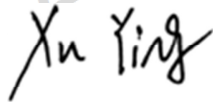


Test Report

Applicant	Espressif Systems (Shanghai) Co.,Ltd.
Product	2.4G Wi-Fi & Bluetooth IoT Module
Model	ESP8684-WROOM-02UC
Report No.	EFTA26030298-IE-01-R2V3
Issue Date	June 16, 2026

Eurofins TA Technology (Shanghai) Co., Ltd. tested the above equipment in accordance with the requirements in **Article 49-20, MIC notification. No.88 of 2004, Annex 43**. The test results show that the equipment tested is capable of demonstrating compliance with the requirements as documented in this report.



Prepared by: Xu Ying



Approved by: Xu Kai

Eurofins TA Technology (Shanghai) Co., Ltd.

Building 3, No.145, Jintang Rd, Pudong Shanghai, P.R.China

TEL: +86-021-50791141/2/3

FAX: +86-021-50791141/2/3-8000

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Version	Revision Description	Issue Date
Rev.0	Initial issue of report.	May 28, 2026
Rev.1	Update description.	June 10, 2026
Rev.2	Update description.	June 15, 2026
Rev.3	Update description.	June 16, 2026
Note: This revised report (Report No.: EFTA26030298-IE-01-R2V3) supersedes and replaces the previously issued report (Report No.: EFTA26030298-IE-01-R2V2). Please discard or destroy the previously issued report and dispose of it accordingly.		

Summary of Measurement Results

Number	Summary of Measurements of Results	Verdict
1	Frequency Error Measurement	PASS
2	Occupied Bandwidth Measurement	PASS
3	Spread Bandwidth and Spread Factor Measurement	N/A
4	Antenna Power (Conducted) Measurement	PASS
5	Transmission Radiation Angle Width (3dB Beamwidth)	N/A
6	Unwanted Emission Strength Measurement	PASS
7	Secondarily Emitted Radio Wave Strength Measurement	PASS
8	Retention Time	PASS
9	Radio Interference Prevention Capability Measurement	PASS
10	Construction Protection Confirmation Method	PASS
Date of Testing: March 26, 2026 ~ April 15, 2026		
Date of Sample Received: March 23, 2026		
Note: N/A = Not applicable.		
All indications of Pass/Fail in this report are opinions expressed by Eurofins TA Technology (Shanghai) Co., Ltd. based on interpretations and/or observations of test results. Measurement Uncertainties were not taken into account and are published for informational purposes only.		

1. Test Laboratory

1.1. Notes of the Test Report

This report shall not be reproduced in full or partial, without the written approval of **Eurofins TA Technology (Shanghai) Co., Ltd.** The results documented in this report apply only to the tested sample, under the conditions and modes of operation as described herein. Measurement Uncertainties were not taken into account and are published for informational purposes only. This report is written to support regulatory compliance of the applicable standards stated above.

1.2. Testing Location

Company: Eurofins TA Technology (Shanghai) Co., Ltd.
Address: Building 3, No.145, Jintang Rd, Pudong Shanghai, P.R.China
City: Shanghai
Post code: 201201
Country: P. R. China
Contact: Xu Kai
Telephone: +86-021-50791141/2/3
Fax: +86-021-50791141/2/3-8000
Website: <https://www.eurofins.com/electrical-and-electronics>
E-mail: Kain.Xu@cpt.eurofinscn.com

2. General Description of Equipment Under Test

2.1. Applicant and Manufacturer Information

Applicant	Espressif Systems (Shanghai) Co., Ltd.
Applicant address	1-7th Floor, Building 3, 235 Yubei Road, Pudong New Area, Shanghai, China
Manufacturer	Espressif Systems (Shanghai) Co., Ltd.
Manufacturer address	1-7th Floor, Building 3, 235 Yubei Road, Pudong New Area, Shanghai, China

2.2. General Information

EUT Description	
Model	ESP8684-WROOM-02UC
Lab internal SN	260323-04-007
Hardware Version	V1.0
Software Version	V1.1.3.4
Antenna Type	External Antenna
Antenna Gain	2.33 dBi
Device Operating Configurations	
Test Mode:	Bluetooth (Low Energy);
Operating Frequency Range(s)	2402MHz ~ 2480MHz
Test Modulation:	Bluetooth v5.3 LE: GFSK
Test Frequency Range(s)	Bluetooth (Low Energy):2402MHz ~ 2480MHz
Operating voltage range:	3.0 V to 3.6 V
State DC voltage:	3.3V
Auxiliary Test Equipment	
PC	Manufacturer: Dell Model: Latitude 3420 (SN: 9JSCR93)
Serial port board	Model: FTDI FT232RNL
Note: The EUT is sent from the applicant to Eurofins TA and the information of the EUT is declared by the applicant.	

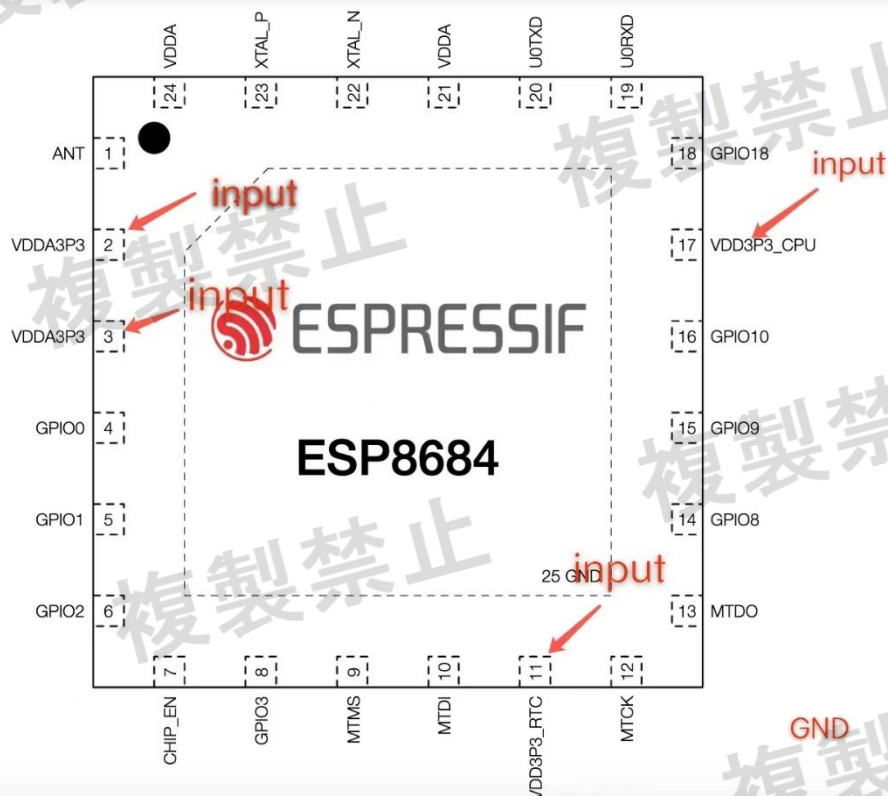
Environment of Test Site

Temperature:	25°C
Huidity:	59%
Atmospheric Pressure:	100.77 kpa
Test Voltage:	Normal Voltage: 3.3V Extreme Voltage: 3.0V~3.6V

Note: For extreme voltage test, we have tested the relationship between the external power supply and RF IC power supply. Base on the test results. only the normal voltage was selected to perform all items. The details information as below:

External Power Supply (V)	IC power supply(V)	Deviation from normal (V)	Deviation (%)
NV: 3.3V	3.3V	--	--
LV: 3V	3.3V	0.00V	0.00%
HV: 3.6V	3.3V	0.00V	0.00%

Measurement point position



3. Applied Standards

According to the specifications of the manufacturer, it must comply with the requirements of the following standards:

Article 49-20

MIC notification. No.88 of 2004, Annex 43

Article 2, Paragraph 1, Item (19)

4. Test Configuration

For all the test items, an engineering test program installed in notebook was used to make the EUT continuously transmit/receive.

Packet Type	Frequency (MHz)	Channel
Bluetooth LE (1M)	2402	0
	2440	19
	2480	39
Bluetooth LE (2M)	2402	0
	2440	19
	2480	39
Bluetooth LE (S=2)	2402	0
	2440	19
	2480	39
Bluetooth LE (S=8)	2402	0
	2440	19
	2480	39

5. Test Case Results

5.1. Frequency Error Measurement

Ambient Condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

(1) Two methods for the item:

a. CW Tone method

i. Set the spectrum analyzer RBW=10kHz, VBW=10kHz, Span=1MHz.

ii. Use peak search function to find the max peak value and record the measuring frequency as f.

b. 10dB down method

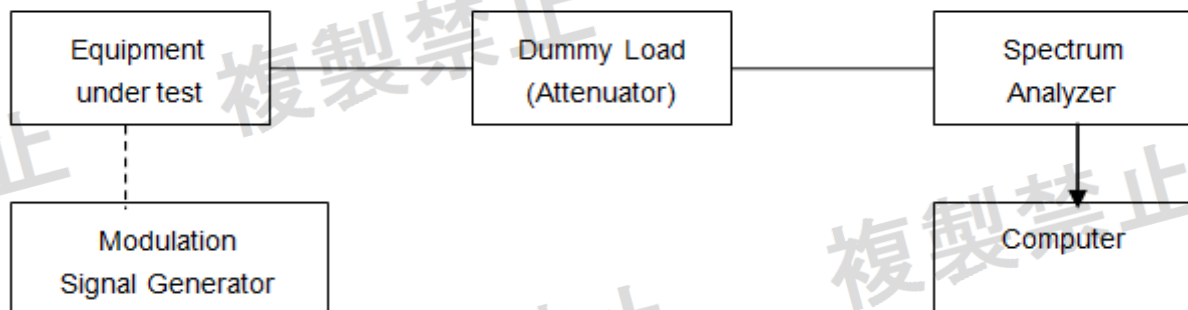
i. Set the spectrum analyzer RBW=100kHz, VBW=100kHz, Trace: Max Hold.

ii. Display line Level = Max. level - 10dB to place two markers, highest(fH) and lowest(fL) frequency

iii. Determine measuring frequency $f = (fH + fL) / 2$

(2) Calculate frequency tolerance by the formula $(f - f_c) / f_c \times 10^6$

Test Setup



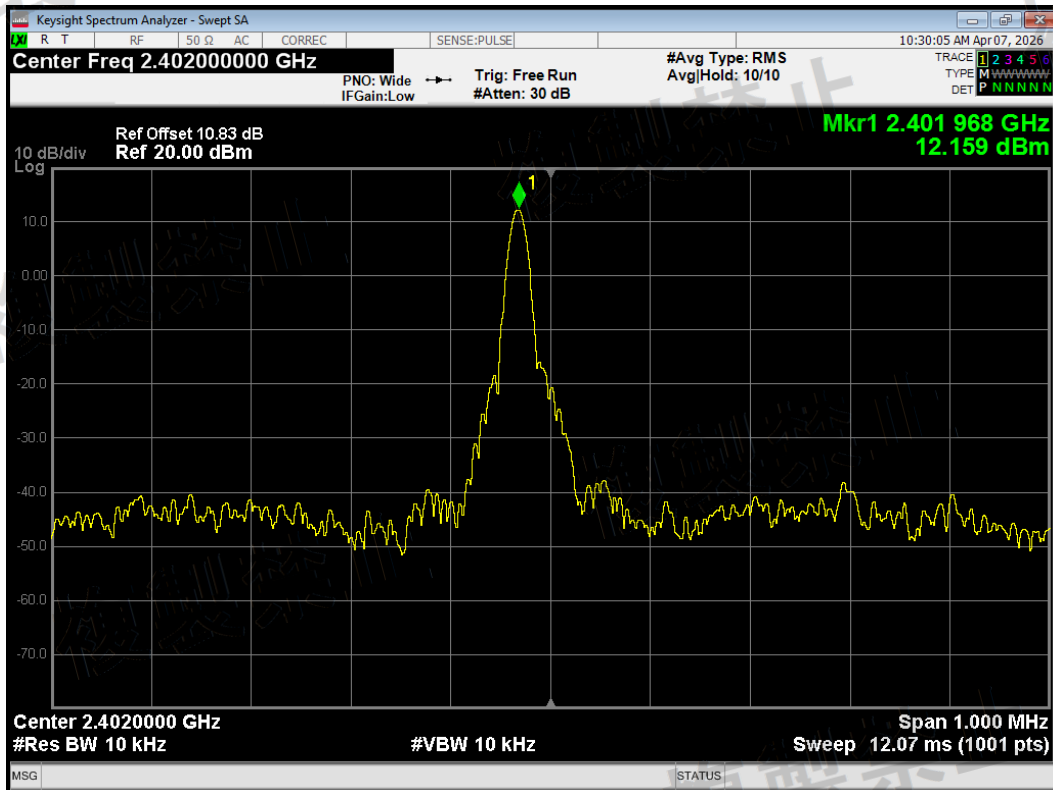
Limits

Frequency Tolerance +/-50 ppm.

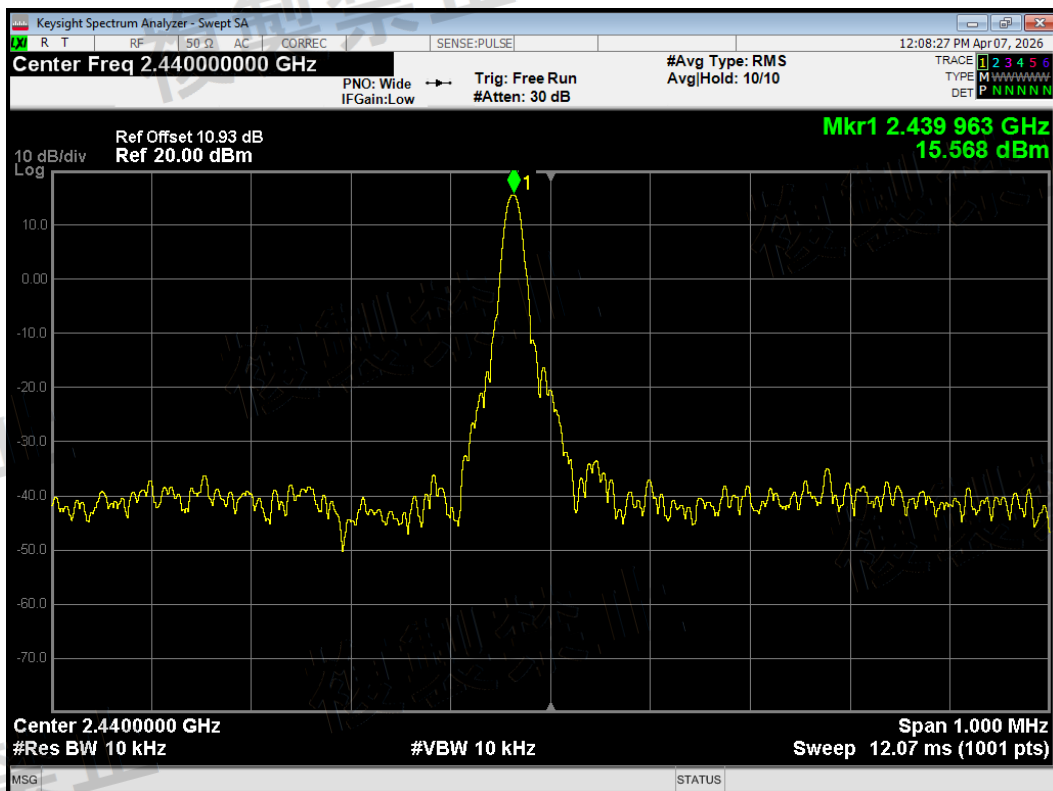
Test Results

Test Mode	Carrier frequency (MHz)	Frequency Error (MHz)	Frequency Error (ppm)	Limit (ppm)	Conclusion
CW	2402	2401.968	-13.32	+/-50	PASS
	2440	2439.963	-15.16	+/-50	PASS
	2480	2479.960	-16.13	+/-50	PASS

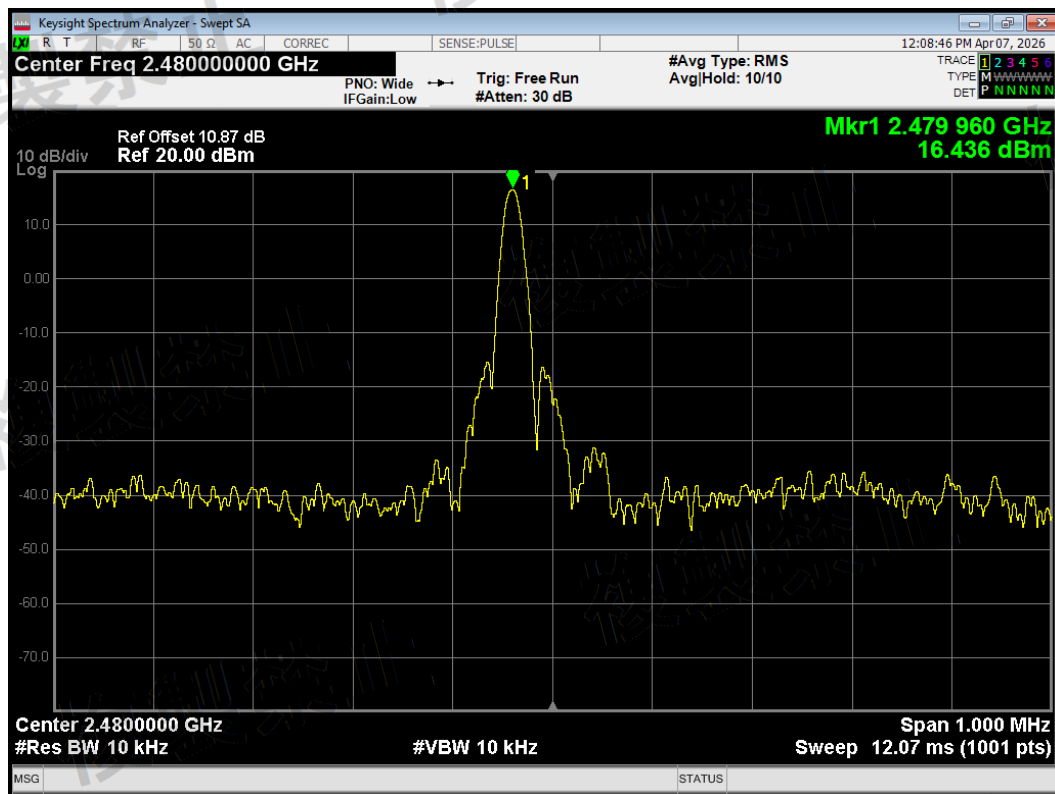
Freq. Error 2402MHz



Freq. Error 2440MHz



Freq. Error 2480MHz



5.2. Occupied Bandwidth Measurement

Ambient Condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

Spectrum Analyzer Setting

SPAN: $2BW \leq \text{SPAN} \leq 3.5BW$

RBW: Less than 3% of BW

VBW: Equal RBW

Sweep Time: AUTO (Minimum time to ensure measurement accuracy.)

Data Points: 401 points or more

Indication mode: Max hold

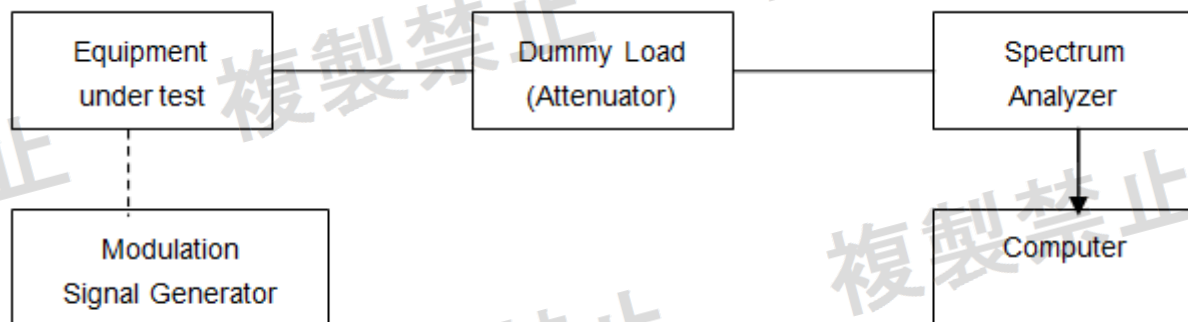
Detection Mode: Positive Peak

Storage Mode: Normal

Y-axis Scale: 10 dB/Div.

Reference Level: Enough level for maximum dynamic range

Test Setup



Limits

Others: Occupied Bandwidth ≤ 26 MHz.

FHSS: Occupied Bandwidth ≤ 83.5 MHz.

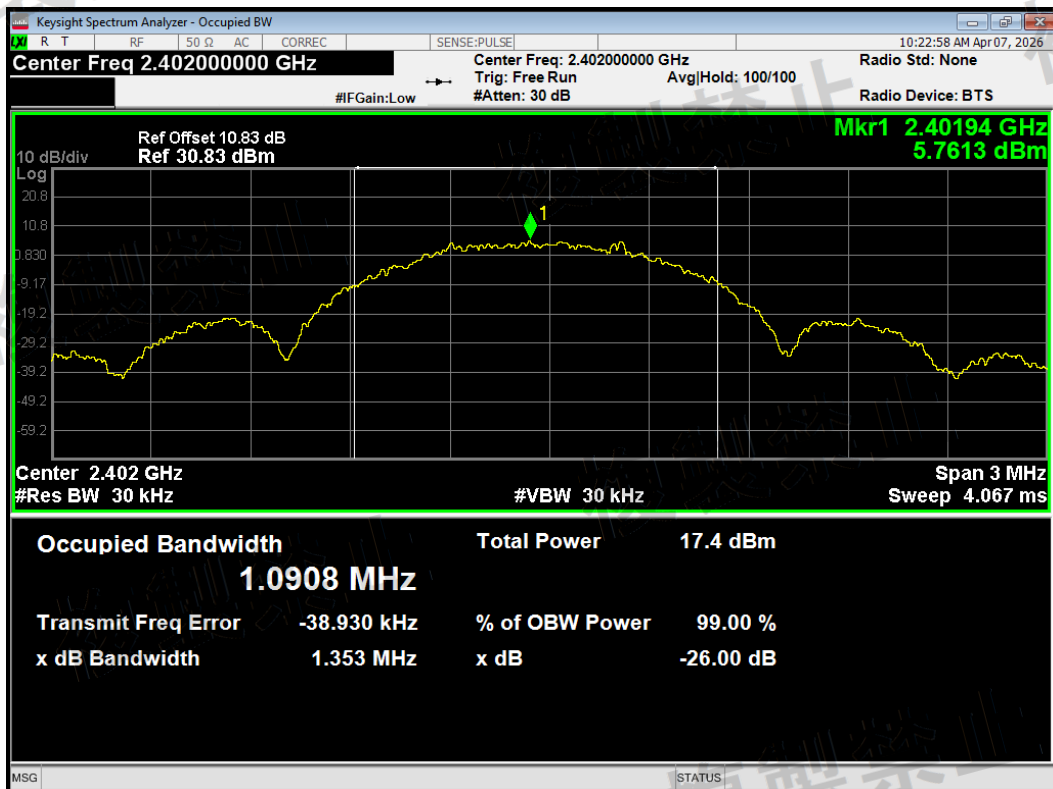
Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U = 936$ Hz.

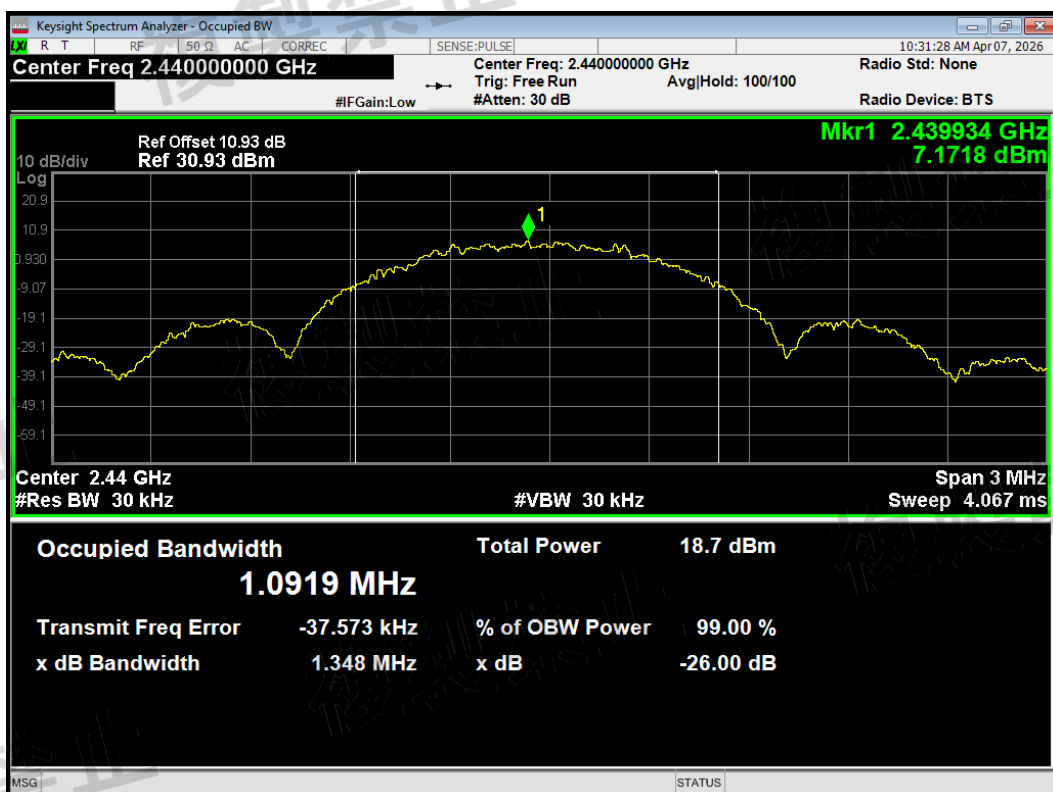
Test Results

Network Standards	Carrier frequency (MHz)	99% bandwidth (MHz)	Limit (MHz)	Result
Bluetooth LE (1M)	2402	1.091	≤ 26	Pass
	2440	1.092	≤ 26	Pass
	2480	1.094	≤ 26	Pass
Bluetooth LE (2M)	2404	2.064	≤ 26	Pass
	2440	2.071	≤ 26	Pass
	2478	2.086	≤ 26	Pass
Bluetooth LE (S=2)	2402	1.072	≤ 26	Pass
	2440	1.086	≤ 26	Pass
	2480	1.080	≤ 26	Pass
Bluetooth LE (S=8)	2402	1.095	≤ 26	Pass
	2440	1.087	≤ 26	Pass
	2480	1.093	≤ 26	Pass

