

FCC TEST REPORT

FCC ID: 2BLW6-S6

Product : Vehicle navigation equipment
Model Name : S6,G200,G300,G500,G200Pro,
ms200-800,m3/45678,dudu45678
Brand : 
Report No. : NCT2400421128XE-2

Prepared for

Dongguan Yiling Electronics Co., Ltd.

**Room 901, Building 3, Times Zhirui Technology, No. 159, Sanlian Road, Luwu,
Changping Town, Dongguan City, Guangdong Province**

Prepared by

Shenzhen NCT Testing Technology Co., Ltd.

**A101&2F B2, Fuqiao 6th Area, Xintian Community, Fuhai Street, Baoan District,
Shenzhen, People's Republic of China**

TEL: 400-8868-419

FAX: 86-755-27790922

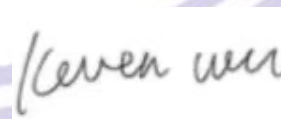
1 TEST RESULT CERTIFICATION

Applicant's name : Dongguan Yiling Electronics Co., Ltd.
Address : Room 901, Building 3, Times Zhirui Technology, No. 159, Sanlian Road, Luwu, Changping Town, Dongguan City, Guangdong Province
Manufacture's name : Dongguan Yiling Electronics Co., Ltd.
Address : Room 901, Building 3, Times Zhirui Technology, No. 159, Sanlian Road, Luwu, Changping Town, Dongguan City, Guangdong Province
Product name : Vehicle navigation equipment
Model name : S6
Additional model : G200,G300,G500,G200Pro,ms200-800,m3/45678,dudu45678
Standards : FCC CFR47 Part 15 Section 15.247
Test procedure : ANSI C63.10:2013
Test Date : Oct. 08, 2024 to Oct. 28, 2024
Date of Issue : Oct. 29, 2024
Test Result : Pass

This device described above has been tested by NCT, and the test results show that the equipment under test (EUT) is in compliance with the FCC requirements. And it is applicable only to the tested sample identified in the report.

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Test Engineer:



Keven Wu / Engineer

Technical Manager:



Henry Wang / Manager

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2 Test Summary

Test Items	Test Requirement	Result
Conduct Emission	15.207	PASS
Radiated Spurious Emissions	15.205(a) 15.209 15.247(d)	PASS
Conducted Spurious Emission	15.247(d)	PASS
Band edge	15.247(d) 15.205(a)	PASS
6dB Bandwidth	15.247(a)(2)	PASS
Maximum Peak Output Power	15.247(b)(3)	PASS
Power Spectral Density	15.247(e)	PASS
Antenna Requirement	15.203	PASS
Remark: N/A: Not Applicable		

3 General Information

3.1 General Description of E.U.T.

Product Name	:	Vehicle navigation equipment
Model Name	:	S6
Additional model	:	G200,G300,G500,G200Pro,ms200-800,m3/45678,dudu45678
Specification	:	802.11b/g/n HT20/HT40
Operating frequency	:	2412-2462MHz for 802.11b/g/ n(HT20) 2422-2452MHz for 802.11 n(HT40)
Numbers of Channel	:	11 channels for 802.11b/g/ n(HT20) 7 channels for 802.11n(HT40)
Antenna Type	:	wire Antenna
Antenna Gain	:	2 dBi
Type of Modulation	:	DSSS with DBPSK/DQPSK/CCK for 802.11b; OFDM with BPSK/QPSK/16QAM/64QAM for 802.11g/n;
Power supply	:	DC 12V from Battery
Hardware Version	:	V1.0
Software Version	:	V1.0
Test sample No.	:	23046145-002; 23046145-003
Remark: the Antenna gain is provided by customer from Antenna spec. and the laboratory will not be responsible for the accumulated calculation results which covers the information provided by the applicant.		

3.2 Channel List

The EUT has been tested under its typical operating condition.

The EUT configuration for testing is installed on RF field strength measurement to meet the Commissions requirement and operating in a manner which intends to maximize its emission characteristics in a continuous normal application.

The Transmitter was operated in the normal operating mode. The TX frequency was fixed which was for the purpose of the measurements.

Test of channel included the lowest and middle and highest frequency to perform the test, then record on this report.

Those data rates (802.11b: 1 Mbps; 802.11g: 6 Mbps; 802.11n (HT20): MCS0;) were used for all test.

Pre-defined engineering program for regulatory testing used to control the EUT for staying in continuous transmitting and receiving mode is programmed.

Frequency and Channel list for 802.11 b/g/n (HT20/HT40)

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

The maximum duty cycle as following table:

Test Mode	Duty Cycle(%)
802.11b	100%
802.11g	100%
802.11n(HT20)	100%
802.11n(HT40)	100%

3.3 Test Site

Site Description

EMC Lab. : Accredited by CNAS, 2022-09-27

The certificate is valid until 2028.01.07

The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2006 (identical to ISO/IEC 17025:2017)

The Certificate Registration Number is L8251

Designation Number: CN1347

Test Firm Registration Number: 894804

Accredited by A2LA, June 14, 2023

The Certificate Registration Number is 6837.01

Accredited by Industry Canada, November 09, 2018

The Conformity Assessment Body Identifier is CN0150

Company Number: 30806

Name of Firm : Shenzhen NCT Testing Technology Co., Ltd.

Site Location : A101&2F B2, Fuqiao 6th Area, Xintian Community, Fuhai Street, Baoan District, Shenzhen, People's Republic of China

4 Equipment During Test

4.1 Equipments List

Conducted emission Test Equipment

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
944 Shielded Room	944 Room	/	EMToni	2022/5/31	2025/5/30
EMI Test Receiver	ESPI	101604	Rohde & Schwarz	2024/6/20	2025/6/19
LISN	ENV 216	102796	Rohde & Schwarz	2024/6/20	2025/6/19
LISN	VN1-13S	004023	CRANAGE	2024/6/20	2025/6/19
Cable	RG223-1500MM	NA	RG	2024/6/20	2025/6/19

Radiated emission & Radio Frequency Test Equipment

Name	Model No.	Serial No.	Manufacturer	Date of Cal.	Due Date
966 Shielded Room	966 Room	/	EMToni	2022/5/31	2025/5/30
EMI Test Receiver	ESCI	101178	Rohde & Schwarz	2024/6/20	2025/6/19
Amplifier (30MHz-1GHz)	BBV 9743 B	00374	SCHNWARZBECK	2024/6/20	2025/6/19
Bilog Antenna (30MHz-1GHz)	VULB9162	00473	SCHNWARZBECK	2023/3/19	2025/3/18
Horn antenna (1GHz-18GHz)	BBHA 9120 D	02622	SCHNWARZBECK	2023/3/19	2025/3/18
Preamplifier (1GHz-18GHz)	BBV 9718D	0024	SCHNWARZBECK	2024/6/20	2025/6/19
Spectrum Analyzer (10Hz-40GHz)	FSV 40	100952	Rohde & Schwarz	2024/6/20	2025/6/19
Preamplifier (18GHz-40GHz)	BBV 9721	0056	SCHNWARZBECK	2024/6/20	2025/6/19
Double Ridge Guide Horn Antenna (18GHz-40GHz)	SAS-574	588	A.H.System	2023/3/19	2025/3/18
Loop Antenna (9KHz-30MHz)	FMZB 1513-60	00115	SCHNWARZBECK	2024/6/20	2025/6/19
Amplifier (9KHz-30MHz)	BBV 9745	00109	CHNWARZBECK	2024/6/20	2025/6/19
MXG Signal Analyzer	N9020A	MY50510202	Agilent	2024/6/20	2025/6/19

MXG Vector Signal Generator	N5182A	MY50140020	Agilent	2024/6/20	2025/6/19
MXG Analog Signal Generator	N5181A	MY47420919	Agilent	2024/6/20	2025/6/19
Power Sensor	TR1029-2	512364	Techoy	2024/6/20	2025/6/19
RF Swith	TR1029-1	512364	Techoy	2024/6/20	2025/6/19
Cable	DA800-4000MM	NA	DA	2024/6/20	2025/6/19
Cable	DA800-11000MM	NA	DA	2024/6/20	2025/6/19

Other

Item	Name	Manufacturer	Model	Software version
1	EMC Conduction Test System	AUDIX	e3	6.120718
2	EMC radiation test system	AUDIX	e3	6.120718
3	RF test system	TACHOY	RFTest	V1.0.0
4	RF communication test system	TACHOY	RFTest	V1.0.0

4.2 Measurement Uncertainty

Parameter	Uncertainty
RF output power, conducted	±1.0dB
Power Spectral Density, conducted	±2.2dB
Radio Frequency	± 1 × 10 ⁻⁶
Bandwidth	± 1.5 × 10 ⁻⁶
Time	±2%
Duty Cycle	±2%
Temperature	±1°C
Humidity	±5%
DC and low frequency voltages	±3%
Conducted Emissions (150kHz~30MHz)	±3.64dB
Radiated Emission(9KHz~30MHz)	±4.51dB
Radiated Emission(30MHz~1GHz)	±5.03dB
Radiated Emission(1GHz~25GHz)	±4.74dB
Radiated Emission(25GHz~40GHz)	±3.38dB
Remark: The coverage Factor (k=2), and measurement Uncertainty for a level of Confidence of 95%	

4.3 Description of Support Units

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.	Note
	Vehicle navigation equipment	N/A	S6	N/A	EUT
	battery	Camel Group Co.,Ltd.	6-QW-36(300)-L	N/A	12V 36AH

Note:

- (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.

5 Conducted Emission

Test Requirement: : FCC CFR 47 Part 15 Section 15.207
Test Method : ANSI C63.10: 2013
Test Result : PASS
Frequency Range : 150kHz to 30MHz
Class/Severity : Class B

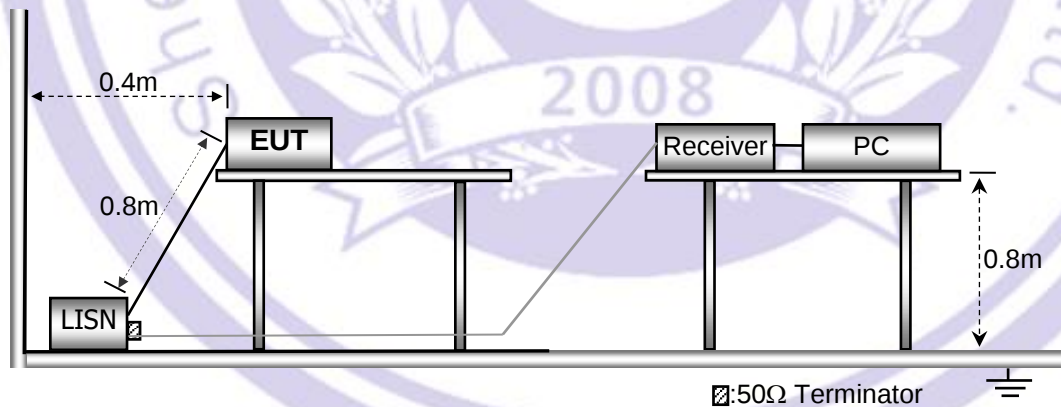
5.1E.U.T. Operation

Operating Environment :

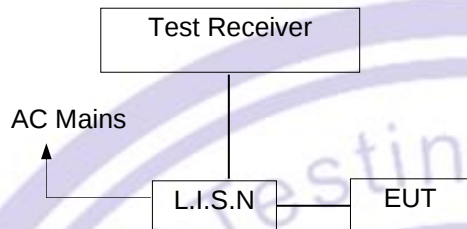
Temperature : 23.9 °C
Humidity : 51.4 % RH
Atmospheric Pressure : 101.21kPa

5.2EUT Setup

The conducted emission tests were performed using the setup accordance with the ANSI C63.10:2013.



5.3 Test SET-UP (Block Diagram of Configuration)



5.4 Measurement Procedure

1. The EUT was placed on a table, which is 0.8m above ground plane.
2. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
3. Repeat above procedures until all frequency measured was complete.

5.5 Conducted Emission Limit

Conducted Emission

Frequency(MHz)	Quasi-peak	Average
0.15-0.5	66-56	56-46
0.5-5.0	56	46
5.0-30.0	60	50

Note:

1. The lower limit shall apply at the transition frequencies
2. The limit decreases in line with the logarithm of the frequency in the range of 0.15 to 0.50MHz.

5.6 Measurement Description

The maximised peak emissions from the EUT was scanned and measured for both the Live and Neutral Lines. Quasi-peak & average measurements were performed if peak emissions were within 6dB of the average limit line.

5.7 Conducted Emission Test Result

N/A

EUT is power DC 12V by a battery, so it is not need.

6 Radiated Spurious Emissions

Test Requirement : FCC CFR47 Part 15 Section 15.209 & 15.247
Test Method : ANSI C63.10:2013
Test Result : PASS
Measurement Distance : 3m
Limit : See the follow table

Frequency (MHz)	Field Strength		Field Strength Limit at 3m Measurement Dist	
	uV/m	Distance (m)	uV/m	dBuV/m
0.009 ~ 0.490	$2400/F(\text{kHz})$	300	$10000 * 2400/F(\text{kHz})$	$20\log^{(2400/F(\text{kHz}))} + 80$
0.490 ~ 1.705	$24000/F(\text{kHz})$	30	$100 * 24000/F(\text{kHz})$	$20\log^{(24000/F(\text{kHz}))} + 40$
1.705 ~ 30	30	30	$100 * 30$	$20\log^{(30)} + 40$
30 ~ 88	100	3	100	$20\log^{(100)}$
88 ~ 216	150	3	150	$20\log^{(150)}$
216 ~ 960	200	3	200	$20\log^{(200)}$
Above 960	500	3	500	$20\log^{(500)}$

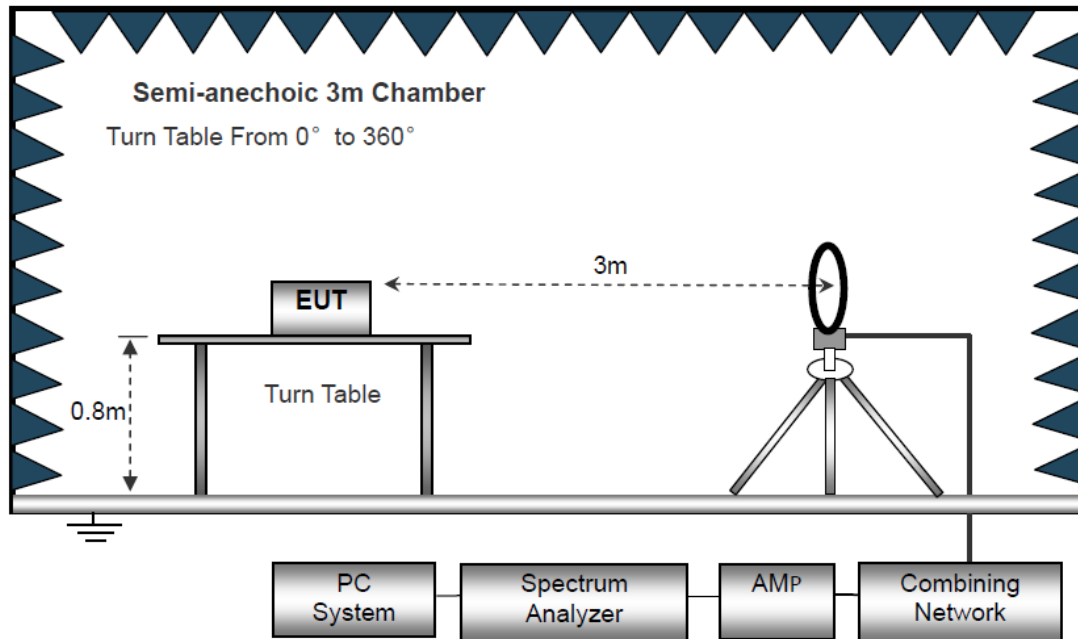
6.1EUT Operation

Operating Environment :
Temperature: : 24.5 °C
Humidity: : 52 % RH
Atmospheric Pressure: : 101.3kPa
Test Voltage : DC 12V

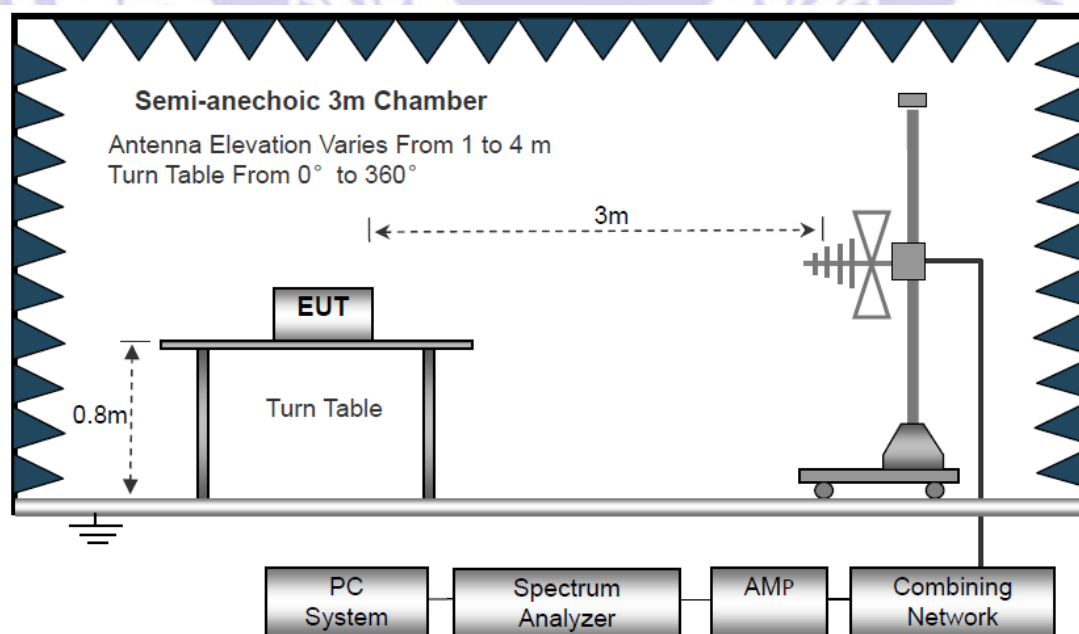
6.2 Test Setup

The radiated emission tests were performed in the 3m Semi- Anechoic Chamber test site

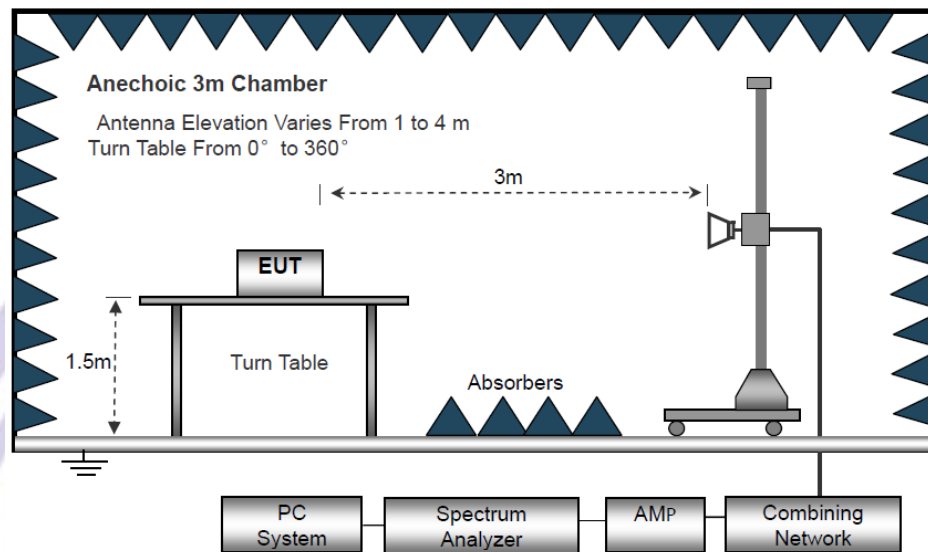
The test setup for emission measurement below 30MHz



The test setup for emission measurement from 30 MHz to 1 GHz.



