

TEST REPORT

FCC ID: 2AXYP-OSW-807**Product: Smart watch****Model No.: OSW-807****Trade Mark: oraimo****Report No.: WSCT-ANAB-R&E250100003A-BT****Issued Date: 15 January 2025****Issued for:****ORAIMO TECHNOLOGY LIMITED****FLAT N 16/F BLOCK B UNIVERSAL INDUSTRIAL CENTRE 19-25 SHAN MEI
STREET FOTAN NT HONGKONG****Issued By:****World Standardization Certification & Testing Group(Shenzhen) Co., Ltd.
Building A-B,Baoli'an Industrial Park,No.58 and 60,Tangtou Avenue, Shiyan
Street, Bao'an District, Shenzhen City, Guangdong Province, China****TEL: +86-755-26996192****FAX: +86-755-86376605**

Note: This report shall not be reproduced except in full, without the written approval of World Standardization Certification & Testing Group (Shenzhen) Co., Ltd. This document may be altered or revised by World Standardization Certification & Testing Group (Shenzhen) Co., Ltd. personnel only, and shall be noted in the revision section of the document. The test results in the report only apply to the tested sample.



TABLE OF CONTENTS

1. Test Certification	3
2. Test Result Summary	4
3. EUT Description	5
4. General Information	7
4.1. TEST ENVIRONMENT AND MODE	7
4.2. DESCRIPTION OF SUPPORT UNITS	7
5. Facilities and Accreditations	8
5.1. FACILITIES	8
5.2. ACCREDITATIONS	8
5.3. MEASUREMENT UNCERTAINTY	8
5.4. MEASUREMENT INSTRUMENTS	10
6. Test Results and Measurement Data	11
6.1. ANTENNA REQUIREMENT	11
6.2. CONDUCTED EMISSION	12
6.3. CONDUCTED OUTPUT POWER	14
6.4. 20dB OCCUPY BANDWIDTH	21
6.5. CARRIER FREQUENCIES SEPARATION	28
6.6. HOPPING CHANNEL NUMBER	35
6.7. DWELL TIME	38
6.8. PSEUDORANDOM FREQUENCY HOPPING SEQUENCE	49
6.9. CONDUCTED BAND EDGE MEASUREMENT	50
6.10. CONDUCTED SPURIOUS EMISSION MEASUREMENT	53
6.11. RADIATED SPURIOUS EMISSION MEASUREMENT	63
7. Test Setup Photographs	75

Report No.: WSCT-ANAB-R&E250100003A-BT

1. Test Certification

Product:	Smart watch
Model No.:	OSW-807
Additional Model:	oraimo
Applicant:	ORAIMO TECHNOLOGY LIMITED FLAT N 16/F BLOCK B UNIVERSAL INDUSTRIAL CENTRE 19-25 SHAN MEI STREET FOTAN NT HONGKONG
Manufacturer:	ORAIMO TECHNOLOGY LIMITED FLAT N 16/F BLOCK B UNIVERSAL INDUSTRIAL CENTRE 19-25 SHAN MEI STREET FOTAN NT HONGKONG
Date of receipt:	02 January 2025
Date of Test:	03 January 2025 ~ 14 January 2025
Applicable Standards:	FCC CFR Title 47 Part 15 Subpart C Section 15.247

The above equipment has been tested by World Standardization Certification & Testing Group(Shenzhen)Co., Ltd. and found compliance with the requirements set forth in the technical standards mentioned above. The results of testing in this report apply only to the product system, which was tested. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties.

Tested By:

Wang Xiang

(Wang Xiang)

Checked By:

Qin Shuiquan

(Qin Shuiquan)

Approved By:

Li Huaibi

(Li Huaibi)

Date:

15 January 2025

Report No.: WSCT-ANAB-R&E250100003A-BT

2. Test Result Summary

Requirement	CFR 47 Section	Result
Antenna Requirement	§15.203/§15.247 (c)	PASS
AC Power Line Conducted Emission	§15.207	N/A
Maximum conducted output power	§15.247 (b)(1) §2.1046	PASS
20dB Occupied Bandwidth	§15.247 (a)(1) §2.1049	PASS
Carrier Frequencies Separation	§15.247 (a)(1)	PASS
Hopping Channel Number	§15.247 (a)(1)	PASS
Dwell Time	§15.247 (a)(1)	PASS
Radiated Emission	§15.205/§15.209 §2.1053, §2.1057	PASS
Band Edge	§15.247(d) §2.1051, §2.1057	PASS

Note:

1. PASS: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.

Report No.: WSCT-ANAB-R&E250100003A-BT

3. EUT Description

Product Name:	Smart watch
Model :	OSW-807
Trade Mark:	oraimo
Hardware version:	V1.5
Frequency Range:	2402-2480MHz(TX/RX)
Channel Separation:	1MHz
Number of Channel:	79
Modulation Type:	GFSK, $\pi/4$ -DQPSK, 8-DPSK
Antenna Type	Single-stage antenna
Antenna Gain:	-5.17dBi
Operating Voltage	Li-ion Polymer Battery: 552123 Nominal Voltage: 3.8V Rated Capacity: 300mAh/1.14Wh
Remark:	N/A.

Note:

1. PASS: Test item meets the requirement.
2. Fail: Test item does not meet the requirement.
3. N/A: Test case does not apply to the test object.
4. The test result judgment is decided by the limit of test standard.

Report No.: WSCT-ANAB-R&E250100003A-BT

Operation Frequency each of channel for GFSK, $\pi/4$ -DQPSK, 8DPSK

Channel	Frequency	Channel	Frequency	Channel	Frequency	Channel	Frequency
0	2402MHz	20	2422MHz	40	2442MHz	60	2462MHz
1	2403MHz	21	2423MHz	41	2443MHz	61	2463MHz
...	...	...	...	...	...	...	...
10	2412MHz	30	2432MHz	50	2452MHz	70	2472MHz
11	2413MHz	31	2433MHz	51	2453MHz	71	2473MHz
...	...	...	...	...	...	...	...
18	2420MHz	38	2440MHz	58	2460MHz	78	2480MHz
19	2421MHz	39	2441MHz	59	2461MHz	-	-

Remark: Channel 0, 39 & 78 have been tested for GFSK, $\pi/4$ -DQPSK, 8DPSK modulation mode.

