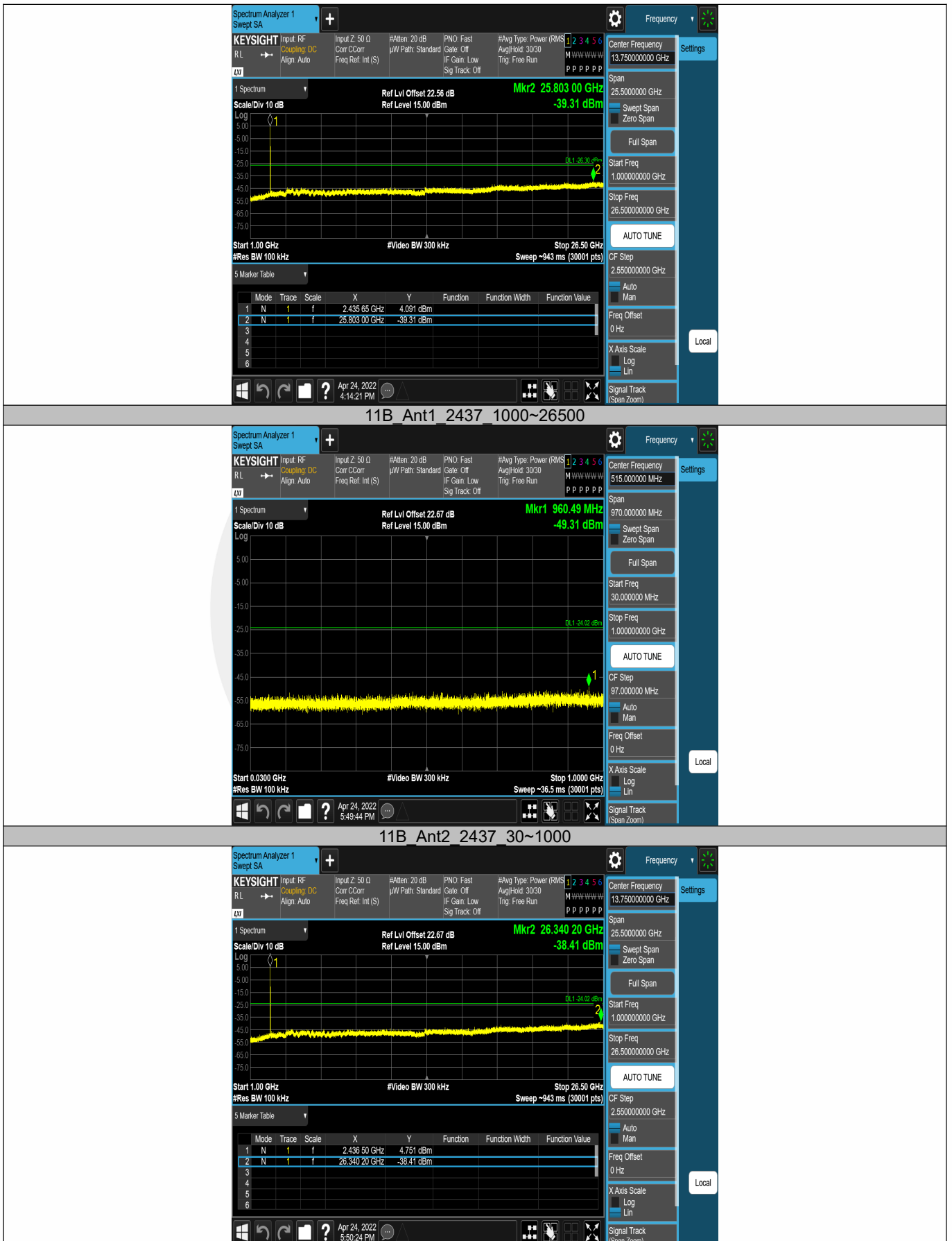
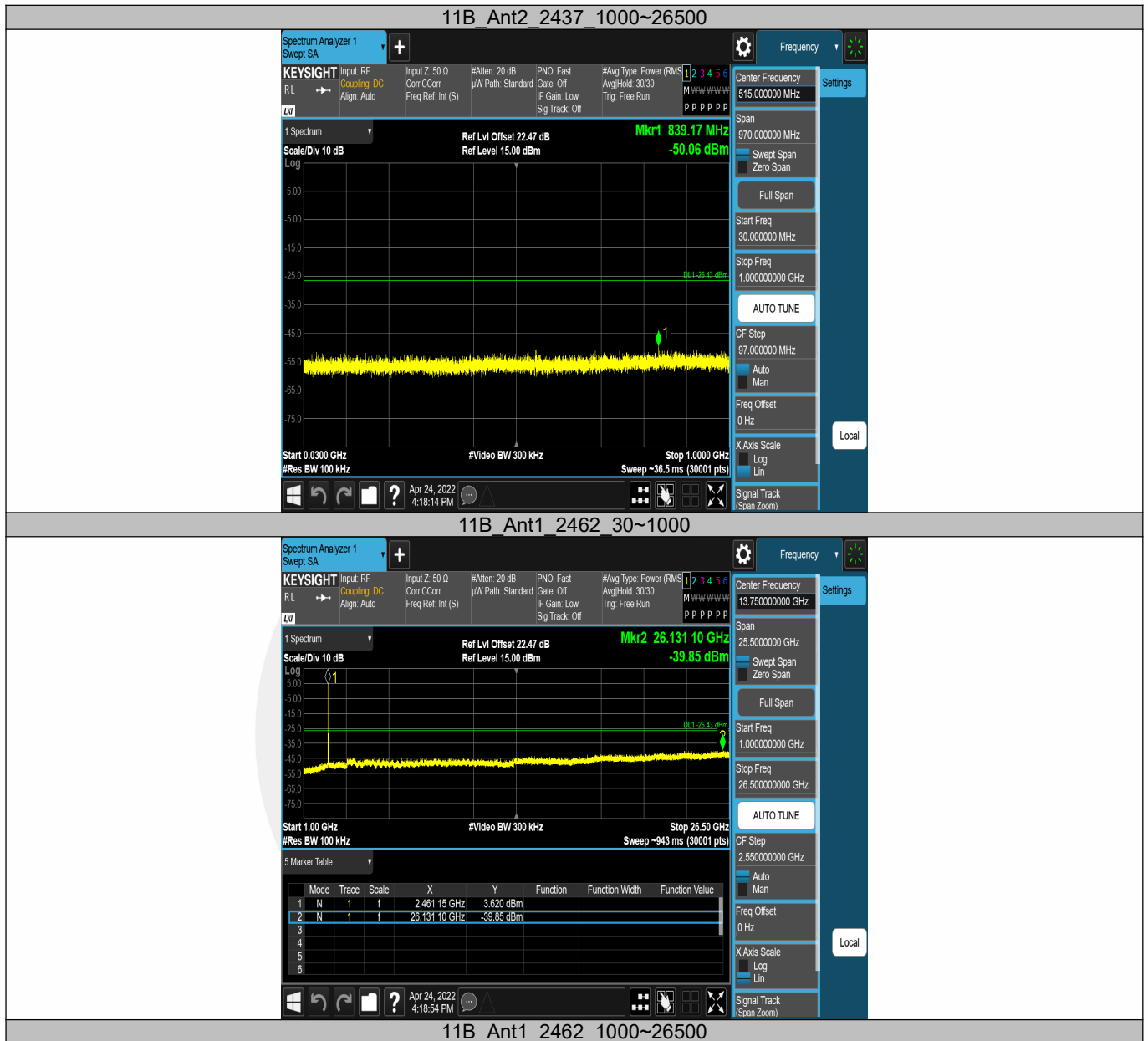
