RF Test Report

For

Applicant Name:	**Cj Global Inc.**
Address:	20-21 Wagaraw Road Bldg 30 Fair Lawn, New Jersey, NJ 0740, United States
EUT Name:	Wireless Speaker
Brand Name:	N/A
Model Number:	71577-DI
Series Model Number:	N/A

Issued By

Company Name:	**BTF Testing Lab (Shenzhen) Co., Ltd.**
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Report Number:	BTF230628R01401
Test Standards:	47 CFR Part 15.247
Test Conclusion:	Pass
FCC ID:	2AND8-BT23SP2
Test Date:	2023-06-29 to 2023-07-11
Date of Issue:	2023-07-11
Prepared By:	Elma. Yang / Project Engineer
Date:	2023-07-11
Approved By:	Ryan CJ / EMC Manager
Date:	2023-07-11

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Revision History		
Version	Issue Date	Revisions Content
R_V0	2023-07-11	Original
Note: Once the revision has been made, then previous versions reports are invalid.		

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1 Introduction

1.1 Identification of Testing Laboratory

Company Name:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Phone Number:	+86-0755-23146130
Fax Number:	+86-0755-23146130

1.2 Identification of the Responsible Testing Location

Company Name:	BTF Testing Lab (Shenzhen) Co., Ltd.
Address:	F101, 201 and 301, Building 1, Block 2, Tantou Industrial Park, Tantou Community, Songgang Street, Bao'an District, Shenzhen, China
Phone Number:	+86-0755-23146130
Fax Number:	+86-0755-23146130
FCC Registration Number:	518915
Designation Number:	CN1330

1.3 Announcement

(1) The test report reference to the report template version v0.
(2) The test report is invalid if not marked with the signatures of the persons responsible for preparing, reviewing and approving the test report.
(3) The test report is invalid if there is any evidence and/or falsification.
(4) This document may not be altered or revised in any way unless done so by BTF and all revisions are duly noted in the revisions section.
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2 Product Information

2.1 Application Information

Company Name:	Cj Global Inc.
Address:	20-21 Wagaraw Road Bldg 30 Fair Lawn, New Jersey, NJ 0740, United States

2.2 Manufacturer Information

Company Name:	Cj Global Inc.
Address:	20-21 Wagaraw Road Bldg 30 Fair Lawn, New Jersey, NJ 0740, United States

2.3 Factory Information

Company Name:	/
Address:	/

2.4 General Description of Equipment under Test (EUT)

EUT Name:	Wireless Speaker
Test Model Number:	71577-DI
Series Model Number:	N/A
Hardware version number:	V1.2
Software version number:	AC6965E
Sample No.:	BTFSN230628E014-1/1

2.5 Technical Information

Power Supply:	From 3.7V 1200mAh Battery and recharged by DC 5V.
Power Adaptor:	/
Operation Frequency:	2402MHz to 2480MHz
Number of Channels:	79
Channel Spacing:	1MHz
Modulation Type:	GFSK, π/4 DQPSK, 8DPSK
Antenna Type:	PCB ANT1
Antenna Gain#:	-0.58 dBi

Note:

#: The antenna gain provided by the applicant, and the laboratory will not be responsible for the accumulated calculation results which covers the information provided by the applicant.

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3 Summary of Test Results

3.1 Test Standards

The tests were performed according to following standards:
47 CFR Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

3.2 Uncertainty of Test

Item	Measurement Uncertainty
Conducted Emission (150 kHz-30 MHz)	±2.64dB
The following measurement uncertainty levels have been estimated for tests performed on the EUT as specified in CISPR 16-4-2. This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

3.3 Summary of Test Result

Item	Standard	Requirement	Result
Antenna requirement	47 CFR Part 15.247	Part 15.203	Pass
Conducted Emission at AC power line	47 CFR Part 15.247	47 CFR 15.207(a)	Pass
Occupied Bandwidth	47 CFR Part 15.247	47 CFR 15.215(c)	Pass
Maximum Conducted Output Power	47 CFR Part 15.247	47 CFR 15.247(b)(1)	Pass
Channel Separation	47 CFR Part 15.247	47 CFR 15.247(a)(1)	Pass
Number of Hopping Frequencies	47 CFR Part 15.247	47 CFR 15.247(a)(1)(iii)	Pass
Dwell Time	47 CFR Part 15.247	47 CFR 15.247(a)(1)(iii)	Pass
Emissions in non-restricted frequency bands	47 CFR Part 15.247	47 CFR 15.247(d)	Pass
Band edge emissions (Radiated)	47 CFR Part 15.247	47 CFR 15.247(d)	Pass
Emissions in restricted frequency bands (below 1GHz)	47 CFR Part 15.247	47 CFR 15.247(d)	Pass
Emissions in restricted frequency bands (above 1GHz)	47 CFR Part 15.247	47 CFR 15.247(d)	Pass

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4 Test Configuration

4.1 Test Equipment List

Conducted Emission at AC power line					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Pulse Limiter	SCHWARZBECK	VTSD 9561-F	00953	2022-11-24	2023-11-23
Coaxial Switcher	SCHWARZBECK	CX210	CX210	2022-11-24	2023-11-23
V-LISN	SCHWARZBECK	NSLK 8127	01073	2022-11-24	2023-11-23
LISN	AFJ	LS16/110VAC	16010020076	2023-02-23	2024-02-22
EMI Receiver	ROHDE&SCHWARZ	ESCI3	101422	2022-11-24	2023-11-23

Occupied Bandwidth					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

Maximum Conducted Output Power					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

Channel Separation					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
RFTest software	/	V1.00	/	/	/

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RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

Number of Hopping Frequencies					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

Dwell Time					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

Emissions in non-restricted frequency bands

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Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RFTest software	/	V1.00	/	/	/
RF Control Unit	Techy	TR1029-1	/	2022-11-24	2023-11-23
RF Sensor Unit	Techy	TR1029-2	/	2022-11-24	2023-11-23
Programmable constant temperature and humidity box	ZZCKONG	ZZ-K02A	20210928007	2022-11-24	2023-11-23
Adjustable Direct Current Regulated Power Supply	Dongguan Tongmen Electronic Technology Co., LTD	etm-6050c	20211026123	2022-11-24	2023-11-23
WIDEBAND RADIO COMMNUNICATION TESTER	Rohde & Schwarz	CMW500	161997	2022-11-24	2023-11-23
MXA Signal Analyzer	KEYSIGHT	N9020A	MY50410020	2022-11-24	2023-11-23

Band edge emissions (Radiated)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Coaxial cable Multiflex 141	Schwarzbeck	N/SMA 0.5m	517386	2023-03-24	2024-03-23
Preamplifier	SCHWARZBECK	BBV9744	00246	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-10m	21101566	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-1m	21101568	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-1m	21101576	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2021-11-28	2023-11-27
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI7	101032	2022-11-24	2023-11-23
SIGNAL ANALYZER	ROHDE&SCHWARZ	FSQ40	100010	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Broadband Preamplilifier	SCHWARZBECK	BBV9718D	00008	2023-03-24	2024-03-23
Horn Antenna	SCHWARZBECK	BBHA9120D	2597	2022-05-22	2024-05-21
EZ_EMC	Frad	FA-03A2 RE+	/	/	/
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Log periodic antenna	SCHWARZBECK	VULB 9168	01328	2021-11-28	2023-11-27

Emissions in restricted frequency bands (below 1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Coaxial cable Multiflex 141	Schwarzbeck	N/SMA 0.5m	517386	2023-03-24	2024-03-23
Preamplifier	SCHWARZBECK	BBV9744	00246	2022-11-24	2023-11-23

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RE Cable	REBES Talent	UF1-SMASMAM-10m	21101566	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-1m	21101568	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-1m	21101576	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2021-11-28	2023-11-27
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI7	101032	2022-11-24	2023-11-23
SIGNAL ANALYZER	ROHDE&SCHWARZ	FSQ40	100010	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Broadband Preamplilifier	SCHWARZBECK	BBV9718D	00008	2023-03-24	2024-03-23
Horn Antenna	SCHWARZBECK	BBHA9120D	2597	2022-05-22	2024-05-21
EZ_EMC	Frad	FA-03A2 RE+	/	/	/
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Log periodic antenna	SCHWARZBECK	VULB 9168	01328	2021-11-28	2023-11-27

Emissions in restricted frequency bands (above 1GHz)					
Equipment	**Manufacturer**	**Model No**	**Inventory No**	**Cal Date**	**Cal Due Date**
Coaxial cable Multiflex 141	Schwarzbeck	N/SMA 0.5m	517386	2023-03-24	2024-03-23
Preamplifier	SCHWARZBECK	BBV9744	00246	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-10m	21101566	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-10m	21101570	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF1-SMASMAM-1m	21101568	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-1m	21101576	2022-11-24	2023-11-23
RE Cable	REBES Talent	UF2-NMNM-2.5m	21101573	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Horn Antenna	SCHWARZBECK	BBHA9170	01157	2021-11-28	2023-11-27
EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCI7	101032	2022-11-24	2023-11-23
SIGNAL ANALYZER	ROHDE&SCHWARZ	FSQ40	100010	2022-11-24	2023-11-23
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/
Broadband Preamplilifier	SCHWARZBECK	BBV9718D	00008	2023-03-24	2024-03-23
Horn Antenna	SCHWARZBECK	BBHA9120D	2597	2022-05-22	2024-05-21
EZ_EMC	Frad	FA-03A2 RE+	/	/	/
POSITIONAL CONTROLLER	SKET	PCI-GPIB	/	/	/

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Log periodic antenna	SCHWARZBECK	VULB 9168	01328	2021-11-28	2023-11-27

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4.2 Test Auxiliary Equipment

The EUT was tested as an independent device.

4.3 Test Modes

No.	Test Modes	Description
TM1	TX-GFSK (Non-Hopping)	Keep the EUT in continuously transmitting mode (non-hopping) with GFSK modulation.
TM2	TX-Pi/4DQPSK (Non-Hopping)	Keep the EUT in continuously transmitting mode (non-hopping) with Pi/4DQPSK modulation.
TM3	TX-8DPSK (Non-Hopping)	Keep the EUT in continuously transmitting mode (non-hopping) with 8DPSK modulation.
TM4	TX-GFSK (Hopping)	Keep the EUT in continuously transmitting mode (hopping) with GFSK modulation,.
TM5	TX-Pi/4DQPSK (Hopping)	Keep the EUT in continuously transmitting mode (hopping) with Pi/4DQPSK modulation.
TM6	TX-8DPSK (Hopping)	Keep the EUT in continuously transmitting mode (hopping) with 8DPSK modulation.

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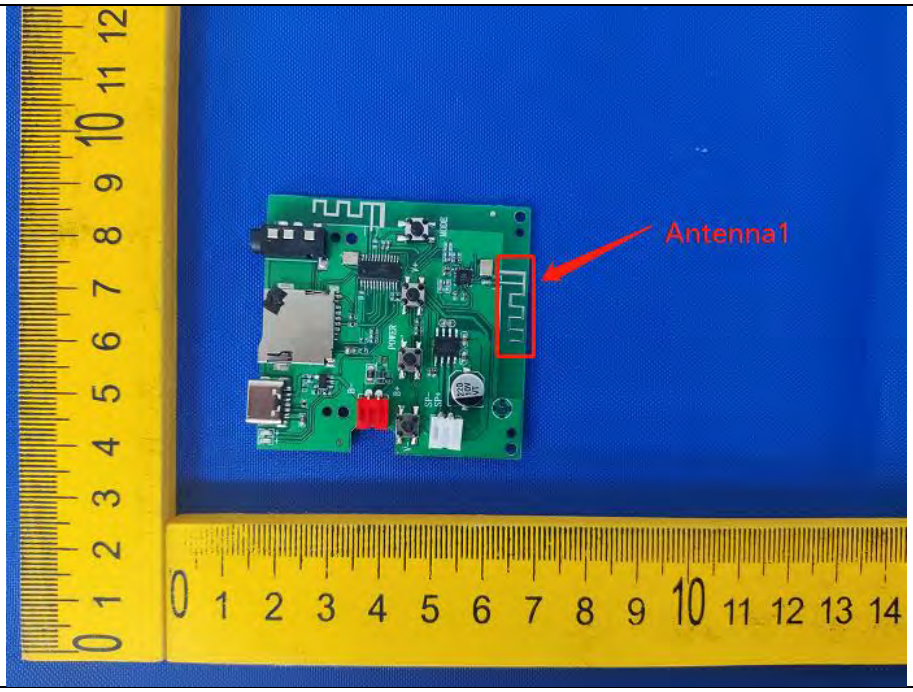
5 Evaluation Results (Evaluation)

5.1 Antenna requirement

Test Requirement:	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section.

5.1.1 Conclusion:



6 Radio Spectrum Matter Test Results (RF)

6.1 Conducted Emission at AC power line

Test Requirement:	Except as shown in paragraphs (b)and (c)of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).
Test Method:	Refer to ANSI C63.10-2013 section 6.2, standard test method for ac power-line conducted emissions from unlicensed wireless devices
Test Limit:	

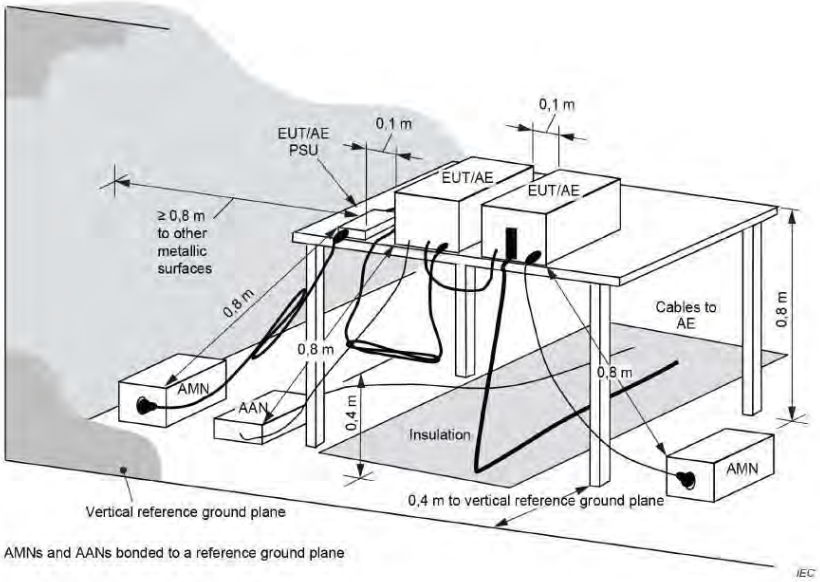
Frequency of emission (MHz)	Conducted limit (dBμV)	
	Quasi-peak	Average
0.15-0.5	66 to 56*	56 to 46*
0.5-5	56	46
5-30	60	50

*Decreases with the logarithm of the frequency.

6.1.1 E.U.T. Operation:

Operating Environment:	
Temperature:	22.5 ℃
Humidity:	52.6 %
Atmospheric Pressure:	1010 mbar

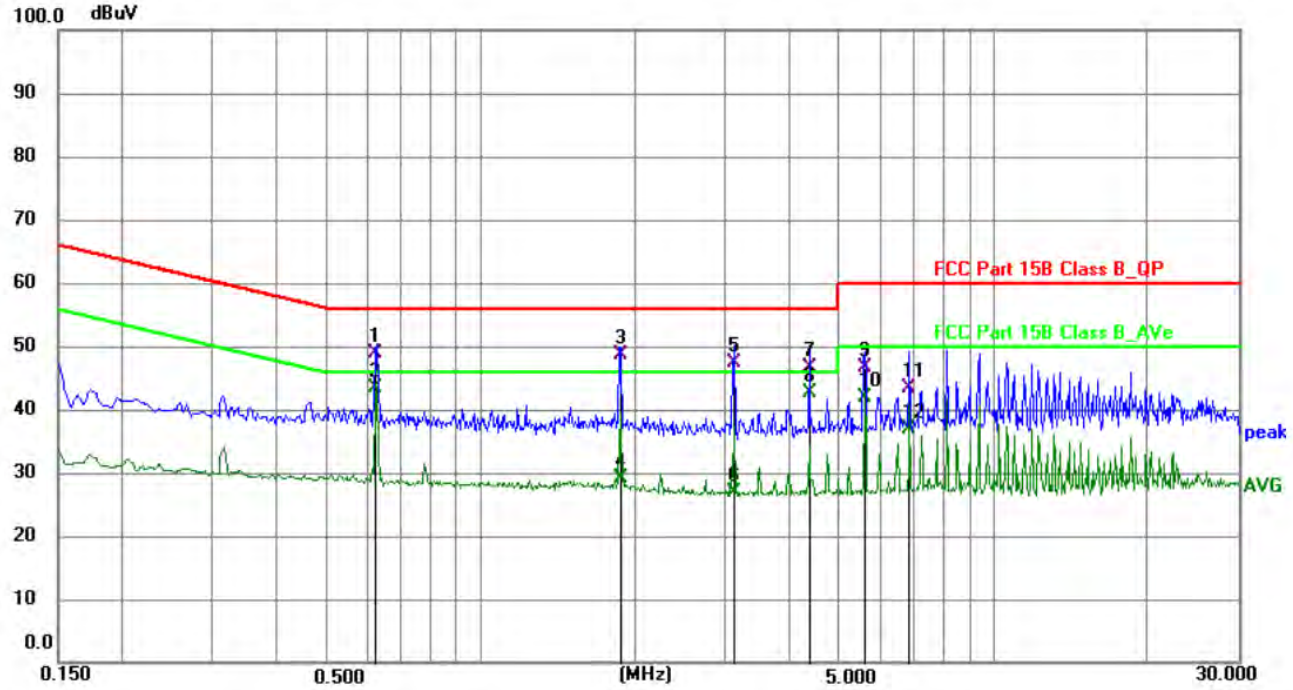
6.1.2 Test Setup Diagram:



6.1.3 Test Data:

Note: Level = Reading level + Factor

TM1 / Line: Line / Band: 2.4G / BW: 1 / CH: M



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.6267	28.78	20.20	48.98	56.00	-7.02	QP	P	
2 *	0.6267	23.18	20.20	43.38	46.00	-2.62	AVG	P	
3	1.8826	28.36	20.36	48.72	56.00	-7.28	QP	P	
4	1.8826	8.69	20.36	29.05	46.00	-16.95	AVG	P	
5	3.1335	27.04	20.43	47.47	56.00	-8.53	QP	P	
6	3.1335	6.46	20.43	26.89	46.00	-19.11	AVG	P	
7	4.3846	26.29	20.39	46.68	56.00	-9.32	QP	P	
8	4.3846	22.33	20.39	42.72	46.00	-3.28	AVG	P	
9	5.6196	26.34	20.41	46.75	60.00	-13.25	QP	P	
10	5.6196	21.56	20.41	41.97	50.00	-8.03	AVG	P	
11	6.8808	22.88	20.50	43.38	60.00	-16.62	QP	P	
12	6.8808	16.41	20.50	36.91	50.00	-13.09	AVG	P	

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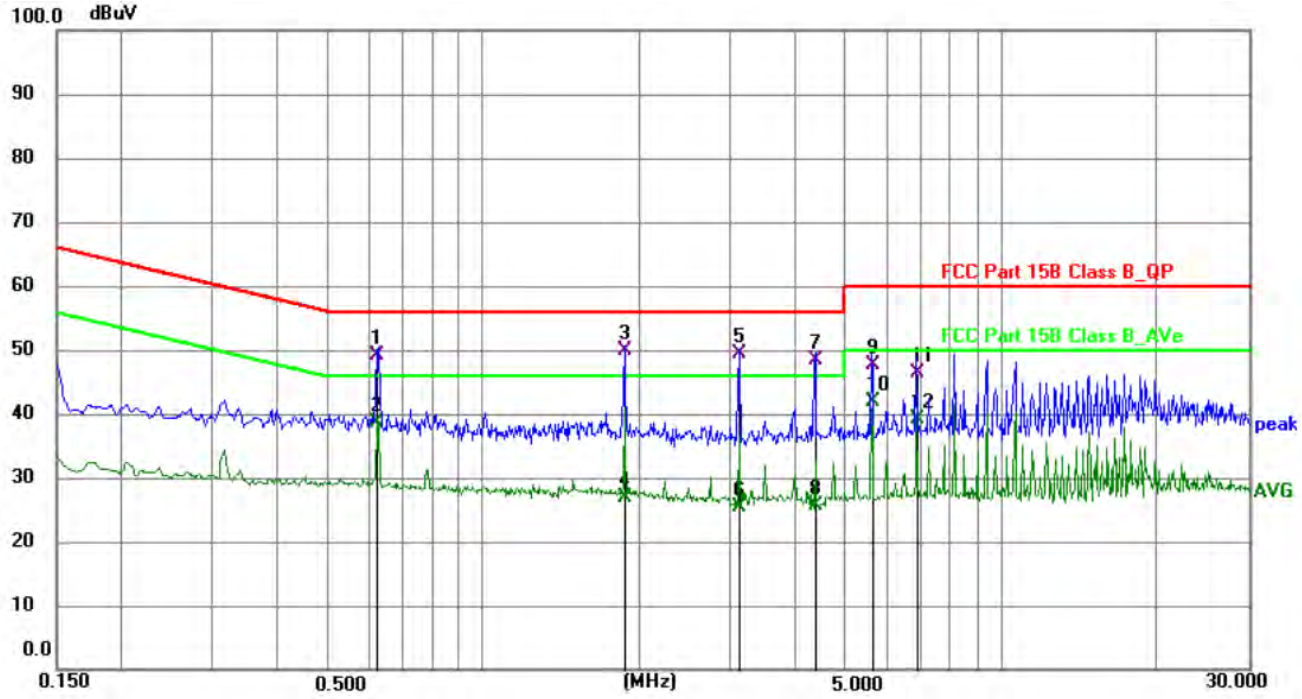
TM1 / Line: Neutral / Band: 2.4G / BW: 1 / CH: M



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.6248	28.89	20.19	49.08	56.00	-6.92	QP	P	
2	0.6248	18.53	20.19	38.72	46.00	-7.28	AVG	P	
3 *	1.8805	29.53	20.36	49.89	56.00	-6.11	QP	P	
4	1.8805	6.63	20.36	26.99	46.00	-19.01	AVG	P	
5	3.1364	28.85	20.43	49.28	56.00	-6.72	QP	P	
6	3.1364	5.07	20.43	25.50	46.00	-20.50	AVG	P	
7	4.3909	28.11	20.39	48.50	56.00	-7.50	QP	P	
8	4.3909	5.34	20.39	25.73	46.00	-20.27	AVG	P	
9	5.6341	27.26	20.41	47.67	60.00	-12.33	QP	P	
10	5.6341	21.52	20.41	41.93	50.00	-8.07	AVG	P	
11	6.8855	25.85	20.50	46.35	60.00	-13.65	QP	P	
12	6.8855	18.60	20.50	39.10	50.00	-10.90	AVG	P	

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6.2 Occupied Bandwidth

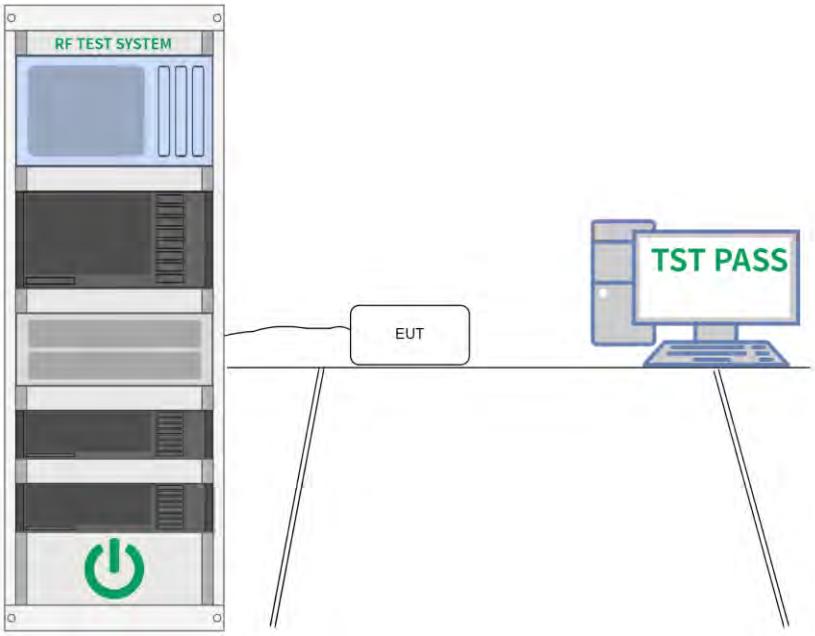
Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2013
Test Limit:	Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific rule section under which the equipment operates, is contained within the frequency band designated in the rule section under which the equipment is operated.
Procedure:	a) The spectrum analyzer center frequency is set to the nominal EUT channel center frequency. The span range for the EMI receiver or spectrum analyzer shall be between two times and five times the OBW. b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and video bandwidth (VBW) shall be approximately three times RBW, unless otherwise specified by the applicable requirement. c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2. d) Steps a) through c) might require iteration to adjust within the specified tolerances. e) The dynamic range of the instrument at the selected RBW shall be more than 10 dB below the target "−xx dB down" requirement; that is, if the requirement calls for measuring the −20 dB OBW, the instrument noise floor at the selected RBW shall be at least 30 dB below the reference value. f) Set detection mode to peak and trace mode to max hold. g) Determine the reference value: Set the EUT to transmit an unmodulated carrier or modulated signal, as applicable. Allow the trace to stabilize. Set the spectrum analyzer marker to the highest level of the displayed trace (this is the reference value). h) Determine the "−xx dB down amplitude" using [(reference value) − xx]. Alternatively, this calculation may be made by using the marker-delta function of the instrument. i) If the reference value is determined by an unmodulated carrier, then turn the EUT modulation ON, and either clear the existing trace or start a new trace on the spectrum analyzer and allow the new trace to stabilize. Otherwise, the trace from step g) shall be used for step j). j) Place two markers, one at the lowest frequency and the other at the highest frequency of the envelope of the spectral display, such that each marker is at or slightly below the "-xx dB down amplitude" determined in step h). If a marker is below this "−xx dB down amplitude" value, then it shall be as close as possible to this value. The occupied bandwidth is the frequency difference between the two markers. Alternatively, set a marker at the lowest frequency of the envelope of the spectral display, such that the marker is at or slightly below the "-xx dB down amplitude" determined in step h). Reset the marker-delta function and move the marker to the other side of the emission until the delta marker amplitude is at the same level as the reference marker amplitude. The marker-delta frequency reading at this point is the specified emission bandwidth. k) The occupied bandwidth shall be reported by providing plot(s) of the measuring instrument display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

6.2.1 E.U.T. Operation:

Operating Environment:

Temperature:	25.1 ℃
Humidity:	50.2 %
Atmospheric Pressure:	1010 mbar

6.2.2 Test Setup Diagram:



6.2.3 Test Data:

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6.3 Maximum Conducted Output Power

Test Requirement:	For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.
Test Method:	Output power test procedure for frequency-hopping spread-spectrum (FHSS) devices
Test Limit:	For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.
Procedure:	This is an RF-conducted test to evaluate maximum peak output power. Use a direct connection between the antenna port of the unlicensed wireless device and the spectrum analyzer, through suitable attenuation. The hopping shall be disabled for this test: a) Use the following spectrum analyzer settings: 1) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel. 2) RBW > 20 dB bandwidth of the emission being measured. 3) VBW >= RBW. 4) Sweep: Auto. 5) Detector function: Peak. 6) Trace: Max hold. b) Allow trace to stabilize. c) Use the marker-to-peak function to set the marker to the peak of the emission. d) The indicated level is the peak output power, after any corrections for external attenuators and cables. e) A plot of the test results and setup description shall be included in the test report. NOTE—A peak responding power meter may be used, where the power meter and sensor system video bandwidth is greater than the occupied bandwidth of the unlicensed wireless device, rather than a spectrum analyzer.

6.3.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.1 ℃
Humidity:	50.2 %
Atmospheric Pressure:	1010 mbar

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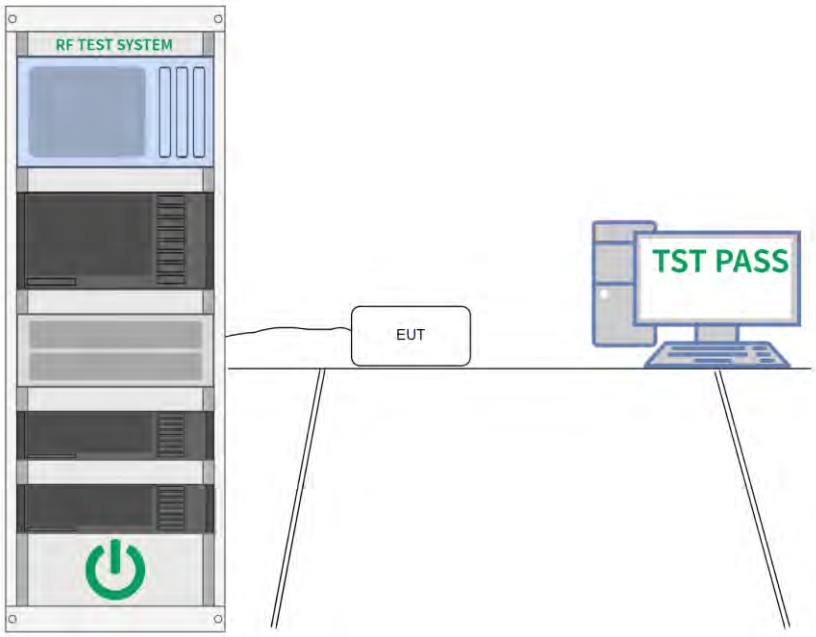
6.3.2 Test Setup Diagram:



6.3.3 Test Data:

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6.4 Channel Separation

Test Requirement:	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.
Test Method:	Carrier frequency separation
Test Limit:	Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.
Procedure:	The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings: a) Span: Wide enough to capture the peaks of two adjacent channels. b) RBW: Start with the RBW set to approximately 30% of the channel spacing; adjust as necessary to best identify the center of each individual channel. c) Video (or average) bandwidth (VBW) ≥ RBW. d) Sweep: Auto. e) Detector function: Peak. f) Trace: Max hold. g) Allow the trace to stabilize. Use the marker-delta function to determine the separation between the peaks of the adjacent channels. Compliance of an EUT with the appropriate regulatory limit shall be determined. A plot of the data shall be included in the test report.

6.4.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.1 ℃
Humidity:	50.2 %
Atmospheric Pressure:	1010 mbar

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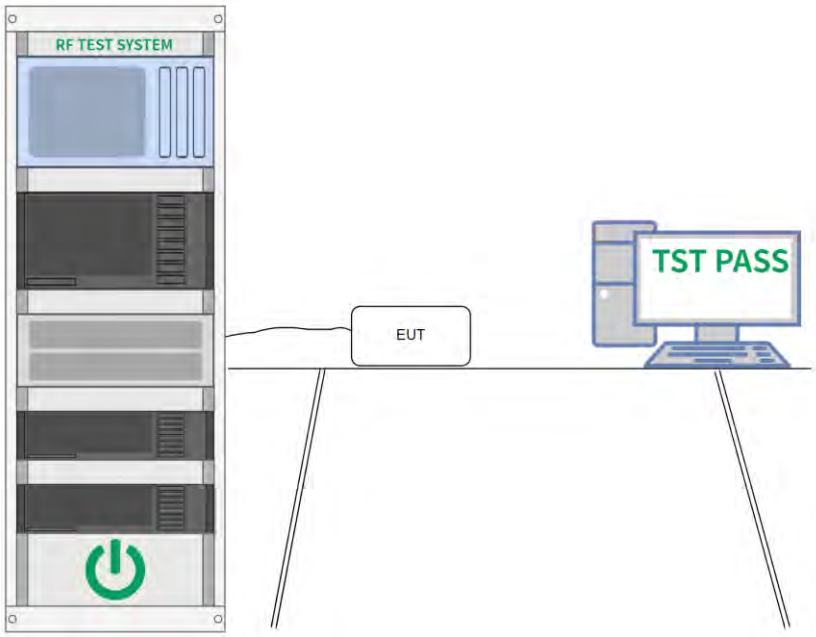
6.4.2 Test Setup Diagram:



6.4.3 Test Data:

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6.5 Number of Hopping Frequencies

Test Requirement:	Fequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.
Test Method:	Number of hopping frequencies
Test Limit:	Fequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.
Procedure:	The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings: a) Span: The frequency band of operation. Depending on the number of channels the device supports, it may be necessary to divide the frequency range of operation across multiple spans, to allow the individual channels to be clearly seen. b) RBW: To identify clearly the individual channels, set the RBW to less than 30% of the channel spacing or the 20 dB bandwidth, whichever is smaller. c) VBW ≥ RBW. d) Sweep: Auto. e) Detector function: Peak. f) Trace: Max hold. g) Allow the trace to stabilize. It might prove necessary to break the span up into subranges to show clearly all of the hopping frequencies. Compliance of an EUT with the appropriate regulatory limit shall be determined for the number of hopping channels. A plot of the data shall be included in the test report.

