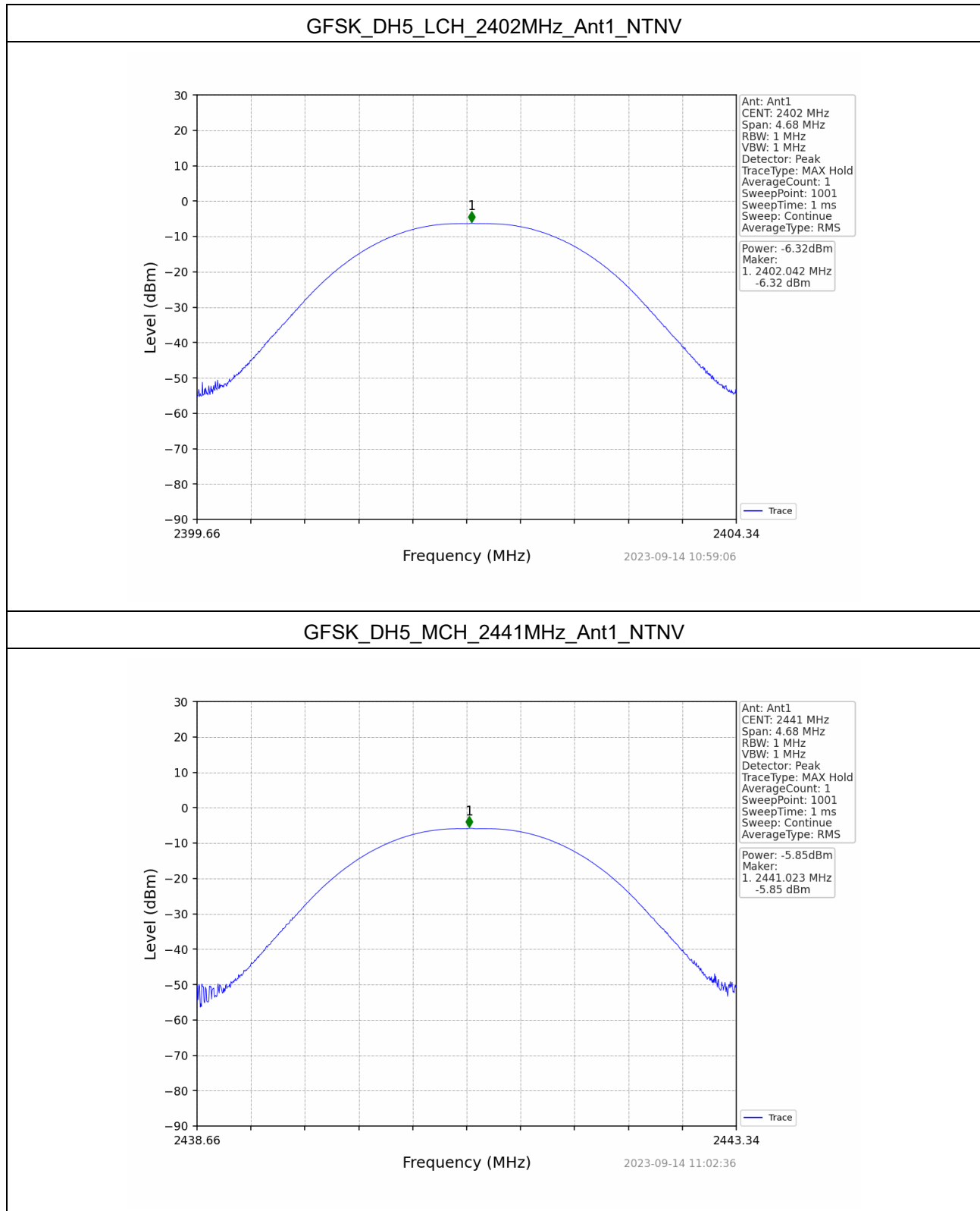
$\pi/4$ -DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



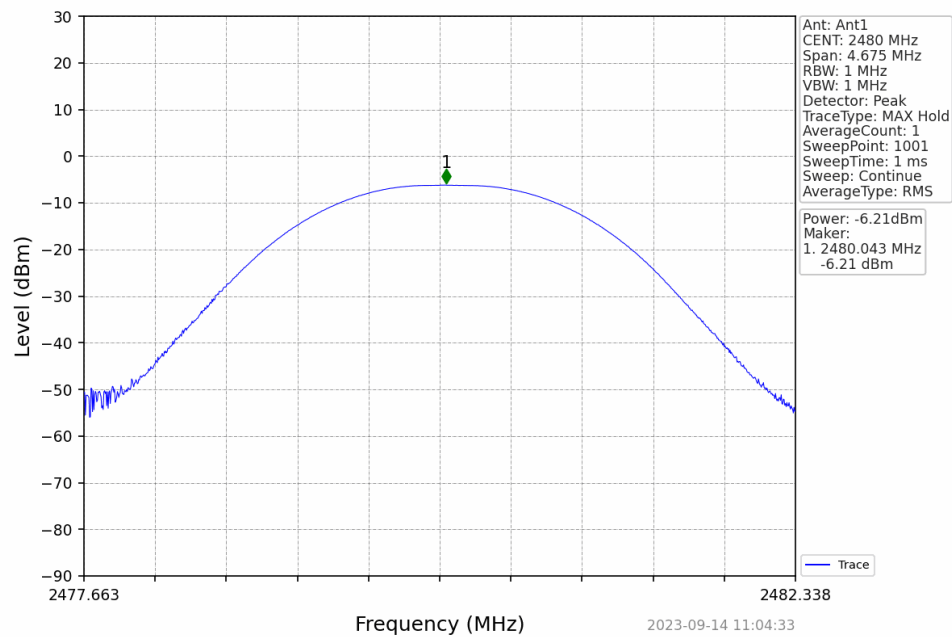
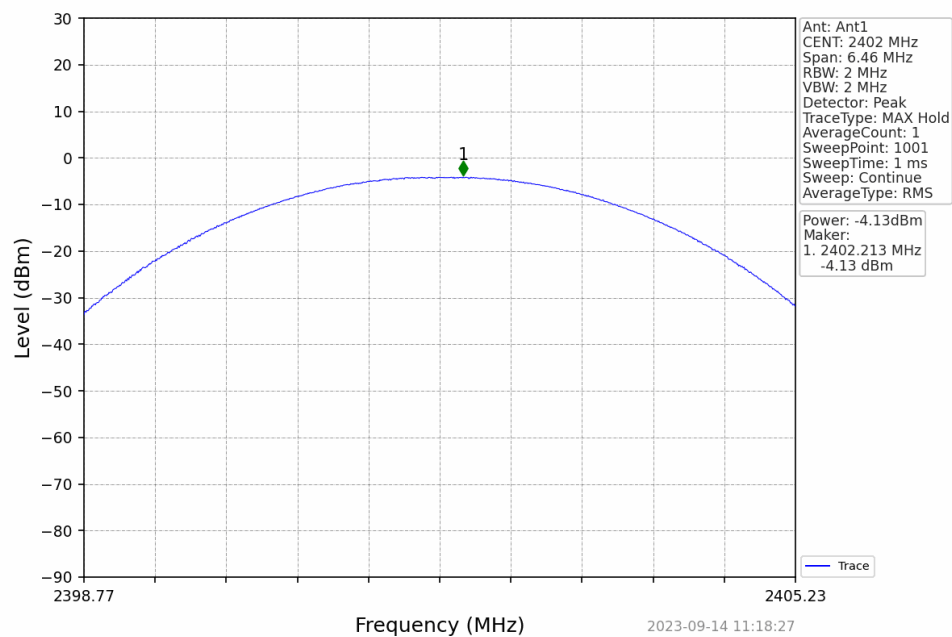
$\pi/4$ -DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



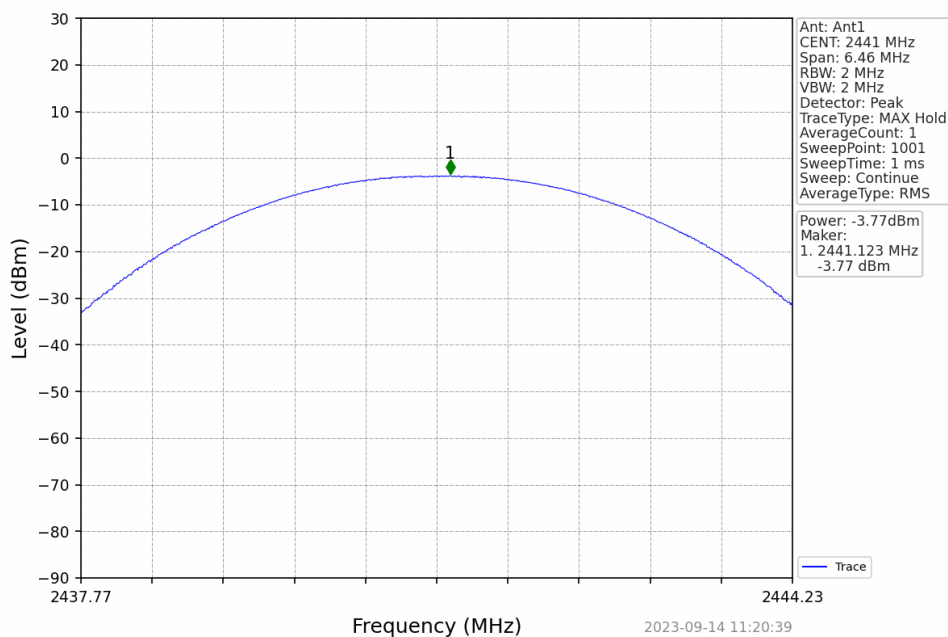
Bluetooth module 2:



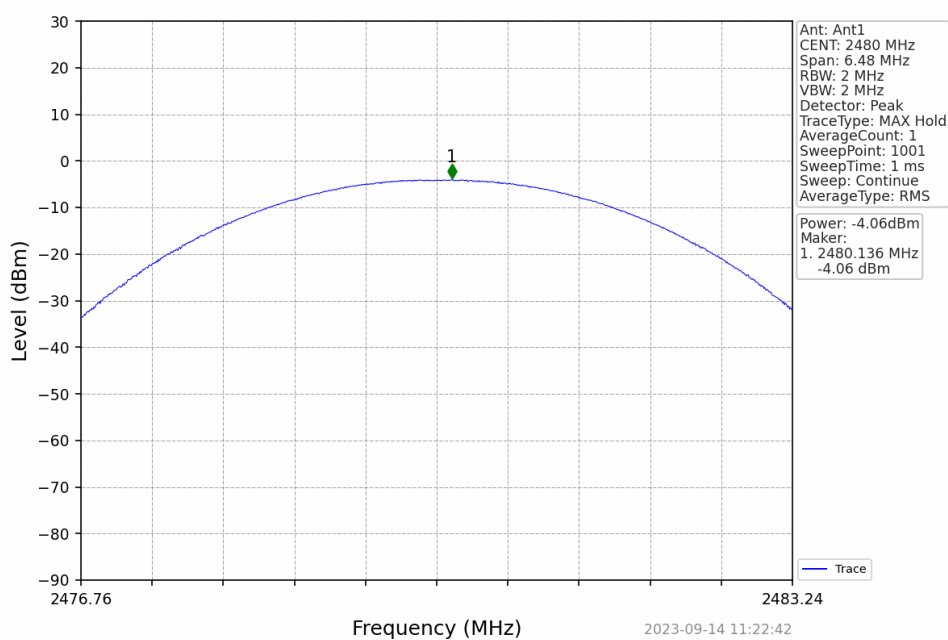
GFSK_DH5_HCH_2480MHz_Ant1_NTNV


 $\pi/4$ -DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV


$\pi/4$ -DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



$\pi/4$ -DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



2 20dB Bandwidth

2.1 Test Result

Bluetooth module 1:

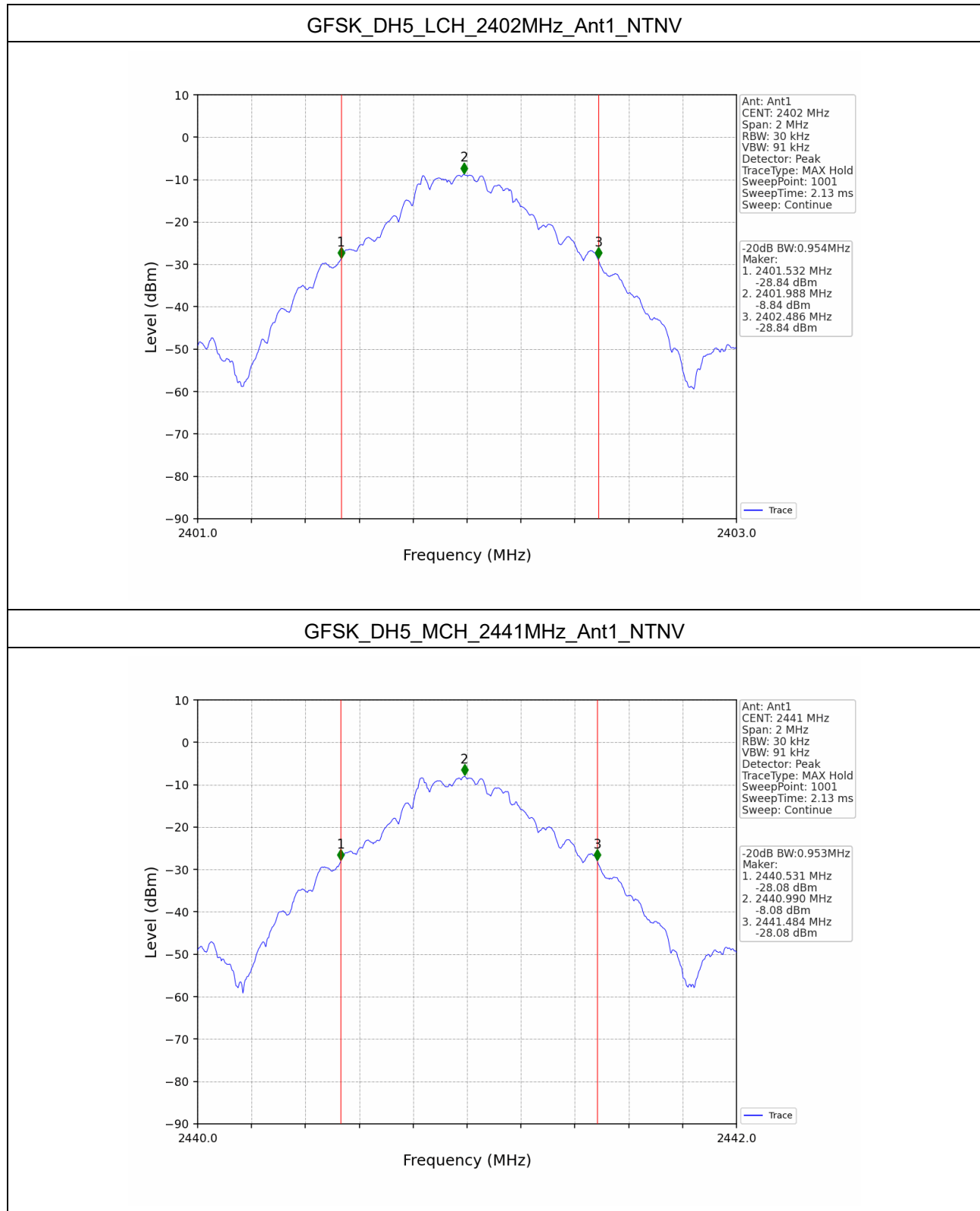
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.954	Not Specified	Pass
	MCH	0.953	Not Specified	Pass
	HCH	0.952	Not Specified	Pass
$\pi/4$ -DQPSK	LCH	1.285	Not Specified	Pass
	MCH	1.286	Not Specified	Pass
	HCH	1.286	Not Specified	Pass

Bluetooth module 2:

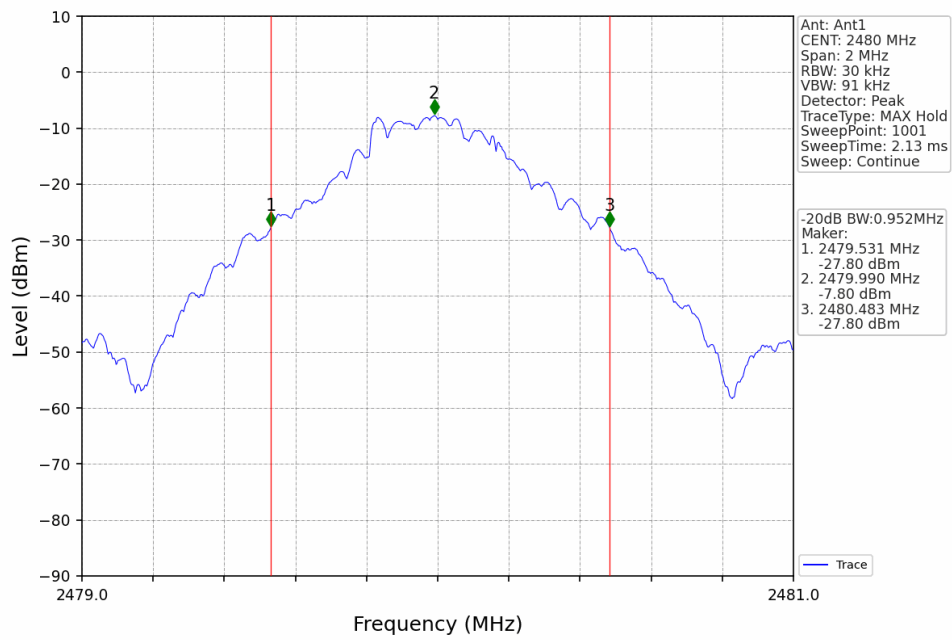
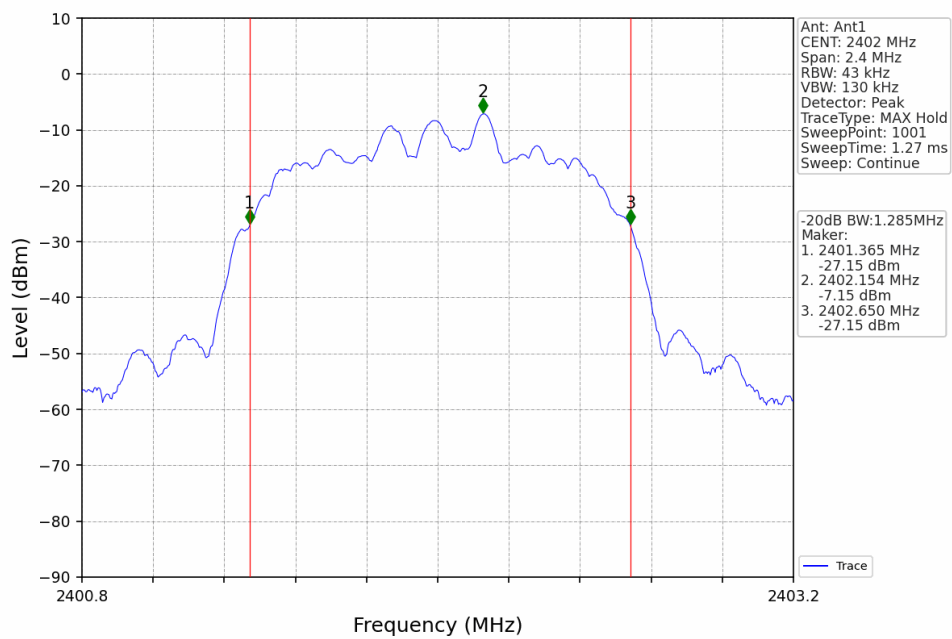
Mode	Channel.	20dB Bandwidth [MHz]	Limit [MHz]	Verdict
GFSK	LCH	0.936	Not Specified	Pass
	MCH	0.936	Not Specified	Pass
	HCH	0.935	Not Specified	Pass
$\pi/4$ -DQPSK	LCH	1.292	Not Specified	Pass
	MCH	1.292	Not Specified	Pass
	HCH	1.296	Not Specified	Pass

2.2 Test Graphs

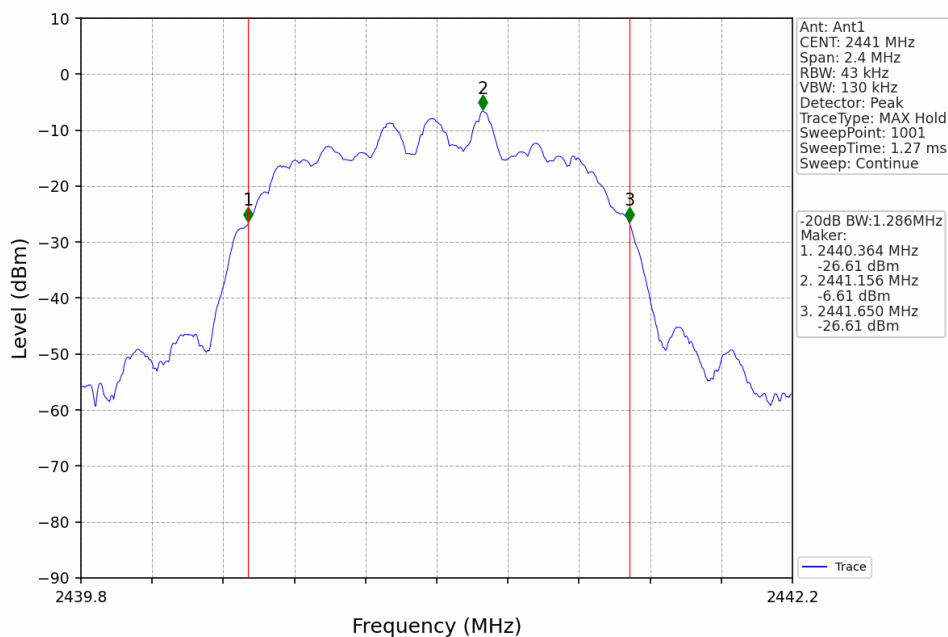
Bluetooth module 1:



