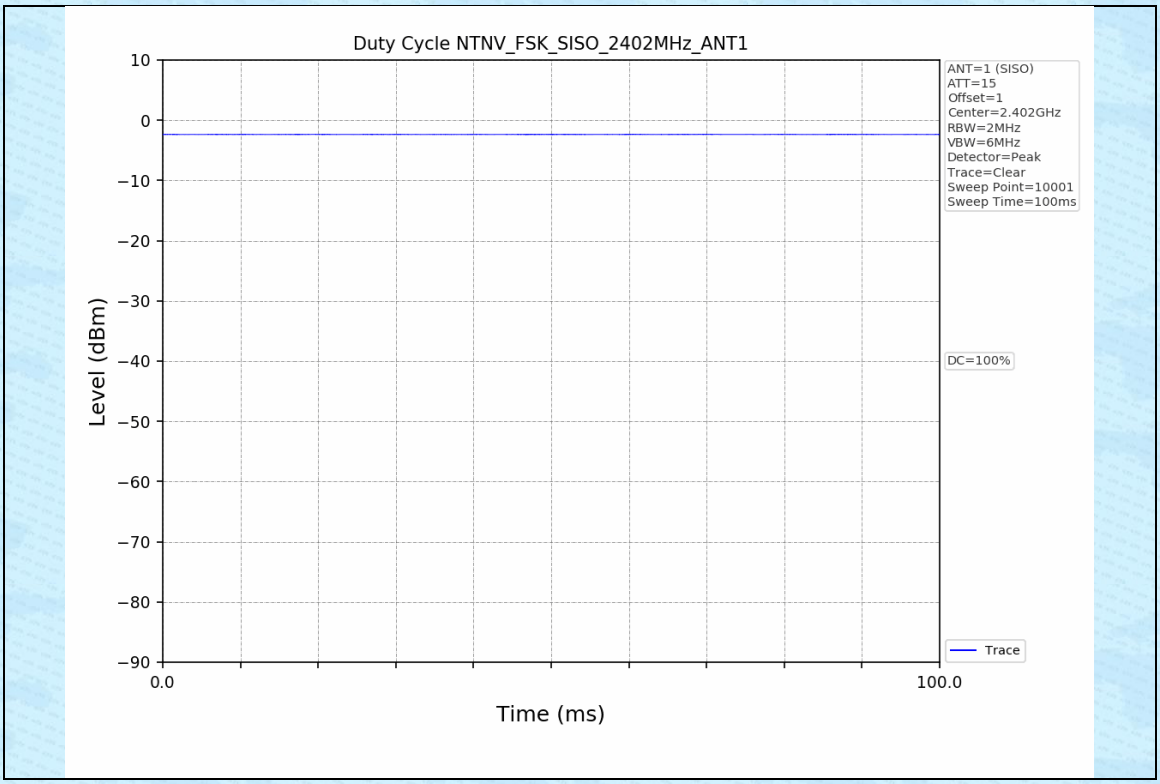
Appendix for 15.247

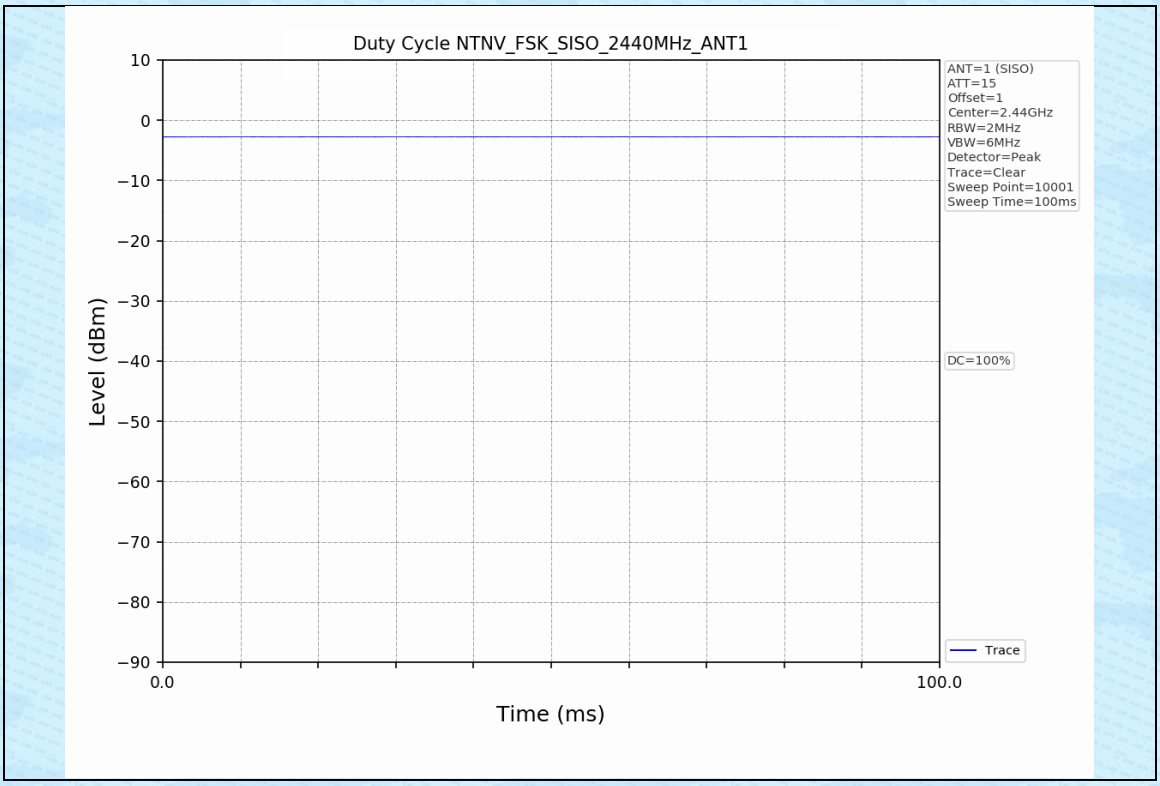
1. Duty Cycle

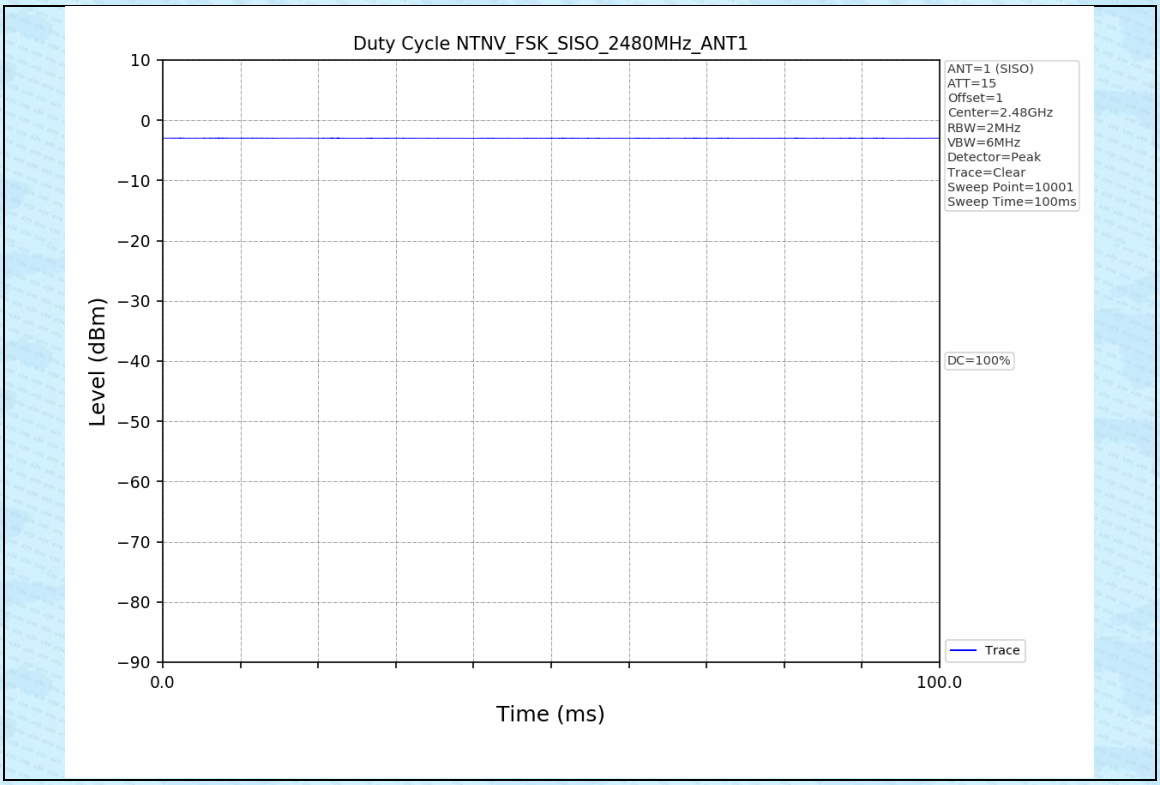
1.1 Test Result

Test Mode	Channel Frequency(MHz)	TX Type	ANT No.	T_on (ms)	Period (ms)	Duty Cycle (%)	Duty Cycle Correction Factor (dB)
FSK	2402	SISO	1	100.000	100.000	100.00	0.00
	2440	SISO	1	100.000	100.000	100.00	0.00
	2480	SISO	1	100.000	100.000	100.00	0.00

