

Product Name: Acoustic Imaging Camera	Report No: ITEZA2-202400496RF2
Product Model: CRY8124, CRY8121, CRY8122, CRY8123, CRY8125, CRY8128, MPAC208, MPAC208-IECEx	Security Classification: Open
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TIRT Testing Report

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RF TEST REPORT

FCC ID: 2BM2S-CRY8120SERIES

According to

47 CFR FCC Part 15, Subpart C(Section 15.247)

ANSI C63.10:2013

Applicant:	Hangzhou Crysound Electronics Co.,Ltd.
Address:	NO.10, Xianqiao Road, Zhongtai Street, Yuhang District, Hangzhou, Zhejiang Province, China
Manufacturer:	Hangzhou Crysound Electronics Co.,Ltd.
Address:	NO.10, Xianqiao Road, Zhongtai Street, Yuhang District, Hangzhou, Zhejiang Province, China
Sample No:	1000052998
Product Name:	Acoustic Imaging Camera
Brand Name:	N/A
Model No.:	CRY8124, CRY8121, CRY8122, CRY8123, CRY8125, CRY8128, MPAC208, MPAC208-IECEX
Test No.:	CRY8124

Date of Receipt:	2024/12/26
Date of Test:	2024/12/26~2025/01/03
Issued Date:	2025/02/14
Testing Lab:	TIRT

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History of this test report

Original Report Issue Date: 2025.02.14

- No additional attachment
- Additional attachments were issued following record

Attachment No.	Issue Date	Description

1. SUMMARY OF STANDARDS AND RESULTS

1.1. Description of Standards and Results

The EUT have been tested according to the applicable standards as referenced below:

Test Item	Standards Paragraph	Result
Maximum Peak Output Power	FCC Part 15: 15.247(b)(1) ANSI C63.10 :2013	P
Bandwidth	FCC Part 15: 15.215 ANSI C63.10 :2013	P
Carrier Frequency Separation	FCC Part 15: 15.247(a)(1) ANSI C63.10 :2013	P
Number Of Hopping Channel	FCC Part 15: 15.247(a)(1)(iii) ANSI C63.10 :2013	P
Dwell Time	FCC Part 15: 15.247(a)(1)(iii) ANSI C63.10 :2013	P
Radiated Emission	FCC Part 15: 15.209 FCC Part 15: 15.247(d) ANSI C63.10 :2013	P
Band Edge Compliance	FCC Part 15: 15.247(d) ANSI C63.10 :2013	P
Power Line Conducted Emissions	FCC Part 15: 15.207 ANSI C63.10 :2013	P
Antenna requirement	FCC Part 15: 15.203	P
Note: 1. P is an abbreviation for Pass. 2. F is an abbreviation for Fail. 3. N/A is an abbreviation for Not Applicable. 4. The conclusion of this test report is judged by actual test data without considering measurement uncertainty.		

2. GENERAL INFORMATION

2.1. Description of Device (EUT)

EUT Name : Acoustic Imaging Camera

Model No. : CRY8124, CRY8121, CRY8122, CRY8123, CRY8125, CRY8128, MPAC208, MPAC208-IECEX

DIFF. : There is no difference except the name of the model. All tests are made with the CRY8124 model.

Power supply : DC 7.2V from battery or DC 5V from Power Adapter

Radio Technology : Bluetooth V5.0 EDR

Operation frequency : 2402-2480MHz

Channel No. : 79 Channels

Channel spacing : 1MHz

Modulation type : GFSK, $\pi/4$ DQPSK, 8DPSK

Antenna Type : FPC antenna, Maximum Gain is 1.28dBi.
Antenna information is provided by applicant.

Software version : V2.00

Hardware version : V1.1

Intend use : Residential, commercial and light industrial environment

environment

2.2. Accessories of Device (EUT)

Accessories: Power Adapter

Manufacturer: Shenzhen Xinspower Technology Co.,Ltd

Model: PN453I

Input: 100-240V~ 50/60Hz 1.2A

Type-C Output: 5.0V==3.0A/9.0V==3.0A/12.0V==3.0A/15.0V==3.0A/20.0V==2.25A(45.0W Max)

2.3. Tested Supporting System Details

No.	Description	Manufacturer	Model	Serial Number	Certification or SDoC
1.	--	--	--	--	--

2.4. Block Diagram of connection between EUT and simulators



2.5. Test Mode Description

Tested mode, channel information		
Mode	Channel	Frequency (MHz)
GFSK	Low :CH1	2402
	Middle: CH40	2441
	High: CH79	2480
π/4 DQPSK	Low :CH1	2402
	Middle: CH40	2441
	High: CH79	2480
8DPSK	Low :CH1	2402
	Middle: CH40	2441
	High: CH79	2480

2.6. Test Conditions

Items	Required	Actual
Temperature range:	15-35℃	24℃
Humidity range:	25-75%	56%
Pressure range:	86-106kPa	980kPa

2.7. Test Facility

Company:	Beijing TIRT Technology Service Co.,Ltd Shenzhen
Address:	104 Building C, Xinmingsheng Industrial Park No.132, Zhangge Old Village East Zone, Zhangge Community, Fucheng Street, Longhua District, Shenzhen, Guangdong, P. R. China
CNAS Registration Number:	CNAS L14158
A2LA Registration Number:	6049.01
FCC Accredited Lab.Designation Number:	CN1366
FCC Test Firm Registration Number:	820690
Telephone:	+86-0755-27087573

2.8. Measurement Uncertainty

(95% confidence levels, k=2)

Uncertainty	
Parameter	Uncertainty
Occupied Channel Bandwidth	±142.12 KHz
RF power conducted	±0.74 dB
RF power radiated	±3.25dB
Spurious emissions, conducted	±1.78dB
Spurious emissions, radiated (9KHz~30MHz)	±2.56dB
Spurious emissions, radiated (30MHz~1GHz)	±4.6dB
Spurious emissions, radiated (Above 1GHz)	±4.9dB
Conduction Emissions(150kHz~30MHz)	±3.1 dB
Humidity	±4.6%
Temperature	±0.7℃
Time	±1.25

2.9. Test Equipment List

Name of Equipment	Manufacturer	Model Number	Serial Number	Last Calibration	Due Calibration
EMI Receiver	Rohde&Schwarz	ESIB 40	YH-TIRT-SAC-966-20220911	2024/01/05	2025/01/04
Integral Antenna	Schwarzbeck	VULB 9163	01314	2023/12/11	2025/12/10
Integral Antenna	Rohde&Schwarz	HF907	RSM2991424	2023/12/11	2025/12/10
Preamplifier	Emtrace	RP01A	'02017	2024/01/05	2025/01/04
Preamplifier	Schwarzbeck	BBV9744	00143	2024/01/05	2025/01/04
Loop Antenna	ZHINAN	ZN30900A	12024	2024/01/05	2025/01/04
Horn Antenna	Schwarzbeck	BBHA9170	00956	2024/01/05	2025/01/04
RF Cable	/	LMR400UF-NMNM-7.0M	/	2024/01/05	2025/01/04
RF Cable	/	SFT2050PUR-NMNM-7.0M	/	2024/01/05	2025/01/04
EMI Receiver	Rohde&Schwarz	ESR7	1316.3003K07-102611-mk	2024/11/02	2025/11/01
LISN	Rohde&Schwarz	ENV216	3560.655.12-102915-Bp	2024/11/02	2025/11/01
RF Cable	\	SFT2050PUR-NMNM-2.0M	\	2024/01/05	2025/01/04
Spectrum analyzer	ROHDE&SCHWARZ	FSU26	200732	2024/01/05	2025/01/04
Spectrum analyzer	ROHDE&SCHWARZ	FSV40-N	101722	2024/01/05	2025/01/04
Filter	HEWLETT PACKARD	JS0806-F	19K8060209	2024/01/05	2025/01/04

3. MAXIMUM PEAK OUTPUT POWER

3.1. Limit

Please refer section15.247.

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

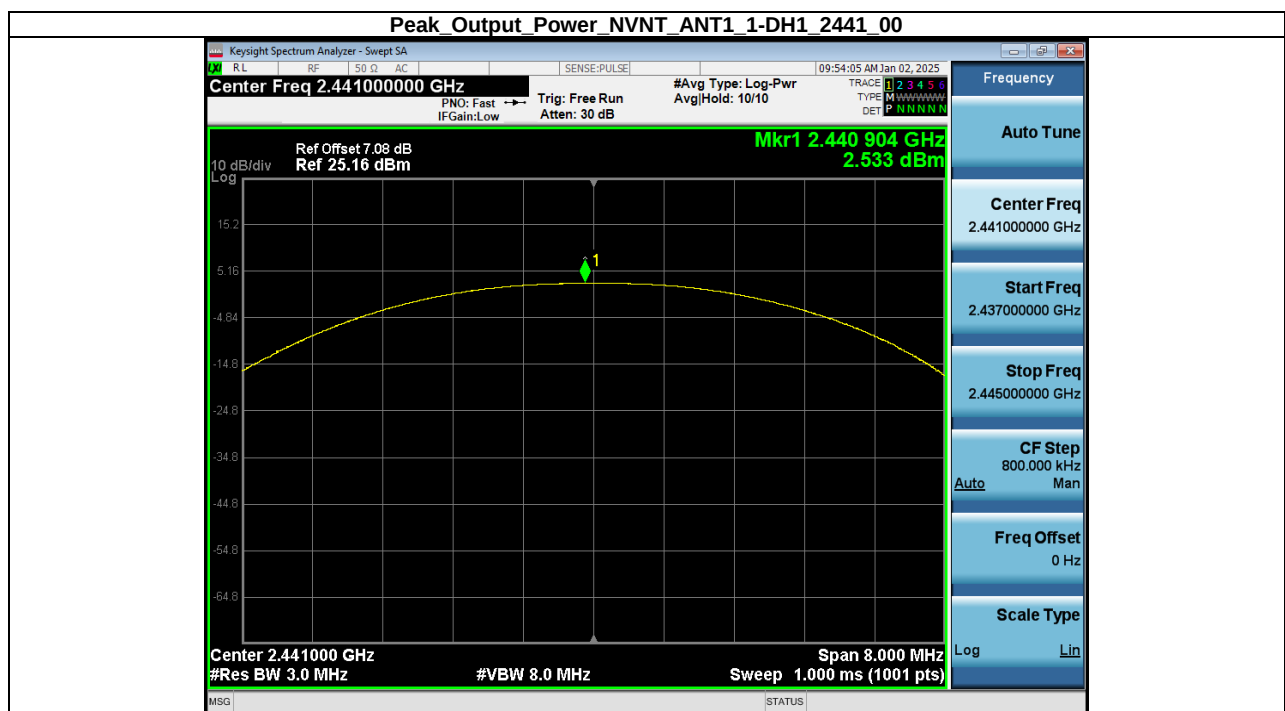
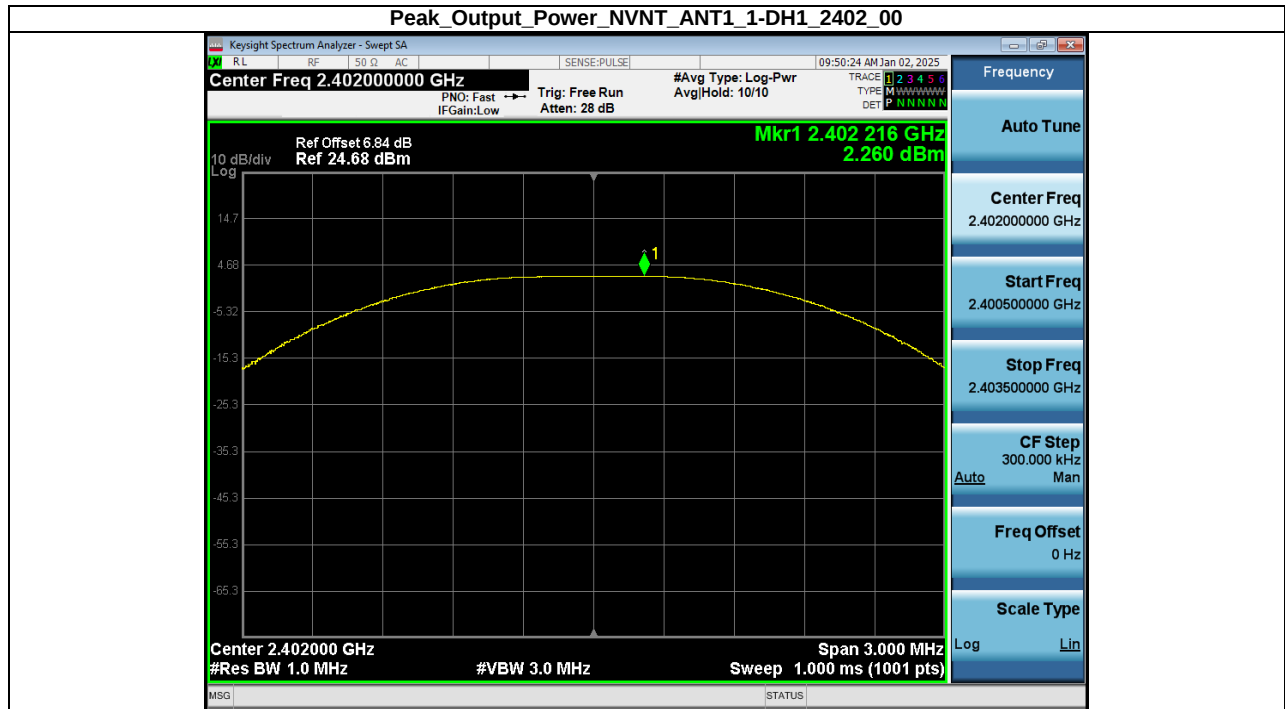
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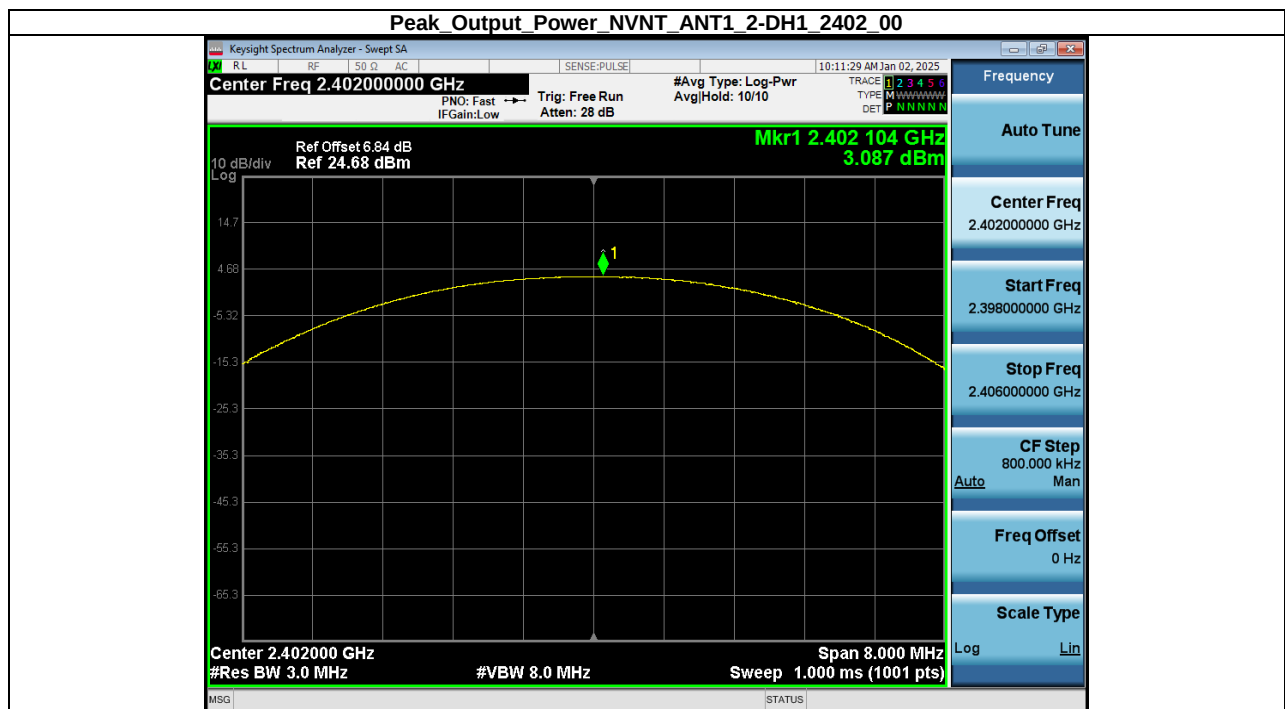
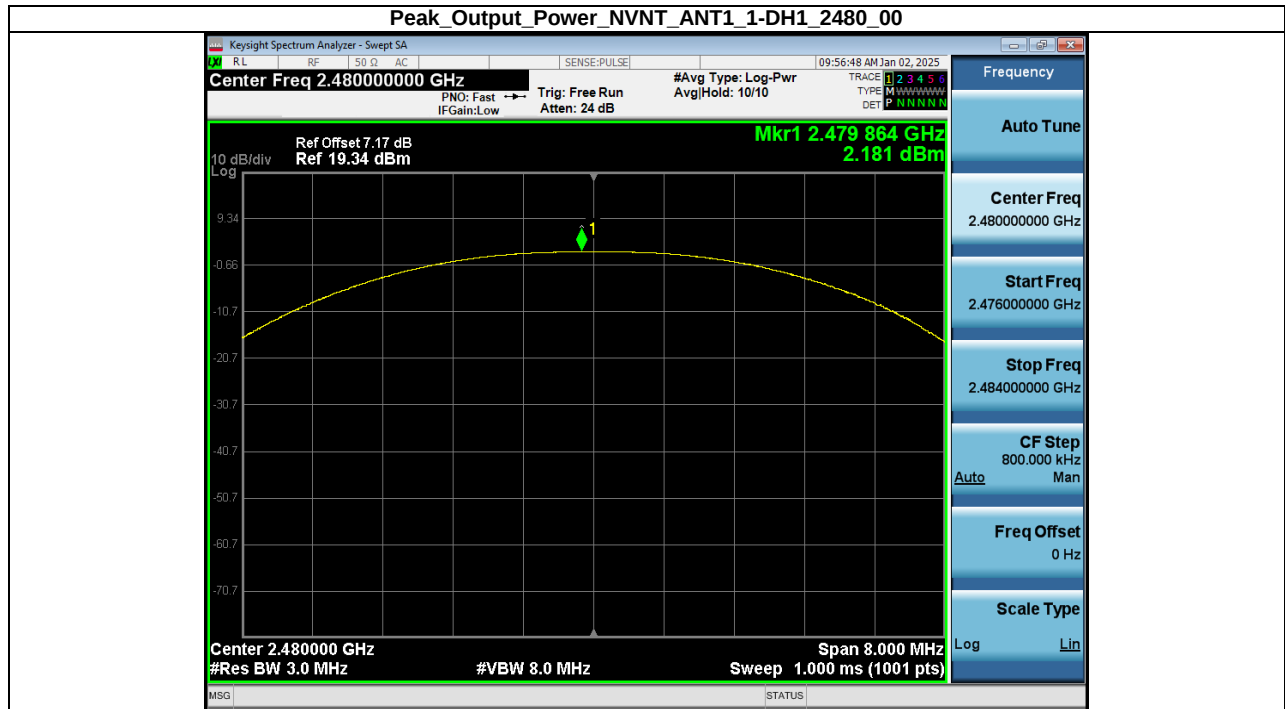
- The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram below.
- The following table is the setting of the spectrum analyzer:

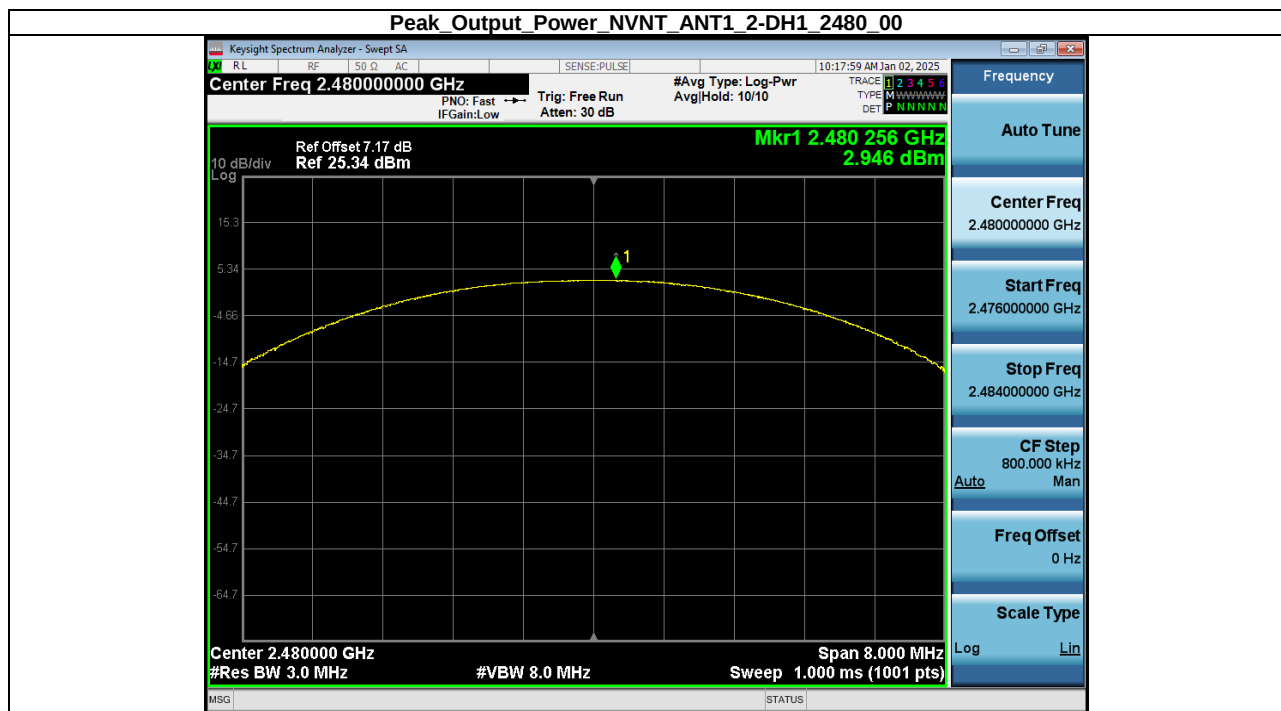
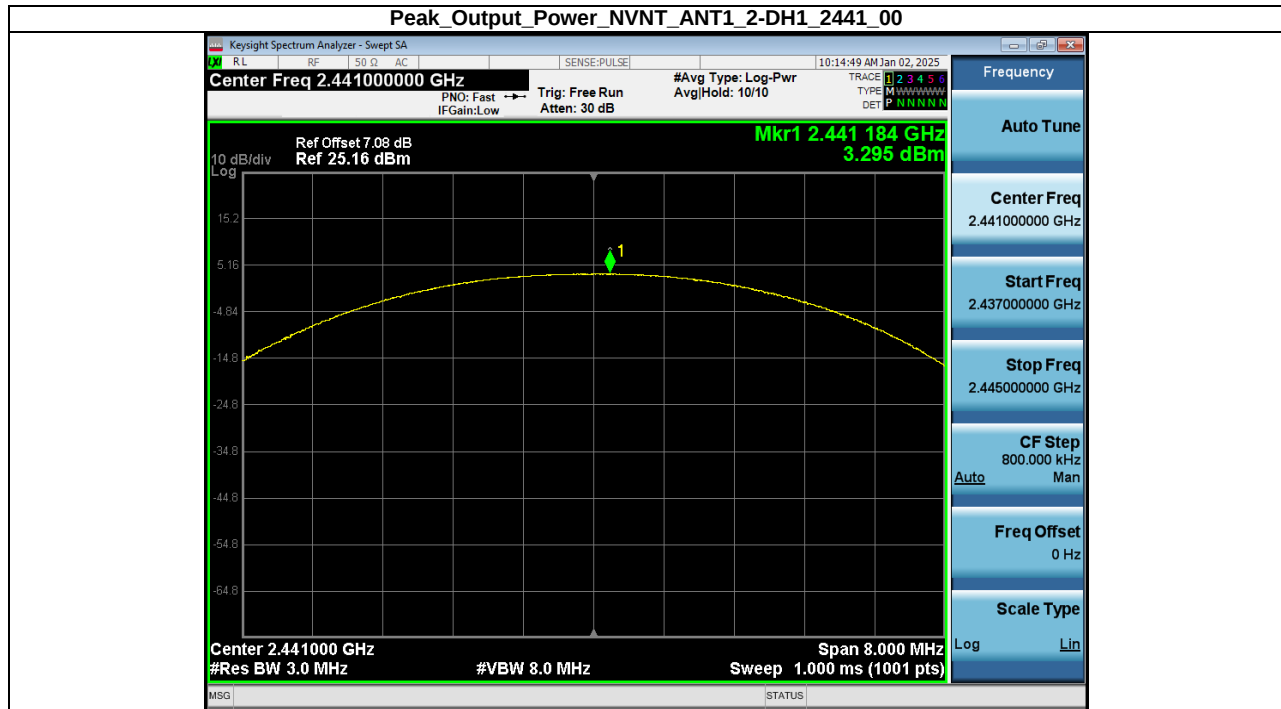
Spectrum Parameters	Setting
Span Frequency	$\geq 3 \times \text{RBW}$
RBW	1M/ 3MHz
VBW	3M/ 8MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

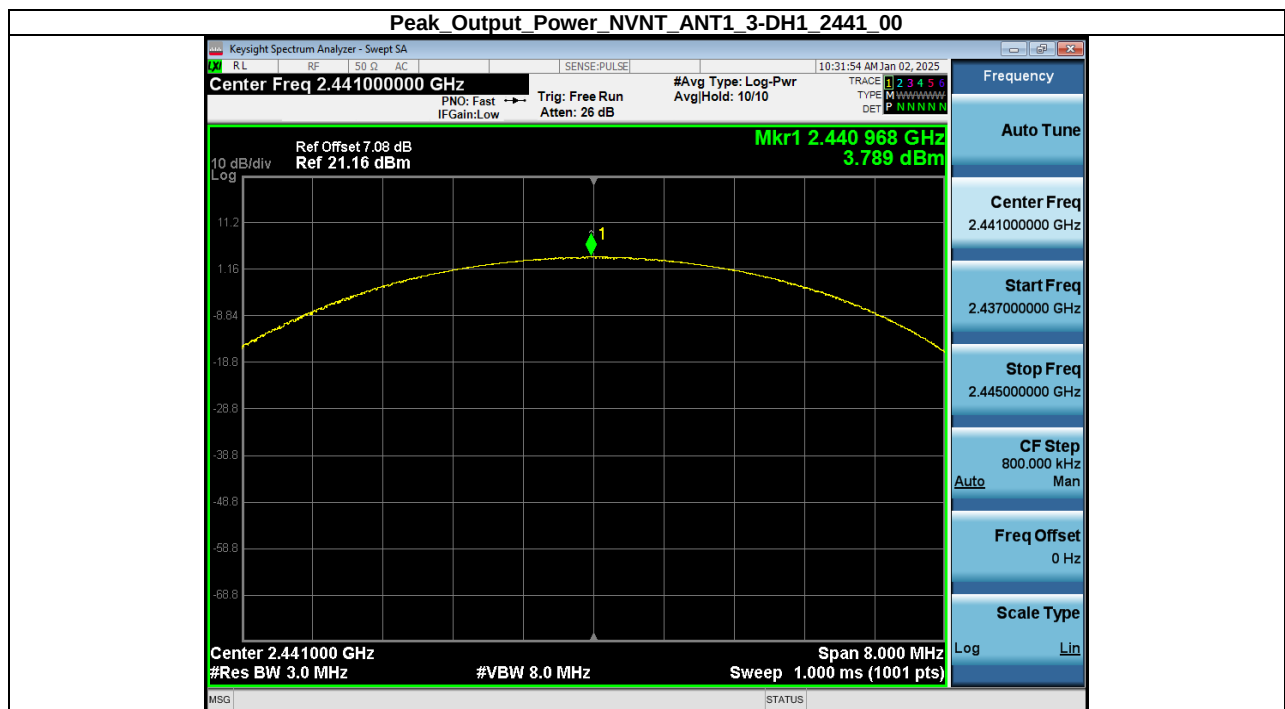
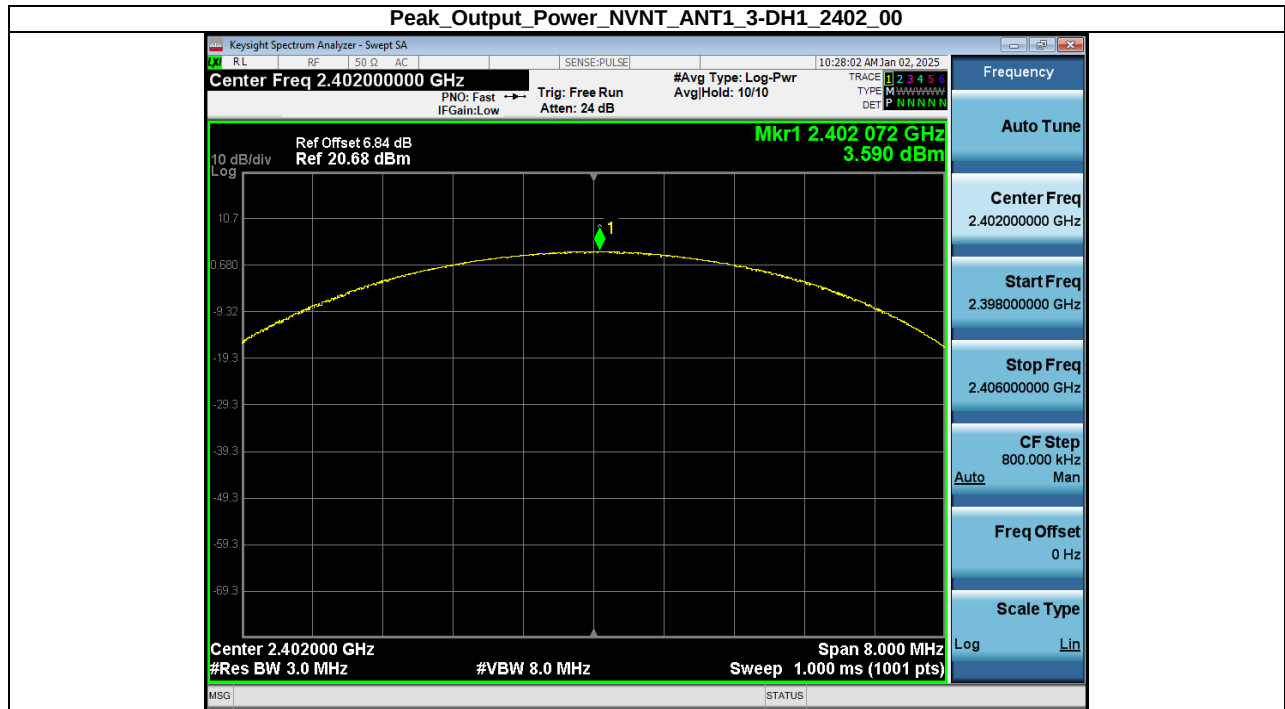
3.3. Test Result

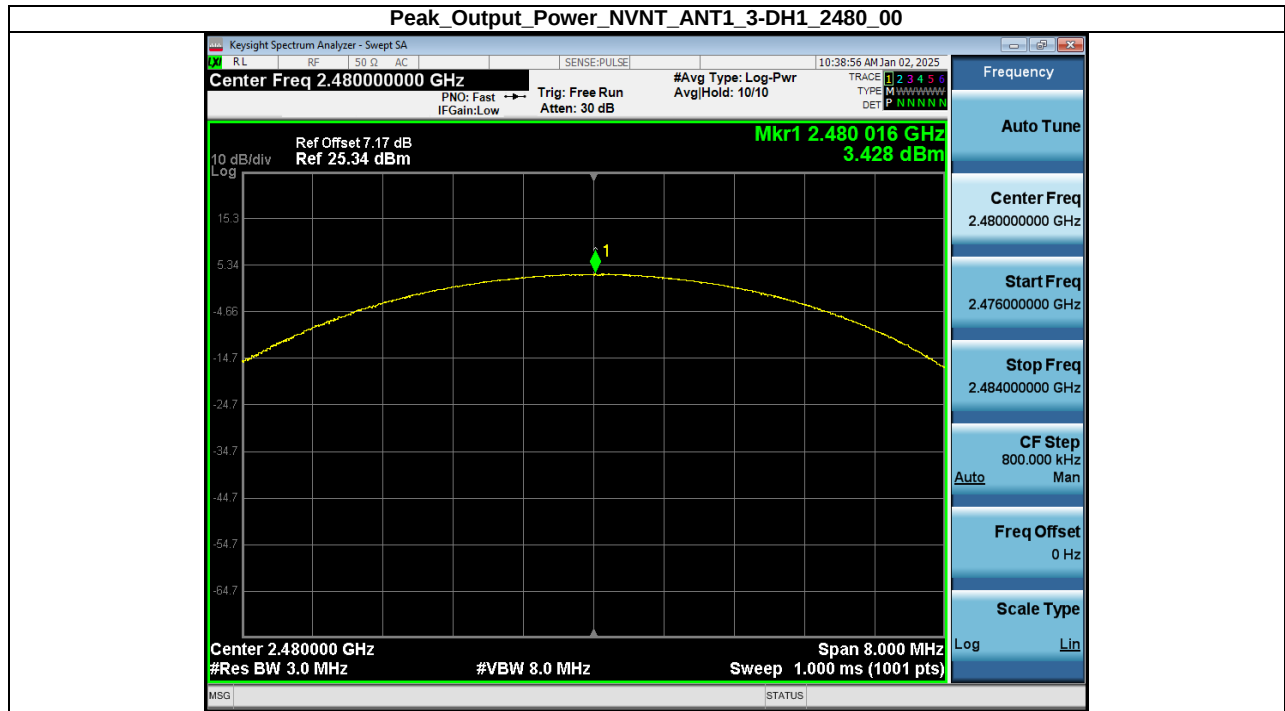
Condition	Antenna	Modulation	Frequency (MHz)	Max. Conducted Power(dBm)	Max. Conducted Power(mW)	Limit(mW)	Result
NVNT	ANT1	1-DH1	2402.00	2.26	1.68	1000	Pass
NVNT	ANT1	1-DH1	2441.00	2.53	1.79	125	Pass
NVNT	ANT1	1-DH1	2480.00	2.18	1.65	125	Pass
NVNT	ANT1	2-DH1	2402.00	3.09	2.04	125	Pass
NVNT	ANT1	2-DH1	2441.00	3.29	2.14	125	Pass
NVNT	ANT1	2-DH1	2480.00	2.95	1.97	125	Pass
NVNT	ANT1	3-DH1	2402.00	3.59	2.29	125	Pass
NVNT	ANT1	3-DH1	2441.00	3.79	2.39	125	Pass
NVNT	ANT1	3-DH1	2480.00	3.43	2.20	125	Pass











4. BANDWIDTH

4.1. 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.