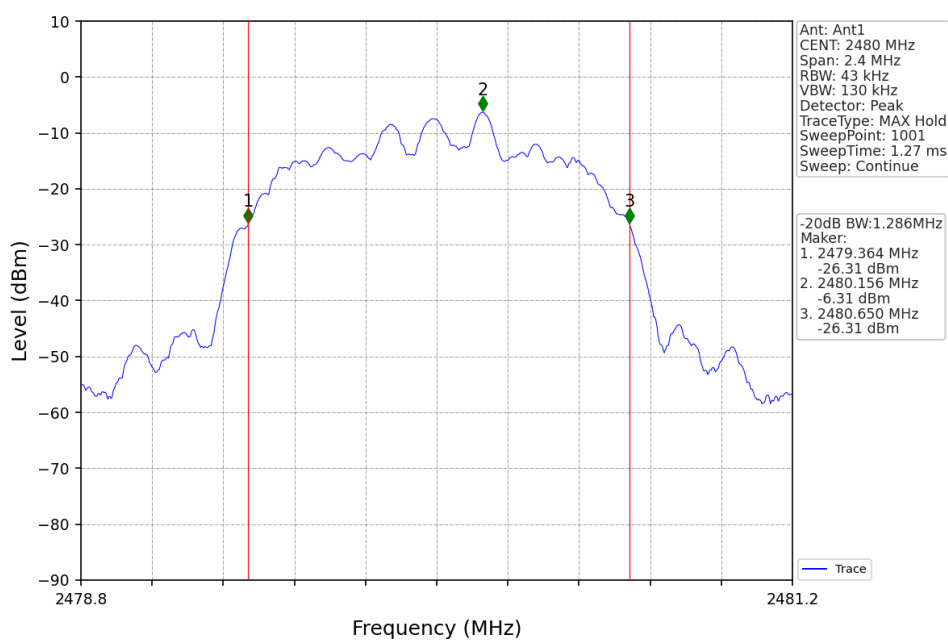
GFSK_DH5_HCH_2480MHz_Ant1_NTNV


 $\pi/4$ -DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV


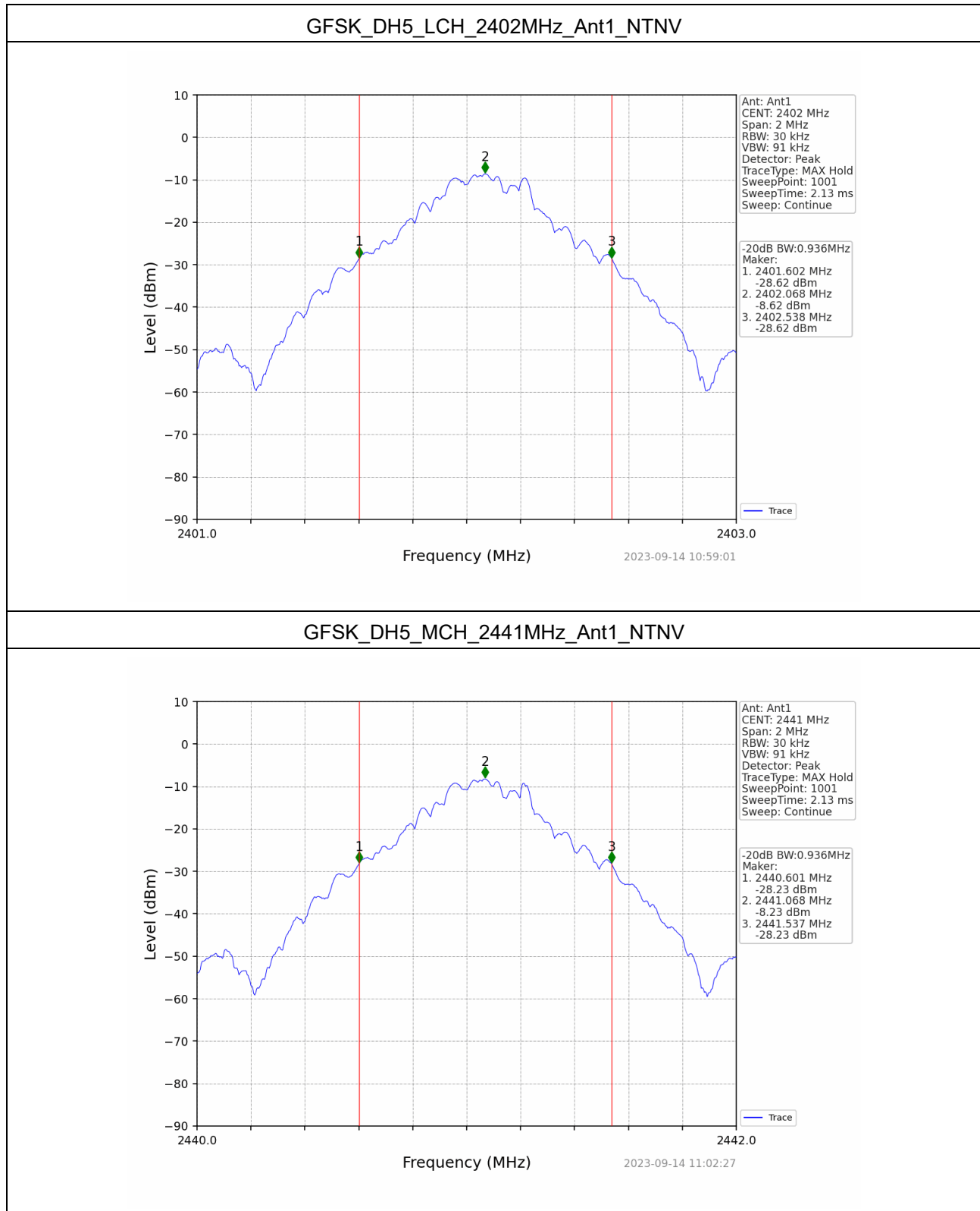
$\pi/4$ -DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



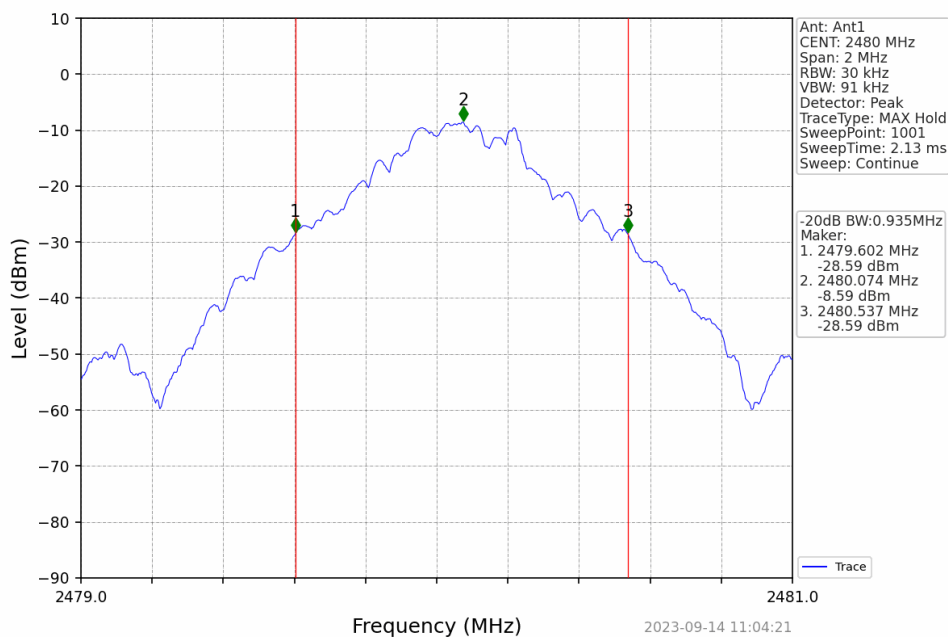
$\pi/4$ -DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



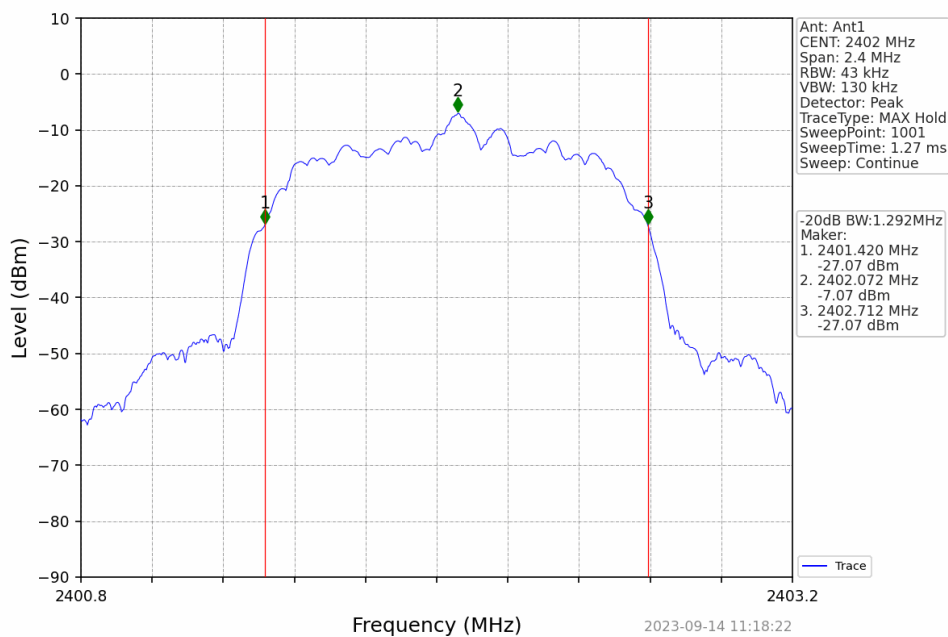
Bluetooth module 2:



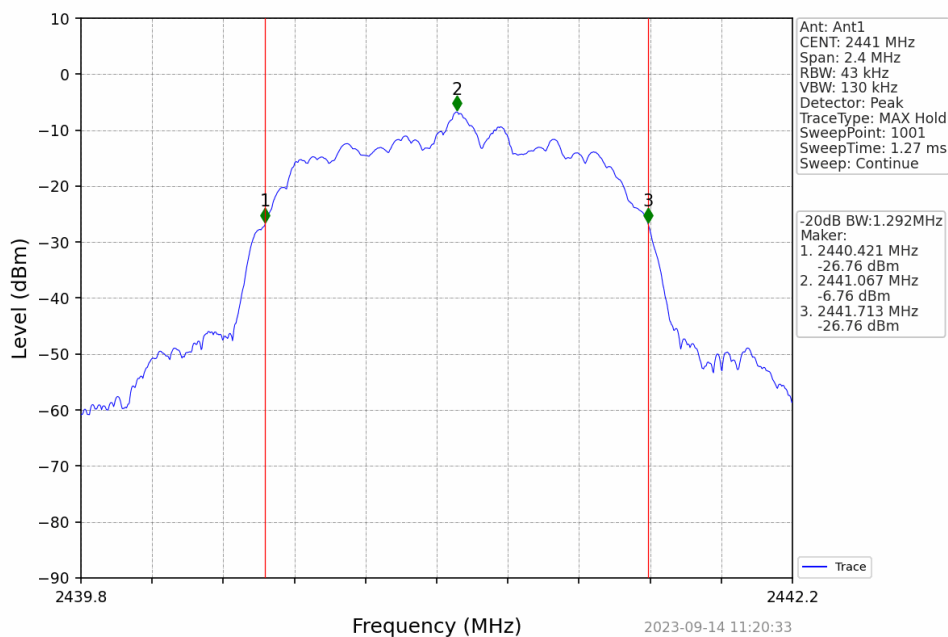
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



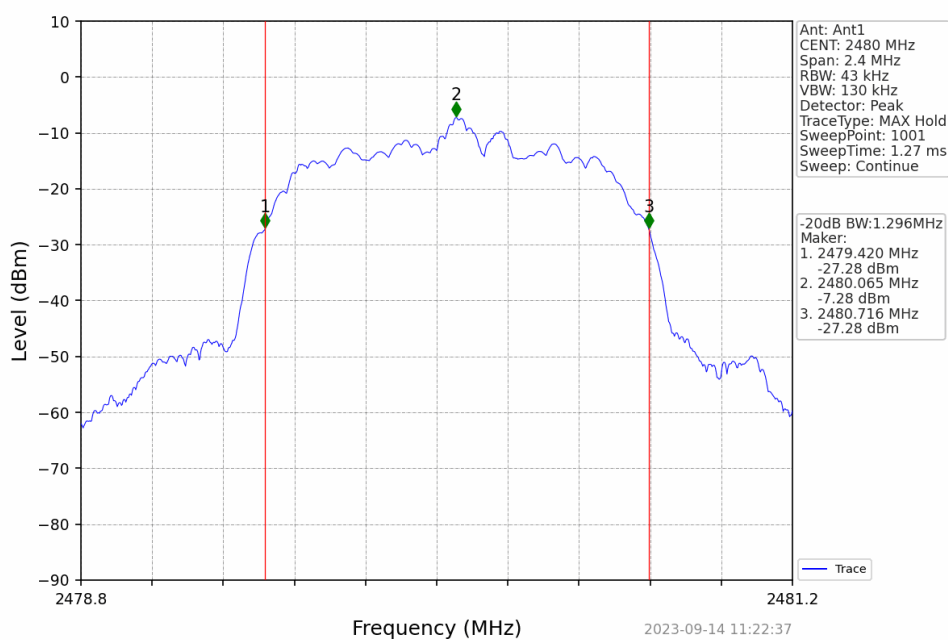
$\pi/4$ -DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



$\pi/4$ -DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV



$\pi/4$ -DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV



3 Carrier Frequency Separation

3.1 Test Result

Bluetooth module 1:

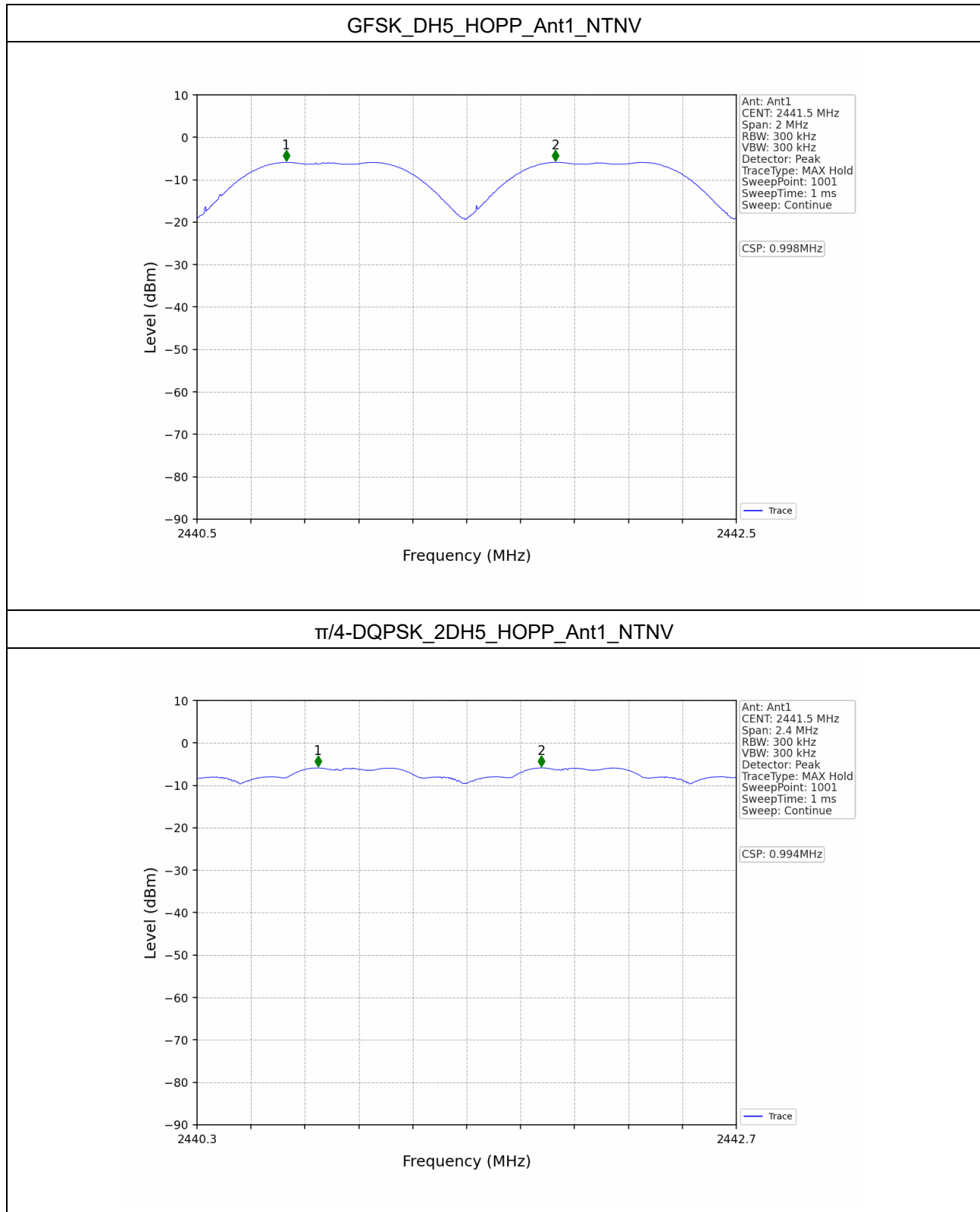
Mode	Channel.	Carrier Frequency Separation [MHz]	20dB Bandwidth (MHz)	Limit [MHz]	Verdict
GFSK	MCH	0.998	0.954	≥ 0.954	Pass
$\pi/4$ -DQPSK	MCH	0.994	1.286	≥ 0.857	Pass

Bluetooth module 2:

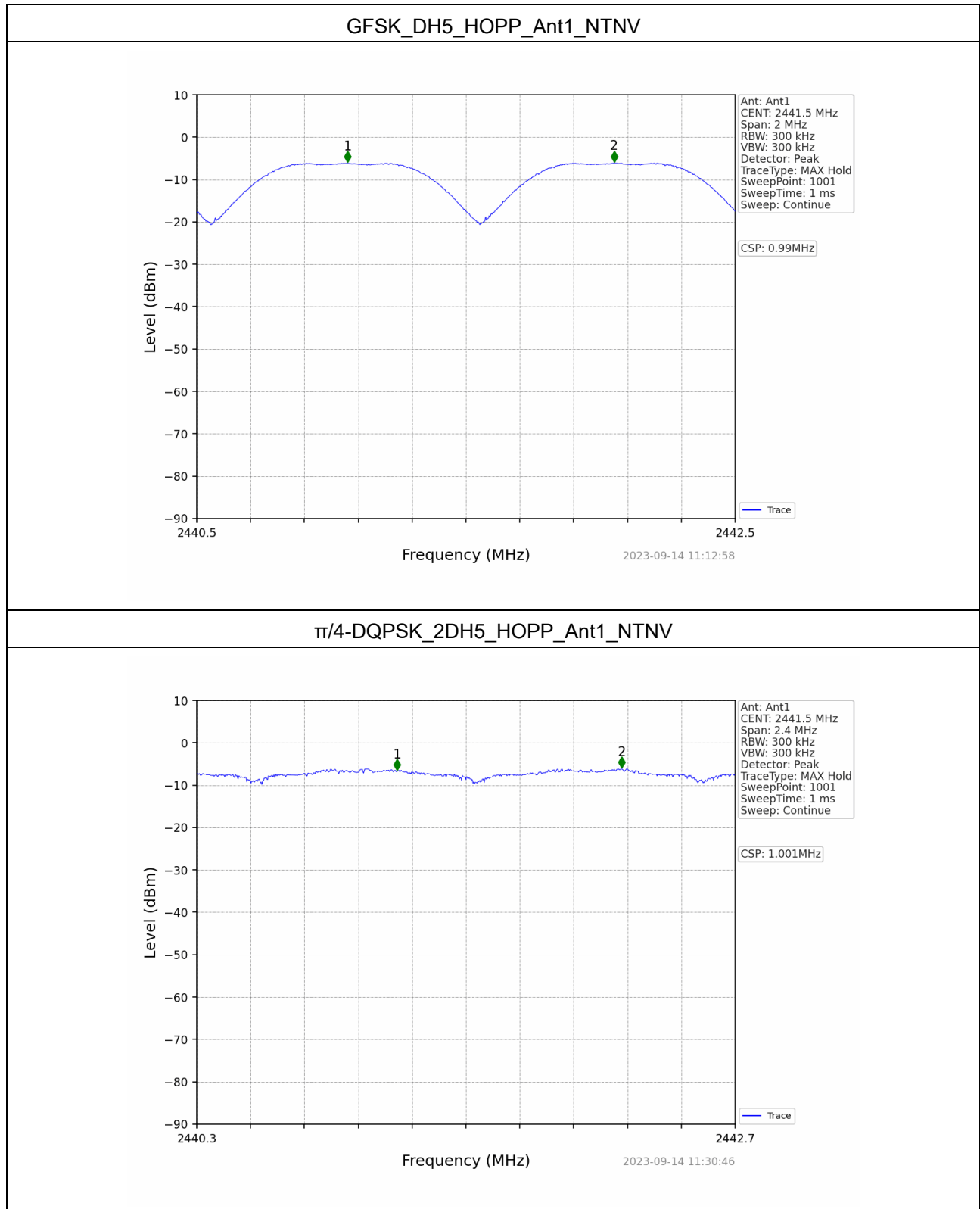
Mode	Channel.	Carrier Frequency Separation [MHz]	20dB Bandwidth (MHz)	Limit [MHz]	Verdict
GFSK	MCH	0.990	0.936	≥ 0.936	Pass
$\pi/4$ -DQPSK	MCH	1.001	1.296	≥ 0.864	Pass

3.2 Test Graphs

Bluetooth module 1:



Bluetooth module 2:



4 Hopping Channel Number

4.1 Test Result

Bluetooth module 1:

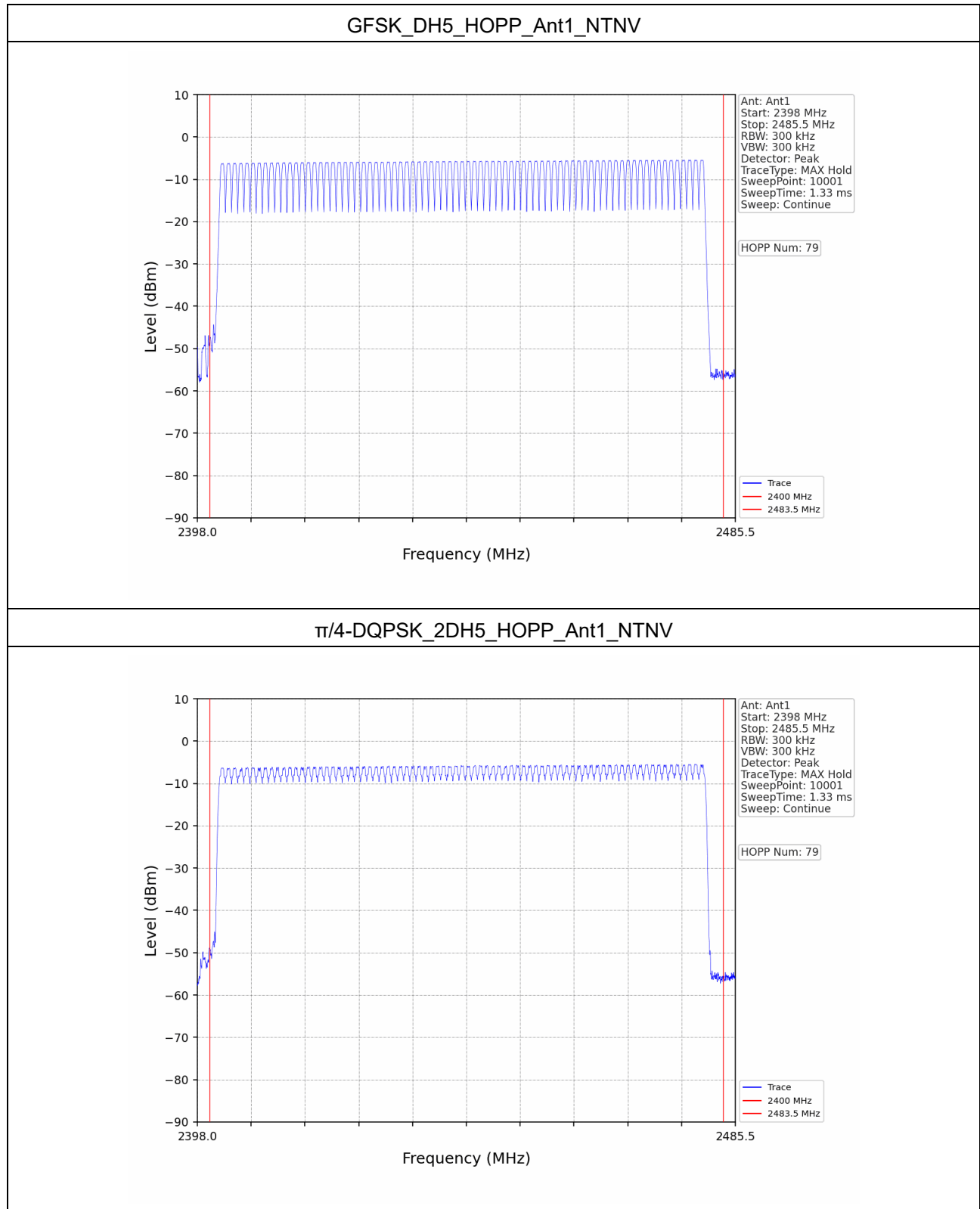
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	≥ 15	PASS
$\pi/4$ -DQPSK	Hop	79	≥ 15	PASS

