



CTC Laboratories, Inc.

TEST REPORT

Report No. : **CTC2025217790**

Applicant : **Shenzhen Skyworth Digital Technology Co.,LTD.**

Address..... : 14/F Unit A. Skyworth Building, Gaoxin Ave.1.S., Nanshan District, Shenzhen, China

Manufacturer..... : Shenzhen Skyworth Digital Technology Co.,LTD.

Address..... : 14/F Unit A. Skyworth Building, Gaoxin Ave.1.S., Nanshan District, Shenzhen, China

Product Name : **Wi-Fi Camera**

Trade Mark : SKYWORTH

Model/Type reference..... : LC2224

Listed Model(s)..... : H30 New, H30 NEW, C40, H40 New, H40 NEW

Standard : **Article 2, Paragraph 1, Item 19**

Test Report Form No : CTC-TR-070_A1

Master TRF..... : Dated 2024-09-20

Date of receipt of test sample..... : Mar. 25, 2025

Date of testing..... : Mar. 31, 2025 ~ Mar. 31, 2025

Date of issue..... : Apr. 16, 2025

Result..... : **PASS**

Compiled by:

(Printed name + signature)

Lucy Lan

Supervised by:

(Printed name + signature)

Eric Zhang

Approved by:

(Printed name + signature)

Totti Zhao

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1. SUMMARY

1.1. Test Standards

The tests were performed according to following standards:

[Test method which is equal to Appendix No.43 of MIC Notification No 88.](#)

1.2. Report version

Revised No.	Report No.	Date of issue	Description
01	CTC2025217790	Apr. 16, 2025	Original

1.3. Test Description

MIC Notice No.88 Appendix No.43 Article 2, Paragraph 1, Item 19 Rules Section	Test Item	Result	Test Engineer
3	Frequency Error	Pass	Marrow
4	Occupied Bandwidth and Spreading Bandwidth	Pass	Marrow
5	Transmitter Spurious Emission and Unwanted Emission Intensity	Pass	Marrow
6	Antenna Output Power and Output Power Tolerance	Pass	Marrow
7	Receiver Spurious Emission and Unwanted Emission Intensity	Pass	Marrow
8	Radio Interference Prevention Capability	Pass	Marrow
9	Frequency Hopping Dwell Time	N/A Note 1	N/A
10	Carrier Sense Capability	Pass	Marrow
11	Construction Protection Confirmation	Pass	Marrow
12	Transmission Radiation Angle Width (3dB Beamwidth)	Pass	Marrow

N/A^{Note 1}: Testing is only required OFDM system with occupied frequency bandwidth below 38MHz and exceed 26MHz.

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1.4. Test Facility

Address of the test laboratory

CTC Laboratories, Inc.

Add: Room 101 of Building B, Room 107, 108, 207, 208 of Building A, No. 7, Lanqing 1st Road, Luh Community, Guanhu Subdistrict, Longhua District, Shenzhen, Guangdong, China

Laboratory accreditation

The test facility is recognized, certified, or accredited by the following organizations:

A2LA-Lab Cert. No.: 4340.01

CTC Laboratories, Inc. EMC Laboratory has been accredited by A2LA for technical competence in the field of electrical testing, and proved to be in compliance with ISO/IEC 17025:2017 General Requirements for the Competence of Testing and Calibration Laboratories and any additional program requirements in the identified field of testing.

Industry Canada (Registration No.: 9783A, CAB Identifier: CN0029)

CTC Laboratories, Inc. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration NO.: 9783A on Jan, 2016.

FCC (Registration No.: 951311, Designation Number CN1208)

CTC Laboratories, Inc. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 951311, Aug 26, 2017.

1.5. Measurement Uncertainty

For the test methods, according to the present document, the measurement uncertainty figures shall be calculated in accordance with TR100028-1 [2] and shall correspond to an expansion factor (coverage factor) $K=1.96$ or $K=2$ (which provide confidence levels of respectively 95% and 95.5% in the case where the distributions characterizing the actual measurement uncertainties are normal).

Parameter	Uncertainty
RF frequency	$\pm 6 \times 10^{-7}$
Total RF power, conducted	± 0.8 dB
Spurious emissions, conducted	± 0.8 dB
DC and low frequency voltages	$\pm 3\%$
Humidity	$\pm 5\%$
Temperature	$\pm 1^\circ\text{C}$

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2. GENERAL INFORMATION

2.1. Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Voltage	Normal Voltage	DC 5.00V
	High Voltage	DC 5.50V
	Low Voltage	DC 4.50V
Other	Normal Temperature/T _{nor} :	23°C
	Relative Humidity	57 %
	Air Pressure	101kPa

2.2. Client Information

Applicant:	Shenzhen Skyworth Digital Technology Co.,LTD.
Address:	14/F Unit A. Skyworth Building, Gaoxin Ave.1.S., Nanshan District, Shenzhen, China
Manufacturer:	Shenzhen Skyworth Digital Technology Co.,LTD.
Address:	14/F Unit A. Skyworth Building, Gaoxin Ave.1.S., Nanshan District, Shenzhen, China
Factory:	Shenzhen Skyworth Digital Technology Co.,LTD. Baoan Factory
Address:	2-5F,Integration Multi-Storied Building, Skyworth Science and Technology Industrial Park, Tangtou Industrial Zone, Shiyan Street, Baoan District, Shenzhen city, China.

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2.3. General Description of EUT

Product Name:	Wi-Fi Camera
Trade Mark:	SKYWORTH
Model/Type reference:	LC2224
Listed Model(s):	H30 New, H30 NEW, C40, H40 New, H40 NEW
Model Different:	Only the model names are different
Sample ID:	CTC250313-017-S001
Power supply:	5Vdc/1A from AC/DC Adapter
Adapter Model:	UT-236A-5100 Input: 100-240V~ 50/60Hz 0.2A Output: 5Vdc/1A
Hardware version:	/
Software version:	/
Supported type:	802.11b/ 802.11g/ 802.11n(HT20)
Modulation:	802.11b: DSSS 802.11g/ 802.11n(HT20): OFDM
Operation frequency:	802.11b/ 802.11g/ 802.11n(HT20): 2412MHz~2472MHz
Channel number:	802.11b/ 802.11g/ 802.11n(HT20): 13
Antenna type:	PIFA Antenna
Antenna gain:	2.dBi Max

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2.4. Description of Test Modes

The EUT has been tested under typical operating condition. The Applicant provides communication tools software to control the EUT for staying in continuous transmitting and receiving mode for testing.

Operation Frequency List 2.4G Band WIFI:

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

Note: The 802.11b/802.11g/802.11n(HT20) were selected 1/7/13 channel to perform the test,
Operation Mode:

802.11b	IEEE 802.11b with data rate of 1Mbps
802.11g	IEEE 802.11g with data rate of 6Mbps
802.11n(HT20)	IEEE 802.11n20 with data rate of MSC0 for bandwidth 20MHz



2.5. Measurement Instruments List

Item	Test Equipment	Manufacturer	Model No.	Serial No.	Cal. Date	Cal. Until	Cal. By
1	Spectrum Analyzer	R&S	FSV40-N	101654	2024/08/07	2025/08/16	CCIC
2	MXG Vector Signal Generator	Agilent	N5182A	MY47420864	2024/12/13	2025/12/12	CCIC
3	PSG Analog Signal Generator	Agilent	E8257D	MY46521908	2024/12/13	2025/12/12	CCIC
4	Wideband Radio Communication Tester	R&S	CMW500	102414	2024/12/13	2025/12/12	CCIC
5	digital oscilloscope	Tektronix	TDS3032B	C010354	2024/10/25	2025/10/24	CCIC
6	RF Control Unit	Tonscend	JS0806-2	/	2024/12/13	2025/12/12	CCIC
Test Software							
Name		Manufacturer			Serial No.		
Tonscend		JS1120-3			V3.3.38		

Note: 1. Calibration conducted in foreign countries, which is equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1)

2. Full name of CCIC: CCIC (Shenzhen) Metrology & Testing Service Co.,Ltd

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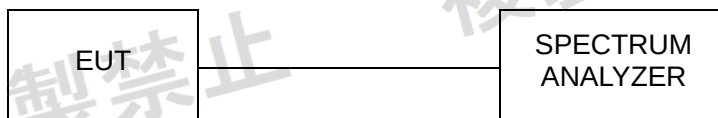
3. TEST CONDITIONS AND RESULTS

3.1. Frequency Error

LIMIT

±50ppm

TEST CONFIGURATION



TEST PROCEDURE

The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram as TEST CONFIGURATION shows.

EUT Condition: No modulation

Spectrum Condition:

Frequency: Test frequency

Span: Show the entire waveform

RBW: 10 kHz

VBW: 10 kHz

Sweep time: Auto

Detector mode: Peak

Indication mode: Max hold

TEST RESULTS

Test voltage (V)	Test Bandwidth	Antenna	Freq (MHz)	Center Freq (MHz)	Result[ppm]	Limit[ppm]	Verdict
DC 5.00V	20MHz	Ant1	2412	2411.997	-1.24378	±50	PASS
		Ant1	2442	2441996	-1.63800	±50	PASS
		Ant1	2472	2471.996	-1.61812	±50	PASS

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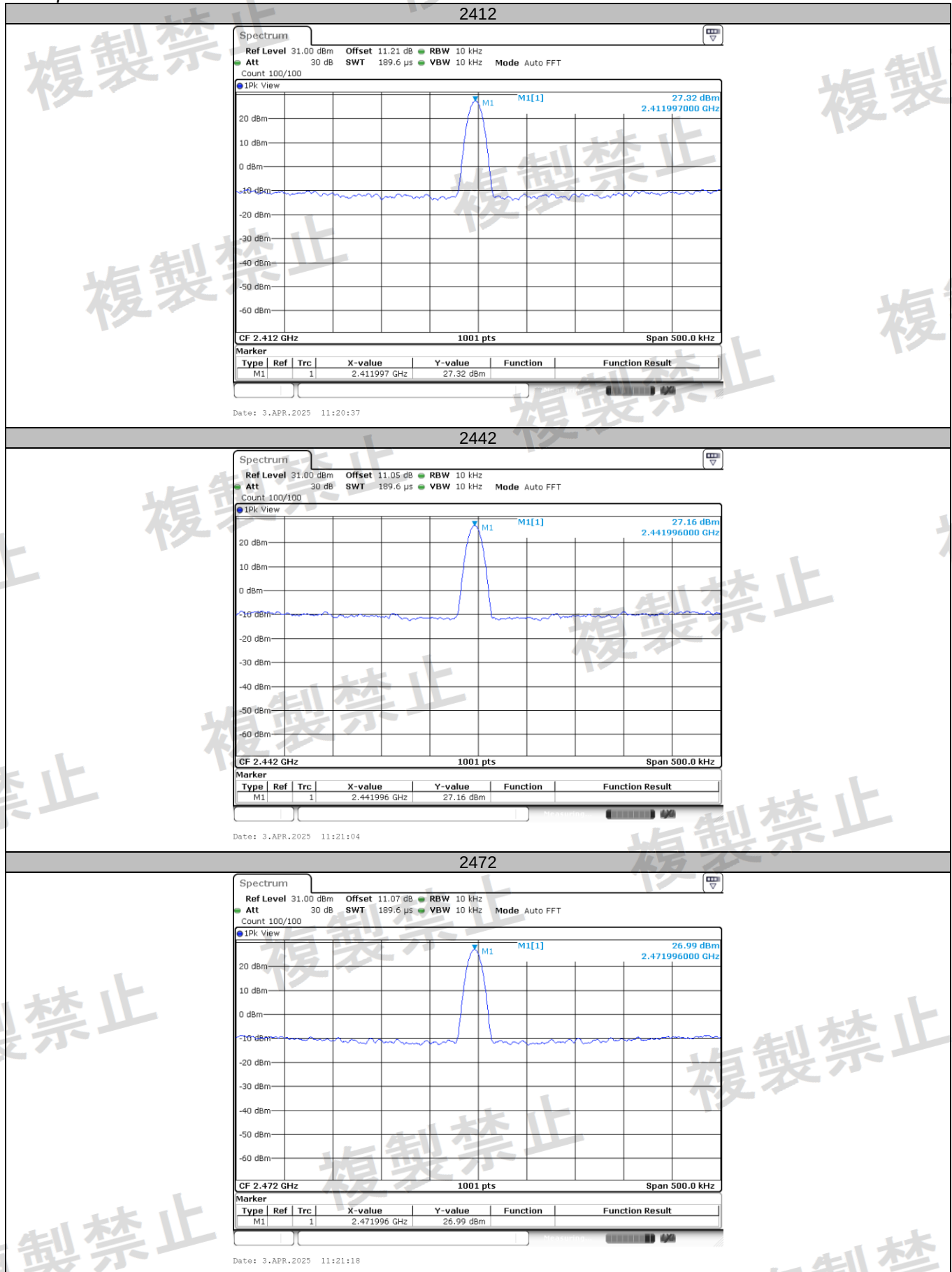
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Test plot as follows:



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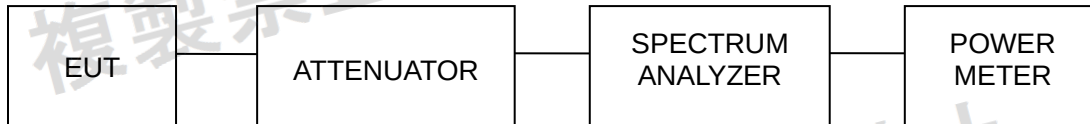
3.2. Antenna Power

LIMIT

- ≤ 3 mW/MHz (FHSS from 2402-2480 MHz)
- ≤ 5 mW/MHz (OFDM(26MHz <Occupied Bandwidth <38MHz) from 2400-2483.5 MHz)
- ≤ 10 mW (Other from 2400-2483.5 MHz)

The Output Power Tolerance must be within +20%.

TEST CONFIGURATION



TEST PROCEDURE

Step 1:

Connect the UUT to the spectrum analyzer as TEST CONFIGURATION and use the following settings:

- Centre Frequency: The center frequency of the channel under test.
- RBW: 1 MHz
- VBW: 1 MHz
- Span: 2 Times of occupied bandwidth
- 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:

Connecting the high frequency power meter with IF output of the spectrum analyzer.

Use the high frequency power meter to measure the Antenna power.

**TEST RESULTS**

DC 5.00V								
Mode	Antenna	Channel (MHz)	Output power (mW/MHz)	Limit (mW/MHz)	Rated output power (mW/MHz)	Tolerance (%)	Limit	Result
802.11b	Ant1	2412	4.1495	10.0	5.0	-17.01	+20%	Pass
	Ant1	2442	4.9431	10.0	5.0	-1.14		
	Ant1	2472	4.5709	10.0	5.0	-8.58		
802.11g	Ant1	2412	1.4289	10.0	2.0	-28.56		
	Ant1	2442	1.6672	10.0	2.0	-16.64		
	Ant1	2472	0.8913	10.0	2.0	-55.44		
802.11n (HT20)	Ant1	2412	1.7179	10.0	2.0	-14.11		
	Ant1	2442	1.7418	10.0	2.0	-12.91		
	Ant1	2472	0.9036	10.0	2.0	-54.82		

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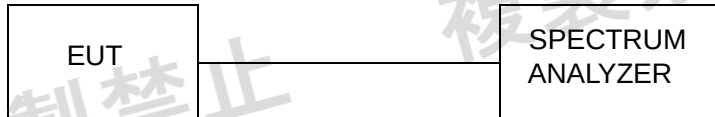


3.3. Occupied Bandwidth

LIMIT

- Occupied bandwidth: FH $\leq$ 83.5 MHz; OFDM $\leq$ 38MHz; DS $\leq$ 26 MHz

TEST CONFIGURATION

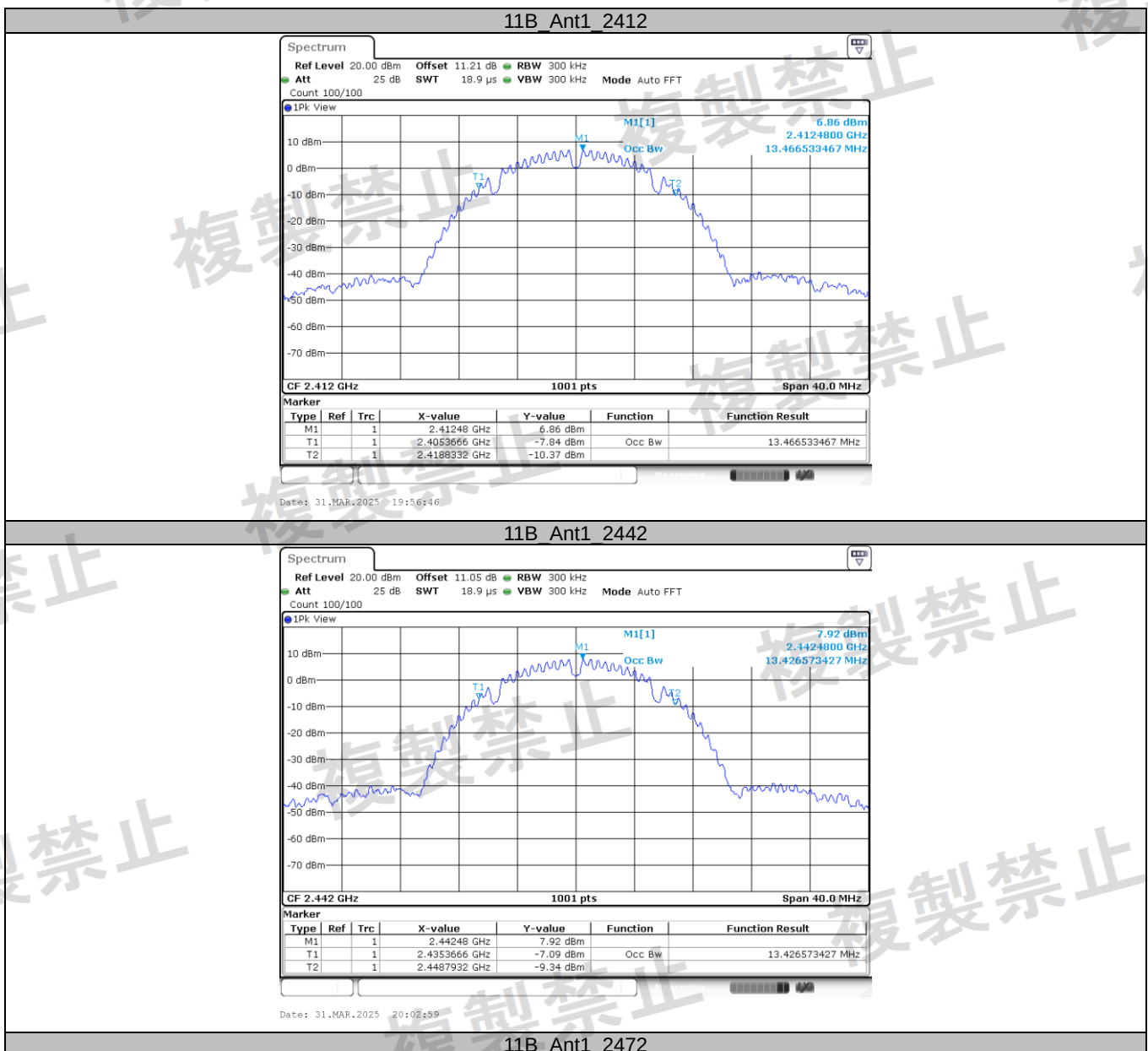


TEST PROCEDURE

1. Setting of SA is following as follow:
RBW: 300 kHz
VBW: 300 kHz
Sweep time: Auto
Sweep Mode: Continuous sweep
Detect mode: Peak
Trace mode: Max hold
2. EUT have transmitted the maximum modulation signal and fixed channelize. SA set to 99% of occupied bandwidth to measure occupied bandwidth.

