

Japan Radio Test Report

for

Projector

Model: P3

Series Models: P1,P2,P3 PRO,P4,P5

Trade Mark: NA

Test Report Number: WSCT-R&E251000668A-BT

Issued Date: 25 October 2025

Issued for:

Shenzhen Efercro Electronic Technology Co., Ltd.

Room 901, Block E, Building 1, Section 1, Chuangzhi Yuncheng, Liuxian Avenue, Xili Community, Xili Street, Nanshan District, Shenzhen

Issued By:

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Revision History Of Report

Rev.	Issue No.	Revisions	Effect Page	Revised By
00	WSCT-R&E251000668A-BT	Initial Issue	ALL	Li Huaibi



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1. TEST CERTIFICATION**Product:** Projector**Model:** P3**Series Models:** P1,P2,P3 PRO,P4,P5**Trade Mark:** NA**Applicant:** Shenzhen Efercro Electronic Technology Co., Ltd.
Room 901, Block E, Building 1, Section 1, Chuangzhi Yuncheng, Liuxian Avenue, Xili Community, Xili Street, Nanshan District, Shenzhen**Manufacturer:** Shenzhen Efercro Electronic Technology Co., Ltd.
Room 901, Block E, Building 1, Section 1, Chuangzhi Yuncheng, Liuxian Avenue, Xili Community, Xili Street, Nanshan District, Shenzhen**Tested:** 10 September 2025 ~ 24 October 2025**Applicable Standards:** MIC Notice No.88 Appendix No.43 Article 2, Paragraph 1, Item 19
ARIB STD-T66 Ver. 3.7: 2014**Deviation from Applicable Standard**

None

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

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Approved By:

Li Huaibi

(Li Huaibi)

Date:

25 October 2025

2. EUT DESCRIPTION

2.1. General information

Product	Projector
Model	P3
Series Models	P1,P2,P3 PRO,P4,P5
Trade Mark	NA
Software Version	Android
Hardware Version	P3 MB V1.1
Antenna gain	1.73dBi
EUT Type	☒ Engineering Sample. ☐ Product Sample, ☐ Mass Product Sample.
Serial Number	N/A
Antenna Type	Integral Antenna
Test Power	Rated Voltage: 100-240Vac Rated Frequency: 50/60Hz Rated Current: ≤0.9A
Type of the Equipment	Portable Equipment
Operating Frequency	2402~2480 MHz (TX/RX);
Modulation type	GFSK, $\pi/4$ -DQPSK, 8-DPSK

Note: N/A stands for no applicable.

Models difference

No.	Main test model	Series Models
1	P3	P1,P2,P3 PRO,P4,P5
2	All models differ only in their model names; their physical structures are identical. All tests were conducted on the P3.	

Channel list:

Channel List					
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	27	2429	54	2456
01	2403	28	2430	40	2457
02	2404	29	2431	56	2458
03	2405	30	2432	57	2459
04	2406	31	2433	58	2460
05	2407	32	2434	59	2461
06	2408	33	2435	60	2462
07	2409	34	2436	61	2463
08	2410	35	2437	62	2464
09	2411	36	2438	63	2465
10	2412	37	2439	64	2466
11	2413	38	2440	65	2467
12	2414	39	2441	66	2468
13	2415	40	2442	67	2469
14	2416	41	2443	68	2470
15	2417	42	2444	69	2471
16	2418	43	2445	70	2472
17	2419	44	2446	71	2473
18	2420	45	2447	72	2474
19	2421	46	2448	73	2475
20	2422	47	2449	74	2476
21	2423	48	2450	75	2477
22	2424	49	2451	76	2478
23	2425	50	2452	77	2479
24	2426	51	2453	78	2480
25	2427	52	2454		
26	2428	53	2455		

3. TEST RESULT SUMMARY

3.1. Test Methodology

All measurements contained in this report were according to Mic Notice No.88 Appendix No.43.

Rule Section	Description of Test	Test Result
3	Frequency Error	Compliance
4	Occupied Bandwidth (99%) and Spread-spectrum Bandwidth (90%)	Compliance
5	Unwanted Emission Intensity	Compliance
6	Antenna Power Error	Compliance
7	Limitation of Collateral Emission of Receiver	Compliance
8	Transmission Antenna Gain (EIRP Antenna Power)	Compliance
9	Transmission Radiation Angle Width (3dB Bandwidth)	Compliance
10	Radio Interference Prevention Capability	Compliance
11	Hopping Frequency Dwell Time	Compliance
12	Construction Protection Confirmation	Compliance

Environmental condition of test site

	Normal Test Conditions	Extreme Test Conditions
Temperature	25°C	LT: -5°C ; HT: 45°C
Relative Humidity	56%	N/A
Supply Voltage	AC 100V	LV: AC 9V; HV: AC 100V

NT: Normal Temperature; LV: Low Voltage 90V; NV: Normal Voltage 100V; HV: High Voltage 110V.

Note: The EUT has voltage regulator chips, so Conduct the test with the rated voltage only.

Test Voltage Information		
Power supply voltage 100VAC(Normal)	Power supply voltage 90V AC(-10%)	Power supply voltage 110V AC(+10%)
RF module voltage AC 100V	RF module voltage AC 100V	RF module voltage AC 100V
When EUT be operated at 10% from the normal supply voltage, the supply voltage of RF part was varied within 1%. All test cases were done under the normal supply voltage. Note: For the test results, the EUT had been tested with all conditions. But only the worst case was shown in test report.		

3.2. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expanded 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	Uncertainty
1	Occupied Channel Bandwidth	$\pm 3.6\text{dB}$
2	RF power, conducted	$\pm 0.16\text{dB}$
3	Power Spectral Density, conducted	$\pm 1.3\text{dB}$
4	Unwanted Emissions, conducted	$\pm 1.3\text{dB}$
5	All emissions, radiated	$\pm 4.7\text{dB}$
6	Temperature	$\pm 0.5^\circ\text{C}$
7	Humidity	$\pm 2\%$
8	DC and low frequency voltages	$\pm 0.5\%$
9	Time	$\pm 1.0\%$
10	Duty Cycle	$\pm 3.0\%$
11	Frequency tolerance	$\pm 1 \times 10^{-7}$



4. FACILITIES AND ACCREDITATIONS

4.1. FACILITIES

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

**World Standardization Certification & Testing Group(Shenzhen) Co., Ltd.
Building J-7F and Building D, Dongjiang Science & Technology Park, Tangjia
Community, Fenghuang Street, Guangming 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."

4.2. ACCREDITATIONS

Our laboratories are accredited and approved by the following approval agencies according to ISO/IEC 17025:2017.

China	CNAS (Registration Number: L3732)
USA	A2LA (Certificate Number: 5768.01)
Canada	ISED(CAB identifier:CN0111)

Copies of granted accreditation certificates are available for downloading from our web site,
<http://www.wsct-cert.com>



5. TEST EQUIPMENTS

Kind of Equipment	Manufacturer	Type No.	Serial No.	Last Calibrated	Calibrated until	Use or Not
EMI Test Receiver	R&S	ESR7	102817	2025-04-18	2026-04-17	☒
Bi-log Antenna	SCHWARZBECK	VULB9168	01664	2025-04-20	2026-04-19	☒
Horn Antenna	R&S	BBHA 9120D	01801	2025-04-19	2026-04-18	☒
pre-amplifier	SCHWARZBECK	CC-AMP-N-6G	231023-6GHZ	2025-04-18	2026-04-17	☒
Spectrum analyzer	Agilent Technologies	N9020A	MY53371004	2025-03-06	2026-03-05	☒
Spectrum analyzer	Agilent Technologies	N9010B	MY63390117	2025-04-18	2026-04-17	☒
Vector Signal Source	Agilent Technologies	N5182A	MY48180819	2025-03-06	2026-03-05	☒
Analog signal source	R&S	E8257D	MY49280264	2025-03-06	2026-03-05	☒
Power meter	Agilent Technologies	E9340A	US39400100	2025-03-06	2026-03-05	☒
Anechoic chamber	mr-emc	966	-	2023-05-30	2026-05-29	☒
Universal Radio Communication Tester	R&S	CMW500	139123	2025-03-06	2026-03-05	☒



6. STANDARD REQUIREMENT

6.1. Frequency Error

Limit

Limits	:	$\leq 50\text{ppm}$
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Test Procedure

1. The EUT was placed on the test table and programmed in un-modulation function in normal condition.
2. Frequency accuracy of SPA shall be less than 10% of limits tolerance (5ppm)
3. Setting of SPA is following as: RB: 10KHz / VB: 30kHz / SPAN: 5MHz / AT: 20dB / Ref: 20dBm
4. Center Frequency: The transmitting frequency for testing of EUT
5. Sweep time: Auto
6. Sweep mode: Continuous sweep
7. Detect mode: Positive peak
8. Mark function: peak
9. Record the frequency of peak value f , f_c is nominal channel frequency, Then the frequency error formula is $(f-f_c)/f_c \times 10^6$ ppm and the limit is less than $\pm 50\text{ppm}$
10. Repeat step 1 to 9 in extrme voltage condition.

Test setup



Environmental Conditions

Temperature:	25°C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

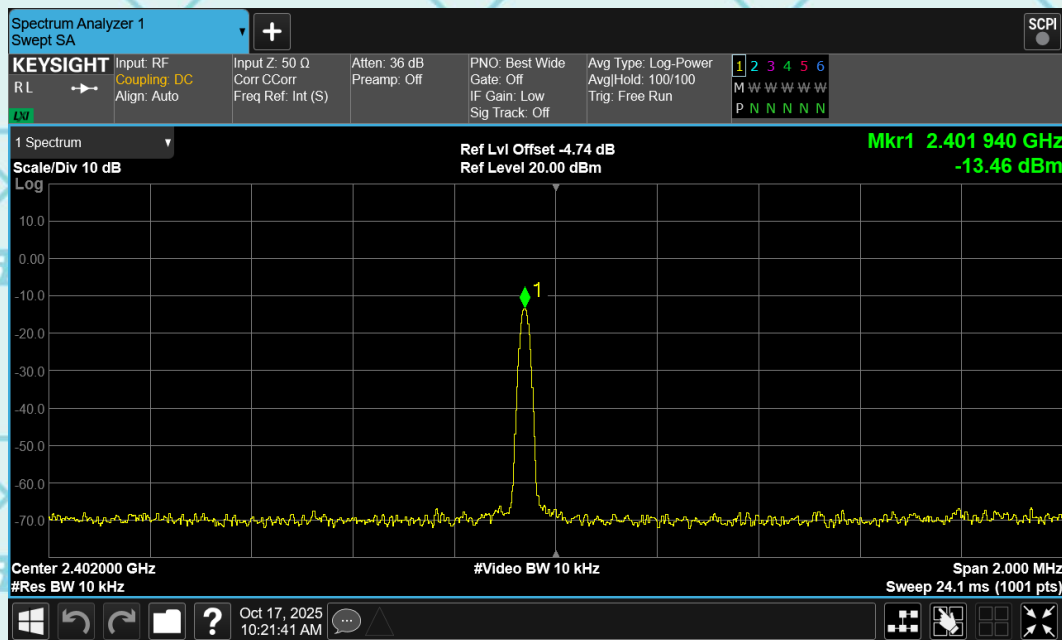
Test Data

Mode	Frequency (MHz)	Measured Frequency (MHz)	Frequency Error (Hz)	Deviation (ppm)	Limit (ppm)	Verdict
1-DH5	2402	2401.94	-60000	-24.98	±50	Pass
1-DH5	2441	2440.938	-62000	-25.4	±50	Pass
1-DH5	2480	2479.938	-62000	-25	±50	Pass
2-DH5	2402	2401.94	-60000	-24.98	±50	Pass
2-DH5	2441	2440.938	-62000	-25.4	±50	Pass
2-DH5	2480	2479.936	-64000	-25.81	±50	Pass
3-DH5	2402	2401.938	-62000	-25.81	±50	Pass
3-DH5	2441	2440.938	-62000	-25.4	±50	Pass
3-DH5	2480	2479.936	-64000	-25.81	±50	Pass

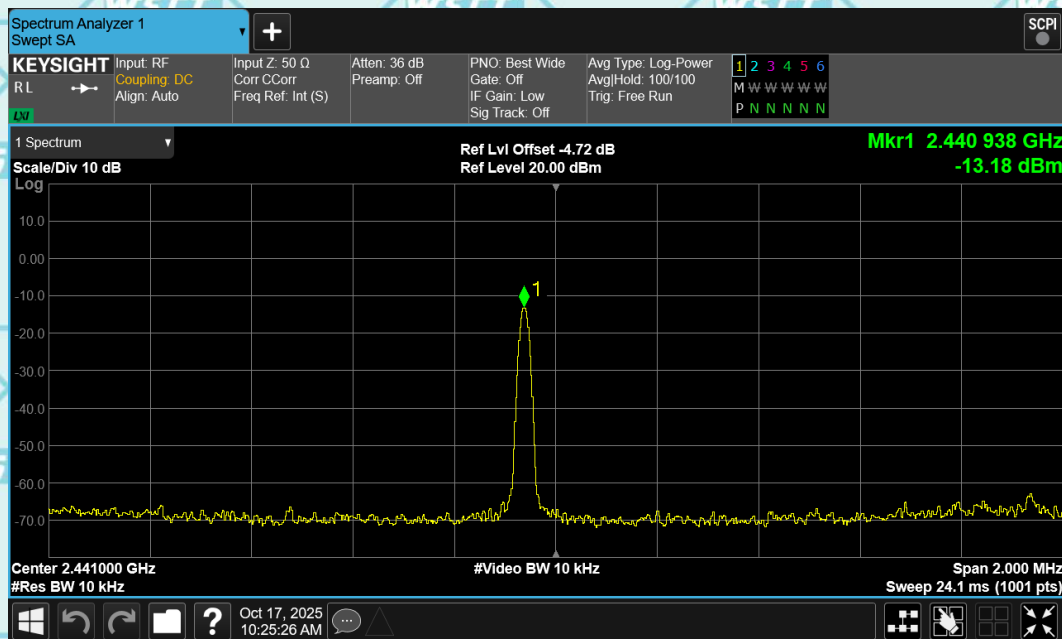


Test Graphs

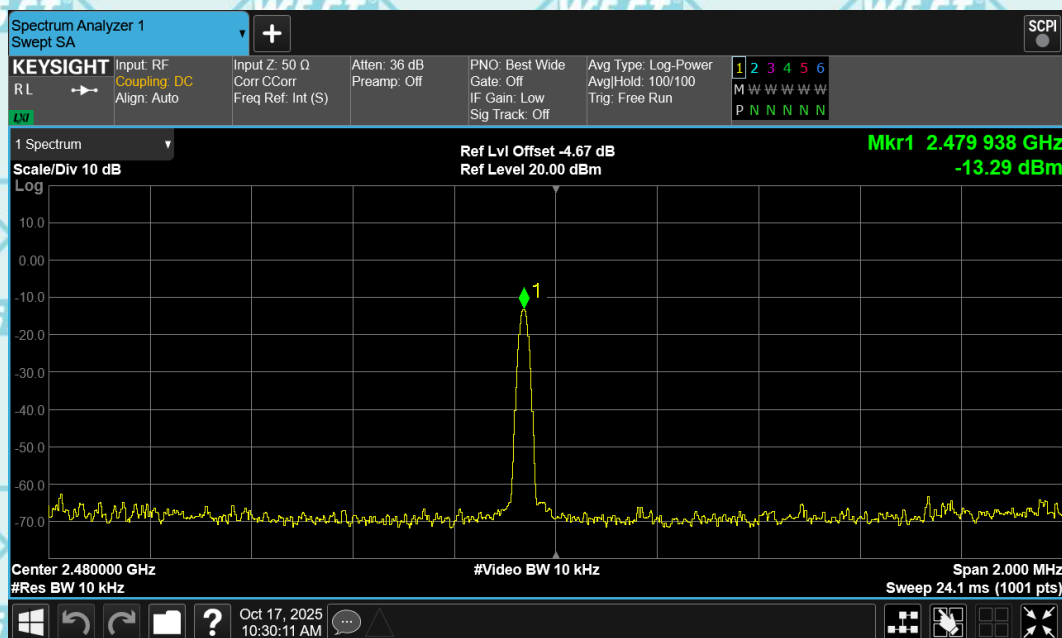
Freq. Error NVNT 1-DH5 2402MHz Ant1



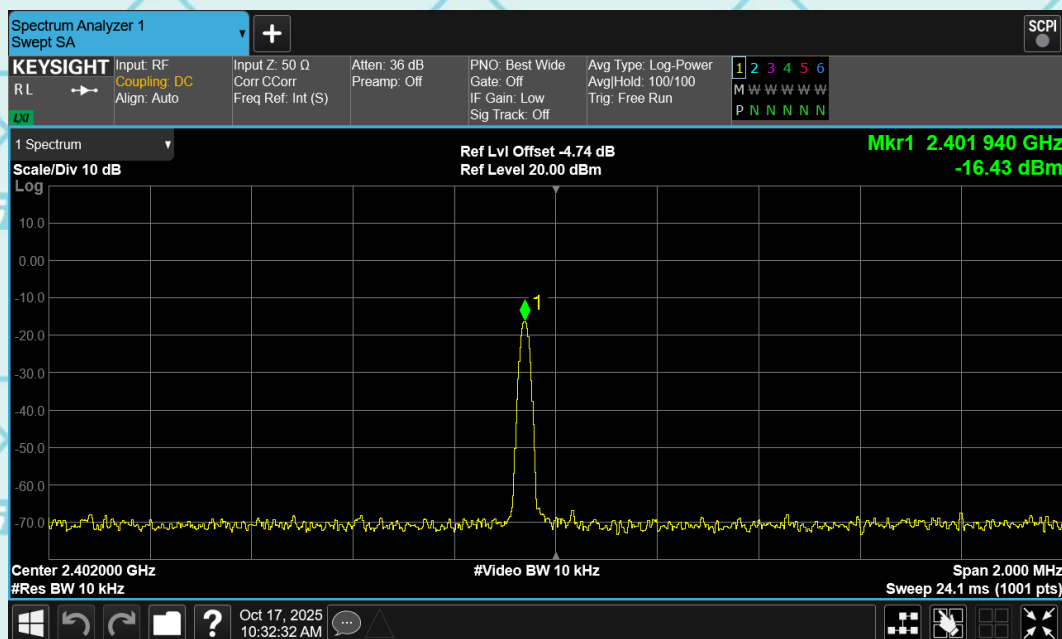
Freq. Error NVNT 1-DH5 2441MHz Ant1



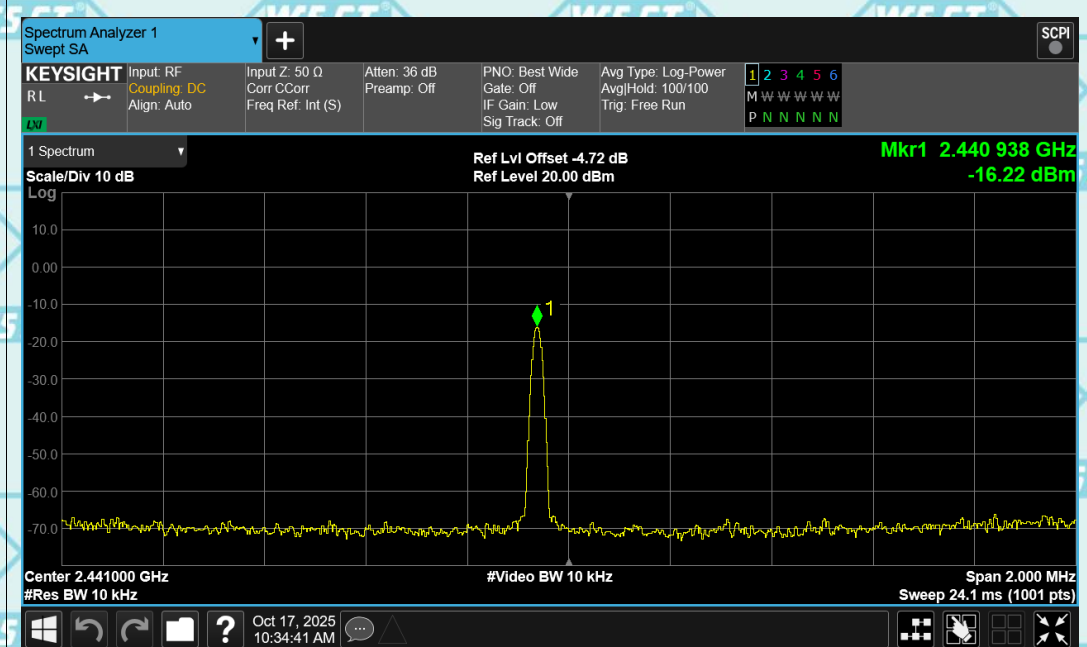
Freq. Error NVNT 1-DH5 2480MHz Ant1



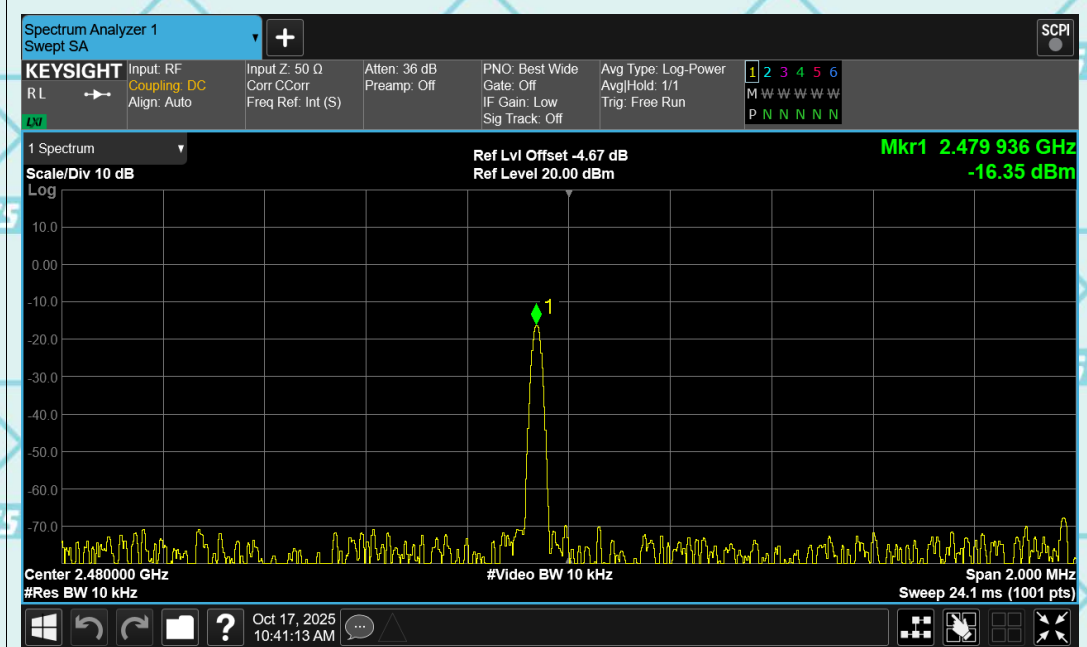
Freq. Error NVNT 2-DH5 2402MHz Ant1



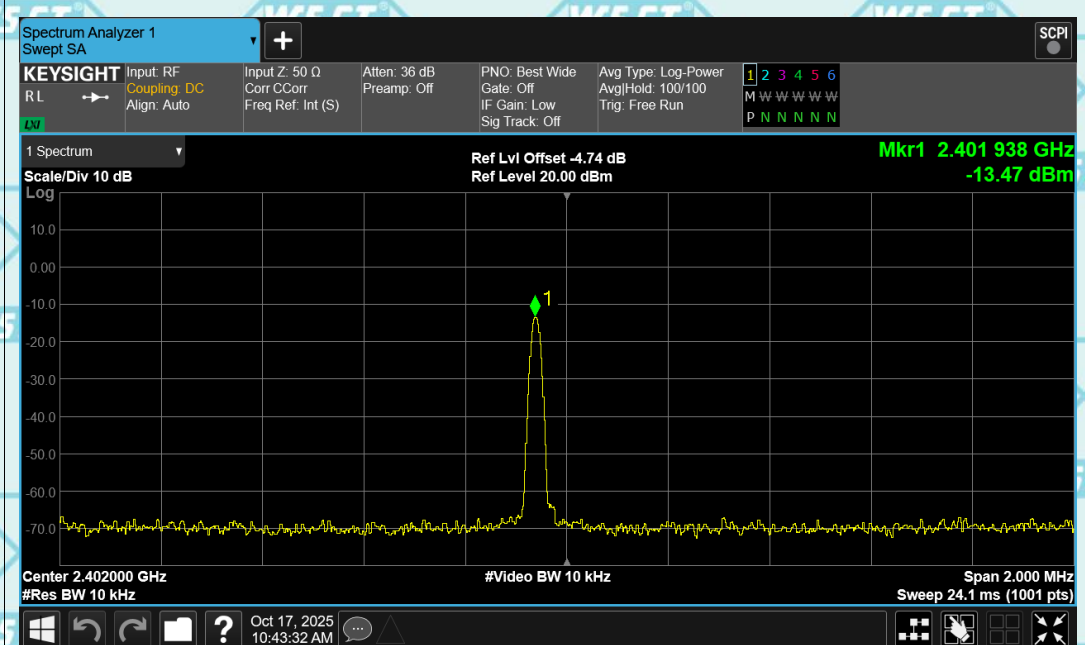
Freq. Error NVNT 2-DH5 2441MHz Ant1



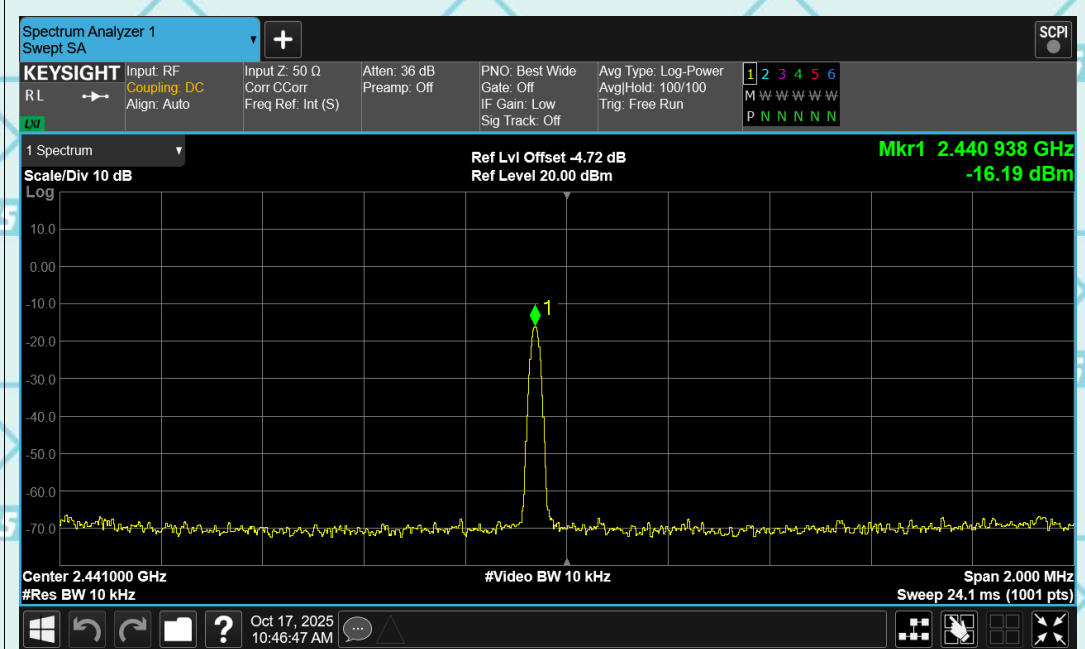
Freq. Error NVNT 2-DH5 2480MHz Ant1

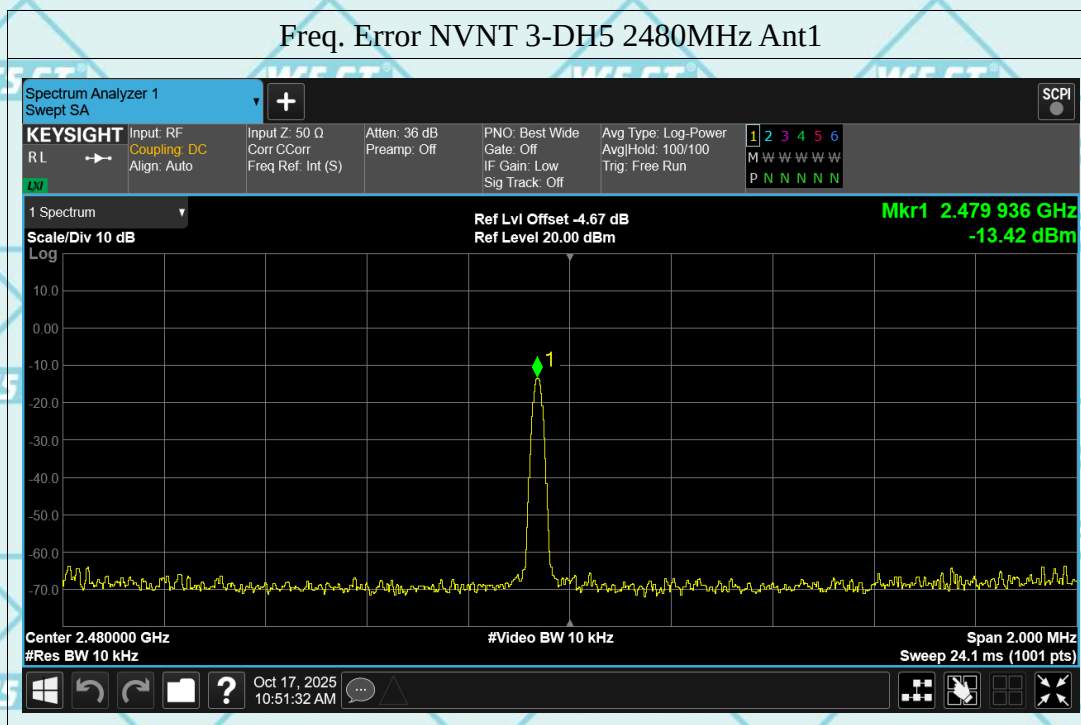


Freq. Error NVNT 3-DH5 2402MHz Ant1



Freq. Error NVNT 3-DH5 2441MHz Ant1





Test Result:

Pass



6.2. Occupied Bandwidth And Spread-Spectrum Bandwidth Measurement

Limit

Item	Limits
OCCUPIED BANDWIDTH (99%)	FH: 83.5 MHz
	FH + DS: 83.5 MHz
	FH + OFDM: 83.5MHz
	OFDM, DS: 26MHz
	Others: 26MHz
	OFDM equipment with 40MHz channel separation: 40MHz
Spreading Bandwidth(90%)	Spread bandwidth: $\geq 500\text{KHz}$,
	Spread factor ≥ 5

Test Procedure

1. The EUT was programmed to be in continuously transmitting mode, setting of SPA is following as: RB: 1MHz / VB: 3MHz / Start: 2400MHz / Stop: 2483.5MHz / AT: 20dB Ref:20dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold
2. EUT have transmitted the maximum modulation signal and fixed channelize (For DSSS or OFDM Device) or continuous maximum power of hopping mode(For FHSS Device). SPA set to 99% of occupied bandwidth to measure occupied bandwidth. The limit is less than 26MHz(For DSSS or OFDM Device) or 83.5MHz(For FHSS Device).
3. SPA set to 90% of occupied bandwidth to measure Spread Spectrum Bandwidth and must greater than 500kHz.
4. Spread Spectrum Factor = Spread Spectrum Bandwidth / modulation rate of EUT. Spread Spectrum Factor limit is greater than 5

Test Setup



Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

Test Data:**Normal Voltage:****Occupied Bandwidth(99%)**

Test Condition	Test Mode	Frequency[MHz]	Result [MHz]()	Limit [MHz]	Verdict
NTNV	DH5	Hop	78.726	≤83.5	PASS
NTNV	2DH5	Hop	78.921	≤83.5	PASS
NTNV	3DH5	Hop	78.729	≤83.5	PASS

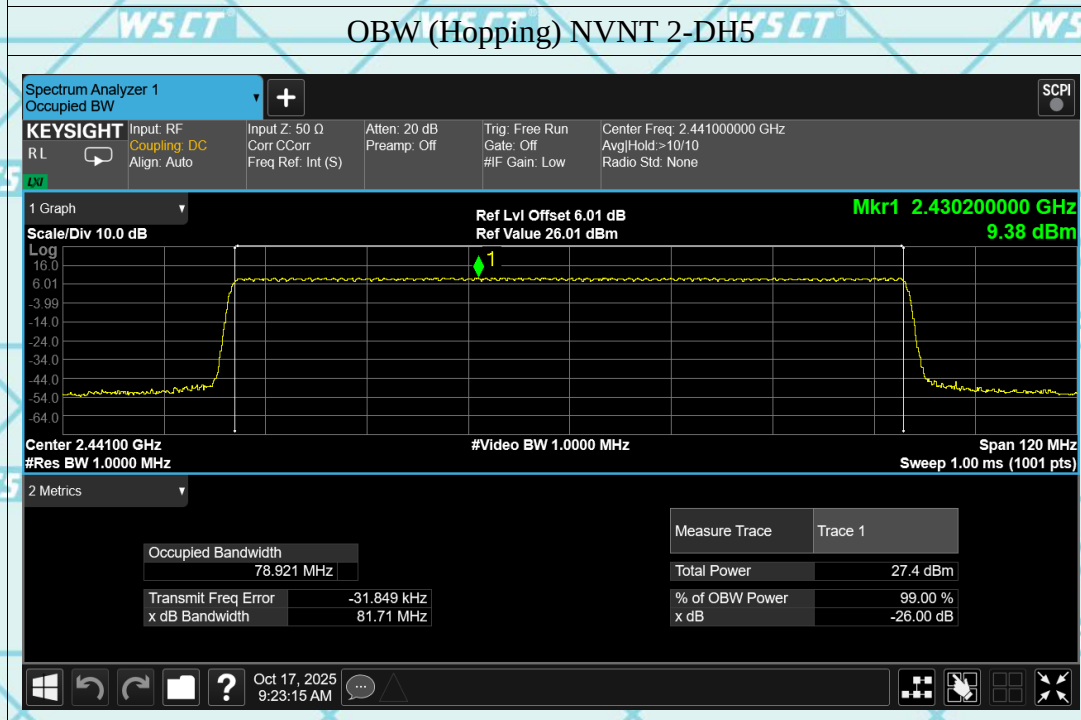
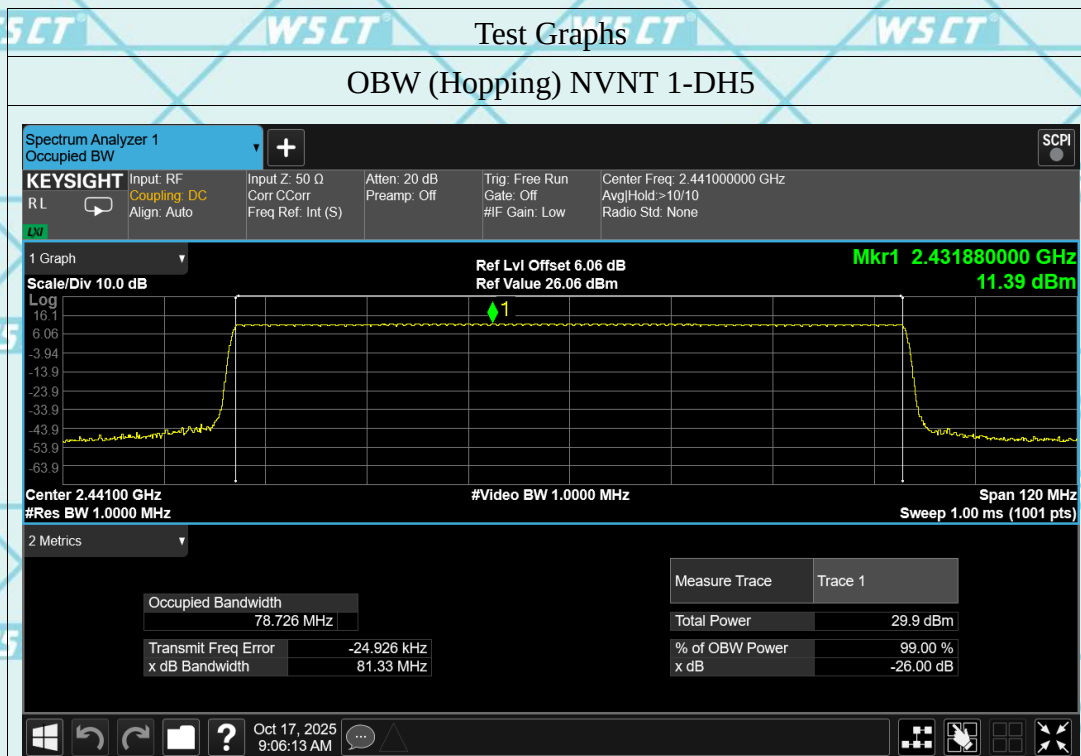
Spread-Spectrum Bandwidth

Test Condition	Test Mode	Frequency[MHz]	Result [MHz]	Limit [MHz]	Spread Factor	Limit	Verdict
NTNV	2DH5	Hop	70.966	≥0.5	70.966	>5	PASS
NTNV	DH5	Hop	71.272	≥0.5	71.272	>5	PASS
NTNV	3DH5	Hop	71.285	≥0.5	71.285	>5	PASS

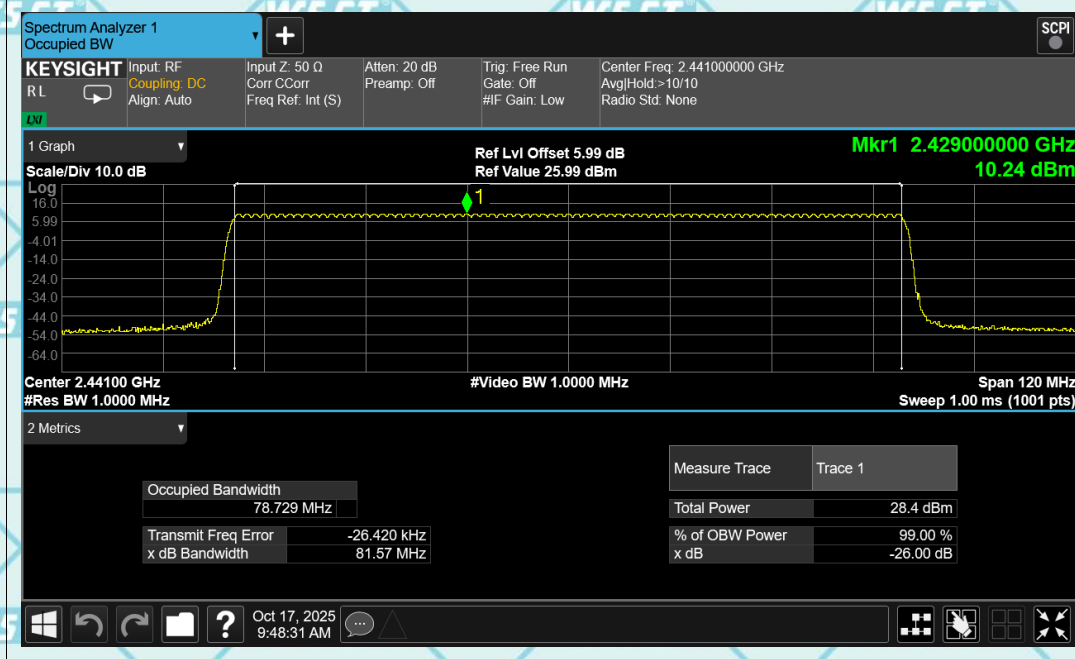


The worst case:

Occupied Bandwidth(99%)



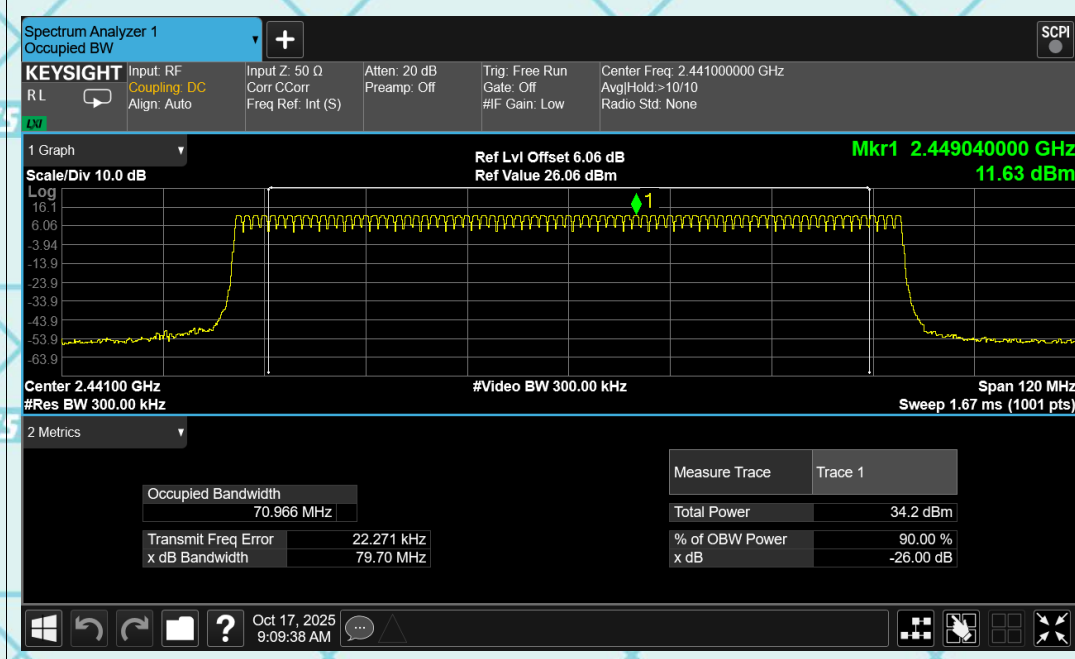
OBW (Hopping) NVNT 3-DH5



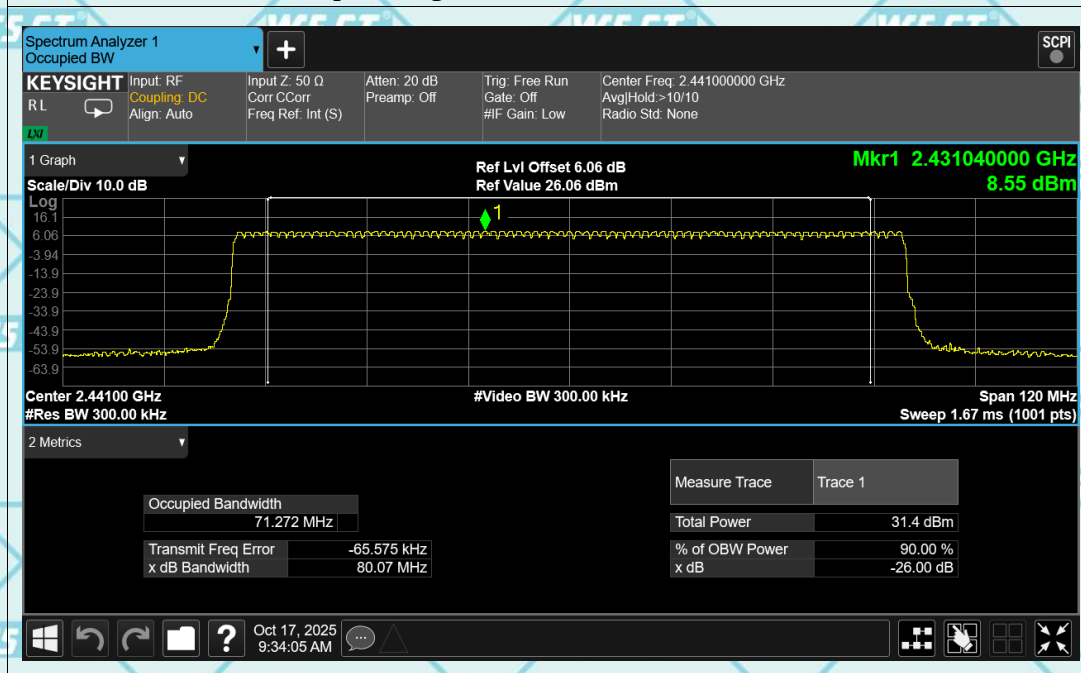
Spread-Spectrum Bandwidth

Test Graphs

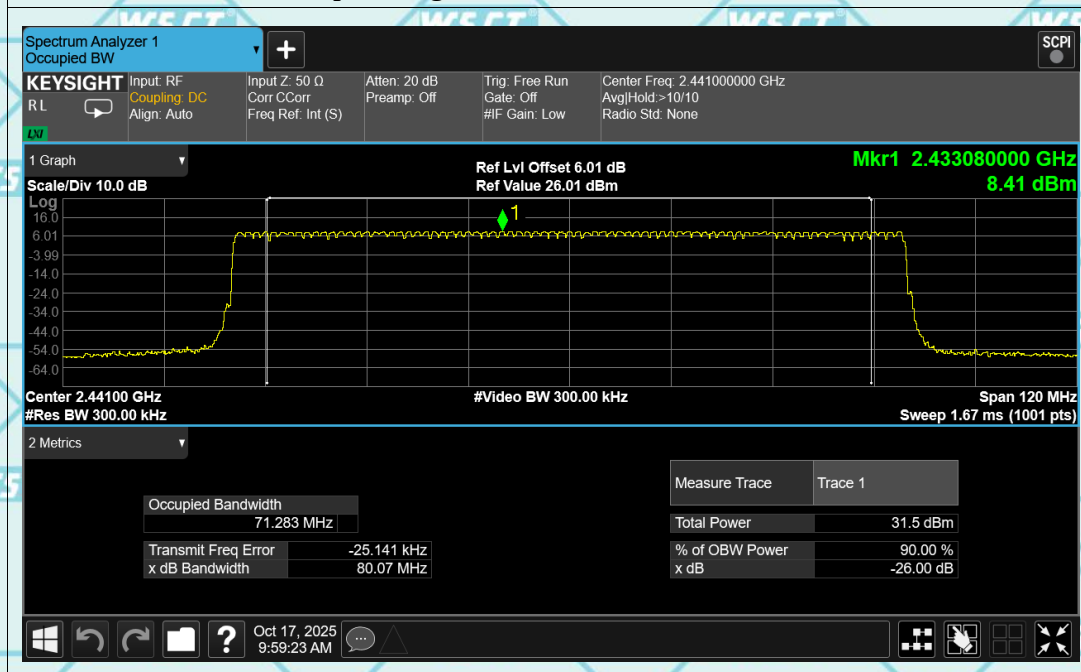
Spreading Bandwidth NVNT 1-DH5



Spreading Bandwidth NVNT 2-DH5



Spreading Bandwidth NVNT 3-DH5



Test Result:

Pass



6.3. Unwanted Emission Intensity Measurement

Limit

Item	Limits
TX Spurious Emission	$\leq 0.25 \mu\text{W}$ ($30\text{MHz} \leq f \leq 1000\text{MHz}$)
	$\leq 2.5 \mu\text{W}$ ($1000\text{MHz} < f \leq 2387\text{MHz}$)
	$\leq 25 \mu\text{W}$ ($2387\text{MHz} < f \leq 2400\text{MHz}$)
	$\leq 25 \mu\text{W}$ ($2483.5\text{MHz} \leq f < 2496.5\text{MHz}$)
	$\leq 2.5 \mu\text{W}$ ($2496.5\text{MHz} \leq f < 13000\text{MHz}$)

Test Procedure

- EUT have transmitted the maximum modulation signal and fixed channelize.
- Setting of SPA is following as: Below 1GHz RB:100KHz / VB:100KHz
Above 1GHz RB:1MHz / VB:1MHz / AT: 10dB Ref: 15dBm / Sweep time: Auto
Sweep Mode: Continuous sweep / Detect mode: Positive peak
Trace mode: Max hold
- Setting of SPA is following as 30MHz and stop frequency 1000MHz Then to mark peak reading value + cable loss shall be less than 0.25μW.
- Setting of SPA is following as 1000MHz and stop frequency 2387MHz Then to mark peak reading value + cable loss shall be less than 2.5μW.
- SPA adjusted to start frequency 2387MHz and stop frequency 2400MHz. Then to mark peak reading value + cable loss shall be less than 25μW.
- SPA adjusted to start frequency 2483.5MHz and stop frequency 2496.5MHz Then to mark peak reading value + cable loss shall be less than 25μW
- SPA adjusted to start frequency 2496.5MHz and stop frequency 12500MHz Then to mark peak reading value + cable loss shall be less than 2.5μW
- Measure side band spurious as follows: For 2.4GHz band: 2374MHz~2400MHz and 2483.5MHz~2509.5MHz RBW = VBW = 30kHz, Result Value = Measured Value + 15.2 [dBm]
- If the Result Value is over the requirement, take total sum of 1MHz band centered at the spur frequency like ACLP measurement as Result Value.

Test Setup



Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

Test data:

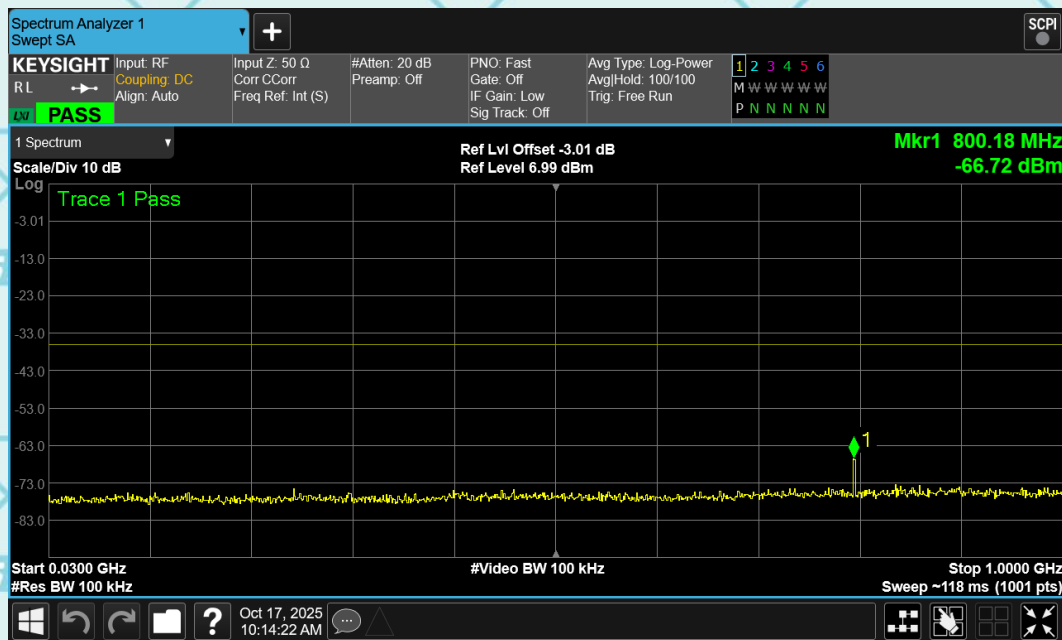
Condition	Mode	Frequency (MHz)	Range (MHz)	Emission Frequency (MHz)	Max Value (dBm)	Limit Start(dBm)	Limit Stop (dBm)	Verdict
NVNT	1-DH5	2402	30-1000	800.18	-56.72	-36	-36	Pass
NVNT	1-DH5	2402	1000-2387	1601.96	-46.02	-26	-26	Pass
NVNT	1-DH5	2402	2387-2400	2400	-37.71	-16	-16	Pass
NVNT	1-DH5	2402	2483.5-2496.5	2496.33	-62.57	-16	-16	Pass
NVNT	1-DH5	2402	2496.5-13000	7202.07	-37.08	-26	-26	Pass
NVNT	1-DH5	2441	30-1000	813.76	-56.65	-36	-36	Pass
NVNT	1-DH5	2441	1000-2387	1626.92	-45.7	-26	-26	Pass
NVNT	1-DH5	2441	2387-2400	2389.3	-61.06	-16	-16	Pass
NVNT	1-DH5	2441	2483.5-2496.5	2487.15	-60.37	-16	-16	Pass
NVNT	1-DH5	2441	2496.5-13000	7328.11	-37.84	-26	-26	Pass
NVNT	1-DH5	2480	30-1000	826.37	-56.12	-36	-36	Pass
NVNT	1-DH5	2480	1000-2387	1653.28	-45.33	-26	-26	Pass
NVNT	1-DH5	2480	2387-2400	2397.28	-61.38	-16	-16	Pass
NVNT	1-DH5	2480	2483.5-2496.5	2483.85	-49.77	-16	-16	Pass
NVNT	1-DH5	2480	2496.5-13000	7443.65	-39.99	-26	-26	Pass
NVNT	2-DH5	2402	30-1000	800.18	-60.76	-36	-36	Pass
NVNT	2-DH5	2402	1000-2387	1601.96	-48.47	-26	-26	Pass
NVNT	2-DH5	2402	2387-2400	2400	-32.4	-16	-16	Pass
NVNT	2-DH5	2402	2483.5-2496.5	2485.15	-61.91	-16	-16	Pass
NVNT	2-DH5	2402	2496.5-13000	7202.07	-39.08	-26	-26	Pass
NVNT	2-DH5	2441	30-1000	910.76	-59.38	-36	-36	Pass
NVNT	2-DH5	2441	1000-2387	1628.31	-48.49	-26	-26	Pass
NVNT	2-DH5	2441	2387-2400	2399.12	-61.67	-16	-16	Pass
NVNT	2-DH5	2441	2483.5-2496.5	2490.88	-61.91	-16	-16	Pass
NVNT	2-DH5	2441	2496.5-13000	7317.61	-39.93	-26	-26	Pass
NVNT	2-DH5	2480	30-1000	826.37	-60.05	-36	-36	Pass
NVNT	2-DH5	2480	1000-2387	1653.28	-47.97	-26	-26	Pass

NVNT	2-DH5	2480	2387-2400	2394.46	-63.24	-16	-16	Pass
NVNT	2-DH5	2480	2483.5-2496.5	2486.74	-53.12	-16	-16	Pass
NVNT	2-DH5	2480	2496.5-13000	7443.65	-42.18	-26	-26	Pass
NVNT	3-DH5	2402	30-1000	800.18	-58.72	-36	-36	Pass
NVNT	3-DH5	2402	1000-2387	1601.96	-47.64	-26	-26	Pass
NVNT	3-DH5	2402	2387-2400	2400	-34.57	-16	-16	Pass
NVNT	3-DH5	2402	2483.5-2496.5	2489.52	-62.15	-16	-16	Pass
NVNT	3-DH5	2402	2496.5-13000	7202.07	-38.21	-26	-26	Pass
NVNT	3-DH5	2441	30-1000	813.76	-60.08	-36	-36	Pass
NVNT	3-DH5	2441	1000-2387	1626.92	-47.24	-26	-26	Pass
NVNT	3-DH5	2441	2387-2400	2399.53	-61.63	-16	-16	Pass
NVNT	3-DH5	2441	2483.5-2496.5	2487.04	-60.74	-16	-16	Pass
NVNT	3-DH5	2441	2496.5-13000	7317.61	-39.14	-26	-26	Pass
NVNT	3-DH5	2480	30-1000	826.37	-59.02	-36	-36	Pass
NVNT	3-DH5	2480	1000-2387	1653.28	-46.9	-26	-26	Pass
NVNT	3-DH5	2480	2387-2400	2394.88	-62.29	-16	-16	Pass
NVNT	3-DH5	2480	2483.5-2496.5	2483.77	-53.4	-16	-16	Pass
NVNT	3-DH5	2480	2496.5-13000	7443.65	-41.65	-26	-26	Pass

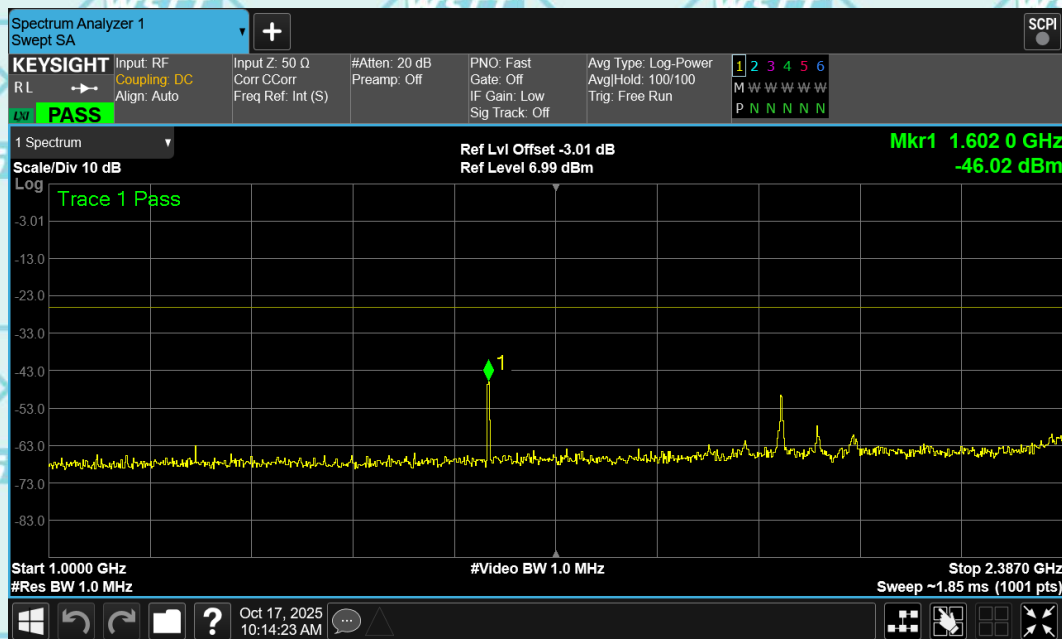


Test Graphs

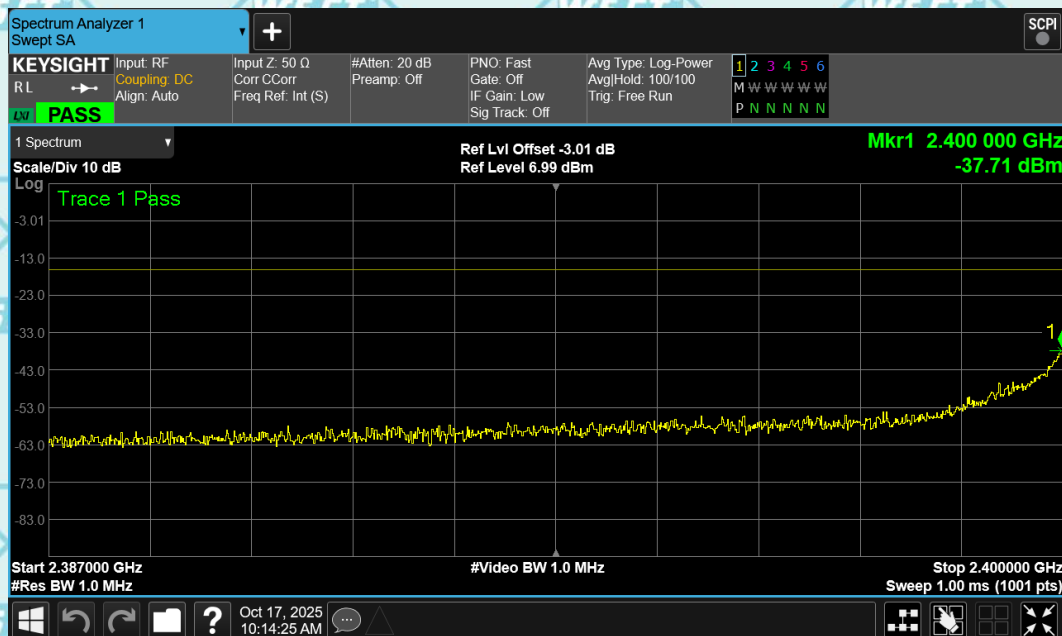
Tx. Spurious NVNT 1-DH5 2402MHz Ant1 @ 30MHz-1000MHz



