

RF Test Report

Report No.: 2505U27457EB

Applicant: Dongguan Xinjia Laser Technology Co., Ltd.

Address: Room 602, No.419, Jinxing Road, Liaobu Town, Dongguan City,
Guangdong Province, China

Product Name: Laser engraving machine

Product Model: K10

Multiple Models: K8, K11, K12, K15, K16, X2, X3, X4, X5, X6, P1, P2, P3

Trade Mark: N/A

Standards: Item 19-2 of Article 2 Paragraph 1

Test Date: 2025-06-17

Test Result: Complied

Report Date: 2025-06-19

Reviewed by:

Abel chen

Abel Chen
Project Engineer

Approved by:

Jacob Kong

Jacob Kong
Manager

Prepared by:

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Announcement

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3. The information marked “#” is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report. Customer model name, addresses, names, trademarks etc. are included.

Revision History

Version No.	Issued Date	Description
00	2025-06-19	Original

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1 General Information

1.1 Client Information

Applicant:	Dongguan Xinjia Laser Technology Co., Ltd.
Address:	Room 602, No.419, Jinxing Road, Liaobu Town, Dongguan City, Guangdong Province, China
Manufacturer:	Dongguan Xinjia Laser Technology Co., Ltd.
Address:	Room 602, No.419, Jinxing Road, Liaobu Town, Dongguan City, Guangdong Province, China

1.2 Product Description of EUT

The EUT is Laser engraving machine that contains 2.4G WLAN radios, this report covers the full testing of the 2.4G WLAN radio CH14.

Sample Serial Number	34HR-1 (assigned by WATC)
Sample Received Date	2025-06-13
Sample Status	Good Condition
Frequency Range	2484MHz(802.11b)
Rated Output Power [#]	9.0mW/MHz
Modulation Technology	DSSS
Antenna Gain [#]	1.23dBi
Spatial Streams [#]	SISO (1TX, 1RX)
Power Supply	DC 12V from adapter
Adapter Information	Model: K651-1204000E Input: AC100-240V, 50/60Hz, 1.5A Output: DC 12V/4000mA
Modification	Sample No Modification by the test lab

1.3 Measurement Uncertainty

Parameter	Expanded Uncertainty (Confidence of 95%(U = 2Uc(y)))
Unwanted Emission, Conducted	1.75dB
Conducted Power	0.74dB
Frequency Error	150Hz
Bandwidth	0.34%
Power Spectral Density	0.74dB
Note 1: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty. Note 2: The Decision Rule is based on simple acceptance with ISO Guide 98-4:2012 Clause 8.2 (Measurement uncertainty is not taken into account when stating conformity with a specified requirement.)	

1.4 Laboratory Location

World Alliance Testing & Certification (Shenzhen) Co., Ltd

No. 1002, East Block, Laobing Building, Xingye Road 3012, Xixiang street, Bao'an District, Shenzhen, Guangdong, People's Republic of China

Tel: +86-755-29691511, Email: qa@watc.com.cn

1.5 Test Methodology

Item 19-2 of Article 2 Paragraph 1

RCR STD-33

MIC Notice No.88 Appendix No.44

2 Description of Measurement

2.1 Test Configuration

Operating channels:					
Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)	Channel No.	Frequency (MHz)
14	2484	/	/	/	/
According to MIC Notice No.88 Appendix No.43 requirement, Channel 14 was testing.					

Test Mode:		
Transmitting mode:	Keep the EUT in continuous transmitting with modulation	
Exercise software [#] :	EspRFTTestTool_v3.6	
Mode	Worst-case Data rate	Power Level Setting [#]
802.11b	1Mbps	Att 10
The exercise software and the maximum power setting that provided by manufacturer.		

