

RF Test Report

Project Number: 4941479**Offer Number: SUW-202204002740****Report Number: 4941479EMC01****Revision Level: 0****Client: Adrich, Inc.****Equipment Under Test: Adrich Replete Device****Model: Gen3-FlexBatt****FCC ID: 2A677G3FB01****IC ID: 28673-G3FB01****Applicable Standards: ANSI C63.10: 2013 (FCC Part 15 Subpart C, § 15.247)****RSS-247, Issue 2****RSS-GEN Issue 5****Report issued on: 17 February 2023****Test Result: Compliant**

FOR THE SCOPE OF ACCREDITATION UNDER CERTIFICATE NUMBER: 3212.01

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Prepared by:

A handwritten signature in black ink that reads 'Andrew Bluhm'.

Andrew Bluhm, Jr RF/EMC Engineer

Reviewed by:

A handwritten signature in blue ink that reads 'Martin Taylor'.

Martin Taylor, Project Engineer

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1 Summary of Test Results

Test Description	Test Specification		Test Result
Bandwidth	15.247(a)(2)	RSS-247 S5.2 (a) RSS-GEN S6.6	Compliant
Peak Output Power	15.247(b)(3)	RSS-247 S5.4 (d)	Compliant
Power Spectral Density	15.247(e)	RSS-247 S5.2 (b)	Compliant
Conducted Spurious Emissions / Band Edge	15.247(d)	RSS-247 S5.5	Compliant
Field Strength of Spurious Radiation	15.247(d), 15.209	RSS-247 S5.5	Compliant
Emissions in Restricted Frequency Bands	15.205, 15.209	RSS-GEN S8.9, S8.10	Compliant
Antenna Requirement	15.203	RSS-GEN S8.3	Compliant ¹
AC Powerline Conducted Emissions	15.107, 15.207	RSS-GEN S8.8	N/A ²

Notes: (1) The device uses an internal chip antenna.

(2) The device does not connect to AC Mains.

1.1 Modifications Required for Compliance

None

2 General Information

2.1 Client Information

Name: Adrich, Inc.
Address: 100 South Commons Suite 102
City, State, Zip, Country: Pittsburgh, PA 15212, USA

2.2 Test Laboratory

Name: SGS North America, Inc.
Address: 620 Old Peachtree Road NW, Suite 100
City, State, Zip, Country: Suwanee, GA 30024, USA

Accrediting Body: A2LA
Type of lab: Testing Laboratory
Certificate Number: 3212.01
ISED CAB Identifier: US0186
FCC Designation Number: US1126

2.3 General Information of EUT

Product Marketing Name (PMN): Adrich Replete Device
Model Number (HVIN): Gen3-FlexBatt
Serial Number: SUW_SP_20220702266 (Conducted)
SUW_SP_20220702264 (Radiated)

Frequency Range: 2402 – 2480 MHz
Data Modes: Bluetooth Low Energy – GFSK
Antenna: Johanson Technology 2450AT42E0100E (Gain: -2.0 dBi*)

Rated Voltage: 3.0Vdc from battery
Test Voltage: 3.0Vdc from battery

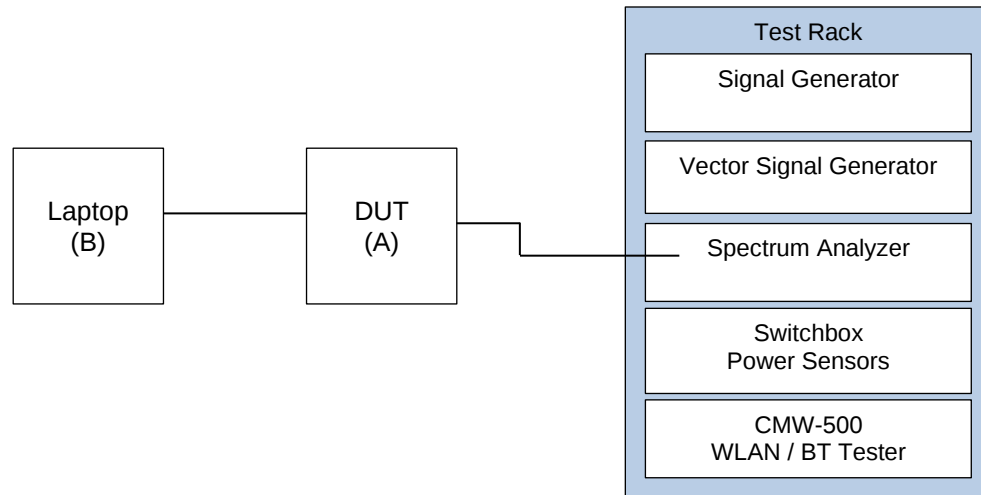
Sample Received Date: 25 July 2022
Dates of testing: 04 October 2022 – 10 October 2022

**Data was not measured; therefore, the lab is not responsible for accuracy. Data obtained via customer, specification sheet, previous regulatory filing or other.*

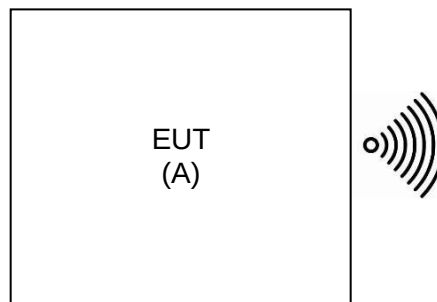
2.4 Operating Modes and Conditions

Using test commands through SmartRF Studio, the EUT was programmed to transmit on low, middle and high channels. During testing the radio was configured for max power.

2.5 EUT Connection Block Diagram – Conducted Measurements



2.6 EUT Connection Block Diagram – Radiated Measurements



2.7 System Configurations

Device reference	Manufacturer	Description	Model Number	Serial Number
A	Adrich	Adrich Replete Device	Gen3-FlexBatt	SUW_SP_20220702264
B	Lenovo	Thinkpad Laptop	T440p	Lab PC #2

3 Bandwidth

3.1 Test Result

Test Description	Test Specification		Test Result
6 dB bandwidth	15.247(a)(2)	RSS-247 S5.2 (a) RSS-GEN S6.6	Compliant

3.2 Test Method

The procedures from ANSI C63.10: 2013 clause 11.8 and 558074 D01 15.247 Meas Guidance v05r02 were used to determine the 6 dB bandwidth.

3.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 21.2 °C

Relative Humidity: 52.4 %

Atmospheric Pressure: 98.5 kPa

3.4 Test Equipment

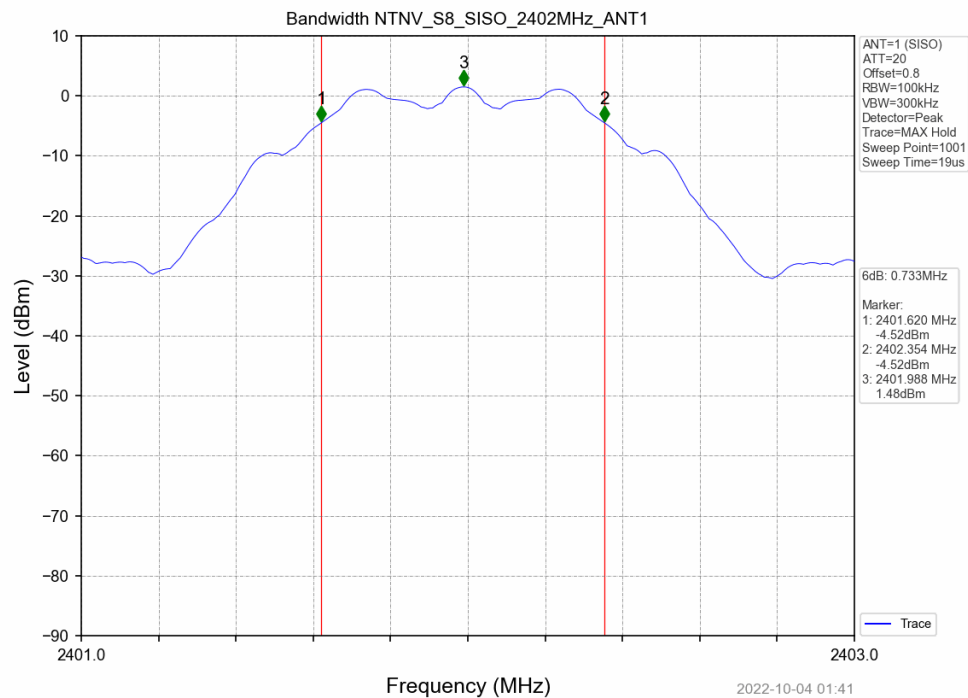
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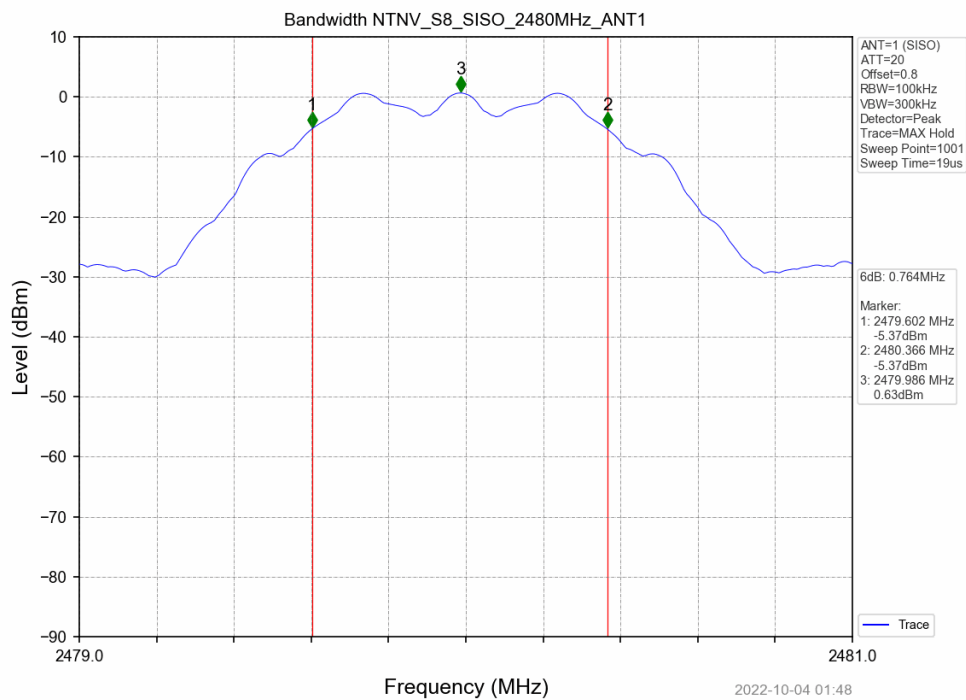
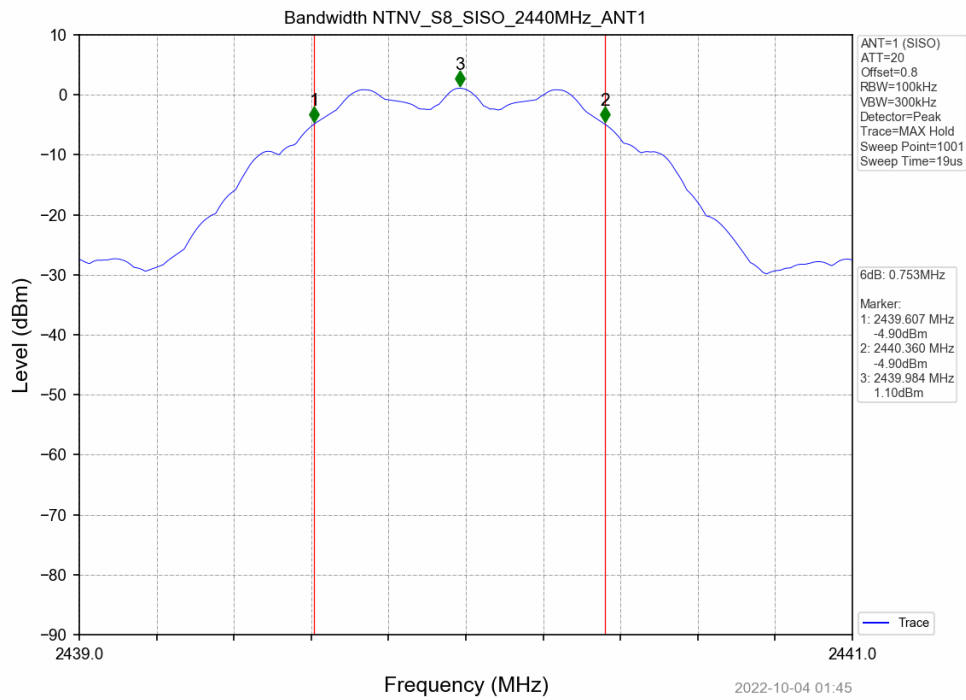
Tester: AB

