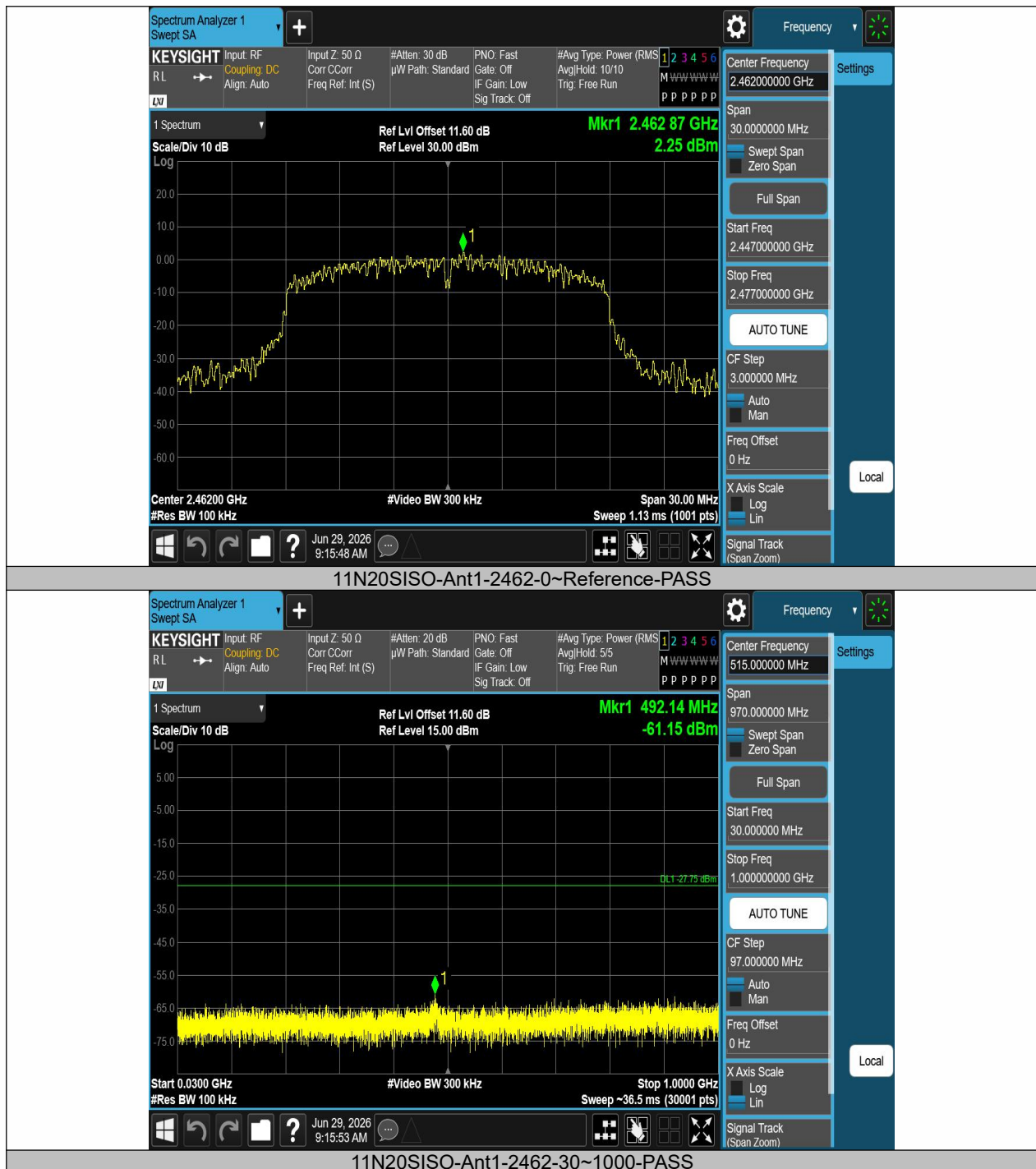
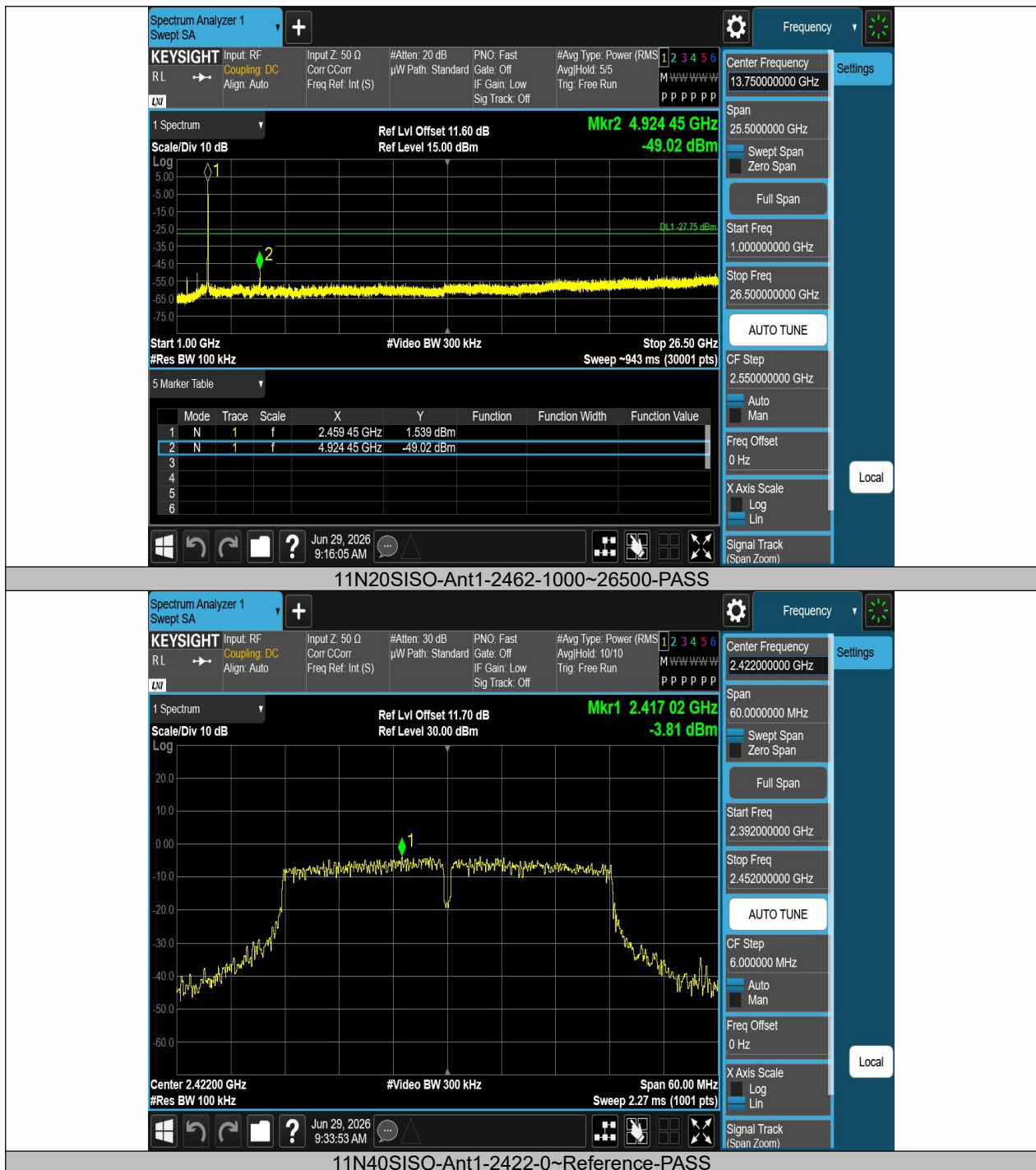
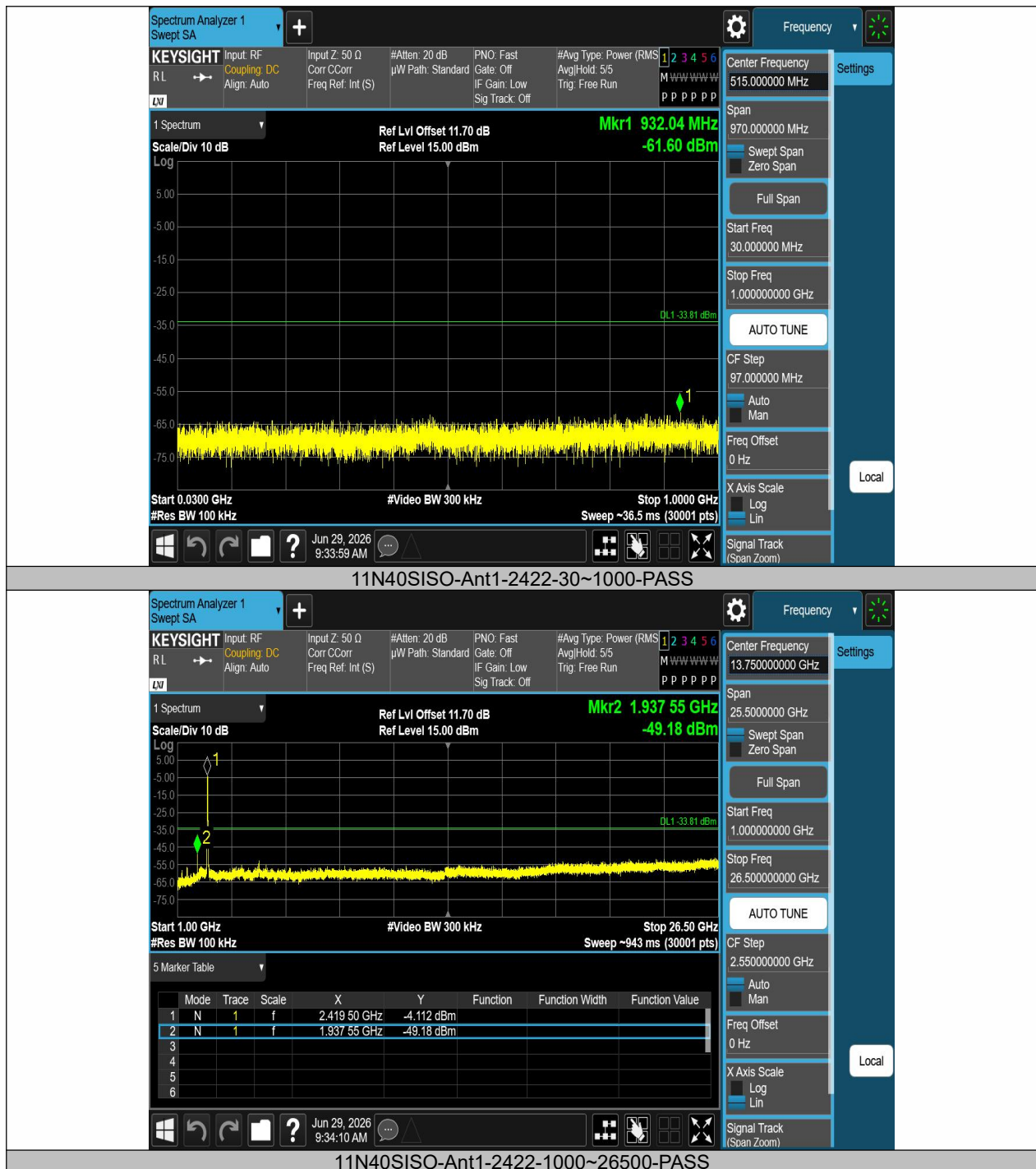
