Appendix for 15.247

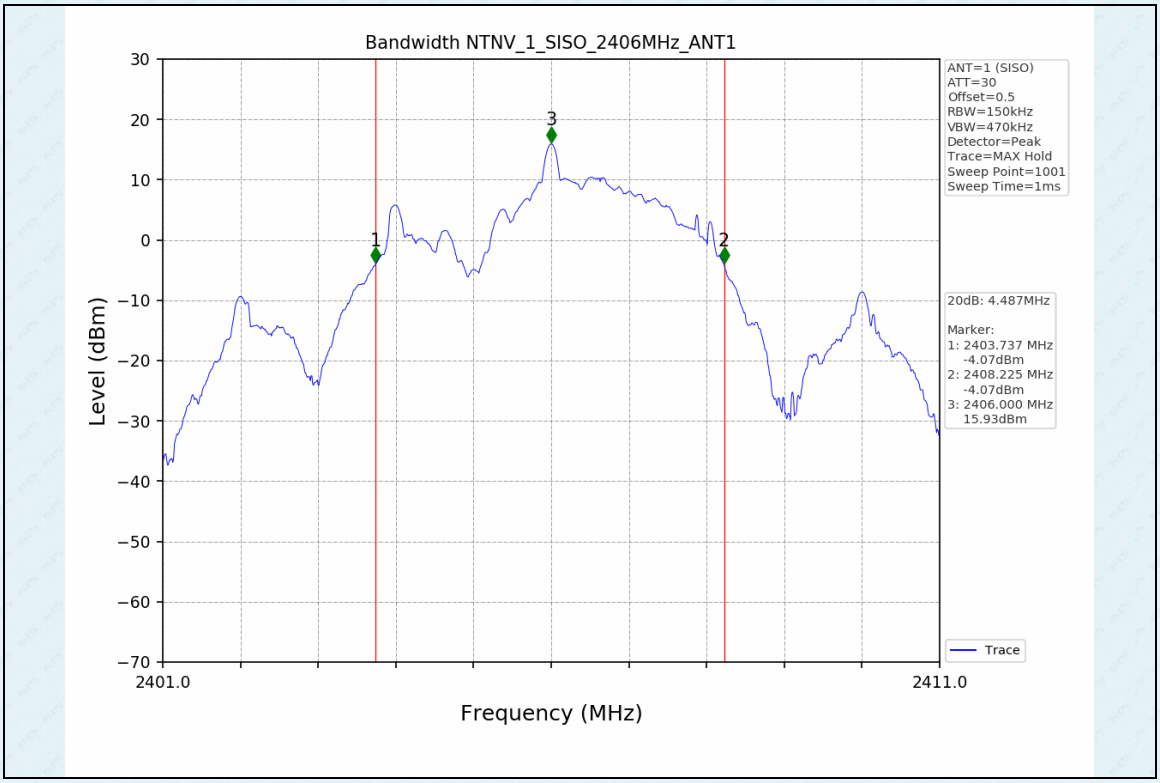
1. Bandwidth

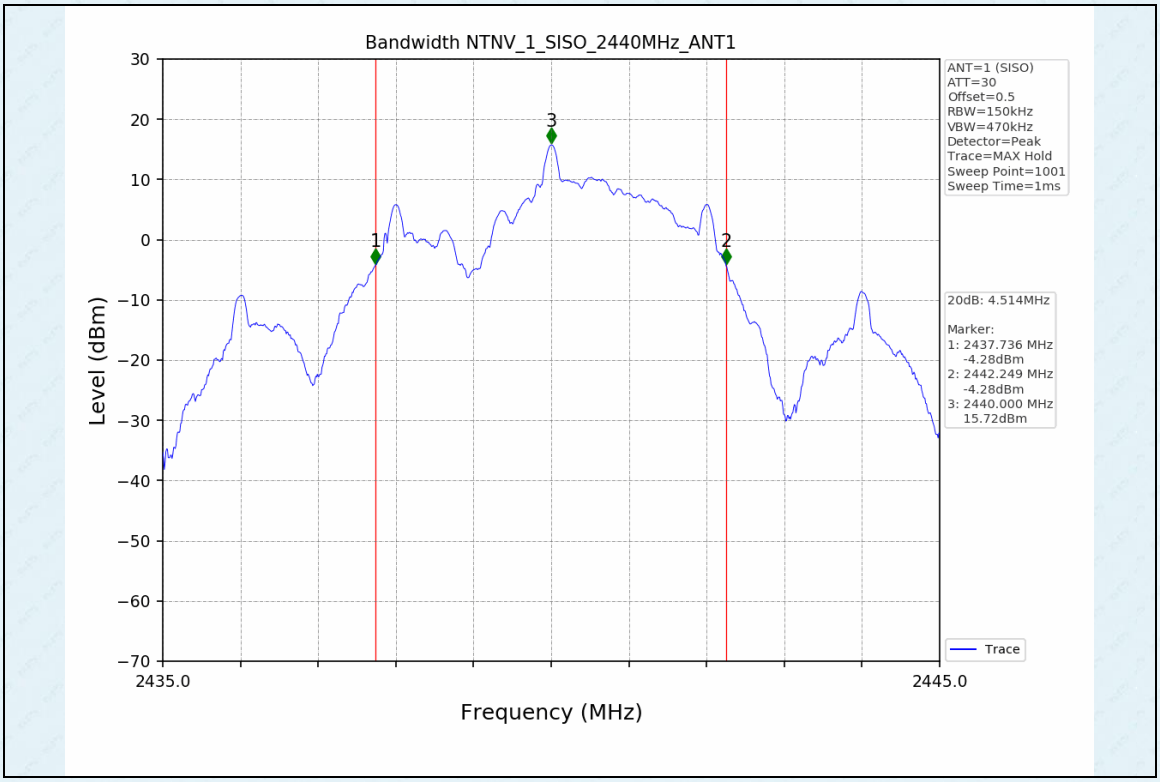
1.1 Test Result

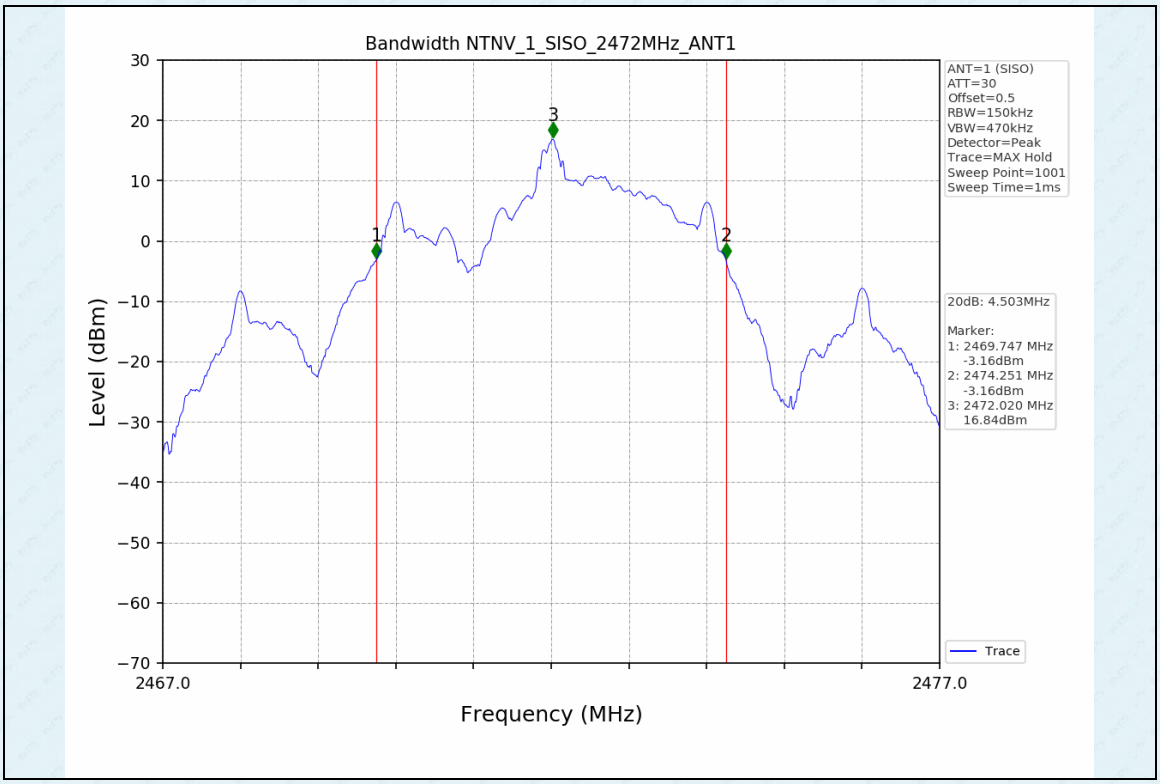
Test Mode	Frequency (MHz)	TX Type	ANT No.	20dB Bandwidth Test Result (MHz)	Verdict
FHSS	2406	SISO	1	4.487	PASS
	2440	SISO	1	4.514	PASS
	2472	SISO	1	4.503	PASS