The test setup for emission measurement above 1 GHz



6.3 Spectrum Analyzer Setup

	Frequency	Detector	RBW	VBW	Remark
Receiver Setup	Below 30MHz	--	10kHz	10kHz	--
	30MHz ~ 1GHz	Quasi-peak	120kHz	300kHz	Quasi-peak Value
	Above 1GHz	Peak	1MHz	3MHz	Peak Value
		RMS	1MHz	3MHz	Average Value

6.4 Test Procedure

1. Below 1000MHz, The EUT was placed on a turn table which is 0.8m above ground plane, And above 1000MHz, The EUT was placed on a styrofoam table which is 1.5m above ground plane.
2. The turntable shall be rotated for 360 degrees to determine the position of maximum emission level.
3. EUT is set 3m away from the receiving antenna, which is moved from 1m to 4m to find out the maximum emissions. The spectrum was investigated from the lowest radio frequency signal generated in the device, without going below 9 kHz, up to the tenth harmonic of the highest fundamental frequency or to 40 GHz, whichever is lower.
4. Maximum procedure was performed on the six highest emissions to ensure EUT compliance.
5. And also, each emission was to be maximized by changing the polarization of receiving antenna both horizontal and vertical.
6. Repeat above procedures until the measurements for all frequencies are complete.
7. The radiation measurements are tested under 3-axes(X,Y,Z) position(X denotes lying on the table, Y denotes side stand and Z denotes vertical stand), After pre-test, It was found that the worse radiation emission was get at the X position. So the data shown was the X position only.
8. The test above 1GHz must be use the fully anechoic room, and the test below 1GHz use the half anechoic room

6.5 Summary of Test Results

Test Frequency: 9KHz-30MHz

Freq. (MHz)	Ant.Pol. H/V	Emission Level (dBuV/m)	Limit 3m (dBuV/m)	Over (dB)
--	--	--	--	>20

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);

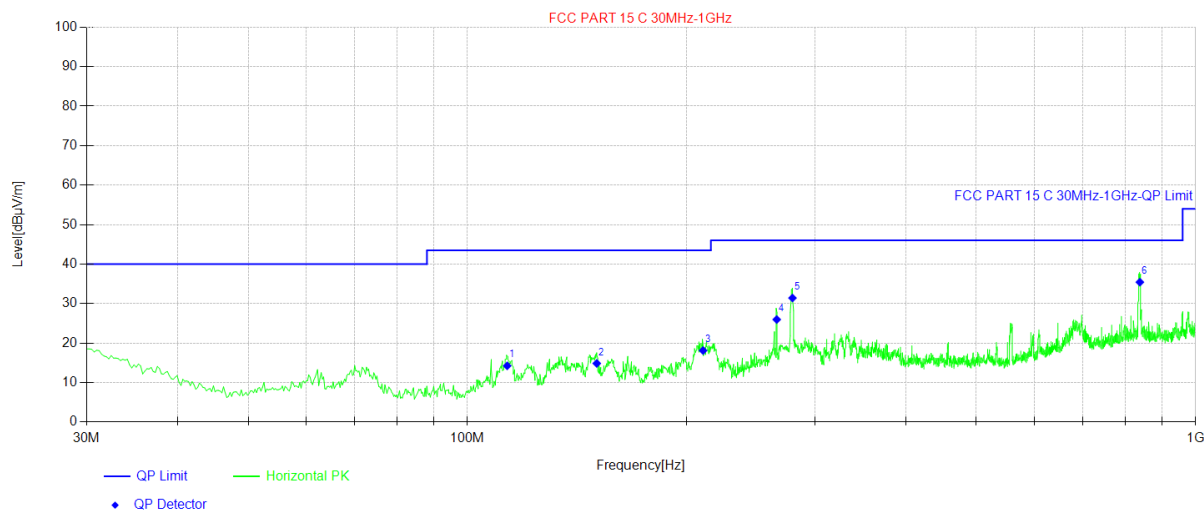
Limit line = Specific limits (dBuV) + distance extrapolation factor.

Test Frequency: 30MHz ~ 1GHz

All the modulation modes were tested the data of the worst mode (TX 802.11b Low Channel) are recorded in the following pages and the others modulation methods do not exceed the limits.

Please refer to the following test plots:

Antenna Polarization: Horizontal

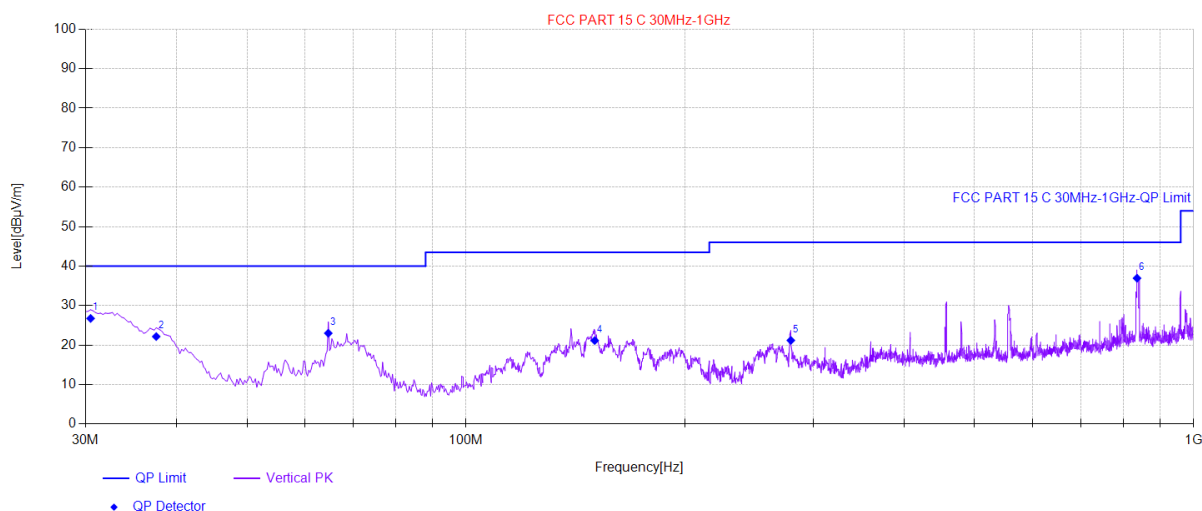


Final Data List[QP]

NO.	Freq. [MHz]	QP Reading [dBμV/m]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Polarity	Verdict
1	113.42	32.96	-18.71	14.25	43.50	29.25	Horizontal	PASS
2	150.52	30.93	-16.07	14.86	43.50	28.64	Horizontal	PASS
3	210.66	37.33	-19.21	18.12	43.50	25.38	Horizontal	PASS
4	265.95	42.89	-16.92	25.97	46.00	20.03	Horizontal	PASS
5	279.53	47.69	-16.27	31.42	46.00	14.58	Horizontal	PASS
6	838.50	40.68	-5.24	35.44	46.00	10.56	Horizontal	PASS

Remark:1. QP Value= QP Reading+ Factor;
 2.QP Margin= QP Limit- QP Value;
 3.Factor= ANT Factor+ Cable Loss -AMP Factor.

Antenna Polarization: Vertical



Final Data List[QP]

NO.	Freq. [MHz]	QP Reading [dBμV/m]	Factor [dB]	QP Value [dBμV/m]	QP Limit [dBμV/m]	QP Margin [dB]	Polarity	Verdict
1	30.49	44.79	-18.04	26.75	40.00	13.25	Vertical	PASS
2	37.52	39.79	-17.62	22.17	40.00	17.83	Vertical	PASS
3	64.68	41.08	-18.07	23.01	40.00	16.99	Vertical	PASS
4	150.28	37.18	-16.03	21.15	43.50	22.35	Vertical	PASS
5	279.53	37.47	-16.27	21.20	46.00	24.80	Vertical	PASS
6	836.07	42.18	-5.24	36.94	46.00	9.06	Vertical	PASS

Remark: Emission Level = Reading + Cable Loss + ANT Factor - AMP Factor

Test Frequency: From 1GHz to 18GHz

Worst case 802.11b

Test Mode: 2412					Test channel: Lowest			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4824	45.74	32.35	4.12	28.44	53.77	74	-20.23	V
7236	38.16	36.08	6.3	27.74	52.80	74	-21.20	V
9648	35.30	38.25	7.91	24.65	56.81	74	-17.19	V
4824	43.25	32.35	4.12	28.44	51.28	74	-22.72	H
7236	38.71	36.08	6.3	27.74	53.35	74	-20.65	H
9648	34.56	38.25	7.91	24.65	56.07	74	-17.93	H
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4824	31.89	32.35	4.12	28.44	39.92	54	-14.08	V
7236	23.58	36.08	6.3	27.74	38.22	54	-15.78	V
9648	21.26	38.25	7.91	24.65	42.77	54	-11.23	V
4824	30.53	32.35	4.12	28.44	38.56	54	-15.44	H
7236	25.75	36.08	6.3	27.74	40.39	54	-13.61	H
9648	21.03	38.25	7.91	24.65	42.54	54	-11.46	H

Worst case 802.11b

Test Mode: 2437					Test channel: Middle			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4874	47.26	32.35	4.12	28.44	55.29	74	-18.71	V
7311	38.26	36.08	6.3	27.74	52.90	74	-21.10	V
9748	35.49	38.25	7.91	24.65	57.00	74	-17.00	V
4874	43.53	32.35	4.12	28.44	51.56	74	-22.44	H
7311	38.47	36.08	6.3	27.74	53.11	74	-20.89	H
9748	34.39	38.25	7.91	24.65	55.90	74	-18.10	H
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4874	31.60	32.35	4.12	28.44	39.63	54	-14.37	V
7311	24.75	36.08	6.3	27.74	39.39	54	-14.61	V
9748	20.83	38.25	7.91	24.65	42.34	54	-11.66	V
4874	31.01	32.35	4.12	28.44	39.04	54	-14.96	H
7311	24.66	36.08	6.3	27.74	39.30	54	-14.70	H
9748	20.48	38.25	7.91	24.65	41.99	54	-12.01	H

Worst case 802.11b

Test Mode: 2462					Test channel: High			
Peak Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4924	46.27	32.41	4.14	28.42	54.40	74	-19.60	V
7386	38.22	36.15	6.36	27.68	53.05	74	-20.95	V
9848	35.60	38.35	7.97	24.33	57.59	74	-16.41	V
4924	43.41	32.41	4.14	28.42	51.54	74	-22.46	H
7386	38.71	36.15	6.36	27.68	53.54	74	-20.46	H
9848	34.45	38.35	7.97	24.33	56.44	74	-17.56	H
Average Value								
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over Limit (dB)	Pol.
4924	30.49	32.41	4.14	28.42	38.62	54	-15.38	V
7386	24.25	36.15	6.36	27.68	39.08	54	-14.92	V
9848	20.90	38.35	7.97	24.33	42.89	54	-11.11	V
4924	30.19	32.41	4.14	28.42	38.32	54	-15.68	H
7386	25.25	36.15	6.36	27.68	40.08	54	-13.92	H
9848	21.74	38.35	7.97	24.33	43.73	54	-10.27	H

Note:

1. The testing has been conformed to $10 \times 2462 \text{ MHz} = 24620 \text{ MHz}$.
2. All other emissions more than 30dB below the limit.
3. Factor = Antenna Factor + Cable Loss – Pre-amplifier.
Emission Level = Reading + Factor
Margin=Emission Level-Limit
4. X-Axis, Y-Axis and Z-Axis were investigated. The results above show only the worst case.

Spurious Emission in Restricted Band 2310-2390MHz and 2483.5-2500MHz
2.4G WiFi (802.11b/g/n) mode have been tested, and the worst result(802.11g) was report as below
Test Mode: Worst case 802.11g Low Channel 2412MHz

Test Mode: 802.11g Low Channel 2412MHz									Test Value
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over (dB)	Polarity H/V	
2390	48.74	27.39	2.77	34.01	44.89	74	-29.11	H	Peak
2400	60.89	27.42	2.78	34.01	57.08	74	-16.92	H	
2390	48.27	27.39	2.77	34.01	44.42	74	-29.58	V	
2400	54.89	27.42	2.78	34.01	51.08	74	-22.92	V	
2390	40.94	27.39	2.77	34.01	37.09	54	-16.91	H	Average
2400	43.69	27.42	2.78	34.01	39.88	54	-14.12	H	
2390	39.86	27.39	2.77	34.01	36.01	54	-17.99	V	
2400	44.53	27.42	2.78	34.01	40.72	54	-13.28	V	

Test Mode: Worst case 802.11g High Channel 2462MHz

Test Mode: 802.11g High Channel 2462MHz									Test Value
Frequency (MHz)	Read Level (dBuV)	Antenna Factor (dB/m)	Cable Loss (dB)	Preamp Factor (dB)	Level (dBuV/m)	Limit (dBuV/m)	Over (dB)	Polarity H/V	
2483.5	60.03	27.39	2.77	34.01	56.18	74	-17.82	H	Peak
2500	49.69	27.42	2.78	34.01	45.88	74	-28.12	H	
2483.5	59.36	27.39	2.77	34.01	55.51	74	-18.49	V	
2500	48.15	27.42	2.78	34.01	44.34	74	-29.66	V	
2483.5	42.33	27.39	2.77	34.01	38.48	54	-15.52	H	Average
2500	40.18	27.42	2.78	34.01	36.37	54	-17.63	H	
2483.5	43.92	27.39	2.77	34.01	40.07	54	-13.93	V	
2500	39.29	27.42	2.78	34.01	35.48	54	-18.52	V	

Test Frequency: From 18GHz to 25GHz

The measurements were more than 20dB below the limit and not reported.

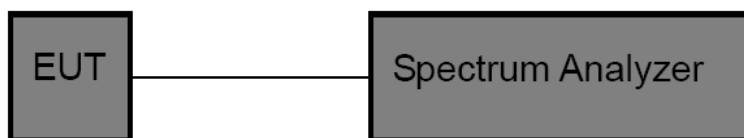
7 Conducted Spurious Emission

Test Requirement : FCC CFR47 Part 15 Section 15.247
Test Method : ANSI C63.10:2013
Test Limit : Regulation 15.247 (d), In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, 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)).

7.1 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz, Sweep = auto
Detector function = peak, Trace = max hold

7.2 Test Setup

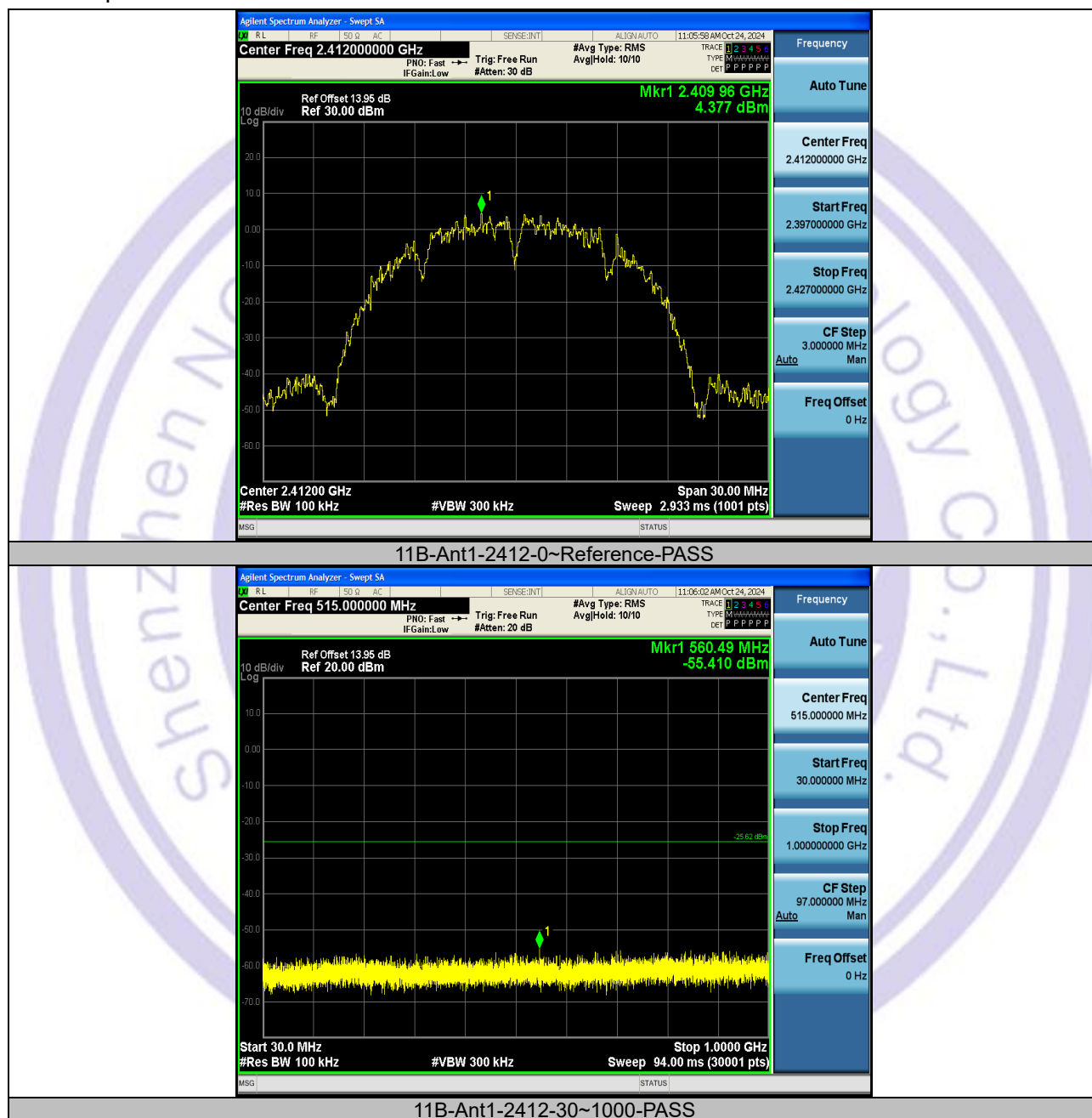


7.3 Test Result

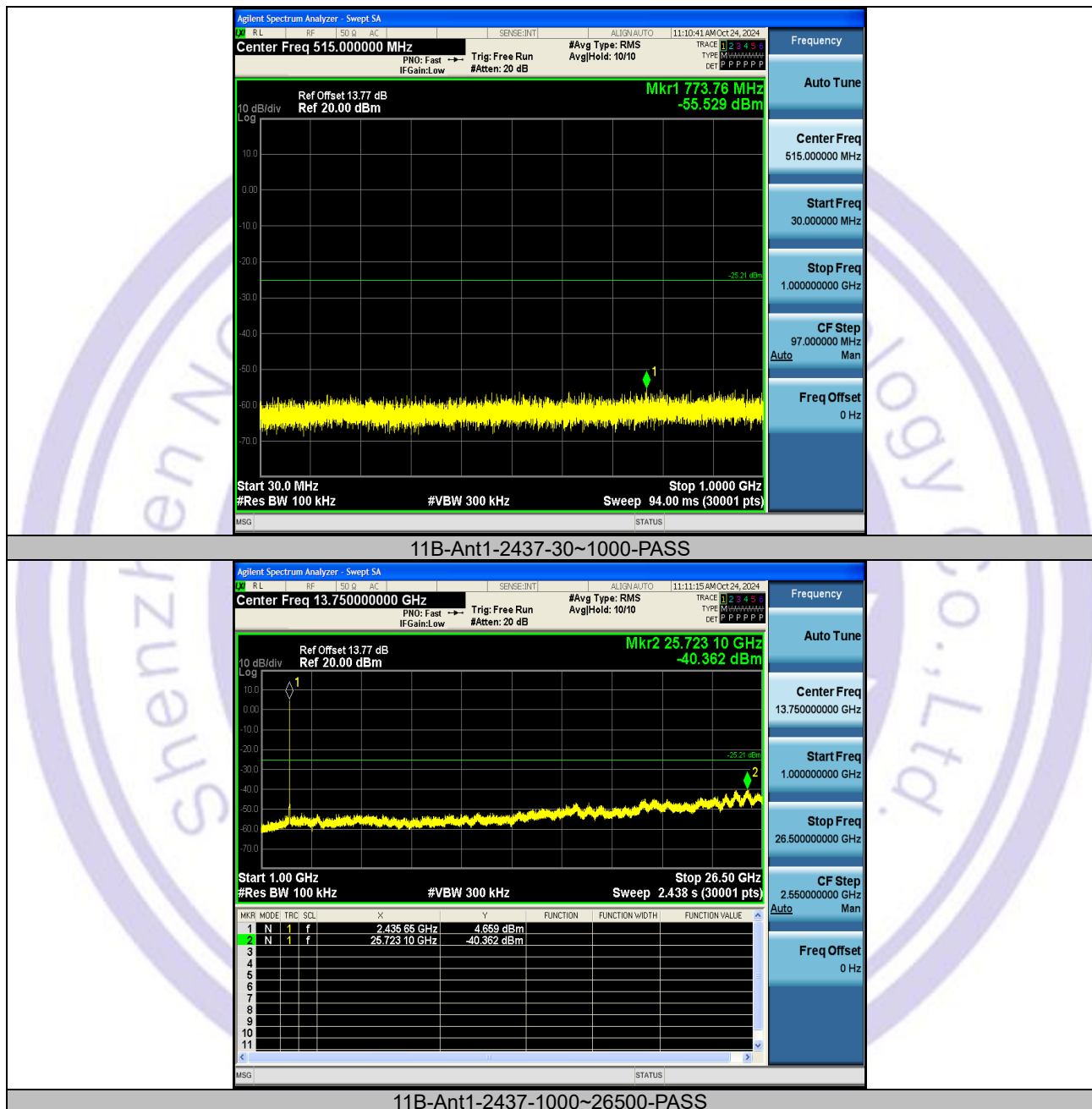
TestMode	Antenna	Frequency[MHz]	FreqRange [Mhz]	RefLevel [dBm]	Result [dBm]	Limit [dBm]	Verdict
11B	Ant1	2412	0~Reference	4.38	4.38	---	PASS
11B	Ant1	2412	30~1000	4.38	-55.41	≤-25.62	PASS
11B	Ant1	2412	1000~26500	4.38	-40.25	≤-25.62	PASS
11B	Ant1	2437	0~Reference	4.79	4.79	---	PASS
11B	Ant1	2437	30~1000	4.79	-55.53	≤-25.21	PASS
11B	Ant1	2437	1000~26500	4.79	-40.36	≤-25.21	PASS
11B	Ant1	2462	0~Reference	4.88	4.88	---	PASS
11B	Ant1	2462	30~1000	4.88	-55.07	≤-25.12	PASS
11B	Ant1	2462	1000~26500	4.88	-39.89	≤-25.12	PASS
11G	Ant1	2412	0~Reference	0.05	0.05	---	PASS
11G	Ant1	2412	30~1000	0.05	-55.47	≤-29.95	PASS
11G	Ant1	2412	1000~26500	0.05	-39.8	≤-29.95	PASS
11G	Ant1	2437	0~Reference	-2.36	-2.36	---	PASS
11G	Ant1	2437	30~1000	-2.36	-56.11	≤-32.36	PASS
11G	Ant1	2437	1000~26500	-2.36	-40.04	≤-32.36	PASS
11G	Ant1	2462	0~Reference	0.62	0.62	---	PASS
11G	Ant1	2462	30~1000	0.62	-55.48	≤-29.38	PASS