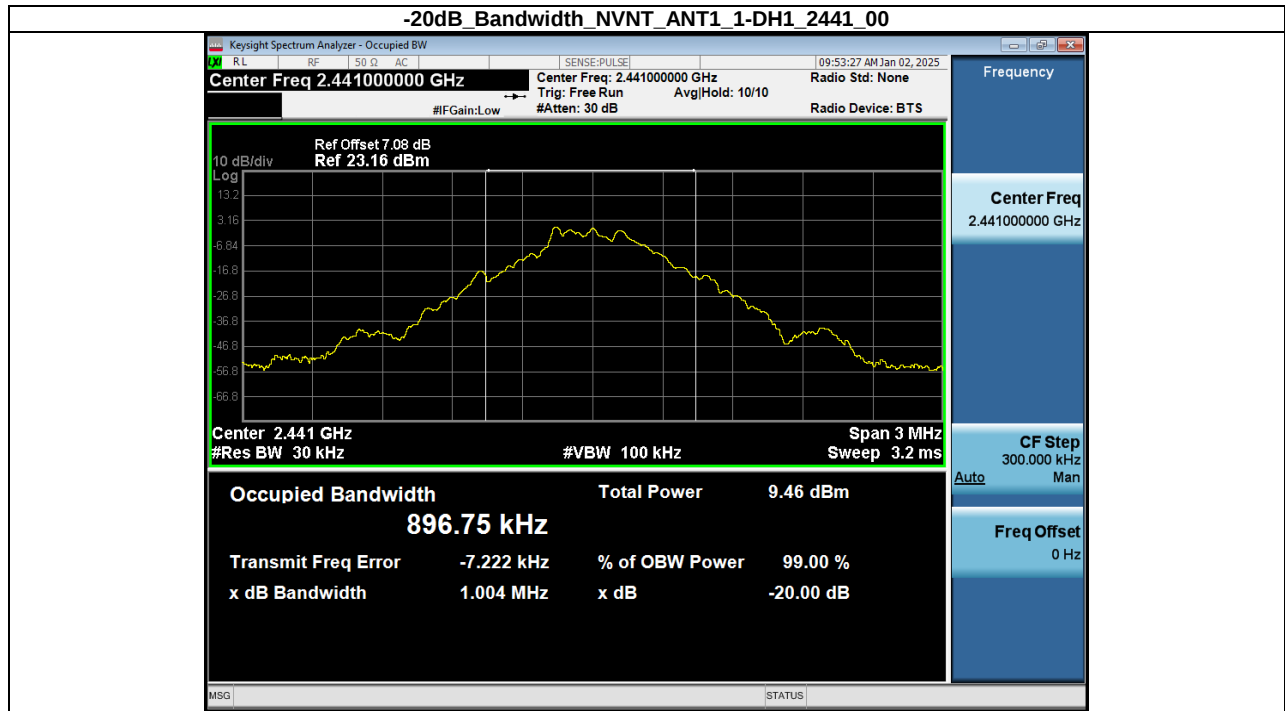
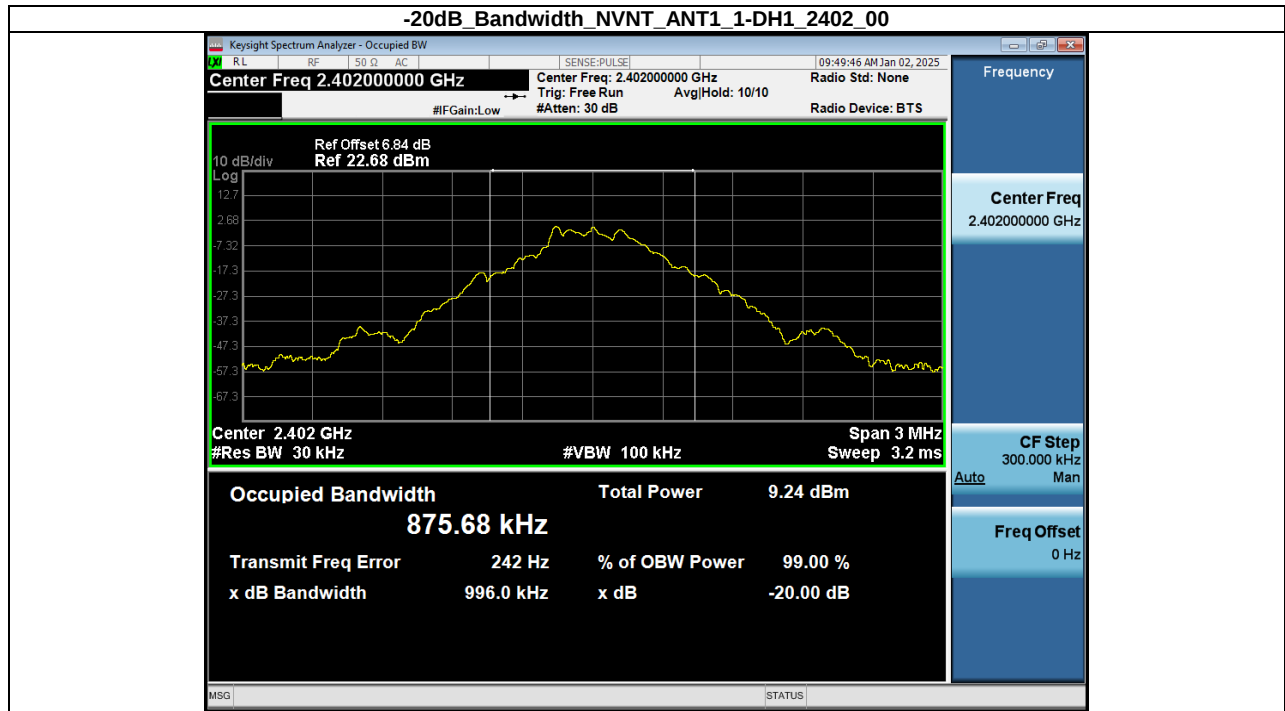
4.2. Test Procedure

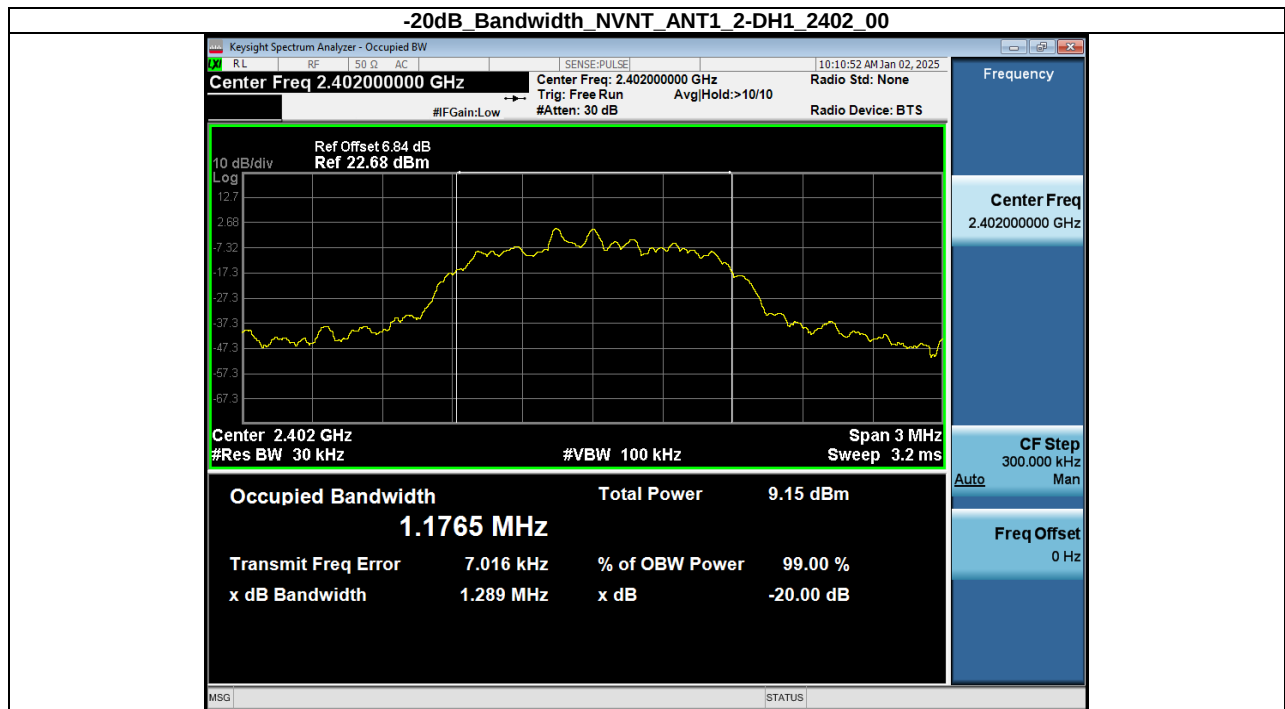
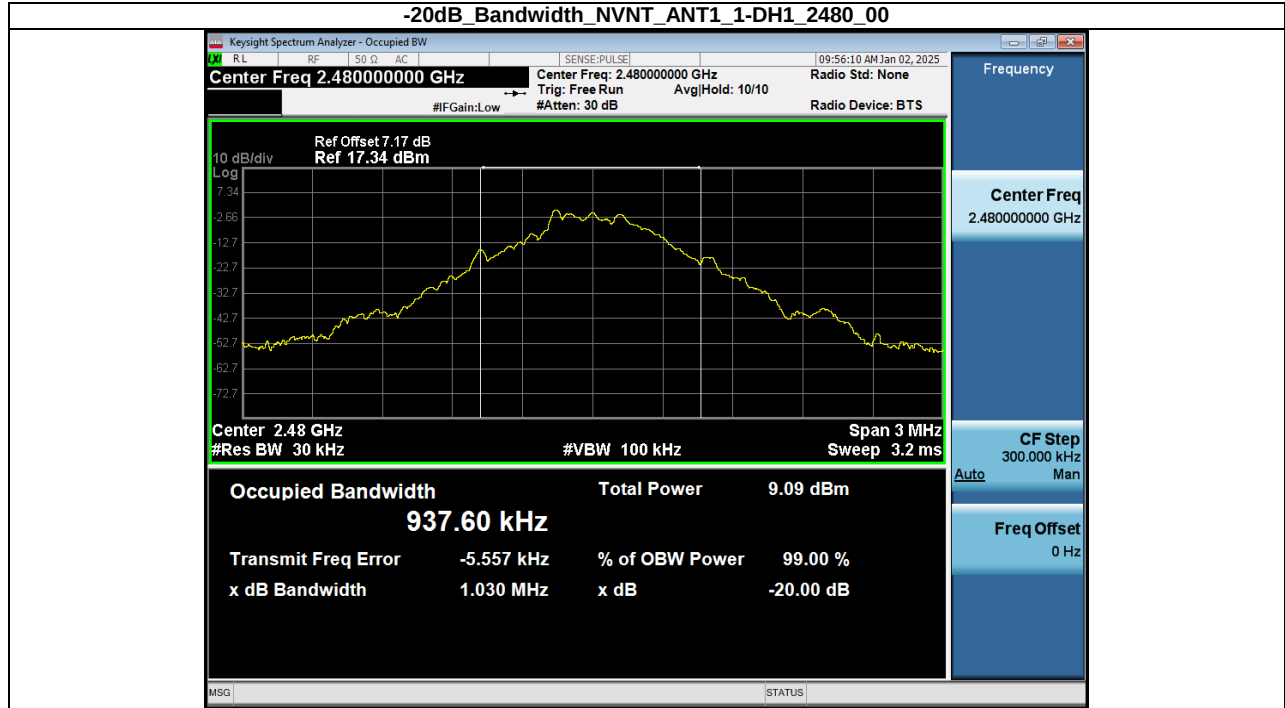
The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The bandwidth of the fundamental frequency was measured by spectrum analyzer with 30kHz RBW and 100kHz VBW. The 20dB bandwidth is defined as the total spectrum the power of which is higher than peak power minus 20dB.

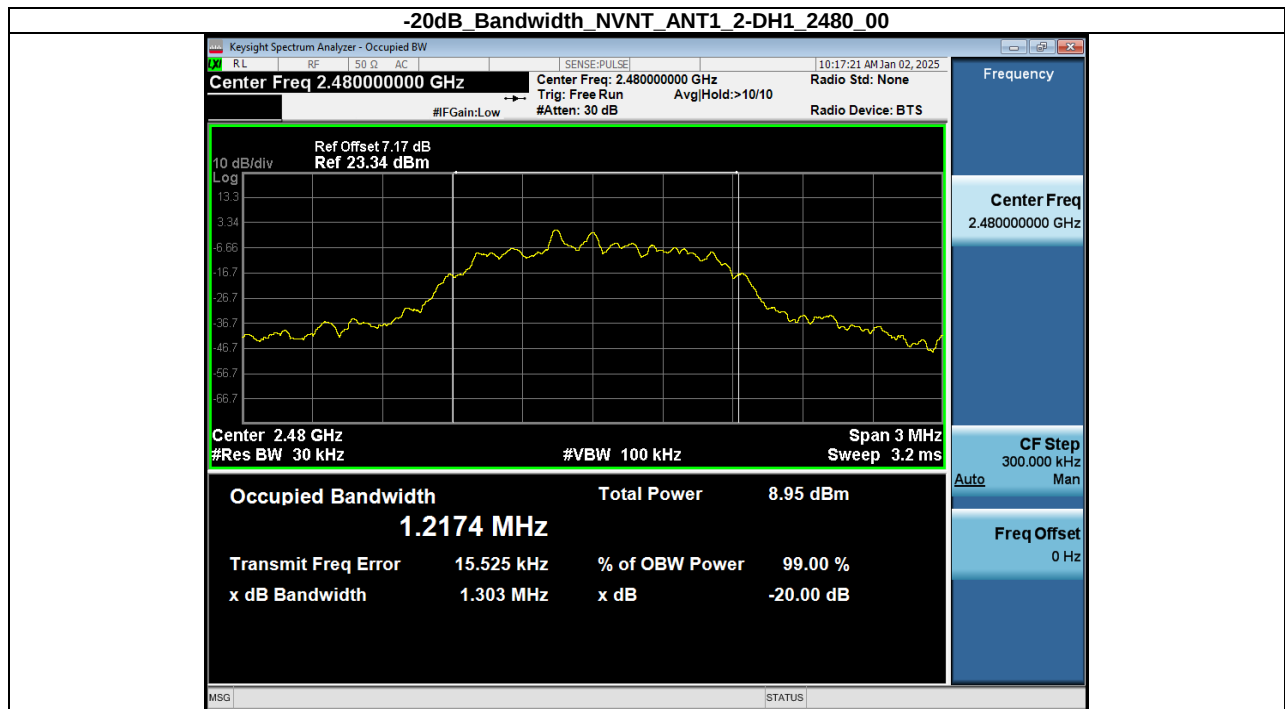
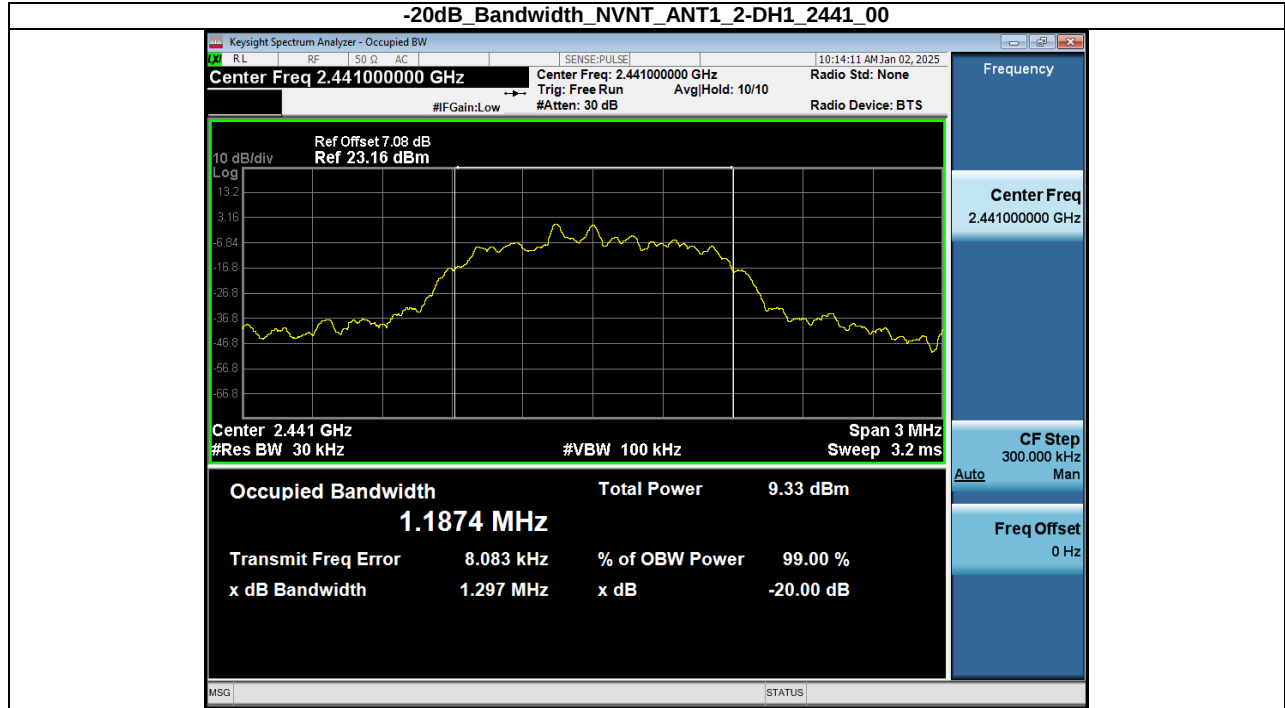
4.3. Test Result

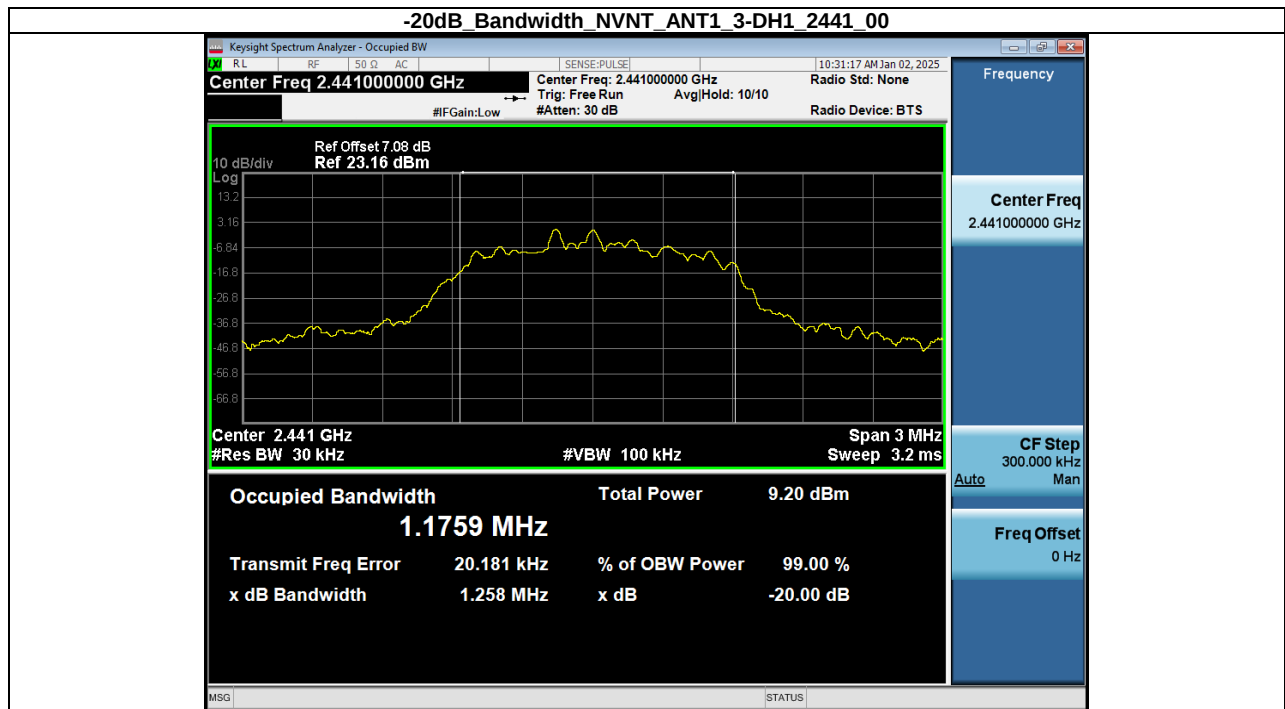
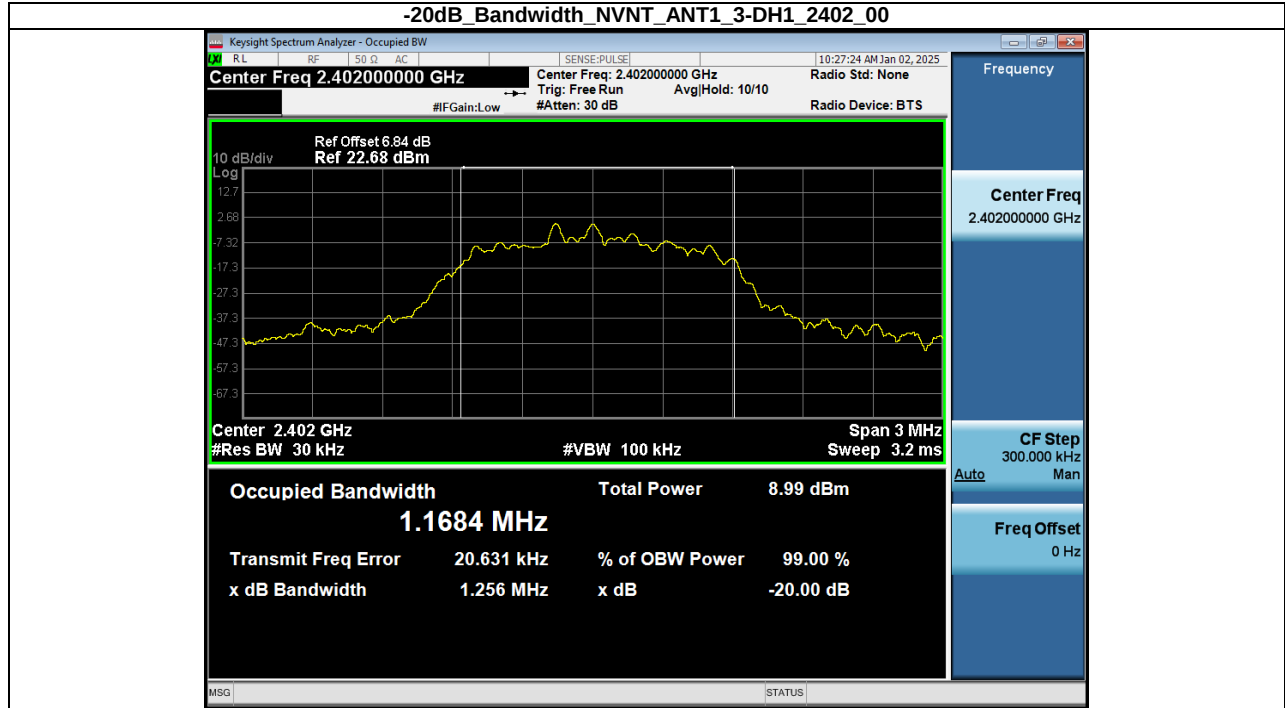
-20dB Bandwidth

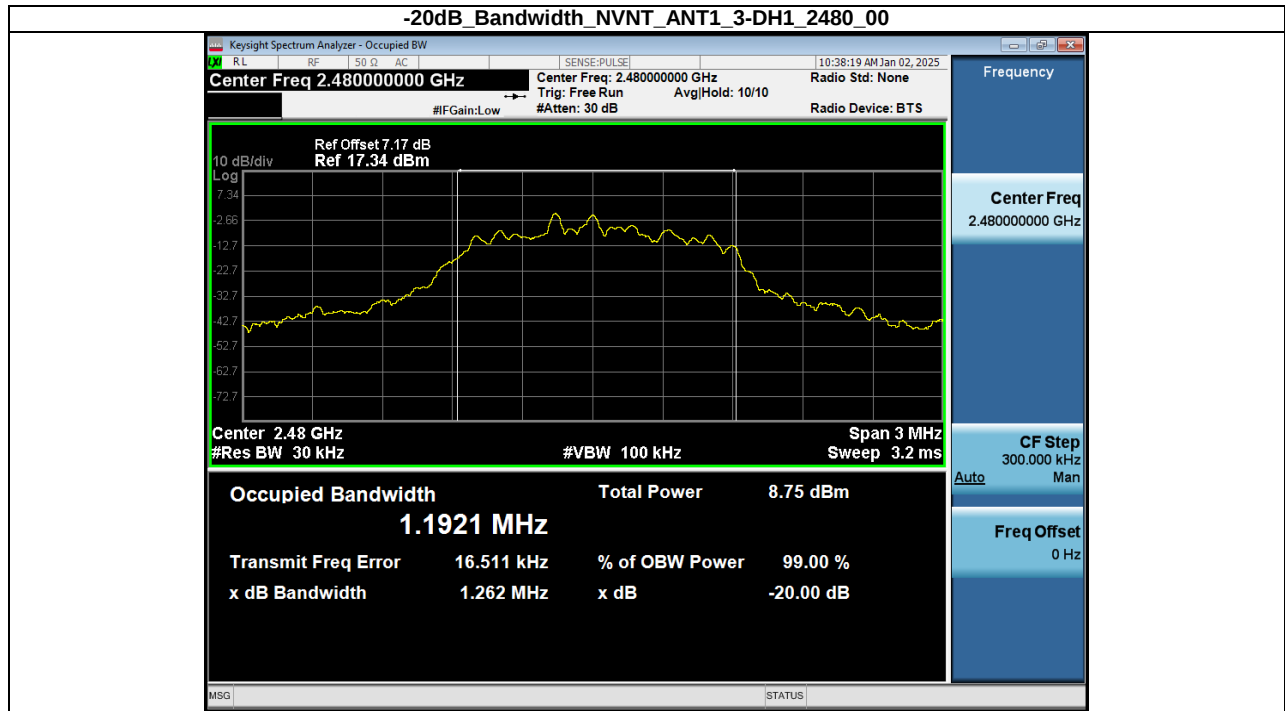
Condition	Antenna	Modulation	Frequency (MHz)	-20dB BW(MHz)	if larger than CFS
NVNT	ANT1	1-DH1	2402.00	0.996	No
NVNT	ANT1	1-DH1	2441.00	1.004	Yes
NVNT	ANT1	1-DH1	2480.00	1.030	Yes
NVNT	ANT1	2-DH1	2402.00	1.289	Yes
NVNT	ANT1	2-DH1	2441.00	1.297	Yes
NVNT	ANT1	2-DH1	2480.00	1.303	Yes
NVNT	ANT1	3-DH1	2402.00	1.256	Yes
NVNT	ANT1	3-DH1	2441.00	1.258	Yes
NVNT	ANT1	3-DH1	2480.00	1.262	Yes





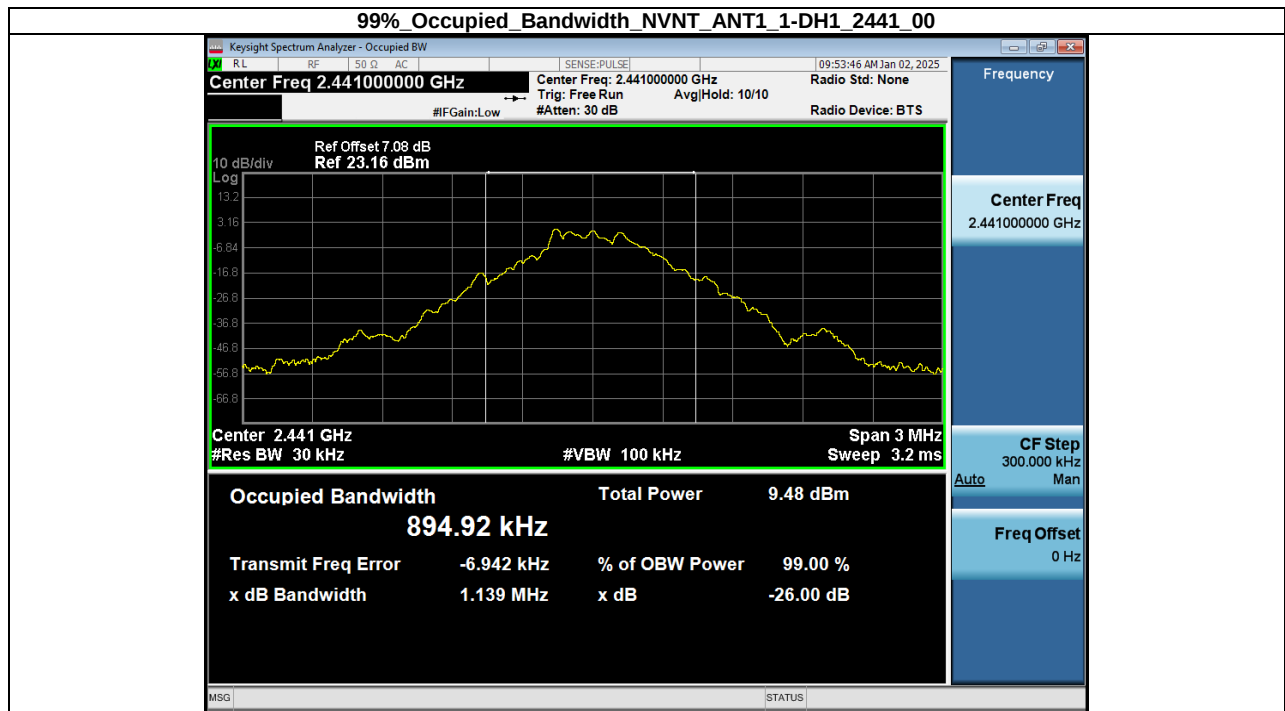
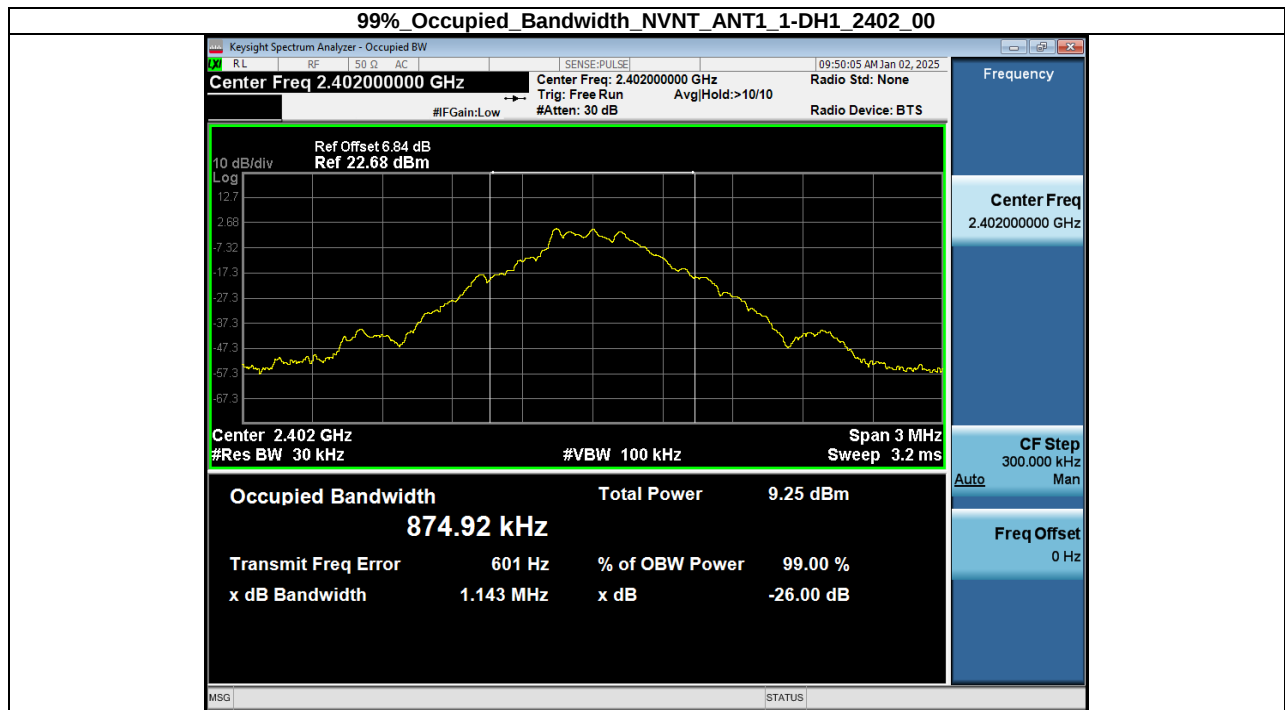