6.5.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.1 ℃
Humidity:	50.2 %
Atmospheric Pressure:	1010 mbar

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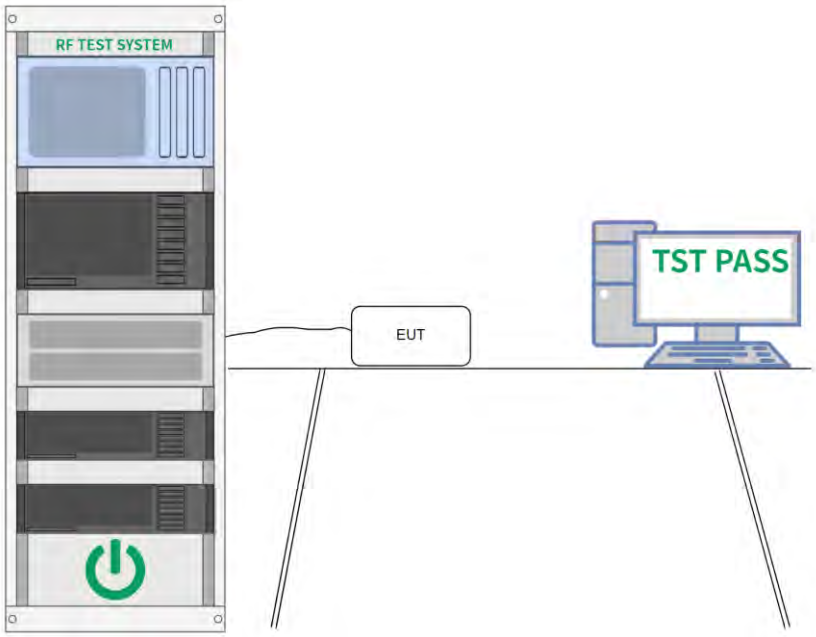
6.5.2 Test Setup Diagram:



6.5.3 Test Data:

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6.6 Dwell Time

Test Requirement:	Fequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.
Test Method:	Time of occupancy (dwell time)
Test Limit:	Fequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.
Procedure:	The EUT shall have its hopping function enabled. Use the following spectrum analyzer settings: a) Span: Zero span, centered on a hopping channel. b) RBW shall be <= channel spacing and where possible RBW should be set >> 1 / T, where T is the expected dwell time per channel. c) Sweep: As necessary to capture the entire dwell time per hopping channel; where possible use a video trigger and trigger delay so that the transmitted signal starts a little to the right of the start of the plot. The trigger level might need slight adjustment to prevent triggering when the system hops on an adjacent channel; a second plot might be needed with a longer sweep time to show two successive hops on a channel. d) Detector function: Peak. e) Trace: Max hold. Use the marker-delta function to determine the transmit time per hop. If this value varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation in transmit time. Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. The sweep time shall be equal to, or less than, the period specified in the requirements. Determine the number of hops over the sweep time and calculate the total number of hops in the period specified in the requirements, using the following equation: (Number of hops in the period specified in the requirements) = (number of hops on spectrum analyzer) × (period specified in the requirements / analyzer sweep time) The average time of occupancy is calculated from the transmit time per hop multiplied by the number of hops in the period specified in the requirements. If the number of hops in a specific time varies with different modes of operation (data rate, modulation format, number of hopping channels, etc.), then repeat this test for each variation. The measured transmit time and time between hops shall be consistent with the values described in the operational description for the EUT.

6.6.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.1 ℃
Humidity:	50.2 %
Atmospheric Pressure:	1010 mbar

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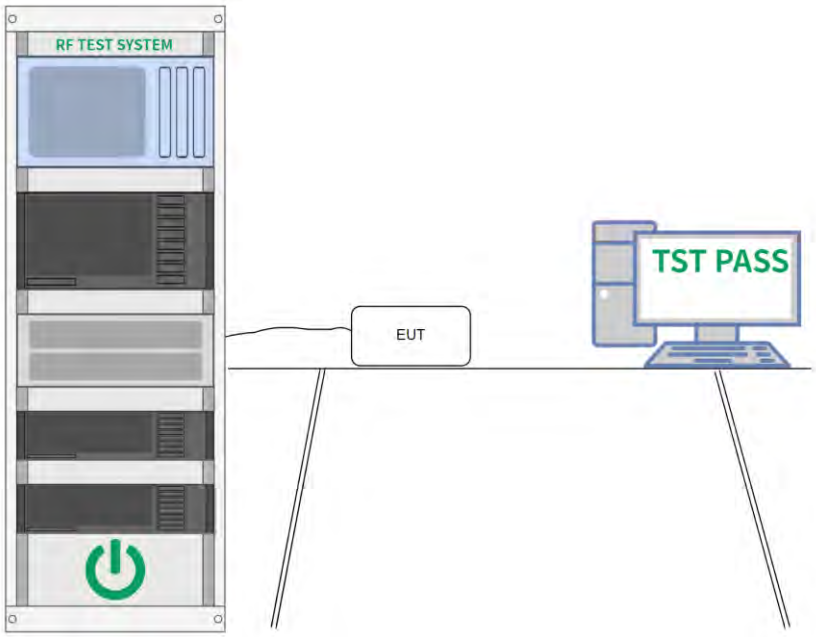
6.6.2 Test Setup Diagram:



6.6.3 Test Data:

Please Refer to Appendix for Details.

6.7 Emissions in non-restricted frequency bands

Test Requirement:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required.
Test Method:	Conducted spurious emissions test methodology
Test Limit:	In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required.
Procedure:	Conducted spurious emissions shall be measured for the transmit frequency, per 5.5 and 5.6, and at the maximum transmit powers. Connect the primary antenna port through an attenuator to the spectrum analyzer input; in the results, account for all losses between the unlicensed wireless device output and the spectrum analyzer. The instrument shall span 30 MHz to 10 times the operating frequency in GHz, with a resolution bandwidth of 100 kHz, video bandwidth of 300 kHz, and a coupled sweep time with a peak detector. The band 30 MHz to the highest frequency may be split into smaller spans, as long as the entire spectrum is covered.

6.7.1 E.U.T. Operation:

Operating Environment:	
Temperature:	25.1 ℃
Humidity:	50.2 %
Atmospheric Pressure:	1010 mbar

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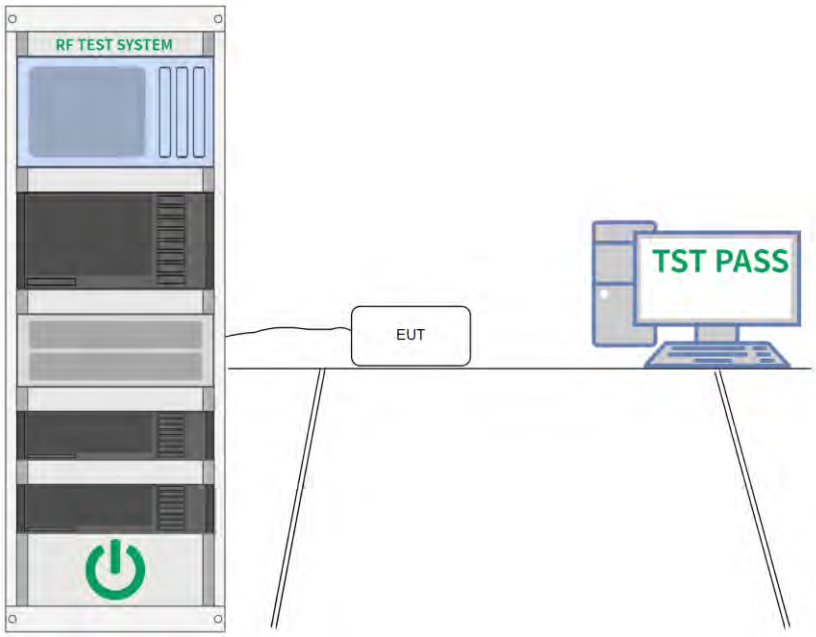
6.7.2 Test Setup Diagram:



6.7.3 Test Data:

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6.8 Band edge emissions (Radiated)

Test Requirement:	In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`
Test Method:	Radiated emissions tests
Test Limit:	

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100 **	3
88-216	150 **	3
216-960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.

Procedure:	ANSI C63.10-2013 section 6.6.4

6.8.1 E.U.T. Operation:

Operating Environment:	
Temperature:	24.6 ℃
Humidity:	49.2 %
Atmospheric Pressure:	1010 mbar

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6.8.2 Test Data:

Note: Level = Reading level + Factor

TM1 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2310.000	67.58	-30.59	36.99	74.00	-37.01	peak	P
2	2390.000	69.20	-30.49	38.71	74.00	-35.29	peak	P
3	2400.000	78.65	-30.48	48.17	74.00	-25.83	peak	P

TM1 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2310.000	67.50	-30.59	36.91	74.00	-37.09	peak	P
2	2390.000	69.69	-30.49	39.20	74.00	-34.80	peak	P
3	2400.000	77.58	-30.48	47.10	74.00	-26.90	peak	P

TM1 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: H

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2483.500	79.81	-30.39	49.42	74.00	-24.58	peak	P
2	2500.000	71.12	-30.37	40.75	74.00	-33.25	peak	P

TM1 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: H

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2483.500	80.91	-30.39	50.52	74.00	-23.48	peak	P
2	2500.000	70.54	-30.37	40.17	74.00	-33.83	peak	P

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TM2 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2310.000	68.04	-30.59	37.45	74.00	-36.55	peak	P
2	2390.000	70.71	-30.49	40.22	74.00	-33.78	peak	P
3	2400.000	78.72	-30.48	48.24	74.00	-25.76	peak	P

TM2 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2310.000	68.36	-30.59	37.77	74.00	-36.23	peak	P
2	2390.000	70.14	-30.49	39.65	74.00	-34.35	peak	P
3	2400.000	78.81	-30.48	48.33	74.00	-25.67	peak	P

TM2 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: H

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2483.500	79.18	-30.39	48.79	74.00	-25.21	peak	P
2	2500.000	70.54	-30.37	40.17	74.00	-33.83	peak	P

TM2 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: H

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2483.500	80.85	-30.39	50.46	74.00	-23.54	peak	P
2	2500.000	71.46	-30.37	41.09	74.00	-32.91	peak	P

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TM3 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2310.000	69.00	-30.59	38.41	74.00	-35.59	peak	P
2	2390.000	70.46	-30.49	39.97	74.00	-34.03	peak	P
3	2400.000	78.47	-30.48	47.99	74.00	-26.01	peak	P

TM3 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2310.000	67.21	-30.59	36.62	74.00	-37.38	peak	P
2	2390.000	68.95	-30.49	38.46	74.00	-35.54	peak	P
3	2400.000	77.64	-30.48	47.16	74.00	-26.84	peak	P

TM3 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: H

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No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2483.500	79.46	-30.39	49.07	74.00	-24.93	peak	P
2	2500.000	71.84	-30.37	41.47	74.00	-32.53	peak	P

TM3 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: H

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2483.500	79.27	-30.39	48.88	74.00	-25.12	peak	P
2	2500.000	70.29	-30.37	39.92	74.00	-34.08	peak	P

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6.9 Emissions in restricted frequency bands (below 1GHz)

Test Requirement:	In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`
Test Method:	Radiated emissions tests
Test Limit:	

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100 **	3
88-216	150 **	3
216-960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.

Procedure:	ANSI C63.10-2013 section 6.6.4

6.9.1 E.U.T. Operation:

Operating Environment:	
Temperature:	24.6 ℃
Humidity:	49.2 %
Atmospheric Pressure:	1010 mbar

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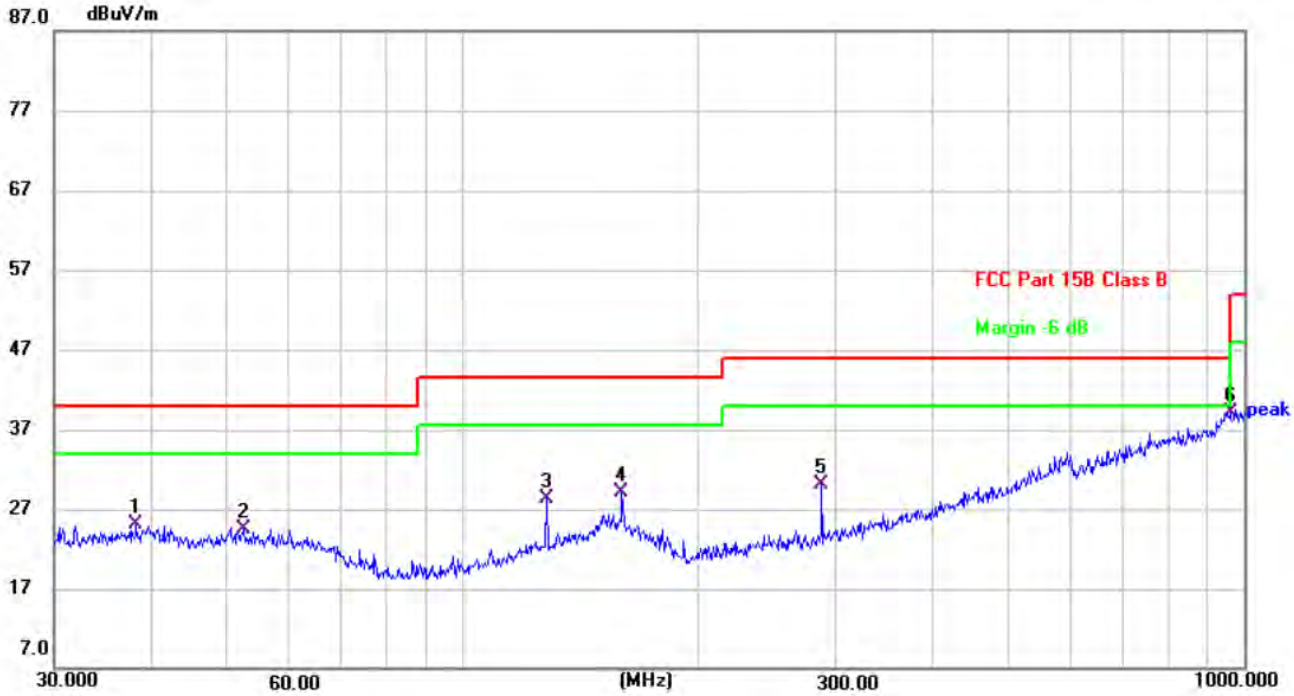
6.9.2 Test Data:

Note: All the mode have been tested, and only the worst case of GFSK mode are in the report
Level = Reading level + Factor

TM1 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	38.2120	42.17	-17.08	25.09	40.00	-14.91	QP	300	344	P	
2	52.3912	42.26	-17.74	24.52	40.00	-15.48	QP	100	0	P	
3	128.1130	46.50	-18.26	28.24	43.50	-15.26	QP	300	11	P	
4	159.7844	46.39	-17.23	29.16	43.50	-14.34	QP	300	11	P	
5	287.9904	48.14	-18.06	30.08	46.00	-15.92	QP	100	150	P	
6 *	958.7943	46.00	-6.83	39.17	46.00	-6.83	QP	300	358	P	

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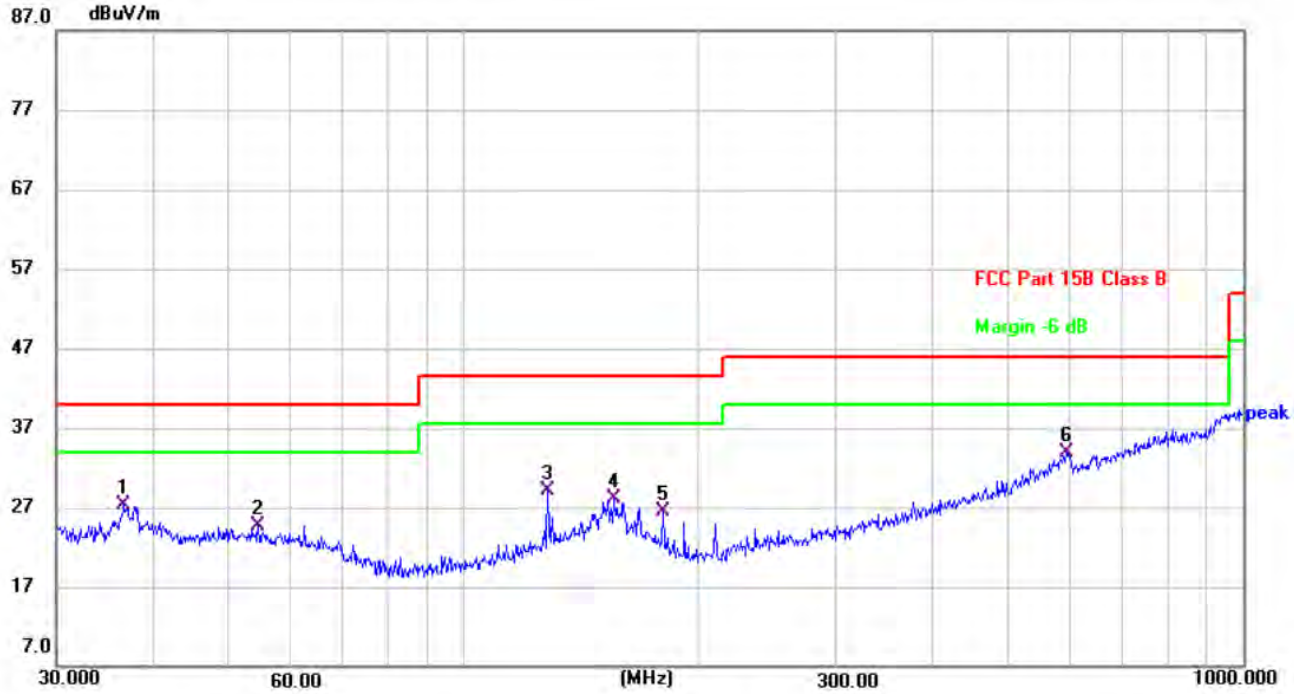
TM1 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	36.6375	44.67	-17.28	27.39	40.00	-12.61	QP	100	248	P	
2	54.4516	42.61	-17.84	24.77	40.00	-15.23	QP	300	12	P	
3	128.1130	47.34	-18.26	29.08	43.50	-14.42	QP	300	12	P	
4	155.9101	45.33	-17.15	28.18	43.50	-15.32	QP	100	348	P	
5	180.0165	46.14	-19.73	26.41	43.50	-17.09	QP	100	50	P	
6 *	593.0497	45.65	-11.84	33.81	46.00	-12.19	QP	300	12	P	

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6.10 Emissions in restricted frequency bands (above 1GHz)

Test Requirement:	In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).`
Test Method:	Radiated emissions tests
Test Limit:	

Frequency (MHz)	Field strength (microvolts/meter)	Measurement distance (meters)
0.009-0.490	2400/F(kHz)	300
0.490-1.705	24000/F(kHz)	30
1.705-30.0	30	30
30-88	100 **	3
88-216	150 **	3
216-960	200 **	3
Above 960	500	3

** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.

Procedure:	ANSI C63.10-2013 section 6.6.4

6.10.1 E.U.T. Operation:

Operating Environment:	
Temperature:	24.6 ℃
Humidity:	49.2 %
Atmospheric Pressure:	1010 mbar

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6.10.2 Test Data:

Note: Level = Reading level + Factor

1G~25G:

TM1 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2914.503	69.18	-30.21	38.97	74.00	-35.03	peak	P
2	4276.828	67.20	-28.41	38.79	74.00	-35.21	peak	P
3	6084.697	63.94	-25.30	38.63	74.00	-35.37	peak	P
4	8645.849	70.56	-25.66	44.91	74.00	-29.09	peak	P
5	11048.025	67.49	-22.56	44.94	74.00	-29.06	peak	P
6	14217.825	70.21	-21.18	49.03	74.00	-24.97	peak	P

TM1 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2973.269	66.87	-29.58	37.29	74.00	-36.71	peak	P
2	4314.088	69.61	-28.06	41.55	74.00	-32.45	peak	P
3	6352.520	66.57	-26.27	40.30	74.00	-33.70	peak	P
4	8575.569	69.25	-25.99	43.26	74.00	-30.74	peak	P
5	11286.842	67.19	-22.83	44.36	74.00	-29.64	peak	P
6	14956.431	71.83	-20.98	50.85	74.00	-23.15	peak	P

TM1 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: M

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	3033.381	65.49	-29.13	36.36	74.00	-37.64	peak	P
2	4477.576	66.39	-29.54	36.85	74.00	-37.15	peak	P
3	6405.222	69.55	-26.20	43.35	74.00	-30.65	peak	P
4	9118.149	67.72	-23.71	44.00	74.00	-30.00	peak	P
5	11648.168	70.50	-23.00	47.50	74.00	-26.50	peak	P
6	13473.664	73.19	-19.78	53.41	74.00	-20.59	peak	P

TM1 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: M

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	3118.905	63.52	-28.78	34.74	74.00	-39.26	peak	P
2	4109.210	67.05	-29.34	37.71	74.00	-36.29	peak	P
3	5952.651	68.61	-26.29	42.32	74.00	-31.68	peak	P
4	7571.944	65.38	-25.84	39.55	74.00	-34.45	peak	P
5	9929.496	70.05	-24.40	45.66	74.00	-28.34	peak	P
6	12827.323	69.85	-21.36	48.49	74.00	-25.51	peak	P

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TM1 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: H

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	3034.052	67.17	-28.59	38.58	74.00	-35.42	peak	P
2	4477.801	66.36	-29.50	36.86	74.00	-37.14	peak	P
3	6405.483	68.20	-24.55	43.65	74.00	-30.35	peak	P
4	9117.752	69.56	-23.92	45.64	74.00	-28.36	peak	P
5	11648.154	69.73	-23.24	46.50	74.00	-27.50	peak	P
6	13474.803	72.45	-21.17	51.28	74.00	-22.72	peak	P

TM1 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: H

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	3119.471	64.22	-28.47	35.75	74.00	-38.25	peak	P
2	4110.661	67.04	-28.36	38.68	74.00	-35.32	peak	P
3	5953.325	68.18	-25.56	42.62	74.00	-31.38	peak	P
4	7571.629	64.73	-24.78	39.95	74.00	-34.05	peak	P
5	9930.524	70.44	-23.42	47.01	74.00	-26.99	peak	P
6	12827.186	70.30	-21.27	49.03	74.00	-24.97	peak	P

TM2 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2973.920	67.14	-28.86	38.28	74.00	-35.72	peak	P
2	4313.193	68.17	-28.57	39.59	74.00	-34.41	peak	P
3	6352.824	68.27	-24.83	43.44	74.00	-30.56	peak	P
4	8575.293	69.04	-25.30	43.74	74.00	-30.26	peak	P
5	11287.141	68.96	-23.47	45.48	74.00	-28.52	peak	P
6	14955.582	71.76	-19.77	51.99	74.00	-22.01	peak	P

TM2 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2914.654	70.18	-30.09	40.09	74.00	-33.91	peak	P
2	4276.472	68.85	-28.82	40.04	74.00	-33.96	peak	P
3	6086.402	64.18	-25.20	38.99	74.00	-35.01	peak	P
4	8644.896	69.45	-25.59	43.86	74.00	-30.14	peak	P
5	11046.699	67.68	-23.29	44.38	74.00	-29.62	peak	P
6	14217.543	69.84	-20.87	48.98	74.00	-25.02	peak	P

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TM2 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: M

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	3120.258	64.51	-29.69	34.82	74.00	-39.18	peak	P
2	4109.648	67.86	-29.49	38.36	74.00	-35.64	peak	P
3	5953.551	68.71	-25.73	42.98	74.00	-31.02	peak	P
4	7572.079	65.43	-24.31	41.12	74.00	-32.88	peak	P
5	9928.801	71.17	-24.30	46.87	74.00	-27.13	peak	P
6	12828.804	70.13	-22.00	48.14	74.00	-25.86	peak	P

TM2 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: M

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	3118.836	64.74	-29.96	34.77	74.00	-39.23	peak	P
2	4109.133	68.10	-29.70	38.40	74.00	-35.60	peak	P
3	5954.142	69.19	-25.19	43.99	74.00	-30.01	peak	P
4	7571.721	66.28	-24.18	42.11	74.00	-31.89	peak	P
5	9929.341	69.62	-24.16	45.46	74.00	-28.54	peak	P
6	12827.377	70.31	-20.64	49.67	74.00	-24.33	peak	P

TM2 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: H

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	3032.764	66.22	-28.90	37.32	74.00	-36.68	peak	P
2	4478.571	67.07	-29.44	37.63	74.00	-36.37	peak	P
3	6405.487	68.55	-26.35	42.20	74.00	-31.80	peak	P
4	9118.441	68.79	-25.01	43.78	74.00	-30.22	peak	P
5	11647.438	69.72	-23.57	46.15	74.00	-27.85	peak	P
6	13474.449	72.86	-19.61	53.25	74.00	-20.75	peak	P

TM2 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: H

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	3032.402	67.11	-28.81	38.30	74.00	-35.70	peak	P
2	4479.138	66.34	-28.58	37.76	74.00	-36.24	peak	P
3	6404.306	69.57	-25.47	44.10	74.00	-29.90	peak	P
4	9117.594	69.60	-24.86	44.74	74.00	-29.26	peak	P
5	11647.773	69.82	-21.96	47.86	74.00	-26.14	peak	P
6	13473.455	72.87	-20.67	52.19	74.00	-21.81	peak	P

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TM3 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2973.665	66.52	-28.77	37.75	74.00	-36.25	peak	P
2	4312.699	69.64	-28.39	41.25	74.00	-32.75	peak	P
3	6353.730	67.75	-24.46	43.30	74.00	-30.70	peak	P
4	8576.179	69.53	-24.60	44.93	74.00	-29.07	peak	P
5	11285.218	68.62	-23.80	44.82	74.00	-29.18	peak	P
6	14954.893	71.97	-21.12	50.86	74.00	-23.14	peak	P

TM3 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: L

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2973.040	67.55	-30.53	37.01	74.00	-36.99	peak	P
2	4313.311	69.63	-28.62	41.01	74.00	-32.99	peak	P
3	6352.359	68.07	-26.08	41.99	74.00	-32.01	peak	P
4	8577.045	70.25	-25.32	44.93	74.00	-29.07	peak	P
5	11286.041	67.25	-22.75	44.50	74.00	-29.50	peak	P
6	14956.717	70.63	-20.41	50.22	74.00	-23.78	peak	P

TM3 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: M

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2915.528	70.51	-29.15	41.35	74.00	-32.65	peak	P
2	4277.249	68.75	-28.56	40.19	74.00	-33.81	peak	P
3	6086.285	64.78	-26.08	38.70	74.00	-35.30	peak	P
4	8646.662	68.82	-25.45	43.37	74.00	-30.63	peak	P
5	11047.593	67.20	-22.43	44.76	74.00	-29.24	peak	P
6	14218.449	70.67	-20.73	49.94	74.00	-24.06	peak	P

TM3 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: M

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	2915.408	69.13	-29.96	39.17	74.00	-34.83	peak	P
2	4278.027	67.59	-28.07	39.52	74.00	-34.48	peak	P
3	6084.759	65.44	-25.30	40.14	74.00	-33.86	peak	P
4	8645.593	70.02	-24.04	45.98	74.00	-28.02	peak	P
5	11047.185	67.53	-23.95	43.58	74.00	-30.42	peak	P
6	14217.574	70.85	-20.15	50.70	74.00	-23.30	peak	P

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TM3 / Polarization: Horizontal / Band: 2.4G / BW: 1 / CH: H

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	3120.080	63.55	-28.67	34.88	74.00	-39.12	peak	P
2	4110.100	68.72	-29.19	39.53	74.00	-34.47	peak	P
3	5953.352	68.48	-24.52	43.97	74.00	-30.03	peak	P
4	7571.272	65.44	-25.35	40.10	74.00	-33.90	peak	P
5	9929.251	69.70	-25.11	44.59	74.00	-29.41	peak	P
6	12826.884	71.40	-22.22	49.19	74.00	-24.81	peak	P

TM3 / Polarization: Vertical / Band: 2.4G / BW: 1 / CH: H

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	P/F
1	3119.990	64.56	-28.65	35.91	74.00	-38.09	peak	P
2	4109.980	68.21	-28.28	39.94	74.00	-34.06	peak	P
3	5952.679	69.27	-24.96	44.31	74.00	-29.69	peak	P
4	7571.183	65.25	-24.95	40.30	74.00	-33.70	peak	P
5	9929.419	70.17	-24.81	45.36	74.00	-28.64	peak	P
6	12828.389	69.78	-22.10	47.67	74.00	-26.33	peak	P

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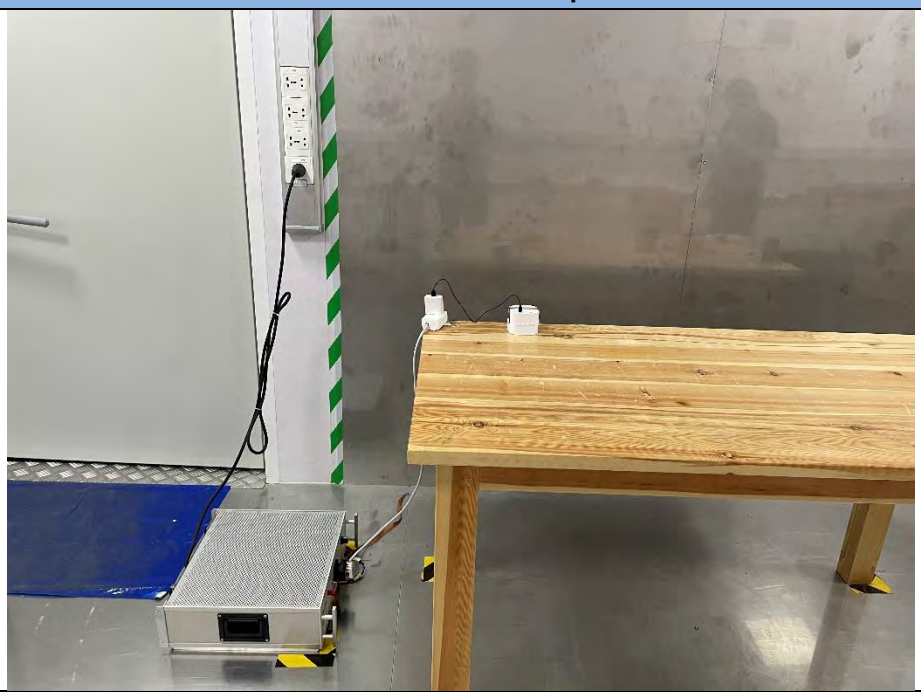
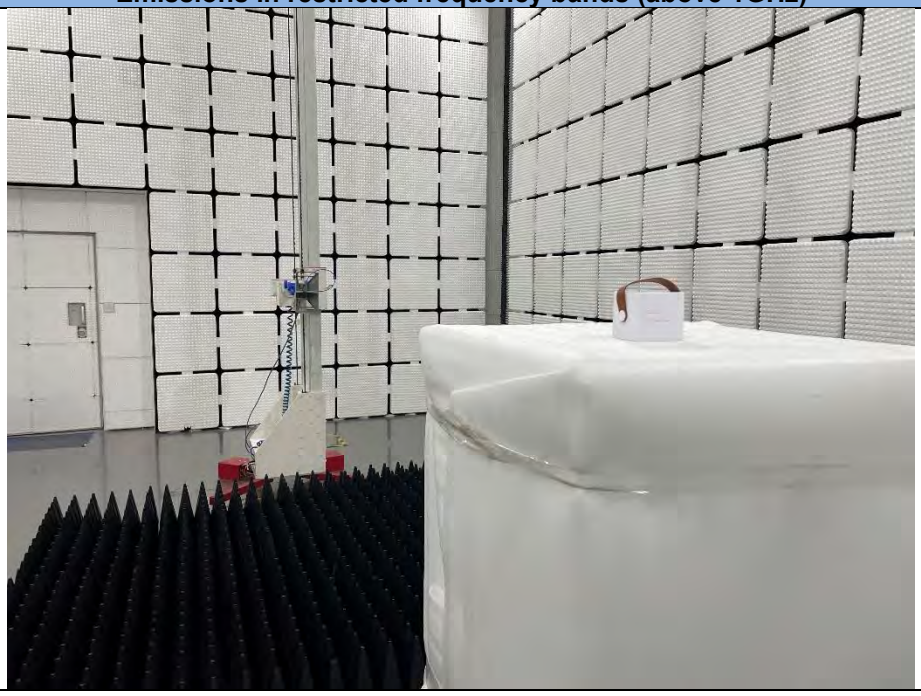
7 Test Setup Photos

Conducted Emission at AC power line

Band edge emissions (Radiated) **Emissions in restricted frequency bands (above 1GHz)**


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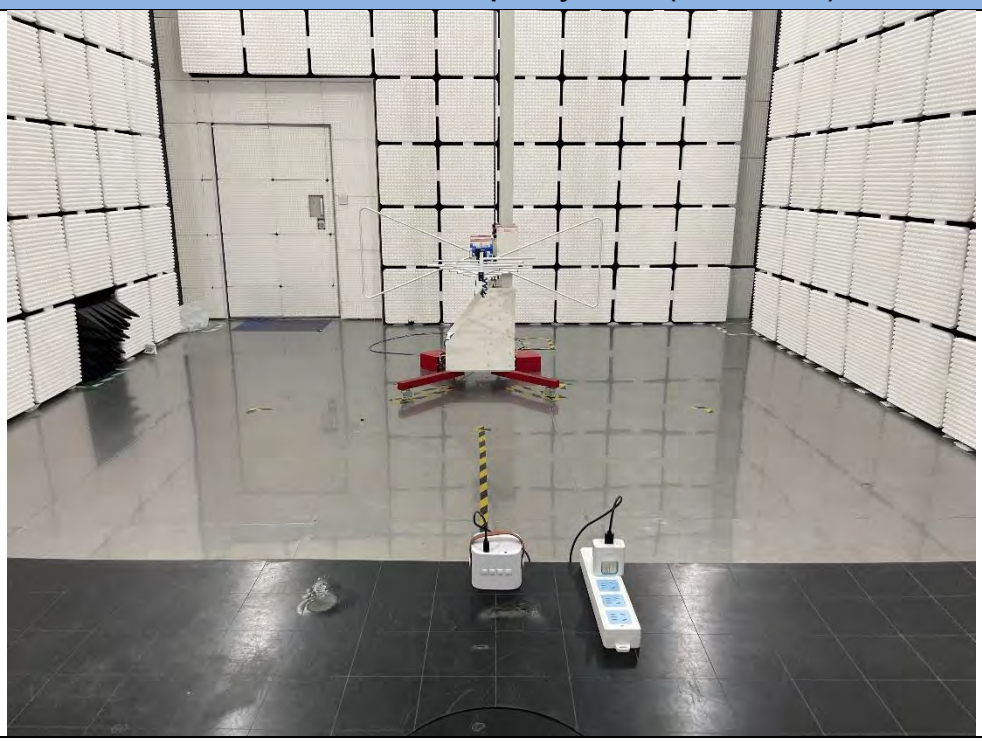
Emissions in restricted frequency bands (below 1GHz)


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8 EUT Constructional Details (EUT Photos)

Please refer to the Appendix EUT Photos.