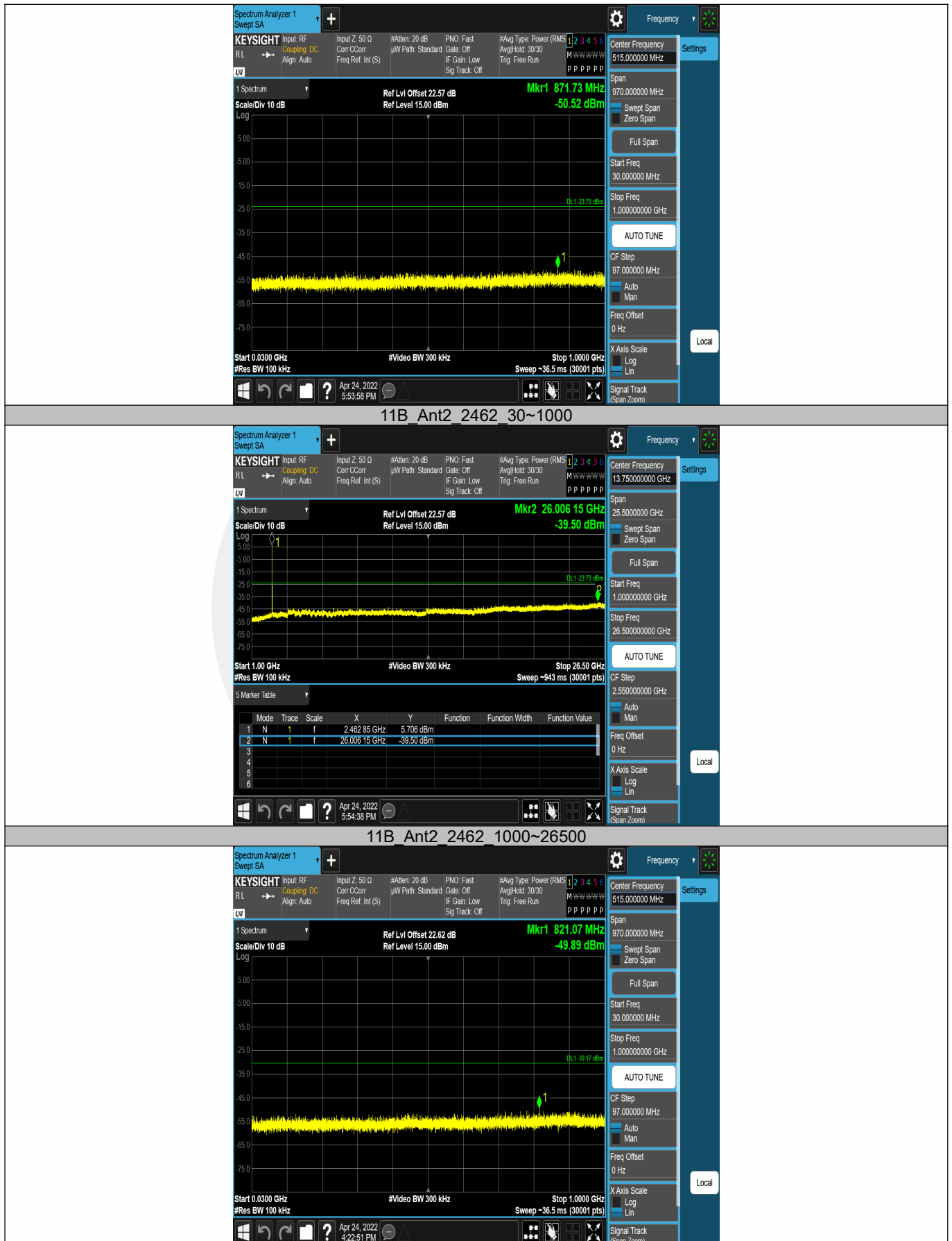
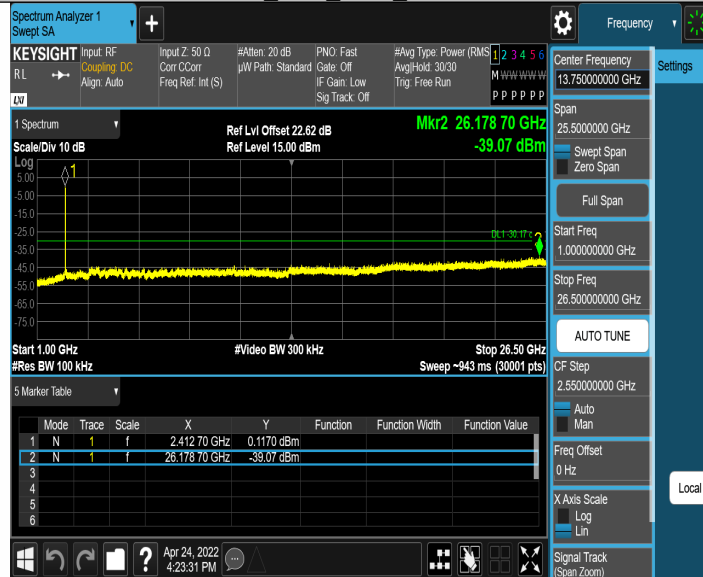