1.2 Test Graph




Duty Cycle NTNV_FSK_SISO_2440MHz_ANT1
Level (dBm)
Time (ms)
10
0
−10
−20
−30
−40
−50
−60
−70
−80
−90
0.0
100.0
ANT=1 (SISO)
ATT=15
Offset=1
Center=2.44GHz
RBW=2MHz
VBW=6MHz
Detector=Peak
Trace=Clear
Sweep Point=10001
Sweep Time=100ms
DC=100%
Trace


Duty Cycle NTNV_FSK_SISO_2480MHz_ANT1
Level (dBm)
Time (ms)
10
0
−10
−20
−30
−40
−50
−60
−70
−80
−90
0.0
100.0
ANT=1 (SISO)
ATT=15
Offset=1
Center=2.48GHz
RBW=2MHz
VBW=6MHz
Detector=Peak
Trace=Clear
Sweep Point=10001
Sweep Time=100ms
DC=100%
Trace

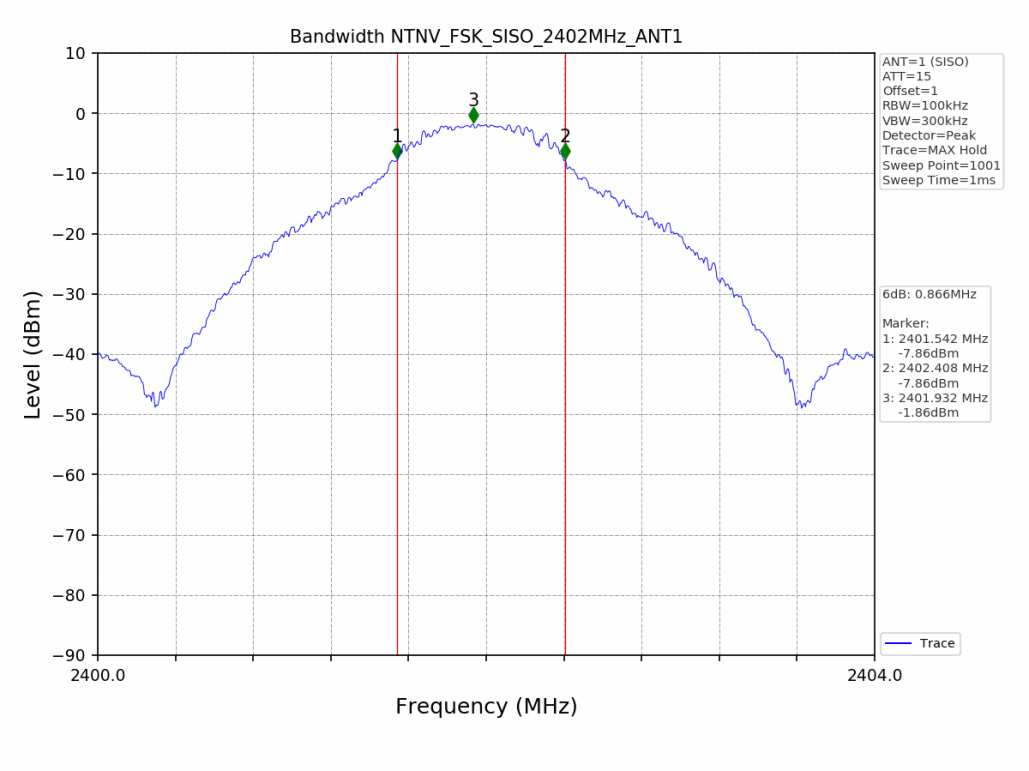
2. Bandwidth

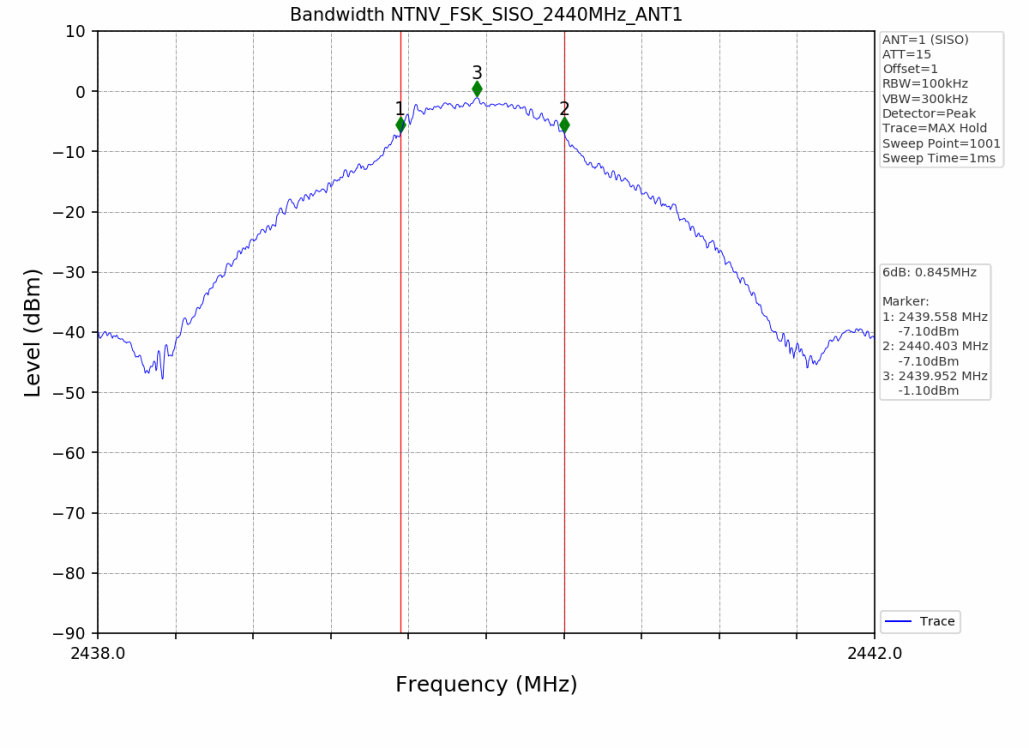
2.1 Test Result

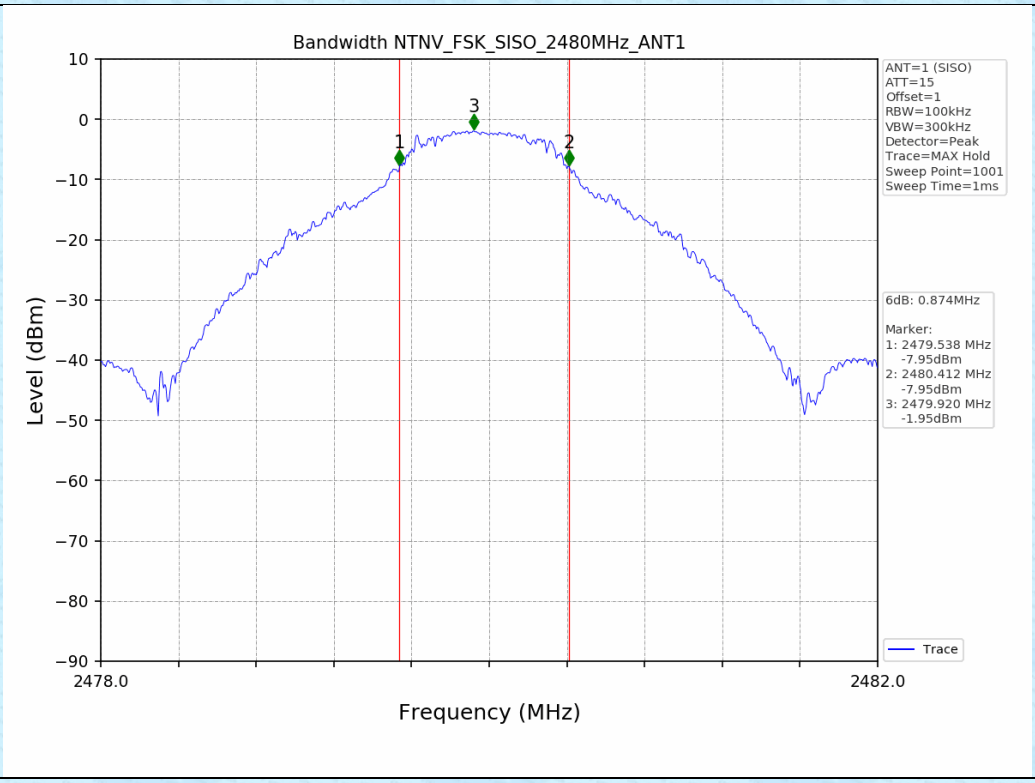
Test Mode	Frequency (MHz)	TX Type	ANT No.	6dB Bandwidth		Verdict
				Test Result (MHz)	Limits (MHz)	
FSK	2402	SISO	1	0.866	≥0.5	PASS
	2440	SISO	1	0.845	≥0.5	PASS
	2480	SISO	1	0.874	≥0.5	PASS