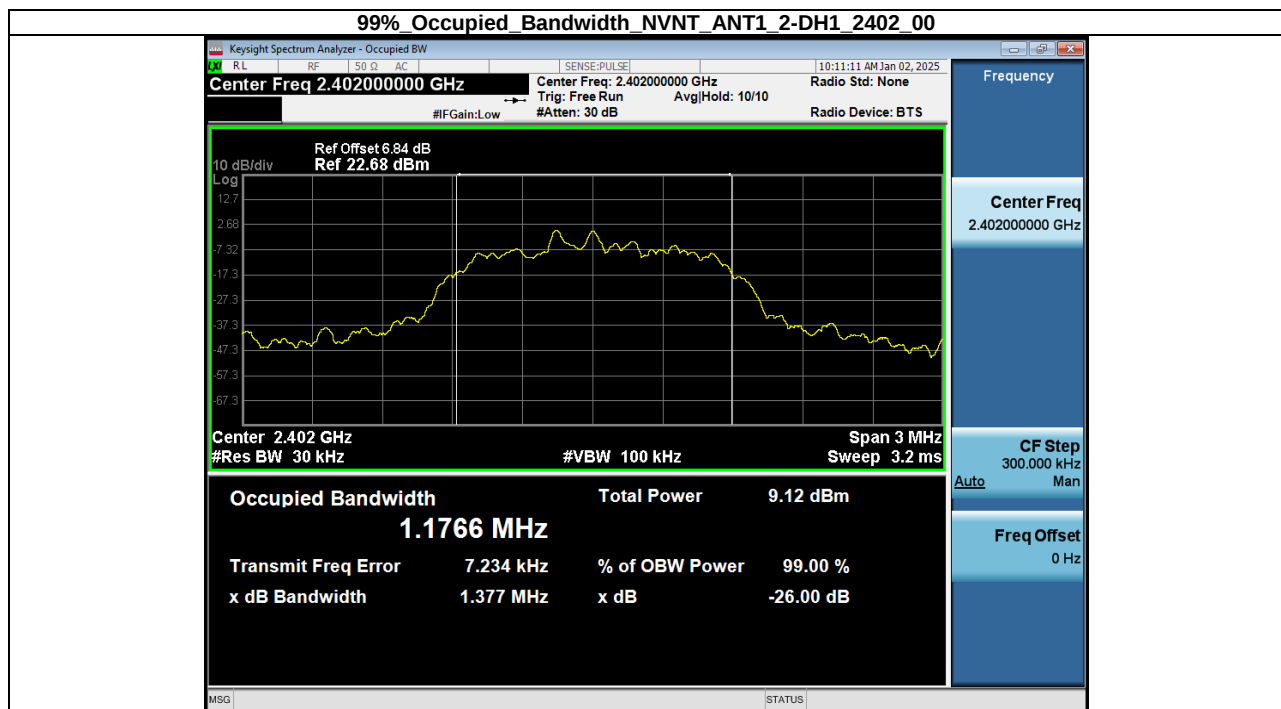
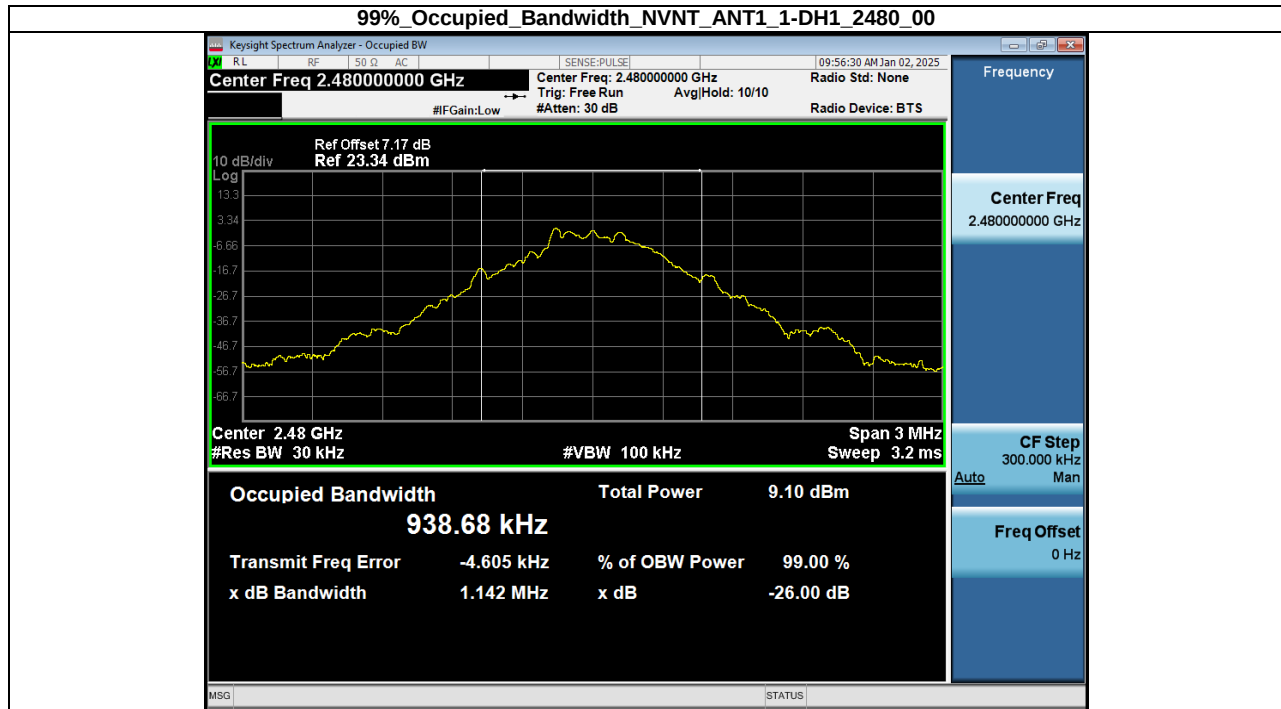


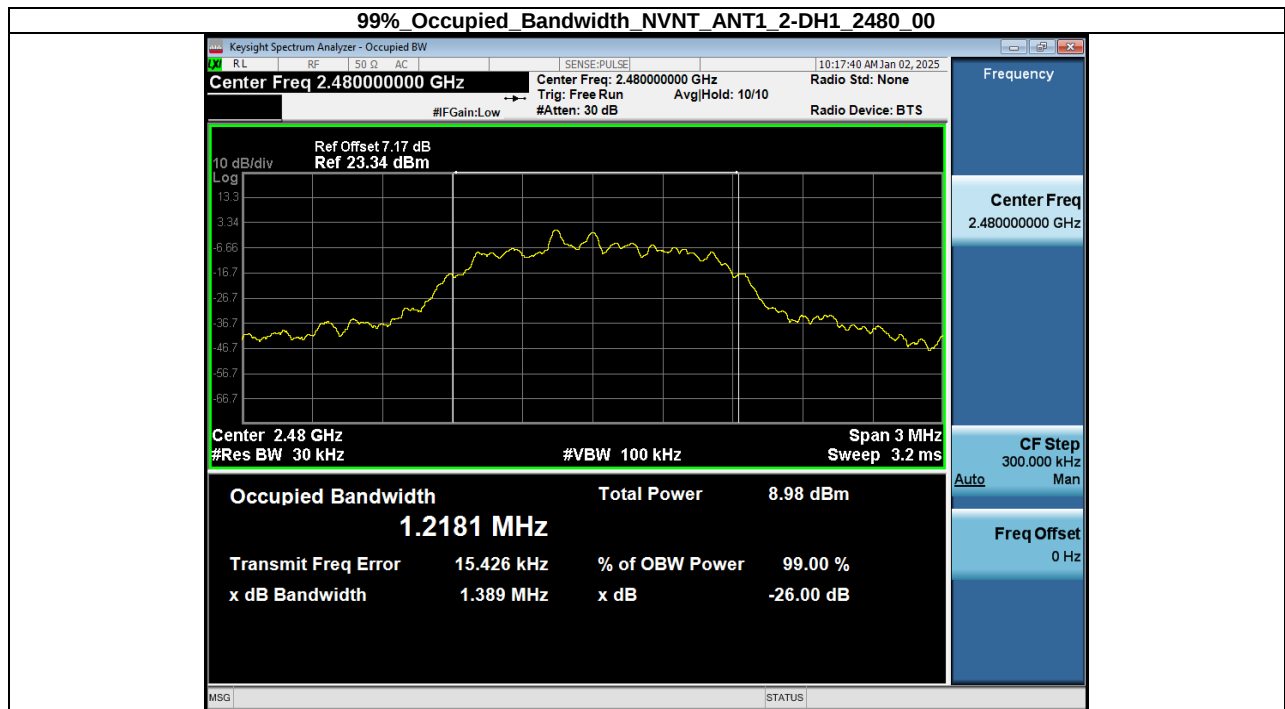
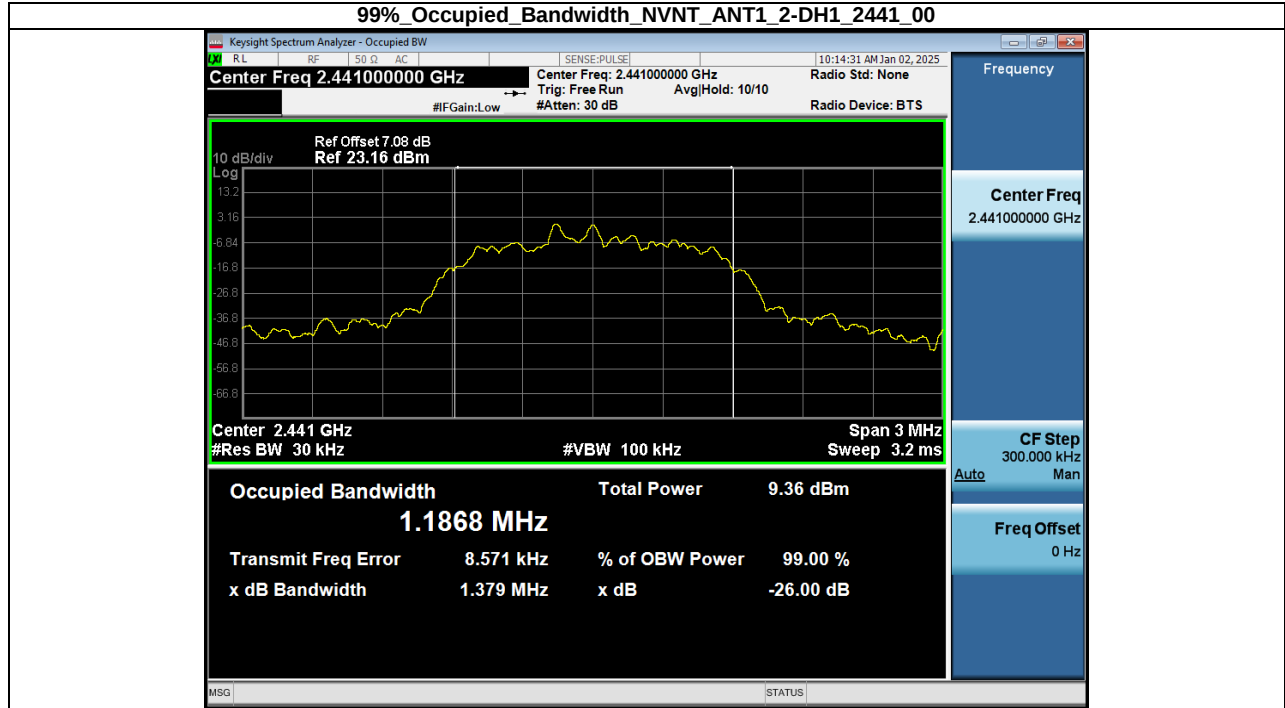


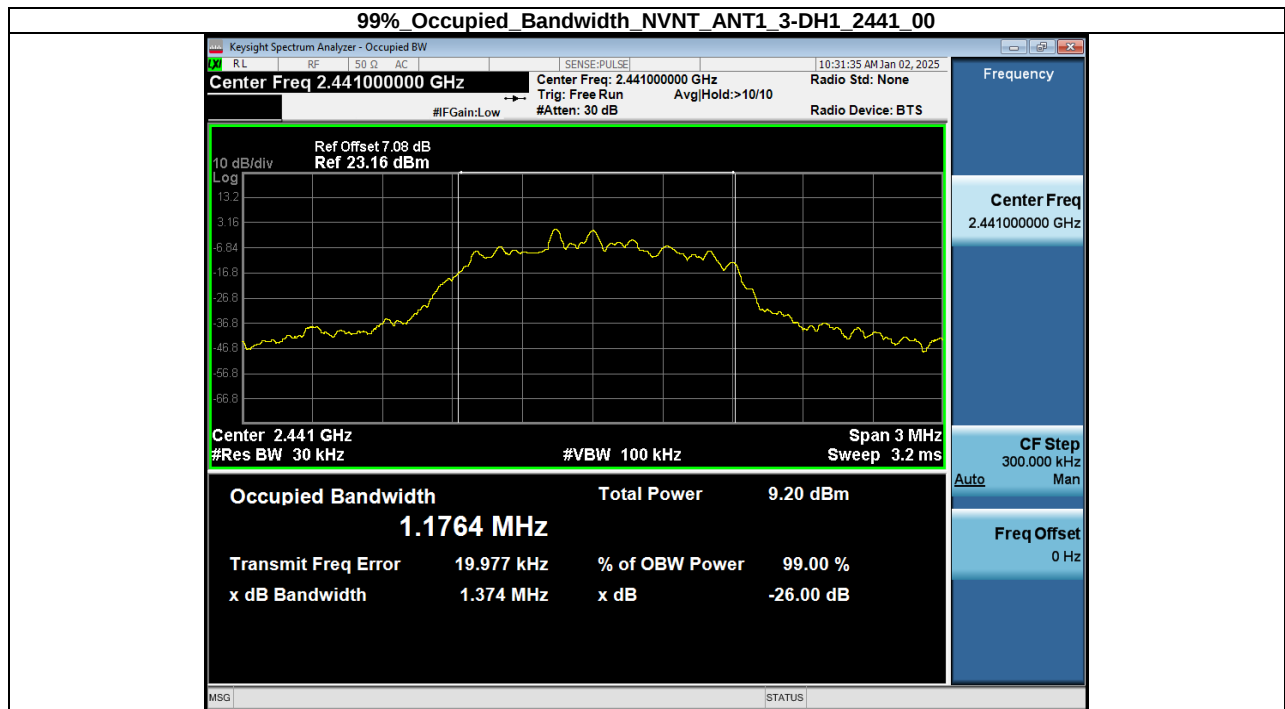
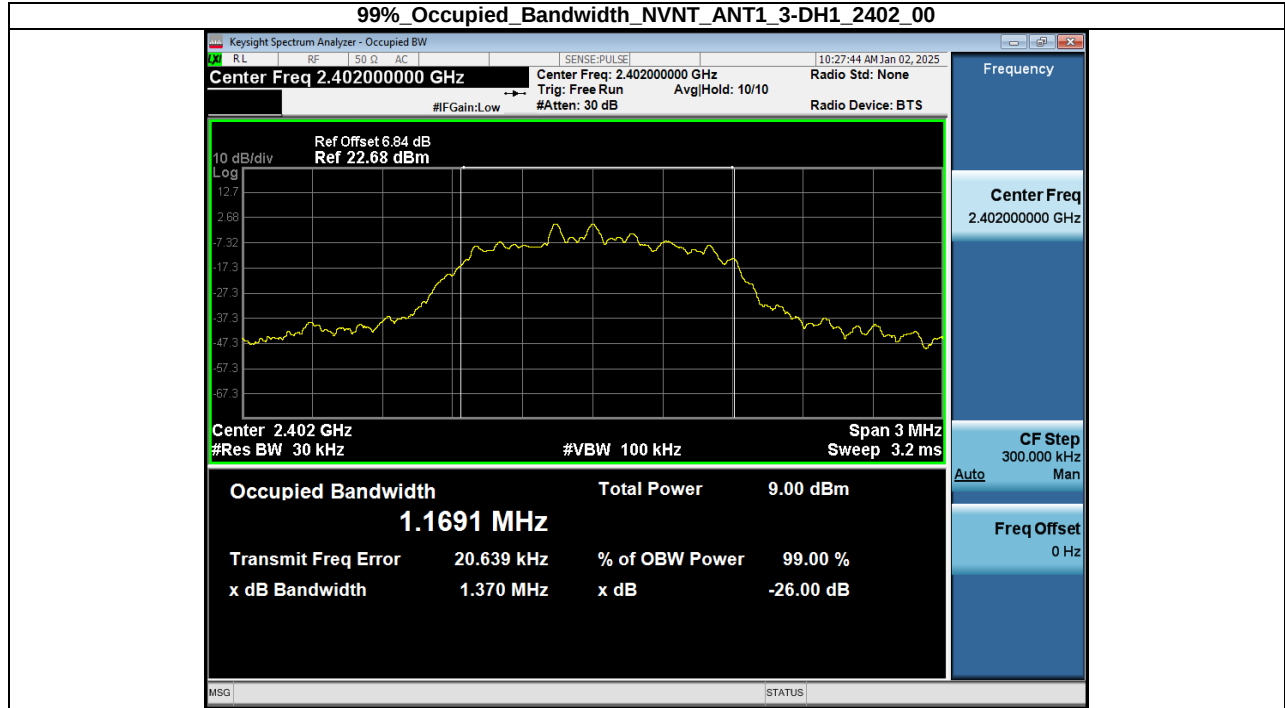
99% Occupied Bandwidth

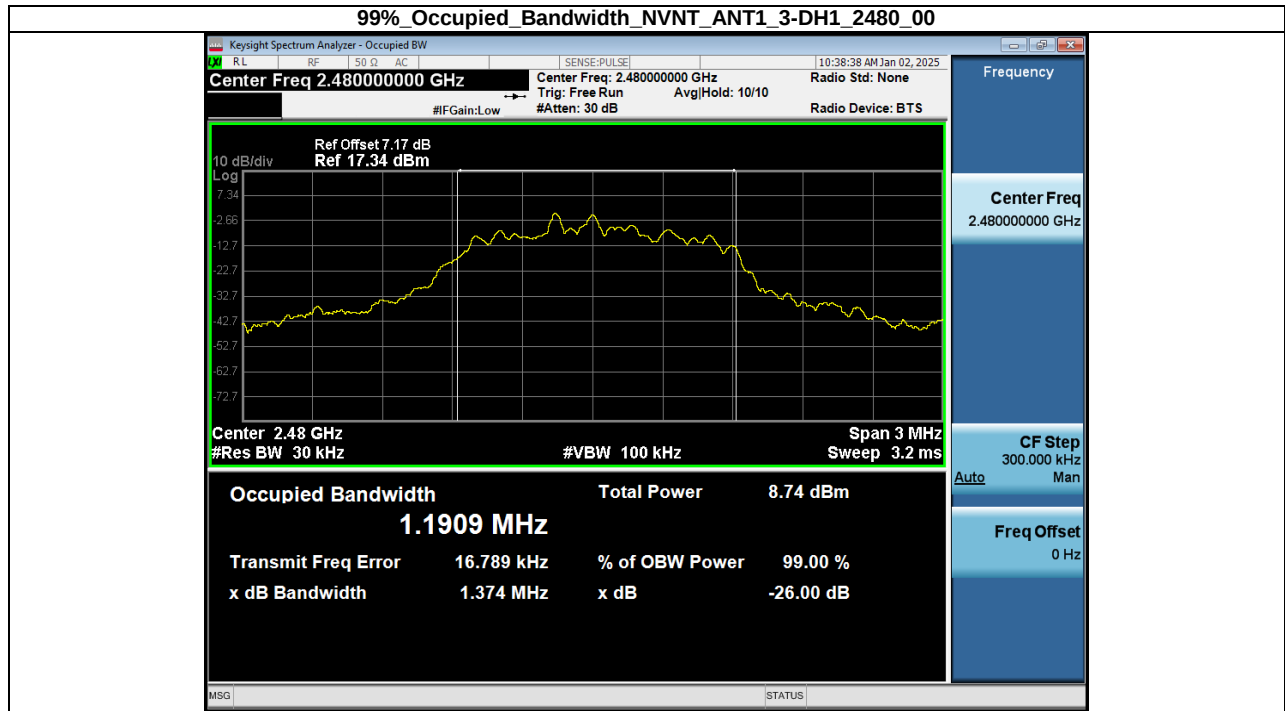
Condition	Antenna	Modulation	Frequency (MHz)	99%%BW(MHz)
NVNT	ANT1	1-DH1	2402.00	0.875
NVNT	ANT1	1-DH1	2441.00	0.895
NVNT	ANT1	1-DH1	2480.00	0.939
NVNT	ANT1	2-DH1	2402.00	1.177
NVNT	ANT1	2-DH1	2441.00	1.187
NVNT	ANT1	2-DH1	2480.00	1.218
NVNT	ANT1	3-DH1	2402.00	1.169
NVNT	ANT1	3-DH1	2441.00	1.176
NVNT	ANT1	3-DH1	2480.00	1.191











5. CARRIER FREQUENCY SEPARATION

5.1. Limit

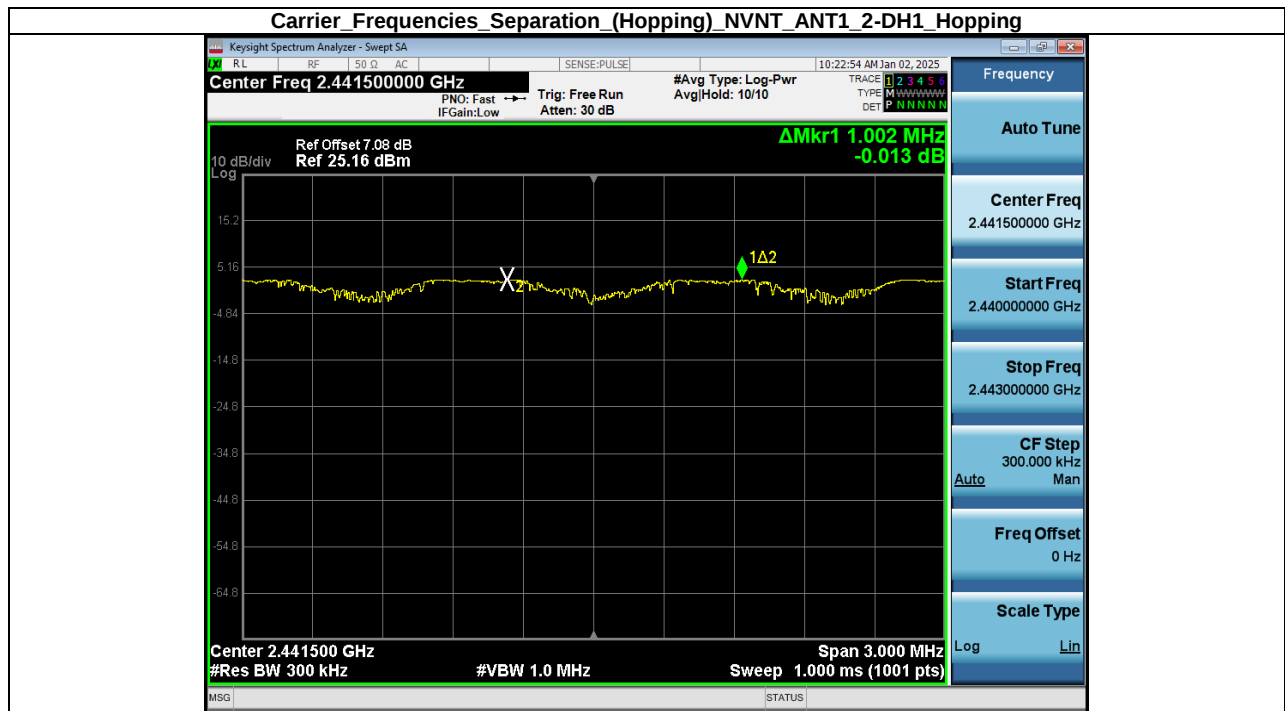
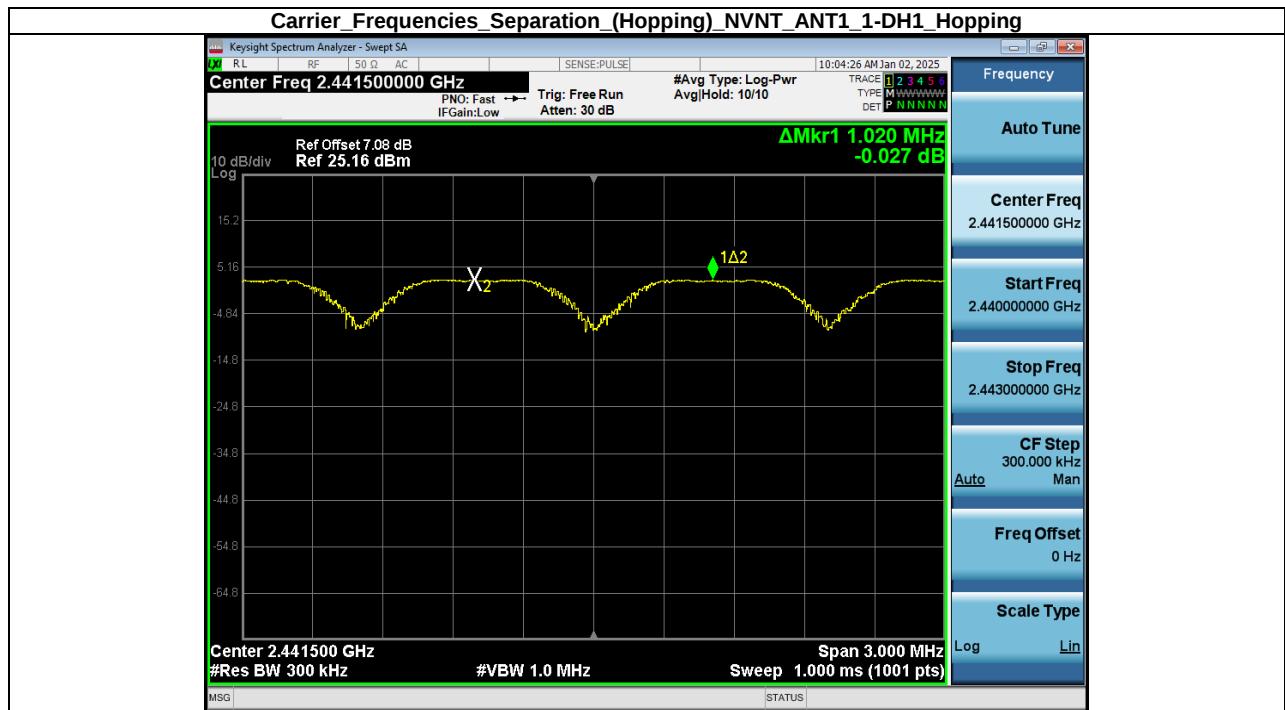
Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that 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

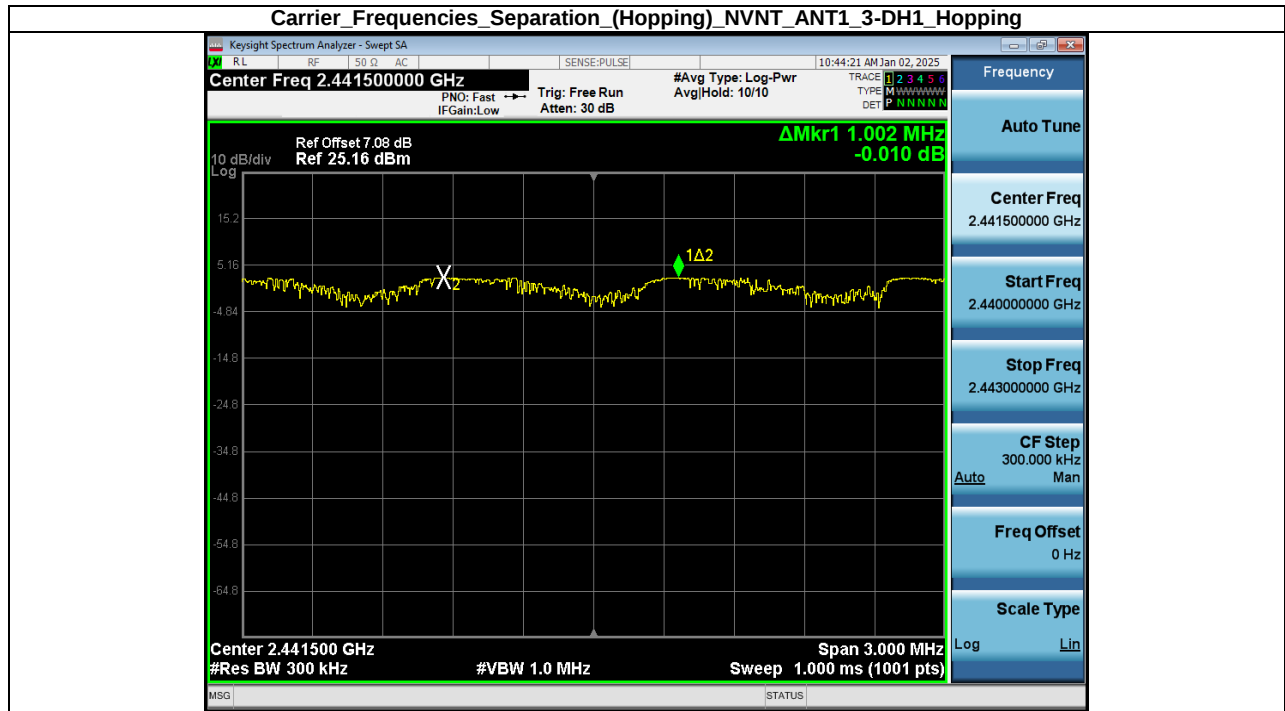
5.2. Test Procedure

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The carrier frequency was measured by spectrum analyzer with 300kHz RBW and 1MHz VBW.