4. General Information

4.1. Test environment and mode

Operating Environment:

Temperature:	25.0 °C
Humidity:	56 % RH
Atmospheric Pressure:	1010 mbar

Test Mode:

Engineering mode:	Keep the EUT in continuous transmitting by select channel and modulations with Fully-charged battery
-------------------	--

The sample was placed 0.8m & 1.5m for the measurement below & above 1GHz above the ground plane of 3m chamber. Measurements in both horizontal and vertical polarities were performed. During the test, each emission was maximized by: having the EUT continuously working, investigated all operating modes, rotated about all 3 axis (X, Y & Z) and considered typical configuration to obtain worst position, manipulating interconnecting cables, rotating the turntable, varying antenna height from 1m to 4m in both horizontal and vertical polarizations. The emissions worst-case are shown in Test Results of the following pages.

4.2. Description of Support Units

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Equipment	Model No.	Serial No.	FCC ID	Trade Name
/	/	/	/	/

Note:

1. All the equipment/cables were placed in the worst-case configuration to maximize the emission during the test.
2. Grounding was established in accordance with the manufacturer's requirements and conditions for the intended use.
3. For conducted measurements (Output Power, 20dB Occupied Bandwidth, Carrier Frequencies Separation, Hopping Channel Number, Dwell Time, Spurious Emissions), the antenna of EUT is connected to the test equipment via temporary antenna connector, the antenna connector is soldered on the antenna port of EUT, and the temporary antenna connector is listed in the Test Instruments.

Report No.: WSCT-ANAB-R&E250100003A-BT

5. Facilities and Accreditations

5.1. Facilities

All measurement facilities used to collect the measurement data are located at

World Standardization Certification & Testing Group (Shenzhen) Co., Ltd.

Building A-B, Baoli'an Industrial Park, No.58 and 60, Tangtou Avenue, Shiyan Street, Bao'an District, Shenzhen City, Guangdong Province, China.

The sites are constructed in conformance with the requirements of ANSI C63.4 and CISPR Publication 22. All receiving equipment conforms to CISPR Publication 16-1, "Radio Interference Measuring Apparatus and Measurement Methods."

5.2. ACCREDITATIONS

ANAB - Certificate Number: AT-3951

The EMC Laboratory has been accredited by the American Association for Laboratory Accreditation (ANAB). Certification Number: AT-3951

5.3. Measurement Uncertainty

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95 %.

No.	Item	MU
1	Conducted Emission Test	$\pm 3.2\text{dB}$

Report No.: WSCT-ANAB-R&E250100003A-BT

2	RF power, conducted	$\pm 0.16\text{dB}$
3	Spurious emissions, conducted	$\pm 0.21\text{dB}$
4	All emissions, radiated(<1GHz)	$\pm 4.7\text{dB}$
5	All emissions, radiated(>1GHz)	$\pm 4.7\text{dB}$
6	Temperature	$\pm 0.5^{\circ}\text{C}$
7	Humidity	$\pm 2.0\%$

Report No.: WSCT-ANAB-R&E250100003A-BT

5.4. MEASUREMENT INSTRUMENTS

NAME OF EQUIPMENT	MANUFACTURER	MODEL	SERIAL NUMBER	Calibration Date	Calibration Due.
Test software	-	EZ-EMC	CON-03A	-	-
Test software	-	MTS8310	-	-	-
EMI Test Receiver	R&S	ESCI	100005	11/05/2024	11/04/2025
LISN	AFJ	LS16	16010222119	11/05/2024	11/04/2025
LISN(EUT)	Mestec	AN3016	04/10040	11/05/2024	11/04/2025
Universal Radio Communication Tester	R&S	CMU 200	1100.0008.02	11/05/2024	11/04/2025
Coaxial cable	Megalon	LMR400	N/A	11/05/2024	11/04/2025
GPIB cable	Megalon	GPIB	N/A	11/05/2024	11/04/2025
Spectrum Analyzer	R&S	FSU	100114	11/05/2024	11/04/2025
Pre Amplifier	H.P.	HP8447E	2945A02715	11/05/2024	11/04/2025
Pre-Amplifier	CDSI	PAP-1G18-38	-	11/05/2024	11/04/2025
Bi-log Antenna	SCHWARZBECK	VULB9168	01488	07/29/2024	07/28/2025
9*6*6 Anechoic	-	-	-	11/05/2024	11/04/2025
Horn Antenna	COMPLIANCE ENGINEERING	CE18000	-	11/05/2024	11/04/2025
Horn Antenna	SCHWARZBECK	BBHA9120D	9120D-631	11/05/2024	11/04/2025
Cable	TIME MICROWAVE	LMR-400	N-TYPE04	11/05/2024	11/04/2025
System-Controller	CCS	N/A	N/A	N.C.R	N.C.R
Turn Table	CCS	N/A	N/A	N.C.R	N.C.R
Antenna Tower	CCS	N/A	N/A	N.C.R	N.C.R
RF cable	Murata	MXHQ87WA3000	-	11/05/2024	11/04/2025
Loop Antenna	EMCO	6502	00042960	11/05/2024	11/04/2025
Horn Antenna	SCHWARZBECK	BBHA 9170	1123	11/05/2024	11/04/2025
Power meter	Anritsu	ML2487A	6K00003613	11/05/2024	11/04/2025
Power sensor	Anritsu	MX248XD	-	11/05/2024	11/04/2025
Spectrum Analyzer	Keysight	N9010B	MY60241089	11/05/2024	11/04/2025

6. Test Results and Measurement Data

6.1 Antenna requirement

Standard requirement:	FCC Part15 C Section 15.203 /247(c)
15.203 requirement: An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator, 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. 15.247(c) (1)(i) requirement: (i) Systems operating in the 2400-2483.5 MHz band that is used exclusively for fixed. Point-to-point operations may employ transmitting antennas with directional gain greater than 6dBi provided the maximum conducted output power of the intentional radiator is reduced by 1 dB for every 3 dB that the directional gain of the antenna exceeds 6dBi.	
E.U.T Antenna:	
The Bluetooth antenna is a Wire Antenna. it meets the standards, and the best case gain of the antenna is -5.17dBi.	

