FCC TEST REPORT

FCC ID: 2A86Y-TG-462

On Behalf of

Shenzhen chengtai electronic and technology co.,LTD

Bluetooth speaker

Model No.: TG-462

Prepared for	:	Shenzhen chengtai electronic and technology co.,LTD
Address	:	6th Floor, Building C, Qinyu Industrial Zone, Sanwei, Sanwei Community, Hangcheng Street, Baoan District, Shenzhen, China

Prepared By	:	Shenzhen PSI Testing Co., Ltd.
Address	:	1-2/F., Building 5, Yudafu Industrial Park, No.10, Xingye West Road, Shajing Subdistrict, Bao'an District, Shenzhen, Guangdong, China

Report Number	:	psi2605182-C01-R01
Date of Receipt	:	May 26, 2026
Date of Test	:	May 26, 2026–June 9, 2026
Date of Report	:	June 9, 2026
Version Number	:	V0

TABLE OF CONTENTS

Description **Page**

1. Summary Of Standards And Results 6
1.1. Description of Standards and Results 6
2. General Information 7
2.1. Description of Device (EUT) 7
2.2. Accessories of Device (EUT) 8
2.3. Tested Supporting System Details 8
2.4. Block Diagram of Connection Between EUT and Simulators 8
2.5. Test Mode Description 9
2.6. Software test version and power setting information 9
2.7. Test Conditions 10
2.8. Test Facility 10
2.9. Measurement Uncertainty 10
2.10. Test Equipment List 11
3. Maximum Peak Output Power 12
3.1. Limit 12
3.2. Test Procedure 12
3.3. Test Setup 12
3.4. Test Result 13
4. Bandwidth 23
4.1. Limit 23
4.2. Test Procedure 23
4.3. Test Setup 24
4.4. Test Result 24
5. Carrier Frequency Separation 34
5.1. Limit 34
5.2. Test Procedure 34
5.3. Test Setup 34
5.4. Test Result 35
6. Number Of Hopping Channel 37
6.1. Limit 37
6.2. Test Procedure 37
6.3. Test Setup 37
6.4. Test Result 38
7. Dwell Time 40
7.1. Test limit 40
7.2. Test Procedure 40
7.3. Test Setup 41
7.4. Test Result 41
8. Out-of-band Emissions 51
8.1. Test Limits 51
8.2. Test Procedure 51
8.3. Test Setup 51

8.4. Test Results 51
9. Spurious Emission 75
9.1. Test Limits 75
9.2. Block Diagram of Test setup 76
9.3. Test Procedure 77
9.4. Test Results 78
10. Band Edge Test 85
10.1. Test Limit 85
10.2. Block Diagram of Test Setup 85
10.3. Test Procedure 85
10.4. Test Results 86
11. Power Line Conducted Emissions 89
11.1. Test Limits 89
11.2. Test Procedure 89
11.3. Test Setup 89
11.4. Test Results 90
12. Antenna Requirements 93
12.1. Limit 93
12.2. Result 93
13. Photos of test setup 94
14. Photos of EUT 94

TEST REPORT DECLARATION

Applicant	:	Shenzhen chengtai electronic and technology co.,LTD
Address	:	6th Floor, Building C, Qinyu Industrial Zone, Sanwei, Sanwei Community, Hangcheng Street, Baoan District, Shenzhen, China
Manufacturer	:	Shenzhen chengtai electronic and technology co.,LTD
Address	:	6th Floor, Building C, Qinyu Industrial Zone, Sanwei, Sanwei Community, Hangcheng Street, Baoan District, Shenzhen, China
EUT Description	:	Bluetooth speaker
		(A) Model No. : TG-462
		(B) Trademark : N/A

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247

ANSI C63.10:2020+Cor.1-2023

Test Result: PASS

The device described above is tested by Shenzhen PSI Testing Co., Ltd. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The test results are contained in this test report and Shenzhen PSI Testing Co., Ltd. is assumed full responsibility for the accuracy and completeness of test. Also, this report shows that the EUT is technically compliant with the FCC Part 15C requirements.

This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Shenzhen PSI Testing Co., Ltd.

Tested by (name + signature).....…..:	Felix Pang Test Engineer	Felix Pang
Approved by (name + signature)…....:	Simple Guan Project Manager	Simple Guan
Date of issue……..:	June 9, 2026	

Revision History

Revision	Issue Date	Revisions	Revised By
V0	June 9, 2026	Initial released Issue	Felix Pang

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 C63.10-2020+Cor.1-2023	P
Bandwidth	FCC Part 15: 15.215(c), ANSI C63.10-2020+Cor.1-2023	P
Carrier Frequency Separation	FCC Part 15: 15.247(a)(1), ANSI C63.10-2020+Cor.1-2023	P
Number Of Hopping Channel	FCC Part 15: 15.247(a)(1)(iii), ANSI C63.10-2020+Cor.1-2023	P
Dwell Time	FCC Part 15: 15.247(a)(1)(iii), ANSI C63.10-2020+Cor.1-2023	P
Radiated Spurious Emission	FCC Part 15: 15.209, FCC Part 15: 15.247(d), ANSI C63.10-2020+Cor.1-2023	P
Out-of-band Emissions	FCC Part 15: 15.247(d), ANSI C63.10-2020+Cor.1-2023	P
Radiated Band Edge Emission	FCC Part 15: 15.247(d), ANSI C63.10-2020+Cor.1-2023	P
Power Line Conducted Emissions	FCC Part 15: 15.207(a), ANSI C63.10-2020+Cor.1-2023	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. Conclusion determination rules of this report: Unless there are clear provisions on measurement uncertainty in the standard or customer requirements, decision by actual test data without considering measurement uncertainty.
5. Measurement method usage KDB 558074 D01 15.247 Meas Guidance v05r02.

2. General Information

2.1. Description of Device (EUT)

Product Name	:	Bluetooth speaker
Model No.	:	TG-462
Diff	:	N/A
Power supply	:	DC 5V from adapter, DC 3.7V from battery.
Radio Technology	:	Bluetooth V5.0 EDR
Operation frequency	:	2402-2480MHz
Channel No.	:	79 channels
Channel Separation	:	1MHz
Modulation	:	GFSK, π/4-DQPSK, 8DPSK
Antenna Type	:	Internal antenna, Maximum Gain is 2.499dBi.
PMN	:	N/A
HVIN	:	N/A
Software version	:	N/A
Hardware version/FVIN	:	N/A
Note	:	Antenna information is provided by applicant. Testing lab is not responsible for the accuracy of the information.

2.2. Accessories of Device (EUT)

Accessories 1 : N/A

Manufacturer : N/A

Model : N/A

2.3. Tested Supporting System Details

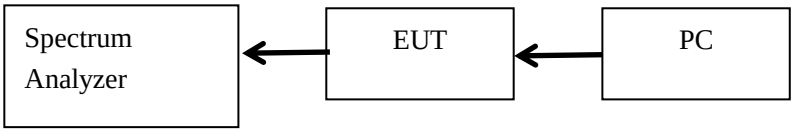
No.	Description	Manufacturer	Model	Serial Number
1	Adapter	Baseus	CCXFK65CC	AJ250501
2	Notebook PC	Dell	Latitude 3490	N/A

2.4. Block Diagram of Connection Between EUT and Simulators

Spurious Emission

Power Line Conducted Emission

RF



2.5. Test Mode Description

The test software used to control EUT work in Continuous TX mode, and select test channel, wireless mode

Tested mode, channel, and data rate information		
Mode	Channel	Frequency (MHz)
GFSK / Pi/4-DQPSK / 8DPSK Carrier Tx Mode	CH0	2402
	CH39	2441
	CH78	2480
GFSK / Pi/4-DQPSK / 8DPSK hopping on Tx Mode	CH0	2402
	CH39	2441
	CH78	2480
GFSK / Pi/4-DQPSK / 8DPSK hopping off Tx Mode	CH0	2402
	CH39	2441
	CH78	2480

2.6. Software test version and power setting information

Software testing version	FCCDirector.exe		
Mode	The client 's preset testing software is used to control the operation of EUT in continuous transmission mode and select the testing channel, wireless mode:		
Power level setup by client			
Mode	Channel	Frequency (MHz)	Soft Set
GFSK, Pi/4-DQPSK, 8DPSK	CH0	2402	TX level is set as defaults value.
	CH39	2441	TX level is set as defaults value.
	CH78	2480	TX level is set as defaults value.

2.7. Test Conditions

Items	Required	Actual
Temperature range:	15-35℃	26℃
Humidity range:	25-75%	54%
Pressure range:	86-106kPa	101kPa

2.8. Test Facility

Shenzhen PSI Testing Co., Ltd.

1-2/F., Building 5, Yudafu Industrial Park, No.10, Xingye West Road, Shajing Subdistrict, Bao'an District, Shenzhen, Guangdong, China

September 13, 2023 File on Federal Communication Commission
Registration Number: 916281
Designation Number: CN1362

September 21, 2023 Certificated by IC
Registration Number: 31123
CAB identifier: CN0158

2.9. Measurement Uncertainty

(95% confidence levels, k=2)

Item	**Uncertainty**
Power Line Conducted Emissions Test	2.13dB
Radiation Emission test in 3m chamber(below 30MHz)	4.07dB
Radiation Emission test in 3m chamber(30MHz to 1GHz)	4.51dB
Radiation Emission test in 3m chamber(1GHz to 18GHz)	5.07dB
Radiation Emission test in 3m chamber(18GHz to 40GHz)	5.21dB
Radio Frequency	48.24KHz
Conducted RF Power	0.41dB
Power Spectral Density	0.39 dB
Occupied-Bandwidth	968Hz
Duty Cycle	1%
Conducted-Spurious Emission	1.26dB

2.10.Test Equipment List

Item	Equipment	Manufacturer	Model No.	Serial No.	Firmware Version	Last Cal.	Cal. Interval
1.	9*6*6 anechoic chamber	SKET	9*6*6	N/A	/	2025.12.18	3 Year
2.	Test Receiver	Rohde&Schwarz	ESCI 7	101032/003	4.42 SP3	2025.12.18	1 Year
3.	L.I.S.N.#1	Rohde&Schwarz	ENV 216	102282	/	2025.12.18	1 Year
4.	L.I.S.N.#2	EMCO	3810-2	00094944	/	2025.12.18	1 Year
5.	Loop Antenna	Schwarz beck	FMZB 1519B	00128	/	2025.01.02	2 Year
6.	Bilog Antenna	Schwarz beck	VULB 9168	01448	/	2025.01.02	2 Year
7.	Spectrum Analyzer	Rohde&Schwarz	FSV40-N	101648	3.70	2025.12.18	1 Year
8.	Horn Antenna	Schwarz beck	BBHA 9120 D	02706	/	2025.01.02	2 Year
9.	Amplifier	SKET	LNPA_0118G-50	SK2022032901	/	2025.12.18	1 Year
10.	Horn Antenna	Schwarz beck	BBHA 9170	00946	/	2024.12.31	2 Year
11.	Amplifier	SKET	LNPA_1840G-50	SK2019040302	/	2025.12.18	1 Year
12.	RF Power Probe	Rohde&Schwarz	NRP-Z11	1138.3004.02-1111533-Fz	/	2025.12.18	1 Year
13.	RF Sensor Unit	Tachoy	TR1029-2	20220428P008	/	2025.12.18	1 Year
14.	Spectrum Analyzer	Agilent	N9020A	MY51281067	A.14.03	2025.12.18	1 Year
15.	Temp. & Humid Chamber	Auchno	9606	/	/	2025.12.18	1 Year
16.	Regulated DC Power Supply	Xinouhua	ADC120V10A	202211251638	/	2025.12.18	1 Year
17.	Cable	SKET	Cable-RE-1	#02/#03	/	2025.12.18	1 Year
18.	Cable	SKET	Cable-RE-2	#01	/	2025.12.18	1 Year
19.	Cable	SKET	Cable-RE-3	#04	/	2025.12.18	1 Year
20.	Cable	SKET	Cable-CE-1	A-E-24	/	2025.12.18	1 Year
21.	6dB Attenuator	Schwarzbeck	DGA 9552N 6dB	CK4186	/	2025.12.18	1 Year
22.	Power meter	Agilent	E4419B	GB40202121	/	2025.12.18	1 Year
23.	Comprehensive Test Instrument	Rohde&Schwarz	CMW 500	145266	/	2025.12.18	1 Year

For Test Software Information

Item	Software Name	Manufacturer	Version
RE	EZ_EMC	Farad	PSI-3A1
CE	EZ_EMC	Farad	PSI-3A1
RF	RTS	TACHOY	V1.0.0

3. Maximum Peak Output Power

3.1. 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.

3.2. Test 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.

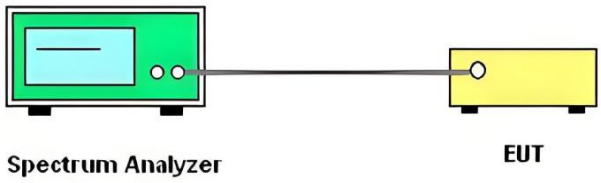
b) Allow trace to stabilize.

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.

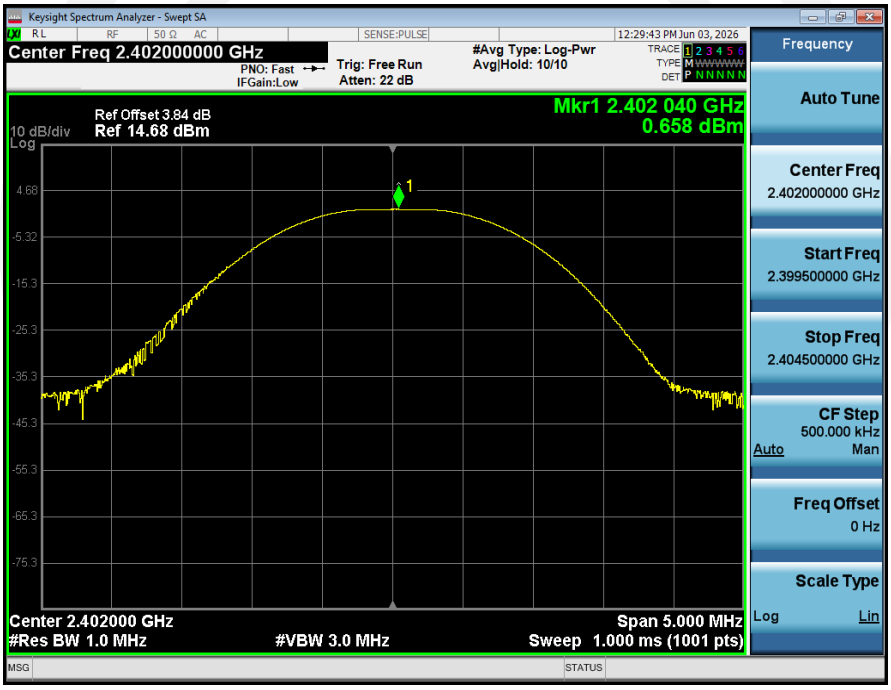
3.3. Test Setup



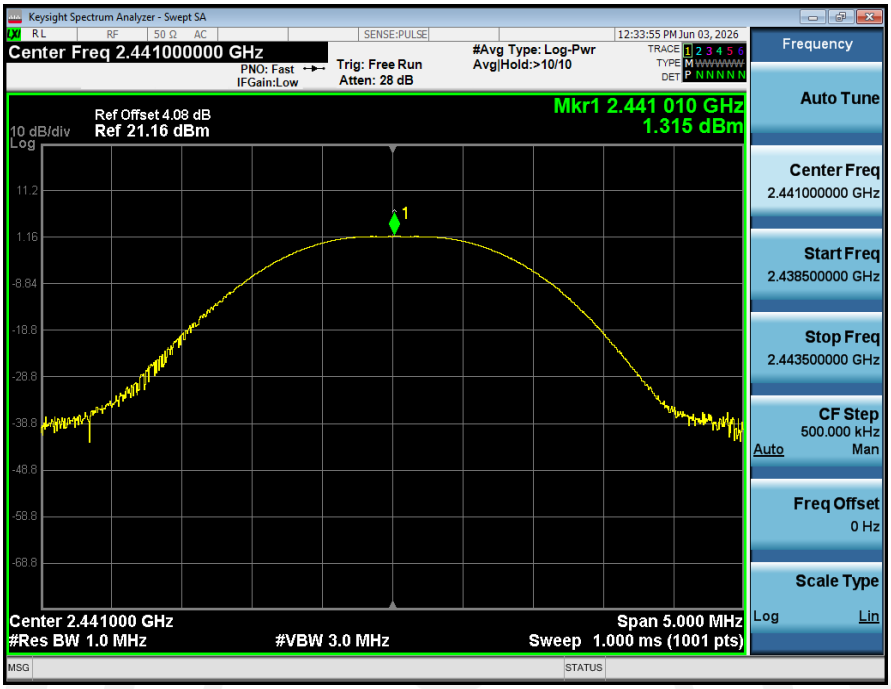
3.4. Test Result

Condition	Antenna	Modulation	Frequency (MHz)	Max. Conducted Power(dBm)	Max. Conducted Power(mW)	Limit(mW)	Result
NVNT	ANT1	1-DH1	2402.00	0.66	1.16	1000	Pass
NVNT	ANT1	1-DH1	2441.00	1.31	1.35	1000	Pass
NVNT	ANT1	1-DH1	2480.00	1.47	1.40	1000	Pass
NVNT	ANT1	2-DH1	2402.00	1.47	1.40	125	Pass
NVNT	ANT1	2-DH1	2441.00	1.97	1.57	125	Pass
NVNT	ANT1	2-DH1	2480.00	2.13	1.63	125	Pass
NVNT	ANT1	3-DH1	2402.00	1.97	1.57	125	Pass
NVNT	ANT1	3-DH1	2441.00	2.49	1.78	125	Pass
NVNT	ANT1	3-DH1	2480.00	**2.62**	1.83	125	Pass

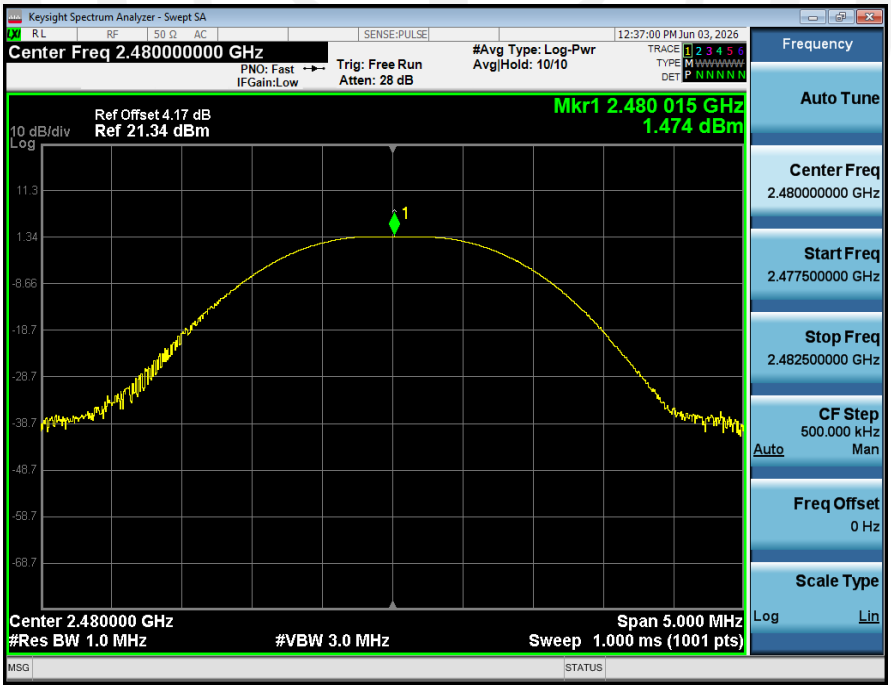
Peak_Output_Power_NVNT_ANT1_1-DH1_2402_00



