Appendix for 15.247

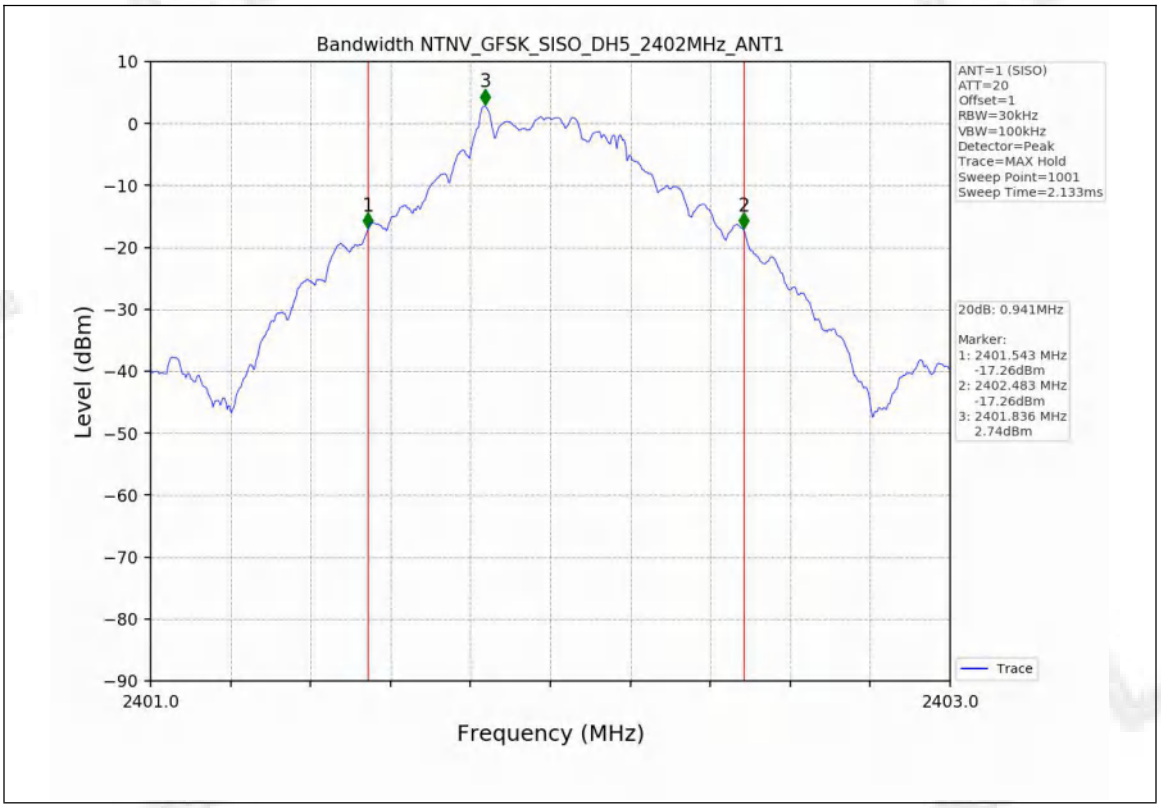
1. Bandwidth

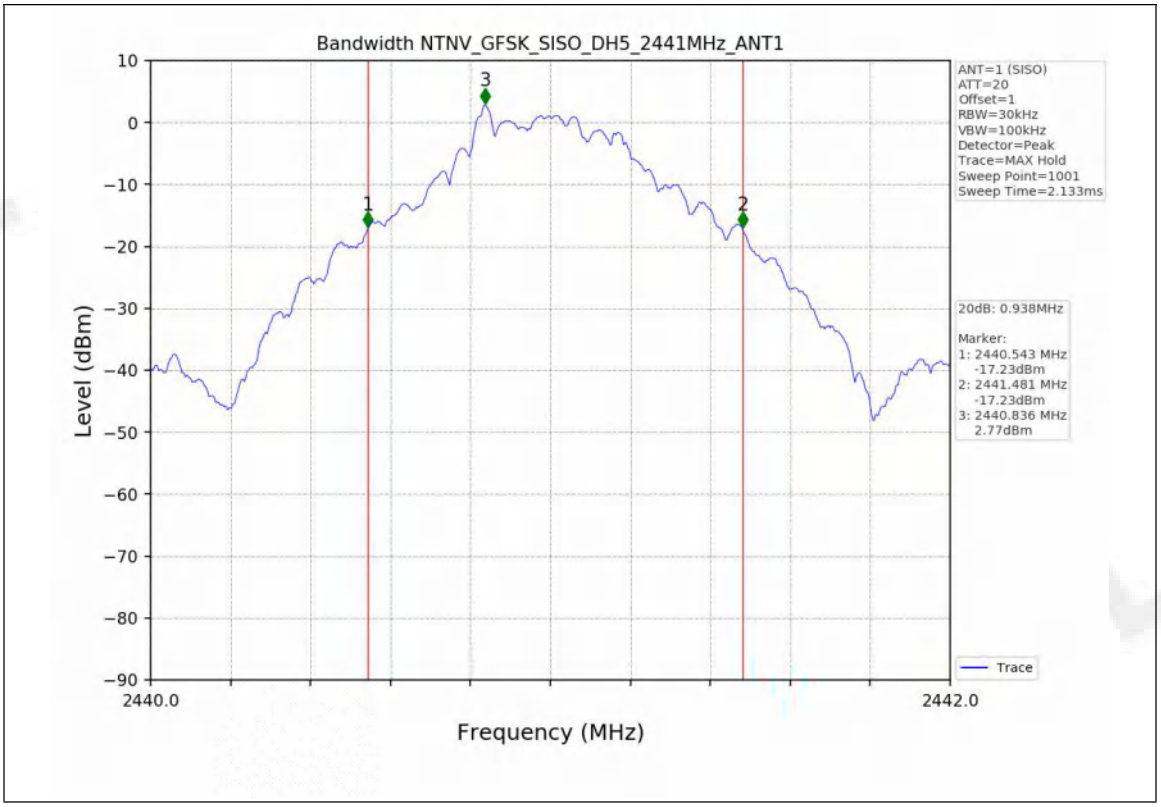
1.1 Test Result

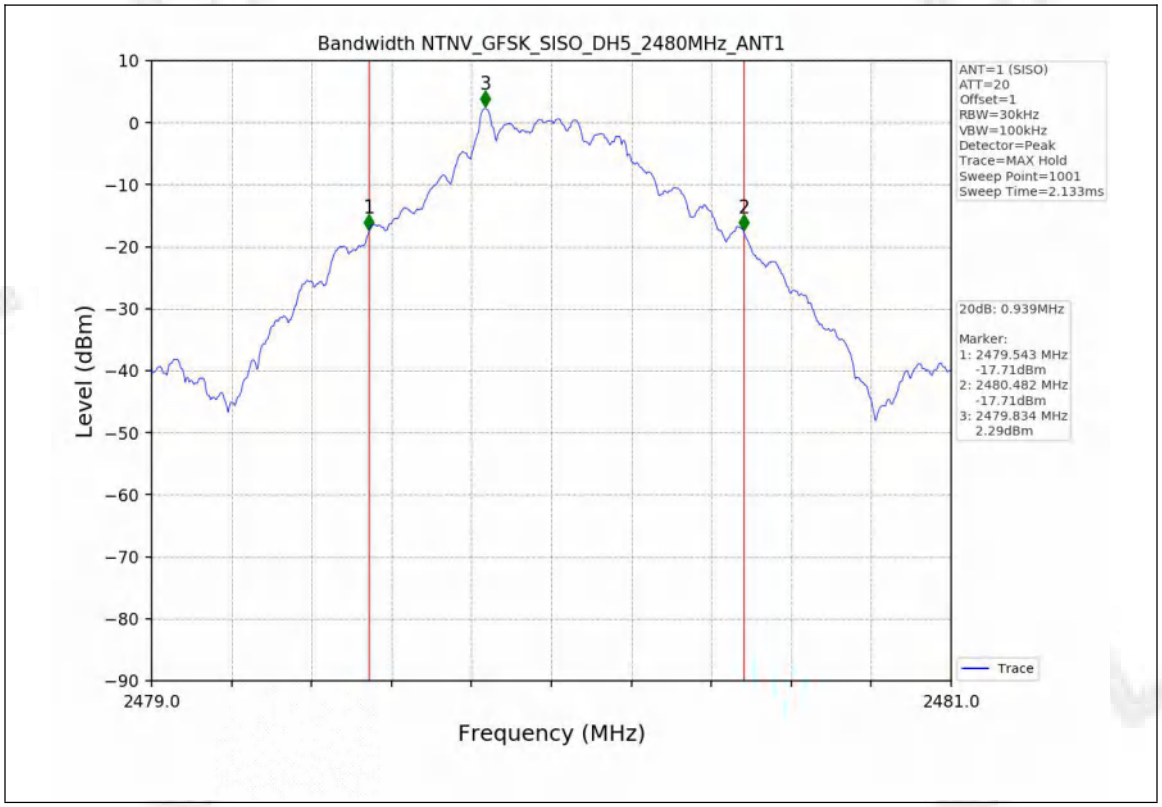
Test Mode	Frequency (MHz)	TX Type	ANT No.	20dB Bandwidth Test Result (MHz)	Verdict
GFSK	2402	SISO	1	0.941	PASS
	2441	SISO	1	0.938	PASS
	2480	SISO	1	0.939	PASS
Pi/4DQPSK	2402	SISO	1	1.271	PASS
	2441	SISO	1	1.308	PASS
	2480	SISO	1	1.268	PASS
8DPSK	2402	SISO	1	1.251	PASS
	2441	SISO	1	1.249	PASS
	2480	SISO	1	1.248	PASS

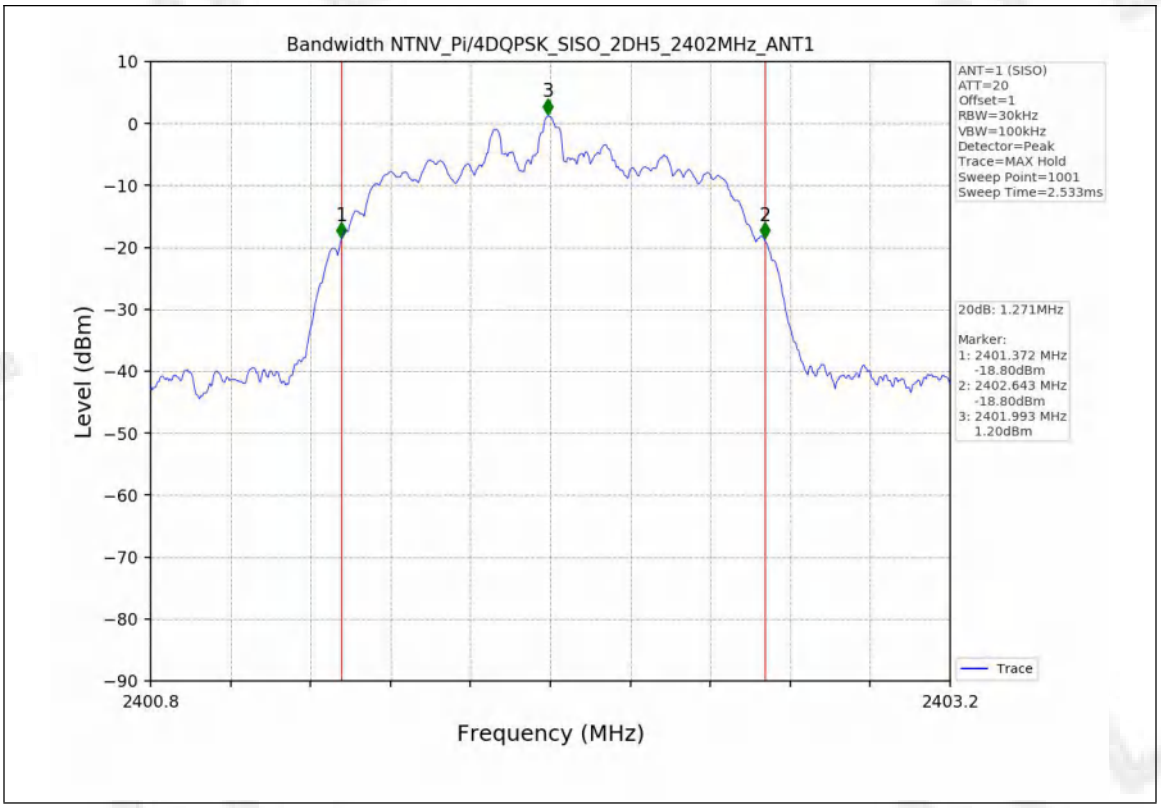
Test Mode	Frequency (MHz)	TX Type	ANT No.	99% Occupied Bandwidth Test Result (MHz)	
GFSK	2402	SISO	1	0.853	Only for Report Use
	2441	SISO	1	0.852	Only for Report Use
	2480	SISO	1	0.850	Only for Report Use
Pi/4DQPSK	2402	SISO	1	1.167	Only for Report Use
	2441	SISO	1	1.169	Only for Report Use
	2480	SISO	1	1.167	Only for Report Use
8DPSK	2402	SISO	1	1.164	Only for Report Use
	2441	SISO	1	1.160	Only for Report Use
	2480	SISO	1	1.159	Only for Report Use

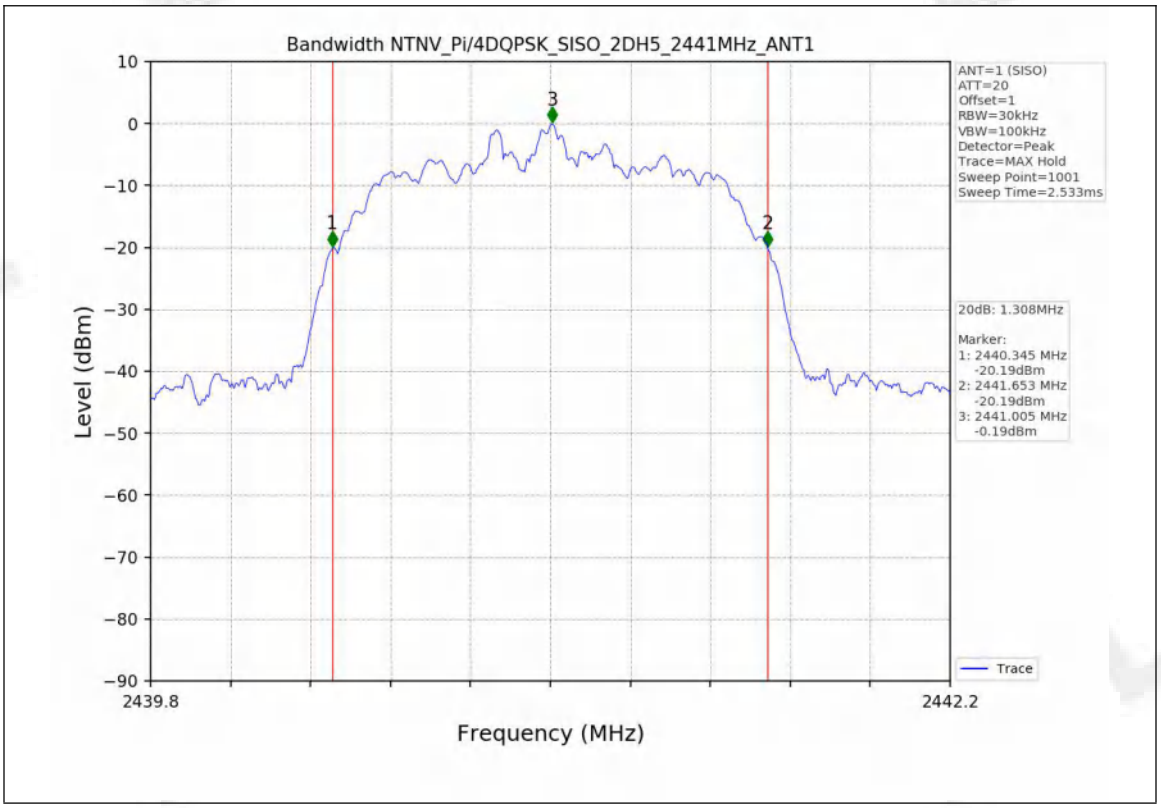
1.2 Test Graph - 20dB Bandwidth

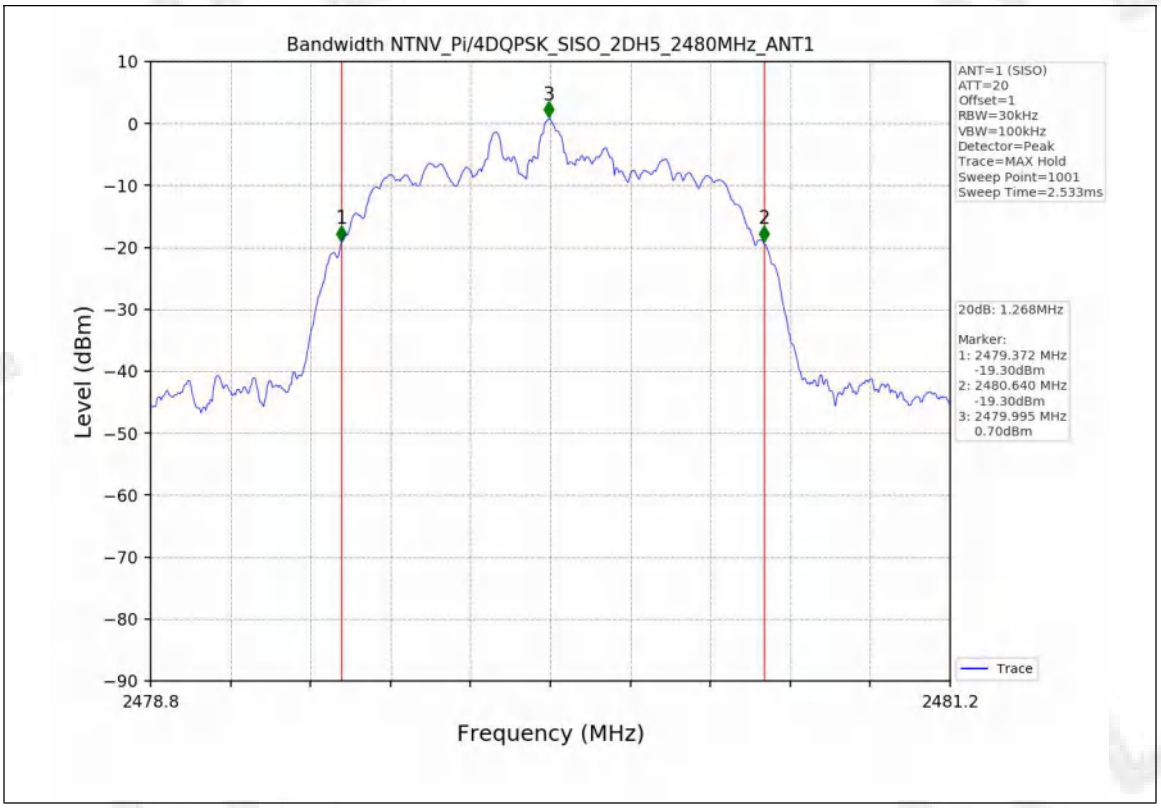


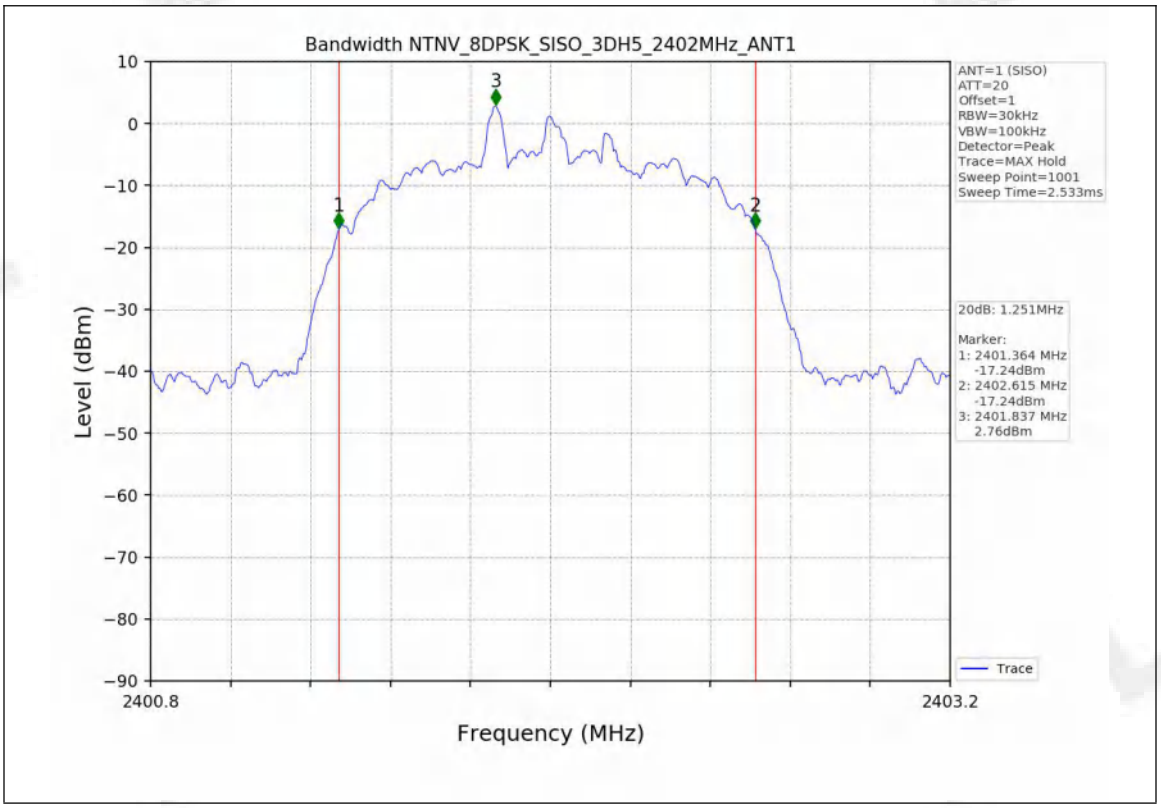


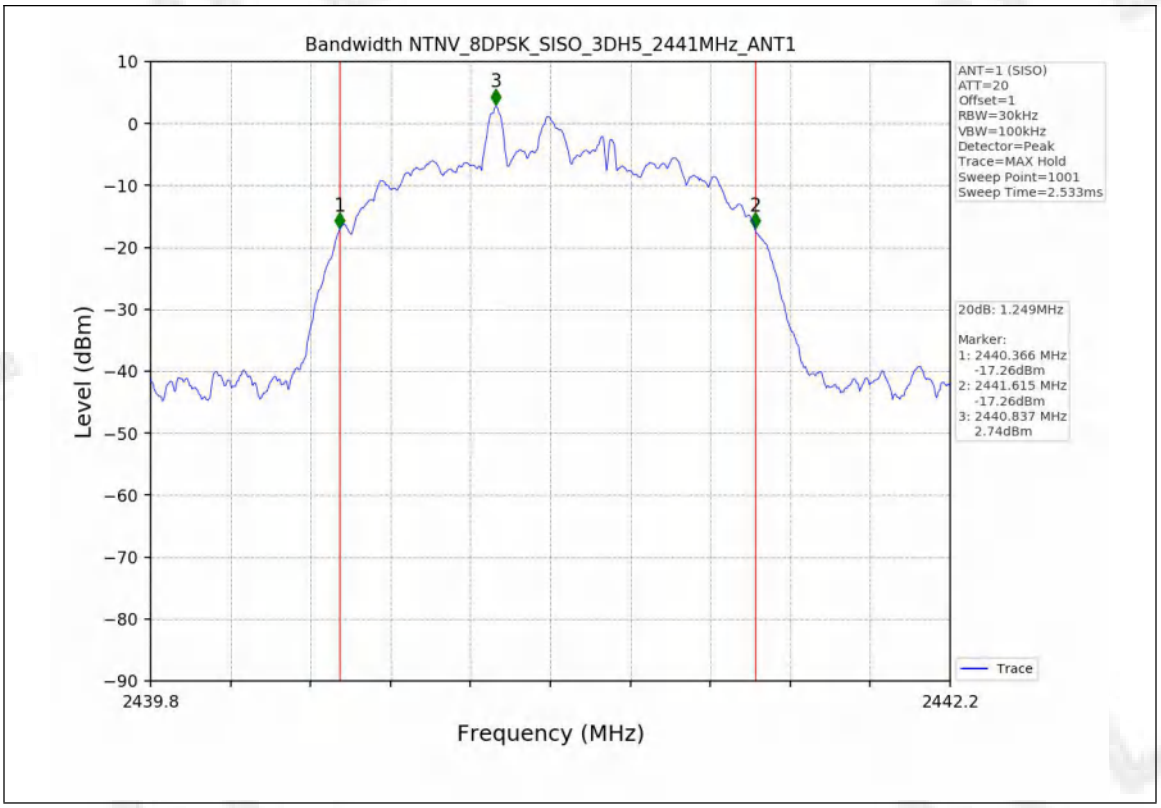

Bandwidth NTNV_GFSK_SISO_DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.133ms
20dB: 0.939MHz
Marker:
1: 2479.543 MHz
-17.71dBm
2: 2480.482 MHz
-17.71dBm
3: 2479.834 MHz
2.29dBm
Trace
Level (dBm)
Frequency (MHz)
2479.0
2481.0

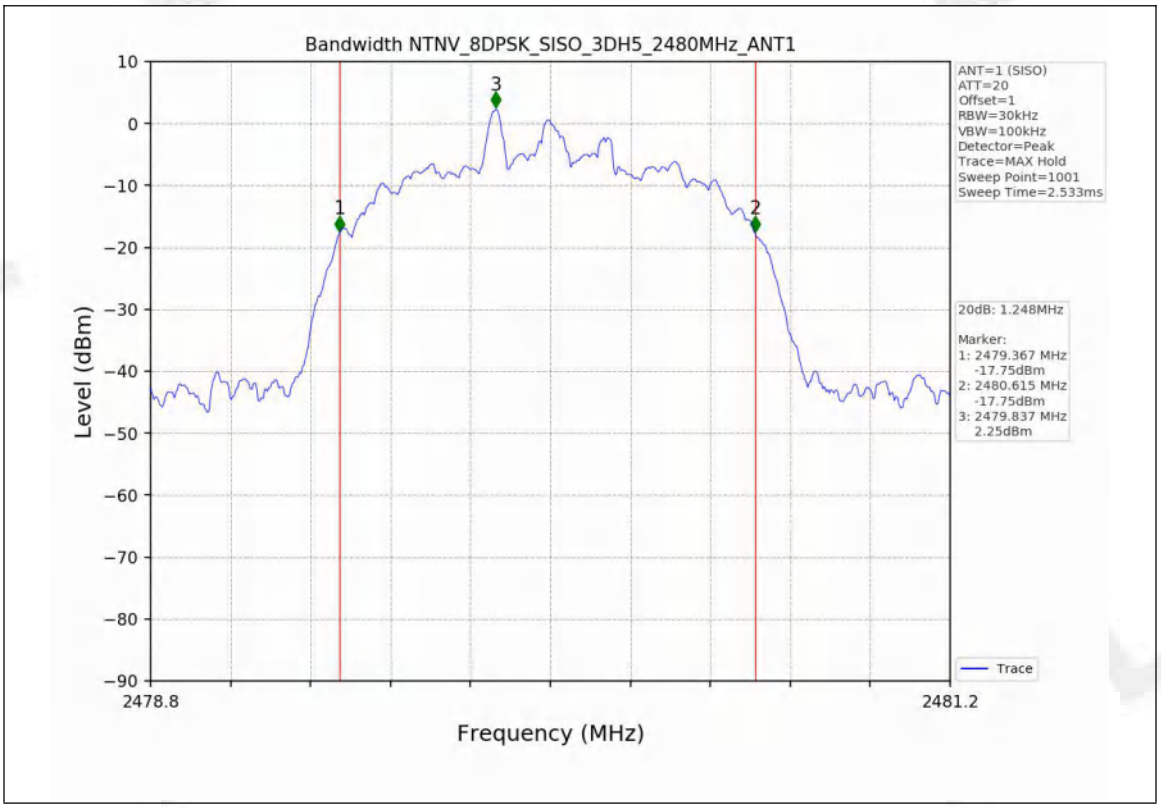

Bandwidth NTNV_Pi/4DQPSK_SISO_2DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.533ms
20dB: 1.271MHz
Marker:
1: 2401.372 MHz
-18.80dBm
2: 2402.643 MHz
-18.80dBm
3: 2401.993 MHz
1.20dBm
Trace
Level (dBm)
Frequency (MHz)
2400.8
2403.2


Bandwidth NTNV_Pi/4DQPSK_SISO_2DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.533ms
20dB: 1.308MHz
Marker:
1: 2440.345 MHz
-20.19dBm
2: 2441.653 MHz
-20.19dBm
3: 2441.005 MHz
-0.19dBm
Trace
Level (dBm)
Frequency (MHz)
2439.8
2442.2

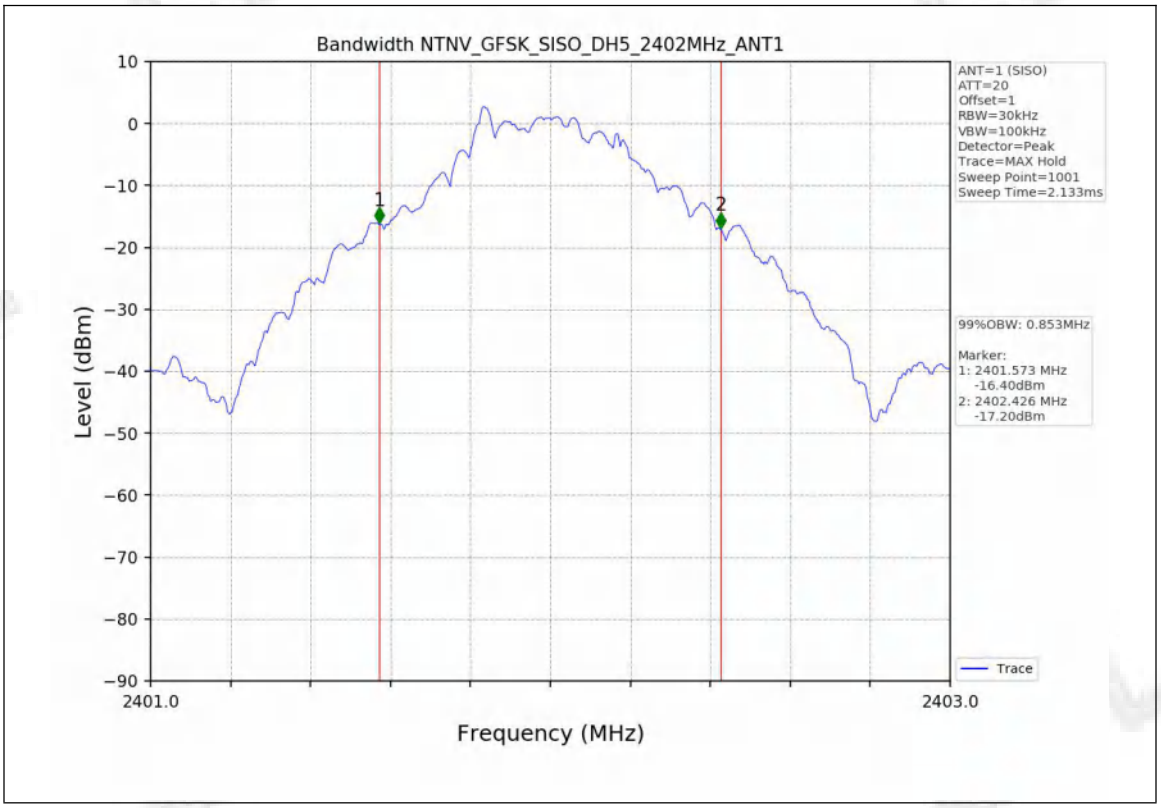

Bandwidth NTNV_Pi/4DQPSK_SISO_2DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.533ms
20dB: 1.268MHz
Marker:
1: 2479.372 MHz
-19.30dBm
2: 2480.640 MHz
-19.30dBm
3: 2479.995 MHz
0.70dBm
Trace
Level (dBm)
Frequency (MHz)
2478.8
2481.2

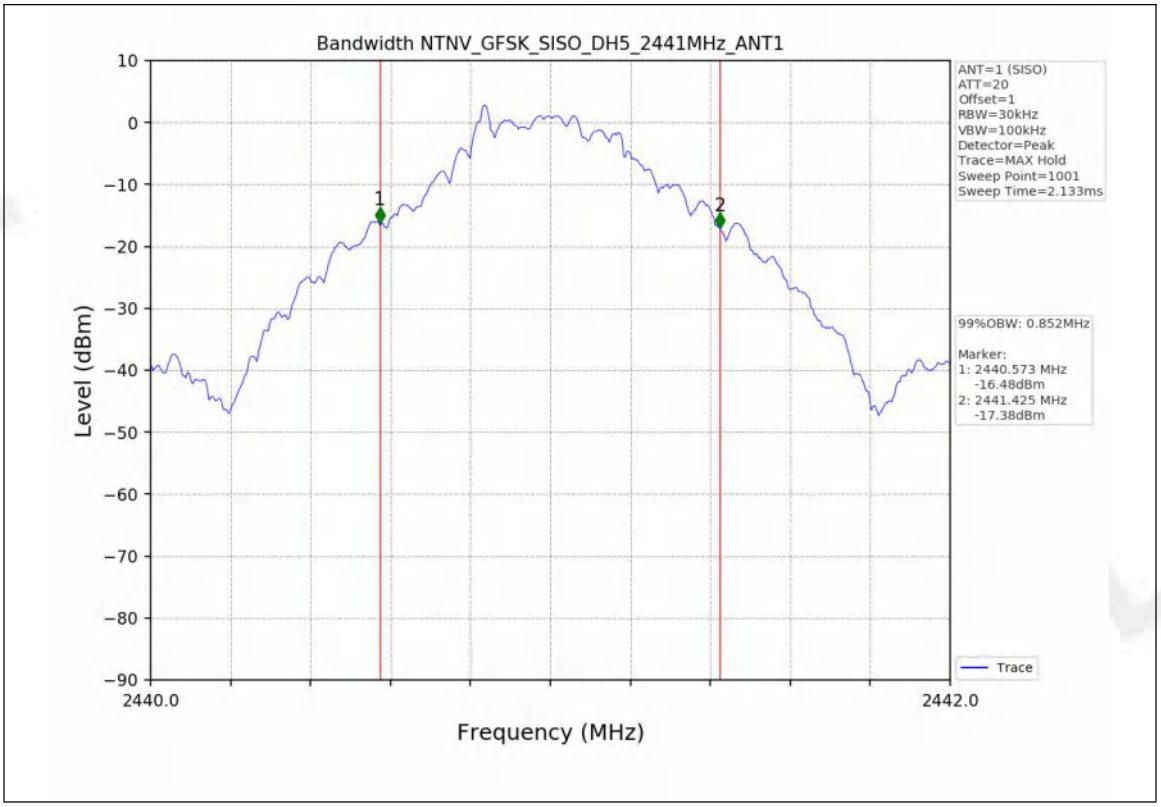

Bandwidth NTNV_8DPSK_SISO_3DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.533ms
20dB: 1.251MHz
Marker:
1: 2401.364 MHz
-17.24dBm
2: 2402.615 MHz
-17.24dBm
3: 2401.837 MHz
2.76dBm
Trace
Level (dBm)
Frequency (MHz)
2400.8
2403.2