Report No.: WSCT-ANAB-R&E250100003A-BT

6.2. Conducted Emission

6.2.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.207		
Test Method:	ANSI C63.10:2014		
Frequency Range:	150 kHz to 30 MHz		
Receiver setup:	RBW=9 kHz, VBW=30 kHz, Sweep time=auto		
Limits:	Frequency range (MHz)	Limit (dBuV)	
		Quasi-peak	Average
	0.15-0.5	66 to 56*	56 to 46*
	0.5-5	56	46
	5-30	60	50
Test Setup:	Reference Plane 40cm 80cm E.U.T AC power Test table/Insulation plane LISN Filter AC power EMI Receiver Remark E.U.T: Equipment Under Test LISN: Line Impedance Stabilization Network Test table height=0.8m		
Test Mode:	Refer to item 4.1		
Test Procedure:	1. The E.U.T is connected to an adapter through a line impedance stabilization network (L.I.S.N.). This provides a 50ohm/50uH coupling impedance for the measuring equipment. 2. The peripheral devices are also connected to the main power through a LISN that provides a 50ohm/50uH coupling impedance with 50ohm termination. (Please refer to the block diagram of the test setup and photographs). 3. Both sides of A.C. line are checked for maximum conducted interference. In order to find the maximum emission, the relative positions of equipment and all of the interface cables must be changed according to ANSI C63.10:2014 on conducted measurement.		
Test Result:	N/A		

6.2.2. Test data

The EUT is working in the Normal link mode. All modes have been tested and normal link mode is worst.

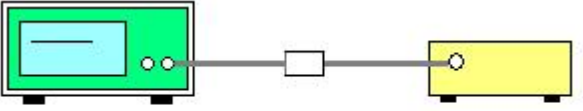
Devices subject to Part 15 must be tested for all available U.S. voltages and frequencies (such as a nominal 120 VAC, 60 Hz and 240 VAC, 50 Hz) for which the device is capable of operation. So, The configuration 120 VAC, 60 Hz and 240 VAC, 50 Hz were tested respectively, but only the worst configuration (120 VAC, 60 Hz) shown here.

Test data

Note: EUT powered by battery not applicable

6.3. Conducted Output Power

6.3.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (b)(3)
Test Method:	ANSI C63.10:2014
Limit:	Section 15.247 (b) The maximum peak conducted output power of the intentional radiator shall not exceed the following: (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 Setup:	 Spectrum Analyzer EUT
Test Mode:	Transmitting mode with modulation
Test Procedure:	Use the following spectrum analyzer settings: Span = approximately 5 times the 20 dB bandwidth, centered on a hopping channel RBW > the 20 dB bandwidth of the emission being measured VBW ≥ RBW Sweep = auto Detector function = peak Trace = max hold Allow the trace to stabilize. Use the marker-to-peak function to set the marker to the peak of the emission.
Test Result:	PASS

Report No.: WSCT-ANAB-R&E250100003A-BT

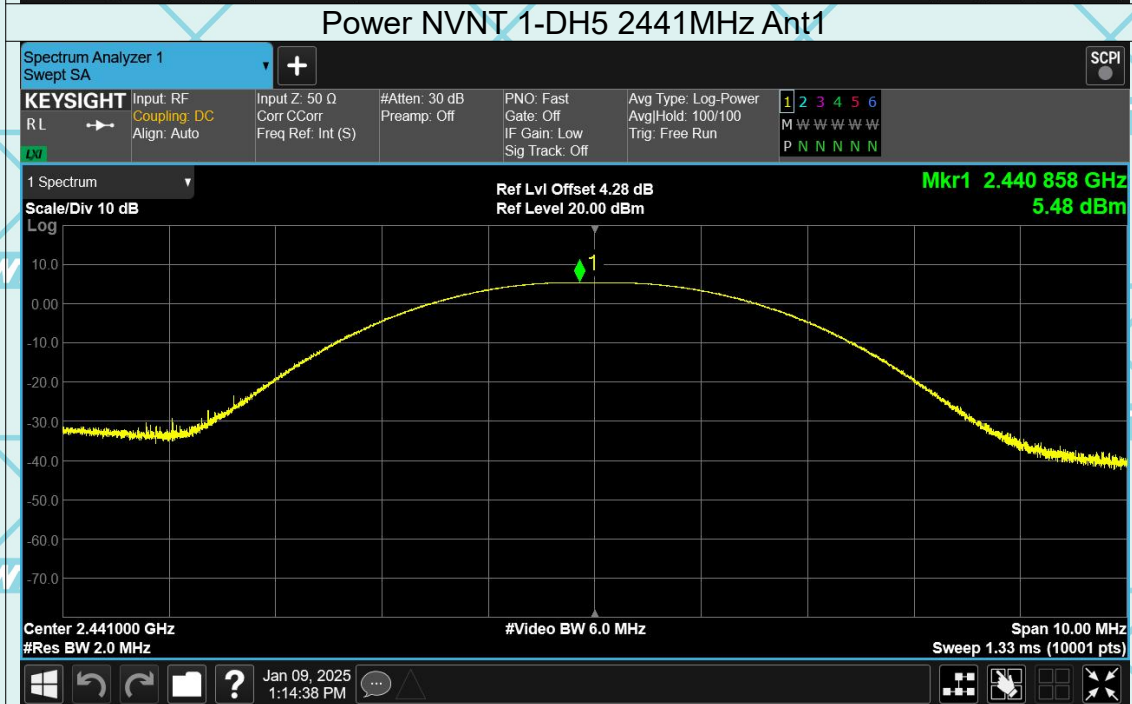
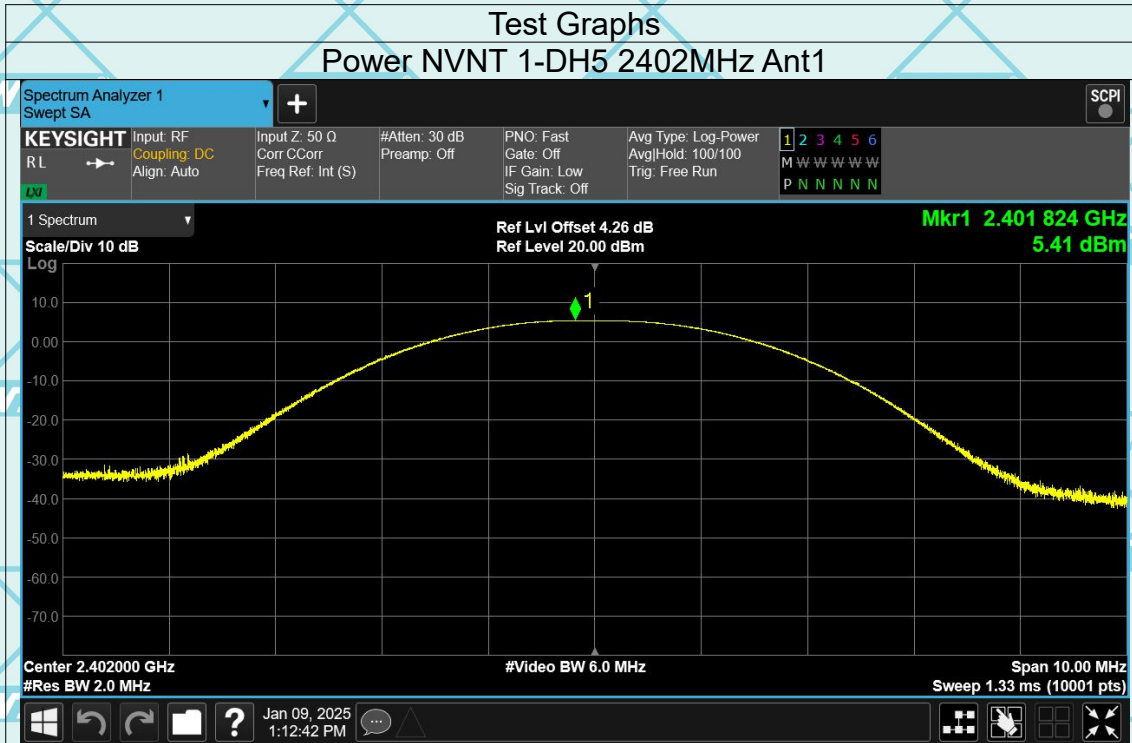
6.3.2. Test Data