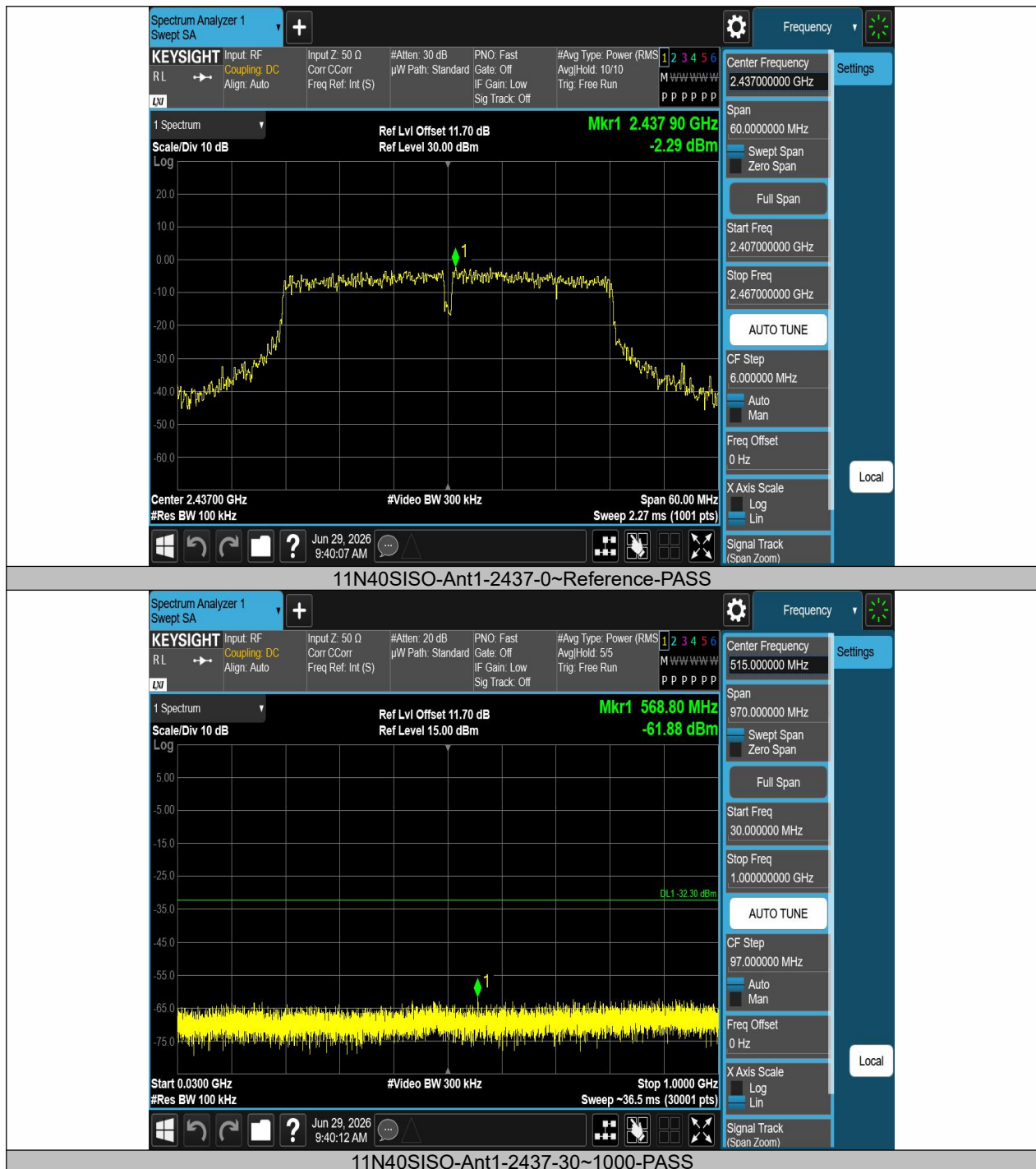
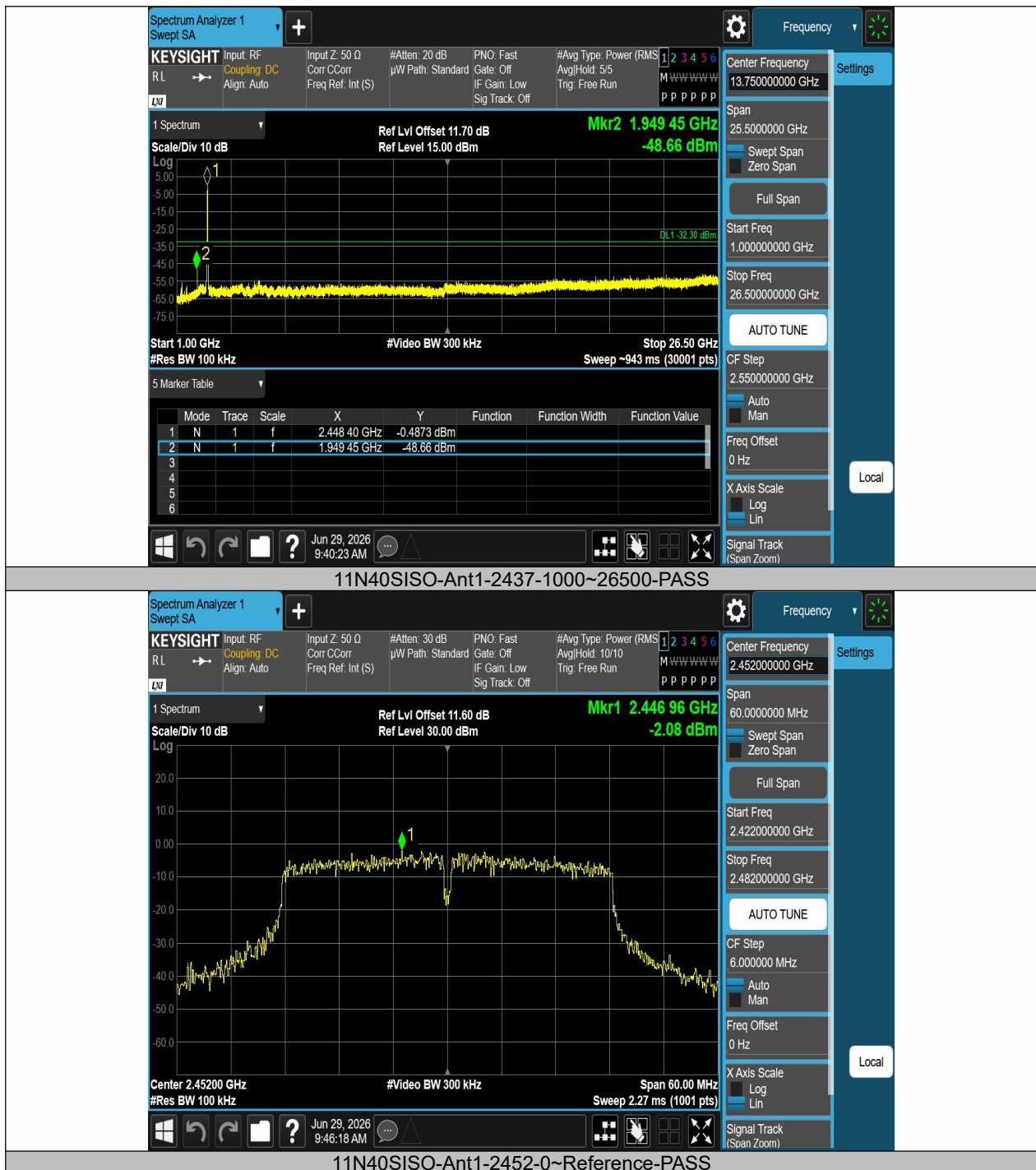