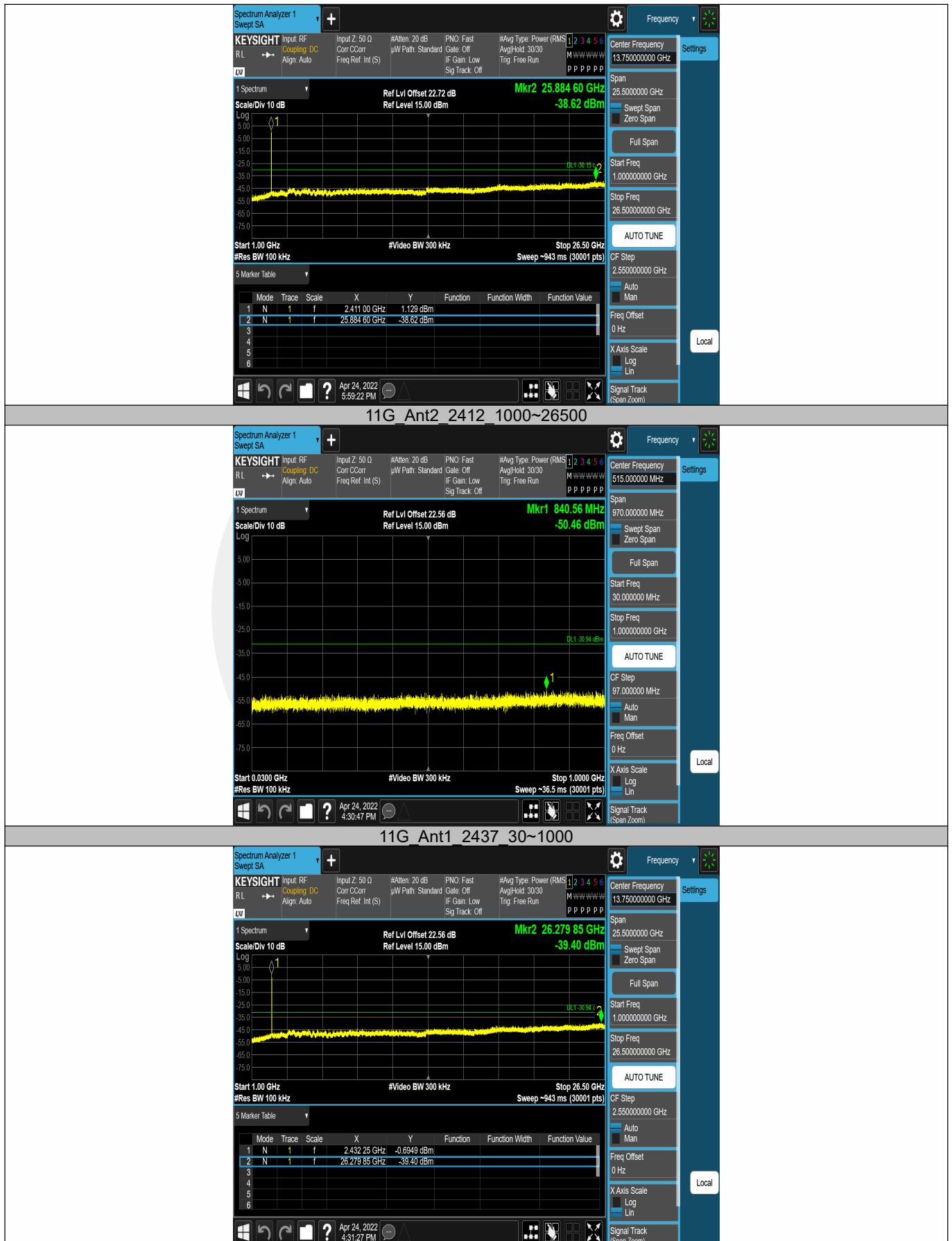
11G_Ant1_2412_30~1000



11G_Ant1_2412_1000~26500



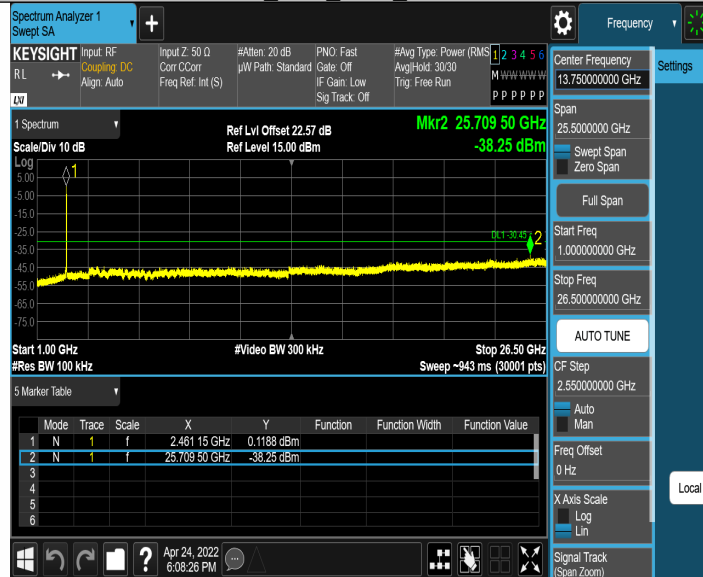
11G_Ant2_2412_30~1000



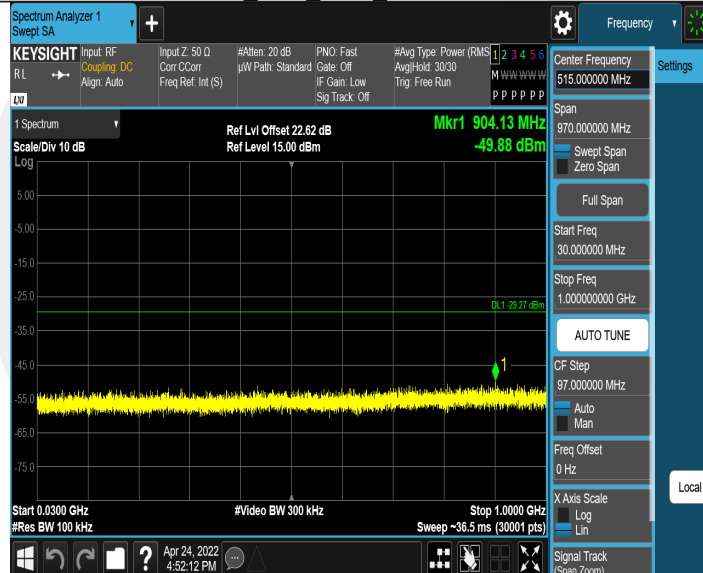




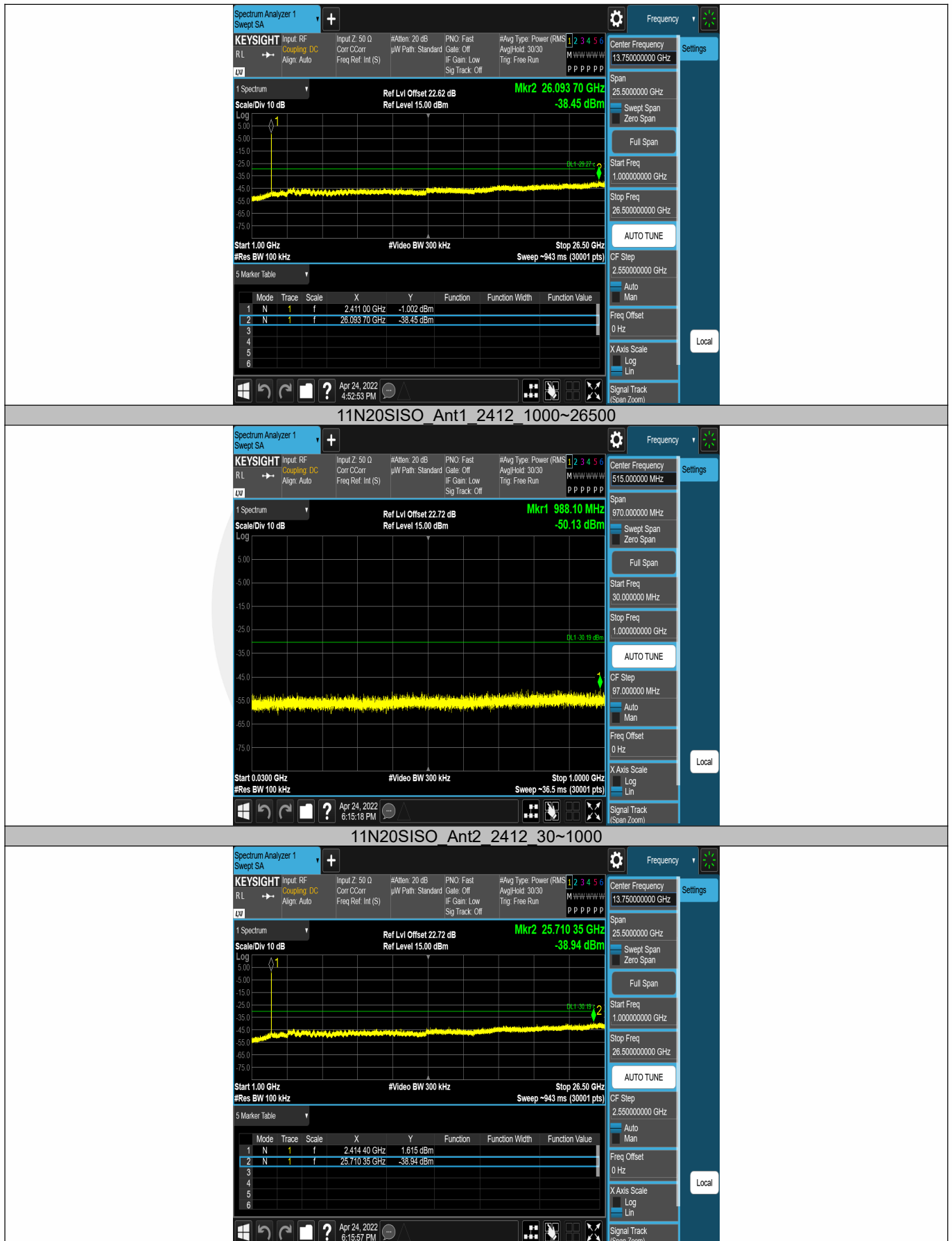
11G_Ant2_2462_30~1000

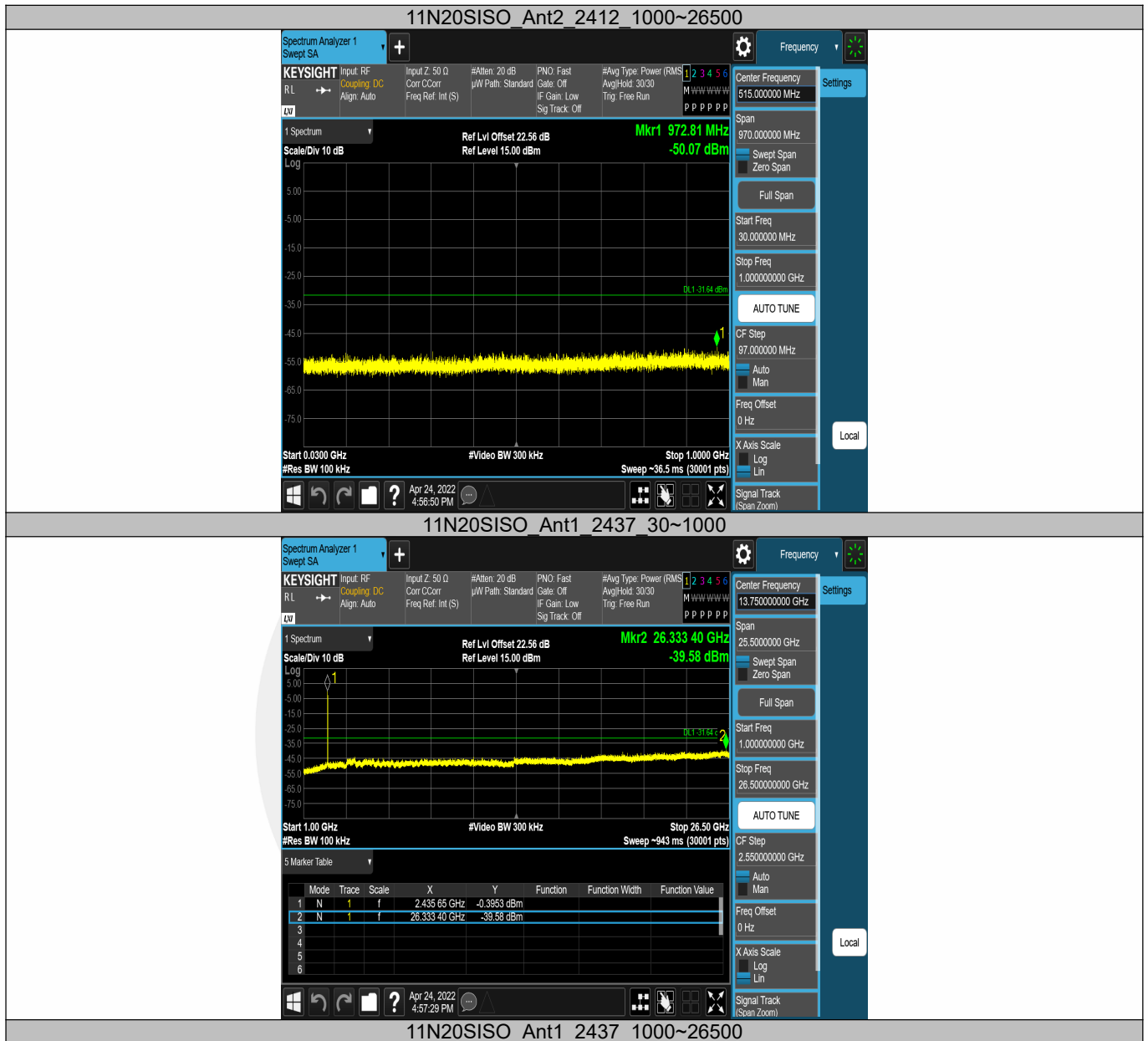


11G_Ant2_2462_1000~26500



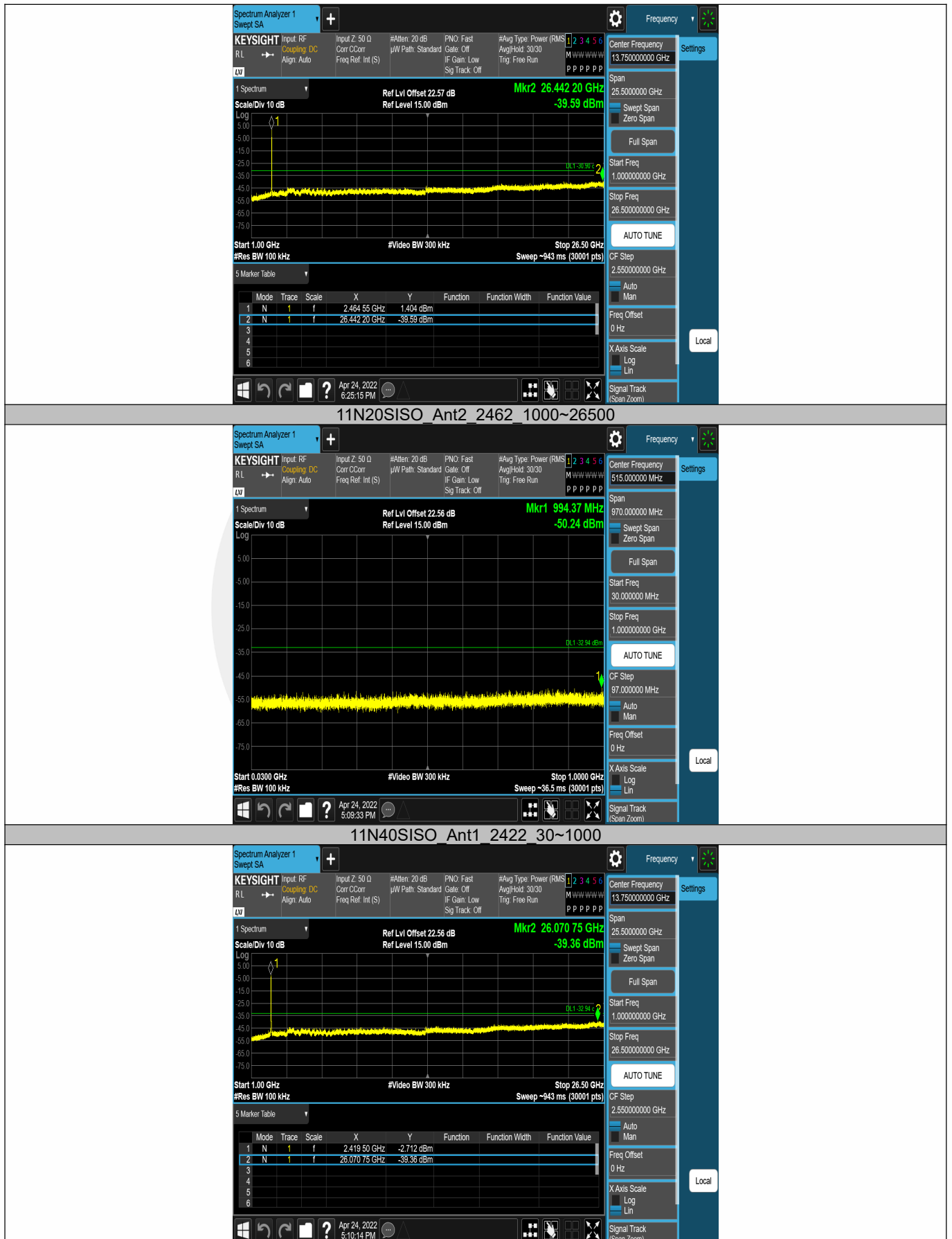
11N20SISO_Ant1_2412_30~1000

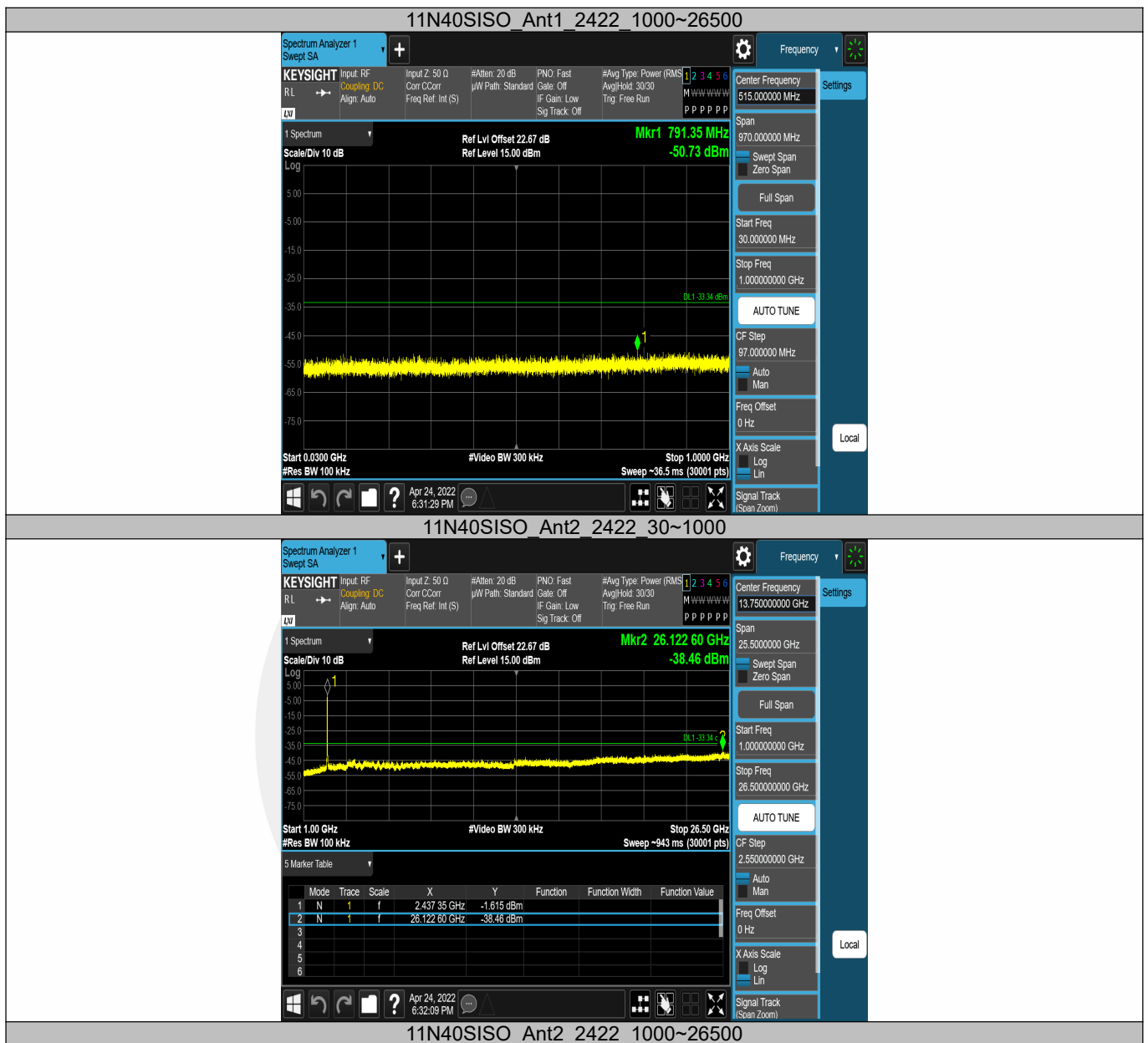






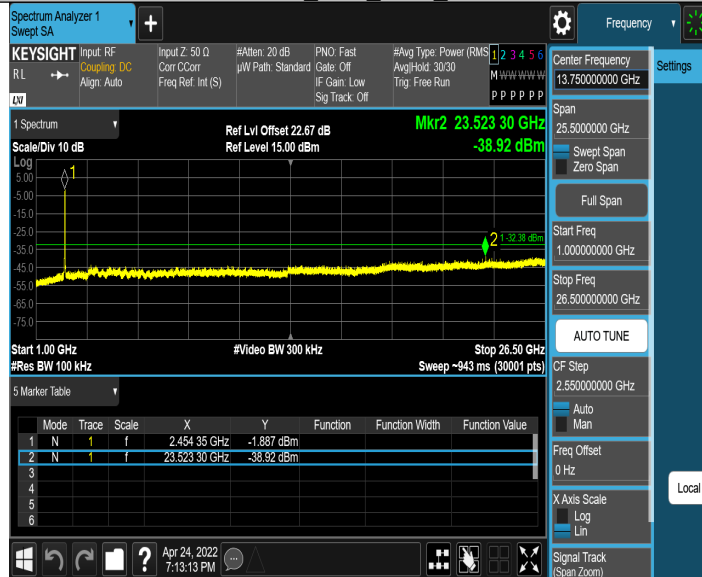




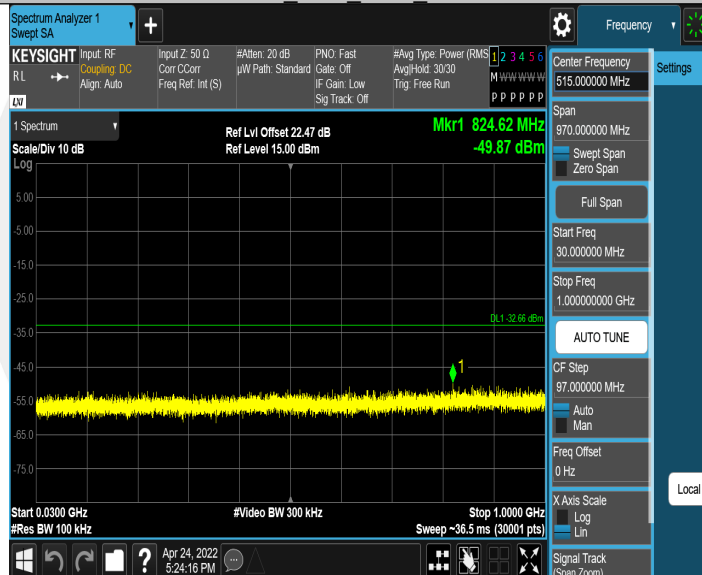




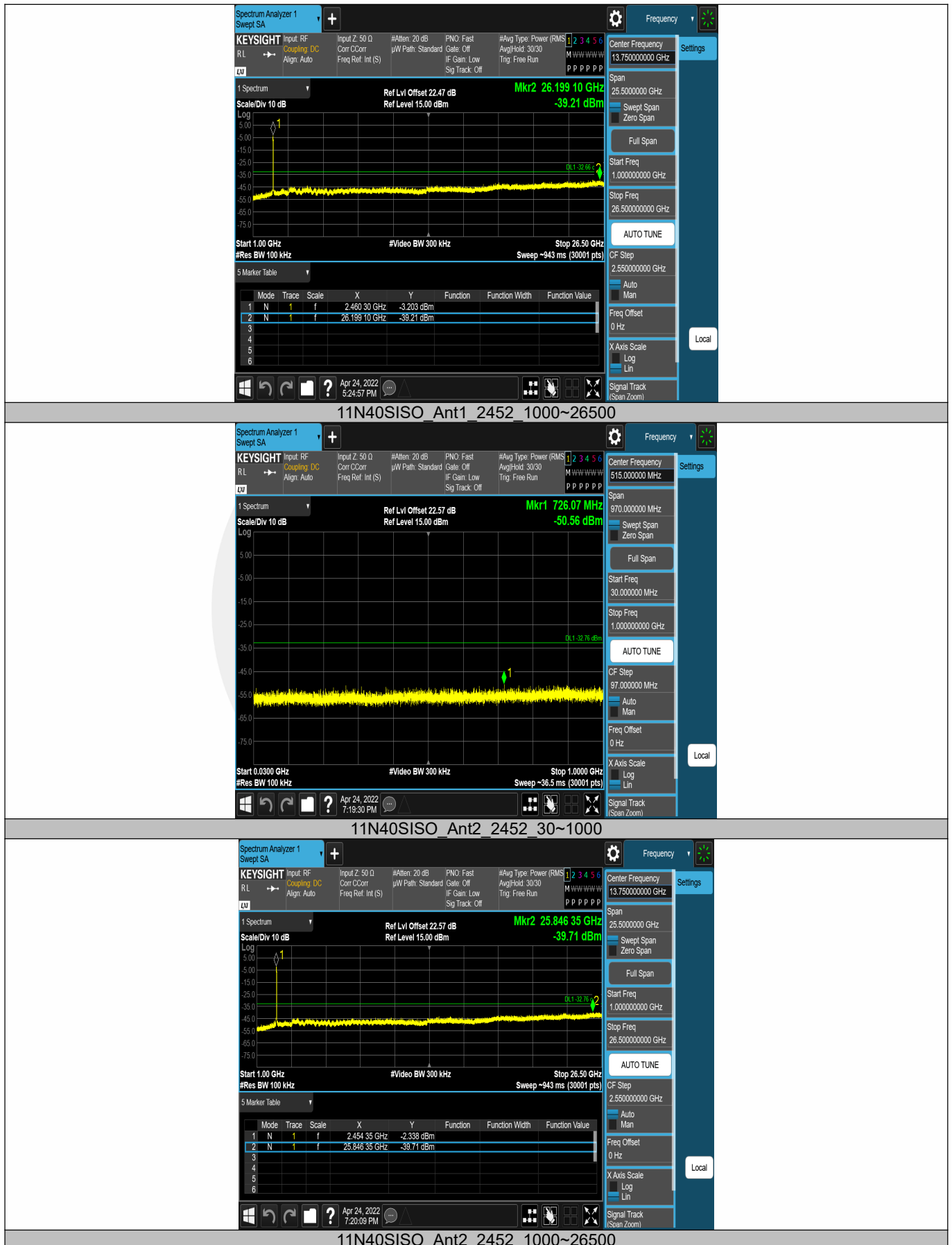
11N40SISO_Ant2_2437_30~1000



11N40SISO_Ant2_2437_1000~26500



11N40SISO_Ant1_2452_30~1000



8.5 RADIATED SPURIOUS EMISSION

8.5.1 Applicable Standard

According to FCC Part 15.247(d) and 15.209 and KDB 558074 D01 15.247 Meas Guidance v05r02

8.5.2 Conformance Limit

According to FCC Part 15.247(d): radiated emissions which fall in the restricted bands, as defined in §15.205(a), must also comply with the radiated emission limits specified in §15.209(a) (see §15.205(c)).

According to FCC Part 15.205, Restricted bands

MHz	MHz	MHz	GHz
0.090-0.110	16.42-16.423	399.9-410	4.5-5.15
10.495-0.505	16.69475-16.69525	608-614	5.35-5.46
2.1735-2.1905	16.80425-16.80475	960-1240	7.25-7.75
4.125-4.128	25.5-25.67	1300-1427	8.025-8.5
4.17725-4.17775	37.5-38.25	1435-1626.5	9.0-9.2
4.20725-4.20775	73-74.6	1645.5-1646.5	9.3-9.5
