

TEST REPORT

Report No.: BCTC2604603175-3E

Applicant: SANSHIN ELECTRONICS CO., LTD.

Product Name: Bluetooth Stellar Gateway

Test Model: MG6

Tested Date: 2026-04-24 to 2026-05-21

Issued Date: 2026-06-08

Shenzhen BCTC Technology Co., Ltd.



Product Name: Bluetooth Stellar Gateway

Trademark: N/A

Model/Type reference: MG6

Prepared For: SANSHIN ELECTRONICS CO., LTD.

Address: 4-4-12, Shiba, Minato-ku, Tokyo 108-0014 Japan

Manufacturer: Shenzhen Minew Technologies Co., Ltd.

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Prepared By: Shenzhen BCTC Technology Co., Ltd.

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Sample Received Date: 2026-04-24

Sample tested Date: 2026-04-24 to 2026-05-21

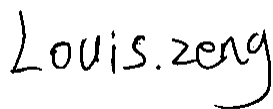
Report No.: BCTC2604603175-3E

Test Standards: Article 2 paragraph 1 of item 19
MIC Notice No.88 Appendix No.43

Test Results: PASS

Remark: This is JAPAN RADIO test report.

Tested by:



Louis Zeng / Project Handler

Approved by:



Sewen Guo/Reviewer

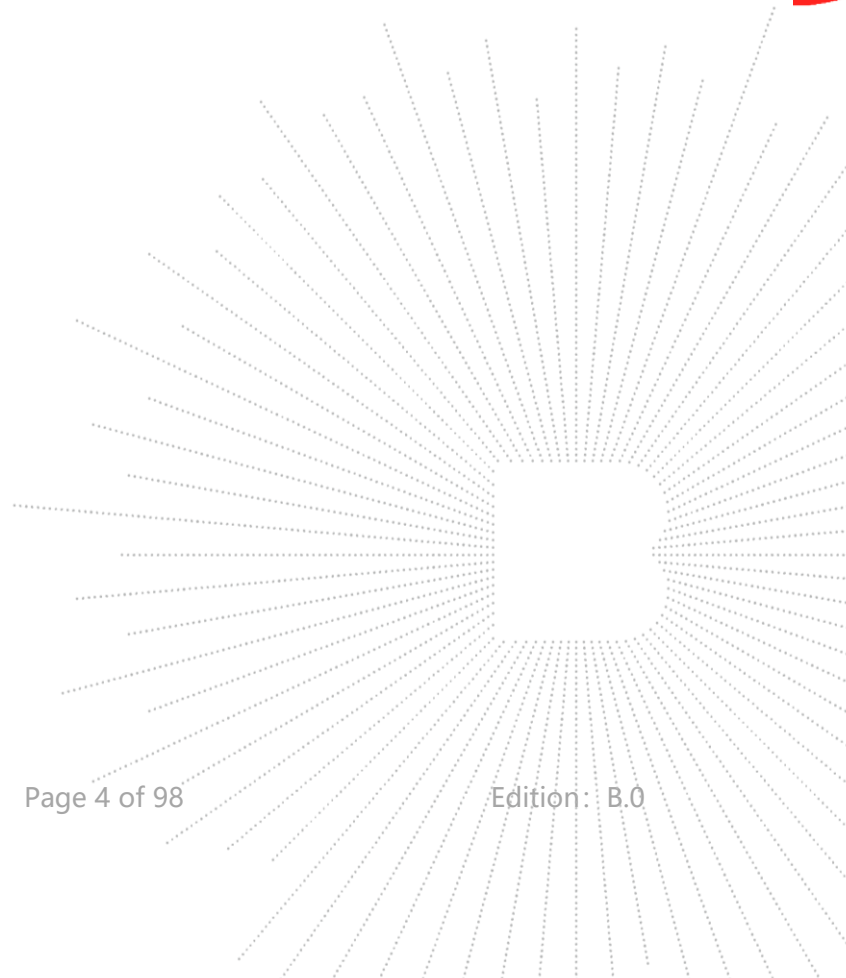
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Table Of Content

Test Report Declaration	Page
1. Version	5
2. Test Summary	6
3. Measurement Uncertainty	7
4. Product Information And Test Setup	8
4.1 Product Information	8
4.2 Block Diagram Parameters Of Test Software Setting	9
4.3 Description Of Support Units (Conducted Mode)	9
4.4 Channel List	9
4.5 Test Mode	10
4.6 Test Conditions	11
4.7 Table Of Parameters Of Test Software Setting	11
5. Test Facility And Test Instrument Used	12
5.1 Test Facility	12
5.2 Test Instrument Used	12
6. RF Shielding Method	13
7. Frequency Error	14
7.1 Block Diagram Of Test Setup	14
7.2 Limit	14
7.3 Measuring Instruments And Setting	14
7.4 Test Procedure	14
7.5 Test Result	15
8. Antenna Power	19
8.1 Block Diagram Of Test Setup	19
8.2 Limit	19
8.3 Test Procedure	19
8.4 Test Result	20
9. Occupied Bandwidth And Spread-Spectrum Bandwidth Measurement	21
9.1 Block Diagram Of Test Setup	21
9.2 Limit	21
9.3 Test Procedure	21
9.4 Test Result	22
10. Unwanted Emission Intensity Measurement	29
10.1 Block Diagram Of Test Setup	29
10.2 Limit	29
10.3 Measuring Instruments And Setting	29
10.4 Test Procedure	30
10.5 Test Result	31
11. Imitation Of Collateral Emission Of Receiver Measurement	72
11.1 Block Diagram Of Test Setup	72
11.2 Limit	72
11.3 Measuring Instruments And Setting	72
11.4 Test Procedure	73
11.5 Test Result	74
12. Transmission Antenna Gain (EIRP Antenna Power) Measurement	88
12.1 Block Diagram Of Test Setup	88

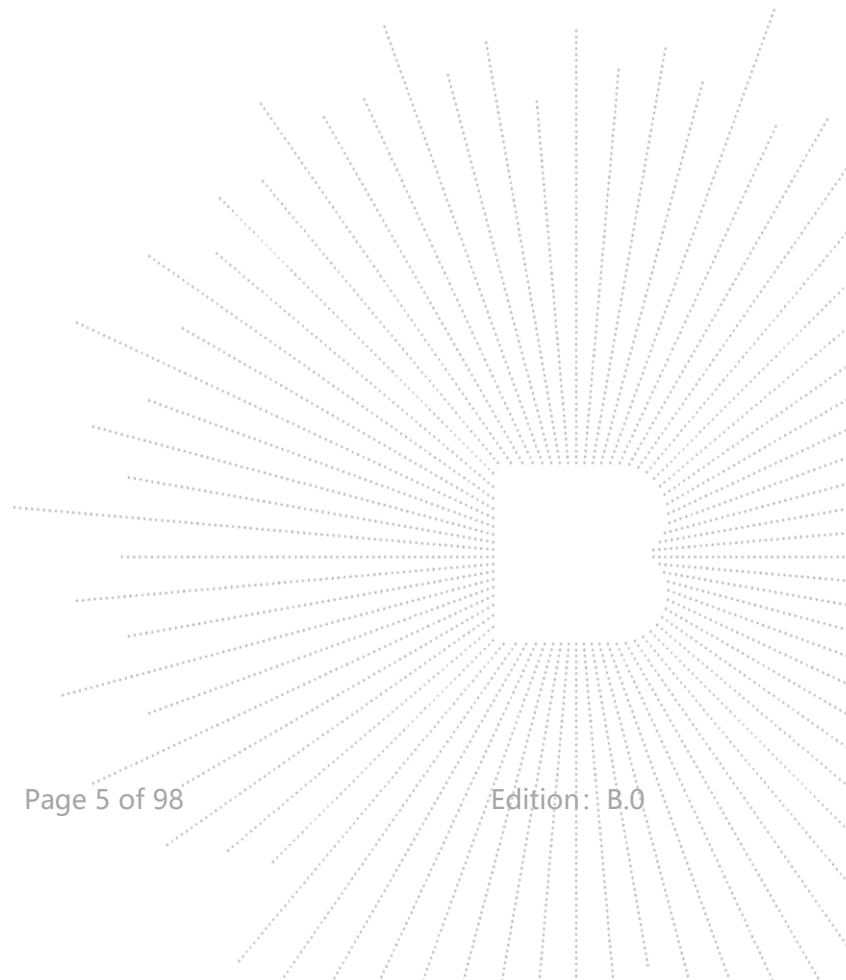
12.2	Limit	88
12.3	Measuring Instruments And Setting	89
12.4	Test Procedure	89
12.5	Test Result.....	90
13.	Transmission Radiation Angle Width (3dB Beamwidth) Measurement	91
13.1	Block Diagram Of Test Setup.....	91
13.2	Limit	91
13.3	Measuring Instruments And Setting	91
13.4	Test Procedure	92
13.5	Test Result.....	92
14.	Radio Interference Prevention Capability Measurement	93
14.1	Block Diagram Of Test Setup.....	93
14.2	Limit	93
14.3	Measuring Instruments And Setting	93
14.4	Test Procedure	94
14.5	Test Result.....	94
15.	Carrier Sense Capability Measurement.....	95
15.1	Block Diagram Of Test Setup.....	95
15.2	Limit	95
15.3	Test Procedure	95
15.4	Test Result.....	95
16.	Duty Cycle Of Test Signal	96
16.1	Standard Requirement	96
16.2	Formula.....	96
16.3	Test Procedure	96
16.4	Test Result.....	96
17.	EUT Test Setup Photographs.....	97

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1. Version

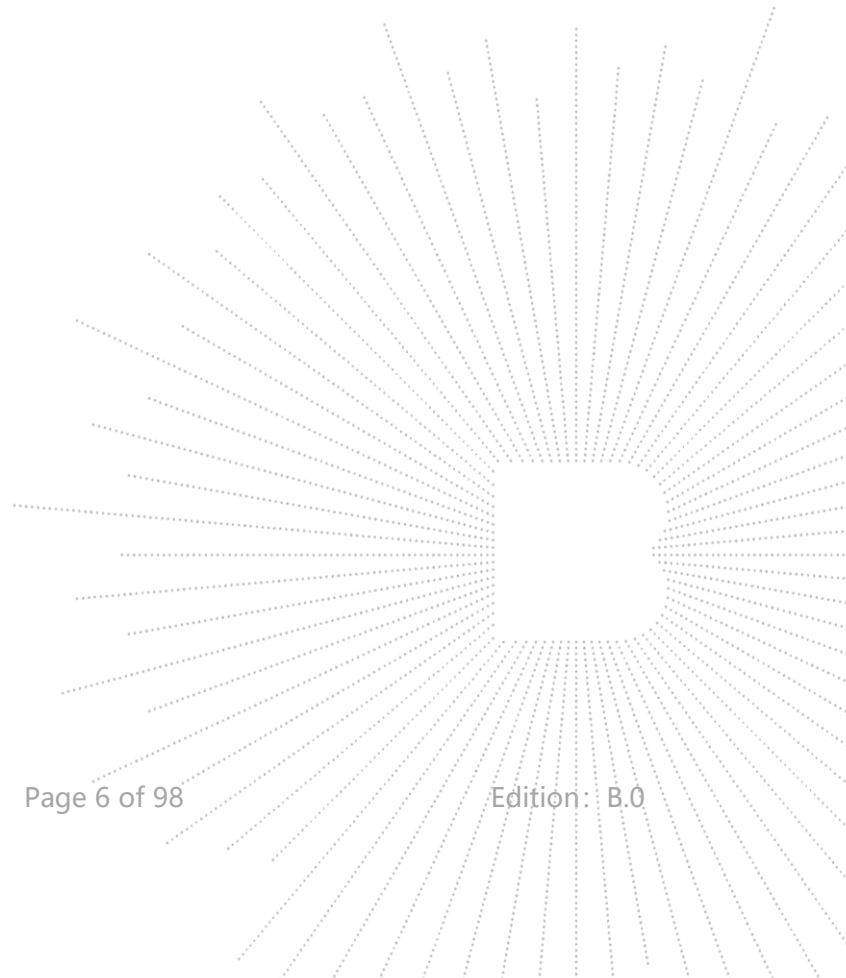
Report No.	Issue Date	Description	Approved
BCTC2604603175-3E	2026-06-08	Original	Valid



2. Test Summary

Article 2 paragraph 1 of item 19	
Description of Test	Result
Frequency Error	Complies
Occupied Bandwidth (99%) and Spread-spectrum Bandwidth (90%)	Complies
Unwanted Emission Intensity	Complies
Antenna Power Error	Complies
Limitation of Collateral Emission of Receiver	Complies
Transmission Antenna Gain (EIRP Antenna Power)	Complies
Transmission Radiation Angle Width (3dB Beamwidth)	N/A
Radio Interference Prevention Capability	Complies
Construction Protection Confirmation	Complies
NOTE: 1)" N/A" denotes test is not applicable in this Test Report	

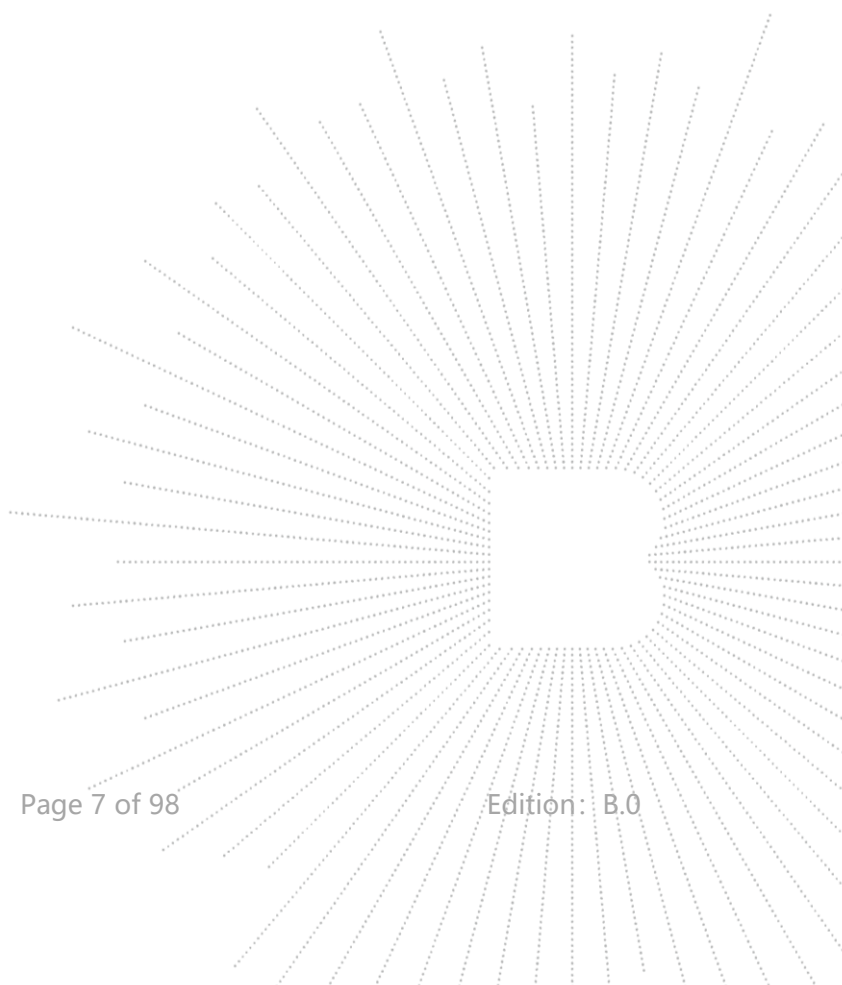
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3. Measurement Uncertainty

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	Conducted Emission Test	$\pm 3.2\text{dB}$
2	Radiated Emission Test	$\pm 4.7\text{dB}$
3	RF power, conducted	$\pm 0.16\text{dB}$
4	Spurious emissions, conducted	$\pm 0.21\text{dB}$
5	All emissions, radiated(<1G)	$\pm 4.68\text{dB}$
6	All emissions, radiated(>1G)	$\pm 5.0\text{dB}$
7	frequency error ppm	$\pm 0.5\text{ppm}$

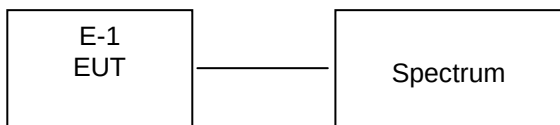


4. Product Information And Test Setup

4.1 Product Information

Model/Type reference:	MG6
Model differences:	N/A
Hardware Version:	N/A
Software Version:	N/A
Operation Frequency:	2412MHz -2472MHz Band for 802.11b/g/n20 2422MHz -2462MHz Band for 802.11n40
Rated RF Output Power Density:	802.11b: 2mW/MHz, 802.11g: 2mW/MHz, 802.11nHT20: 3mW/MHz, 802.11nHT40: 3mW/MHz,
Conducted Power Density:	802.11b: 1.079mW/MHz, 802.11g: 0.53mW/MHz, 802.11nHT20:1.89mW/MHz, 802.11nHT40: 0.90mW/MHz,
Type of Modulation:	DSSS with DBPSK/DQPSK/CCK for 802.11b; OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n;
channel space:	5MHz
Antenna installation:	FPC*2
Antenna Gain:	FPC Antenna 1 5.24dBi FPC Antenna 2 4.40dBi
Remark:	The antenna gain of the product comes from the antenna report provided by the customer, and the test data is affected by the customer information.
Ratings:	DC 12V/1A,POE(DC48V/1.25A)

4.2 Block Diagram Parameters Of Text Software Setting



4.3 Description Of Support Units (Conducted Mode)

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
E-1	Bluetooth Stellar Gateway	N/A	MG6	N/A	EUT

Notes:

1. The support equipment was authorized by Declaration of Confirmation.
2. For detachable type I/O cable should be specified the length in cm in 『Length』 column
3. “YES” is means “shielded” “with core”; “NO” is means “unshielded” “without core”.

4.4 Channel List

Frequency and Channel list for 802.11b/g/n (HT20):

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	5	2432	10	2457
2	2417	6	2437	11	2462
3	2422	7	2442	12	2467
4	2427	8	2447	13	2472
		9	2452		

Frequency and Channel list for 802.11n (HT40):

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
3	2422	6	2437	9	2452
4	2427	7	2442	10	2457
5	2432	8	2447	11	2462

4.5 Test Mode

Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description	
Mode1	CH01	802.11b
Mode2	CH07	
Mode3	CH13	
Mode4	RX	
Mode5	CH01	802.11g
Mode6	CH07	
Mode7	CH13	
Mode8	RX	
Mode9	CH01	802.11n20
Mode10	CH07	
Mode11	CH13	
Mode12	RX	
Mode13	CH03	802.11n40
Mode14	CH07	
Mode15	CH11	
Mode16	RX	

4.6 Test Conditions

The devices was tested while in a continuous transmitter/receiver mode.

The EUT was tuned to a low, middle, and high channel for all tests. For all test case pre/scans were completed in all Modes to determine worst case levels.

Power Supply Voltage Fluctuation Test

Voltage Fluctuation Test	Normal Voltage	High Voltage +10% of Normal Voltage	Low Voltage -10% of Normal Voltage
Input DC Power	DC 12V	DC 13.2V	DC 10.8V
Input to the RF	DC 3.3V	DC 3.3V	DC 3.3V

Note:

Voltage Variation (%)= (Output high or Low Voltage - Output Normal Voltage)/ Output Normal Voltage* 100

During the input supply voltage to the EUT from the external power source is varied by +/-10%, The voltage variation input to the RF circuit is less than ±1%,so only operated in normal voltage to test all regulations.

4.7 Table Of Parameters Of Test Software Setting

During testing channel & power controlling software provided by the customer was used to control the operating channel as well as the output power level. The RF output power selection is for the setting of RF output power expected by the customer and is going to be fixed on the firmware of the final end product power parameters

Test software Version	QATool_Dbg.exe		
Frequency	2412 MHz	2442 MHz	2472 MHz
Parameters	DEF	DEF	DEF
Frequency	2422 MHz	2442 MHz	2462 MHz
Parameters	DEF	DEF	DEF

5. Test Facility And Test Instrument Used

5.1 Test Facility

All measurement facilities used to collect the measurement data are located at Shenzhen BCTC Technology Co., Ltd. Address: Room 101M, Unit 1, Building1, Pengyuan, No.18, Lilang Road, Shanglilang, Nanwan Subdistrict, Longgang District, Shenzhen, Guangdong, China. The site and apparatus are constructed in conformance with the requirements of ANSI C63.4 and CISPR 16-1-1 other equivalent standards.

5.2 Test Instrument Used

RF Conducted Test					
Equipment	Manufacturer	Model#	Serial#	Last Cal.	Next Cal.
Spectrum Analyzer	Keysight	N9020A	MY51287403	2025.08.30	2026.08.29
Signal Generator	Keysight	N5182A	MY50144088	2025.08.30	2026.08.29
Power Sensor	Keysight	U2001	MY51250006	2025.10.28	2026.10.27
Temperature & Humidity	Wetest	HTC-1	/	2025.09.01	2026.08.31
Communication test set	R&S	CMW500	157483	2025.08.30	2026.08.29
Radio frequency control box	MWRFTest	MW100-RFCB	\	\	\
Software	MWRFTest	MTS 8310	V 3.0.0.0	\	\
D.C. Power Supply	Elektro-Automatik GmbH & Co.KG	D-41747 Viersen	6230316	2025.09.30	2026.08.29
Temperature and humidity test chamber	Auchno	OJN-9606-408L	19120183	2025.07.09	2026.07.08

Remark:

- Calibration conducted by the National institute of information and communications Technology (NICT) in Japan (hereinafter referred to as "NICT") or a designated calibration agency under Article 102-18 paragraph in JRL.
 - Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Act (Act No. 51 of 1992).
 - Calibration conducted in countries except Japan, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1).
 - Calibration, etc. conducted by using measuring instruments and other equipment listed in the right column of appended table No. 3, which shall have been given any type of calibration, etc. listed above from (a) to (c).
- The calibration corresponds to c described above. From JRL Article 24-2, paragraph 4, Item 2
Notice: calibration duration for above equipments is 1 year

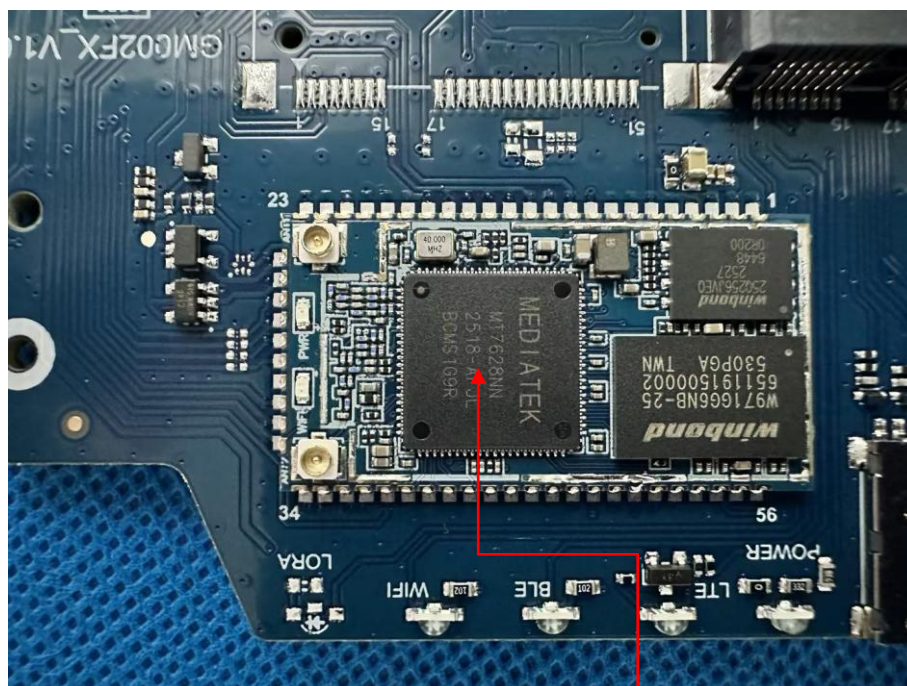
Calibration laboratory: CCIC(Shenzhen) Co., Ltd

6. RF Shielding Method

Chipset:

This product features a protective plastic casing, with internal components assembled using SMD surface-mount technology. As illustrated in the accompanying figure, attempting to disassemble the unit will result in permanent damage to the product.

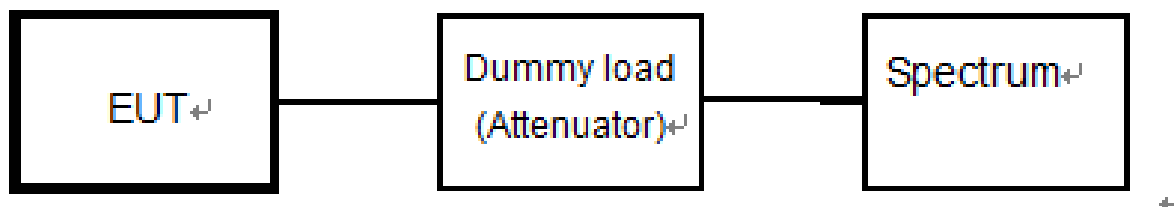
Terminal number is 56. Pitch is 0.5mm.



Protective containment
soldering

7. Frequency Error

7.1 Block Diagram Of Test Setup



7.2 Limit

Item	Limits
Frequency Error	±50ppm

7.3 Measuring Instruments And Setting

The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	10KHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

7.4 Test Procedure

- (1) In the case of unmodulated signal (continuous or continuous burst), measure the frequency directly by a frequency meter.
- (2) In the case of burst waves, the measurement shall be done for enough time in order to obtain the enough measuring accuracy, and the average of the measured values becomes the final value.
- (3) In the case of a test mode with a specific frequency spectrum, measure the frequency of the specific spectrum by a spectrum analyzer.
- (4) In the cases above, if the frequency equivalent to the test frequency is not directly measured in principle, it shall be obtained by necessary calculation. In the case of modulated signal, if there is no specific spectrum measurable by a spectrum analyzer but a specific dip is observed, it is allowed to measure the frequency with the signal generator (synthesized). That is, observe a signal of the signal generator concurrently (or alternately) with the tested signal using the spectrum analyzer while setting the frequency of the signal generator to the position of the dip on the screen of the spectrum analyzer, and determine the frequency of the signal generator at the time as a measured value.

7.5 Test Result

Temperature:	25 ⁰ C		
Humidity:	55 % RH	Test Voltage	DC 12V
Operation Mode:	Transmitting- unmodulation mode		

ANT 1:

Test Voltage	Test Frequency (MHz)	Measured Frequency (MHz)	Frequency Error(ppm)	Limit (ppm)	P/F
Normal Voltage	2412	2411.988	-4.98	±50	PASS
	2442	2441.988	-4.91	±50	PASS
	2472	2471.988	-4.85	±50	PASS
	2462	2421.988	-4.95	±50	PASS
	2472	2461.988	-4.87	±50	PASS

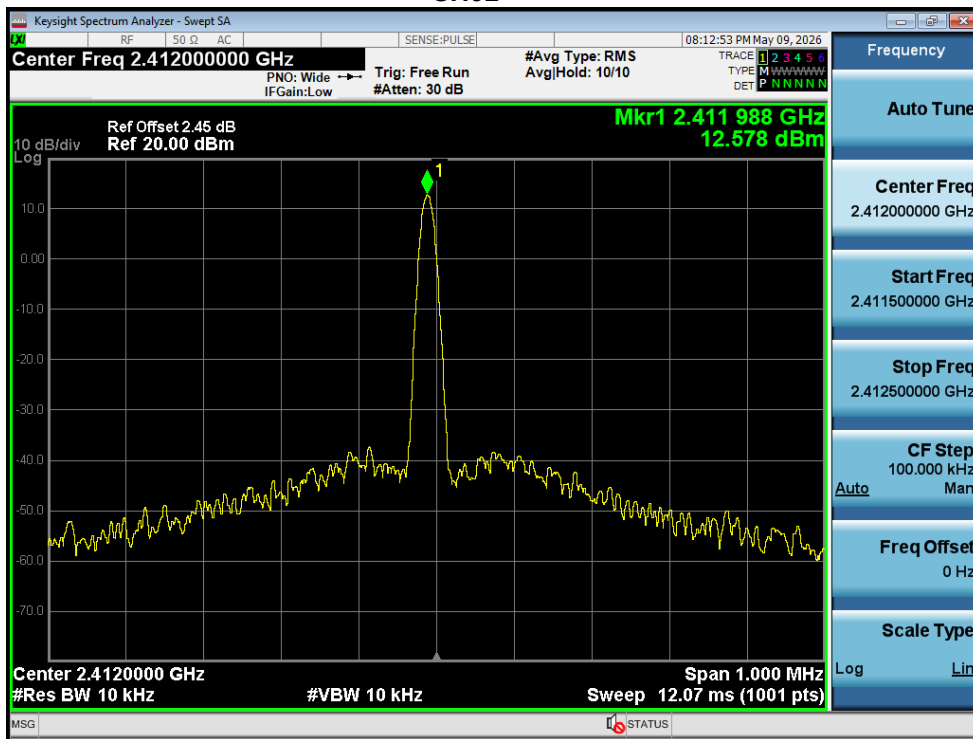
ANT 2:

Test Voltage	Test Frequency (MHz)	Measured Frequency (MHz)	Frequency Error(ppm)	Limit (ppm)	P/F
Normal Voltage	2412	2411.99	-4.15	±50	PASS
	2442	2441.99	-4.1	±50	PASS
	2472	2471.988	-4.85	±50	PASS
	2462	2421.989	-4.54	±50	PASS
	2472	2461.989	-4.47	±50	PASS

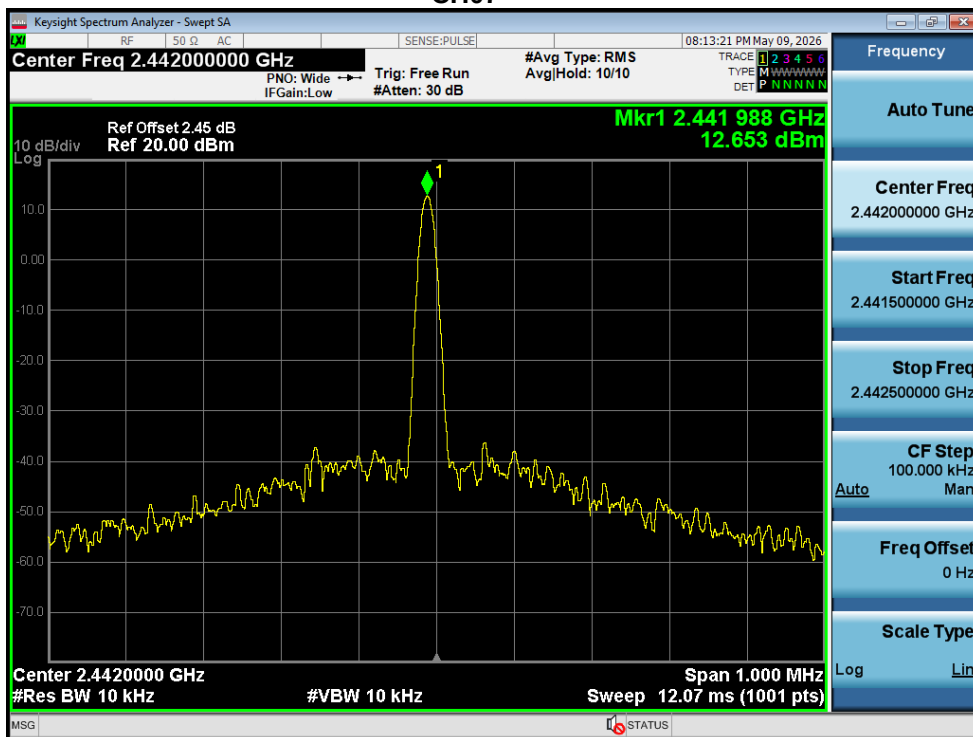
Note: 1(2) Represent the value of antenna 1 and 2, the worst data is Antenna 1, only shown Antenna 1 Plot.

Antenna 1

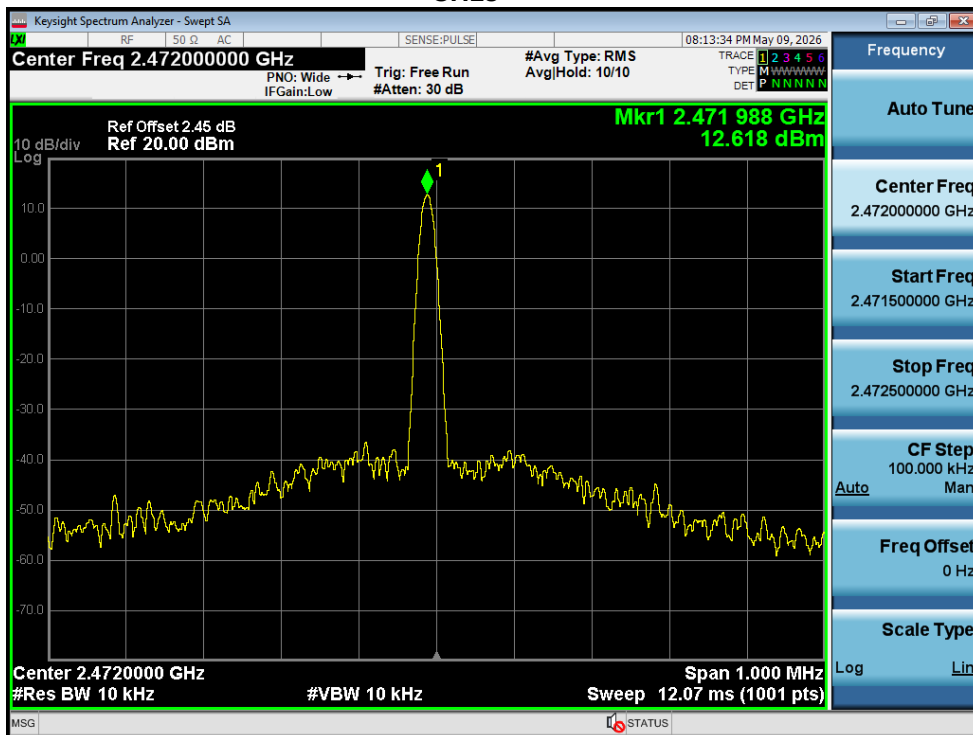
CH01



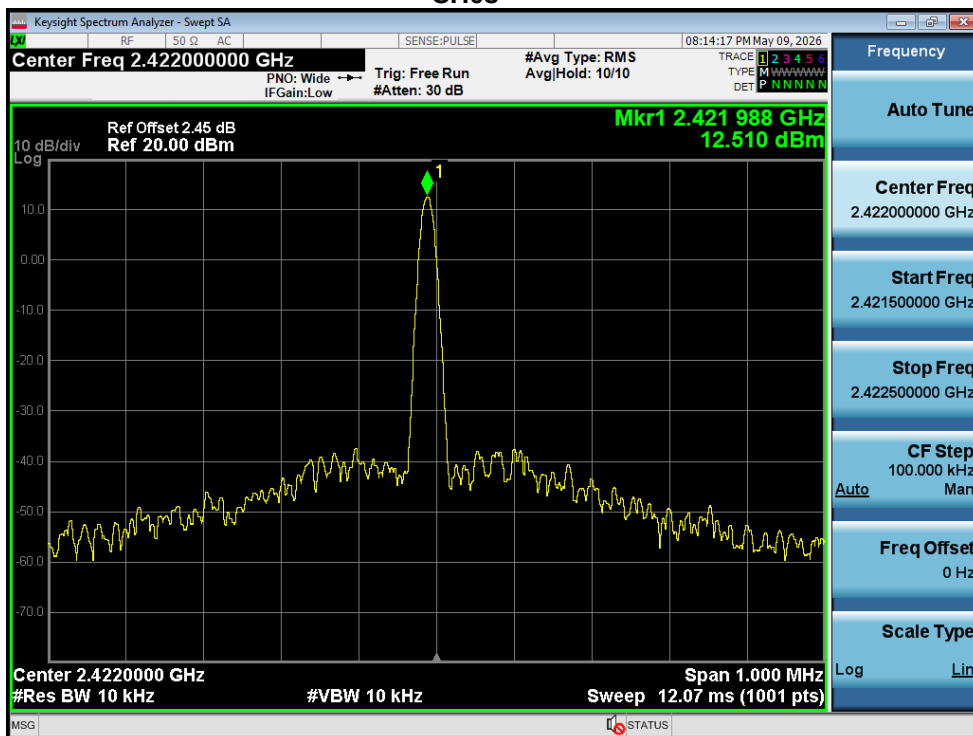
CH07



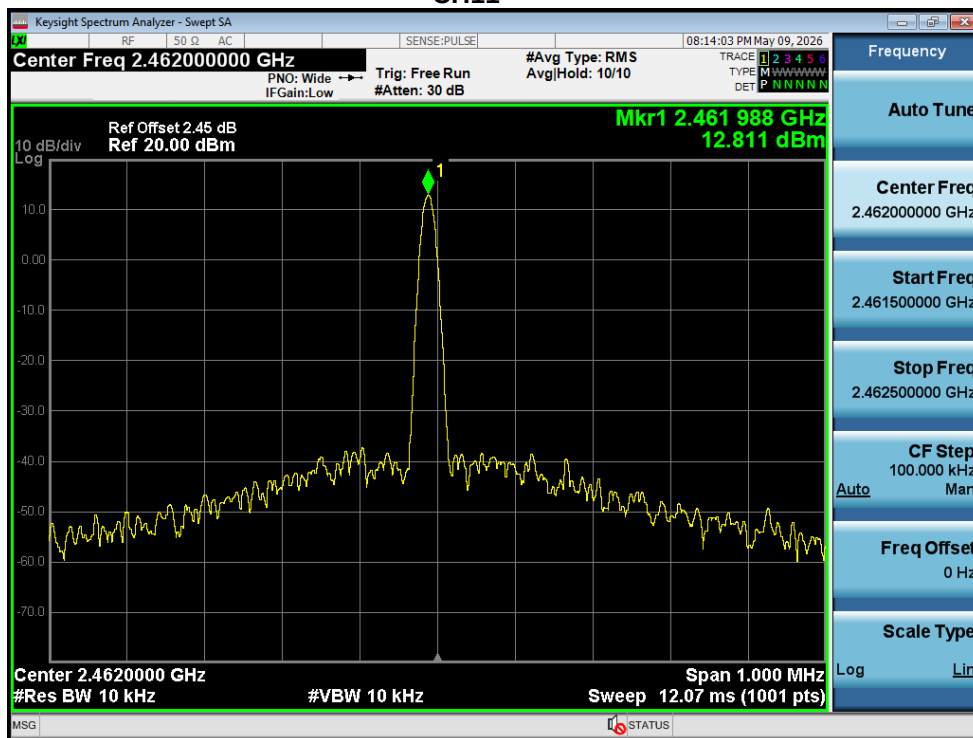
CH13



CH03



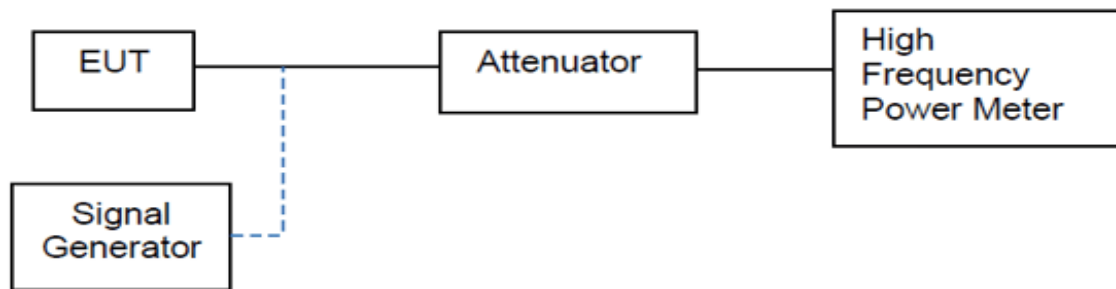
CH11



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8. Antenna Power

8.1 Block Diagram Of Test Setup



8.2 Limit

Item	Limits
Antenna Power Density	(1) $\leq 3\text{mW/MHz}$ (FH, FH+DS, FH+OFDM form 2400 - 2483.5 MHz) (2) $\leq 10\text{mW/MHz}$ (OFDM OBW < 26MHz, DS, FH other than (1)) (3) $\leq 5\text{mW}$ (OFDM OBW 26-38MHz) (4) $\leq 10\text{mW}$ (Other than (1) & (2)& (3))
Antenna Power Error	+20% (Base on manufacturer declare antenna power density)

8.3 Test Procedure

Step 1: Connect the EUT to the Spectrum analyser and use the following settings:

Centre Frequency: The Centre frequency of the channel under test.

RBW: 1 MHz.

VBW: 1 MHz.

Span: Wide enough to cover the complete power envelope of the signal of the EUT.

Detector: Peak.

Trace Mode: Max Hold.

Step 2: When the trace is complete, find the peak value of the power envelope and record the frequency.

Step 3: Make the following changes to the settings of the Spectrum analyser:

Centre Frequency: Equal to the frequency recorded in step 2.

Span: 0 MHz.

RBW: 1 MHz.

VBW: 1 MHz.

Detector: Peak.

Trace Mode: Max Hold

8.4 Test Result

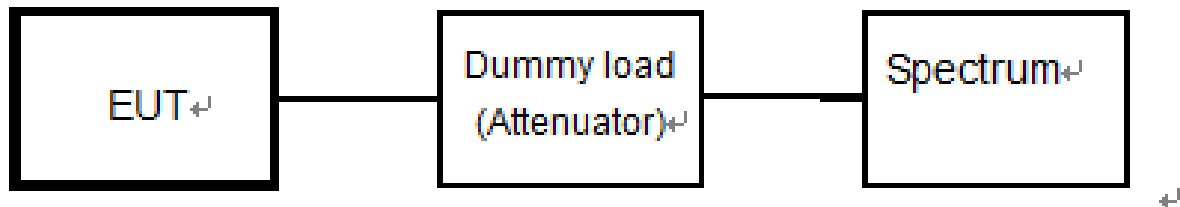
Temperature:	25 ⁰ C		
Humidity:	55 % RH	Test Voltage	DC 12V
Operation Mode:	Transmitting		

Test voltage (V)	Mode	Channel (MHz)	Antenna Power (dBm MHz) ANT 1	Antenna Power (dBm MHz) ANT 2	Antenna Power (mW/MHz) ANT 1	Antenna Power (mW/MHz) ANT 2	Total Antenna Power (mW/MHz)
DC=12V	802.11b	2412	0.08	0.29	1.019	1.069	/
		2442	-0.2	-0.01	0.955	0.998	/
		2472	0.05	0.33	1.012	1.079	/
	802.11g	2412	-3.67	-2.76	0.43	0.53	/
		2442	-3.7	-3.23	0.427	0.475	/
		2472	-3.2	-2.87	0.479	0.516	/
	802.11n(H T20)	2412	-0.66	0.02	0.859	1.005	1.86
		2442	-0.73	-0.42	0.845	0.908	1.75
		2472	-0.43	-0.09	0.906	0.979	1.89
	802.11n(H T40)	2422	-3.71	-3.21	0.426	0.478	0.90
		2442	-3.7	-3.39	0.427	0.458	0.88
		2462	-3.79	-3.53	0.418	0.444	0.86

Test voltage (V)	Mode	Channel (MHz)	Rated output power (mW/MHz)	Tolerance (%) ANT 1	Tolerance (%) ANT 2	Total Tolerance (%)	Limit
DC=12V	802.11b	2412	2	-49.05	-46.55	/	10mW/MHz z +20%
		2442	2	-52.25	-50.10	/	
		2472	2	-49.40	-46.05	/	
	802.11g	2412	2	-78.50	-73.50	/	
		2442	2	-78.65	-76.25	/	
		2472	2	-76.05	-74.20	/	
	802.11n(H T20)	2412	3	-71.37	-66.50	-38.00	5mW/MHz +20%
		2442	3	-71.83	-69.73	-41.67	
		2472	3	-69.80	-67.37	-37.00	
	802.11n(H T40)	2422	3	-85.80	-84.07	-70.00	
		2442	3	-85.77	-84.73	-70.67	
		2462	3	-86.07	-85.20	-71.33	

9. Occupied Bandwidth And Spread-Spectrum Bandwidth Measurement

9.1 Block Diagram Of Test Setup



9.2 Limit

Item	Limits
Occupied Band Width:	802.11b,g,n(HT20): 26MHz or less

9.3 Test Procedure

1. Setting of SA is following as: RB: 300kHz / VB:300kHz / SPAN: 40MHz / AT: 30dB Ref: 25.40dBm / 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). SA 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. SA 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.