**TEST RESULTS**

Test voltage (V)	TestMode	Antenna	Freq(MHz)	Result [MHz]	Limit [MHz]	Verdict
DC 5.00V	11B	Ant1	2412	13.467	≤26	PASS
			2442	13.427	≤26	PASS
			2472	13.347	≤26	PASS
	11G	Ant1	2412	16.783	≤26	PASS
			2442	16.703	≤26	PASS
			2472	16.743	≤26	PASS
	11N20SISO	Ant1	2412	17.822	≤26	PASS
			2442	17.782	≤26	PASS
			2472	17.702	≤26	PASS



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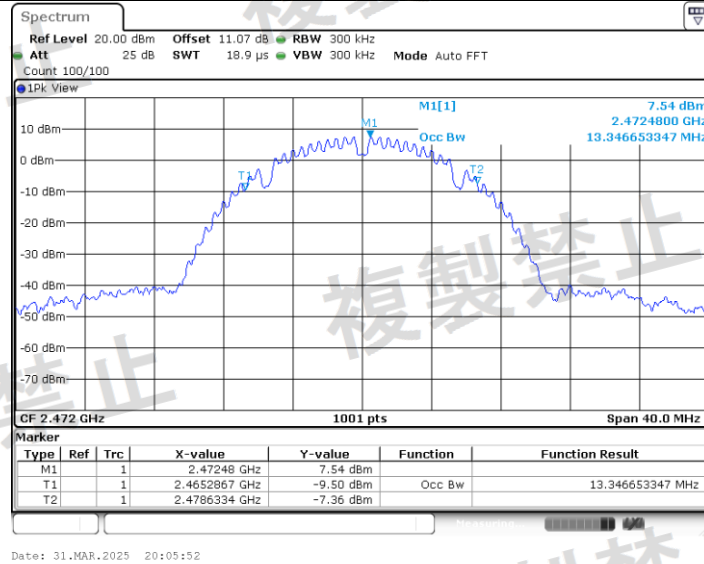
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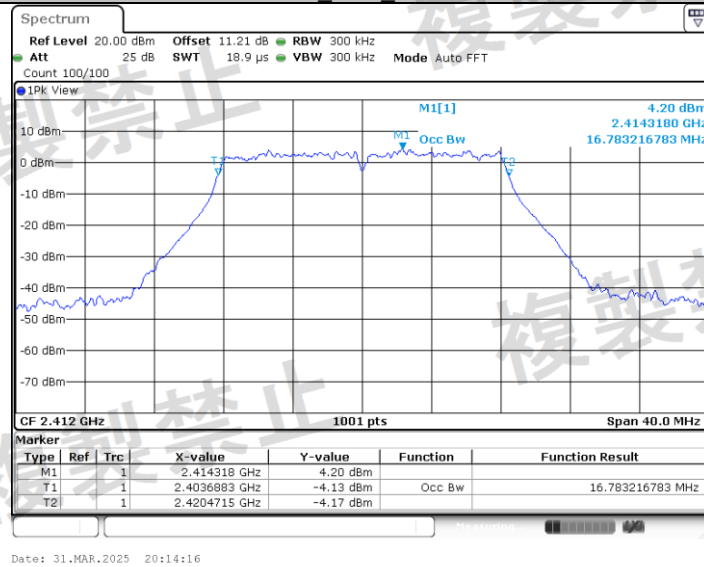
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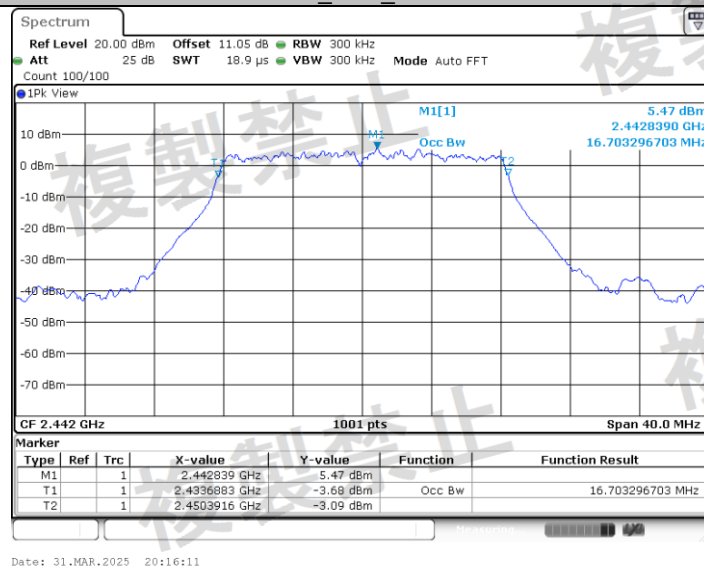
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11G_Ant1_2412



11G_Ant1_2442



11G_Ant1_2472

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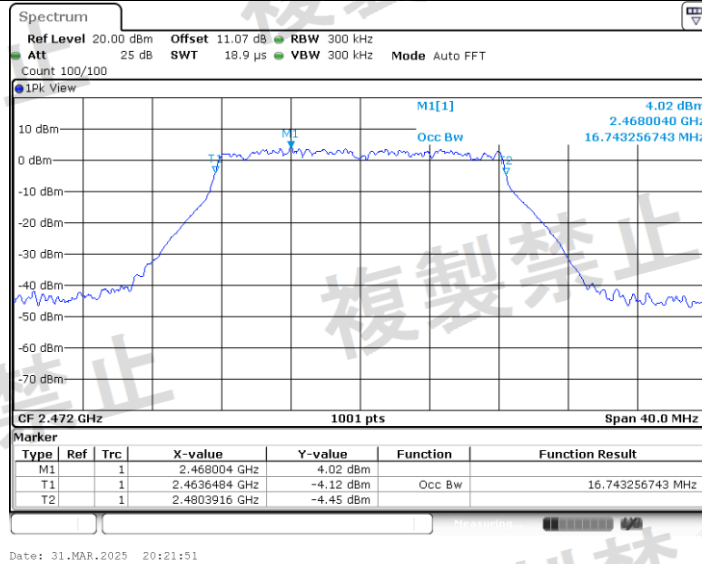
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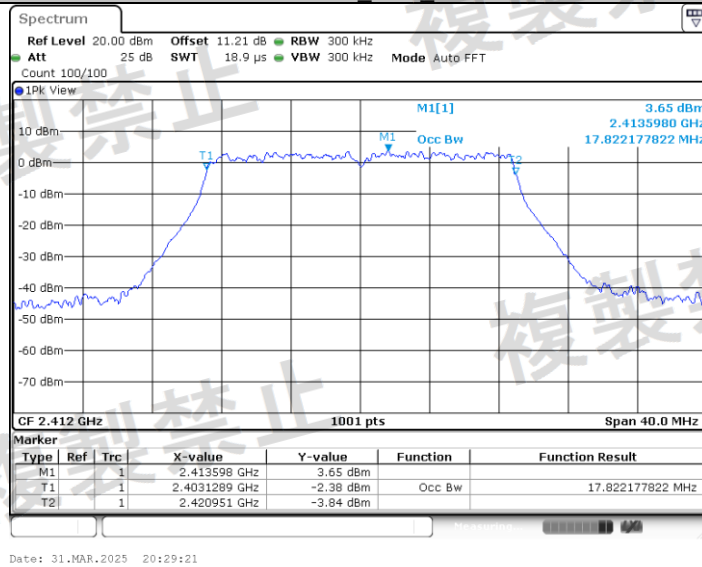
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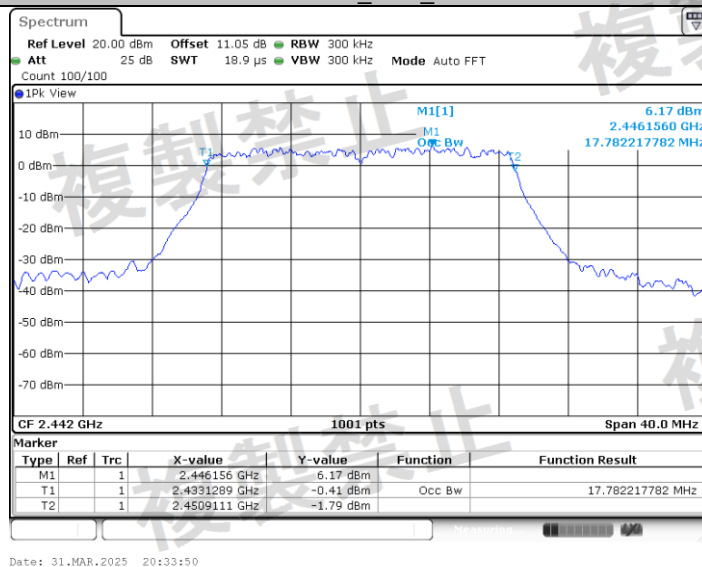
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11N20SISO_Ant1_2412



11N20SISO_Ant1_2442



11N20SISO_Ant1_2472

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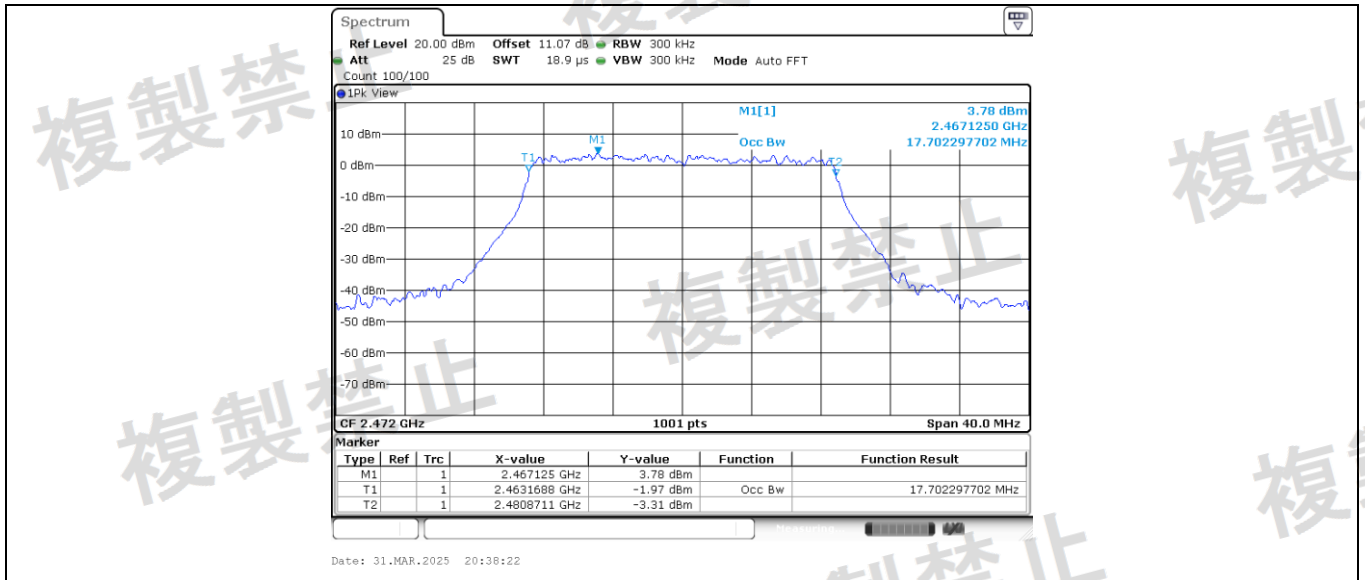
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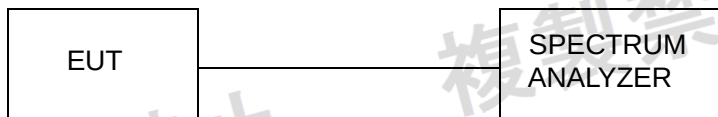


3.4. Spreading Bandwidth

LIMIT

- Spread Bandwidth: ≥ 500 kHz.

TEST CONFIGURATION



TEST PROCEDURE

1. Setting of SA is following as follow:
RBW: 300 kHz
VBW: 300 kHz
Sweep time: Auto
Sweep Mode: Continuous sweep
Detect mode: Peak
Trace mode: Max hold
2. EUT have transmitted the maximum modulation signal and fixed channelize. SA set to 90% of occupied bandwidth to measure spread bandwidth.

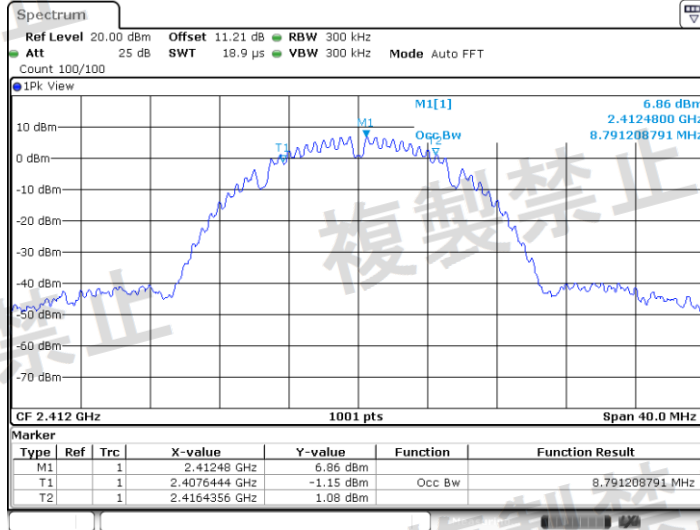
TEST RESULTS

Test voltage (V)	TestMode	Antenna	Freq(MHz)	Result [MHz]	Limit [MHz]	SpreadFactor	Limit	Verdict
DC 5.00V	11B	Ant1	2412	8.791	≥ 0.5	6.393	>5	PASS
			2442	8.751	≥ 0.5	6.364	>5	PASS
			2472	8.791	≥ 0.5	6.393	>5	PASS
	11G	Ant1	2412	14.705	≥ 0.5	---	---	PASS
			2442	14.825	≥ 0.5	---	---	PASS
			2472	14.745	≥ 0.5	---	---	PASS
	11N20SISO	Ant1	2412	15.824	≥ 0.5	---	---	PASS
			2442	15.584	≥ 0.5	---	---	PASS
			2472	15.624	≥ 0.5	---	---	PASS

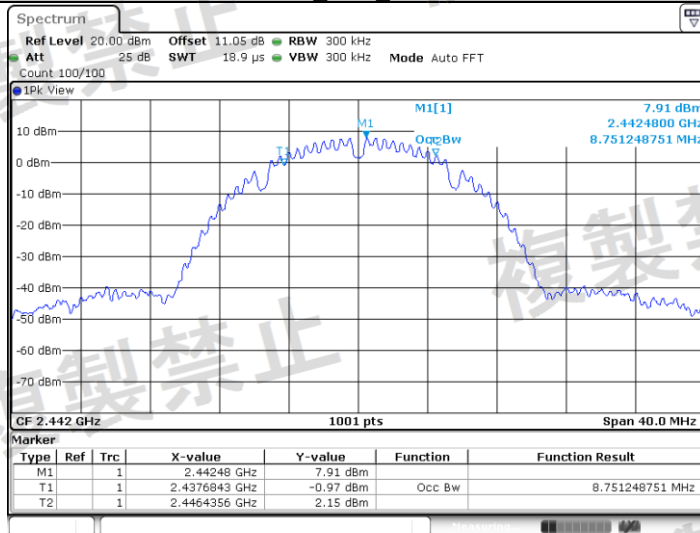
Note: Spreading Rate=Spread Bandwidth/modulation rate. The modulation rate: MR=1.375 for 802.11b.