Test Voltage:		
According to MIC Notice No.88 Appendix No.43 requirement,		
1. In the case of characteristic tests for technical standard conformity certification:		
The input voltage from the external power supply to the EUT shall be the rated voltage.		
2. In other cases		
The input voltage from the external power supply to the EUT is the rated voltage and $\pm 10\%$ of the rated voltage, the following cases shall apply:		
(1) If it is confirmed that when the input voltage from the external power source to the EUT varied by $\pm 10\%$, the input voltage to the RF circuit of EUT (excluding the power supply) fluctuates by $\pm 1\%$ or less. Measure only with rated/normal voltage.		
(2) The EUT is designed to operate only within a specific fluctuation range within $\pm 10\%$ of the power supply voltage, and this fact and the upper and lower limits of the specific fluctuation range are stated in the construction design document. Measure at the rated voltage and the upper and lower limits of the specified fluctuation range.		
Low Voltage(V_{DC})	Normal Voltage(V_{DC})	High Voltage(V_{DC})
/	12.0	/
Note: We confirmed with the manufacturer that there is regulator inside the EUT, the input voltage to the RF circuit of EUT (excluding the power supply) fluctuates by $\pm 1\%$ or less.		

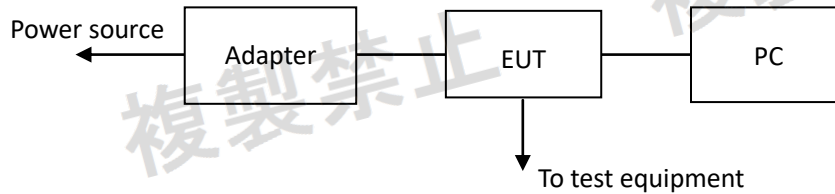
2.2 Test Auxiliary Equipment

Manufacturer	Description	Model	Serial Number
Dell	PC	Optiplex 7010	42349061413

2.3 Interconnecting Cables

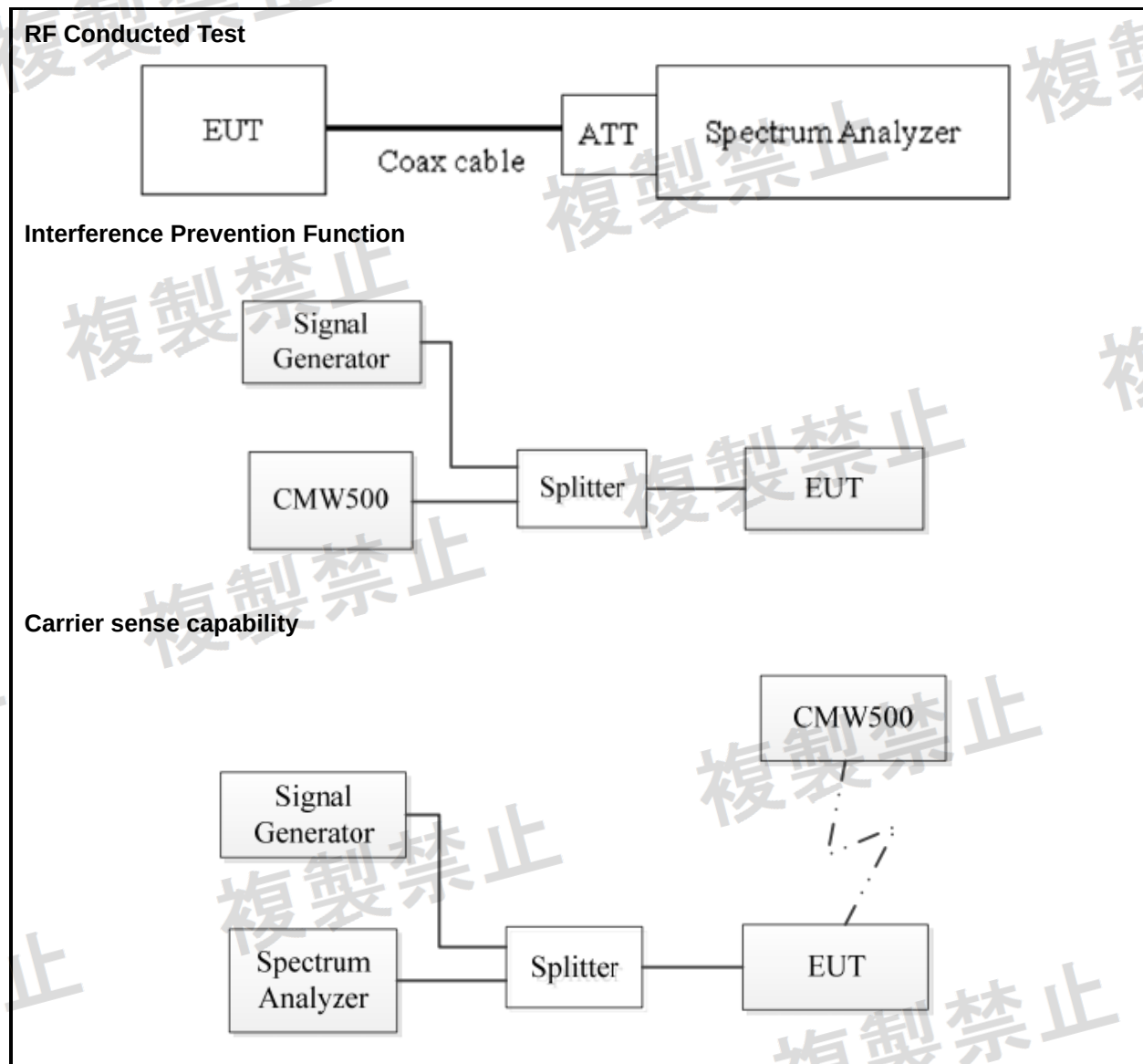
Manufacturer	Description	Length(m)	From	To
unknown	USB extension cable	1.5	Laptop	USB Cable
Dell	USB Cable	1.0	USB extension cable	EUT
Dell	DC Power Cable	1.5	Adapter	EUT

