Appendix for 15.247

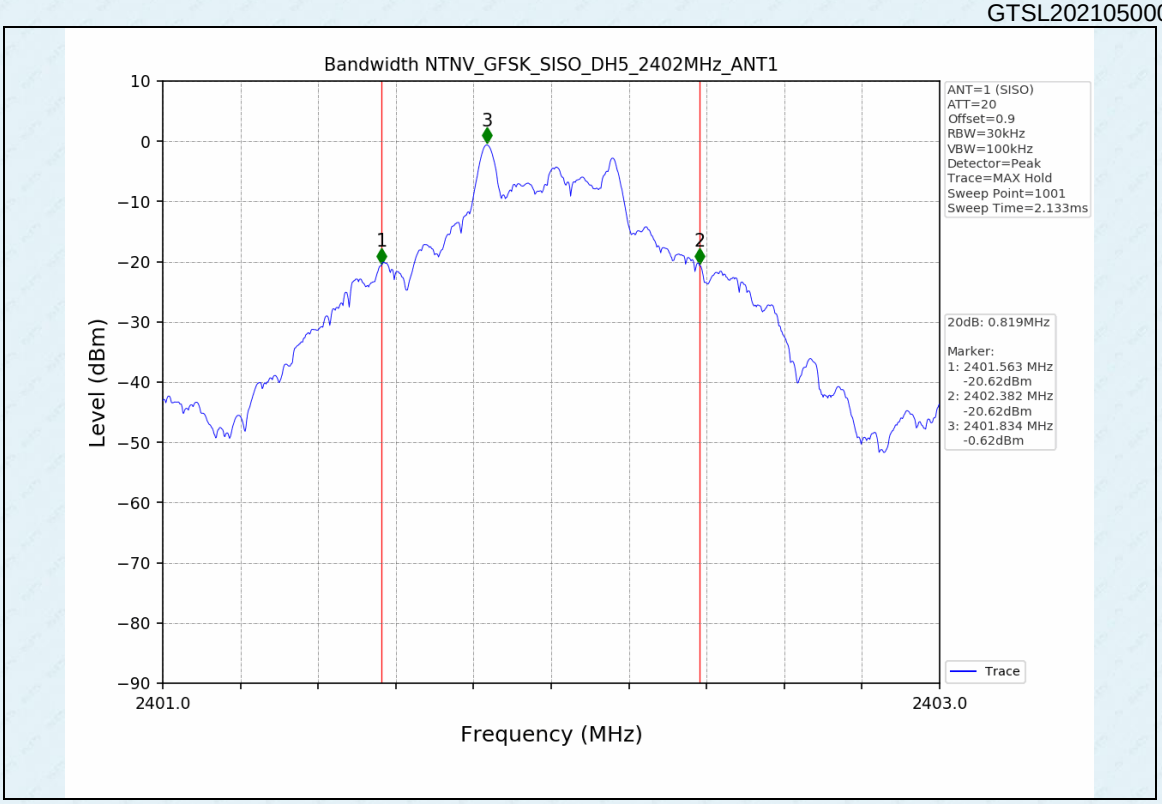
1. Bandwidth

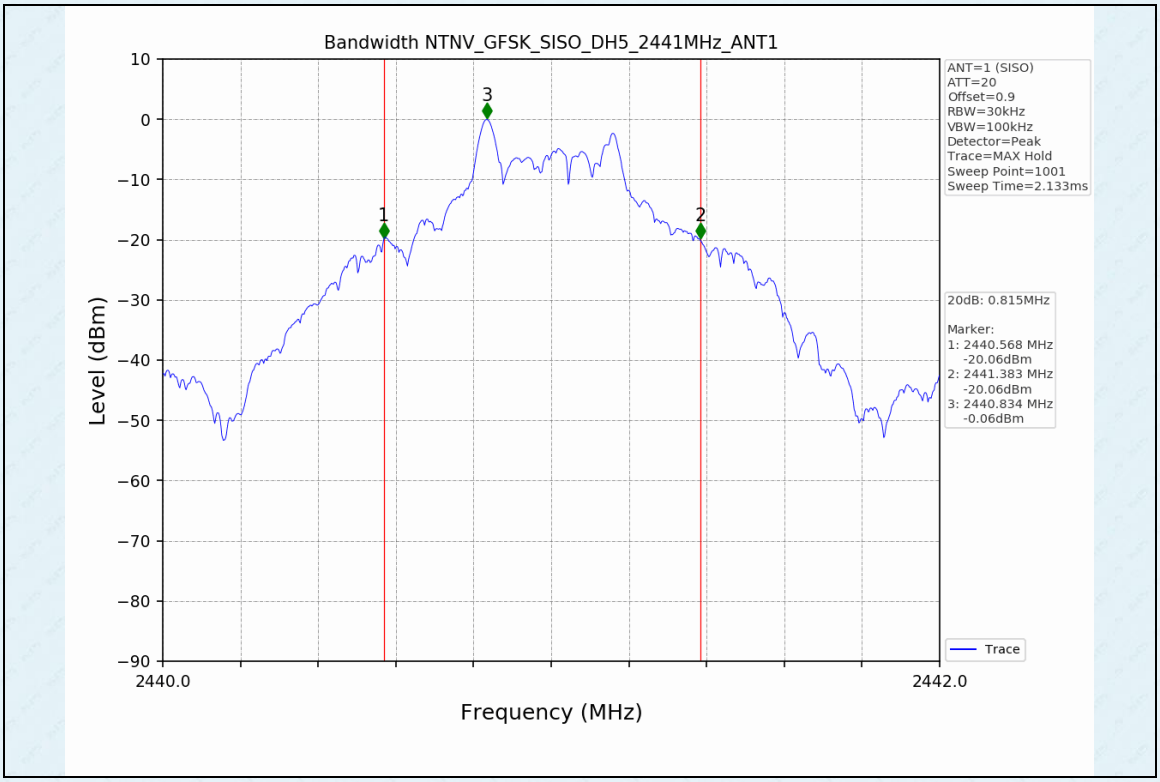
1.1 Test Result

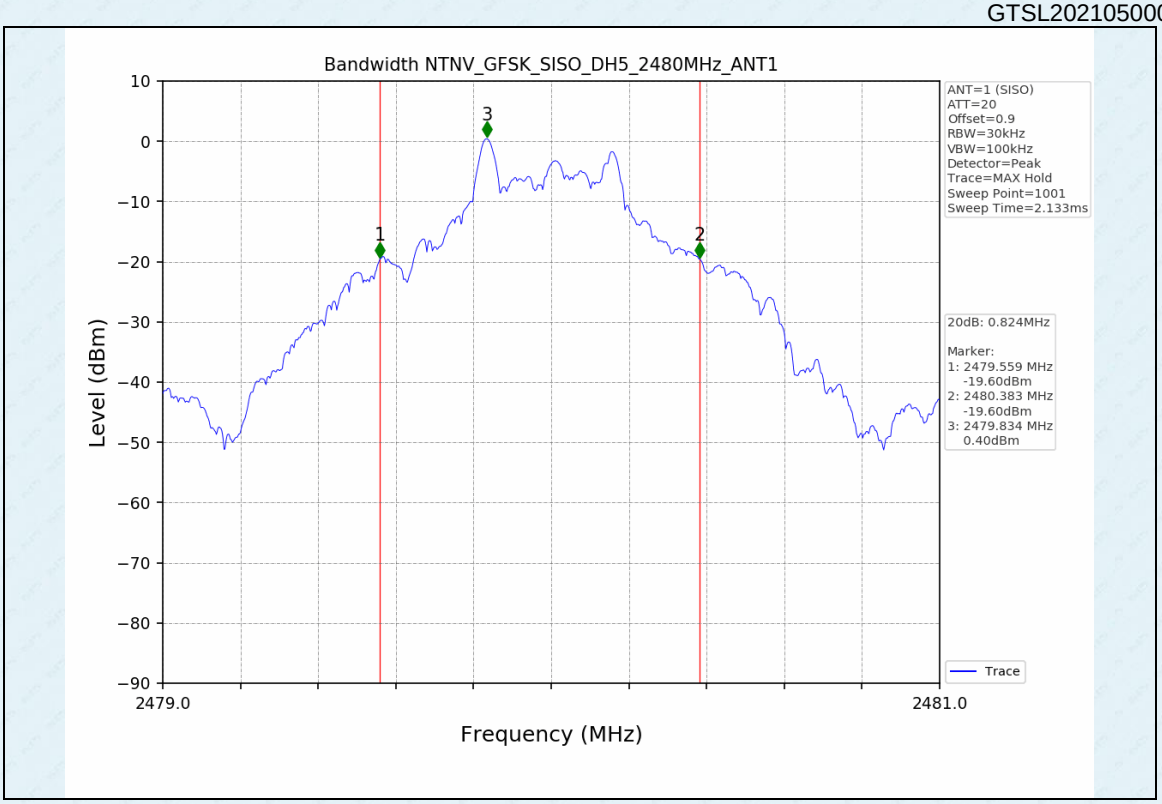
Test Mode	Frequency (MHz)	TX Type	ANT No.	20dB Bandwidth Test Result (MHz)	Verdict
GFSK	2402	SISO	1	0.819	PASS
	2441	SISO	1	0.815	PASS
	2480	SISO	1	0.824	PASS
Pi/4DQPSK	2402	SISO	1	1.112	PASS
	2441	SISO	1	1.113	PASS
	2480	SISO	1	1.117	PASS
8DPSK	2402	SISO	1	1.128	PASS
	2441	SISO	1	1.153	PASS
	2480	SISO	1	1.151	PASS

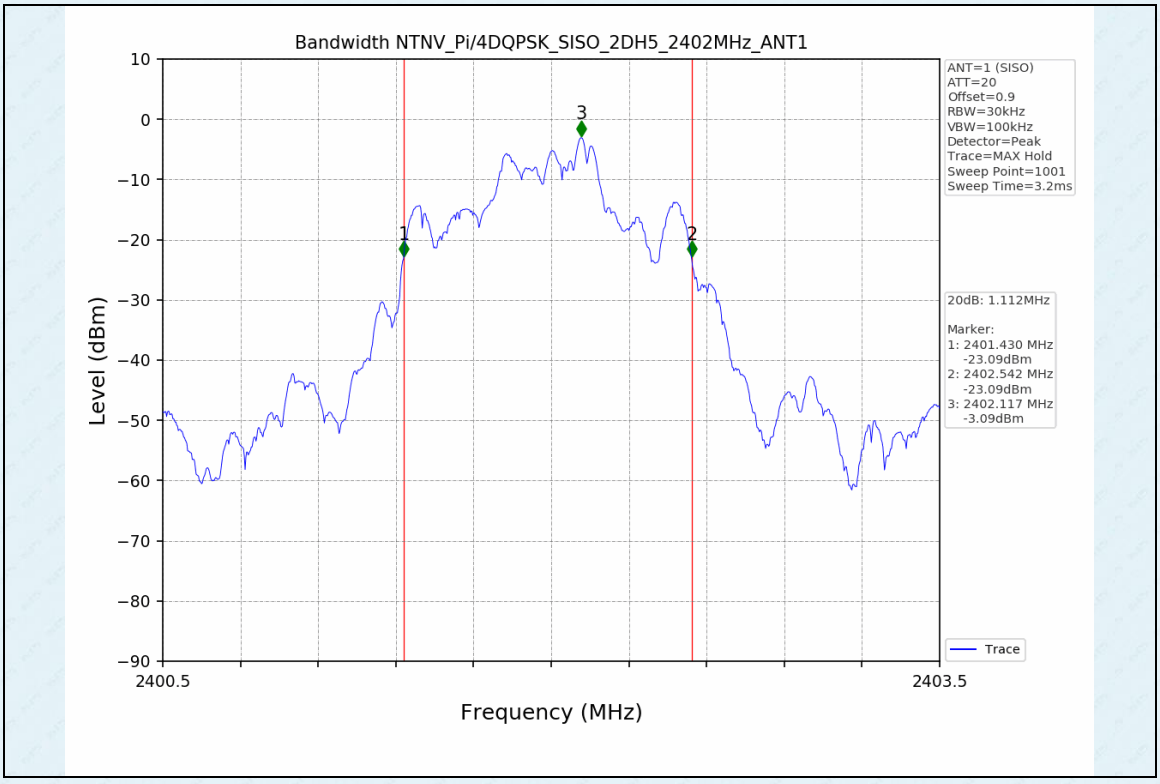
Test Mode	Frequency (MHz)	TX Type	ANT No.	99% Occupied Bandwidth Test Result (MHz)	
GFSK	2402	SISO	1	0.863	Only for Report Use
	2441	SISO	1	0.858	Only for Report Use
	2480	SISO	1	0.859	Only for Report Use
Pi/4DQPSK	2402	SISO	1	1.060	Only for Report Use
	2441	SISO	1	1.060	Only for Report Use
	2480	SISO	1	1.061	Only for Report Use
8DPSK	2402	SISO	1	1.072	Only for Report Use
	2441	SISO	1	1.072	Only for Report Use
	2480	SISO	1	1.067	Only for Report Use

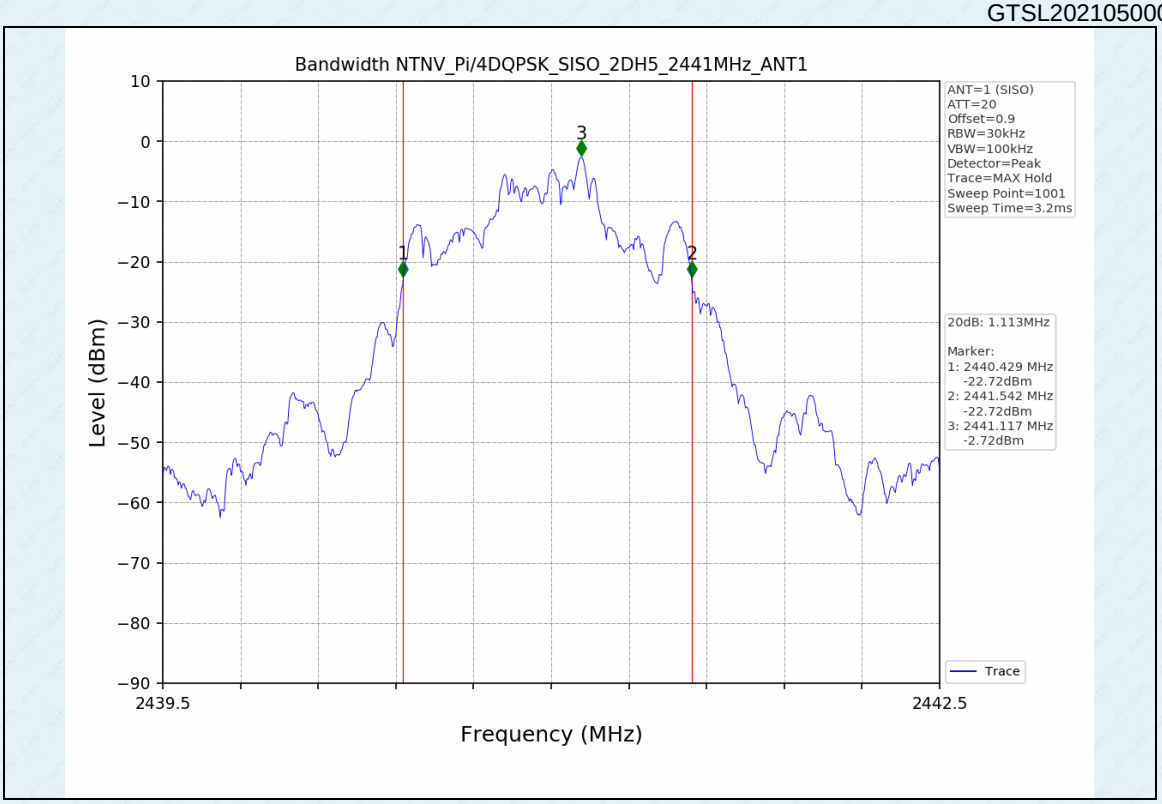
1.2 Test Graph - 20dB Bandwidth

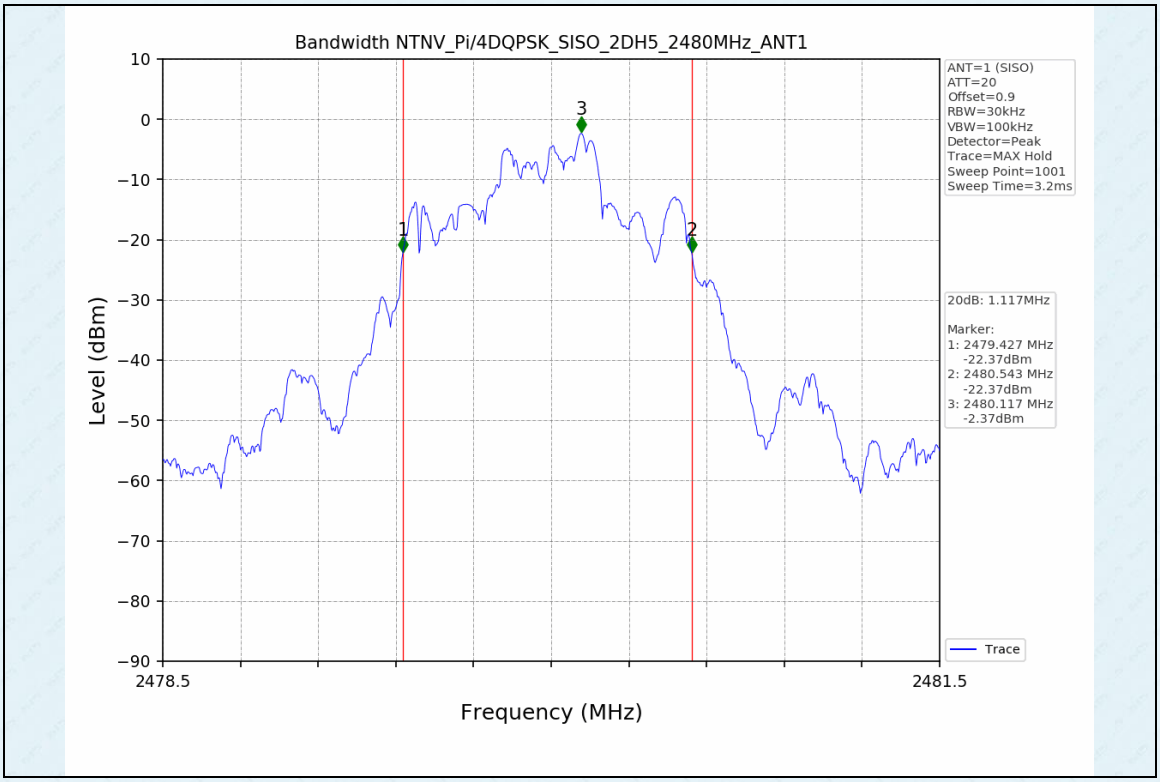

Bandwidth NTNV_GFSK_SISO_DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.133ms
20dB: 0.819MHz
Marker:
1: 2401.563 MHz
-20.62dBm
2: 2402.382 MHz
-20.62dBm
3: 2401.834 MHz
-0.62dBm
Trace
Level (dBm)
Frequency (MHz)
2401.0
2403.0

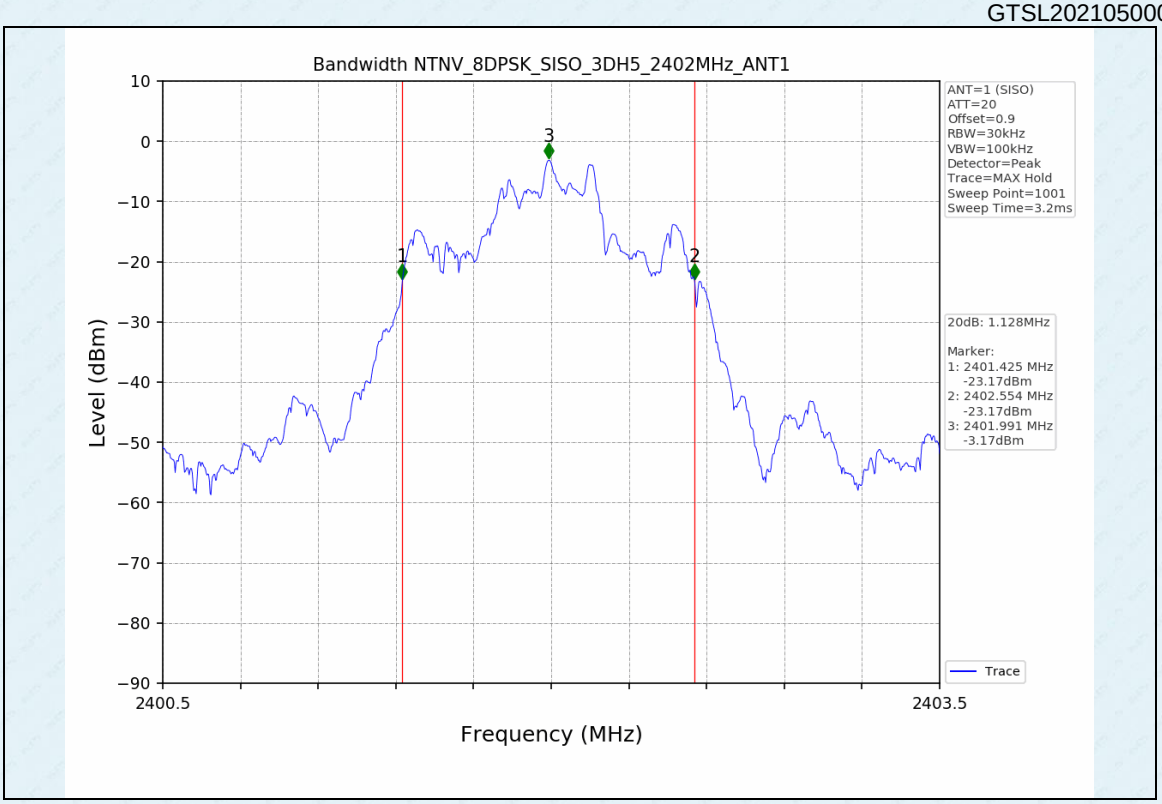

Bandwidth NTNV_GFSK_SISO_DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.133ms
20dB: 0.815MHz
Marker:
1: 2440.568 MHz
-20.06dBm
2: 2441.383 MHz
-20.06dBm
3: 2440.834 MHz
-0.06dBm
Trace
Level (dBm)
Frequency (MHz)
2440.0
2442.0

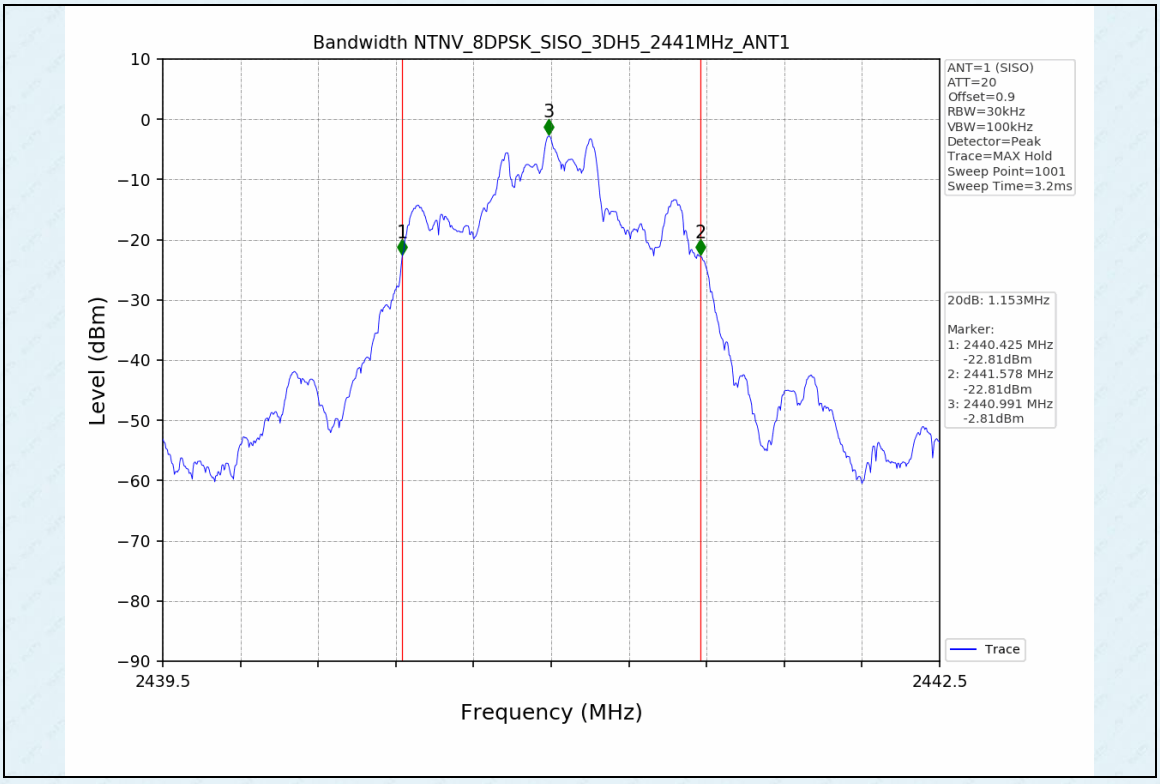

Bandwidth NTNV_GFSK_SISO_DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.133ms
20dB: 0.824MHz
Marker:
1: 2479.559 MHz
-19.60dBm
2: 2480.383 MHz
-19.60dBm
3: 2479.834 MHz
0.40dBm
Trace
Level (dBm)
Frequency (MHz)
2479.0
2481.0

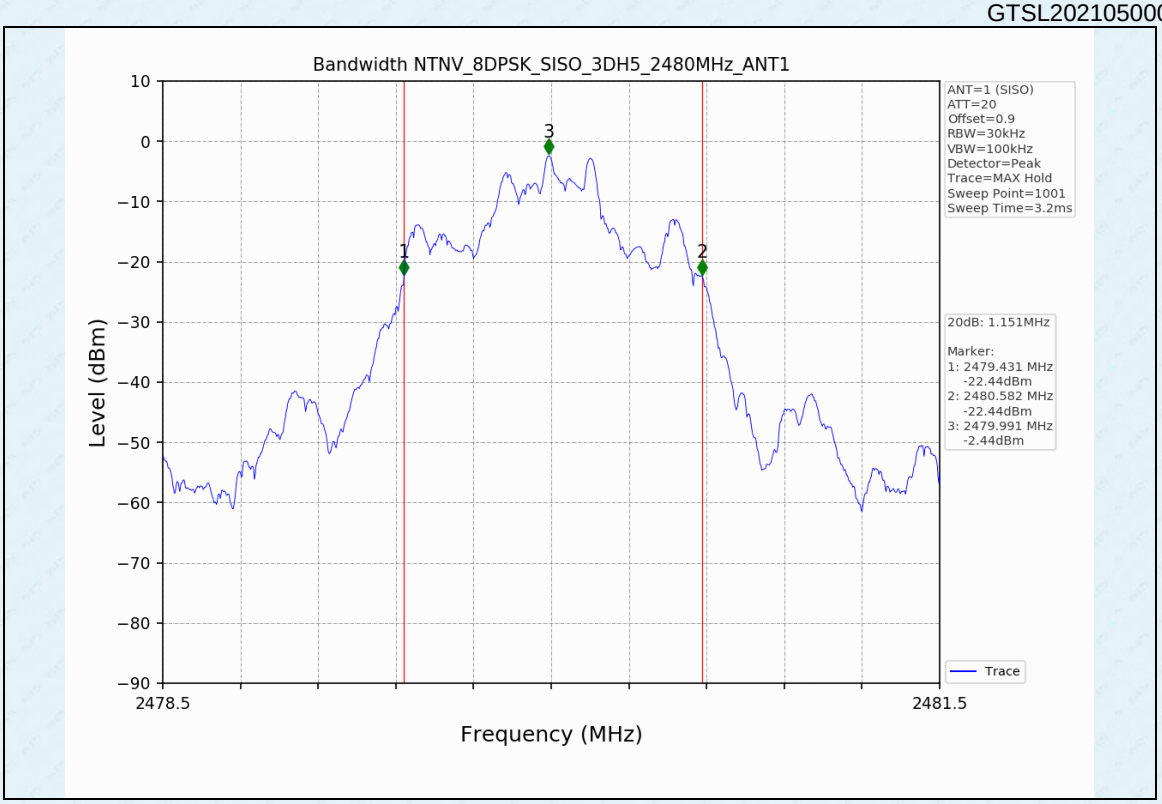

Bandwidth NTNV_Pi/4DQPSK_SISO_2DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.2ms
20dB: 1.112MHz
Marker:
1: 2401.430 MHz
-23.09dBm
2: 2402.542 MHz
-23.09dBm
3: 2402.117 MHz
-3.09dBm
Trace
Level (dBm)
Frequency (MHz)
2400.5
2403.5