Test Mode	Frequency (MHz)	TX Type	ANT No.	99% Occupied Bandwidth Test Result (MHz)	
FHSS	2406	SISO	1	4.454	Only for Report Use
	2440	SISO	1	4.693	Only for Report Use
	2472	SISO	1	4.549	Only for Report Use

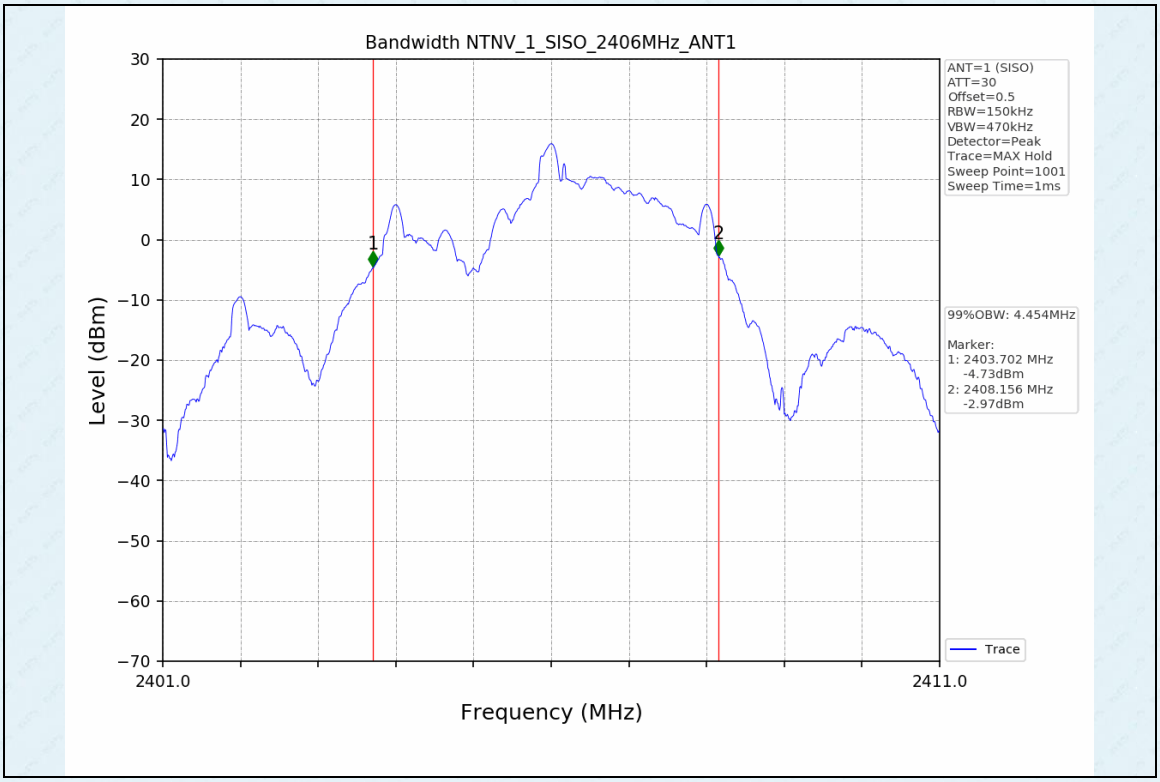
1.2 Test Graph - 20dB Bandwidth

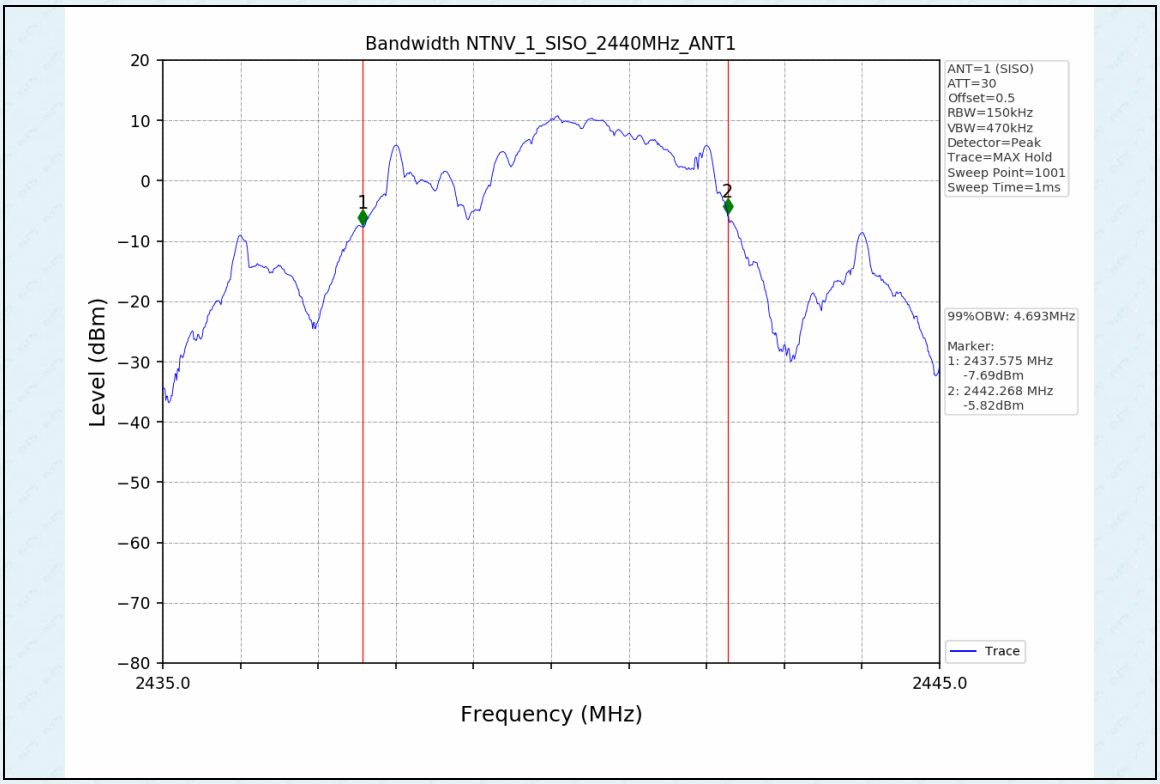


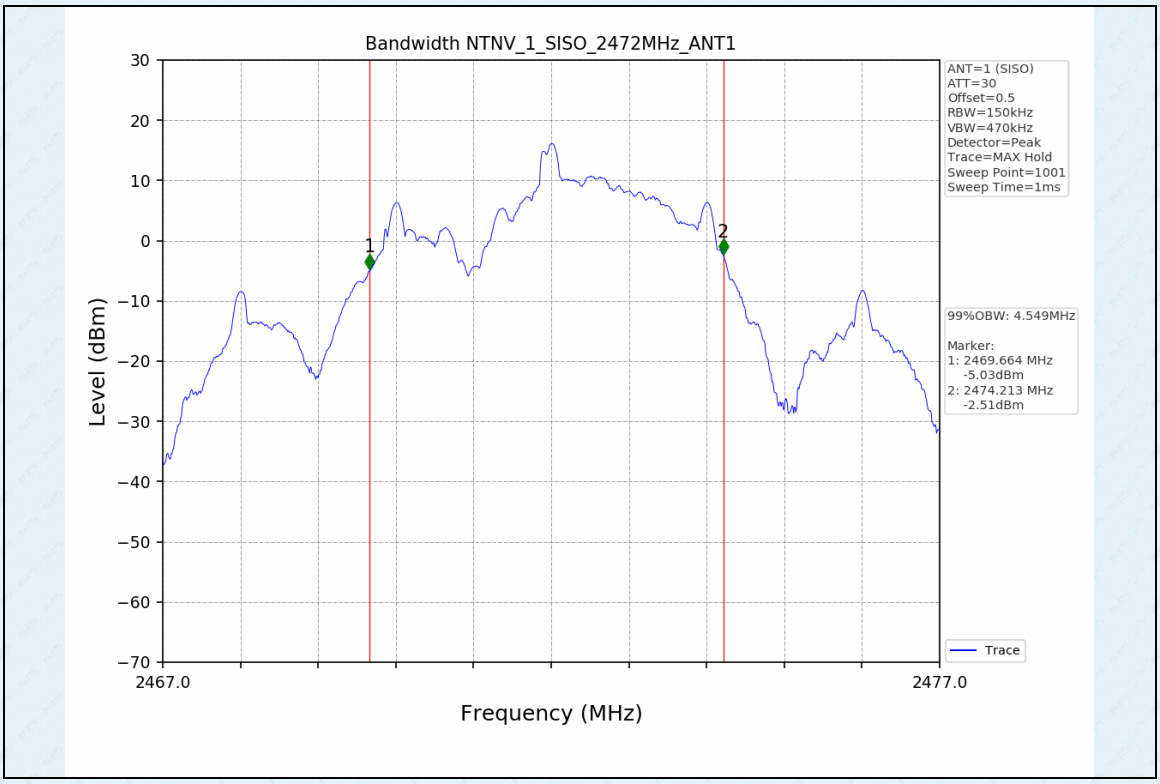




1.3 Test Graph - 99% Occupied Bandwidth




Bandwidth NTNV_1_SISO_2440MHz_ANT1
ANT=1 (SISO)
ATT=30
Offset=0.5
RBW=150kHz
VBW=470kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
99%OBW: 4.693MHz
Marker:
1: 2437.575 MHz
-7.69dBm
2: 2442.268 MHz
-5.82dBm
Trace
Level (dBm)