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Appendix

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1. Bandwidth

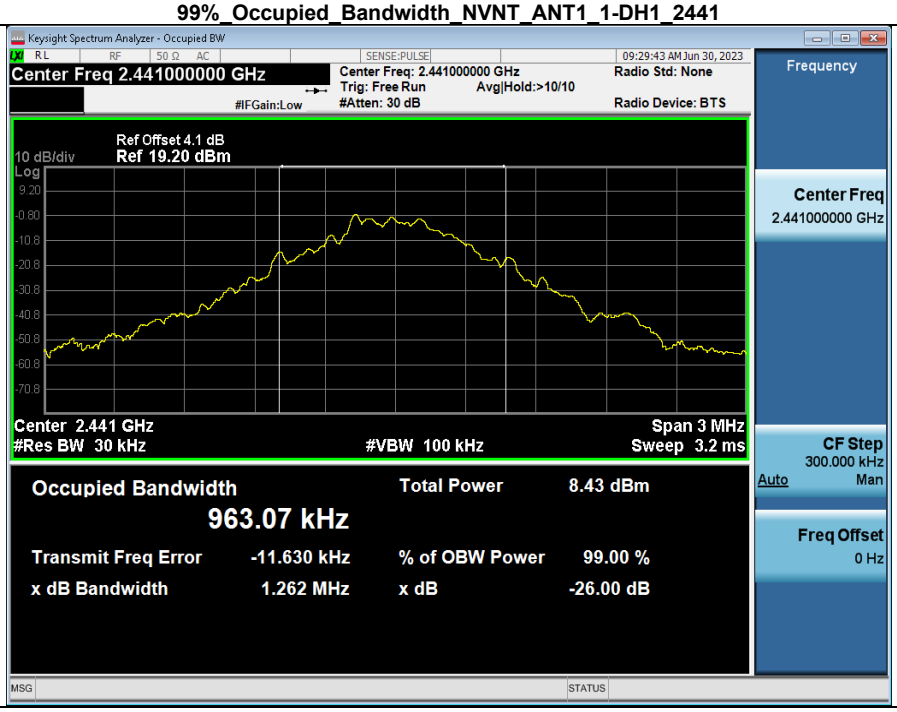
1.1 OBW

1.1.1 Test Result

Condition	Antenna	Modulation	Frequency (MHz)	99%%BW(MHz)
NVNT	ANT1	1-DH1	2402.00	0.926
NVNT	ANT1	1-DH1	2441.00	0.963
NVNT	ANT1	1-DH1	2480.00	0.987
NVNT	ANT1	2-DH1	2402.00	1.207
NVNT	ANT1	2-DH1	2441.00	1.221
NVNT	ANT1	2-DH1	2480.00	1.232
NVNT	ANT1	3-DH1	2402.00	1.186
NVNT	ANT1	3-DH1	2441.00	1.195
NVNT	ANT1	3-DH1	2480.00	1.212

99%_Occupied_Bandwidth_NVNT_ANT1_1-DH1_2402

99%_Occupied_Bandwidth_NVNT_ANT1_1-DH1_2441



99%_Occupied_Bandwidth_NVNT_ANT1_1-DH1_2480

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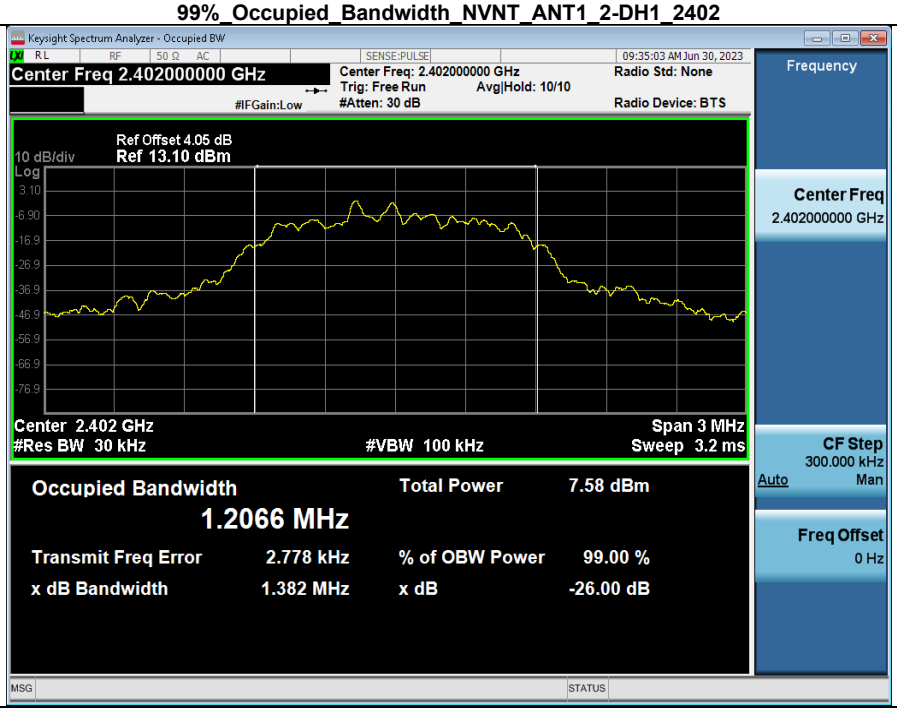
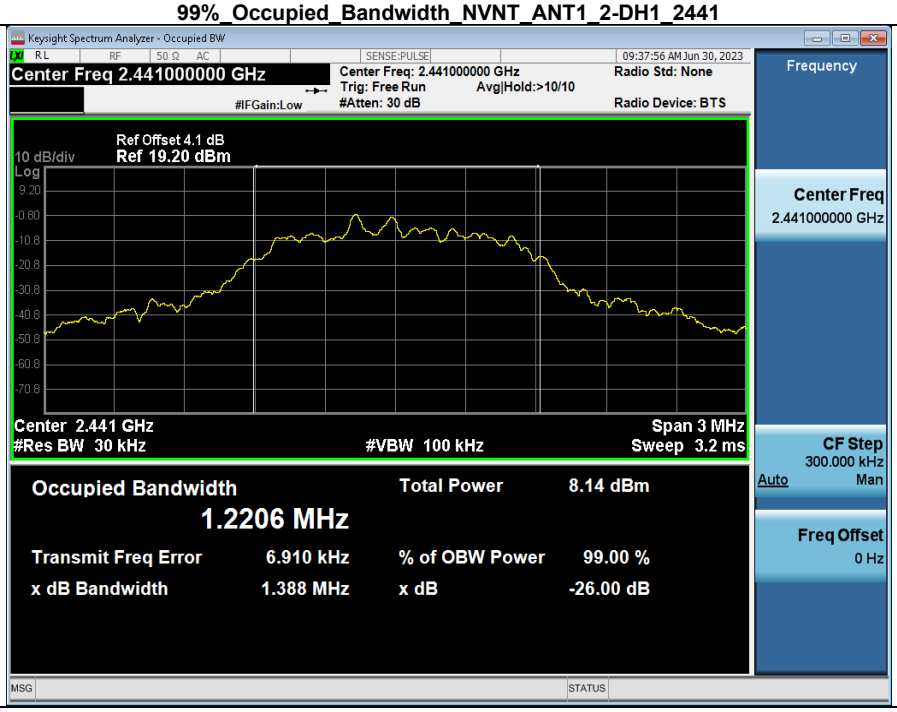
99%_Occupied_Bandwidth_NVNT_ANT1_2-DH1_2402



99%_Occupied_Bandwidth_NVNT_ANT1_2-DH1_2441



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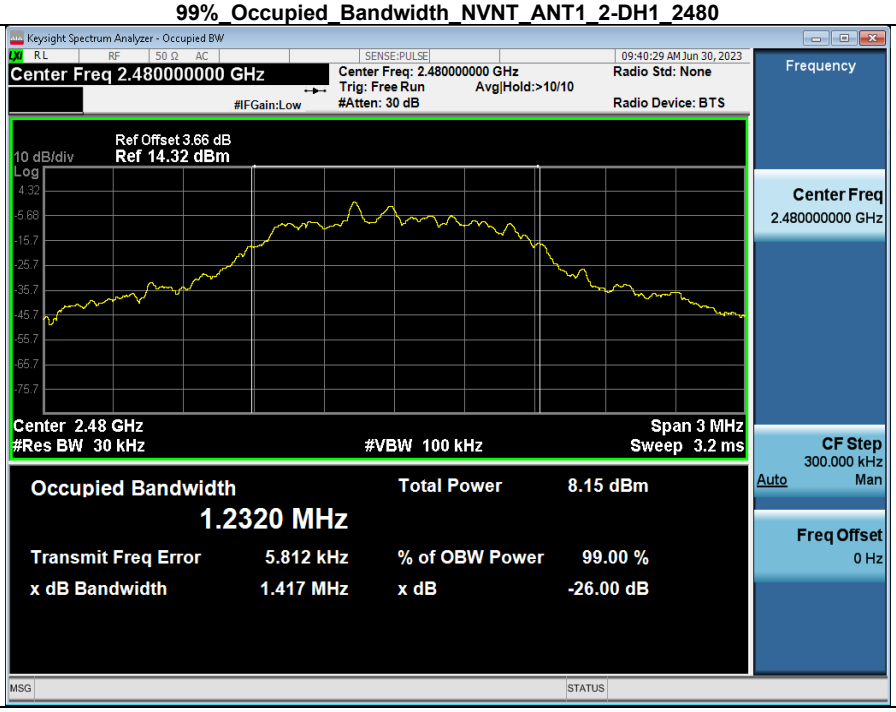
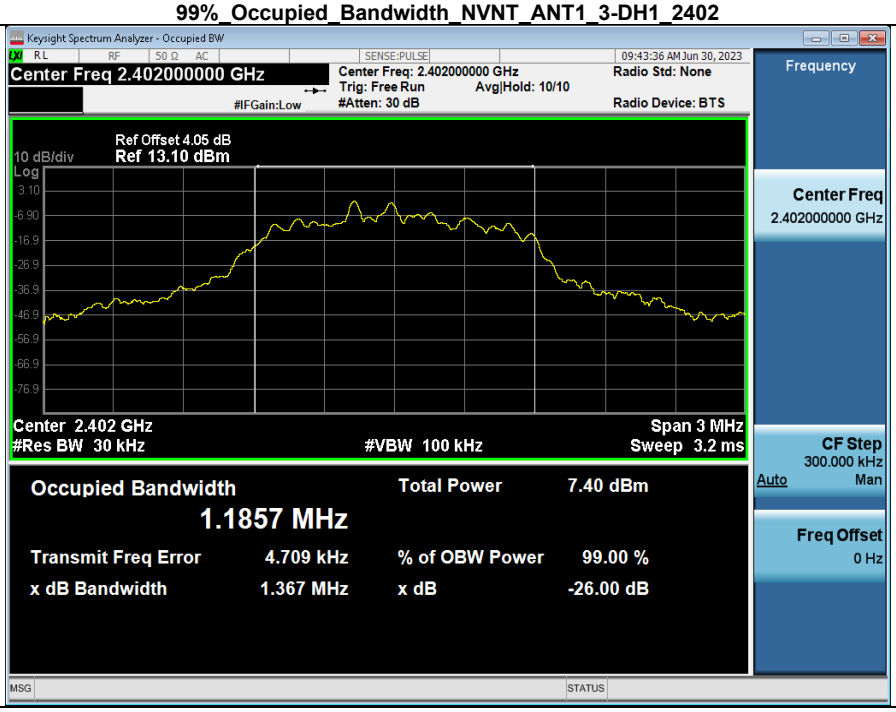
99%_Occupied_Bandwidth_NVNT_ANT1_2-DH1_2480



99%_Occupied_Bandwidth_NVNT_ANT1_3-DH1_2402



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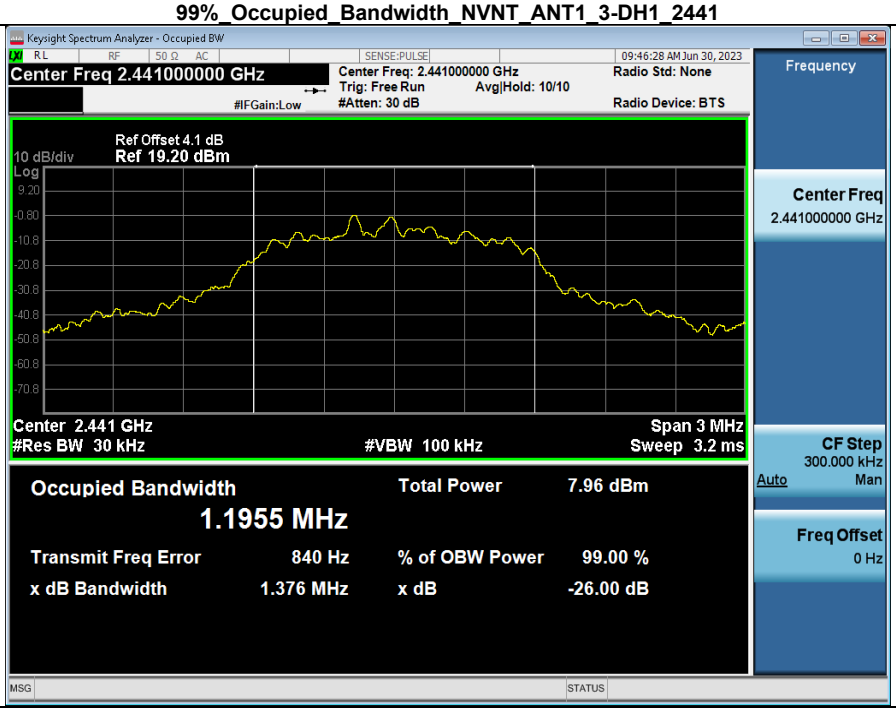
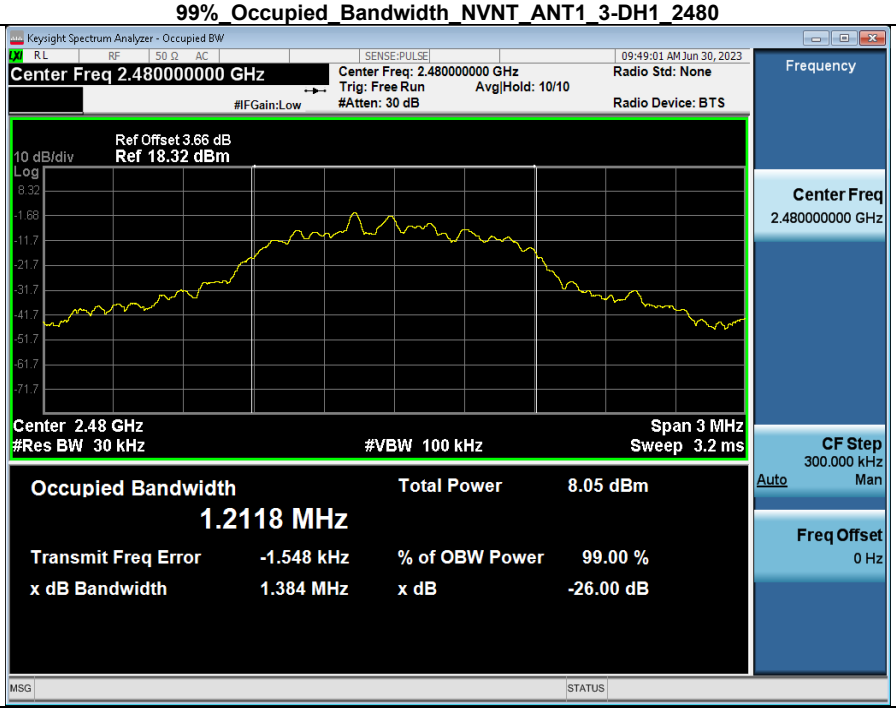
99%_Occupied_Bandwidth_NVNT_ANT1_3-DH1_2441



99%_Occupied_Bandwidth_NVNT_ANT1_3-DH1_2480



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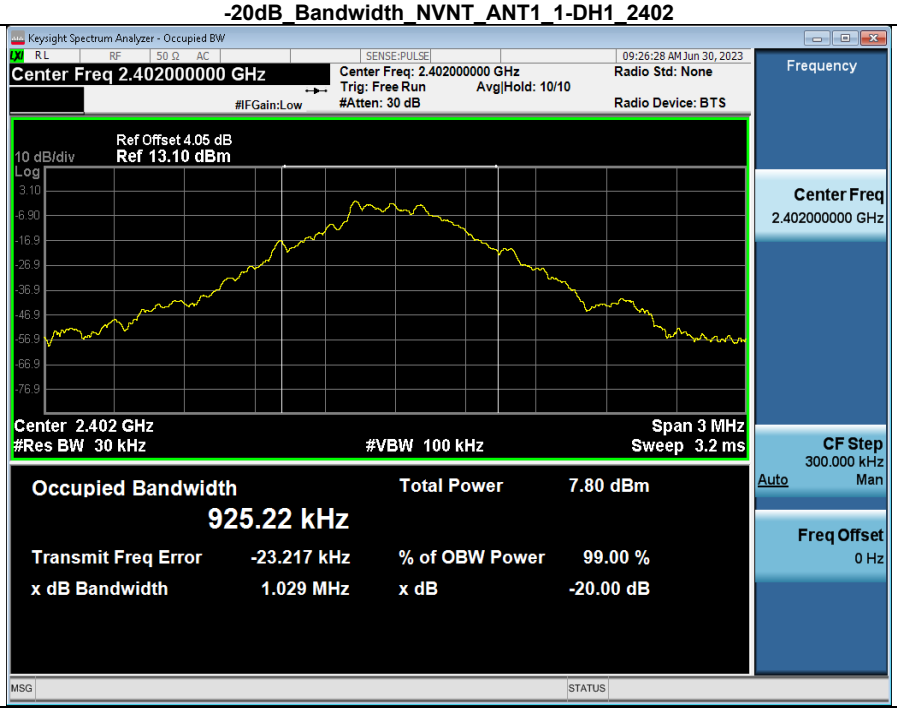
1.2 20dB BW

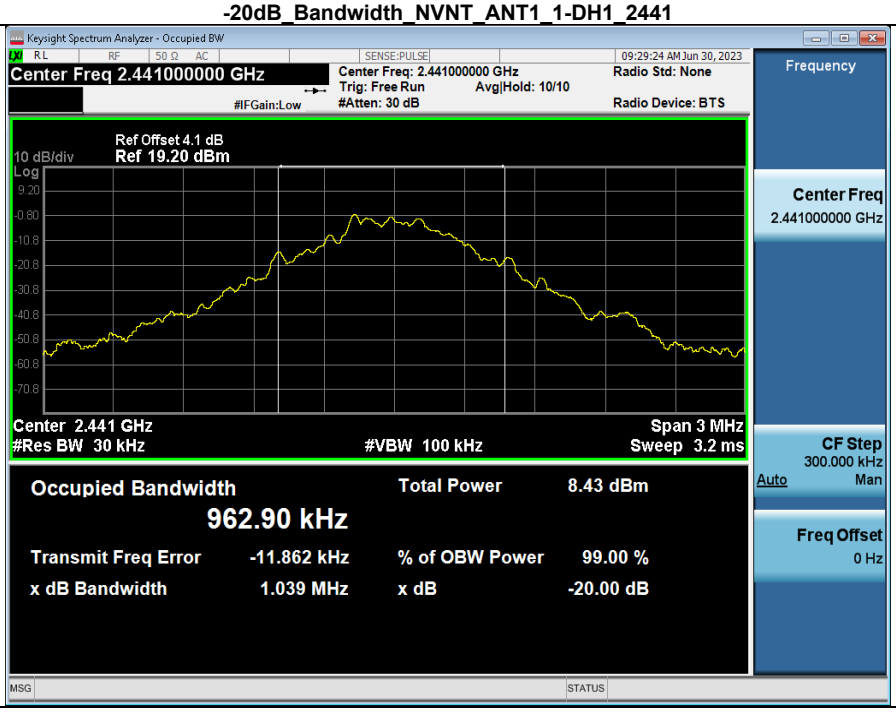
1.2.1 Test Result

Condition	Antenna	Modulation	Frequency (MHz)	-20dB BW(MHz)	if larger than CFS
NVNT	ANT1	1-DH1	2402.00	1.029	Yes
NVNT	ANT1	1-DH1	2441.00	1.039	Yes
NVNT	ANT1	1-DH1	2480.00	1.045	Yes
NVNT	ANT1	2-DH1	2402.00	1.299	Yes
NVNT	ANT1	2-DH1	2441.00	1.299	Yes
NVNT	ANT1	2-DH1	2480.00	1.293	Yes
NVNT	ANT1	3-DH1	2402.00	1.262	Yes
NVNT	ANT1	3-DH1	2441.00	1.262	Yes
NVNT	ANT1	3-DH1	2480.00	1.292	Yes

-20dB_Bandwidth_NVNT_ANT1_1-DH1_2402



-20dB_Bandwidth_NVNT_ANT1_1-DH1_2441



-20dB_Bandwidth_NVNT_ANT1_1-DH1_2480

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-20dB_Bandwidth_NVNT_ANT1_2-DH1_2402

-20dB_Bandwidth_NVNT_ANT1_2-DH1_2441

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-20dB_Bandwidth_NVNT_ANT1_2-DH1_2480

-20dB_Bandwidth_NVNT_ANT1_3-DH1_2402

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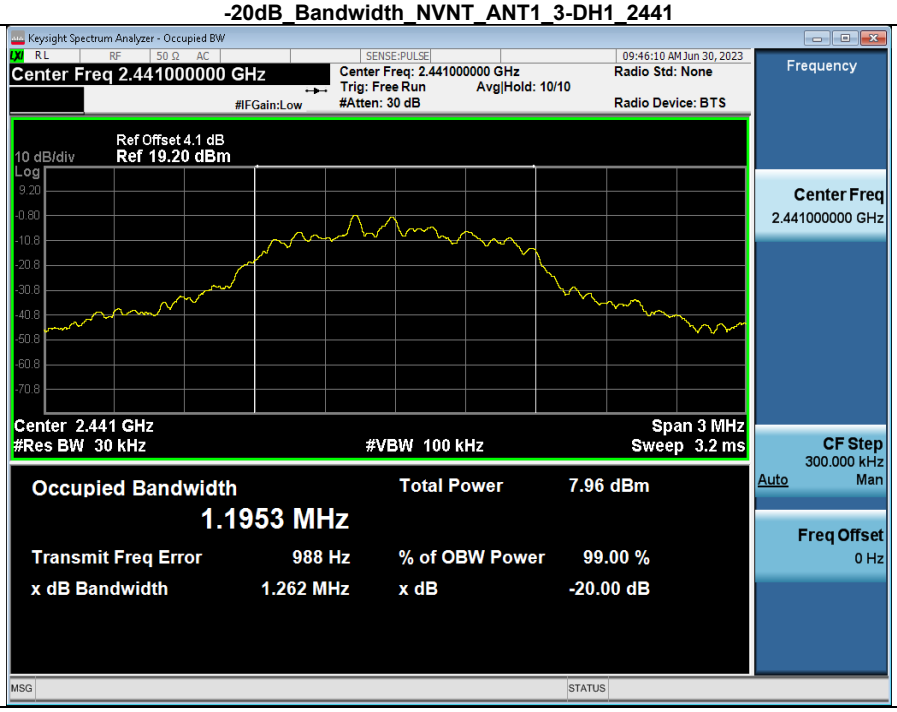
-20dB_Bandwidth_NVNT_ANT1_3-DH1_2441



-20dB_Bandwidth_NVNT_ANT1_3-DH1_2480

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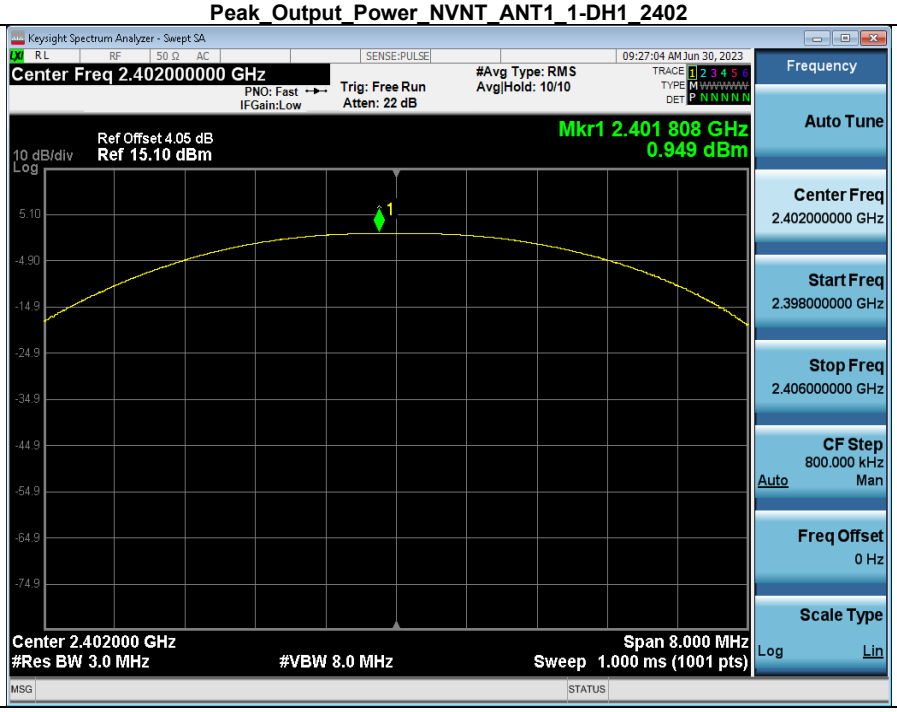
2. Maximum Conducted Output Power

2.1 Power

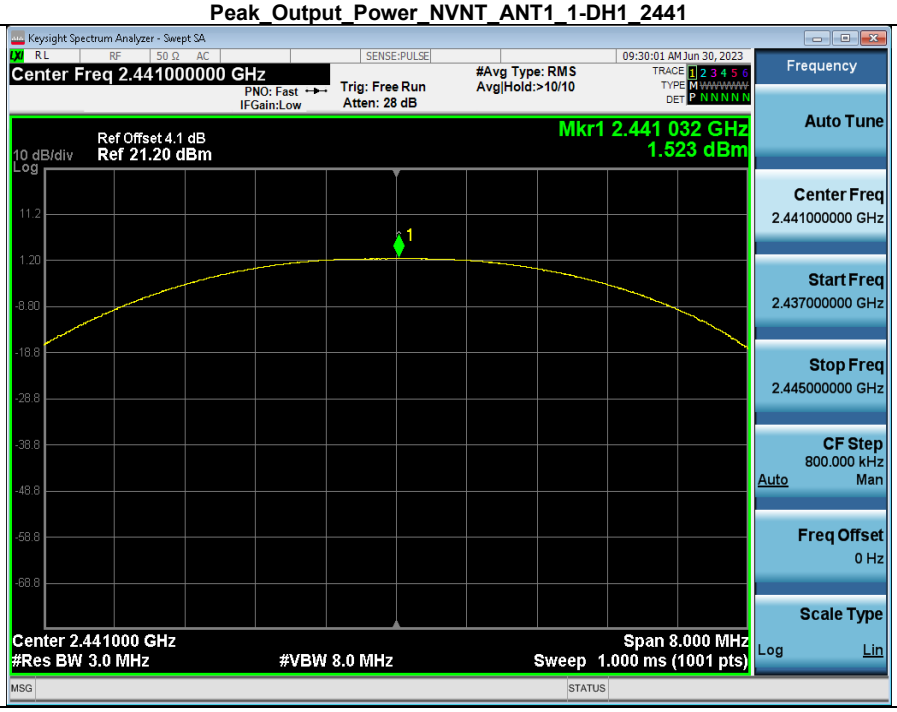
2.1.1 Test Result

Condition	Antenna	Modulation	Frequency (MHz)	Max. Conducted Power(dBm)	Max. Conducted Power(mW)	Limit(mW)	Result
NVNT	ANT1	1-DH1	2402.00	0.95	1.24	125	Pass
NVNT	ANT1	1-DH1	2441.00	1.52	1.42	125	Pass
NVNT	ANT1	1-DH1	2480.00	1.53	1.42	125	Pass
NVNT	ANT1	2-DH1	2402.00	1.79	1.51	125	Pass
NVNT	ANT1	2-DH1	2441.00	2.37	1.73	125	Pass
NVNT	ANT1	2-DH1	2480.00	2.30	1.70	125	Pass
NVNT	ANT1	3-DH1	2402.00	2.36	1.72	125	Pass
NVNT	ANT1	3-DH1	2441.00	2.93	1.96	125	Pass
NVNT	ANT1	3-DH1	2480.00	2.84	1.92	125	Pass