Bandwidth NTNV_Pi/4DQPSK_SISO_2DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.2ms
20dB: 1.113MHz
Marker:
1: 2440.429 MHz
-22.72dBm
2: 2441.542 MHz
-22.72dBm
3: 2441.117 MHz
-2.72dBm
Trace
Level (dBm)
Frequency (MHz)
2439.5
2442.5

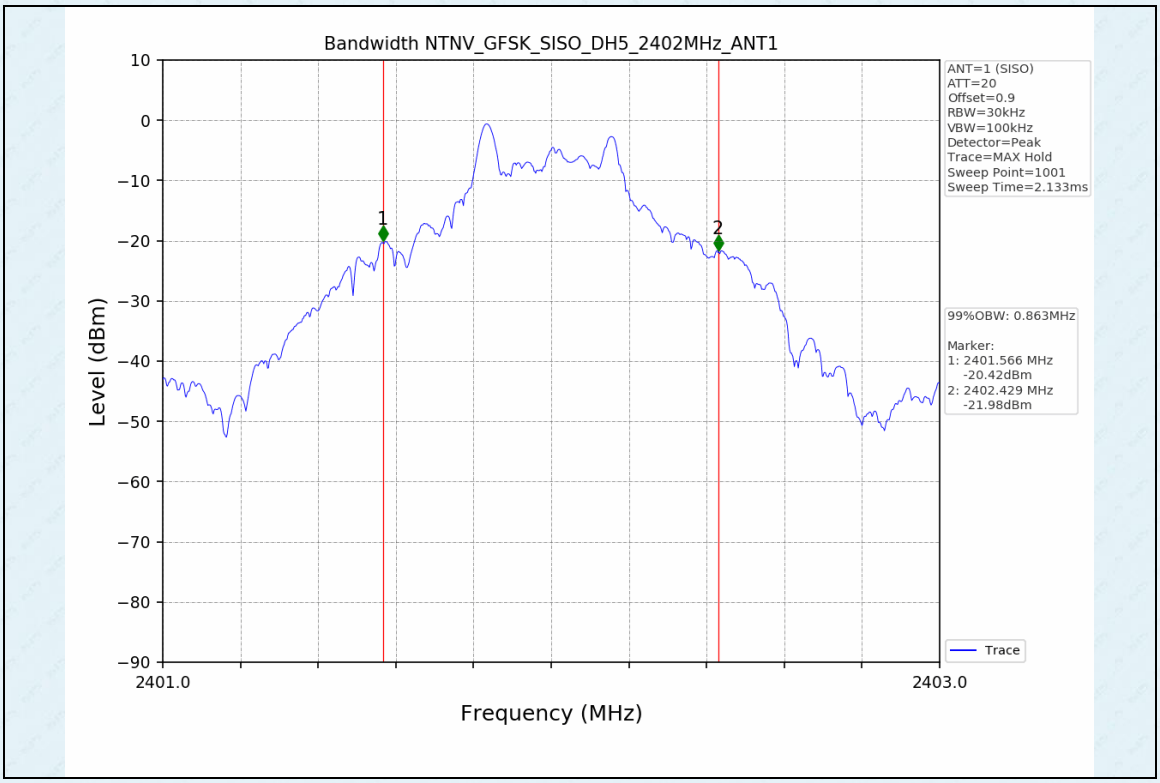

Bandwidth NTNV_Pi/4DQPSK_SISO_2DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.2ms
20dB: 1.117MHz
Marker:
1: 2479.427 MHz
-22.37dBm
2: 2480.543 MHz
-22.37dBm
3: 2480.117 MHz
-2.37dBm
Trace
Level (dBm)
Frequency (MHz)
2478.5
2481.5

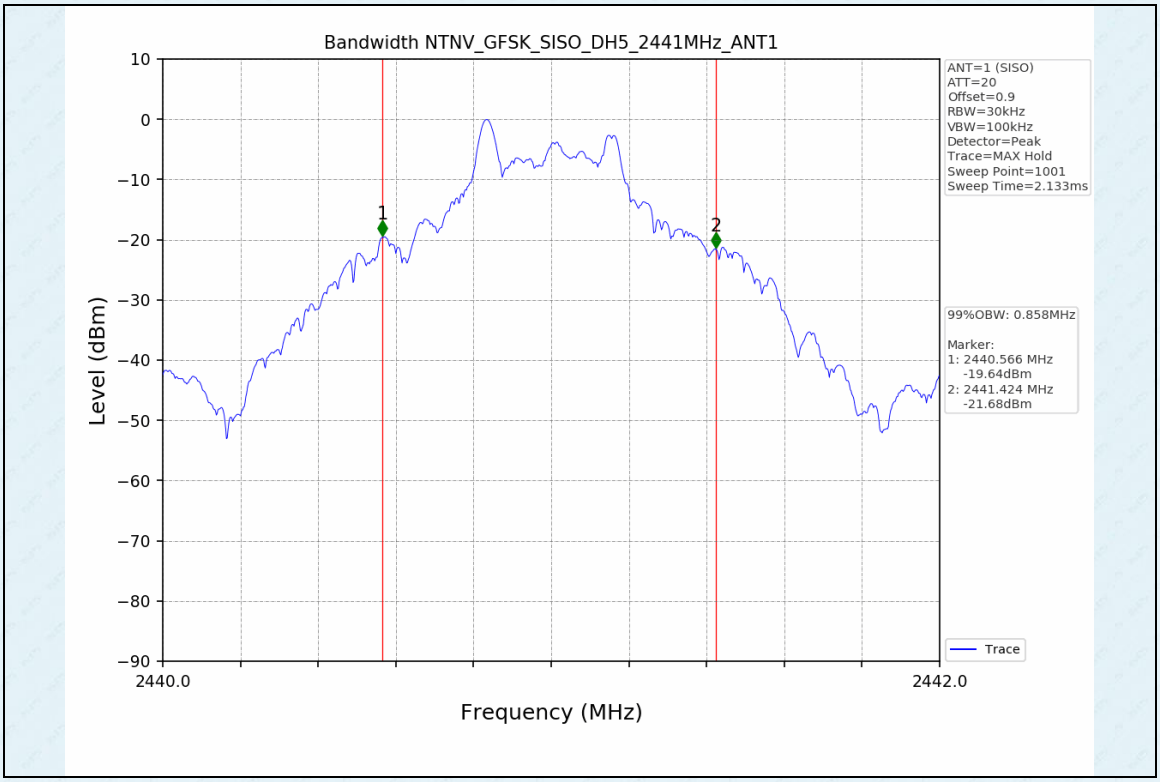

Bandwidth NTNV_8DPSK_SISO_3DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.2ms
20dB: 1.128MHz
Marker:
1: 2401.425 MHz
-23.17dBm
2: 2402.554 MHz
-23.17dBm
3: 2401.991 MHz
-3.17dBm
Trace
Level (dBm)
Frequency (MHz)
2400.5
2403.5

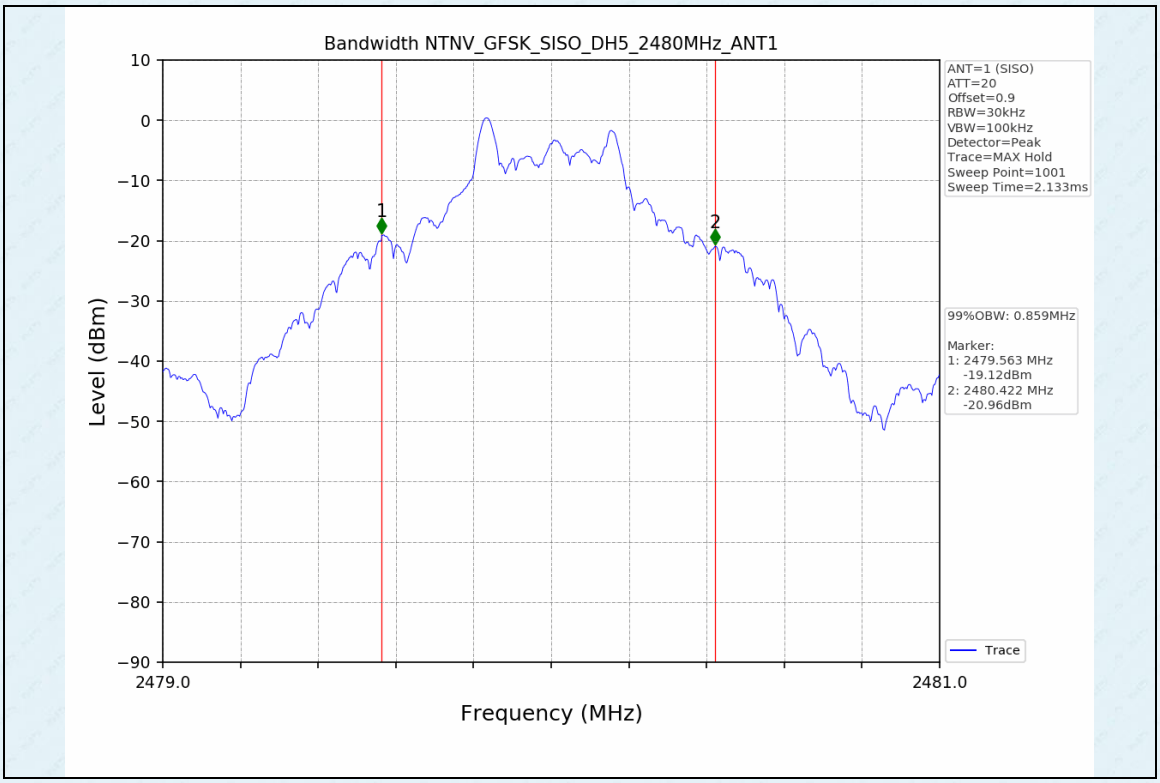

Bandwidth NTNV_8DPSK_SISO_3DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.2ms
20dB: 1.153MHz
Marker:
1: 2440.425 MHz
-22.81dBm
2: 2441.578 MHz
-22.81dBm
3: 2440.991 MHz
-2.81dBm
Trace
Level (dBm)
Frequency (MHz)
2439.5
2442.5

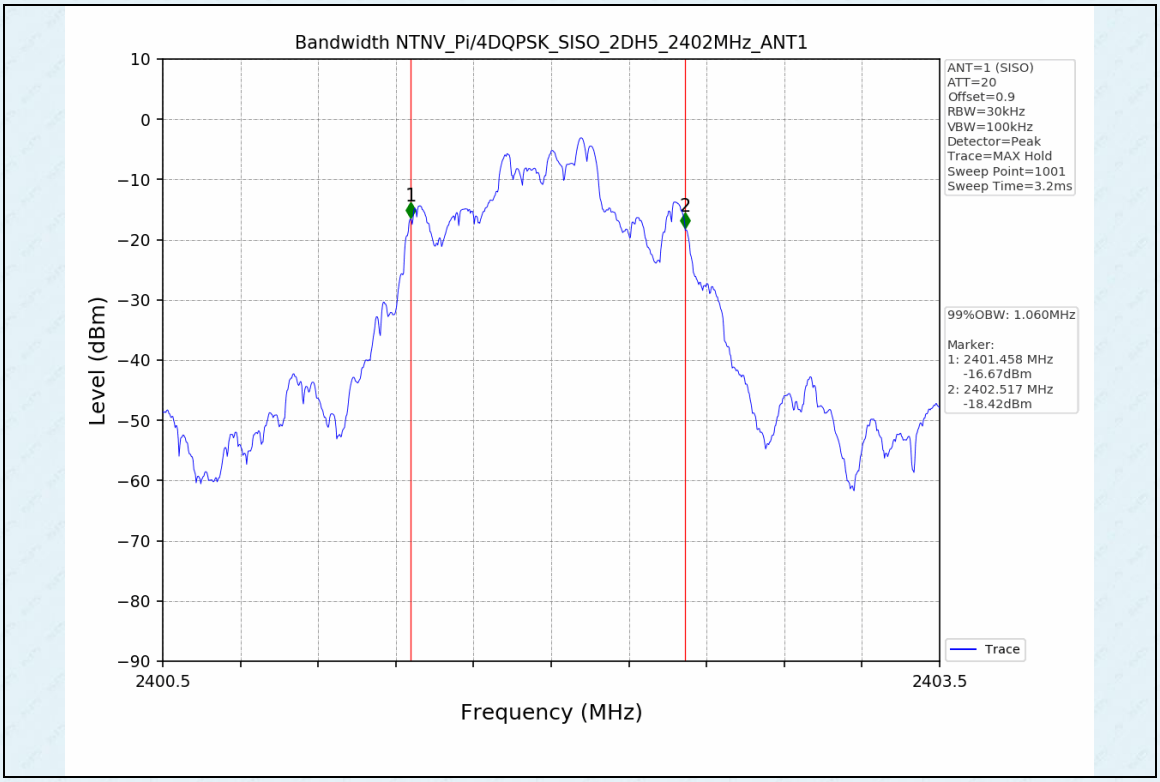


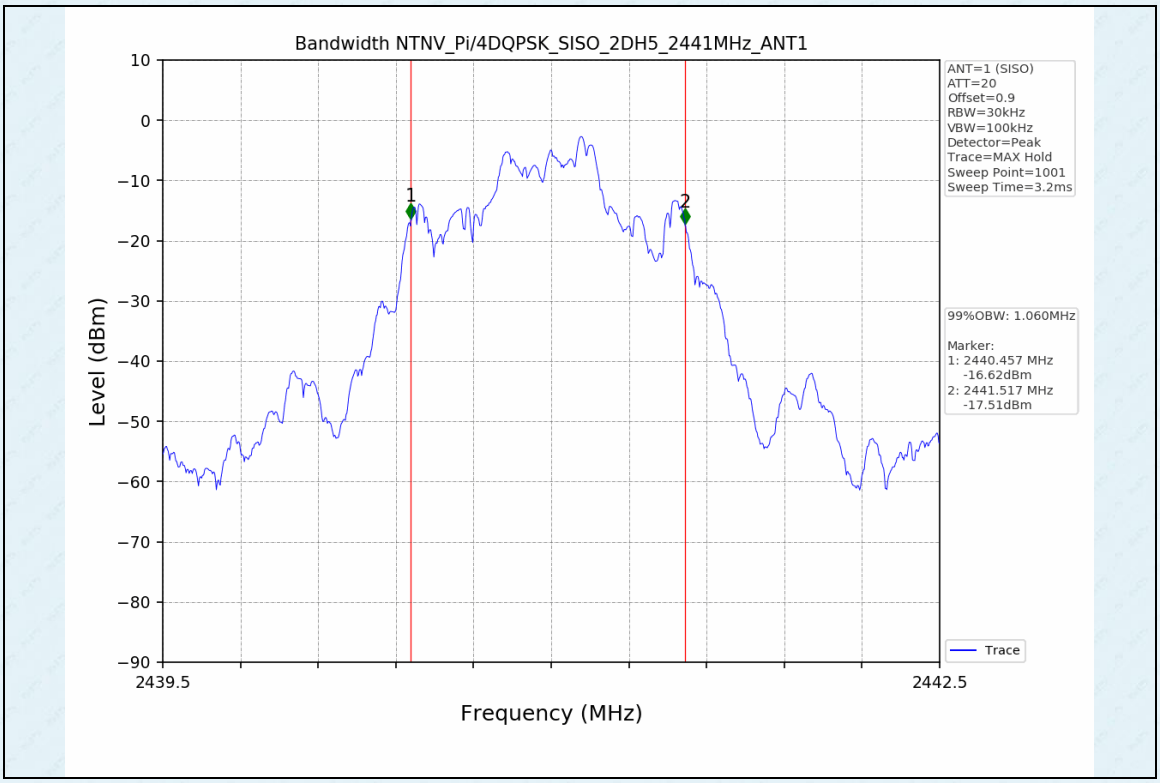
1.3 Test Graph - 99% Occupied Bandwidth

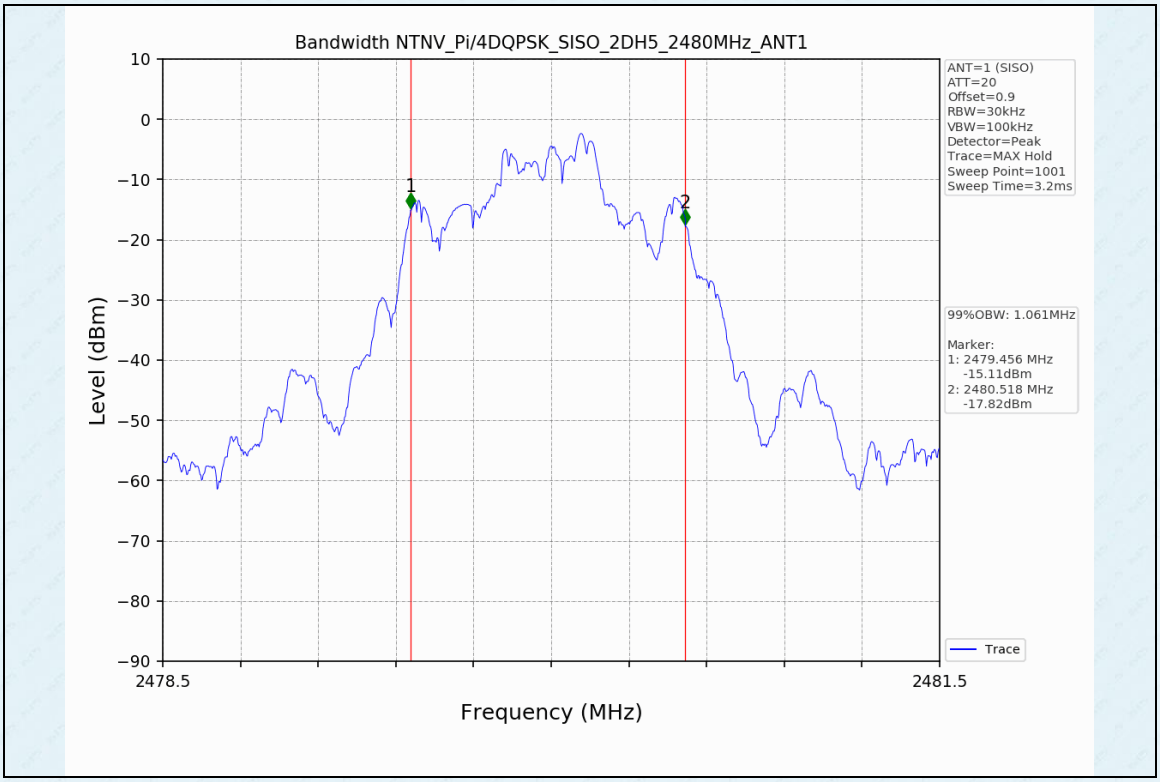


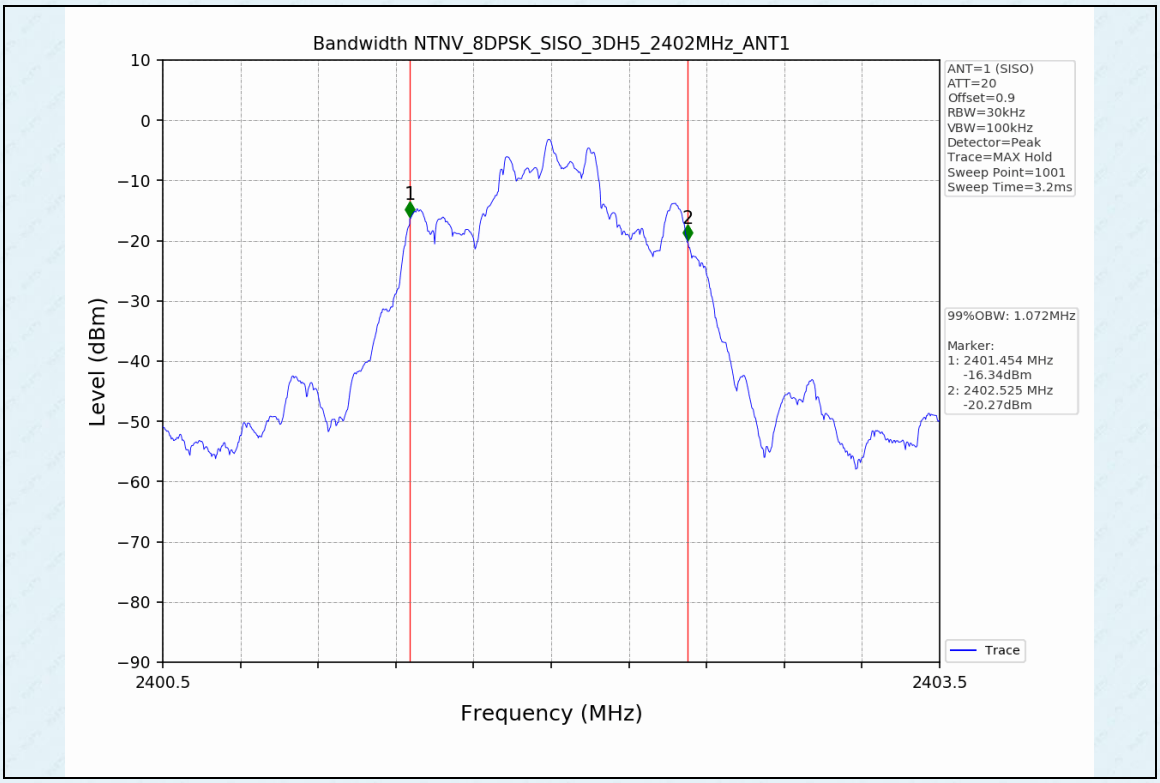

Bandwidth NTNV_GFSK_SISO_DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.133ms
99%OBW: 0.858MHz
Marker:
1: 2440.566 MHz
-19.64dBm
2: 2441.424 MHz
-21.68dBm
Trace
Level (dBm)
Frequency (MHz)
2440.0
2442.0

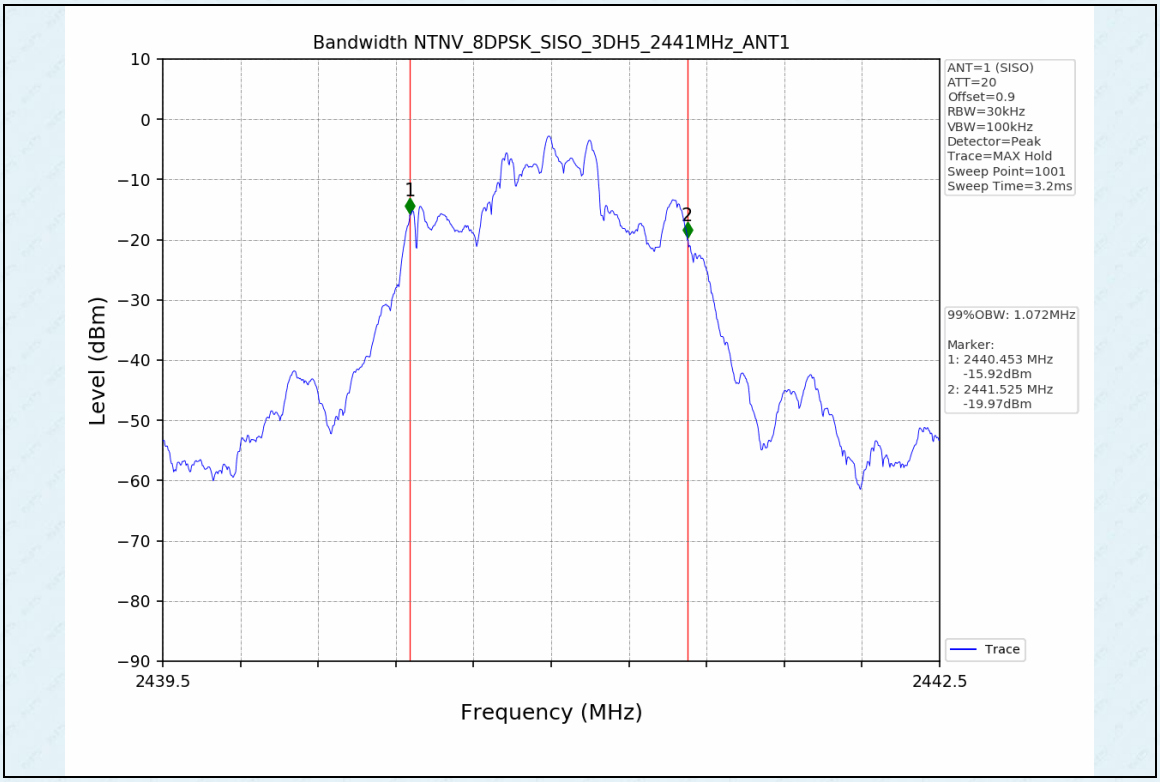

Bandwidth NTNV_GFSK_SISO_DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.133ms
99%OBW: 0.859MHz
Marker:
1: 2479.563 MHz
-19.12dBm
2: 2480.422 MHz
-20.96dBm
Trace
Level (dBm)
Frequency (MHz)
2479.0
2481.0

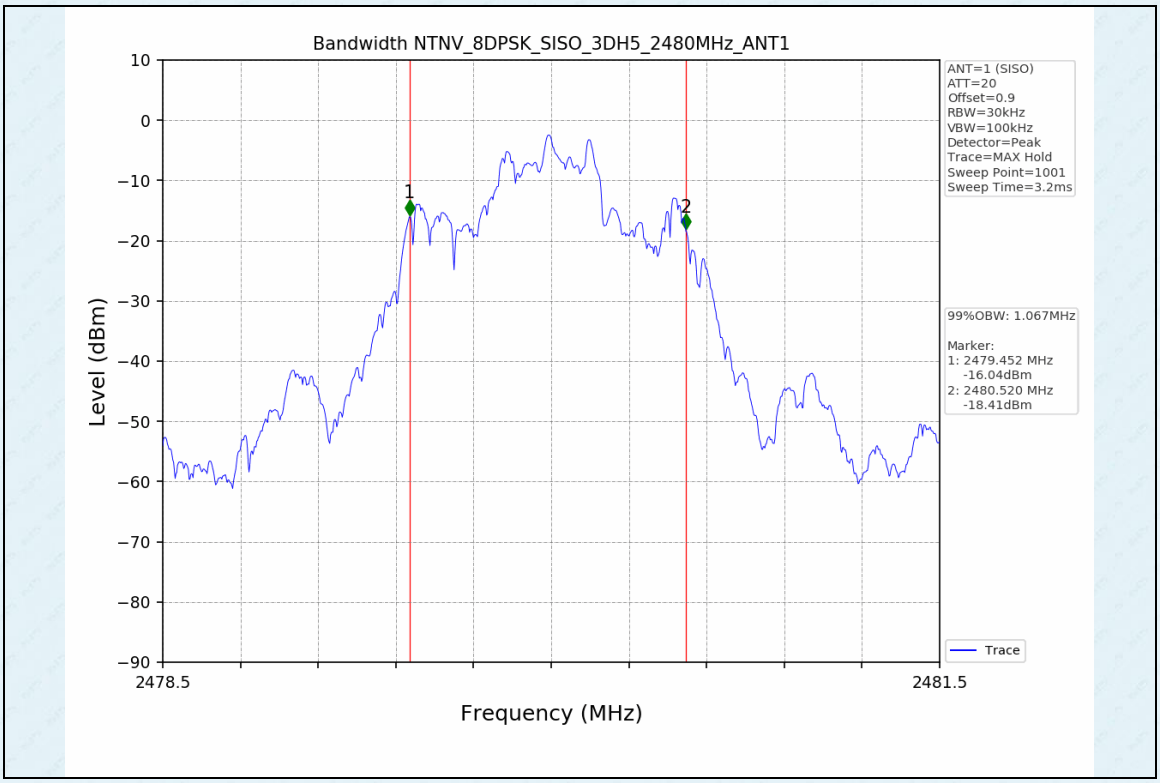

Bandwidth NTNV_Pi/4DQPSK_SISO_2DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.2ms
99%OBW: 1.060MHz
Marker:
1: 2401.458 MHz
-16.67dBm
2: 2402.517 MHz
-18.42dBm
Trace
Level (dBm)
Frequency (MHz)
2400.5
2403.5


Bandwidth NTNV_Pi/4DQPSK_SISO_2DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.2ms
99%OBW: 1.060MHz
Marker:
1: 2440.457 MHz
-16.62dBm
2: 2441.517 MHz
-17.51dBm
Trace
Level (dBm)
Frequency (MHz)
2439.5
2442.5