Peak_Output_Power_NVNT_ANT1_1-DH1_2441_00

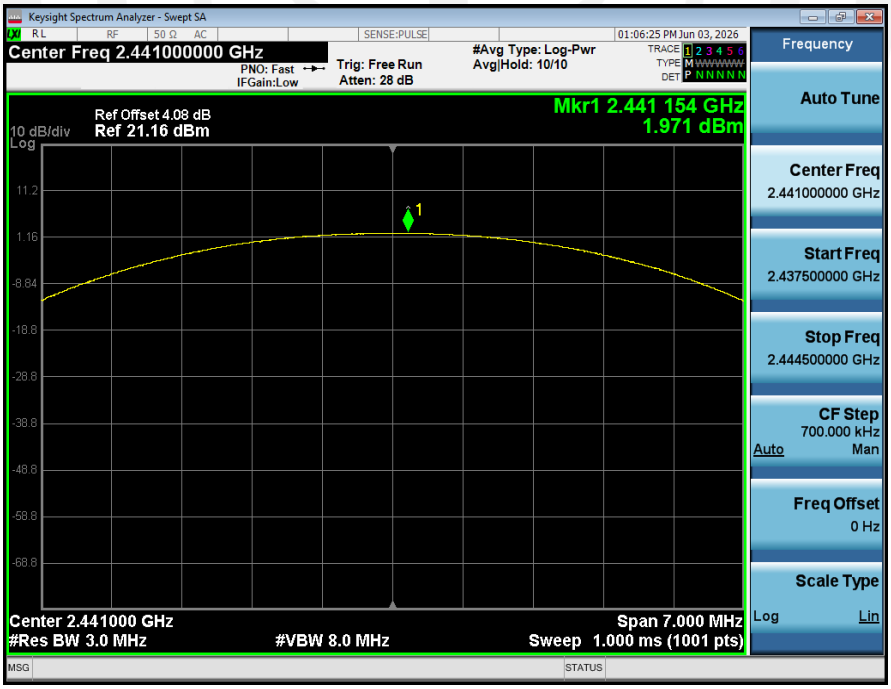


Peak_Output_Power_NVNT_ANT1_1-DH1_2480_00

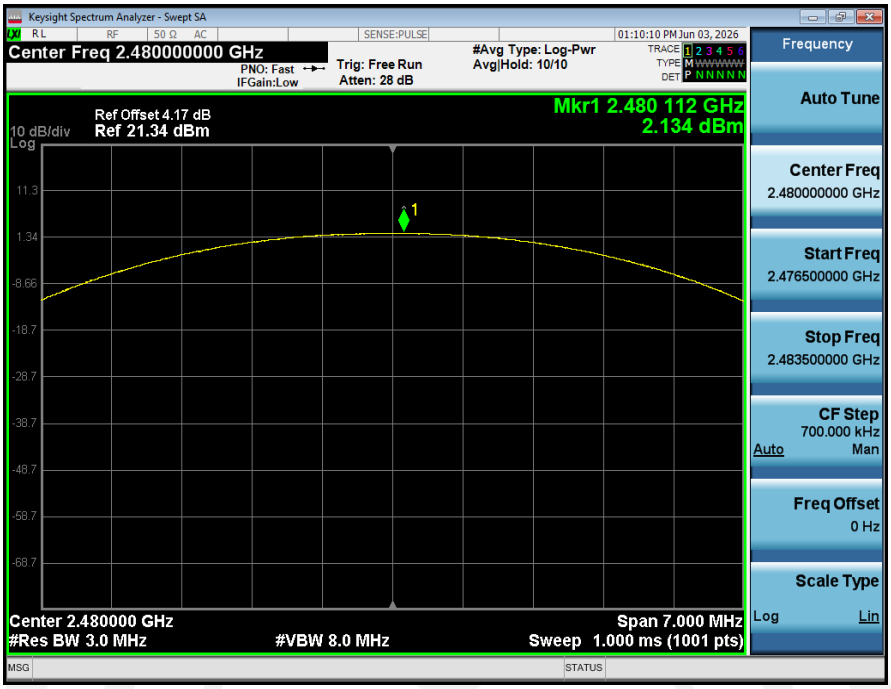


Peak_Output_Power_NVNT_ANT1_2-DH1_2402_00

Peak_Output_Power_NVNT_ANT1_2-DH1_2441_00

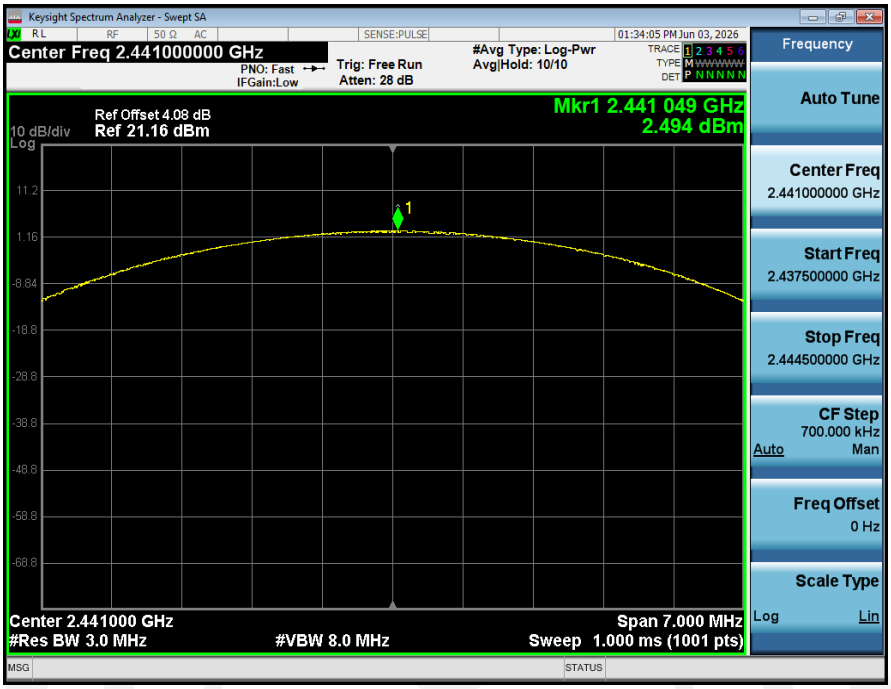


Peak_Output_Power_NVNT_ANT1_2-DH1_2480_00

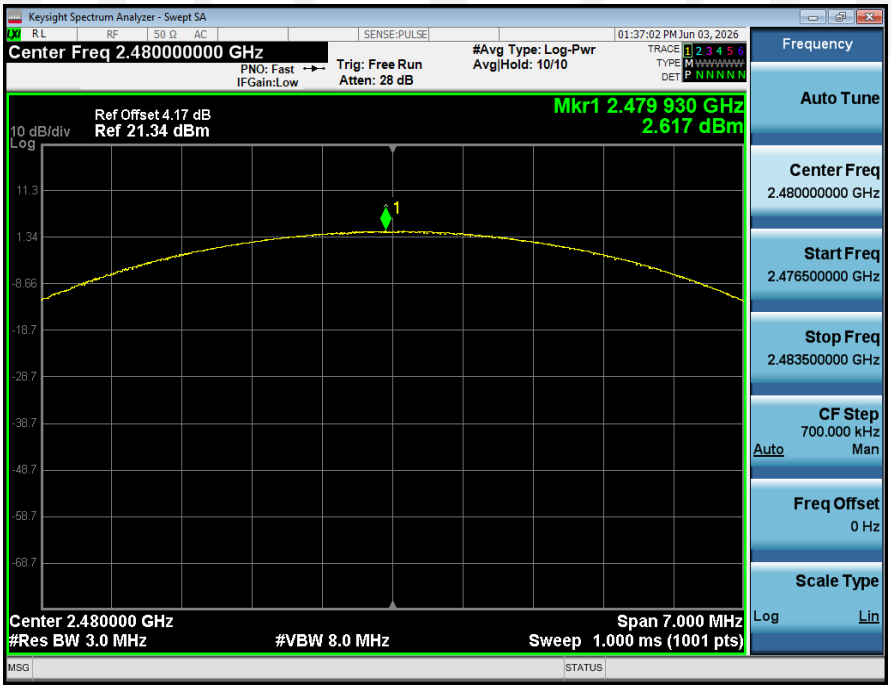


Peak_Output_Power_NVNT_ANT1_3-DH1_2402_00

Peak_Output_Power_NVNT_ANT1_3-DH1_2441_00

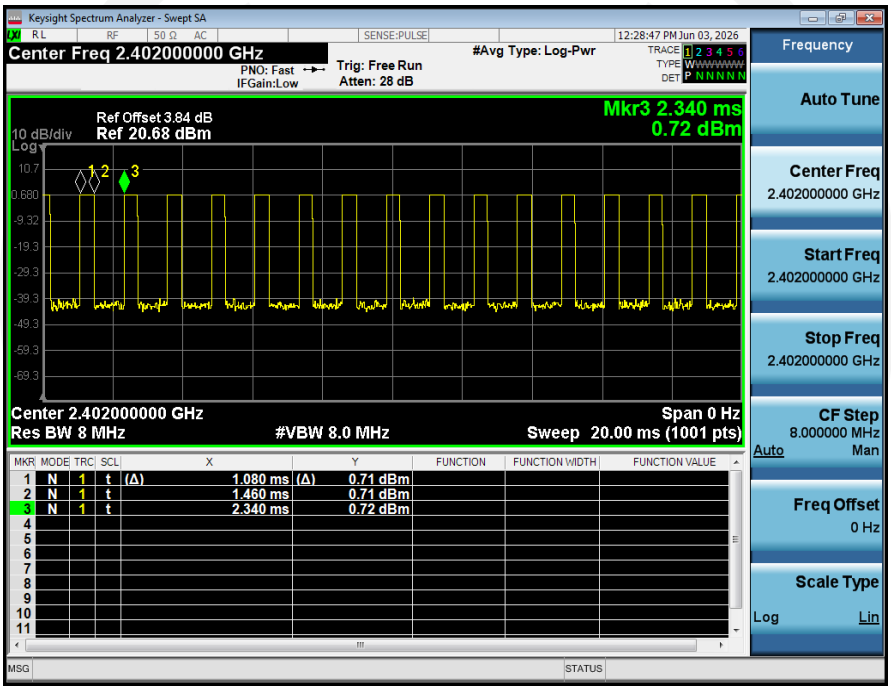


Peak_Output_Power_NVNT_ANT1_3-DH1_2480_00

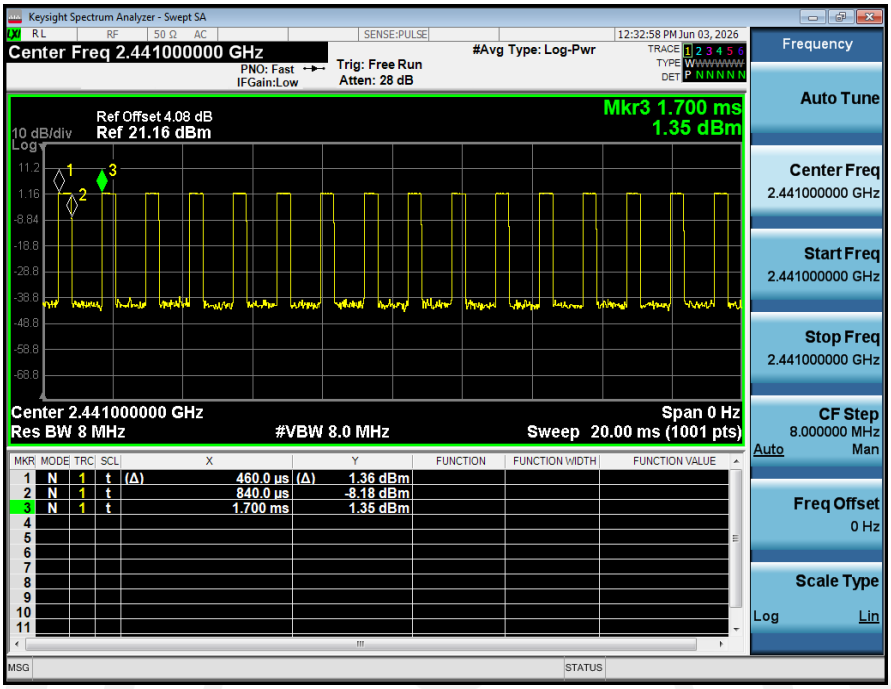


Condition	Antenna	Rate	Frequency (MHz)	Dutycycle(%)	Duty_factor
NVNT	ANT1	1-DH1	2402.00	31.75	4.98
NVNT	ANT1	1-DH1	2441.00	30.65	5.14
NVNT	ANT1	1-DH1	2480.00	30.16	5.21
NVNT	ANT1	2-DH1	2402.00	31.75	4.98
NVNT	ANT1	2-DH1	2441.00	30.16	5.21
NVNT	ANT1	2-DH1	2480.00	33.33	4.77
NVNT	ANT1	3-DH1	2402.00	33.33	4.77
NVNT	ANT1	3-DH1	2441.00	31.75	4.98
NVNT	ANT1	3-DH1	2480.00	30.65	5.14

