



FCC TEST REPORT

FCC ID: 2BWH7-TG461

On Behalf of

SHENZHEN BORUN EDUCATION TECHNOLOGY CO., LTD.

Bluetooth speaker

Model No.: TG461

Prepared for : SHENZHEN BORUN EDUCATION TECHNOLOGY CO., LTD.
1407, HOWELL TECHNOLOGY BUILDING, NO. 2, KEJI SOUTH
Address : 8TH ROAD, GAOXINDISTRICT COMMUNITY, YUEHAI STREET.
NANSHAN DISTRICT. SHENZHEN

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

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TEST REPORT DECLARATION

Applicant : SHENZHEN BORUN EDUCATION TECHNOLOGY CO., LTD.
1407, HOWELL TECHNOLOGY BUILDING, NO. 2, KEJI SOUTH 8TH ROAD,
Address : GAOXINDISTRICT COMMUNITY, YUEHAI STREET. NANSHAN DISTRICT.
SHENZHEN
Manufacturer : Shenzhen chengtai electronic and technology co.,LTD
6th Floor, Building C, Qinyu Industrial Zone, Sanwei, Sanwei Community,
Address : Hangcheng Street, Baoan District, Shenzhen
EUT Description : Bluetooth speaker
(A) Model No. : TG461
(B) Trademark : T&G

Measurement Standard Used:

FCC Rules and Regulations Part 15 Subpart C Section 15.247

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 

Approved by (name + signature).....: Simple Guan
Project Manager 

Date of issue.....: September 3, 2026

Revision History

Revision	Issue Date	Revisions	Revised By
V0	September 3, 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+C63.10a-2024 + Errata to C63.10a-2024	P
Bandwidth	FCC Part 15: 15.215(c), ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024	P
Carrier Frequency Separation	FCC Part 15: 15.247(a)(1), ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024	P
Number Of Hopping Channel	FCC Part 15: 15.247(a)(1)(iii), ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024	P
Dwell Time	FCC Part 15: 15.247(a)(1)(iii), ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024	P
Radiated Spurious Emission	FCC Part 15: 15.209, FCC Part 15: 15.247(d), ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024	P
Out-of-band Emissions	FCC Part 15: 15.247(d), ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024	P
Radiated Band Edge Emission	FCC Part 15: 15.247(d), ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024	P
Power Line Conducted Emissions	FCC Part 15: 15.207(a), ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024	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. : TG461
Diff : N/A
Power supply : DC 5V from adapter, DC 3.7V from battery.

Radio Technology : Bluetooth V5.3 EDR
Operation frequency : 2402-2480MHz
Channel No. : 79 channels
Channel Separation : 1MHz
Modulation : GFSK, $\pi/4$ -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

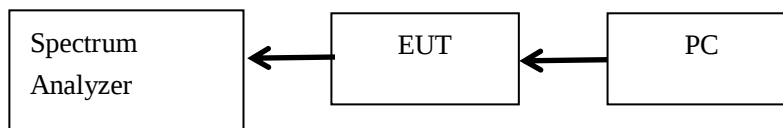
Spurious Emission



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	FCC_assist_1.0.2.2.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_EMG	Farad		PSI-3A1			
CE	EZ_EMG	Farad		PSI-3A1			
RF	RTS	TACHOY		V1.0.0			

3. Maximum Peak Output Power

3.1. Limit

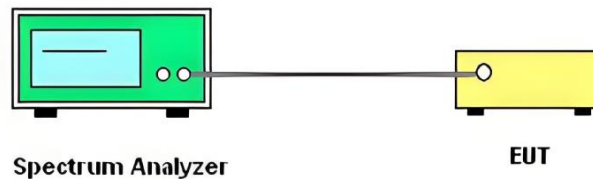
For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.

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 $\geq$ 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.

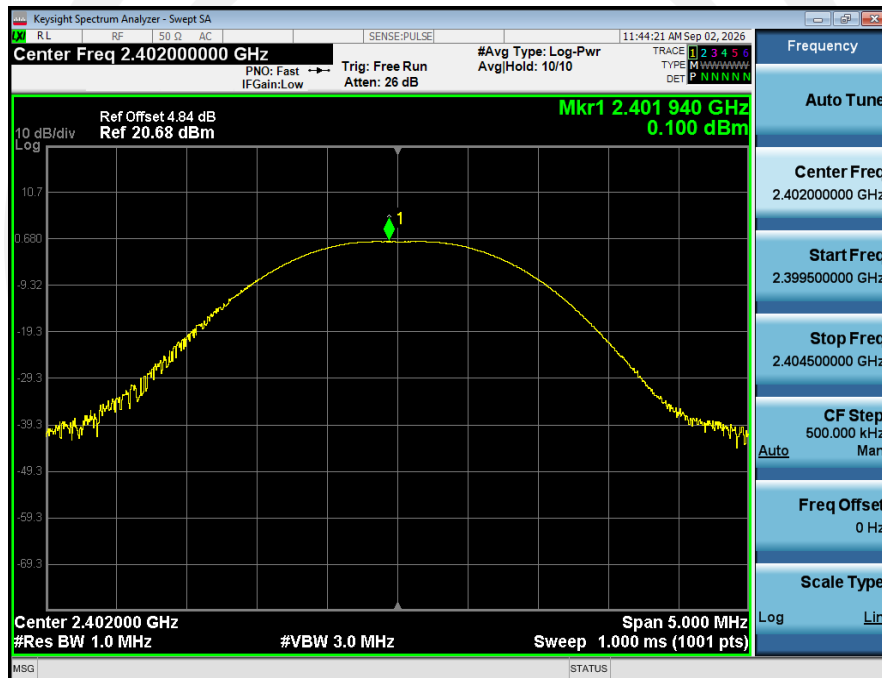
3.3. Test Setup



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	0.10	1.02	1000	Pass
NVNT	ANT1	1-DH1	2441.00	-0.02	1.00	1000	Pass
NVNT	ANT1	1-DH1	2480.00	-0.37	0.92	1000	Pass
NVNT	ANT1	2-DH1	2402.00	1.10	1.29	125	Pass
NVNT	ANT1	2-DH1	2441.00	1.04	1.27	125	Pass
NVNT	ANT1	2-DH1	2480.00	0.58	1.14	125	Pass
NVNT	ANT1	3-DH1	2402.00	1.72	1.49	125	Pass
NVNT	ANT1	3-DH1	2441.00	1.60	1.45	125	Pass
NVNT	ANT1	3-DH1	2480.00	1.21	1.32	125	Pass

Peak Output Power_NVNT_ANT1_1-DH1_2402_00



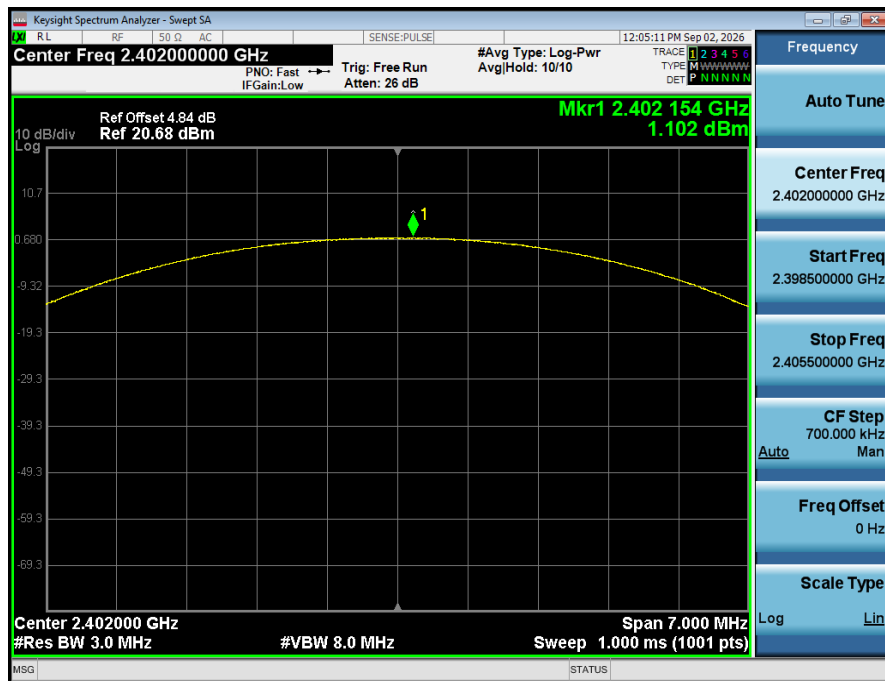
Peak_Output_Power_NVNT_ANT1_1-DH1_2441_00



Peak_Output_Power_NVNT_ANT1_1-DH1_2480_00



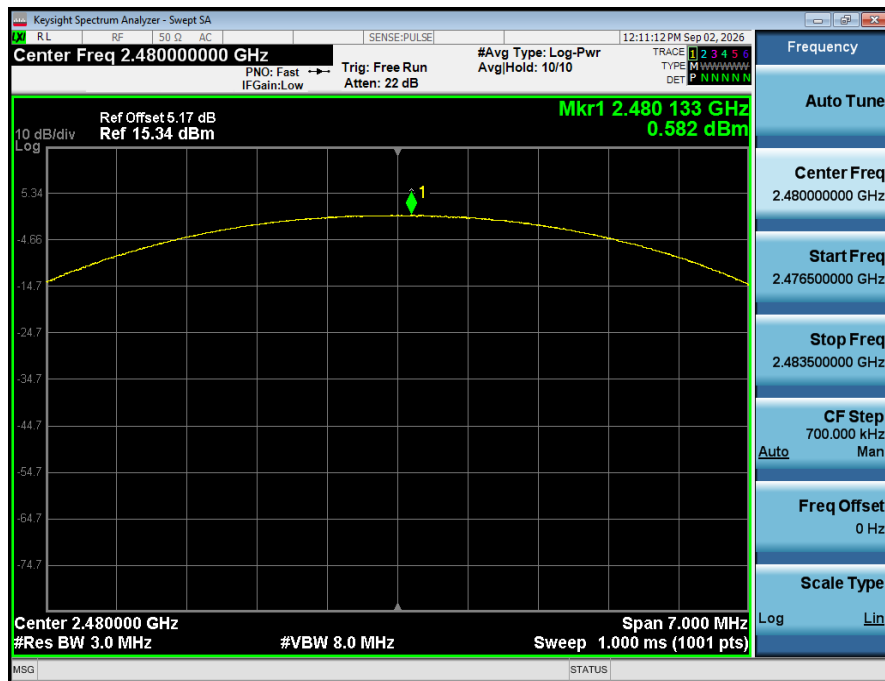
Peak_Output_Power_NVNT_ANT1_2-DH1_2402_00



Peak_Output_Power_NVNT_ANT1_2-DH1_2441_00



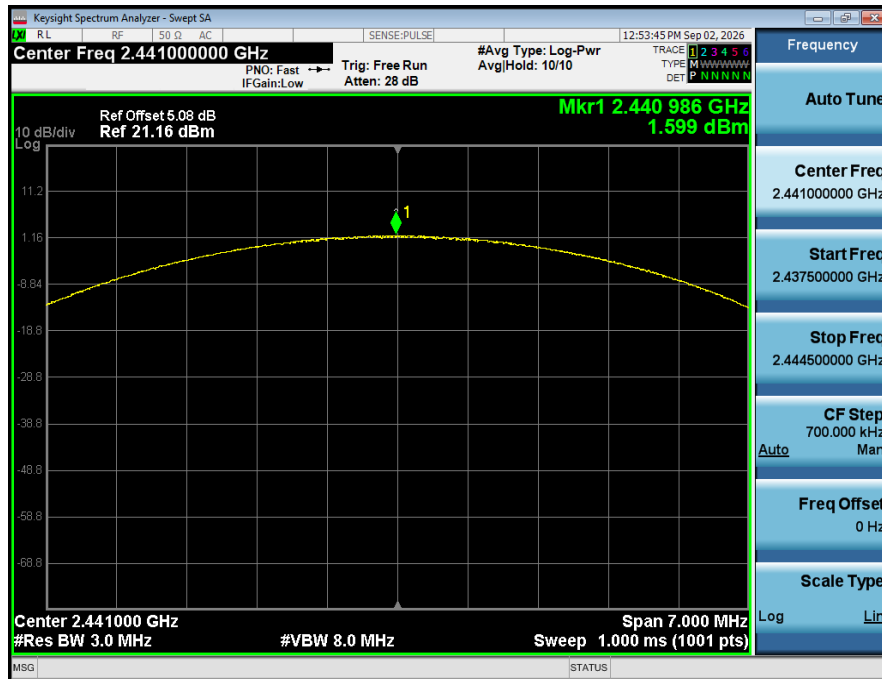
Peak_Output_Power_NVNT_ANT1_2-DH1_2480_00



Peak_Output_Power_NVNT_ANT1_3-DH1_2402_00



Peak_Output_Power_NVNT_ANT1_3-DH1_2441_00

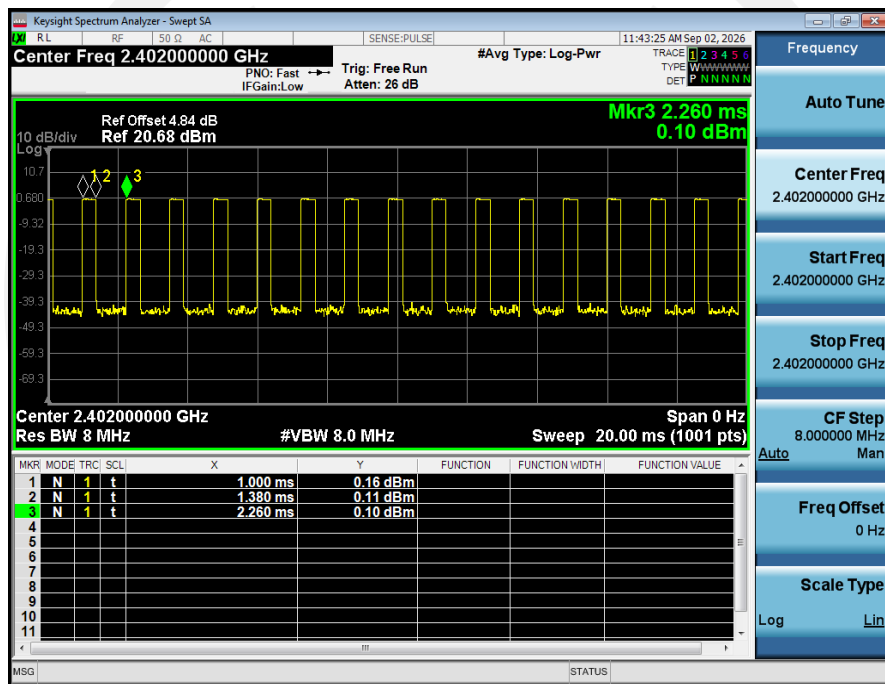


Peak_Output_Power_NVNT_ANT1_3-DH1_2480_00

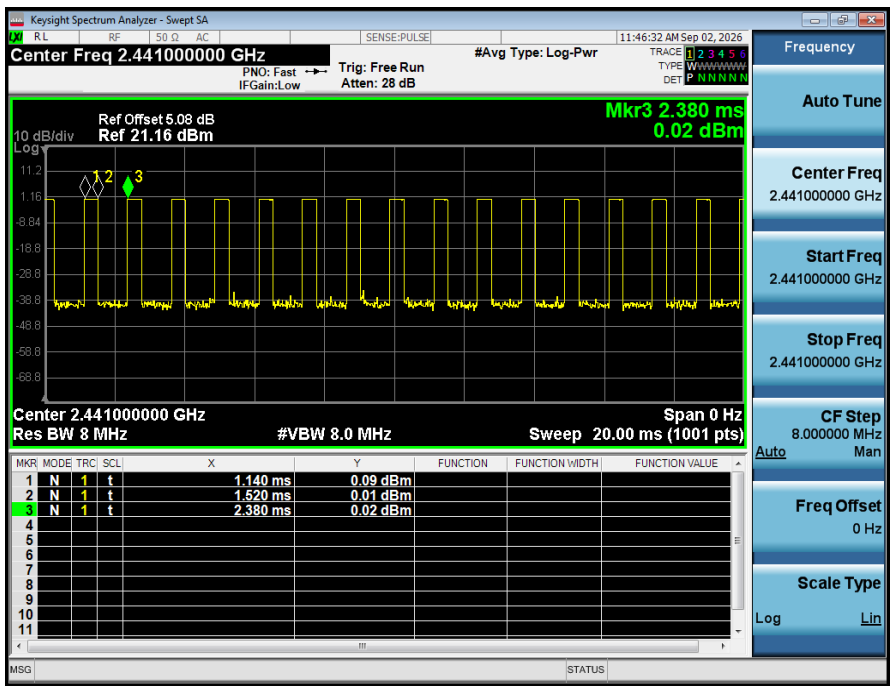


Condition	Antenna	Rate	Frequency (MHz)	Dutycycle(%)	Duty_factor
NVNT	ANT1	1-DH1	2402.00	31.75	4.98
NVNT	ANT1	1-DH1	2441.00	32.26	4.91
NVNT	ANT1	1-DH1	2480.00	32.26	4.91
NVNT	ANT1	2-DH1	2402.00	30.65	5.14
NVNT	ANT1	2-DH1	2441.00	31.75	4.98
NVNT	ANT1	2-DH1	2480.00	33.33	4.77
NVNT	ANT1	3-DH1	2402.00	30.65	5.14
NVNT	ANT1	3-DH1	2441.00	32.26	4.91
NVNT	ANT1	3-DH1	2480.00	31.75	4.98

