RF TEST REPORT

For

OCG Products, LLC
Product Name: DOUBLE BLUETOOTH TRANSMITTER
Test Model(s): TC-FB-NG

Report Reference No.	:	**DACE251110004RL001**
FCC ID	:	**2BTB8-TC-FB-NG**
Applicant's Name	:	OCG Products, LLC
Address	:	28 Olmsted St, Birmingham AL 35242 USA
Testing Laboratory	:	Shenzhen DACE Testing Technology Co., Ltd.
Address	:	102, Building H1, & 1/F., Building H, Hongfa Science & Technology Park, Tangtou Community, Shiyan Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Test Specification Standard	:	**47 CFR Part 15.247**
Date of Receipt	:	November 10, 2025
Date of Test	:	November 10, 2025 to November 24, 2025
Data of Issue	:	November 24, 2025
Result	:	**Pass**

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Apply for company information

Applicant's Name	:	OCG Products, LLC
Address	:	28 Olmsted St, Birmingham AL 35242 USA
Product Name	:	DOUBLE BLUETOOTH TRANSMITTER
Test Model(s)	:	TC-FB-NG
Test Specification Standard(s)	:	47 CFR Part 15.247

NOTE1:

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards.

Compiled by:	Supervised by:	Approved by:
Keren Huang	Stone Yin	Tom Chen
Keren Huang / Test Engineer	Stone Yin / Project Engineer	Tom Chen / Manager
November 24, 2025	November 24, 2025	November 24, 2025

Shenzhen DACE Testing Technology Co., Ltd. APPROVED

Revision History Of Report

Version	Description	REPORT No.	Issue Date
V1.0	Original	DACE251110004RL001	November 24, 2025

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1 TEST SUMMARY

1.1 Test Standards

The tests were performed according to following standards:

47 CFR Part 15.247: Operation within the bands 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz

1.2 Summary of Test Result

Item	Method	Requirement	Result
Antenna requirement	/	47 CFR 15.203	Pass
Conducted Emission at AC power line	ANSI C63.10-2020 section 6.2	47 CFR 15.207(a)	Pass
20dB Bandwidth	ANSI C63.10-2020, section 7.8.6 KDB 558074 D01 15.247 Meas Guidance v05r02	47 CFR 15.247(a)(1)	Pass
Maximum Conducted Output Power	ANSI C63.10-2020, section 7.8.5 KDB 558074 D01 15.247 Meas Guidance v05r02	47 CFR 15.247(b)(1)	Pass
Channel Separation	ANSI C63.10-2020, section 7.8.2 KDB 558074 D01 15.247 Meas Guidance v05r02	47 CFR 15.247(a)(1)	Pass
Number of Hopping Frequencies	ANSI C63.10-2020, section 7.8.3 KDB 558074 D01 15.247 Meas Guidance v05r02	47 CFR 15.247(a)(1)(iii)	Pass
Dwell Time	ANSI C63.10-2020, section 7.8.4 KDB 558074 D01 15.247 Meas Guidance v05r02	47 CFR 15.247(a)(1)(iii)	Pass
Emissions in non-restricted frequency bands	ANSI C63.10-2020 section 7.8.7 KDB 558074 D01 15.247 Meas Guidance v05r02	47 CFR 15.247(d)	Pass
Band edge emissions (Radiated)	ANSI C63.10-2020 section 6.10 KDB 558074 D01 15.247 Meas Guidance v05r02	47 CFR 15.247(d), 15.209, 15.205	Pass
Emissions in frequency bands (below 1GHz)	ANSI C63.10-2020 section 6.6.4 KDB 558074 D01 15.247 Meas Guidance v05r02	47 CFR 15.247(d), 15.209, 15.205	Pass
Emissions in frequency bands (above 1GHz)	ANSI C63.10-2020 section 6.6.4 KDB 558074 D01 15.247 Meas Guidance v05r02	47 CFR 15.247(d), 15.209, 15.205	Pass

Note: 1.N/A -this device(EUT) is not applicable to this testing item
2. RF-conducted test results including cable loss.

2 GENERAL INFORMATION

2.1 Client Information

Applicant's Name : OCG Products, LLC
Address : 28 Olmsted St, Birmingham AL 35242 USA

Manufacturer : Shenzhen iSight Tech Company Limited
Address : 3A, 3rd floor, No.10, Xingsheng Road, huangniupu, Huangjiang Town, Dongguan City, Guangdong Province

2.2 Description of Device (EUT)

Product Name:	DOUBLE BLUETOOTH TRANSMITTER
Sample No.:	Q251028002
Model/Type reference:	TC-FB-NG
Trade Mark:	TECH CANDY
Product Description:	DOUBLE BLUETOOTH TRANSMITTER
Power Supply:	DC3.7V from battery
Operation Frequency:	2402MHz to 2480MHz
Number of Channels:	79
Modulation Type:	GFSK, π/4 DQPSK, 8DPSK
Antenna Type:	Chip Antenna
Antenna Gain:	2.06dBi
Hardware Version:	V1.1
Software Version:	V2.24

Operation Frequency each of channel:

Channel	Frequency(MHz)	Channel	Frequency (MHz)	Channel	Frequency(MHz)	Channel	Frequency (MHz)
1	2402	21	2422	41	2442	61	2462
2	2403	22	2423	42	2443	62	2463
3	2404	23	2424	43	2444	63	2464
4	2405	24	2425	44	2445	64	2465
5	2406	25	2426	45	2446	65	2466
6	2407	26	2427	46	2447	66	2467
7	2408	27	2428	47	2448	67	2468
8	2409	28	2429	48	2449	68	2469
9	2410	29	2430	49	2450	69	2470
10	2411	30	2431	50	2451	70	2471
11	2412	31	2432	51	2452	71	2472
12	2413	32	2433	52	2453	72	2473
13	2414	33	2434	53	2454	73	2474
14	2415	34	2435	54	2455	74	2475
15	2416	35	2436	55	2456	75	2476

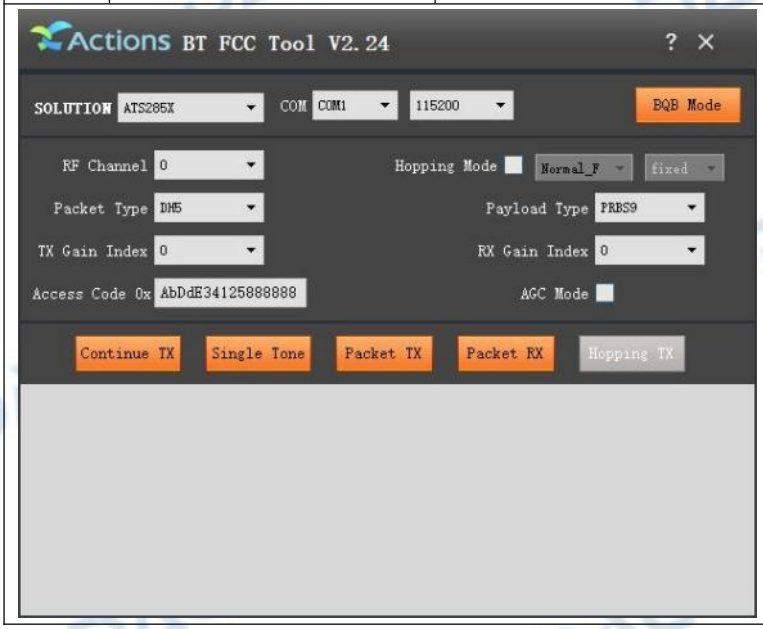
16	2417	36	2437	56	2457	76	2477
17	2418	37	2438	57	2458	77	2478
18	2419	38	2439	58	2459	78	2479
19	2420	39	2440	59	2460	79	2480
20	2421	40	2441	60	2461		

Note:In section 15.31(m), regards to the operating frequency range over 10 MHz, the Lowest frequency, the middle frequency, and the highest frequency of channel were selected to perform the test, and the selected channel see below:

Test channel	**Frequency (MHz)**
	BR/EDR
Lowest channel	2402MHz
Middle channel	2441MHz
Highest channel	2480MHz

2.3 Description of Test Modes

No	**Title**	**Description**
TM1	TX-GFSK (Non-Hopping)	Keep the EUT in continuously transmitting mode (non-hopping) with GFSK modulation at lowest, middle and highest channel.
TM2	TX-Pi/4DQPSK (Non-Hopping)	Keep the EUT in continuously transmitting mode (non-hopping) with Pi/4DQPSK modulation at lowest, middle and highest channel.
TM3	TX-8DPSK (Non-Hopping)	Keep the EUT in continuously transmitting mode (non-hopping) with 8DPSK modulation at lowest, middle and highest channel.
TM4	TX-GFSK (Hopping)	Keep the EUT in continuously transmitting mode (hopping) with GFSK modulation,.
TM5	TX-Pi/4DQPSK (Hopping)	Keep the EUT in continuously transmitting mode (hopping) with Pi/4DQPSK modulation.
TM6	TX-8DPSK (Hopping)	Keep the EUT in continuously transmitting mode (hopping) with 8DPSK modulation.
TM7	Charging	When charging ,EUT can not transmit



2.4 Description of Support Units

Title	Manufacturer	Model No.	Serial No.
AC-DC adapter	HUAWEI TECHNOLOGY	HW100400C01	/

2.5 Equipments Used During The Test

Conducted Emission at AC power line					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
Cable	SCHWARZ BECK	/	/	2025-04-18	2026-04-17
Pulse Limiter	SCHWARZ BECK	VTSD 9561-F Pulse limiter 10dB Attenuation	561-G071	2024-12-06	2025-12-05
50ΩCoaxial Switch	Anritsu	MP59B	M20531	/	/
Test Receiver	Rohde & Schwarz	ESPI TEST RECEIVER	1164.6607K03-102109-MH	2025-04-25	2026-04-24
L.I.S.N	R&S	ESH3-Z5	831.5518.52	2025-04-18	2026-04-17
L.I.S.N	SCHWARZ BECK	NSLK 8126	05055	2025-04-18	2026-04-17
Pulse Limiter	CYBERTEK	EM5010A	/	2025-04-25	2026-04-24
EMI test software	EZ -EMC	EZ	V1.1.42	/	/

20dB Bandwidth Maximum Conducted Output Power Channel Separation Number of Hopping Frequencies Dwell Time Emissions in non-restricted frequency bands					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
RF Test Software	Tachoy Information Technology(shenzhen) Co.,Ltd.	RTS-01	V1.0.0	/	/
RF Sensor Unit	Tachoy Information Technology(shenzhen) Co.,Ltd.	TR1029-2	000001	/	/
Wideband radio communication tester	R&S	CMW500	113410	2025-04-25	2026-04-24
Vector Signal Generator	Keysight	N5181A	MY50143455	2024-12-06	2025-12-05
Signal Generator	Keysight	N5182A	MY48180415	2024-12-06	2025-12-05
Spectrum Analyzer	Keysight	N9020A	MY53420323	2024-12-06	2025-12-05
Spectrum Analyzer	Keysight	N9020A	MY55338111	2025-09-16	2026-09-15

Emissions in frequency bands (above 1GHz) Band edge emissions (Radiated) Emissions in frequency bands (below 1GHz)					
Equipment	Manufacturer	Model No	Inventory No	Cal Date	Cal Due Date
EMI Test software	Farad	EZ -EMC	V1.1.42	/	/
Positioning Controller	MF	MF-7802	/	/	/
Amplifier(18-40G)	COM-POWER	AH-1840	10100008-1	2024-04-26	2027-04-25
Horn antenna	COM-POWER	AH-1840 (18-40G)	10100008	2024-04-26	2027-04-25
Loop antenna	ZHINAN	ZN30900C	ZN30900C	2025-04-28	2026-04-27
Cable(LF)#2	Schwarzbeck	/	/	2024-12-19	2025-12-18
Cable(LF)#1	Schwarzbeck	/	/	2024-12-19	2025-12-18
Cable(HF)#2	Schwarzbeck	AK9515E	96250	2025-04-25	2026-04-24
Cable(HF)#1	Schwarzbeck	SYV-50-3-1	/	2025-04-25	2026-04-24
Power amplifier(LF)	Schwarzbeck	BBV9743	9743-151	2025-04-29	2026-04-28
Power amplifier(HF)	Schwarzbeck	BBV9718	9718-282	2025-04-29	2026-04-28
Wideband radio communication tester	R&S	CMW500	113410	2025-04-25	2026-04-24
Spectrum Analyzer	R&S	FSP30	1321.3008K40-101729-jR	2025-04-18	2026-04-17
Test Receiver	R&S	ESCI 3	1166.5950K03-101431-Jq	2025-04-18	2026-04-17
Horn Antenna	Sunol Sciences	DRH-118	A091114	2025-04-21	2026-04-20
Broadband Antenna	Sunol Sciences	JB6 Antenna	A090414	2024-09-28	2026-09-27

2.6 Statement Of The Measurement Uncertainty

Test Item	**Measurement Uncertainty**
Conducted Disturbance (0.15~30MHz)	±3.41dB
Occupied Bandwidth	±3.63%
RF conducted power	±0.733dB
Duty cycle	±3.1%
Conducted Spurious emissions	±1.98dB
Radiated Emission (Above 1GHz)	±5.46dB
Radiated Emission (Below 1GHz)	±5.79dB
Note: (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.	

2.7 Identification of Testing Laboratory

Company Name:	Shenzhen DACE Testing Technology Co., Ltd.
Address:	102, Building H1, & 1/F., Building H, Hongfa Science & Technology Park, Tangtou Connunity, Shiyan Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Phone Number:	+86-13267178997
Fax Number:	86-755-29113252

Identification of the Responsible Testing Location

Company Name:	Shenzhen DACE Testing Technology Co., Ltd.
Address:	102, Building H1, & 1/F., Building H, Hongfa Science & Technology Park, Tangtou Connunity, Shiyan Subdistrict, Bao'an District, Shenzhen, Guangdong, China
Phone Number:	+86-13267178997
Fax Number:	86-755-29113252
FCC Registration Number:	0032847402
Designation Number:	CN1342
Test Firm Registration Number:	778666
A2LA Certificate Number:	6270.01

2.8 Announcement

(1) The test report reference to the report template version v0.

(2) The test report is invalid if not marked with the signatures of the persons responsible for preparing, reviewing and approving the test report.

(3) The test report is invalid if there is any evidence and/or falsification.

(4) This document may not be altered or revised in any way unless done so by DACE and all revisions are duly noted in the revisions section.

(5) Content of the test report, in part or in full, cannot be used for publicity and/or promotional purposes without prior written approval from the laboratory.

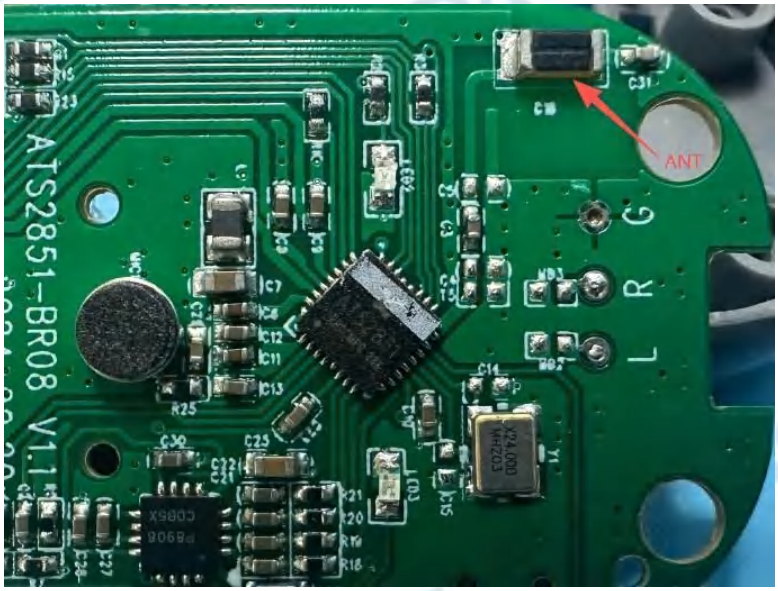
(6) We hereby declare that the laboratory is only responsible for the data released by the laboratory, except for the part provided by the applicant. the laboratory is not responsible for the accuracy of the information provided by the client(item 2.2). When the information provided by the customer may affect the effectiveness of the results, the responsibility lies with the customer, and the laboratory does not assume any responsibility.

3 Evaluation Results (Evaluation)

3.1 Antenna requirement

Test Requirement:	Refer to 47 CFR Part 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. 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.

3.1.1 Conclusion:



4 Radio Spectrum Matter Test Results (RF)

4.1 Conducted Emission at AC power line

Test Requirement:	Refer to 47 CFR 15.207(a), Except as shown in paragraphs (b)and (c)of this section, for an intentional radiator that is designed to be connected to the public utility (AC) power line, the radio frequency voltage that is conducted back onto the AC power line on any frequency or frequencies, within the band 150 kHz to 30 MHz, shall not exceed the limits in the following table, as measured using a 50 μH/50 ohms line impedance stabilization network (LISN).
Test Limit:	

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

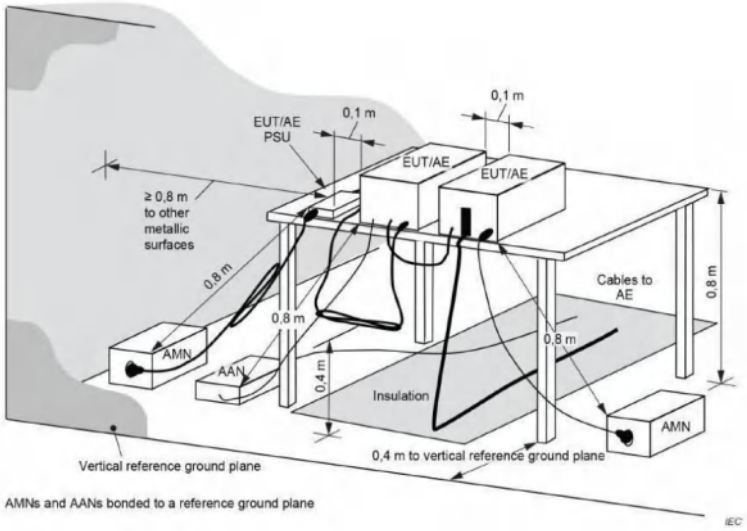
*Decreases with the logarithm of the frequency.

Test Method:	ANSI C63.10-2020 section 6.2
Procedure:	Refer to ANSI C63.10-2020 section 6.2, standard test method for ac power-line conducted emissions from unlicensed wireless devices

4.1.1 E.U.T. Operation:

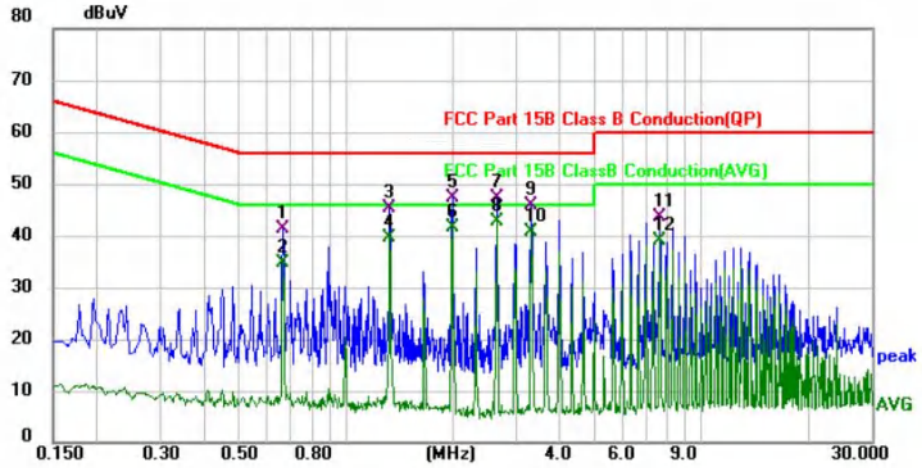
Operating Environment:					
Temperature:	22.7 °C	Humidity:	52 %	Atmospheric Pressure:	101.2 kPa
Pretest mode:	TM7				
Final test mode:	TM7				

4.1.2 Test Setup Diagram:



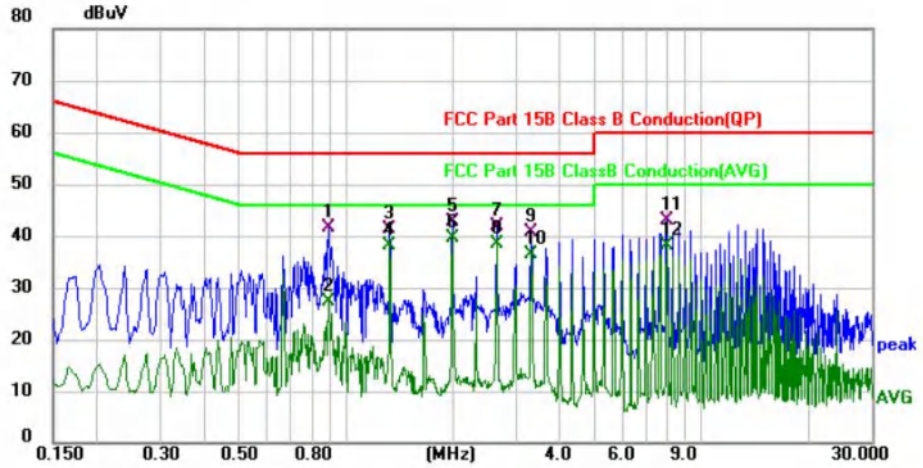
4.1.3 Test Data:

TM7 / Line: Line



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.6660	31.06	10.10	41.16	56.00	-14.84	QP	
2		0.6660	24.71	10.10	34.81	46.00	-11.19	AVG	
3		1.3300	35.21	10.08	45.29	56.00	-10.71	QP	
4		1.3300	29.49	10.08	39.57	46.00	-6.43	AVG	
5		1.9940	37.18	10.00	47.18	56.00	-8.82	QP	
6		1.9940	31.52	10.00	41.52	46.00	-4.48	AVG	
7		2.6580	37.19	10.05	47.24	56.00	-8.76	QP	
8	*	2.6580	32.62	10.05	42.67	46.00	-3.33	AVG	
9		3.3220	35.75	10.10	45.85	56.00	-10.15	QP	
10		3.3220	30.67	10.10	40.77	46.00	-5.23	AVG	
11		7.6460	33.48	10.23	43.71	60.00	-16.29	QP	
12		7.6460	28.66	10.23	38.89	50.00	-11.11	AVG	

TM7 / Line: Neutral



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over		
		MHz	dBuV	dB	dBuV	dBuV	dB	Detector	Comment
1		0.8980	31.49	10.08	41.57	56.00	-14.43	QP	
2		0.8980	17.27	10.08	27.35	46.00	-18.65	AVG	
3		1.3300	31.17	10.05	41.22	56.00	-14.78	QP	
4		1.3300	28.00	10.05	38.05	46.00	-7.95	AVG	
5		1.9940	32.63	10.00	42.63	56.00	-13.37	QP	
6	*	1.9940	29.52	10.00	39.52	46.00	-6.48	AVG	
7		2.6619	31.73	10.05	41.78	56.00	-14.22	QP	
8		2.6619	28.31	10.05	38.36	46.00	-7.64	AVG	
9		3.3260	30.71	10.11	40.82	56.00	-15.18	QP	
10		3.3260	26.25	10.11	36.36	46.00	-9.64	AVG	
11		7.9820	32.86	10.27	43.13	60.00	-16.87	QP	
12		7.9820	27.88	10.27	38.15	50.00	-11.85	AVG	

NOTE:

1.An initial pre-scan was performed on the line and neutral lines with peak detector.

2.Quasi-Peak and Average measurement were performed at the frequencies with maximized peak emission.

3.Mesurement Level = Reading level + Correct Factor, Over=Limit- Mesurement

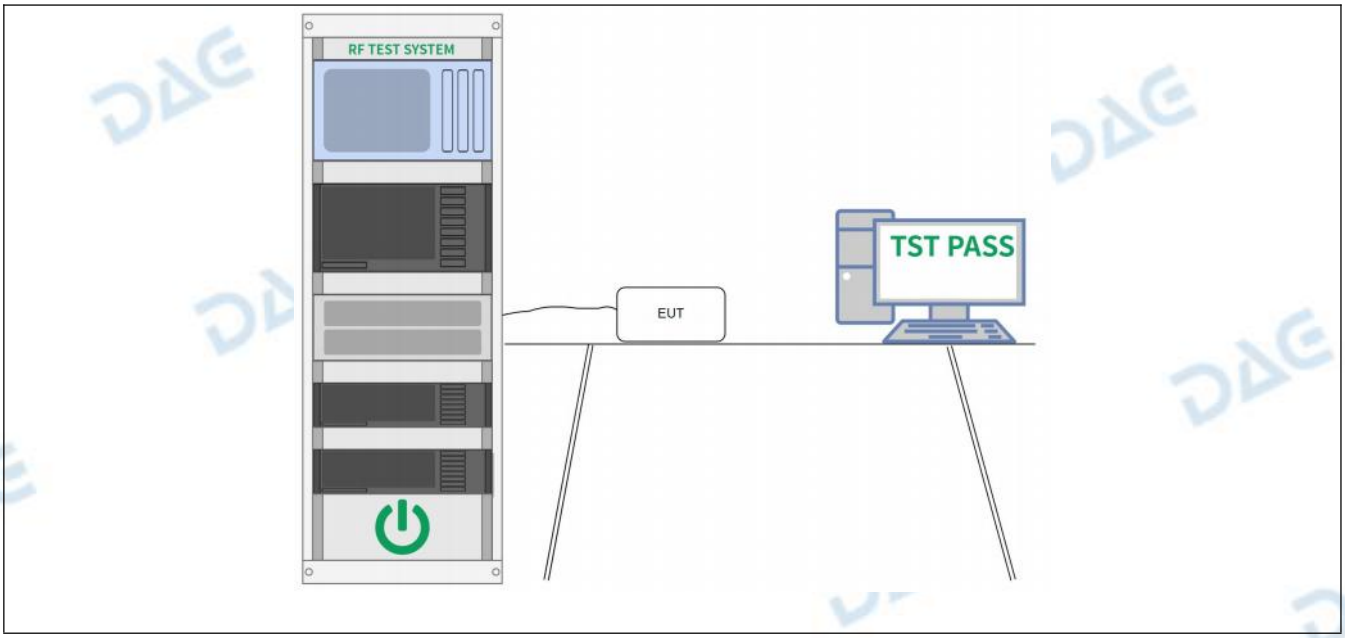
4.2 20dB Bandwidth

Test Requirement:	47 CFR 15.247(a)(1)
Test Limit:	Refer to 47 CFR 15.215(c), 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.
Test Method:	ANSI C63.10-2020, section 7.8.6, For occupied bandwidth measurements, use the procedure in 6.9.3. Frequency hopping shall be disabled for this test. KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure shall be used for measuring 99% power bandwidth: a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 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 VBW shall be at least three times the 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 4.1.6.2. d) Step a) through step c) might require iteration to adjust within the specified range. e) Video averaging is not permitted. Where practical, a sample detection and single sweep mode shall be used. Otherwise, peak detection and max-hold mode (until the trace stabilizes) shall be used. f) Use the 99% power bandwidth function of the instrument (if available) and report the measured bandwidth. g) If the instrument does not have a 99% power bandwidth function, then the trace data points are recovered and directly summed in linear power terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached; that frequency is recorded as the lower frequency. The process is repeated until 99.5% of the total is reached; that frequency is recorded as the upper frequency. The 99% power bandwidth is the difference between these two frequencies. h) The occupied bandwidth shall be reported by providing spectral 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).