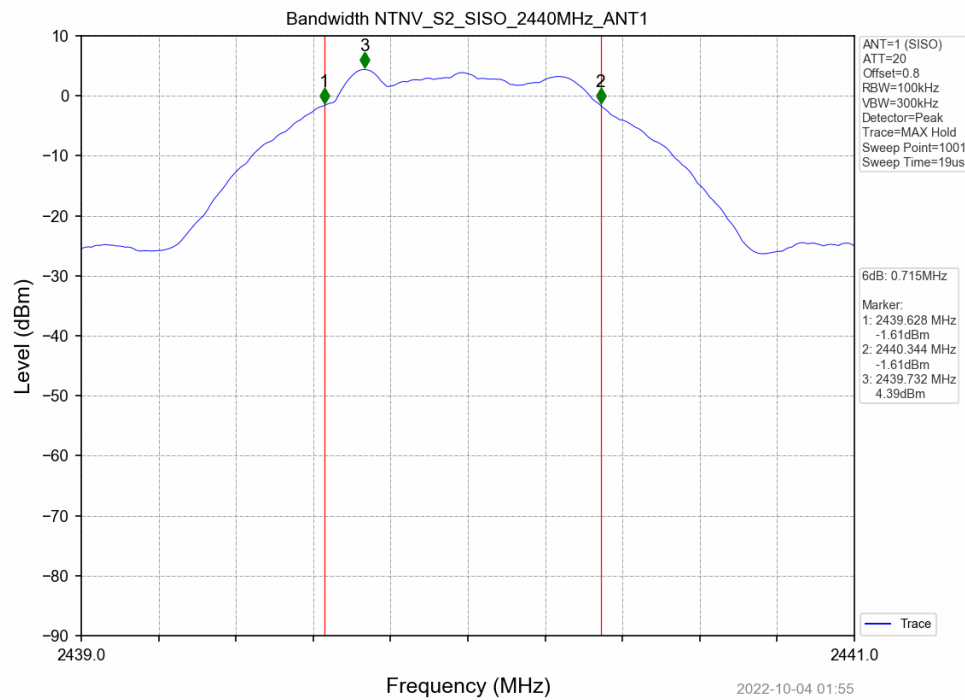
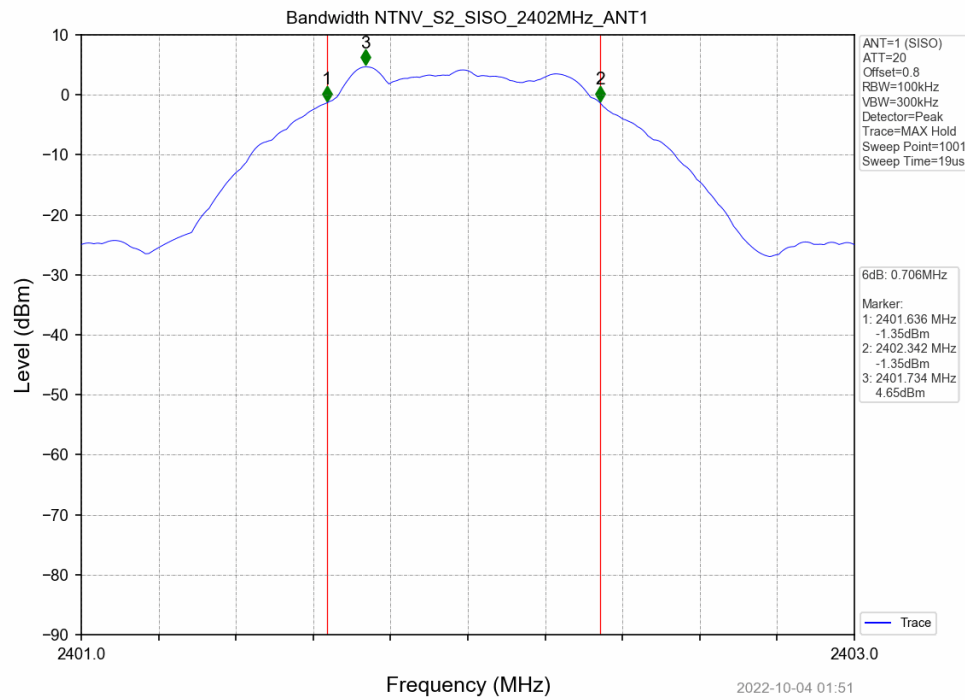
Equipment	Model	Manufacturer	Asset	Cal Date	Cal Due Date
RF CABLE (TS8997)	141	HUBER & SUHNER	B095588	5-Jul-2022	5-Jul-2023
SIGNAL ANALYZER (TS8997)	FSV30	ROHDE & SCHWARZ	B085749	4-Jan-2022	4-Jan-2024

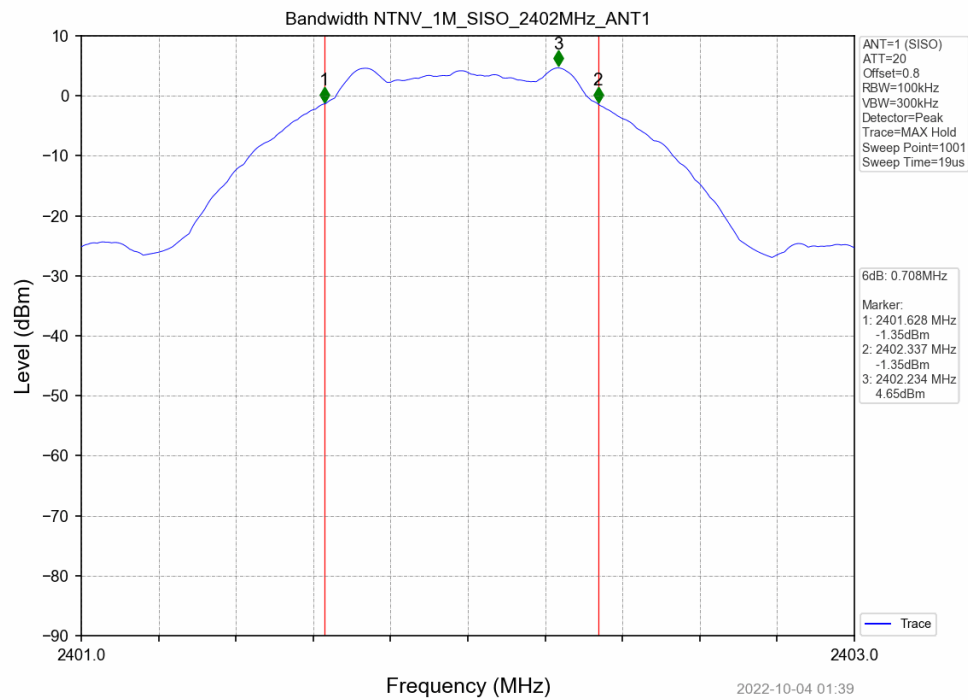
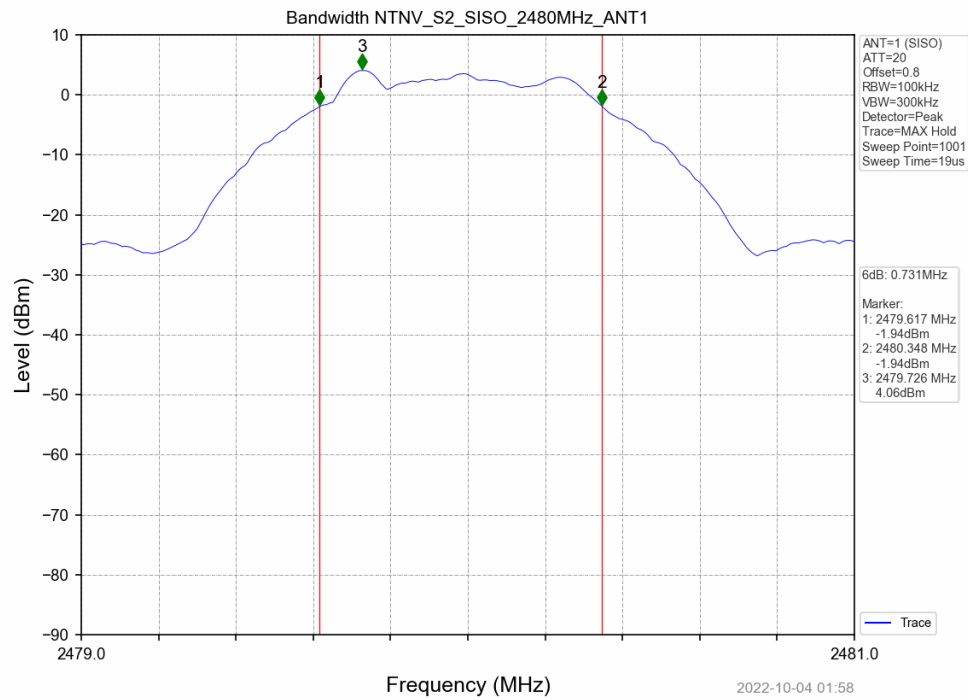
3.5 Test Data