Frequency (MHz)
2435.0
2445.0

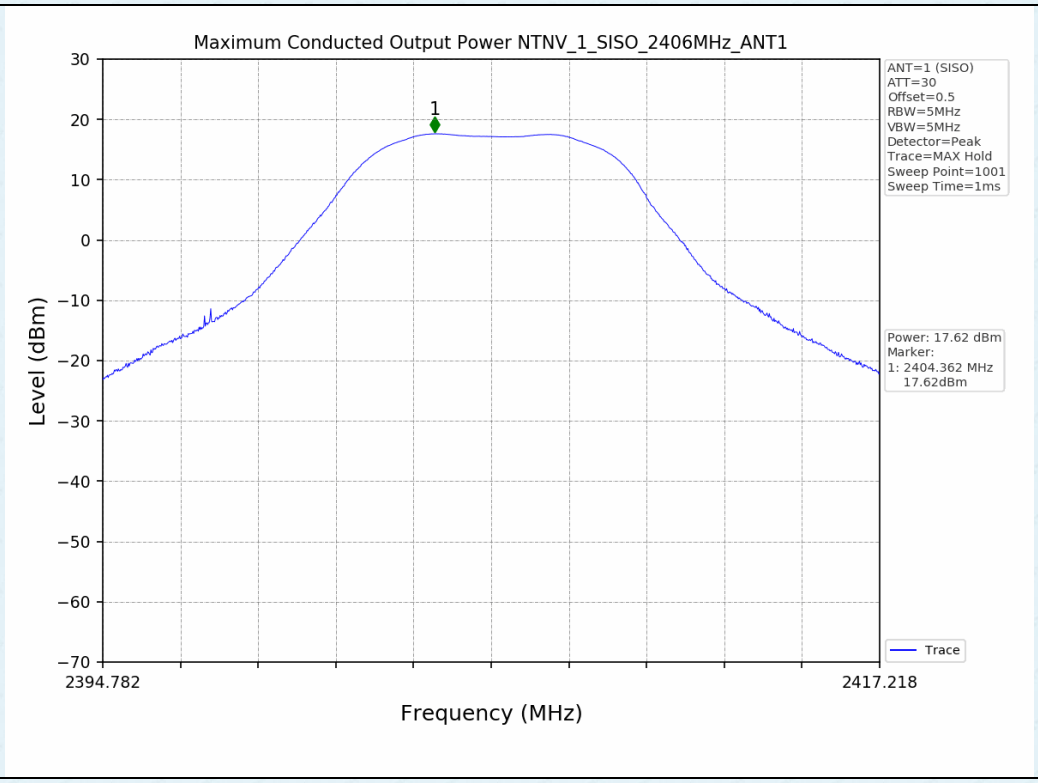

Bandwidth NTNV_1_SISO_2472MHz_ANT1
ANT=1 (SISO)
ATT=30
Offset=0.5
RBW=150kHz
VBW=470kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
99%OBW: 4.549MHz
Marker:
1: 2469.664 MHz
-5.03dBm
2: 2474.213 MHz
-2.51dBm
Trace
Level (dBm)
Frequency (MHz)
2467.0
2477.0

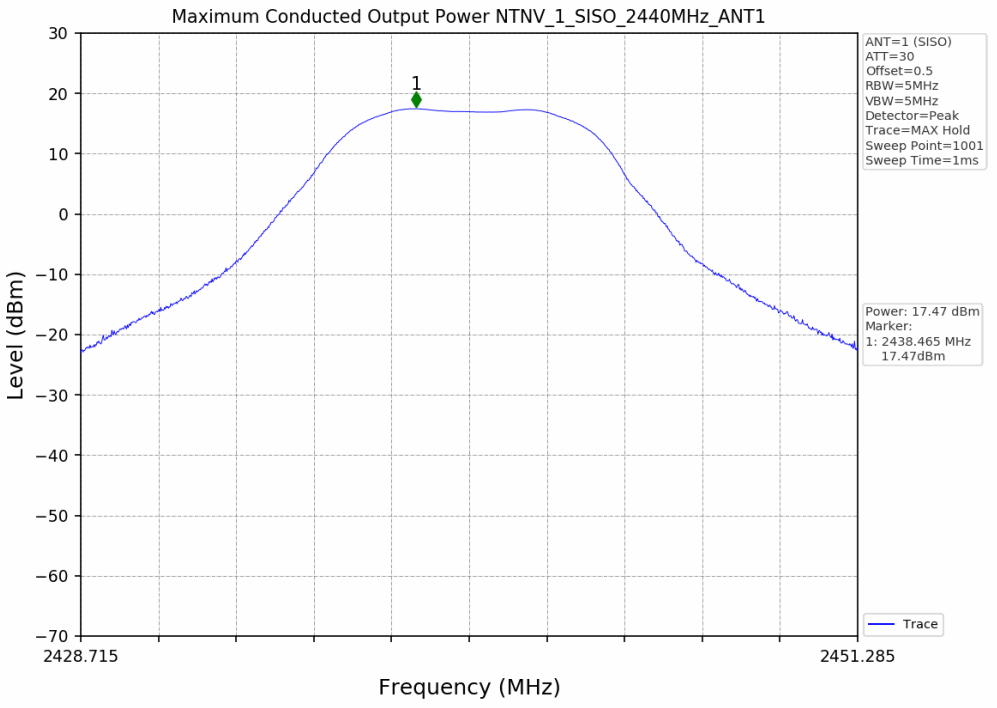
2. Maximum Conducted Output Power

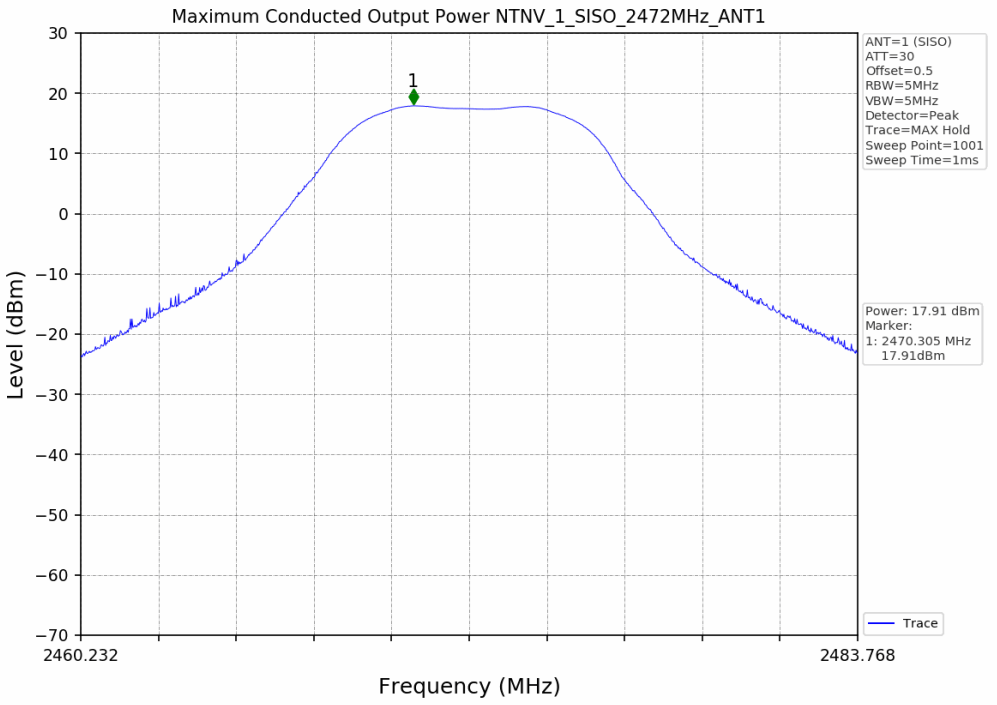
2.1 Test Result

Test Mode	Frequency (MHz)	Tx Type	Measured Peak Output Power (dBm)	Limits (dBm)	Verdict
			Ant 1		
FHSS	2406	SISO	17.62	20.97	PASS
	2440	SISO	17.47	20.97	PASS
	2472	SISO	17.91	20.97	PASS