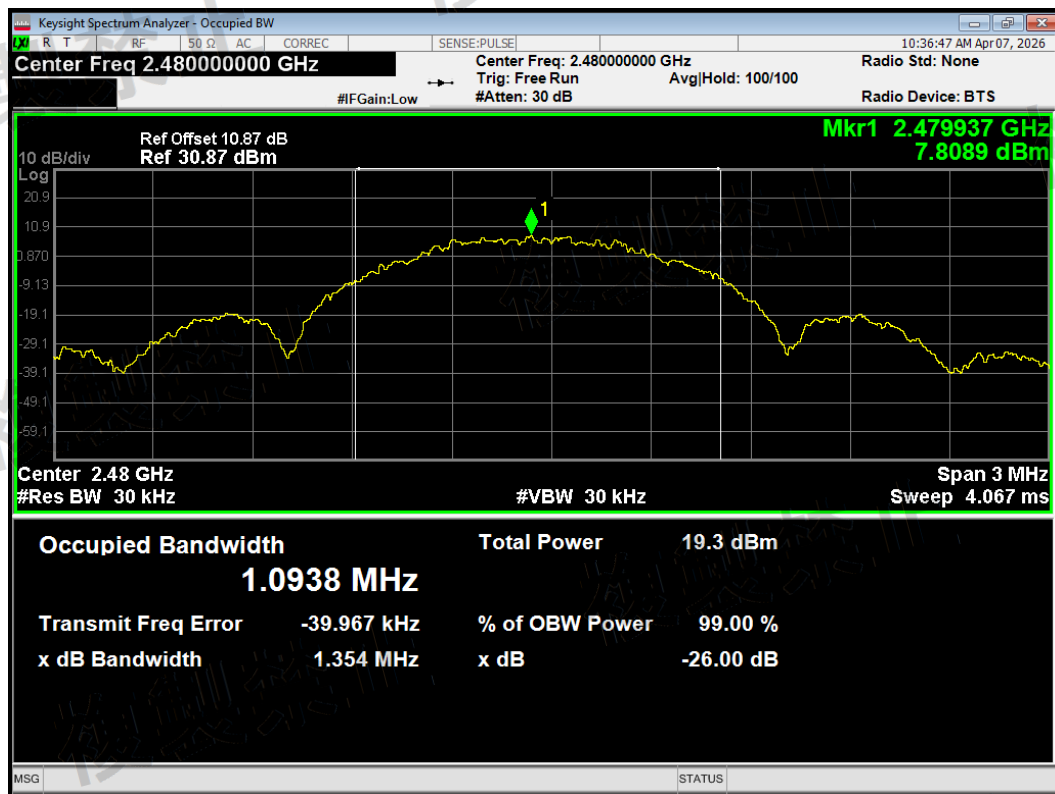
OBW BLE (1M) 2402MHz



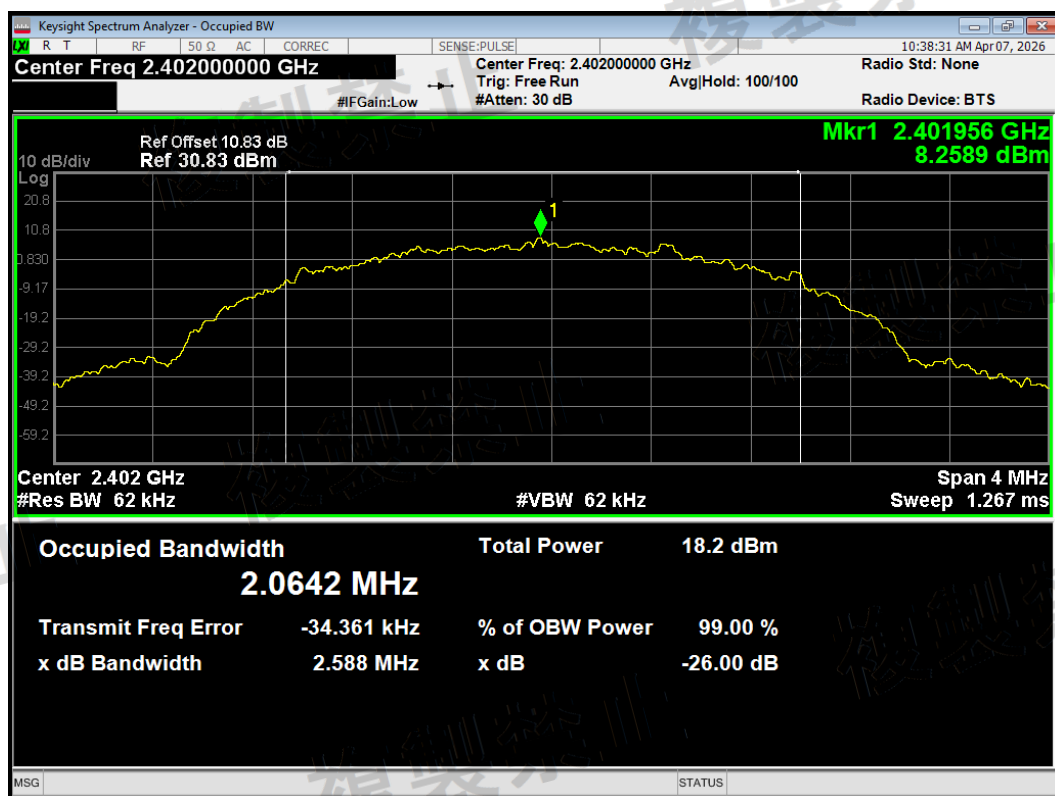
OBW BLE (1M) 2440MHz



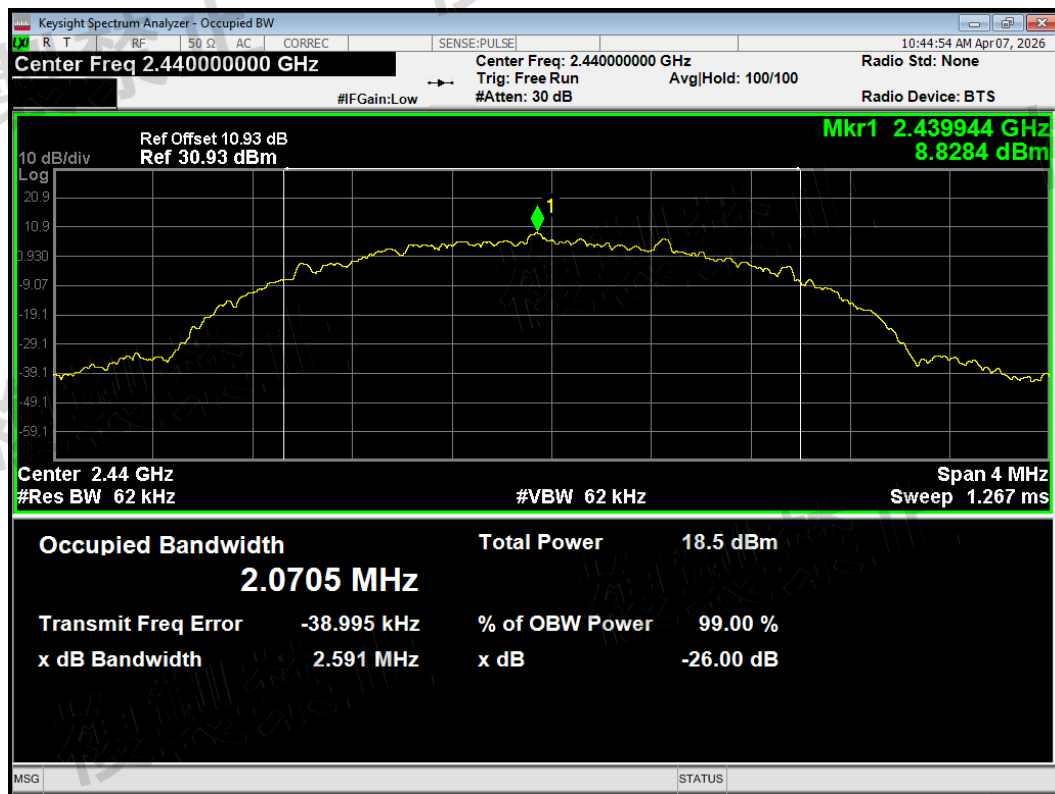
OBW BLE (1M) 2480MHz



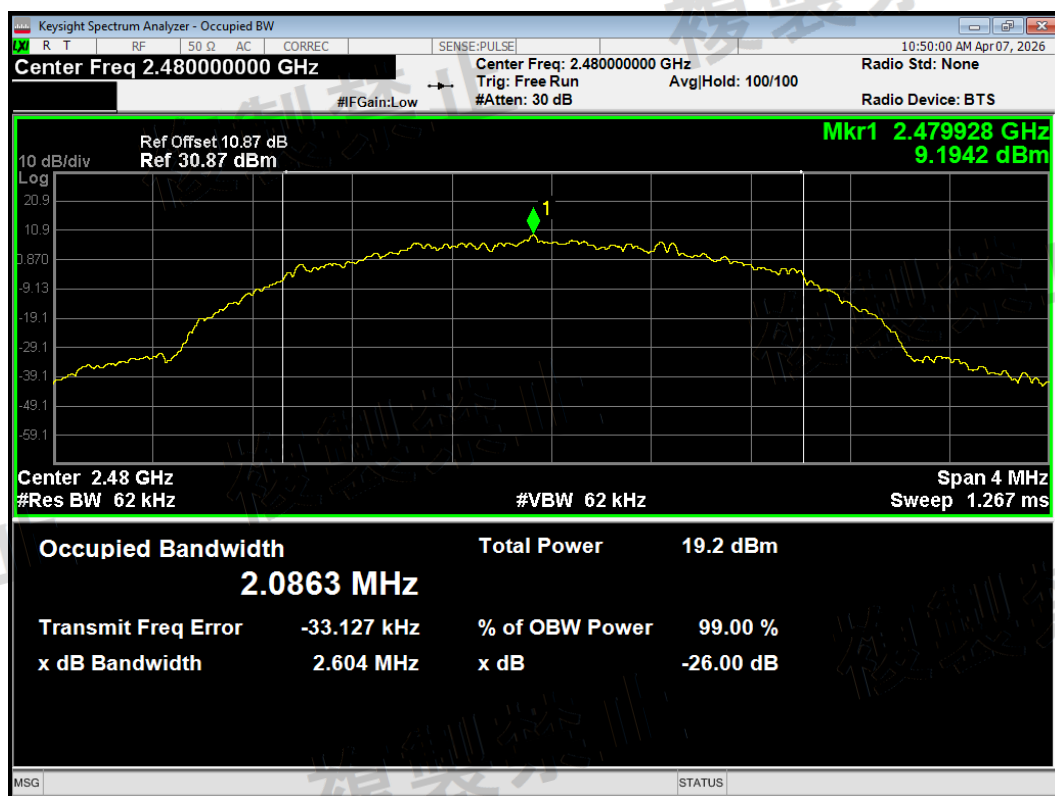
OBW BLE (2M) 2402MHz



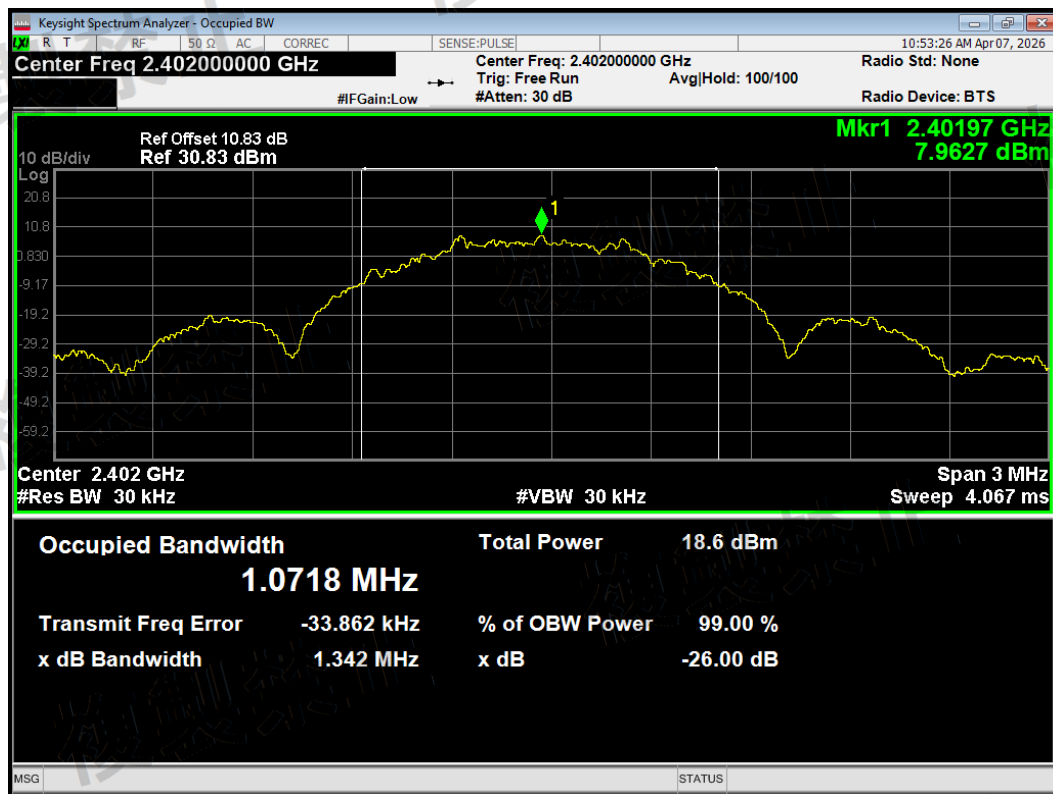
OBW BLE (2M) 2440MHz



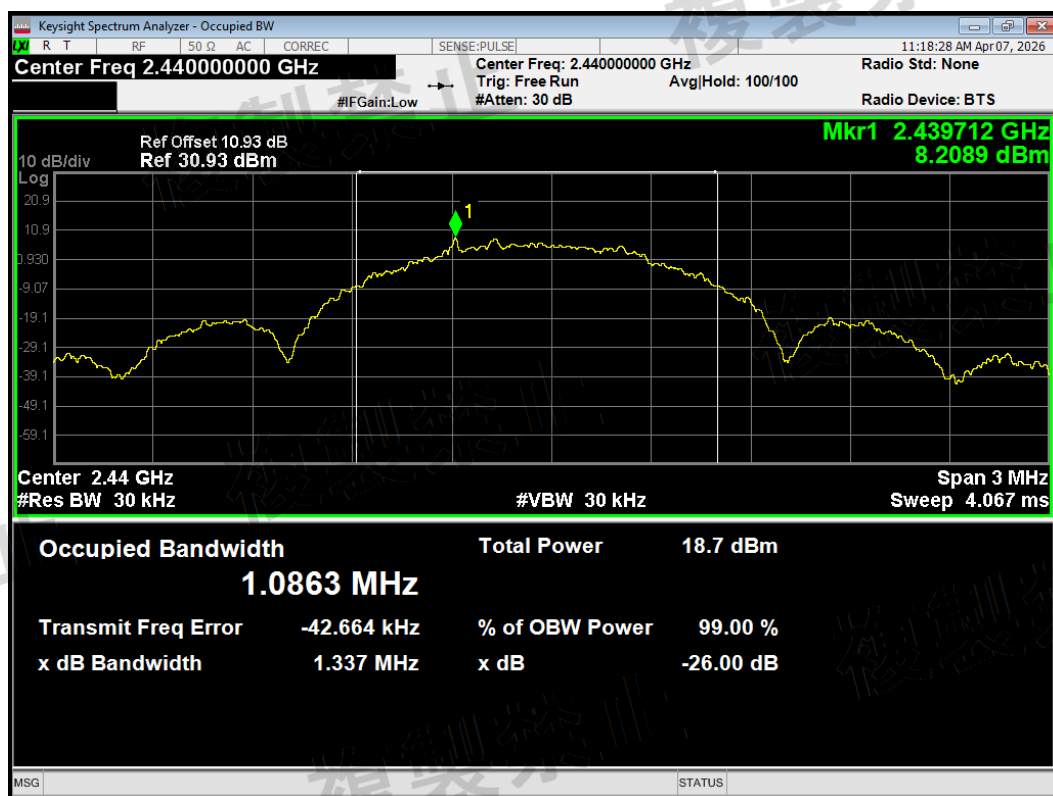
OBW BLE (2M) 2480MHz



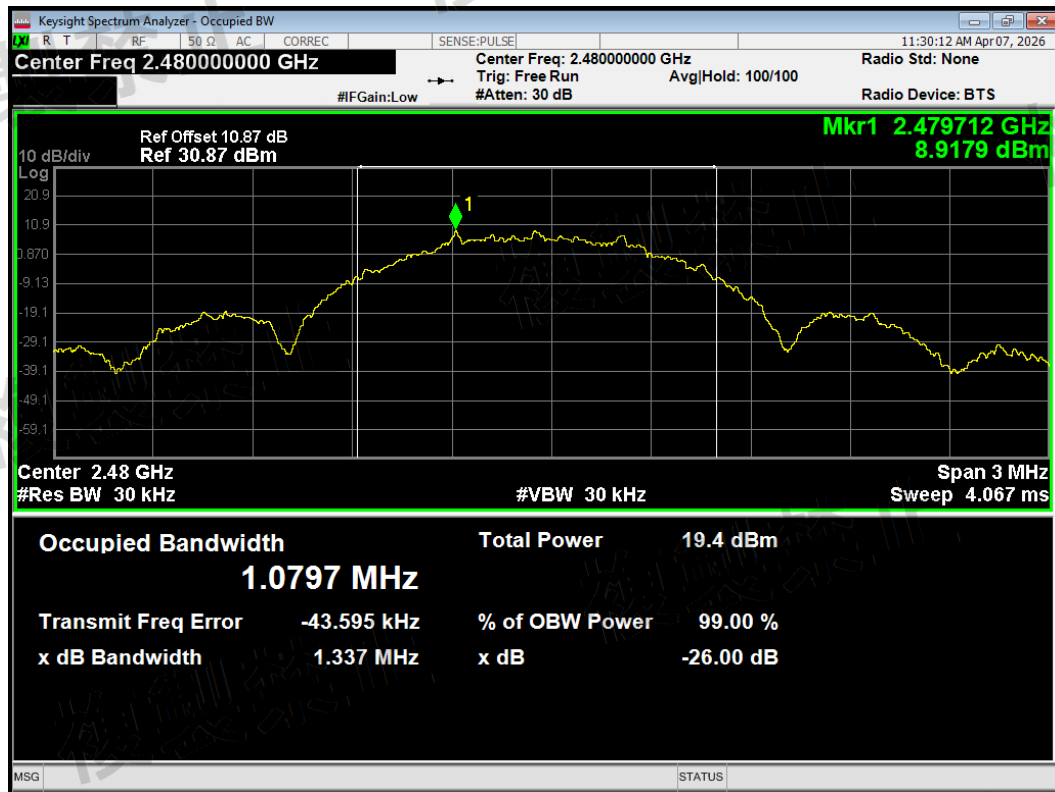
OBW S=2 2402MHz



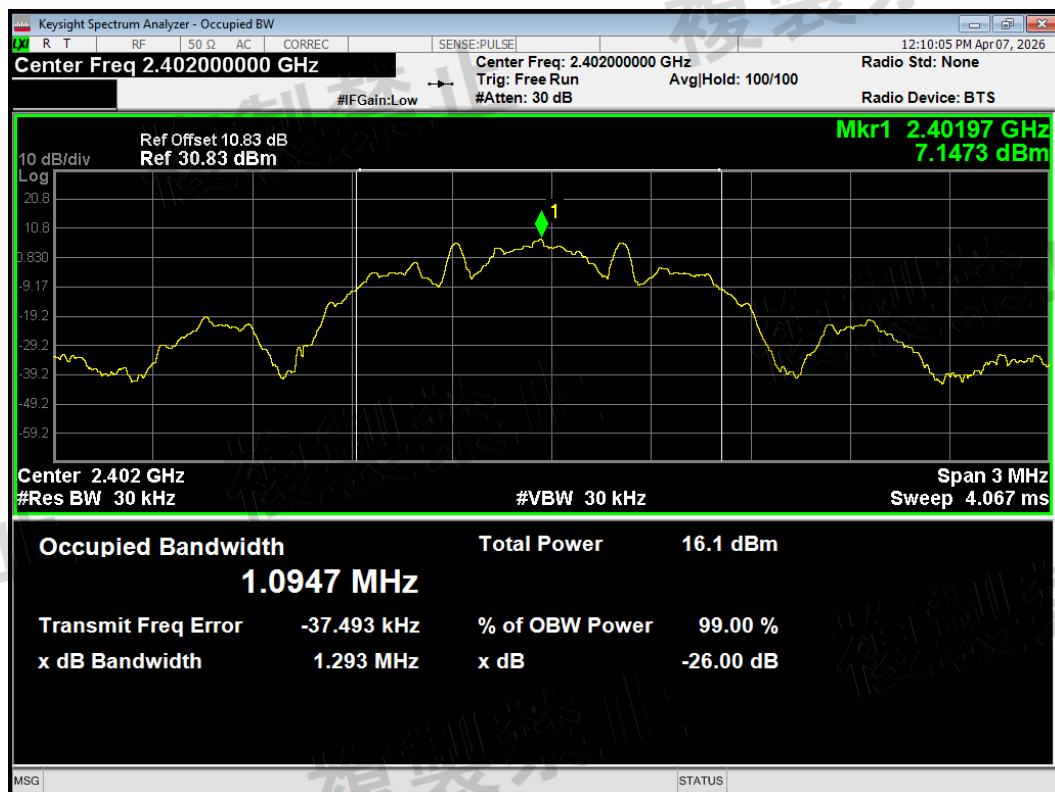
OBW S=2 2440MHz



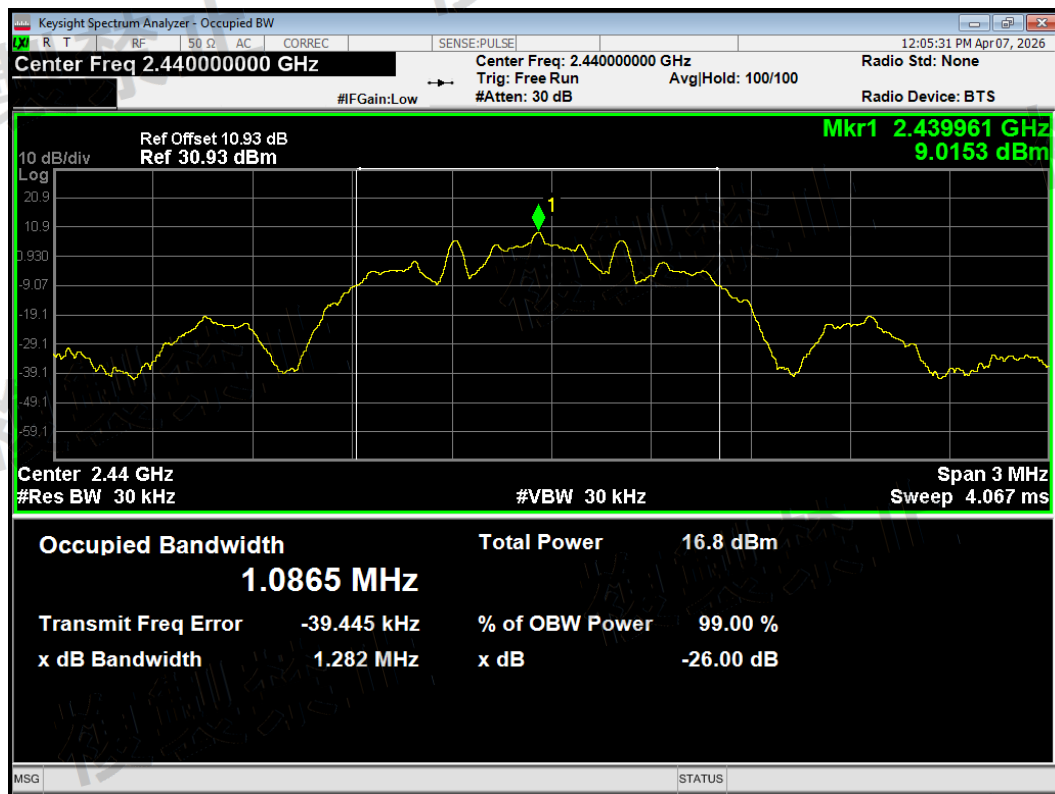
OBW S=2 2480MHz



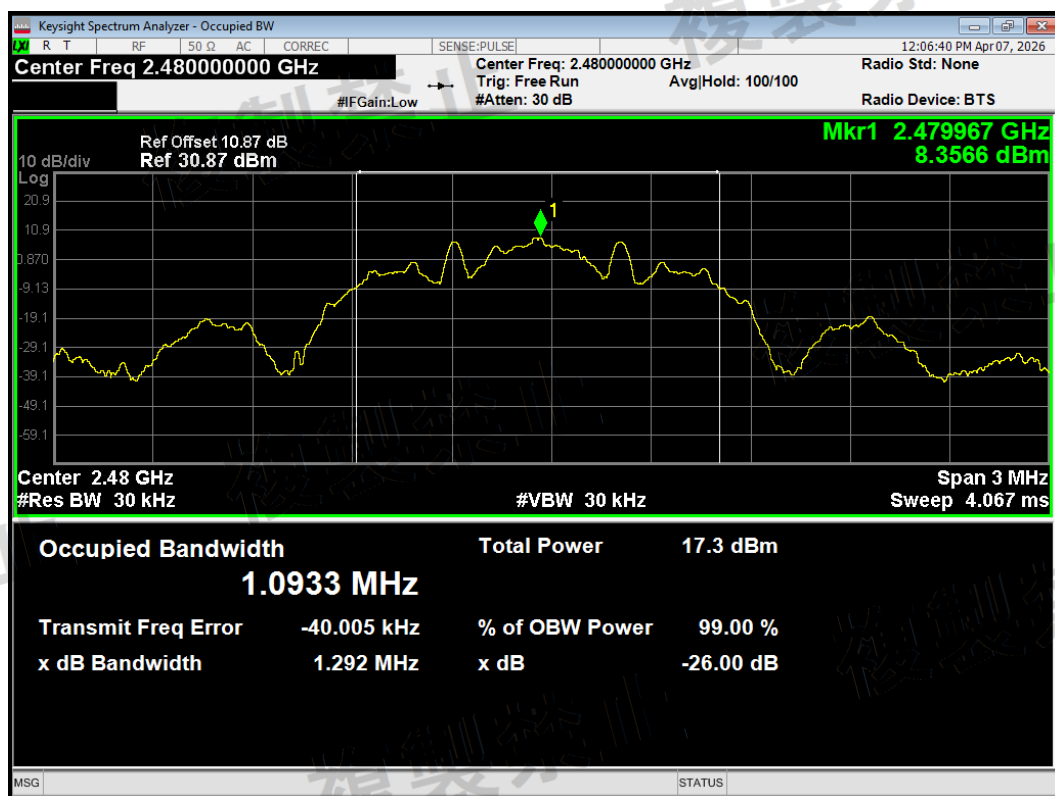
OBW S=8 2402MHz



OBW S=8 2440MHz



OBW S=8 2480MHz



5.3. Spread Bandwidth and Spread Factor Measurement

Ambient Condition

Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Method of Measurement

Spectrum Analyzer Setting

SPAN: $2BW \leq \text{SPAN} \leq 3.5BW$

RBW: Less than 3% of BW

VBW: Equal RBW

Sweep Time: AUTO (Minimum time to ensure measurement accuracy.)

Data Points: 401 points or more

Indication mode: Max hold

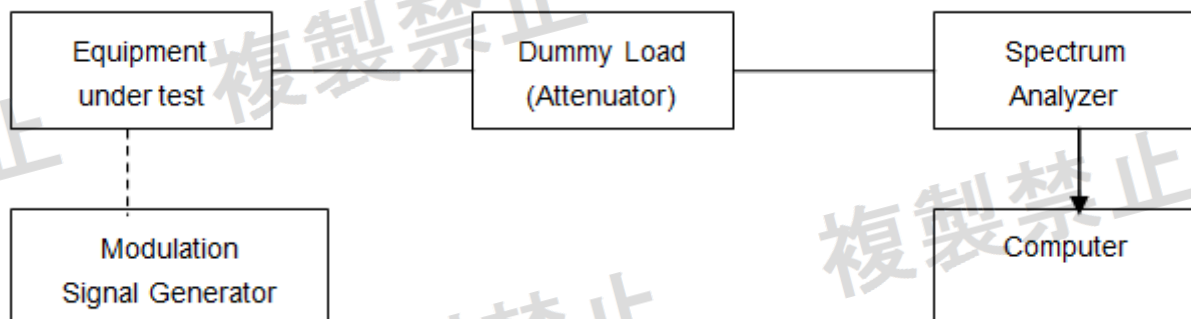
Detection Mode: Positive Peak

Storage Mode: Normal

Y-axis Scale: 10 dB/Div.

Reference Level: Enough level for maximum dynamic range

Test Setup



Limits

Only recorded in the report

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U = 936$ Hz.

Test Results

Only applicable for FHSS and DSSS.

5.4. Antenna Power (Conducted) Measurement

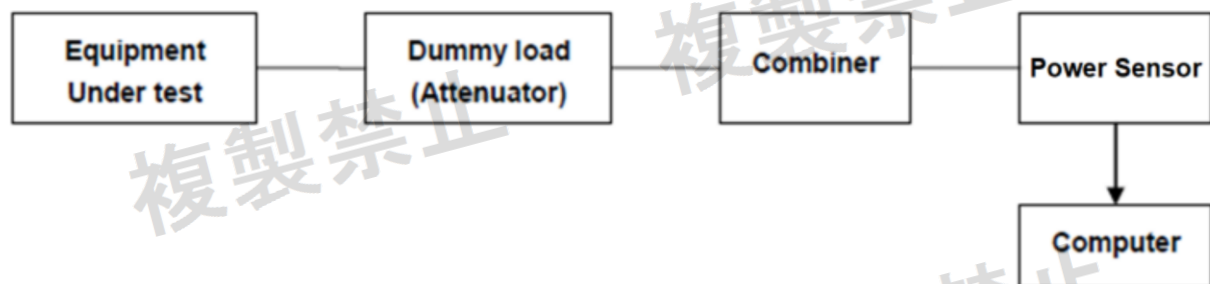
Ambient Condition

Temperature	Relative humidity	Pressure
23°C ~ 25°C	45% ~ 50%	101.5kPa

Methods of Measurement

Connect a power meter to the output of the dummy load (attenuator) and measure the total power.

Test Setup



Limits

FHSS: Antenna Power ≤ 3 mW/MHz;

EIRP Limit ≤ 6.91 dBm/MHz - 16.91 dBm/MHz (Limit is variable by the HPBA)

Others: Antenna Power ≤ 10 mW;

EIRP Limit ≤ 12.14 dBm - 22.14 dBm (Limit is variable by the HPBA)

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$, $U = 0.44$ dB.

Test Results:

Test Mode	Carrier Frequency (MHz)	Power Index
Bluetooth (Low Energy) (1M)	2402	12.00
	2440	12.00
	2480	12.00
Bluetooth (Low Energy) (2M)	2404	11.00
	2440	12.00
	2478	12.00
Bluetooth (Low Energy) (S=2)	2402	12.00
	2440	12.00
	2480	12.00
Bluetooth (Low Energy) (S=8)	2402	12.00
	2440	12.00
	2480	12.00

Bluetooth LE

Test Mode	Carrier Frequency (MHz)	Antenna Power (dBm)	Antenna Power (mW)	Limit (mW)	Declaration Antenna Power (mW)	Tolerance	Tolerance Limit	Result
Bluetooth (Low Energy) (1M)	2402	7.57	5.71	10	6	-4.75%	[<20%]	Pass
	2440	7.88	6.14	10	6	2.29%	[<20%]	Pass
	2480	8.34	6.82	10	6	13.59%	[<20%]	Pass
Bluetooth (Low Energy) (2M)	2402	4.49	2.81	10	6	-53.12%	[<20%]	Pass
	2440	7.74	5.94	10	6	-0.95%	[<20%]	Pass
	2480	8.11	6.47	10	6	7.86%	[<20%]	Pass
Bluetooth (Low Energy) (S=2)	2402	7.57	5.71	10	6	-4.80%	[<20%]	Pass
	2440	7.93	6.21	10	6	3.48%	[<20%]	Pass
	2480	8.17	6.55	10	6	9.23%	[<20%]	Pass
Bluetooth (Low Energy) (S=8)	2402	7.77	5.98	10	6	-0.26%	[<20%]	Pass
	2440	7.73	5.93	10	6	-1.09%	[<20%]	Pass
	2480	8.10	6.46	10	6	7.63%	[<20%]	Pass

Test Mode	Carrier Frequency (MHz)	EIRP (dBm)	Limit (dBm)	Conclusion
Bluetooth (Low Energy) (1M)	2402	9.90	12.14	PASS
	2440	10.21	12.14	PASS
	2480	10.67	12.14	PASS
Bluetooth (Low Energy) (2M)	2402	6.82	12.14	PASS
	2440	10.07	12.14	PASS
	2480	10.44	12.14	PASS
Bluetooth (Low Energy) (S=2)	2402	9.90	12.14	PASS
	2440	10.26	12.14	PASS
	2480	10.50	12.14	PASS
Bluetooth (Low Energy) (S=8)	2402	10.10	12.14	PASS
	2440	10.06	12.14	PASS
	2480	10.43	12.14	PASS

Note: 1. EIRP = Antenna Power + Antenna Gain (Antenna Gain = 2.33 dBi)

5.5. Transmission Radiation Angle Width (3dB Beamwidth)

Ambient Condition

Temperature	Relative humidity	Pressure
23°C ~ 25°C	45% ~ 50%	101.5kPa

Methods of Measurement

Set EUT and measuring antenna at the same height and roughly facing each other.

Set spectrum analyzer RBW=1MHz, VBW=1MHz, SPAN=0Hz, Detector=Positive Peak and tune reference level to observer receiving signal position.

Rotate directions of the EUT horizontally and vertically to find the maximum receiving power.

Move the measuring antenna height up and down with $\pm 50\text{cm}$ 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".

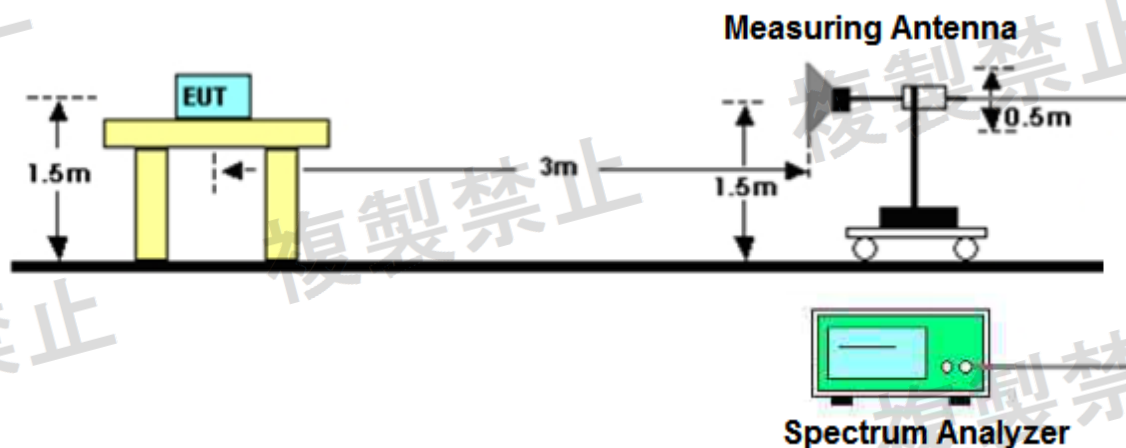
Calculate permitted radiation angle in horizontal and vertical using EIRP measured in another test method.

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



Limit

Item	Limits
3dB Antenna beamwidth	$360/A$ (if $A < 1$; then $A = 1$) $A = \{ \text{EIRP Power [mW]} / 16.36 \text{ for DS, OFDM} \}$ or $A = \{ \text{EIRP Power [mW]} / 4.9 \text{ for FH} \}$
Remark: This test item will not be applied to Antenna Gain of EUT is lower than 2.14dBi.	

Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 1.96$, $U = 3.55 \text{ dB}$.

Test Results

For Bluetooth LE mode, this test item will not be applied to EIRP of EUT is Lower than 12.14 dBm.

5.6. Unwanted Emission Strength Measurement

Ambient Condition

Temperature	Relative humidity	Pressure
25°C	50%	101.5kPa

Method of Measurement

Step-1

Spectrum Analyzer Setting

RBW: 1MHz

VBW: Same as RBW

Sweep Time: AUTO (Minimum time to ensure measurement accuracy)

Sweep Mode: Single Sweep

Detection Mode: Positive Peak

Step-2

Spectrum Analyzer Setting

Center Frequency: Searched Frequency

SPAN: 0 Hz

RBW: 100kHz for frequencies below 1GHz, 1MHz for frequencies above 1GHz

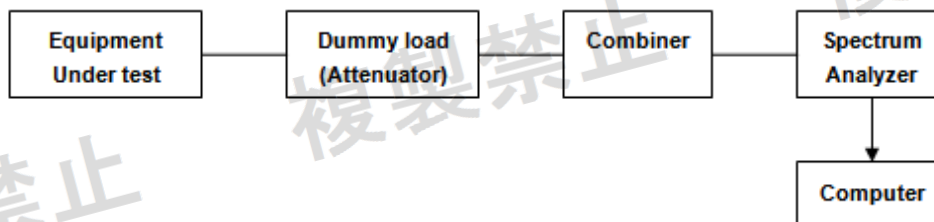
VBW: Same as RBW

Sweep Time: AUTO (Minimum time to ensure measurement accuracy)

Sweep Mode: Single Sweep

Detection Mode: Sample

Test Setup



Limit

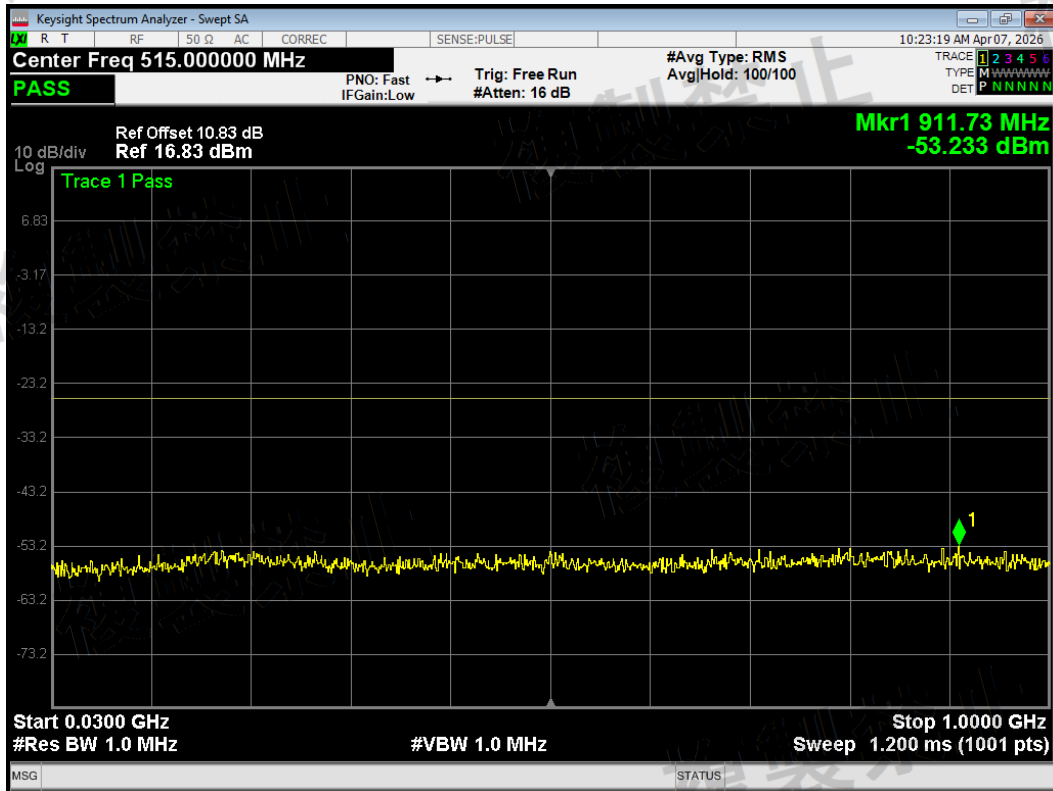
Frequency Range	Limits (μW/MHz)
30MHz - 2387 MHz	2.5
2387MHz - 2400MHz	25
2483.5MHz - 2496.5MHz	25
2496.5MHz - 12.5GHz	2.5

Test Results

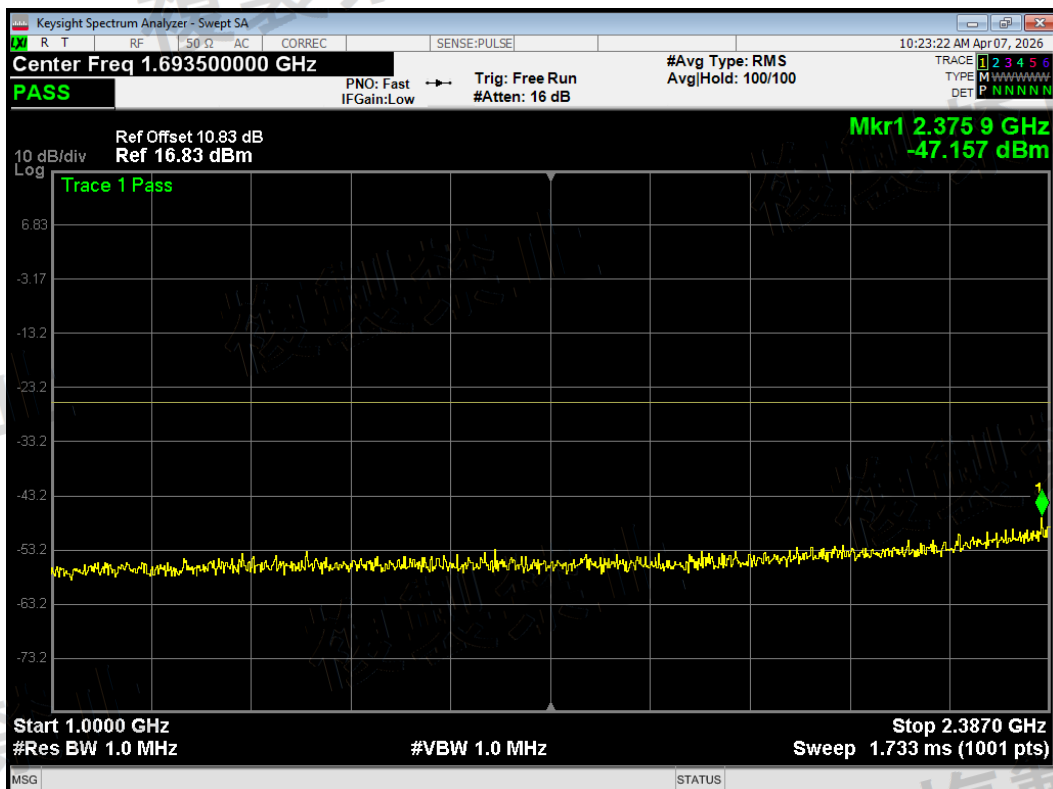
Mode	Frequency (MHz)	Range (MHz)	Emission Frequency (MHz)	Max Value (dBm/MHz)	Max Value (μW/MHz)	Limit (μW/MHz)	Verdict
BLE (1M)	2402	30-1000	911.73	-53.23	0.005	2.5	Pass
BLE (1M)	2402	1000-2387	2375.90	-47.15	0.019	2.5	Pass
BLE (1M)	2402	2387-2400	2399.99	-20.97	7.998	25	Pass
BLE (1M)	2402	2483.5-2496.5	2487.96	-46.97	0.020	25	Pass
BLE (1M)	2402	2496.5-13000	4009.00	-43.30	0.047	2.5	Pass
BLE (1M)	2440	30-1000	201.69	-49.24	0.012	2.5	Pass
BLE (1M)	2440	1000-2387	2370.36	-46.97	0.020	2.5	Pass
BLE (1M)	2440	2387-2400	2391.56	-45.88	0.026	25	Pass
BLE (1M)	2440	2483.5-2496.5	2491.86	-43.18	0.048	25	Pass
BLE (1M)	2440	2496.5-13000	4072.02	-43.91	0.041	2.5	Pass
BLE (1M)	2480	30-1000	851.59	-49.09	0.012	2.5	Pass
BLE (1M)	2480	1000-2387	2353.71	-47.28	0.019	2.5	Pass
BLE (1M)	2480	2387-2400	2396.78	-46.21	0.024	25	Pass
BLE (1M)	2480	2483.5-2496.5	2483.57	-36.27	0.236	25	Pass
BLE (1M)	2480	2496.5-13000	2496.50	-41.32	0.074	2.5	Pass
BLE (2M)	2402	30-1000	126.03	-49.81	0.010	2.5	Pass
BLE (2M)	2402	1000-2387	2127.63	-48.96	0.013	2.5	Pass
BLE (2M)	2402	2387-2400	2399.97	-19.31	11.722	25	Pass
BLE (2M)	2402	2483.5-2496.5	2493.76	-47.31	0.019	25	Pass
BLE (2M)	2402	2496.5-13000	4009.00	-46.13	0.024	2.5	Pass
BLE (2M)	2440	30-1000	911.73	-48.98	0.013	2.5	Pass
BLE (2M)	2440	1000-2387	2306.55	-45.08	0.031	2.5	Pass
BLE (2M)	2440	2387-2400	2399.74	-45.99	0.025	25	Pass
BLE (2M)	2440	2483.5-2496.5	2494.20	-44.74	0.034	25	Pass
BLE (2M)	2440	2496.5-13000	4072.02	-44.25	0.038	2.5	Pass
BLE (2M)	2480	30-1000	480.08	-48.99	0.013	2.5	Pass
BLE (2M)	2480	1000-2387	2342.62	-46.96	0.020	2.5	Pass
BLE (2M)	2480	2387-2400	2393.24	-46.34	0.023	25	Pass
BLE (2M)	2480	2483.5-2496.5	2484.18	-36.09	0.246	25	Pass
BLE (2M)	2480	2496.5-13000	2496.50	-44.53	0.035	2.5	Pass
S=2	2402	30-1000	198.78	-48.92	0.013	2.5	Pass
S=2	2402	1000-2387	2387.00	-46.11	0.024	2.5	Pass
S=2	2402	2387-2400	2399.99	-20.36	9.204	25	Pass
S=2	2402	2483.5-2496.5	2492.63	-46.03	0.025	25	Pass
S=2	2402	2496.5-13000	4009.00	-41.67	0.068	2.5	Pass
S=2	2440	30-1000	197.81	-48.33	0.015	2.5	Pass
S=2	2440	1000-2387	2363.42	-46.26	0.024	2.5	Pass
S=2	2440	2387-2400	2399.88	-45.56	0.028	25	Pass
S=2	2440	2483.5-2496.5	2494.90	-44.63	0.034	25	Pass
S=2	2440	2496.5-13000	4072.02	-43.87	0.041	2.5	Pass

S=2	2480	30-1000	362.71	-48.73	0.013	2.5	Pass
S=2	2480	1000-2387	2316.26	-46.37	0.023	2.5	Pass
S=2	2480	2387-2400	2390.73	-46.10	0.025	25	Pass
S=2	2480	2483.5-2496.5	2484.07	-36.16	0.242	25	Pass
S=2	2480	2496.5-13000	2496.50	-43.66	0.043	2.5	Pass
S=8	2402	30-1000	921.43	-49.04	0.012	2.5	Pass
S=8	2402	1000-2387	2359.26	-46.82	0.021	2.5	Pass
S=8	2402	2387-2400	2400.00	-21.01	7.925	25	Pass
S=8	2402	2483.5-2496.5	2486.53	-45.98	0.025	25	Pass
S=8	2402	2496.5-13000	4009.00	-42.54	0.056	2.5	Pass
S=8	2440	30-1000	792.42	-48.75	0.013	2.5	Pass
S=8	2440	1000-2387	2367.58	-46.96	0.020	2.5	Pass
S=8	2440	2387-2400	2394.05	-45.37	0.029	25	Pass
S=8	2440	2483.5-2496.5	2484.37	-45.18	0.030	25	Pass
S=8	2440	2496.5-13000	4072.02	-44.14	0.039	2.5	Pass
S=8	2480	30-1000	722.58	-49.00	0.013	2.5	Pass
S=8	2480	1000-2387	2324.59	-46.53	0.022	2.5	Pass
S=8	2480	2387-2400	2389.73	-46.62	0.022	25	Pass
S=8	2480	2483.5-2496.5	2483.55	-35.74	0.267	25	Pass
S=8	2480	2496.5-13000	2496.50	-42.74	0.053	2.5	Pass

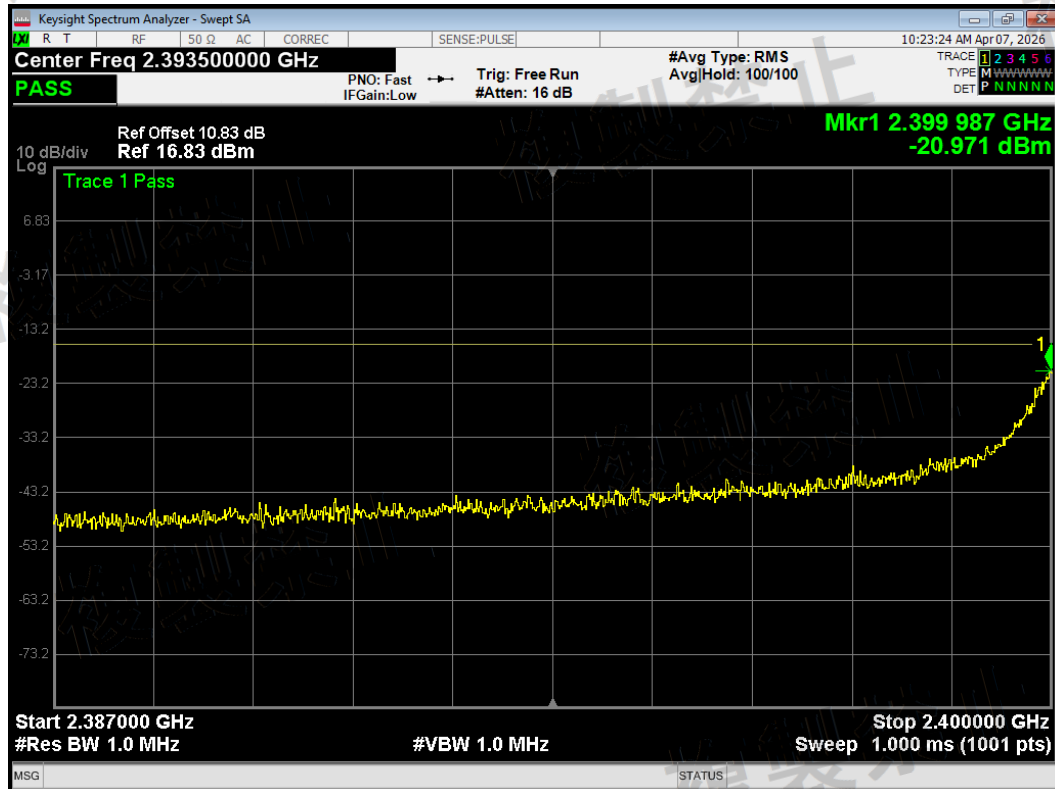
Tx. Spurious BLE (1M) 2402MHz @ 30MHz-1000MHz