6.215-6.218	74.8-75.2	1660-1710	10.6-12.7
6.26775-6.26825	123-138	2200-2300	14.47-14.5
8.291-8.294	149.9-150.05	2310-2390	15.35-16.2
8.362-8.366	156.52475-156.52525	2483.5-2500	17.7-21.4
8.37625-8.38675	156.7-156.9	2690-2900	22.01-23.12
8.41425-8.41475	162.0125-167.17	3260-3267	23.6-24.0
12.29-12.293	167.72-173.2	3332-3339	31.2-31.8
12.51975-12.52025	240-285	3345.8-3358	36.43-36.5
12.57675-12.57725	322-335.4	3600-4400	(2)
13.36-13.41			

According to FCC Part 15.205, the level of any transmitter spurious emission in Restricted bands shall not exceed the level of the emission specified in the following table

Restricted Frequency(MHz)	Field Strength ($\mu\text{V/m}$)	Field Strength ($\text{dB}\mu\text{V/m}$)	Measurement Distance
0.009-0.490	2400/F(KHz)	20 log ($\mu\text{V/m}$)	300
0.490-1.705	24000/F(KHz)	20 log ($\mu\text{V/m}$)	30
1.705-30	30	29.5	30
30-88	100	40	3
88-216	150	43.5	3
216-960	200	46	3
Above 960	500	54	3

8.5.3 Test Configuration

Test according to clause 7.2 radio frequency test setup 2

8.5.4 Test Procedure

This test is required for any spurious emission that falls in a Restricted Band, as defined in Section 15.205. It must be performed with the highest gain of each type of antenna proposed for use with the EUT. Use the following spectrum analyzer settings:

The EUT was placed on a turn table which is 0.8m above ground plane.

Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Span = wide enough to fully capture the emission being measured