5.3. 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	2441.00	2440.990	2442.010	1.02	0.664	Pass
NVNT	ANT1	2-DH1	2441.00	2441.131	2442.133	1.00	0.865	Pass
NVNT	ANT1	3-DH1	2441.00	2440.861	2441.863	1.00	0.839	Pass





6. NUMBER OF HOPPING CHANNEL

6.1. Limit

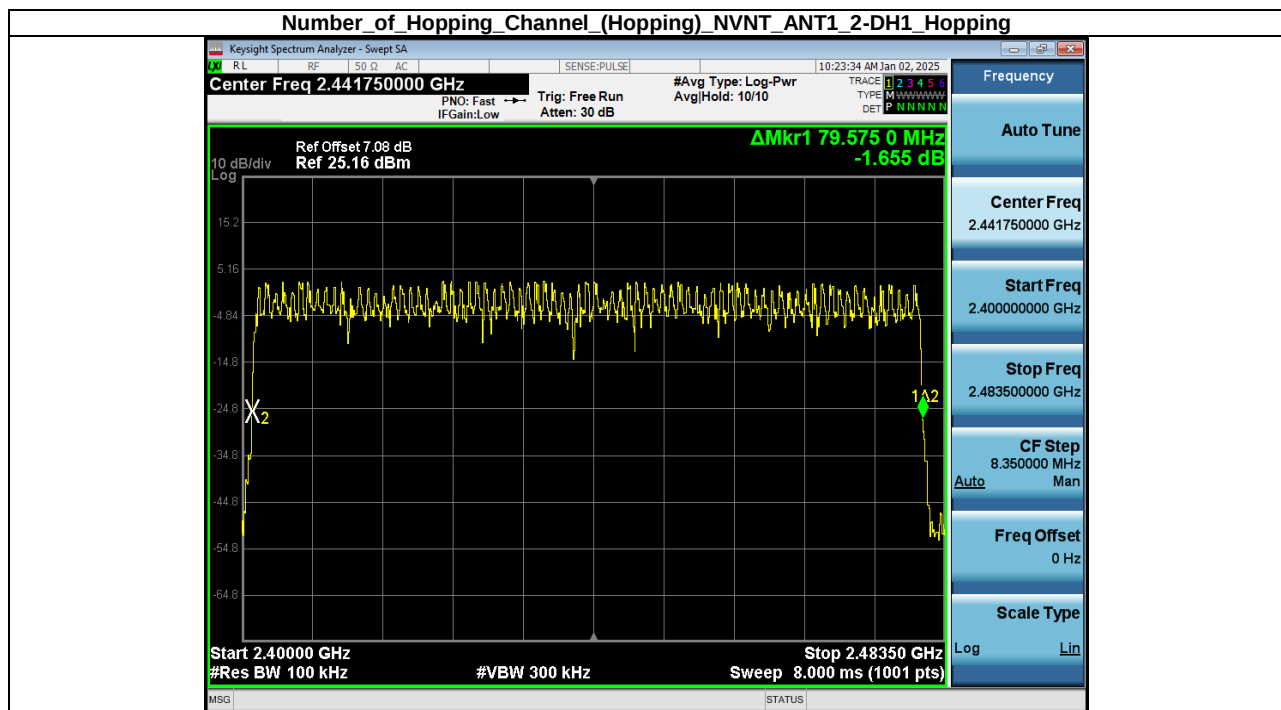
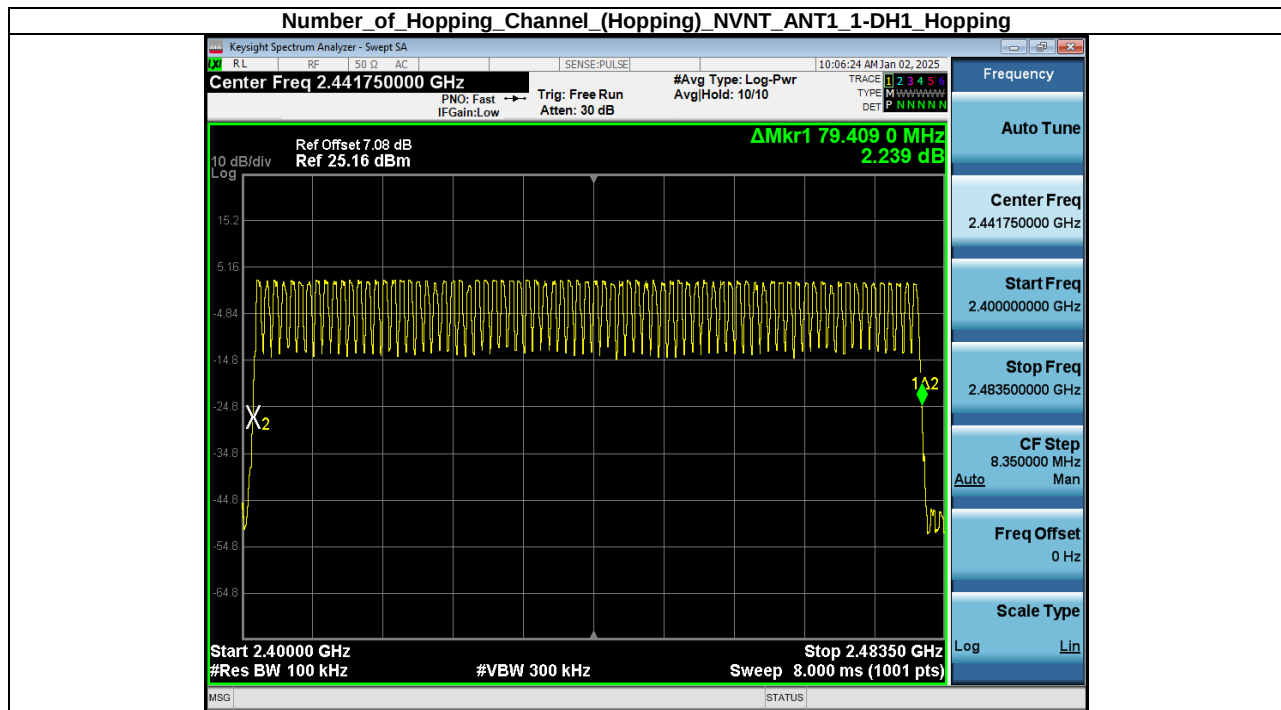
Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels

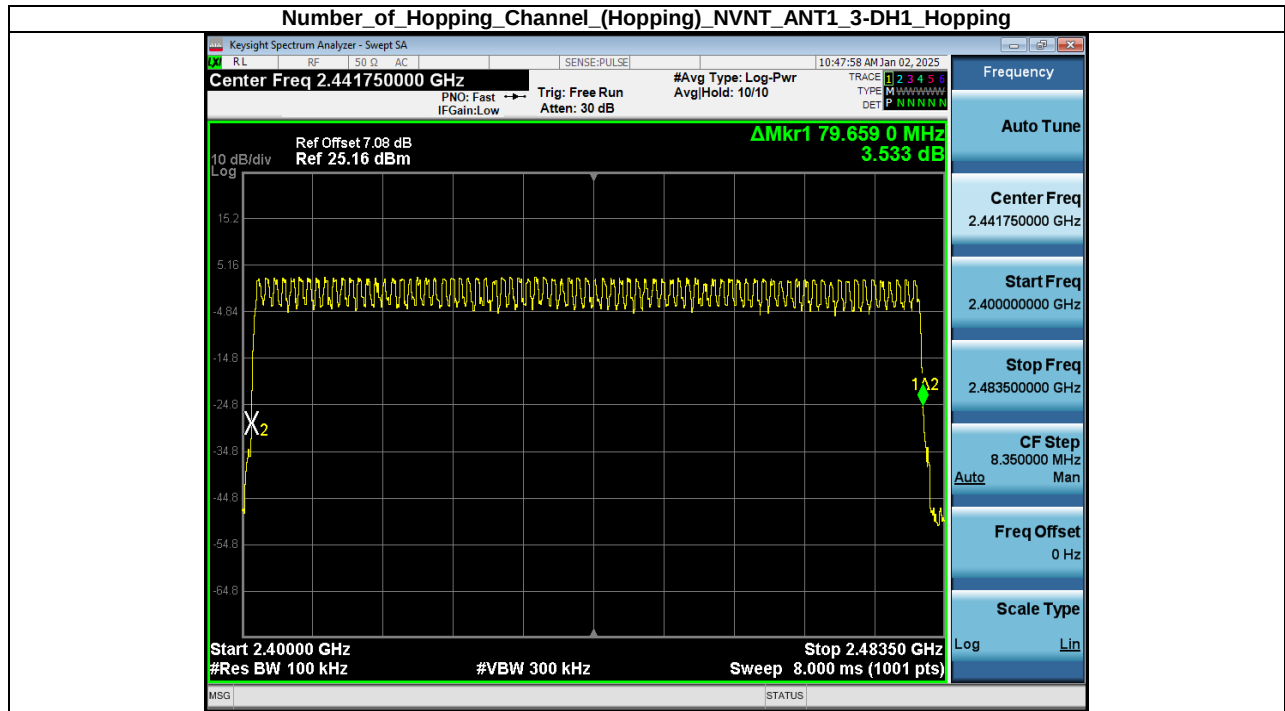
6.2. Test Procedure

The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The number of hopping channel was measured by spectrum analyzer with 100kHz RBW and 300KHz VBW.

6.3. 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





7. DWELL TIME

7.1. Test limit

Please refer section 15.247

According to §15.247(a)(1)(iii), Frequency hopping systems operating in the 2400MHz-2483.5 MHz.

The average time of occupancy on any frequency shall not greater than 0.4 s within period of 0.4 sec- onds multiplied by the number of hopping channel employed.

7.2. Test Procedure

7.2.1. Place the EUT on the table and set it in transmitting mode.

7.2.2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.

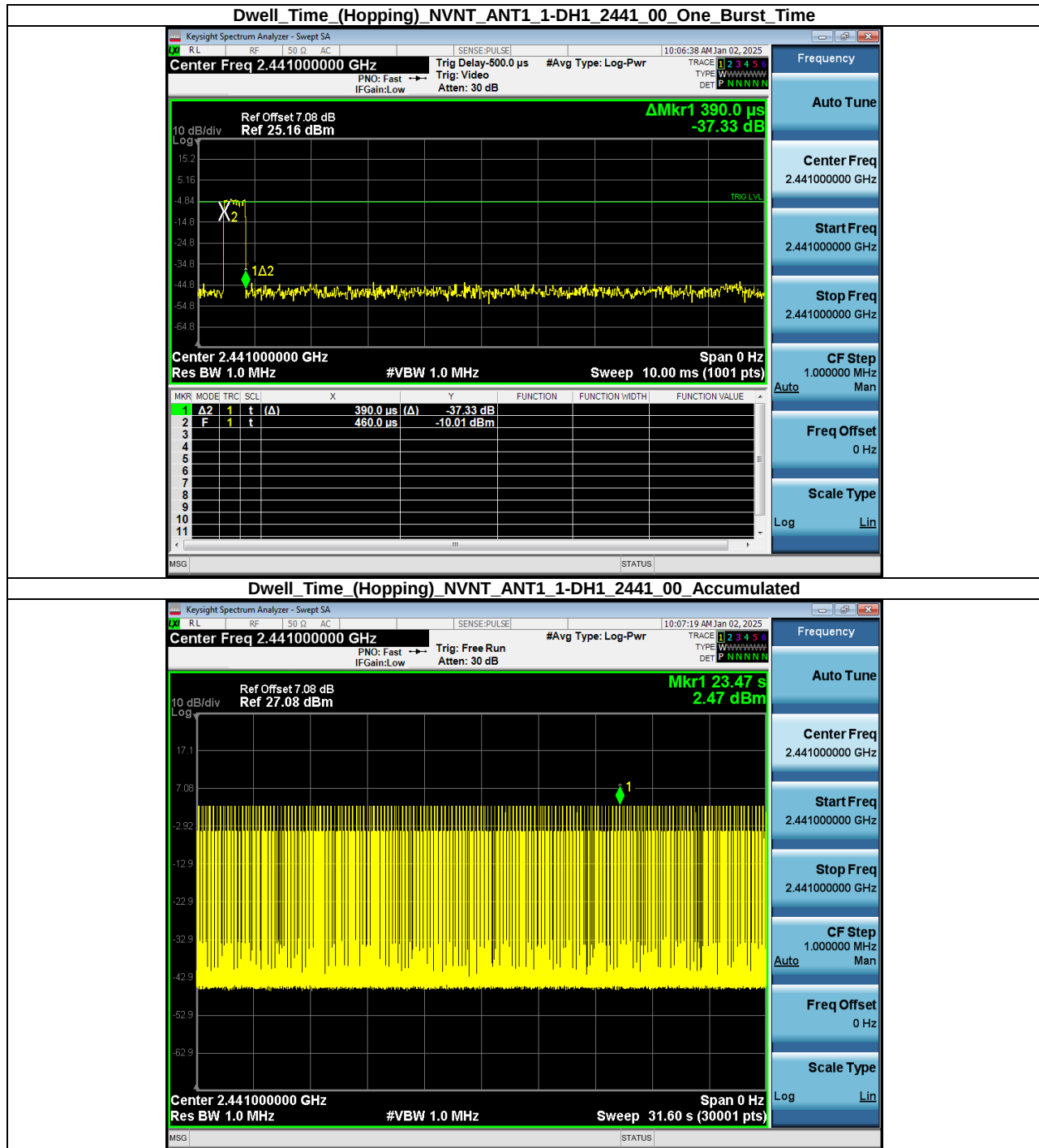
7.2.3. Set center frequency of spectrum analyzer = operating frequency.

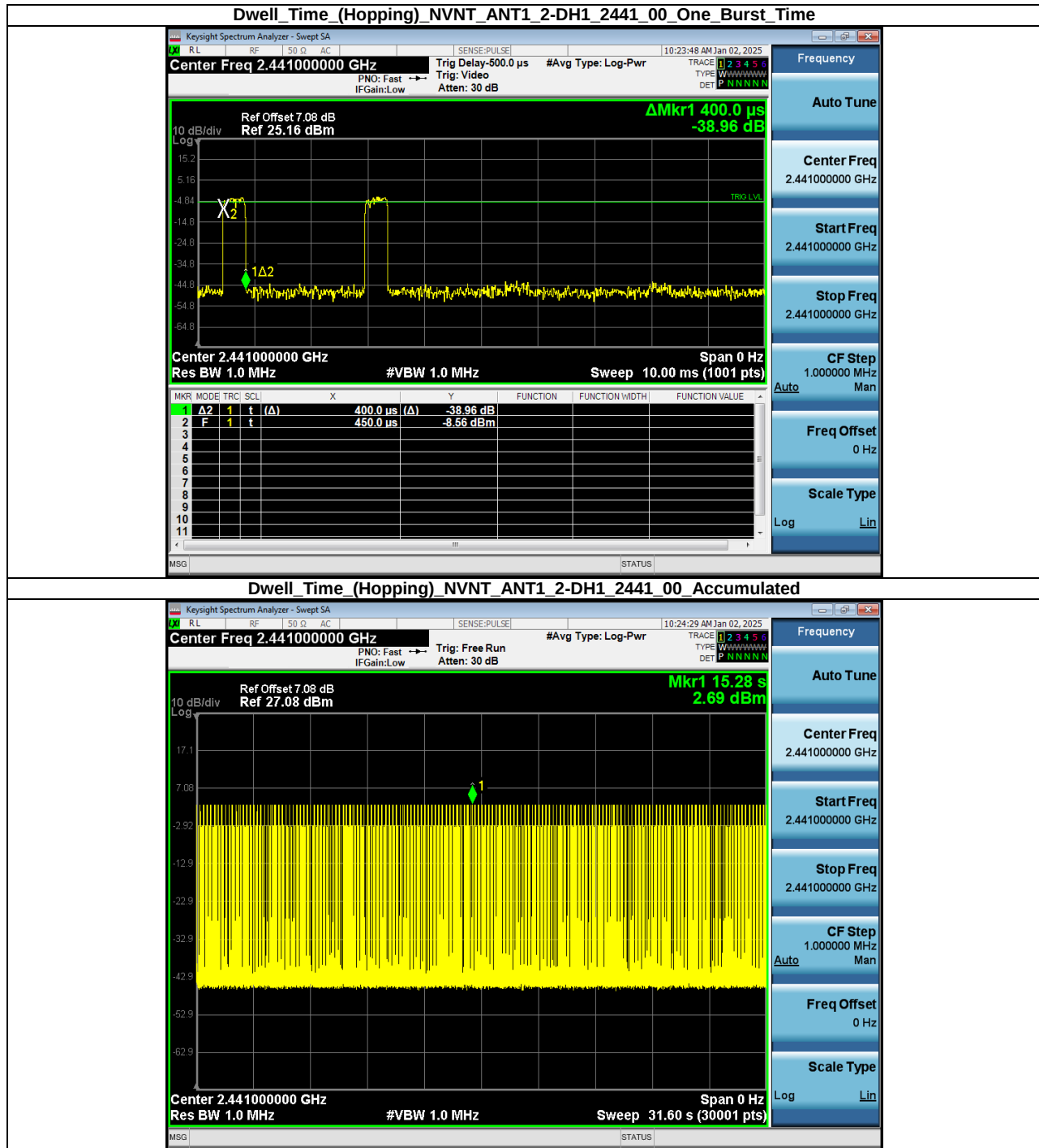
7.2.4. Set the spectrum analyzer as RBW=1MHz, VBW=1MHz, Span = 0Hz, Sweep = auto.

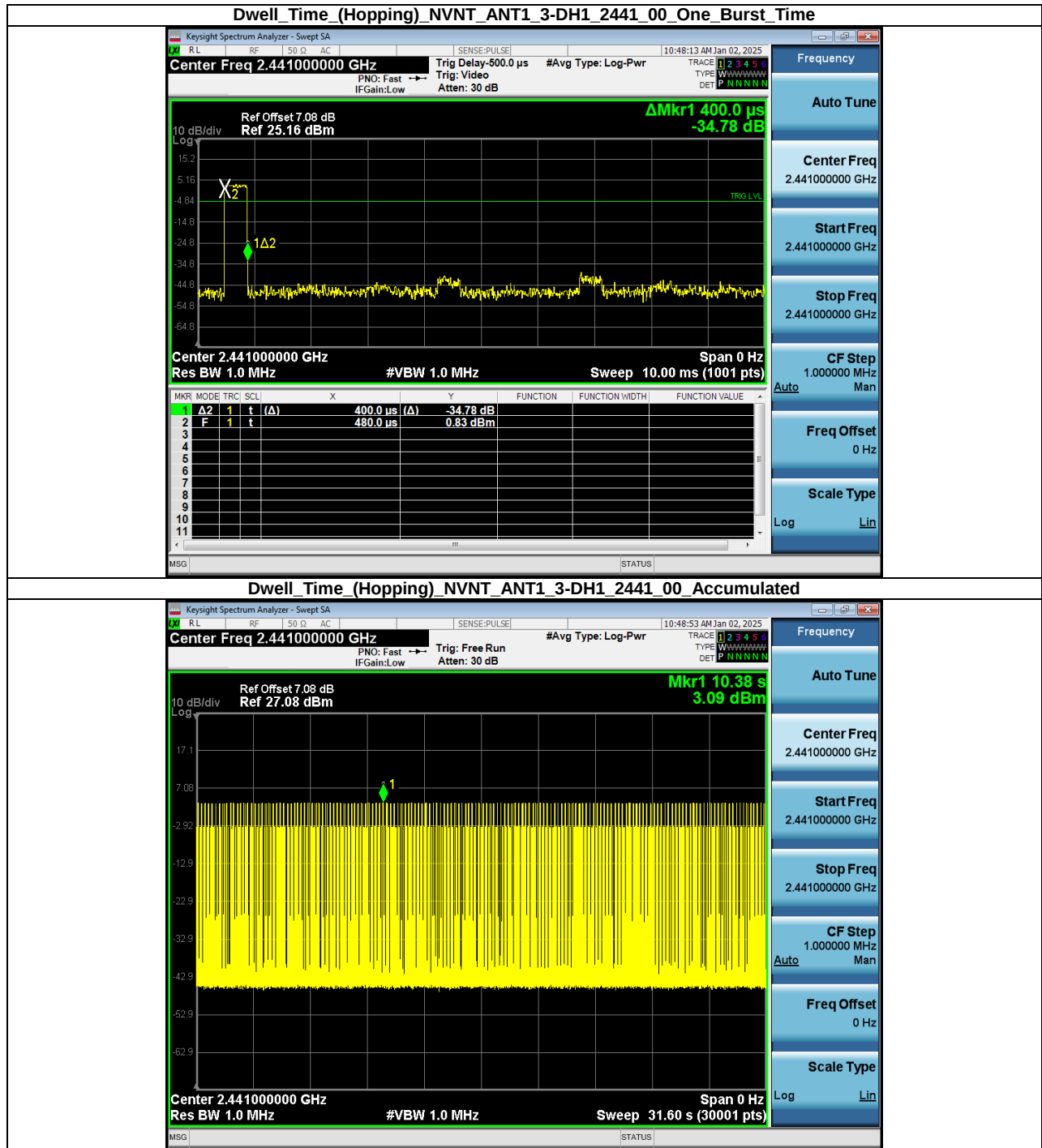
7.2.5. Repeat above procedures until all frequency measured were complete.

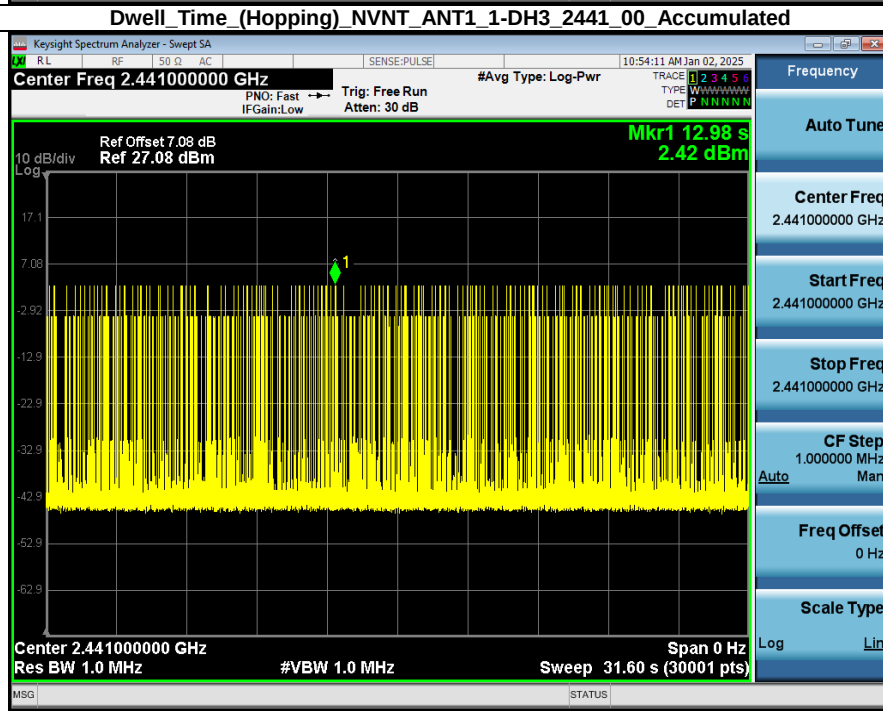
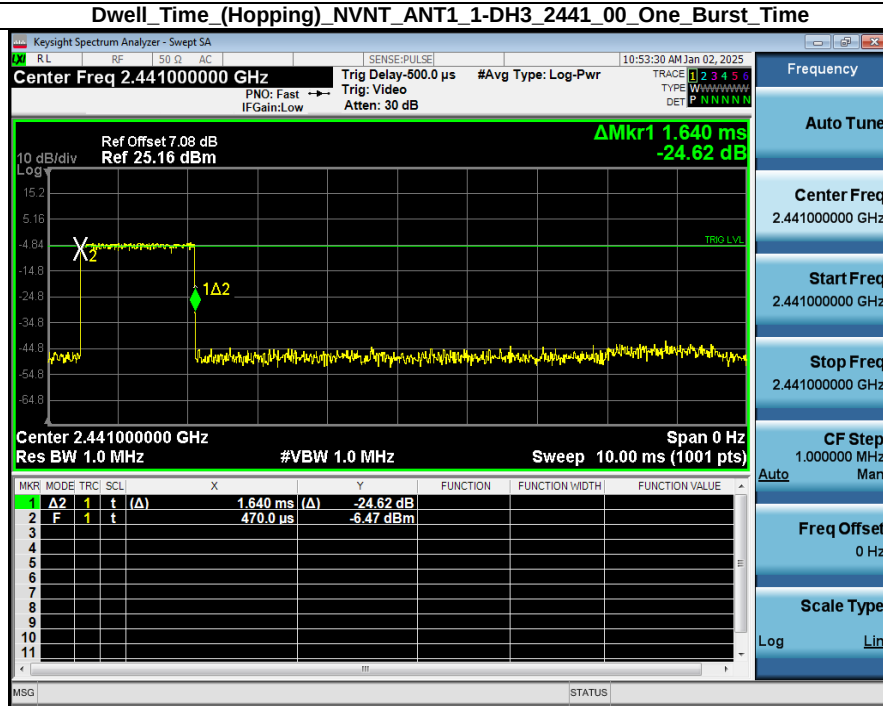
7.3. Test Result

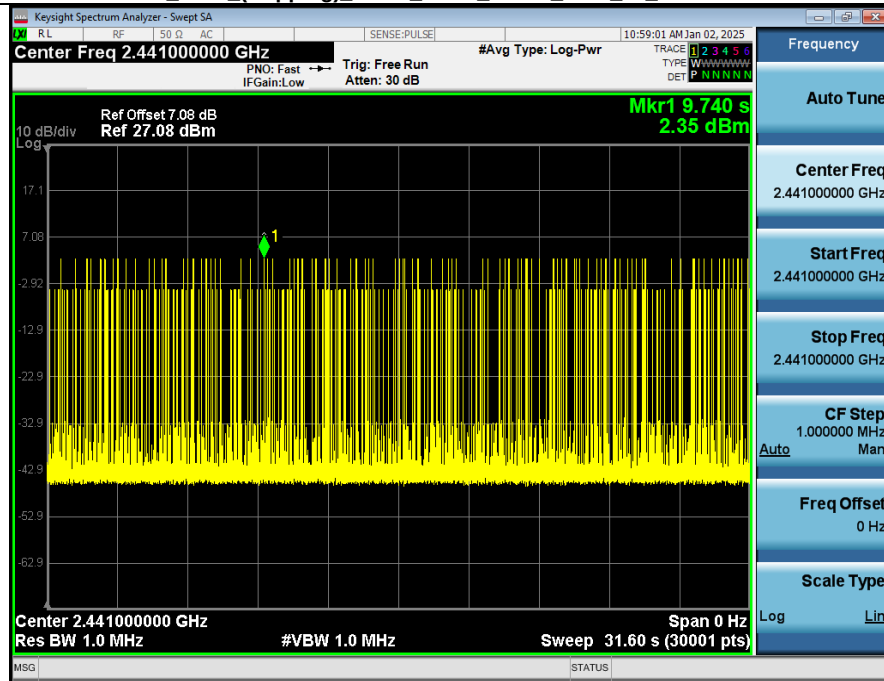
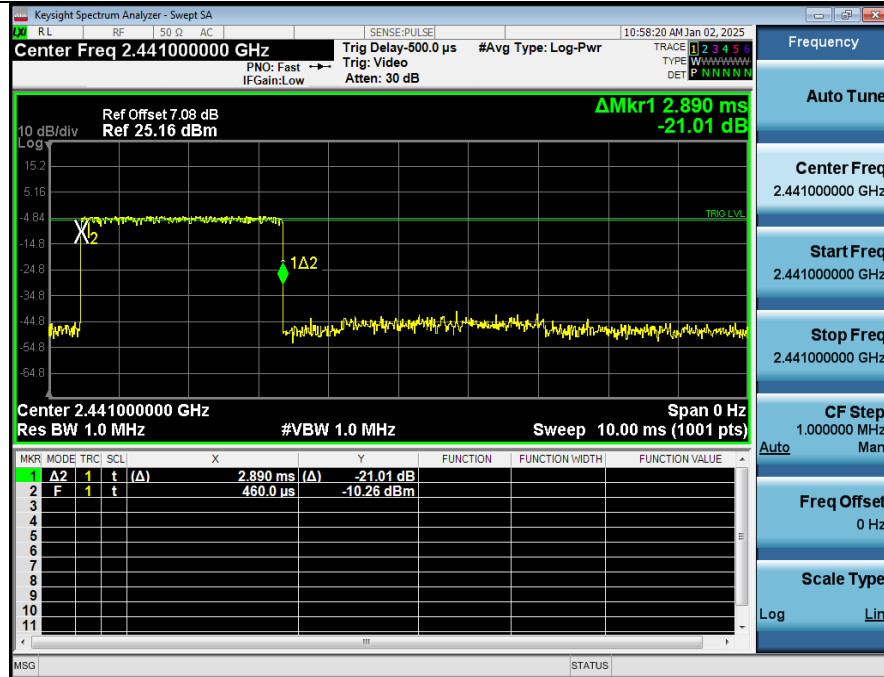
Condition	Antenna	Packet Type	Pulse Time(ms)	Hops	Dwell Time(ms)	Limit(s)	Result
NVNT	ANT1	1-DH1	0.390	318.00	124.020	0.40	Pass
NVNT	ANT1	2-DH1	0.400	320.00	128.000	0.40	Pass
NVNT	ANT1	3-DH1	0.400	319.00	127.600	0.40	Pass
NVNT	ANT1	1-DH3	1.640	163.00	267.320	0.40	Pass
NVNT	ANT1	1-DH5	2.890	110.00	317.900	0.40	Pass
NVNT	ANT1	2-DH3	1.650	159.00	262.350	0.40	Pass
NVNT	ANT1	2-DH5	2.890	113.00	326.570	0.40	Pass
NVNT	ANT1	3-DH3	1.650	169.00	278.850	0.40	Pass
NVNT	ANT1	3-DH5	2.890	121.00	349.690	0.40	Pass