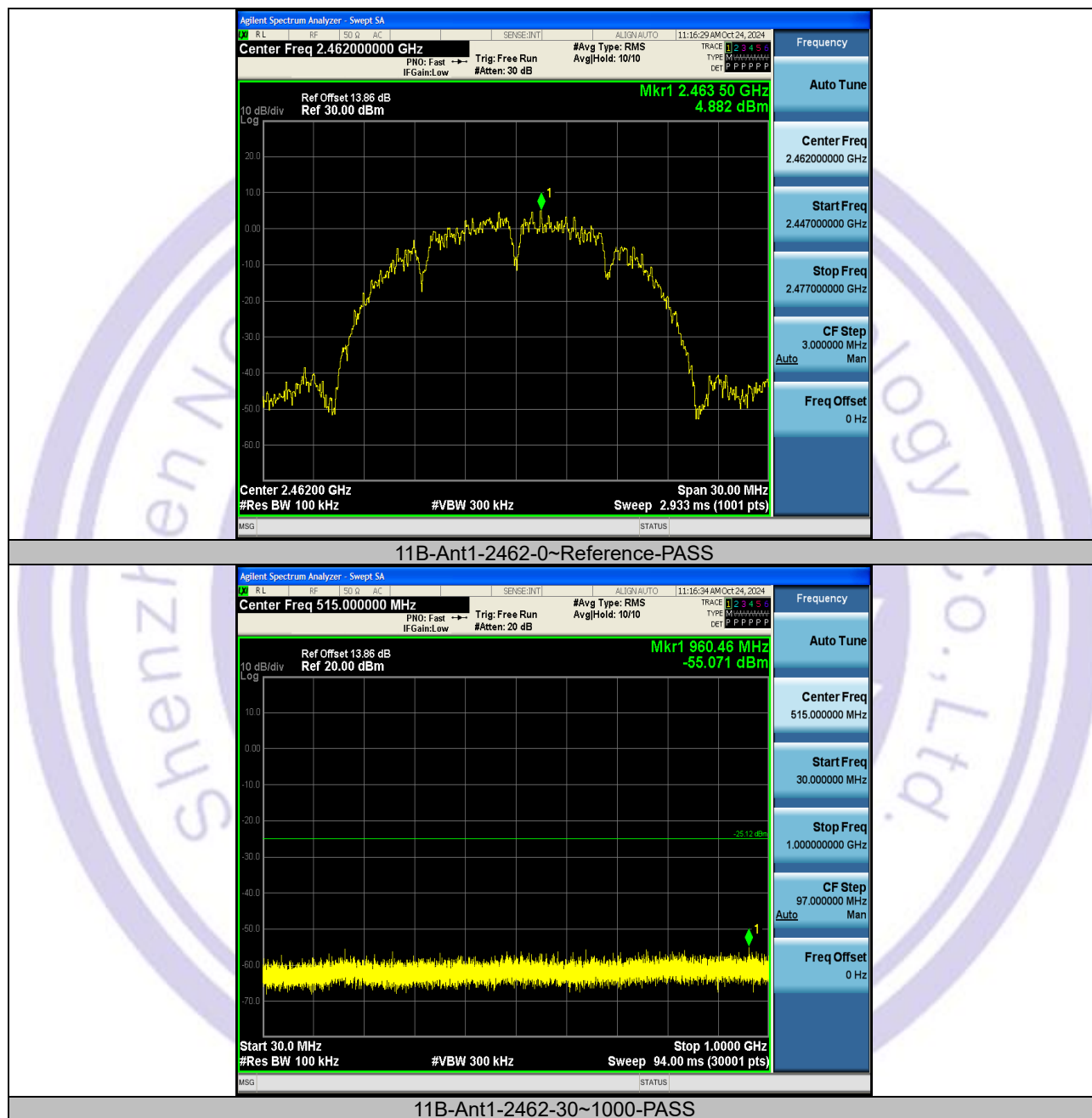
11G	Ant1	2462	1000~26500	0.62	-39.9	≤-29.38	PASS
11N20SISO	Ant1	2412	0~Reference	0.83	0.83	---	PASS
11N20SISO	Ant1	2412	30~1000	0.83	-55.72	≤-29.17	PASS
11N20SISO	Ant1	2412	1000~26500	0.83	-40.62	≤-29.17	PASS
11N20SISO	Ant1	2437	0~Reference	1.45	1.45	---	PASS
11N20SISO	Ant1	2437	30~1000	1.45	-55.94	≤-28.55	PASS
11N20SISO	Ant1	2437	1000~26500	1.45	-40.26	≤-28.55	PASS
11N20SISO	Ant1	2462	0~Reference	-1.00	-1.00	---	PASS
11N20SISO	Ant1	2462	30~1000	-1.00	-55.39	≤-31	PASS
11N20SISO	Ant1	2462	1000~26500	-1.00	-39.77	≤-31	PASS
11N40SISO	Ant1	2422	0~Reference	-2.09	-2.09	---	PASS
11N40SISO	Ant1	2422	30~1000	-2.09	-55.76	≤-32.09	PASS
11N40SISO	Ant1	2422	1000~26500	-2.09	-39.95	≤-32.09	PASS
11N40SISO	Ant1	2437	0~Reference	-1.29	-1.29	---	PASS
11N40SISO	Ant1	2437	30~1000	-1.29	-55.68	≤-31.29	PASS
11N40SISO	Ant1	2437	1000~26500	-1.29	-40.55	≤-31.29	PASS
11N40SISO	Ant1	2452	0~Reference	-3.48	-3.48	---	PASS
11N40SISO	Ant1	2452	30~1000	-3.48	-55.44	≤-33.48	PASS
11N40SISO	Ant1	2452	1000~26500	-3.48	-40.16	≤-33.48	PASS

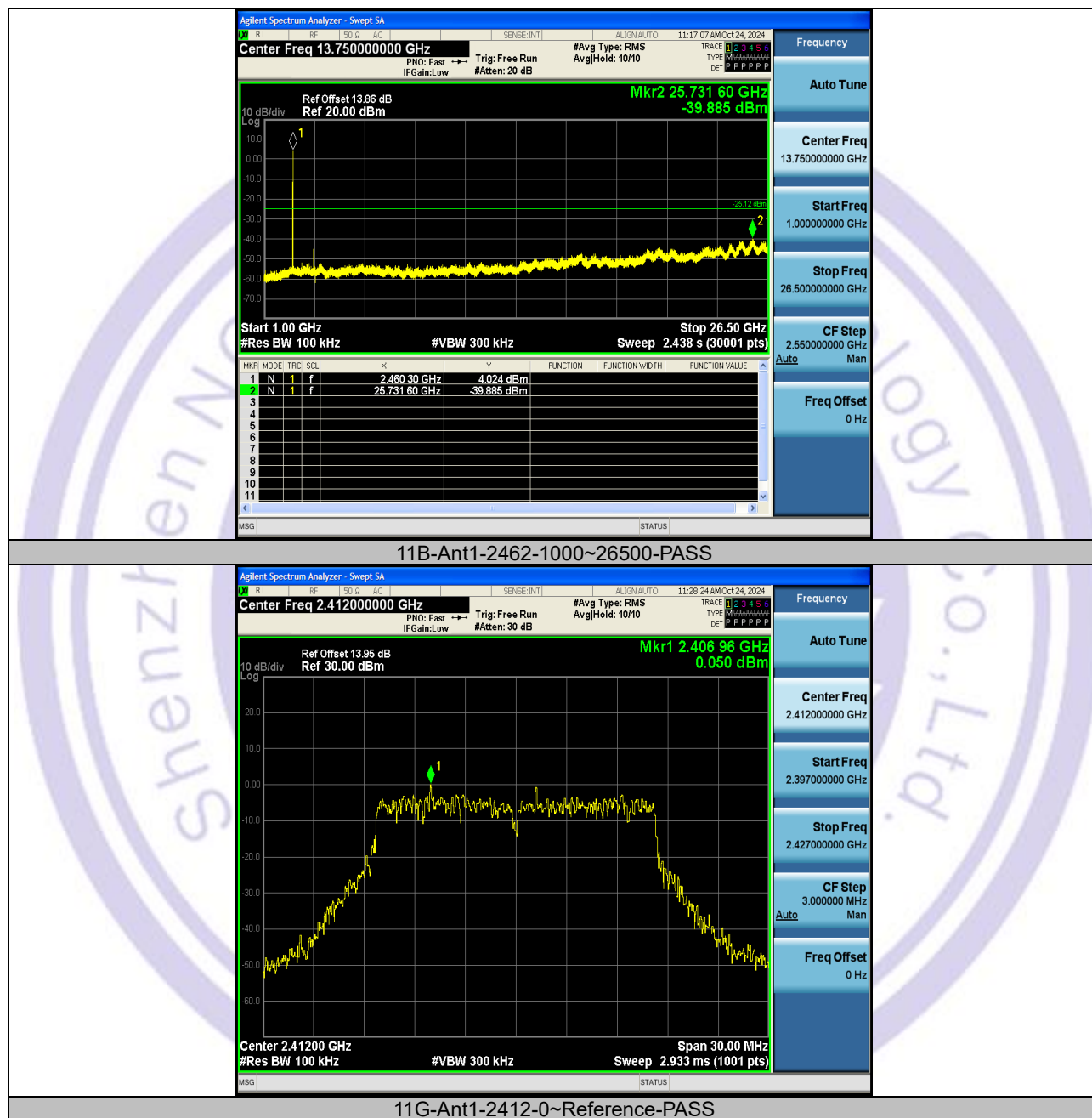
Test Graphs:

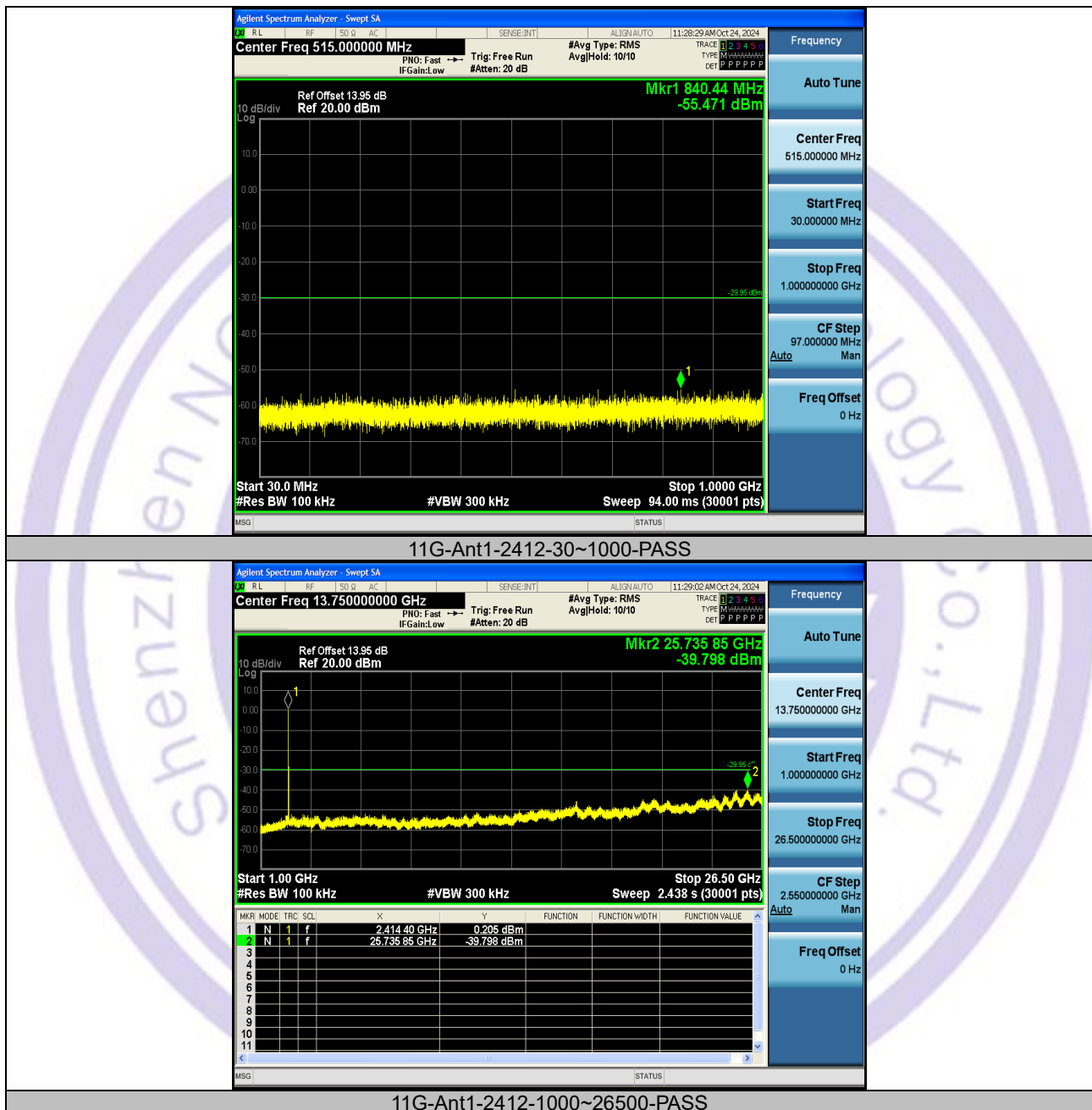


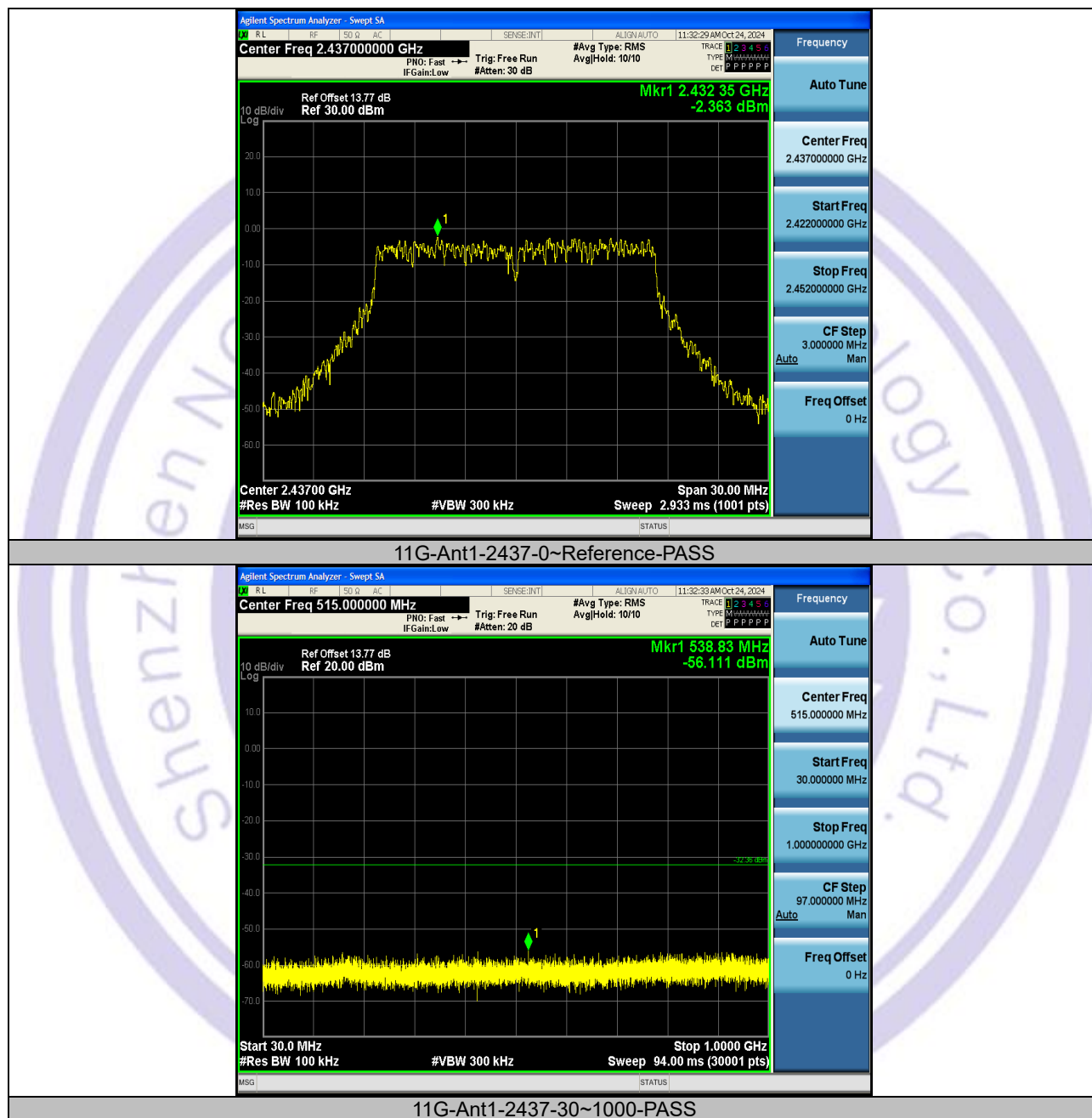




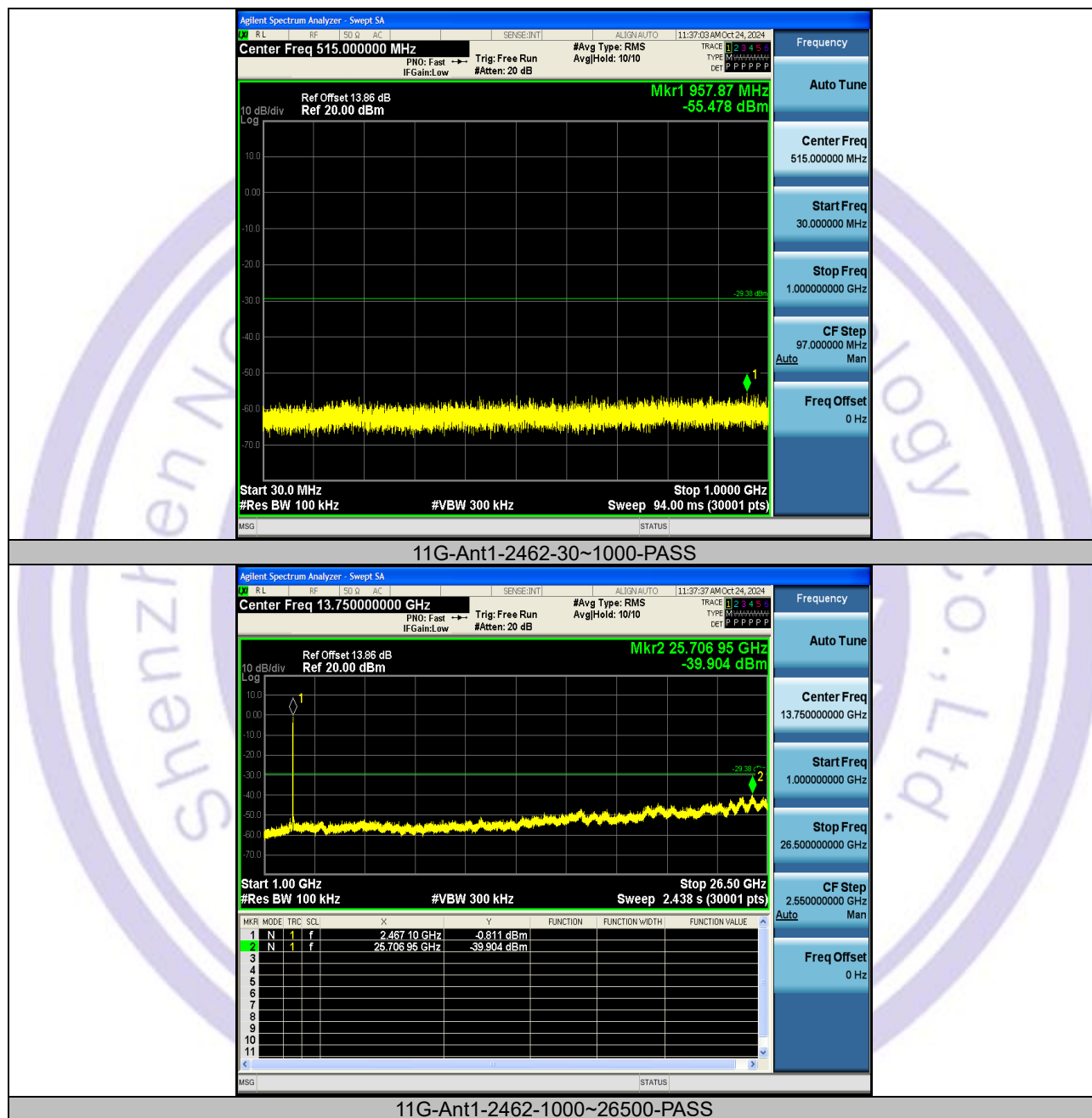


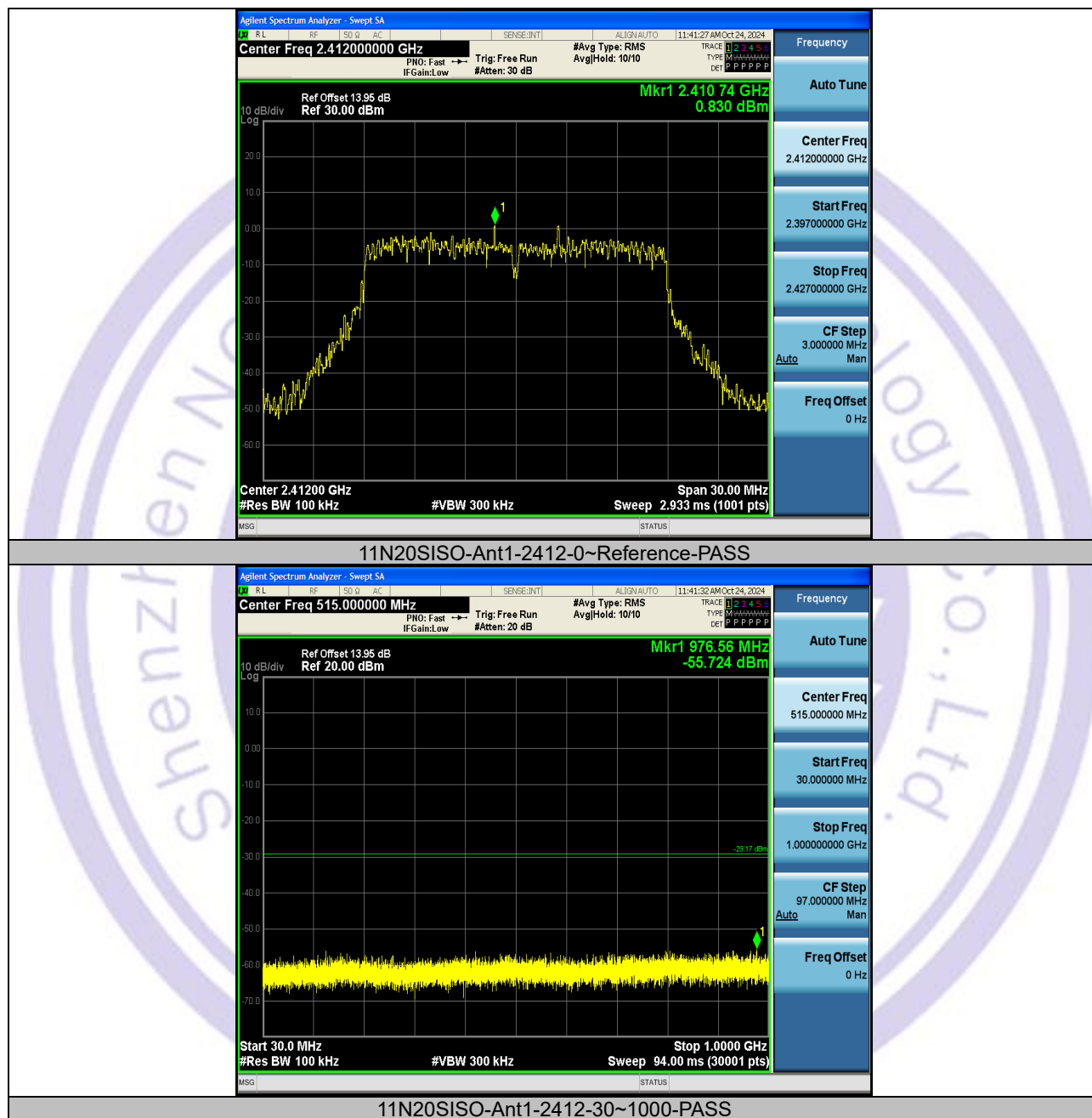


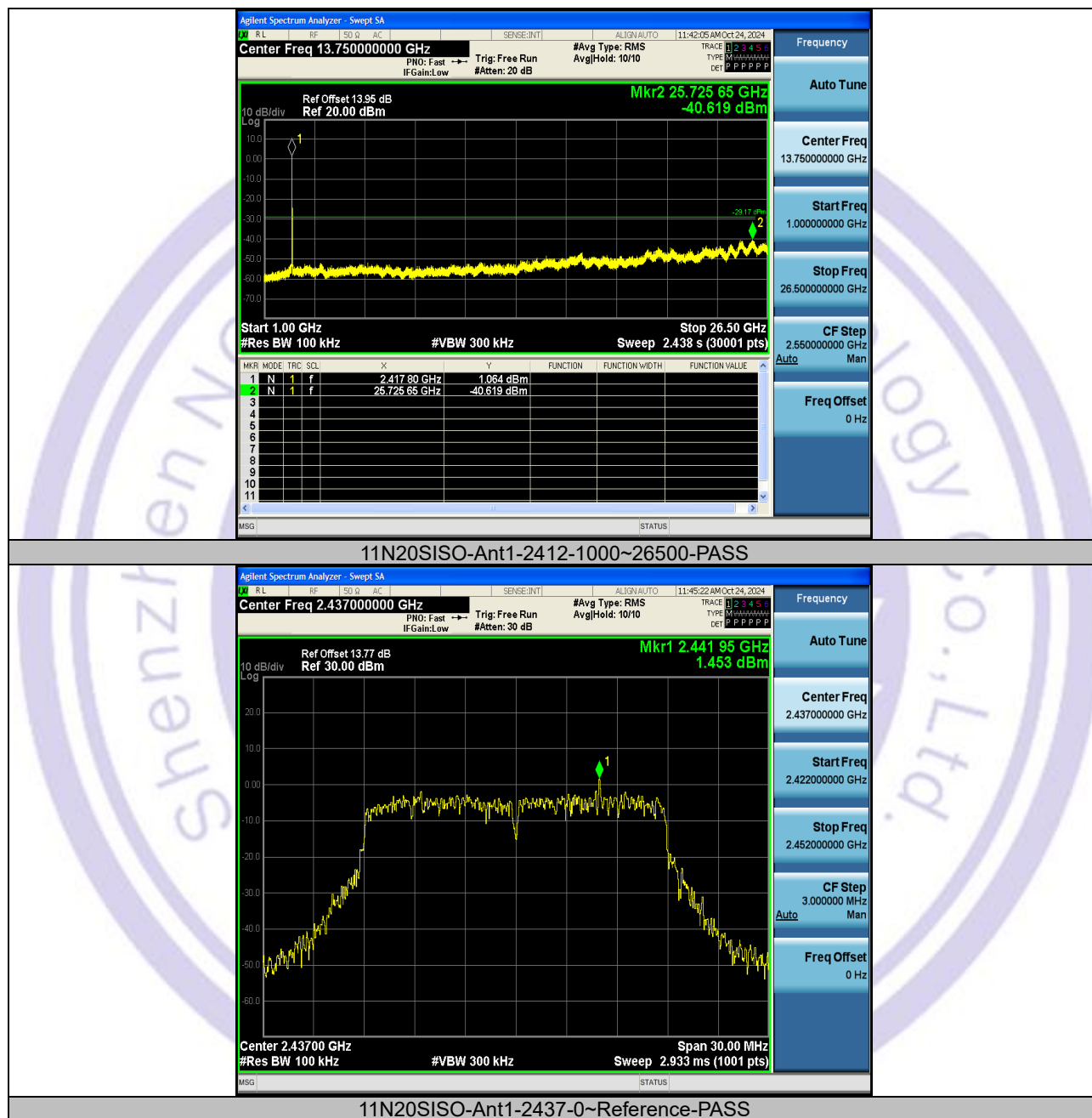


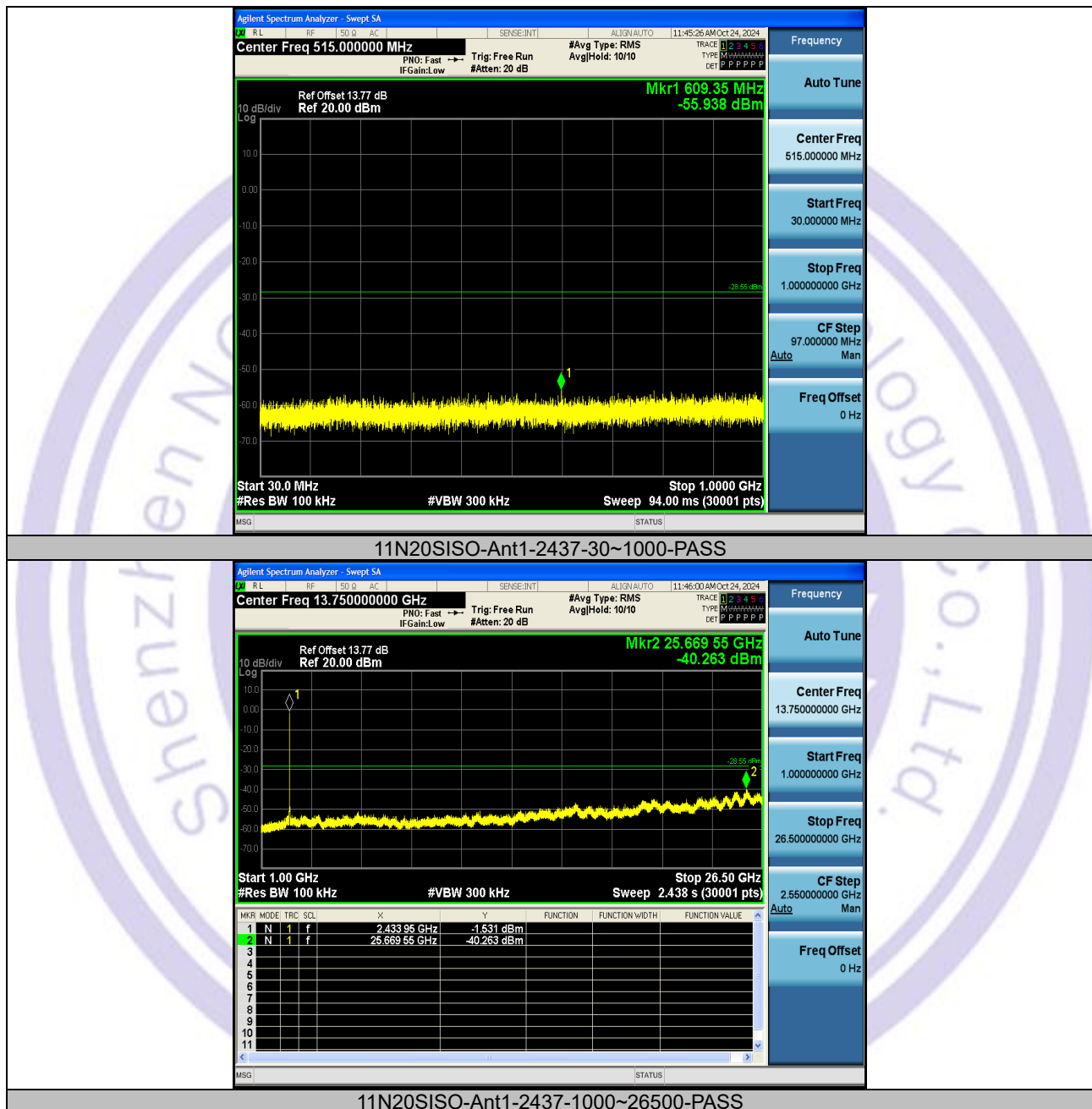


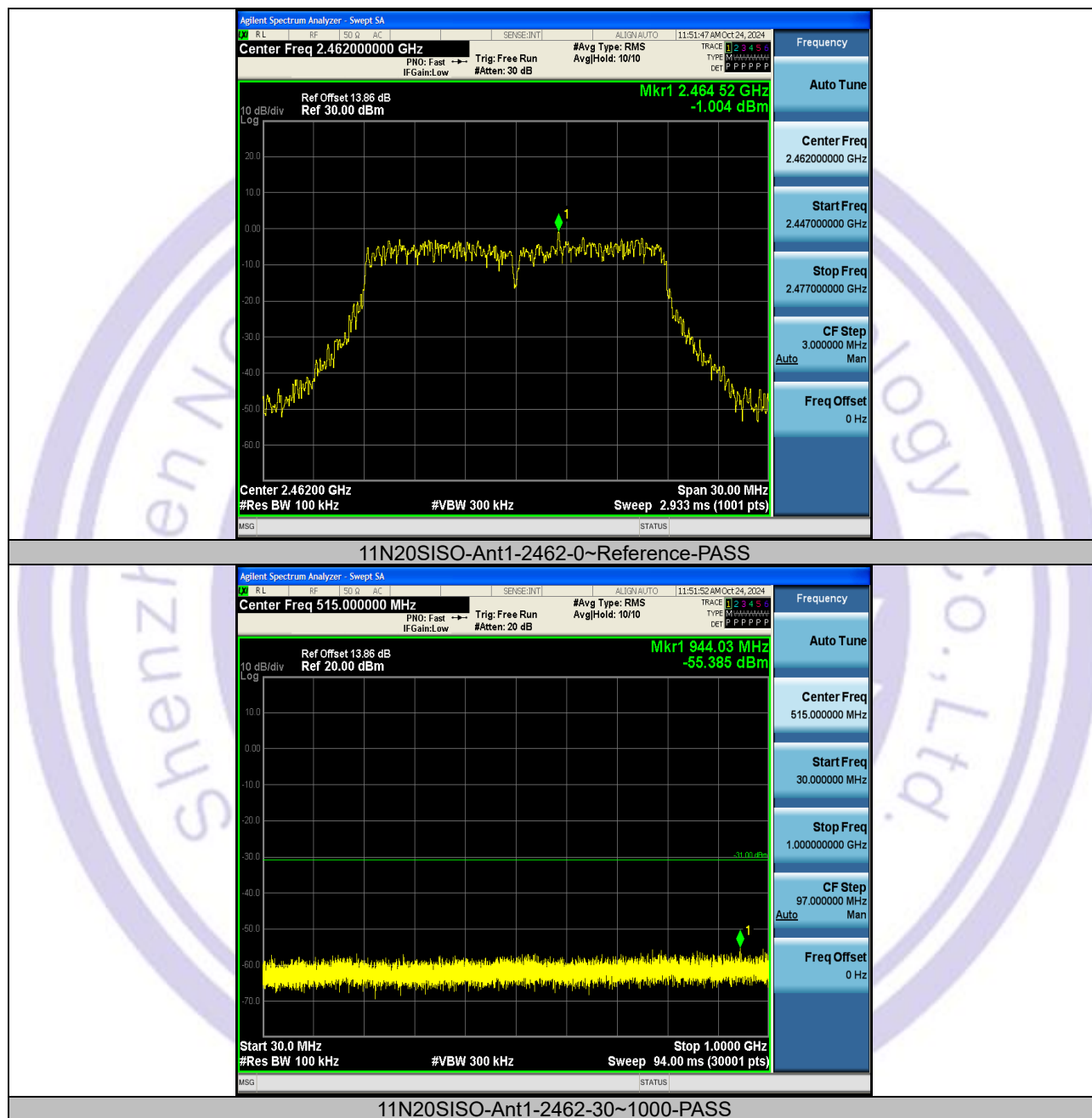


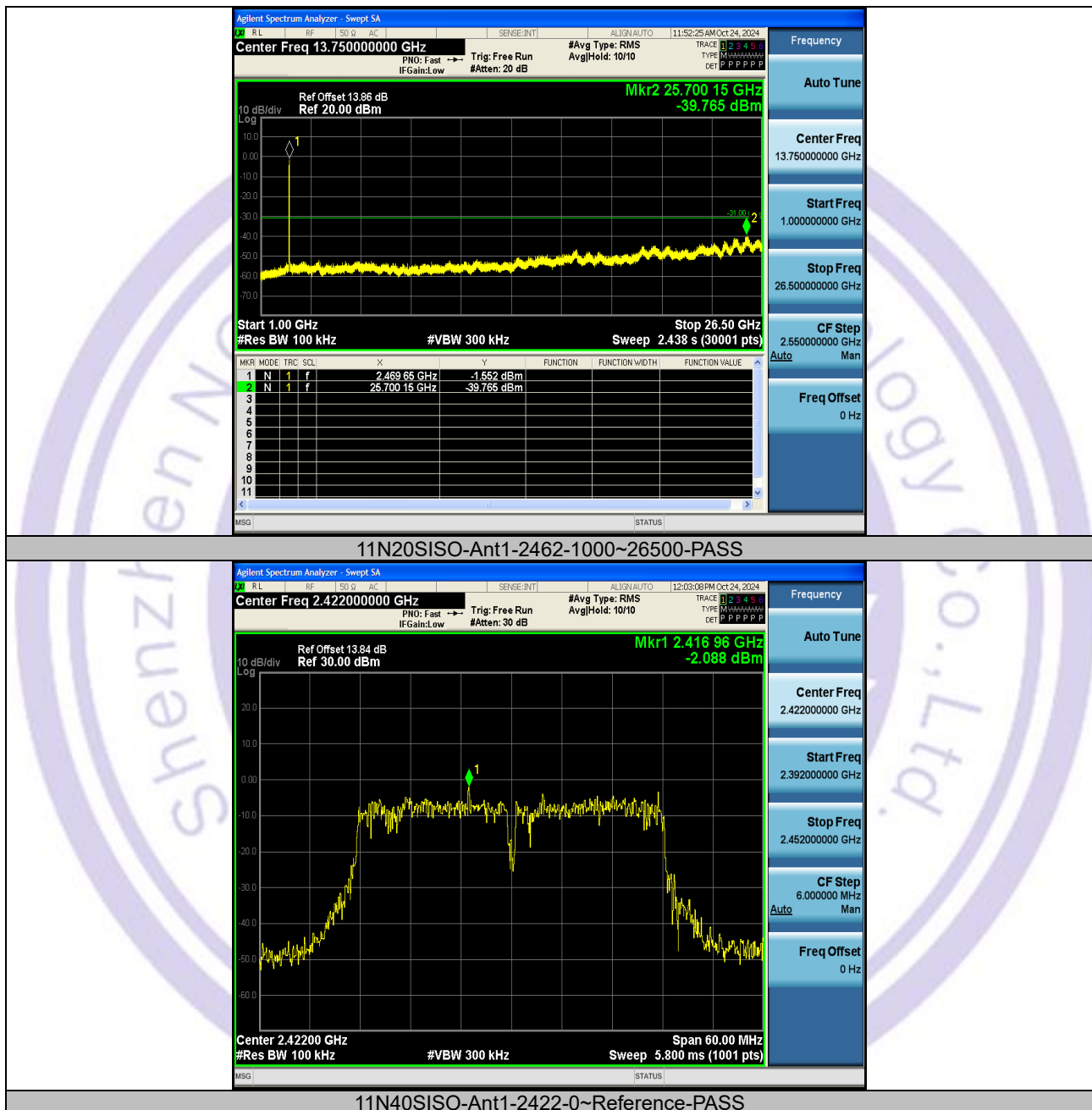


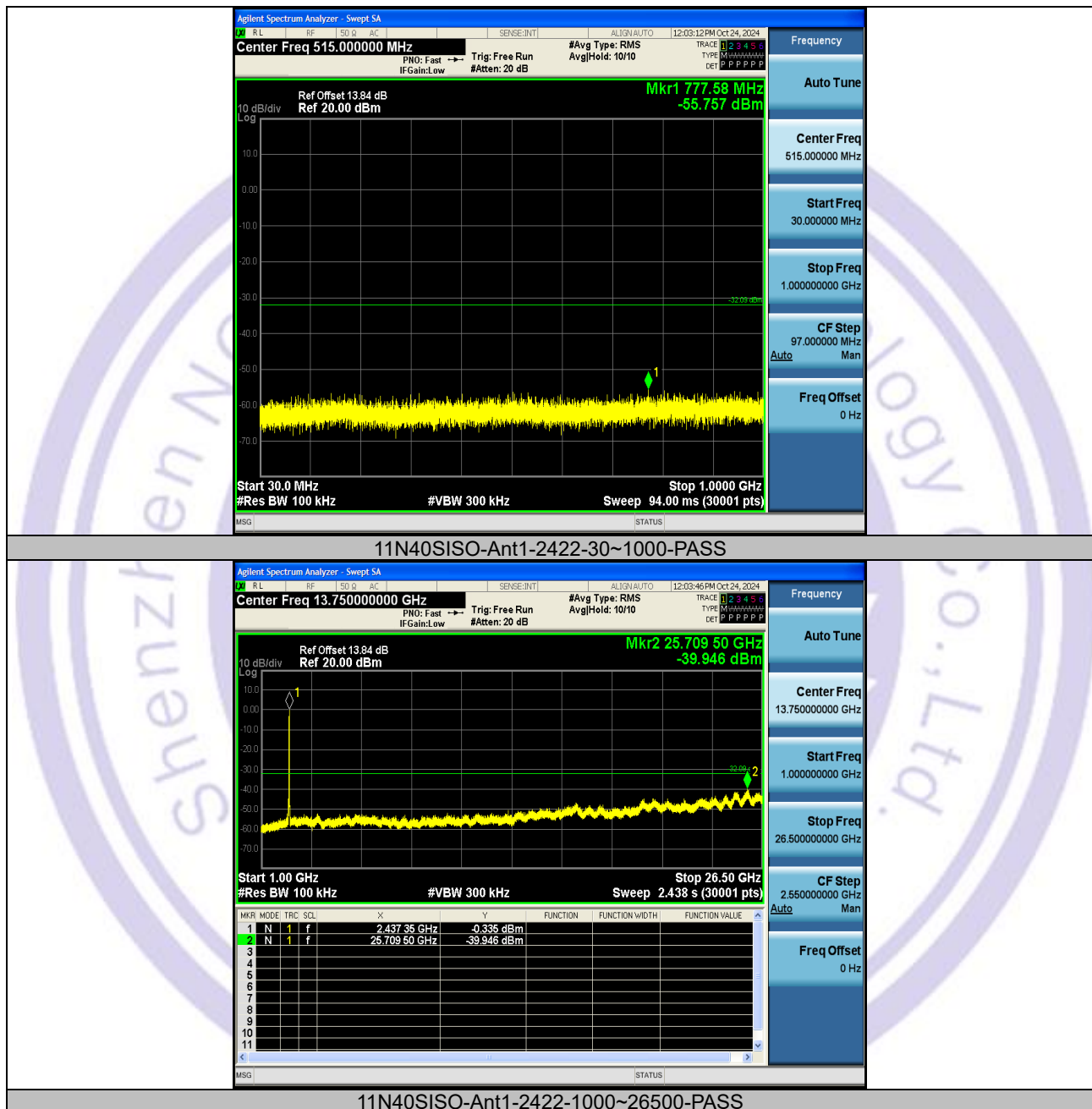


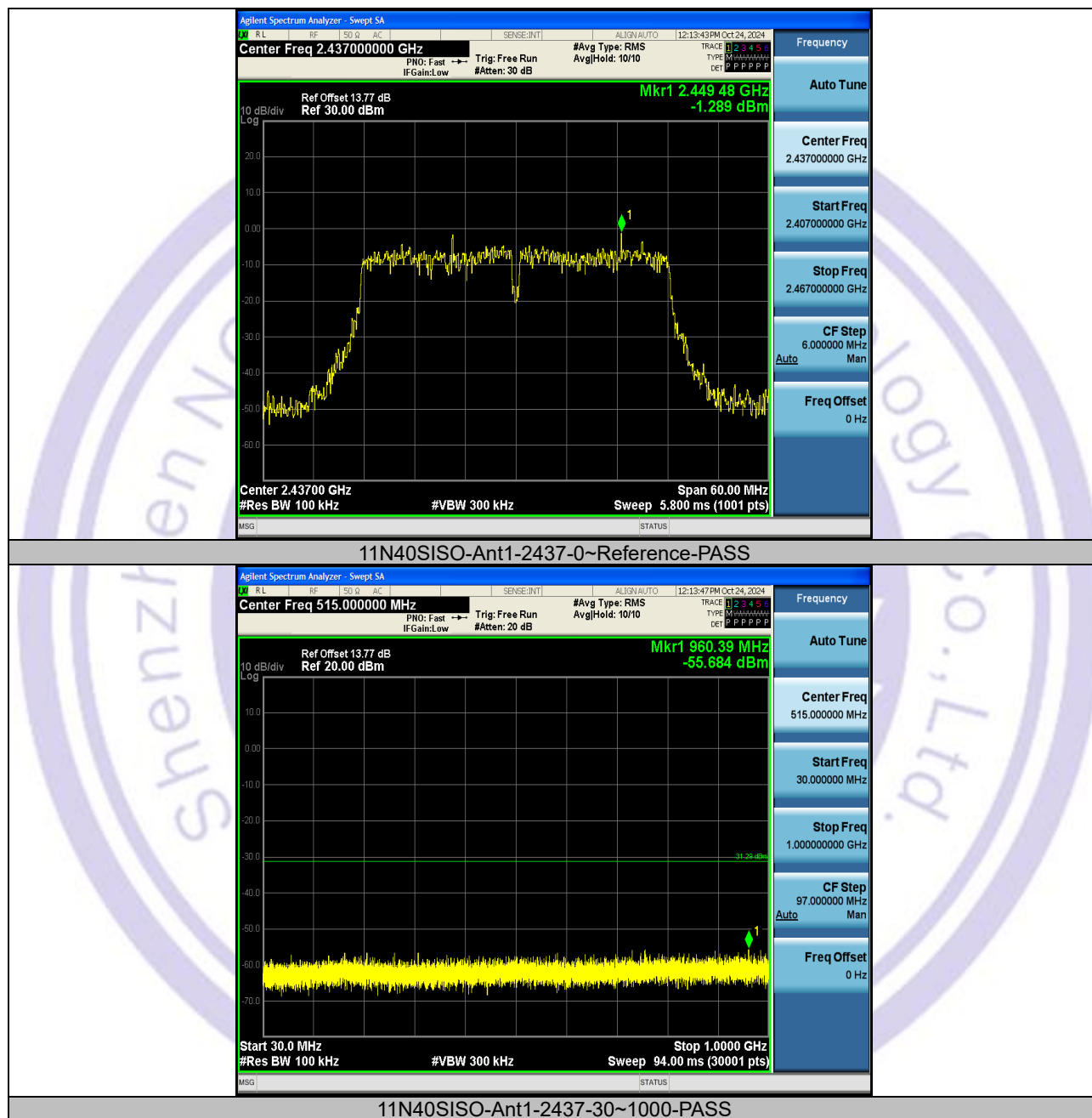


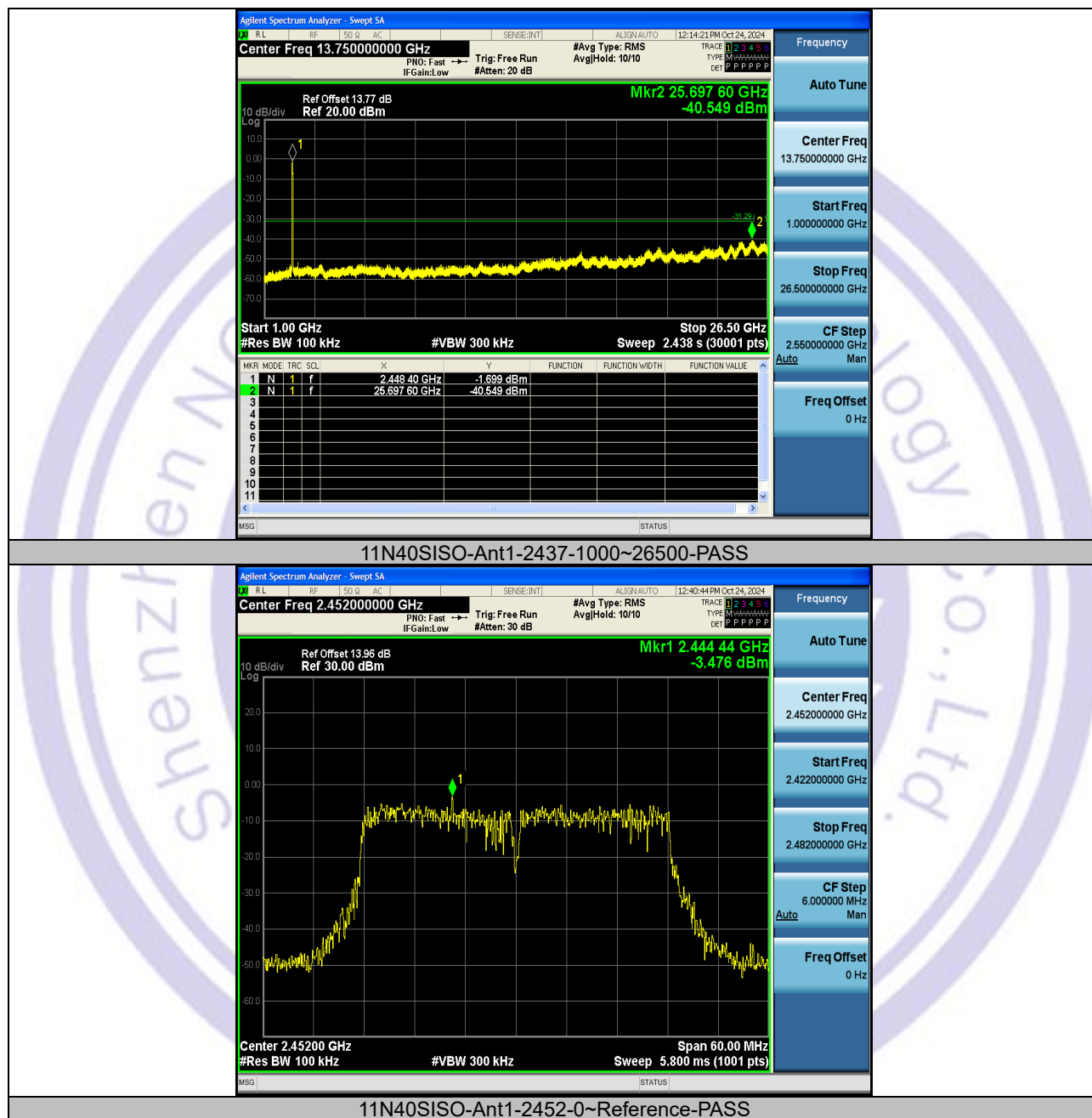


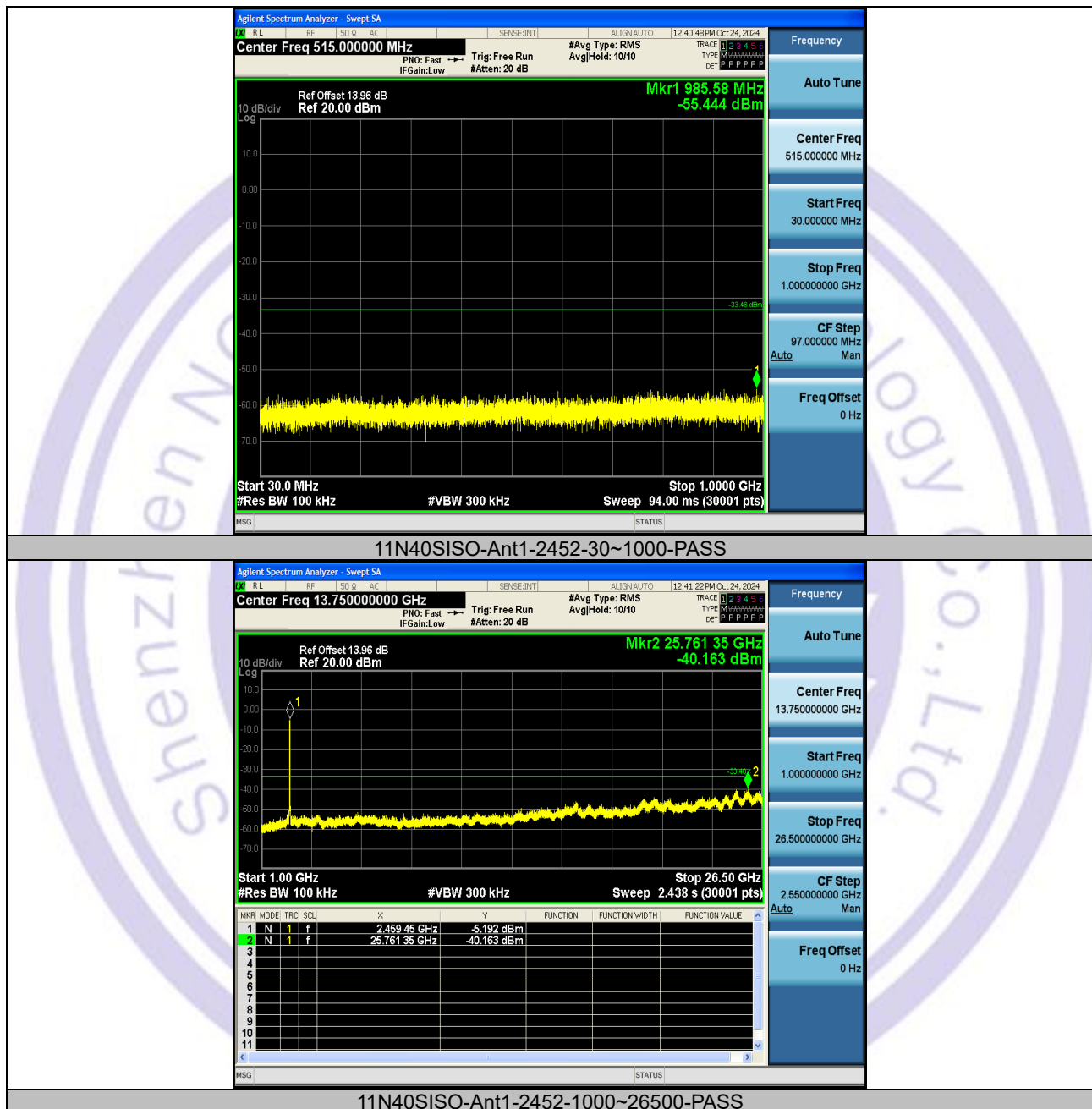












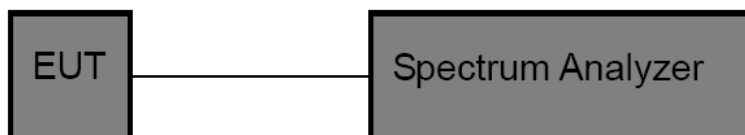
8 Band Edge Measurement

- Test Requirement : Section 15.247(d) In addition, radiated emissions which fall in the restricted bands, as defined in Section 15.205(a), must also comply with the radiated emission limits specified in Section 15.209(a) (see Section 15.205(c)).
- Test Method : ANSI C63.10:2013
- Test Limit : Regulation 15.247 (d), In any 100 kHz bandwidth outside the frequency band in which the spread spectrum or digitally modulated intentional radiator is operating, the radio frequency power that is produced by the intentional radiator shall be at least 20 dB below that in the 100 kHz bandwidth within the band that contains the highest level of the desired power, based on either an RF conducted or a radiated measurement, provided the transmitter demonstrates compliance with the peak conducted power limits. If the transmitter complies with the conducted power limits based on the use of RMS averaging over a time interval, as permitted under paragraph (b)(3) of this section, the attenuation required under this paragraph shall be 30 dB instead of 20 dB. Attenuation below the general limits specified in §15.209(a) is not required. In addition, 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)).

8.1 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz, Sweep = auto
Detector function = peak, Trace = max hold