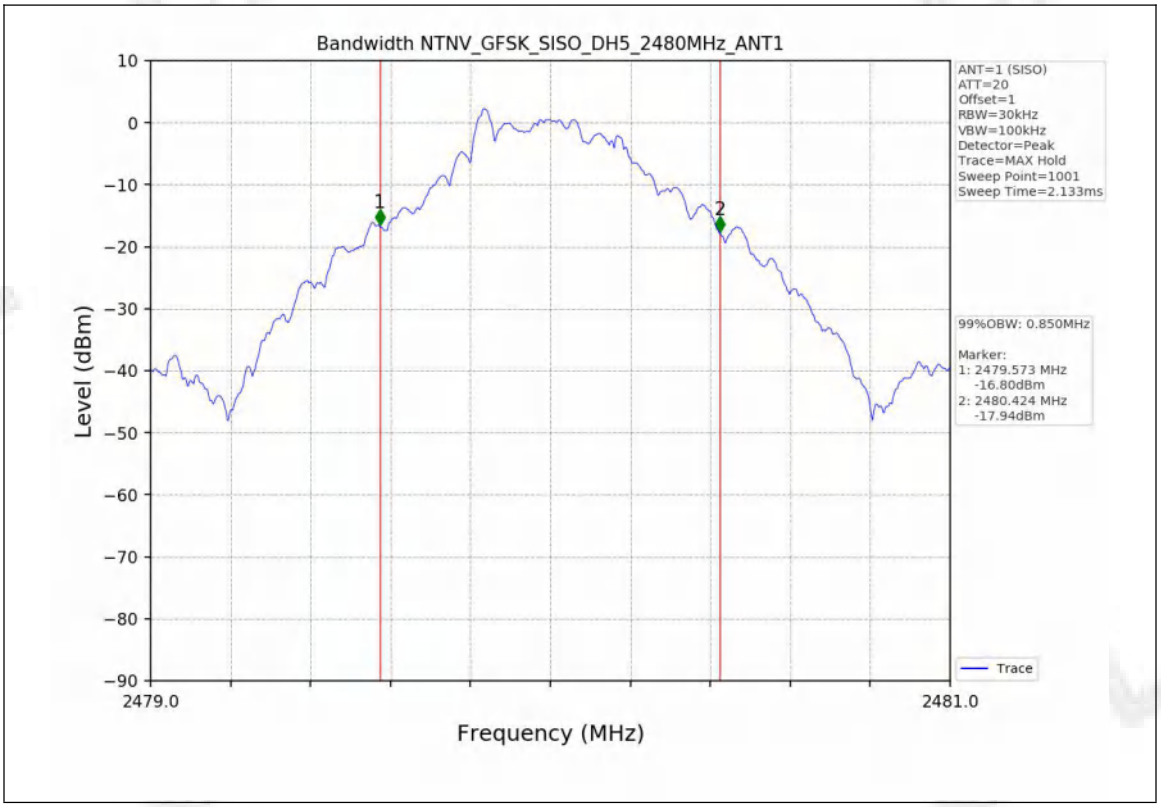

Bandwidth NTNV_8DPSK_SISO_3DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.533ms
20dB: 1.249MHz
Marker:
1: 2440.366 MHz
-17.26dBm
2: 2441.615 MHz
-17.26dBm
3: 2440.837 MHz
2.74dBm
Trace
Level (dBm)
Frequency (MHz)
2439.8
2442.2

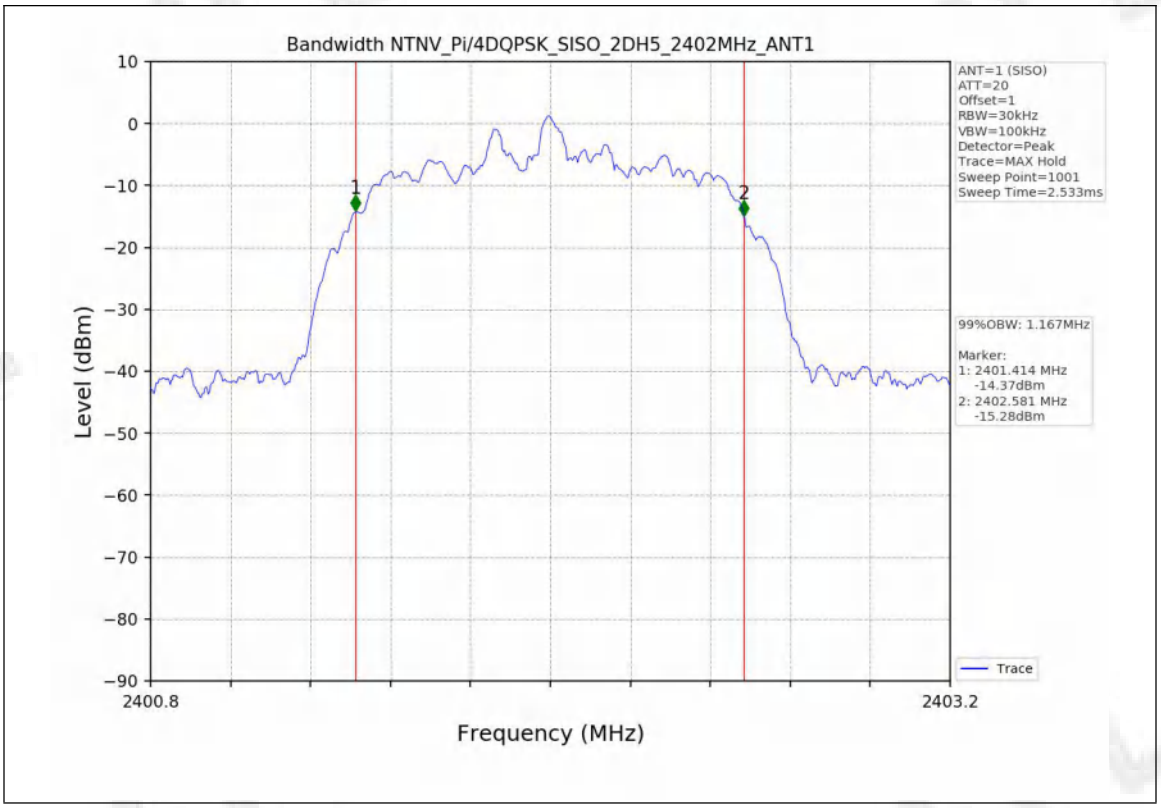

Bandwidth NTNV_8DPSK_SISO_3DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.533ms
20dB: 1.248MHz
Marker:
1: 2479.367 MHz
-17.75dBm
2: 2480.615 MHz
-17.75dBm
3: 2479.837 MHz
2.25dBm
Trace
Level (dBm)
Frequency (MHz)
2478.8
2481.2

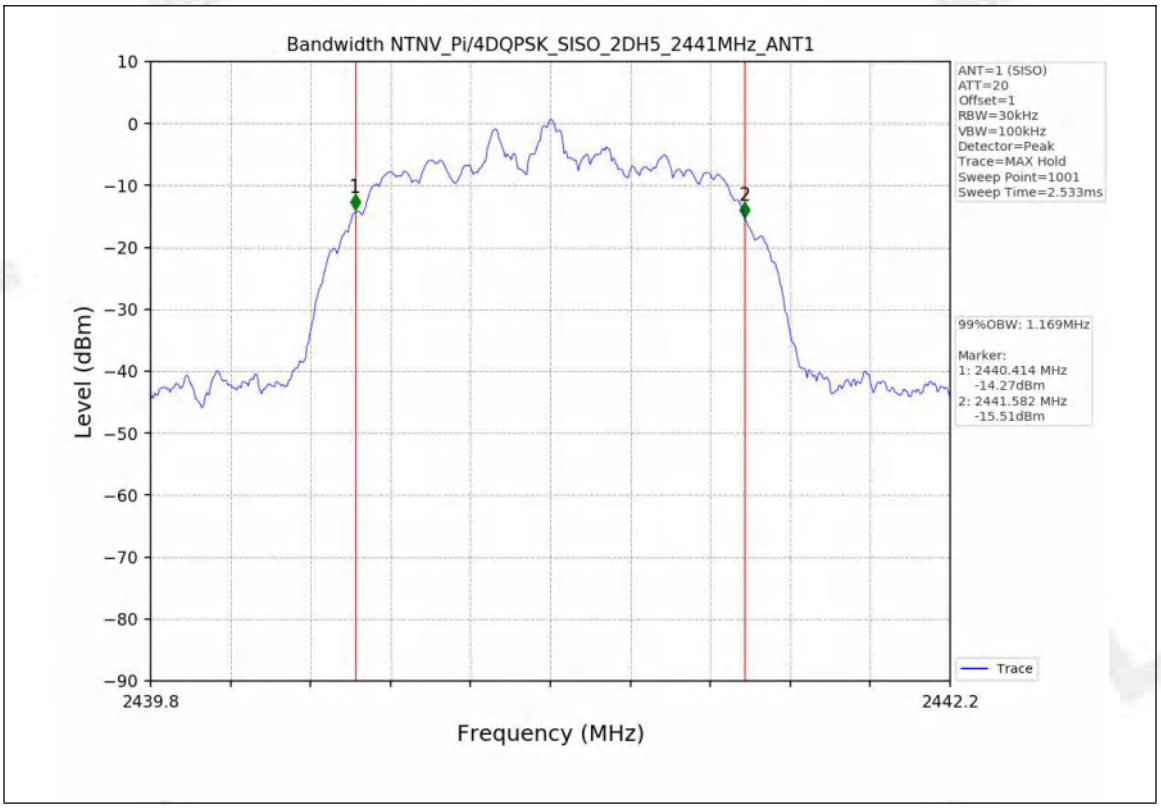
1.3 Test Graph - 99% Occupied Bandwidth

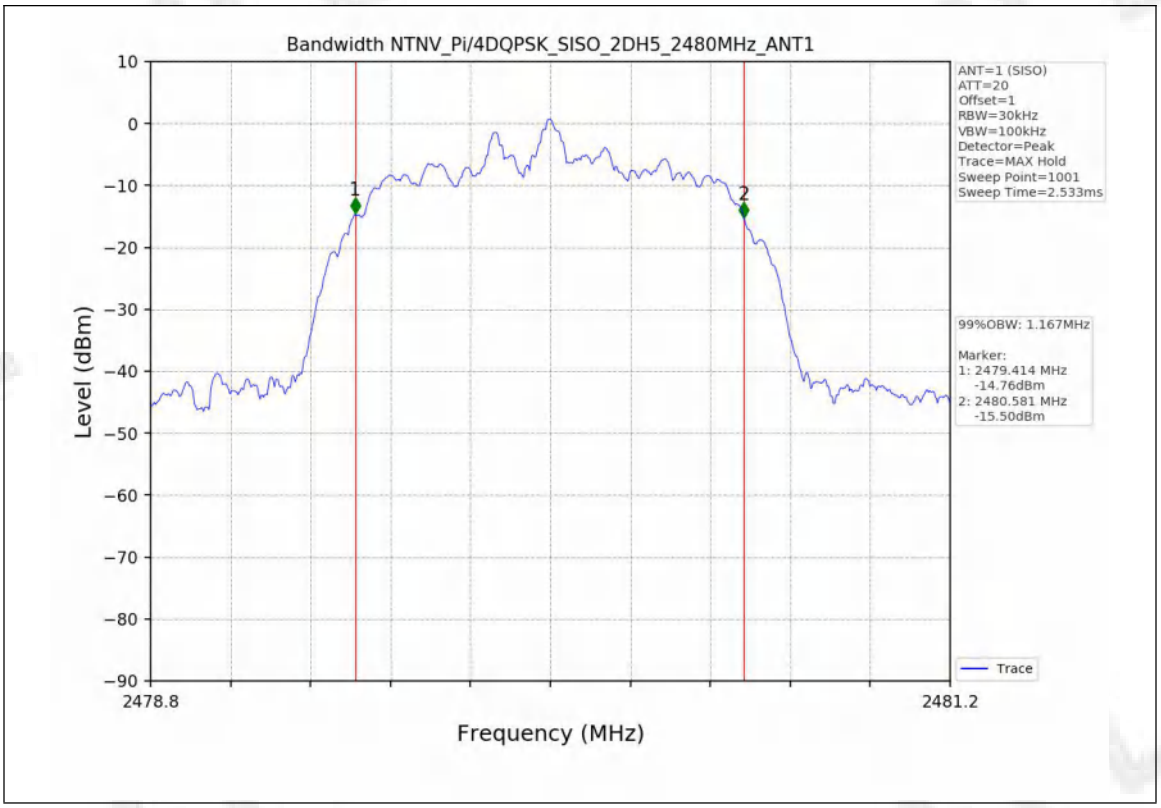


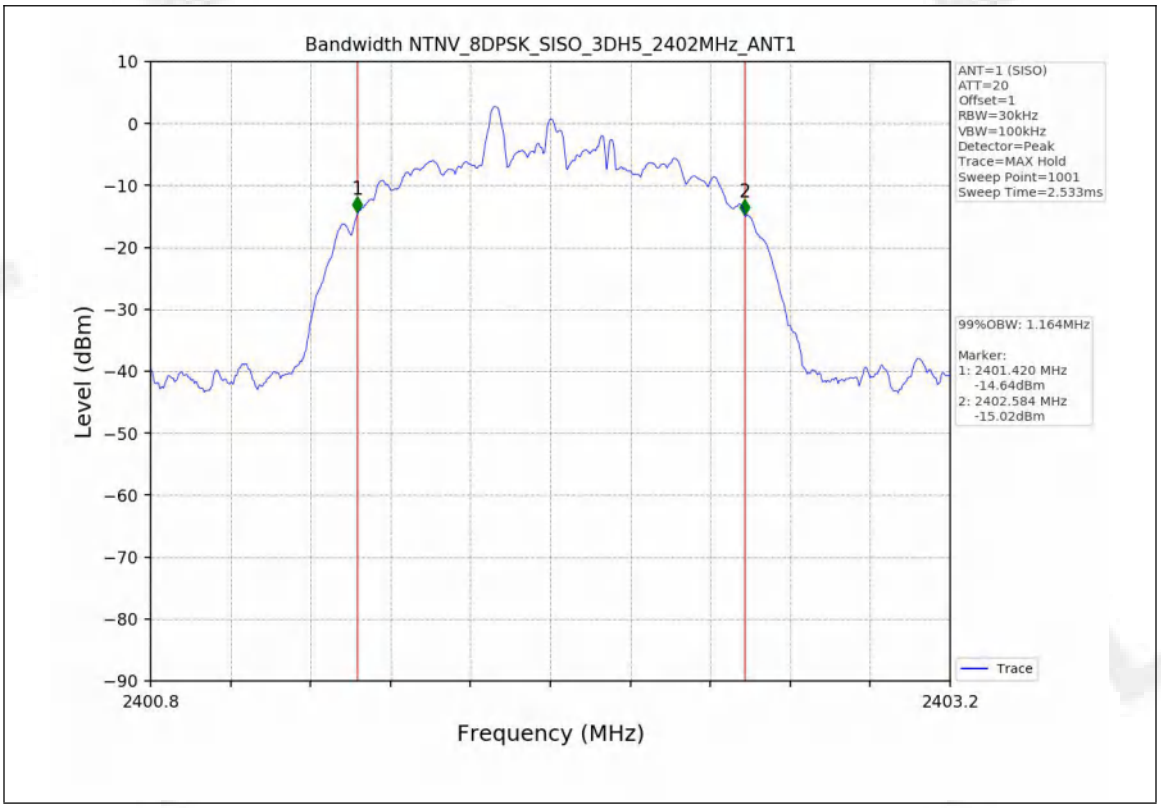


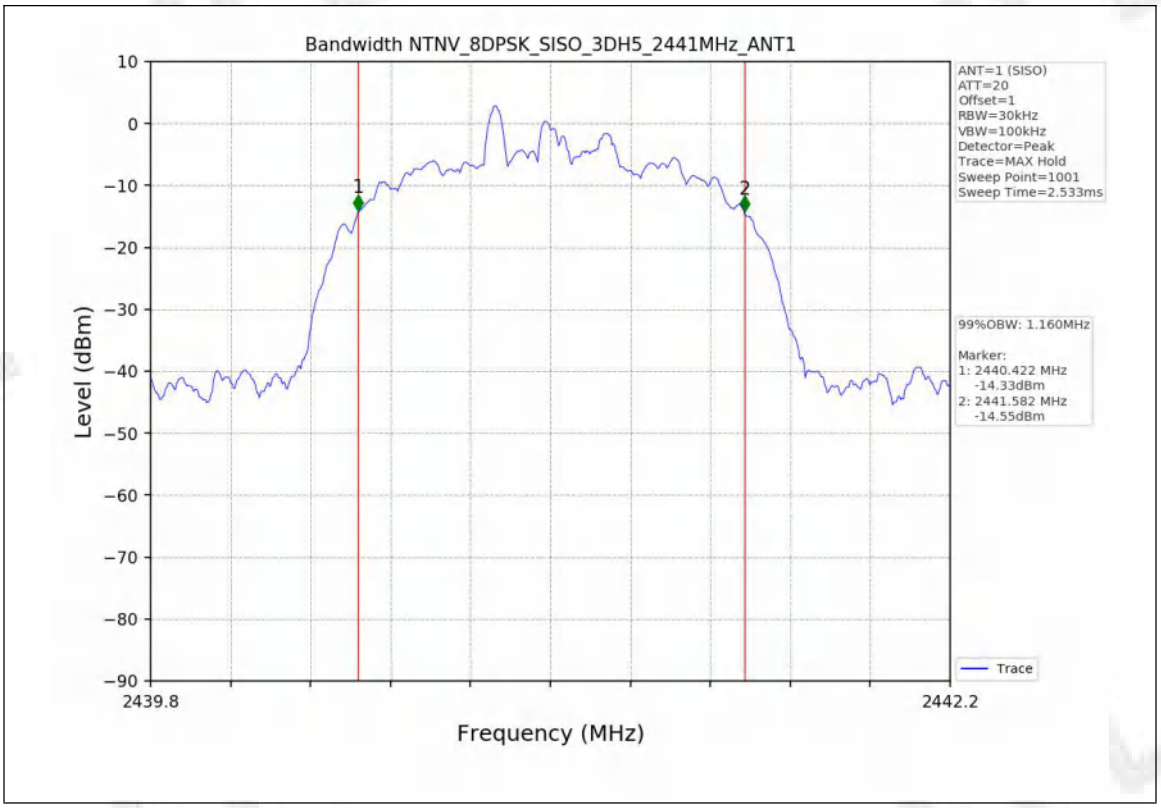

Bandwidth NTNV_GFSK_SISO_DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.133ms
99%OBW: 0.850MHz
Marker:
1: 2479.573 MHz
-16.80dBm
2: 2480.424 MHz
-17.94dBm
Trace
Level (dBm)
Frequency (MHz)
2479.0
2481.0

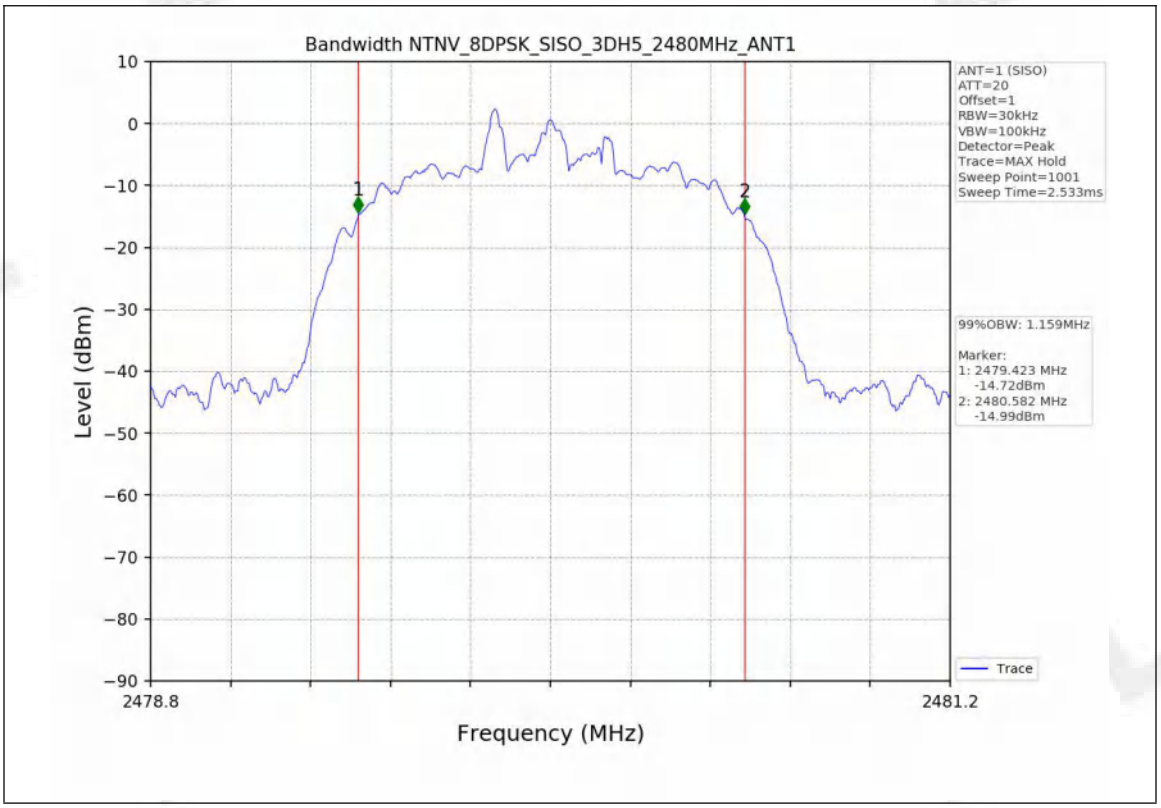

Bandwidth NTNV_Pi/4DQPSK_SISO_2DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.533ms
99%OBW: 1.167MHz
Marker:
1: 2401.414 MHz
-14.37dBm
2: 2402.581 MHz
-15.28dBm
Trace
Level (dBm)
Frequency (MHz)
2400.8
2403.2


Bandwidth NTNV_Pi/4DQPSK_SISO_2DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.533ms
99%OBW: 1.169MHz
Marker:
1: 2440.414 MHz
-14.27dBm
2: 2441.582 MHz
-15.51dBm
Trace
Level (dBm)
Frequency (MHz)
2439.8
2442.2


Bandwidth NTNV_Pi/4DQPSK_SISO_2DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.533ms
99%OBW: 1.167MHz
Marker:
1: 2479.414 MHz
-14.76dBm
2: 2480.581 MHz
-15.50dBm
Trace
Level (dBm)
Frequency (MHz)
2478.8
2481.2


Bandwidth NTNV_8DPSK_SISO_3DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.533ms
99%OBW: 1.164MHz
Marker:
1: 2401.420 MHz
-14.64dBm
2: 2402.584 MHz
-15.02dBm
Trace
Level (dBm)
Frequency (MHz)
2400.8
2403.2


Bandwidth NTNV_8DPSK_SISO_3DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.533ms
99%OBW: 1.160MHz
Marker:
1: 2440.422 MHz
-14.33dBm
2: 2441.582 MHz
-14.55dBm
Trace
Level (dBm)
Frequency (MHz)
2439.8
2442.2

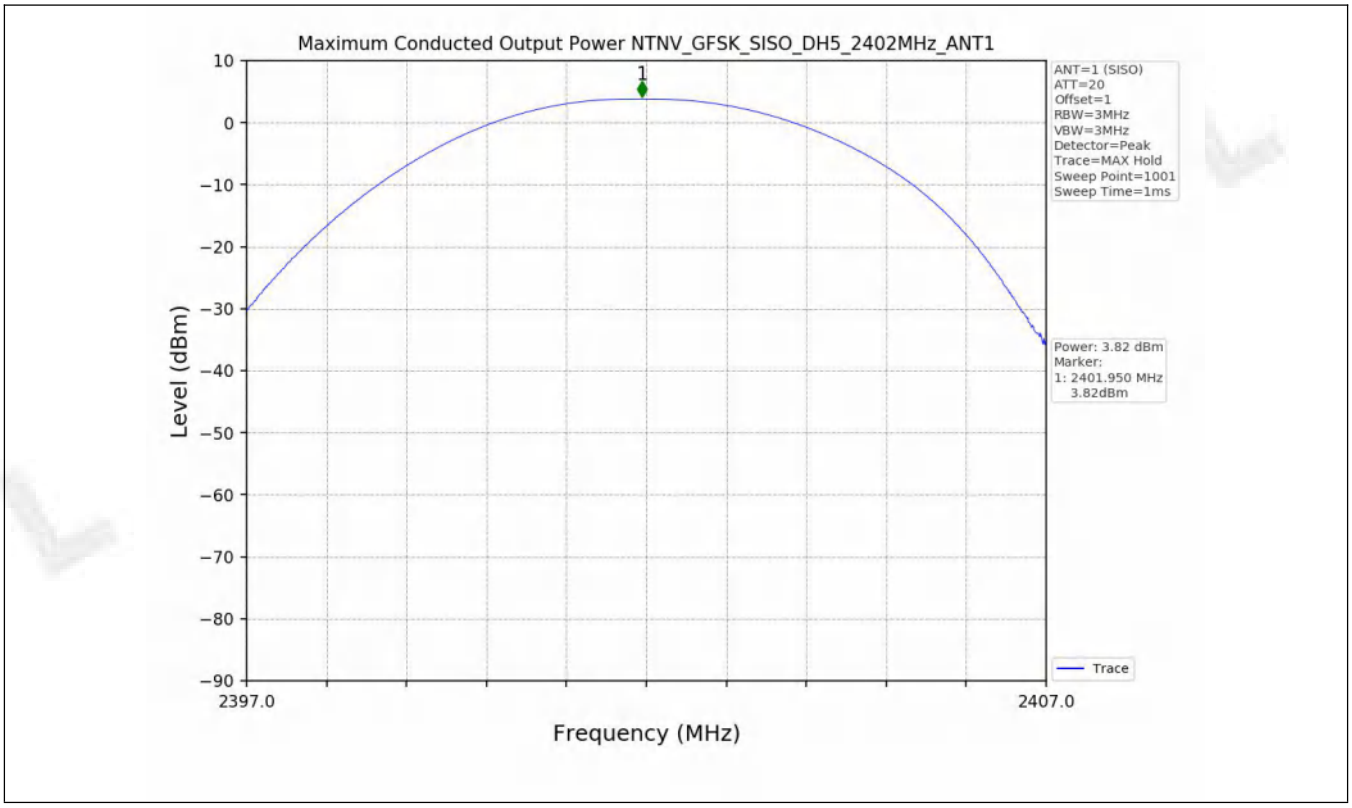

Bandwidth NTNV_8DPSK_SISO_3DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=30kHz
VBW=100kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.533ms
99%OBW: 1.159MHz
Marker:
1: 2479.423 MHz
-14.72dBm
2: 2480.582 MHz
-14.99dBm
Trace
Level (dBm)
Frequency (MHz)
2478.8
2481.2

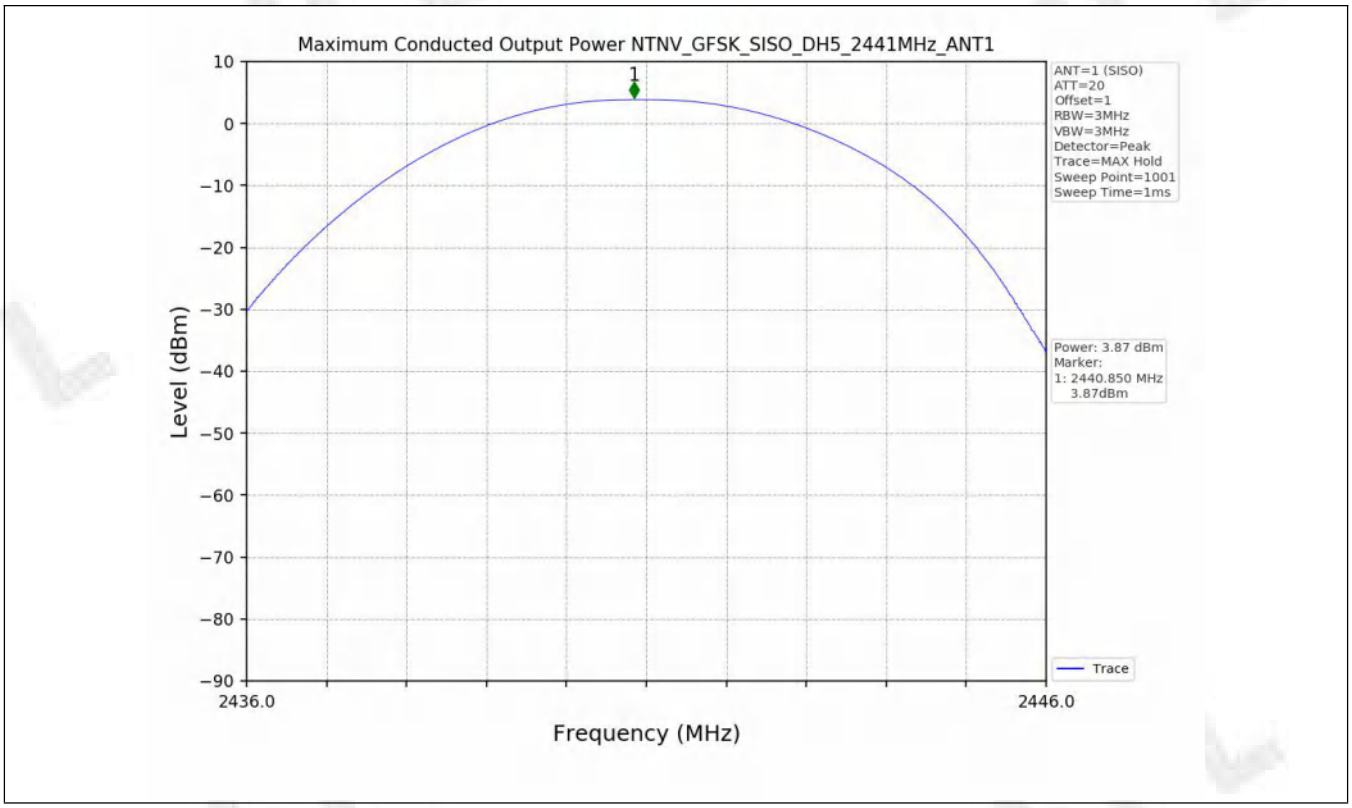
2. Maximum Conducted Output Power

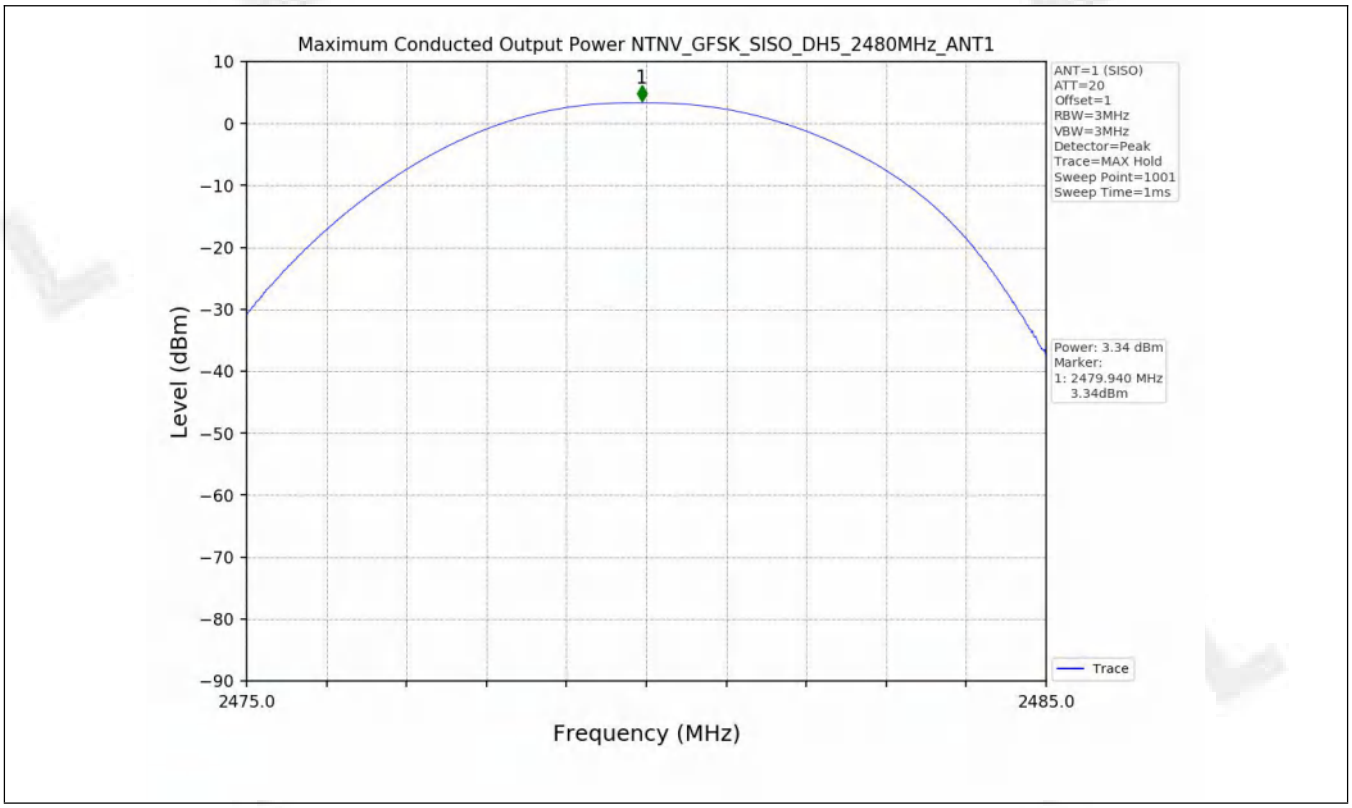
2.1 Test Result

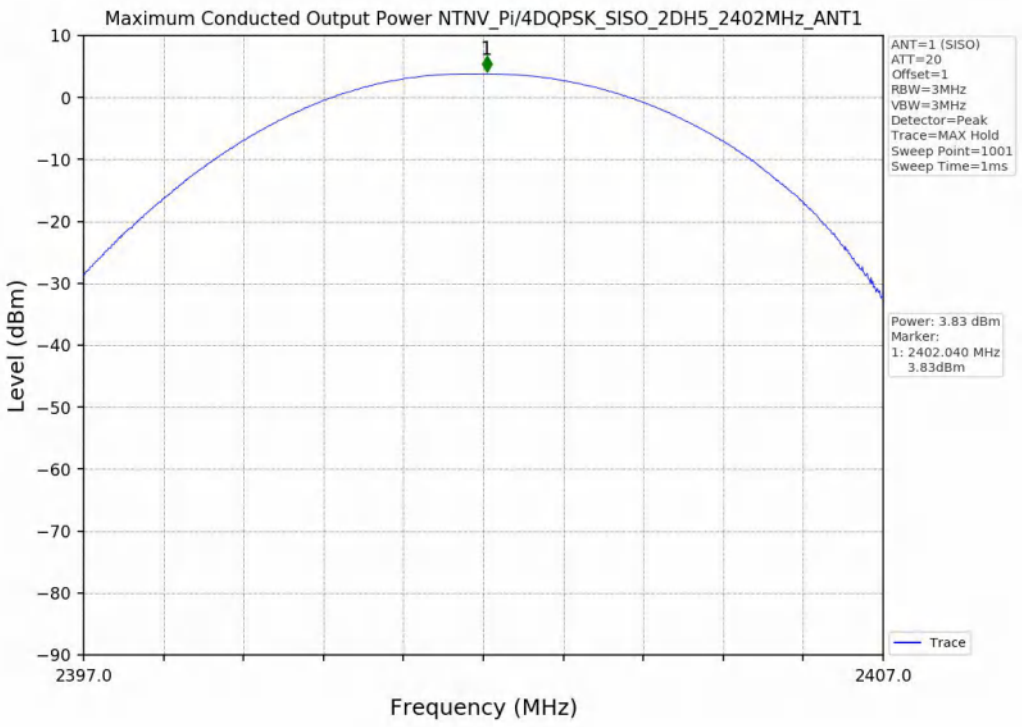
Test Mode	Frequency (MHz)	Tx Type	Measured Peak Output Power (dBm)	Limits (dBm)	Verdict
			Ant 1		
GFSK	2402	SISO	3.82	30	PASS
	2441	SISO	3.87	30	PASS
	2480	SISO	3.34	30	PASS
Pi/4DQPSK	2402	SISO	3.83	20.97	PASS
	2441	SISO	3.87	20.97	PASS
	2480	SISO	3.35	20.97	PASS
8DPSK	2402	SISO	3.99	20.97	PASS
	2441	SISO	4.03	20.97	PASS
	2480	SISO	3.51	20.97	PASS