4.2.1 E.U.T. Operation:

Operating Environment:					
Temperature:	22.9 °C	Humidity:	55 %	Atmospheric Pressure:	101.2 kPa
Pretest mode:	TM1, TM2, TM3				
Final test mode:	TM1, TM2, TM3				

4.2.2 Test Setup Diagram:



4.2.3 Test Data:

Please Refer to Appendix for Details.

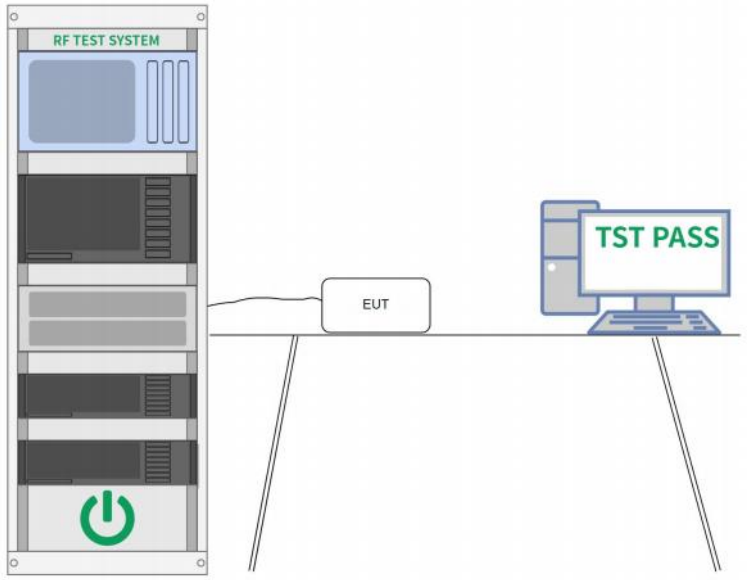
4.3 Maximum Conducted Output Power

Test Requirement:	47 CFR 15.247(b)(1)
Test Limit:	Refer to 47 CFR 15.247(b)(1), For frequency hopping systems operating in the 2400-2483.5 MHz band employing at least 75 non-overlapping hopping channels, and all frequency hopping systems in the 5725-5850 MHz band: 1 watt. For all other frequency hopping systems in the 2400-2483.5 MHz band: 0.125 watts.
Test Method:	ANSI C63.10-2020, section 7.8.5 KDB 558074 D01 15.247 Meas Guidance v05r02
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. Frequency hopping shall be disabled for this test. Use the following spectrum analyzer settings: a) Span: Approximately five times the 20 dB bandwidth, centered on a hopping channel. b) RBW > 20 dB bandwidth of the emission being measured. c) VBW ≥ RBW. d) Sweep: No faster than coupled (auto) time. e) Detector function: Peak. f) Trace: Max-hold. g) Allow trace to stabilize. h) Use the marker-to-peak function to set the marker to the peak of the emission. i) The indicated level is the peak output power, after any corrections for external attenuators and cables. j) A spectral plot of the test results and setup description shall be included in the test report.

4.3.1 E.U.T. Operation:

Operating Environment:					
Temperature:	24 °C	Humidity:	53 %	Atmospheric Pressure:	101.2 kPa
Pretest mode:	TM1, TM2, TM3				
Final test mode:	TM1, TM2, TM3				

4.3.2 Test Setup Diagram:



4.3.3 Test Data:

Please Refer to Appendix for Details.

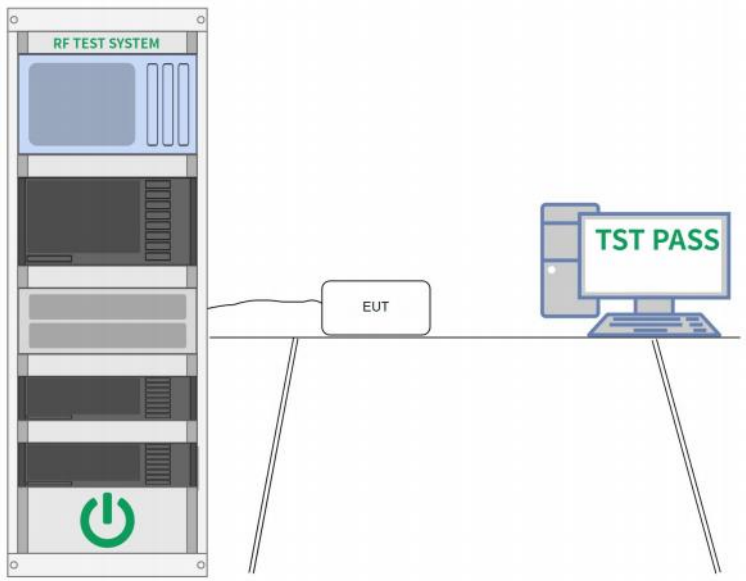
4.4 Channel Separation

Test Requirement:	47 CFR 15.247(a)(1)
Test Limit:	Refer to 47 CFR 15.247(a)(1), Frequency hopping systems shall have hopping channel carrier frequencies separated by a minimum of 25 kHz or the 20 dB bandwidth of the hopping channel, whichever is greater. Alternatively, frequency hopping systems operating in the 2400-2483.5 MHz band may have hopping channel carrier frequencies that are separated by 25 kHz or two-thirds of the 20 dB bandwidth of the hopping channel, whichever is greater, provided the systems operate with an output power no greater than 125 mW.
Test Method:	ANSI C63.10-2020, section 7.8.2 KDB 558074 D01 15.247 Meas Guidance v05r02
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: No faster than coupled (auto) time. e) Detector function: Peak. f) Trace: Max-hold. g) Allow the trace to stabilize.

4.4.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23.7 °C	Humidity:	52 %	Atmospheric Pressure:	101.2 kPa
Pretest mode:	TM4, TM5, TM6				
Final test mode:	TM4, TM5, TM6				

4.4.2 Test Setup Diagram:



4.4.3 Test Data:

Please Refer to Appendix for Details.

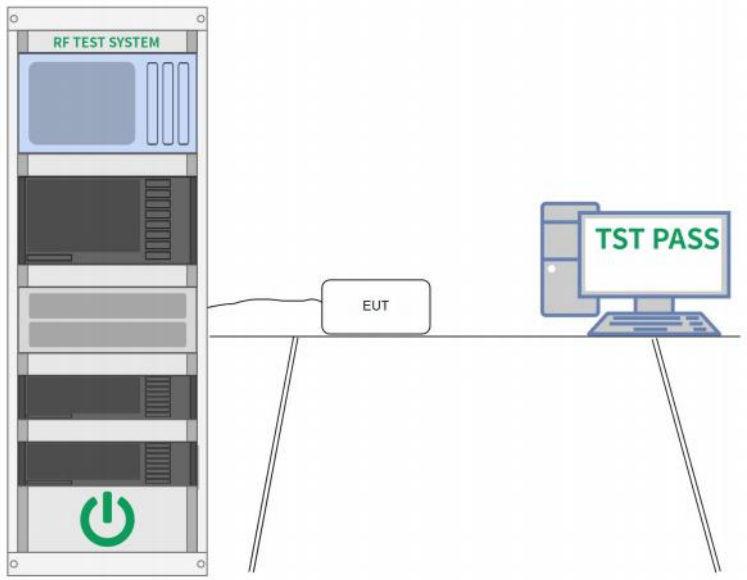
4.5 Number of Hopping Frequencies

Test Requirement:	47 CFR 15.247(a)(1)(iii)
Test Limit:	Refer to 47 CFR 15.247(a)(1)(iii), Fequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied by the number of hopping channels employed. Frequency hopping systems may avoid or suppress transmissions on a particular hopping frequency provided that a minimum of 15 channels are used.
Test Method:	ANSI C63.10-2020, section 7.8.3 KDB 558074 D01 15.247 Meas Guidance v05r02
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 could 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: No faster than coupled (auto) time. e) Detector function: Peak. f) Trace: Max-hold. g) Allow the trace to stabilize. It might prove necessary to break the span up into subranges to show clearly all of the hopping frequencies. Compliance of an EUT with the appropriate regulatory limit shall be determined for the number of hopping channels. A spectral plot of the data shall be included in the test report.

4.5.1 E.U.T. Operation:

Operating Environment:					
Temperature:	22.7 °C	Humidity:	55 %	Atmospheric Pressure:	101.2 kPa
Pretest mode:	TM4, TM5, TM6				
Final test mode:	TM4, TM5, TM6				

4.5.2 Test Setup Diagram:



4.5.3 Test Data:

Please Refer to Appendix for Details.

4.6 Dwell Time

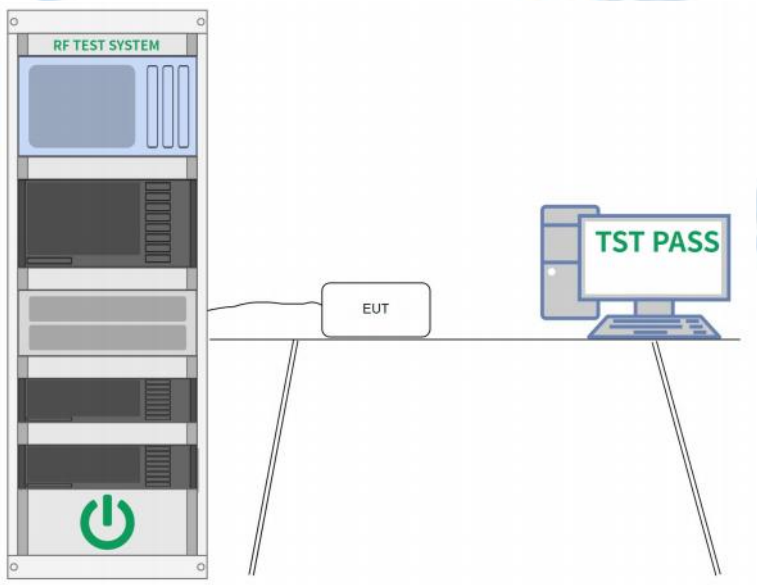
Test Requirement:	47 CFR 15.247(a)(1)(iii)
Test Limit:	Refer to 47 CFR 15.247(a)(1)(iii), Frequency hopping systems in the 2400-2483.5 MHz band shall use at least 15 channels. The average time of occupancy on any channel shall not be greater than 0.4 seconds within a period of 0.4 seconds multiplied 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.
Test Method:	ANSI C63.10-2020, section 7.8.4 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	The dwell time per hop on a channel is the time from the start of the first transmission to the end of the last transmission for that hop. If the device has a single transmission per hop then the dwell time is the duration of that transmission. If the device has a multiple transmissions per hop then the dwell time is measured from the start of the first transmission to the end of the last transmission. The time of occupancy is the total time that the device dwells on a channel over an observation period specified in the regulatory requirement. To determine the time of occupancy the spectrum analyzer will be configured to measure both the dwell time per hop and the number of times the device transmits on a specific channel in a given period. The EUT shall have its hopping function enabled. Compliance with the requirements shall be made with the minimum and with the maximum number of channels enabled. If the dwell time per channel does not vary with the number of channels than compliance with the requirements may be based on the minimum number of channels. If the device supports different dwell times per channel (example Bluetooth devices can dwell on a channel for 1, 3 or 5 time slots) then measurements can be limited to the longest dwell time with the minimum number of channels. Use the following spectrum analyzer settings to determine the dwell time per hop: 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 transmission time per hop. c) Sweep time: Set so that the start of the first transmission and end of the last transmission for the hop are clearly captured. Setting the sweep time to be slightly longer than the hopping period per channel (hopping period = 1/hopping rate) should achieve this. d) Use a video trigger, where possible with a trigger delay, so that the start of the transmission is clearly observed. The trigger level might need adjustment to reduce the chance of triggering when the system hops on an adjacent channel. e) Detector function: Peak. f) Trace: Clear-write, single sweep. g) Place markers at the start of the first transmission on the channel and at the end of the last transmission. The dwell time per hop is the time between these two markers. To determine the number of hops on a channel in the regulatory observation period repeat the measurement using a longer sweep time. When the device uses a single hopping sequence the period of measurement should be sufficient to capture at least 2 hops. When the device uses a dynamic hopping sequence, or the sequence varies, the period of measurement may need to capture multiple hops to better determine the average time of occupancy. Count the number of hops on the channel across the sweep time. The average number of hops on the same channel within the regulatory observation

	period is calculated from the number of hops on the channel divided by the spectrum analyzer sweep time multiplied by the regulatory observation period. For example, if three hops are counted with an analyzer sweep time of 500 ms and the regulatory observation period is 10 s, then the number of hops in that ten seconds is 3 / 0.5 × 10, or 60 hops. The average time of occupancy is calculated by multiplying the dwell time per hop by the number of hops in the observation period.

4.6.1 E.U.T. Operation:

Operating Environment:					
Temperature:	23.7 °C	Humidity:	52 %	Atmospheric Pressure:	101.2 kPa
Pretest mode:	TM4, TM5, TM6				
Final test mode:	TM4, TM5, TM6				

4.6.2 Test Setup Diagram:



4.6.3 Test Data:

Please Refer to Appendix for Details.

4.7 Emissions in non-restricted frequency bands

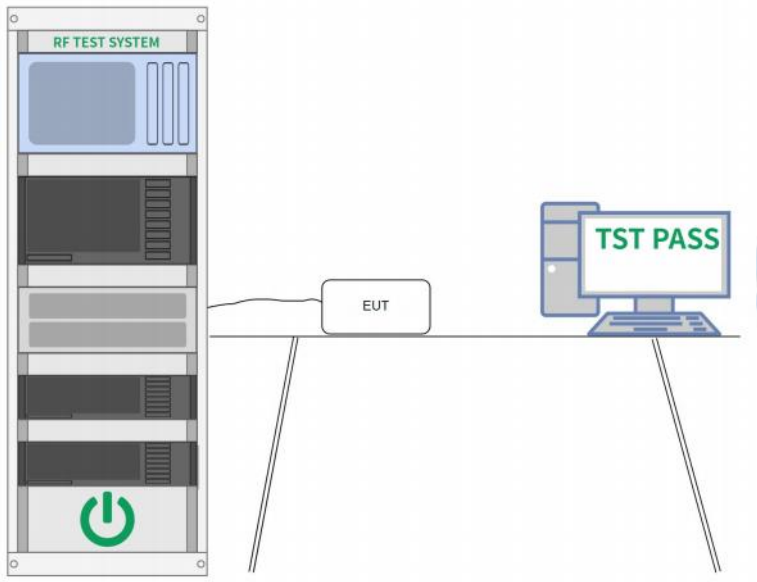
Test Requirement:	47 CFR 15.247(d)
Test Limit:	Refer to 47 CFR 15.247(d), In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in § 15.209(a) is not required.
Test Method:	ANSI C63.10-2020 section 7.8.7 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	7.8.7.1 General considerations To demonstrate compliance with the relative out-of-band emissions requirements conducted spurious emissions shall be measured for the transmit frequencies, per 5.5 and 5.6, and at the maximum transmit powers. Frequency hopping shall be disabled for this test with the exception of measurements at the allocated band-edges which shall be repeated with hopping enabled. 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 frequency range of testing shall span 30 MHz to 10 times the operating frequency and this may be done in a single sweep or, to aid resolution, across a number of sweeps. The resolution bandwidth shall be 100 kHz, video bandwidth 300 kHz, and a coupled sweep time with a peak detector. The limit is based on the highest in-band level across all channels measured using the same instrument settings (resolution bandwidth of 100 kHz, video bandwidth of 300 kHz, and a coupled sweep time with a peak detector). To help clearly demonstrate compliance a display line may be set at the required offset (typically 20 dB) below the highest in-band level. Where the highest in-band level is not clearly identified in the out-of-band measurements a separate spectral plot showing the in-band level shall be provided. When conducted measurements cannot be made (for example a device with integrated, non-removable antenna) radiated measurements shall be used. The reference level for determining the limit shall be established by maximizing the field strength from the highest power channel and measuring using the resolution and video bandwidth settings and peak detector as described above. The field strength limit for spurious emissions outside of restricted-bands shall then be set at the required offset (typically 20 dB) below the highest in-band level. Radiated measurements will follow the standards measurement procedures described in Clause 6 with the exception that the resolution bandwidth shall be 100 kHz, video bandwidth 300 kHz, and a coupled sweep time with a peak detector. Note that use of wider measurement bandwidths are acceptable for measuring the spurious emissions provided that the peak detector is used and that the measured value of spurious emissions are compared to the highest in-band level measured with the 100 kHz / 300 kHz bandwidth settings to determine compliance. 7.8.7.2 Band-edges Compliance with a relative limit at the band-edges (e.g., −20 dBc) shall be made on the lowest and on the highest channels with frequency hopping disabled and repeated with frequency hopping enabled. For the latter test the hopping sequence shall include the lowest and highest channels.

	For measurements with the hopping disabled the analyzer screen shall clearly show compliance with the requirement within 10 MHz of the allocated band-edge. For measurements with the hopping enabled the analyzer screen shall clearly show compliance with the requirement within 10 MHz of both of the allocated band-edges. This could require separate spectral plots for each band-edge.

4.7.1 E.U.T. Operation:

Operating Environment:					
Temperature:	22.7 °C	Humidity:	55 %	Atmospheric Pressure:	101.2 kPa
Pretest mode:	TM1, TM2, TM3, TM4, TM5, TM6				
Final test mode:	TM1, TM2, TM3, TM4, TM5, TM6				

4.7.2 Test Setup Diagram:



4.7.3 Test Data:

Please Refer to Appendix for Details.

4.8 Band edge emissions (Radiated)

Test Requirement:	Refer to 47 CFR 15.247(d), In addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).
Test Limit:	

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

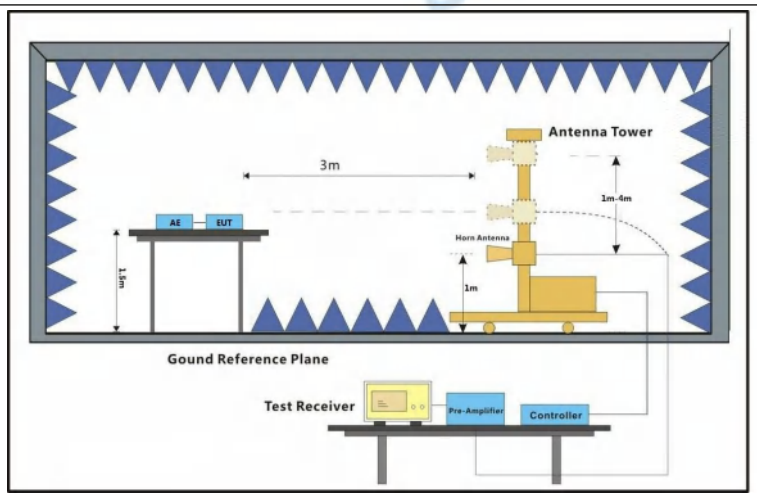
** Except as provided in paragraph (g), fundamental emissions from intentional radiators operating under this section shall not be located in the frequency bands 54-72 MHz, 76-88 MHz, 174-216 MHz or 470-806 MHz. However, operation within these frequency bands is permitted under other sections of this part, e.g., §§ 15.231 and 15.241.
In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.

Test Method:	ANSI C63.10-2020 section 6.10 KDB 558074 D01 15.247 Meas Guidance v05r02
Procedure:	ANSI C63.10-2020 section 6.10.5.2

4.8.1 E.U.T. Operation:

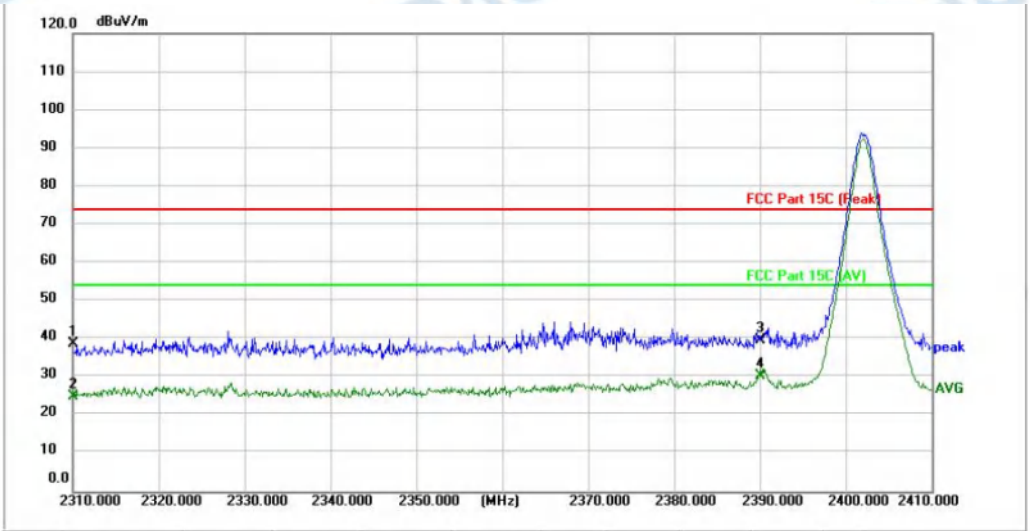
Operating Environment:					
Temperature:	23.4 °C	Humidity:	48 %	Atmospheric Pressure:	101.2 kPa
Pretest mode:	TM3				
Final test mode:	TM3				

4.8.2 Test Setup Diagram:



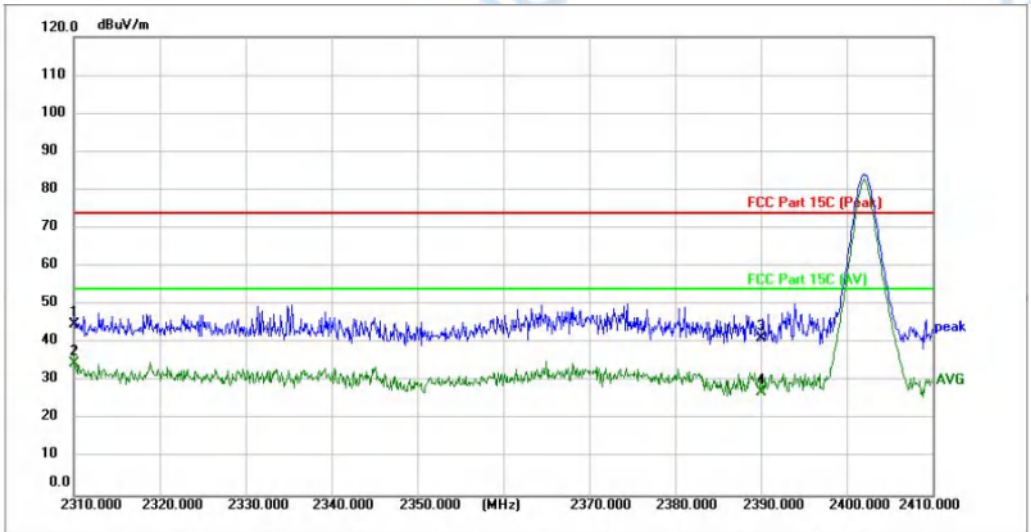
4.8.3 Test Data:

TM3 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: L



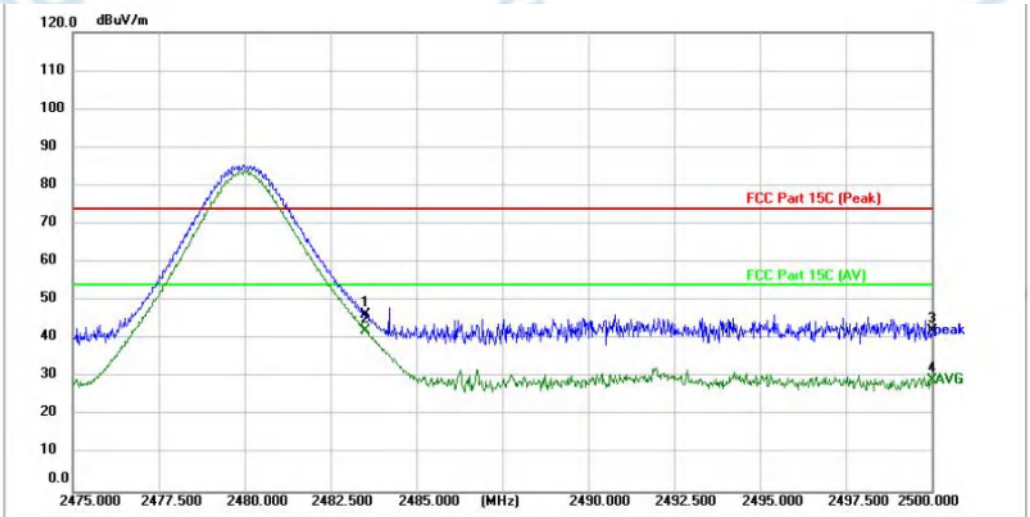
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2310.000	45.45	-6.63	38.82	74.00	-35.18	peak			P	
2	2310.000	31.77	-6.63	25.14	54.00	-28.86	AVG			P	
3	2390.000	46.28	-6.42	39.86	74.00	-34.14	peak			P	
4 *	2390.000	36.92	-6.42	30.50	54.00	-23.50	AVG			P	

TM3 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: L



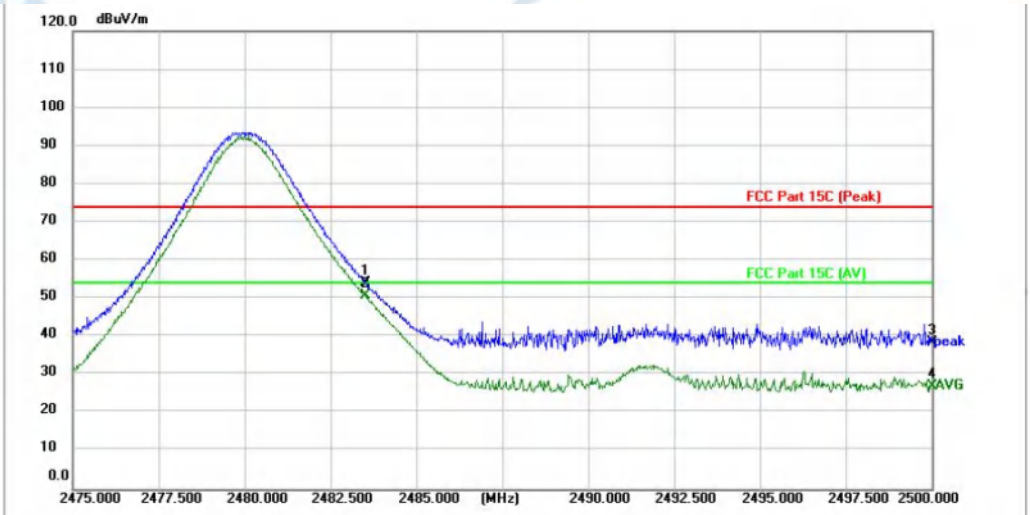
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2310.000	51.38	-6.63	44.75	74.00	-29.25	peak			P	
2 *	2310.000	41.36	-6.63	34.73	54.00	-19.27	AVG			P	
3	2390.000	47.80	-6.42	41.38	74.00	-32.62	peak			P	
4	2390.000	33.60	-6.42	27.18	54.00	-26.82	AVG			P	

TM3 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2483.500	52.66	-6.17	46.49	74.00	-27.51	peak	149		P	
2 *	2483.500	48.37	-6.17	42.20	54.00	-11.80	AVG	149		P	
3	2500.000	48.34	-6.13	42.21	74.00	-31.79	peak	149		P	
4	2500.000	35.29	-6.13	29.16	54.00	-24.84	AVG	149		P	

TM3 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	2483.500	60.43	-6.17	54.26	74.00	-19.74	peak	149		P	
2 *	2483.500	56.90	-6.17	50.73	54.00	-3.27	AVG	149		P	
3	2500.000	44.61	-6.13	38.48	74.00	-35.52	peak	149		P	
4	2500.000	33.21	-6.13	27.08	54.00	-26.92	AVG	149		P	

Remark:Margin=Level - Limit, Level=Test receiver reading + correction factor

The test software will only record the worst test angle and height, and only the worst case will be recorded in the test report.