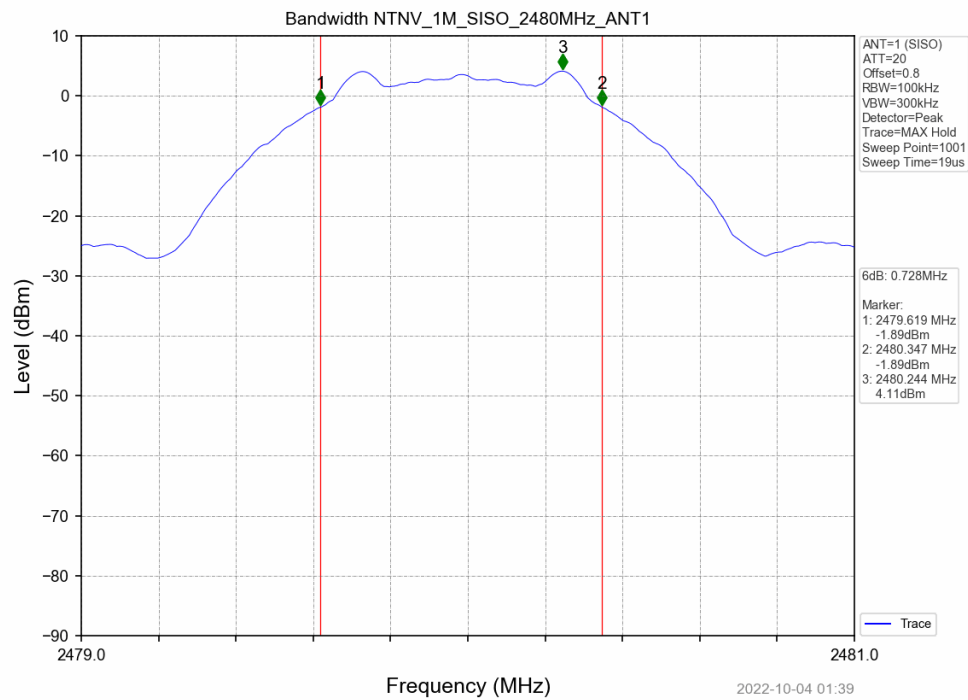
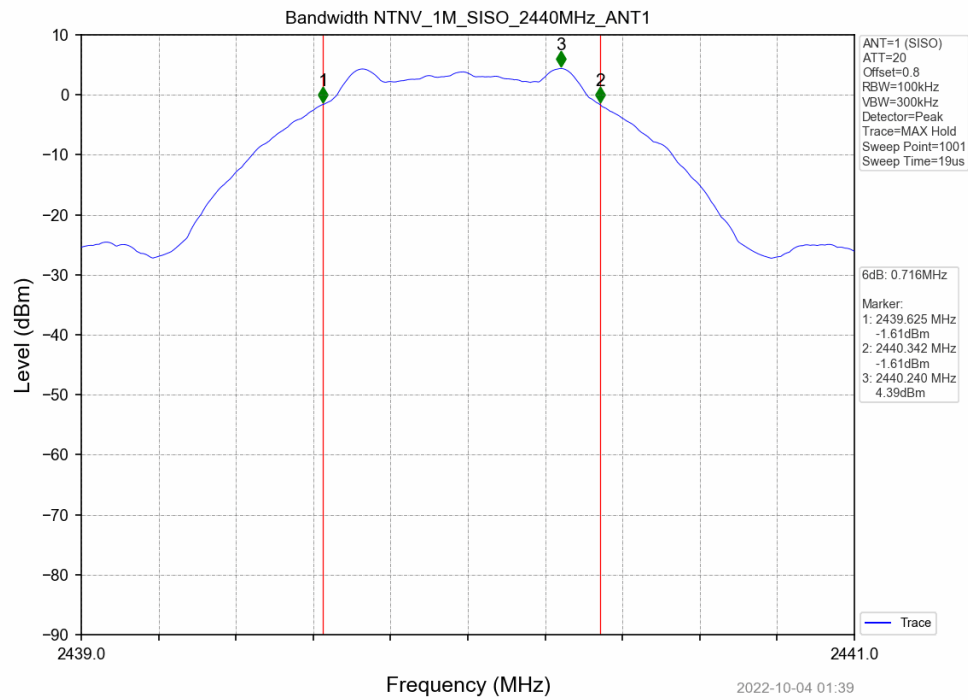
Test Mode	Frequency (MHz)	TX Type	ANT No.	6dB Bandwidth		Verdict
				Test Result (MHz)	Limits (MHz)	
S8	2402	SISO	1	0.733	≥ 0.5	PASS
	2440	SISO	1	0.753	≥ 0.5	PASS
	2480	SISO	1	0.764	≥ 0.5	PASS
S2	2402	SISO	1	0.706	≥ 0.5	PASS
	2440	SISO	1	0.715	≥ 0.5	PASS
	2480	SISO	1	0.731	≥ 0.5	PASS
1M	2402	SISO	1	0.708	≥ 0.5	PASS
	2440	SISO	1	0.716	≥ 0.5	PASS
	2480	SISO	1	0.728	≥ 0.5	PASS
2M	2402	SISO	1	1.364	≥ 0.5	PASS
	2440	SISO	1	1.375	≥ 0.5	PASS
	2480	SISO	1	1.492	≥ 0.5	PASS

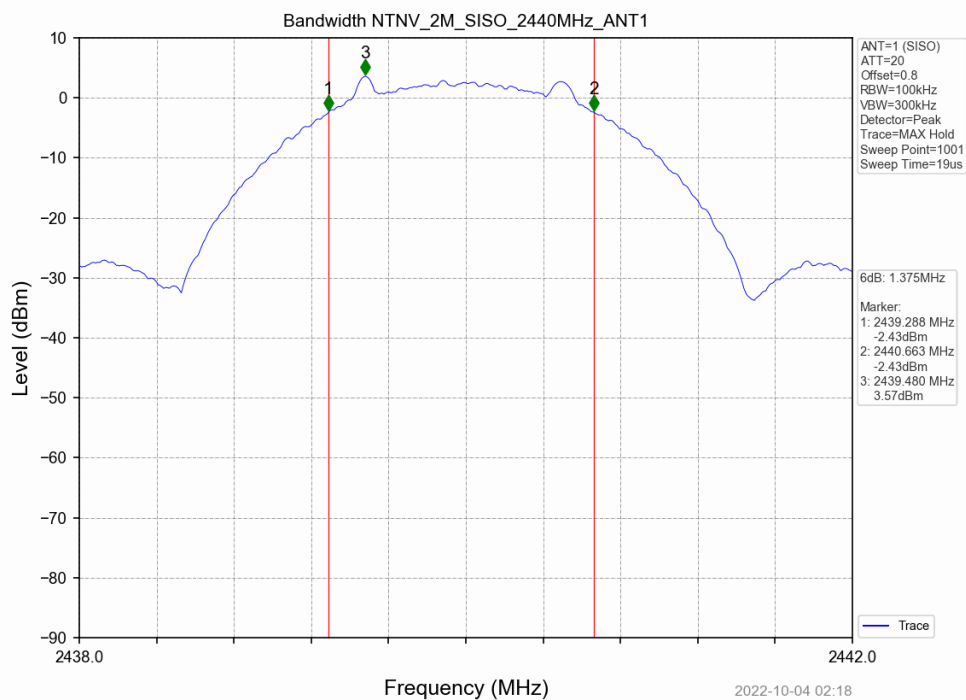
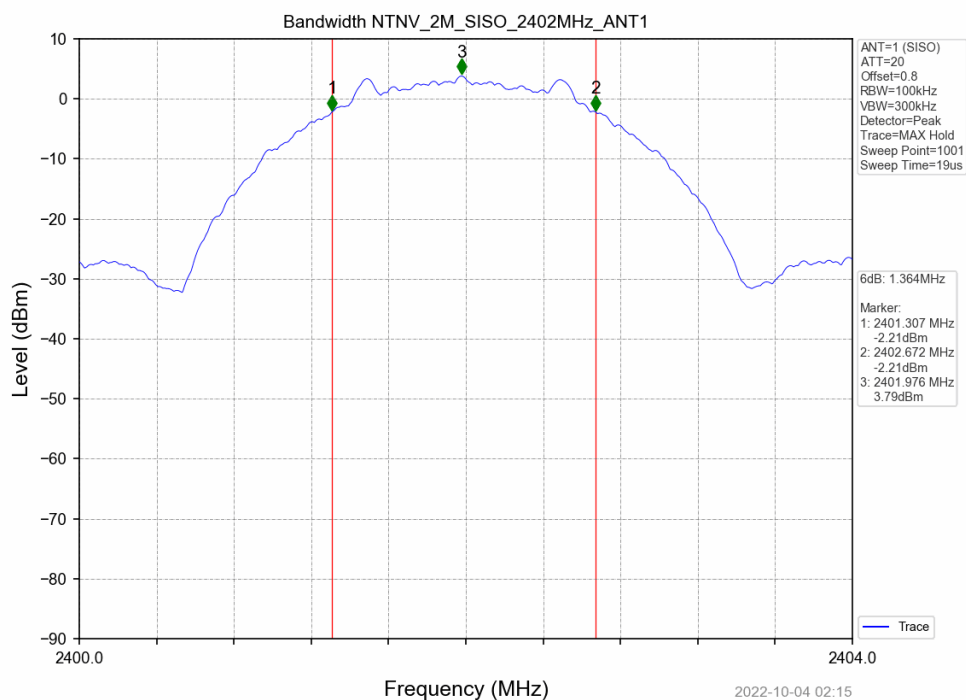


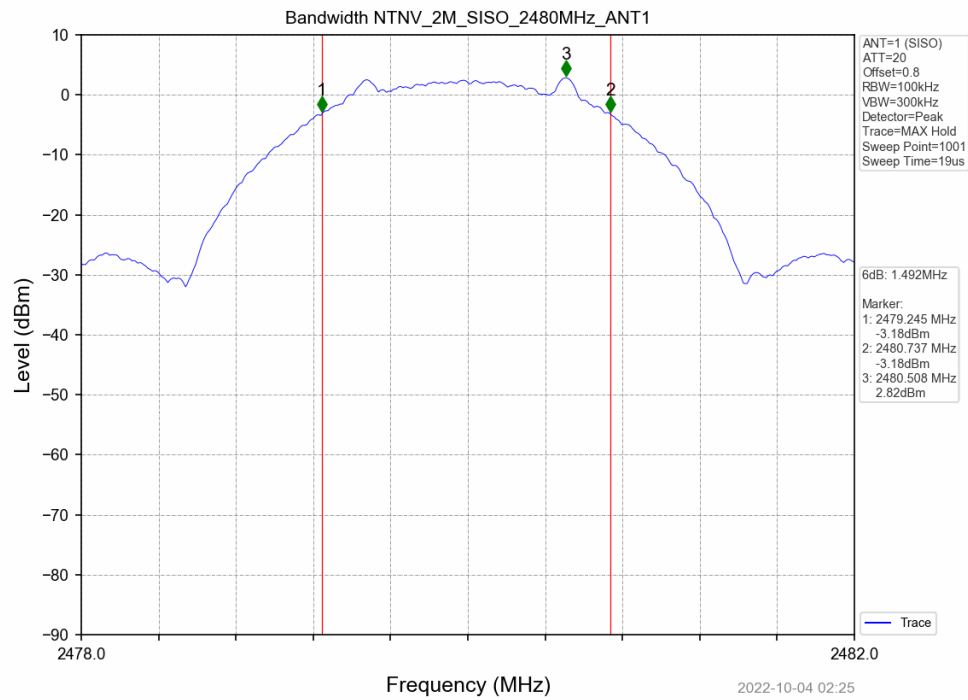












4 Peak Output Power

4.1 Test Result

Test Description	Test Specification		Test Result
Peak Output Power	15.247(b)(3)	RSS-247 S5.4 (d)	Compliant

4.2 Test Method

Fundamental peak power measurements were recorded using the procedures from ANSI C63.10: 2013 clause 11.9 and KDB 558074 D01 15.247 Meas Guidance v05r02.