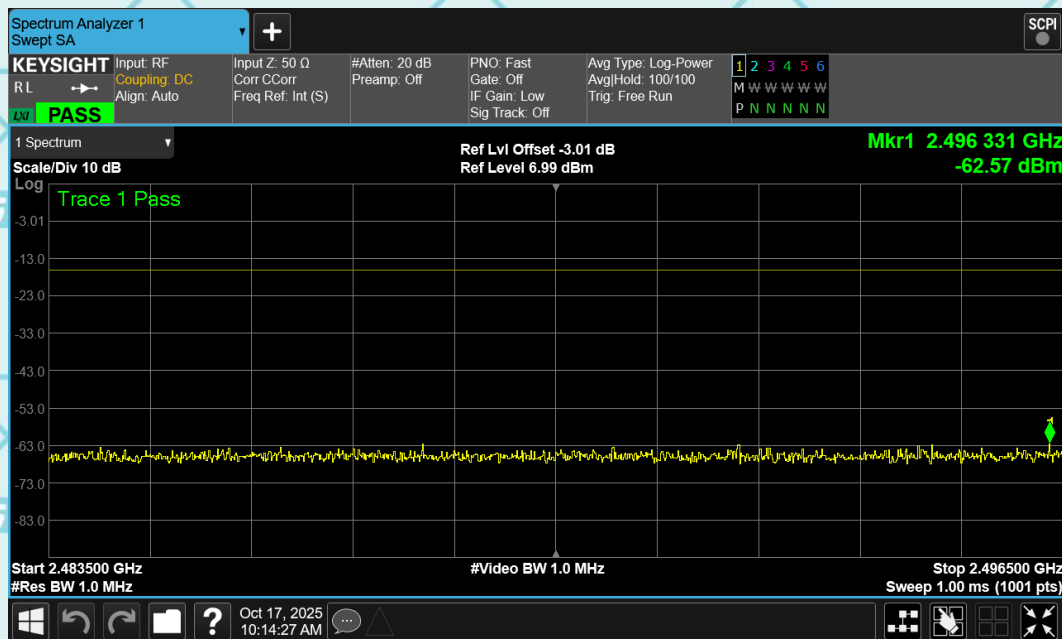
Tx. Spurious NVNT 1-DH5 2402MHz Ant1 @ 1000MHz-2387MHz



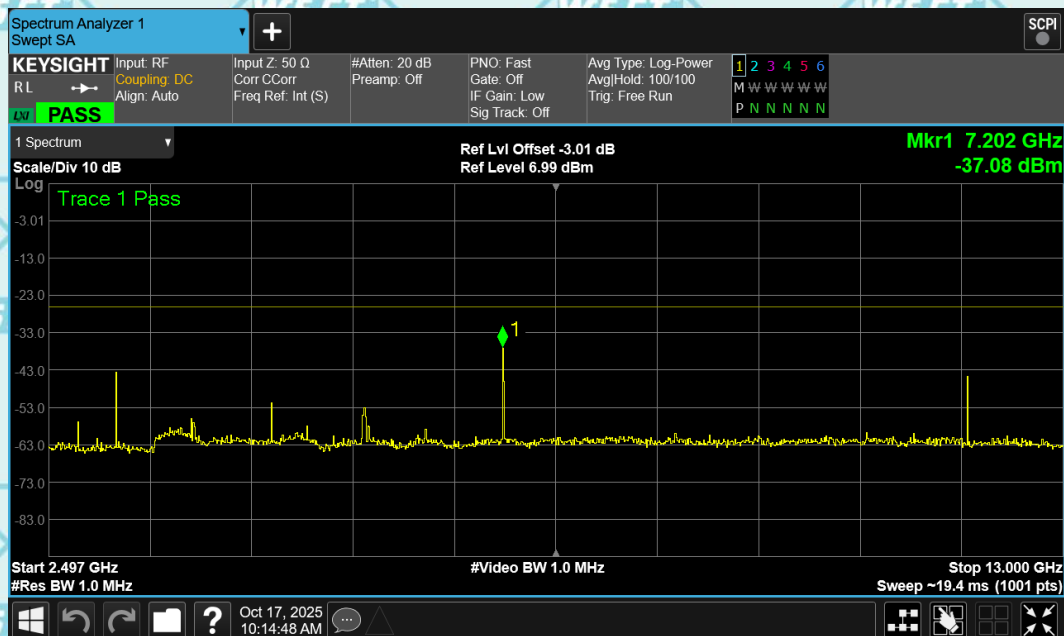
Tx. Spurious NVNT 1-DH5 2402MHz Ant1 @ 2387MHz-2400MHz



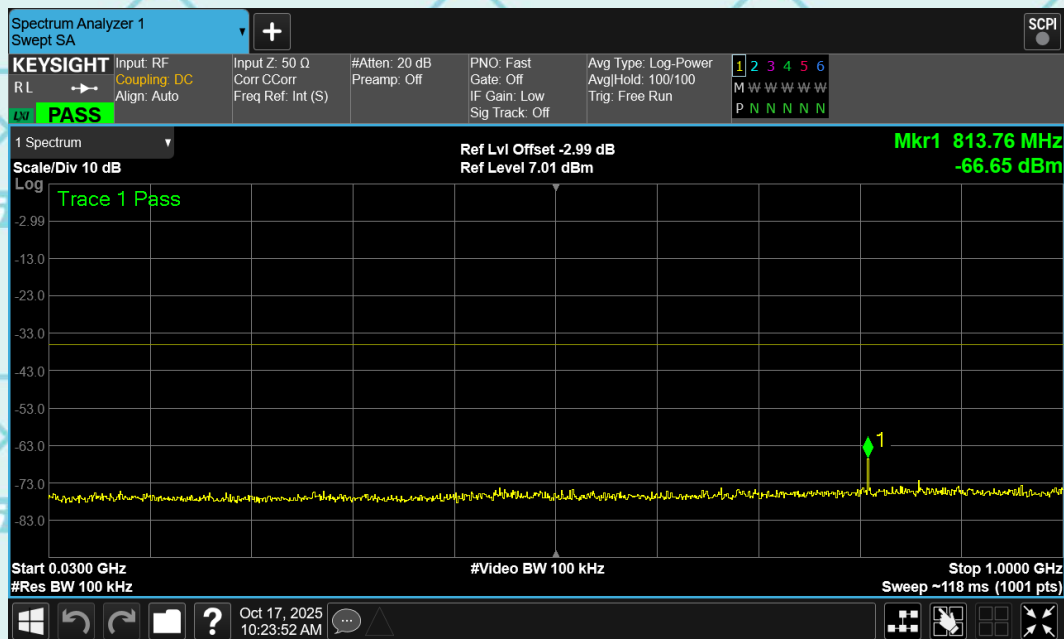
Tx. Spurious NVNT 1-DH5 2402MHz Ant1 @ 2483.5MHz-2496.5MHz



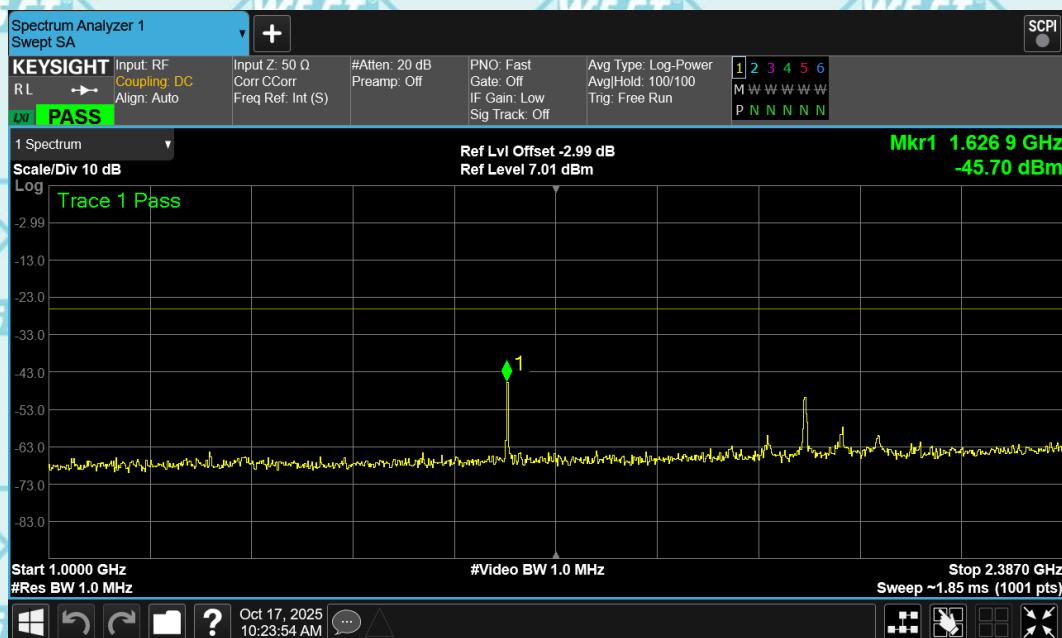
Tx. Spurious NVNT 1-DH5 2402MHz Ant1 @ 2496.5MHz-13000MHz



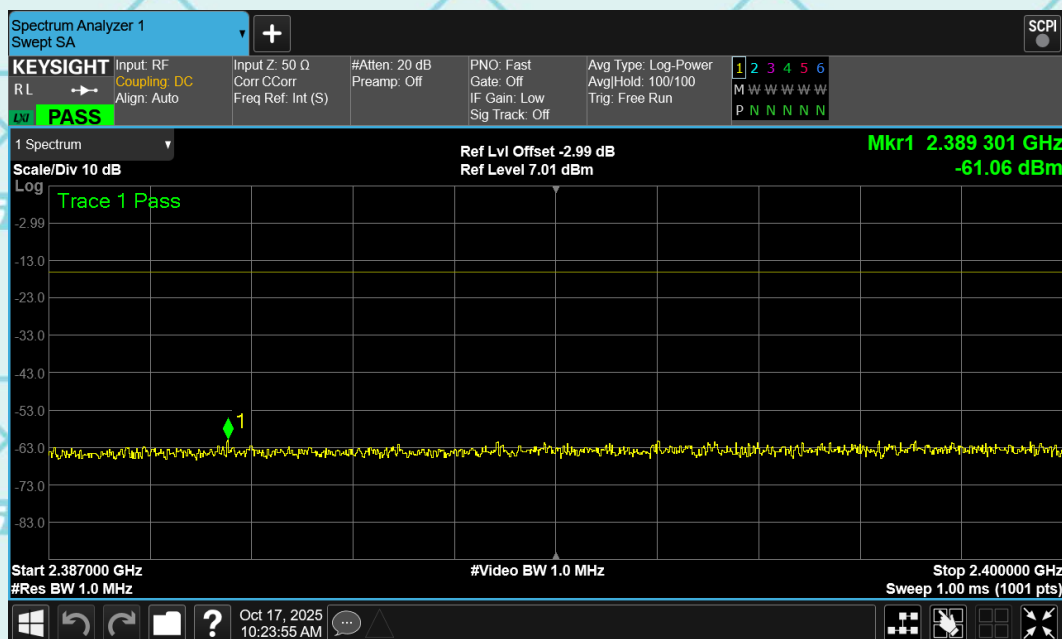
Tx. Spurious NVNT 1-DH5 2441MHz Ant1 @ 30MHz-1000MHz



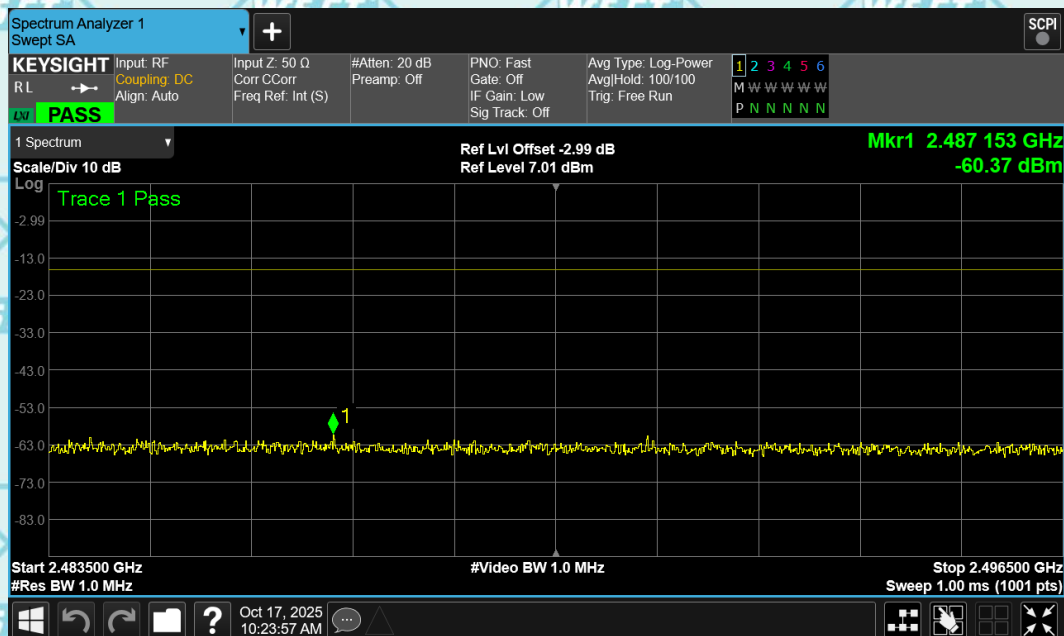
Tx. Spurious NVNT 1-DH5 2441MHz Ant1 @ 1000MHz-2387MHz



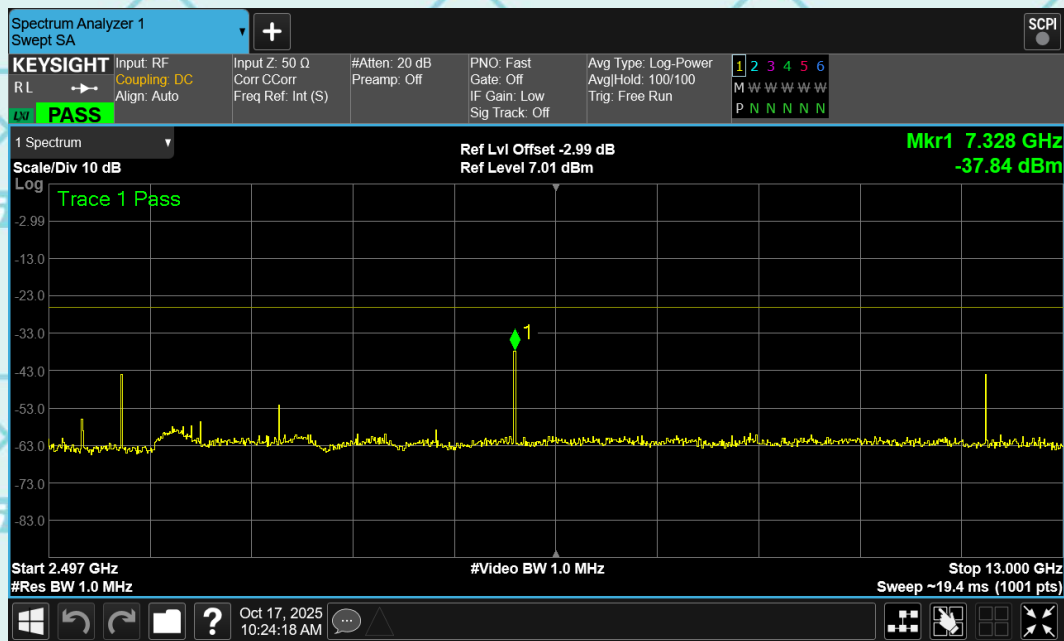
Tx. Spurious NVNT 1-DH5 2441MHz Ant1 @ 2387MHz-2400MHz



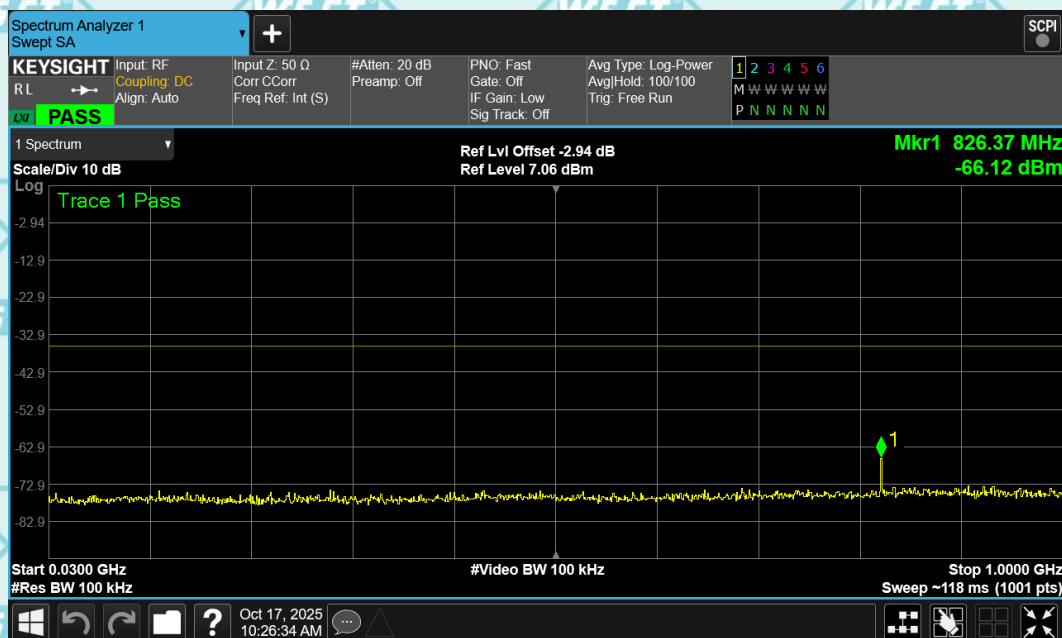
Tx. Spurious NVNT 1-DH5 2441MHz Ant1 @ 2483.5MHz-2496.5MHz



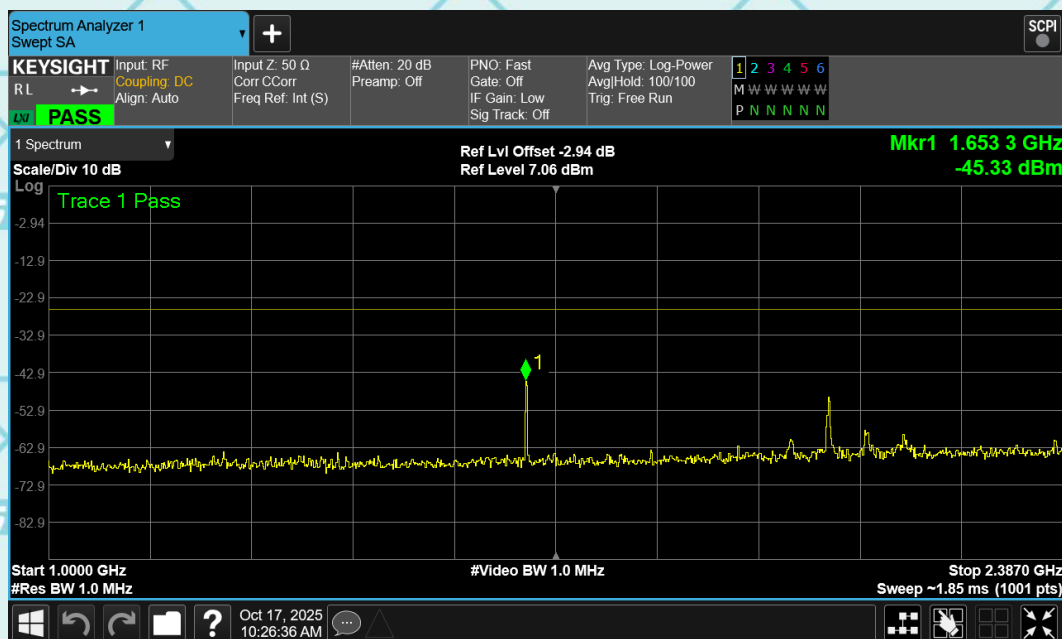
Tx. Spurious NVNT 1-DH5 2441MHz Ant1 @ 2496.5MHz-13000MHz



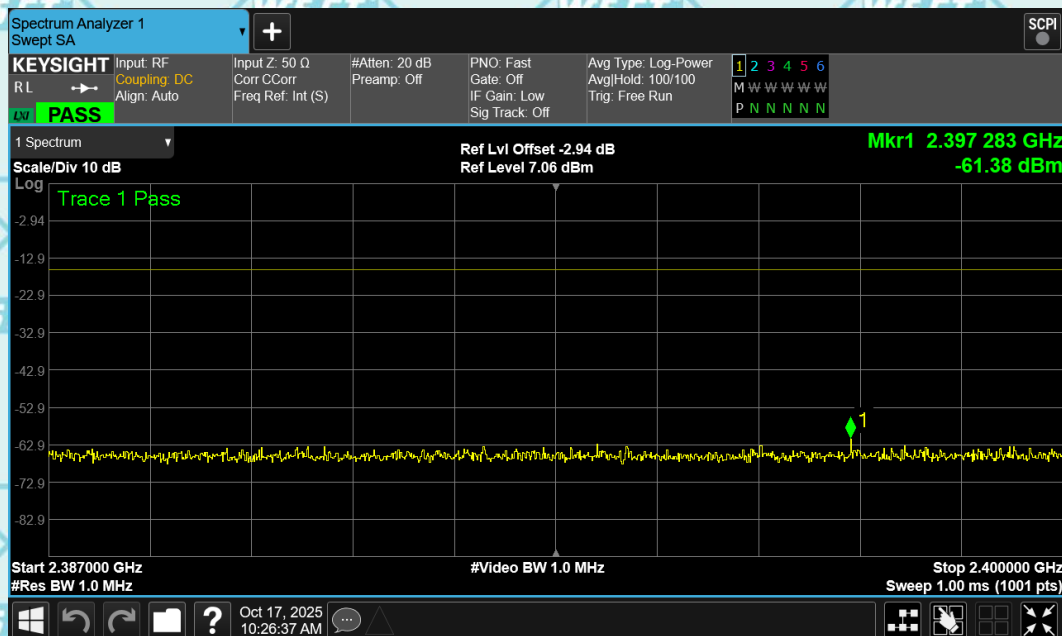
Tx. Spurious NVNT 1-DH5 2480MHz Ant1 @ 30MHz-1000MHz



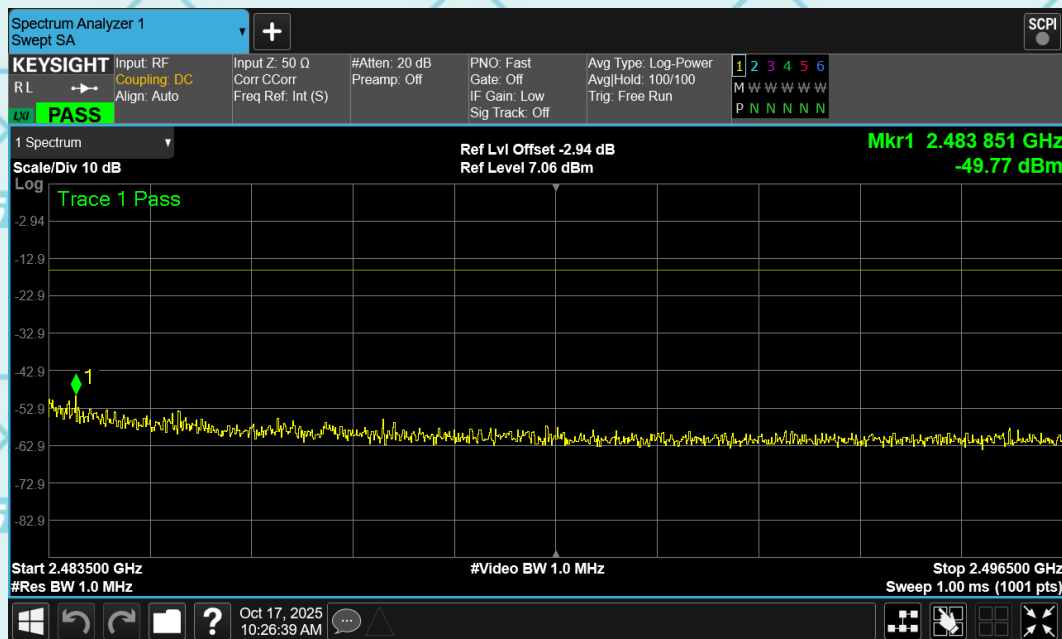
Tx. Spurious NVNT 1-DH5 2480MHz Ant1 @ 1000MHz-2387MHz



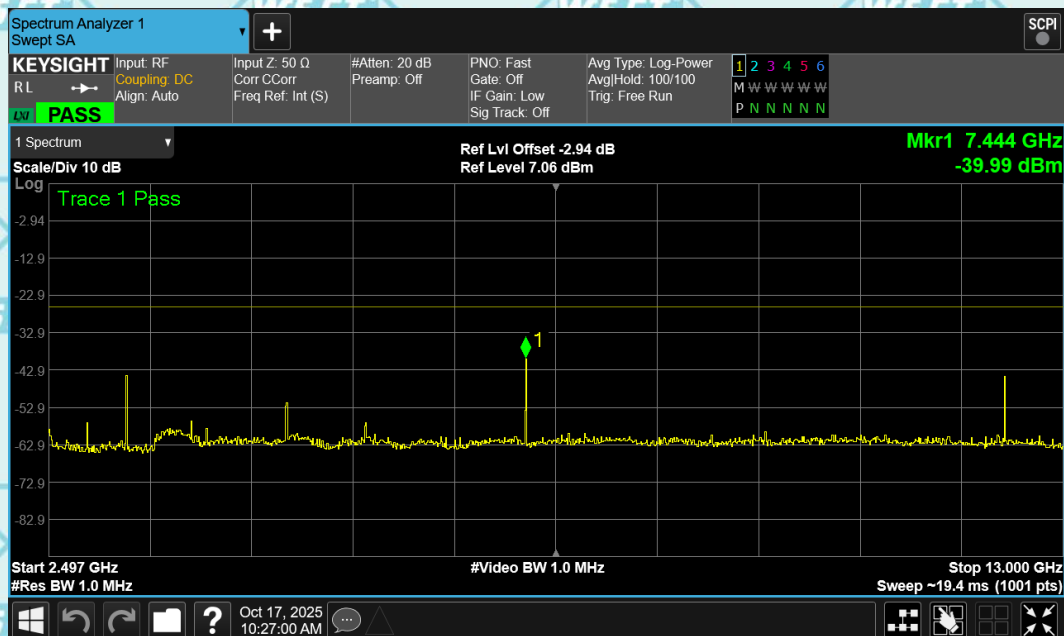
Tx. Spurious NVNT 1-DH5 2480MHz Ant1 @ 2387MHz-2400MHz



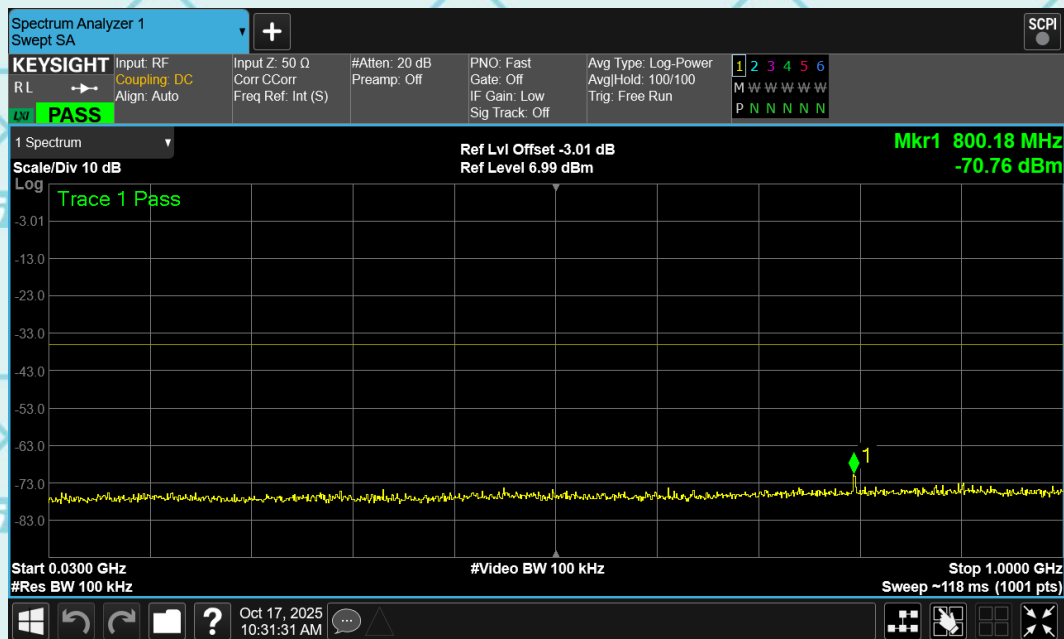
Tx. Spurious NVNT 1-DH5 2480MHz Ant1 @ 2483.5MHz-2496.5MHz