GFSK mode			
Test channel	Maximum conducted output power (dBm)	Limit (dBm)	Result
Lowest	5.41	21	PASS
Middle	5.48	21	PASS
Highest	5.35	21	PASS

Pi/4DQPSK mode			
Test channel	Maximum conducted output power (dBm)	Limit (dBm)	Result
Lowest	5.80	21	PASS
Middle	5.79	21	PASS
Highest	5.54	21	PASS

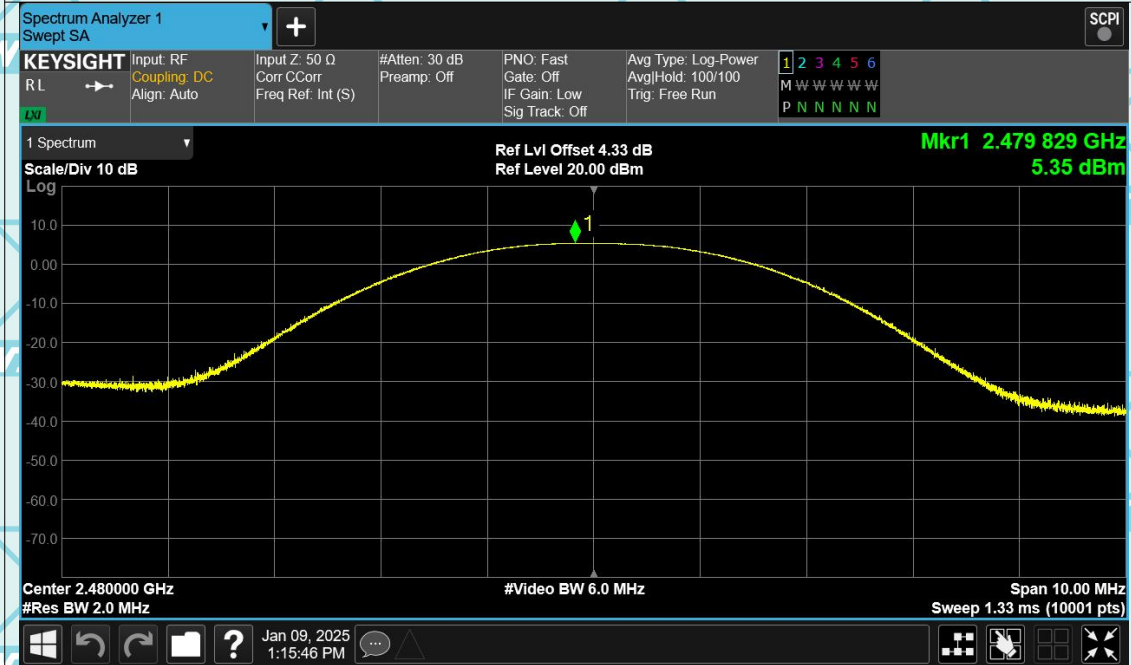
8DPSK mode			
Test channel	Maximum conducted output power (dBm)	Limit (dBm)	Result
Lowest	5.84	21	PASS
Middle	5.88	21	PASS
Highest	5.59	21	PASS