2.2 Test Graph




Maximum Conducted Output Power NTNV_1_SISO_2440MHz_ANT1
ANT=1 (SISO)
ATT=30
Offset=0.5
RBW=5MHz
VBW=5MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Power: 17.47 dBm
Marker:
1: 2438.465 MHz
17.47dBm
Trace
Level (dBm)
Frequency (MHz)
2428.715
2451.285

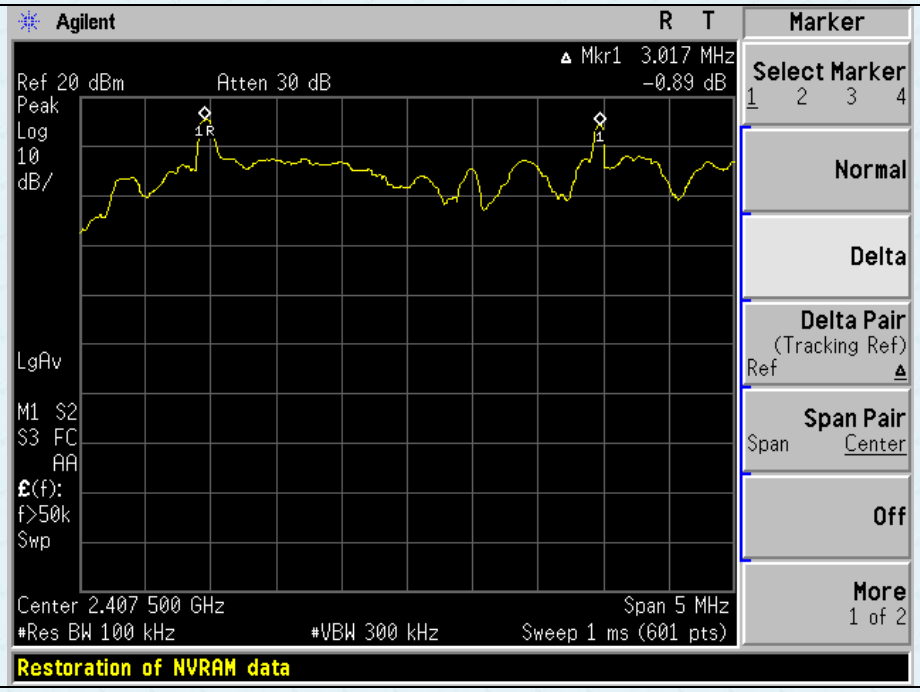

Maximum Conducted Output Power NTNV_1_SISO_2472MHz_ANT1
ANT=1 (SISO)
ATT=30
Offset=0.5
RBW=5MHz
VBW=5MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Power: 17.91 dBm
Marker:
1: 2470.305 MHz
17.91dBm
Trace
Level (dBm)
Frequency (MHz)
2460.232
2483.768

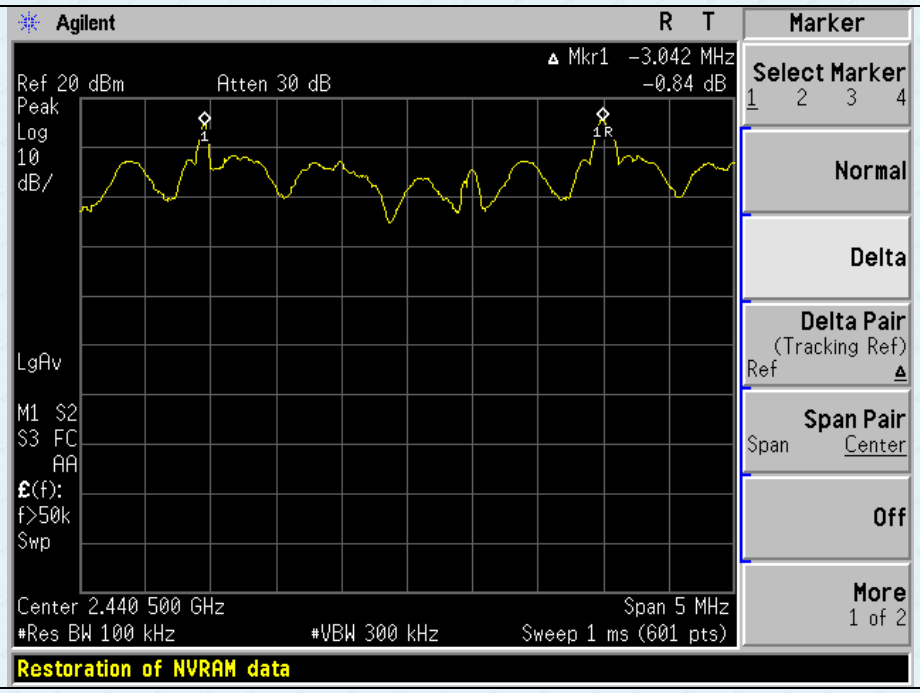
3. Carrier frequency separation

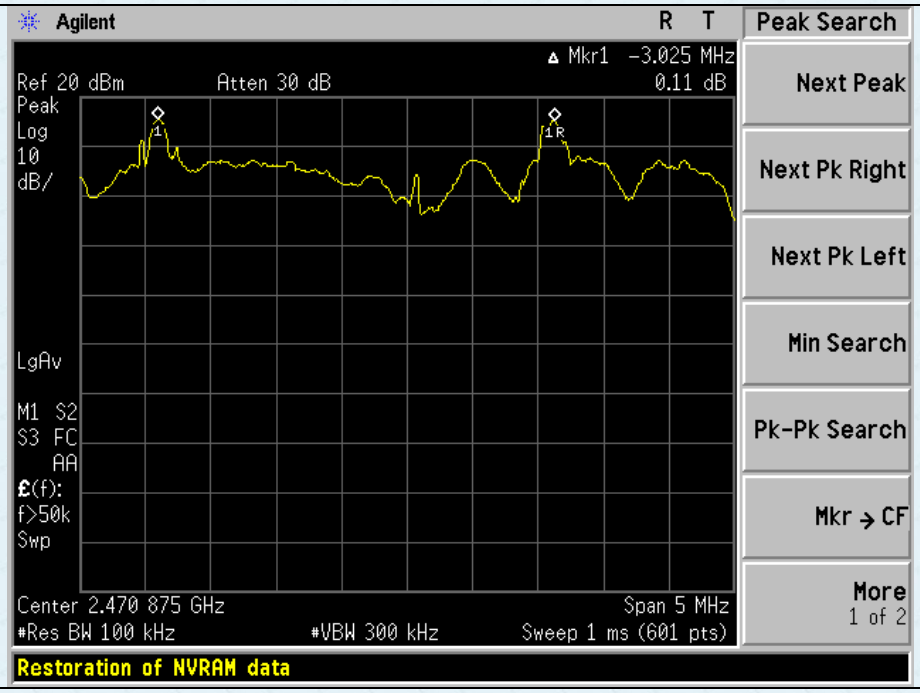
3.1 Test Result

ANT No.	Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
1	Lowest	3017	2.991	Pass
	Middle	3042	3.009	Pass
	Highest	3025	3.002	Pass

3.2 Test Graph




Agilent
R T
Marker
Mkr1 -3.042 MHz
Ref 20 dBm
Atten 30 dB
-0.84 dB
Peak
Log
10
dB/
LgAv
M1 S2
S3 FC
AA
£(f):
f>50k
Swp
Center 2.440 500 GHz
Span 5 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 1 ms (601 pts)
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span Center
Off
More
1 of 2
Restoration of NVRAM data