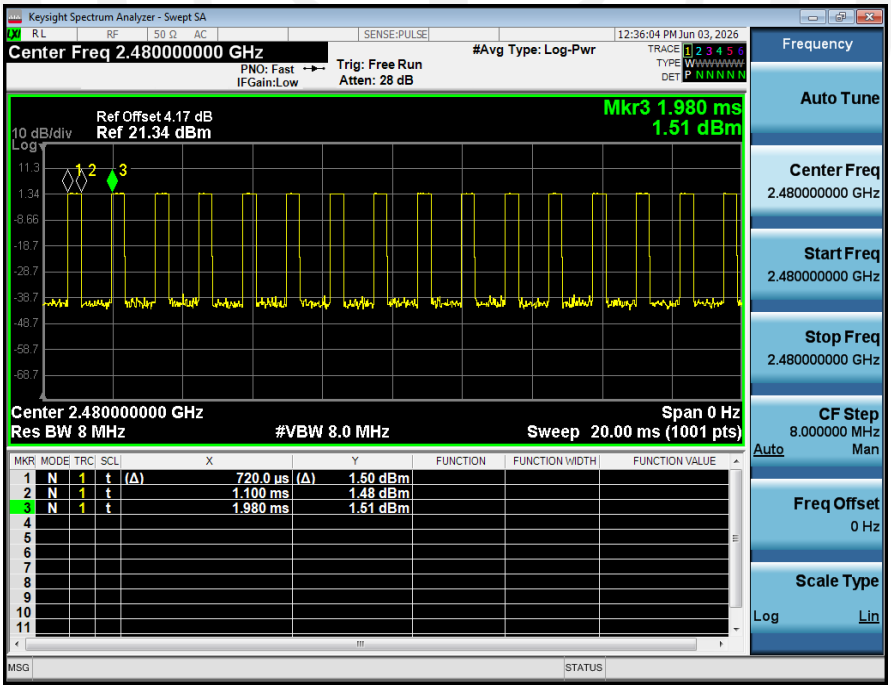
Duty_Cycle_NVNT_ANT1_1-DH1_2402



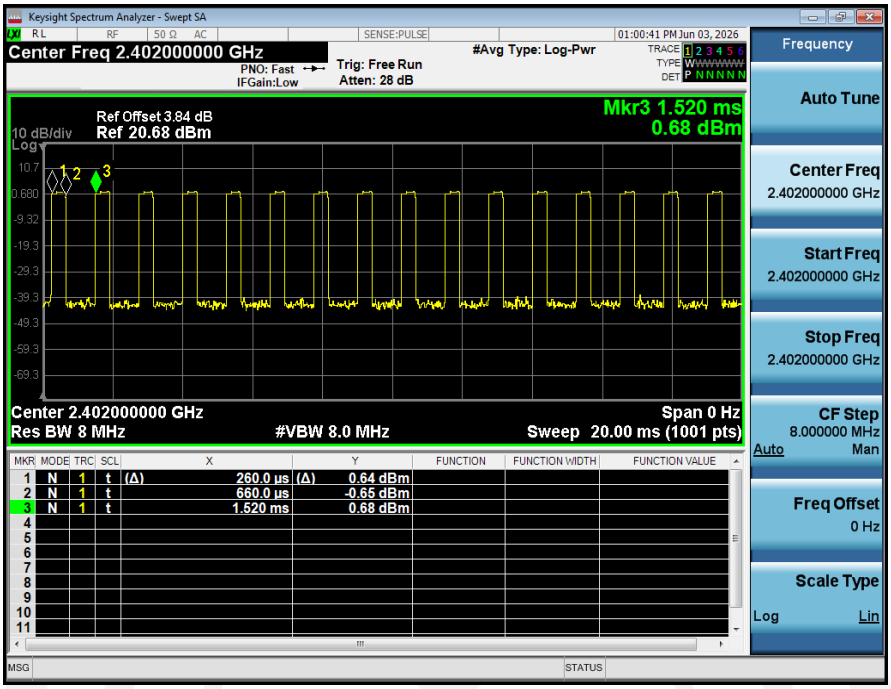
Duty_Cycle_NVNT_ANT1_1-DH1_2441



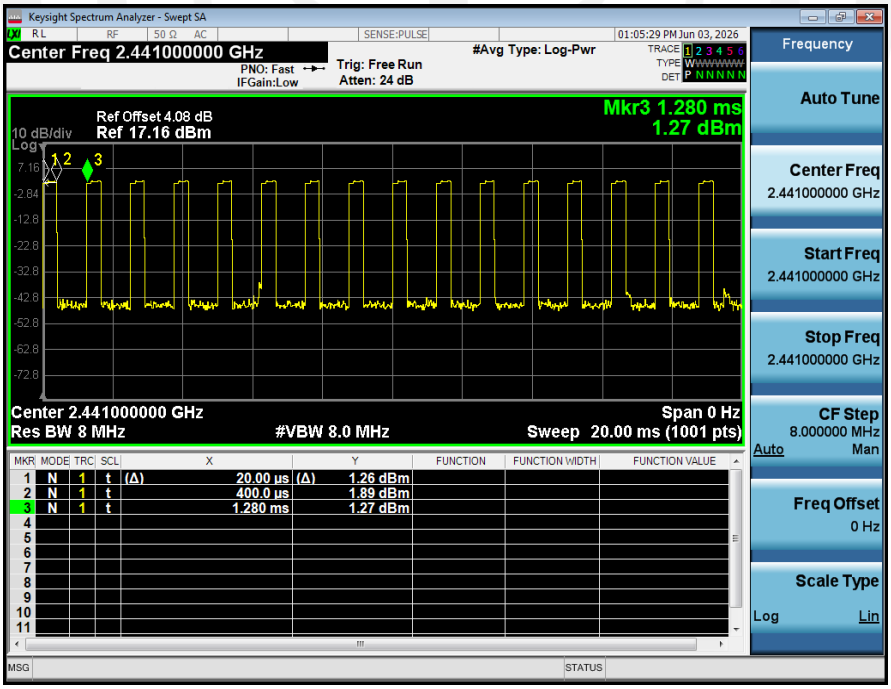
Duty_Cycle_NVNT_ANT1_1-DH1_2480



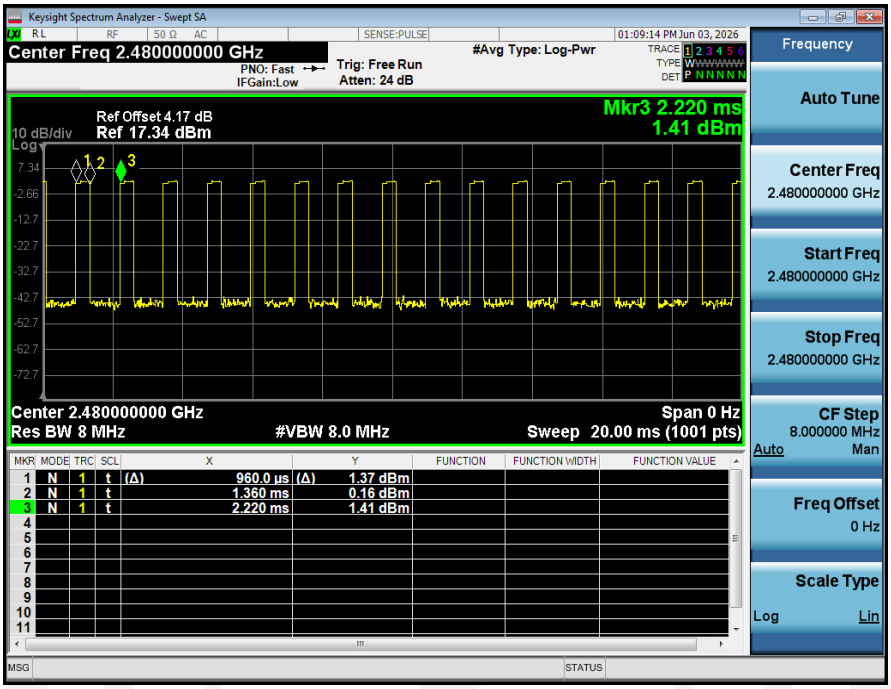
Duty_Cycle_NVNT_ANT1_2-DH1_2402



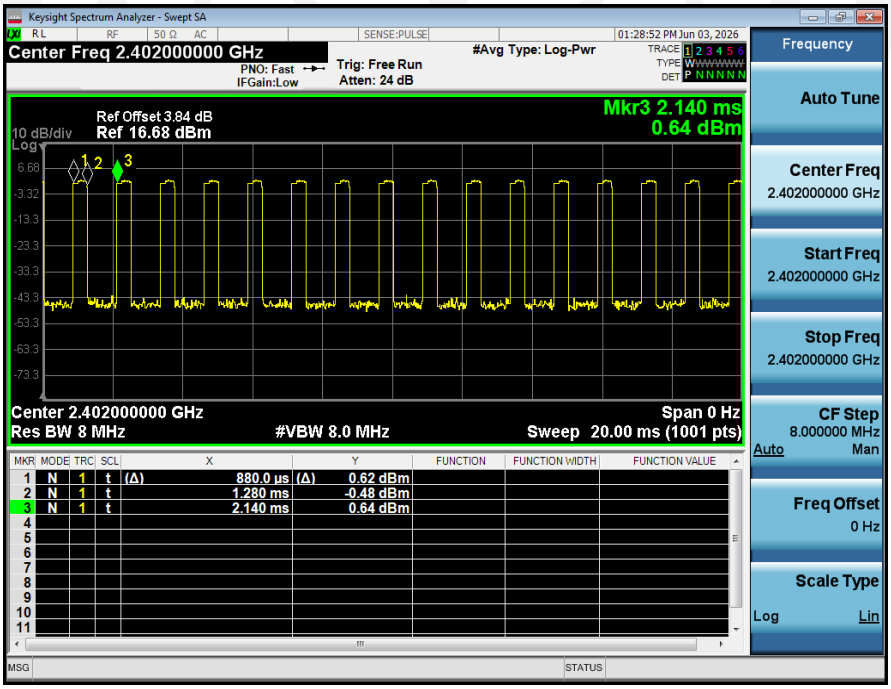
Duty_Cycle_NVNT_ANT1_2-DH1_2441



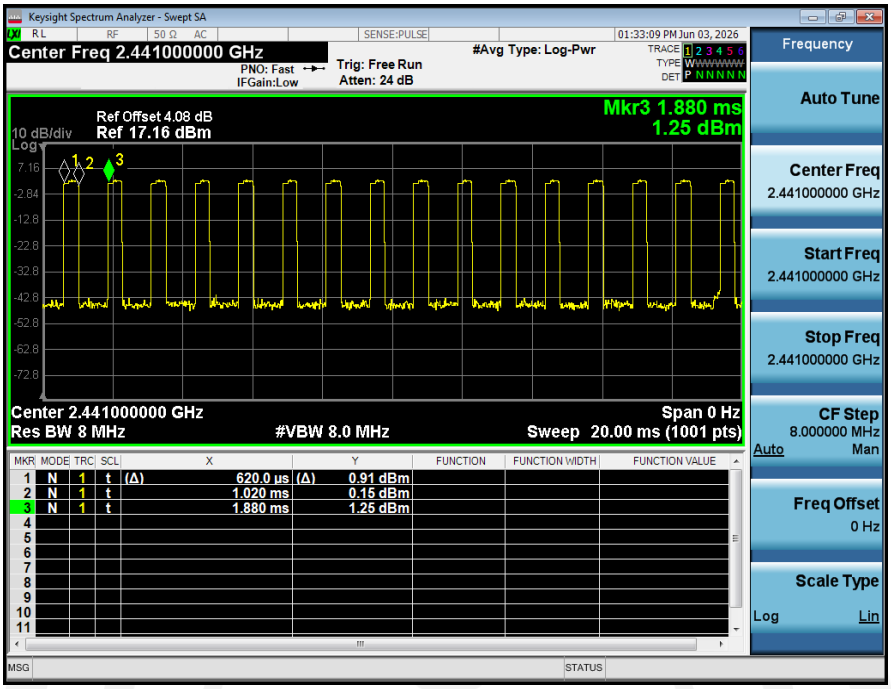
Duty_Cycle_NVNT_ANT1_2-DH1_2480



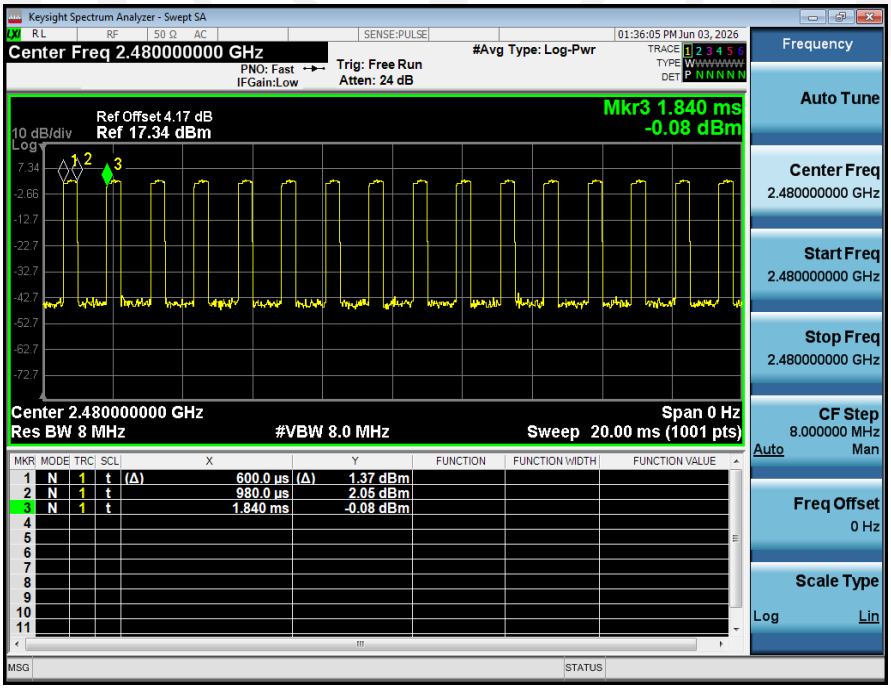
Duty_Cycle_NVNT_ANT1_3-DH1_2402



Duty_Cycle_NVNT_ANT1_3-DH1_2441



Duty_Cycle_NVNT_ANT1_3-DH1_2480



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

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

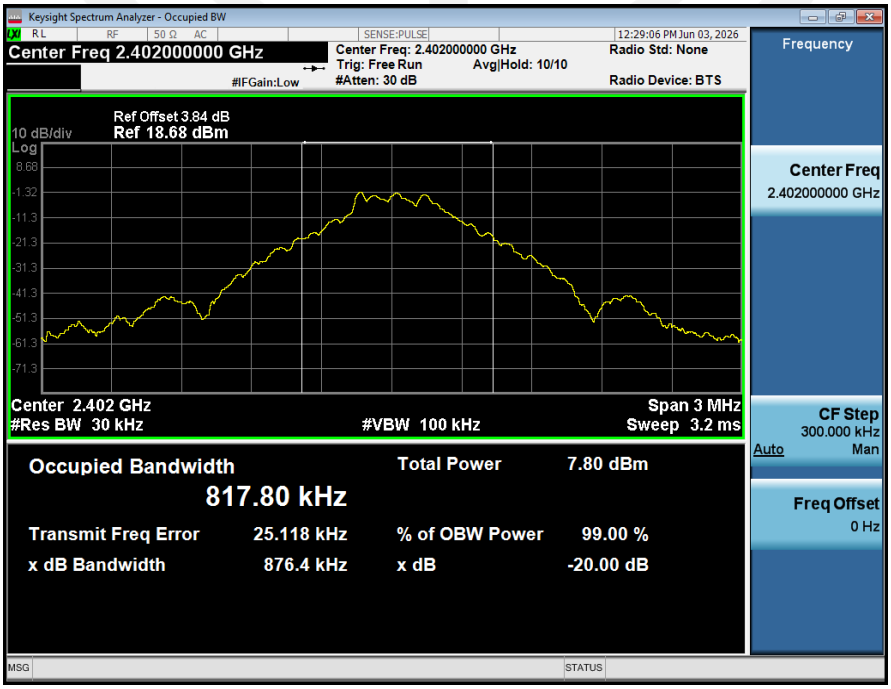
display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

4.3. Test Setup

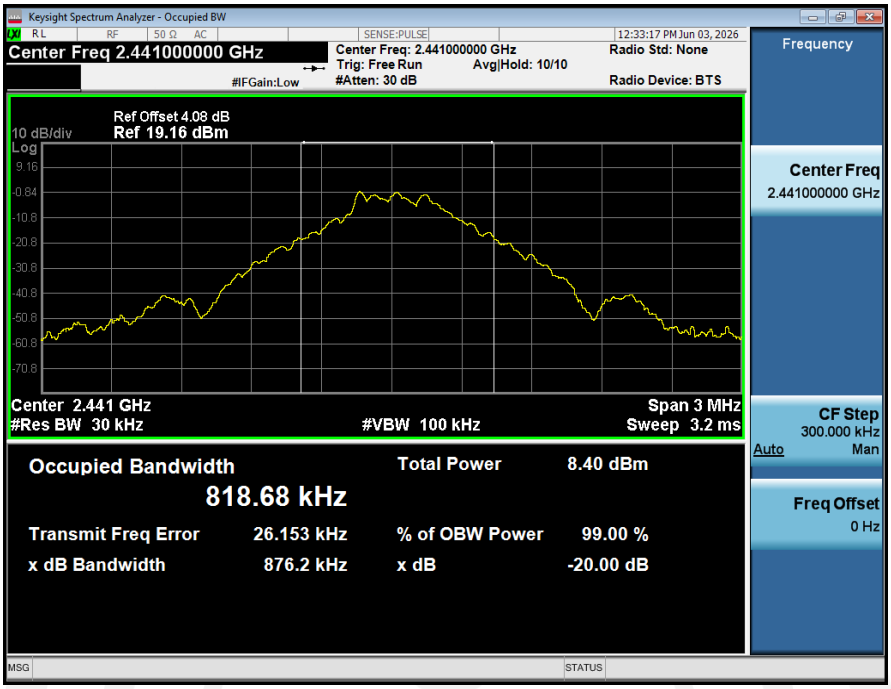
4.4. Test Result

Condition	Antenna	Modulation	Frequency (MHz)	-20dB BW(MHz)	if larger than CFS
NVNT	ANT1	1-DH1	2402.00	0.876	No
NVNT	ANT1	1-DH1	2441.00	0.876	No
NVNT	ANT1	1-DH1	2480.00	0.877	No
NVNT	ANT1	2-DH1	2402.00	1.262	Yes
NVNT	ANT1	2-DH1	2441.00	1.266	Yes
NVNT	ANT1	2-DH1	2480.00	1.274	Yes
NVNT	ANT1	3-DH1	2402.00	1.223	Yes
NVNT	ANT1	3-DH1	2441.00	1.224	Yes
NVNT	ANT1	3-DH1	2480.00	1.224	Yes