Report No.: WSCT-ANAB-R&E250100003A-BT

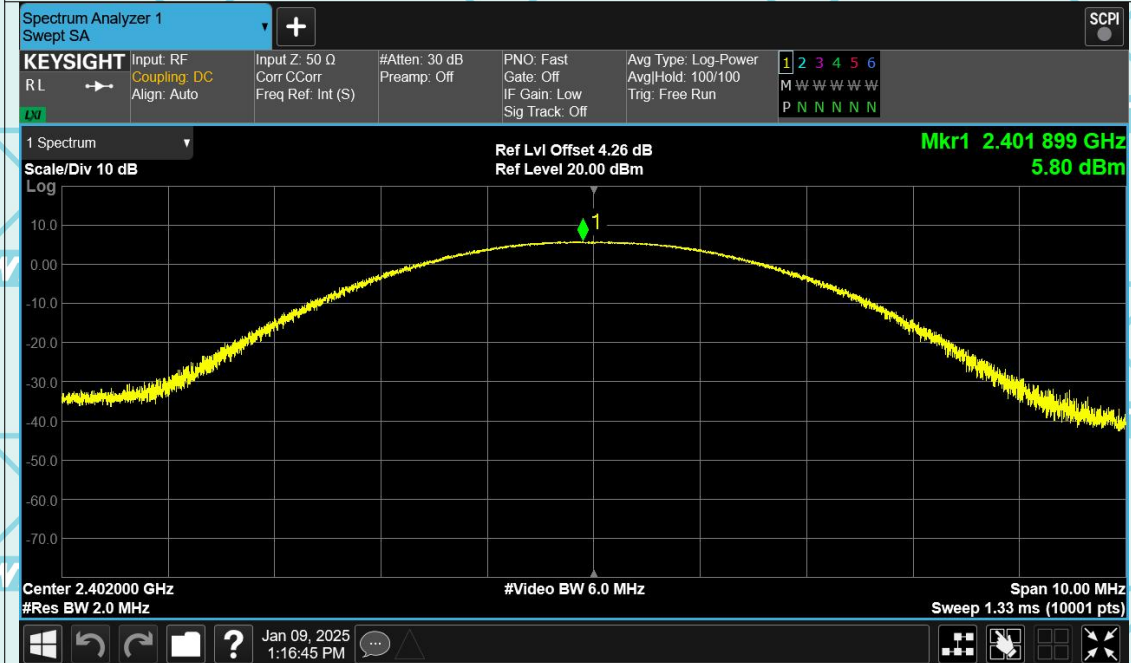


Report No.: WSCT-ANAB-R&E250100003A-BT

Power NVNT 1-DH5 2480MHz Ant1

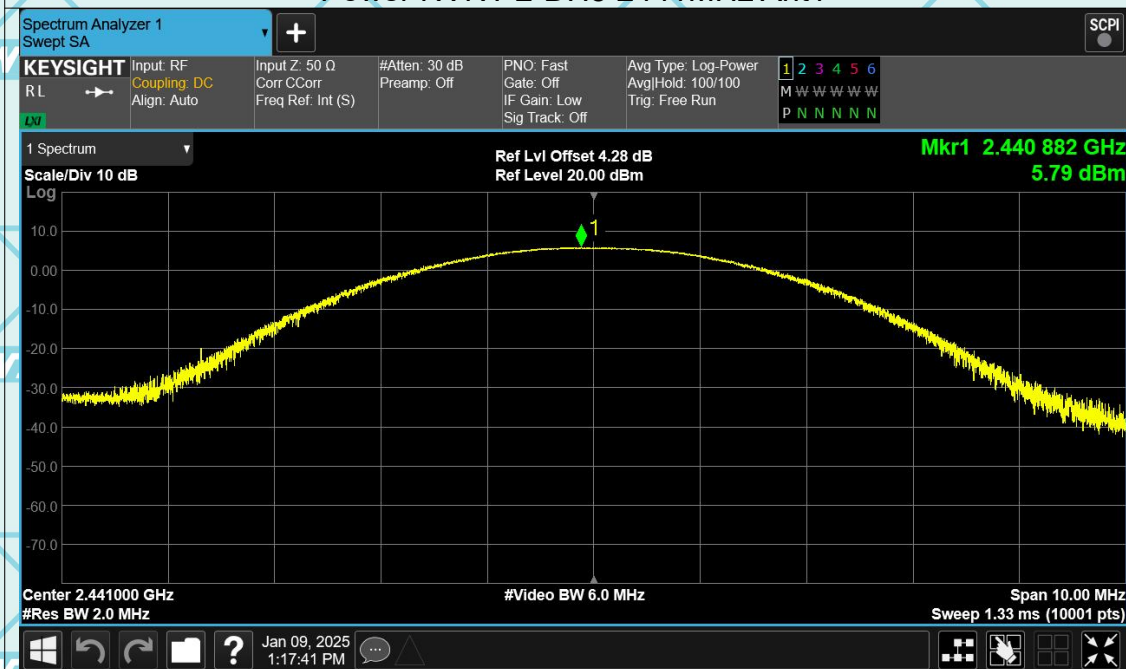


Power NVNT 2-DH5 2402MHz Ant1

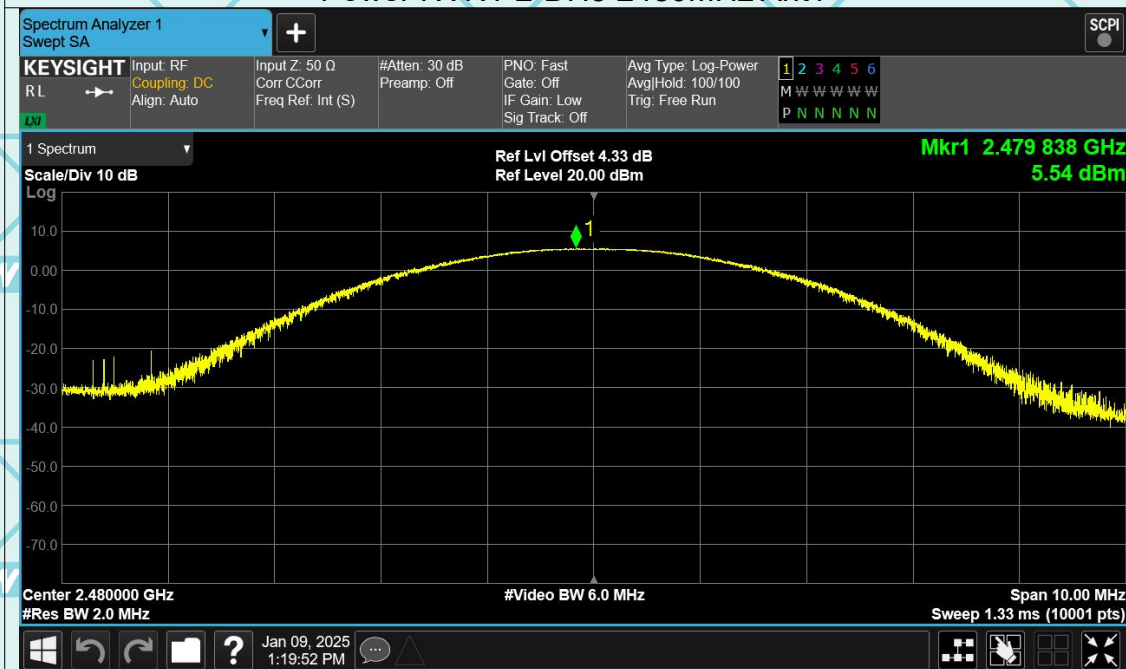


Report No.: WSCT-ANAB-R&E250100003A-BT

Power NVNT 2-DH5 2441MHz Ant1



Power NVNT 2-DH5 2480MHz Ant1

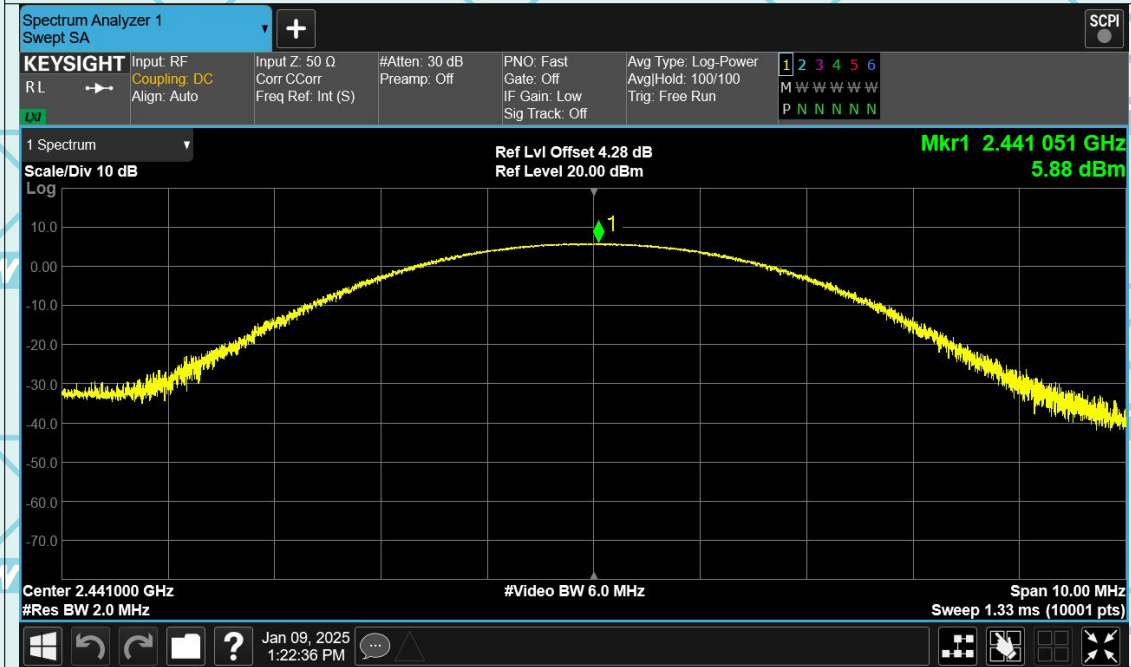


Report No.: WSCT-ANAB-R&E250100003A-BT

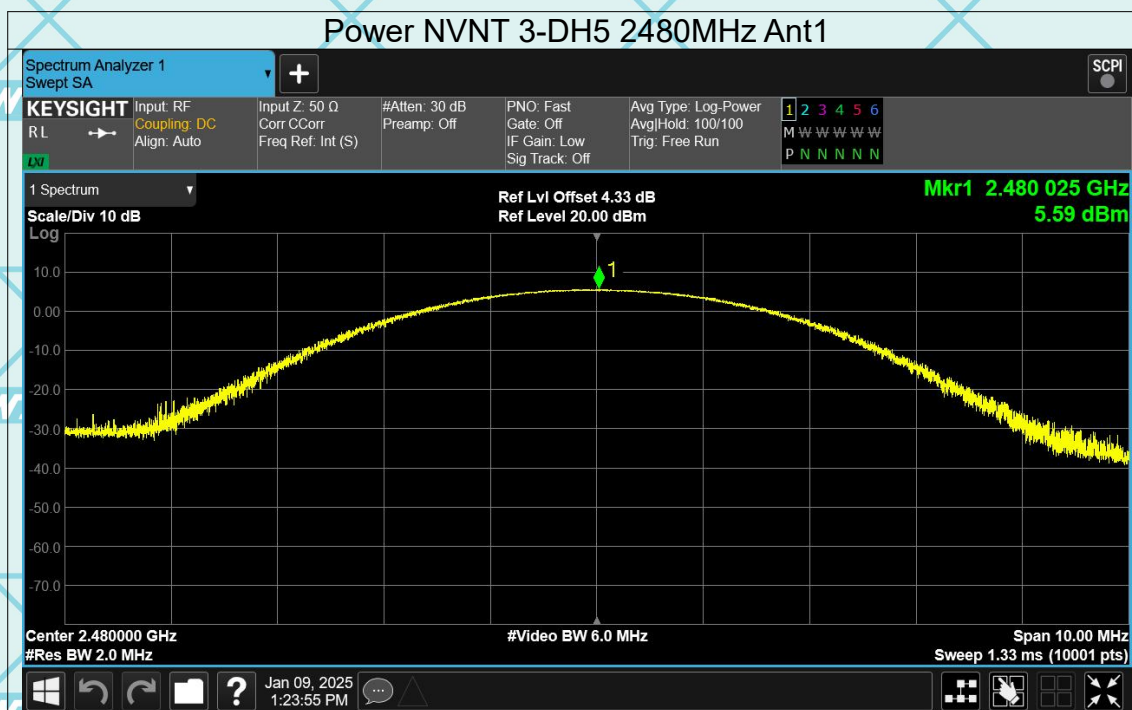
Power NVNT 3-DH5 2402MHz Ant1



Power NVNT 3-DH5 2441MHz Ant1



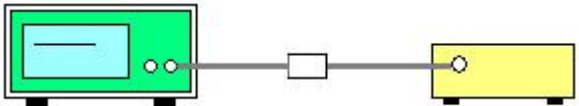
Report No.: WSCT-ANAB-R&E250100003A-BT



Report No.: WSCT-ANAB-R&E250100003A-BT

6.4. 20dB Occupy Bandwidth

6.4.1. Test Specification

Test Requirement:	FCC Part15 C Section 15.247 (a)(1)
Test Method:	ANSI C63.10:2014
Limit:	N/A
Test Setup:	 Spectrum Analyzer EUT
Test Mode:	Transmitting mode with modulation
Test Procedure:	1. The testing follows ANSI C63.10:2014 Measurement Guidelines. 2. The RF output of EUT was connected to the spectrum analyzer by RF cable and attenuator. The path loss was compensated to the results for each measurement. 3. Set to the maximum power setting and enable the EUT transmit continuously. 4. Use the following spectrum analyzer settings for 20dB Bandwidth measurement. Span = approximately 2 to 5 times the 20 dB bandwidth, centered on a hopping channel; $1\% \leq RBW \leq 5\%$ of the 20 dB bandwidth; $VBW \geq 3RBW$; Sweep = auto; Detector function = peak; Trace = max hold. 5. Measure and record the results in the test report.
Test Result:	PASS

Report No.: WSCT-ANAB-R&E250100003A-BT

6.4.2. Test data

Test channel	20dB Occupy Bandwidth (MHz)			
	GFSK	$\pi/4$ -DQPSK	8DPSK	Conclusion
Lowest	0.9542	1.363	1.286	PASS
Middle	0.9536	1.333	1.304	PASS
Highest	0.9420	1.338	1.378	PASS

Test plots as follows:

Report No.: WSCT-ANAB-R&E250100003A-BT

Test Graphs

-20dB Bandwidth NVNT 1-DH5 2402MHz Ant1



-20dB Bandwidth NVNT 1-DH5 2441MHz Ant1

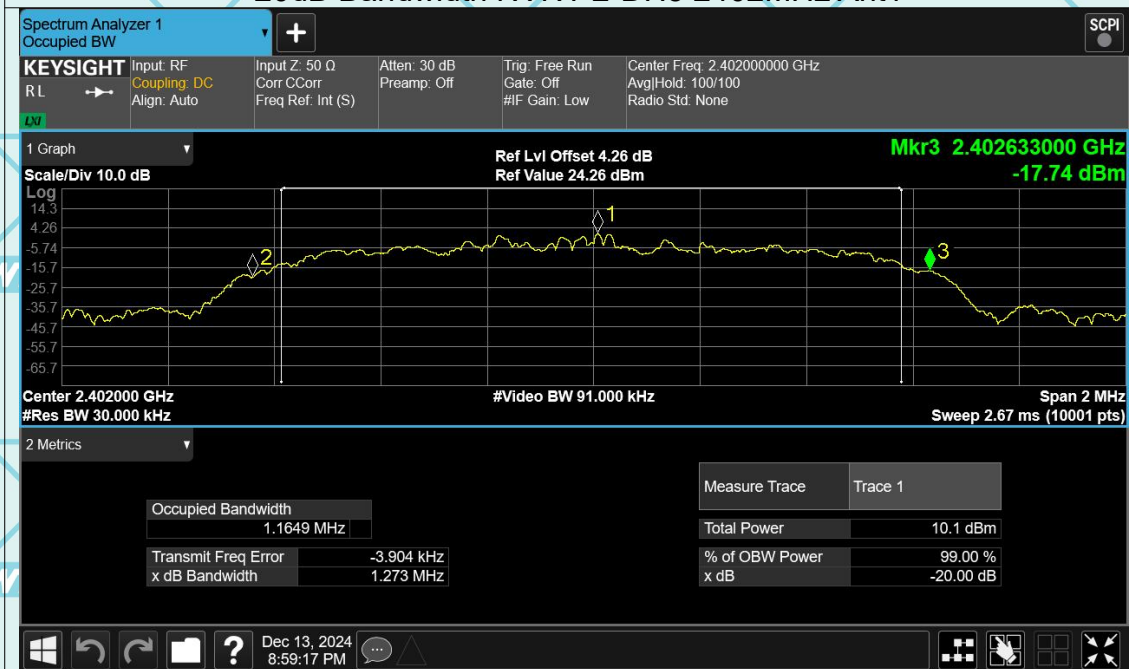


Report No.: WSCT-ANAB-R&E250100003A-BT

-20dB Bandwidth NVNT 1-DH5 2480MHz Ant1

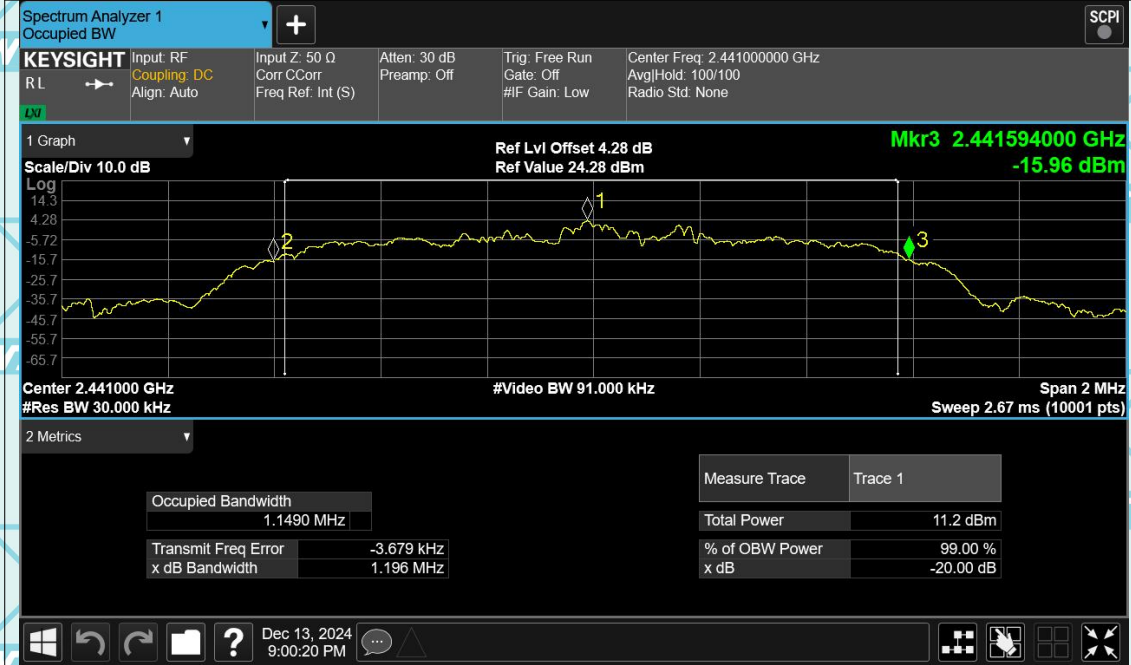


-20dB Bandwidth NVNT 2-DH5 2402MHz Ant1

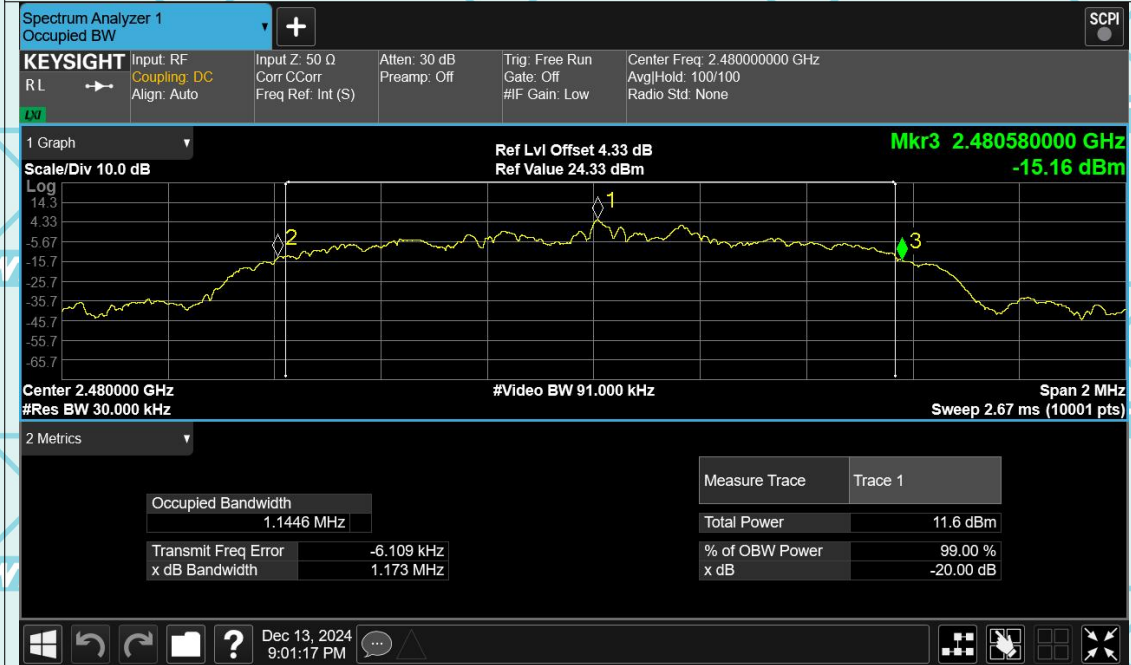