2.4 Block Diagram of Connection between EUT and AE



Note: for reference only, the actual connection setup used for testing please refer to the test photos.

2.5 Test Setup



2.6 Test Procedure

RF Conducted Test:

1. The antenna port of EUT was connected to the RF port of the test equipment (Spectrum analyzer) through Attenuator and RF cable.
2. The cable assembly insertion loss of 7.5dB (including 6.0dB Attenuator and 1.5dB cable) was entered as an offset in the test equipment. Note: Actual cable loss was unavailable at the time of testing, therefore a loss of 1.5dB was assumed as worst case. This was later verified to be true by laboratory. (if the RF cable provided by client, the cable loss declared by client)
3. The EUT is keeping in continuous transmission mode and tested in all modulation modes.

2.7 Measurement Method

Description of Test	Measurement Method
Frequency Error	No.88 Appendix No.44 section 3
Occupied Bandwidth and Spreading Bandwidth	No.88 Appendix No.44 section 4
Transmitter Spurious Emission and Unwanted Emission Intensity	No.88 Appendix No.44 section 5 No.88 Appendix No.1
Antenna Output Power and Output Power Tolerance	No.88 Appendix No.44 section 6
Receiver Spurious Emission and Unwanted Emission Intensity	No.88 Appendix No.44 section 7
Carrier sense capability	No.88 Appendix No.44 section 9 or No.88 Appendix No.44 section 10
Frequency Hopping Dwell Time	No.88 Appendix No.44 section 13
Interference Prevention Function	No.88 Appendix No.44 section 8

2.8 Measurement Equipment

Manufacturer	Description	Model	Management No.	Calibration Date	Calibration Due Date	Calibration Authority	Calibration Method
ROHDE&SCHWARZ	SPECTRUM ANALYZER	FSV40	101419	2025/5/23	2026/5/22	BACL	c)
narda	6dB attenuator	603-06-1	N/A	2025/5/23	2026/5/22	BACL	c)
ROHDE&SCHWARZ	WIDEBAND RADIO COMMUNICATION TESTER	CMW500	116218	2024/11/6	2025/11/5	BACL	c)
ROHDE&SCHWARZ	Vector Signal Generator	SMBV100A	256300	2025/5/23	2026/5/22	BACL	c)
HP	Power Splitter	11667A	1610A	2024/11/6	2025/11/5	BACL	c)

Note: All equipment is calibrated with valid calibrations. Each measurement data is traceable to the national or International standards.