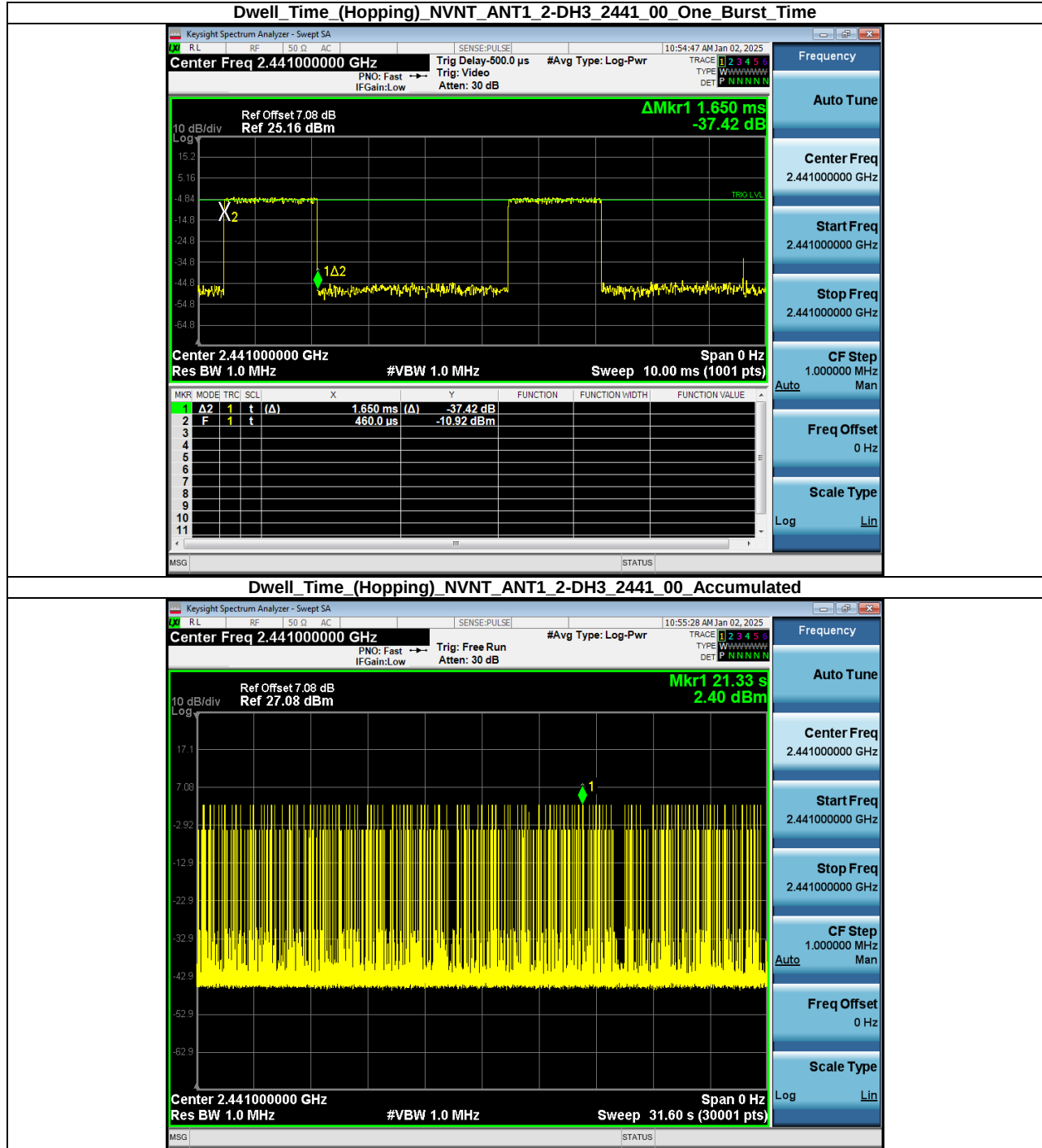


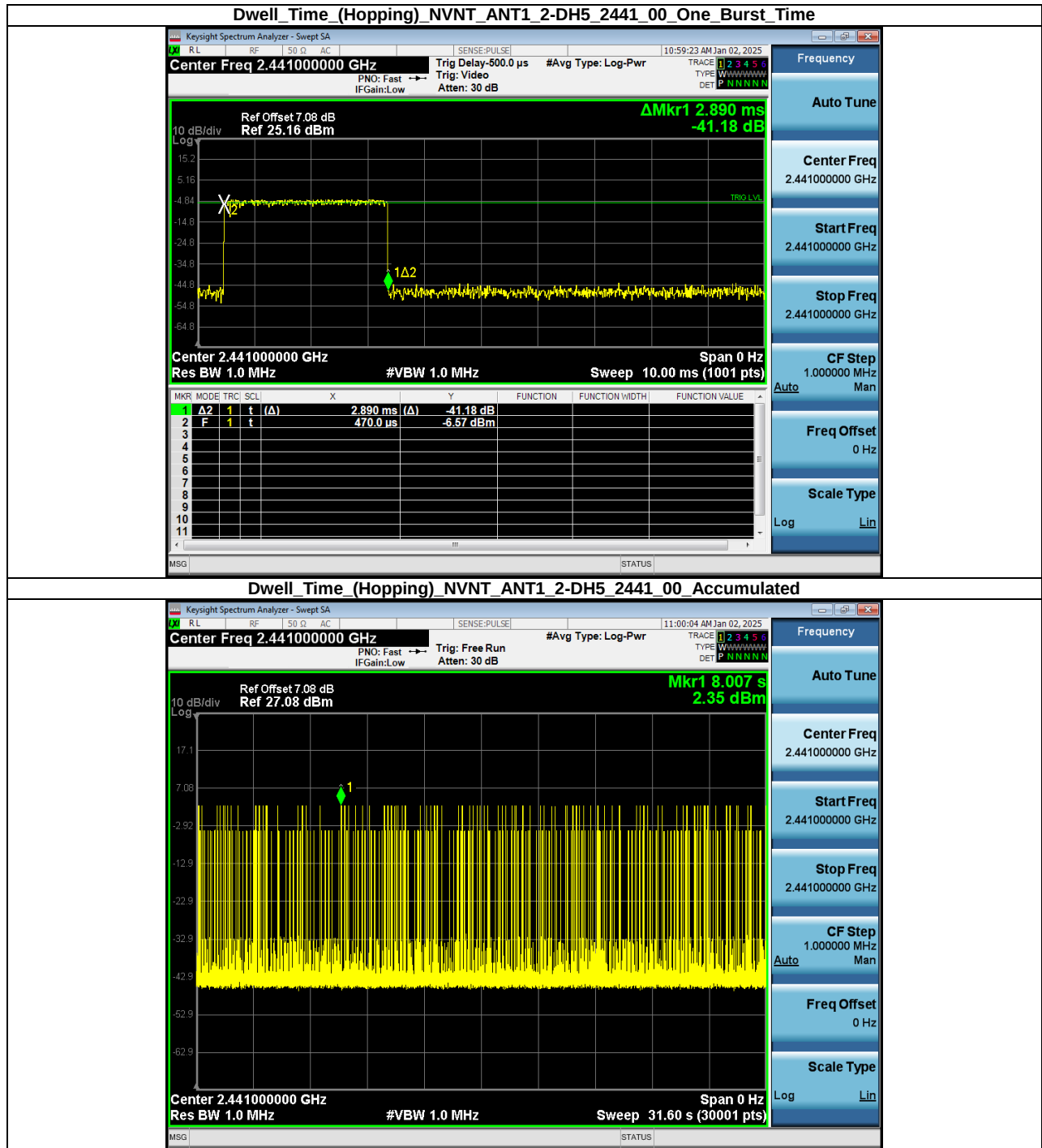


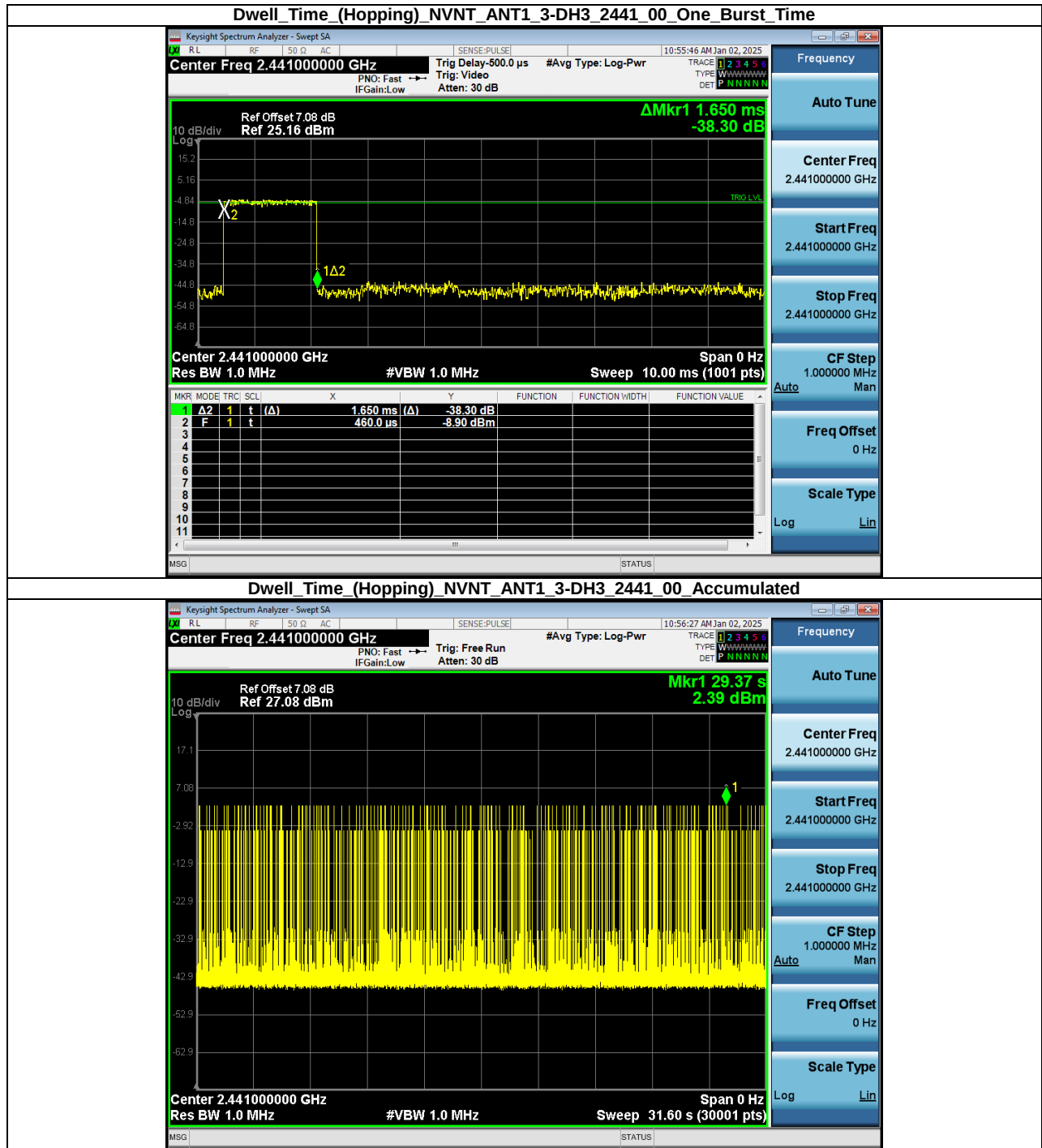


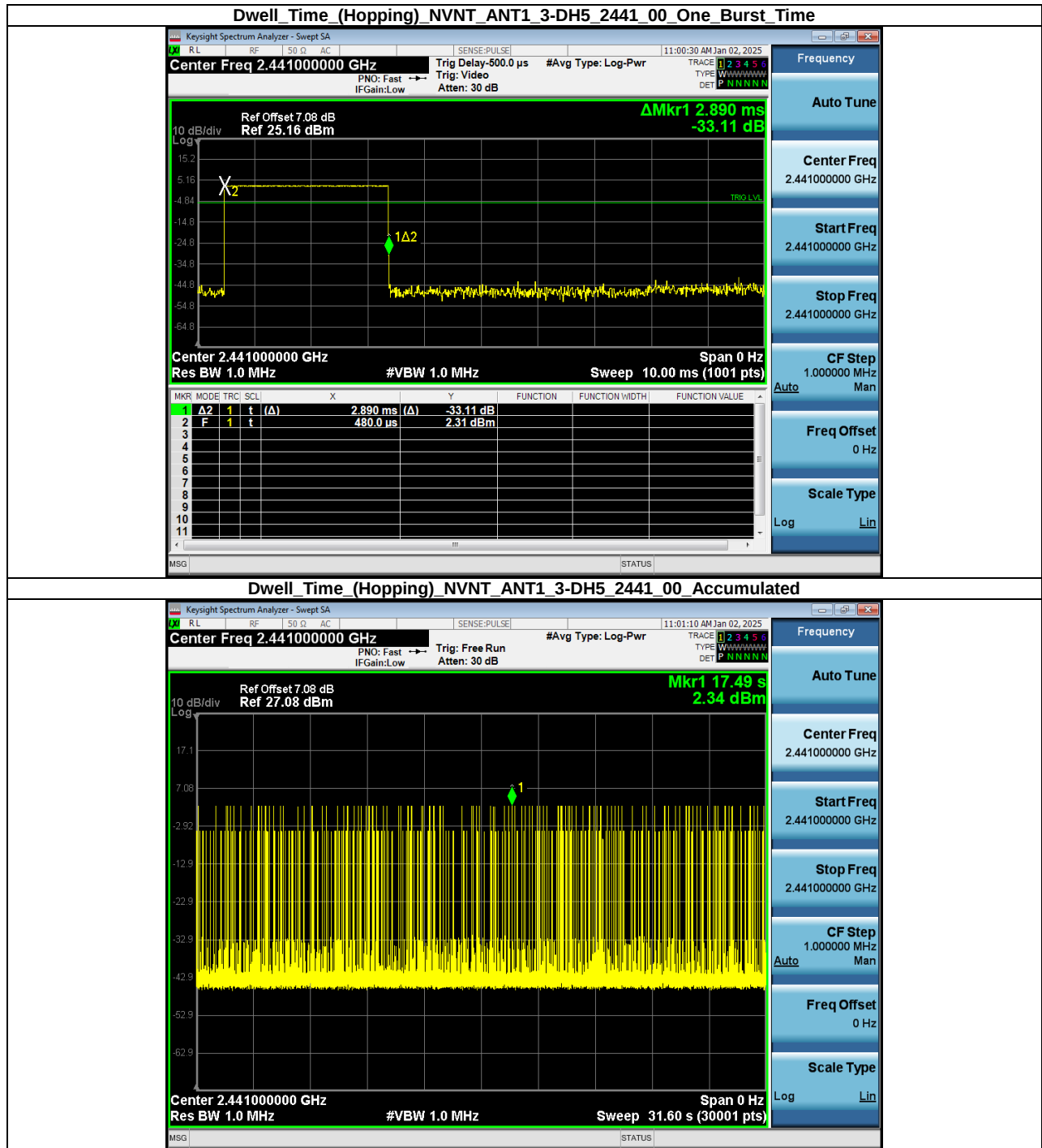












8. RADIATED EMISSIONS

8.1. Limit

All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

15.205 Restricted frequency band

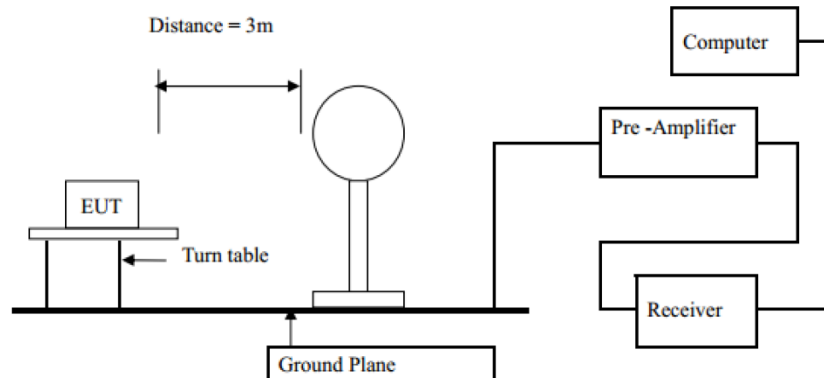
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 4.20775	73 - 74.6	1645.5 - 1646.5	9.3 - 9.5
6.215 - 6.218	74.8 - 75.2	1660 - 1710	10.6 - 12.7
6.26775 - 6.26825	108 - 121.94	1718.8 - 1722.2	13.25 - 13.4
6.31175 - 6.31225	123 - 138	2200 - 2300	14.47 - 14.5
8.291 - 8.294	149.9 - 150.05	2310 - 2390	15.35 - 16.2
8.362 - 8.366	156.52475 - 156.52525	2483.5 - 2500	17.7 - 21.4
8.37625 - 8.38675	156.7 - 156.9	2690 - 2900	22.01 - 23.12
8.41425 - 8.41475	162.0125 - 167.17	3260 - 3267	23.6 - 24.0
12.29 - 12.293	167.72 - 173.2	3332 - 3339	31.2 - 31.8
12.51975 - 12.52025	240 - 285	3345.8 - 3358	36.43 - 36.5
12.57675 - 12.57725	322 - 335.4	3600 - 4400	(²)

15.209 Limit

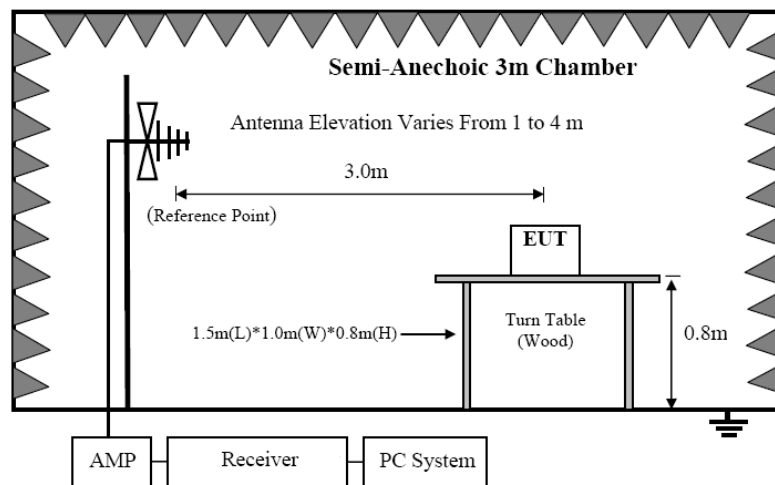
FREQUENCY MHz	DISTANCE Meters	FIELD STRENGTHS LIMIT	
		μV/m	dB(μV)/m
0.009-0.490	300	2400/F(KHz)	/
0.490-1.705	30	24000/F(KHz)	/
1.705-30	30	30	29.5
30 88	3	100	40.0
88 216	3	150	43.5
216 960	3	200	46.0
960 1000	3	500	54.0
Above 1000	3	74.0 dB(μV)/m (Peak) 54.0 dB(μV)/m (Average)	

8.2. Block Diagram of Test setup

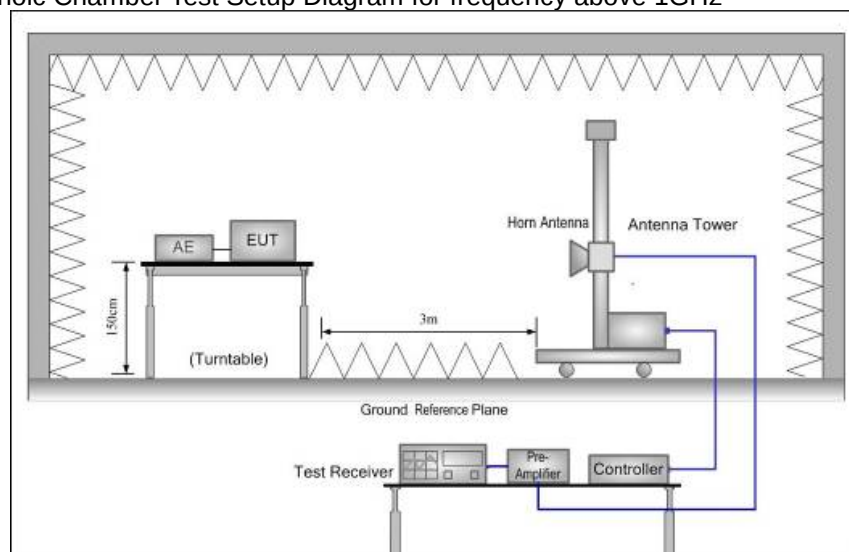
8.2.1 In 3m Anechoic Chamber Test Setup Diagram for below 30MHz



8.2.1 In 3m Anechoic Chamber Test Setup Diagram for below 1GHz



8.2.2 In 3m Anechoic Chamber Test Setup Diagram for frequency above 1GHz



Note: For harmonic emissions test a appropriate high pass filter was inserted in the input port of AMP.

8.3. Test Procedure

- (1) EUT was placed on a non-metallic table, 80 cm above the ground plane inside a semi-anechoic chamber.
- (2) Setup EUT and simulator as shown in section 1.4 and 6.1
- (3) Test antenna was located 3m from the EUT on an adjustable mast. Below pre-scan procedure was first performed in order to find prominent radiated emissions.
 - (a) Change work frequency or channel of device if practicable.
 - (b) Change modulation type of device if practicable.
 - (c) Rotated EUT though three orthogonal axes to determine the attitude of EUT arrangement produces highest emissions
- (4) Spectrum frequency from 9KHz to 25GHz (tenth harmonic of fundamental frequency) was investigated
- (5) For final emissions measurements at each frequency of interest, the EUT were rotated and the antenna height was varied between 1m and 4m in order to maximize the emission. Measurements in both horizontal and vertical polarities were made and the data was recorded. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10:2013on Radiated Emission test.
- (6) For emissions above 1GHz, both Peak and Average level were measured with Spectrum Analyzer, and the RBW is set at 1MHz, VBW is set at 3MHz for Peak measure; RBW is set at 1MHz, VBW is set at 10Hz for Average measure.

8.4. Test Result

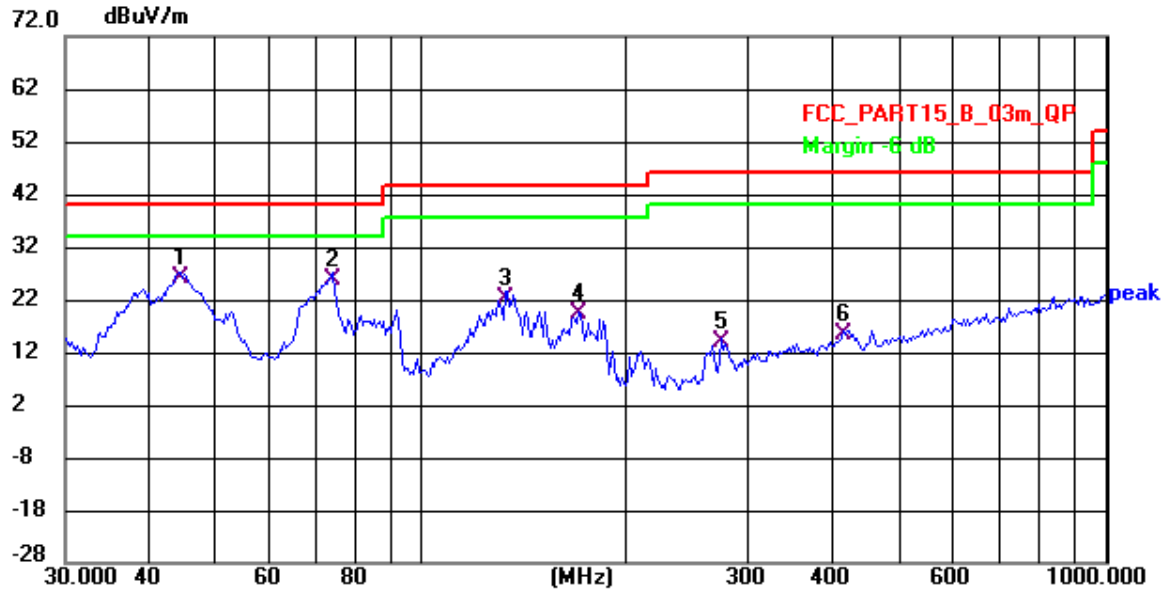
We have scanned the 10th harmonic from 9KHz to the EUT's highest frequency.
Detailed information please see the following page.

From 9KHz to 30MHz: Conclusion: PASS

Note: The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

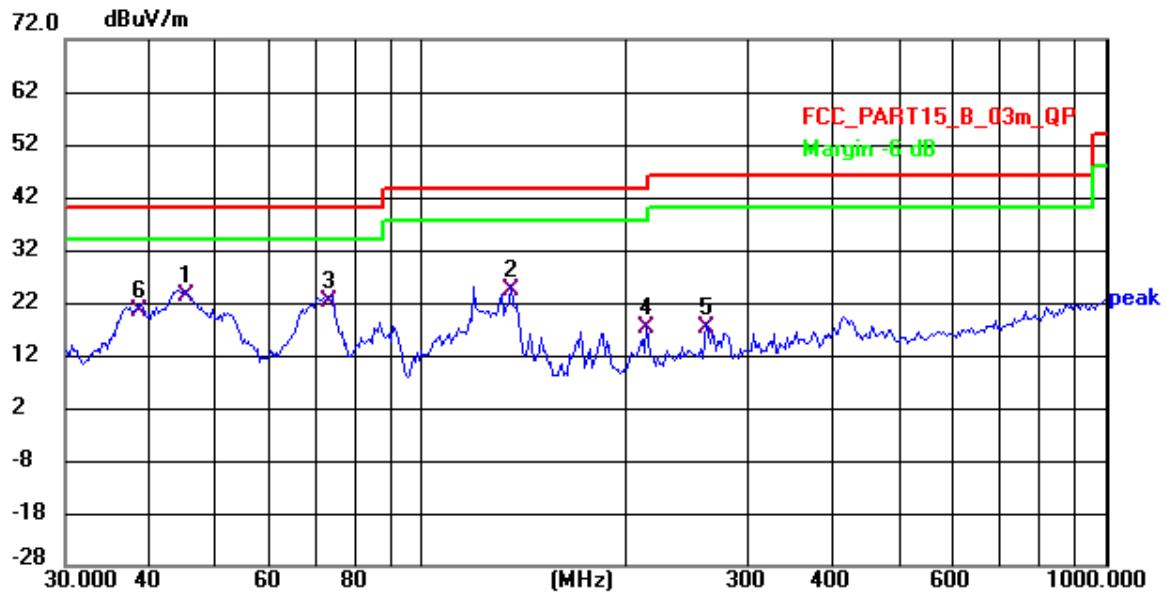
From 30MHz to 1000MHz: Conclusion: PASS

Vertical:



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 *	44.154	45.48	-19.46	26.02	40.00	-13.98	QP	100	69	P	
2	73.750	48.49	-22.88	25.61	40.00	-14.39	QP	100	271	P	
3	132.149	43.54	-21.53	22.01	43.50	-21.49	QP	100	254	P	
4	168.997	40.34	-21.13	19.21	43.50	-24.29	QP	100	36	P	
5	274.446	36.97	-22.96	14.01	46.00	-31.99	QP	100	45	P	
6	412.539	34.28	-19.03	15.25	46.00	-30.75	QP	100	0	P	

Horizontal:



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 *	73.750	40.24	-22.88	17.36	40.00	-22.64	QP	200	210	P	
2	182.578	41.06	-23.14	17.92	43.50	-25.58	QP	200	94	P	
3	270.616	43.07	-23.06	20.01	46.00	-25.99	QP	100	105	P	
4	34.770	35.53	-19.92	15.61	40.00	-24.39	QP	100	58	P	
5	318.087	40.96	-21.65	19.31	46.00	-26.69	QP	200	145	P	
6	118.928	39.27	-22.22	17.05	43.50	-26.45	QP	200	147	P	

Remark: All modes have been tested, and only worst data of GFSK mode, Channel 2402MHz was listed in this report.

From 1G-25GHz

All modes had been tested, only show the worst mode 8DPSK

Test Mode : 8DPSK TX Low								
No.	Freq MHz	Polarity	Reading (dBuV/m)	Correct Factor	Result (dBuV/m)	Limit (dBuV/m)	Margin	Remark
1	4804	V	89.01	-27.21	61.80	74	-12.20	Peak
2	4804	V	69.25	-27.21	42.04	54	-11.96	Avg
3	7206	--	--	--		--		--
4	9608	--	--	--		--		--
5	4804	H	90.28	-27.21	63.07	74	-10.93	Peak
6	4804	H	68.36	-27.21	41.15	54	-12.85	Avg
7	7206	--	--	--		--		--
8	9608	--	--	--		--		--
Test Mode : 8DPSK TX Mid								
1	4880	V	90.39	-27.84	62.55	74	-11.45	Peak
2	4880	V	70.28	-27.84	42.44	54	-11.56	Avg
3	7320	--	--	--		--		--
4	9760	--	--	--		--		--
5	4880	H	90.74	-27.84	62.90	74	-11.10	Peak
6	4880	H	71.61	-27.84	43.77	54	-10.23	Avg
7	7320	--	--	--		--		--
8	9760	--	--	--		--		--
Test Mode : 8DPSK TX High								
1	4960	V	90.29	-28.49	61.80	74	-12.20	Peak
2	4960	V	70.31	-28.49	41.82	54	-12.18	Avg
3	7440	--	--	--		--		--
4	9920	--	--	--		--		--
5	4960	H	90.82	-28.49	62.33	74	-11.67	Peak
6	4960	H	70.07	-28.49	41.58	54	-12.42	Avg
7	7440	--	--	--		--		--
8	9920	--	--	--		--	--	--

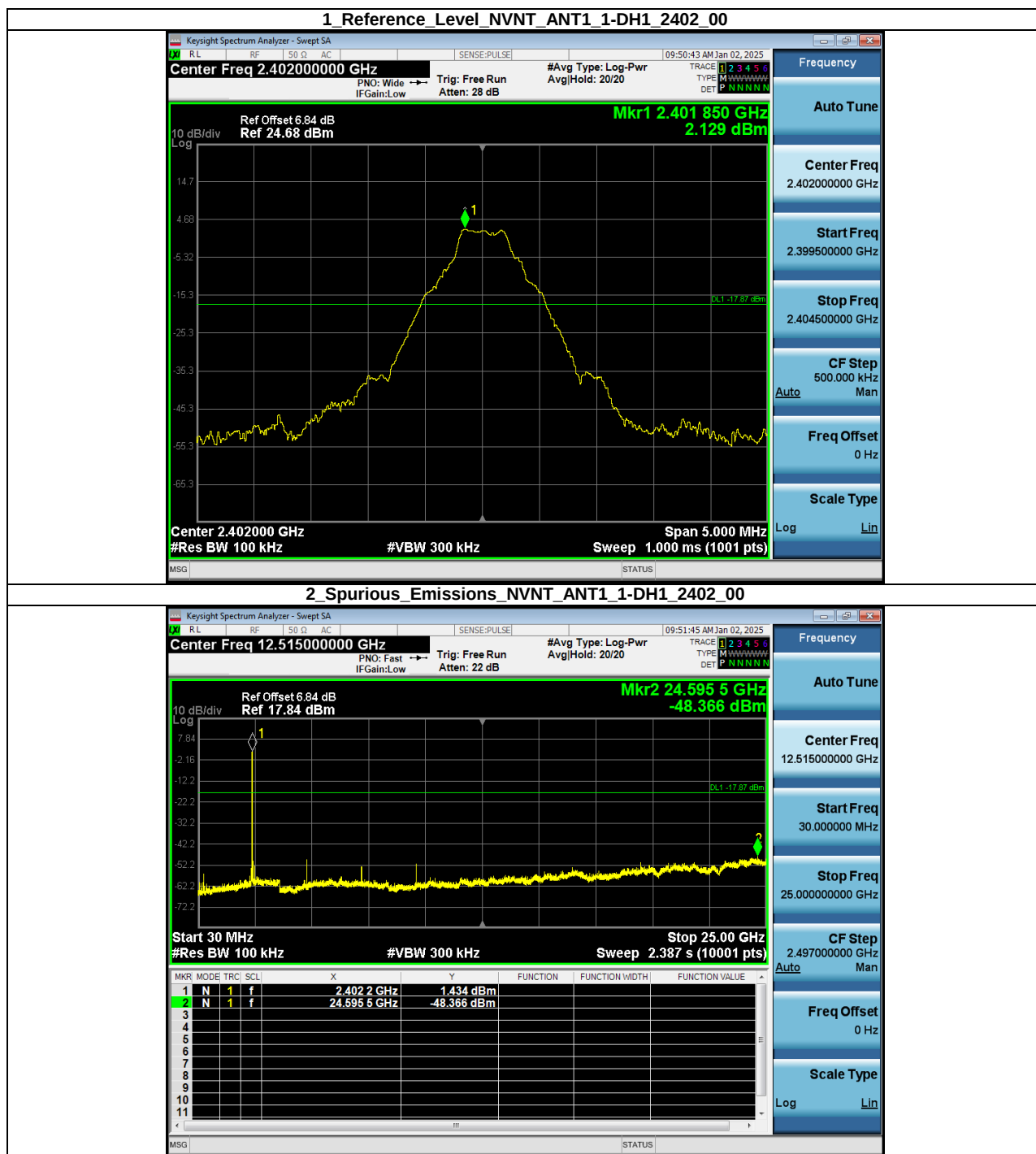
Note:

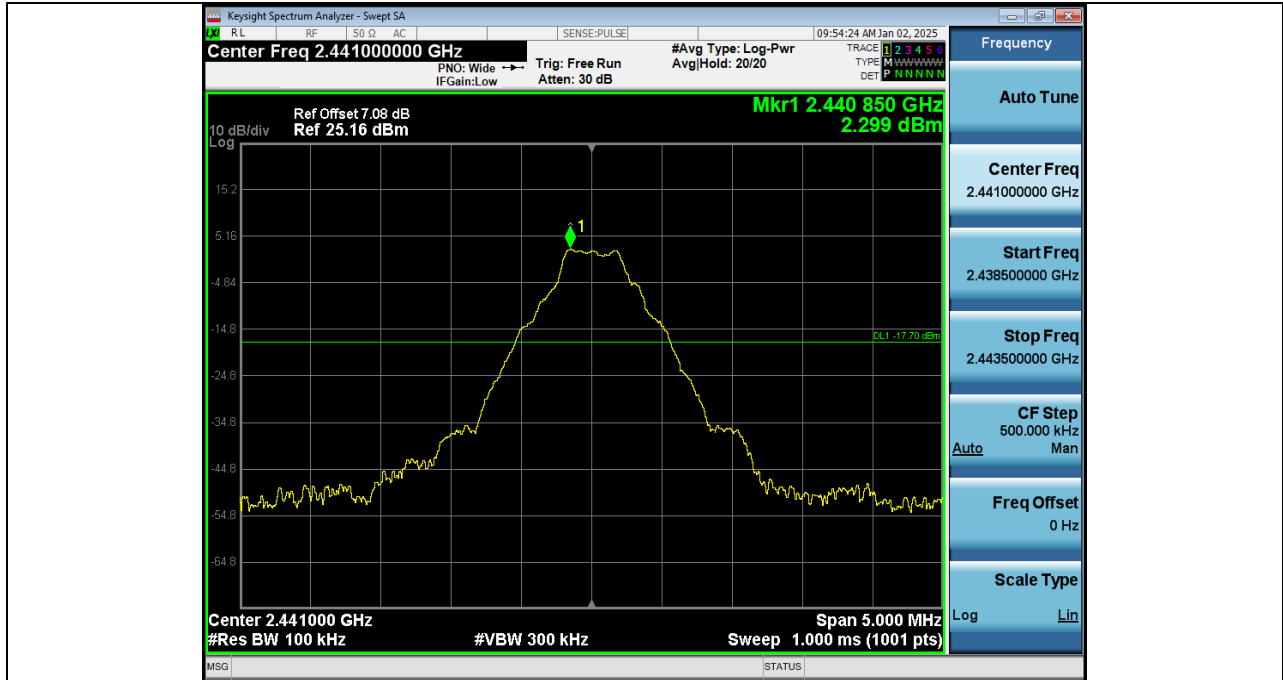
1, Result = Read level + Antenna factor + cable loss-Amp factor

2, All the other emissions not reported were too low to read and deemed to comply with FCC limit.

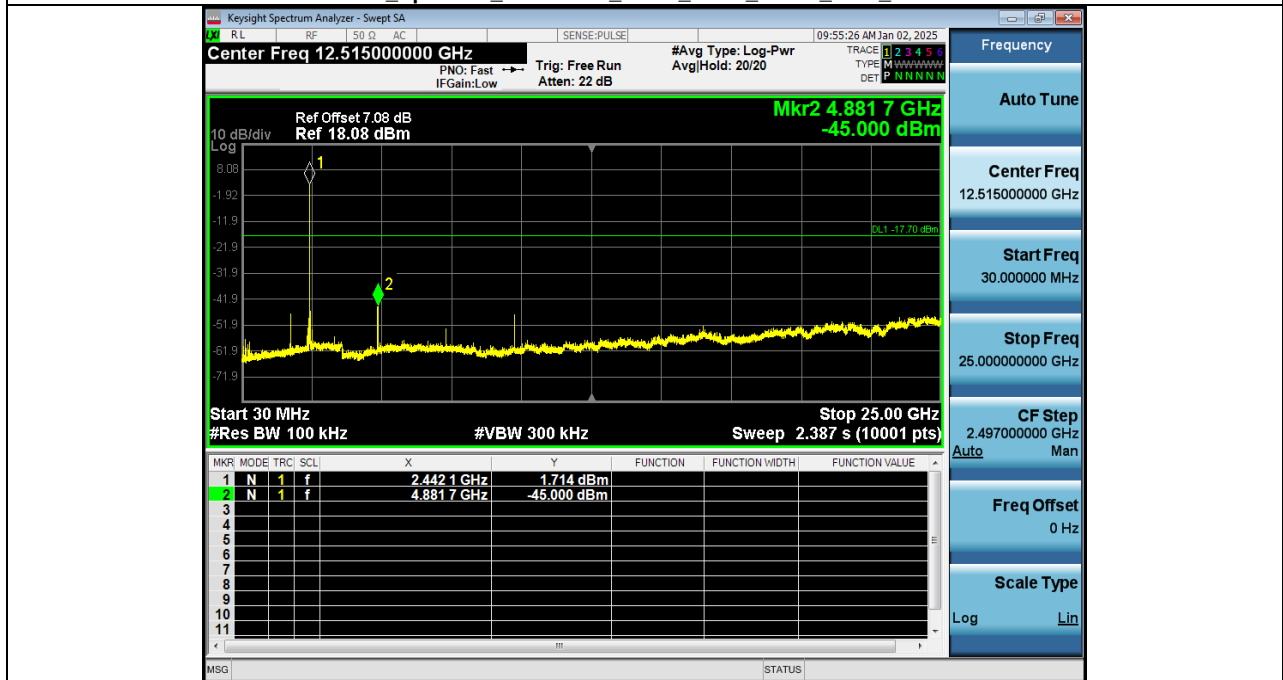
Conducted Method

Condition	Antenna	Modulation	TX Mode	Ref_level(dBm)	Spurious MAX.Value(dBm)	Limit	Result
NVNT	ANT1	1-DH1	2402.00	2.129	-48.366	-17.871	Pass
NVNT	ANT1	1-DH1	2441.00	2.299	-45.000	-17.701	Pass
NVNT	ANT1	1-DH1	2480.00	1.926	-41.303	-18.074	Pass
NVNT	ANT1	2-DH1	2402.00	2.139	-47.287	-17.861	Pass
NVNT	ANT1	2-DH1	2441.00	2.359	-45.511	-17.641	Pass
NVNT	ANT1	2-DH1	2480.00	1.964	-46.103	-18.036	Pass
NVNT	ANT1	3-DH1	2402.00	2.240	-47.121	-17.760	Pass
NVNT	ANT1	3-DH1	2441.00	2.398	-37.188	-17.602	Pass
NVNT	ANT1	3-DH1	2480.00	1.930	-42.722	-18.070	Pass