Test Mode	Frequency (MHz)	TX Type	ANT No.	99% Occupied Bandwidth	
				Test Result (MHz)	
FSK	2402	SISO	1	1.825	Only for Report Use
	2440	SISO	1	1.823	Only for Report Use
	2480	SISO	1	1.831	Only for Report Use

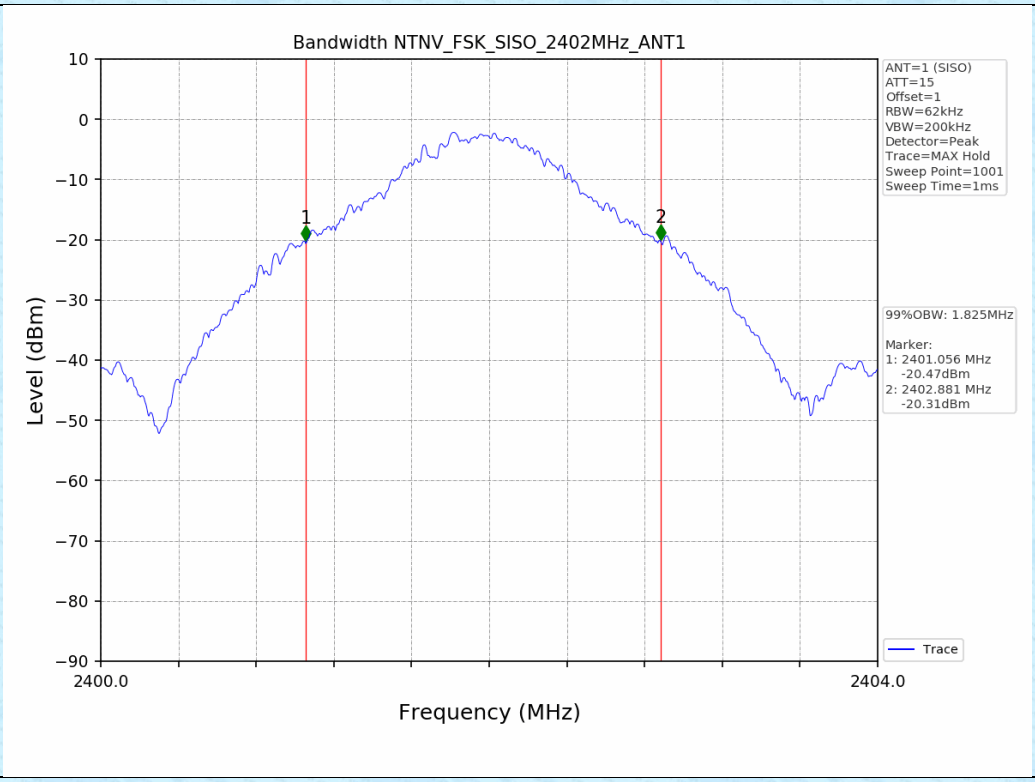
2.2 Test Graph - 6dB Bandwidth

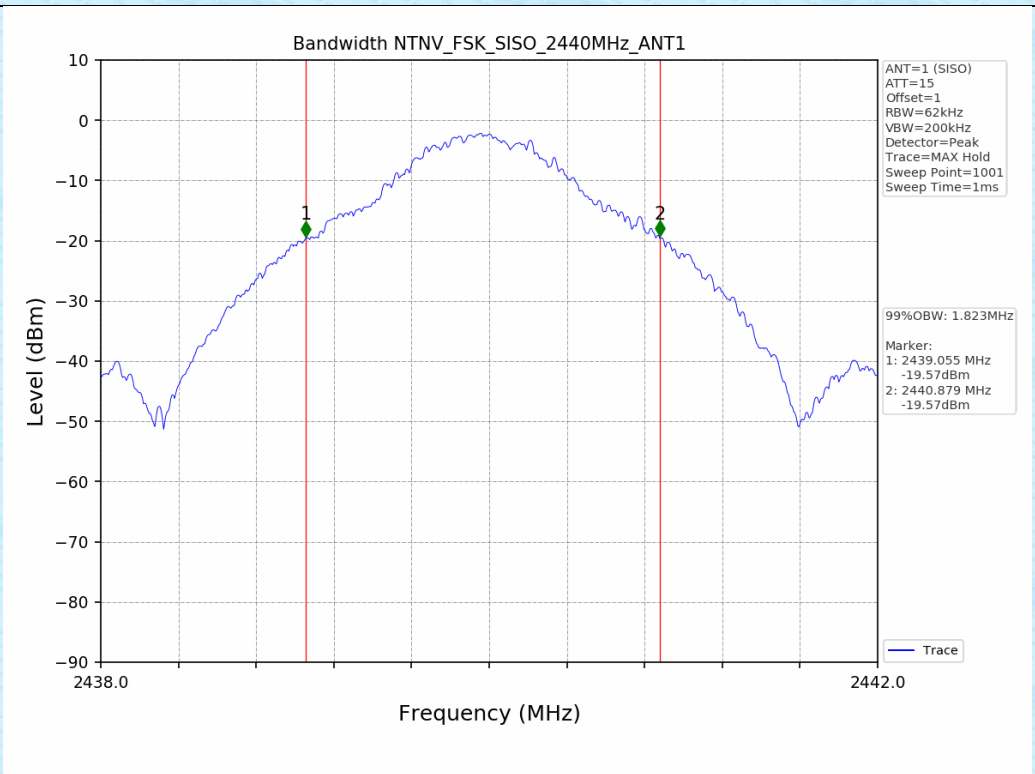


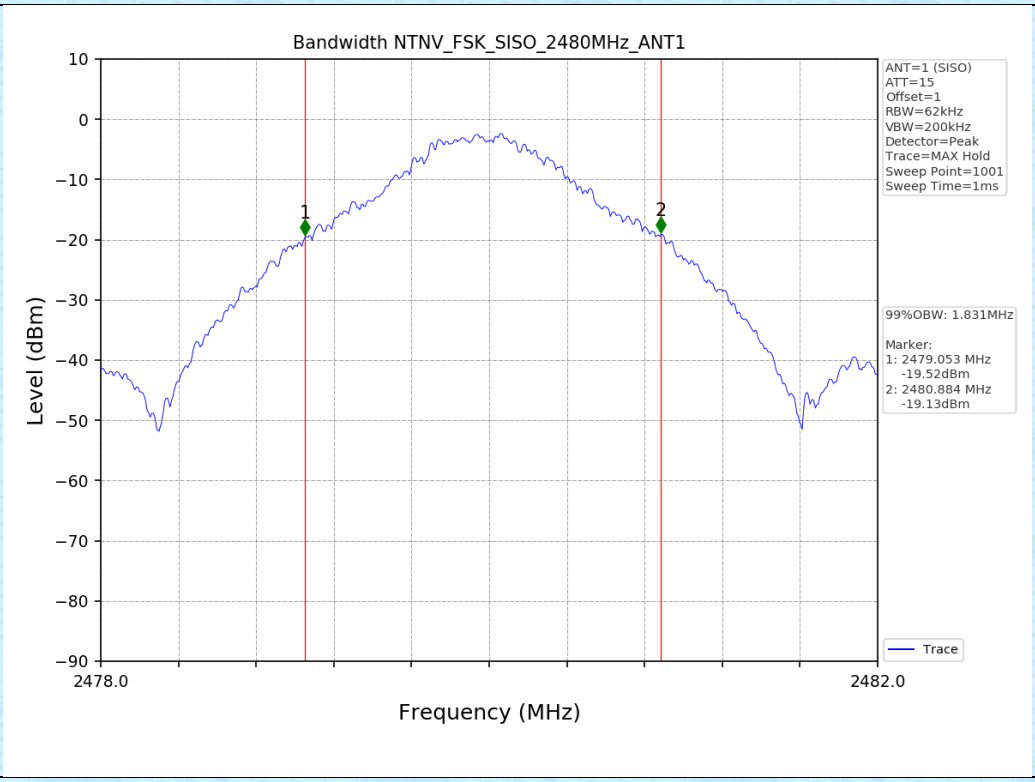

Bandwidth NTNV_FSK_SISO_2440MHz_ANT1
Level (dBm)
Frequency (MHz)
2438.0
2442.0
ANT=1 (SISO)
ATT=15
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
6dB: 0.845MHz
Marker:
1: 2439.558 MHz
-7.10dBm
2: 2440.403 MHz
-7.10dBm
3: 2439.952 MHz
-1.10dBm
Trace