Calibration Method:

- a) Calibration conducted by the National Institute of Information and Communications Technology (NICT) or a designated calibration agency under Article 102-18 paragraph (1)
- b) Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992) ~Japan Calibration Service System~
- c) Calibration conducted in foreign countries, which shall be equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1)
- d) Calibration conducted by using other equipment that listed above from a) to c)

3 Test Results

3.1 Test Summary

The EUT has been tested according to the Radio equipment regulations and RCR STD-33

Rules	Description of Test	Result
STD-33 Section 3.2	Frequency Error	Compliance
STD-33 Section 3.2	Occupied Bandwidth and Spreading Bandwidth	Compliance
STD-33 Section 3.2	Transmitter Spurious Emission and Unwanted Emission Intensity	Compliance
STD-33 Section 3.2	Antenna Output Power and Output Power Tolerance	Compliance
STD-33 Section 3.3	Receiver Spurious Emission and Unwanted Emission Intensity	Compliance
STD-33 Section 3.4	Carrier sense capability	Compliance
STD-33 Section 3.2	Frequency Hopping Dwell Time	N/A ¹
STD-33 Section 3.4	Interference Prevention Function	Compliance
STD-33 Section 3.7	Construction Protection Confirmation	Compliance

Note:

N/A¹: Testing is only required for FHSS system devices.

3.2 Limit

Test items	Limit
Frequency Error	+/-50ppm
Occupied Bandwidth and Spreading Bandwidth	Occupied bandwidth: ≤ 26 MHz; Spread Bandwidth: ≥ 500 kHz, Spread factor >10 .
Transmitter Spurious Emission and Unwanted Emission Intensity	30MHz-2458MHz: 2.5uW/MHz or less 2458MHz-2471MHz: 25uW/MHz or less 2497MHz-2510MHz: 25uW/MHz or less 2510MHz-12.5GHz: 2.5uW/MHz or less
Antenna Output Power and Output Power Tolerance	Antenna Output Power: ≤ 10 mW/MHz Output Power Tolerance: -80%~+20% E.I.R.P.: ≤ 12.14 dBm/MHz
Receiver Spurious Emission and Unwanted Emission Intensity	30MHz-1000MHz: 4nW or less 1GHz-12.5GHz: 20nW or less
Carrier sense capability	EUT stop RF transmission signal after carrier inject to EUT
Interference Prevention Function	The EUT shall have the interference prevention capability to transmit or to receive the identification automatically, so that sender and receiver shall exclude other equipment.
Construction Protection Confirmation	The high-frequency section and modulation section of the radio equipment except for the antenna system shall not be capable of being opened easily.

3.3 Test Data

Test Date:	2025-06-17	Test By:	Ryan Zhang
Environment condition:	Temperature: 25.2°C;RelativeHumidity:60%; ATM Pressure: 100.1kPa		

3.3.1 Frequency Error

Test Condition: NV

Mode	Frequency (MHz)	Measure Frequency (MHz)	Frequency Tolerance (ppm)	Limit (ppm)	Verdict
Single Carrier	2484	2484.0165	6.64	± 50	Pass

Note:

Frequency Tolerance = (Measure Frequency - Frequency)/Frequency*10⁶

3.3.2 Occupied Bandwidth and Spreading Bandwidth

Test Condition: NV

Test Items	Measured Result	Limit	Verdict
Occupied bandwidth (MHz)	19	≤ 26	Pass
Spreading bandwidth (MHz)	14.28	≥ 0.5	Pass
Spreading Factor	10.385	≥ 10	Pass

Note1: Spread factor = spread bandwidth/modulation rate

Note2: Modulation rate: 802.11b = 1.375

3.3.3 Transmitter Spurious Emission and Unwanted Emission Intensity

Test Condition: NV

802.11b

Channel	Test Band (RBW)	Frequency Range		Max.Emission Located(MHz)	Result (dBm/RBW)	Result (μW/RBW)	Limit (μW/RBW)	Verdict
		Start (MHz)	Stop (MHz)					
14	Band I (100kHz)	30	1000	31.7	-36.07	0.25	0.25	Pass
	Band II (1MHz)	1000	2458	1253.33	-33.89	0.41	2.50	Pass
	Band III (1MHz)	2458	2471	2466.0633	-29.13	1.22	25	Pass
	Band IV (1MHz)	2497	2510	2497.0748	-25.94	2.55	25	Pass
	Band V (1MHz)	2510	12500	3052	-31.47	0.71	2.50	Pass