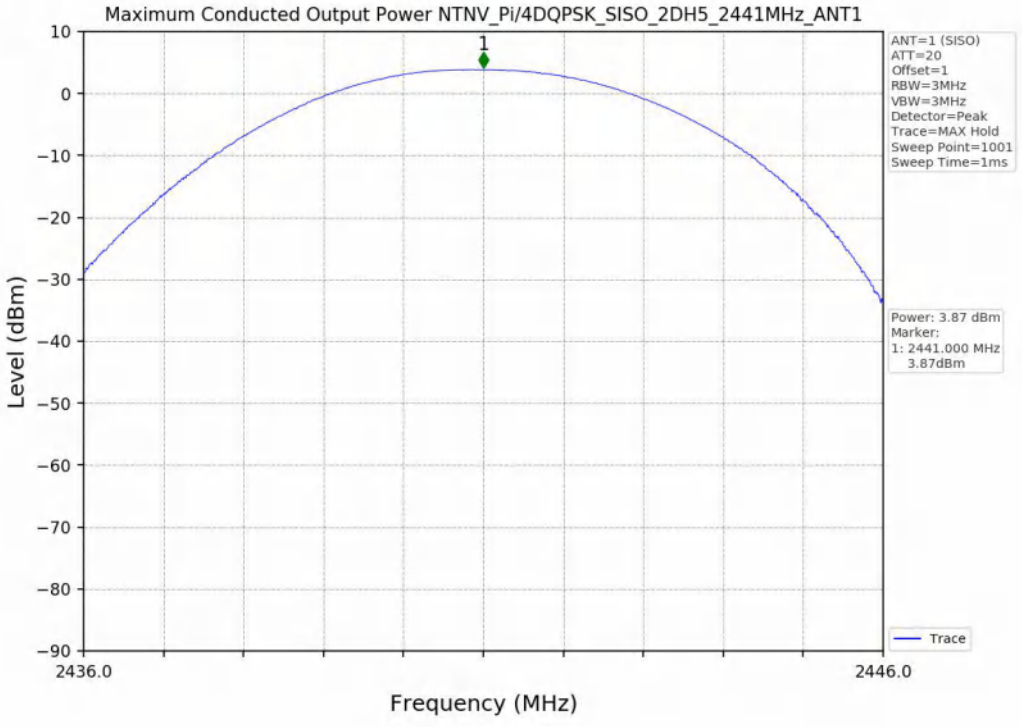
2.2 Test Graph



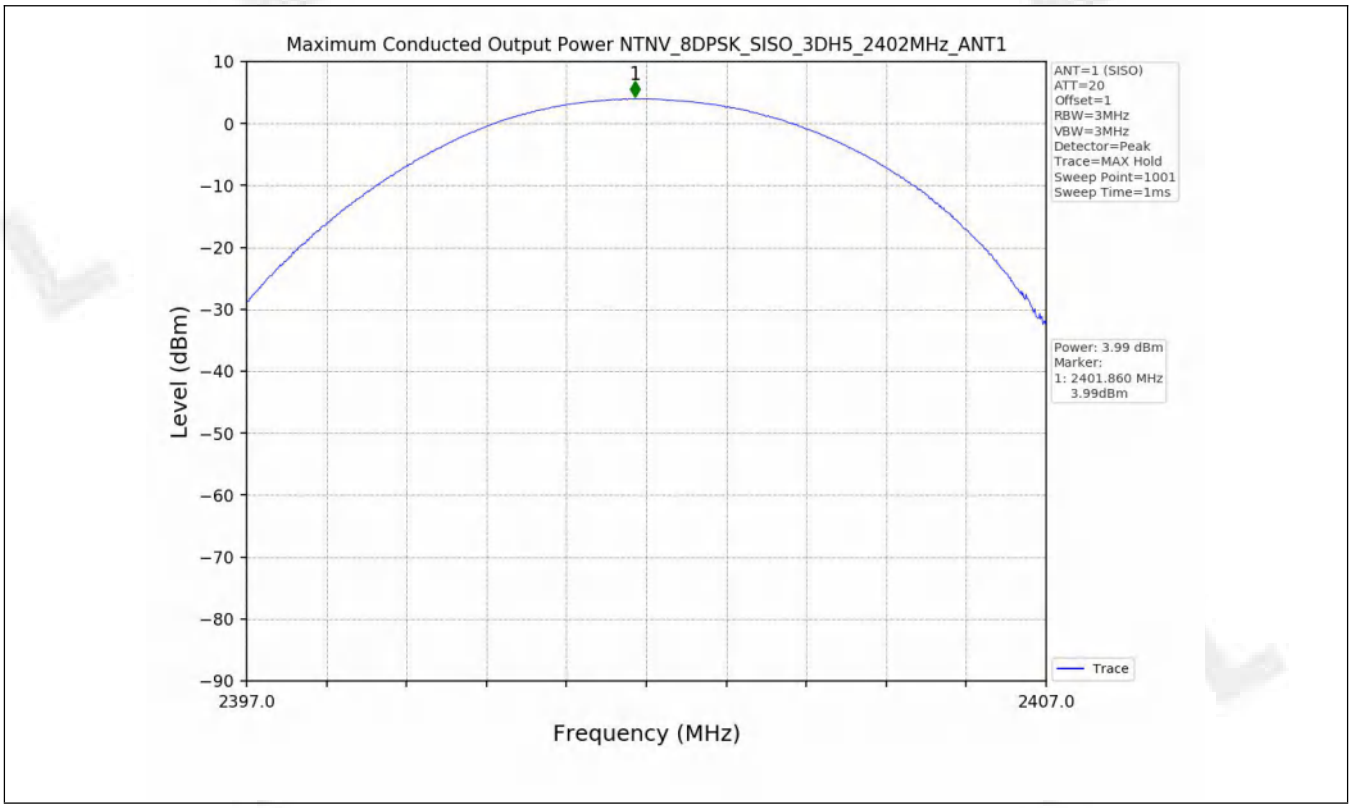

Maximum Conducted Output Power NTNV_GFSK_SISO_DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=3MHz
VBW=3MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Power: 3.87 dBm
Marker:
1: 2440.850 MHz
3.87dBm
Trace
Level (dBm)
Frequency (MHz)
2436.0
2446.0


Maximum Conducted Output Power NTNV_GFSK_SISO_DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=3MHz
VBW=3MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Power: 3.34 dBm
Marker:
1: 2479.940 MHz
3.34dBm
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=1
RBW=3MHz
VBW=3MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Power: 3.83 dBm
Marker:
1: 2402.040 MHz
3.83dBm
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=1
RBW=3MHz
VBW=3MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Power: 3.87 dBm
Marker:
1: 2441.000 MHz
3.87dBm
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=1
RBW=3MHz
VBW=3MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Power: 3.35 dBm
Marker:
1: 2479.910 MHz
3.35dBm
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=1
RBW=3MHz
VBW=3MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Power: 3.99 dBm
Marker:
1: 2401.860 MHz
3.99dBm
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=1
RBW=3MHz
VBW=3MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Power: 4.03 dBm
Marker:
1: 2440.870 MHz
4.03dBm
Trace
Level (dBm)
Frequency (MHz)
2436.0
2446.0

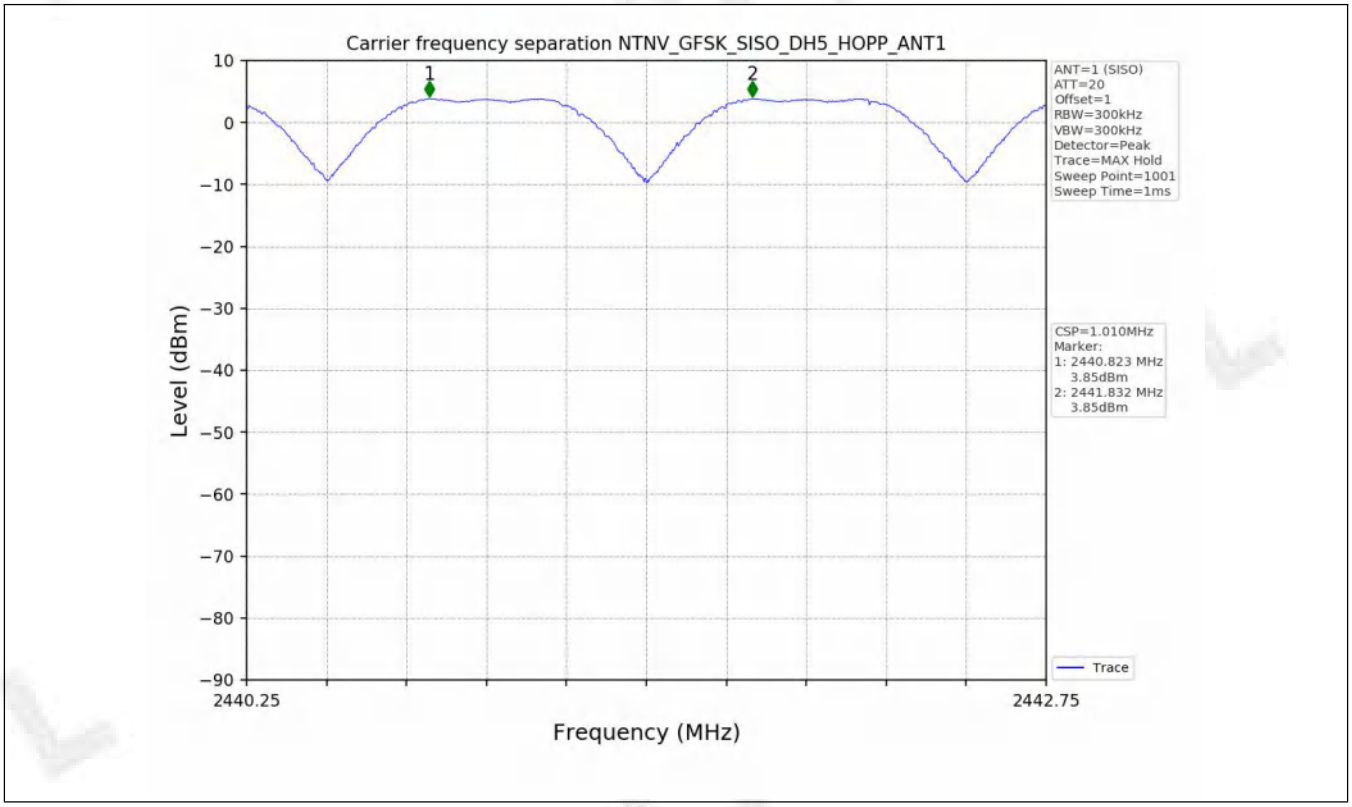
Maximum Conducted Output Power NTNV_8DPSK_SISO_3DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=3MHz
VBW=3MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Power: 3.51 dBm
Marker:
1: 2479.810 MHz
3.51dBm
Trace
Level (dBm)
Frequency (MHz)
2475.0
2485.0

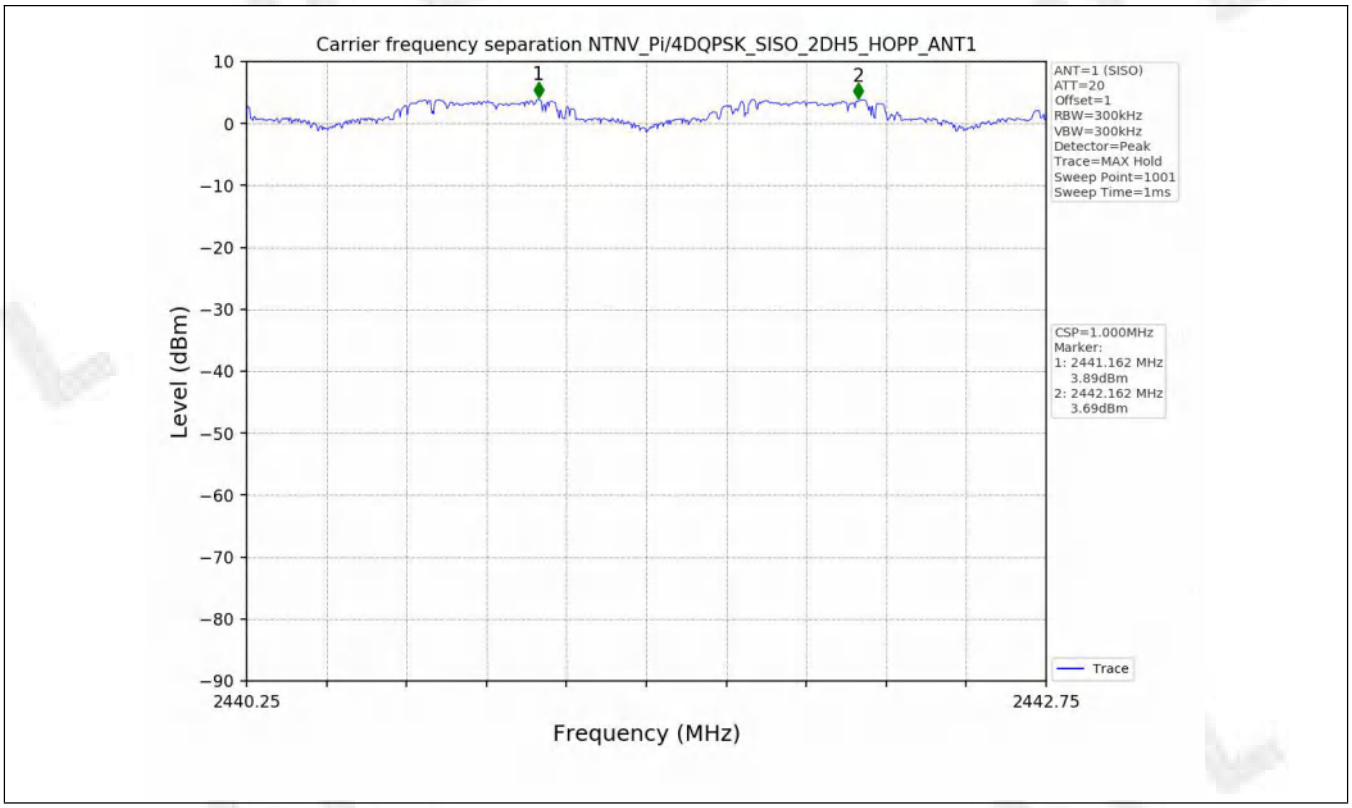
3. Carrier frequency separation

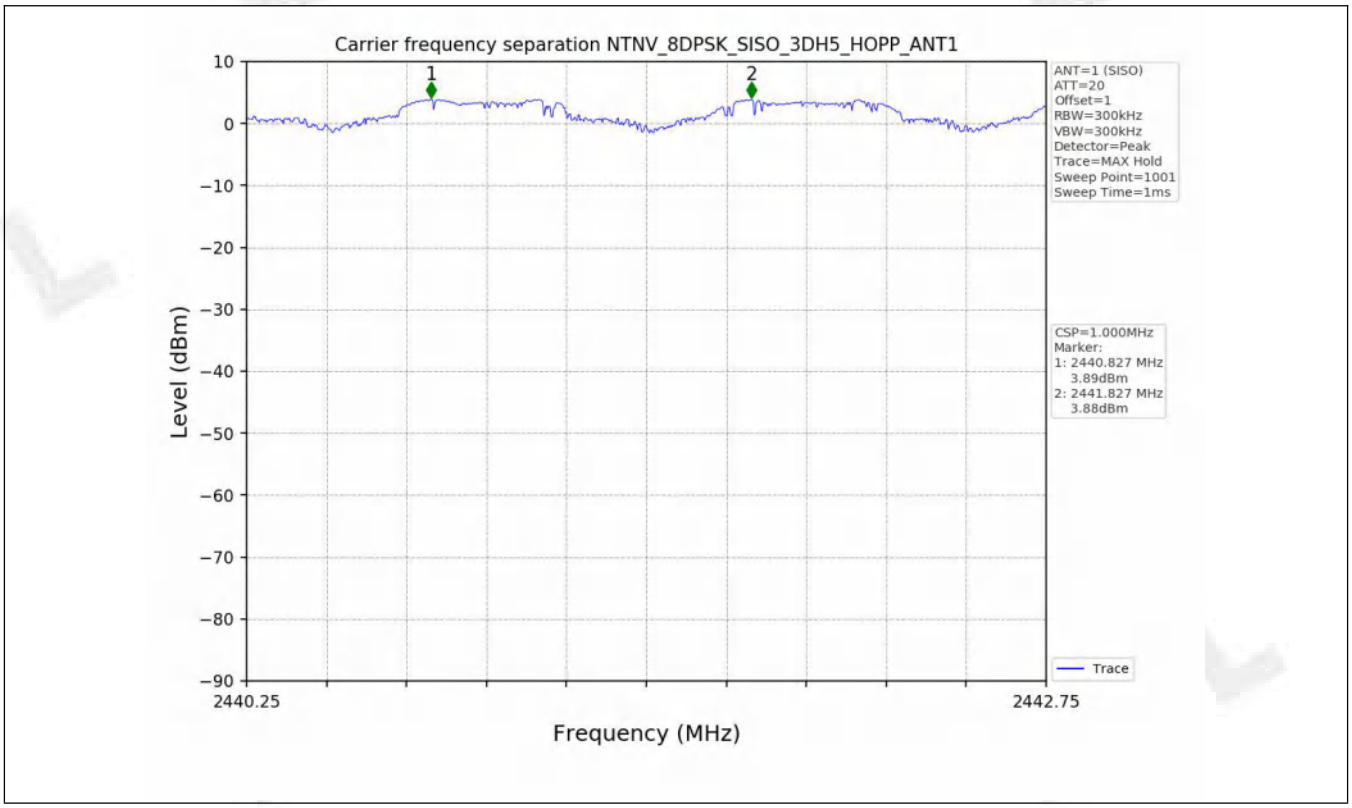
3.1 Test Result

Test Mode	TX Type	ANT No.	Channel Separation (MHz)	20dB Bandwidth (MHz)	Limits (MHz)	Verdict
GFSK	SISO	1	1.010	0.941	≥0.941	PASS
Pi/4DQPSK	SISO	1	1.000	1.308	≥0.872	PASS
8DPSK	SISO	1	1.000	1.251	≥0.834	PASS

3.2 Test Graph




Carrier frequency separation NTNV_Pi/4DQPSK_SISO_2DH5_HOPP_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=300kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
CSP=1.000MHz
Marker:
1: 2441.162 MHz
3.89dBm
2: 2442.162 MHz
3.69dBm
Trace
Level (dBm)
Frequency (MHz)
2440.25
2442.75

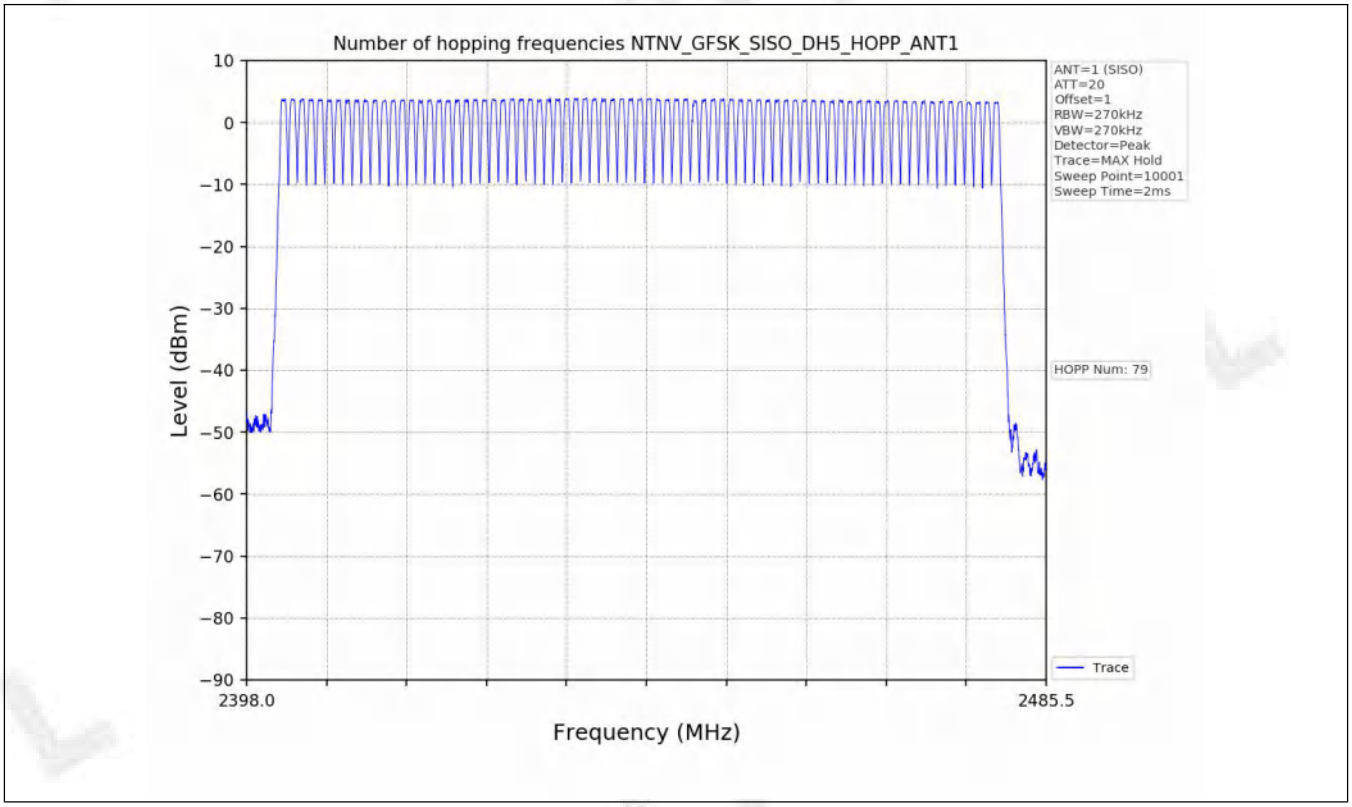

Carrier frequency separation NTNV_8DPSK_SISO_3DH5_HOPP_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=300kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
CSP=1.000MHz
Marker:
1: 2440.827 MHz
3.89dBm
2: 2441.827 MHz
3.88dBm
Trace
Level (dBm)
Frequency (MHz)
2440.25
2442.75

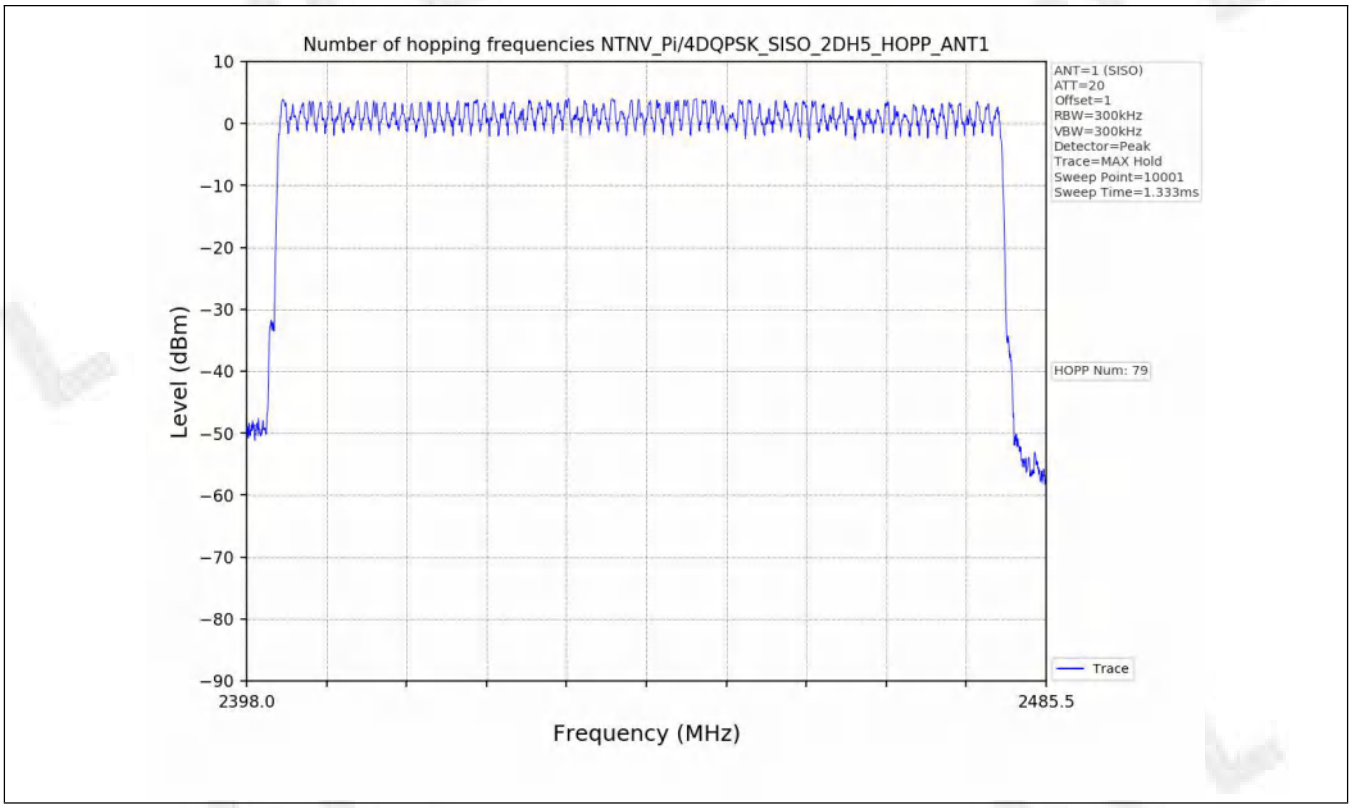
4. Number of hopping frequencies

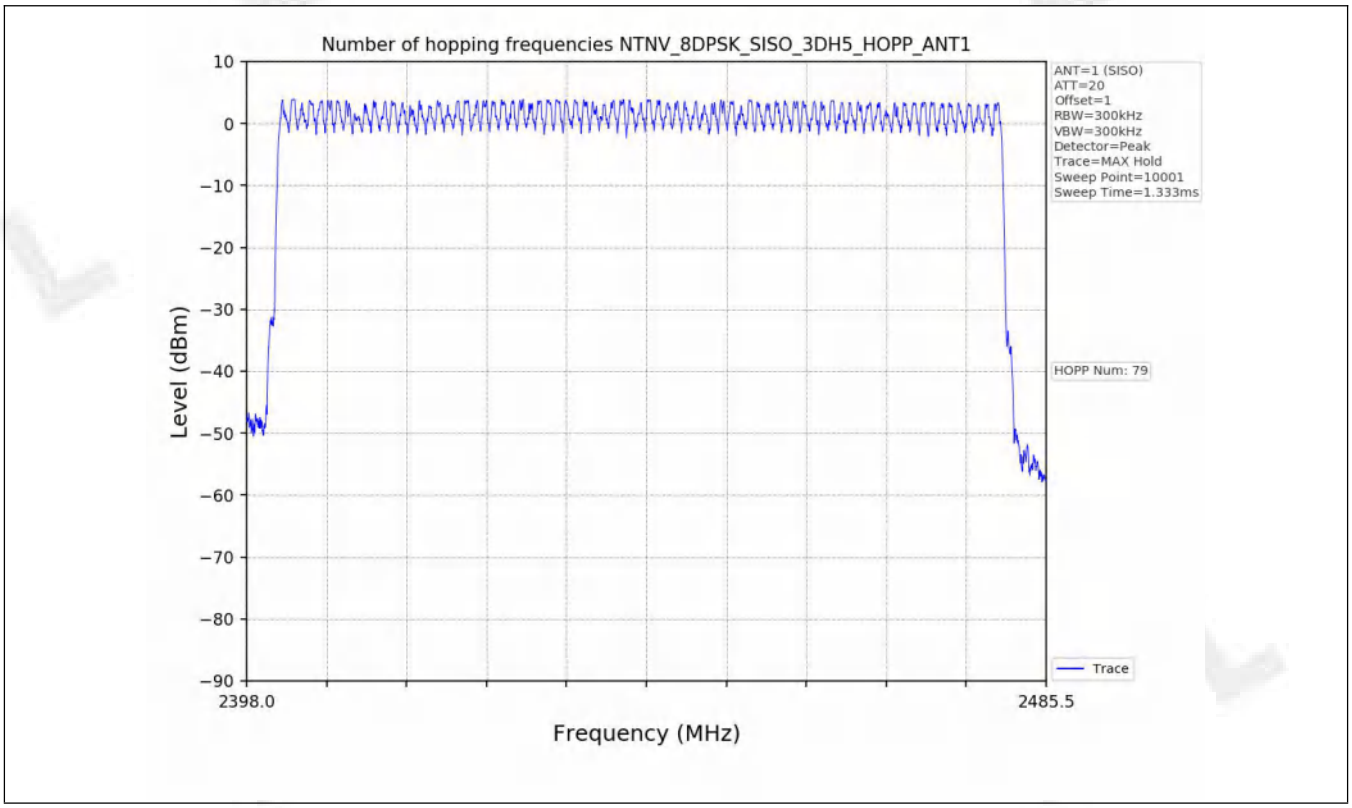
4.1 Test Result

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=1
RBW=300kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=10001
Sweep Time=1.333ms
HOPP Num: 79
Trace
Level (dBm)
Frequency (MHz)
2398.0
2485.5

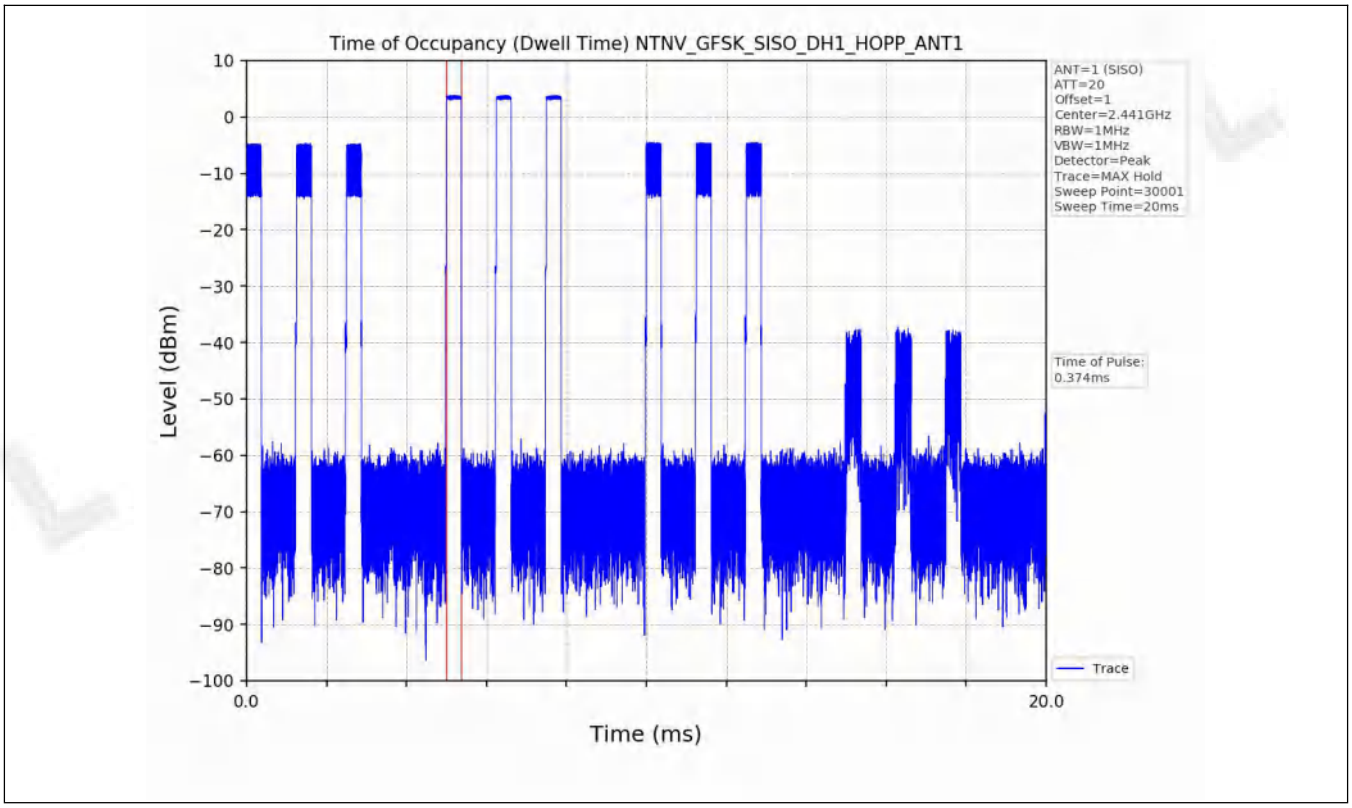

Number of hopping frequencies NTNV_8DPSK_SISO_3DH5_HOPP_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=300kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=10001
Sweep Time=1.333ms
HOPP Num: 79
Trace
Level (dBm)
Frequency (MHz)
2398.0
2485.5