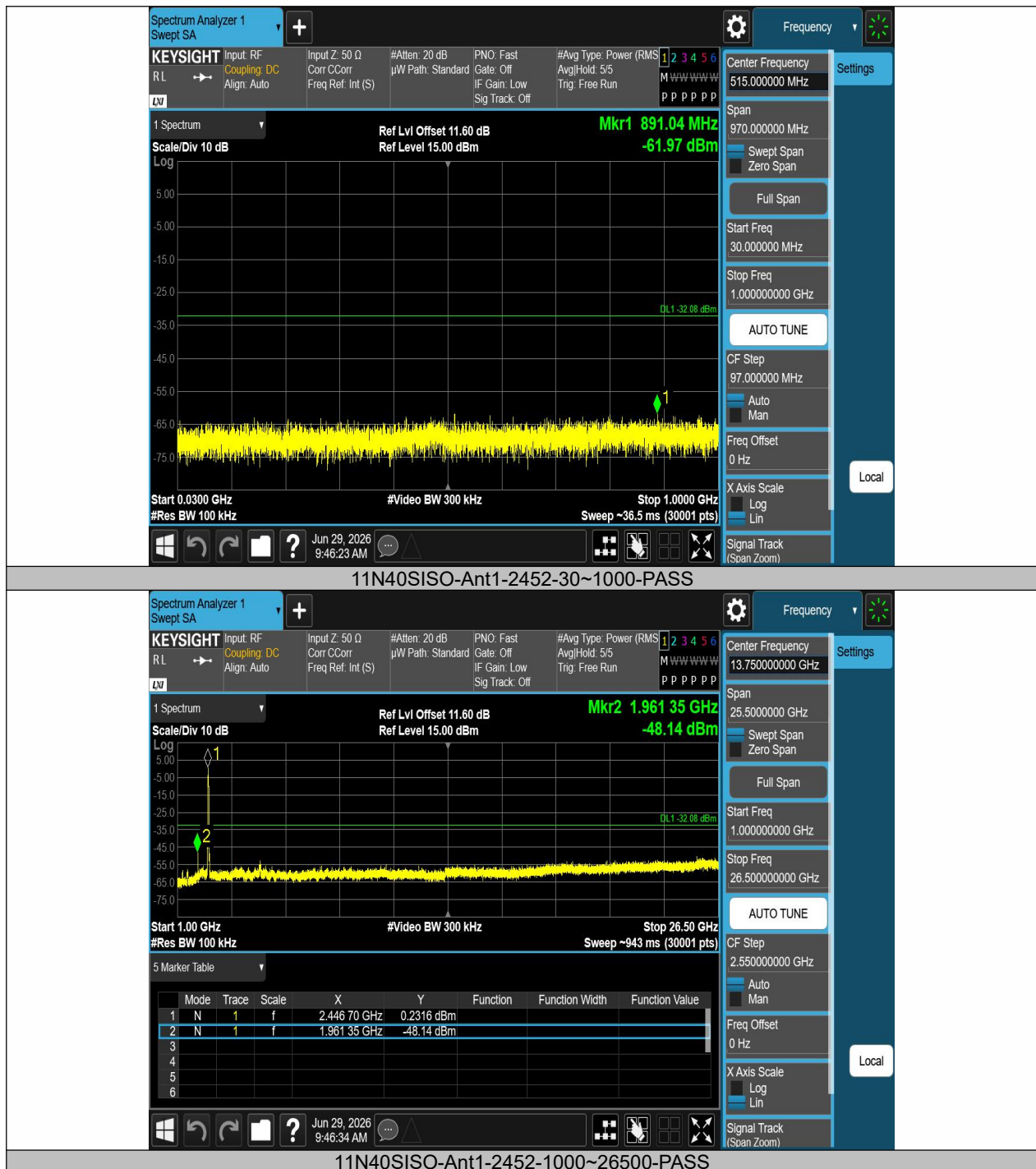


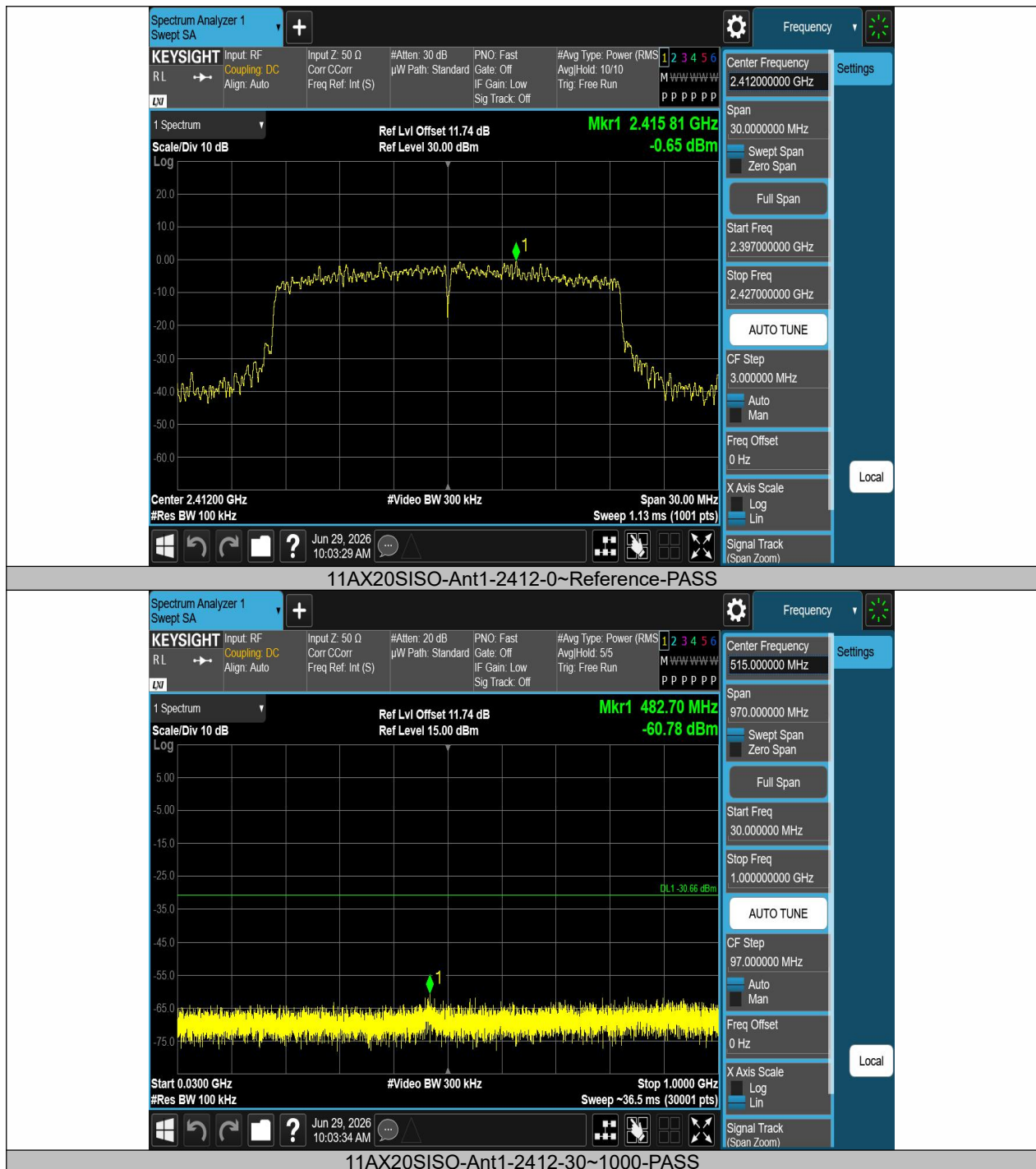


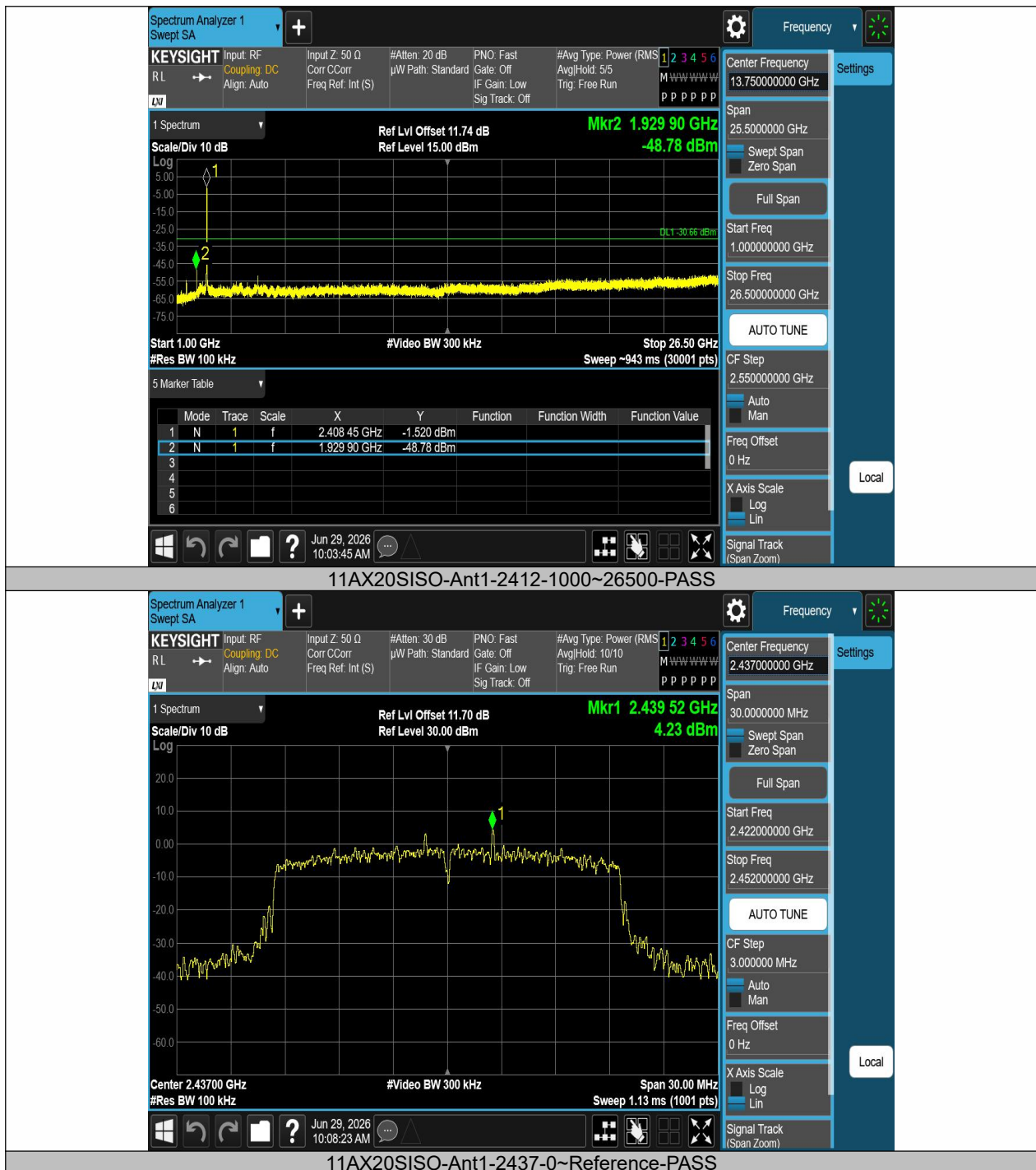


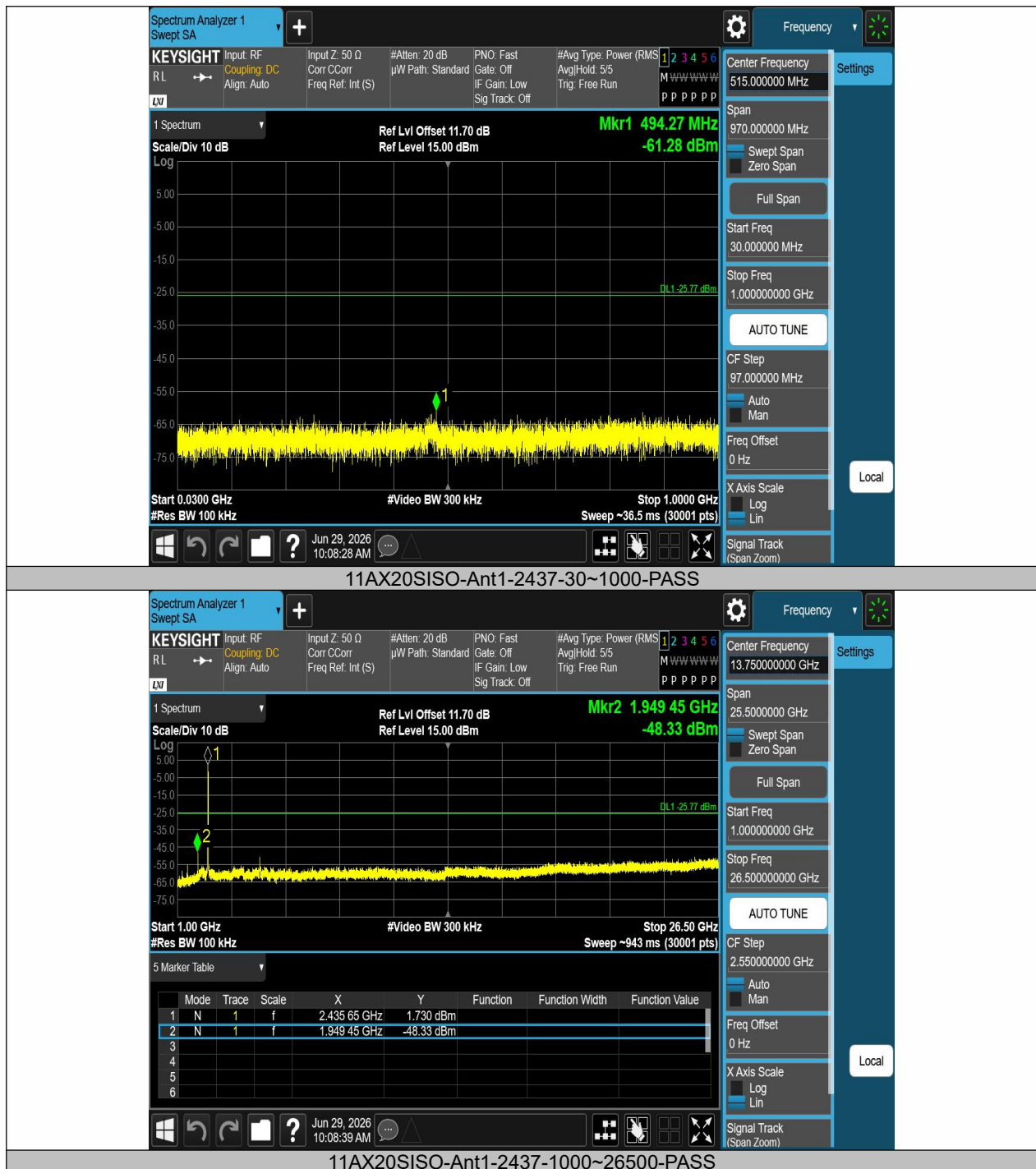


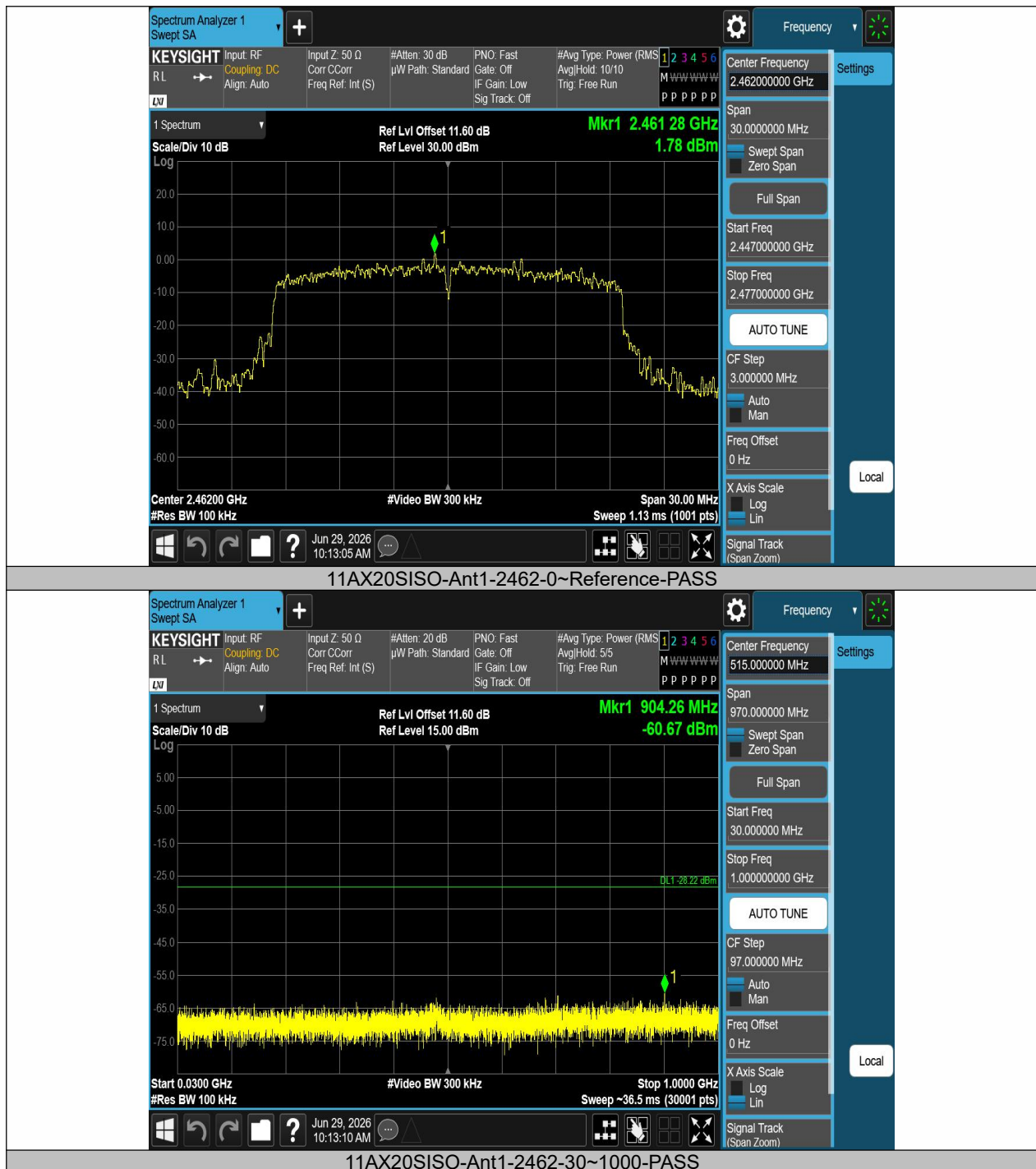


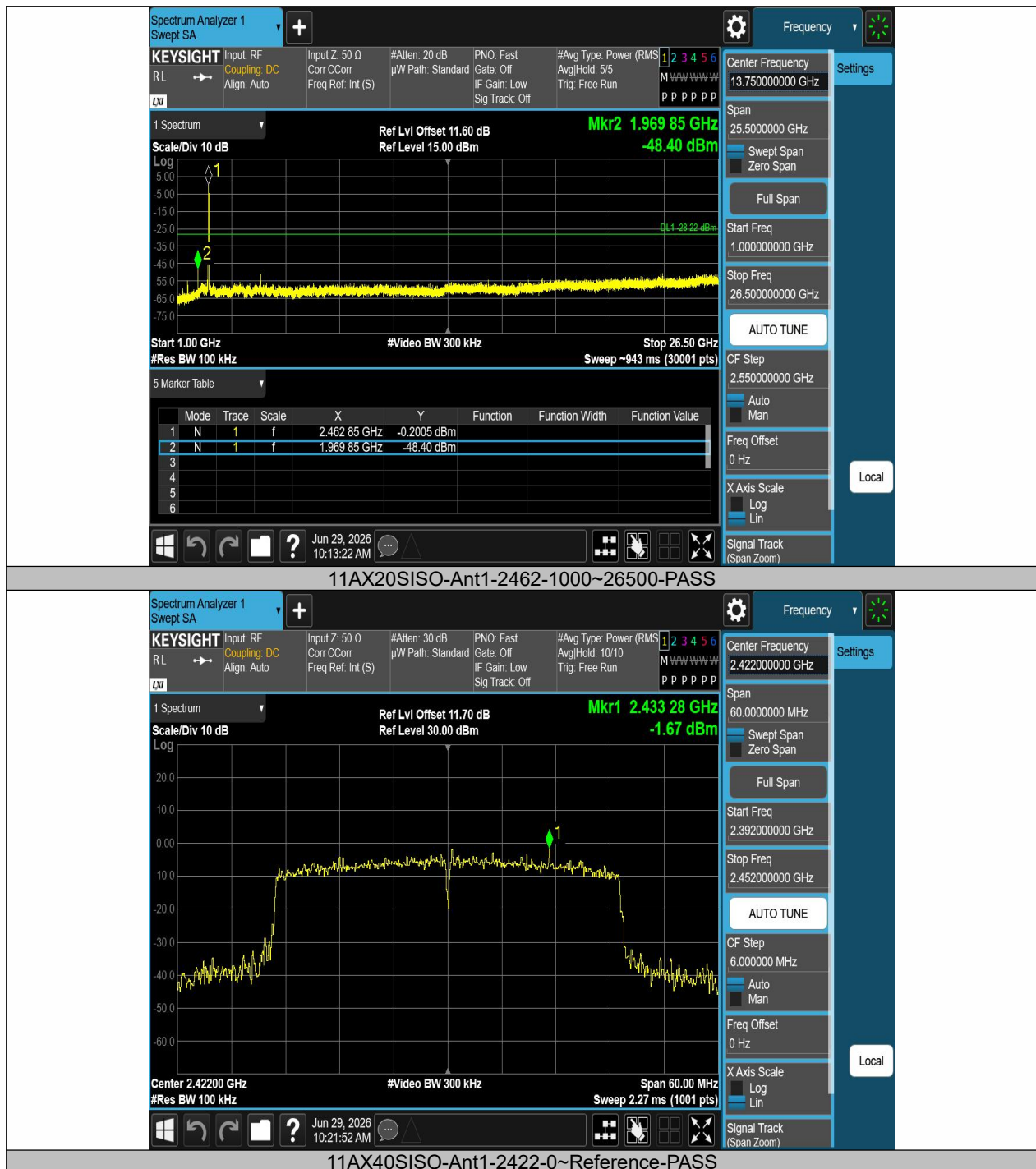


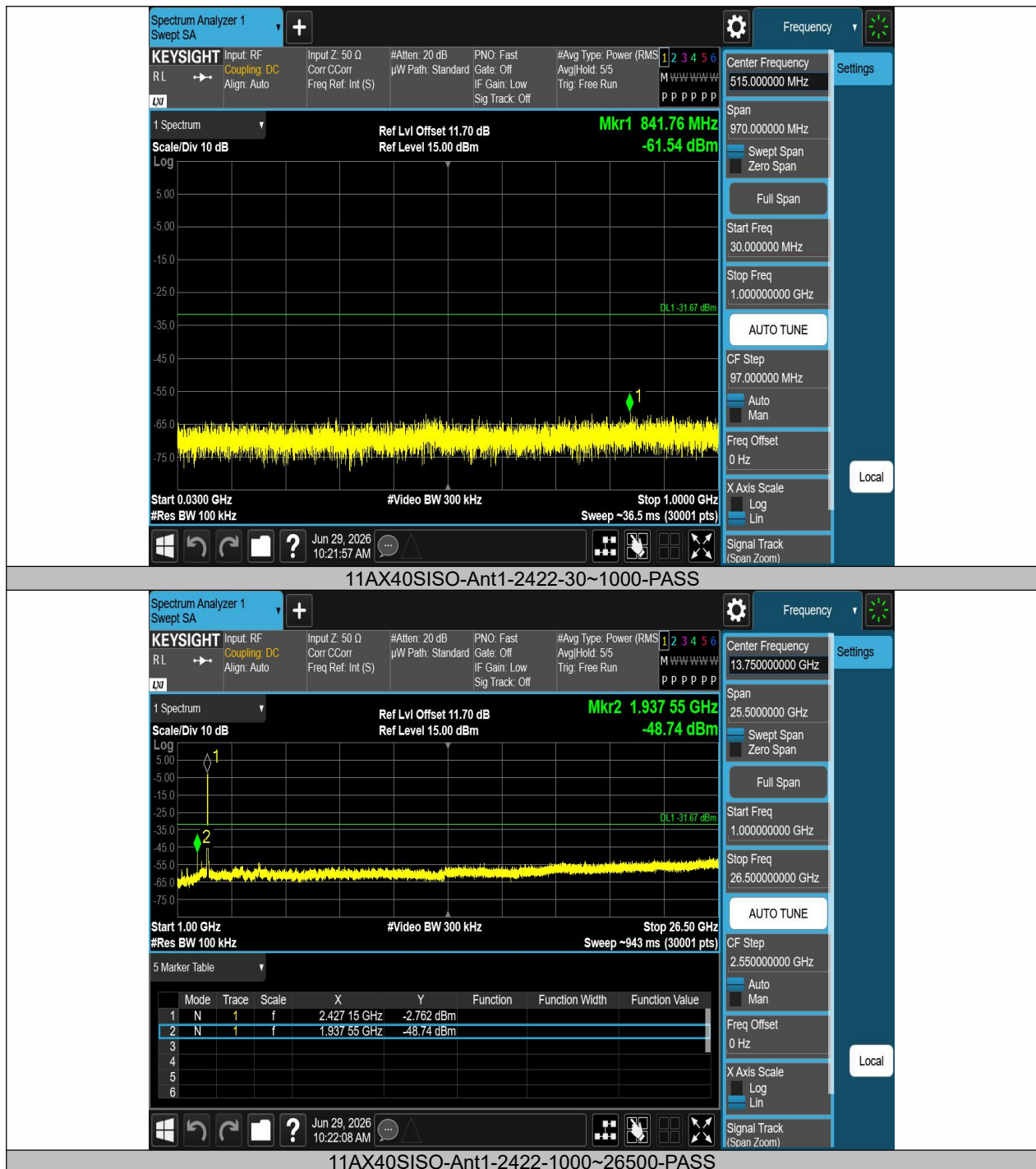


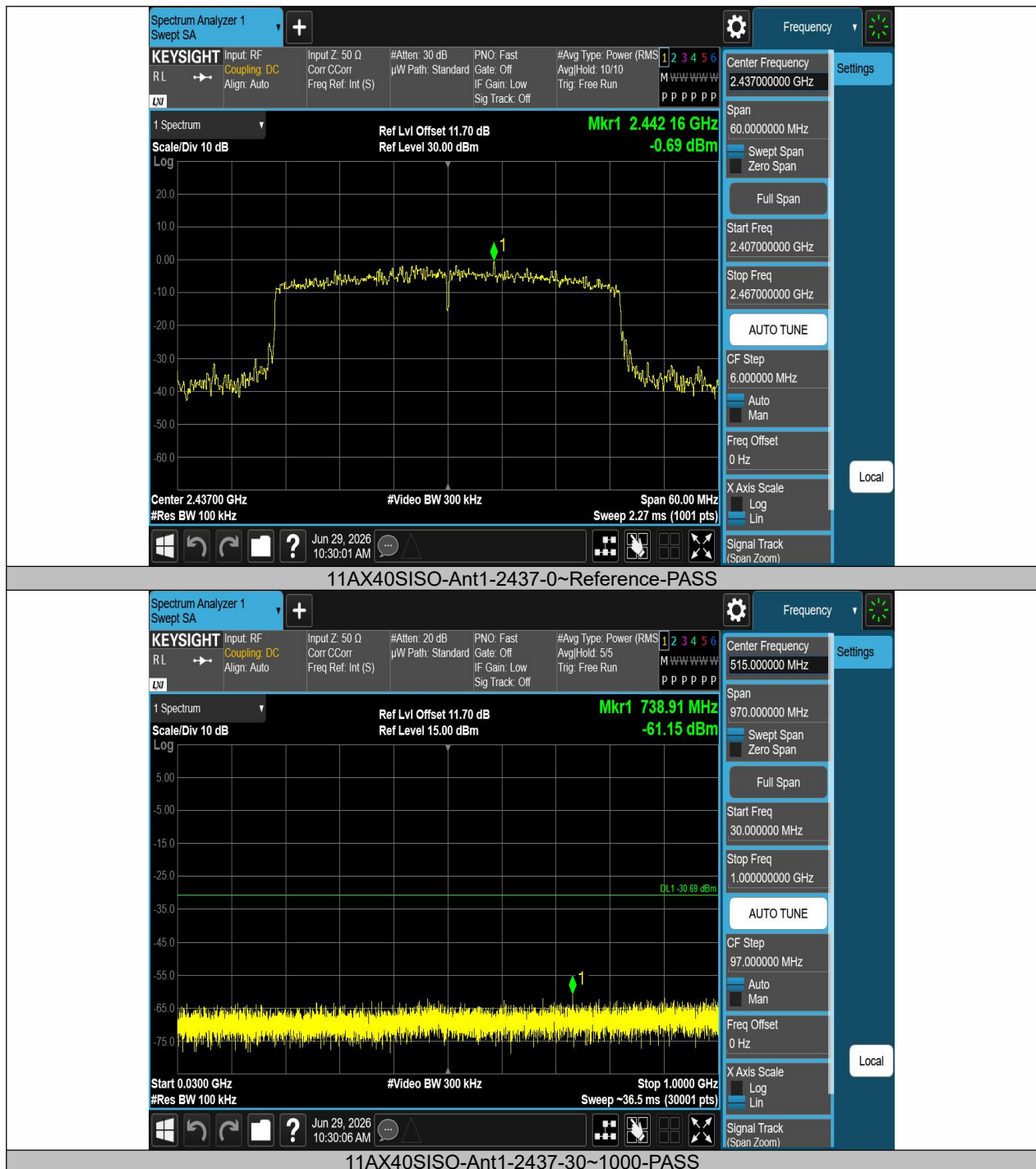


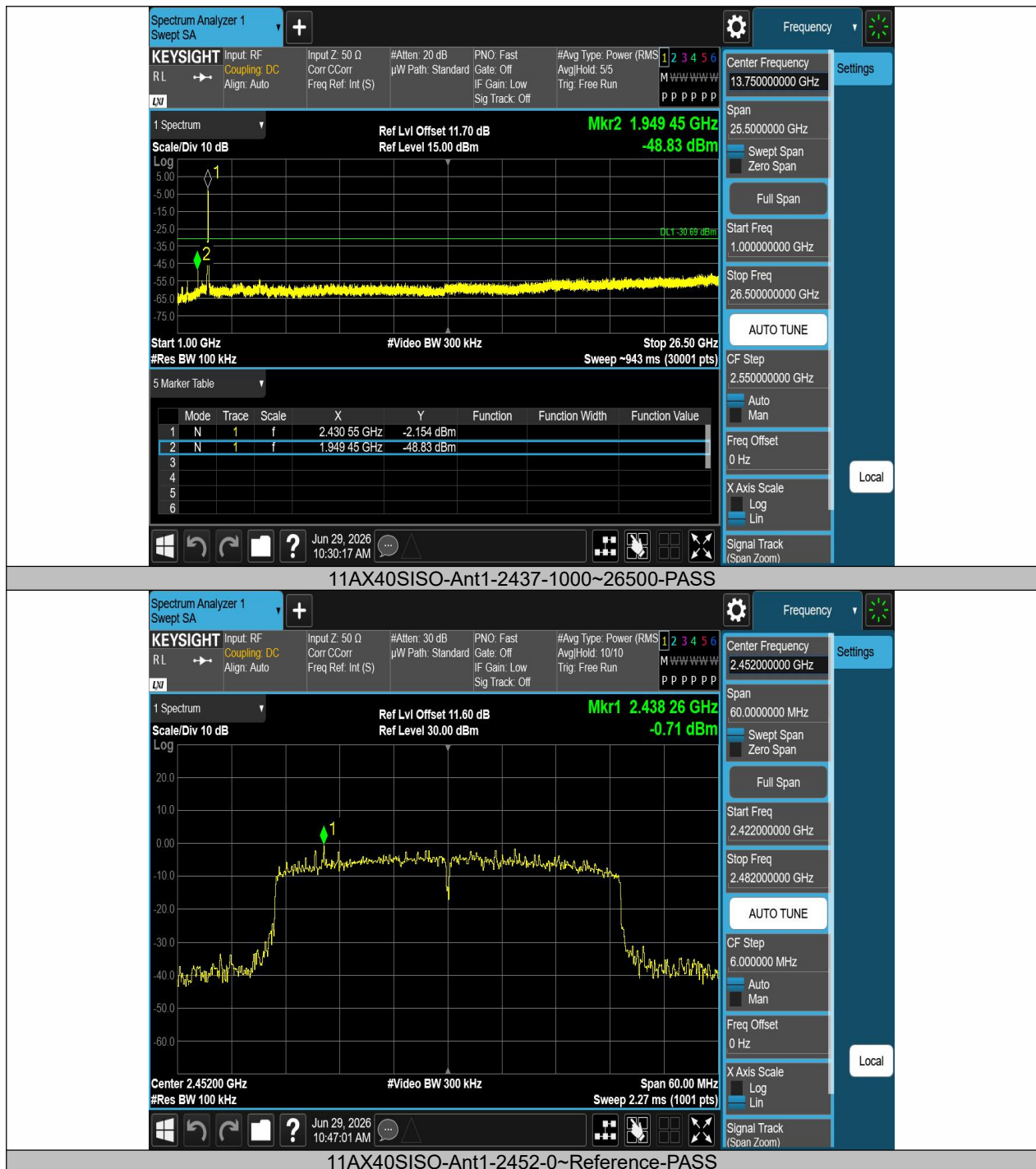


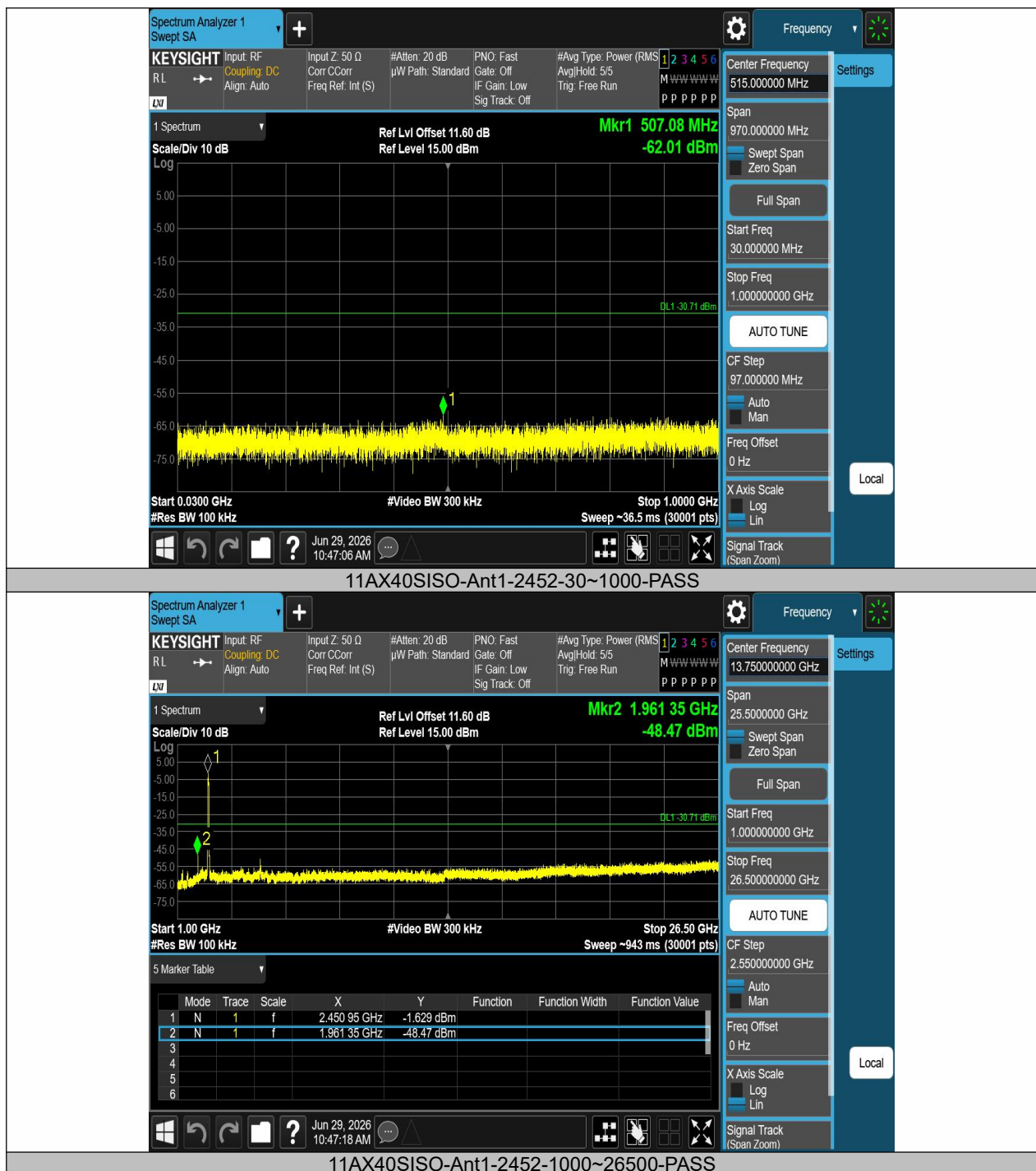












7.5 RADIATED EMISSION

7.5.1 Applicable Standard

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

7.5.2 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 (μV/m)	Field Strength (dBμV/m)	Measurement Distance
0.009-0.490	2400/F(KHz)	20 log (uV/m)	300
0.490-1.705	24000/F(KHz)	20 log (uV/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

7.5.3 Test Configuration

Test according to clause 6.2 radio frequency test setup 2.

7.5.4 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:

For Above 1GHz:

The EUT was placed on a turn table which is 1.5m 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.

VBW ≥ RBW.

Sweep = auto.

Detector function = peak.

Trace = max hold.

For Below 1GHz:

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 = 100 kHz.

VBW $\geq$ RBW.

Sweep = auto.

Detector function = peak.