4.9 Emissions in frequency bands (below 1GHz)

<table>
<tr><td>Test Requirement:</td><td>Refer to 47 CFR 15.247(d), 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)).</td></tr>
<tr><td>Test Limit:</td><td>
<table>
<tr><td>Frequency (MHz)</td><td>Field strength (microvolts/meter)</td><td>Measurement distance (meters)</td></tr>
<tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr>
<tr><td>1.705-30.0</td><td>30</td><td>30</td></tr>
<tr><td>30-88</td><td>100 **</td><td>3</td></tr>
<tr><td>88-216</td><td>150 **</td><td>3</td></tr>
<tr><td>216-960</td><td>200 **</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>3</td></tr>
</table>
** 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.
In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10-2020 section 6.6.4
KDB 558074 D01 15.247 Meas Guidance v05r02</td></tr>
<tr><td>Procedure:</td><td>a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
j. Repeat above procedures until all frequencies measured was complete.
Remark:
1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.</td></tr>
</table>

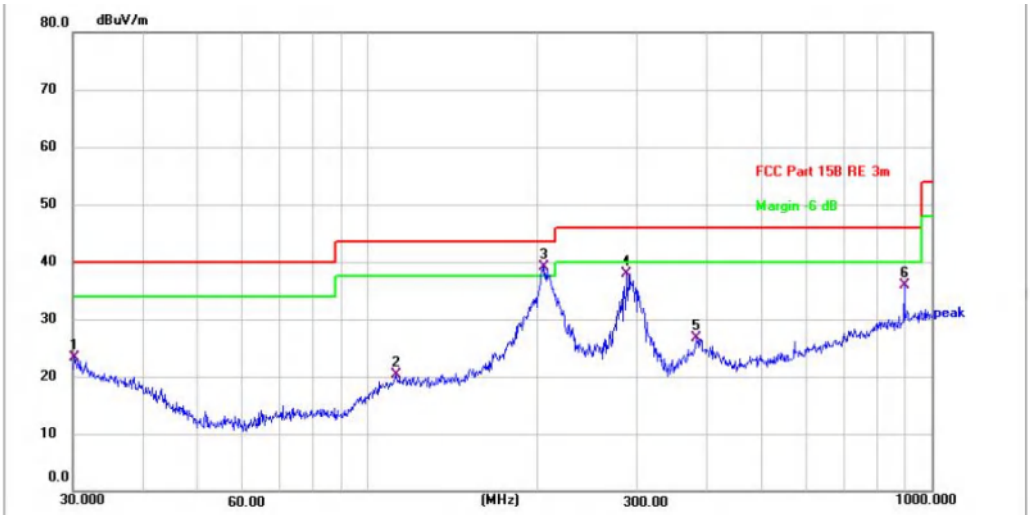
	2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows: Final Test Level =Receiver Reading + Antenna Factor + Cable Factor ¨C Preamplifier Factor 3) Scan from 9kHz to 25GHz, the disturbance above 12.75GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. Fundamental frequency is blocked by filter, and only spurious emission is shown.

4.9.1 E.U.T. Operation:

Operating Environment:					
Temperature:	22.5 °C	Humidity:	49 %	Atmospheric Pressure:	101.2 kPa
Pretest mode:	TM3				
Final test mode:	TM3				

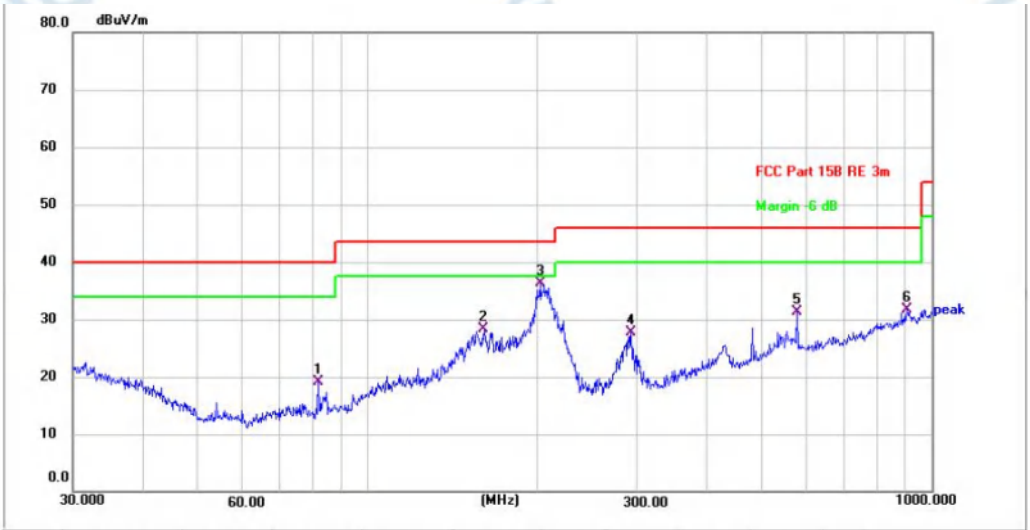
4.9.2 Test Data:

TM3 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: L



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	30.2111	25.85	-2.49	23.36	40.00	-16.64	QP	100		P	
2	112.1305	27.57	-7.25	20.32	43.50	-23.18	QP	100		P	
3 *	205.6751	49.09	-9.96	39.13	43.50	-4.37	QP	100		P	
4	287.9904	45.80	-7.96	37.84	46.00	-8.16	QP	100		P	
5	382.5879	33.08	-6.44	26.64	46.00	-19.36	QP	100		P	
6	893.8567	32.24	3.60	35.84	46.00	-10.16	QP	100		P	

TM3 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: L



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	81.7833	31.99	-12.97	19.02	40.00	-20.98	QP	100		P	
2	160.9089	36.76	-8.44	28.32	43.50	-15.18	QP	100		P	
3 *	202.1005	45.95	-9.64	36.31	43.50	-7.19	QP	100		P	
4	293.0842	35.89	-8.12	27.77	46.00	-18.23	QP	100		P	
5	576.6443	33.30	-1.97	31.33	46.00	-14.67	QP	100		P	
6	903.3094	27.77	4.03	31.80	46.00	-14.20	QP	100		P	

Remark:Margin=Level - Limit, Level=Test receiver reading + correction factor

The test software will only record the worst test angle and height, and only the worst case will be recorded in the test report.

4.10 Emissions in frequency bands (above 1GHz)

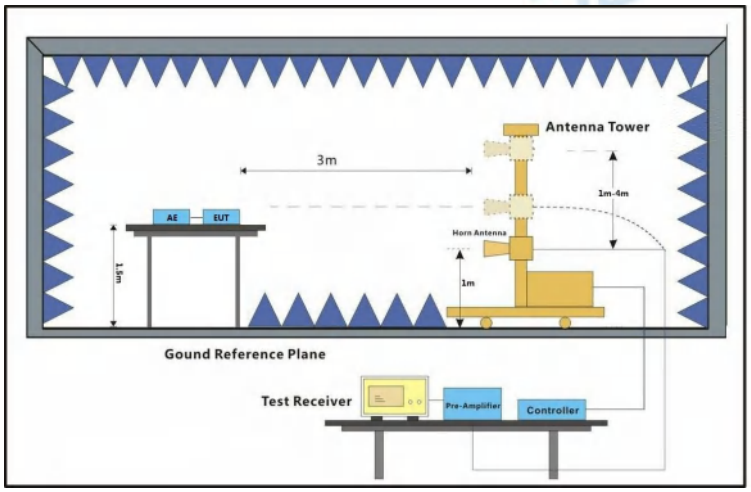
<table>
<tr><td>Test Requirement:</td><td>Refer to 47 CFR 15.247(d), in addition, radiated emissions which fall in the restricted bands, as defined in § 15.205(a), must also comply with the radiated emission limits specified in § 15.209(a)(see § 15.205(c)).</td></tr>
<tr><td>Test Limit:</td><td>
<table>
<tr><th>Frequency (MHz)</th><th>Field strength (microvolts/meter)</th><th>Measurement distance (meters)</th></tr>
<tr><td>0.009-0.490</td><td>2400/F(kHz)</td><td>300</td></tr>
<tr><td>0.490-1.705</td><td>24000/F(kHz)</td><td>30</td></tr>
<tr><td>1.705-30.0</td><td>30</td><td>30</td></tr>
<tr><td>30-88</td><td>100 **</td><td>3</td></tr>
<tr><td>88-216</td><td>150 **</td><td>3</td></tr>
<tr><td>216-960</td><td>200 **</td><td>3</td></tr>
<tr><td>Above 960</td><td>500</td><td>3</td></tr>
</table>
** 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.
In the emission table above, the tighter limit applies at the band edges.
The emission limits shown in the above table are based on measurements employing a CISPR quasi-peak detector except for the frequency bands 9–90 kHz, 110–490 kHz and above 1000 MHz. Radiated emission limits in these three bands are based on measurements employing an average detector.
</td></tr>
<tr><td>Test Method:</td><td>ANSI C63.10-2020 section 6.6.4
KDB 558074 D01 15.247 Meas Guidance v05r02</td></tr>
<tr><td>Procedure:</td><td>a. For below 1GHz, the EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 or 10 meter semi-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
b. For above 1GHz, the EUT was placed on the top of a rotating table 1.5 meters above the ground at a 3 meter fully-anechoic chamber. The table was rotated 360 degrees to determine the position of the highest radiation.
c. The EUT was set 3 or 10 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
d. The antenna height is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
e. For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters (for the test frequency of below 30MHz, the antenna was tuned to heights 1 meter) and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
f. The test-receiver system was set to Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.
g. If the emission level of the EUT in peak mode was 10dB lower than the limit specified, then testing could be stopped and the peak values of the EUT would be reported. Otherwise the emissions that did not have 10dB margin would be re-tested one by one using peak, quasi-peak or average method as specified and then reported in a data sheet.
h. Test the EUT in the lowest channel, the middle channel, the Highest channel.
i. The radiation measurements are performed in X, Y, Z axis positioning for Transmitting mode, and found the X axis positioning which it is the worst case.
j. Repeat above procedures until all frequencies measured was complete.
Remark:
1) For emission below 1GHz, through pre-scan found the worst case is the lowest channel. Only the worst case is recorded in the report.</td></tr>
</table>

	2) The field strength is calculated by adding the Antenna Factor, Cable Factor & Preamplifier. The basic equation with a sample calculation is as follows: Final Test Level =Receiver Reading + Antenna Factor + Cable Factor ¨C Preamplifier Factor 3) Scan from 9kHz to 25GHz, the disturbance above 12.75GHz and below 30MHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed. The amplitude of spurious emissions from the radiator which are attenuated more than 20dB below the limit need not be reported. Fundamental frequency is blocked by filter, and only spurious emission is shown.

4.10.1 E.U.T. Operation:

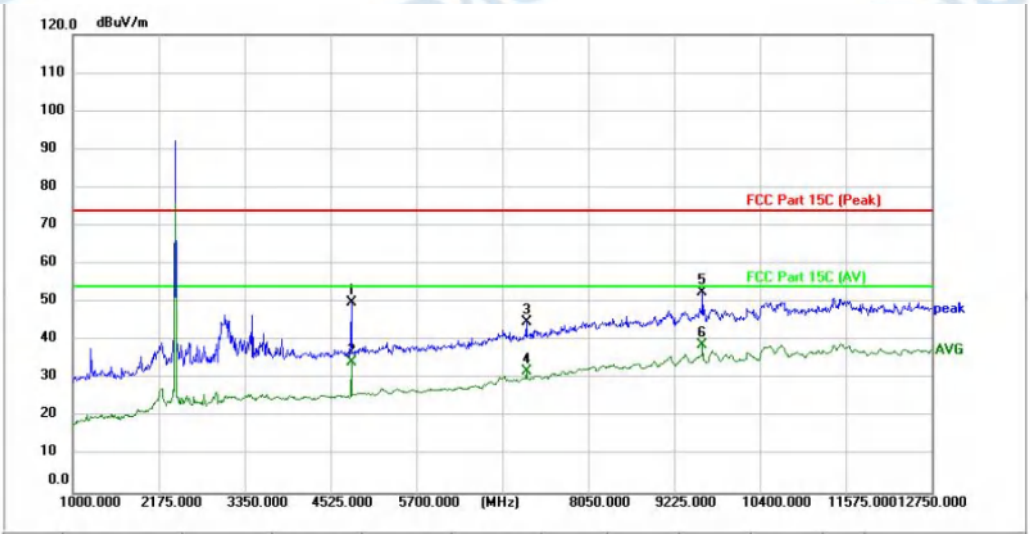
Operating Environment:					
Temperature:	23.7 °C	Humidity:	51 %	Atmospheric Pressure:	101.2 kPa
Pretest mode:	TM3				
Final test mode:	TM3				

4.10.2 Test Setup Diagram:



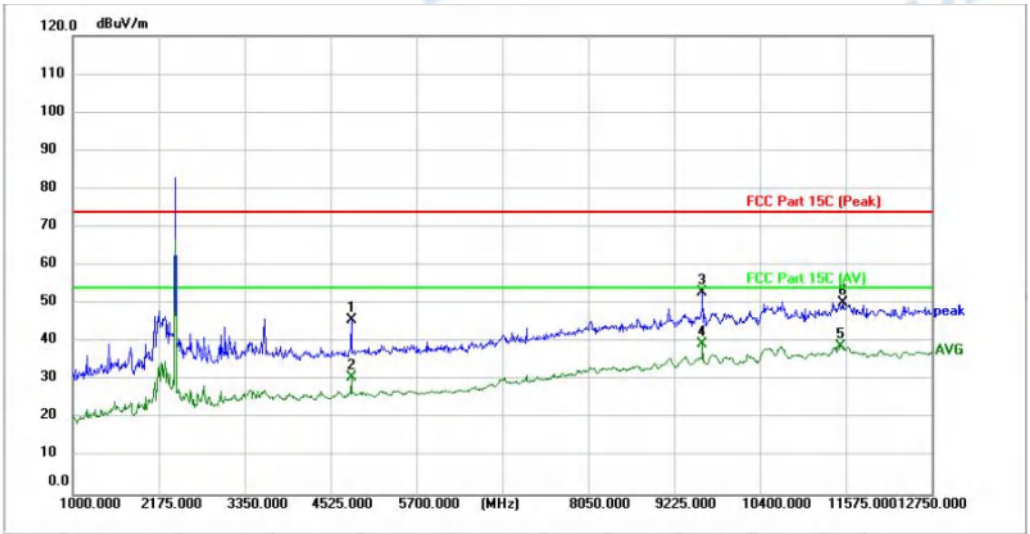
4.10.3 Test Data:

TM3 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: L



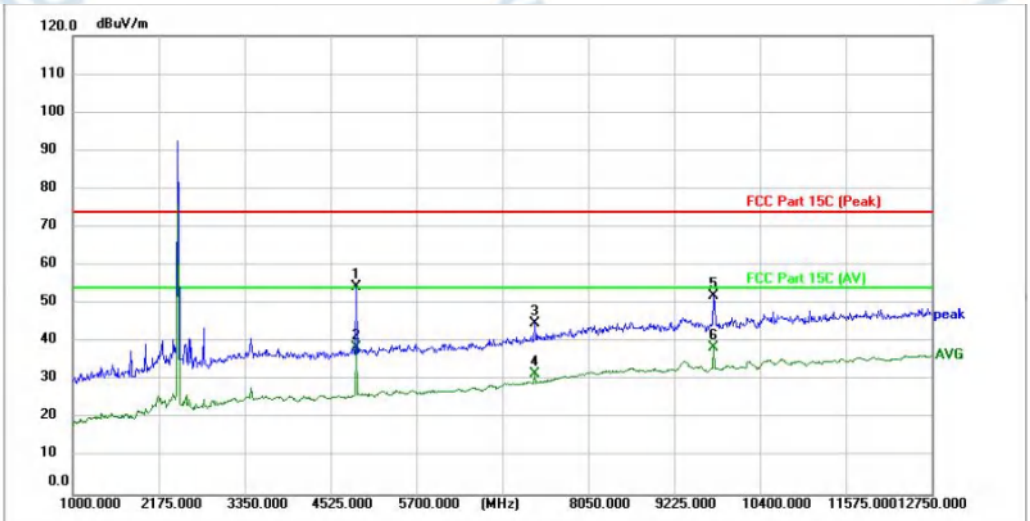
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	4807.000	50.62	-0.69	49.93	74.00	-24.07	peak	149		P	
2	4807.000	35.16	-0.69	34.47	54.00	-19.53	AVG	149		P	
3	7204.000	40.63	4.37	45.00	74.00	-29.00	peak	149		P	
4	7204.000	27.59	4.37	31.96	54.00	-22.04	AVG	149		P	
5	9612.750	44.52	8.10	52.62	74.00	-21.38	peak	149		P	
6 *	9612.750	30.81	8.10	38.91	54.00	-15.09	AVG	149		P	

TM3 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: L



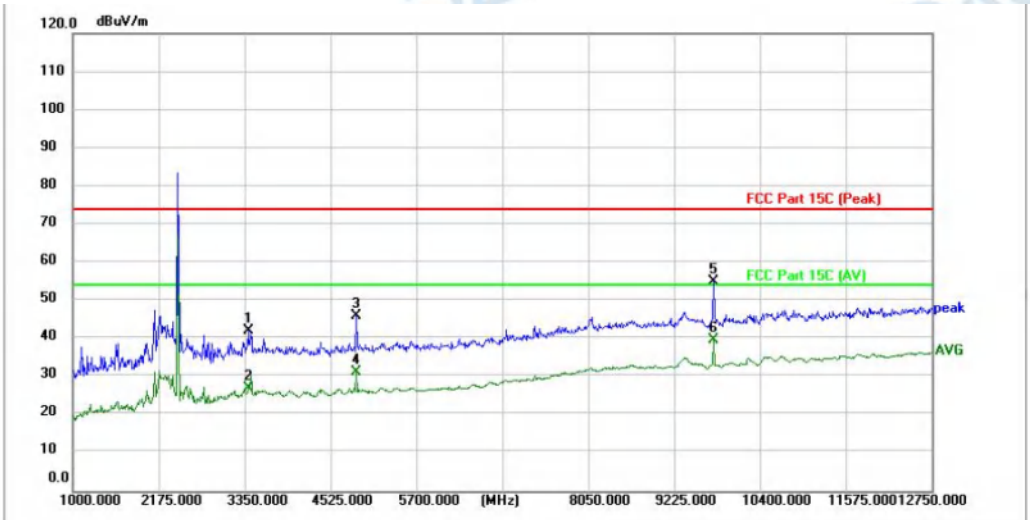
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	4807.000	46.59	-0.69	45.90	74.00	-28.10	peak	149		P	
2	4807.000	31.43	-0.69	30.74	54.00	-23.26	AVG	149		P	
3	9612.750	44.71	8.10	52.81	74.00	-21.19	peak	149		P	
4 *	9612.750	31.31	8.10	39.41	54.00	-14.59	AVG	149		P	
5	11504.500	29.17	9.67	38.84	54.00	-15.16	AVG	149		P	
6	11528.000	40.56	9.68	50.24	74.00	-23.76	peak	149		P	

TM3 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: M



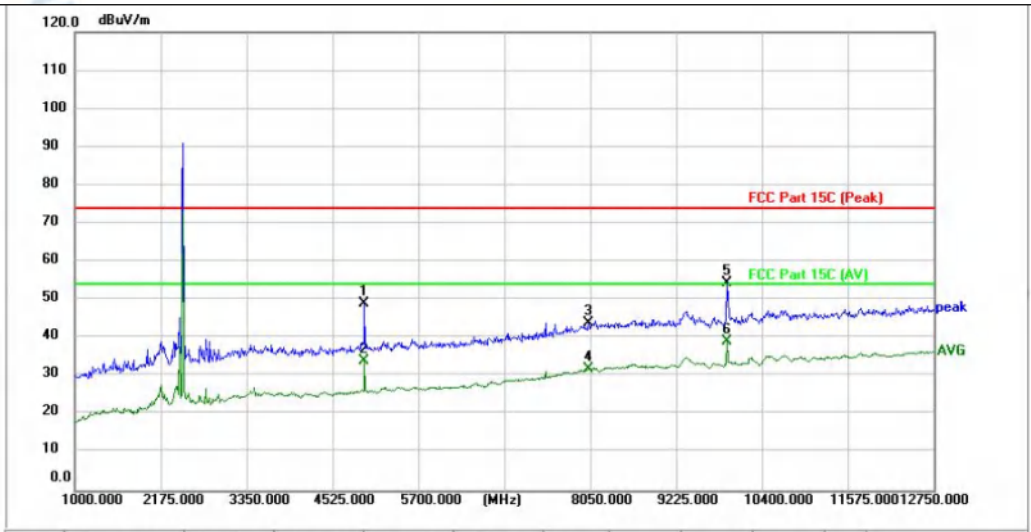
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	4877.500	55.00	-0.45	54.55	74.00	-19.45	peak	149		P	
2 *	4877.500	39.00	-0.45	38.55	54.00	-15.45	AVG	149		P	
3	7321.500	40.18	4.57	44.75	74.00	-29.25	peak	149		P	
4	7321.500	27.16	4.57	31.73	54.00	-22.27	AVG	149		P	
5	9765.500	43.99	8.09	52.08	74.00	-21.92	peak	149		P	
6	9765.500	30.36	8.09	38.45	54.00	-15.55	AVG	149		P	

TM3 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: M



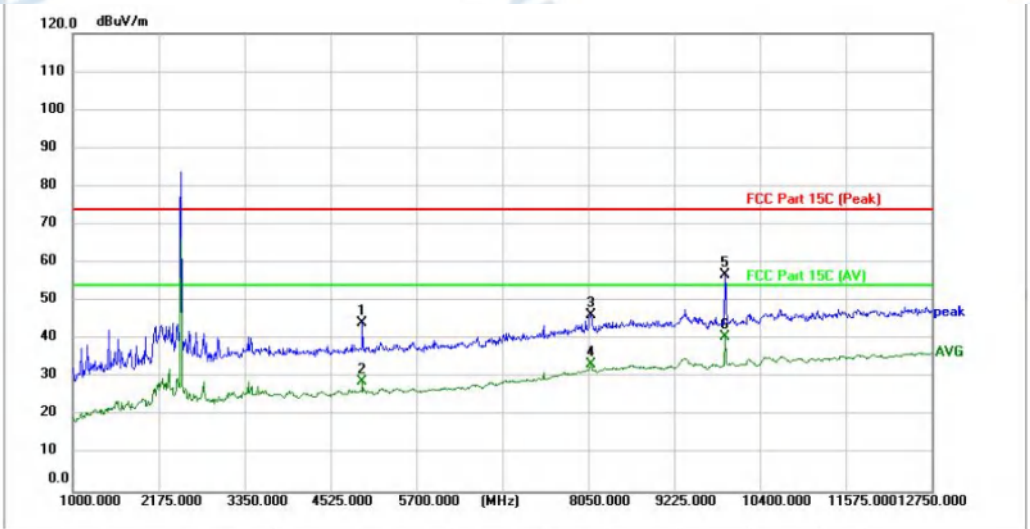
No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	3397.000	46.20	-3.94	42.26	74.00	-31.74	peak			P	
2	3397.000	31.01	-3.94	27.07	54.00	-26.93	AVG			P	
3	4877.500	46.43	-0.45	45.98	74.00	-28.02	peak			P	
4	4877.500	31.66	-0.45	31.21	54.00	-22.79	AVG			P	
5	9765.500	46.96	8.09	55.05	74.00	-18.95	peak			P	
6 *	9765.500	31.58	8.09	39.67	54.00	-14.33	AVG			P	

TM3 / Polarization: Horizontal / Band: 2400-2483.5 MHz / BW: 1 / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	4959.750	49.20	-0.17	49.03	74.00	-24.97	peak	149		P	
2	4959.750	34.21	-0.17	34.04	54.00	-19.96	AVG	149		P	
3	8026.500	37.20	6.72	43.92	74.00	-30.08	peak	149		P	
4	8026.500	25.15	6.72	31.87	54.00	-22.13	AVG	149		P	
5	9918.250	46.46	8.08	54.54	74.00	-19.46	peak	149		P	
6 *	9918.250	30.97	8.08	39.05	54.00	-14.95	AVG	149		P	

TM3 / Polarization: Vertical / Band: 2400-2483.5 MHz / BW: 1 / CH: H



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	4959.750	44.43	-0.17	44.26	74.00	-29.74	peak			P	
2	4959.750	29.01	-0.17	28.84	54.00	-25.16	AVG			P	
3	8085.250	39.58	6.81	46.39	74.00	-27.61	peak			P	
4	8085.250	26.55	6.81	33.36	54.00	-20.64	AVG			P	
5	9918.250	48.66	8.08	56.74	74.00	-17.26	peak			P	
6 *	9918.250	32.43	8.08	40.51	54.00	-13.49	AVG			P	

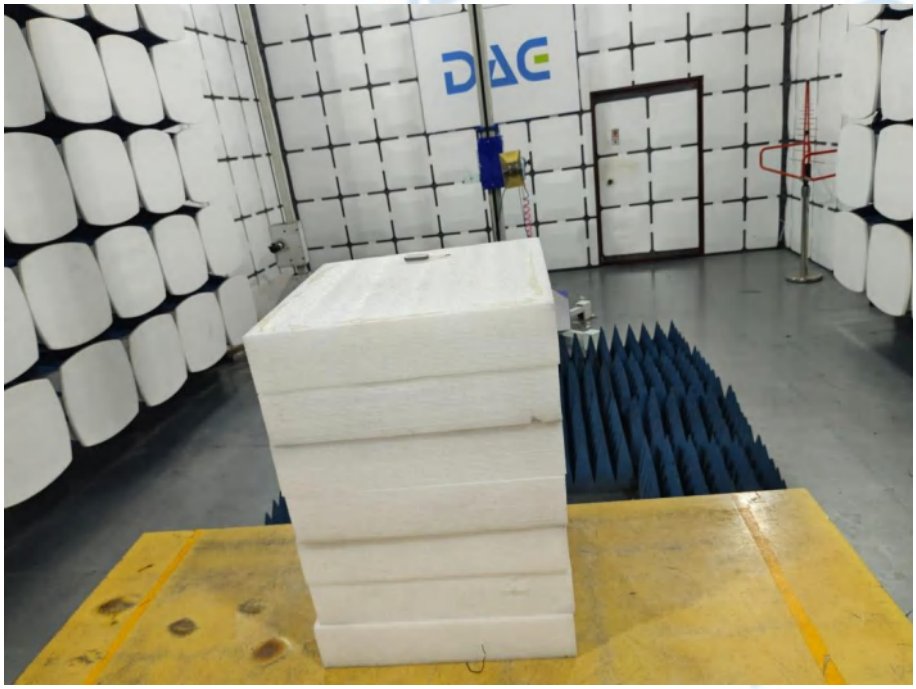
Remark:Margin=Level - Limit, Level=Test receiver reading + correction factor

The test software will only record the worst test angle and height, and only the worst case will be recorded in the test report.