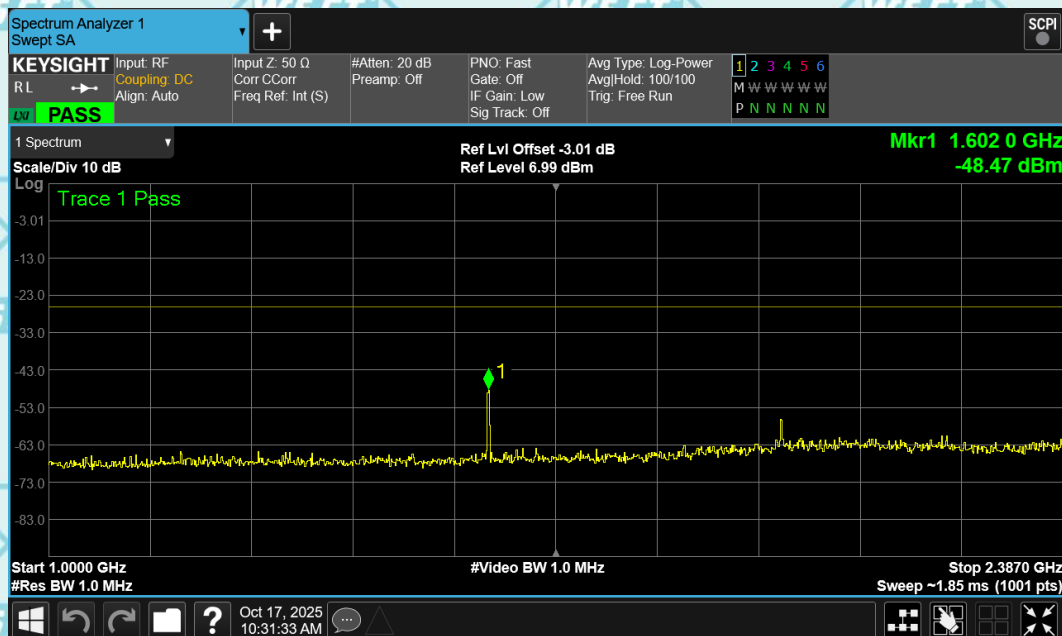
Tx. Spurious NVNT 1-DH5 2480MHz Ant1 @ 2496.5MHz-13000MHz



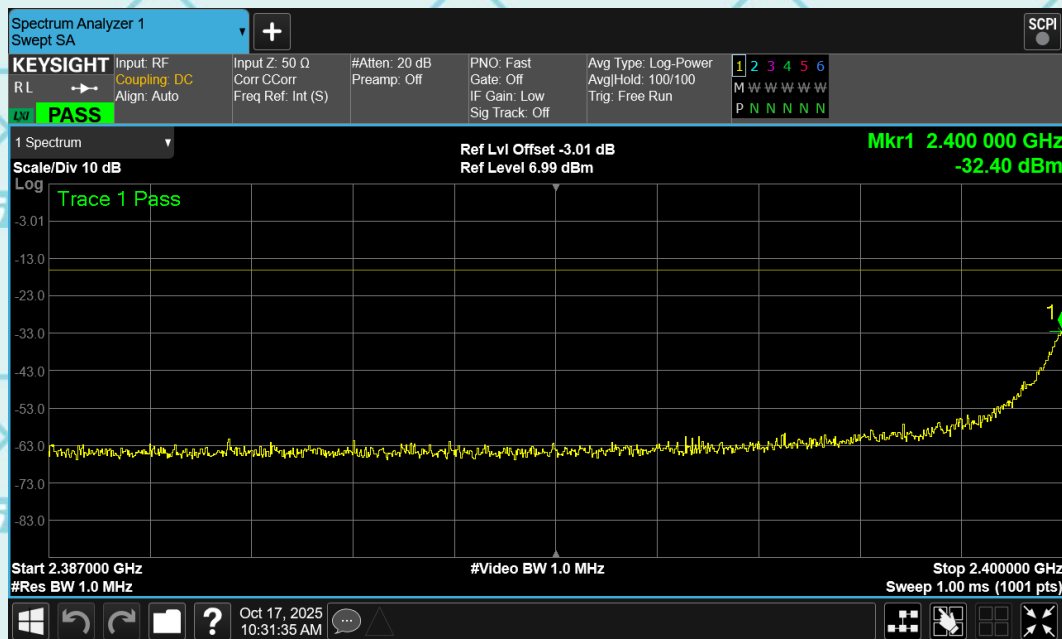
Tx. Spurious NVNT 2-DH5 2402MHz Ant1 @ 30MHz-1000MHz



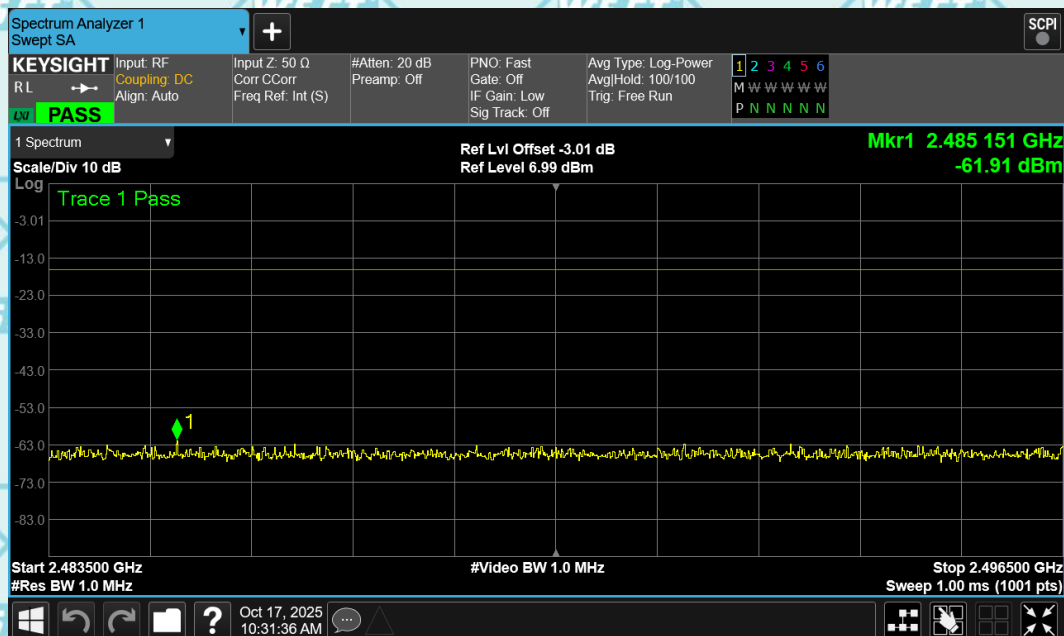
Tx. Spurious NVNT 2-DH5 2402MHz Ant1 @ 1000MHz-2387MHz



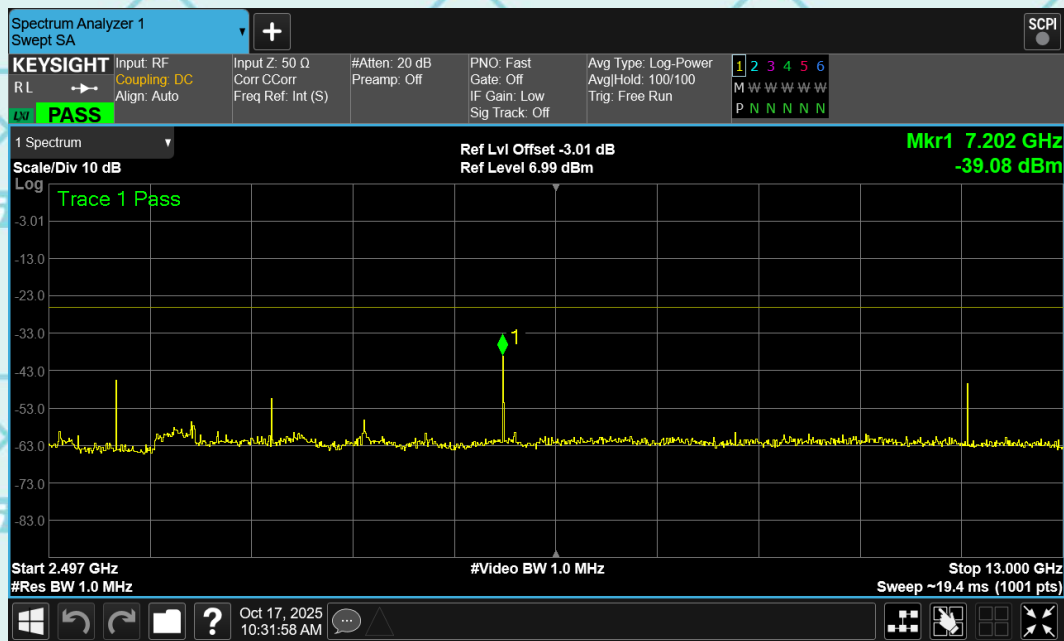
Tx. Spurious NVNT 2-DH5 2402MHz Ant1 @ 2387MHz-2400MHz



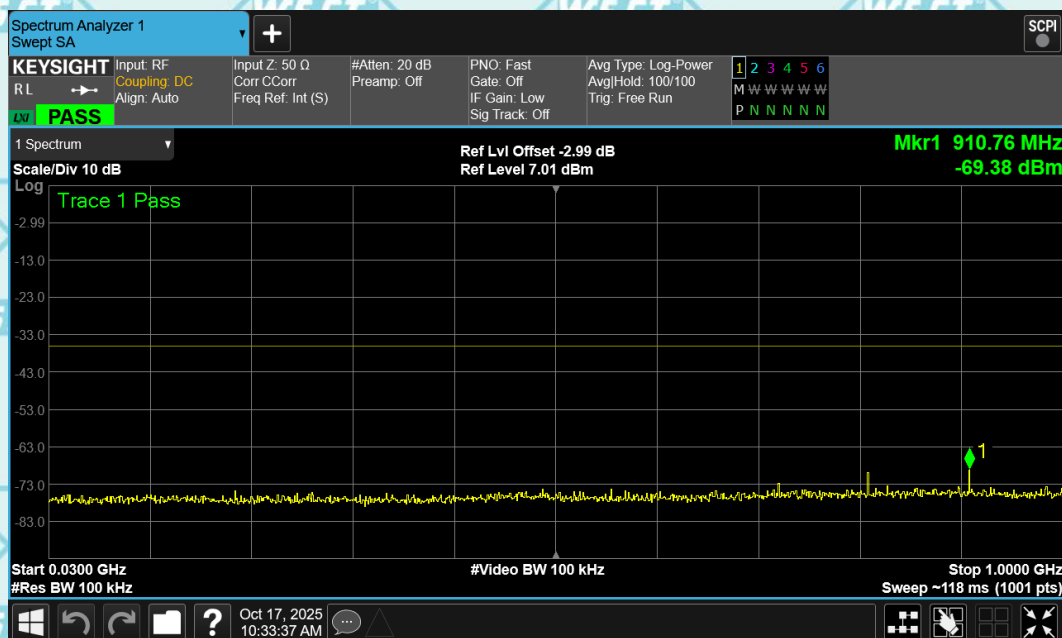
Tx. Spurious NVNT 2-DH5 2402MHz Ant1 @ 2483.5MHz-2496.5MHz



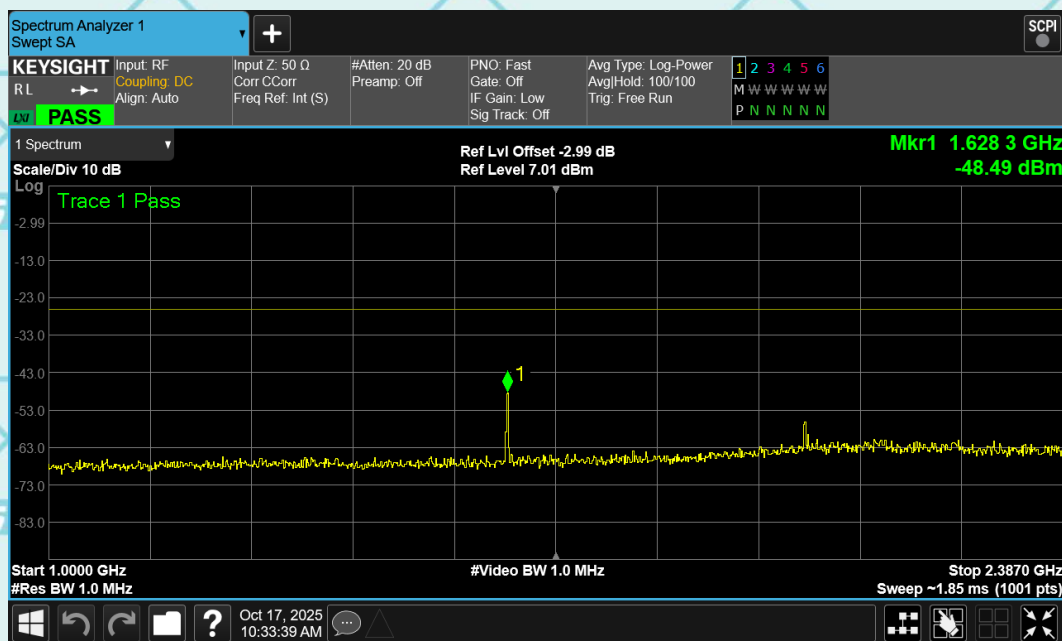
Tx. Spurious NVNT 2-DH5 2402MHz Ant1 @ 2496.5MHz-13000MHz



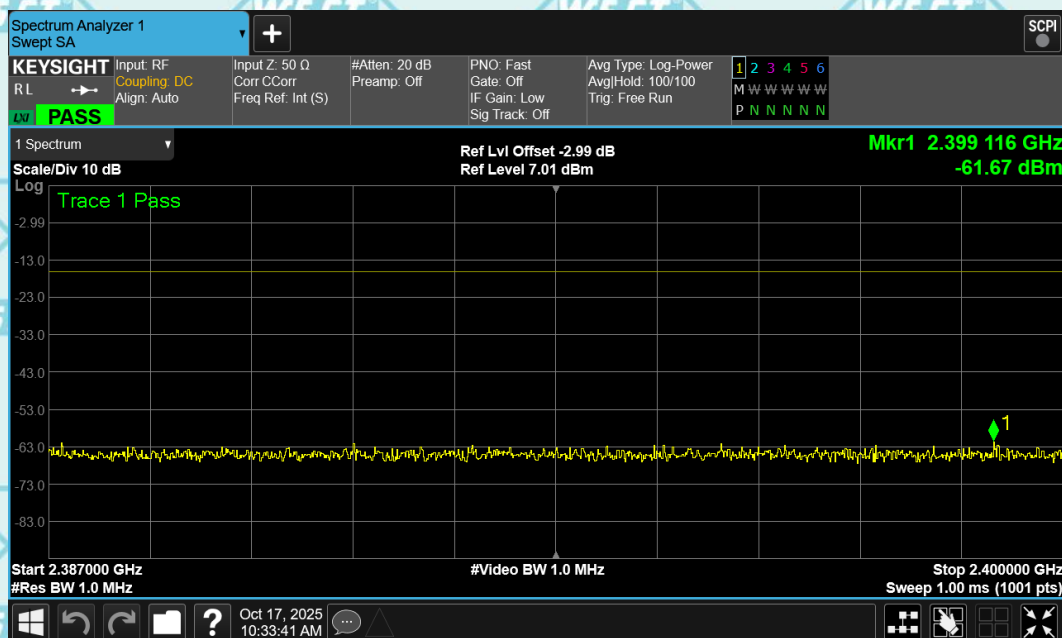
Tx. Spurious NVNT 2-DH5 2441MHz Ant1 @ 30MHz-1000MHz



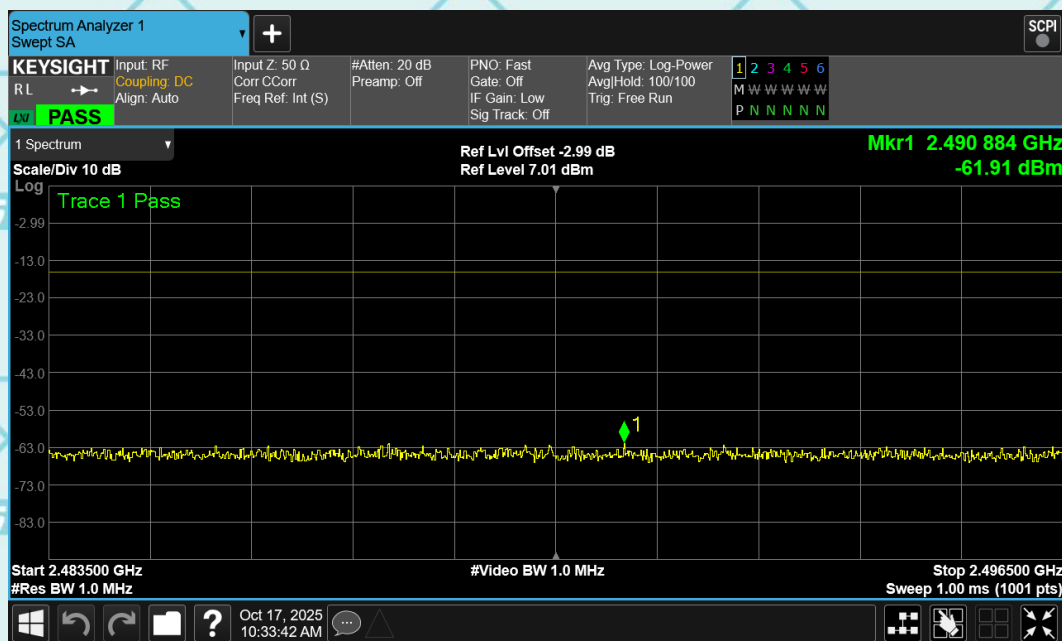
Tx. Spurious NVNT 2-DH5 2441MHz Ant1 @ 1000MHz-2387MHz



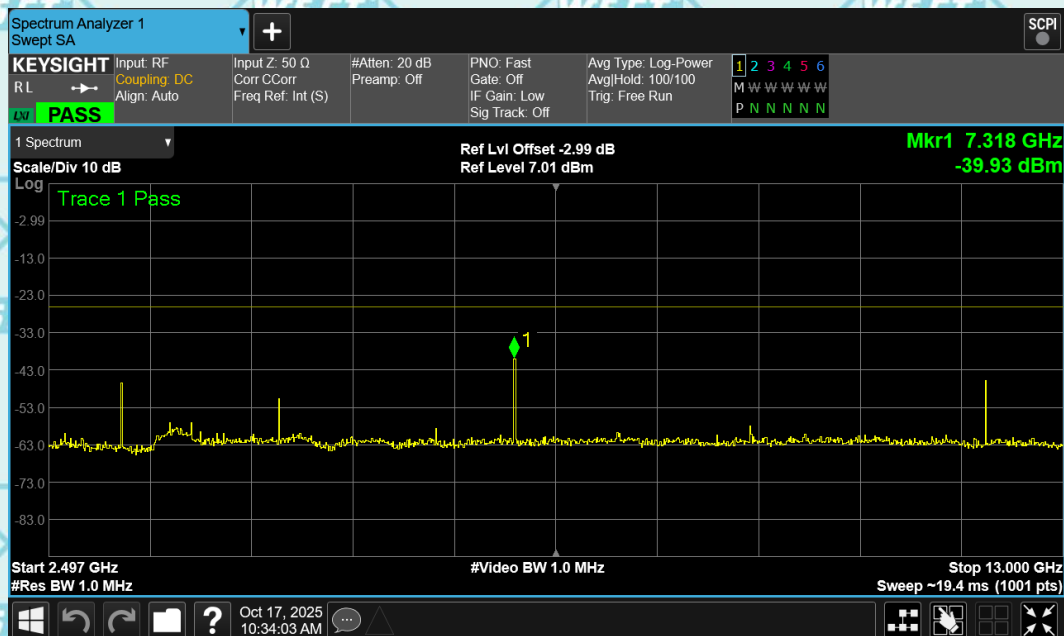
Tx. Spurious NVNT 2-DH5 2441MHz Ant1 @ 2387MHz-2400MHz



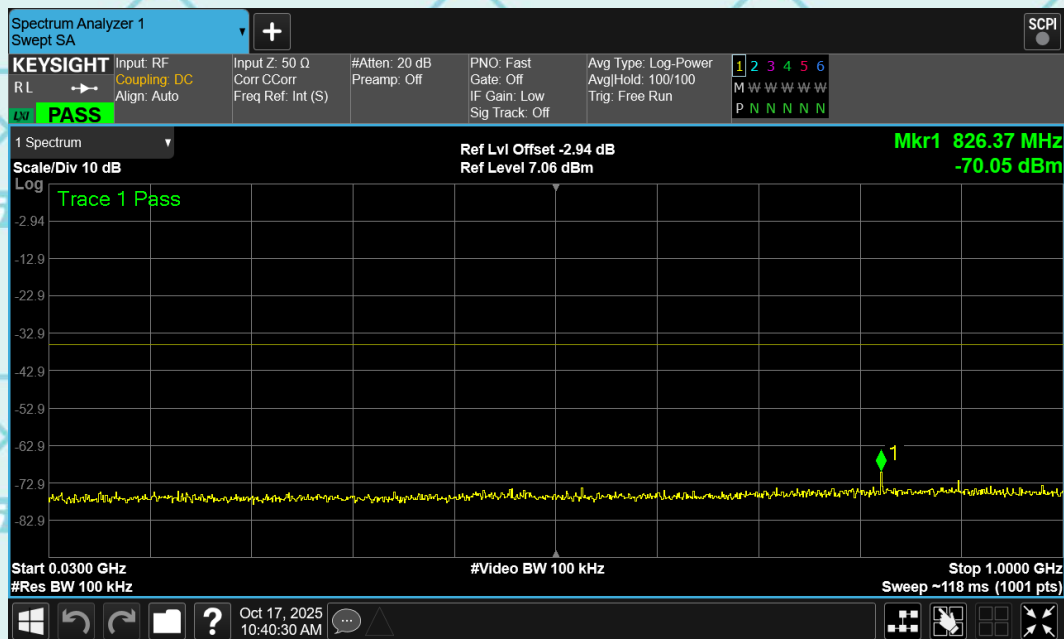
Tx. Spurious NVNT 2-DH5 2441MHz Ant1 @ 2483.5MHz-2496.5MHz



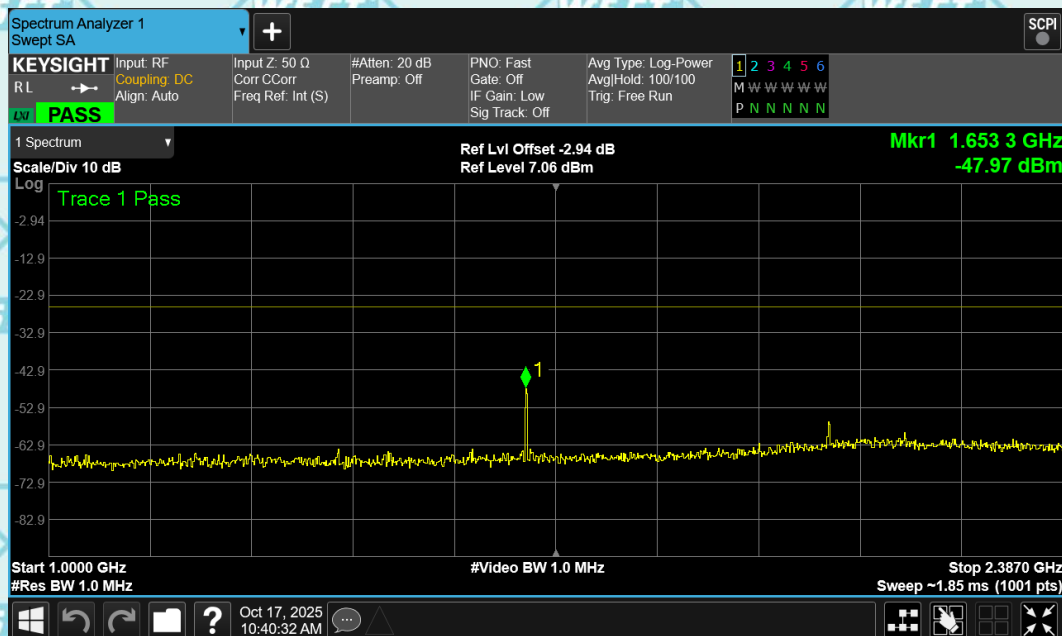
Tx. Spurious NVNT 2-DH5 2441MHz Ant1 @ 2496.5MHz-13000MHz



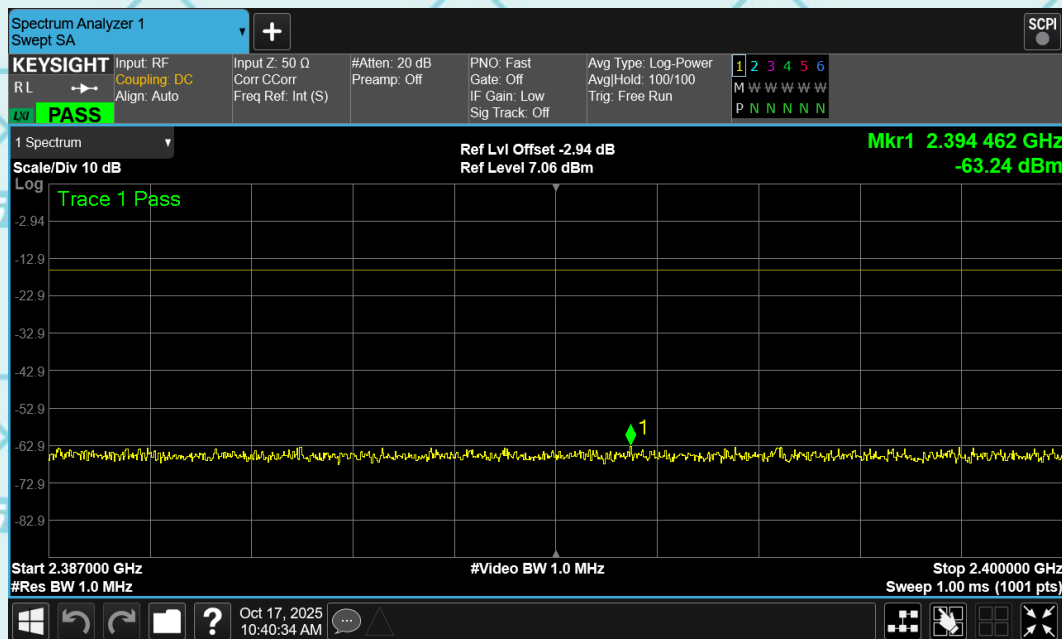
Tx. Spurious NVNT 2-DH5 2480MHz Ant1 @ 30MHz-1000MHz



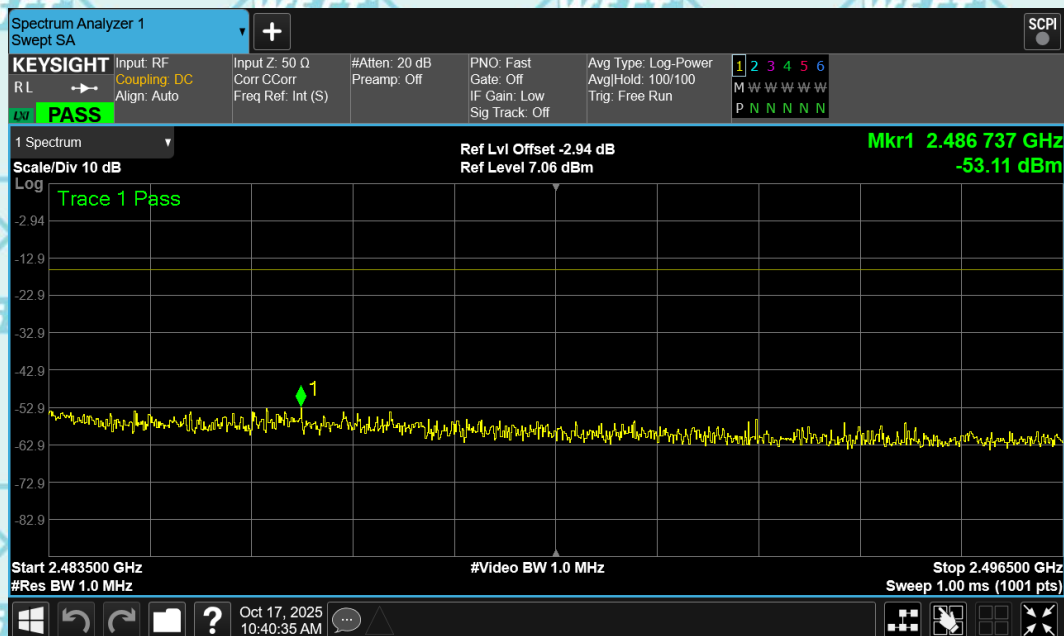
Tx. Spurious NVNT 2-DH5 2480MHz Ant1 @ 1000MHz-2387MHz