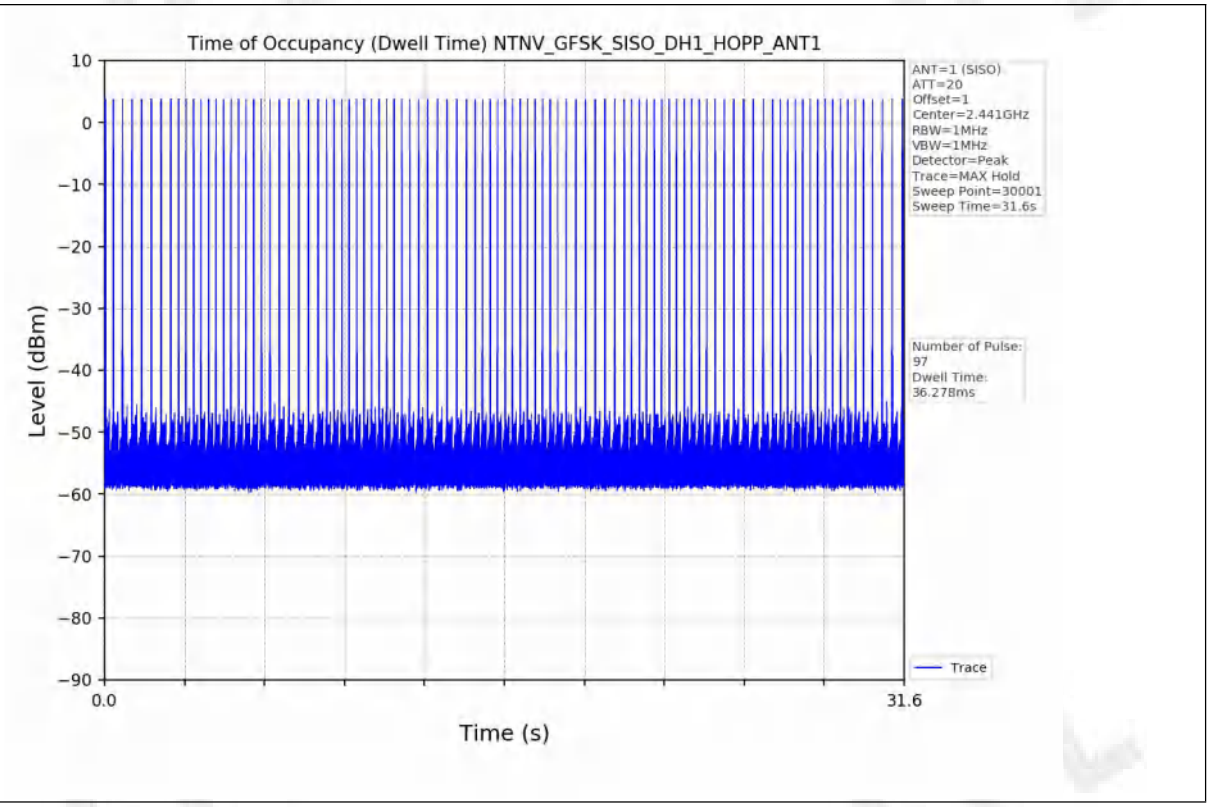
5. Time of Occupancy (Dwell Time)

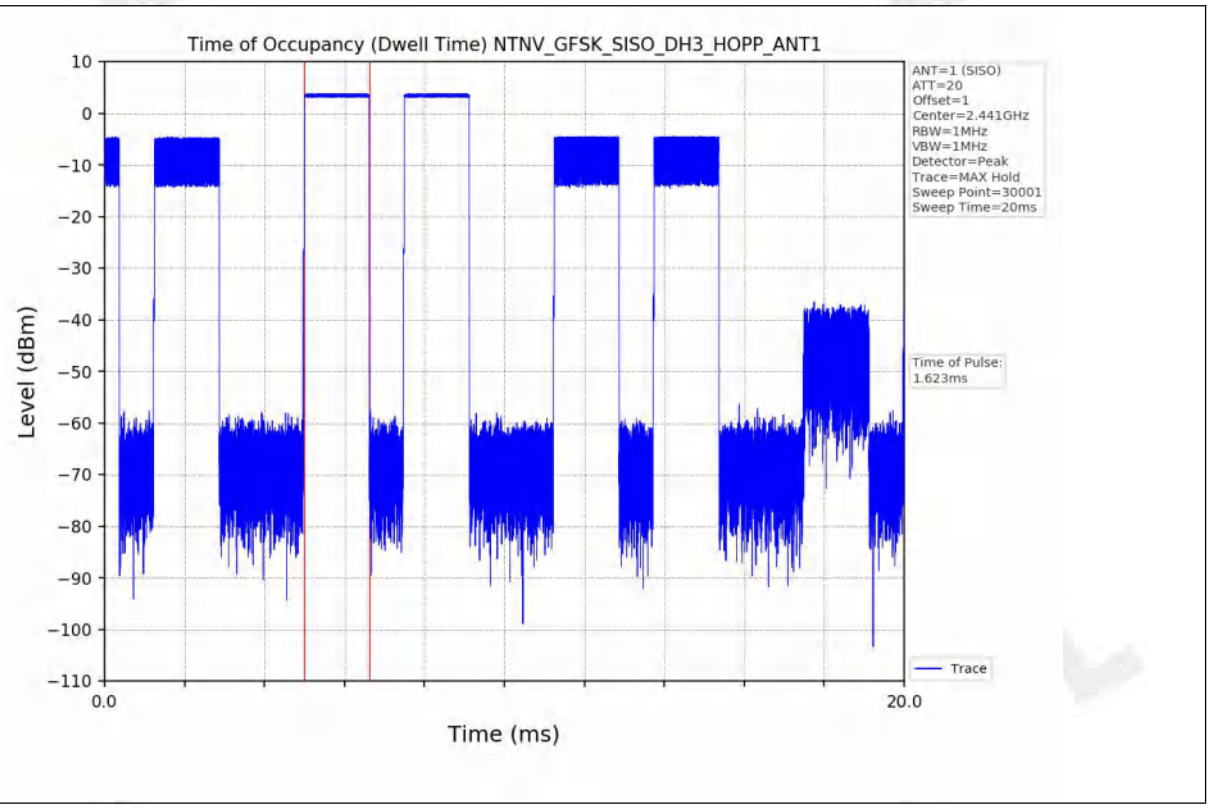
5.1 Test Result

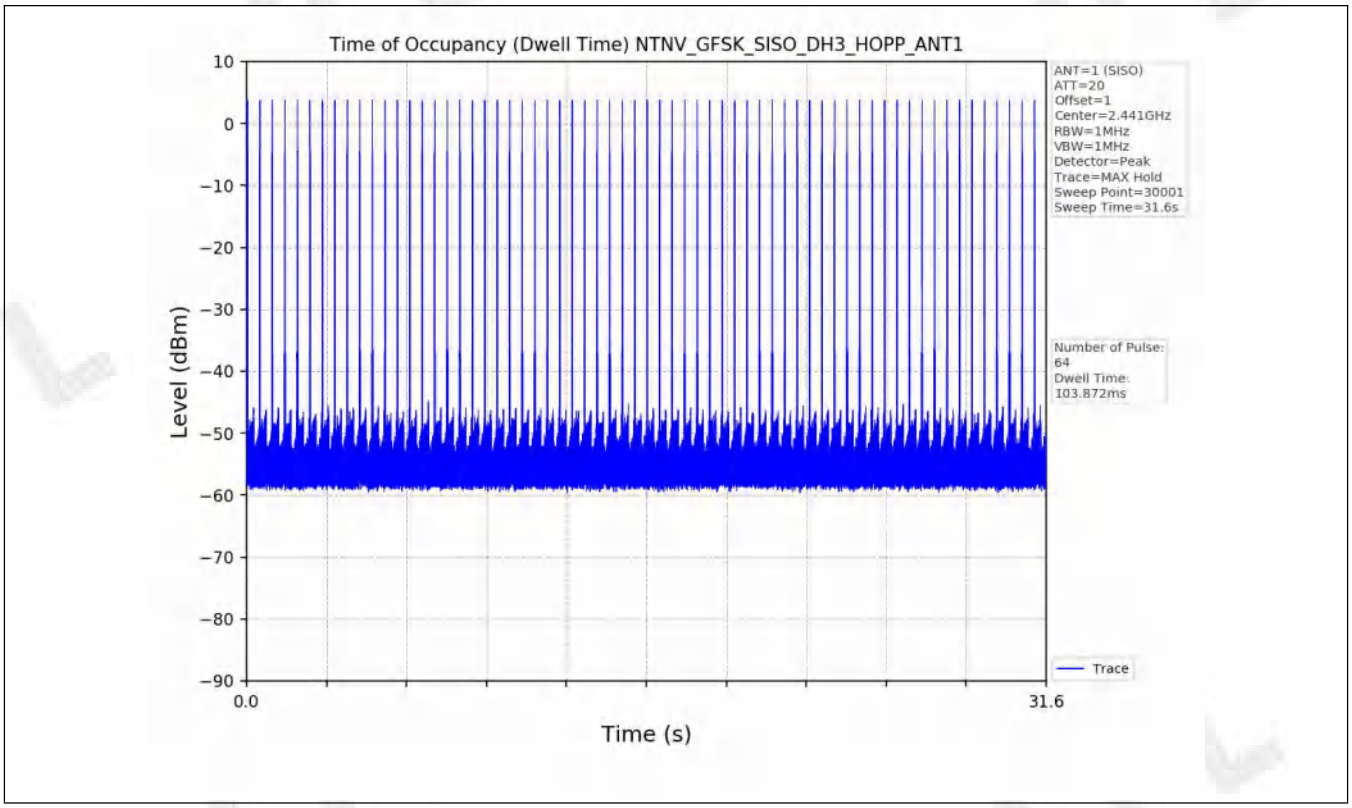
Test Mode	Packet Type	TX Type	ANT No.	Duration of Single Pulse (ms)	Obeservation Period (s)	Num of Pulse in Observation Period	Dwell Time (ms)	Limits (ms)	Verdict
GFSK	DH1	SISO	1	0.374	31.6	97	36.278	≤400	PASS
	DH3	SISO	1	1.623	31.6	64	103.872	≤400	PASS
	DH5	SISO	1	2.870	31.6	46	132.020	≤400	PASS
Pi/4DQPSK	2DH1	SISO	1	0.408	31.6	97	39.576	≤400	PASS
	2DH3	SISO	1	1.659	31.6	64	106.176	≤400	PASS
	2DH5	SISO	1	2.908	31.6	46	133.768	≤400	PASS
8DPSK	3DH1	SISO	1	0.407	31.6	320	130.240	≤400	PASS
	3DH3	SISO	1	1.633	31.6	160	261.280	≤400	PASS
	3DH5	SISO	1	2.883	31.6	106	305.598	≤400	PASS

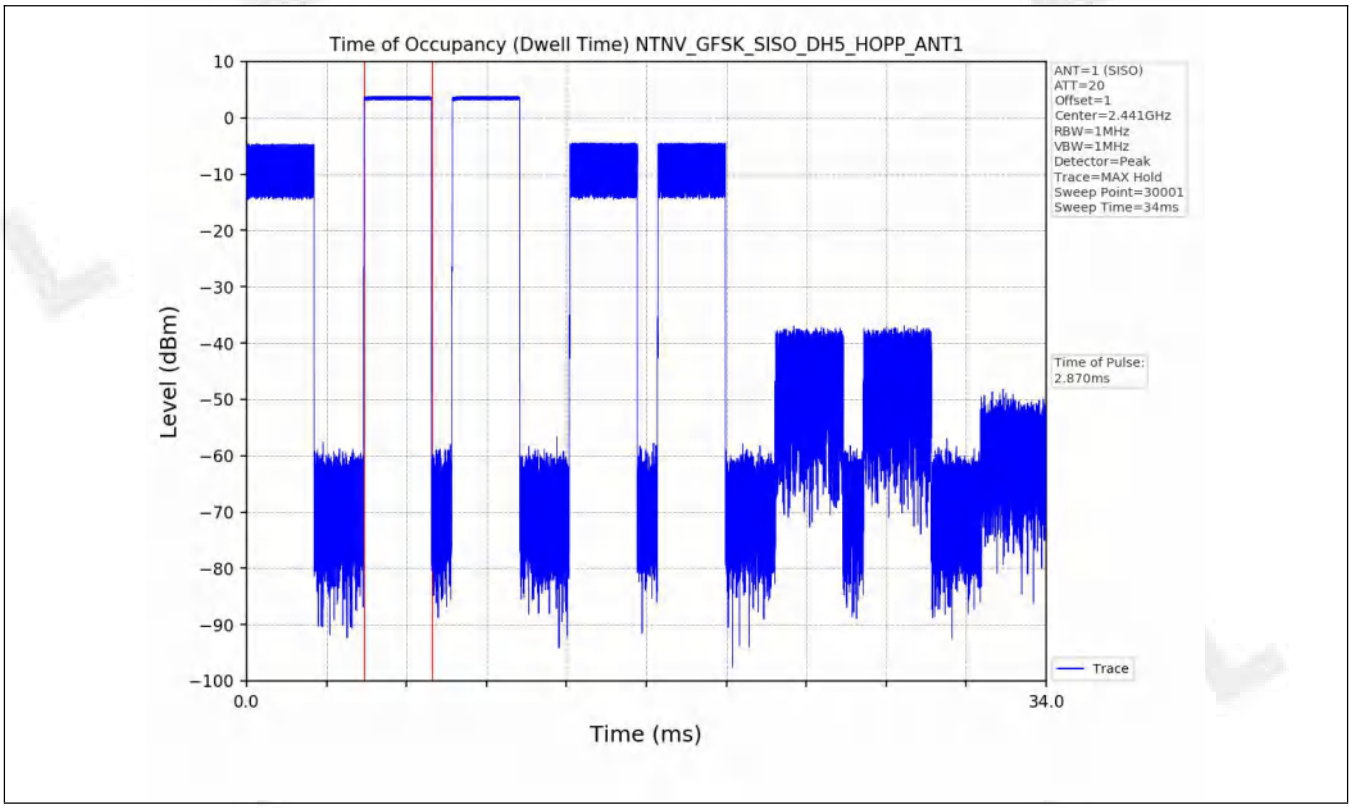
5.2 Test Graph

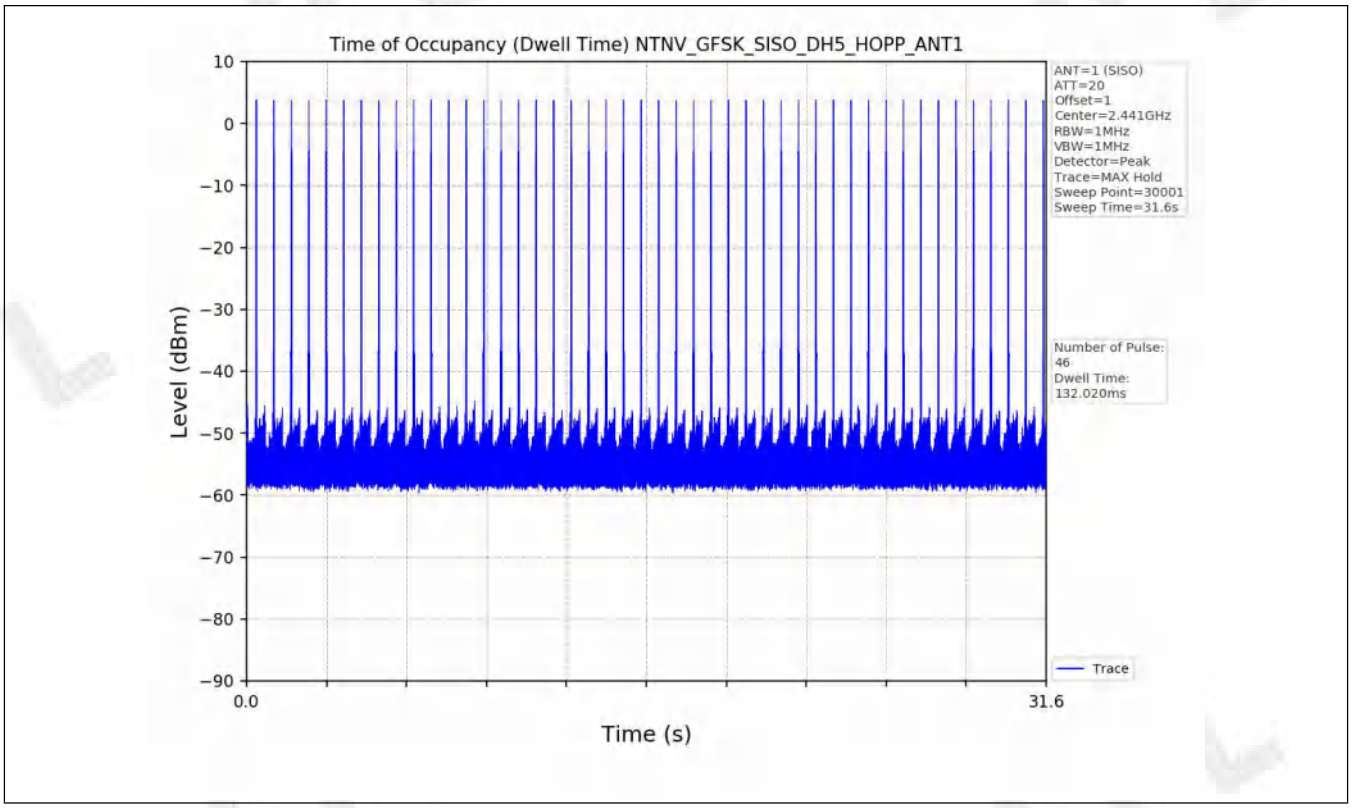


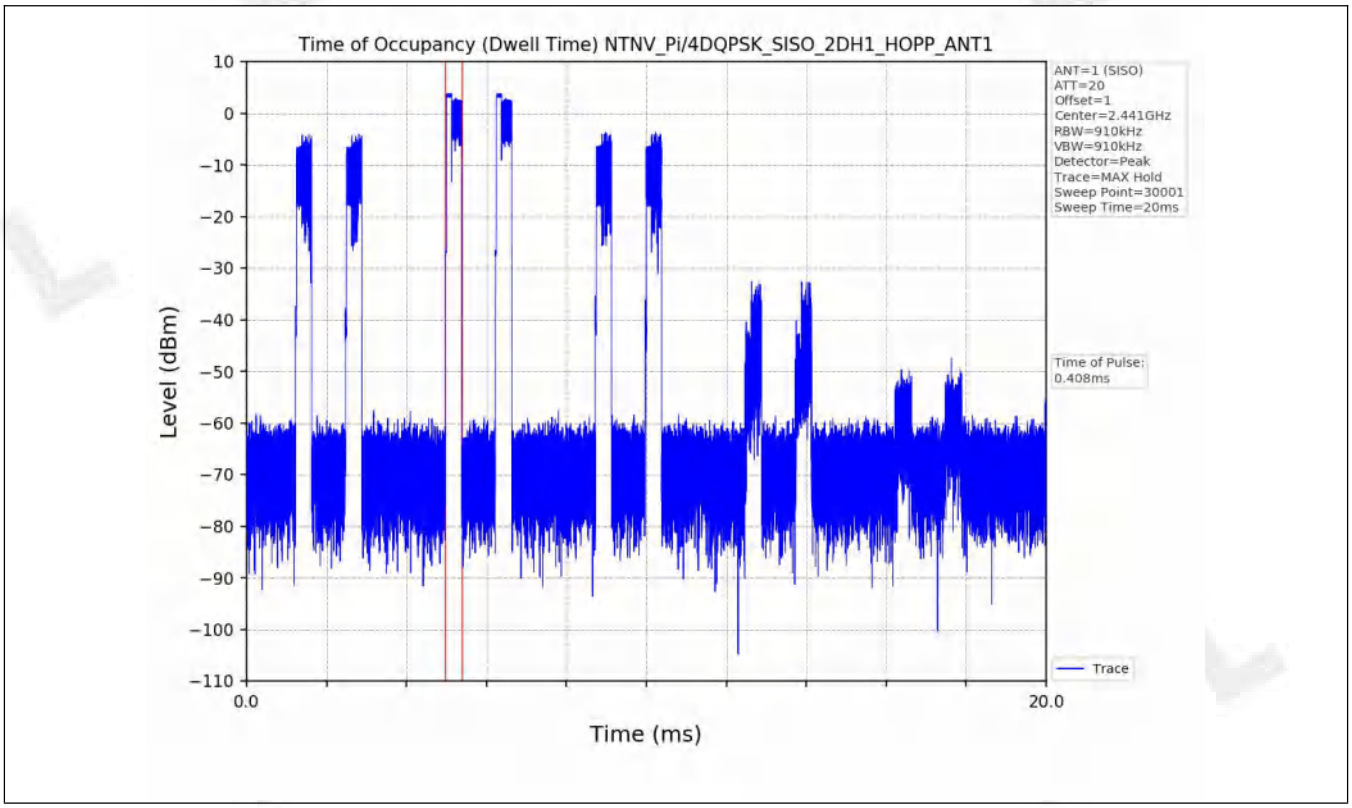

Time of Occupancy (Dwell Time) NTNV_GFSK_SISO_DH1_HOPP_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
Center=2.441GHz
RBW=1MHz
VBW=1MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=31.6s
Number of Pulse:
97
Dwell Time:
36.278ms
Trace
Level (dBm)
Time (s)
10
0
−10
−20
−30
−40
−50
−60
−70
−80
−90
0.0
31.6

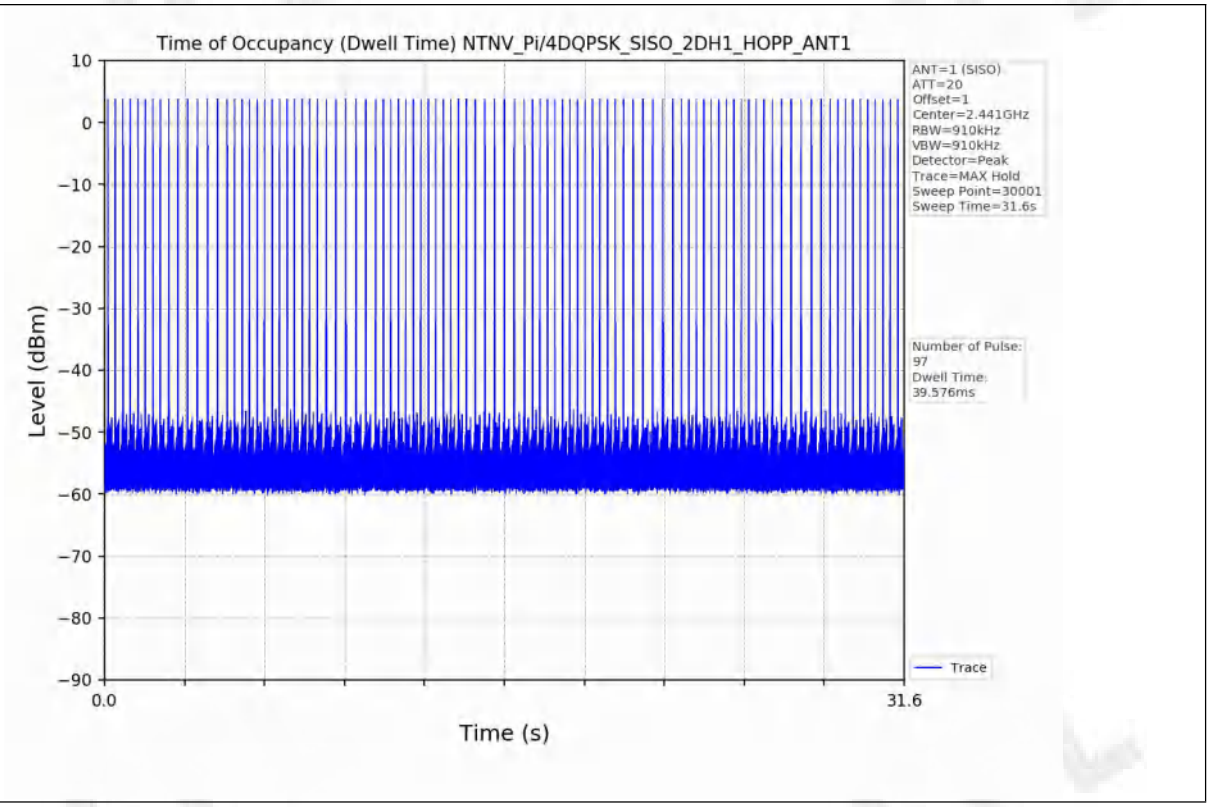

Time of Occupancy (Dwell Time) NTNV_GFSK_SISO_DH3_HOPP_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
Center=2.441GHz
RBW=1MHz
VBW=1MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=20ms
Time of Pulse:
1.623ms
Trace
Level (dBm)
Time (ms)
10
0
−10
−20
−30
−40
−50
−60
−70
−80
−90
−100
−110
0.0
20.0

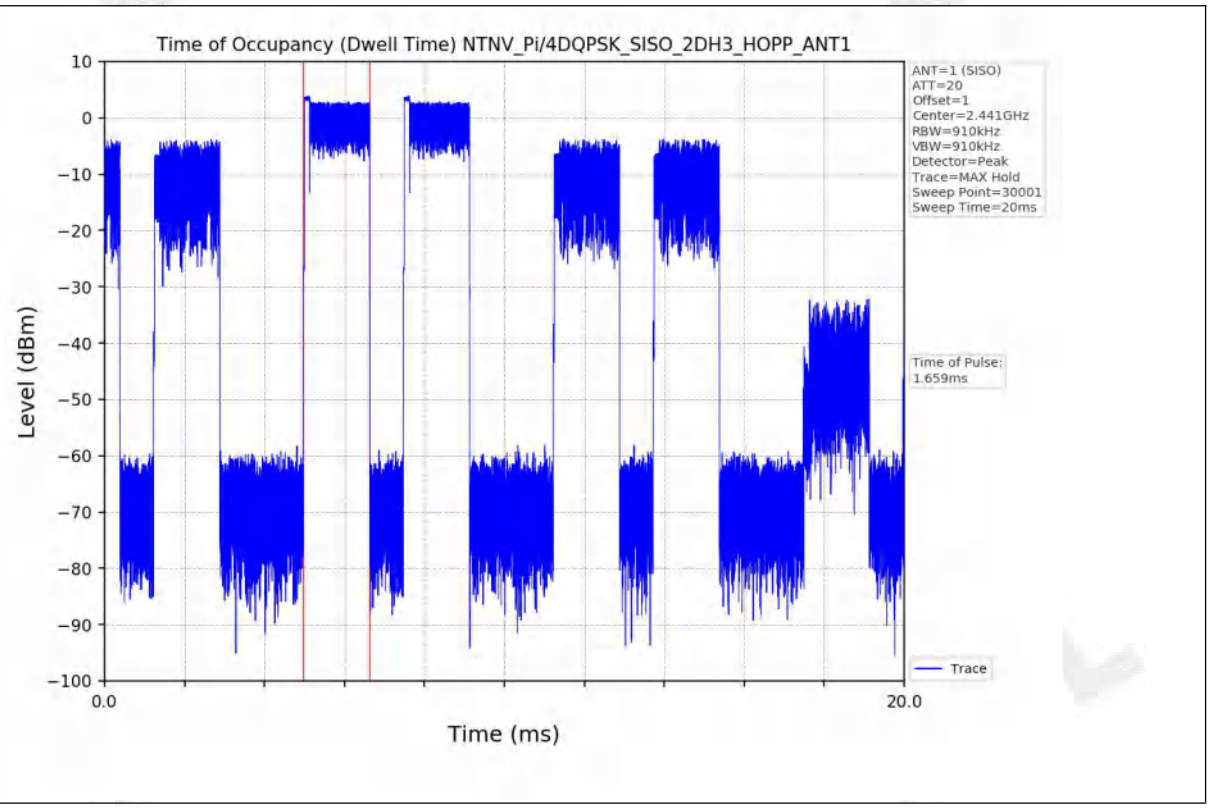

Time of Occupancy (Dwell Time) NTNV_GFSK_SISO_DH3_HOPP_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
Center=2.441GHz
RBW=1MHz
VBW=1MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=31.6s
Number of Pulse: 64
Dwell Time: 103.872ms
Trace
Level (dBm)
Time (s)
10
0
−10
−20
−30
−40
−50
−60
−70
−80
−90
0.0
31.6

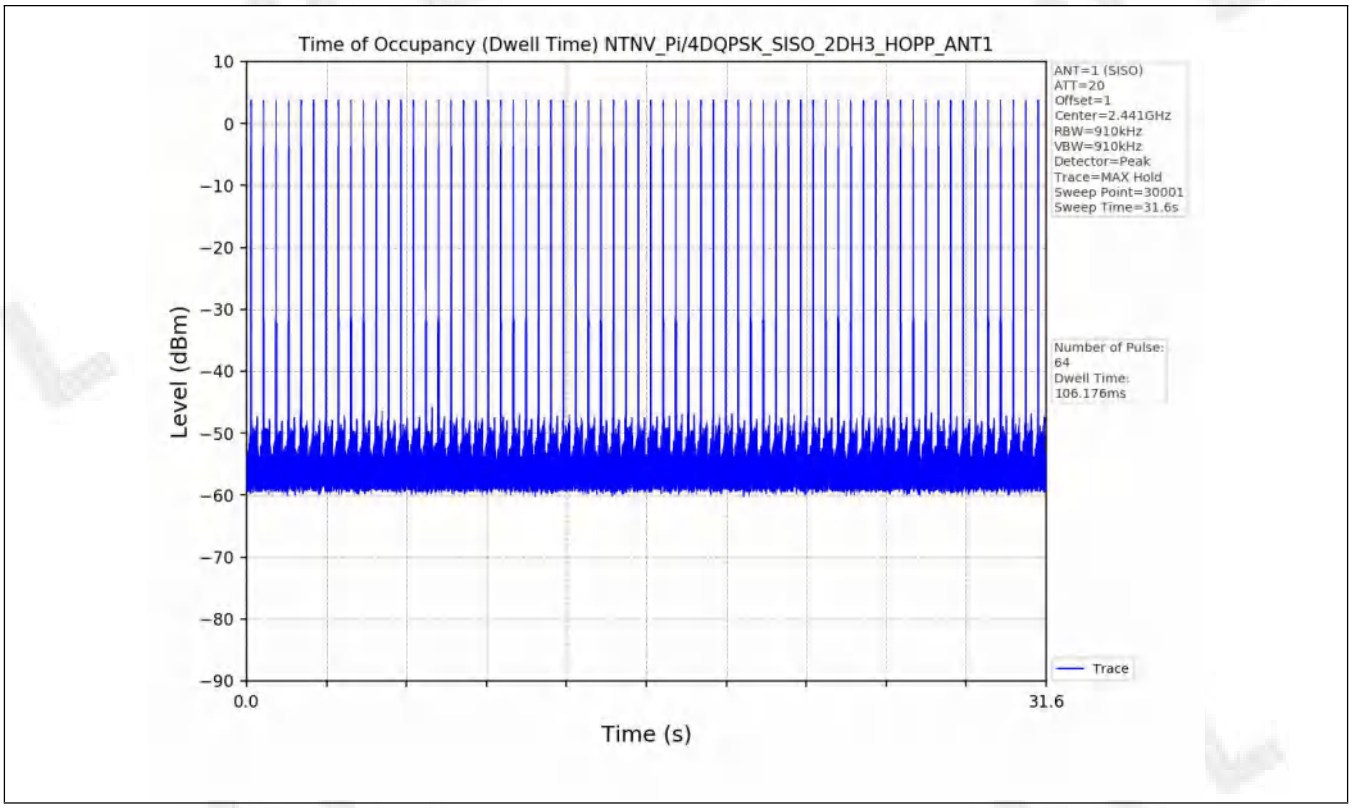

Time of Occupancy (Dwell Time) NTNV_GFSK_SISO_DH5_HOPP_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
Center=2.441GHz
RBW=1MHz
VBW=1MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=34ms
Time of Pulse: 2.870ms
Trace
Level (dBm)
Time (ms)
10
0
−10
−20
−30
−40
−50
−60
−70
−80
−90
−100
0.0
34.0