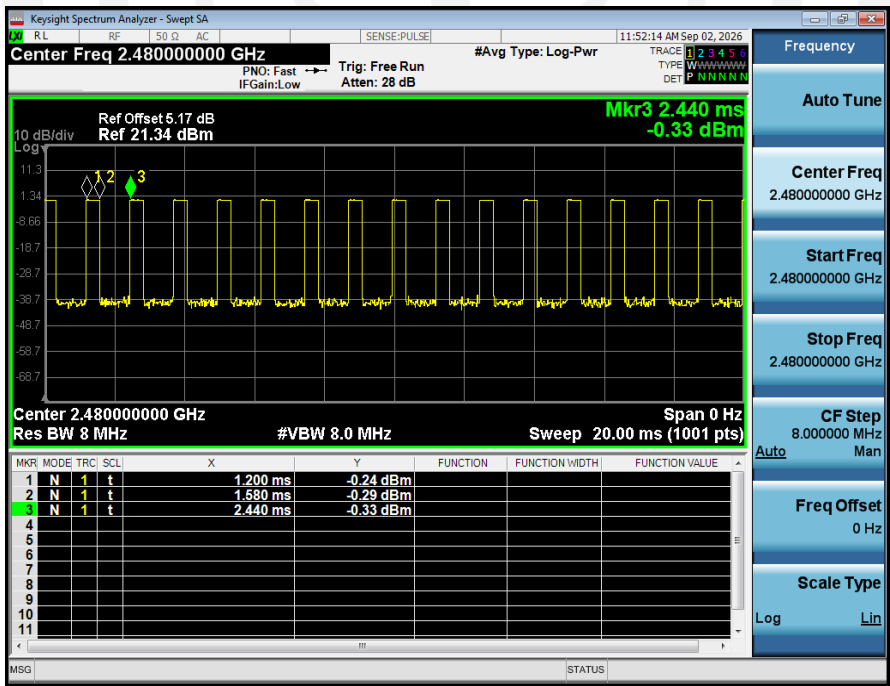
Duty_Cycle_NVNT_ANT1_1-DH1_2402



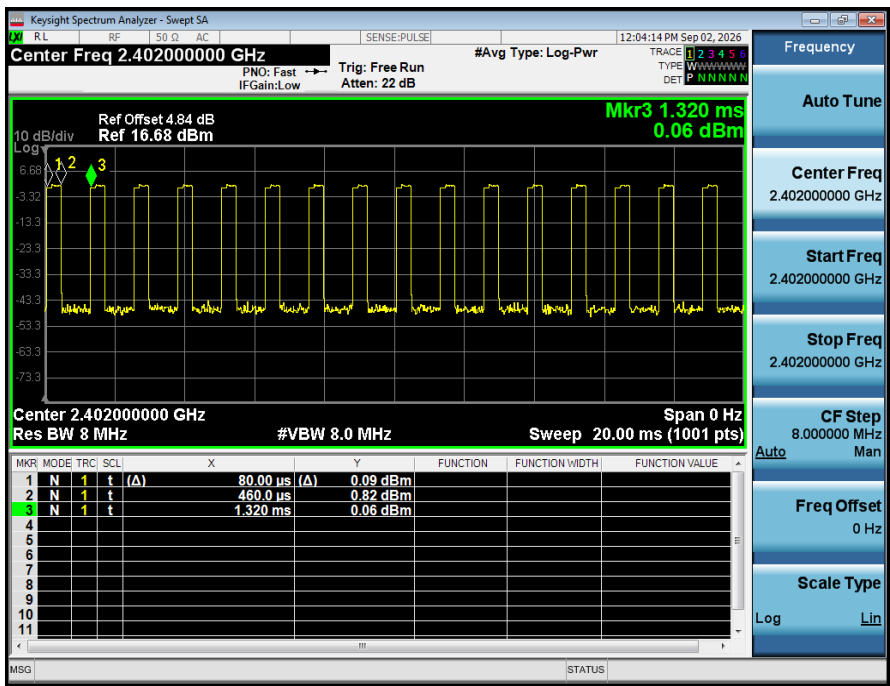
Duty_Cycle_NVNT_ANT1_1-DH1_2441



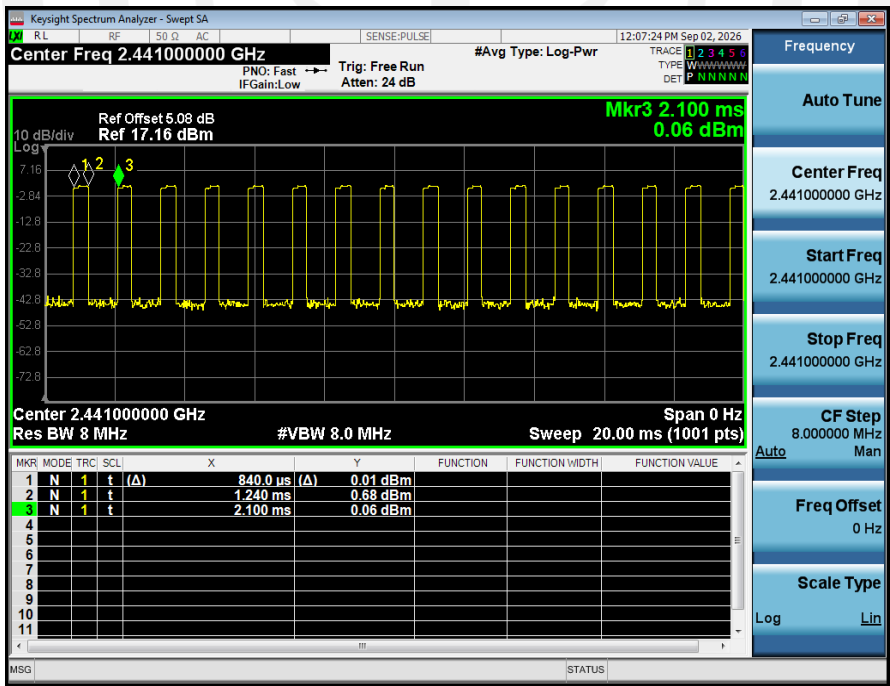
Duty_Cycle_NVNT_ANT1_1-DH1_2480



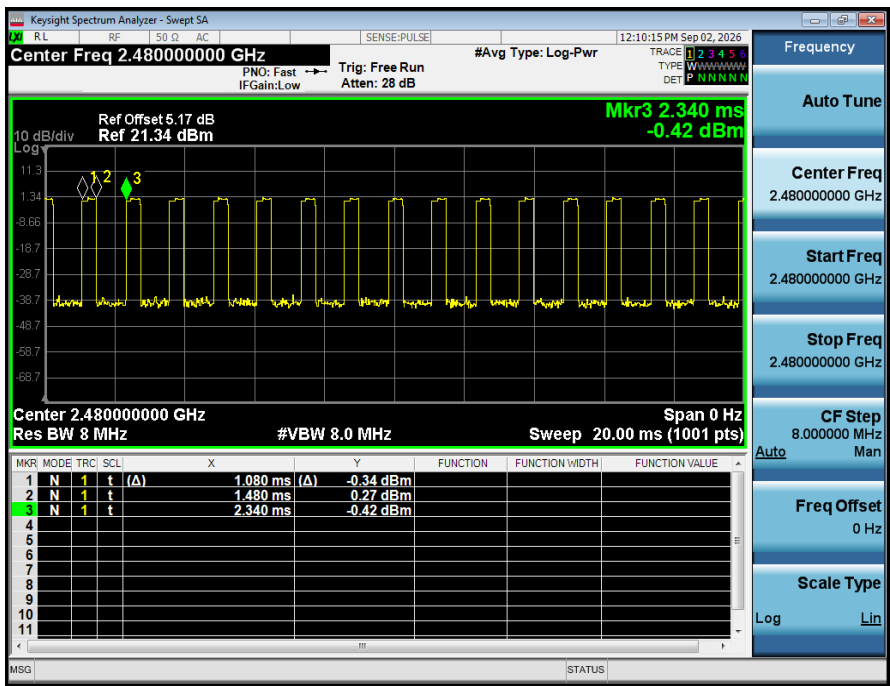
Duty_Cycle_NVNT_ANT1_2-DH1_2402



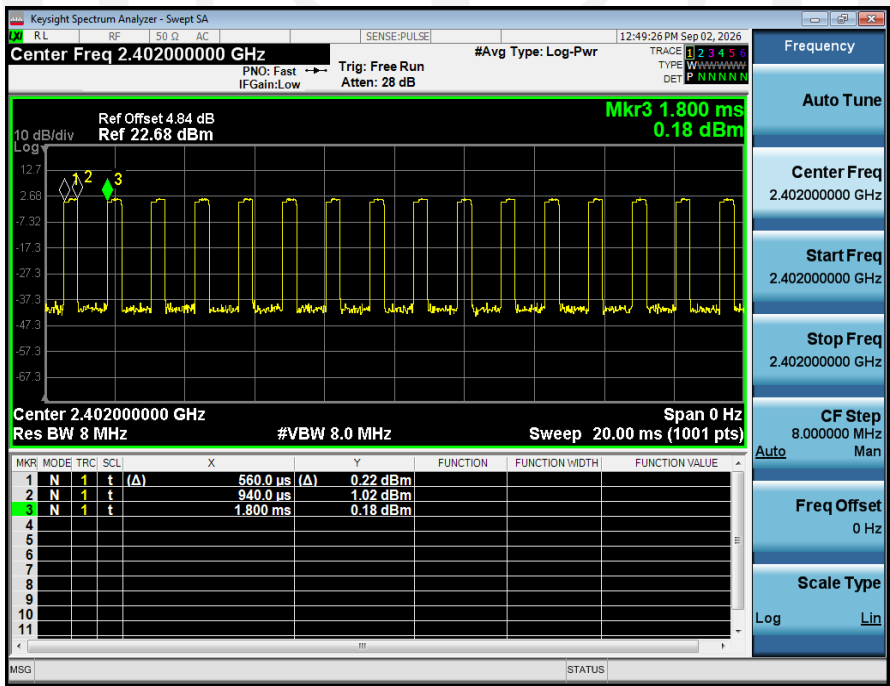
Duty_Cycle_NVNT_ANT1_2-DH1_2441



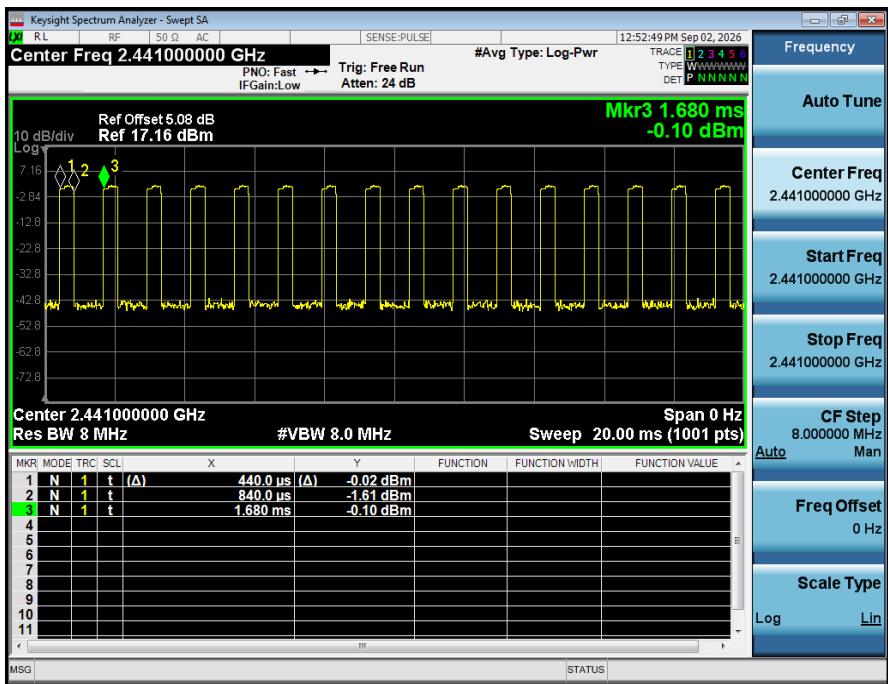
Duty_Cycle_NVNT_ANT1_2-DH1_2480



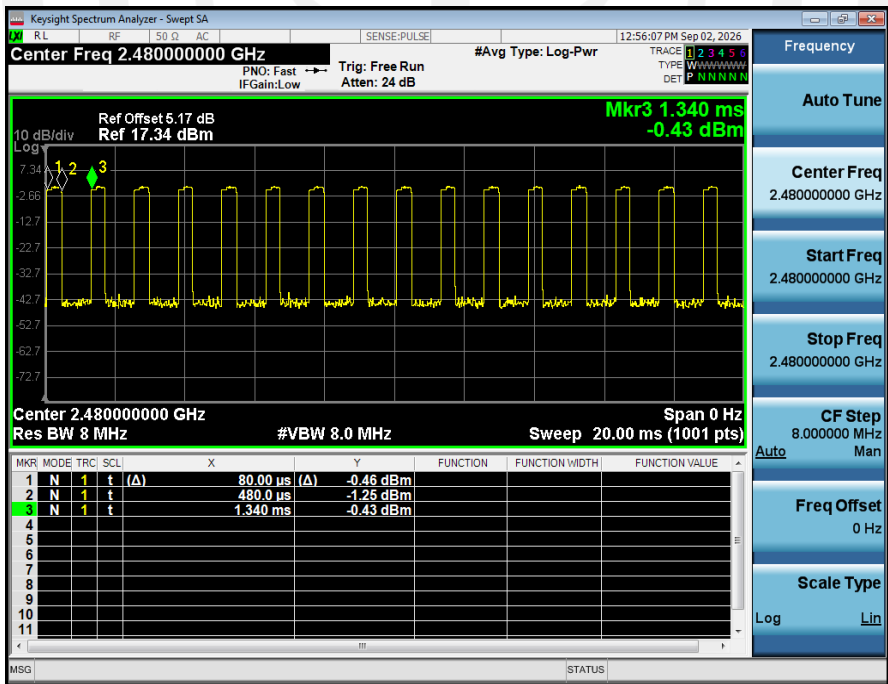
Duty_Cycle_NVNT_ANT1_3-DH1_2402



Duty_Cycle_NVNT_ANT1_3-DH1_2441



Duty_Cycle_NVNT_ANT1_3-DH1_2480



4. Bandwidth

4.1. Limit

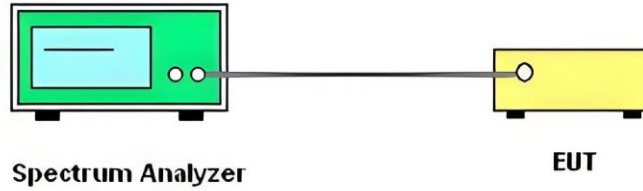
Intentional radiators operating under the alternative provisions to the general emission limits, as contained in §§ 15.217 through 15.257 and in subpart E of this part, must be designed to ensure that the 20 dB bandwidth of the emission, or whatever bandwidth may otherwise be specified in the specific 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 $[(\text{reference value}) - xx]$. 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

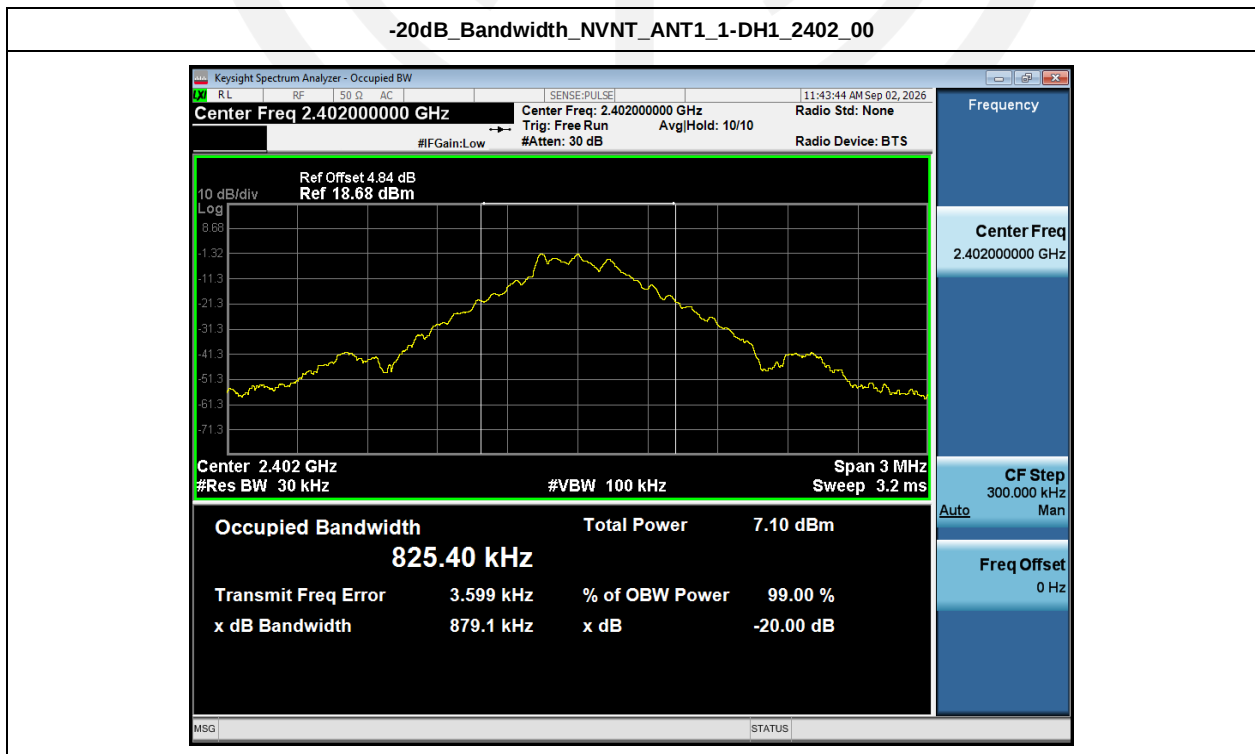
display; the plot axes and the scale units per division shall be clearly labeled. Tabular data may be reported in addition to the plot(s).

4.3. Test Setup

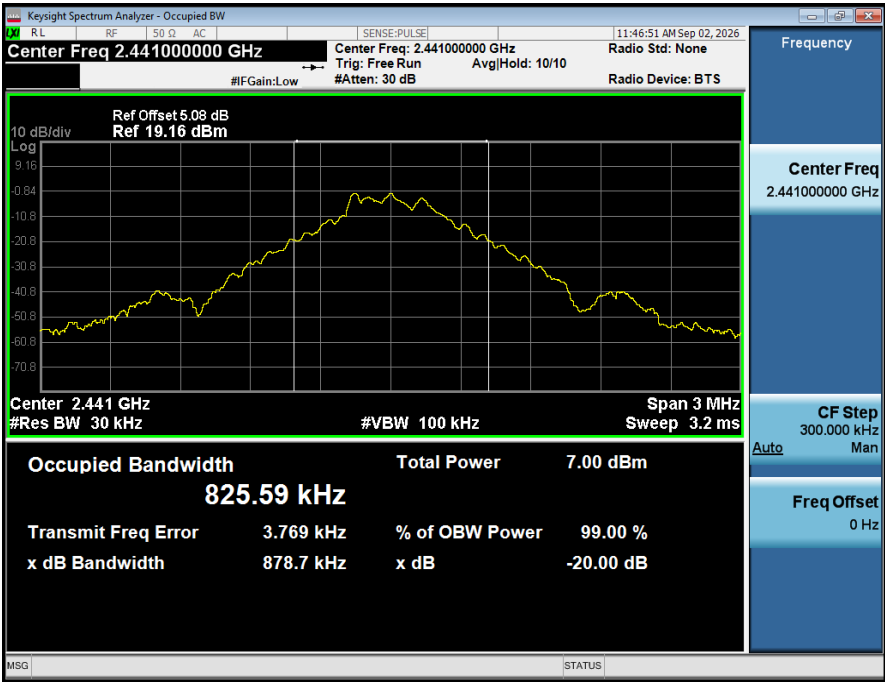


4.4. Test Result

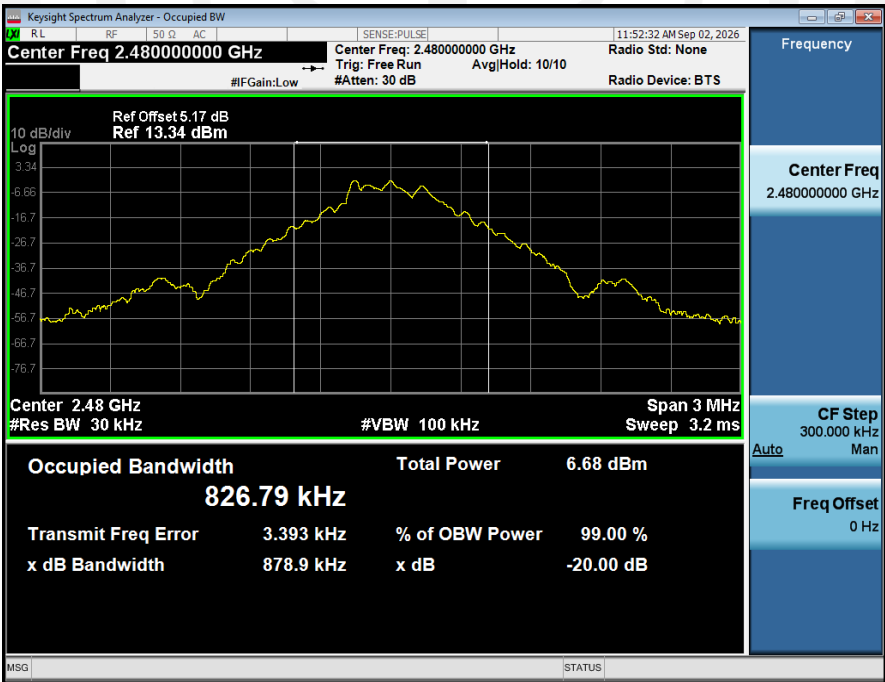
Condition	Antenna	Modulation	Frequency (MHz)	-20dB BW(MHz)	if larger than CFS
NVNT	ANT1	1-DH1	2402.00	0.879	No
NVNT	ANT1	1-DH1	2441.00	0.879	No
NVNT	ANT1	1-DH1	2480.00	0.879	No
NVNT	ANT1	2-DH1	2402.00	1.256	Yes
NVNT	ANT1	2-DH1	2441.00	1.258	Yes
NVNT	ANT1	2-DH1	2480.00	1.258	Yes
NVNT	ANT1	3-DH1	2402.00	1.221	Yes
NVNT	ANT1	3-DH1	2441.00	1.222	Yes
NVNT	ANT1	3-DH1	2480.00	1.222	Yes

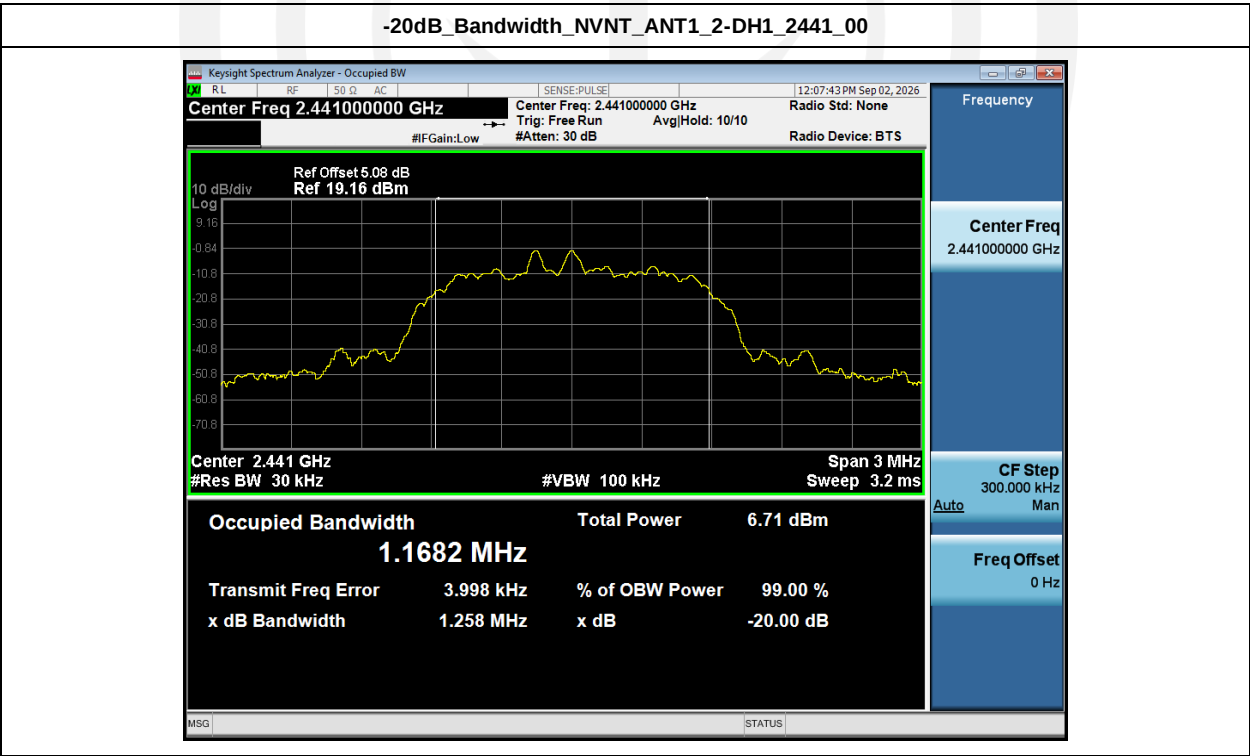
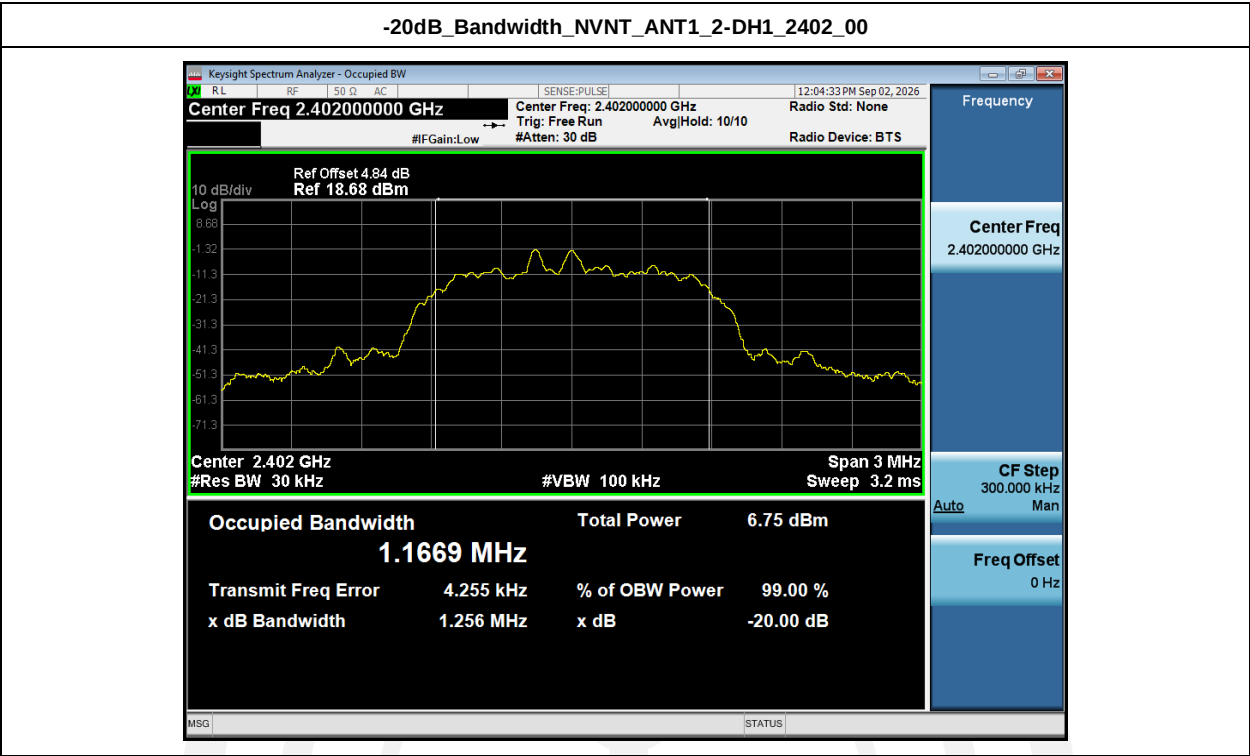