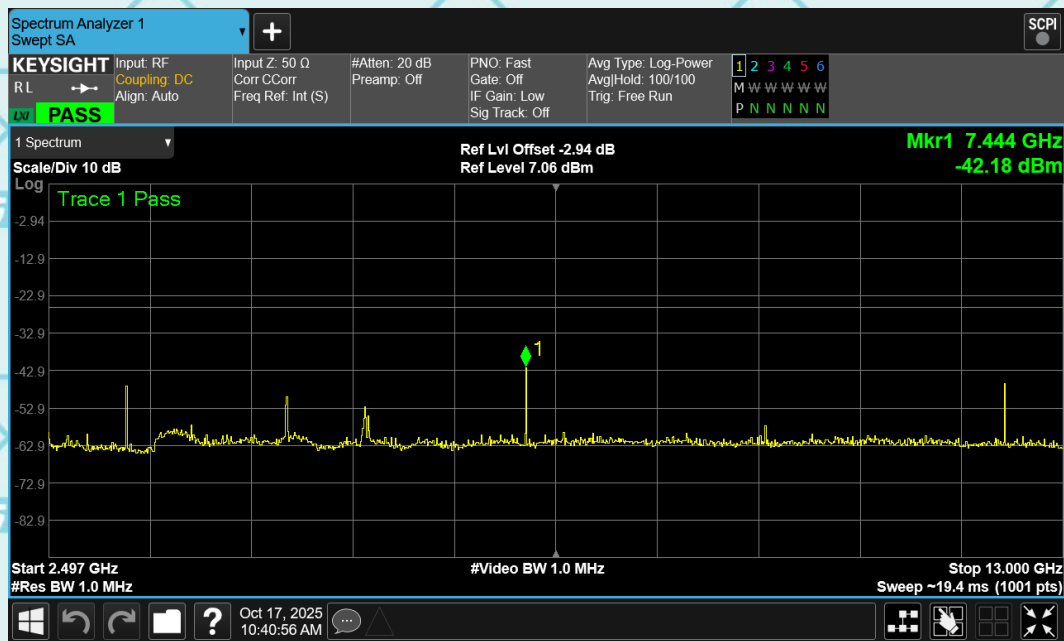
Tx. Spurious NVNT 2-DH5 2480MHz Ant1 @ 2387MHz-2400MHz



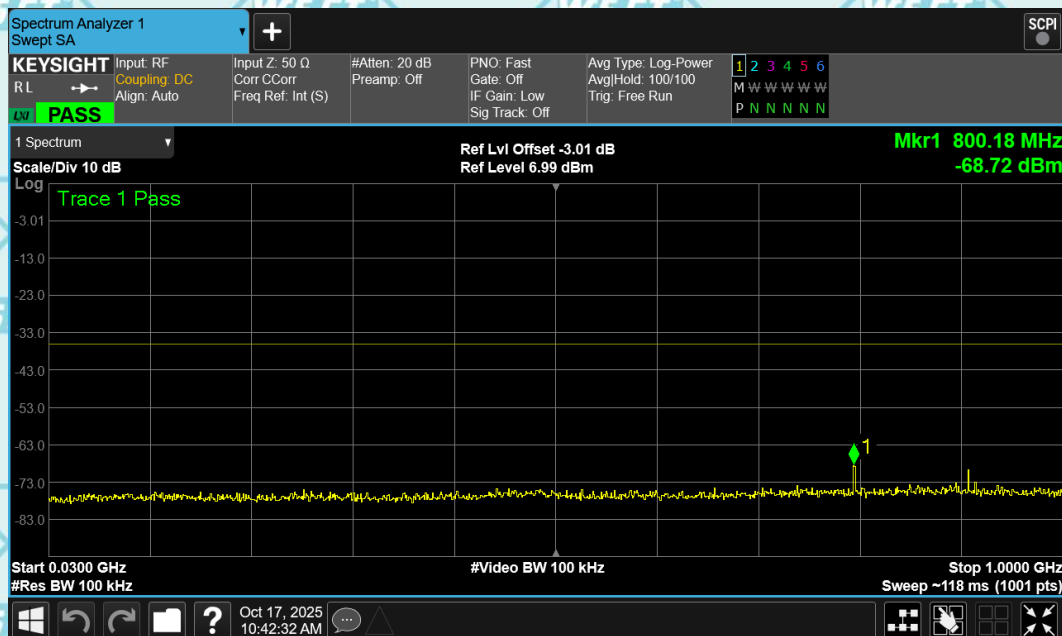
Tx. Spurious NVNT 2-DH5 2480MHz Ant1 @ 2483.5MHz-2496.5MHz



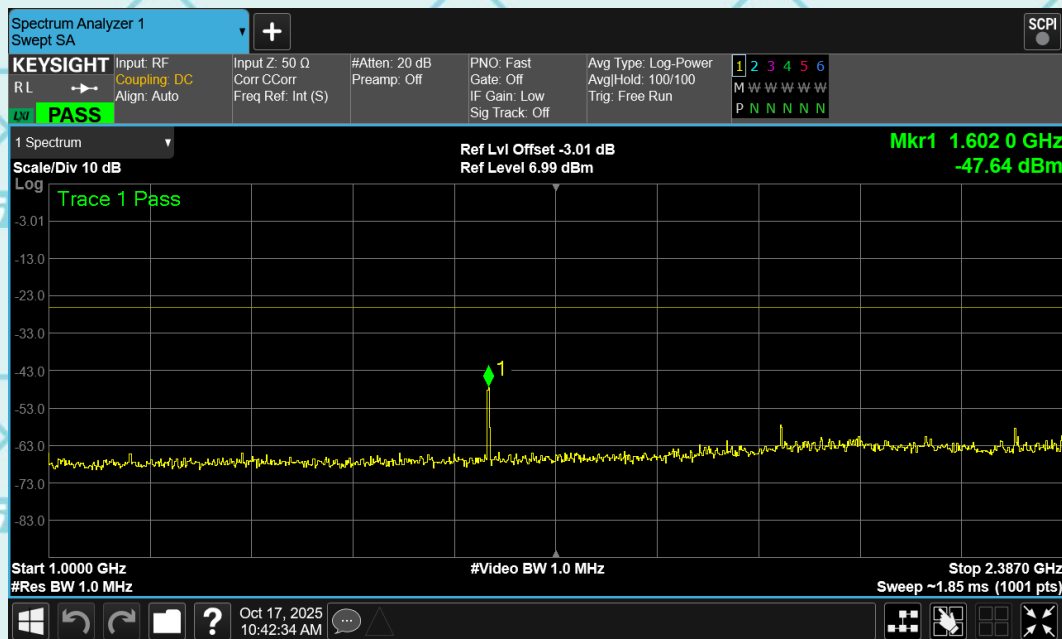
Tx. Spurious NVNT 2-DH5 2480MHz Ant1 @ 2496.5MHz-13000MHz



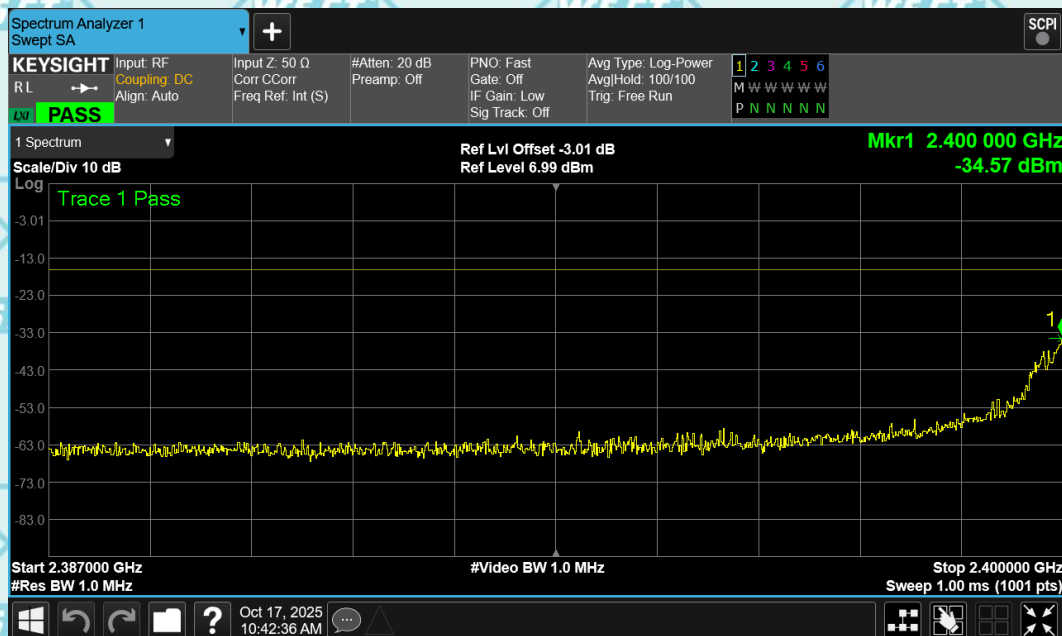
Tx. Spurious NVNT 3-DH5 2402MHz Ant1 @ 30MHz-1000MHz



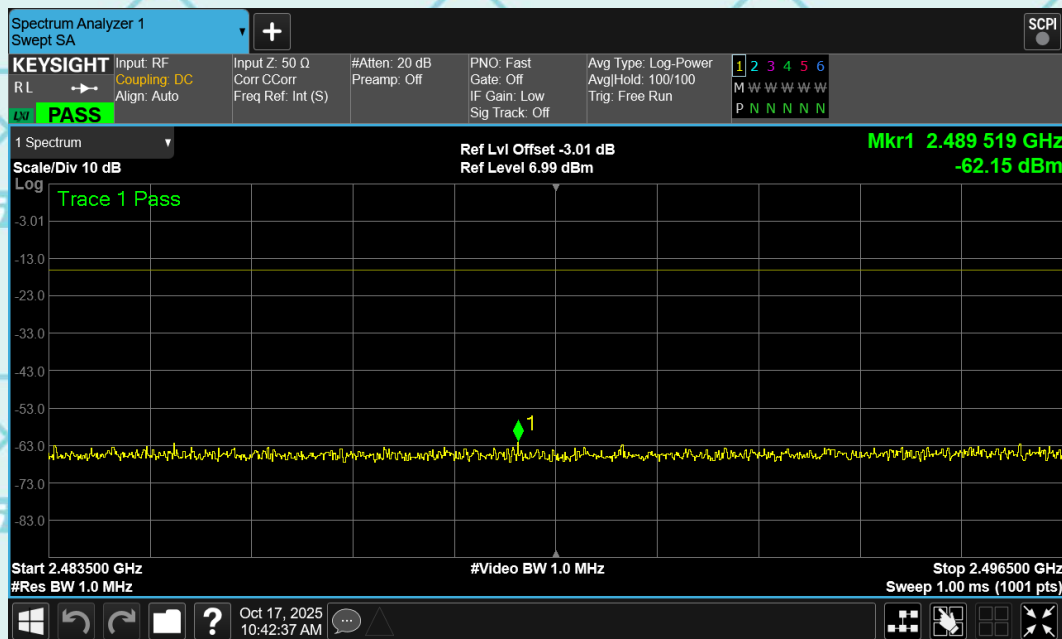
Tx. Spurious NVNT 3-DH5 2402MHz Ant1 @ 1000MHz-2387MHz



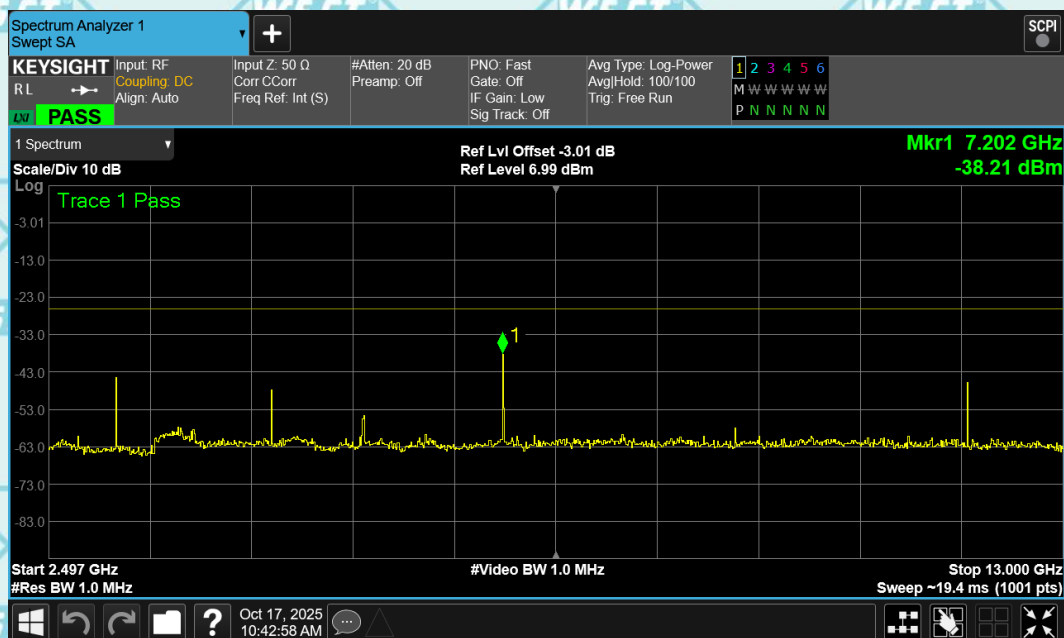
Tx. Spurious NVNT 3-DH5 2402MHz Ant1 @ 2387MHz-2400MHz



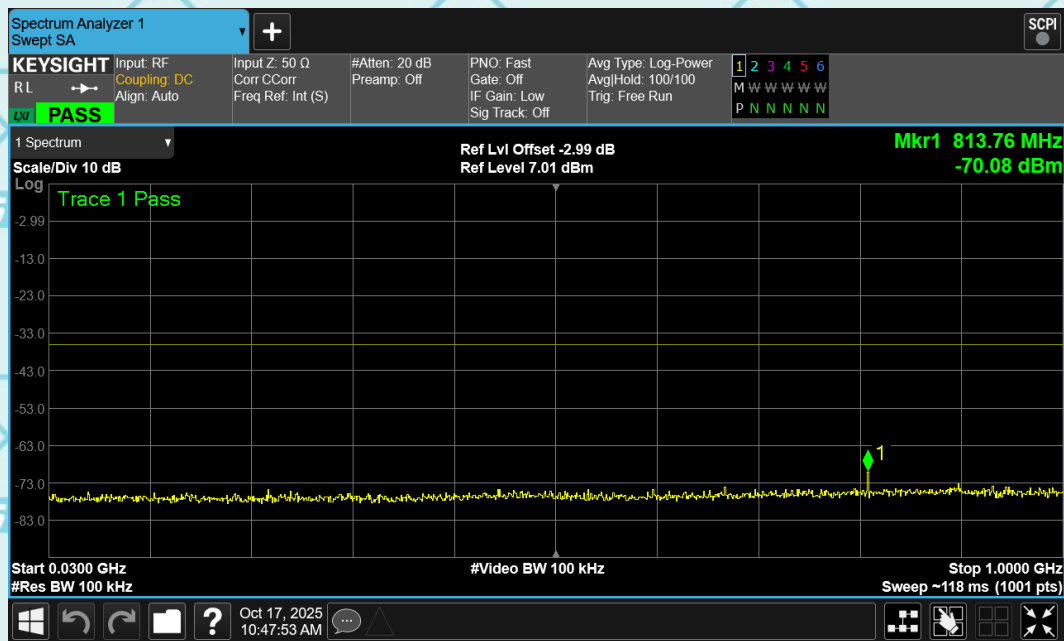
Tx. Spurious NVNT 3-DH5 2402MHz Ant1 @ 2483.5MHz-2496.5MHz



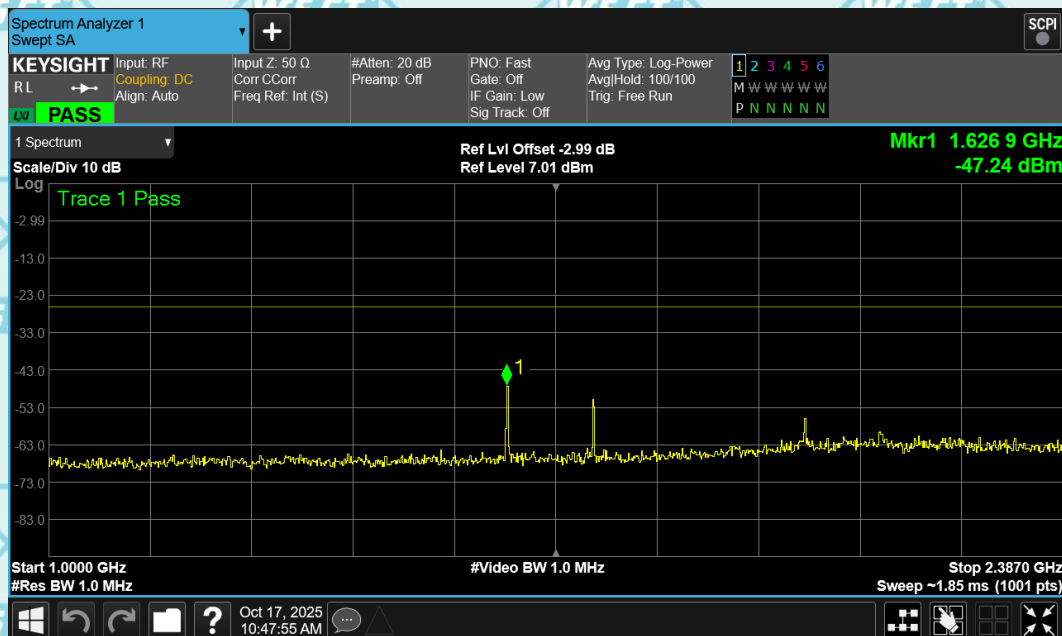
Tx. Spurious NVNT 3-DH5 2402MHz Ant1 @ 2496.5MHz-13000MHz



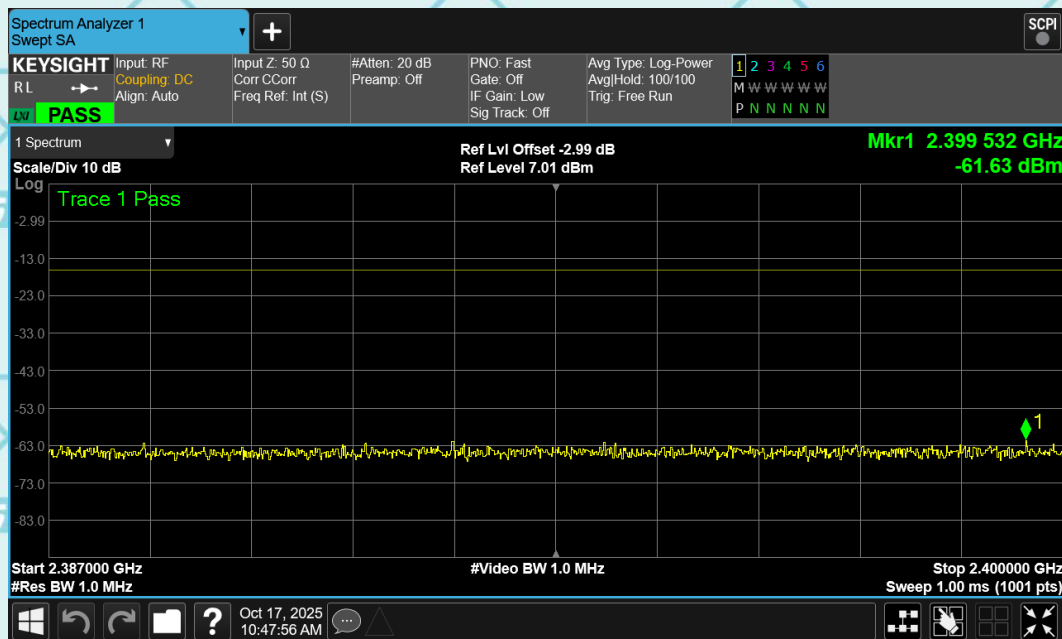
Tx. Spurious NVNT 3-DH5 2441MHz Ant1 @ 30MHz-1000MHz



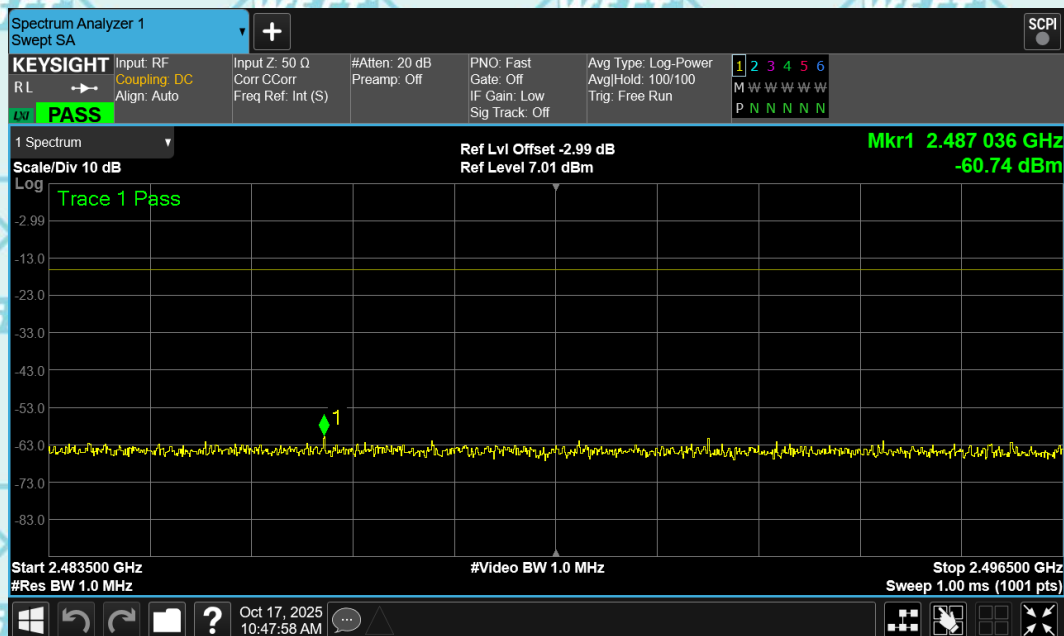
Tx. Spurious NVNT 3-DH5 2441MHz Ant1 @ 1000MHz-2387MHz



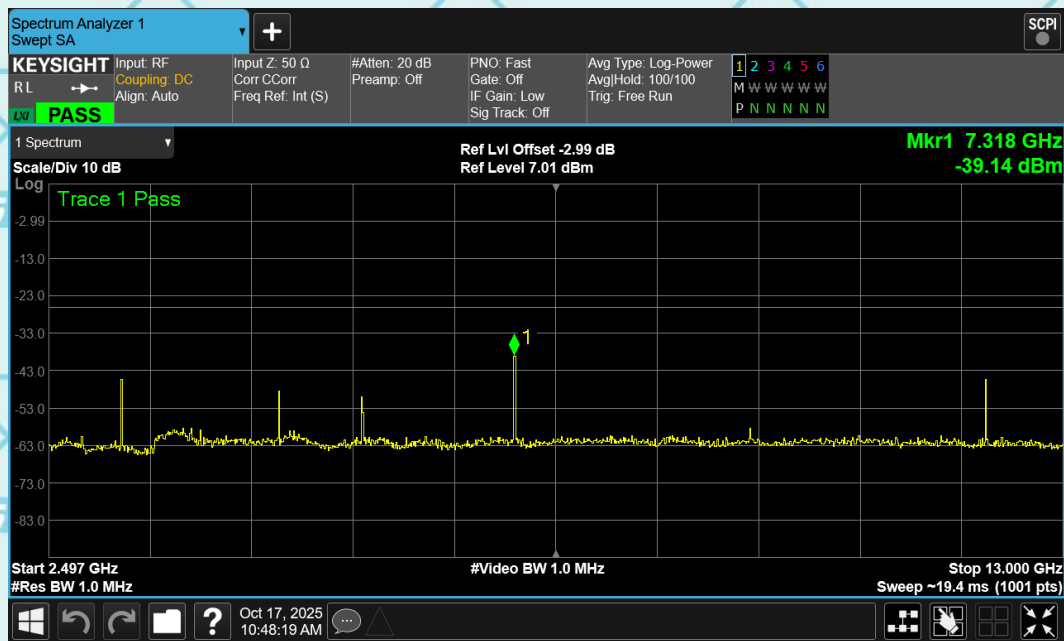
Tx. Spurious NVNT 3-DH5 2441MHz Ant1 @ 2387MHz-2400MHz



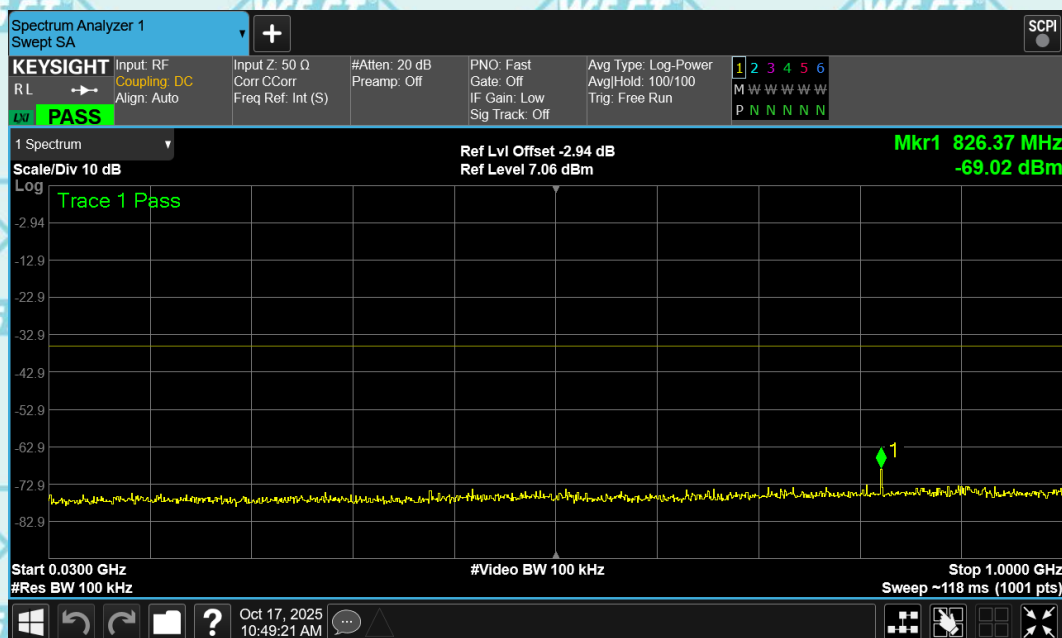
Tx. Spurious NVNT 3-DH5 2441MHz Ant1 @ 2483.5MHz-2496.5MHz



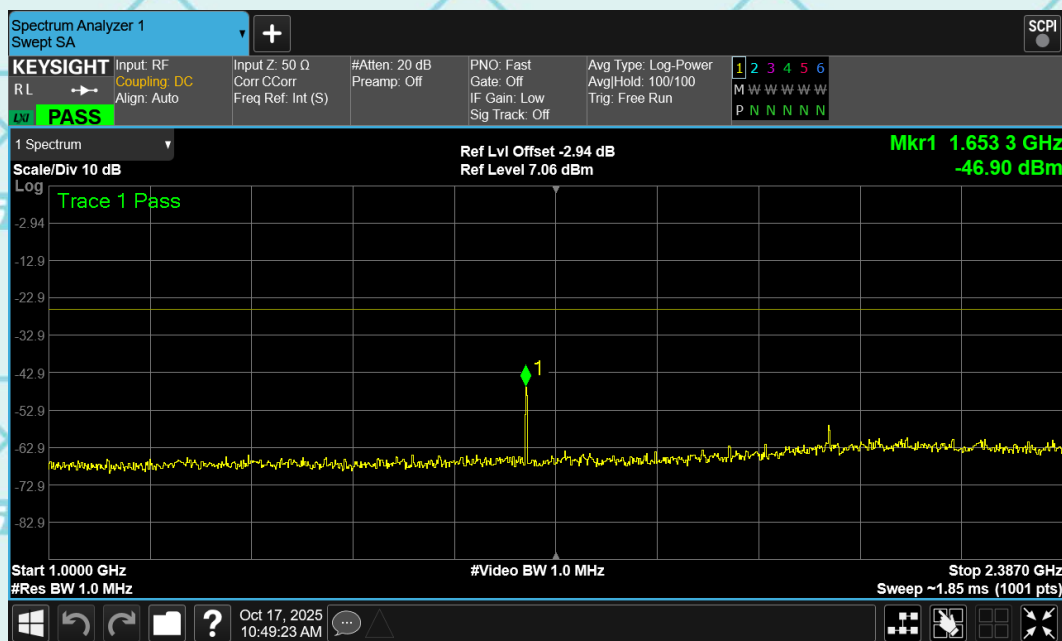
Tx. Spurious NVNT 3-DH5 2441MHz Ant1 @ 2496.5MHz-13000MHz