Bluetooth module 2:

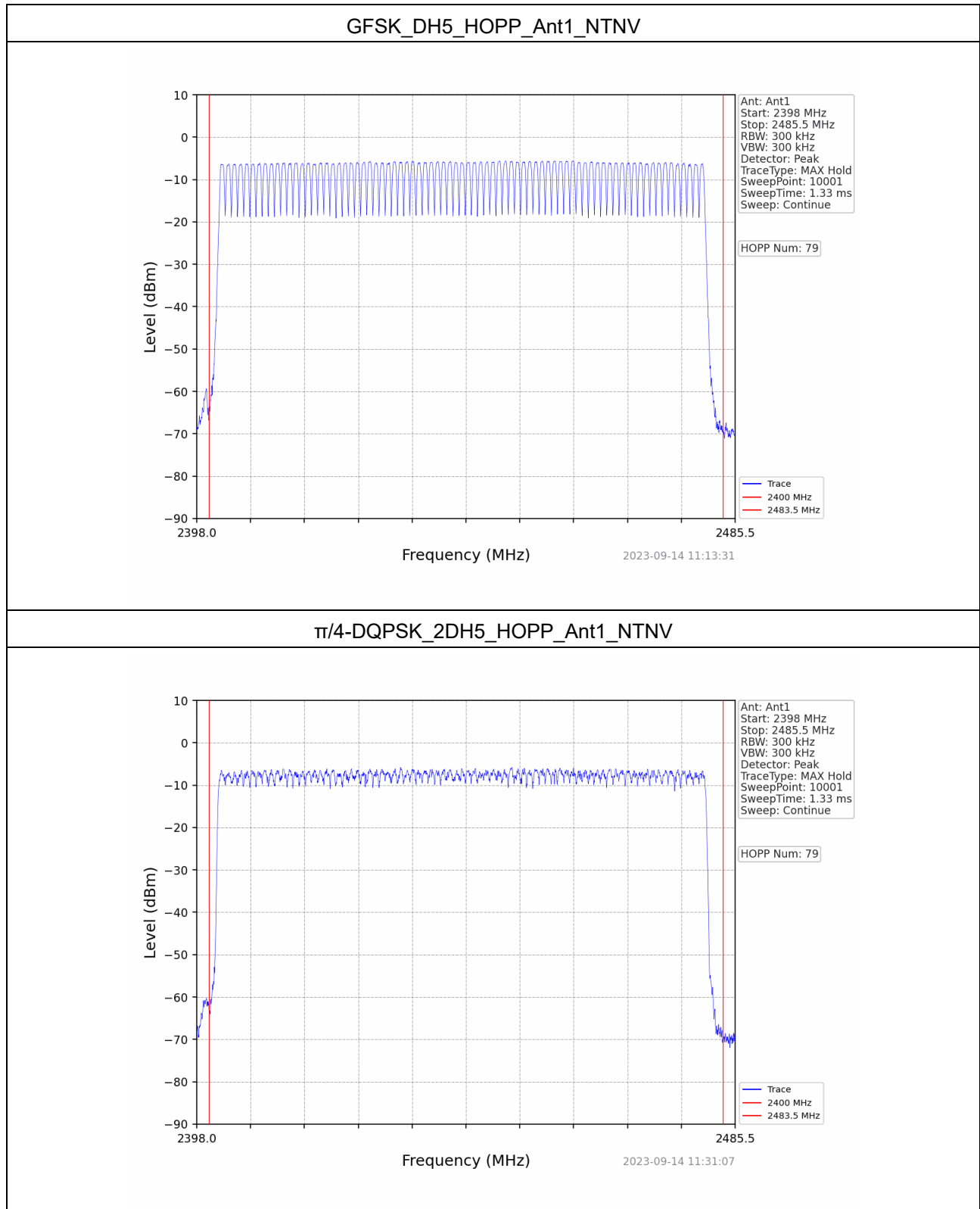
Mode	Channel.	Number of Hopping Channel [N]	Limit [N]	Verdict
GFSK	Hop	79	≥ 15	PASS
$\pi/4$ -DQPSK	Hop	79	≥ 15	PASS

4.2 Test Graphs

Bluetooth module 1:



Bluetooth module 2:



5 Dwell Time

5.1 Test Result

Bluetooth module 1:

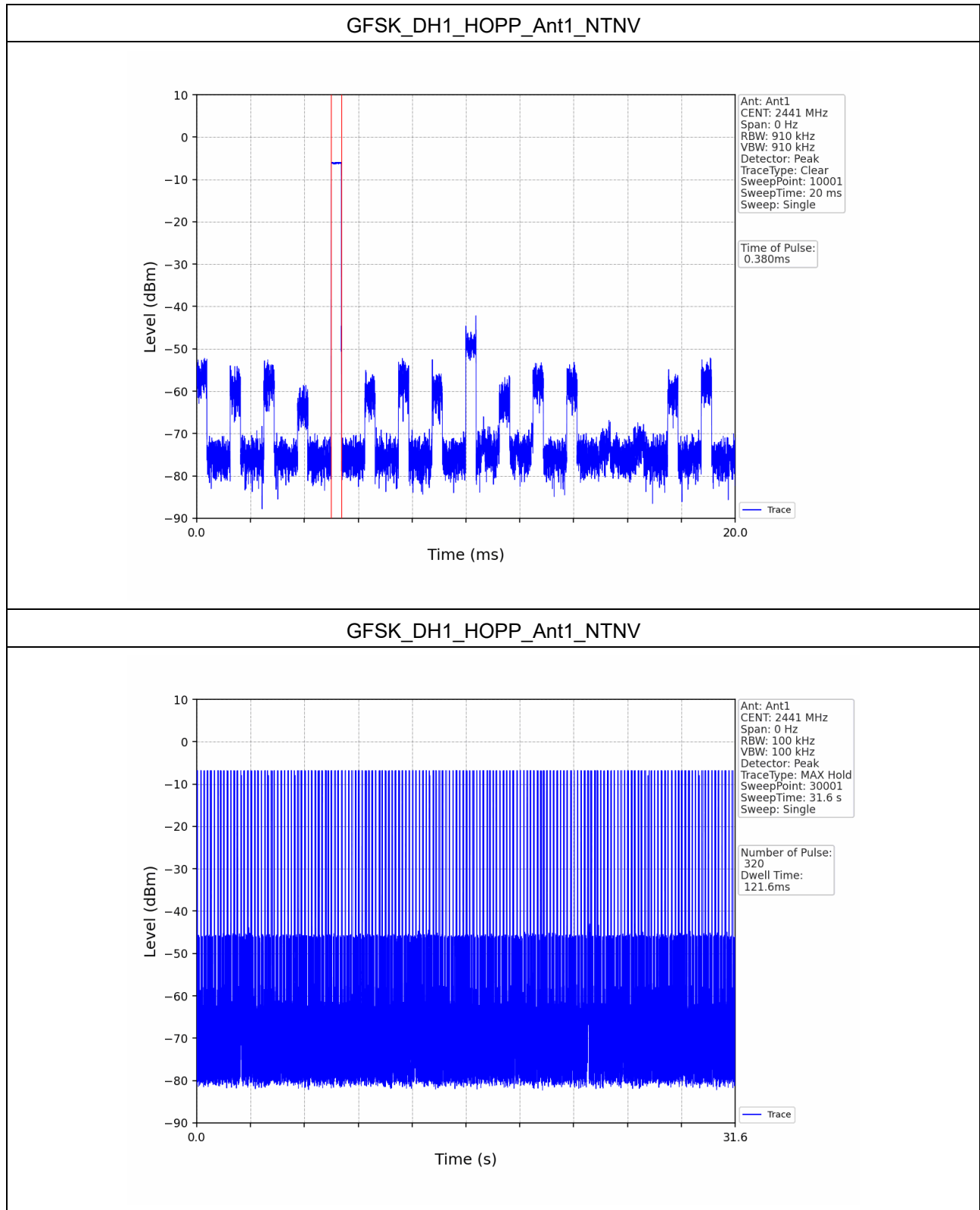
Mode	Packet	Channel	Duration of Single Pulse (ms)	Observation Period (s)	Num of Pulse in Observation Period	Dwell Time (ms)	Limit (ms)	Verdict
GFSK	DH5	LCH	0.380	31.600	320	121.600	<=400	Pass
		MCH	1.636	31.600	155	253.580	<=400	Pass
		HCH	2.884	31.600	102	294.168	<=400	Pass
$\pi/4$ -DQPSK	2DH5	LCH	0.394	31.600	319	125.686	<=400	Pass
		MCH	1.642	31.600	161	264.362	<=400	Pass
		HCH	2.890	31.600	116	335.240	<=400	Pass

Bluetooth module 2:

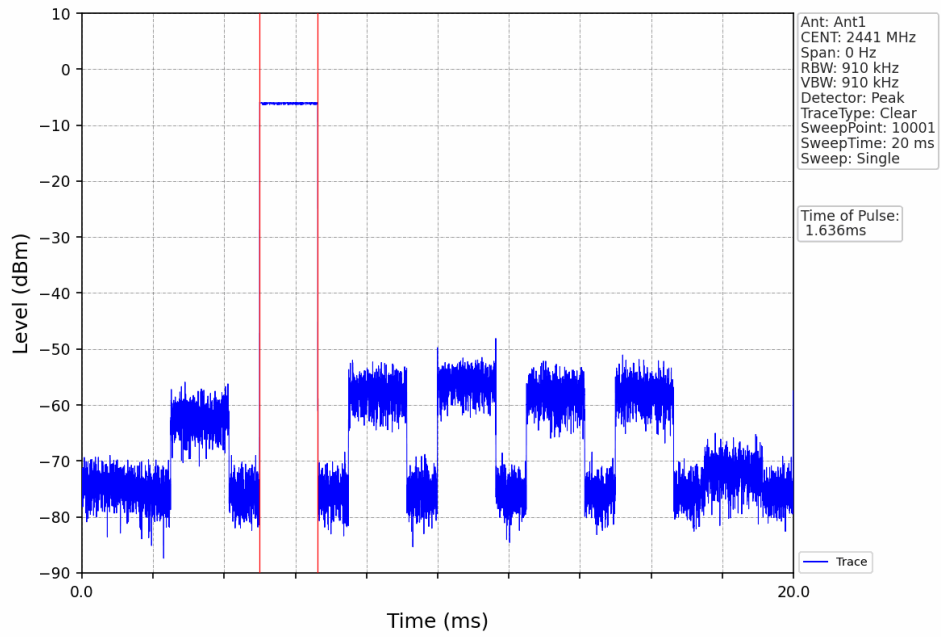
Mode	Packet	Channel	Duration of Single Pulse (ms)	Observation Period (s)	Num of Pulse in Observation Period	Dwell Time (ms)	Limit (ms)	Verdict
GFSK	DH5	LCH	0.382	31.600	320	122.240	<=400	Pass
		MCH	1.640	31.600	154	252.560	<=400	Pass
		HCH	2.886	31.600	97	279.942	<=400	Pass
$\pi/4$ -DQPSK	2DH5	LCH	0.394	31.600	320	126.080	<=400	Pass
		MCH	1.648	31.600	154	253.792	<=400	Pass
		HCH	2.898	31.600	112	324.576	<=400	Pass

5.2 Test Graphs

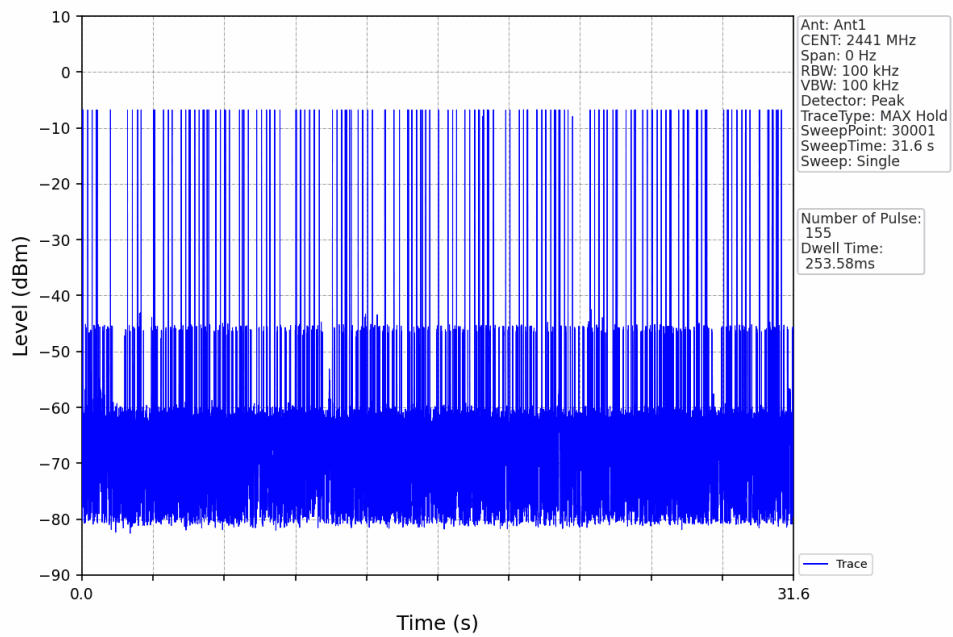
Bluetooth module 1:



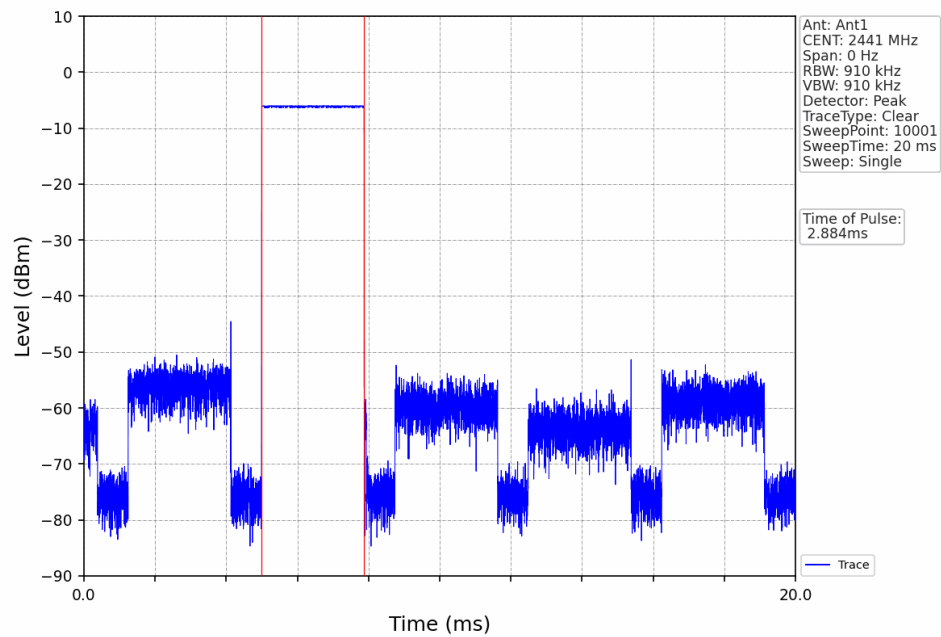
GFSK_DH3_HOPP_Ant1_NTNV



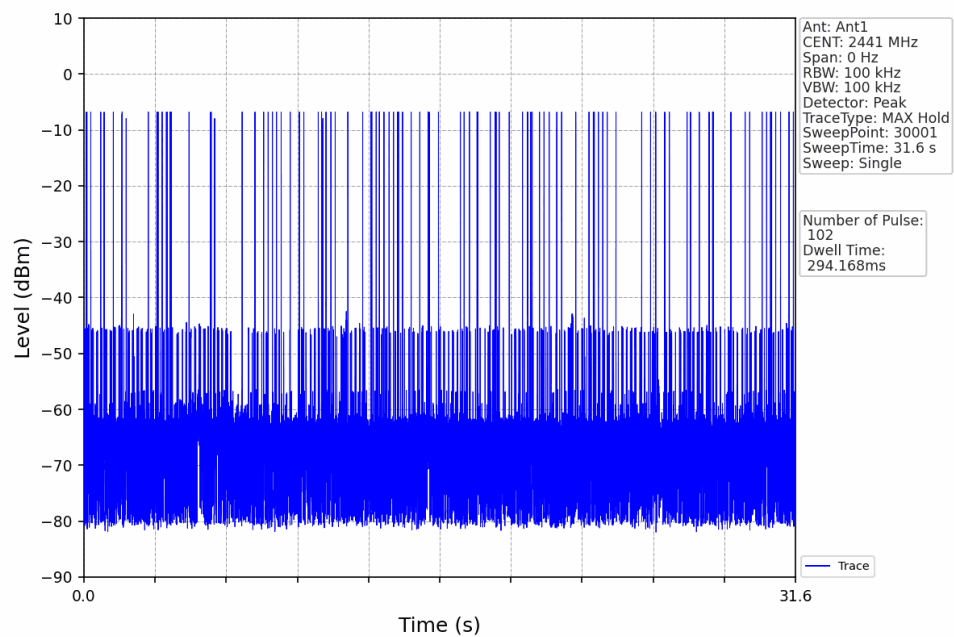
GFSK_DH3_HOPP_Ant1_NTNV



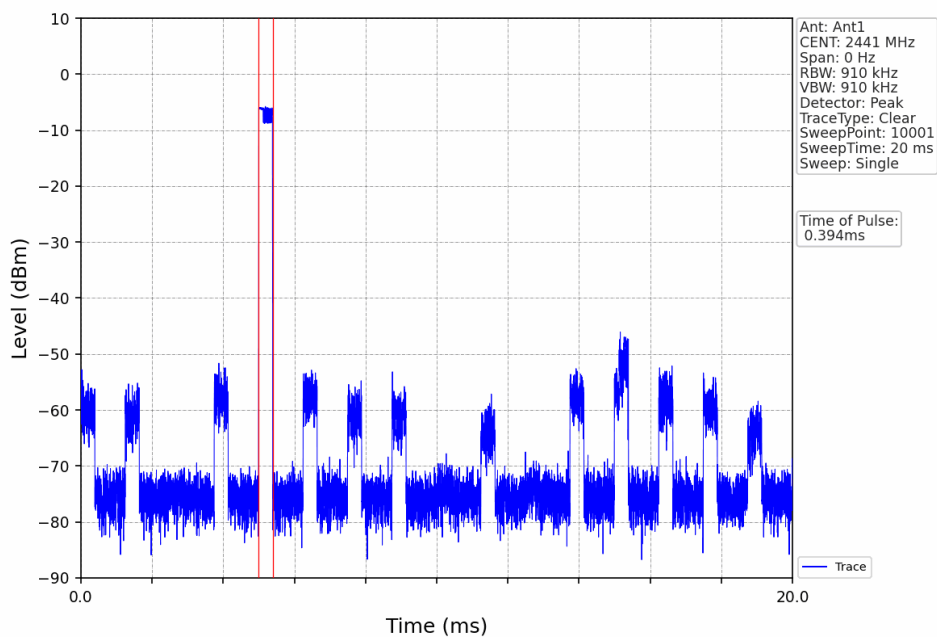
GFSK_DH5_HOPP_Ant1_NTNV



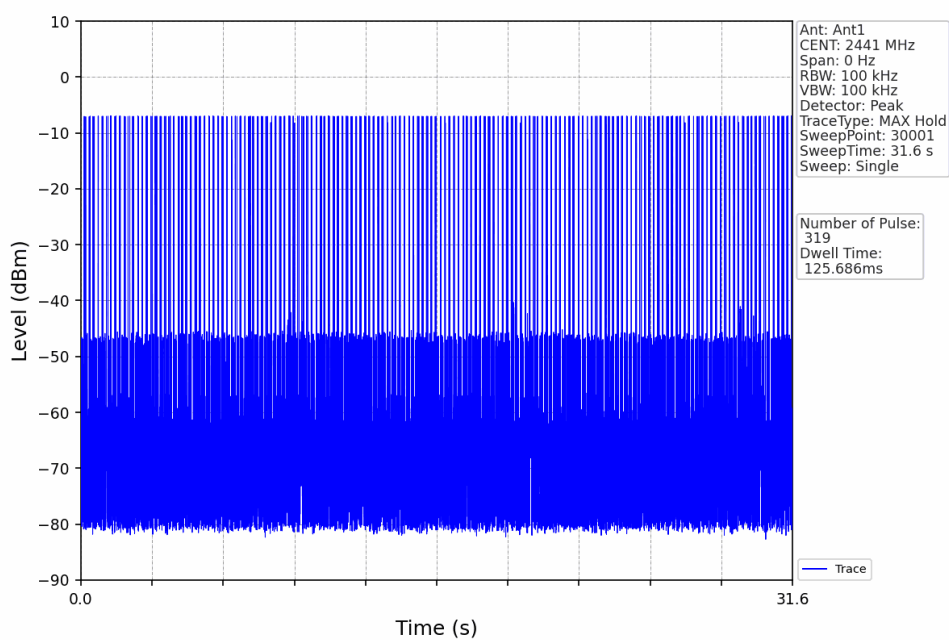
GFSK_DH5_HOPP_Ant1_NTNV



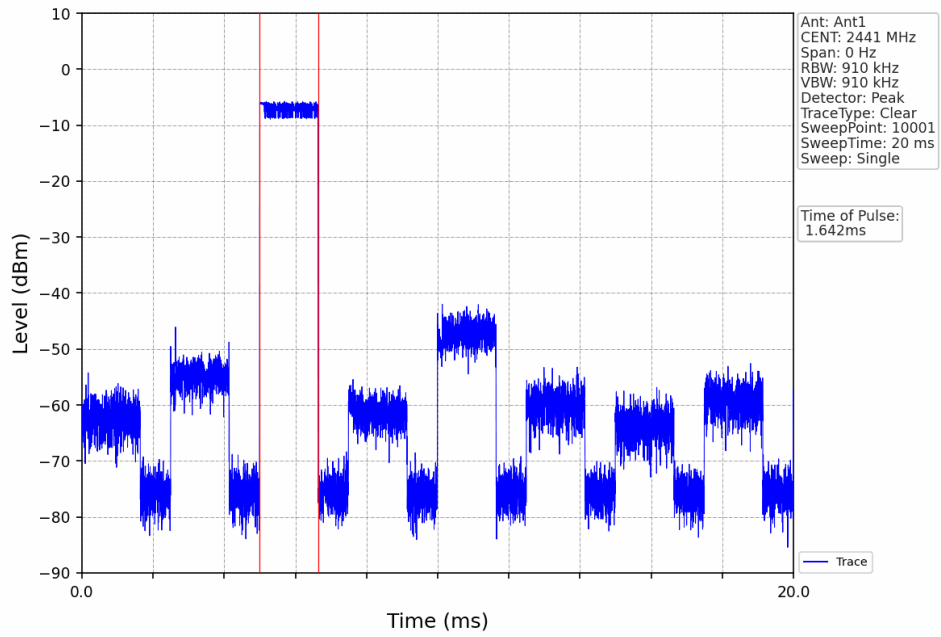
$\pi/4$ -DQPSK_2DH1_HOPP_Ant1_NTNV



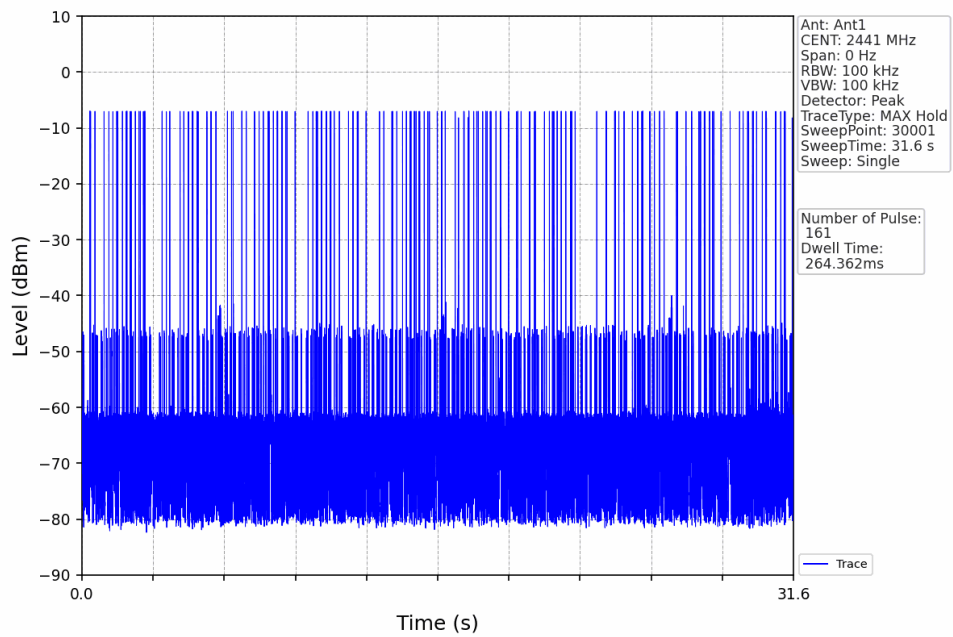
$\pi/4$ -DQPSK_2DH1_HOPP_Ant1_NTNV



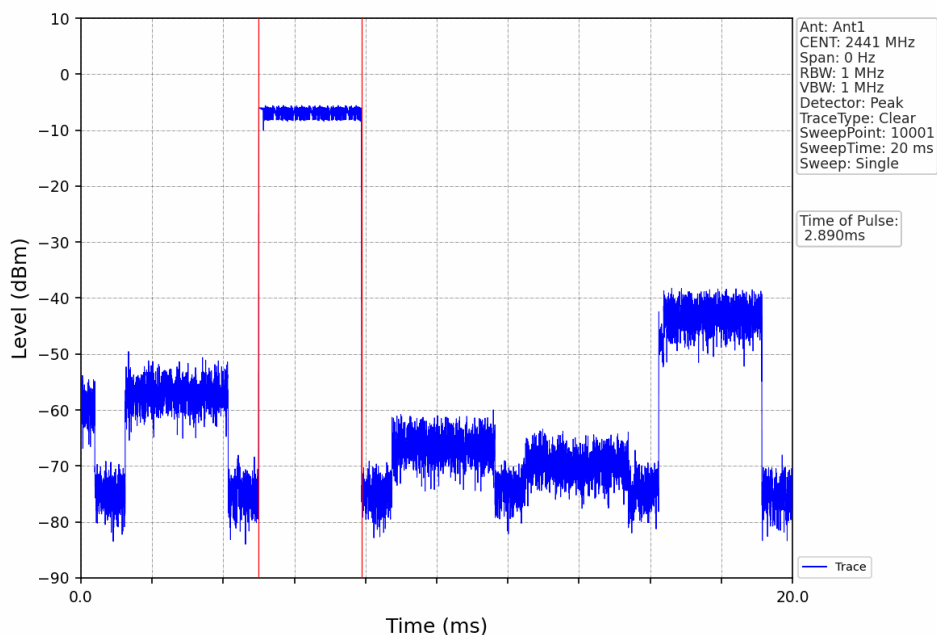
$\pi/4$ -DQPSK_2DH3_HOPP_Ant1_NTNV



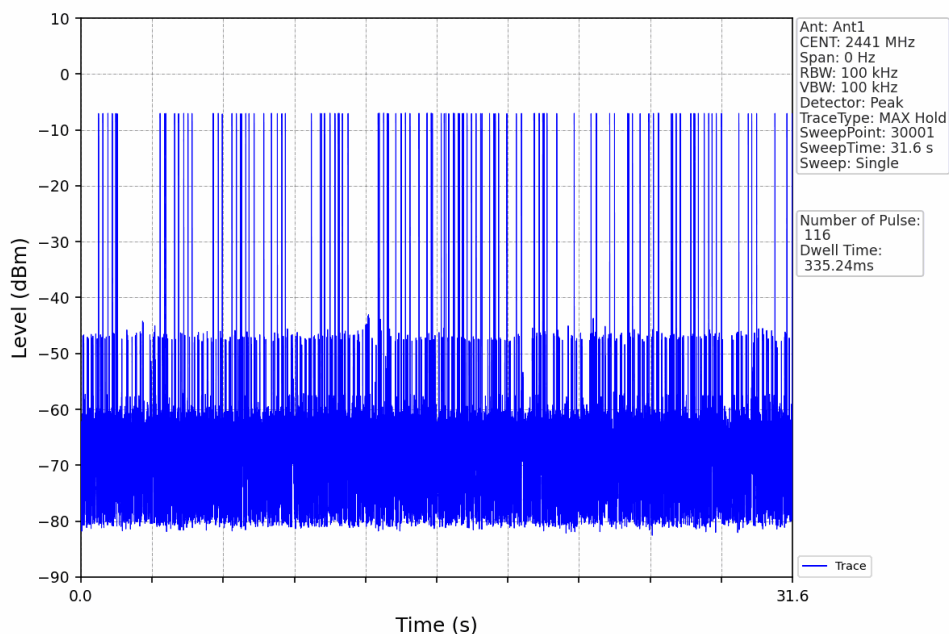
$\pi/4$ -DQPSK_2DH3_HOPP_Ant1_NTNV



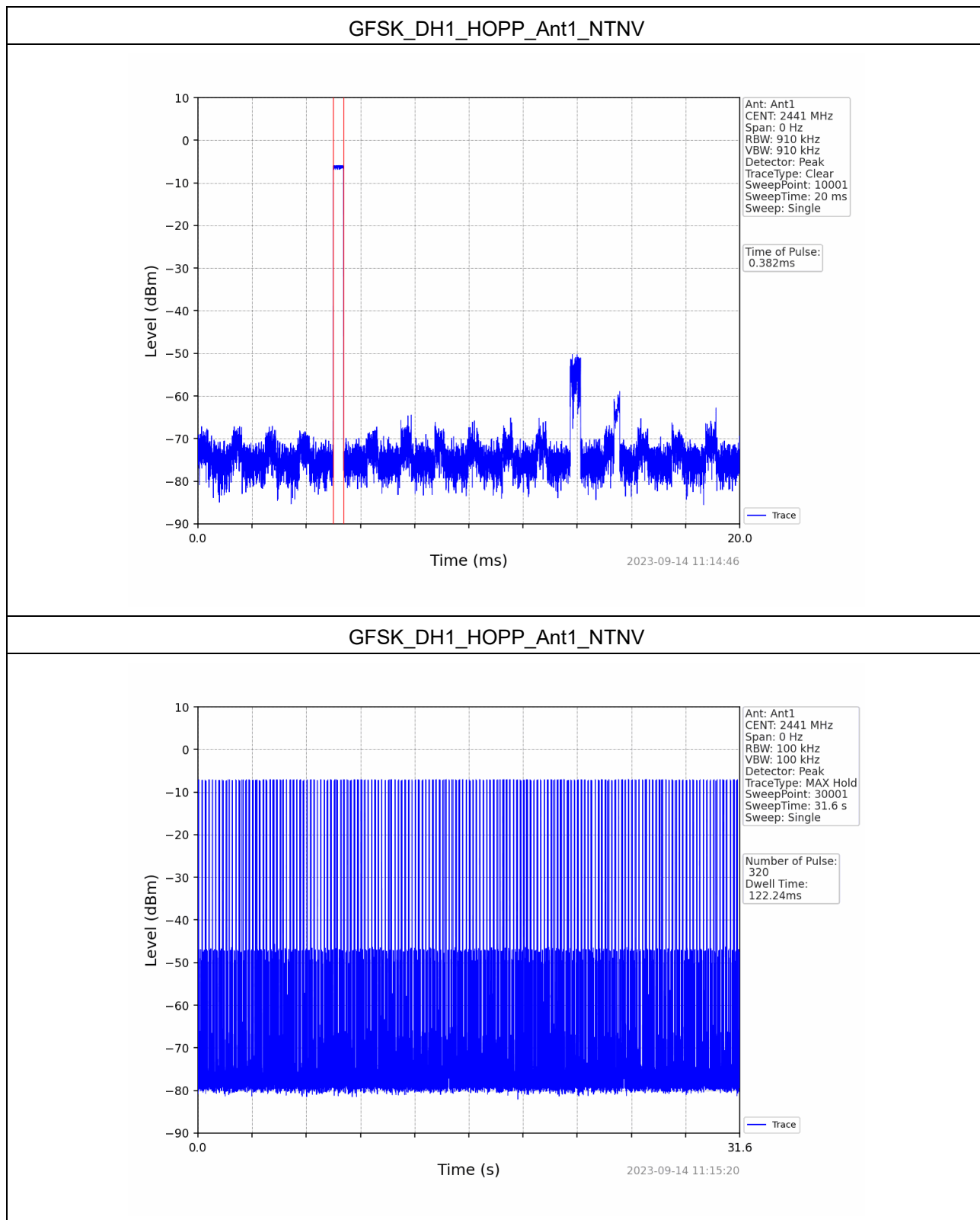
$\pi/4$ -DQPSK_2DH5_HOPP_Ant1_NTNV



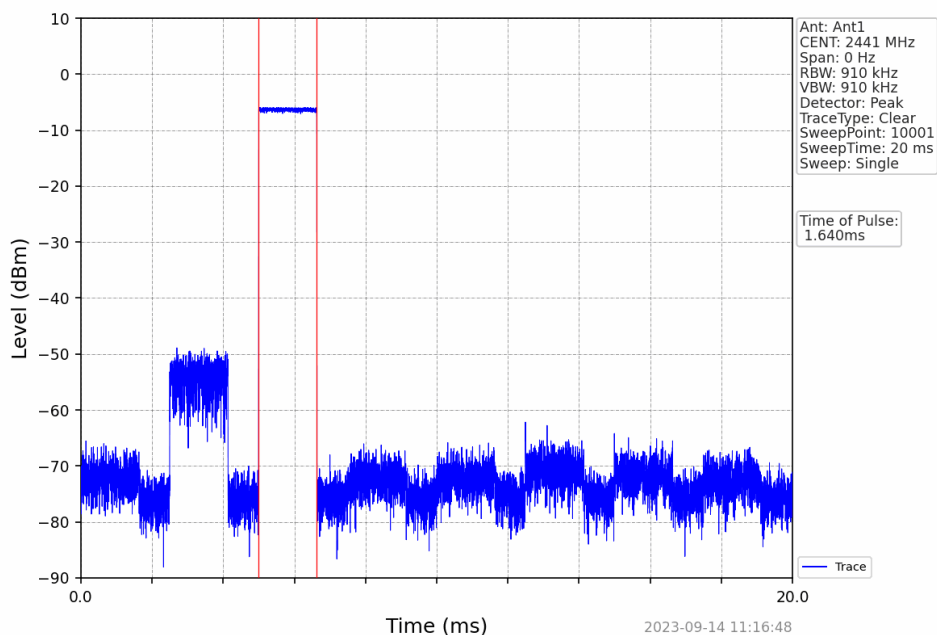
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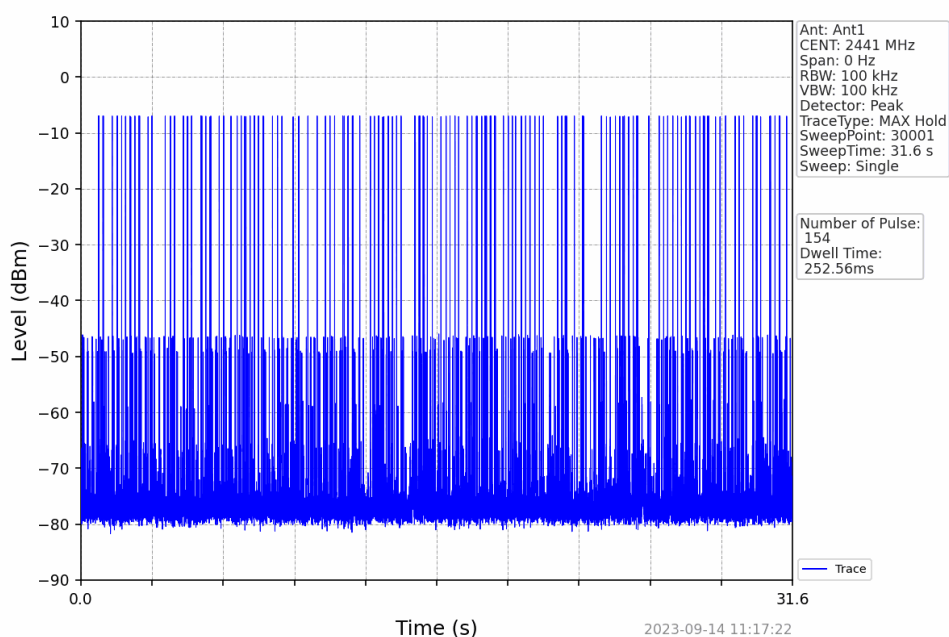
Bluetooth module 2:



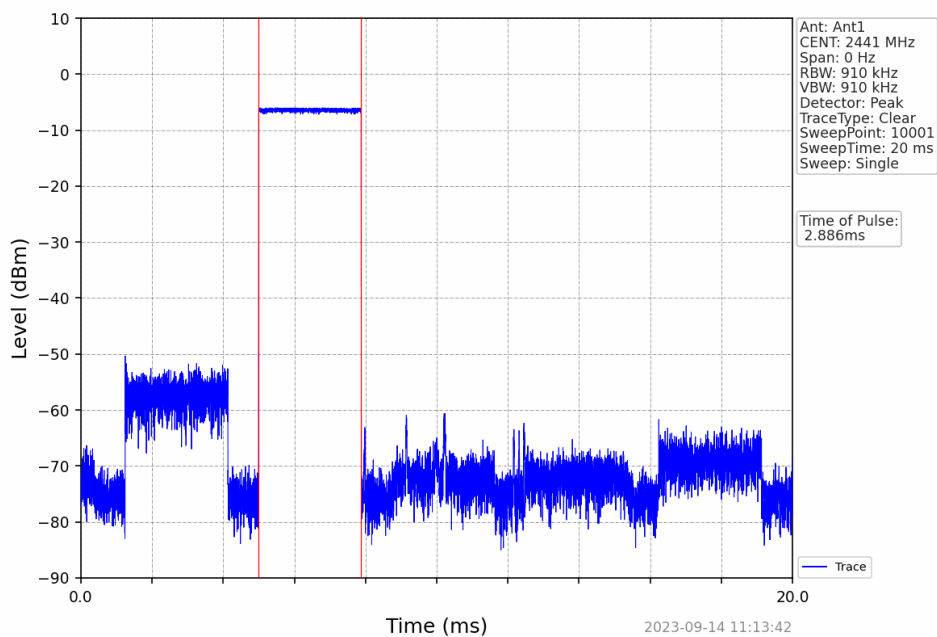
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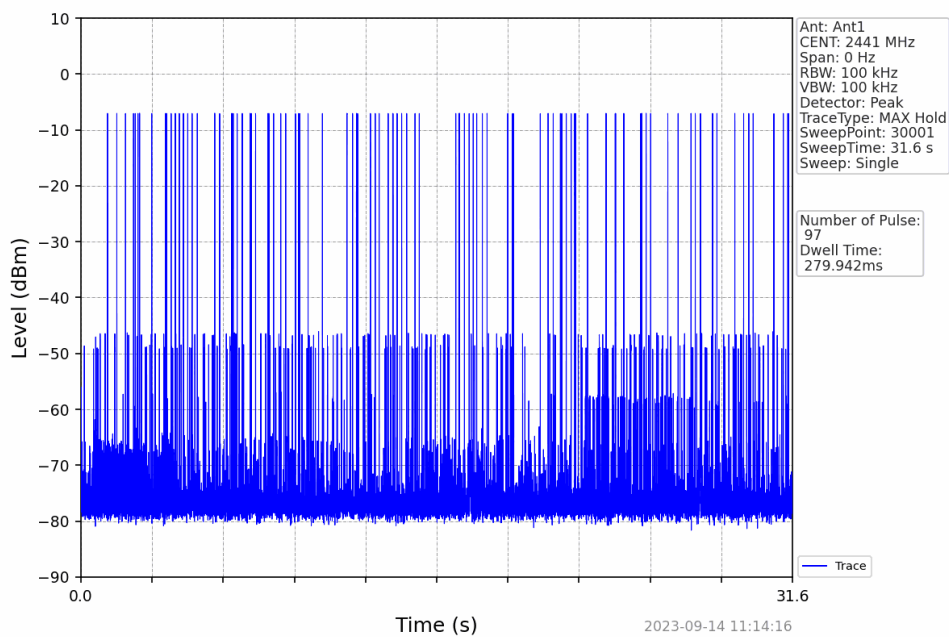
GFSK_DH3_HOPP_Ant1_NTNV