Limit

(3) For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. For using antennas with greater than 6dBi of gain, the limit is reduced in dB by the amount the gain exceeds 6dBi (e.g. for a 7.4dBi antenna, the limit is reduced from 30dBm to 28.6dBm)

4.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 21.2 °C

Relative Humidity: 52.4 %

Atmospheric Pressure: 98.5 kPa

4.4 Test Equipment

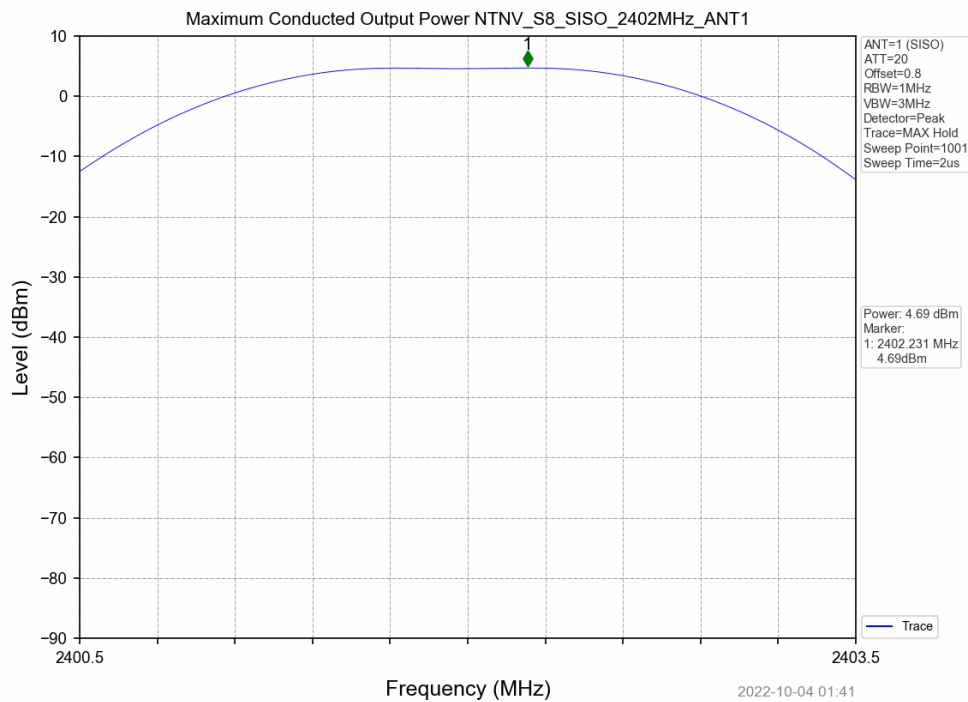
Test End Date: 4-Oct-2022

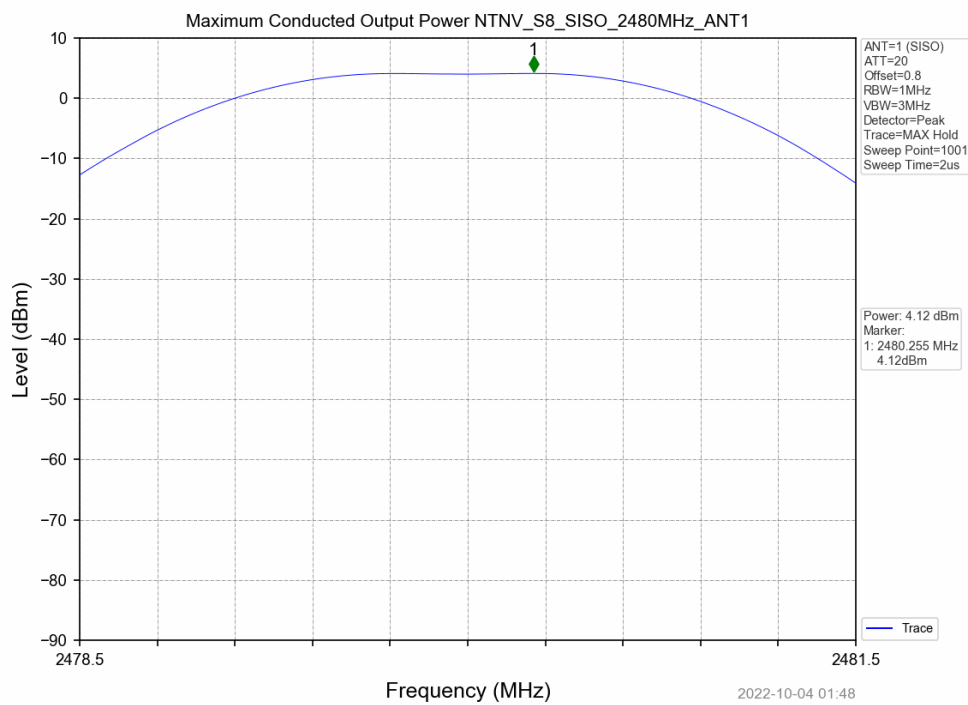
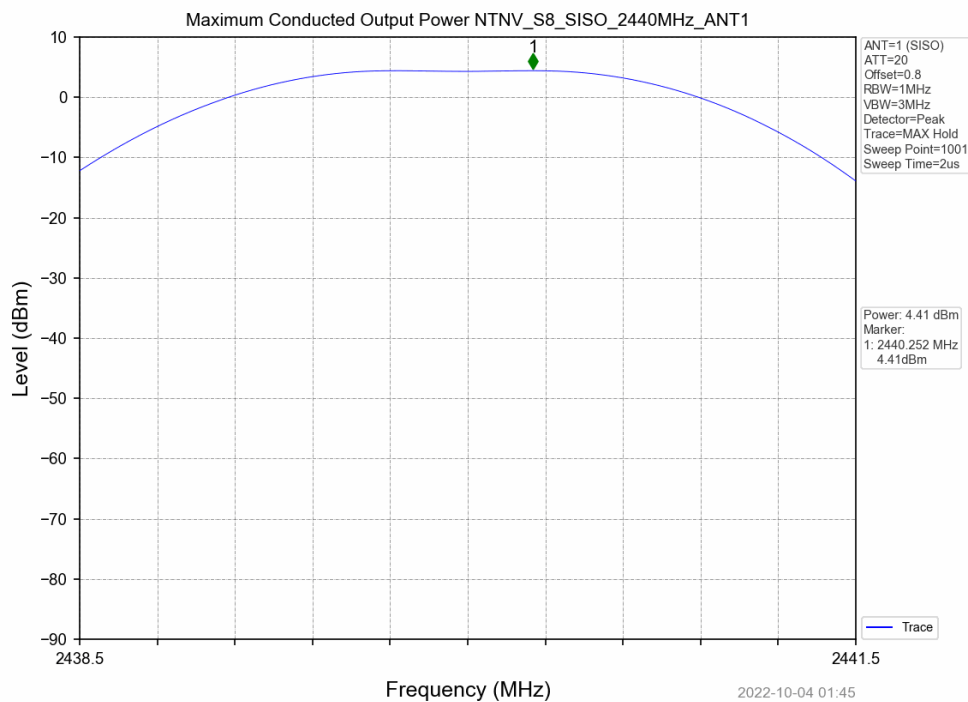
Tester: AB

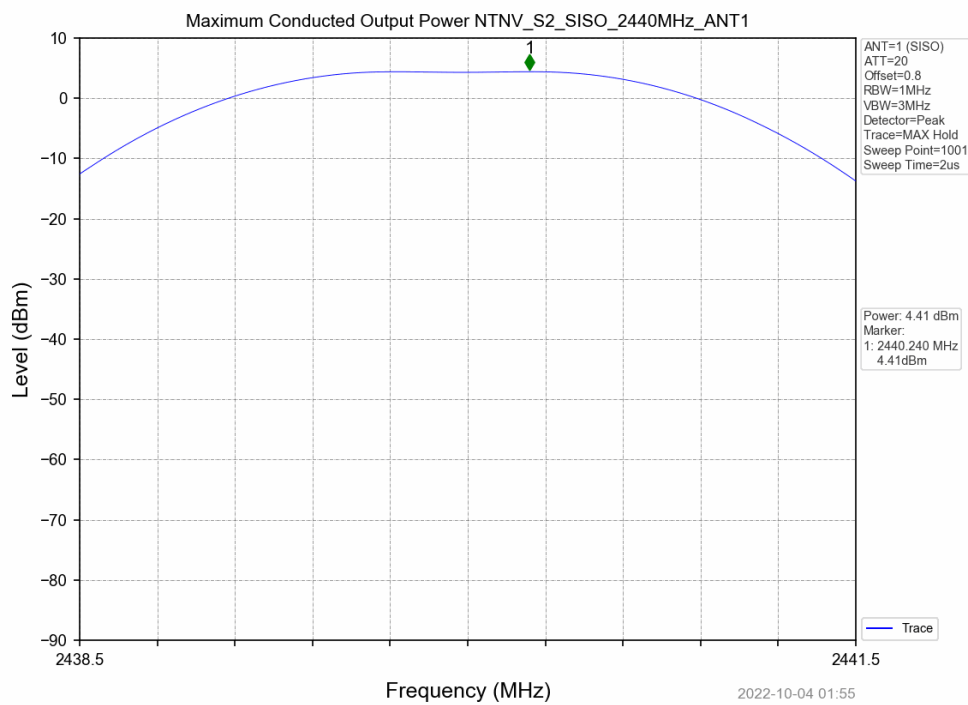
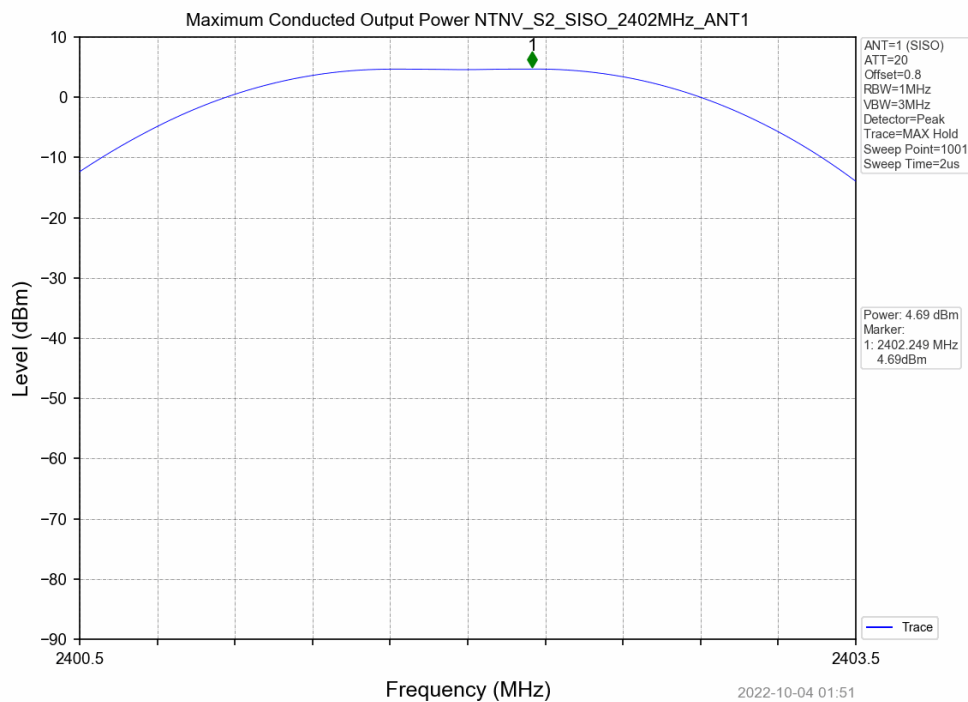
Equipment	Model	Manufacturer	Asset	Cal Date	Cal Due Date
RF CABLE (TS8997)	141	HUBER & SUHNER	B095588	5-Jul-2022	5-Jul-2023
SIGNAL ANALYZER (TS8997)	FSV30	ROHDE & SCHWARZ	B085749	4-Jan-2022	4-Jan-2024