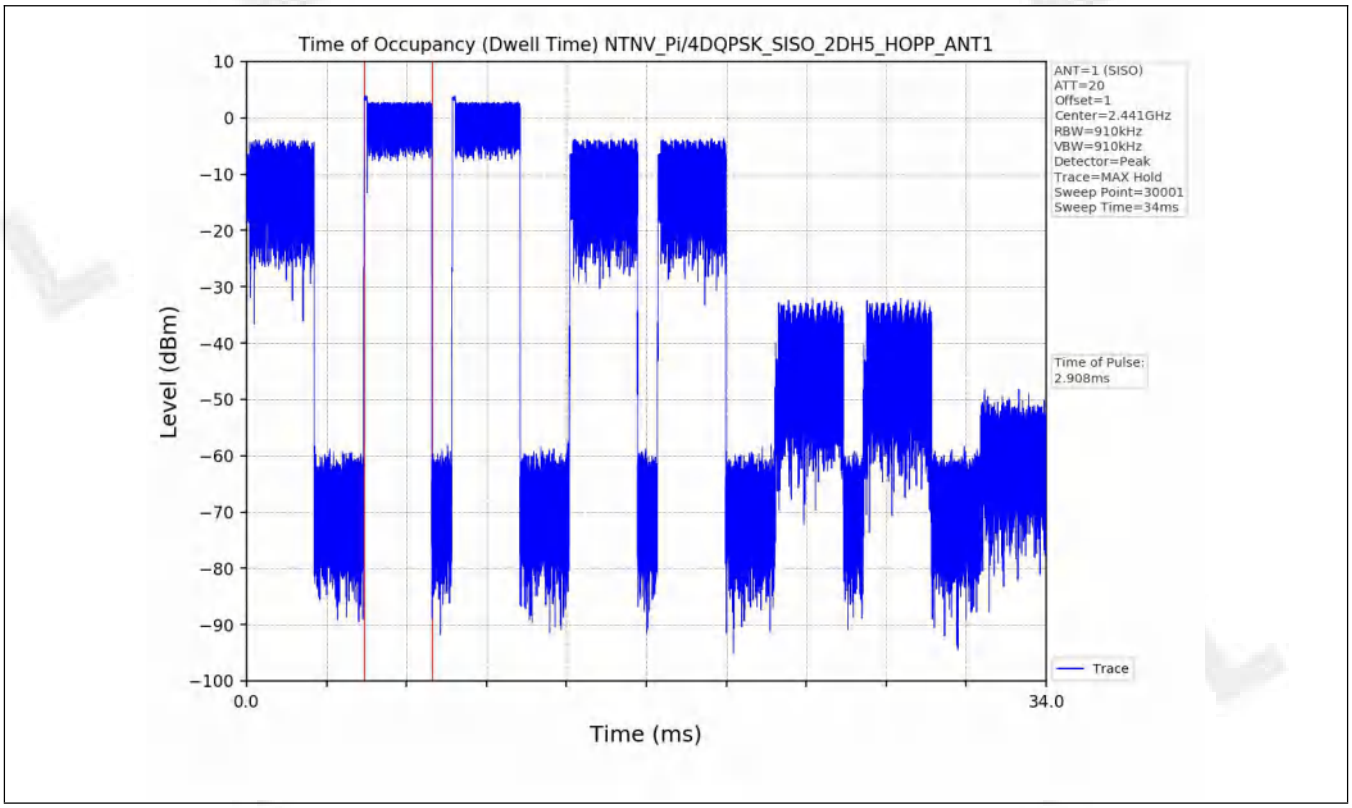

Time of Occupancy (Dwell Time) NTNV_GFSK_SISO_DH5_HOPP_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
Center=2.441GHz
RBW=1MHz
VBW=1MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=31.6s
Number of Pulse:
46
Dwell Time:
132.020ms
Trace
Level (dBm)
Time (s)
10
0
−10
−20
−30
−40
−50
−60
−70
−80
−90
0.0
31.6

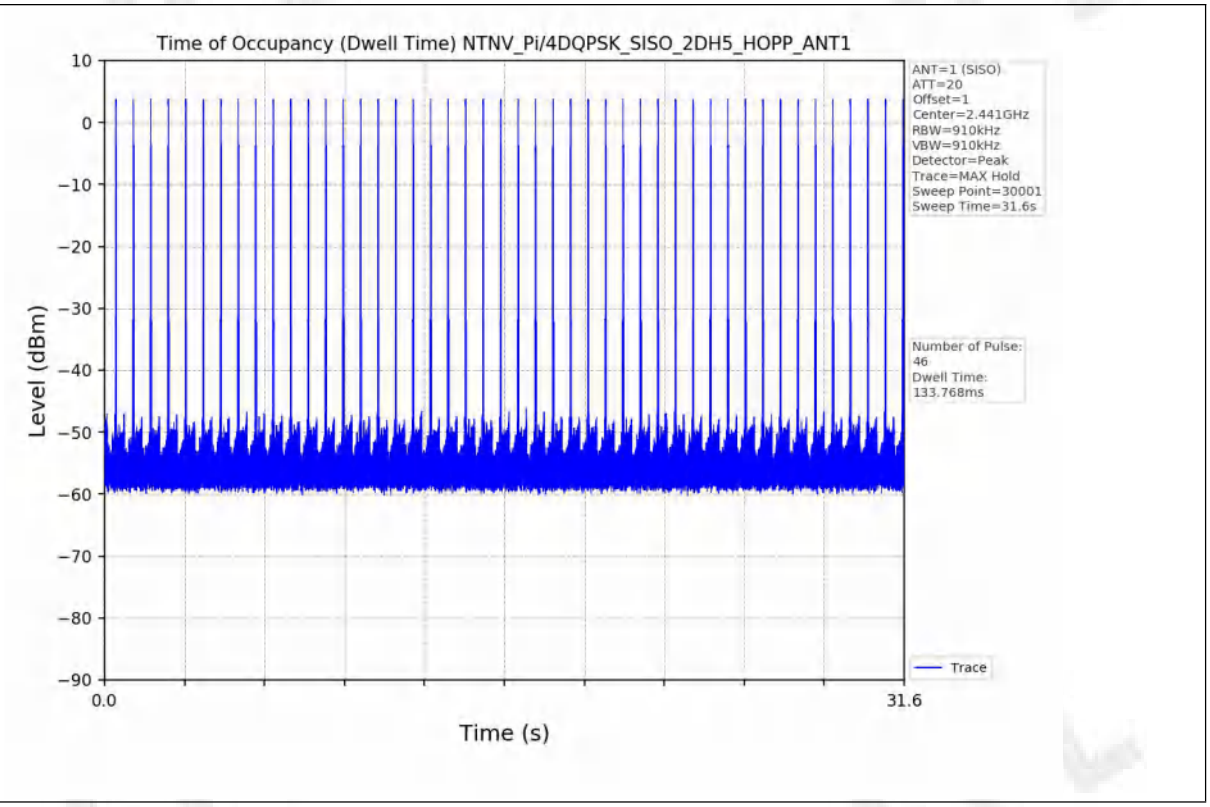

Time of Occupancy (Dwell Time) NTNV_Pi/4DQPSK_SISO_2DH1_HOPP_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=20ms
Time of Pulse:
0.408ms
Trace
Level (dBm)
Time (ms)
10
0
−10
−20
−30
−40
−50
−60
−70
−80
−90
−100
−110
0.0
20.0

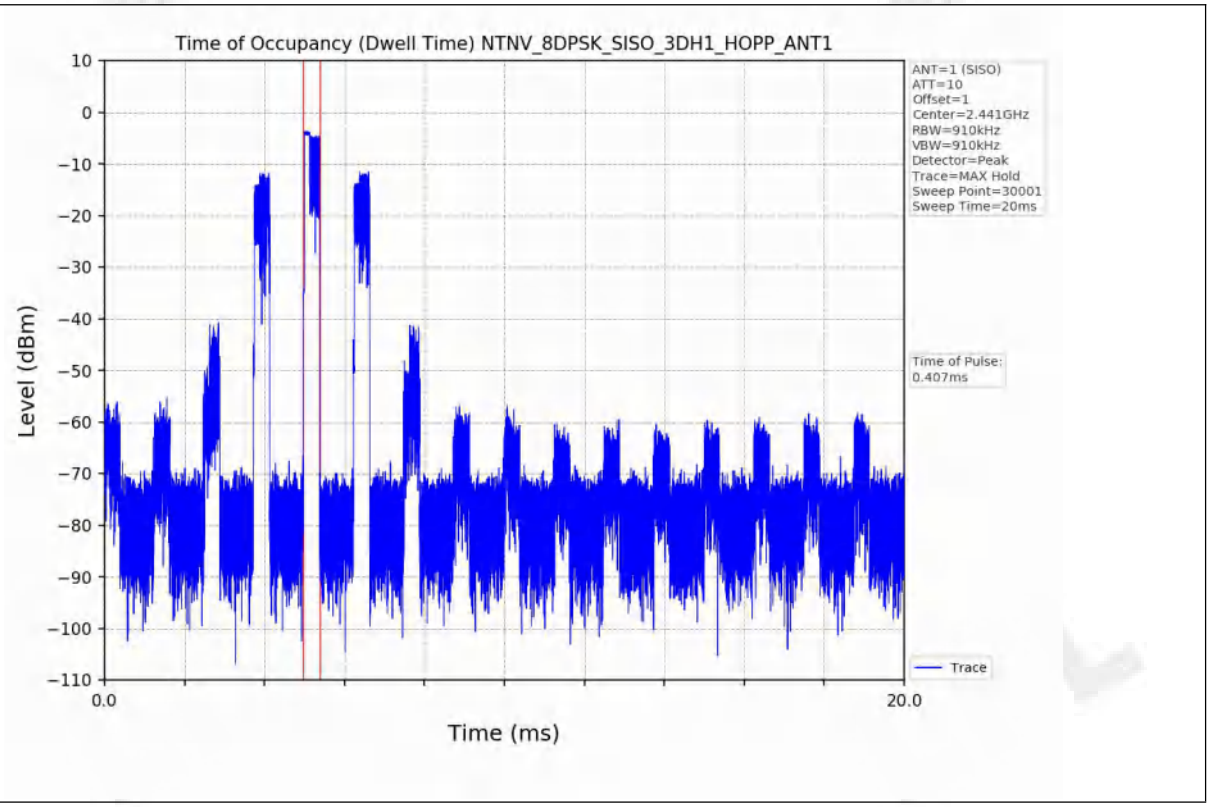

Time of Occupancy (Dwell Time) NTNV_Pi/4DQPSK_SISO_2DH1_HOPP_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=31.6s
Number of Pulse:
97
Dwell Time:
39.576ms
Trace
Level (dBm)
Time (s)
10
0
−10
−20
−30
−40
−50
−60
−70
−80
−90
0.0
31.6

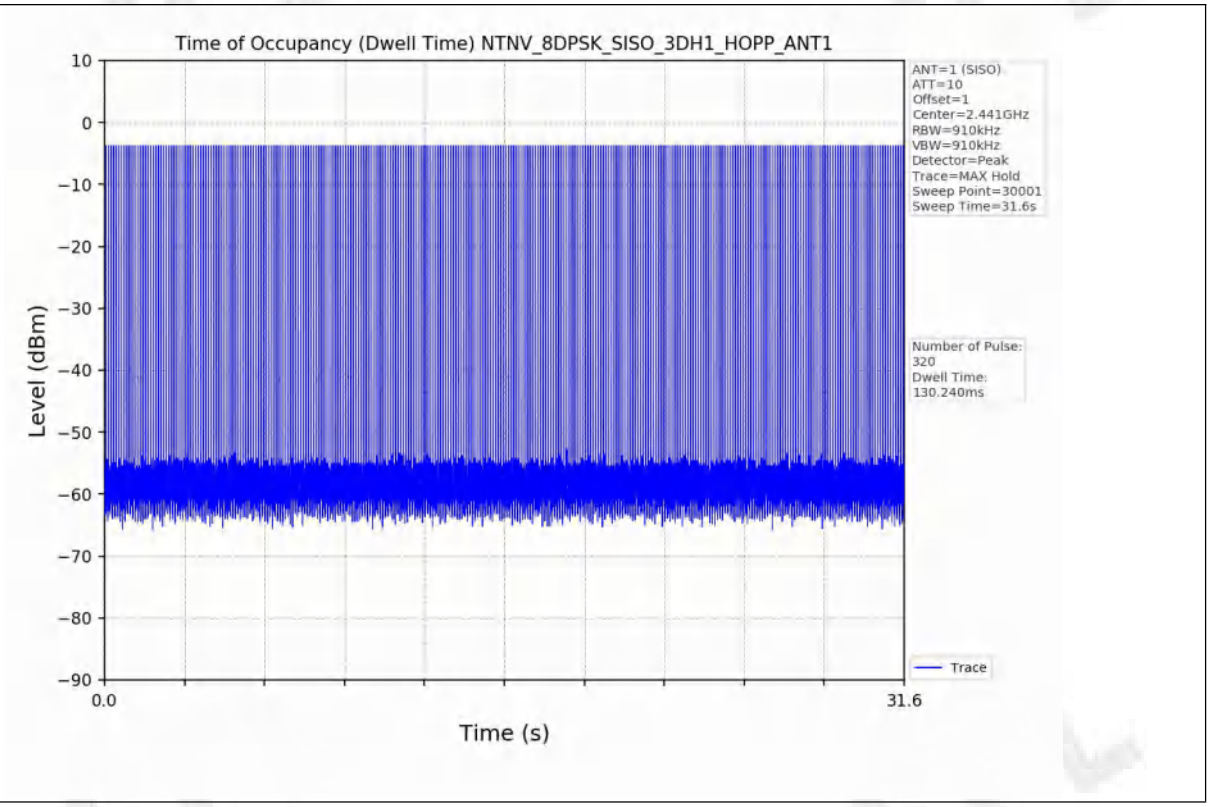

Time of Occupancy (Dwell Time) NTNV_Pi/4DQPSK_SISO_2DH3_HOPP_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=20ms
Time of Pulse:
1.659ms
Trace
Level (dBm)
Time (ms)
10
0
−10
−20
−30
−40
−50
−60
−70
−80
−90
−100
0.0
20.0

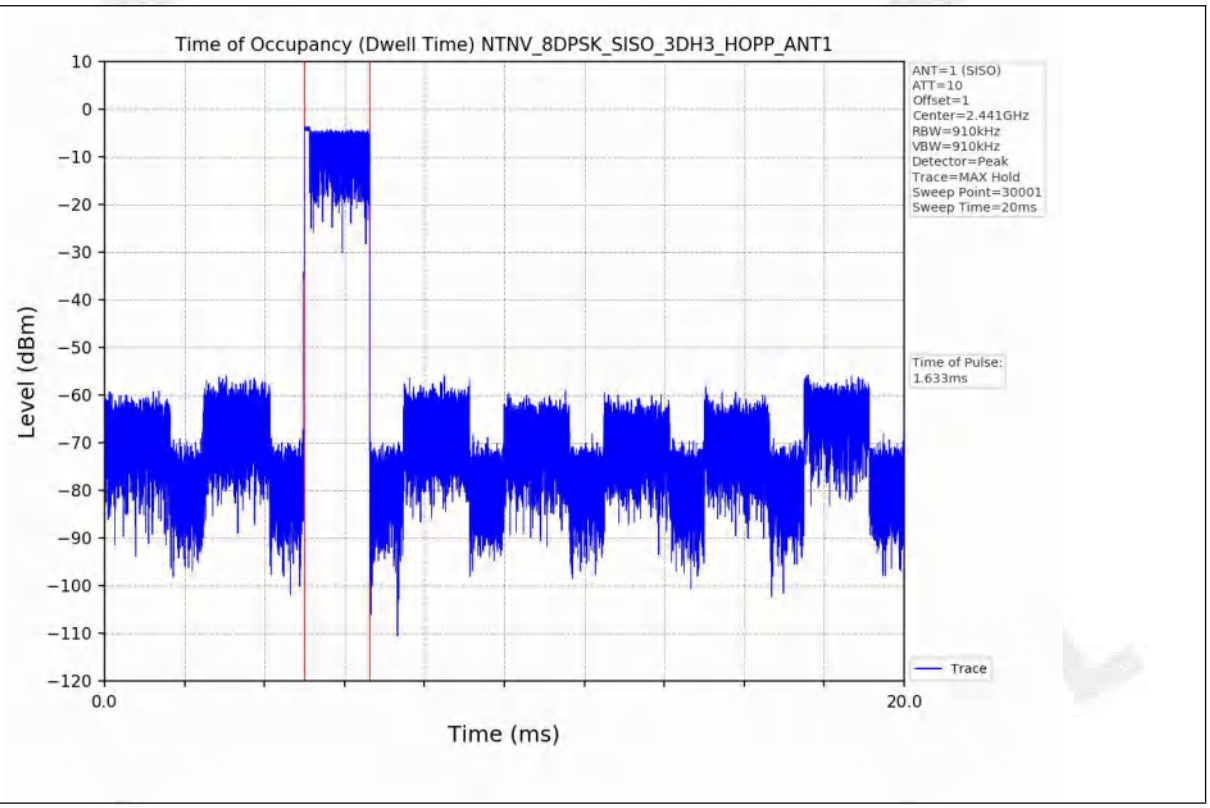

Time of Occupancy (Dwell Time) NTNV_Pi/4DQPSK_SISO_2DH3_HOPP_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=31.6s
Number of Pulse: 64
Dwell Time: 106.176ms
Trace
Level (dBm)
Time (s)
10
0
−10
−20
−30
−40
−50
−60
−70
−80
−90
0.0
31.6

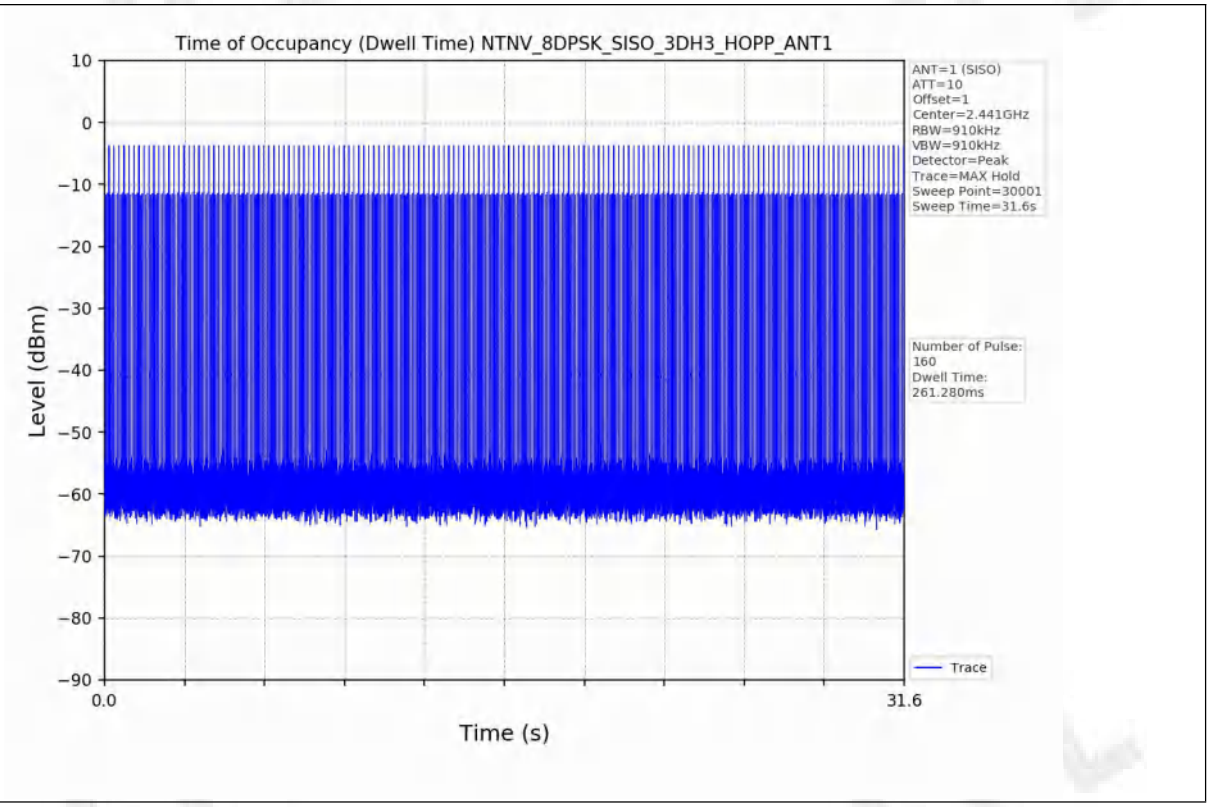

Time of Occupancy (Dwell Time) NTNV_Pi/4DQPSK_SISO_2DH5_HOPP_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=34ms
Time of Pulse: 2.908ms
Trace
Level (dBm)
Time (ms)
10
0
−10
−20
−30
−40
−50
−60
−70
−80
−90
−100
0.0
34.0

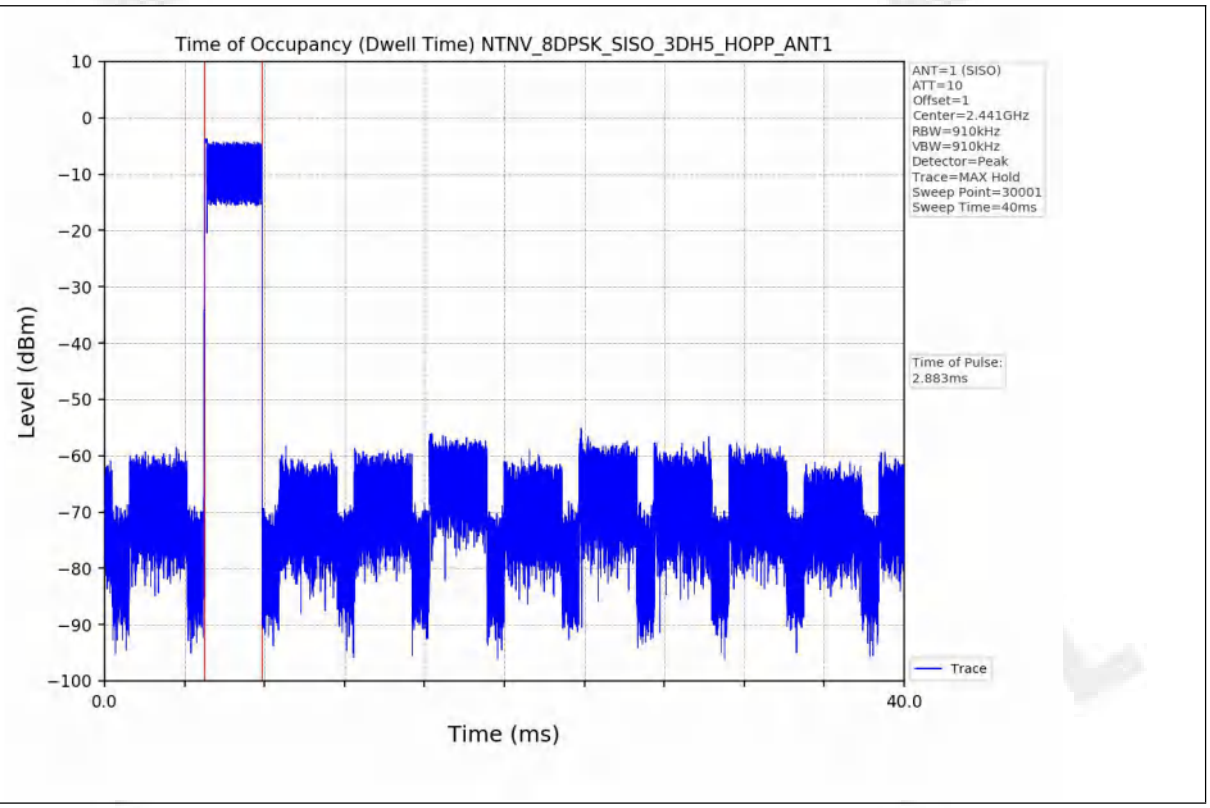

Time of Occupancy (Dwell Time) NTNV_Pi/4DQPSK_SISO_2DH5_HOPP_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=31.6s
Number of Pulse:
46
Dwell Time:
133.768ms
Trace
Level (dBm)
Time (s)
10
0
−10
−20
−30
−40
−50
−60
−70
−80
−90
0.0
31.6

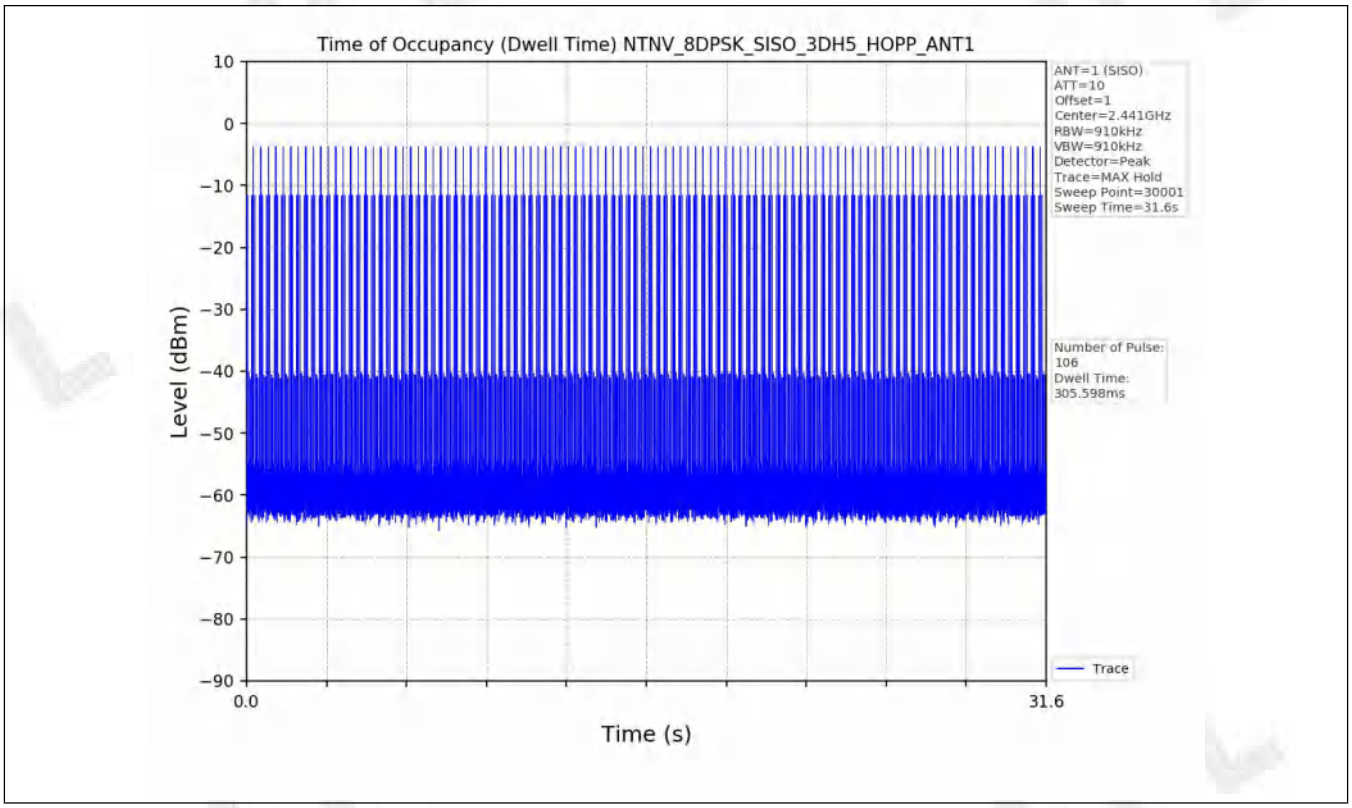

Time of Occupancy (Dwell Time) NTNV_8DPSK_SISO_3DH1_HOPP_ANT1
ANT=1 (SISO)
ATT=10
Offset=1
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=20ms
Time of Pulse:
0.407ms
Trace
Level (dBm)
Time (ms)
10
0
−10
−20
−30
−40
−50
−60
−70
−80
−90
−100
−110
0.0
20.0


Time of Occupancy (Dwell Time) NTNV_8DPSK_SISO_3DH1_HOPP_ANT1
ANT=1 (SISO)
ATT=10
Offset=1
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=31.6s
Number of Pulse:
320
Dwell Time:
130.240ms
Trace
Level (dBm)
Time (s)
10
0
−10
−20
−30
−40
−50
−60
−70
−80
−90
0.0
31.6


Time of Occupancy (Dwell Time) NTNV_8DPSK_SISO_3DH3_HOPP_ANT1
ANT=1 (SISO)
ATT=10
Offset=1
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=20ms
Time of Pulse:
1.633ms
Trace
Level (dBm)
Time (ms)
10
0
−10
−20
−30
−40
−50
−60
−70
−80
−90
−100
−110
−120
0.0
20.0


Time of Occupancy (Dwell Time) NTNV_8DPSK_SISO_3DH3_HOPP_ANT1
ANT=1 (SISO)
ATT=10
Offset=1
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
Level (dBm)
Time (s)
10
0
−10
−20
−30
−40
−50
−60
−70
−80
−90
0.0
31.6


Time of Occupancy (Dwell Time) NTNV_8DPSK_SISO_3DH5_HOPP_ANT1
ANT=1 (SISO)
ATT=10
Offset=1
Center=2.441GHz
RBW=910kHz
VBW=910kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=30001
Sweep Time=40ms
Time of Pulse:
2.883ms
Trace
Level (dBm)
Time (ms)
10
0
−10
−20
−30
−40
−50
−60
−70
−80
−90
−100
0.0
40.0



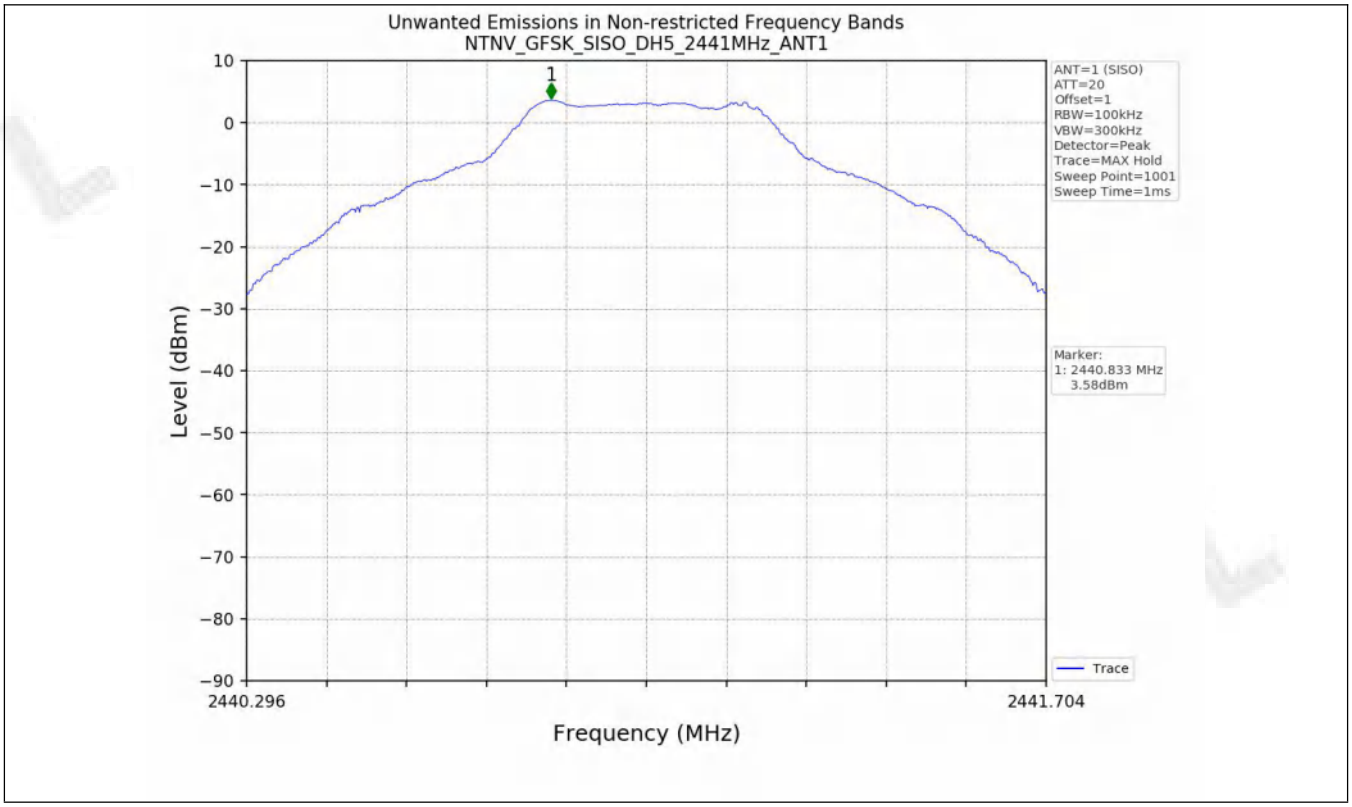
6. Unwanted Emissions in Non-restricted Frequency Bands