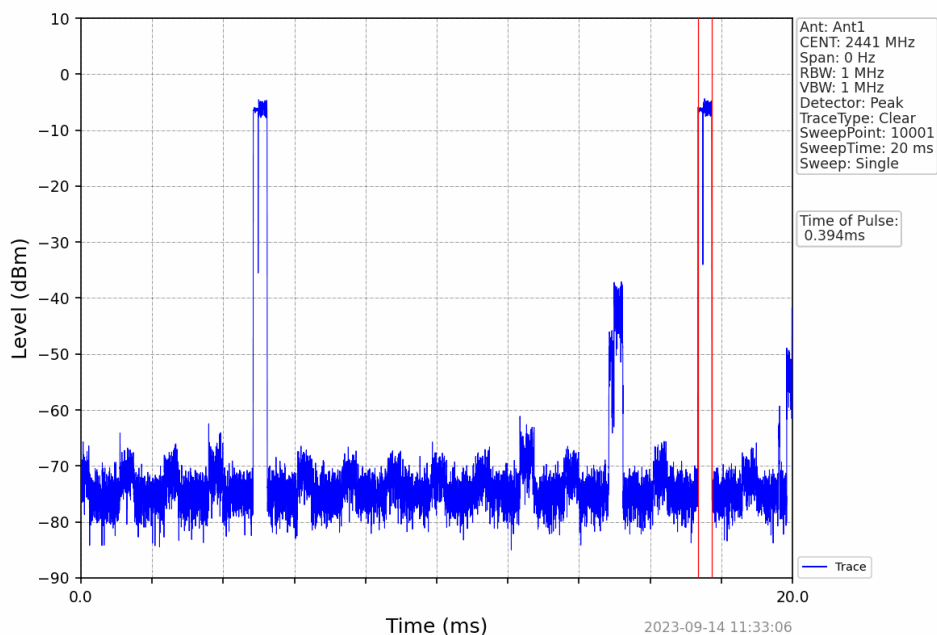
GFSK_DH5_HOPP_Ant1_NTNV



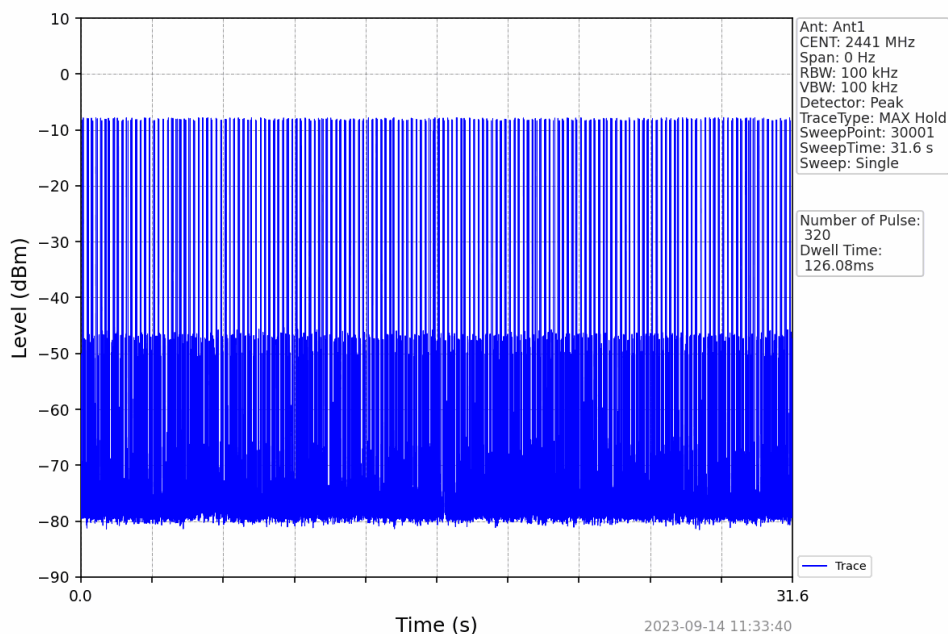
GFSK_DH5_HOPP_Ant1_NTNV



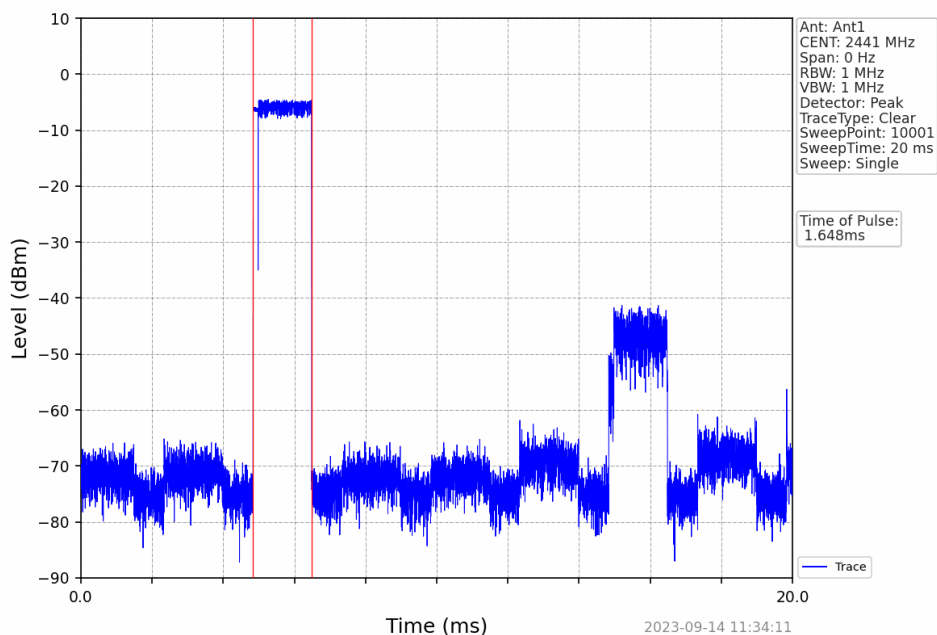
$\pi/4$ -DQPSK_2DH1_HOPP_Ant1_NTNV



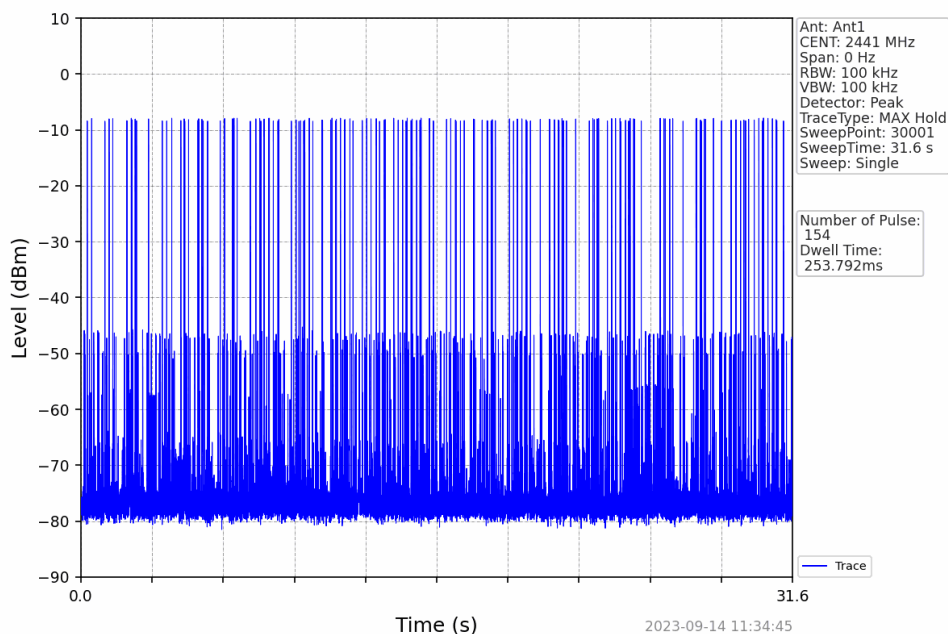
$\pi/4$ -DQPSK_2DH1_HOPP_Ant1_NTNV



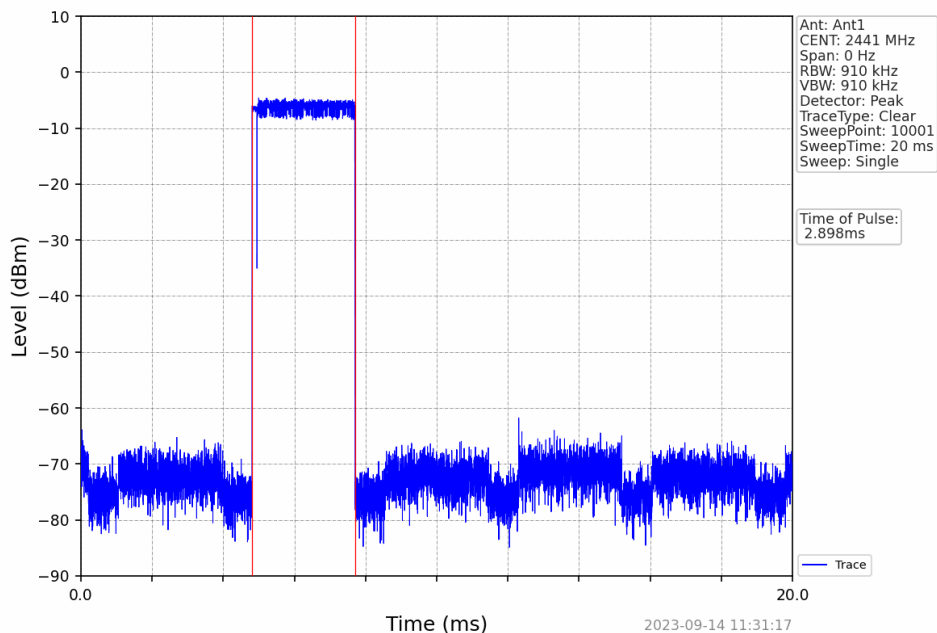
$\pi/4$ -DQPSK_2DH3_HOPP_Ant1_NTNV



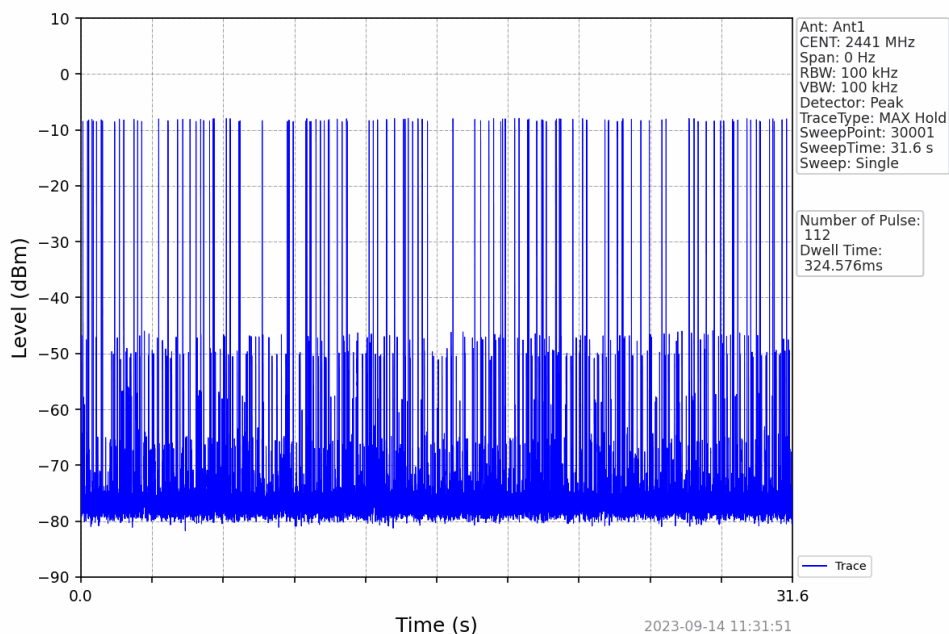
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$\pi/4$ -DQPSK_2DH5_HOPP_Ant1_NTNV



$\pi/4$ -DQPSK_2DH5_HOPP_Ant1_NTNV



6 Conducted Spurious Emissions and Band Edges Test

6.1 Test Result

Bluetooth module 1:

Mode	Channel	Max. Level [dBc]	Limit [dBc]	Verdict
GFSK	LCH	-6.54	-20	Pass
	MCH	-6.00	-20	Pass
	HCH	-5.71	-20	Pass
$\pi/4$ -DQPSK	LCH	-6.54	-20	Pass
	MCH	-6.02	-20	Pass
	HCH	-5.72	-20	Pass

Mode	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	2402	DH5	1	-5.71	-25.71	Pass
	2441	DH5	1	-5.71	-25.71	Pass
	2480	DH5	1	-5.71	-25.71	Pass
	HOPP	DH5	1	-5.71	-25.71	Pass
$\pi/4$ -DQPSK	2402	2DH5	1	-5.72	-25.72	Pass
	2441	2DH5	1	-5.72	-25.72	Pass
	2480	2DH5	1	-5.72	-25.72	Pass
	HOPP	2DH5	1	-5.72	-25.72	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.

Bluetooth module 2:

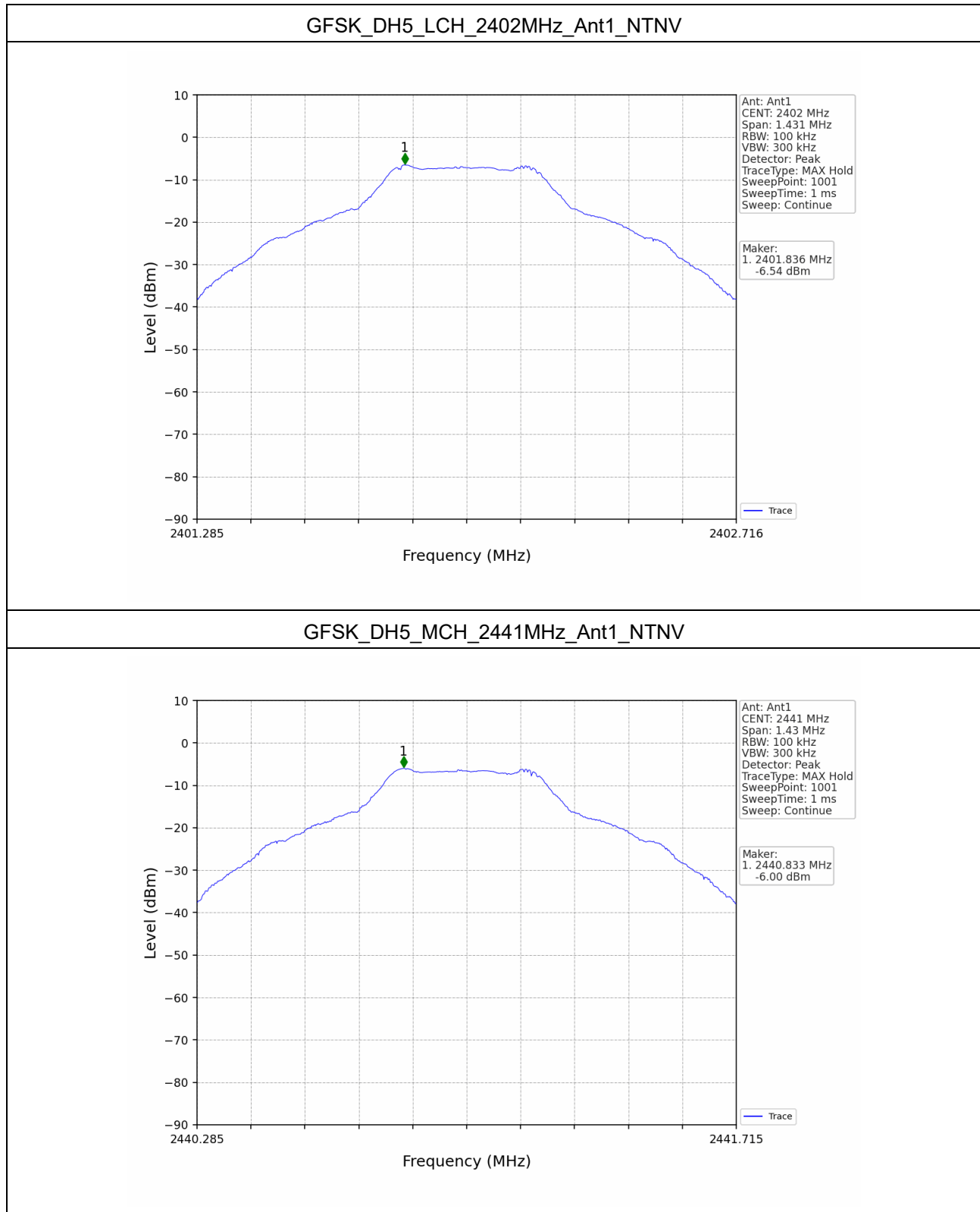
Mode	Channel	Max. Level [dBc]	Limit [dBc]	Verdict
GFSK	LCH	-6.46	-20	Pass
	MCH	-6.18	-20	Pass
	HCH	-6.38	-20	Pass
$\pi/4$ -DQPSK	LCH	-6.42	-20	Pass
	MCH	-6.32	-20	Pass
	HCH	-6.46	-20	Pass

Mode	Frequency (MHz)	Packet Type	ANT	Level of Reference (dBm)	Limit (dBm)	Verdict
GFSK	2402	DH5	1	-6.18	-26.18	Pass
	2441	DH5	1	-6.18	-26.18	Pass
	2480	DH5	1	-6.18	-26.18	Pass
	HOPP	DH5	1	-6.18	-26.18	Pass
$\pi/4$ -DQPSK	2402	2DH5	1	-6.32	-26.32	Pass
	2441	2DH5	1	-6.32	-26.32	Pass
	2480	2DH5	1	-6.32	-26.32	Pass
	HOPP	2DH5	1	-6.32	-26.32	Pass

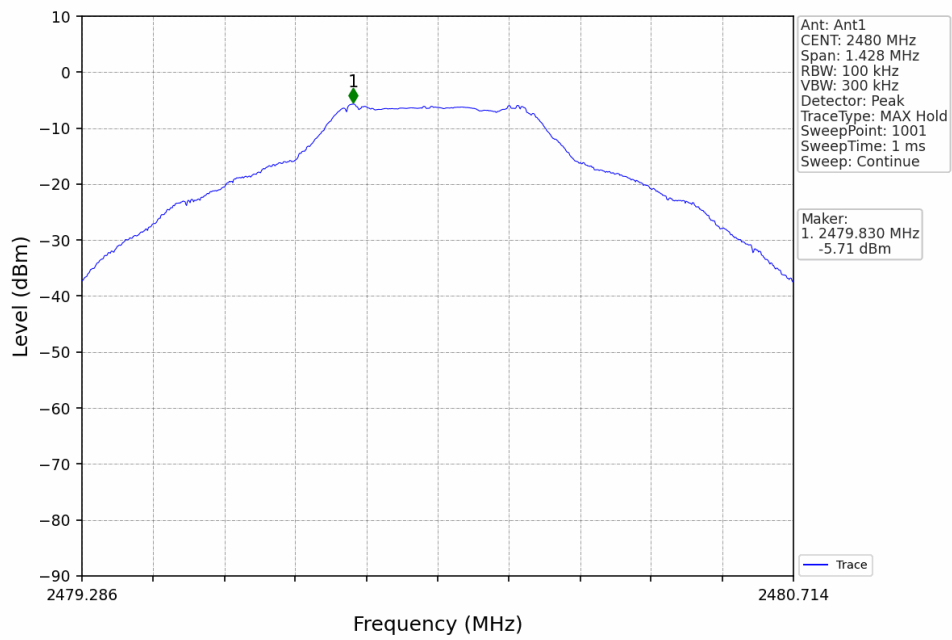
Note1: Refer to FCC Part 15.247 (d) and ANSI C63.10-2013, the channel contains the maximum PSD level was used to establish the reference level.

6.2 Test Graphs

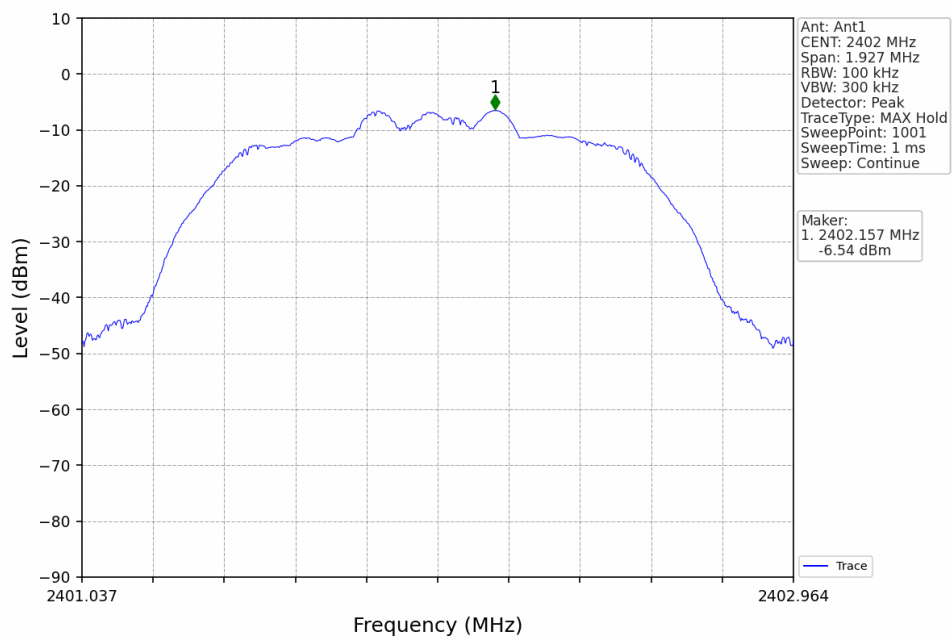
Bluetooth module 1:



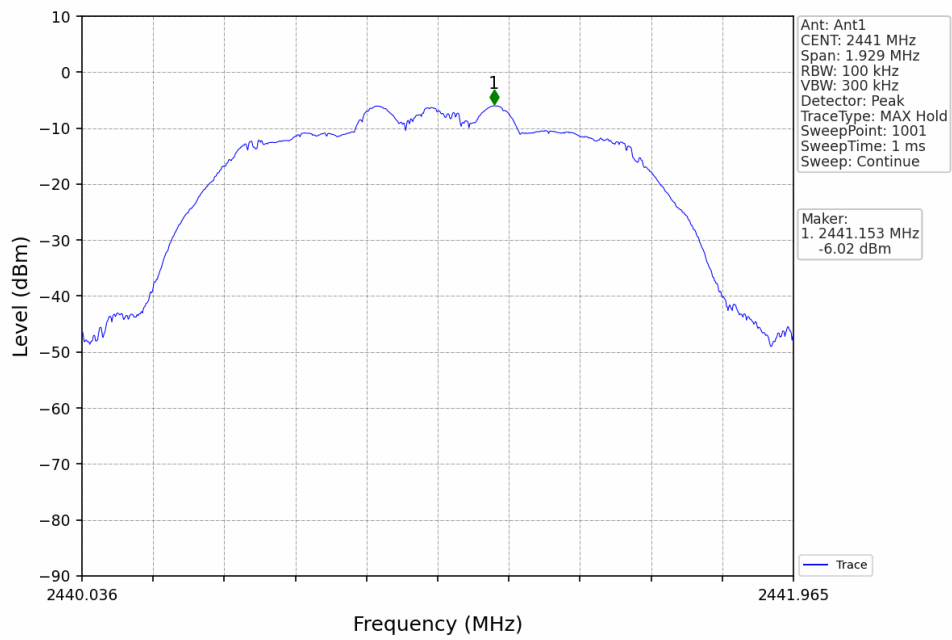
GFSK_DH5_HCH_2480MHz_Ant1_NTNV



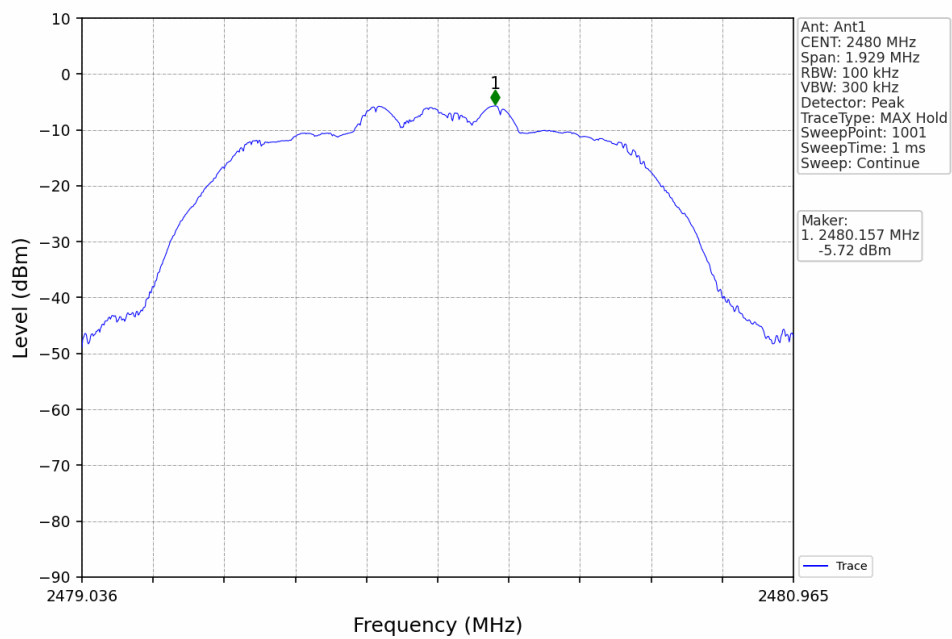
$\pi/4$ -DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV



