Appendix for 15.247

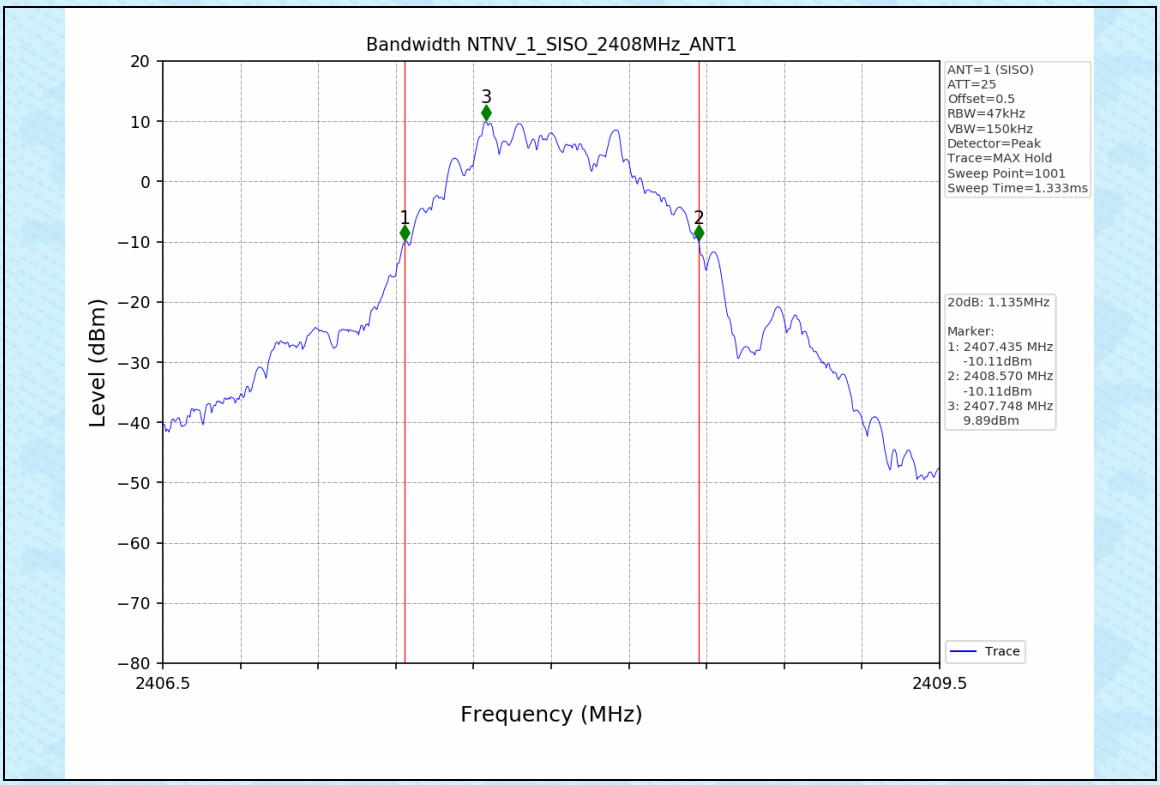
1. Bandwidth

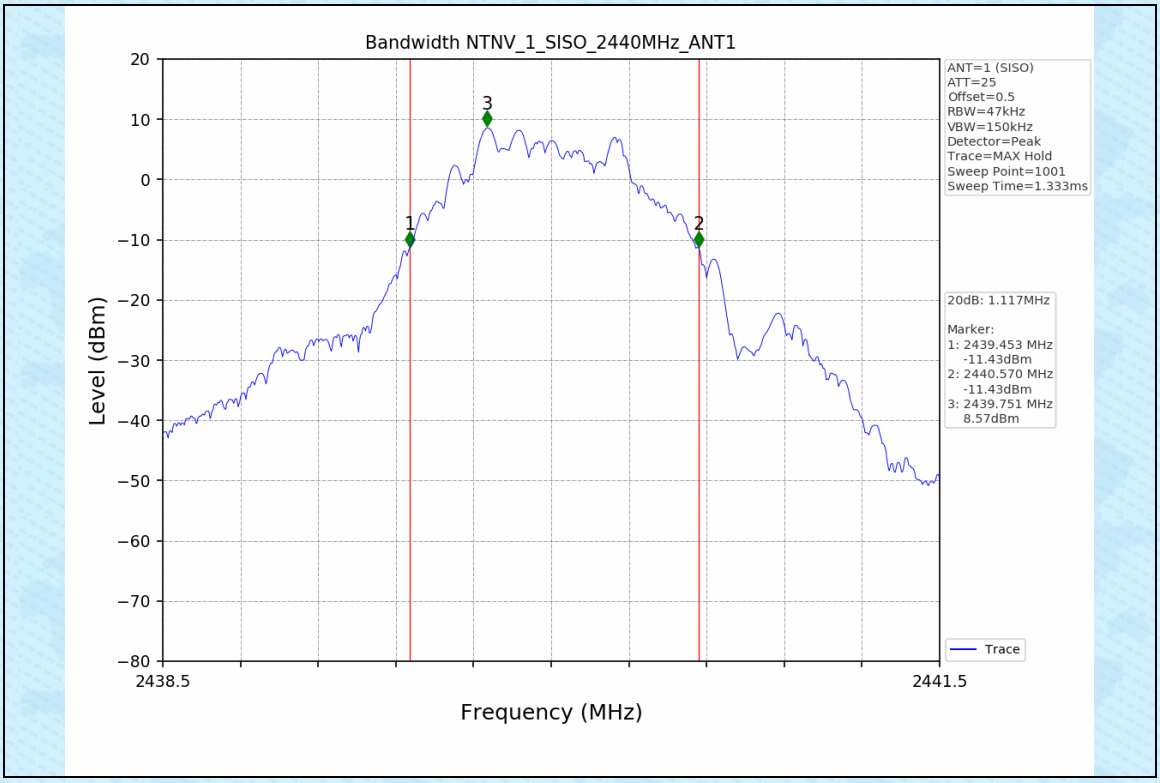
1.1 Test Result

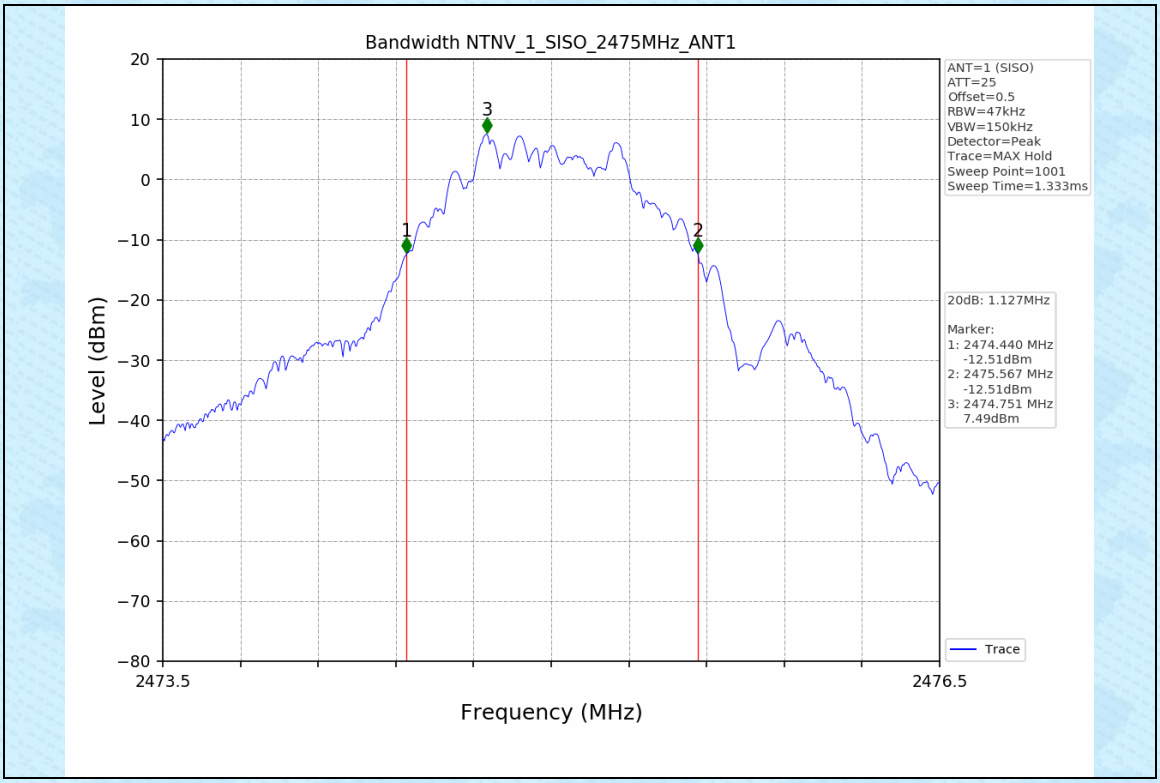
Test Mode	Frequency (MHz)	TX Type	ANT No.	20dB Bandwidth Test Result (MHz)	Verdict
FHSS	2408	SISO	1	1.135	PASS
	2440	SISO	1	1.117	PASS
	2475	SISO	1	1.127	PASS