Bandwidth NTNV_Pi/4DQPSK_SISO_2DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.2ms
99%OBW: 1.061MHz
Marker:
1: 2479.456 MHz
-15.11dBm
2: 2480.518 MHz
-17.82dBm
Trace
Level (dBm)
Frequency (MHz)
2478.5
2481.5


Bandwidth NTNV_8DPSK_SISO_3DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.2ms
99%OBW: 1.072MHz
Marker:
1: 2401.454 MHz
-16.34dBm
2: 2402.525 MHz
-20.27dBm
Trace
Level (dBm)
Frequency (MHz)
2400.5
2403.5


Bandwidth NTNV_8DPSK_SISO_3DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.2ms
99%OBW: 1.072MHz
Marker:
1: 2440.453 MHz
-15.92dBm
2: 2441.525 MHz
-19.97dBm
Trace
Level (dBm)
Frequency (MHz)
2439.5
2442.5

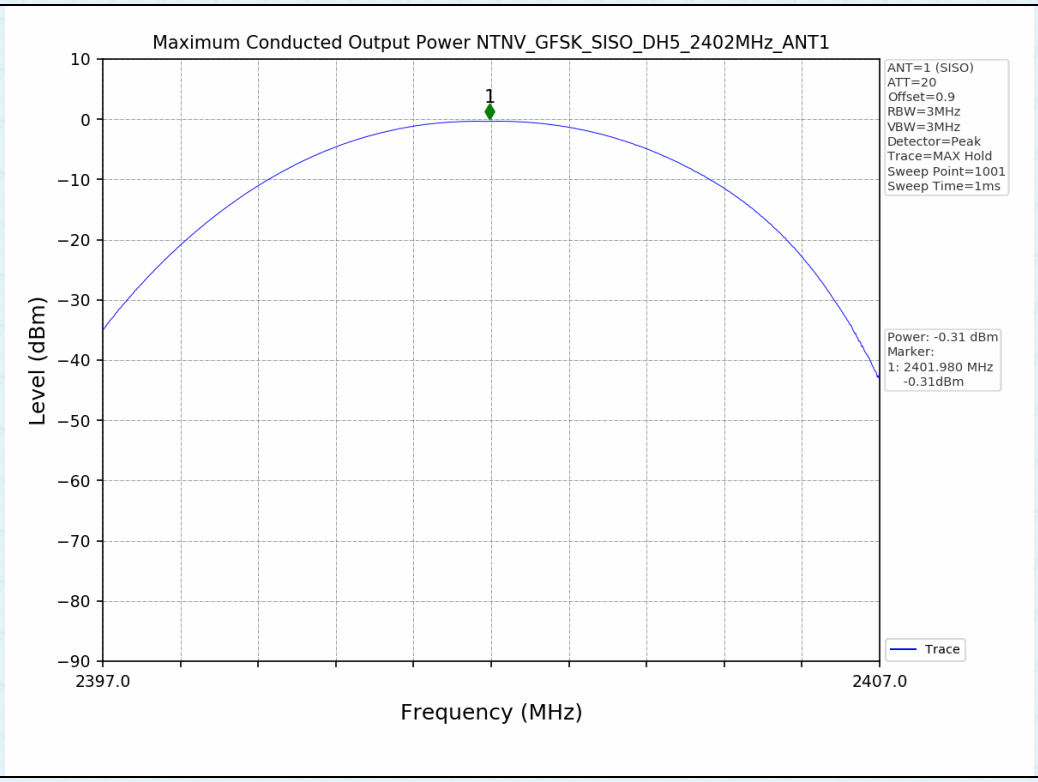

Bandwidth NTNV_8DPSK_SISO_3DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.2ms
99%OBW: 1.067MHz
Marker:
1: 2479.452 MHz
-16.04dBm
2: 2480.520 MHz
-18.41dBm
Trace
Level (dBm)
Frequency (MHz)
2478.5
2481.5

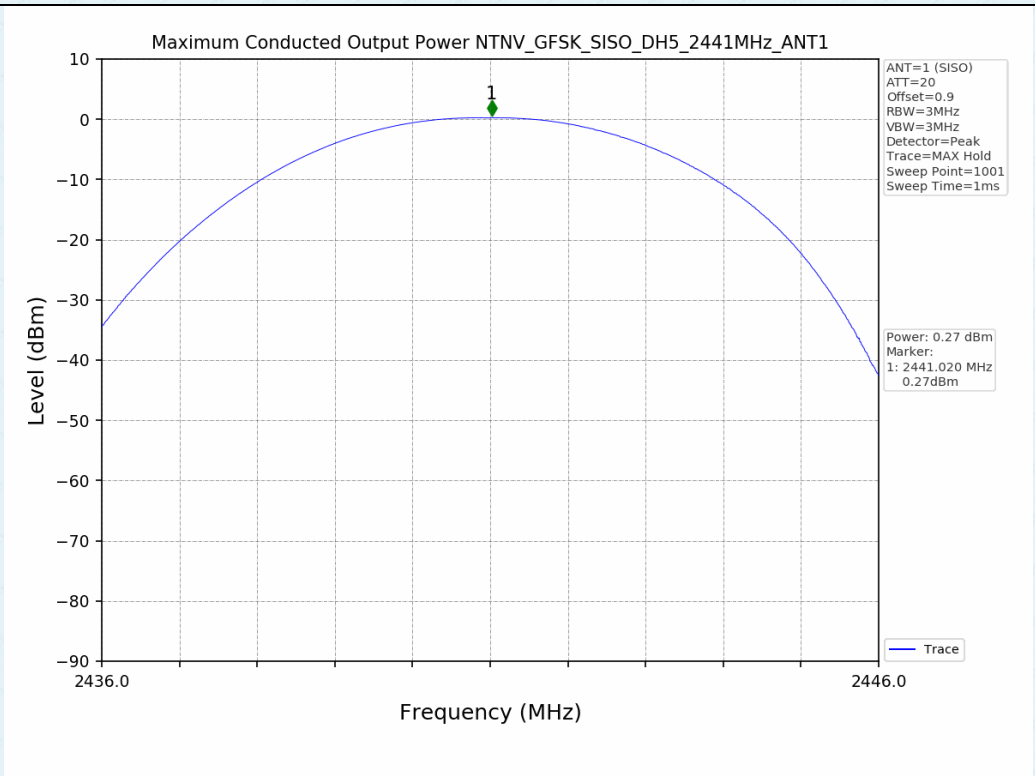
2. Maximum Conducted Output Power

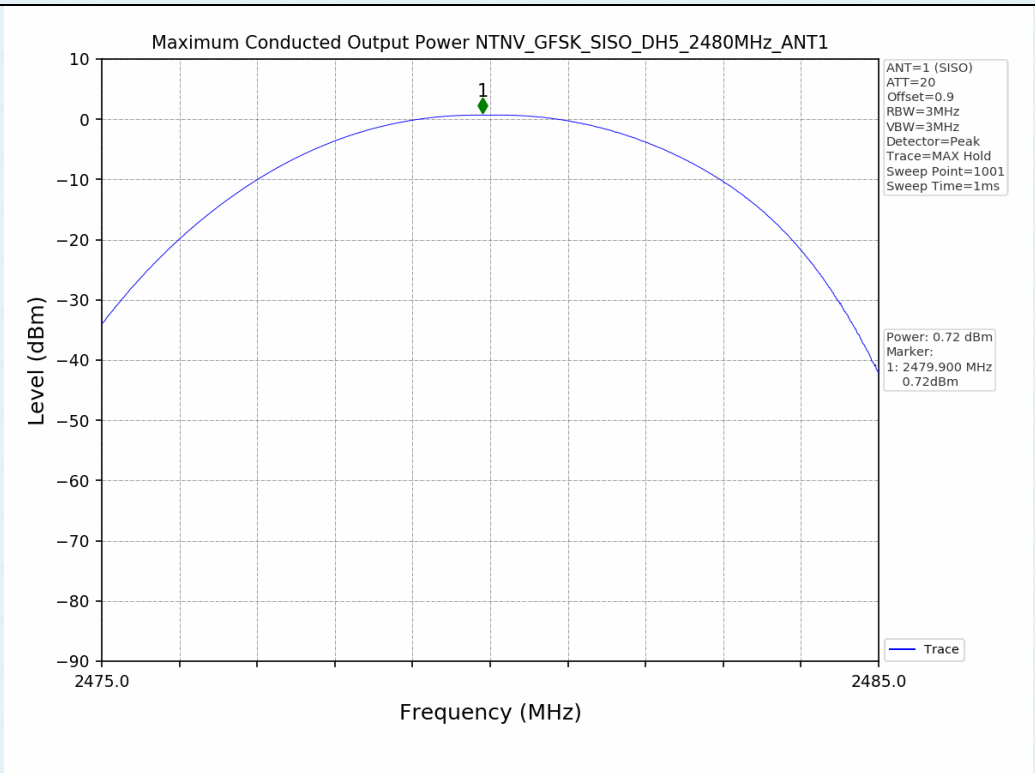
2.1 Test Result

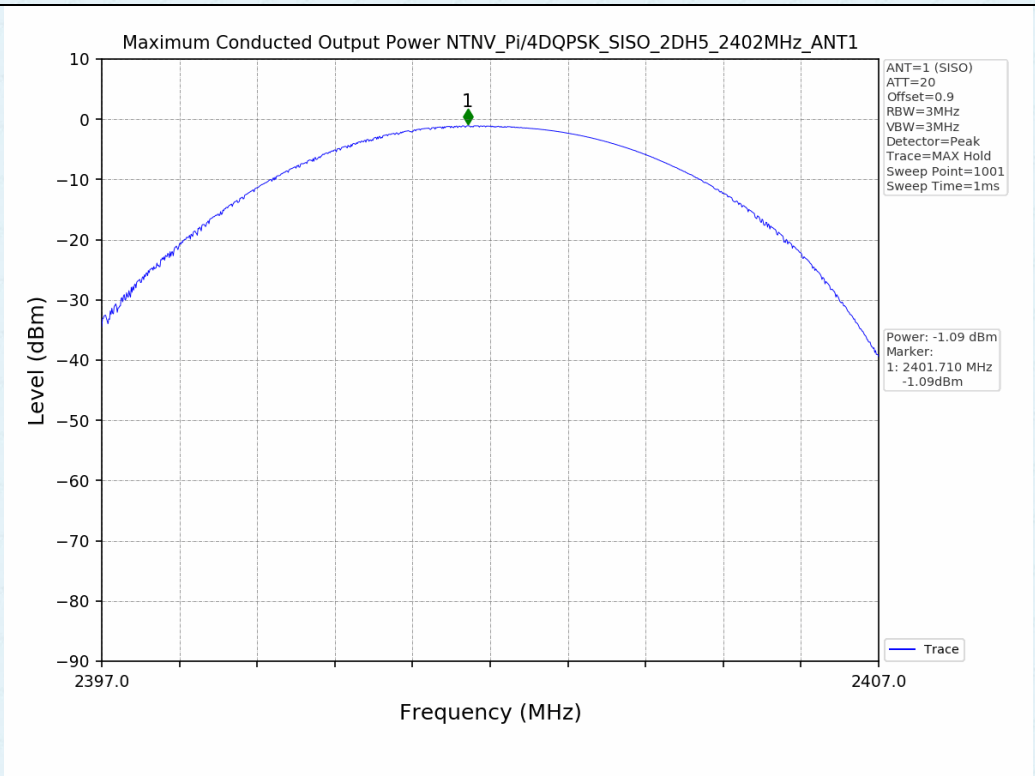
Test Mode	Frequency (MHz)	Tx Type	Measured Peak Output Power (dBm)	Limits (dBm)	Verdict
			Ant 1		
GFSK	2402	SISO	-0.31	30	PASS
	2441	SISO	0.27	30	PASS
	2480	SISO	0.72	30	PASS
Pi/4DQPSK	2402	SISO	-1.09	20.97	PASS
	2441	SISO	-0.58	20.97	PASS
	2480	SISO	-0.17	20.97	PASS
8DPSK	2402	SISO	-1.05	20.97	PASS
	2441	SISO	-0.50	20.97	PASS
	2480	SISO	-0.07	20.97	PASS

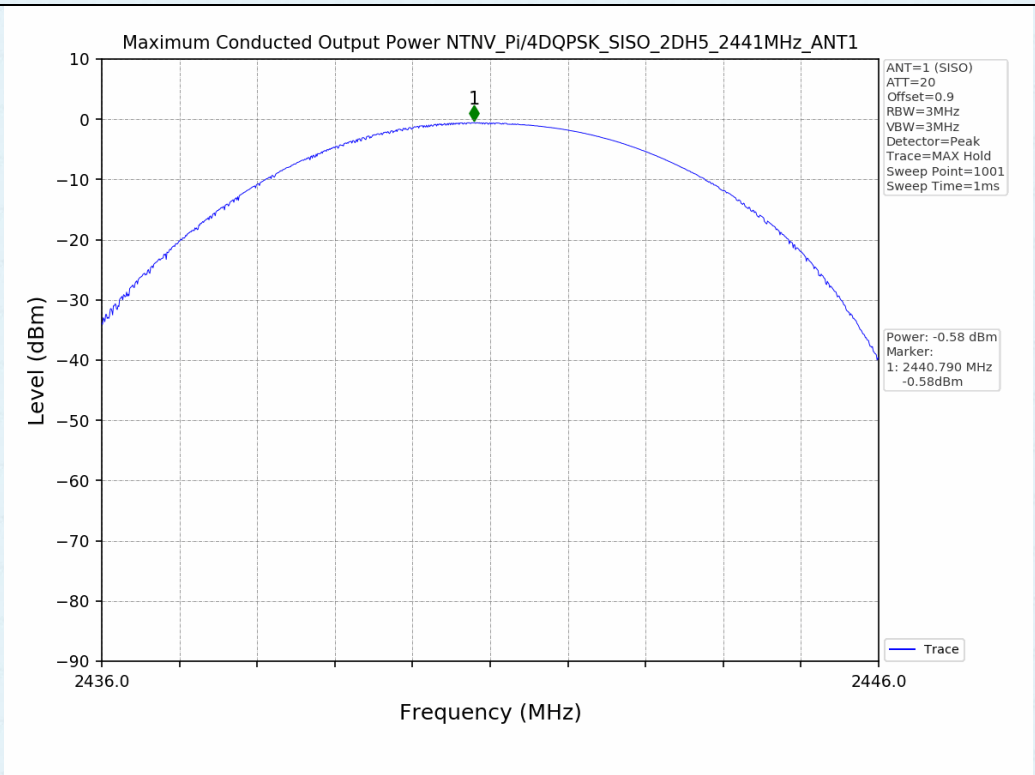
2.2 Test Graph

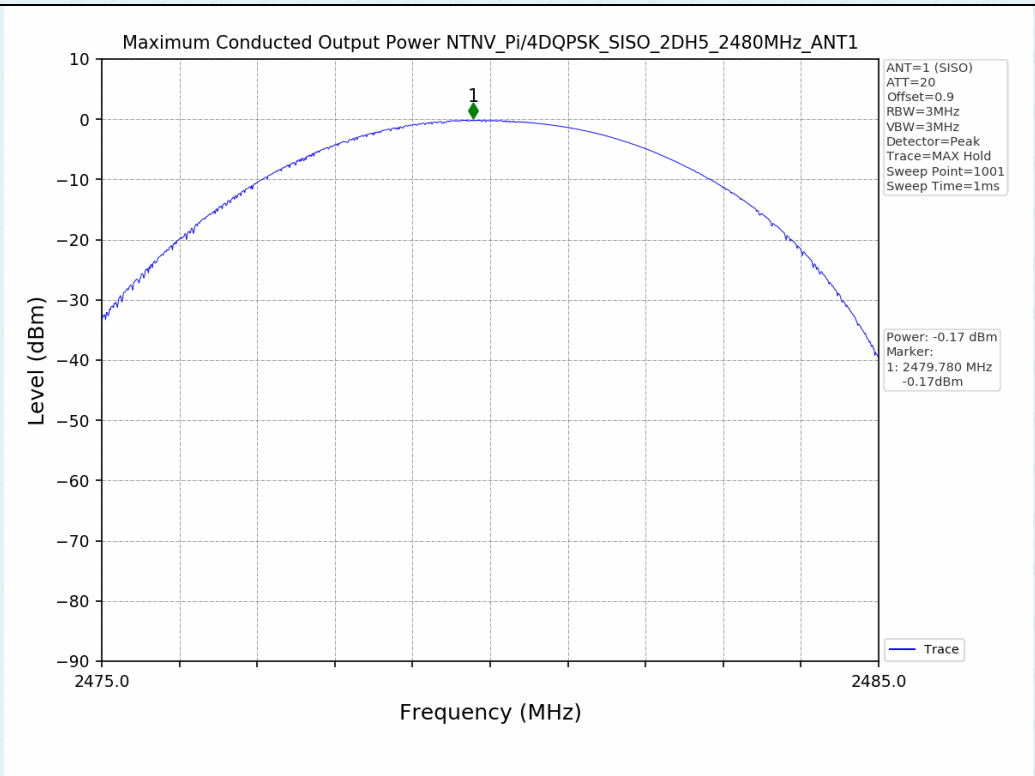


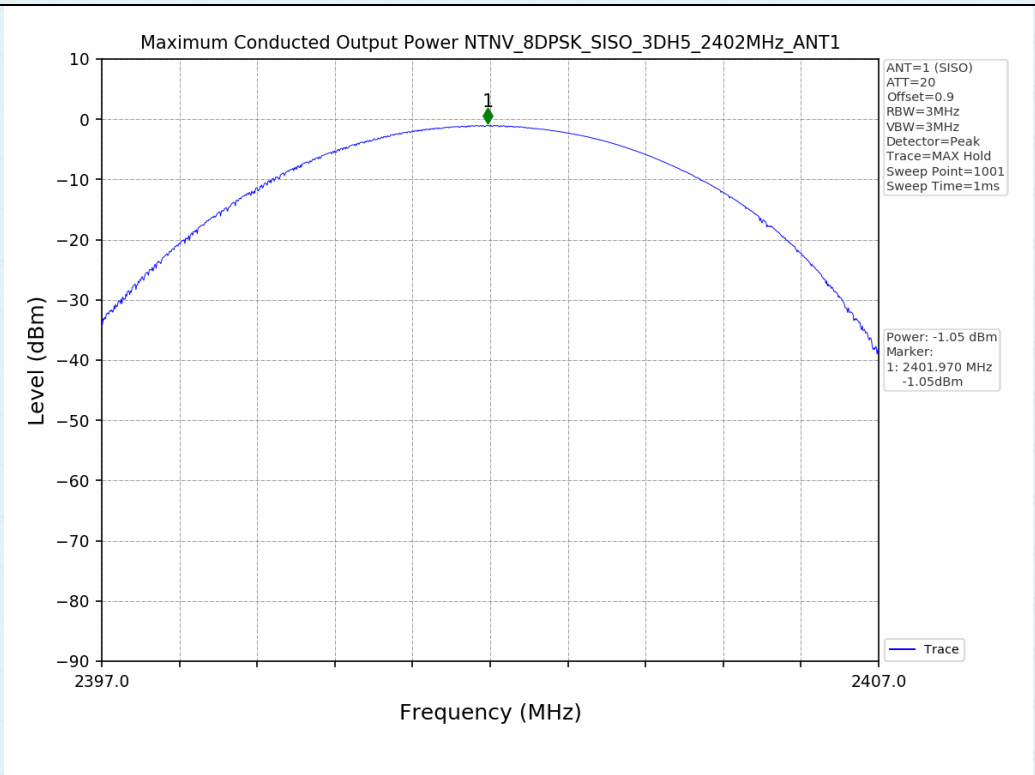

Maximum Conducted Output Power NTNV_GFSK_SISO_DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=3MHz
VBW=3MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Power: 0.27 dBm
Marker:
1: 2441.020 MHz
0.27dBm
Trace
Level (dBm)
Frequency (MHz)
2436.0
2446.0

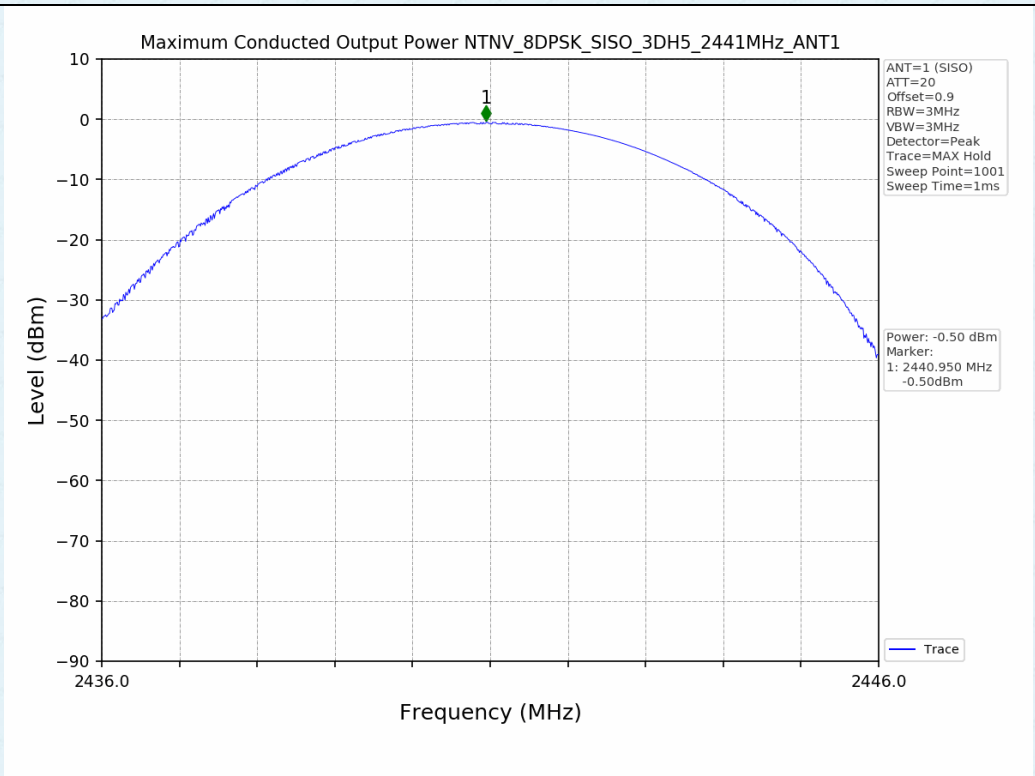

Maximum Conducted Output Power NTNV_GFSK_SISO_DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=3MHz
VBW=3MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Power: 0.72 dBm
Marker:
1: 2479.900 MHz
0.72dBm
Trace
Level (dBm)
Frequency (MHz)
2475.0
2485.0

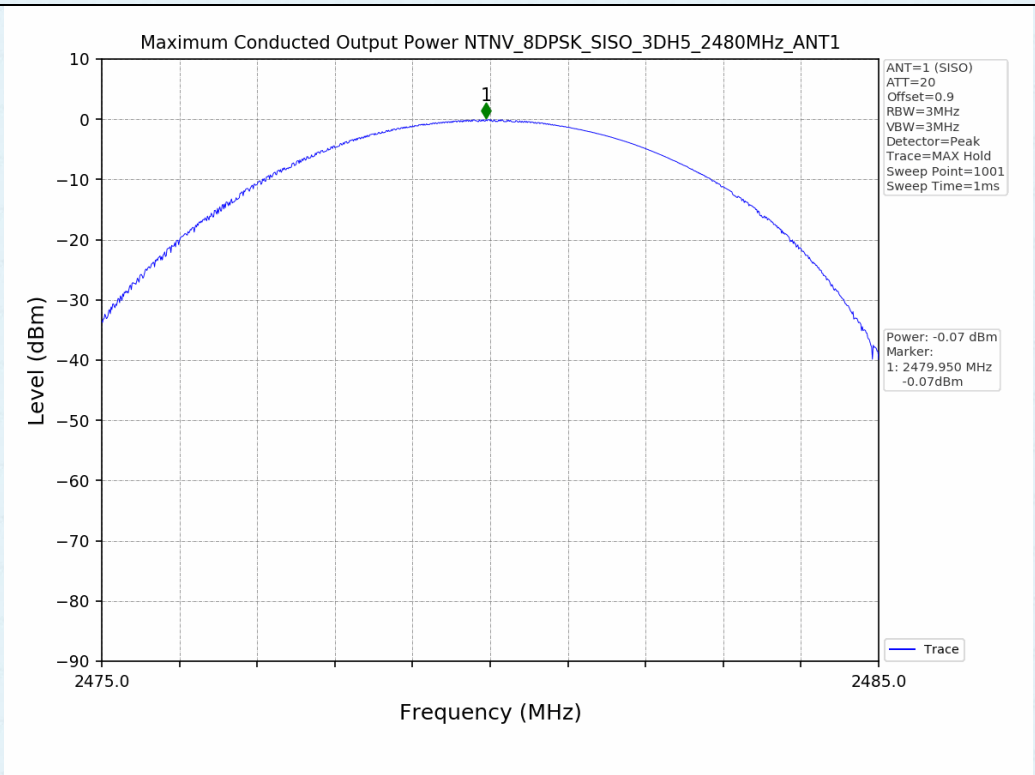

Maximum Conducted Output Power NTNV_Pi/4DQPSK_SISO_2DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=3MHz
VBW=3MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Power: -1.09 dBm
Marker:
1: 2401.710 MHz
-1.09dBm
Trace
Level (dBm)
Frequency (MHz)
2397.0
2407.0


Maximum Conducted Output Power NTNV_Pi/4DQPSK_SISO_2DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=3MHz
VBW=3MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Power: -0.58 dBm
Marker:
1: 2440.790 MHz
-0.58dBm
Trace
Level (dBm)
Frequency (MHz)
2436.0
2446.0


Maximum Conducted Output Power NTNV_Pi/4DQPSK_SISO_2DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=3MHz
VBW=3MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Power: -0.17 dBm
Marker:
1: 2479.780 MHz
-0.17dBm
Trace
Level (dBm)
Frequency (MHz)
2475.0
2485.0


Maximum Conducted Output Power NTNV_8DPSK_SISO_3DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=3MHz
VBW=3MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Power: -1.05 dBm
Marker:
1: 2401.970 MHz
-1.05dBm
Trace
Level (dBm)
Frequency (MHz)
2397.0
2407.0


Maximum Conducted Output Power NTNV_8DPSK_SISO_3DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=3MHz
VBW=3MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Power: -0.50 dBm
Marker:
1: 2440.950 MHz
-0.50dBm
Trace
Level (dBm)
Frequency (MHz)
2436.0
2446.0

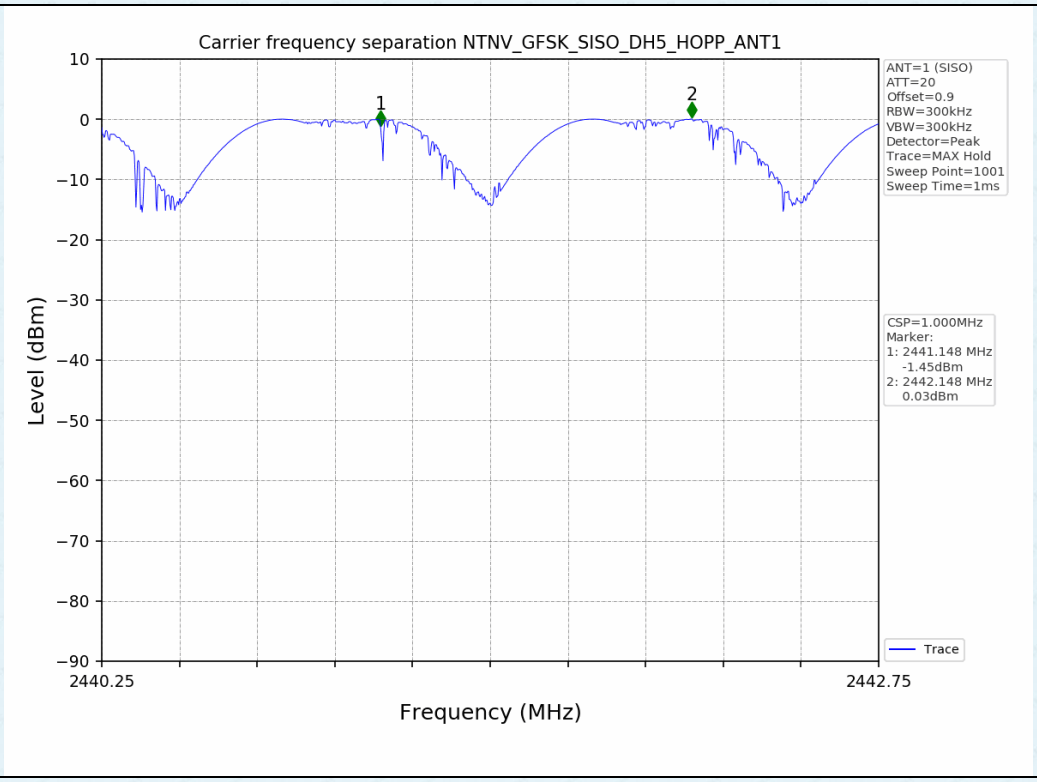

Maximum Conducted Output Power NTNV_8DPSK_SISO_3DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=3MHz
VBW=3MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Power: -0.07 dBm
Marker:
1: 2479.950 MHz
-0.07dBm
Trace
Level (dBm)
Frequency (MHz)
2475.0
2485.0