$\pi/4$ -DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV

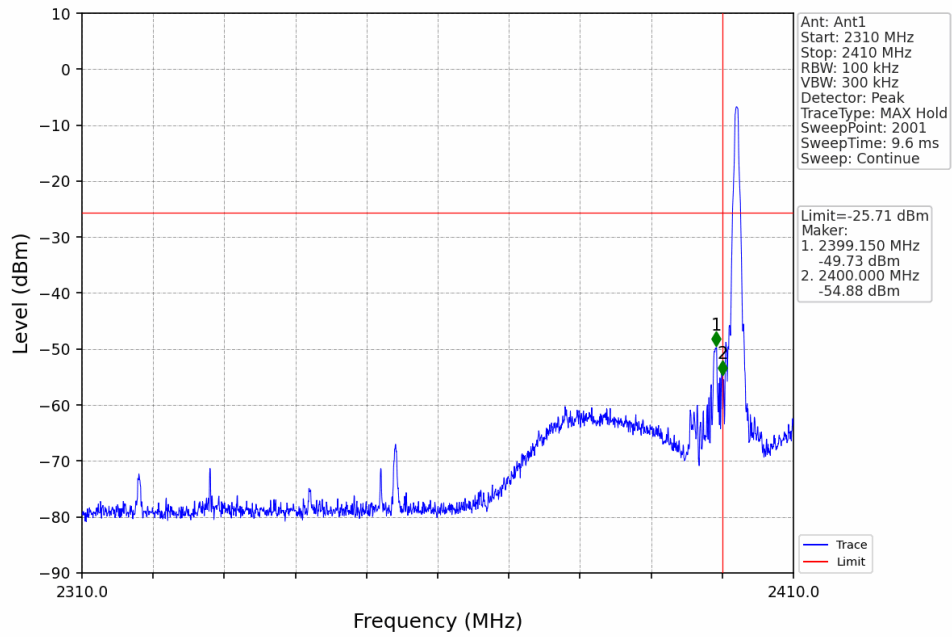


$\pi/4$ -DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

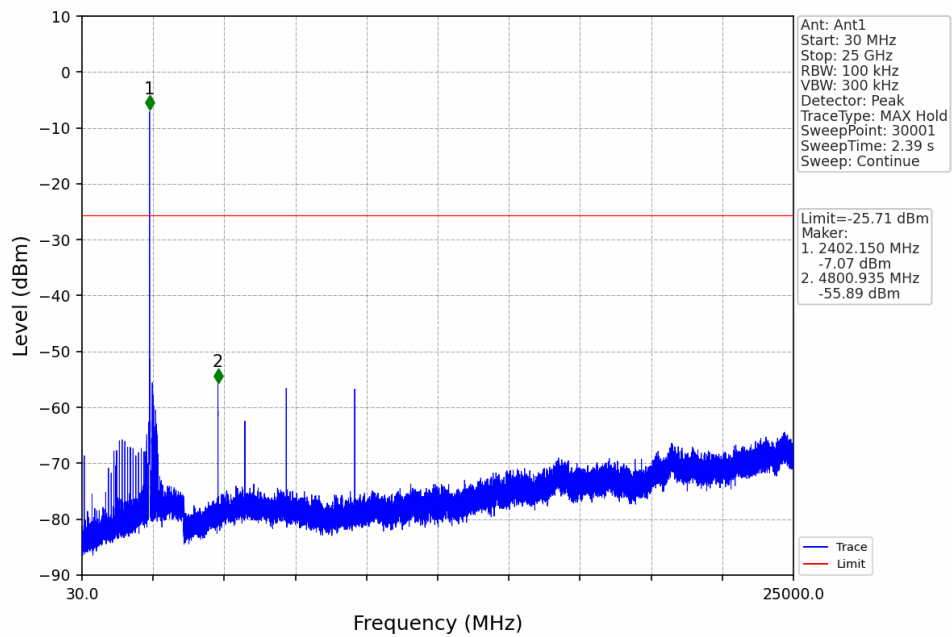


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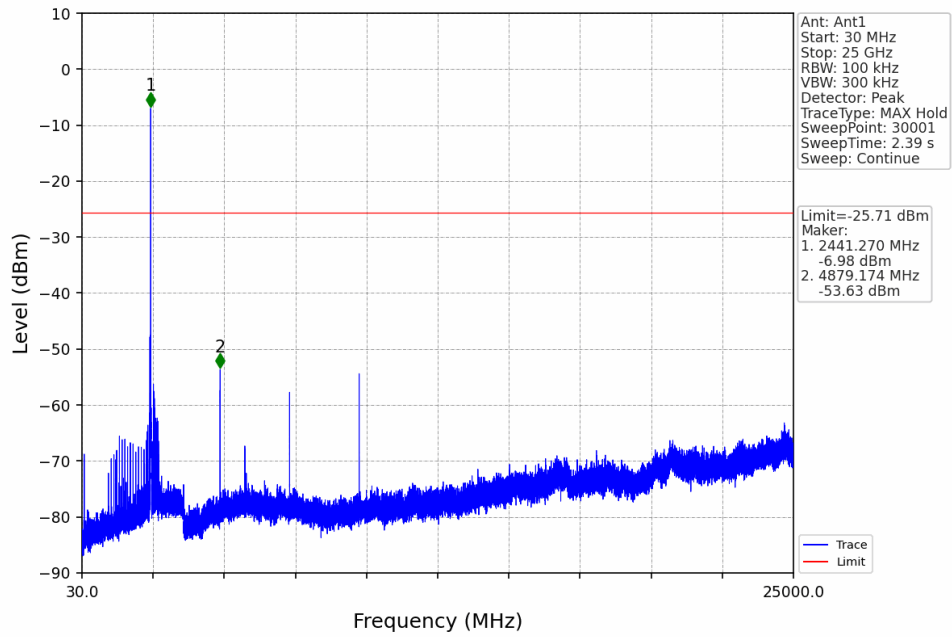
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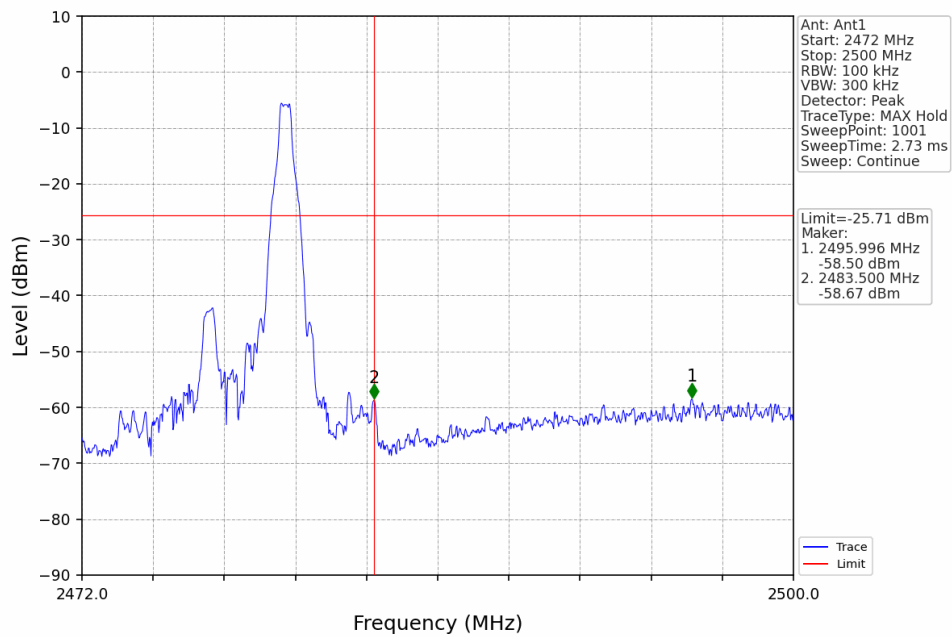
GFSK_DH5_LCH_2402MHz_Ant1_NTNV



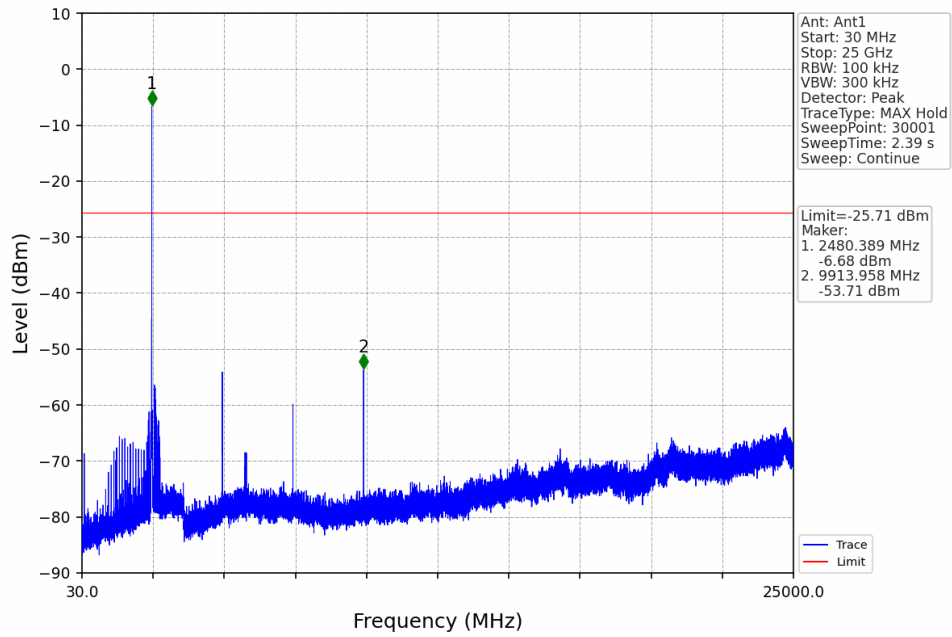
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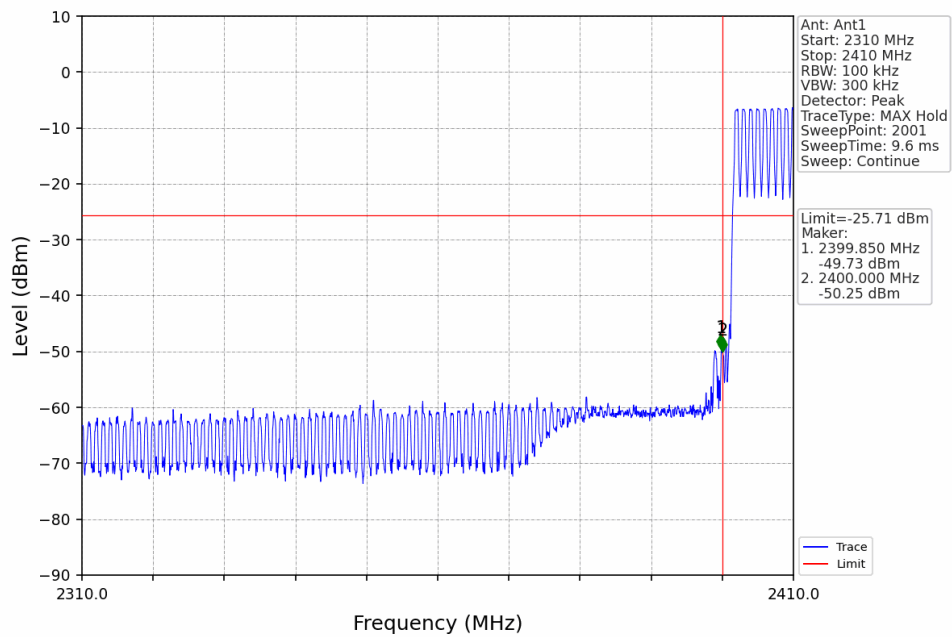
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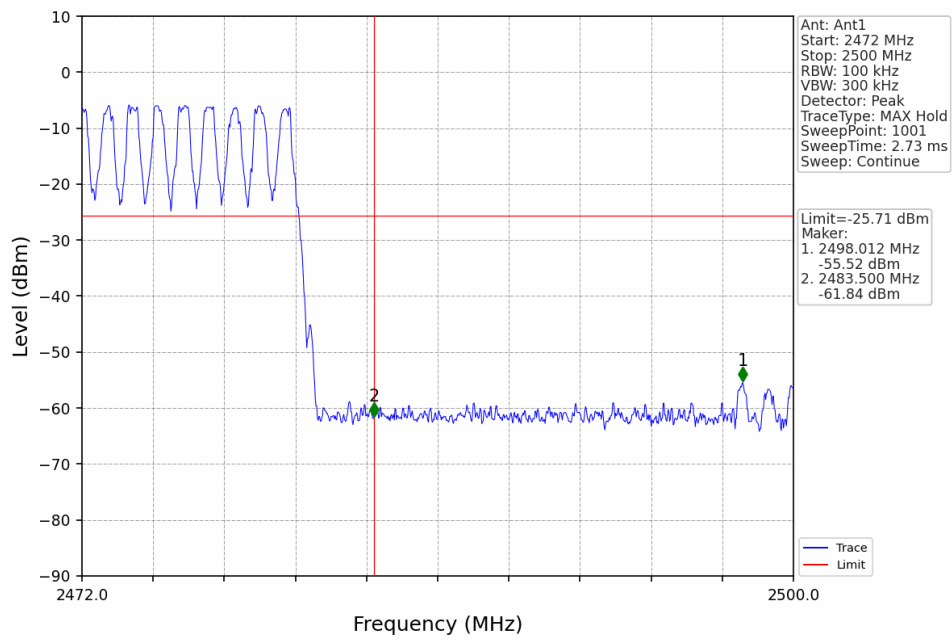
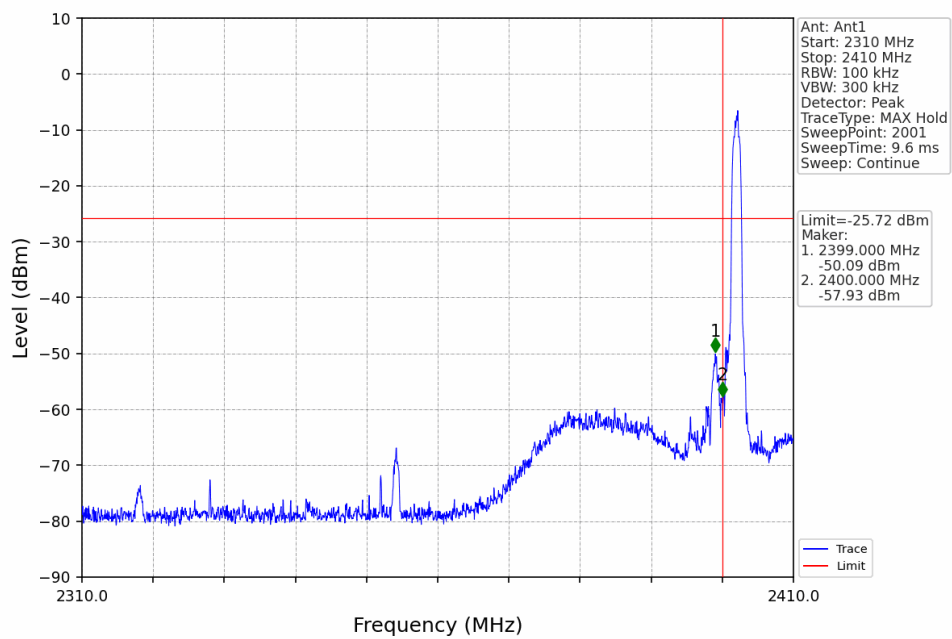
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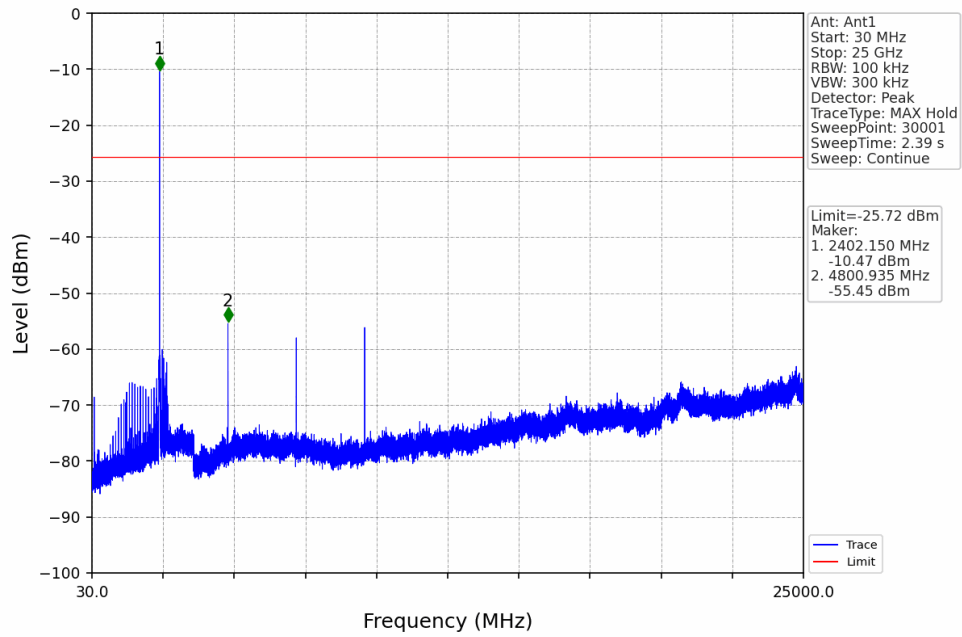
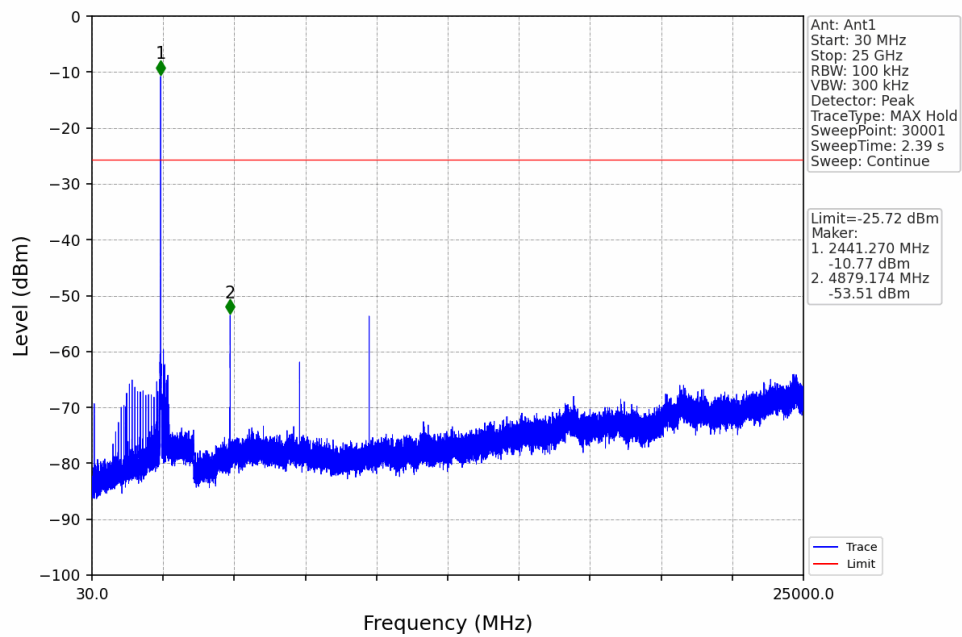


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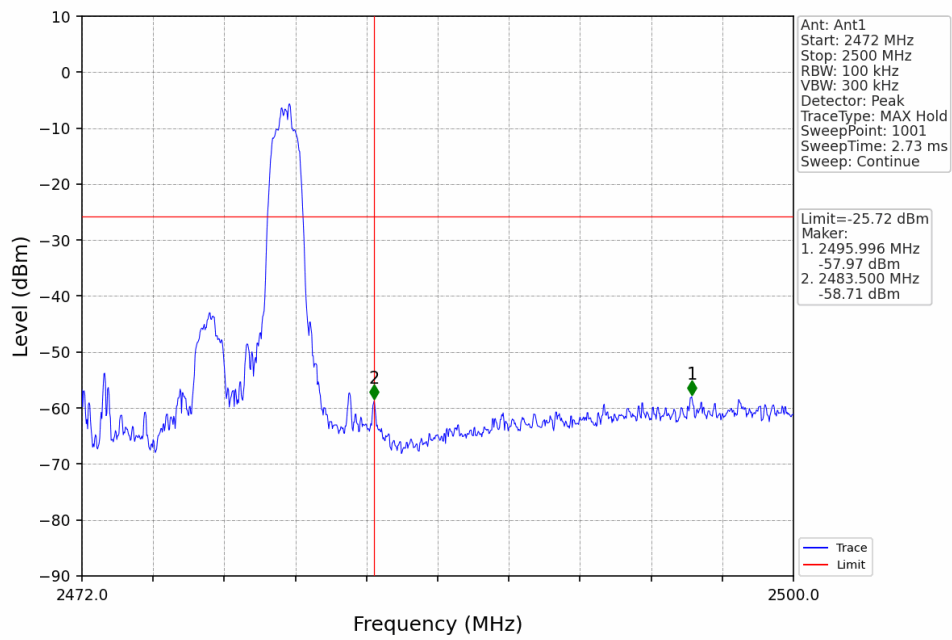