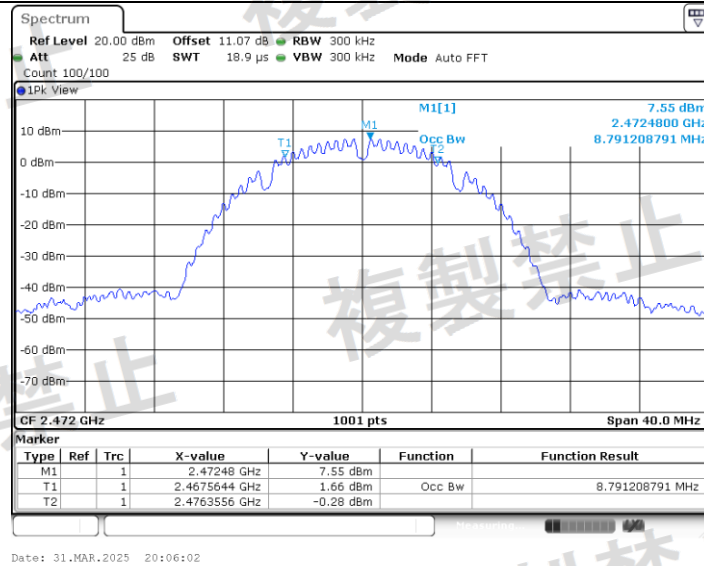
11B_Ant1_2412



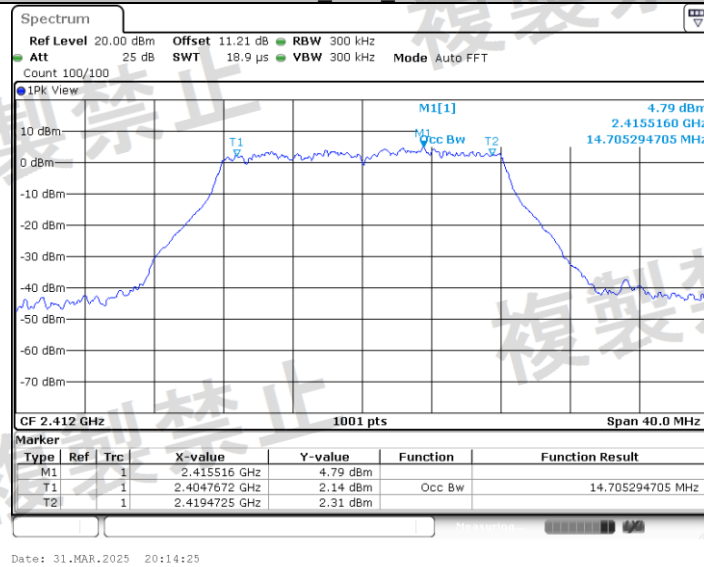
11B_Ant1_2442



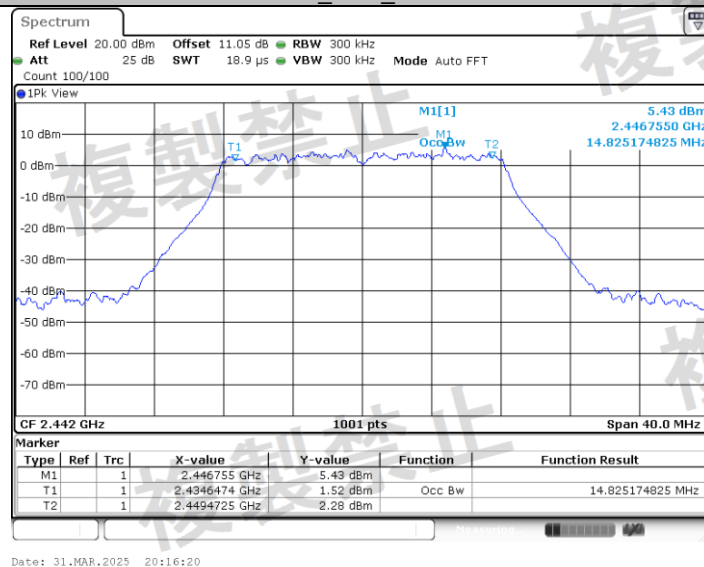
11B_Ant1_2472



11G_Ant1_2412



11G_Ant1_2442



11G_Ant1_2472

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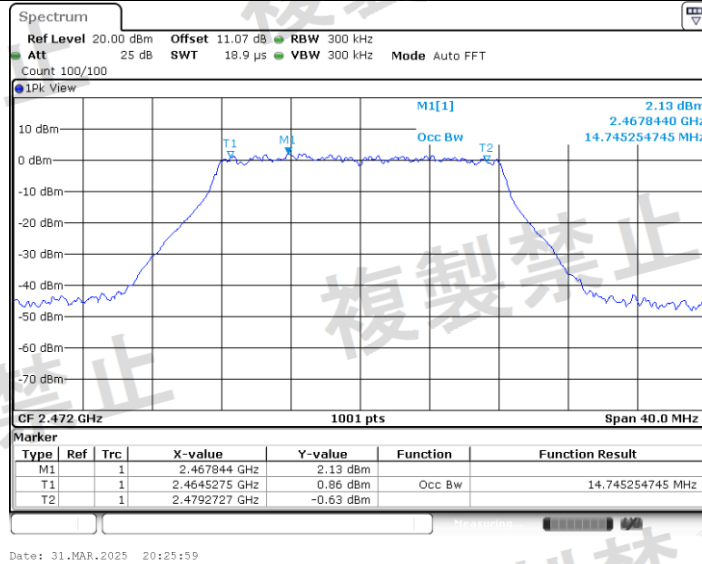
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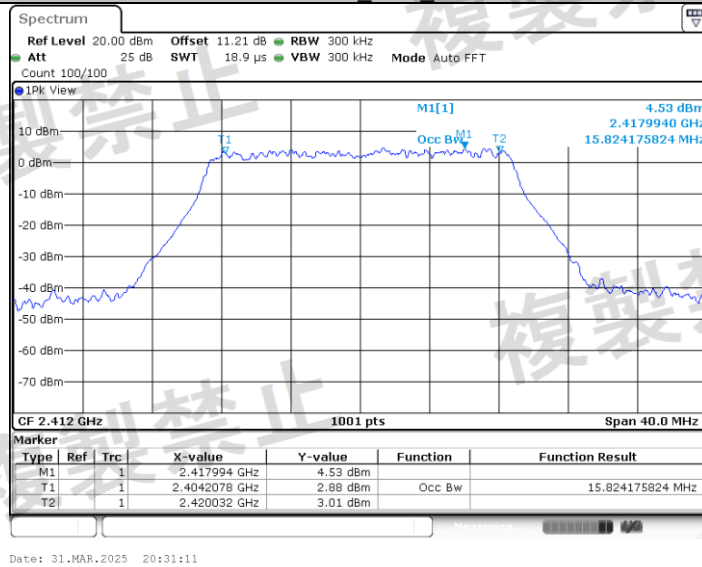
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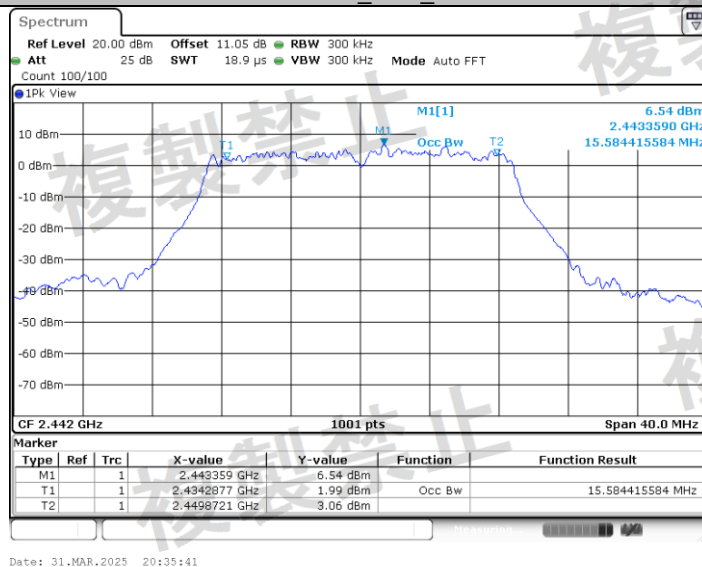
TRF No: CTC-TR-070_A1



11N20SISO_Ant1_2412



11N20SISO_Ant1_2442



11N20SISO_Ant1_2472

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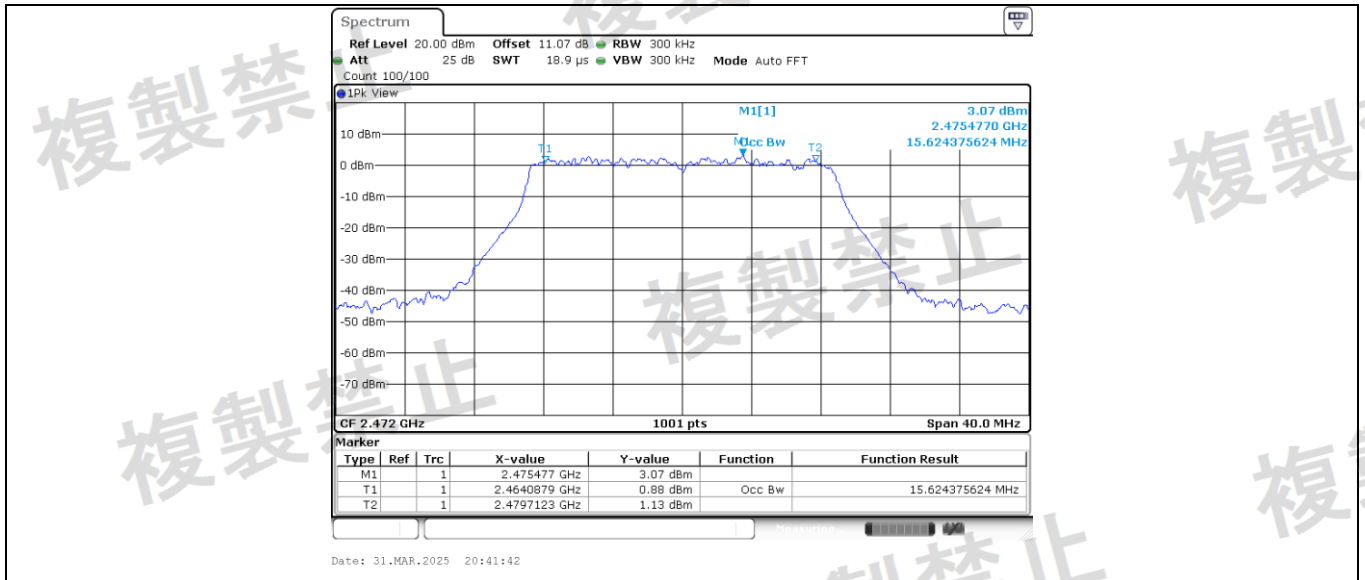
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3.5. Transmitter Spurious Emission Strength and Unwanted Emission Intensity

LIMIT

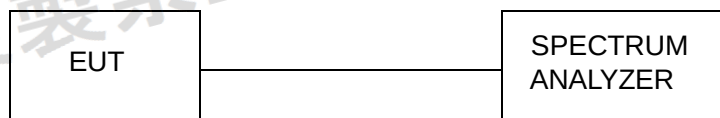
30MHz to 2387 MHz: 2.5 μ W/MHz (-26dBm) or less

2387 to 2400 MHz: 25 μ W/MHz (-16dBm) or less

2483.5 Through 2496.5 MHz: 25 μ W/MHz (-16dBm) or less

Over 2496.5 MHz: 2.5 μ W/MHz (-26dBm) or less

TEST CONFIGURATION



TEST PROCEDURE

The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram as TEST CONFIGURATION shows.

EUT Condition: Modulation

Spectrum Condition:

Frequency: 30MHz-12.5GHz

RBW: 1MHz

VBW: 1MHz

Sweep time: Auto

Detector mode: Peak

Indication mode: Max hold

TEST RESULTS

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Measurement Data:

DC 5V									
Test Mode	Antenna	Freq (MHz)	Freq.Range [MHz]	Freq. (MHz)	Result [dBm/MHz]	Limit [dBm/MHz]	Result [μW/MHz]	Limit [μW/MHz]	Verdict
11B	Ant1	2412	30~2387	2383.465	-44.41	≤-26	0.03622	≤2.5	PASS
			1000~2387	2386.653	-37.34	≤-26	0.18450	≤2.5	PASS
			2387~2400	2399.883	-26.55	≤-16	2.21309	≤25	PASS
			2483.5~2496.5	2489.246	-38.91	≤-16	0.12853	≤25	PASS
			2496.5~12500	4823.814	-29.45	≤-26	1.13501	≤2.5	PASS
		2442	30~2387	2369.323	-46.04	≤-26	0.02489	≤2.5	PASS
			2387~2400	2394.988	-39.91	≤-16	0.10209	≤25	PASS
			2483.5~2496.5	2486.301	-39.11	≤-16	0.12274	≤25	PASS
			2496.5~12500	4883.835	-29.18	≤-26	1.20781	≤2.5	PASS
		2472	30~2387	2380.518	-46.57	≤-26	0.02203	≤2.5	PASS
			2387~2400	2392.356	-39.37	≤-16	0.11561	≤25	PASS
			2483.5~2496.5	2483.610	-23.86	≤-16	4.11150	≤25	PASS
			2496.5~12500	4943.856	-30.32	≤-26	0.92897	≤2.5	PASS
11G	Ant1	2412	30~2387	2383.465	-40.85	≤-26	0.08222	≤2.5	PASS
			2387~2400	2400.000	-20.95	≤-16	8.03526	≤25	PASS
			2483.5~2496.5	2494.127	-38.08	≤-16	0.15560	≤25	PASS
			2496.5~12500	7240.660	-27.26	≤-26	1.87932	≤2.5	See table below
		2442	30~2387	2360.484	-45.32	≤-26	0.02938	≤2.5	PASS
			2387~2400	2399.642	-38.79	≤-16	0.13213	≤25	PASS
			2483.5~2496.5	2492.996	-38.97	≤-16	0.12677	≤25	PASS
			2496.5~12500	7315.686	-27.91	≤-26	1.61808	≤2.5	See table below
		2472	30~2387	2385.232	-45.82	≤-26	0.02618	≤2.5	PASS
			2387~2400	2398.940	-39.00	≤-16	0.12589	≤25	PASS
			2483.5~2496.5	2483.500	-16.94	≤-16	20.23019	≤25	See table below
			2496.5~12500	7410.219	-35.67	≤-26	0.27102	≤2.5	PASS
11N20SISO	Ant1	2412	30~2387	2387.000	-41.74	≤-26	0.06699	≤2.5	PASS
			2387~2400	2399.954	-20.00	≤-16	10.00000	≤25	PASS
			2483.5~2496.5	2490.916	-38.38	≤-16	0.14521	≤25	PASS
			2496.5~12500	7236.158	-28.04	≤-26	1.57036	≤2.5	See table below
		2442	30~2387	2363.430	-45.15	≤-26	0.03055	≤2.5	PASS
			2387~2400	2392.148	-39.25	≤-16	0.11885	≤25	PASS
			2483.5~2496.5	2495.141	-38.87	≤-16	0.12972	≤25	PASS
			2496.5~12500	7315.686	-27.91	≤-26	1.61808	≤2.5	See table below
		2472	30~2387	910.929	-44.60	≤-26	0.03467	≤2.5	PASS
			2387~2400	2399.954	-38.60	≤-16	0.13804	≤25	PASS
			2483.5~2496.5	2483.500	-17.81	≤-16	16.55770	≤25	See table below
			2496.5~12500	7415.221	-33.56	≤-26	0.44055	≤2.5	PASS

Test Result_Step2

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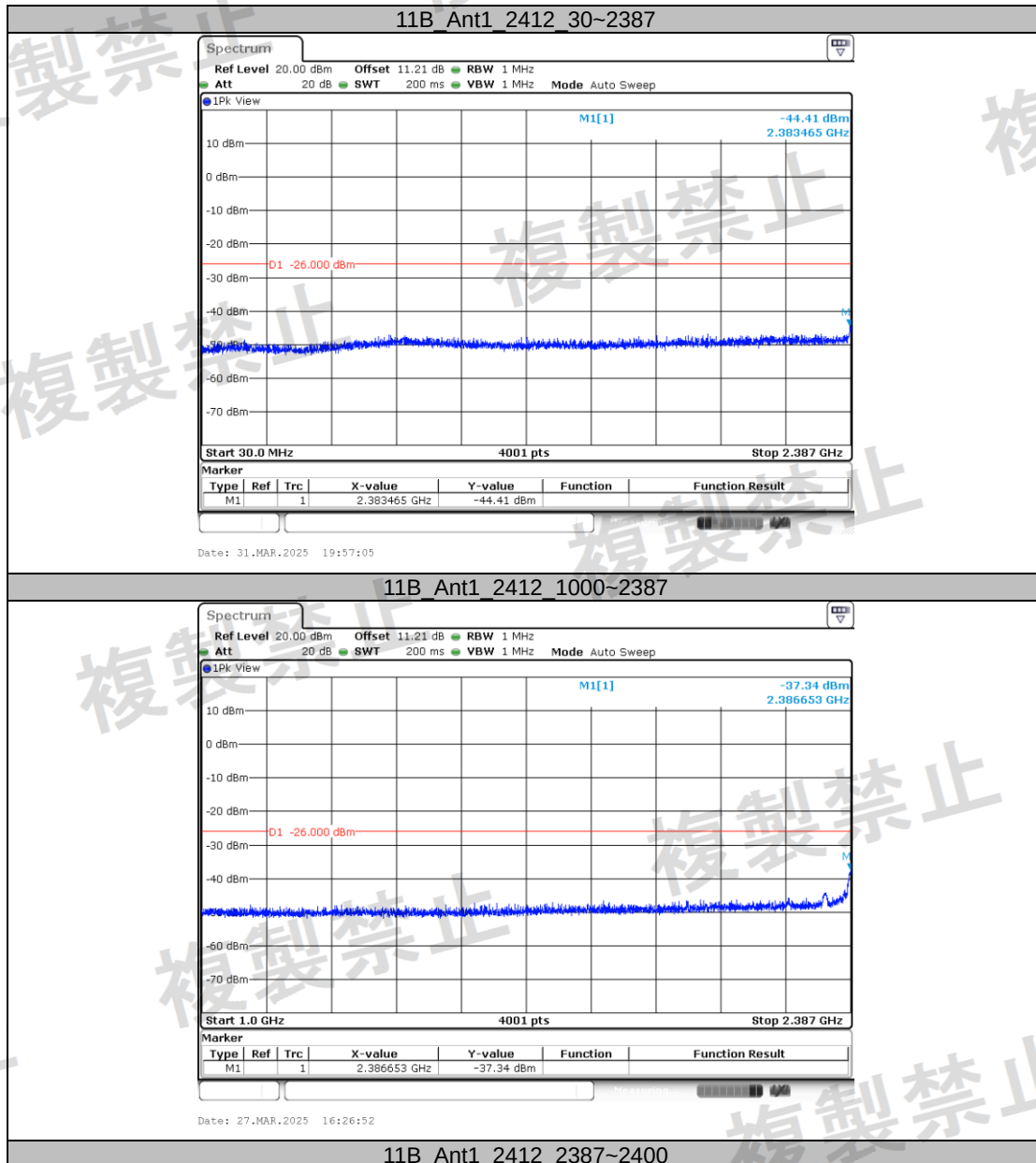
TRF No: CTC-TR-070_A1



TestMode	PreScan In Ant	Freq [MHz]	Ant	Freq. [MHz]	Result [dBm/MHz]	Limit [dBm/MHz]	Result [μW/MHz]	Limit [μW/MHz]	Verdict
11G	Ant1	2412	Ant1	7240.98	-41.76	≤-26	0.06668	≤2.5	PASS
		2442	Ant1	7324.10	-40.81	≤-26	0.08299	≤2.5	PASS
		2472	Ant1	2483.50	-35.55	≤-16	0.27861	≤25	PASS
11N20SISO	Ant1	2412	Ant1	7246.61	-42.09	≤-26	0.06180	≤2.5	PASS
		2442	Ant1	7326.70	-38.94	≤-26	0.12764	≤2.5	PASS
		2472	Ant1	2483.50	-34.24	≤-16	0.37670	≤25	PASS



Test plot as follows:



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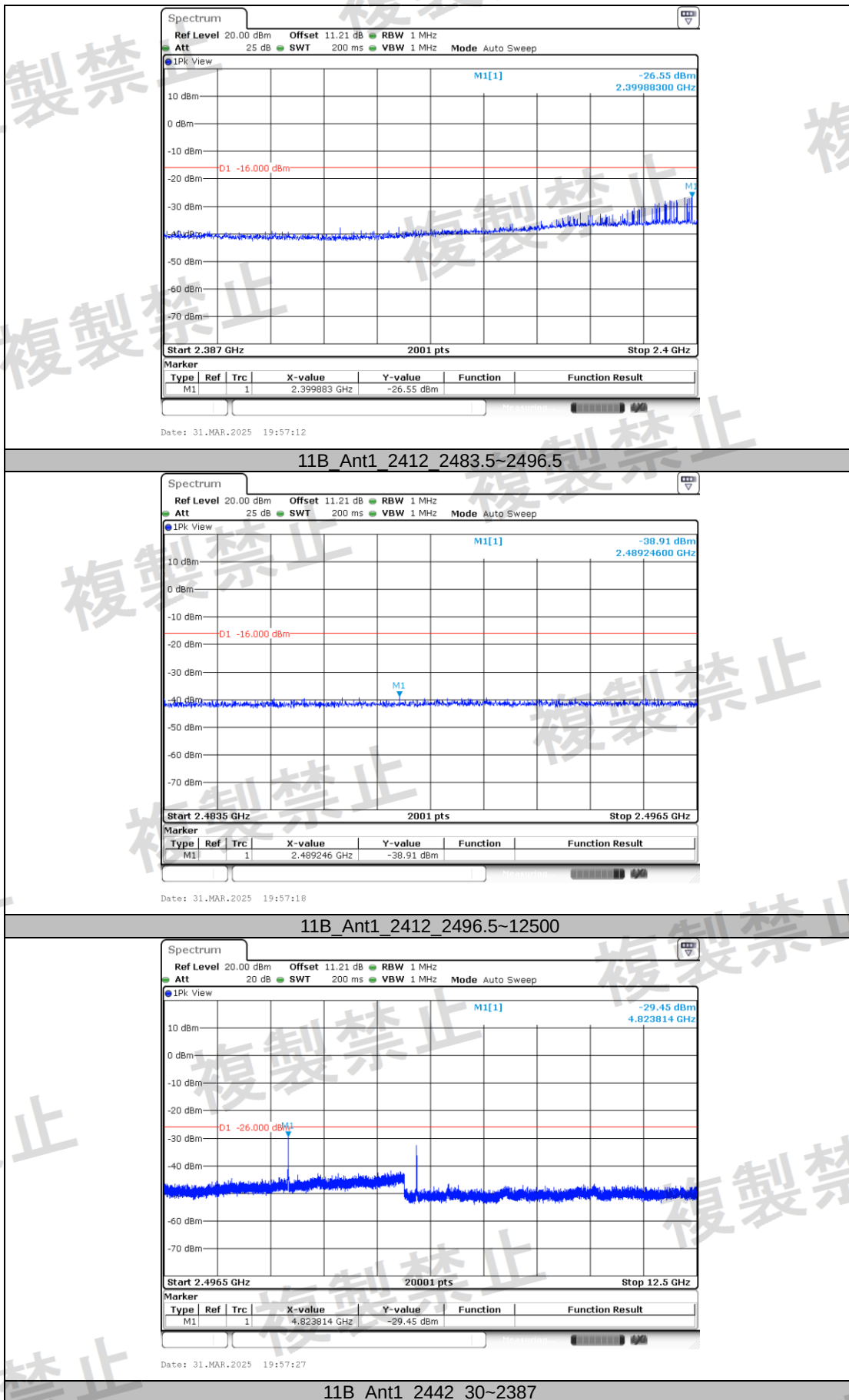
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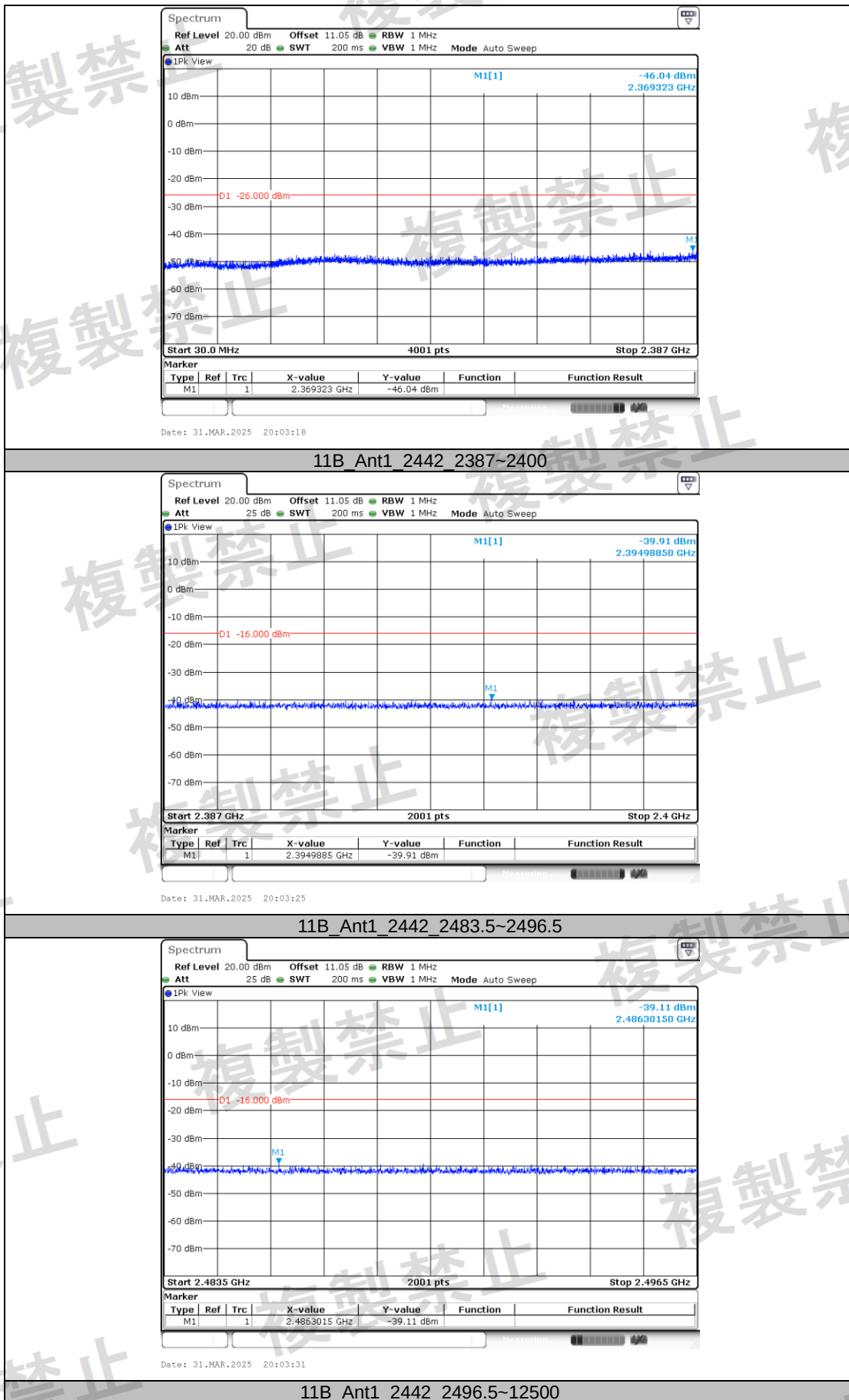
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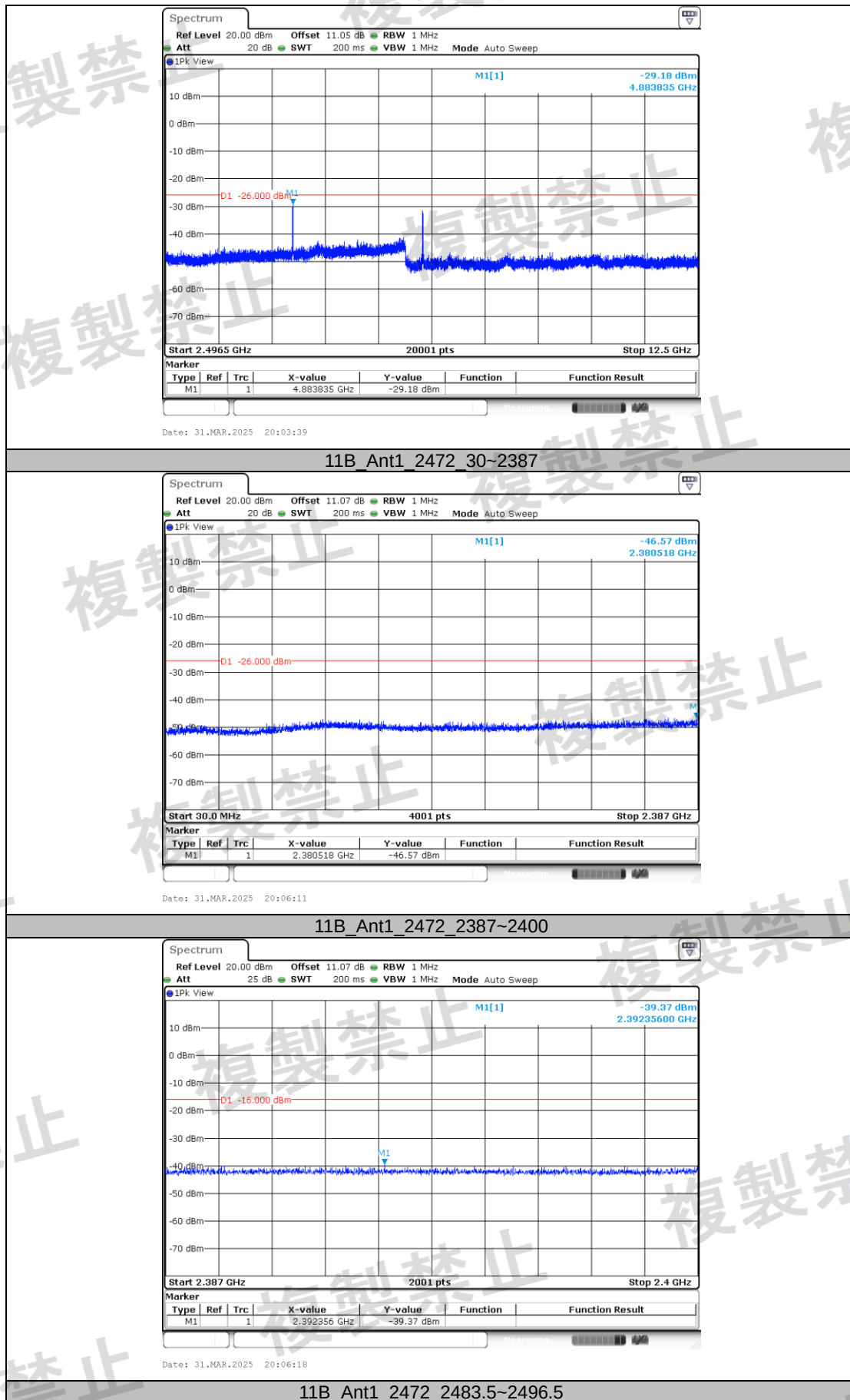
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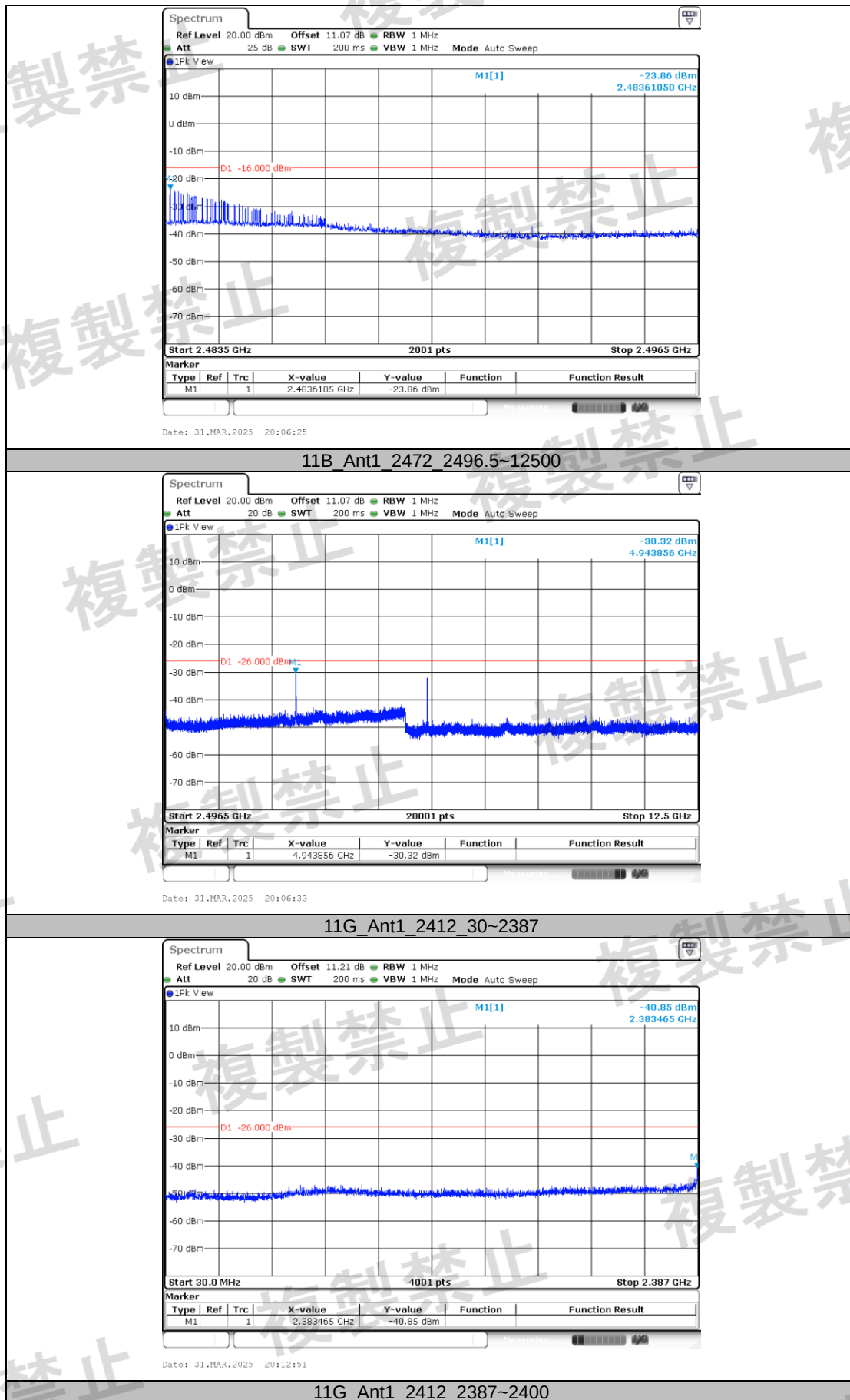
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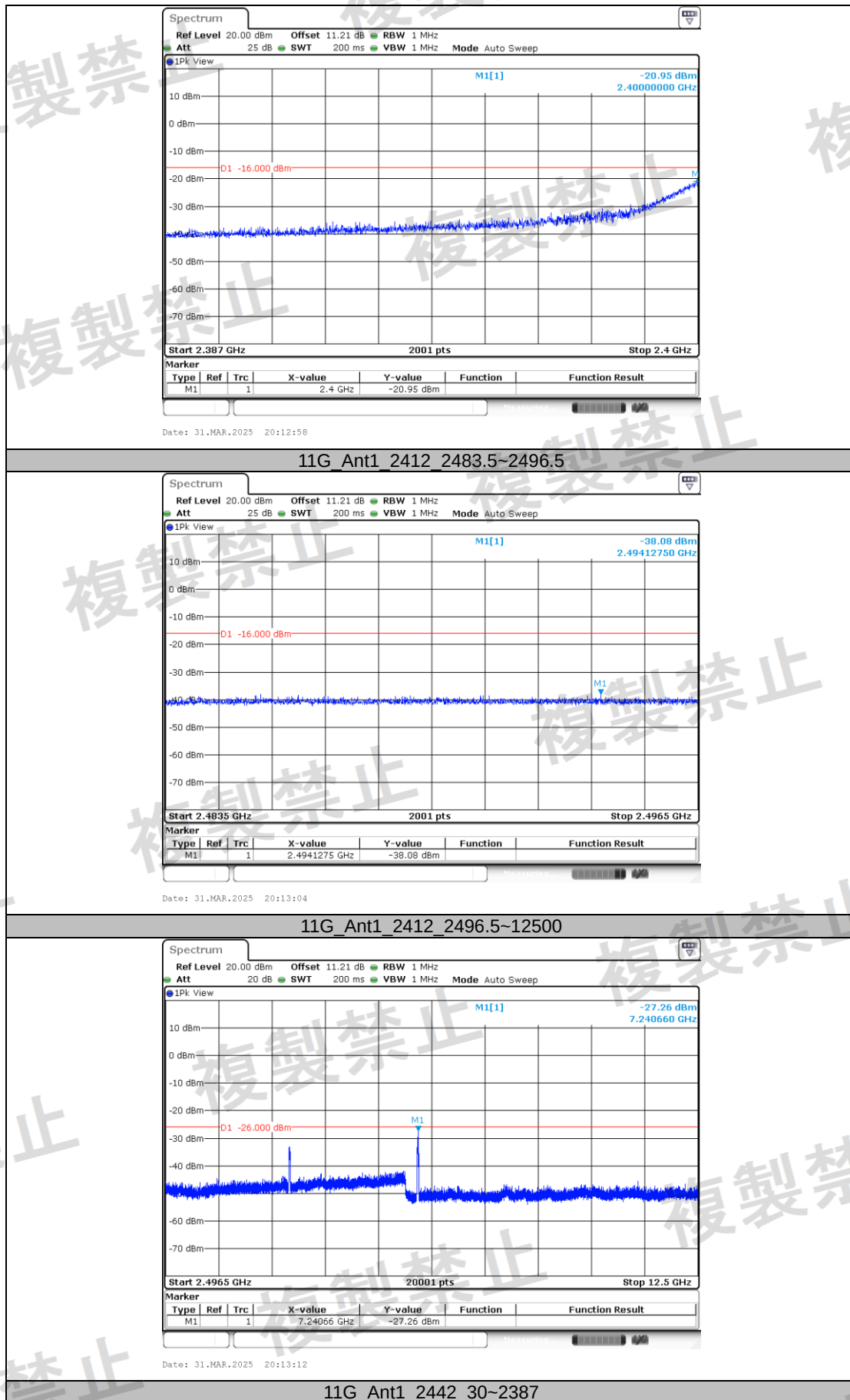
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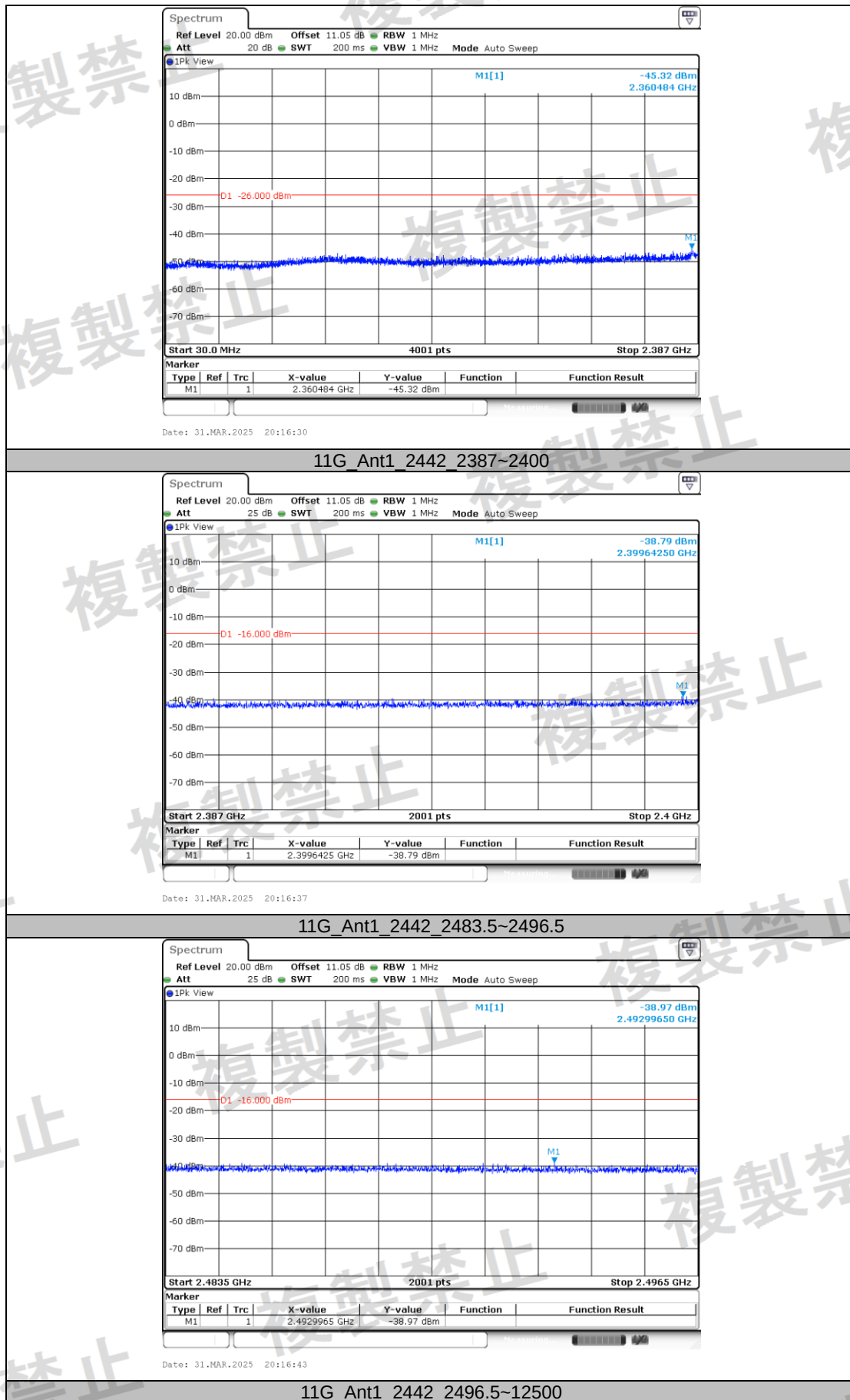
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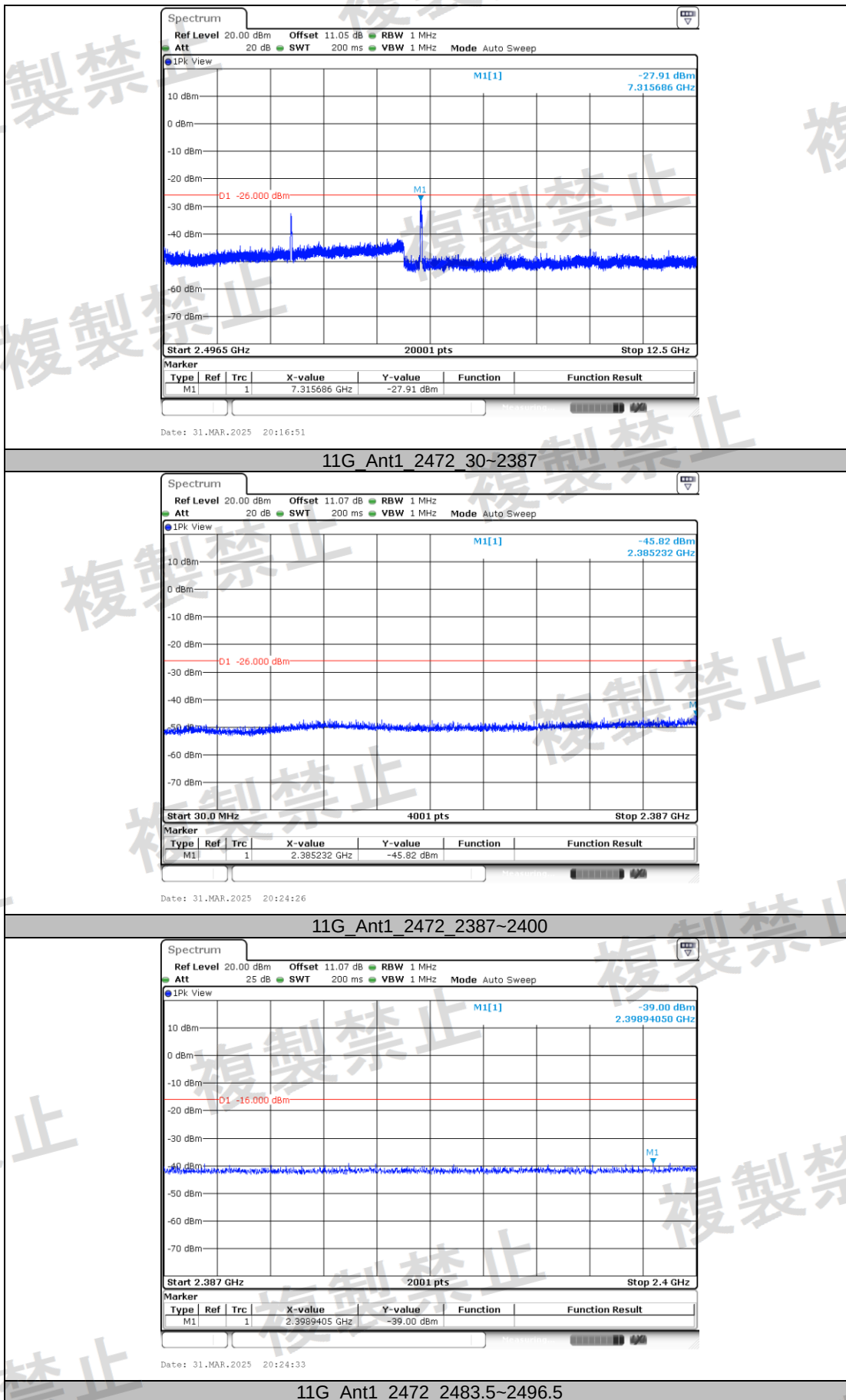