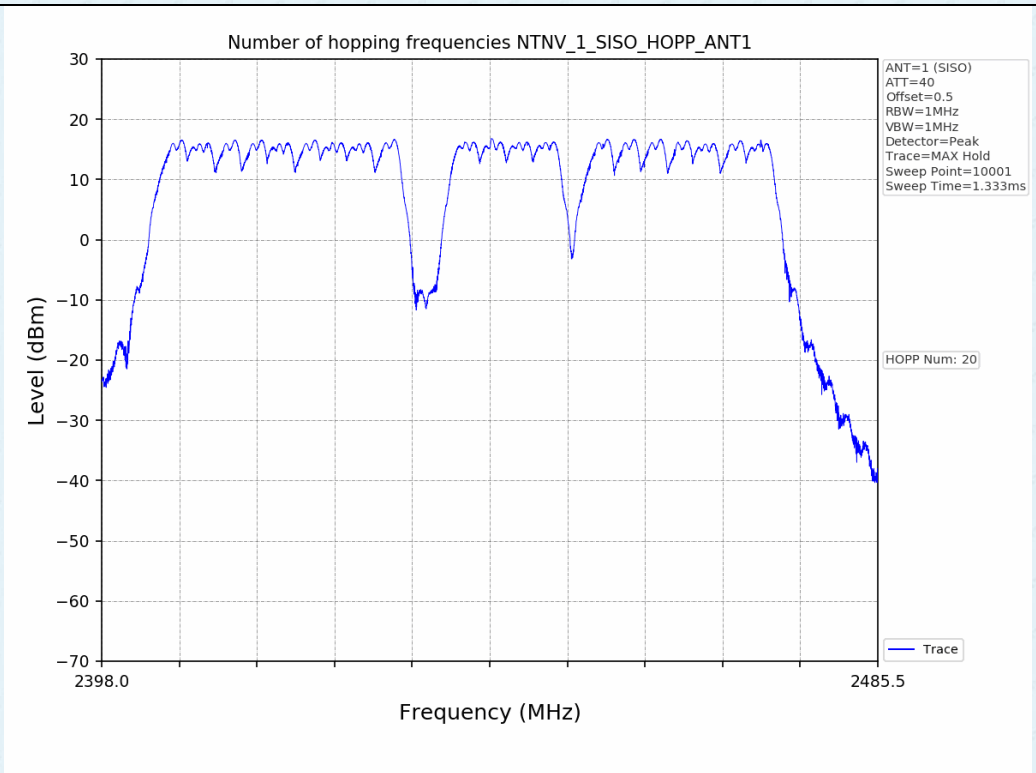

Agilent
R T
Peak Search
Mkr1 -3.025 MHz
Ref 20 dBm
Atten 30 dB
0.11 dB
Peak
Log
10
dB/
LgAv
M1 S2
S3 FC
AA
£(f):
f>50k
Swp
Center 2.470 875 GHz
Span 5 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 1 ms (601 pts)
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Restoration of NVRAM data

4. Number of hopping frequencies

4.1 Test Result

Test Mode	TX Type	ANT No.	Num of Hopping Frequencies	Limits	Verdict
FHSS	SISO	1	20	≥15	PASS

4.2 Test Graph



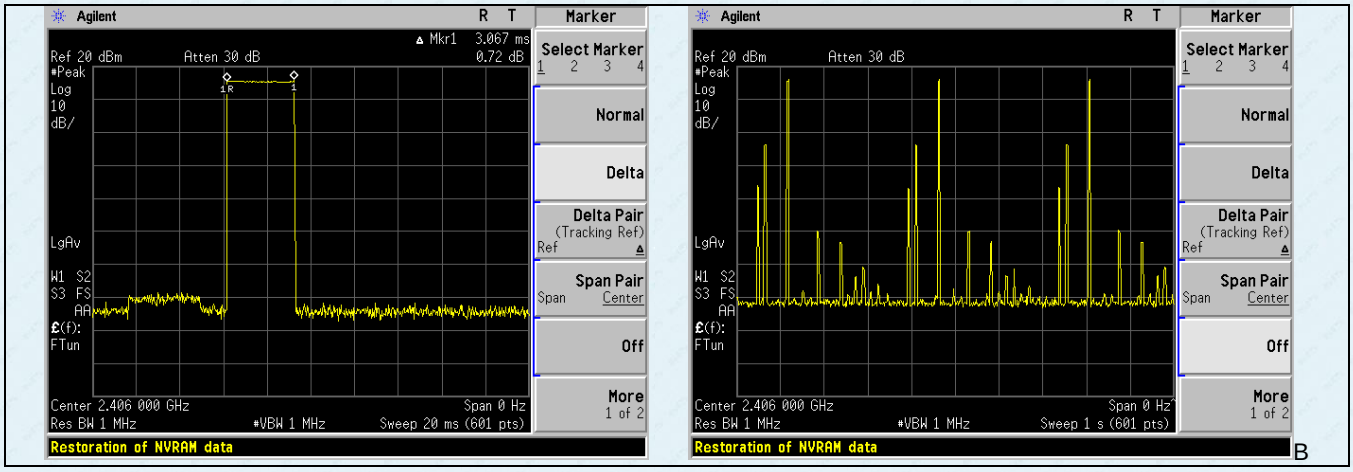
5. Time of Occupancy (Dwell Time)

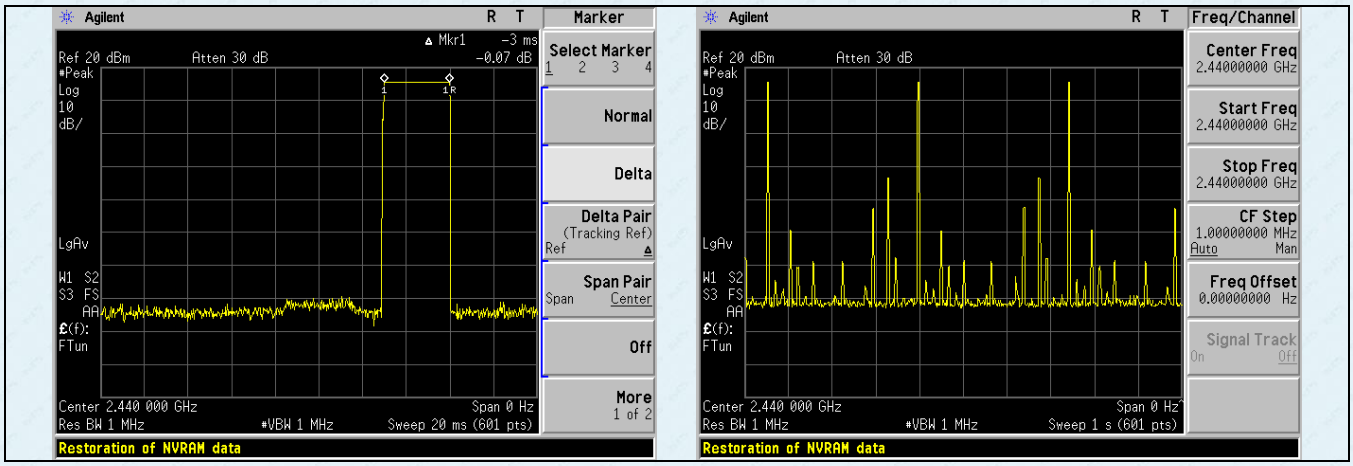
5.1 Test Result

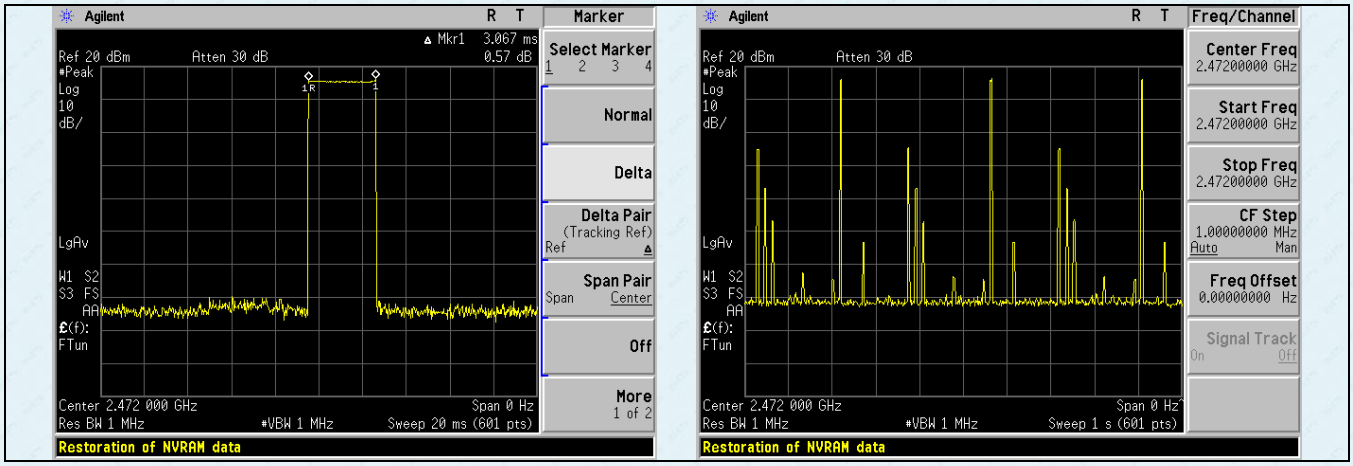
ANT No.	Test channel	Ton (ms)	Dwell time(ms)	Limit(ms)	Result
1	Lowest	3.0670	73.6080	400	Pass
	Middle	3.0000	72.0000	400	Pass
	Highest	3.0670	73.6080	400	Pass