Trace = max hold.

For Below 30MHz:

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 = 9kHz.

VBW $\geq$ RBW.

Sweep = auto.

Detector function = peak.

Trace = max hold.

For Below 150KHz:

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 = 200Hz.

VBW $\geq$ RBW.

Sweep = auto.

Detector function = peak.

Trace = max hold.

Follow the guidelines in ANSI C63.10 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. 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. 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 limit. Submit this data.

Repeat above procedures until all frequency measured was complete.

7.5.5 Test Results

Temperature : 25°C

Humidity : 60 %

ATM Pressure:: 1011 mbar

Test Engineer: HuWeiTang

■ 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: Data of measurement within this frequency range shown “ -- ” in the table above means 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 Above 1GHz(1GHz to 25GHz)

All of the configurations or modes are tested, the data of the worst case is recorded in the report. Highest gain of each antenna and highest output power is ANT1 and MIMO as below:

Test mode:		802.11b		Frequency:		Channel 1: 2412MHz	
Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
11028.17	V	59.24	45.95	74.00	54.00	-14.76	-8.05
15191.05	V	58.90	45.83	74.00	54.00	-15.10	-8.17
17236.27	V	58.71	45.66	74.00	54.00	-15.29	-8.34
9393.69	H	57.73	44.60	74.00	54.00	-16.27	-9.40
12255.22	H	57.98	44.79	74.00	54.00	-16.02	-9.21
17573.31	H	57.73	44.78	74.00	54.00	-16.27	-9.22

Test mode:		802.11b		Frequency:		Channel 6: 2437MHz	
Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
10569.42	V	58.08	45.20	74.00	54.00	-15.92	-8.80
14271.64	V	58.37	45.18	74.00	54.00	-15.63	-8.82
16969.34	V	58.30	45.04	74.00	54.00	-15.70	-8.96
11092.11	H	58.32	45.20	74.00	54.00	-15.68	-8.80
13571.64	H	58.05	45.22	74.00	54.00	-15.95	-8.78
15007.76	H	58.57	45.51	74.00	54.00	-15.43	-8.49

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

Freq. (MHz)	Ant.Pol.	Emission Level(dBuV/m)		Limit 3m(dBuV/m)		Over(dB)	
	H/V	PK	AV	PK	AV	PK	AV
11864.84	V	58.82	45.58	74.00	54.00	-15.18	-8.42
14296.41	V	58.67	46.21	74.00	54.00	-15.33	-7.79
17839.43	V	59.05	46.19	74.00	54.00	-14.95	-7.81
12048.00	H	58.71	45.45	74.00	54.00	-15.29	-8.55
13384.65	H	58.53	45.38	74.00	54.00	-15.47	-8.62
17366.29	H	58.68	45.81	74.00	54.00	-15.32	-8.19

- 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 the antenna(Antenna 1) and modes(802.11b/g/n) have been tested and the worst(Antenna 1, 802.11b) result recorded was report as below:

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

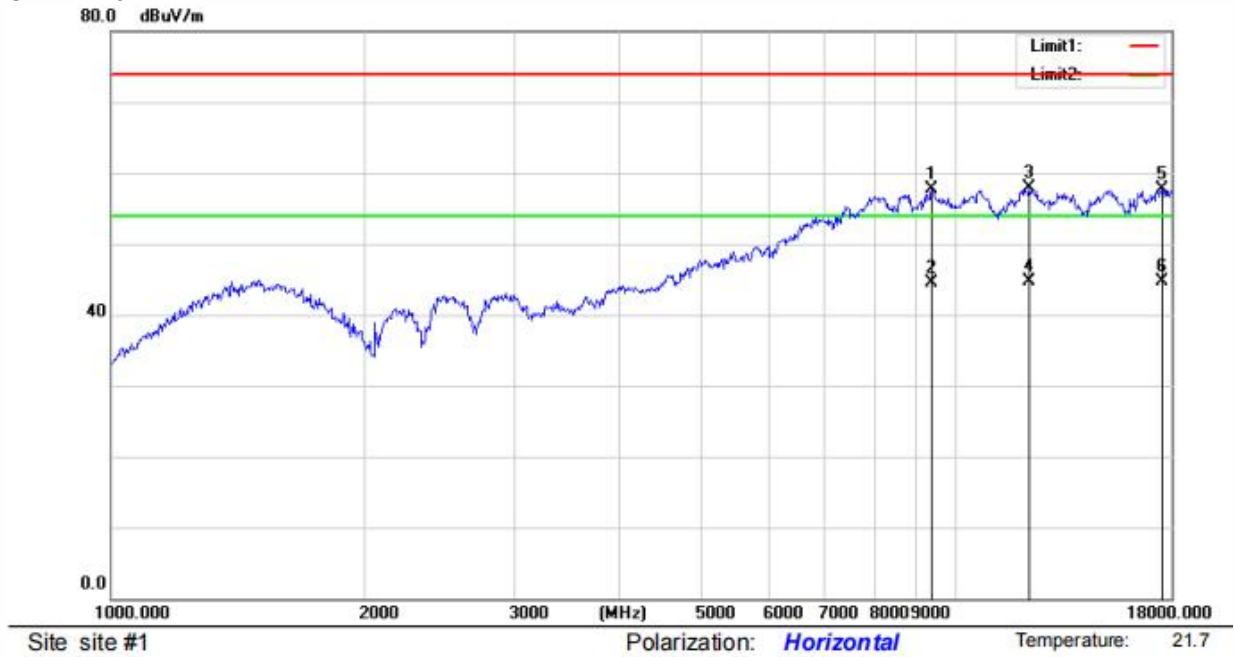
Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
2363.672	H	43.99	74.00	30.87	54.00
2375.752	V	44.16	74.00	30.91	54.00

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

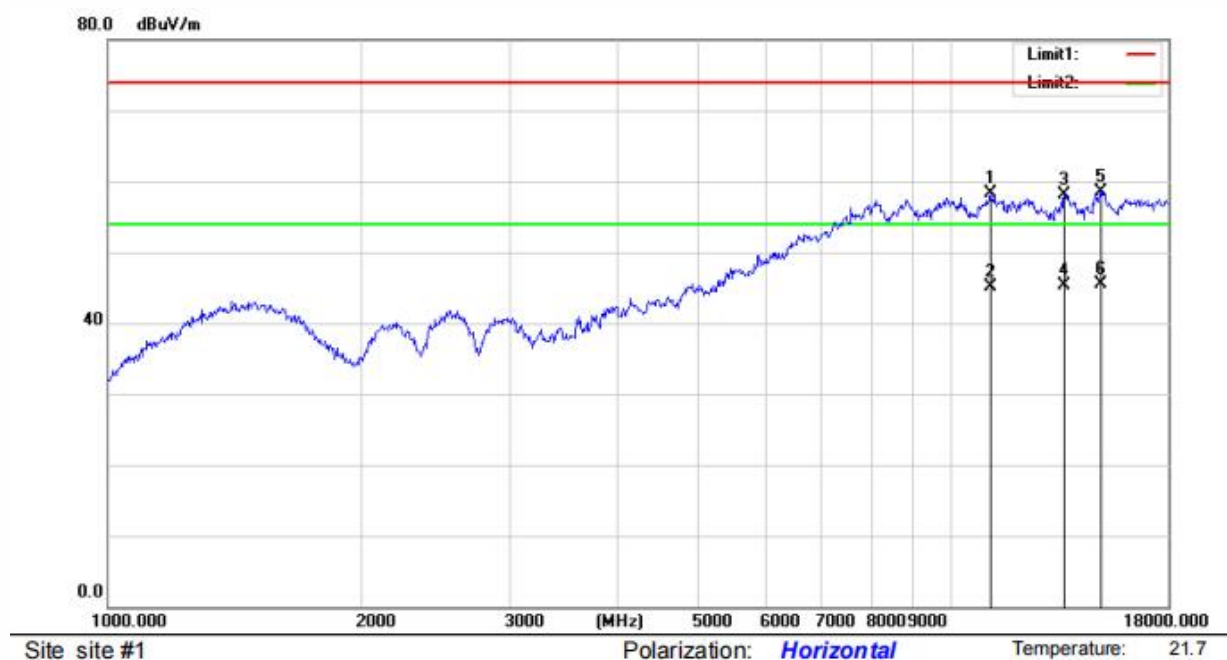
Frequency (MHz)	Polarity	PK(dBuV/m) (VBW=3MHz)	Limit 3m (dBuV/m)	AV(dBuV/m) (VBW=10Hz)	Limit 3m (dBuV/m)
2486.322	H	43.90	74.00	31.02	54.00
2484.704	V	43.58	74.00	30.44	54.00

- 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.

Channel 0: 2412MHz



Channel 6: 2437MHz

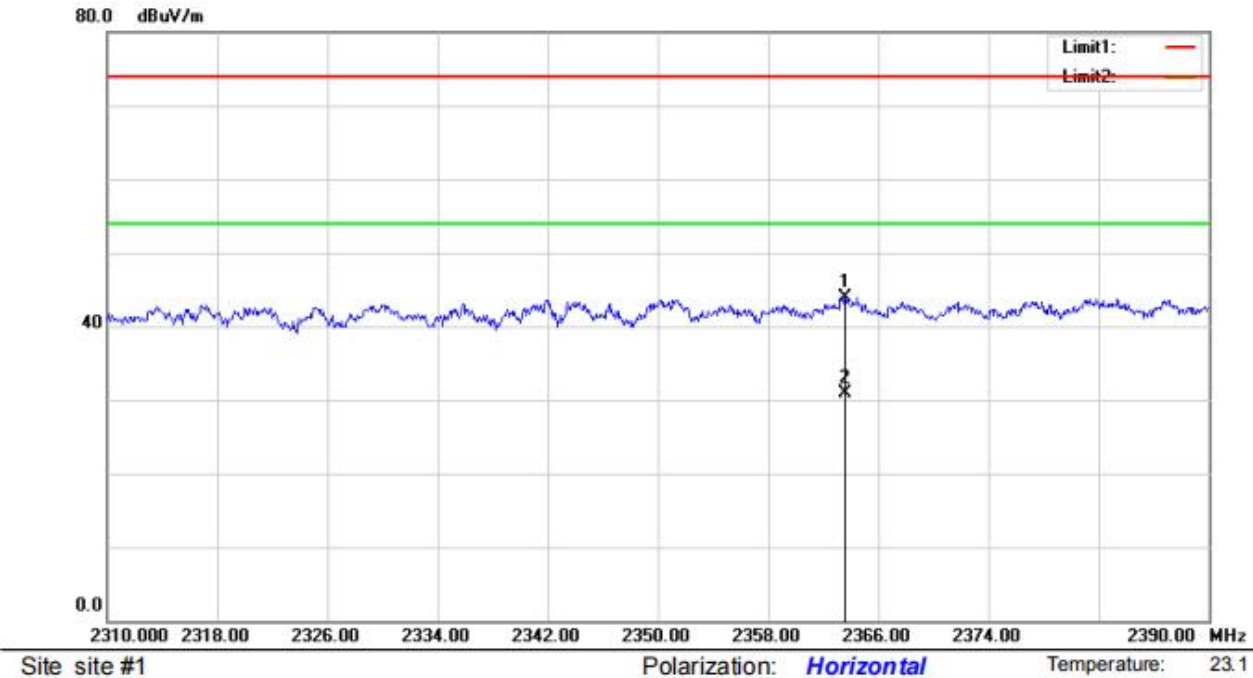


Channel 11: 2462MHz

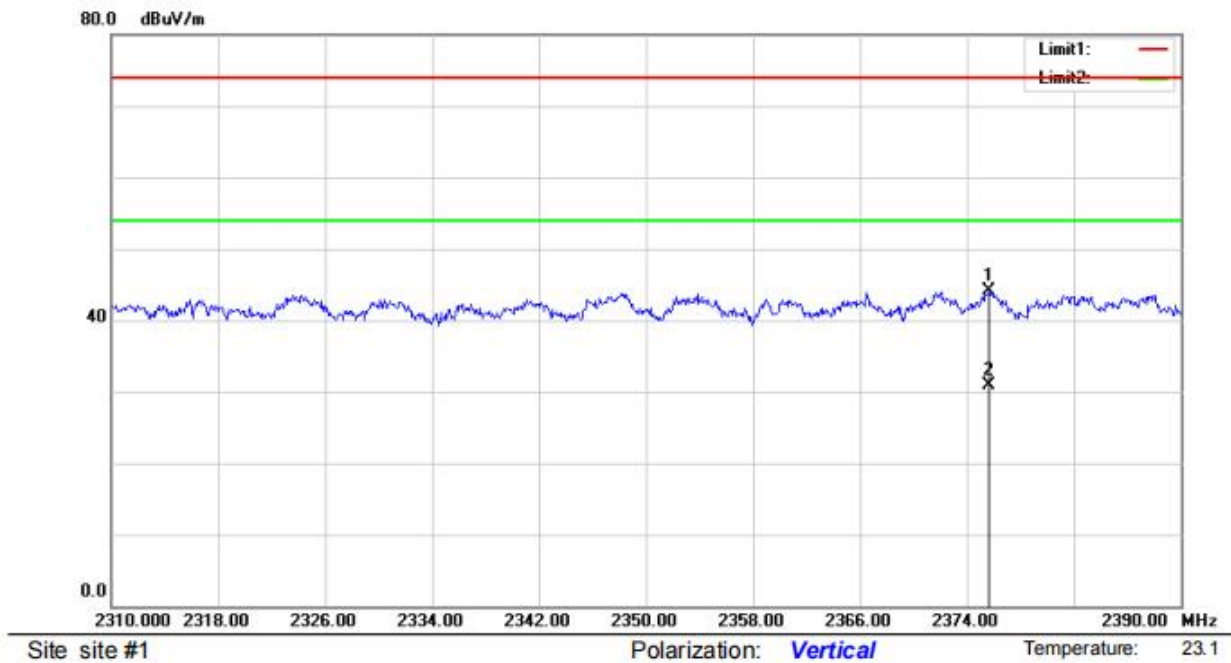


Note: Scan from 1GHz to 25GHz, the disturbance above 18GHz was very low. The points marked on above plots are the highest emissions could be found when testing, so only above points had been displayed.