5. Spread Spectrum Factor limit is greater than 5

6. Spread Factor=Spread Bandwidth/modulation rate. The modulation rate: MR=1.375 for 802.11b, MR=1.5 for 802.11g/n20, MR=3 for 802.11n40.

9.4 Test Result

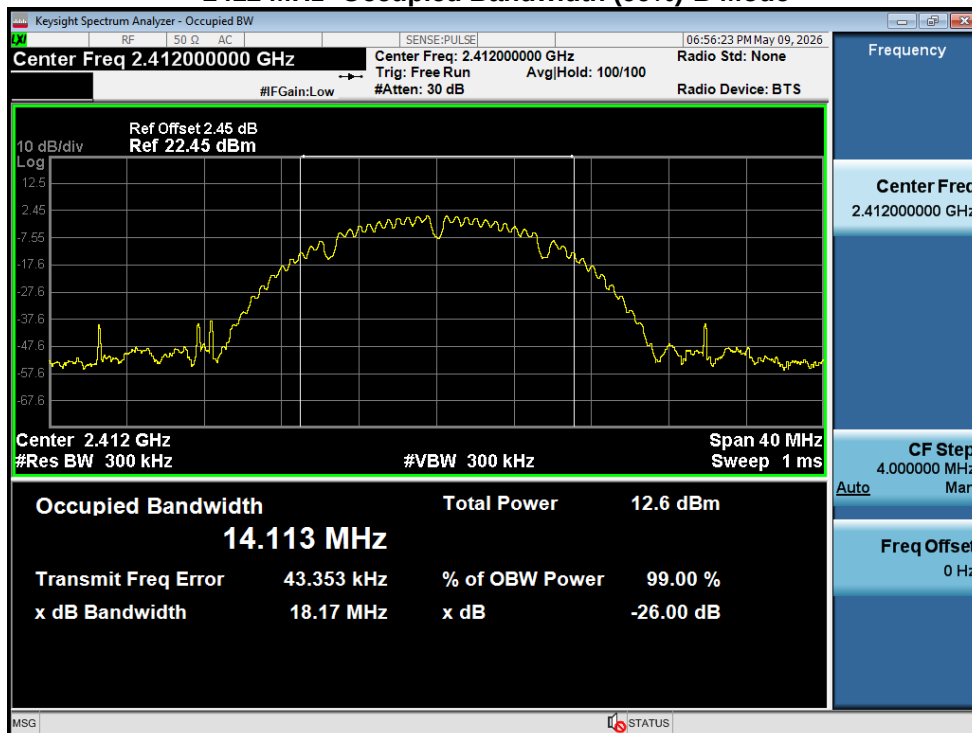
Temperature:	25 ⁰ C		
Humidity:	55 % RH	Test Voltage	DC 12V
Operation Mode:	Transmitting		

Operation Mode	Test Frequency (MHz)	Antenna 1 99% Occupied Bandwidth (MHz)	Antenna 2 99% Occupied Bandwidth (MHz)	Verdict
Normal Voltage-b mode	2412	14.113	14.089	Pass
	2442	14.277	14.064	Pass
	2472	14.169	14.073	Pass
Normal Voltage-g mode	2412	16.549	16.586	Pass
	2442	16.586	16.508	Pass
	2472	16.616	16.499	Pass
Normal Voltage-n20 mode	2412	17.683	17.694	Pass
	2442	17.636	17.614	Pass
	2472	17.691	17.655	Pass
Normal Voltage-n40 mode	2422	35.858	35.88	Pass
	2442	35.868	35.783	Pass
	2462	35.852	35.858	Pass

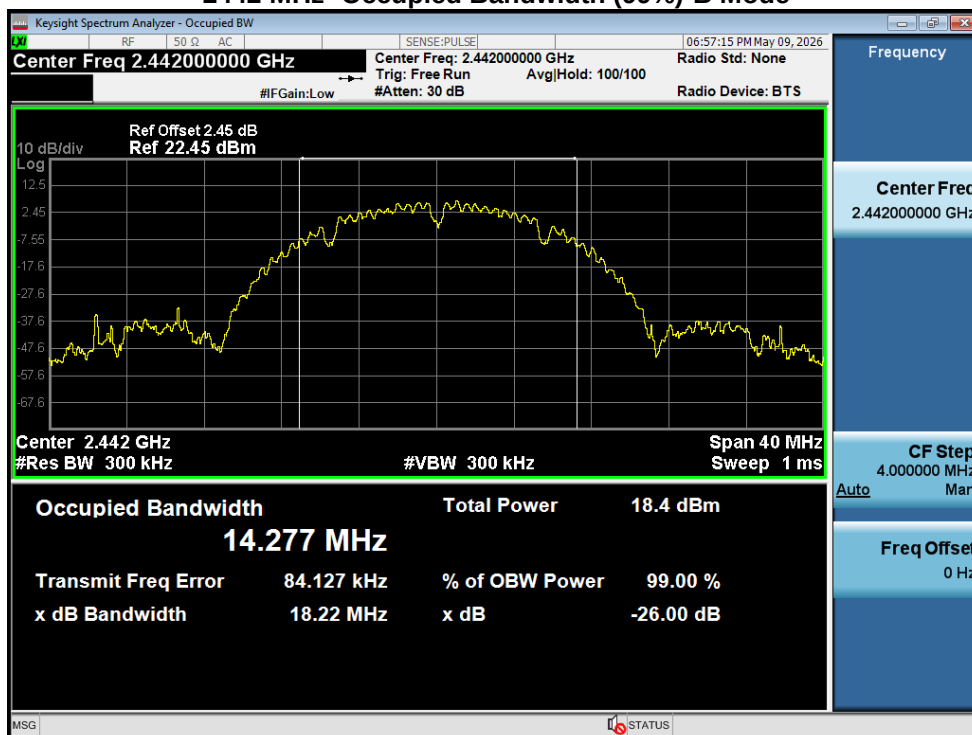
Note: 1(2) Represent the value of antenna 1 and 2, the worst data is Antenna 1, only shown Antenna 1 Plot.

Antenna 1:

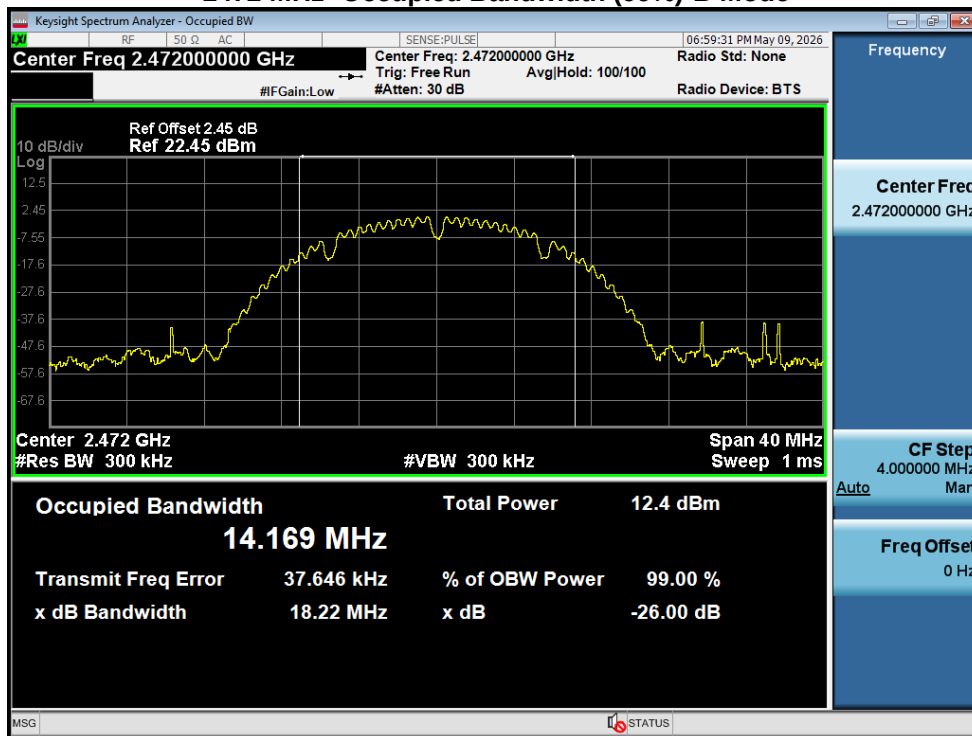
2412 MHz -Occupied Bandwidth (99%)-B Mode



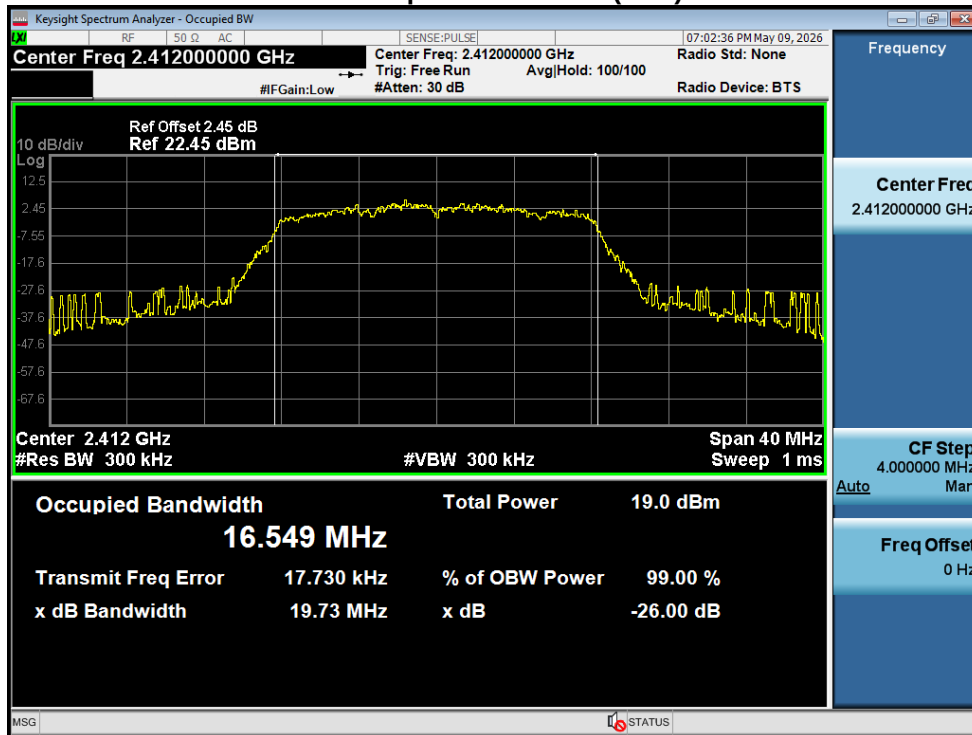
2442 MHz -Occupied Bandwidth (99%)-B Mode



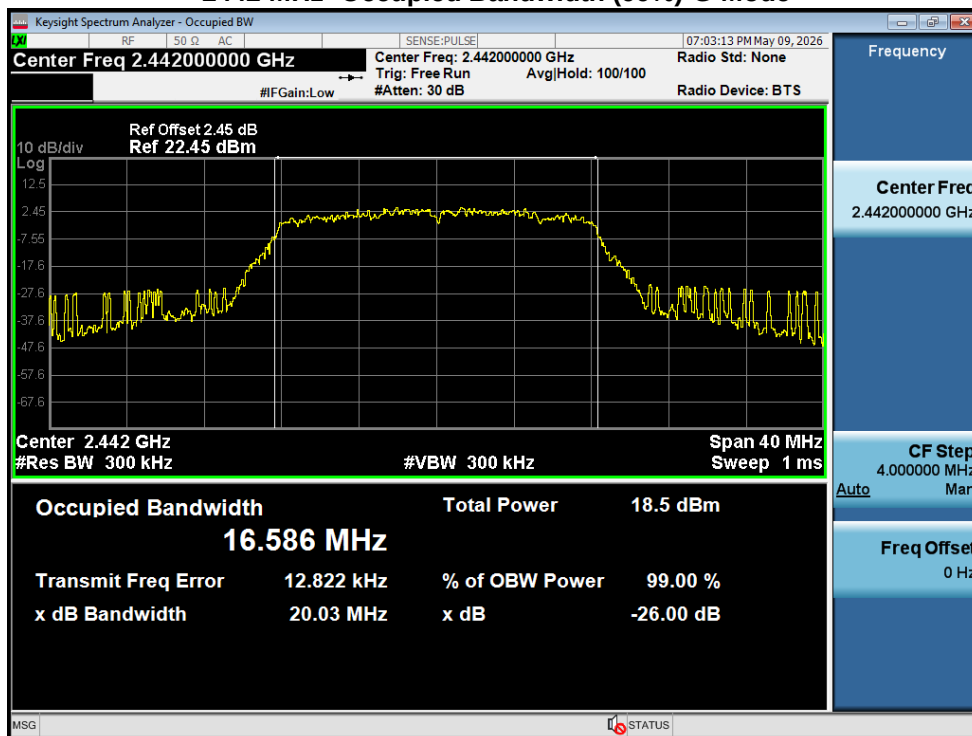
2472 MHz -Occupied Bandwidth (99%)-B Mode



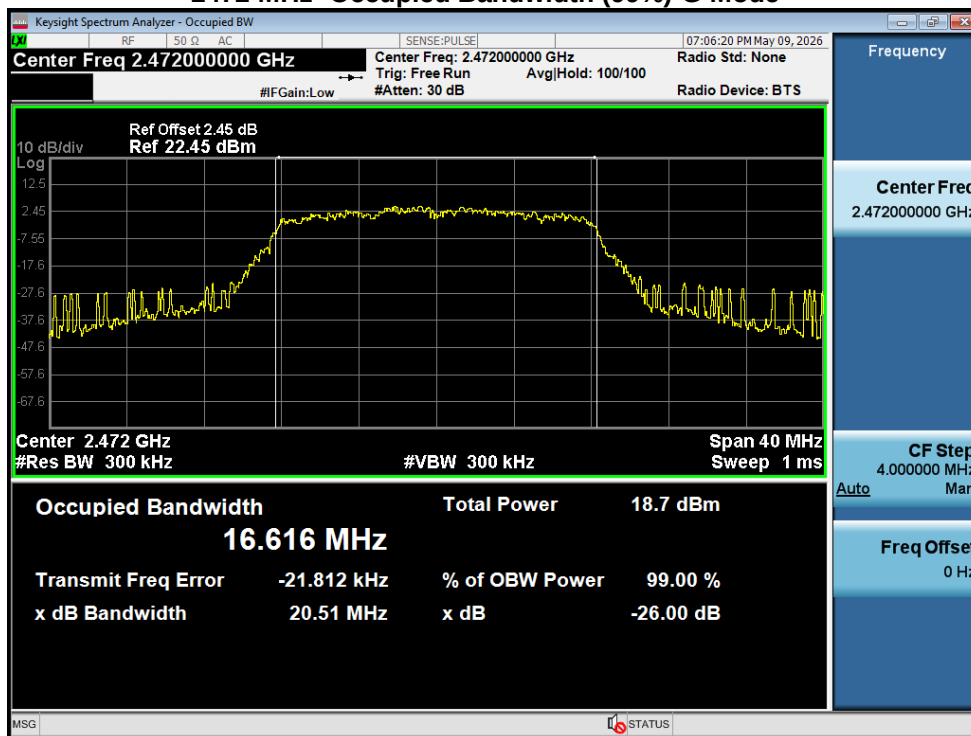
2412 MHz -Occupied Bandwidth (99%)-G Mode



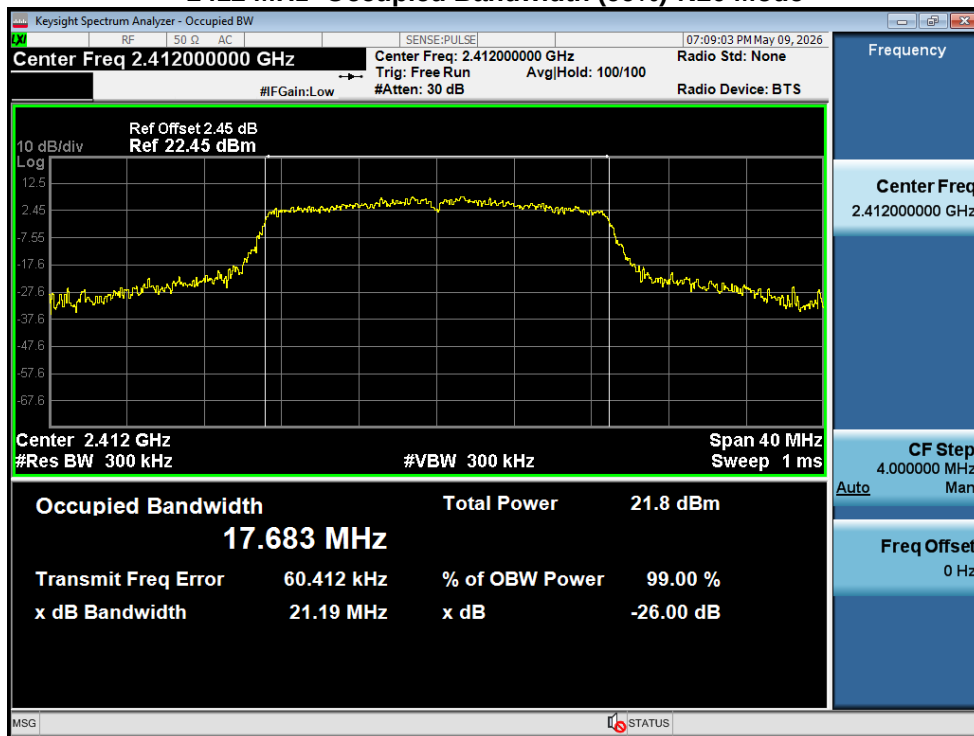
2442 MHz -Occupied Bandwidth (99%)-G Mode



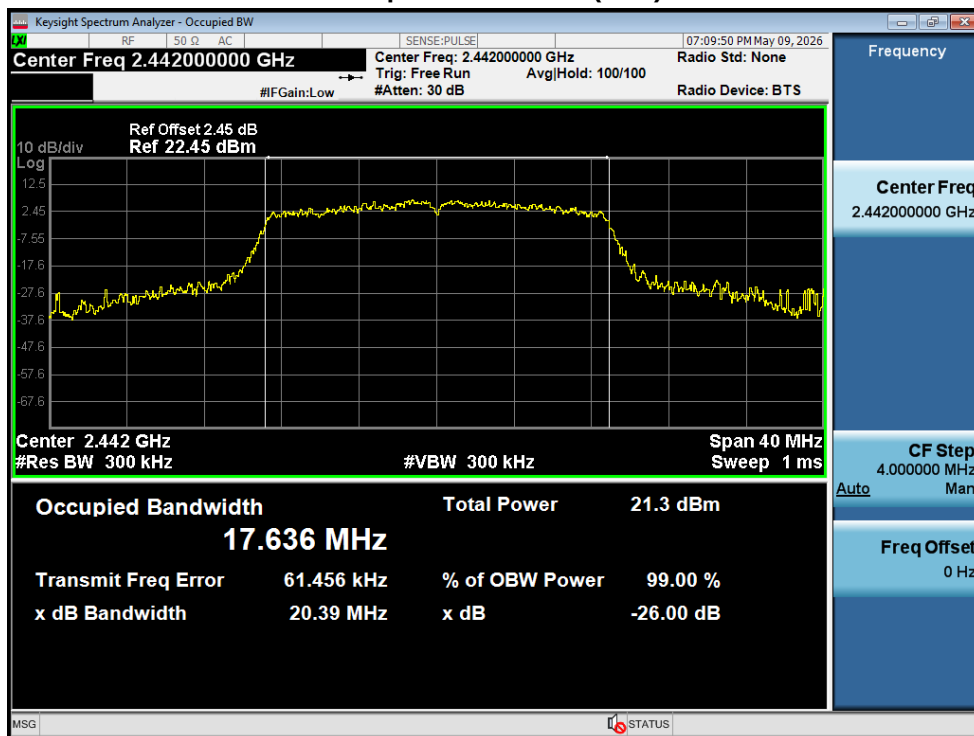
2472 MHz -Occupied Bandwidth (99%)-G Mode



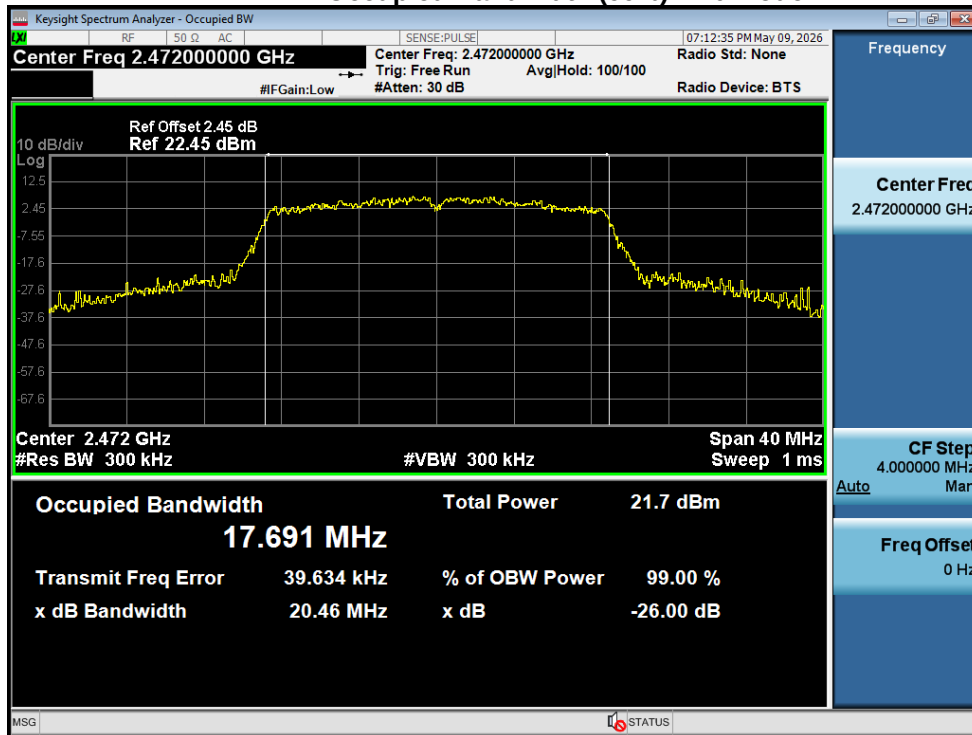
2412 MHz -Occupied Bandwidth (99%)-N20 Mode



2442 MHz -Occupied Bandwidth (99%)-N20 Mode



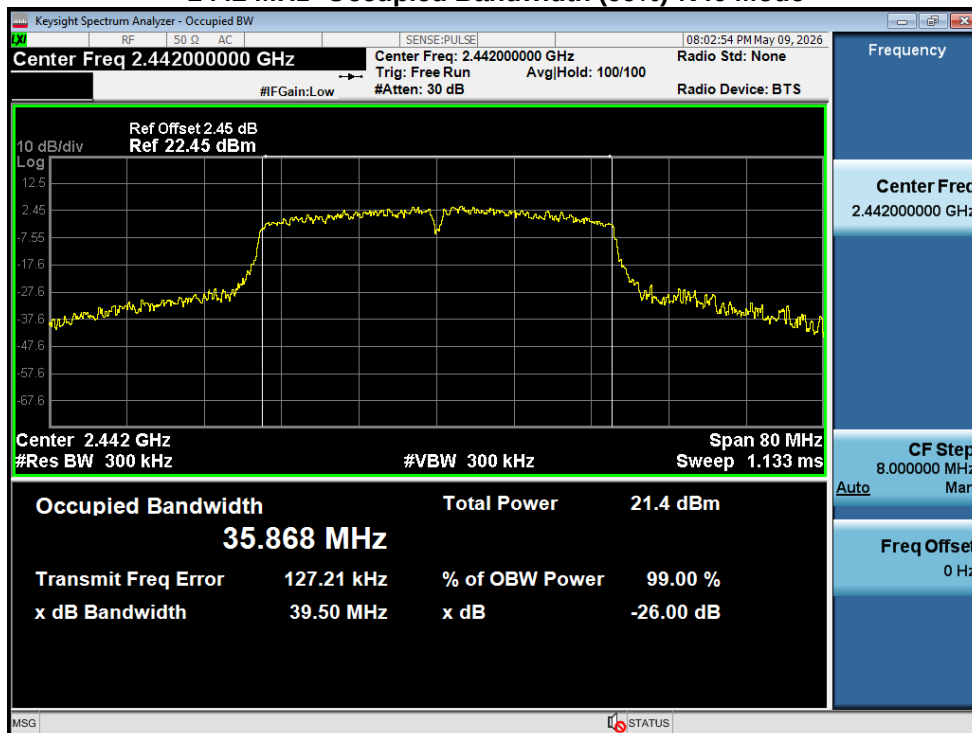
2472 MHz -Occupied Bandwidth (99%)-N20 Mode



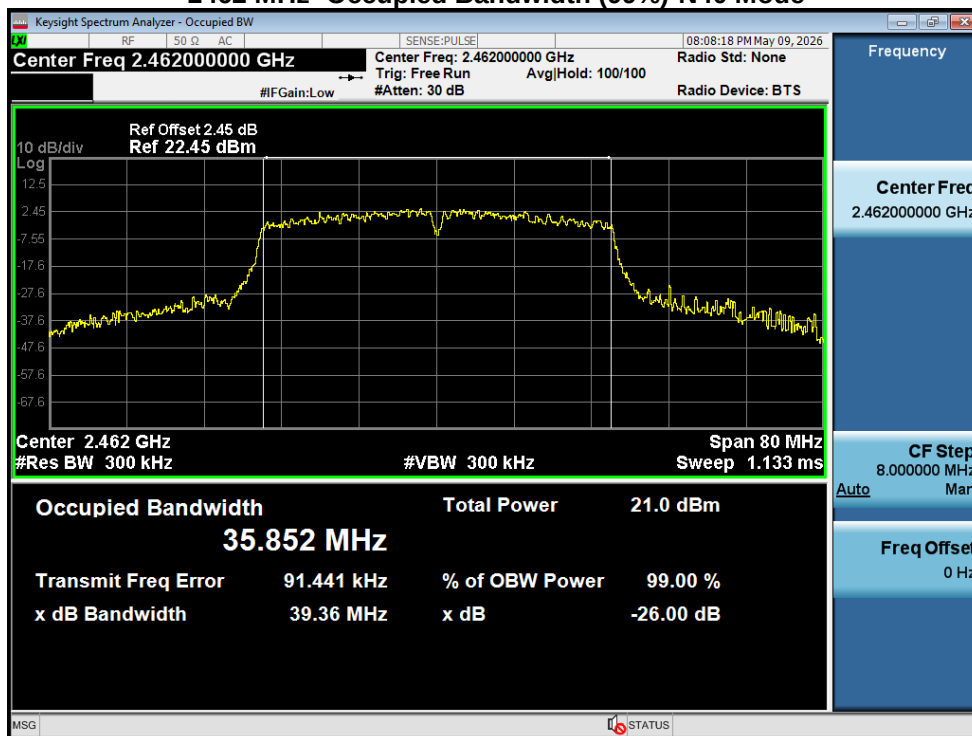
2422 MHz -Occupied Bandwidth (99%)-N40 Mode



2442 MHz -Occupied Bandwidth (99%)-N40 Mode

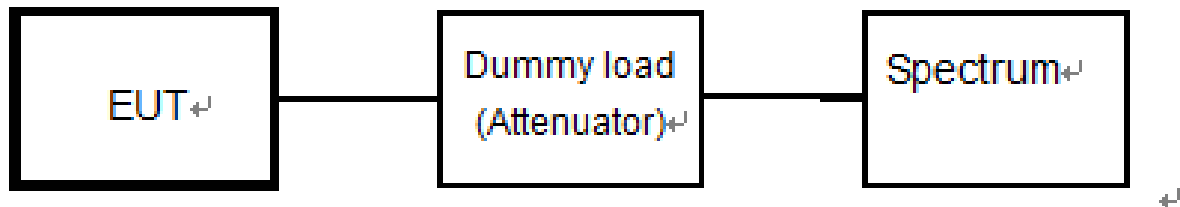


2462 MHz -Occupied Bandwidth (99%)-N40 Mode



10. Unwanted Emission Intensity Measurement

10.1 Block Diagram Of Test Setup



10.2 Limit

Item	Limits
TX Spurious Emission	$\leq 0.25 \mu\text{W/MHz}$ (-36dBm) ($30\text{MHz} \leq f \leq 1000\text{MHz}$)
	$\leq 2.5 \mu\text{W/MHz}$ (-26dBm) ($1000\text{MHz} < f \leq 2387\text{MHz}$)
	$\leq 25 \mu\text{W/MHz}$ (-16dBm) ($2387\text{MHz} < f \leq 2400\text{MHz}$)
	$\leq 25 \mu\text{W/MHz}$ (-16dBm) ($2483.5\text{MHz} \leq f < 2496.5\text{MHz}$)
	$\leq 2.5 \mu\text{W/MHz}$ (-26dBm) ($2496.5\text{MHz} \leq f < 12500\text{MHz}$)

10.3 Measuring Instruments And Setting

Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB / VB	1 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

10.4 Test Procedure

1. EUT have transmitted the maximum modulation signal and fixed channelize.
2. Setting of SA is following as: Below 1GHz RB:100KHz / VB:100KHz Above 1GHz RB:1MHz / VB:1MHz / AT: 20dB Ref: 10dBm / Sweep time: Auto Sweep Mode: Continuous sweep / Detect mode: Positive peak Trace mode: Max hold
3. Setting of SA is following as 30MHz and stop frequency 1000MHz Then to mark peak reading value + cable loss shall be less than 0.25 μ W (-36dBm).
4. Setting of SA is following as 1000MHz and stop frequency 2387MHz Then to mark peak reading value + cable loss shall be less than 2.5 μ W (-26dBm).
5. SA adjusted to start frequency 2387MHz and stop frequency 2400MHz. Then to mark peak reading value + cable loss shall be less than 25 μ W (-16dBm).
6. SA adjusted to start frequency 2483.5MHz and stop frequency 2496.5MHz Then to mark peak reading value + cable loss shall be less than 25 μ W (-16dBm)
7. SA adjusted to start frequency 2496.5MHz and stop frequency 12500MHz Then to mark peak reading value + cable loss shall be less than 2.5 μ W (-26dBm)

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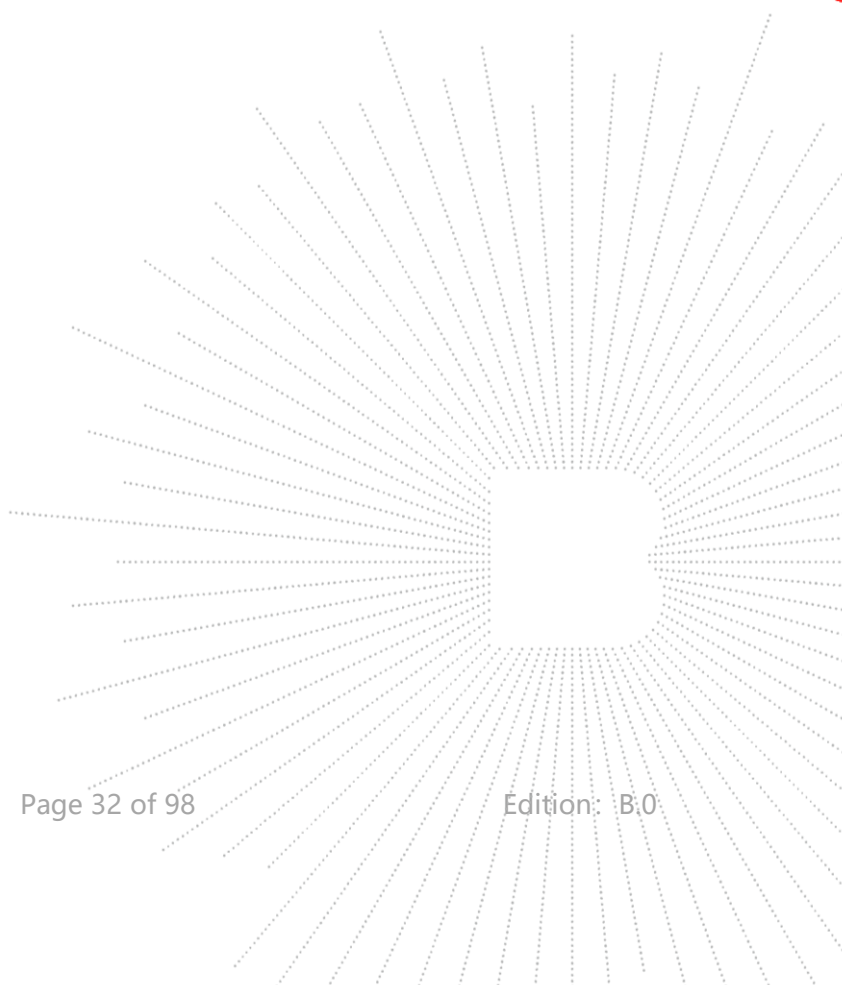
10.5 Test Result

Temperature:	25°C		
Humidity:	55 % RH	Test Voltage	DC 12V

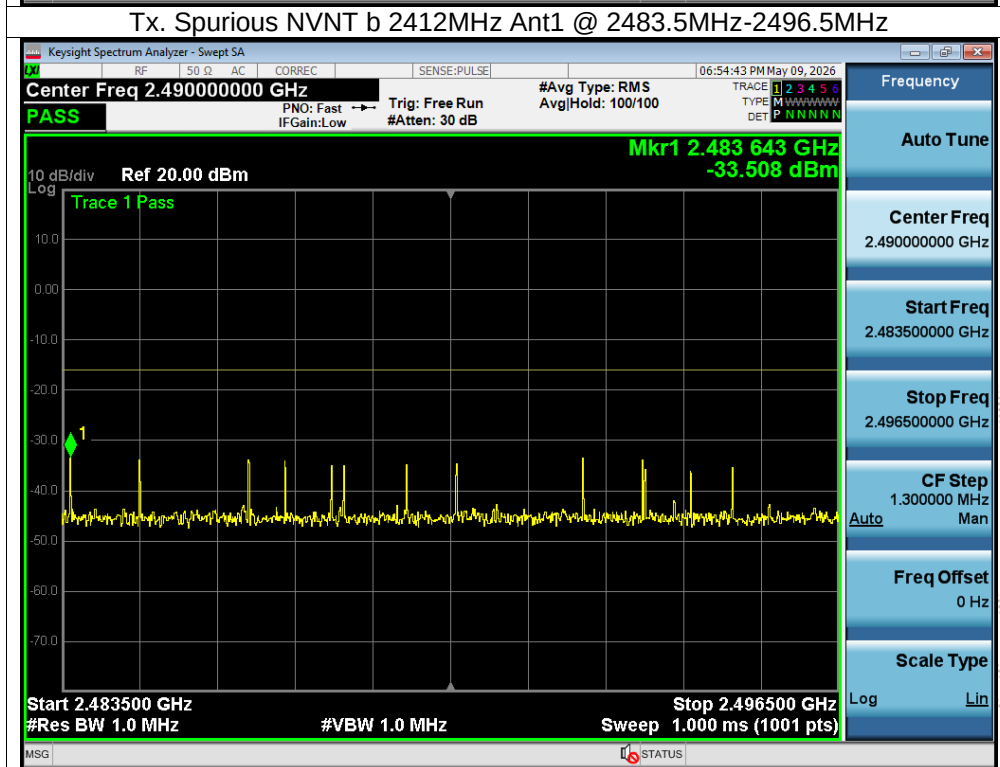
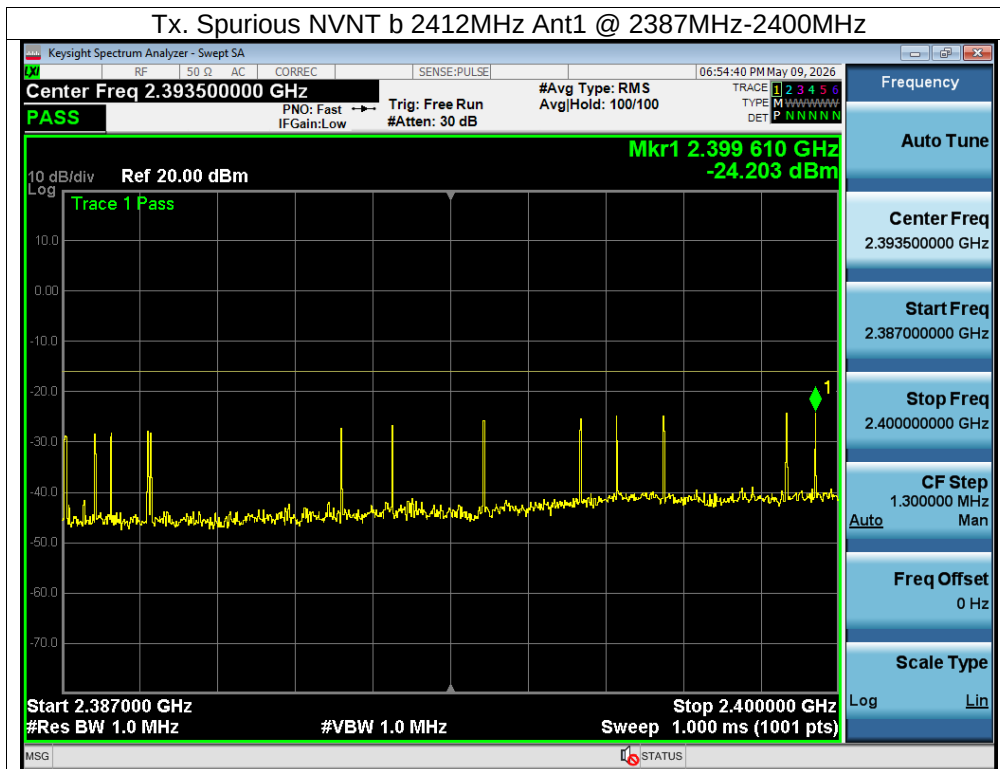
The worst test channel of all channels was showed as the follow: only shown Antenna 1 Plot.