GFSK_DH5_HOPP_Ant1_NTNV

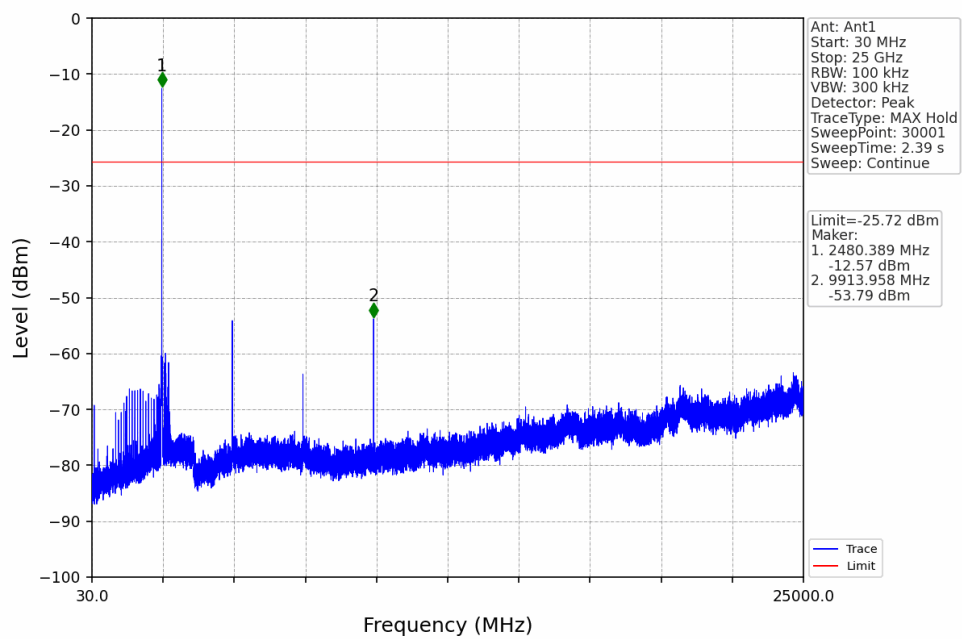

 $\pi/4$ -DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV


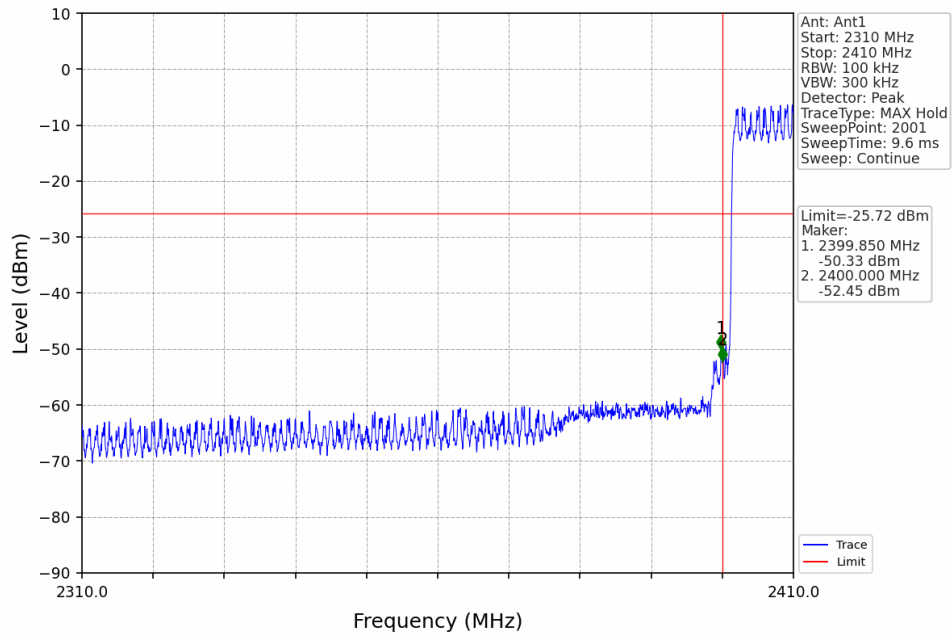
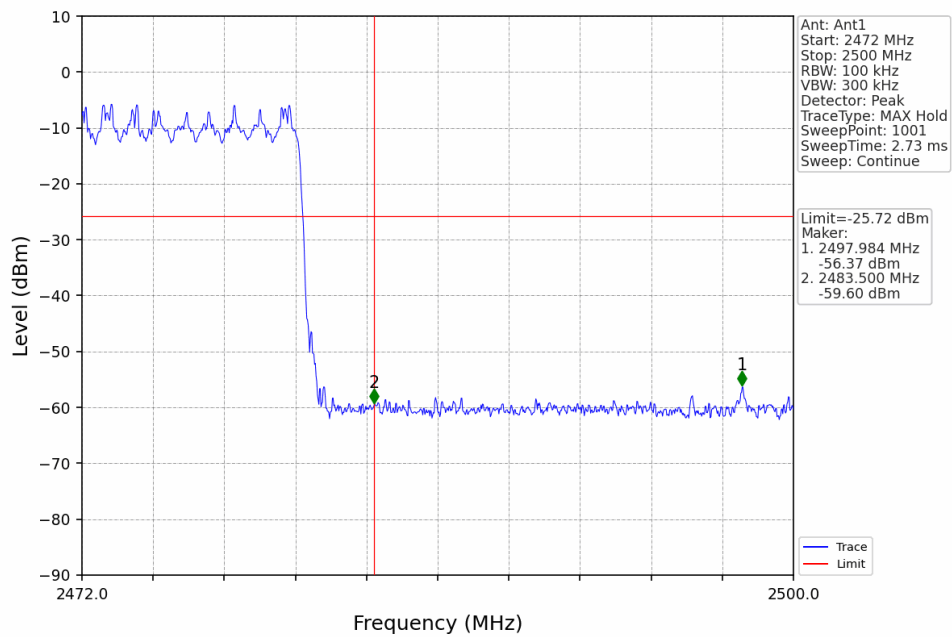
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$\pi/4$ -DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

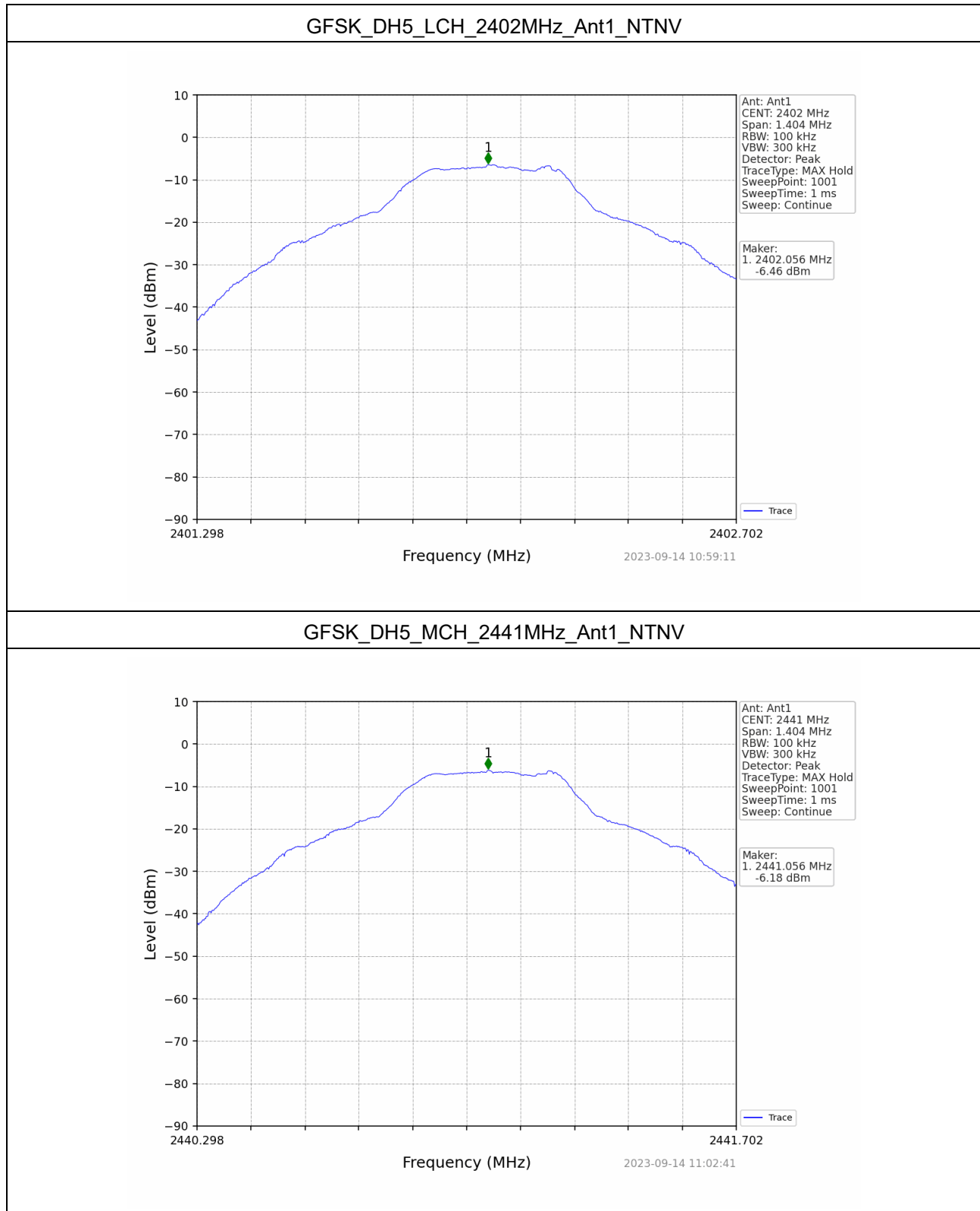


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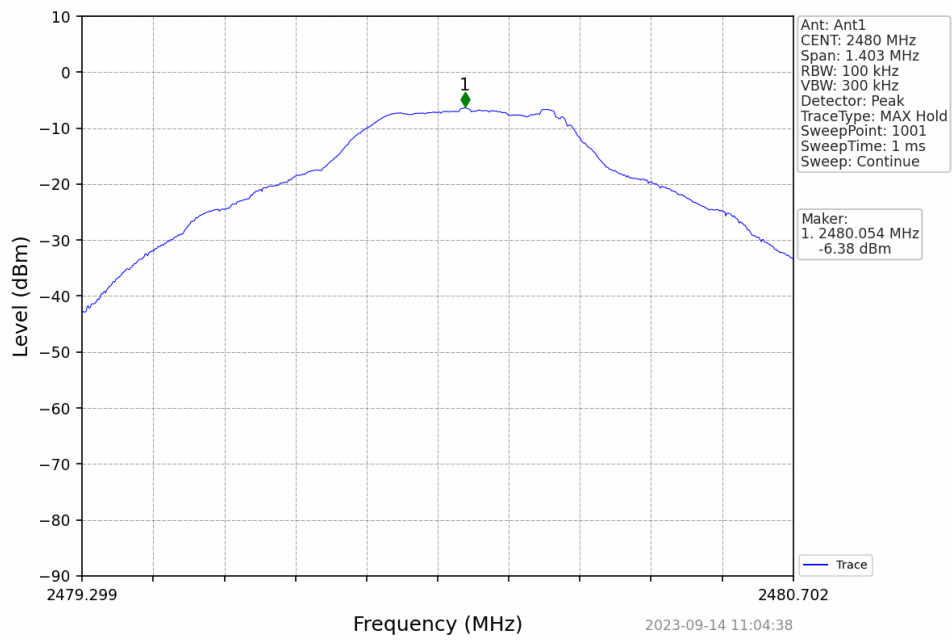


$\pi/4$ -DQPSK_2DH5_HOPP_Ant1_NTNV

 $\pi/4$ -DQPSK_2DH5_HOPP_Ant1_NTNV


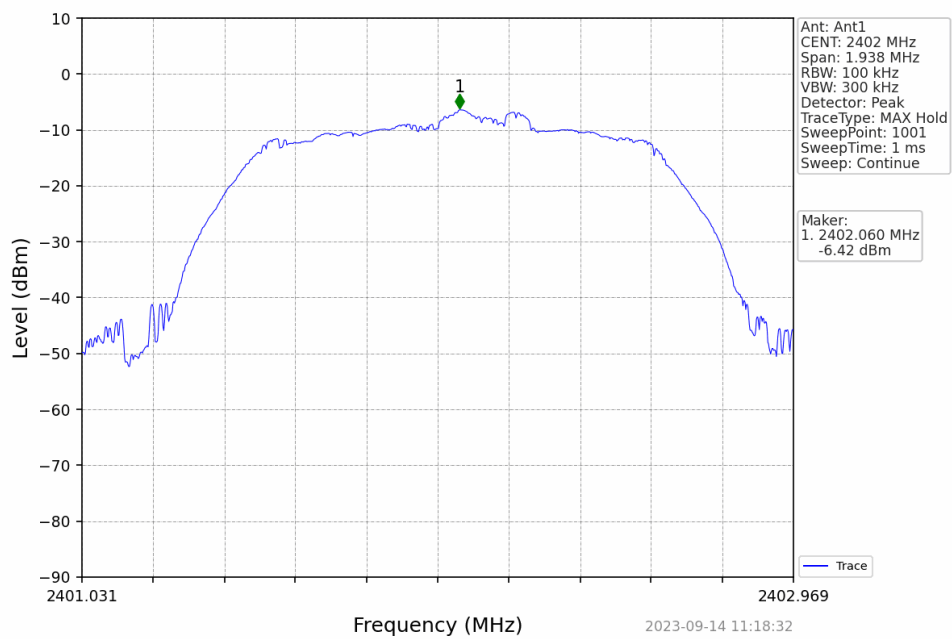
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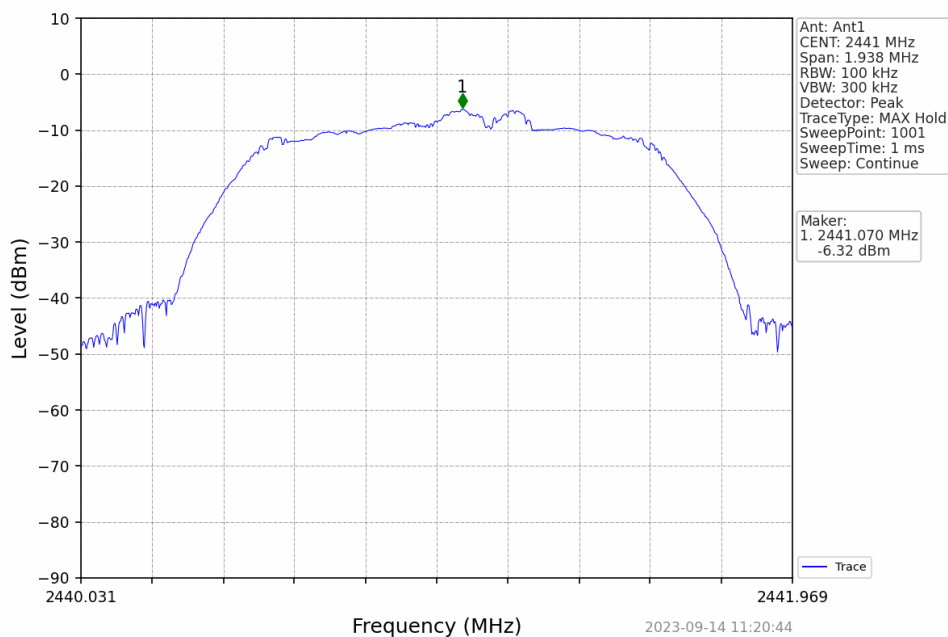
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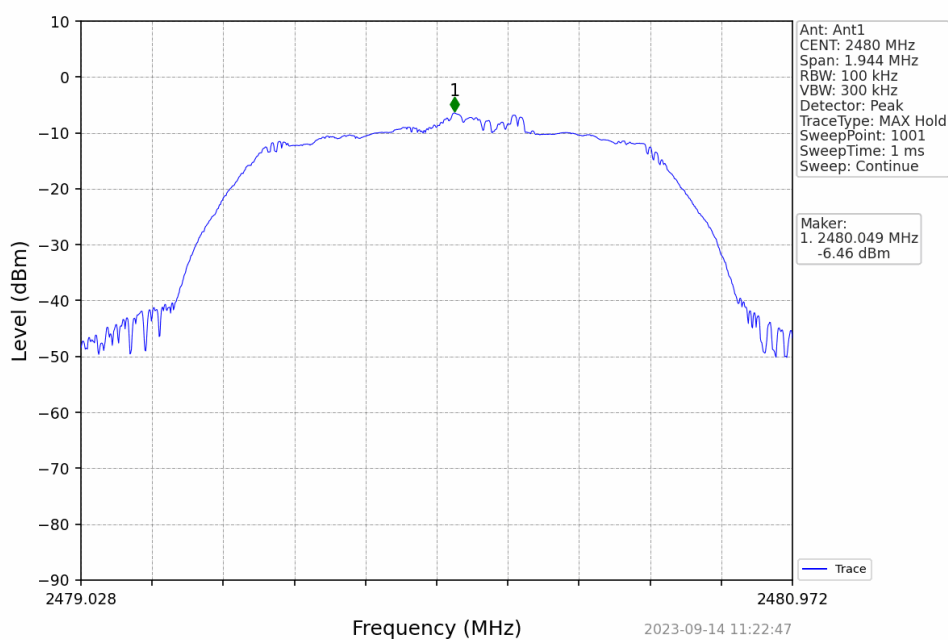
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$\pi/4$ -DQPSK_2DH5_MCH_2441MHz_Ant1_NTNV