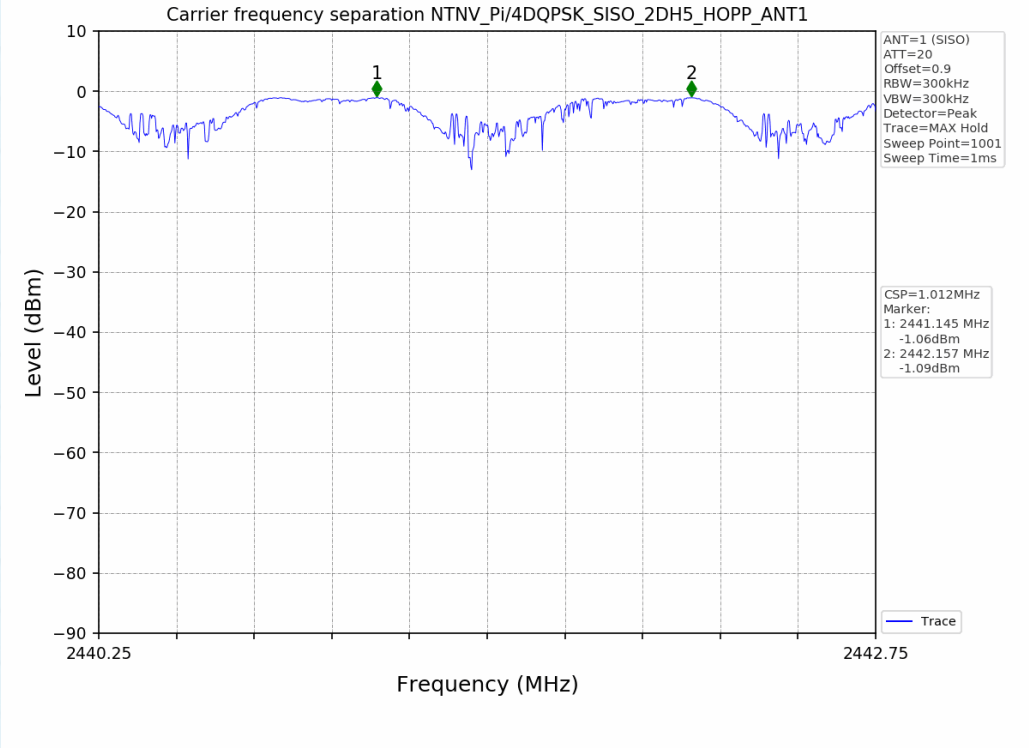
3. Carrier frequency separation

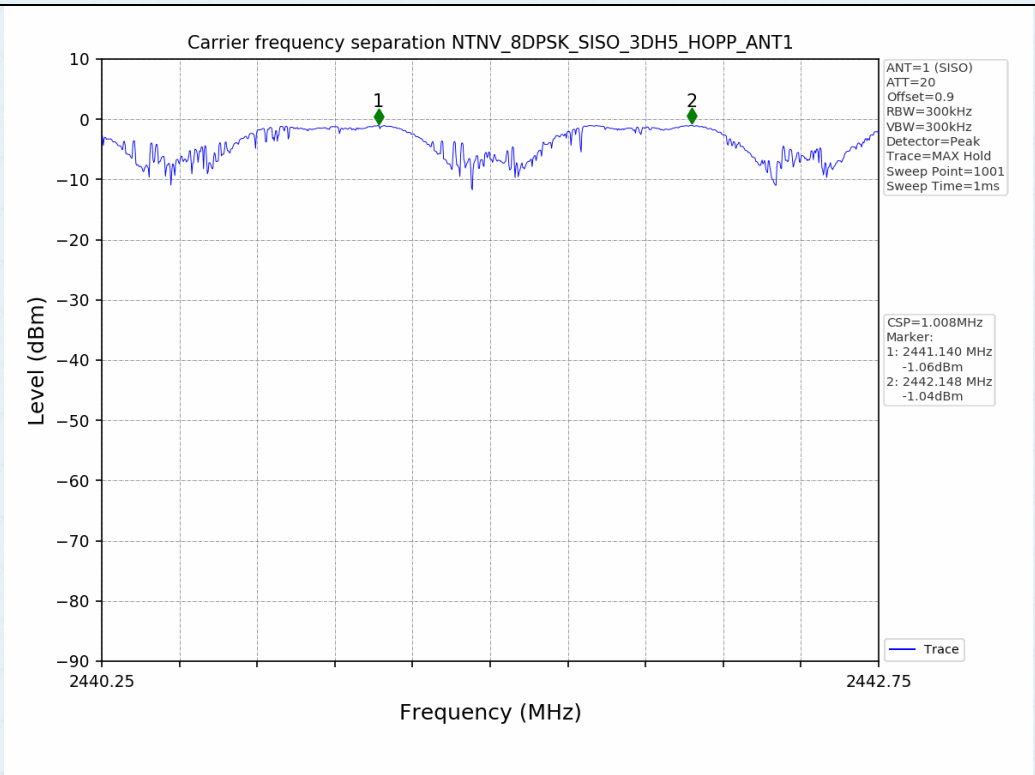
3.1 Test Result

Test Mode	TX Type	ANT No.	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limits (MHz)	Verdict
GFSK	SISO	1	1.000	0.824	≥0.824	PASS
Pi/4DQPSK	SISO	1	1.012	1.117	≥0.745	PASS
8DPSK	SISO	1	1.008	1.153	≥0.769	PASS

3.2 Test Graph




Carrier frequency separation NTNV_Pi/4DQPSK_SISO_2DH5_HOPP_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=300kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
CSP=1.012MHz
Marker:
1: 2441.145 MHz
-1.06dBm
2: 2442.157 MHz
-1.09dBm
Trace
Level (dBm)
Frequency (MHz)
2440.25
2442.75

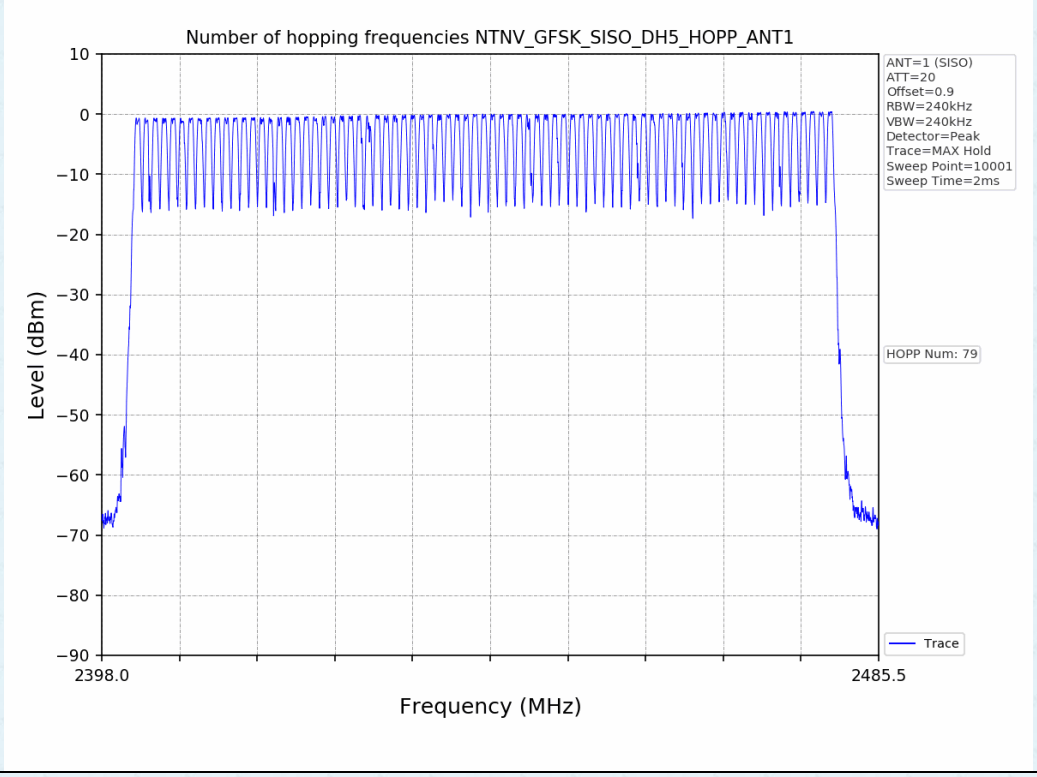

Carrier frequency separation NTNV_8DPSK_SISO_3DH5_HOPP_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=300kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
CSP=1.008MHz
Marker:
1: 2441.140 MHz
-1.06dBm
2: 2442.148 MHz
-1.04dBm
Trace
Level (dBm)
Frequency (MHz)
2440.25
2442.75

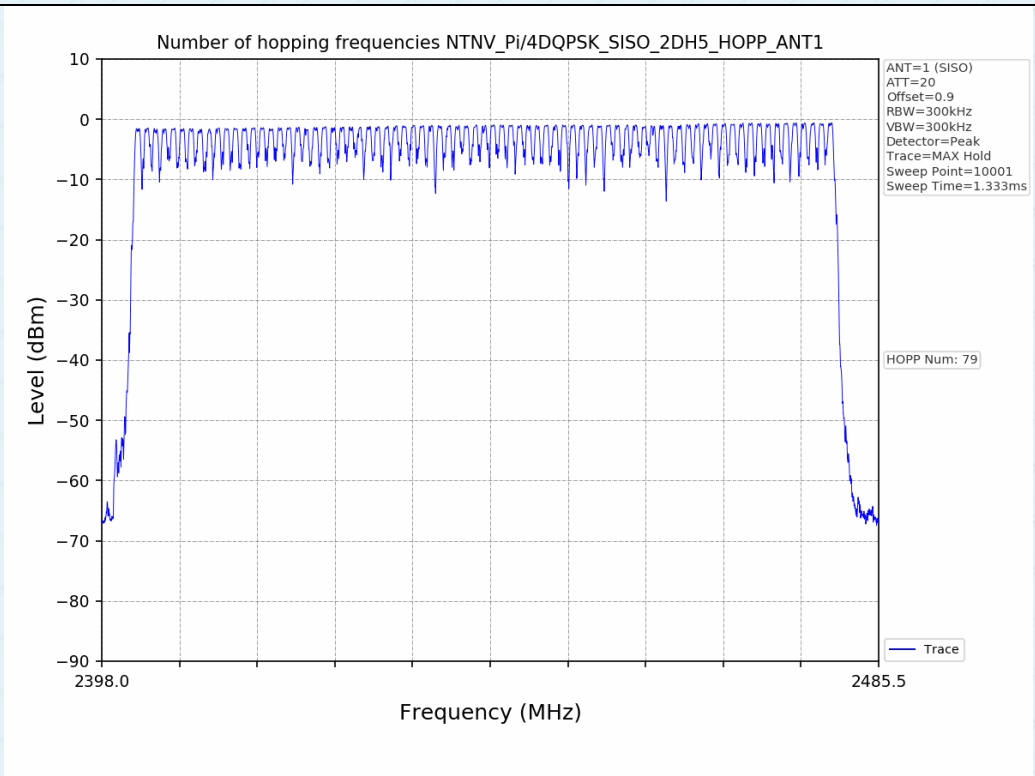
4. Number of hopping frequencies

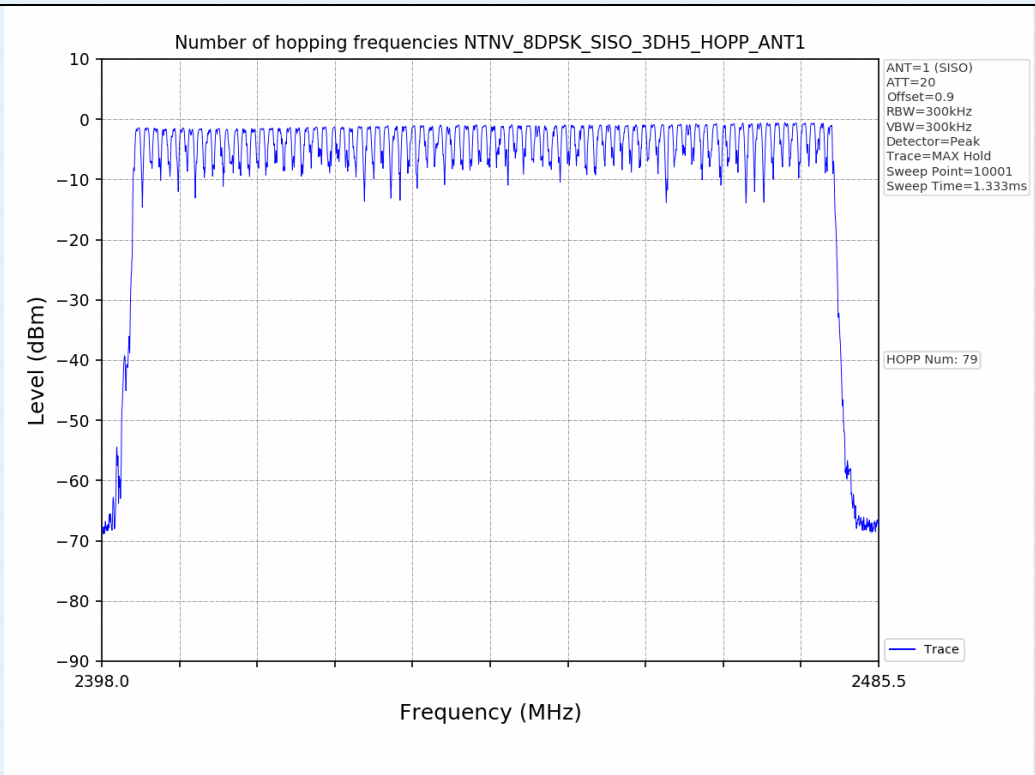
4.1 Test Result

Test Mode	TX Type	ANT No.	Num of Hopping Frequencies	Limits	Verdict
GFSK	SISO	1	79	≥15	PASS
Pi/4DQPSK	SISO	1	79	≥15	PASS
8DPSK	SISO	1	79	≥15	PASS

4.2 Test Graph




Number of hopping frequencies NTNV_Pi/4DQPSK_SISO_2DH5_HOPP_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=300kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=10001
Sweep Time=1.333ms
HOPP Num: 79
Trace
Level (dBm)
10
0
−10
−20
−30
−40
−50
−60
−70
−80
−90
2398.0
2485.5
Frequency (MHz)

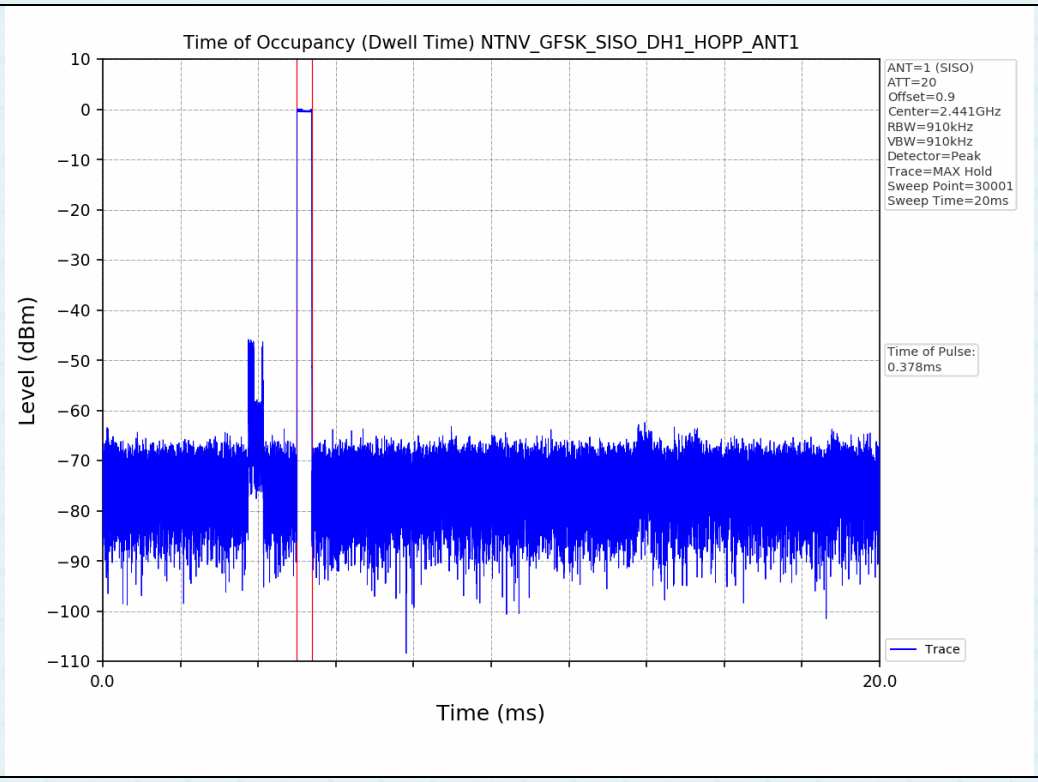

Number of hopping frequencies NTNV_8DPSK_SISO_3DH5_HOPP_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=300kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=10001
Sweep Time=1.333ms
HOPP Num: 79
Trace
Level (dBm)
10
0
−10
−20
−30
−40
−50
−60
−70
−80
−90
2398.0
2485.5
Frequency (MHz)

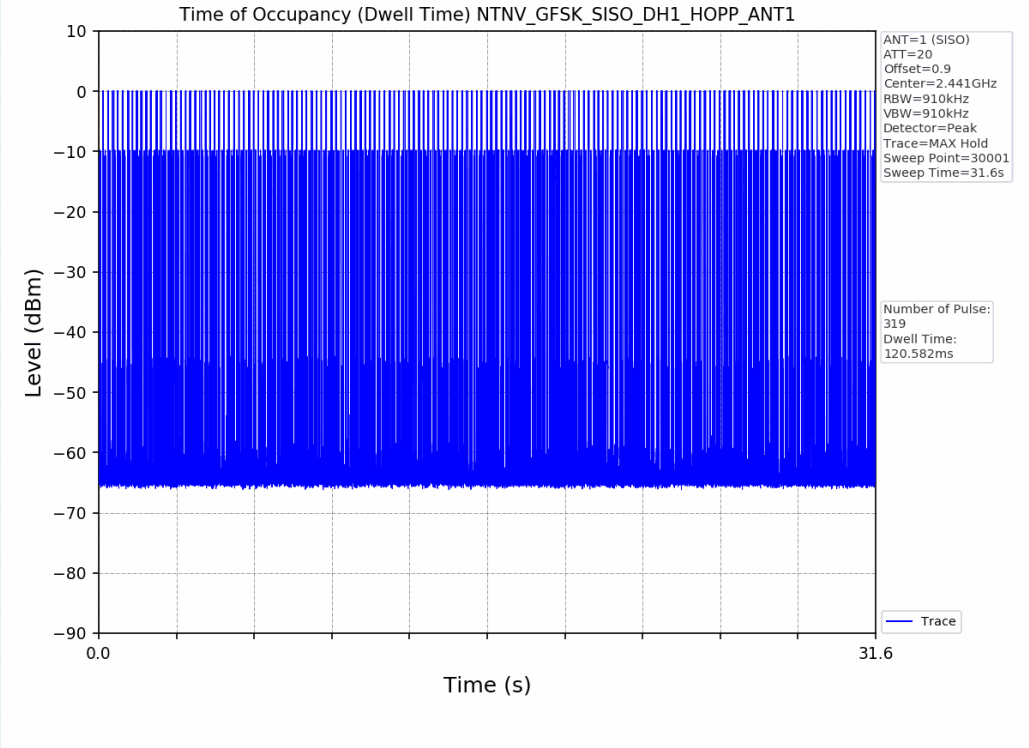
5. Time of occupancy (dwell time)

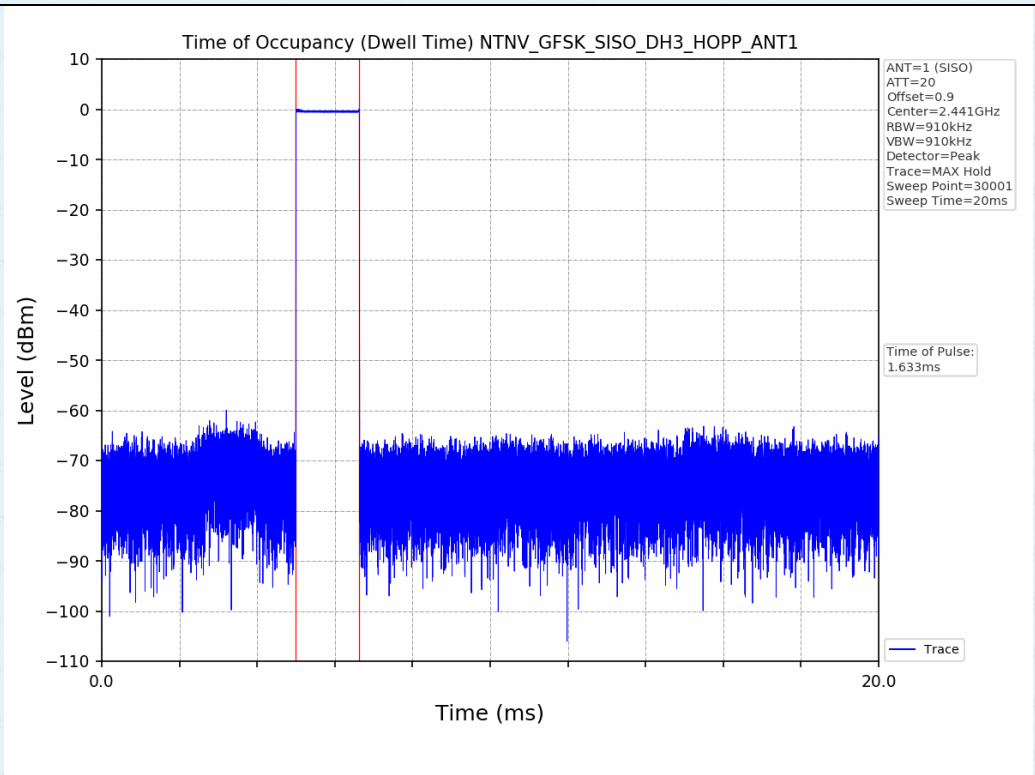
5.1 Test Result

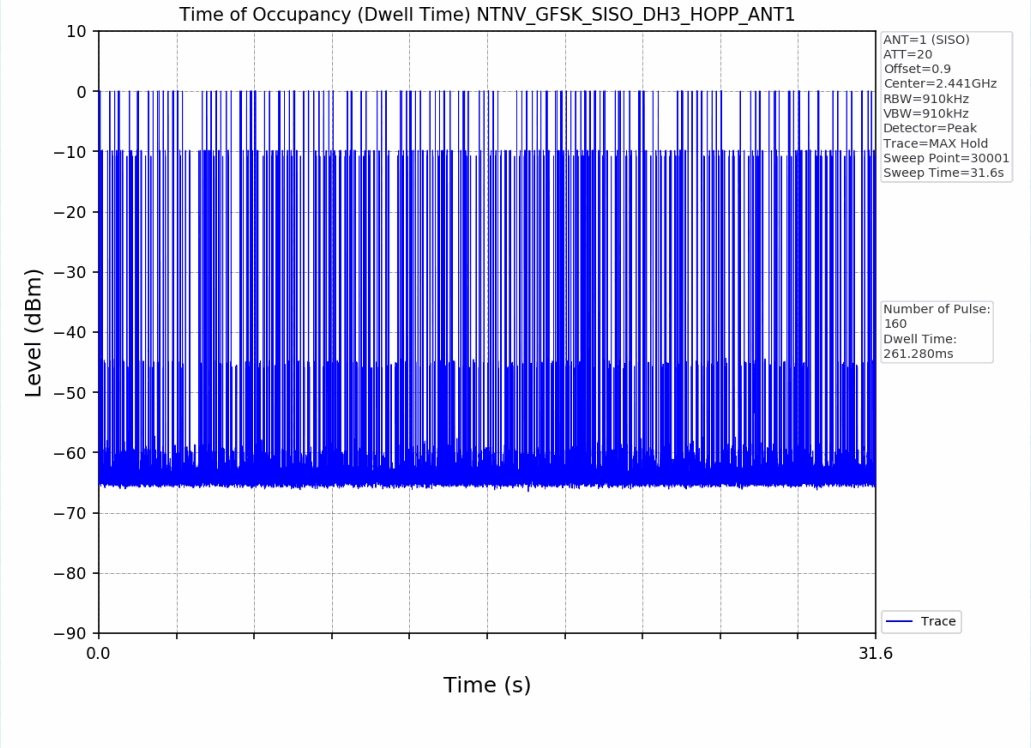
Test Mode	Packet Type	TX Type	ANT No.	Duration of Single Pulse (ms)	Obeservation Period (s)	Num of Pulse in Observation Period	Dwell Time (ms)	Limits (ms)	Verdict
GFSK	DH1	SISO	1	0.378	31.6	319	120.582	≤400	PASS
	DH3	SISO	1	1.633	31.6	160	261.280	≤400	PASS
	DH5	SISO	1	2.882	31.6	108	311.256	≤400	PASS
Pi/4DQPSK	2DH1	SISO	1	0.387	31.6	320	123.840	≤400	PASS
	2DH3	SISO	1	1.638	31.6	160	262.080	≤400	PASS
	2DH5	SISO	1	2.883	31.6	107	308.481	≤400	PASS
8DPSK	3DH1	SISO	1	0.387	31.6	320	123.840	≤400	PASS
	3DH3	SISO	1	1.638	31.6	160	262.080	≤400	PASS
	3DH5	SISO	1	2.889	31.6	111	320.679	≤400	PASS