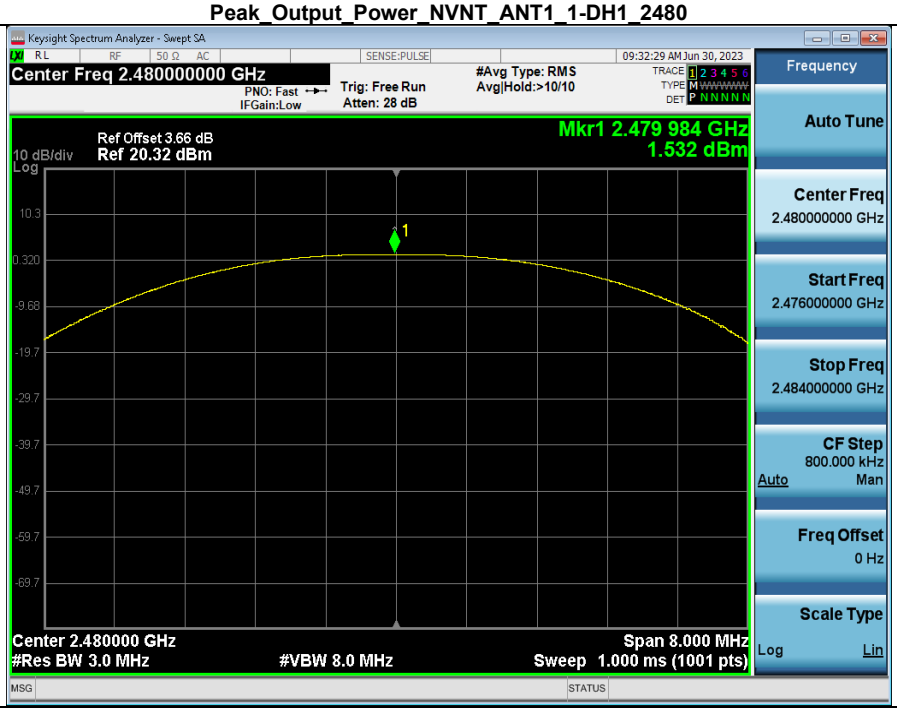
Peak_Output_Power_NVNT_ANT1_1-DH1_2402



Peak_Output_Power_NVNT_ANT1_1-DH1_2441



Peak_Output_Power_NVNT_ANT1_1-DH1_2480



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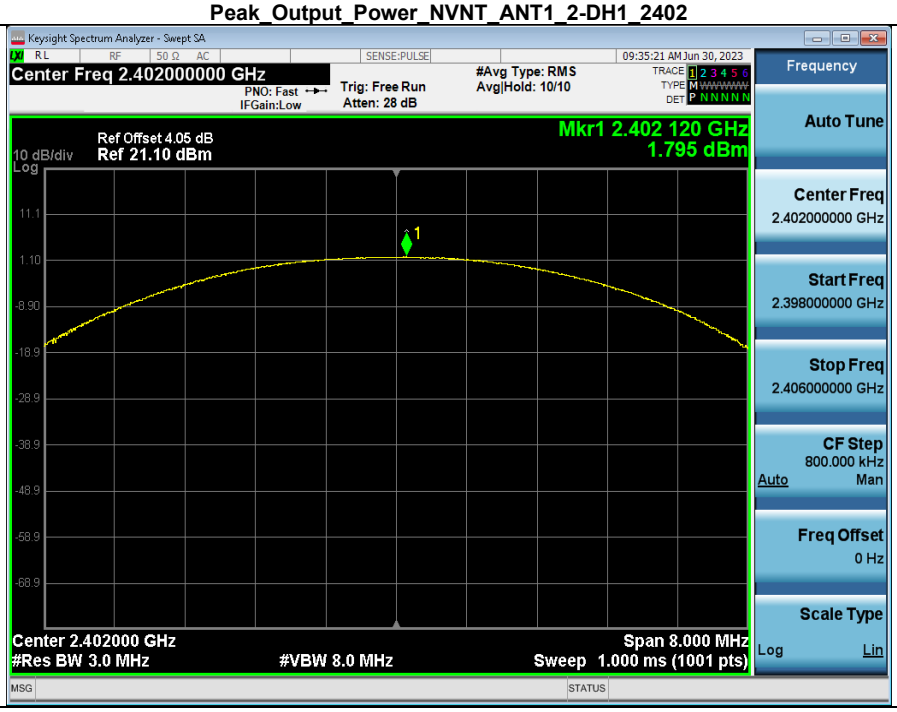
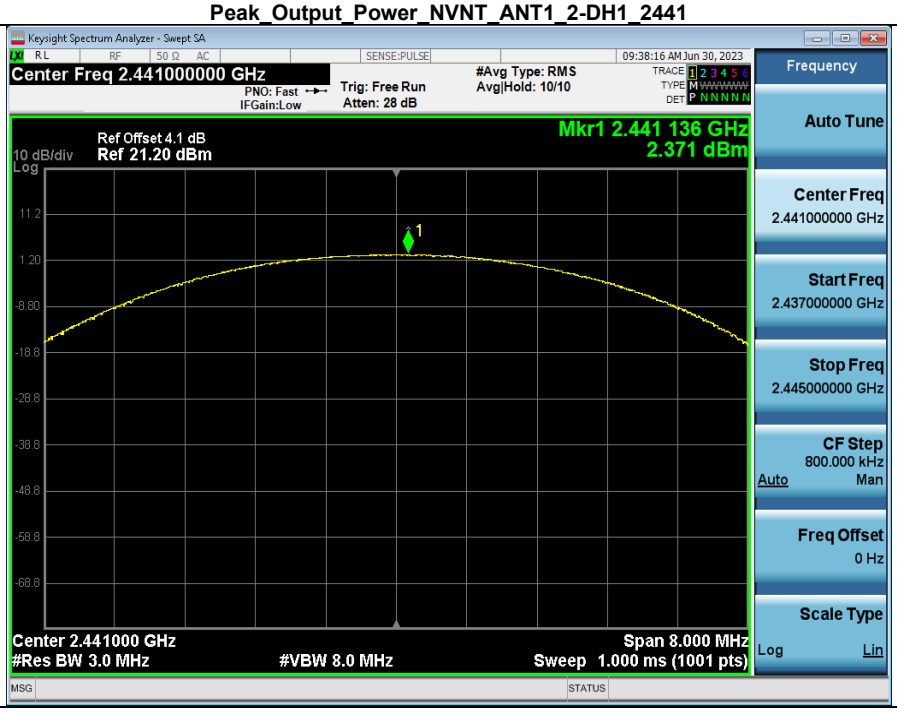
Peak_Output_Power_NVNT_ANT1_2-DH1_2402



Peak_Output_Power_NVNT_ANT1_2-DH1_2441



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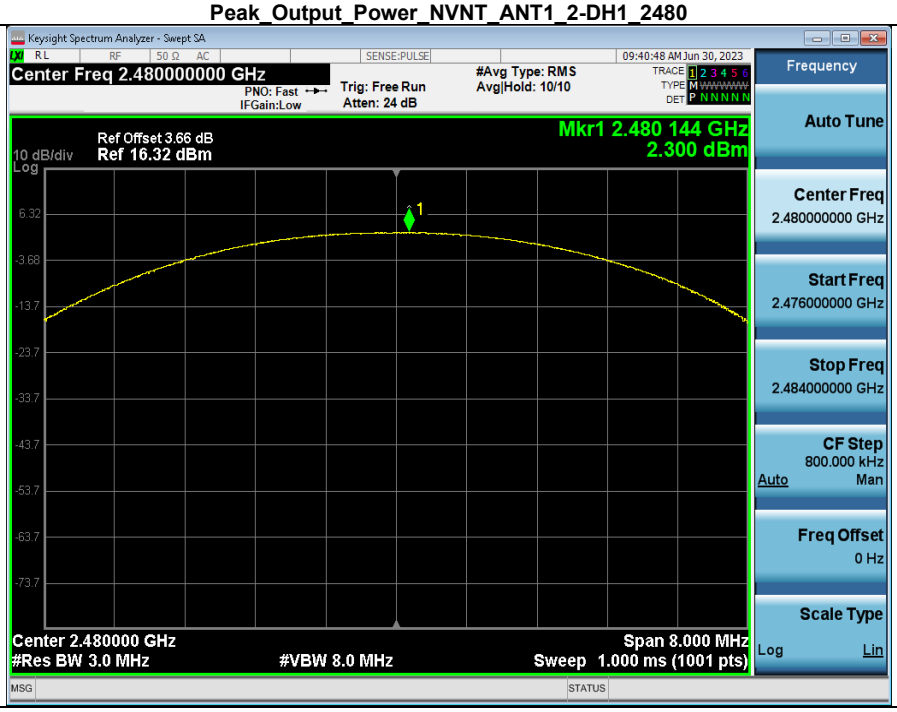
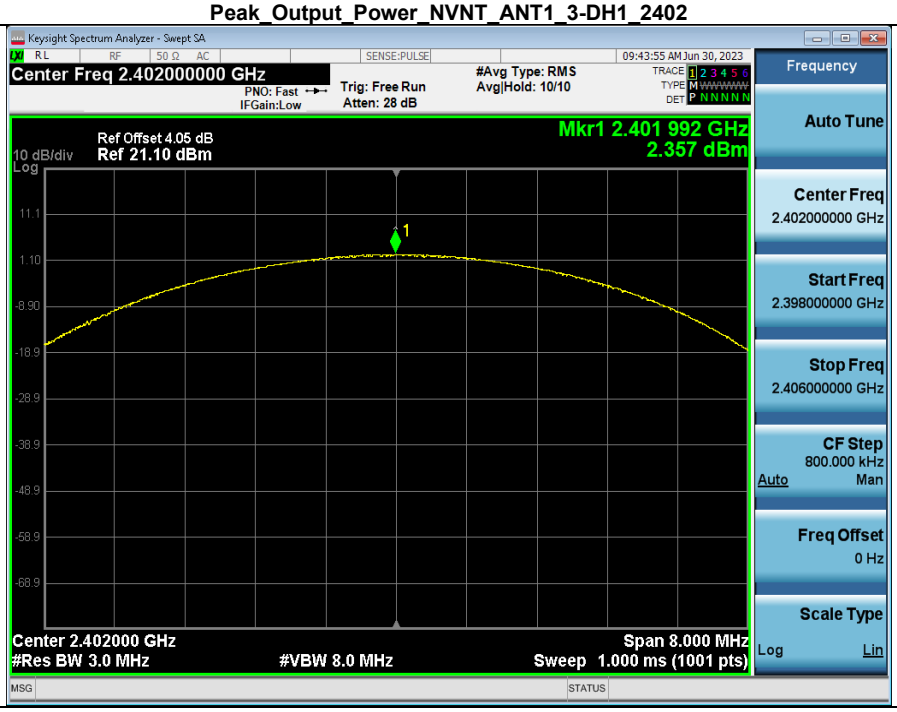
Peak_Output_Power_NVNT_ANT1_2-DH1_2480



Peak_Output_Power_NVNT_ANT1_3-DH1_2402



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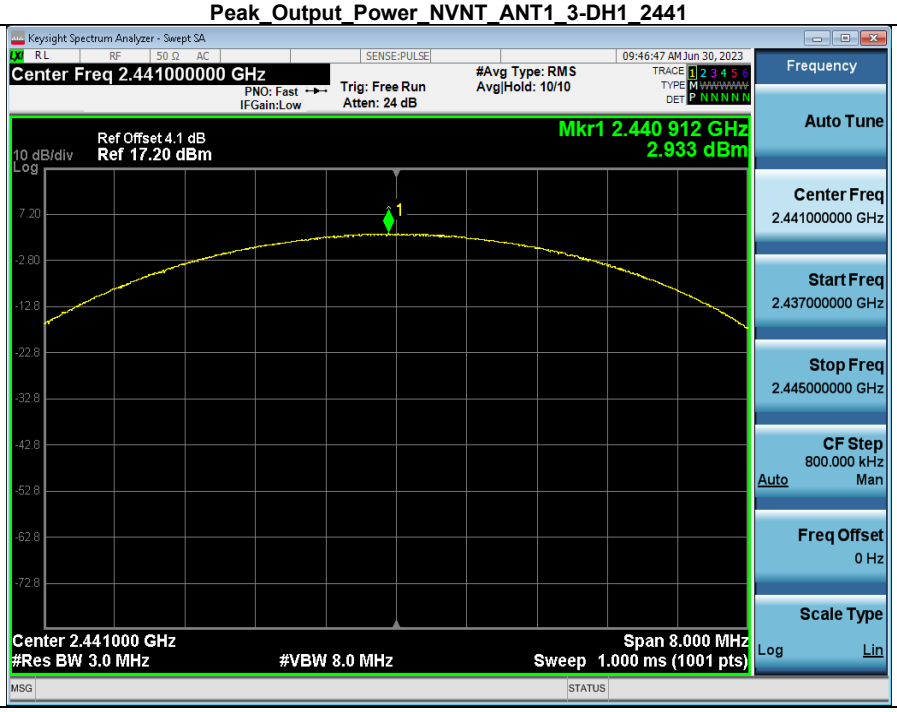
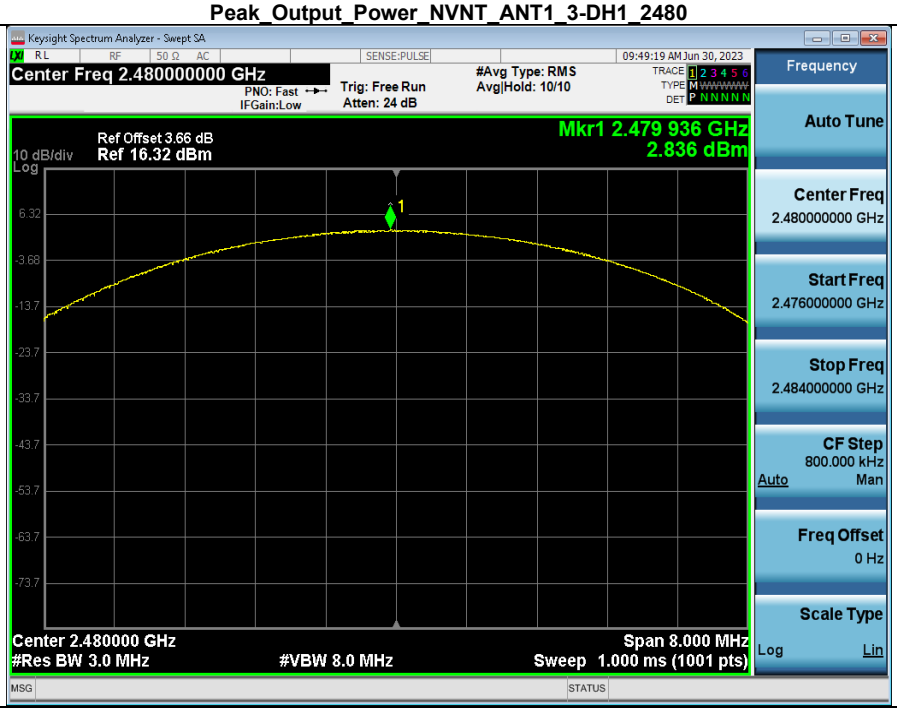
Peak_Output_Power_NVNT_ANT1_3-DH1_2441



Peak_Output_Power_NVNT_ANT1_3-DH1_2480



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3. Carrier Frequency Separation

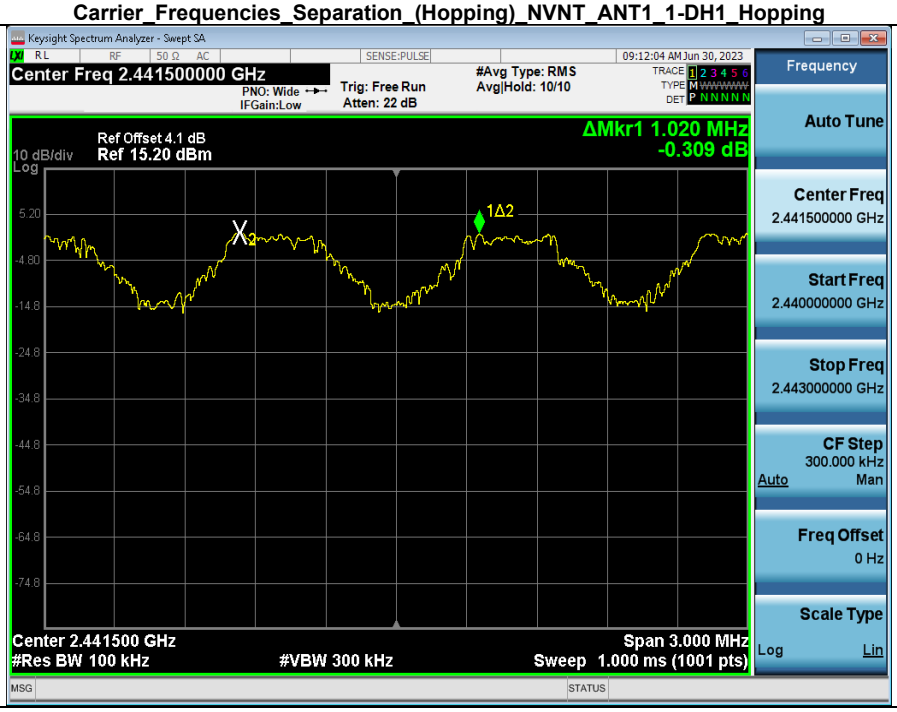
3.1 Ant1

3.1.1 Test Result

Condition	Antenna	Modulation	Frequency(MHz)	Hopping NO.0 (MHz)	Hopping NO.1 (MHz)	Carrier Frequencies Separation(MHz)	Limit(MHz)	Result
NVNT	ANT1	1-DH1	2402.00	2401.837	2403.163	1.33	0.686	Pass
NVNT	ANT1	1-DH1	2441.00	2440.834	2441.854	1.02	0.693	Pass
NVNT	ANT1	1-DH1	2480.00	2478.840	2479.998	1.16	0.697	Pass
NVNT	ANT1	2-DH1	2402.00	2401.828	2402.827	1.00	0.866	Pass
NVNT	ANT1	2-DH1	2441.00	2440.831	2441.839	1.01	0.866	Pass
NVNT	ANT1	2-DH1	2480.00	2478.837	2479.830	0.99	0.862	Pass
NVNT	ANT1	3-DH1	2402.00	2401.831	2402.842	1.01	0.841	Pass
NVNT	ANT1	3-DH1	2441.00	2440.834	2441.833	1.00	0.841	Pass
NVNT	ANT1	3-DH1	2480.00	2478.822	2479.986	1.16	0.861	Pass

Carrier_Frequencies_Separation_(Hopping)_NVNT_ANT1_1-DH1_Hopping

Carrier_Frequencies_Separation_(Hopping)_NVNT_ANT1_1-DH1_Hopping



Carrier_Frequencies_Separation_(Hopping)_NVNT_ANT1_1-DH1_Hopping

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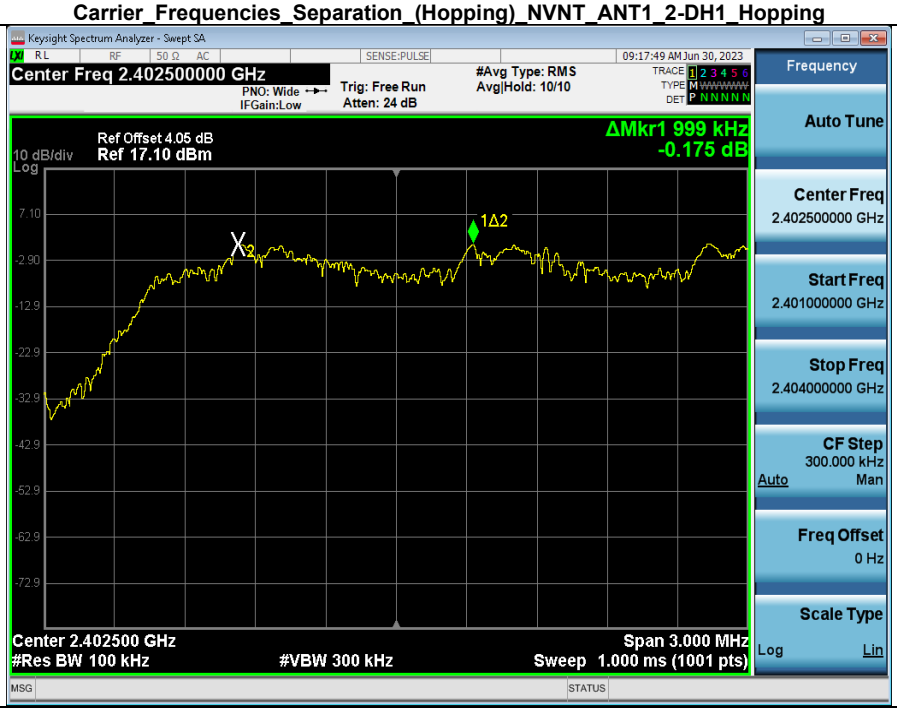
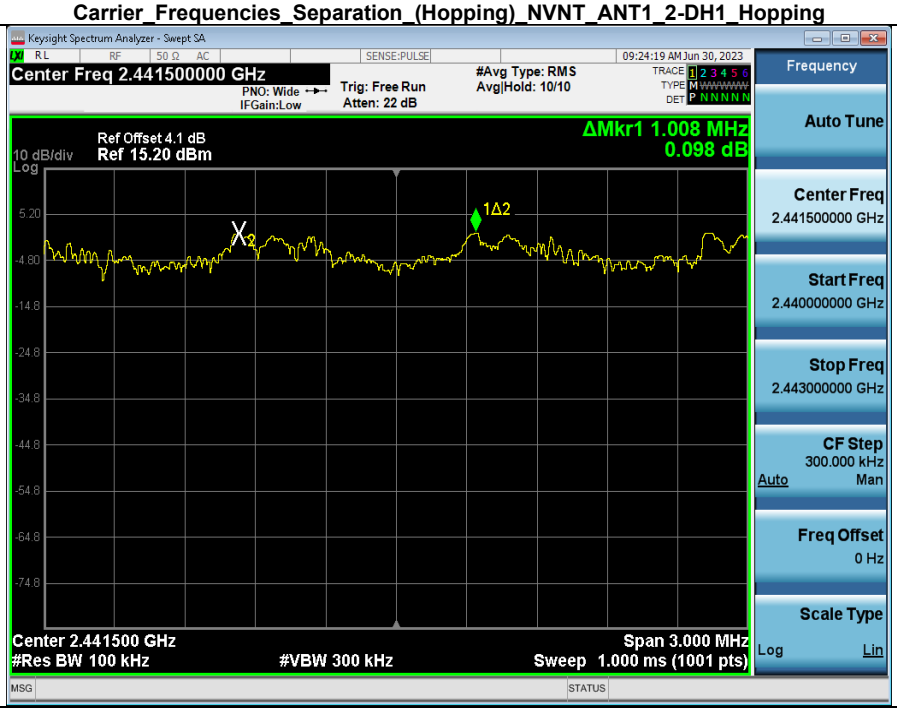
Carrier_Frequencies_Separation_(Hopping)_NVNT_ANT1_2-DH1_Hopping



Carrier_Frequencies_Separation_(Hopping)_NVNT_ANT1_2-DH1_Hopping



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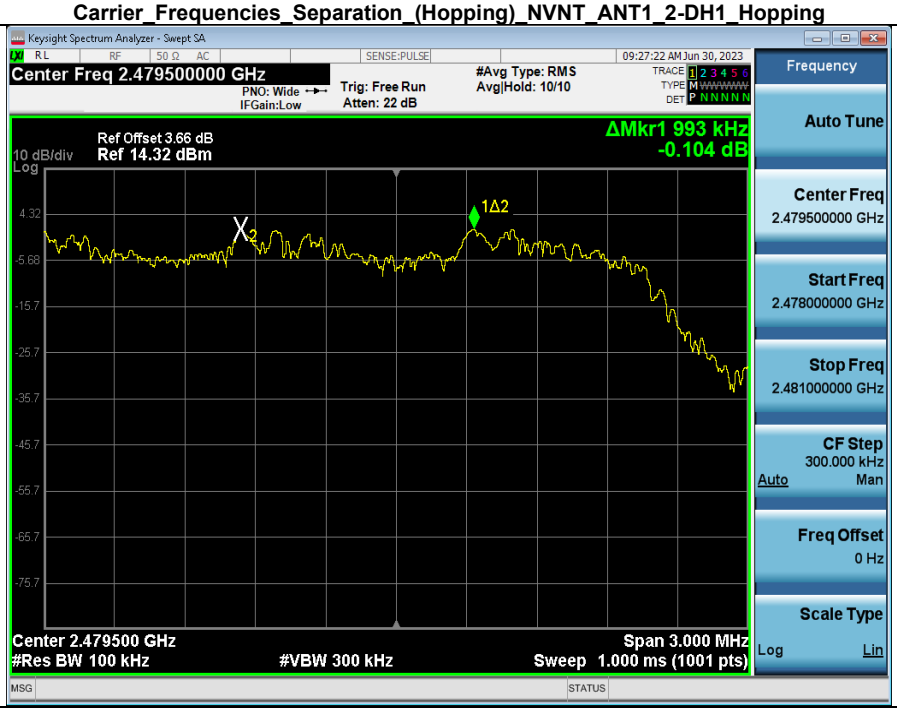
Carrier_Frequencies_Separation_(Hopping)_NVNT_ANT1_2-DH1_Hopping



Carrier_Frequencies_Separation_(Hopping)_NVNT_ANT1_3-DH1_Hopping

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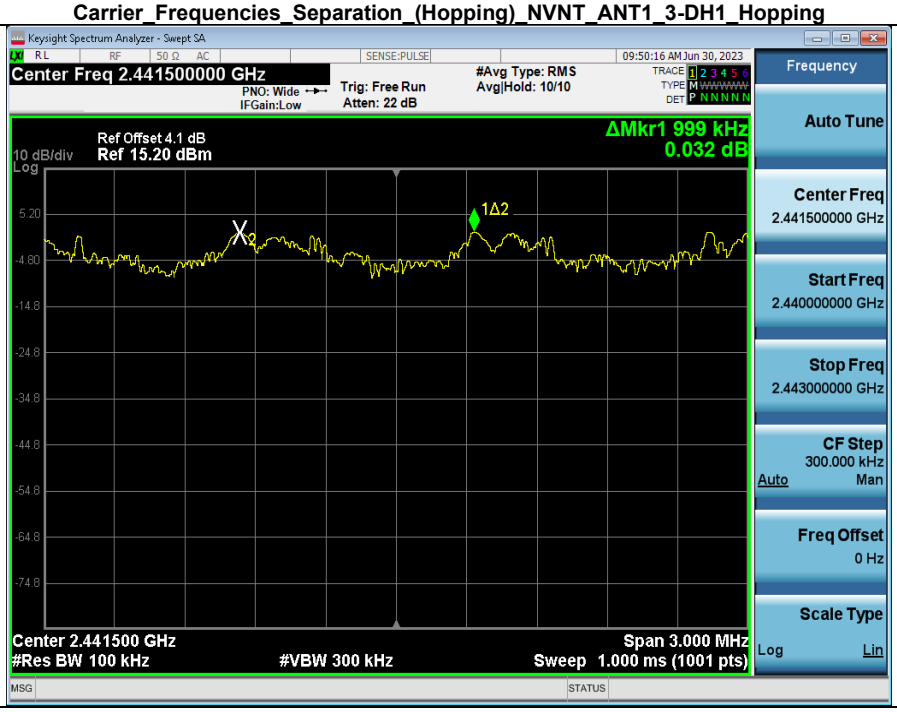
Carrier_Frequencies_Separation_(Hopping)_NVNT_ANT1_3-DH1_Hopping



Carrier_Frequencies_Separation_(Hopping)_NVNT_ANT1_3-DH1_Hopping

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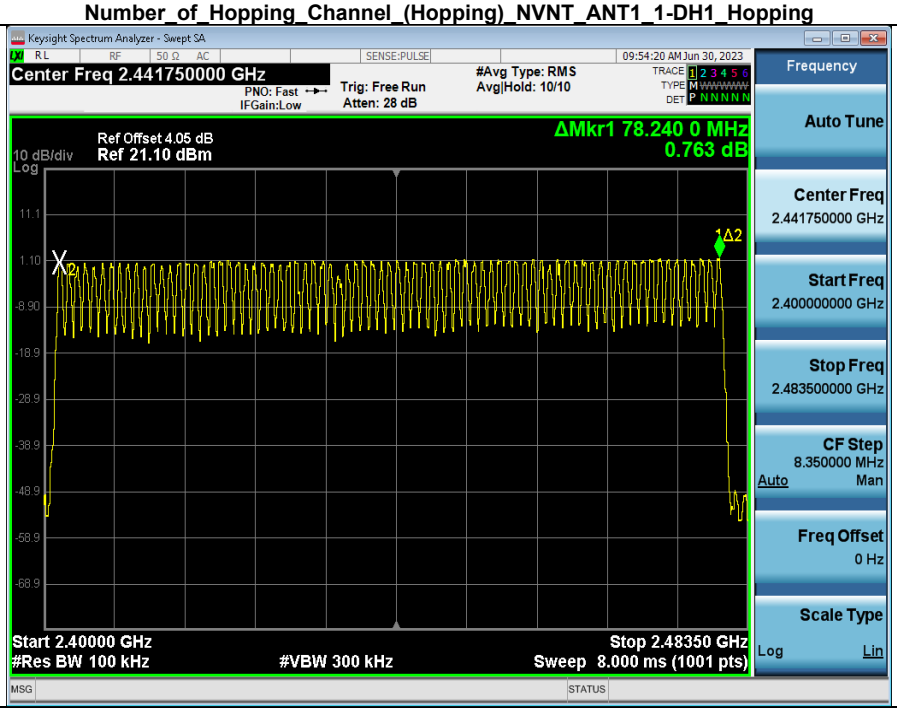
4. Number of Hopping Frequencies

4.1 HoppNum

4.1.1 Test Result

Condition	Antenna	Modulation	Hopping Num	Limit	Result
NVNT	ANT1	1-DH1	79	15	Pass
NVNT	ANT1	2-DH1	79	15	Pass
NVNT	ANT1	3-DH1	79	15	Pass