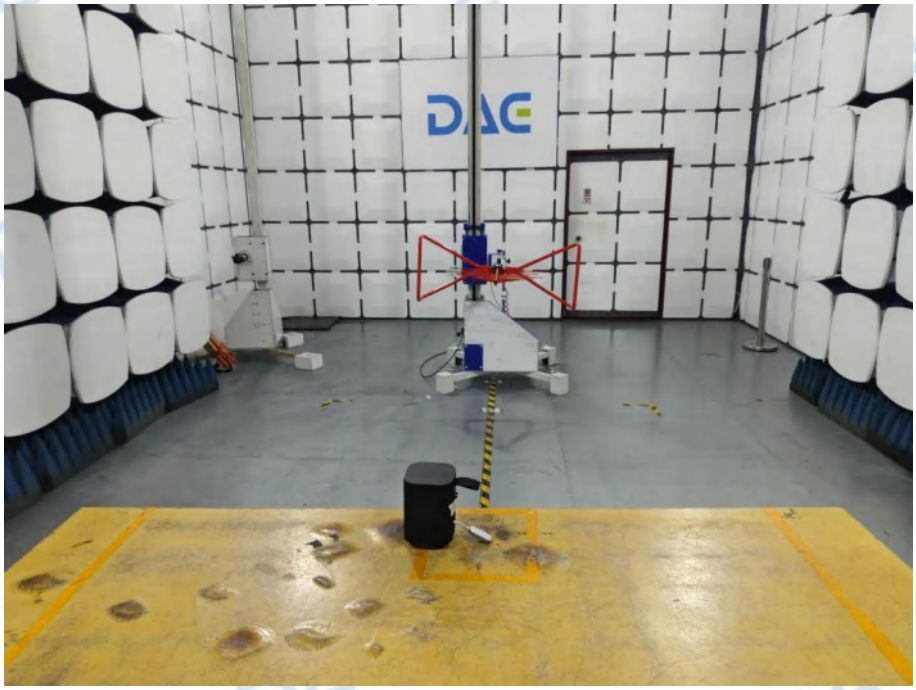
5 TEST SETUP PHOTOS

Conducted Emission at AC power line

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



Emissions in frequency bands (below 1GHz)



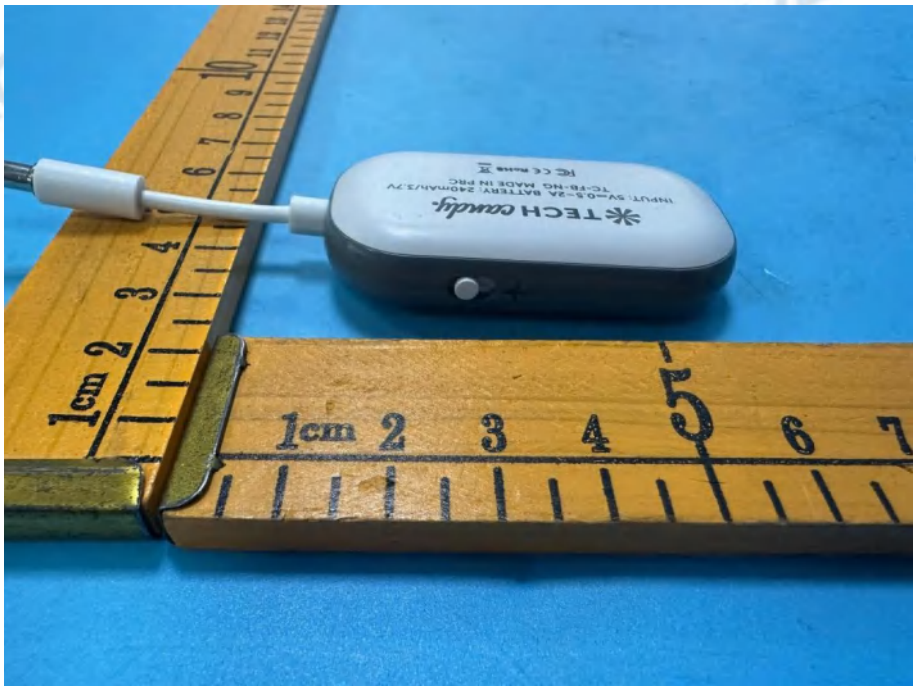
6 PHOTOS OF THE EUT

External

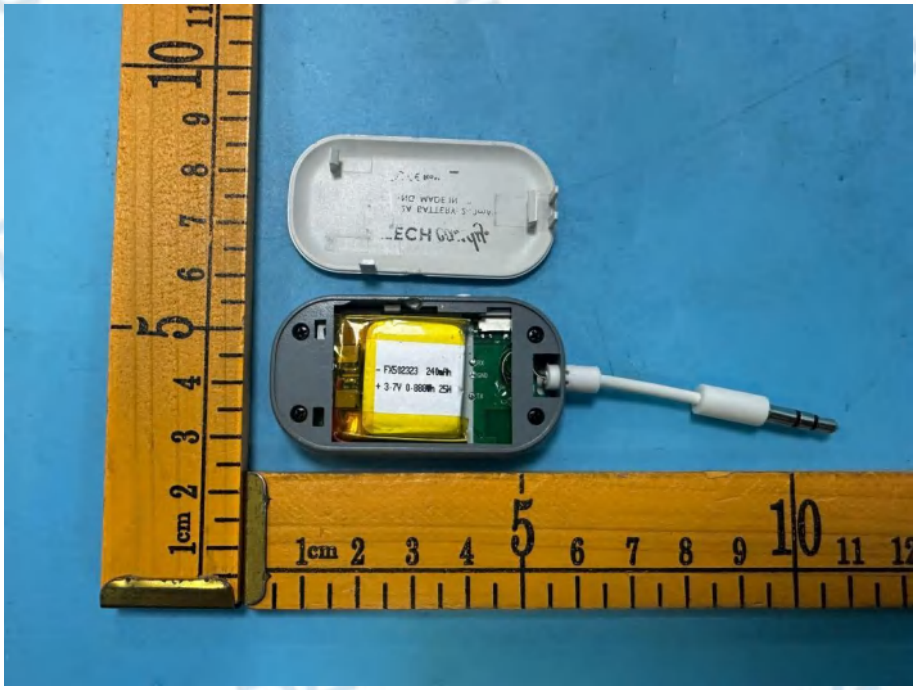
TECH
1cm 2 3 4 5 6

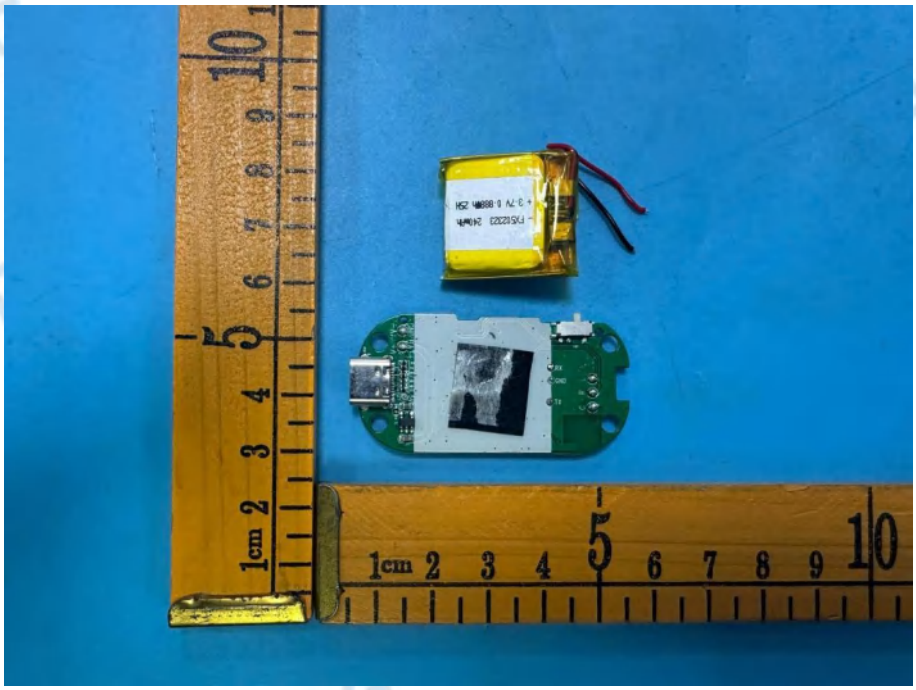
TECH
1cm 2 3 4 5 6 7

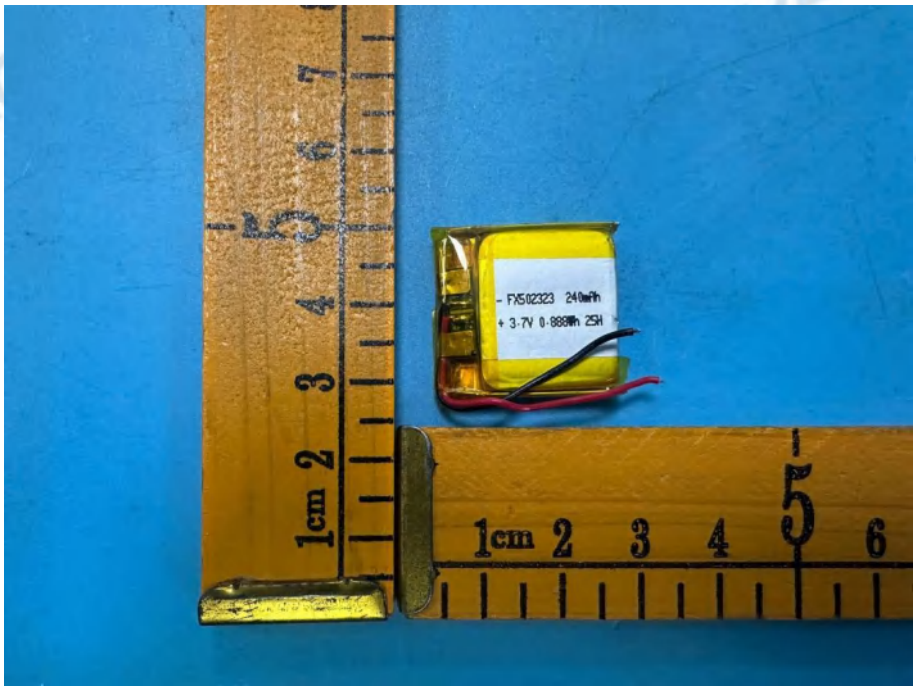
TECH candy.
INPUT: 5V⎓0.5~2A BATTERY: 240mAh/3.7V
TC-F8-NG MADE IN PRC
CE RoHS

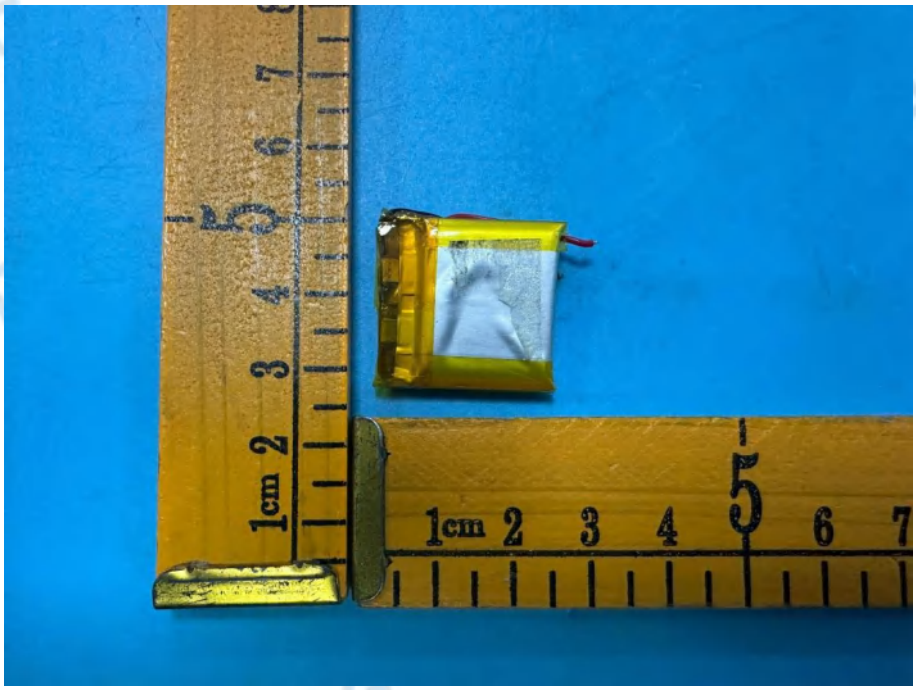


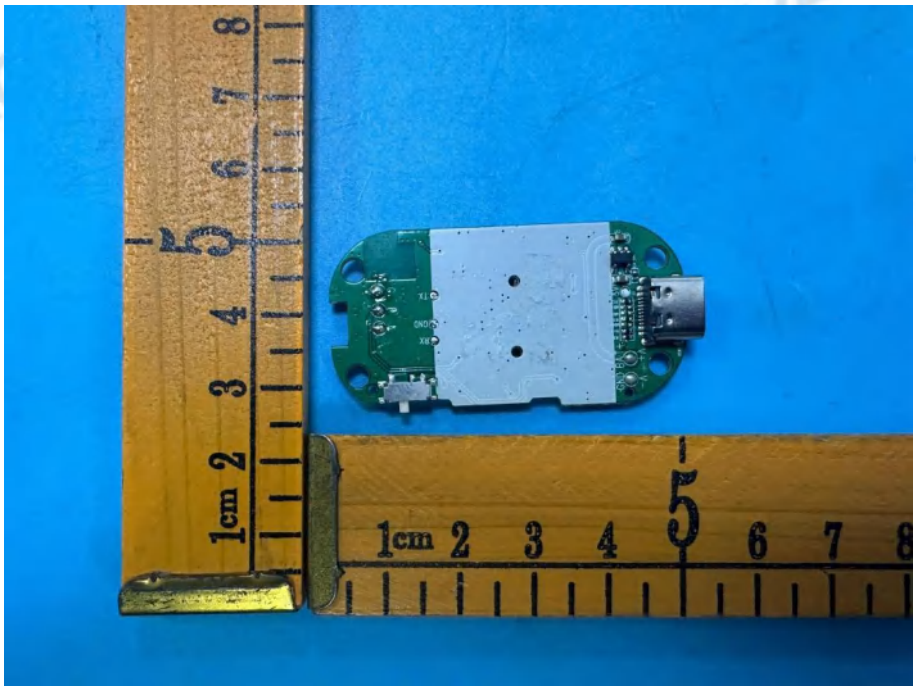
Internal

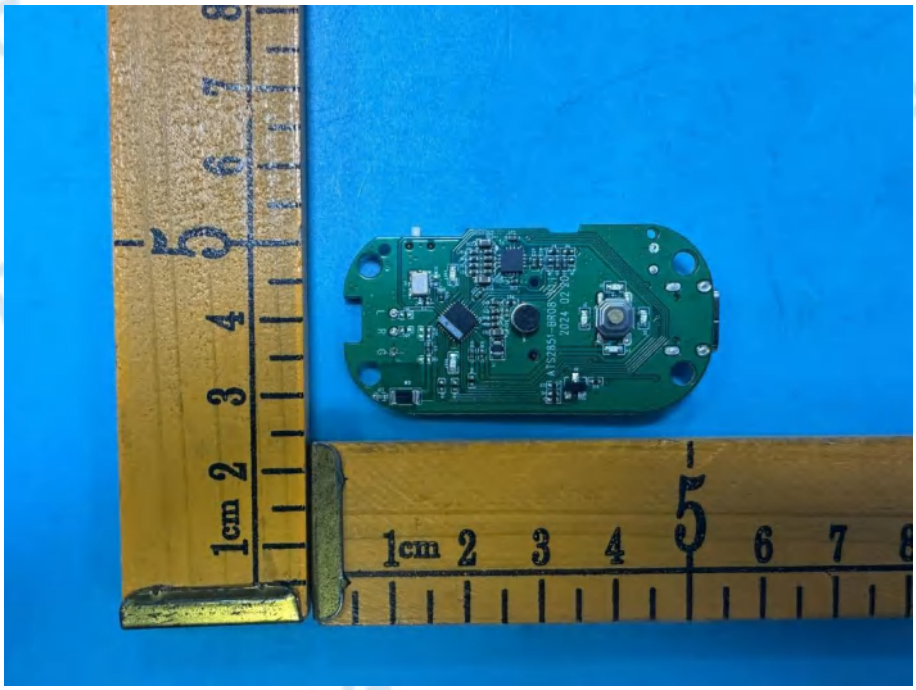


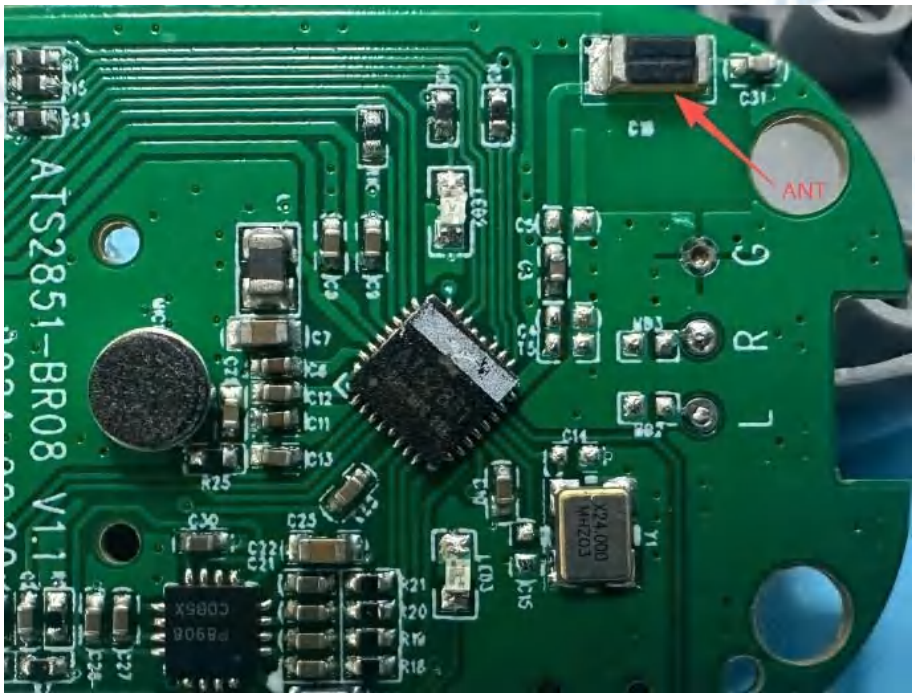



- FX502323 240mAh
+ 3.7V 0.888Wh 25H








ANT
ATS2851-BR08 V1.1

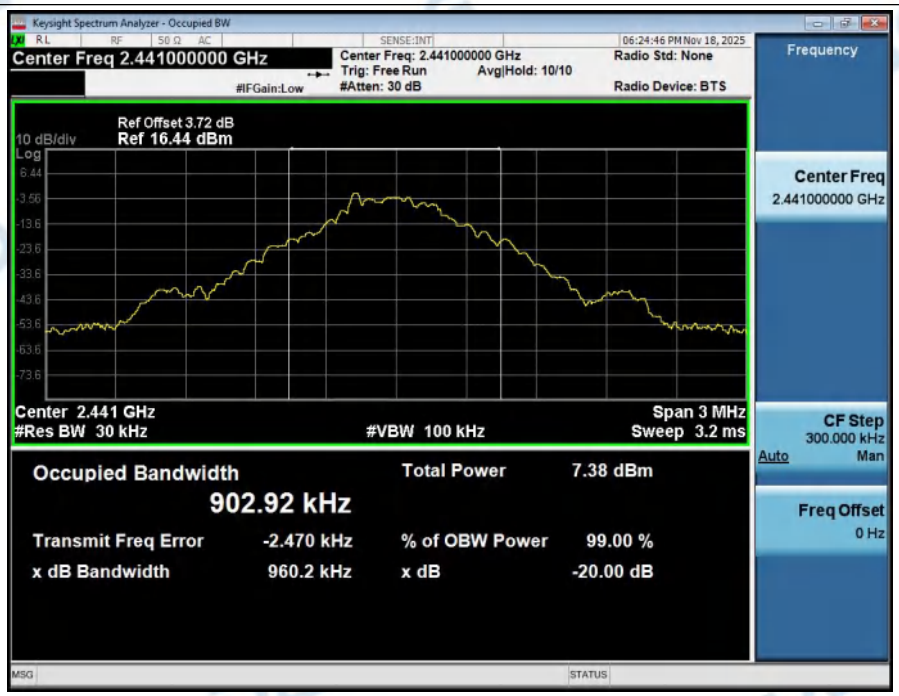
Appendix

1. -20dB Bandwidth

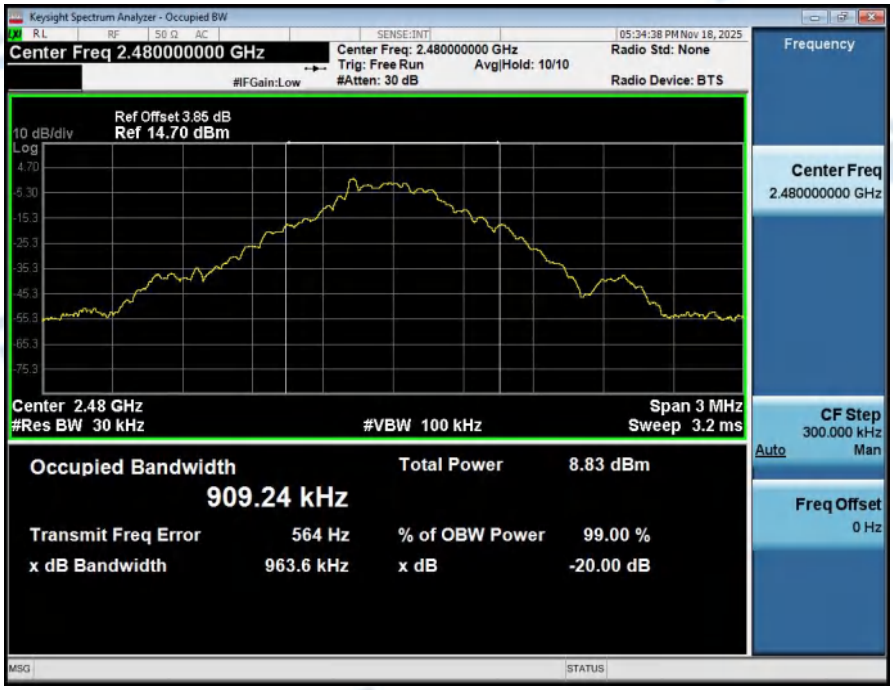
Condition	Antenna	Modulation	Frequency (MHz)	-20dB BW(MHz)	if larger than CFS
NVNT	ANT1	1-DH5	2402.00	0.960	No
NVNT	ANT1	1-DH5	2441.00	0.960	No
NVNT	ANT1	1-DH5	2480.00	0.964	No
NVNT	ANT1	2-DH5	2402.00	1.310	Yes
NVNT	ANT1	2-DH5	2441.00	1.306	Yes
NVNT	ANT1	2-DH5	2480.00	1.284	Yes
NVNT	ANT1	3-DH5	2402.00	1.272	Yes
NVNT	ANT1	3-DH5	2441.00	1.267	Yes
NVNT	ANT1	3-DH5	2480.00	1.269	Yes