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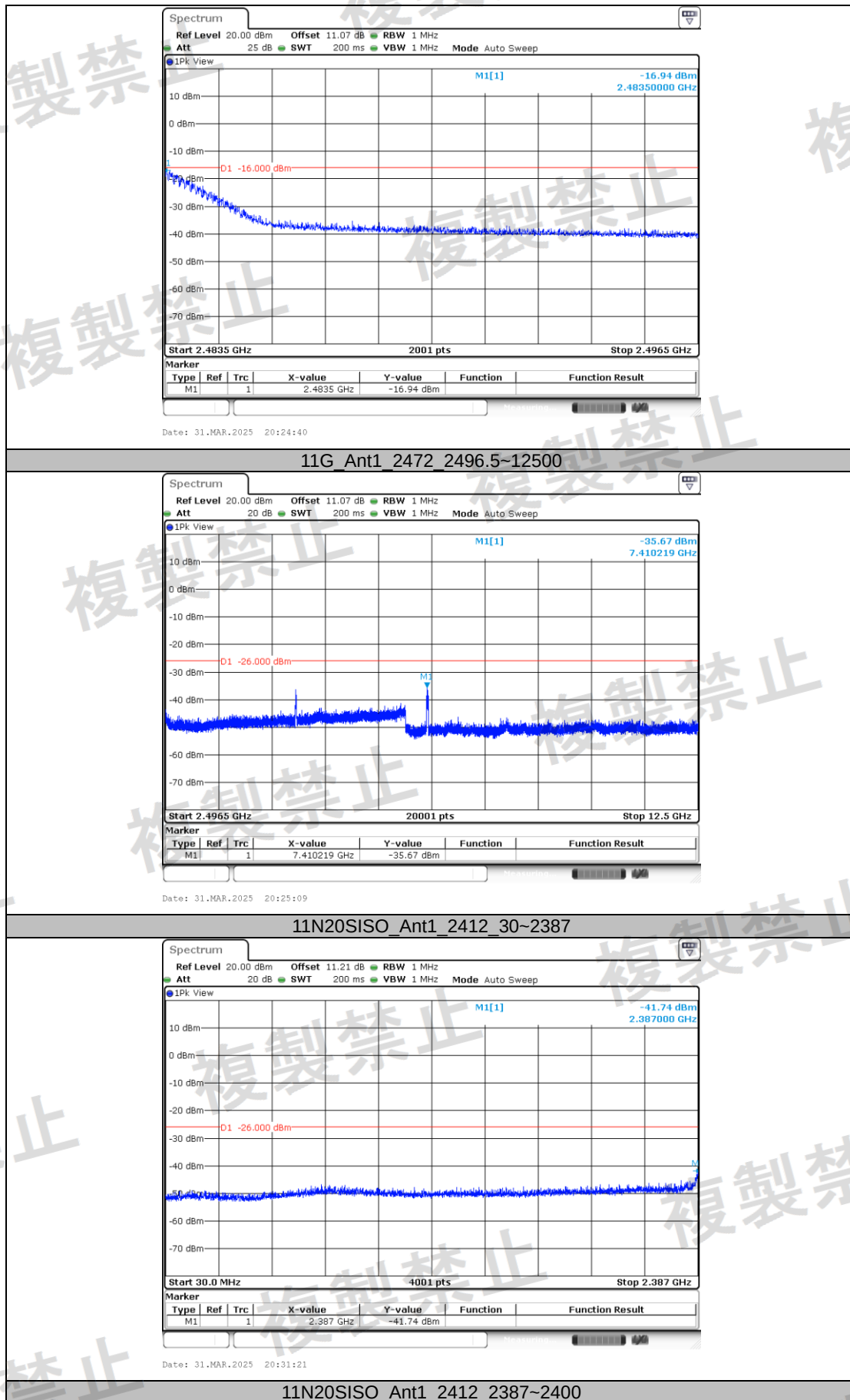
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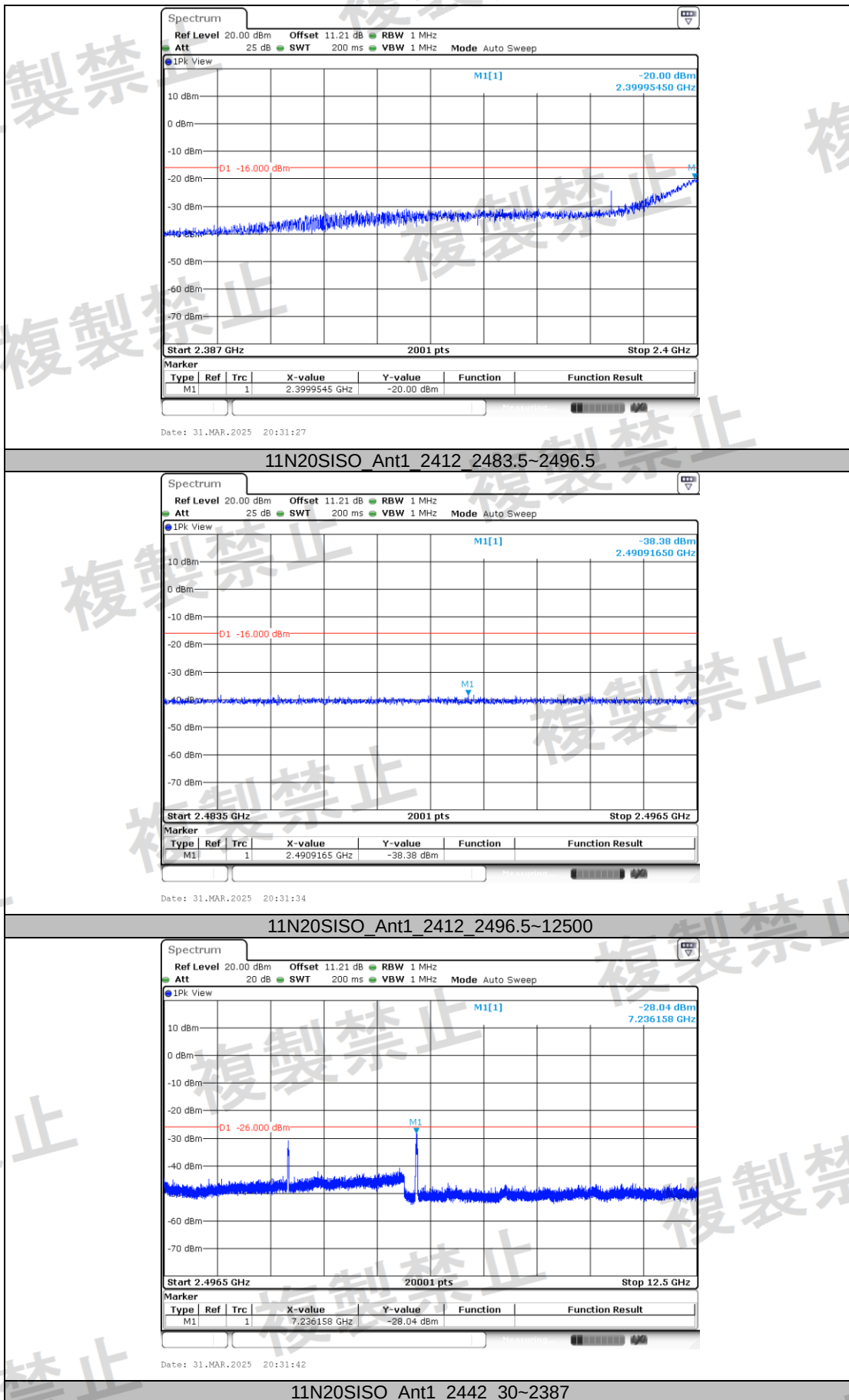
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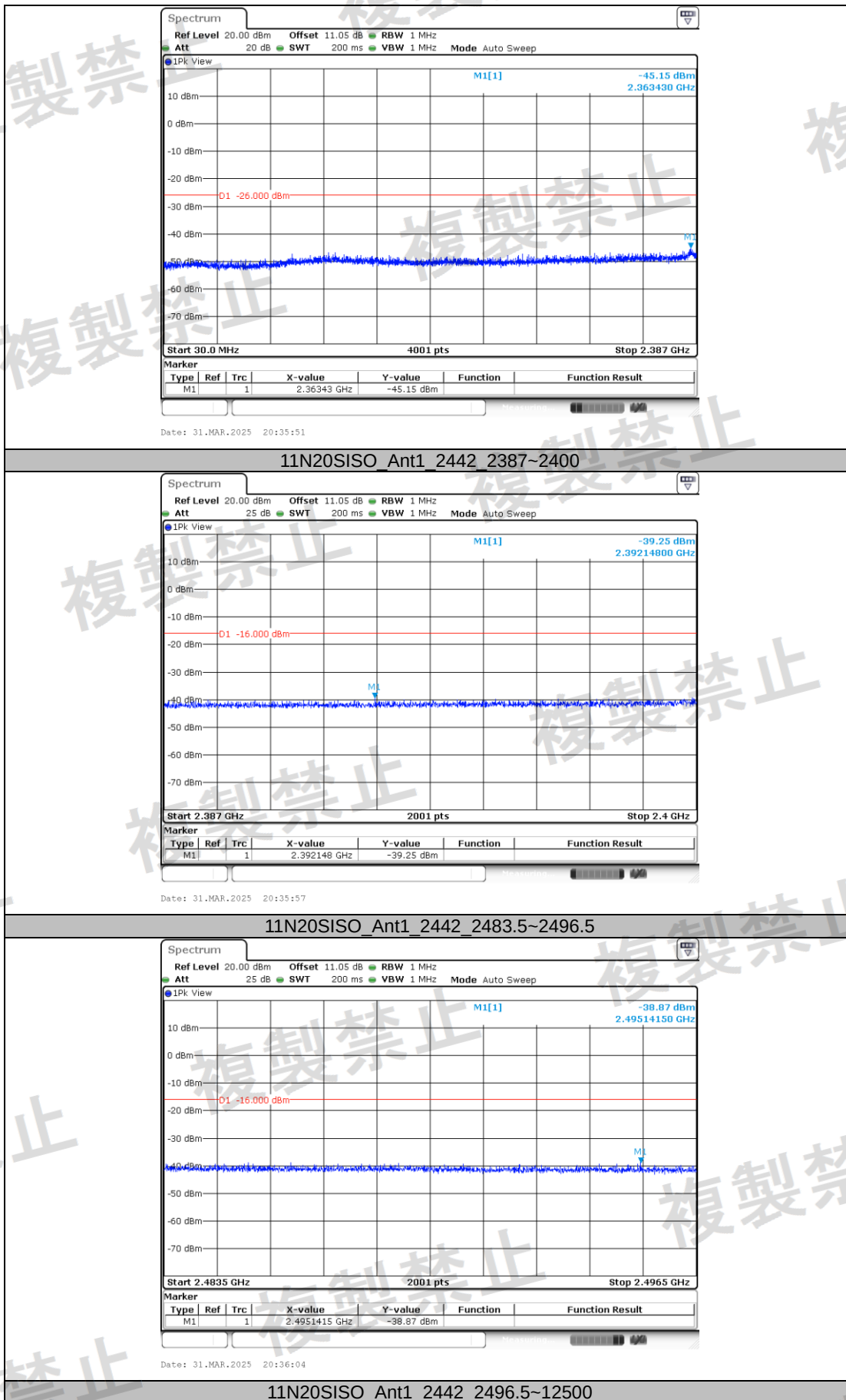
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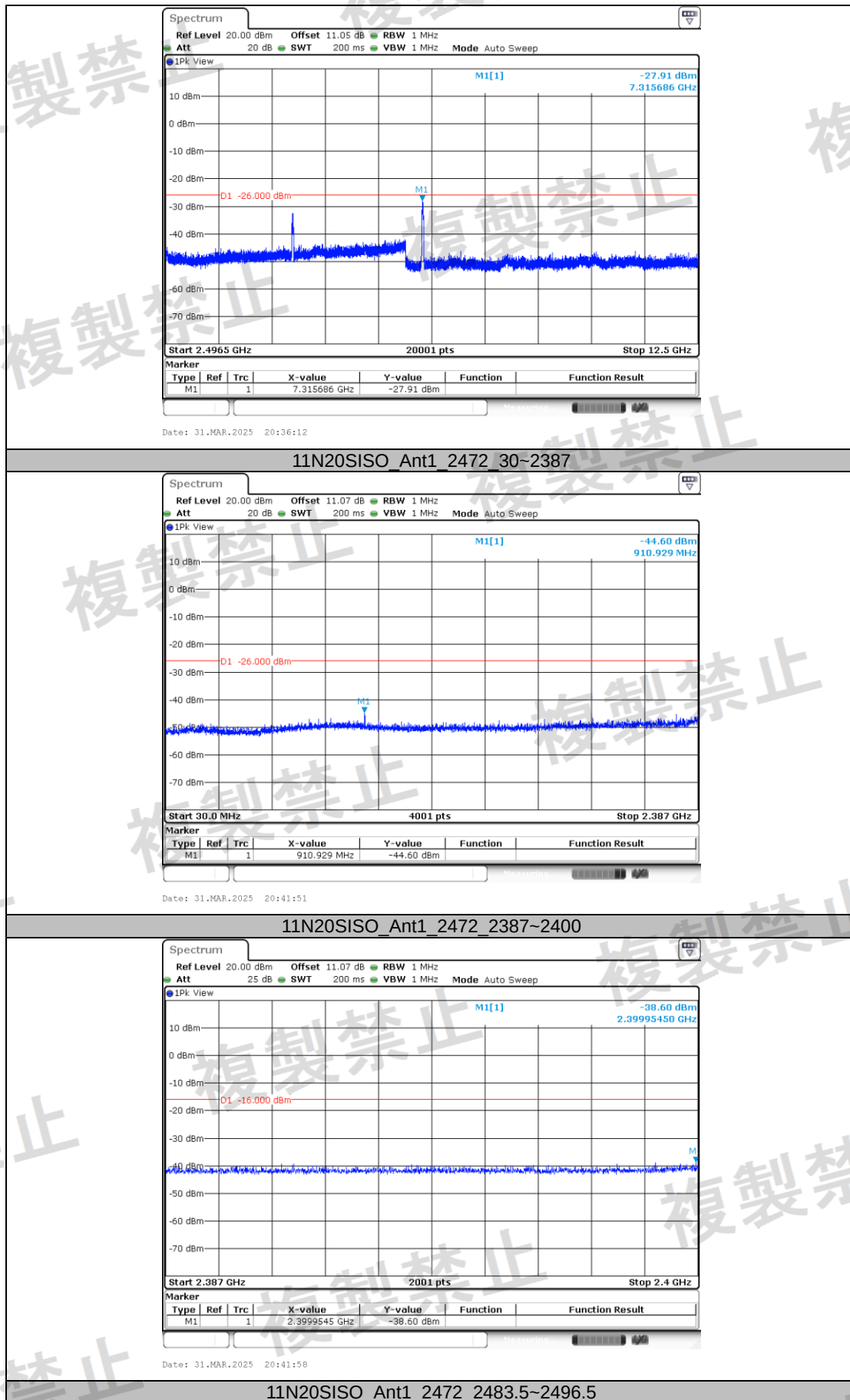
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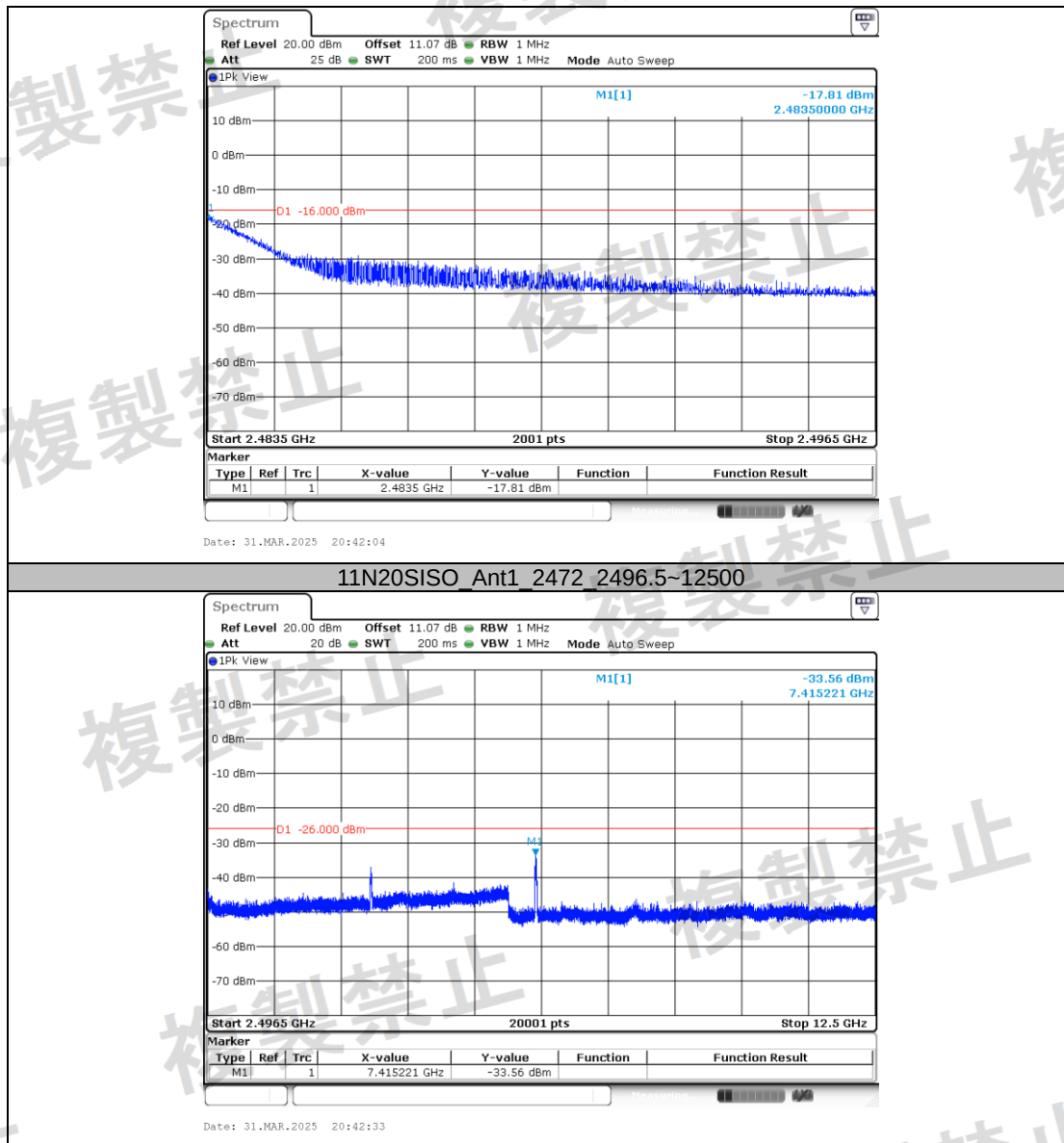
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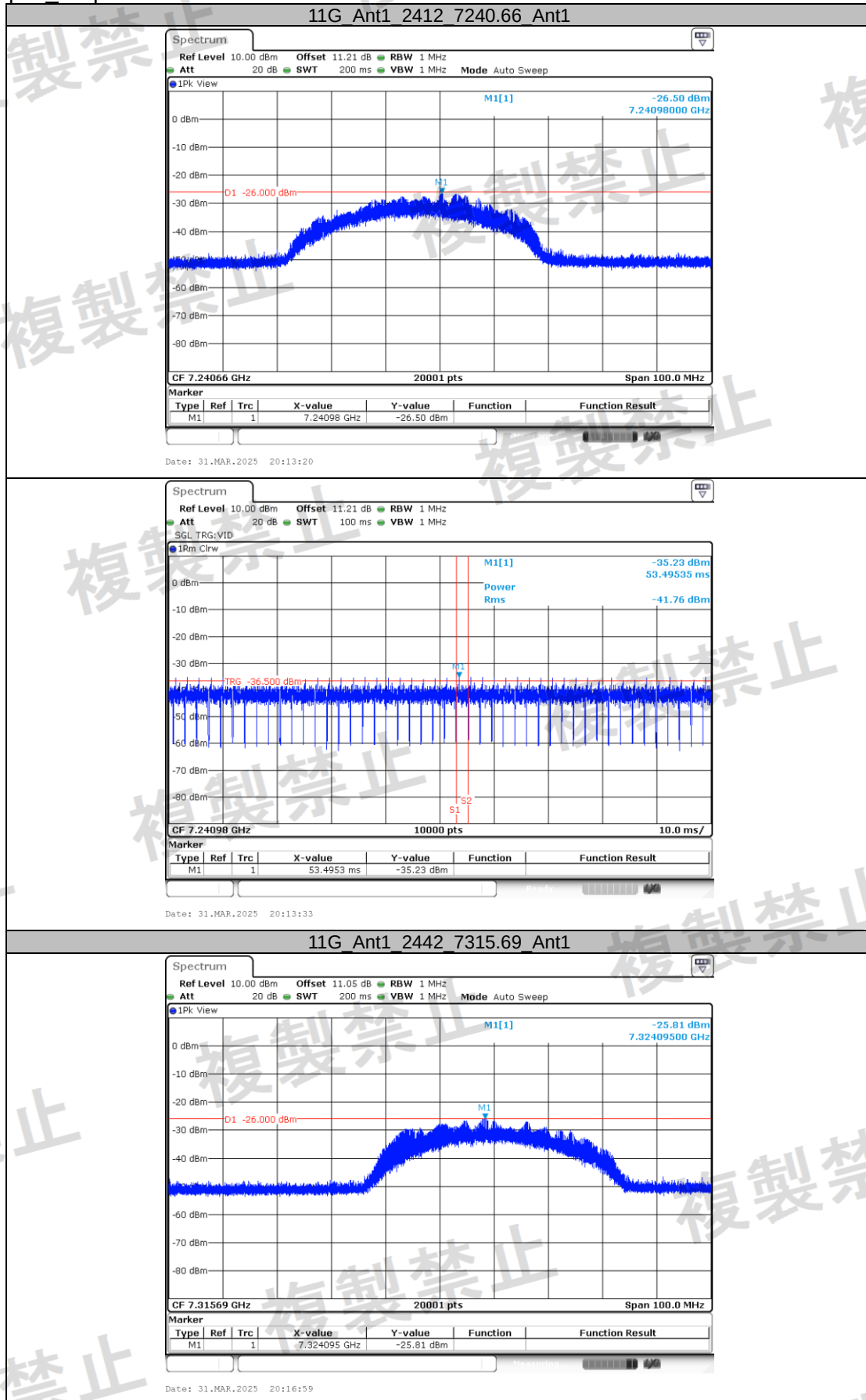
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Test Graphs_Step2