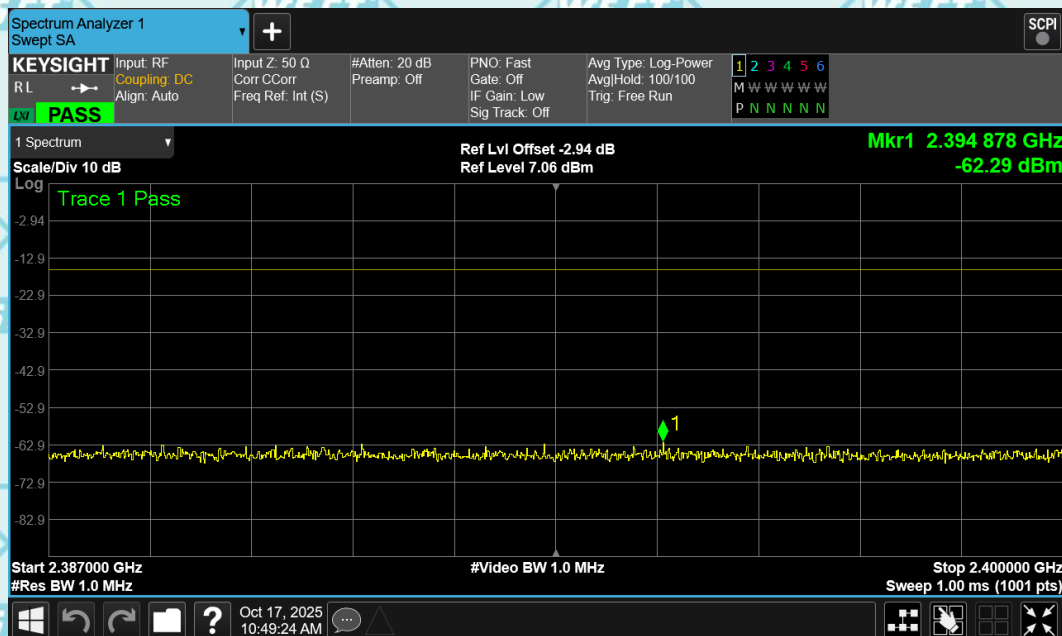
Tx. Spurious NVNT 3-DH5 2480MHz Ant1 @ 30MHz-1000MHz



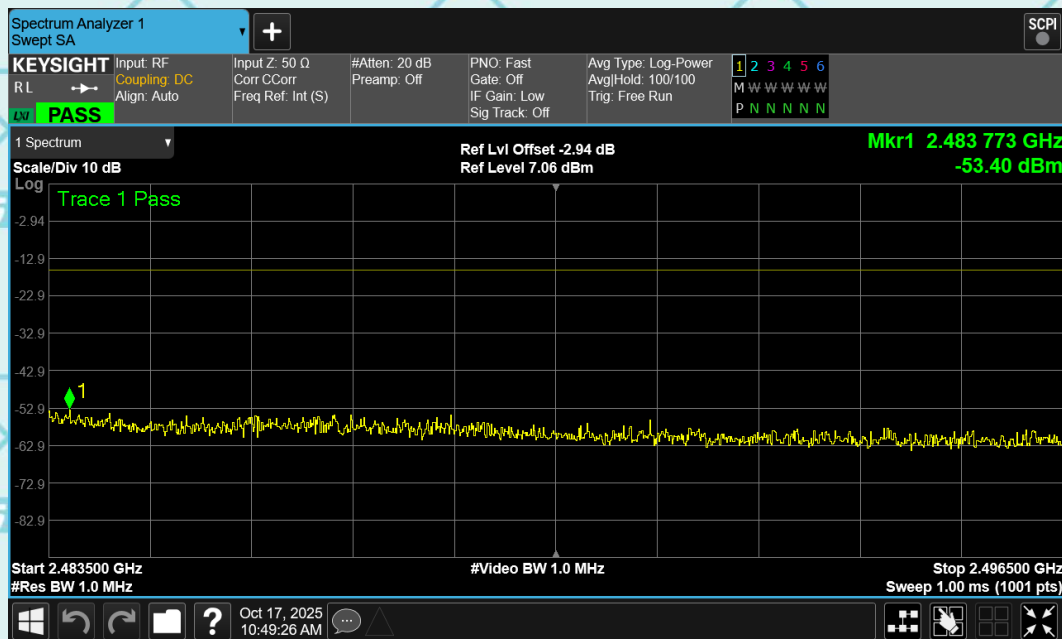
Tx. Spurious NVNT 3-DH5 2480MHz Ant1 @ 1000MHz-2387MHz

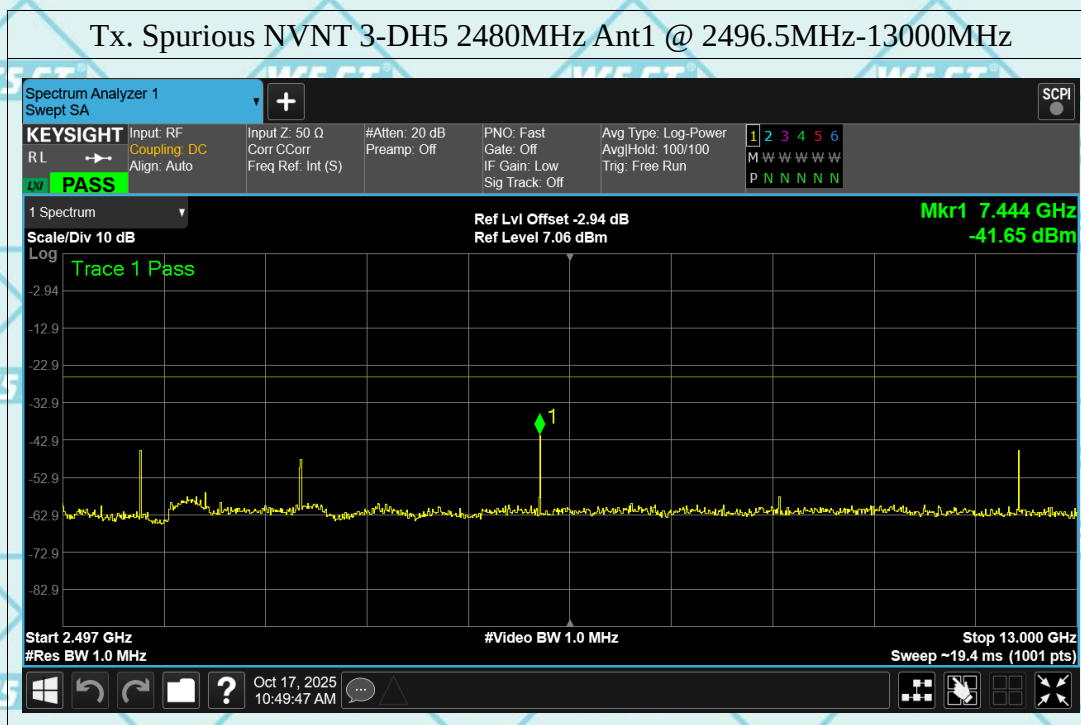


Tx. Spurious NVNT 3-DH5 2480MHz Ant1 @ 2387MHz-2400MHz



Tx. Spurious NVNT 3-DH5 2480MHz Ant1 @ 2483.5MHz-2496.5MHz





Test Result:

Pass



6.4. Antenna Power Test

Limit

Antenna Power Limit (mW/MHz)

- ≤3mW/MHz (FHSS, FHSS+DSSS, FHSS+OFDM from 2427~2470.75 MHz)
- ≤10mW/MHz(DSSS from 2400~2483.5MHz)
- ≤10mW/MHz(OFDM from 2400~2483.5MHz)-[OBW≤26MHz]
- ≤5mW/MHz (OFDM from 2400~2483.5MHz)-[26MHz<OBW≤38MHz]
- ≤10mW (Other from 2400~2483.5MHz)

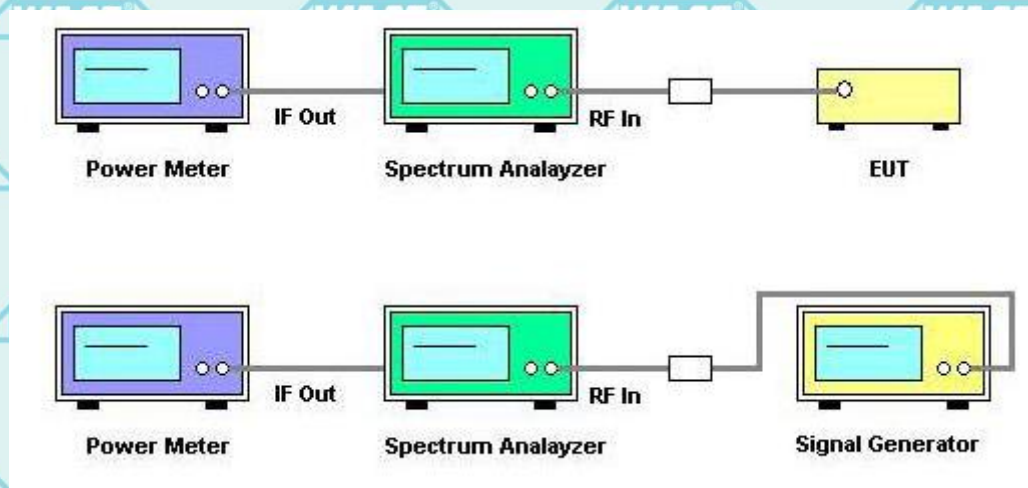
Antenna Power Error Limit (%)

+20%~-80%

Test Procedure

1. A power meter is connected on the IF output port of the spectrum analyzer.
2. EUT turn to test frequency channel and keep continuous transmitting
3. Connected the equipment to be measured. Using the following settings of the spectrum analyzer in combination with "max hold" function, find the frequency of highest power output in the power envelope: center frequency equal to operation frequency; RBW & VBW: 1 MHz; detector mode: positive peak; averGaing: off; span: 3 times the spectrum width; amplitude: adjust for middle of the instrument' range.
4. Reading the output power from the Power meter as PEUT
5. Turn the Signal generator to frequency channel the same as the EUT
- 6.Using the following settings of the spectrum analyzer in combination with "max hold" function, find the frequency of highest power output in the power envelope: center frequency equal to operation frequency; RBW & VBW: 1 MHz; detector mode: positive peak; averaging: off; span: 3 times the spectrum width; amplitude: adjust for middle of the instrument' range.
7. Turn the level of Signal generator, scan with the power meter until the power equal to PEUT, the level of Signal generator recorded as "P"
8. The antenna power of EUT is "P".
9. EIRP power="P"+antenna gain

Test Setup



Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

Test Data

Normal Voltage:

Test Condition	Test Mode	Frequency [MHz]	Result (dBm)	Result (mW)	Spectrum Bandwidth	Antenna Power (mW/MHz)	Limit (mw/MHz)	Verdict
NTNV	DH5	2402	0.11	1.03	70.966	0.0145	≤3	PASS
NTNV	DH5	2441	0.46	1.11		0.0157	≤3	PASS
NTNV	DH5	2480	0.33	1.08		0.0152	≤3	PASS
NTNV	2DH5	2402	-3.08	0.49	71.272	0.0069	≤3	PASS
NTNV	2DH5	2441	-3.72	0.43		0.0060	≤3	PASS
NTNV	2DH5	2480	-3.61	0.44		0.0061	≤3	PASS
NTNV	3DH5	2402	-3.23	0.47	71.285	0.0067	≤3	PASS
NTNV	3DH5	2441	-3.05	0.5		0.0069	≤3	PASS
NTNV	3DH5	2480	-3.13	0.49		0.0068	≤3	PASS

Note: Result(mW)= 10^{(Test Result(dBm)/10)}

Test Condition	Test Mode	Frequency [MHz]	Antenna Power (mW/MHz)	Rated Power (mW/MHz)	Result (%)	Limit (%)	Verdict
NTNV	DH5	2402	0.0145	0.015	-4	-80 to +20	PASS
NTNV	DH5	2441	0.0157	0.015	4	-80 to +20	PASS
NTNV	DH5	2480	0.0152	0.015	1	-80 to +20	PASS
NTNV	2DH5	2402	0.0069	0.015	-54	-80 to +20	PASS
NTNV	2DH5	2441	0.0060	0.015	-60	-80 to +20	PASS
NTNV	2DH5	2480	0.0061	0.015	-59	-80 to +20	PASS
NTNV	3DH5	2402	0.0067	0.015	-56	-80 to +20	PASS
NTNV	3DH5	2441	0.0069	0.015	-54	-80 to +20	PASS
NTNV	3DH5	2480	0.0068	0.015	-55	-80 to +20	PASS

Test Condition	Test Mode	Frequency [MHz]	Result (dBm/MHz)	EIRP (dBm/MHz)	Limit (dBm/MHz)	Verdict
NTNV	DH5	2402	-18.39	-16.66	≤6.91	PASS
NTNV	DH5	2441	-18.04	-16.31	≤6.91	PASS
NTNV	DH5	2480	-18.18	-16.45	≤6.91	PASS
NTNV	2DH5	2402	-21.61	-19.88	≤6.91	PASS
NTNV	2DH5	2441	-22.22	-20.49	≤6.91	PASS
NTNV	2DH5	2480	-22.15	-20.42	≤6.91	PASS
NTNV	3DH5	2402	-21.74	-20.01	≤6.91	PASS
NTNV	3DH5	2441	-21.61	-19.88	≤6.91	PASS
NTNV	3DH5	2480	-21.67	-19.94	≤6.91	PASS

Note: for FHSS Antenna Power(mW/MHz)=Average Burst Power(mW) / Spread Bandwidth(MHz)

Test Result:

Pass



6.5 Limitation Of Collateral Emission Of Receiver Measurement

Limit

Item	Limits
RX Spurious Emission:	$\leq 4\text{nW}$ ($f < 1\text{GHz}$)
	$\leq 20\text{nW}$ ($1\text{GHz} \leq f$)

Test Procedure

- EUT have the continuous reception mode and fixed only one channelize.
- Setting of SA is following as RB / VB: 100 kHz (below 1GHz emissions) / 1 MHz (above 1GHz emissions) /
AT: 10dB / Ref: 0dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect Mode: Positive peak / Trace mode: Max hold
- SA set RB: 100kHz and VB: 100kHz. Then adjust to start frequency 30MHz and stop frequency 1000MHz. Search to mark peak reading value + cable loss shall be less than 4nW
- SA set RB: 1MHz and VB: 1MHz. Then adjust to start frequency 1000MHz and stop frequency 13000MHz. Search to mark peak reading value + cable loss shall be less than 20nW
- If power level of lower emissions are more than 1/10 of limit (.0.4nW for $f < 1\text{GHz}$, 2nW for $f \geq 1\text{GHz}$), all those are to be indicated in the 2nd and 3rd lines. If others are 1/10 or less more of the limit, no necessary to be indicated.
- The EUT was programmed to be in continuously reception mode.

Test Setup



Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

Test Data (the worst case)

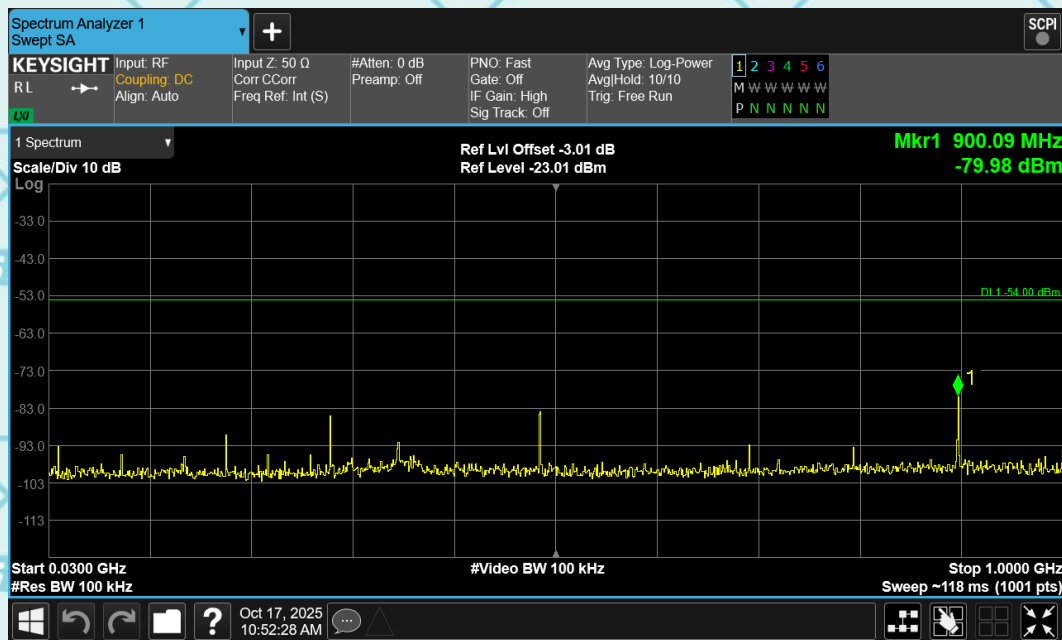
Condition	Mode	Frequency (MHz)	Range (MHz)	Emission Frequency (MHz)	Max Value (dBm)	Limit (dBm)	Verdict
NVNT	1-DH5	2402	30-1000	900.09	-79.98	-54	Pass
NVNT	1-DH5	2402	1000-13000	2416	-52.44	-47	Pass
NVNT	1-DH5	2441	30-1000	910.76	-69.92	-54	Pass
NVNT	1-DH5	2441	1000-13000	2416	-52.35	-47	Pass
NVNT	1-DH5	2480	30-1000	900.09	-79.71	-54	Pass
NVNT	1-DH5	2480	1000-13000	3976	-62.71	-47	Pass
NVNT	2-DH5	2402	30-1000	900.09	-79.73	-54	Pass
NVNT	2-DH5	2402	1000-13000	2416	-54.23	-47	Pass
NVNT	2-DH5	2441	30-1000	910.76	-73.18	-54	Pass
NVNT	2-DH5	2441	1000-13000	2416	-52.39	-47	Pass
NVNT	2-DH5	2480	30-1000	900.09	-79.74	-54	Pass
NVNT	2-DH5	2480	1000-13000	2416	-56.38	-47	Pass
NVNT	3-DH5	2402	30-1000	900.09	-79.47	-54	Pass
NVNT	3-DH5	2402	1000-13000	2416	-54.38	-47	Pass
NVNT	3-DH5	2441	30-1000	900.09	-80.04	-54	Pass
NVNT	3-DH5	2441	1000-13000	2416	-55.19	-47	Pass
NVNT	3-DH5	2480	30-1000	900.09	-79.95	-54	Pass
NVNT	3-DH5	2480	1000-13000	5764	-53.2	-47	Pass

Test Plot(s)

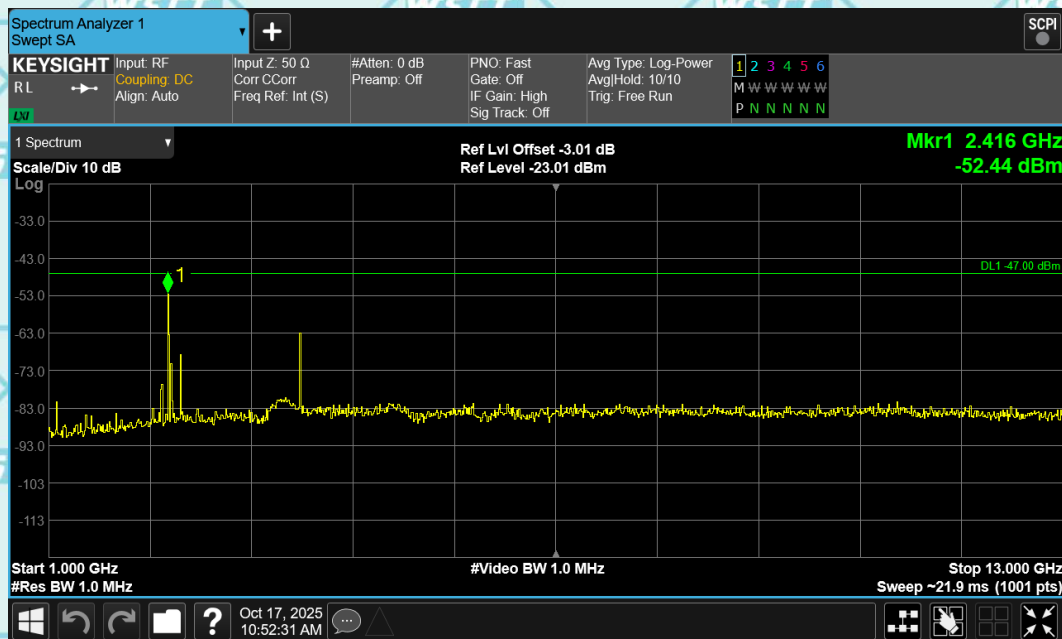


Test Graphs

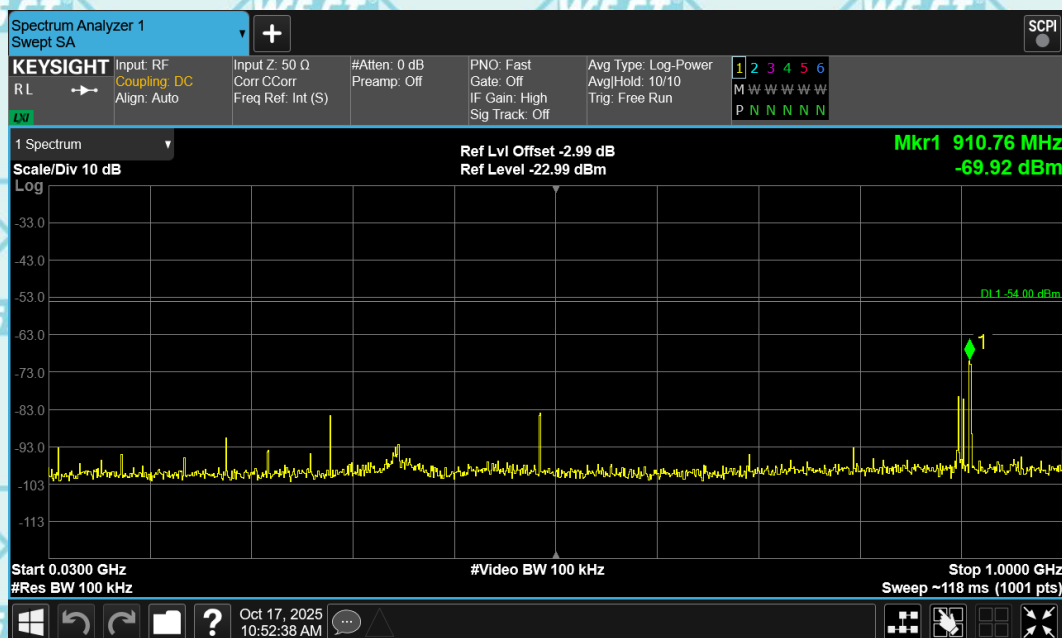
Rx. Spurious NVNT 1-DH5 2402MHz Ant1 @ 30MHz-1000MHz



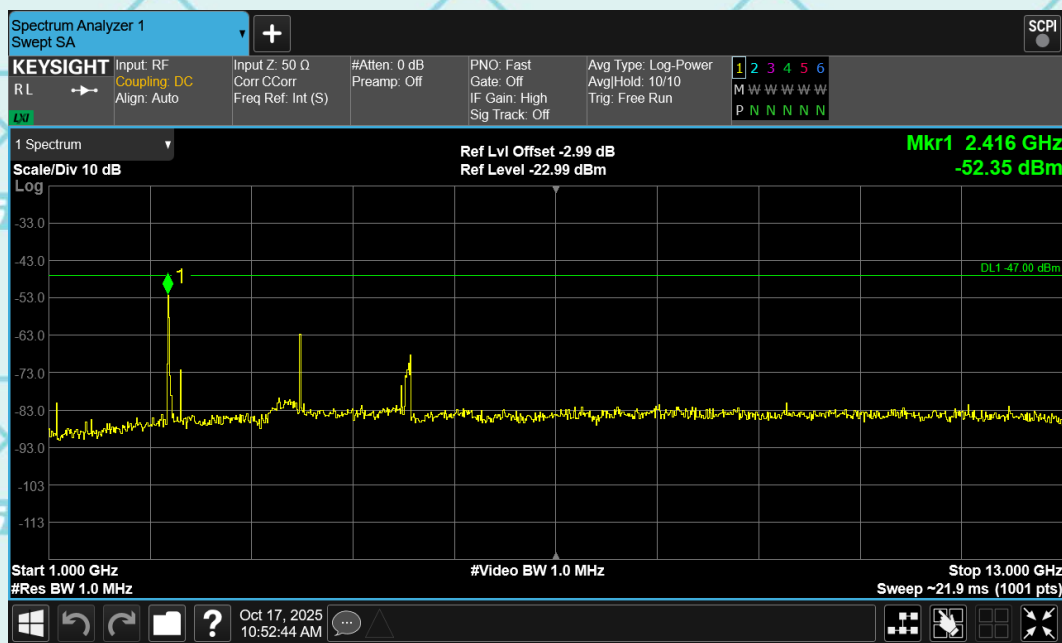
Rx. Spurious NVNT 1-DH5 2402MHz Ant1 @ 1000MHz-13000MHz



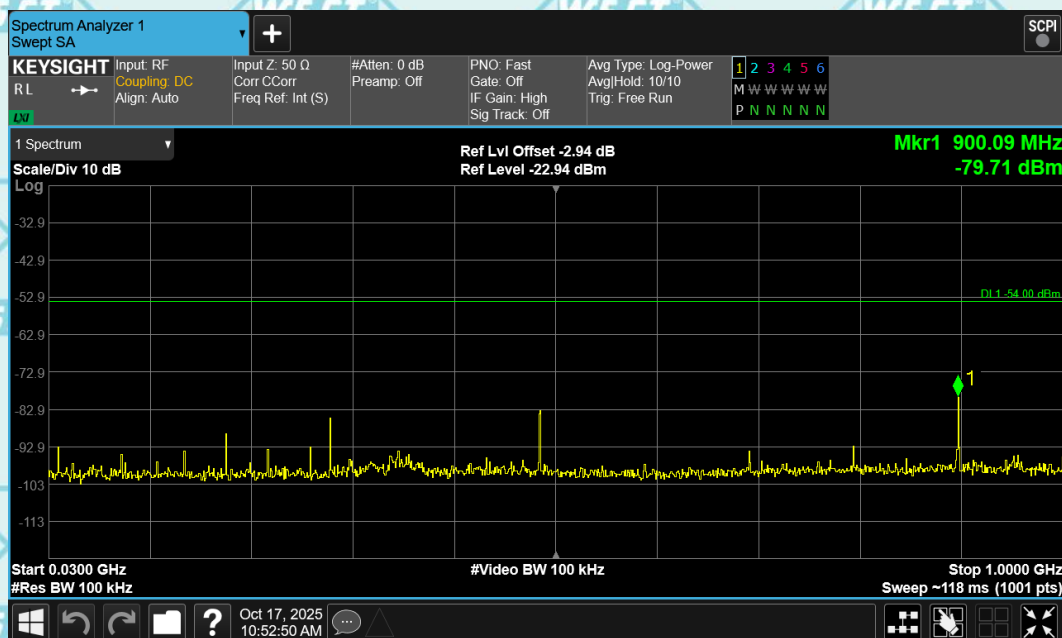
Rx. Spurious NVNT 1-DH5 2441MHz Ant1 @ 30MHz-1000MHz



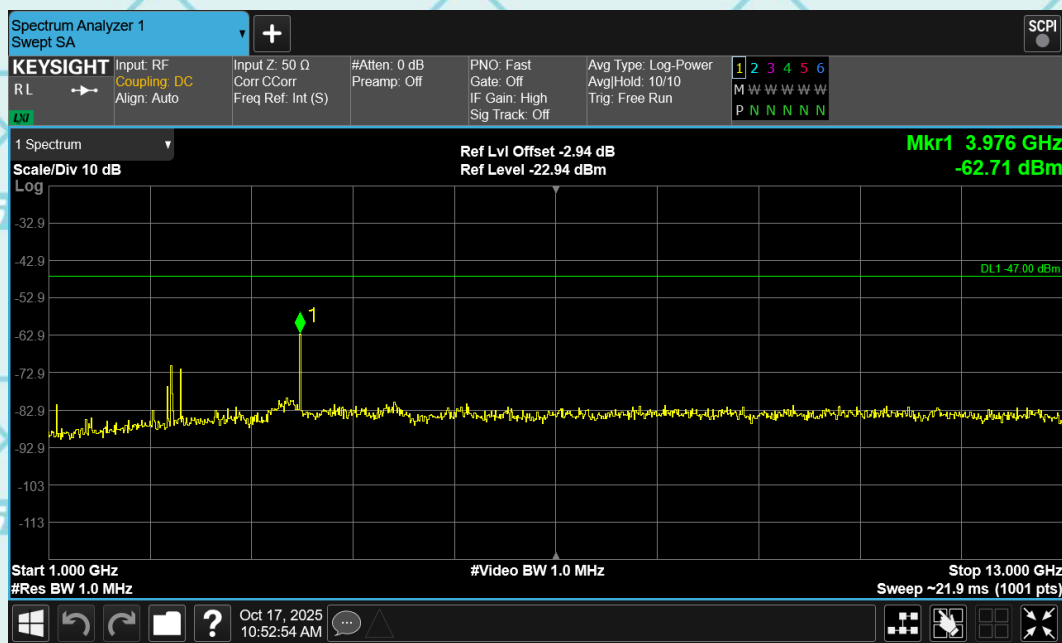
Rx. Spurious NVNT 1-DH5 2441MHz Ant1 @ 1000MHz-13000MHz