RBW = 1 MHz for $f \geq 1$ GHz (1GHz to 25GHz), 100 kHz for $f < 1$ GHz (30MHz to 1GHz), 200Hz for $f < 150$ KHz (9KHz to 150KHz), 9KHz for $f < 30$ MHz (150KHz to 30KHz)

VBW $\geq$ RBW

Sweep = auto

Detector function = peak

Trace = max hold

Follow the guidelines in ANSI C63.10-2013 with respect to maximizing the emission by rotating the EUT, measuring the emission while the EUT is situated in three orthogonal planes (if appropriate), adjusting the measurement antenna height and polarization, etc. A pre-amp and a high pass filter are required for this test, in

order to provide the measuring system with sufficient sensitivity. Allow the trace to stabilize. The peak reading of the emission, after being corrected by the antenna factor, cable loss, pre-amp gain, etc., is the peak field strength, which must comply with the limit specified in Section 15.35(b). Submit this data.

Now set the VBW to 10 Hz, while maintaining all of the other instrument settings. This peak level, once corrected, must comply with the limit specified in Section 15.209. If the dwell time per channel of the hopping signal is less than 100 ms, then the reading obtained with the 10 Hz VBW may be further adjusted by a “duty cycle correction factor”, derived from $20\log(\text{dwell time}/100 \text{ ms})$, in an effort to demonstrate compliance with the 15.209 limit. Submit this data.