-20dB_Bandwidth_NVNT_ANT1_1-DH1_2441_00

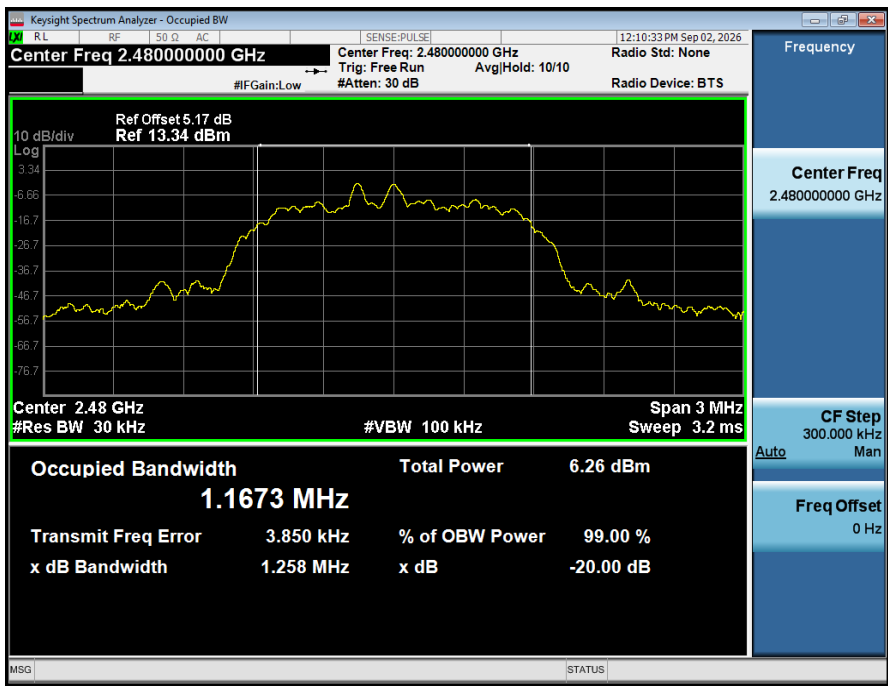


-20dB_Bandwidth_NVNT_ANT1_1-DH1_2480_00

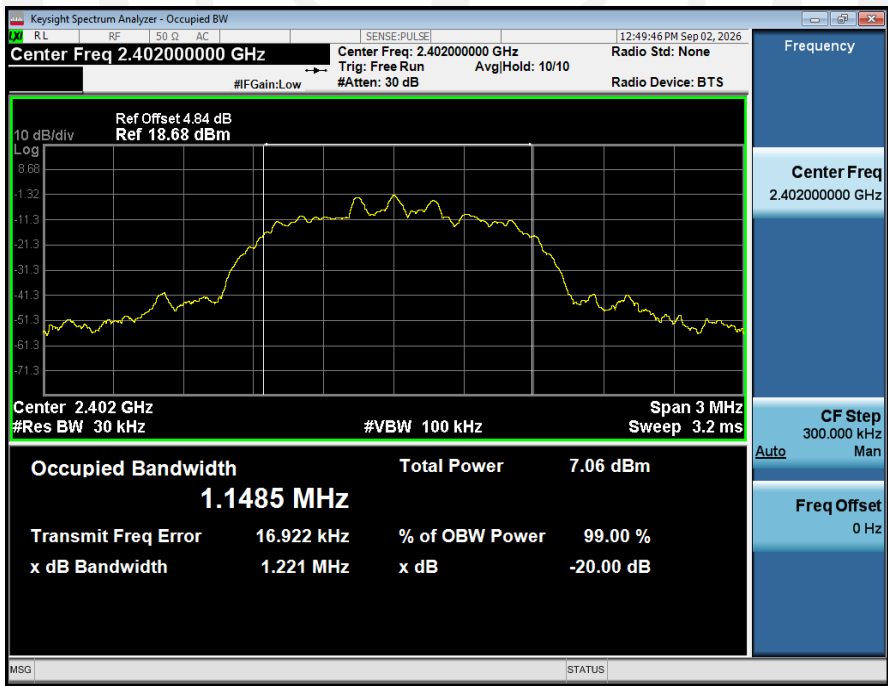




-20dB_Bandwidth_NVNT_ANT1_2-DH1_2480_00



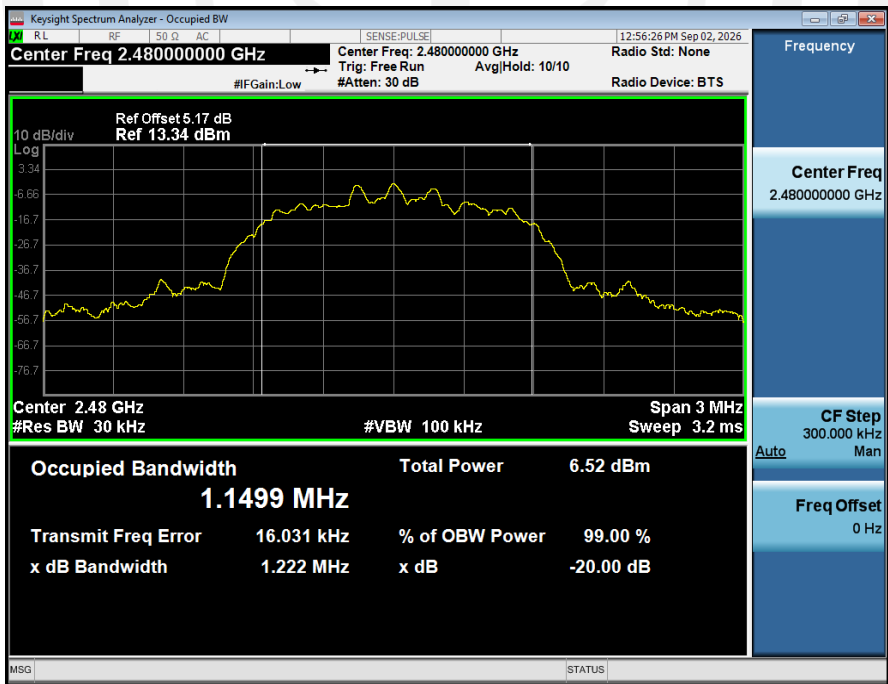
-20dB_Bandwidth_NVNT_ANT1_3-DH1_2402_00



-20dB_Bandwidth_NVNT_ANT1_3-DH1_2441_00

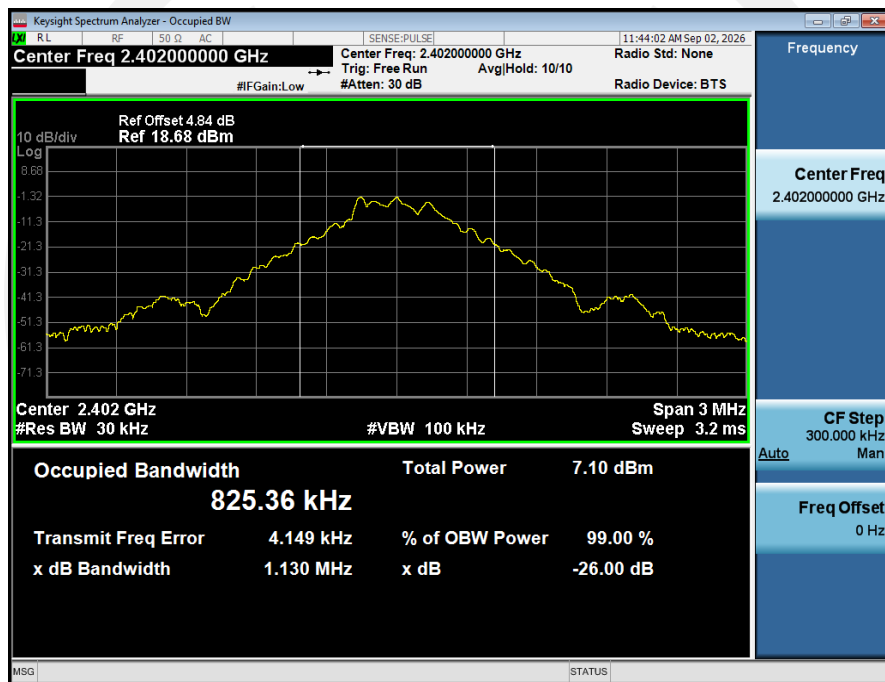


-20dB_Bandwidth_NVNT_ANT1_3-DH1_2480_00

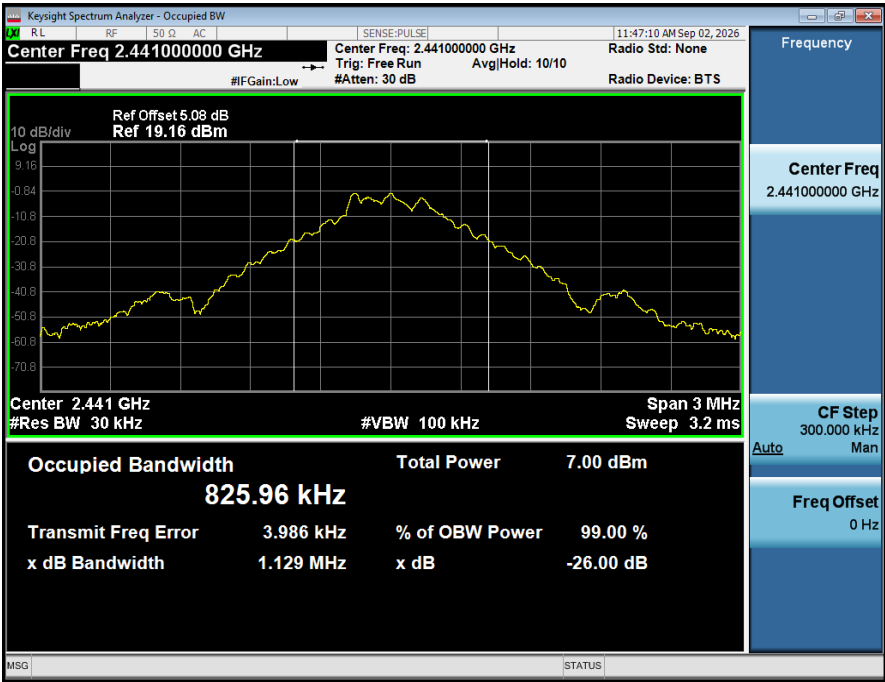


Condition	Antenna	Modulation	Frequency (MHz)	99%BW(MHz)
NVNT	ANT1	1-DH1	2402.00	0.825
NVNT	ANT1	1-DH1	2441.00	0.826
NVNT	ANT1	1-DH1	2480.00	0.828
NVNT	ANT1	2-DH1	2402.00	1.167
NVNT	ANT1	2-DH1	2441.00	1.167
NVNT	ANT1	2-DH1	2480.00	1.169
NVNT	ANT1	3-DH1	2402.00	1.149
NVNT	ANT1	3-DH1	2441.00	1.149
NVNT	ANT1	3-DH1	2480.00	1.150

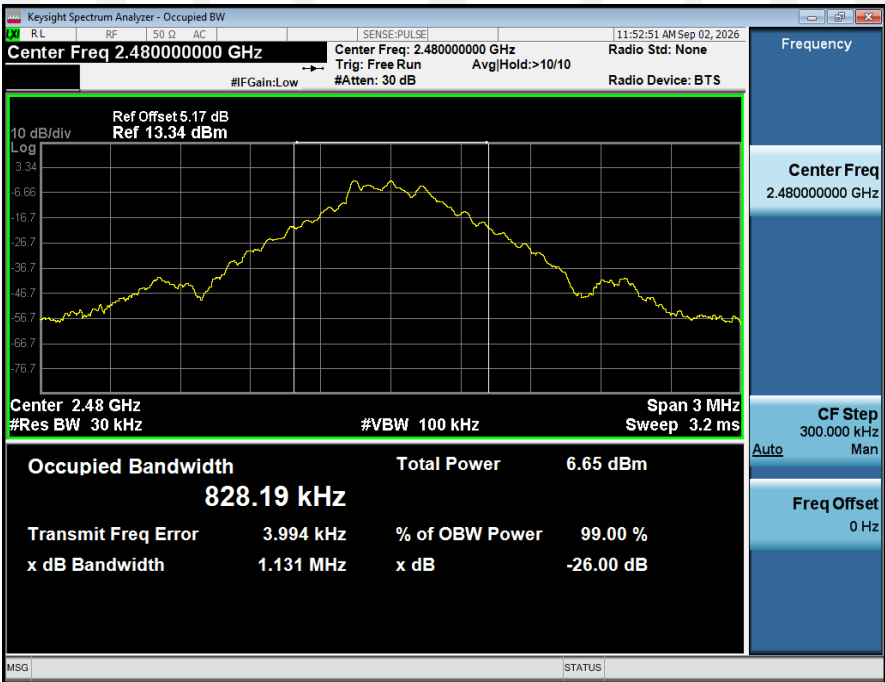
99%_Occupied_Bandwidth_NVNT_ANT1_1-DH1_2402_00



99%_Occupied_Bandwidth_NVNT_ANT1_1-DH1_2441_00



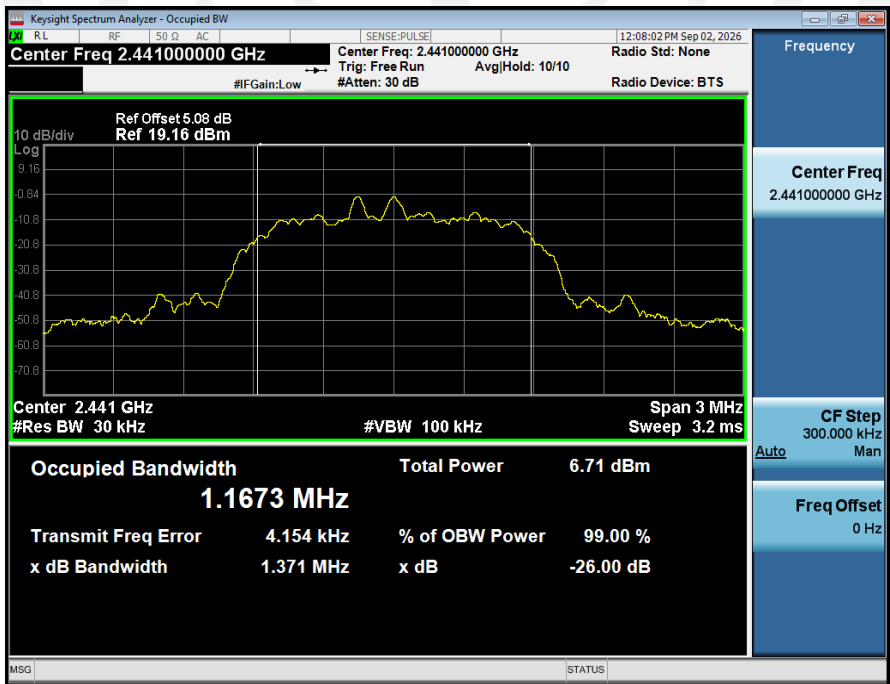
99%_Occupied_Bandwidth_NVNT_ANT1_1-DH1_2480_00



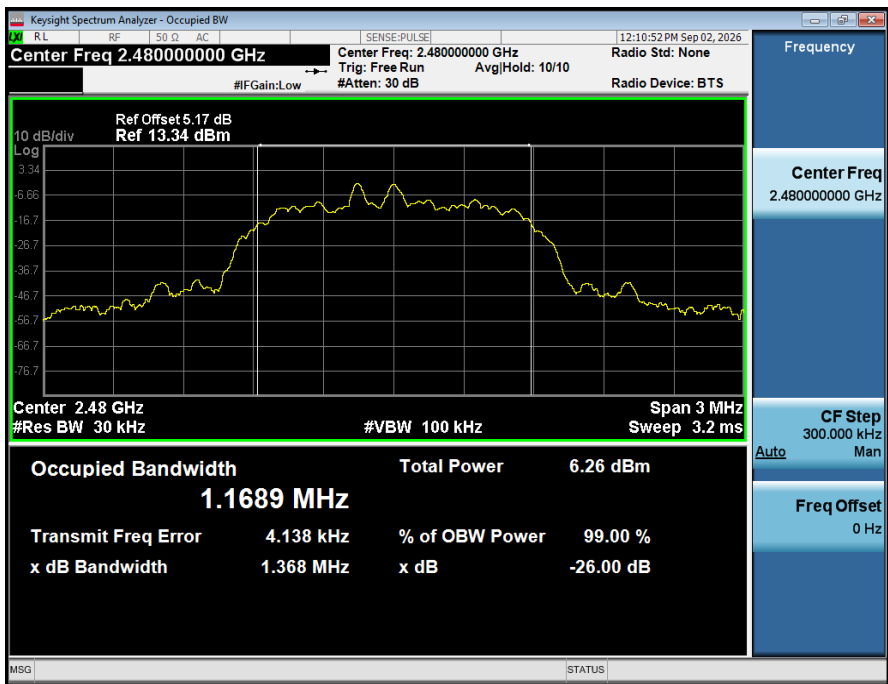
99%_Occupied_Bandwidth_NVNT_ANT1_2-DH1_2402_00



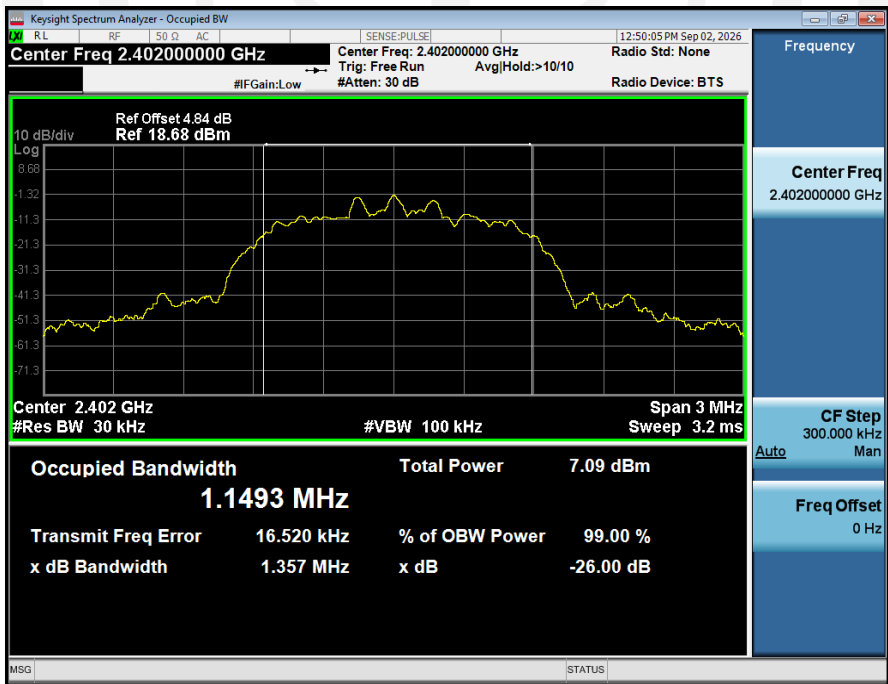
99%_Occupied_Bandwidth_NVNT_ANT1_2-DH1_2441_00



99%_Occupied_Bandwidth_NVNT_ANT1_2-DH1_2480_00



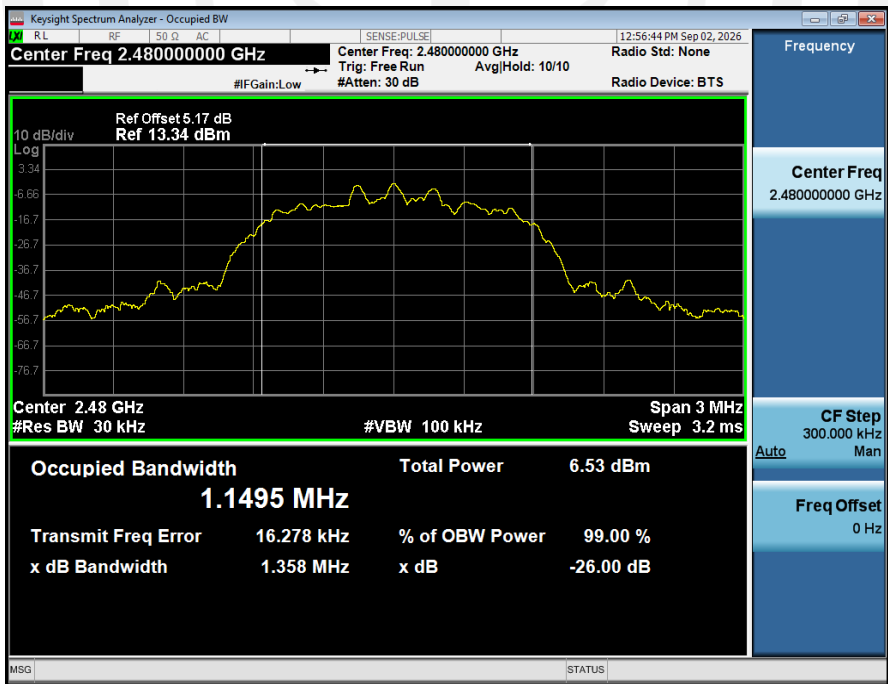
99%_Occupied_Bandwidth_NVNT_ANT1_3-DH1_2402_00



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.

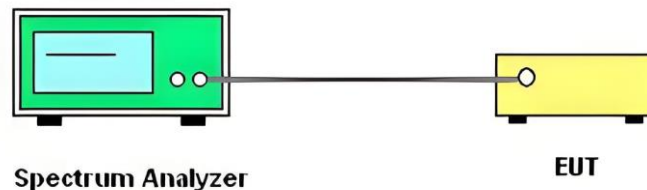
5.2. Test Procedure

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) $\geq$ 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.

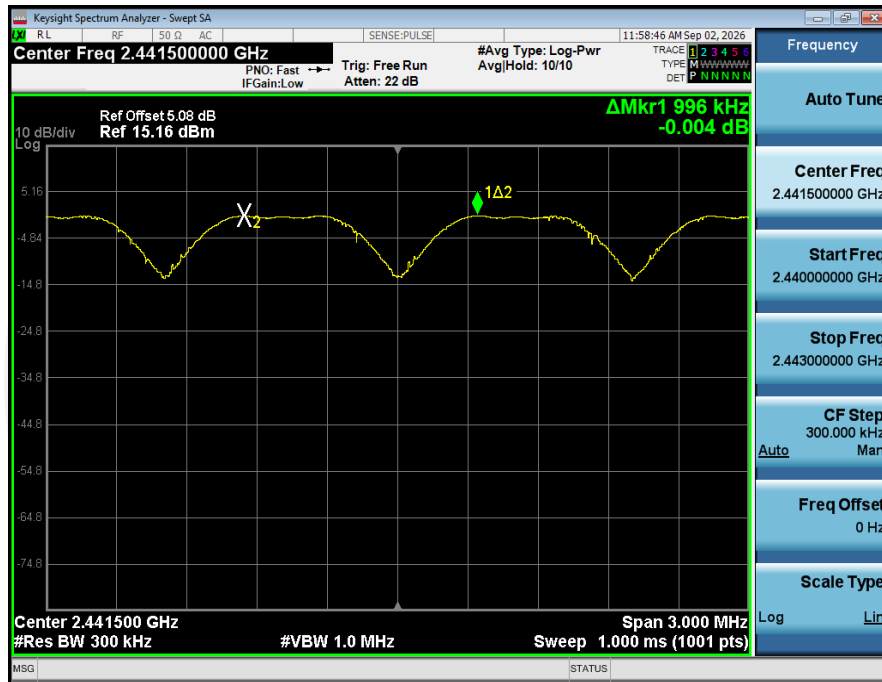
5.3. Test Setup



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	2440.846	2441.842	1.00	0.879	Pass
NVNT	ANT1	2-DH1	2441.00	2440.849	2441.842	0.99	0.839	Pass
NVNT	ANT1	3-DH1	2441.00	2440.849	2441.851	1.00	0.815	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.

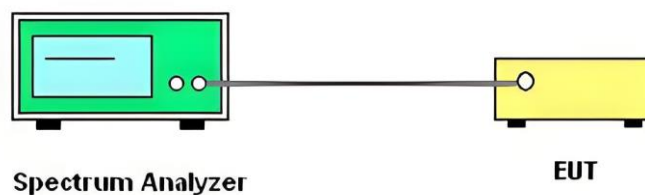
6.2. Test Procedure

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 $\geq$ RBW.
- d) Sweep: Auto.
- e) Detector function: Peak.
- f) Trace: Max hold.
- g) Allow the trace to stabilize.