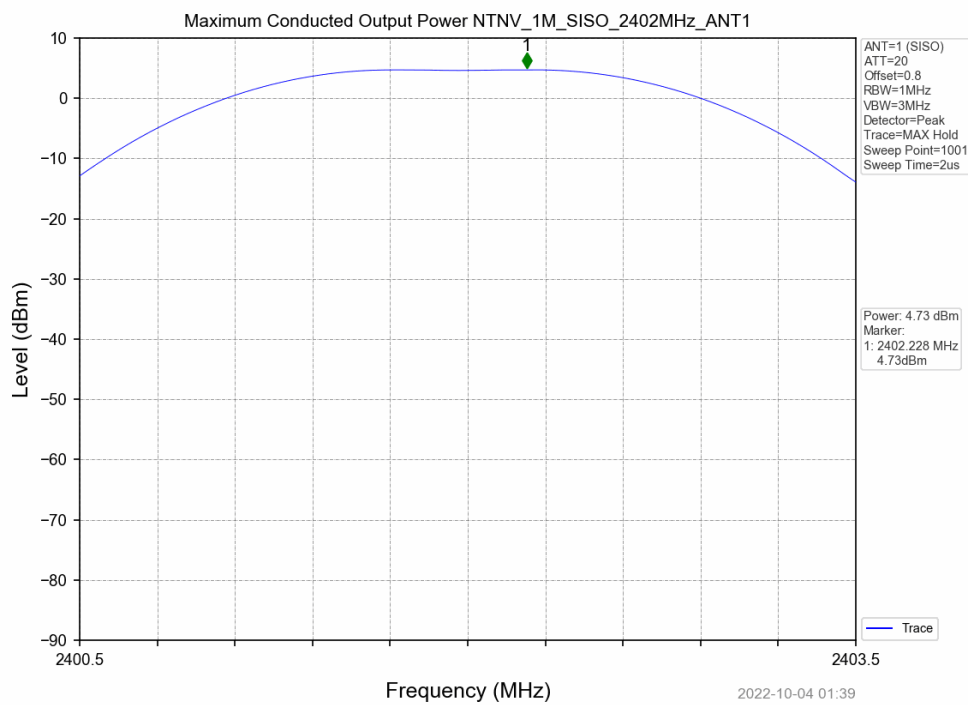
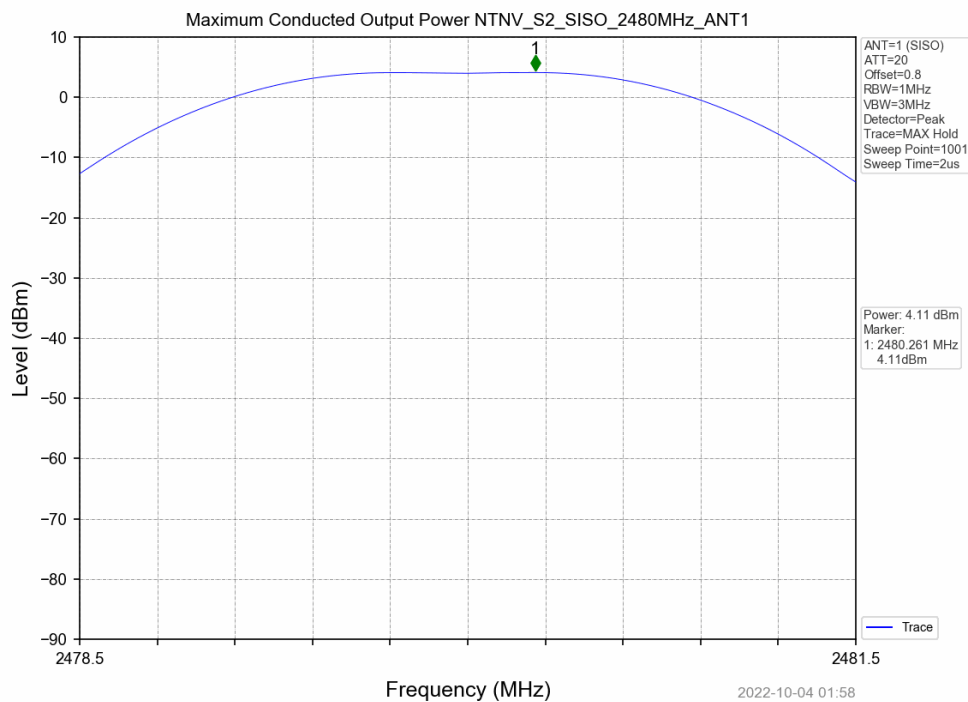
4.5 Test Data

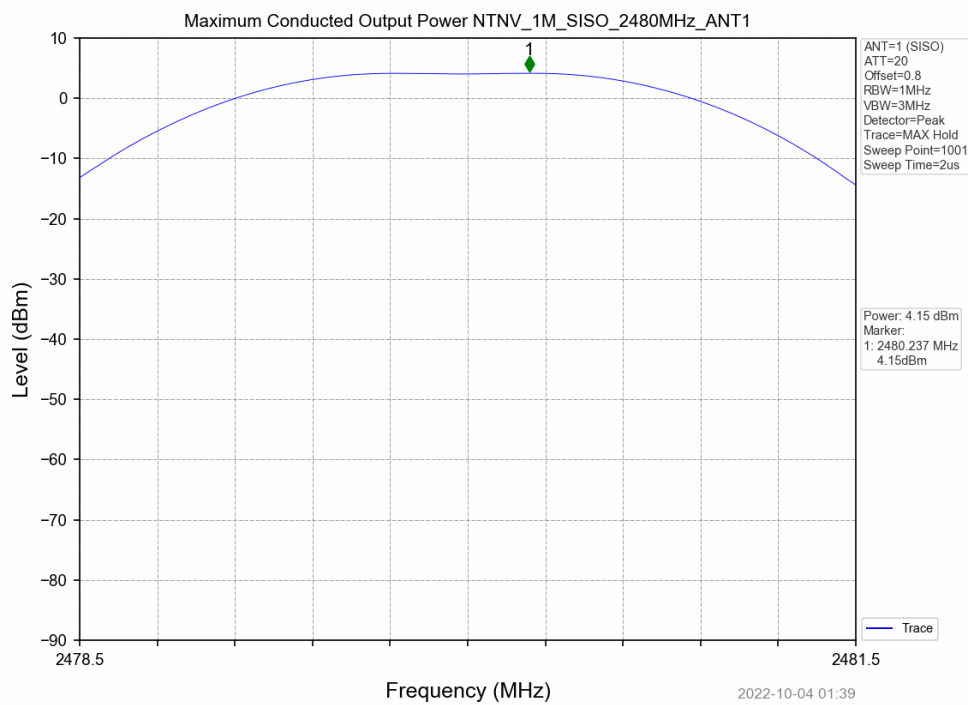
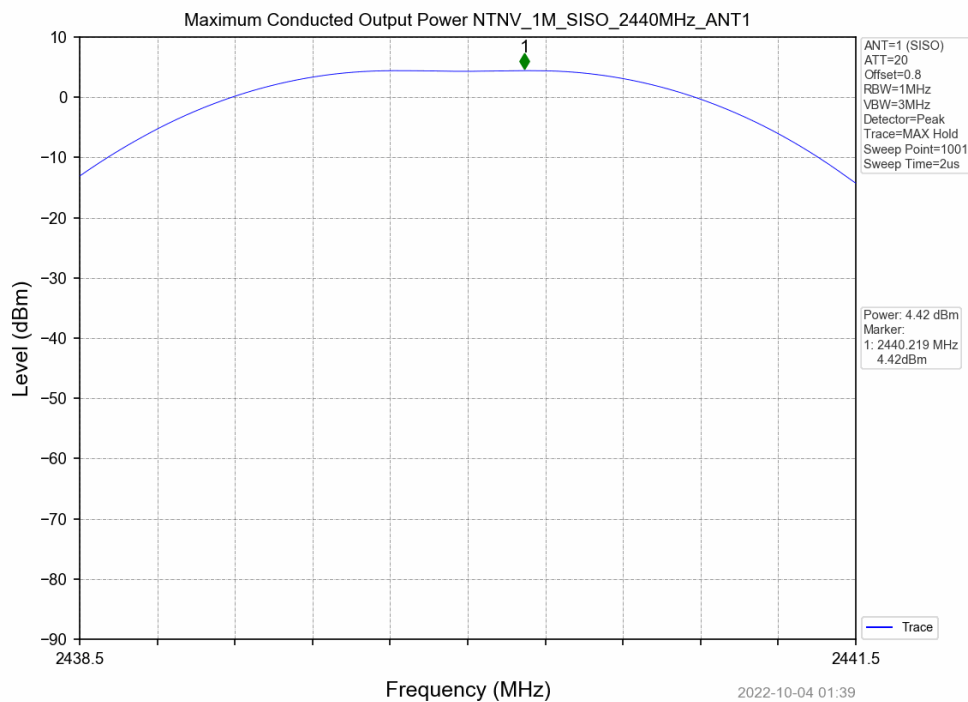
Test Mode	Frequency (MHz)	Tx Type	Measured Peak Output Power (dBm)	Limits (dBm)	Verdict
			Ant 1		
S8	2402	SISO	4.69	30	PASS
	2440	SISO	4.41	30	PASS
	2480	SISO	4.12	30	PASS
S2	2402	SISO	4.69	30	PASS
	2440	SISO	4.41	30	PASS
	2480	SISO	4.11	30	PASS
1M	2402	SISO	4.73	30	PASS
	2440	SISO	4.42	30	PASS
	2480	SISO	4.15	30	PASS
2M	2402	SISO	4.72	30	PASS
	2440	SISO	4.43	30	PASS
	2480	SISO	4.15	30	PASS

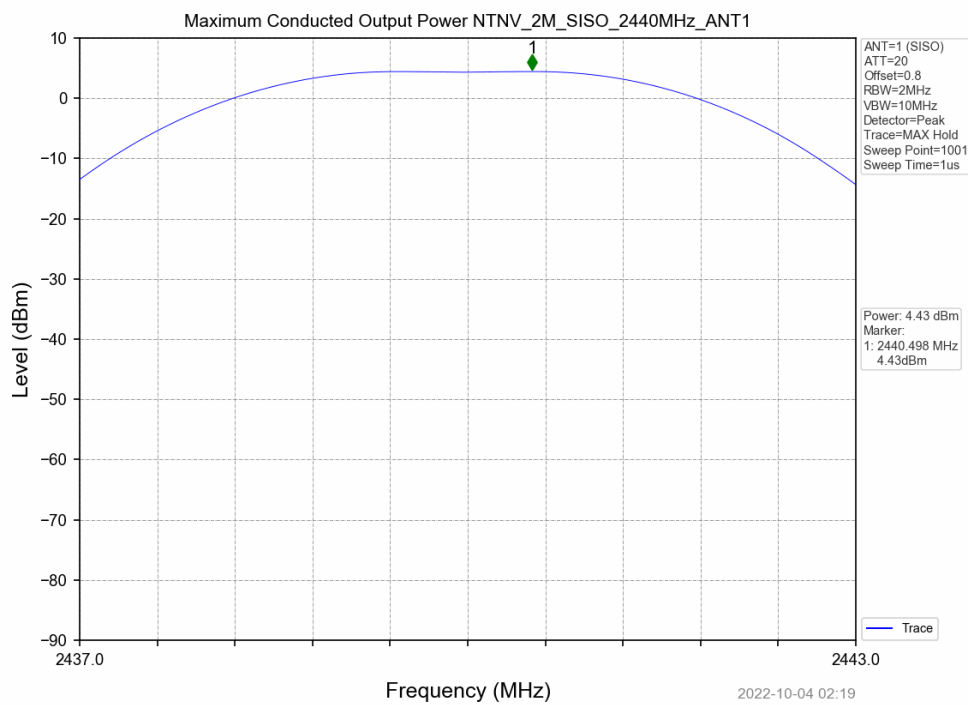
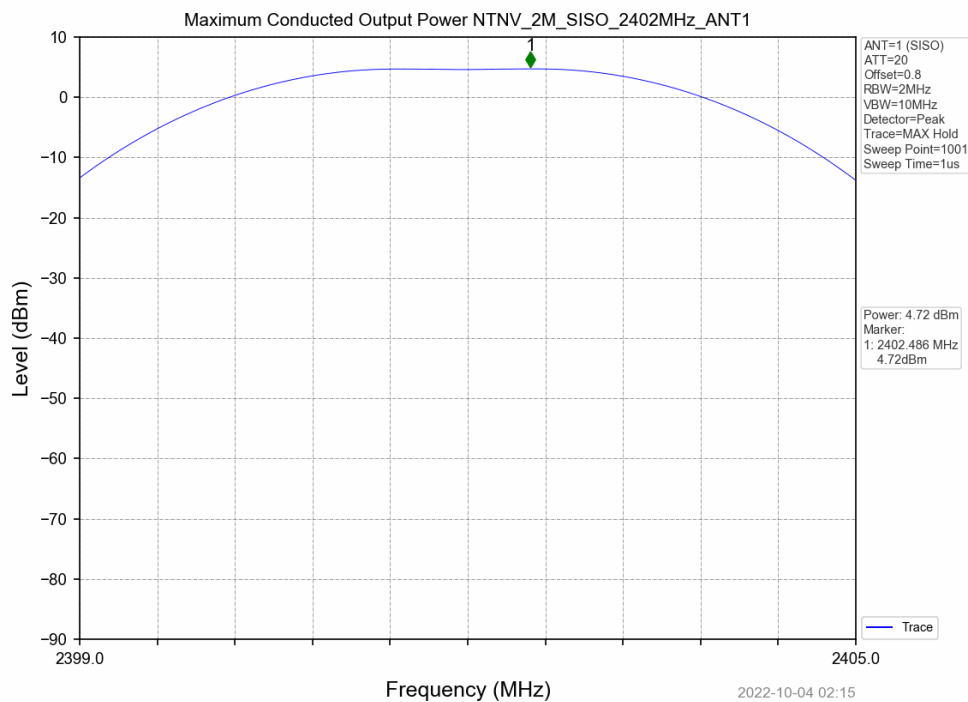