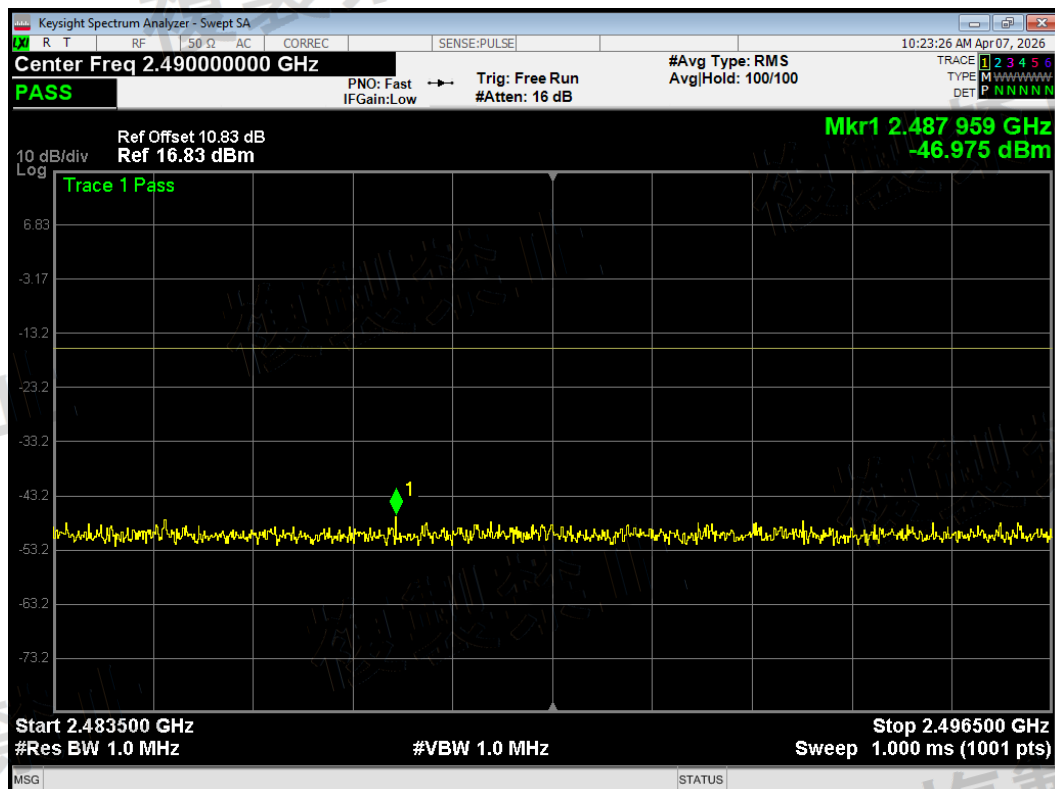
Tx. Spurious BLE (1M) 2402MHz @ 1000MHz-2387MHz



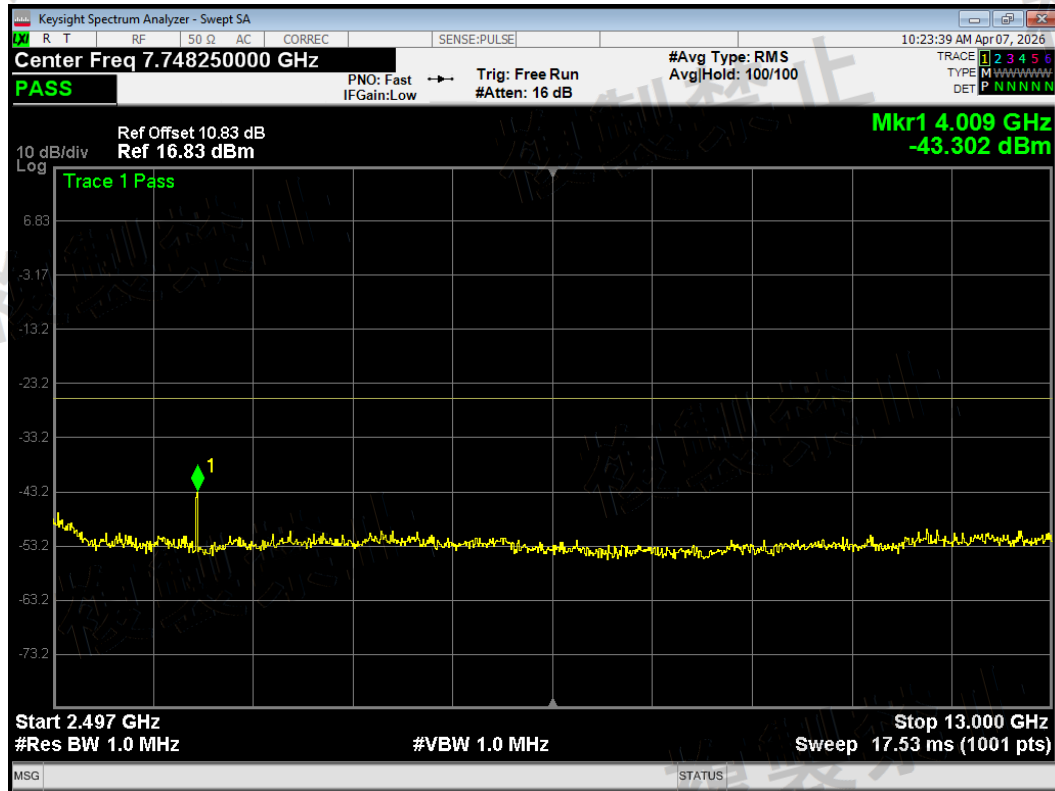
Tx. Spurious BLE (1M) 2402MHz @ 2387MHz-2400MHz



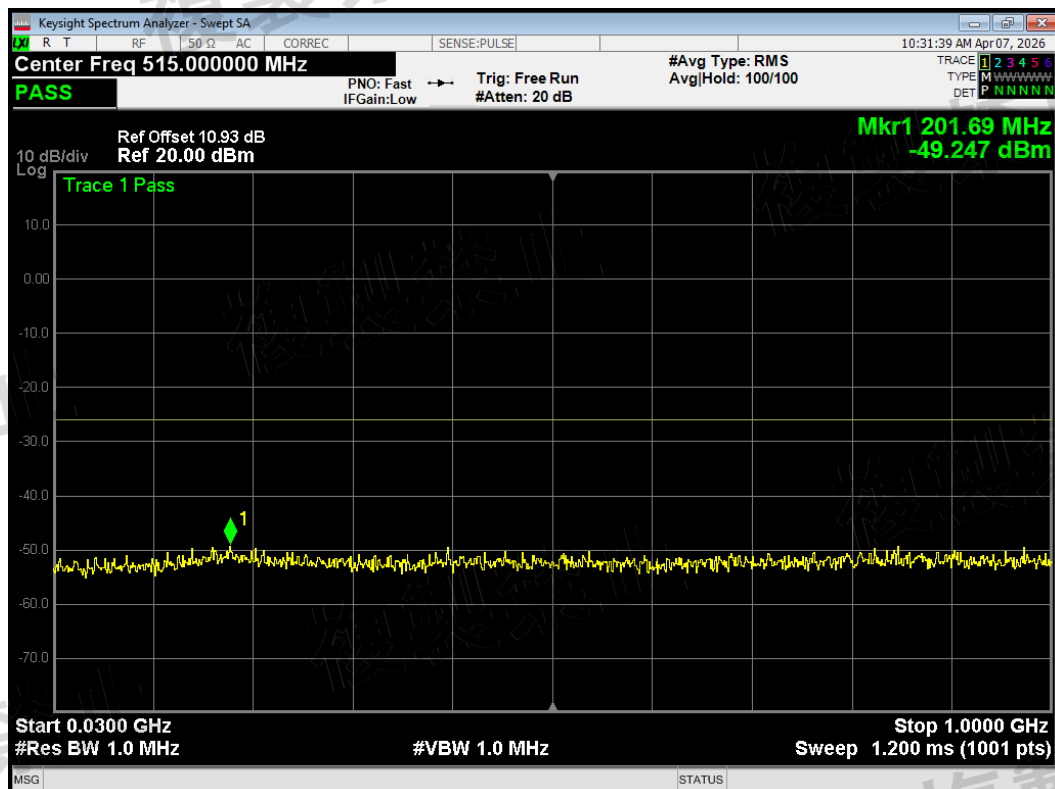
Tx. Spurious BLE (1M) 2402MHz @ 2483.5MHz-2496.5MHz



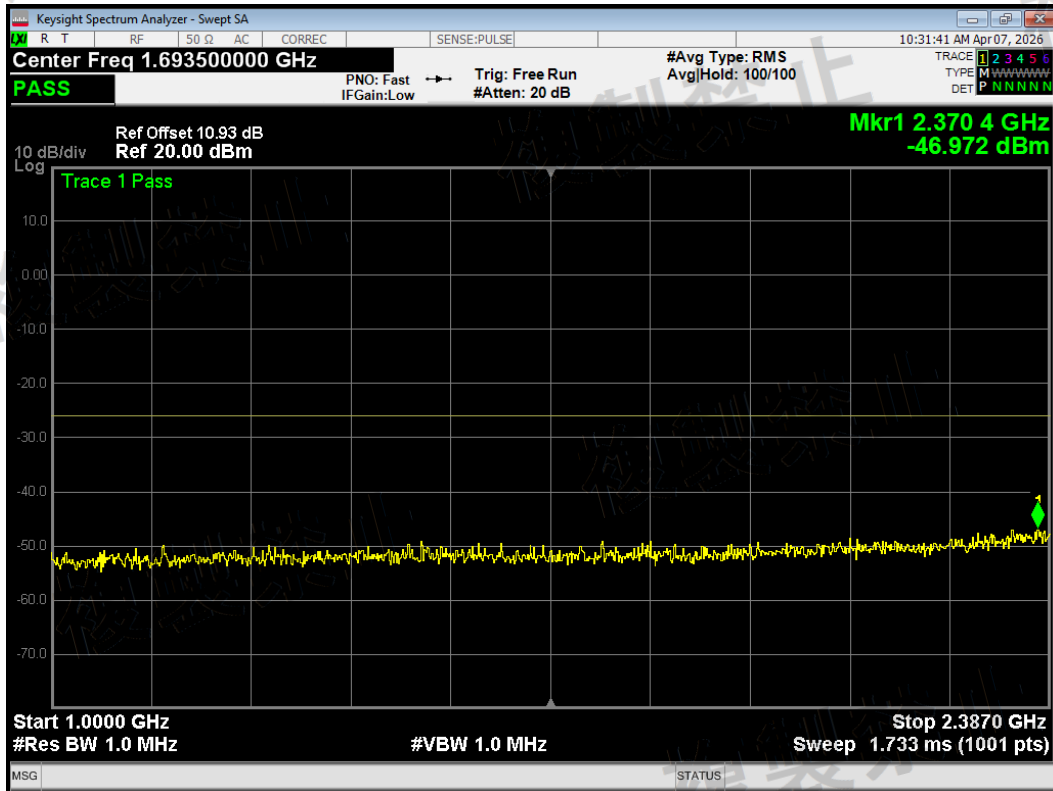
Tx. Spurious BLE (1M) 2402MHz @ 2496.5MHz-13000MHz



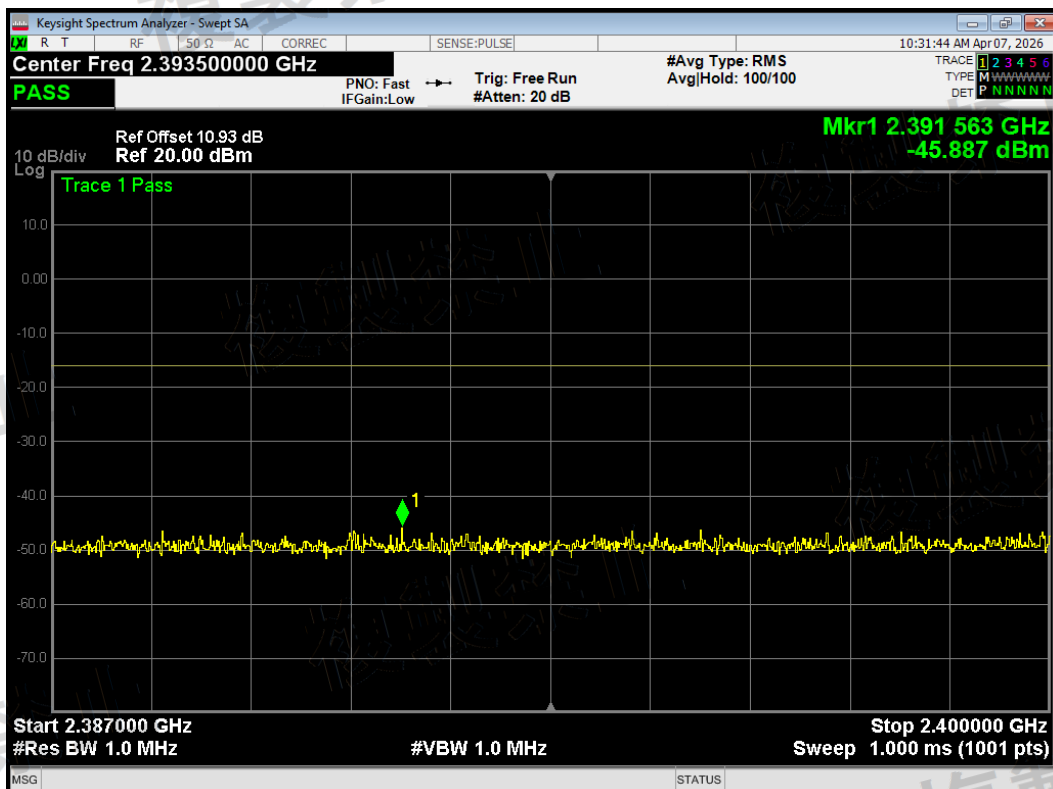
Tx. Spurious BLE (1M) 2440MHz @ 30MHz-1000MHz



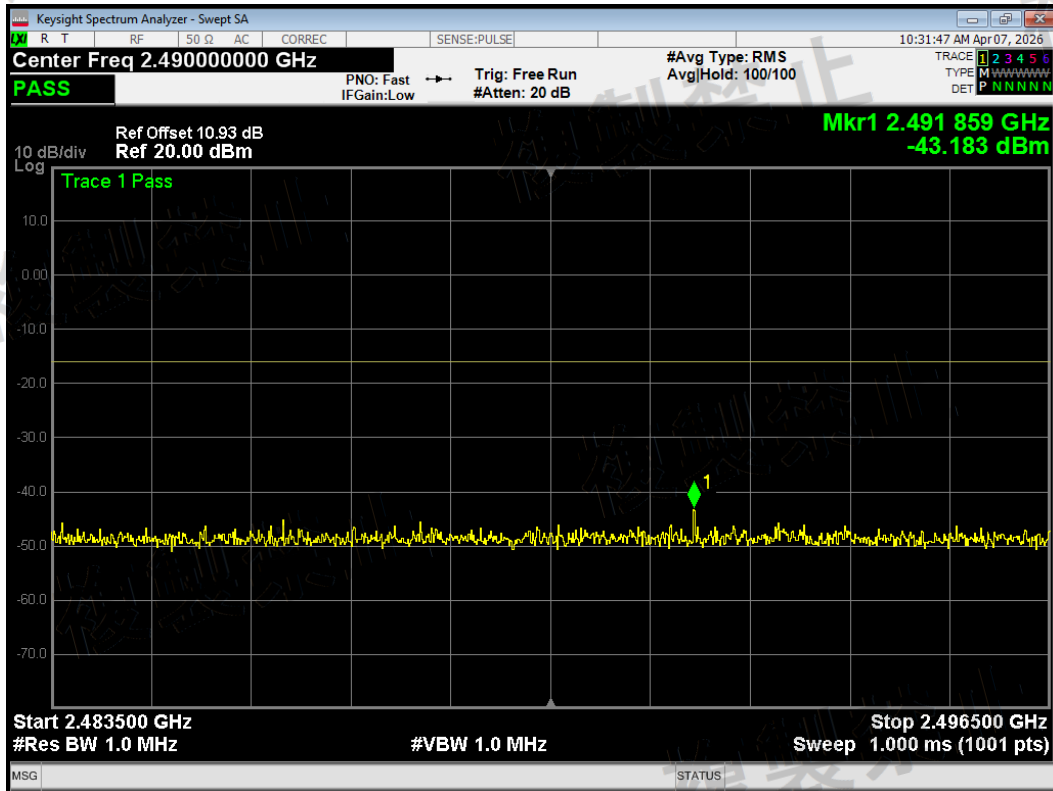
Tx. Spurious BLE (1M) 2440MHz @ 1000MHz-2387MHz



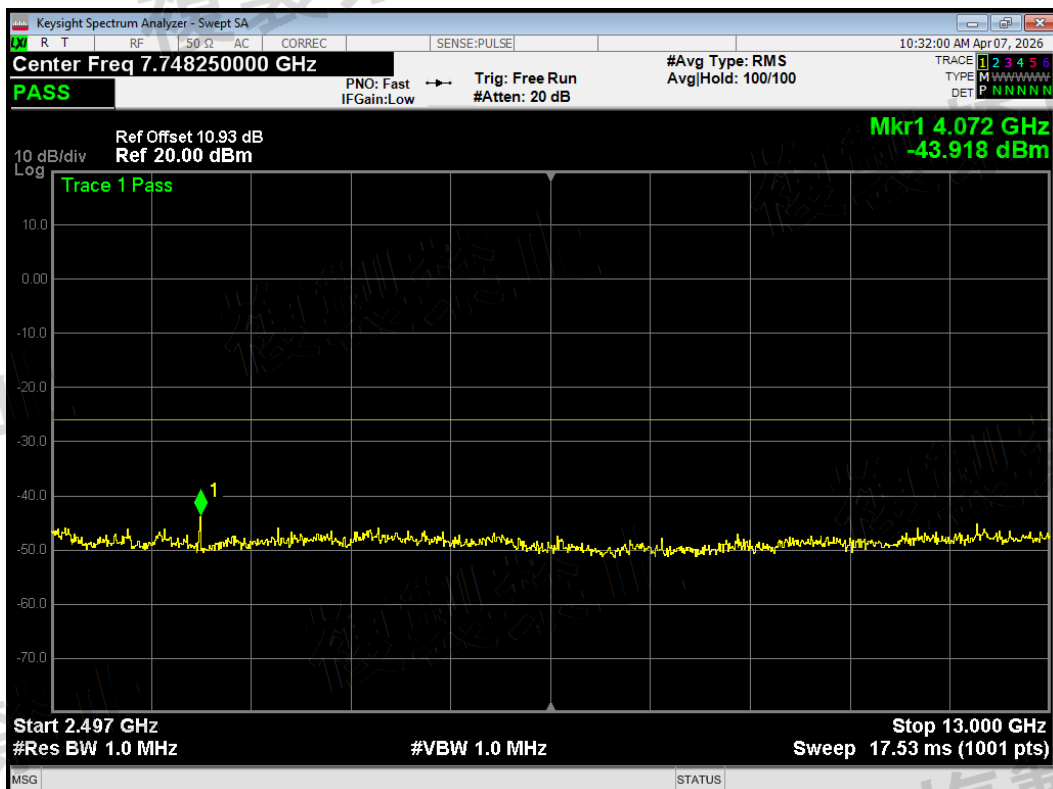
Tx. Spurious BLE (1M) 2440MHz @ 2387MHz-2400MHz



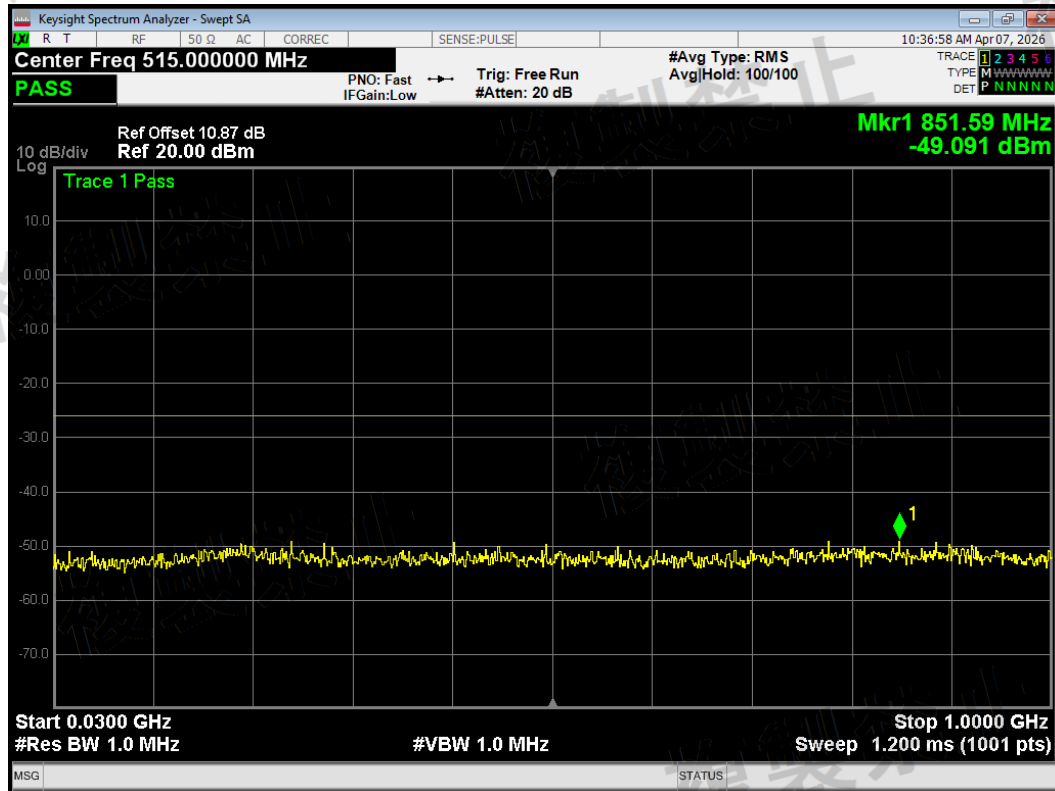
Tx. Spurious BLE (1M) 2440MHz @ 2483.5MHz-2496.5MHz



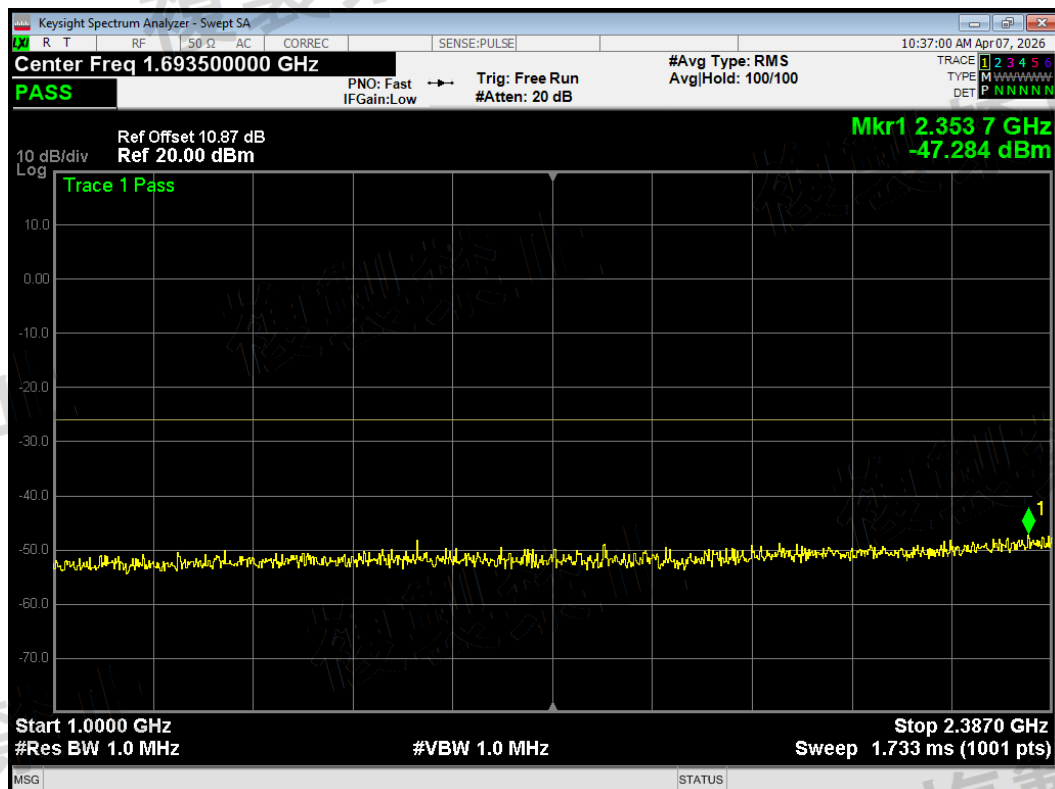
Tx. Spurious BLE (1M) 2440MHz @ 2496.5MHz-13000MHz



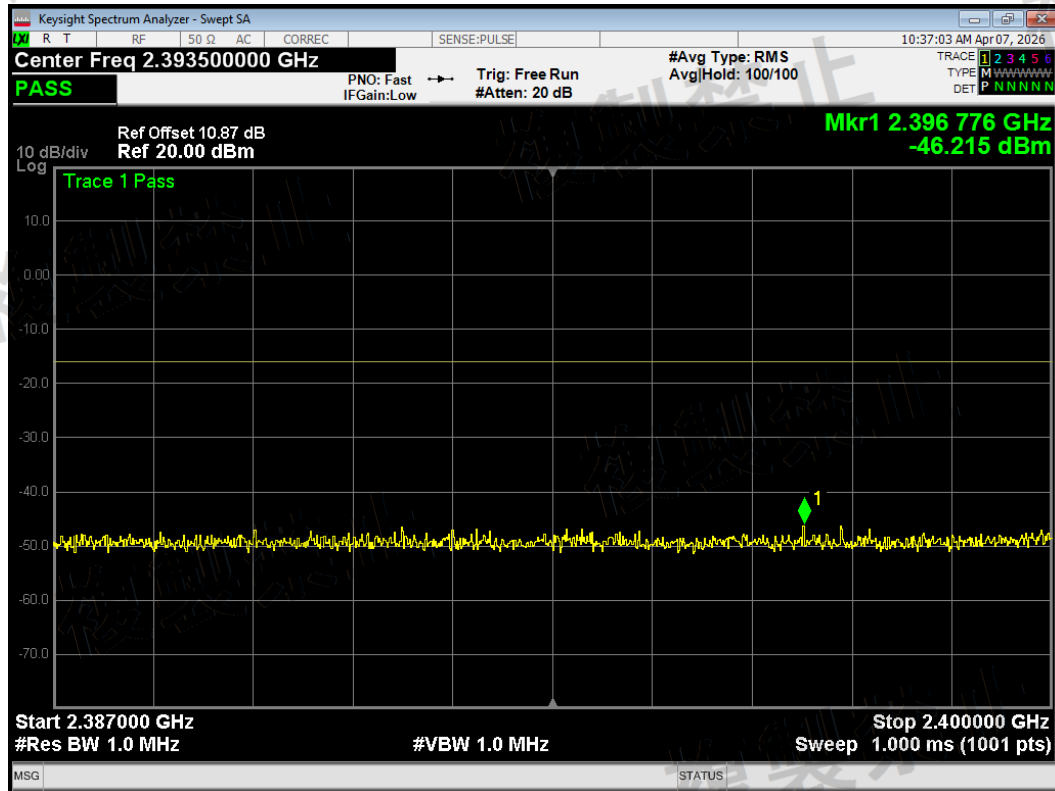
Tx. Spurious BLE (1M) 2480MHz @ 30MHz-1000MHz



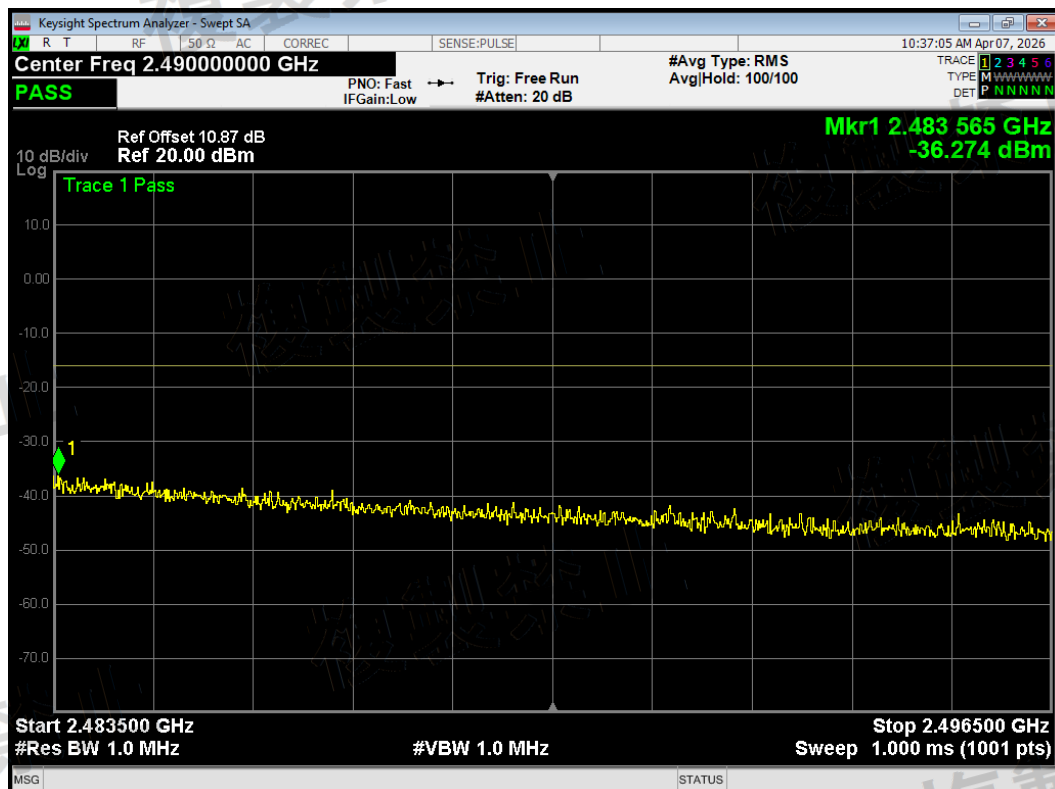
Tx. Spurious BLE (1M) 2480MHz @ 1000MHz-2387MHz



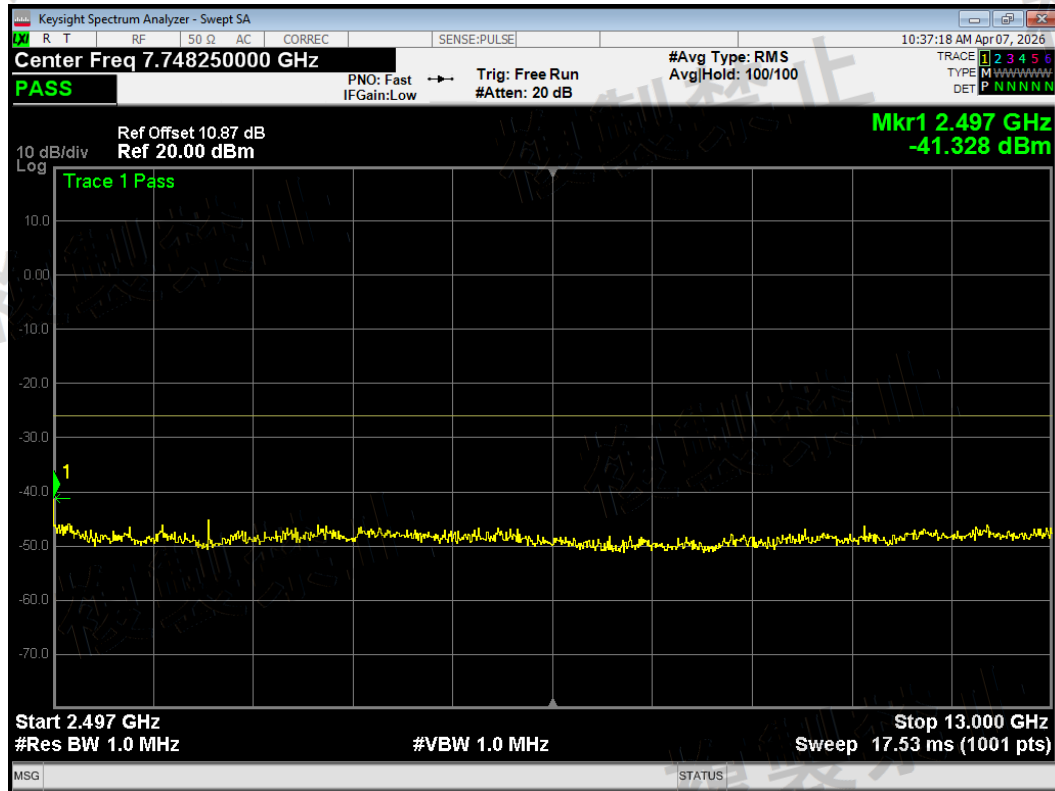
Tx. Spurious BLE (1M) 2480MHz @ 2387MHz-2400MHz



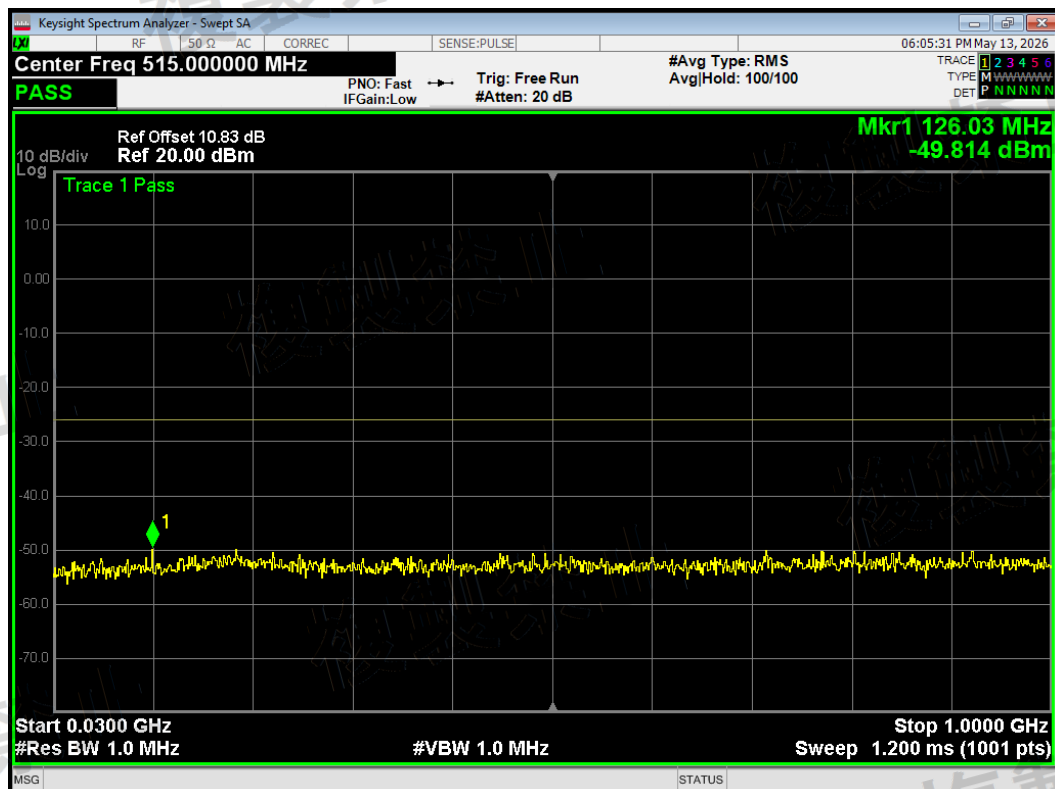
Tx. Spurious BLE (1M) 2480MHz @ 2483.5MHz-2496.5MHz



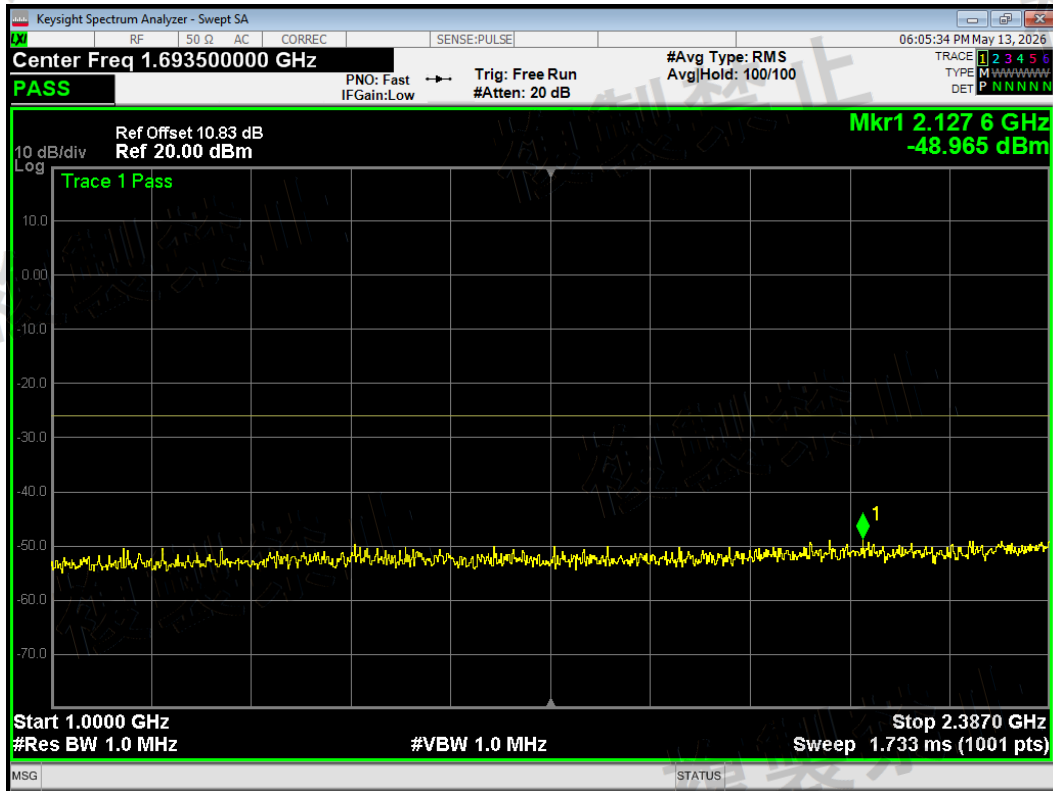
Tx. Spurious BLE (1M) 2480MHz @ 2496.5MHz-13000MHz