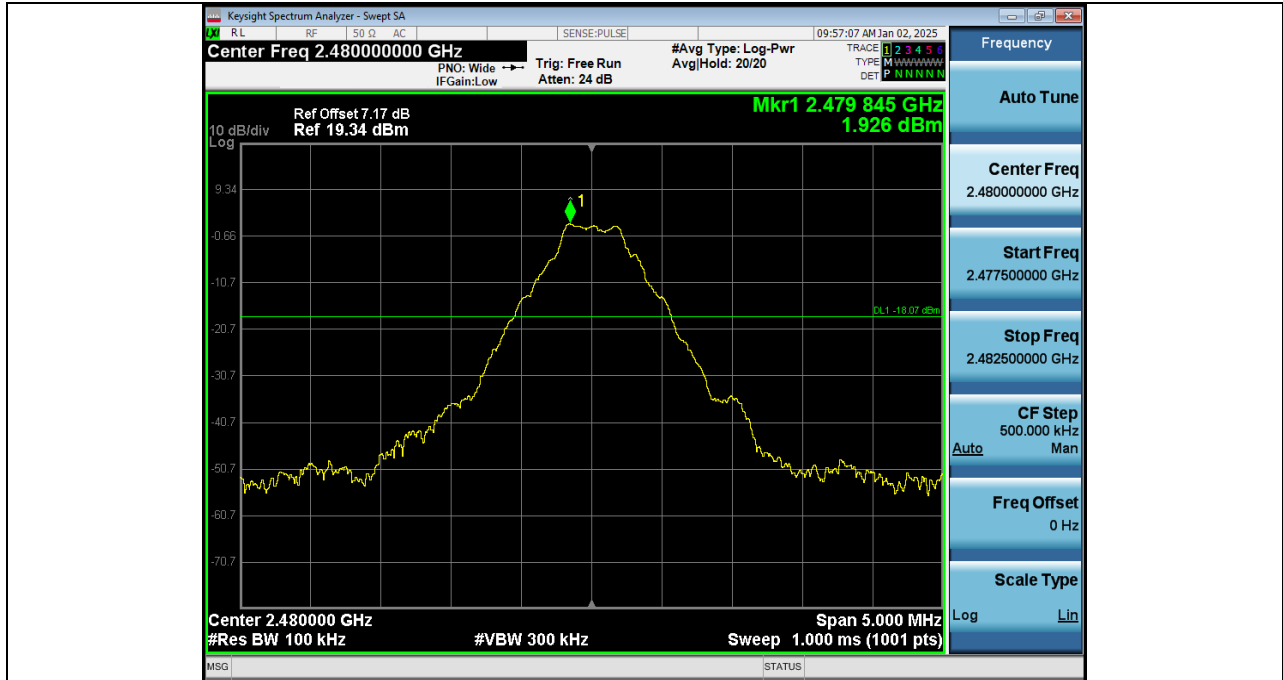




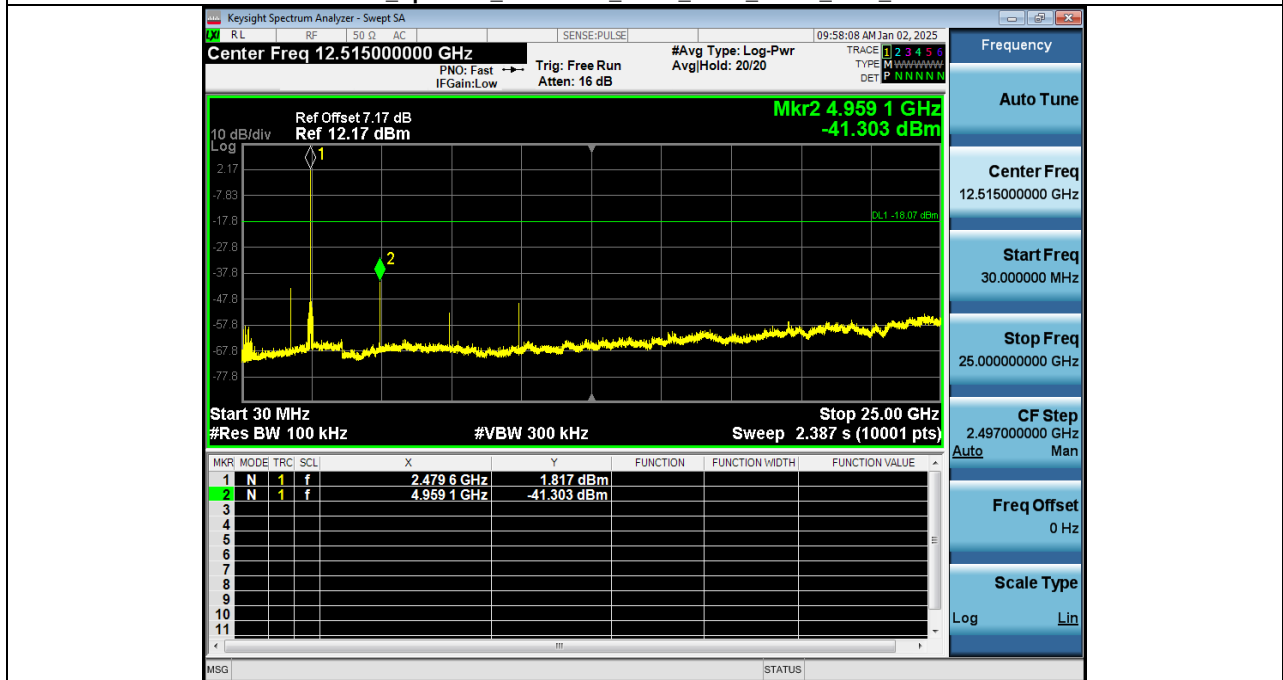
2 Spurious Emissions NVNT_ANT1_1-DH1_2441_00



1 Reference Level NVNT_ANT1_1-DH1_2480_00



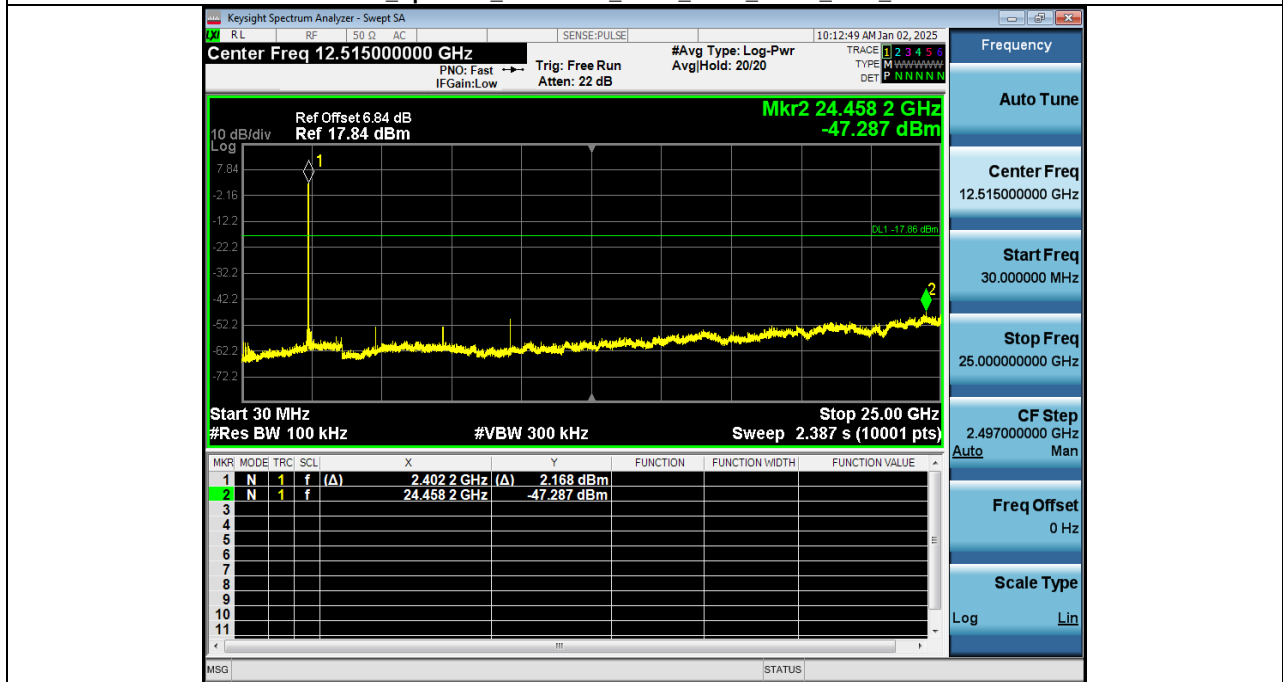
2 Spurious Emissions NVNT_ANT1_1-DH1_2480_00



1 Reference Level NVNT_ANT1_2-DH1_2402_00



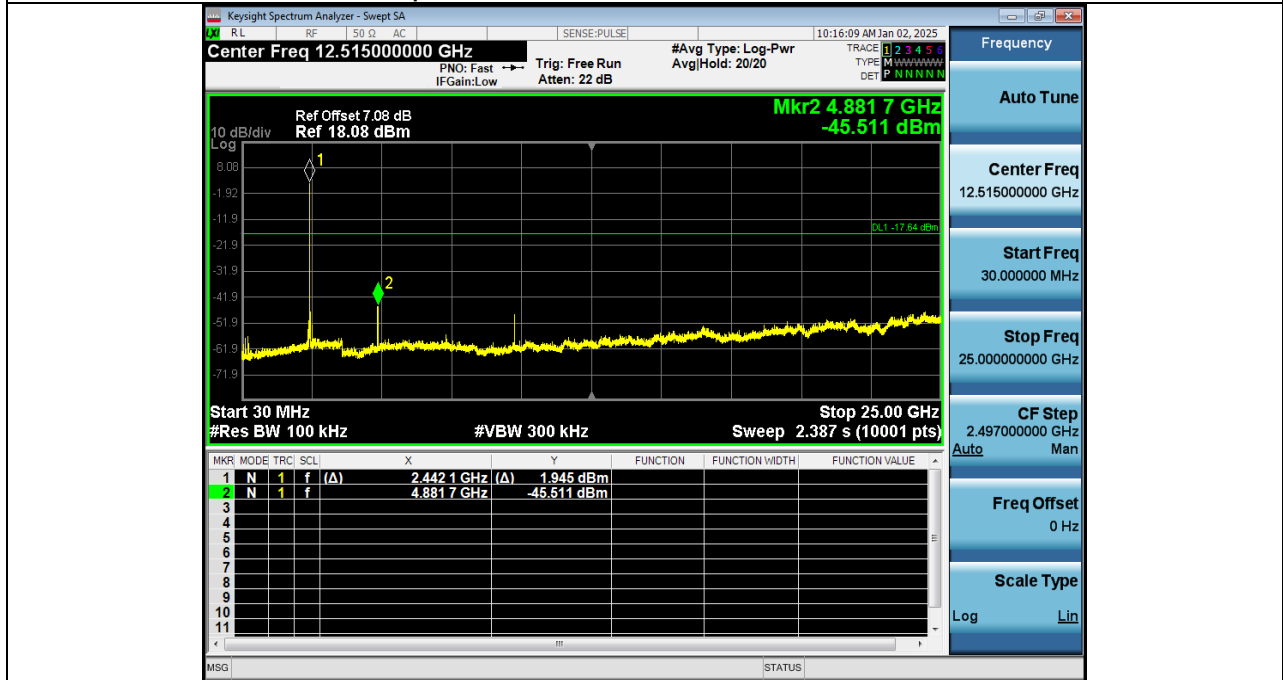
2 Spurious Emissions_NVNT_ANT1_2-DH1_2402_00



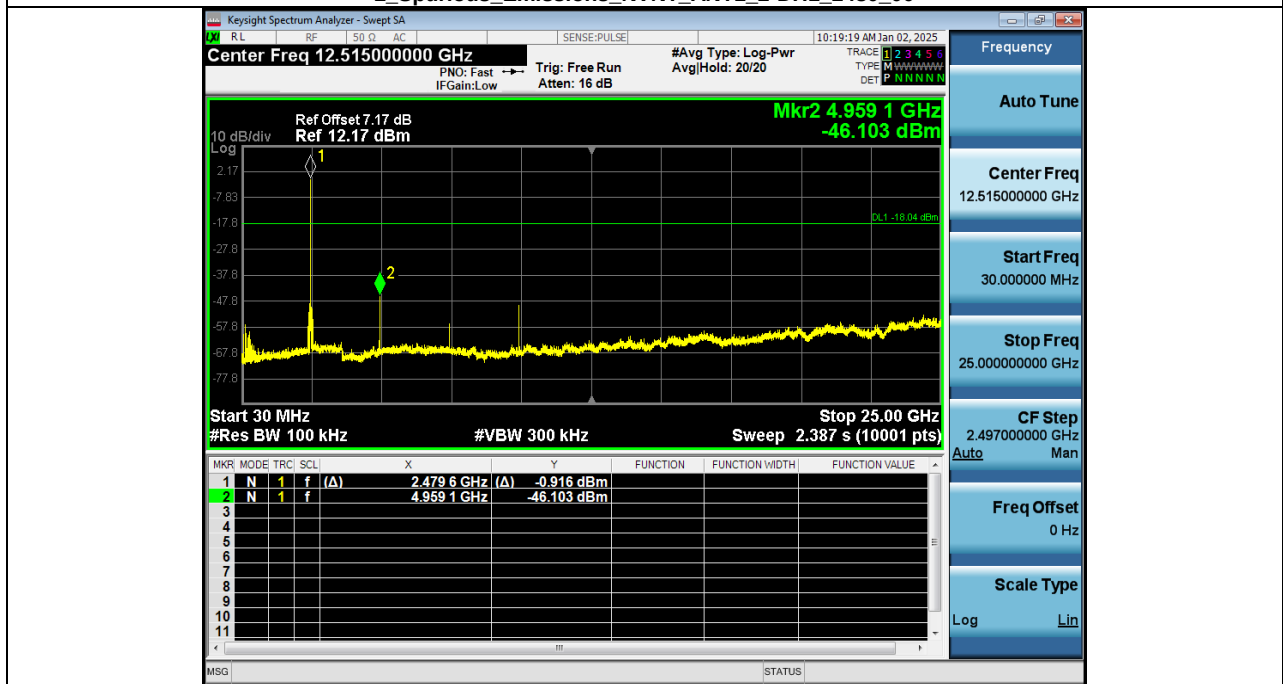
1 Reference_Level_NVNT_ANT1_2-DH1_2441_00



2 Spurious Emissions NVNT ANT1 2-DH1 2441_00

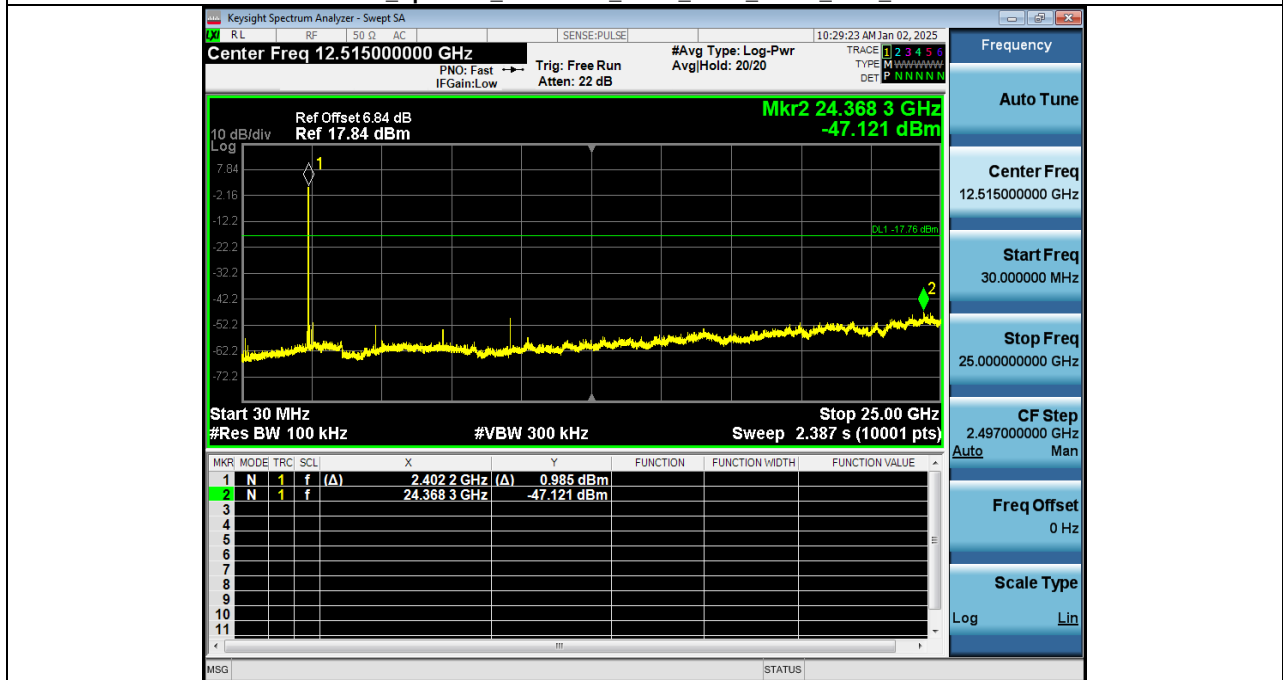


1 Reference Level NVNT ANT1 2-DH1 2480_00





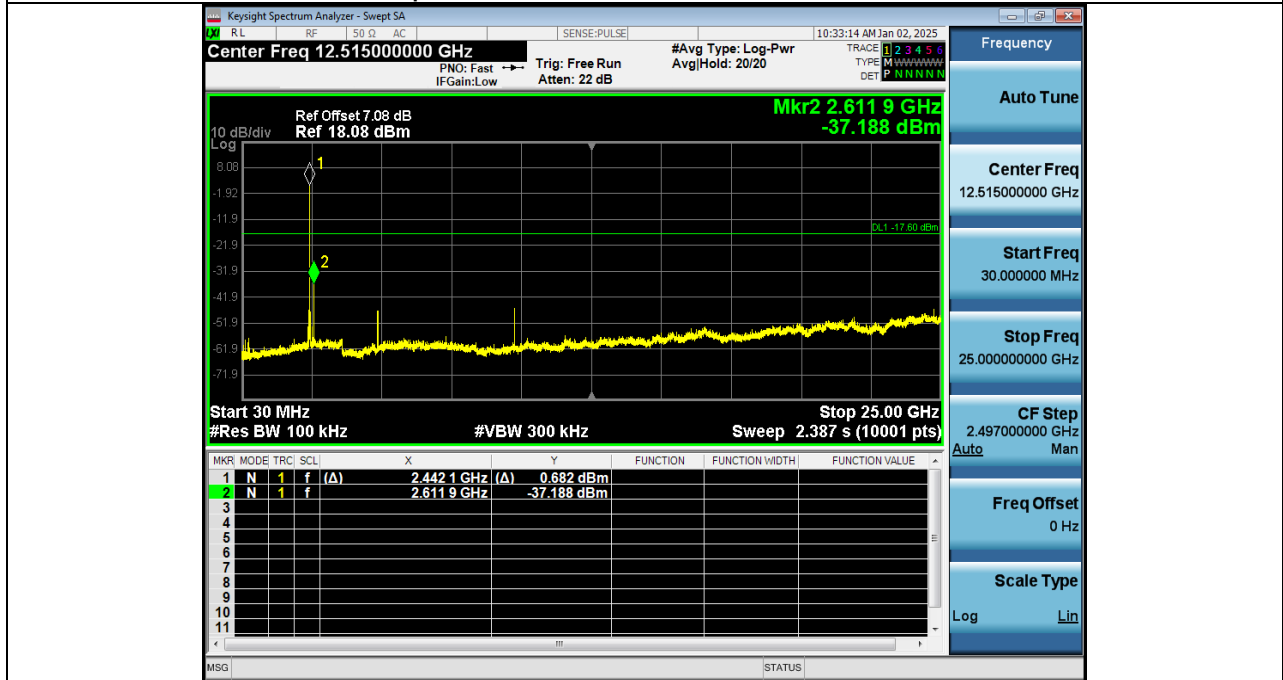
2 Spurious Emissions NVNT_ANT1_3-DH1_2402_00



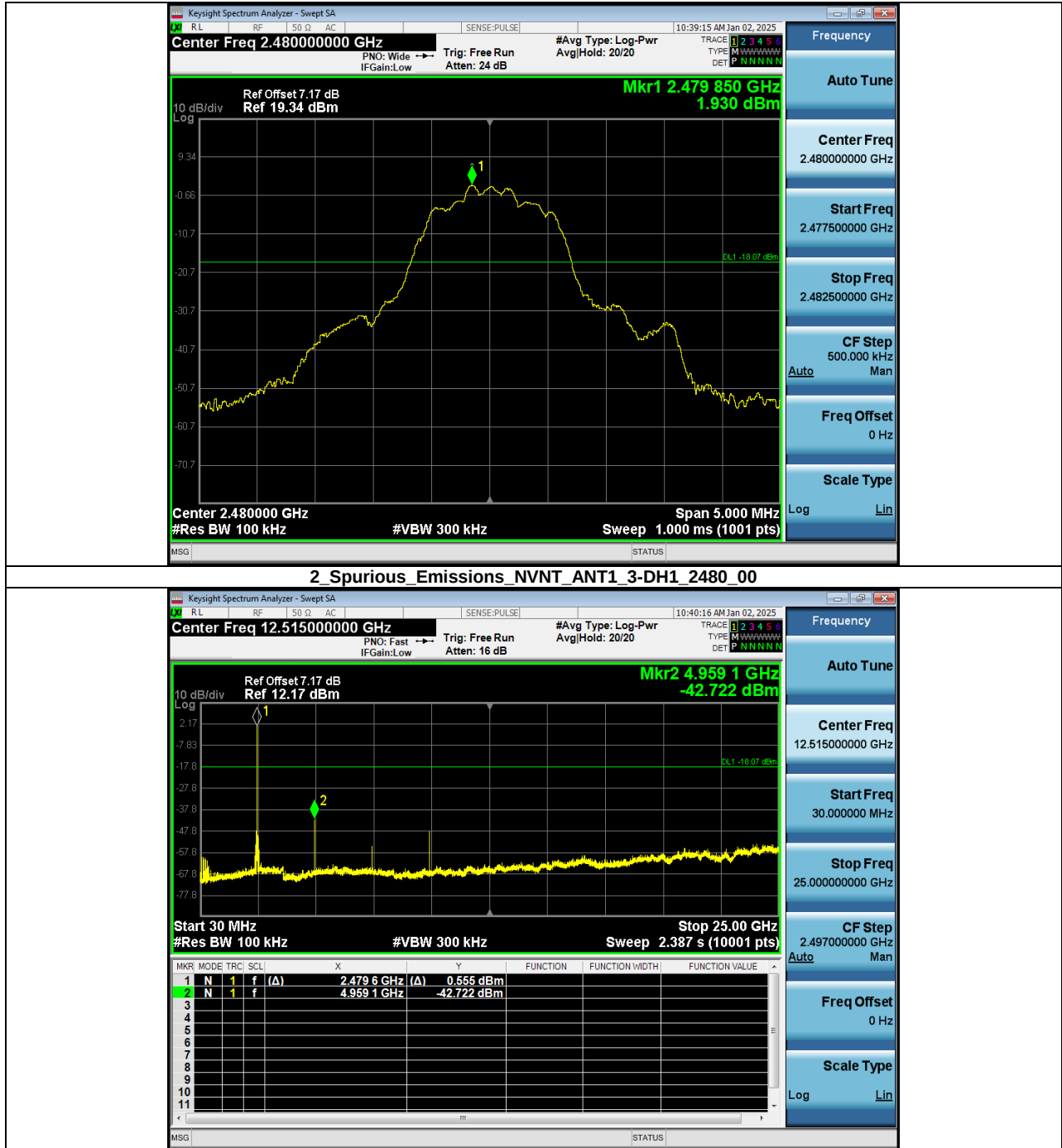
1 Reference_Level_NVNT_ANT1_3-DH1_2441_00



2 Spurious Emissions NVNT_ANT1_3-DH1_2441_00

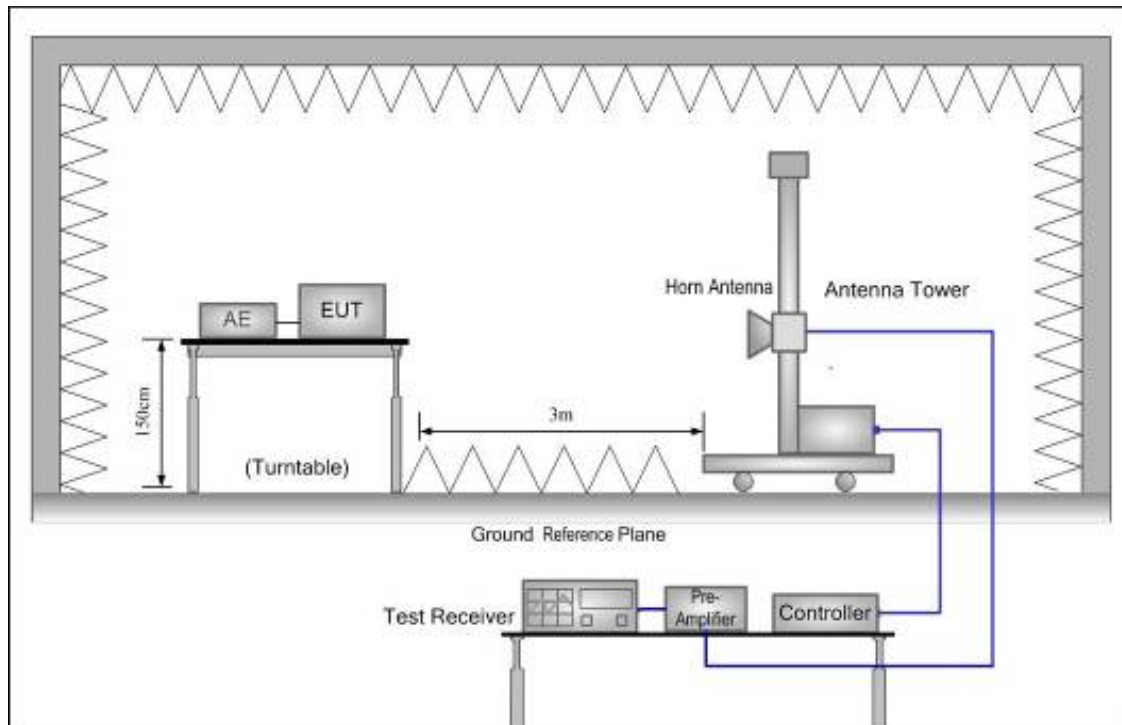


1 Reference Level NVNT_ANT1_3-DH1_2480_00



9. BAND EDGE COMPLIANCE

9.1. Block Diagram of Test Setup



9.2. Limit

All the lower and upper band-edges emissions appearing within restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions outside operation shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

9.3. Test Procedure

All restriction band and non- restriction band have been tested , only worse case is reported.

9.4. Test Result

PASS. (See below detailed test data)

Test Results					PASS			
Frequency Range					2310MHz~2410MHz			
Test Mode					GFSK TX 2402MHz			
N o.	Freq MHz	Polarity	Reading (dBuV/m)	Correct Factor	Result (dBuV/m)	Limit (dBuV/m)	Margin	Remark
1	2390	H	74.60	-21.47	53.13	74.00	-20.87	Peak
2	2390	H	--	-21.47	--	54.00	--	Avg
3	2400	H	78.90	-26.12	52.78	74.00	-21.22	Peak
4	2400	H	--	-26.12	--	54.00	--	Avg
1	2390	V	74.30	-21.47	52.83	74.00	-21.17	Peak
2	2390	V	--	-21.47	--	54.00	--	Avg
3	2400	V	78.88	-26.12	52.76	74.00	-21.24	Peak
4	2400	V	--	-26.12	--	54.00	--	Avg
Test Results					PASS			
Frequency Range					2450MHz~2550MHz			
Test Mode					GFSK TX 2480MHz			
1	2483.5	H	78.93	-25.29	53.64	74.00	-20.36	Peak
2	2483.5	H	--	-25.29	--	54.00	--	Avg
1	2483.5	V	78.61	-25.29	53.32	74.00	-20.68	Peak
2	2483.5	V	--	-25.29	--	54.00	--	Avg
Note: 1. Means other frequency and mode comply with standard requirements and at least have 20dB margin. 2. Correct Factor=Cable Loss+ Antenna Factor-Amplifier Gain. Result=Reading + Correct Factor. Margin= Result-Limit. 3. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.								

Test Results					PASS			
Frequency Range					2310MHz~2410MHz			
Test Mode					14 DQPSK TX 2402MHz			
N o.	Freq MHz	Polarity	Reading (dBuV/m)	Correct Factor	Result (dBuV/m)	Limit (dBuV/m)	Margin	Remark
1	2390	H	75.04	-21.47	53.57	74.00	-20.43	Peak
2	2390	H	--	-21.47	--	54.00	--	Avg
3	2400	H	78.84	-26.12	52.72	74.00	-21.28	Peak
4	2400	H	--	-26.12	--	54.00	--	Avg
1	2390	V	75.16	-21.47	53.69	74.00	-20.31	Peak
2	2390	V	--	-21.47	--	54.00	--	Avg
3	2400	V	78.82	-26.12	52.70	74.00	-21.30	Peak
4	2400	V	--	-26.12	--	54.00	--	Avg
Test Results					PASS			
Frequency Range					2450MHz~2550MHz			
Test Mode					14 DQPSK TX 2480MHz			
1	2483.5	H	78.98	-25.29	53.69	74.00	-20.31	Peak
2	2483.5	H	--	-25.29	--	54.00	--	Avg
1	2483.5	V	78.96	-25.29	53.67	74.00	-20.33	Peak
2	2483.5	V	--	-25.29	--	54.00	--	Avg
Note: 1. Means other frequency and mode comply with standard requirements and at least have 20dB margin. 2. Correct Factor=Cable Loss+ Antenna Factor-Amplifier Gain. Result=Reading + Correct Factor. Margin= Result-Limit. 3. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.								

Test Results					PASS			
Frequency Range					2310MHz~2410MHz			
Test Mode					8DPSK TX 2402MHz			
N o.	Freq MHz	Polarity	Reading (dBuV/m)	Correct Factor	Result (dBuV/m)	Limit (dBuV/m)	Margin	Remark
1	2390	H	75.23	-21.47	53.76	74.00	-20.24	Peak
2	2390	H	--	-21.47	--	54.00	--	Avg
3	2400	H	79.16	-26.12	53.04	74.00	-20.96	Peak
4	2400	H	--	-26.12	--	54.00	--	Avg
1	2390	V	74.91	-21.47	53.44	74.00	-20.56	Peak
2	2390	V	--	-21.47	--	54.00	--	Avg
3	2400	V	79.60	-26.12	53.48	74.00	-20.52	Peak
4	2400	V	--	-26.12	--	54.00	--	Avg
Test Results					PASS			
Frequency Range					2450MHz~2550MHz			
Test Mode					8DPSK TX 2480MHz			
1	2483.5	H	78.51	-25.29	53.22	74.00	-20.78	Peak
2	2483.5	H	--	-25.29	--	54.00	--	Avg
1	2483.5	V	79.07	-25.29	53.78	74.00	-20.22	Peak
2	2483.5	V	--	-25.29	--	54.00	--	Avg
Note: 1. Means other frequency and mode comply with standard requirements and at least have 20dB margin. 2. Correct Factor=Cable Loss+ Antenna Factor-Amplifier Gain. Result=Reading + Correct Factor. Margin= Result-Limit. 3. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.								

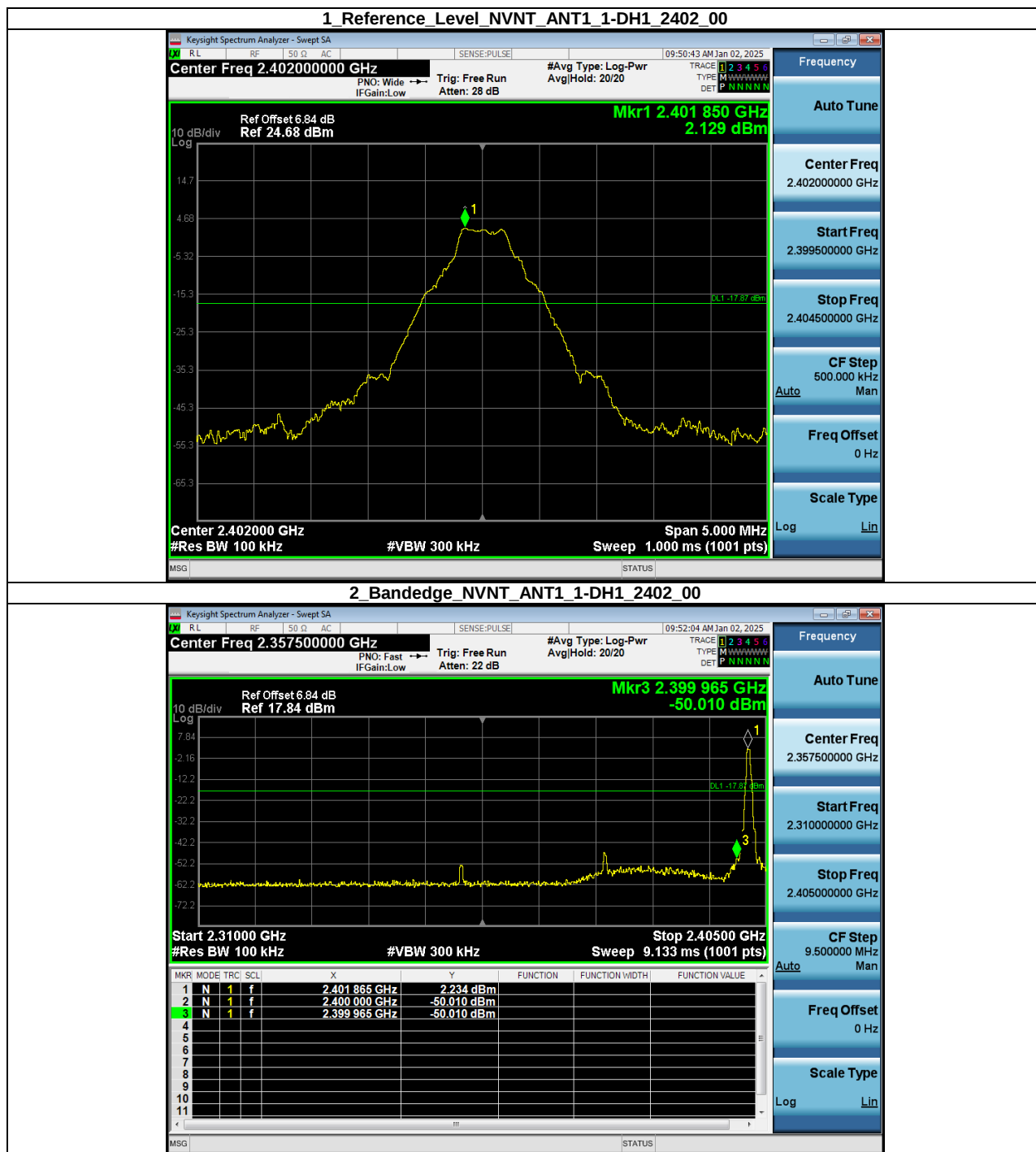
Test Results					PASS			
Frequency Range					2310MHz~2410MHz			
Test Mode					GFSK Hopping			
N o.	Freq MHz	Polarity	Reading (dBuV/m)	Correct Factor	Result (dBuV/m)	Limit (dBuV/m)	Margin	Remark
1	2390	H	75.12	-21.47	53.65	74.00	-20.35	Peak
2	2390	H	--	-21.47	--	54.00	--	Avg
3	2400	H	79.01	-26.12	52.89	74.00	-21.11	Peak
4	2400	H	--	-26.12	--	54.00	--	Avg
1	2390	V	74.60	-21.47	53.13	74.00	-20.87	Peak
2	2390	V	--	-21.47	--	54.00	--	Avg
3	2400	V	79.20	-26.12	53.08	74.00	-20.92	Peak
4	2400	V	--	-26.12	--	54.00	--	Avg
Test Results					PASS			
Frequency Range					2450MHz~2550MHz			
Test Mode					GFSK Hopping			
1	2483.5	H	78.93	-25.29	53.64	74.00	-20.36	Peak
2	2483.5	H	--	-25.29	--	54.00	--	Avg
1	2483.5	V	79.02	-25.29	53.73	74.00	-20.27	Peak
2	2483.5	V	--	-25.29	--	54.00	--	Avg
Note: 1. Means other frequency and mode comply with standard requirements and at least have 20dB margin. 2. Correct Factor=Cable Loss+ Antenna Factor-Amplifier Gain. Result=Reading + Correct Factor. Margin= Result-Limit. 3. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.								