Test Mode	Frequency (MHz)	TX Type	ANT No.	99% Occupied Bandwidth Test Result (MHz)	
FHSS	2408	SISO	1	1.008	Only for Report Use
	2440	SISO	1	1.012	Only for Report Use
	2475	SISO	1	1.008	Only for Report Use

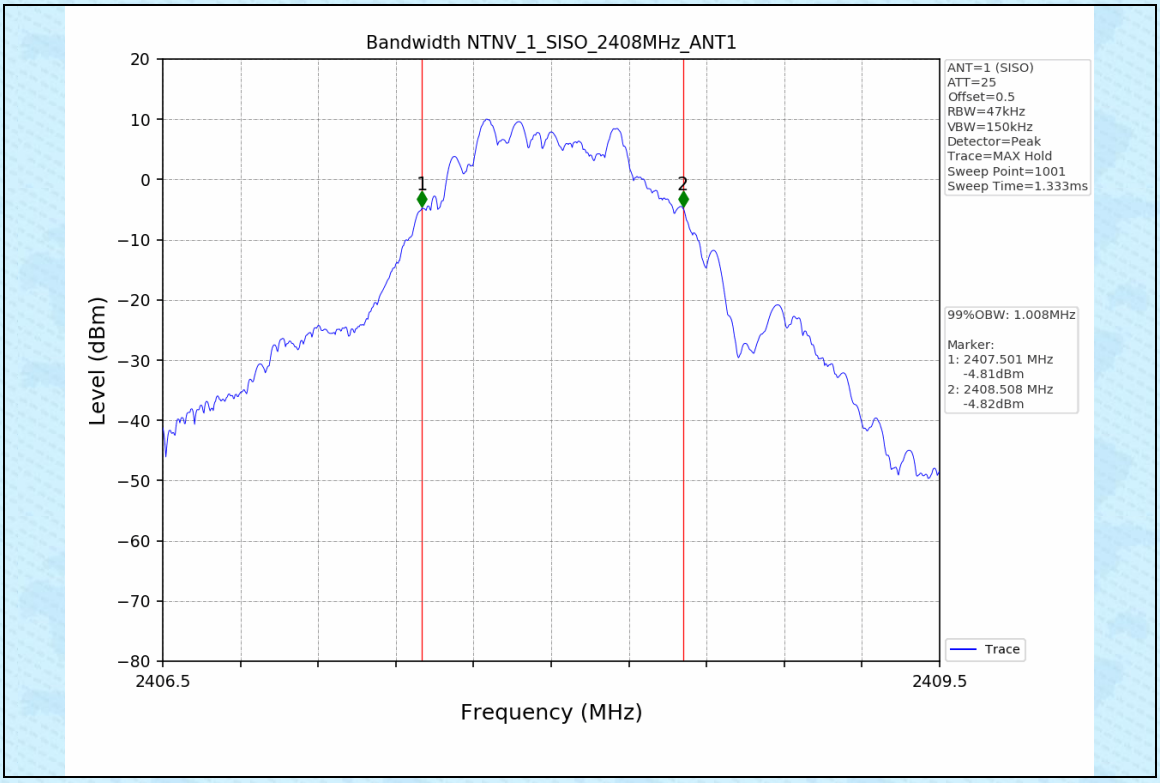
1.2 Test Graph - 20dB Bandwidth

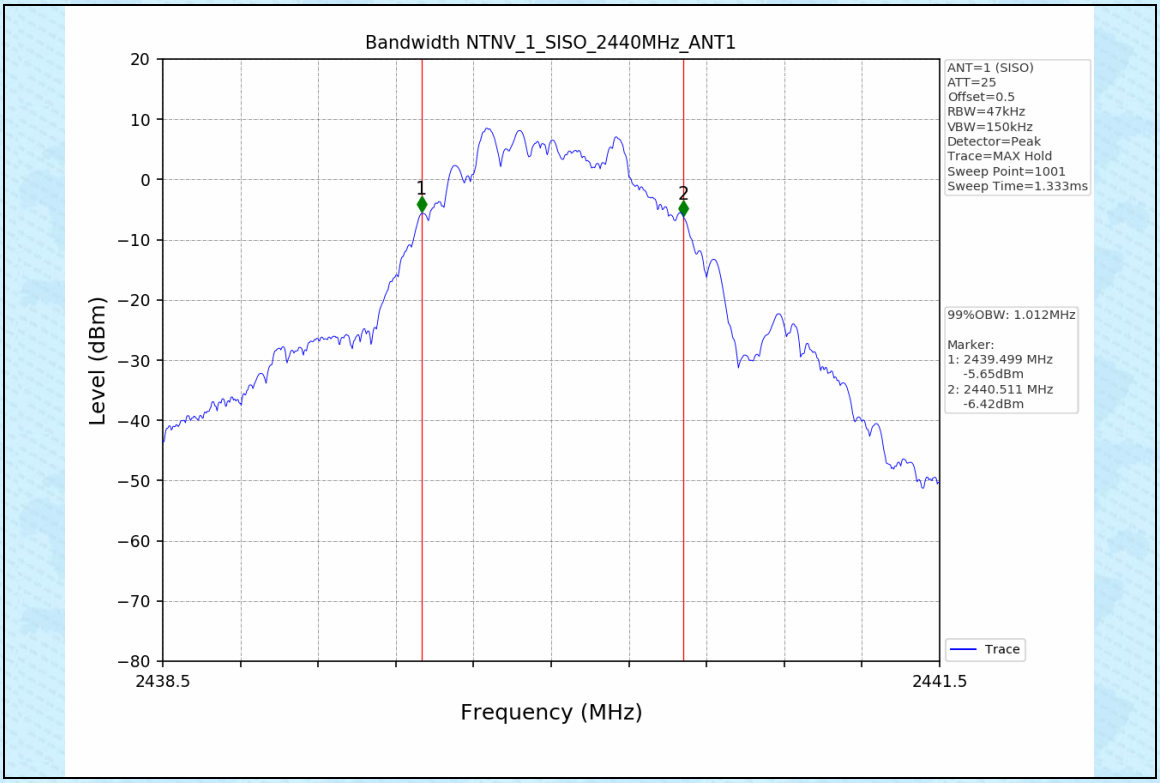


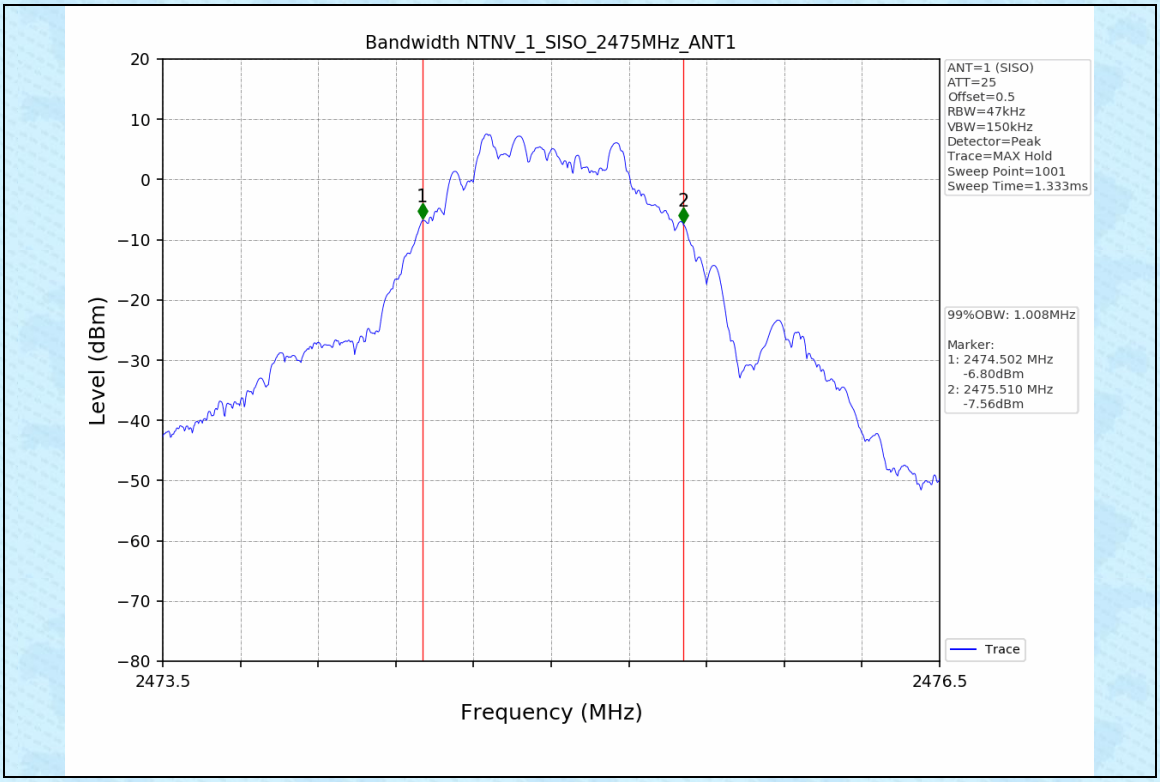




1.3 Test Graph - 99% Occupied Bandwidth




Bandwidth NTNV_1_SISO_2440MHz_ANT1
ANT=1 (SISO)
ATT=25
Offset=0.5
RBW=47kHz
VBW=150kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1.333ms
99%OBW: 1.012MHz
Marker:
1: 2439.499 MHz
-5.65dBm
2: 2440.511 MHz
-6.42dBm
Trace
Level (dBm)
Frequency (MHz)
2438.5
2441.5

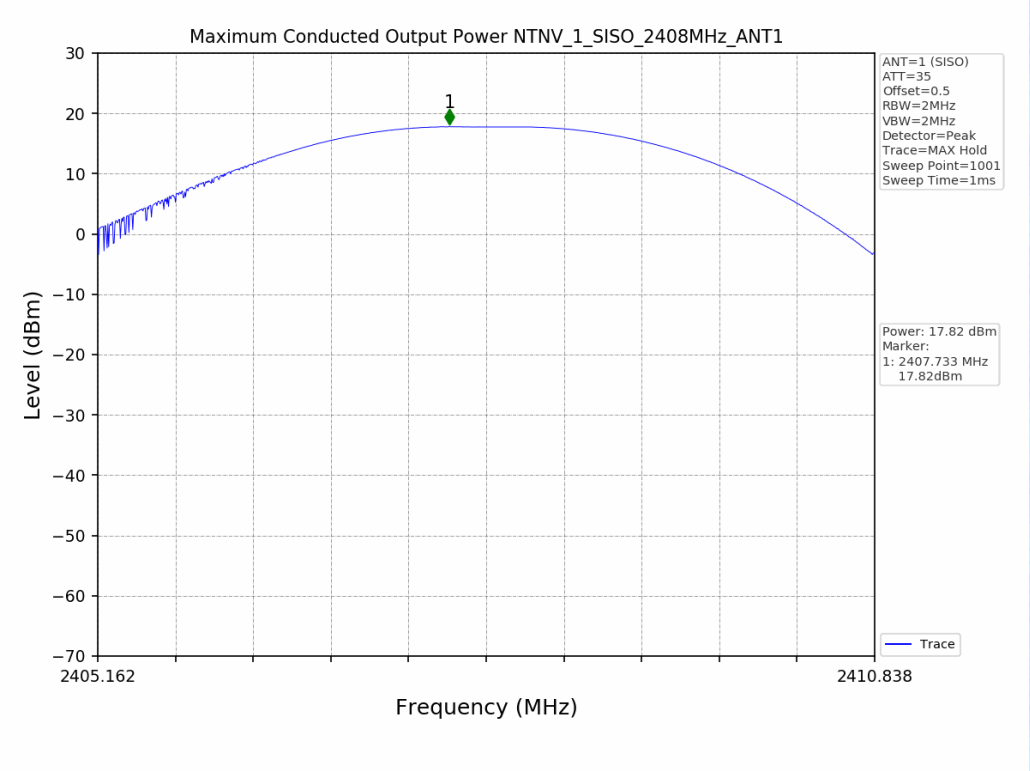

Bandwidth NTNV_1_SISO_2475MHz_ANT1
ANT=1 (SISO)
ATT=25
Offset=0.5
RBW=47kHz
VBW=150kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1.333ms
99%OBW: 1.008MHz
Marker:
1: 2474.502 MHz
-6.80dBm
2: 2475.510 MHz
-7.56dBm
Trace
Level (dBm)
Frequency (MHz)
2473.5
2476.5