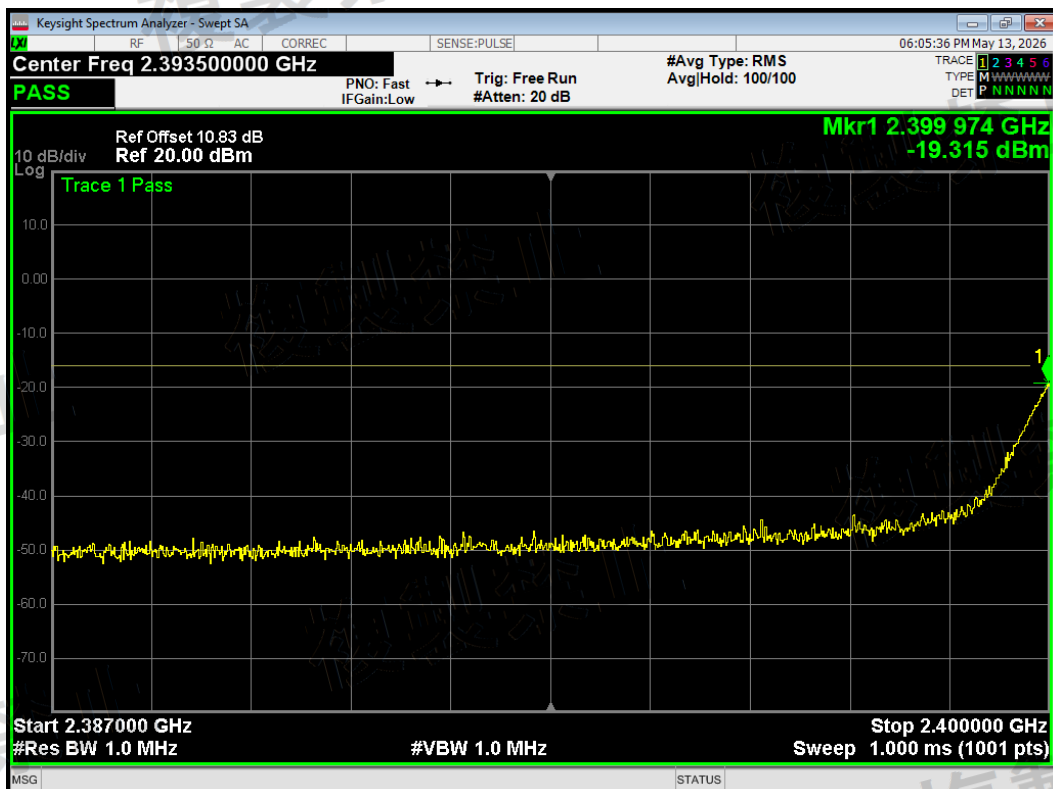
Tx. Spurious BLE (2M) 2402MHz @ 30MHz-1000MHz



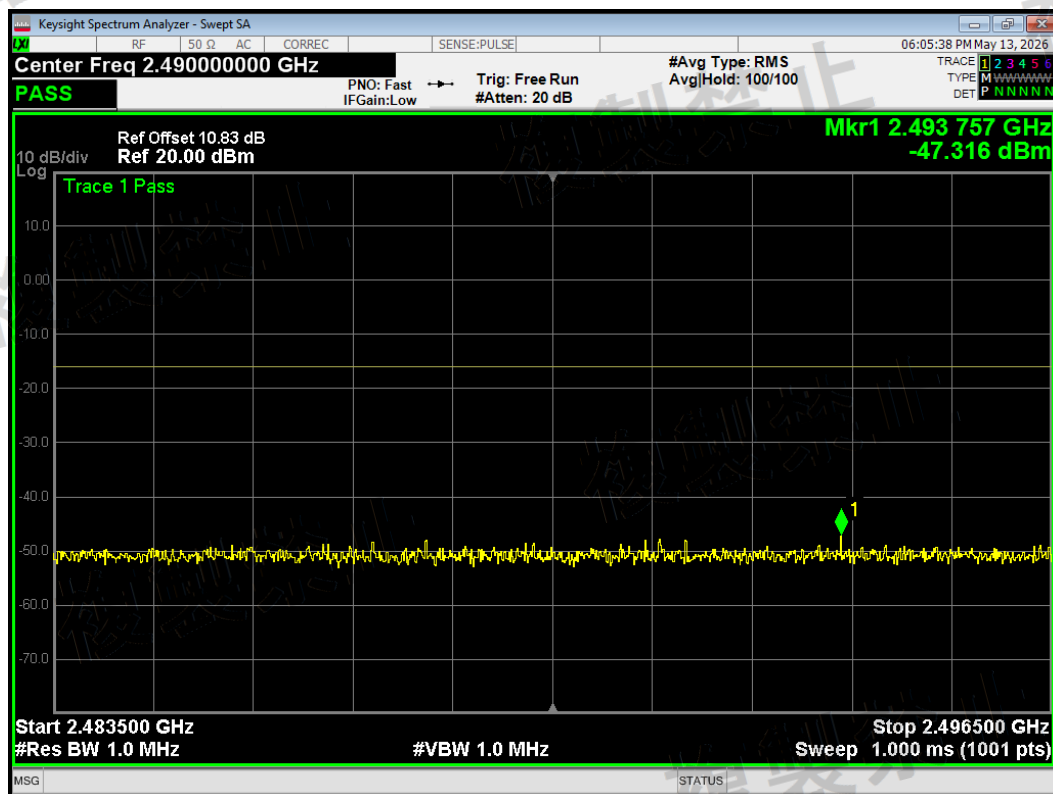
Tx. Spurious BLE (2M) 2402MHz @ 1000MHz-2387MHz



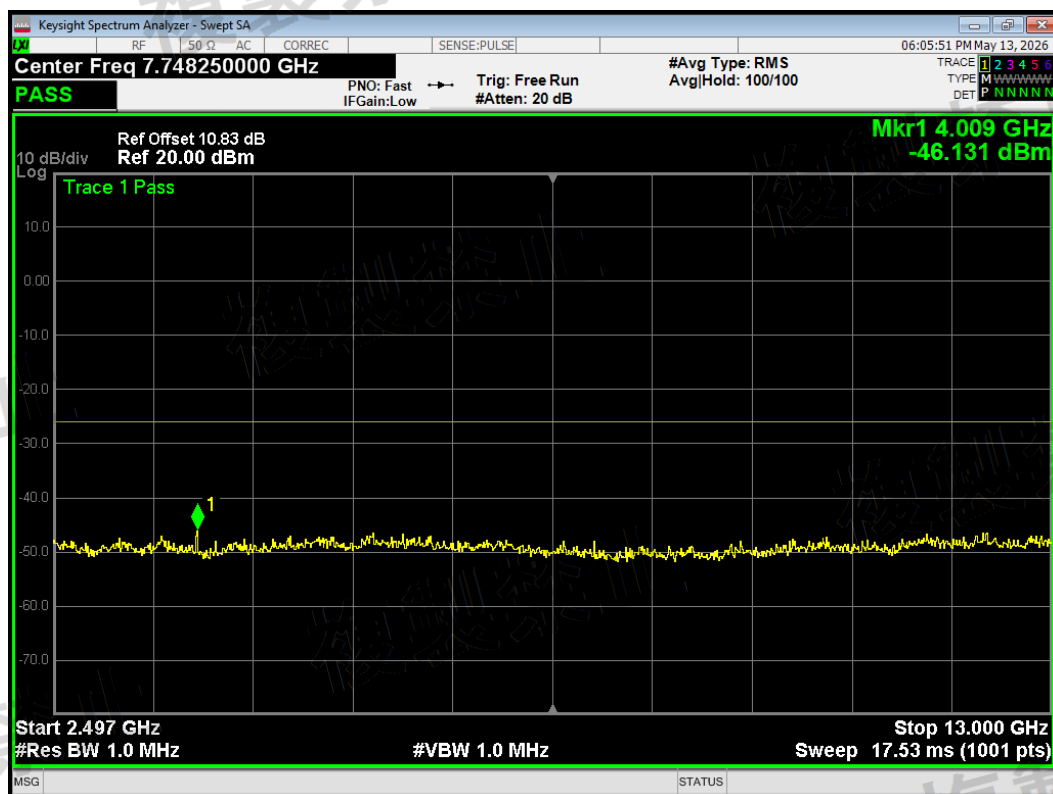
Tx. Spurious BLE (2M) 2402MHz @ 2387MHz-2400MHz



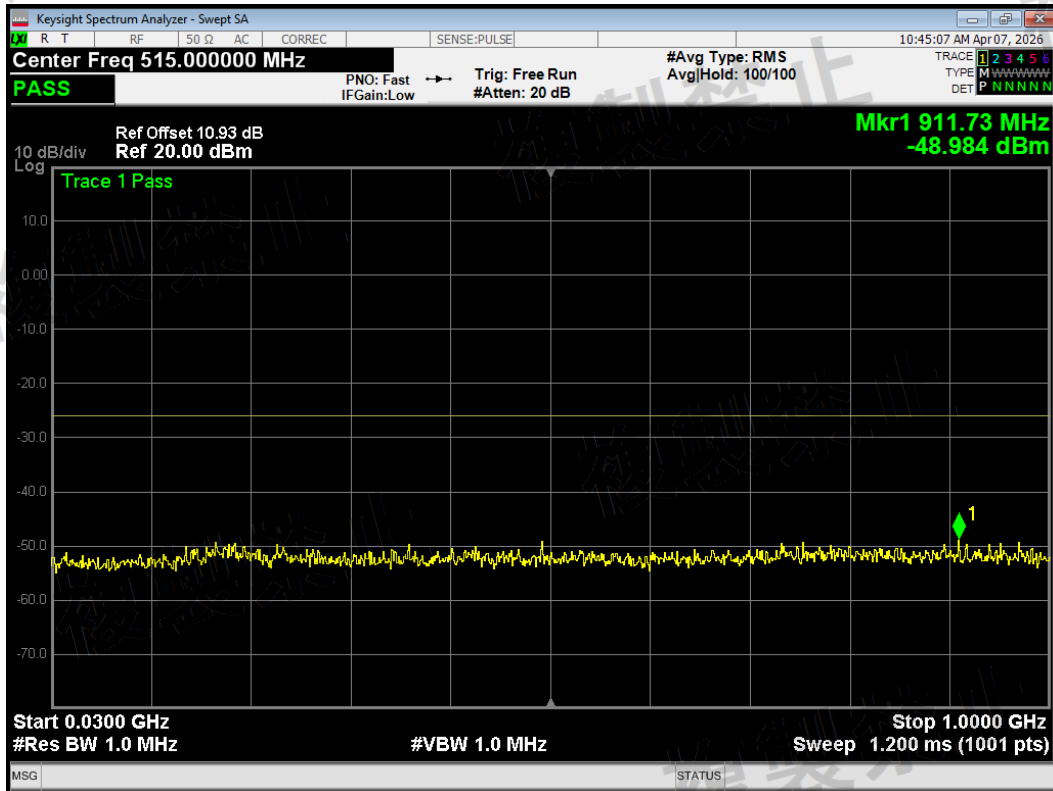
Tx. Spurious BLE (2M) 2402MHz @ 2483.5MHz-2496.5MHz



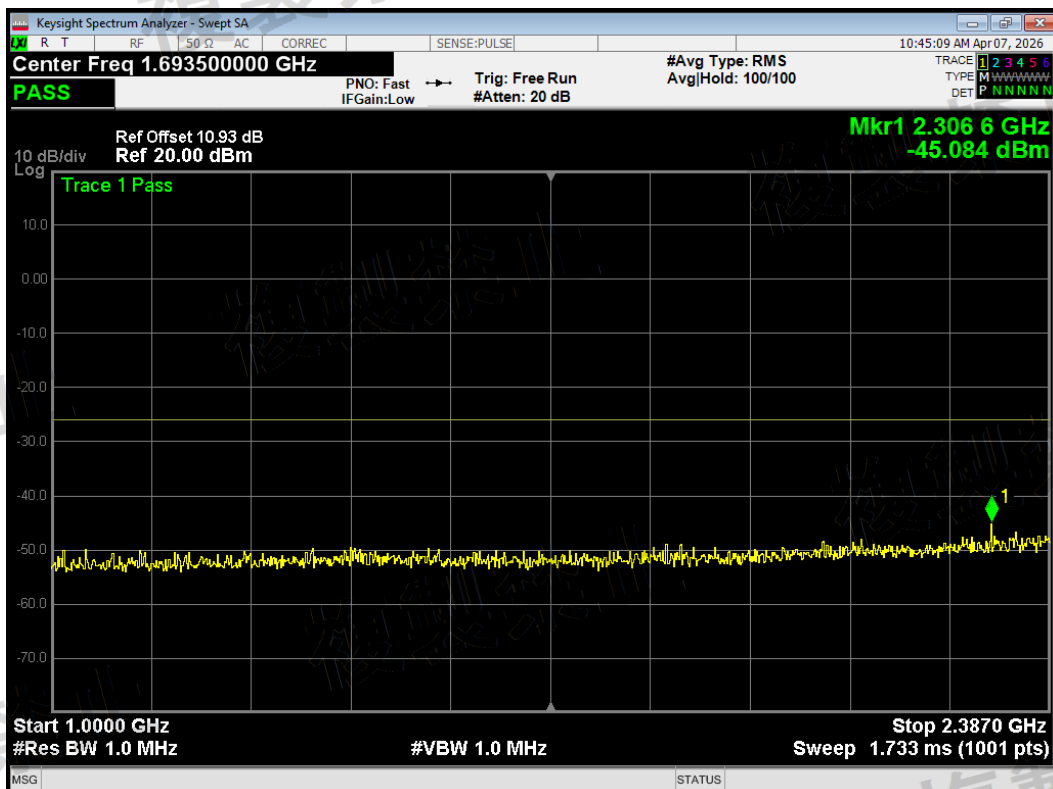
Tx. Spurious BLE (2M) 2402MHz @ 2496.5MHz-13000MHz



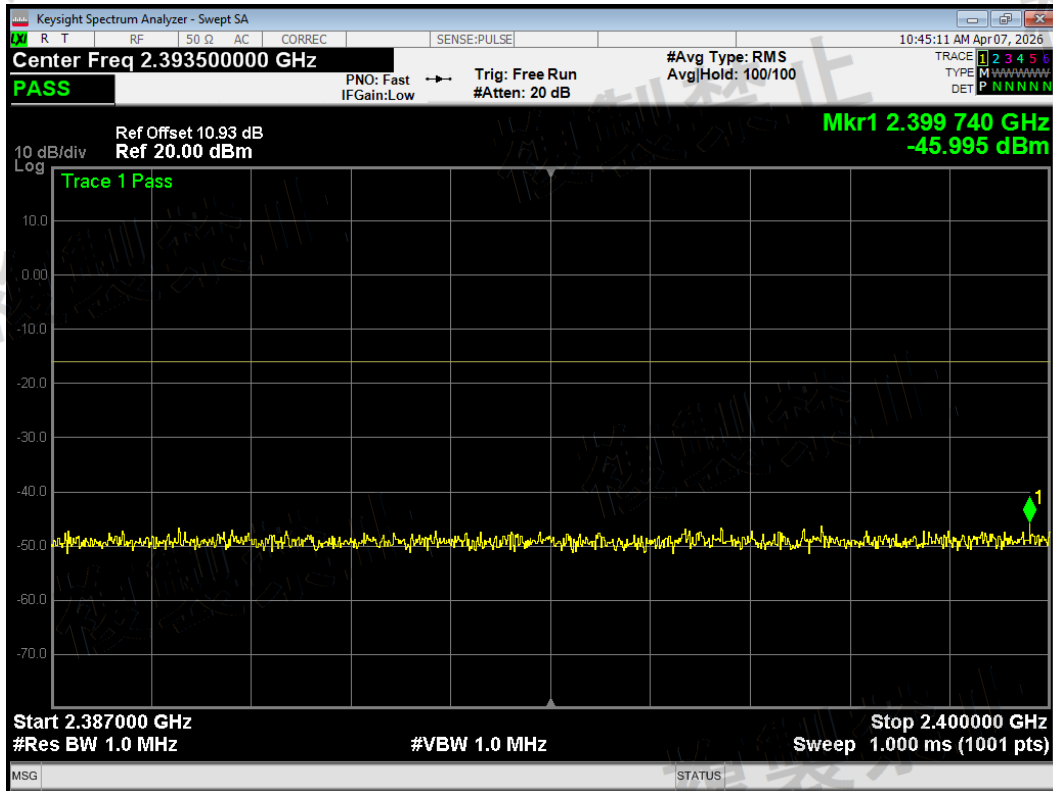
Tx. Spurious BLE (2M) 2440MHz @ 30MHz-1000MHz



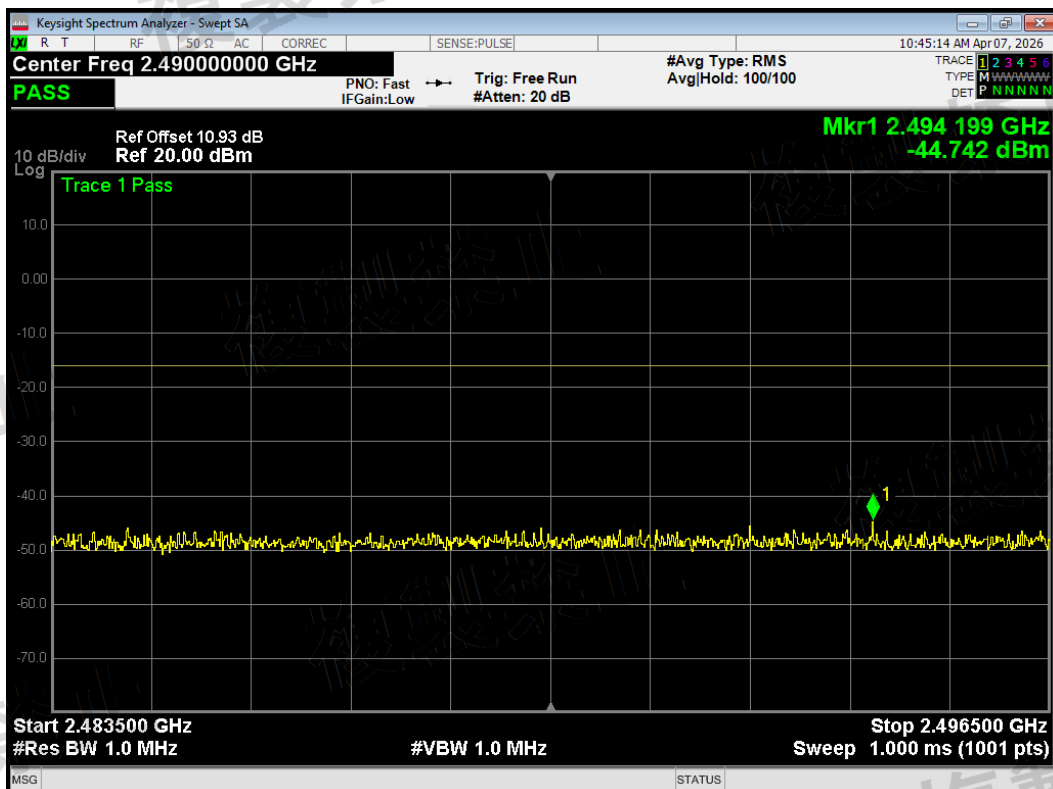
Tx. Spurious BLE (2M) 2440MHz @ 1000MHz-2387MHz



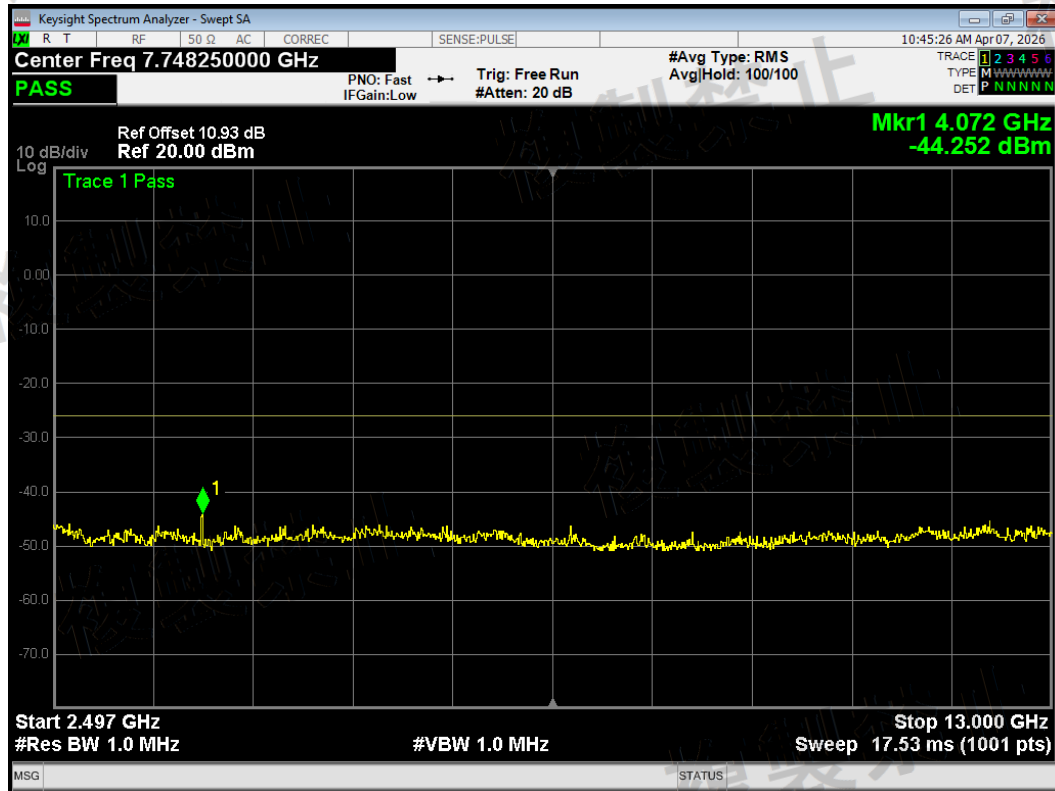
Tx. Spurious BLE (2M) 2440MHz @ 2387MHz-2400MHz



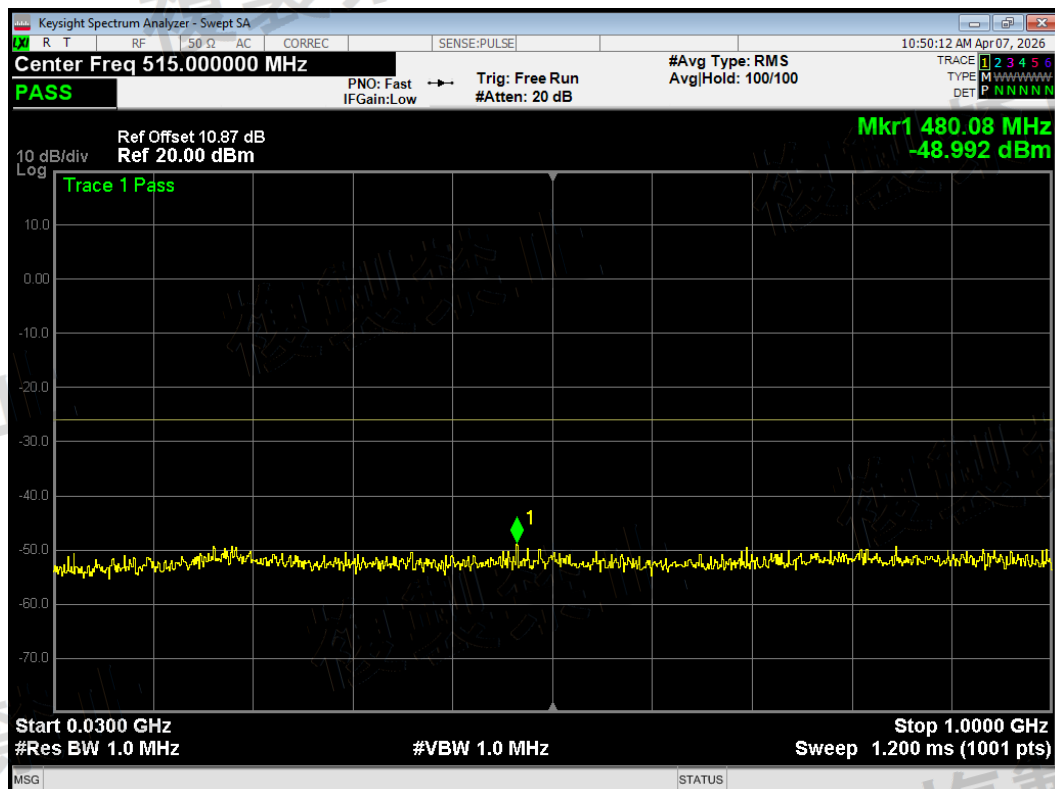
Tx. Spurious BLE (2M) 2440MHz @ 2483.5MHz-2496.5MHz



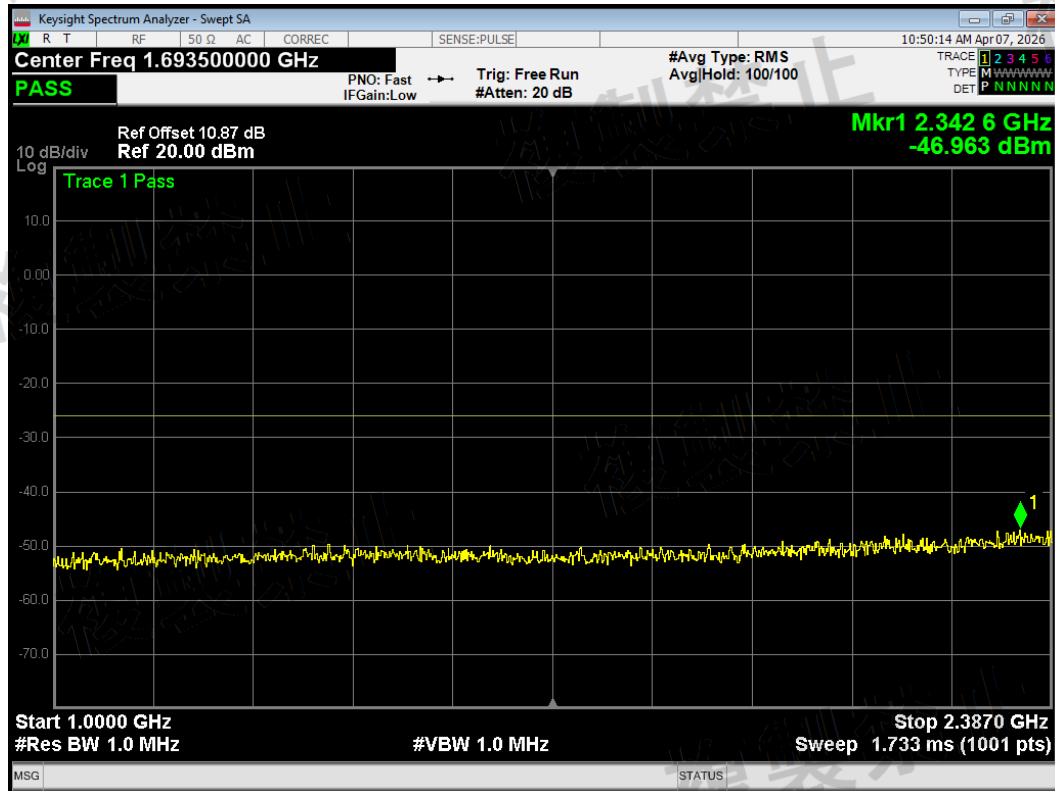
Tx. Spurious BLE (2M) 2440MHz @ 2496.5MHz-13000MHz



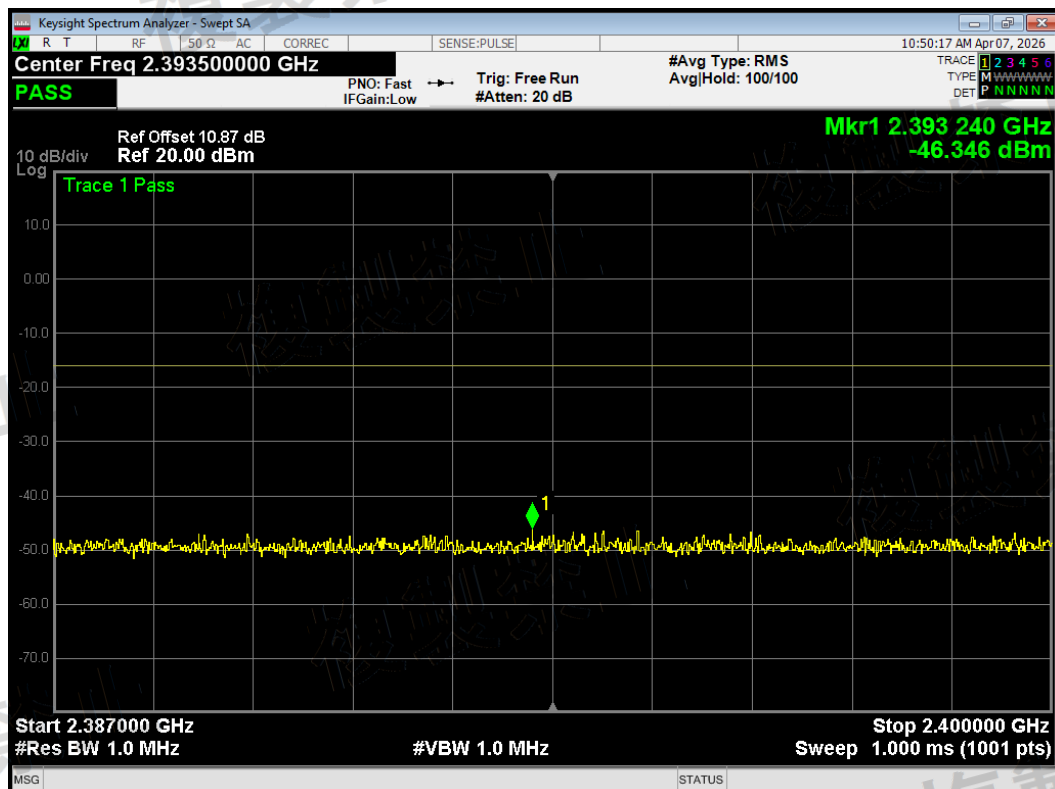
Tx. Spurious BLE (2M) 2480MHz @ 30MHz-1000MHz



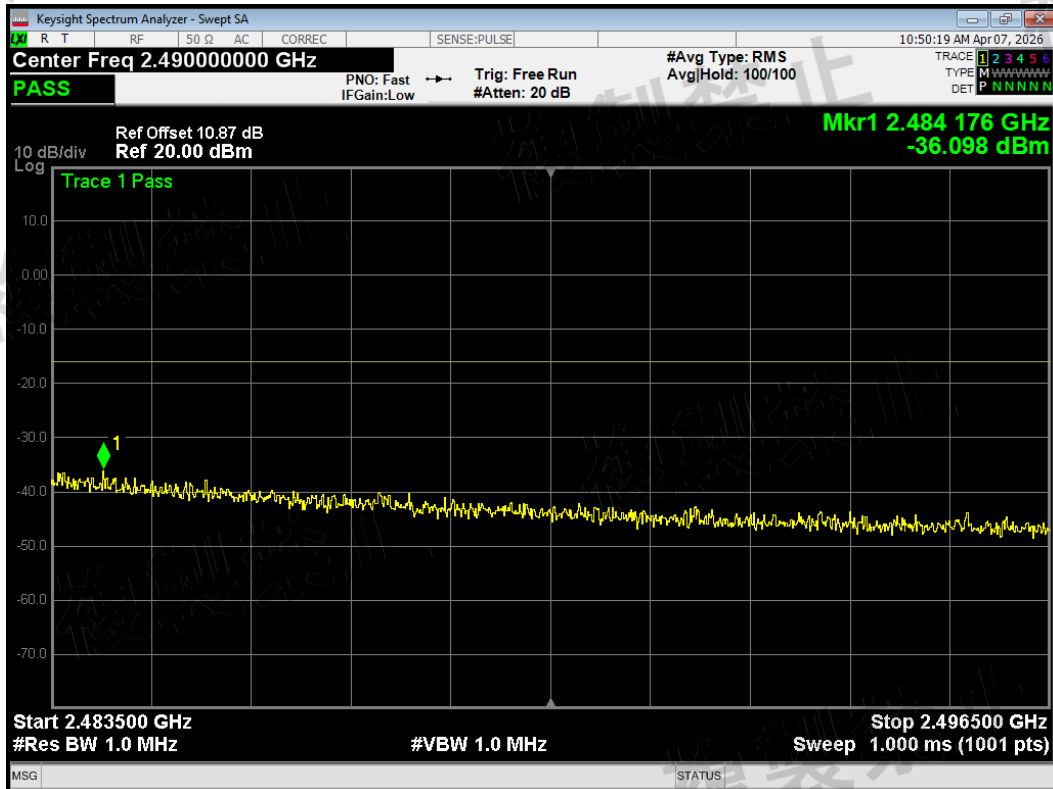
Tx. Spurious BLE (2M) 2480MHz @ 1000MHz-2387MHz



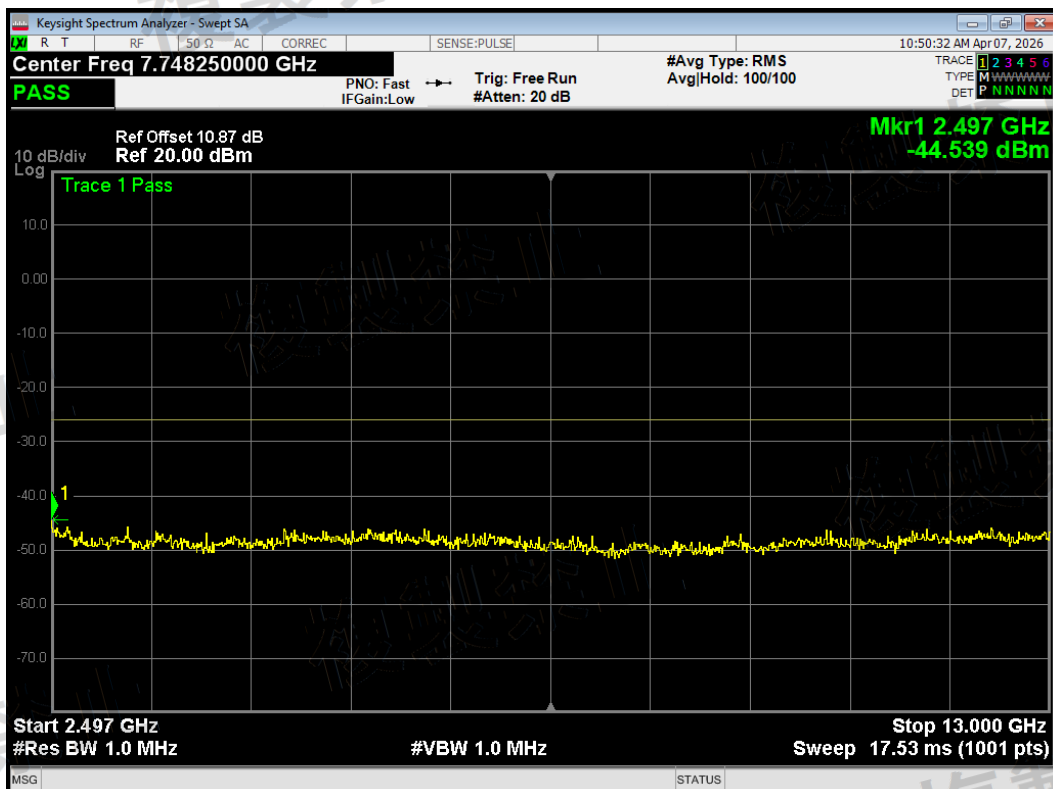
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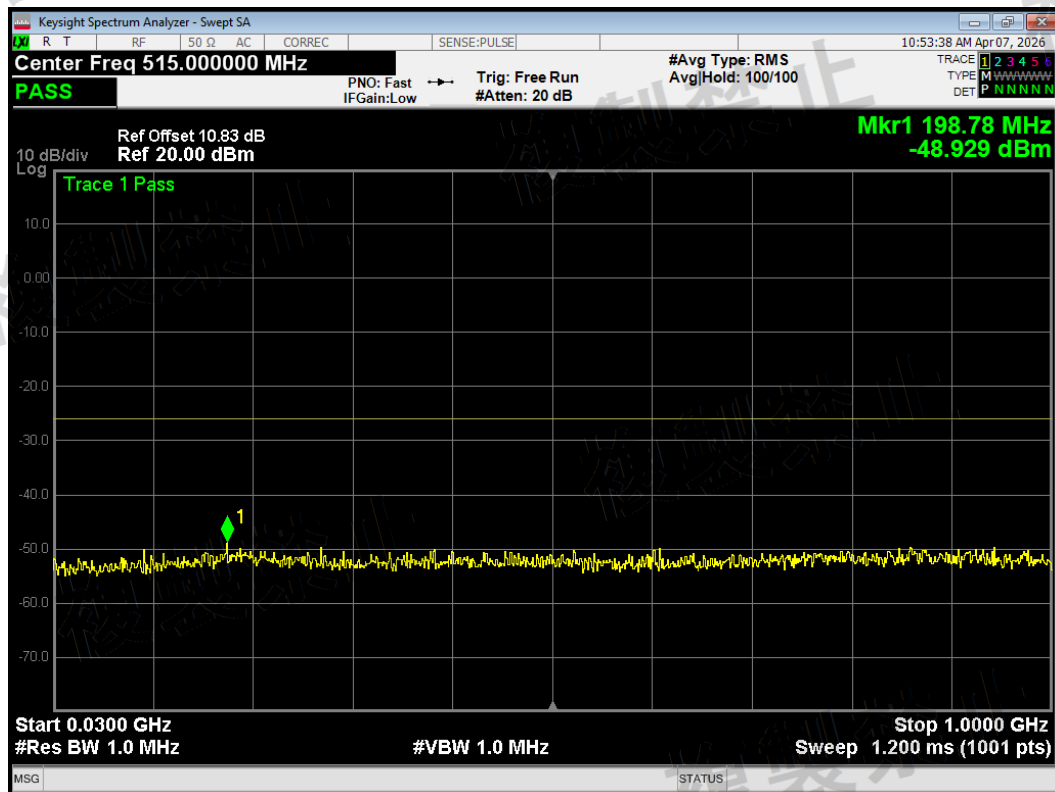
Tx. Spurious BLE (2M) 2480MHz @ 2483.5MHz-2496.5MHz