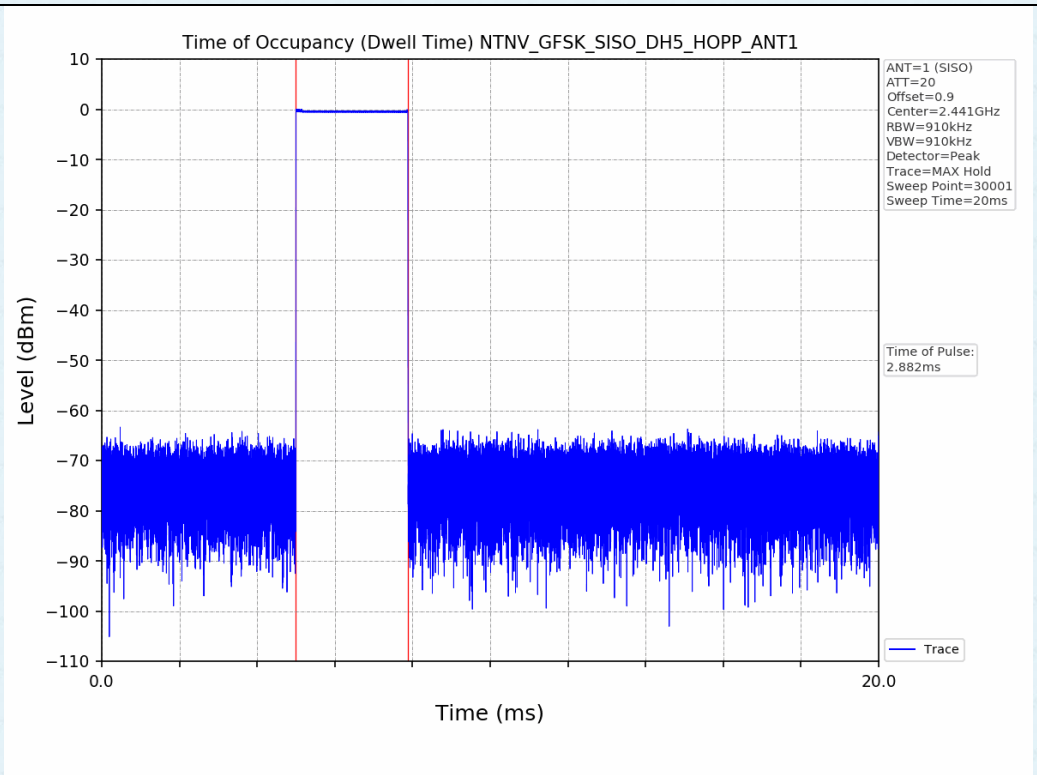
5.2 Test Graph

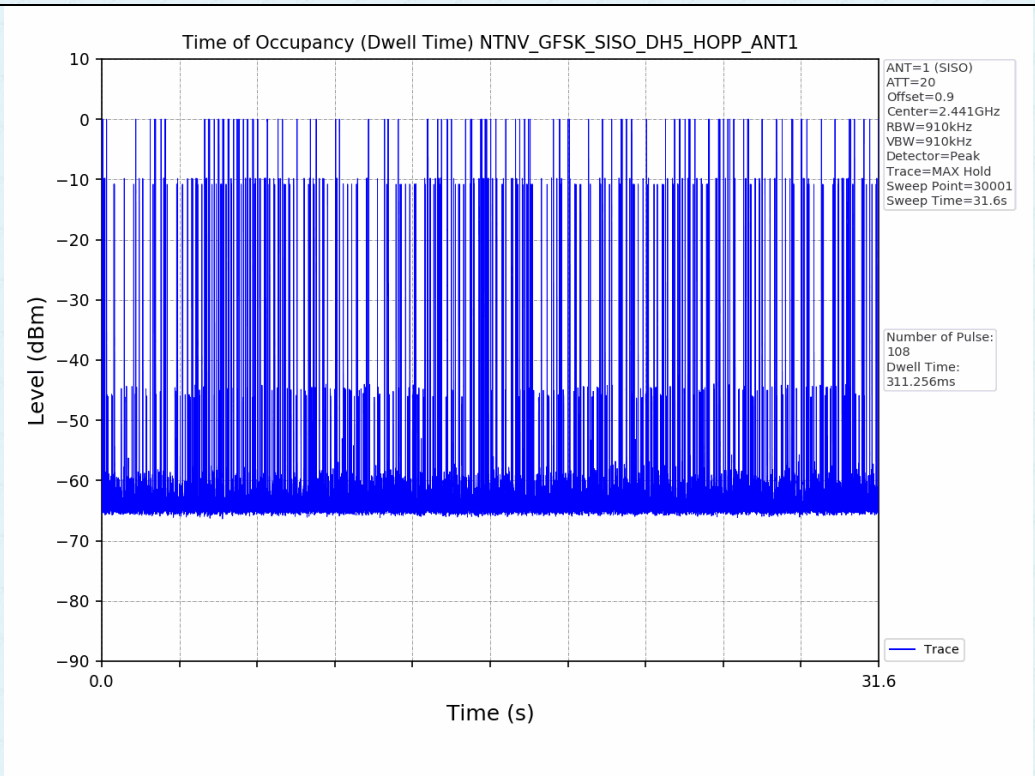


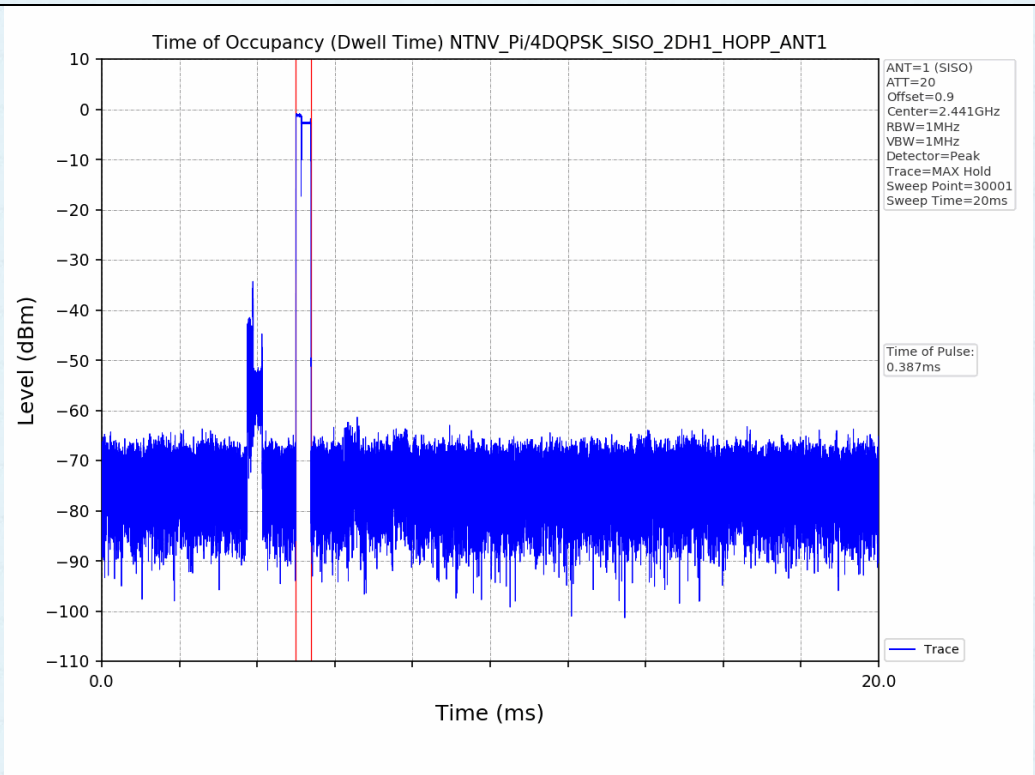

Time of Occupancy (Dwell Time) NTNV_GFSK_SISO_DH1_HOPP_ANT1
Level (dBm)
Time (s)
0.0
31.6
ANT=1 (SISO)
ATT=20
Offset=0.9
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=31.6s
Number of Pulse:
319
Dwell Time:
120.582ms
Trace

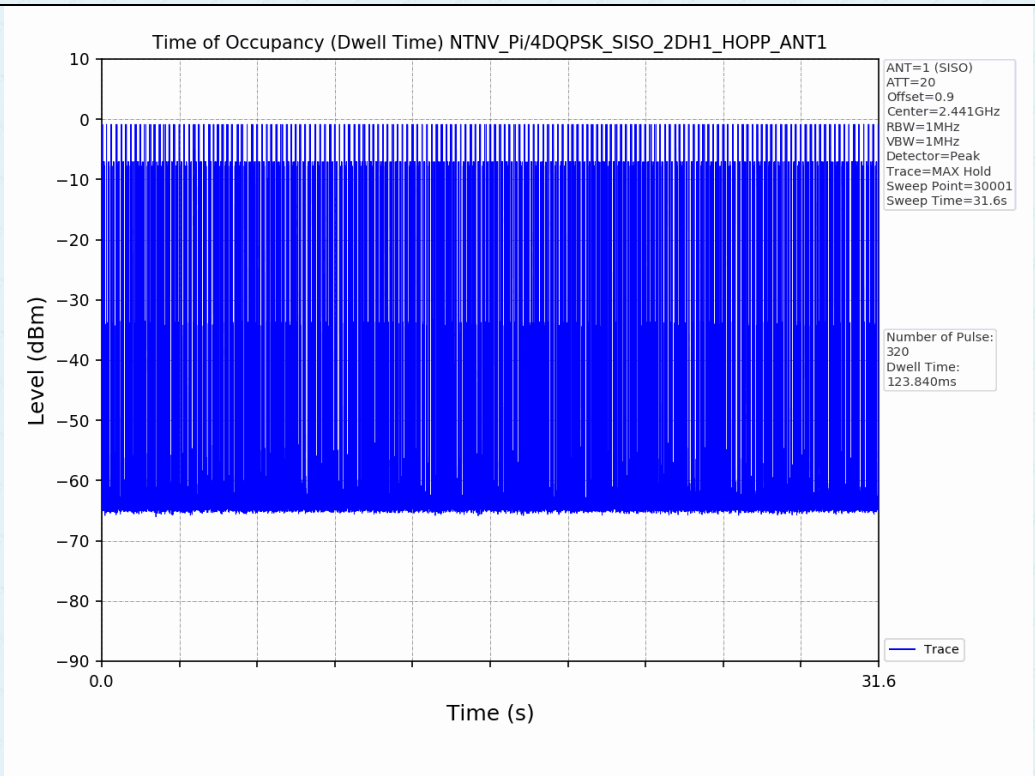

Time of Occupancy (Dwell Time) NTNV_GFSK_SISO_DH3_HOPP_ANT1
Level (dBm)
Time (ms)
0.0
20.0
ANT=1 (SISO)
ATT=20
Offset=0.9
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=20ms
Time of Pulse:
1.633ms
Trace

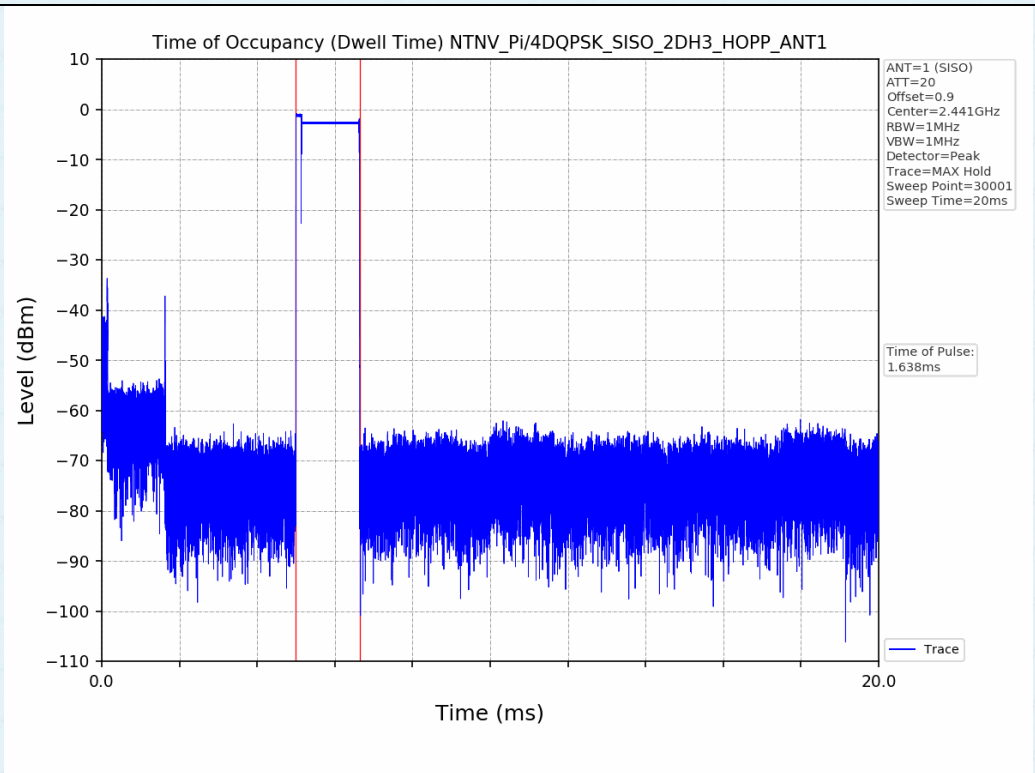

Time of Occupancy (Dwell Time) NTNV_GFSK_SISO_DH3_HOPP_ANT1
Level (dBm)
Time (s)
0.0
31.6
ANT=1 (SISO)
ATT=20
Offset=0.9
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=31.6s
Number of Pulse:
160
Dwell Time:
261.280ms
Trace

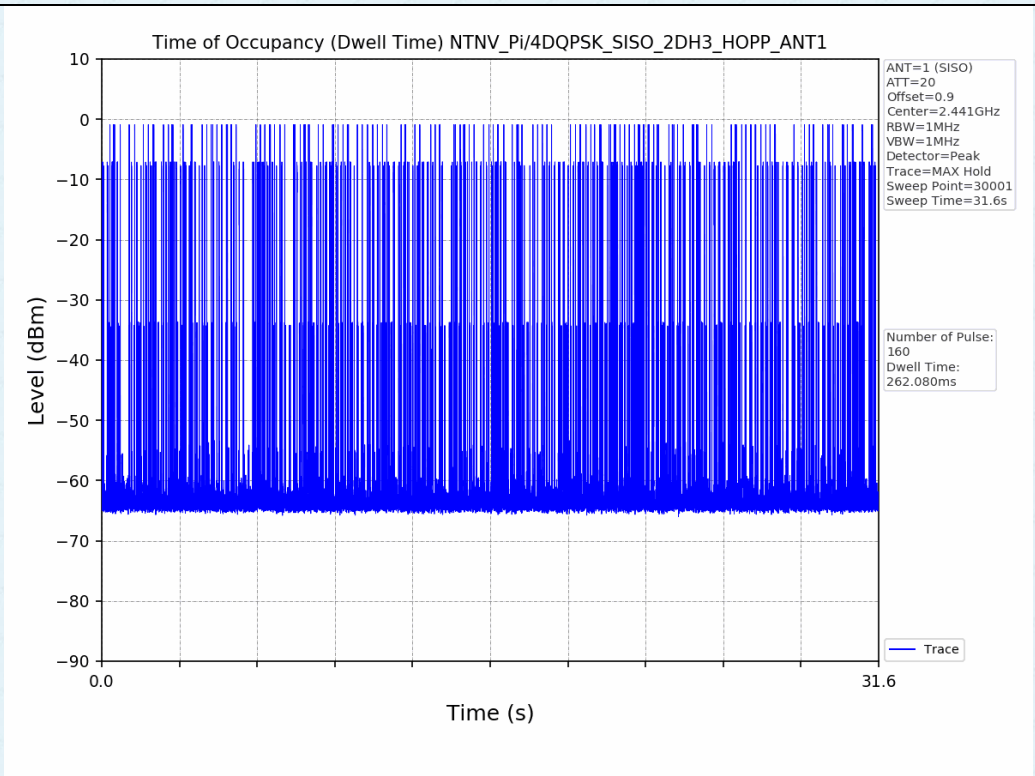

Time of Occupancy (Dwell Time) NTNV_GFSK_SISO_DH5_HOPP_ANT1
Level (dBm)
Time (ms)
0.0
20.0
ANT=1 (SISO)
ATT=20
Offset=0.9
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=20ms
Time of Pulse:
2.882ms
Trace

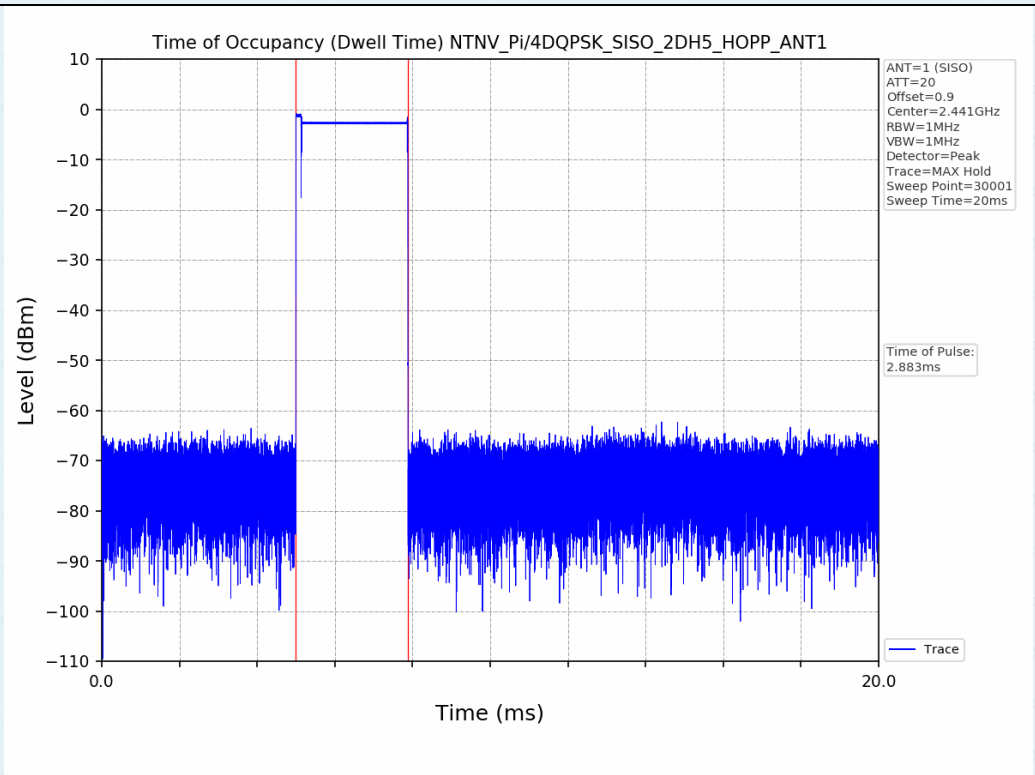

Time of Occupancy (Dwell Time) NTNV_GFSK_SISO_DH5_HOPP_ANT1
Level (dBm)
Time (s)
0.0
31.6
10
0
−10
−20
−30
−40
−50
−60
−70
−80
−90
ANT=1 (SISO)
ATT=20
Offset=0.9
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=31.6s
Number of Pulse:
108
Dwell Time:
311.256ms
Trace

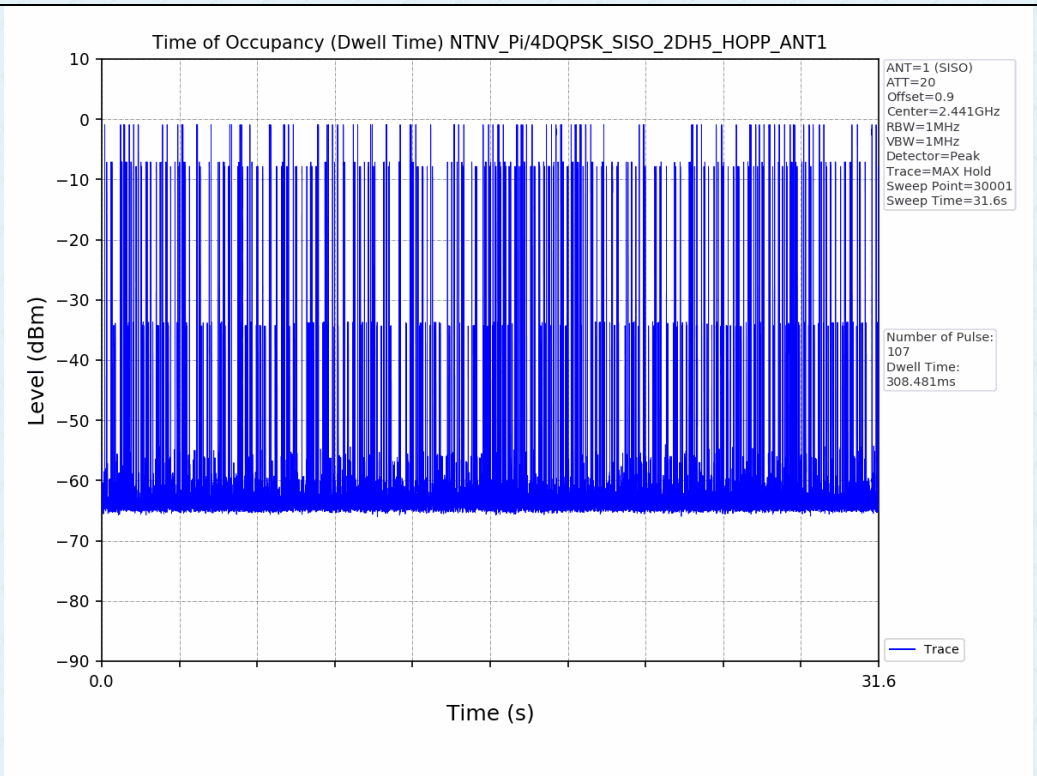

Time of Occupancy (Dwell Time) NTNV_Pi/4DQPSK_SISO_2DH1_HOPP_ANT1
Level (dBm)
Time (ms)
0.0
20.0
10
0
−10
−20
−30
−40
−50
−60
−70
−80
−90
−100
−110
ANT=1 (SISO)
ATT=20
Offset=0.9
Center=2.441GHz
RBW=1MHz
VBW=1MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=20ms
Time of Pulse:
0.387ms
Trace

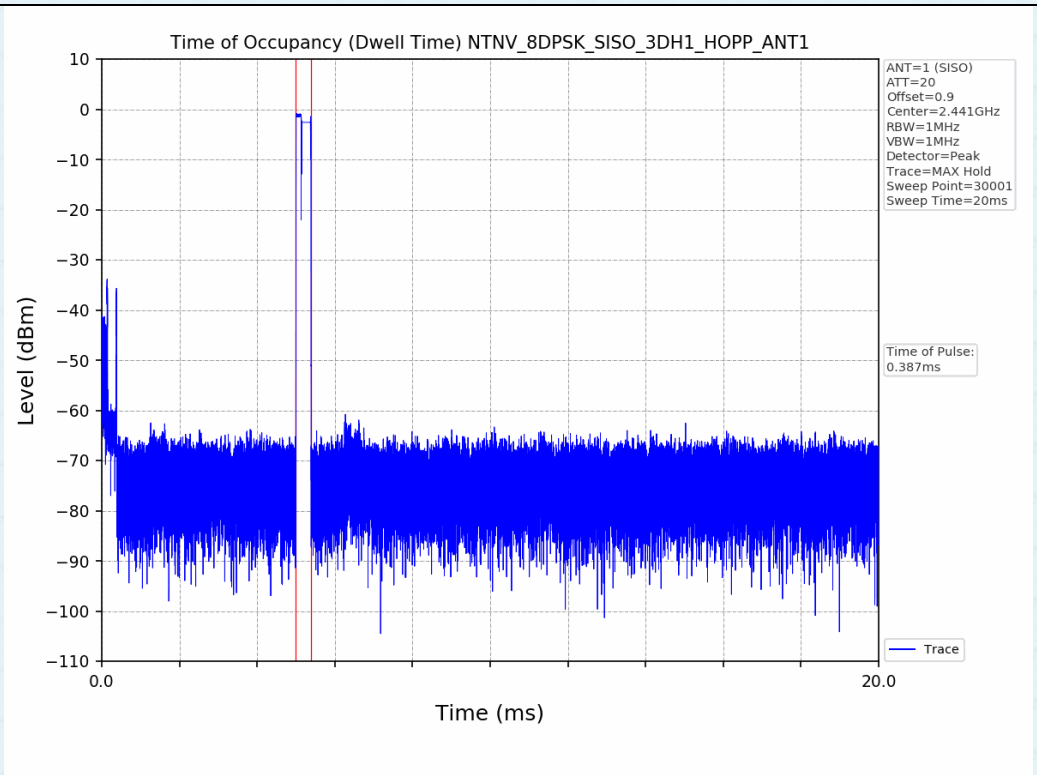

Time of Occupancy (Dwell Time) NTNV_Pi/4DQPSK_SISO_2DH1_HOPP_ANT1
Level (dBm)
Time (s)
0.0
31.6
ANT=1 (SISO)
ATT=20
Offset=0.9
Center=2.441GHz
RBW=1MHz
VBW=1MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=31.6s
Number of Pulse:
320
Dwell Time:
123.840ms
Trace

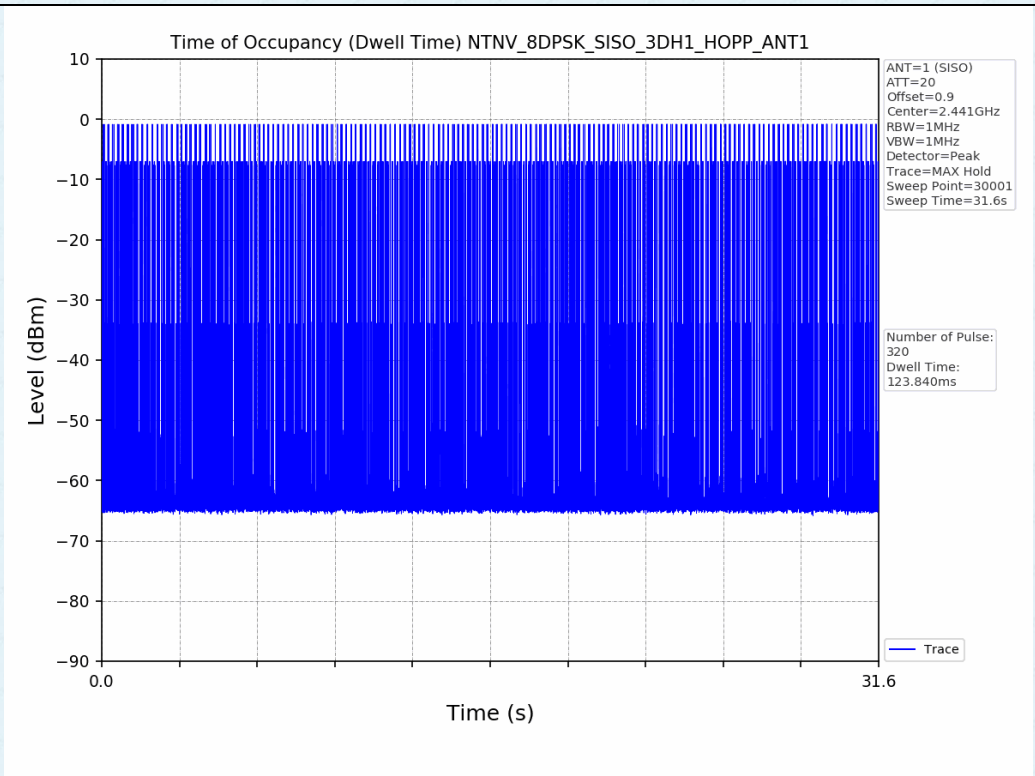

Time of Occupancy (Dwell Time) NTNV_Pi/4DQPSK_SISO_2DH3_HOPP_ANT1
Level (dBm)
Time (ms)
0.0
20.0
ANT=1 (SISO)
ATT=20
Offset=0.9
Center=2.441GHz
RBW=1MHz
VBW=1MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=20ms
Time of Pulse:
1.638ms
Trace

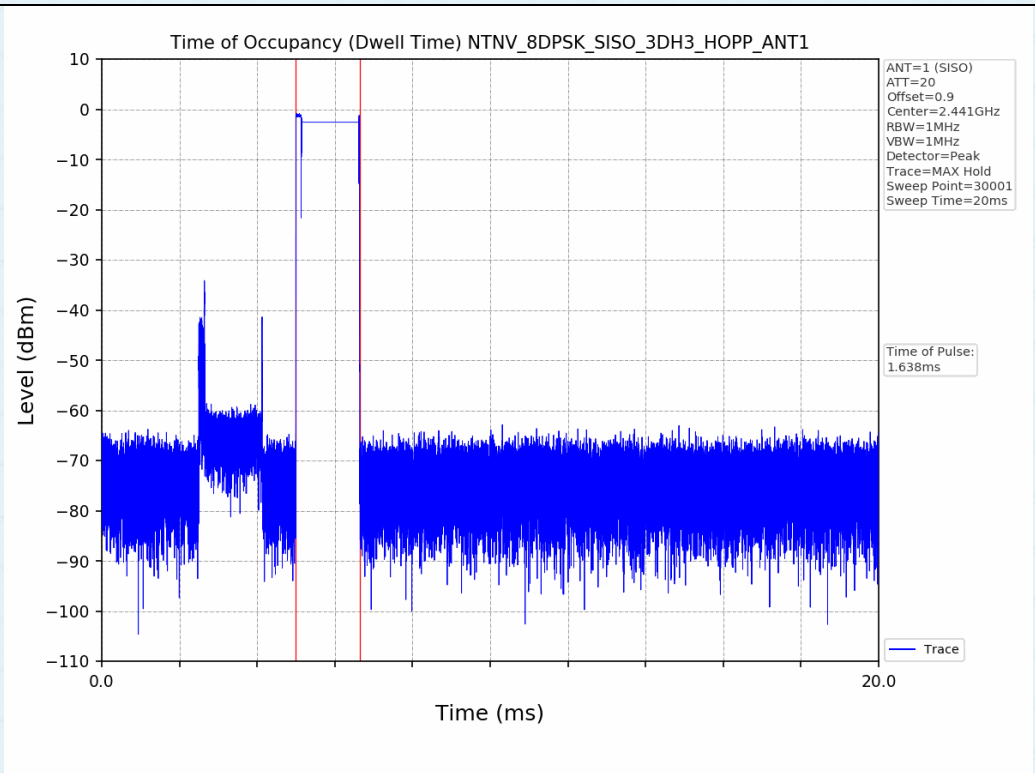

Time of Occupancy (Dwell Time) NTNV_Pi/4DQPSK_SISO_2DH3_HOPP_ANT1
Level (dBm)
Time (s)
0.0
31.6
ANT=1 (SISO)
ATT=20
Offset=0.9
Center=2.441GHz
RBW=1MHz
VBW=1MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=31.6s
Number of Pulse:
160
Dwell Time:
262.080ms
Trace