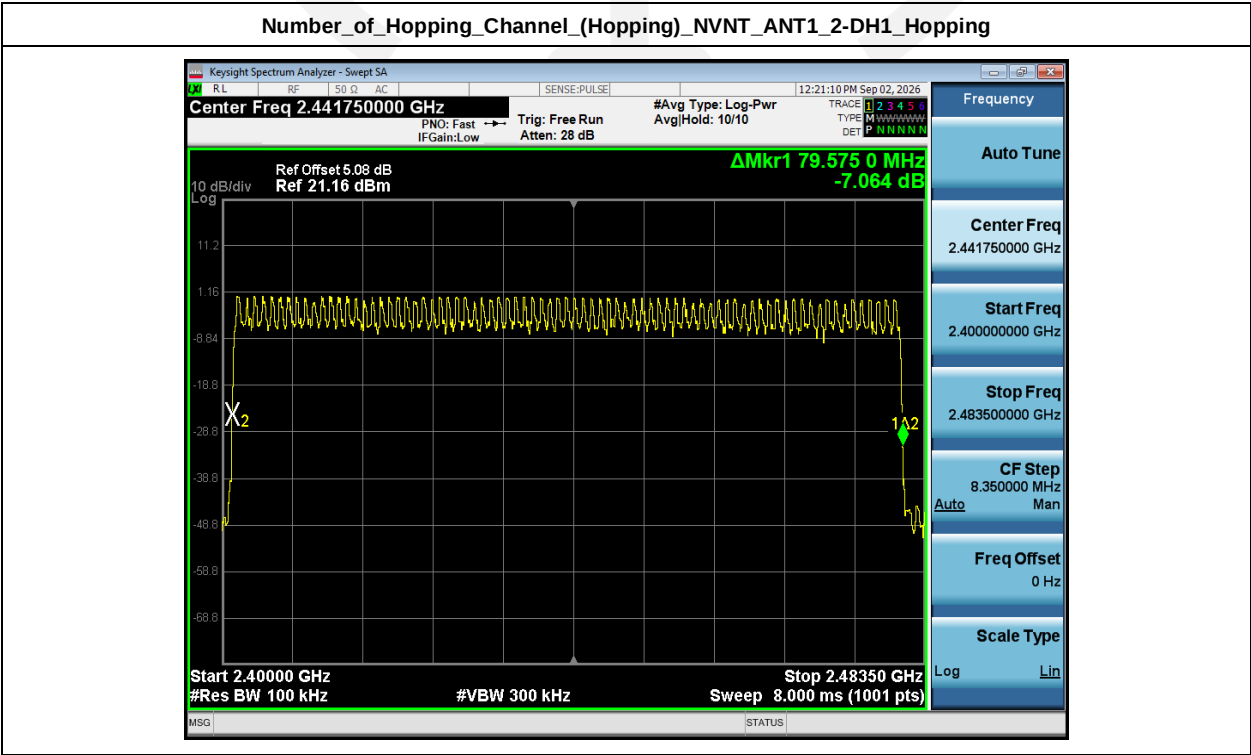
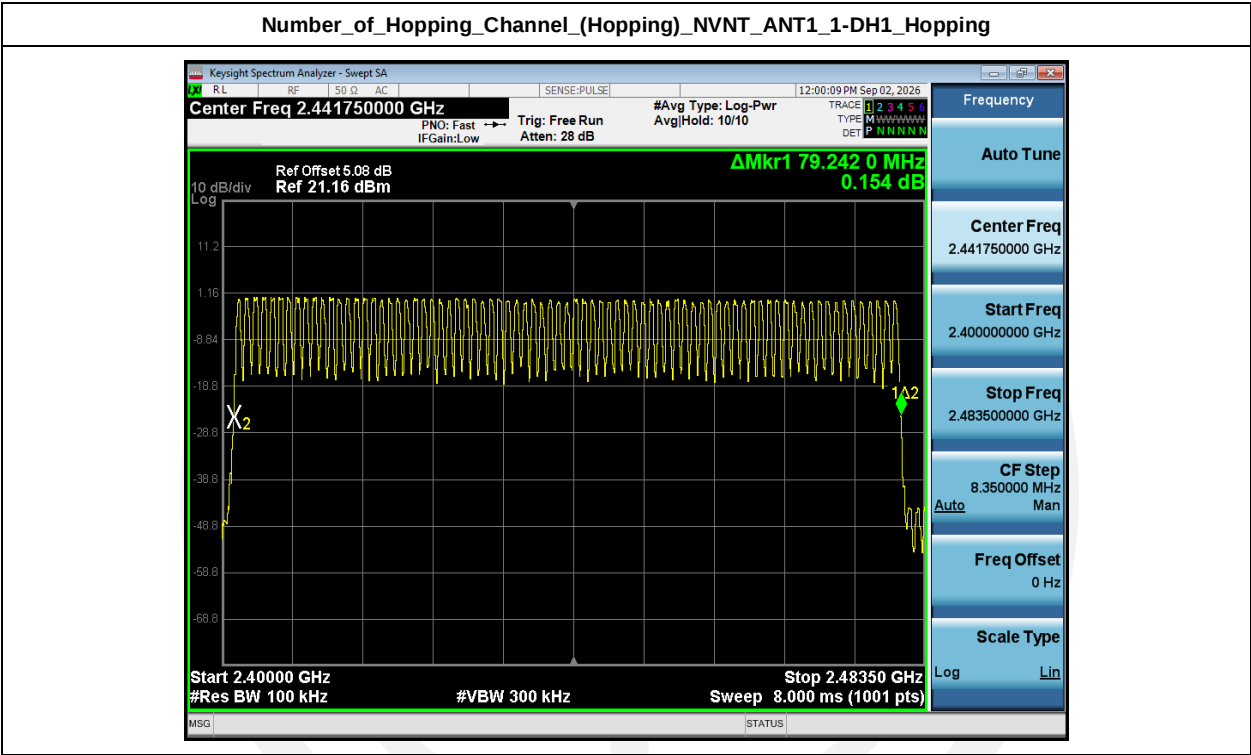
It might prove necessary to break the span up into sub ranges to show clearly all of the hopping frequencies. Compliance of an EUT with the appropriate regulatory limit shall be determined for the number of hopping channels. A plot of the data shall be included in the test report.

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



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 $\leq$ channel spacing and where possible RBW should be set $\gg 1 / T$, 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.

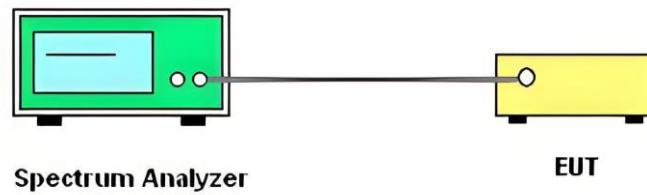
Repeat the measurement using a longer sweep time to determine the number of hops over the period specified in the requirements. The sweep time shall be equal to, or less than, the period specified in the requirements. Determine the number of hops over the sweep time and calculate the total number of hops in the period specified in the requirements, using the following equation:

$$\begin{aligned} & \text{(Number of hops in the period specified in the requirements)} = \\ & \text{(number of hops on spectrum analyzer)} \times \text{(period specified in the requirements / analyzer sweep time)} \end{aligned}$$

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.

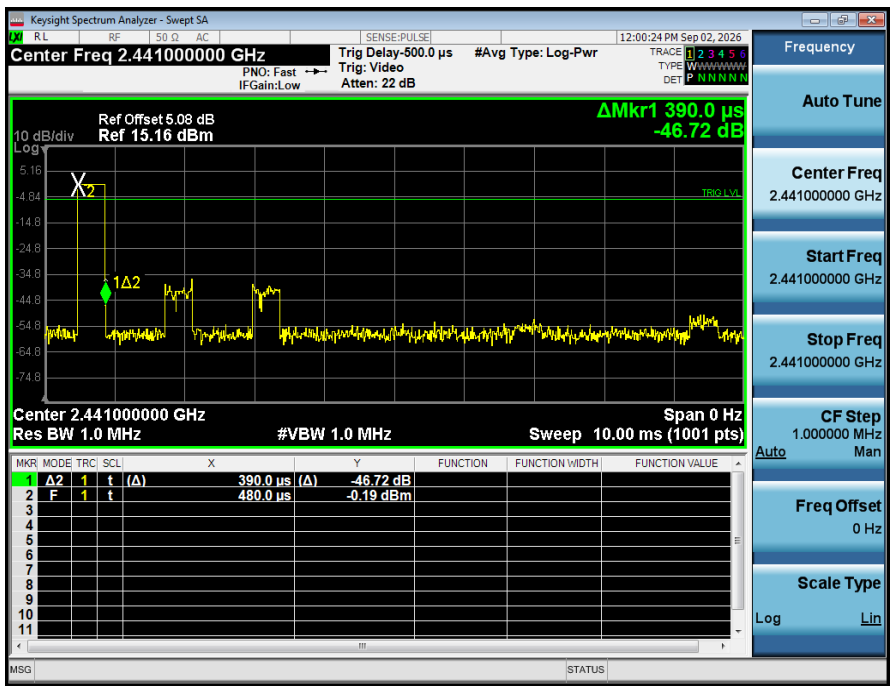
7.3. Test Setup



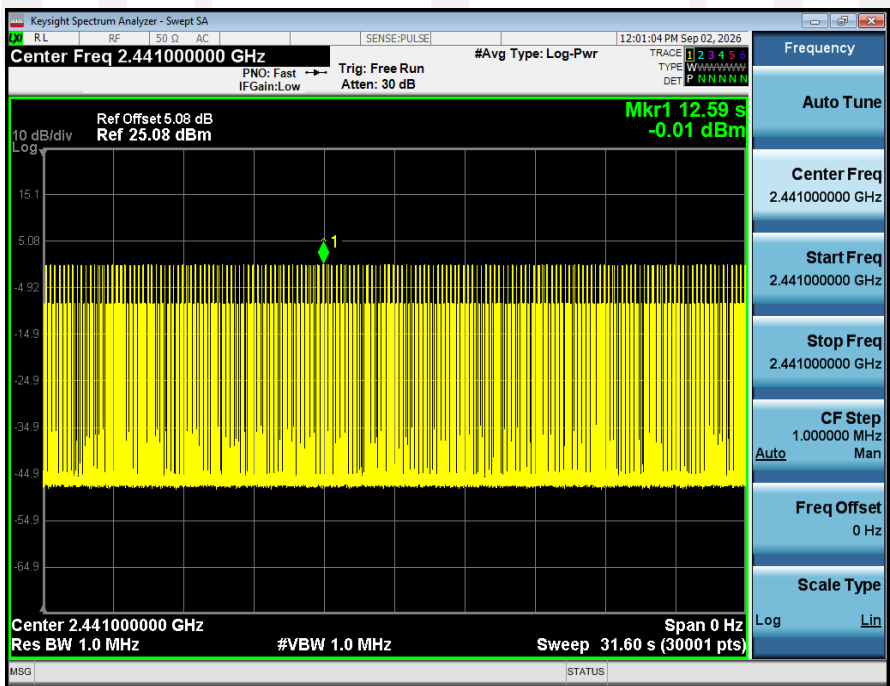
7.4. Test Result

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	0.400	319.00	127.600	0.40	Pass
NVNT	ANT1	3-DH1	0.410	318.00	130.380	0.40	Pass
NVNT	ANT1	1-DH3	1.650	154.00	254.100	0.40	Pass
NVNT	ANT1	1-DH5	2.900	93.00	269.700	0.40	Pass
NVNT	ANT1	2-DH3	1.660	159.00	263.940	0.40	Pass
NVNT	ANT1	2-DH5	2.910	104.00	302.640	0.40	Pass
NVNT	ANT1	3-DH3	1.660	164.00	272.240	0.40	Pass
NVNT	ANT1	3-DH5	2.910	112.00	325.920	0.40	Pass

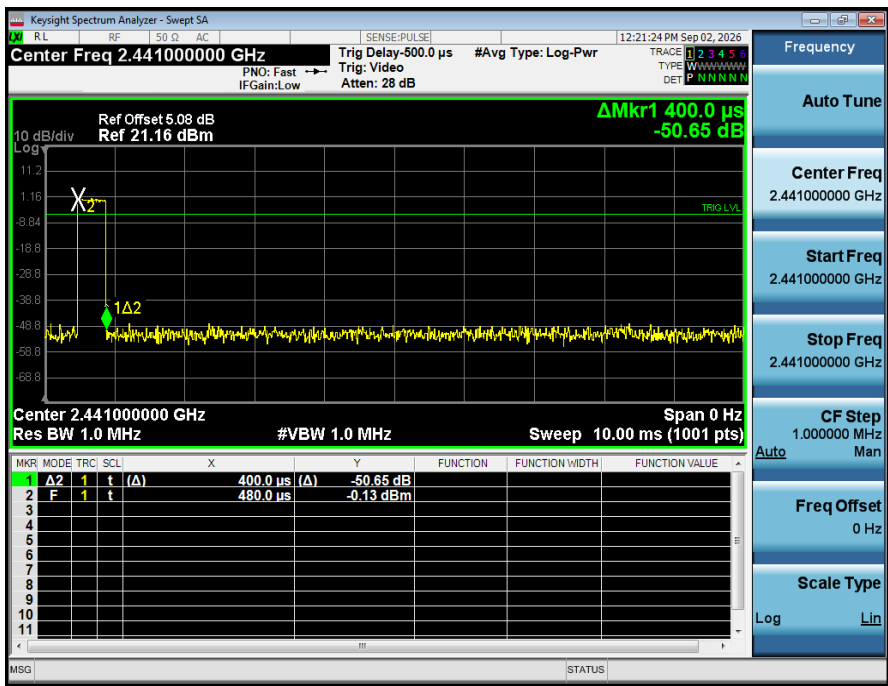
Dwell_Time_(Hopping)_NVNT_ANT1_1-DH1_2441_00_One_Burst_Time



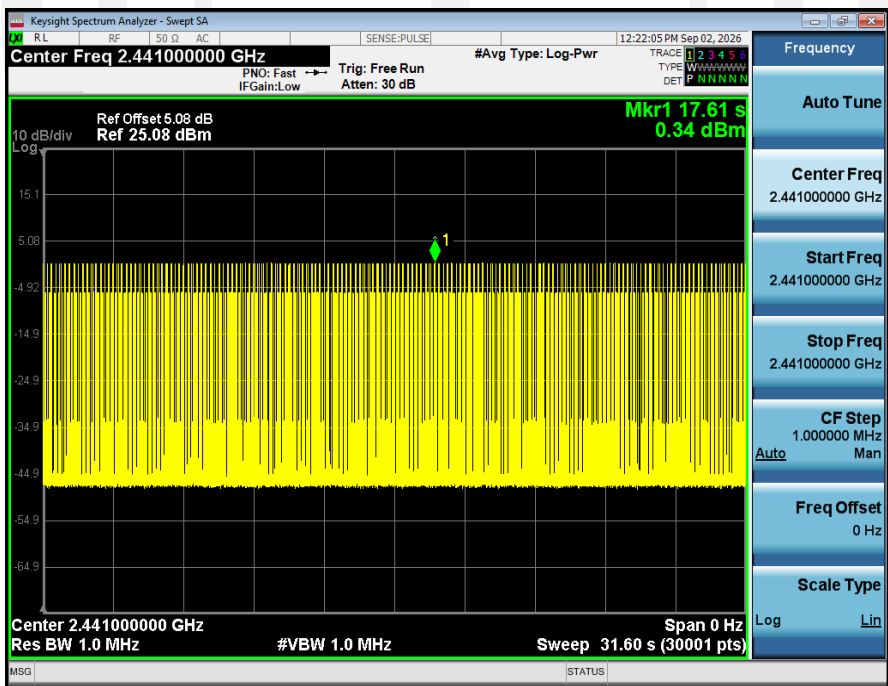
Dwell_Time_(Hopping)_NVNT_ANT1_1-DH1_2441_00_Accumulated



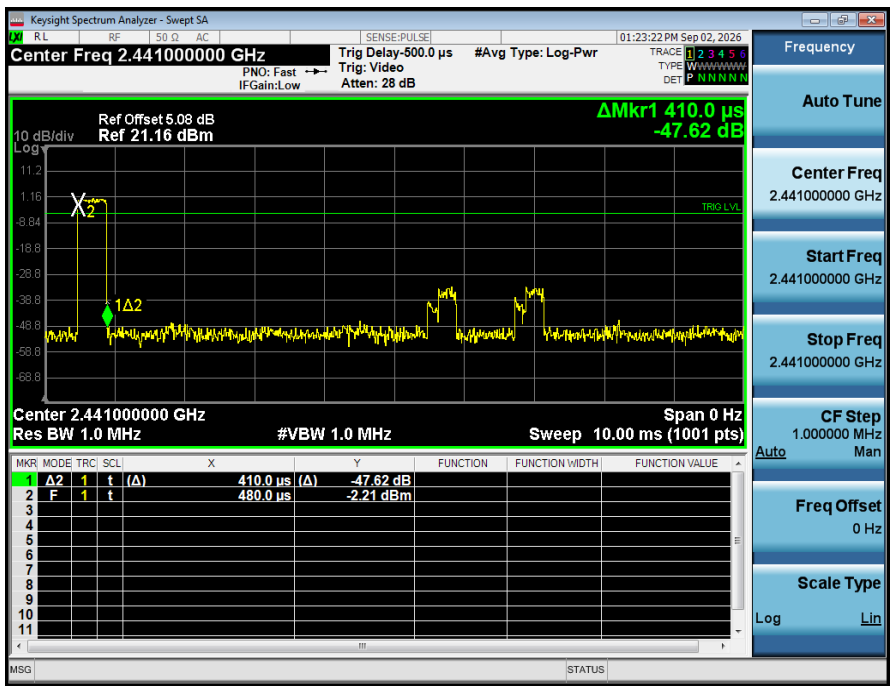
Dwell_Time_(Hopping)_NVNT_ANT1_2-DH1_2441_00_One_Burst_Time



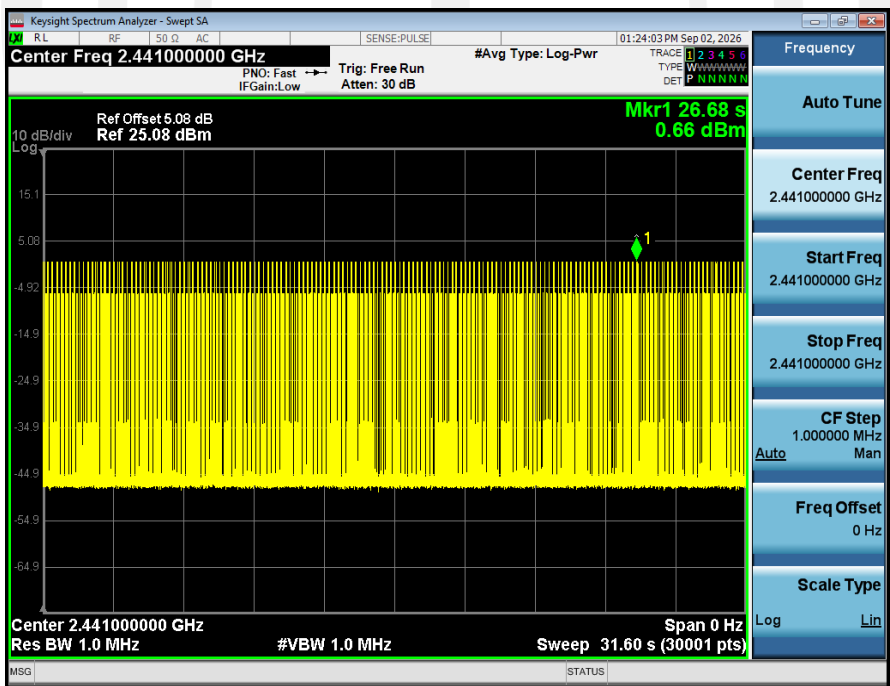
Dwell_Time_(Hopping)_NVNT_ANT1_2-DH1_2441_00_Accumulated



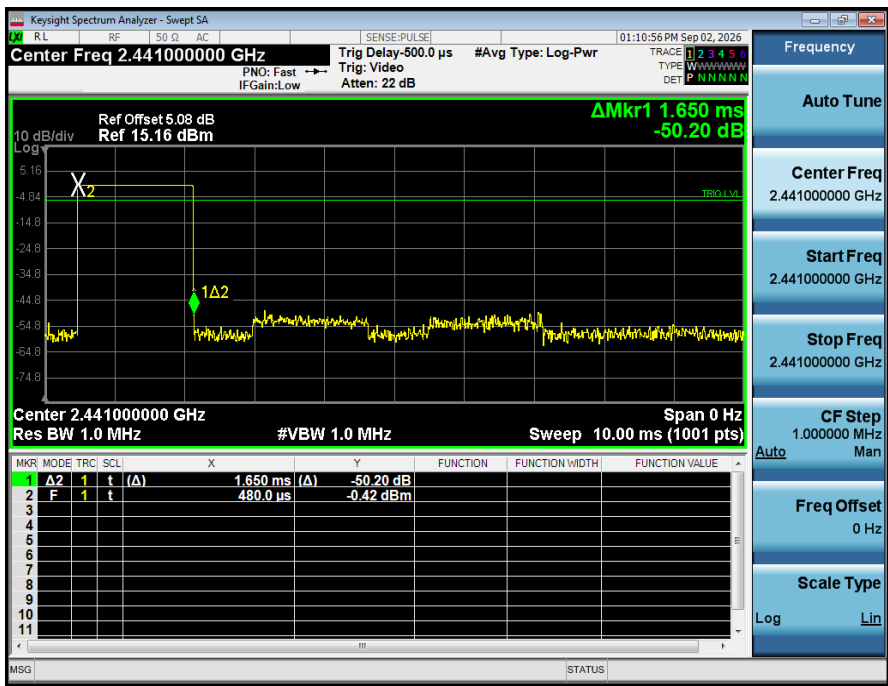
Dwell_Time_(Hopping)_NVNT_ANT1_3-DH1_2441_00_One_Burst_Time



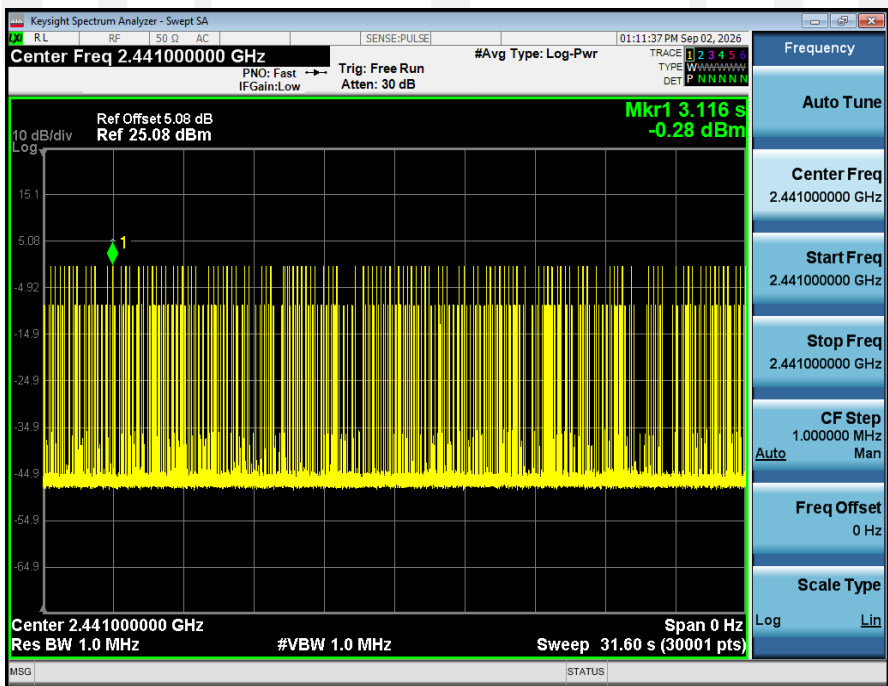
Dwell_Time_(Hopping)_NVNT_ANT1_3-DH1_2441_00_Accumulated



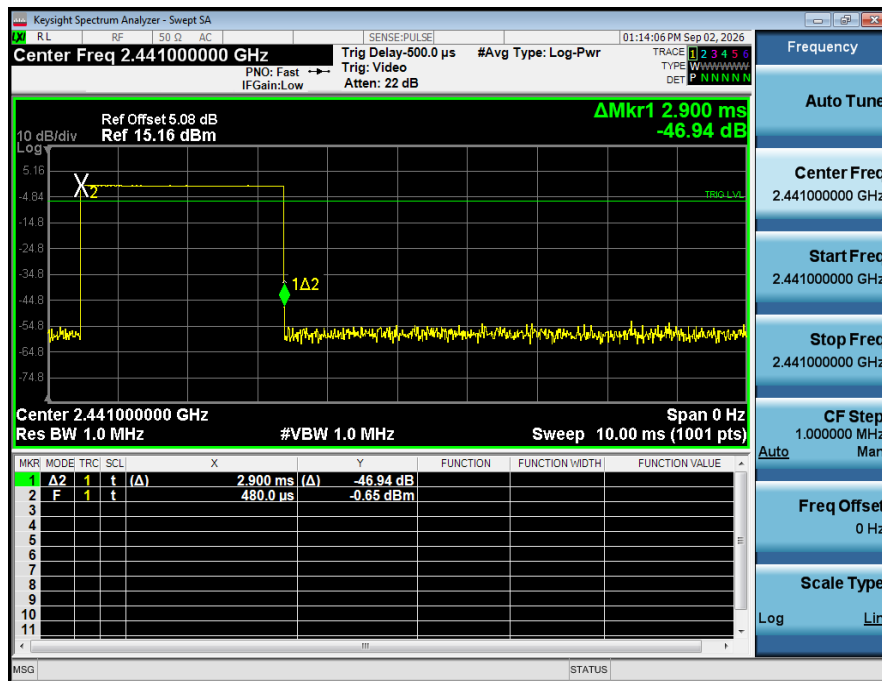
Dwell_Time_(Hopping)_NVNT_ANT1_1-DH3_2441_00_One_Burst_Time