Bandwidth NTNV_FSK_SISO_2480MHz_ANT1
Level (dBm)
Frequency (MHz)
2478.0
2482.0
ANT=1 (SISO)
ATT=15
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
6dB: 0.874MHz
Marker:
1: 2479.538 MHz
-7.95dBm
2: 2480.412 MHz
-7.95dBm
3: 2479.920 MHz
-1.95dBm
Trace

2.3 Test Graph - 99% Occupied Bandwidth





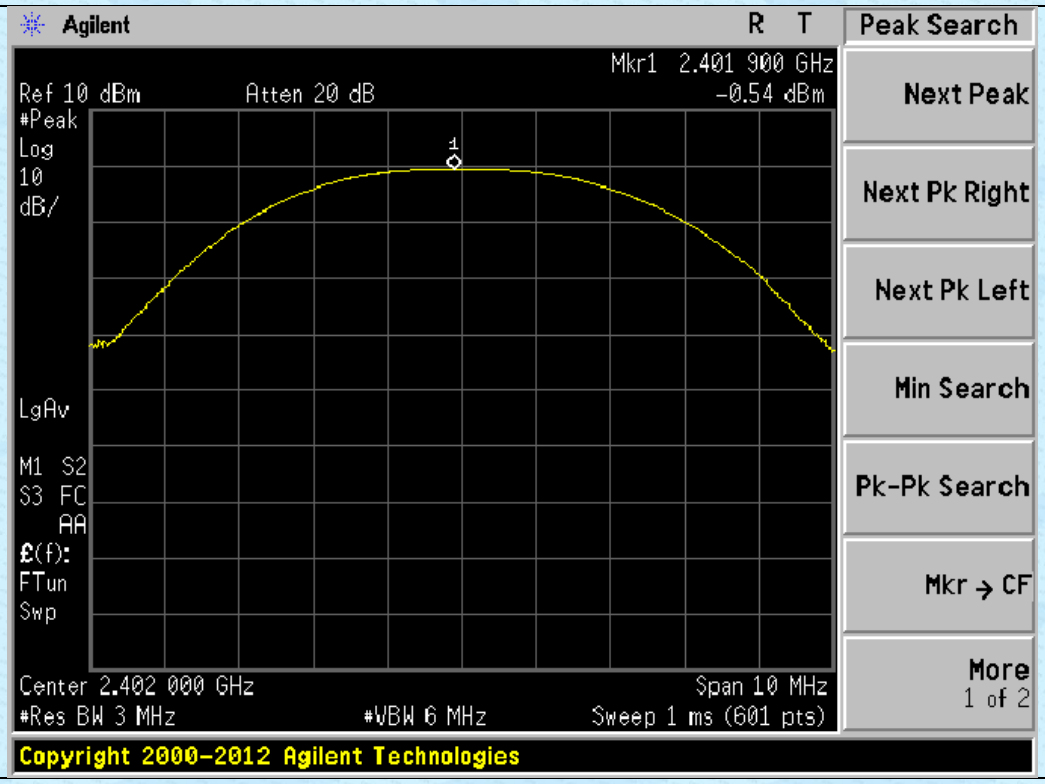


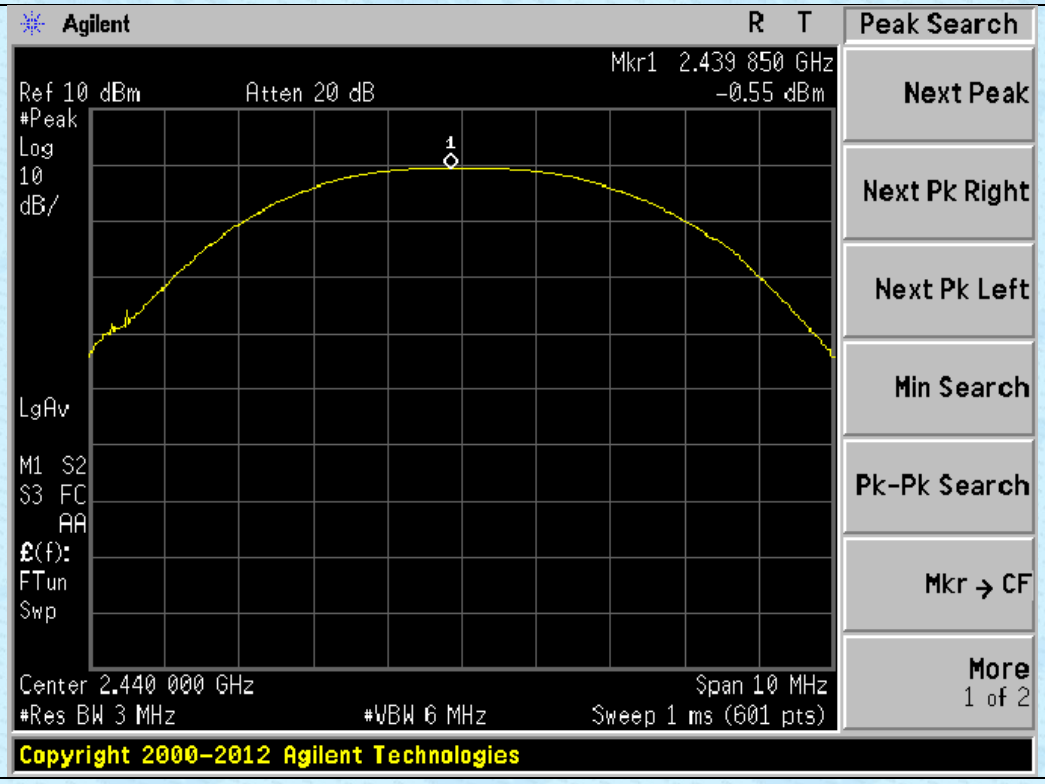
3. Maximum Conducted Output Power

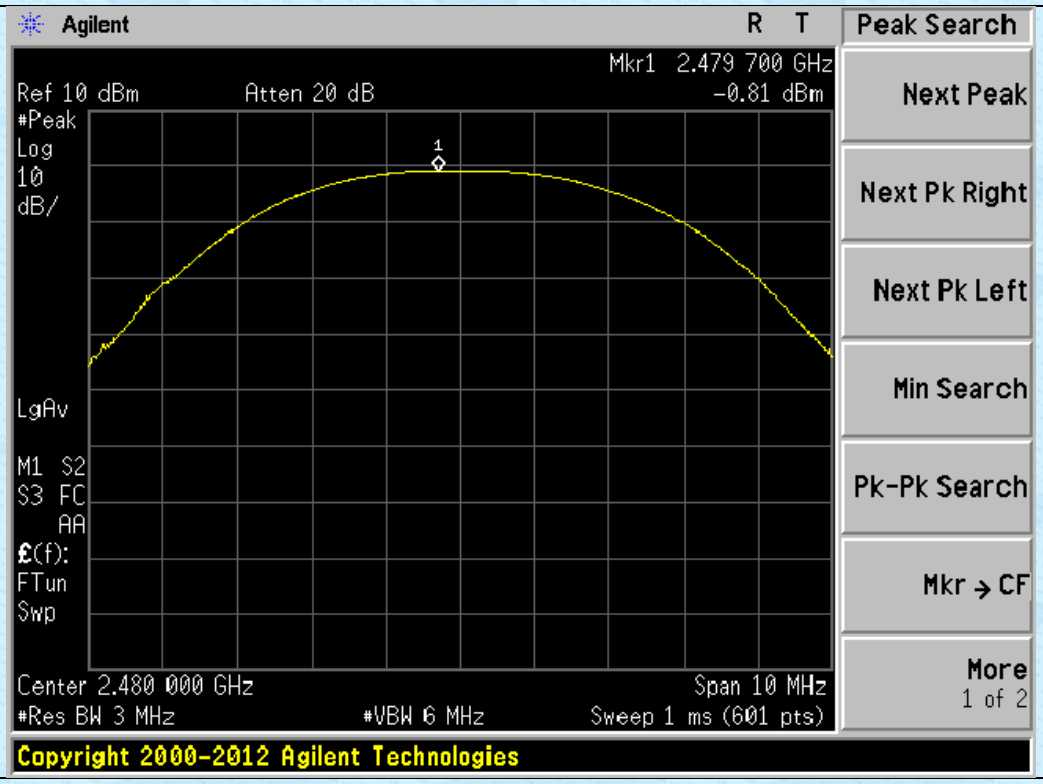
3.1 Test Result

Test Mode	Frequency (MHz)	Tx Type	Measured Peak Output Power (dBm)	Limits (dBm)	Verdict
			Ant 1		
FSK	2402	SISO	-0.54	30	PASS
	2440	SISO	-0.55	30	PASS
	2480	SISO	-0.81	30	PASS

3.2 Test Graph


Agilent
R T
Peak Search
Mkr1 2.401 900 GHz
Ref 10 dBm
Atten 20 dB
-0.54 dBm
#Peak
Log
10
dB/
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Center 2.402 000 GHz
Span 10 MHz
#Res BW 3 MHz
#VBW 6 MHz
Sweep 1 ms (601 pts)
Copyright 2000-2012 Agilent Technologies