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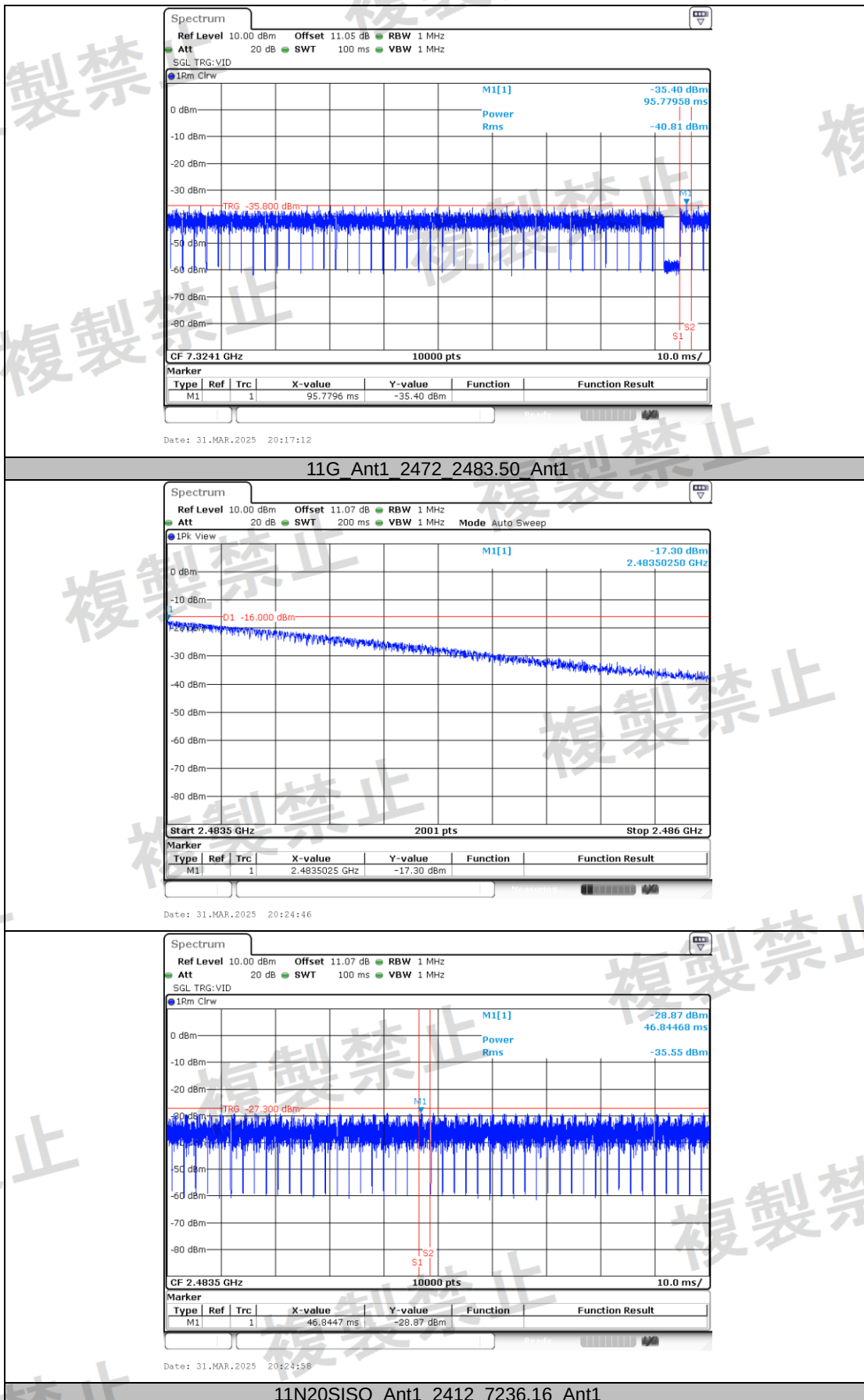
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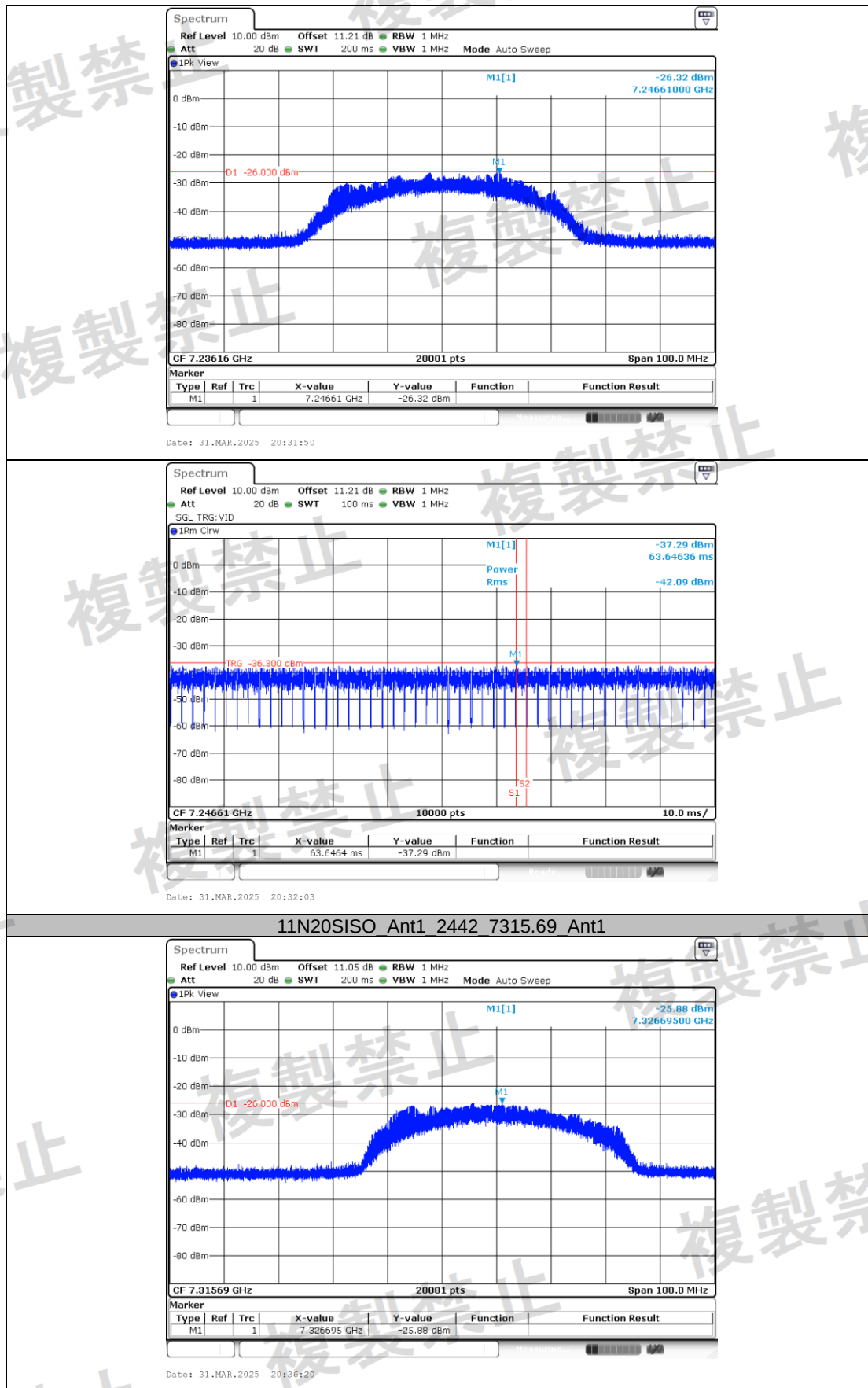
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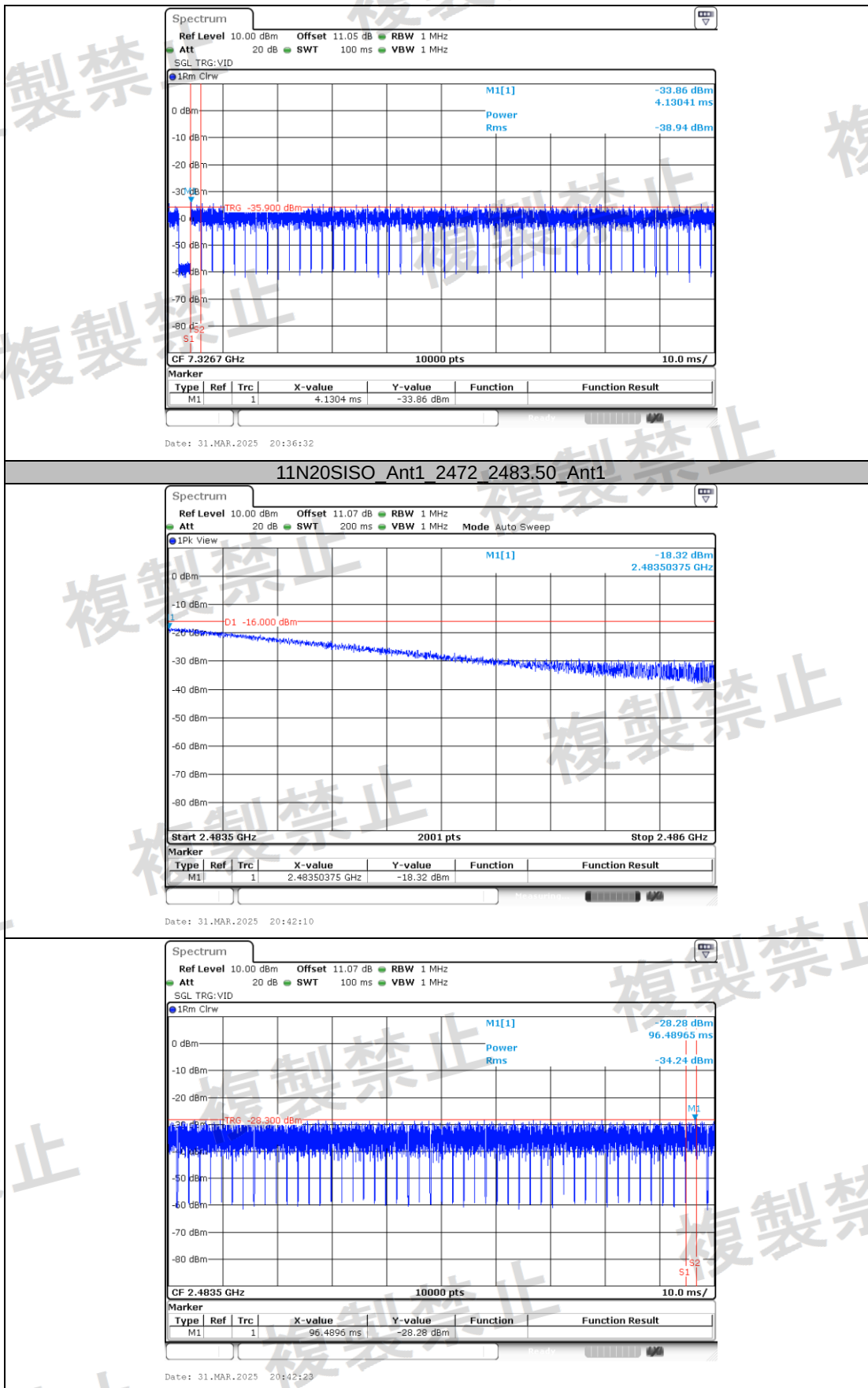
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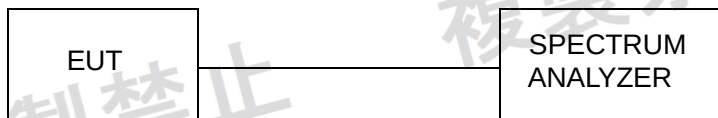
3.6. Receiver Spurious Emission and Unwanted Emission Intensity