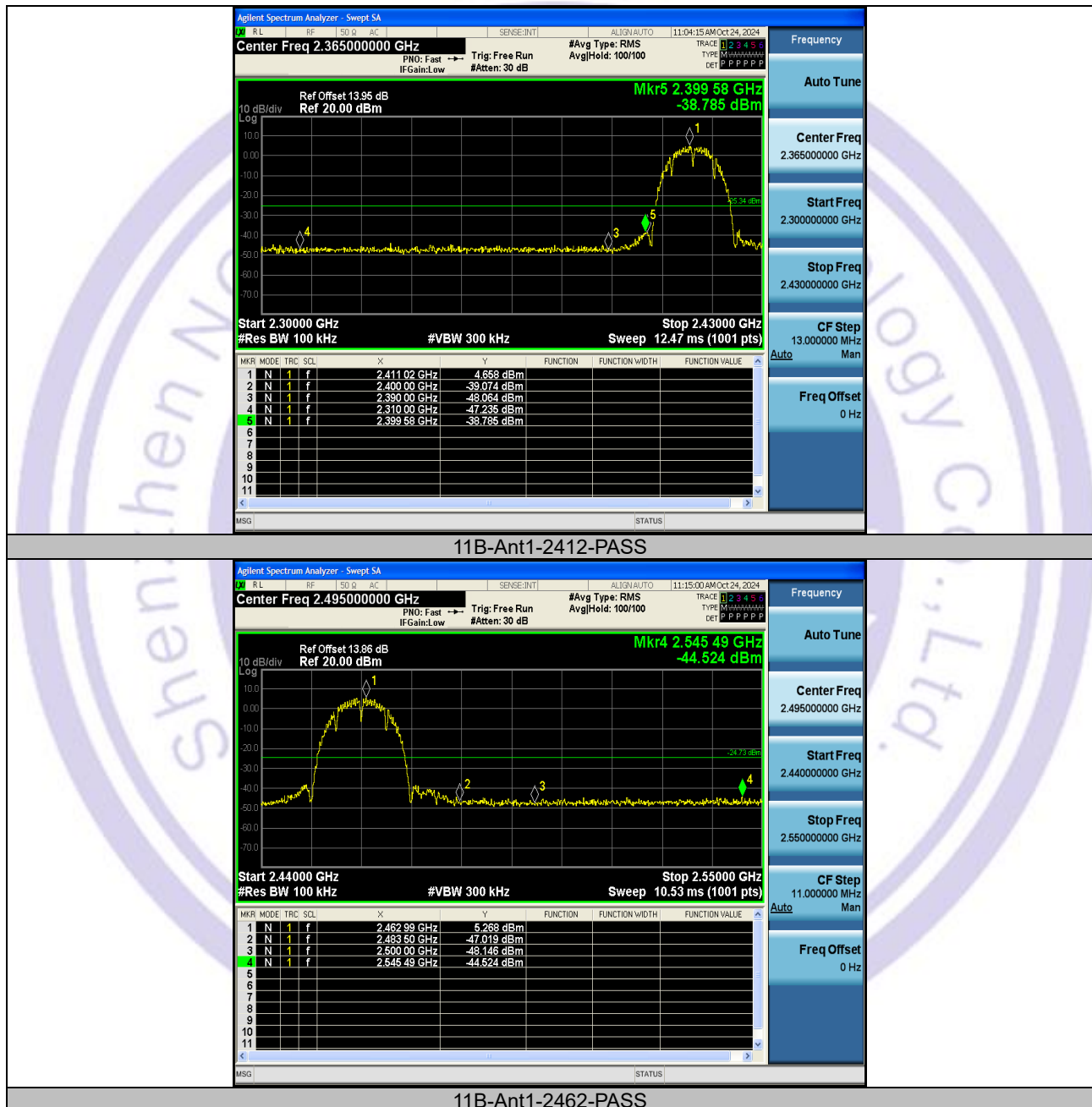
8.2 Test Setup

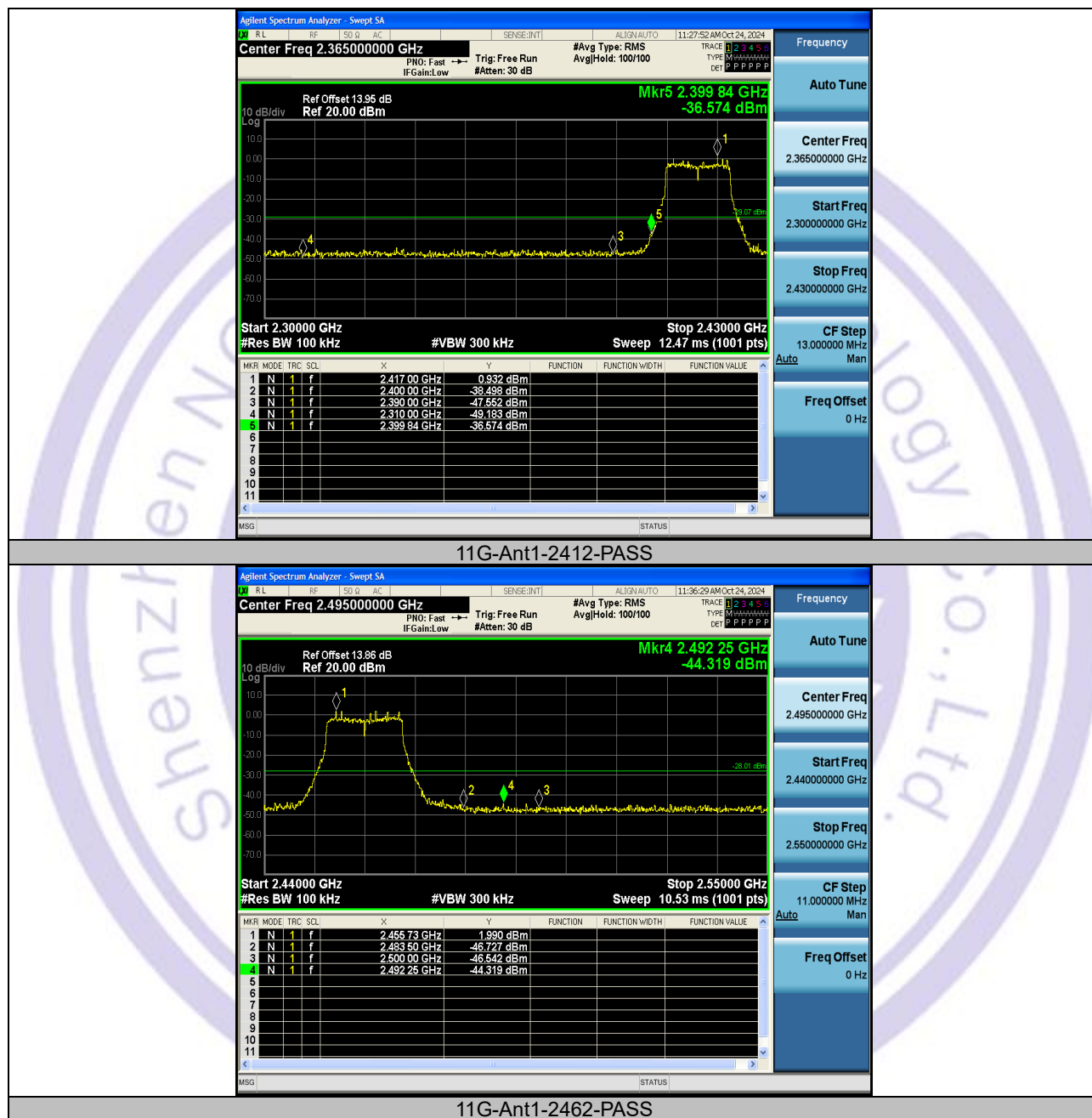


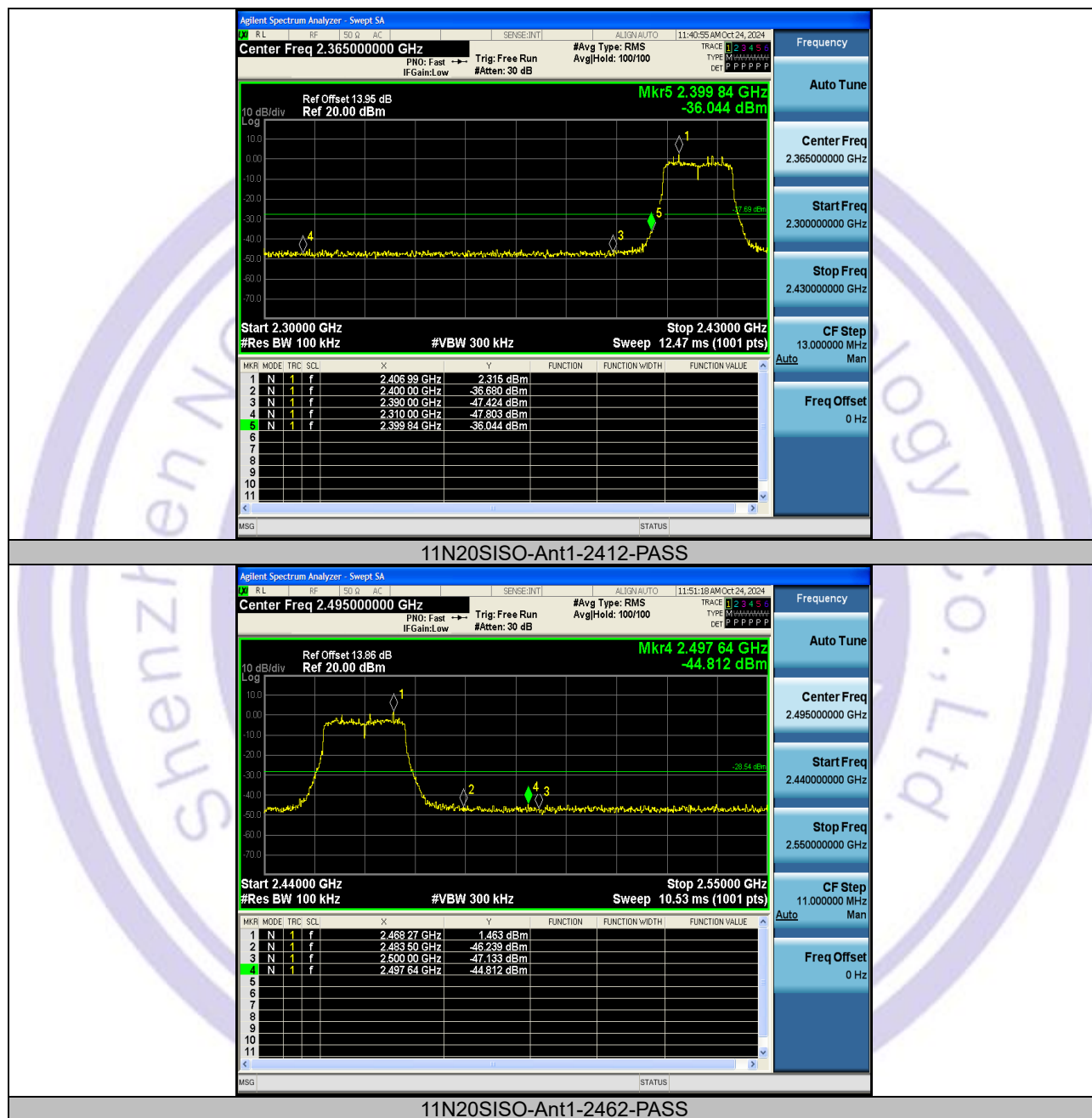
8.3 Test Result

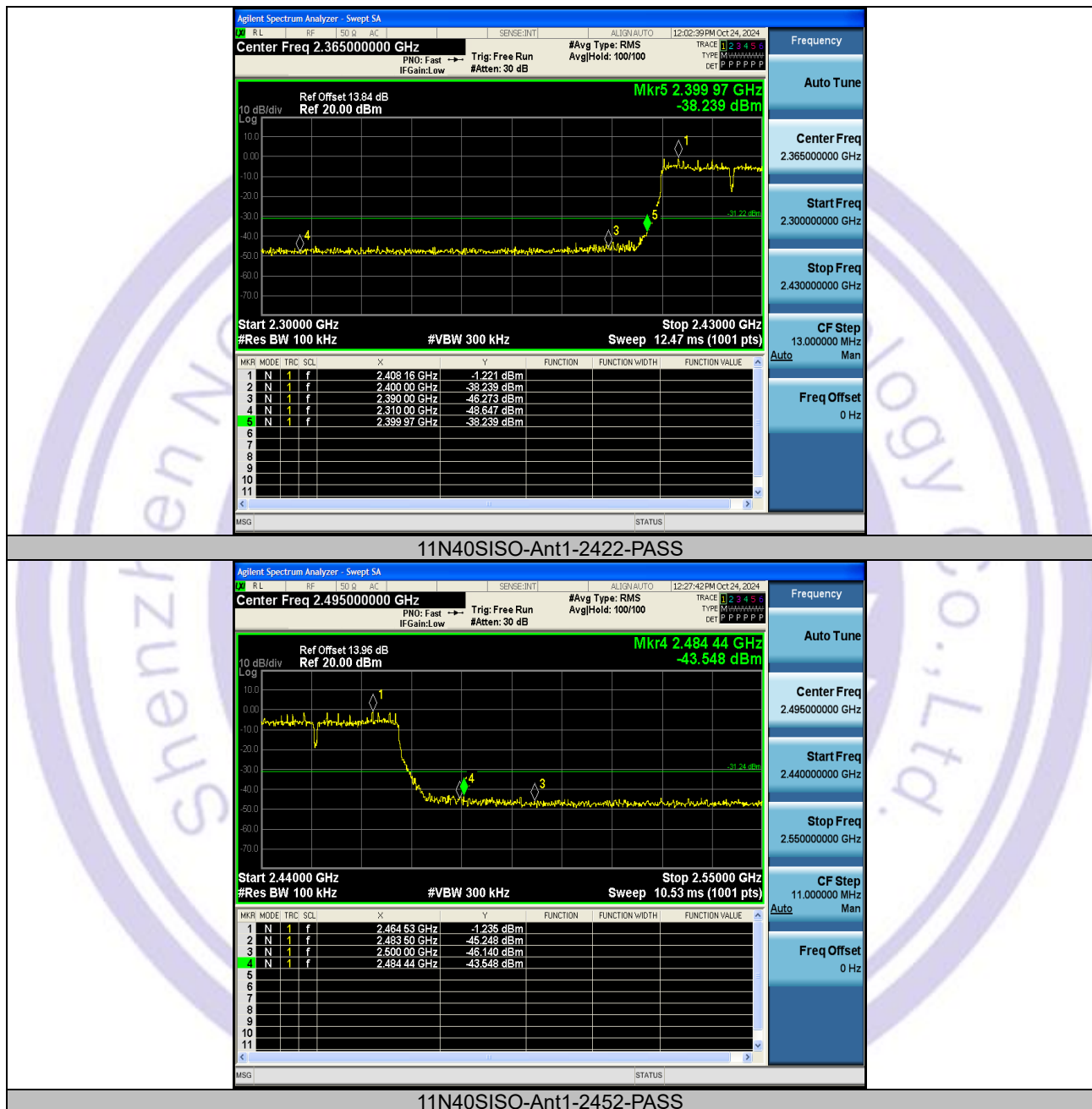
TestMode	Antenna	ChName	Frequency[MHz]	RefLevel[dBm]	Result[dBm]	Limit[dBm]	Verdict
11B	Ant1	Low	2412	4.66	-38.79	≤-25.34	PASS
11B	Ant1	High	2462	5.27	-44.52	≤-24.73	PASS
11G	Ant1	Low	2412	0.93	-36.57	≤-29.07	PASS
11G	Ant1	High	2462	1.99	-44.32	≤-28.01	PASS
11N20SISO	Ant1	Low	2412	2.32	-36.04	≤-27.69	PASS
11N20SISO	Ant1	High	2462	1.46	-44.81	≤-28.54	PASS
11N40SISO	Ant1	Low	2422	-1.22	-38.24	≤-31.22	PASS
11N40SISO	Ant1	High	2452	-1.24	-43.55	≤-31.24	PASS

Test Graphs:









9 6dB Bandwidth Measurement

Test Requirement : FCC CFR47 Part 15 Section 15.247

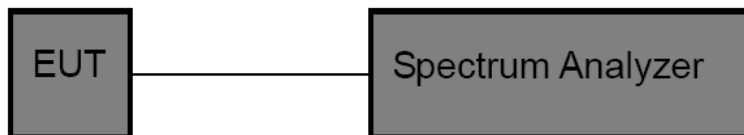
Test Method : ANSI C63.10:2013

Test Limit Systems using digital modulation techniques may operate in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands. The minimum 6 dB bandwidth shall be at least 500 kHz.

9.1 Test Procedure

1. Remove the antenna from the EUT and then connect a low RF cable from the antenna port to the spectrum;
2. Set the spectrum analyzer: RBW = 100kHz, VBW = 300kHz