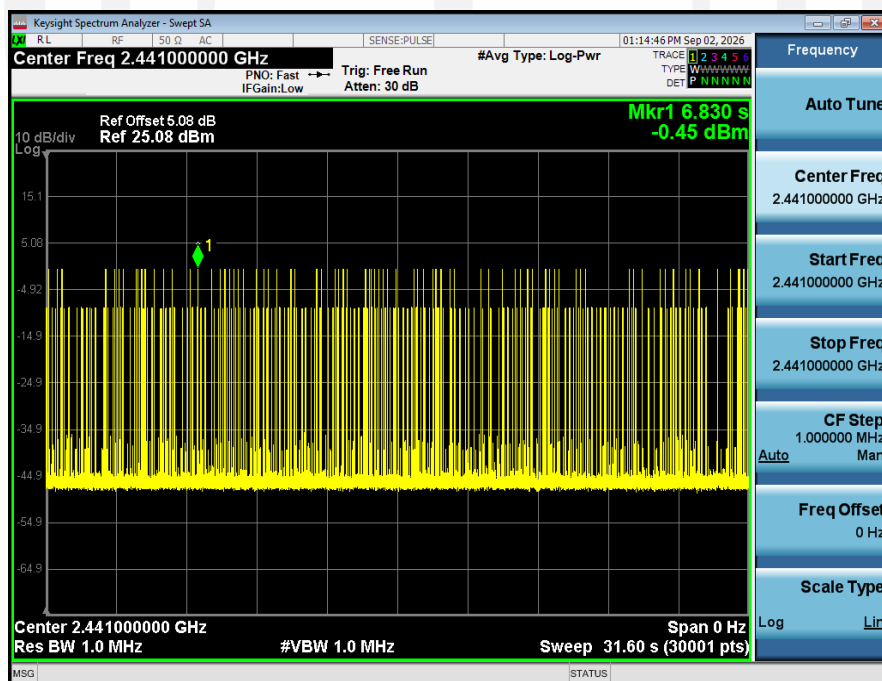
Dwell_Time_(Hopping)_NVNT_ANT1_1-DH3_2441_00_Accumulated



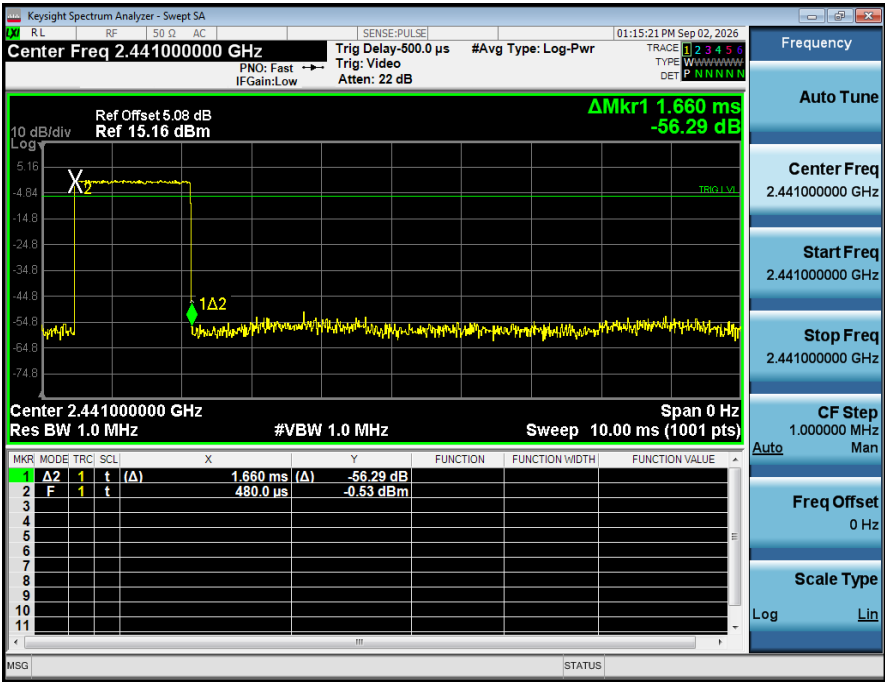
Dwell_Time_(Hopping)_NVNT_ANT1_1-DH5_2441_00_One_Burst_Time



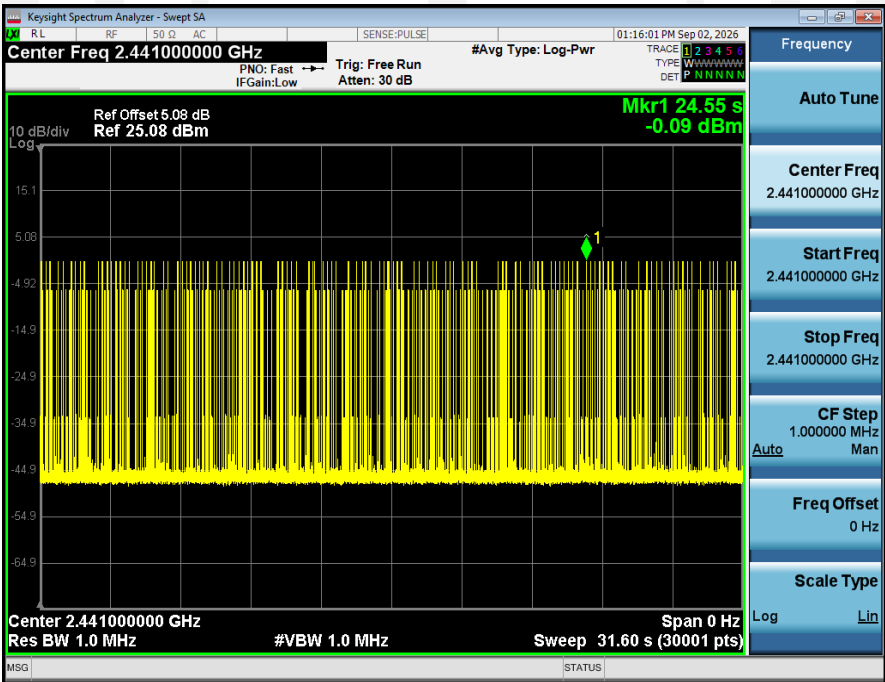
Dwell_Time_(Hopping)_NVNT_ANT1_1-DH5_2441_00_Accumulated



Dwell_Time_(Hopping)_NVNT_ANT1_2-DH3_2441_00_One_Burst_Time



Dwell_Time_(Hopping)_NVNT_ANT1_2-DH3_2441_00_Accumulated



[illegible]

Keysight Spectrum Analyzer - Swept SA

Center Freq 2.441000000 GHz

PNO: Fast → Trig: Free Run

IFGain: Low Atten: 30 dB

#Avg Type: Log-Pwr

TRACE 1 2 3 4 5 6

TYPE W W W W W W W W

DET P N N N N N N

01:18:43 PM Sep 02, 2026

10 dB/div

Ref Offset 5.08 dB

Ref 25.08 dBm

Mkr1 14.05 s

-0.11 dBm

Log

Center 2.441000000 GHz

Res BW 1.0 MHz

#VBW 1.0 MHz

Span 0 Hz

Sweep 31.60 s (30001 pts)

Log Lin

Frequency

Auto Tune

Center Freq
2.441000000 GHz

Start Freq
2.441000000 GHz

Stop Freq
2.441000000 GHz

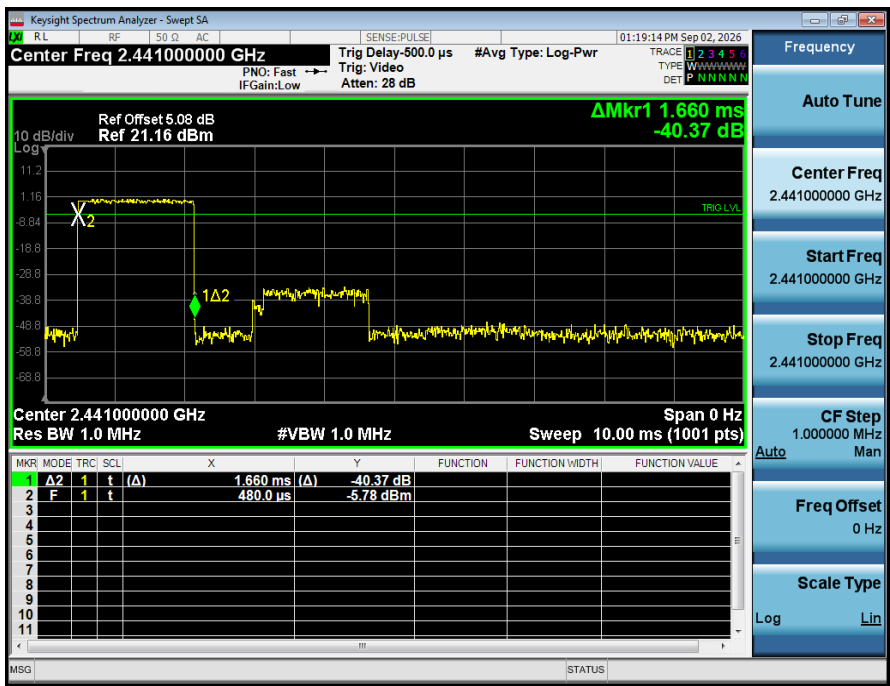
CF Step
1.00000 MHz
Auto Man

Freq Offset
0 Hz

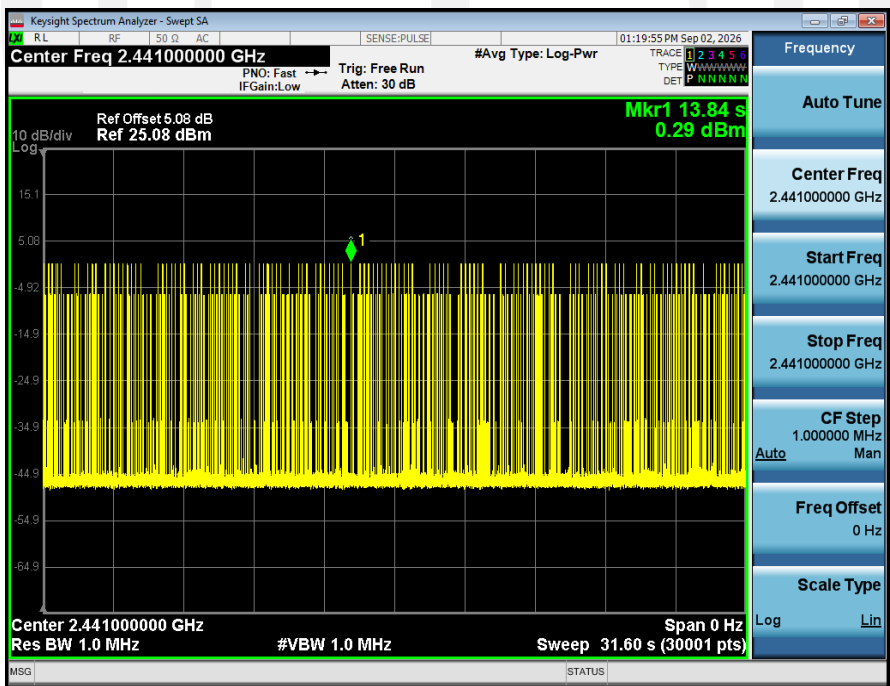
Scale Type
Log Lin

The image shows a Keysight Spectrum Analyzer interface. The main display is a frequency spectrum plot with a center frequency of 2.441000000 GHz. The y-axis represents power in dBm, ranging from -64.9 to 15.1, with a 10 dB/div scale. The x-axis represents frequency, with a span of 0 Hz. A dense signal is visible across the entire span. A marker is placed on the signal at -0.11 dBm. The right side of the interface contains a control panel with various settings, including Auto Tune, Center Freq, Start Freq, Stop Freq, CF Step, Freq Offset, and Scale Type. The bottom status bar shows the resolution bandwidth (Res BW) as 1.0 MHz, the video bandwidth (#VBW) as 1.0 MHz, and the sweep time as 31.60 s (30001 pts).

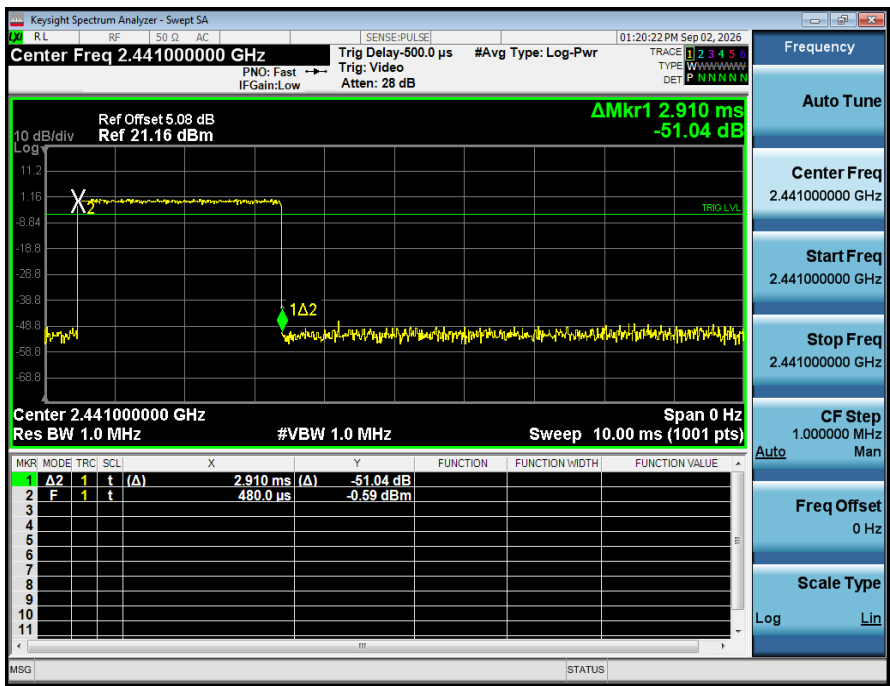
Dwell_Time_(Hopping)_NVNT_ANT1_3-DH3_2441_00_One_Burst_Time



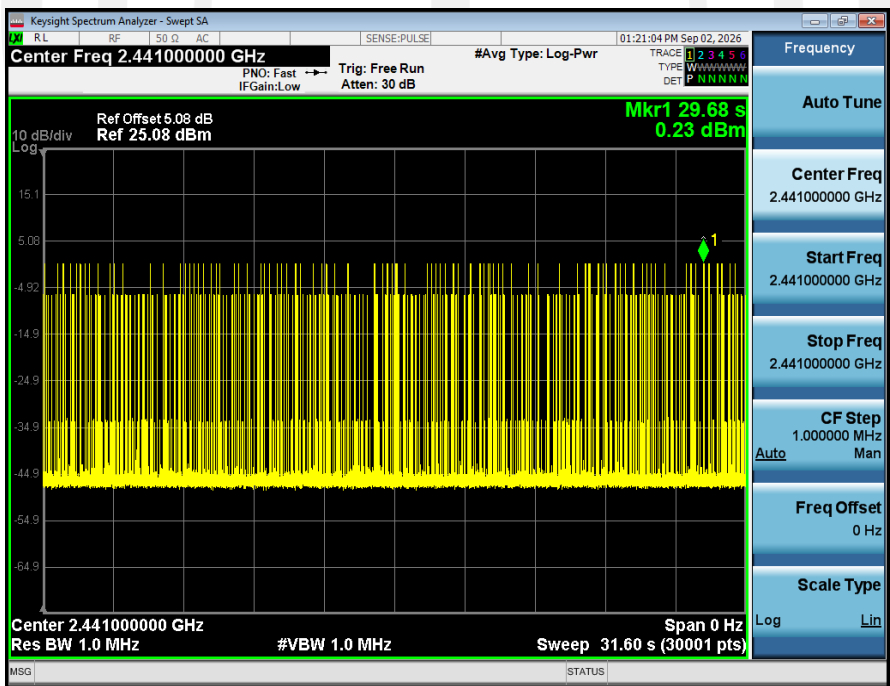
Dwell_Time_(Hopping)_NVNT_ANT1_3-DH3_2441_00_Accumulated



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

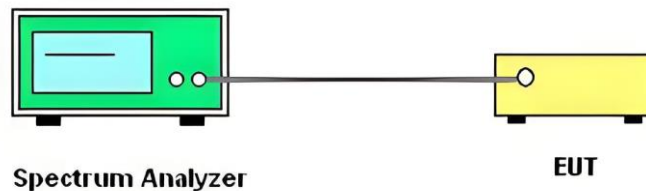
8.1. Test Limits

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

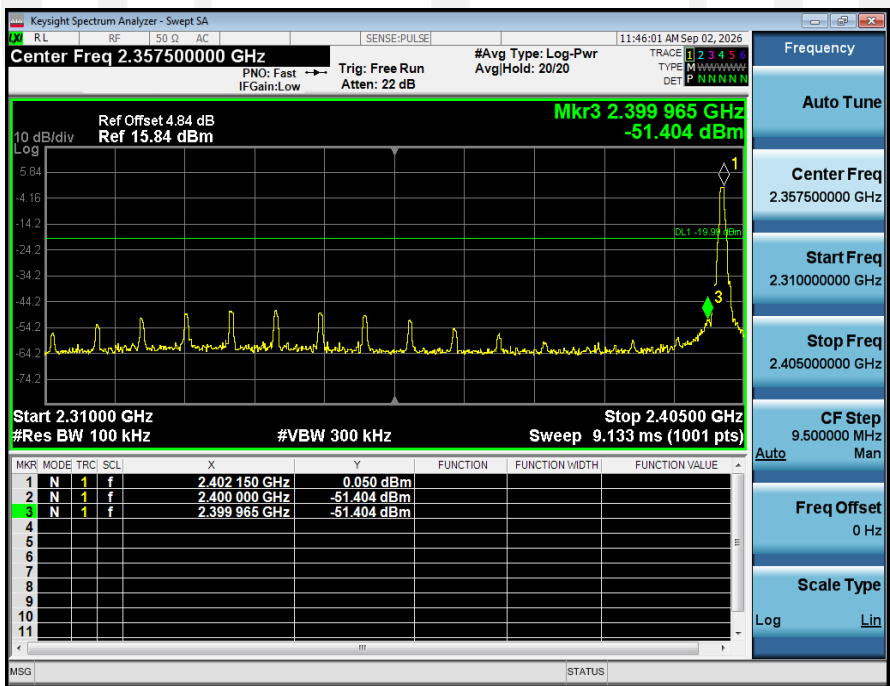
Condition	Antenna	Modulation	TX Mode	Ref_level(dBm)	Bandedge MAX.Value (dBm)	Limit(dBm)	Result
NVNT	ANT1	1-DH1	2402.00	0.006	-51.404	-19.994	Pass
NVNT	ANT1	1-DH1	Hopping_LCH	-0.013	-47.460	-20.013	Pass
NVNT	ANT1	1-DH1	2480.00	-0.427	-58.221	-20.427	Pass
NVNT	ANT1	1-DH1	Hopping_HCH	0.389	-44.645	-19.611	Pass
NVNT	ANT1	2-DH1	2402.00	-0.022	-49.751	-20.022	Pass
NVNT	ANT1	2-DH1	Hopping_LCH	0.058	-47.171	-19.942	Pass
NVNT	ANT1	2-DH1	2480.00	-0.457	-58.599	-20.457	Pass
NVNT	ANT1	2-DH1	Hopping_HCH	0.388	-44.492	-19.612	Pass
NVNT	ANT1	3-DH1	2402.00	0.005	-50.505	-19.995	Pass
NVNT	ANT1	3-DH1	Hopping_LCH	-0.075	-48.541	-20.075	Pass
NVNT	ANT1	3-DH1	2480.00	-0.581	-58.656	-20.581	Pass
NVNT	ANT1	3-DH1	Hopping_HCH	0.303	-44.745	-19.697	Pass



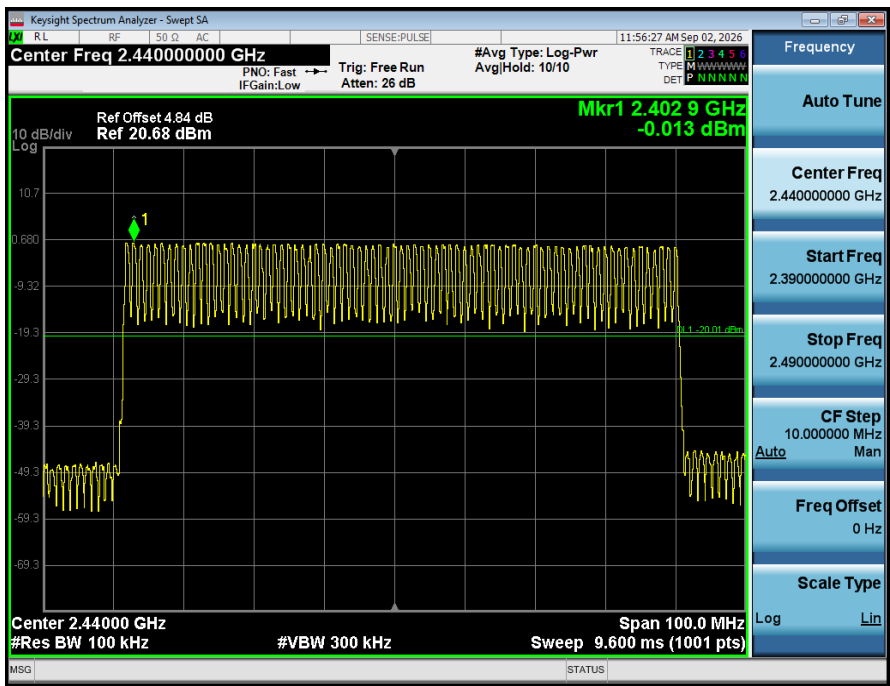
1_Reference_Level_NVNT_ANT1_1-DH1_2402_00



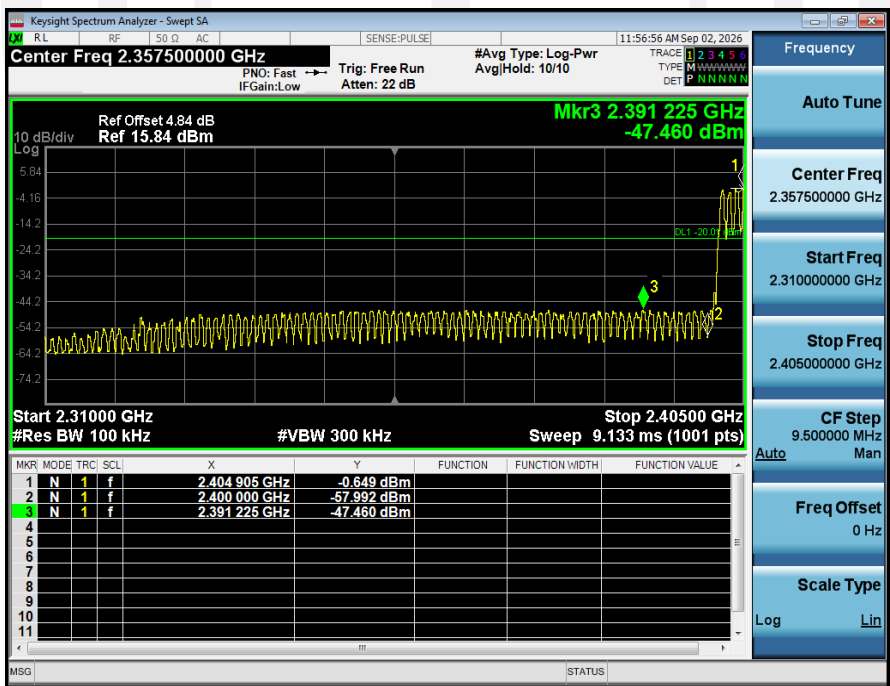
2_Bandedge_NVNT_ANT1_1-DH1_2402_00



1_Reference_Level_Hopping_NVNT_ANT1_1-DH1_Hopping



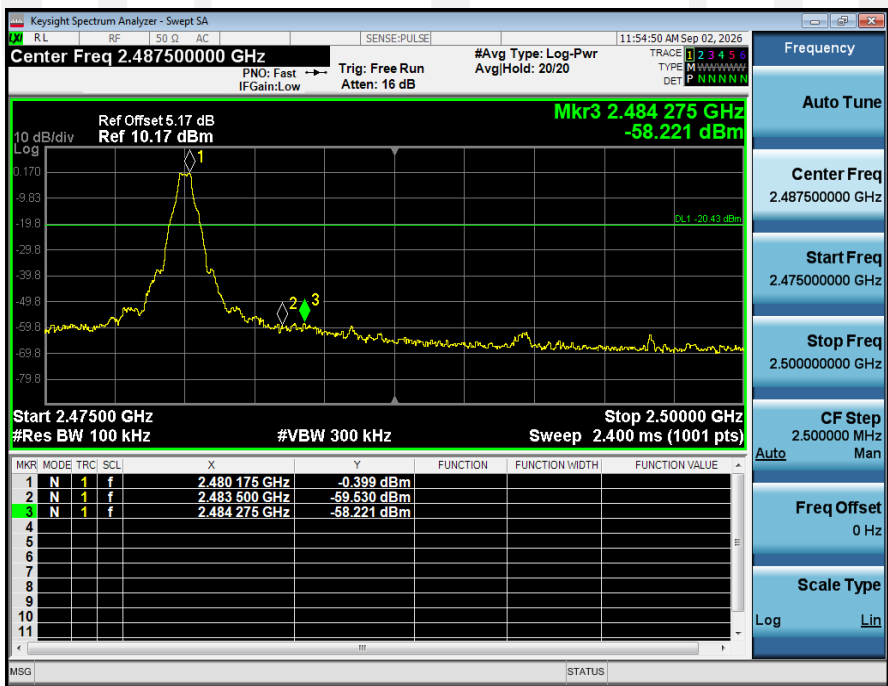
2_Band_Edge_(Hopping)_NVNT_ANT1_1-DH1_Hopping