Report No.: WSCT-ANAB-R&E250100003A-BT

-20dB Bandwidth NVNT 2-DH5 2441MHz Ant1

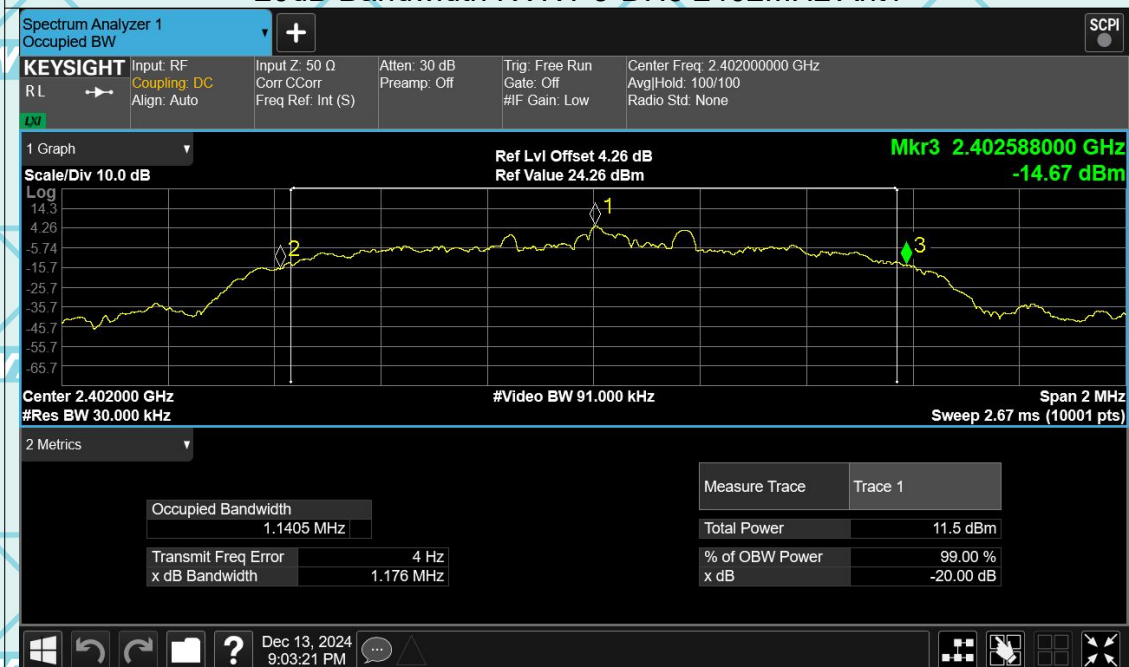


-20dB Bandwidth NVNT 2-DH5 2480MHz Ant1

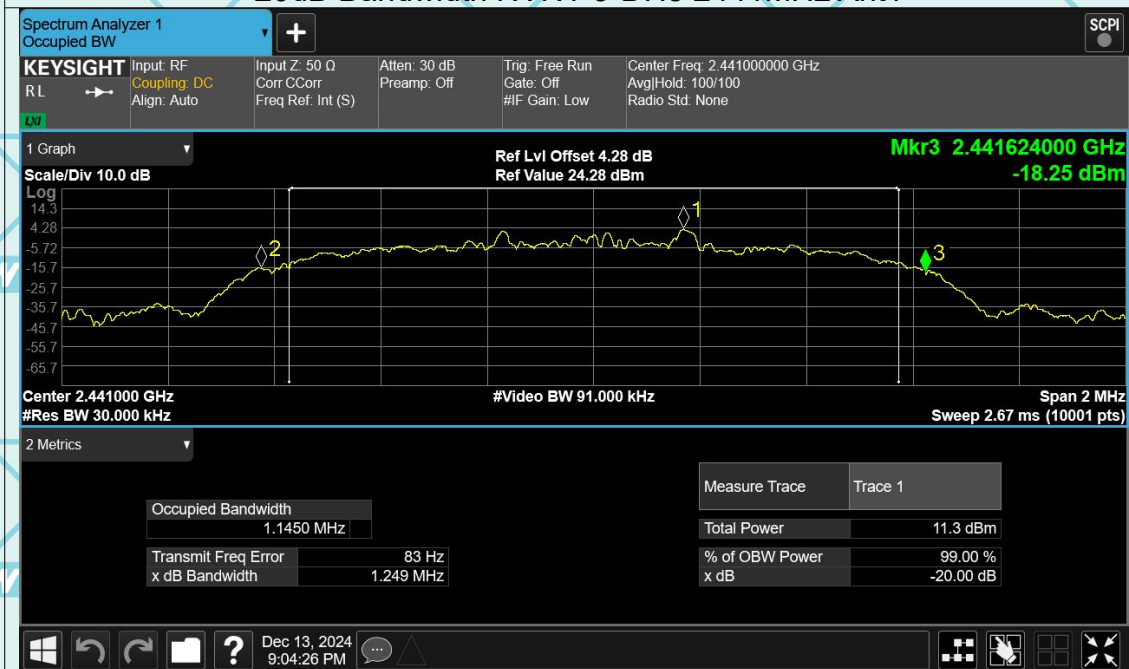


Report No.: WSCT-ANAB-R&E250100003A-BT

-20dB Bandwidth NVNT 3-DH5 2402MHz Ant1



-20dB Bandwidth NVNT 3-DH5 2441MHz Ant1



Report No.: WSCT-ANAB-R&E250100003A-BT