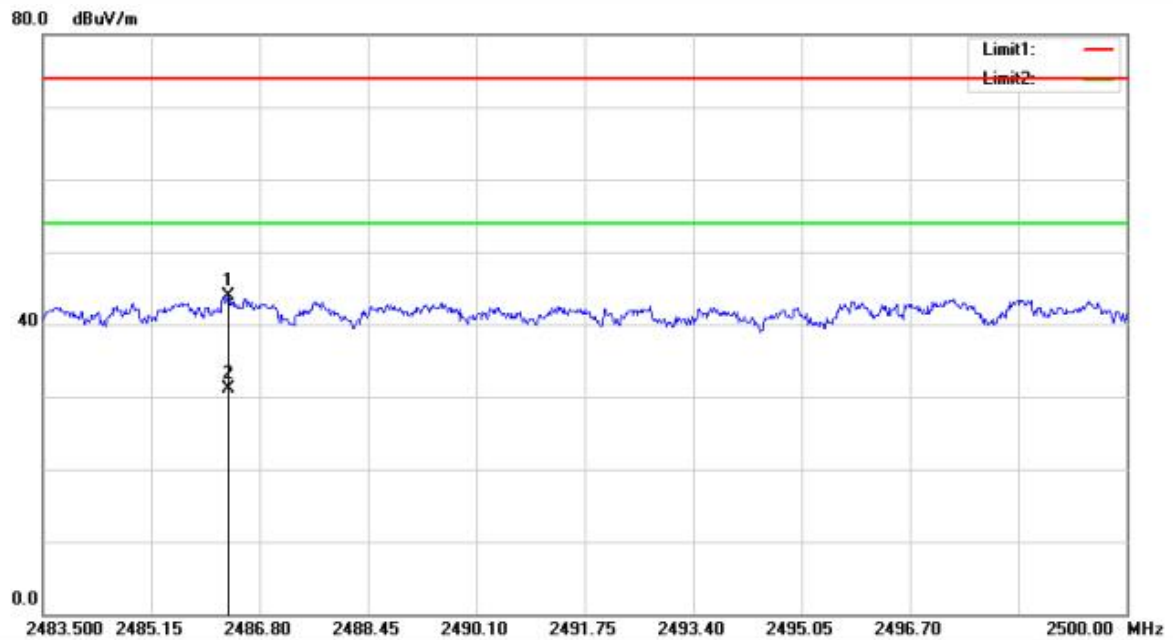
Test Model	802.11b	Spurious Emission in Restricted Band 2310-2390MHz	Channel 1: 2412MHz	VBW=3MHz	Polarity: H
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Test Model	802.11b	Spurious Emission in Restricted Band 2310-2390MHz	Channel 1: 2412MHz	VBW=3MHz	Polarity: V
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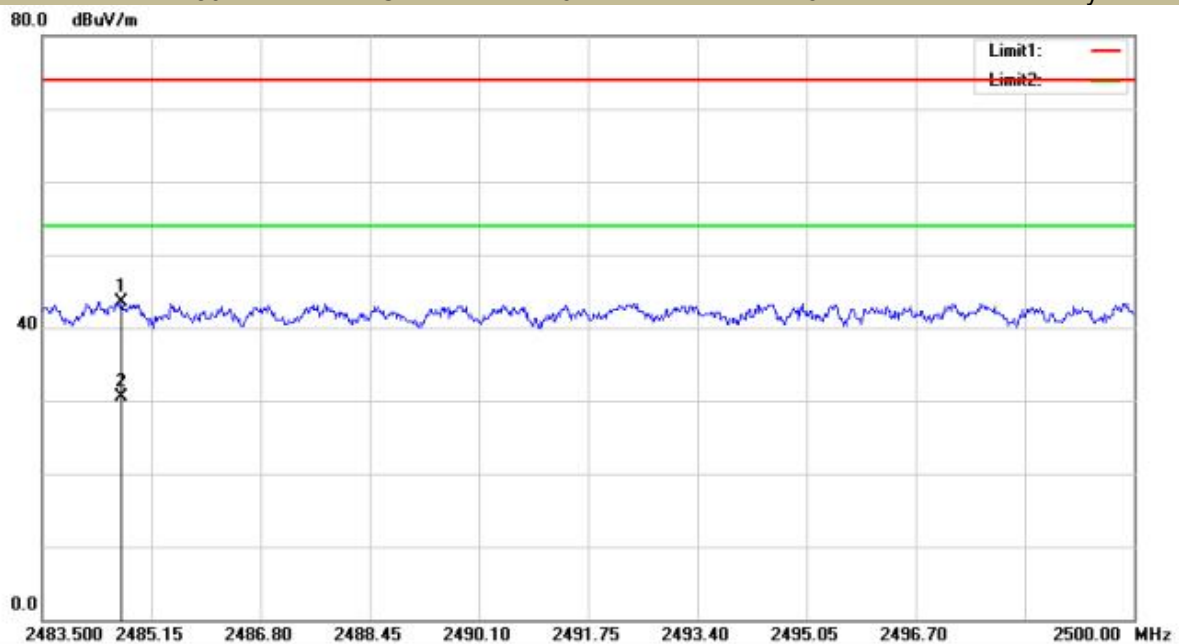


Test Model	802.11b	Spurious Emission in Restricted Band 2483.5-2500MHz		
		Channel 11: 2462MHz	VBW=3MHz	Polarity: H



Site site #1 Polarization: **Horizontal** Temperature: 23.7

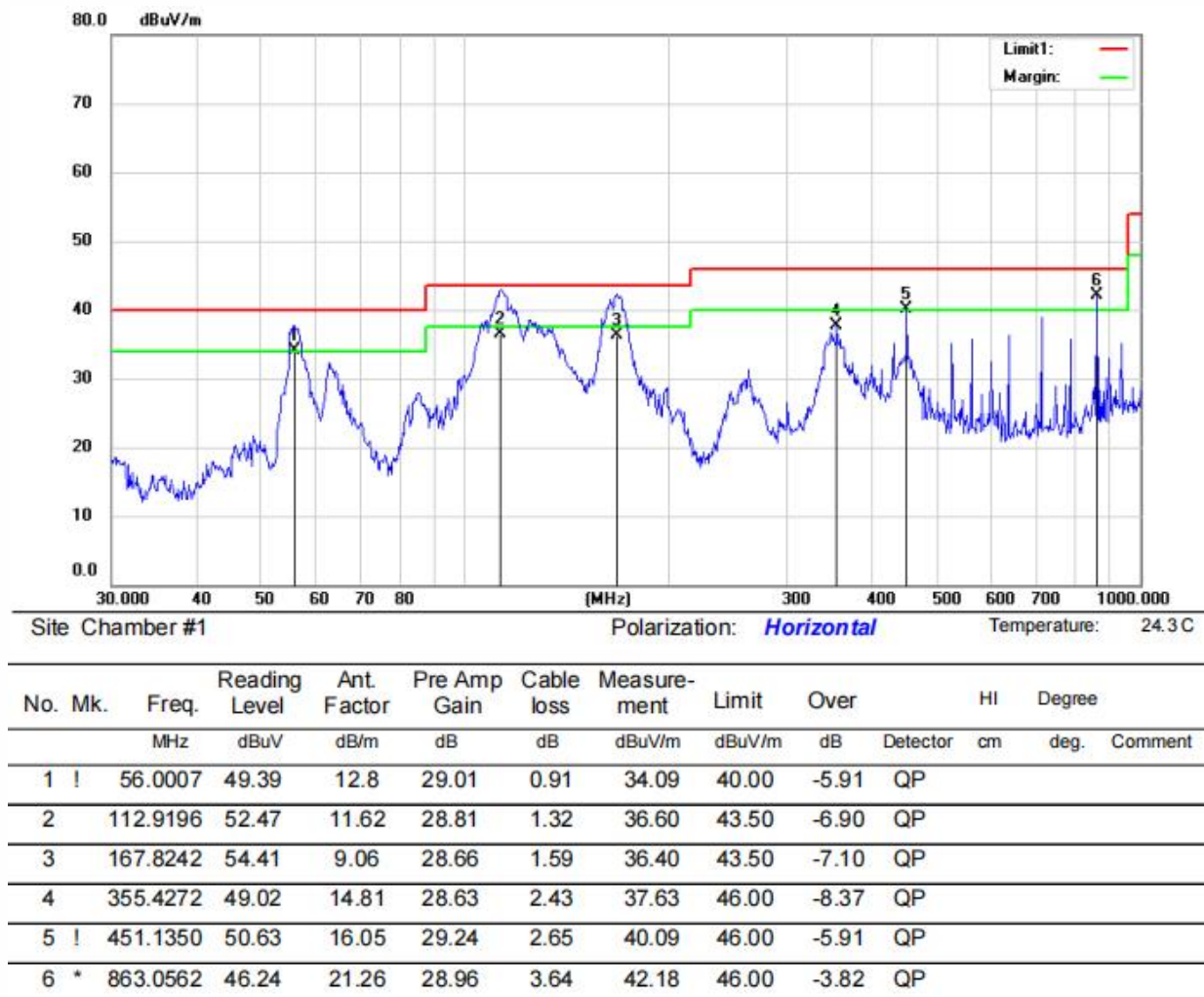
Test Model	802.11b	Spurious Emission in Restricted Band 2483.5-2500MHz		
		Channel 11: 2462MHz	VBW=3MHz	Polarity: V



Site site #1 Polarization: **Vertical** Temperature: 23.7

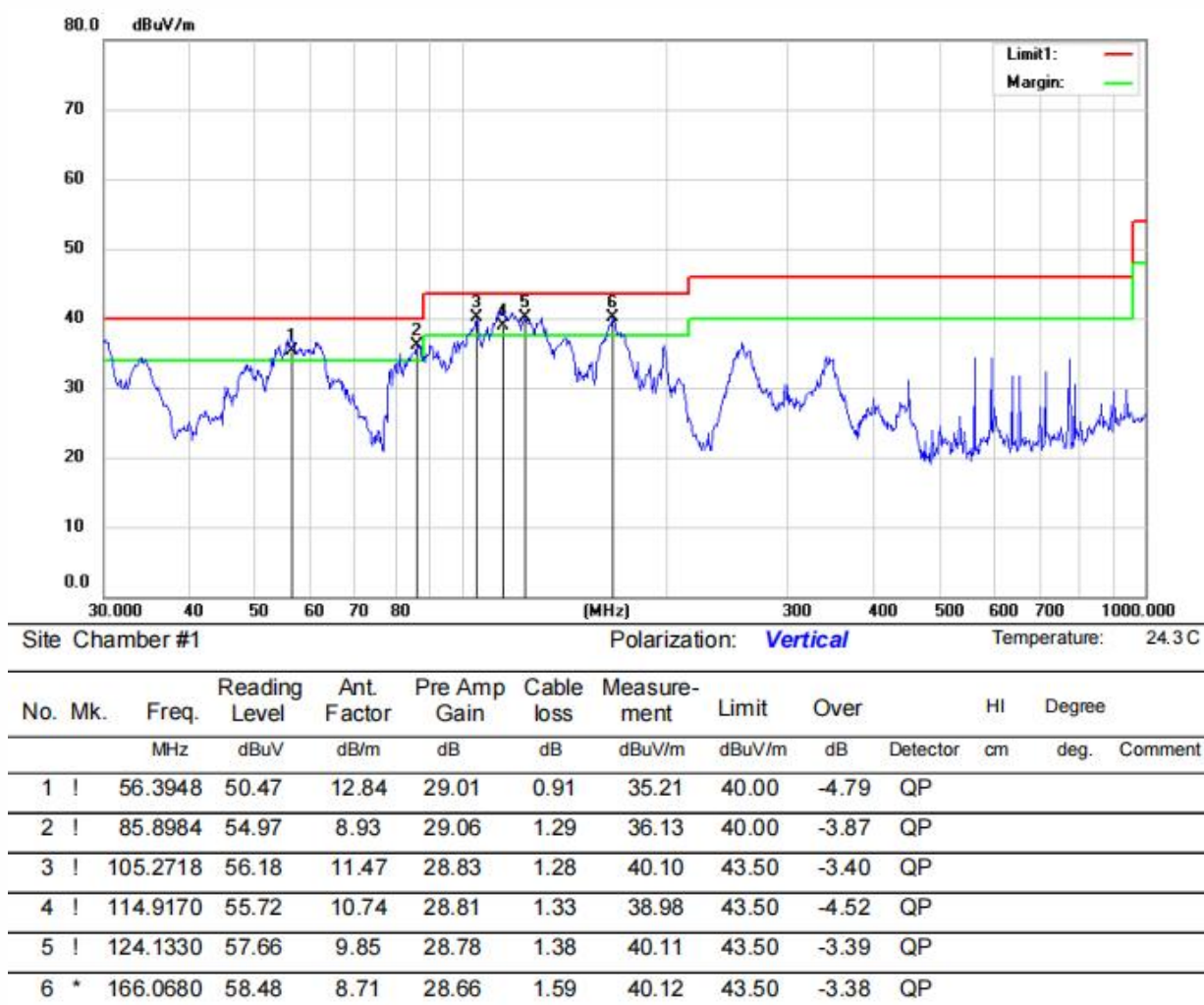
■ Spurious Emission below 1GHz (30MHz to 1GHz)

All the antenna(Antenna 1) and modes(802.11b/g/n) have been tested and the worst(Antenna 1, 802.11b) result recorded was report as below:



*:Maximum data x:Over limit !:over margin

Operator: Ccyf



*:Maximum data x:Over limit !:over margin

Operator: Ccyf

7.6 CONDUCTED EMISSION TEST

7.6.1 Applicable Standard

According to FCC Part 15.207(a)

According to IC RSS-Gen 8.8

7.6.2 Conformance Limit

Frequency (MHz)	Limit (dB μ V)	
	Quasi-peak Level	Average Level
0.15 ~ 0.50	79	66
0.50 ~ 30.00	73	60

NOTE1-The lower limit shall apply at the transition frequencies.