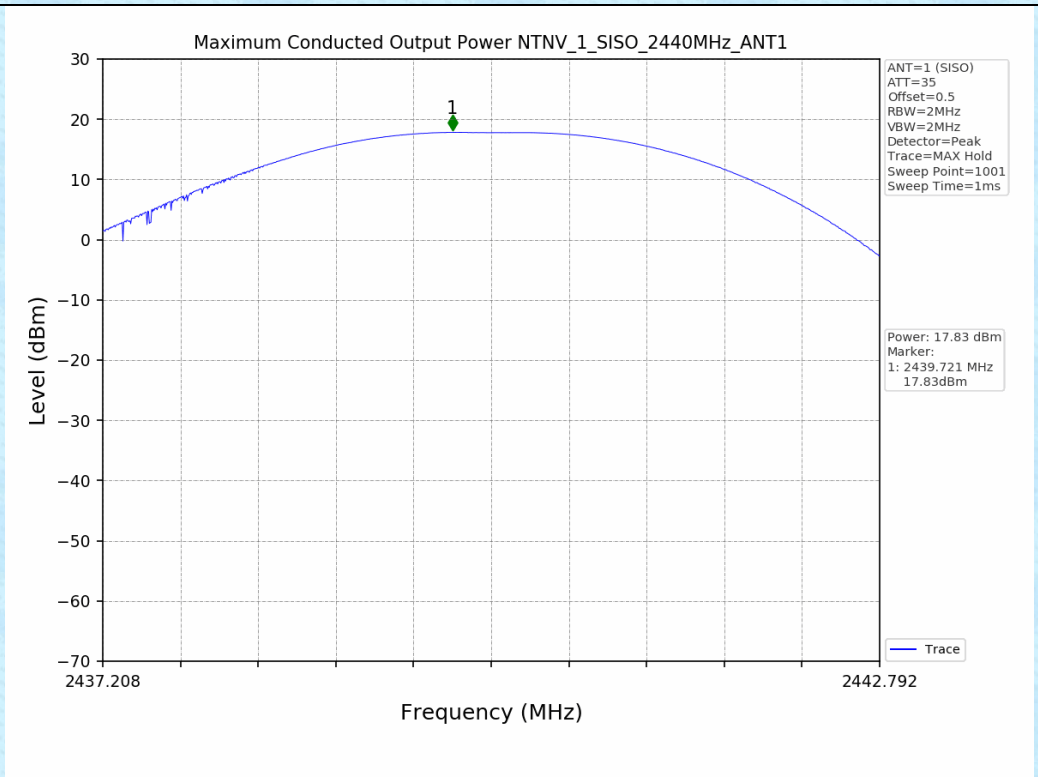
2. Maximum Conducted Output Power

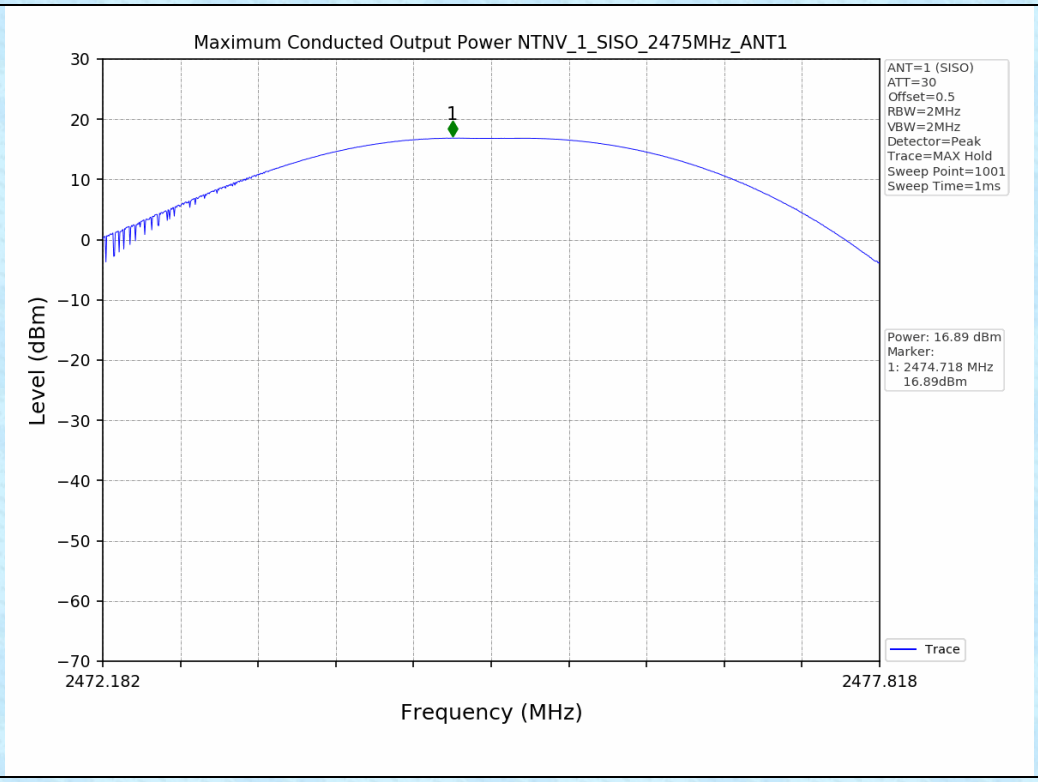
2.1 Test Result

Test Mode	Frequency (MHz)	Tx Type	Measured Peak Output Power (dBm)	Limits (dBm)	Verdict
			Ant 1		
GFSK	2408	SISO	17.82	20.97	PASS
	2440	SISO	17.83	20.97	PASS
	2475	SISO	16.89	20.97	PASS

2.2 Test Graph




Maximum Conducted Output Power NTNV_1_SISO_2440MHz_ANT1
ANT=1 (SISO)
ATT=35
Offset=0.5
RBW=2MHz
VBW=2MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Power: 17.83 dBm
Marker:
1: 2439.721 MHz
17.83dBm
Trace
Level (dBm)
Frequency (MHz)
2437.208
2442.792

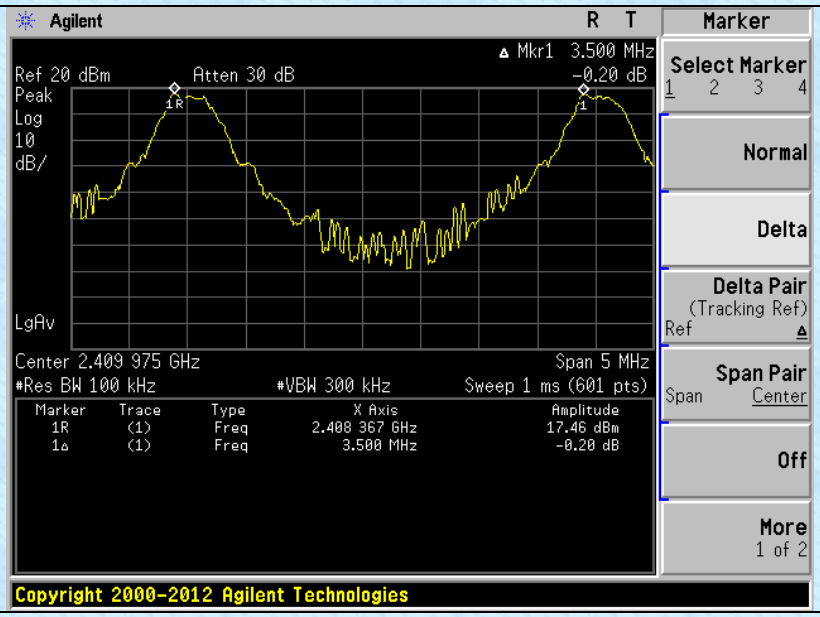

Maximum Conducted Output Power NTNV_1_SISO_2475MHz_ANT1
ANT=1 (SISO)
ATT=30
Offset=0.5
RBW=2MHz
VBW=2MHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Power: 16.89 dBm
Marker:
1: 2474.718 MHz
16.89dBm
Trace
Level (dBm)
Frequency (MHz)
2472.182
2477.818

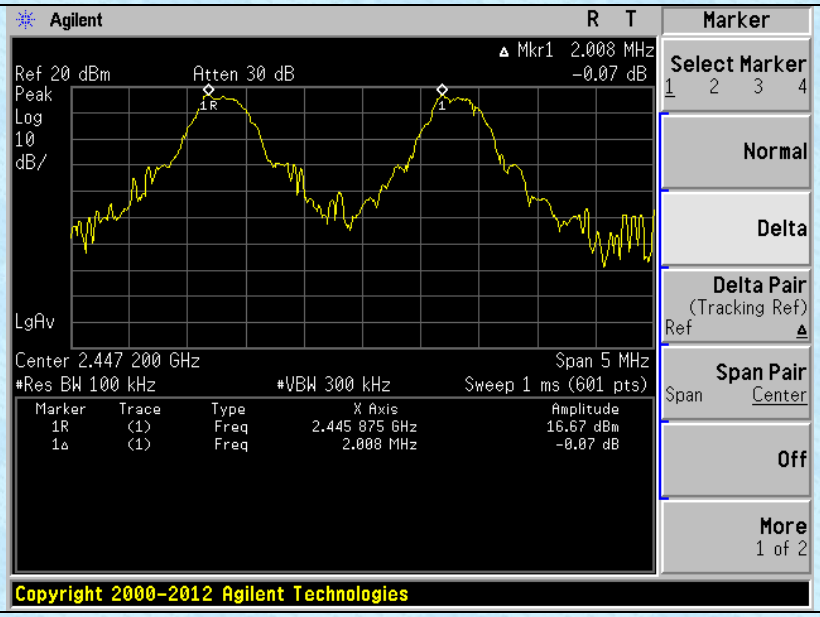
3. Carrier frequency separation

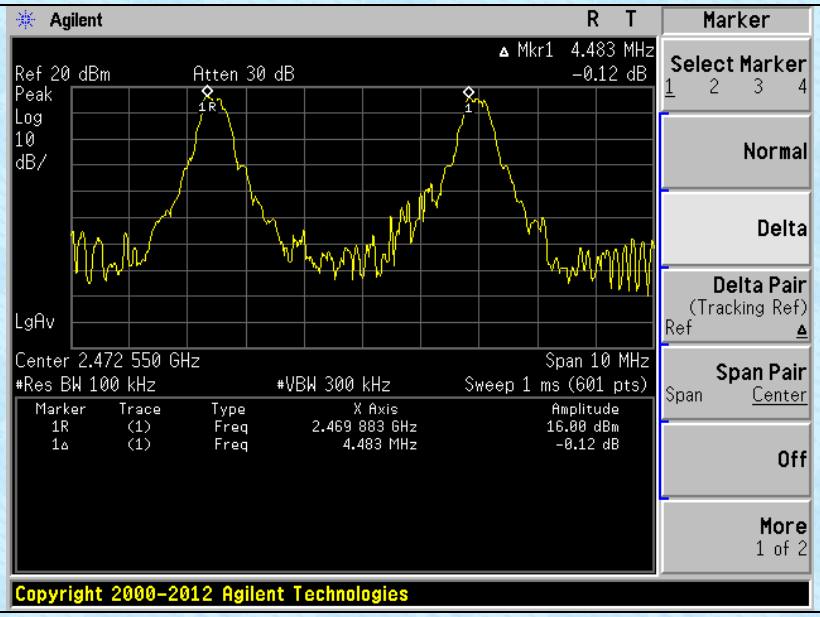
3.1 Test Result

ANT No.	Test channel	Carrier Frequencies Separation (kHz)	Limit (kHz)	Result
1	Lowest	3500	757	Pass
	Middle	2008	745	Pass
	Highest	4483	751	Pass