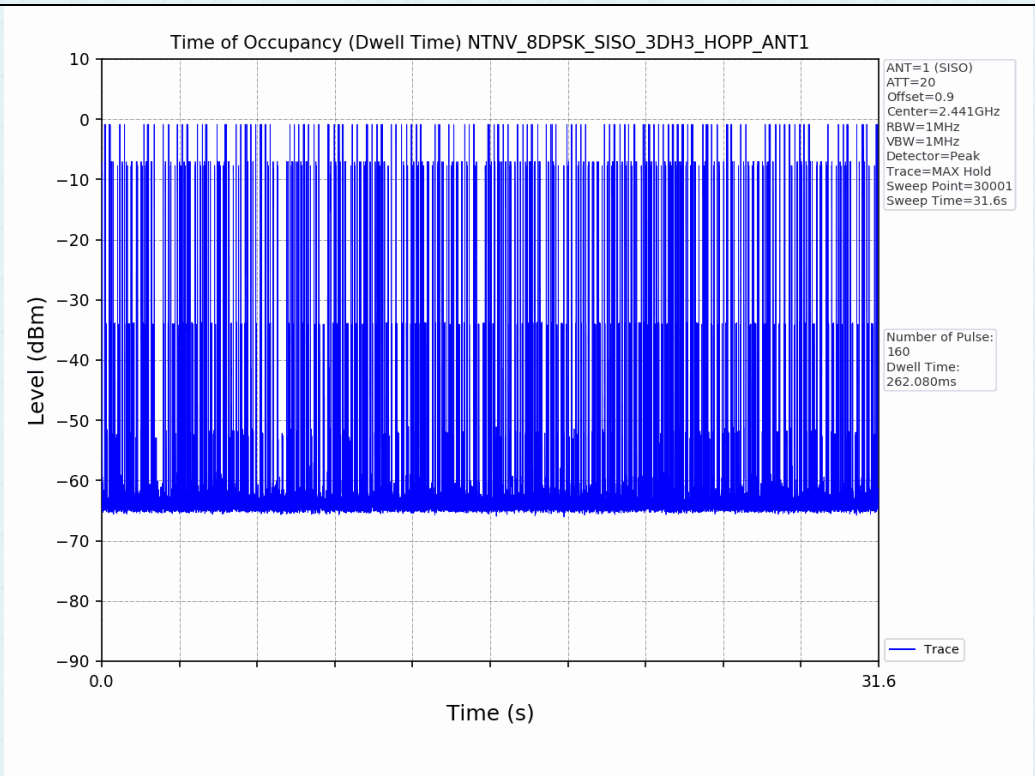

Time of Occupancy (Dwell Time) NTNV_Pi/4DQPSK_SISO_2DH5_HOPP_ANT1
Level (dBm)
Time (ms)
0.0
20.0
ANT=1 (SISO)
ATT=20
Offset=0.9
Center=2.441GHz
RBW=1MHz
VBW=1MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=20ms
Time of Pulse:
2.883ms
Trace

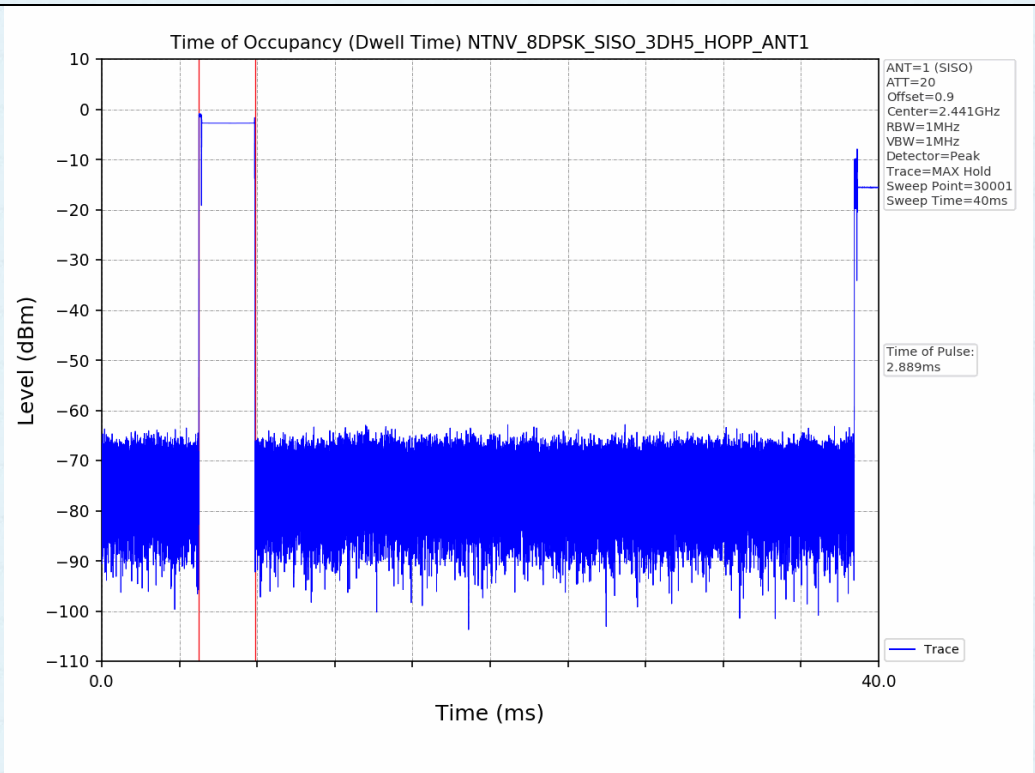

Time of Occupancy (Dwell Time) NTNV_Pi/4DQPSK_SISO_2DH5_HOPP_ANT1
Level (dBm)
Time (s)
0.0
31.6
ANT=1 (SISO)
ATT=20
Offset=0.9
Center=2.441GHz
RBW=1MHz
VBW=1MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=31.6s
Number of Pulse:
107
Dwell Time:
308.481ms
Trace

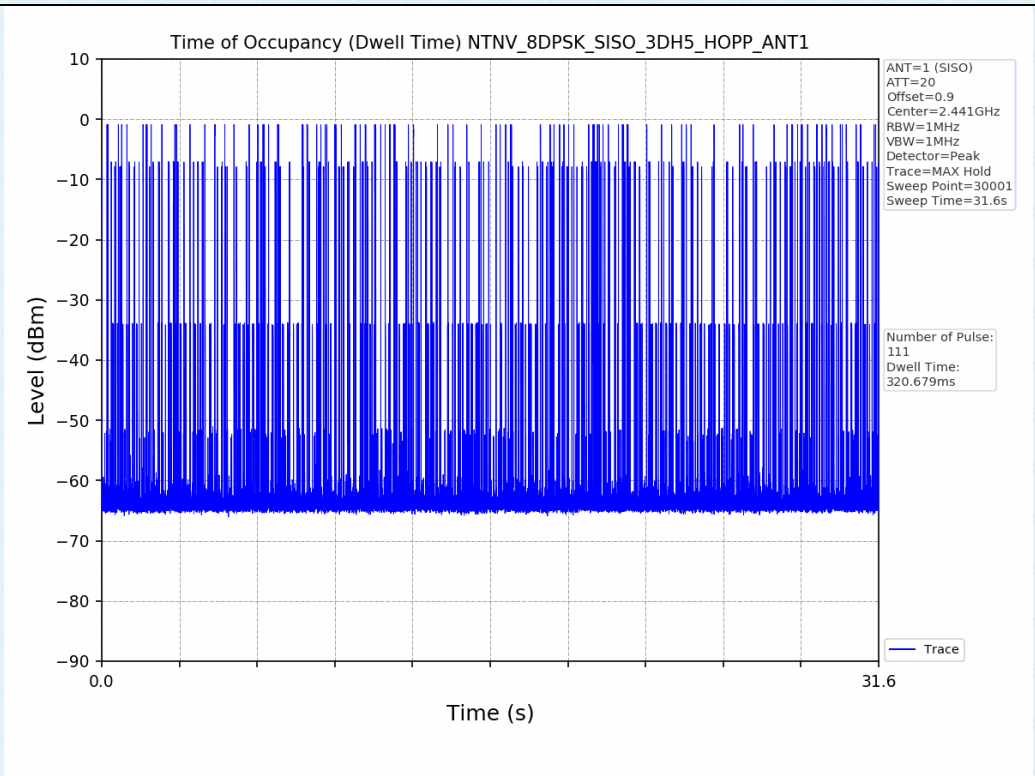

Time of Occupancy (Dwell Time) NTNV_8DPSK_SISO_3DH1_HOPP_ANT1
Level (dBm)
Time (ms)
0.0
20.0
ANT=1 (SISO)
ATT=20
Offset=0.9
Center=2.441GHz
RBW=1MHz
VBW=1MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=20ms
Time of Pulse:
0.387ms
Trace


Time of Occupancy (Dwell Time) NTNV_8DPSK_SISO_3DH1_HOPP_ANT1
Level (dBm)
Time (s)
0.0
31.6
ANT=1 (SISO)
ATT=20
Offset=0.9
Center=2.441GHz
RBW=1MHz
VBW=1MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=31.6s
Number of Pulse:
320
Dwell Time:
123.840ms
Trace


Time of Occupancy (Dwell Time) NTNV_8DPSK_SISO_3DH3_HOPP_ANT1
Level (dBm)
Time (ms)
0.0
20.0
ANT=1 (SISO)
ATT=20
Offset=0.9
Center=2.441GHz
RBW=1MHz
VBW=1MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=20ms
Time of Pulse:
1.638ms
Trace


Time of Occupancy (Dwell Time) NTNV_8DPSK_SISO_3DH3_HOPP_ANT1
Level (dBm)
Time (s)
0.0
31.6
ANT=1 (SISO)
ATT=20
Offset=0.9
Center=2.441GHz
RBW=1MHz
VBW=1MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=31.6s
Number of Pulse:
160
Dwell Time:
262.080ms
Trace


Time of Occupancy (Dwell Time) NTNV_8DPSK_SISO_3DH5_HOPP_ANT1
Level (dBm)
Time (ms)
0.0
40.0
ANT=1 (SISO)
ATT=20
Offset=0.9
Center=2.441GHz
RBW=1MHz
VBW=1MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=40ms
Time of Pulse:
2.889ms
Trace

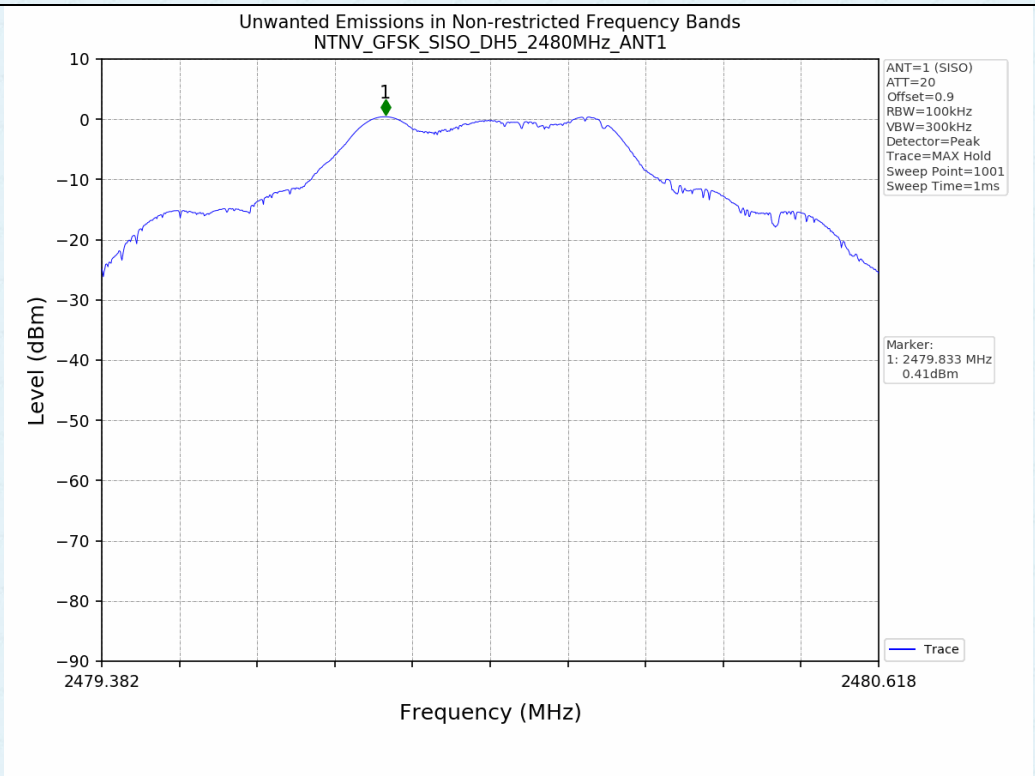


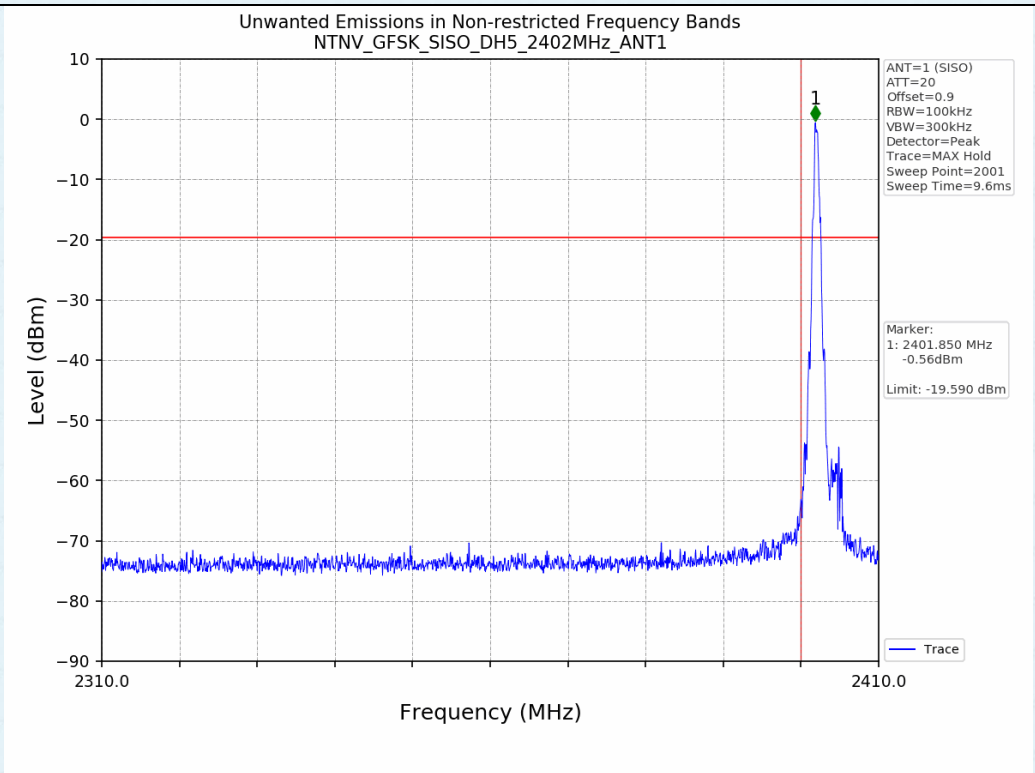
6. Unwanted Emissions in Non-restricted Frequency Bands

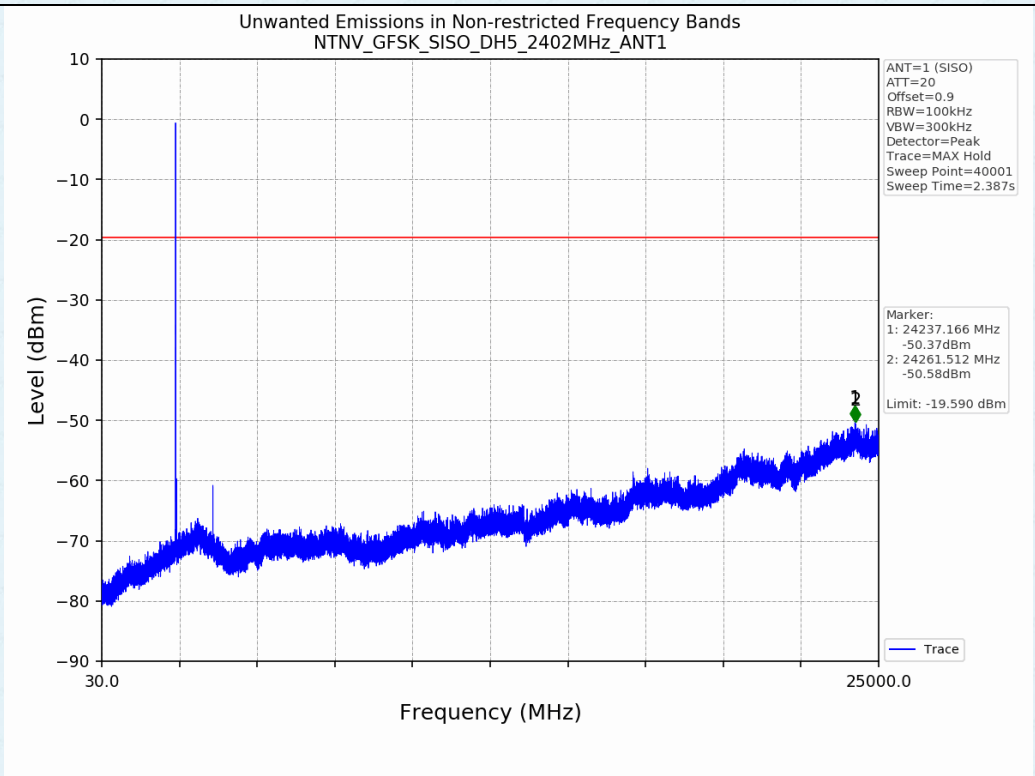
6.1 Test Result

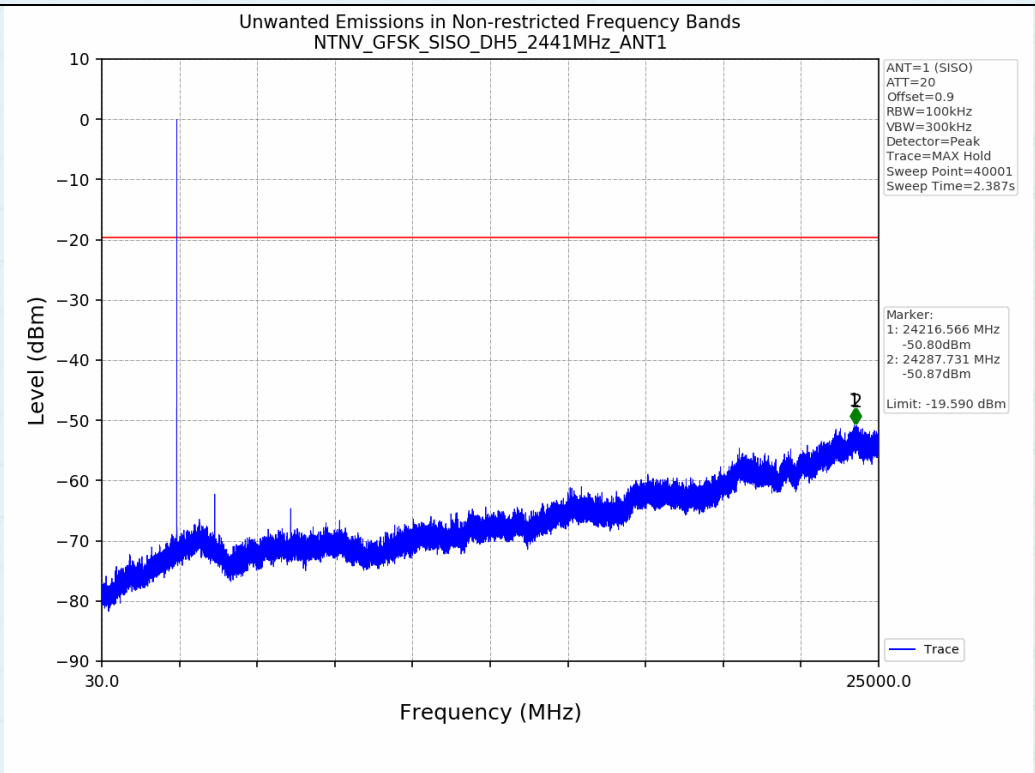
Test Mode	Frequency (MHz)	TX Type	ANT No.	Spurious Conducted Emission (dBm)	Limits (dBm)	Verdict
GFSK	2402	SISO	1	Refer to test graph	-19.59	PASS
	2441	SISO	1	Refer to test graph	-19.59	PASS
	2480	SISO	1	Refer to test graph	-19.59	PASS
	Hopping	SISO	1	Refer to test graph	-19.59	PASS
Pi/4DQPSK	2402	SISO	1	Refer to test graph	-20.80	PASS
	2441	SISO	1	Refer to test graph	-20.80	PASS
	2480	SISO	1	Refer to test graph	-20.80	PASS
	Hopping	SISO	1	Refer to test graph	-20.80	PASS
8DPSK	2402	SISO	1	Refer to test graph	-20.75	PASS
	2441	SISO	1	Refer to test graph	-20.75	PASS
	2480	SISO	1	Refer to test graph	-20.75	PASS
	Hopping	SISO	1	Refer to test graph	-20.75	PASS

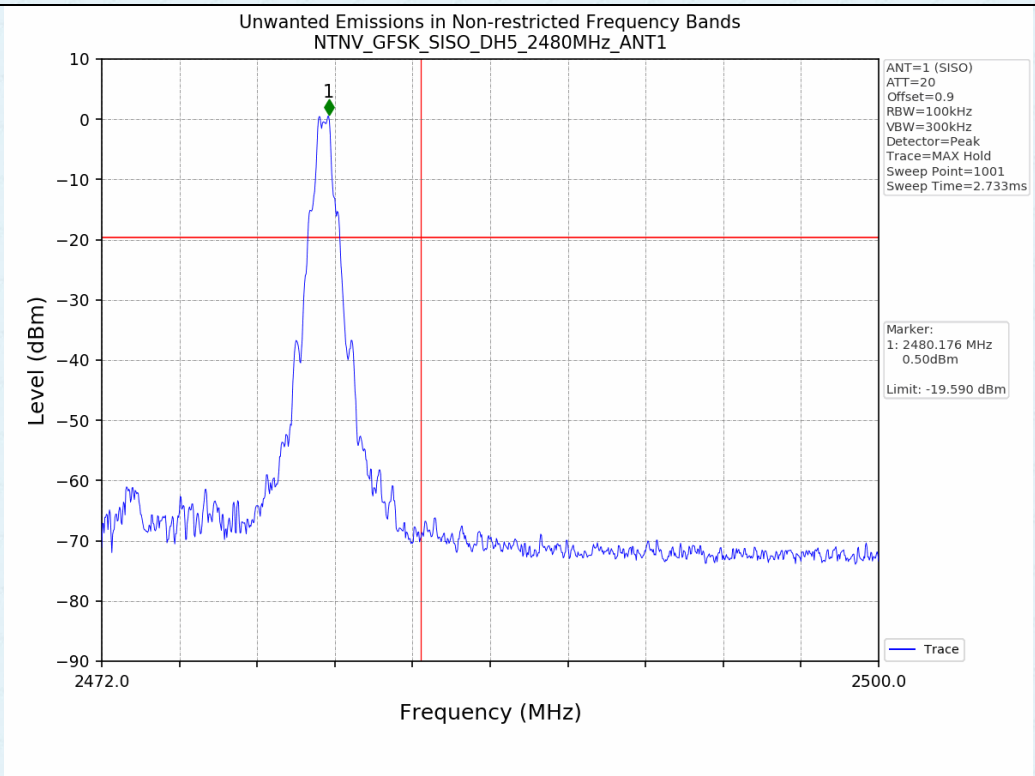
6.2 Test Graph

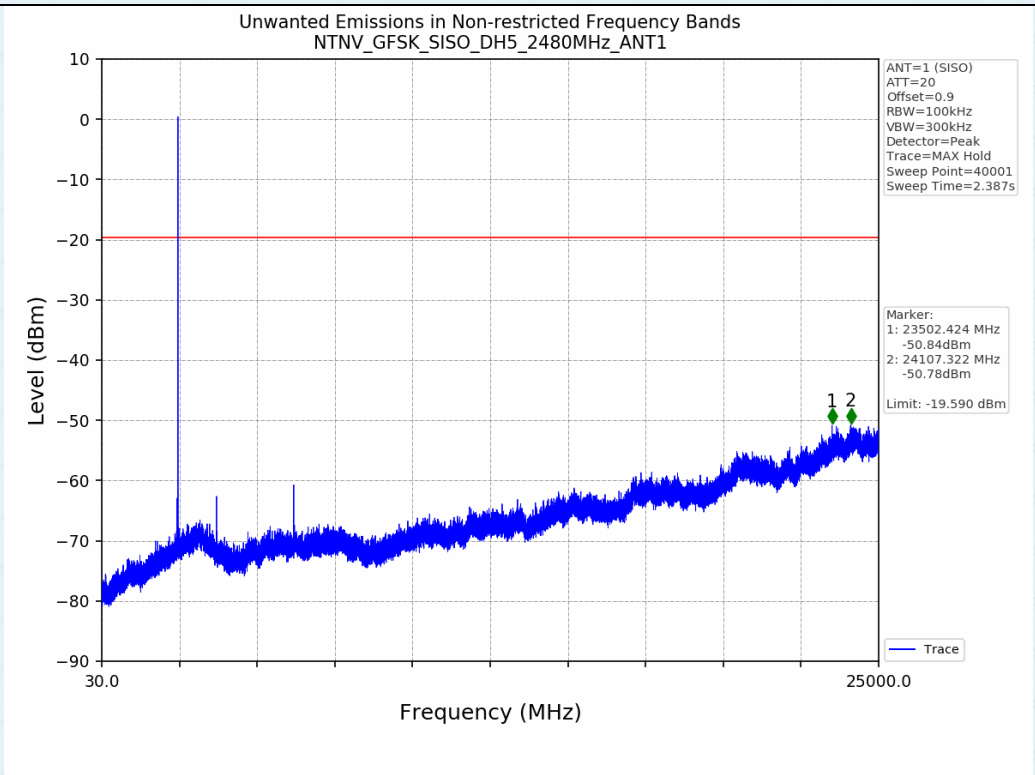

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_GFSK_SISO_DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Marker:
1: 2479.833 MHz
0.41dBm
Trace
Level (dBm)
Frequency (MHz)
2479.382
2480.618

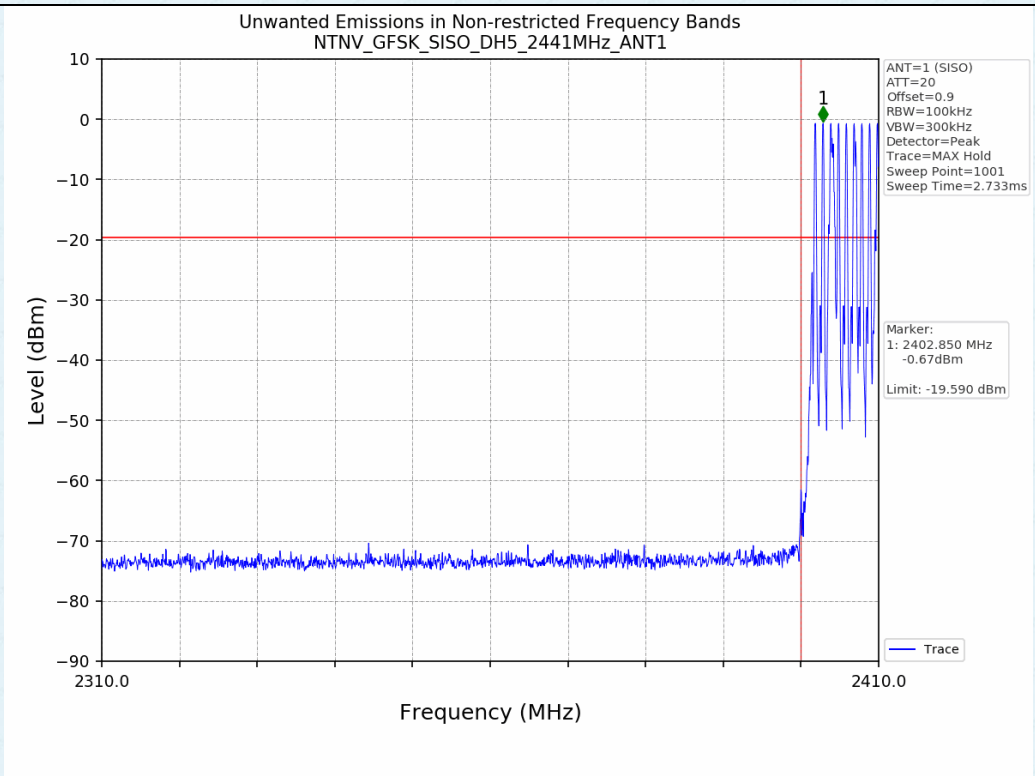

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_GFSK_SISO_DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=2001
Sweep Time=9.6ms
Marker:
1: 2401.850 MHz
-0.56dBm
Limit: -19.590 dBm
Trace
Level (dBm)
Frequency (MHz)
2310.0
2410.0