-20dB_Bandwidth_NVNT_ANT1_1-DH5_2402_00

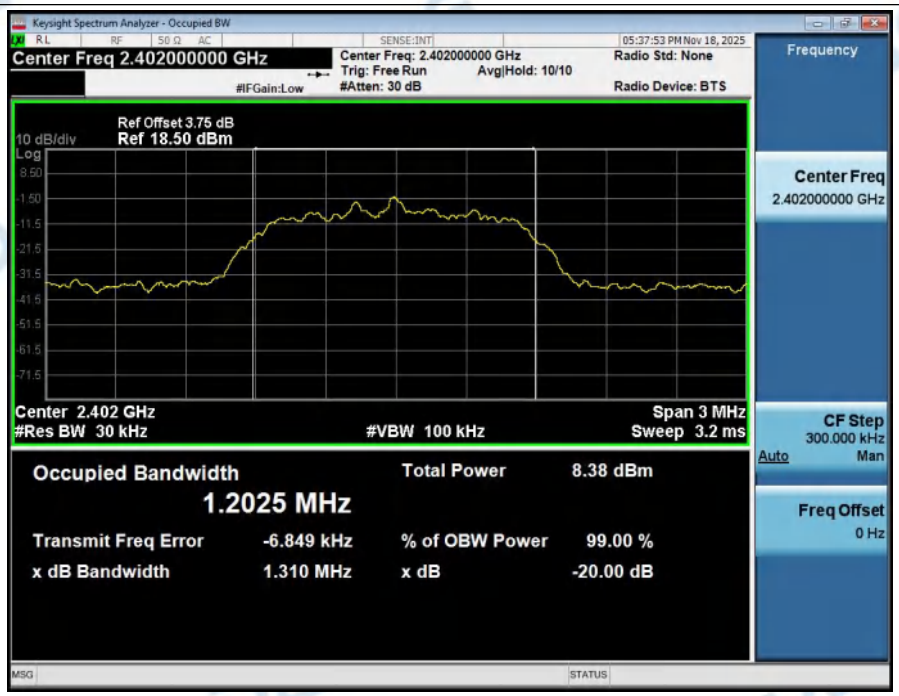
-20dB_Bandwidth_NVNT_ANT1_1-DH5_2441_00



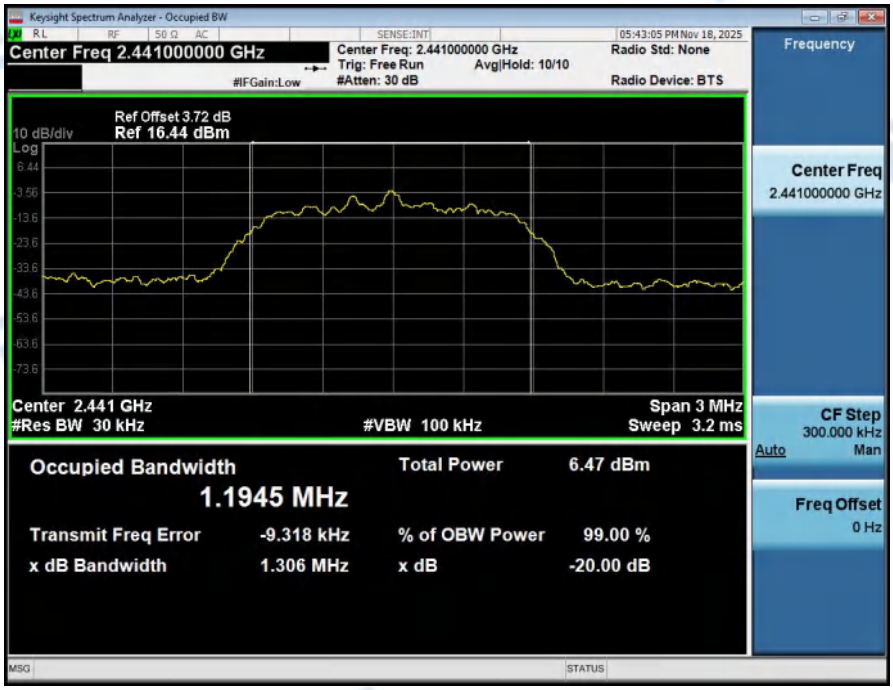
-20dB_Bandwidth_NVNT_ANT1_1-DH5_2480_00



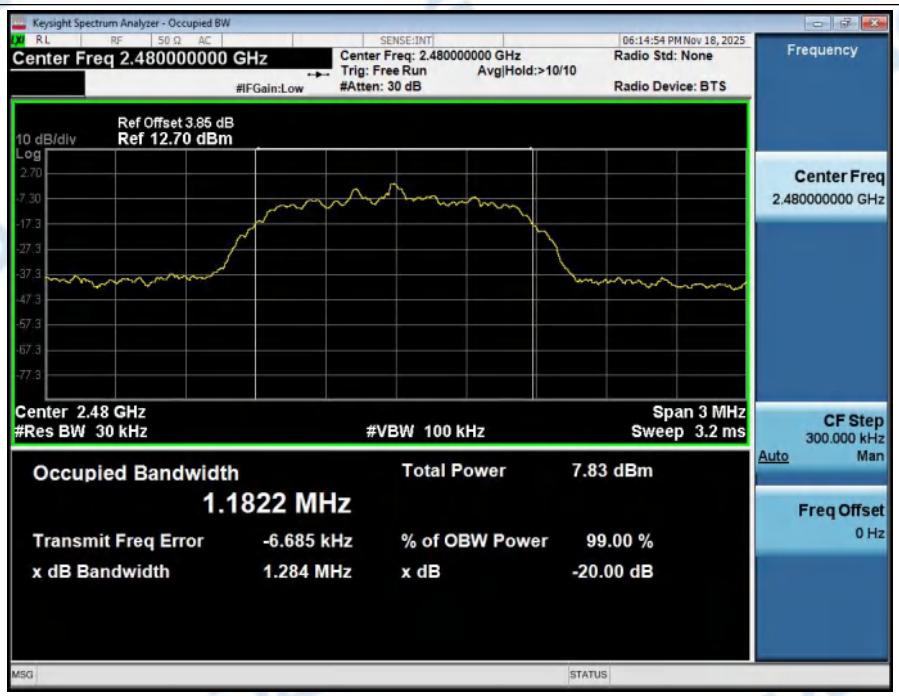
-20dB_Bandwidth_NVNT_ANT1_2-DH5_2402_00



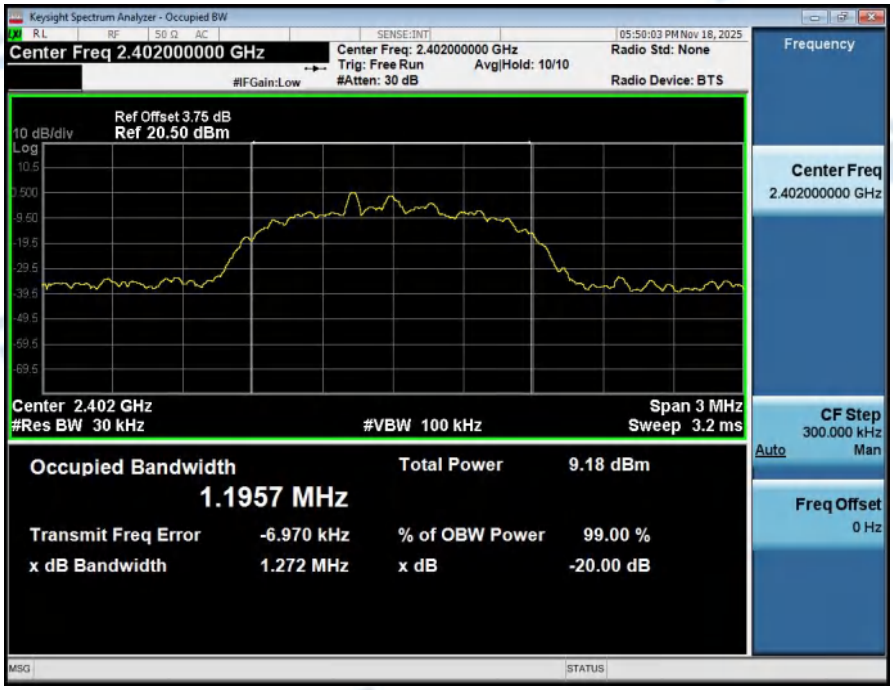
-20dB_Bandwidth_NVNT_ANT1_2-DH5_2441_00



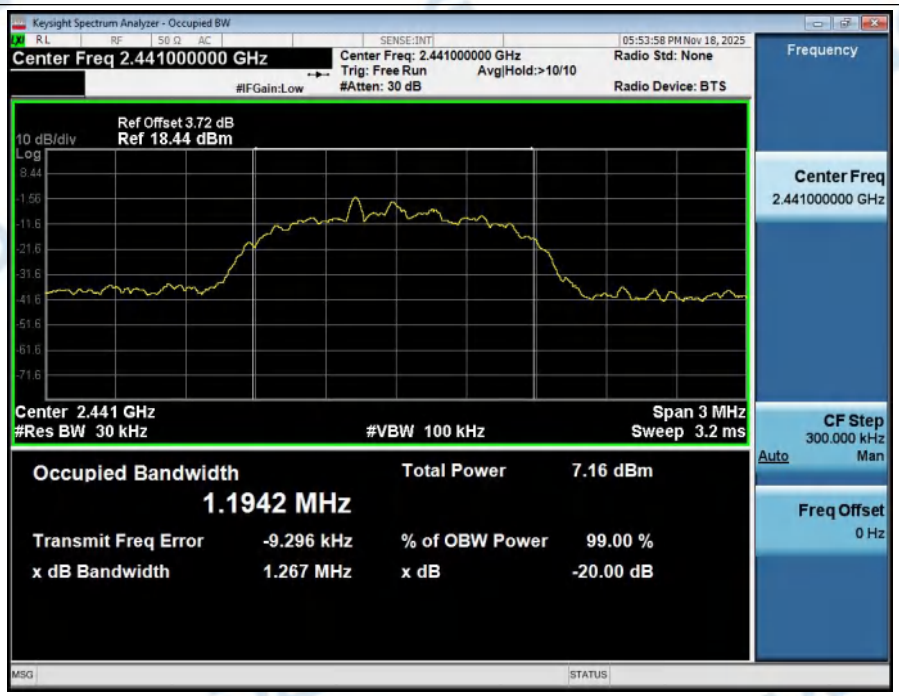
-20dB_Bandwidth_NVNT_ANT1_2-DH5_2480_00



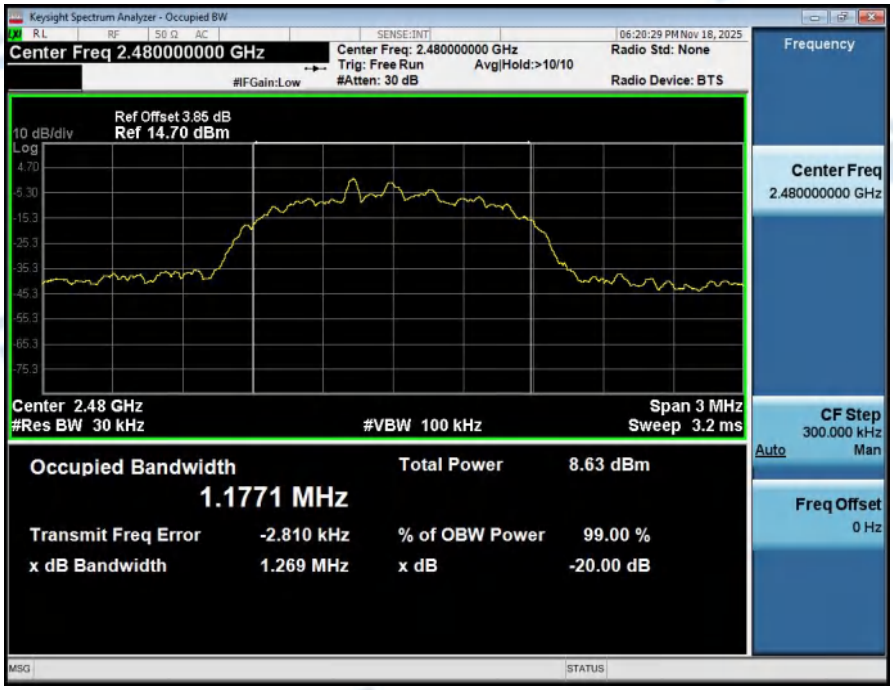
-20dB_Bandwidth_NVNT_ANT1_3-DH5_2402_00



-20dB_Bandwidth_NVNT_ANT1_3-DH5_2441_00



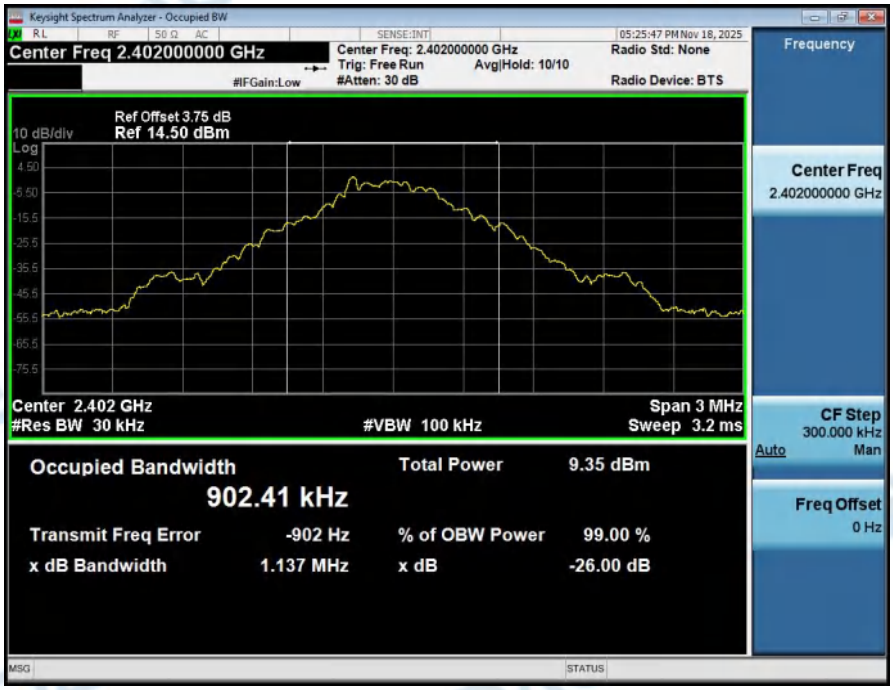
-20dB_Bandwidth_NVNT_ANT1_3-DH5_2480_00



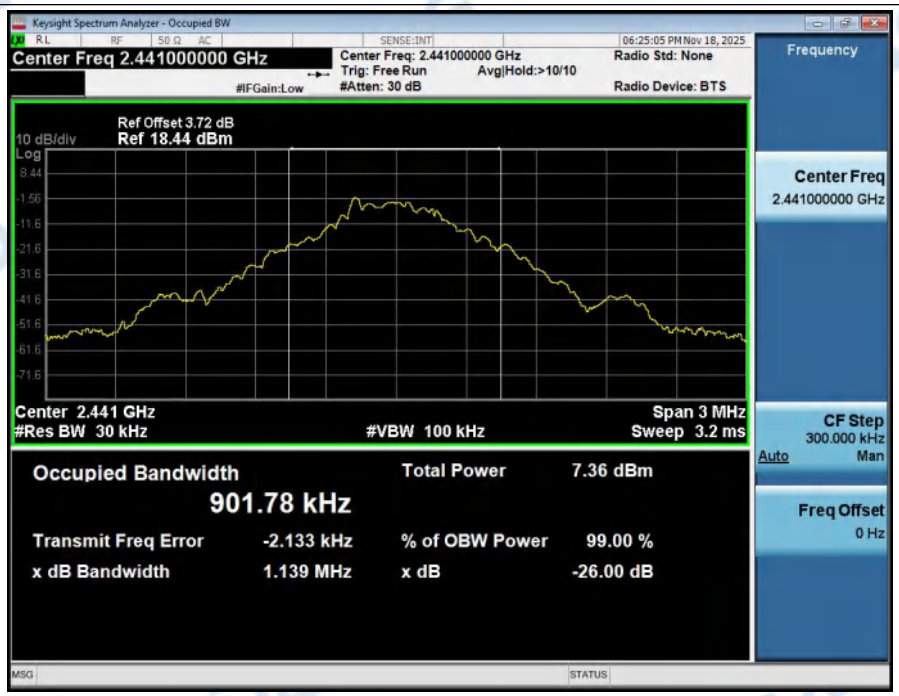
2. 99% Occupied Bandwidth

Condition	Antenna	Modulation	Frequency (MHz)	99%%BW(MHz)
NVNT	ANT1	1-DH5	2402.00	0.902
NVNT	ANT1	1-DH5	2441.00	0.902
NVNT	ANT1	1-DH5	2480.00	0.910
NVNT	ANT1	2-DH5	2402.00	1.202
NVNT	ANT1	2-DH5	2441.00	1.195
NVNT	ANT1	2-DH5	2480.00	1.185
NVNT	ANT1	3-DH5	2402.00	1.196
NVNT	ANT1	3-DH5	2441.00	1.194
NVNT	ANT1	3-DH5	2480.00	1.179

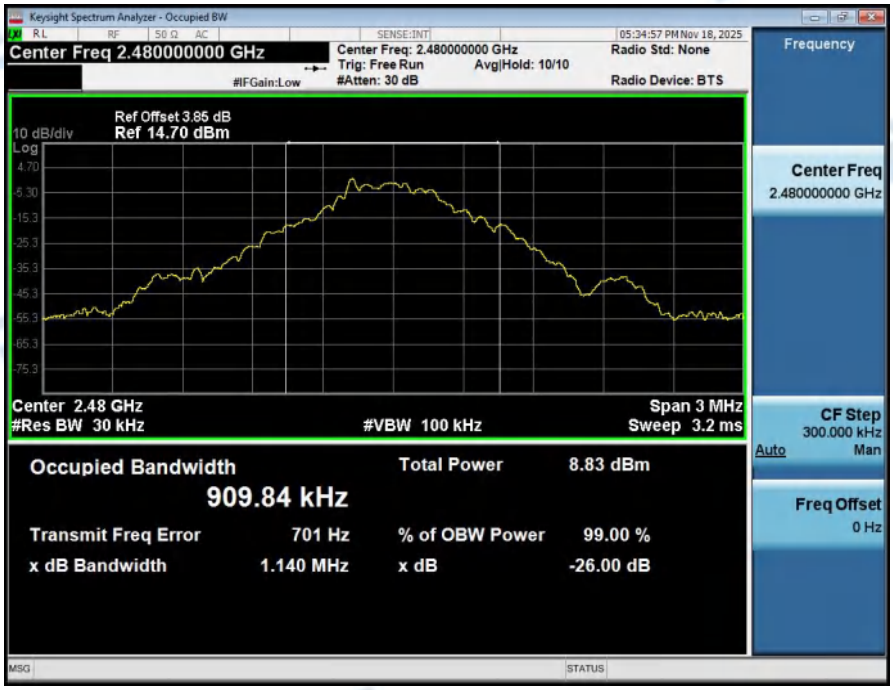
99%_Occupied_Bandwidth_NVNT_ANT1_1-DH5_2402_00



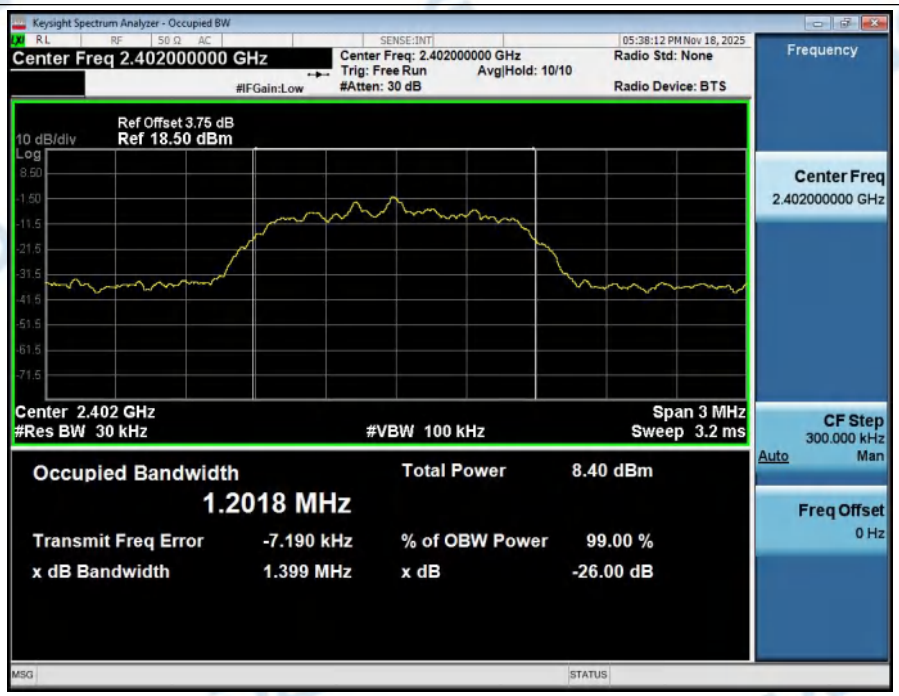
99%_Occupied_Bandwidth_NVNT_ANT1_1-DH5_2441_00



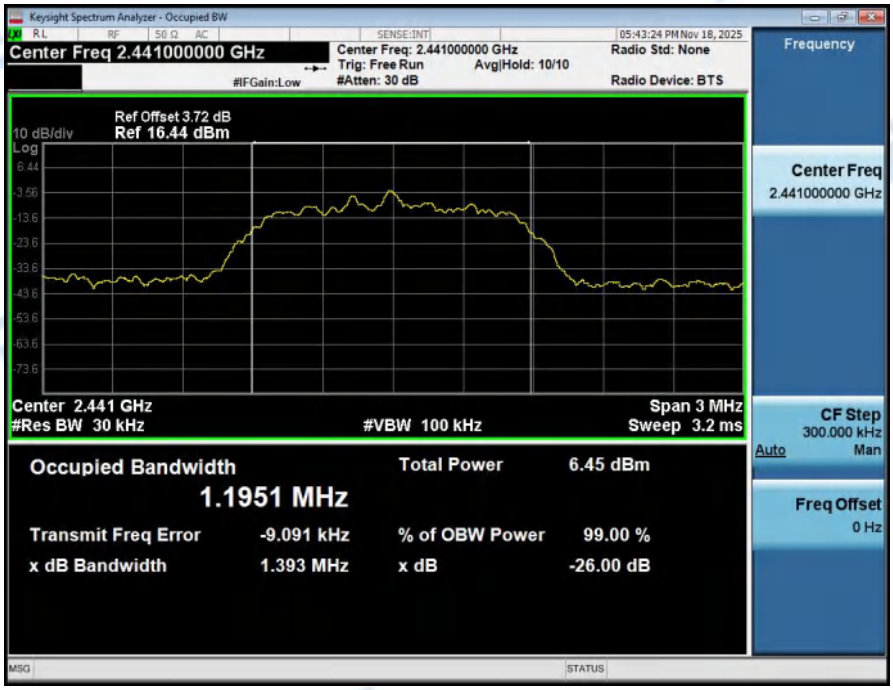
99%_Occupied_Bandwidth_NVNT_ANT1_1-DH5_2480_00



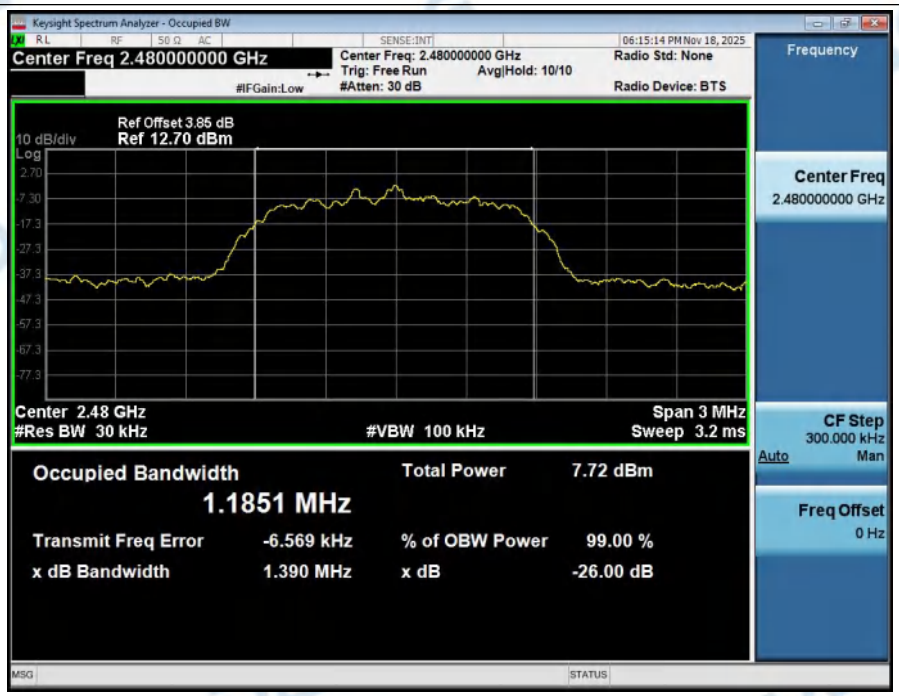
99%_Occupied_Bandwidth_NVNT_ANT1_2-DH5_2402_00



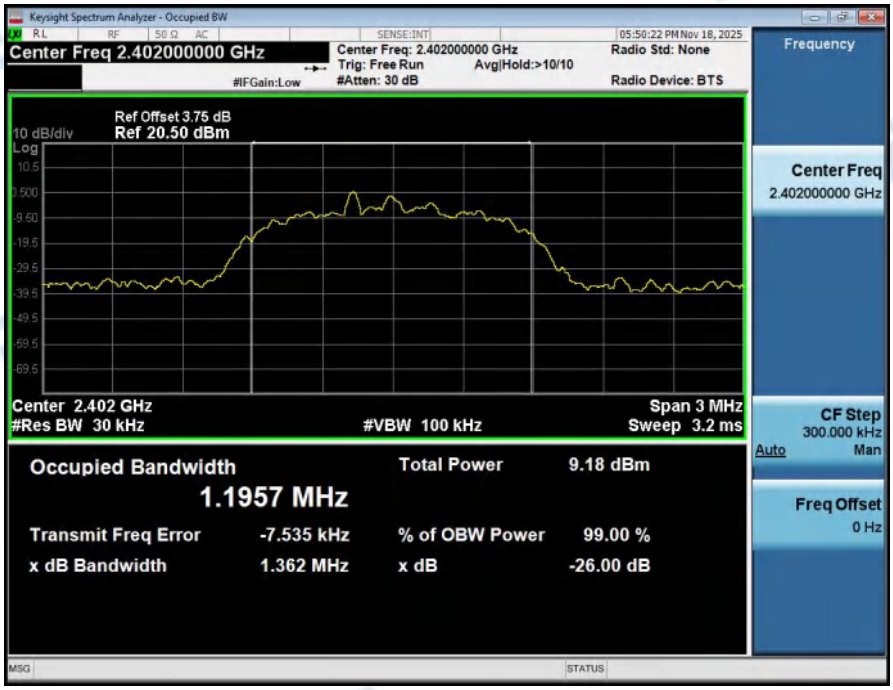
99%_Occupied_Bandwidth_NVNT_ANT1_2-DH5_2441_00



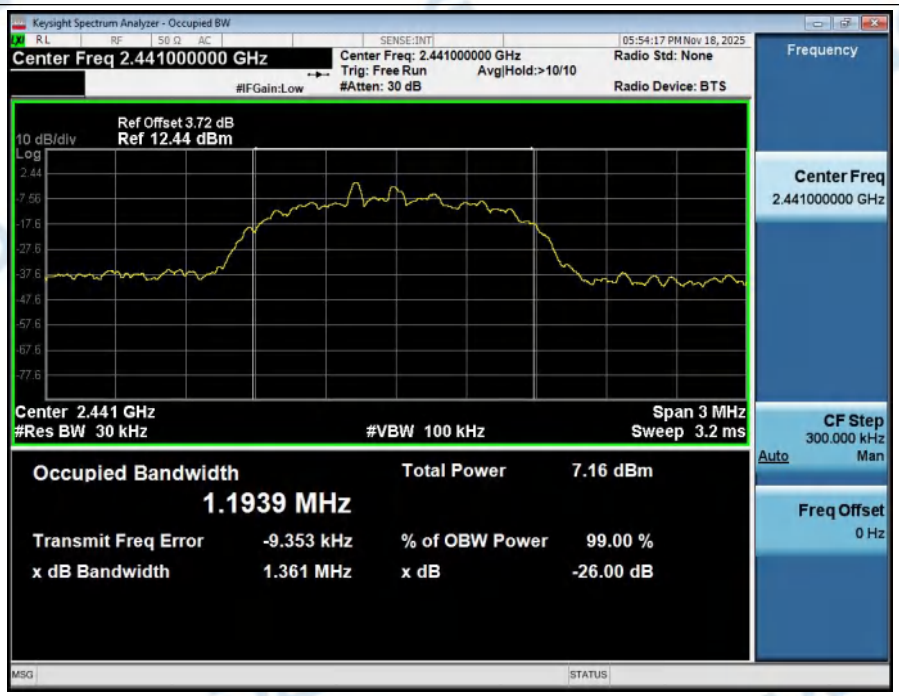
99%_Occupied_Bandwidth_NVNT_ANT1_2-DH5_2480_00



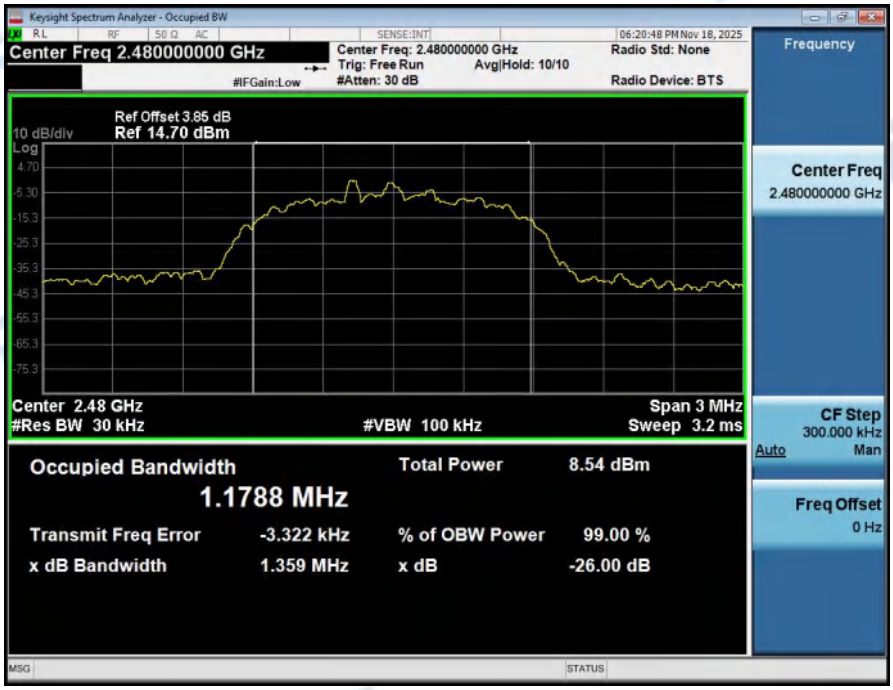
99%_Occupied_Bandwidth_NVNT_ANT1_3-DH5_2402_00