LIMIT

Below 1GHz: 4.0nW (-54dBm) or less

Above 1GHz: 20nW (-47dBm) or less

TEST CONFIGURATION



TEST PROCEDURE

The EUT was directly connected to the spectrum analyzer and antenna output port as show in the block diagram as TEST CONFIGURATION shows.

EUT Condition: Modulation

Spectrum Condition:

Frequency: 30MHz-12.5GHz

RBW: 100kHz (30MHz-1GHz), 1MHz (1GHz-12.5GHz)

VBW: 100kHz (30MHz-1GHz), 1MHz (1GHz-12.5GHz)

Sweep time: Auto

Detector mode: Peak

Indication mode: Max hold

TEST RESULTS

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Measurement Data:

DC 5V									
TestMode	Antenna	Freq (MHz)	Freq.Range [MHz]	Freq. (MHz)	Result [dBm/MHz]	Limit [dBm/MHz]	Result [μW/MHz]	Limit [μW/MHz]	Verdict
11B	Ant1	2412	30~1000	642.010	-67.62	≤-54	0.17298	≤4	PASS
			1000~12500	2460.140	-58.82	≤-47	1.31220	≤20	PASS
		2442	30~1000	951.770	-68.29	≤-54	0.14825	≤4	PASS
			1000~12500	6897.770	-61.92	≤-47	0.64269	≤20	PASS
		2472	30~1000	747.200	-68.45	≤-54	0.14289	≤4	PASS
			1000~12500	6871.320	-61.74	≤-47	0.66988	≤20	PASS
11G	Ant1	2412	30~1000	979.610	-68.13	≤-54	0.15382	≤4	PASS
			1000~12500	6973.090	-61.64	≤-47	0.68549	≤20	PASS
		2442	30~1000	902.810	-67.71	≤-54	0.16943	≤4	PASS
			1000~12500	6954.110	-61.69	≤-47	0.67764	≤20	PASS
		2472	30~1000	685.150	-67.86	≤-54	0.16368	≤4	PASS
			1000~12500	1714.400	-61.24	≤-47	0.75162	≤20	PASS
11N20SISO	Ant1	2412	30~1000	802.460	-67.77	≤-54	0.16711	≤4	PASS
			1000~12500	6918.470	-61.42	≤-47	0.72111	≤20	PASS
		2442	30~1000	713.270	-68.06	≤-54	0.15631	≤4	PASS
			1000~12500	6942.040	-61.44	≤-47	0.71779	≤20	PASS
		2472	30~1000	568.810	-68.21	≤-54	0.15101	≤4	PASS
			1000~12500	6917.890	-61.93	≤-47	0.64121	≤20	PASS

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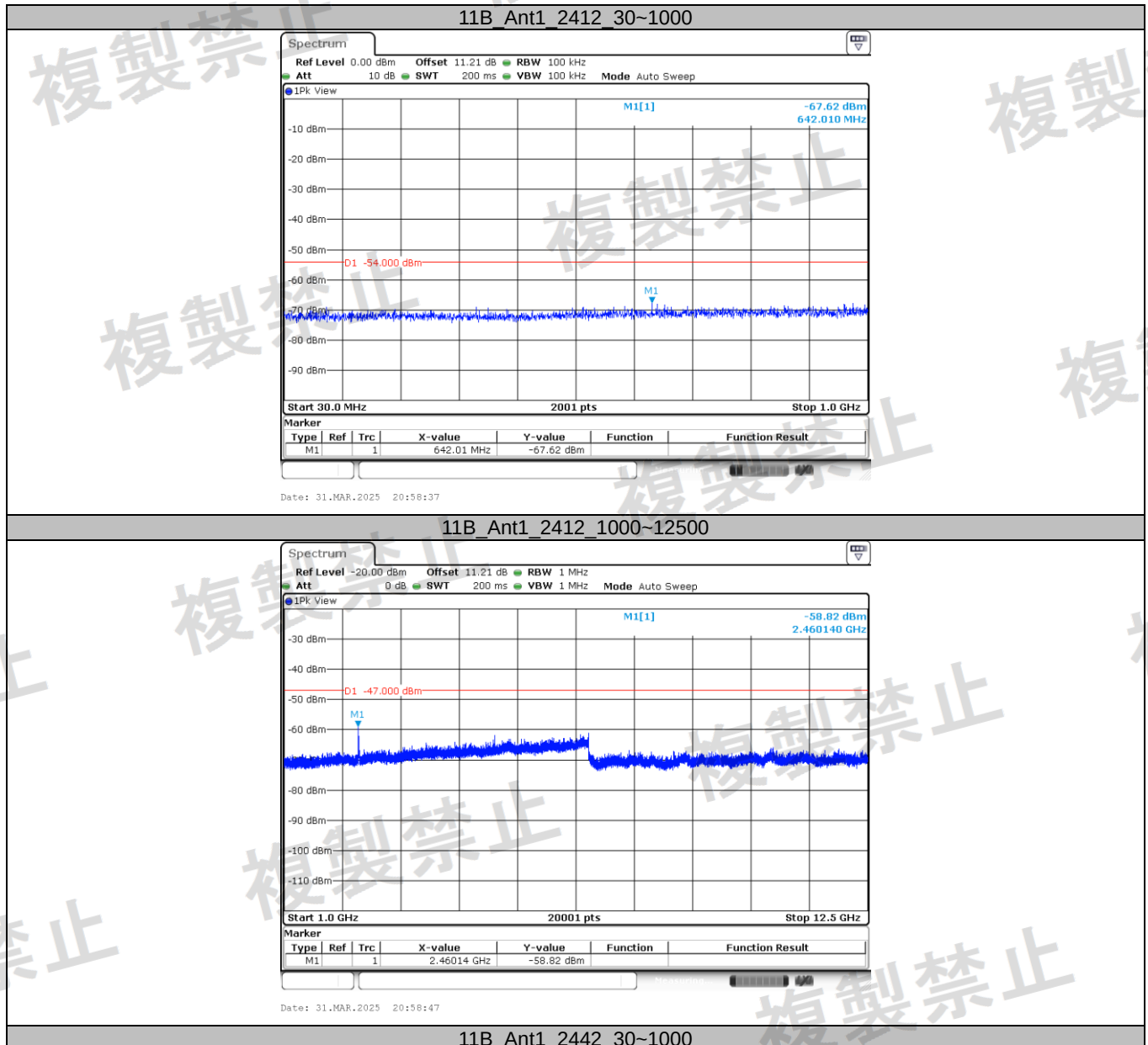
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Test plot as follows:



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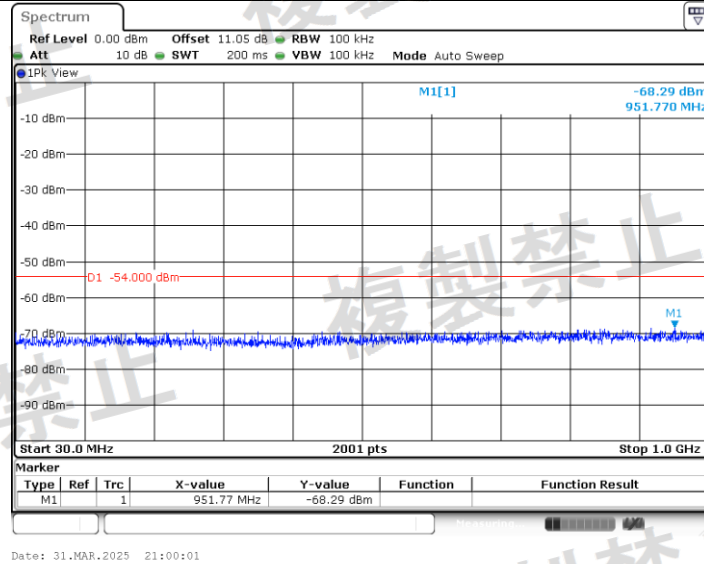
Fax: (86)755-27521011

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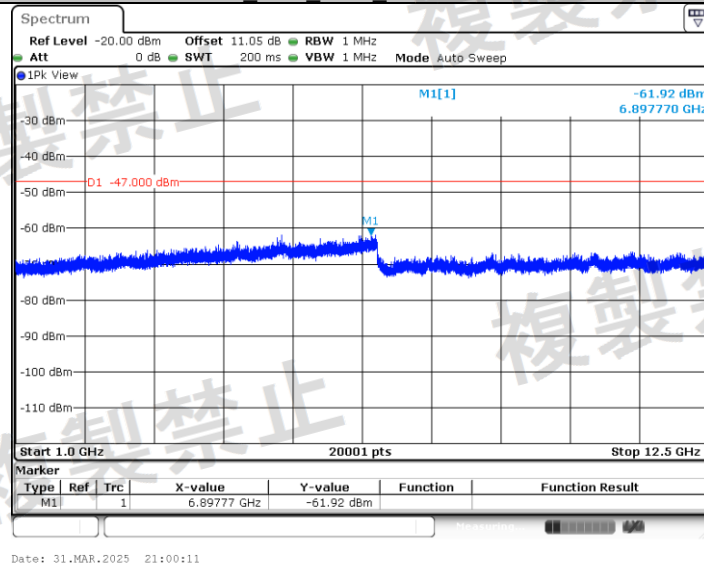
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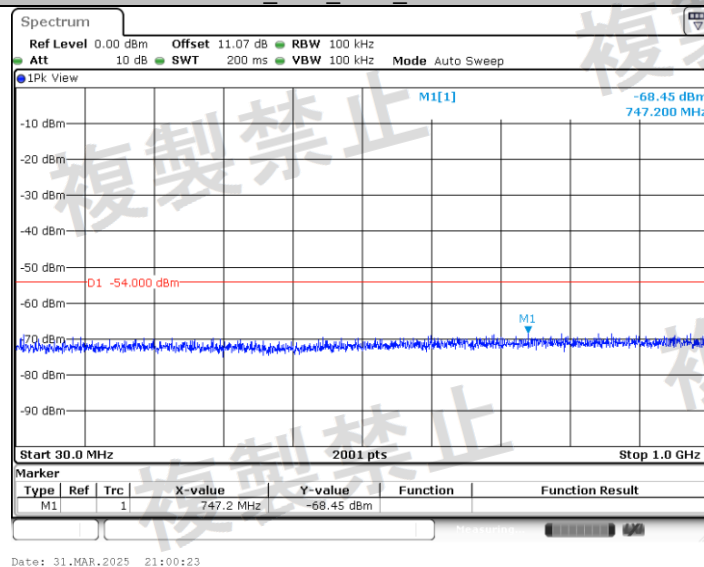
TRF No: CTC-TR-070_A1



11B_Ant1_2442_1000~12500



11B_Ant1_2472_30~1000



11B_Ant1_2472_1000~12500

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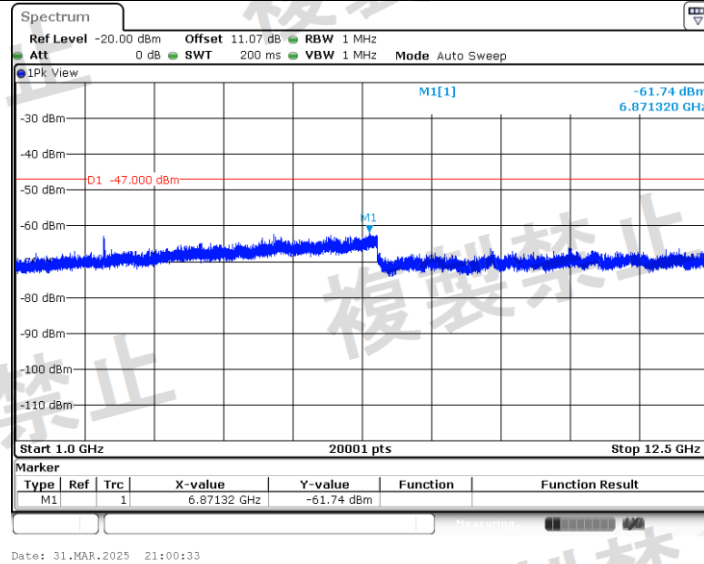
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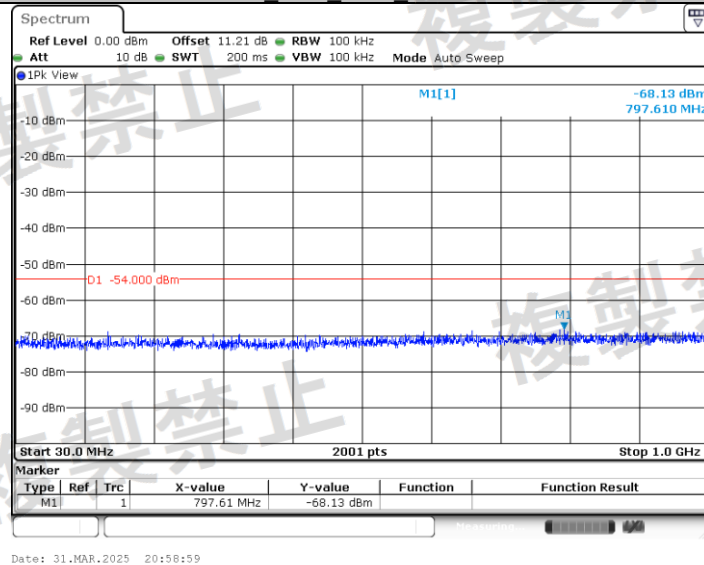
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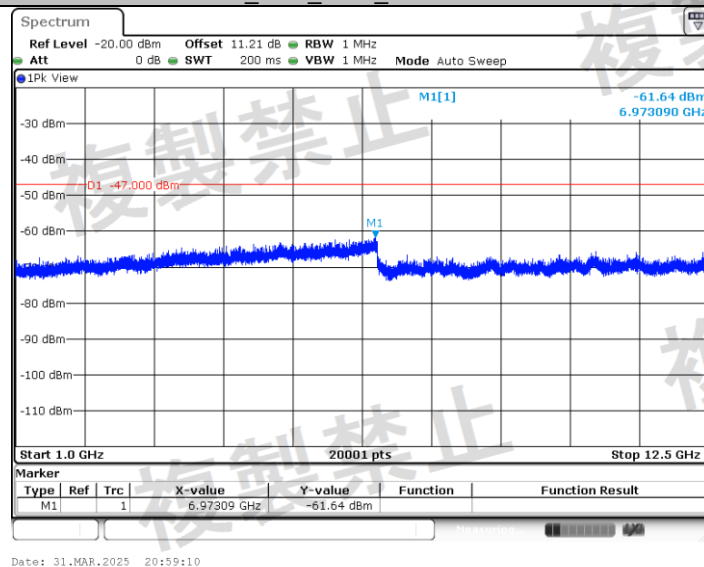
Society: yz.cnca.cn



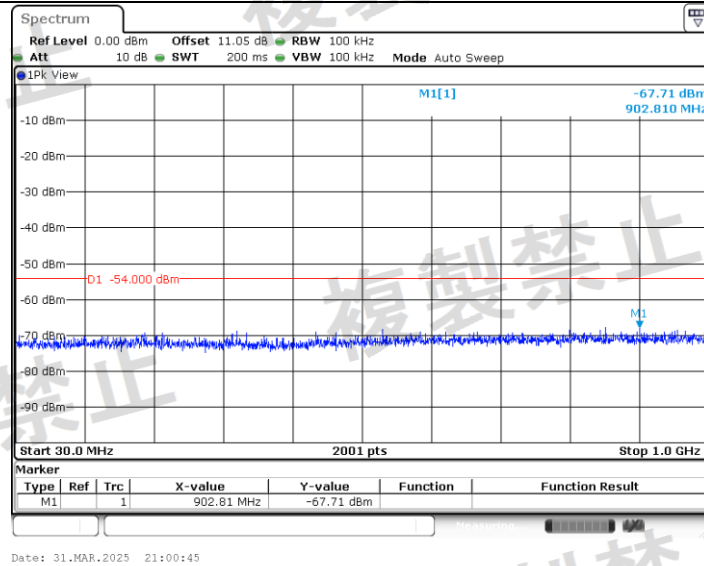
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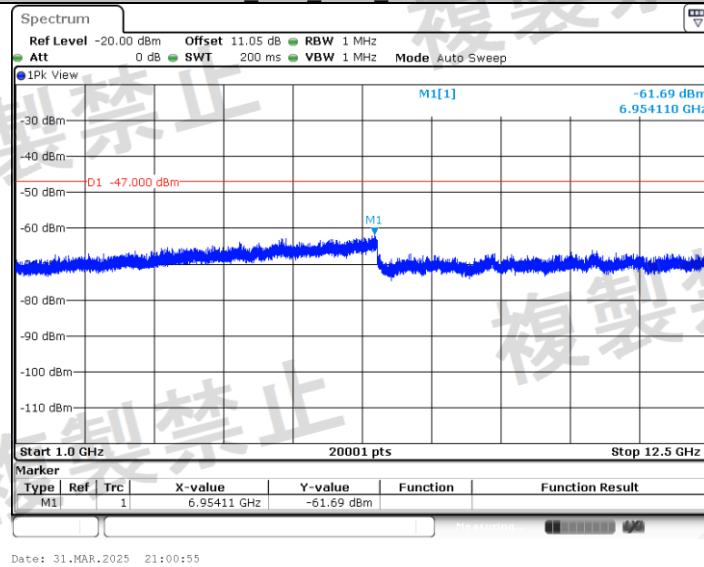
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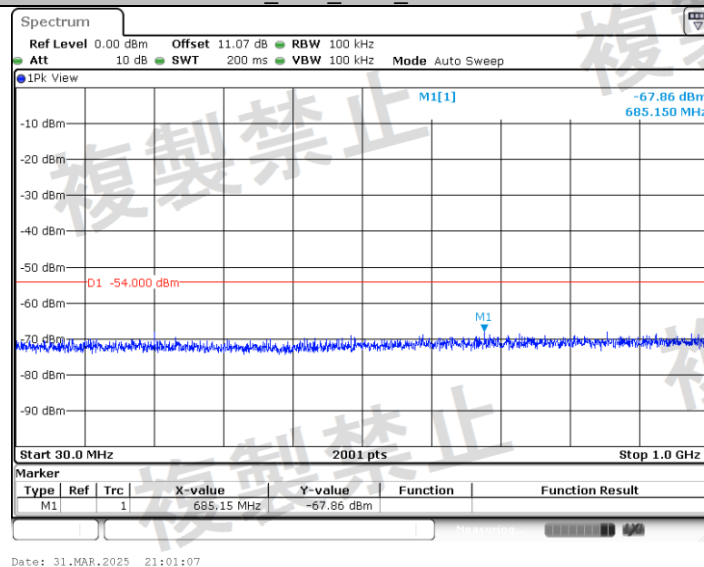
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11G_Ant1_2472_30~1000