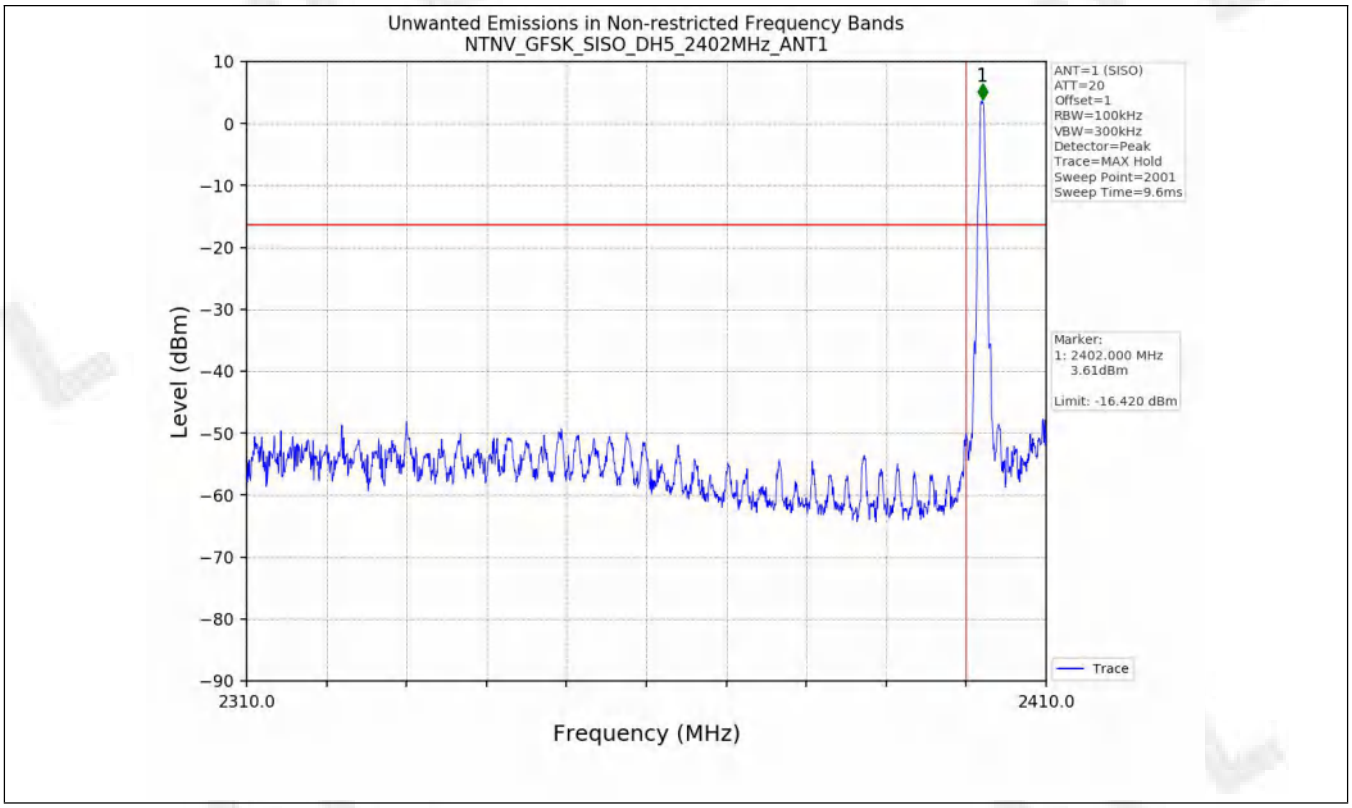
6.1 Test Result

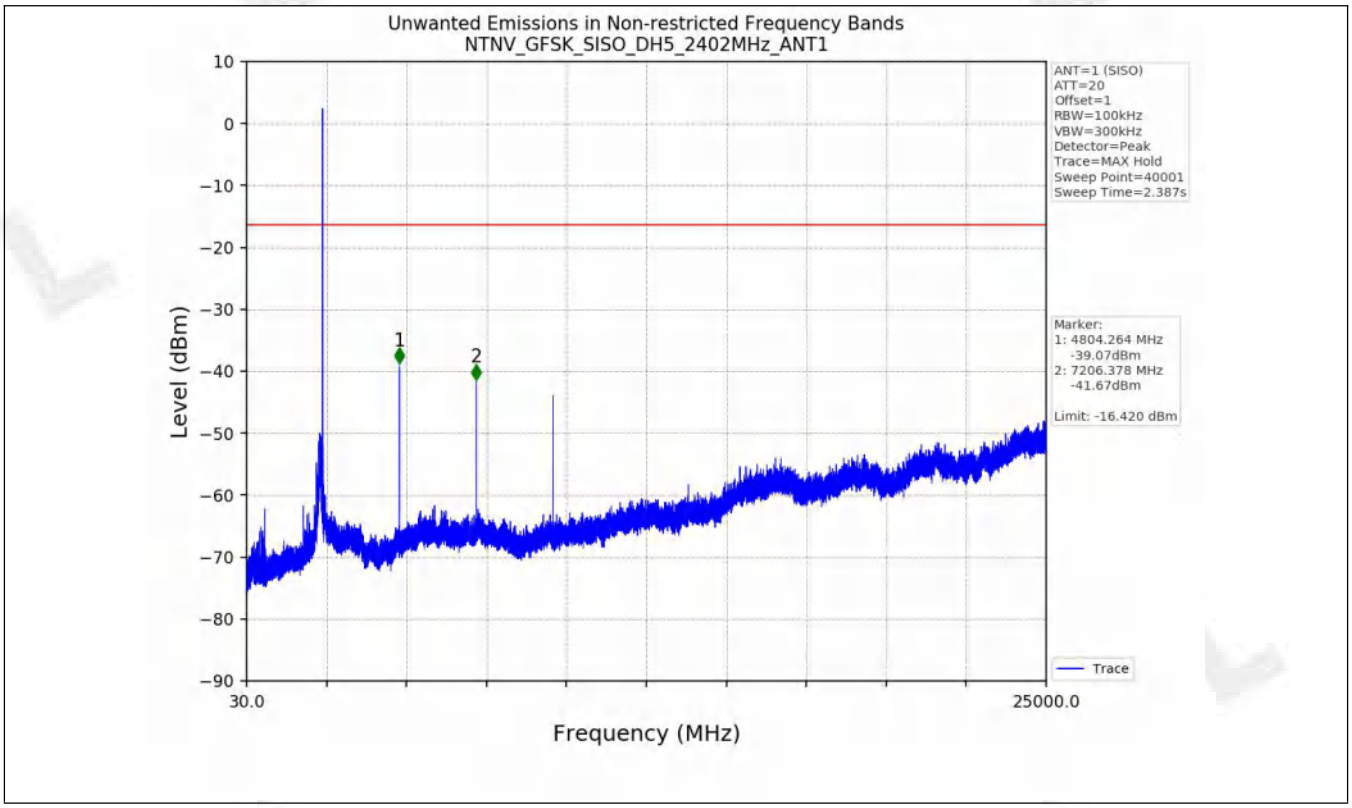
Test Mode	Frequency (MHz)	TX Type	ANT No.	Spurious Conducted Emission (dBm)	Limits (dBm)	Verdict
GFSK	2402	SISO	1	Refer to test graph	-16.42	PASS
	2441	SISO	1	Refer to test graph	-16.42	PASS
	2480	SISO	1	Refer to test graph	-16.42	PASS
	Hopping	SISO	1	Refer to test graph	-16.42	PASS
Pi/4DQPSK	2402	SISO	1	Refer to test graph	-16.59	PASS
	2441	SISO	1	Refer to test graph	-16.59	PASS
	2480	SISO	1	Refer to test graph	-16.59	PASS
	Hopping	SISO	1	Refer to test graph	-16.59	PASS
8DPSK	2402	SISO	1	Refer to test graph	-16.36	PASS
	2441	SISO	1	Refer to test graph	-16.36	PASS
	2480	SISO	1	Refer to test graph	-16.36	PASS

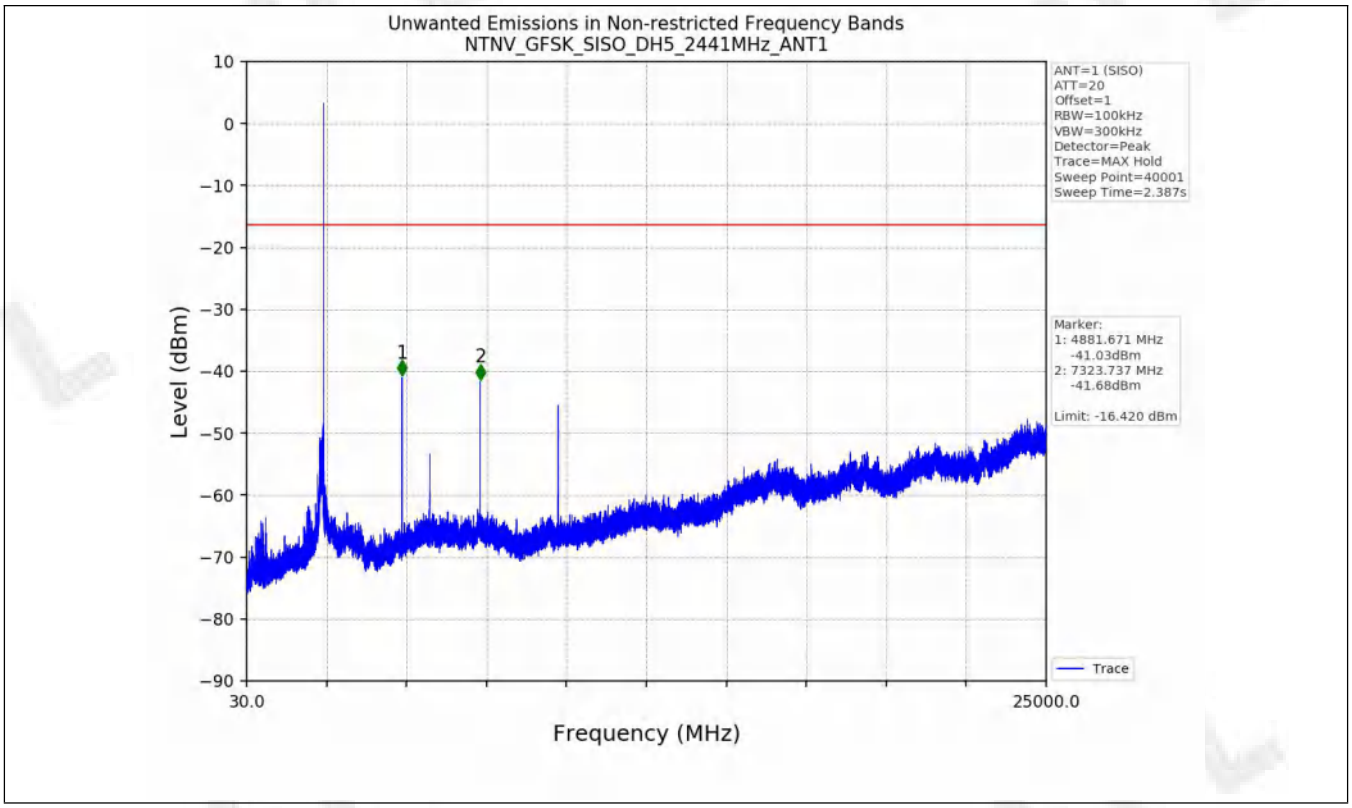
	Hopping	SISO	1	Refer to test graph	-16.36	PASS

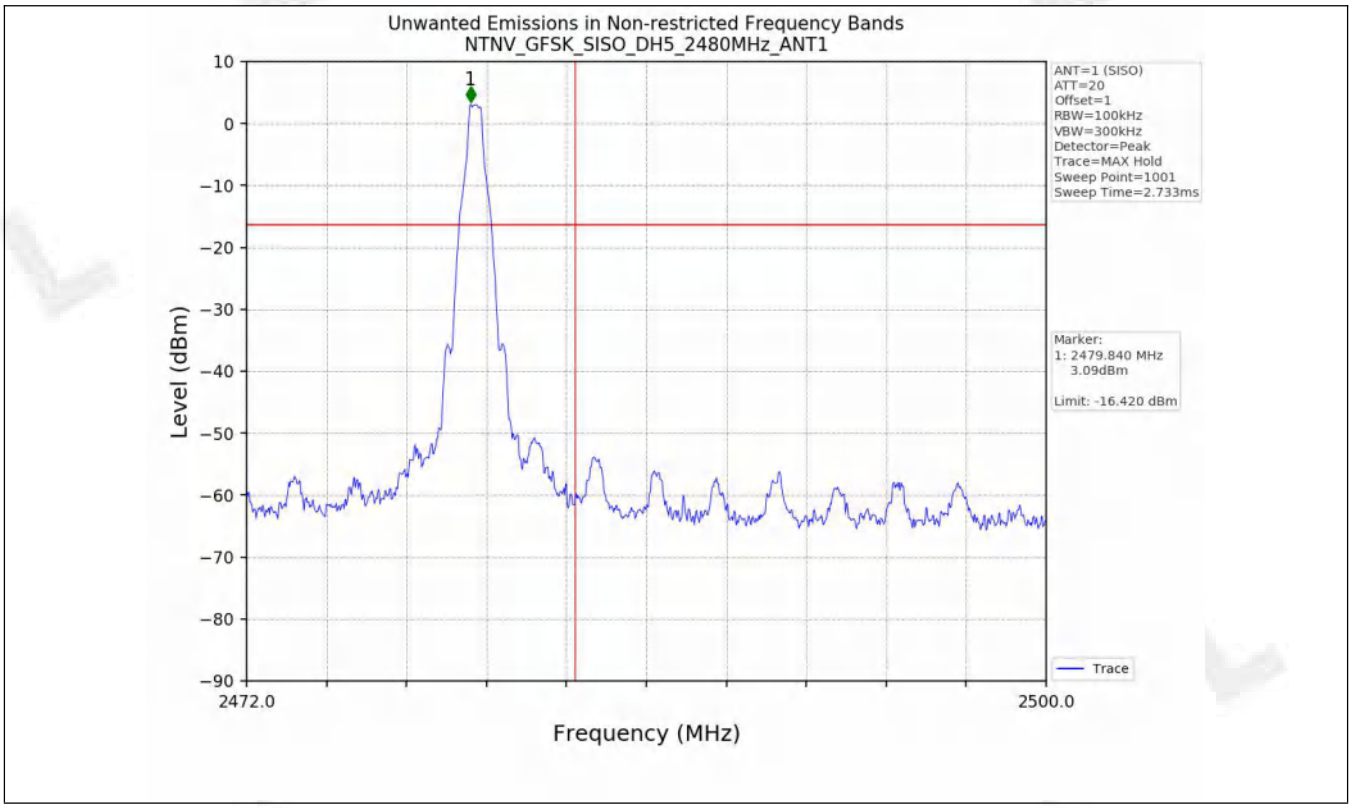
6.2 Test Graph

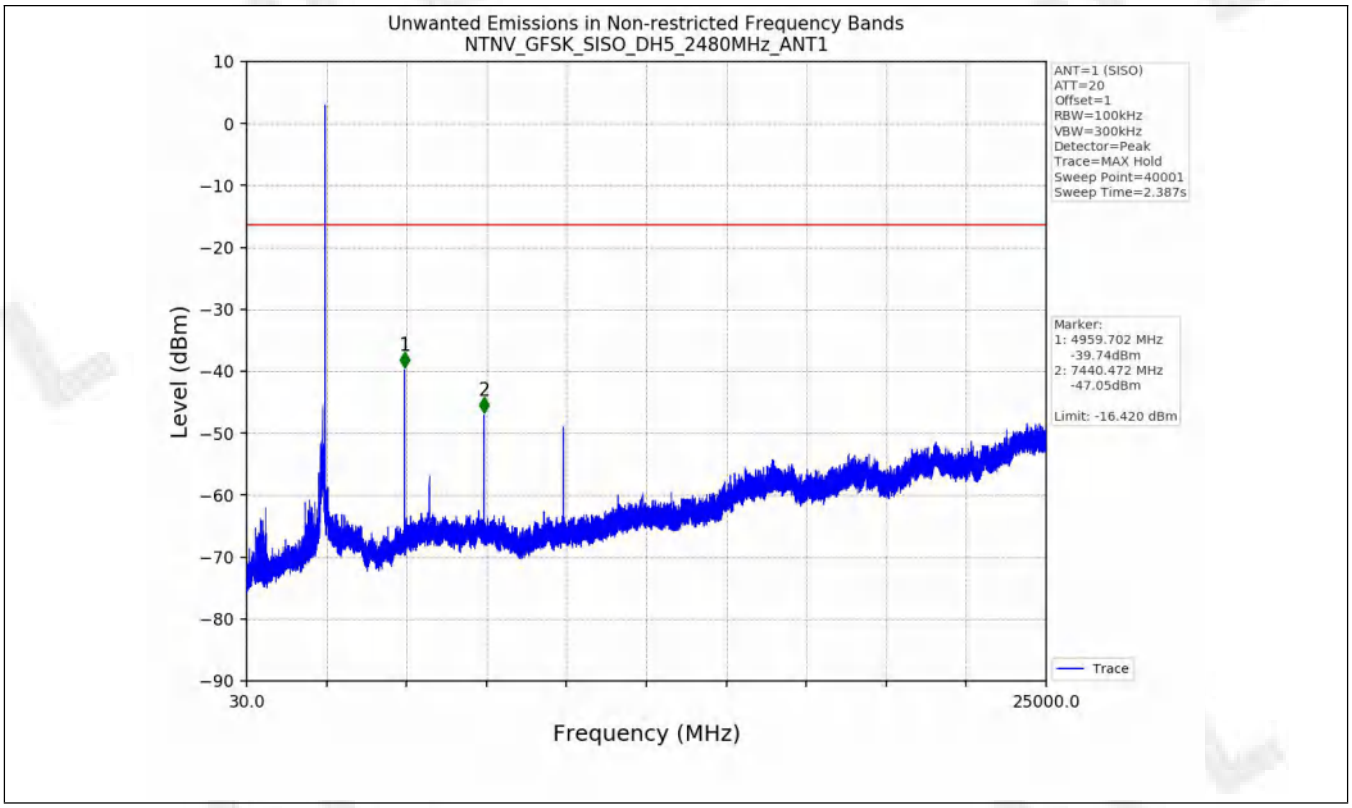


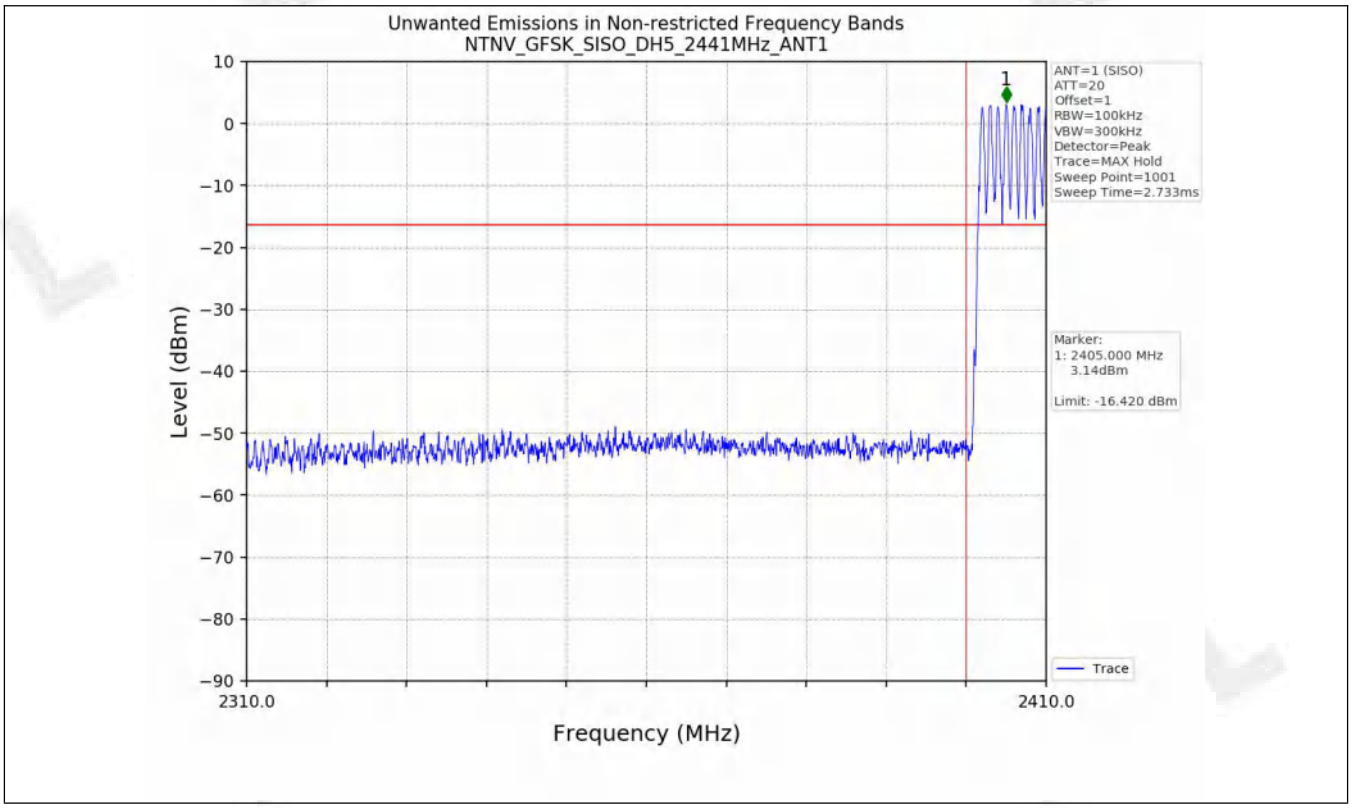

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_GFSK_SISO_DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=2001
Sweep Time=9.6ms
Marker:
1: 2402.000 MHz
3.61dBm
Limit: -16.420 dBm
Trace
Level (dBm)
Frequency (MHz)
2310.0
2410.0

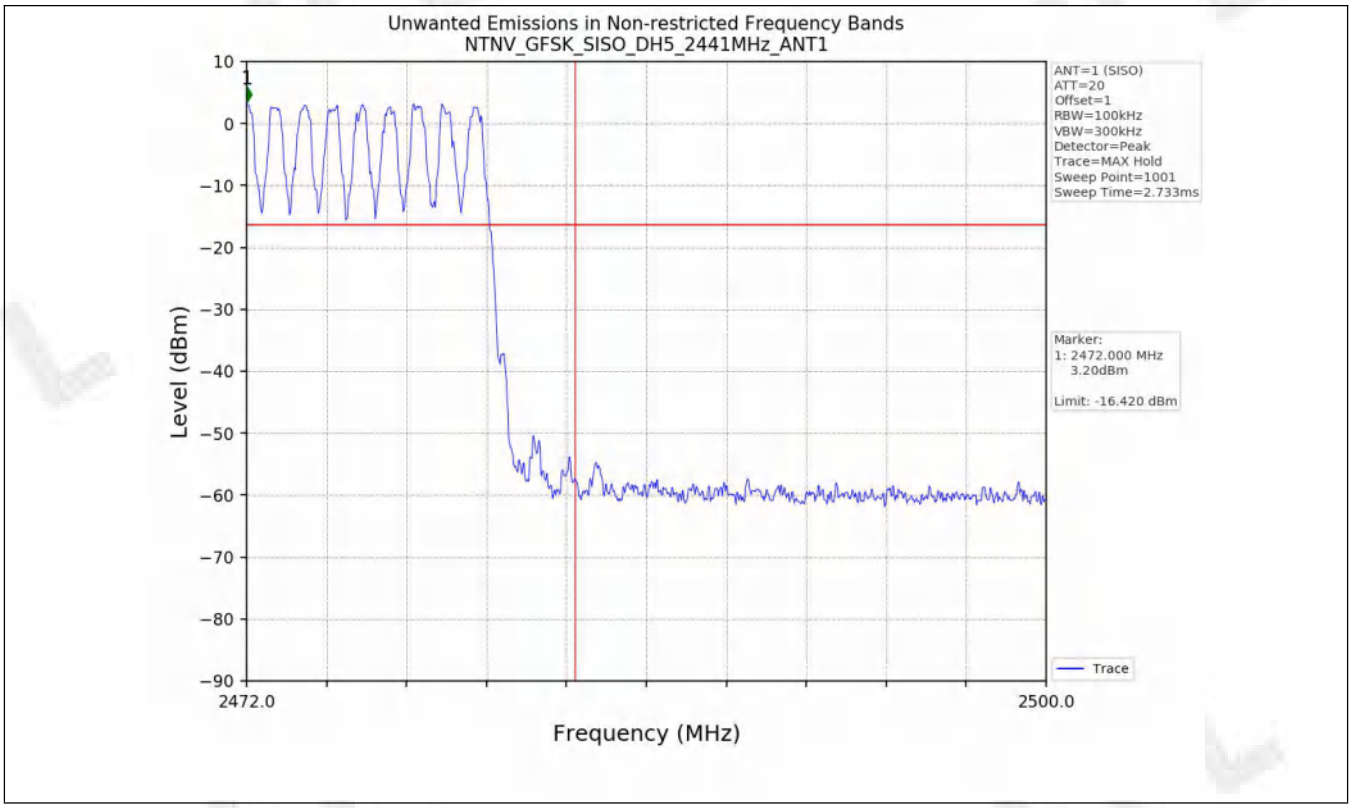

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_GFSK_SISO_DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 4804.264 MHz
-39.07dBm
2: 7206.378 MHz
-41.67dBm
Limit: -16.420 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0

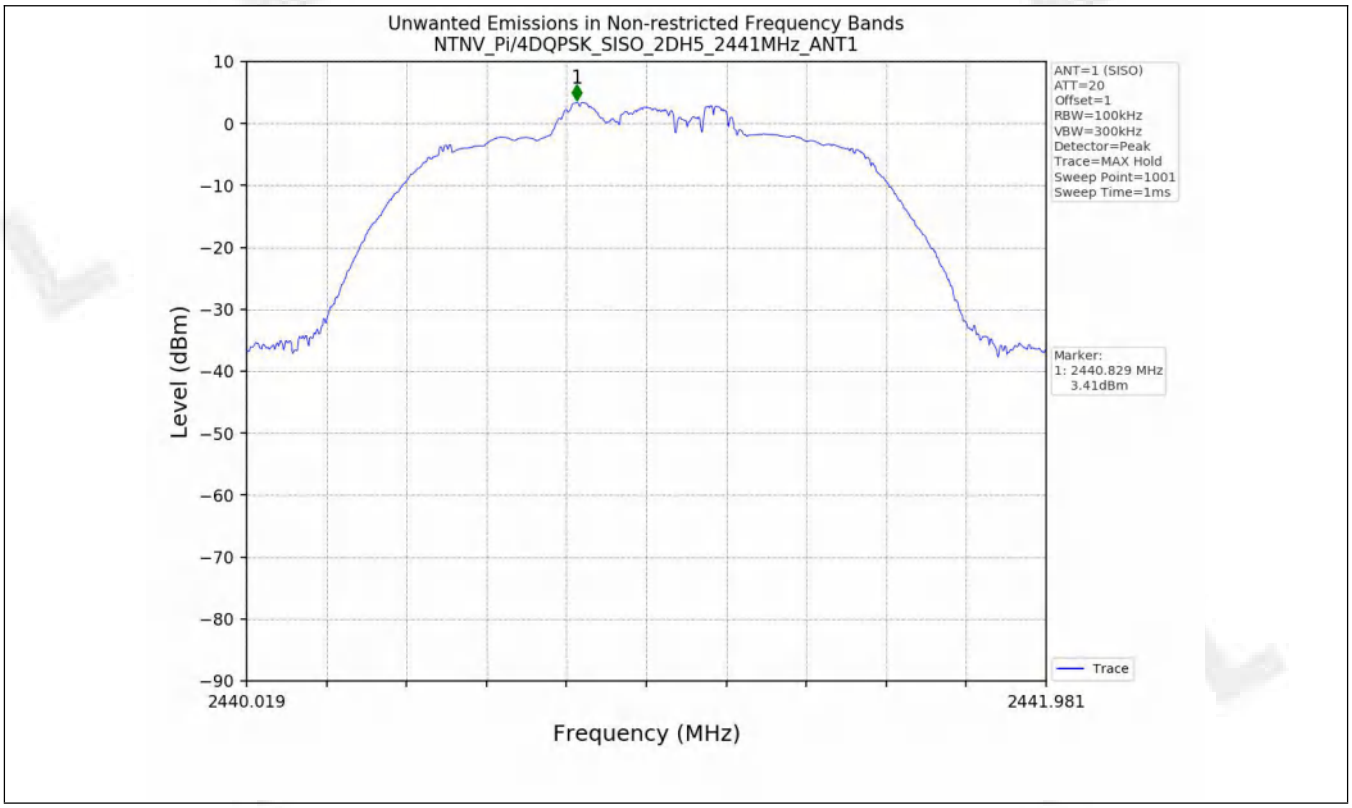

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_GFSK_SISO_DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 4881.671 MHz
-41.03dBm
2: 7323.737 MHz
-41.68dBm
Limit: -16.420 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0

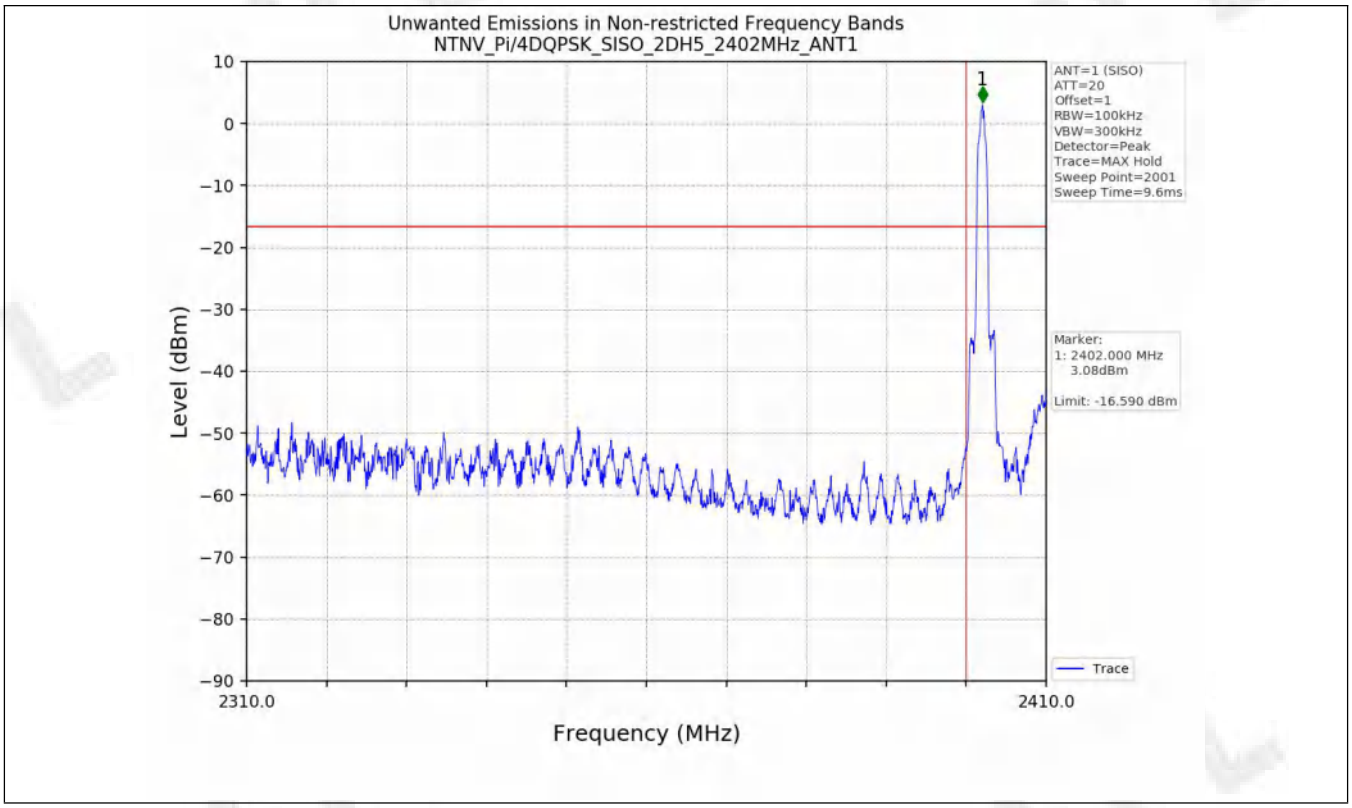

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_GFSK_SISO_DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.733ms
Marker:
1: 2479.840 MHz
3.09dBm
Limit: -16.420 dBm
Trace
Level (dBm)
Frequency (MHz)
2472.0
2500.0

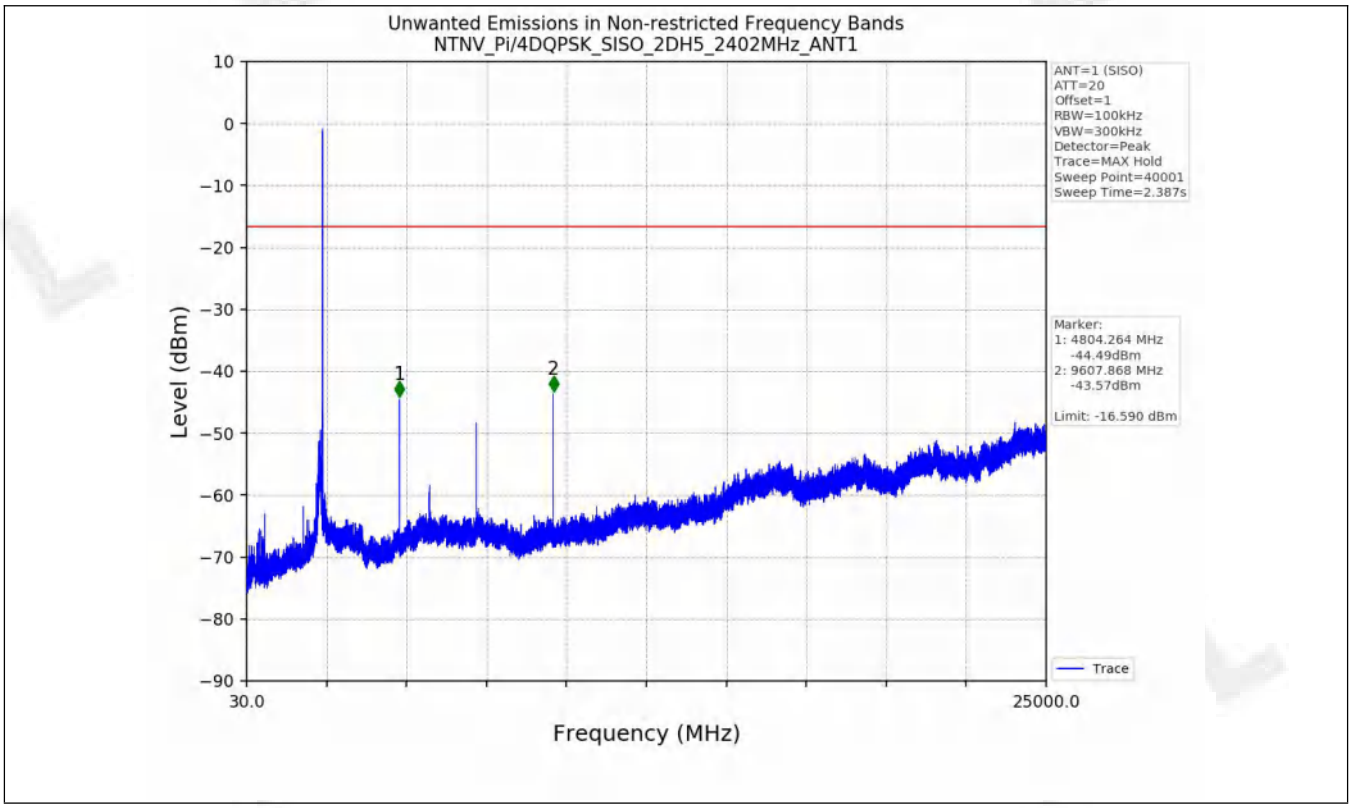

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_GFSK_SISO_DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 4959.702 MHz
-39.74dBm
2: 7440.472 MHz
-47.05dBm
Limit: -16.420 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0

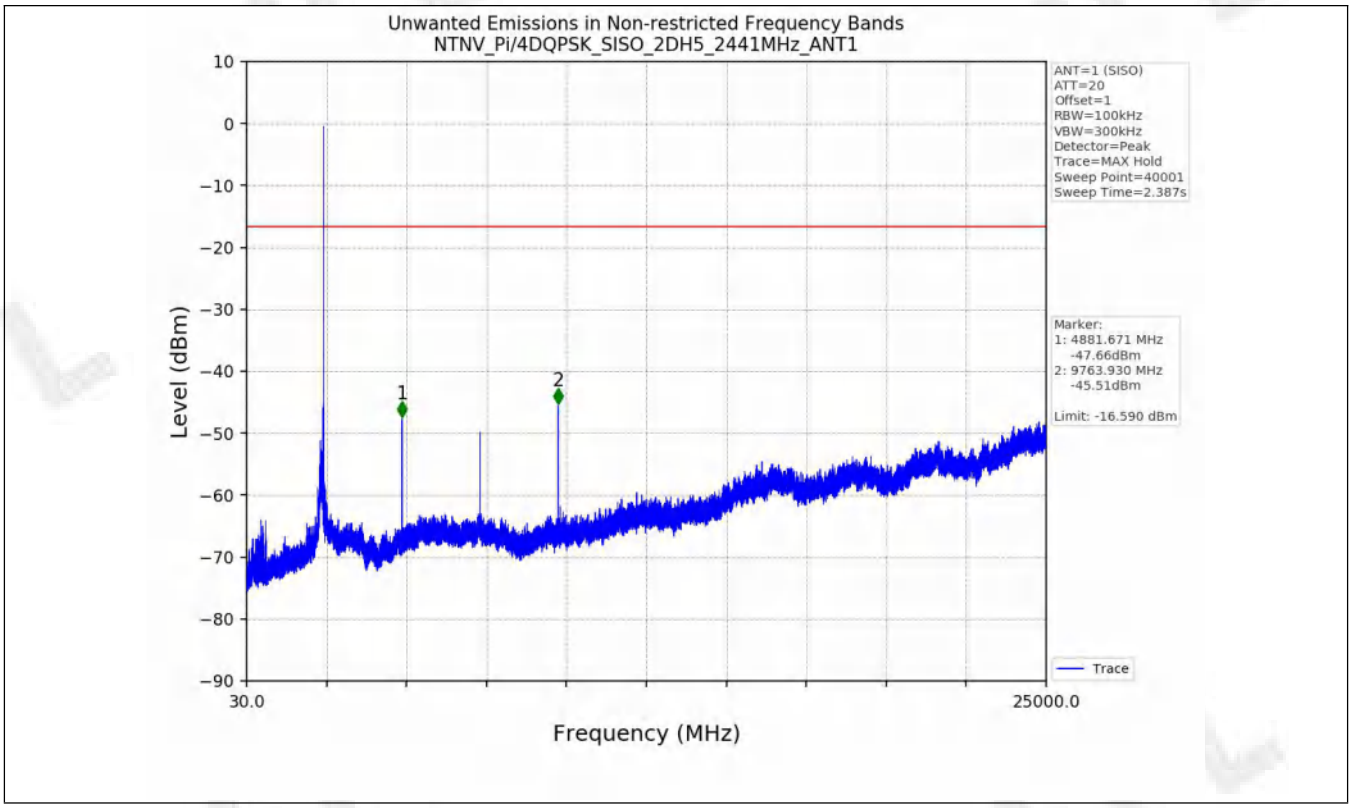

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_GFSK_SISO_DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.733ms
Marker:
1: 2405.000 MHz
3.14dBm
Limit: -16.420 dBm
Trace
Level (dBm)
Frequency (MHz)
2310.0
2410.0