Repeat above procedures until all frequency measured was complete.

8.5.5 Test Results

Temperature:	25° C
Relative Humidity:	45%
ATM Pressure:	1011 mbar

■ Spurious Emission below 30MHz(9KHz to 30MHz)

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
--	--	--	--	--	--	--	--

Note: the amplitude of spurious emission that is attenuated by more than 20dB below the permissible limit has no need to be reported.

Distance extrapolation factor = $40\log(\text{Specific distance}/ \text{test distance})$ (dB);

Limit line=Specific limits(dBuV) + distance extrapolation factor

Spurious Emission Above 1GHz(1GHz to 25GHz)

All modes 2.4G 802.11b/g/n have been tested, and the worst result 802.11b was recorded as below:

Test mode: 802.11 b Frequency: Channel 1: 2412MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
4747.515	V	43.22	25.16	74	54	-30.78	-28.84
8560.107	V	52.46	34.32	74	54	-21.54	-19.68
17893.66	V	68.09	50.02	74	54	-5.91	-3.98
6566.107	H	49.01	31.55	74	54	-24.99	-22.45
11112.97	H	57.72	40.66	74	54	-16.28	-13.34
17821.40	H	68.22	50.14	74	54	-5.78	-3.86

Test mode: 802.11 b Frequency: Channel 6: 2437MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
7094.948	V	50.49	32.24	74	54	-23.51	-21.76
11222.72	V	57.66	40.64	74	54	-16.34	-13.36
17976.60	V	67.93	50.84	74	54	-6.07	-3.16
6429.015	H	48.33	30.15	74	54	-25.67	-23.85
11242.20	H	57.71	40.65	74	54	-16.29	-13.35
17976.60	H	67.63	50.39	74	54	-6.37	-3.61