Test Results					PASS			
Frequency Range					2310MHz~2410MHz			
Test Mode					14 DQPSK Hopping			
N o.	Freq MHz	Polarity	Reading (dBuV/m)	Correct Factor	Result (dBuV/m)	Limit (dBuV/m)	Margin	Remark
1	2390	H	74.71	-21.47	53.24	74.00	-20.76	Peak
2	2390	H	--	-21.47	--	54.00	--	Avg
3	2400	H	79.24	-26.12	53.12	74.00	-20.88	Peak
4	2400	H	--	-26.12	--	54.00	--	Avg
1	2390	V	74.46	-21.47	52.99	74.00	-21.01	Peak
2	2390	V	--	-21.47	--	54.00	--	Avg
3	2400	V	79.02	-26.12	52.90	74.00	-21.10	Peak
4	2400	V	--	-26.12	--	54.00	--	Avg
Test Results					PASS			
Frequency Range					2450MHz~2550MHz			
Test Mode					14 DQPSK Hopping			
1	2483.5	H	79.05	-25.29	53.76	74.00	-20.24	Peak
2	2483.5	H	--	-25.29	--	54.00	--	Avg
1	2483.5	V	78.59	-25.29	53.30	74.00	-20.70	Peak
2	2483.5	V	--	-25.29	--	54.00	--	Avg
Note: 1. Means other frequency and mode comply with standard requirements and at least have 20dB margin. 2. Correct Factor=Cable Loss+ Antenna Factor-Amplifier Gain. Result=Reading + Correct Factor. Margin= Result-Limit. 3. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.								

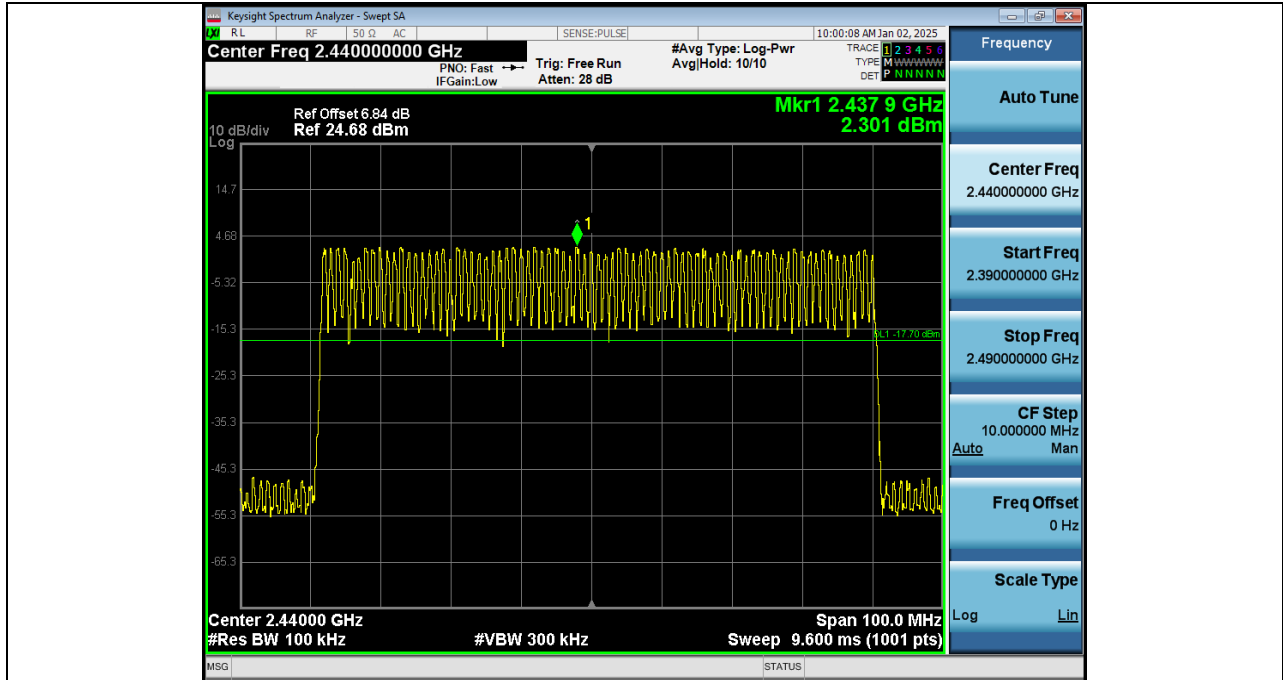
Test Results					PASS			
Frequency Range					2310MHz~2410MHz			
Test Mode					8DPSK Hopping			
N o.	Freq MHz	Polarity	Reading (dBuV/m)	Correct Factor	Result (dBuV/m)	Limit (dBuV/m)	Margin	Remark
1	2390	H	74.36	-21.47	52.89	74.00	-21.11	Peak
2	2390	H	--	-21.47	--	54.00	--	Avg
3	2400	H	78.95	-26.12	52.83	74.00	-21.17	Peak
4	2400	H	--	-26.12	--	54.00	--	Avg
1	2390	V	74.96	-21.47	53.49	74.00	-20.51	Peak
2	2390	V	--	-21.47	--	54.00	--	Avg
3	2400	V	79.25	-26.12	53.13	74.00	-20.87	Peak
4	2400	V	--	-26.12	--	54.00	--	Avg
Test Results					PASS			
Frequency Range					2450MHz~2550MHz			
Test Mode					8DPSK Hopping			
1	2483.5	H	78.39	-25.29	53.10	74.00	-20.90	Peak
2	2483.5	H	--	-25.29	--	54.00	--	Avg
1	2483.5	V	79.16	-25.29	53.87	74.00	-20.13	Peak
2	2483.5	V	--	-25.29	--	54.00	--	Avg
Note: 1. Means other frequency and mode comply with standard requirements and at least have 20dB margin. 2. Correct Factor=Cable Loss+ Antenna Factor-Amplifier Gain. Result=Reading + Correct Factor. Margin= Result-Limit. 3. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.								

Conducted Method

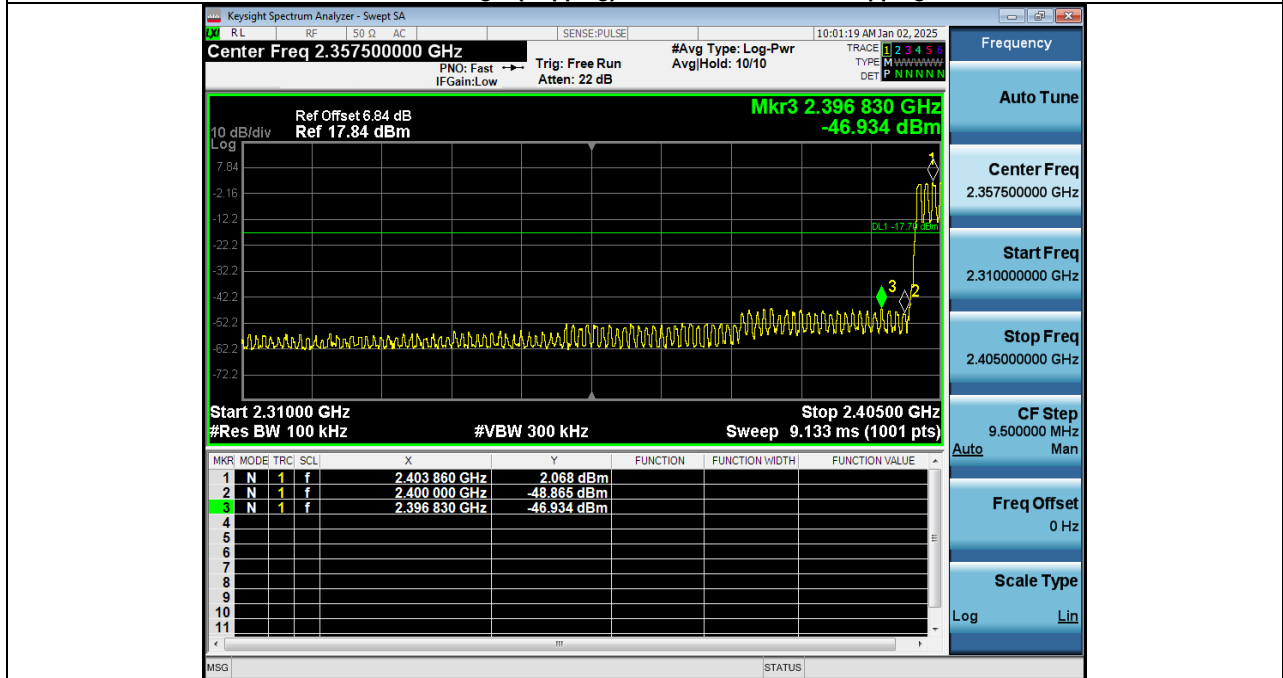
Condition	Antenna	Modulation	TX Mode	Ref_level(dBm)	Bandedge MAX.Value	Limit	Result
NVNT	ANT1	1-DH1	2402.00	2.129	-50.010	-17.871	Pass
NVNT	ANT1	1-DH1	Hopping_LCH	2.301	-46.934	-17.699	Pass
NVNT	ANT1	1-DH1	2480.00	1.926	-54.156	-18.074	Pass
NVNT	ANT1	1-DH1	Hopping_HCH	2.507	-46.881	-17.493	Pass
NVNT	ANT1	2-DH1	2402.00	2.139	-50.191	-17.861	Pass
NVNT	ANT1	2-DH1	Hopping_LCH	2.297	-46.949	-17.703	Pass
NVNT	ANT1	2-DH1	2480.00	1.964	-53.939	-18.036	Pass
NVNT	ANT1	2-DH1	Hopping_HCH	2.580	-47.273	-17.420	Pass
NVNT	ANT1	3-DH1	2402.00	2.240	-51.575	-17.760	Pass
NVNT	ANT1	3-DH1	Hopping_LCH	2.240	-48.249	-17.760	Pass
NVNT	ANT1	3-DH1	2480.00	1.930	-53.913	-18.070	Pass
NVNT	ANT1	3-DH1	Hopping_HCH	2.586	-46.936	-17.414	Pass



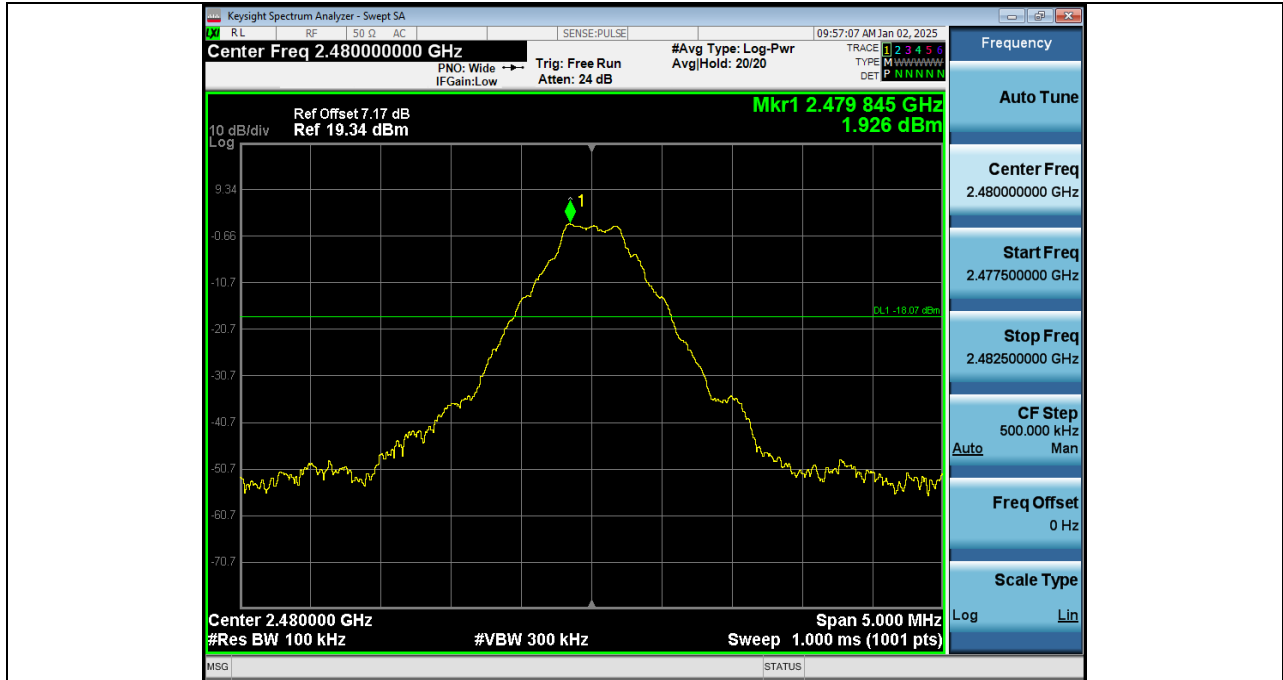
1 Reference_Level_Hopping_NVNT_ANT1_1-DH1_Hopping



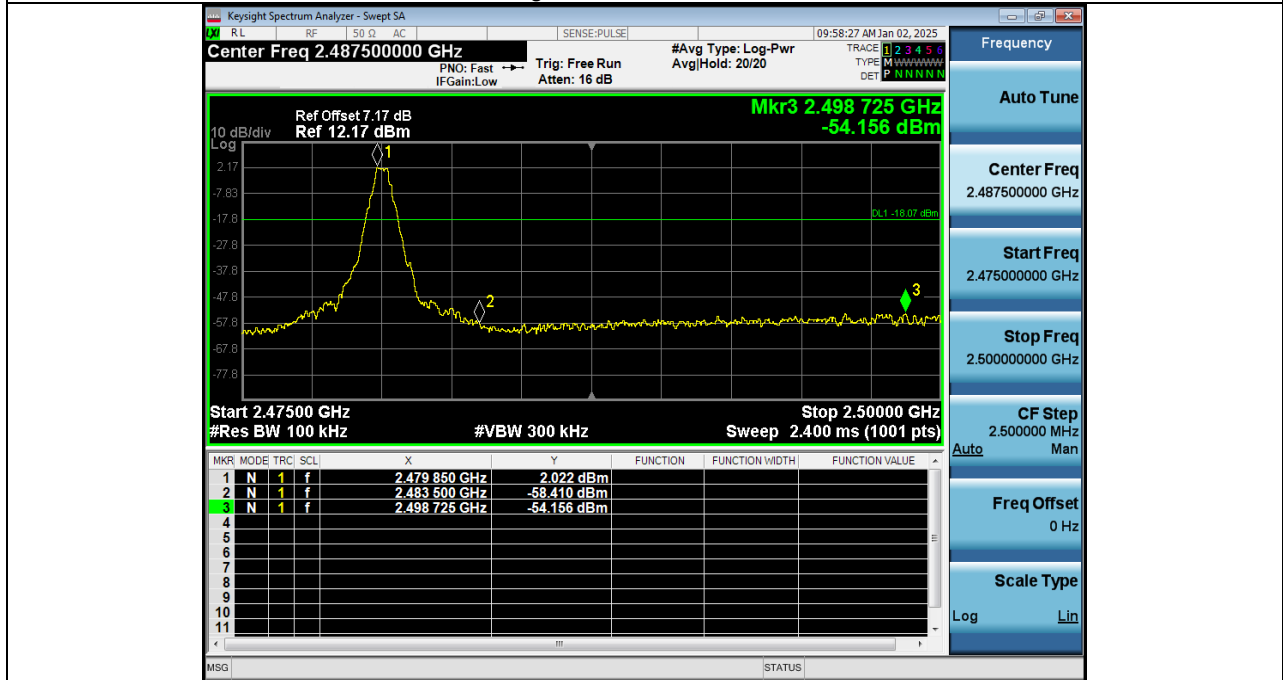
2_Band_Edge_(Hopping)_NVNT_ANT1_1-DH1_Hopping



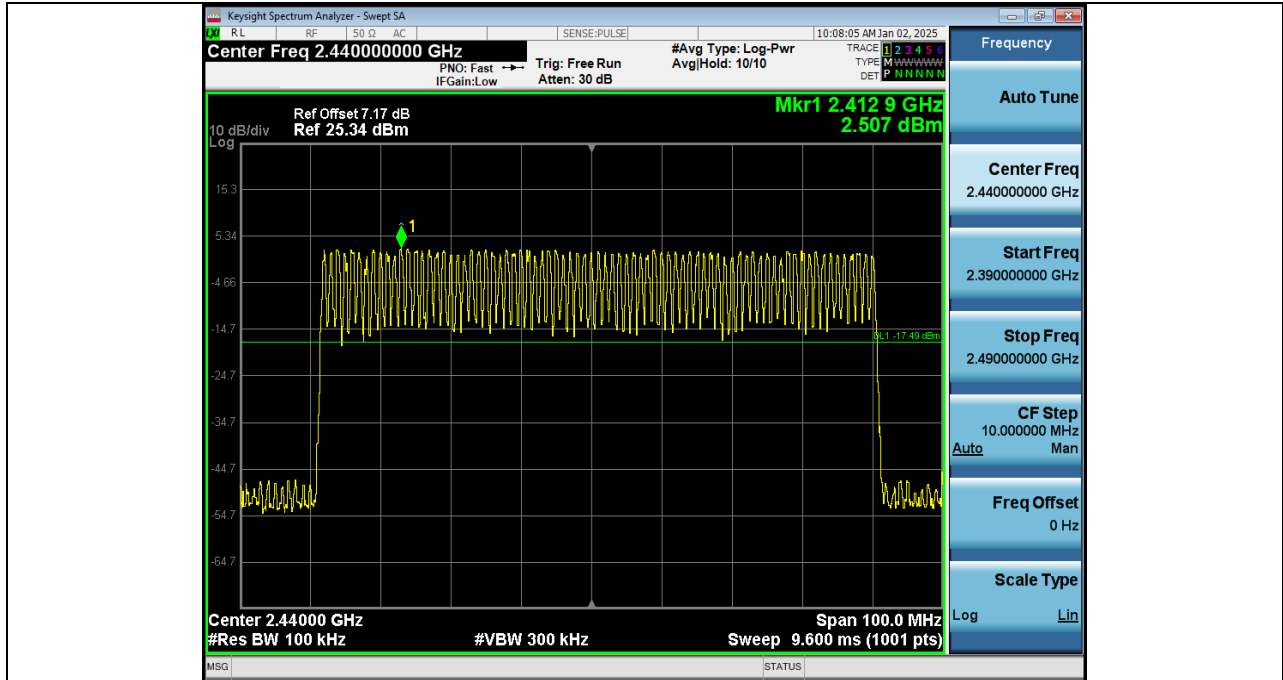
1_Reference_Level_NVNT_ANT1_1-DH1_2480_00



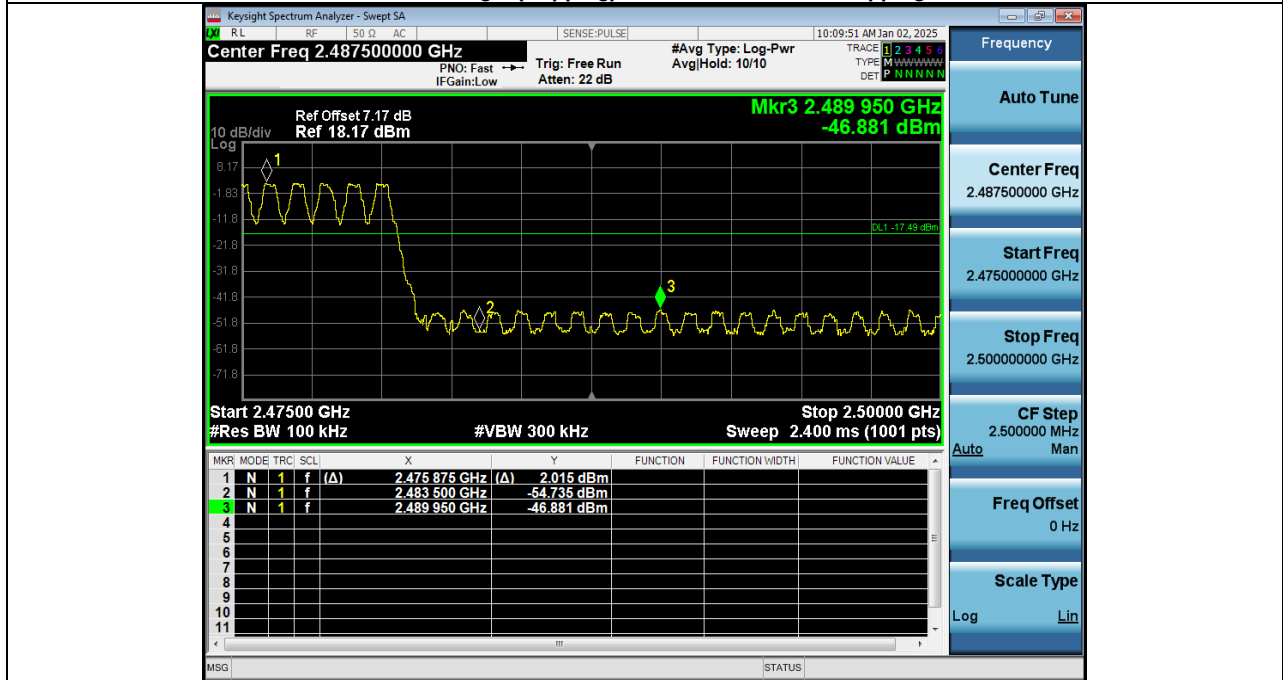
2_Bandedge_NVNT_ANT1_1-DH1_2480_00



1_Reference_Level_Hopping_NVNT_ANT1_1-DH1_Hopping



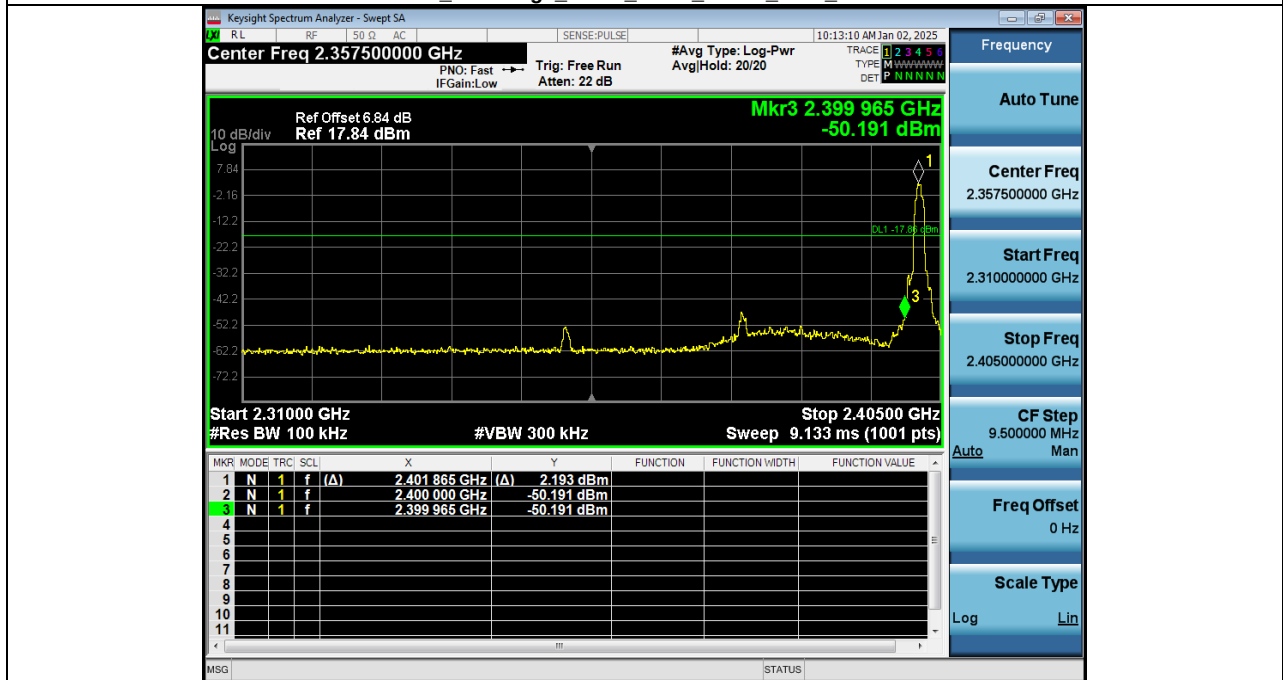
2_Band_Edge_(Hopping)_NVNT_ANT1_1-DH1_Hopping



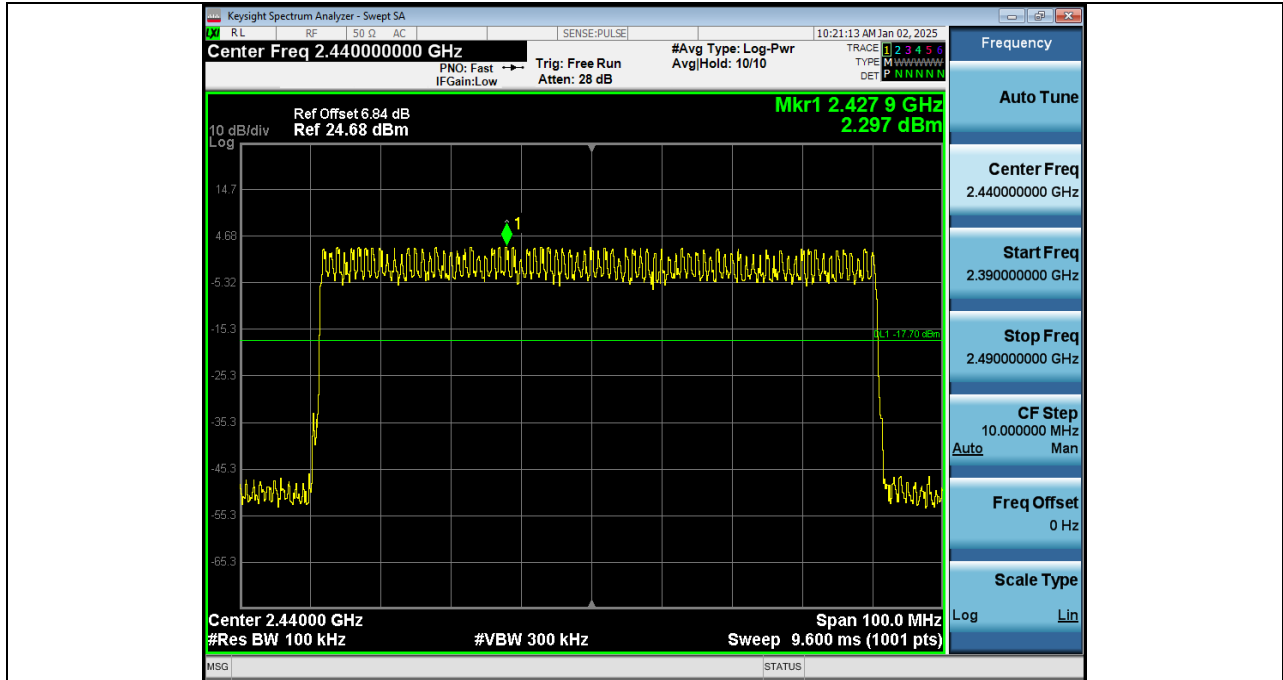
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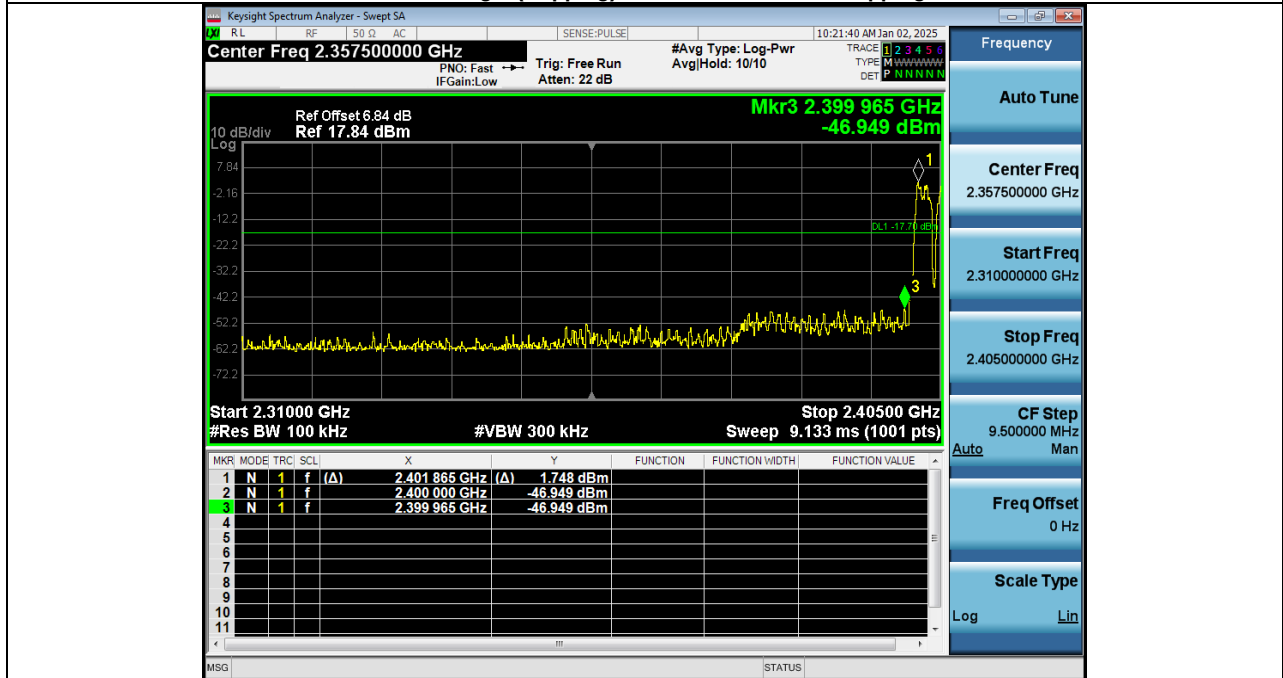
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1_Reference_Level_Hopping_NVNT_ANT1_2-DH1_Hopping



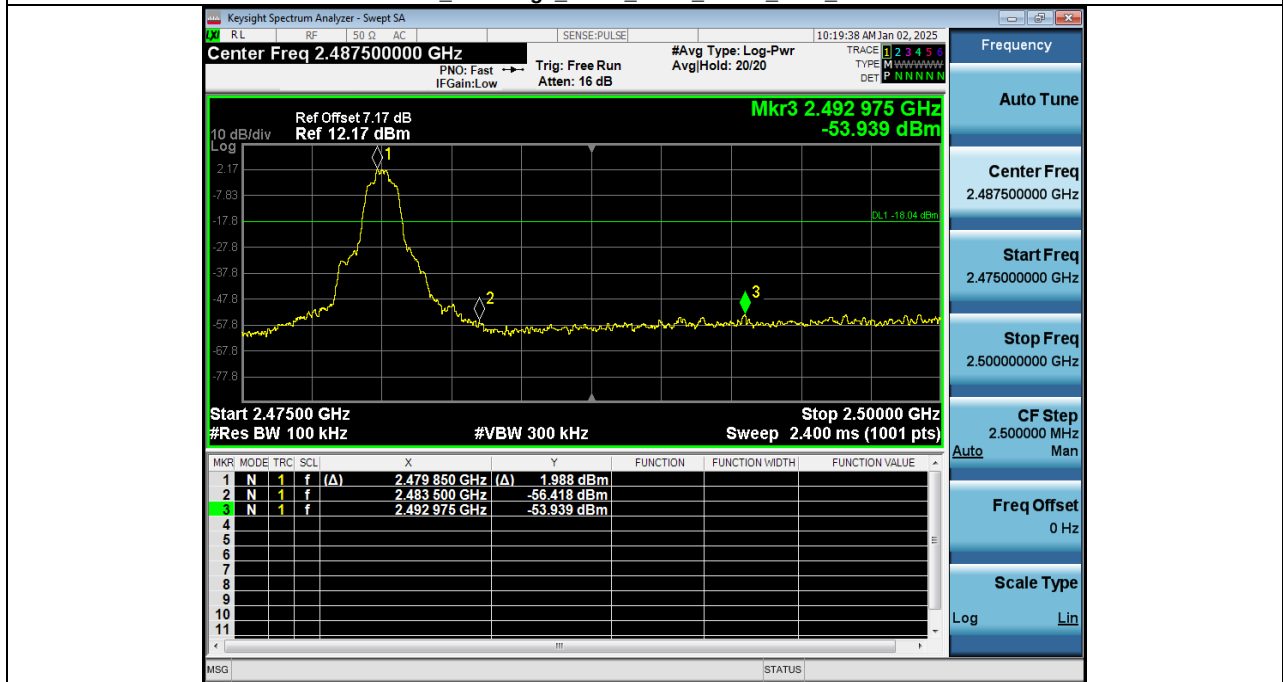
2_Band_Edge_(Hopping)_NVNT_ANT1_2-DH1_Hopping