3.2 Test Graph





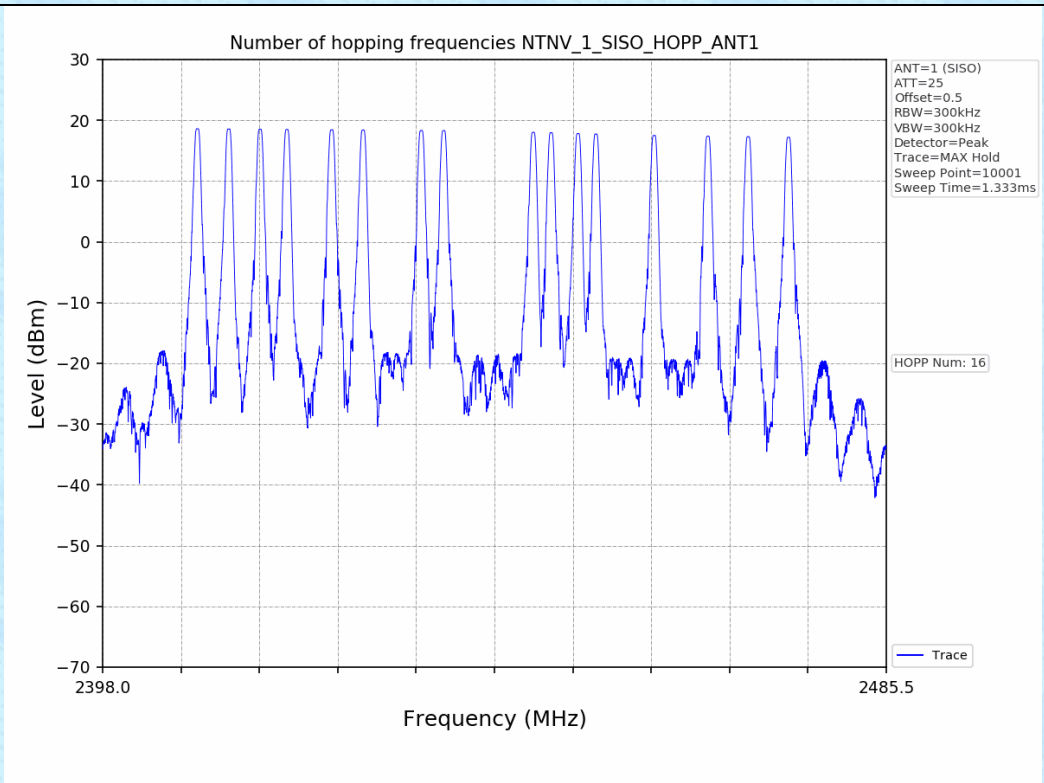

Agilent
R T
Marker
Mkr1 4.483 MHz
Ref 20 dBm
Atten 30 dB
-0.12 dB
Peak
Log
10
dB/
LgAv
Center 2.472 550 GHz
Span 10 MHz
#Res BW 100 kHz
#VBW 300 kHz
Sweep 1 ms (601 pts)
Marker Trace Type X Axis Amplitude
1R (1) Freq 2.469 883 GHz 16.00 dBm
1Δ (1) Freq 4.483 MHz -0.12 dB
Select Marker
1 2 3 4
Normal
Delta
Delta Pair
(Tracking Ref)
Ref
Span Pair
Span Center
Off
More
1 of 2
Copyright 2000-2012 Agilent Technologies

4. Number of hopping frequencies

4.1 Test Result

Test Mode	TX Type	ANT No.	Num of Hopping Frequencies	Limits	Verdict
FHSS	SISO	1	16	≥15	PASS

4.2 Test Graph



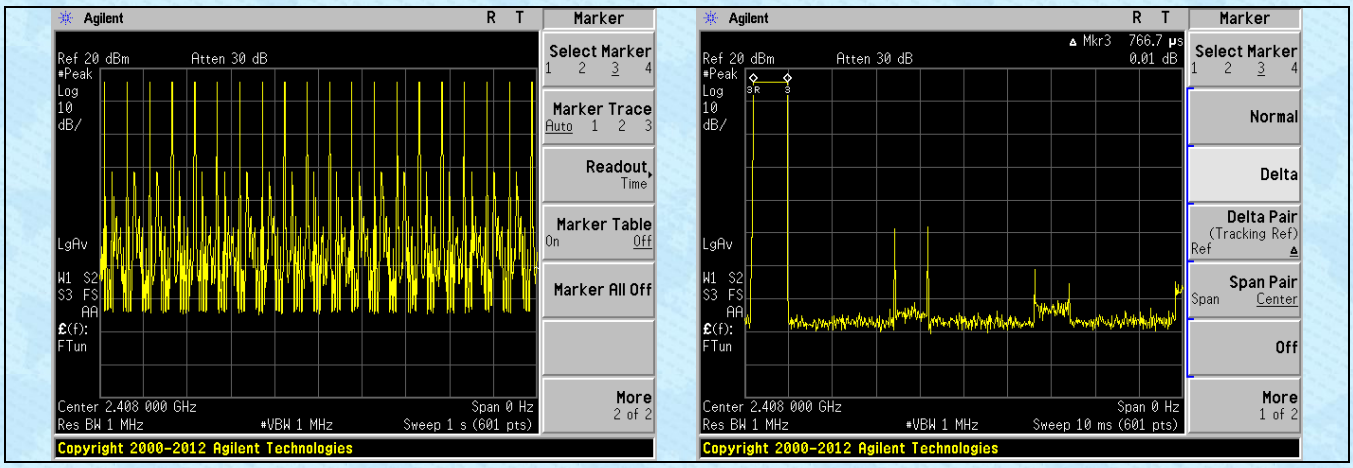
5. Time of occupancy (dwell time)