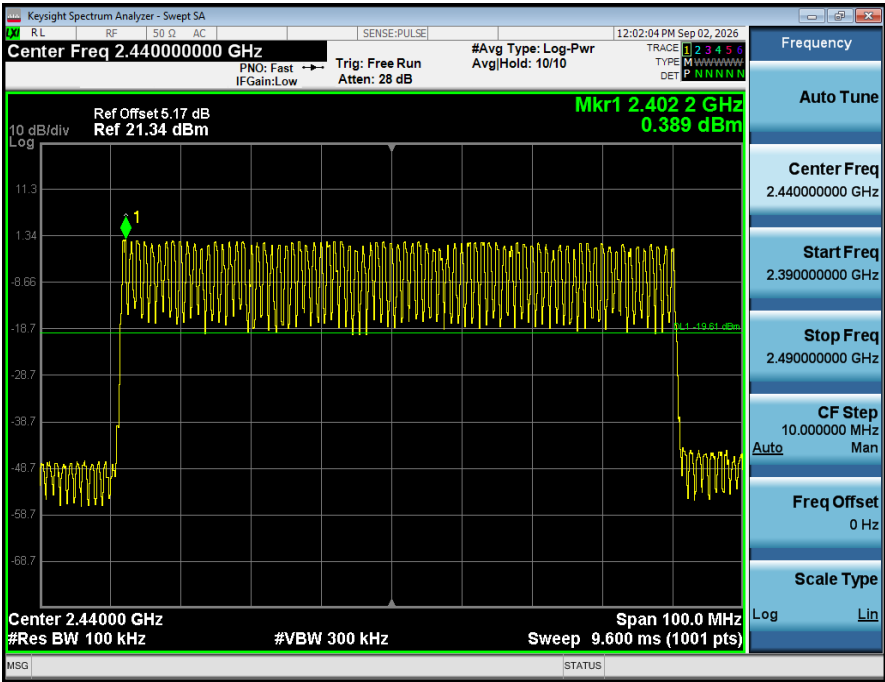
1_Reference_Level_NVNT_ANT1_1-DH1_2480_00



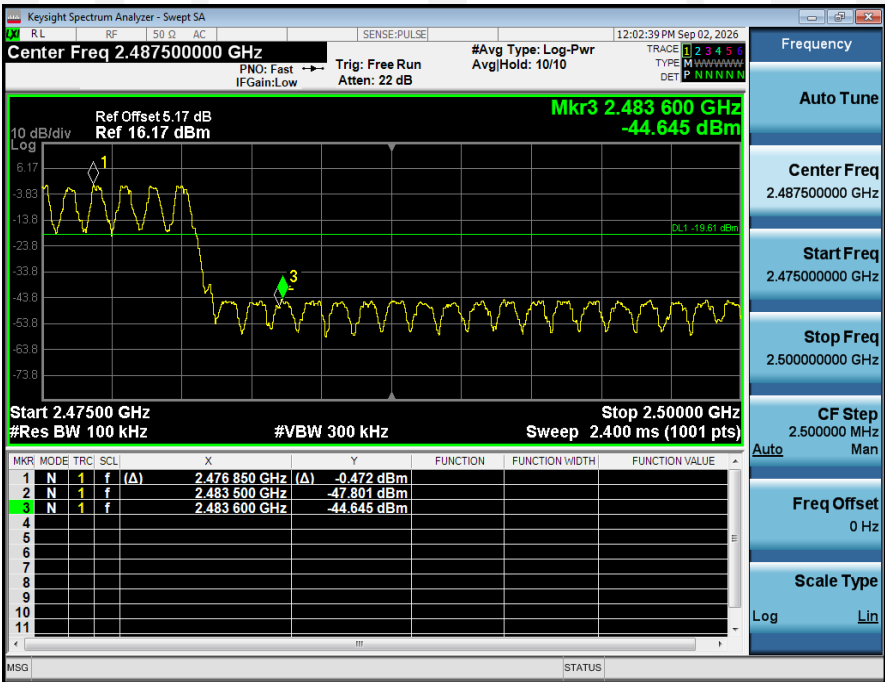
2_Bandedge_NVNT_ANT1_1-DH1_2480_00



1_Reference_Level_Hopping_NVNT_ANT1_1-DH1_Hopping



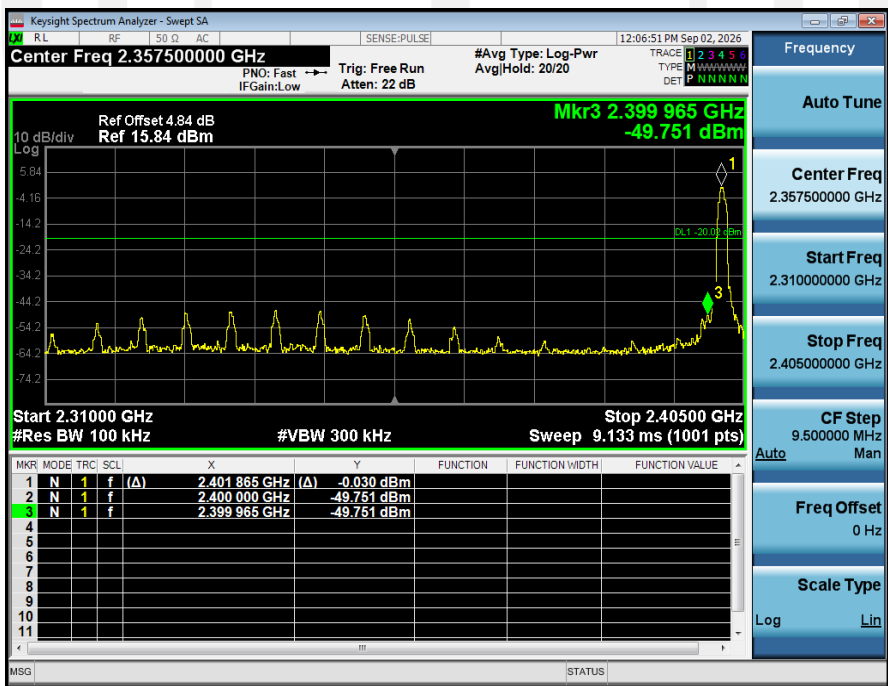
2_Band_Edge_(Hopping)_NVNT_ANT1_1-DH1_Hopping



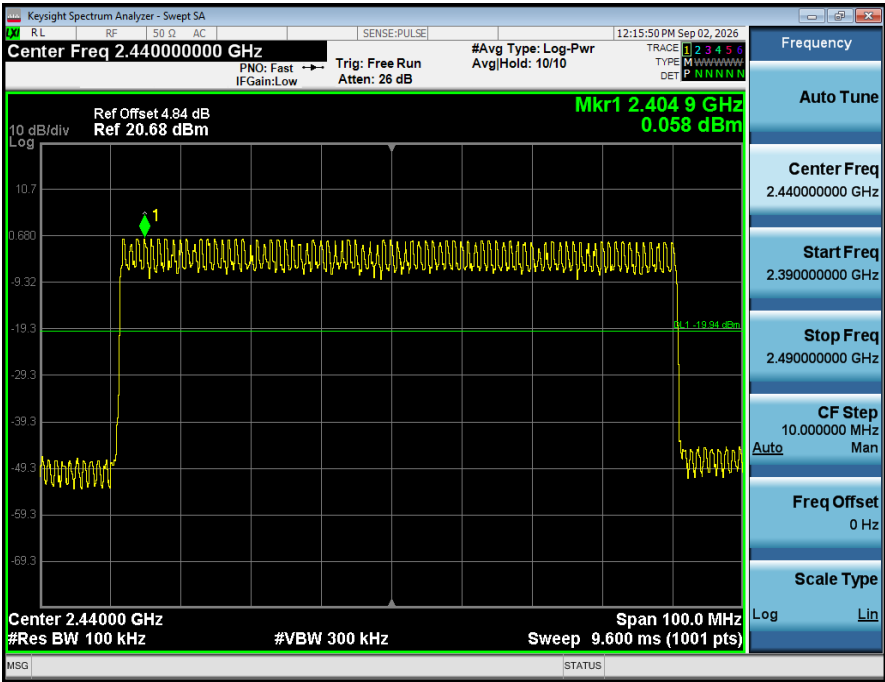
1_Reference_Level_NVNT_ANT1_2-DH1_2402_00



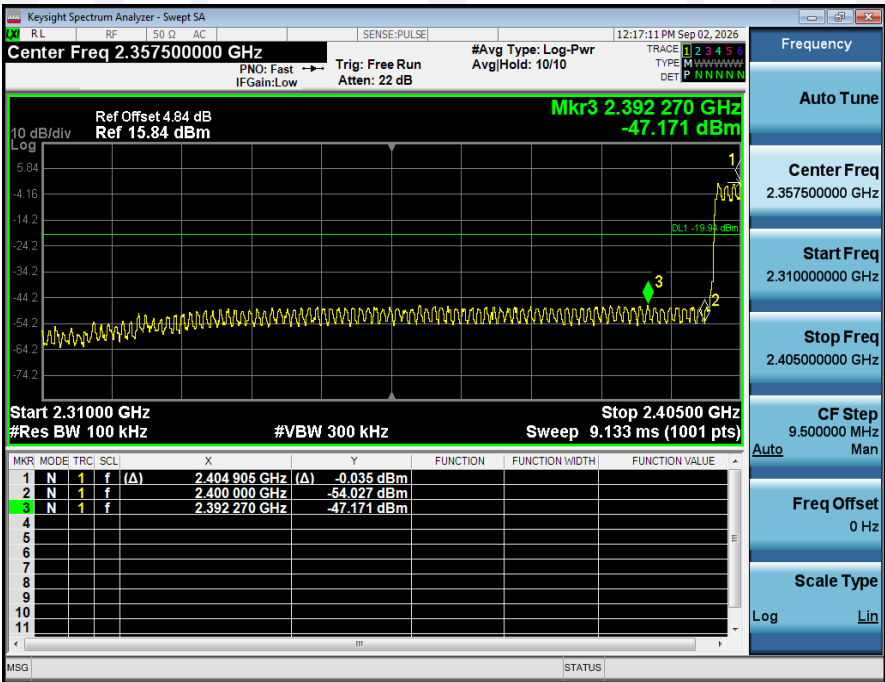
2_Bandedge_NVNT_ANT1_2-DH1_2402_00



1_Reference_Level_Hopping_NVNT_ANT1_2-DH1_Hopping



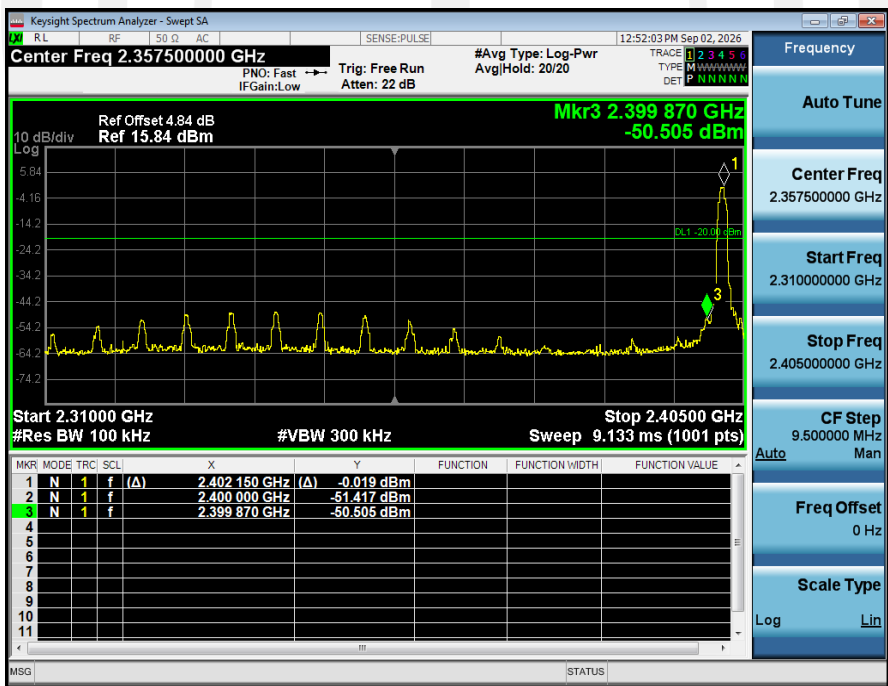
2_Band_Edge_(Hopping)_NVNT_ANT1_2-DH1_Hopping



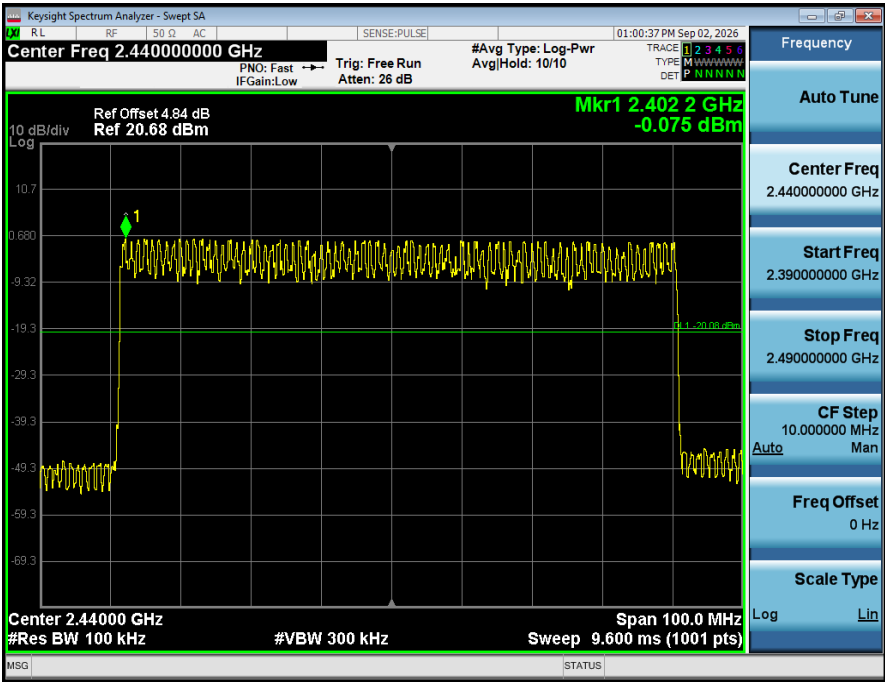
1_Reference_Level_NVNT_ANT1_3-DH1_2402_00



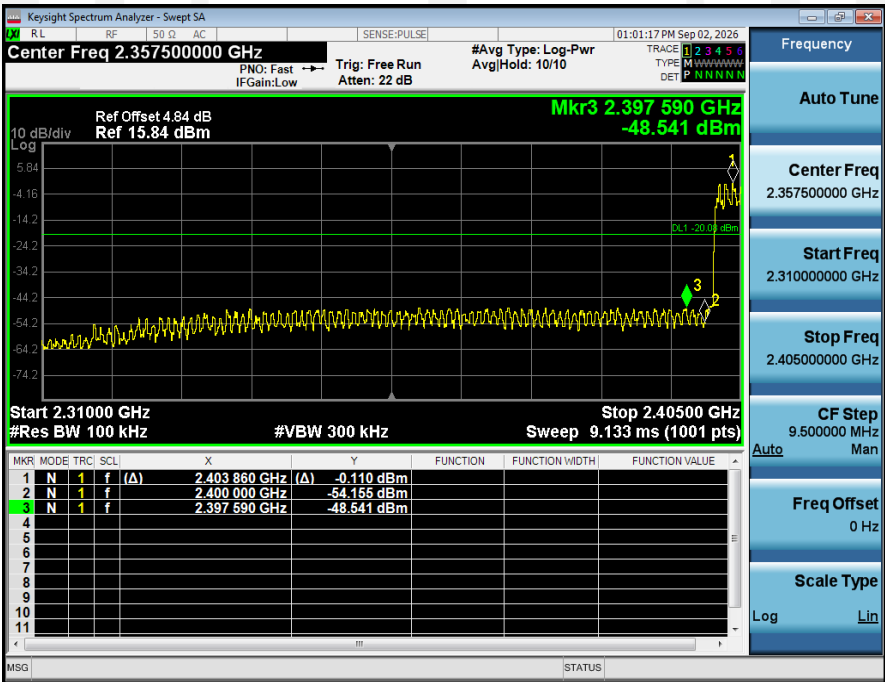
2_Bandedge_NVNT_ANT1_3-DH1_2402_00



1_Reference_Level_Hopping_NVNT_ANT1_3-DH1_Hopping



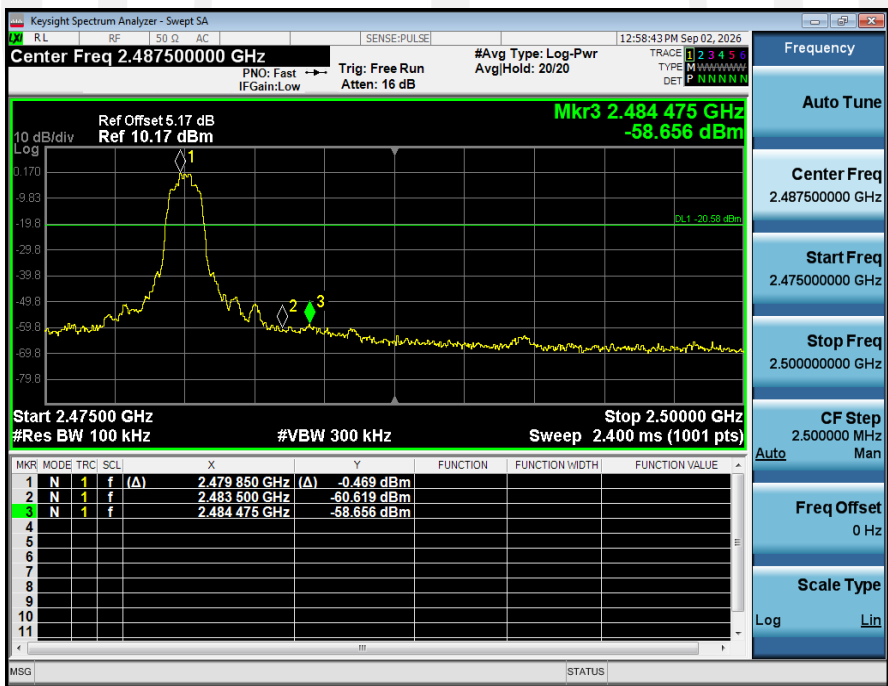
2_Band_Edge_(Hopping)_NVNT_ANT1_3-DH1_Hopping



1_Reference_Level_NVNT_ANT1_3-DH1_2480_00



2_Bandedge_NVNT_ANT1_3-DH1_2480_00



Conducted spurious emission: Pass

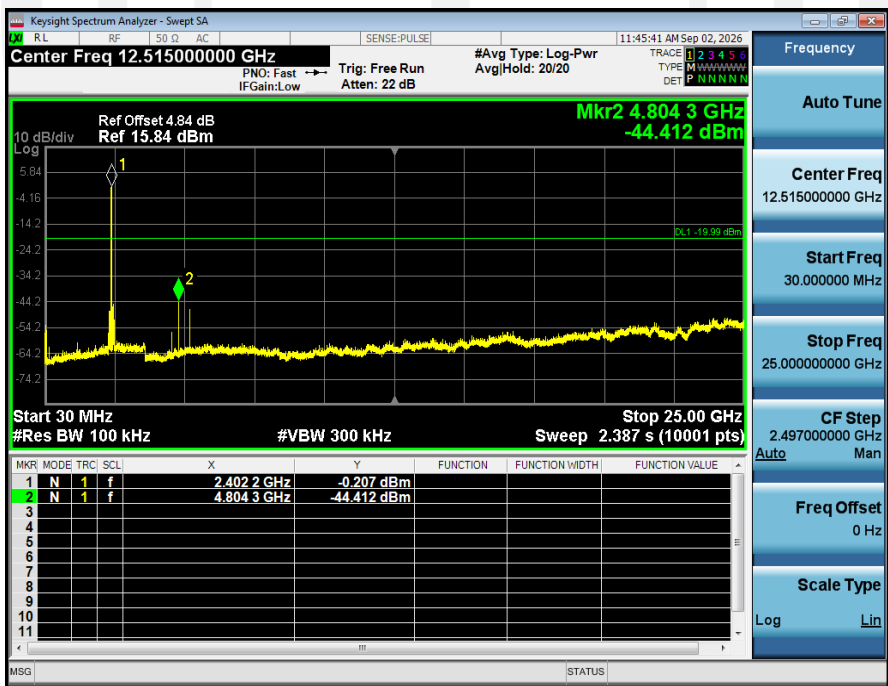
Condition	Antenna	Modulation	TX Mode	Ref_level(dBm)	Spurious MAX.Value(dBm)	Limit(dBm)	Result
NVNT	ANT1	1-DH1	2402.00	0.006	-44.412	-19.994	Pass
NVNT	ANT1	1-DH1	2441.00	-0.099	-44.590	-20.099	Pass
NVNT	ANT1	1-DH1	2480.00	-0.427	-44.698	-20.427	Pass
NVNT	ANT1	2-DH1	2402.00	-0.022	-46.005	-20.022	Pass
NVNT	ANT1	2-DH1	2441.00	-0.086	-44.348	-20.086	Pass
NVNT	ANT1	2-DH1	2480.00	-0.457	-45.424	-20.457	Pass
NVNT	ANT1	3-DH1	2402.00	0.005	-44.985	-19.995	Pass
NVNT	ANT1	3-DH1	2441.00	-0.100	-44.289	-20.100	Pass
NVNT	ANT1	3-DH1	2480.00	-0.581	-45.508	-20.581	Pass



1_Reference_Level_NVNT_ANT1_1-DH1_2402_00



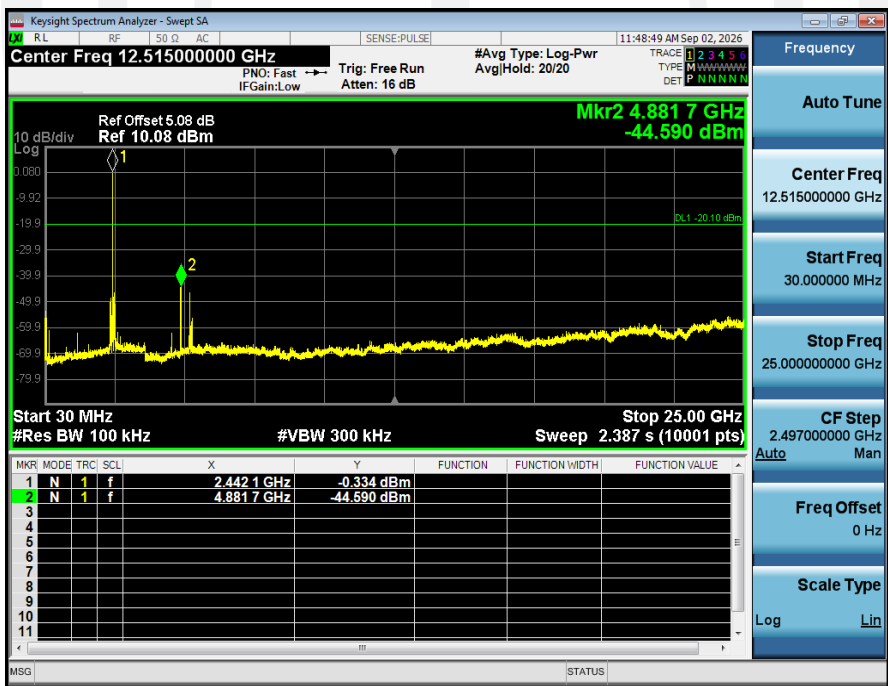
2_Spurious_Emissions_NVNT_ANT1_1-DH1_2402_00