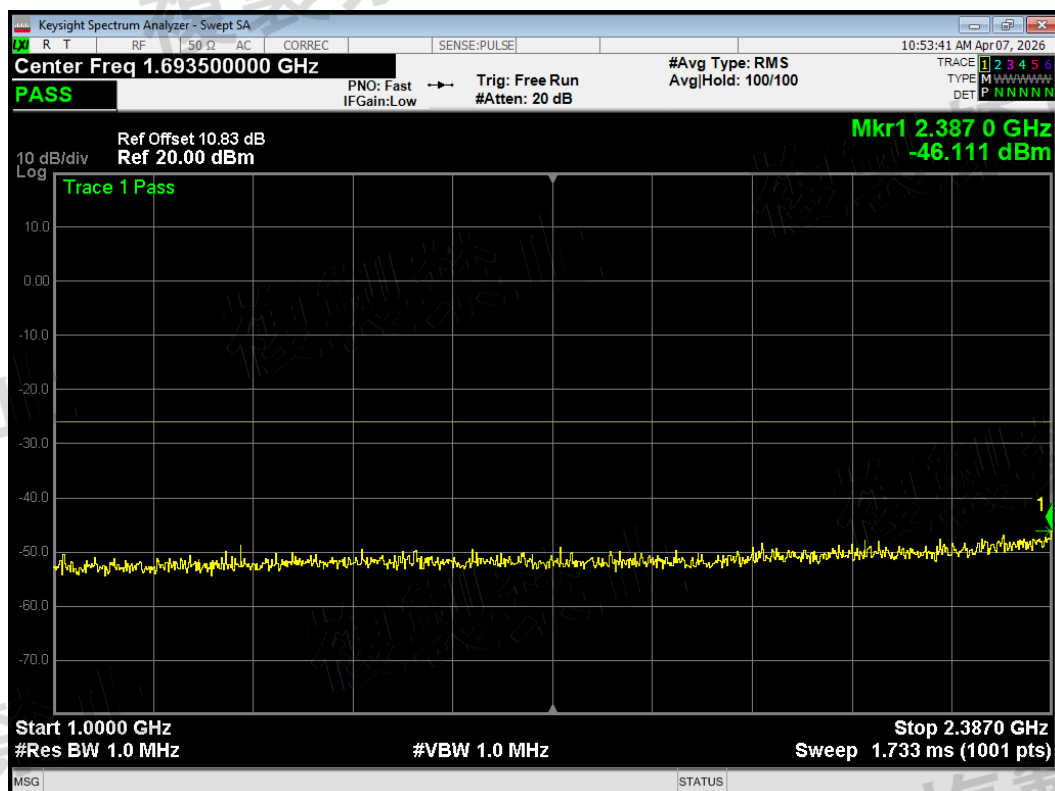
Tx. Spurious BLE (2M) 2480MHz @ 2496.5MHz-13000MHz



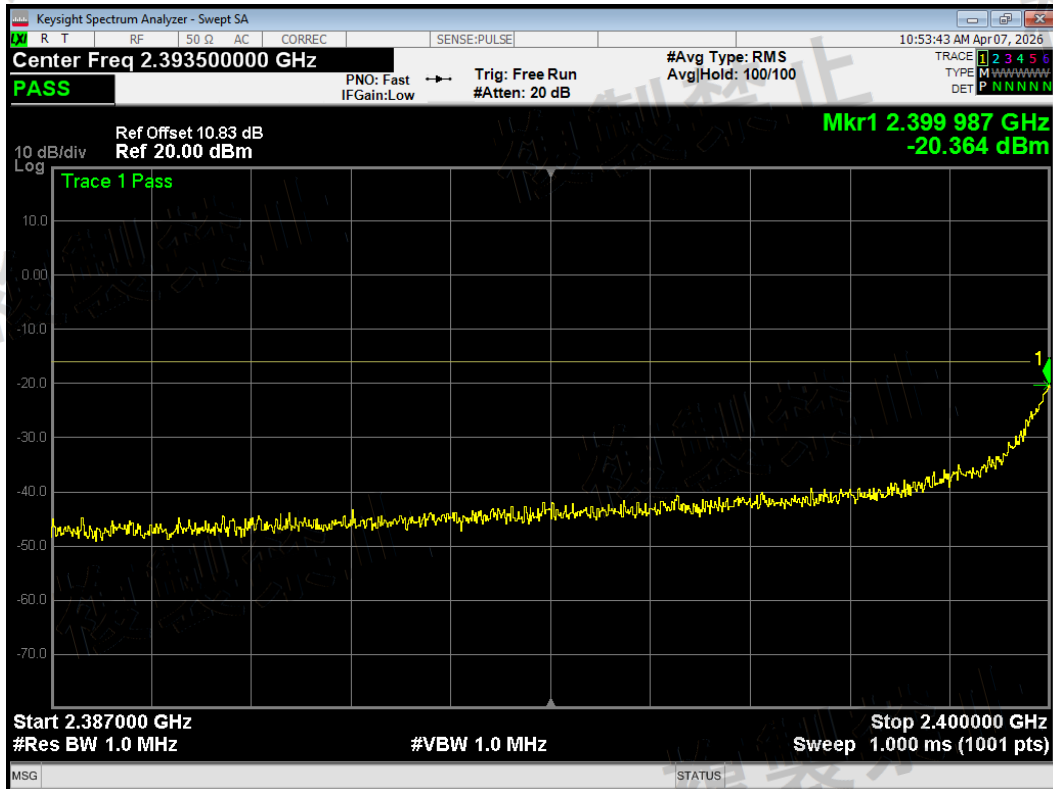
Tx. Spurious S=2 2402MHz @ 30MHz-1000MHz



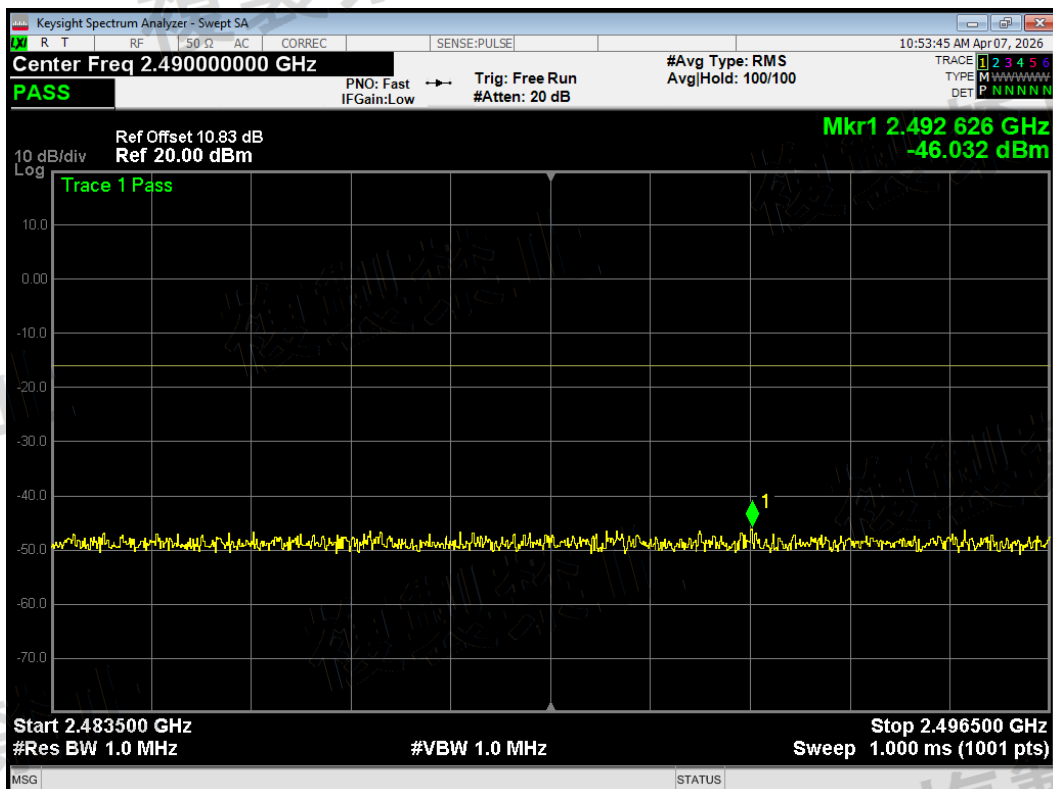
Tx. Spurious S=2 2402MHz @ 1000MHz-2387MHz



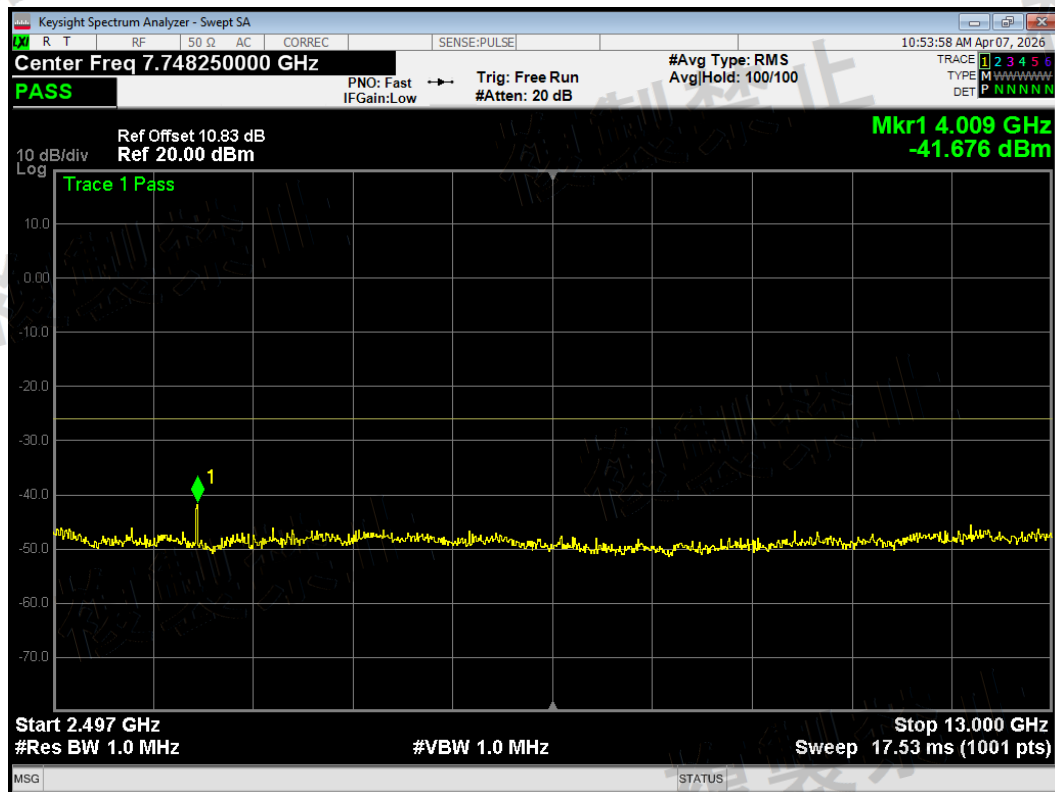
Tx. Spurious S=2 2402MHz @ 2387MHz-2400MHz



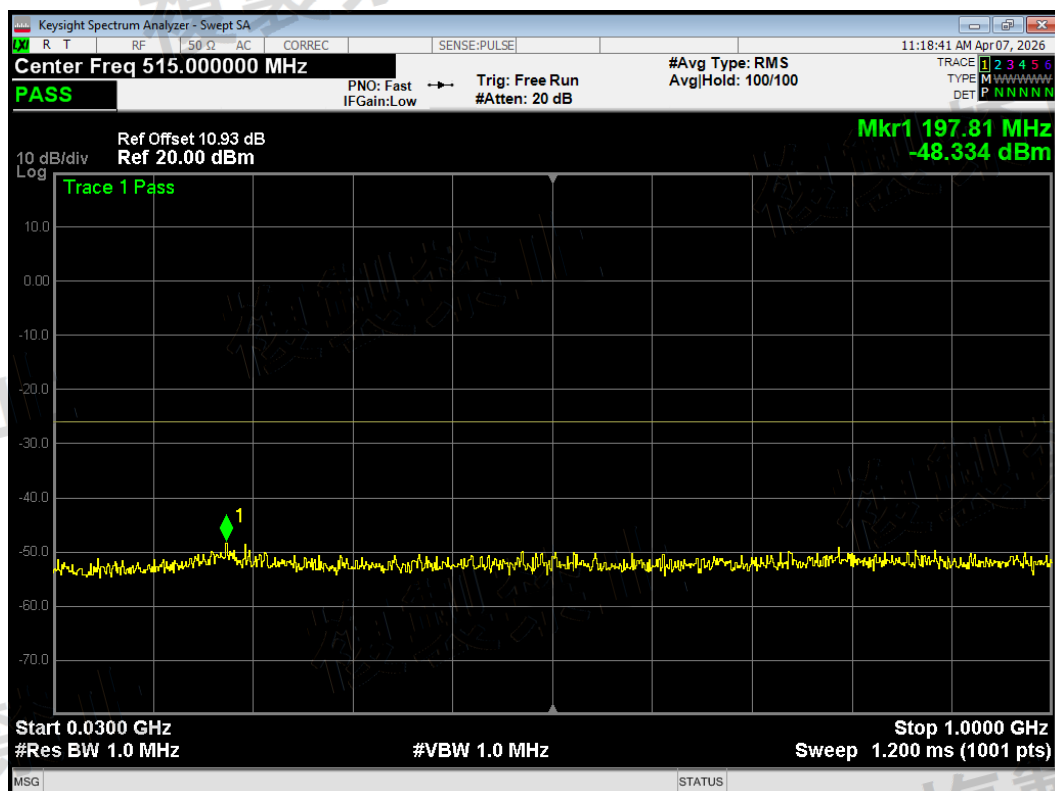
Tx. Spurious S=2 2402MHz @ 2483.5MHz-2496.5MHz



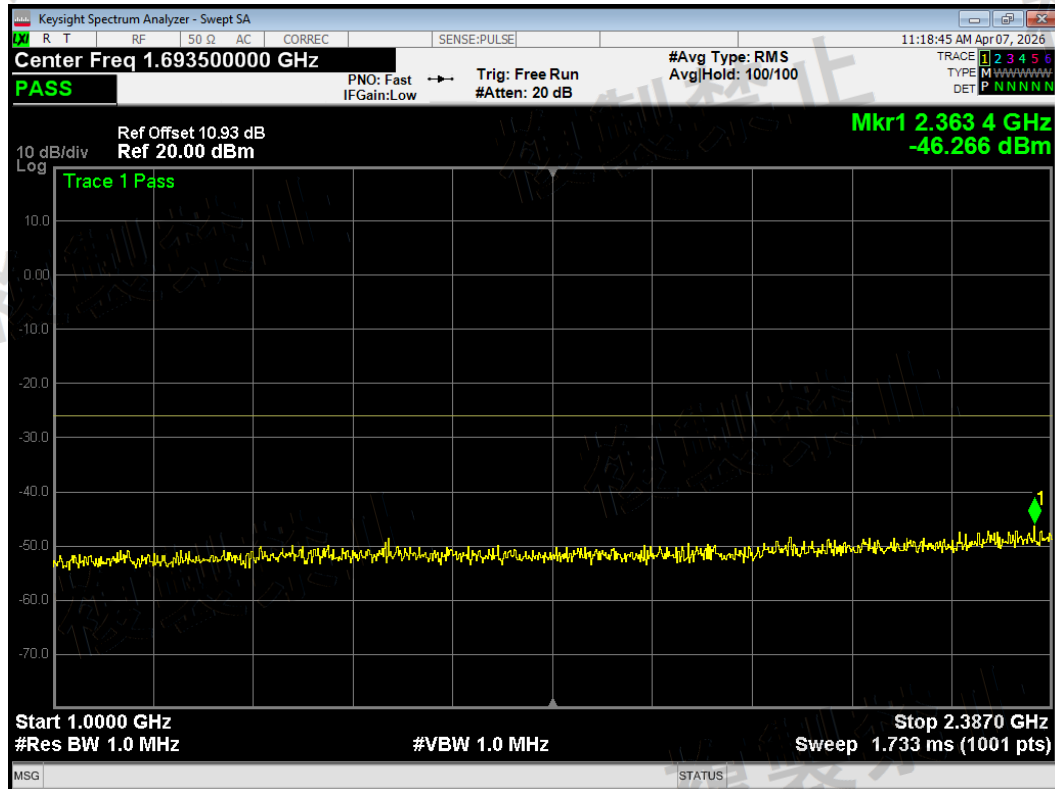
Tx. Spurious S=2 2402MHz @ 2496.5MHz-13000MHz



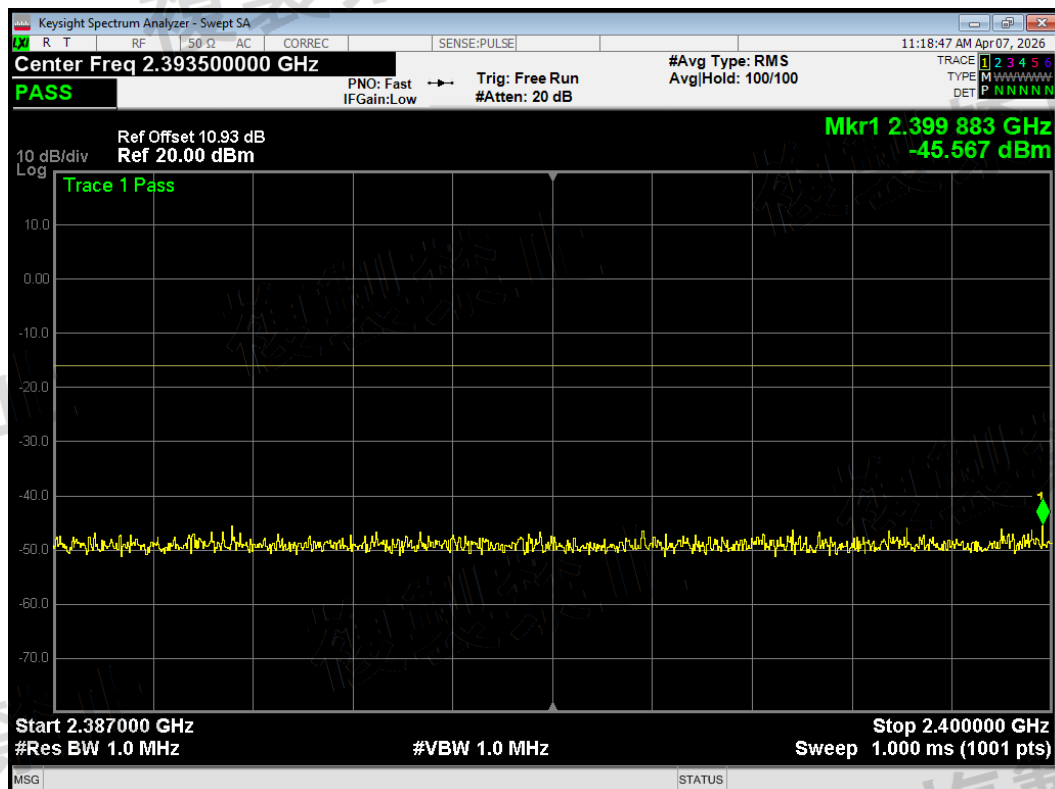
Tx. Spurious S=2 2440MHz @ 30MHz-1000MHz



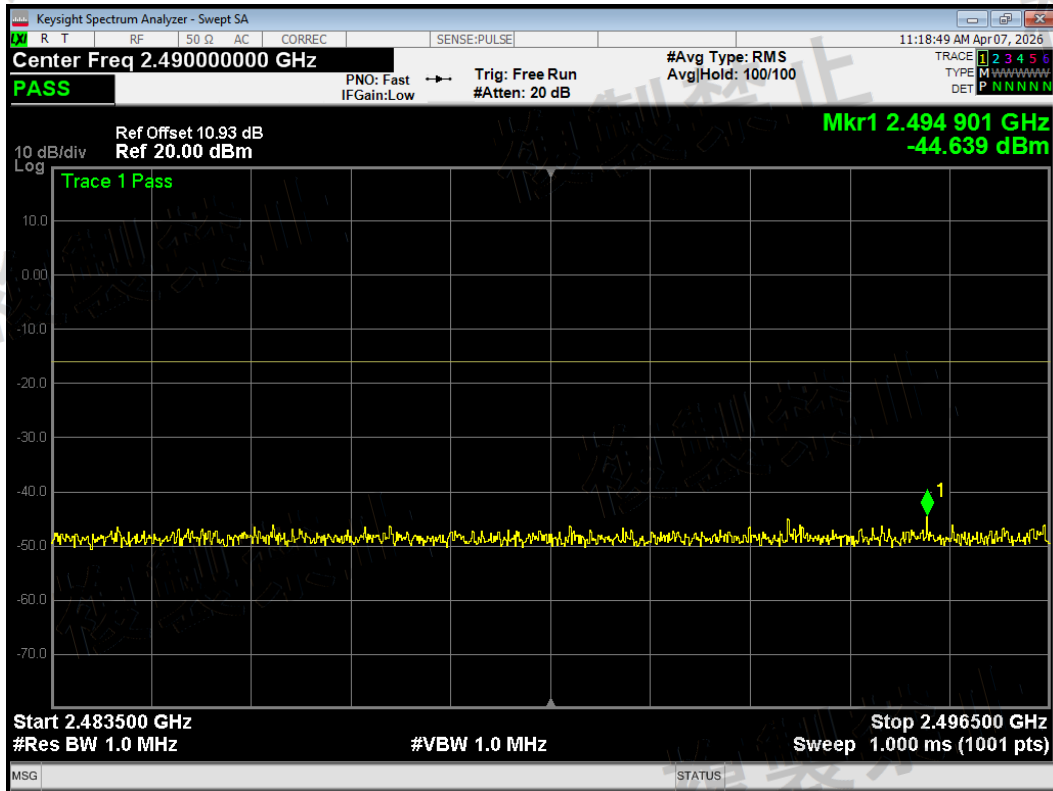
Tx. Spurious S=2 2440MHz @ 1000MHz-2387MHz



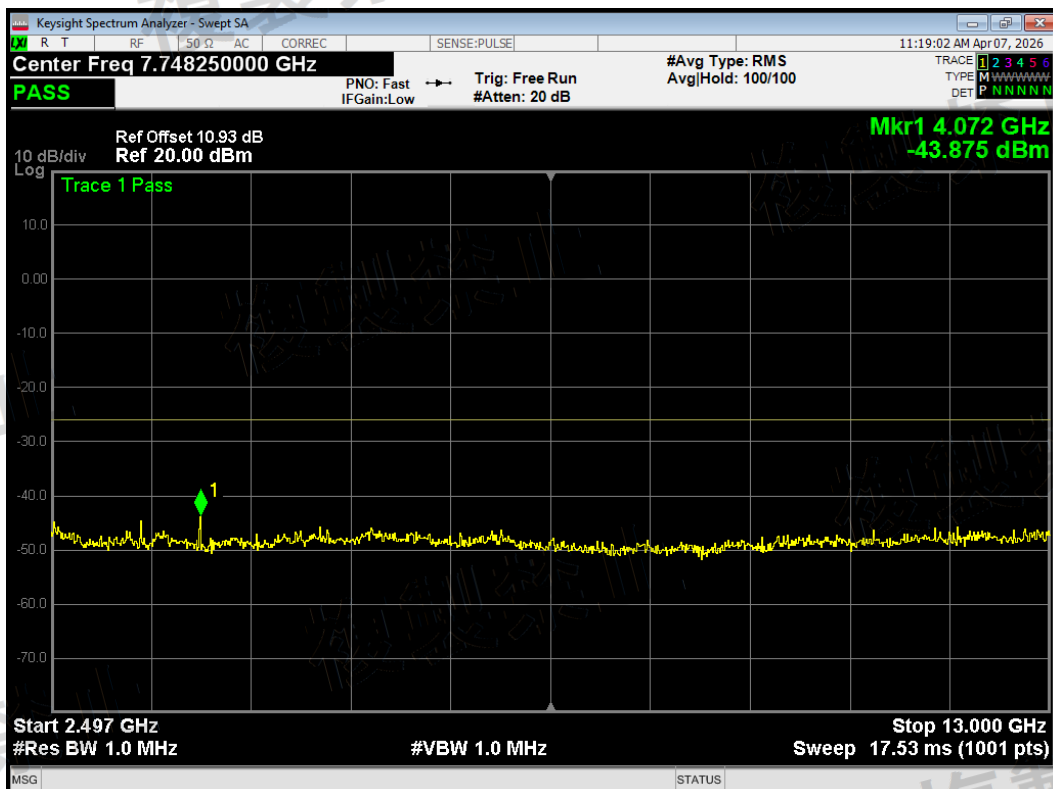
Tx. Spurious S=2 2440MHz @ 2387MHz-2400MHz



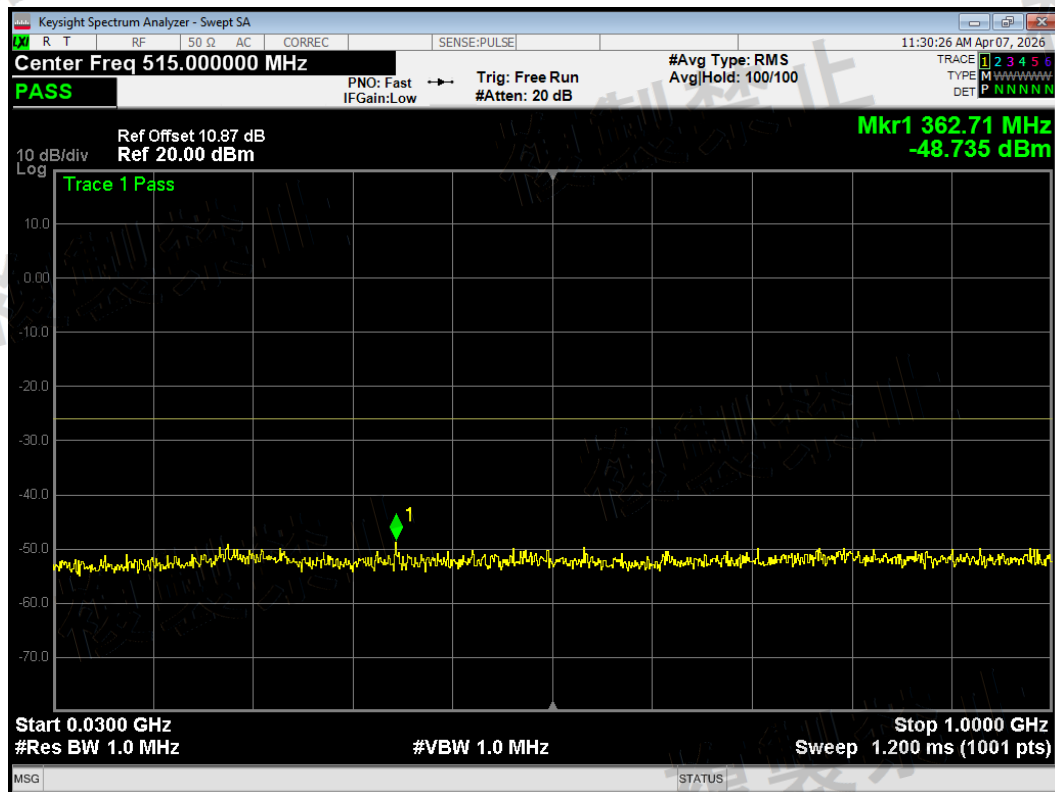
Tx. Spurious S=2 2440MHz @ 2483.5MHz-2496.5MHz



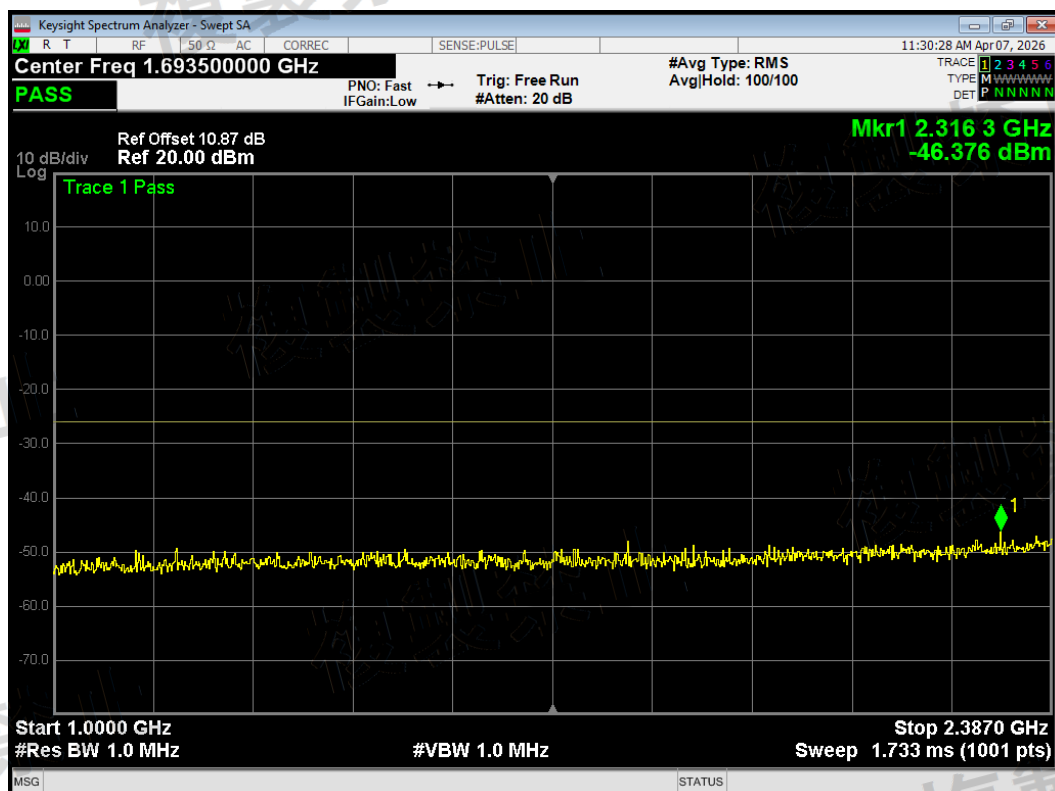
Tx. Spurious S=2 2440MHz @ 2496.5MHz-13000MHz



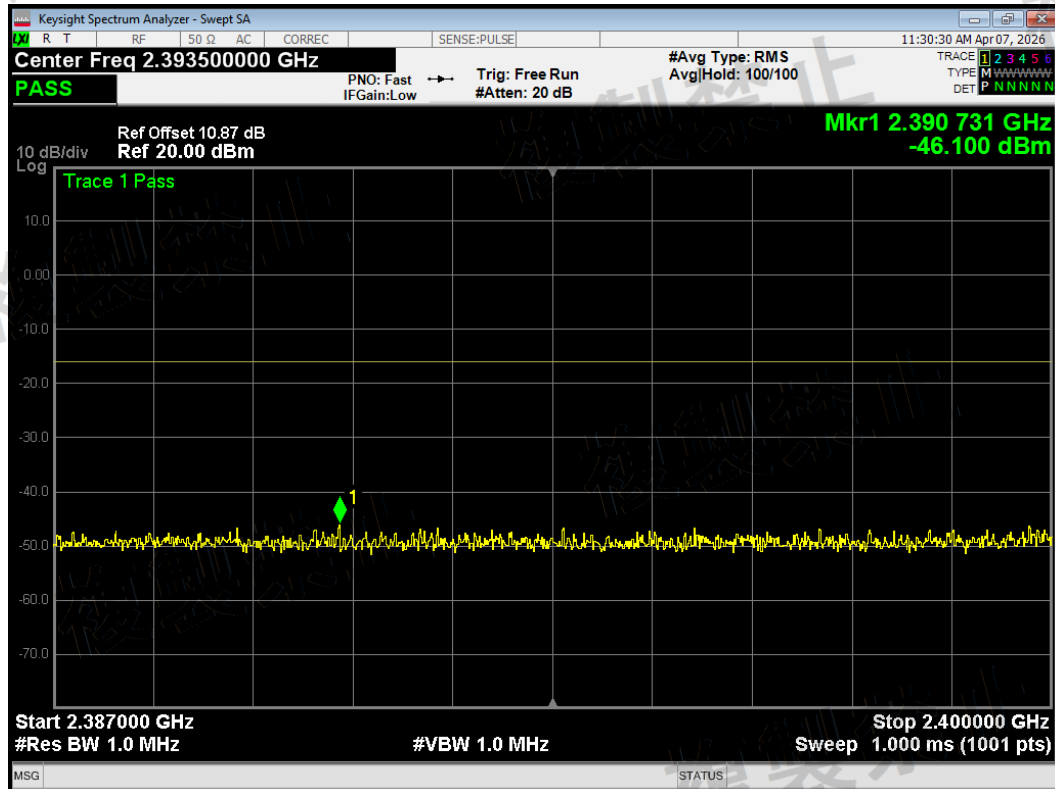
Tx. Spurious S=2 2480MHz @ 30MHz-1000MHz



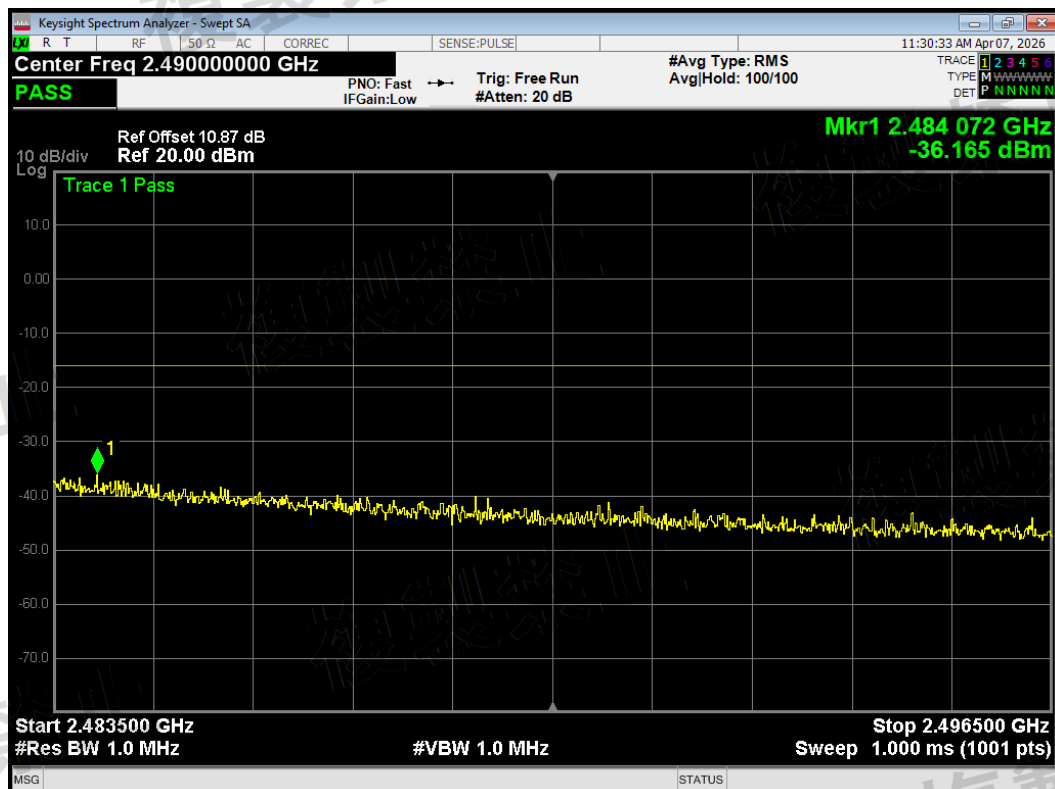
Tx. Spurious S=2 2480MHz @ 1000MHz-2387MHz



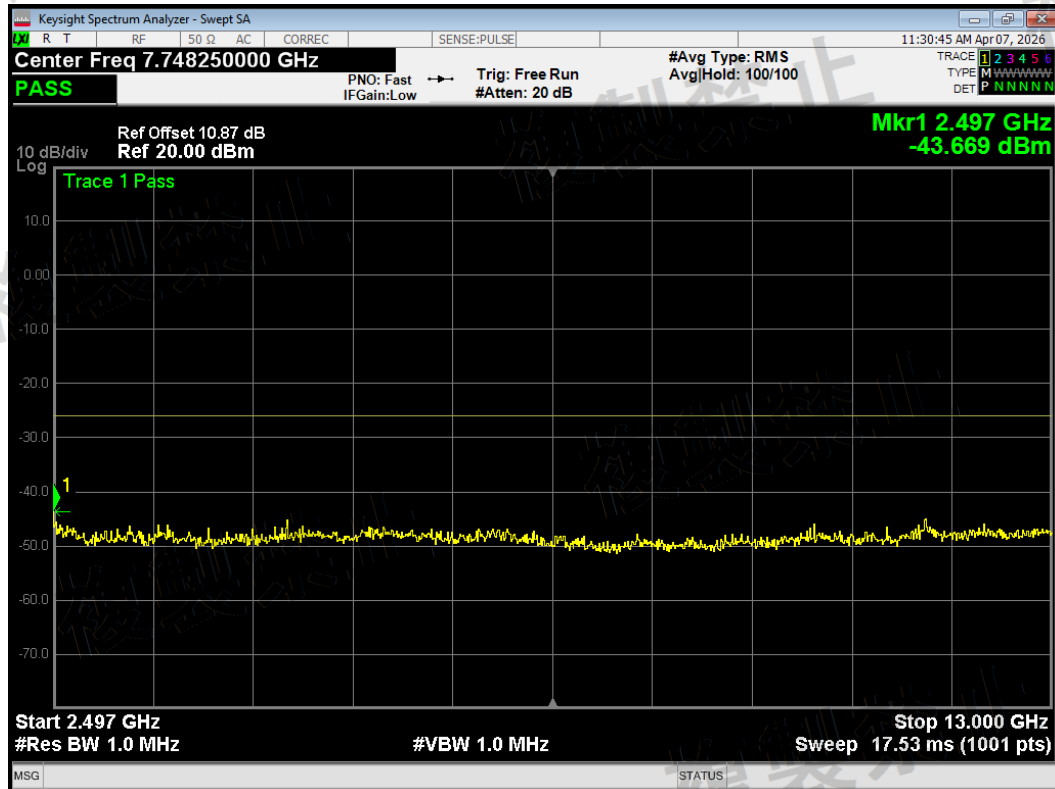
Tx. Spurious S=2 2480MHz @ 2387MHz-2400MHz