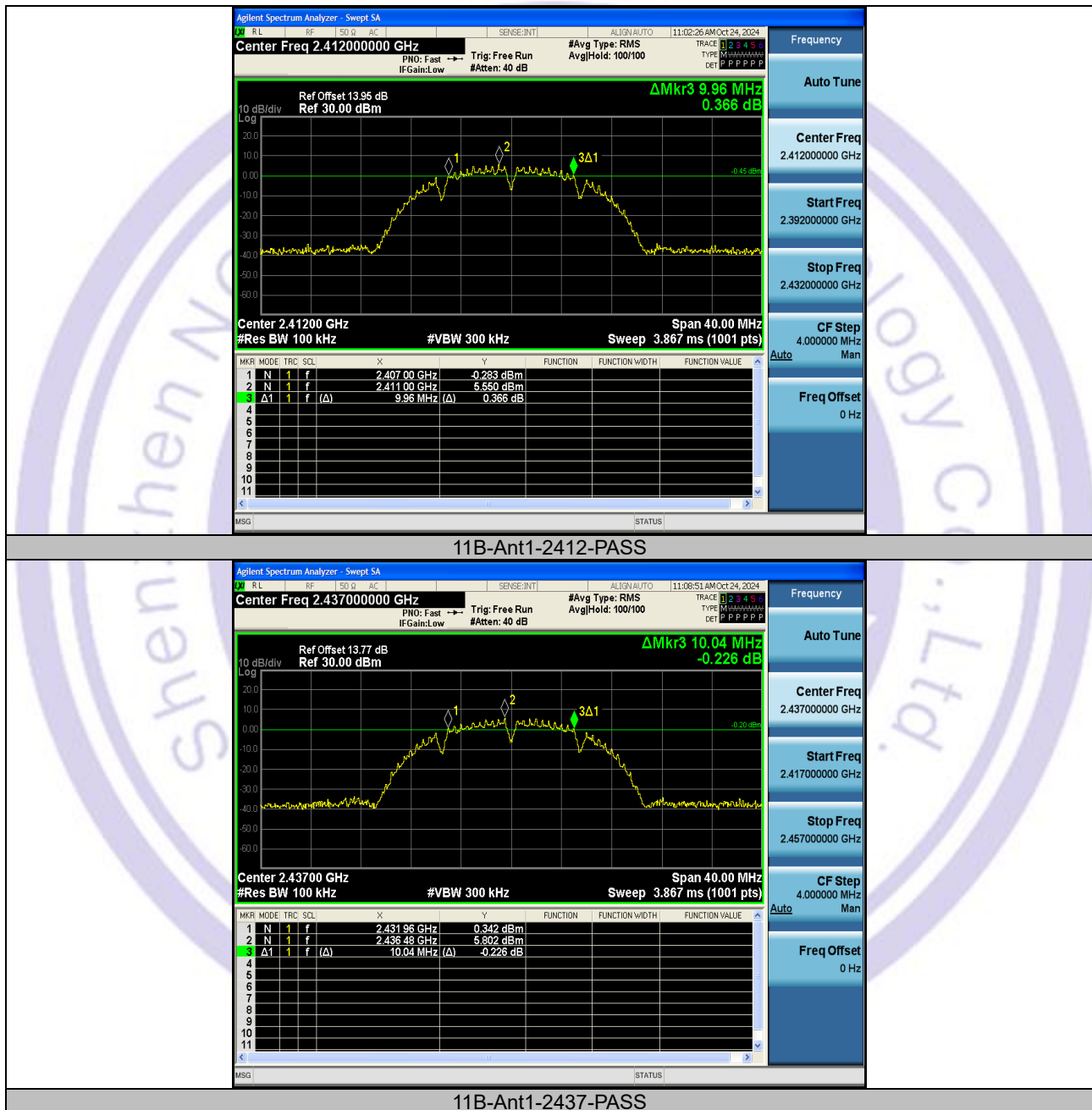
9.2 Test Setup

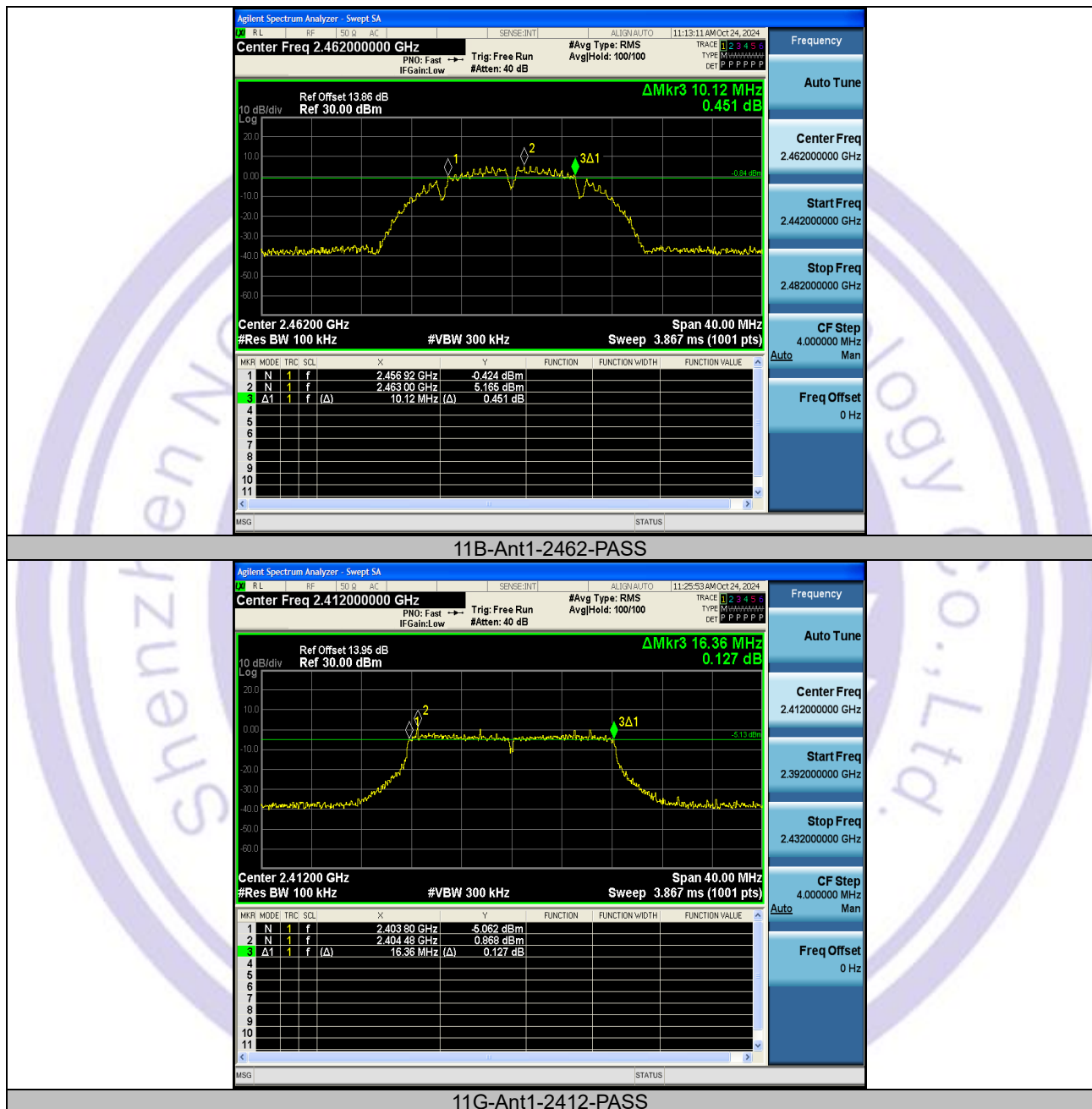


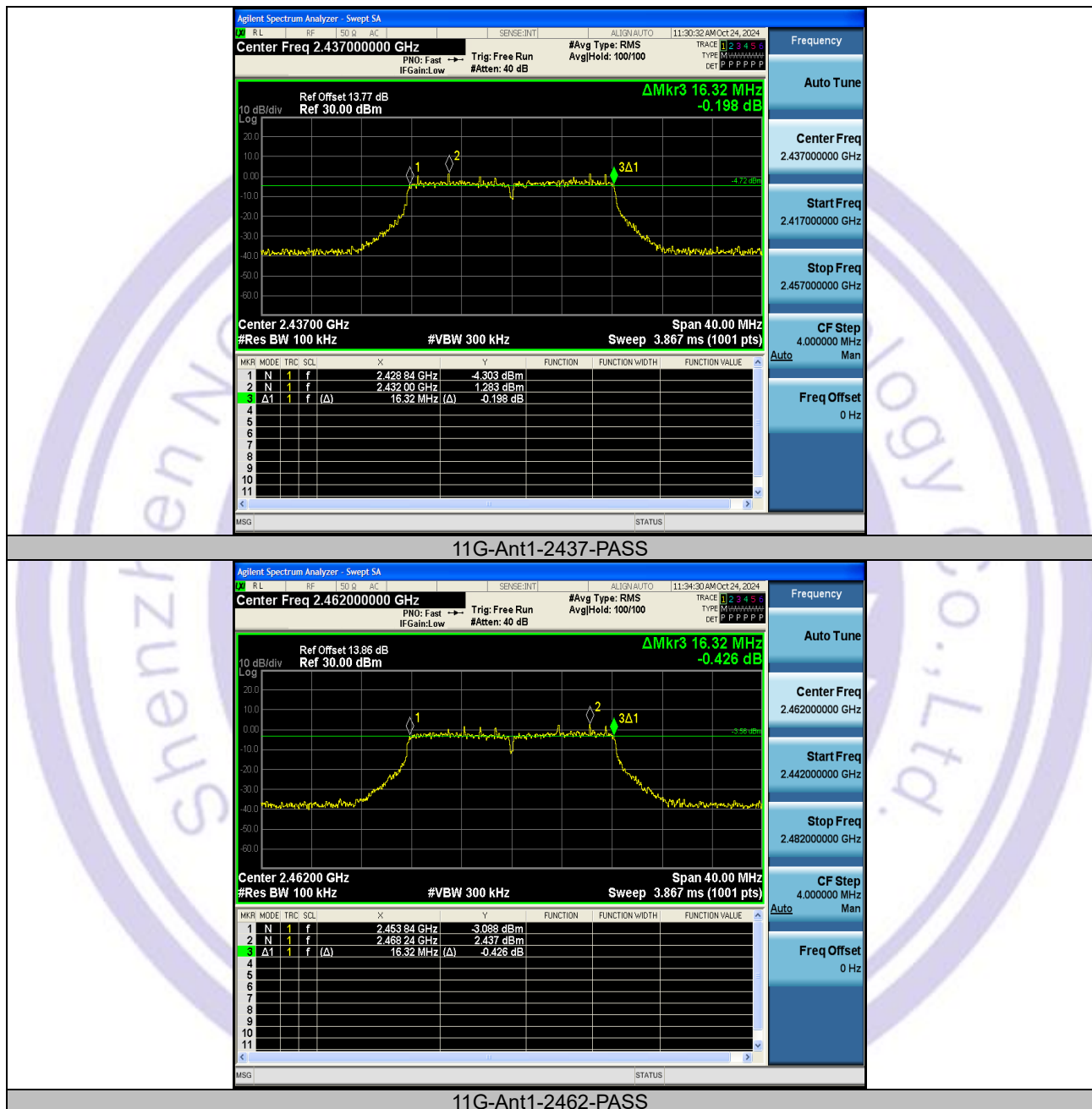
9.3 Test Result

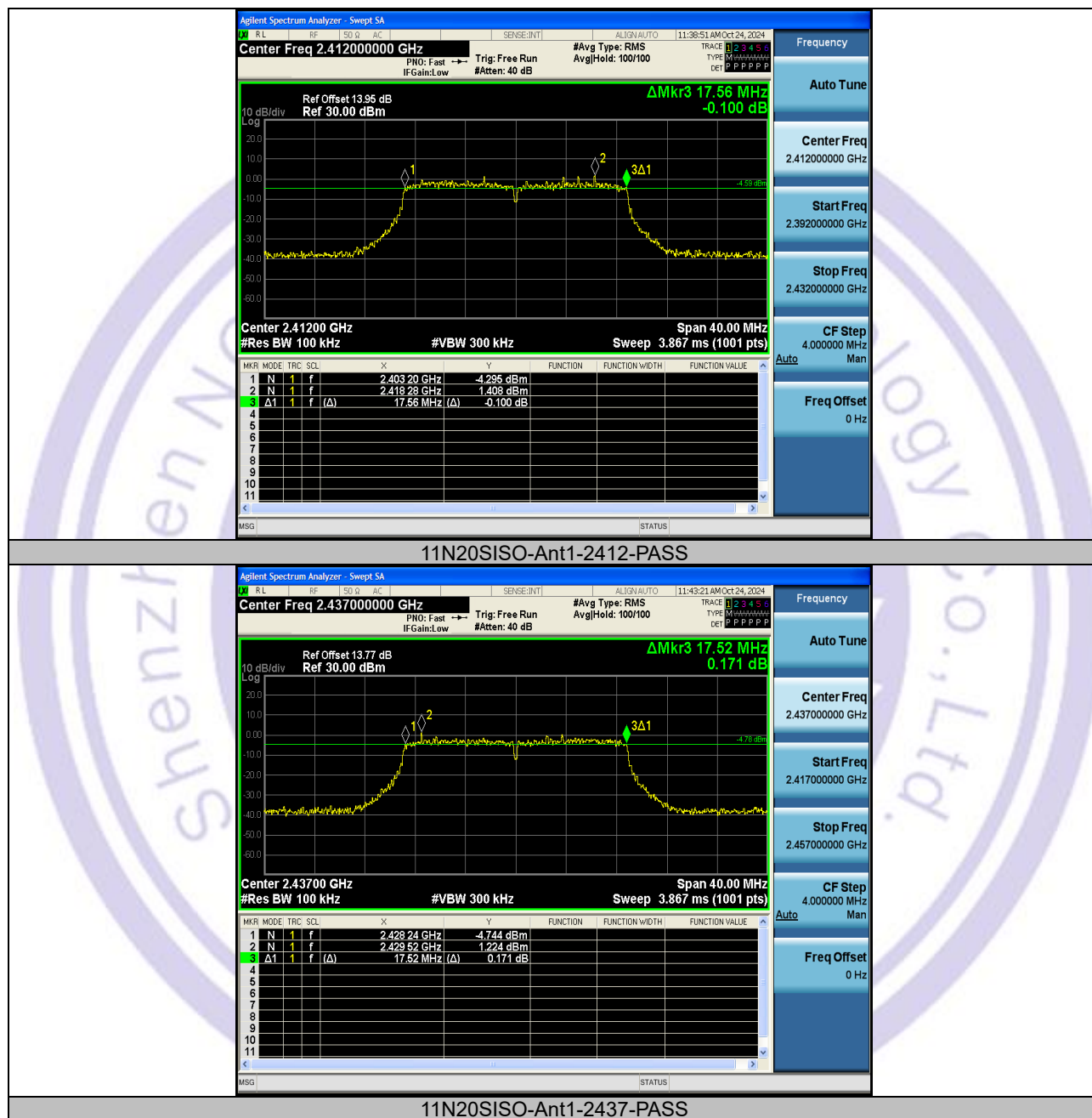
TestMode	Antenna	Frequency[MHz]	DTS BW [MHz]	FL[MHz]	FH[MHz]	Limit[MHz]	Verdict
11B	Ant1	2412	9.960	2407.000	2416.960	0.5	PASS
11B	Ant1	2437	10.040	2431.960	2442.000	0.5	PASS
11B	Ant1	2462	10.120	2456.920	2467.040	0.5	PASS
11G	Ant1	2412	16.360	2403.800	2420.160	0.5	PASS
11G	Ant1	2437	16.320	2428.840	2445.160	0.5	PASS
11G	Ant1	2462	16.320	2453.840	2470.160	0.5	PASS
11N20SISO	Ant1	2412	17.560	2403.200	2420.760	0.5	PASS
11N20SISO	Ant1	2437	17.520	2428.240	2445.760	0.5	PASS
11N20SISO	Ant1	2462	17.040	2453.480	2470.520	0.5	PASS
11N40SISO	Ant1	2422	35.280	2404.400	2439.680	0.5	PASS
11N40SISO	Ant1	2437	35.440	2419.400	2454.840	0.5	PASS
11N40SISO	Ant1	2452	35.760	2434.080	2469.840	0.5	PASS

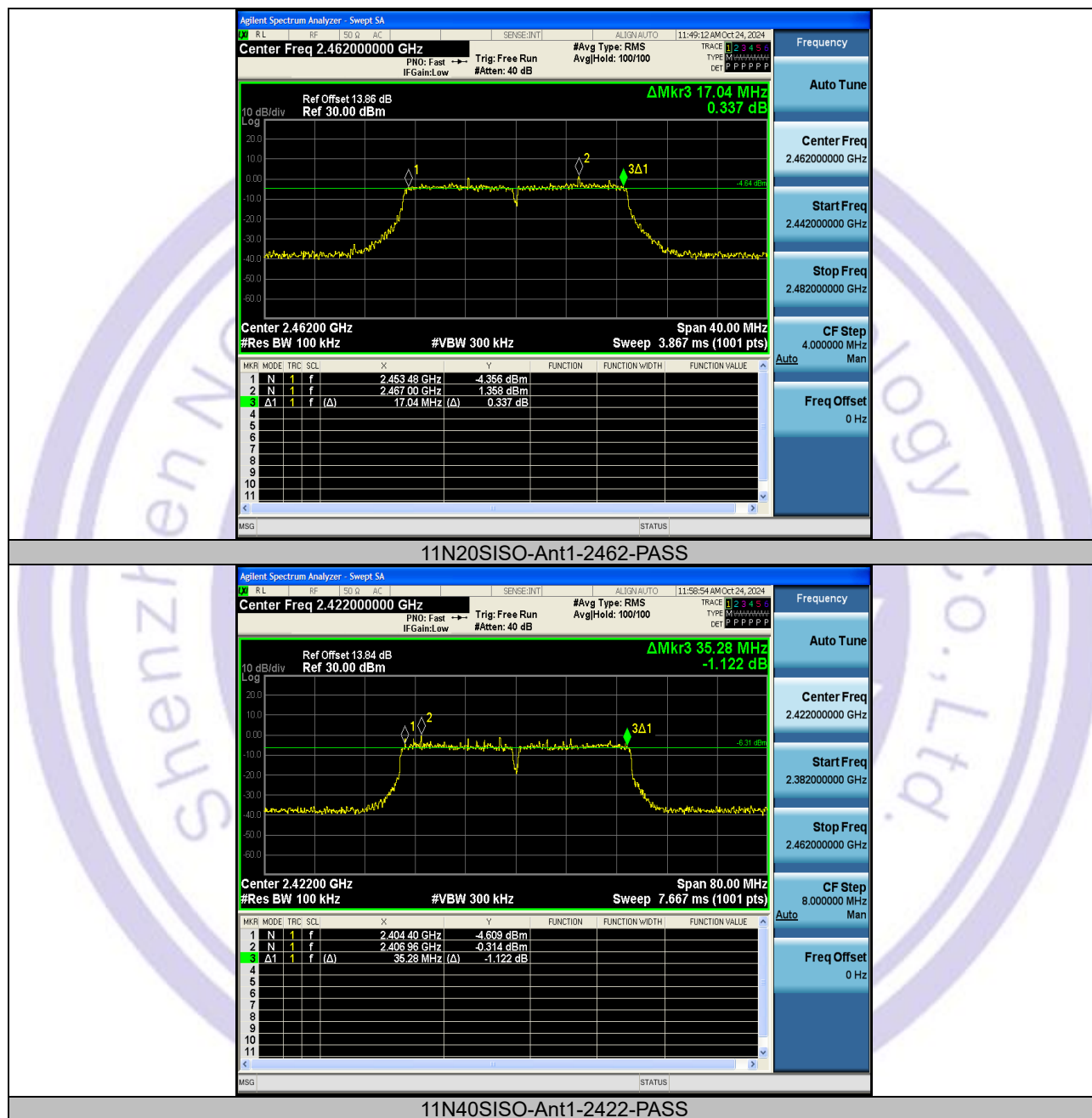
Test Graphs:

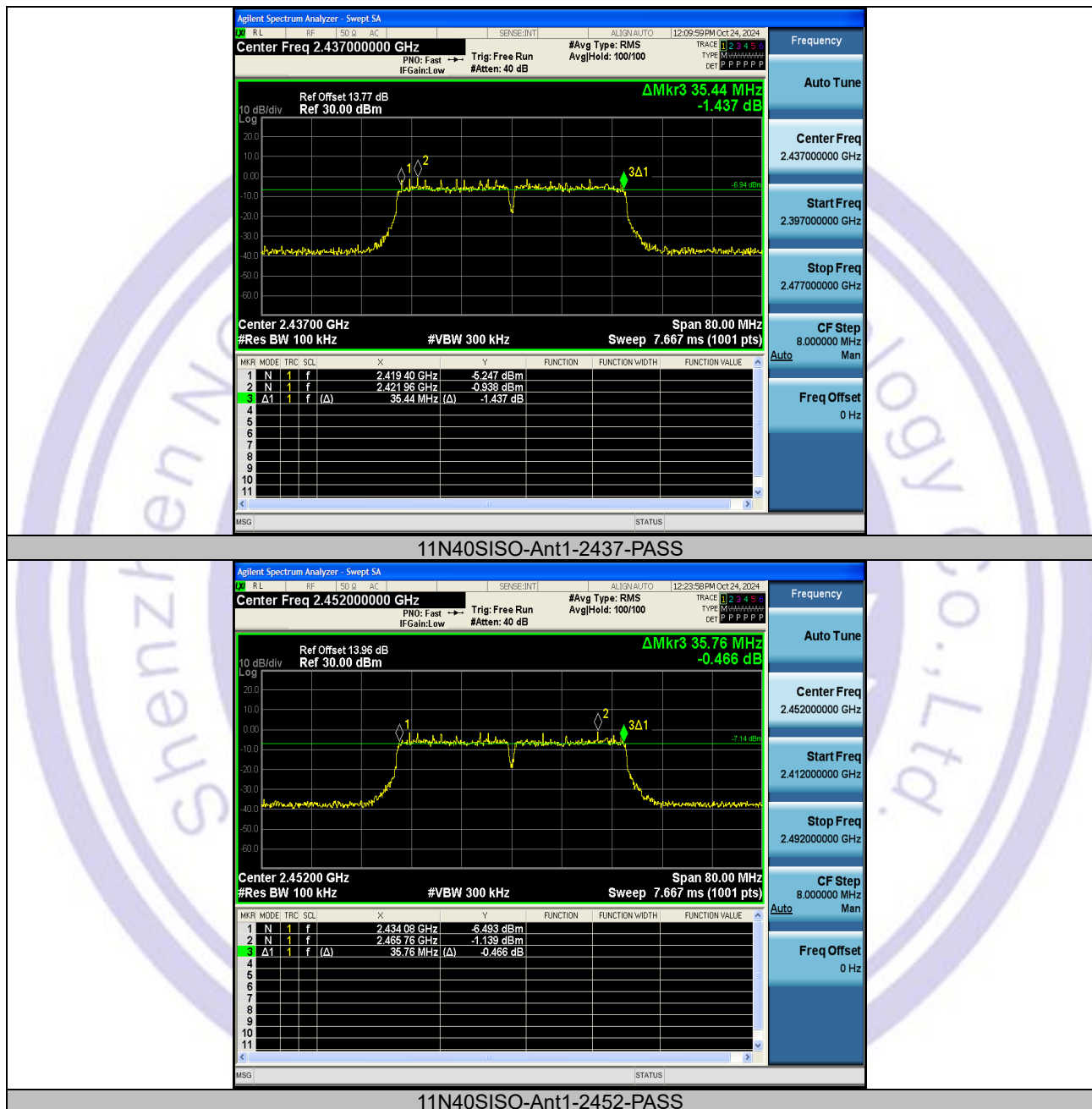












10 Maximum conducted output power

Test Requirement : FCC CFR47 Part 15 Section 15.247

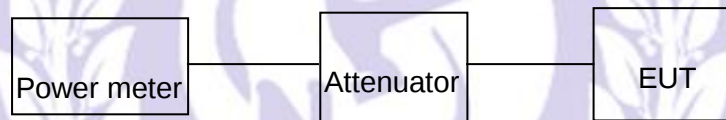
Test Method : ANSI C63.10:2013

Test Limit : Regulation 15.247 (b)(3), For systems using digital modulation in the 902-928 MHz, 2400-2483.5 MHz, and 5725-5850 MHz bands: 1 Watt. As an alternative to a peak power measurement, compliance with the one Watt limit can be based on a measurement of the maximum conducted output power.

10.1 Test Procedure

1. According to ANSI C63.10-2013 clause 11.9.1.3 PKPM1 Peak power meter method. The maximum peak conducted output power may be measured using a broadband peak RF power meter. The power meter shall have a video bandwidth that is greater than or equal to the DTS bandwidth and shall use a fast-responding diode detector.

10.2 Test Setup



10.3 Test Result

TestMode	Antenna	Frequency[MHz]	Set Power	Peak Power[dBm]	Conducted Limit[dBm]	Verdict
11B	Ant1	2412	---	14.86	≤30.00	PASS
11B	Ant1	2437	---	15.17	≤30.00	PASS
11B	Ant1	2462	---	14.78	≤30.00	PASS
11G	Ant1	2412	---	11.96	≤30.00	PASS
11G	Ant1	2437	---	12.27	≤30.00	PASS
11G	Ant1	2462	---	13.18	≤30.00	PASS
11N20SISO	Ant1	2412	---	13.05	≤30.00	PASS
11N20SISO	Ant1	2437	---	12.98	≤30.00	PASS
11N20SISO	Ant1	2462	---	12.21	≤30.00	PASS
11N40SISO	Ant1	2422	---	13.45	≤30.00	PASS
11N40SISO	Ant1	2437	---	13.10	≤30.00	PASS
11N40SISO	Ant1	2452	---	12.79	≤30.00	PASS

11 Power Spectral density

Test Requirement : FCC CFR47 Part 15 Section 15.247

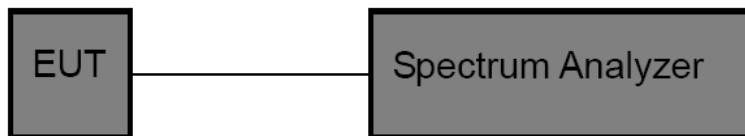
Test Method : ANSI C63.10:2013

Test Limit : Regulation 15.247(e) The power spectral density conducted from the intentional radiator to the antenna due to the digital modulation operation of the hybrid system, with the frequency hopping operation turned off, shall not be greater than 8 dBm in any 3 kHz band during any time interval of continuous transmission.

11.1 Test Procedure

1. Connect the antenna port(s) to the spectrum analyzer input.
2. Configure the spectrum analyzer as shown below:
Center frequency=DTS channel center frequency
Span = 1.5 times the DTS bandwidth
RBW = 3KHz, VBW = 10KHz
Sweep time = auto couple
Detector = peak
Trace mode =max hold
3. Place the radio in continuous transmit mode, allow the trace to stabilize, view the transmitter wave form on the spectrum analyzer.
4. Use the peak marker function to determine the maximum amplitude level within the RBW.
5. If measured value exceeds limit, reduce RBW(no less than 3KHz) and repeat.