1_Reference_Level_NVNT_ANT1_1-DH1_2441_00



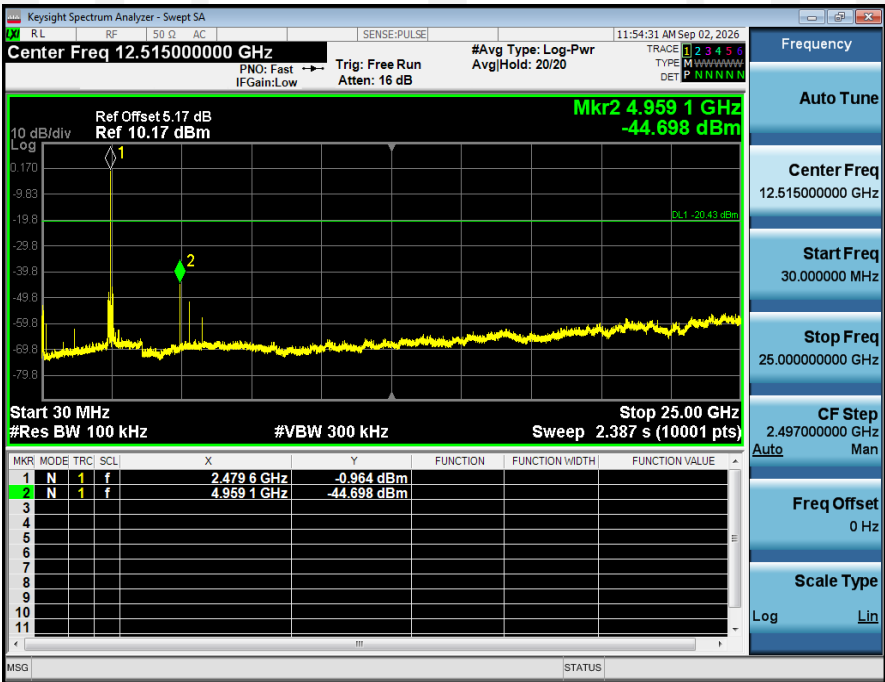
2_Spurious_Emissions_NVNT_ANT1_1-DH1_2441_00



1_Reference_Level_NVNT_ANT1_1-DH1_2480_00



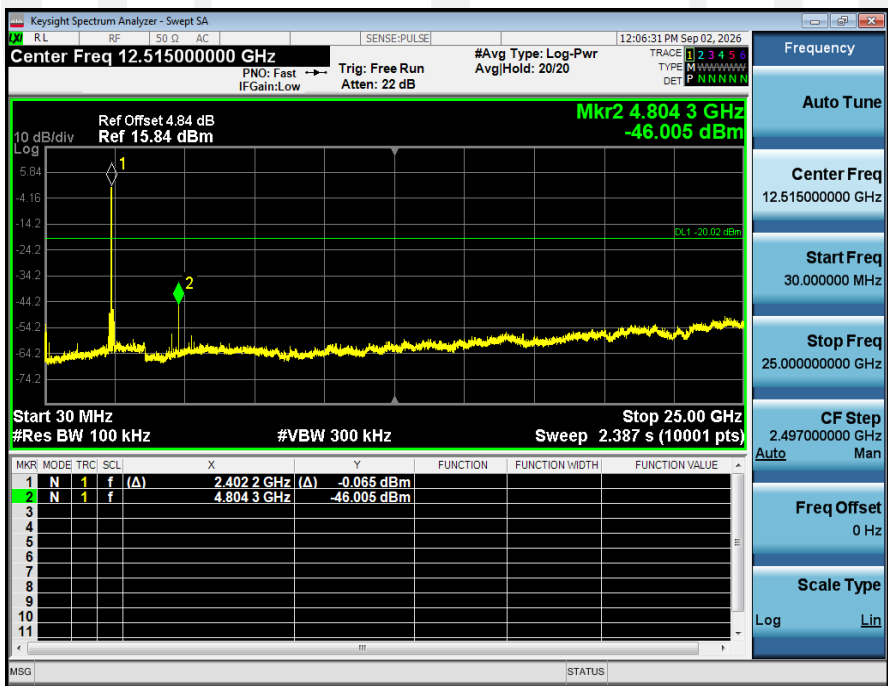
2_Spurious_Emissions_NVNT_ANT1_1-DH1_2480_00



1_Reference_Level_NVNT_ANT1_2-DH1_2402_00



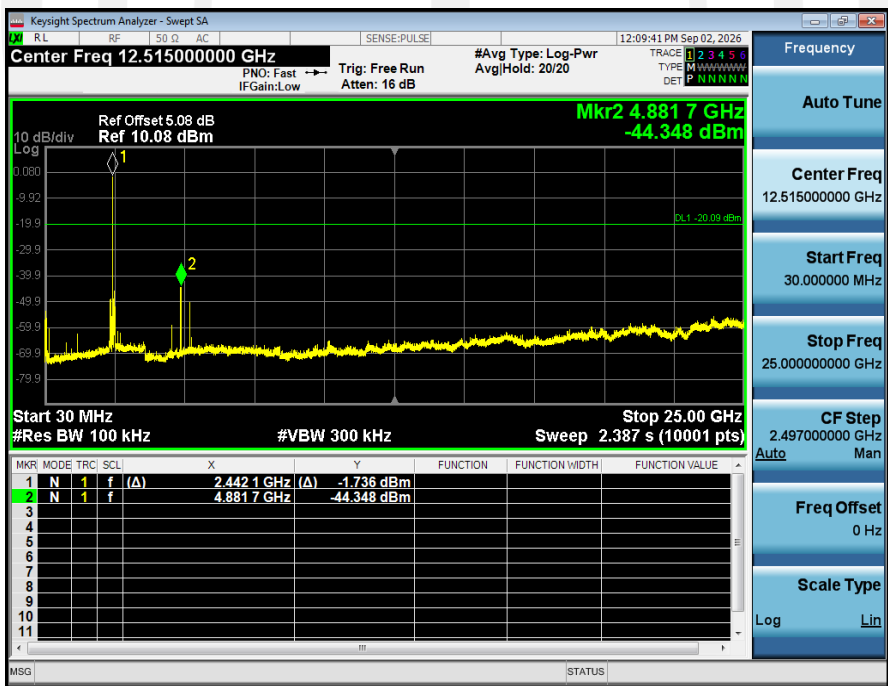
2_Spurious_Emissions_NVNT_ANT1_2-DH1_2402_00



1_Reference_Level_NVNT_ANT1_2-DH1_2441_00



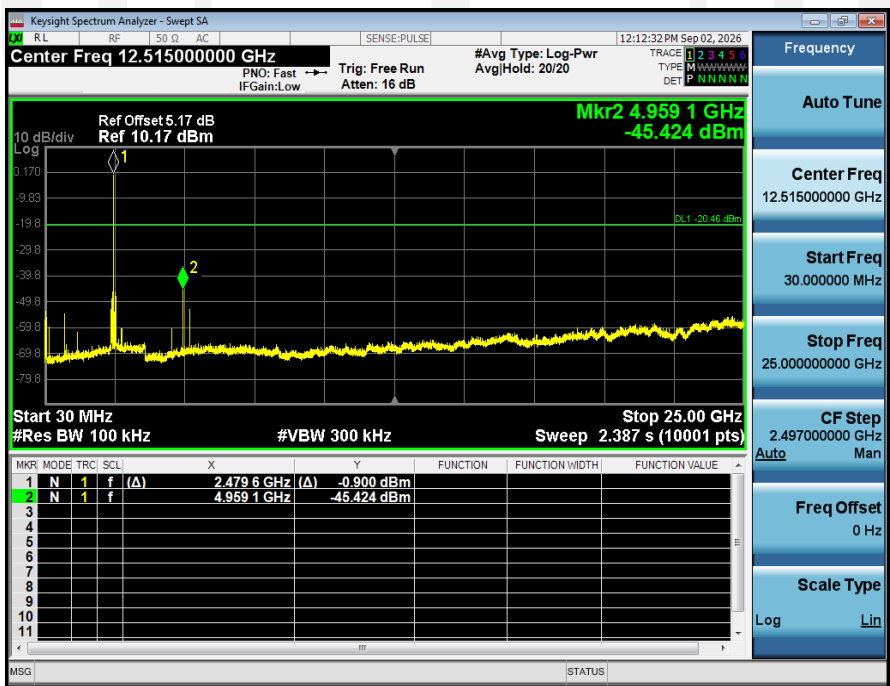
2_Spurious_Emissions_NVNT_ANT1_2-DH1_2441_00



1_Reference_Level_NVNT_ANT1_2-DH1_2480_00



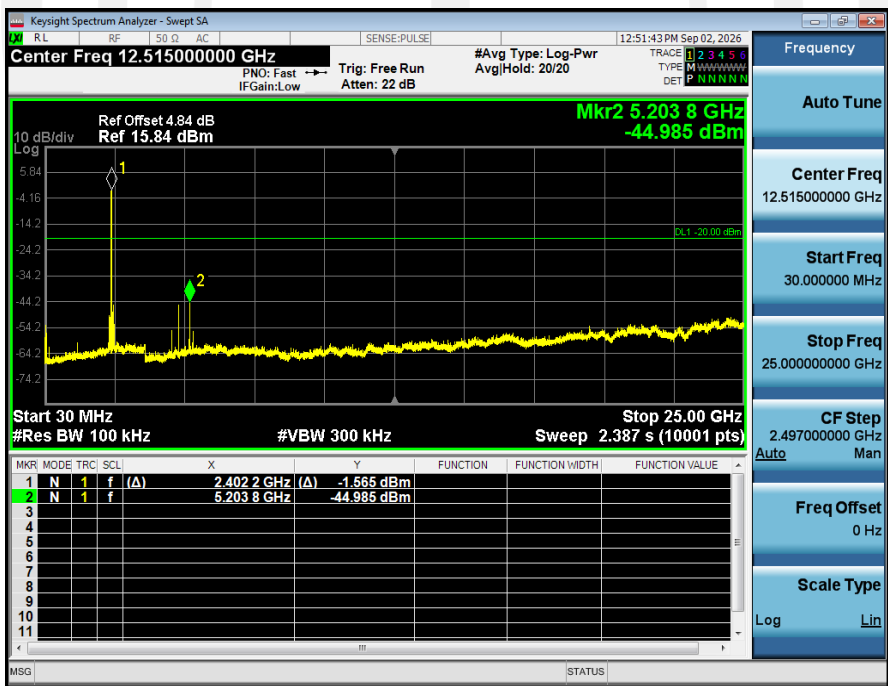
2_Spurious_Emissions_NVNT_ANT1_2-DH1_2480_00



1_Reference_Level_NVNT_ANT1_3-DH1_2402_00



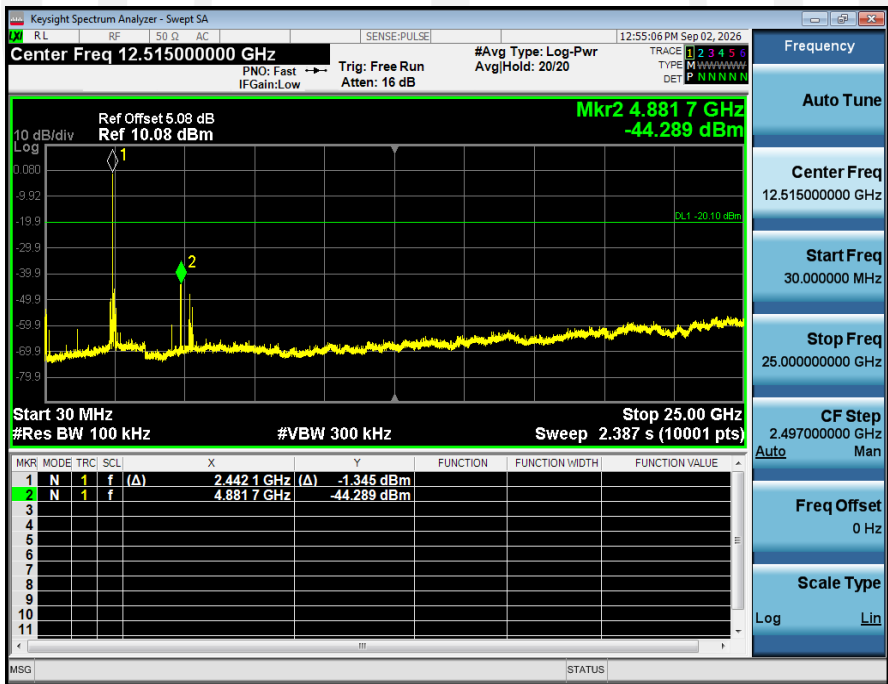
2_Spurious_Emissions_NVNT_ANT1_3-DH1_2402_00



1_Reference_Level_NVNT_ANT1_3-DH1_2441_00



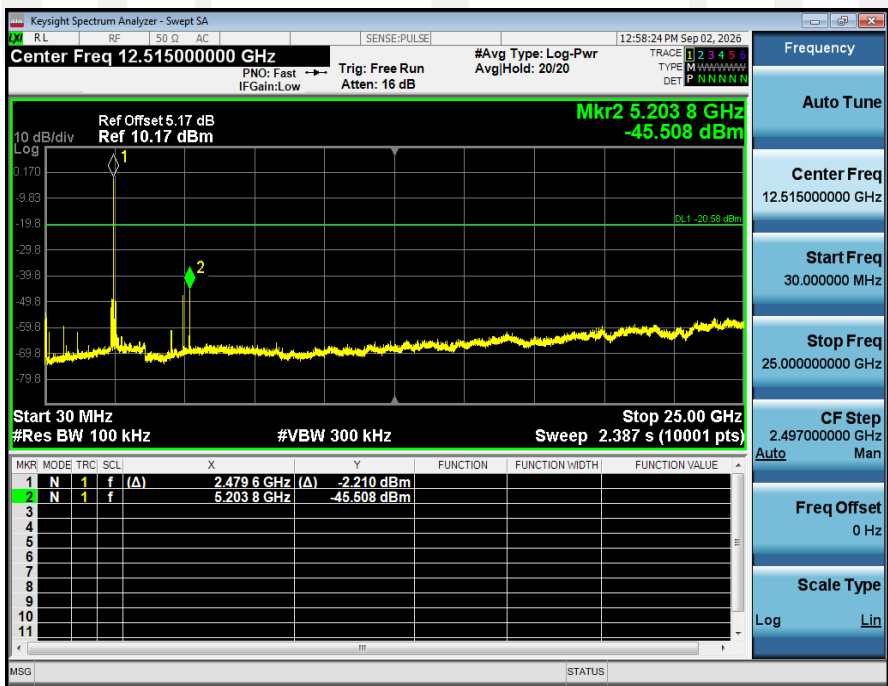
2_Spurious_Emissions_NVNT_ANT1_3-DH1_2441_00



1_Reference_Level_NVNT_ANT1_3-DH1_2480_00



2_Spurious_Emissions_NVNT_ANT1_3-DH1_2480_00



9. Spurious Emission

9.1. Test Limits

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

Note: The peak limit is 20 dB higher than the average limit

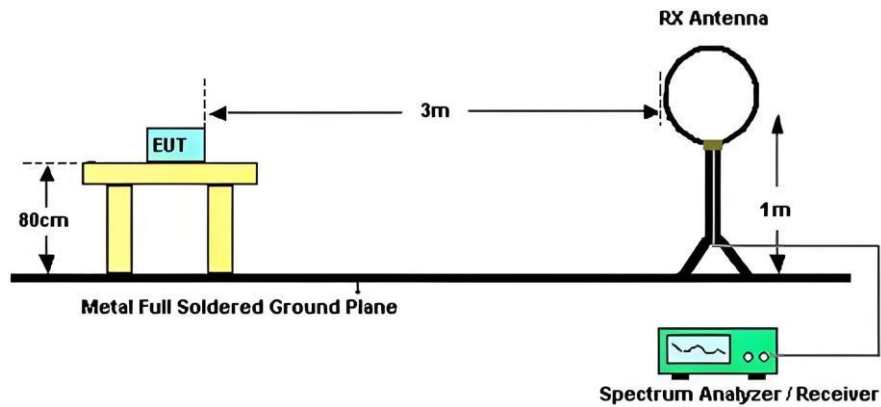
All the emissions appearing within 15.205 restricted frequency bands shall not exceed the limits shown in 15.209, all the other emissions shall be at least 20dB below the fundamental emissions, or comply with 15.209 limits.

15.205 Restricted frequency band

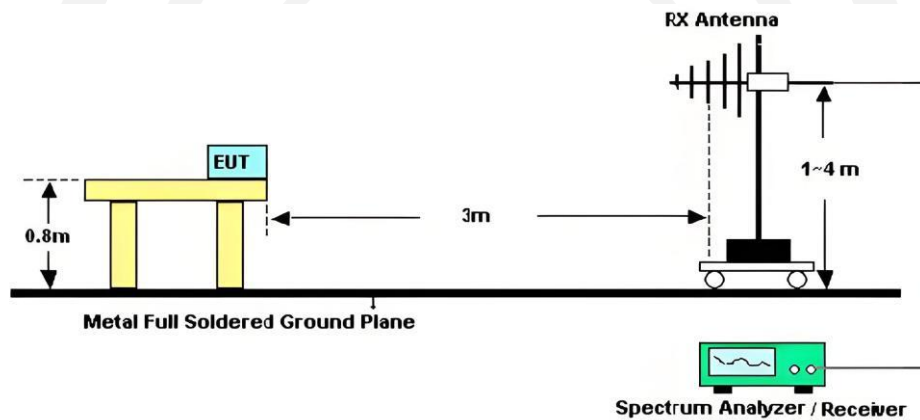
MHz	MHz	MHz	GHz
0.090 - 0.110	16.42 - 16.423	399.9 - 410	4.5 - 5.15
¹ 0.495 - 0.505	16.69475 - 16.69525	608 - 614	5.35 - 5.46
2.1735 - 2.1905	16.80425 - 16.80475	960 - 1240	7.25 - 7.75
4.125 - 4.128	25.5 - 25.67	1300 - 1427	8.025 - 8.5
4.17725 - 4.17775	37.5 - 38.25	1435 - 1626.5	9.0 - 9.2
4.20725 - 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)

9.2. Block Diagram of Test setup

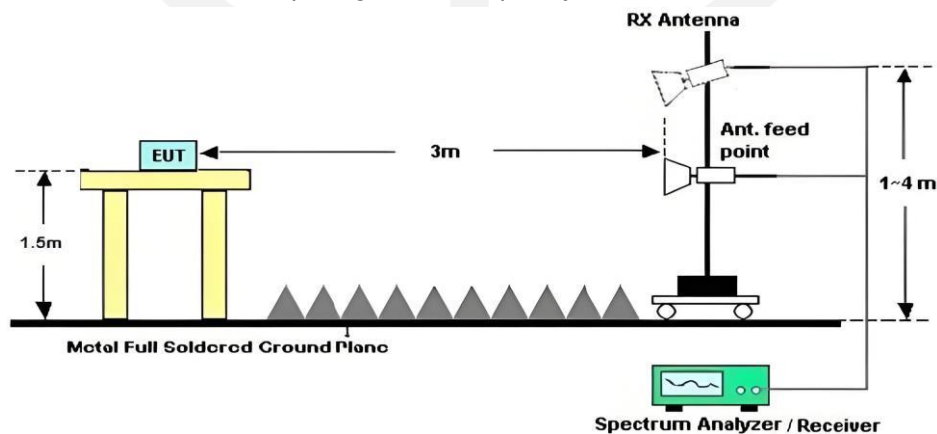
a. In 3m Anechoic Chamber Test Setup Diagram for below 30MHz



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



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



9.3. Test Procedure

- (1) The test equipment is placed on a non-metallic tabletop. For false radiation emission tests below 1G, the distance between the equipment and the ground surface is 80 cm; for false radiation emission tests above 1G, the distance is 1.5 meters. The equipment is situated within a semi-anechoic chamber.
- (2) Setup EUT and simulator
- (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 C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 on 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 3MHz for Average measure.

Test setup information:

9KHz~150KHz	RBW 200Hz	VBW 1KHz
150KHz~30MHz	RBW 9KHz	VBW 30KHz
30MHz~1GHz	RBW 120KHz	VBW 300KHz
Above1GHz	RBW 1MHz	VBW 3MHz

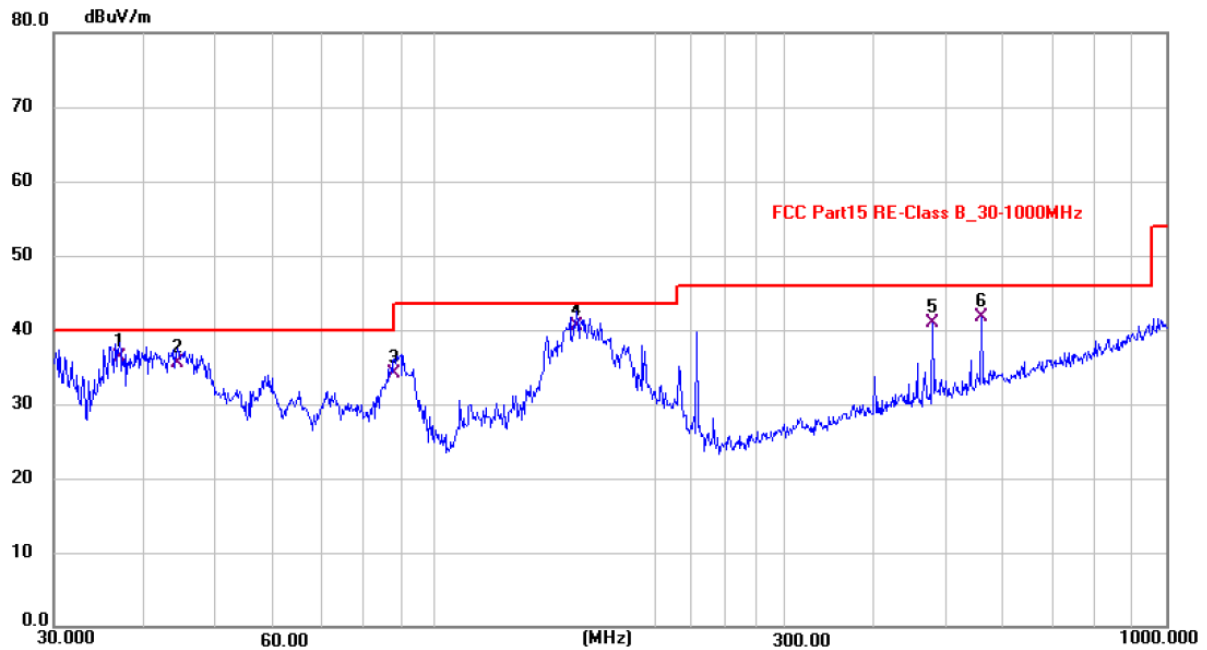
9.4. Test Results

We have scanned from 9kHz to the 10th harmonic of the EUT's highest frequency.

Detailed information please see the following page.

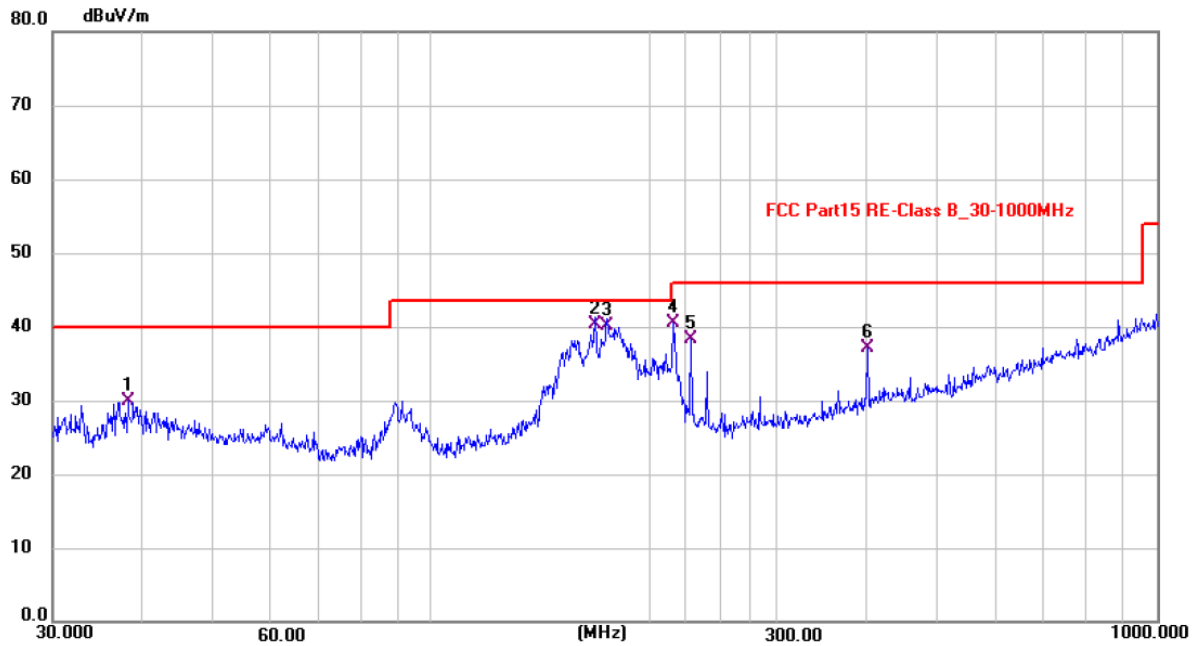
From 9KHz to 30MHz:	
Test Date : 2026.09.01	Temperature : 26°C
Test Engineer : Felix Pang	Humidity : 54%
Test Mode : GFSK mode	
Test Voltage : AC 120V/60HZ	
Test Results : PASS	
Note:	The amplitude of spurious emissions which are attenuated by more than 20dB below the permissible value has no need to be reported.