99%_Occupied_Bandwidth_NVNT_ANT1_3-DH5_2441_00



99%_Occupied_Bandwidth_NVNT_ANT1_3-DH5_2480_00



3. Peak Output Power

Condition	Antenna	Modulation	Frequency (MHz)	Max. Conducted Power(dBm)	Max. Conducted Power(mW)	Limit(mW)	Result
NVNT	ANT1	1-DH5	2402.00	1.79	1.51	1000	Pass
NVNT	ANT1	1-DH5	2441.00	-0.14	0.97	1000	Pass
NVNT	ANT1	1-DH5	2480.00	1.41	1.38	1000	Pass
NVNT	ANT1	2-DH5	2402.00	2.19	1.65	125	Pass
NVNT	ANT1	2-DH5	2441.00	0.42	1.10	125	Pass
NVNT	ANT1	2-DH5	2480.00	2.01	1.59	125	Pass
NVNT	ANT1	3-DH5	2402.00	2.60	1.82	125	Pass
NVNT	ANT1	3-DH5	2441.00	0.79	1.20	125	Pass
NVNT	ANT1	3-DH5	2480.00	2.43	1.75	125	Pass

Peak_Output_Power_NVNT_ANT1_1-DH5_2402_00

Peak_Output_Power_NVNT_ANT1_1-DH5_2441_00

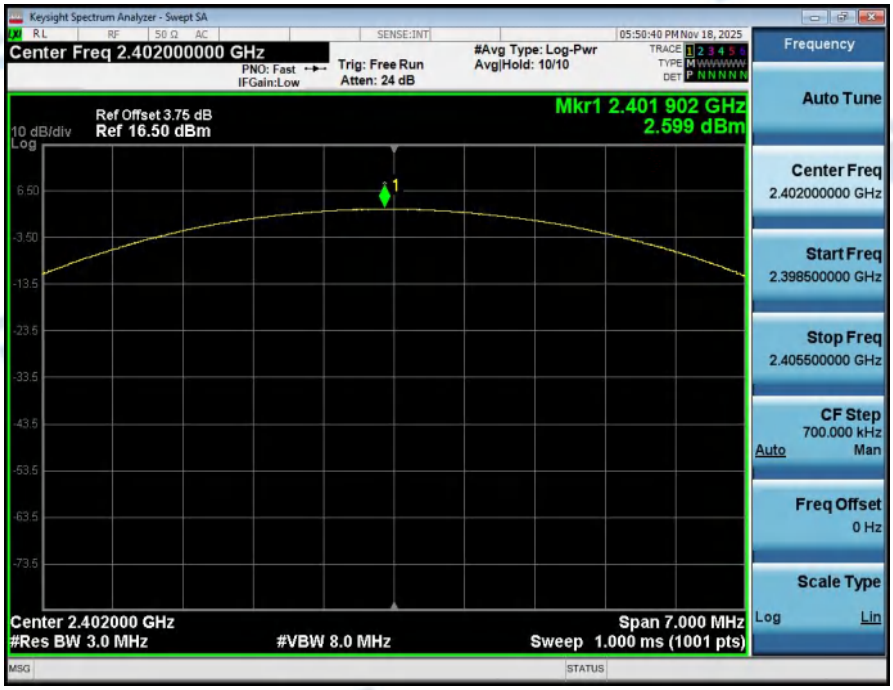
Peak_Output_Power_NVNT_ANT1_1-DH5_2480_00

Peak_Output_Power_NVNT_ANT1_2-DH5_2402_00

Peak_Output_Power_NVNT_ANT1_2-DH5_2441_00

Peak_Output_Power_NVNT_ANT1_2-DH5_2480_00

Peak_Output_Power_NVNT_ANT1_3-DH5_2402_00



Peak_Output_Power_NVNT_ANT1_3-DH5_2441_00

Peak_Output_Power_NVNT_ANT1_3-DH5_2480_00

4. Carrier Frequencies Separation (Hopping)

Condition	Antenna	Modulation	Frequency(MHz)	Hopping NO.0 (MHz)	Hopping NO.1 (MHz)	Carrier Frequencies Separation(MHz)	Limit(MHz)	Result
NVNT	ANT1	1-DH5	2441.00	2440.831	2441.830	0.97	0.960	Pass
NVNT	ANT1	2-DH5	2441.00	2440.831	2442.160	1.11	0.871	Pass
NVNT	ANT1	3-DH5	2441.00	2440.831	2441.824	0.89	0.845	Pass

Carrier_Frequencies_Separation_(Hopping)_NVNT_ANT1_1-DH5_Hopping

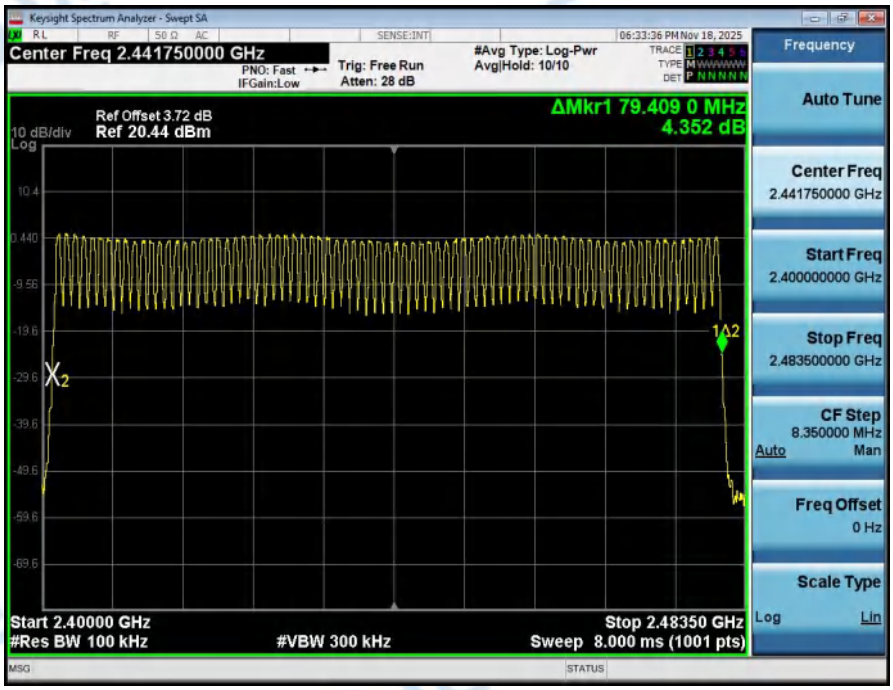
Carrier_Frequencies_Separation_(Hopping)_NVNT_ANT1_2-DH5_Hopping

Carrier_Frequencies_Separation_(Hopping)_NVNT_ANT1_3-DH5_Hopping

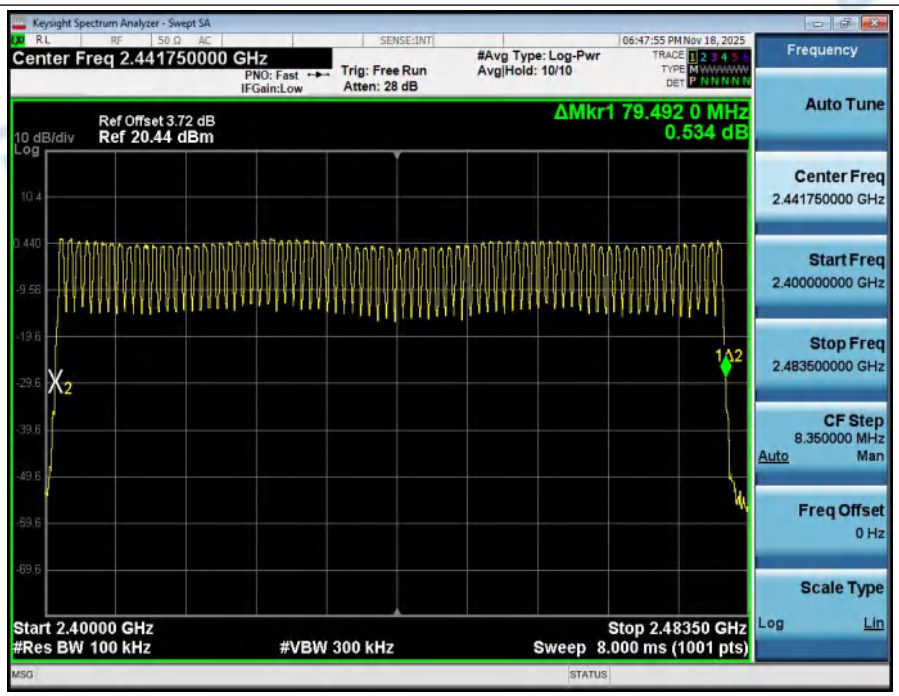
5. Number of Hopping Channel (Hopping)

Condition	Antenna	Modulation	Hopping Num	Limit	Result
NVNT	ANT1	1-DH5	79	15	Pass
NVNT	ANT1	2-DH5	79	15	Pass
NVNT	ANT1	3-DH5	79	15	Pass

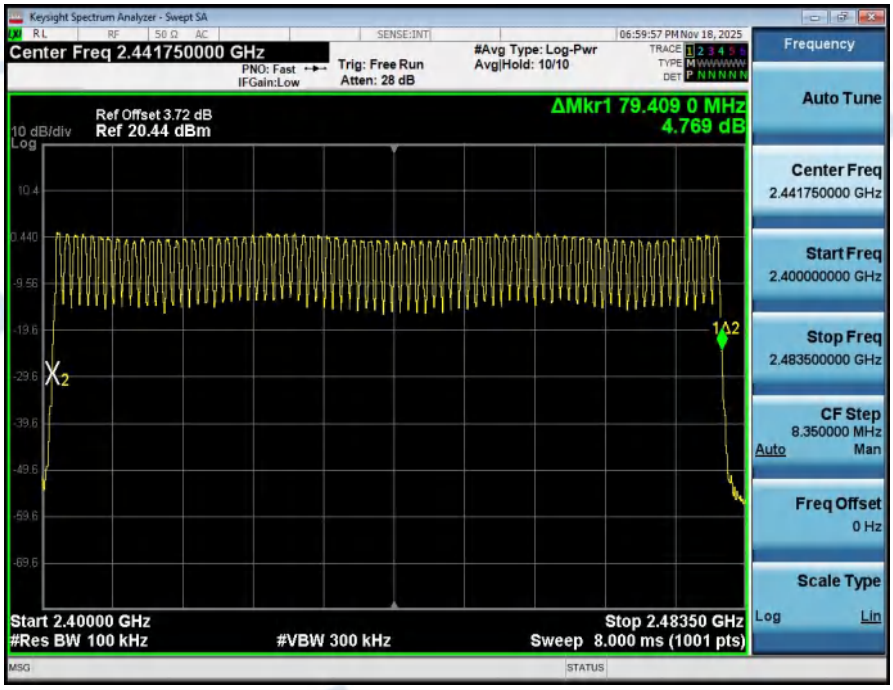
Number_of_Hopping_Channel_(Hopping)_NVNT_ANT1_1-DH5_Hopping



Number_of_Hopping_Channel_(Hopping)_NVNT_ANT1_2-DH5_Hopping



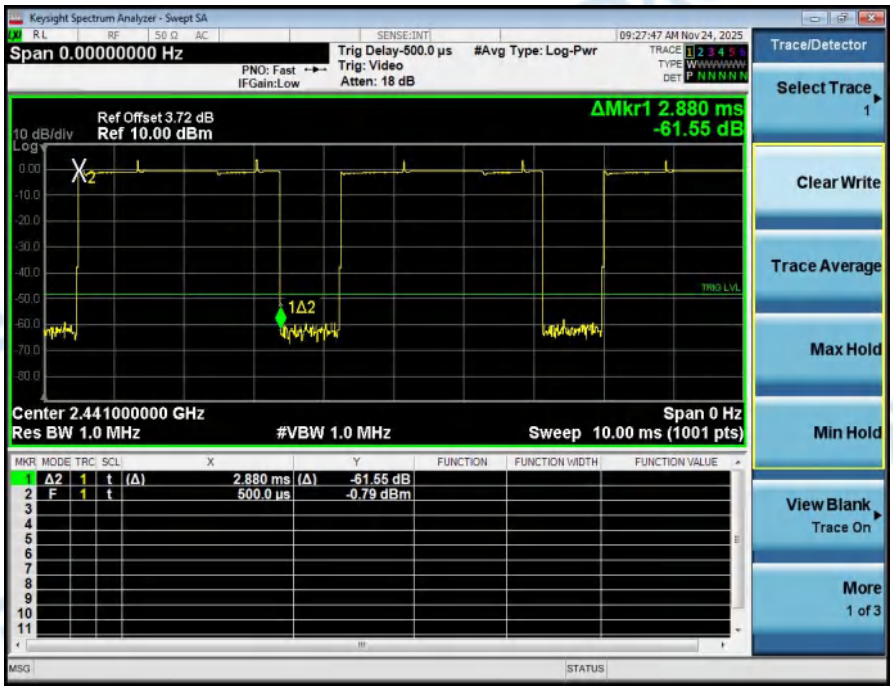
Number_of_Hopping_Channel_(Hopping)_NVNT_ANT1_3-DH5_Hopping


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.441750000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 28 dB
#Avg Type: Log-Pwr
Avg|Hold: 10/10
06:59:57 PM Nov 18, 2025
Ref Offset 3.72 dB
10 dB/div
Ref 20.44 dBm
Log
ΔMkr1 79.409 0 MHz
4.769 dB
Start 2.40000 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.48350 GHz
Sweep 8.000 ms (1001 pts)
Frequency
Auto Tune
Center Freq
2.441750000 GHz
Start Freq
2.400000000 GHz
Stop Freq
2.483500000 GHz
CF Step
8.350000 MHz
Auto
Man
Freq Offset
0 Hz
Scale Type
Log
Lin

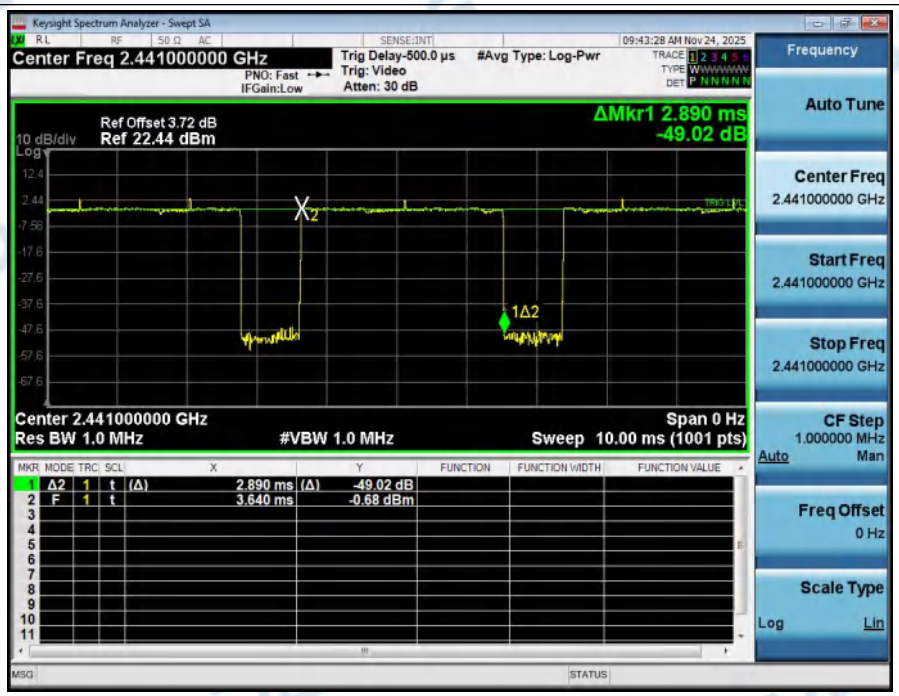
6. Dwell Time (Hopping)

Condition	Antenna	Packet Type	Pulse Time(ms)	Dwell Time(ms)	Limit(s)	Result
NVNT	ANT1	1-DH5	2.880	307.200	0.40	Pass
NVNT	ANT1	2-DH5	2.890	308.267	0.40	Pass
NVNT	ANT1	3-DH5	2.900	309.333	0.40	Pass
NVNT	ANT1	1-DH1	0.380	121.600	0.40	Pass
NVNT	ANT1	1-DH3	1.630	260.800	0.40	Pass
NVNT	ANT1	2-DH1	0.400	128.000	0.40	Pass
NVNT	ANT1	2-DH3	1.640	262.400	0.40	Pass
NVNT	ANT1	3-DH1	0.390	124.800	0.40	Pass
NVNT	ANT1	3-DH3	1.640	262.400	0.40	Pass

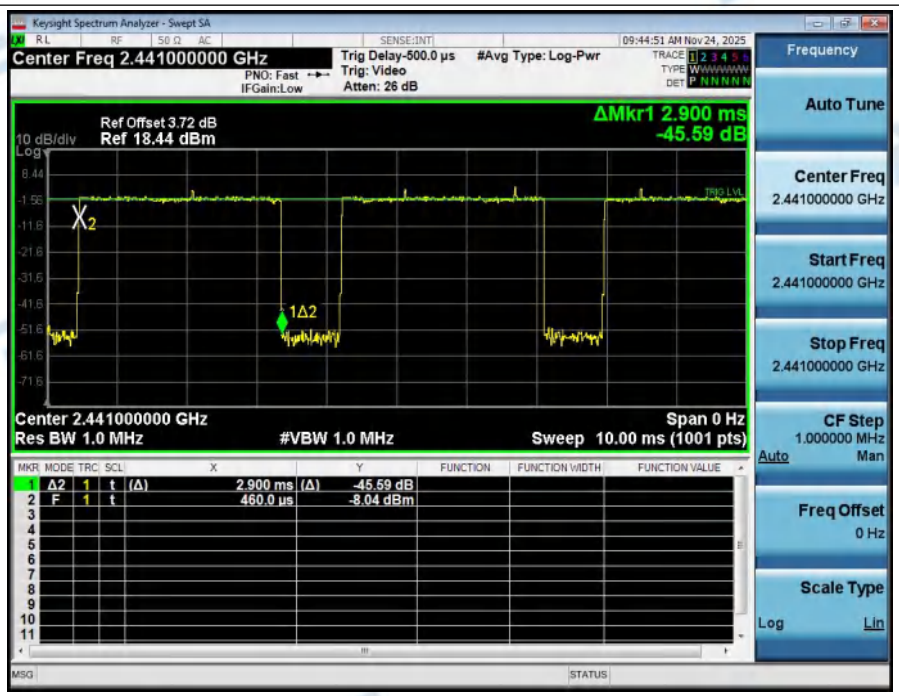
Dwell_Time_(Hopping)_NVNT_ANT1_1-DH5_2441_00_One_Burst_Time



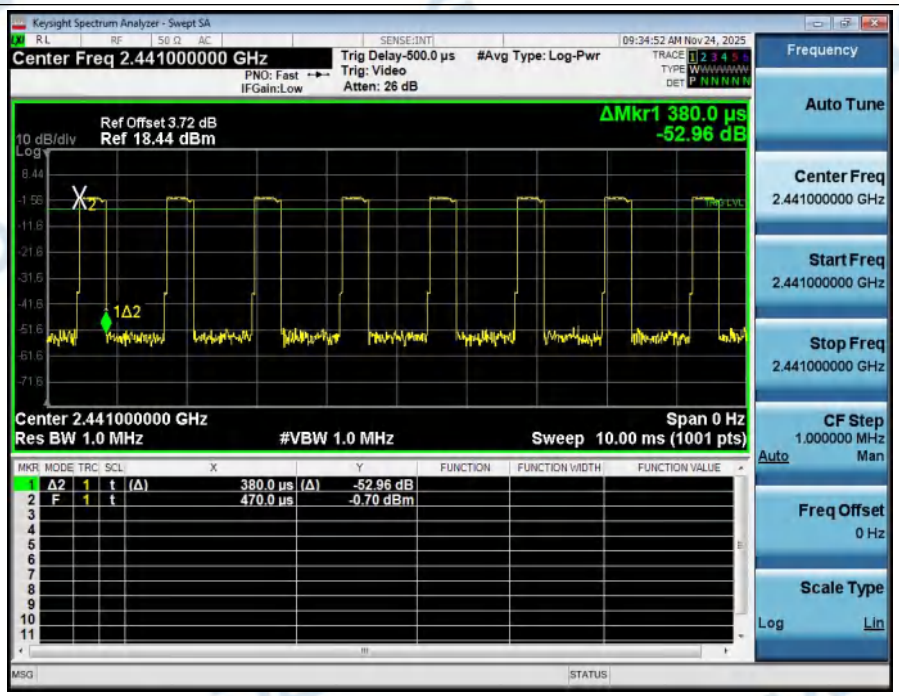
Dwell_Time_(Hopping)_NVNT_ANT1_2-DH5_2441_00_One_Burst_Time



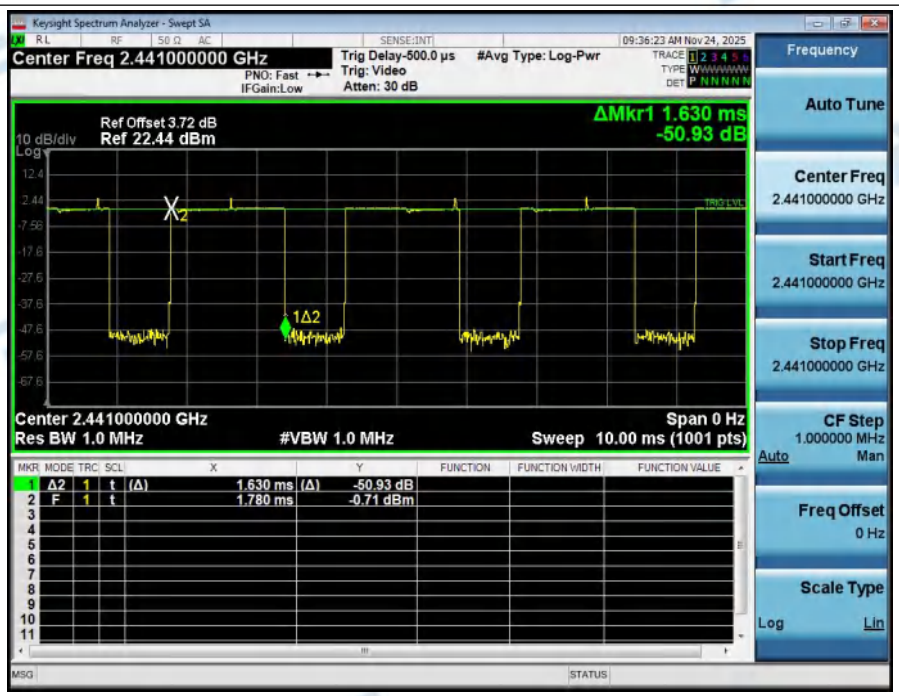
Dwell_Time_(Hopping)_NVNT_ANT1_3-DH5_2441_00_One_Burst_Time



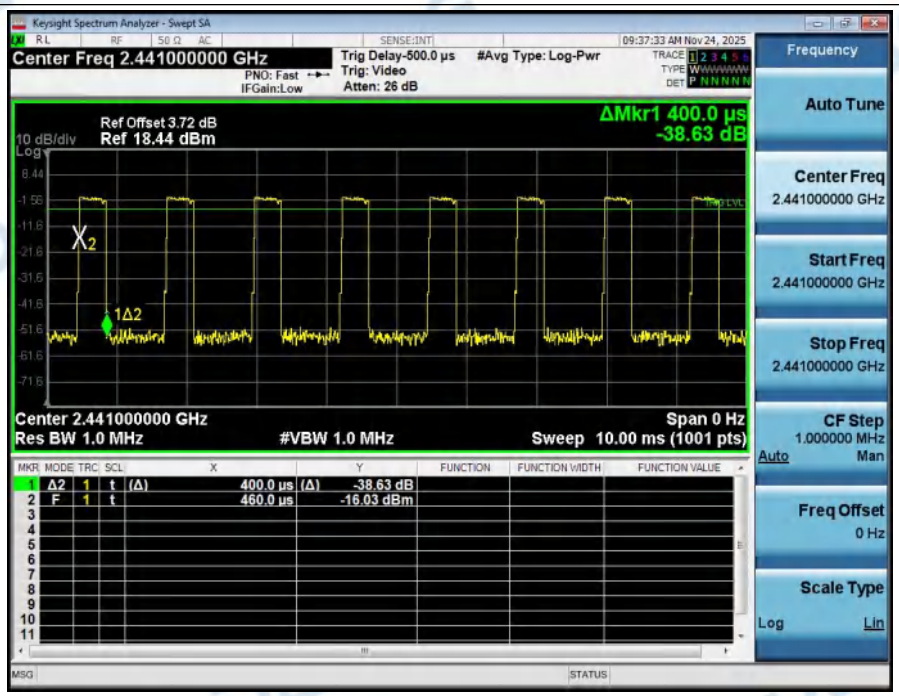
Dwell_Time_(Hopping)_NVNT_ANT1_1-DH1_2441_00_One_Burst_Time



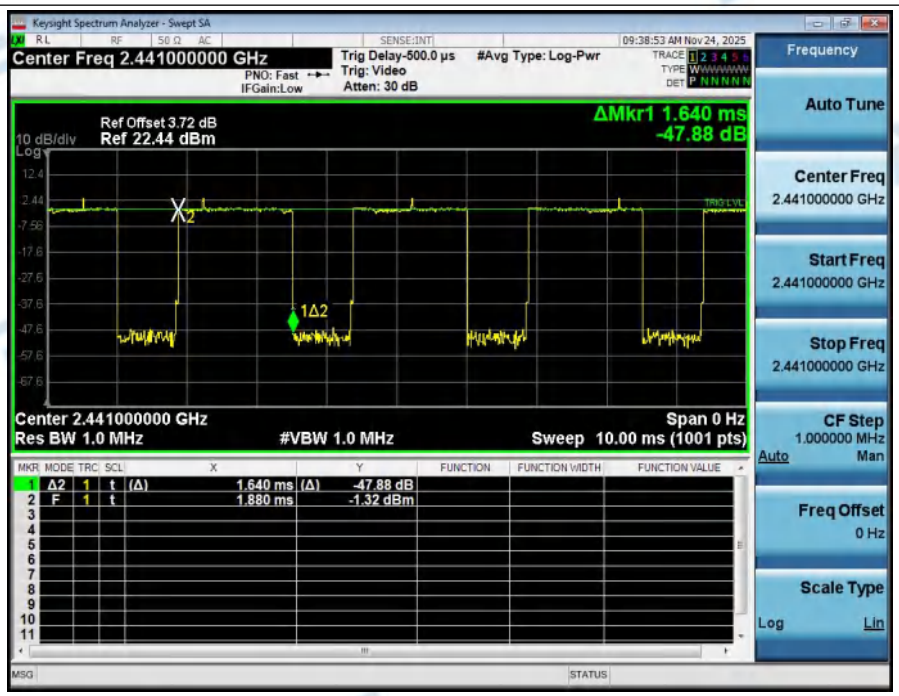
Dwell_Time_(Hopping)_NVNT_ANT1_1-DH3_2441_00_One_Burst_Time