Test mode: 802.11 b Frequency: Channel 11: 2462MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
		PK	AV	PK	AV	PK	AV
6502.835	V	48.59	30.63	74	54	-25.41	-23.37
10508.50	V	55.50	38.15	74	54	-18.50	-15.85
17971.40	V	67.52	50.23	74	54	-6.48	-3.77
5465.100	H	45.66	28.39	74	54	-28.34	-25.61
11169.32	H	57.90	40.64	74	54	-16.10	-13.36
17909.18	H	68.26	50.16	74	54	-5.74	-3.84

- Note:** (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).
(2) Emission Level= Reading Level+Correct Factor.
(3) Correct Factor= Ant_F + Cab_L - Preamp
(4) The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

■ Spurious Emission in Restricted Band 2310-2390MHz and 2483.5-2500MHz

All modes 2.4G 802.11b/g/n have been tested, and the worst result 802.11b was recorded as below:

Test mode: 802.11 b Frequency: Channel 1: 2412MHz

Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Over(dB)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)	Over(dB)
2389.936	H	67.07	74	-6.93	50.11	54	-3.89
2388.296	V	63.27	74	-10.73	45.22	54	-8.78

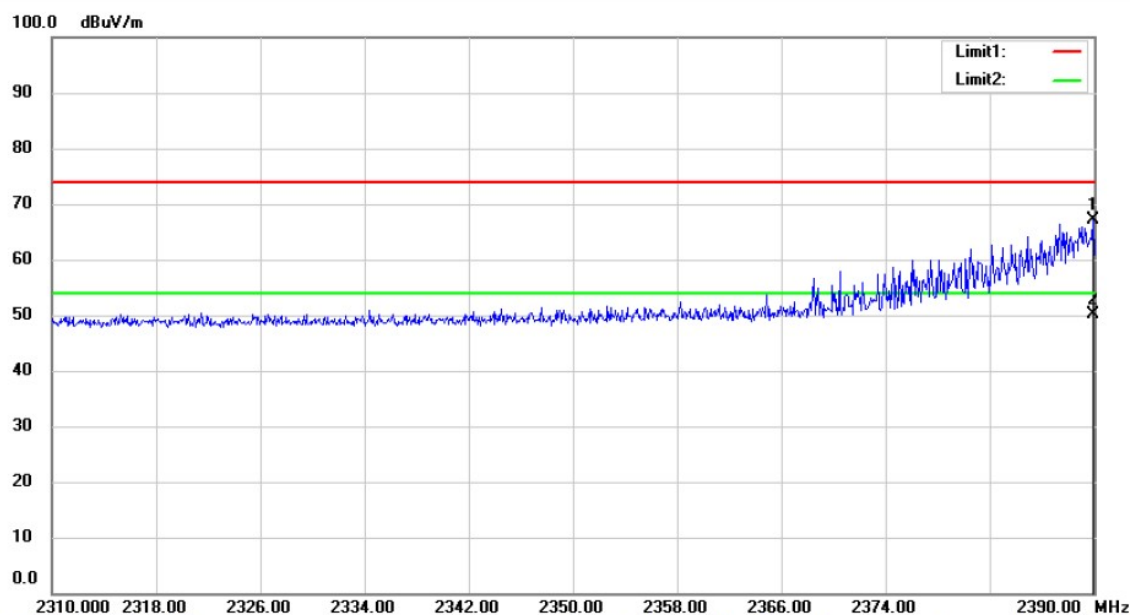
Test mode: 802.11 b Frequency: Channel 11: 2462MHz

Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	Over(dB)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)	Over(dB)
2483.589	H	66.58	74	-7.42	48.42	54	-5.58
2484.224	V	62.40	74	-11.60	44.38	54	-9.62

- Note:** (1) All Readings are Peak Value (VBW=3MHz) and Average Value (VBW=10Hz).
(2) Emission Level= Reading Level+Correct Factor.
(3) Correct Factor= Ant_F + Cab_L - Preamp
(4) The reading of emissions are attenuated more than 20dB below the permissible limits or the field strength is too small to be measured.

Spurious Emission in Restricted Band 2310-2390MHz

Test Model ☒ 802.11b ☐ 802.11g ☐ 802.11n(HT20) ☐ 802.11n(HT40)
☒ Channel 1: 2412MHz ☐ Channel 3: 2422MHz Polarity: H
 VBW=3MHz



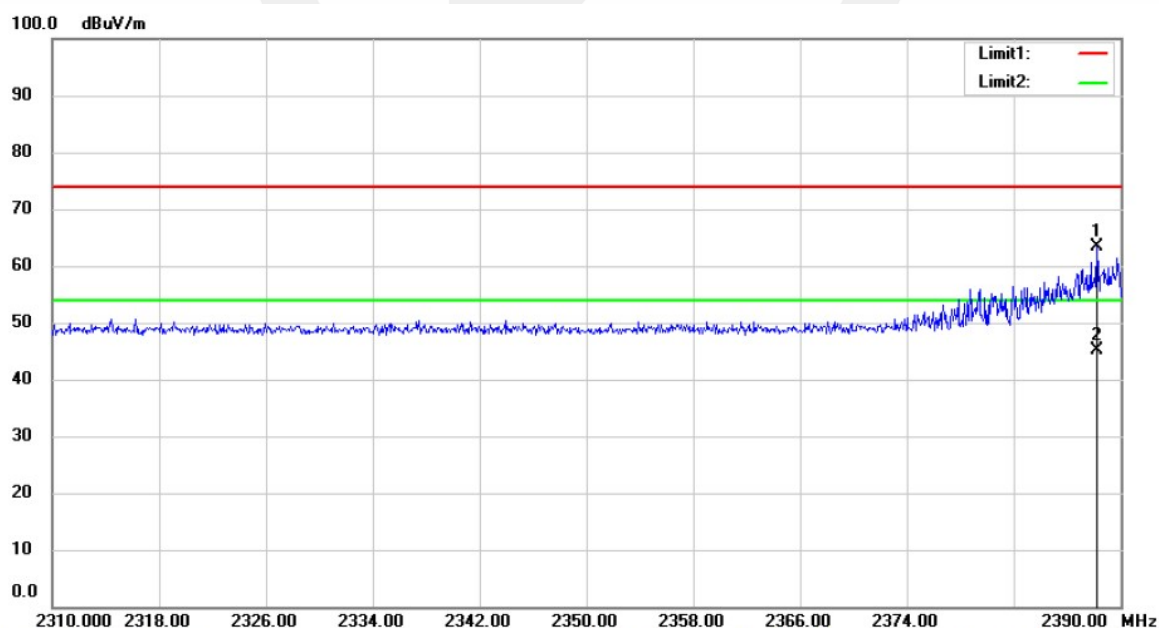
Site 3m Chamber #1

Polarization: **Horizontal**

Temperature: 28.1 C

Spurious Emission in Restricted Band 2310-2390MHz

Test Model ☒ 802.11b ☐ 802.11g ☐ 802.11n(HT20) ☐ 802.11n(HT40)
☒ Channel 1: 2412MHz ☐ Channel 3: 2422MHz Polarity: V
 VBW=3MHz