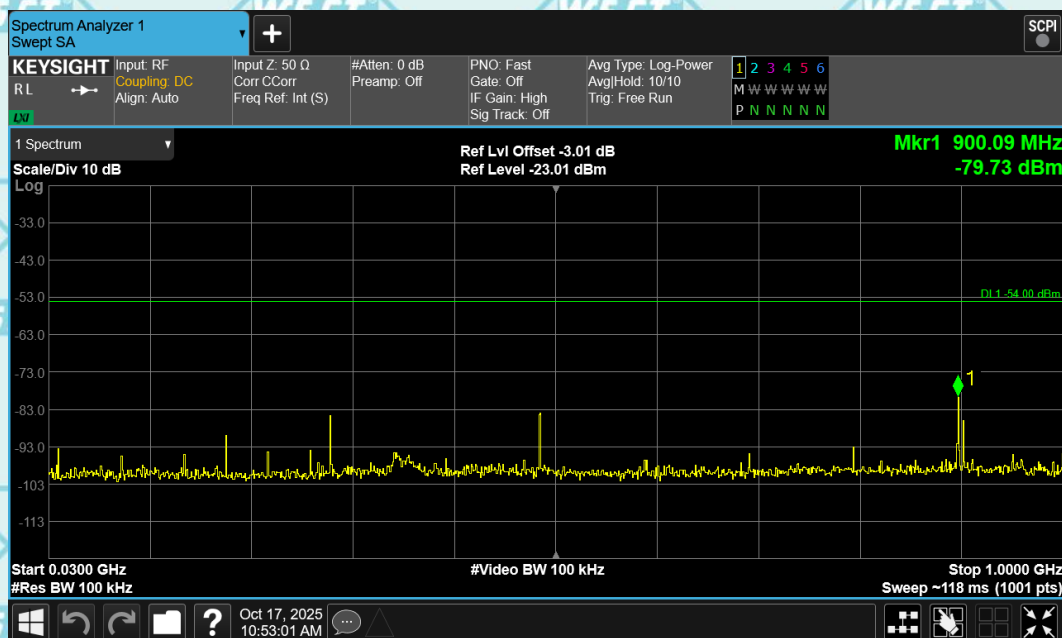
Rx. Spurious NVNT 1-DH5 2480MHz Ant1 @ 30MHz-1000MHz



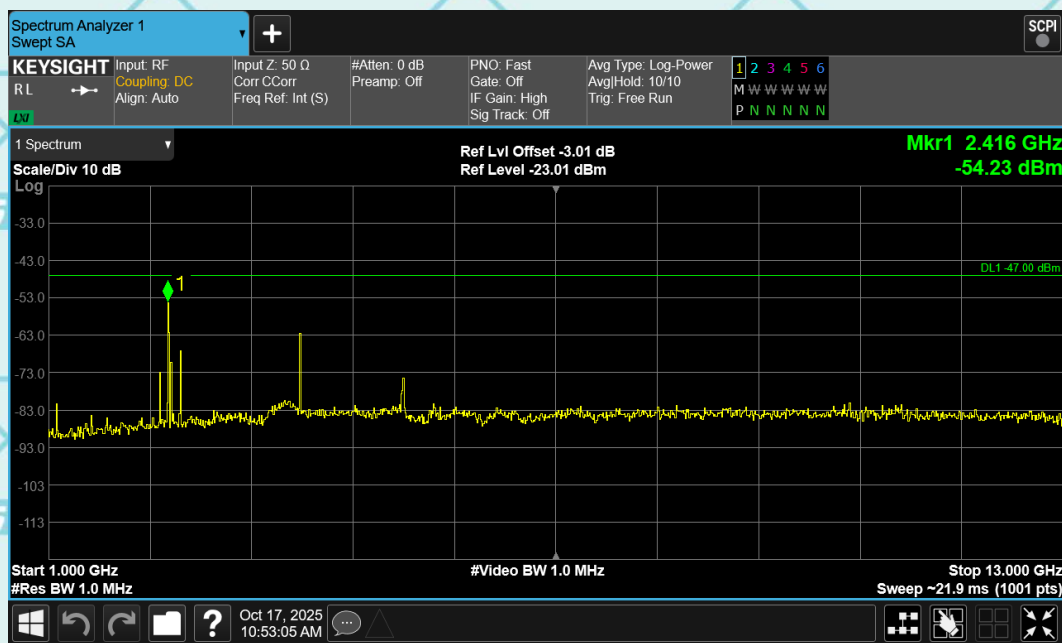
Rx. Spurious NVNT 1-DH5 2480MHz Ant1 @ 1000MHz-13000MHz



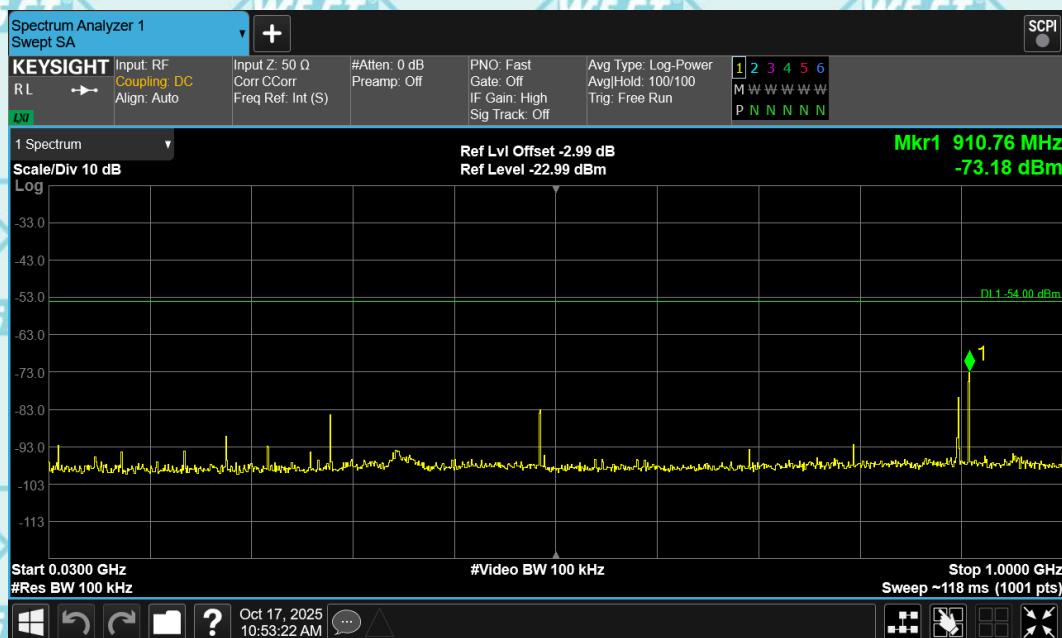
Rx. Spurious NVNT 2-DH5 2402MHz Ant1 @ 30MHz-1000MHz



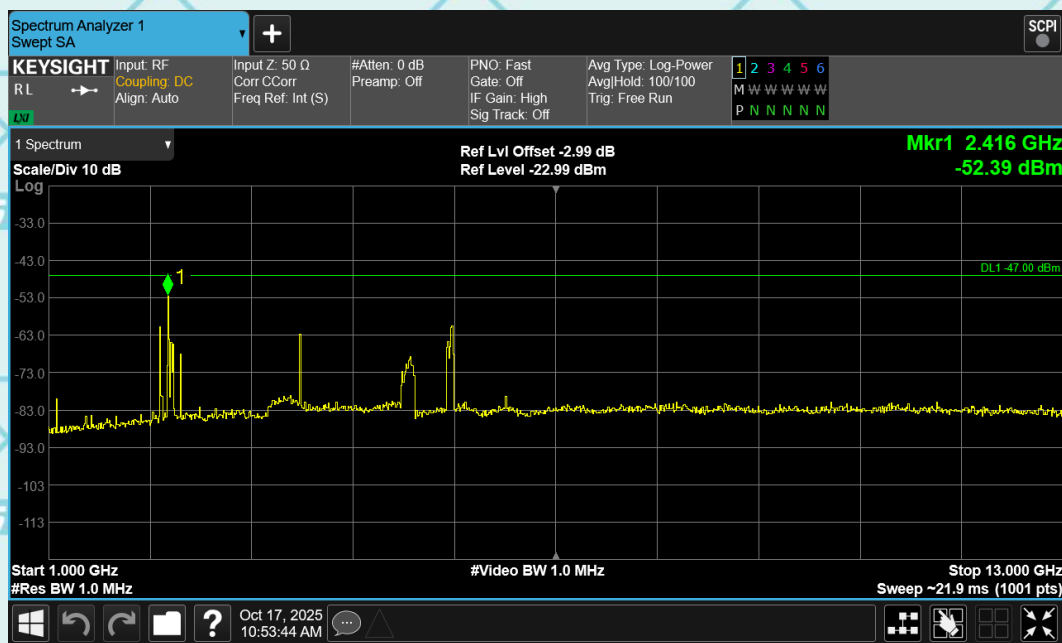
Rx. Spurious NVNT 2-DH5 2402MHz Ant1 @ 1000MHz-13000MHz



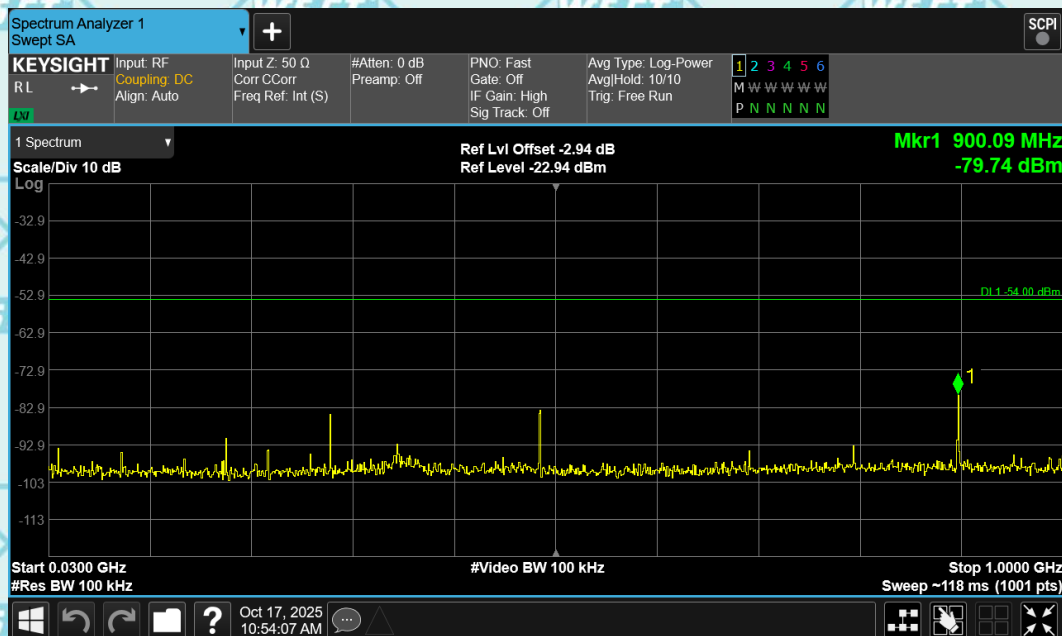
Rx. Spurious NVNT 2-DH5 2441MHz Ant1 @ 30MHz-1000MHz



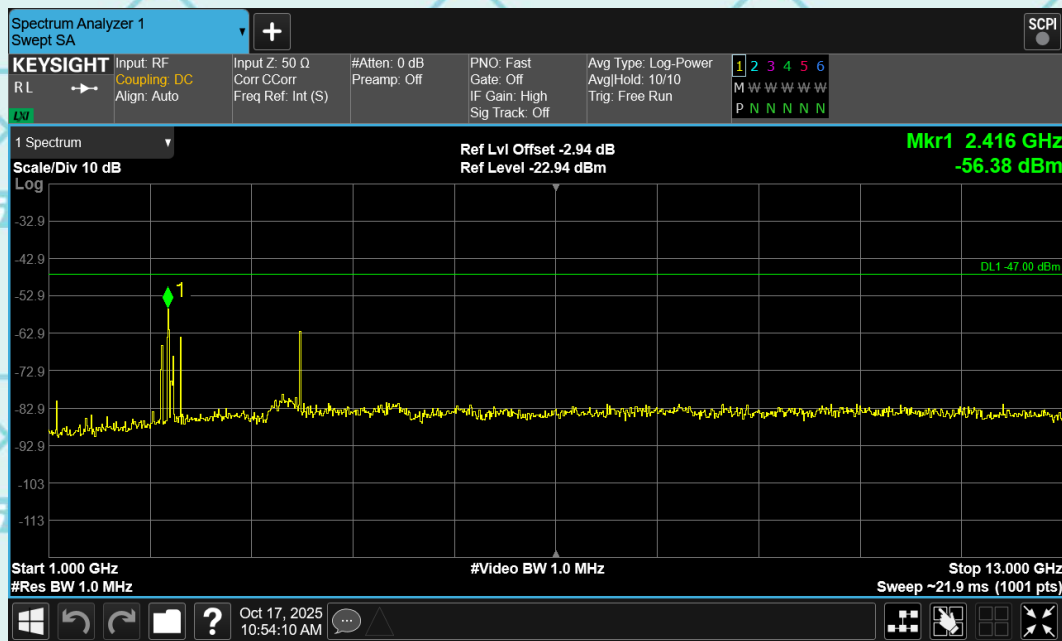
Rx. Spurious NVNT 2-DH5 2441MHz Ant1 @ 1000MHz-13000MHz



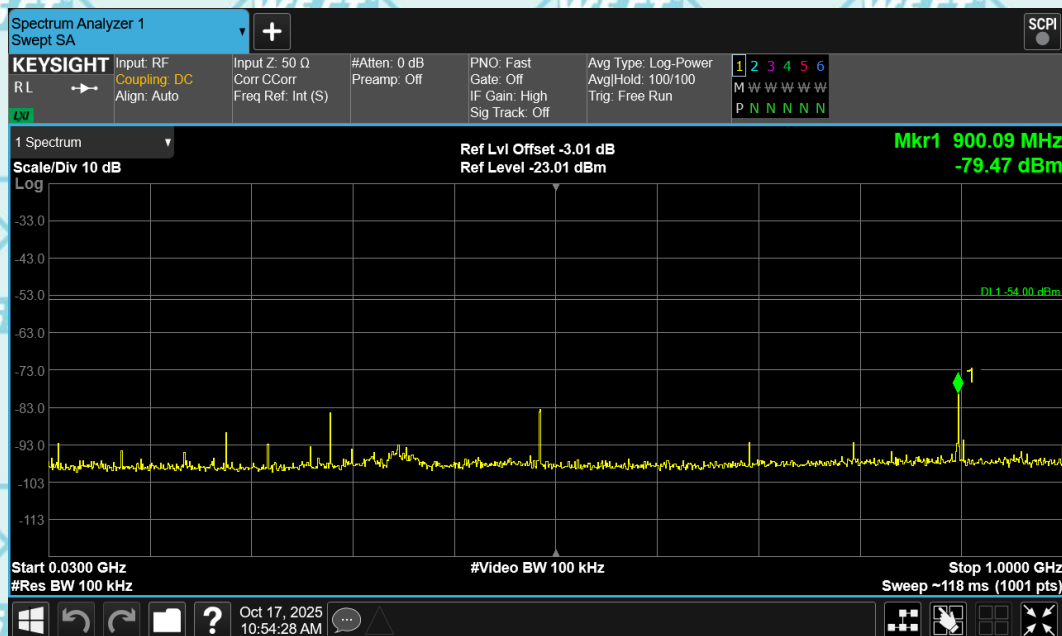
Rx. Spurious NVNT 2-DH5 2480MHz Ant1 @ 30MHz-1000MHz



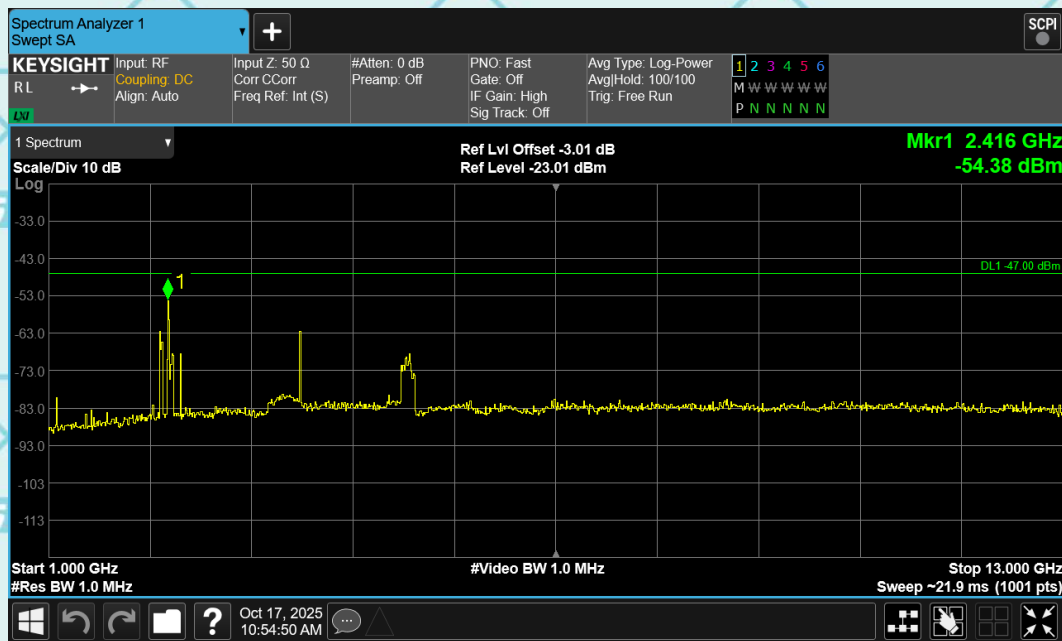
Rx. Spurious NVNT 2-DH5 2480MHz Ant1 @ 1000MHz-13000MHz



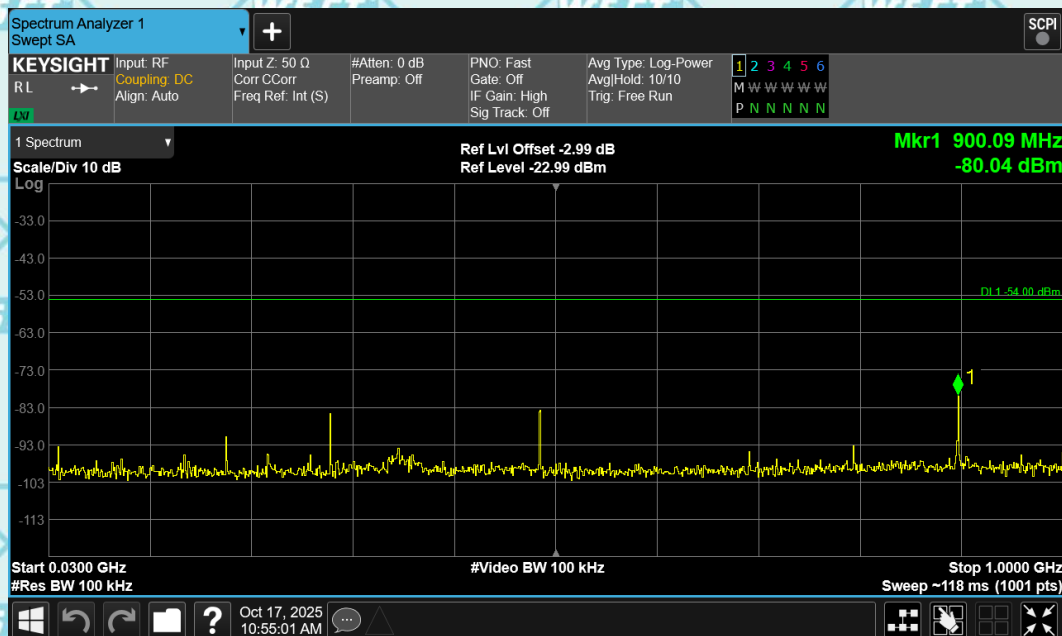
Rx. Spurious NVNT 3-DH5 2402MHz Ant1 @ 30MHz-1000MHz



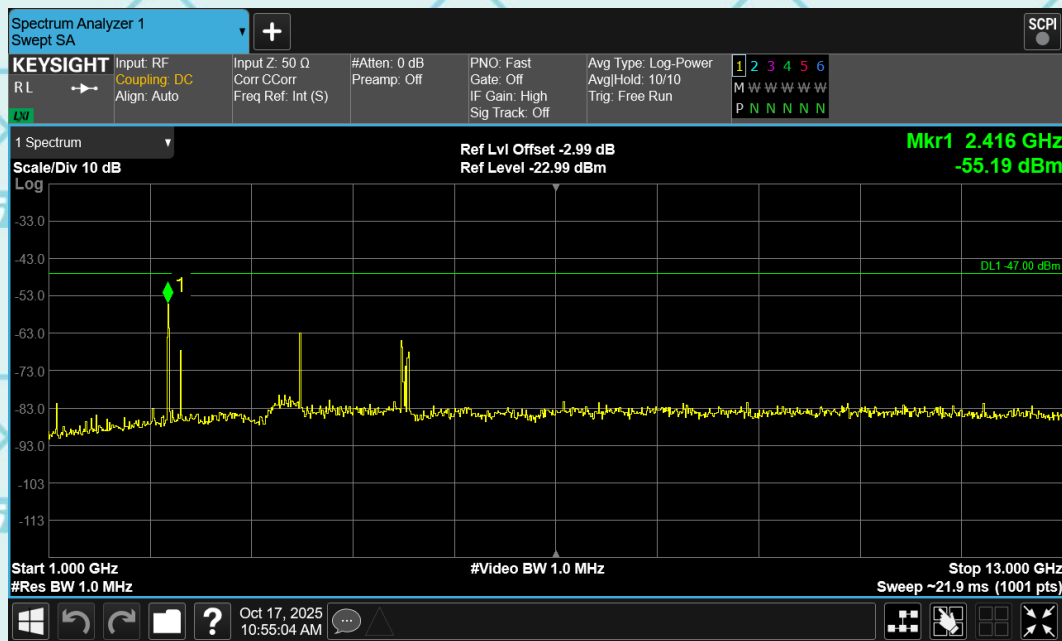
Rx. Spurious NVNT 3-DH5 2402MHz Ant1 @ 1000MHz-13000MHz



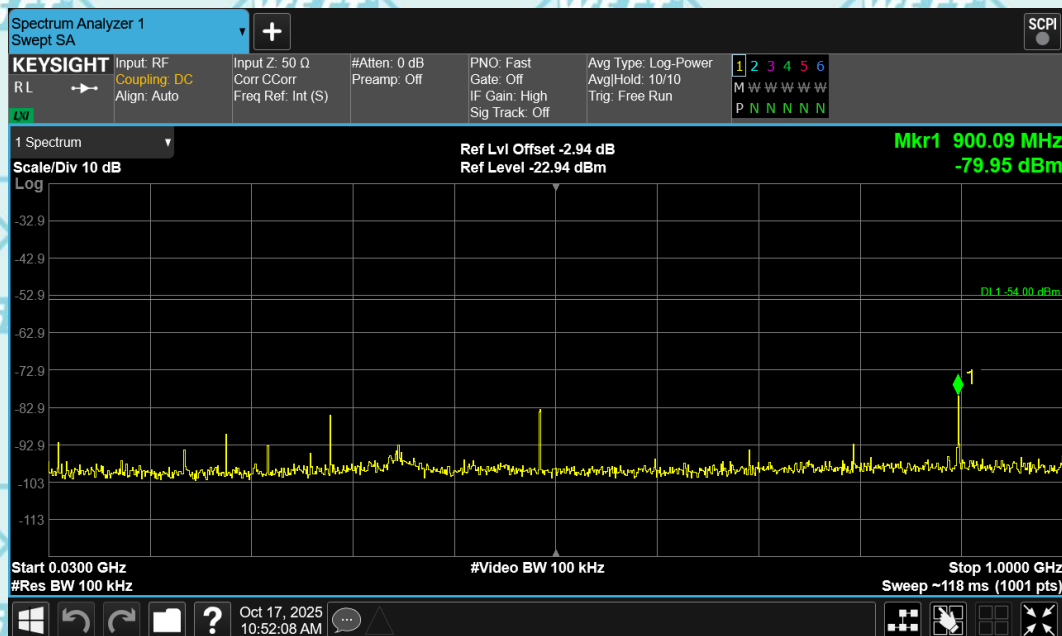
Rx. Spurious NVNT 3-DH5 2441MHz Ant1 @ 30MHz-1000MHz



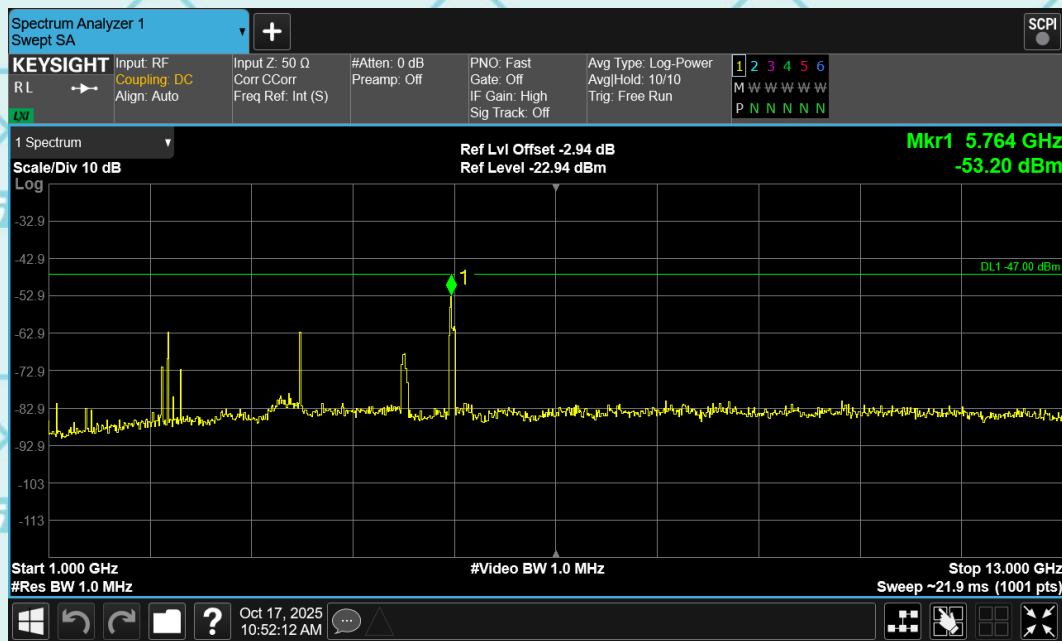
Rx. Spurious NVNT 3-DH5 2441MHz Ant1 @ 1000MHz-13000MHz



Rx. Spurious NVNT 3-DH5 2480MHz Ant1 @ 30MHz-1000MHz



Rx. Spurious NVNT 3-DH5 2480MHz Ant1 @ 1000MHz-13000MHz



Test Data:

Pass



6.6 Transmission Radiation Angle Width (3db Beamwidth) Measurement

Limit

Item	Limits
3dB antenna beam width	360/A (If $A < 1$; then $A = 1$) $A = \{\text{EIRP Power [mW]} / 16.36 \text{ for DS, OFDM}\}$ or $A = \{\text{EIRP Power [mW]} / 4.9 \text{ for FH}\}$
Note: This test item is not applied for radio equipment with equivalent isotropic radiation power lower than 12.14dBm/MHz, but Antenna Power(Conducted) limit is 10mW/MHz (10dBm/MHz), So the test item will not be applied to the transmission antenna which has a gain of 2.14dBi or less	

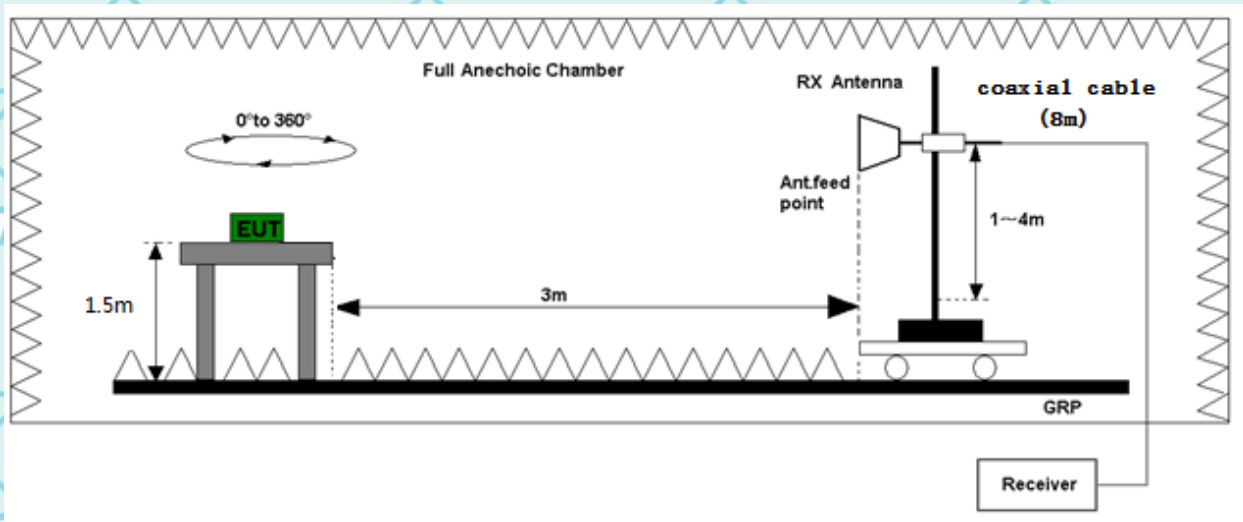
Test Procedure

- Set EUT and measuring antenna at the same height and roughly facing each other.
- Set spectrum analyzer with condition in section 4.7.2 and tune reference level to observe receiving signal position.
spectrum analyzer setting as follow:

Attenuation	Auto
Span Frequency	0 MHz
RB	1 MHz
VB	1 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

- Rotate directions of the EUT horizontally and vertically to find the maximum receiving power.
- Move the measuring antenna height up and down within $\pm 50\text{cm}$ of EUT height and swing it to find the maximum output of measuring antenna. The output level at the spectrum analyzer is read as "E"
- Calculate permitted radiation angle in horizontal and vertical using EIRP measured in another test method.
- Calculate 3dB antenna beam width by the formula below $360/A$ (If $A < 1$; then $A = 1$).
 $A = \{\text{EIRP Power [mW]} / 16.36 \text{ for DS, OFDM}\}$ or
 $A = \{\text{EIRP Power [mW]} / 4.9 \text{ for FH}\}$

Test Setup



Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

Test Data

Antenna Power	Antenna			Total Gain D=B-C	EIRP F=A+D	Permitted Angle	Judgement
A (dBm/MHz)	Type	3dB Beam-width Horizontal (Degree)	3dB Beam-width Vertical (Degree)	dBi	dBm/MHz	Degree	
N/A	printed	N/A	N/A	N/A	N/A	N/A	N/A

Note: This test item is not applied for radio equipment with equivalent isotropic radiation power lower than 12.14dBm/MHz, only record the result without judgement.