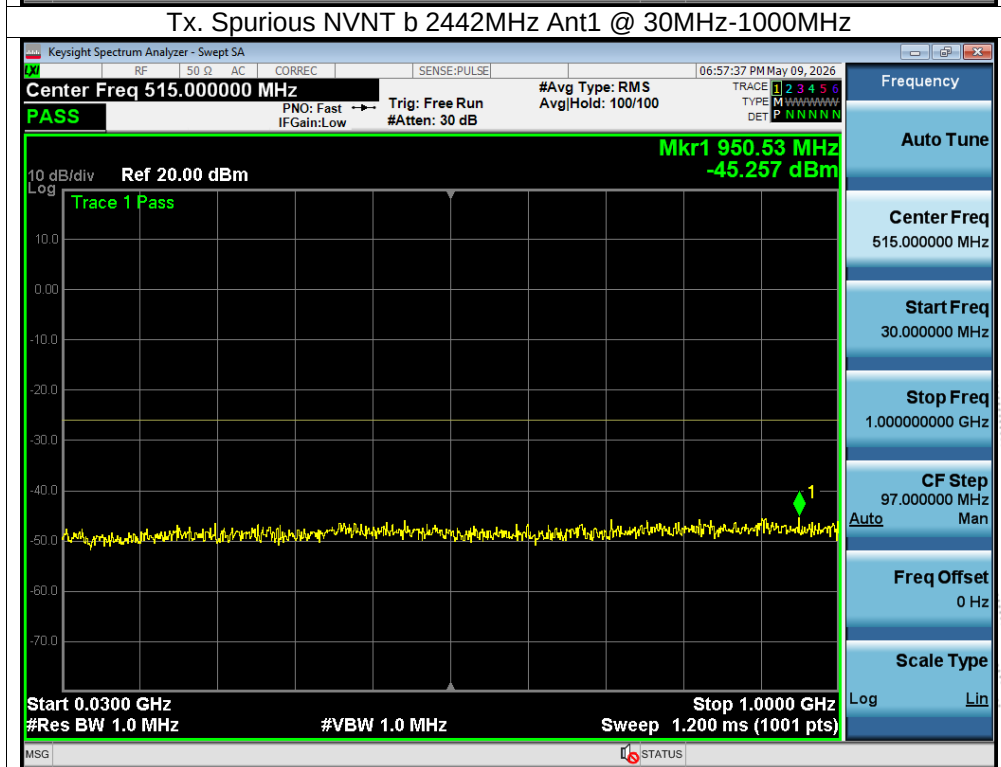
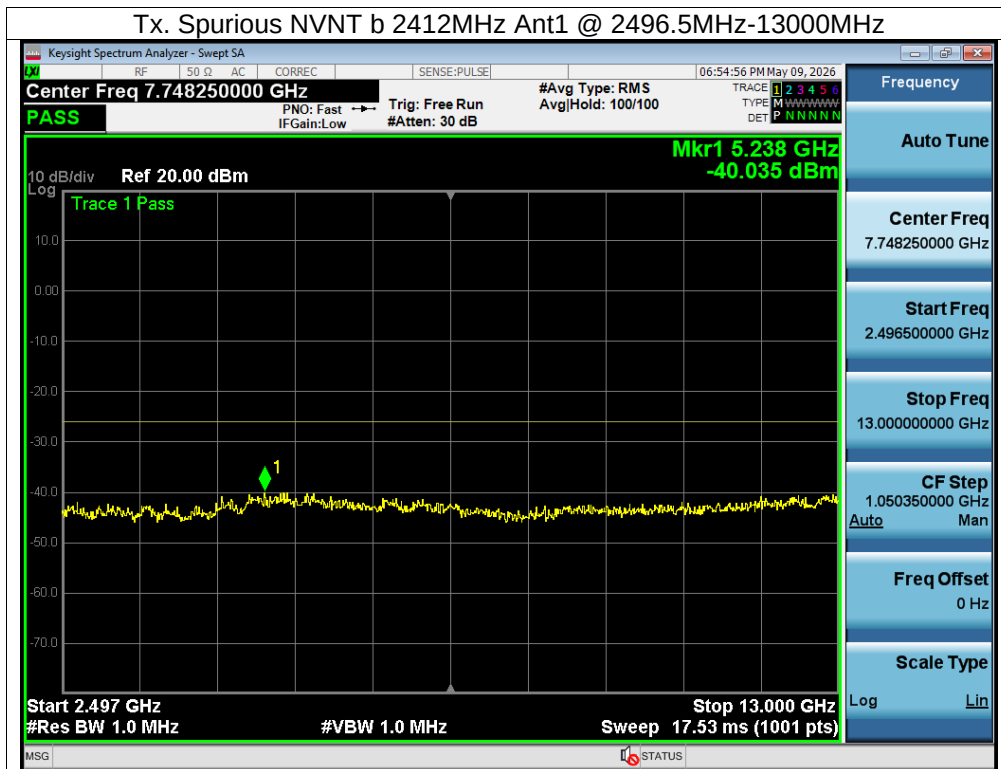
Mode	Frequency (MHz)	Range (MHz)	Emission Frequency (MHz)	Max Peak Value (dBm)	Max RMS Value (dBm)	Max Peak Value (uW)	Max RMS Value (uW)	Limit Start(uW)	Limit Stop (uW)	Verdict
b	2412	30-1000	920.46	-44.71	NA	0.0338	NA	2.5	2.5	Pass
b	2412	1000-2387	2310.71	-36.42	NA	0.228	NA	2.5	2.5	Pass
b	2412	2387-2400	2399.61	-24.20	NA	3.8019	NA	25	25	Pass
b	2412	2483.5-2496.5	2483.64	-33.50	NA	0.4467	NA	25	25	Pass
b	2412	2496.5-13000	5237.91	-40.03	NA	0.0993	NA	2.5	2.5	Pass
b	2442	30-1000	950.53	-45.25	NA	0.0299	NA	2.5	2.5	Pass
b	2442	1000-2387	2378.68	-35.88	NA	0.2582	NA	2.5	2.5	Pass
b	2442	2387-2400	2393.07	-34.64	NA	0.3436	NA	25	25	Pass
b	2442	2483.5-2496.5	2484.36	-34.06	NA	0.3926	NA	25	25	Pass
b	2442	2496.5-13000	2538.51	-29.47	NA	1.1298	NA	2.5	2.5	Pass
b	2472	30-1000	398.60	-44.90	NA	0.0324	NA	2.5	2.5	Pass
b	2472	1000-2387	2349.55	-40.00	NA	0.1	NA	2.5	2.5	Pass
b	2472	2387-2400	2397.96	-33.16	NA	0.4831	NA	25	25	Pass
b	2472	2483.5-2496.5	2486.33	-24.01	NA	3.9719	NA	25	25	Pass
b	2472	2496.5-13000	2496.50	-29.33	NA	1.1668	NA	2.5	2.5	Pass
g	2412	30-1000	722.58	-44.47	NA	0.0357	NA	2.5	2.5	Pass
g	2412	1000-2387	2387.00	-23.27	-49.83	4.7098	0.0104	2.5	2.5	Pass
g	2412	2387-2400	2399.82	-16.69	-43.14	21.4289	0.0485	25	25	Pass
g	2412	2483.5-2496.5	2486.62	-28.03	NA	1.574	NA	25	25	Pass
g	2412	2496.5-13000	2517.51	-30.23	NA	0.9484	NA	2.5	2.5	Pass
g	2442	30-1000	967.99	-45.02	NA	0.0315	NA	2.5	2.5	Pass
g	2442	1000-2387	2377.29	-31.48	NA	0.7112	NA	2.5	2.5	Pass
g	2442	2387-2400	2390.03	-24.77	NA	3.3343	NA	25	25	Pass
g	2442	2483.5-2496.5	2483.58	-28.13	NA	1.5382	NA	25	25	Pass
g	2442	2496.5-13000	2507.00	-32.52	NA	0.5598	NA	2.5	2.5	Pass
g	2472	30-1000	977.69	-44.40	NA	0.0363	NA	2.5	2.5	Pass
g	2472	1000-2387	2371.74	-31.53	NA	0.7031	NA	2.5	2.5	Pass
g	2472	2387-2400	2399.51	-31.95	NA	0.6383	NA	25	25	Pass
g	2472	2483.5-2496.5	2484.27	-15.77	-43.03	26.485	0.0498	25	25	Pass
g	2472	2496.5-13000	2496.50	-18.23	-48.18	15.0314	0.0152	2.5	2.5	Pass
n20	2412	30-1000	143.49	-43.08	NA	0.0492	NA	2.5	2.5	Pass
n20	2412	1000-2387	2387.00	-17.17	-47.13	19.1867	0.0194	2.5	2.5	Pass
n20	2412	2387-2400	2399.75	-12.72	-37.93	53.4564	0.1611	25	25	Pass
n20	2412	2483.5-2496.5	2484.25	-29.77	NA	1.0544	NA	25	25	Pass
n20	2412	2496.5-13000	2528.01	-28.41	-51.08	1.4421	0.0078	2.5	2.5	Pass
n20	2442	30-1000	363.68	-44.25	NA	0.0376	NA	2.5	2.5	Pass
n20	2442	1000-2387	2375.90	-28.83	-50.43	1.3092	0.0091	2.5	2.5	Pass
n20	2442	2387-2400	2388.13	-29.74	NA	1.0617	NA	25	25	Pass
n20	2442	2483.5-2496.5	2483.64	-24.28	NA	3.7325	NA	25	25	Pass
n20	2442	2496.5-13000	2496.50	-29.87	NA	1.0304	NA	2.5	2.5	Pass
n20	2472	30-1000	438.37	-44.15	NA	0.0385	NA	2.5	2.5	Pass
n20	2472	1000-2387	2382.84	-29.71	NA	1.0691	NA	2.5	2.5	Pass
n20	2472	2387-2400	2398.26	-29.38	NA	1.1535	NA	25	25	Pass
n20	2472	2483.5-2496.5	2484.02	-11.86	-37.5	65.1628	0.1778	25	25	Pass
n20	2472	2496.5-13000	2496.50	-13.59	-45.95	43.7522	0.0254	2.5	2.5	Pass

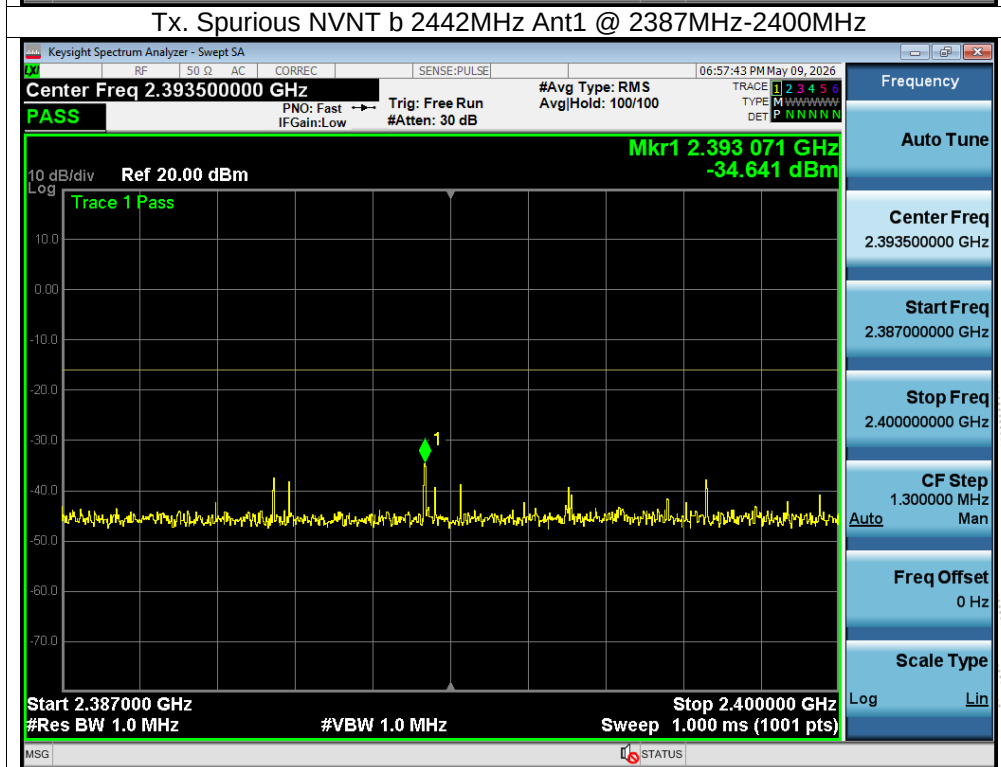
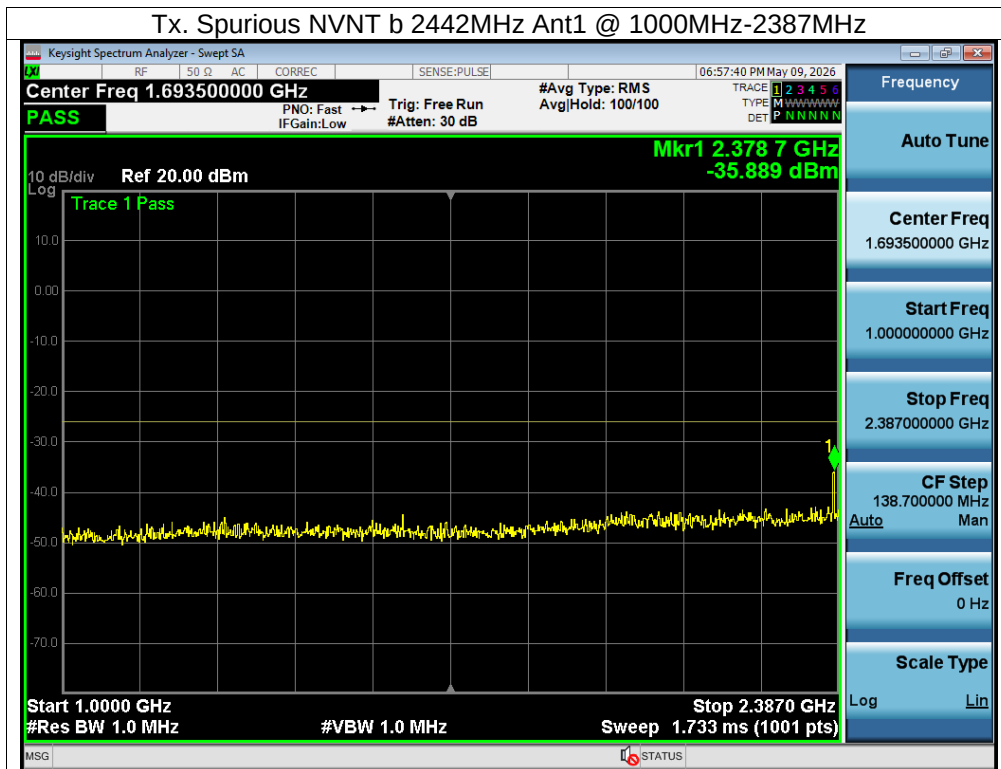
n40	2422	30-1000	705.12	-42.79	NA	0.0526	NA	2.5	2.5	Pass
n40	2422	1000-2387	2360.65	-29.08	NA	1.2359	NA	2.5	2.5	Pass
n40	2422	2387-2400	2399.44	-15.28	-39.63	29.6483	0.1089	25	25	Pass
n40	2422	2483.5-2496.5	2492.02	-28.57	NA	1.39	NA	25	25	Pass
n40	2422	2496.5-13000	2528.01	-28.94	-50.39	1.2764	0.0091	2.5	2.5	Pass
n40	2442	30-1000	712.88	-35.25	NA	0.2985	NA	2.5	2.5	Pass
n40	2442	1000-2387	2377.29	-28.42	-50.23	1.4388	0.0095	2.5	2.5	Pass
n40	2442	2387-2400	2387.38	-29.86	NA	1.0328	NA	25	25	Pass
n40	2442	2483.5-2496.5	2483.92	-24.06	NA	3.9264	NA	25	25	Pass
n40	2442	2496.5-13000	2549.02	-28.97	-50.8	1.2677	0.0083	2.5	2.5	Pass
n40	2462	30-1000	412.18	-43.48	NA	0.0449	NA	2.5	2.5	Pass
n40	2462	1000-2387	2363.42	-28.18	-51.33	1.5205	0.0074	2.5	2.5	Pass
n40	2462	2387-2400	2396.50	-27.90	NA	1.6218	NA	25	25	Pass
n40	2462	2483.5-2496.5	2483.98	-14.00	-39.73	39.8107	0.1064	25	25	Pass
n40	2462	2496.5-13000	2496.50	-17.61	-46.64	17.338	0.0217	2.5	2.5	Pass





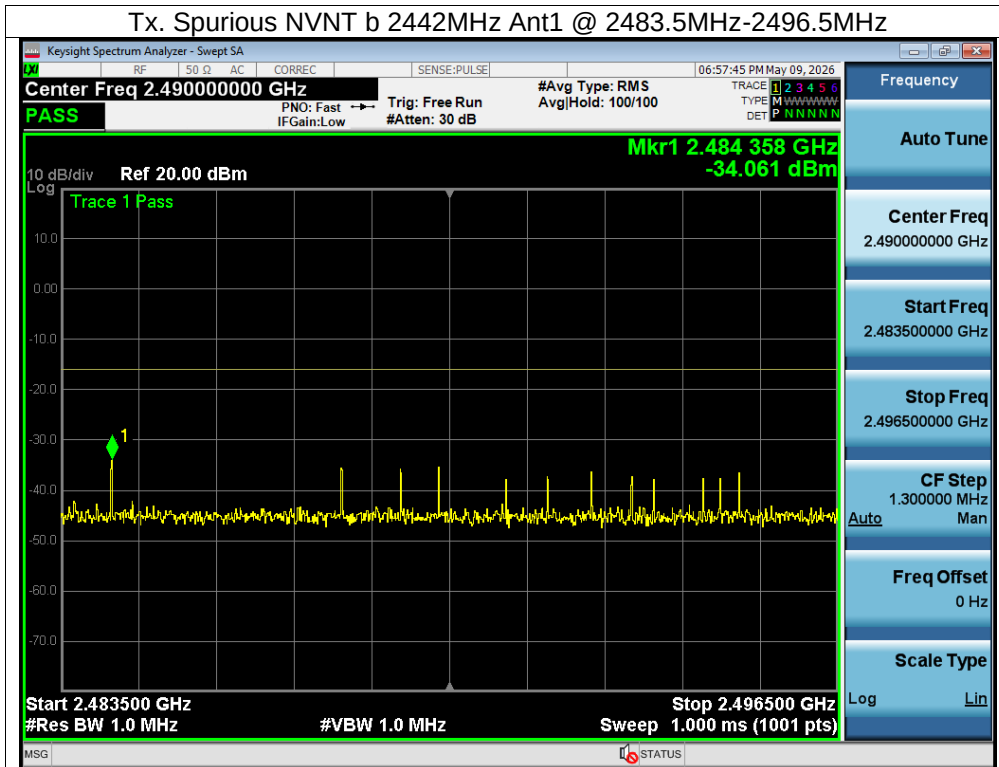




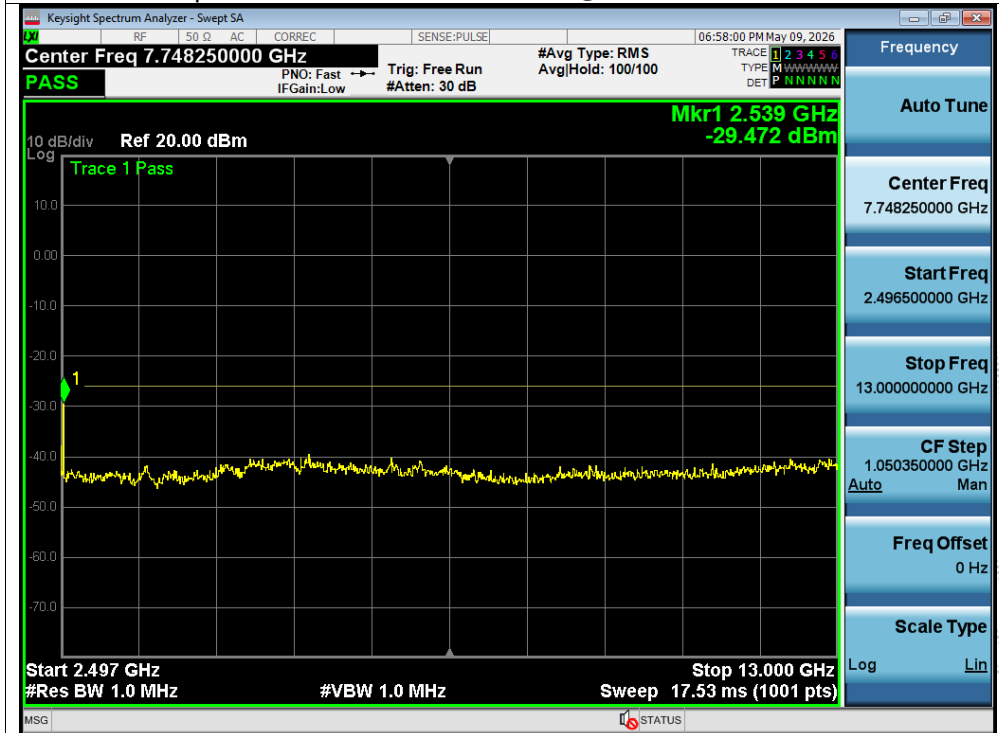


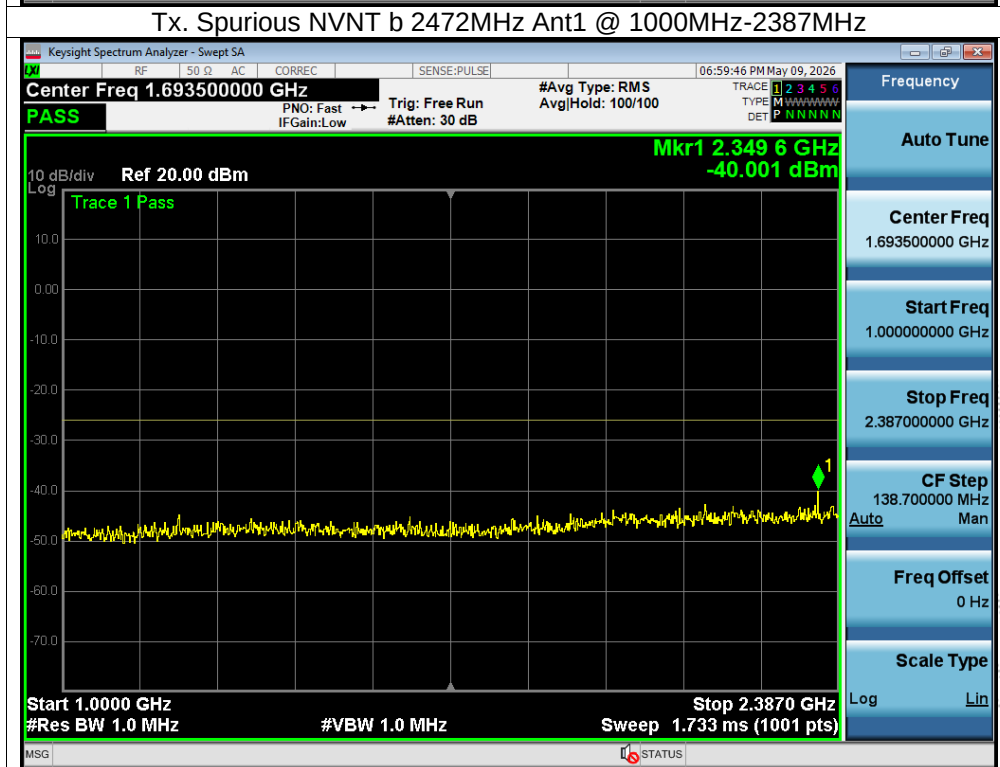
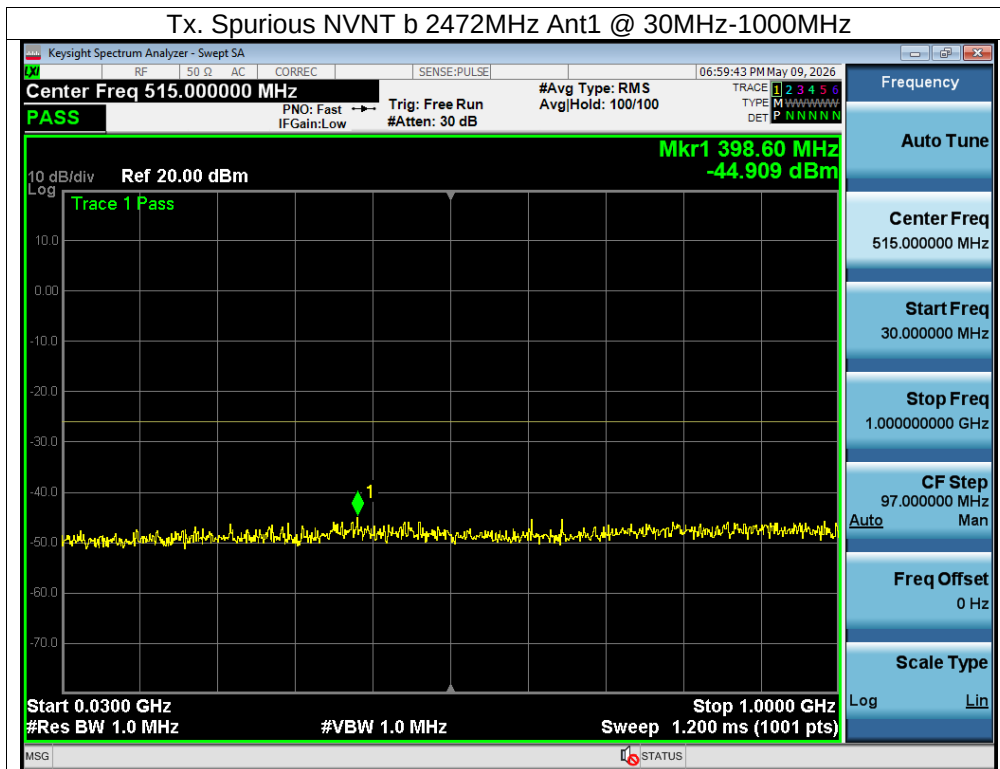


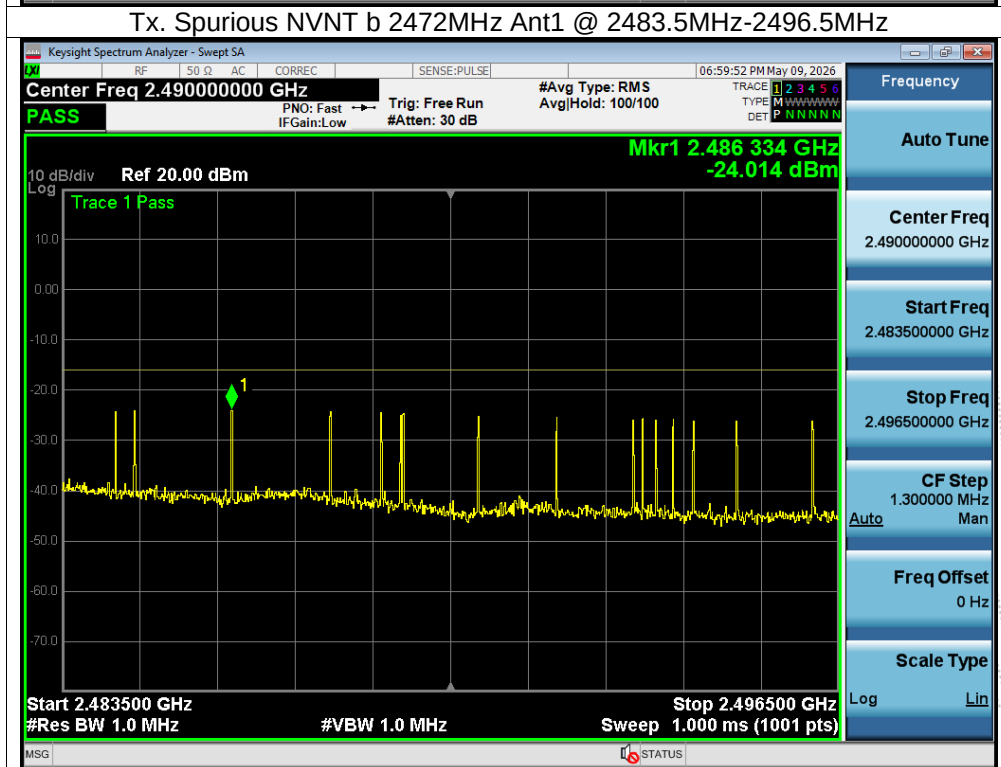
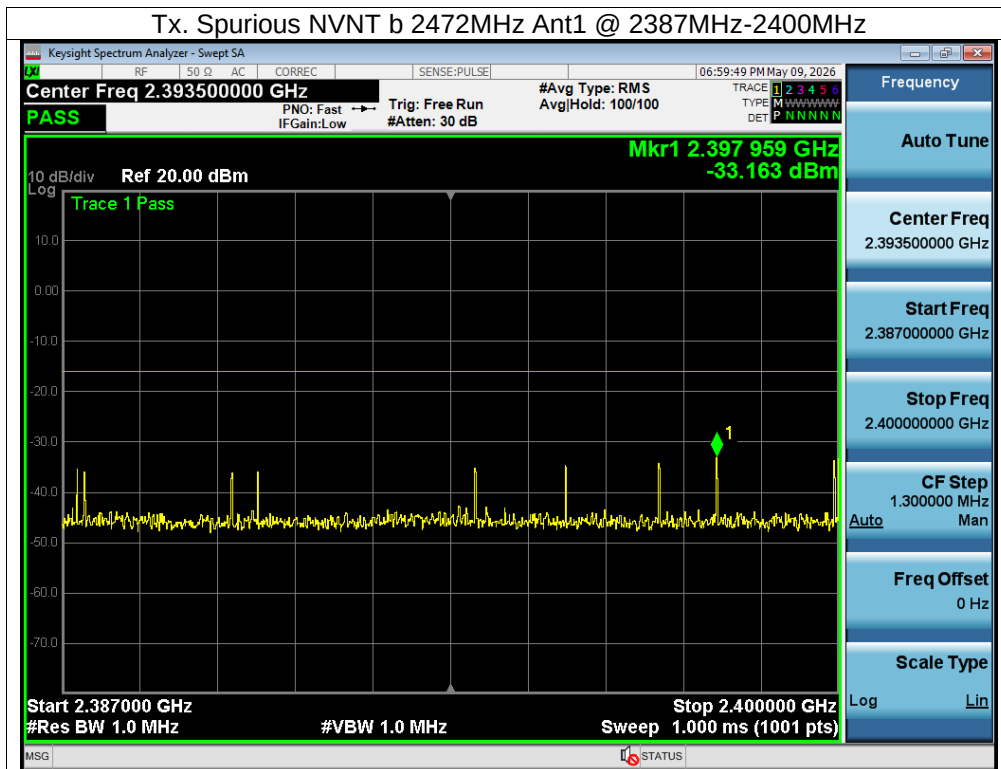
Tx. Spurious NVNT b 2442MHz Ant1 @ 2483.5MHz-2496.5MHz

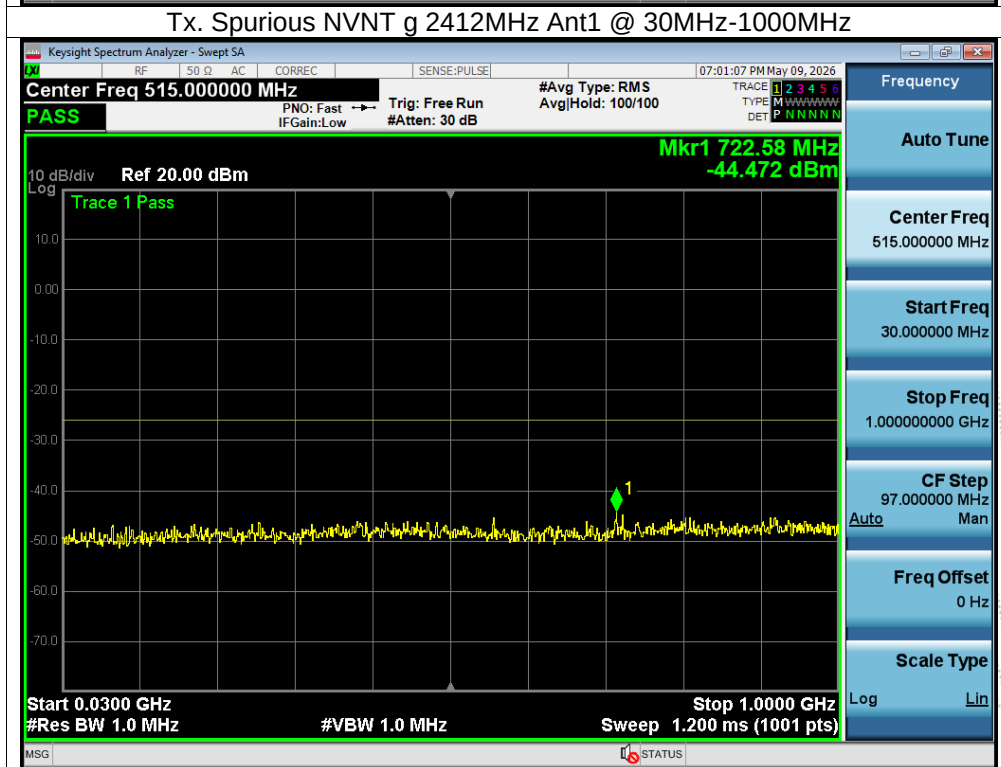
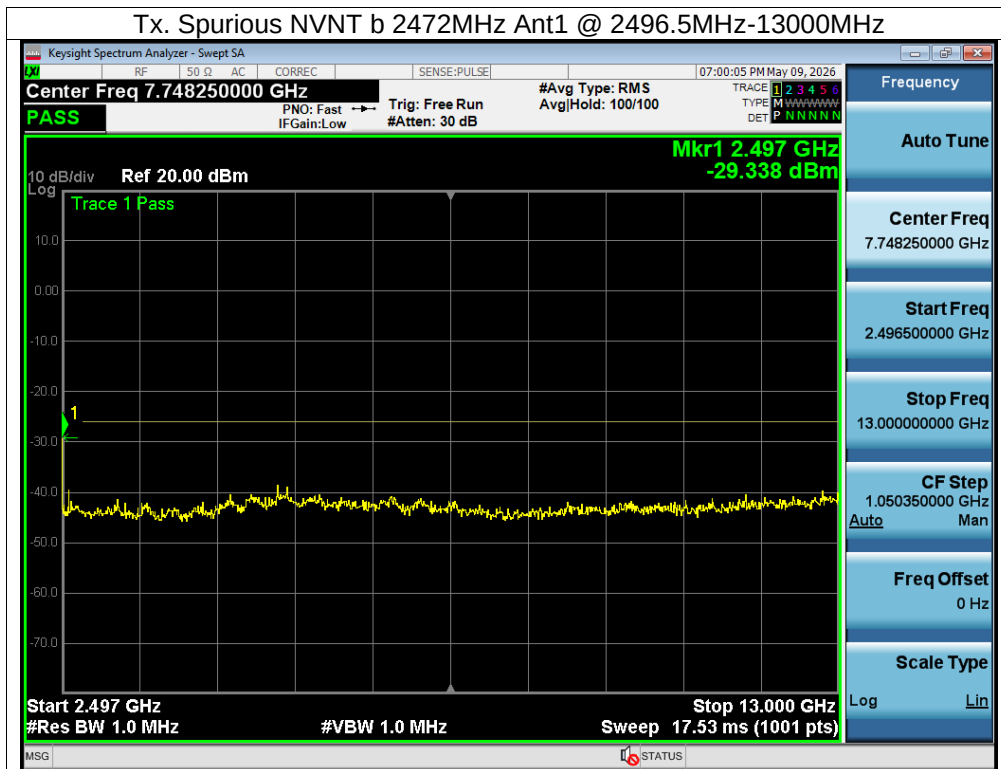


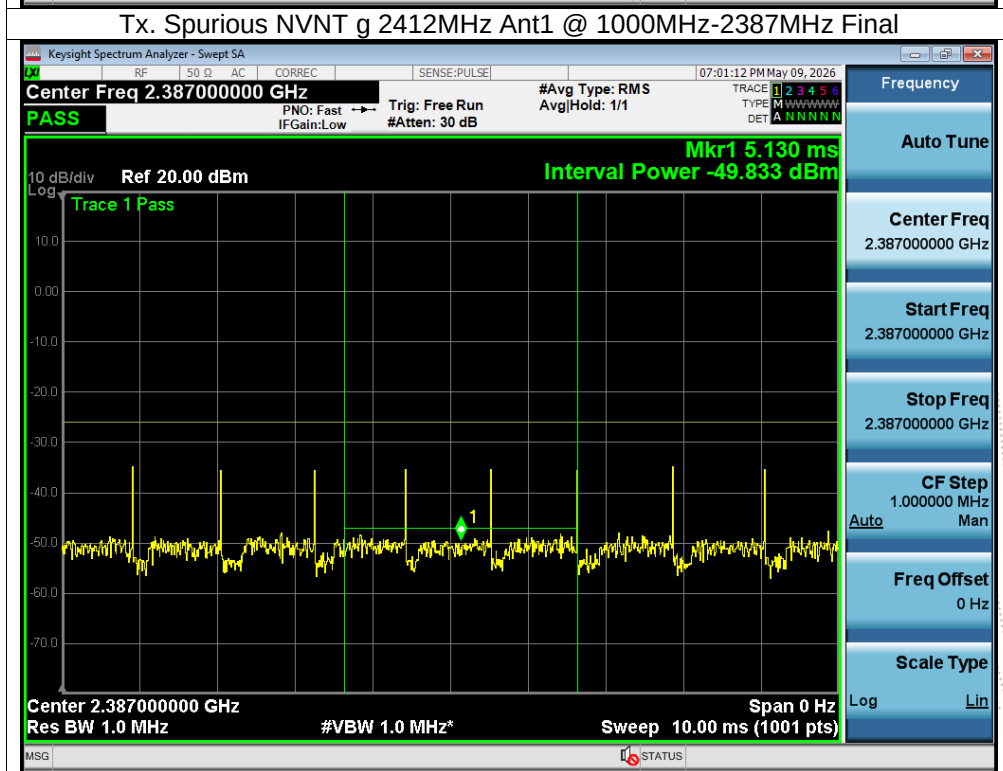
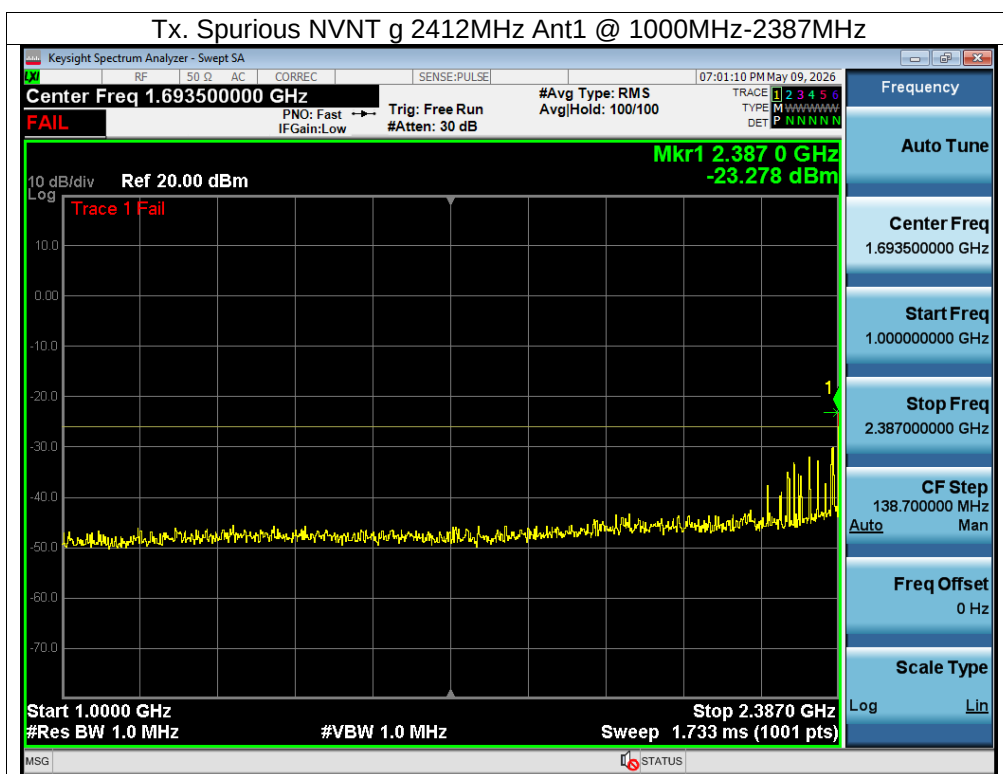
Tx. Spurious NVNT b 2442MHz Ant1 @ 2496.5MHz-13000MHz

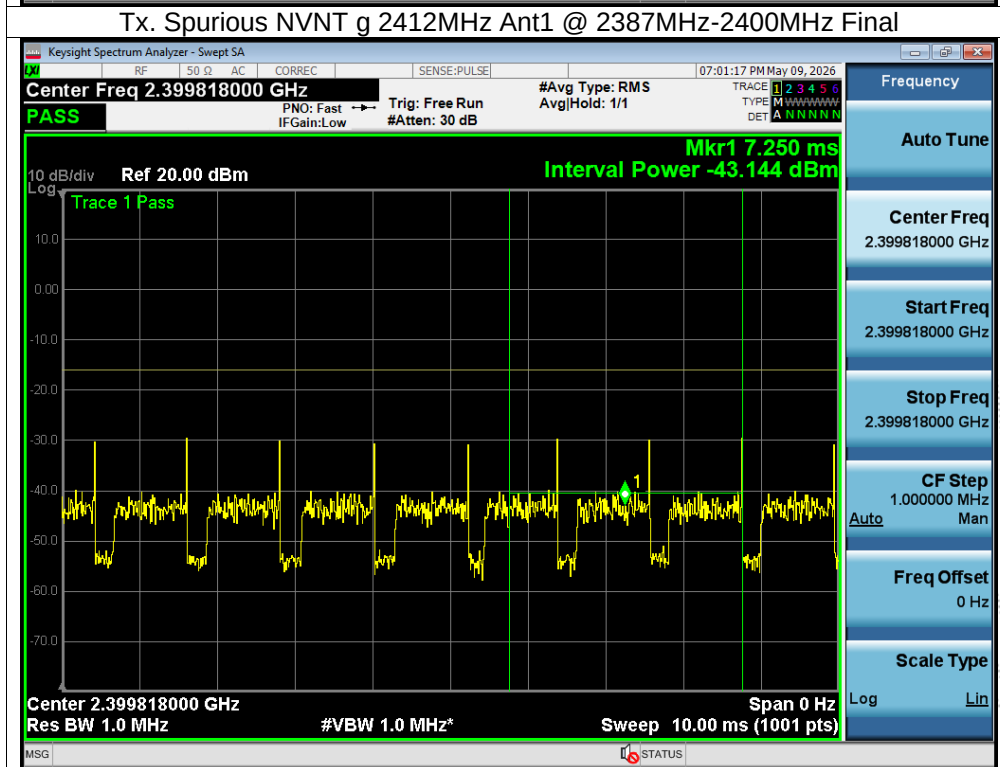
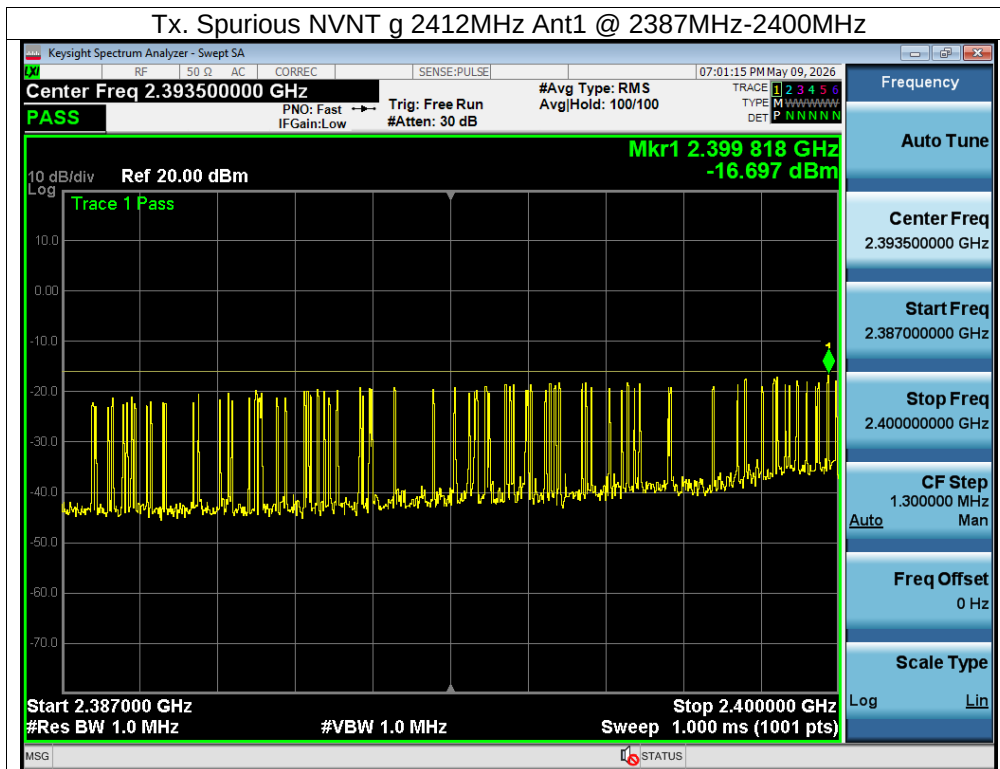