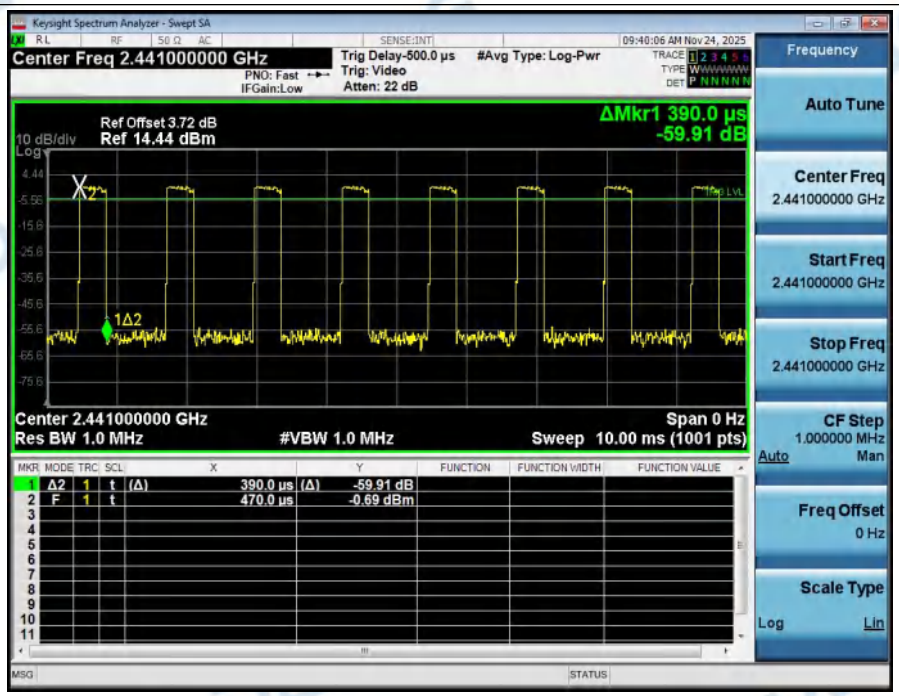
Dwell_Time_(Hopping)_NVNT_ANT1_2-DH1_2441_00_One_Burst_Time



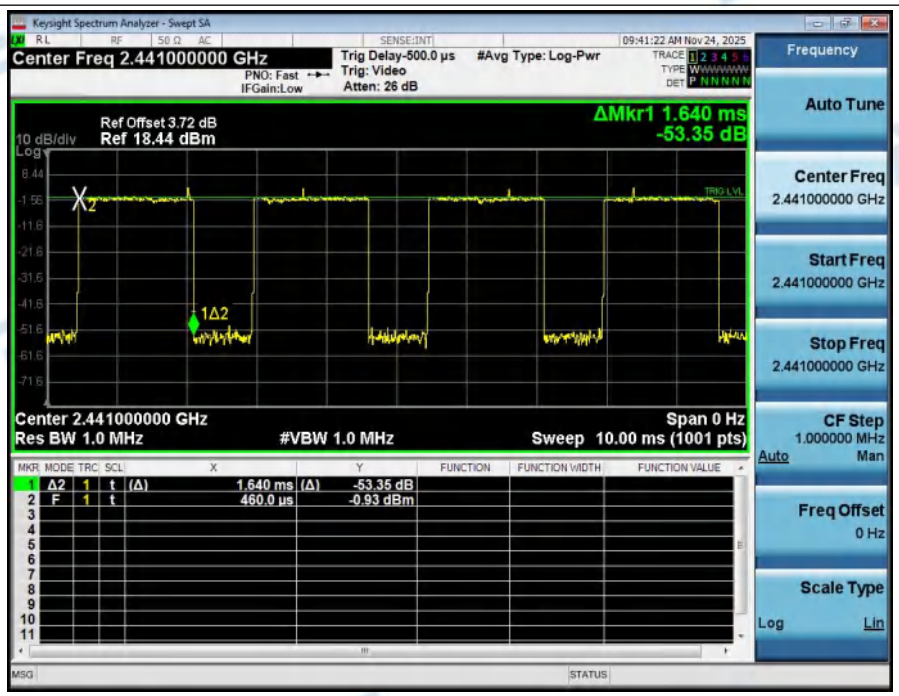
Dwell_Time_(Hopping)_NVNT_ANT1_2-DH3_2441_00_One_Burst_Time



Dwell_Time_(Hopping)_NVNT_ANT1_3-DH1_2441_00_One_Burst_Time



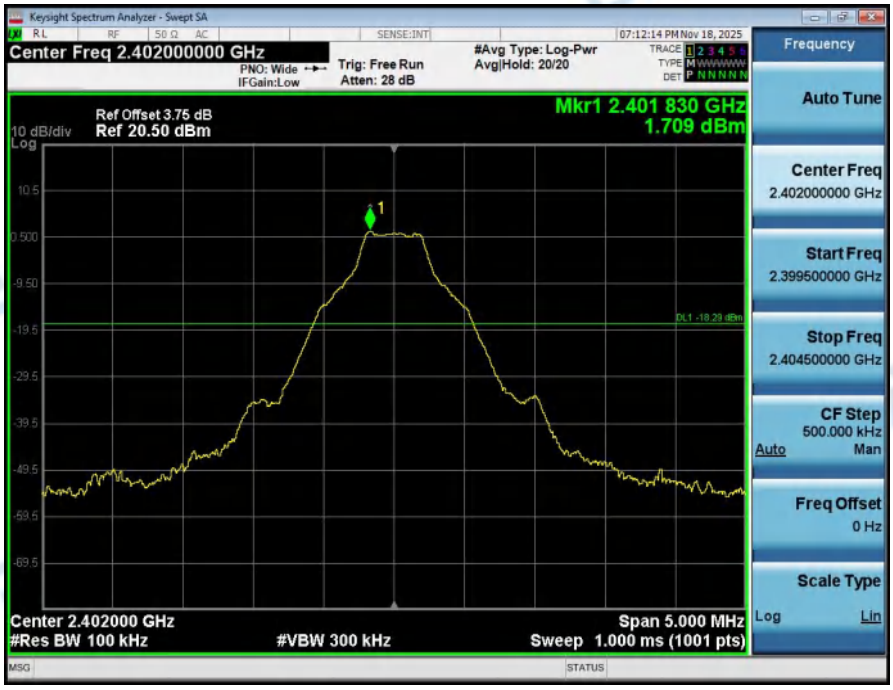
Dwell_Time_(Hopping)_NVNT_ANT1_3-DH3_2441_00_One_Burst_Time



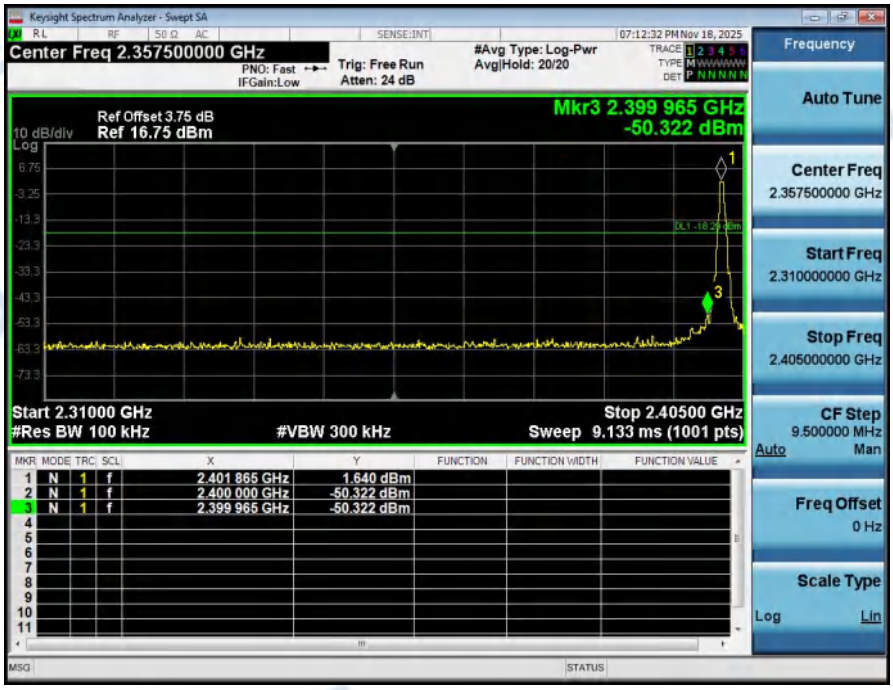
7. Bandedge

Condition	Antenna	Modulation	TX Mode	Ref_level(dBm)	Bandedge MAX.Value	Limit	Result
NVNT	ANT1	1-DH5	2402.00	1.709	-50.322	-18.291	Pass
NVNT	ANT1	1-DH5	Hopping_LCH	1.370	-53.021	-18.630	Pass
NVNT	ANT1	1-DH5	2480.00	1.100	-54.940	-18.900	Pass
NVNT	ANT1	1-DH5	Hopping_HCH	1.414	-56.598	-18.586	Pass
NVNT	ANT1	2-DH5	2402.00	1.097	-49.124	-18.903	Pass
NVNT	ANT1	2-DH5	Hopping_LCH	1.430	-51.554	-18.570	Pass
NVNT	ANT1	2-DH5	2480.00	0.685	-55.153	-19.315	Pass
NVNT	ANT1	2-DH5	Hopping_HCH	1.496	-56.126	-18.504	Pass
NVNT	ANT1	3-DH5	2402.00	1.726	-49.319	-18.274	Pass
NVNT	ANT1	3-DH5	Hopping_LCH	1.408	-54.377	-18.592	Pass
NVNT	ANT1	3-DH5	2480.00	1.131	-56.240	-18.869	Pass
NVNT	ANT1	3-DH5	Hopping_HCH	1.508	-56.432	-18.492	Pass

1_Reference_Level_NVNT_ANT1_1-DH5_2402_00

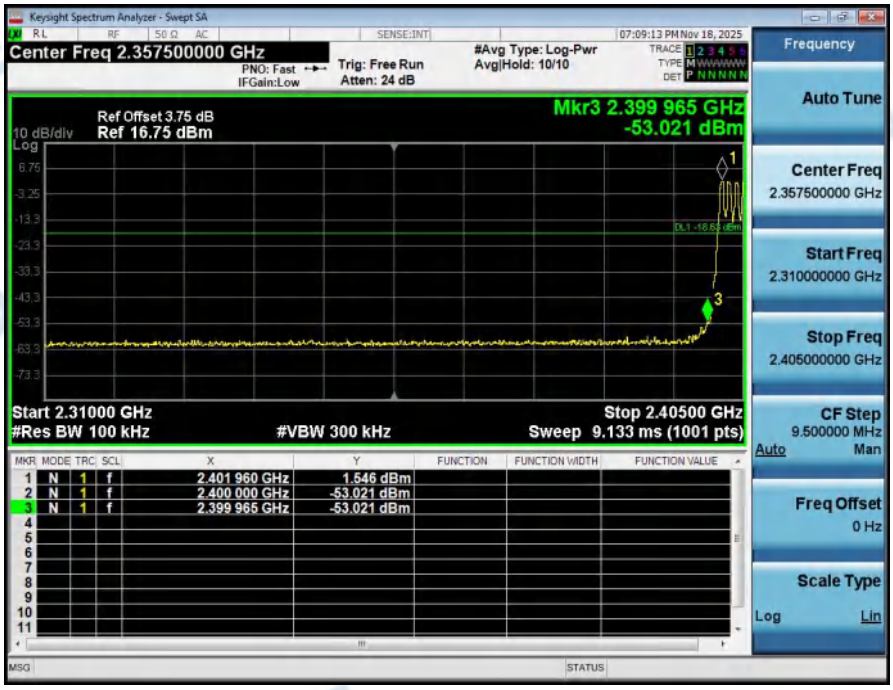


2_Bandedge_NVNT_ANT1_1-DH5_2402_00



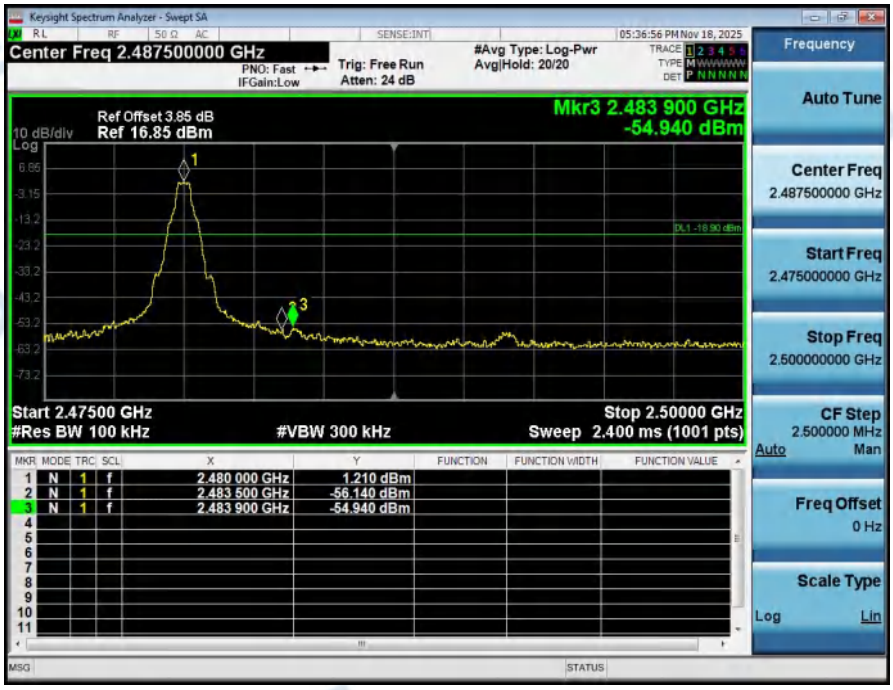
1_Reference_Level_Hopping_NVNT_ANT1_1-DH5_Hopping

2_Band_Edge_(Hopping)_NVNT_ANT1_1-DH5_Hopping



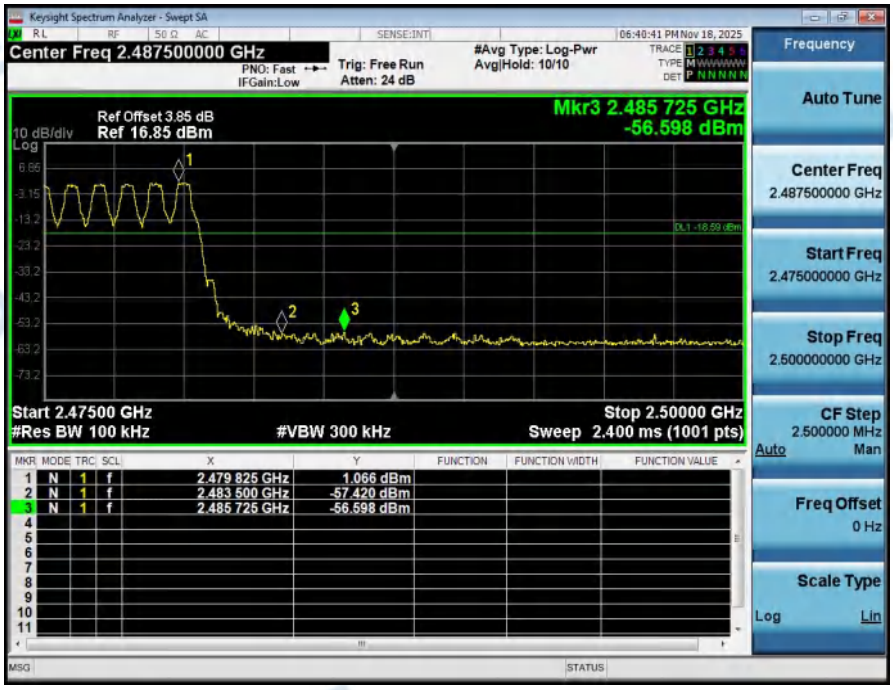
1_Reference_Level_NVNT_ANT1_1-DH5_2480_00

2_Bandedge_NVNT_ANT1_1-DH5_2480_00



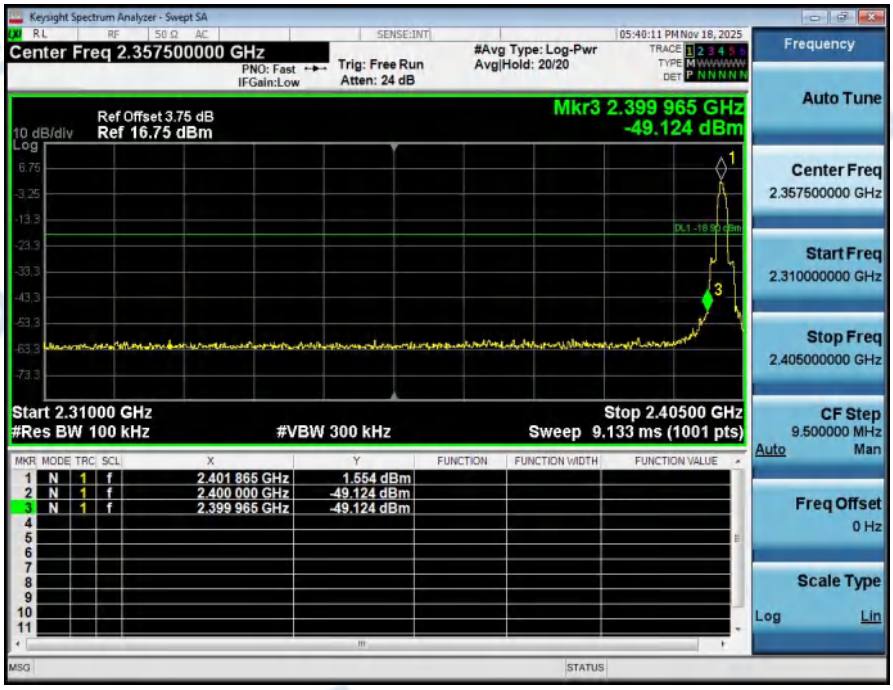
1_Reference_Level_Hopping_NVNT_ANT1_1-DH5_Hopping

2_Band_Edge_(Hopping)_NVNT_ANT1_1-DH5_Hopping

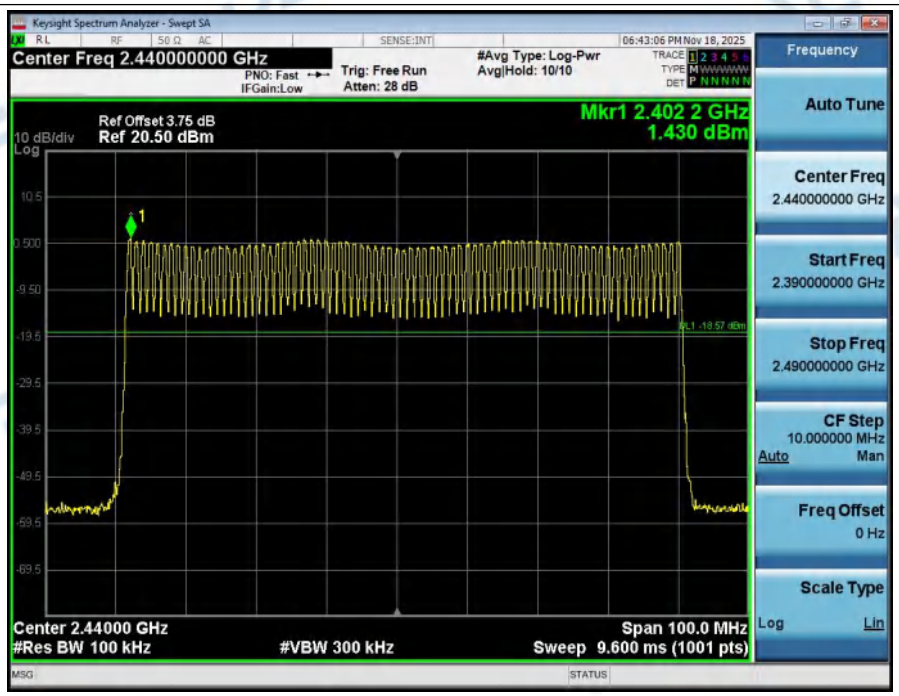


1_Reference_Level_NVNT_ANT1_2-DH5_2402_00

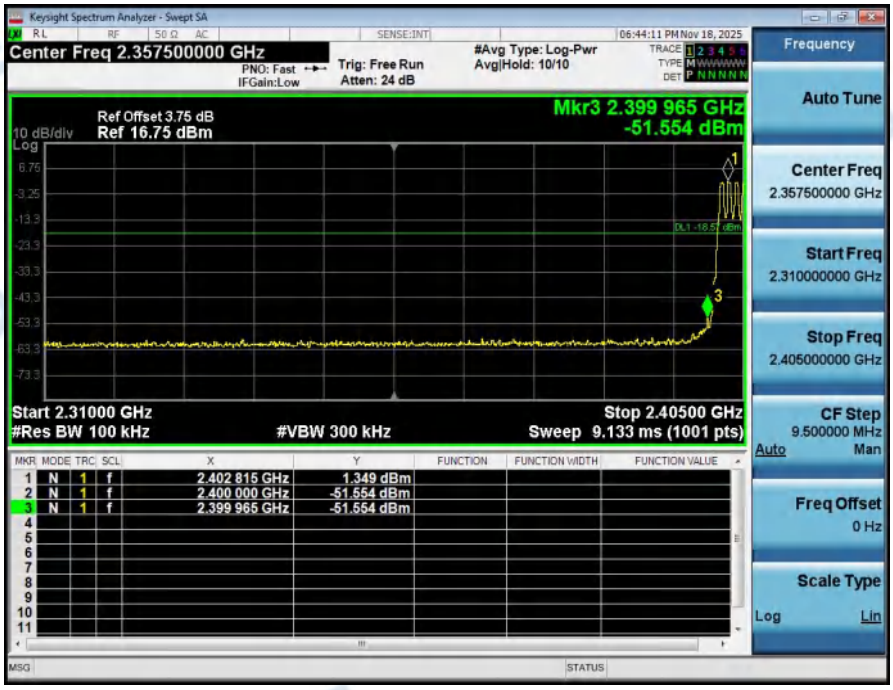
2_Bandedge_NVNT_ANT1_2-DH5_2402_00



1_Reference_Level_Hopping_NVNT_ANT1_2-DH5_Hopping



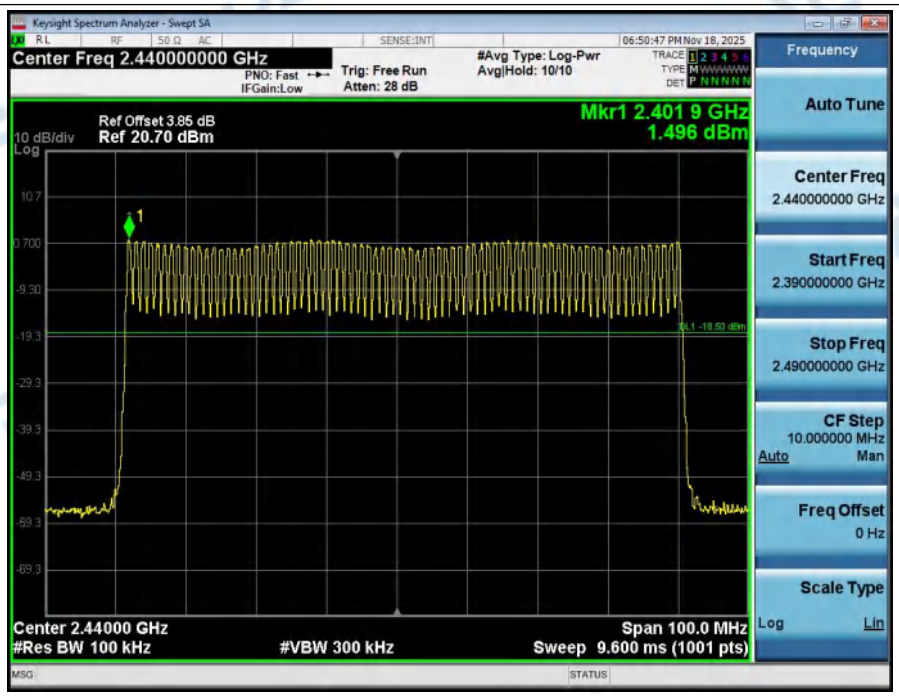
2_Band_Edge_(Hopping)_NVNT_ANT1_2-DH5_Hopping



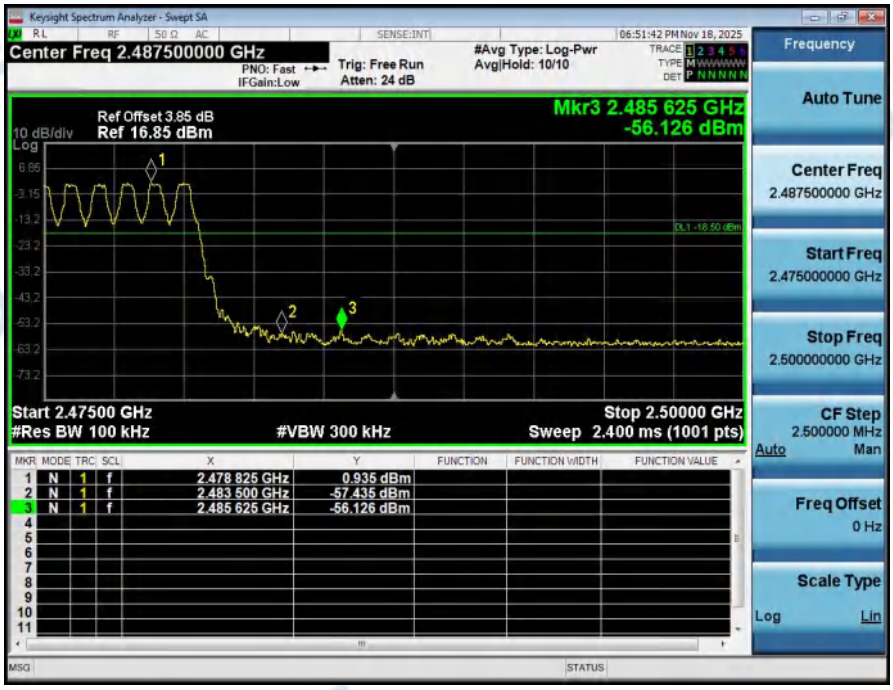
1_Reference_Level_NVNT_ANT1_2-DH5_2480_00