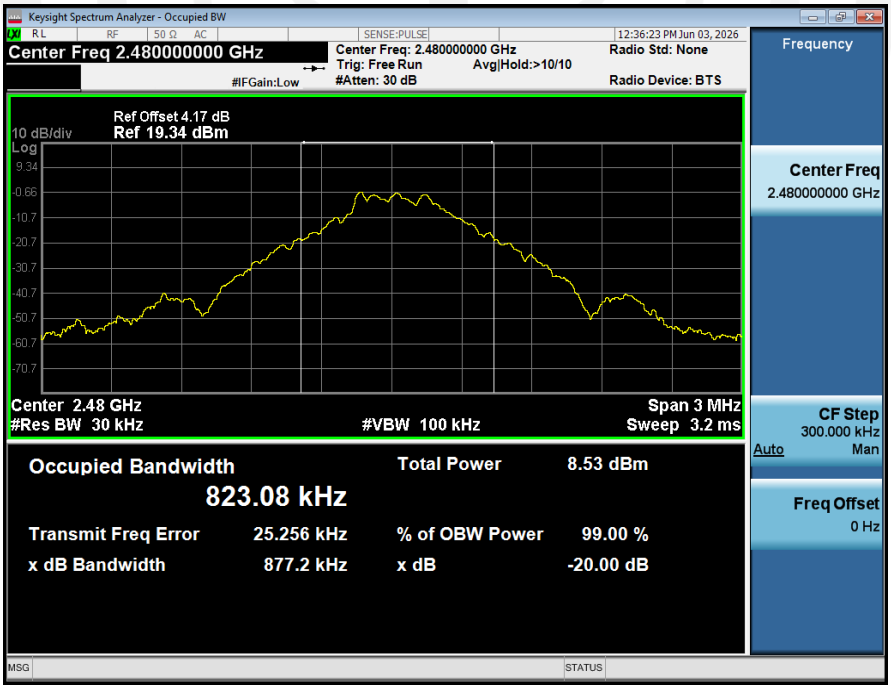
-20dB_Bandwidth_NVNT_ANT1_1-DH1_2402_00



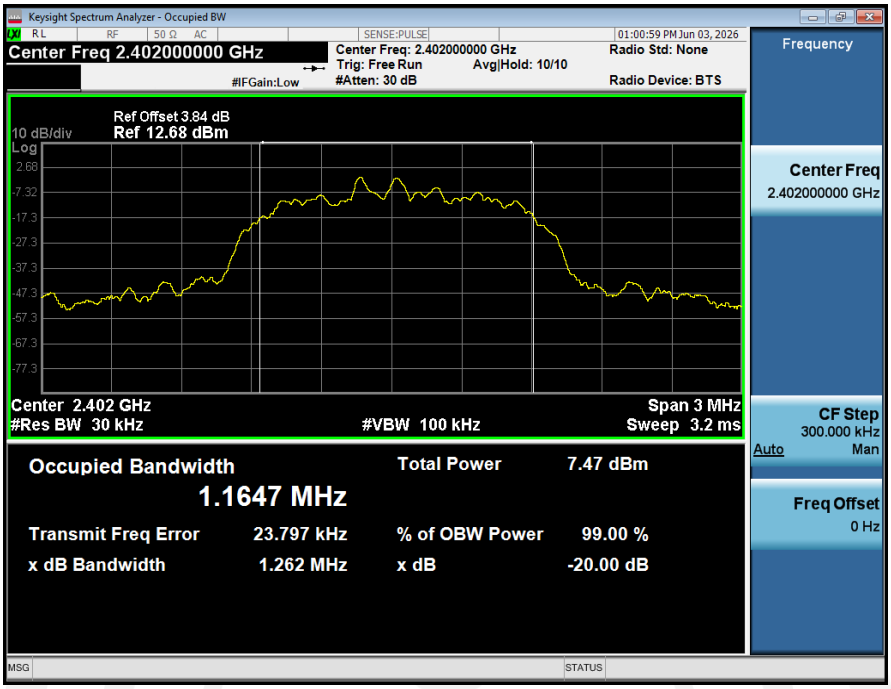
-20dB_Bandwidth_NVNT_ANT1_1-DH1_2441_00



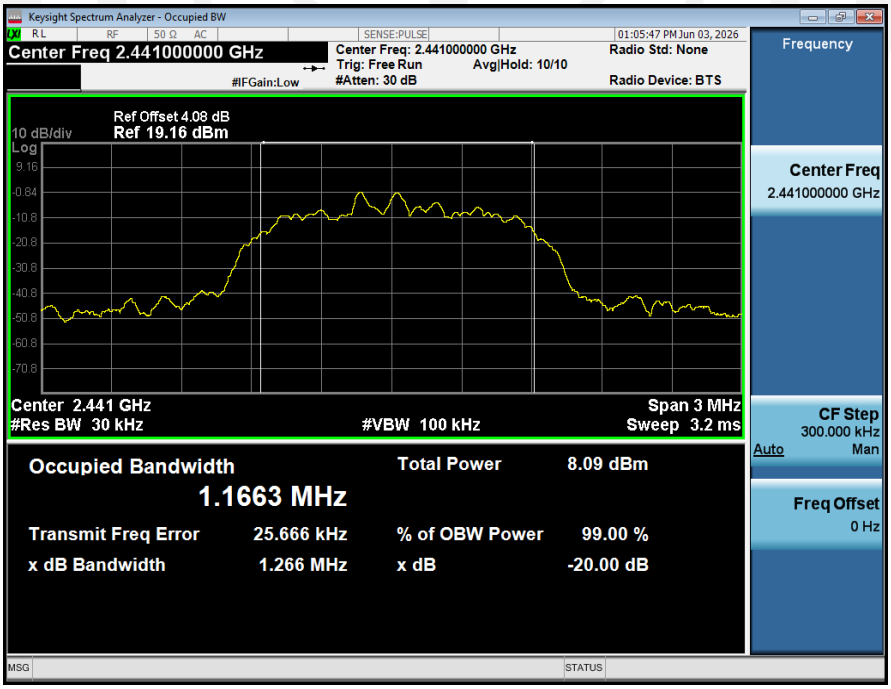
-20dB_Bandwidth_NVNT_ANT1_1-DH1_2480_00



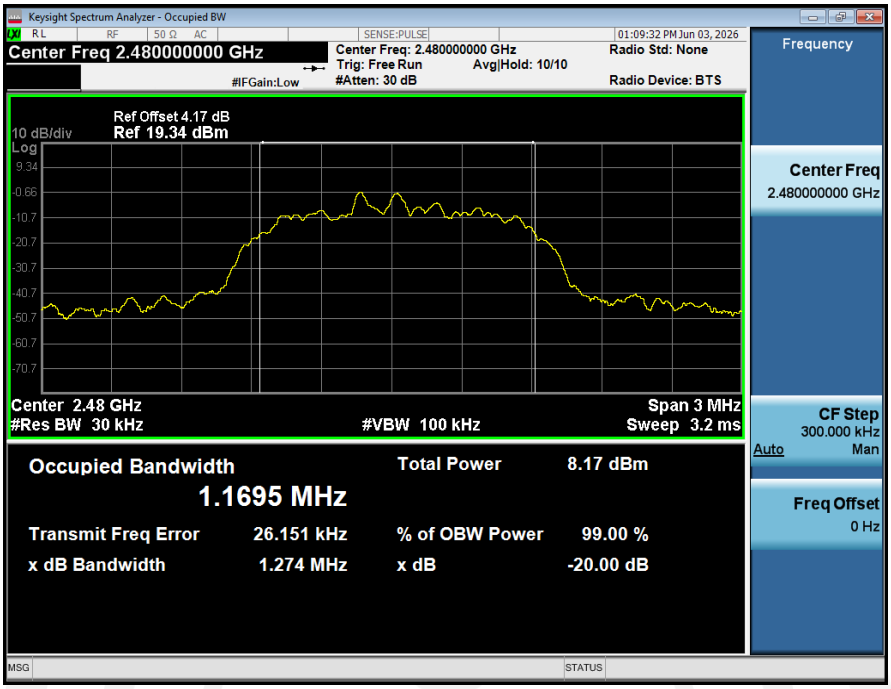
-20dB_Bandwidth_NVNT_ANT1_2-DH1_2402_00



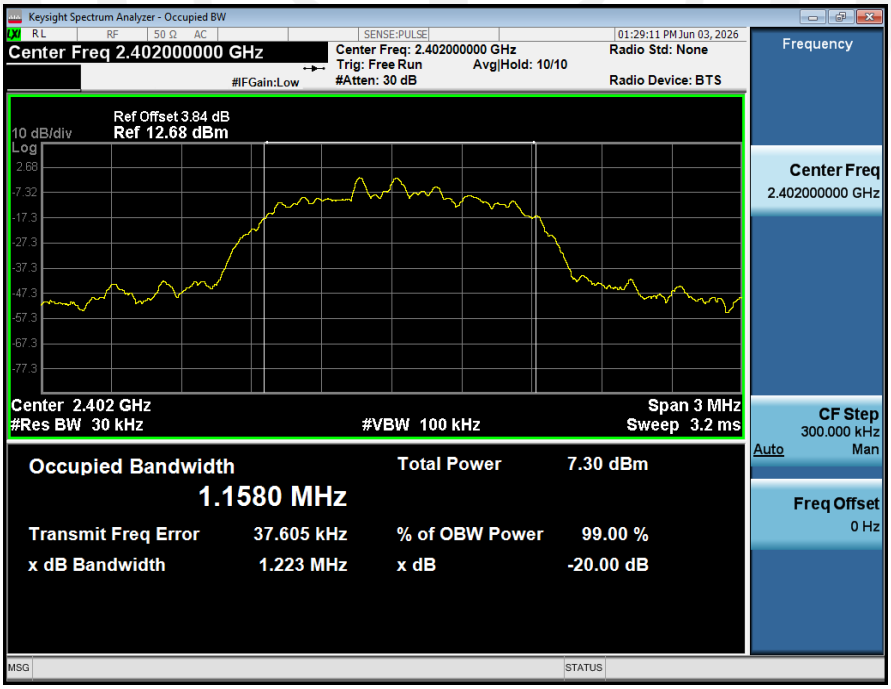
-20dB_Bandwidth_NVNT_ANT1_2-DH1_2441_00



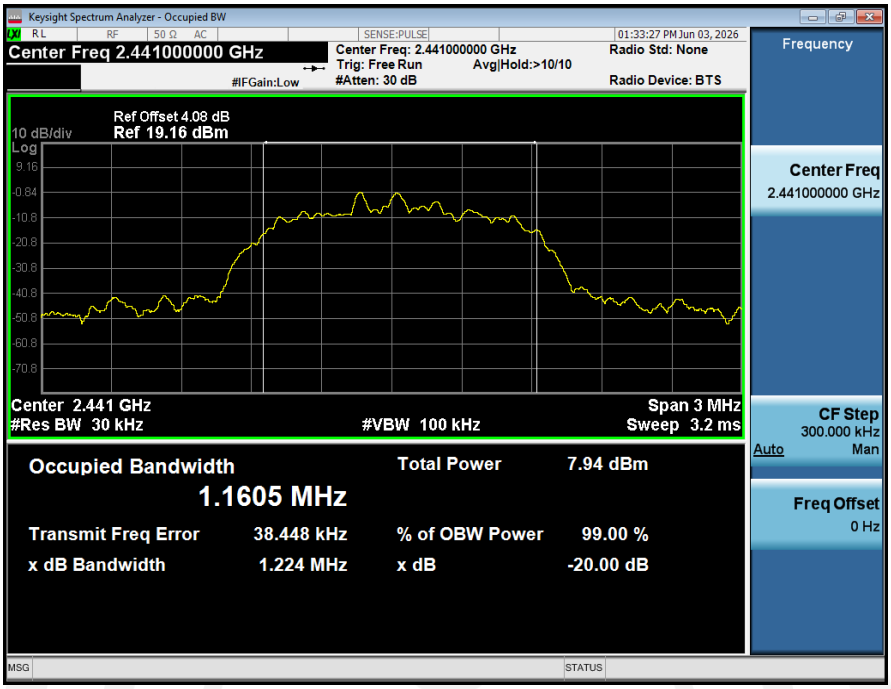
-20dB_Bandwidth_NVNT_ANT1_2-DH1_2480_00



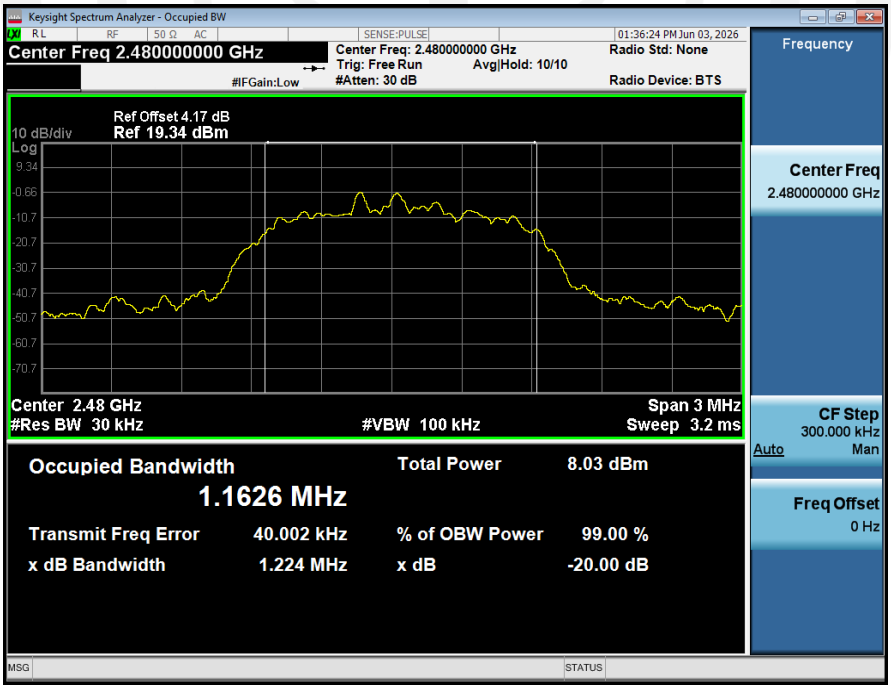
-20dB_Bandwidth_NVNT_ANT1_3-DH1_2402_00



-20dB_Bandwidth_NVNT_ANT1_3-DH1_2441_00

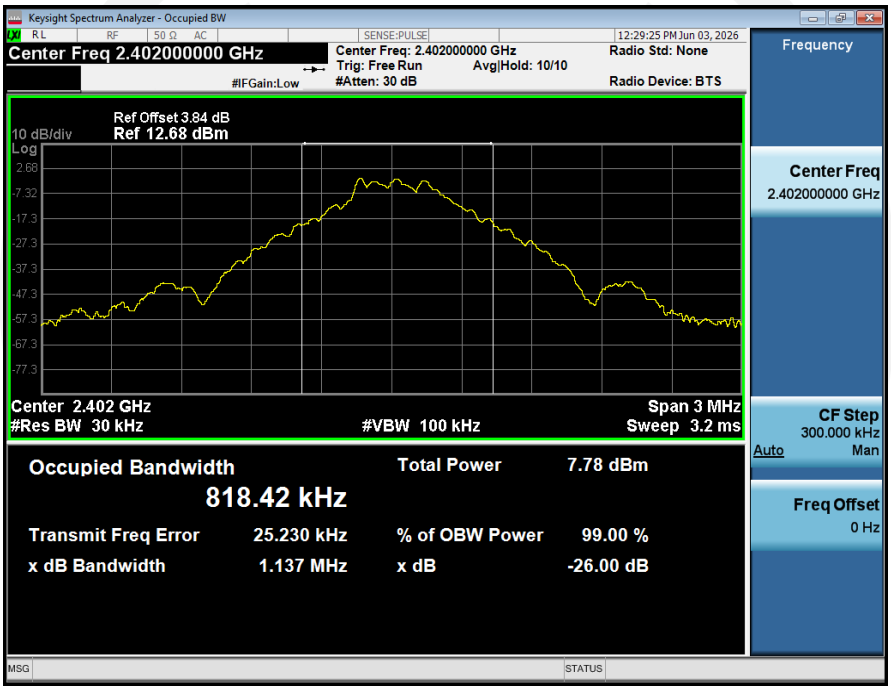


-20dB_Bandwidth_NVNT_ANT1_3-DH1_2480_00

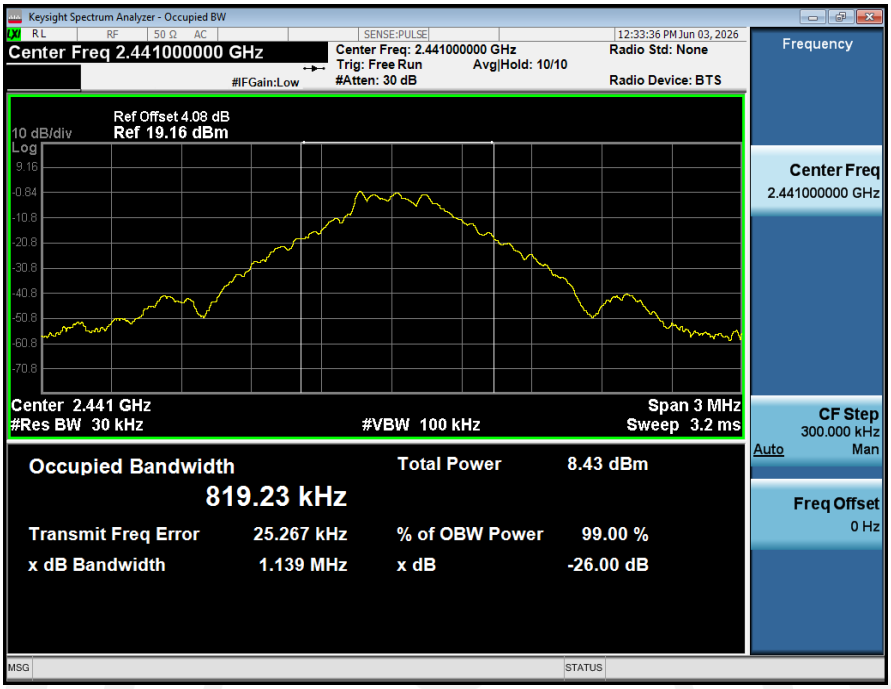


Condition	Antenna	Modulation	Frequency (MHz)	99%%BW(MHz)
NVNT	ANT1	1-DH1	2402.00	0.818
NVNT	ANT1	1-DH1	2441.00	0.819
NVNT	ANT1	1-DH1	2480.00	0.825
NVNT	ANT1	2-DH1	2402.00	1.165
NVNT	ANT1	2-DH1	2441.00	1.166
NVNT	ANT1	2-DH1	2480.00	1.169
NVNT	ANT1	3-DH1	2402.00	1.157
NVNT	ANT1	3-DH1	2441.00	1.160
NVNT	ANT1	3-DH1	2480.00	1.163

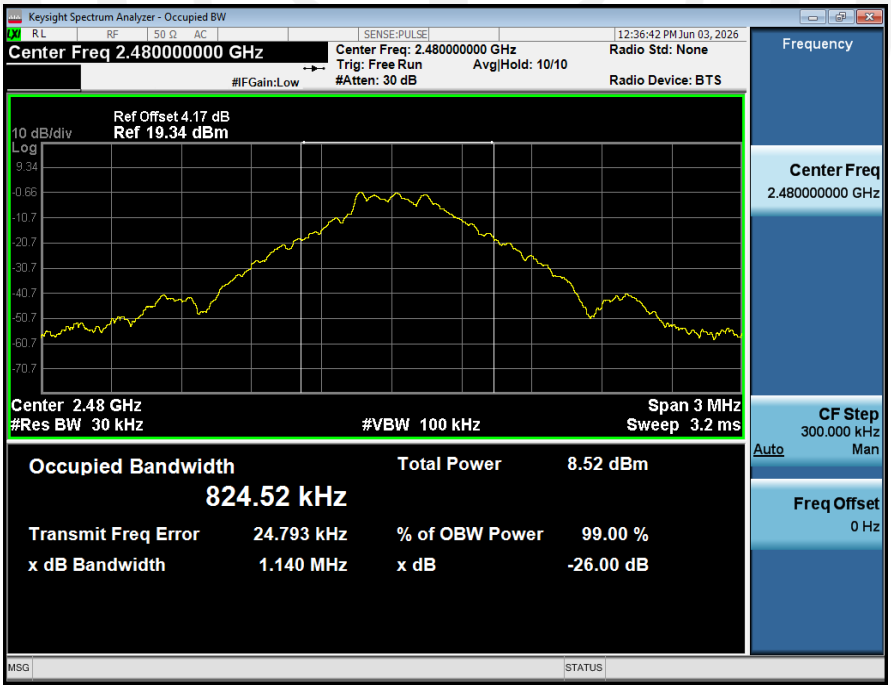
99%_Occupied_Bandwidth_NVNT_ANT1_1-DH1_2402_00



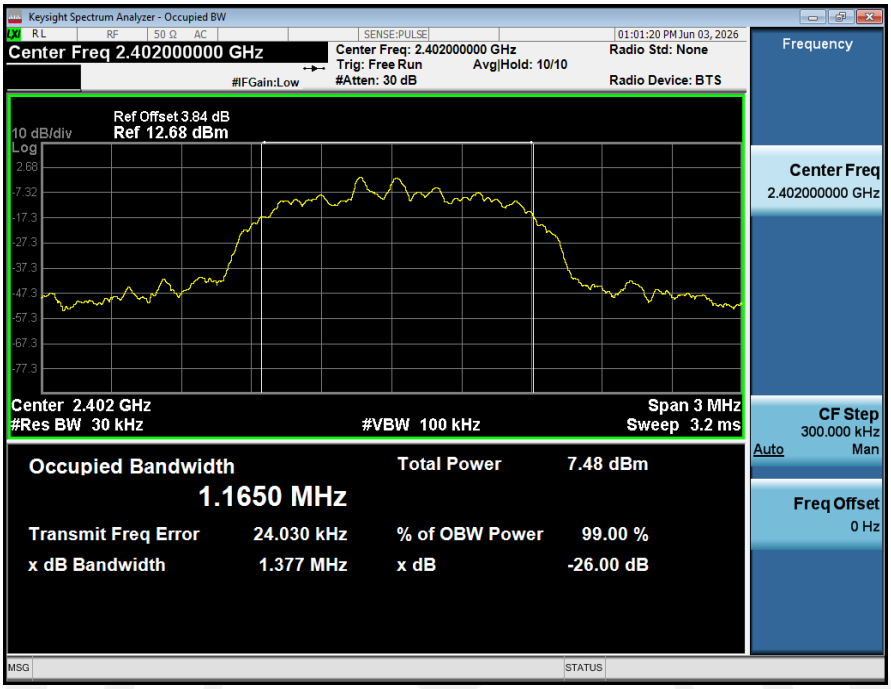
99%_Occupied_Bandwidth_NVNT_ANT1_1-DH1_2441_00



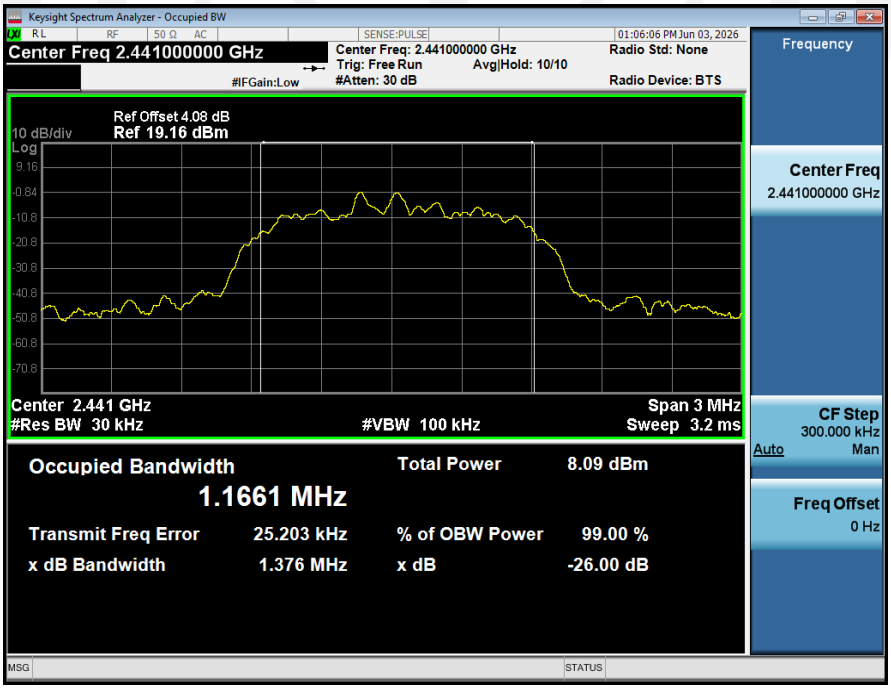
99%_Occupied_Bandwidth_NVNT_ANT1_1-DH1_2480_00



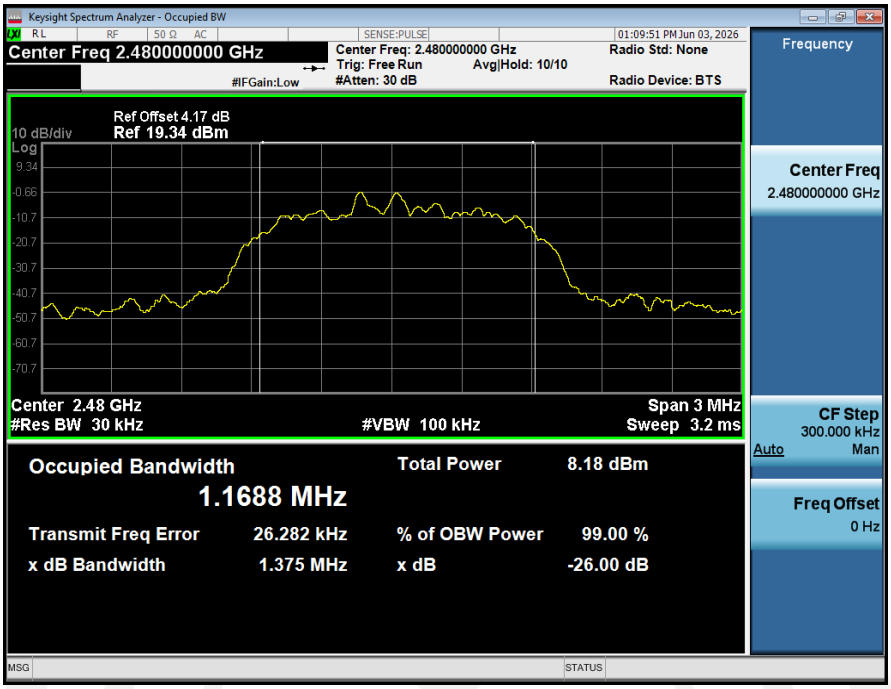
99%_Occupied_Bandwidth_NVNT_ANT1_2-DH1_2402_00



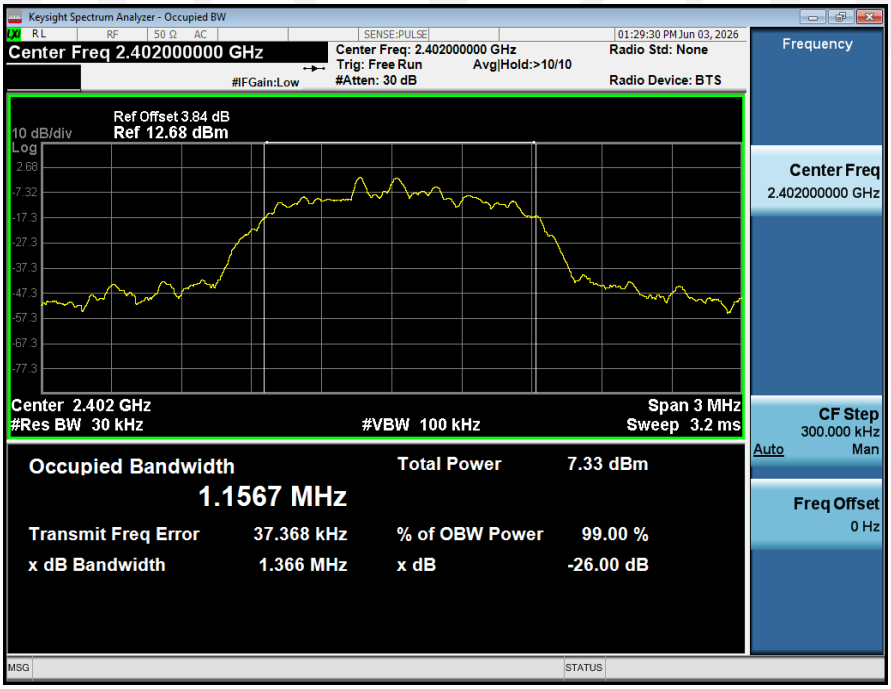
99%_Occupied_Bandwidth_NVNT_ANT1_2-DH1_2441_00



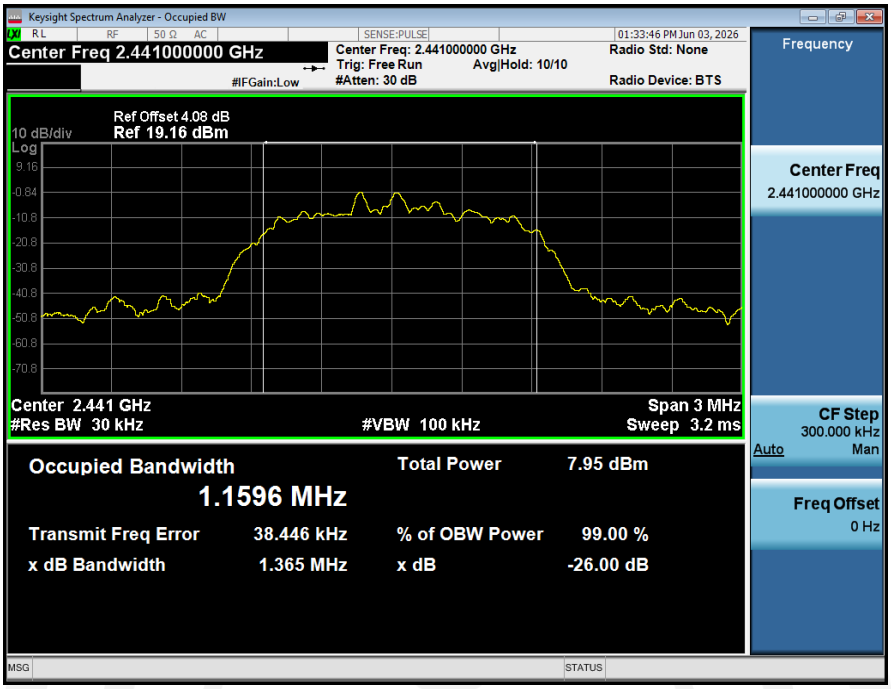
99%_Occupied_Bandwidth_NVNT_ANT1_2-DH1_2480_00



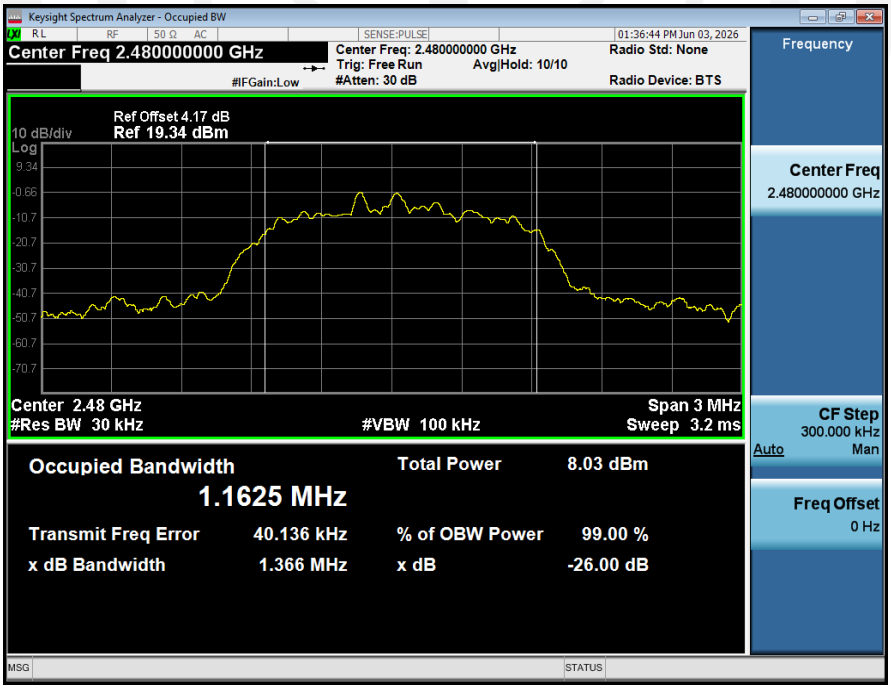
99%_Occupied_Bandwidth_NVNT_ANT1_3-DH1_2402_00



99%_Occupied_Bandwidth_NVNT_ANT1_3-DH1_2441_00



99%_Occupied_Bandwidth_NVNT_ANT1_3-DH1_2480_00



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 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.