The formula as below:
Lowest: Dwell time = Ton * Ton times in 1s * 0.4s * channel numbers=3.0670ms*3*0.4*20=73.6080ms
Middle: Dwell time = Ton * Ton times in 1s * 0.4s * channel numbers=3.0000ms*3*0.4*20=72.0000ms
Highest: Dwell time = Ton * Ton times in 1s * 0.4s * channel numbers=3.0670ms*3*0.4*20=73.6080ms

5.2 Test Graph





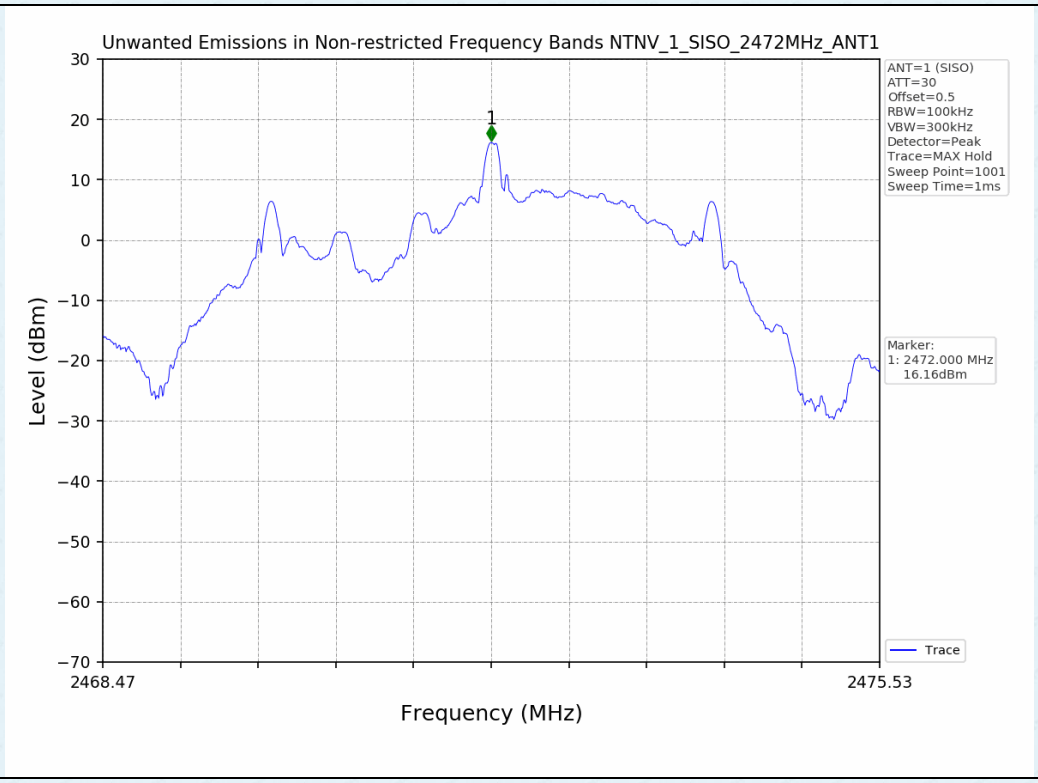


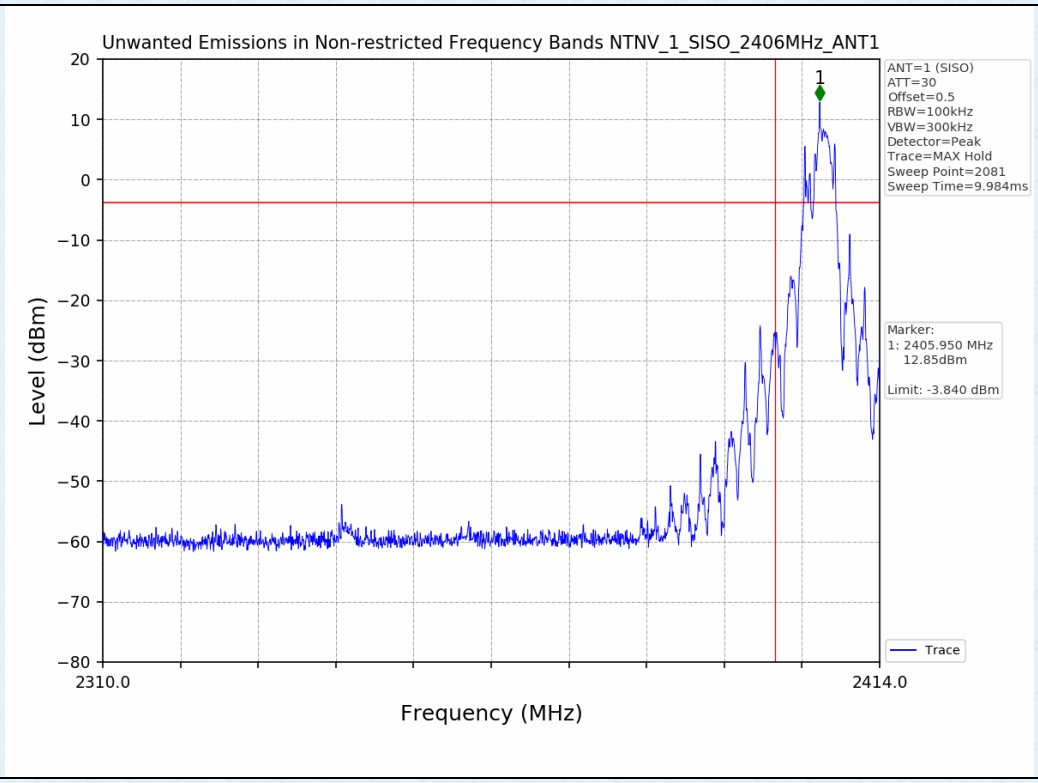
6. Unwanted Emissions in Non-restricted Frequency Bands