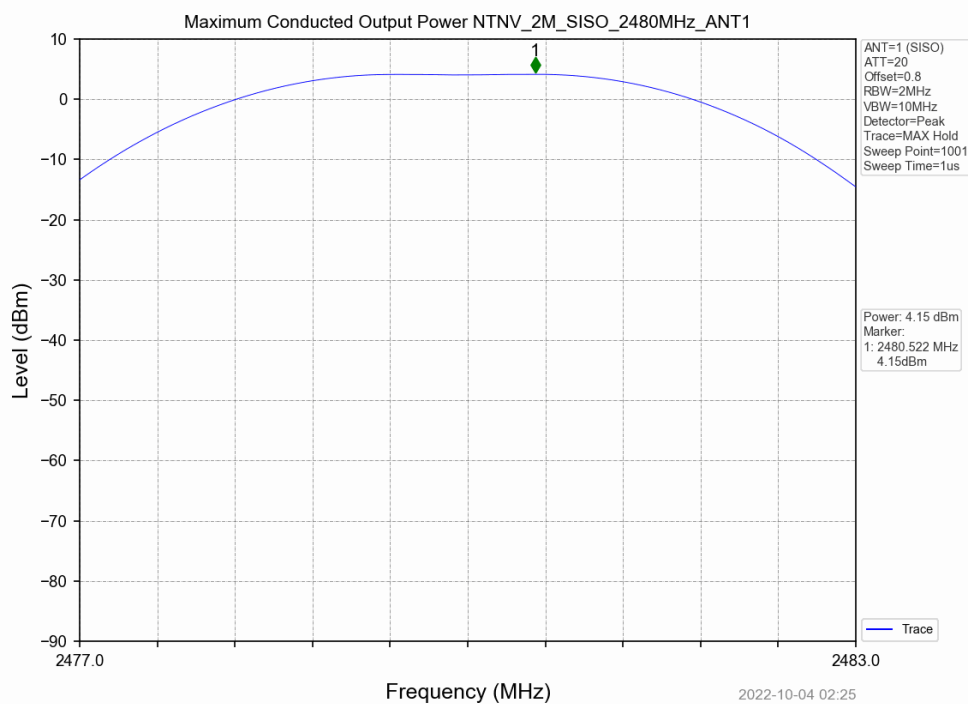












5 Power Spectral Density

5.1 Test Result

Test Description	Test Specification		Test Result
Power Spectral Density	15.247(e)	RSS-247 S5.2 (b)	Compliant

5.2 Test Method

Power spectral density measurements were recorded using the procedures from ANSI C63.10: 2013 clause 11.10 and KDB 558074 D01 15.247 Meas Guidance v05r02.

Limit

The limit is 8 dBm.

5.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 21.2 °C

Relative Humidity: 52.4 %

Atmospheric Pressure: 98.5 kPa

5.4 Test Equipment

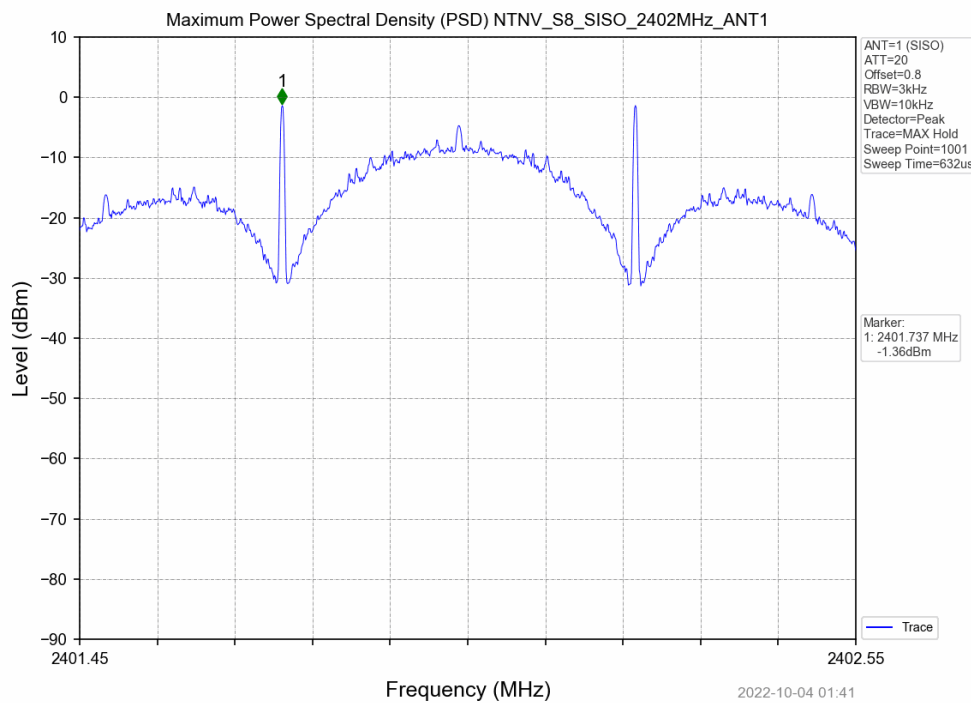
Test End Date: 4-Oct-2022

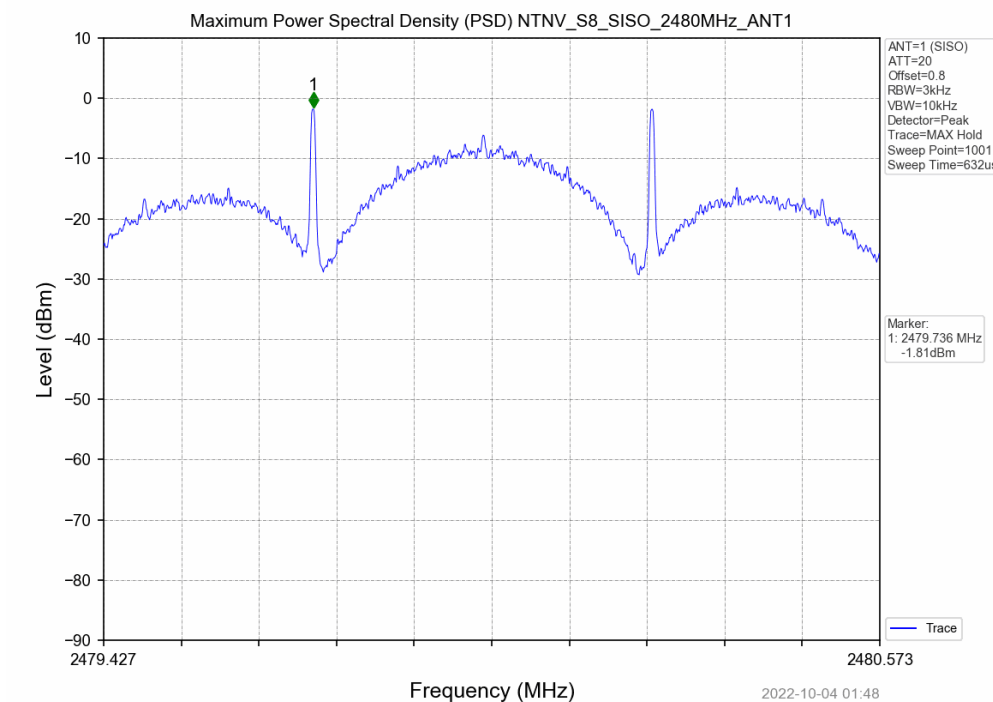
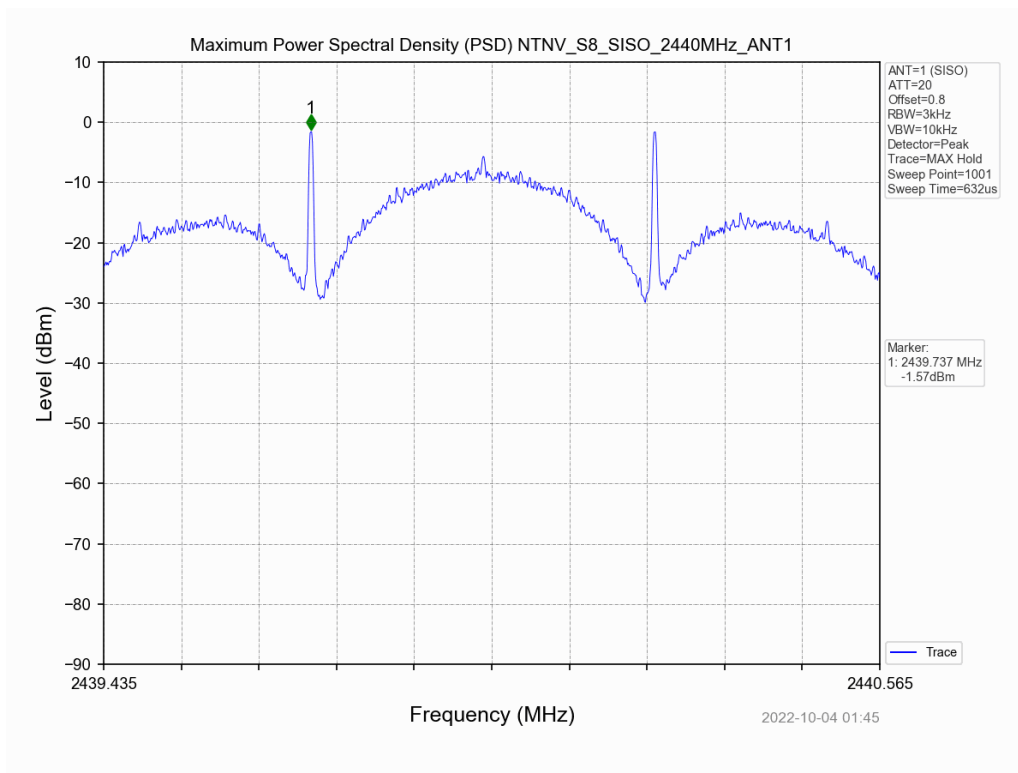
Tester: AB