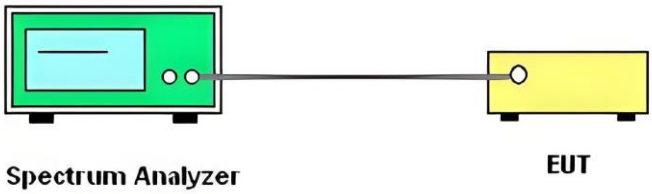
e) Detector function: Peak.

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.

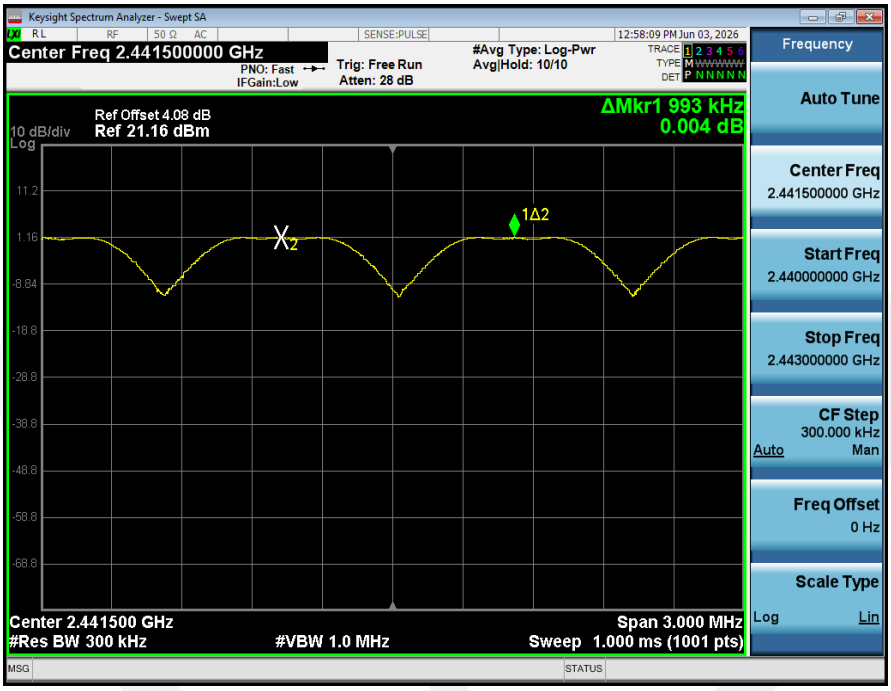
5.3. Test Setup



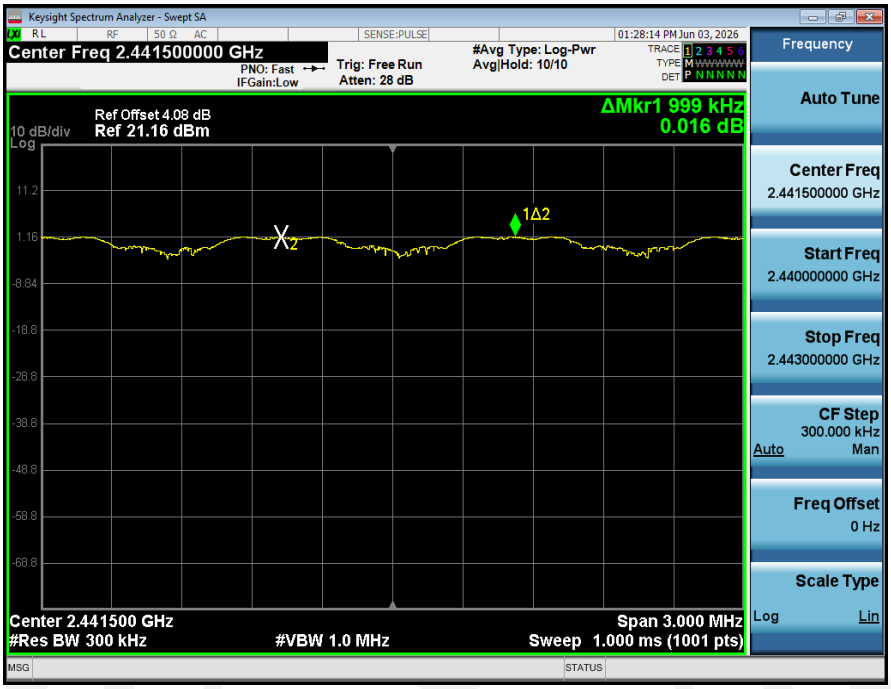
5.4. Test Result

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	2441.026	2442.019	0.99	0.876	Pass
NVNT	ANT1	2-DH1	2441.00	2441.023	2442.022	1.00	0.844	Pass
NVNT	ANT1	3-DH1	2441.00	2441.035	2442.025	0.99	0.816	Pass

Carrier_Frequencies_Separation_(Hopping)_NVNT_ANT1_1-DH1_Hopping



Carrier_Frequencies_Separation_(Hopping)_NVNT_ANT1_2-DH1_Hopping



Carrier_Frequencies_Separation_(Hopping)_NVNT_ANT1_3-DH1_Hopping

6. Number Of Hopping Channel

6.1. Limit

Frequency 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.

6.2. Test 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.

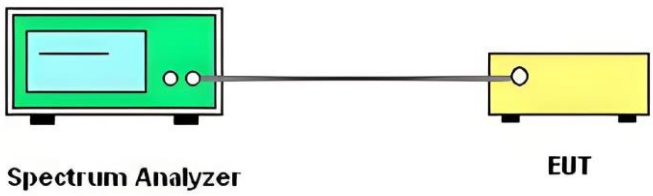
e) Detector function: Peak.

f) Trace: Max hold.

g) Allow the trace to stabilize.

It might prove necessary to break the span up into sub ranges 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.

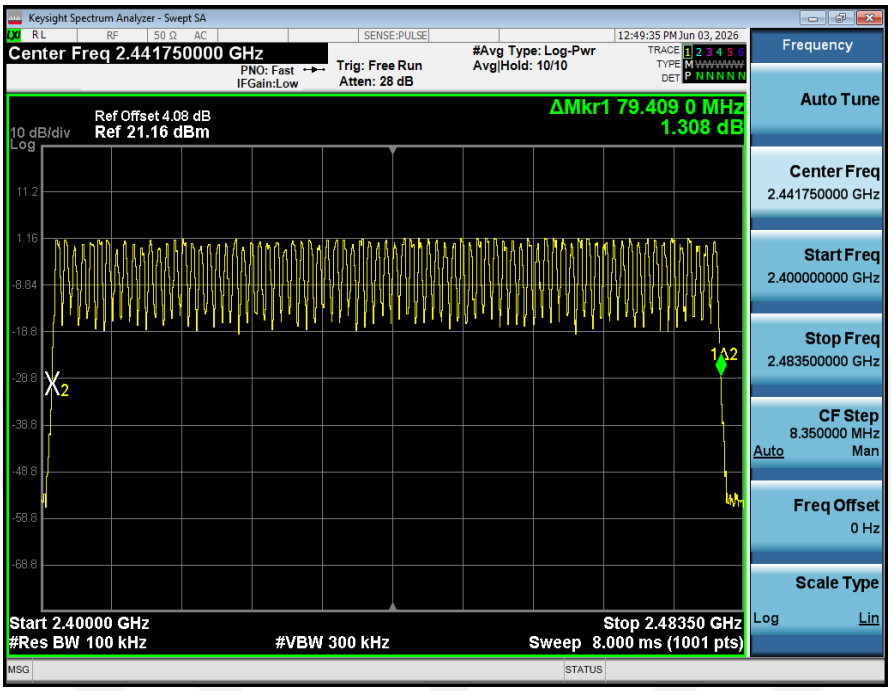
6.3. Test Setup



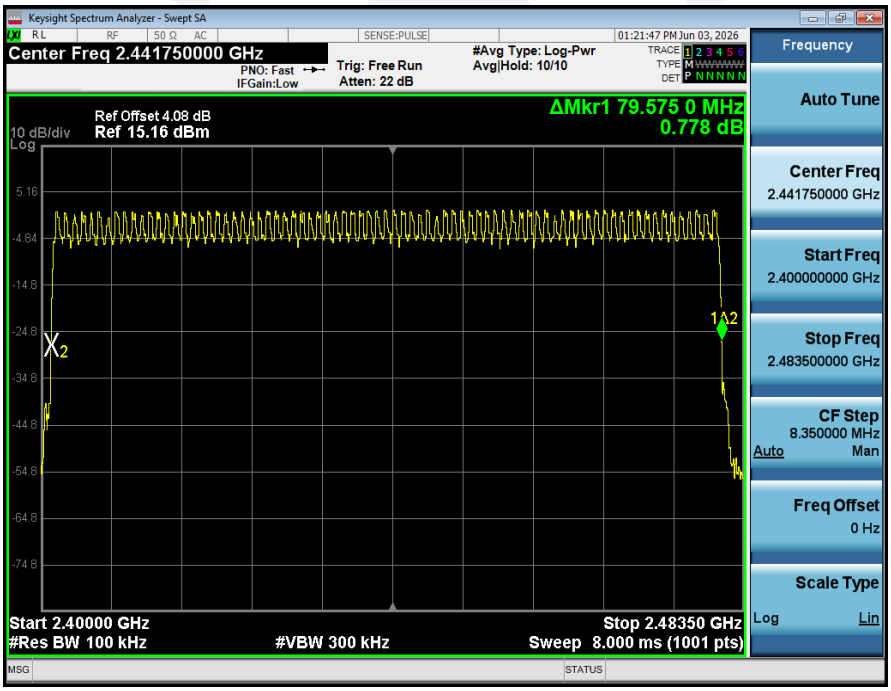
6.4. Test Result

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

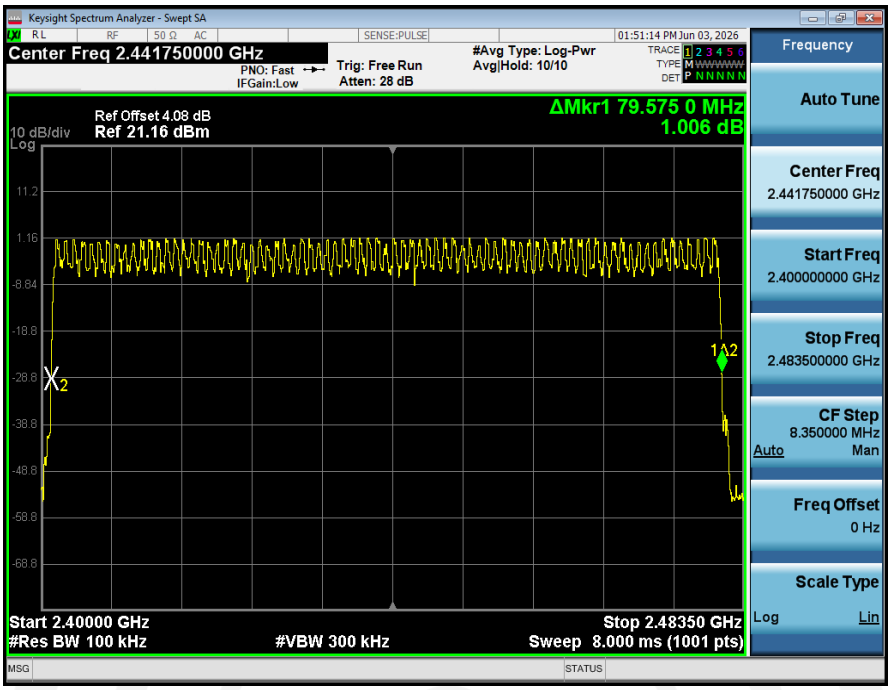
Number_of_Hopping_Channel_(Hopping)_NVNT_ANT1_1-DH1_Hopping



Number_of_Hopping_Channel_(Hopping)_NVNT_ANT1_2-DH1_Hopping



Number_of_Hopping_Channel_(Hopping)_NVNT_ANT1_3-DH1_Hopping



7. Dwell Time

7.1. Test limit

Frequency 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.

7.2. Test 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:

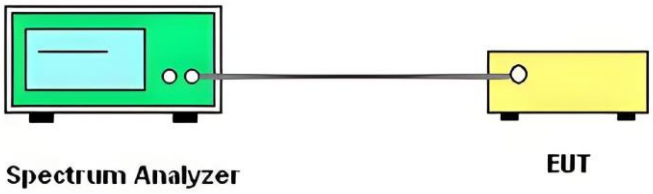
(Number of hops in the period specified in the requirements) =

(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.

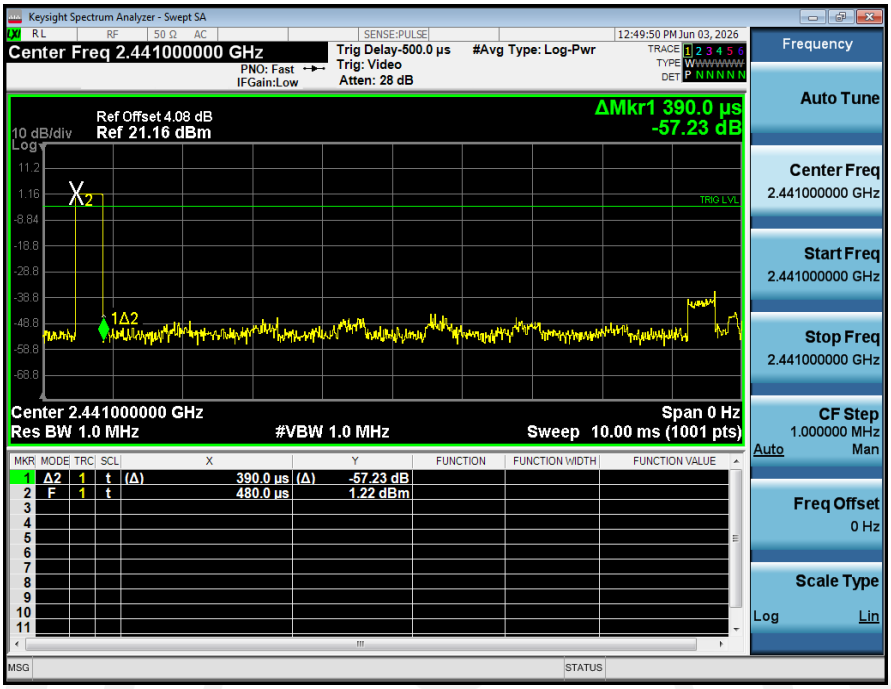
7.3. Test Setup



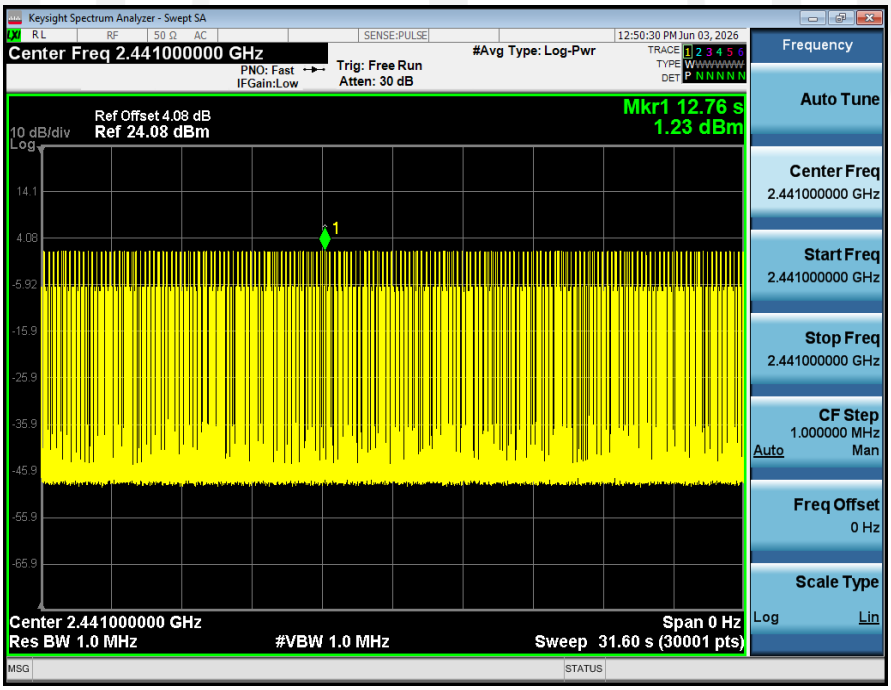
7.4. Test Result

Condition	Antenna	Packet Type	Pulse Time(ms)	Hops	Dwell Time(ms)	Limit(s)	Result
NVNT	ANT1	1-DH1	0.390	320.00	124.800	0.40	Pass
NVNT	ANT1	2-DH1	0.390	320.00	124.800	0.40	Pass
NVNT	ANT1	3-DH1	0.400	320.00	128.000	0.40	Pass
NVNT	ANT1	1-DH3	1.640	165.00	270.600	0.40	Pass
NVNT	ANT1	1-DH5	2.890	102.00	294.780	0.40	Pass
NVNT	ANT1	2-DH3	1.650	156.00	257.400	0.40	Pass
NVNT	ANT1	2-DH5	2.900	108.00	313.200	0.40	Pass
NVNT	ANT1	3-DH3	1.650	160.00	264.000	0.40	Pass
NVNT	ANT1	3-DH5	2.900	111.00	321.900	0.40	Pass

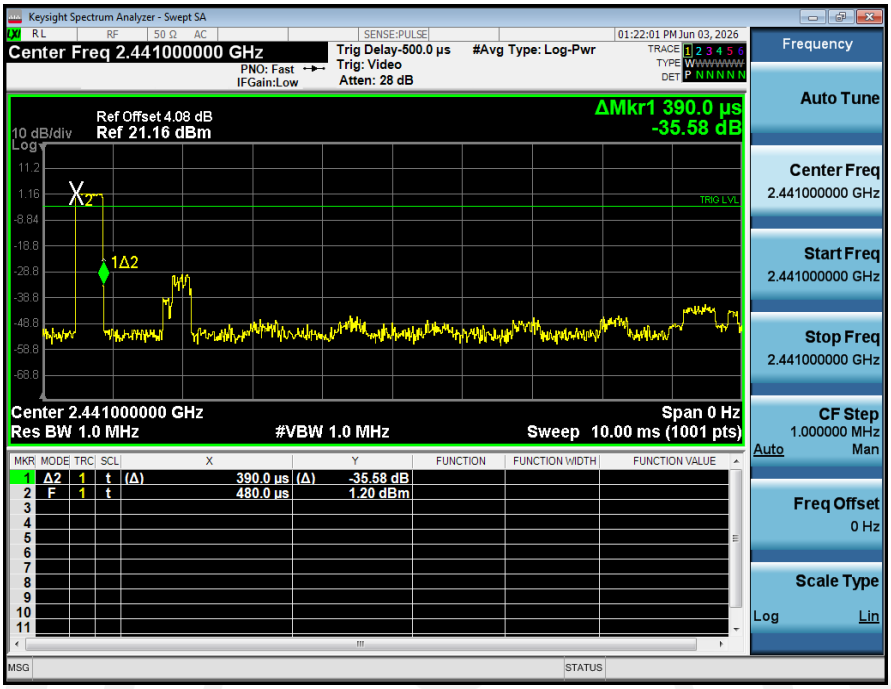
Dwell_Time_(Hopping)_NVNT_ANT1_1-DH1_2441_00_One_Burst_Time



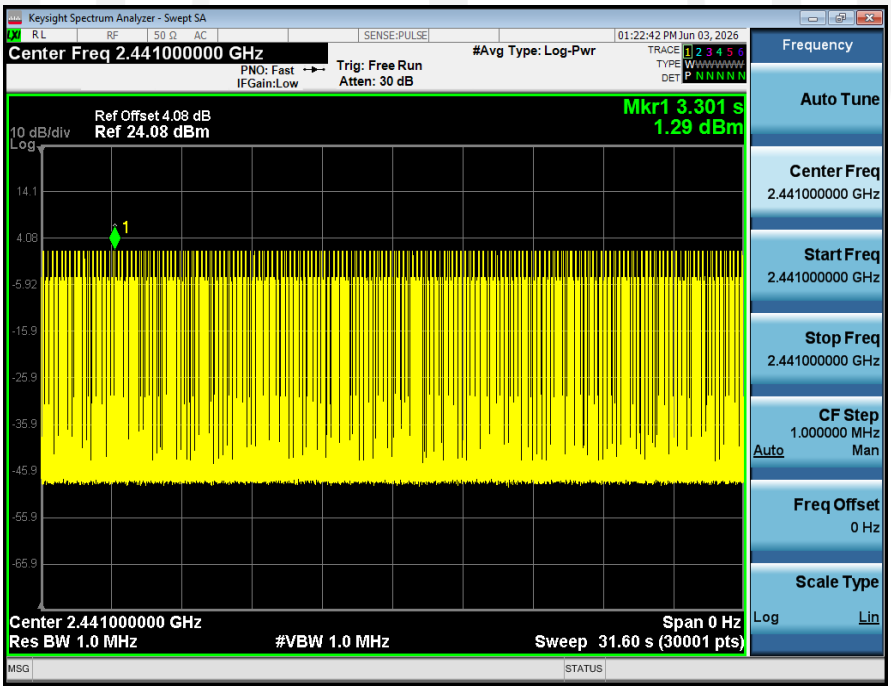
Dwell_Time_(Hopping)_NVNT_ANT1_1-DH1_2441_00_Accumulated