Number_of_Hopping_Channel_(Hopping)_NVNT_ANT1_1-DH1_Hopping



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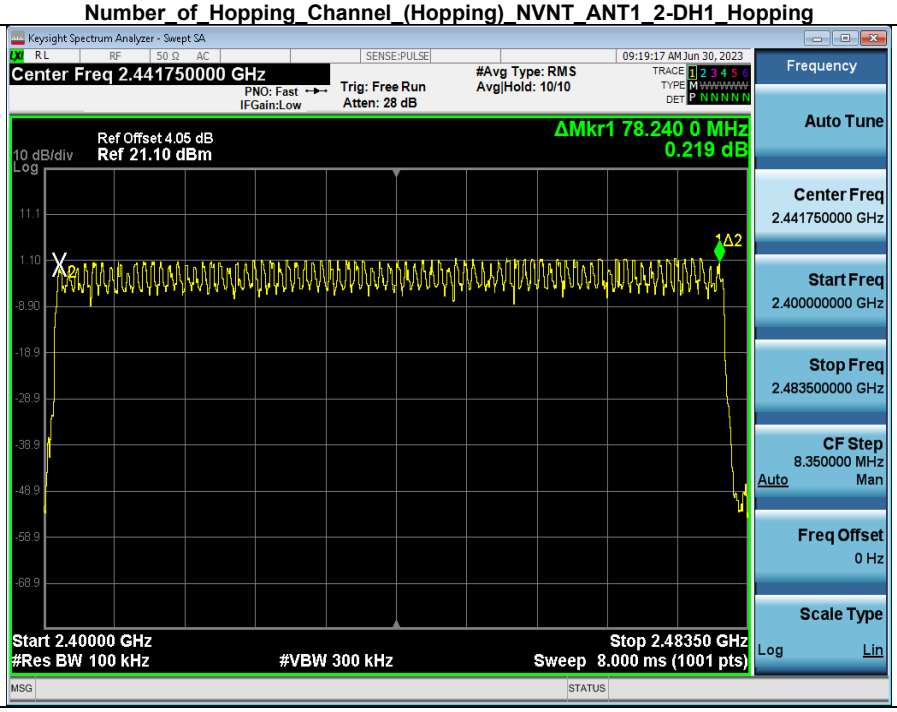
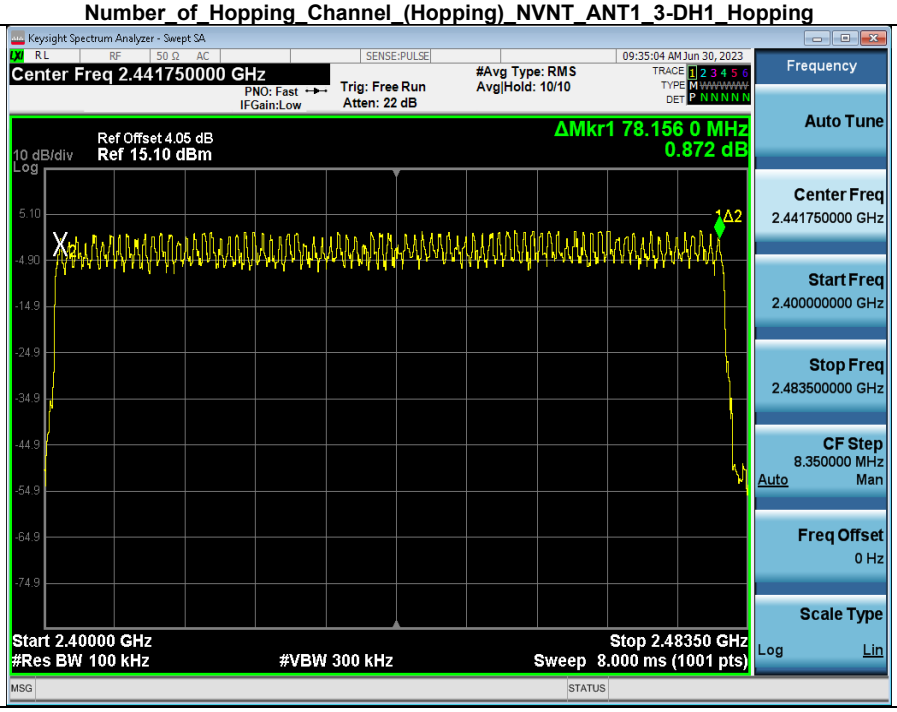


Number_of_Hopping_Channel_(Hopping)_NVNT_ANT1_3-DH1_Hopping



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5. Time of Occupancy (Dwell Time)

5.1 Ant1

5.1.1 Test Result

Condition	Antenna	Packet Type	Pulse Time(ms)	Hops	Dwell Time(ms)	Limit(s)	Result
NVNT	ANT1	1-DH1	0.377	319.00	120.263	0.40	Pass
NVNT	ANT1	1-DH3	1.633	151.00	246.583	0.40	Pass
NVNT	ANT1	1-DH5	2.881	106.00	305.386	0.40	Pass
NVNT	ANT1	2-DH1	0.387	320.00	123.840	0.40	Pass
NVNT	ANT1	2-DH3	1.639	158.00	258.962	0.40	Pass
NVNT	ANT1	2-DH5	2.887	105.00	303.135	0.40	Pass
NVNT	ANT1	3-DH1	0.388	320.00	124.160	0.40	Pass
NVNT	ANT1	3-DH3	1.638	157.00	257.166	0.40	Pass
NVNT	ANT1	3-DH5	2.889	101.00	291.789	0.40	Pass

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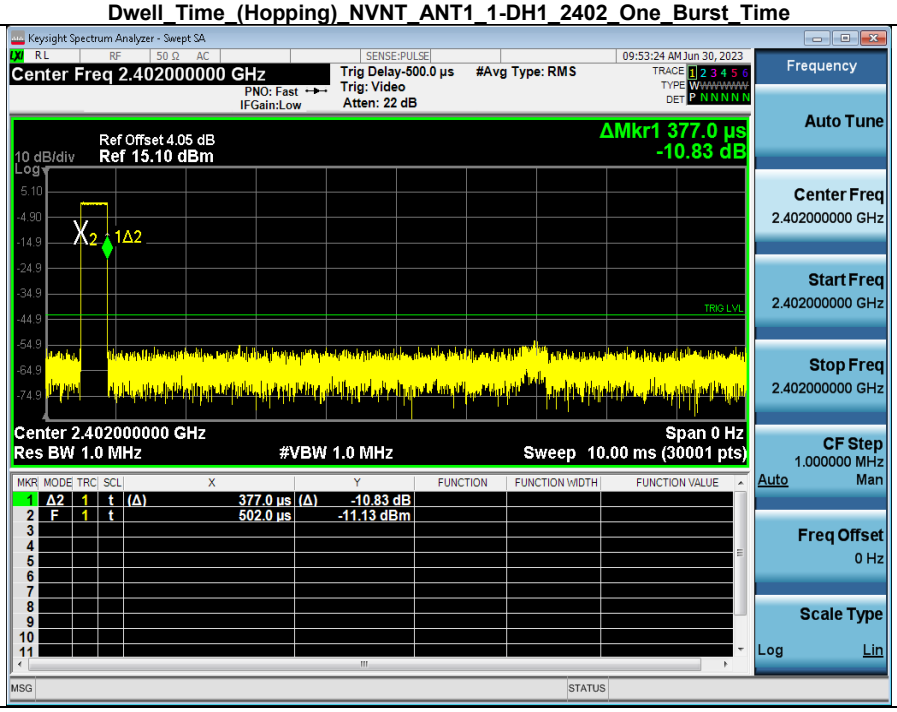
Dwell_Time_(Hopping)_NVNT_ANT1_1-DH1_2402_One_Burst_Time



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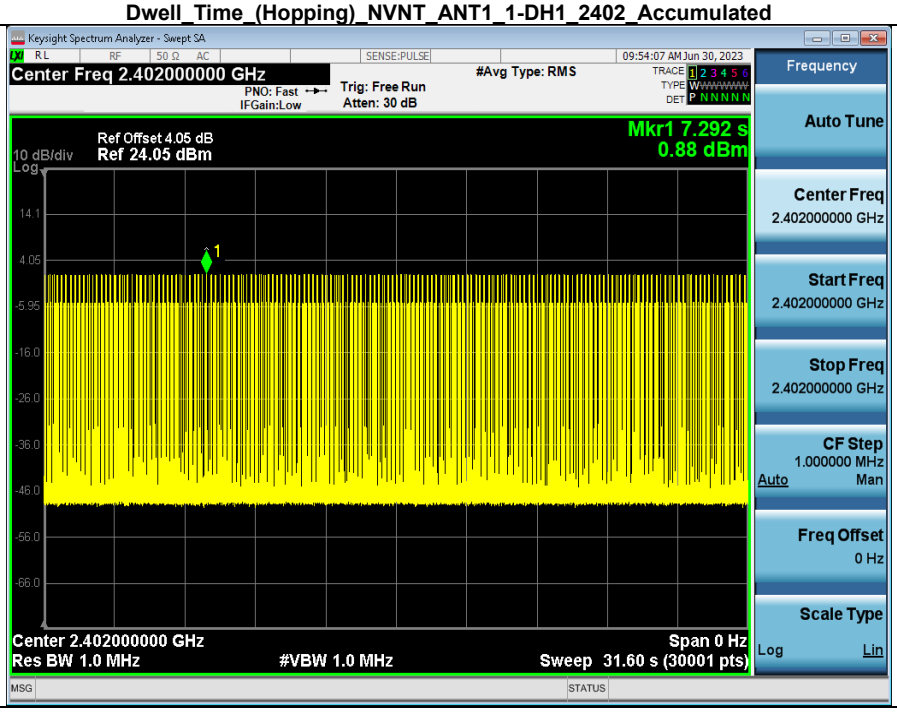

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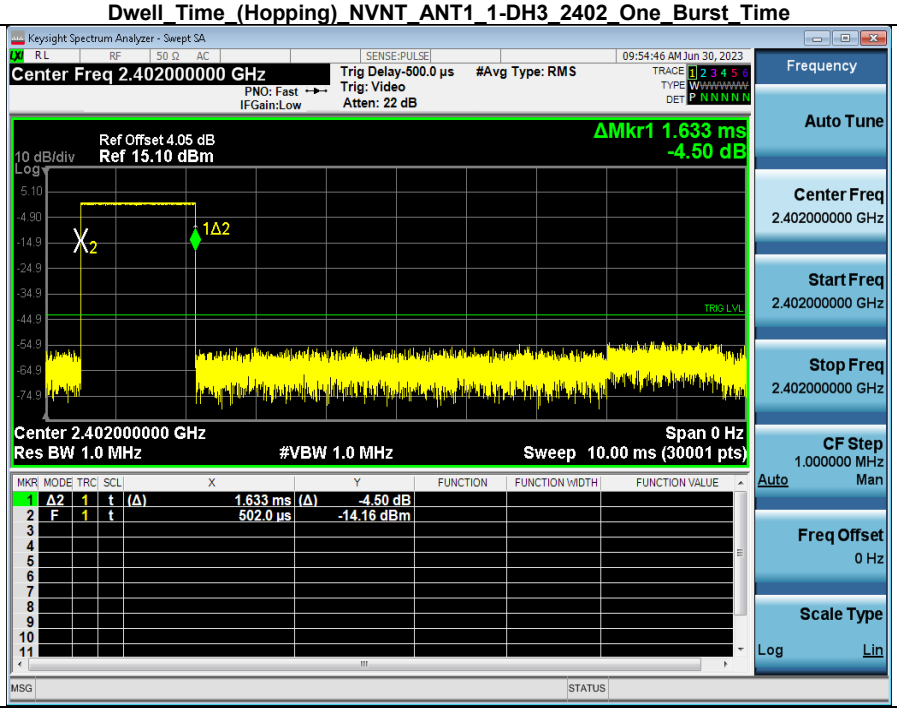

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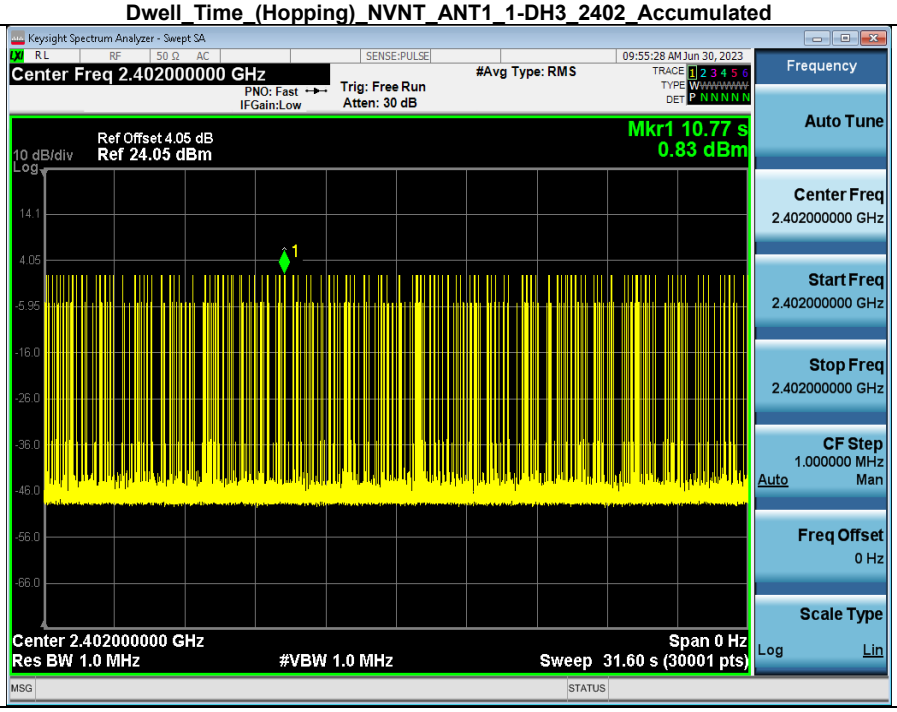

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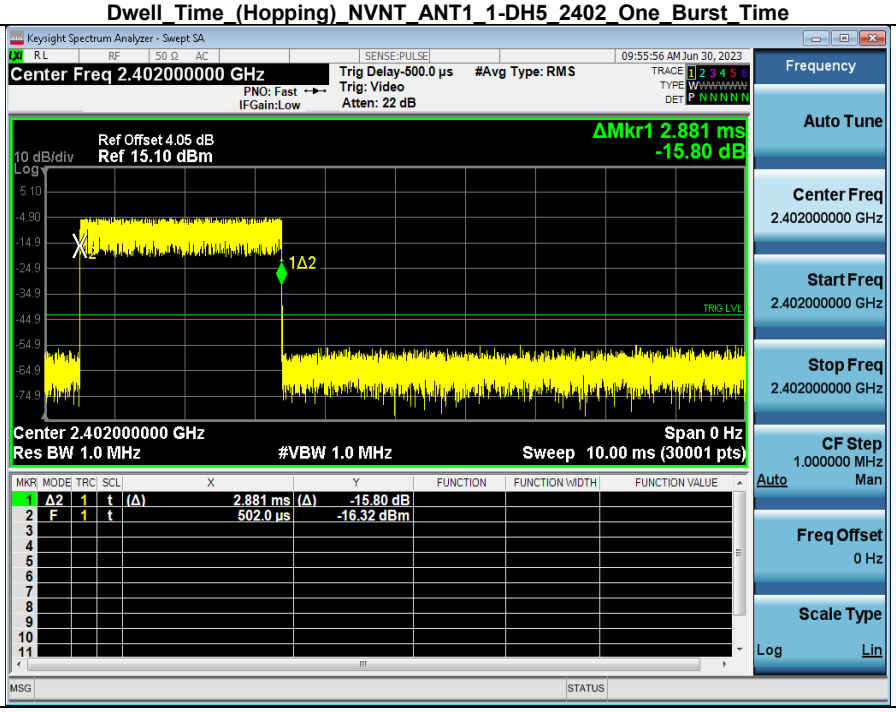
Dwell_Time_(Hopping)_NVNT_ANT1_1-DH5_2402_One_Burst_Time



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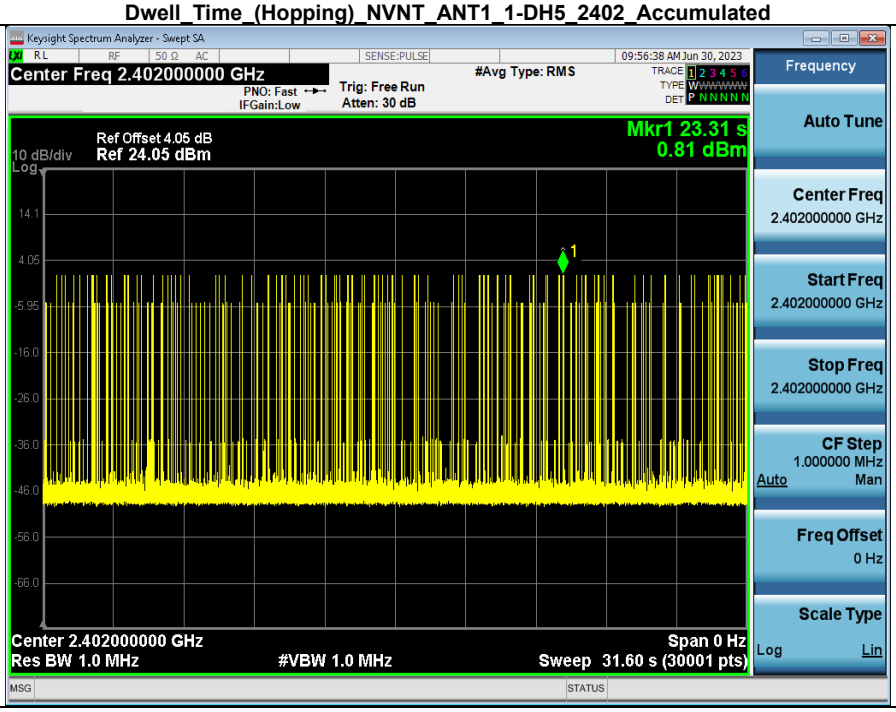

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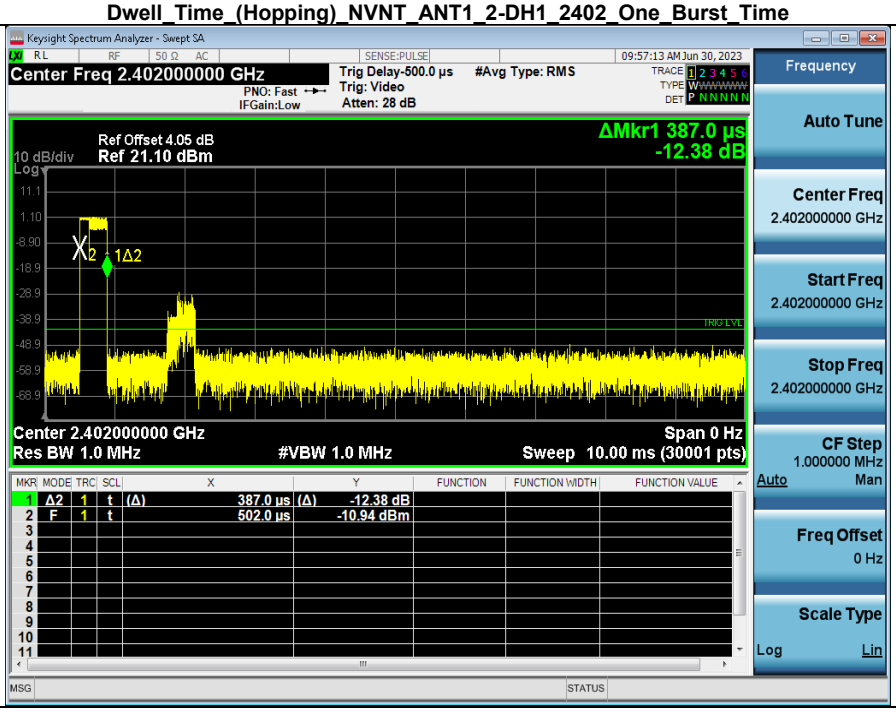
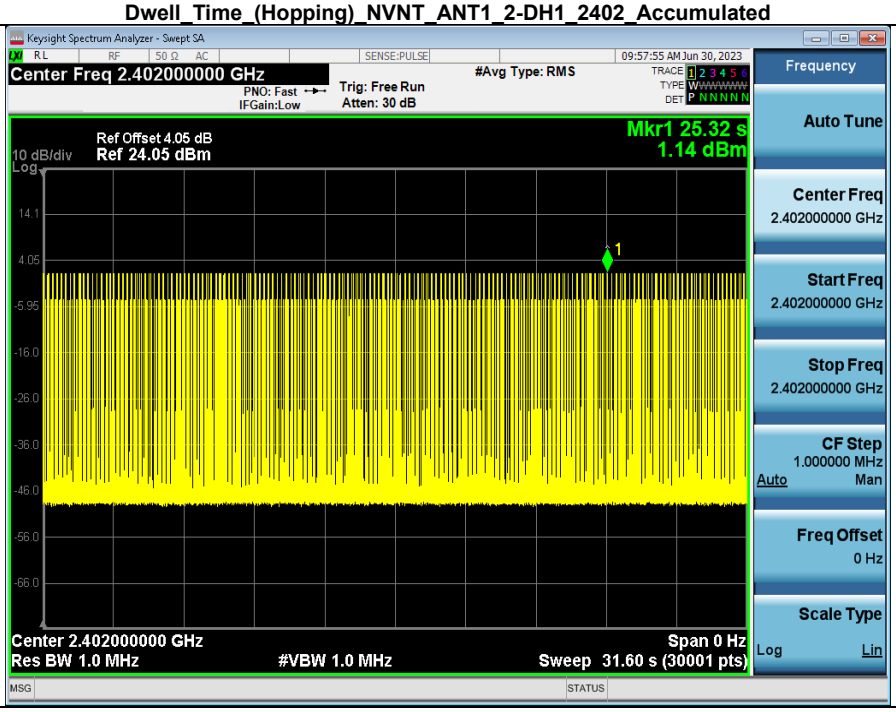
Dwell_Time_(Hopping)_NVNT_ANT1_2-DH1_2402_One_Burst_Time



Dwell_Time_(Hopping)_NVNT_ANT1_2-DH1_2402_Accumulated



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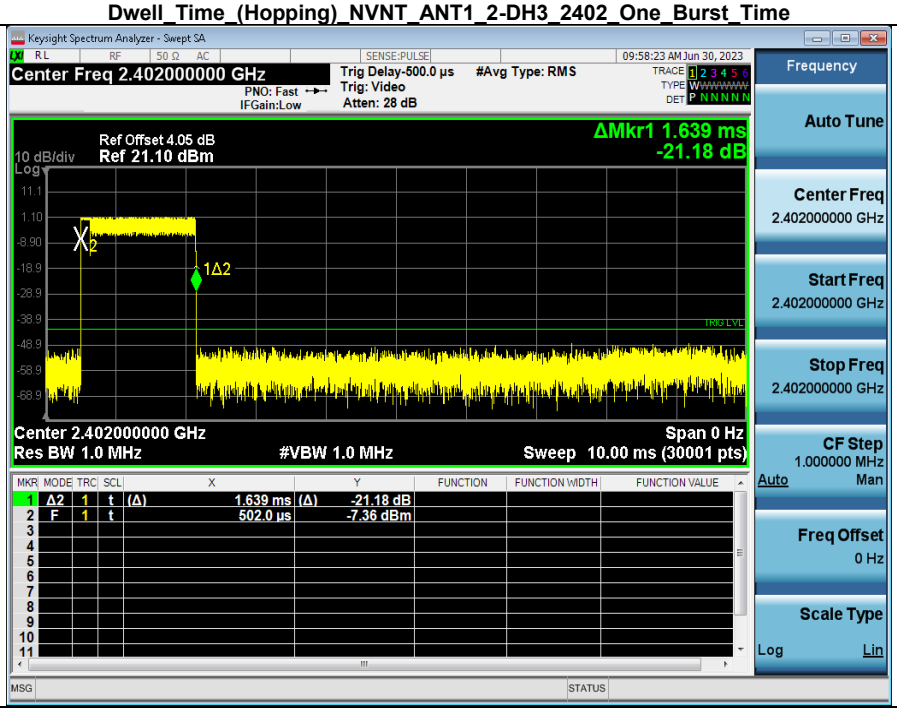
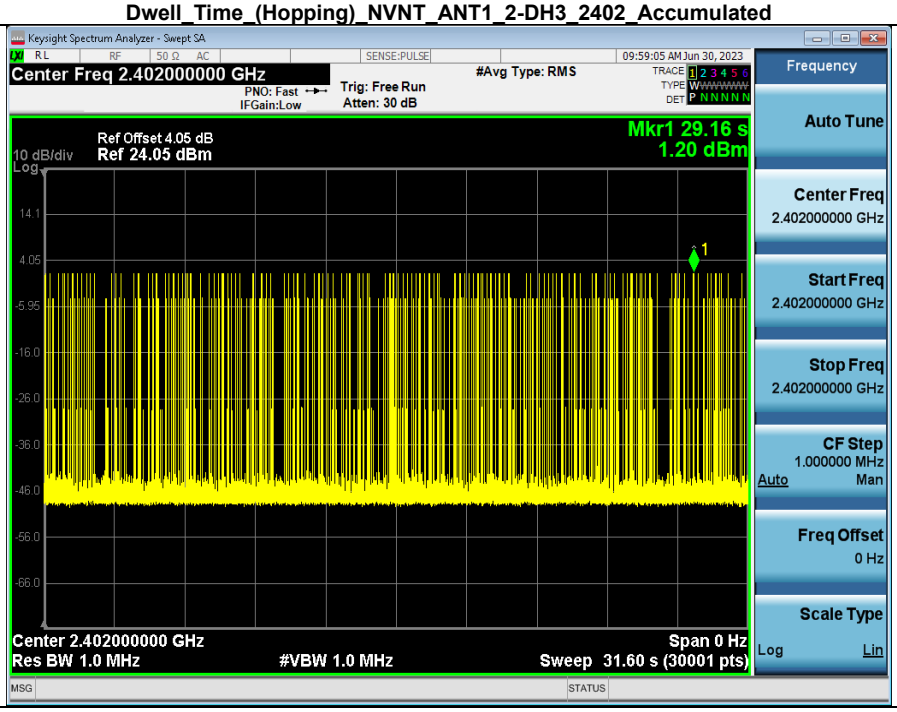
Dwell_Time_(Hopping)_NVNT_ANT1_2-DH3_2402_One_Burst_Time



Dwell_Time_(Hopping)_NVNT_ANT1_2-DH3_2402_Accumulated



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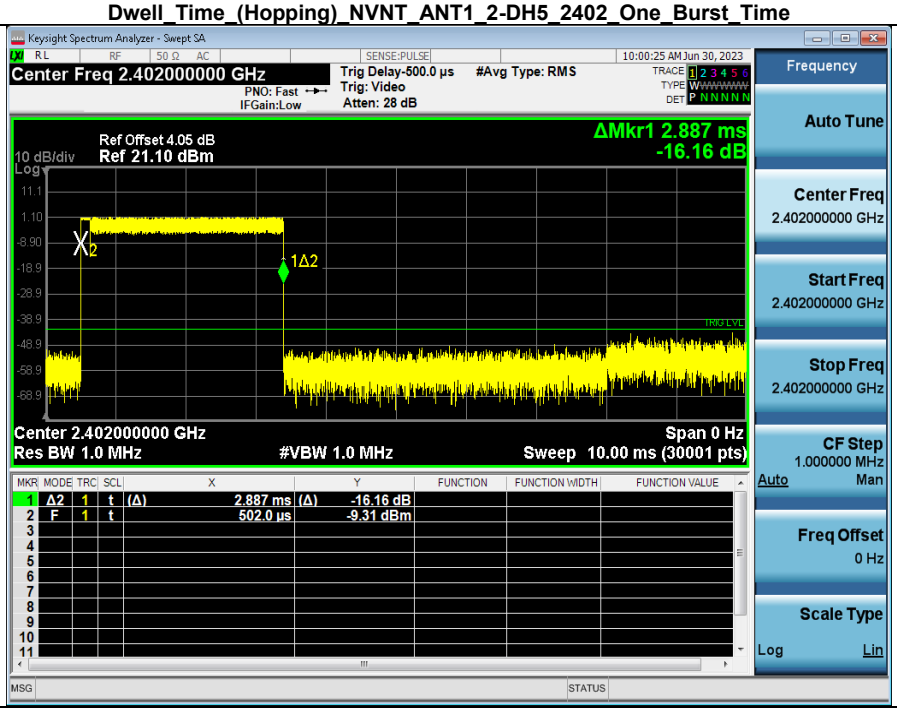
Dwell_Time_(Hopping)_NVNT_ANT1_2-DH5_2402_One_Burst_Time



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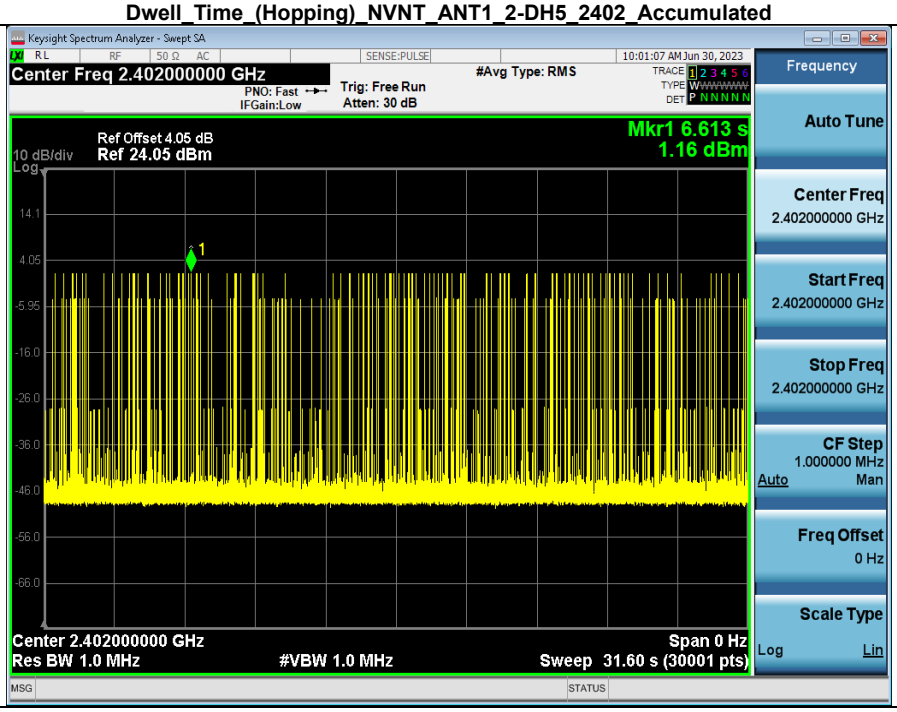