11G_Ant1_2472_1000~12500

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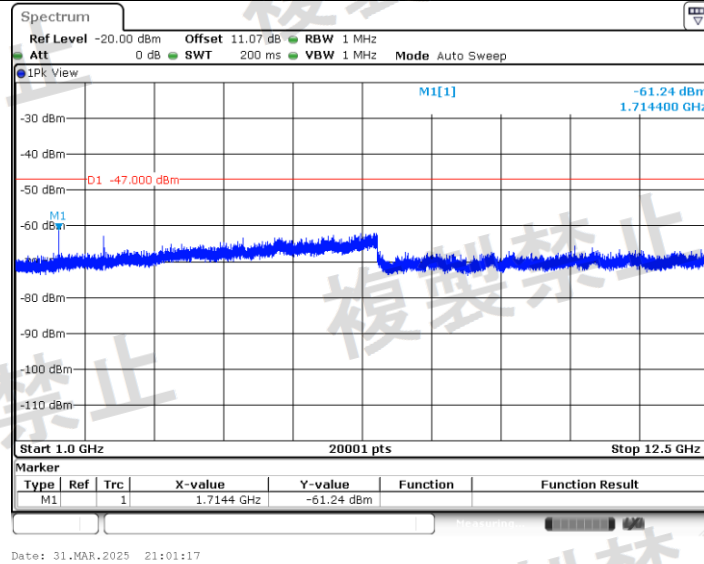
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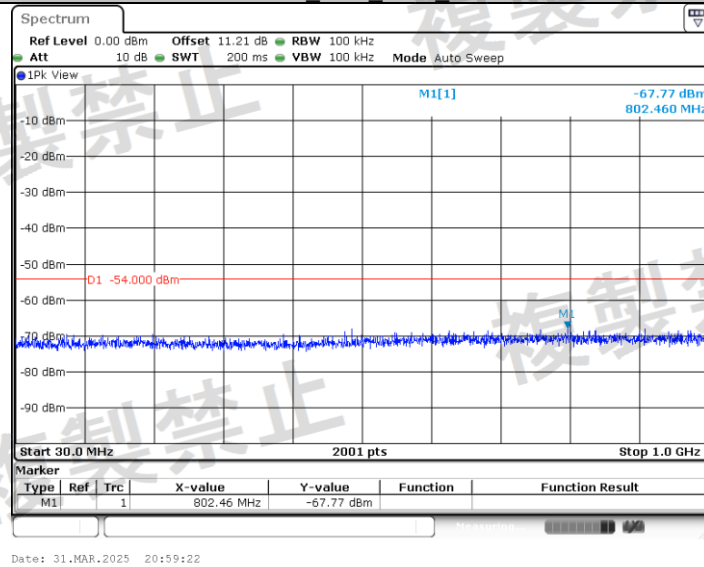
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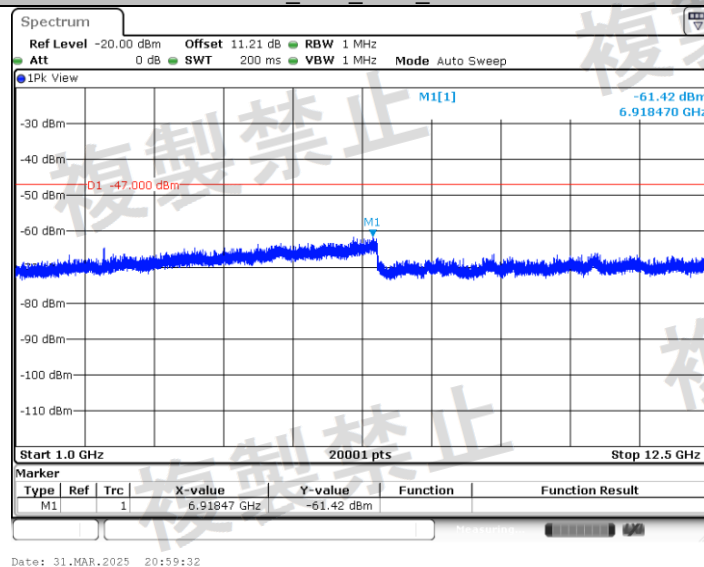
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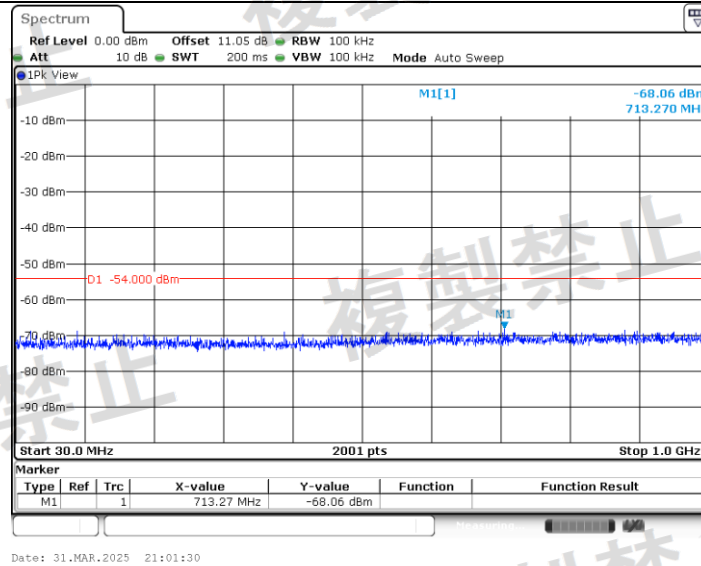
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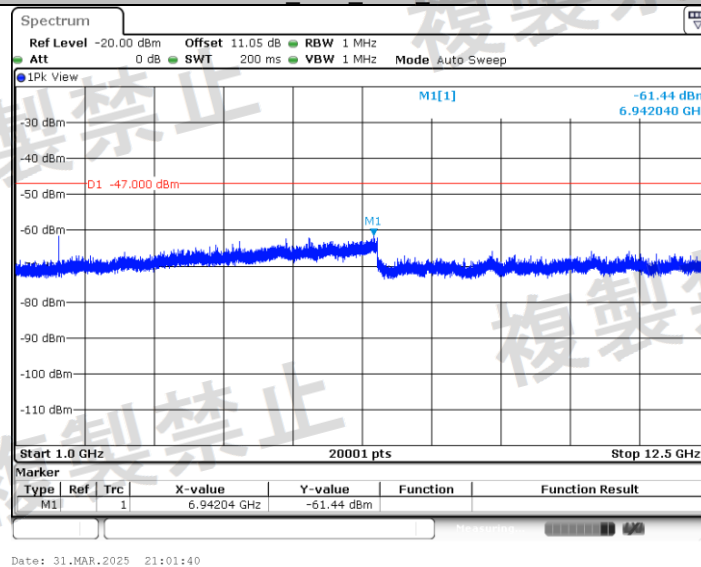
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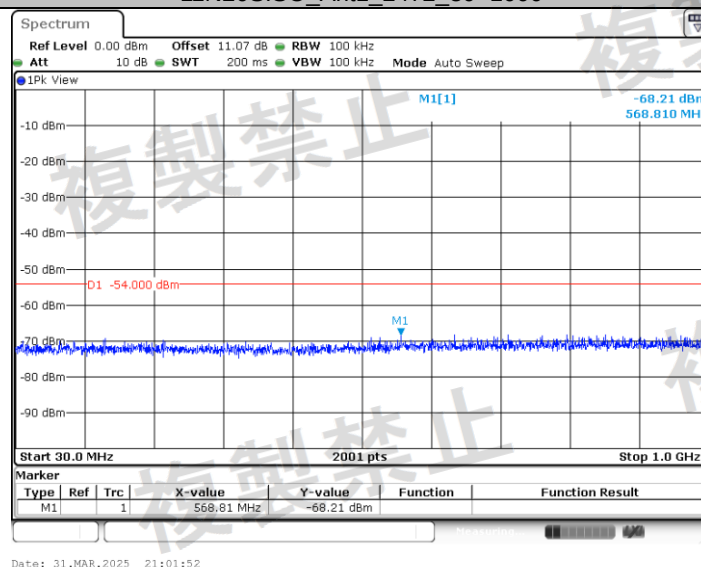
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11N20SISO_Ant1_2472_30~1000



11N20SISO_Ant1_2472_1000~12500

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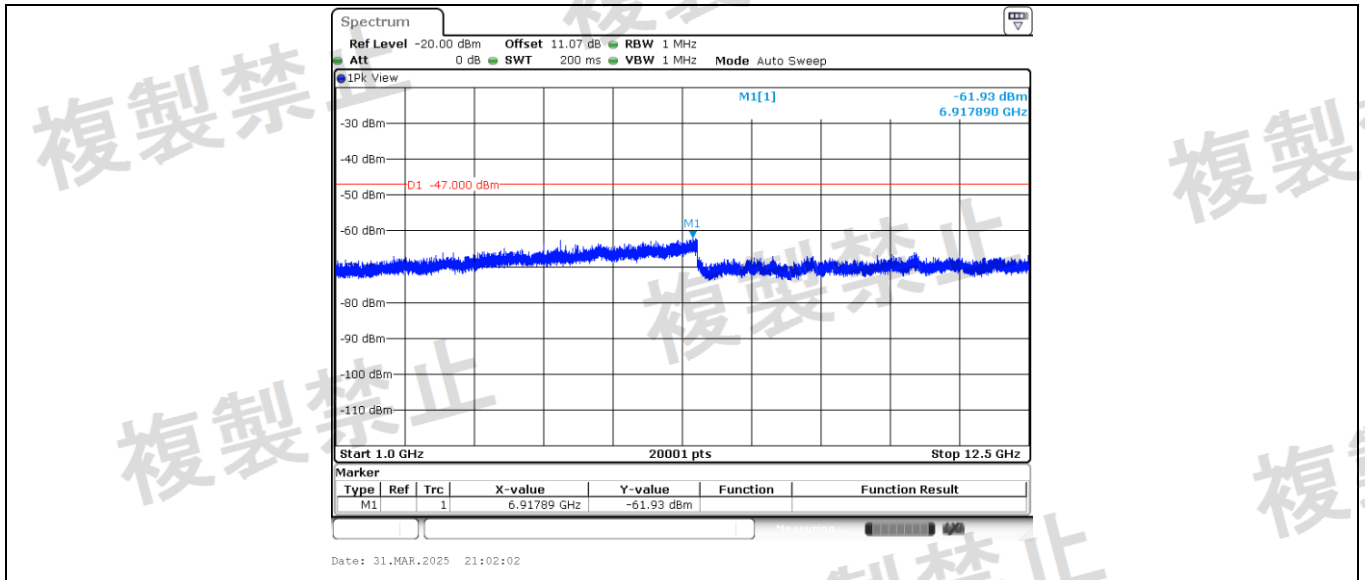
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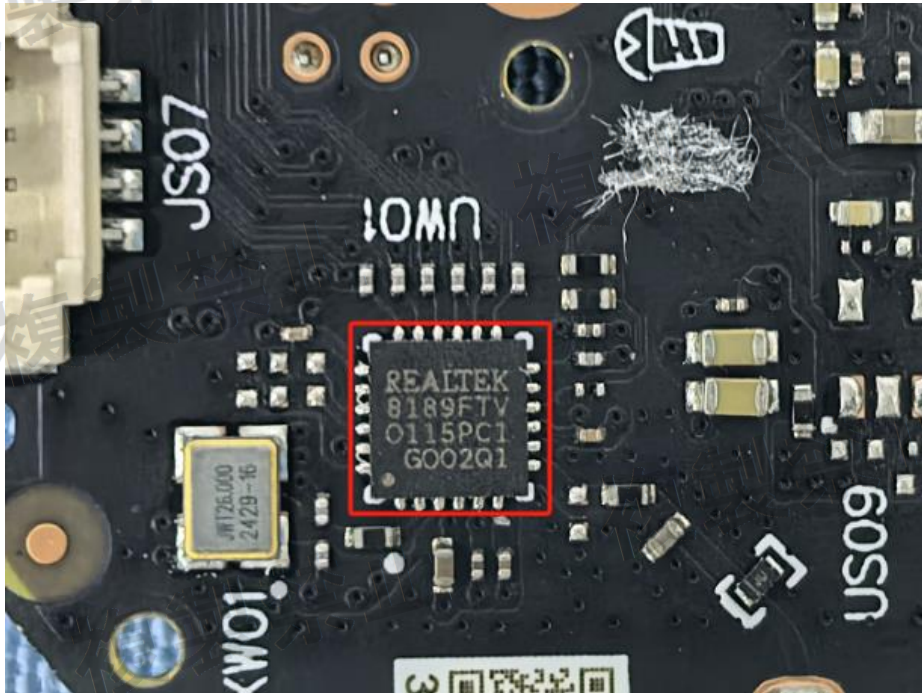
3.7. Construction protection confirmation method

Requirement

The high-frequency section and modulation section of the radio equipment except for the antenna system shall not be capable of being opened easily

Confirmation method

RF and Modulation parts are mounted on PCB with surface mount technology, and there is no any adjustable parts on PCB or adjustable parts are not exposed, So the end user can not to modify or change the RF Parts easily, please refer the following photo.



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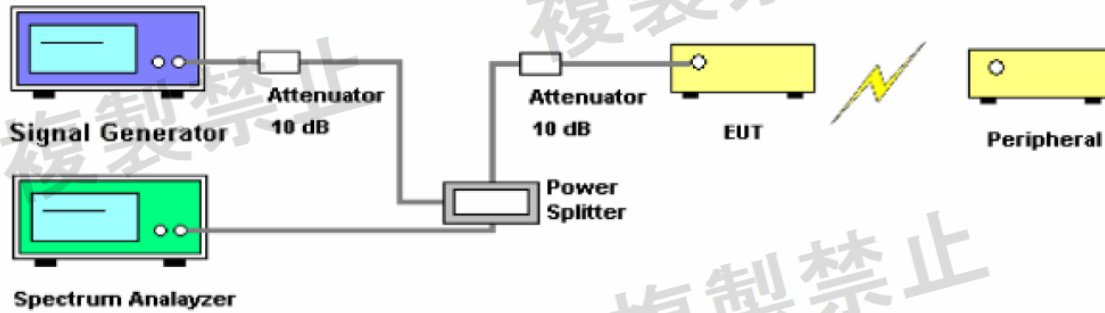


3.8. Carrier Sense Capability

Limit

EUT stop RF transmission signal after carrier inject to EUT and continue to transmit when inference signal turned off for the OFDM system with occupied frequency bandwidth below 38MHz and exceed 26MHz.

TEST CONFIGURATION



TEST PROCEDURE

1. Set The EUT state in "normal mode link with wireless router".
2. SG adjusted the frequency as same as the EUT transmitted signal and emitted the absence of modulation from SG and power level is $(\text{on } 22.79 + G - 20 \cdot \log^{(f)} \text{ dBm})$ (G is the antenna gain is the test frequency)
(^(f)): Test frequency, Unit: MHz
3. Turn off the RF signal of the SG.
4. EUT have transmitted the maximum modulation signal and fixed channelize.
5. Setting the spectrum as fellow :
RBW/VBW=1MHz/1MHz
Span=80MHz
Sweep time=auto
Sweep mode=continuous
Detect mode=positive peak
6. SG RF signal on.
7. EUT shall be stop the transmitted any signal and SG RF signal off, the EUT will be continuous transmitted signal.

TEST RESULTS

GOOD, The carrier sense value is -42 dBm.

Note: $P_{cs} [\text{dBm}] = 22.79 - 20 \cdot \log(f \text{ MHz}) + \text{Antenna Gain}$

Antenna Gain: 2dBi



3.9. Interference Prevention Function

Module apply DSSS technique, in which the message signal is used to modulate a bit sequence known as the Pseudo Noise (PN) code; this PN code consists of pulses of a much shorter duration (larger bandwidth) than the pulse duration of the message signal, therefore the modulation by the message signal has the effect of chopping up the pulses of the message signal and thereby resulting in a signal which has a bandwidth nearly as large as that of the PN sequence. In this context the duration of the pulse of the PN code is referred to as the chip duration and the smaller this value, the larger the bandwidth of the resultant DSSS signal and the more immune to interference the resultant signal becomes.

TEST PROCEDURE

1. Connect the EUT to the PC serial port,
2. Run "ifconfig" on the SecureCRTPortable.exe through the serial port

We can get the information as follows:

34:D8:56:D0:4B:10

TEST RESULTS

```
root@(none):~# ifconfig
lo        Link encap:Local Loopback
          inet addr:127.0.0.1  Mask:255.0.0.0
          UP LOOPBACK RUNNING  MTU:65536  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)

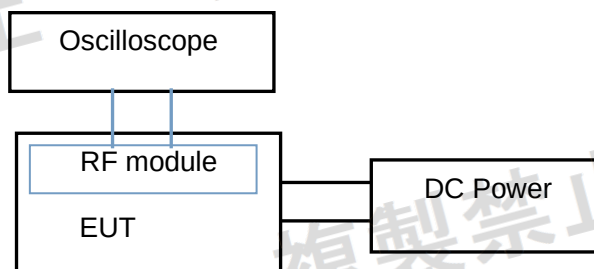
wlan0     Link encap:Ethernet  Hwaddr 34:D8:56:D0:4B:10
          UP BROADCAST MULTICAST  MTU:1500  Metric:1
          RX packets:0 errors:0 dropped:0 overruns:0 frame:0
          TX packets:0 errors:0 dropped:0 overruns:0 carrier:0
          collisions:0 txqueuelen:1000
          RX bytes:0 (0.0 B)  TX bytes:0 (0.0 B)
```



3.10. Condition for Voltage Stabilization

- In the case of a characteristic test in the technical regulations conformity certification, the power supply supplies the voltage rating
- Other cases
The power supply supplies the voltage rating and the rating. However, when it can be confirmed that the change of the input voltage to the wireless part circuit of the testing machine is 1% or less when the input voltage to the testing machine from the external source changes at 10%, examines it only by the voltage rating.

TEST CONFIGURATION



TEST PROCEDURE

1. Use the DC power supplies the EUT, set the output power 5.0V.
2. Connect the BLE module power input ports to the Oscilloscope, record the voltage value.
3. Set respectively the DC power output 5.5V and 4.5V, record the Oscilloscope's voltage values.

EUT supply power	RF module input power	Rated RF module power	Tolerance (%)
5.0V	3.30V	3.30V	0
5.5V	3.30V	3.30V	0
4.5V	3.30V	3.30V	0

Conclusion: when the input voltage to EUT from the external source changes at 10%, the change of the input voltage to RF Module circuit of EUT is less 1%, another test item only need to test for normal condition.



3.11. Transmission Radiation Angle Width (3DB Beamwidth) Measurement

Limit

Item	Limits (See Article 49-20, Item1-f of the Ordinance Regulating Radio Equipment)
3dB antenna beam width	$360/A$ (if $A < 1$; then $A = 1$) $A = \{\text{EIRP Power [mW]} / 16.36 \text{ for DS, OFDM}\}$

Measuring Instruments and Setting

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

Spectrum Parameter	Setting
Attenuation	Auto
Span	0 MHz
RBW	1 MHz
VBW	1 kHz
Y scale	5 dB
Detector	Peak
Trace	Max Hold

Test Procedures

Test method which surpass to Clause 22 of Annex No.43 of MIC Notification No.88.

1. Set EUT and measuring antenna at the same height and roughly facing each other.
2. Set spectrum analyzer with condition 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

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

Test Setup Layout

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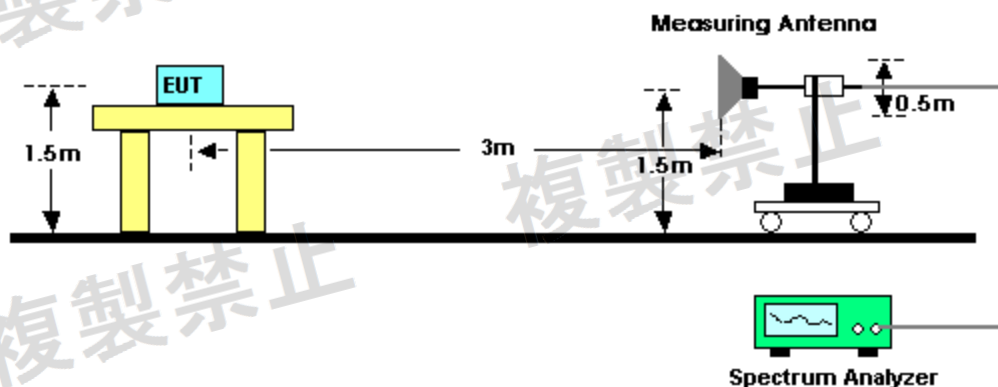
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**Test Result of Transmission Radiation Angle Width (3dB Beamwidth)**

Not necessary

Note: Because EIRP < 12.14dBm, So 3dB Beam-width(Degree) does not need to be tested.

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