Agilent
R T
Peak Search
Mkr1 2.439 850 GHz
Ref 10 dBm
Atten 20 dB
-0.55 dBm
#Peak
Log
10
dB/
LgAv
M1 S2
S3 FC
AA
£(f):
FTun
Swp
Next Peak
Next Pk Right
Next Pk Left
Min Search
Pk-Pk Search
Mkr → CF
More
1 of 2
Center 2.440 000 GHz
Span 10 MHz
#Res BW 3 MHz
#VBW 6 MHz
Sweep 1 ms (601 pts)
Copyright 2000-2012 Agilent Technologies

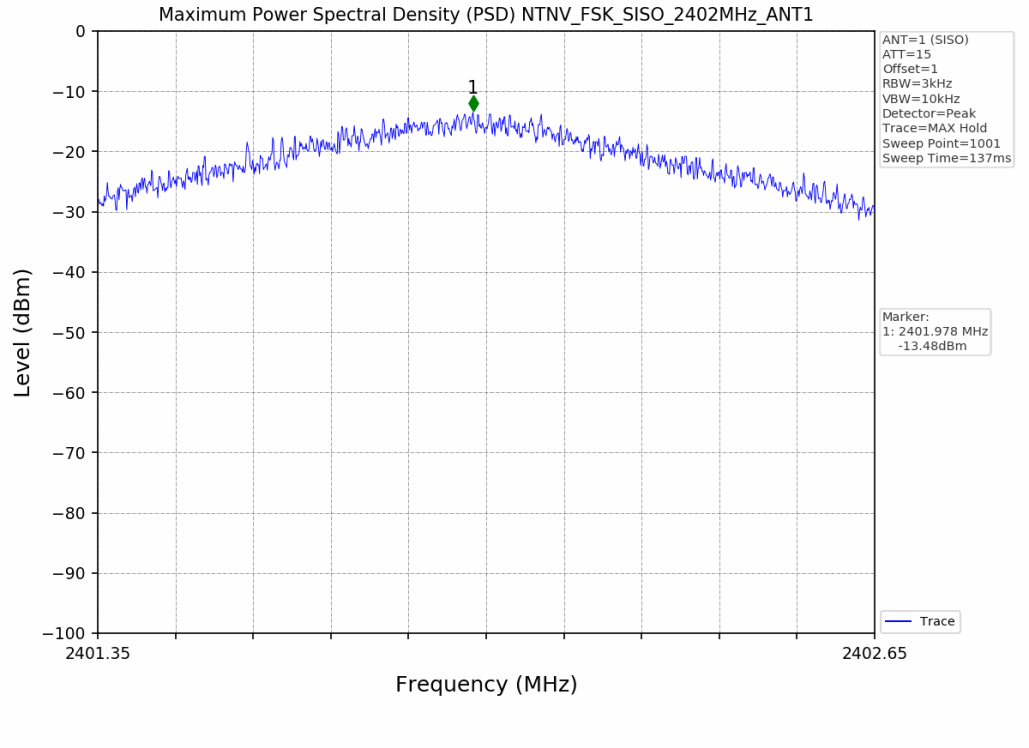


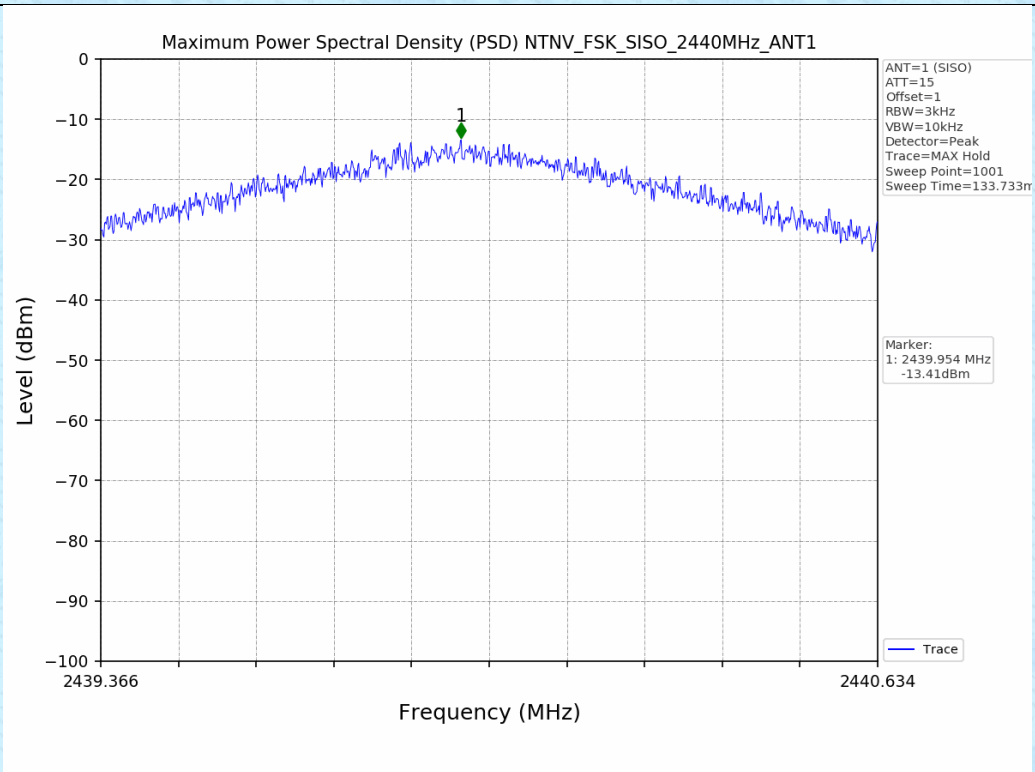
4. Maximum Power Spectral Density (PSD)

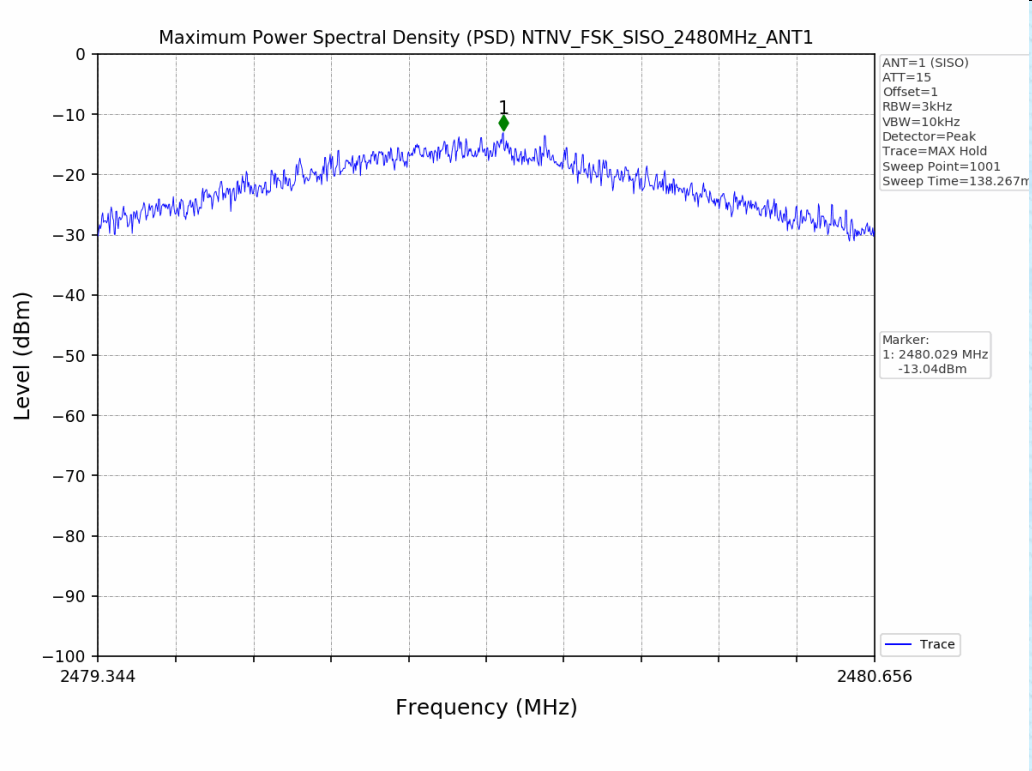
4.1 Test Result

Test Mode	Frequency (MHz)	Tx Type	Maximum Power Spectral Density (dBm/3KHz)	Limits (dBm/3kHz)	Verdict
			Ant 1		
FSK	2402	SISO	-13.48	≤8	PASS
	2440	SISO	-13.41	≤8	PASS
	2480	SISO	-13.04	≤8	PASS

4.2 Test Graph


Maximum Power Spectral Density (PSD) NTNV_FSK_SISO_2402MHz_ANT1
ANT=1 (SISO)
ATT=15
Offset=1
RBW=3kHz
VBW=10kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=137ms
Marker:
1: 2401.978 MHz
-13.48dBm
Trace
Level (dBm)
Frequency (MHz)
2401.35
2402.65