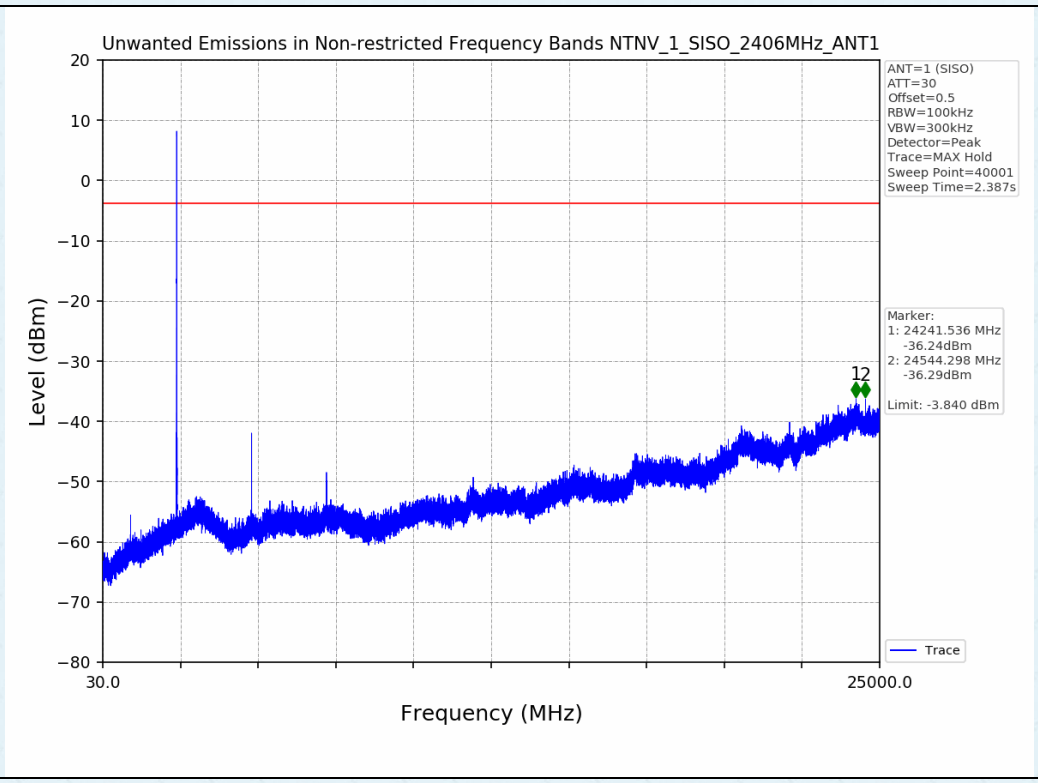
6.1 Test Result

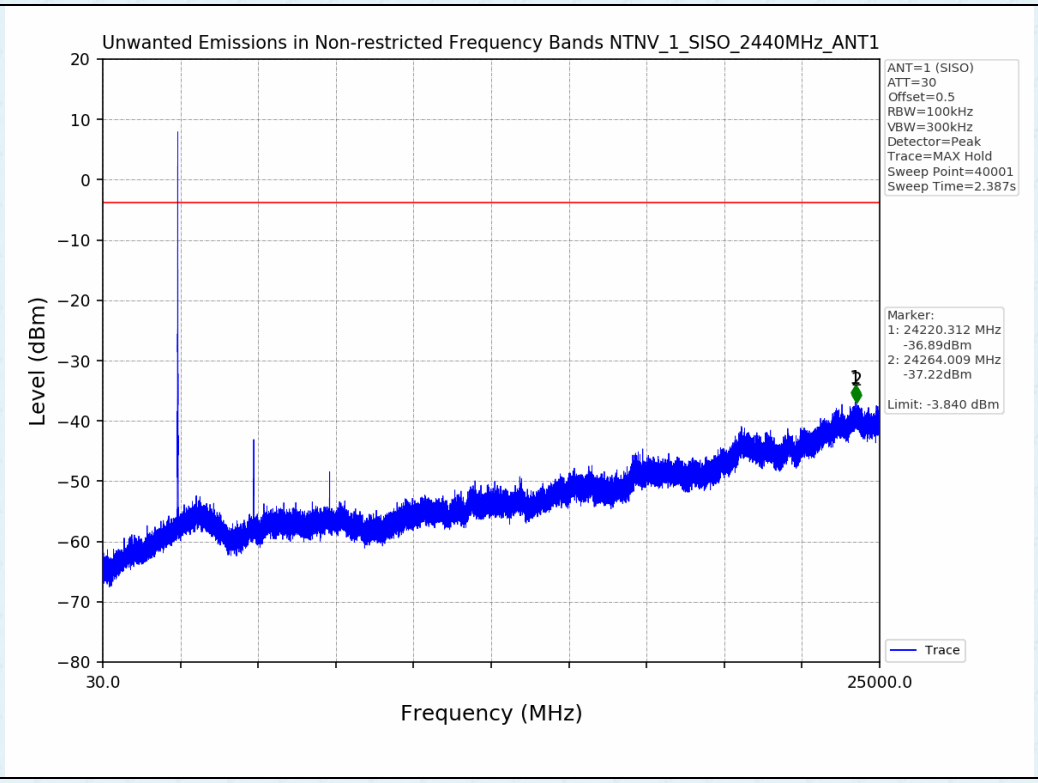
Test Mode	Frequency (MHz)	TX Type	ANT No.	Spurious Conducted Emission (dBm)	Limits (dBm)	Verdict
FHSS	2406	SISO	1	Refer to test graph	-3.84	PASS
	2440	SISO	1	Refer to test graph	-3.84	PASS
	2472	SISO	1	Refer to test graph	-3.84	PASS
	Hopping	SISO	1	Refer to test graph	-3.84	PASS

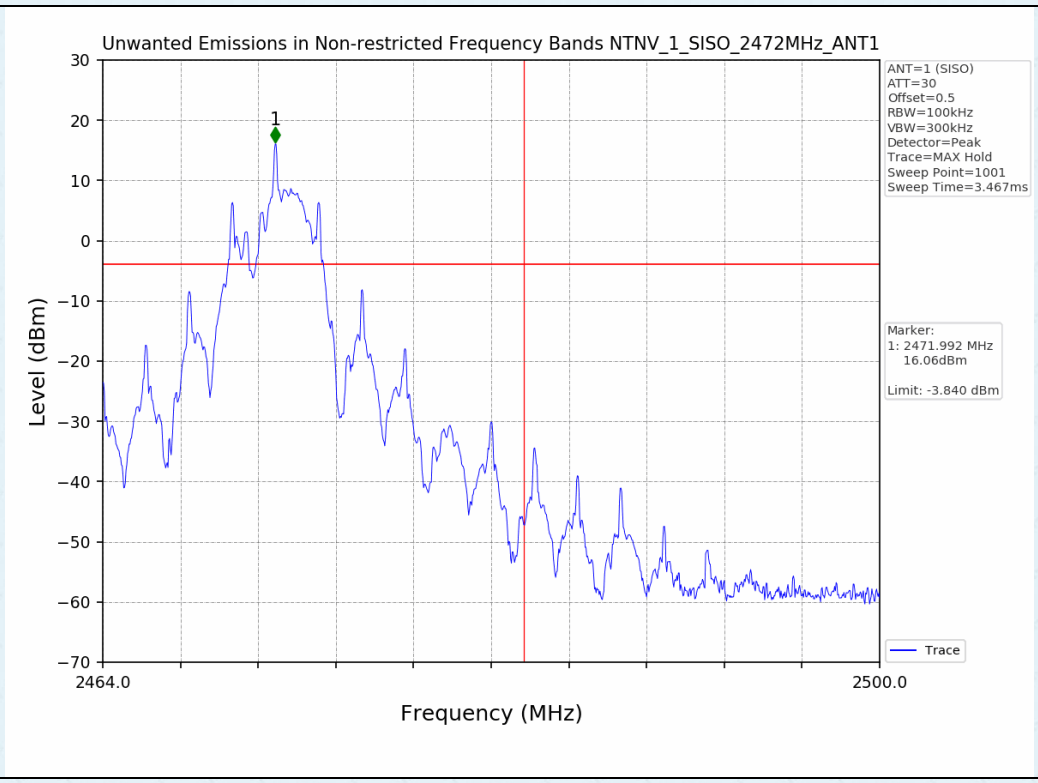
6.2 Test Graph

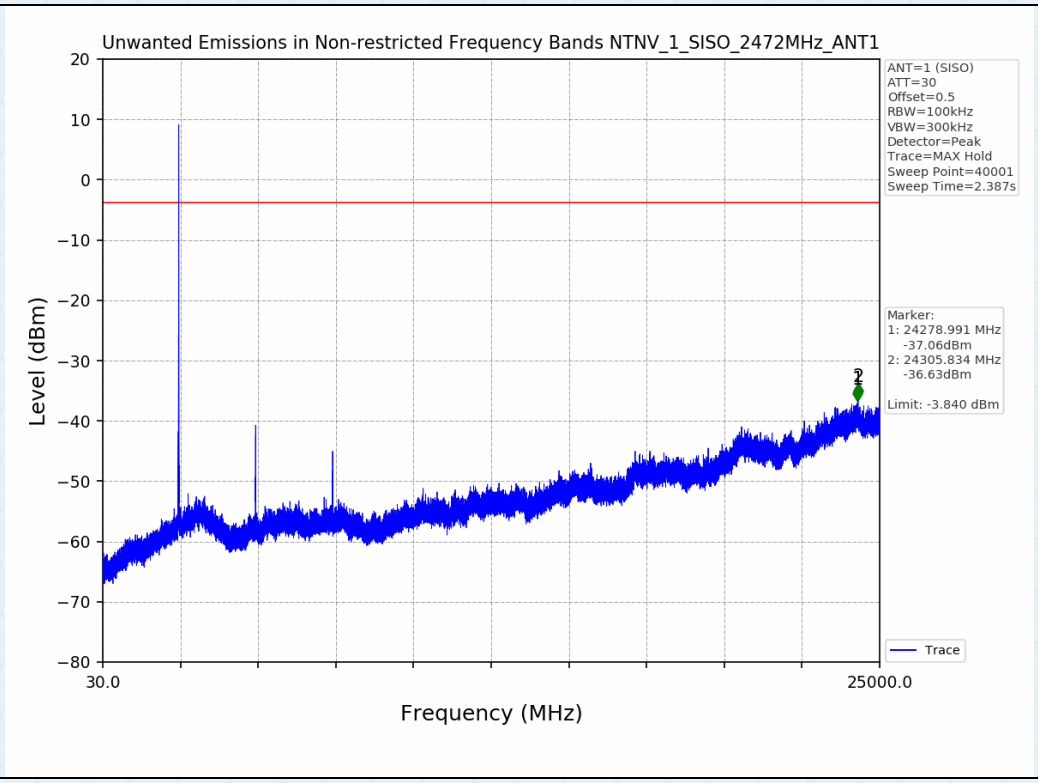



Unwanted Emissions in Non-restricted Frequency Bands NTNV_1_SISO_2406MHz_ANT1
ANT=1 (SISO)
ATT=30
Offset=0.5
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=2081
Sweep Time=9.984ms
Marker:
1: 2405.950 MHz
12.85dBm
Limit: -3.840 dBm
Trace
Level (dBm)
Frequency (MHz)
2310.0
2414.0
1