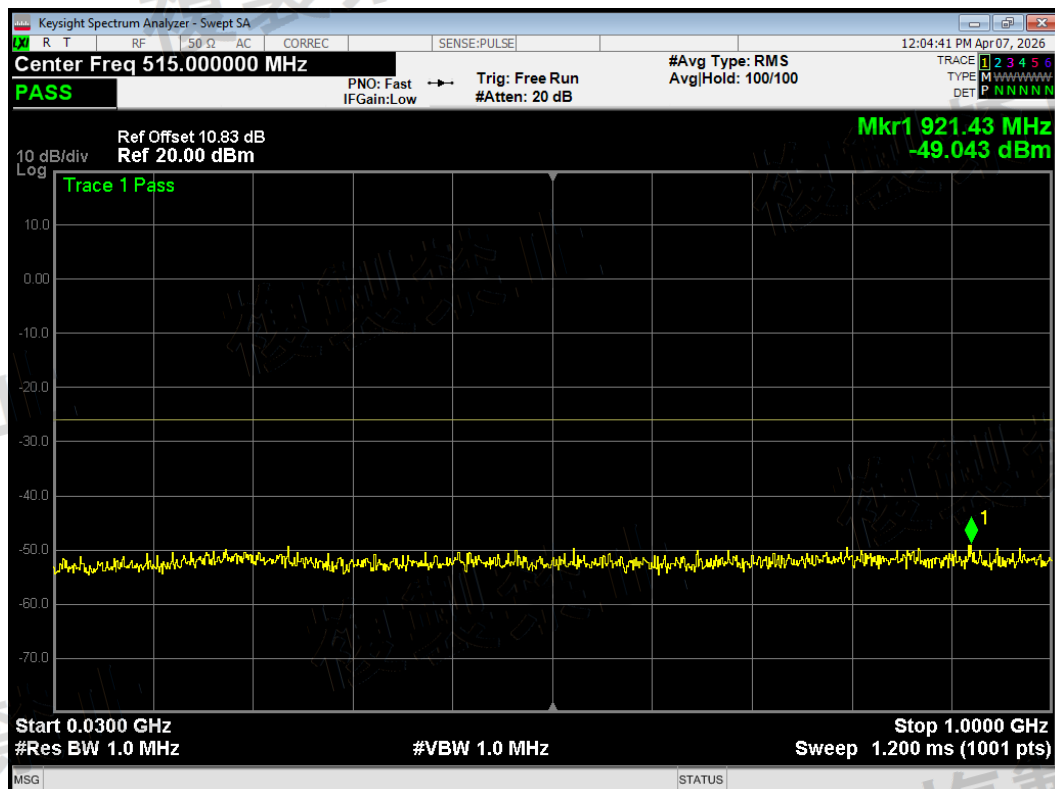
Tx. Spurious S=2 2480MHz @ 2483.5MHz-2496.5MHz



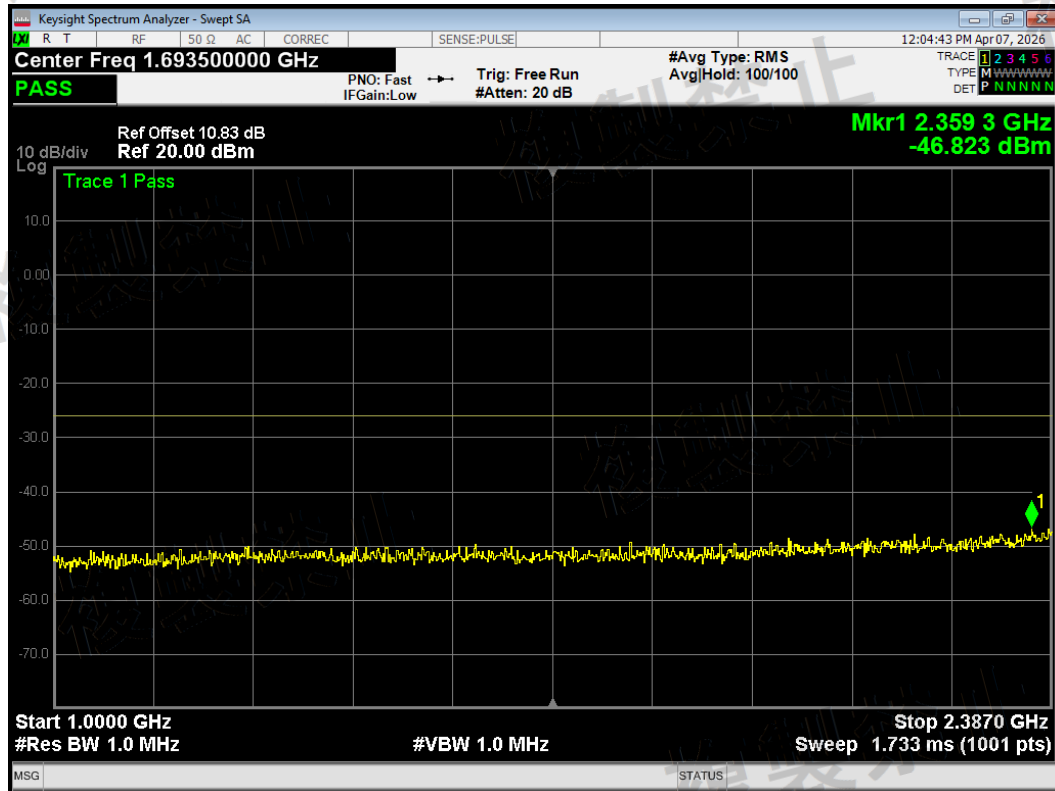
Tx. Spurious S=2 2480MHz @ 2496.5MHz-13000MHz



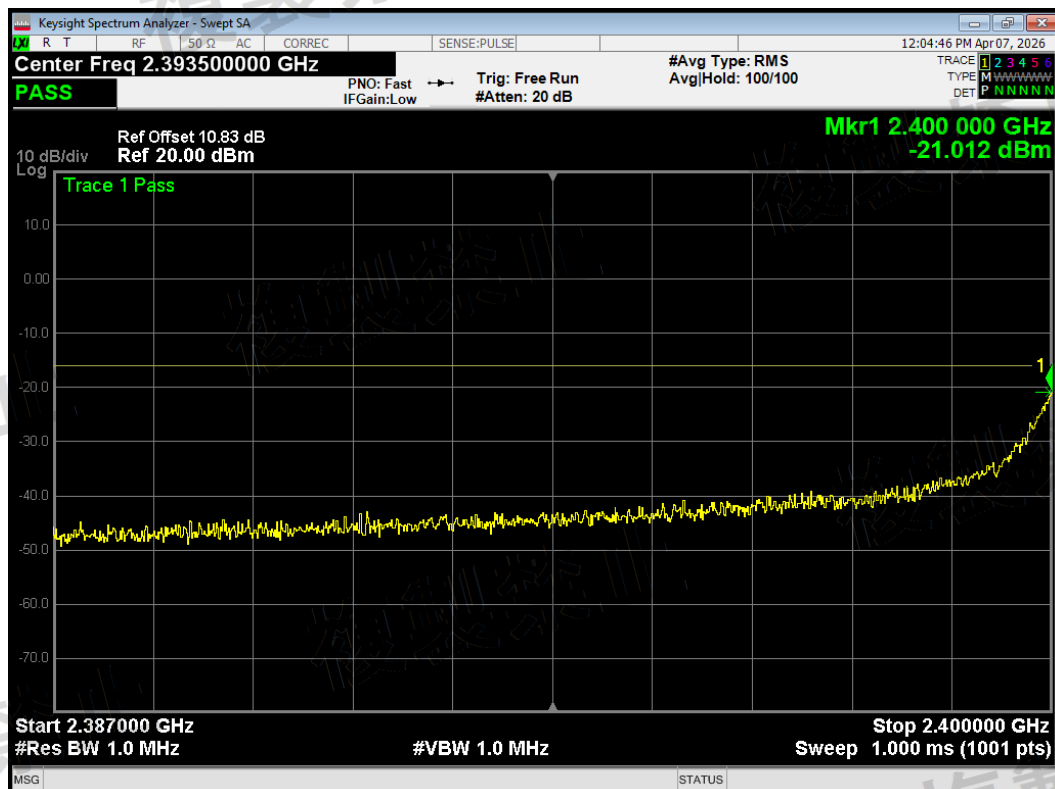
Tx. Spurious S=8 2402MHz @ 30MHz-1000MHz



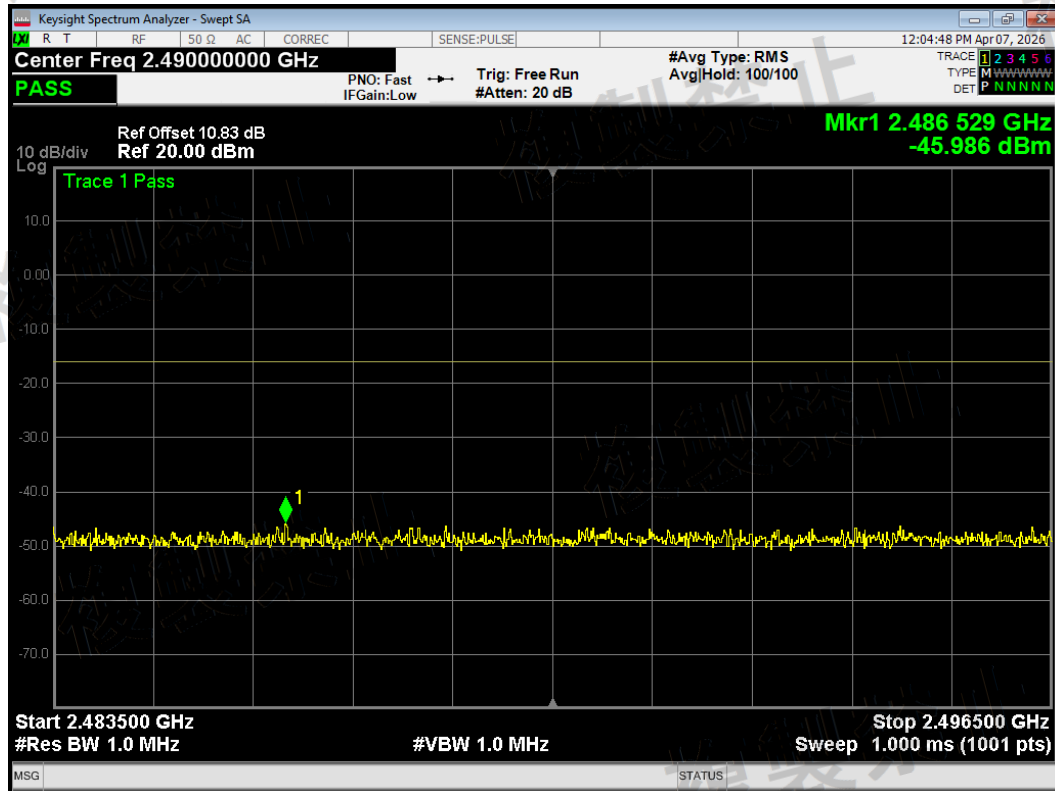
Tx. Spurious S=8 2402MHz @ 1000MHz-2387MHz



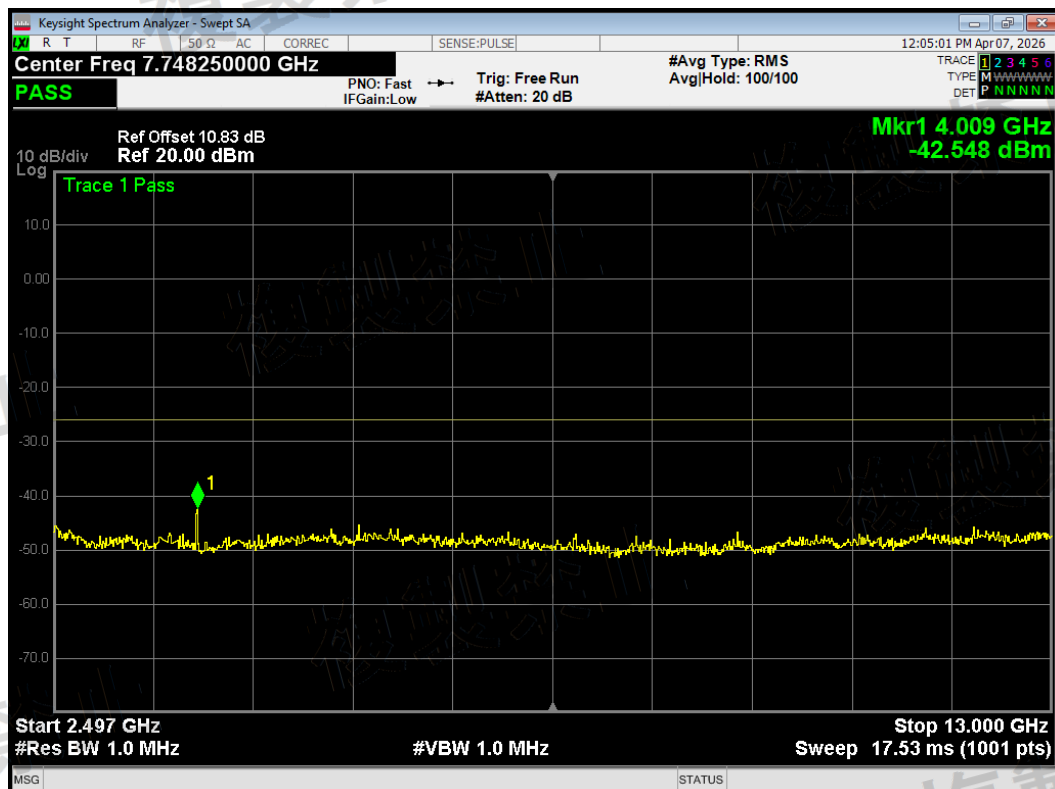
Tx. Spurious S=8 2402MHz @ 2387MHz-2400MHz



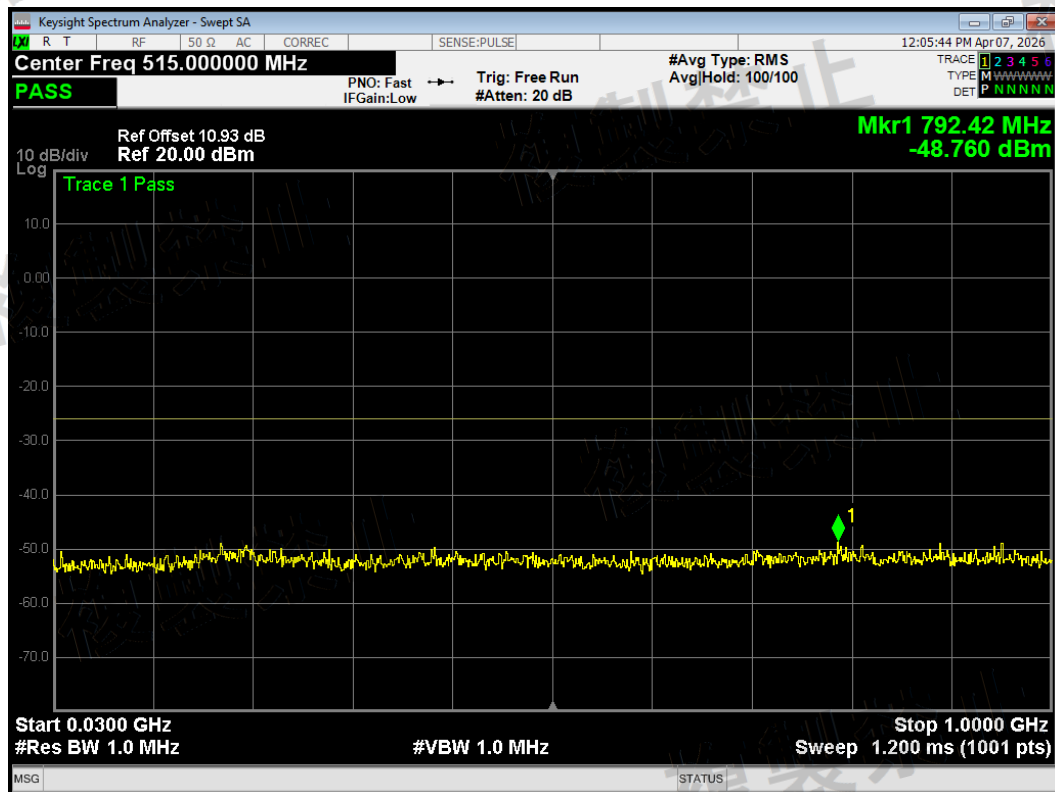
Tx. Spurious S=8 2402MHz @ 2483.5MHz-2496.5MHz



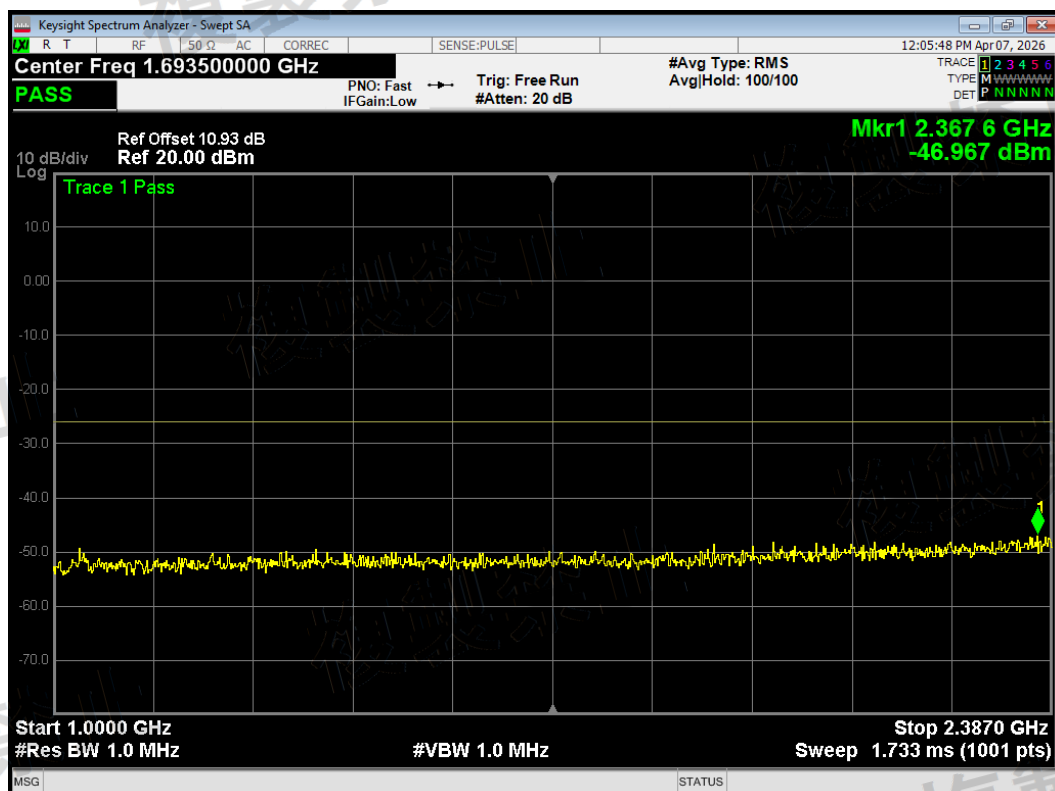
Tx. Spurious S=8 2402MHz @ 2496.5MHz-13000MHz



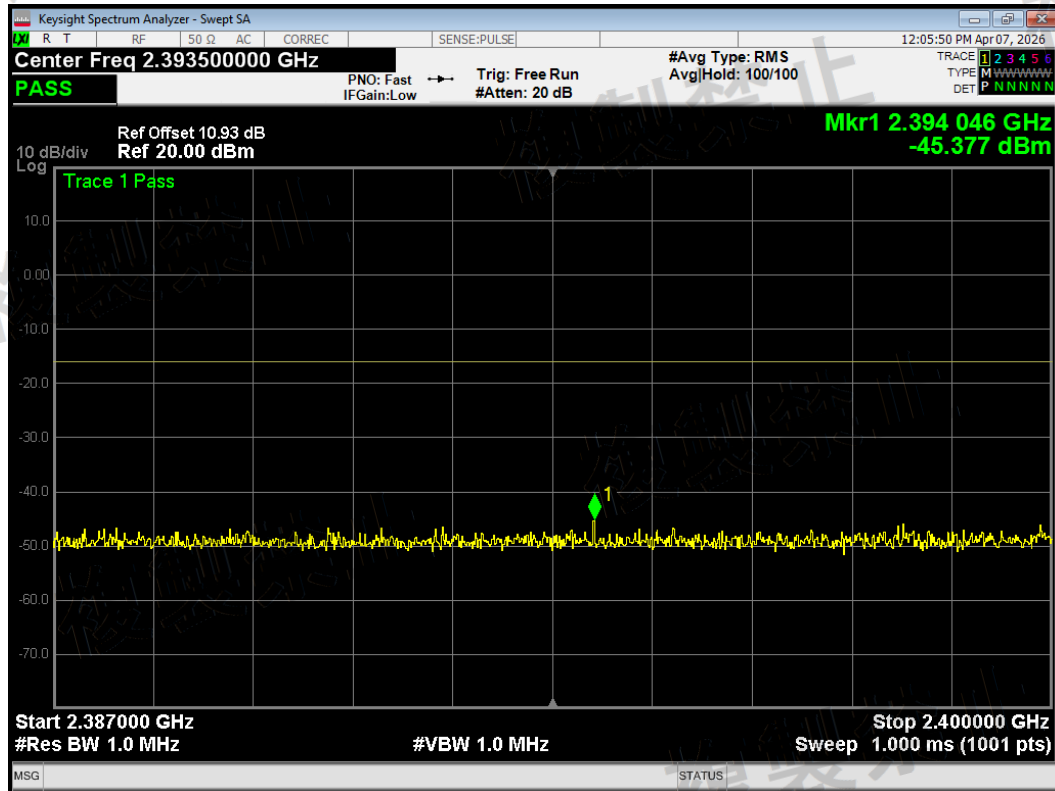
Tx. Spurious S=8 2440MHz @ 30MHz-1000MHz



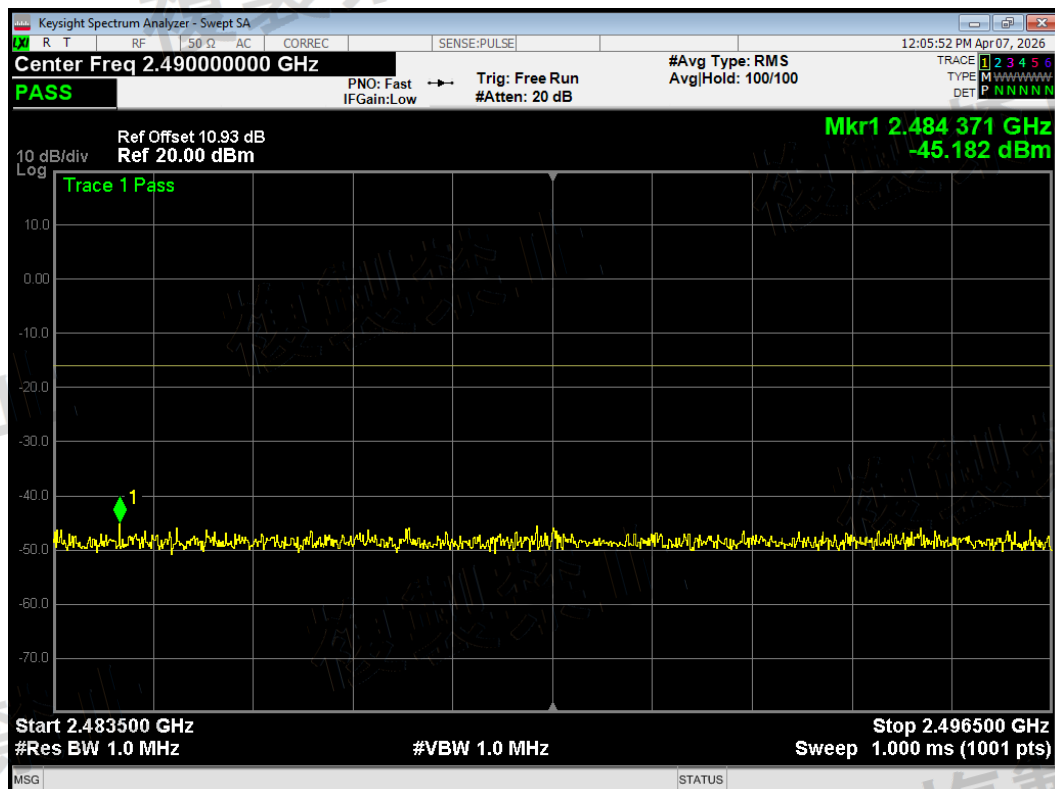
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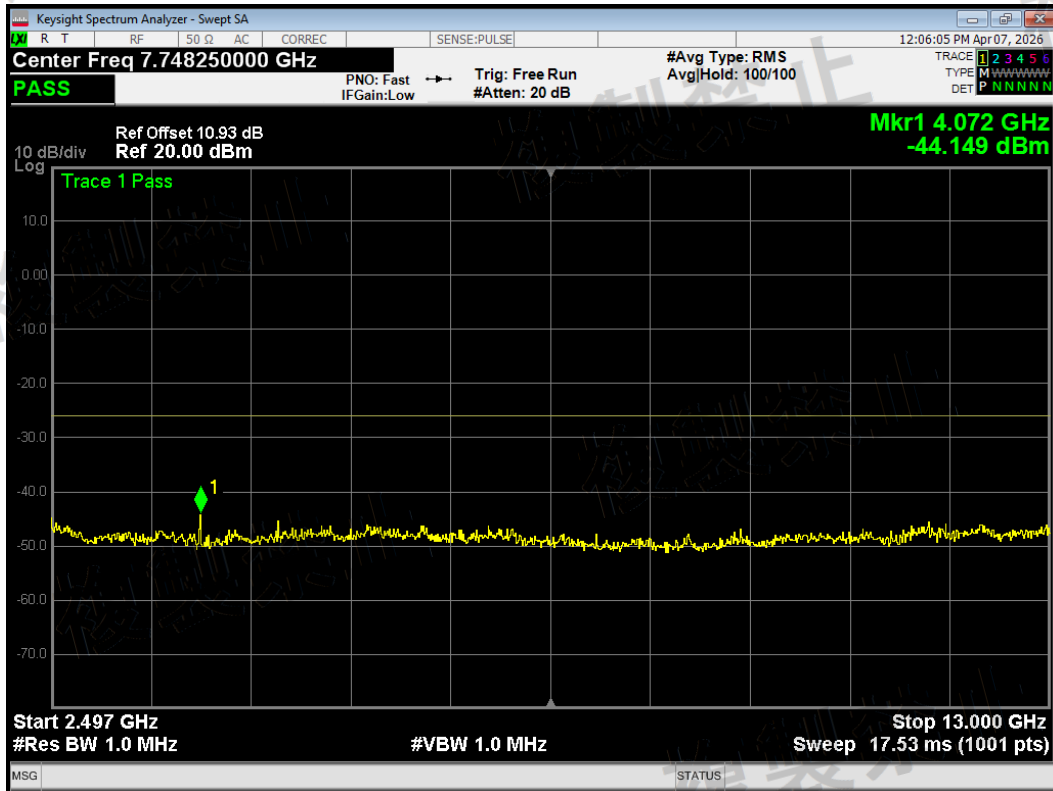
Tx. Spurious S=8 2440MHz @ 2387MHz-2400MHz



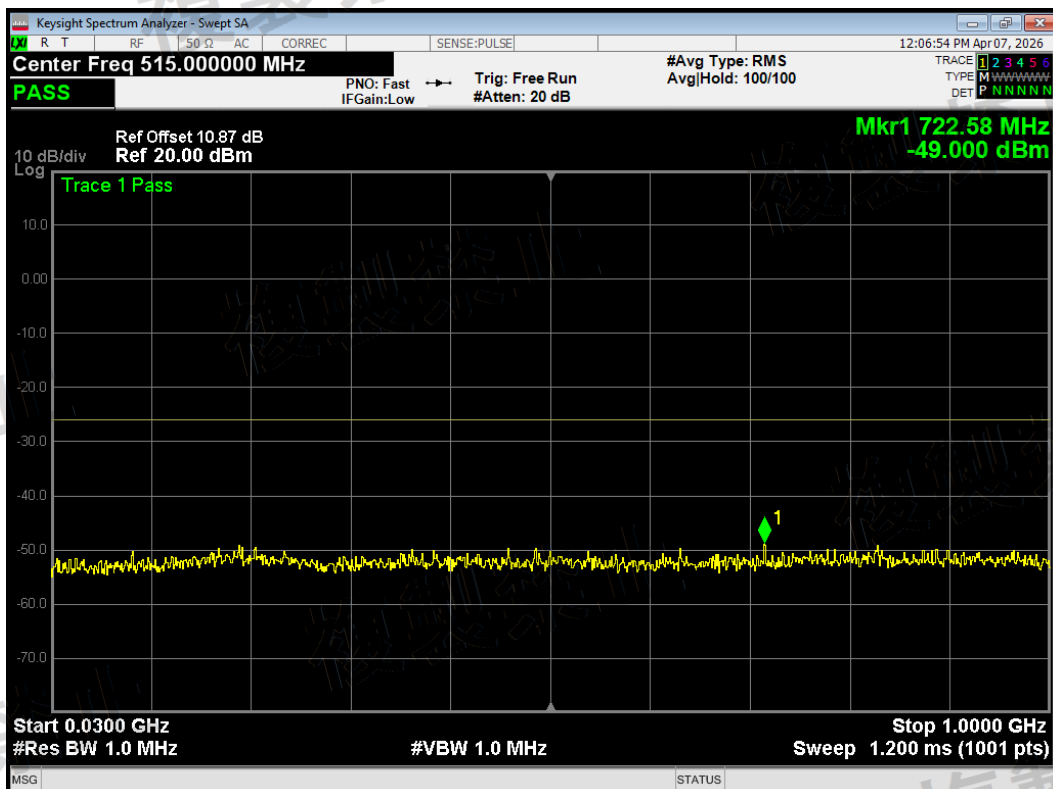
Tx. Spurious S=8 2440MHz @ 2483.5MHz-2496.5MHz



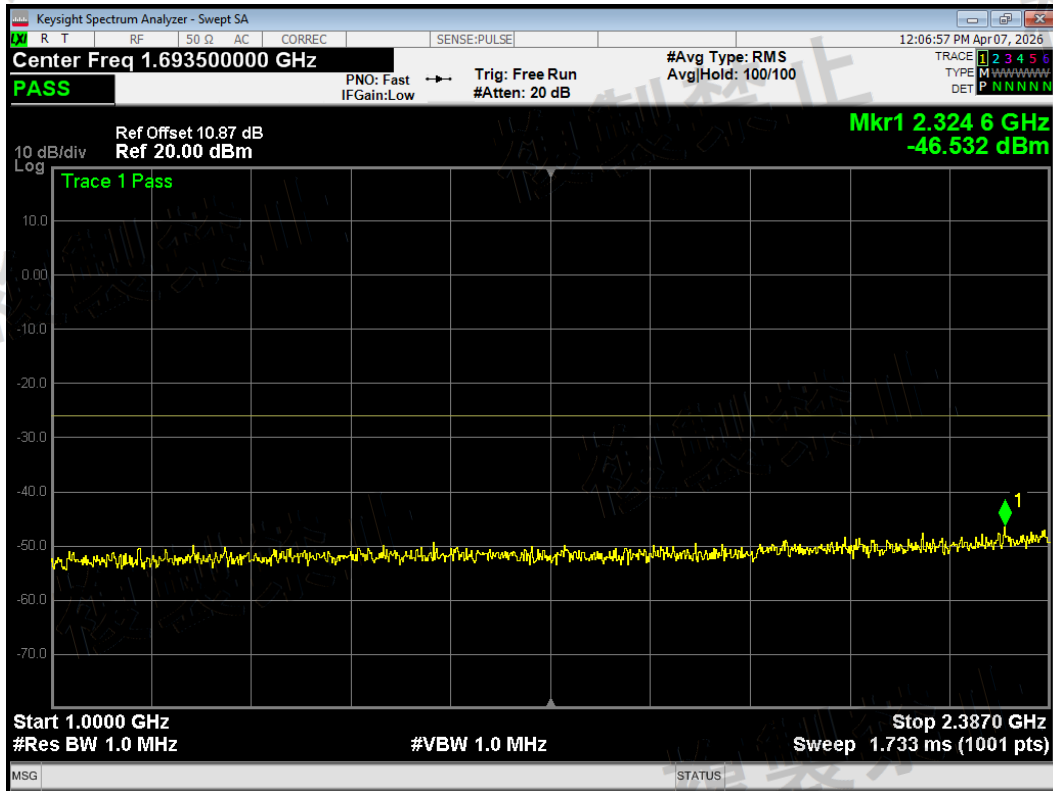
Tx. Spurious S=8 2440MHz @ 2496.5MHz-13000MHz



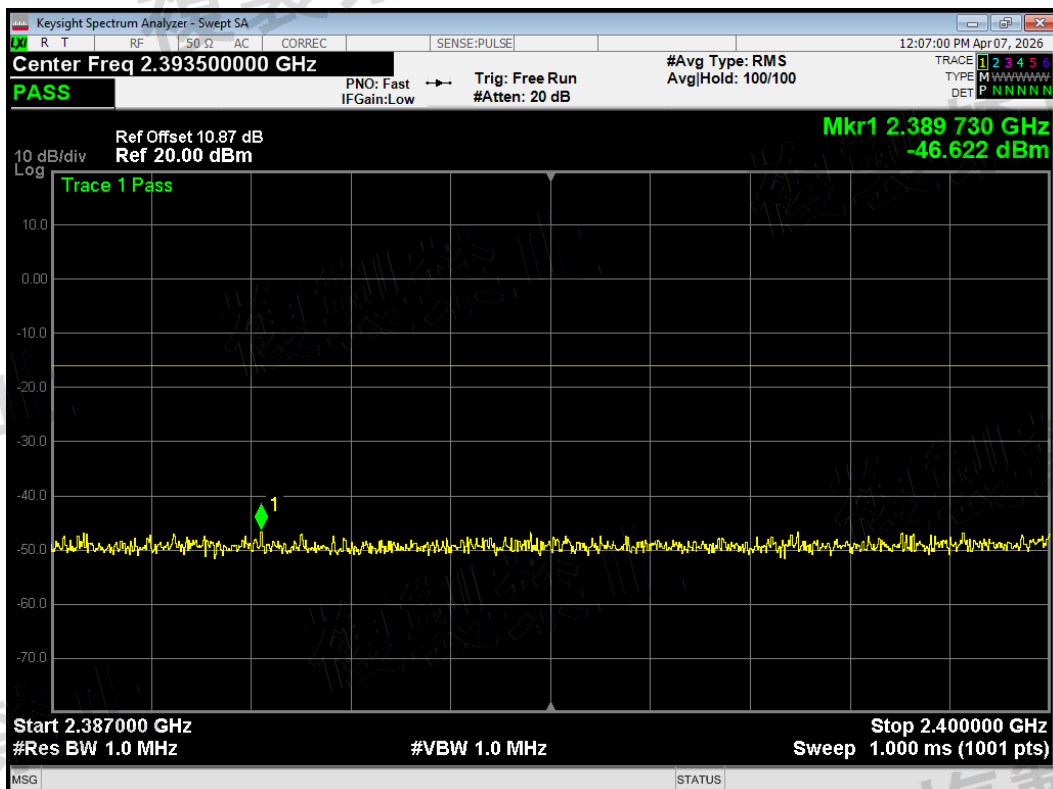
Tx. Spurious S=8 2480MHz @ 30MHz-1000MHz



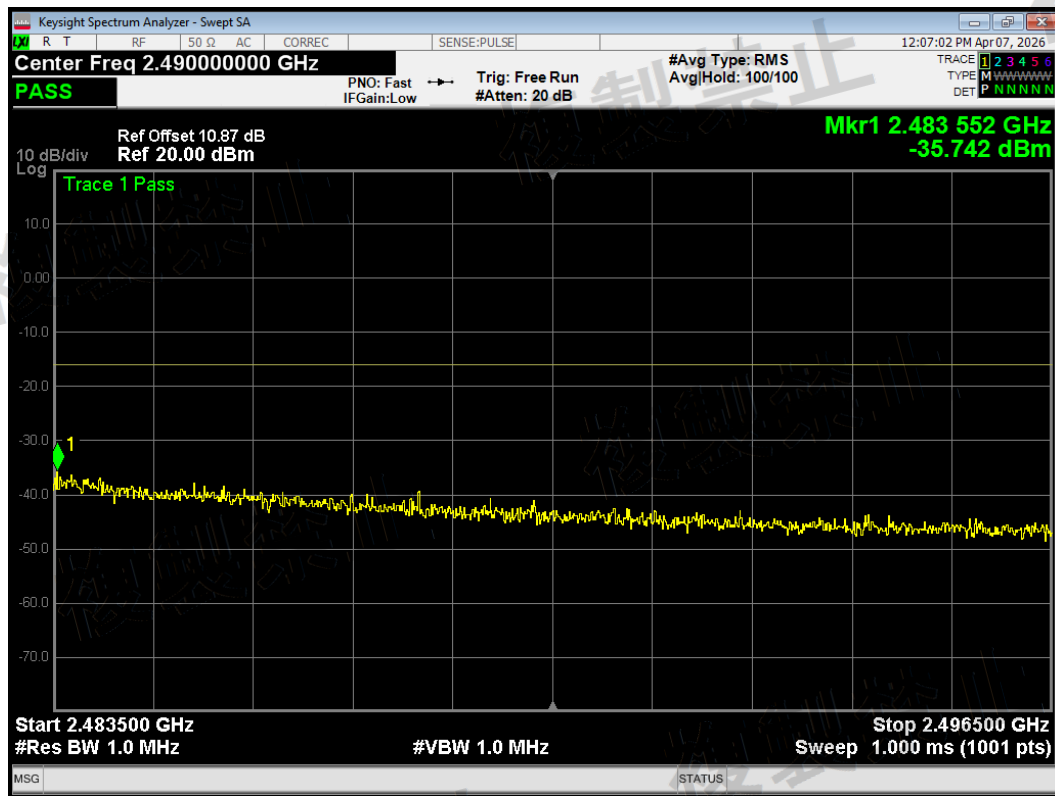
Tx. Spurious S=8 2480MHz @ 1000MHz-2387MHz