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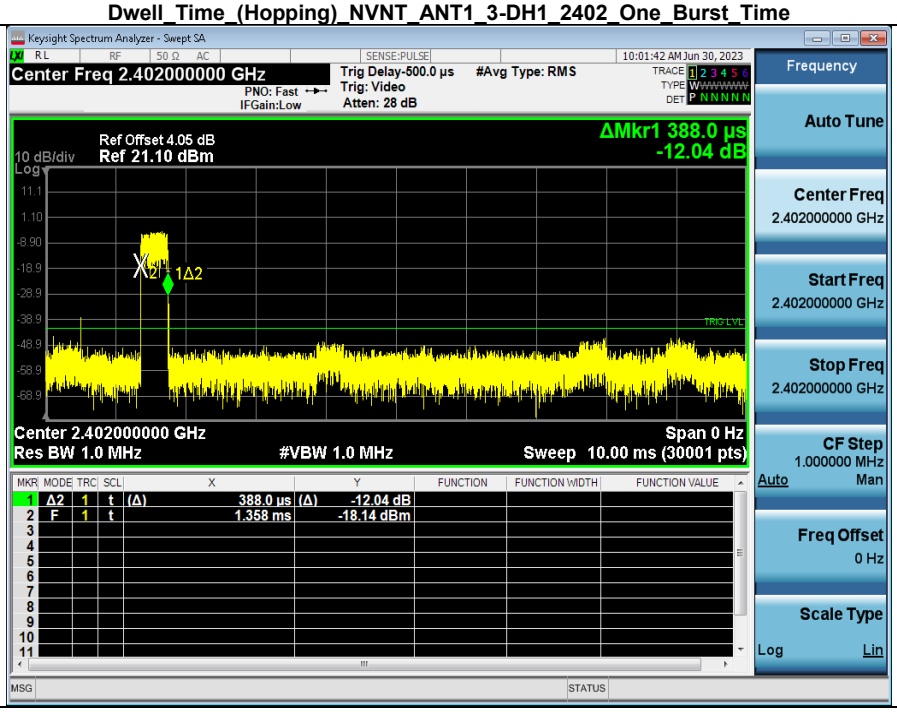
Dwell_Time_(Hopping)_NVNT_ANT1_3-DH1_2402_One_Burst_Time



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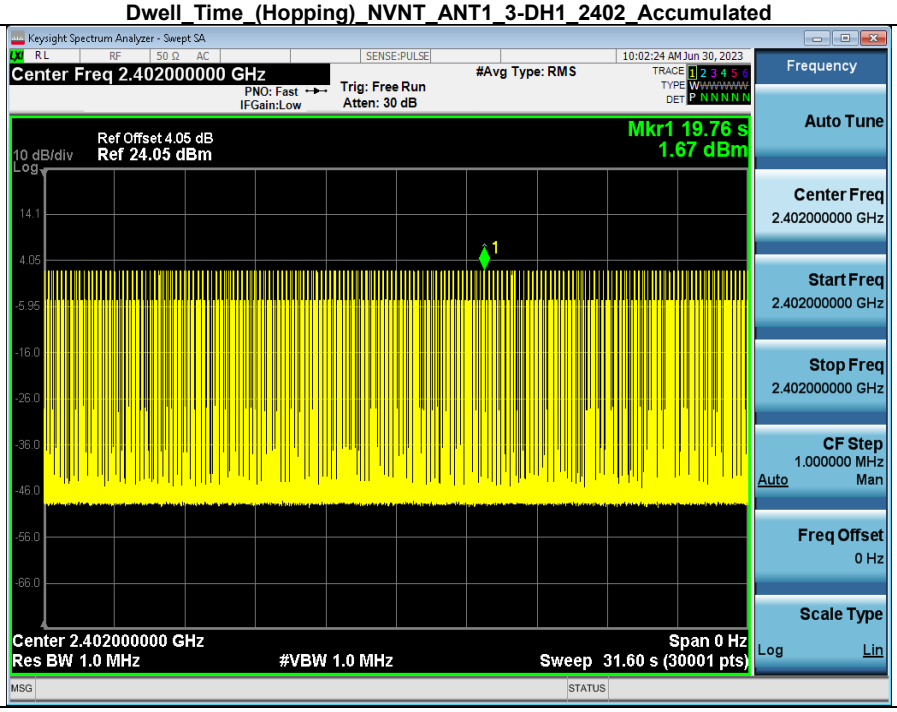

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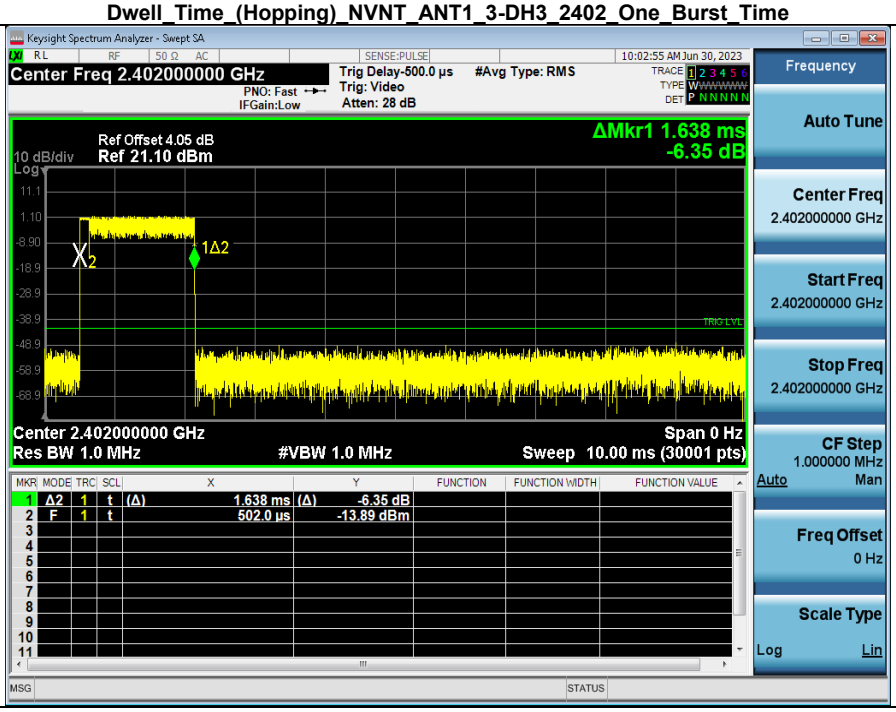

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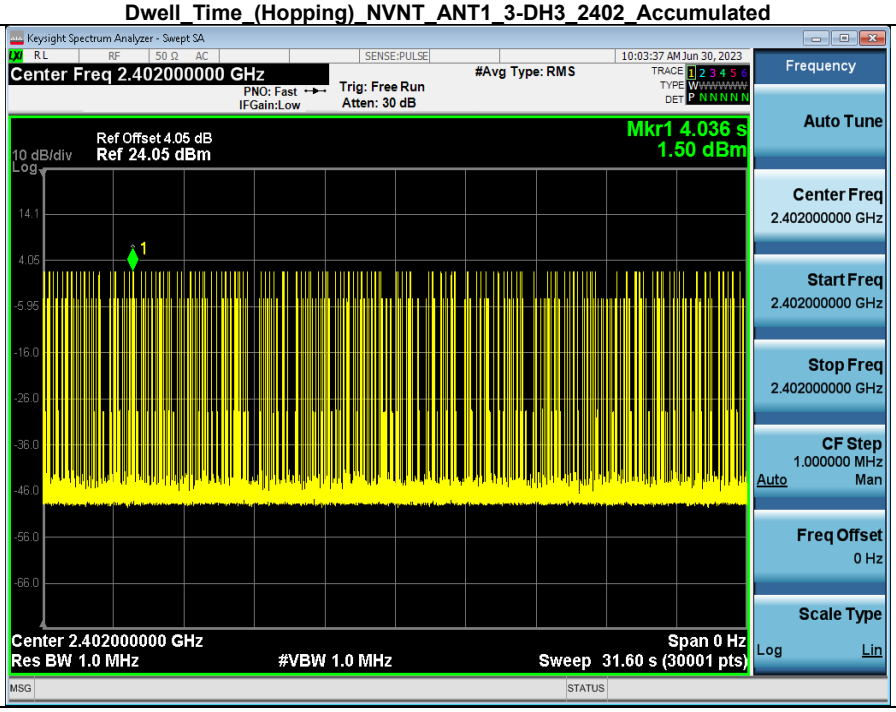

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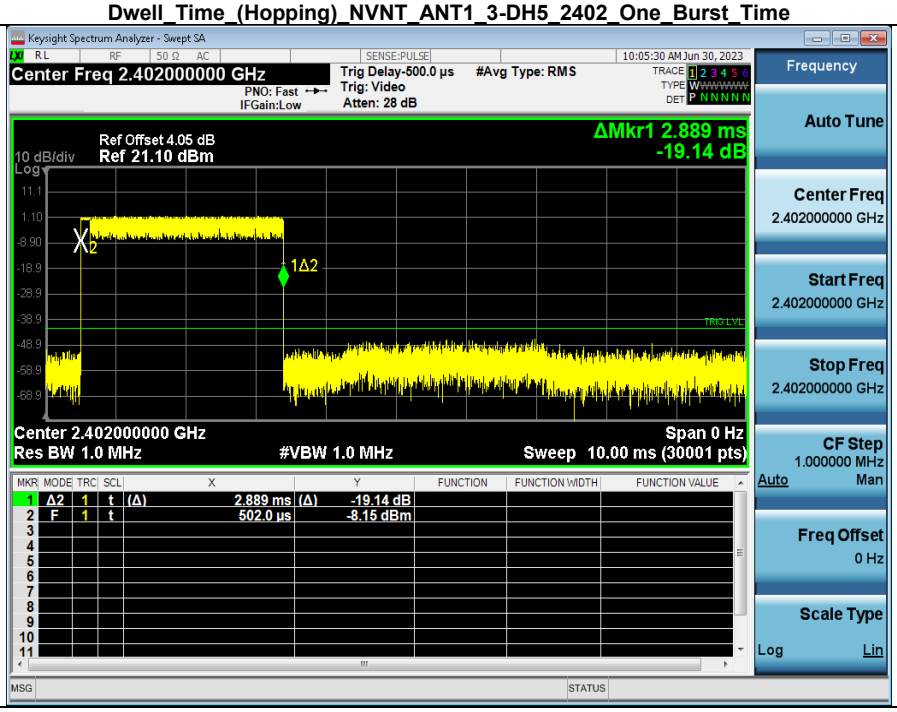
Dwell_Time_(Hopping)_NVNT_ANT1_3-DH5_2402_One_Burst_Time



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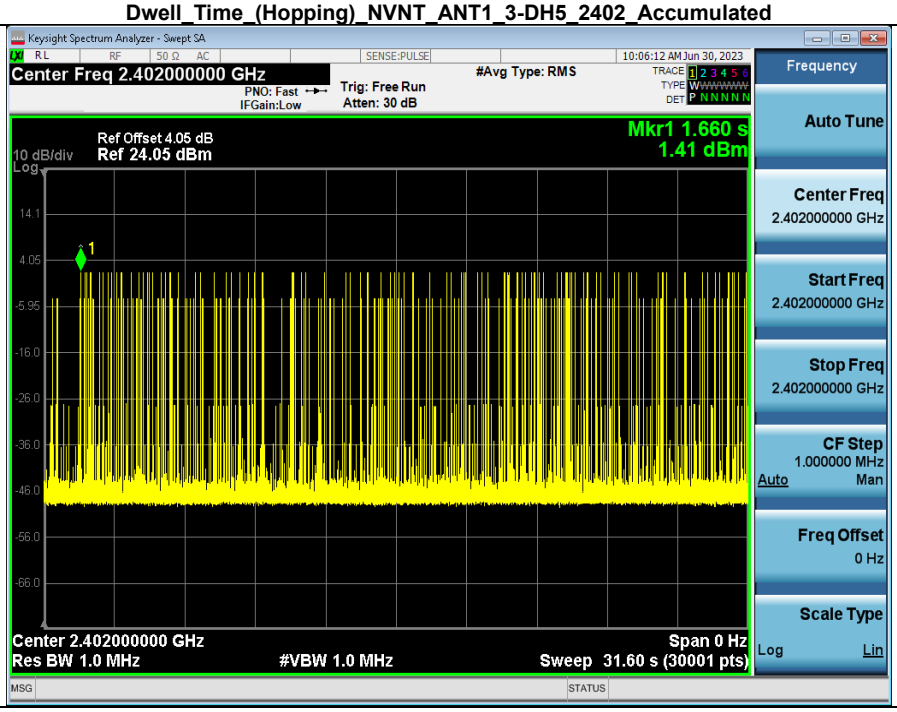

6 Unwanted Emissions In Non-restricted Frequency Bands

6.1 Spurious Emissions

6.1.1 Test Result

Condition	Antenna	Modulation	TX Mode	Spurious MAX.Value(dBm)	Limit	Result
NVNT	ANT1	1-DH1	2402.00	-40.773	-19.386	Pass
NVNT	ANT1	1-DH1	2441.00	-40.724	-18.858	Pass
NVNT	ANT1	1-DH1	2480.00	-40.935	-18.973	Pass
NVNT	ANT1	2-DH1	2402.00	-43.002	-19.396	Pass
NVNT	ANT1	2-DH1	2441.00	-42.209	-18.838	Pass
NVNT	ANT1	2-DH1	2480.00	-40.824	-18.976	Pass
NVNT	ANT1	3-DH1	2402.00	-45.898	-19.383	Pass
NVNT	ANT1	3-DH1	2441.00	-42.204	-18.861	Pass
NVNT	ANT1	3-DH1	2480.00	-40.741	-18.954	Pass

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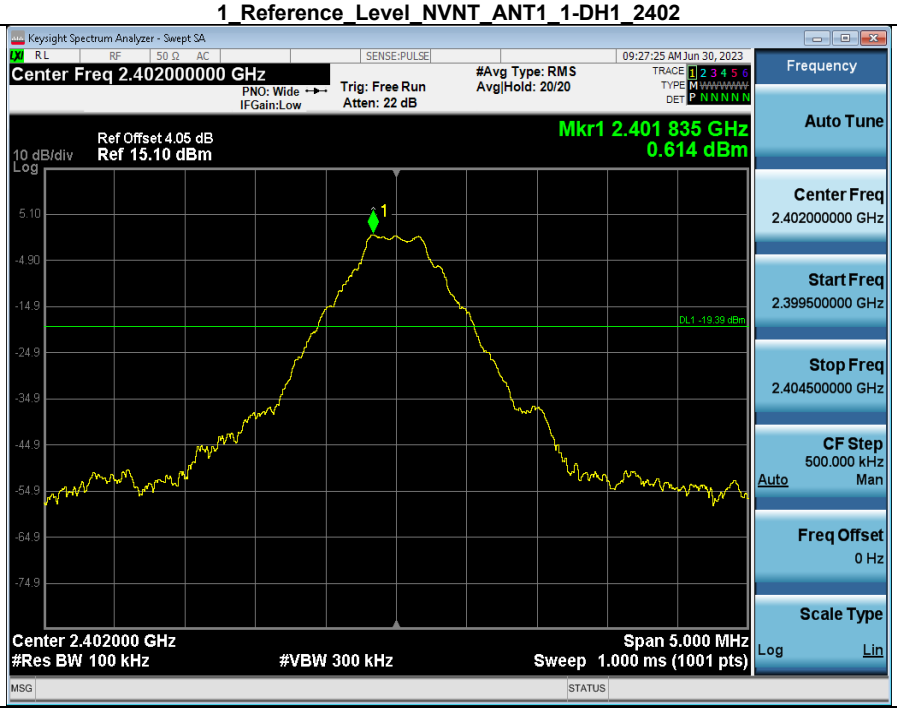
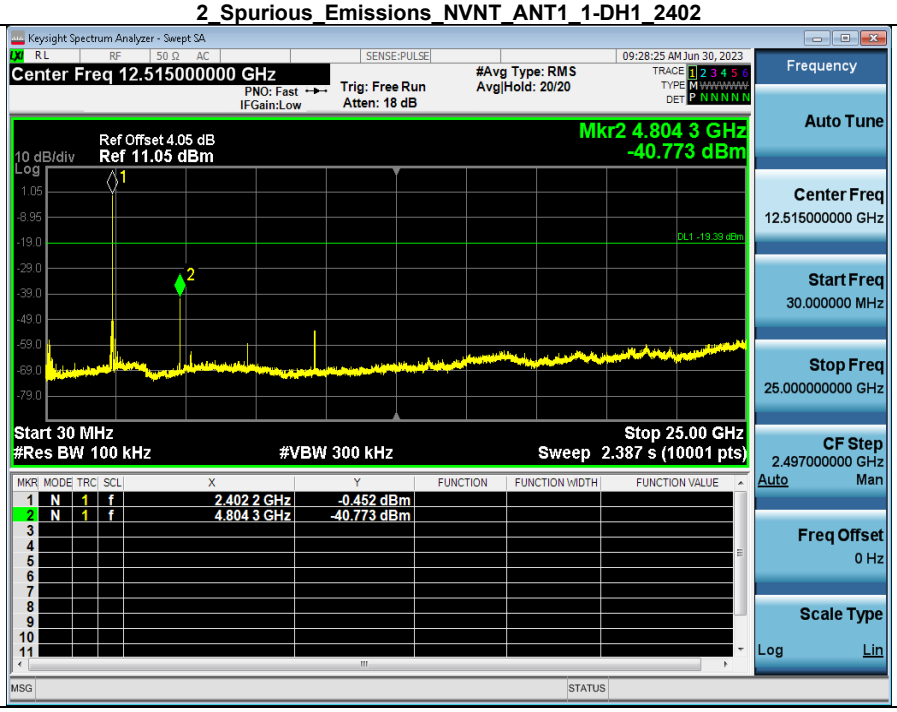
1_Reference_Level_NVNT_ANT1_1-DH1_2402



2_Spurious_Emissions_NVNT_ANT1_1-DH1_2402



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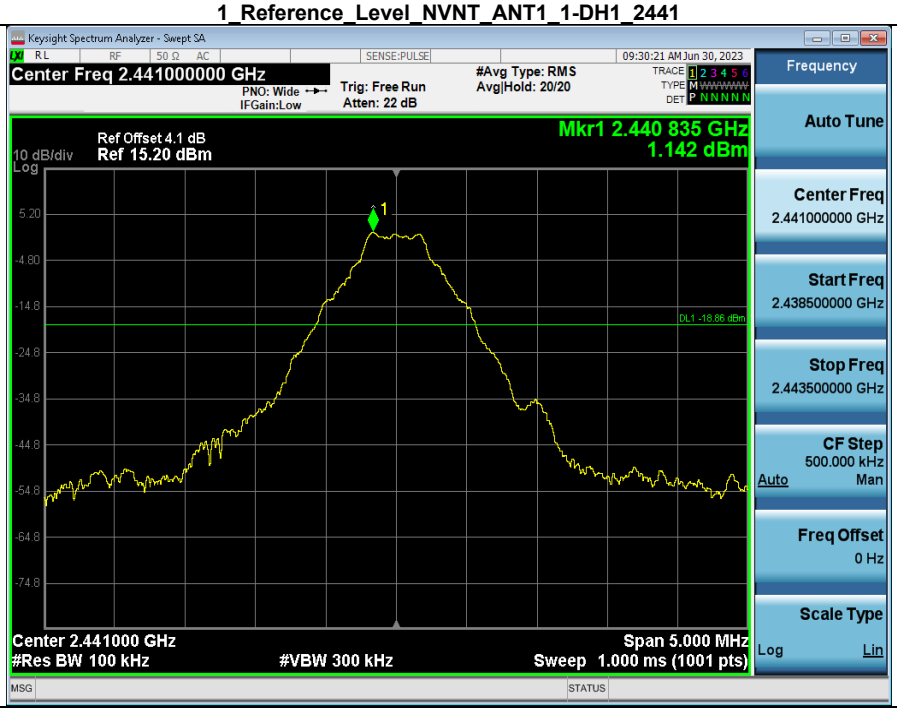
1_Reference_Level_NVNT_ANT1_1-DH1_2441



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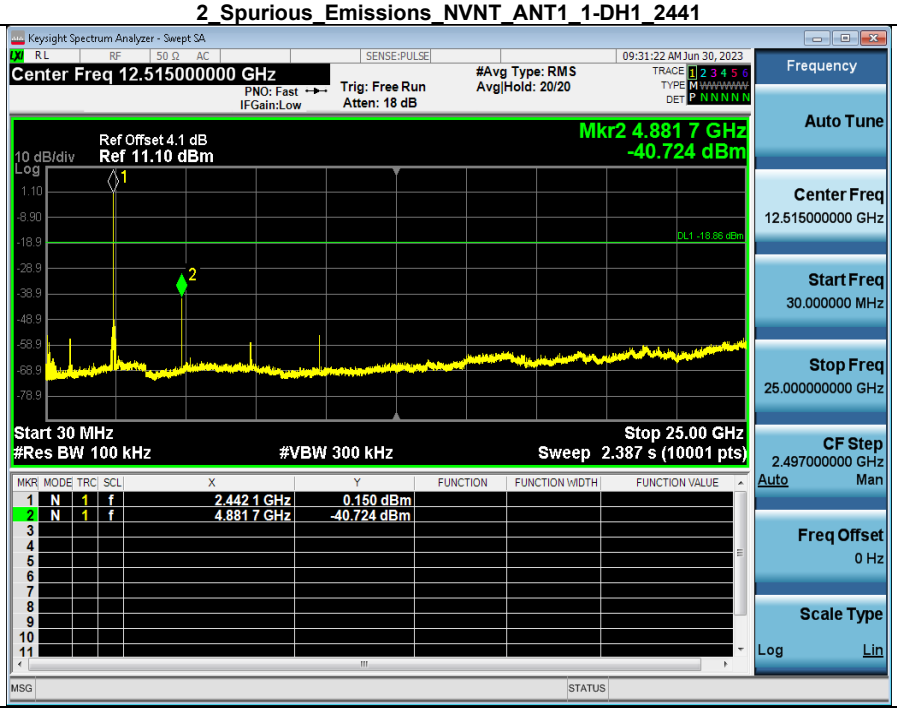

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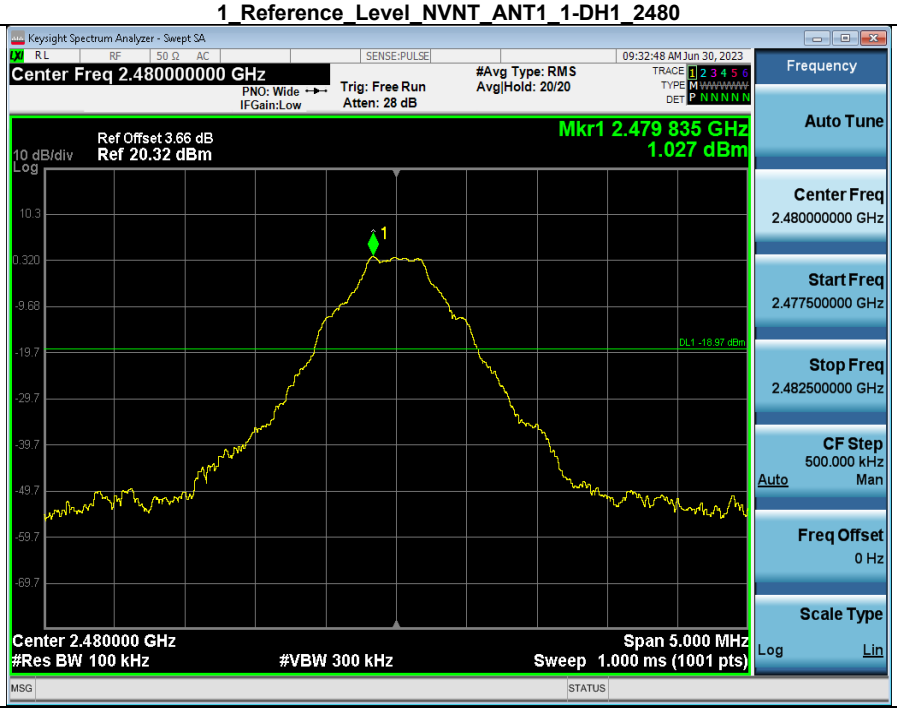
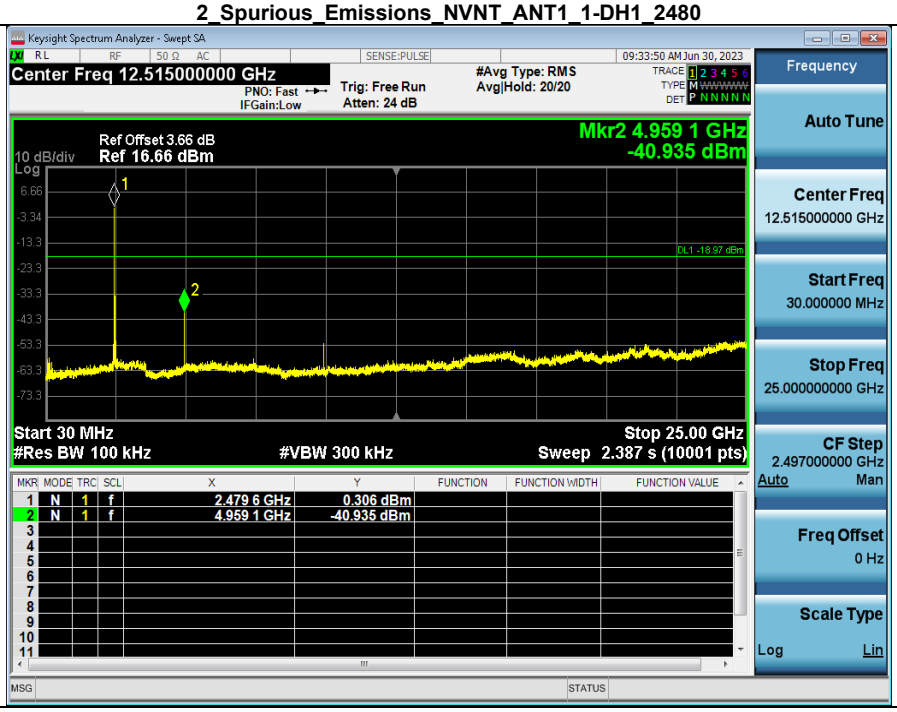
1_Reference_Level_NVNT_ANT1_1-DH1_2480



2_Spurious_Emissions_NVNT_ANT1_1-DH1_2480



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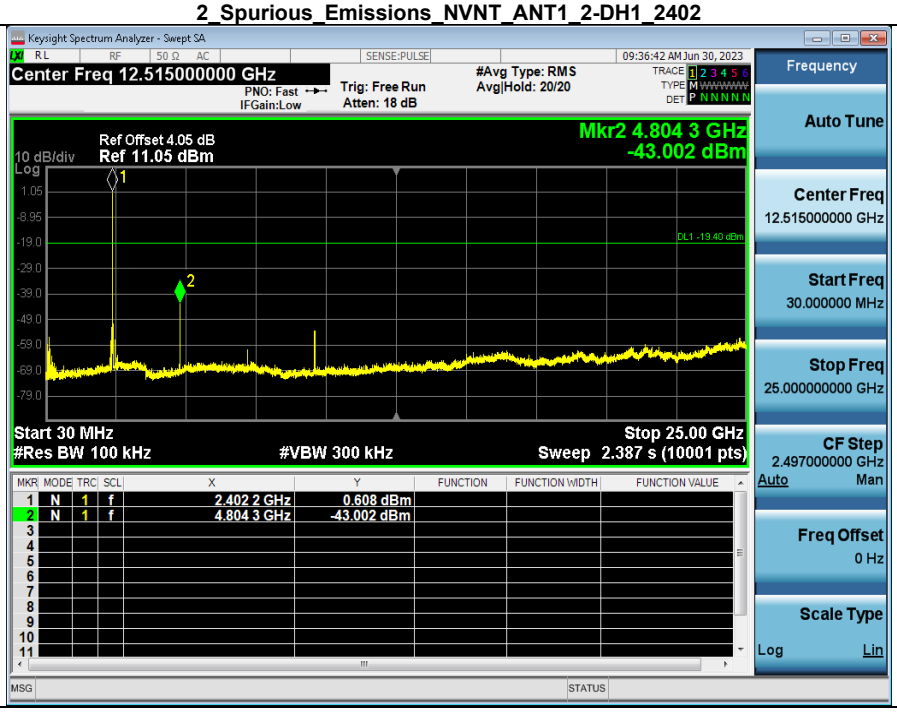
1_Reference_Level_NVNT_ANT1_2-DH1_2402

2_Spurious_Emissions_NVNT_ANT1_2-DH1_2402



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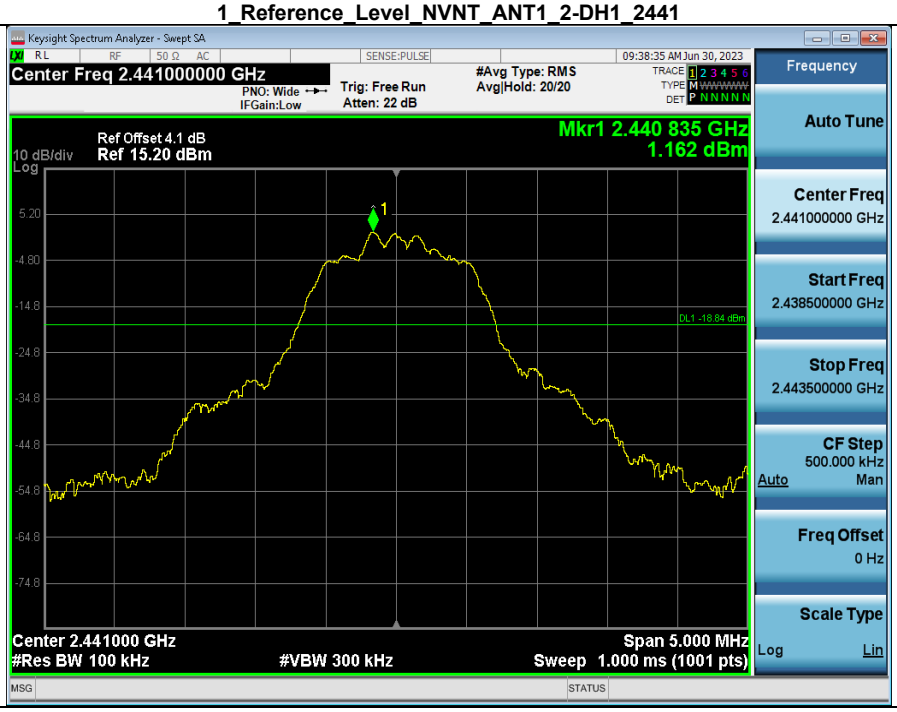
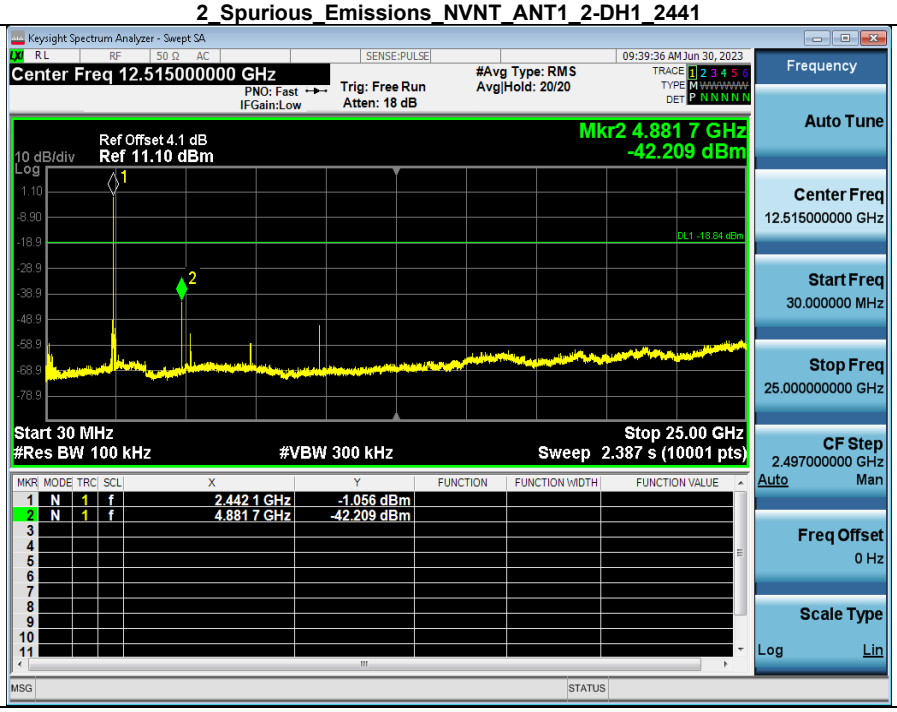
1_Reference_Level_NVNT_ANT1_2-DH1_2441