Test result:

N/A



6.7 Radio Interference Prevention Capability Measurement

Limit

Item	Limits
Identification code	≥ 48 bits

MEASURING ID CODE SOFTWARE

Item	Limits
MAC IP List	MAC Scan

Test Procedure

- In the case that the EUT has the function of automatically transmitting the identification code: a. Transmit the predetermined identification codes from EUT. b. Check the transmitted identification codes with the demodulator.
- In the case of receiving the identification code: a. Transmit the predetermined identification codes from the counterpart. b. Check if communication is normal. c. Transmit the signals other than predetermined ID codes from the counterpart. d. Check if the EUT stops the transmission, or if it displays that identification codes are different from the predetermined ones.
- The EUT was programmed to be in normal transmitting mode.

Test Setup



Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

Test result

TX: The transmitting mode of is on normal operating, the interference prevention Function is okay.

RX: The receiving mode of is on normal operating, the interference prevention Function is okay.

The ID code of this Bluetooth device is **89:14:2b:c7:52:68** as below list:



6.8 Hopping Frequency Dwell Time Measurement

Limit

Item	Limits
Hopping Freq. Dwell Time	$\leq 0.4 \text{ sec (In } 0.4 \text{ sec} \times \text{ spreading rate)}$

Test Procedure

1. The transmitter output (antenna port) was connected to the spectrum analyzer
2. Set RBW of spectrum analyzer to 1MHz and VBW to 1MHz.
3. Use a video trigger with the trigger level set to enable triggering only on full pulses.
4. Sweep Time is more than once pulse time.
5. Set the center frequency on any frequency would be measure and set the frequency span to zero span.
6. Measure the maximum time duration of one single pulse.
7. Set the EUT for DH5, DH3 and DH1 packet transmitting.
8. Measure the maximum time duration of one single pulse.
9. Dwell time = [spreading rate/78] x duty-cycle x 0.4 seconds

Test Setup

Environmental Conditions

Temperature:	25 °C
Relative Humidity:	56 %
ATM Pressure:	100.0 kPa

Test data: (the worst case)

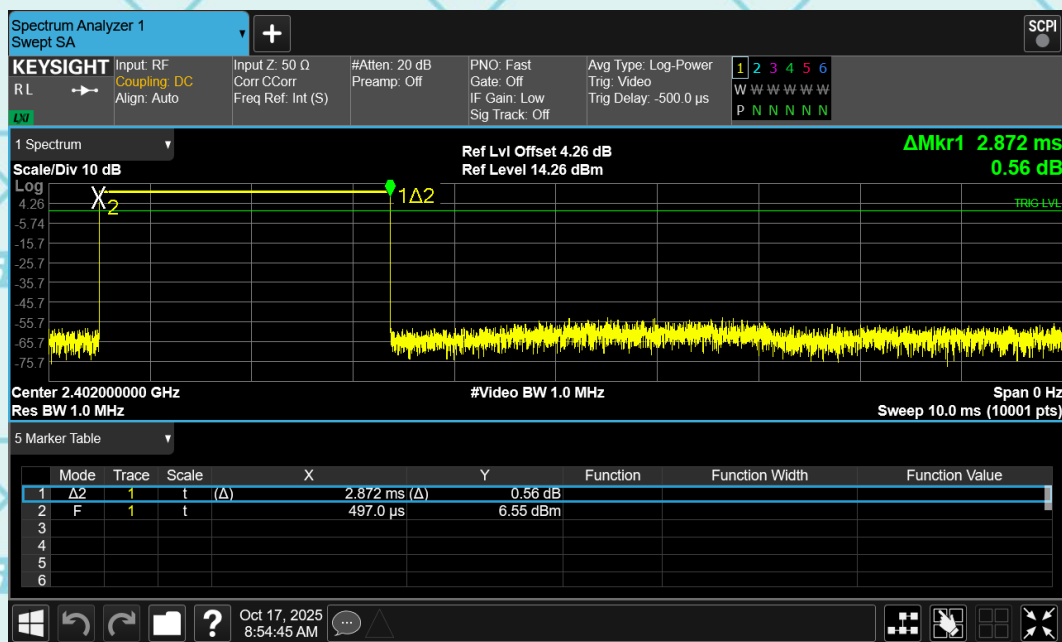
Condition	Mode	Frequency (MHz)	Pulse Time (ms)	Total Dwell Time (ms)	Burst Count	Period Time (ms)	Limit (ms)	Verdict
NVNT	1-DH5	2402	2.872	235.504	82	28046.8	400	Pass
NVNT	1-DH5	2441	2.871	284.229	99	28366.8	400	Pass
NVNT	1-DH5	2480	2.872	290.072	101	28386.4	400	Pass
NVNT	2-DH5	2402	2.879	313.811	109	28470.8	400	Pass
NVNT	2-DH5	2441	2.88	299.52	104	28480.4	400	Pass
NVNT	2-DH5	2480	2.877	264.684	92	28508.8	400	Pass
NVNT	3-DH5	2402	2.879	264.868	92	28507.2	400	Pass
NVNT	3-DH5	2441	2.879	287.9	100	28514	400	Pass
NVNT	3-DH5	2480	2.88	227.52	79	28504.4	400	Pass

Test Plot:

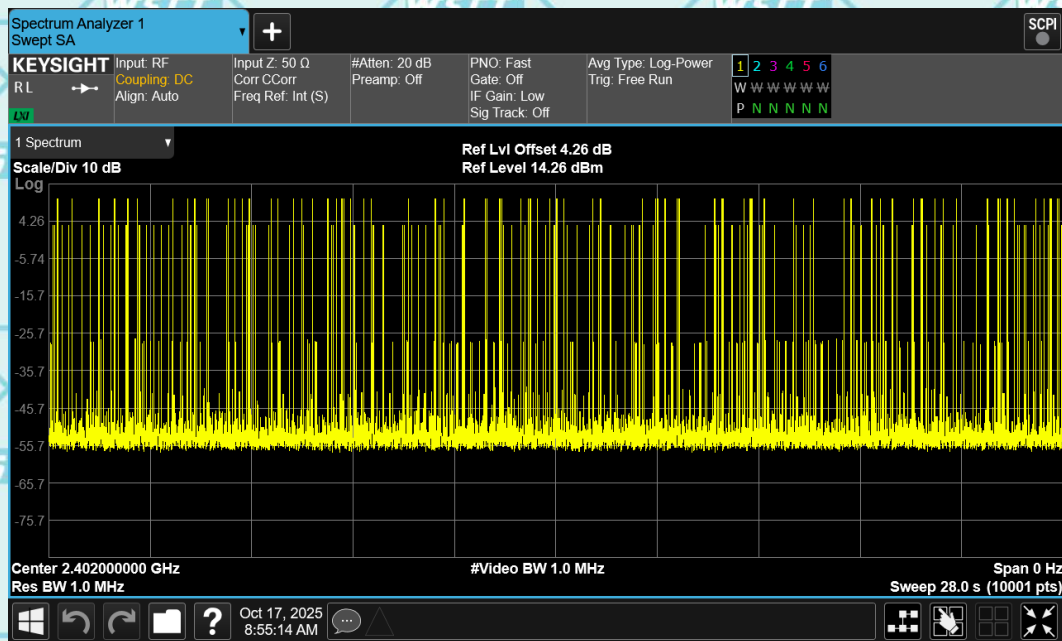


Test Graphs

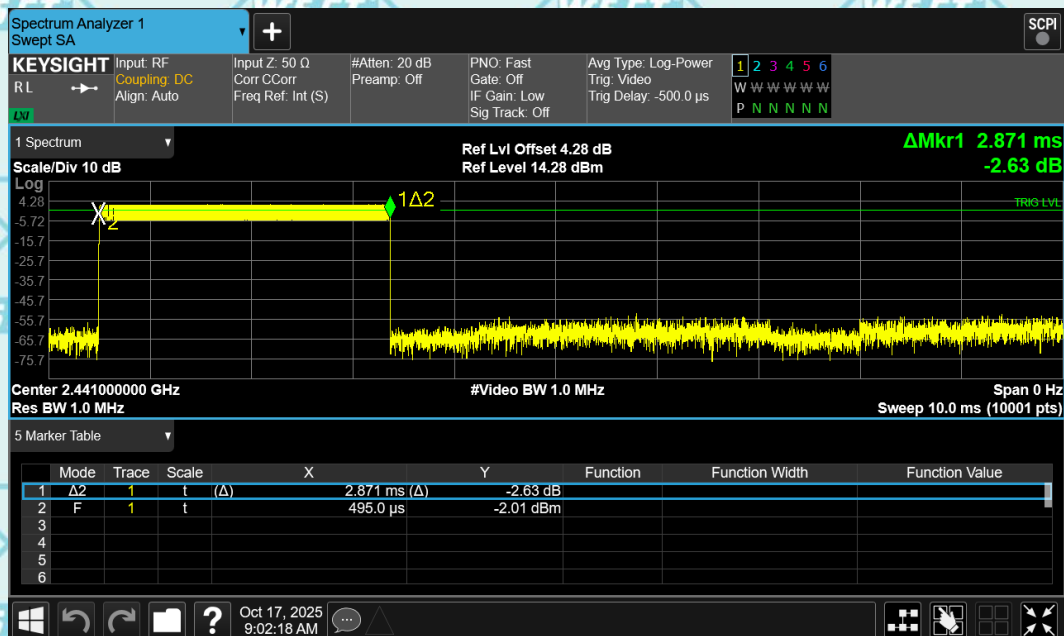
Dwell NVNT 1-DH5 2402MHz Ant1 One Burst



Dwell NVNT 1-DH5 2402MHz Ant1 Accumulated



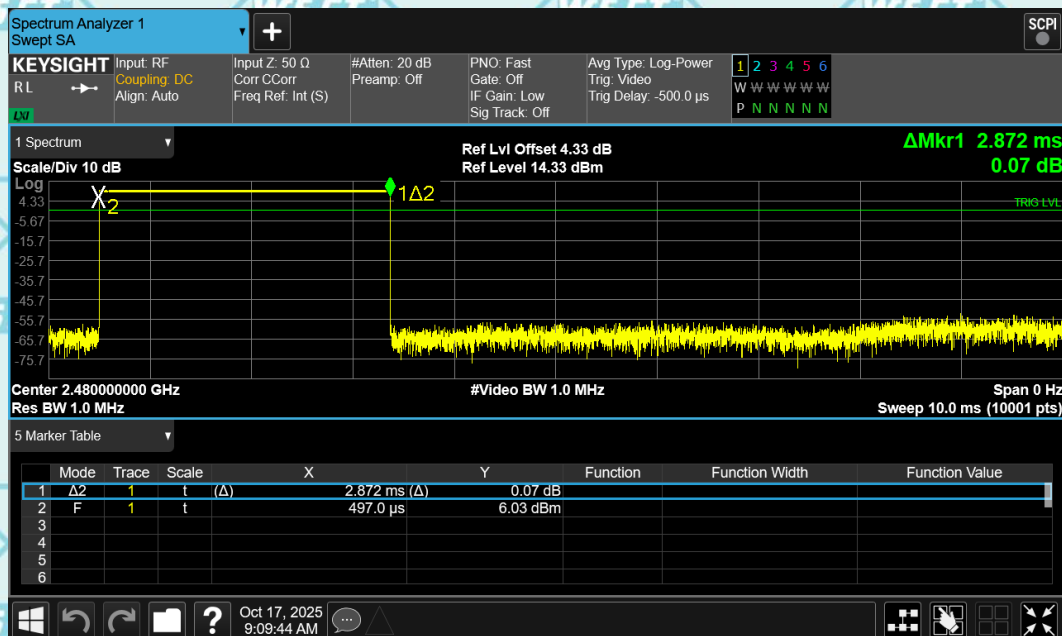
Dwell NVNT 1-DH5 2441MHz Ant1 One Burst



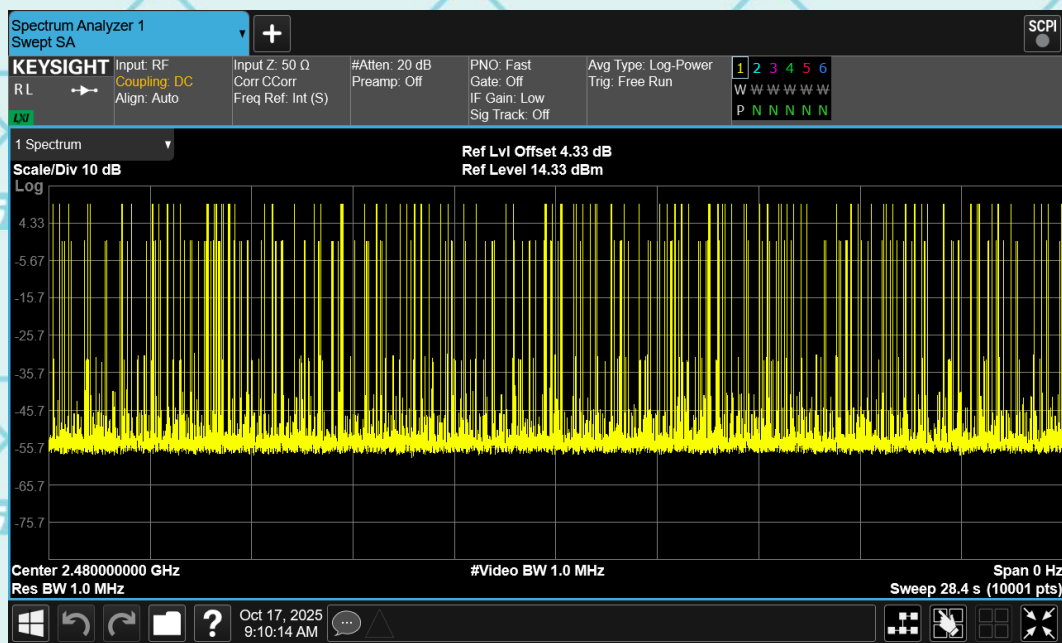
Dwell NVNT 1-DH5 2441MHz Ant1 Accumulated



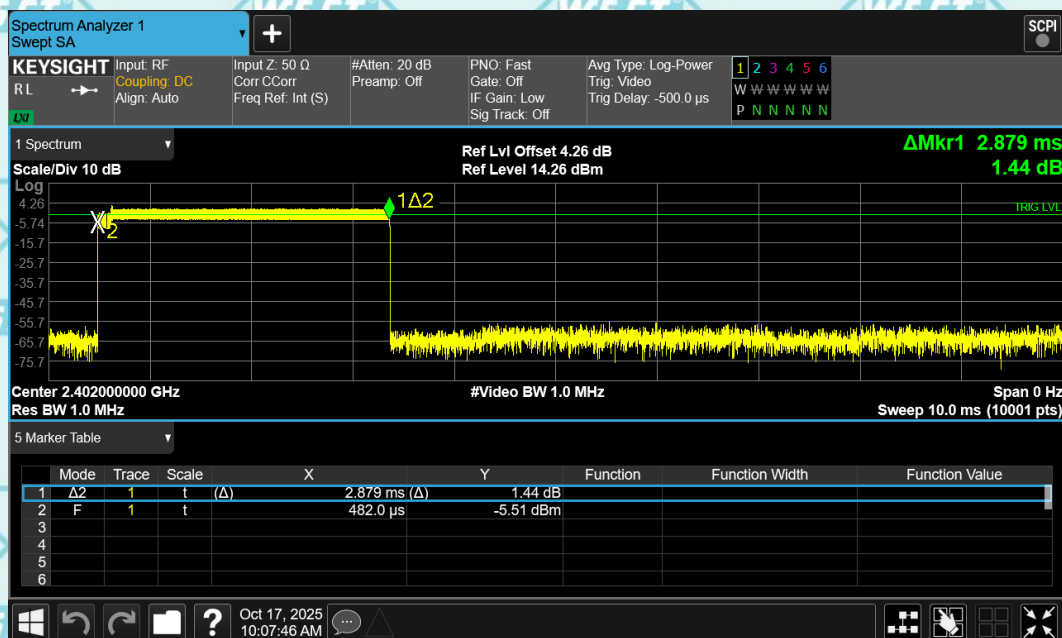
Dwell NVNT 1-DH5 2480MHz Ant1 One Burst



Dwell NVNT 1-DH5 2480MHz Ant1 Accumulated



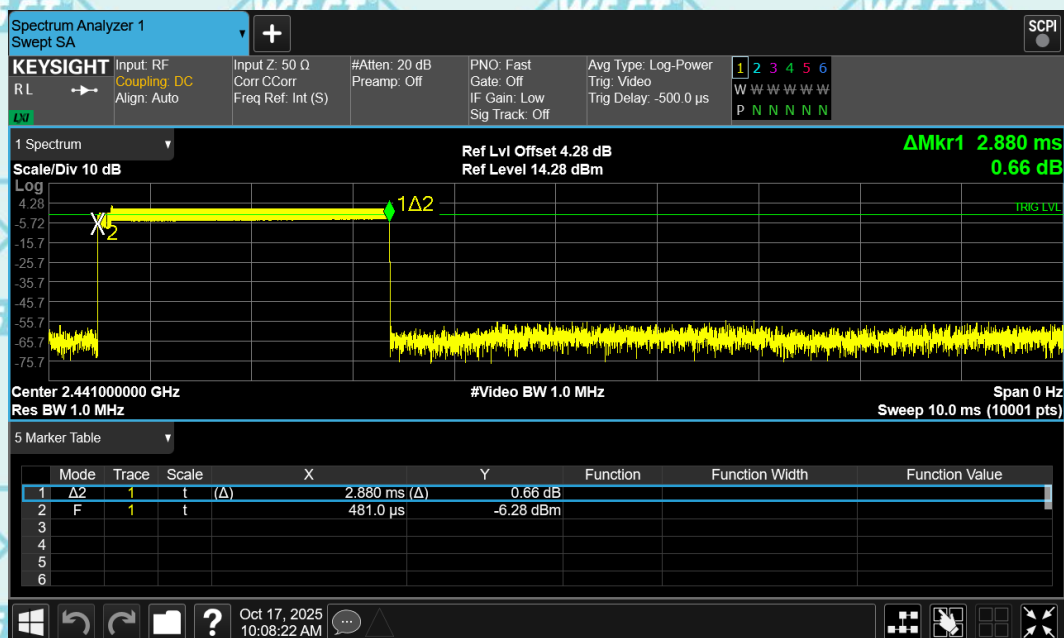
Dwell NVNT 2-DH5 2402MHz Ant1 One Burst



Dwell NVNT 2-DH5 2402MHz Ant1 Accumulated



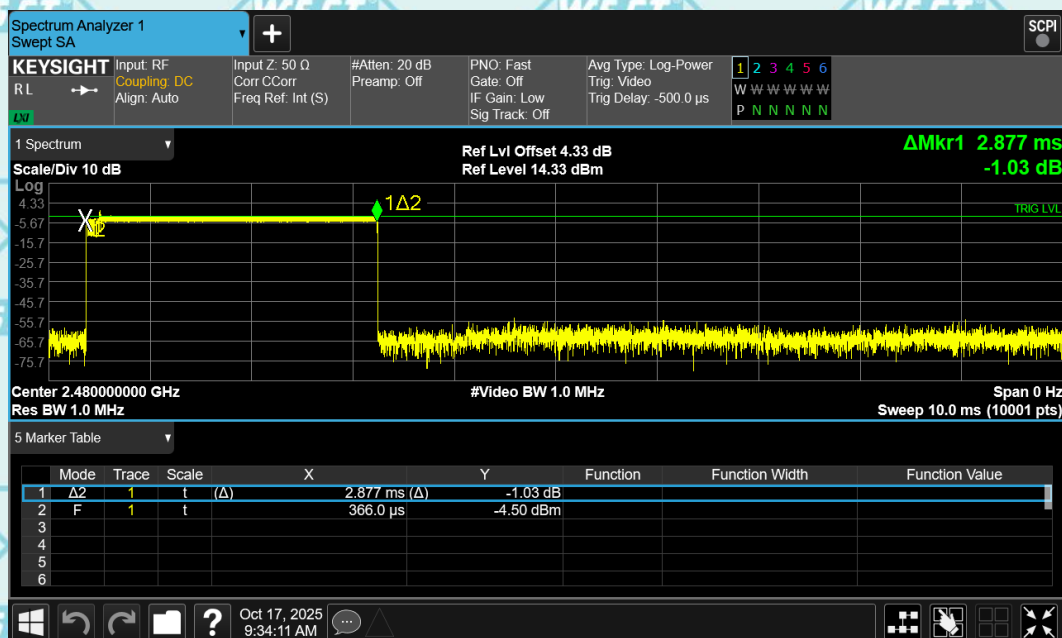
Dwell NVNT 2-DH5 2441MHz Ant1 One Burst



Dwell NVNT 2-DH5 2441MHz Ant1 Accumulated



Dwell NVNT 2-DH5 2480MHz Ant1 One Burst



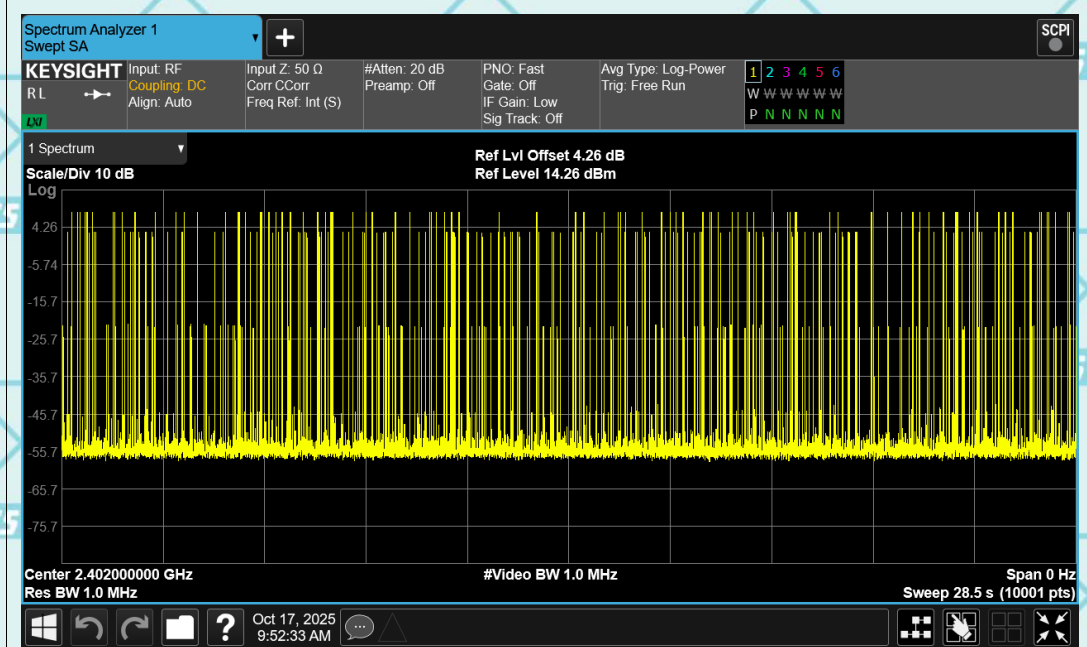
Dwell NVNT 2-DH5 2480MHz Ant1 Accumulated



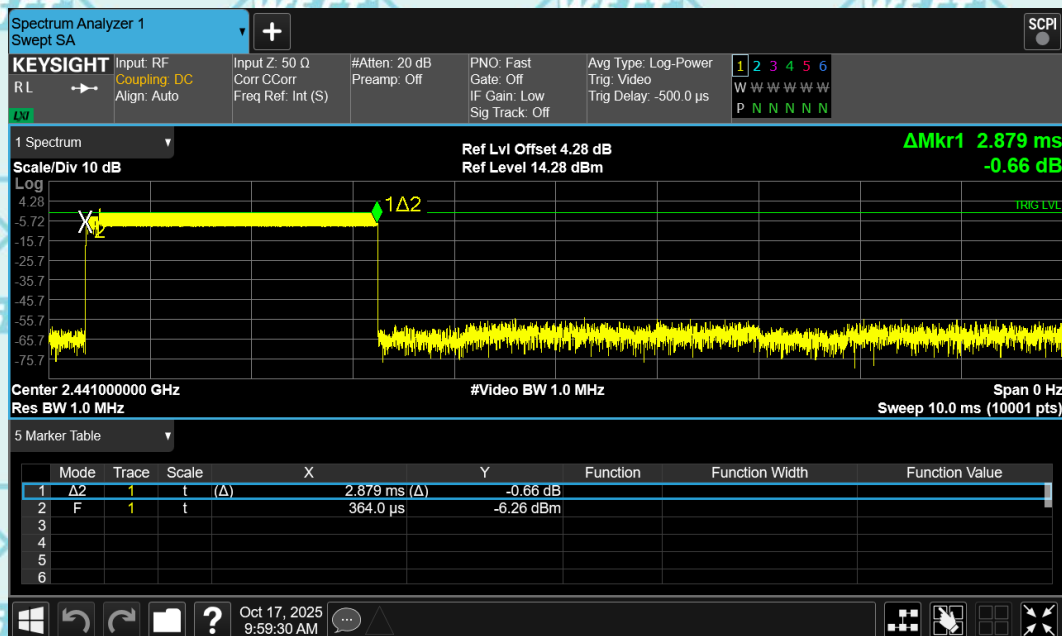
Dwell NVNT 3-DH5 2402MHz Ant1 One Burst



Dwell NVNT 3-DH5 2402MHz Ant1 Accumulated



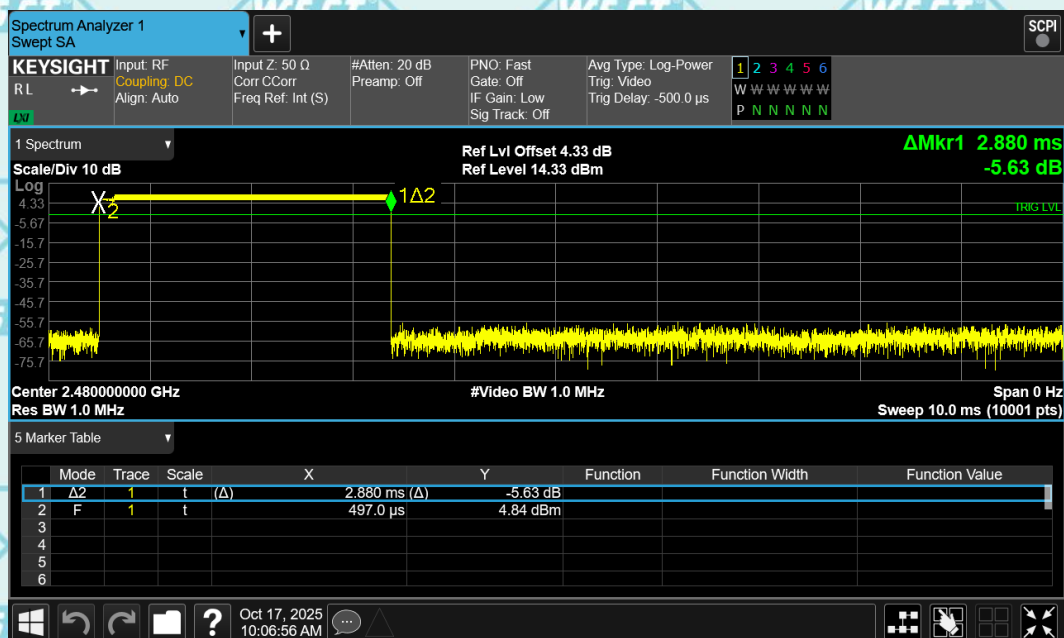
Dwell NVNT 3-DH5 2441MHz Ant1 One Burst



Dwell NVNT 3-DH5 2441MHz Ant1 Accumulated



Dwell NVNT 3-DH5 2480MHz Ant1 One Burst



Dwell NVNT 3-DH5 2480MHz Ant1 Accumulated



7. TEST SETUP PHOTOGRAPHS

Test setup photo



8. PHOTOGRAPHS OF EUT

Please refer to Appendix .

—END OF REPORT—