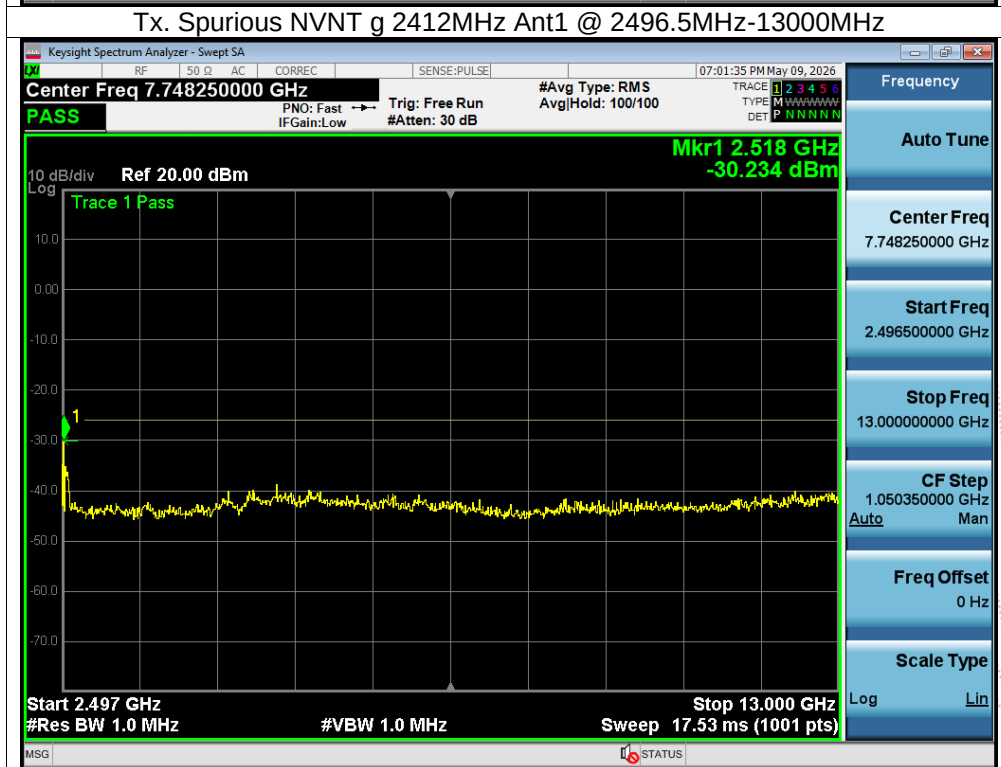
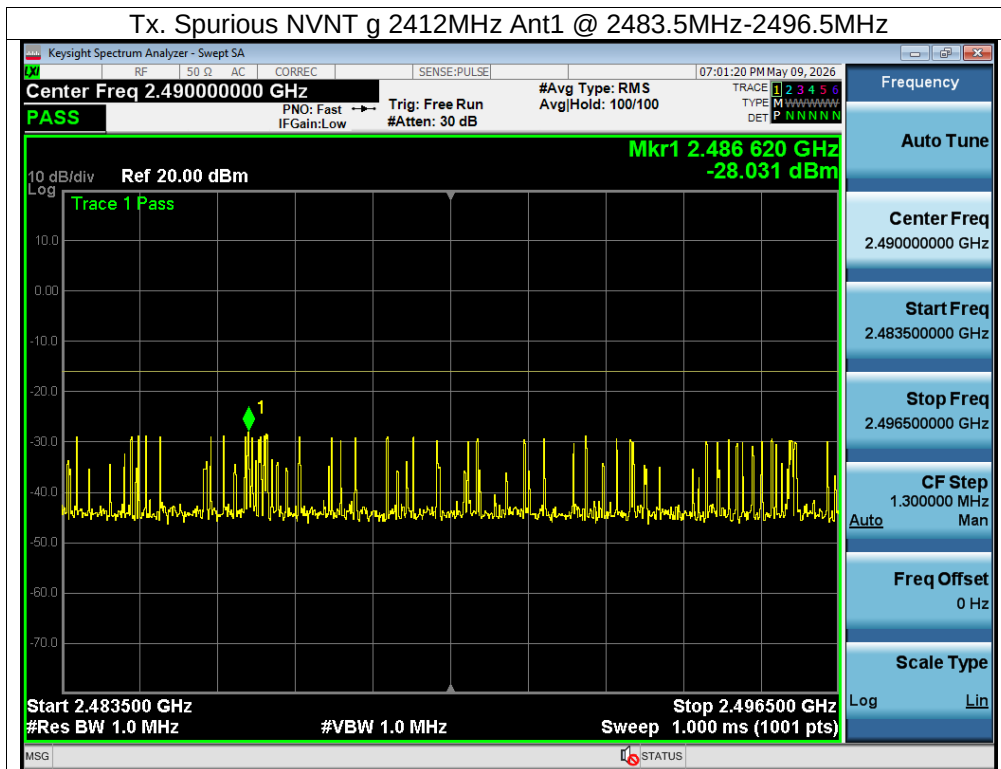


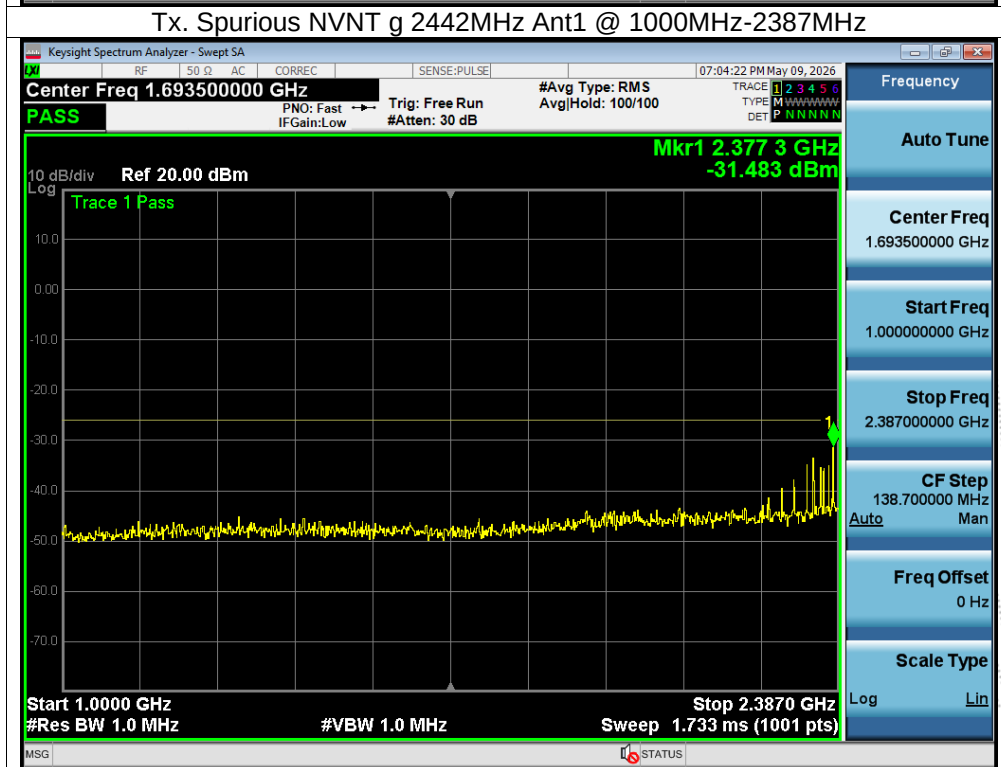
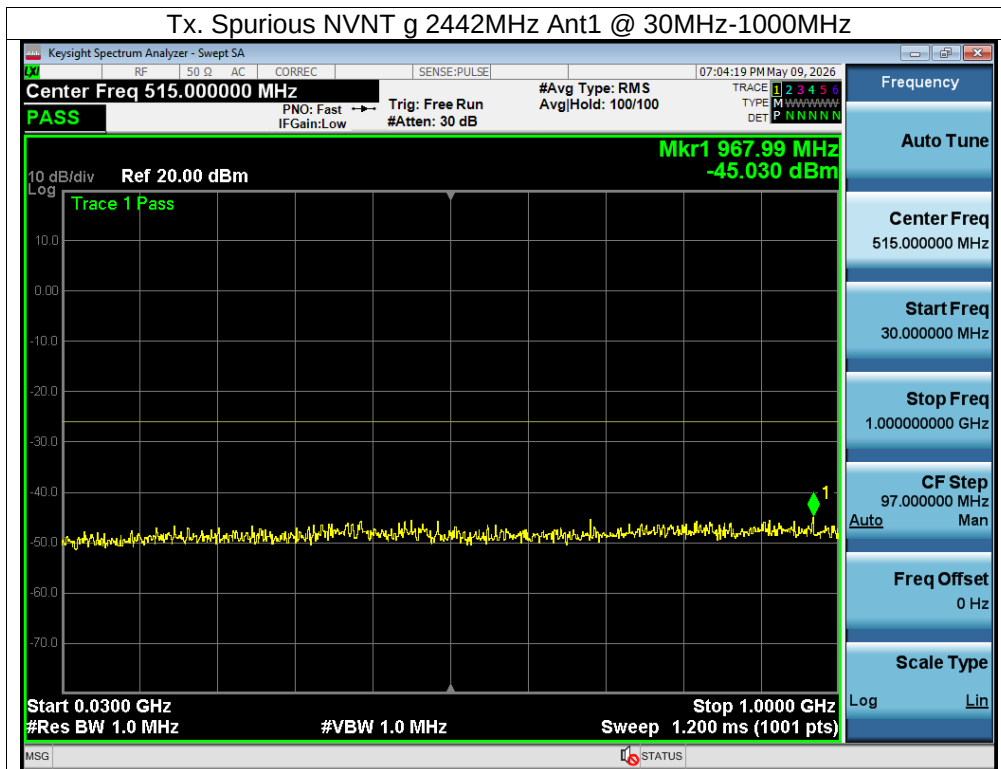


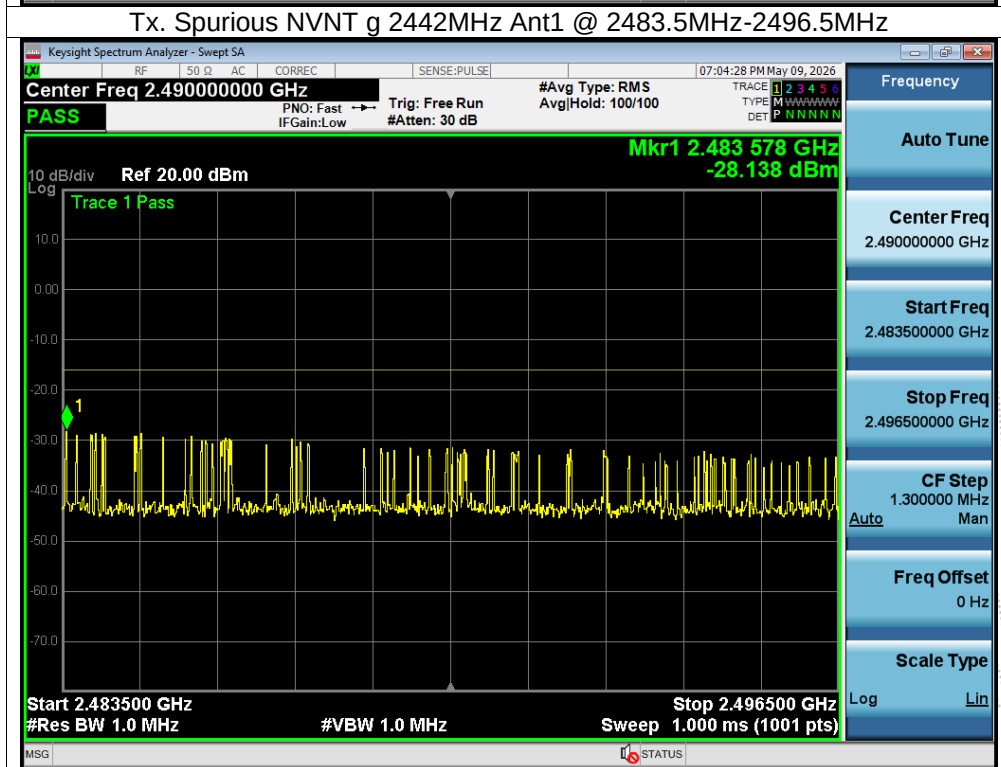
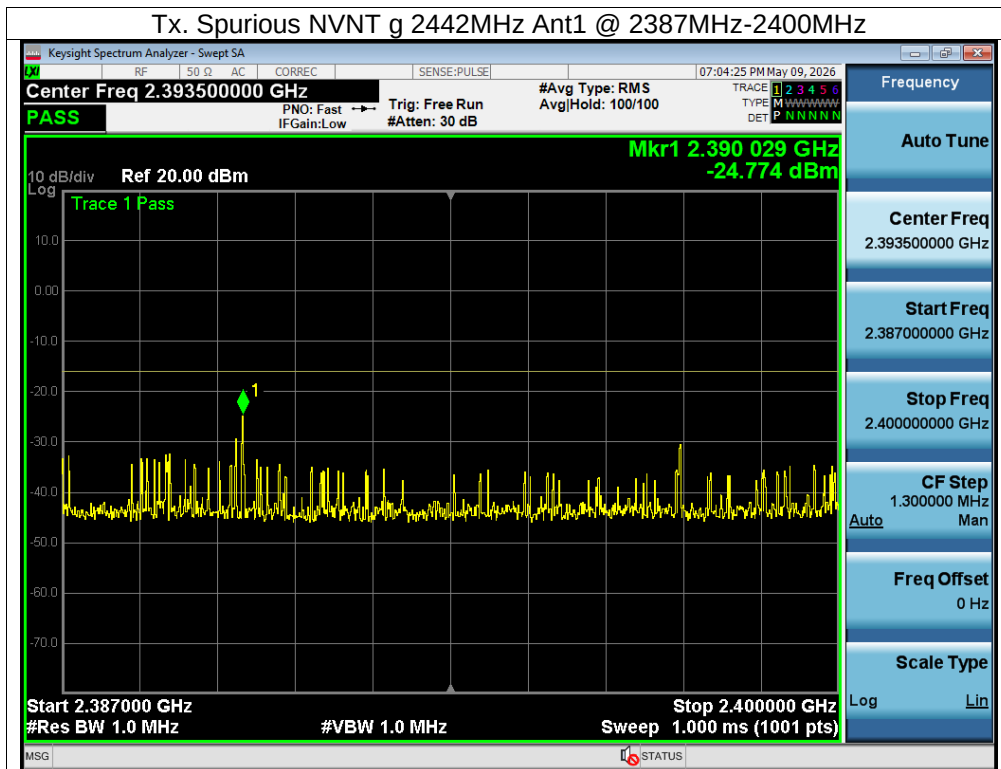


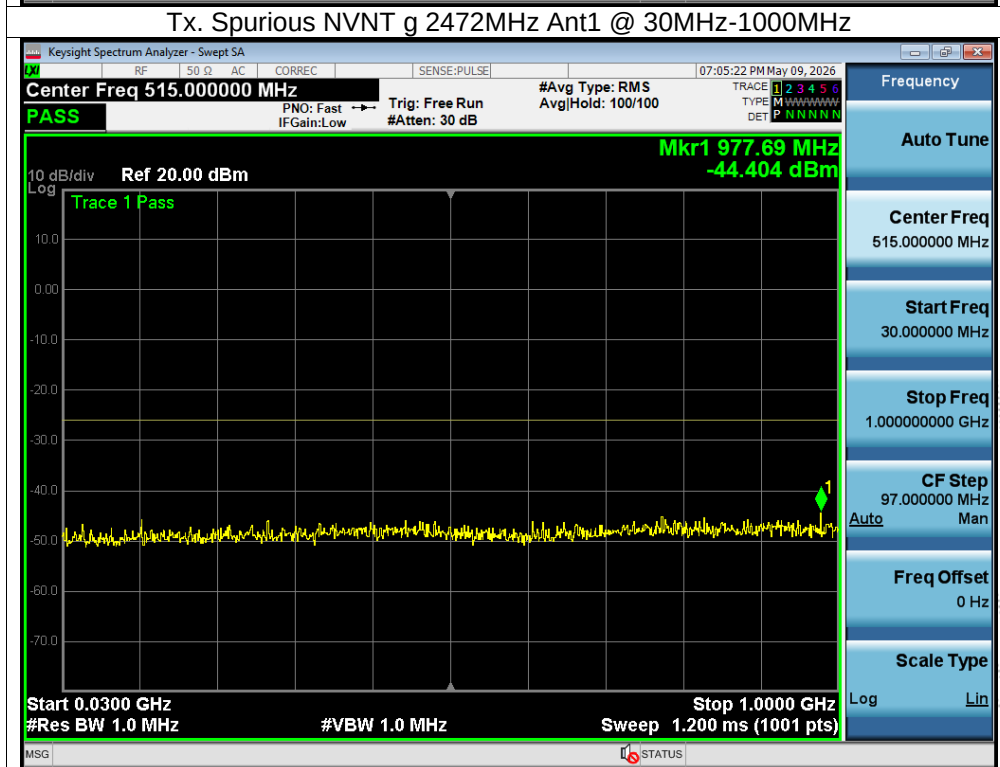
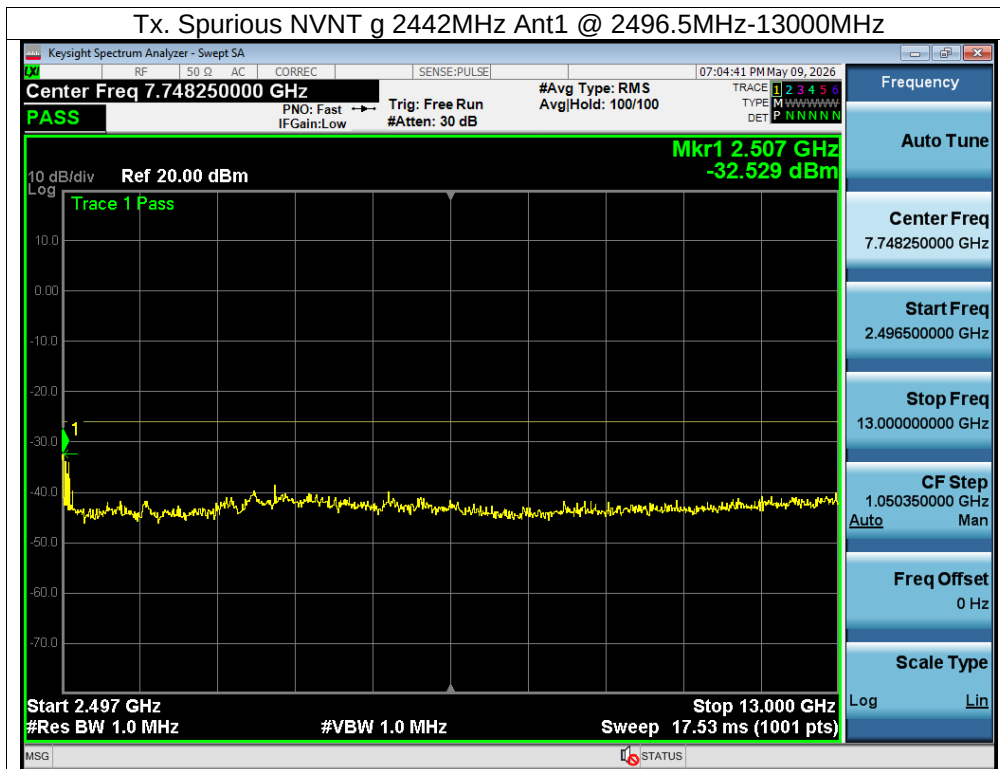


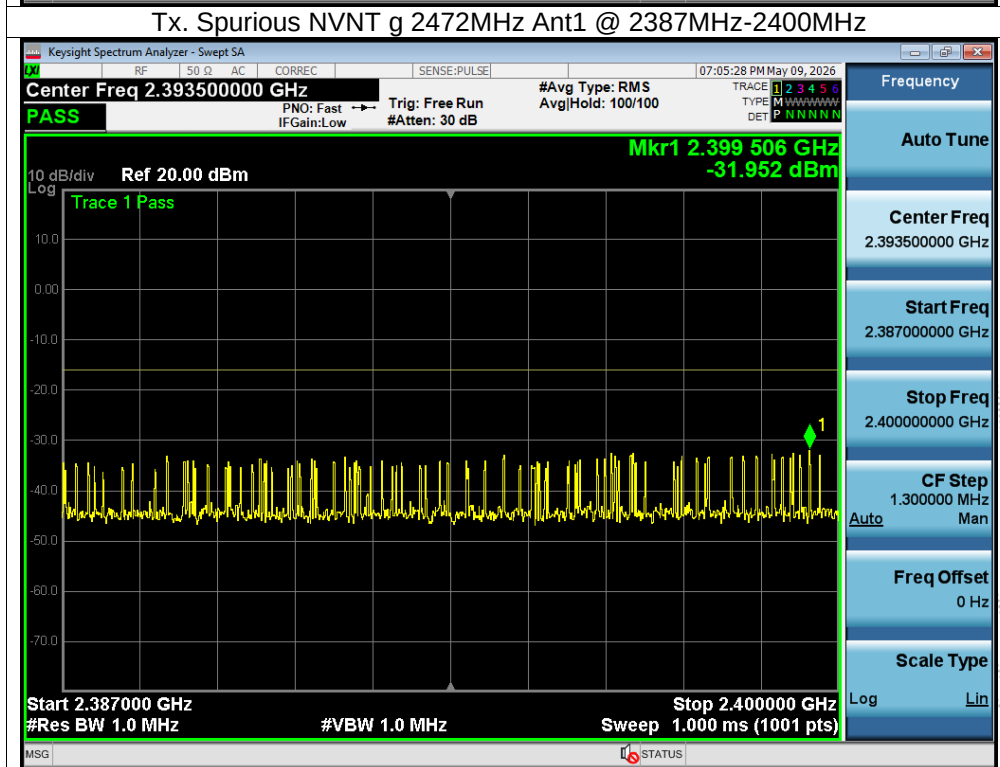
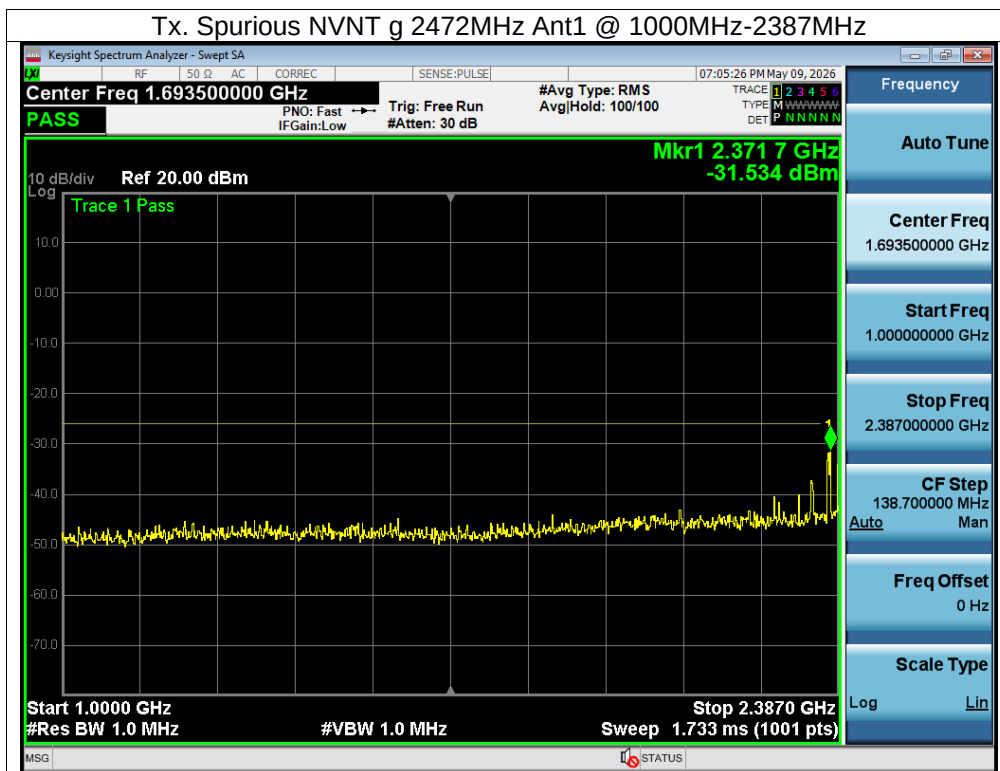


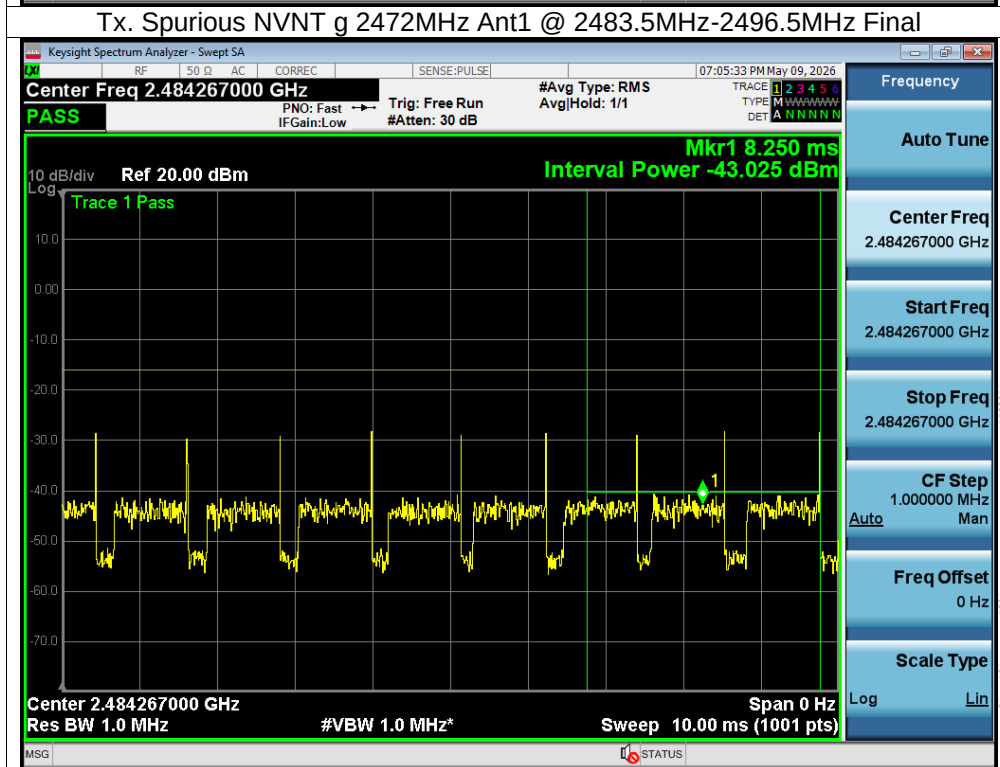
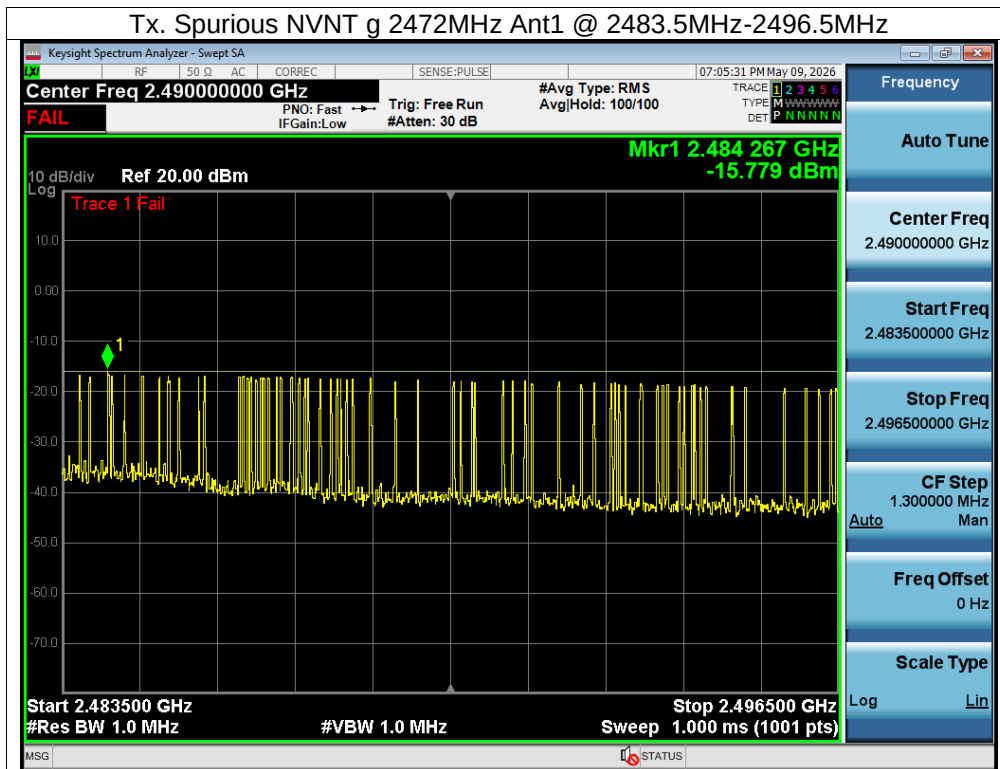


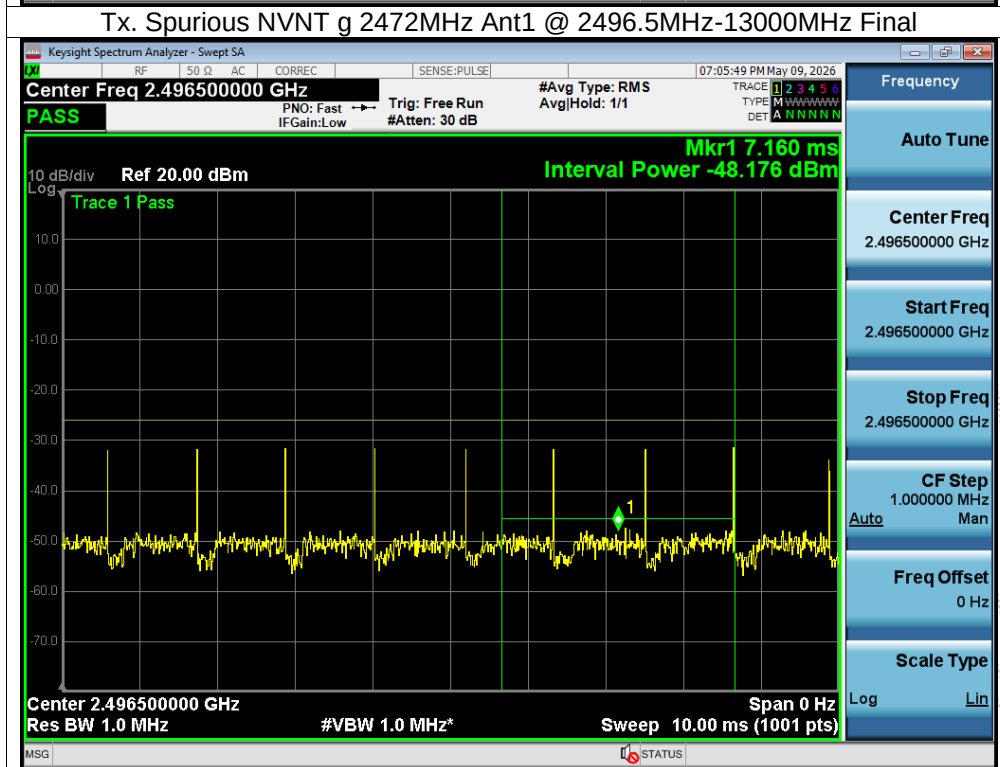
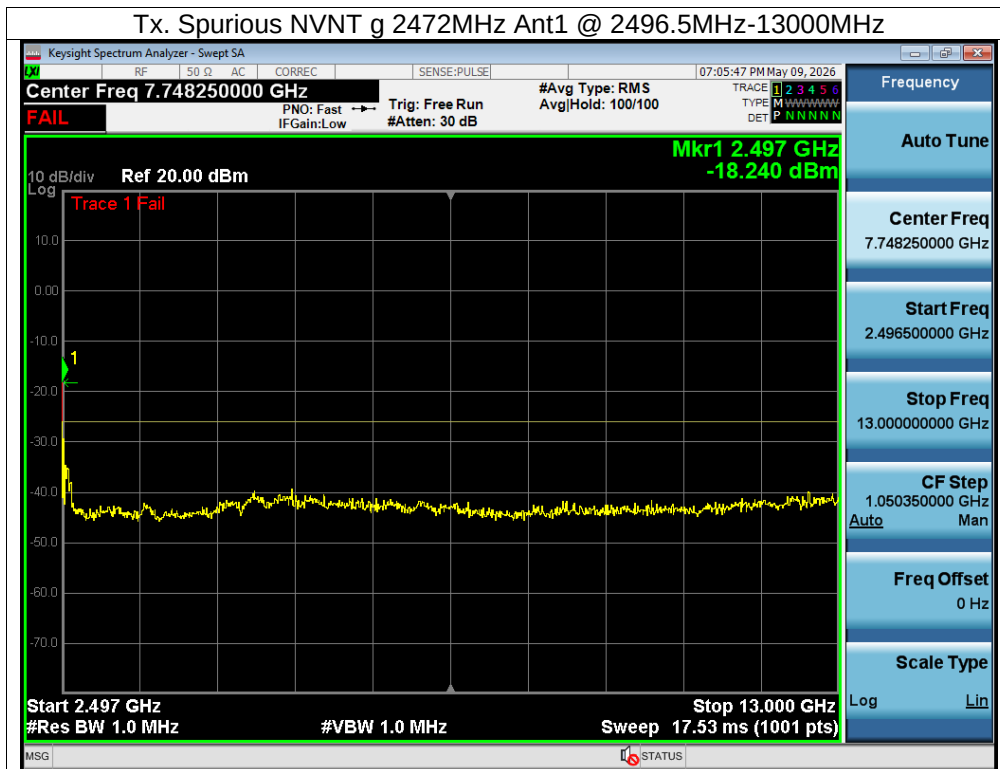


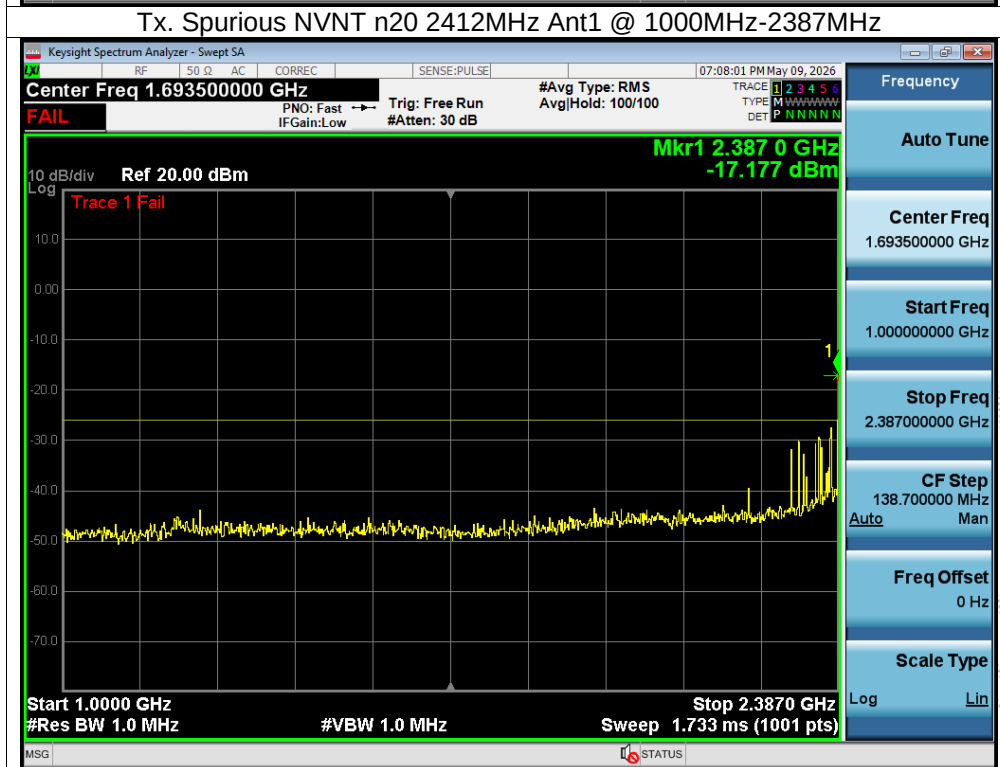
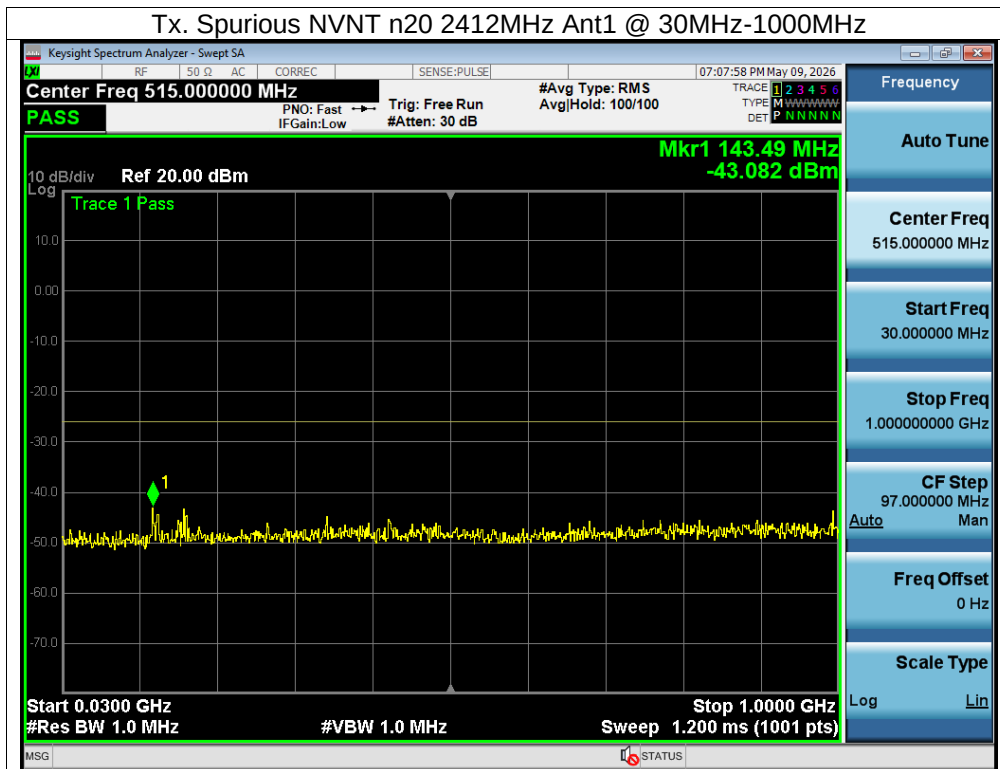


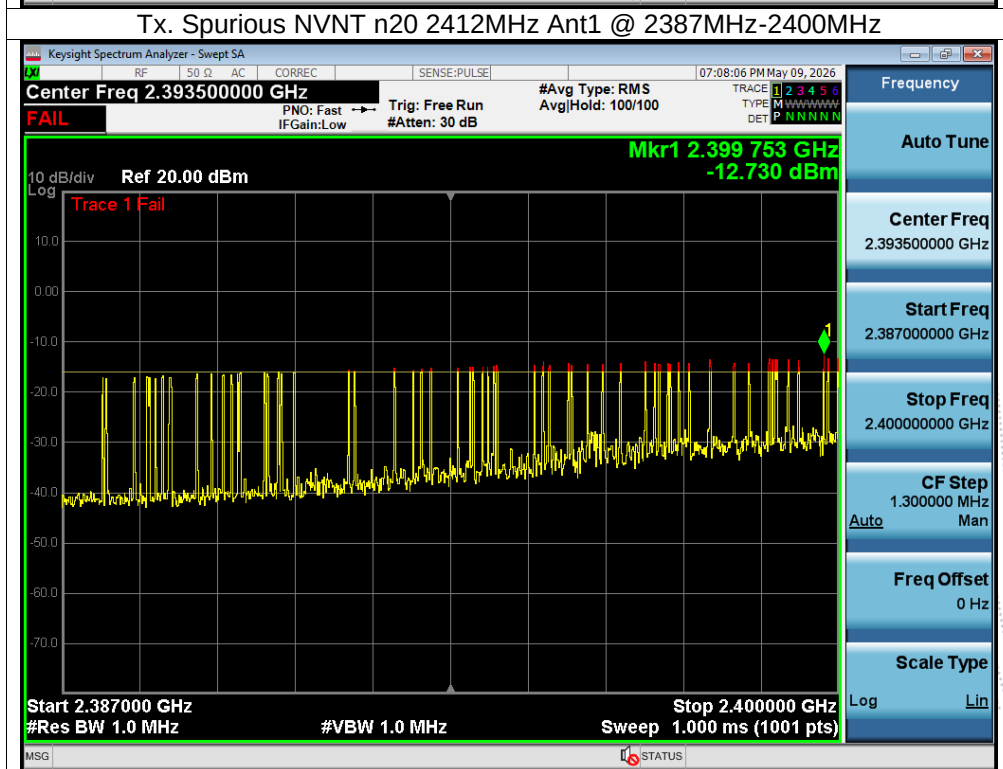
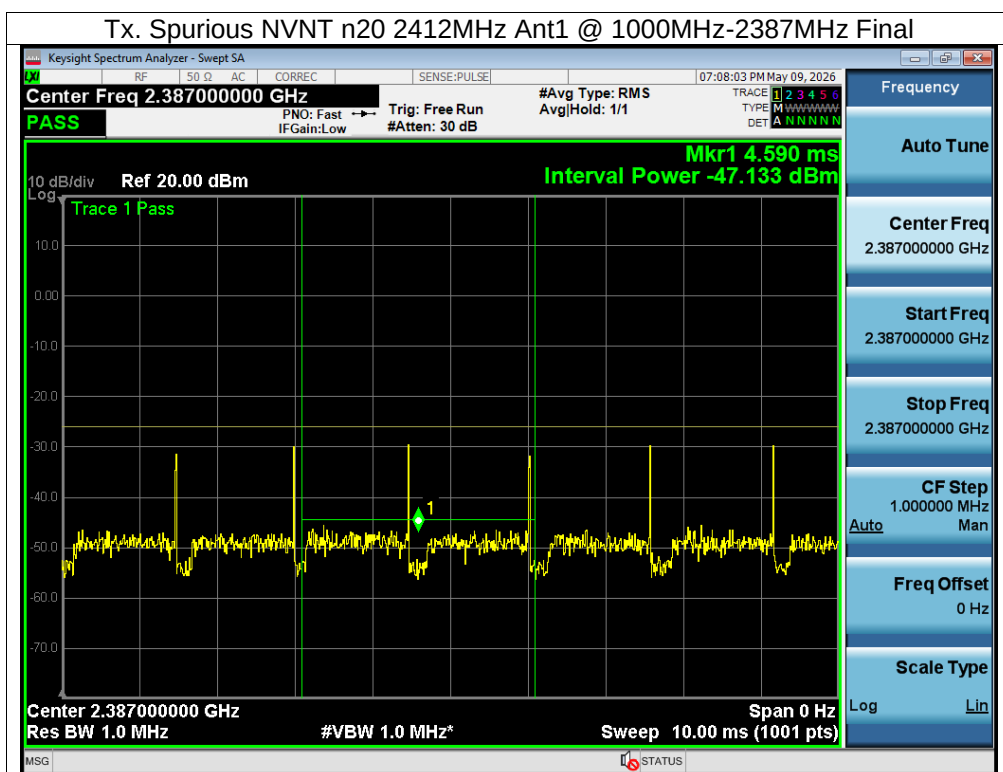