3.3.4 Antenna Output Power and Output Power Tolerance

Test Condition: NV

Mode	Antenna gain (dBi)	Declared power (mW/MHz)
802.11b	1.23	9.0

Mode	Channel	Antenna output power (dBm/MHz)	Antenna output power(mW/MHz)		Antenna output tolerance(%)		EIRP (dBm/MHz)		Verdict
			Result	Limit	Result	Limit	Result	Limit	
802.11b	14	9.00	7.943	≤ 10	-11.74	-80~+20	10.23	≤ 12.14	Pass

Note:

Antenna output power(mW/MHz)= $10^{[\text{Antenna output power(dBm/MHz)} / 10]}$

Antenna output power tolerance(%) = (Antenna output power - Declared power) / Declared power * 100

EIRP(dBm/MHz) = Antenna output power(dBm/MHz) + Antenna gain.

The duty cycle of the device is 100%.

3.3.5 Receiver Spurious Emission and Unwanted Emission Intensity

Test Condition: NV

Mode	Channel	Test Band (RBW)	Frequency Range		Max.Emission Located(MHz)	Result (dBm)	Result (nW)	Limit (nW)	Verdict
			Start(MHz)	Stop(MHz)					
802.11b	14	Band I (100kHz)	30	1000	31.69750	-56.87	2.06	4	Pass
		Band II (1MHz)	1000	12500	3067.12	-49.75	1.06	20	Pass

3.3.6 Duty Cycle

Mode	Frequency (MHz)	Ton (ms)	Ton+Toff (ms)	Duty cycle (%)
802.11b	2484	100	100	100

3.3.7 Carrier sense capability

Test Result: Good

3.3.8 Interference Prevention Function

Test Result: Compliant

3.3.9 Construction Protection Confirmation

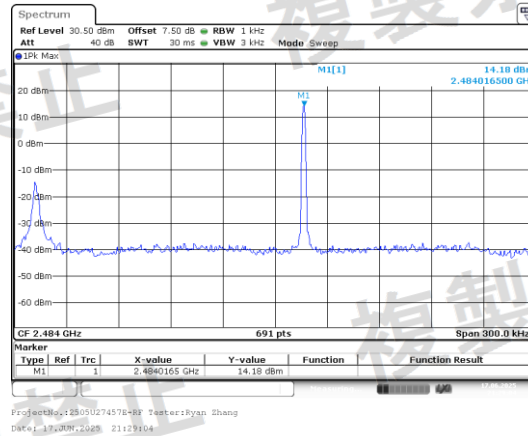
Test Result: Compliant, The EUT has shielding cover for the high-frequency section and modulation section of the radio which can't be opened easily, please see the EUT photos.

Test Plots:

Frequency Error:

Test Condition: NV

802.11b_2484MHz

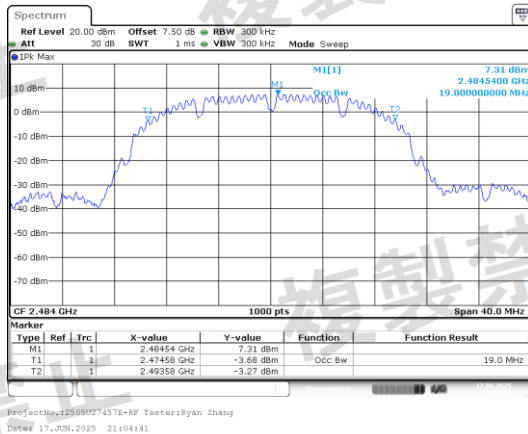


Occupied Bandwidth and Spreading Bandwidth:

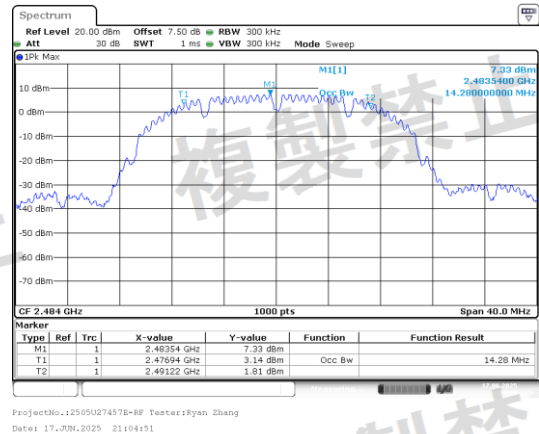
Test Condition: NV

802.11b_2484MHz

Occupied Bandwidth



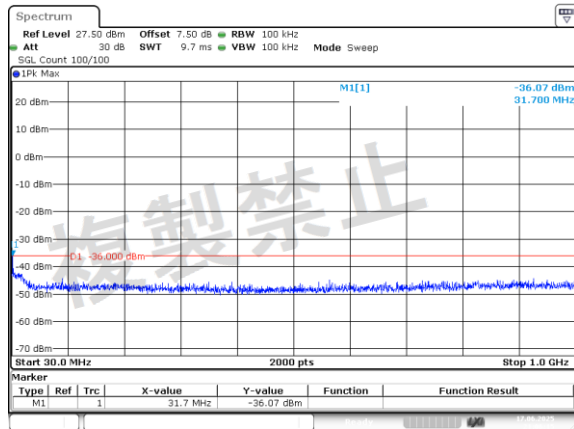
Spreading Bandwidth



Transmitter Spurious Emission and Unwanted Emission Intensity:

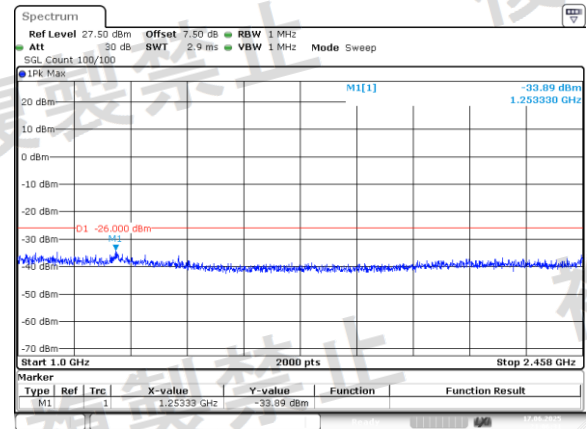
Test Condition: NV

802.11b_2484MHz(30MHz~1GHz)



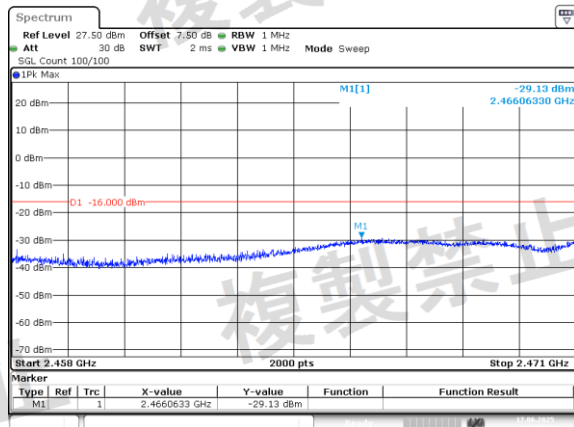
ProjectNo.:2505U27457E-RF Tester:Ryan Zhang
Date: 17.JUN.2025 21:06:16

802.11b_2484MHz(1GHz~2.458GHz)



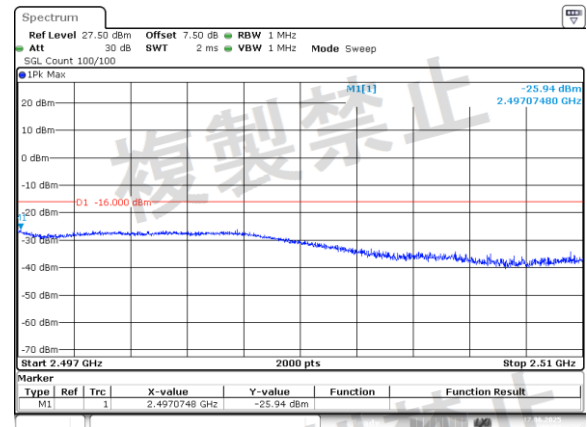
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802.11b_2484MHz(2.458GHz~2.471GHz)