From 30MHz to 1000MHz:	
Test Date : 2026.09.01	Temperature : 26°C
Test Engineer : Felix Pang	Humidity : 54%
Test Mode : GFSK mode	
Test Voltage : AC 120V/60HZ	
Test Results : PASS	
Note:	1. The test results are listed in next pages. 2. 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 and quasi-peak detector need not be carried out. 3. All modes have been tested, and only worst data of GFSK mode, Channel 2402MHz was listed in this report.

Polarization: Vertical

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	37.0250	22.54	13.84	36.38	40.00	-3.62	QP
2	44.3140	21.58	13.96	35.54	40.00	-4.46	QP
3	87.9171	23.97	10.20	34.17	40.00	-5.83	QP
4 *	156.0466	25.38	15.19	40.57	43.50	-2.93	QP
5	480.1064	21.34	19.51	40.85	46.00	-5.15	QP
6	560.2015	20.51	21.25	41.76	46.00	-4.24	QP

Note: Level = Reading + Factor Margin = Level - Limit

Polarization: Horizontal

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
1	38.1784	15.94	14.01	29.95	40.00	-10.05	QP
2 *	167.9713	25.87	14.49	40.36	43.50	-3.14	QP
3	174.5770	26.47	13.66	40.13	43.50	-3.37	QP
4	216.0240	28.30	12.14	40.44	46.00	-5.56	QP
5	227.9901	25.69	12.68	38.37	46.00	-7.63	QP
6	400.0810	19.61	17.56	37.17	46.00	-8.83	QP

Note: Level = Reading + Factor Margin = Level - Limit

From 1GHz to 25GHz:	
Test Date : 2026.09.01	Temperature : 26℃
Test Engineer : Felix Pang	Humidity : 54%
Test Mode : GFSK, $\pi/4$ DQPSK, 8DPSK mode	
Test Voltage : AC 120V/60HZ	
Test Results : PASS	
Note:	1. The test results are listed in next pages. 2. 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 and quasi-peak detector need not be carried out. 3. If the limits for the measurement with the average detector are met when using a receiver with a quasi-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 Mode : GFSK TX Low								
No.	Freq MHz	Polarity	Reading (dBuV/m)	Correct Factor	Result (dBuV/m)	Limit (dBuV/m)	Margin	Remark
1	4804	V	59.78	-13.25	46.53	74.00	-27.47	Peak
2	4804	V	48.42	-13.25	35.17	54.00	-18.83	Avg
3	7206	--	--	--	--	--	--	--
4	9608	--	--	--	--	--	--	--
5	4804	H	55.23	-13.25	41.98	74.00	-32.02	Peak
6	4804	H	45.21	-13.25	31.96	54.00	-22.04	Avg
7	7206	--	--	--	--	--	--	--
8	9608	--	--	--	--	--	--	--
Test Mode : GFSK TX Mid								
1	4882	V	59.34	-12.98	46.36	74.00	-27.64	Peak
2	4882	V	49.42	-12.98	36.44	54.00	-17.56	Avg
3	7323	--	--	--	--	--	--	--
4	9764	--	--	--	--	--	--	--
5	4882	H	57.04	-12.98	44.06	74.00	-29.94	Peak
6	4882	H	46.26	-12.98	33.28	54.00	-20.72	Avg
7	7323	--	--	--	--	--	--	--
8	9764	--	--	--	--	--	--	--
Test Mode : GFSK TX High								
1	4960	V	58.61	-12.70	45.91	74.00	-28.09	Peak
2	4960	V	49.70	-12.70	37.00	54.00	-17.00	Avg
3	7440	--	--	--	--	--	--	--
4	9920	--	--	--	--	--	--	--
5	4960	H	57.14	-12.70	44.44	74.00	-29.56	Peak
6	4960	H	45.83	-12.70	33.13	54.00	-20.87	Avg
7	7440	--	--	--	--	--	--	--
8	9920	--	--	--	--	--	--	--
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.							

Test Mode : $\pi/4$ DQPSK TX Low								
No.	Freq MHz	Polarity	Reading (dBuV/m)	Correct Factor	Result (dBuV/m)	Limit (dBuV/m)	Margin	Remark
1	4804	V	56.90	-13.25	43.65	74.00	-30.35	Peak
2	4804	V	48.52	-13.25	35.27	54.00	-18.73	Avg
3	7206	--	--	--	--	--	--	--
4	9608	--	--	--	--	--	--	--
5	4804	H	57.74	-13.25	44.49	74.00	-29.51	Peak
6	4804	H	47.29	-13.25	34.04	54.00	-19.96	Avg
7	7206	--	--	--	--	--	--	--
8	9608	--	--	--	--	--	--	--
Test Mode : $\pi/4$ DQPSK TX Mid								
1	4882	V	57.03	-12.98	44.05	74.00	-29.95	Peak
2	4882	V	49.76	-12.98	36.78	54.00	-17.22	Avg
3	7323	--	--	--	--	--	--	--
4	9764	--	--	--	--	--	--	--
5	4882	H	55.74	-12.98	42.76	74.00	-31.24	Peak
6	4882	H	45.56	-12.98	32.58	54.00	-21.42	Avg
7	7323	--	--	--	--	--	--	--
8	9764	--	--	--	--	--	--	--
Test Mode : $\pi/4$ DQPSK TX High								
1	4960	V	59.74	-12.70	47.04	74.00	-26.96	Peak
2	4960	V	50.45	-12.70	37.75	54.00	-16.25	Avg
3	7440	--	--	--	--	--	--	--
4	9920	--	--	--	--	--	--	--
5	4960	H	54.75	-12.70	42.05	74.00	-31.95	Peak
6	4960	H	44.81	-12.70	32.11	54.00	-21.89	Avg
7	7440	--	--	--	--	--	--	--
8	9920	--	--	--	--	--	--	--
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.							

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	59.53	-13.25	46.28	74.00	-27.72	Peak
2	4804	V	50.24	-13.25	36.99	54.00	-17.01	Avg
3	7206	--	--	--	--	--	--	--
4	9608	--	--	--	--	--	--	--
5	4804	H	57.66	-13.25	44.41	74.00	-29.59	Peak
6	4804	H	46.46	-13.25	33.21	54.00	-20.79	Avg
7	7206	--	--	--	--	--	--	--
8	9608	--	--	--	--	--	--	--
Test Mode : 8DPSK TX Mid								
1	4882	V	57.62	-12.98	44.64	74.00	-29.36	Peak
2	4882	V	49.64	-12.98	36.66	54.00	-17.34	Avg
3	7323	--	--	--	--	--	--	--
4	9764	--	--	--	--	--	--	--
5	4882	H	57.50	-12.98	44.52	74.00	-29.48	Peak
6	4882	H	44.72	-12.98	31.74	54.00	-22.26	Avg
7	7323	--	--	--	--	--	--	--
8	9764	--	--	--	--	--	--	--
Test Mode : 8D PSK TX High								
1	4960	V	57.69	-12.70	44.99	74.00	-29.01	Peak
2	4960	V	47.09	-12.70	34.39	54.00	-19.61	Avg
3	7440	--	--	--	--	--	--	--
4	9920	--	--	--	--	--	--	--
5	4960	H	57.07	-12.70	44.37	74.00	-29.63	Peak
6	4960	H	46.46	-12.70	33.76	54.00	-20.24	Avg
7	7440	--	--	--	--	--	--	--
8	9920	--	--	--	--	--	--	--
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.								

10. Band Edge Test

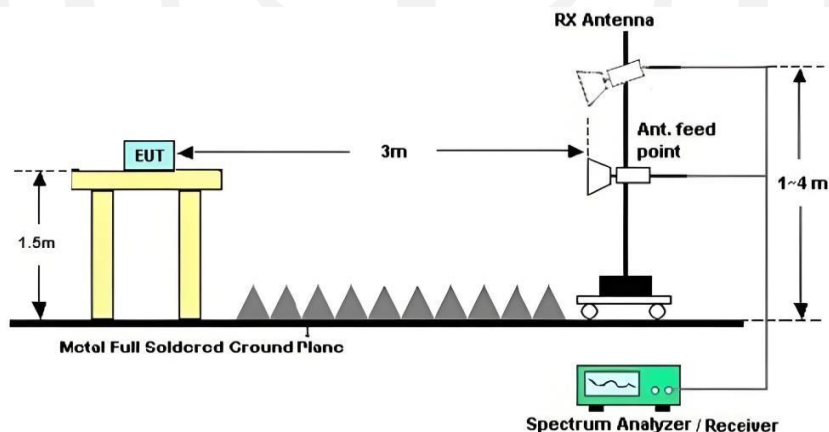
10.1. Test Limit

In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).

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

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

10.2. Block Diagram of Test Setup



10.3. Test Procedure

ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 section 6.10.5.2

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

Details see the KDB558074 D01 Meas Guidance v05r02

1. Put the EUT on a 1.5m high table, power on the EUT. Emissions were scanned and measured rotating the EUT to 360 degrees, Find the maximum Emission
2. Check the spurious emissions out of band.
3. RBW 1MHz, VBW 3MHz, peak detector for peak value, RBW 1MHz, VBW 3MHz, RMS detector for AV value.

10.4. Test Results

Test Date	: 2026.09.01	Temperature	: 26℃
Test Engineer	: Felix Pang	Humidity	: 54%
Test Results	: PASS		

Frequency Range : 2310MHz~2390MHz								
Test Mode : GFSK TX 2402MHz								
No.	Freq MHz	Polarity	Reading (dBuV/m)	Correct Factor	Result (dBuV/m)	Limit (dBuV/m)	Margin	Remark
1	2390	H	62.91	-20.45	42.46	74.00	-31.54	Peak
2	2390	H	--	-20.45	--	54.00	--	Avg
1	2390	V	60.98	-20.45	40.53	74.00	-33.47	Peak
2	2390	V	--	-20.45	--	54.00	--	Avg
Frequency Range : 2483.5MHz~2550MHz								
Test Mode : GFSK TX 2480MHz								
1	2483.5	H	62.08	-20.15	41.93	74.00	-32.07	Peak
2	2483.5	H	--	-20.15	--	54.00	--	Avg
1	2483.5	V	64.79	-20.15	44.64	74.00	-29.36	Peak
2	2483.5	V	--	-20.15	--	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.							

Frequency Range : 2310MHz~2390MHz								
Test Mode : $\pi/4$ DQPSK TX 2402MHz								
No.	Freq MHz	Polarity	Reading (dBuV/m)	Correct Factor	Result (dBuV/m)	Limit (dBuV/m)	Margin	Remark
1	2390	H	60.96	-20.45	40.51	74.00	-33.49	Peak
2	2390	H	--	-20.45	--	54.00	--	Avg
1	2390	V	61.56	-20.45	41.11	74.00	-32.89	Peak
2	2390	V	--	-20.45	--	54.00	--	Avg
Frequency Range : 2483.5MHz~2550MHz								
Test Mode : $\pi/4$ DQPSK TX 2480MHz								
1	2483.5	H	62.79	-20.15	42.64	74.00	-31.36	Peak
2	2483.5	H	--	-20.15	--	54.00	--	Avg
1	2483.5	V	63.11	-20.15	42.96	74.00	-31.04	Peak
2	2483.5	V	--	-20.15	--	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.								

Frequency Range : 2310MHz~2390MHz								
Test Mode : 8DPSK TX 2402MHz								
No.	Freq MHz	Polarity	Reading (dBuV/m)	Correct Factor	Result (dBuV/m)	Limit (dBuV/m)	Margin	Remark
1	2390	H	60.06	-20.45	39.61	74.00	-34.39	Peak
2	2390	H	--	-20.45	--	54.00	--	Avg
1	2390	V	59.80	-20.45	39.35	74.00	-34.65	Peak
2	2390	V	--	-20.45	--	54.00	--	Avg
Frequency Range : 2483.5MHz~2550MHz								
Test Mode : 8DPSK TX 2480MHz								
1	2483.5	H	60.52	-20.15	40.37	74.00	-33.63	Peak
2	2483.5	H	--	-20.15	--	54.00	--	Avg
1	2483.5	V	63.49	-20.15	43.34	74.00	-30.66	Peak
2	2483.5	V	--	-20.15	--	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.								

11. Power Line Conducted Emissions

11.1. Test Limits

Frequency (MHz)	Limits dB(μV)	
	Quasi-peak Level	Average Level
0.15 -0.50	66 -56*	56 - 46*
0.50 -5.00	56	46
5.00 -30.00	60	50

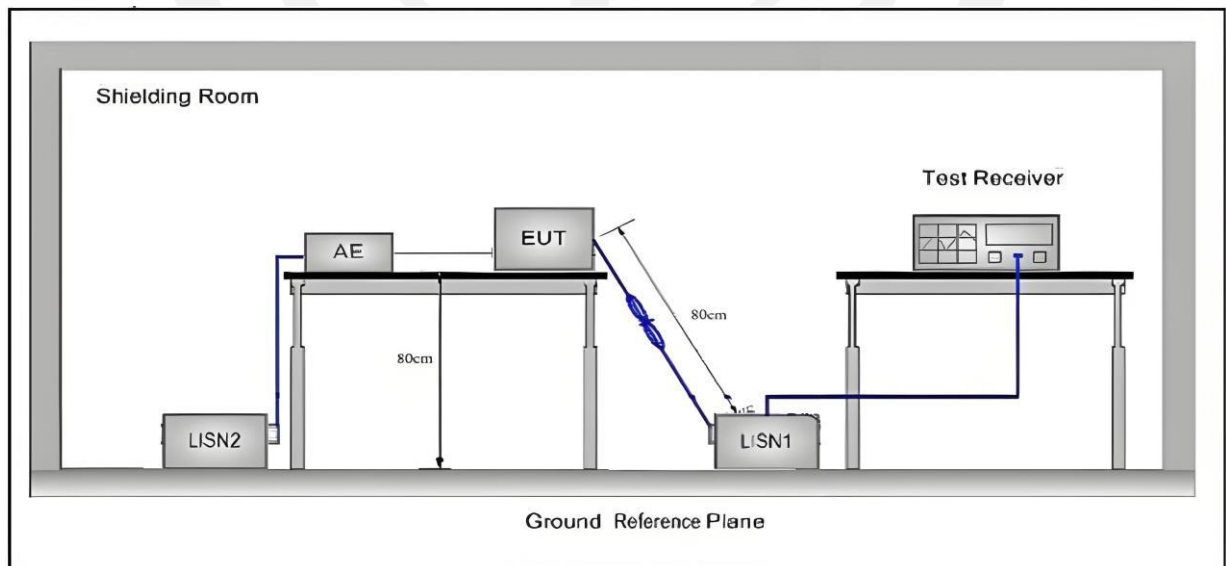
- Notes: 1. *Decreasing linearly with logarithm of frequency.
 2. The lower limit shall apply at the transition frequencies.
 3. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

11.2. Test Procedure

The EUT is put on the plane 0.8m high above the ground by insulating support and is connected to the power mains through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm coupling impedance for the EUT system. Please refer the block diagram of the test setup and photographs. Both sides of AC lines are checked to find out the maximum conducted emission. In order to find the maximum emission levels, the relative positions of equipment and all of the interface cables shall be changed according to ANSI C63.10-2020+Cor. 1-2023+C63.10a-2024 + Errata to C63.10a-2024 on Conducted Emission Measurement.

The bandwidth of test receiver is set at 9 kHz.

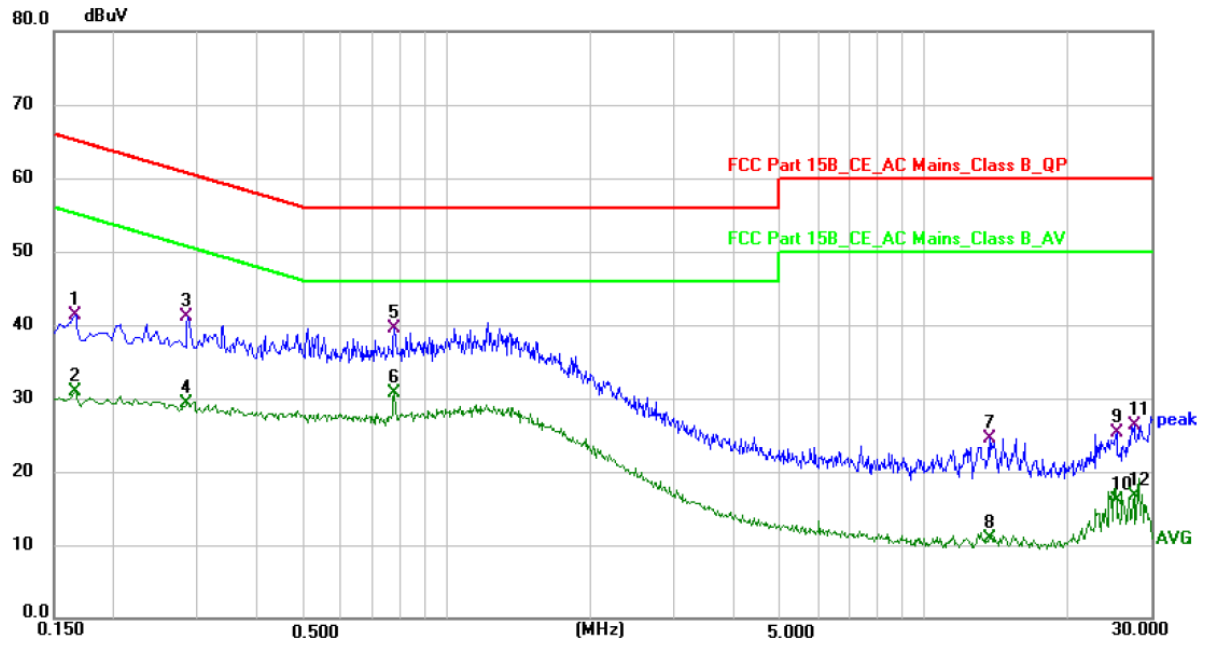
11.3. Test Setup



11.4. Test Results

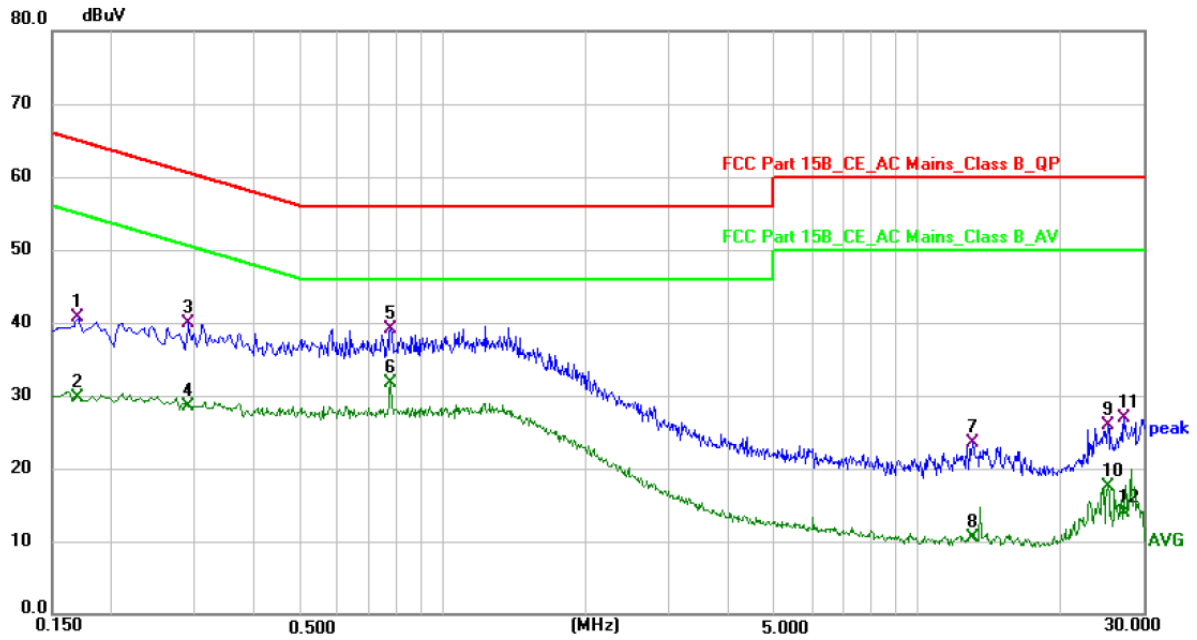
Test Date	: 2026.09.01	Temperature	: 24℃
Test Engineer	: Felix Pang	Humidity	: 56%
Test Mode	: GFSK mode		
Test voltage	: AC 120V/60Hz		
Test Results	: PASS		
Note:	1. The test results are listed in next pages.		
	2. If the limits for the measurement with the average detector are met when using a receiver with a peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector and quasi-peak detector need not be carried out.		
	3. If the limits for the measurement with the average detector are met when using a receiver with a quasi-peak detector, the test unit shall be deemed to meet both limits and the measurement with the average detector need not be carried out.		
	4. All modes have been tested, and only worst data of GFSK mode, Channel 2402MHz was listed in this report.		

Polarization: L



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1660	31.77	9.62	41.39	65.16	-23.77	QP
2	0.1660	21.36	9.62	30.98	55.16	-24.18	AVG
3	0.2860	31.71	9.42	41.13	60.64	-19.51	QP
4	0.2860	19.96	9.42	29.38	50.64	-21.26	AVG
5	0.7780	29.94	9.53	39.47	56.00	-16.53	QP
6 *	0.7780	21.15	9.53	30.68	46.00	-15.32	AVG
7	13.7660	14.57	9.86	24.43	60.00	-35.57	QP
8	13.7660	0.97	9.86	10.83	50.00	-39.17	AVG
9	25.4460	15.66	9.73	25.39	60.00	-34.61	QP
10	25.4460	6.45	9.73	16.18	50.00	-33.82	AVG
11	27.6060	16.69	9.69	26.38	60.00	-33.62	QP
12	27.6060	7.02	9.69	16.71	50.00	-33.29	AVG

Note: Level = Reading + Factor, Margin = Level - Limit

Polarization: N

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB)	Level (dBuV)	Limit (dBuV)	Margin (dB)	Detector
1	0.1700	31.19	9.54	40.73	64.96	-24.23	QP
2	0.1700	20.26	9.54	29.80	54.96	-25.16	AVG
3	0.2900	30.55	9.42	39.97	60.52	-20.55	QP
4	0.2900	19.18	9.42	28.60	50.52	-21.92	AVG
5	0.7780	29.25	9.85	39.10	56.00	-16.90	QP
6 *	0.7780	21.85	9.85	31.70	46.00	-14.30	AVG
7	13.0780	13.84	9.57	23.41	60.00	-36.59	QP
8	13.0780	0.87	9.57	10.44	50.00	-39.56	AVG
9	25.2420	15.90	9.94	25.84	60.00	-34.16	QP
10	25.2420	7.60	9.94	17.54	50.00	-32.46	AVG
11	27.3340	16.97	9.94	26.91	60.00	-33.09	QP
12	27.3340	3.94	9.94	13.88	50.00	-36.12	AVG

Note: Level = Reading + Factor, Margin = Level - Limit

12. Antenna Requirements

12.1.Limit

An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this Section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited.

12.2.Result

The EUT antenna is internal antenna. It complies with the standard requirement.



13. Photos of test setup

Reference to the **appendix I Test Setup Photo** for details.

14. Photos of EUT

Reference to the **appendix II external photos** and **appendix III internal photos** for details.

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