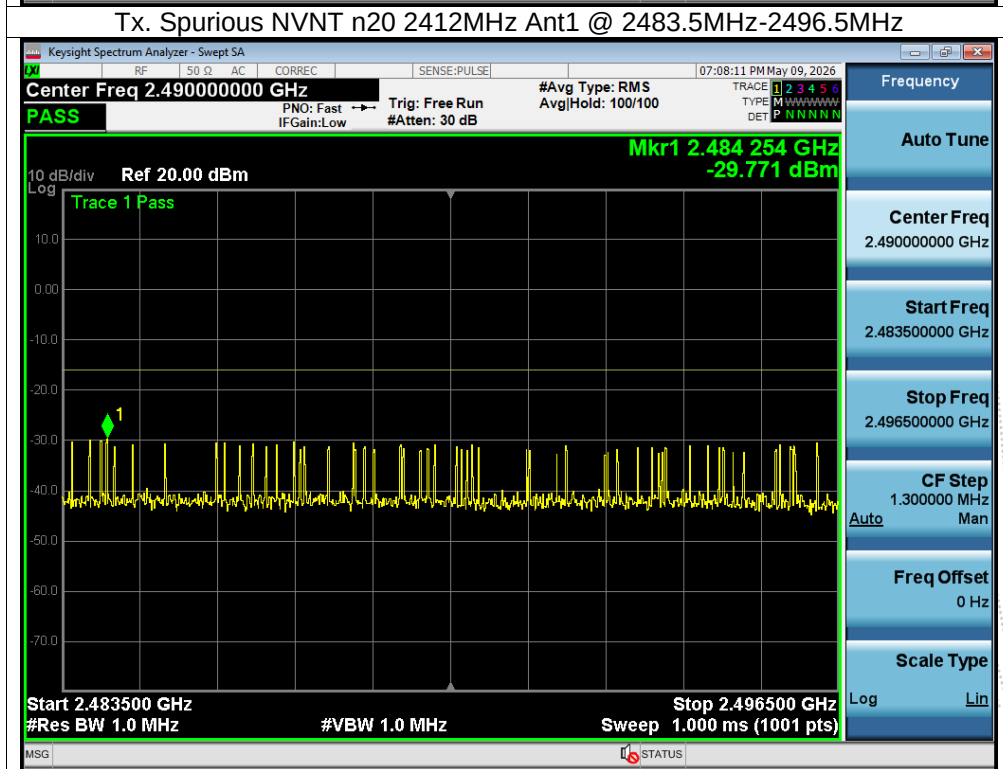
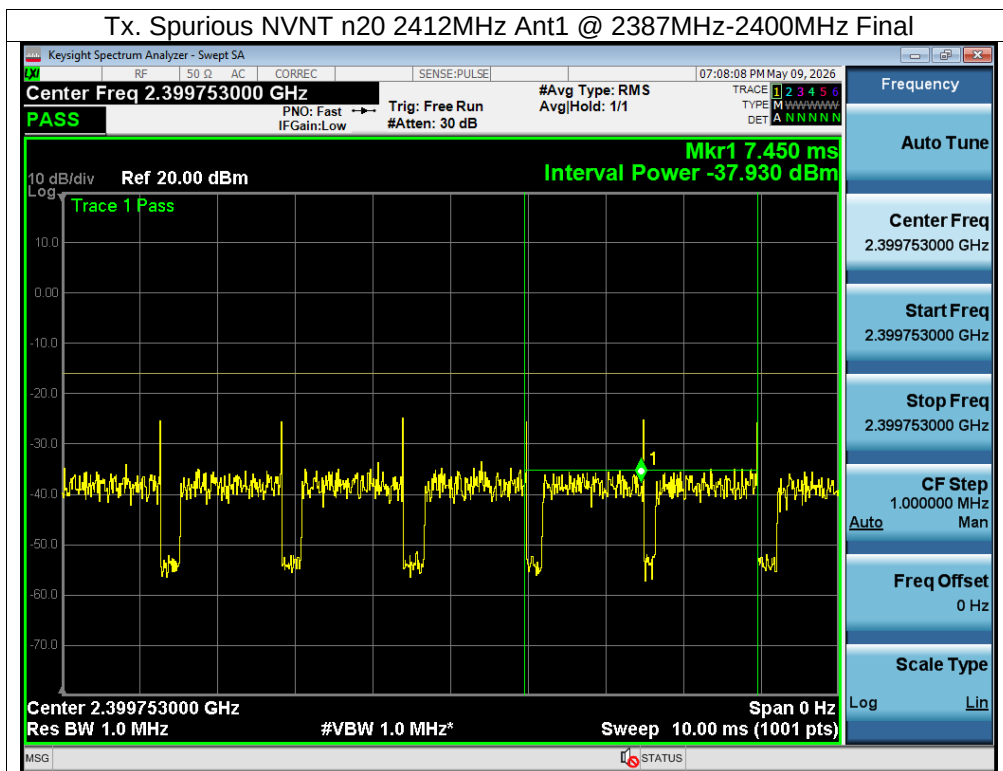


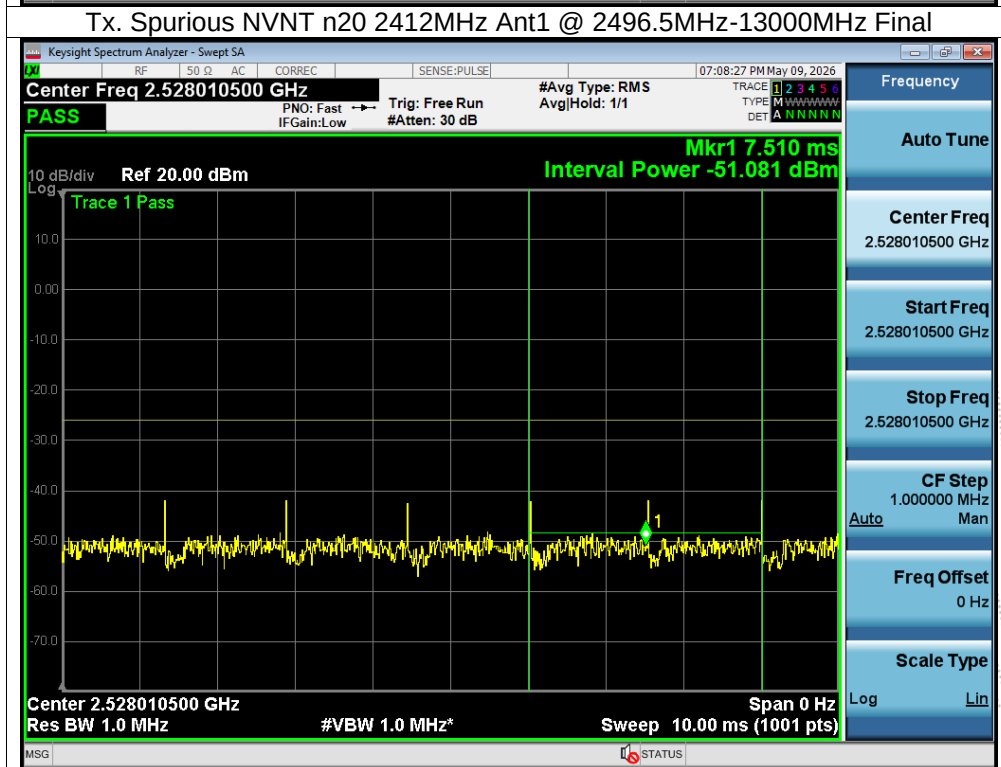
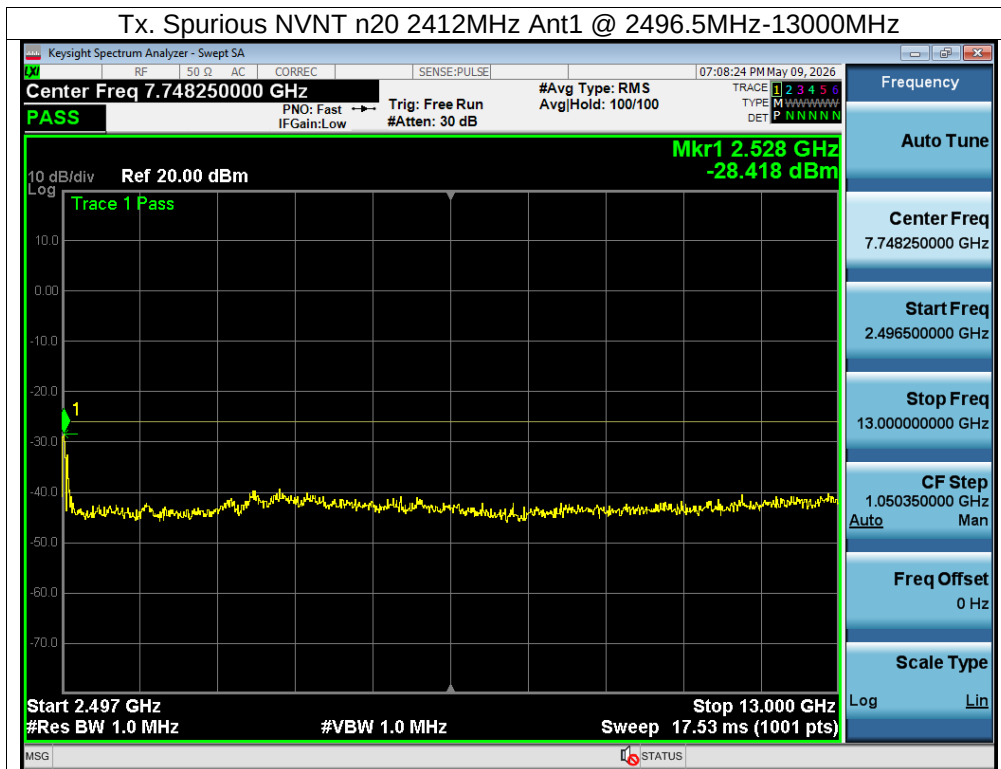


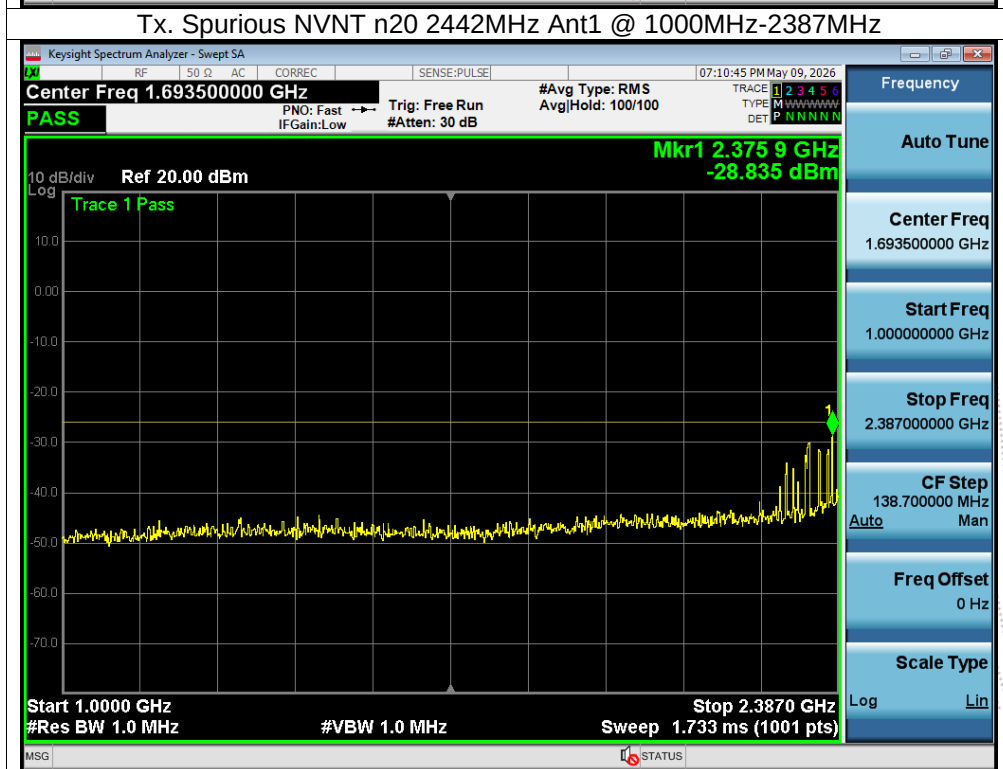
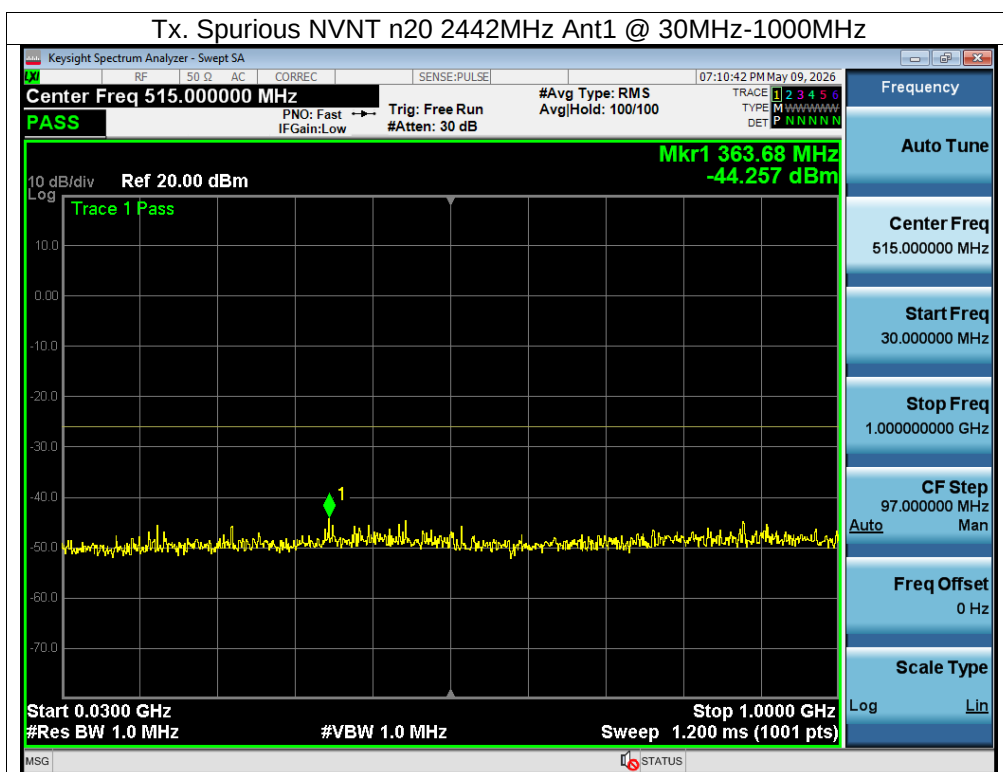




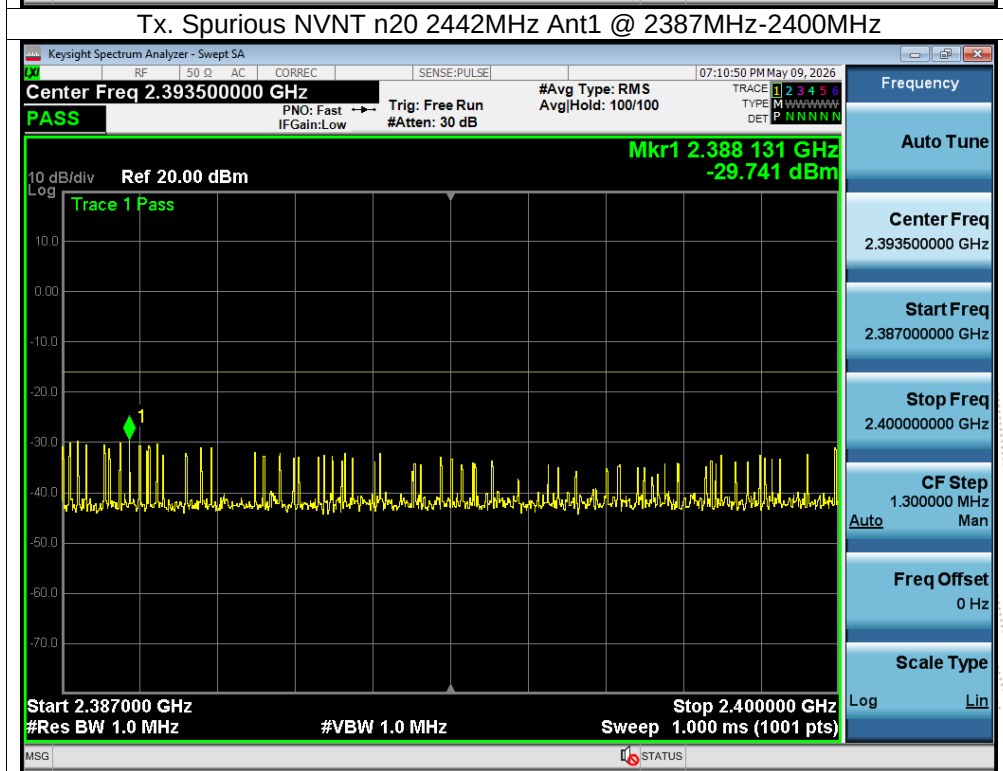
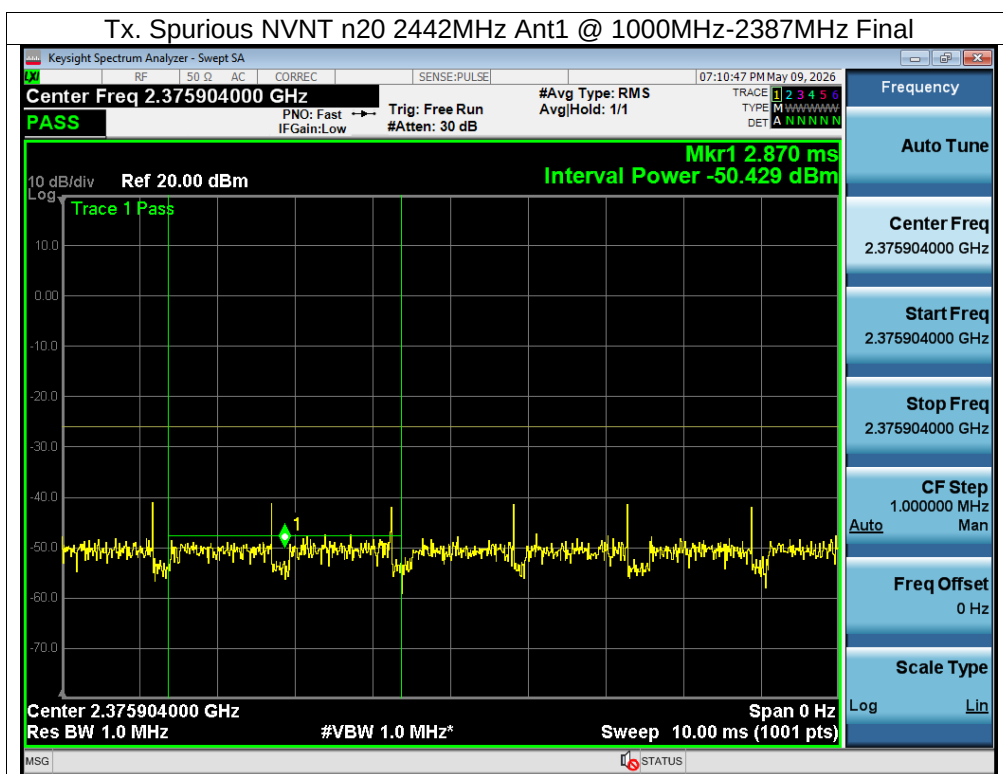


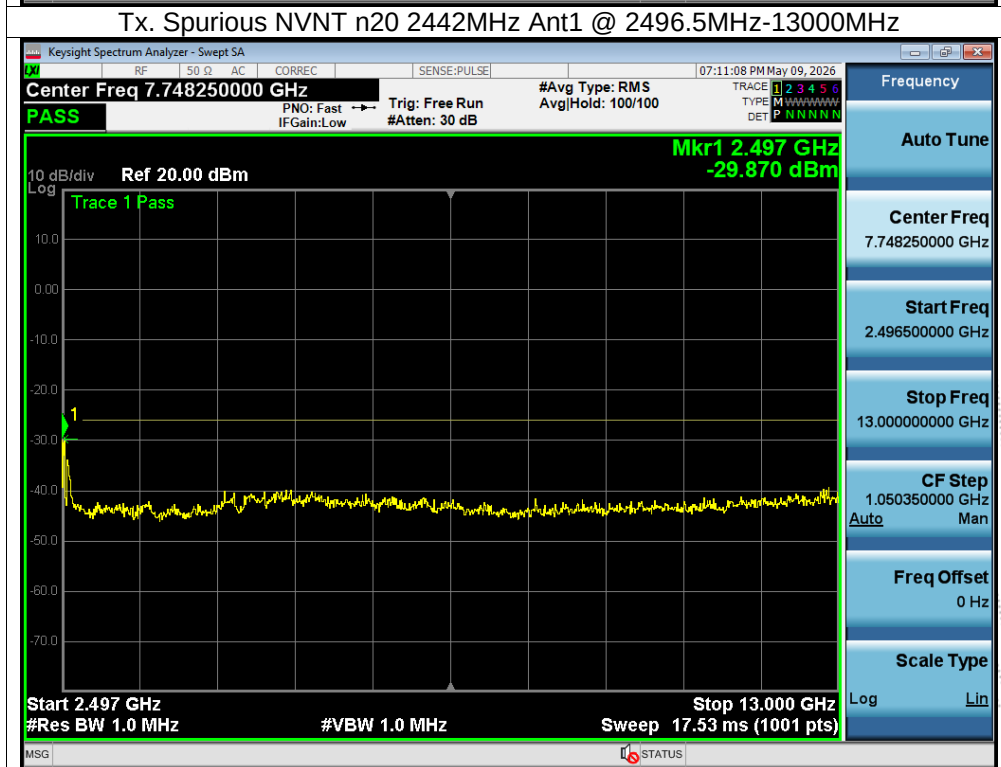
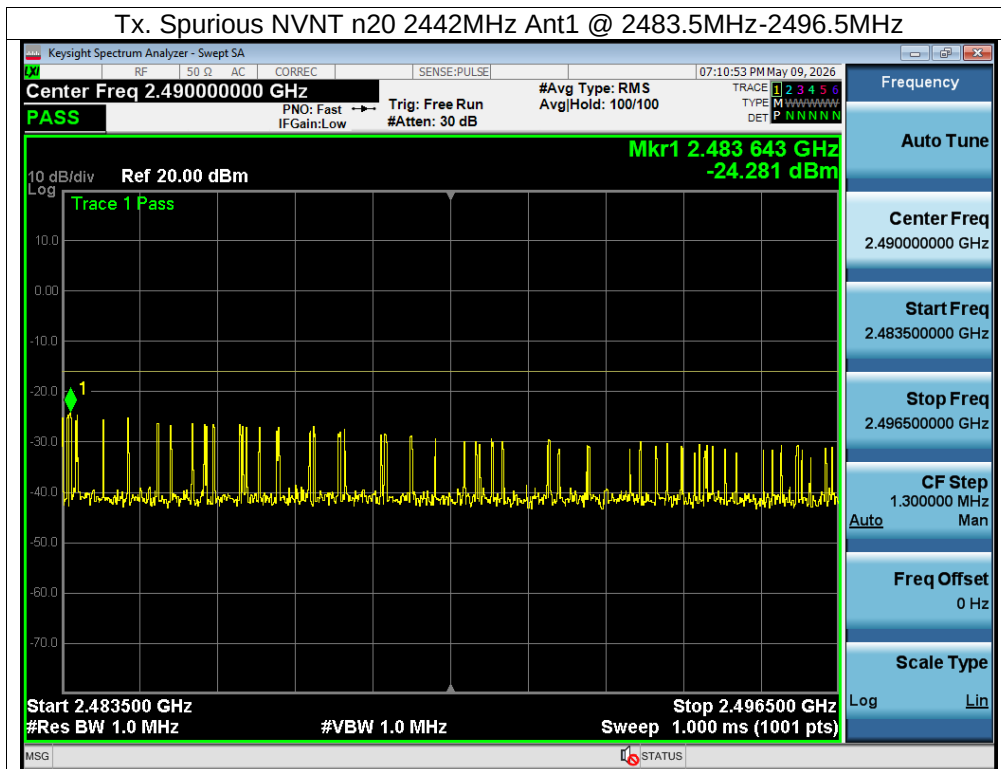


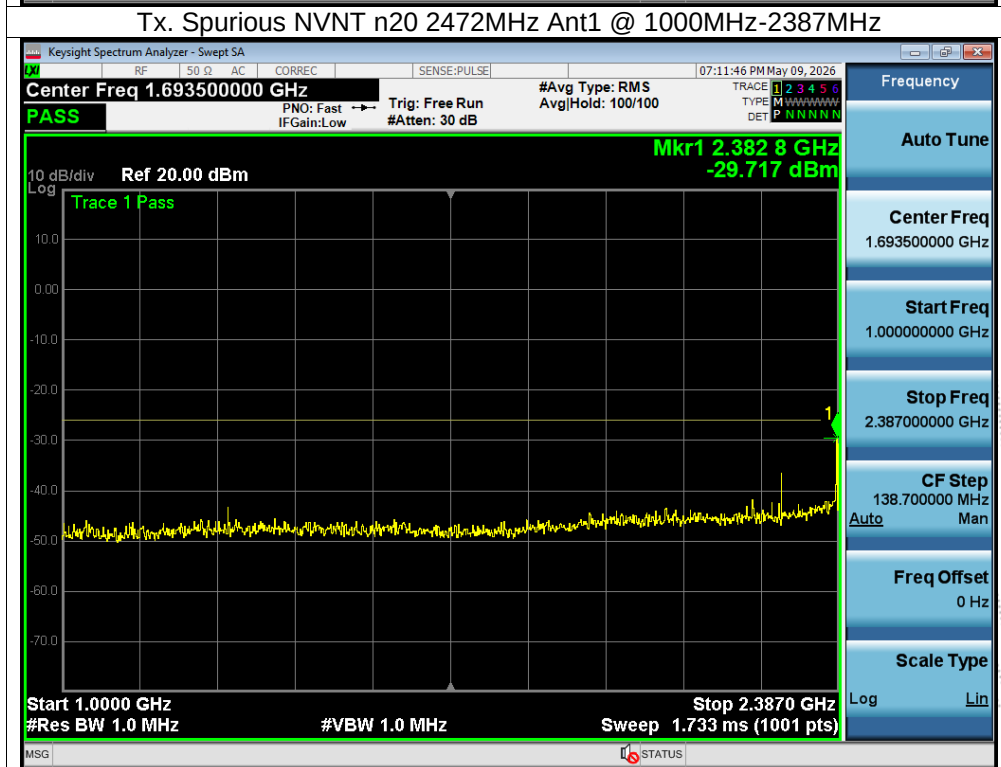
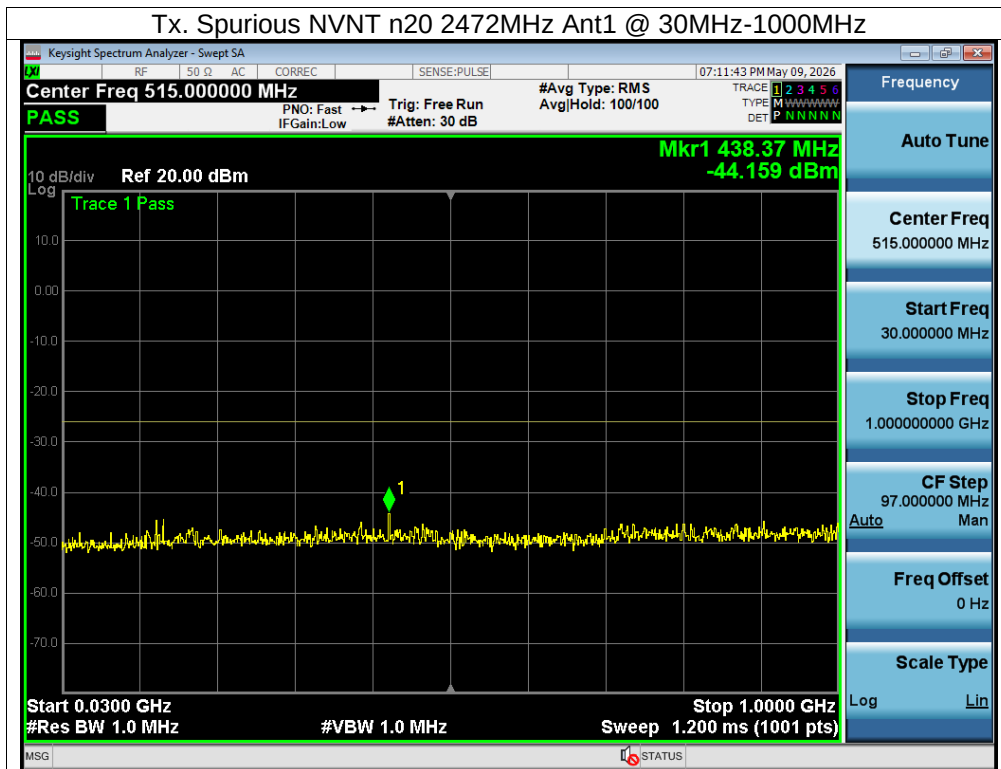


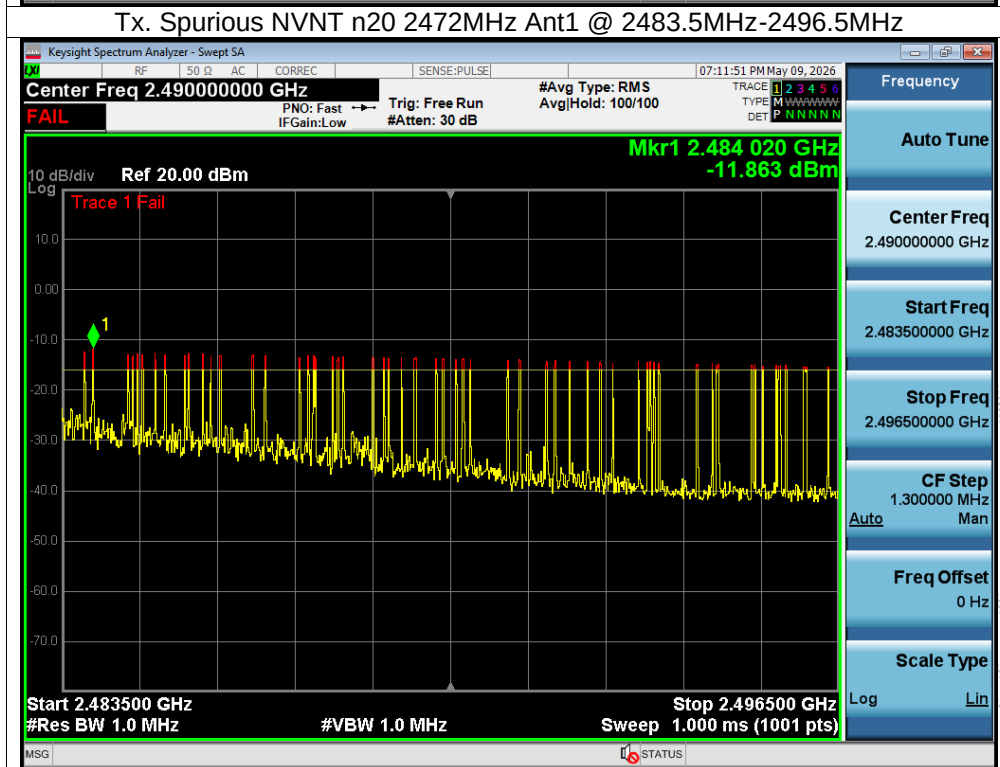
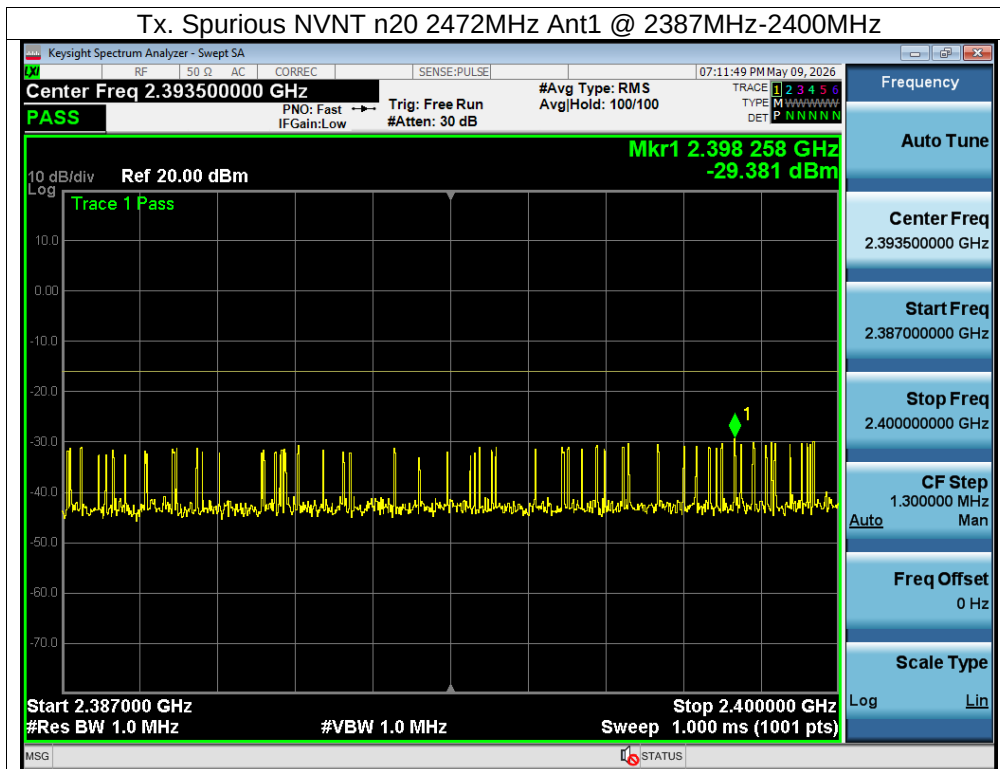


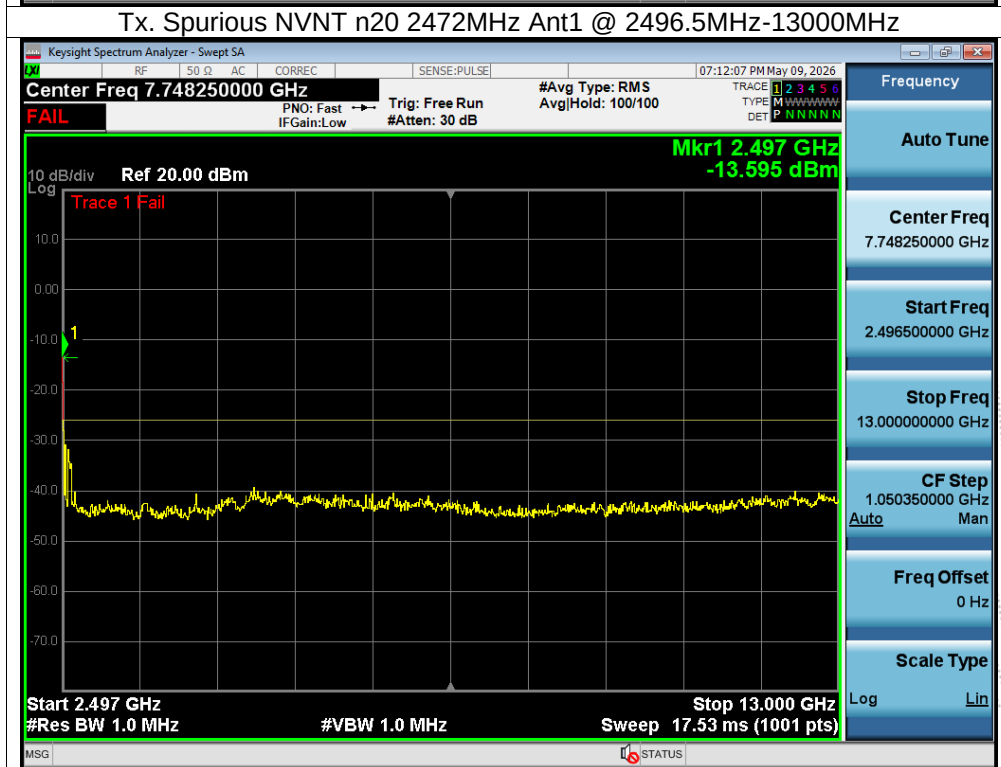
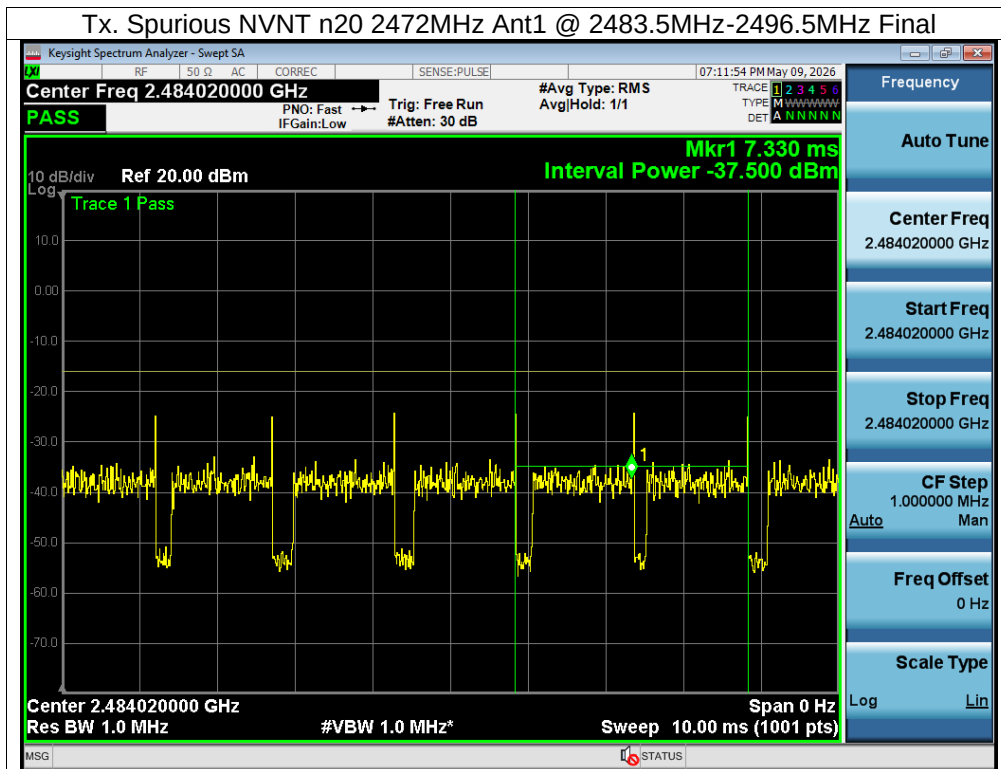
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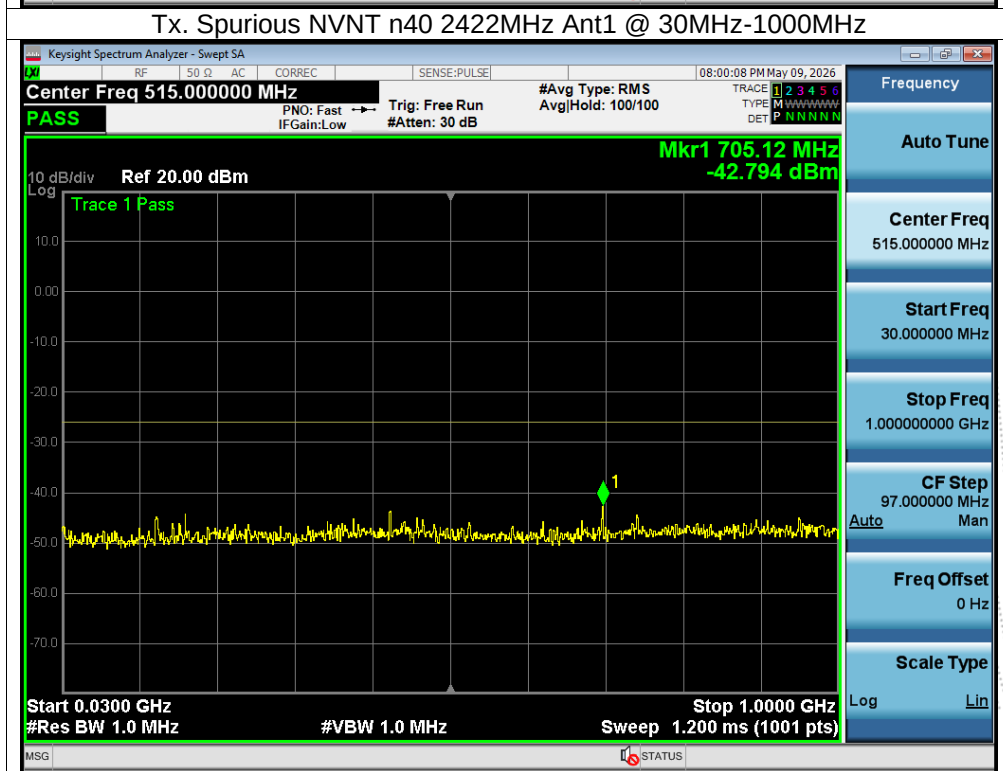
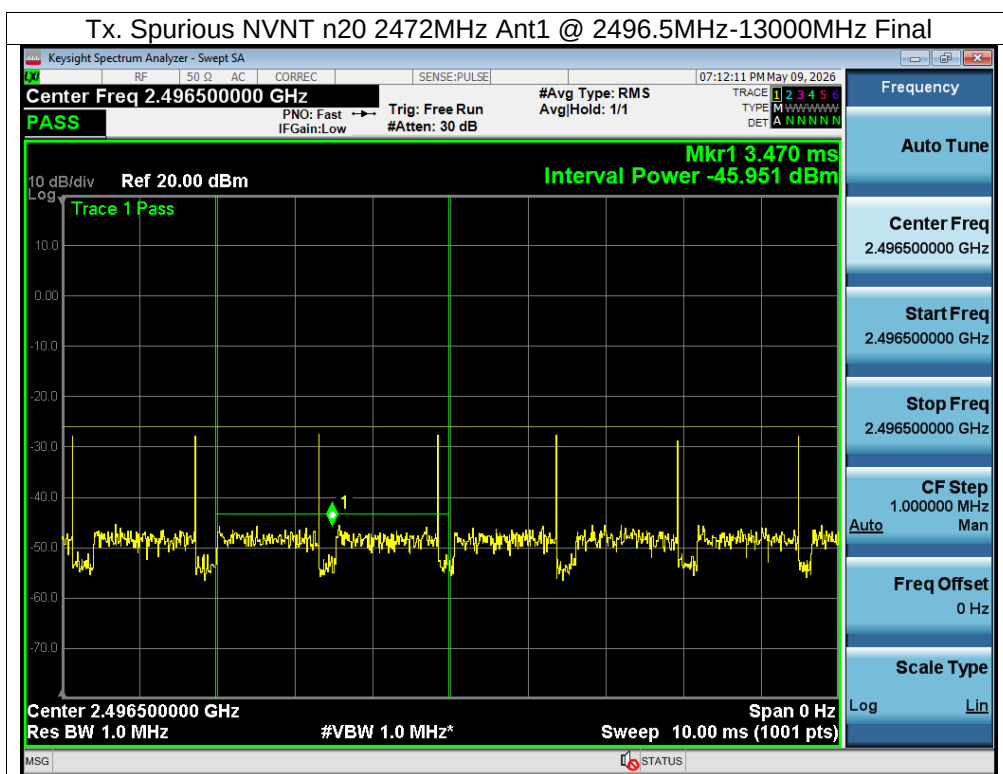