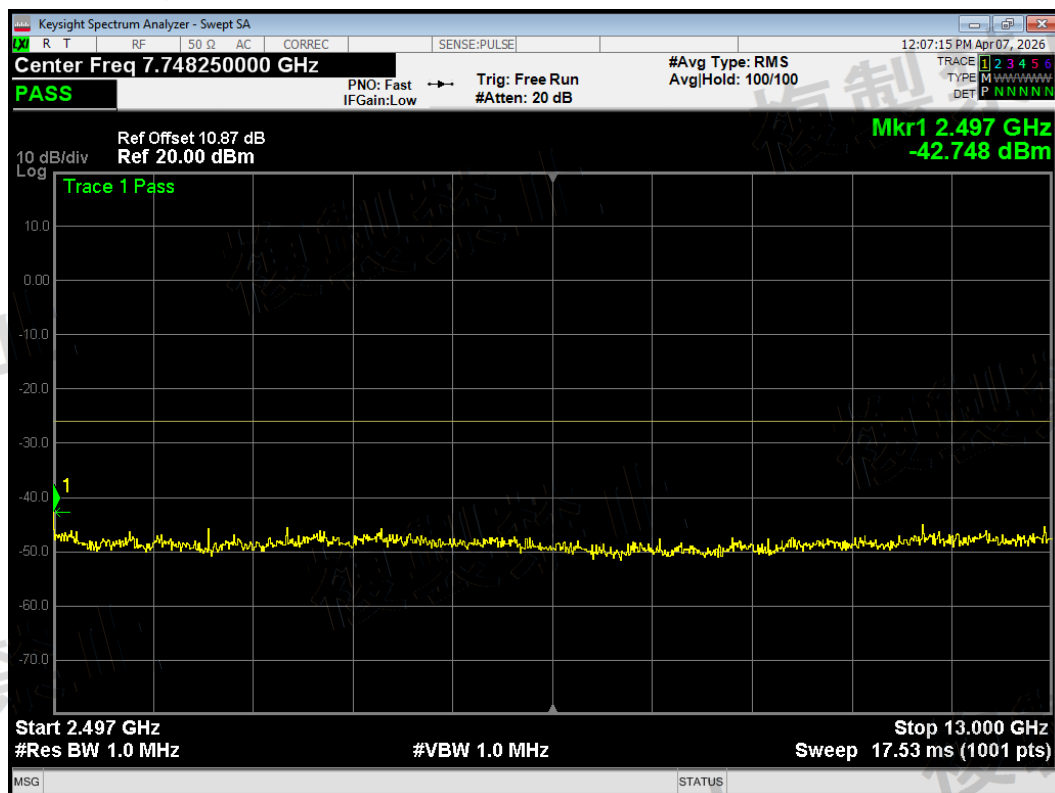
Tx. Spurious S=8 2480MHz @ 2387MHz-2400MHz



Tx. Spurious S=8 2480MHz @ 2483.5MHz-2496.5MHz



Tx. Spurious S=8 2480MHz @ 2496.5MHz-13000MHz



5.7. Secondarily Emitted Radio Wave Strength Measurement

Ambient Condition

Temperature	Relative humidity	Pressure
25°C	50%	101.5kPa

Method of Measurement

Step-1

Spectrum Analyzer Setting

RBW: 1 MHz (frequency range; 1 GHz over), 100 kHz (frequency range; 30 MHz to 1 GHz)

VBW: Same as RBW

Sweep Time: AUTO (Minimum time to ensure measurement accuracy)

Sweep Mode: Single Sweep

Detection Mode: Positive Peak

Step-2

Spectrum Analyzer Setting

Center Frequency: Searched Frequency

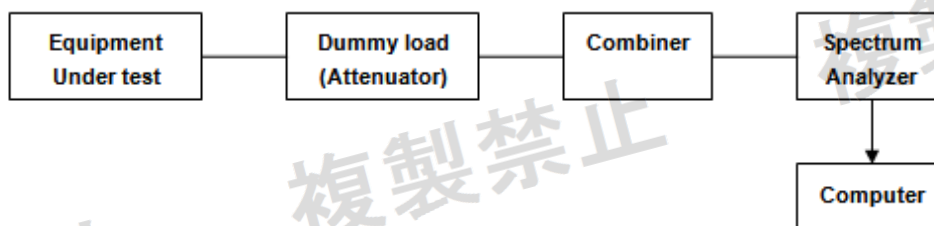
RBW: 1 MHz (frequency range; 1 GHz over), 100 kHz (frequency range; 30 MHz to 1 GHz)

VBW: Same as RBW Sweep Time: AUTO (Minimum time to ensure measurement accuracy)

Sweep Mode: Single Sweep

Detection Mode: Sample

Test Setup



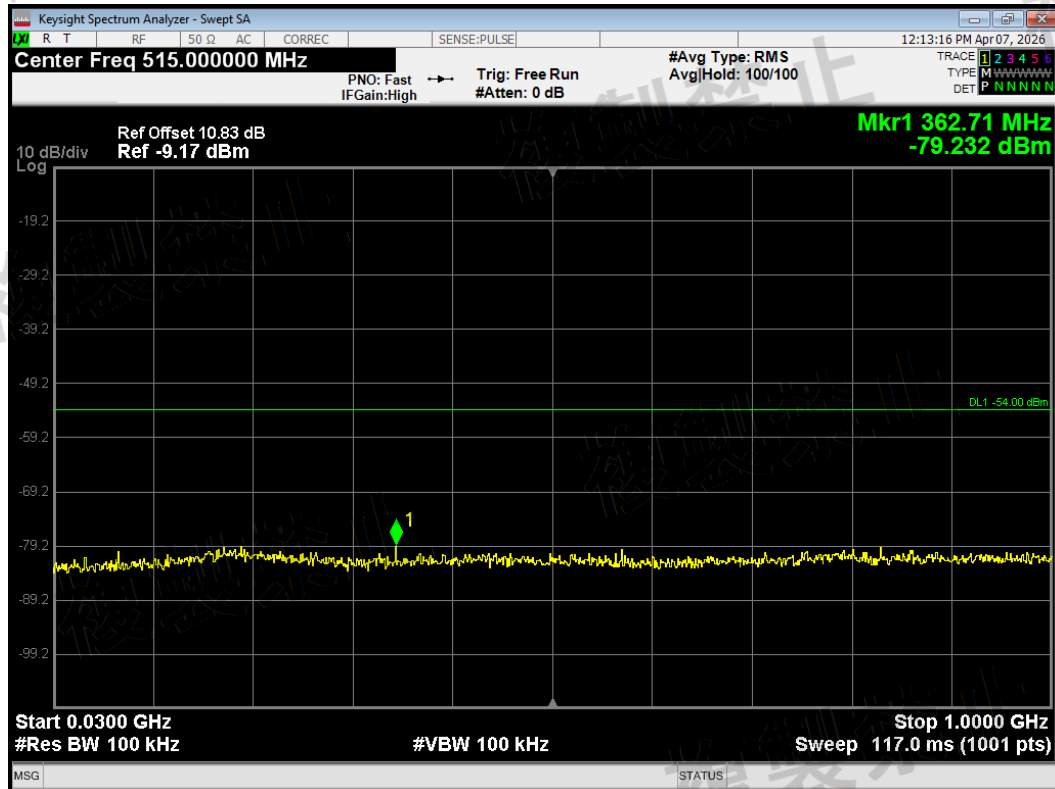
Limit

Frequency Range	Limits (nW)
Under 1 GHz	≤ 4
1GHz-12.5GHz	≤ 20

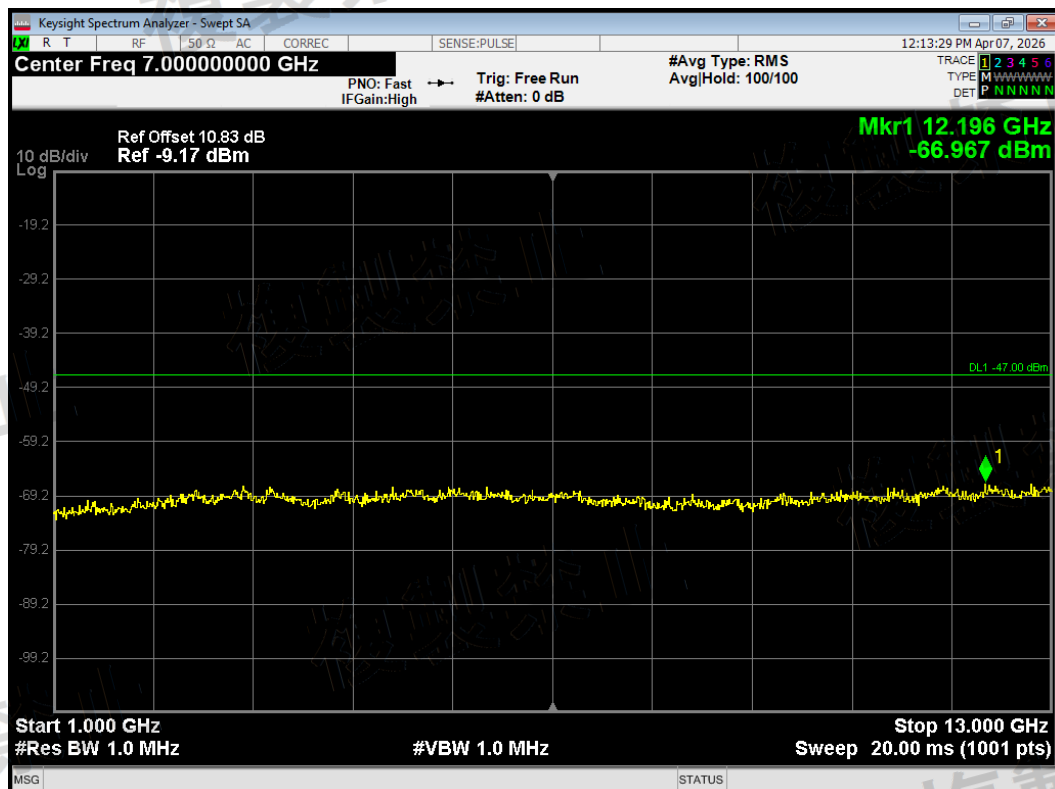
Test Results

Mode	Frequency (MHz)	Range (MHz)	Emission Frequency (MHz)	Max Value (dBm)	Max Value (nW)	Limit (nW)	Verdict
BLE (1M)	2402	30-1000	362.71	-79.23	0.01	4	Pass
BLE (1M)	2402	1000-13000	12196	-66.97	0.20	20	Pass
BLE (1M)	2440	30-1000	835.1	-78.34	0.01	4	Pass
BLE (1M)	2440	1000-13000	12940	-66.67	0.22	20	Pass
BLE (1M)	2480	30-1000	206.54	-79.15	0.01	4	Pass
BLE (1M)	2480	1000-13000	5764	-66.36	0.23	20	Pass
BLE (2M)	2402	30-1000	232.73	-78.77	0.01	4	Pass
BLE (2M)	2402	1000-13000	12328	-66.03	0.25	20	Pass
BLE (2M)	2440	30-1000	780.78	-78.58	0.01	4	Pass
BLE (2M)	2440	1000-13000	12268	-66.28	0.24	20	Pass
BLE (2M)	2480	30-1000	181.32	-79.21	0.01	4	Pass
BLE (2M)	2480	1000-13000	6028	-66.67	0.22	20	Pass
BLE (S=2)	2402	30-1000	916.58	-79.13	0.01	4	Pass
BLE (S=2)	2402	1000-13000	12820	-66.67	0.22	20	Pass
BLE (S=2)	2440	30-1000	937.92	-78.62	0.01	4	Pass
BLE (S=2)	2440	1000-13000	12268	-66.47	0.23	20	Pass
BLE (S=2)	2480	30-1000	918.52	-79.24	0.01	4	Pass
BLE (S=2)	2480	1000-13000	11536	-66.94	0.20	20	Pass
BLE (S=8)	2402	30-1000	191.02	-78.87	0.01	4	Pass
BLE (S=8)	2402	1000-13000	12700	-66.38	0.23	20	Pass
BLE (S=8)	2440	30-1000	189.08	-78.45	0.01	4	Pass
BLE (S=8)	2440	1000-13000	11716	-66.76	0.21	20	Pass
BLE (S=8)	2480	30-1000	239.52	-78.9	0.01	4	Pass
BLE (S=8)	2480	1000-13000	7048	-66.83	0.21	20	Pass

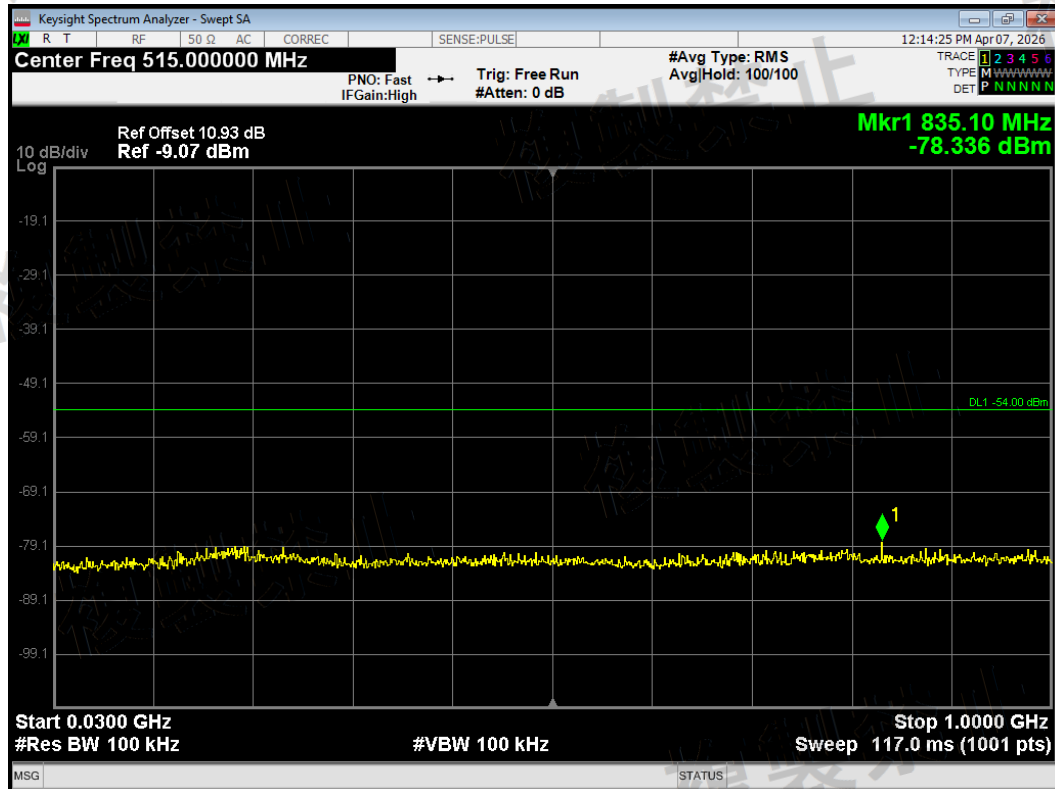
Rx. Spurious BLE (1M) 2402MHz @ 30MHz-1000MHz



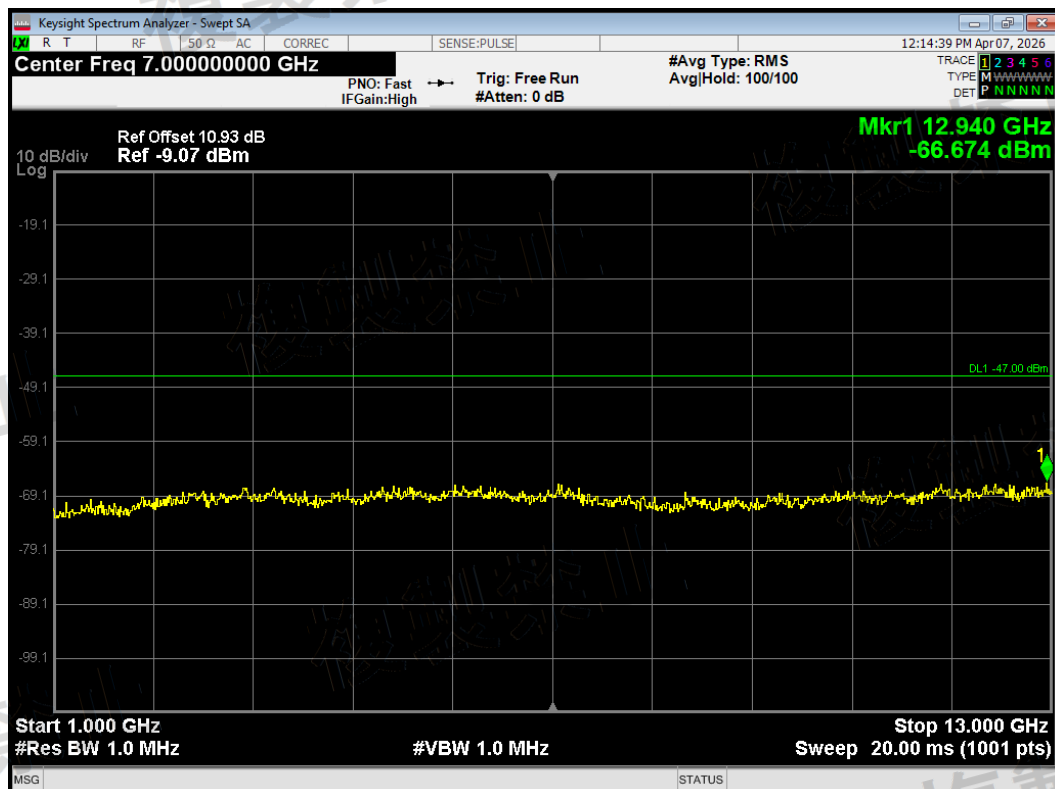
Rx. Spurious BLE (1M) 2402MHz @ 1000MHz-13000MHz



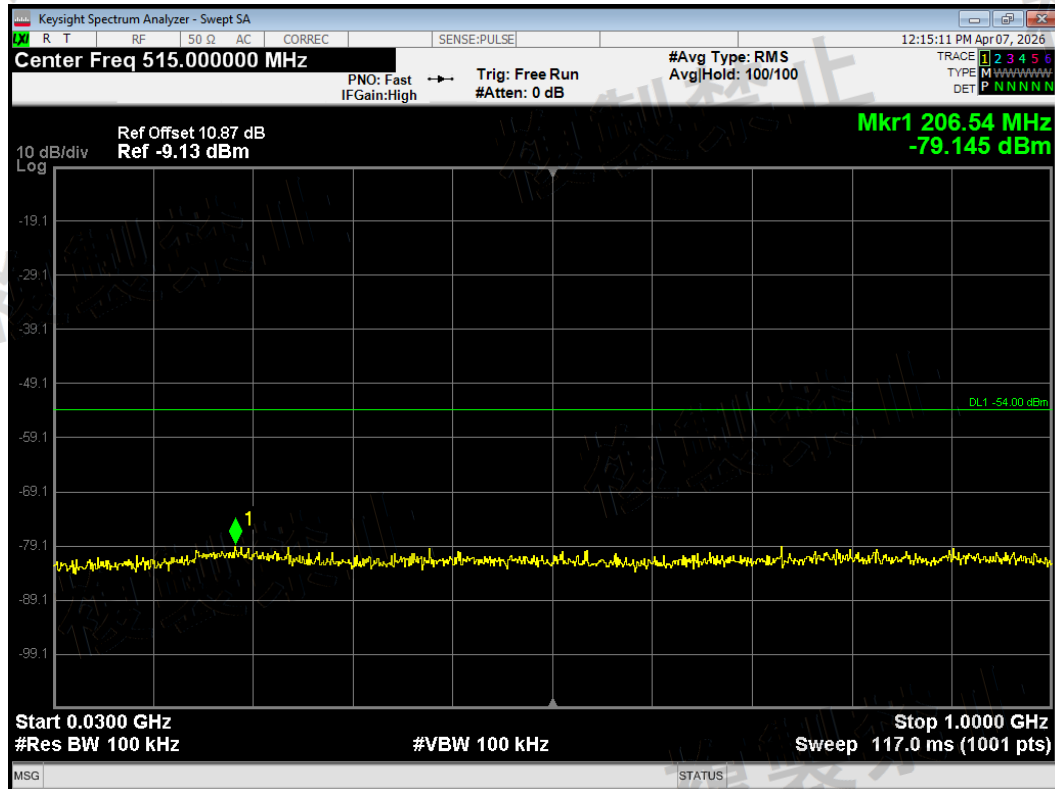
Rx. Spurious BLE (1M) 2440MHz @ 30MHz-1000MHz



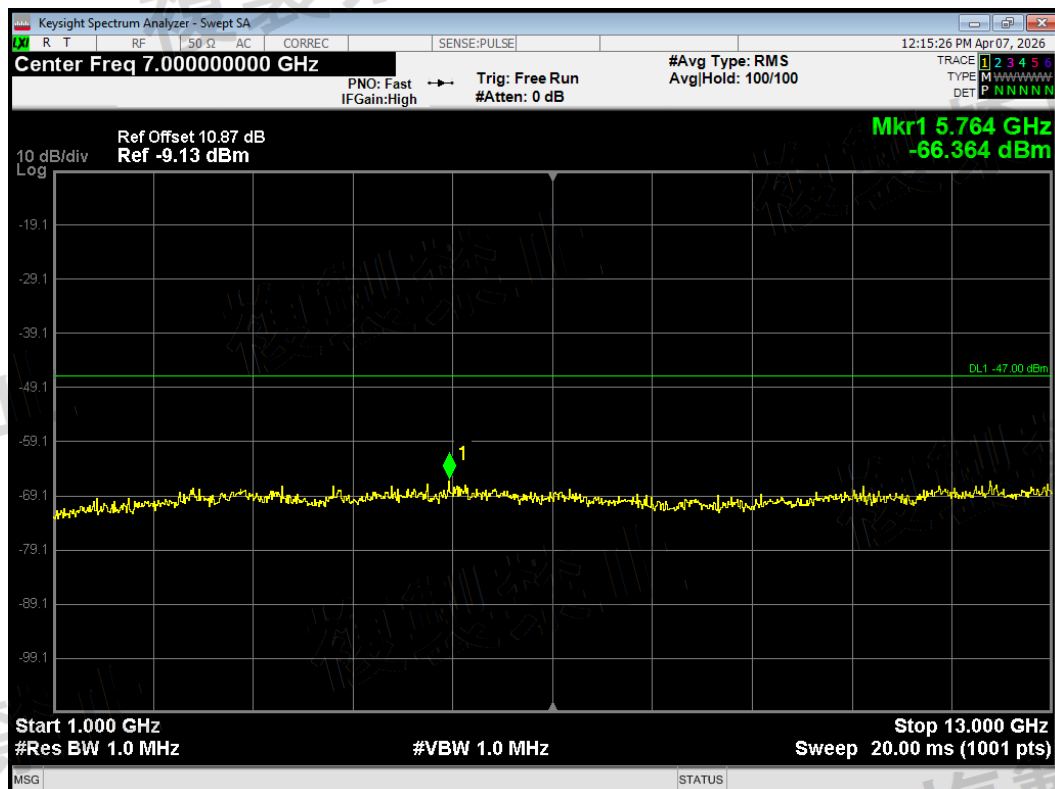
Rx. Spurious BLE (1M) 2440MHz @ 1000MHz-13000MHz



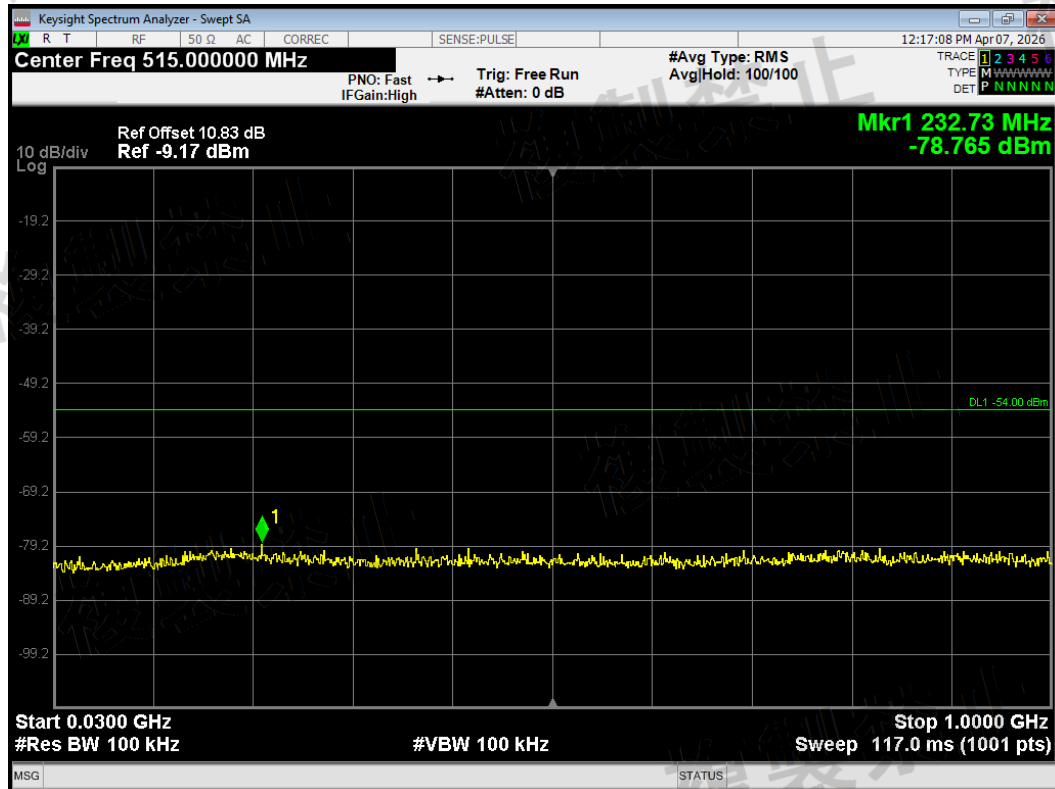
Rx. Spurious BLE (1M) 2480MHz @ 30MHz-1000MHz



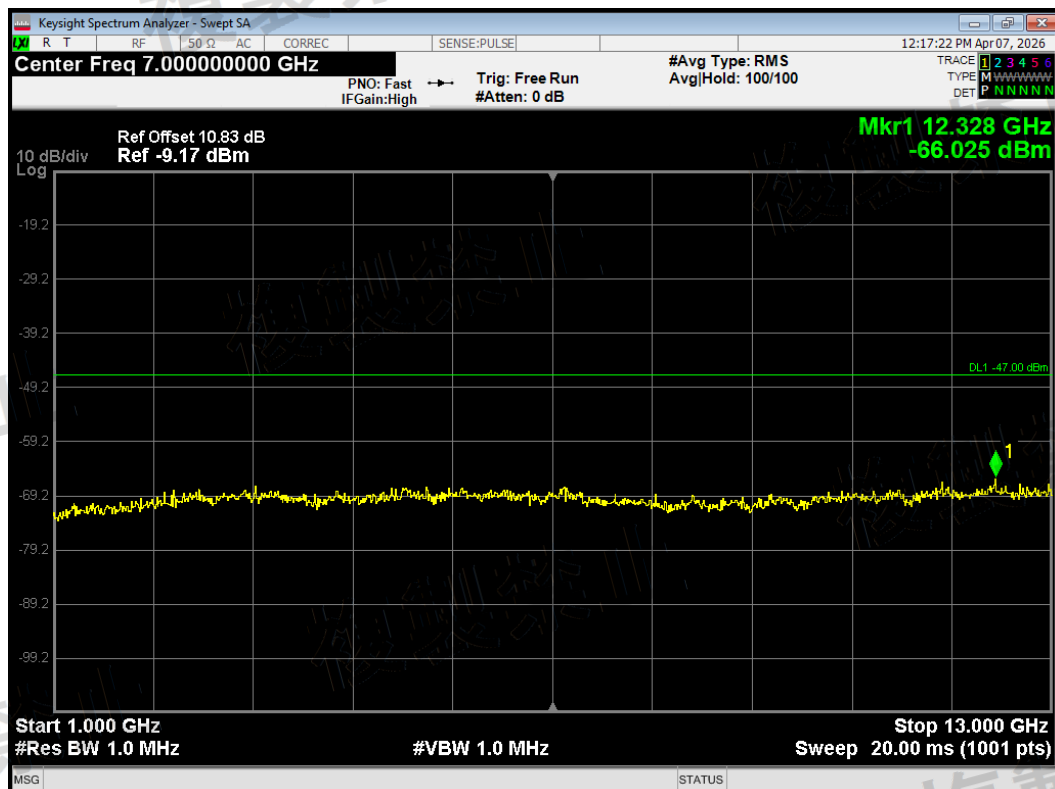
Rx. Spurious BLE (1M) 2480MHz @ 1000MHz-13000MHz



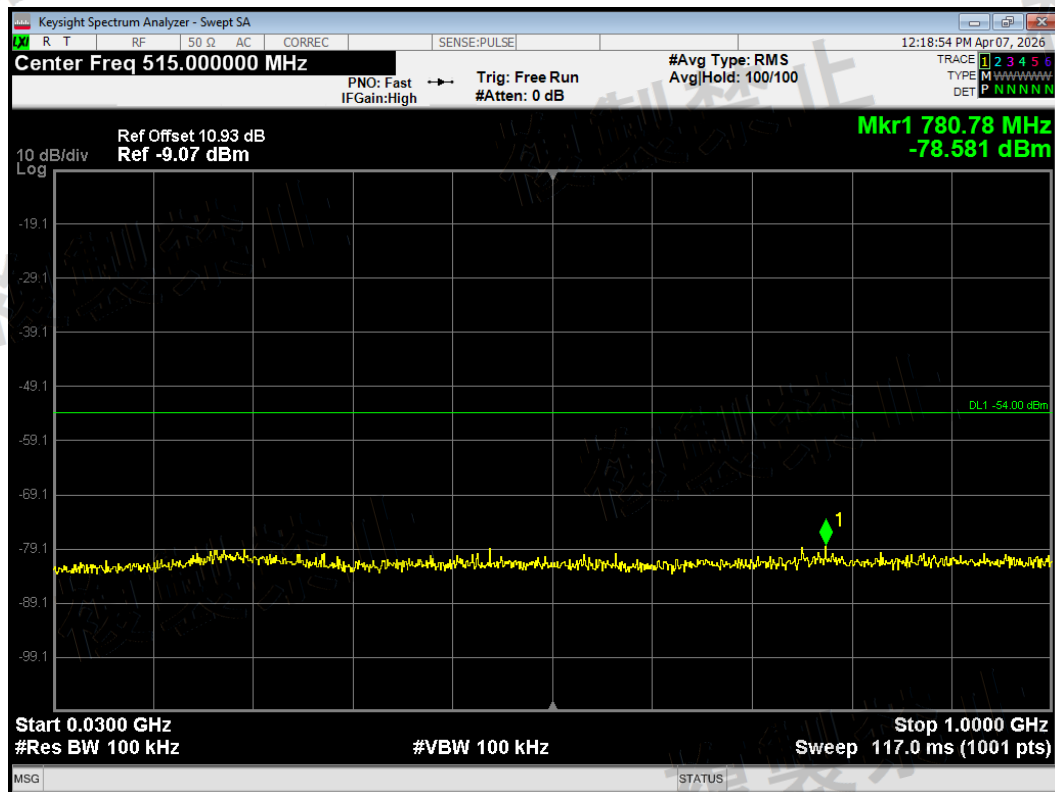
Rx. Spurious BLE (2M) 2402MHz @ 30MHz-1000MHz



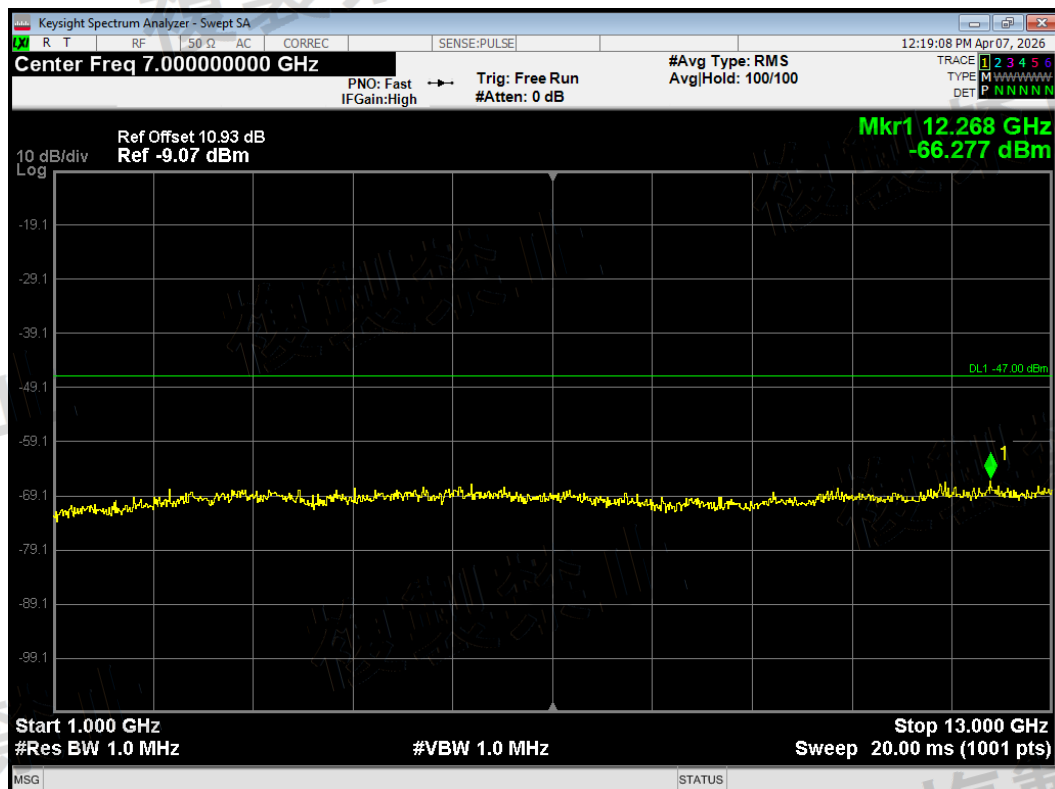
Rx. Spurious BLE (2M) 2402MHz @ 1000MHz-13000MHz



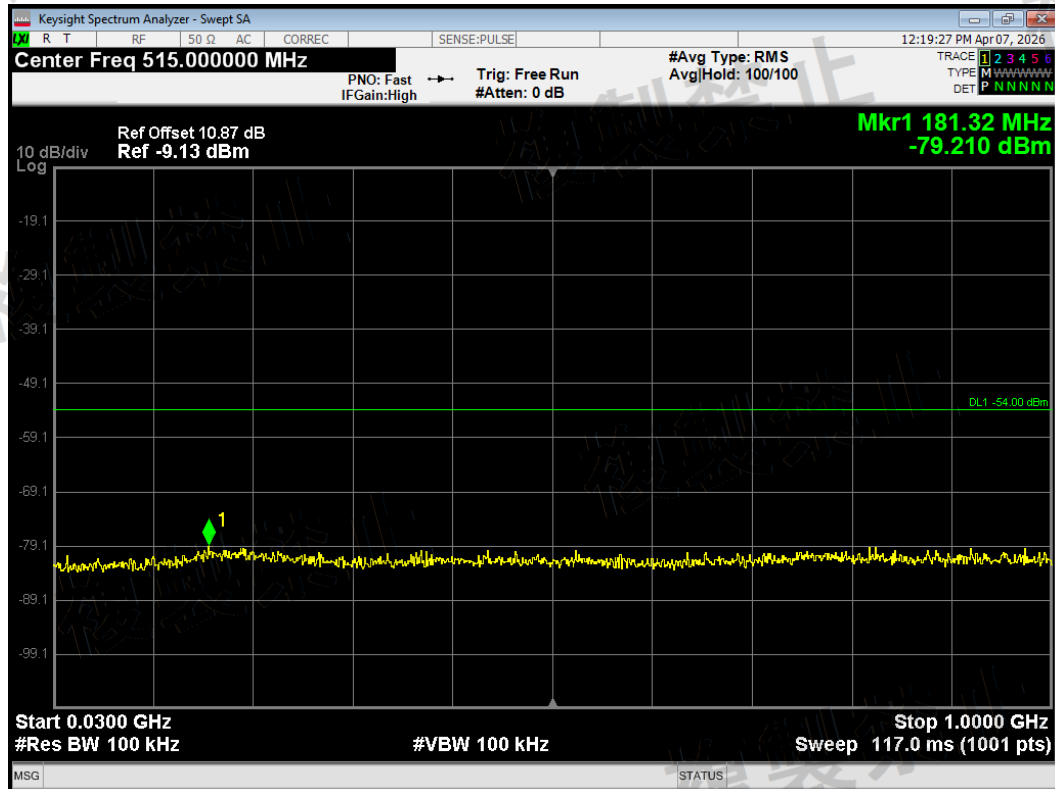
Rx. Spurious BLE (2M) 2440MHz @ 30MHz-1000MHz



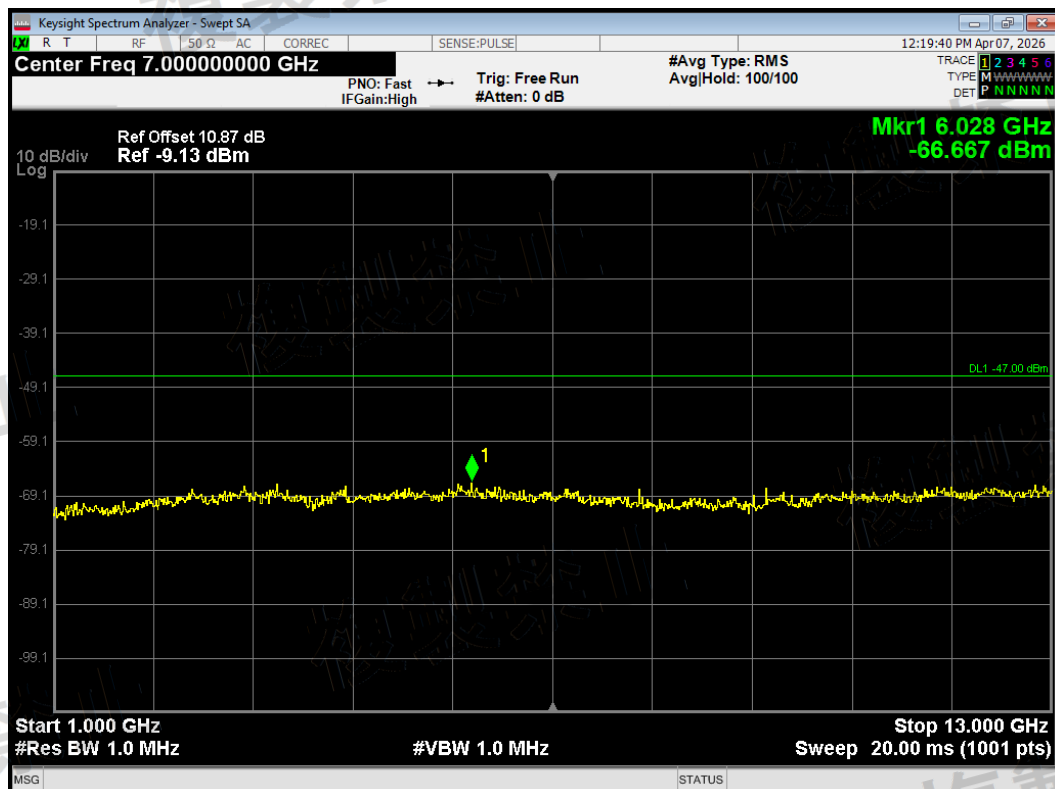
Rx. Spurious BLE (2M) 2440MHz @ 1000MHz-13000MHz