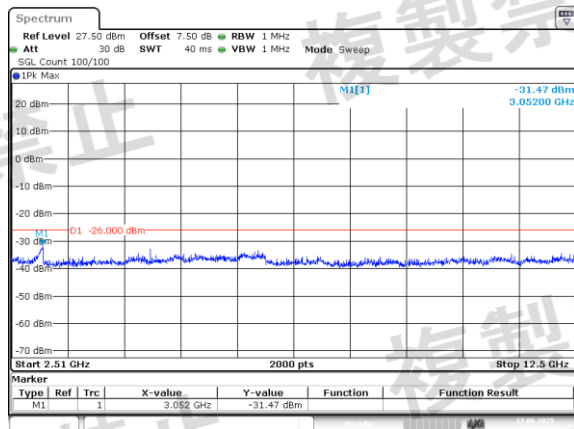
ProjectNo.:2505U27457E-RF Tester:Ryan Zhang
Date: 17.JUN.2025 21:06:42

802.11b_2484MHz(2.497GHz~2.51GHz)



ProjectNo.:2505U27457E-RF Tester:Ryan Zhang
Date: 17.JUN.2025 21:06:53

802.11b_2484MHz(2.51GHz~12.5GHz)

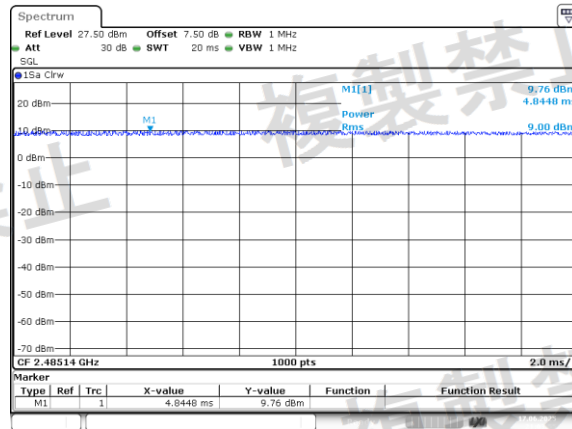


ProjectNo.:2505U27457E-RF Tester:Ryan Zhang
Date: 17.JUN.2025 21:07:23

Antenna Output Power:

Test Condition: NV

802.11b_2484MHz

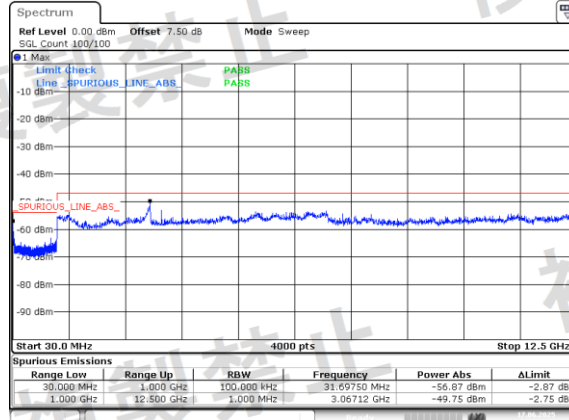


ProjectNo.:2505U27457E-RF Tester:Ryan Zhang
Date: 17 JUN 2025 21:03:55

Receiver Spurious Emission and Unwanted Emission Intensity:

Test Condition: NV

802.11b_2484MHz(30MHz~12.5GHz)



ProjectNo.:2505U27457E-RF Tester:Ryan Zhang
Date: 17 JUN 2025 21:10:30

4 Test Setup Photo

Please refer to the attachment 2505U27457E Test Setup Photo.

5 E.U.T Photo

Please refer to the attachment 2505U27457E External Photo and 2505U27457E Internal Photo.

---End of Report---