Maximum Power Spectral Density (PSD) NTNV_FSK_SISO_2440MHz_ANT1
ANT=1 (SISO)
ATT=15
Offset=1
RBW=3kHz
VBW=10kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=133.733m
Marker:
1: 2439.954 MHz
-13.41dBm
Trace
Level (dBm)
Frequency (MHz)
2439.366
2440.634

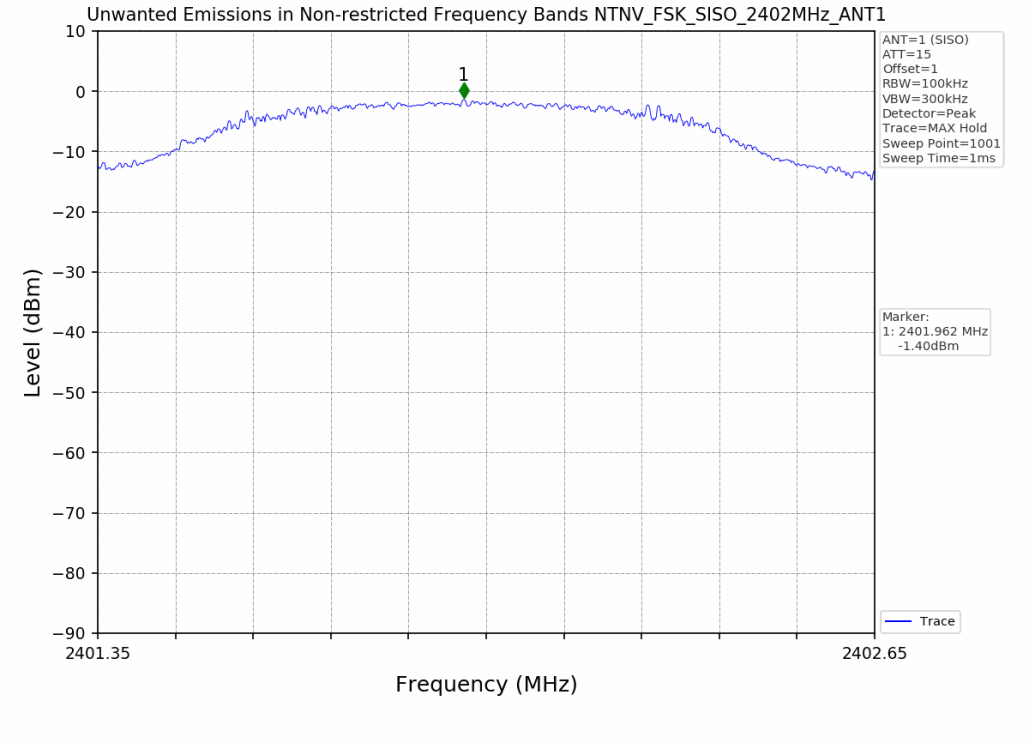


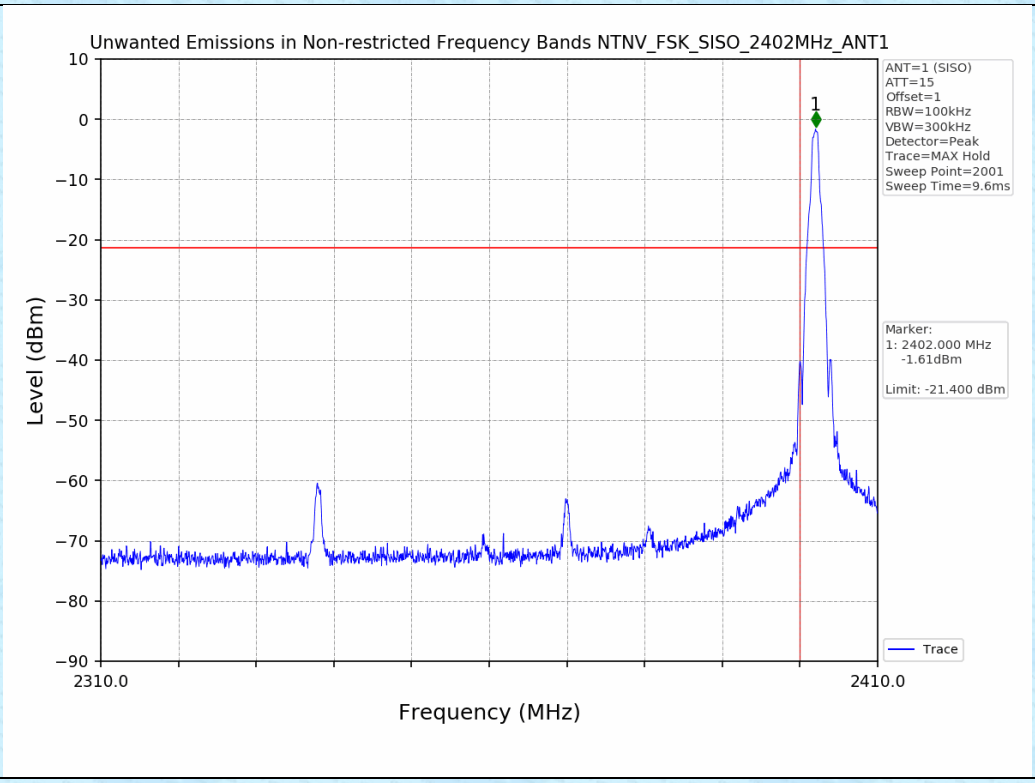
5. Unwanted Emissions in Non-restricted Frequency Bands