7.6.3 Test Configuration

Test according to clause 6.3 conducted emission test setup

7.6.4 Test Procedure

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

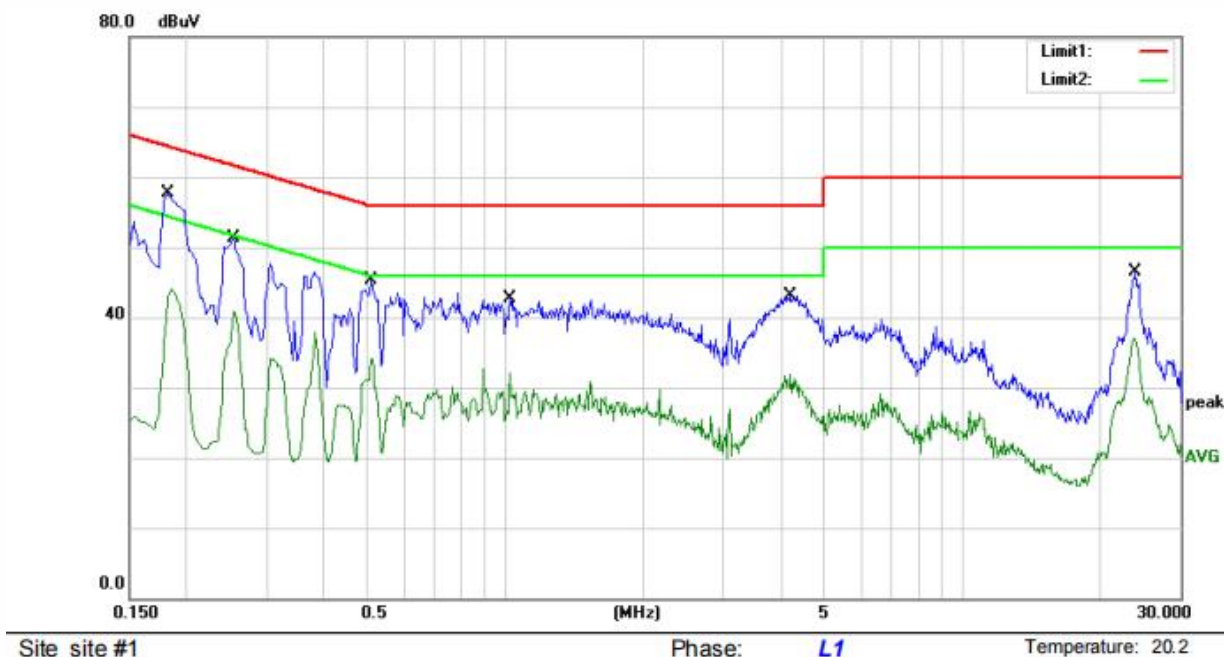
Maximum procedure was performed on the highest emissions to ensure EUT compliance.

Repeat above procedures until all frequency measured were complete.

7.6.5 Test Results

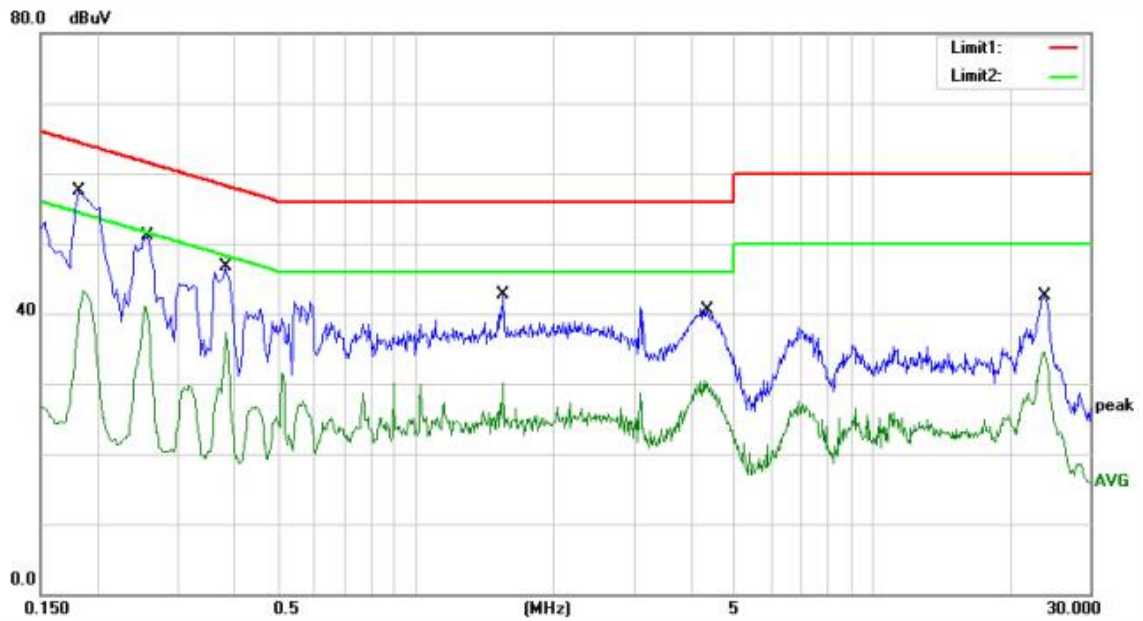
Pass

The AC120V &240V voltage have been tested, and the worst result recorded was report as below:



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1820	37.06	18.34	55.40	64.39	-8.99	QP	
2		0.1820	25.74	18.34	44.08	54.39	-10.31	AVG	
3		0.2521	33.22	18.17	51.39	61.69	-10.30	QP	
4		0.2521	20.63	18.17	38.80	51.69	-12.89	AVG	
5		0.5060	27.80	17.55	45.35	56.00	-10.65	QP	
6		0.5060	14.59	17.55	32.14	46.00	-13.86	AVG	
7		1.0220	25.17	17.57	42.74	56.00	-13.26	QP	
8		1.0220	14.45	17.57	32.02	46.00	-13.98	AVG	
9		4.2140	25.31	17.72	43.03	56.00	-12.97	QP	
10		4.2140	14.20	17.72	31.92	46.00	-14.08	AVG	
11		23.9380	28.65	17.83	46.48	60.00	-13.52	QP	
12		23.9380	19.10	17.83	36.93	50.00	-13.07	AVG	

*:Maximum data x:Over limit !:over margin Comment: Factor build in receiver. Operator: Lusi



Site site #1 Phase: **N** Temperature: 20.2

No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1835	38.68	18.34	57.02	64.33	-7.31	QP	
2		0.1835	22.82	18.34	41.16	54.33	-13.17	AVG	
3		0.2561	32.90	18.16	51.06	61.56	-10.50	QP	
4		0.2561	22.44	18.16	40.60	51.56	-10.96	AVG	
5		0.3820	28.77	17.84	46.61	58.24	-11.63	QP	
6		0.3820	19.43	17.84	37.27	48.24	-10.97	AVG	
7		1.5580	25.06	17.60	42.66	56.00	-13.34	QP	
8		1.5580	12.44	17.60	30.04	46.00	-15.96	AVG	
9		4.3380	22.77	17.72	40.49	56.00	-15.51	QP	
10		4.3380	12.28	17.72	30.00	46.00	-16.00	AVG	
11		23.6940	24.72	17.82	42.54	60.00	-17.46	QP	
12		23.6940	16.71	17.82	34.53	50.00	-15.47	AVG	

*:Maximum data x:Over limit l:over margin Comment: Factor build in receiver. Operator: Lusi

7.7 ANTENNA APPLICATION

7.7.1 Antenna Requirement

Standard	Requirement
FCC CRF Part15.203	An intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. The use of a permanently attached antenna or of an antenna that uses a unique coupling to the intentional radiator shall be considered sufficient to comply with the provisions of this section. The manufacturer may design the unit so that a broken antenna can be replaced by the user, but the use of a standard antenna jack or electrical connector is prohibited. This requirement does not apply to carrier current devices or to devices operated under the provisions of §15.211, §15.213, §15.217, §15.219, or §15.221. Further, this requirement does not apply to intentional radiators that must be professionally installed, such as perimeter protection systems and some field disturbance sensors, or to other intentional radiators which, in accordance with §15.31(d), must be measured at the installation site. However, the installer shall be responsible for ensuring that the proper antenna is employed so that the limits in this part are not exceeded.

For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional gain greater than 6dBi are used, the power shall be reduced by the amount in dB that the directional gain of the antenna exceeds 6dBi..

7.7.2 Result

Temperature : 25℃ ATM Pressure:: 1011 mbar
Humidity : 45 % Test Engineer: Calvin

PASS

The EUT is Chip Antenna, ANT1: 3.51 dBi.

- ☐ Antenna uses a permanently attached antenna which is not replaceable.
- ☒ Not using a standard antenna jack or electrical connector for antenna replacement.
- ☐ The antenna has to be professionally installed (please provide method of installation).

Which in accordance to section 15.203, please refer to the internal photos.

Detail of factor for radiated emission:

Frequency(MHz)	Ant_F(dB)	Cab_L(dB)	Preamp(dB)	Correct Factor(dB)
0.009	20.6	0.03	\	20.63
0.15	20.7	0.1	\	20.8
1	20.9	0.15	\	21.05
10	20.1	0.28	\	20.38
30	18.8	0.45	\	19.25
30	11.7	0.62	27.9	-15.58
100	12.5	1.02	27.8	-14.28
300	12.9	1.91	27.5	-12.69
600	19.2	2.92	27	-4.88
800	21.1	3.54	26.6	-1.96
1000	22.3	4.17	26.2	0.27
1000	25.6	1.76	41.4	-14.04
3000	28.9	3.27	43.2	-11.03
5000	31.1	4.2	44.6	-9.3
8000	36.2	5.95	44.7	-2.55
10000	38.4	6.3	43.9	0.8
12000	38.5	7.14	42.3	3.34
15000	40.2	8.15	41.4	6.95
18000	45.4	9.02	41.3	13.12
18000	37.9	1.81	47.9	-8.19
21000	37.9	1.95	48.7	-8.85
25000	39.3	2.01	42.8	-1.49
28000	39.6	2.16	46.0	-4.24
31000	41.2	2.24	44.5	-1.06
34000	41.5	2.29	46.6	-2.81
37000	43.8	2.30	46.4	-0.3
40000	43.2	2.50	42.2	3.5

--- End of Report ---

声 明 Statement

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2. 未经许可本报告不得部分复制。
2. This report shall not be copied partly without authorization.
3. 本报告的检测结果仅对送测样品有效，委托方对样品的代表性和资料的真实性负责。
3. The test results or observations are applicable only to tested sample. Client shall be responsible for representativeness of the sample and authenticity of the material.
4. 本检测报告中检测项目标注有特殊符号则该项目不在资质认定范围内，仅作为客户委托、科研、教学或内部质量控制等目的使用。
4. The observations or tests with special mark fall outside the scope of accreditation, and are only used for purpose of commission, research, training, internal quality control etc.
5. 本检测报告以实测值进行符合性判定，未考虑不确定度所带来的风险，本实验室不承担相关责任，特别约定、标准或规范中有明确规定的除外。
5. The test results or observations are provided in accordance with measured value, without taking risks caused by uncertainty into account. Without explicit stipulation in special agreements, standards or regulations, EMTEK shall not assume any responsibility.
6. 对本检验报告若有异议，请于收到报告之日起 20 日内提出。
6. Objections shall be raised within 20 days from the date receiving the report.