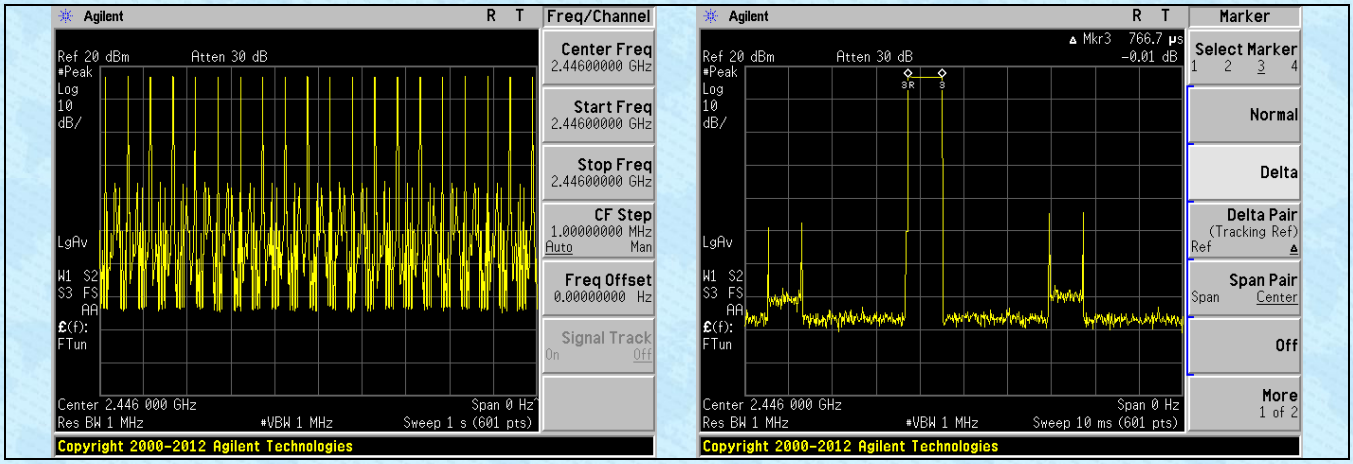
5.1 Test Result

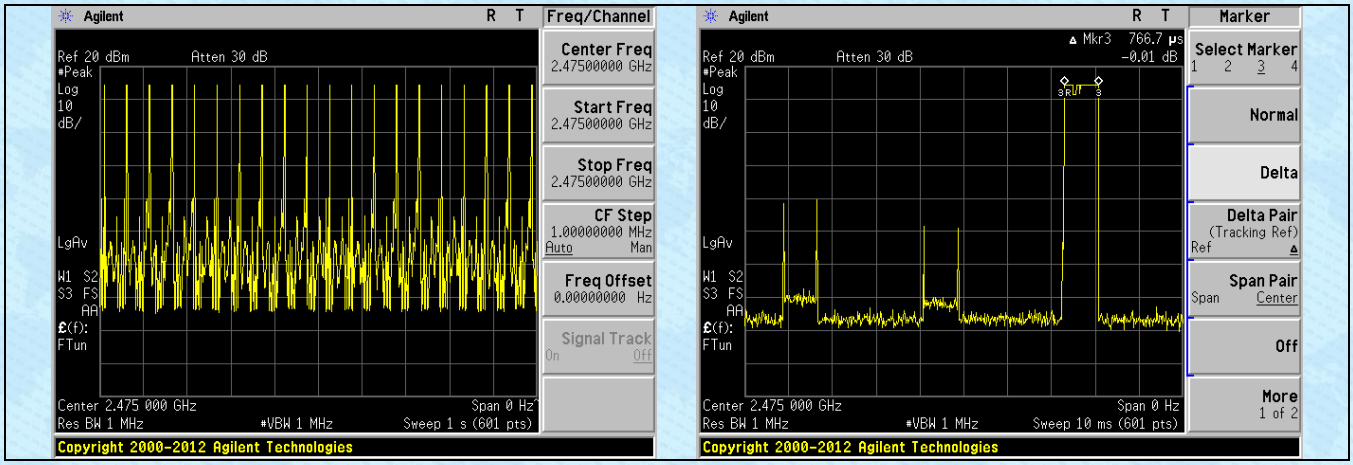
ANT No.	Test channel	**Ton (ms)**	**Dwell time(ms)**	**Limit(ms)**	**Result**
1	Lowest	0.7667	98.1376	400	Pass
	Middle	0.7667	98.1376	400	Pass
	Highest	0.7667	98.1376	400	Pass

The formula as below:
Lowest: Dwell time = Ton * Ton times in 1s * 0.4s * channel numbers=0.7667ms*20*0.4*16=98.1376ms
Middle: Dwell time = Ton * Ton times in 1s * 0.4s * channel numbers=0.7667ms*20*0.4*16=98.1376ms
Highest: Dwell time = Ton * Ton times in 1s * 0.4s * channel numbers=0.7667ms*20*0.4*16=98.1376ms

5.2 Test Graph





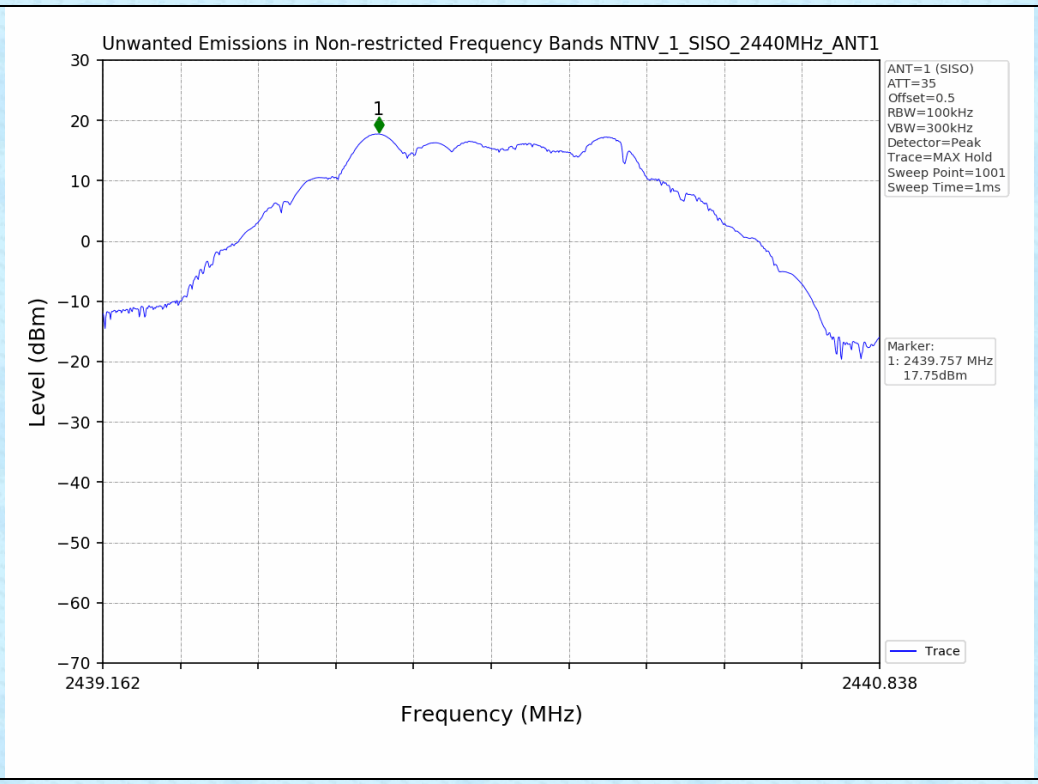


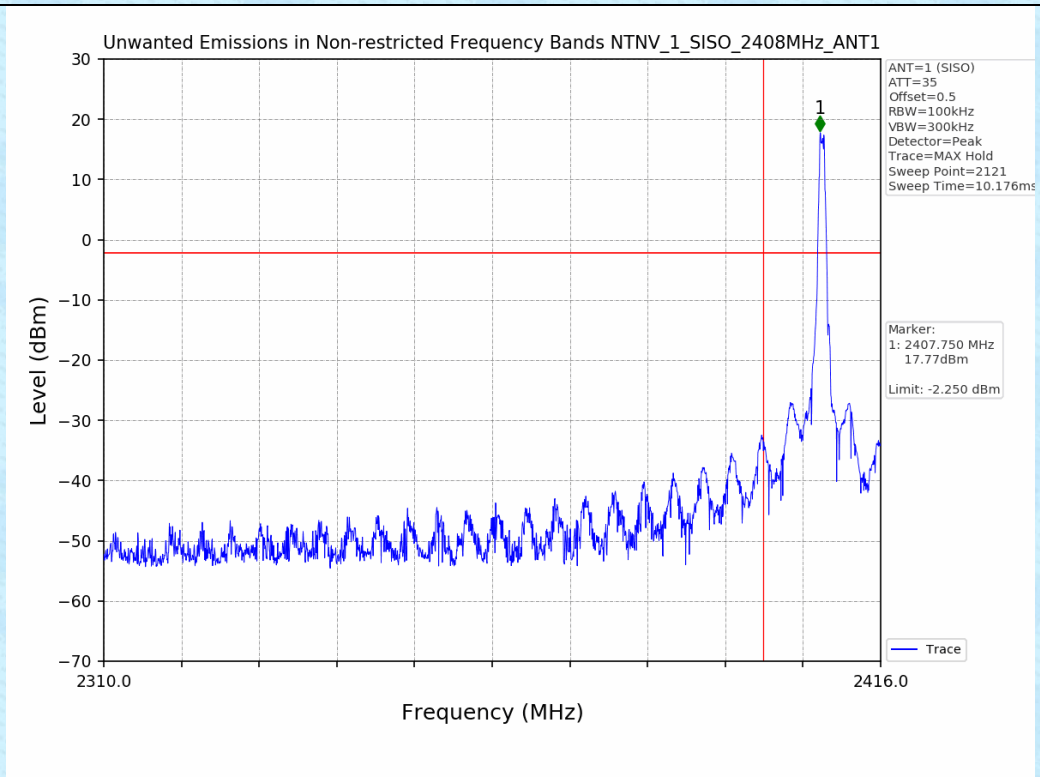
6. Unwanted Emissions in Non-restricted Frequency Bands