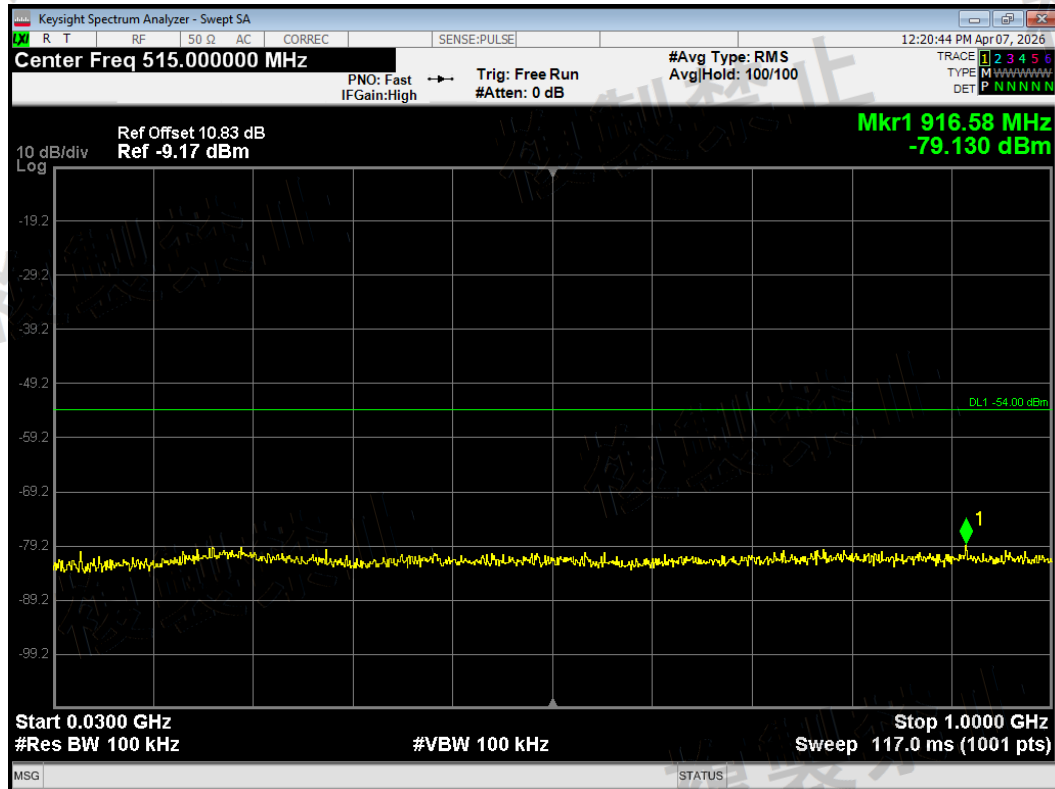
Rx. Spurious BLE (2M) 2480MHz @ 30MHz-1000MHz



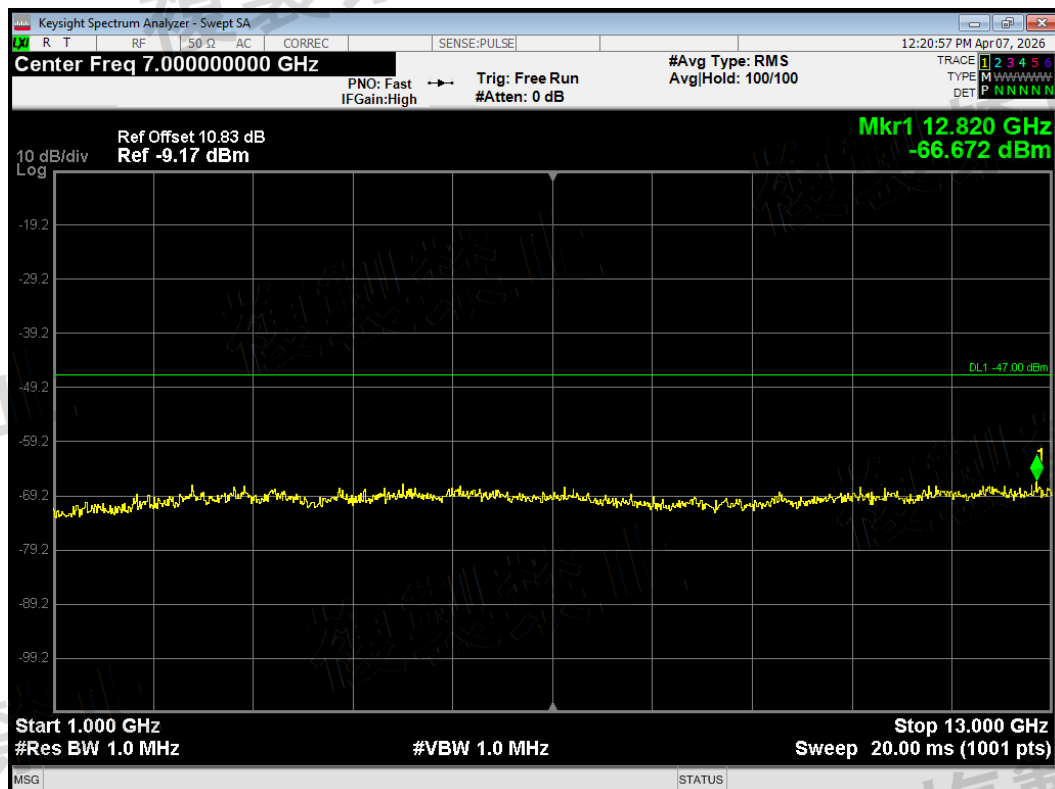
Rx. Spurious BLE (2M) 2480MHz @ 1000MHz-13000MHz



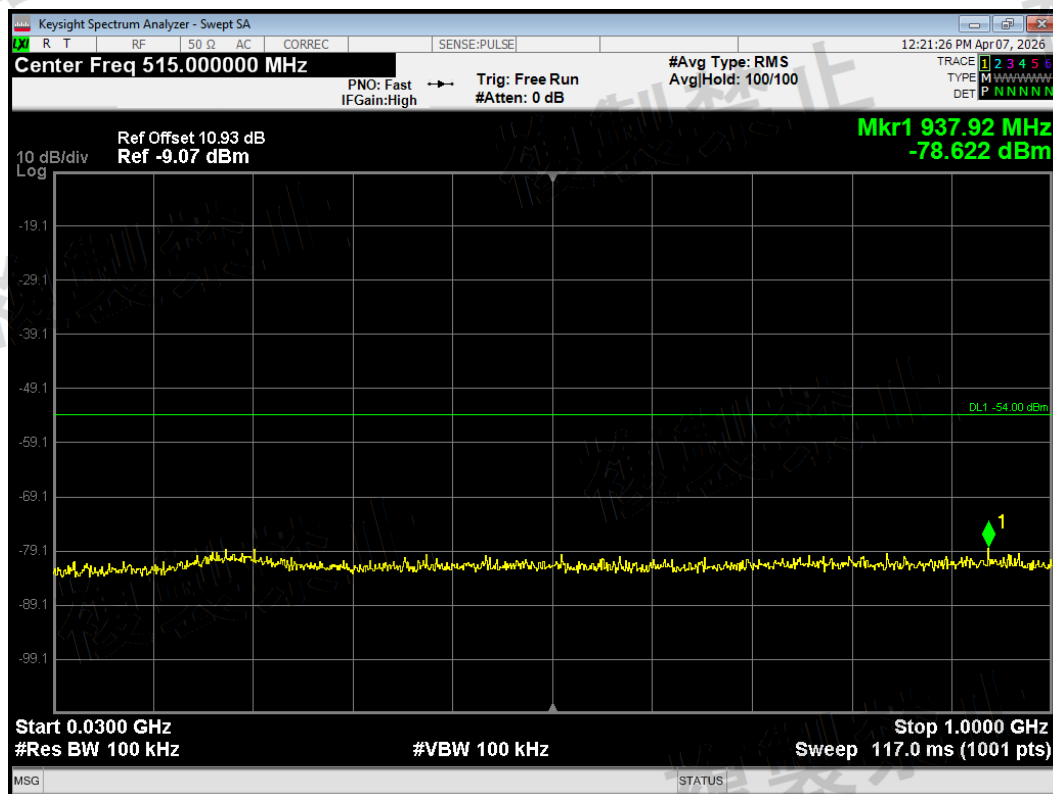
Rx. Spurious S=2 2402MHz @ 30MHz-1000MHz



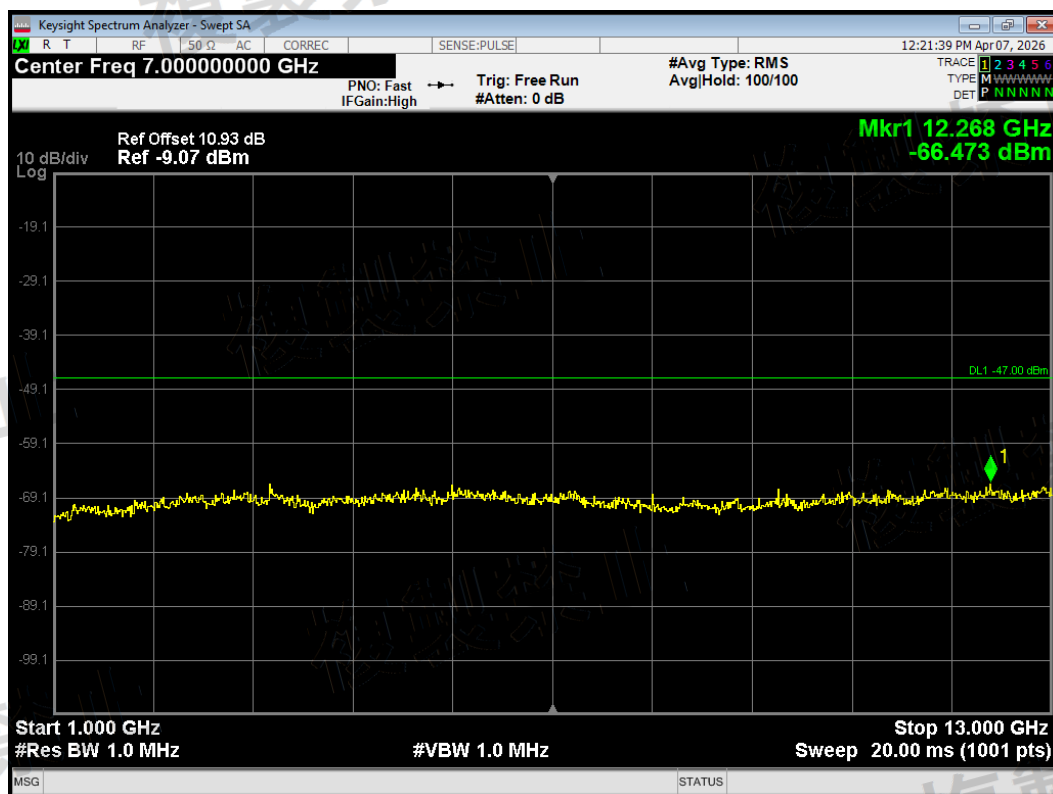
Rx. Spurious S=2 2402MHz @ 1000MHz-13000MHz



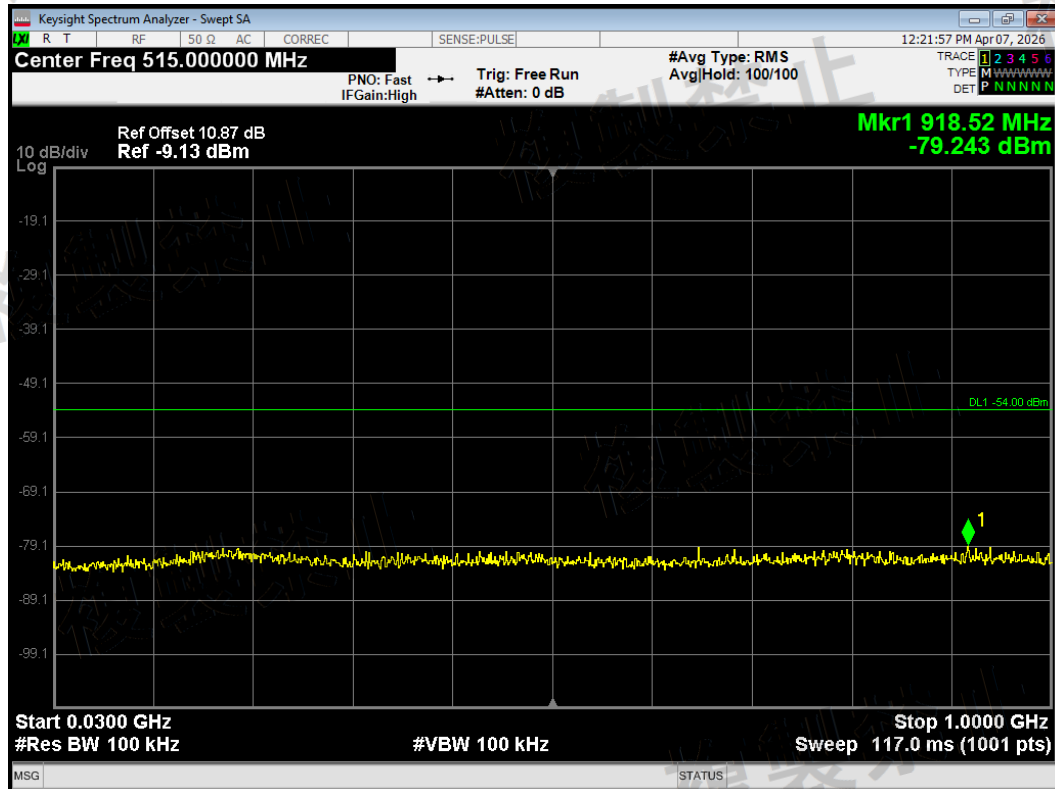
Rx. Spurious S=2 2440MHz @ 30MHz-1000MHz



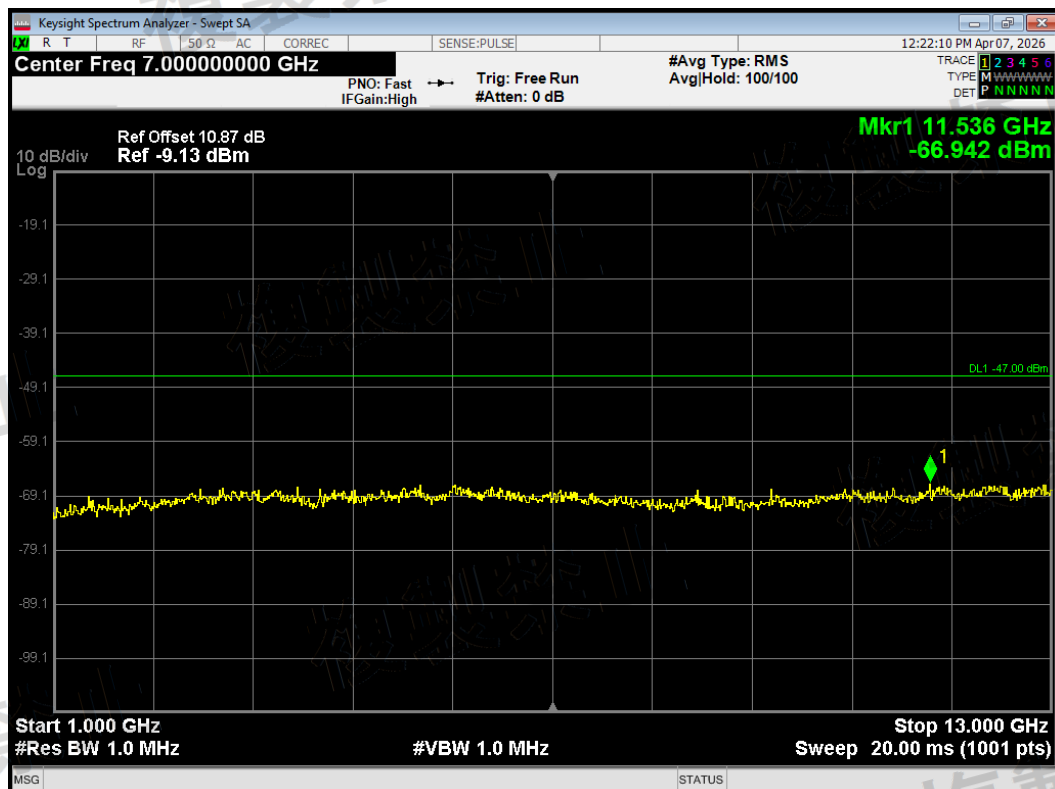
Rx. Spurious S=2 2440MHz @ 1000MHz-13000MHz



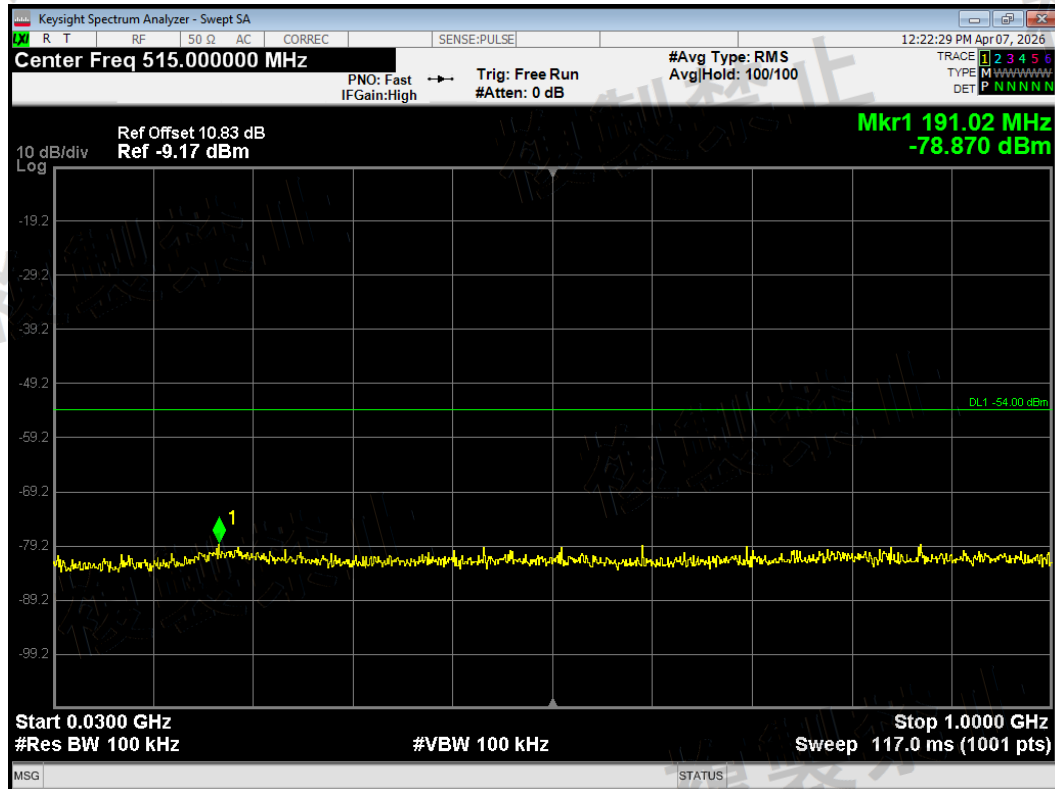
Rx. Spurious S=2 2480MHz @ 30MHz-1000MHz



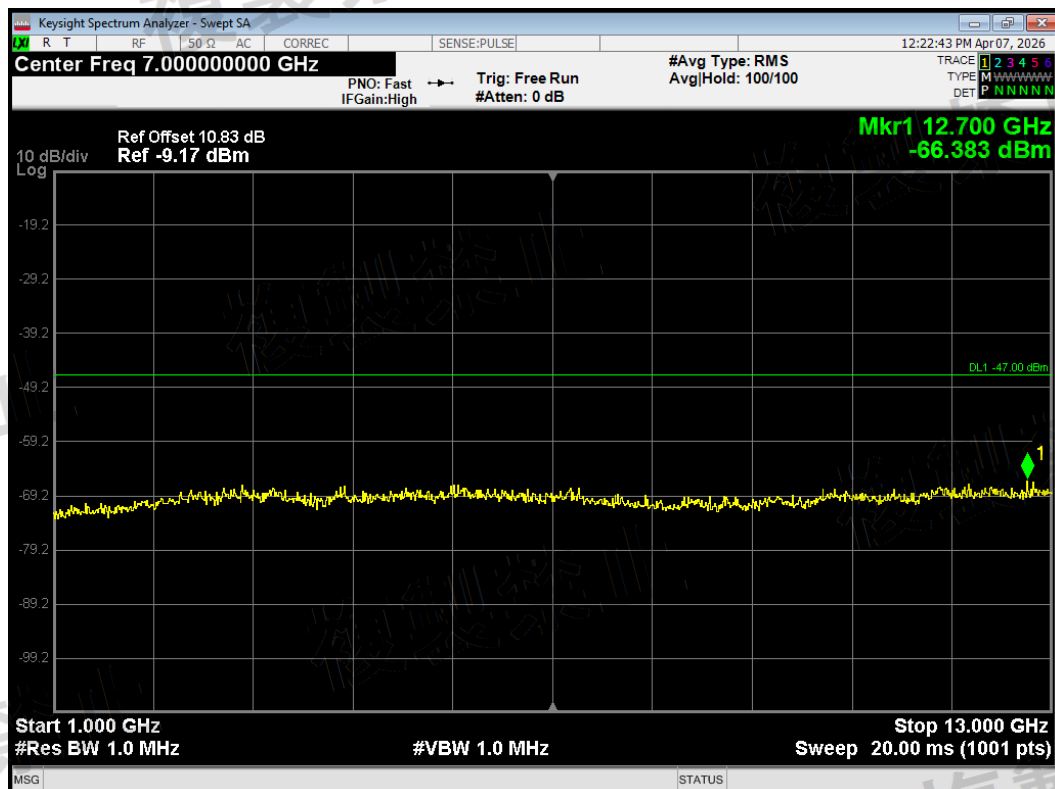
Rx. Spurious S=2 2480MHz @ 1000MHz-13000MHz



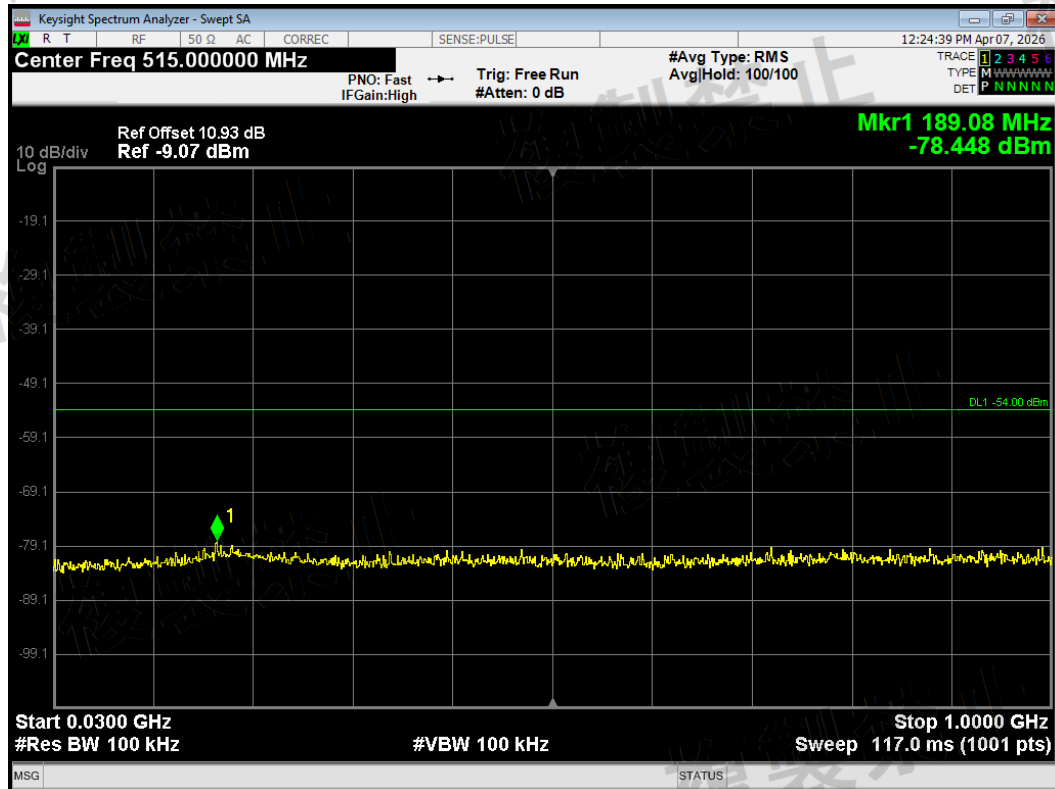
Rx. Spurious S=8 2402MHz @ 30MHz-1000MHz



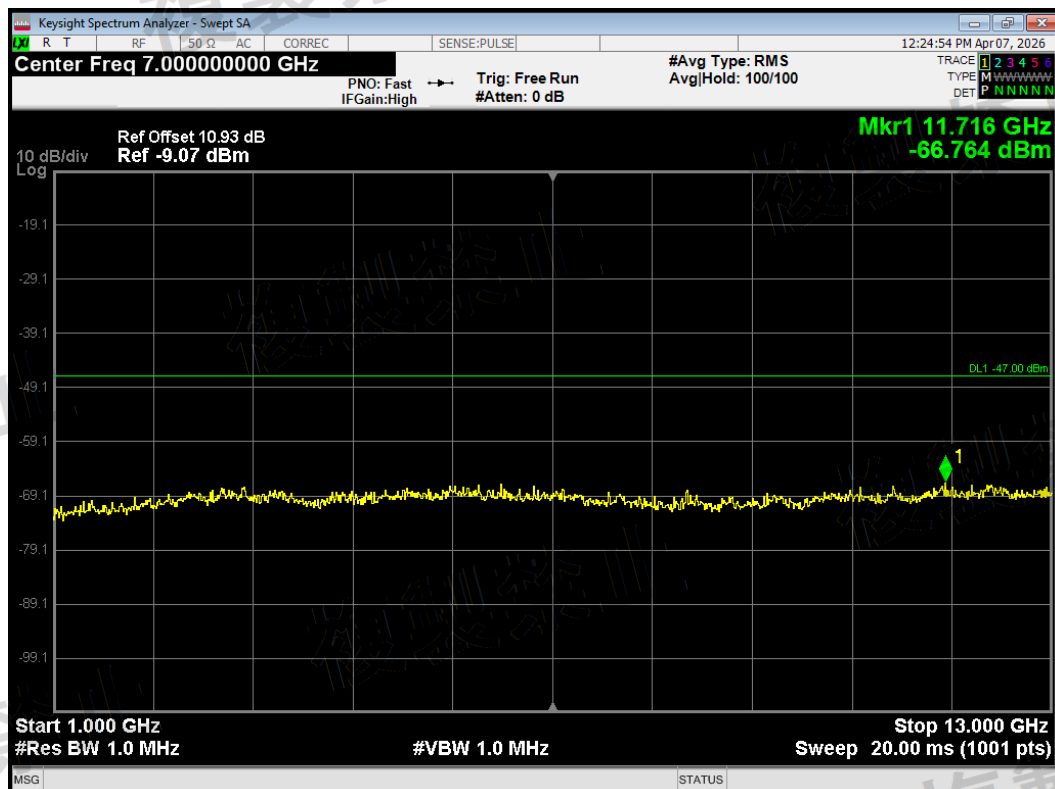
Rx. Spurious S=8 2402MHz @ 1000MHz-13000MHz



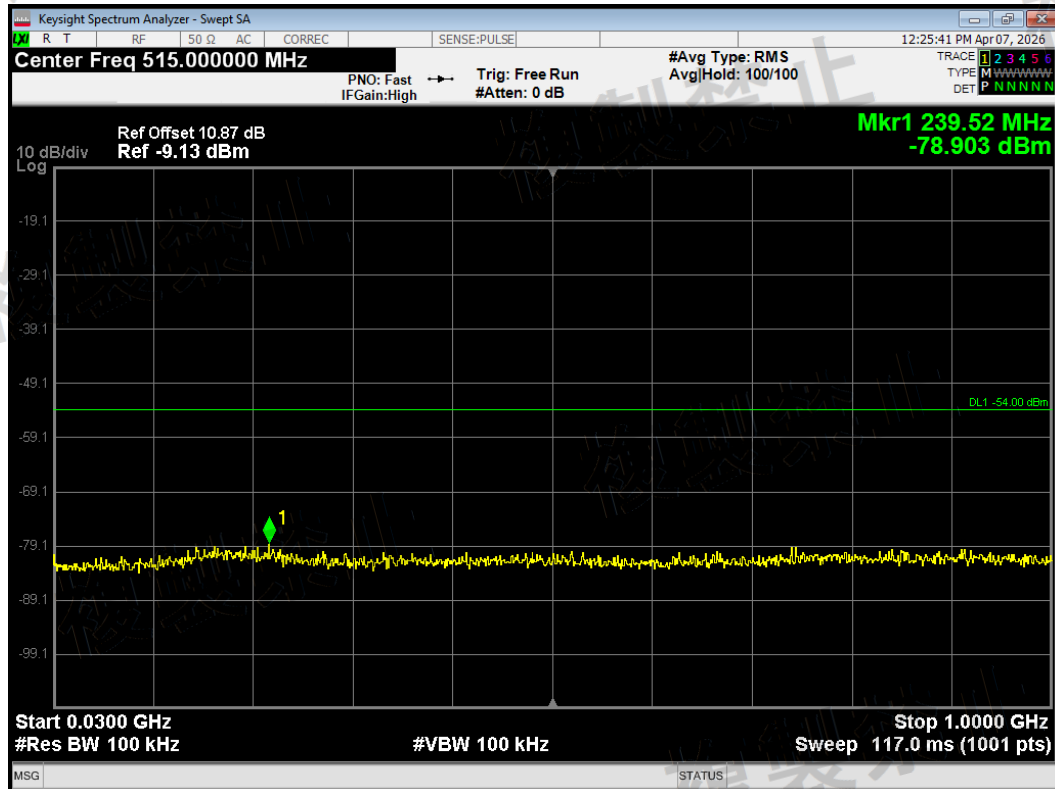
Rx. Spurious S=8 2440MHz @ 30MHz-1000MHz



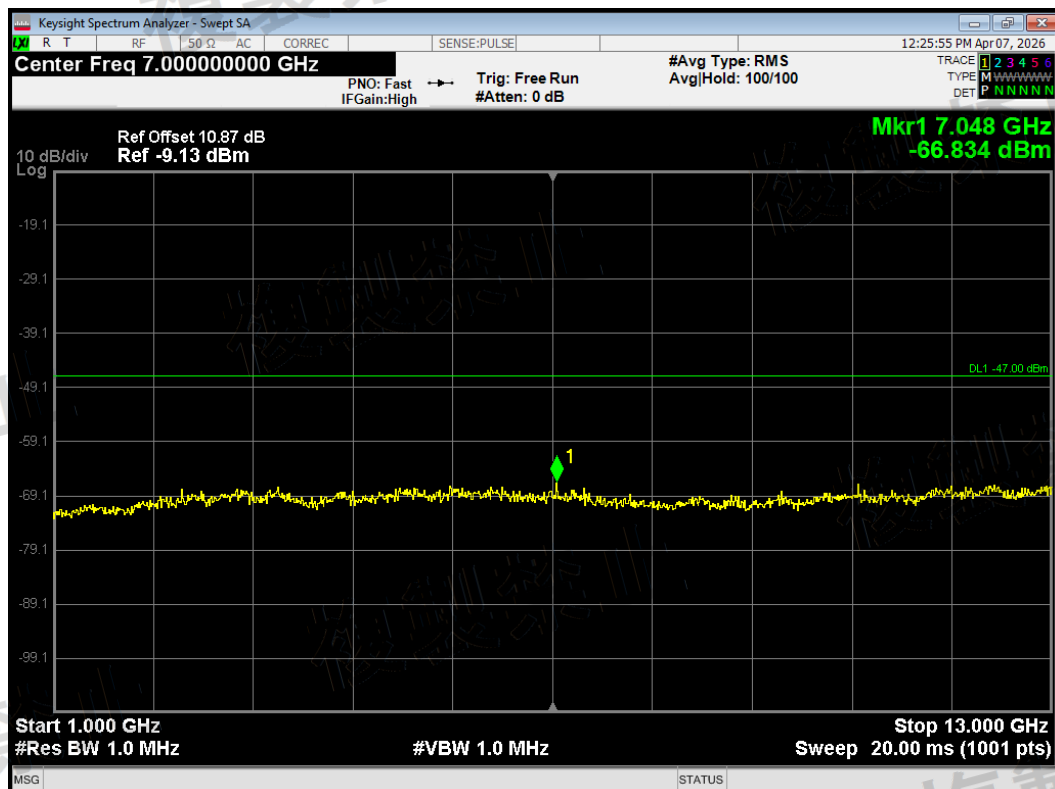
Rx. Spurious S=8 2440MHz @ 1000MHz-13000MHz



Rx. Spurious S=8 2480MHz @ 30MHz-1000MHz



Rx. Spurious S=8 2480MHz @ 1000MHz-13000MHz



5.8. Retention Time

Ambient Condition

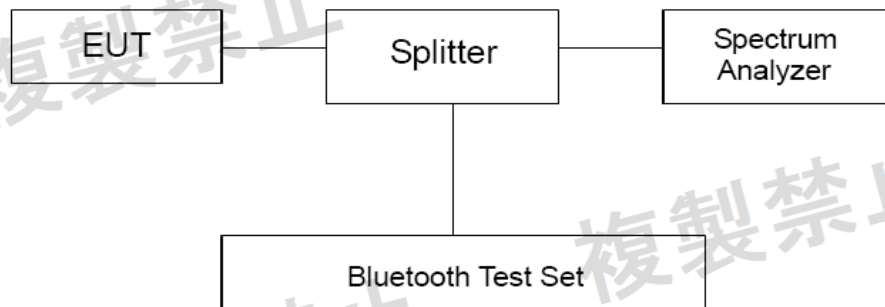
Temperature	Relative humidity	Pressure
23°C ~25°C	45%~50%	101.5kPa

Methods of Measurement

The EUT was connected to the spectrum analyzer and Bluetooth test set via a power splitter with a known loss. RBW is set to 1MHz and VBW is set to 1MHz on spectrum analyzer. The Retention time is calculated by:

Retention time=Scanning times * Pulse time length /1000

Test Setup



Limits

The total sum of the frequency retention time in any frequency within the time obtained by multiplying the diffusion rate by 0.4 second shall be 0.4 second or shorter.

Retention time	≤ 0.4s
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Measurement Uncertainty

The assessed measurement uncertainty to ensure 95% confidence level for the normal distribution is with the coverage factor $k = 2$.

Requirements	Uncertainty					
Retention time	DH5	$U=0.70\text{ms}$	2DH5	$U=0.70\text{ms}$	3DH5	$U=0.70\text{ms}$

Test Results:

Only applicable for FHSS.

5.9. Radio Interference Prevention Capability Measurement

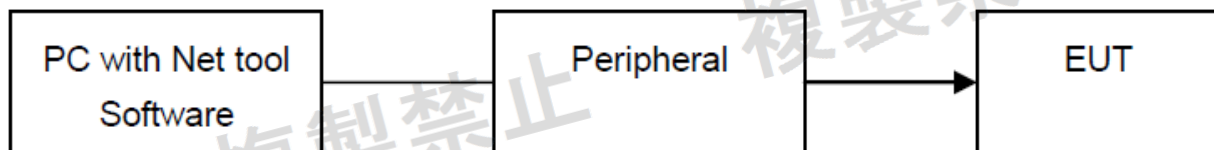
Ambient Condition

Temperature	Relative humidity	Pressure
25°C	50%	101.5kPa

Method of Measurement

1. In the case that the EUT has the function of automatically transmitting the identification code:
 - a. Transmit the predetermined identification codes from EUT.
 - b. Check the transmitted identification codes with the demodulator.
2. In the case of receiving the identification code:
 - a. Transmit the predetermined identification codes from the counterpart.
 - b. Check if communication is normal.
 - c. Transmit the signals other than predetermined ID codes from the counterpart.
 - d. check if the EUT stops the transmission, or if it displays that identification codes are different from the predetermined ones.

Test Setup



Limit

Identification code $\geq$ 48 bits

Test Results

Test Mode	Test Frequency (MHz)	Identification code	Result
Bluetooth	2402	48	Pass
	2440	48	Pass
	2480	48	Pass
MAC address	083A8D410258		

5.10. Construction Protection Confirmation Method

Ambient Condition

Temperature	Relative humidity	Pressure
25°C	50%	101.5kPa

Limit

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

Test Results:

Protected Method	BB and RF chips are protected by metal shielding shells
Description	BB and RF chips are protected by metal shielding shells, and the heat is conducted using thermal silicone grease inside. The interface is an M.2 interface. When used, it requires a matching heat dissipation design, so the module is generally located inside the entire device when used, and users cannot touch it.

Photo



6. Uncertainty Measurement

Parameter	Uncertainty
RF Output Power	$\pm 1.25\text{dB}$
Frequency Error Measurement	$\pm 2.5 \times 10^{-7}$
Occupied Bandwidth and Spread-spectrum Bandwidth / Factor	$\pm 4.54\%$
Unwanted Emission Strength Measurement	$\pm 1.23\text{dB}$
Secondarily Emitted Radio Wave Strength	$\pm 1.12\text{ dB}$
Carrier Sense	$\pm 1.55\text{ dB}$

7. Main Test Instruments

Name	Type	Manufacturer	Serial Number	Calibration Unite	Date of Calibration	Expiry Date	Calibration Method
Power sensor	R&S	NRP18S	101954	CHINA CEPREI LABORATORY CALIBRATION & TESTING CENTRE	2025-05-06	2026-05-05	c
Attenuator	HASCO	HA18A-10	0003	/	/	/	c
Test software	MW	MTS8310	/	/	/	/	c
Splitter	UCLMicrowa ve	2 way	UCL-PD0512- 2S	/	/	/	c
Spectrum Analyzer	KEYSIGHT	N9020A	MY51330870	CHINA CEPREI LABORATORY CALIBRATION & TESTING CENTRE	2025-05-06	2026-05-05	c
TEMP/HUMIDITY	DELIXI	HTC-1	/	CTTL	2025-05-06	2026-05-05	c

Note: The auxiliary devices of attenuation and splitter have been integrated into the system, and the system calibration has been included Calibration Method:

- Calibration conducted by the National Institute of Information and Communications Technology (NICT) (hereinafter referred to as "NICT") or a designated calibration agency under Article 102-18 paragraph (1)
- Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992)
- 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)
- Calibration conducted by using measuring instruments and other equipment listed in the right column of Table No. 3 attached hereto, which shall have been given any of calibration, etc. listed above from a) to c)

8. The EUT Appearance

Refer to *EUT Appearance*.

9. Test Setup Photos

Refer to *RF Test Setup*.

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