2_Spurious_Emissions_NVNT_ANT1_2-DH1_2441



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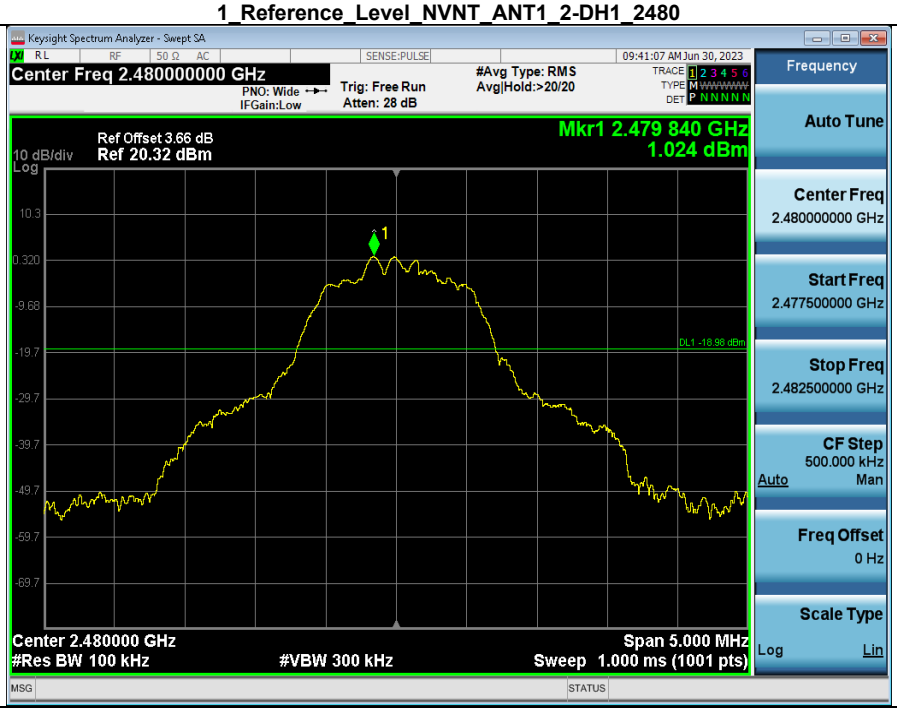
1_Reference_Level_NVNT_ANT1_2-DH1_2480



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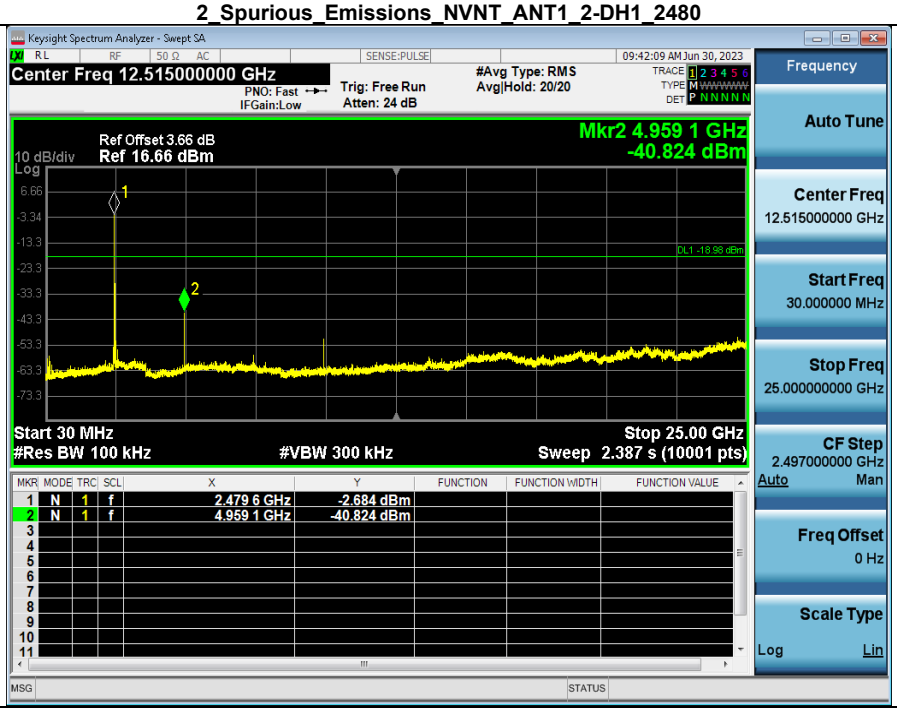

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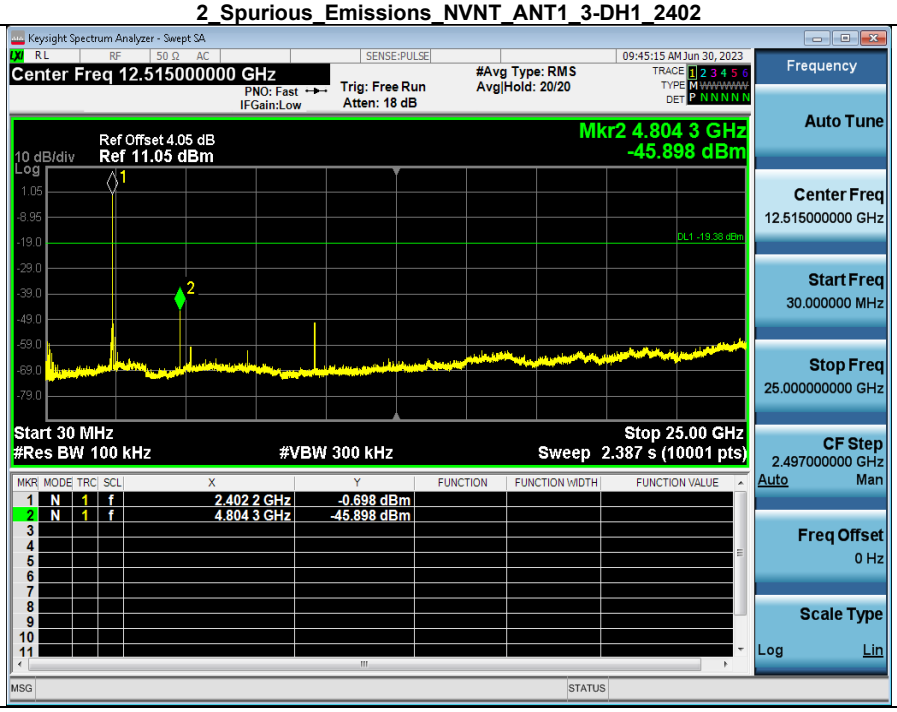
1_Reference_Level_NVNT_ANT1_3-DH1_2402

2_Spurious_Emissions_NVNT_ANT1_3-DH1_2402



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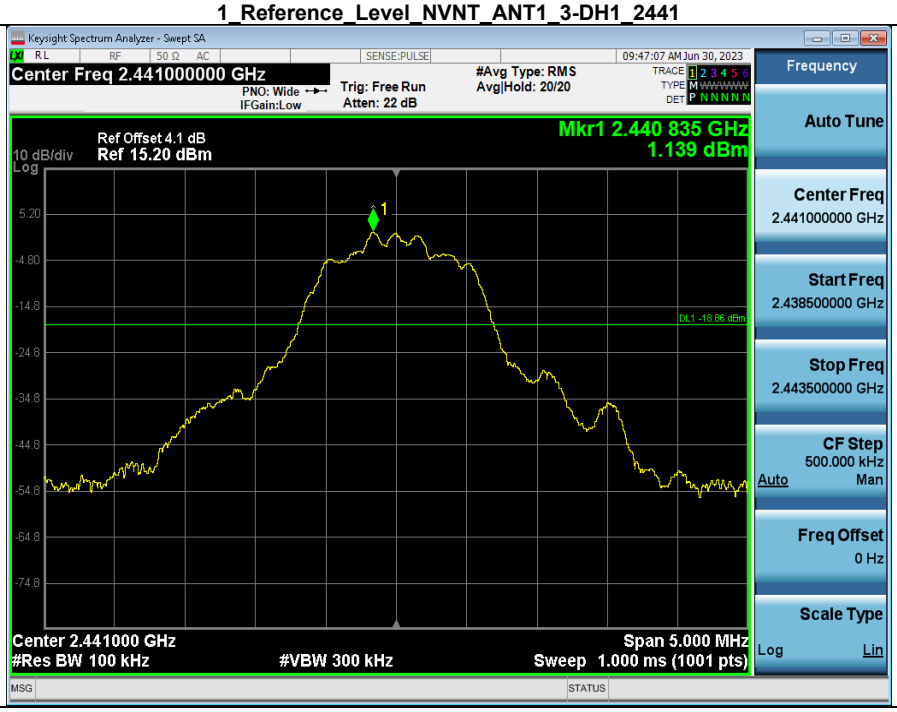
1_Reference_Level_NVNT_ANT1_3-DH1_2441



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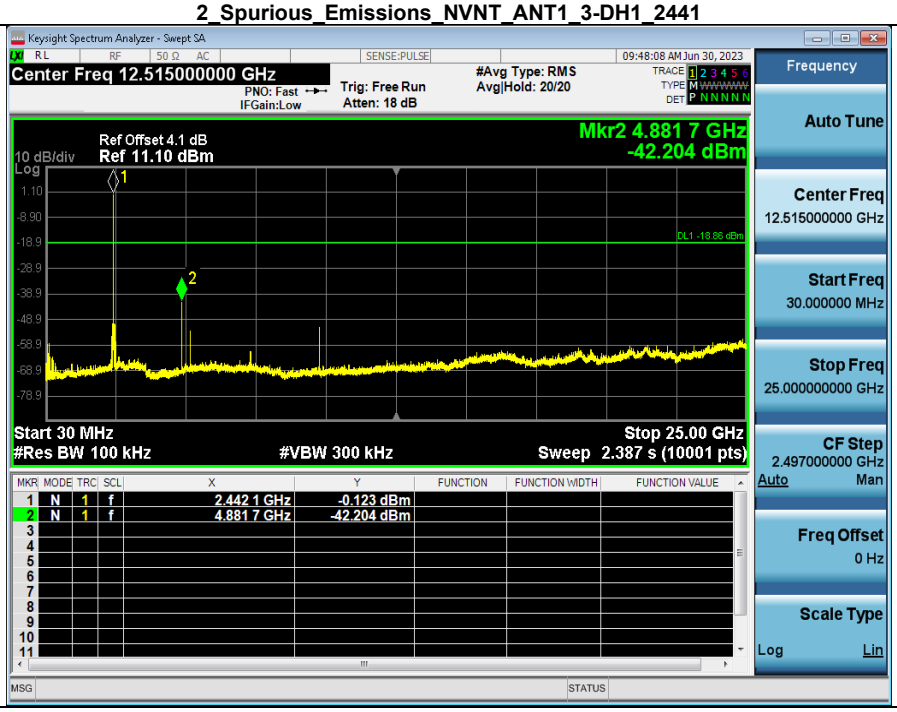

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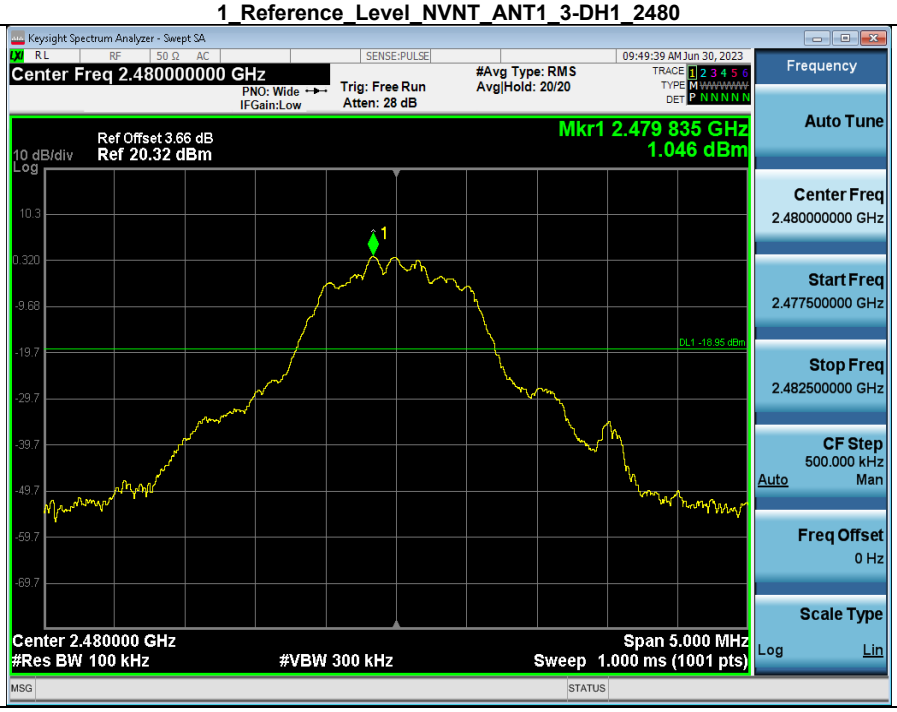
1_Reference_Level_NVNT_ANT1_3-DH1_2480



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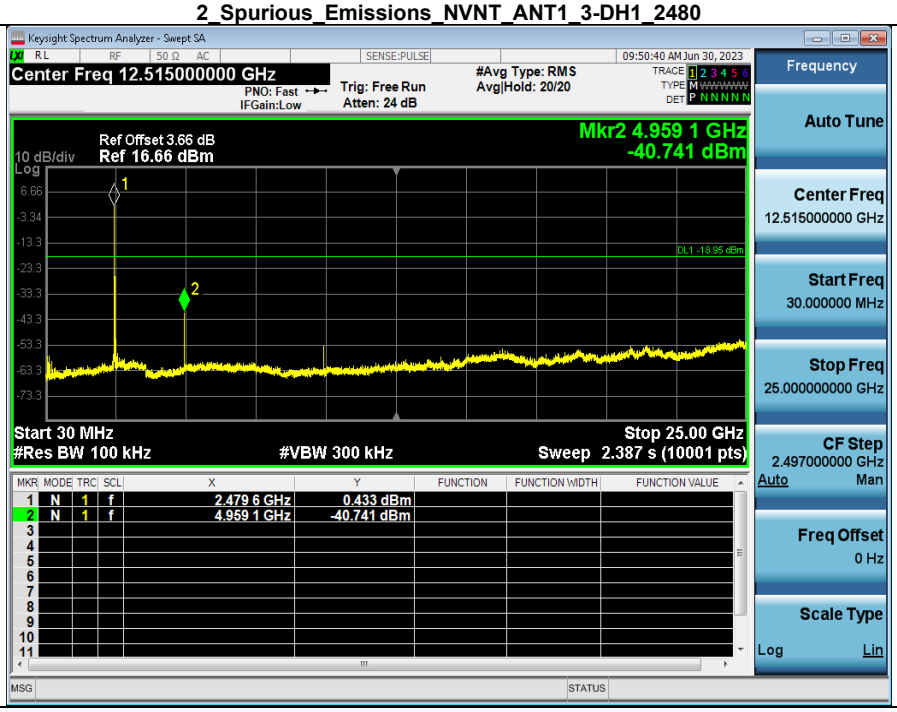

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6.2 Bandedge

6.2.1 Test Result

Condition	Antenna	Modulation	TX Mode	Bandedge MAX.Value	Limit	Result
NVNT	ANT1	1-DH1	2402.00	-51.403	-19.386	Pass
NVNT	ANT1	1-DH1	Hopping_LCH	-49.062	-18.479	Pass
NVNT	ANT1	1-DH1	2480.00	-54.922	-18.973	Pass
NVNT	ANT1	1-DH1	Hopping_HCH	-48.817	-18.901	Pass
NVNT	ANT1	2-DH1	2402.00	-51.913	-19.396	Pass
NVNT	ANT1	2-DH1	Hopping_LCH	-48.820	-18.565	Pass
NVNT	ANT1	2-DH1	2480.00	-53.783	-18.976	Pass
NVNT	ANT1	2-DH1	Hopping_HCH	-48.361	-18.850	Pass
NVNT	ANT1	3-DH1	2402.00	-52.311	-19.383	Pass
NVNT	ANT1	3-DH1	Hopping_LCH	-49.803	-18.530	Pass
NVNT	ANT1	3-DH1	2480.00	-53.918	-18.954	Pass
NVNT	ANT1	3-DH1	Hopping_HCH	-48.866	-18.868	Pass

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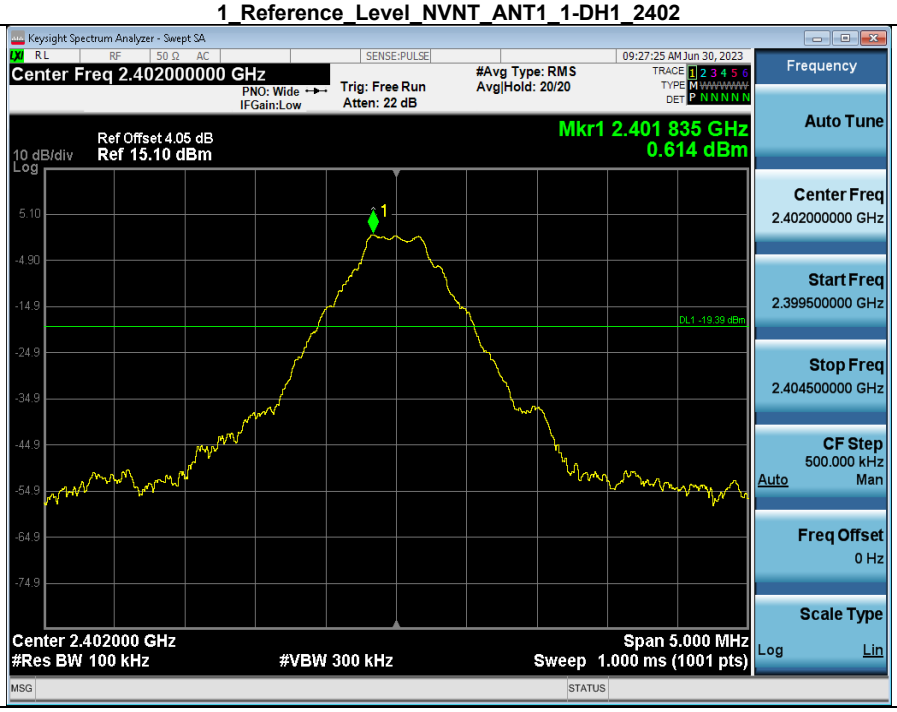
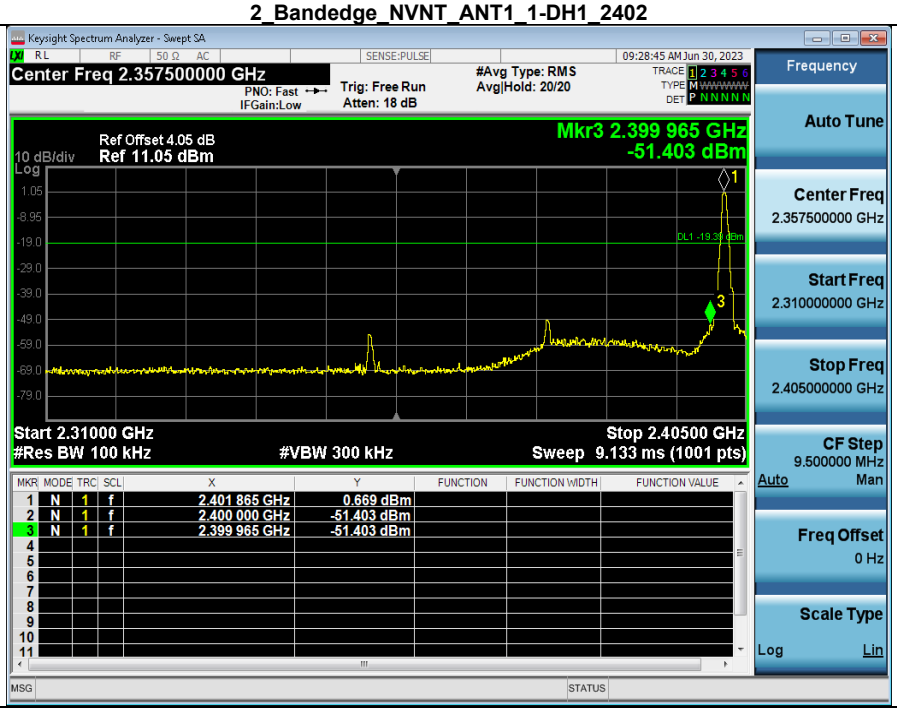
1_Reference_Level_NVNT_ANT1_1-DH1_2402



2_Bandedge_NVNT_ANT1_1-DH1_2402



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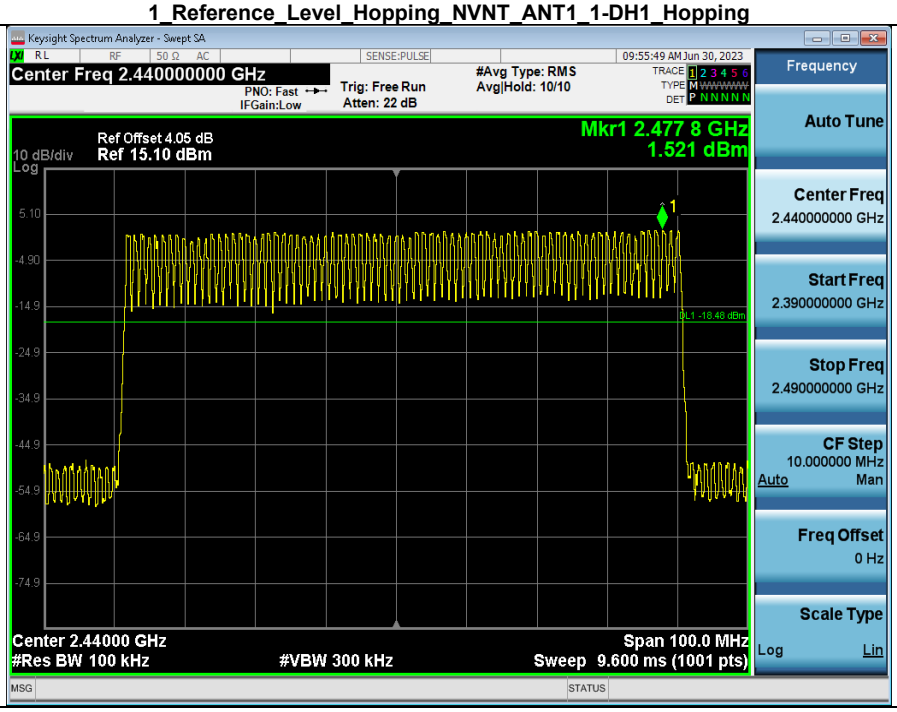
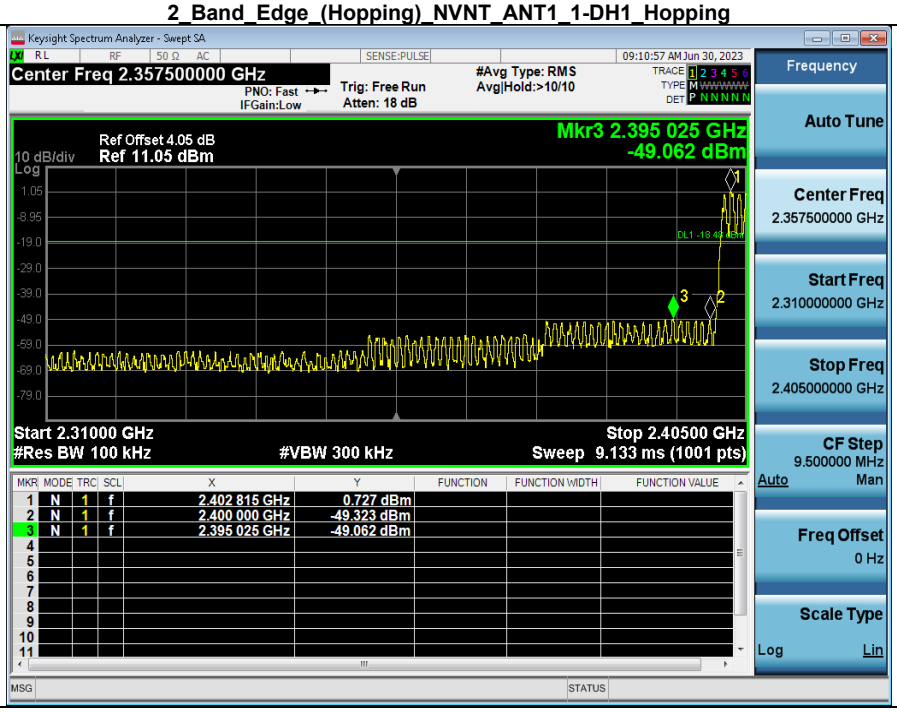
1_Reference_Level_Hopping_NVNT_ANT1_1-DH1_Hopping



2_Band_Edge_(Hopping)_NVNT_ANT1_1-DH1_Hopping



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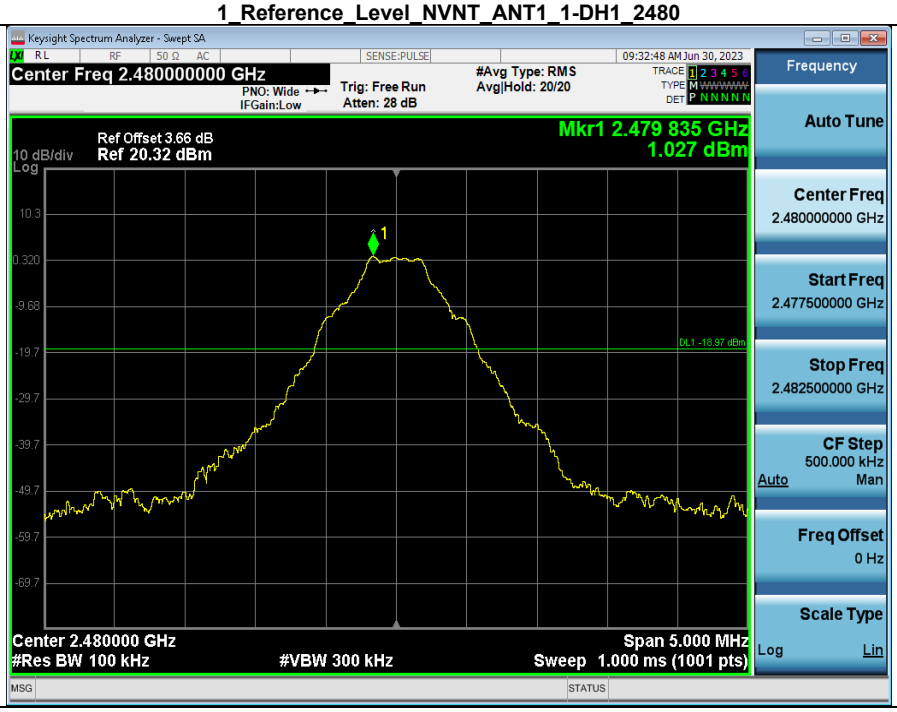
1_Reference_Level_NVNT_ANT1_1-DH1_2480



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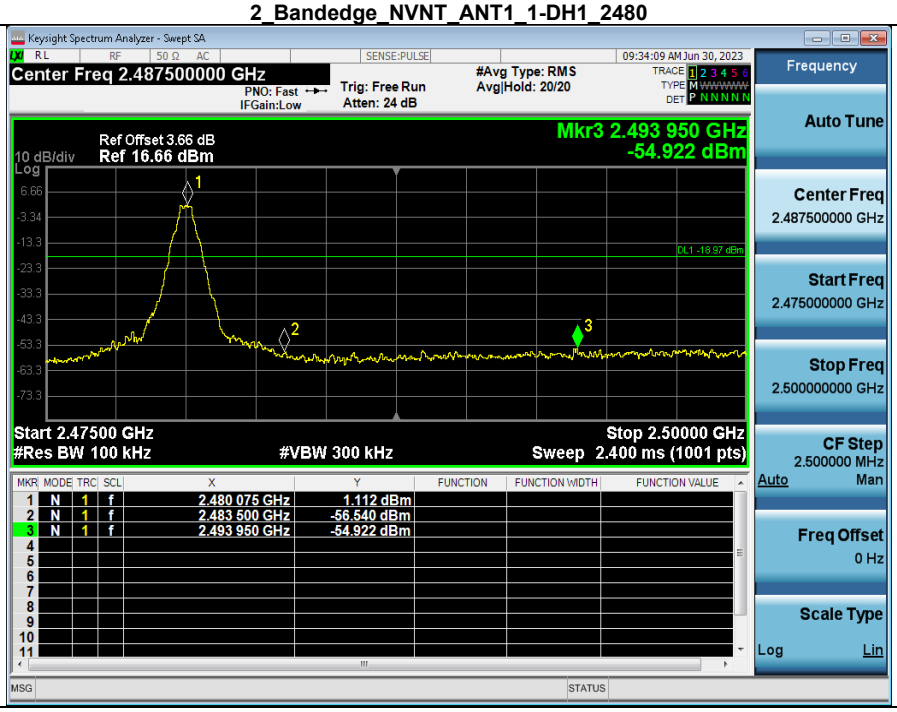

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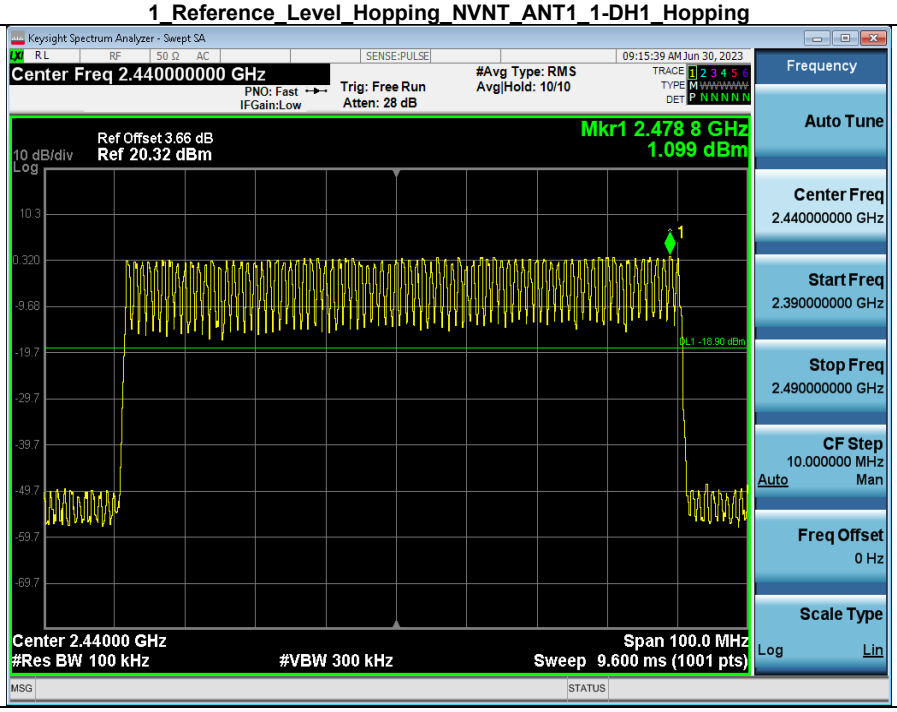
1_Reference_Level_Hopping_NVNT_ANT1_1-DH1_Hopping