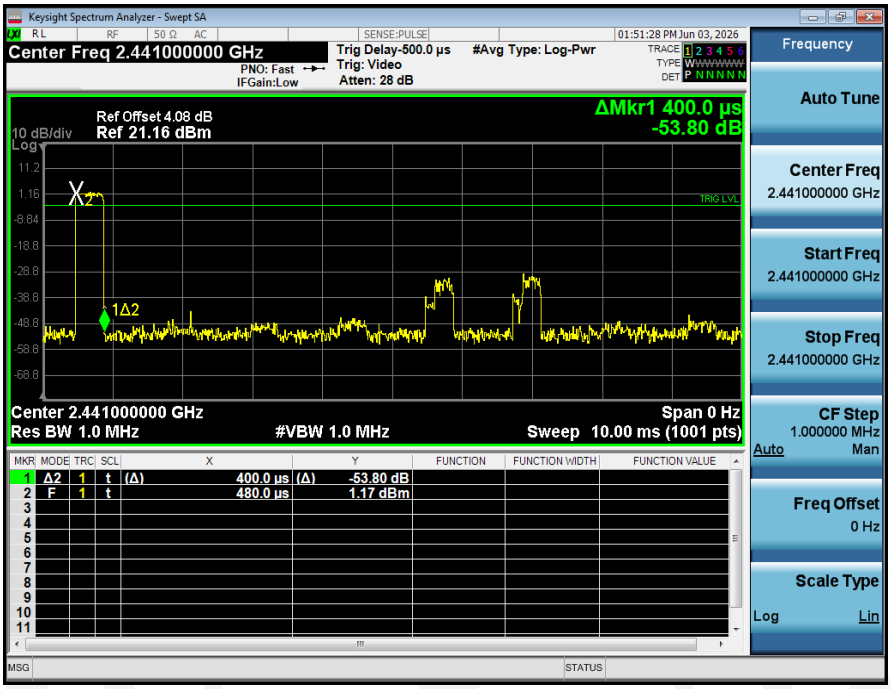
Dwell_Time_(Hopping)_NVNT_ANT1_2-DH1_2441_00_One_Burst_Time



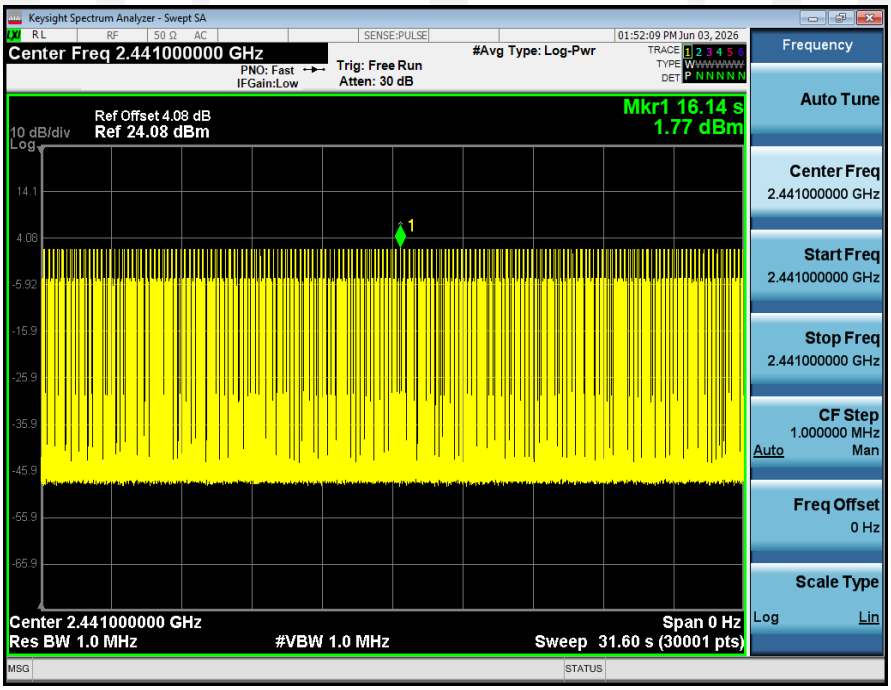
Dwell_Time_(Hopping)_NVNT_ANT1_2-DH1_2441_00_Accumulated



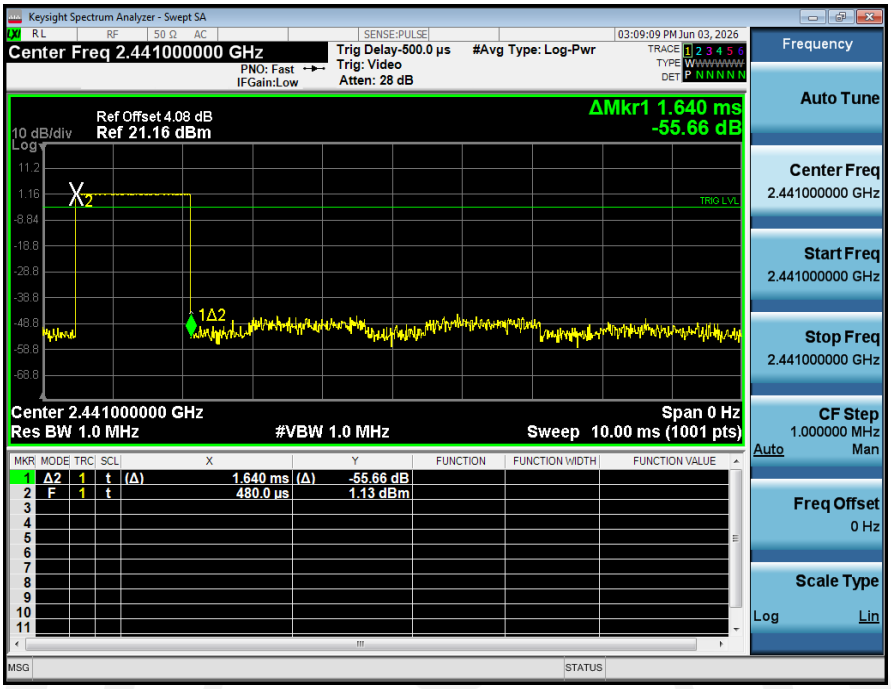
Dwell_Time_(Hopping)_NVNT_ANT1_3-DH1_2441_00_One_Burst_Time



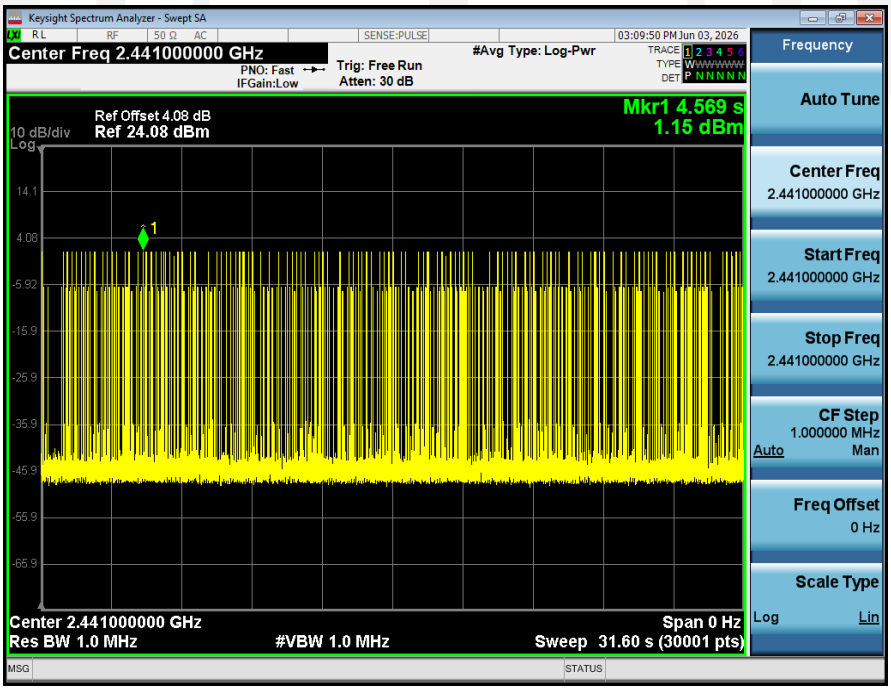
Dwell_Time_(Hopping)_NVNT_ANT1_3-DH1_2441_00_Accumulated



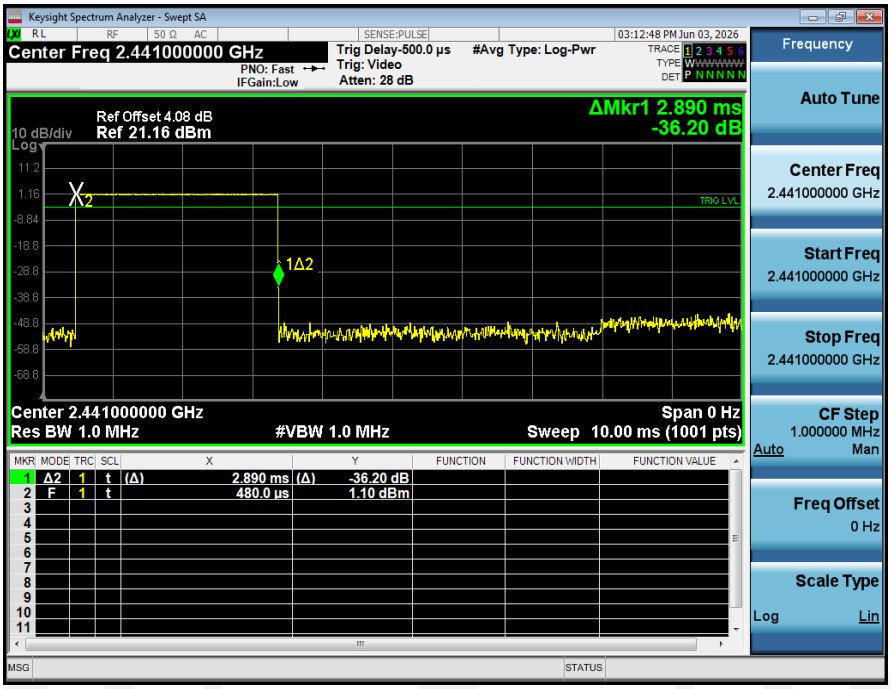
Dwell_Time_(Hopping)_NVNT_ANT1_1-DH3_2441_00_One_Burst_Time



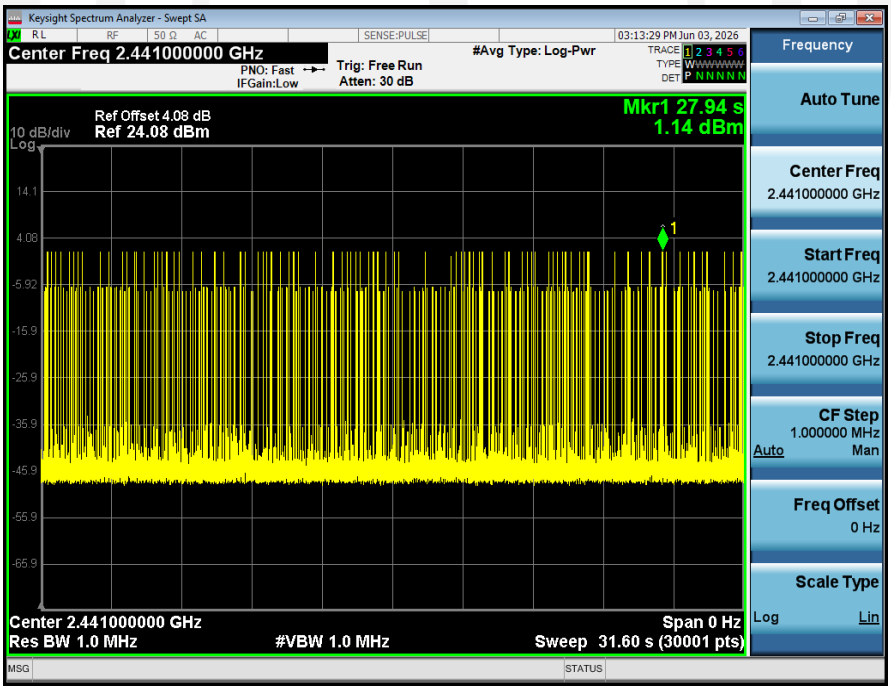
Dwell_Time_(Hopping)_NVNT_ANT1_1-DH3_2441_00_Accumulated



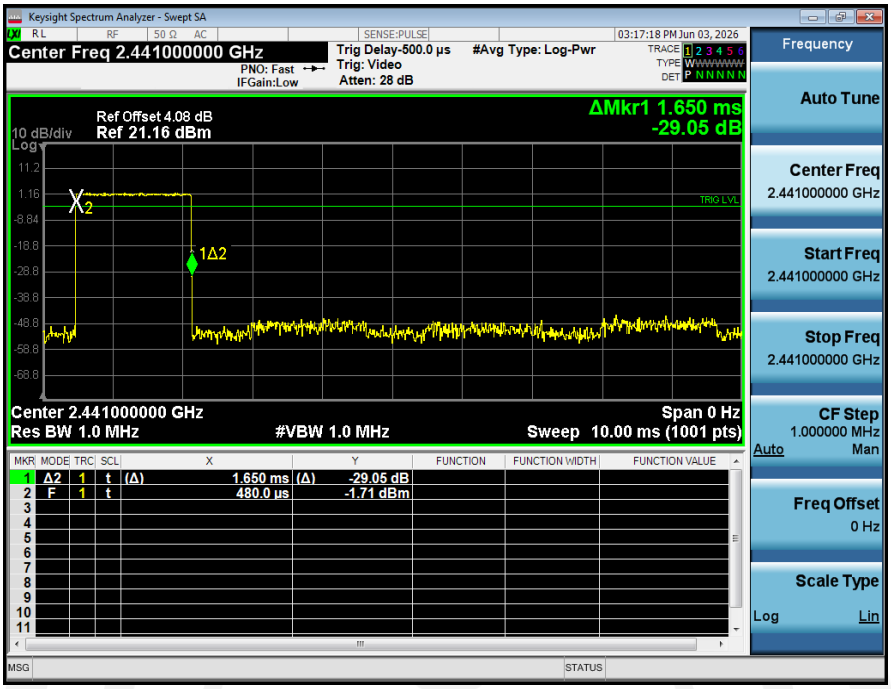
Dwell_Time_(Hopping)_NVNT_ANT1_1-DH5_2441_00_One_Burst_Time



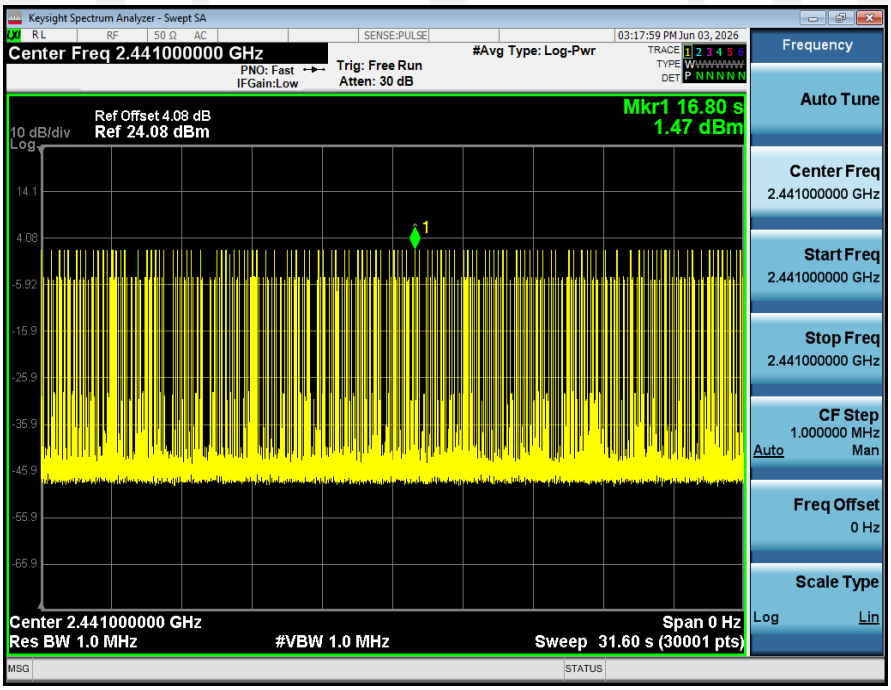
Dwell_Time_(Hopping)_NVNT_ANT1_1-DH5_2441_00_Accumulated



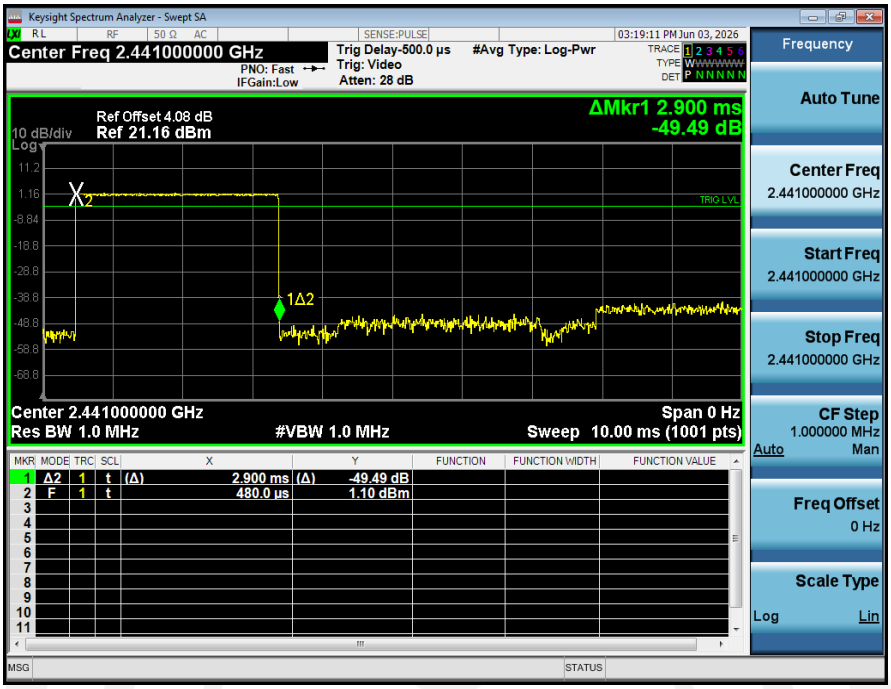
Dwell_Time_(Hopping)_NVNT_ANT1_2-DH3_2441_00_One_Burst_Time



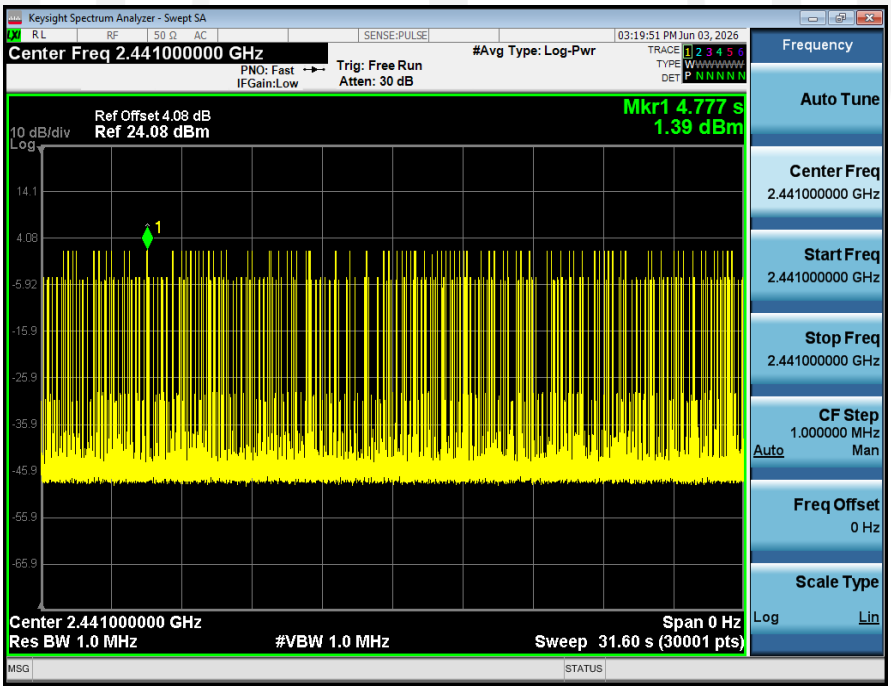
Dwell_Time_(Hopping)_NVNT_ANT1_2-DH3_2441_00_Accumulated