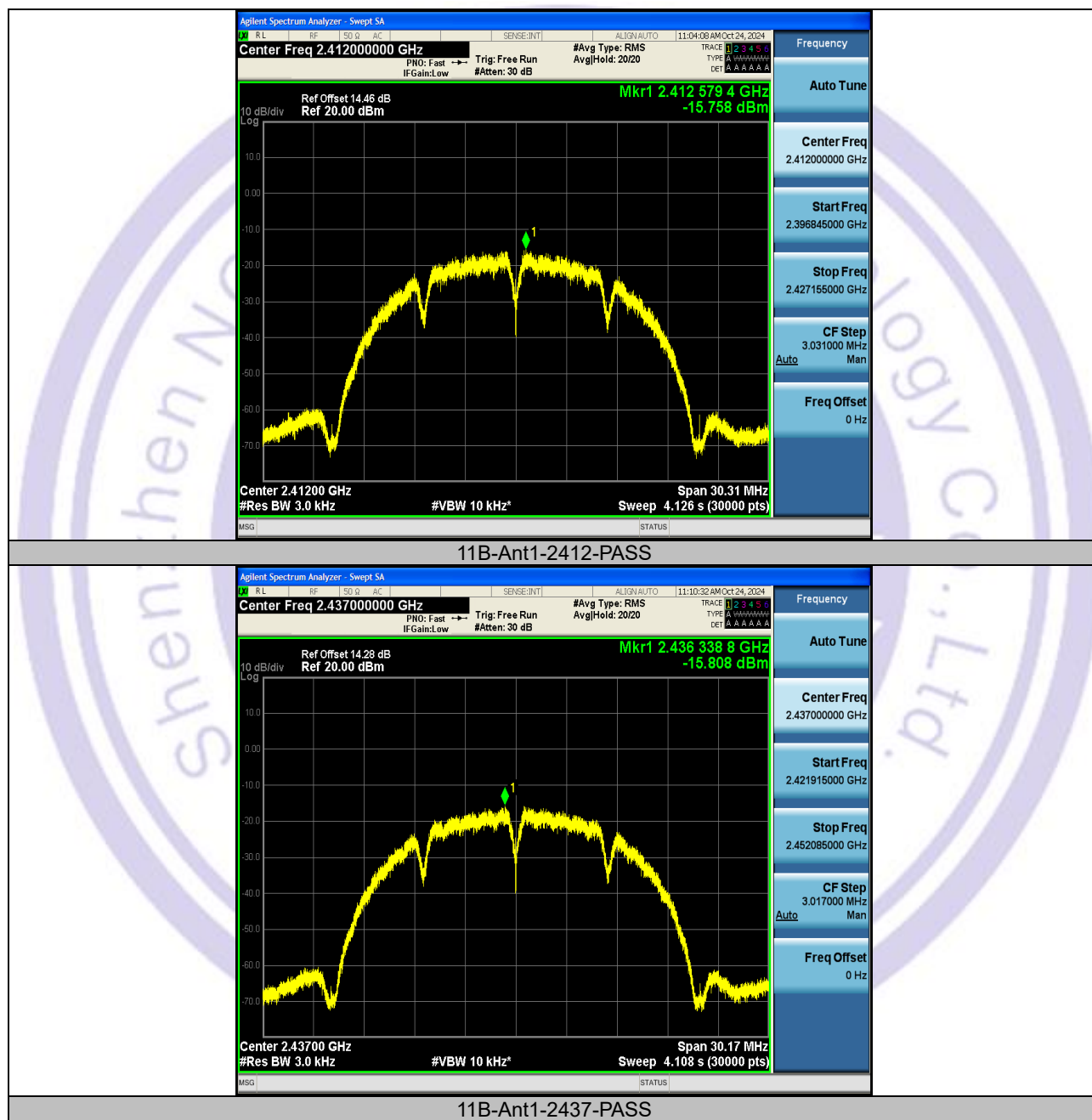
11.2 Test Setup

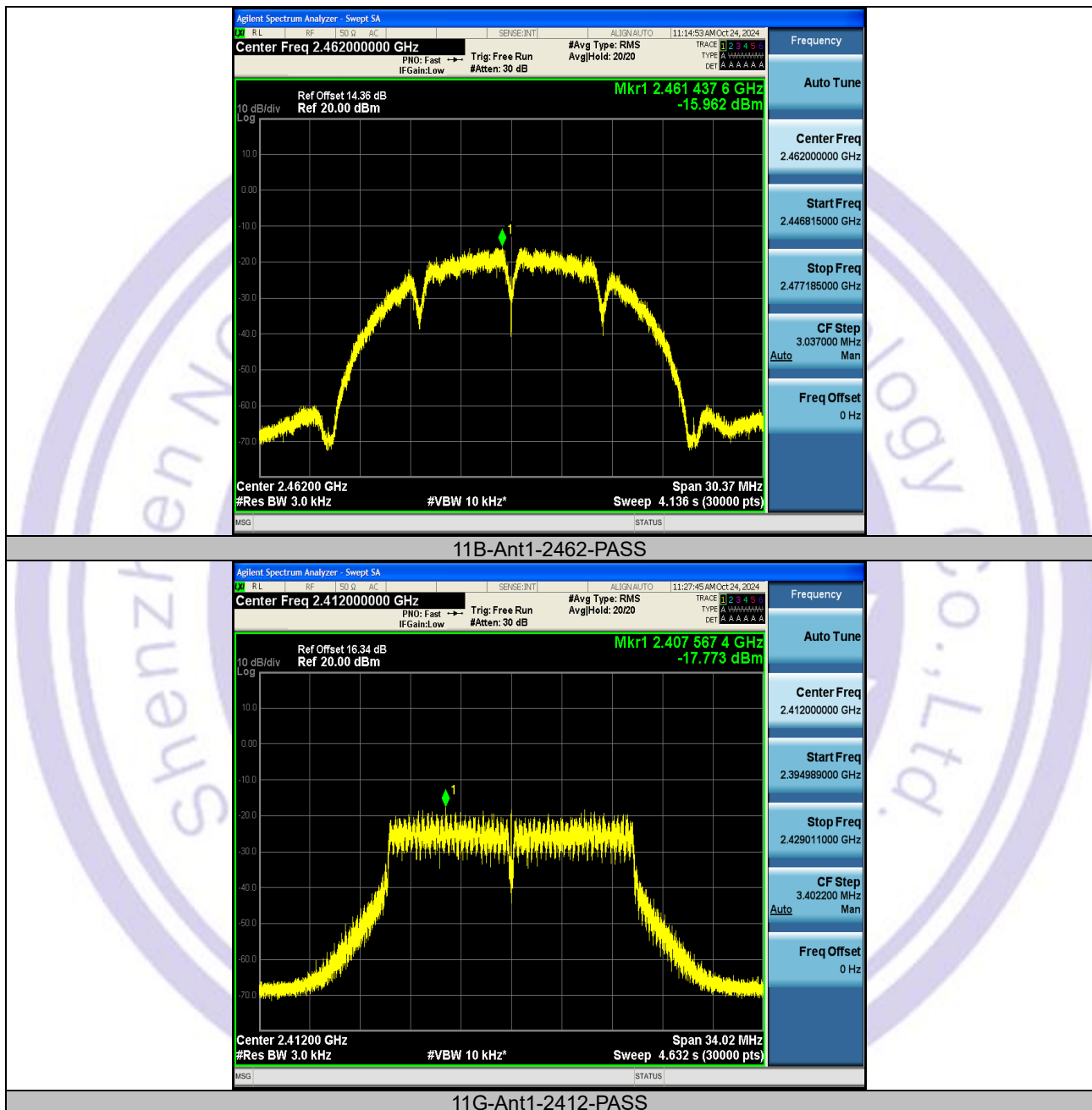


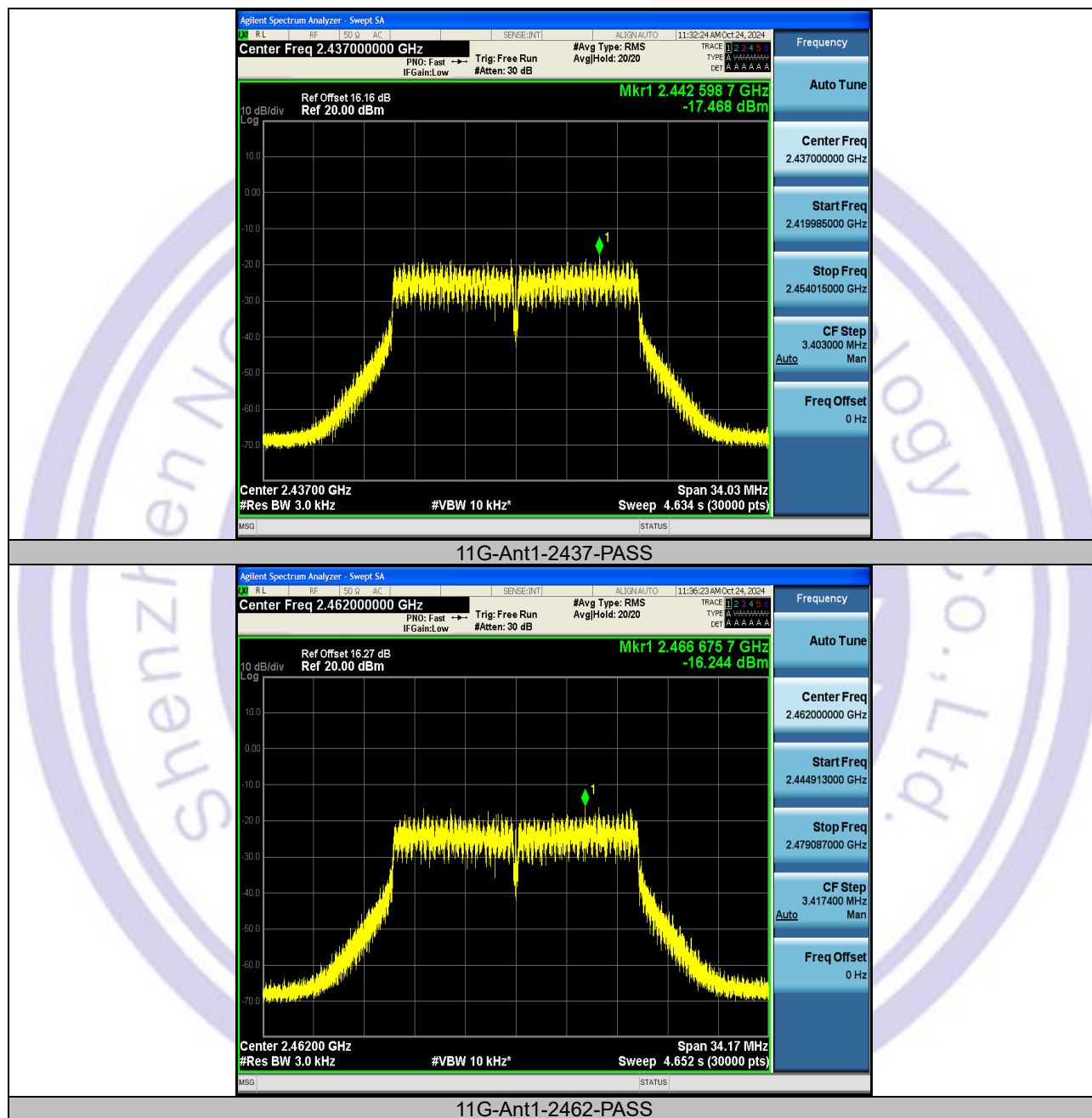
11.3 Test Result

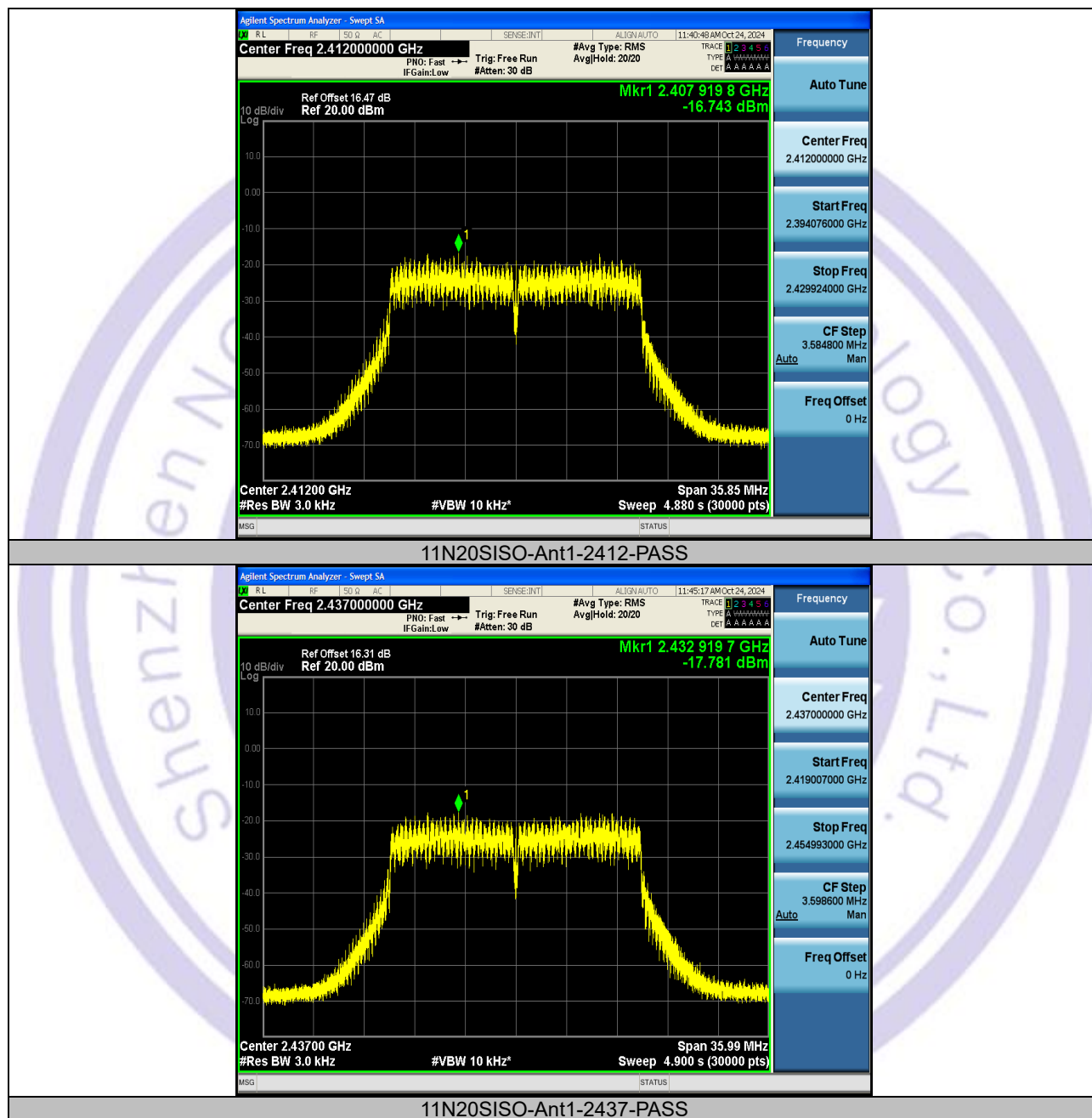
TestMode	Antenna	Frequency[MHz]	Result[dBm/3-100kHz]	Limit[dBm/3kHz]	Verdict
11B	Ant1	2412	-15.76	≤8.00	PASS
11B	Ant1	2437	-15.81	≤8.00	PASS
11B	Ant1	2462	-15.96	≤8.00	PASS
11G	Ant1	2412	-17.77	≤8.00	PASS
11G	Ant1	2437	-17.47	≤8.00	PASS
11G	Ant1	2462	-16.24	≤8.00	PASS
11N20SISO	Ant1	2412	-16.74	≤8.00	PASS
11N20SISO	Ant1	2437	-17.78	≤8.00	PASS
11N20SISO	Ant1	2462	-17.67	≤8.00	PASS
11N40SISO	Ant1	2422	-19.28	≤8.00	PASS
11N40SISO	Ant1	2437	-19.21	≤8.00	PASS
11N40SISO	Ant1	2452	-19.13	≤8.00	PASS

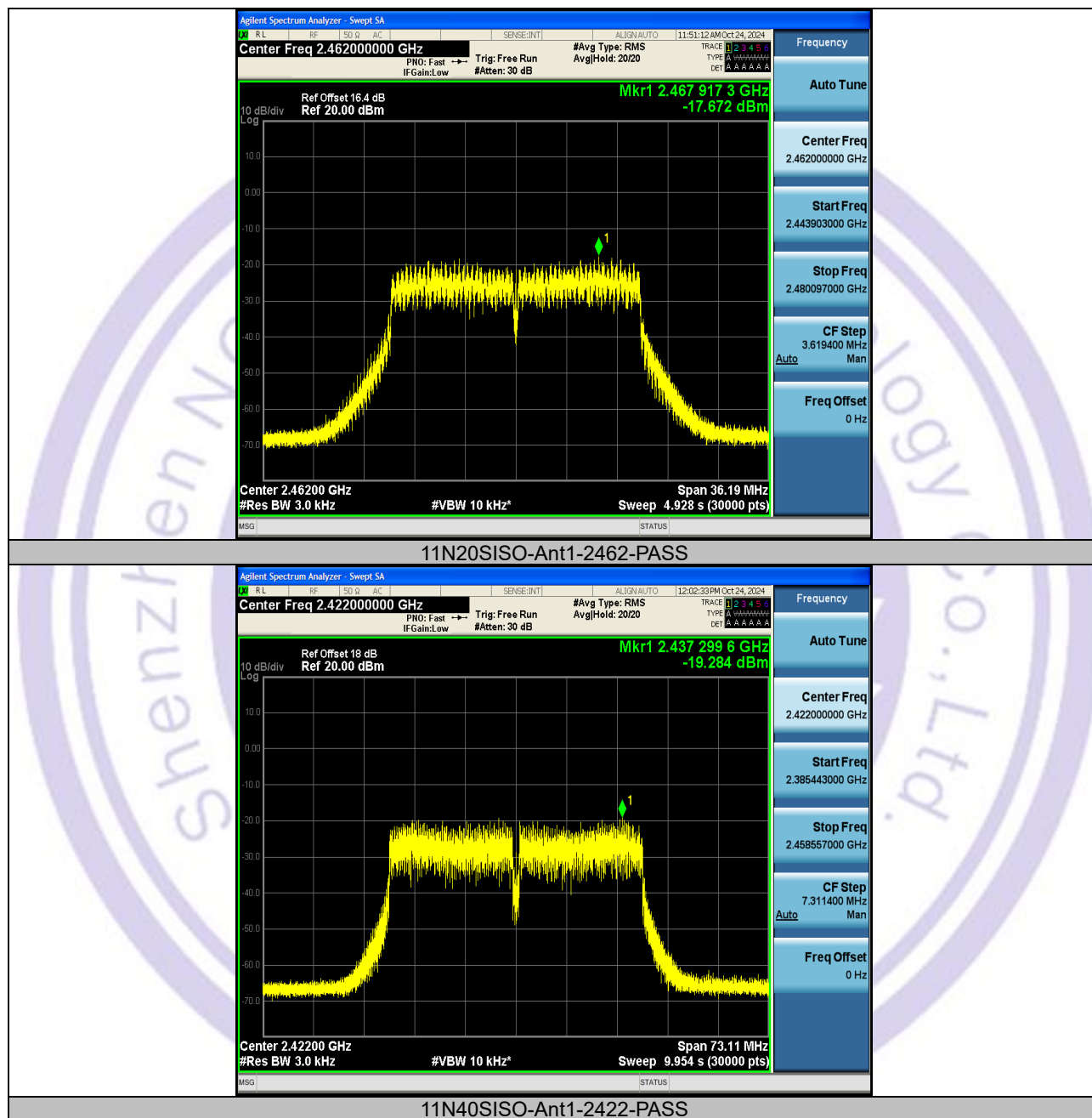
Test Graphs:

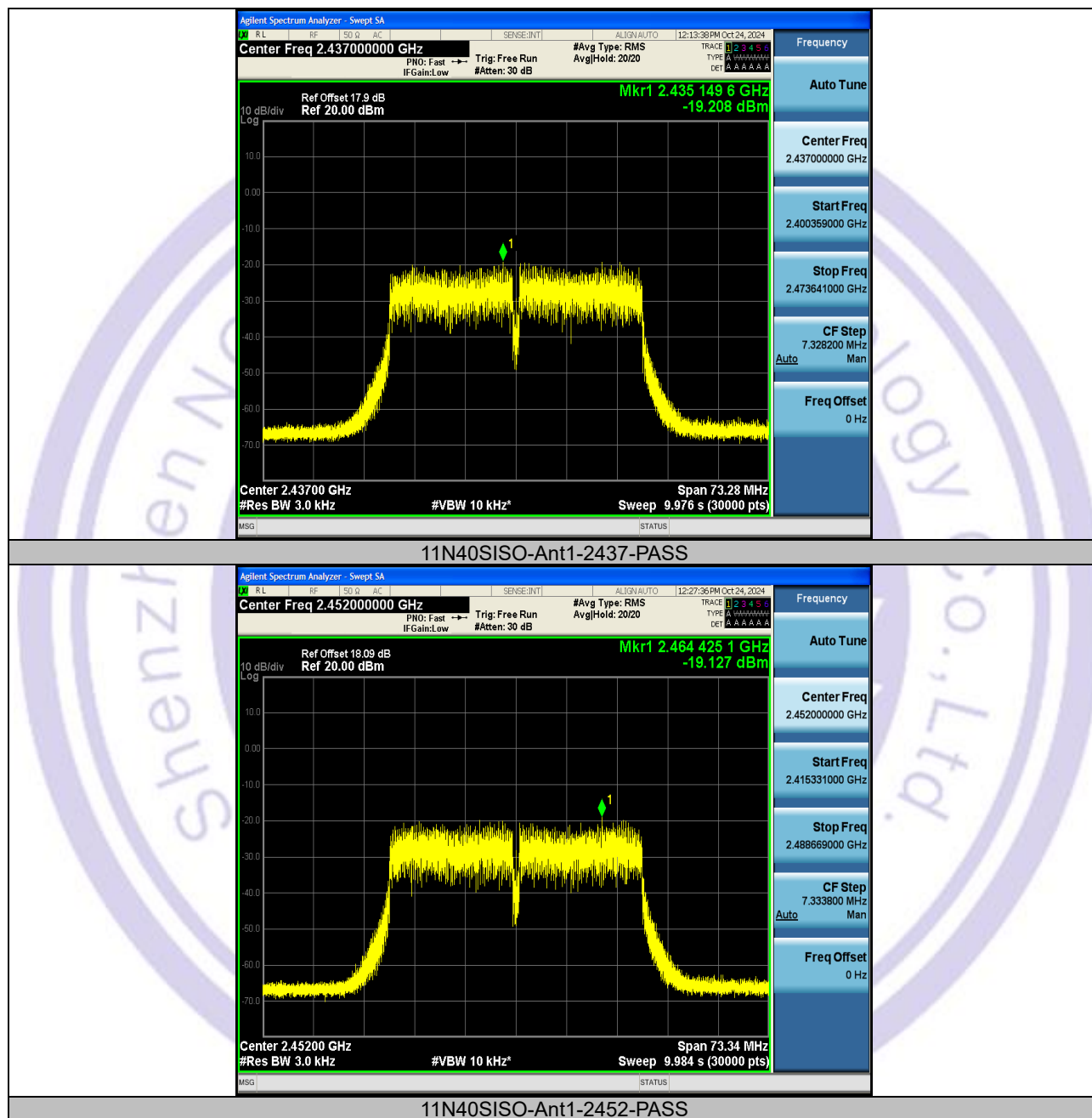












12 Antenna Application

12.1 Antenna Requirement

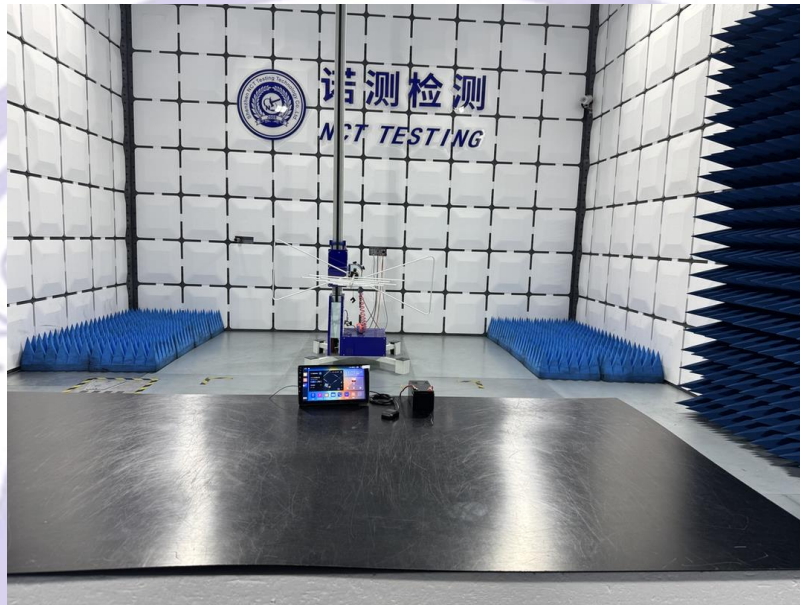
For intentional device, according to FCC 47 CFR Section 15.203, an intentional radiator shall be designed to ensure that no antenna other than that furnished by the responsible party shall be used with the device. And according to FCC 47 CFR Section 15.247 (b), if transmitting antennas of directional 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.

12.2 Result

The EUT'S antenna, permanent attached antenna, is wire Antenna. The antenna's gain is 2 dBi and meets the requirement.

13 Test Setup

Radiated Spurious Emissions
From 30MHz-1000MHz



Test frequency from Above 1GHz



14 EUT PHOTOS

Please reference “EUT photos”

*****THE END REPORT*****