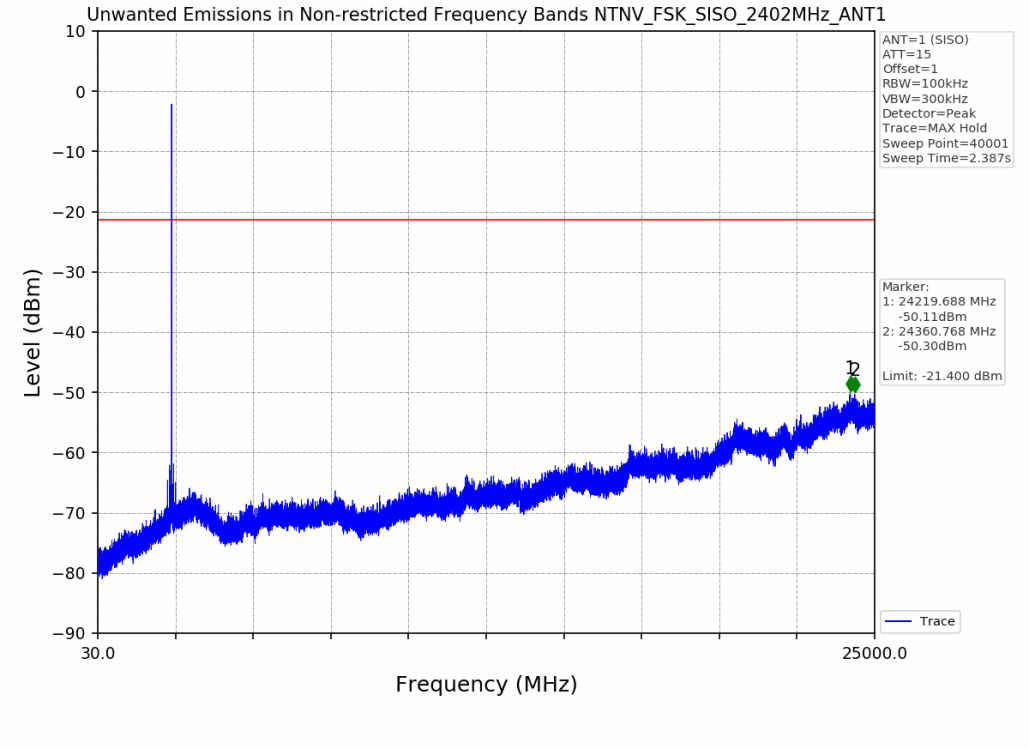
5.1 Test Result

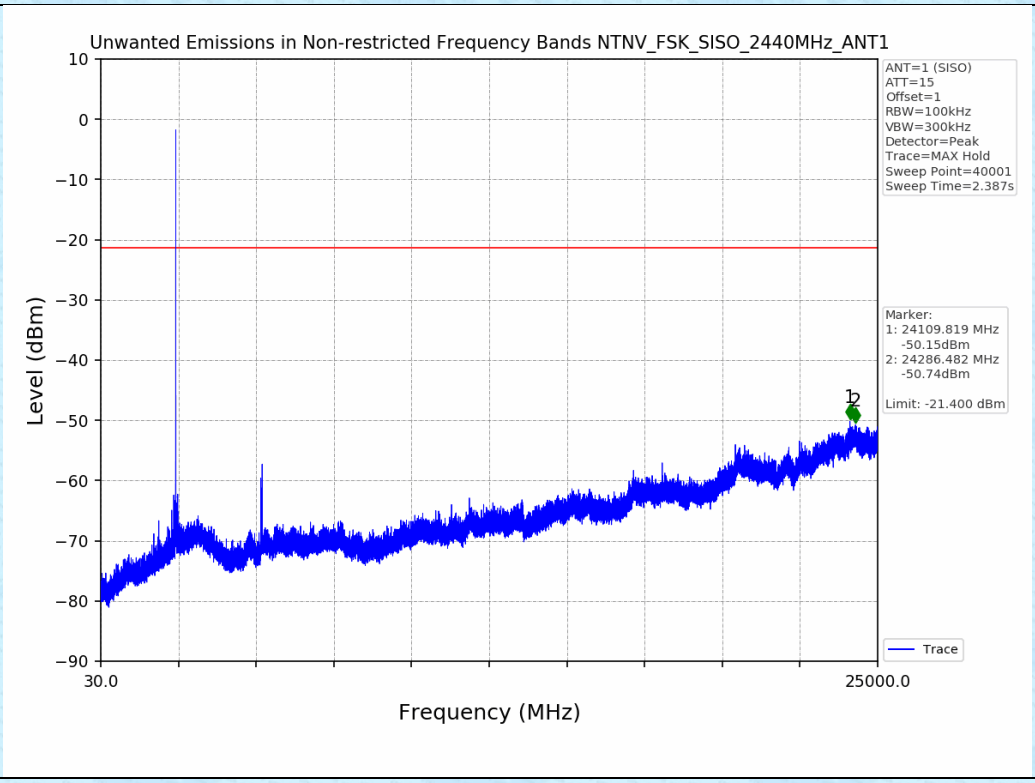
Test Mode	Frequency (MHz)	TX Type	ANT No.	Spurious Conducted Emission (dBm)	Limits (dBm)	Verdict
FSK	2402	SISO	1	Refer to test graph	-21.40	PASS
	2440	SISO	1	Refer to test graph	-21.40	PASS
	2480	SISO	1	Refer to test graph	-21.40	PASS

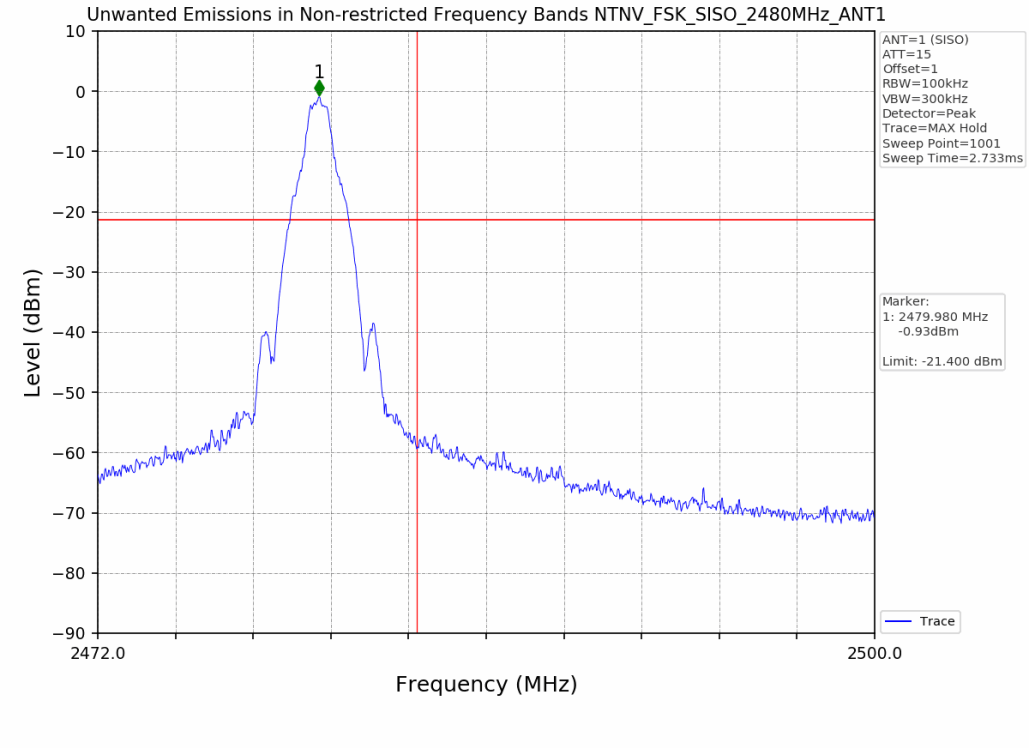
5.2 Test Graph

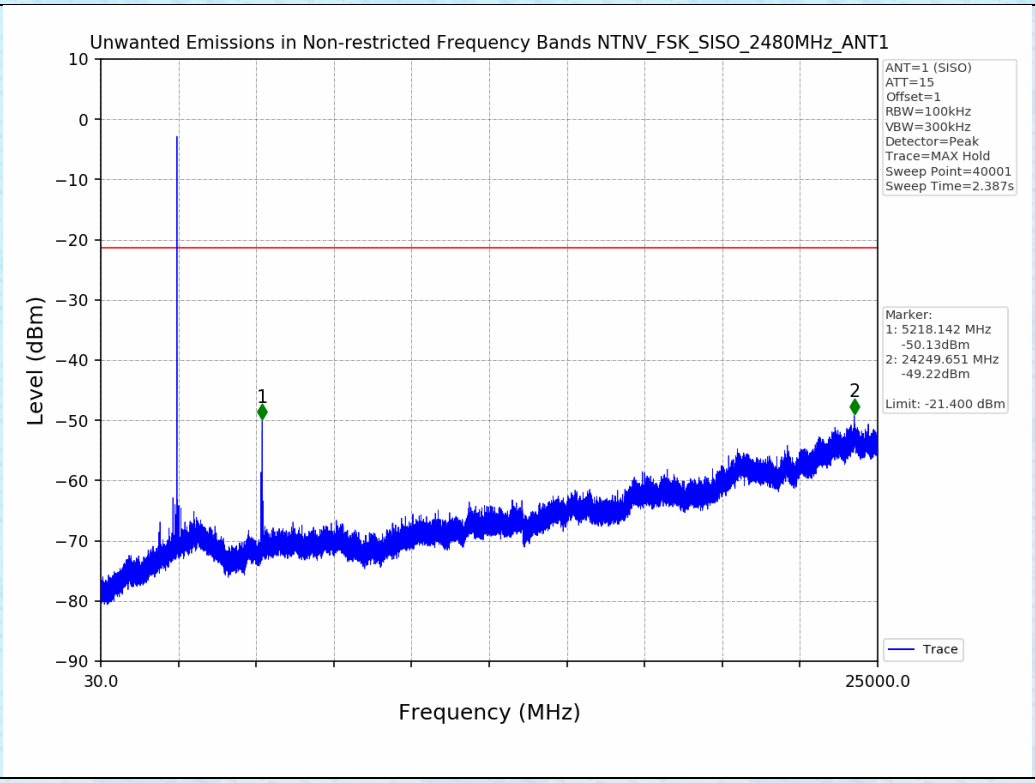

Unwanted Emissions in Non-restricted Frequency Bands NTNV_FSK_SISO_2402MHz_ANT1
ANT=1 (SISO)
ATT=15
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Marker:
1: 2401.962 MHz
-1.40dBm
Trace
Level (dBm)
Frequency (MHz)
2401.35
2402.65


Unwanted Emissions in Non-restricted Frequency Bands NTNV_FSK_SISO_2402MHz_ANT1
ANT=1 (SISO)
ATT=15
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=2001
Sweep Time=9.6ms
Marker:
1: 2402.000 MHz
-1.61dBm
Limit: -21.400 dBm
Trace
Level (dBm)
Frequency (MHz)
2310.0
2410.0


Unwanted Emissions in Non-restricted Frequency Bands NTNV_FSK_SISO_2402MHz_ANT1
ANT=1 (SISO)
ATT=15
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 24219.688 MHz
-50.11dBm
2: 24360.768 MHz
-50.30dBm
Limit: -21.400 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0


Unwanted Emissions in Non-restricted Frequency Bands NTNV_FSK_SISO_2440MHz_ANT1
ANT=1 (SISO)
ATT=15
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 24109.819 MHz
-50.15dBm
2: 24286.482 MHz
-50.74dBm
Limit: -21.400 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0


Unwanted Emissions in Non-restricted Frequency Bands NTNV_FSK_SISO_2480MHz_ANT1
ANT=1 (SISO)
ATT=15
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=2.733ms
Marker:
1: 2479.980 MHz
-0.93dBm
Limit: -21.400 dBm
Trace
Level (dBm)
Frequency (MHz)
2472.0
2500.0