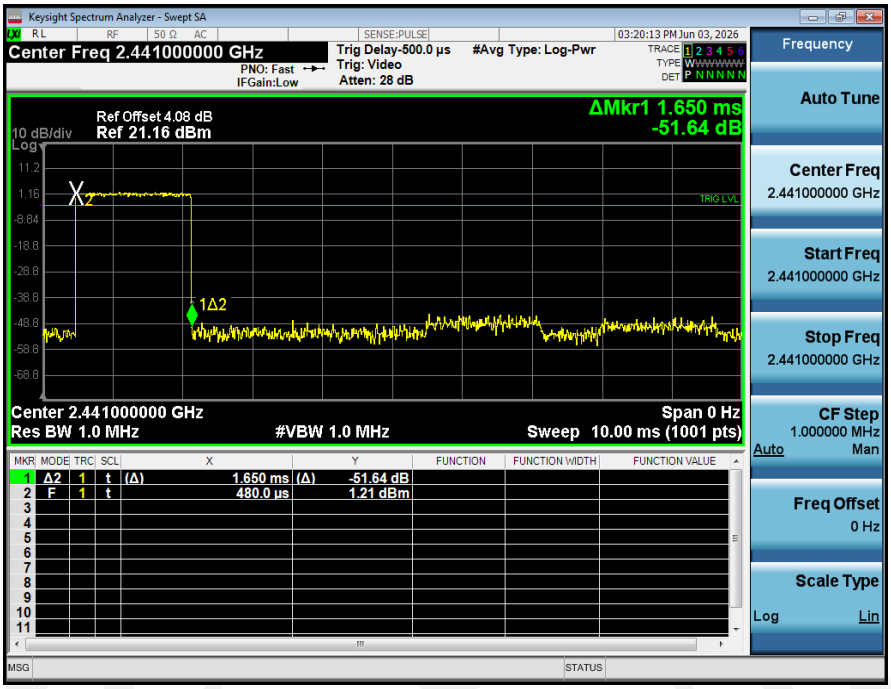
Dwell_Time_(Hopping)_NVNT_ANT1_2-DH5_2441_00_One_Burst_Time



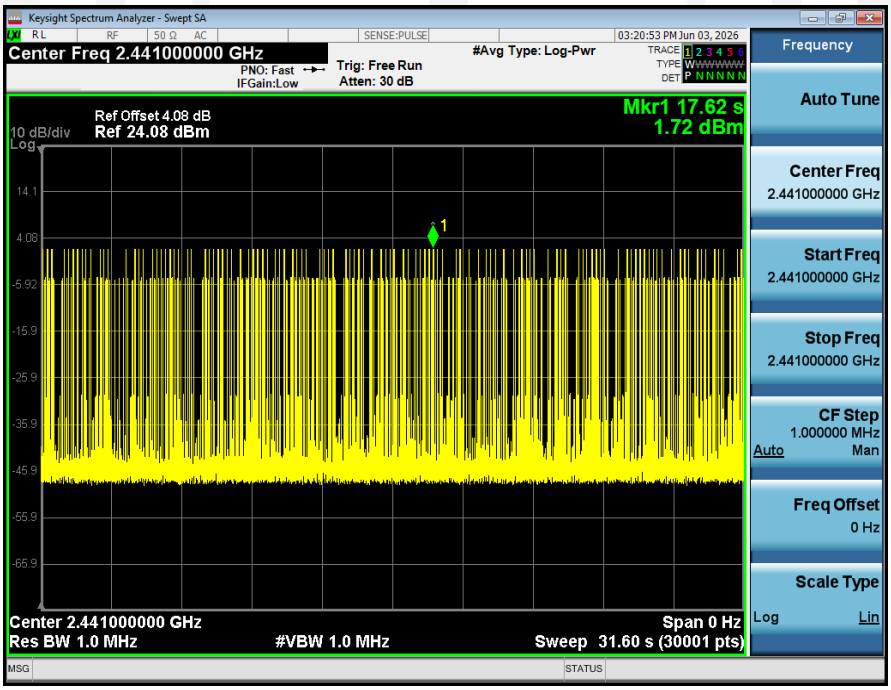
Dwell_Time_(Hopping)_NVNT_ANT1_2-DH5_2441_00_Accumulated



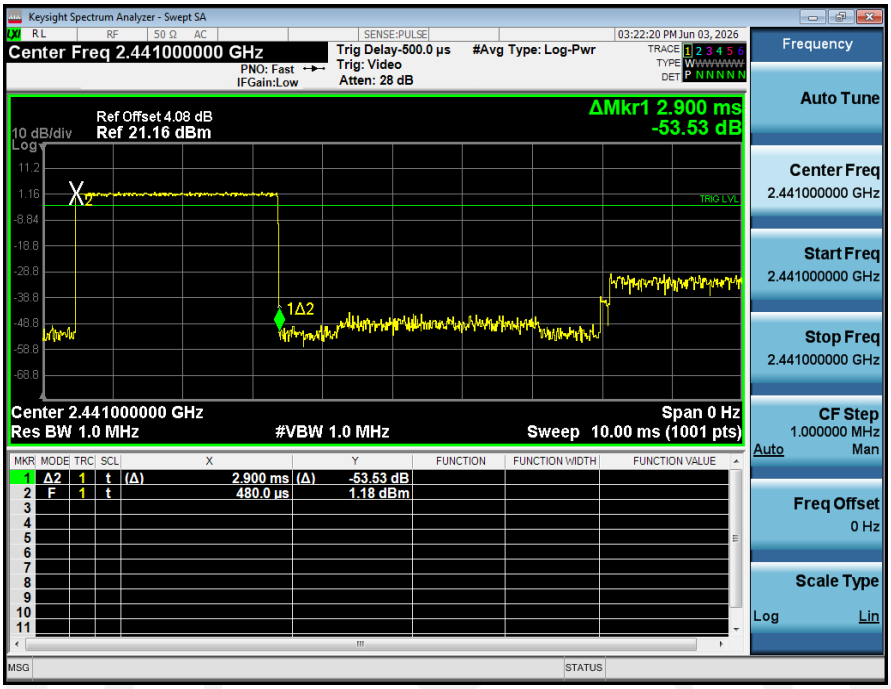
Dwell_Time_(Hopping)_NVNT_ANT1_3-DH3_2441_00_One_Burst_Time



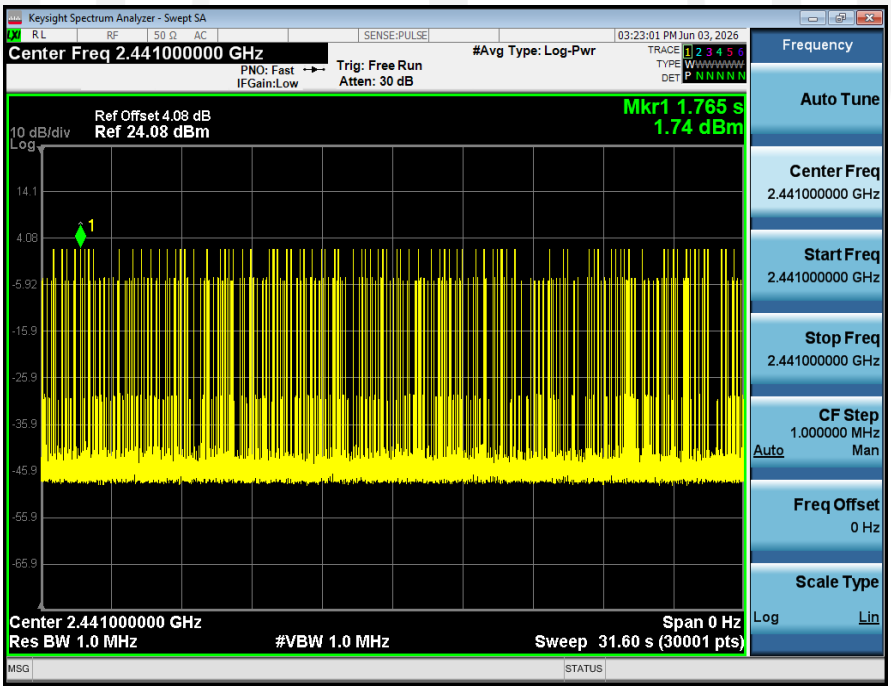
Dwell_Time_(Hopping)_NVNT_ANT1_3-DH3_2441_00_Accumulated



Dwell_Time_(Hopping)_NVNT_ANT1_3-DH5_2441_00_One_Burst_Time



Dwell_Time_(Hopping)_NVNT_ANT1_3-DH5_2441_00_Accumulated



8. Out-of-band Emissions

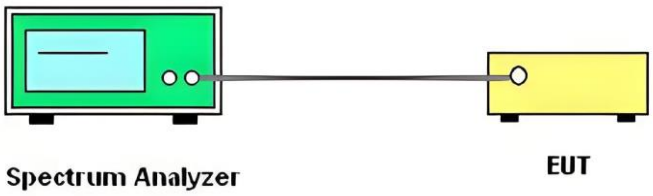
8.1. Test Limits

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 FCC Part 15.209(a) is not required.

8.2. Test 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.

8.3. Test Setup



8.4. Test Results

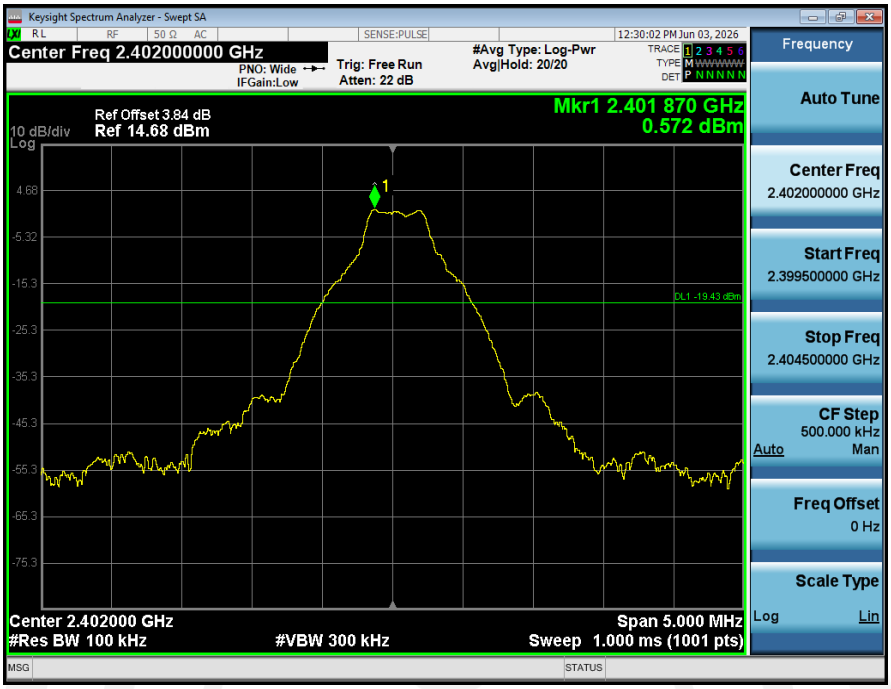
PASS.

The test results are listed in next pages.

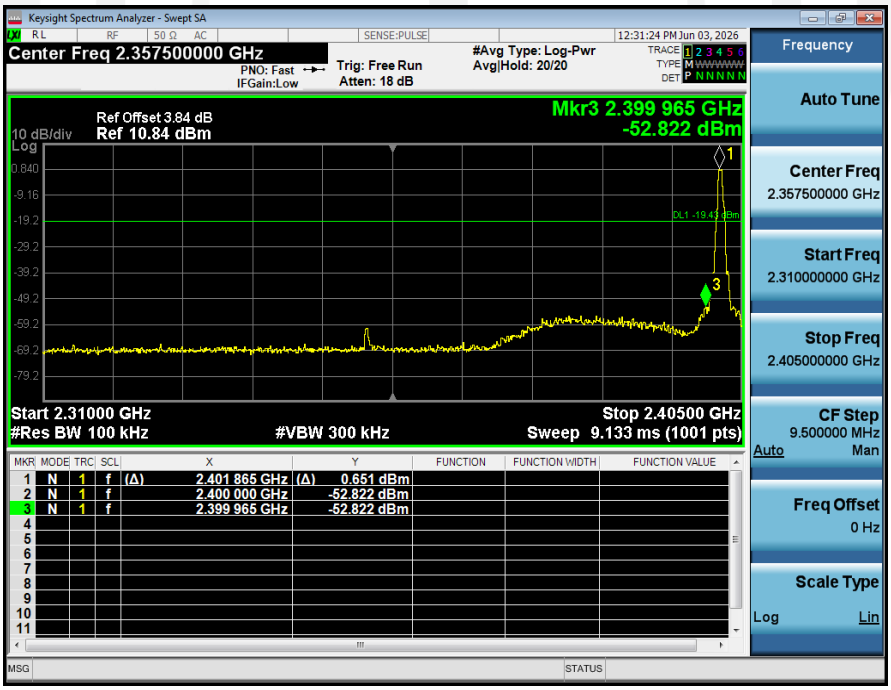
Band Edge: Pass

Condition	Antenna	Modulation	TX Mode	Ref_level(dBm)	Bandedge MAX.Value (dBm)	Limit(dBm)	Result
NVNT	ANT1	1-DH1	2402.00	0.572	-52.822	-19.428	Pass
NVNT	ANT1	1-DH1	Hopping_LCH	1.122	-55.598	-18.878	Pass
NVNT	ANT1	1-DH1	2480.00	1.345	-52.208	-18.655	Pass
NVNT	ANT1	1-DH1	Hopping_HCH	1.360	-52.293	-18.640	Pass
NVNT	ANT1	2-DH1	2402.00	0.503	-51.249	-19.497	Pass
NVNT	ANT1	2-DH1	Hopping_LCH	0.989	-54.402	-19.011	Pass
NVNT	ANT1	2-DH1	2480.00	1.253	-52.942	-18.747	Pass
NVNT	ANT1	2-DH1	Hopping_HCH	1.389	-53.393	-18.611	Pass
NVNT	ANT1	3-DH1	2402.00	0.494	-52.489	-19.506	Pass
NVNT	ANT1	3-DH1	Hopping_LCH	1.027	-52.544	-18.973	Pass
NVNT	ANT1	3-DH1	2480.00	1.255	-53.736	-18.745	Pass
NVNT	ANT1	3-DH1	Hopping_HCH	1.343	-52.669	-18.657	Pass

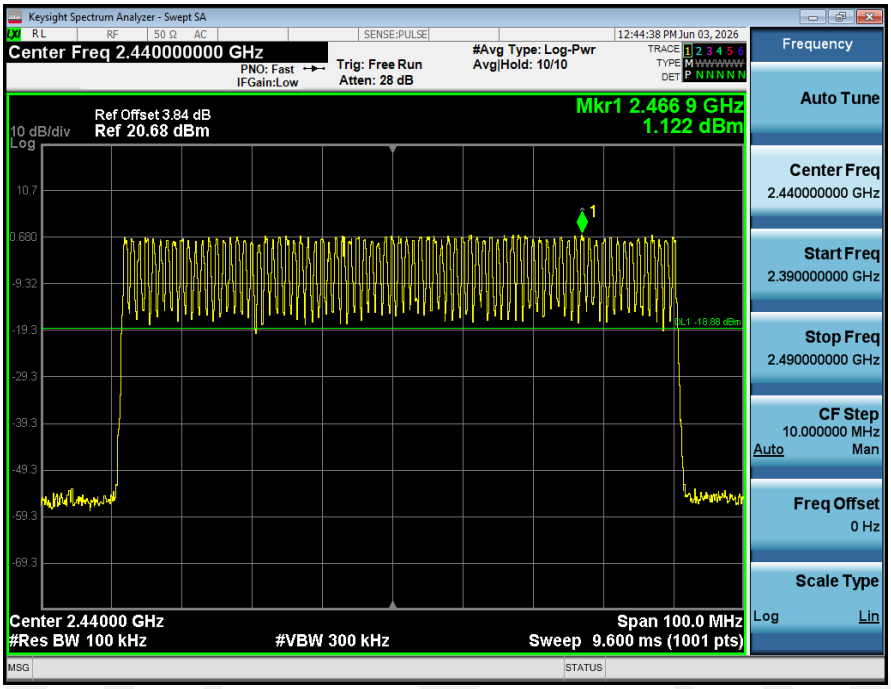
1_Reference_Level_NVNT_ANT1_1-DH1_2402_00