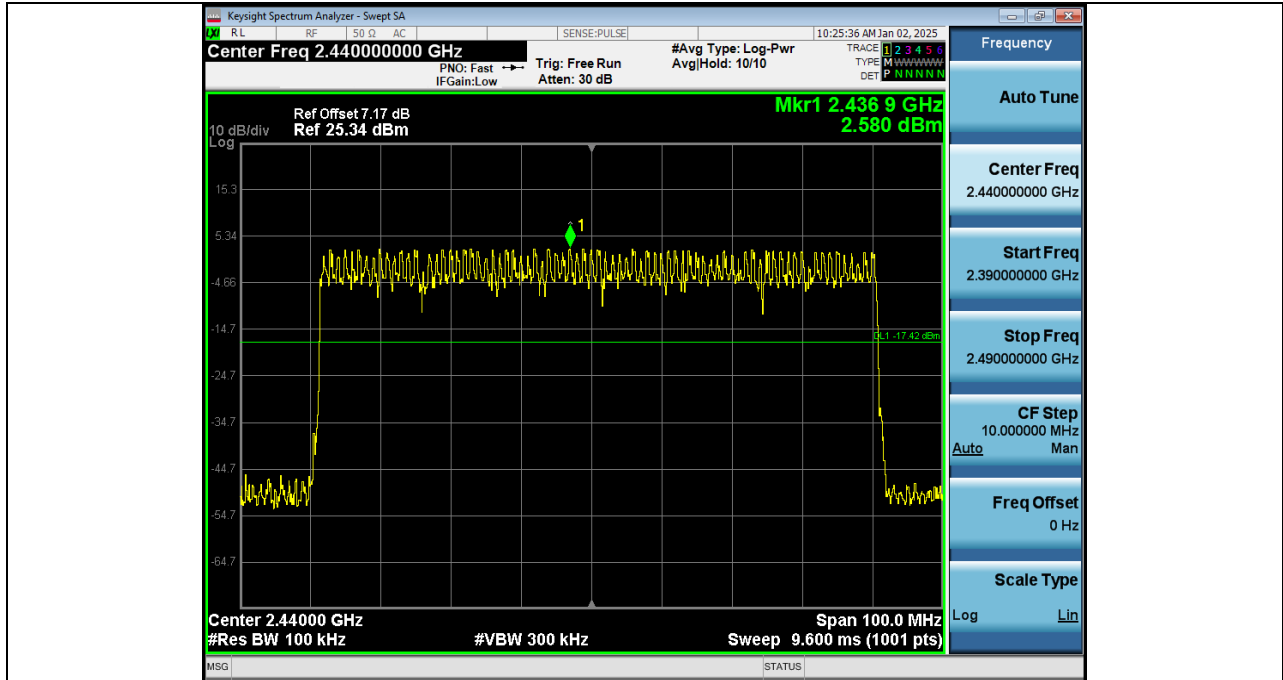
1_Reference_Level_NVNT_ANT1_2-DH1_2480_00



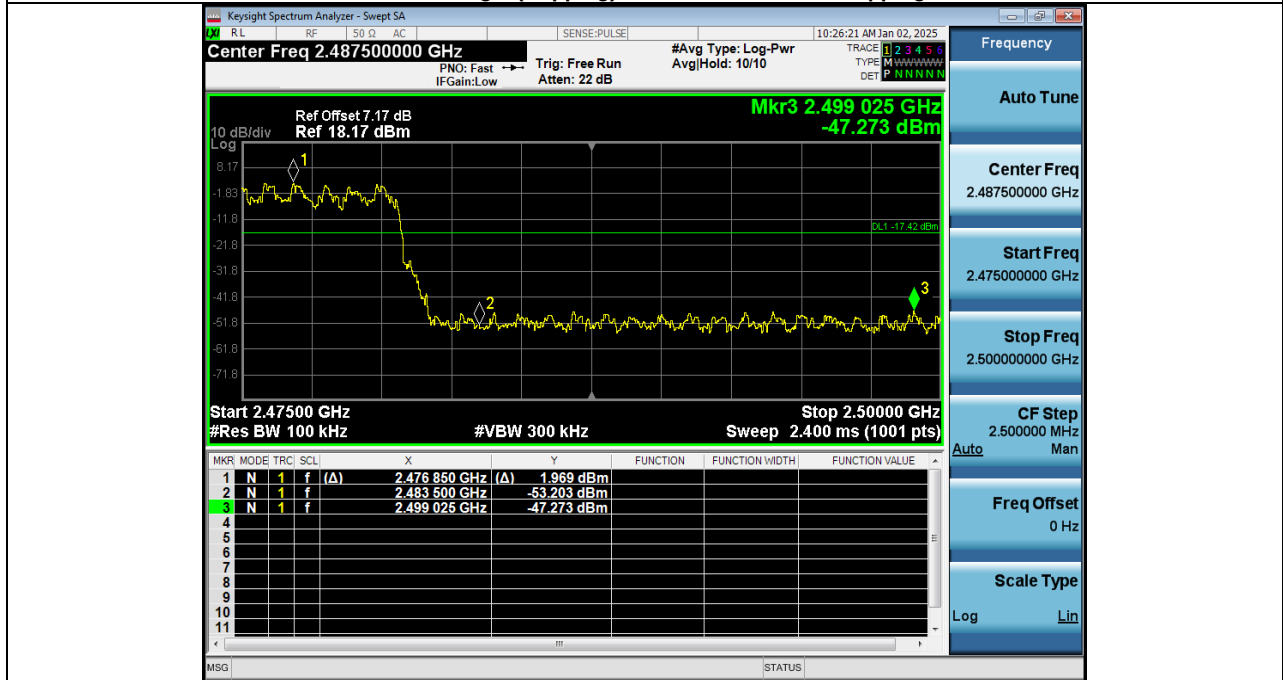
2_Bandedge_NVNT_ANT1_2-DH1_2480_00



1_Reference_Level_Hopping_NVNT_ANT1_2-DH1_Hopping



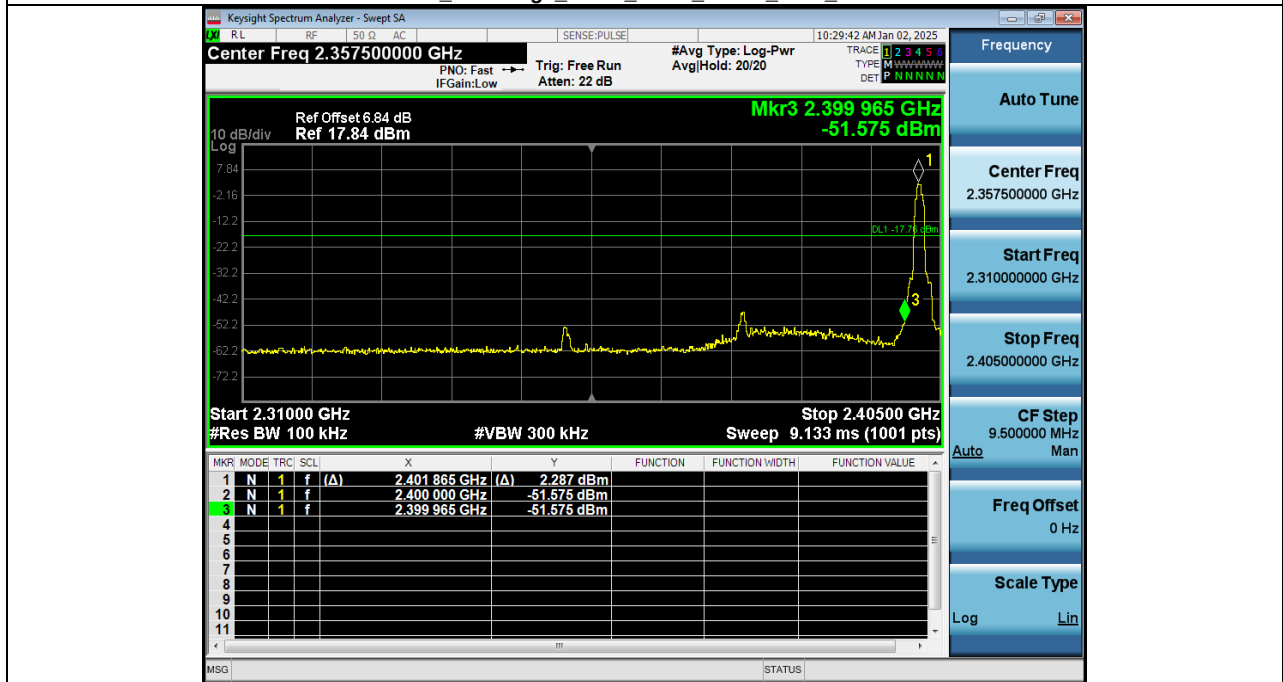
2_Band_Edge_(Hopping)_NVNT_ANT1_2-DH1_Hopping



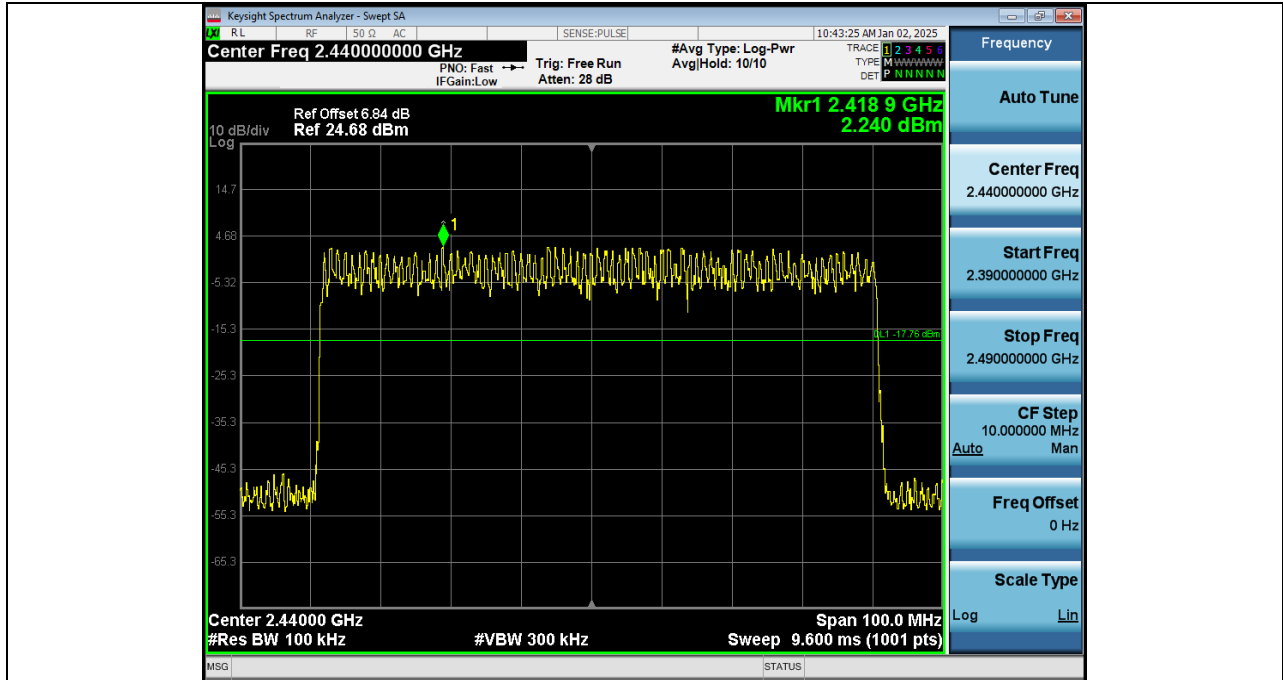
1_Reference_Level_NVNT_ANT1_3-DH1_2402_00



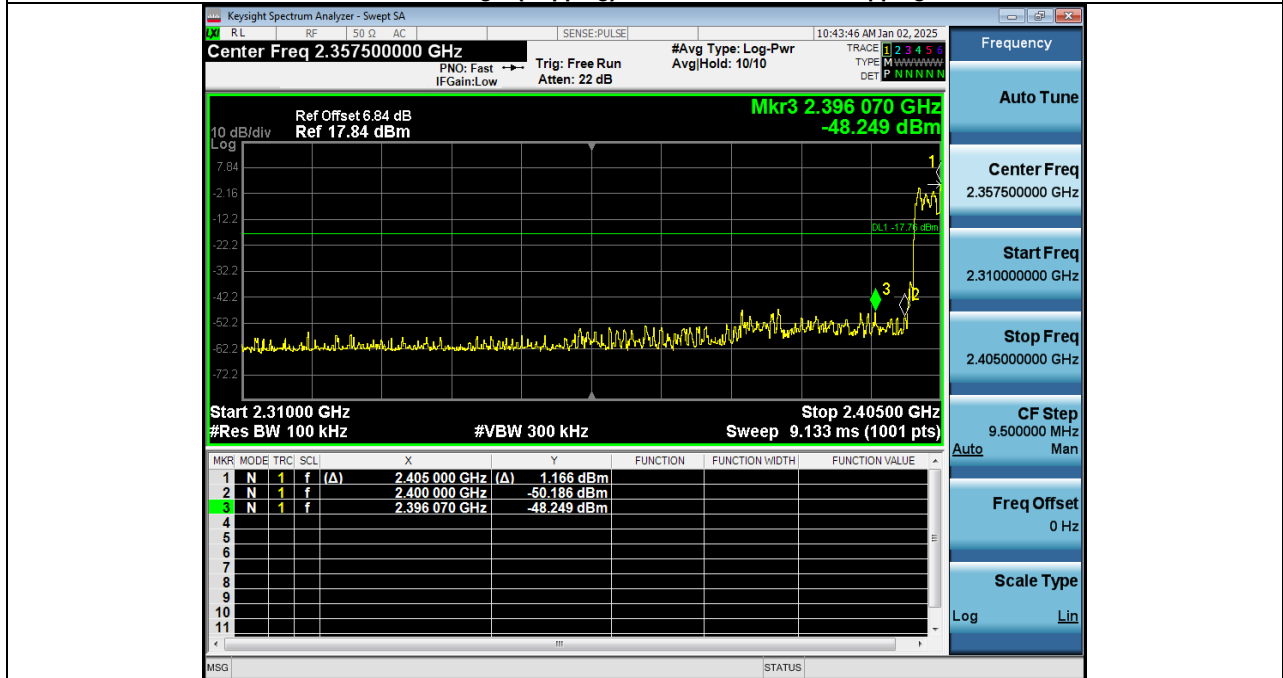
2_Bandedge_NVNT_ANT1_3-DH1_2402_00



1_Reference_Level_Hopping_NVNT_ANT1_3-DH1_Hopping



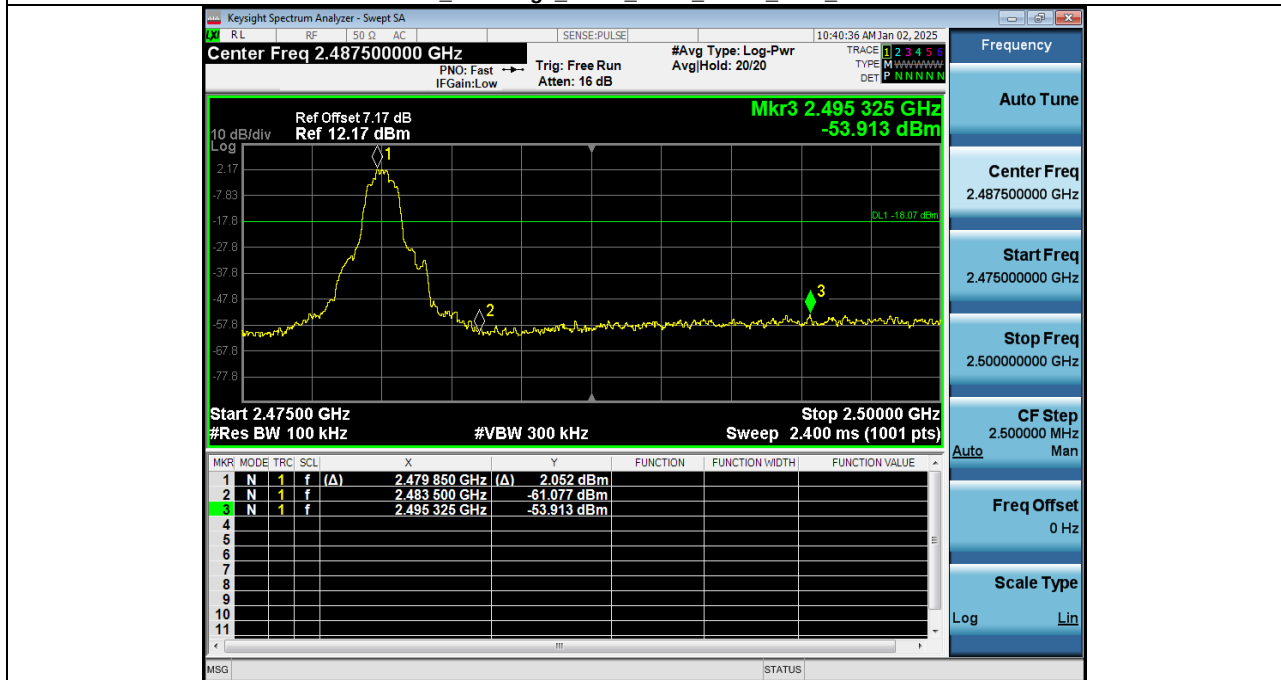
2_Band_Edge_(Hopping)_NVNT_ANT1_3-DH1_Hopping



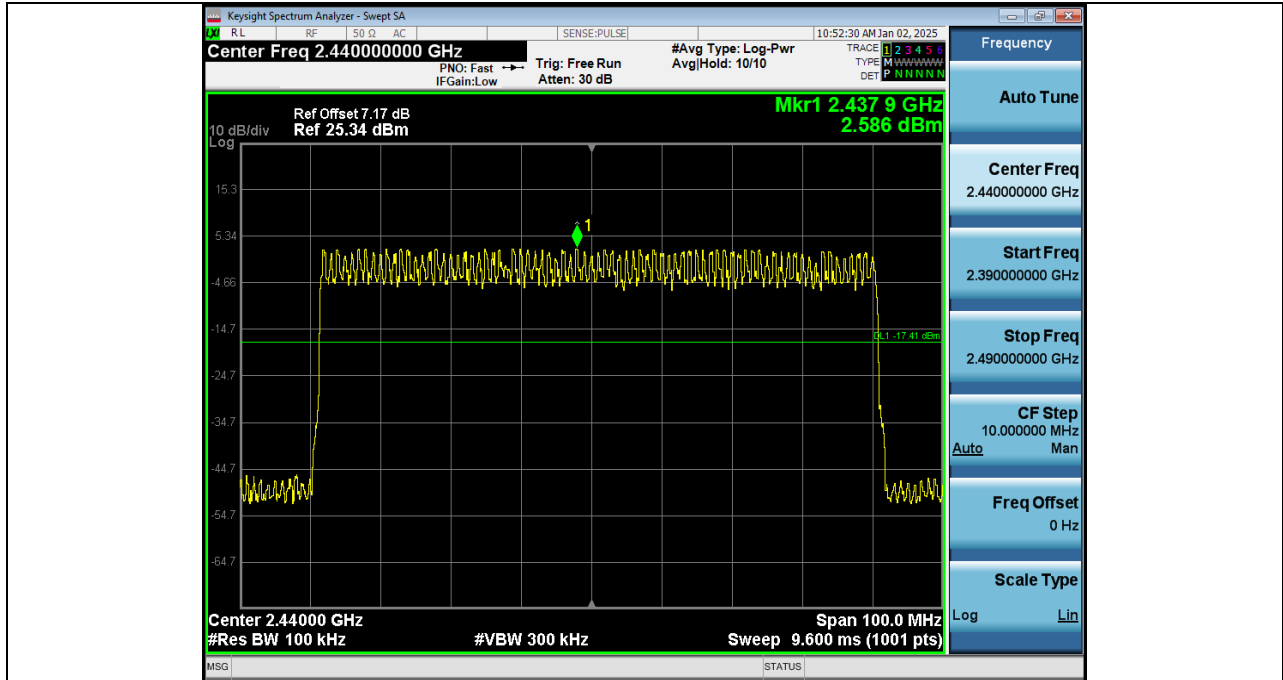
1_Reference_Level_NVNT_ANT1_3-DH1_2480_00



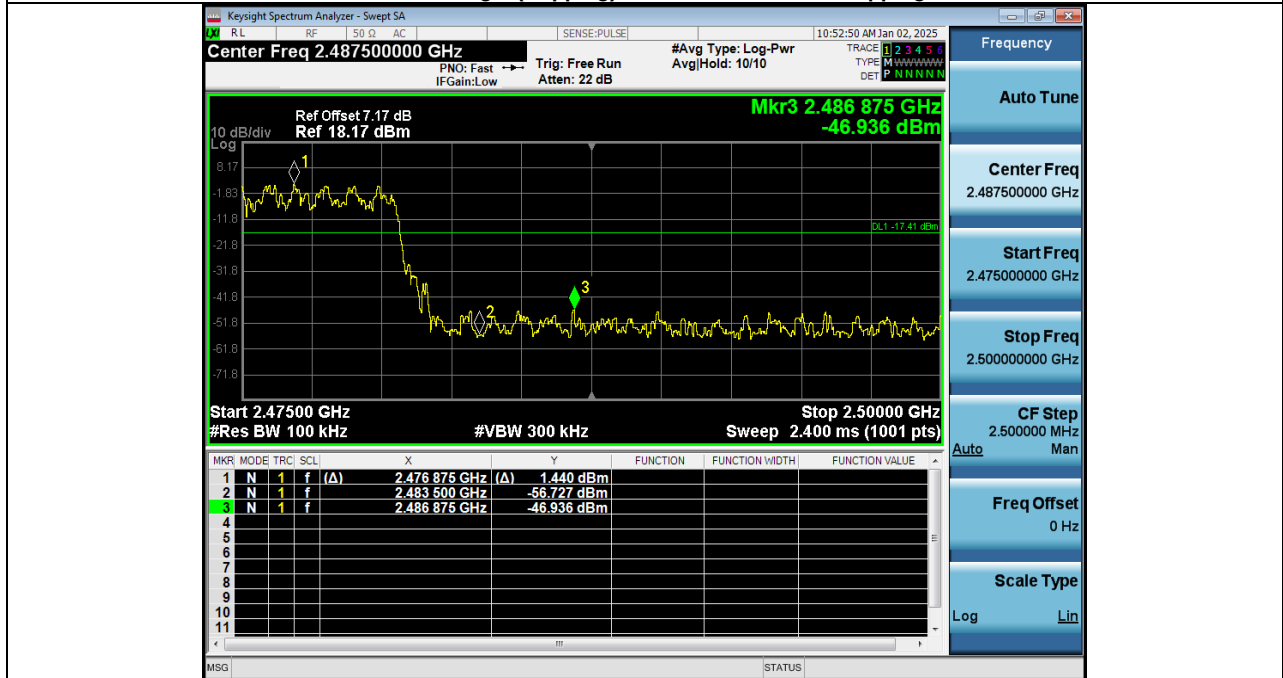
2_Bandedge_NVNT_ANT1_3-DH1_2480_00



1_Reference_Level_Hopping_NVNT_ANT1_3-DH1_Hopping

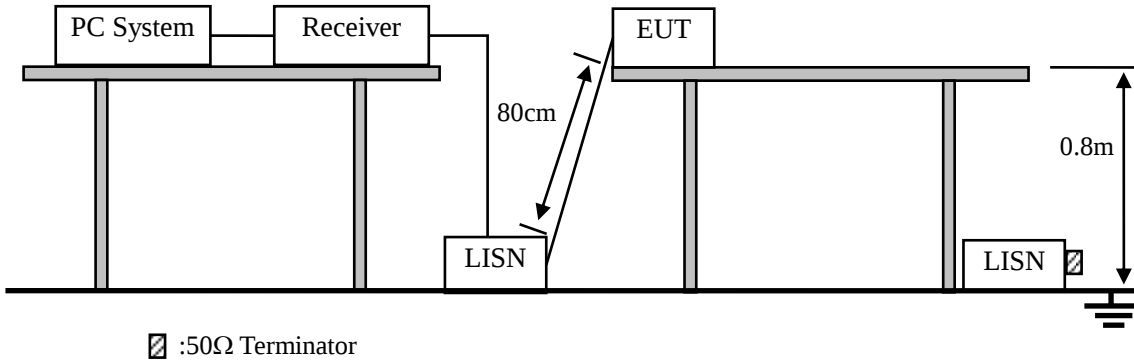


2_Band_Edge_(Hopping)_NVNT_ANT1_3-DH1_Hopping



10. POWER LINE CONDUCTED EMISSIONS

10.1. Block Diagram of Test Setup



10.2. Limit

Frequency	Maximum RF Line Voltage	
	Quasi-Peak Level dB(μV)	Average Level dB(μV)
150kHz ~ 500kHz	66 ~ 56*	56 ~ 46*
500kHz ~ 5MHz	56	46
5MHz ~ 30MHz	60	50

Notes: 1. * Decreasing linearly with logarithm of frequency.
2. The lower limit shall apply at the transition frequencies.

10.3. Test Procedure

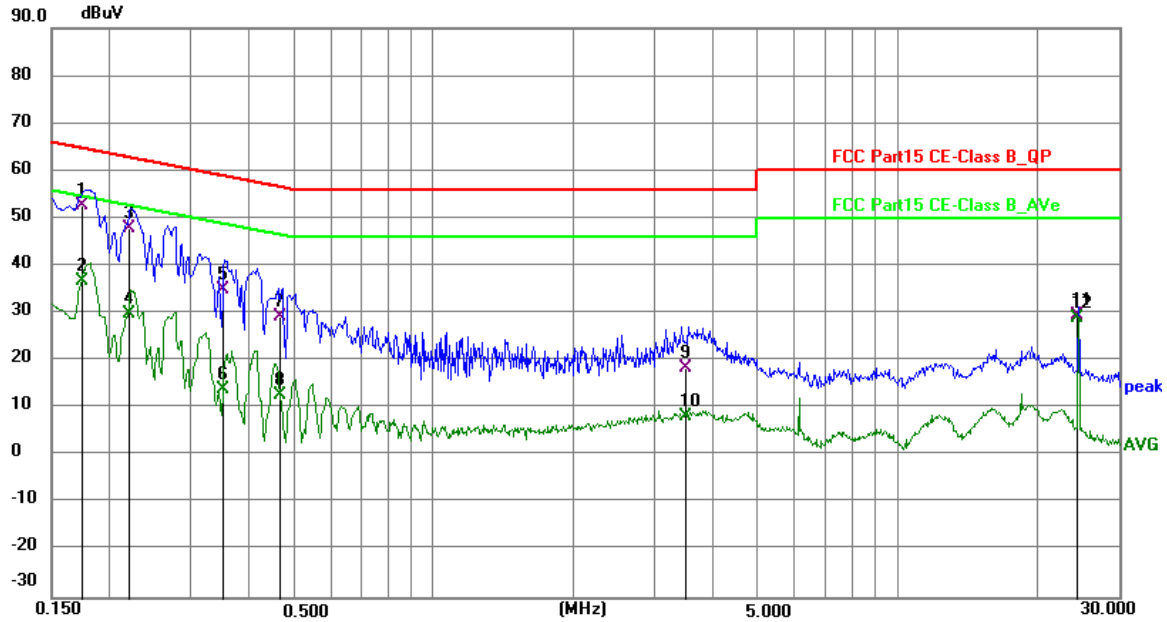
- (1) The EUT was placed on a non-metallic table, 80cm above the ground plane.
- (2) Setup the EUT and simulator as shown in 10.1
- (3) The EUT Power connected to the power mains through a power adapter and a line impedance stabilization network (L.I.S.N1). The other peripheral devices power cord connected to the power mains through a line impedance stabilization network (L.I.S.N2), this provided a 50-ohm coupling impedance for the EUT (Please refer to the block diagram of the test setup and photographs). Both sides of power line were checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipments and all of the interface cables were changed according to ANSI C63.10:2013 on conducted Emission test.
- (4) The bandwidth of test receiver is set at 10KHz.
- (5) The frequency range from 150 KHz to 30MHz is checked.

10.4.Test Result

Pass

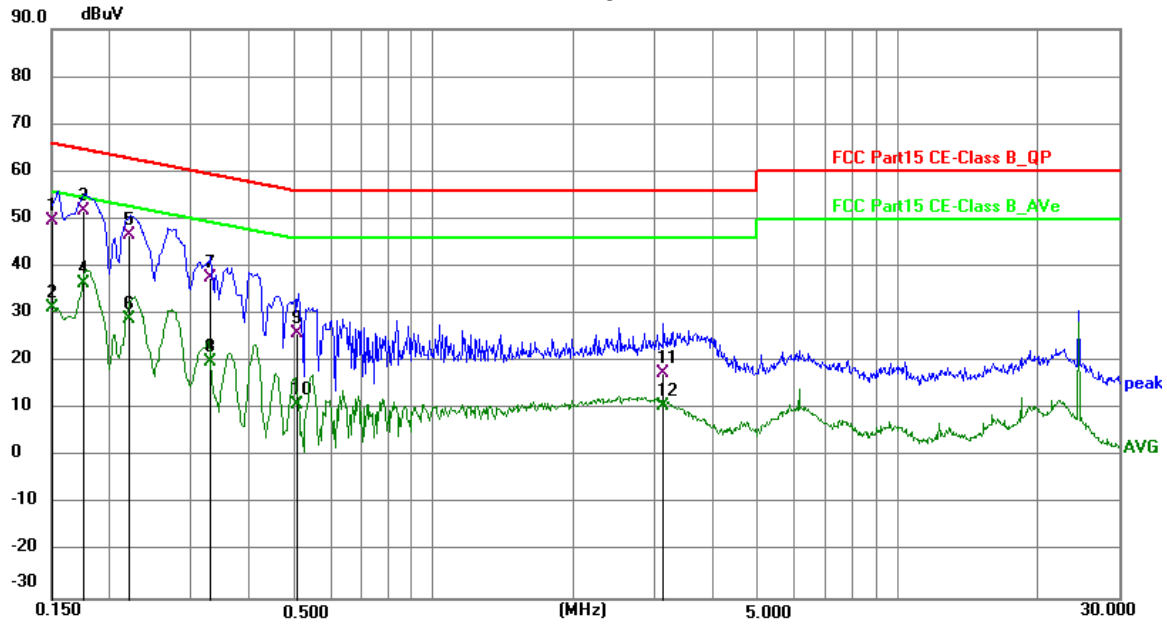
Remark: All modes have been tested, and only worst data of 8DPSK mode, Channel 2441MHz was listed in this report.

Polarity: L



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1 *	0.1746	42.92	9.62	52.54	64.74	-12.20	QP	P	
2	0.1746	27.13	9.62	36.75	54.74	-17.99	AVG	P	
3	0.2196	38.11	9.63	47.74	62.83	-15.09	QP	P	
4	0.2196	20.33	9.63	29.96	52.83	-22.87	AVG	P	
5	0.3512	25.37	9.63	35.00	58.93	-23.93	QP	P	
6	0.3512	4.34	9.63	13.97	48.93	-34.96	AVG	P	
7	0.4652	19.68	9.62	29.30	56.60	-27.30	QP	P	
8	0.4652	2.99	9.62	12.61	46.60	-33.99	AVG	P	
9	3.5154	8.87	9.67	18.54	56.00	-37.46	QP	P	
10	3.5154	-1.55	9.67	8.12	46.00	-37.88	AVG	P	
11	24.5748	19.69	9.76	29.45	60.00	-30.55	QP	P	
12	24.5748	19.24	9.76	29.00	50.00	-21.00	AVG	P	

Polarity: N



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector	P/F	Remark
1	0.1510	40.18	9.62	49.80	65.94	-16.14	QP	P	
2	0.1510	21.63	9.62	31.25	55.94	-24.69	AVG	P	
3 *	0.1760	42.03	9.63	51.66	64.67	-13.01	QP	P	
4	0.1760	26.77	9.63	36.40	54.67	-18.27	AVG	P	
5	0.2200	37.16	9.63	46.79	62.82	-16.03	QP	P	
6	0.2200	19.24	9.63	28.87	52.82	-23.95	AVG	P	
7	0.3285	27.90	9.62	37.52	59.49	-21.97	QP	P	
8	0.3285	10.46	9.62	20.08	49.49	-29.41	AVG	P	
9	0.5090	16.32	9.62	25.94	56.00	-30.06	QP	P	
10	0.5090	1.34	9.62	10.96	46.00	-35.04	AVG	P	
11	3.1231	7.81	9.67	17.48	56.00	-38.52	QP	P	
12	3.1231	1.10	9.67	10.77	46.00	-35.23	AVG	P	

11. ANTENNA REQUIREMENTS

11.1.Limit

For intentional device, according to FCC 47 CFR Section 15.203, 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. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi.

11.2.Result

The EUT antenna is FPC Antenna. It comply with the standard requirement.

12. TEST SETUP PHOTO

Please reference to the appendix I Test Setup Photo for details.

13. PHOTOS OF EUT

Please reference to the appendix II external photos and appendix III internal photos for details..

-----END OF REPORT-----