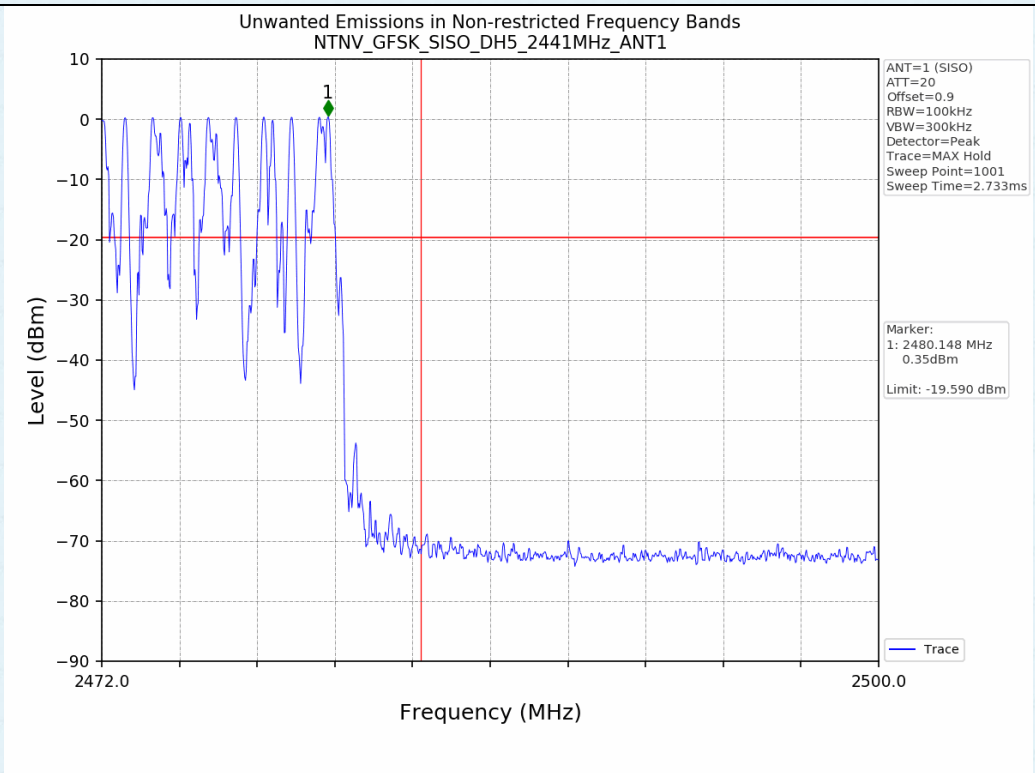

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_GFSK_SISO_DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 24237.166 MHz
-50.37dBm
2: 24261.512 MHz
-50.58dBm
Limit: -19.590 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0

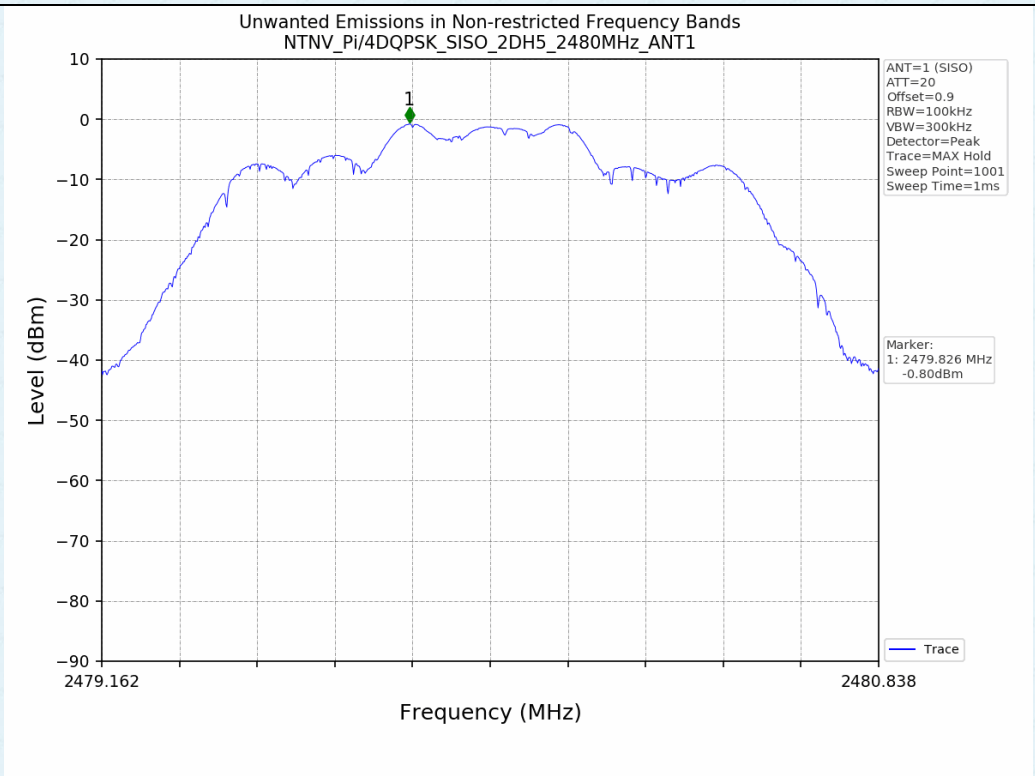

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_GFSK_SISO_DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 24216.566 MHz
-50.80dBm
2: 24287.731 MHz
-50.87dBm
Limit: -19.590 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0

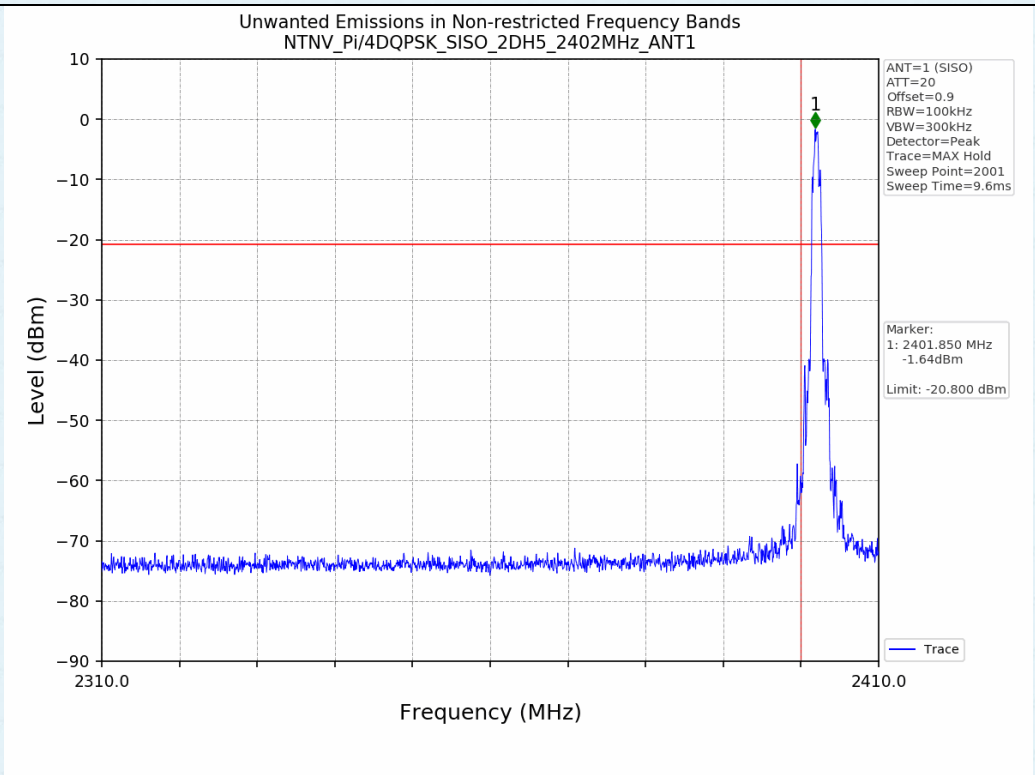

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_GFSK_SISO_DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.733ms
Marker:
1: 2480.176 MHz
0.50dBm
Limit: -19.590 dBm
Trace
Level (dBm)
Frequency (MHz)
2472.0
2500.0
1

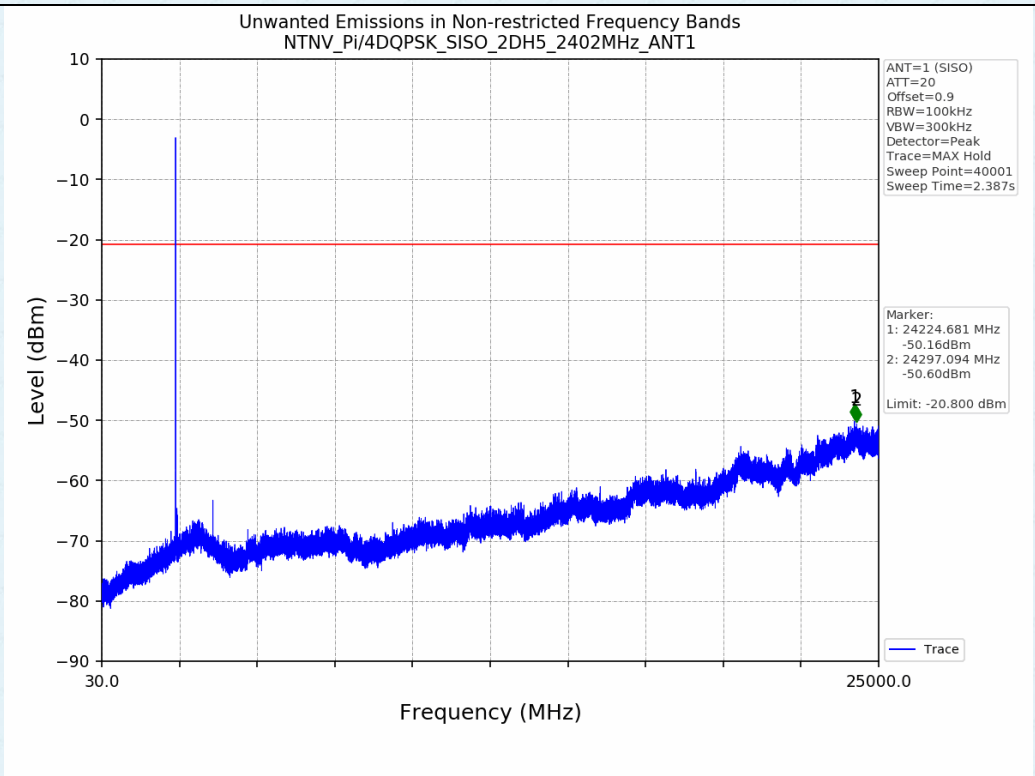

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_GFSK_SISO_DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 23502.424 MHz
-50.84dBm
2: 24107.322 MHz
-50.78dBm
Limit: -19.590 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0
1 2

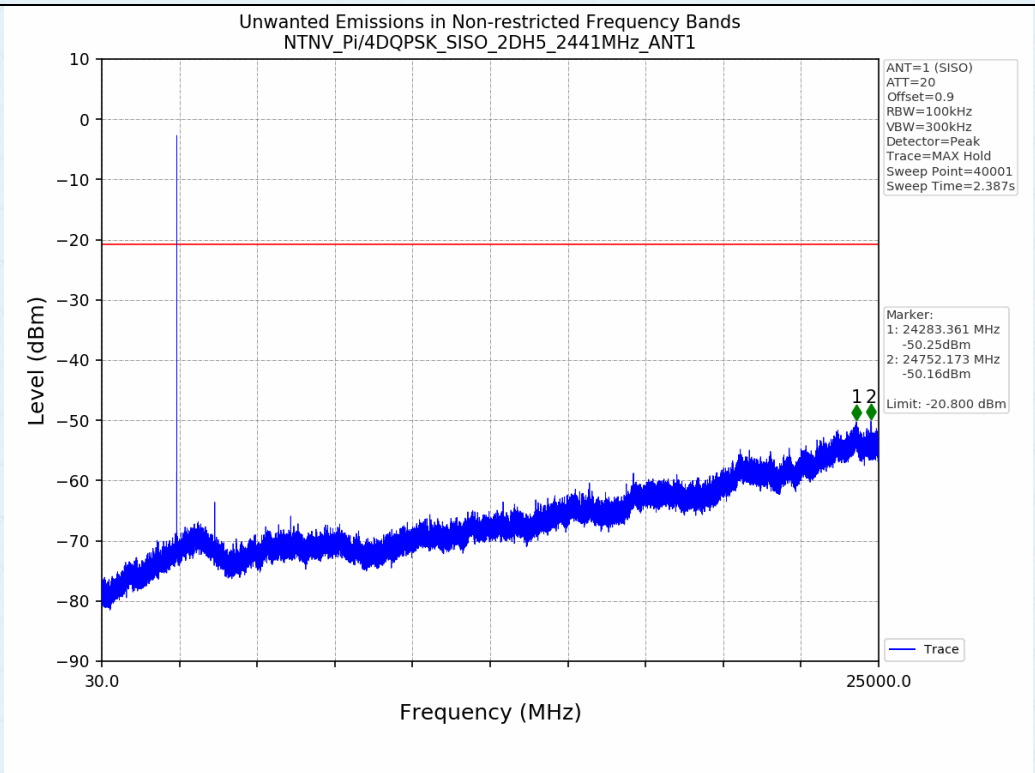

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_GFSK_SISO_DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.733ms
Marker:
1: 2402.850 MHz
-0.67dBm
Limit: -19.590 dBm
Trace
Level (dBm)
Frequency (MHz)
2310.0
2410.0

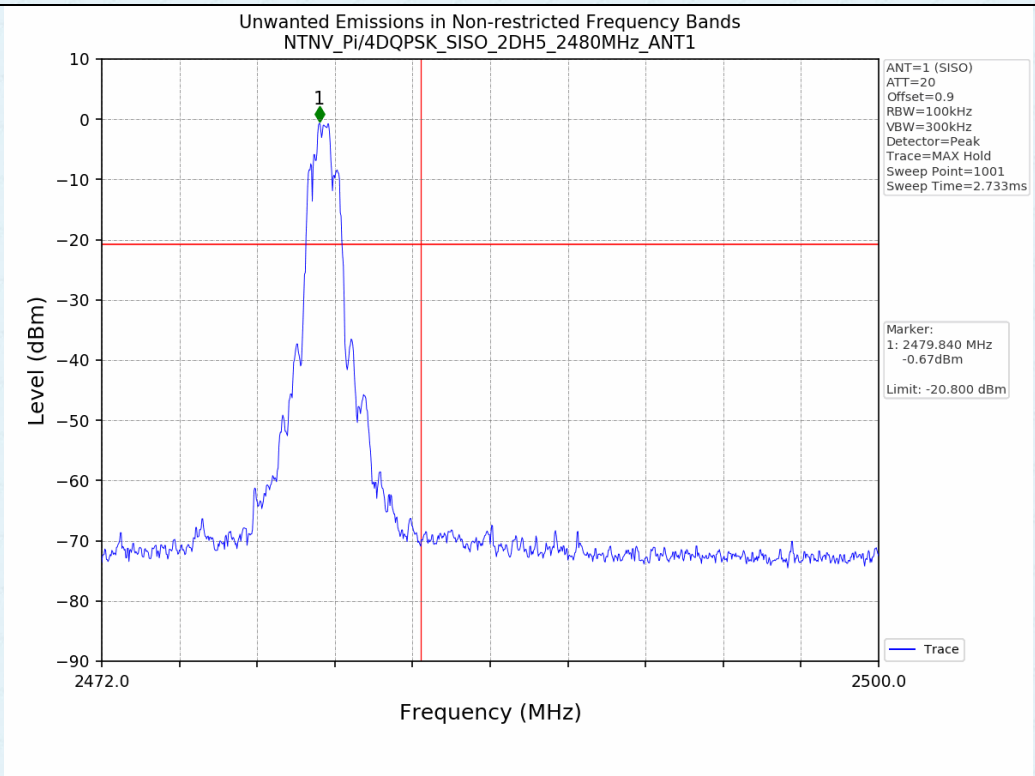

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_GFSK_SISO_DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.733ms
Marker:
1: 2480.148 MHz
0.35dBm
Limit: -19.590 dBm
Trace
Level (dBm)
Frequency (MHz)
2472.0
2500.0

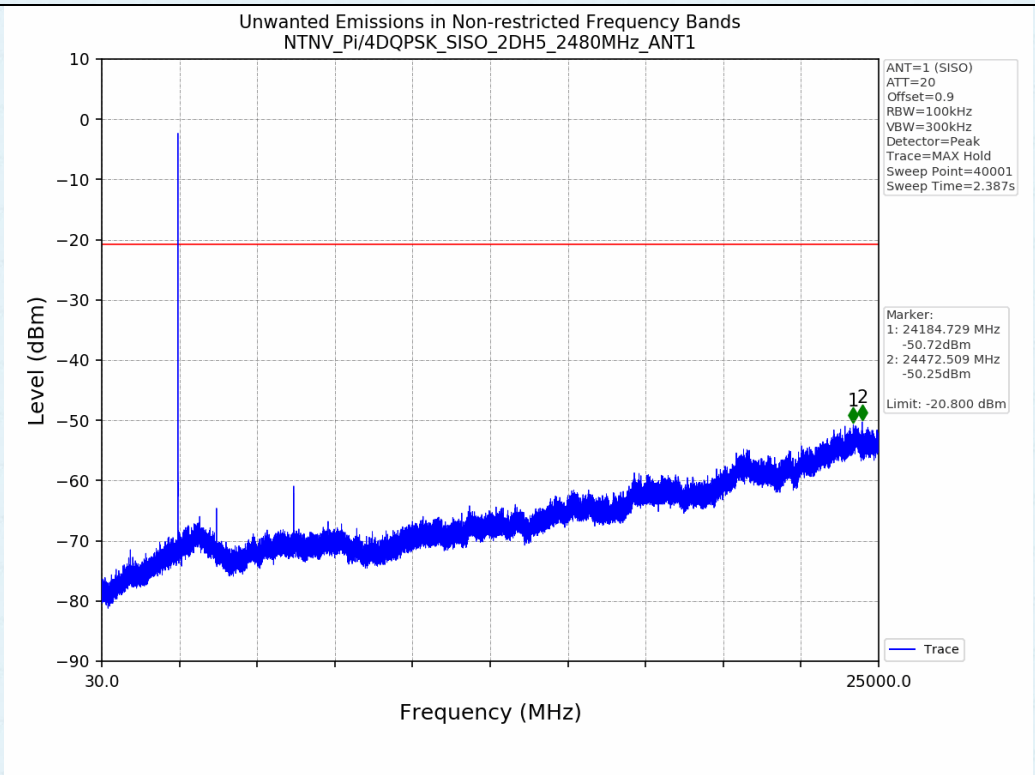

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_Pi/4DQPSK_SISO_2DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Marker:
1: 2479.826 MHz
-0.80dBm
Trace
Level (dBm)
Frequency (MHz)
2479.162
2480.838

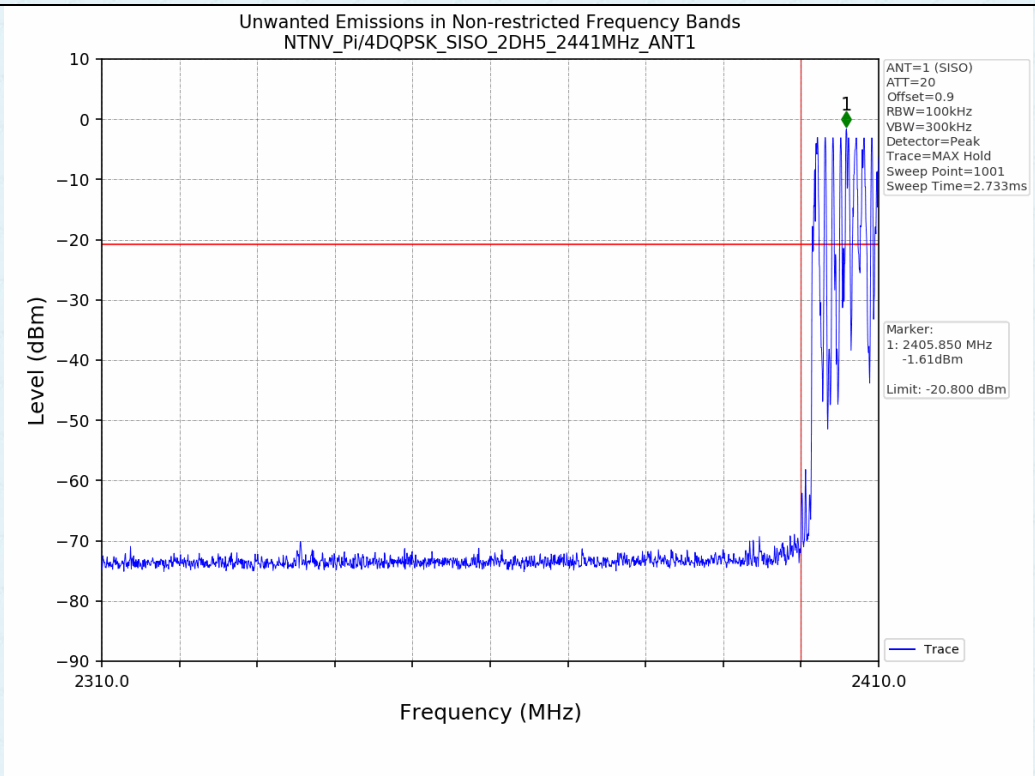

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_Pi/4DQPSK_SISO_2DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=2001
Sweep Time=9.6ms
Marker:
1: 2401.850 MHz
-1.64dBm
Limit: -20.800 dBm
Trace
Level (dBm)
Frequency (MHz)
2310.0
2410.0

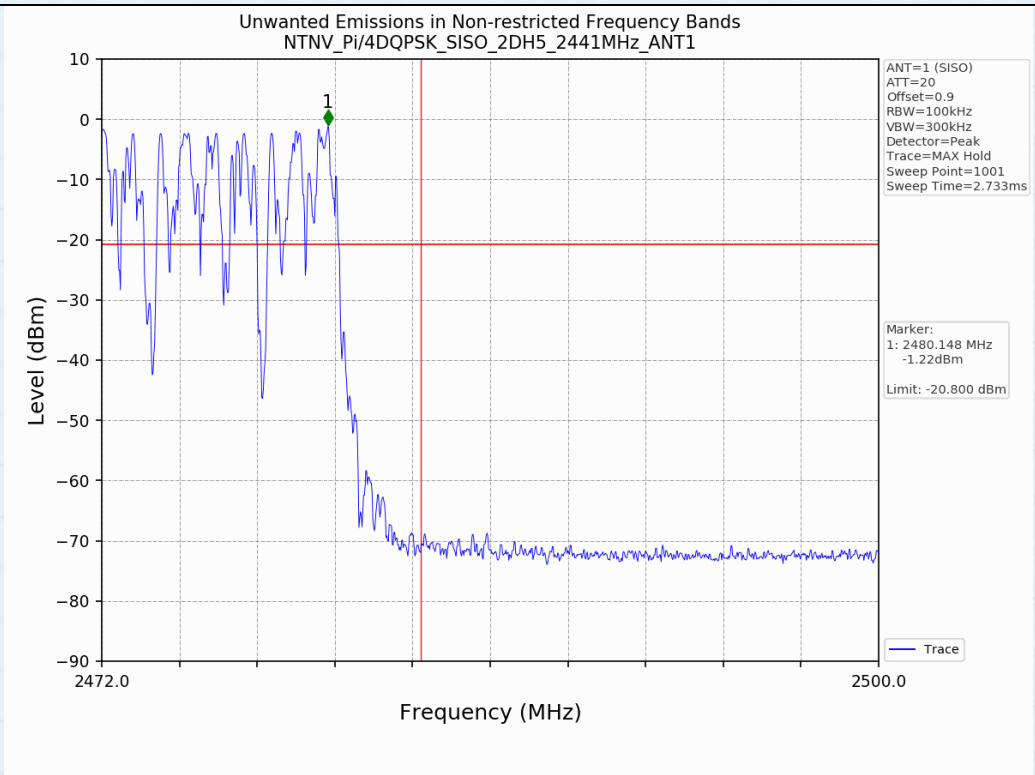

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_Pi/4DQPSK_SISO_2DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 24224.681 MHz
-50.16dBm
2: 24297.094 MHz
-50.60dBm
Limit: -20.800 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0

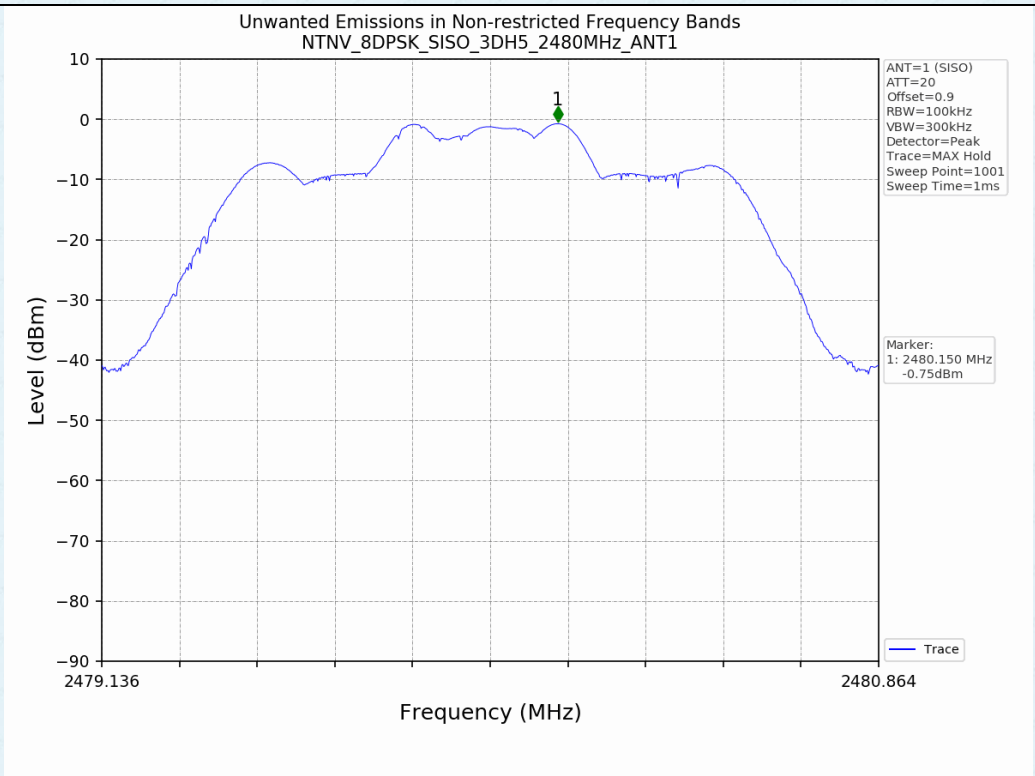

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_Pi/4DQPSK_SISO_2DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 24283.361 MHz
-50.25dBm
2: 24752.173 MHz
-50.16dBm
Limit: -20.800 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0