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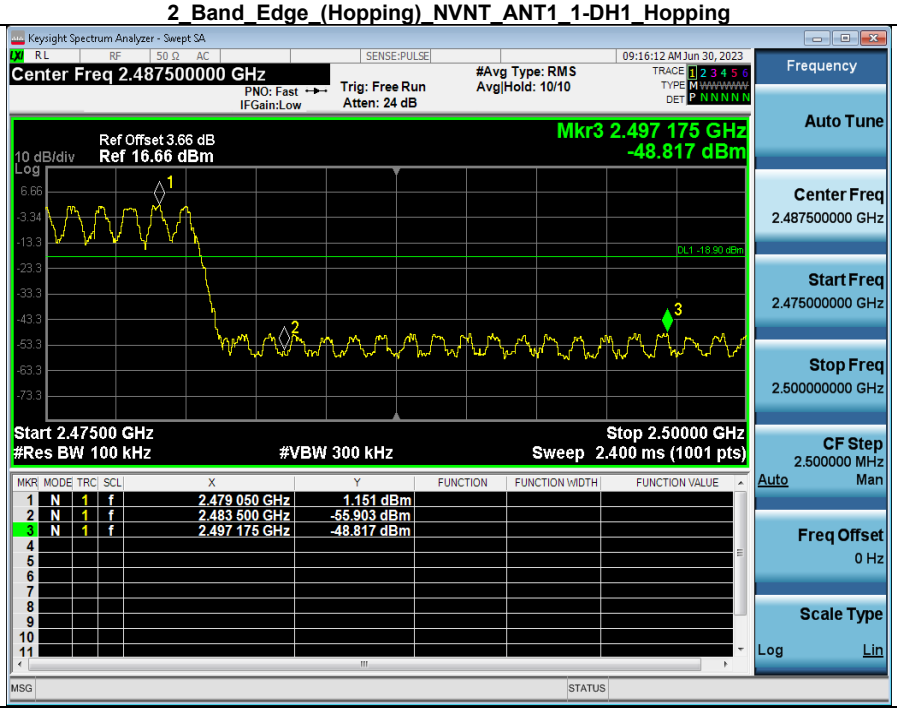

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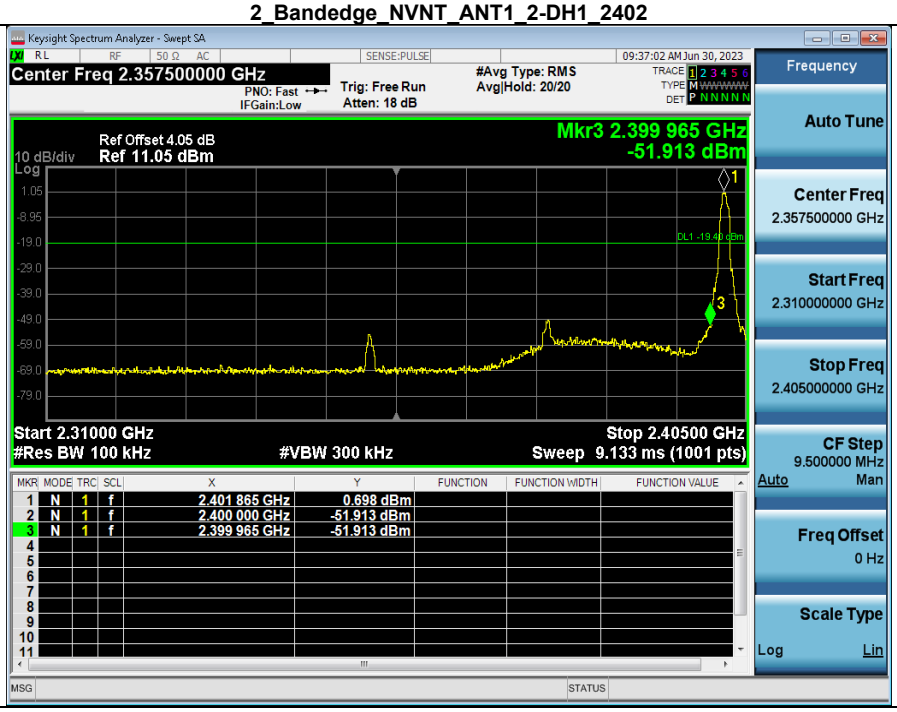
1_Reference_Level_NVNT_ANT1_2-DH1_2402

2_Bandedge_NVNT_ANT1_2-DH1_2402



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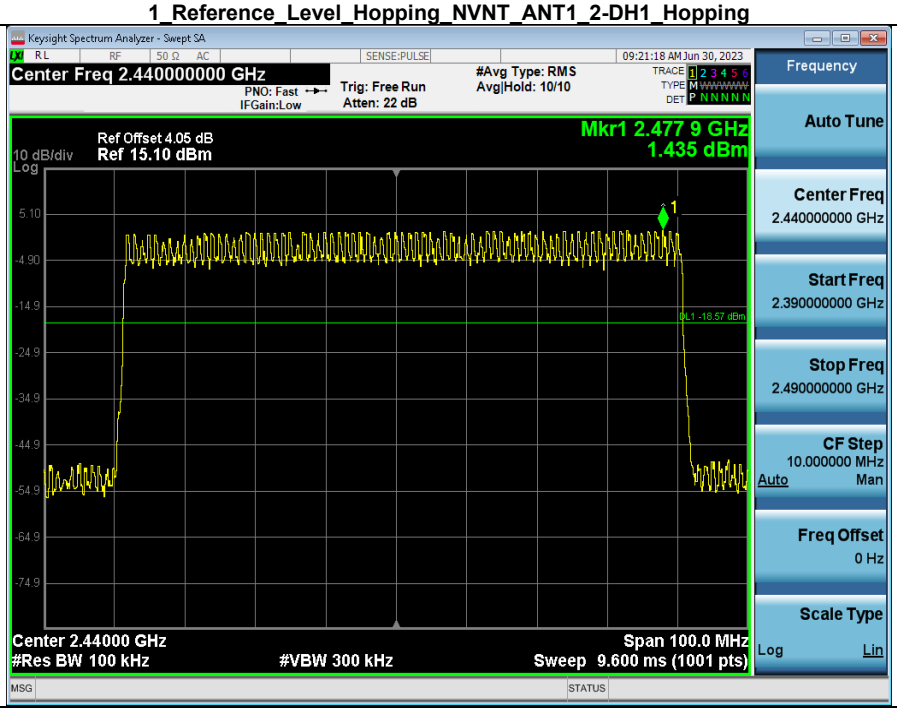
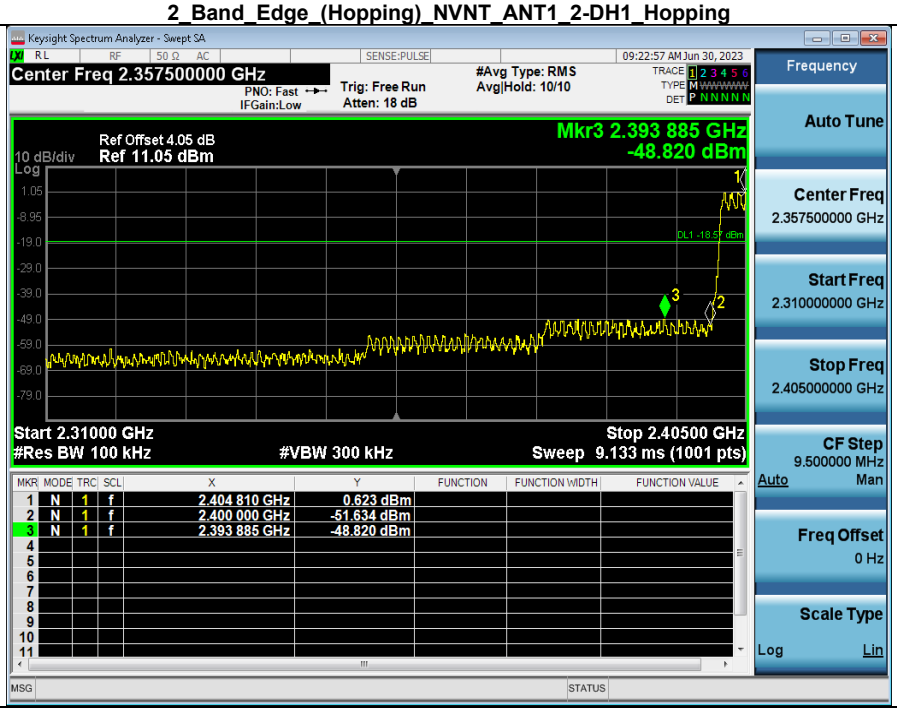
1_Reference_Level_Hopping_NVNT_ANT1_2-DH1_Hopping



2_Band_Edge_(Hopping)_NVNT_ANT1_2-DH1_Hopping



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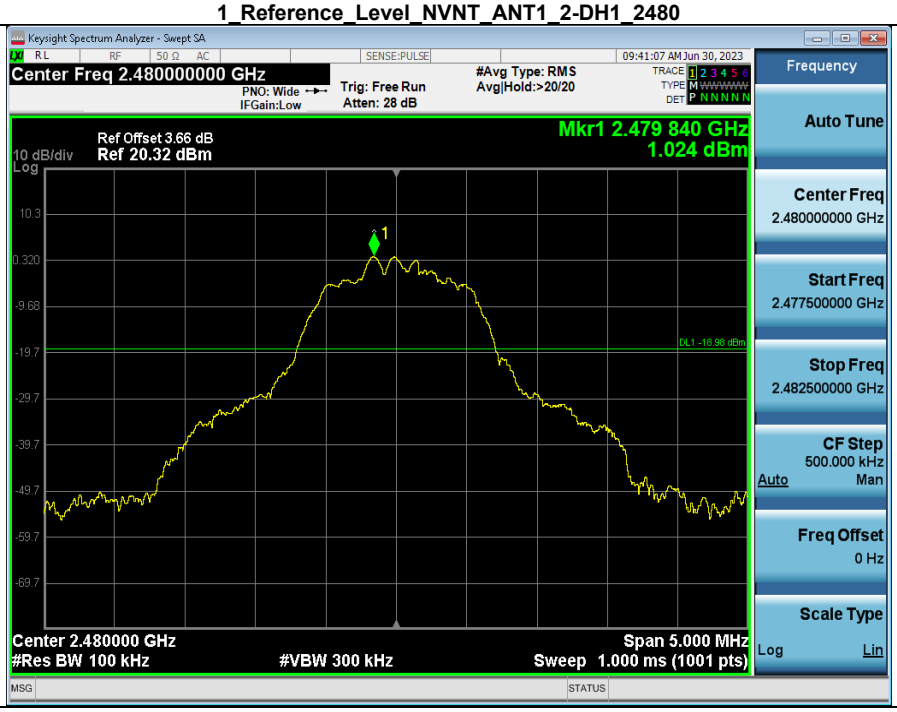
1_Reference_Level_NVNT_ANT1_2-DH1_2480



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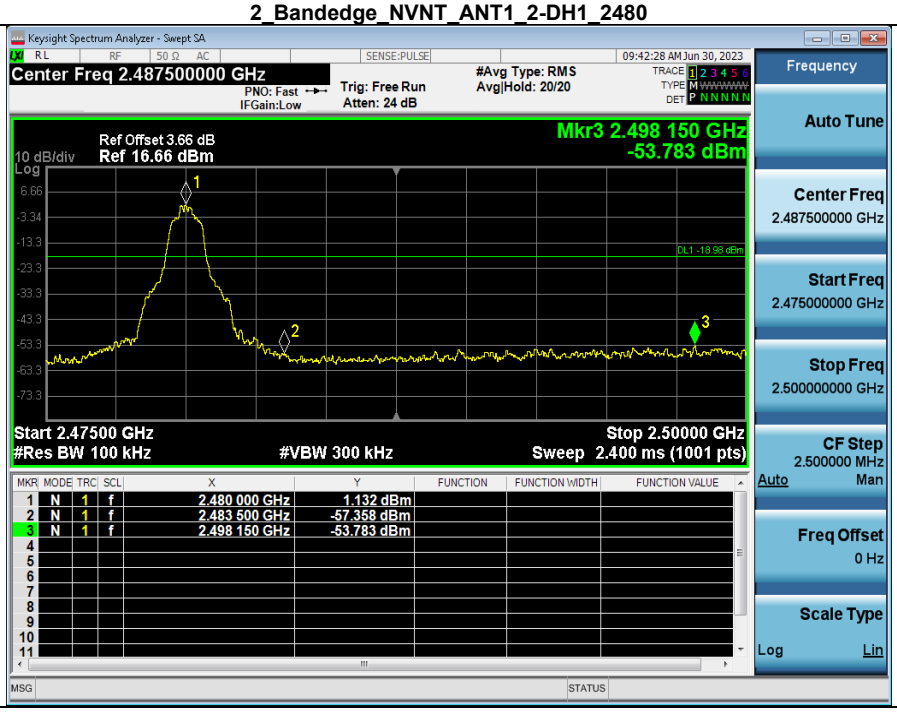

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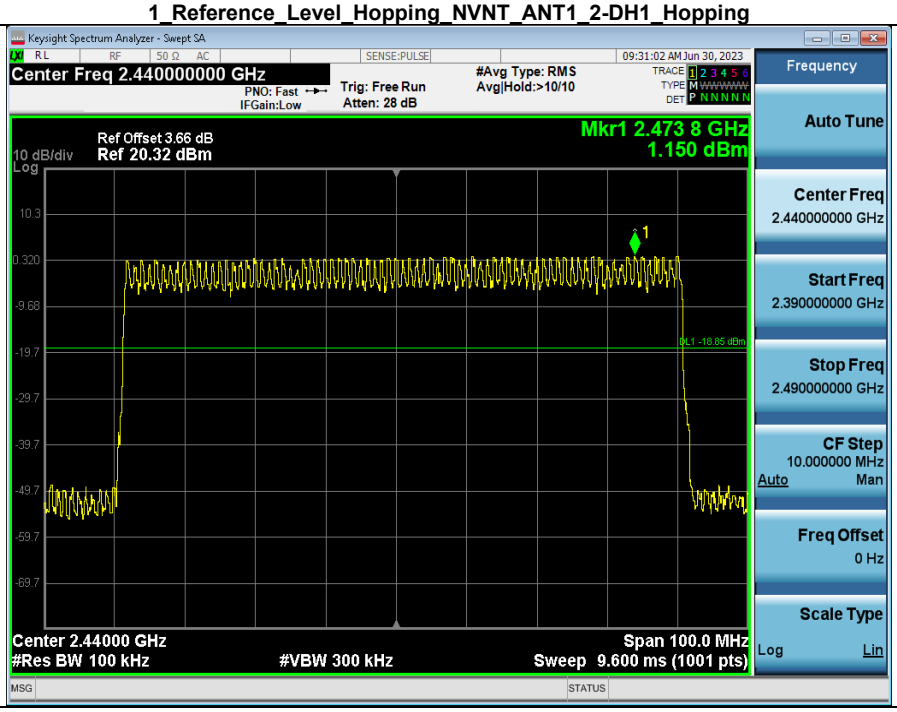
1_Reference_Level_Hopping_NVNT_ANT1_2-DH1_Hopping



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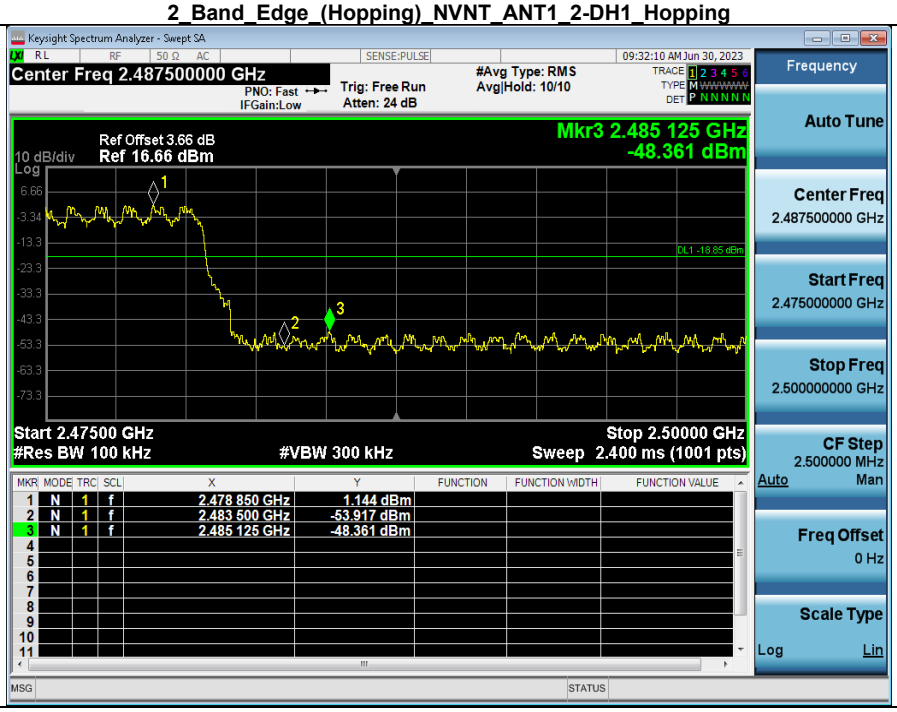

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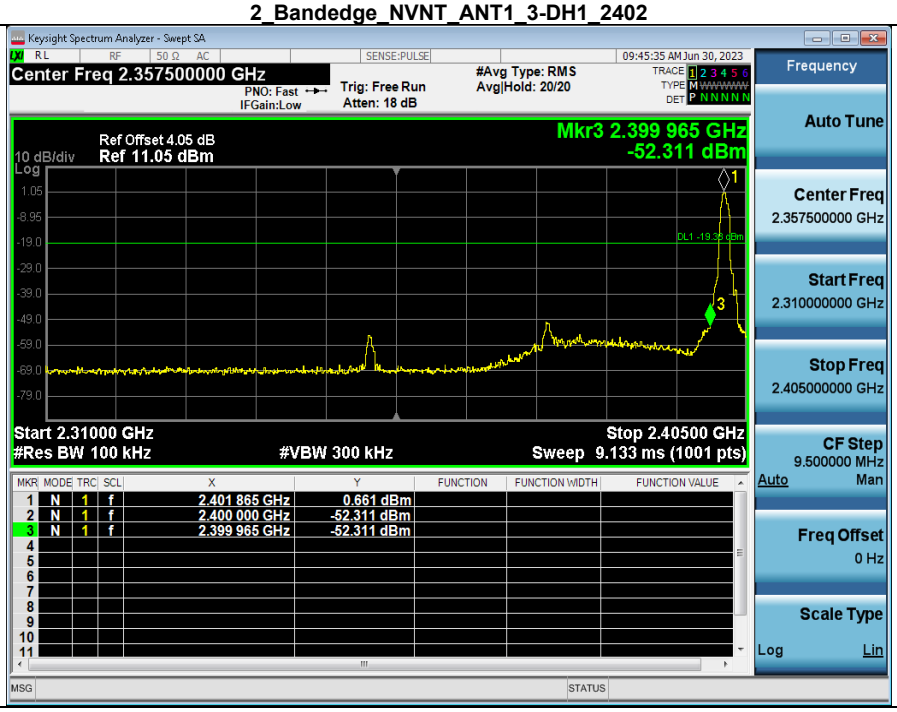
1_Reference_Level_NVNT_ANT1_3-DH1_2402

2_Bandedge_NVNT_ANT1_3-DH1_2402



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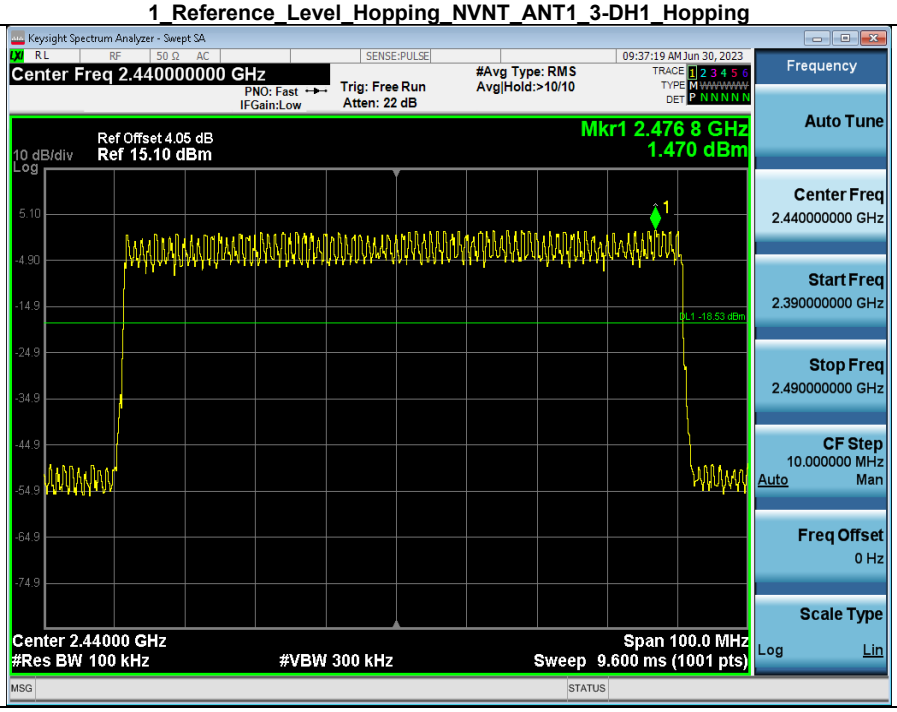
1_Reference_Level_Hopping_NVNT_ANT1_3-DH1_Hopping



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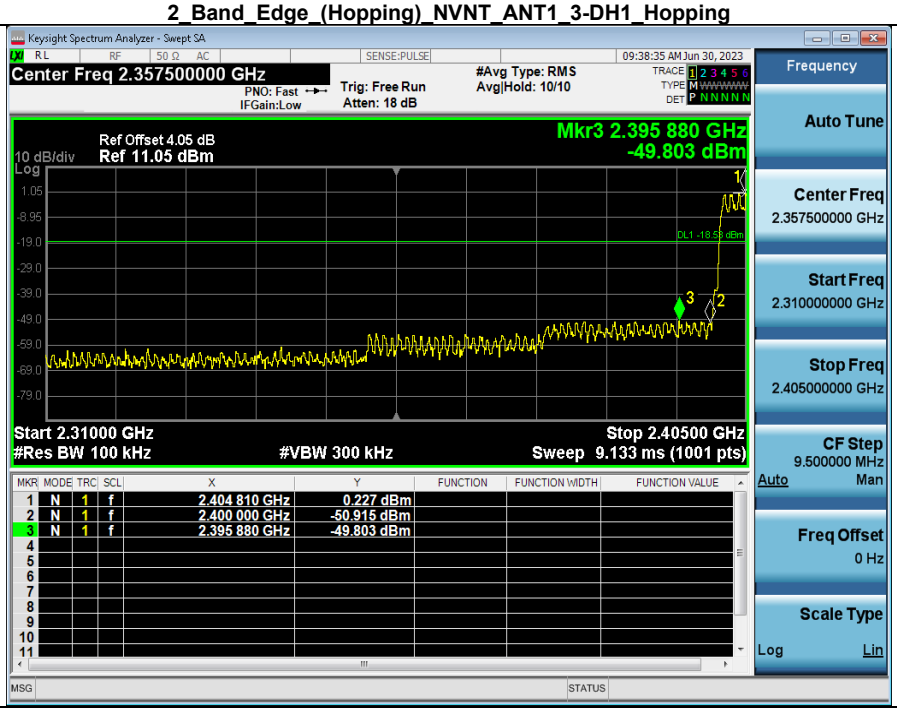

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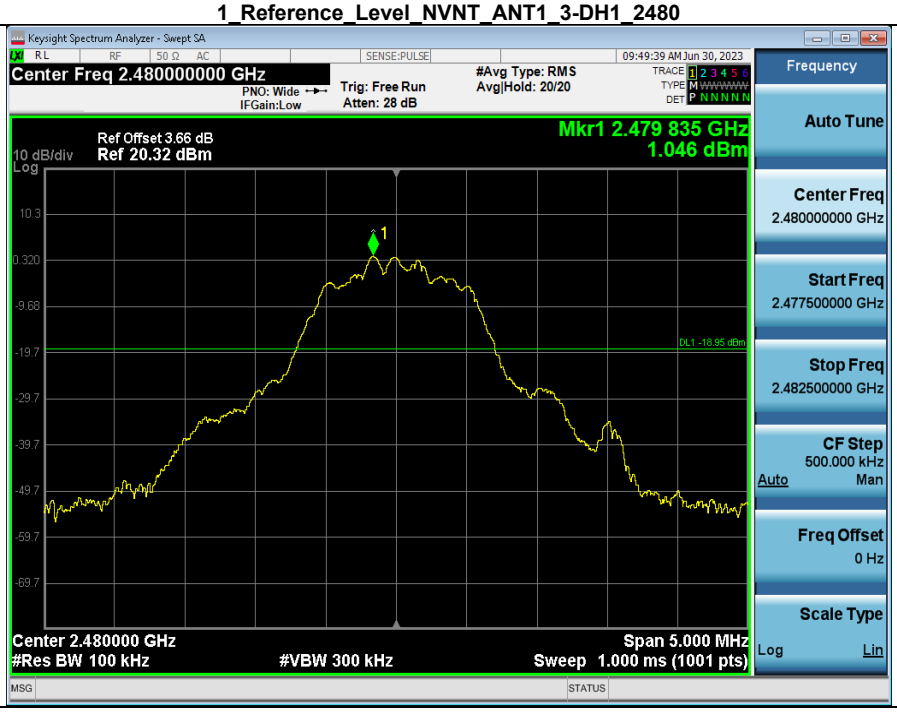
1_Reference_Level_NVNT_ANT1_3-DH1_2480



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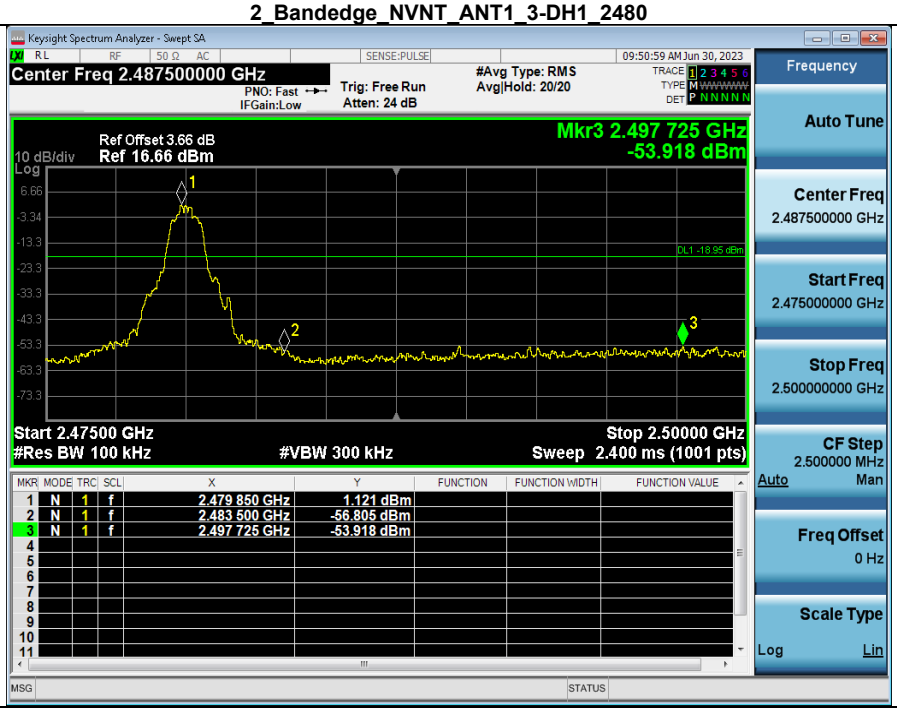

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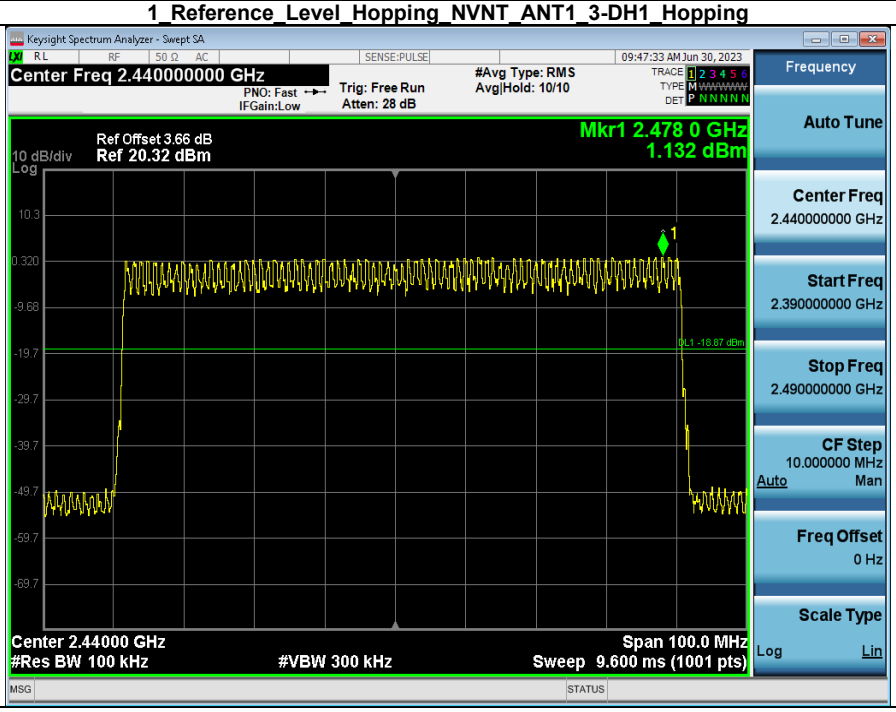
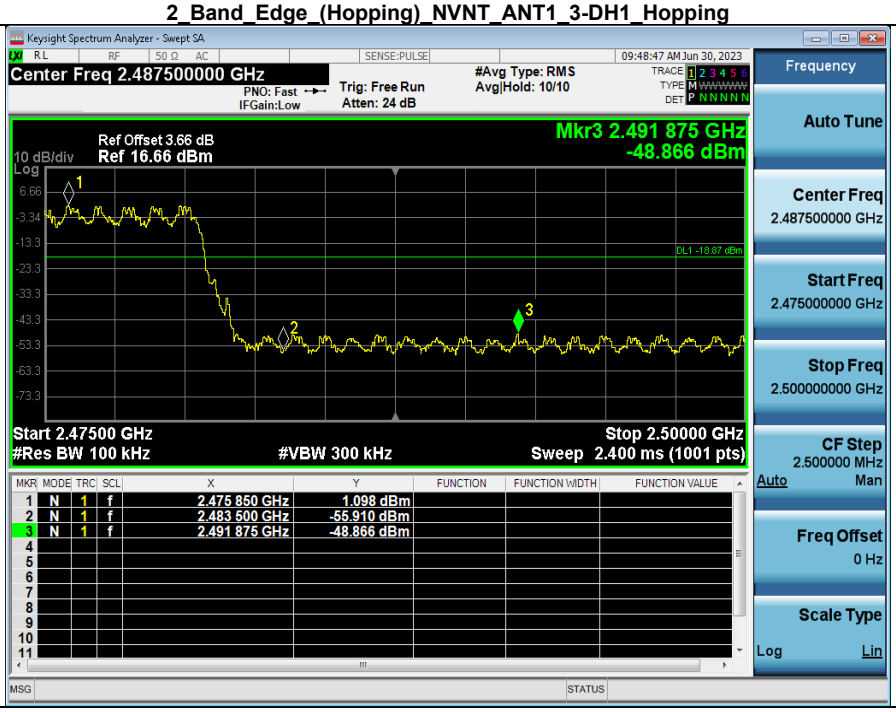
SS

1_Reference_Level_Hopping_NVNT_ANT1_3-DH1_Hopping



2_Band_Edge_(Hopping)_NVNT_ANT1_3-DH1_Hopping



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