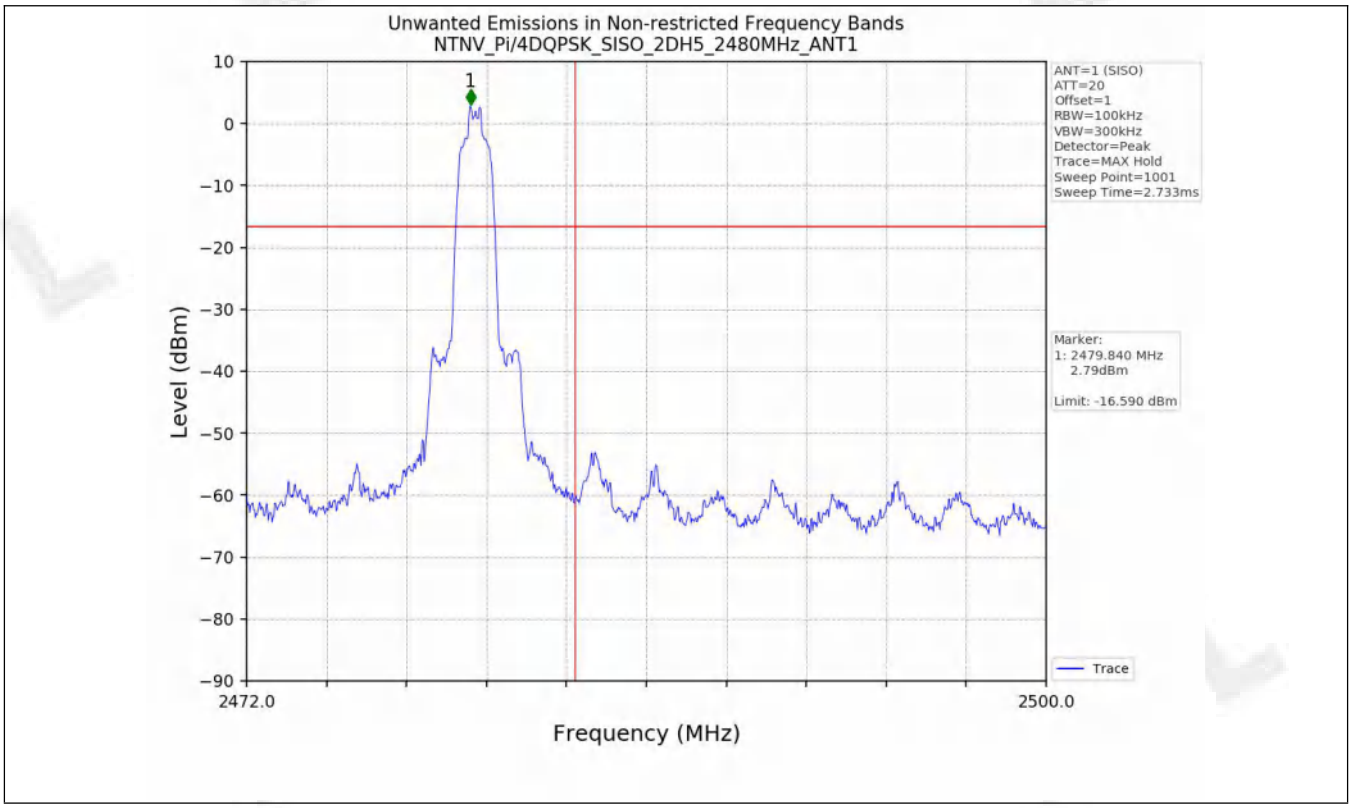

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_GFSK_SISO_DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.733ms
Marker:
1: 2472.000 MHz
3.20dBm
Limit: -16.420 dBm
Trace
Level (dBm)
Frequency (MHz)
2472.0
2500.0

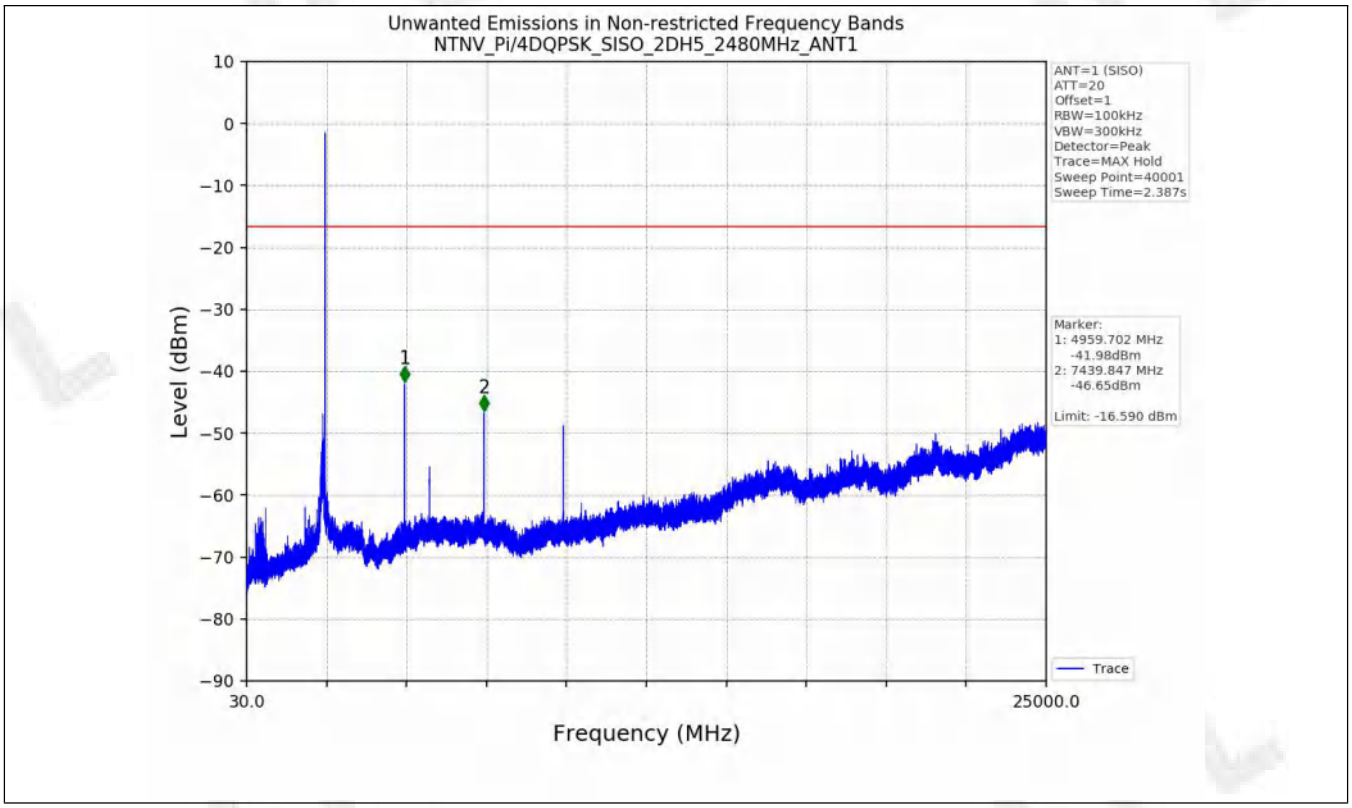

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_Pi/4DQPSK_SISO_2DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Marker:
1: 2440.829 MHz
3.41dBm
Trace
Level (dBm)
Frequency (MHz)
2440.019
2441.981

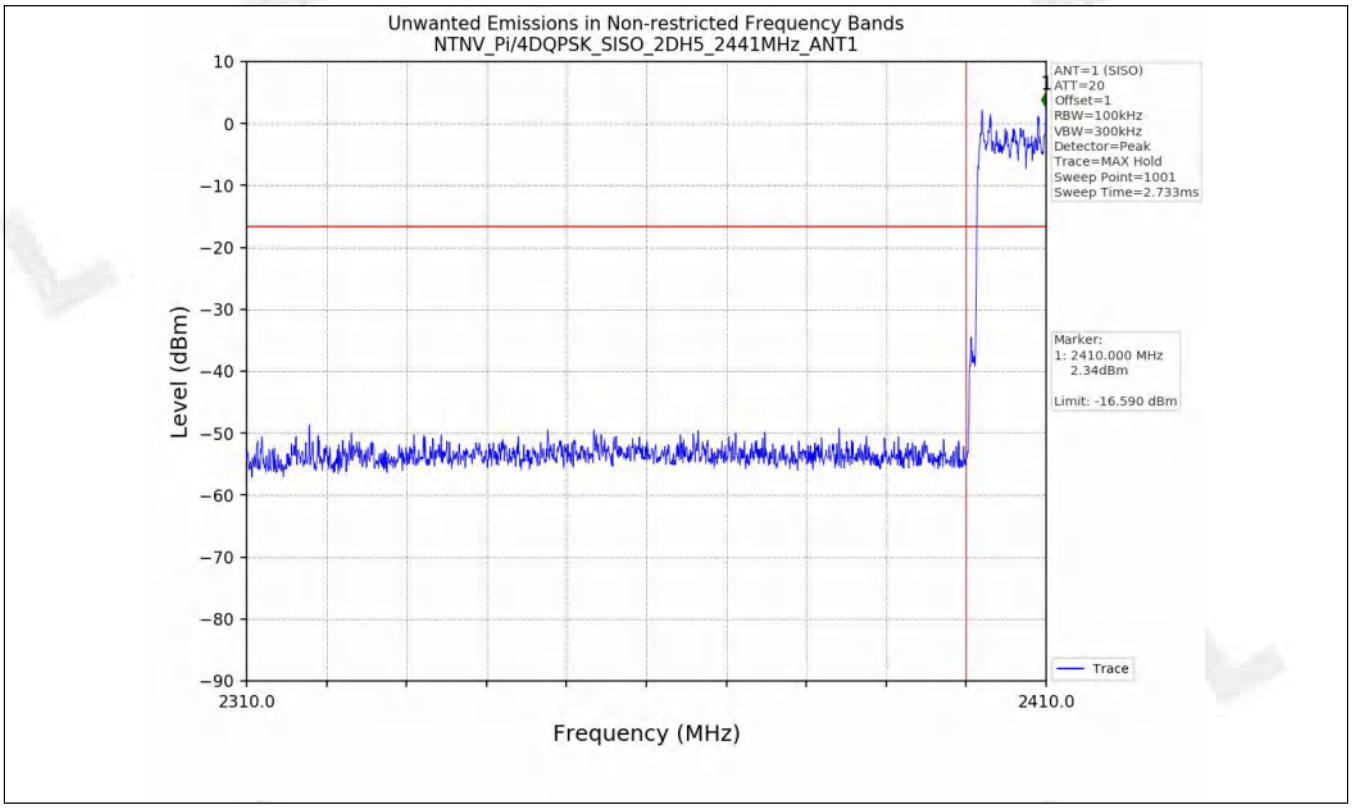

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_Pi/4DQPSK_SISO_2DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=2001
Sweep Time=9.6ms
Marker:
1: 2402.000 MHz
3.08dBm
Limit: -16.590 dBm
Trace
Level (dBm)
Frequency (MHz)
2310.0
2410.0

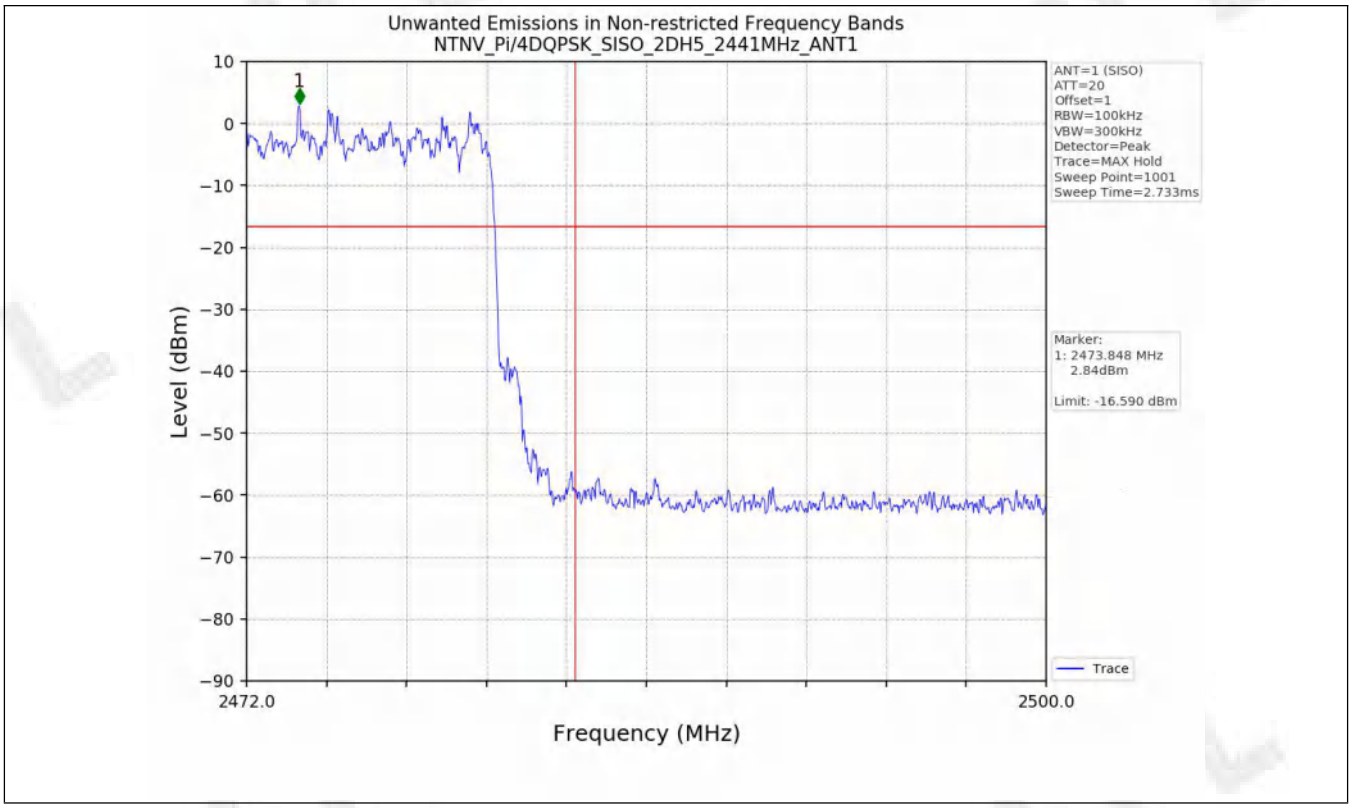

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_Pi/4DQPSK_SISO_2DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 4804.264 MHz
-44.49dBm
2: 9607.868 MHz
-43.57dBm
Limit: -16.590 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0

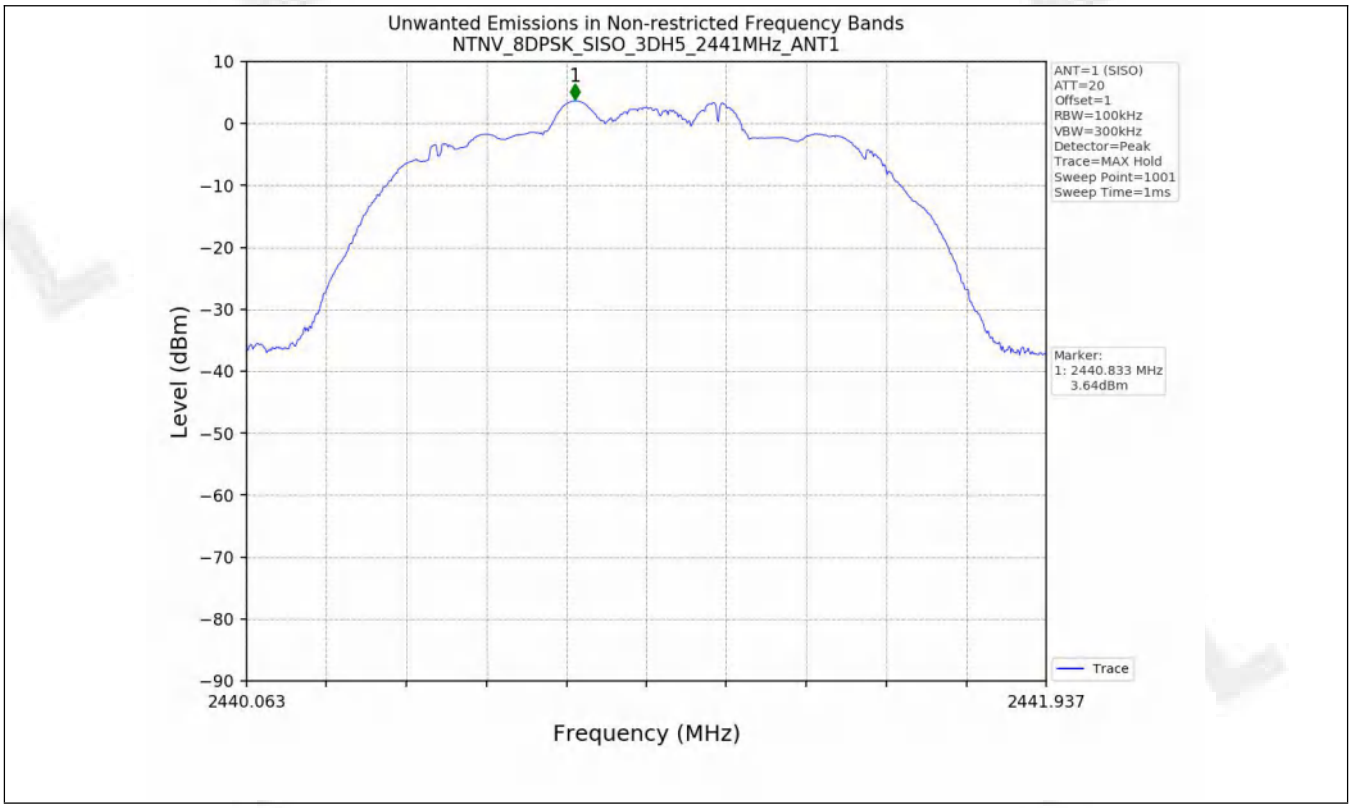

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_Pi/4DQPSK_SISO_2DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 4881.671 MHz
-47.66dBm
2: 9763.930 MHz
-45.51dBm
Limit: -16.590 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0

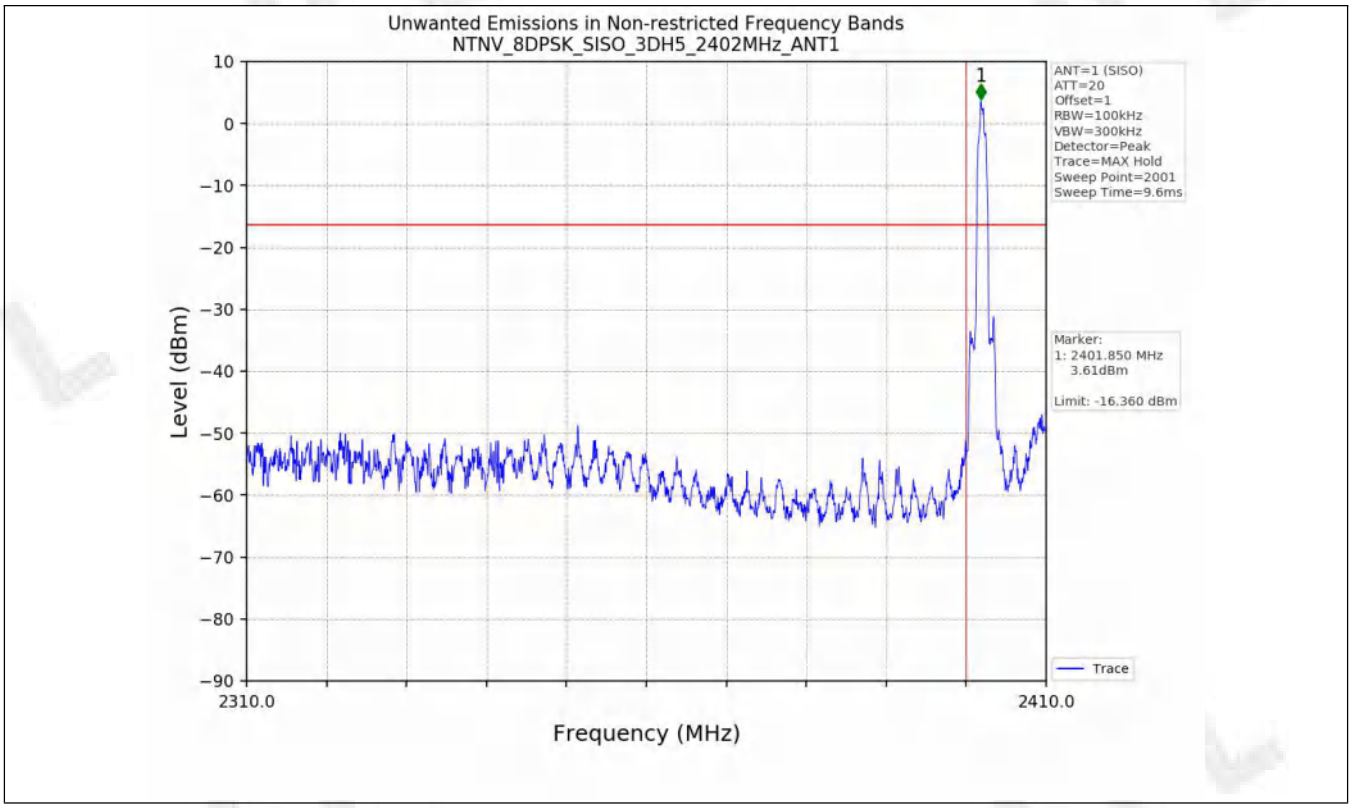

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_Pi/4DQPSK_SISO_2DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.733ms
Marker:
1: 2479.840 MHz
2.79dBm
Limit: -16.590 dBm
Trace
Level (dBm)
Frequency (MHz)
2472.0
2500.0

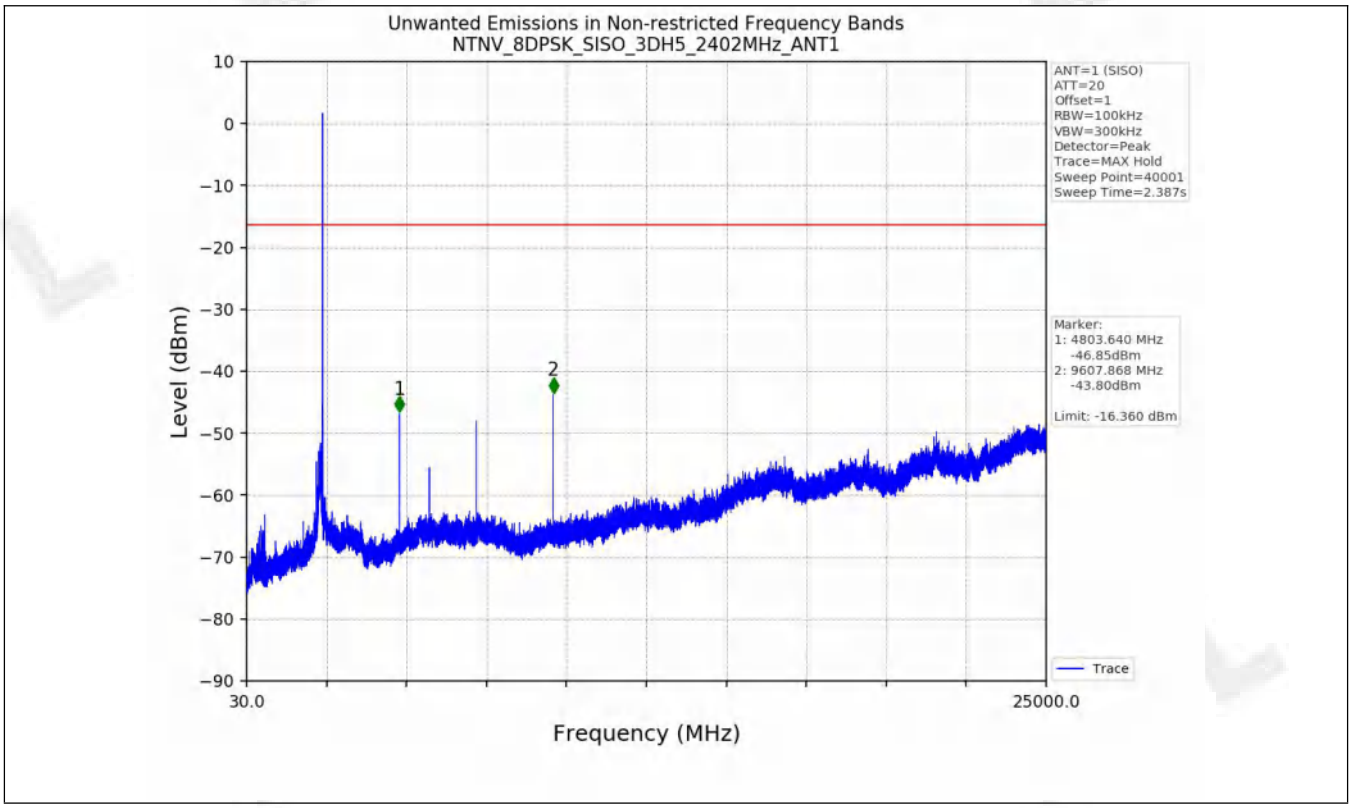

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_Pi/4DQPSK_SISO_2DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 4959.702 MHz
-41.98dBm
2: 7439.847 MHz
-46.65dBm
Limit: -16.590 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0

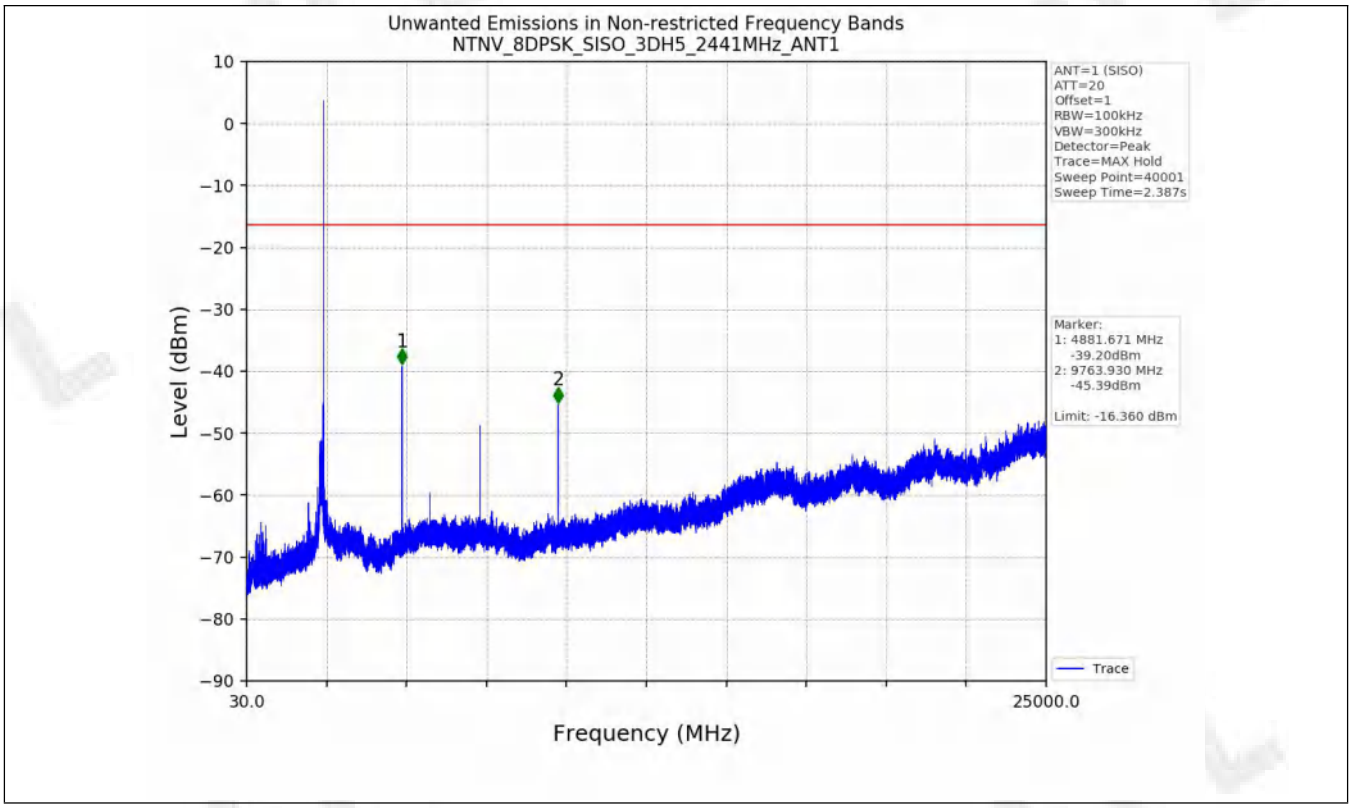

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_Pi/4DQPSK_SISO_2DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.733ms
Marker:
1: 2410.000 MHz
2.34dBm
Limit: -16.590 dBm
Trace
Level (dBm)
Frequency (MHz)
2310.0
2410.0

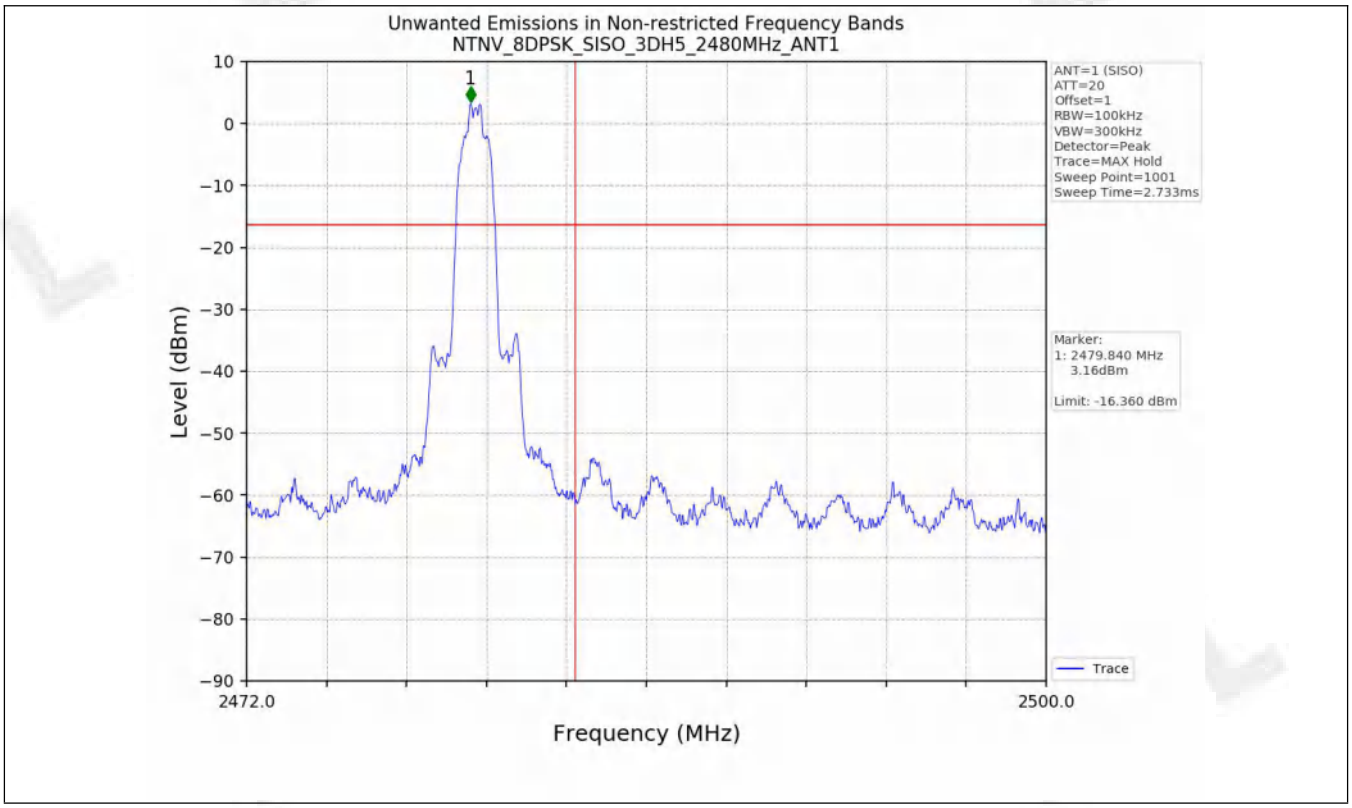

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_Pi/4DQPSK_SISO_2DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.733ms
Marker:
1: 2473.848 MHz
2.84dBm
Limit: -16.590 dBm
Trace
Level (dBm)
Frequency (MHz)
2472.0
2500.0