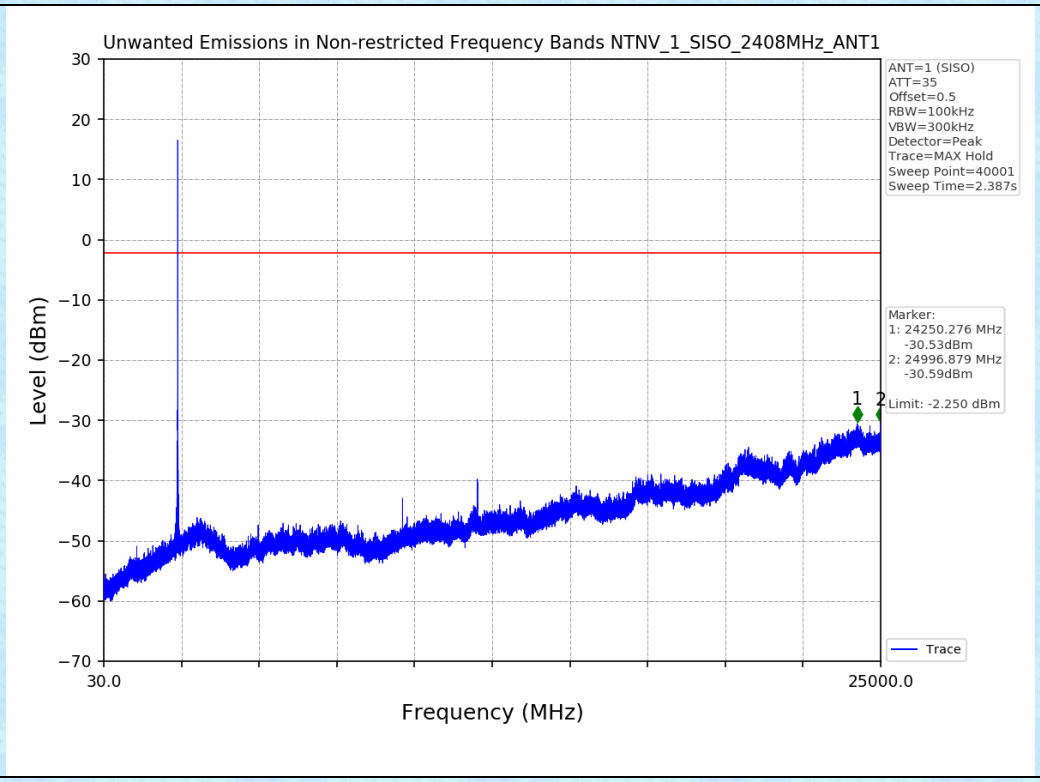
6.1 Test Result

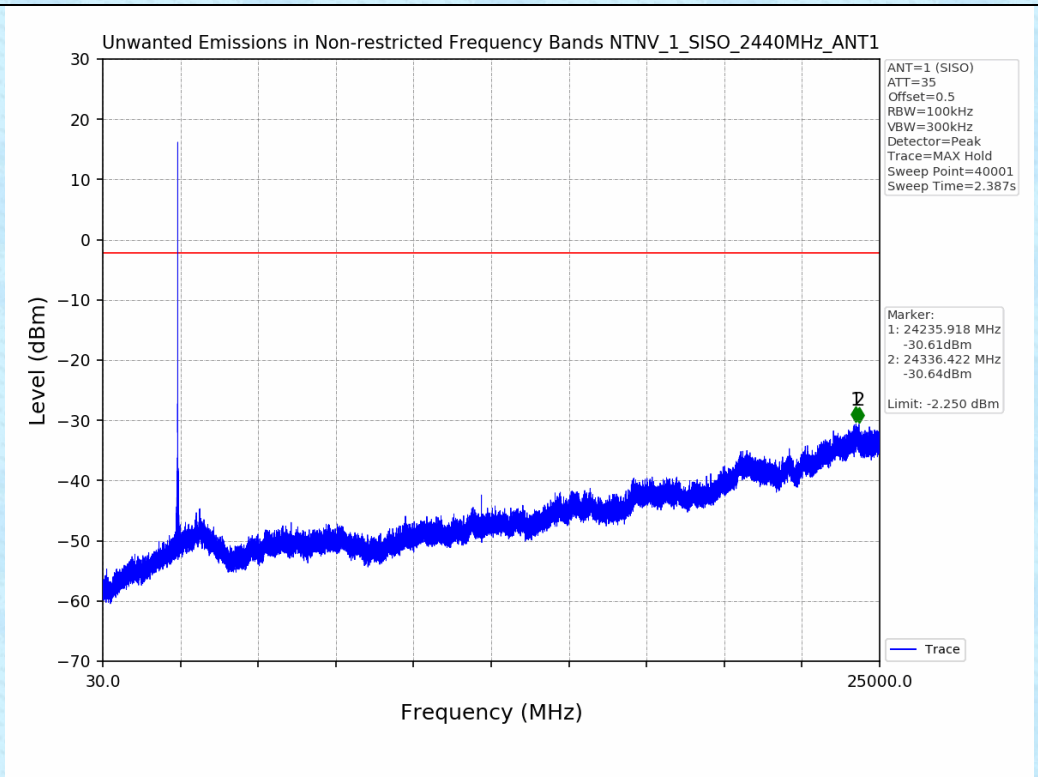
Test Mode	Frequency (MHz)	TX Type	ANT No.	Spurious Conducted Emission (dBm)	Limits (dBm)	Verdict
FHSS	2408	SISO	1	Refer to test graph	-2.25	PASS
	2440	SISO	1	Refer to test graph	-2.25	PASS
	2475	SISO	1	Refer to test graph	-2.25	PASS
	Hopping	SISO	1	Refer to test graph	-2.25	PASS