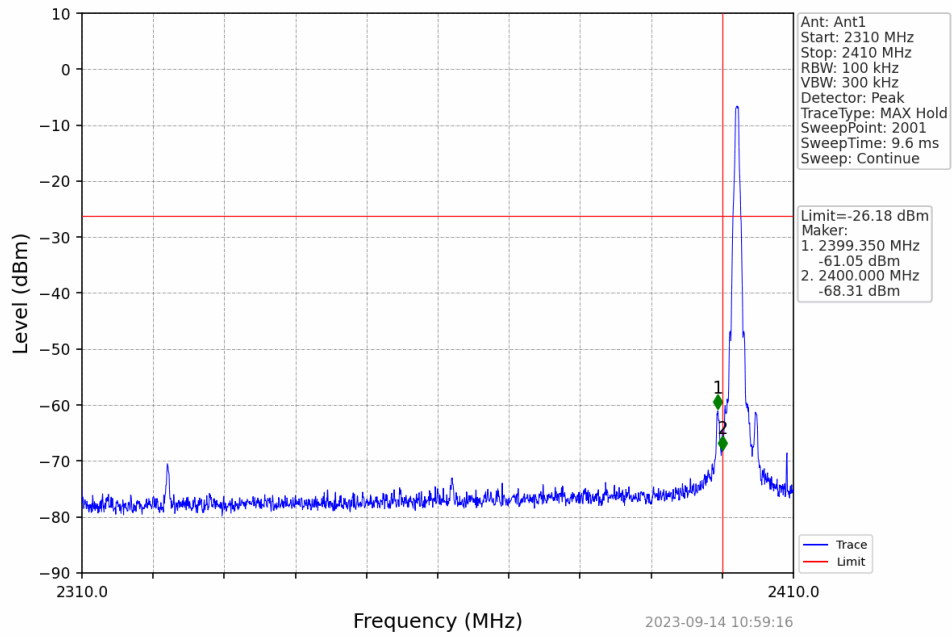


$\pi/4$ -DQPSK_2DH5_HCH_2480MHz_Ant1_NTNV

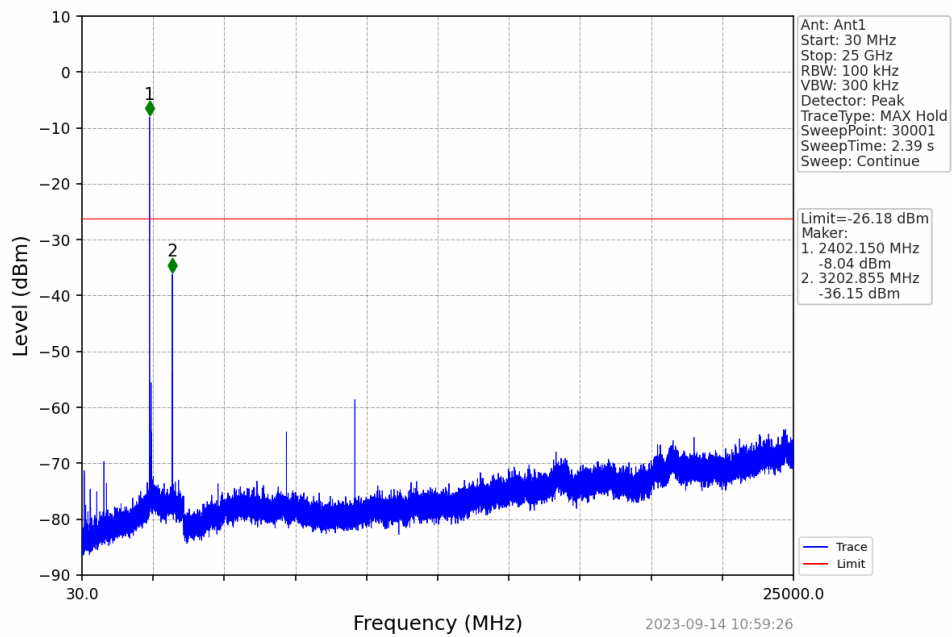


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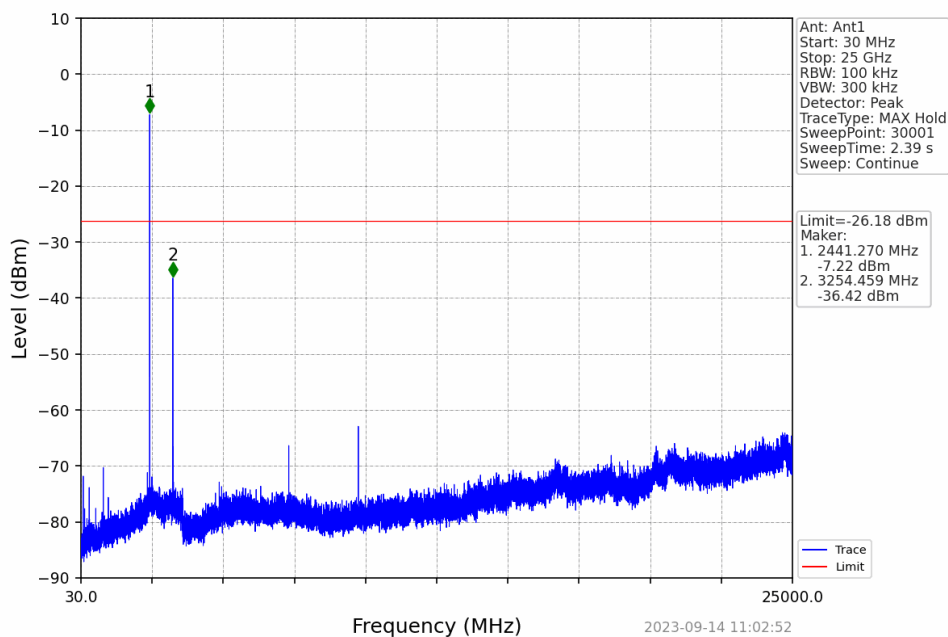
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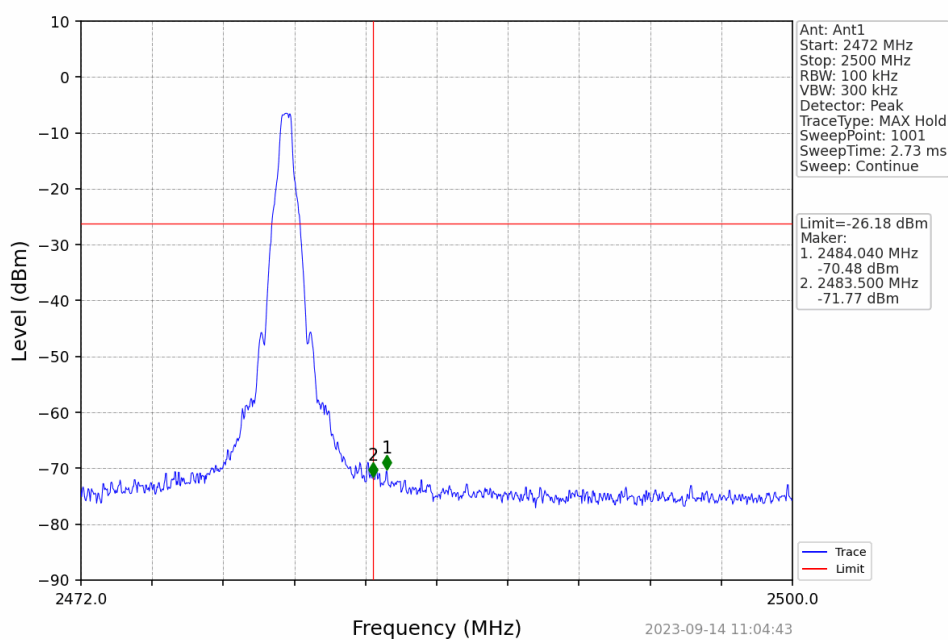
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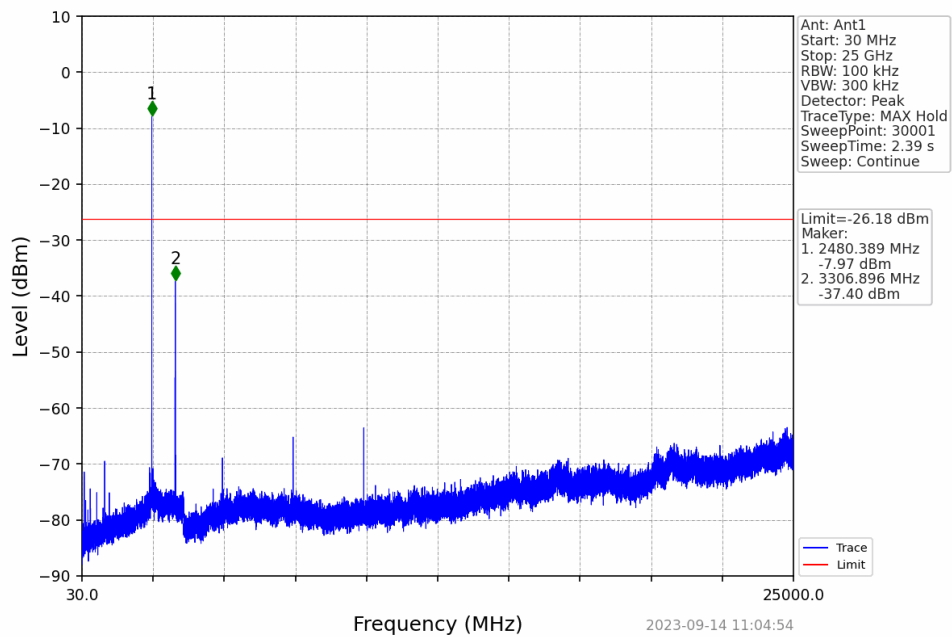
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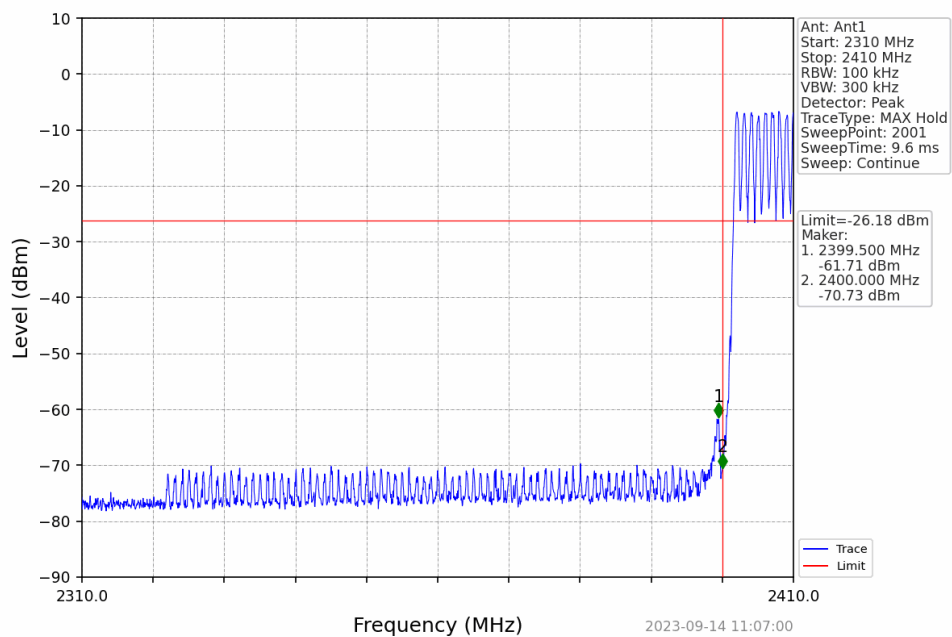
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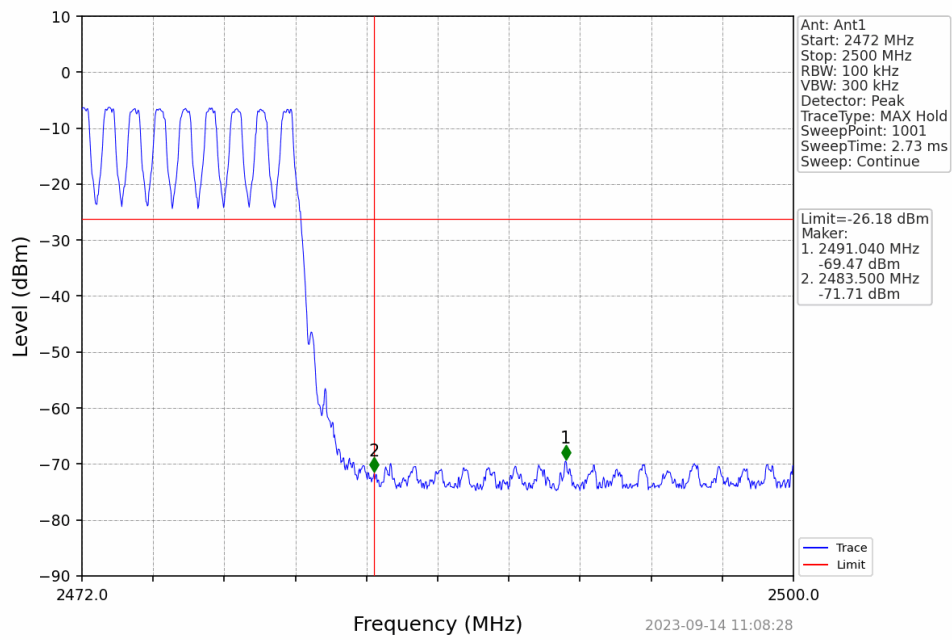
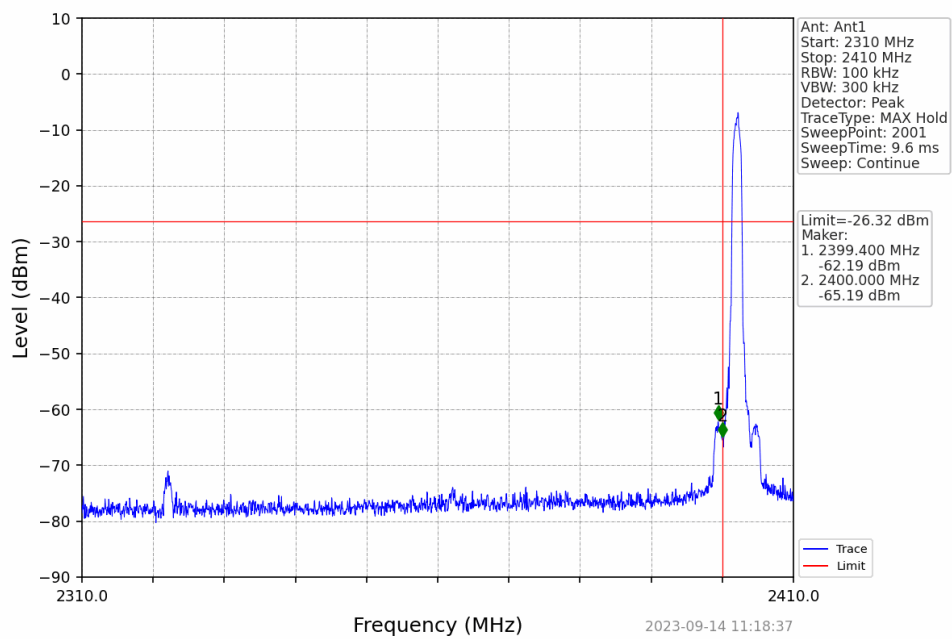
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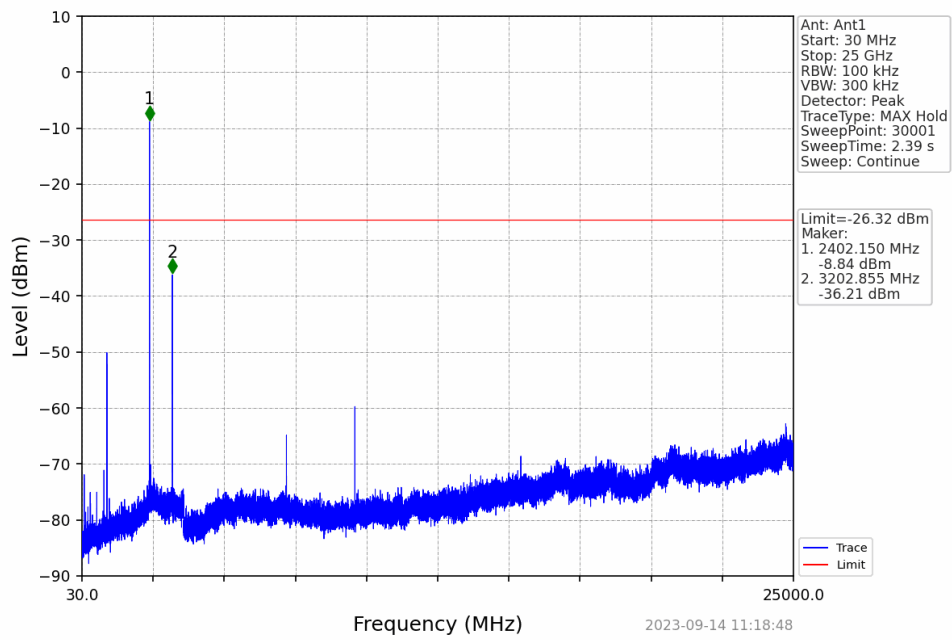
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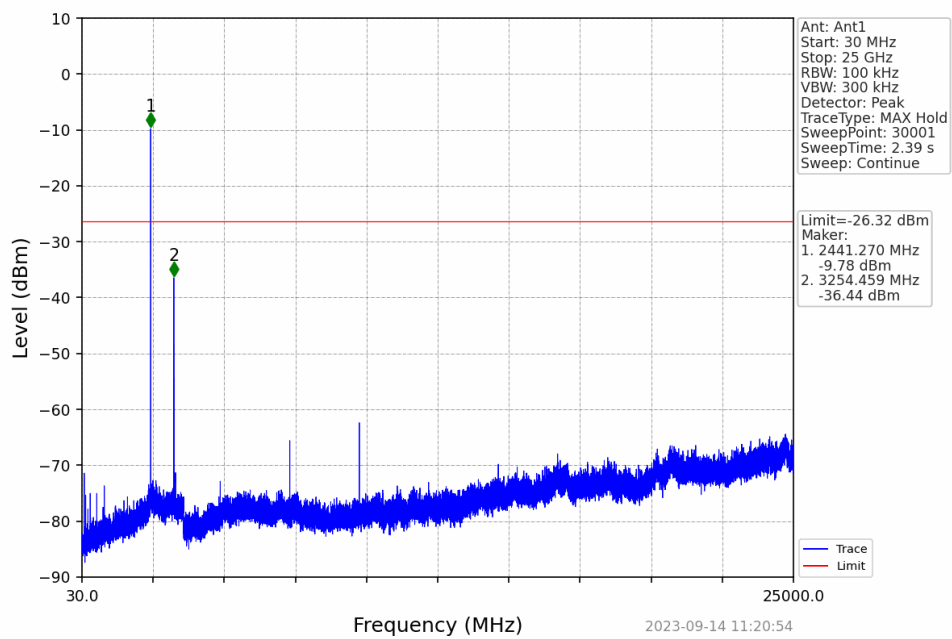
GFSK_DH5_HOPP_Ant1_NTNV


 $\pi/4$ -DQPSK_2DH5_LCH_2402MHz_Ant1_NTNV


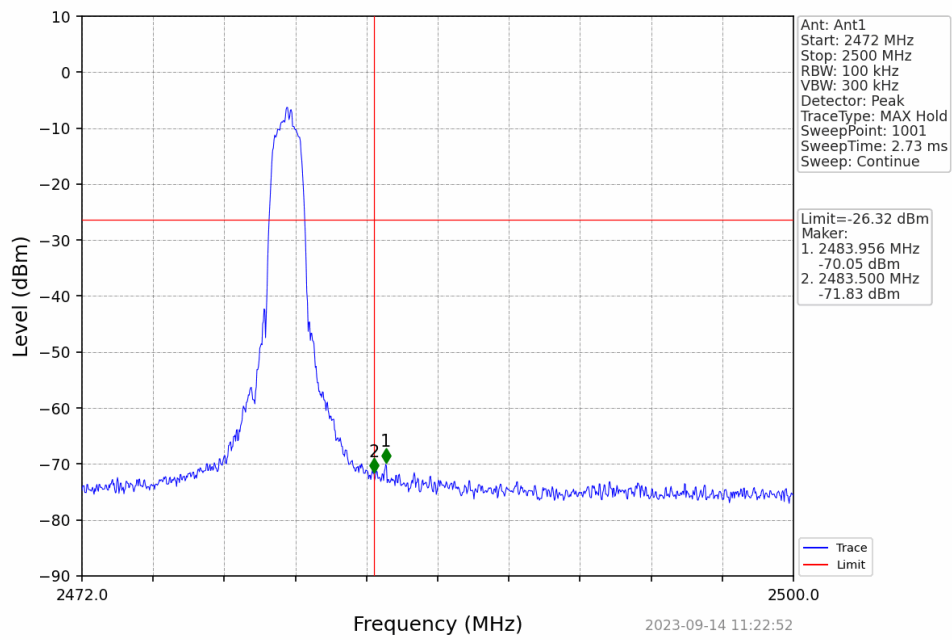
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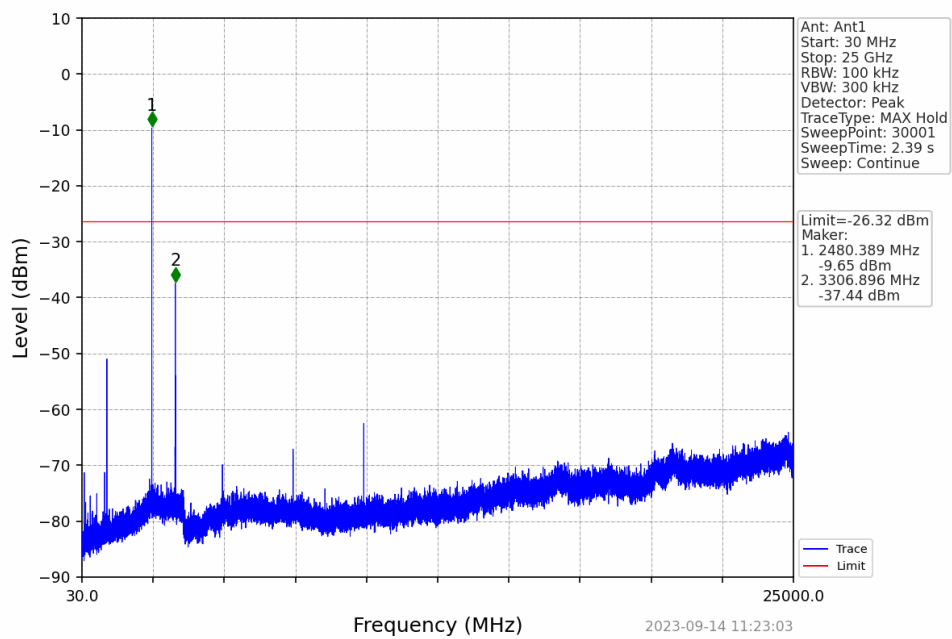
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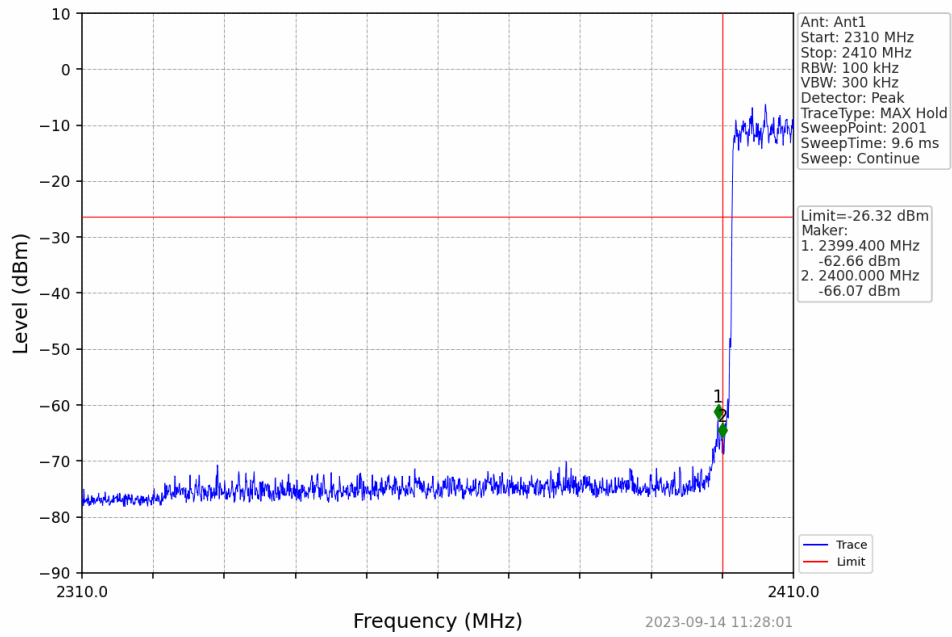
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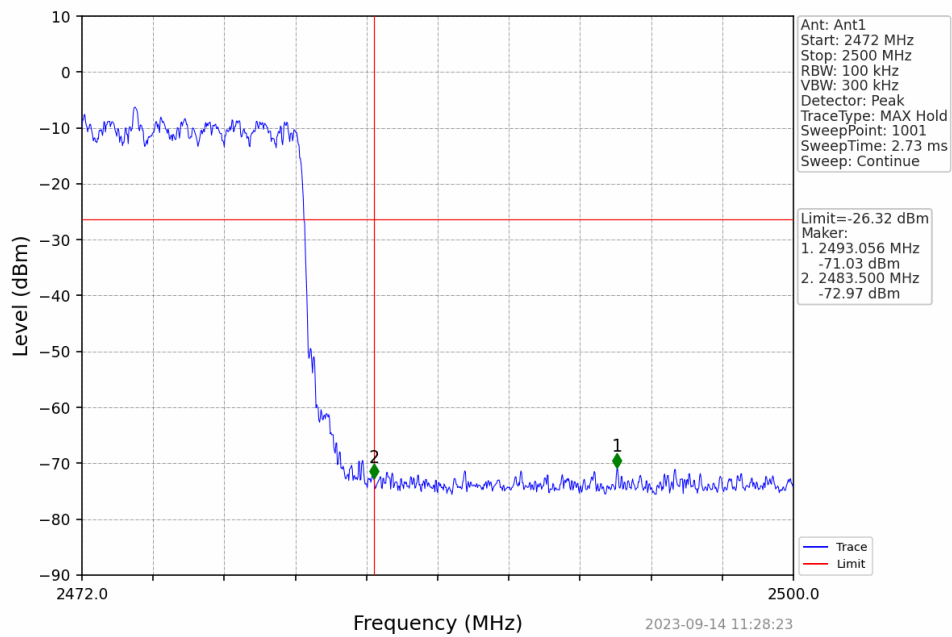
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$\pi/4$ -DQPSK_2DH5_HOPP_Ant1_NTNV



$\pi/4$ -DQPSK_2DH5_HOPP_Ant1_NTNV



7 Band-edge for RF Conducted Emissions

7.1 Test Result

Test Mode: GFKS										
Pol.	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detect or Type	Result
Low Channel: 2402MHz										
H	2390.00	45.96	29.15	3.41	34.01	44.51	74.00	-29.49	PK	PASS
H	2400.00	63.19	29.16	3.43	34.01	61.77	74.00	-12.23	PK	PASS
V	2390.00	46.81	29.15	3.41	34.01	45.36	74.00	-28.64	PK	PASS
V	2400.00	65.56	29.16	3.43	34.01	64.14	74.00	-9.86	PK	PASS
H	2390.00	35.82	29.15	3.41	34.01	34.37	54.00	-19.63	AV	PASS
H	2400.00	47.24	29.16	3.43	34.01	45.82	54.00	-8.18	AV	PASS
V	2390.00	35.98	29.15	3.41	34.01	34.53	54.00	-19.47	AV	PASS
V	2400.00	49.18	29.16	3.43	34.01	47.76	54.00	-6.24	AV	PASS
High Channel: 2480MHz										
H	2483.50	48.44	29.28	3.53	34.03	47.22	74.00	-26.78	PK	PASS
H	2500.00	47.02	29.30	3.56	34.03	45.85	74.00	-28.15	PK	PASS
V	2483.50	49.79	29.28	3.53	34.03	48.57	74.00	-25.43	PK	PASS
V	2500.00	48.31	29.30	3.56	34.03	47.14	74.00	-26.86	PK	PASS
H	2483.50	38.68	29.28	3.53	34.03	37.46	54.00	-16.54	AV	PASS
H	2500.00	36.24	29.30	3.56	34.03	35.07	54.00	-18.93	AV	PASS
V	2483.50	40.15	29.28	3.53	34.03	38.93	54.00	-15.07	AV	PASS
V	2500.00	36.42	29.30	3.56	34.03	35.25	54.00	-18.75	AV	PASS



Test Mode: $\pi/4$ -DQPSK										
Pol.	Frequency (MHz)	Meter Reading (dBuV)	Pre-amplifier (dB)	Cable Loss (dB)	Antenna Factor (dB/m)	Emission level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detect or Type	Result
Low Channel: 2402MHz										
H	2390.00	46.28	29.15	3.41	34.01	44.83	74.00	-29.17	PK	PASS
H	2400.00	63.55	29.16	3.43	34.01	62.13	74.00	-11.87	PK	PASS
V	2390.00	47.15	29.15	3.41	34.01	45.70	74.00	-28.30	PK	PASS
V	2400.00	65.95	29.16	3.43	34.01	64.53	74.00	-9.47	PK	PASS
H	2390.00	36.06	29.15	3.41	34.01	34.61	54.00	-19.39	AV	PASS
H	2400.00	47.50	29.16	3.43	34.01	46.08	54.00	-7.92	AV	PASS
V	2390.00	36.24	29.15	3.41	34.01	34.79	54.00	-19.21	AV	PASS
V	2400.00	49.47	29.16	3.43	34.01	48.05	54.00	-5.95	AV	PASS
High Channel: 2480MHz										
H	2483.50	48.78	29.28	3.53	34.03	47.56	74.00	-26.44	PK	PASS
H	2500.00	47.31	29.30	3.56	34.03	46.14	74.00	-27.86	PK	PASS
V	2483.50	50.19	29.28	3.53	34.03	48.97	74.00	-25.03	PK	PASS
V	2500.00	48.63	29.30	3.56	34.03	47.46	74.00	-26.54	PK	PASS
H	2483.50	38.92	29.28	3.53	34.03	37.70	54.00	-16.30	AV	PASS
H	2500.00	36.44	29.30	3.56	34.03	35.27	54.00	-18.73	AV	PASS
V	2483.50	40.42	29.28	3.53	34.03	39.20	54.00	-14.80	AV	PASS
V	2500.00	36.65	29.30	3.56	34.03	35.48	54.00	-18.52	AV	PASS

Remark:

1. Emission Level = Meter Reading + Antenna Factor + Cable Loss – Pre-amplifier, Margin= Emission Level - Limit

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