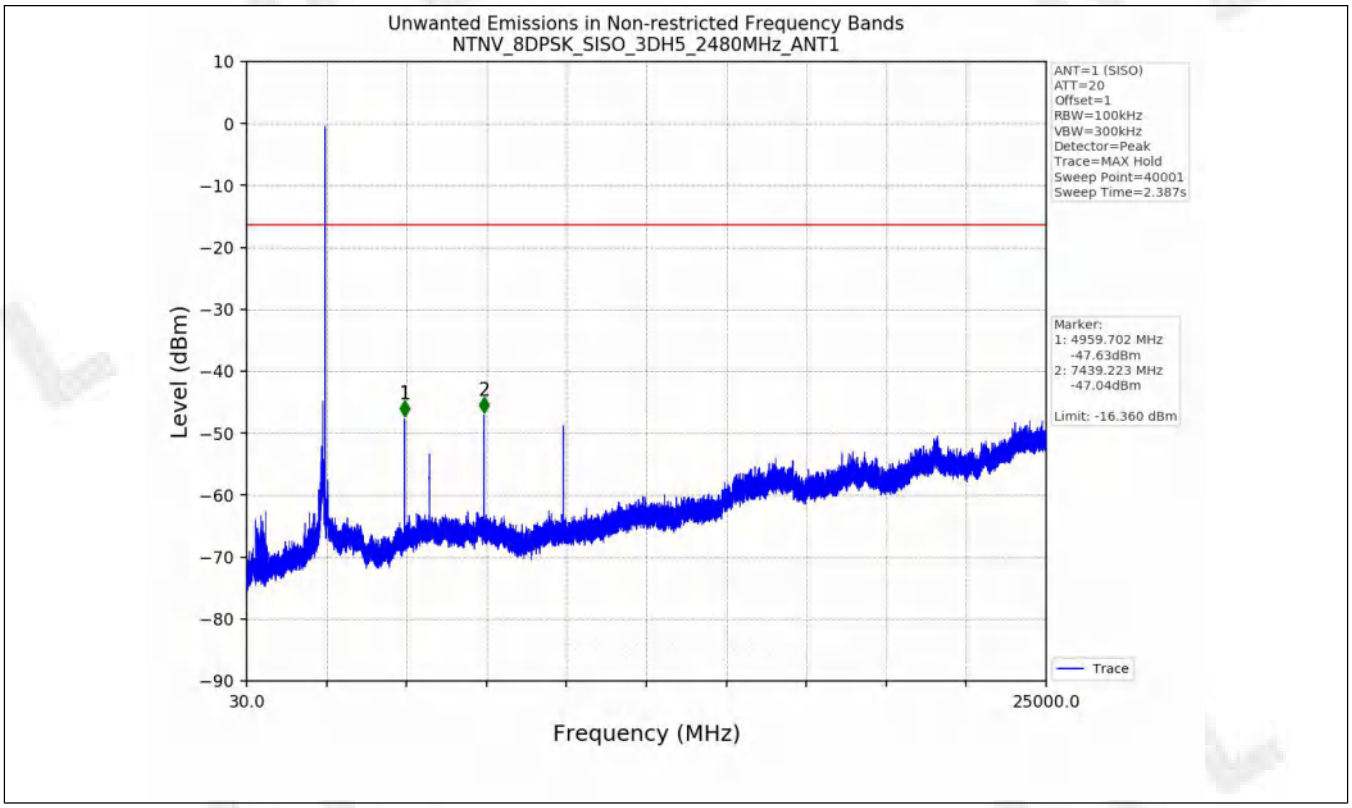

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_8DPSK_SISO_3DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Marker:
1: 2440.833 MHz
3.64dBm
Trace
Level (dBm)
Frequency (MHz)
2440.063
2441.937

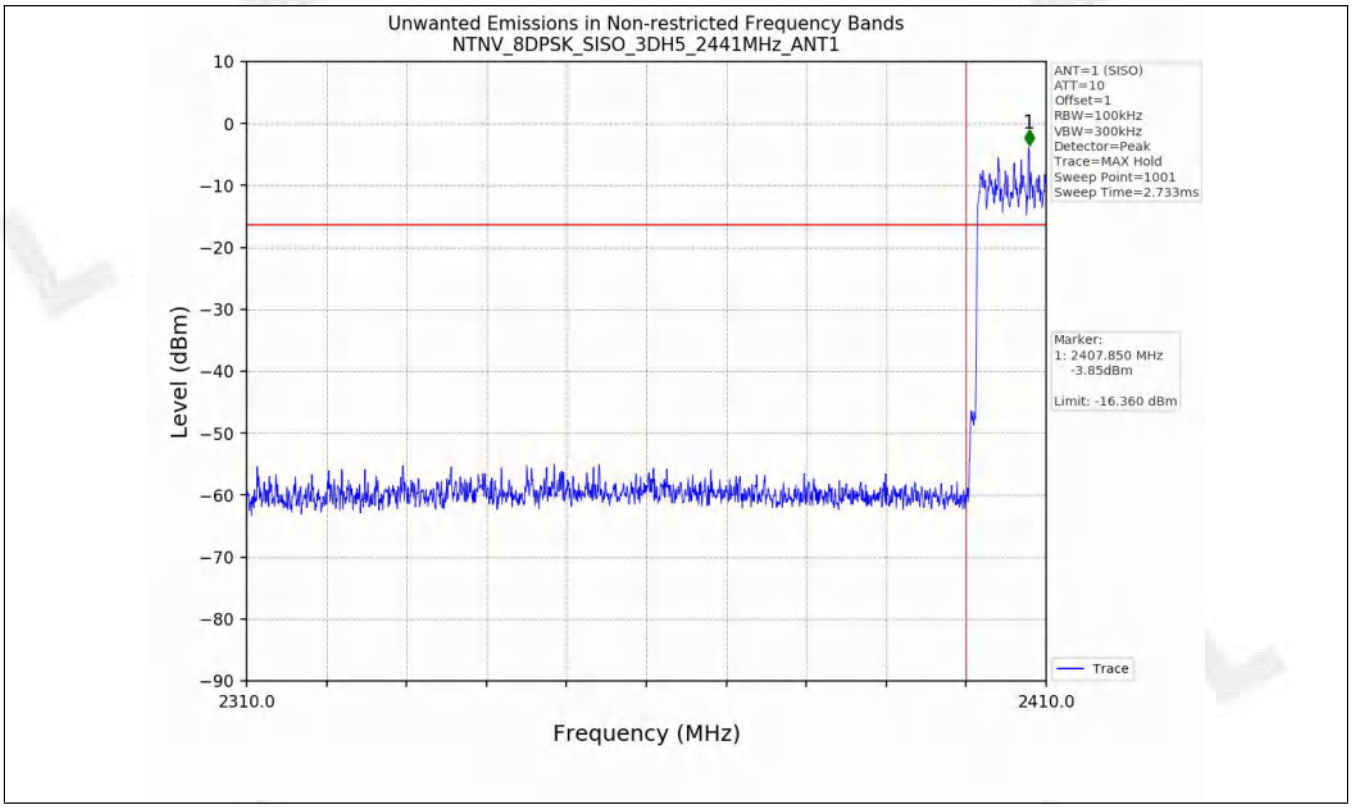

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_8DPSK_SISO_3DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=2001
Sweep Time=9.6ms
Marker:
1: 2401.850 MHz
3.61dBm
Limit: -16.360 dBm
Trace
Level (dBm)
Frequency (MHz)
2310.0
2410.0

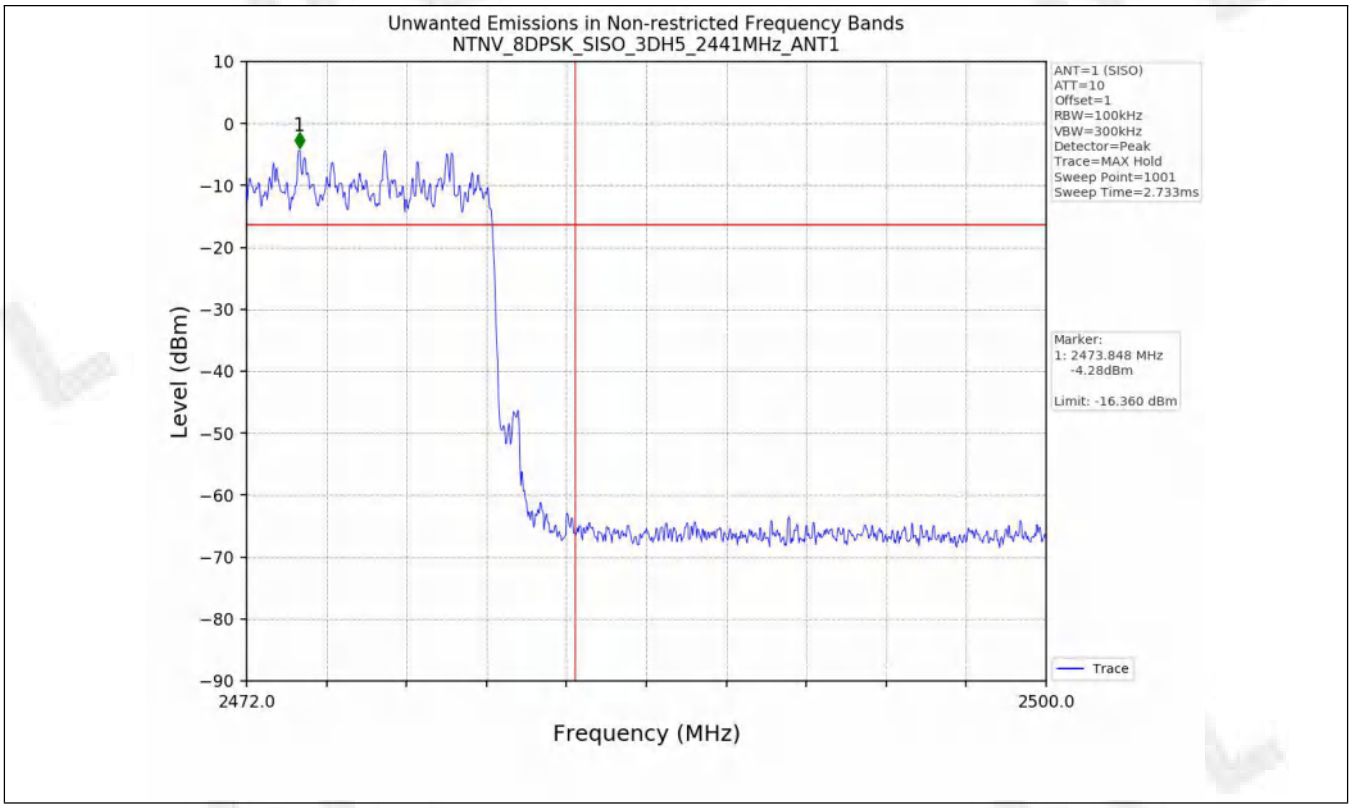

Unwanted Emissions in Non-restricted Frequency Bands
NTNV_8DPSK_SISO_3DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 4803.640 MHz
-46.85dBm
2: 9607.868 MHz
-43.80dBm
Limit: -16.360 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0


Unwanted Emissions in Non-restricted Frequency Bands
NTNV_8DPSK_SISO_3DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 4881.671 MHz
-39.20dBm
2: 9763.930 MHz
-45.39dBm
Limit: -16.360 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=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.733ms
Marker:
1: 2479.840 MHz
3.16dBm
Limit: -16.360 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=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 4959.702 MHz
-47.63dBm
2: 7439.223 MHz
-47.04dBm
Limit: -16.360 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=10
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.733ms
Marker:
1: 2407.850 MHz
-3.85dBm
Limit: -16.360 dBm
Trace
Level (dBm)
Frequency (MHz)
2310.0
2410.0

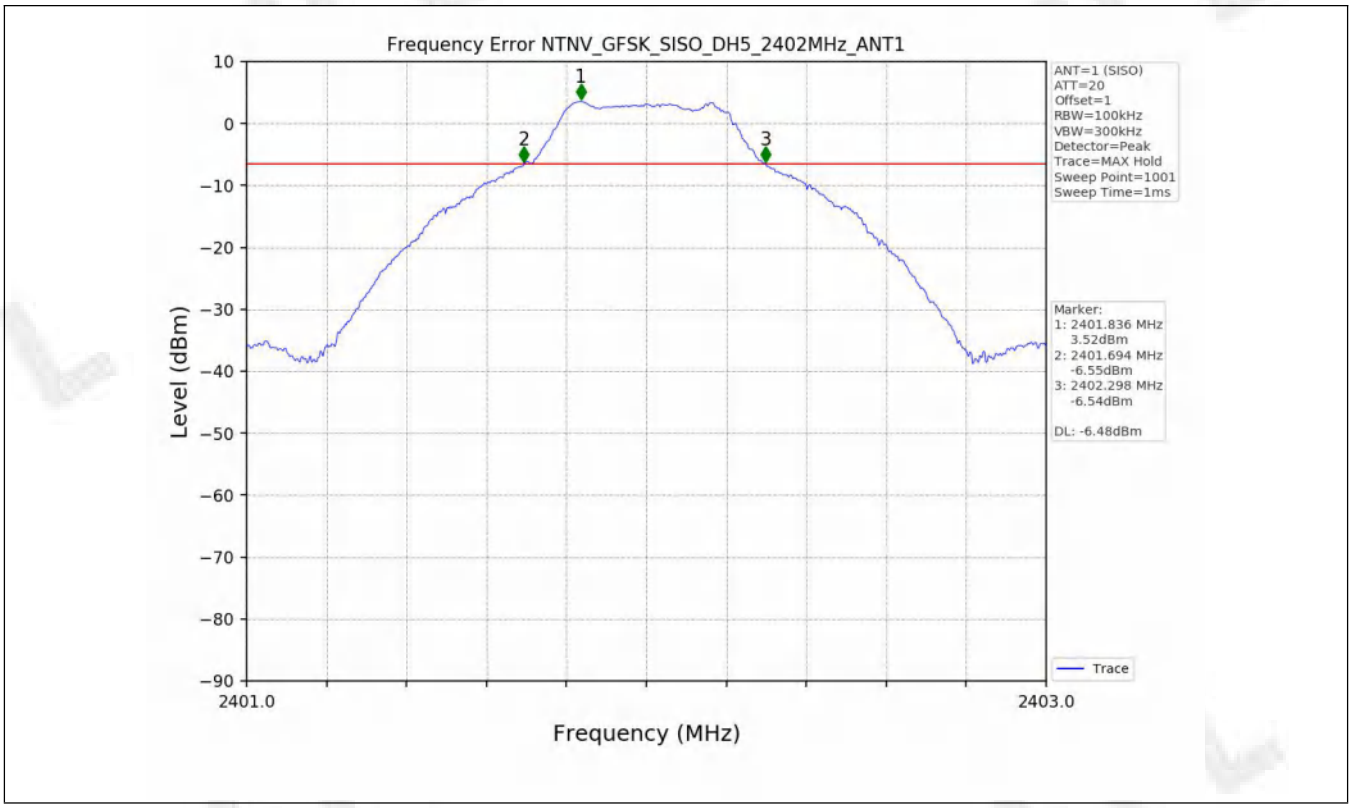


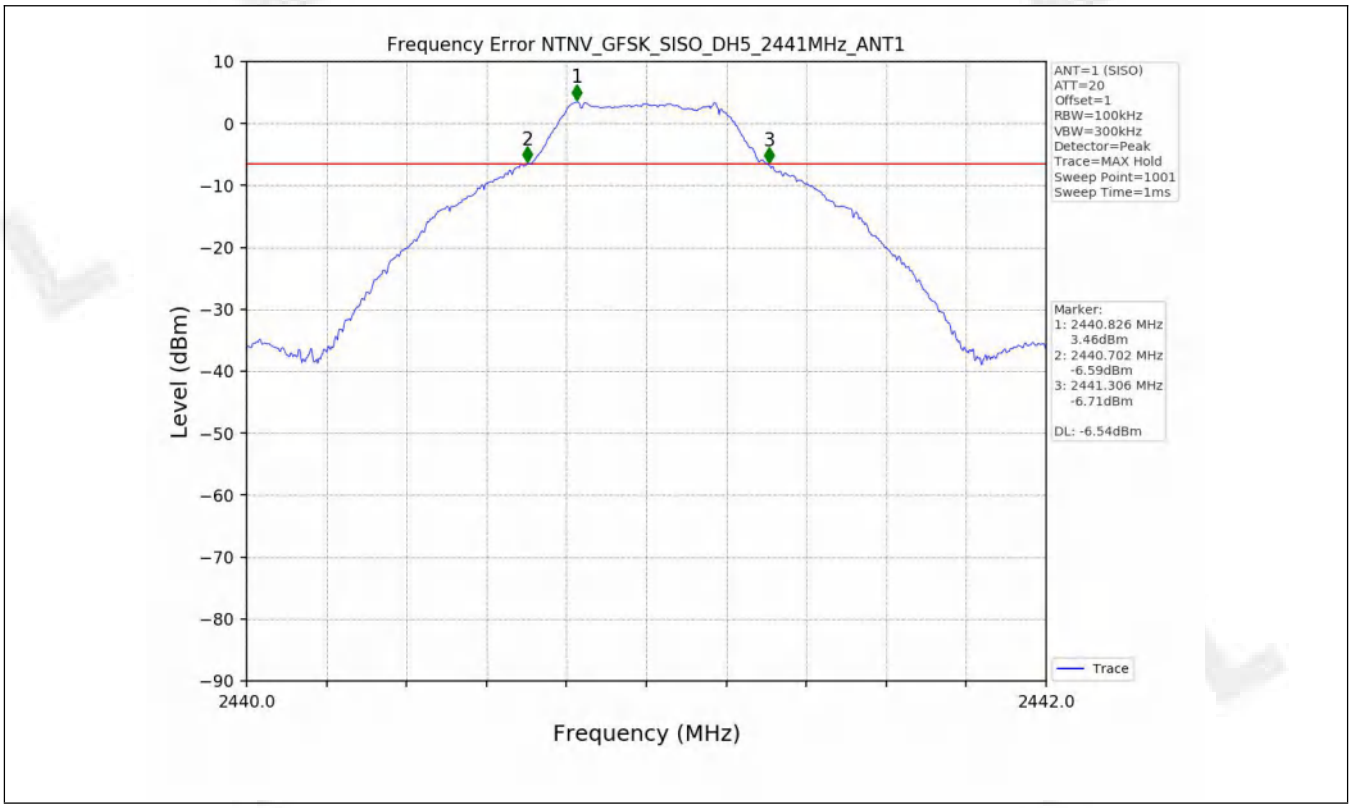
7. Frequency Error

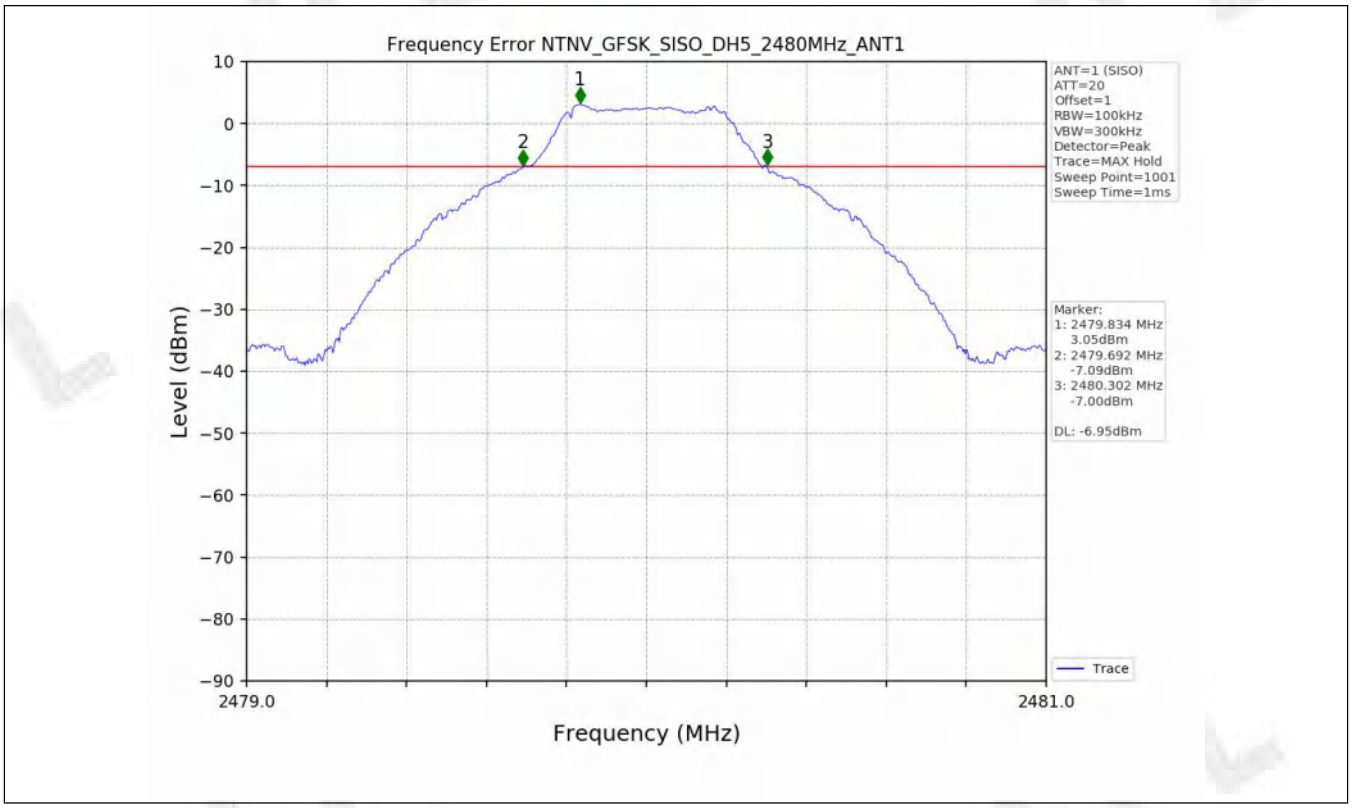
7.1 Test Result

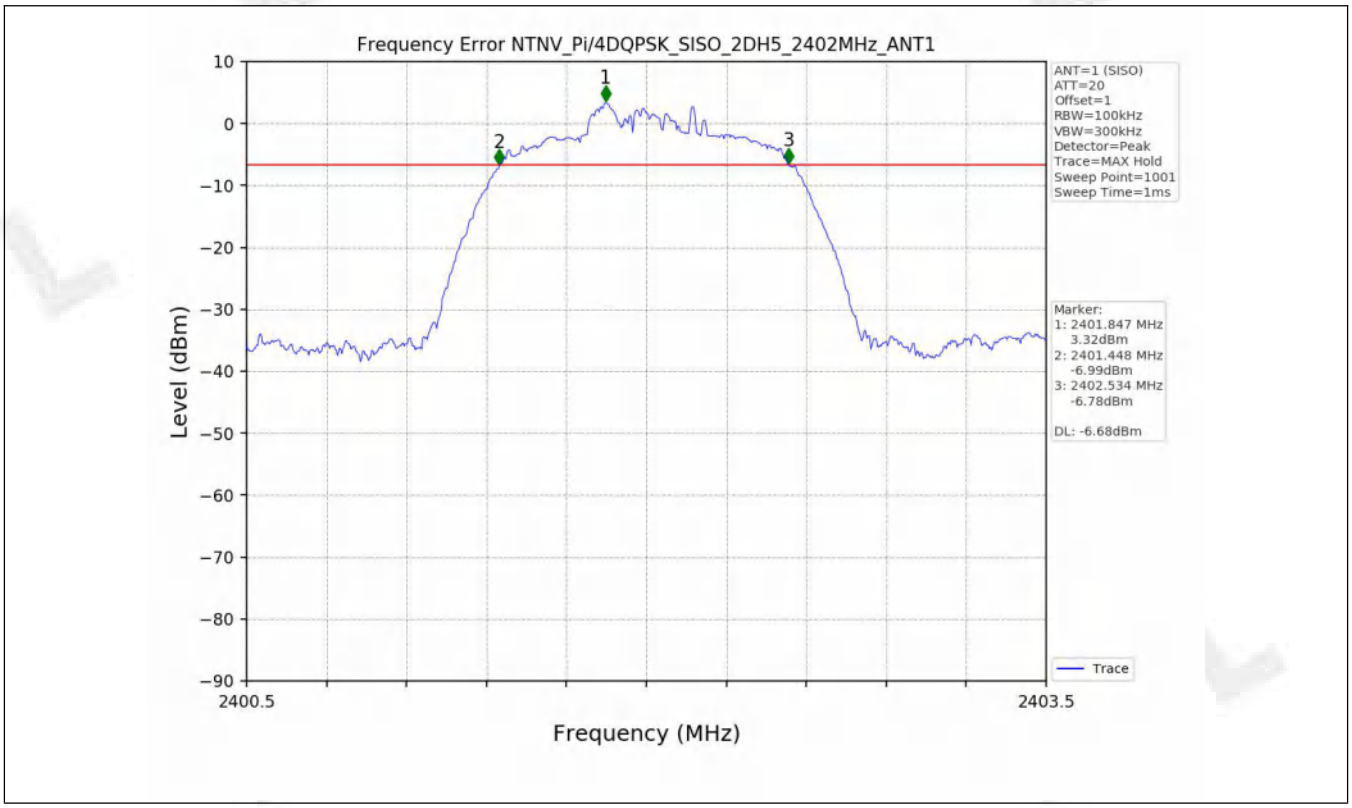
Test Mode	Frequency (MHz)	TX Type	ANT	Measured Frequency (MHz)		Verdict
				Test Result	Limit	
GFSK	2402	SISO	1	2402.00	2400-2483.5	PASS
	2441	SISO	1	2441.00	2400-2483.5	PASS
	2480	SISO	1	2480.00	2400-2483.5	PASS
Pi/4DQPSK	2402	SISO	1	2401.99	2400-2483.5	PASS
	2441	SISO	1	2441.00	2400-2483.5	PASS
	2480	SISO	1	2480.00	2400-2483.5	PASS

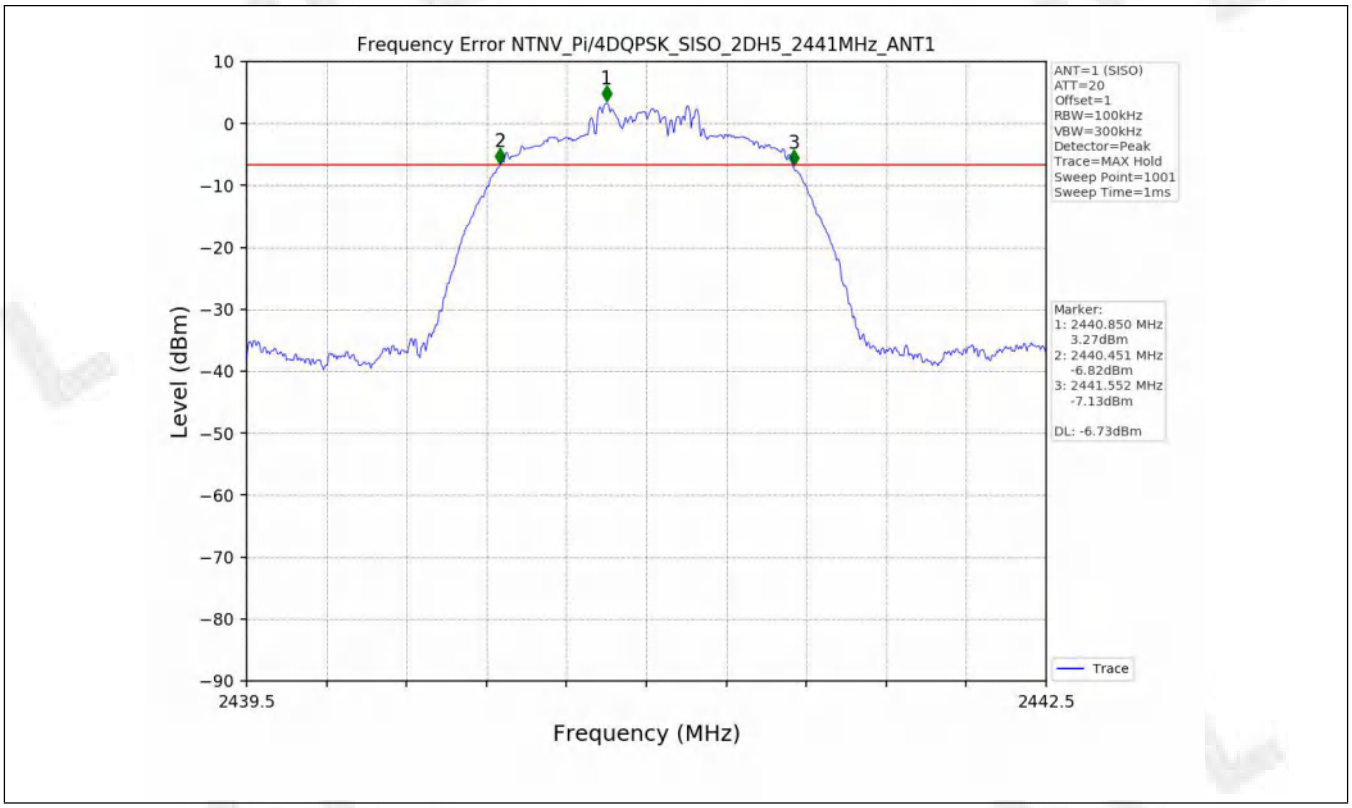
7.2 Test Graph

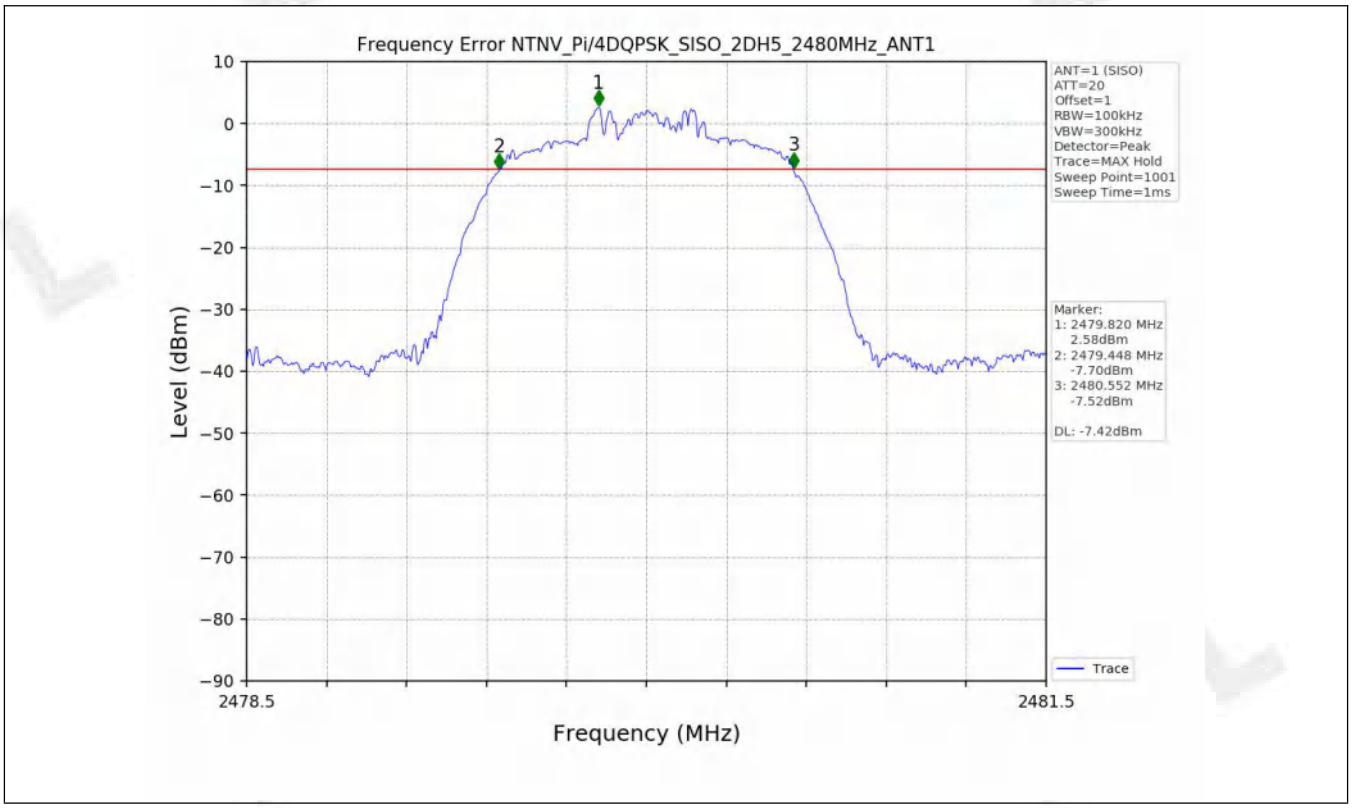

Frequency Error NTNV_GFSK_SISO_DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Marker:
1: 2401.836 MHz
3.52dBm
2: 2401.694 MHz
-6.55dBm
3: 2402.298 MHz
-6.54dBm
DL: -6.48dBm
Trace
Level (dBm)
Frequency (MHz)
2401.0
2403.0


Frequency Error NTNV_GFSK_SISO_DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Marker:
1: 2440.826 MHz
3.46dBm
2: 2440.702 MHz
-6.59dBm
3: 2441.306 MHz
-6.71dBm
DL: -6.54dBm
Trace
Level (dBm)
Frequency (MHz)
2440.0
2442.0


Frequency Error NTNV_GFSK_SISO_DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Marker:
1: 2479.834 MHz
3.05dBm
2: 2479.692 MHz
-7.09dBm
3: 2480.302 MHz
-7.00dBm
DL: -6.95dBm
Trace
Level (dBm)
Frequency (MHz)
2479.0
2481.0


Frequency Error NTNV_Pi/4DQPSK_SISO_2DH5_2402MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Marker:
1: 2401.847 MHz
3.32dBm
2: 2401.448 MHz
-6.99dBm
3: 2402.534 MHz
-6.78dBm
DL: -6.68dBm
Trace
Level (dBm)
Frequency (MHz)
2400.5
2403.5


Frequency Error NTNV_Pi/4DQPSK_SISO_2DH5_2441MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Marker:
1: 2440.850 MHz
3.27dBm
2: 2440.451 MHz
-6.82dBm
3: 2441.552 MHz
-7.13dBm
DL: -6.73dBm
Trace
Level (dBm)
Frequency (MHz)
2439.5
2442.5


Frequency Error NTNV_Pi/4DQPSK_SISO_2DH5_2480MHz_ANT1
ANT=1 (SISO)
ATT=20
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Marker:
1: 2479.820 MHz
2.58dBm
2: 2479.448 MHz
-7.70dBm
3: 2480.552 MHz
-7.52dBm
DL: -7.42dBm
Trace
Level (dBm)
Frequency (MHz)
2478.5
2481.5