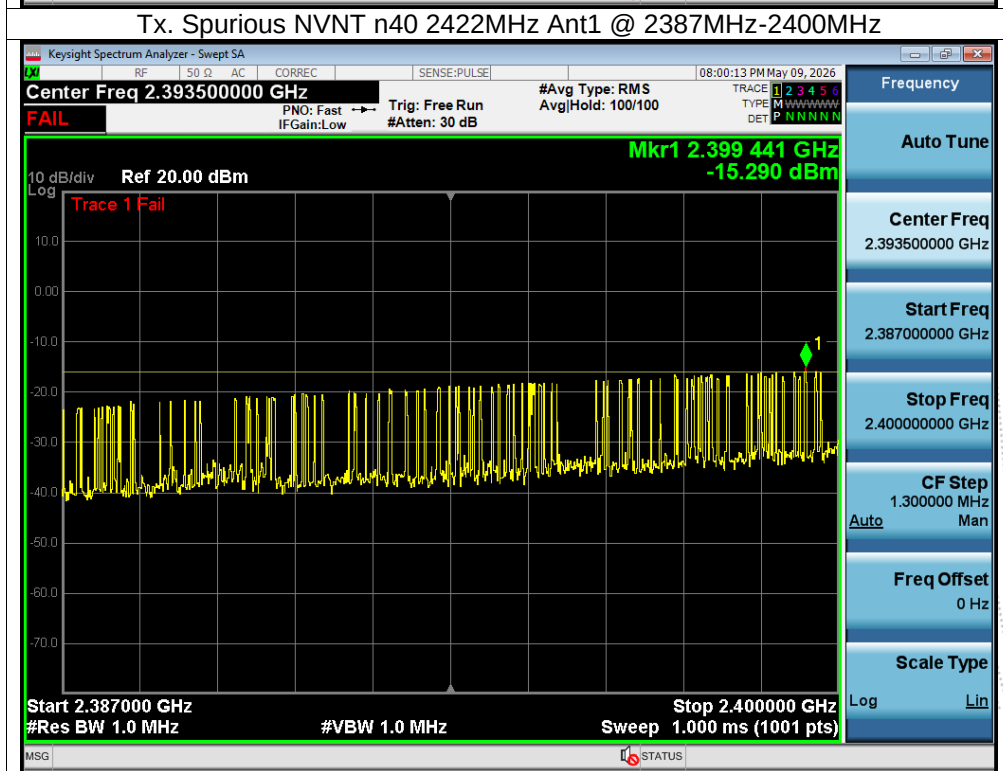
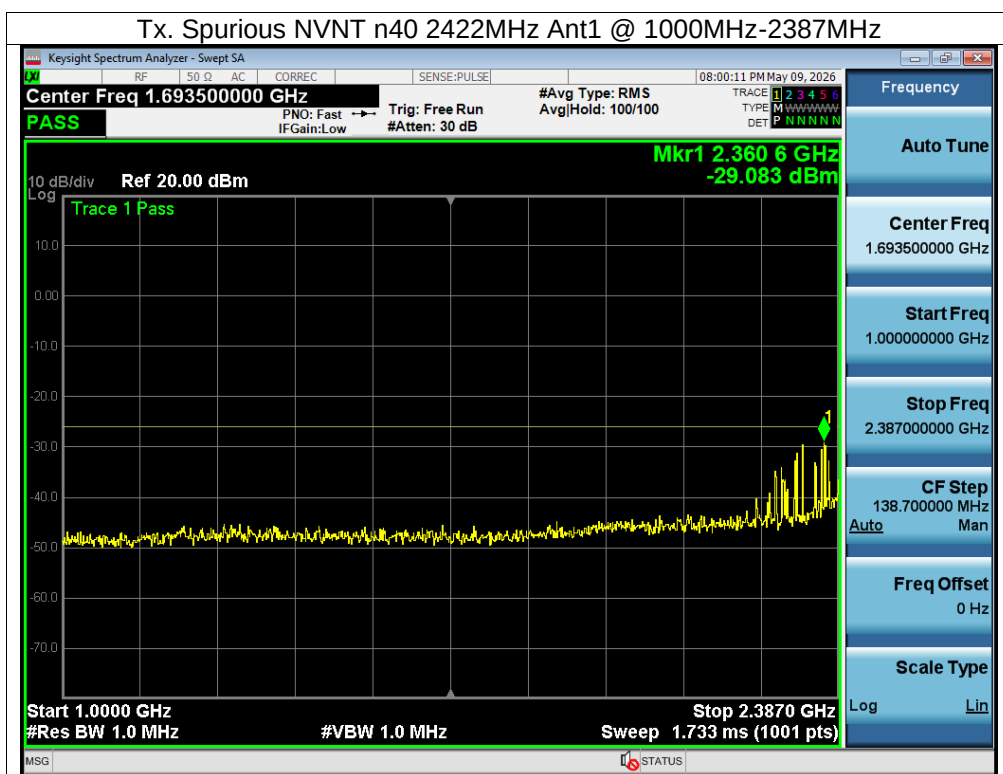


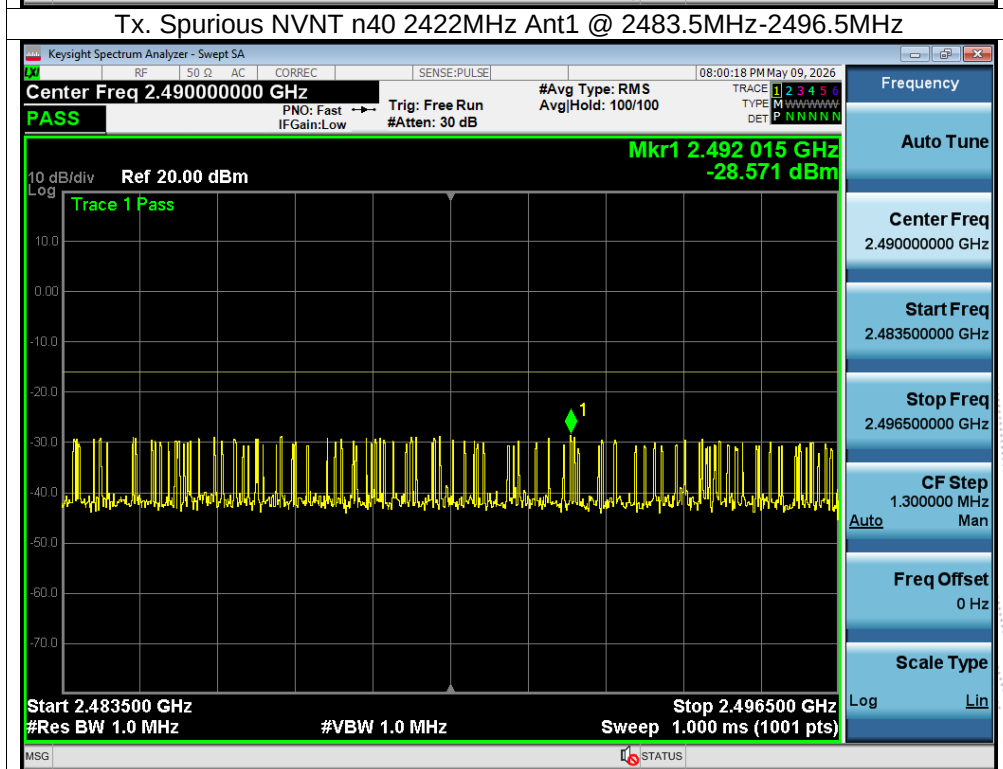
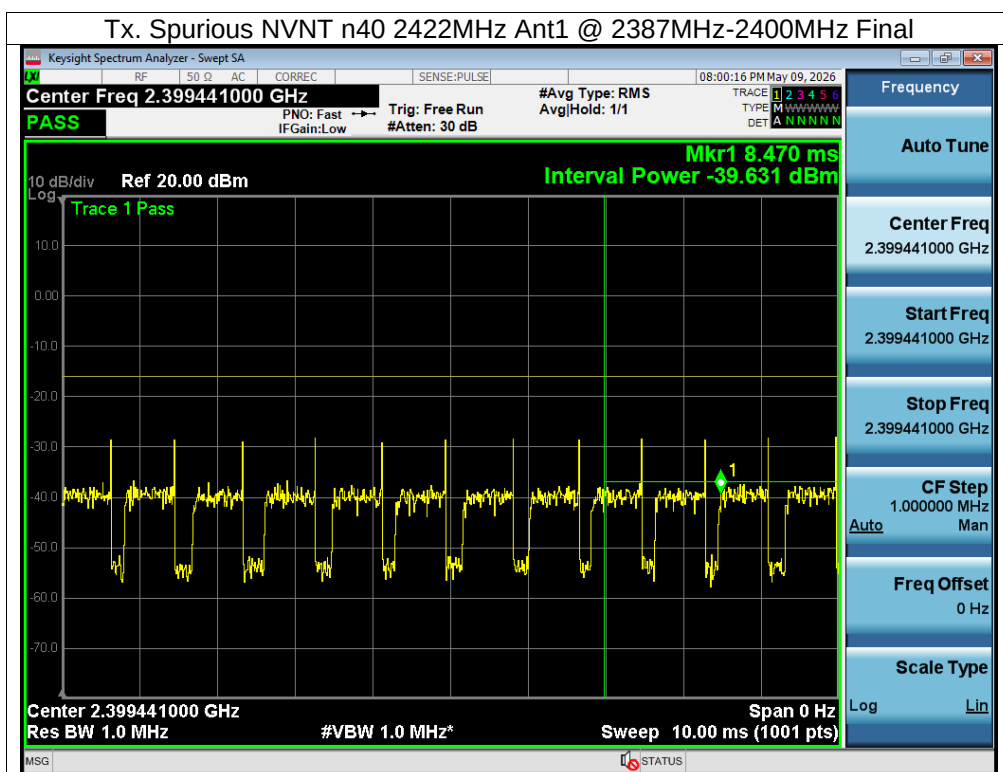


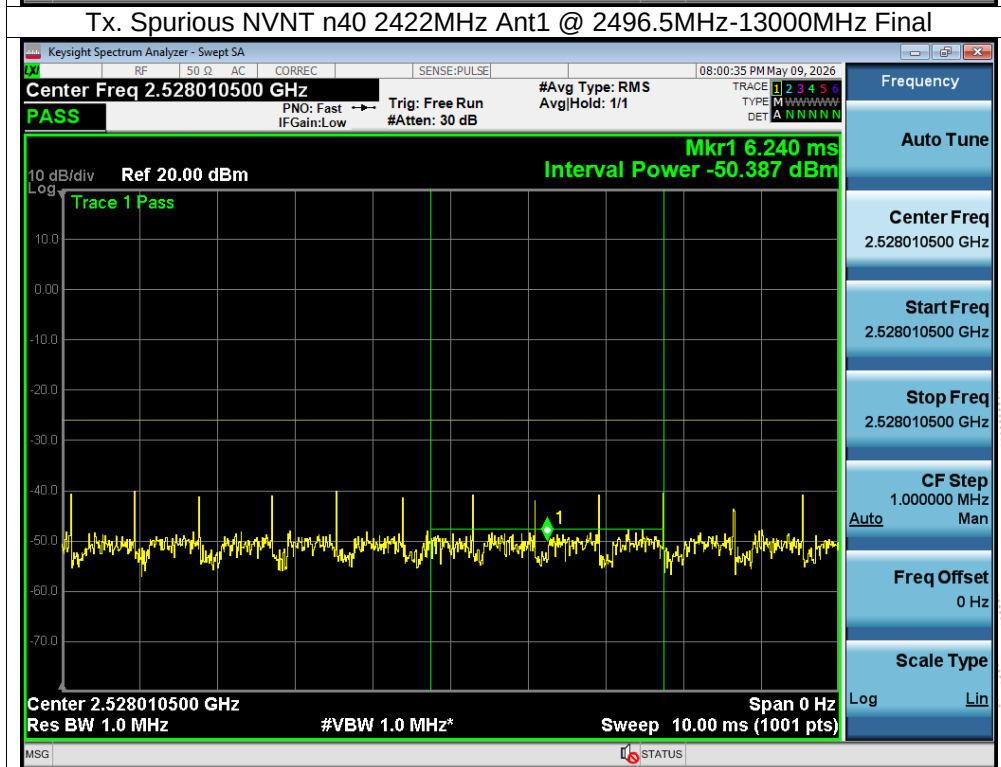
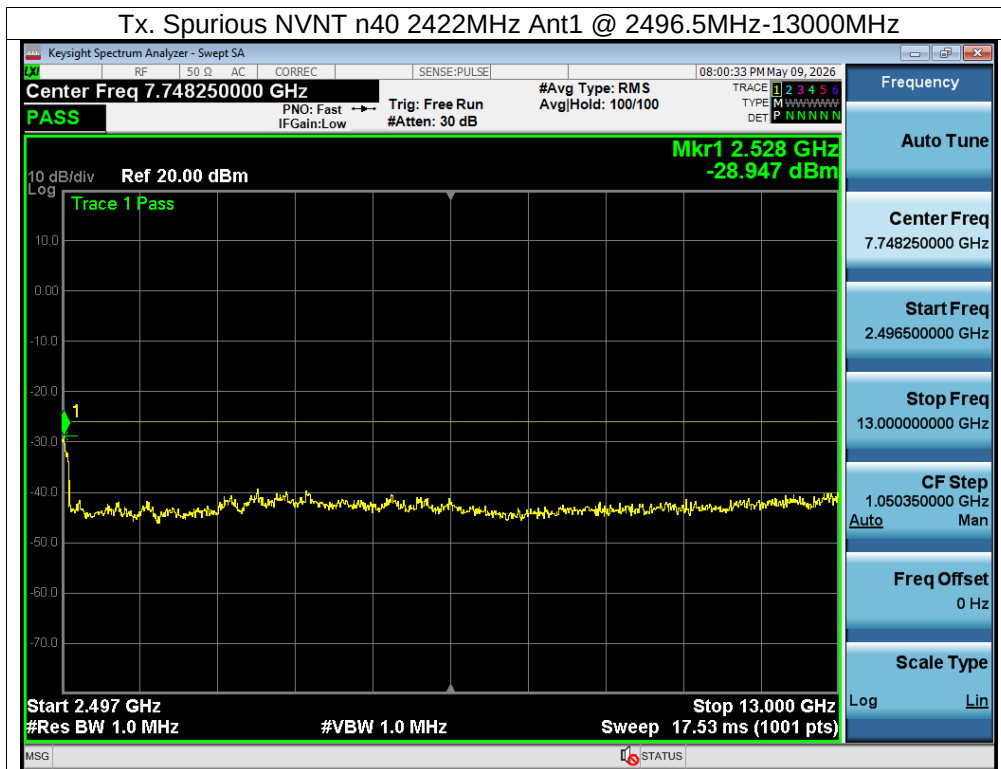


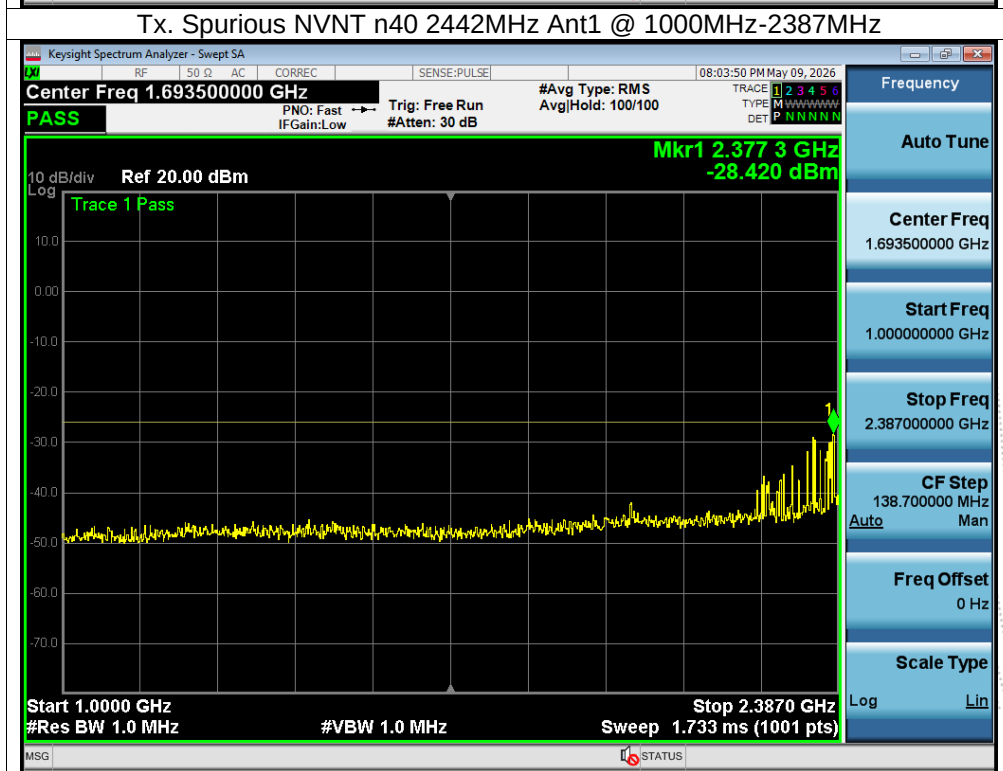
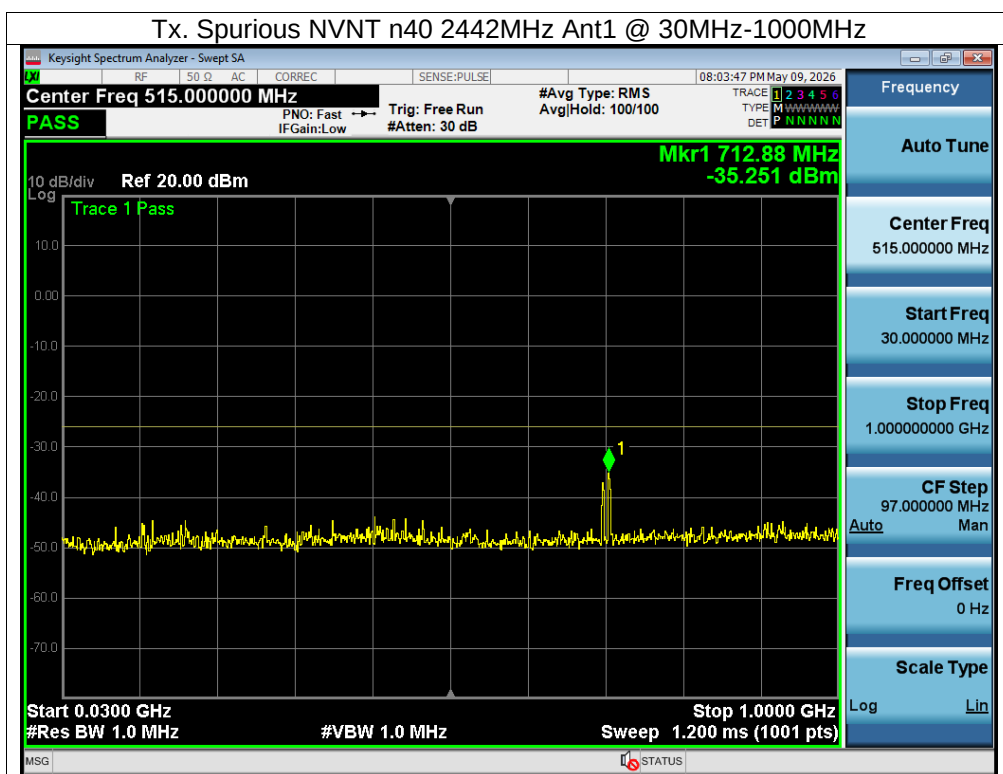


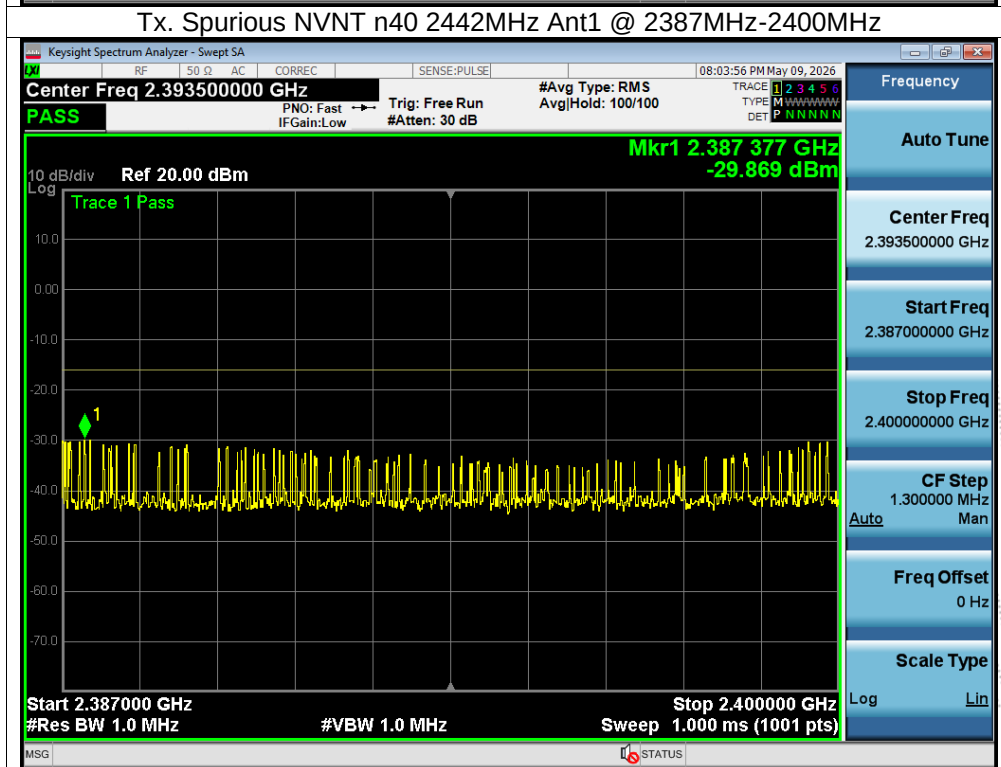
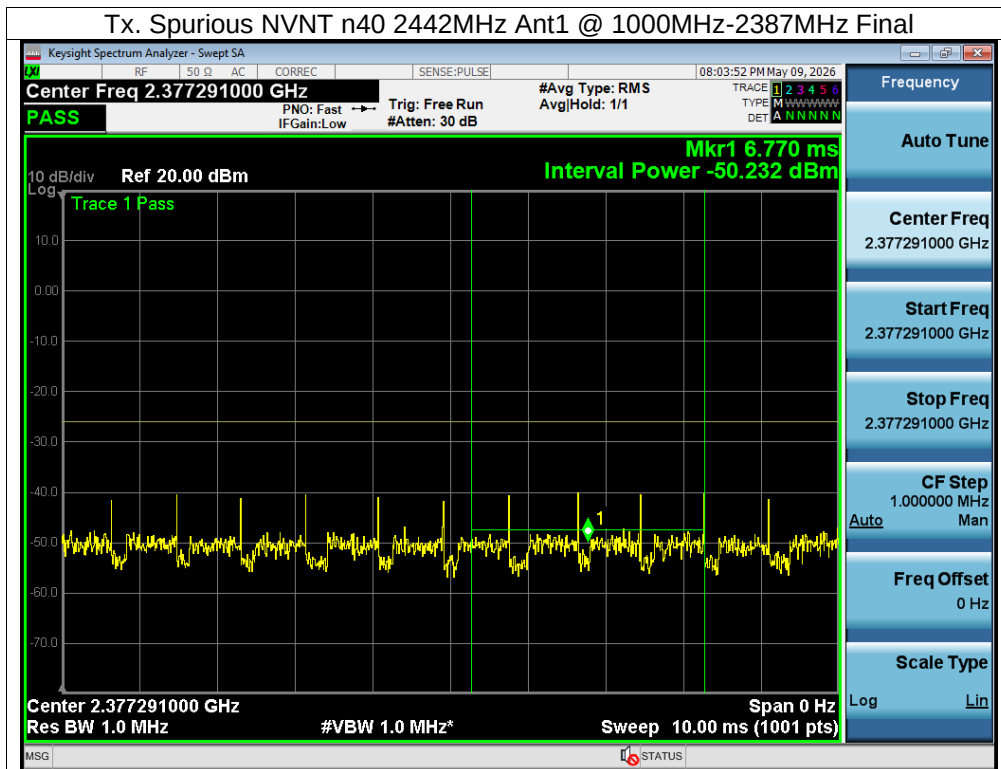
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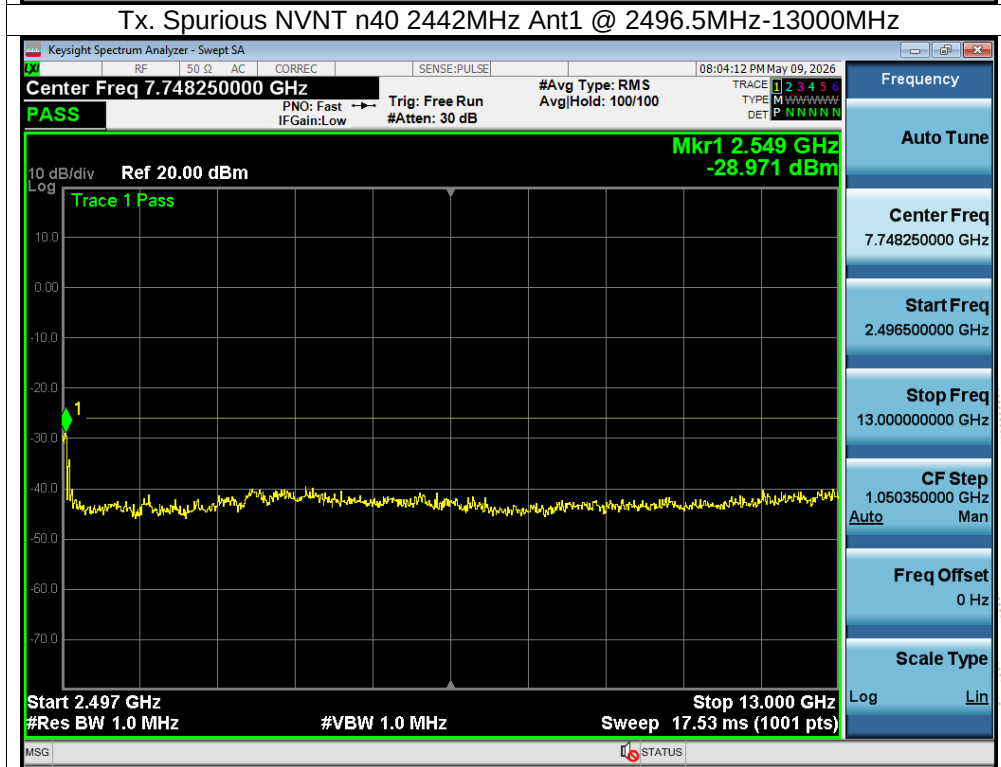
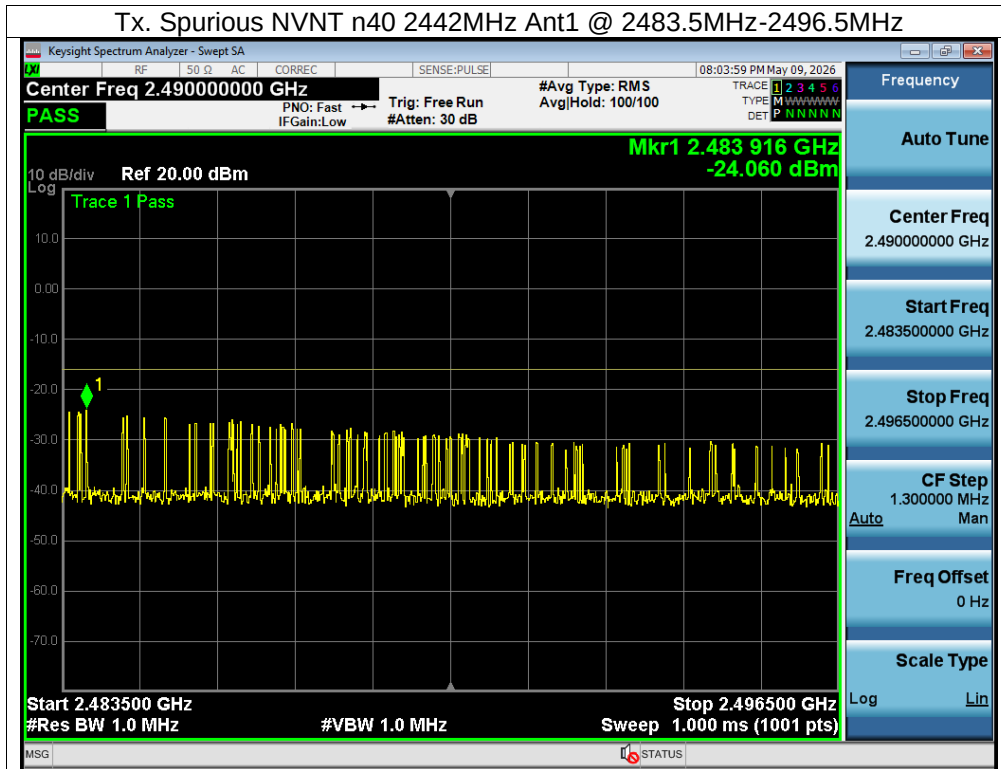


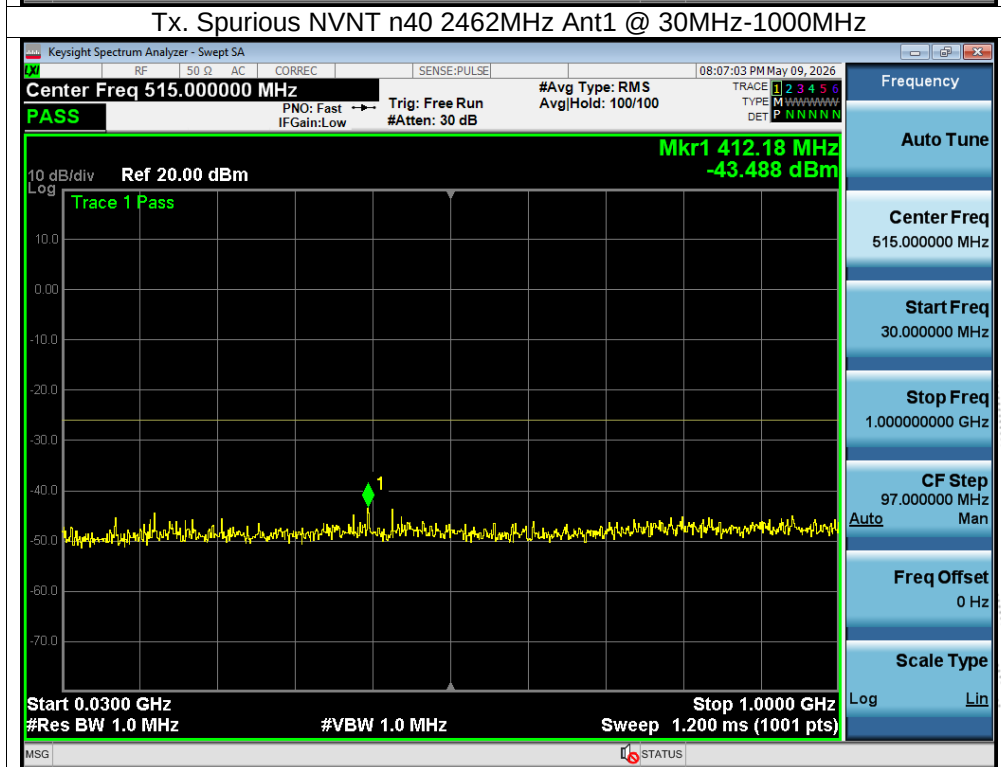
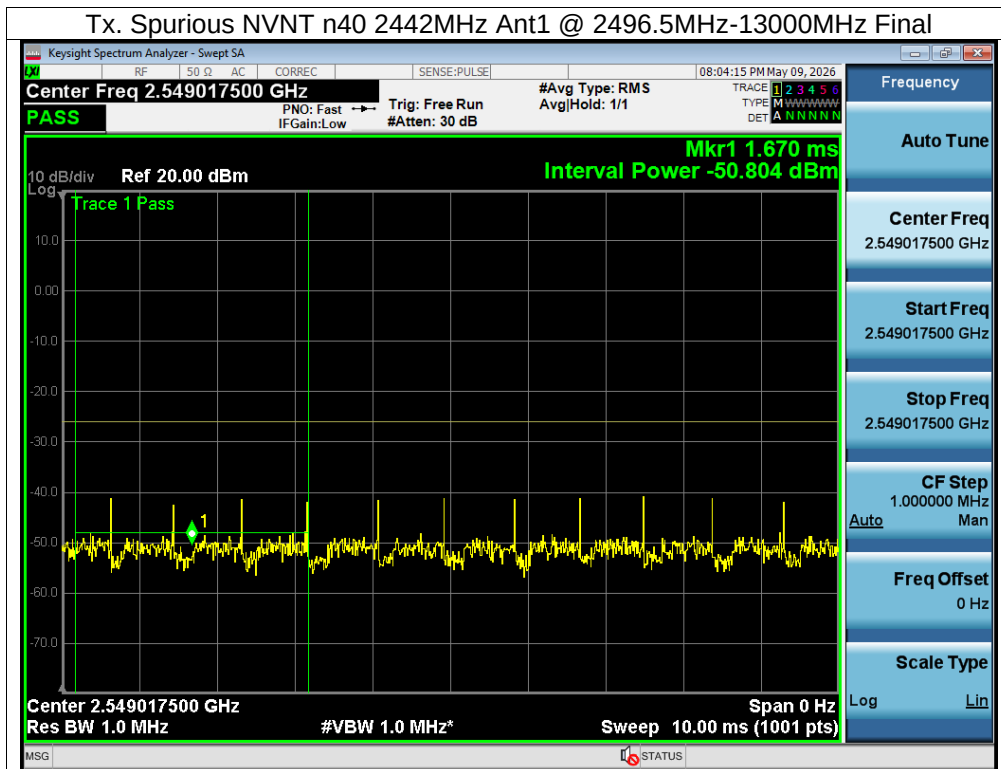


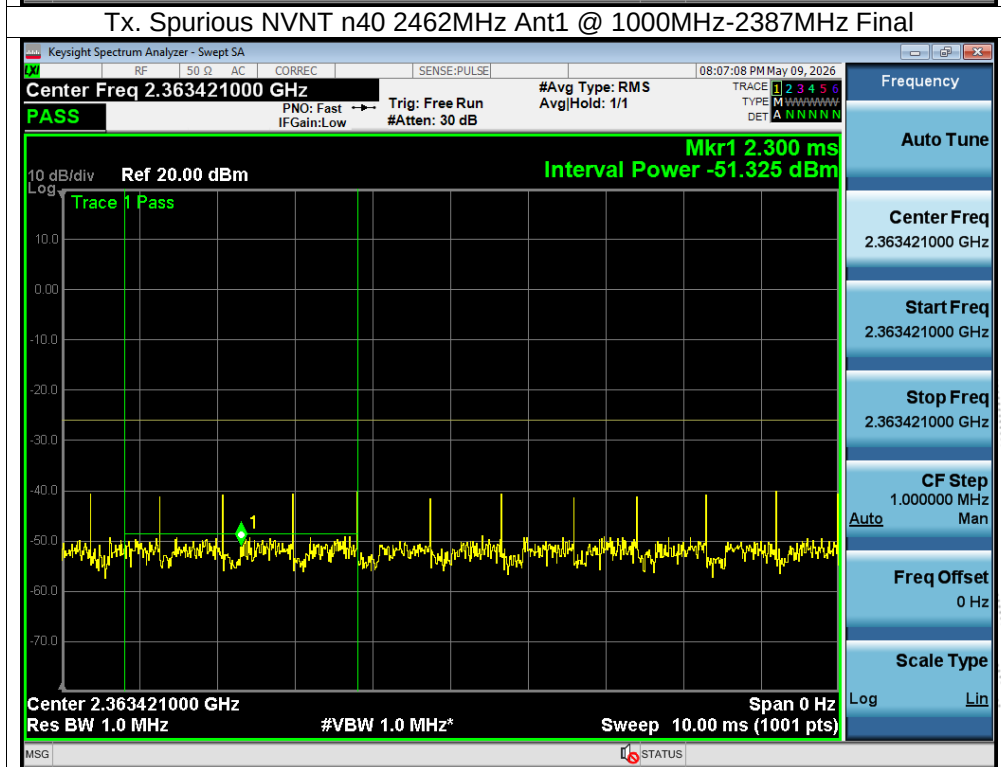
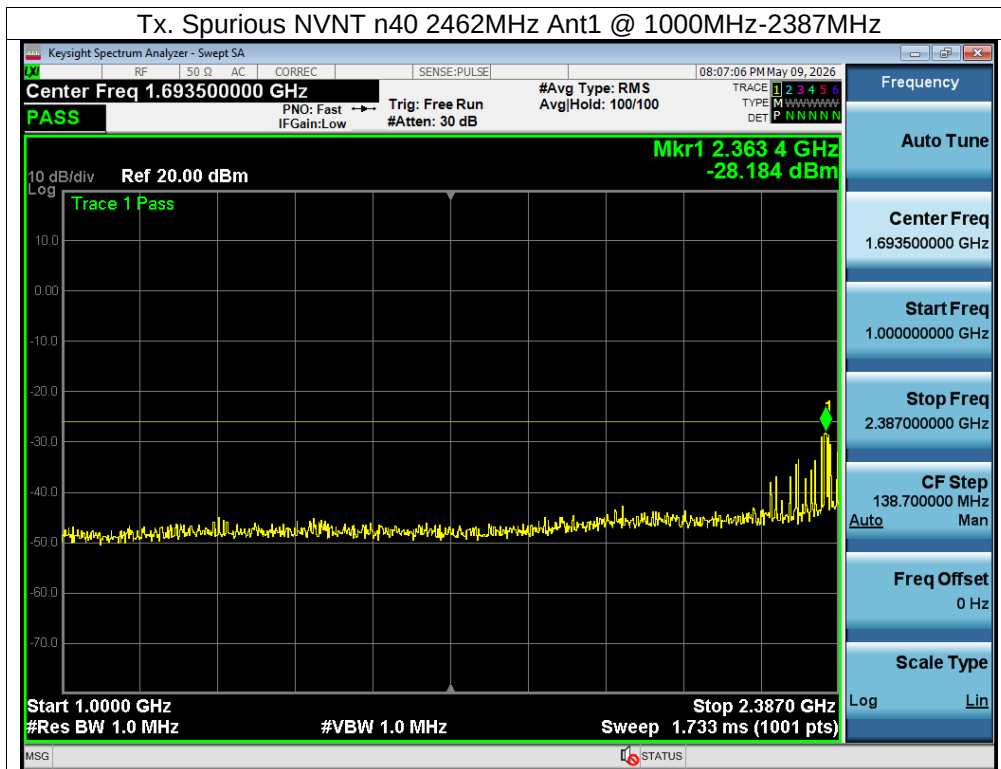


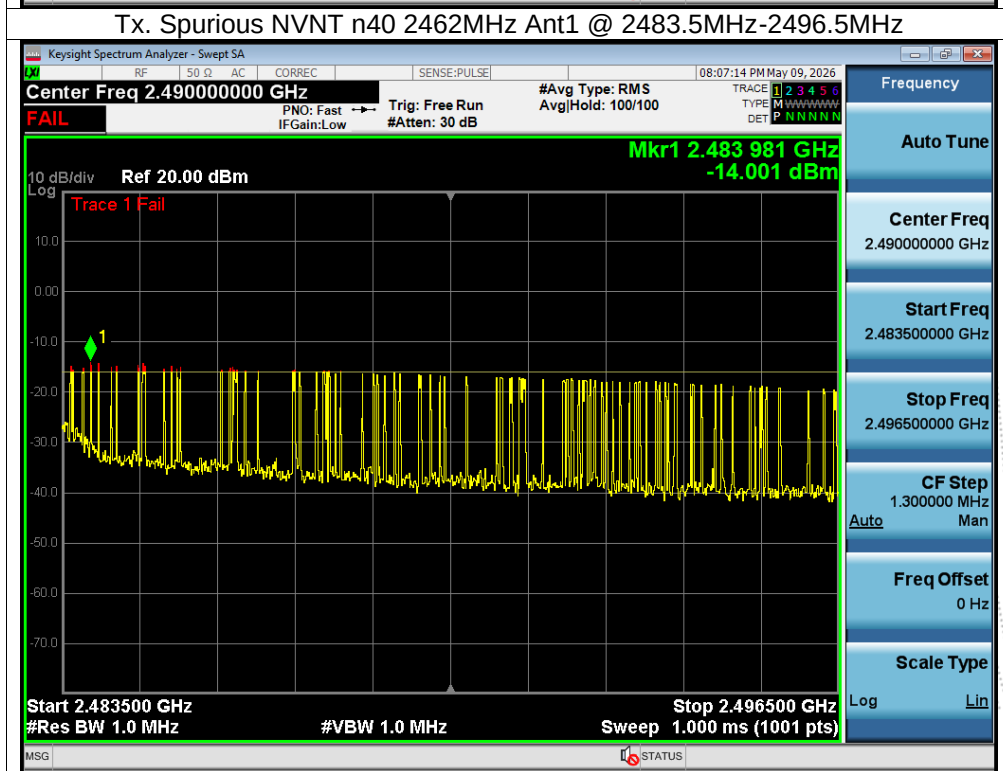
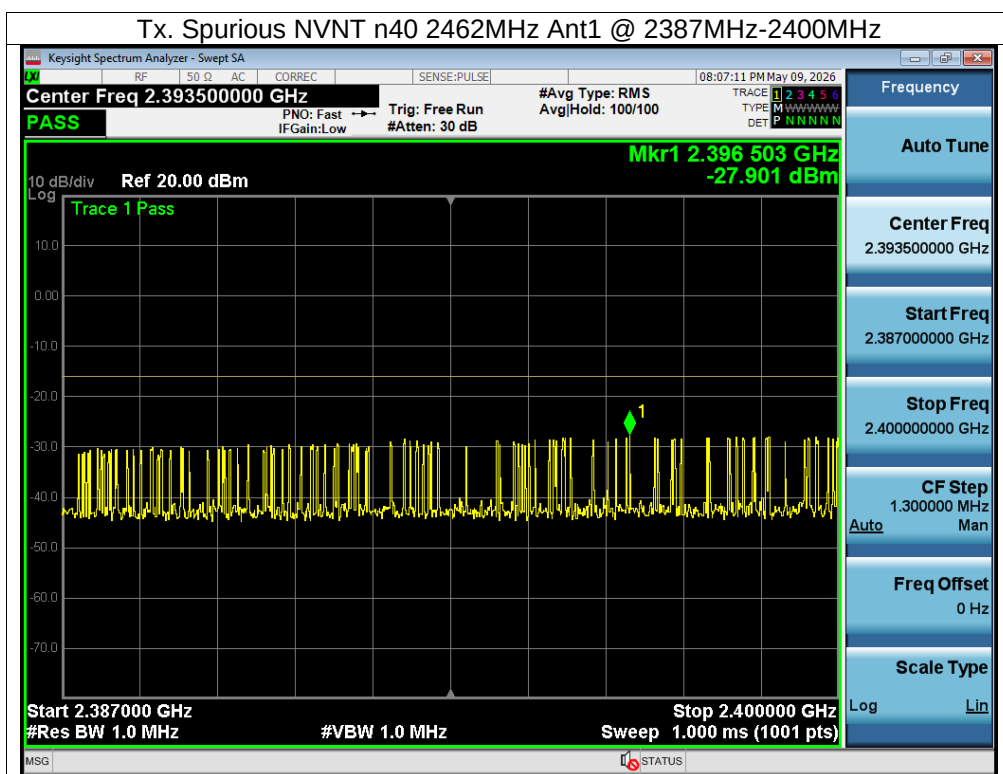