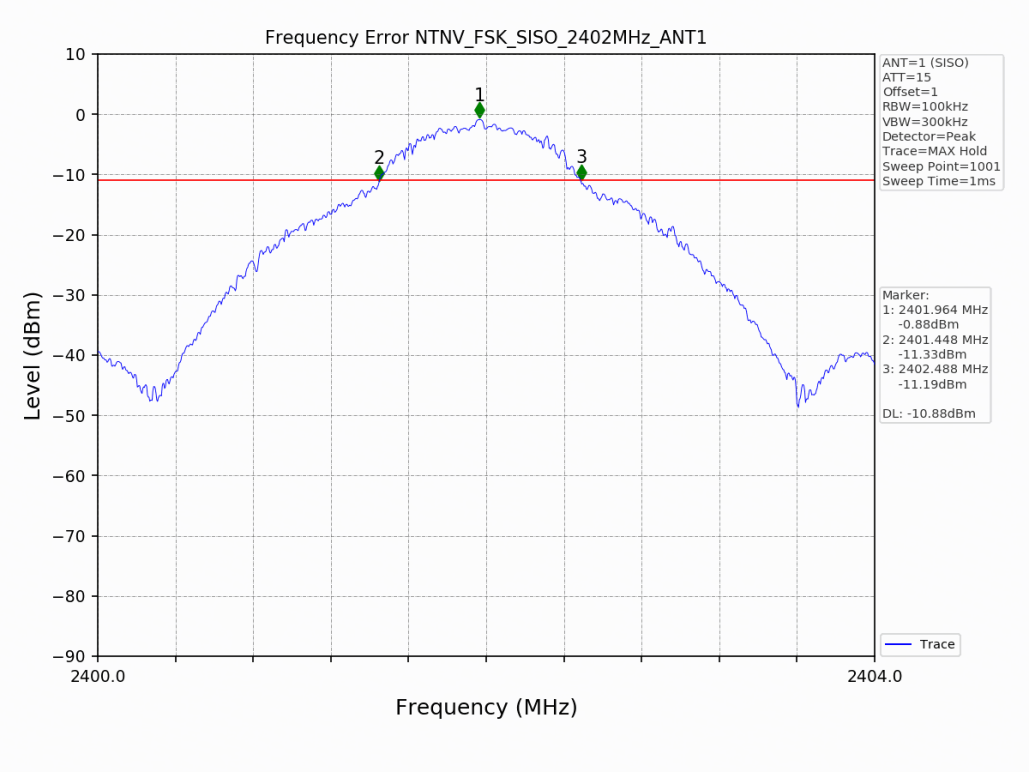

Unwanted Emissions in Non-restricted Frequency Bands NTNV_FSK_SISO_2480MHz_ANT1
ANT=1 (SISO)
ATT=15
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=40001
Sweep Time=2.387s
Marker:
1: 5218.142 MHz
-50.13dBm
2: 24249.651 MHz
-49.22dBm
Limit: -21.400 dBm
Trace
Level (dBm)
Frequency (MHz)
30.0
25000.0

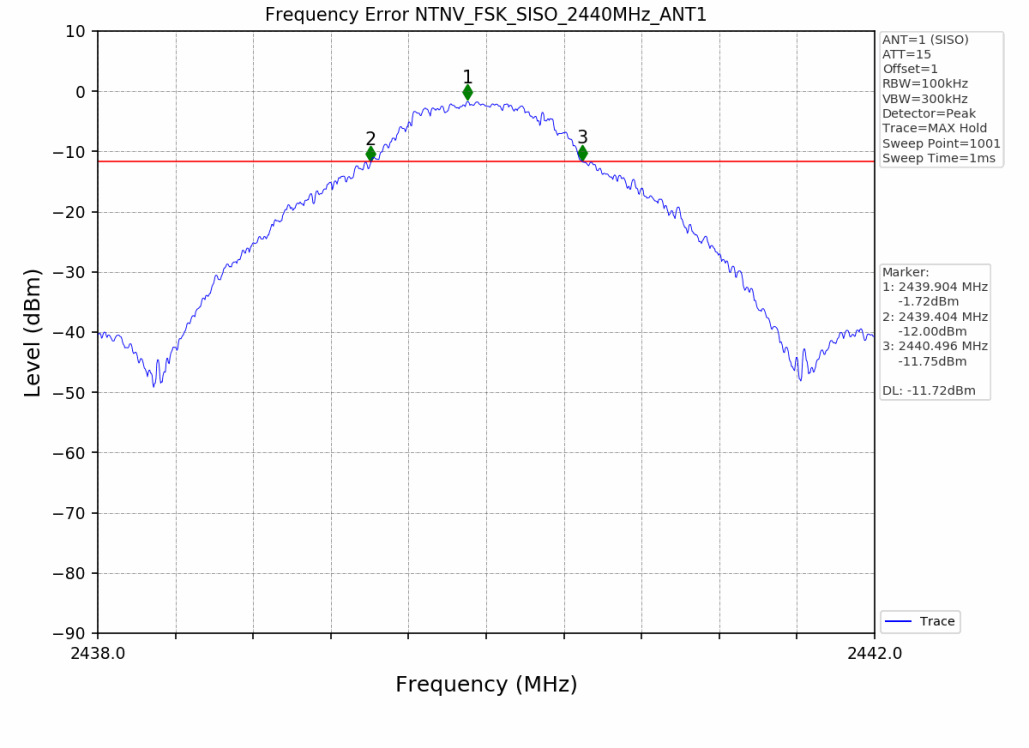
6. Frequency Error

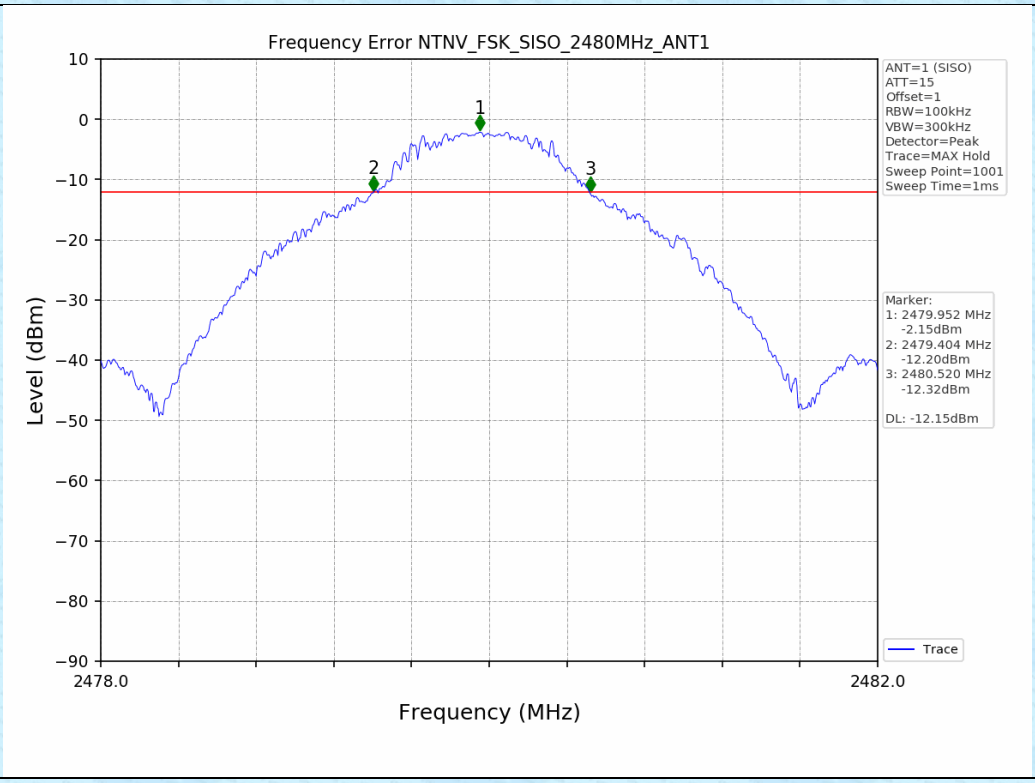
6.1 Test Result

Test Mode	Frequency (MHz)	TX Type	ANT	Measured Frequency (MHz)		Verdict
				Test Result	Limit	
FSK	2402	SISO	1	2401.97	2400-2483.5	PASS
	2440	SISO	1	2439.95	2400-2483.5	PASS
	2480	SISO	1	2479.96	2400-2483.5	PASS

6.2 Test Graph




Frequency Error NTNV_FSK_SISO_2440MHz_ANT1
Level (dBm)
Frequency (MHz)
2438.0
2442.0
ANT=1 (SISO)
ATT=15
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Marker:
1: 2439.904 MHz
-1.72dBm
2: 2439.404 MHz
-12.00dBm
3: 2440.496 MHz
-11.75dBm
DL: -11.72dBm
Trace


Frequency Error NTNV_FSK_SISO_2480MHz_ANT1
Level (dBm)
Frequency (MHz)
2478.0
2482.0
ANT=1 (SISO)
ATT=15
Offset=1
RBW=100kHz
VBW=300kHz
Detector=Peak
Trace=MAX Hold
Sweep Point=1001
Sweep Time=1ms
Marker:
1: 2479.952 MHz
-2.15dBm
2: 2479.404 MHz
-12.20dBm
3: 2480.520 MHz
-12.32dBm
DL: -12.15dBm
Trace

------End------