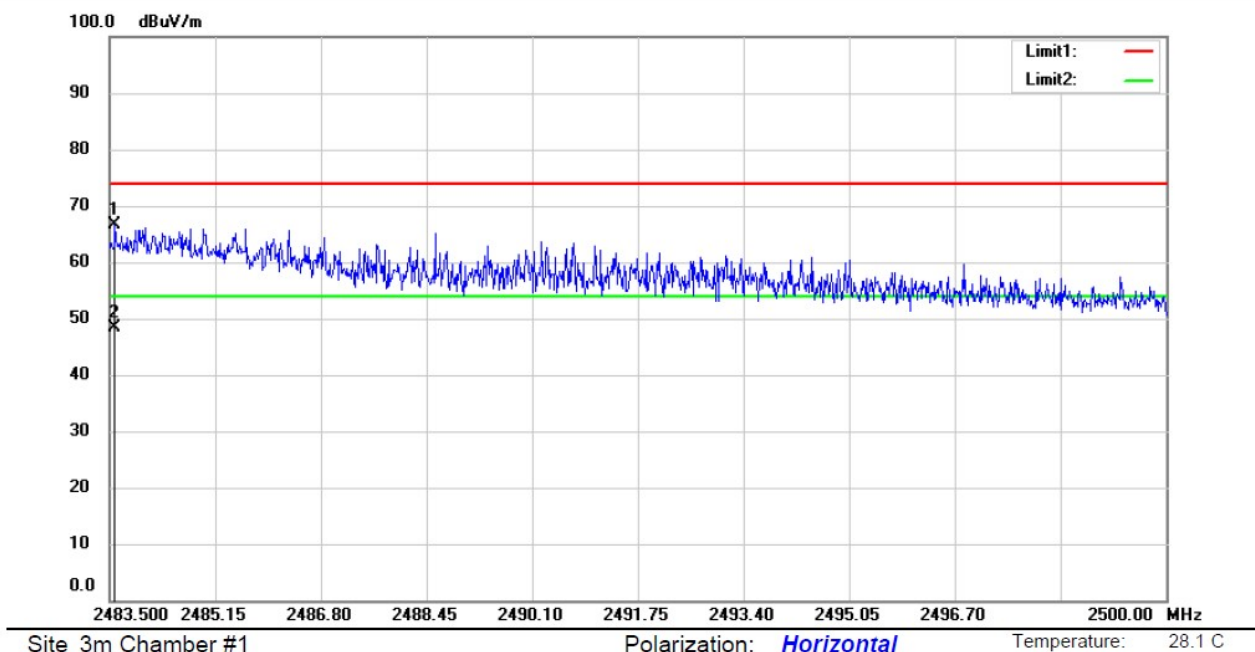
Site 3m Chamber #1

Polarization: **Vertical**

Temperature: 28.1 C

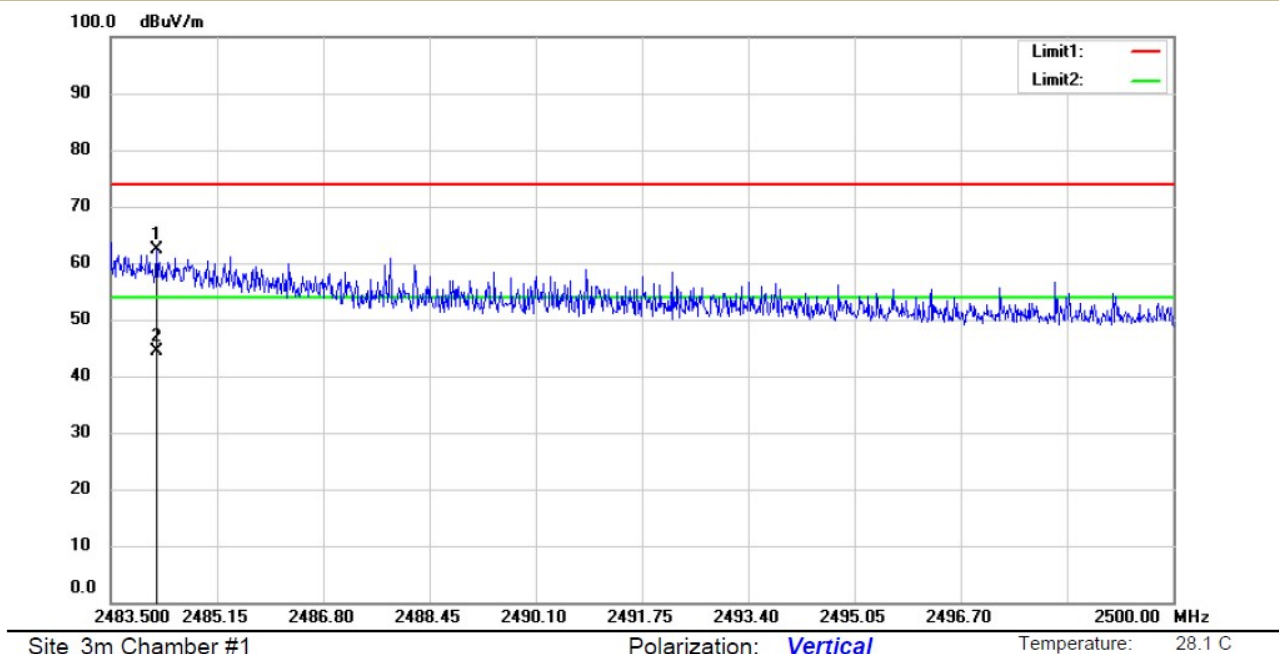
Spurious Emission in Restricted Band 2483.5-2500MHz

Test Model ☒ 802.11b ☐ 802.11g ☐ 802.11n(HT20) ☐ 802.11n(HT40)
☒ Channel 11: 2462MHz ☐ Channel 9: 2452MHz Polarity: H
 VBW=3MHz



Spurious Emission in Restricted Band 2483.5-2500MHz

Test Model ☒ 802.11b ☐ 802.11g ☐ 802.11n(HT20) ☐ 802.11n(HT40)
☒ Channel 11: 2462MHz ☐ Channel 9: 2452MHz Polarity: V
 VBW=3MHz



■ Spurious Emission below 1GHz (30MHz to 1GHz)

All modes 2.4G 802.11b/g/n have been tested, and the worst result 802.11b was recorded as below:



Site 3m Chamber #1

Polarization: **Vertical**

Temperature: 28.1 C

Limit: (RE)FCC PART 15 CLASS B

Power: AC 230V/50Hz

Humidity: 43 %

Mode: WIFI 2412

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1	*	32.5768	45.08	-14.37	30.71	40.00	-9.29	QP		
2		49.1435	41.62	-12.22	29.40	40.00	-10.60	QP		
3		56.9663	41.27	-12.07	29.20	40.00	-10.80	QP		
4		125.0066	45.57	-14.39	31.18	43.50	-12.32	QP		
5		424.6556	39.13	-5.88	33.25	46.00	-12.75	QP		
6		875.2470	33.36	1.76	35.12	46.00	-10.88	QP		



Site 3m Chamber #1

Polarization: **Horizontal**

Temperature: 28.1 C

Limit: (RE)FCC PART 15 CLASS B

Power: AC 230V/50Hz

Humidity: 43 %

Mode:WIFI 2412

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		42.0434	30.29	-12.87	17.42	40.00	-22.58	QP		
2		60.4124	31.10	-12.00	19.10	40.00	-20.90	QP		
3		125.0066	37.40	-14.39	23.01	43.50	-20.49	QP		
4		338.6970	34.94	-7.86	27.08	46.00	-18.92	QP		
5		431.4096	33.66	-5.68	27.98	46.00	-18.02	QP		
6	*	875.2470	37.70	1.76	39.46	46.00	-6.54	QP		



Site 3m Chamber #1

Polarization: **Horizontal**

Temperature: 28.1 C

Limit: (RE)FCC PART 15 CLASS B

Power: AC 230V/50Hz

Humidity: 43 %

Mode:WIFI 2437

Note:

No.	Mk.	Freq.	Reading Level	Correct Factor	Measurement	Limit	Over	Antenna Height	Table Degree	
		MHz	dBuV	dB	dBuV/m	dBuV/m	dB	cm	degree	Comment
1		62.5684	31.23	-12.05	19.18	40.00	-20.82	QP		
2		125.0066	36.38	-14.39	21.99	43.50	-21.51	QP		
3		330.1950	35.15	-8.26	26.89	46.00	-19.11	QP		
4		424.0976	34.10	-5.90	28.20	46.00	-17.80	QP		
5		680.2581	35.92	-1.21	34.71	46.00	-11.29	QP		
6	*	875.2470	38.76	1.76	40.52	46.00	-5.48	QP		