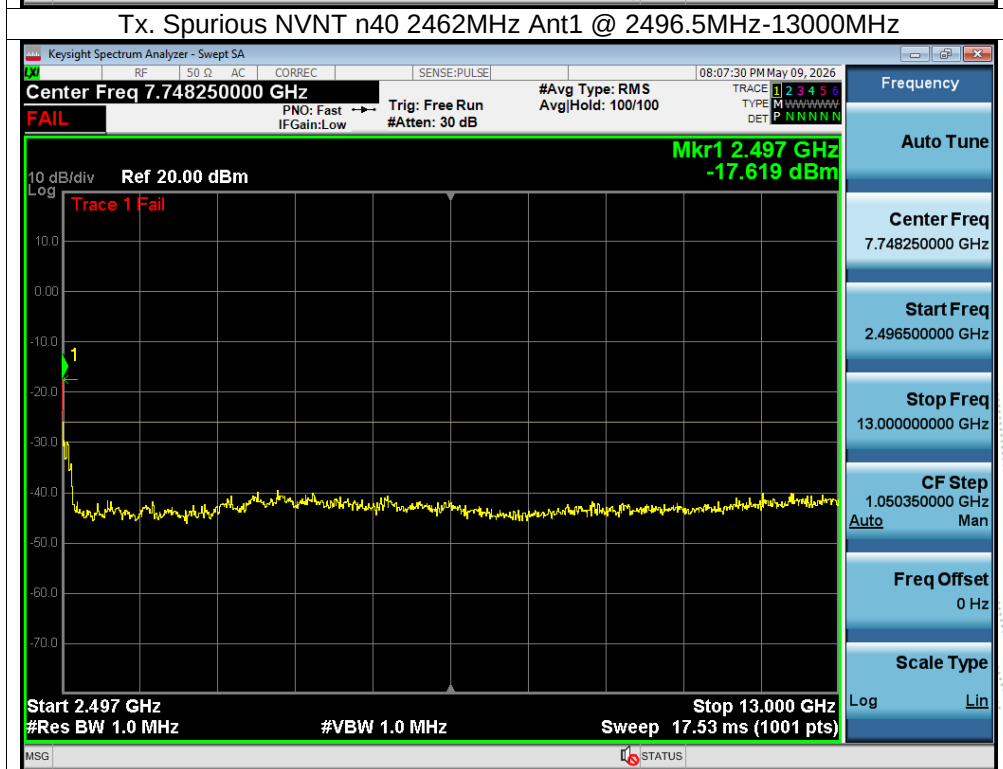
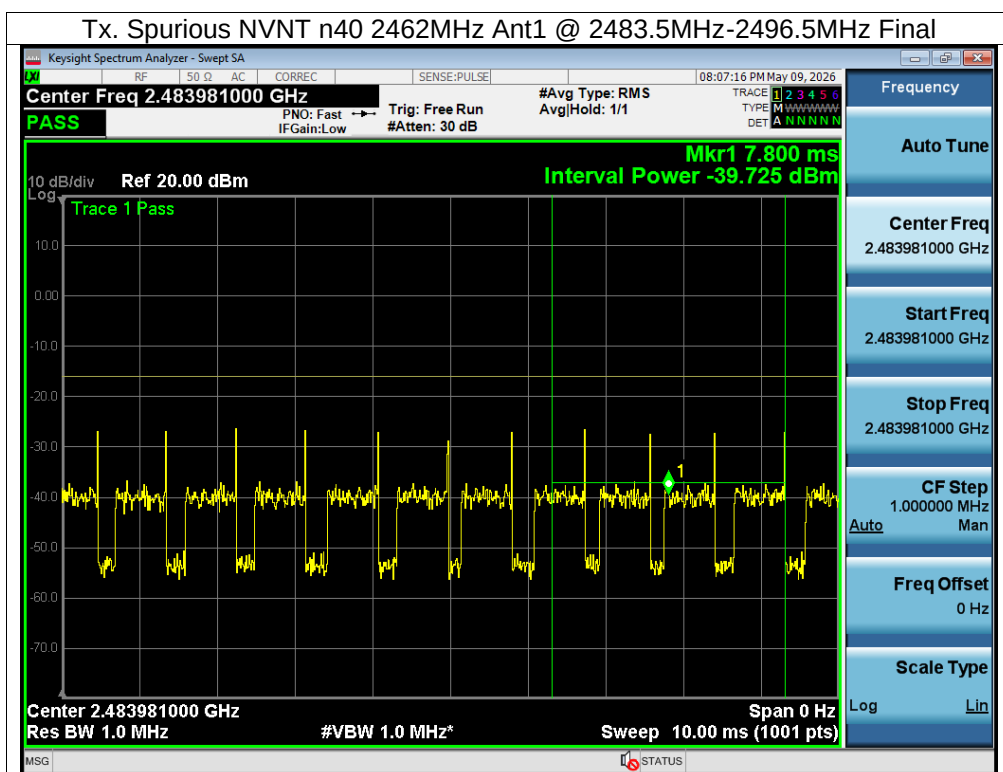


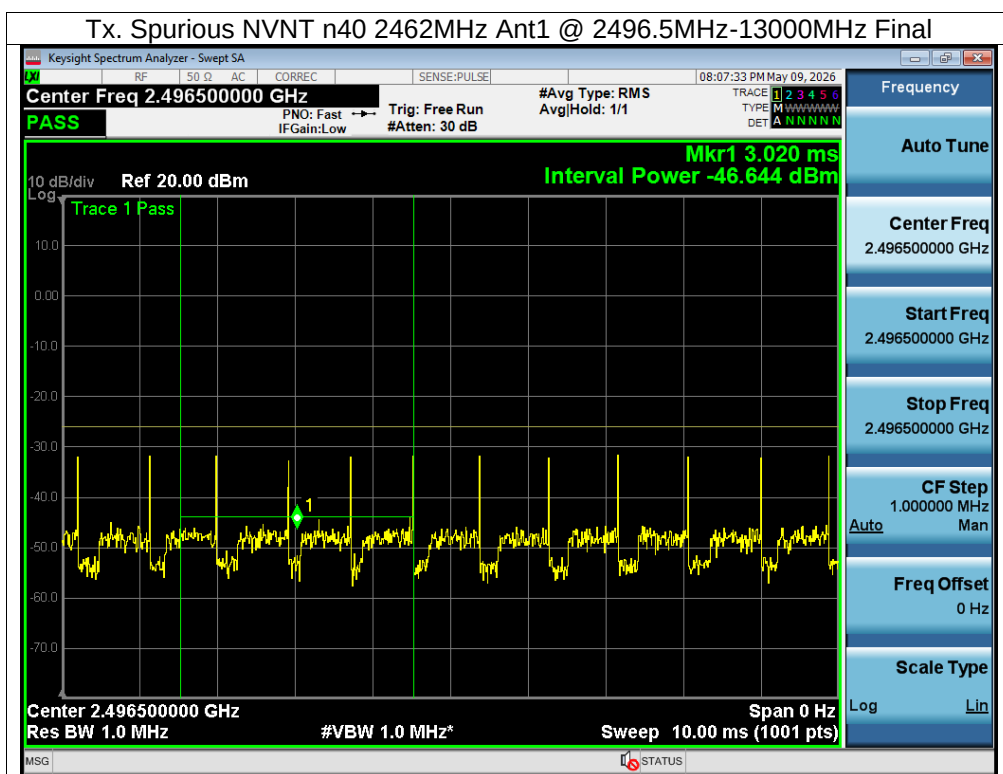








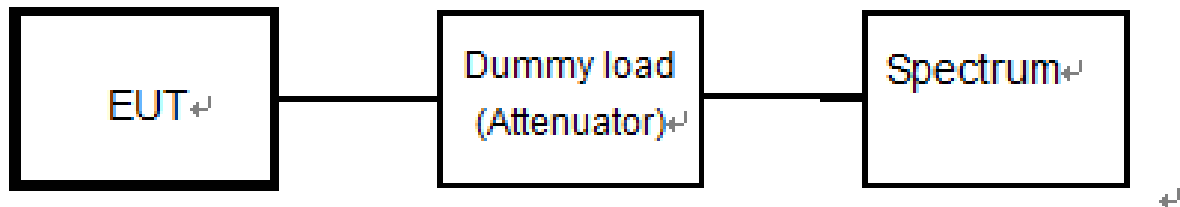




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11. Imitation Of Collateral Emission Of Receiver Measurement

11.1 Block Diagram Of Test Setup



11.2 Limit

Item	Limits
RX Spurious Emission:	$\leq 4\text{nW}$ (-54dBm) (30MHz-1GHz)
	$\leq 20\text{nW}$ (-47dBm) (1GHz-12.5GHz)

11.3 Measuring Instruments And Setting

Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB	100 kHz (below 1GHz emissions) 1 MHz (above 1GHz emissions)
VB	100 kHz (below 1GHz emissions) 1 MHz (above 1GHz emissions)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

11.4 Test Procedure

1. EUT have the continuous reception mode and fixed only one channelize.
2. Setting of SA is following as RB / VB: 100 kHz (below 1GHz emissions) / 1 MHz (above 1GHz emissions) / AT: 6dB / Ref: -20dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold
3. 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
4. SA set RB: 1MHz and VB: 1MHz. Then adjust to start frequency 1000MHz and stop frequency 12500MHz. Search to mark peak reading value + cable loss shall be less than 20nW
5. 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.

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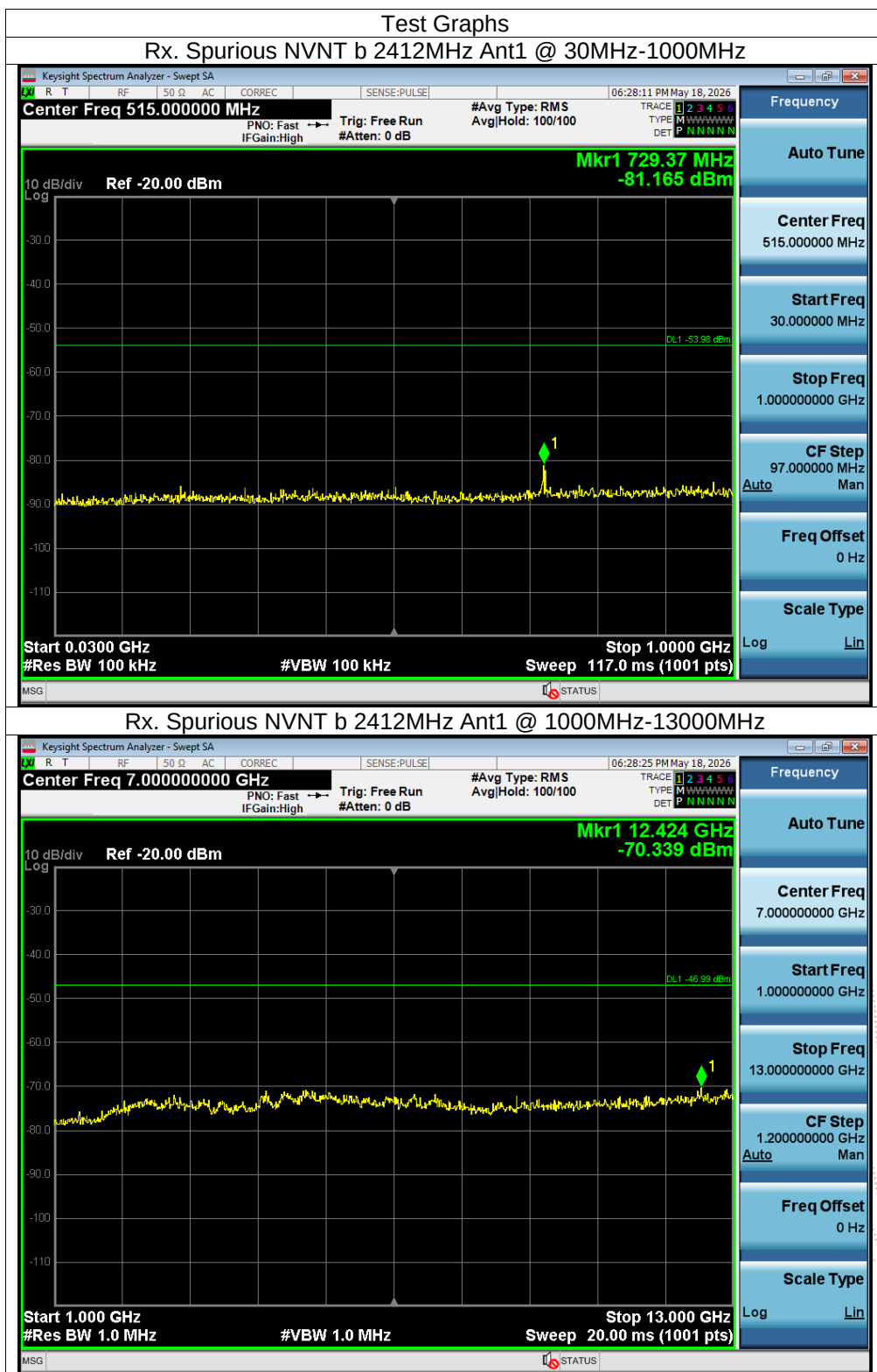
11.5 Test Result

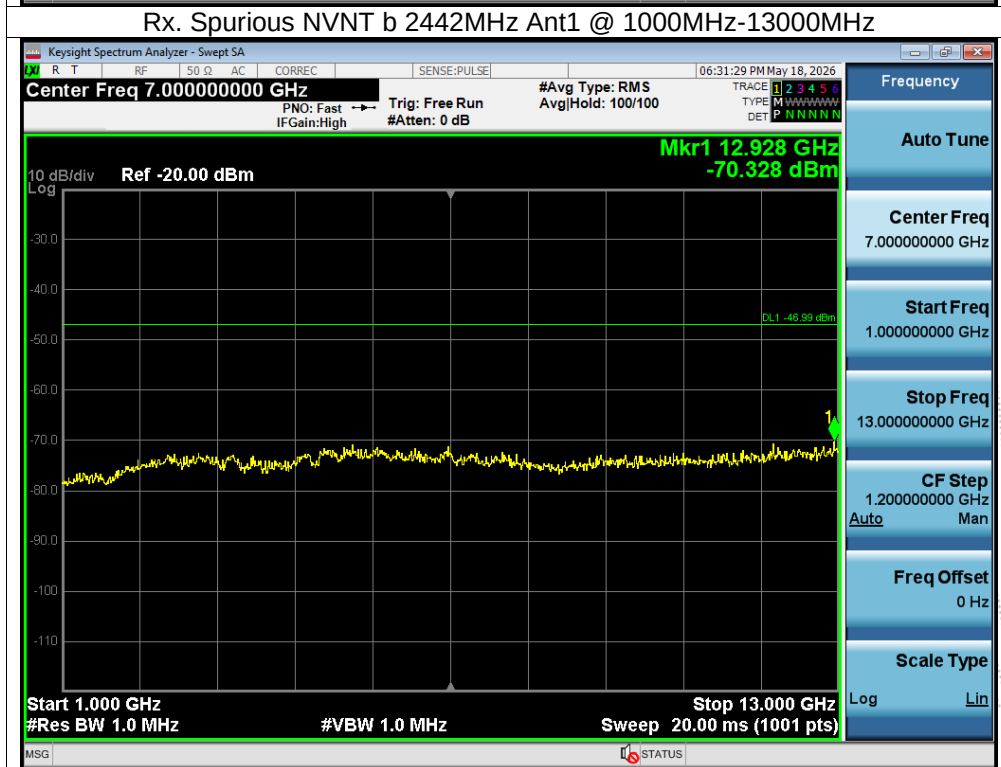
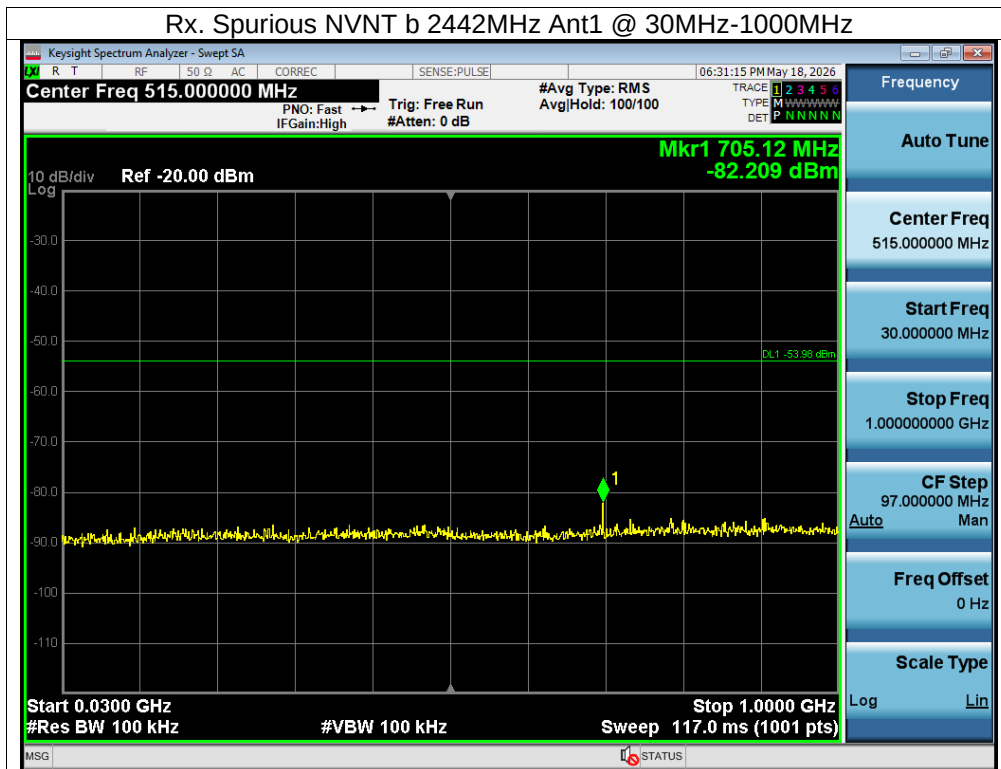
Temperature:	25°C		
Humidity:	55 % RH	Test Voltage	DC 12V

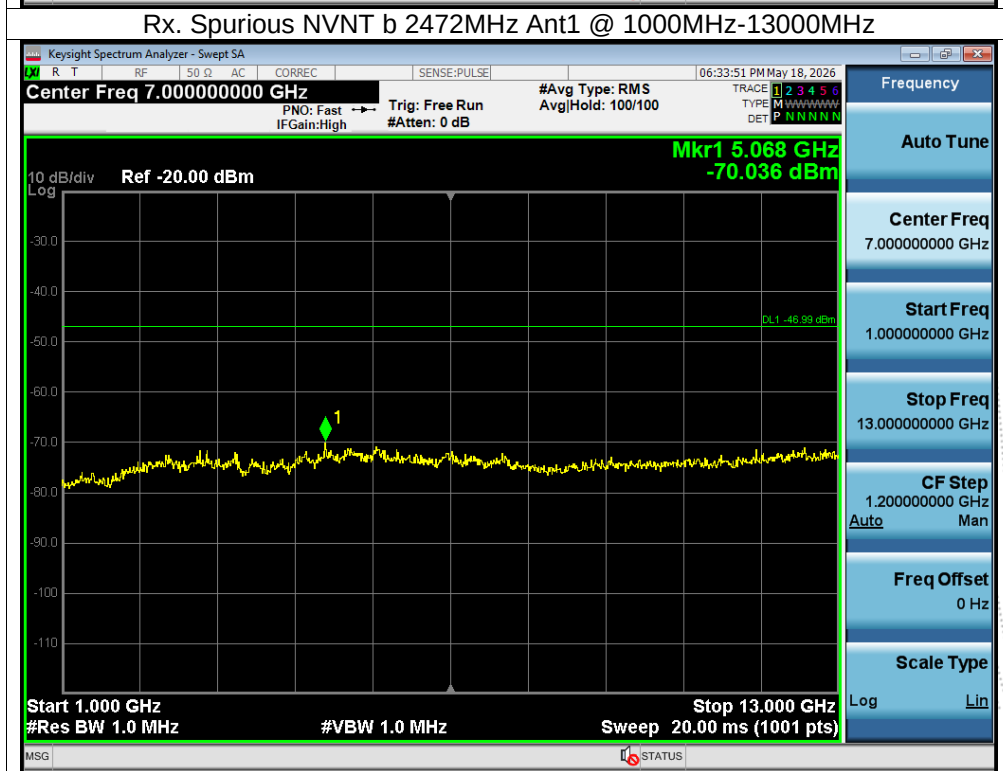
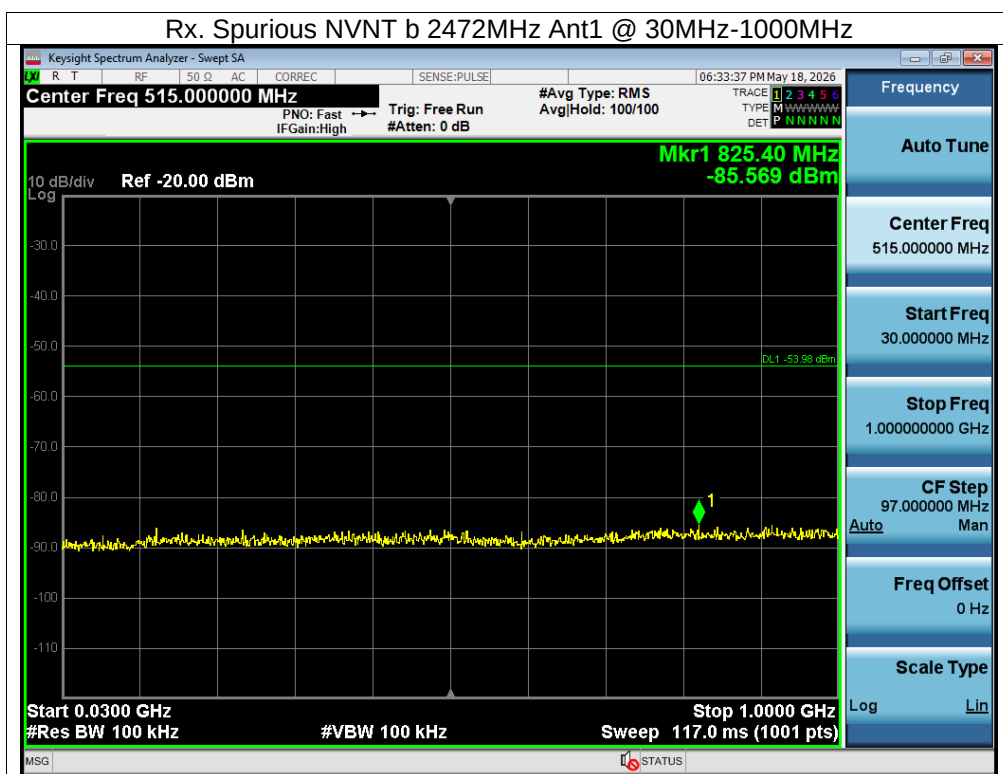
The worst test channel of all channels was showed as the follow: only shown Antenna 1 Plot.

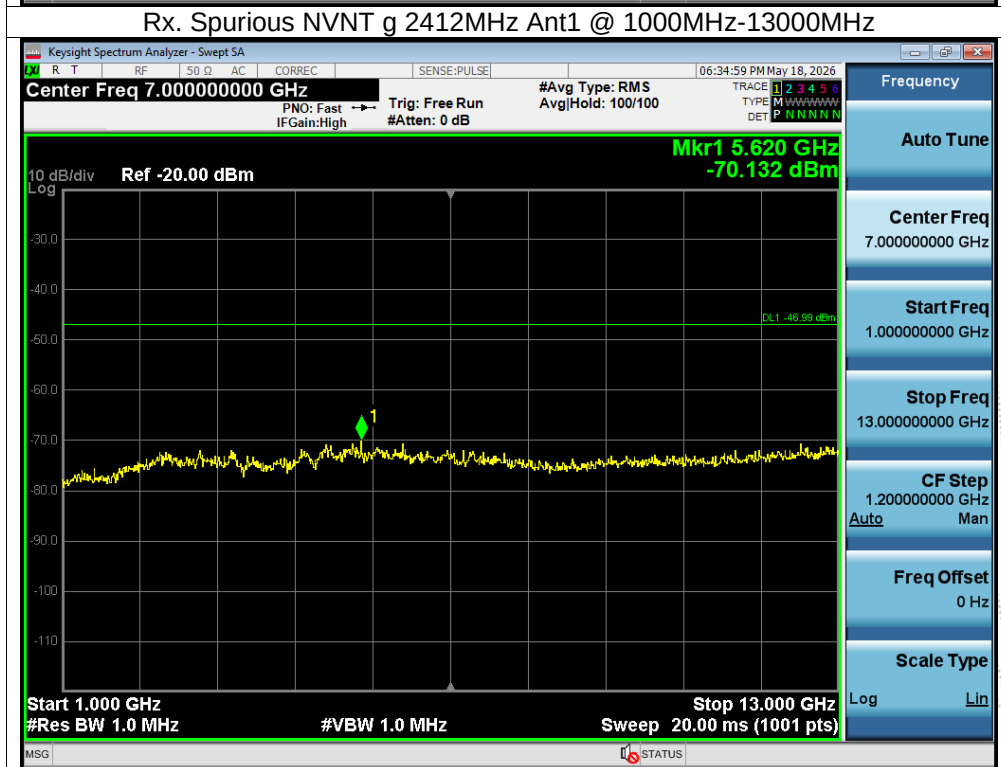
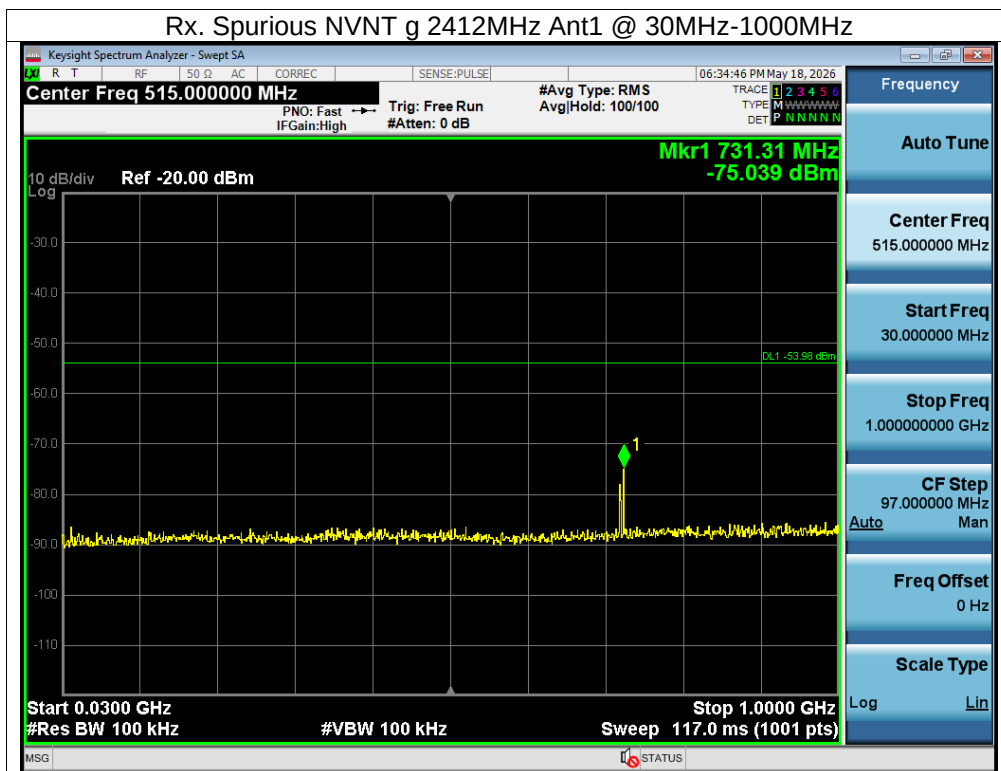
Mode	Frequency (MHz)	Range (MHz)	Emission Frequency (MHz)	Max Peak Value (dBm)	Max RMS Value (dBm)	Max Peak Value (nW)	Max RMS Value (nW)	Limit (nW)	Verdict
b	2412	30-1000	729.37	-81.17	NA	0.0076	NA	4	Pass
b	2412	1000-13000	12424.00	-70.34	NA	0.0925	NA	20	Pass
b	2442	30-1000	705.12	-82.21	NA	0.006	NA	4	Pass
b	2442	1000-13000	12928.00	-70.33	NA	0.0927	NA	20	Pass
b	2472	30-1000	825.40	-85.57	NA	0.0028	NA	4	Pass
b	2472	1000-13000	5068.00	-70.04	NA	0.0991	NA	20	Pass
g	2412	30-1000	731.31	-75.04	NA	0.0313	NA	4	Pass
g	2412	1000-13000	5620.00	-70.13	NA	0.0971	NA	20	Pass
g	2442	30-1000	728.40	-79.35	NA	0.0116	NA	4	Pass
g	2442	1000-13000	7816.00	-70.64	NA	0.0863	NA	20	Pass
g	2472	30-1000	726.46	-73.87	NA	0.041	NA	4	Pass
g	2472	1000-13000	5068.00	-69.67	NA	0.1079	NA	20	Pass
n20	2412	30-1000	786.60	-85.56	NA	0.0028	NA	4	Pass
n20	2412	1000-13000	2524.00	-54.68	-59.52	3.4041	1.1169	20	Pass
n20	2442	30-1000	724.52	-85.67	NA	0.0027	NA	4	Pass
n20	2442	1000-13000	12400.00	-69.63	NA	0.1089	NA	20	Pass
n20	2472	30-1000	727.43	-77.85	NA	0.0164	NA	4	Pass
n20	2472	1000-13000	5080.00	-70.08	NA	0.0982	NA	20	Pass
n40	2422	30-1000	726.46	-74.84	NA	0.0328	NA	4	Pass
n40	2422	1000-13000	5428.00	-70.47	NA	0.0897	NA	20	Pass
n40	2442	30-1000	721.61	-84.86	NA	0.0033	NA	4	Pass
n40	2442	1000-13000	5872.00	-70.92	NA	0.0809	NA	20	Pass
n40	2462	30-1000	727.43	-76.39	NA	0.023	NA	4	Pass
n40	2462	1000-13000	5824.00	-70.89	NA	0.0815	NA	20	Pass

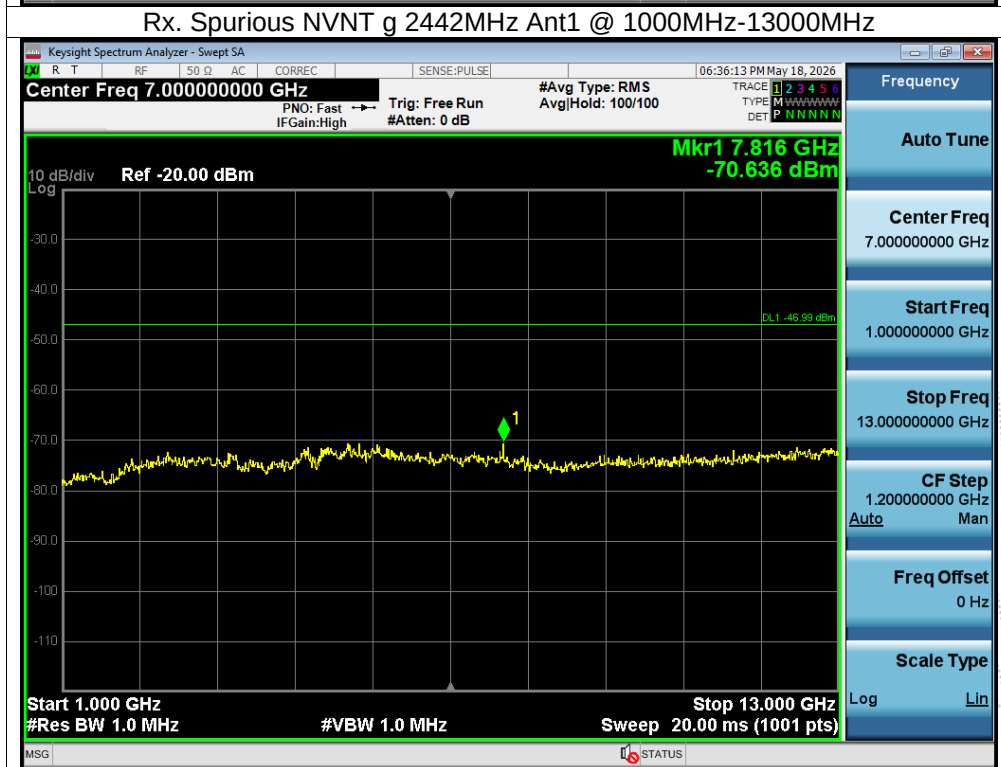
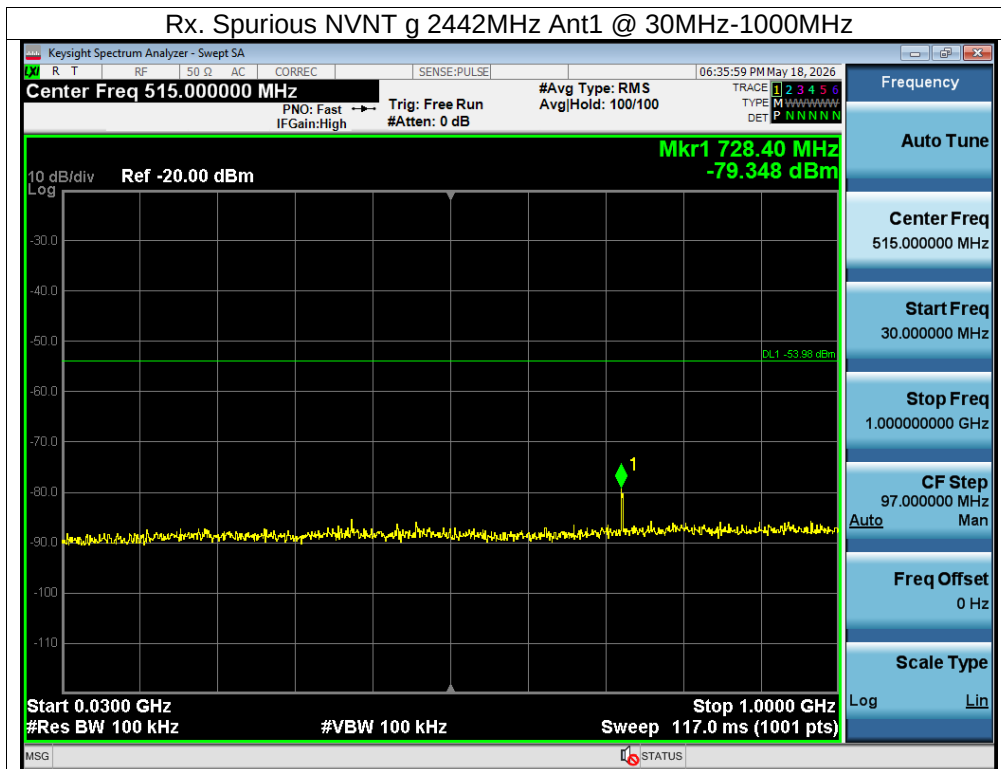


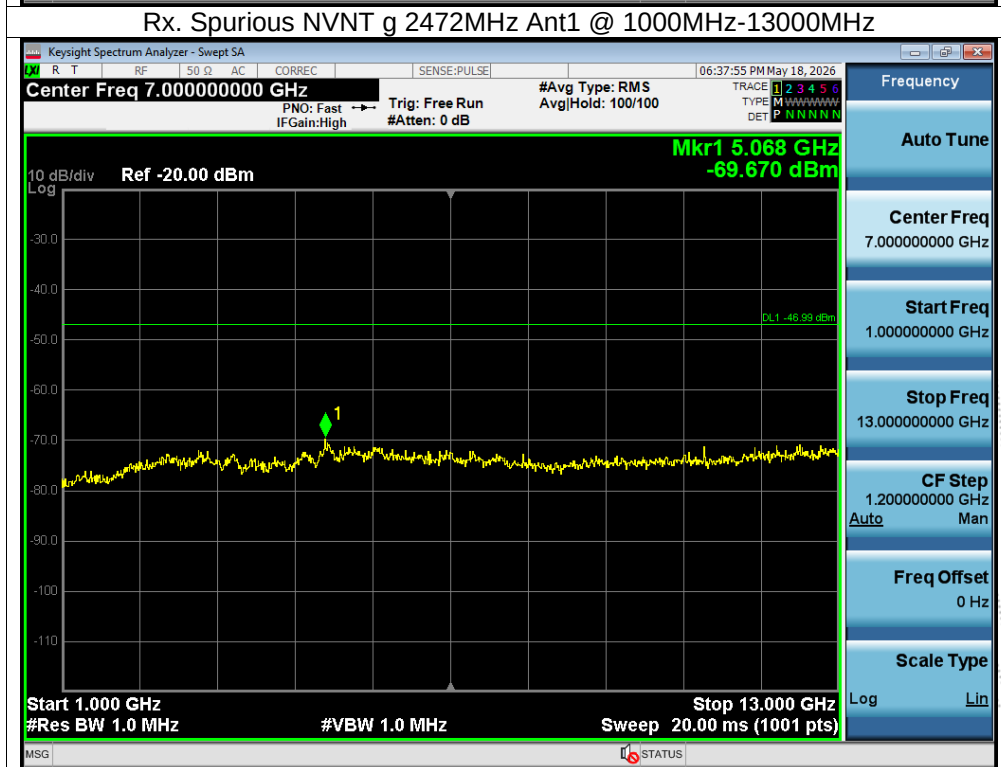
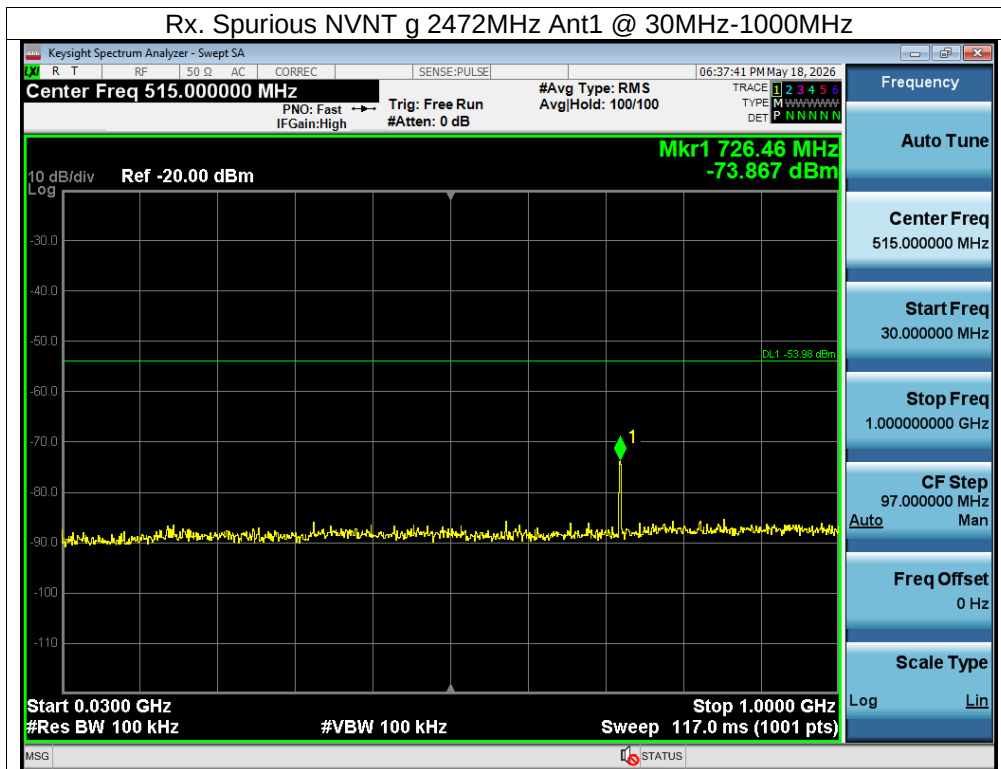


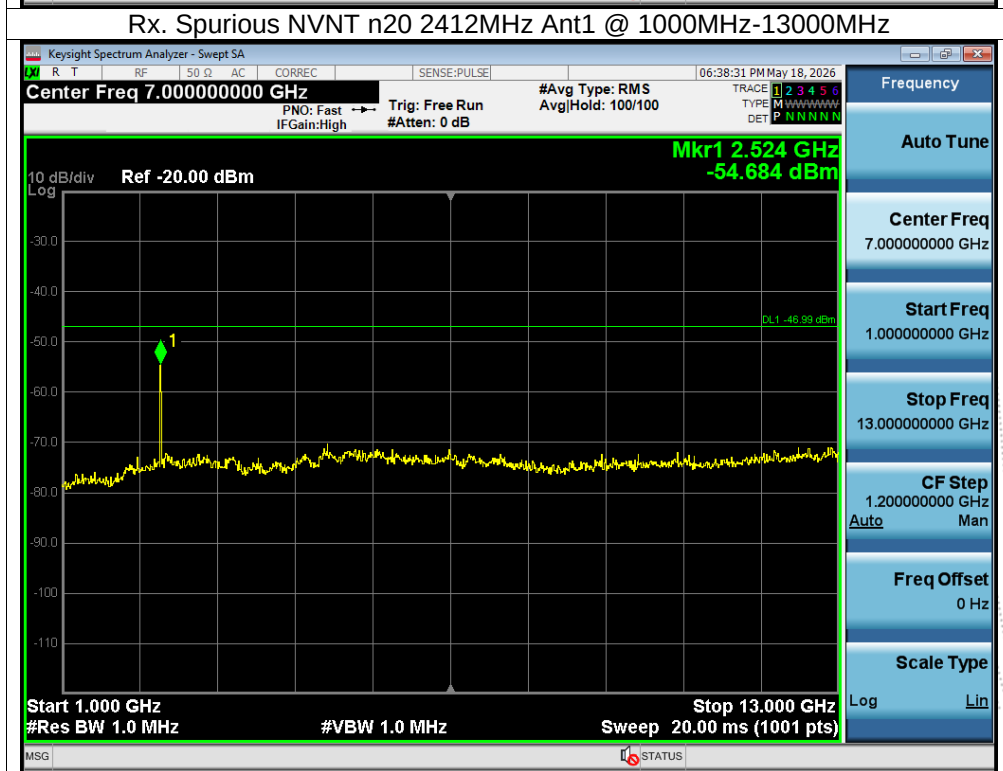
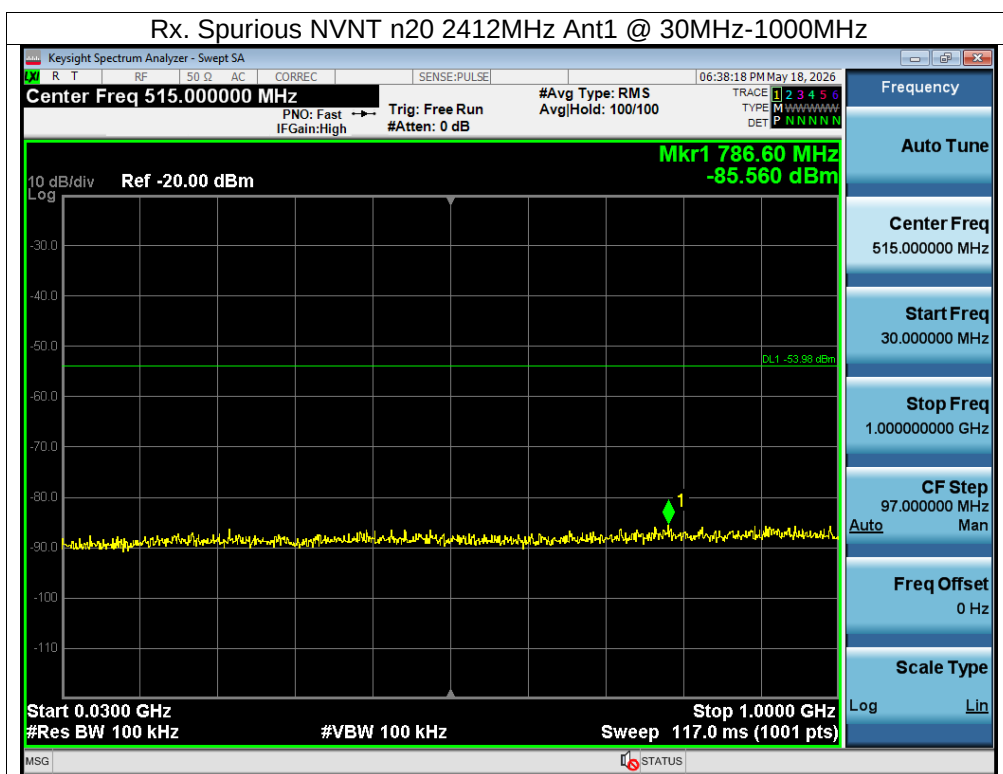