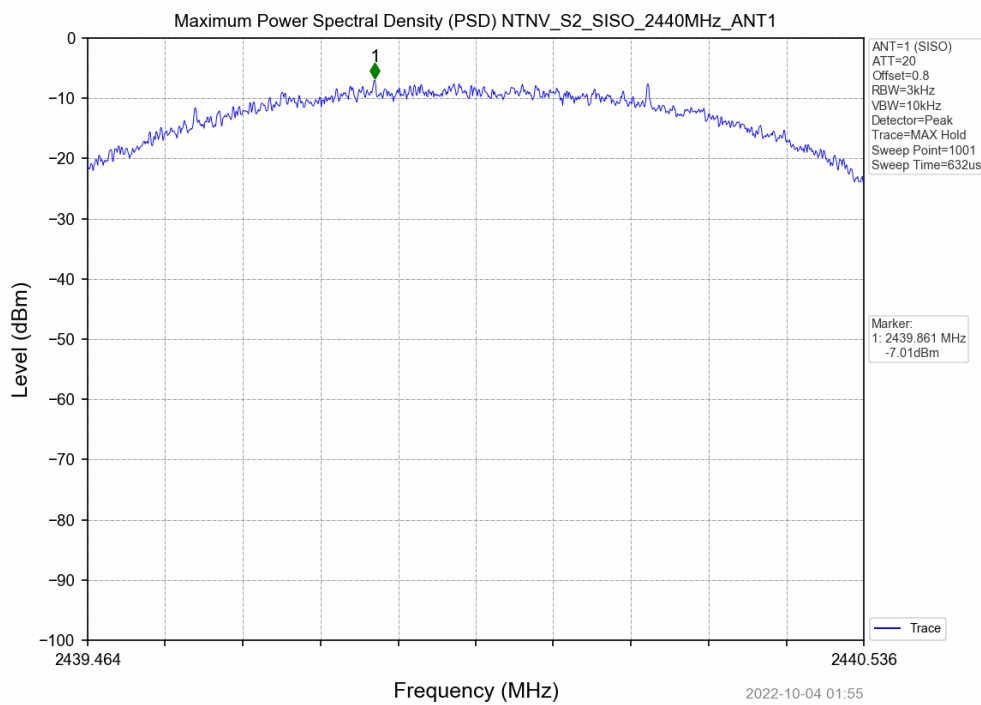
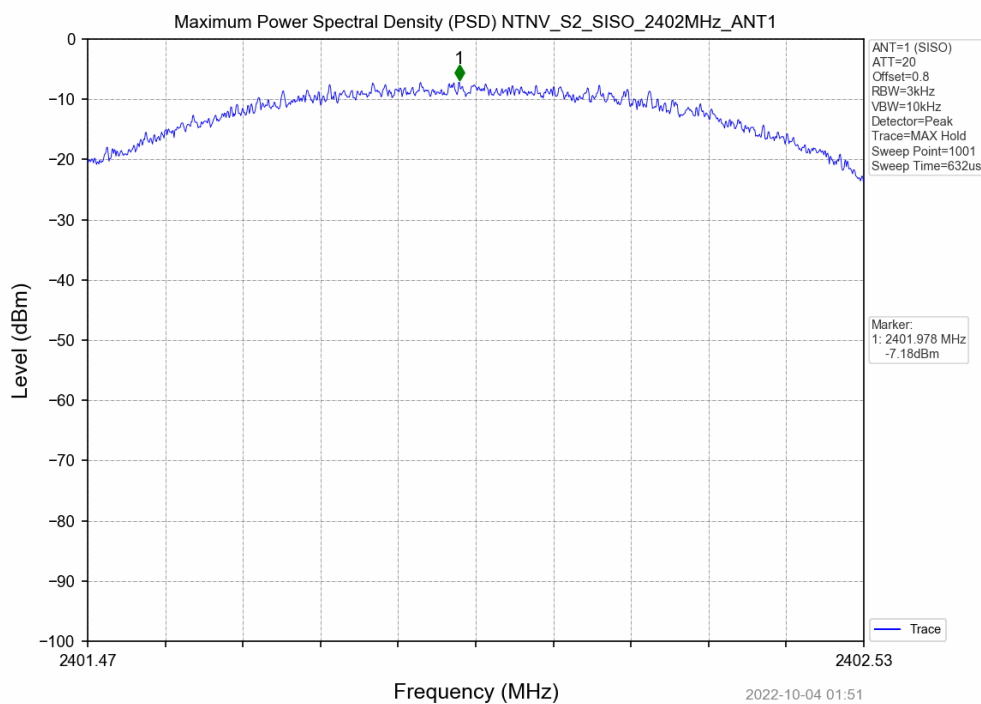
Equipment	Model	Manufacturer	Asset	Cal Date	Cal Due Date
RF CABLE (TS8997)	141	HUBER & SUHNER	B095588	5-Jul-2022	5-Jul-2023
SIGNAL ANALYZER (TS8997)	FSV30	ROHDE & SCHWARZ	B085749	4-Jan-2022	4-Jan-2024

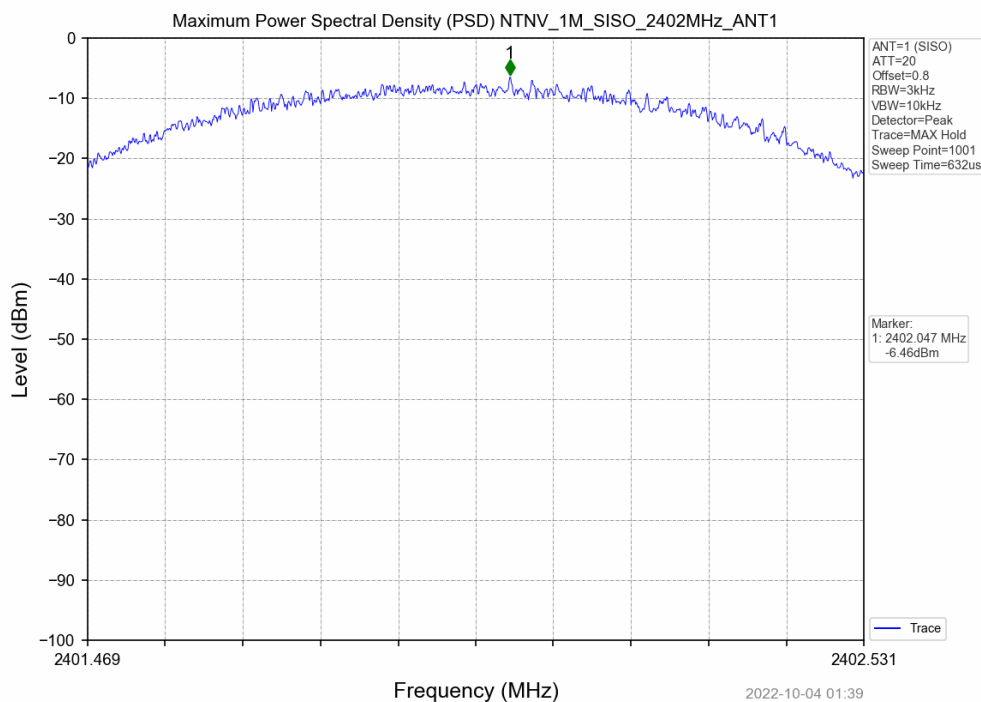
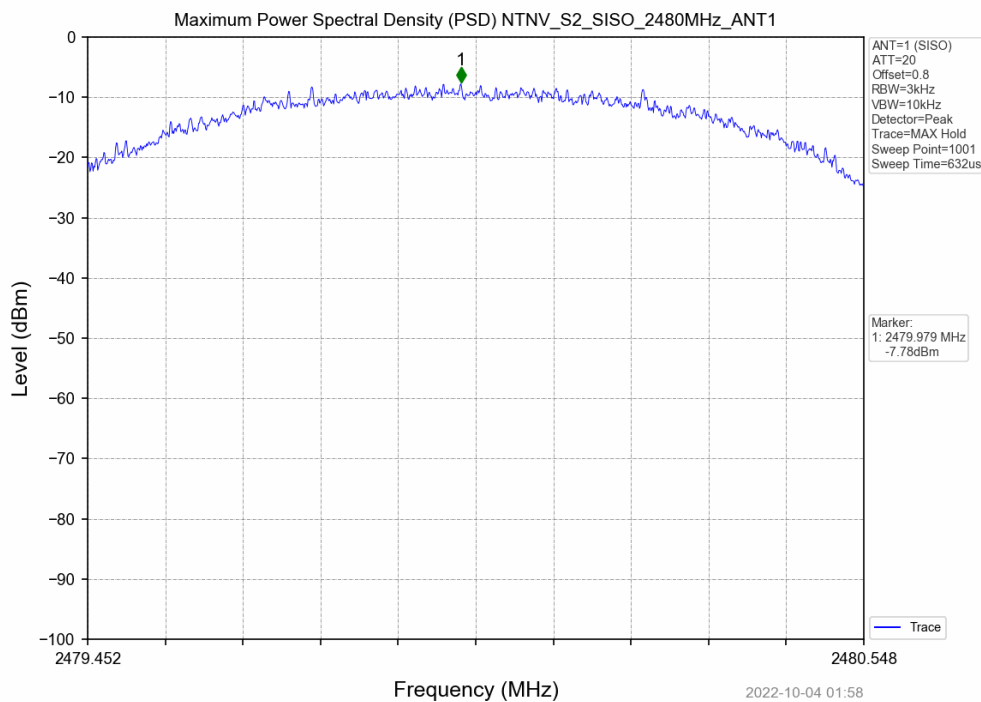
5.5 Test Data

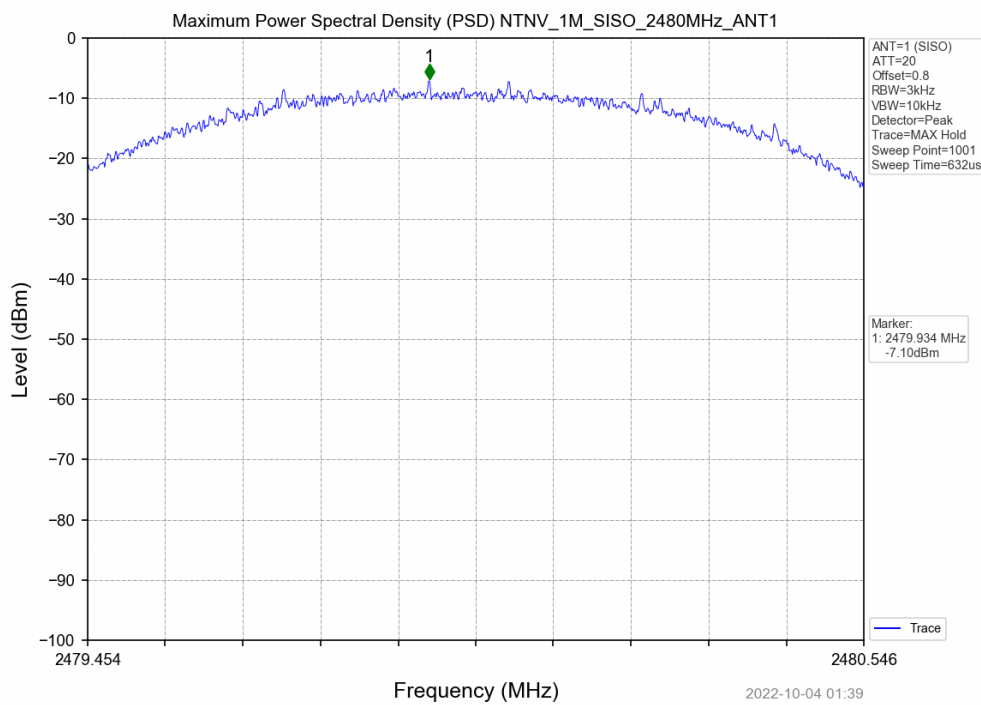
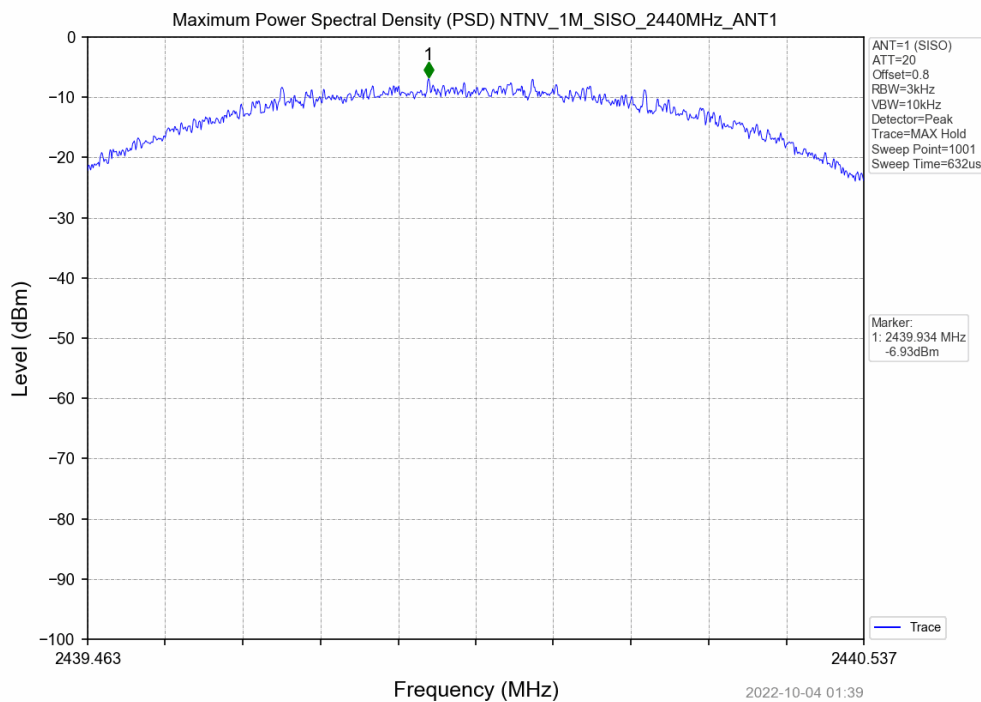
Test Mode	Frequency (MHz)	Tx Type	Maximum Power Spectral Density (dBm/3KHz)	Limits (dBm/3kHz)	Verdict
			Ant 1		
S8	2402	SISO	-1.36	≤8	PASS
	2440	SISO	-1.57	≤8	PASS
	2480	SISO	-1.81	≤8	PASS
S2	2402	SISO	-7.18	≤8	PASS
	2440	SISO	-7.01	≤8	PASS
	2480	SISO	-7.78	≤8	PASS
1M	2402	SISO	-6.46	≤8	PASS
	2440	SISO	-6.93	≤8	PASS
	2480	SISO	-7.10	≤8	PASS
2M	2402	SISO	-8.92	≤8	PASS
	2440	SISO	-8.89	≤8	PASS
	2480	SISO	-10.19	≤8	PASS