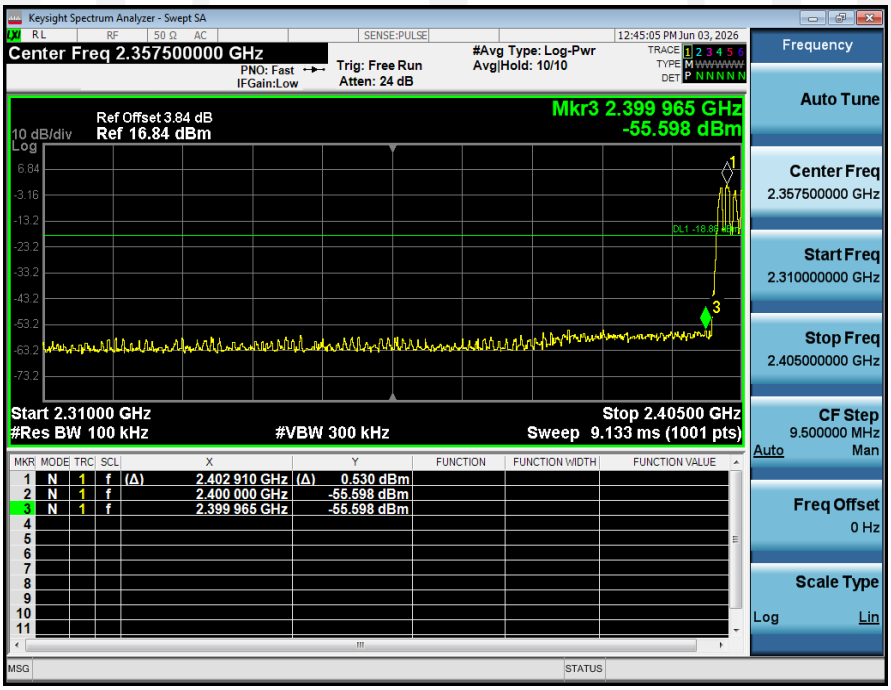
2_Bandedge_NVNT_ANT1_1-DH1_2402_00



1_Reference_Level_Hopping_NVNT_ANT1_1-DH1_Hopping

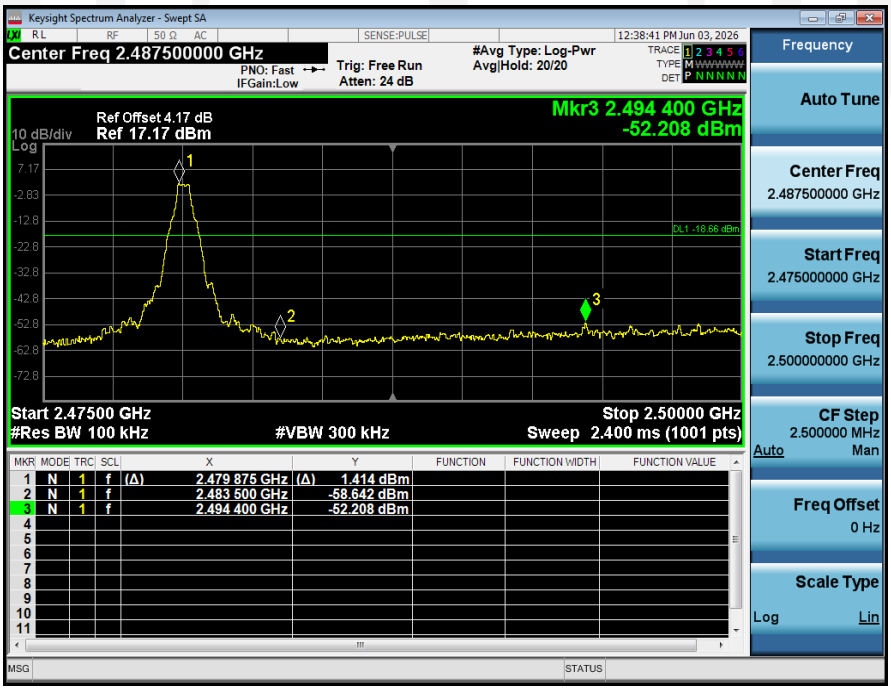


2_Band_Edge_(Hopping)_NVNT_ANT1_1-DH1_Hopping

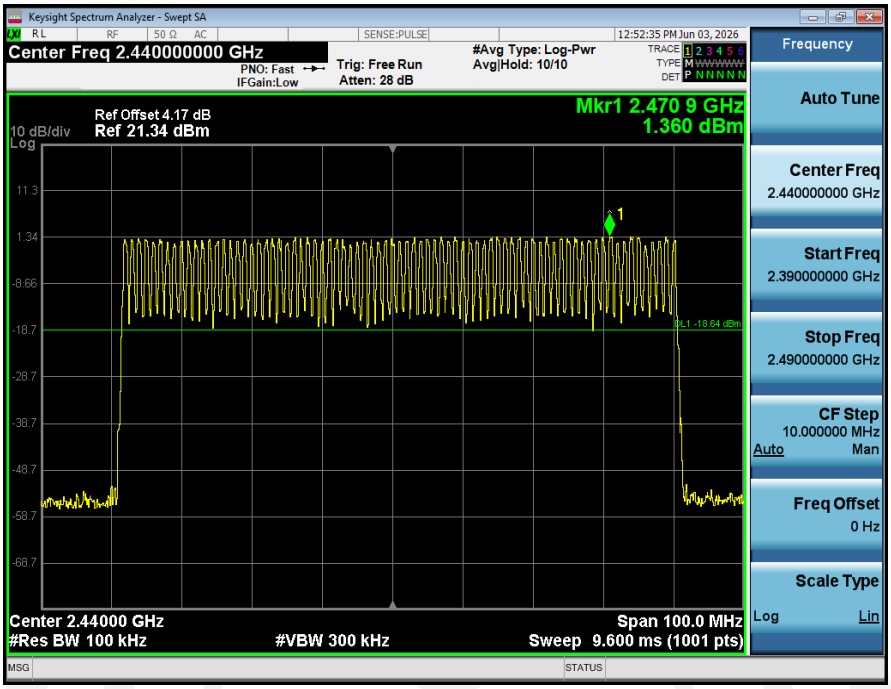


1_Reference_Level_NVNT_ANT1_1-DH1_2480_00

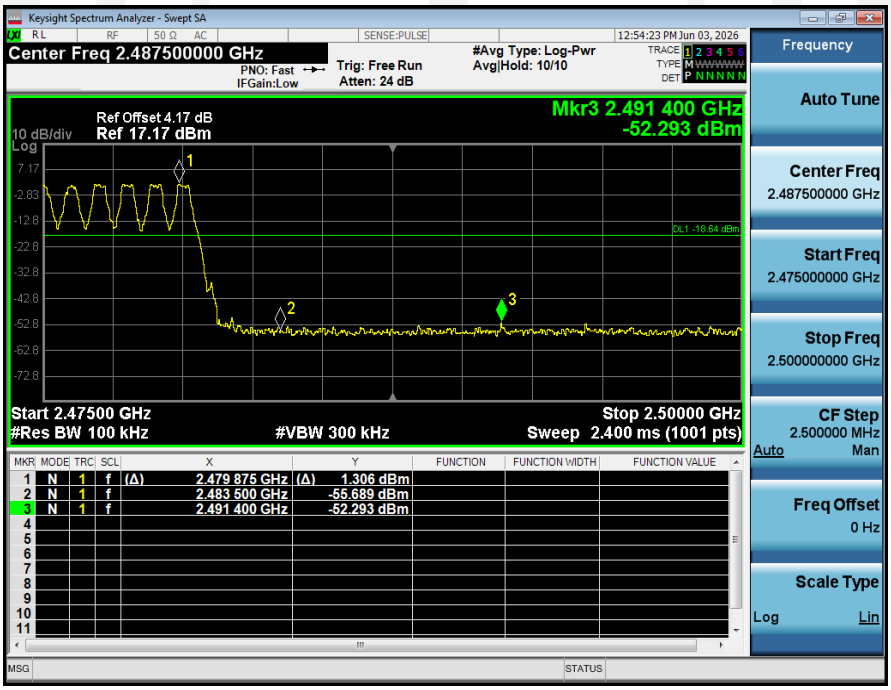
2_Bandedge_NVNT_ANT1_1-DH1_2480_00



1_Reference_Level_Hopping_NVNT_ANT1_1-DH1_Hopping

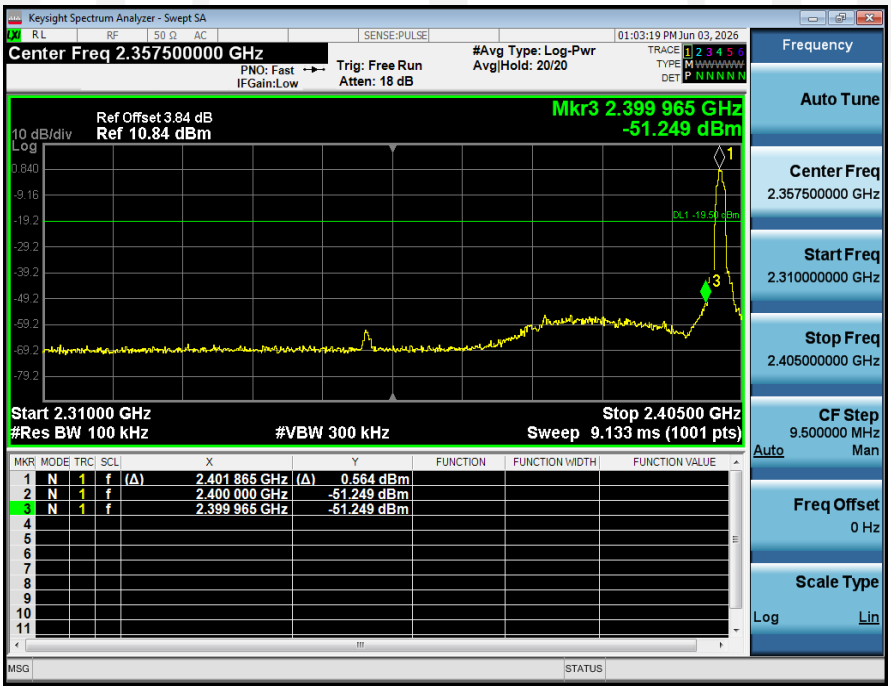


2_Band_Edge_(Hopping)_NVNT_ANT1_1-DH1_Hopping

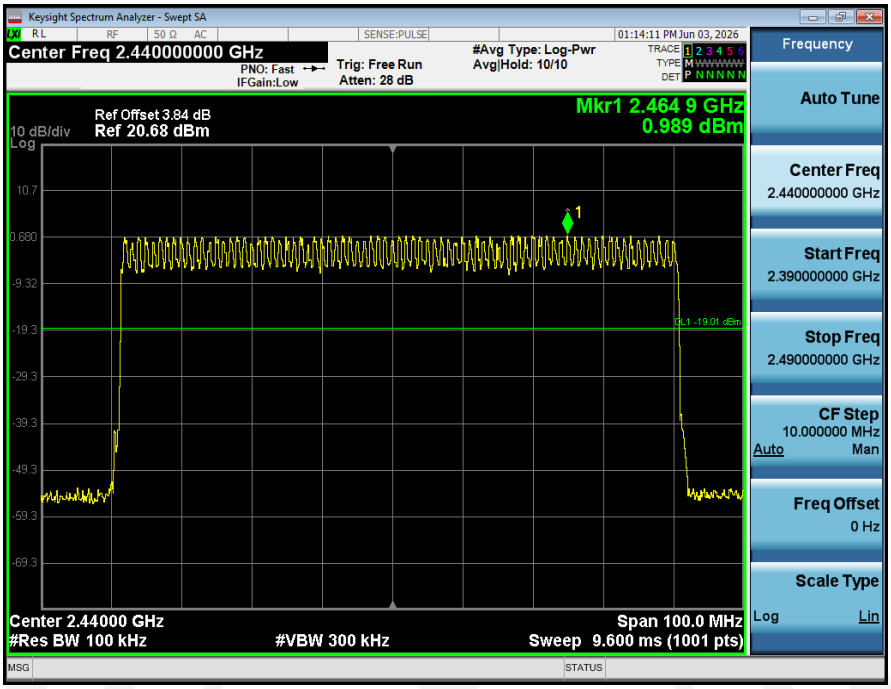


1_Reference_Level_NVNT_ANT1_2-DH1_2402_00

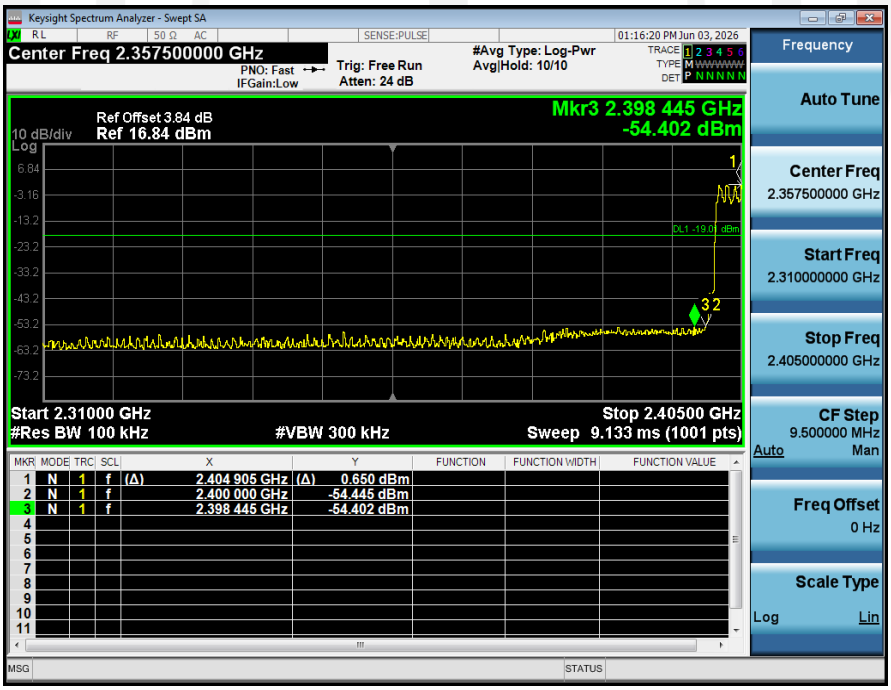
2_Bandedge_NVNT_ANT1_2-DH1_2402_00



1_Reference_Level_Hopping_NVNT_ANT1_2-DH1_Hopping

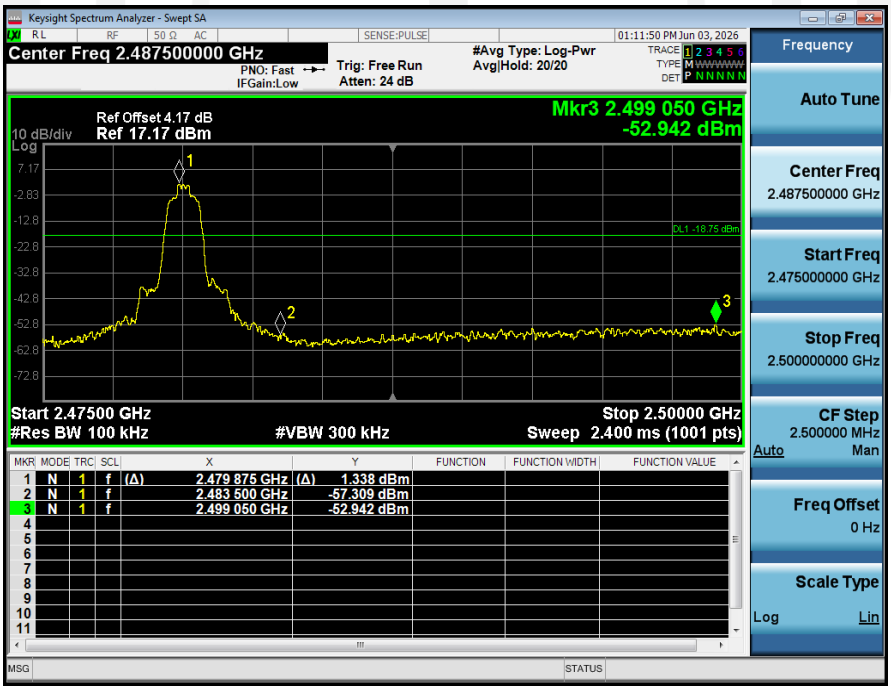


2_Band_Edge_(Hopping)_NVNT_ANT1_2-DH1_Hopping

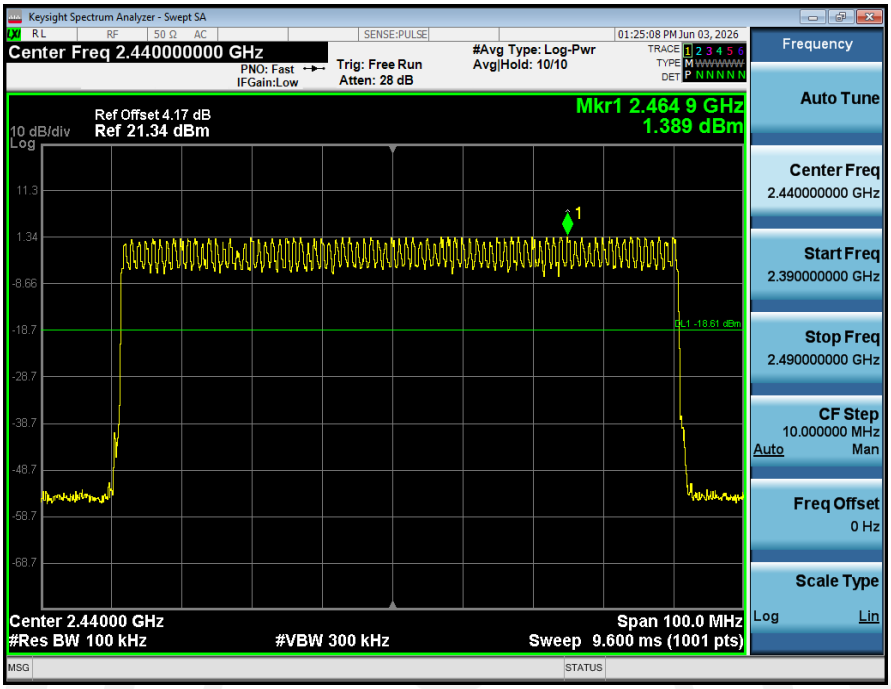


1_Reference_Level_NVNT_ANT1_2-DH1_2480_00

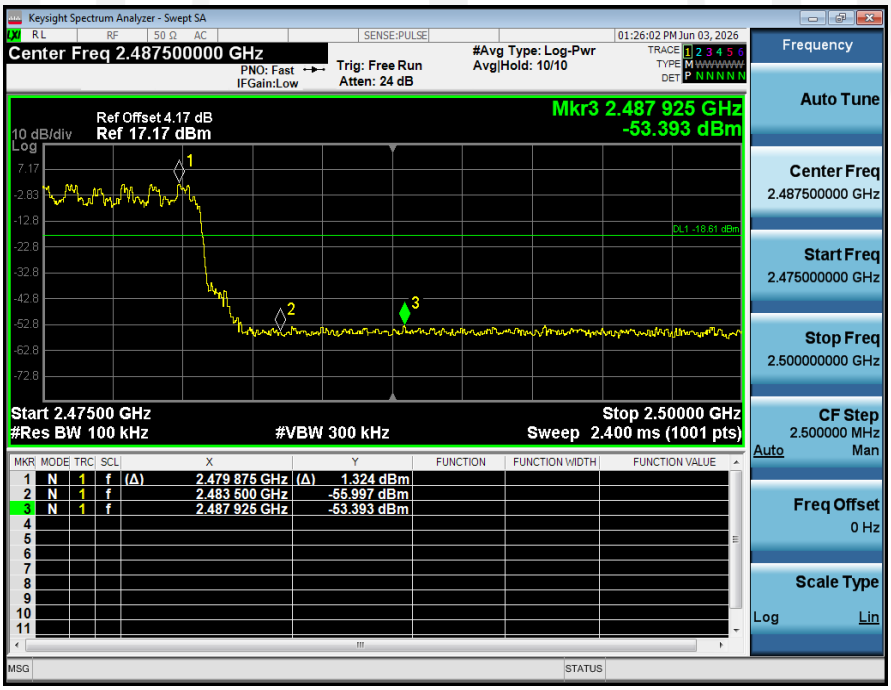
2_Bandedge_NVNT_ANT1_2-DH1_2480_00



1_Reference_Level_Hopping_NVNT_ANT1_2-DH1_Hopping

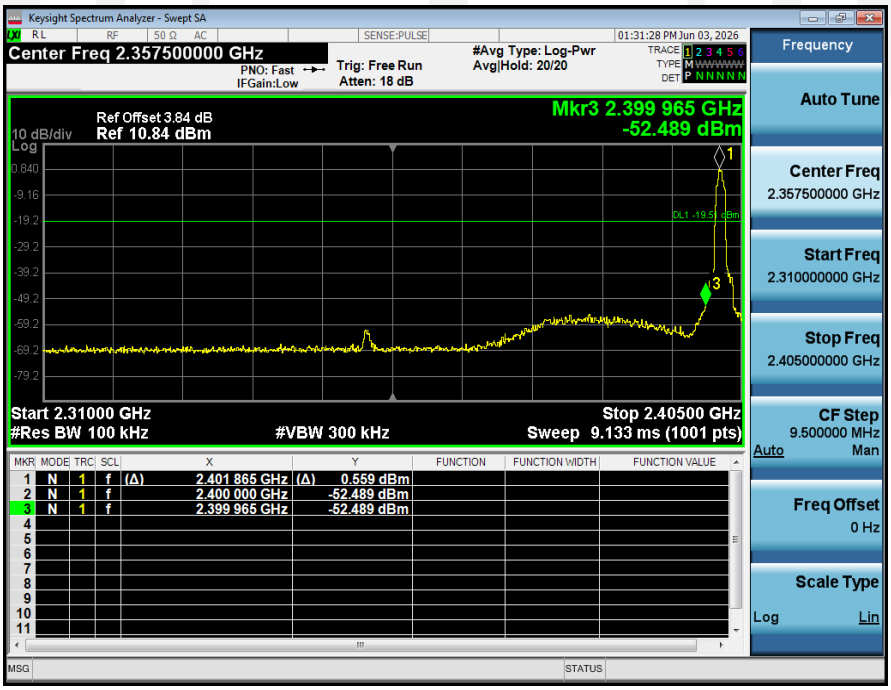


2_Band_Edge_(Hopping)_NVNT_ANT1_2-DH1_Hopping

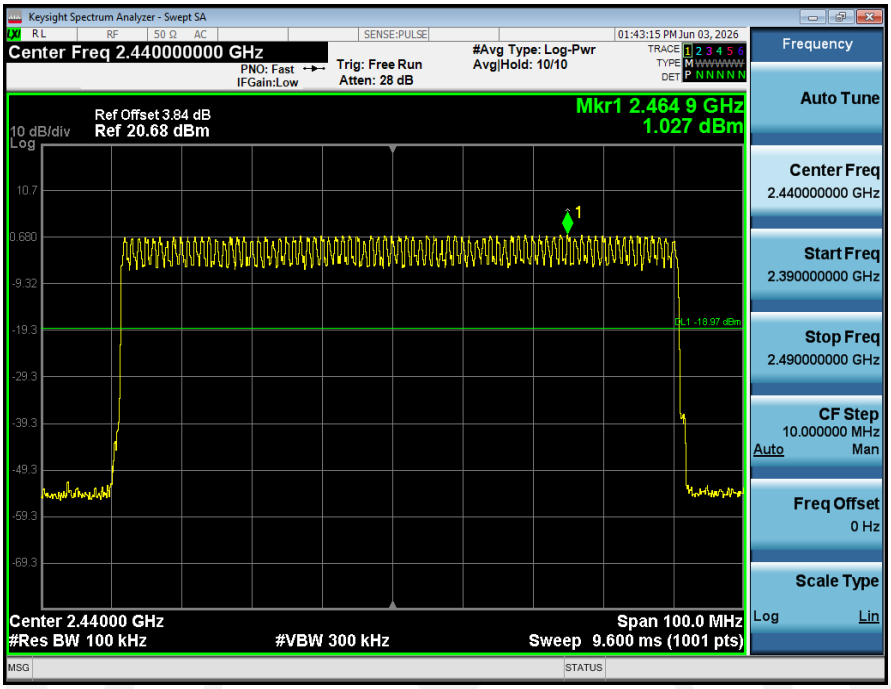
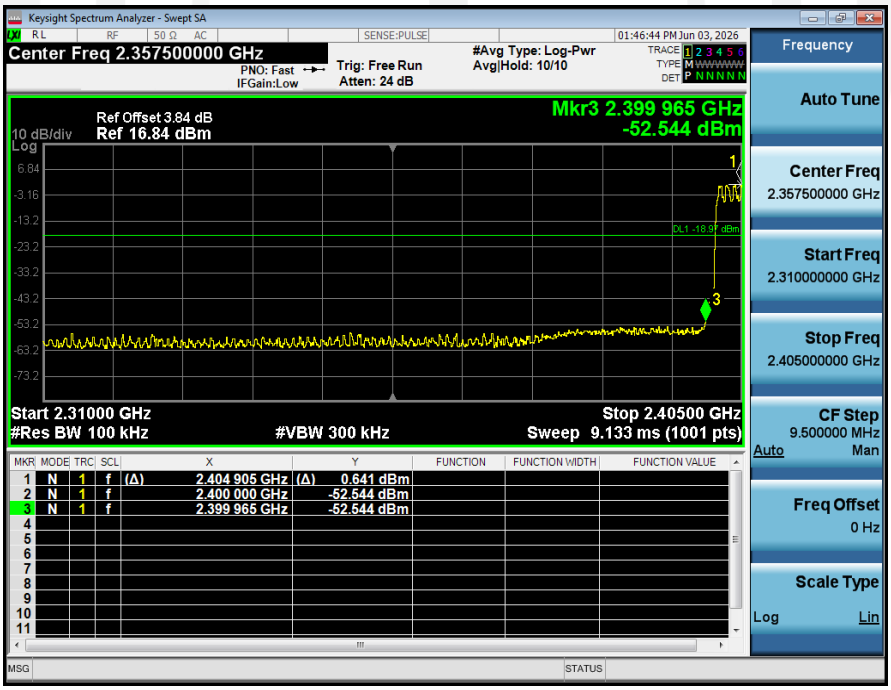


1_Reference_Level_NVNT_ANT1_3-DH1_2402_00

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