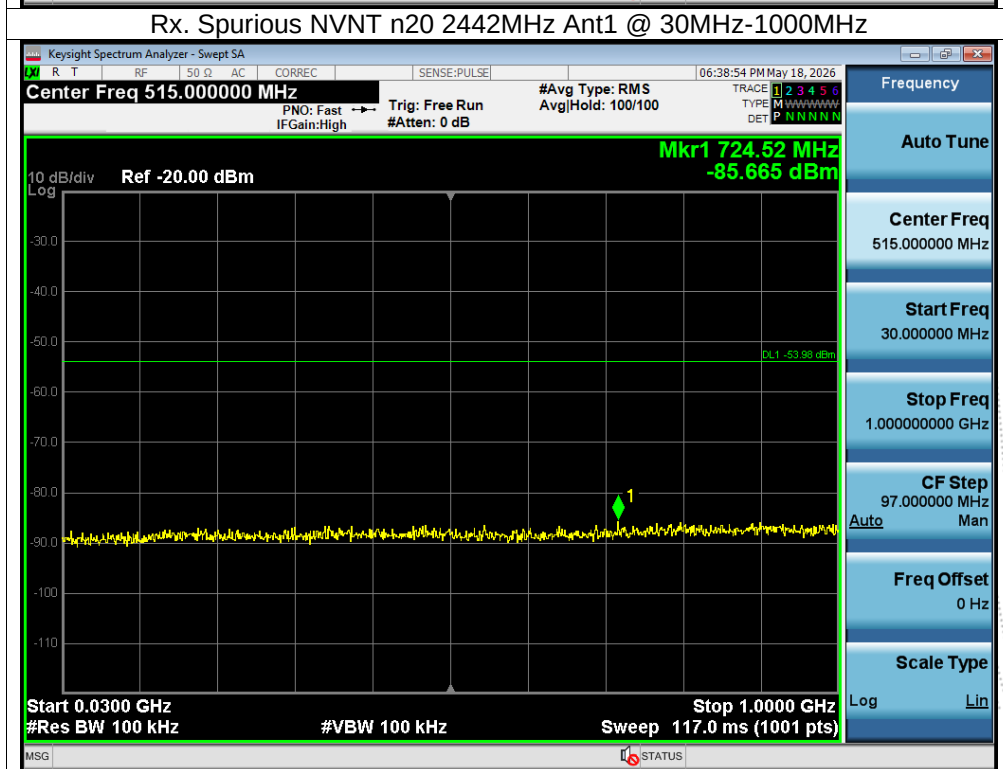
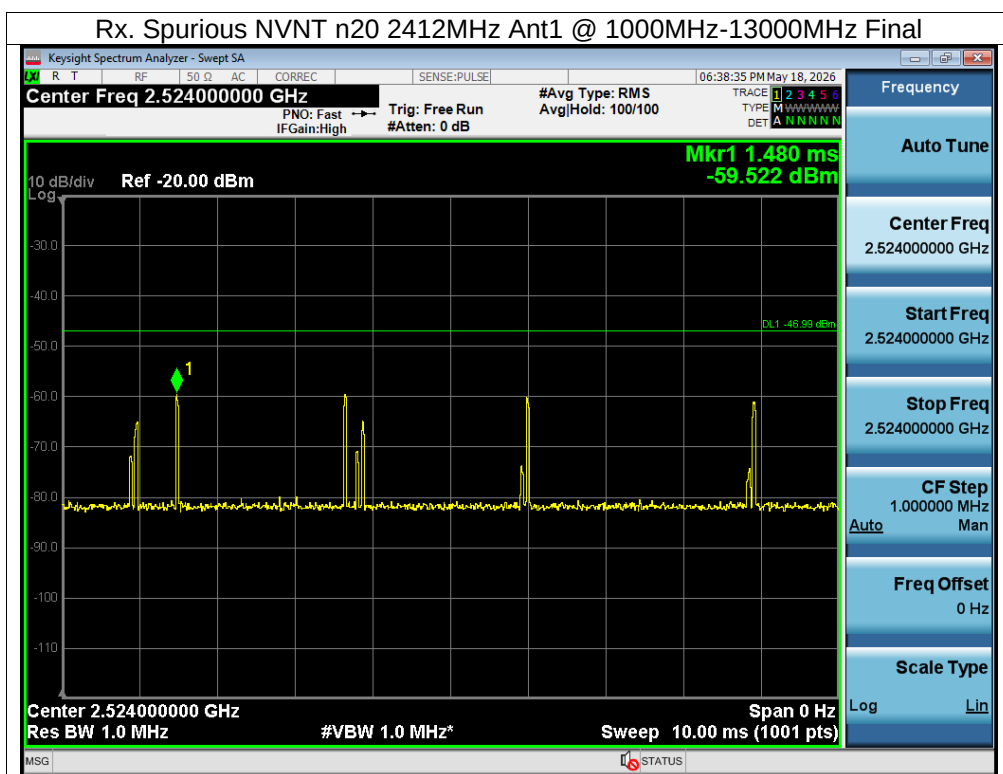


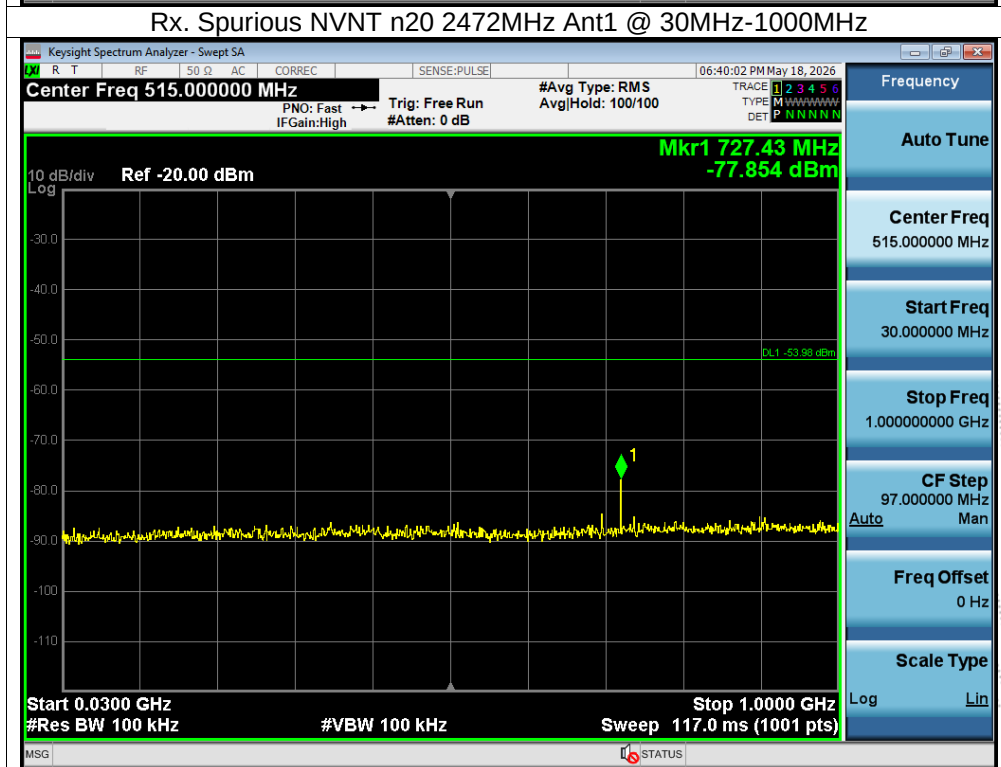
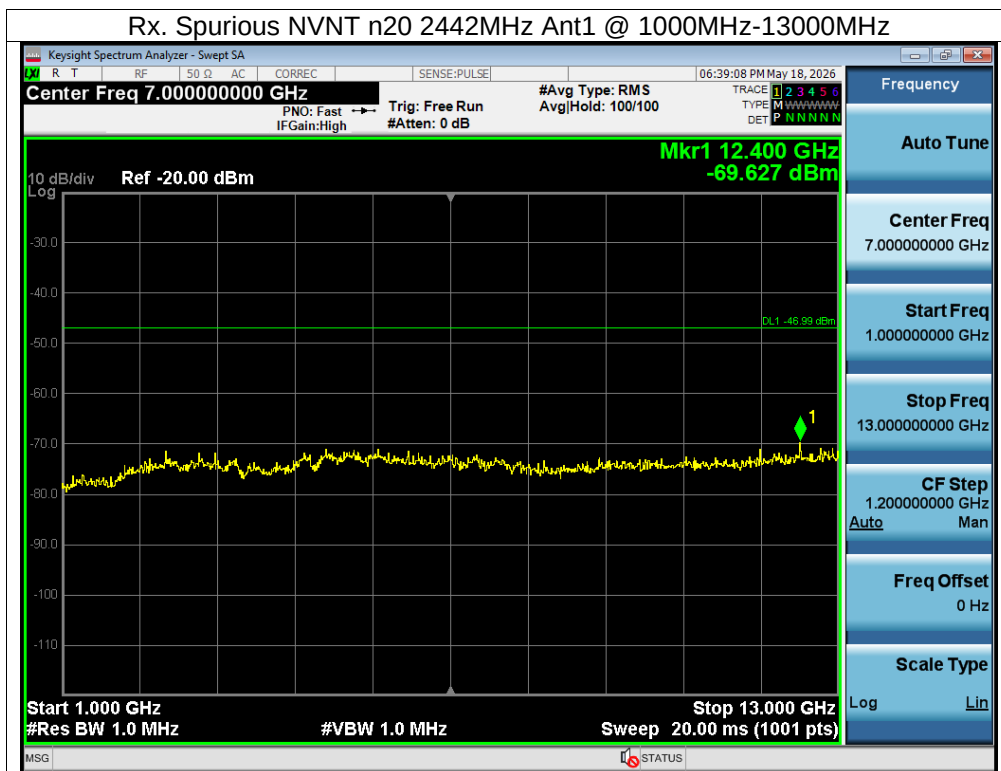


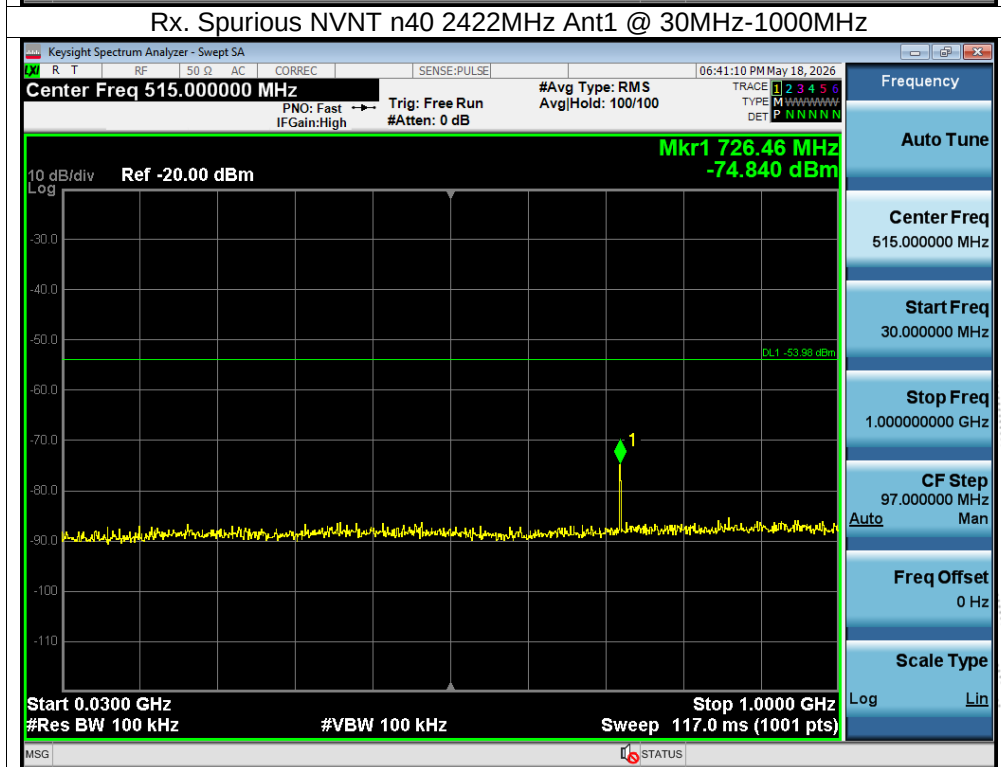
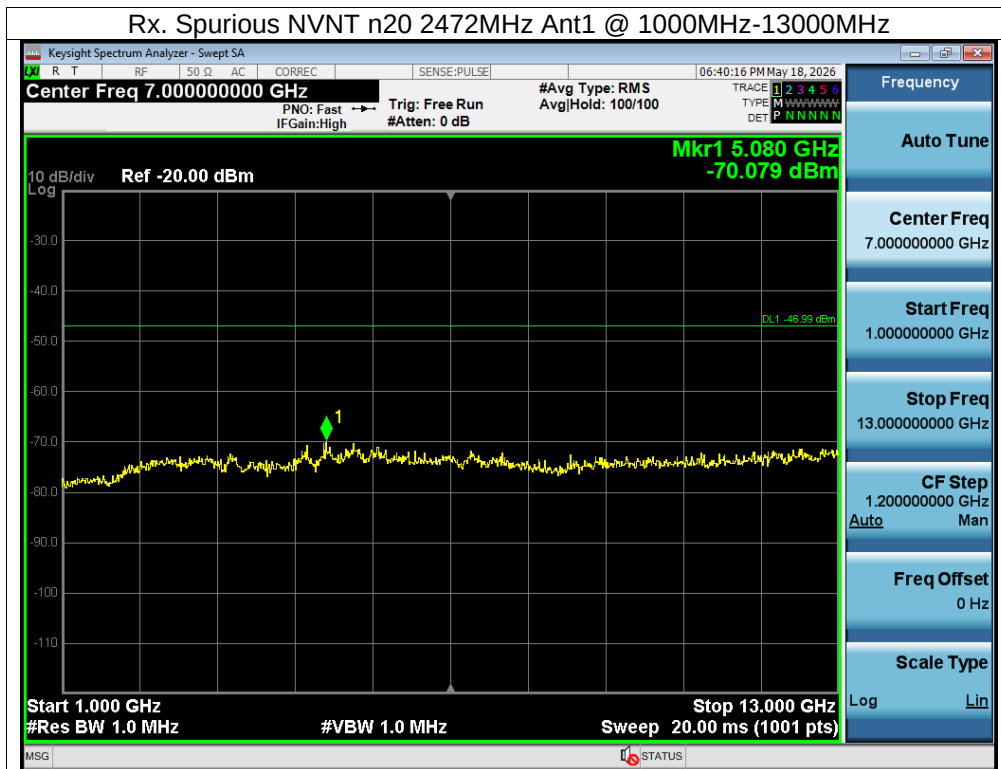


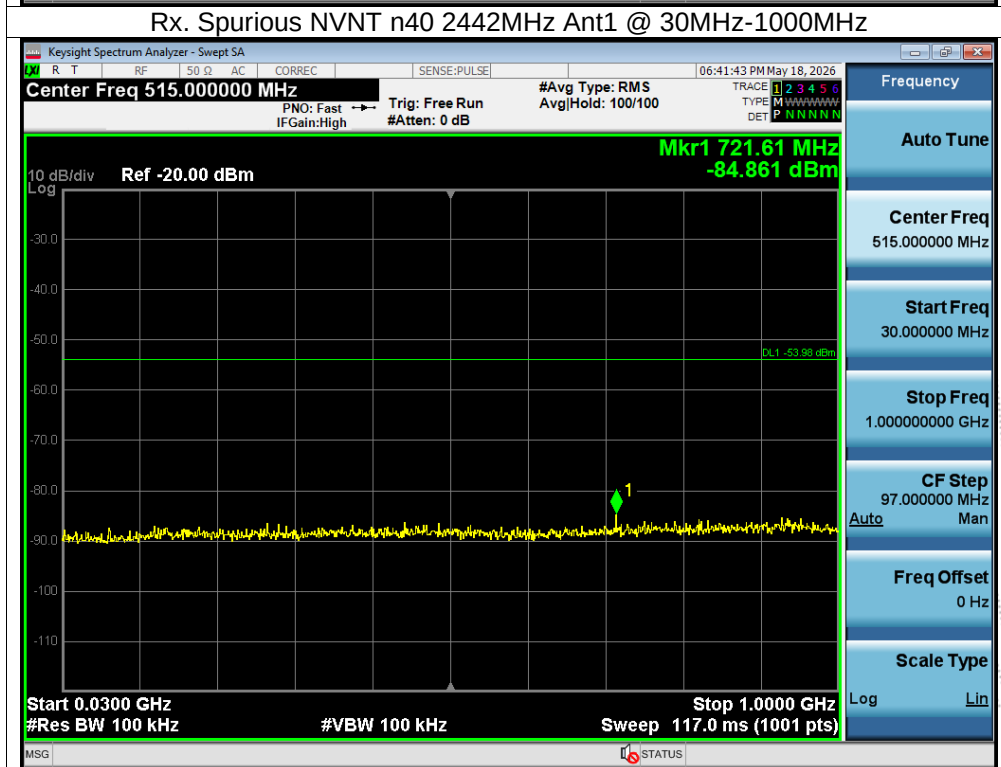
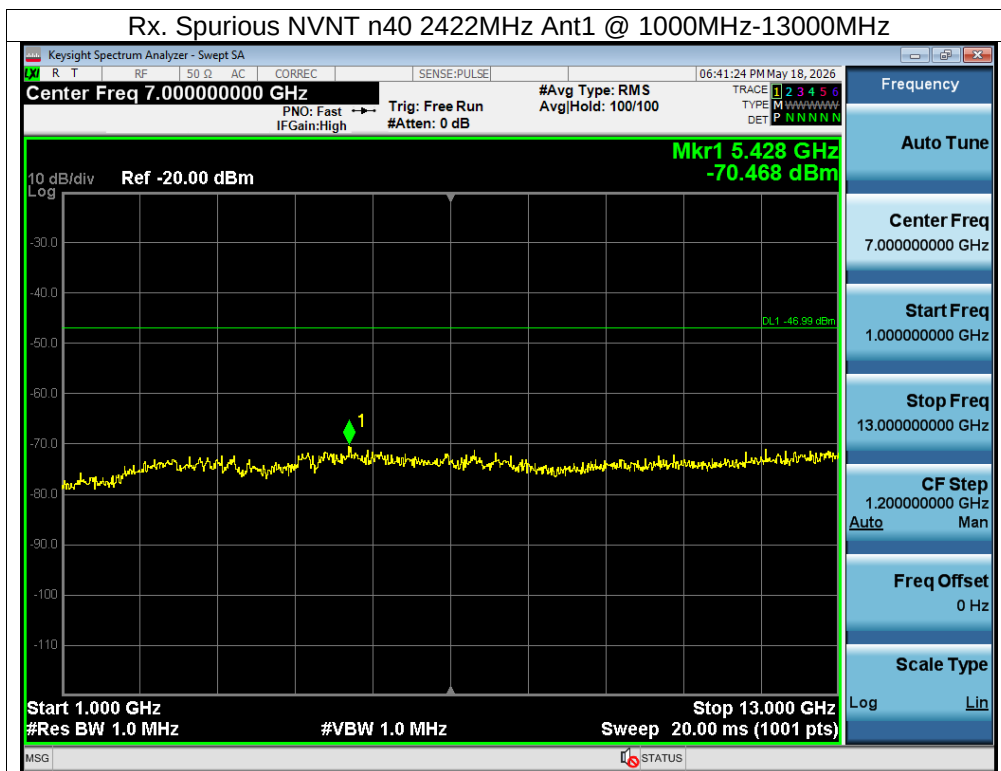


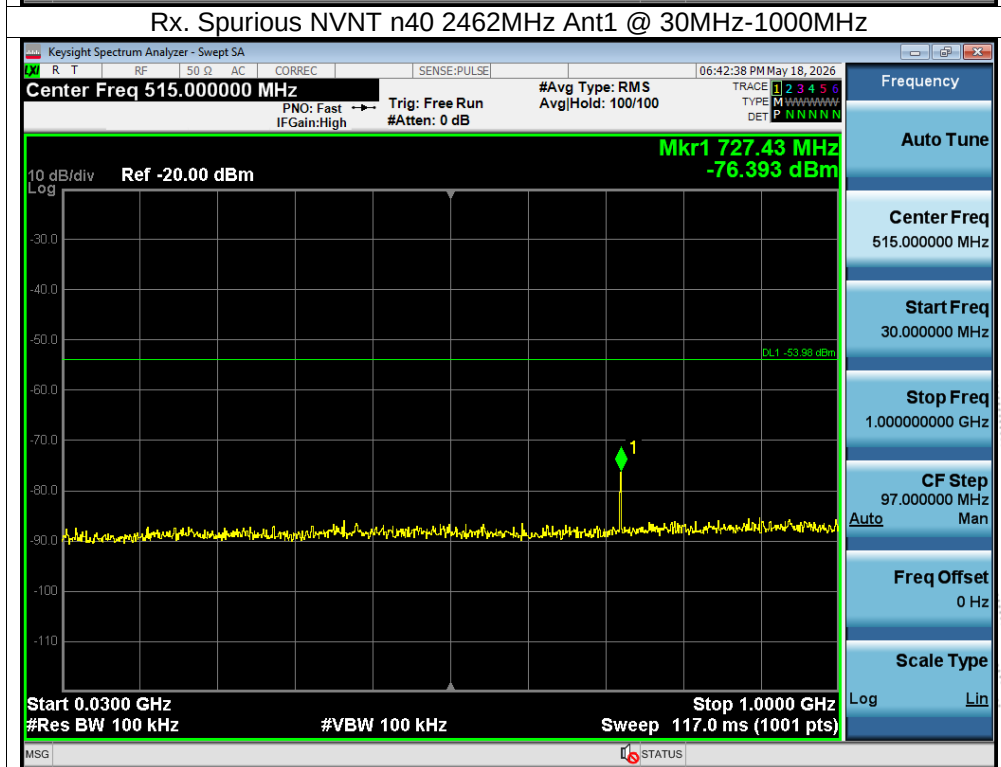
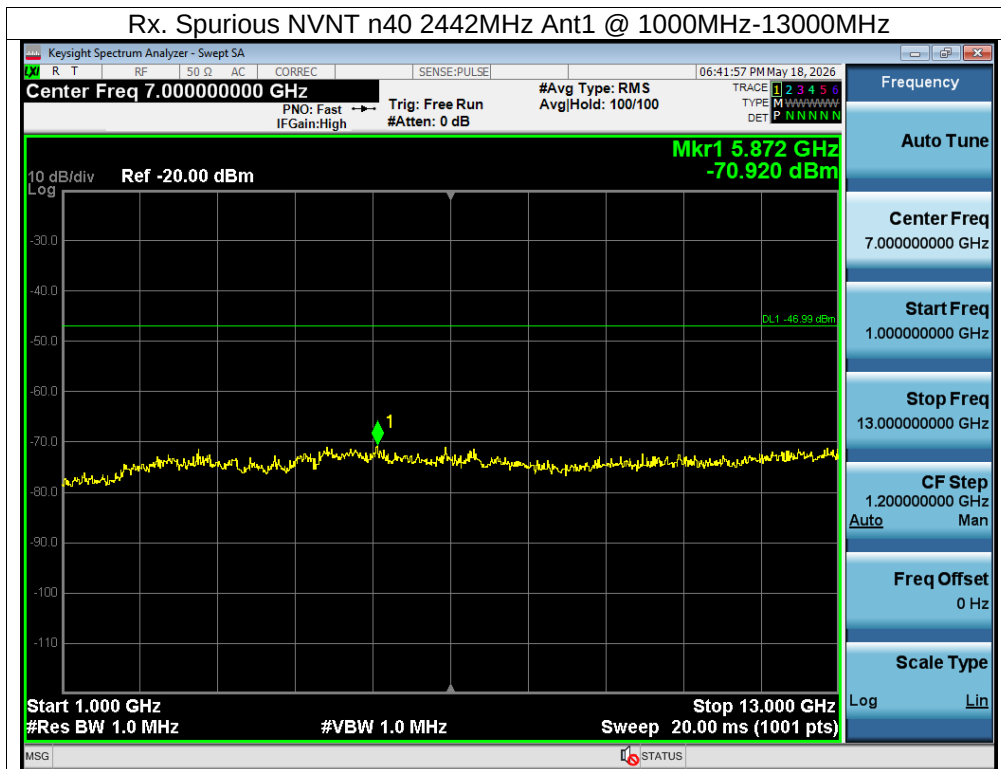


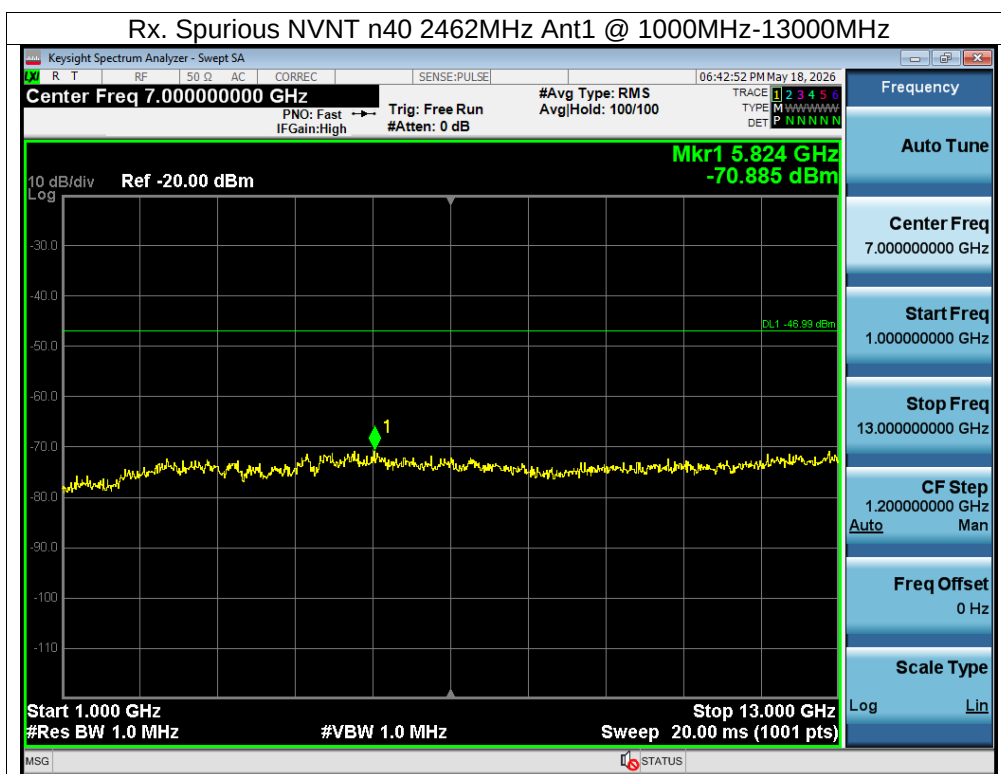












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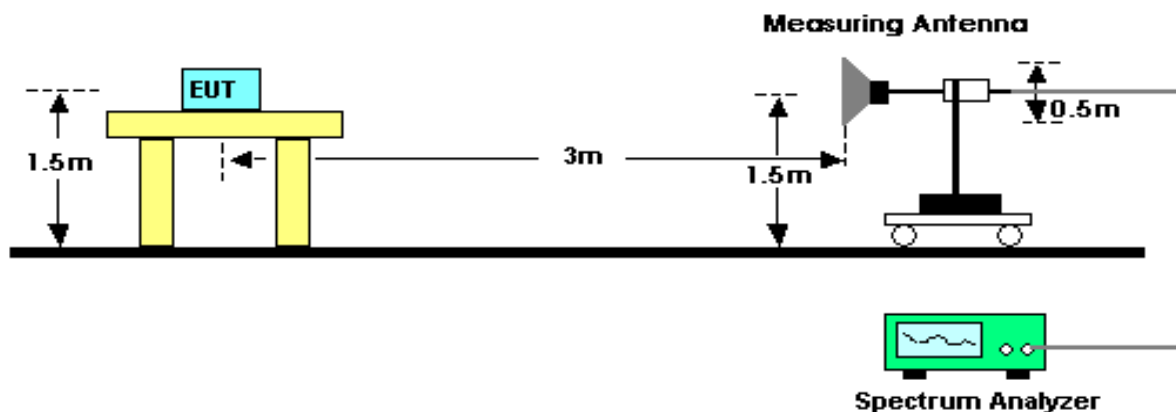
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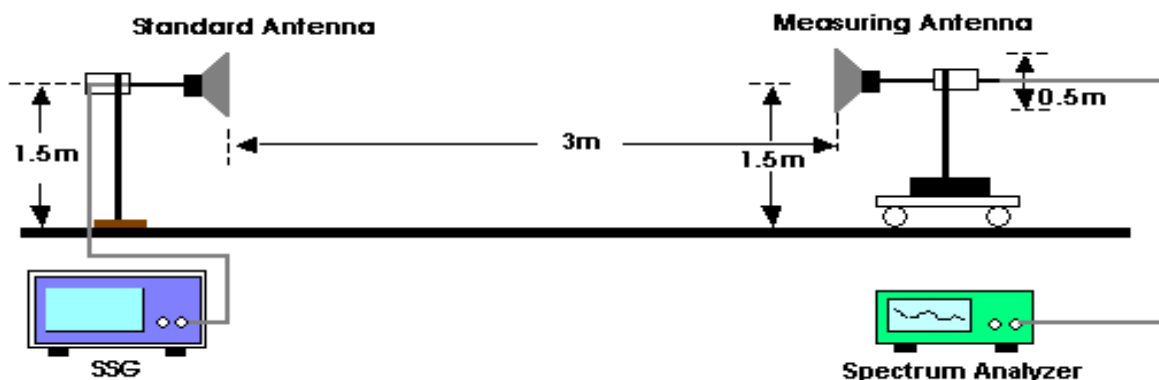
12. Transmission Antenna Gain (EIRP Antenna Power) Measurement

12.1 Block Diagram Of Test Setup

For EUT radiation measurement



For standard antenna measurement



12.2 Limit

Modulation	Frequency band	Antenna power	Max EIRP	
			Non-directional	Beam directional ^{Note1}
DS	2,400-2,483.5MHz	10mW/MHz	12.14dBm/MHz	22.14dBm/MHz
OFDM1	2,400-2,483.5MHz	10mW/MHz	12.14dBm/MHz	22.14dBm/MHz
OFDM2	2,400-2,483.5MHz	5mW/MHz	9.14dBm/MHz	19.14dBm/MHz
FH,DS-FH, FH-OFDM	2,400-2,483.5MHz	3mW/MHz	6.91dBm/MHz	16.91dBm/MHz
	2,427-2,470.75MHz	10mW/MHz	12.14dBm/MHz	22.14dBm/MHz
Other than those above	2,400-2,483.5MHz	10mW	12.14dBm	22.14dBm

Note : OFDM 1 in the modulation method column indicates that the occupied frequency band width is 26

MHz or less, and OFDM 2 indicates the occupied frequency bandwidth exceeding 26 MHz and 38 MHz or less.

12.3 Measuring Instruments And Setting

Please refer to section 5 in this report. The following table is the setting of spectrum analyzer.

Spectrum Parameter	Setting
Attenuation	Auto
RB/VB	1 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

12.4 Test Procedure

1. Set EUT ad measuring antenna at the same height and roughly facing each other.
2. 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 the measuring antenna. The output level at the spectrum analyzer is read sa "E".
3. Remove the EUT from the turn table and put the replacing antenna facing to measuring antenna at same height. Set the standard signal generator (SSG) at same frequency and transmit on then receive the signal
4. Swing the replacing antenna give a maximum receiving level.
5. Move the measuring antenna height up and down within $\pm 50\text{cm}$ of replacing antenna height and swing it to find the maximum receiving level.
6. Set SSG output power at Pt to give the equivalent output level of "E" or caluate Pt with SSG output which gives the nearest of "E" and difference ($\pm 1\text{dB}$). Record the Pt.
7. Calculate EIRP by the formula below $\text{EIRP} = \text{Gt} - \text{L} + \text{Pt}$.

Gt: gain of replacing antenna (dBi)

L: feeder loss between SSG and replacing antenna

Pt: Output power of the SSG

8. If the antenna for the EUT has circular polarization, sum of V-field and H-field will be result if measuring antenna is linear polarization.

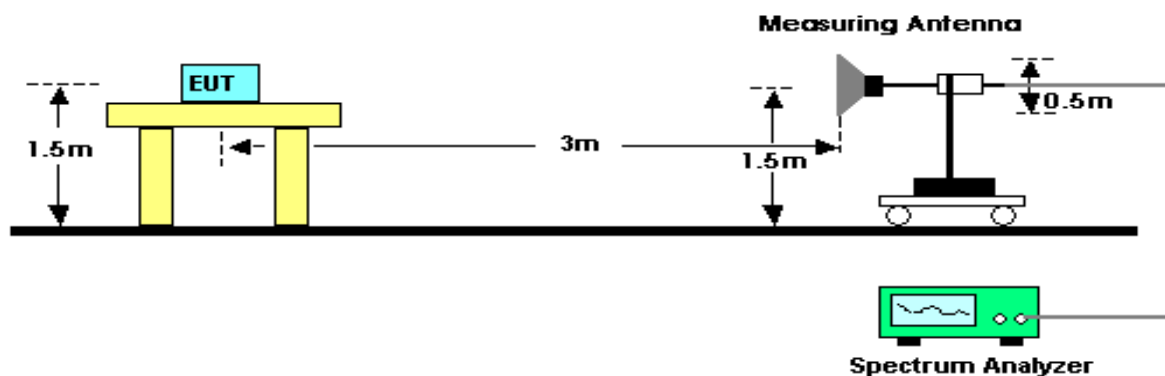
12.5 Test Result

Temperature:	25 ⁰ C		
Humidity:	55 % RH	Test Voltage	DC 12V
Operation Mode:	Transmitting-		

Test voltage (V)	Mode	Channel (MHz)	Antenna Power (dBm/MHz) ANT 1	Antenna Power (dBm/MHz) ANT 2	ANT 1 (dBi)	ANT 2 (dBi)	EIRP (dBm/MHz) ANT 1	EIRP (dBm/MHz) ANT 2	Total EIRP (dBm/MHz)	Limit (dBm/MHz)
DC 12V	802.11b	2412	0.08	0.29	5.24	4.4	5.32	4.69	/	12.14
		2442	-0.2	-0.01	5.24	4.4	5.04	4.39	/	
		2472	0.05	0.33	5.24	4.4	5.29	4.73	/	
	802.11g	2412	-3.67	-2.76	5.24	4.4	1.57	1.64	/	
		2442	-3.7	-3.23	5.24	4.4	1.54	1.17	/	
		2472	-3.2	-2.87	5.24	4.4	2.04	1.53	/	
	802.11n(HT20)	2412	-0.66	0.02	5.24	4.4	4.58	4.42	7.51	
		2442	-0.73	-0.42	5.24	4.4	4.51	3.98	7.26	
		2472	-0.43	-0.09	5.24	4.4	4.81	4.31	7.58	
	802.11n(HT40)	2422	-3.71	-3.21	5.24	4.4	1.53	1.19	4.37	9.14
		2442	-3.7	-3.39	5.24	4.4	1.54	1.01	4.29	
		2462	-3.79	-3.53	5.24	4.4	1.45	0.87	4.18	

13. Transmission Radiation Angle Width (3dB Beamwidth) Measurement

13.1 Block Diagram Of Test Setup



13.2 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 ₁ : $A = \text{E.I.R.P.} / (2.14\text{dBi} + \text{"Antenna Power (limit)" of each modulation method (*3mW/MHz, 10mW/MHz, etc.)}$ Note ₂ : 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 10 mW/MHz (10 dBm/MHz), So the test item will not be applied to the transmission antenna which has a gain of 2.14dBi or less	

13.3 Measuring Instruments And Setting

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

13.4 Test Procedure

1. Set EUT and measuring antenna at the same height and roughly facing each other.
2. Set spectrum analyzer with condition in section 4.7.2 and tune reference level to observe receiving signal position.
3. Rotate directions of the EUT horizontally and vertically to find the maximum receiving power.
4. 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"
5. Calculate permitted radiation angle in horizontal and vertical using EIRP measured in another test method.
6. 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

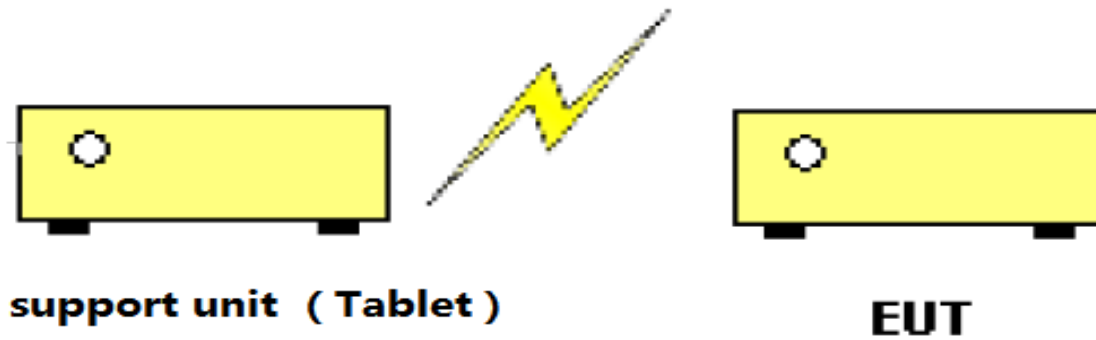
$A = \{\text{EIRP Power [mW]} / 4.9 \text{ for FH}\}$

13.5 Test Result

N/A (Not Applicable)

14. Radio Interference Prevention Capability Measurement

14.1 Block Diagram Of Test Setup



14.2 Limit

Item	Limits
Identification code	≥ 48 bits

14.3 Measuring Instruments And Setting

Item	Limits
MAC IP List	MAC Scan

14.4 Test Procedure

1. 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.

2. 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.

14.5 Test Result

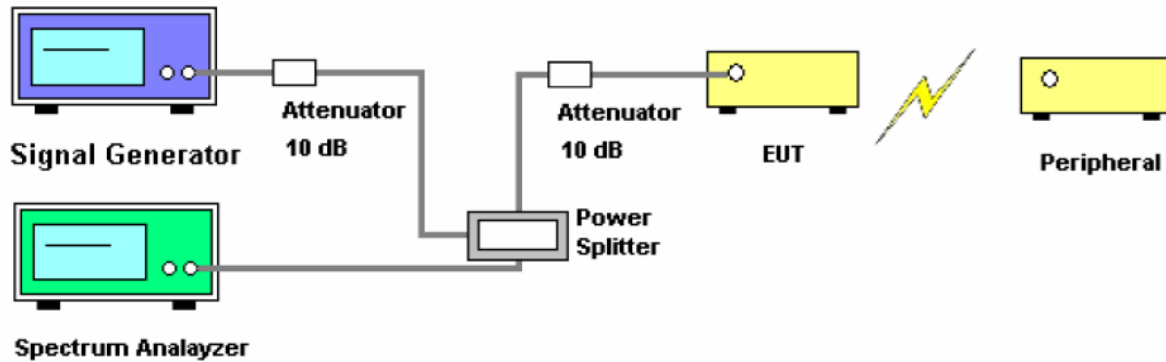
Temperature:	25°C		
Humidity:	55 % RH	Test Voltage	DC 12V
Operation Mode:	Transmitting-		

Test result:	CONFORM
--------------	---------

MAC: 24:35:57: ed: 69:67

15. Carrier Sense Capability Measurement

15.1 Block Diagram Of Test Setup



15.2 Limit

EUT stop RF transmission signal after carrier inject to EUT

15.3 Test Procedure

1. SG adjusted the frequency as same as the EUT transmitted signal and emitted the absence of modulation from SG and power level is (on $22.79 + G - 20 \cdot \log(f) \text{ dBm}$) (G is the antenna gain, f is the test frequency).
2. turn off the RF signal of the SG.
3. EUT have transmitted the maximum modulation signal and fixed channelize.
4. Setting of SA :RBW/VBW=1MHz/1MHz, Span=50MHz, Sweep time=auto, Sweep mode=continuous, Detect mode=positive peak
5. SG RF signal on.
6. EUT shall be stop the transmitted any signal and SG RF signal off, the EUT will be continuous transmitted signal.

15.4 Test Result

Mode	Channel	Result		
		Normal Voltage	High Voltage	Low Voltage
802.11n40	CH3	Pass	Pass	Pass
	CH7	Pass	Pass	Pass
	CH11	Pass	Pass	Pass

Note: For this test just evaluate the mode which bandwidth $\geq 26 \text{ MHz}$.

16. Duty Cycle Of Test Signal

16.1 Standard Requirement

Pre-analysis Check: While conducting average power measurement, duty cycle of each mode shall be checked to ensure its duty cycle in order to compensate for the loss due to insufficient ratio of duty cycle.

All duty cycle is pre-scanned, and result as obtained below shows only the most representative ones where duty cycle is conducted as the given transmission with given virtual operation that expresses the percentage

16.2 Formula

Duty Cycle = $T_{on} / (T_{on} + T_{off})$

16.3 Test Procedure

1. Set span = Zero
2. RBW = 8MHz
3. VBW = 8MHz,
4. Detector = Peak

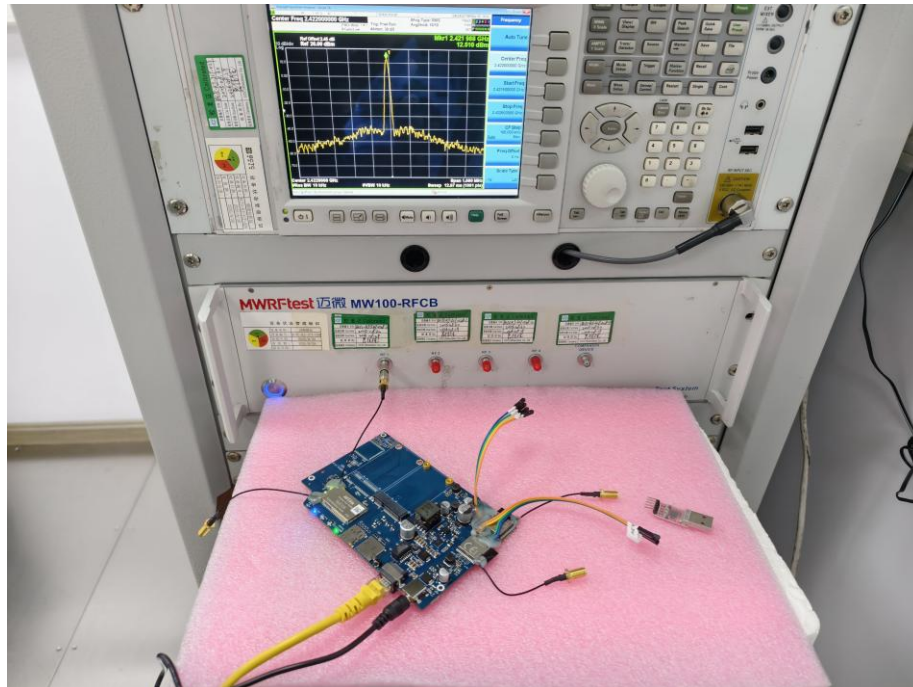
16.4 Test Result

Temperature:	25°C		
Humidity:	55 % RH	Test Voltage	DC 12V
Operation Mode:	Transmitting		

Operation mode	Duty Cycle(%)	Duty Fator (dB)
802.11b	100	0
802.11g	100	0
802.11n(HT20)	100	0
802.11n(HT40)	100	0

17. EUT Test Setup Photographs

Measurement Photos



STATEMENT

1. The equipment lists are traceable to the national reference standards.
2. The test report can not be partially copied unless prior written approval is issued from our lab.
3. The test report is invalid without the "special seal for inspection and testing".
4. The test report is invalid without the signature of the approver.
5. The test process and test result is only related to the Unit Under Test.
6. Sample information is provided by the client and the laboratory is not responsible for its authenticity.
7. The quality system of our laboratory is in accordance with ISO/IEC17025.
8. If there is any objection to this test report, the client should inform issuing laboratory within 15 days from the date of receiving test report.

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***** END *****