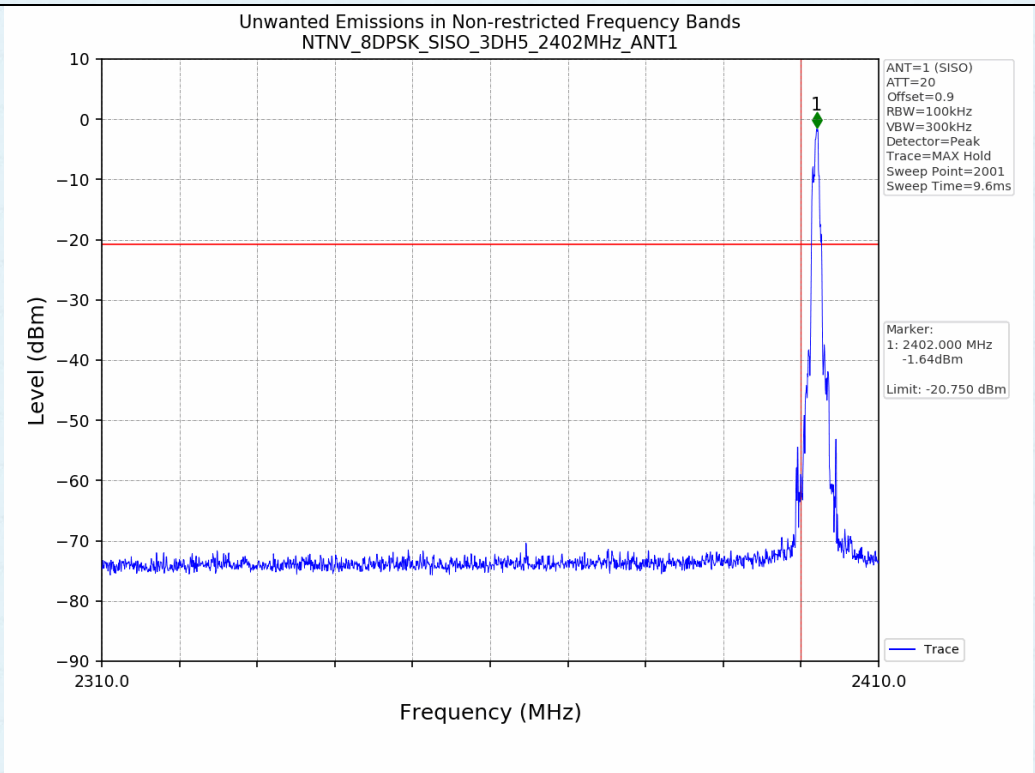

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_Pi/4DQPSK_SISO_2DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.733ms
Marker:
1: 2479.840 MHz
-0.67dBm
Limit: -20.800 dBm
Trace
Level (dBm)
Frequency (MHz)
2472.0
2500.0

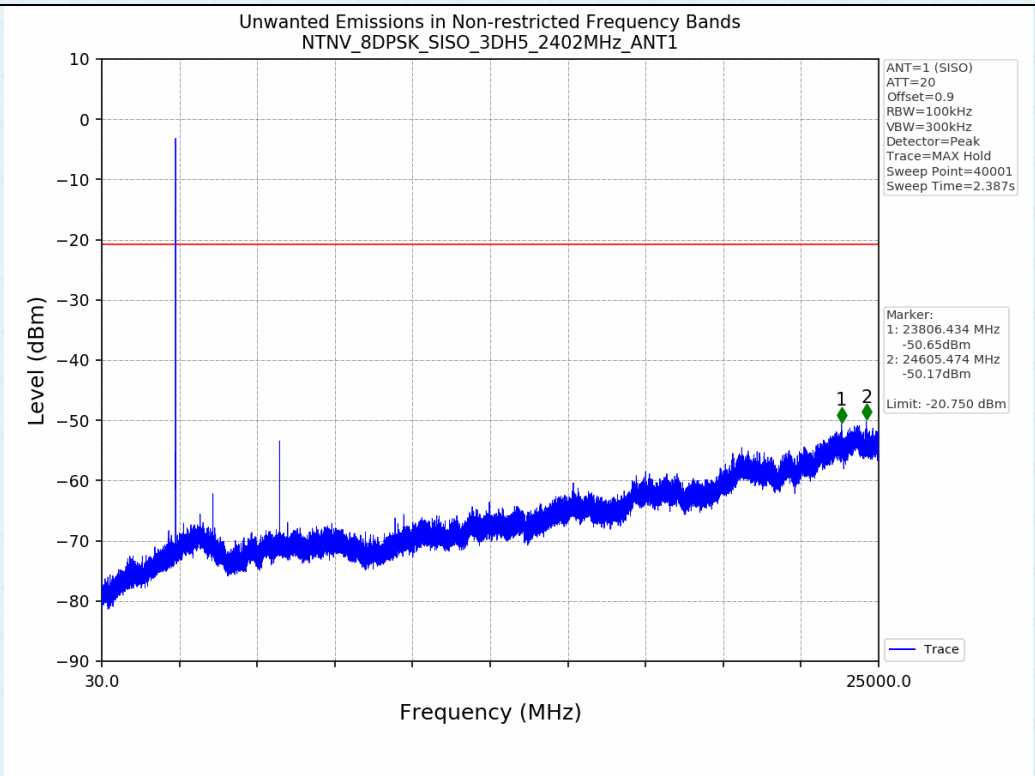

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_Pi/4DQPSK_SISO_2DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 24184.729 MHz
-50.72dBm
2: 24472.509 MHz
-50.25dBm
Limit: -20.800 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0

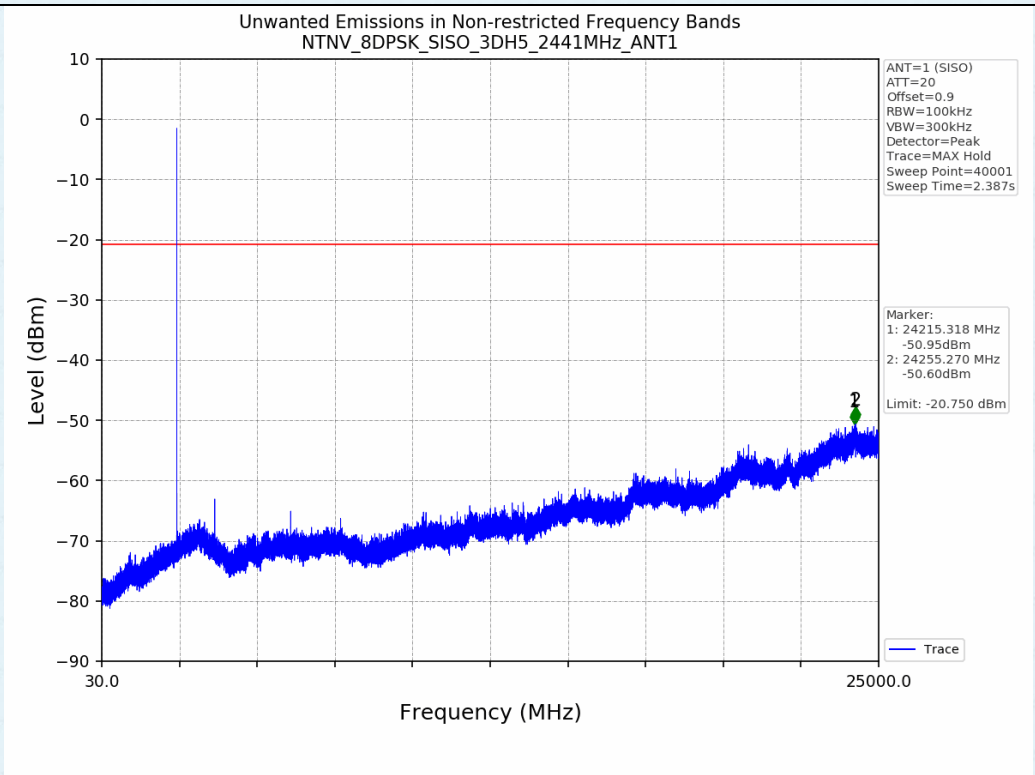

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_Pi/4DQPSK_SISO_2DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.733ms
Marker:
1: 2405.850 MHz
-1.61dBm
Limit: -20.800 dBm
Trace
Level (dBm)
Frequency (MHz)
2310.0
2410.0

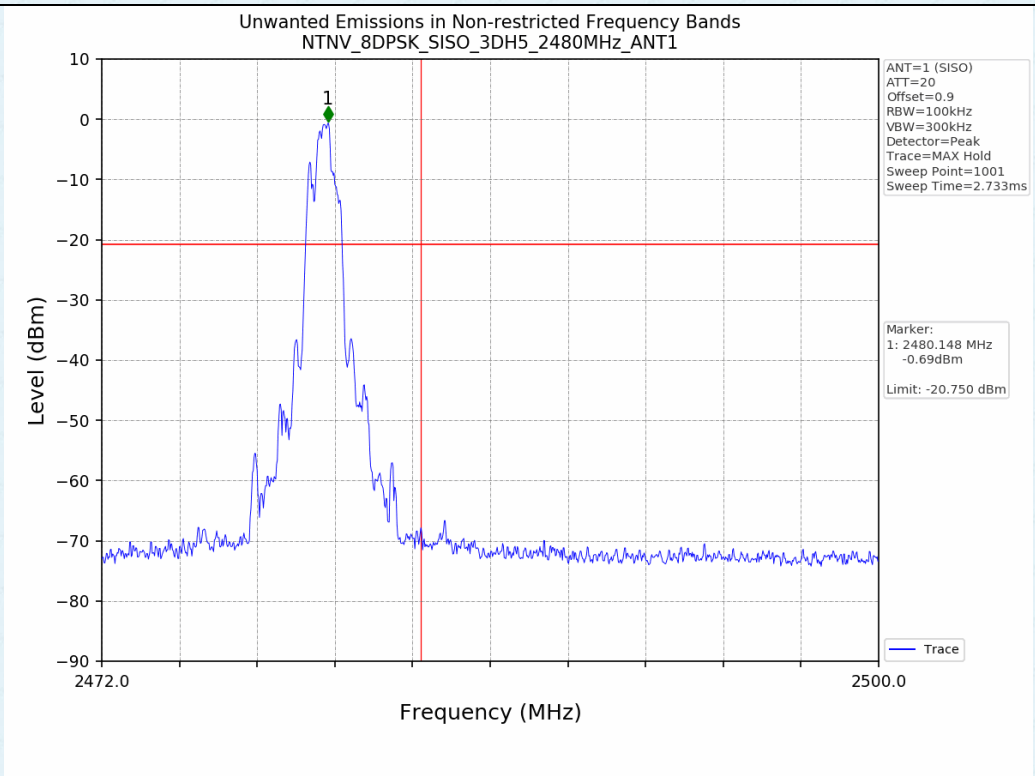

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_Pi/4DQPSK_SISO_2DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.733ms
Marker:
1: 2480.148 MHz
-1.22dBm
Limit: -20.800 dBm
Trace
Level (dBm)
Frequency (MHz)
2472.0
2500.0

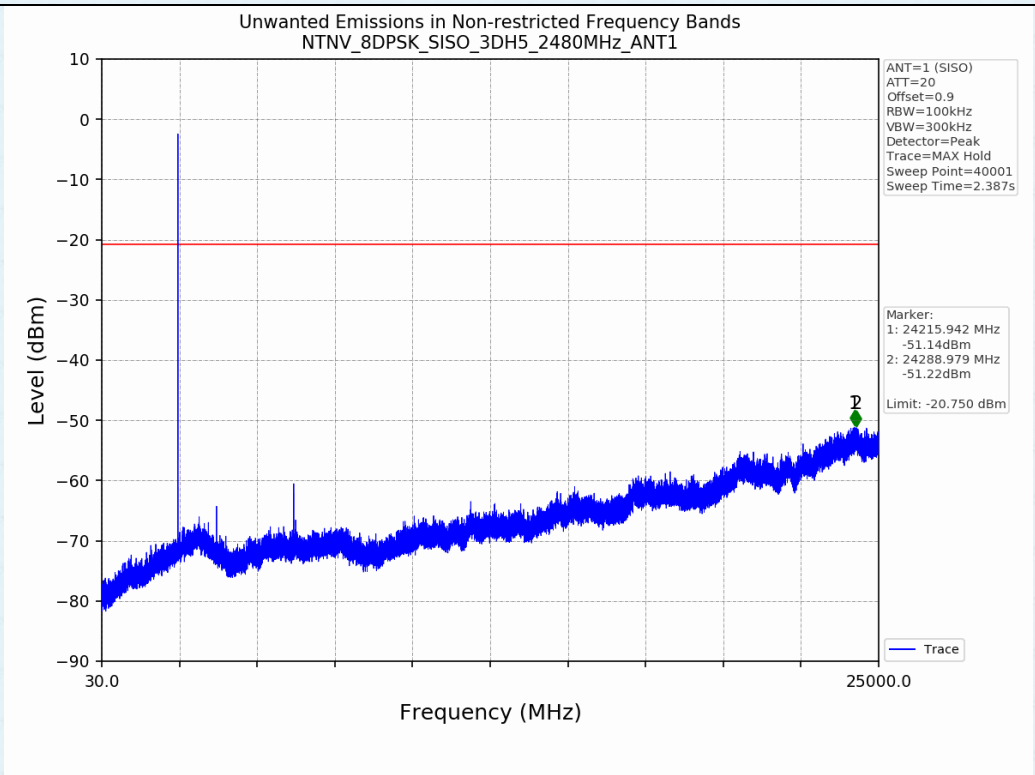

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_8DPSK_SISO_3DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Marker:
1: 2480.150 MHz
-0.75dBm
Trace
Level (dBm)
Frequency (MHz)
2479.136
2480.864

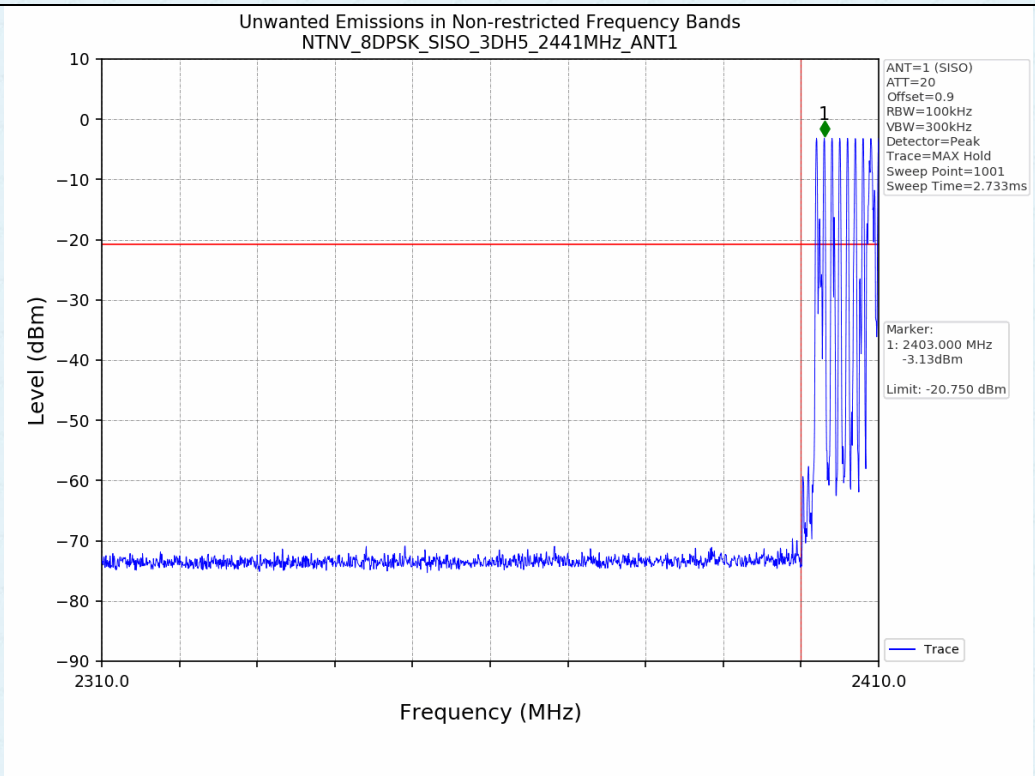

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_8DPSK_SISO_3DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=2001
Sweep Time=9.6ms
Marker:
1: 2402.000 MHz
-1.64dBm
Limit: -20.750 dBm
Trace
Level (dBm)
Frequency (MHz)
2310.0
2410.0

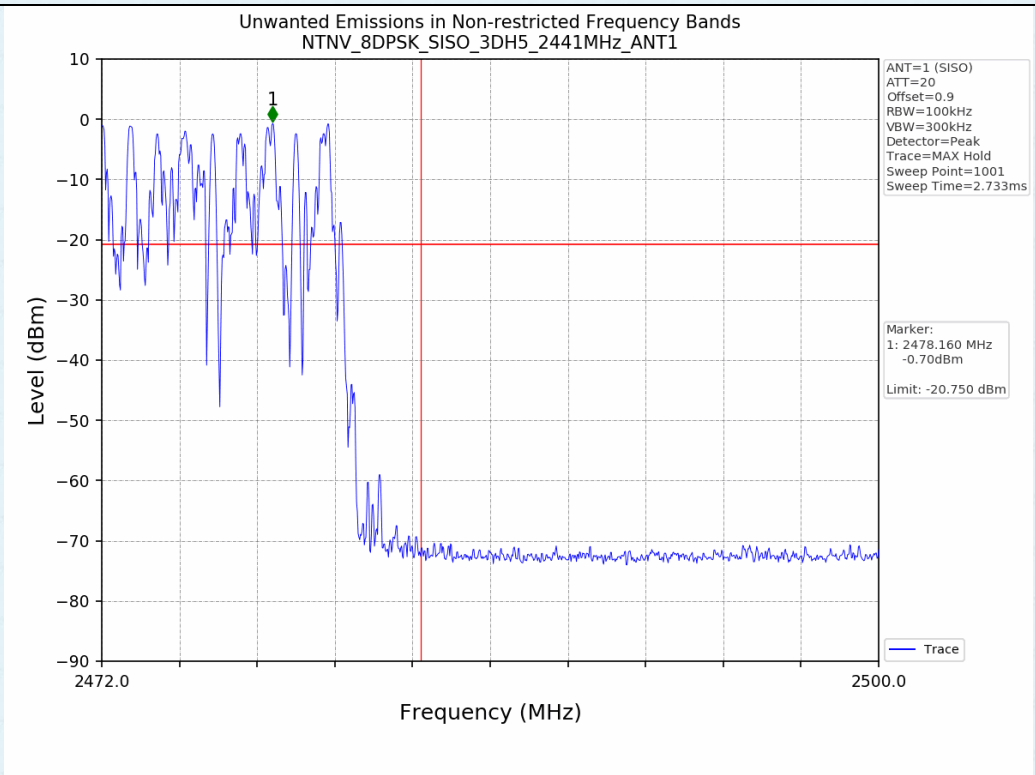

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_8DPSK_SISO_3DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 23806.434 MHz
-50.65dBm
2: 24605.474 MHz
-50.17dBm
Limit: -20.750 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0


Unwanted Emissions in Non-restricted Frequency Bands
NTNV_8DPSK_SISO_3DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 24215.318 MHz
-50.95dBm
2: 24255.270 MHz
-50.60dBm
Limit: -20.750 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0


Unwanted Emissions in Non-restricted Frequency Bands
NTNV_8DPSK_SISO_3DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.733ms
Marker:
1: 2480.148 MHz
-0.69dBm
Limit: -20.750 dBm
Trace
Level (dBm)
Frequency (MHz)
2472.0
2500.0


Unwanted Emissions in Non-restricted Frequency Bands
NTNV_8DPSK_SISO_3DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 24215.942 MHz
-51.14dBm
2: 24288.979 MHz
-51.22dBm
Limit: -20.750 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0


Unwanted Emissions in Non-restricted Frequency Bands
NTNV_8DPSK_SISO_3DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.733ms
Marker:
1: 2403.000 MHz
-3.13dBm
Limit: -20.750 dBm
Trace
Level (dBm)
Frequency (MHz)
2310.0
2410.0

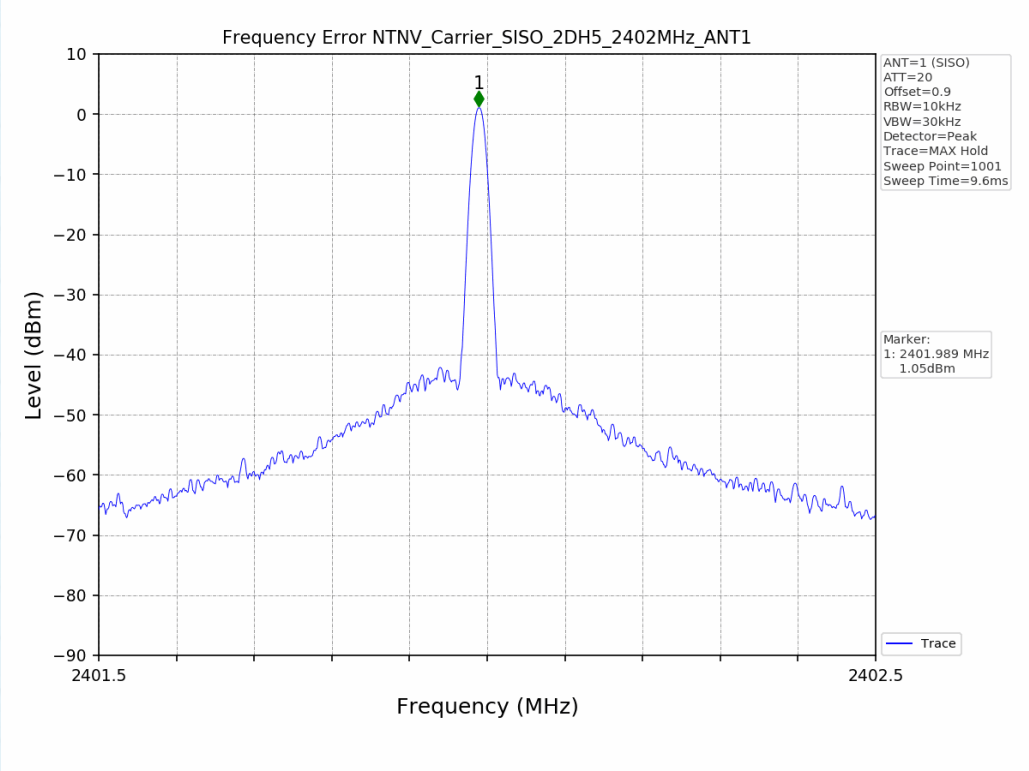

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_8DPSK_SISO_3DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.733ms
Marker:
1: 2478.160 MHz
-0.70dBm
Limit: -20.750 dBm
Trace
Level (dBm)
Frequency (MHz)
2472.0
2500.0

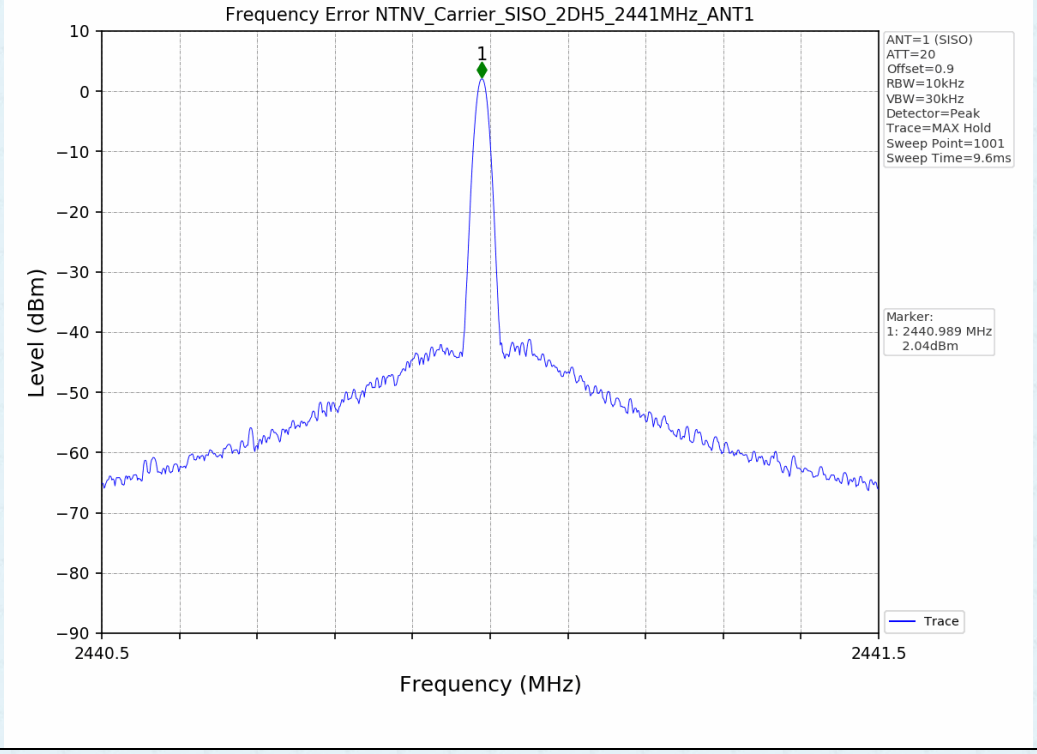
7. Frequency Error

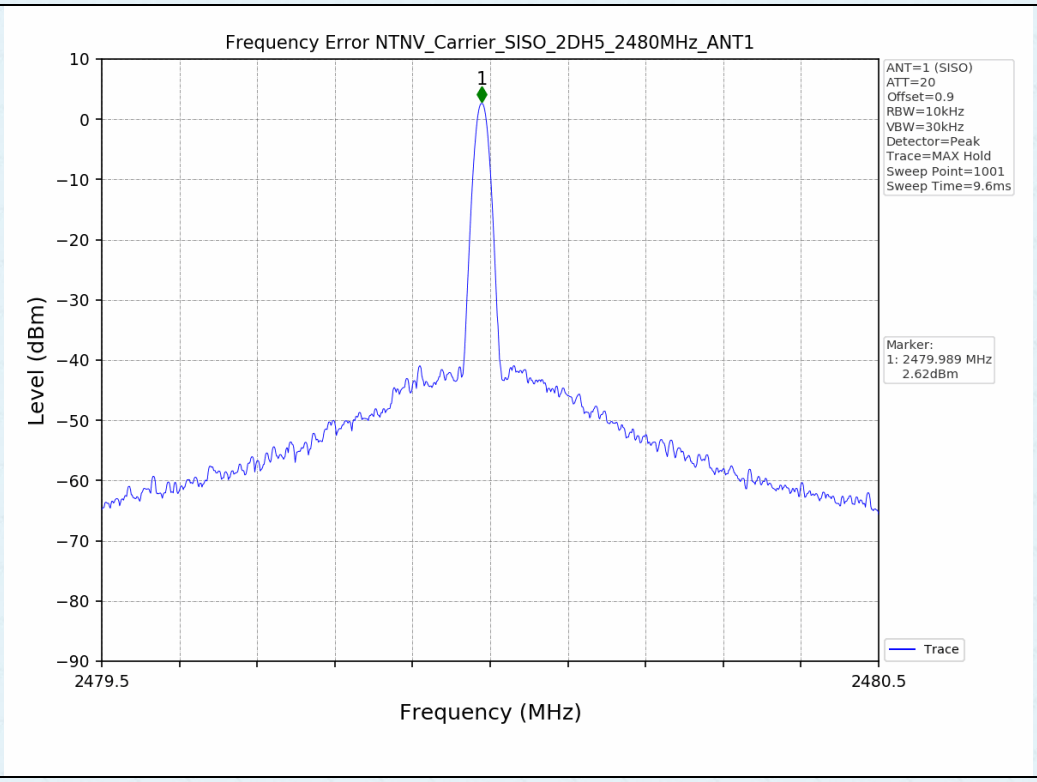
7.1 Test Result

Test Mode	Frequency (MHz)	TX Type	ANT	Measured Frequency (MHz)		Verdict
				Test Result	Limit	
Carrier	2402	SISO	1	2401.99	2400-2483.5	PASS
	2441	SISO	1	2440.99	2400-2483.5	PASS
	2480	SISO	1	2479.99	2400-2483.5	PASS

7.2 Test Graph




Frequency Error NTNV_Carrier_SISO_2DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=10kHz
VBW=30kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=9.6ms
Marker:
1: 2440.989 MHz
2.04dBm
Trace
Level (dBm)
Frequency (MHz)
2440.5
2441.5


Frequency Error NTNV_Carrier_SISO_2DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=0.9
RBW=10kHz
VBW=30kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=9.6ms
Marker:
1: 2479.989 MHz
2.62dBm
Trace
Level (dBm)
Frequency (MHz)
2479.5
2480.5