2_Bandedge_NVNT_ANT1_2-DH5_2480_00

1_Reference_Level_Hopping_NVNT_ANT1_2-DH5_Hopping

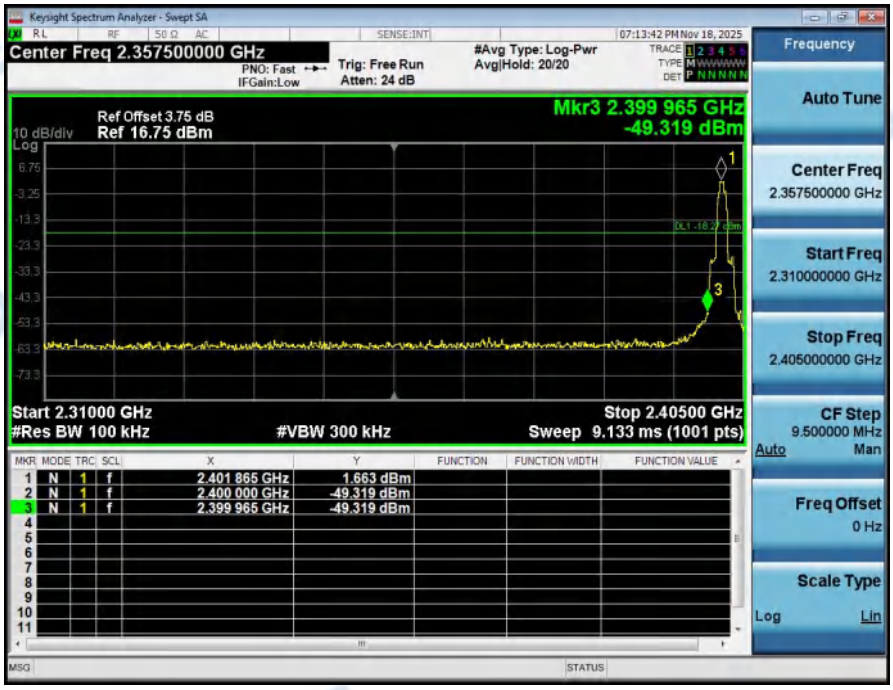


2_Band_Edge_(Hopping)_NVNT_ANT1_2-DH5_Hopping



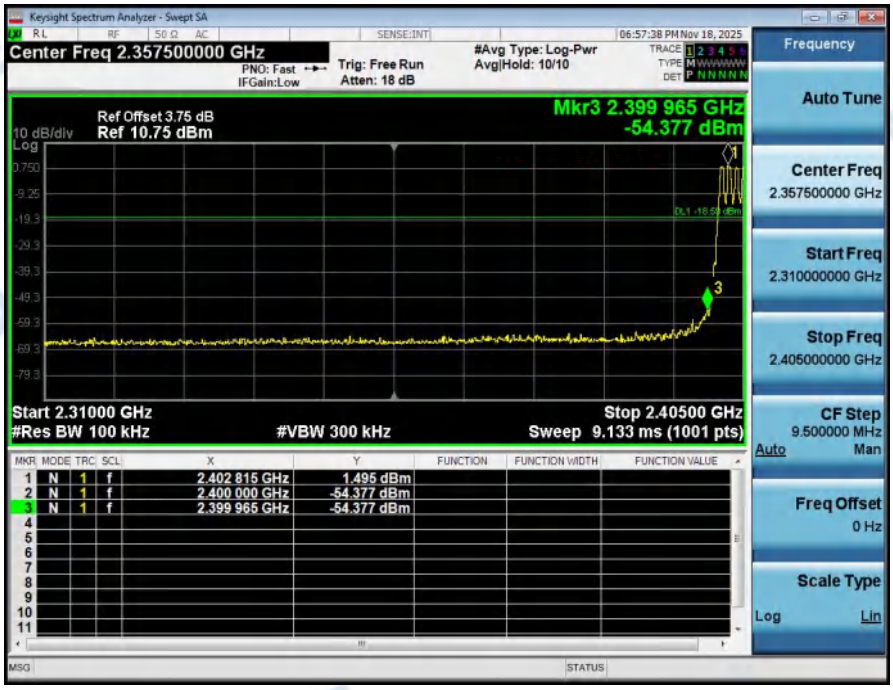
1_Reference_Level_NVNT_ANT1_3-DH5_2402_00

2_Bandedge_NVNT_ANT1_3-DH5_2402_00



1_Reference_Level_Hopping_NVNT_ANT1_3-DH5_Hopping

2_Band_Edge_(Hopping)_NVNT_ANT1_3-DH5_Hopping

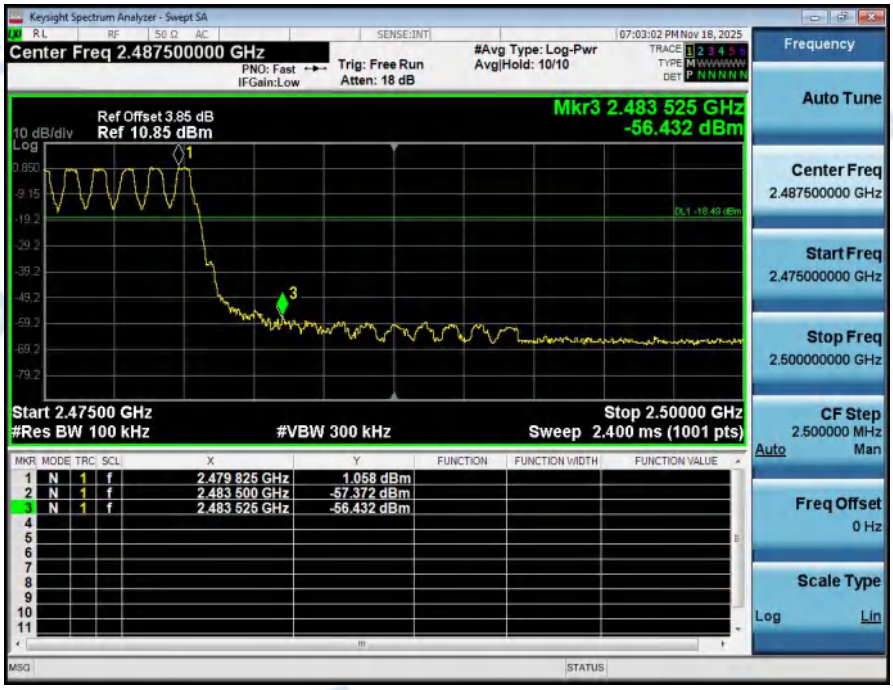


1_Reference_Level_NVNT_ANT1_3-DH5_2480_00

2_Bandedge_NVNT_ANT1_3-DH5_2480_00

1_Reference_Level_Hopping_NVNT_ANT1_3-DH5_Hopping

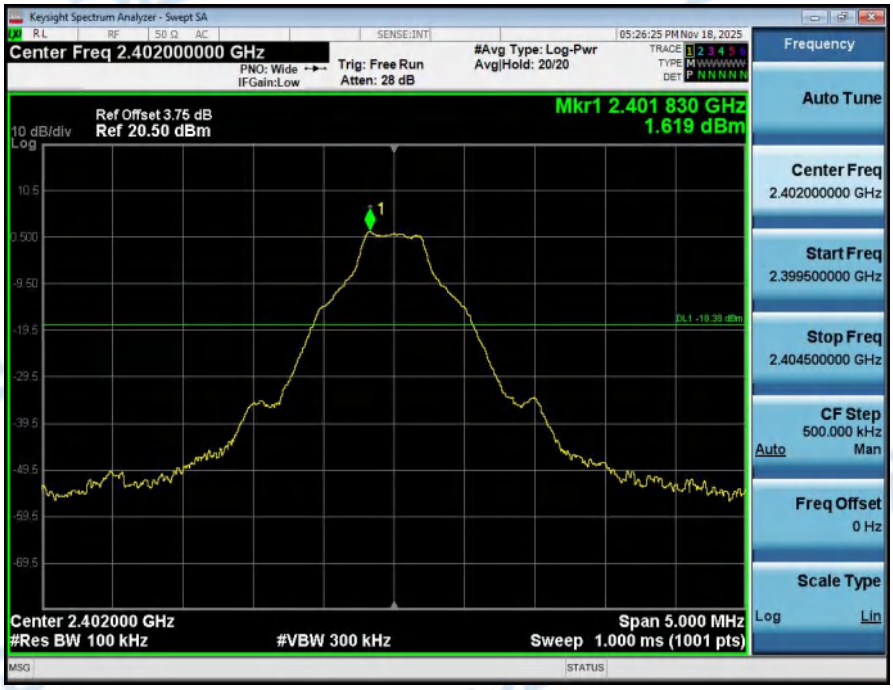
2_Band_Edge_(Hopping)_NVNT_ANT1_3-DH5_Hopping


Keysight Spectrum Analyzer - Swept SA
Center Freq 2.487500000 GHz
PNO: Fast
IFGain:Low
Trig: Free Run
Atten: 18 dB
#Avg Type: Log-Pwr
Avg|Hold: 10/10
07:03:02 PM Nov 18, 2025
Ref Offset 3.85 dB
10 dB/div Ref 10.85 dBm
Mkr3 2.483 525 GHz
-56.432 dBm
Start 2.47500 GHz
#Res BW 100 kHz
#VBW 300 kHz
Stop 2.50000 GHz
Sweep 2.400 ms (1001 pts)
1 N 1 f 2.479 825 GHz 1.058 dBm
2 N 1 f 2.483 500 GHz -57.372 dBm
3 N 1 f 2.483 525 GHz -56.432 dBm
Frequency
Auto Tune
Center Freq
2.487500000 GHz
Start Freq
2.475000000 GHz
Stop Freq
2.500000000 GHz
CF Step
2.500000 MHz
Auto Man
Freq Offset
0 Hz
Scale Type
Log Lin

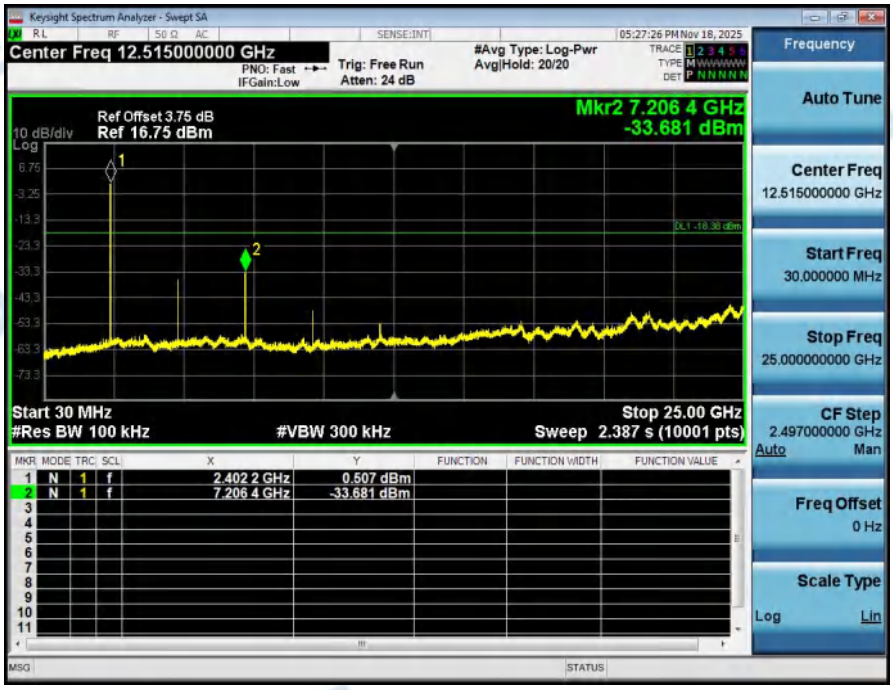
8. Spurious Emissions

Condition	Antenna	Modulation	TX Mode	Ref_level(dBm)	Spurious MAX.Value(dBm)	Limit	Result
NVNT	ANT1	1-DH5	2402.00	1.619	-33.681	-18.381	Pass
NVNT	ANT1	1-DH5	2441.00	-0.407	-33.435	-20.407	Pass
NVNT	ANT1	1-DH5	2480.00	1.100	-33.157	-18.900	Pass
NVNT	ANT1	2-DH5	2402.00	1.097	-33.653	-18.903	Pass
NVNT	ANT1	2-DH5	2441.00	-0.513	-32.676	-20.513	Pass
NVNT	ANT1	2-DH5	2480.00	0.685	-36.518	-19.315	Pass
NVNT	ANT1	3-DH5	2402.00	1.647	-35.840	-18.353	Pass
NVNT	ANT1	3-DH5	2441.00	-0.396	-34.922	-20.396	Pass
NVNT	ANT1	3-DH5	2480.00	1.131	-33.606	-18.869	Pass

1_Reference_Level_NVNT_ANT1_1-DH5_2402_00

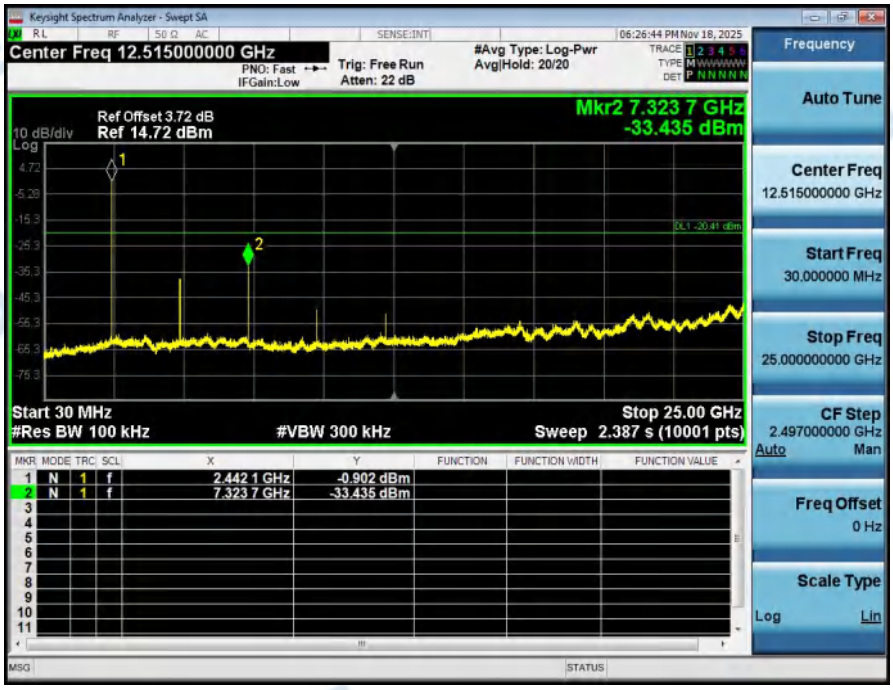


2_Spurious_Emissions_NVNT_ANT1_1-DH5_2402_00



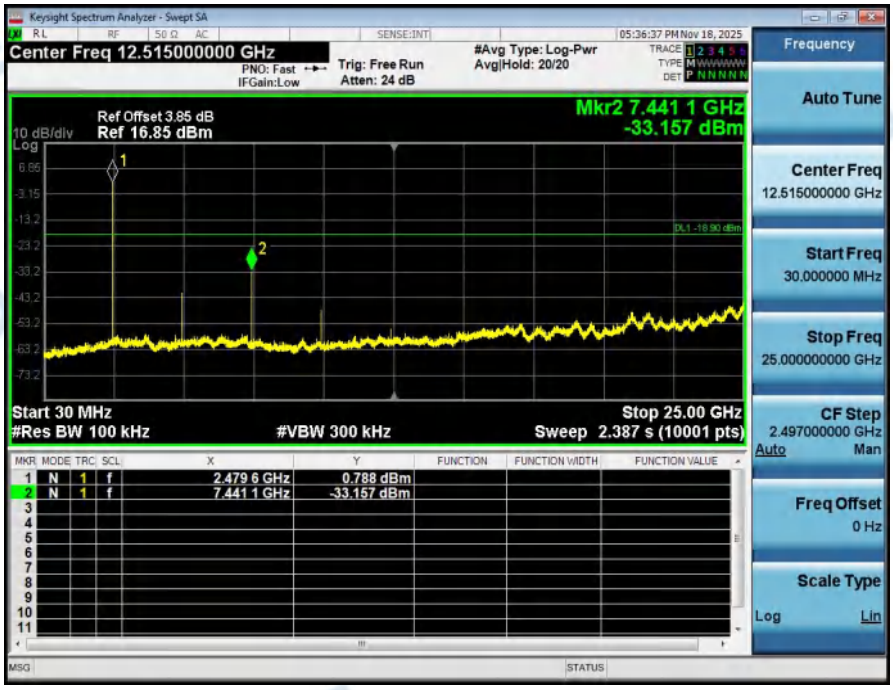
1_Reference_Level_NVNT_ANT1_1-DH5_2441_00

2_Spurious_Emissions_NVNT_ANT1_1-DH5_2441_00



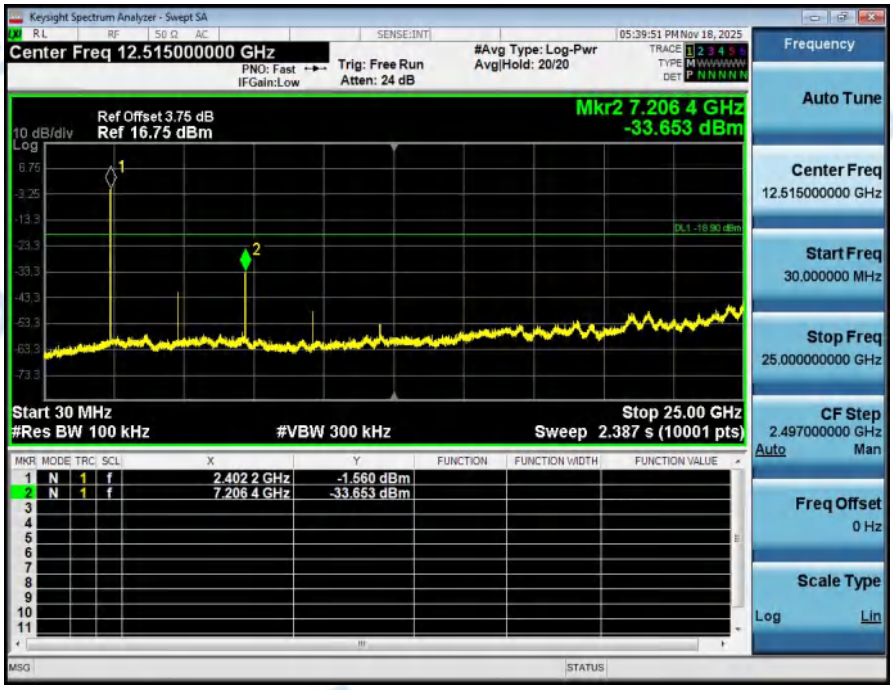
1_Reference_Level_NVNT_ANT1_1-DH5_2480_00

2_Spurious_Emissions_NVNT_ANT1_1-DH5_2480_00



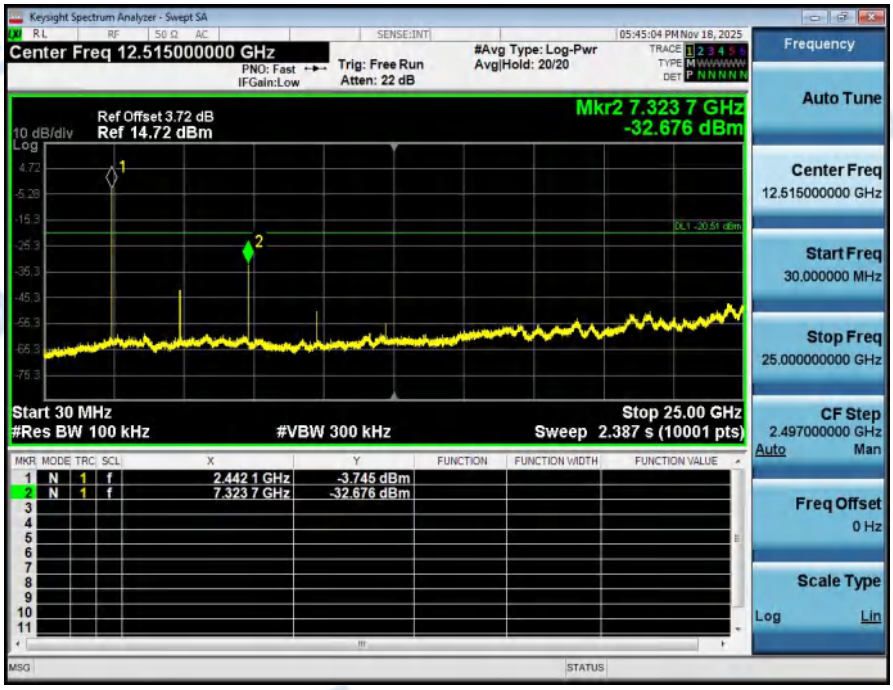
1_Reference_Level_NVNT_ANT1_2-DH5_2402_00

2_Spurious_Emissions_NVNT_ANT1_2-DH5_2402_00



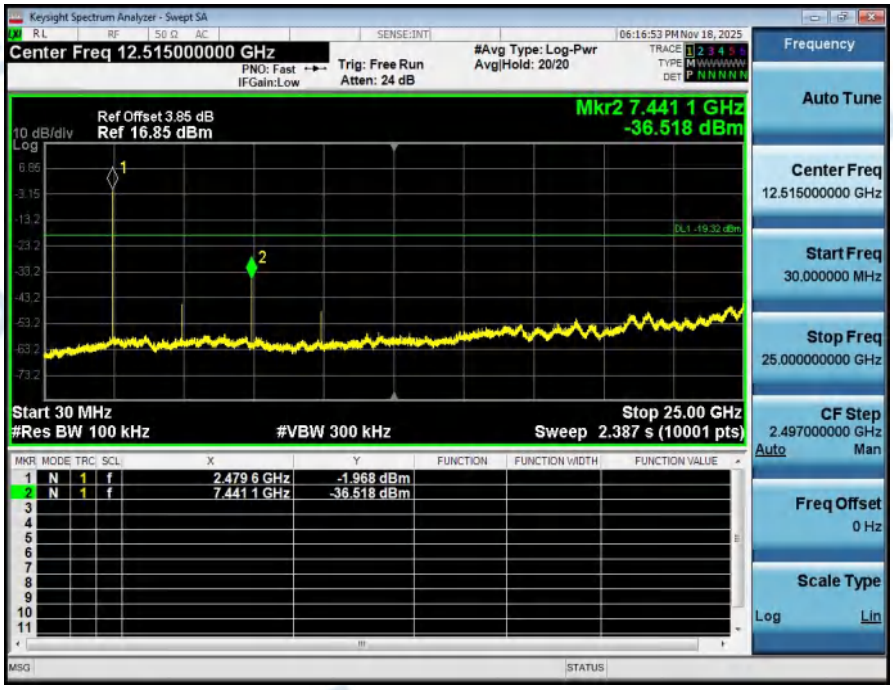
1_Reference_Level_NVNT_ANT1_2-DH5_2441_00

2_Spurious_Emissions_NVNT_ANT1_2-DH5_2441_00



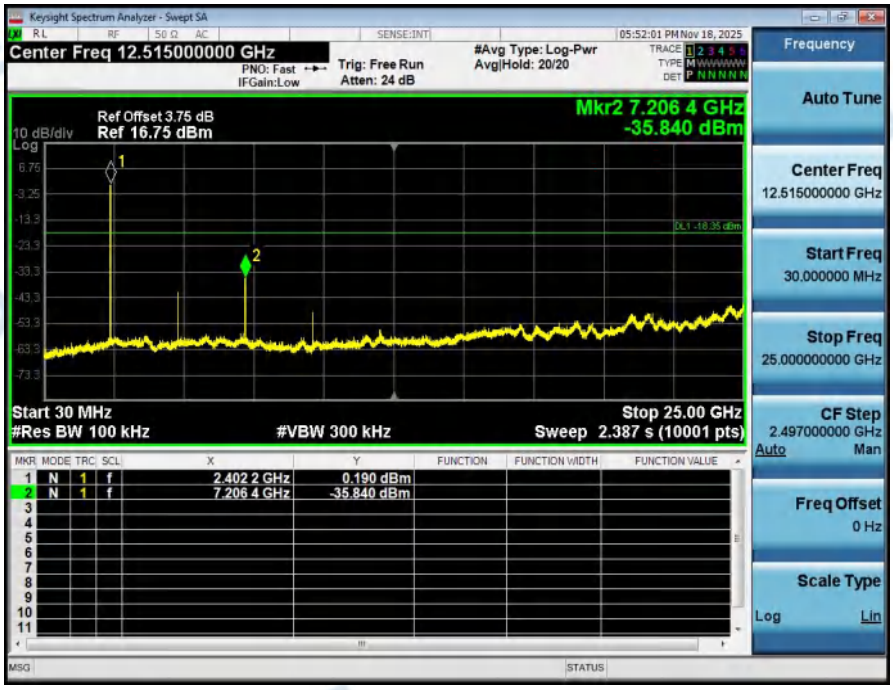
1_Reference_Level_NVNT_ANT1_2-DH5_2480_00

2_Spurious_Emissions_NVNT_ANT1_2-DH5_2480_00



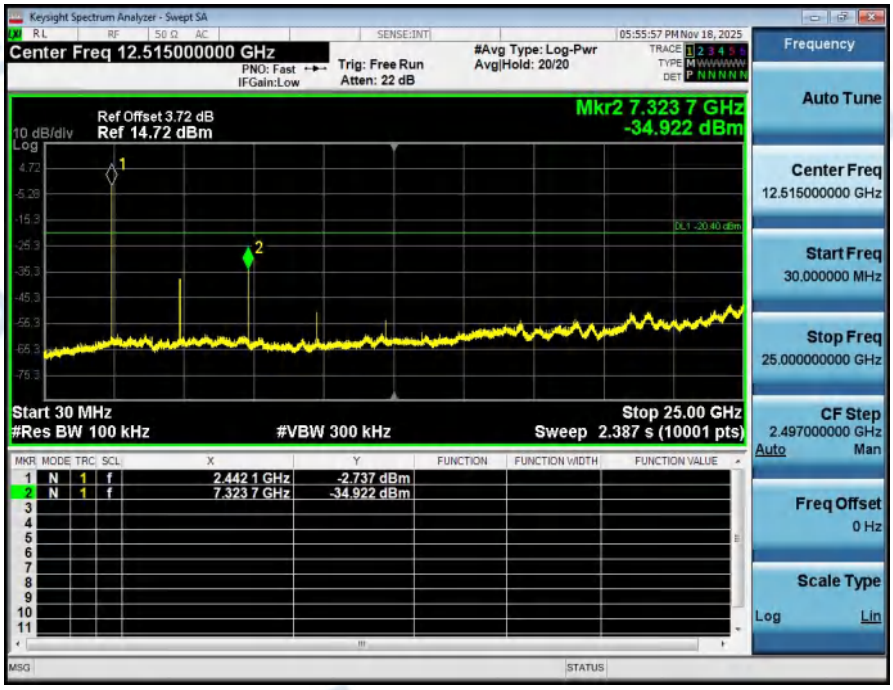
1_Reference_Level_NVNT_ANT1_3-DH5_2402_00

2_Spurious_Emissions_NVNT_ANT1_3-DH5_2402_00



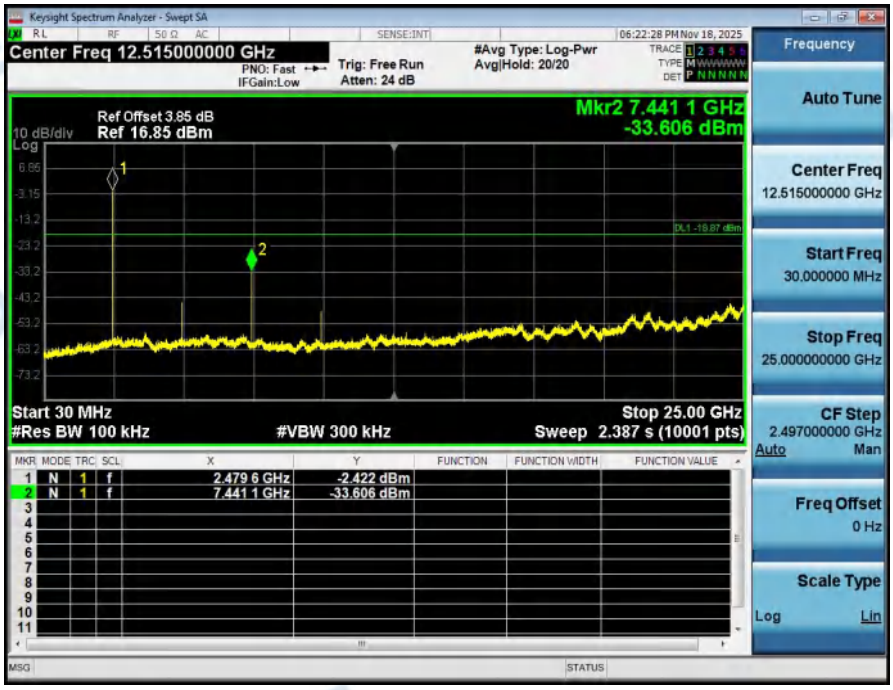
1_Reference_Level_NVNT_ANT1_3-DH5_2441_00

2_Spurious_Emissions_NVNT_ANT1_3-DH5_2441_00



1_Reference_Level_NVNT_ANT1_3-DH5_2480_00

2_Spurious_Emissions_NVNT_ANT1_3-DH5_2480_00



********** End of Report **********