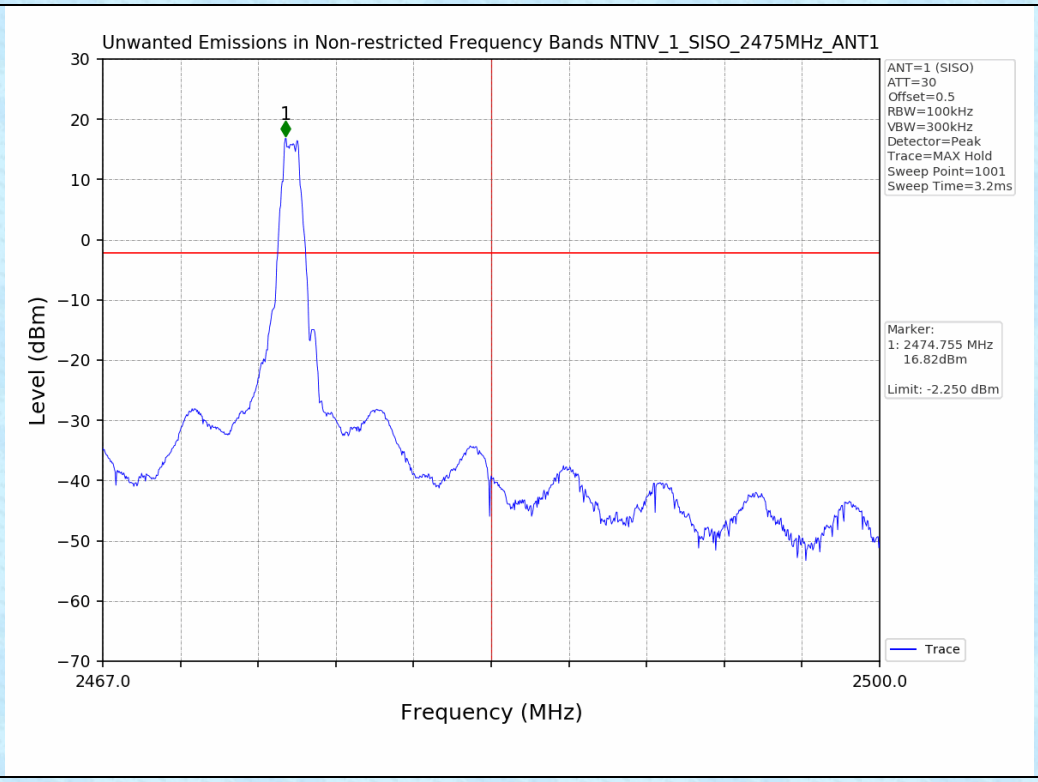
6.2 Test Graph

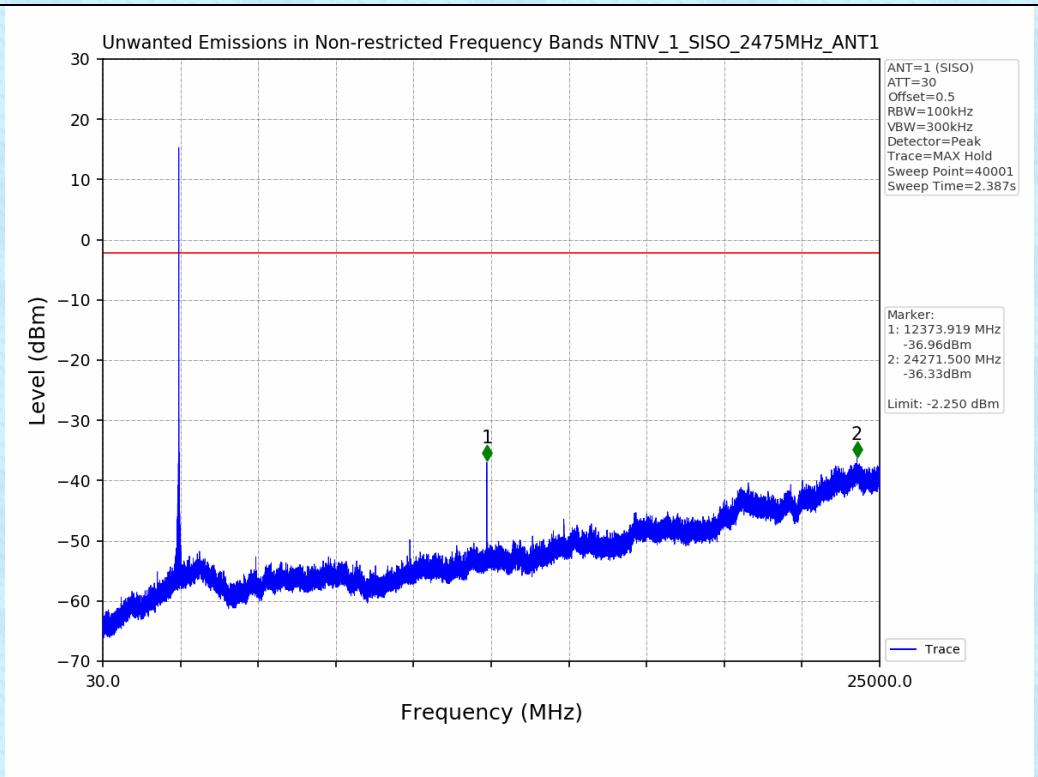


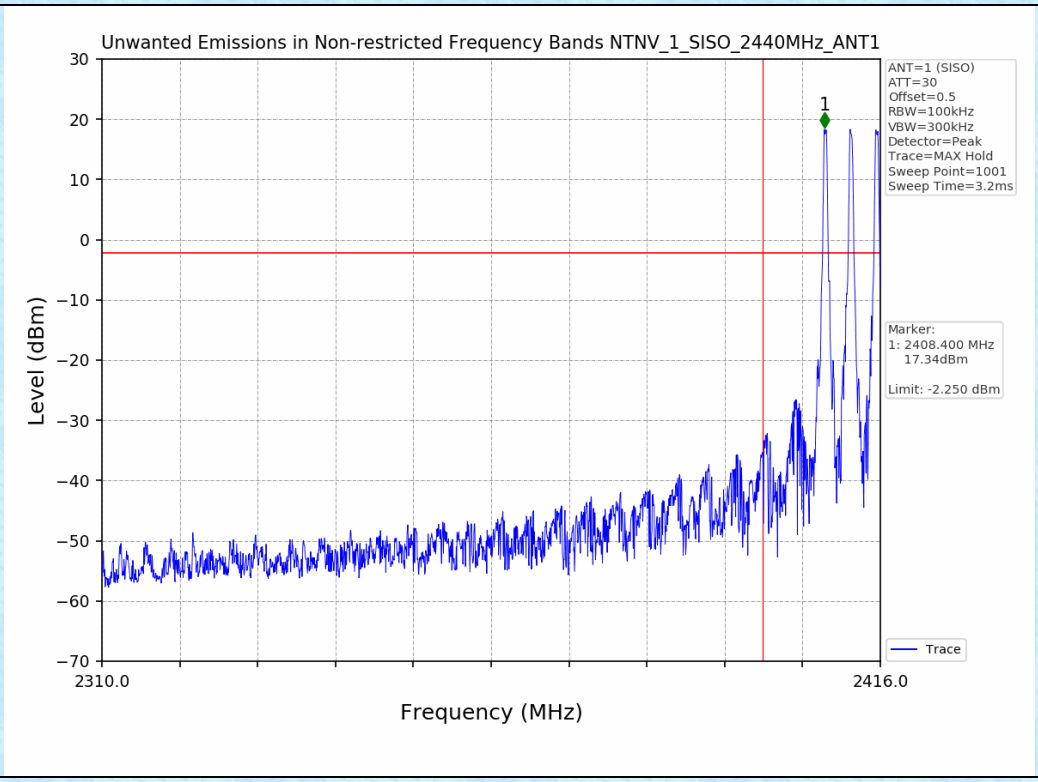

Unwanted Emissions in Non-restricted Frequency Bands NTNV_1_SISO_2408MHz_ANT1
ANT=1 (SISO)
ATT=35
Offset=0.5
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=2121
Sweep Time=10.176ms
Marker:
1: 2407.750 MHz
17.77dBm
Limit: -2.250 dBm
Trace
Level (dBm)
Frequency (MHz)
2310.0
2416.0

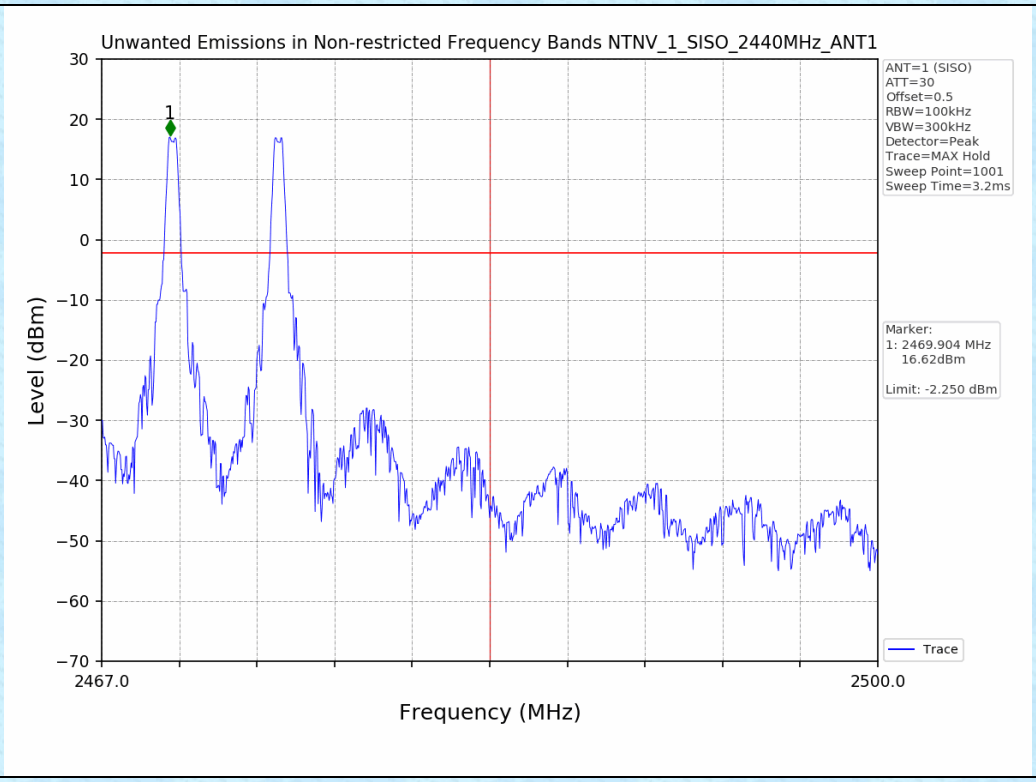

Unwanted Emissions in Non-restricted Frequency Bands NTNV_1_SISO_2408MHz_ANT1
ANT=1 (SISO)
ATT=35
Offset=0.5
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 24250.276 MHz
-30.53dBm
2: 24996.879 MHz
-30.59dBm
Limit: -2.250 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0


Unwanted Emissions in Non-restricted Frequency Bands NTNV_1_SISO_2440MHz_ANT1
ANT=1 (SISO)
ATT=35
Offset=0.5
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 24235.918 MHz
-30.61dBm
2: 24336.422 MHz
-30.64dBm
Limit: -2.250 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0


Unwanted Emissions in Non-restricted Frequency Bands NTNV_1_SISO_2475MHz_ANT1
ANT=1 (SISO)
ATT=30
Offset=0.5
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=3.2ms
Marker:
1: 2474.755 MHz
16.82dBm
Limit: -2.250 dBm
Trace
Level (dBm)
Frequency (MHz)
2467.0
2500.0


Unwanted Emissions in Non-restricted Frequency Bands NTNV_1_SISO_2475MHz_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: 12373.919 MHz
-36.96dBm
2: 24271.500 MHz
-36.33dBm
Limit: -2.250 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0


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=1001
Sweep Time=3.2ms
Marker:
1: 2408.400 MHz
17.34dBm
Limit: -2.250 dBm
Trace
Level (dBm)
Frequency (MHz)
2310.0
2416.0


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=1001
Sweep Time=3.2ms
Marker:
1: 2469.904 MHz
16.62dBm
Limit: -2.250 dBm
Trace
Level (dBm)
Frequency (MHz)
2467.0
2500.0
30
20
10
0
−10
−20
−30
−40
−50
−60
−70
1

---End---