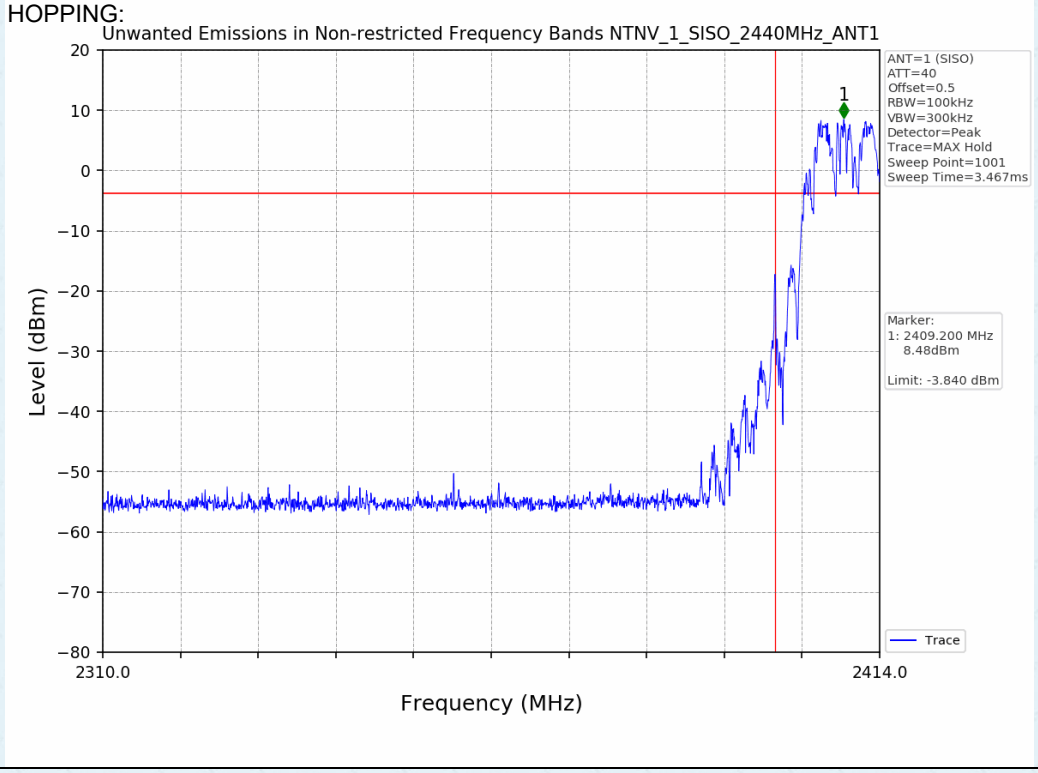

Unwanted Emissions in Non-restricted Frequency Bands NTNV_1_SISO_2406MHz_ANT1
ANT=1 (SISO)
ATT=30
Offset=0.5
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 24241.536 MHz
-36.24dBm
2: 24544.298 MHz
-36.29dBm
Limit: -3.840 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0
12


Unwanted Emissions in Non-restricted Frequency Bands NTNV_1_SISO_2440MHz_ANT1
ANT=1 (SISO)
ATT=30
Offset=0.5
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 24220.312 MHz
-36.89dBm
2: 24264.009 MHz
-37.22dBm
Limit: -3.840 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0

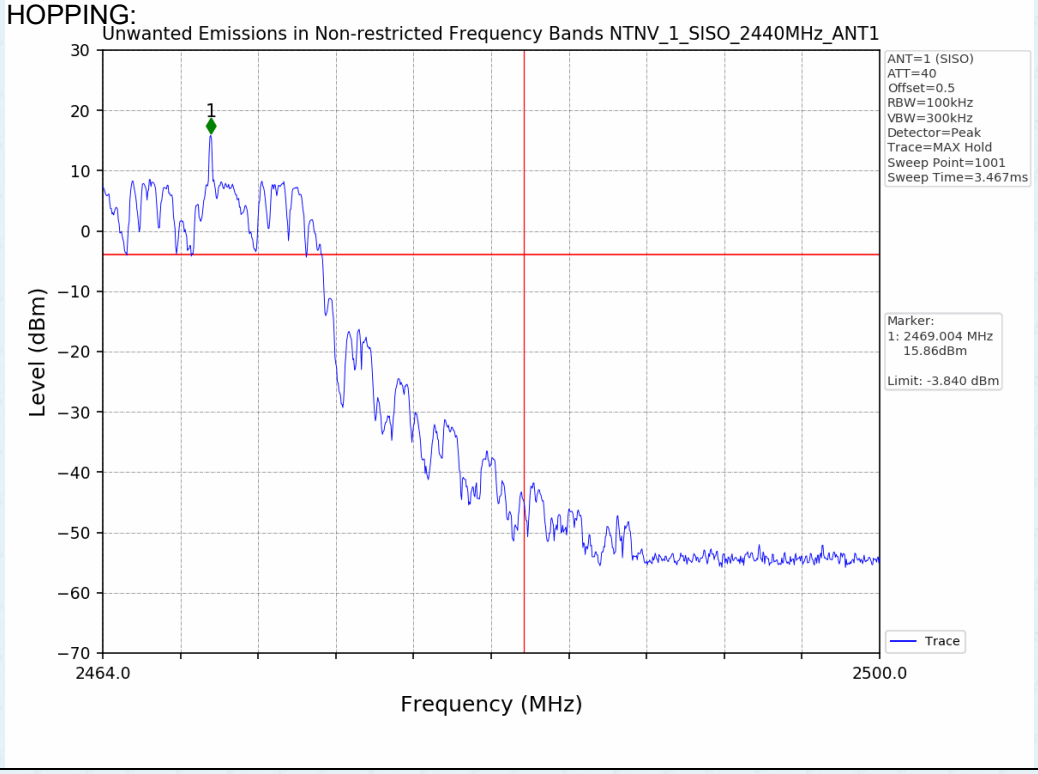

Unwanted Emissions in Non-restricted Frequency Bands NTNV_1_SISO_2472MHz_ANT1
ANT=1 (SISO)
ATT=30
Offset=0.5
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.467ms
Marker:
1: 2471.992 MHz
16.06dBm
Limit: -3.840 dBm
Trace
Level (dBm)
Frequency (MHz)
2464.0
2500.0


Unwanted Emissions in Non-restricted Frequency Bands NTNV_1_SISO_2472MHz_ANT1
ANT=1 (SISO)
ATT=30
Offset=0.5
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 24278.991 MHz
-37.06dBm
2: 24305.834 MHz
-36.63dBm
Limit: -3.840 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0

HOPPING:


Unwanted Emissions in Non-restricted Frequency Bands NTNV_1_SISO_2440MHz_ANT1
ANT=1 (SISO)
ATT=40
Offset=0.5
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.467ms
Marker:
1: 2409.200 MHz
8.48dBm
Limit: -3.840 dBm
Trace
Level (dBm)
Frequency (MHz)
2310.0
2414.0

HOPPING:


Unwanted Emissions in Non-restricted Frequency Bands NTNV_1_SISO_2440MHz_ANT1
ANT=1 (SISO)
ATT=40
Offset=0.5
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.467ms
Marker:
1: 2469.004 MHz
15.86dBm
Limit: -3.840 dBm
Trace
Level (dBm)
Frequency (MHz)
2464.0
2500.0
30
20
10
0
−10
−20
−30
−40
−50
−60
−70
1

---End---