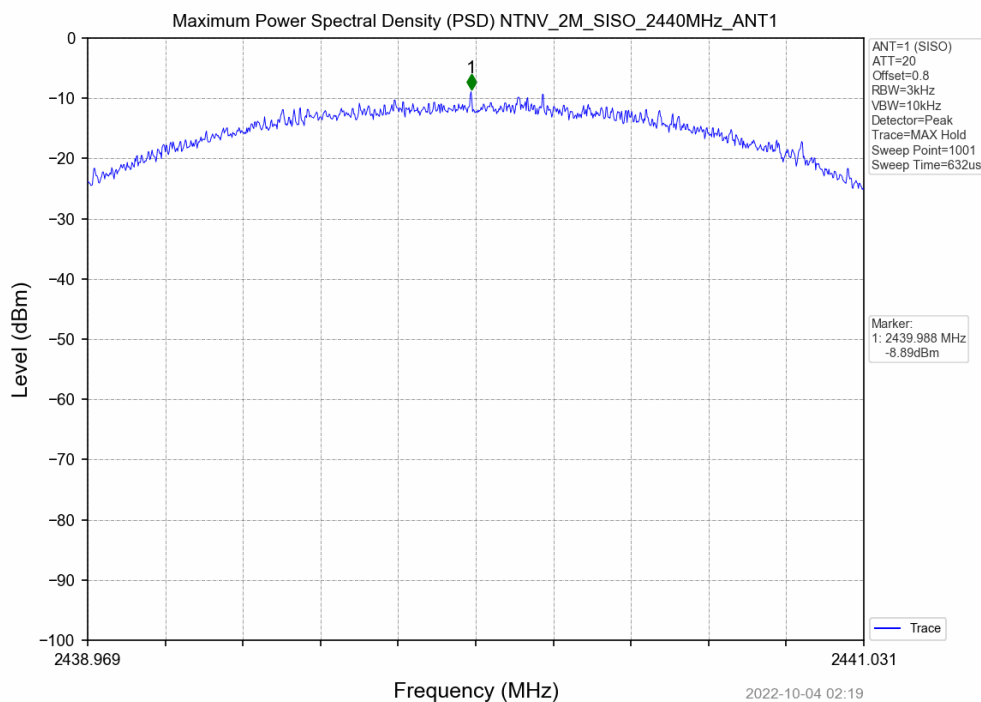
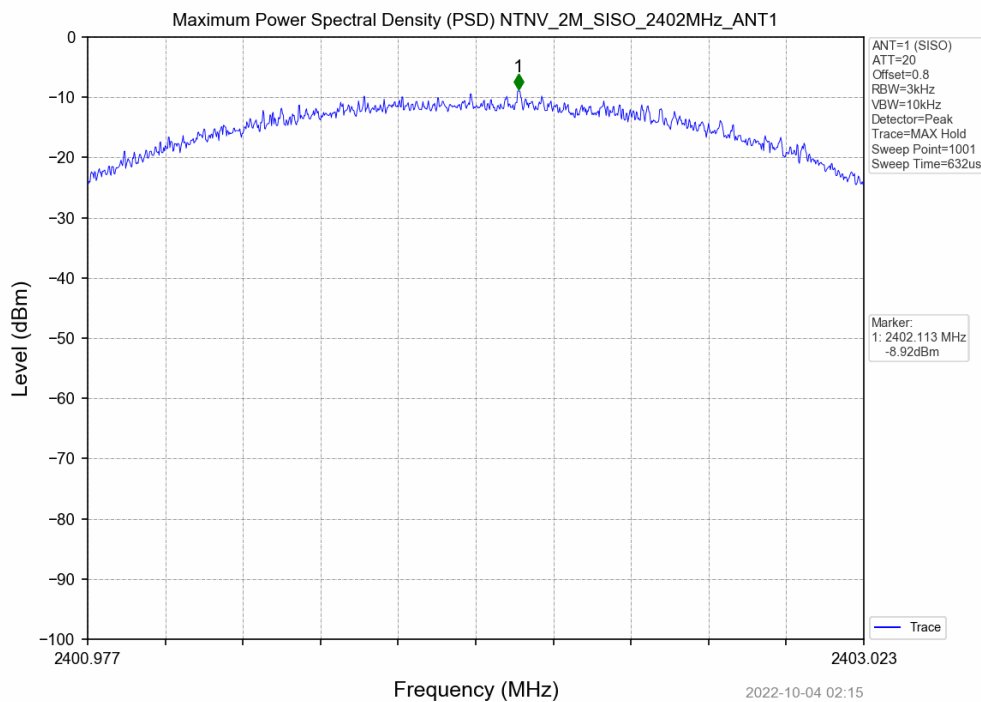


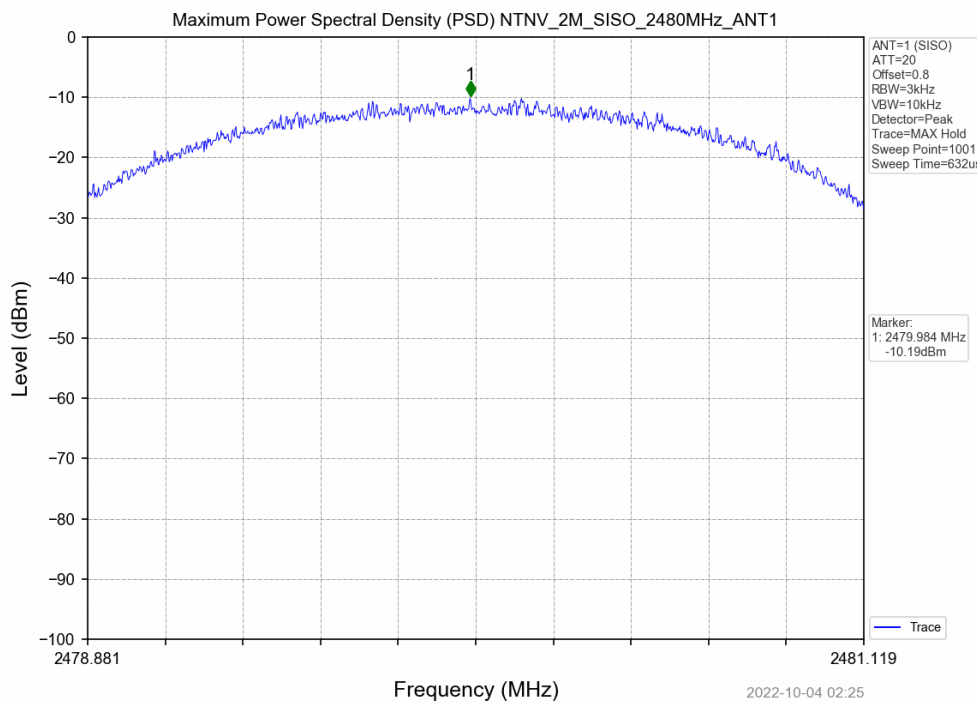












6 Conducted Spurious Emissions / Band Edge

6.1 Test Result

Test Description	Test Specification		Test Result
Conducted Spurious Emissions	15.247(d)	RSS-247 S5.5	Compliant

6.2 Test Method

Spurious emissions in non-restricted frequency bands were recorded using the methods defined in ANSI C63.10: 2013 clause 11.11 and KDB 558074 D01 15.247 Meas Guidance v05r02.

Lowest, middle, and highest channels were investigated.

Because the maximum conducted peak output power was used to determine compliance with the output power limits, the limit in any 100 kHz band outside of the authorized band is 20 dB below the maximum in-band peak level.

6.3 Test Site

SGS EMC Laboratory, Suwanee, GA

Environmental Conditions

Temperature: 21.2 °C

Relative Humidity: 52.4 %

Atmospheric Pressure: 98.5 kPa

6.4 Test Equipment

Test End Date: 4-Oct-2022

Tester: AB

Equipment	Model	Manufacturer	Asset	Cal Date	Cal Due Date
RF CABLE (TS8997)	141	HUBER & SUHNER	B095588	5-Jul-2022	5-Jul-2023
SIGNAL ANALYZER (TS8997)	FSV30	ROHDE & SCHWARZ	B085749	4-Jan-2022	4-Jan-2024

6.5 Test Data

Test Mode	Frequency (MHz)	TX Type	ANT No.	Spurious Conducted Emission (dBm)	Limits (dBm)	Verdict
S8	2402	SISO	1	Refer to test graph	-18.57	PASS
	2440	SISO	1	Refer to test graph	-18.57	PASS
	2480	SISO	1	Refer to test graph	-18.57	PASS
S2	2402	SISO	1	Refer to test graph	-15.34	PASS
	2440	SISO	1	Refer to test graph	-15.34	PASS
	2480	SISO	1	Refer to test graph	-15.34	PASS
1M	2402	SISO	1	Refer to test graph	-15.48	PASS
	2440	SISO	1	Refer to test graph	-15.48	PASS
	2480	SISO	1	Refer to test graph	-15.48	PASS
2M	2402	SISO	1	Refer to test graph	-16.61	PASS
	2440	SISO	1	Refer to test graph	-16.61	PASS
	2480	SISO	1	Refer to test graph	-16.61	PASS

