

TEST REPORT

 CTK Co., Ltd. (Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si, Gyeonggi-do, 17142, Korea Tel: +82-31-339-9970 Fax: +82-31-624-9501	Report No.: CTK-2025-02713 Page (1) / (44) Pages	
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1. Applicant

- Name : SOLUM CO.,LTD.
- Address : 7F, 2354, Yonggu-daero, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea
- Date of Receipt : 2025-03-07

2. Manufacturer

- Name : SOLUM CO.,LTD.
- Address : 7F, 2354, Yonggu-daero, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea

3. Use of Report : For Japan MIC Certification

4. Test Sample / Model : ESL Label / EL315TRB6S

5. Date(s) of Test : 2025-04-04

6. Test Standard(method) used : ARIB STD-T66, Article 2, Clause 1, Item 19 No. 88 appended table 43

7. Testing Environment : Temp.: (23 ± 1) °C, Humidity: (48 ± 3) % R.H.

8. Test Results : Compliance

9. Location of Test : ☒ Permanent Testing Lab ☐ On Site Testing (Address : 5, Dongbu-ro 221beon-gil, Cheoin-gu, Yongin-si, Gyeonggi-do, Republic of Korea)

The results shown in this test report refer only to the sample(s) tested unless otherwise stated. This report cannot be reproduced or copied without the written consent of CTK.

Approval	Tested by Min-Wook Jung: (Signature)	Technical Manager Young-taek Lee: (Signature)
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2025-09-29

CTK Co., Ltd.

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REPORT REVISION HISTORY

Date	Revision	Page No
2025-09-29	Issued (CTK-2025-02713)	all

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1. General Product Description

1.1 Applicant Information

Company	SOLUM CO.,LTD.
Contact Point	7F, 2354, Yonggu-daero, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea
Contact Person	Name : LEE TAE HA E-mail : taeha.lee@solu-m.com Tel : +82-31-8006-7705

1.2 Manufacturer Information

Manufacturer	SOLUM CO.,LTD.
Address	7F, 2354, Yonggu-daero, Giheung-gu, Yongin-si, Gyeonggi-do, Republic of Korea
Factory #1	SOLUM VINA CO., LTD
Factory #1 Address	Plot B3, Ba Thien II Industrial Park, Thien Ke Ward, Binh Xuyen District, Vinh Phuc Province, VIETNAM

1.3 Product Information

Product Description	ESL Label
Model name	EL315TRB6S
Variant Model name	-
Antenna type	PCB Antenna
Antenna gain	2.5 dBi
Operating Frequency	2 401 MHz - 2 480 MHz
RF Output Power	2 401 MHz : 0.103 mW 2 402 MHz - 2 480 MHz : 3.451 mW
Number of channels	80
Channel Spacing	1 MHz
Type of Modulation	GFSK
Power Source	DC 3.0 V
Test Software(Version)	Tera term 4.99(-)
Firmware version	V36

1.4 Peripheral Devices

Device	Manufacturer	Model No.	Serial No.
Note Computer	HP	HP ProBook 455 G7	5CD0234DX4
AC/DC Adapter	HP	TPN-CA16	L25298-002

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1.5 Interference prevention function

Interference prevention function	Description	Check
Identification code transmission/reception	Radio equipment used mainly on the same premises and automatically transmits or receives identification code	☒ Apply ☐ Does not apply

1.6 Test Software

Conducted Test	Ics Pro Ver. 7.0.8
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2. Accreditations

2.1 Laboratory Accreditations and Listings

Country	Agency	Registration Number
USA	FCC	805871
CANADA	ISED	CN : 8737A CAB ID : KR0025
KOREA	NRRA	KR0025

2.2 Calibration Details of Equipment Used for Measurement

Test equipment and test accessories are calibrated on regular basis. The maximum time between calibrations is one year or what is recommended by the manufacturer, whichever is less. All test equipment calibrations are traceable to the Korea Research Institute of Standards and Science (KRISS), therefore, all test data recorded in this report is traceable to KRISS.

2.3 Measurement equipment list

	Name of Equipment	Manufacturer	Model No.	Serial No.	Cal. Authority	Cal. Method	Cal Date	Due Date
1	Signal Analyzer	Agilent	N9020A	MY50200512	SICT Co., Ltd.	(c)	2025-03-13	2026-03-13
2	DC Power Supply	HP	E3632A	MY40011638	SICT Co., Ltd.	(c)	2024-09-20	2025-09-20
3	Signal Generator	R&S	SMB100A	175528	SICT Co., Ltd.	(c)	2025-03-21	2026-03-21

Note : Cal. Method

- Calibration conducted by the National Institute of Information and Communications Technology~NICT~ or a designated calibration agency under Article 102-18 paragraph (1)~ Telecom Engineering Center, Intertek Japan K.K., Keysight Technologies, Inc~.
- 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~
- 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)~ Telecom Engineering Center, Intertek Japan K.K., Keysight Technologies, Inc~.

Calibration conducted by using other equipment that listed above from a) to c)

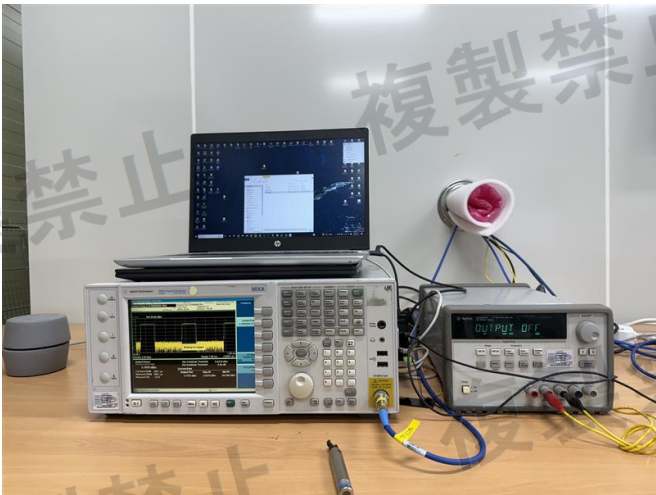
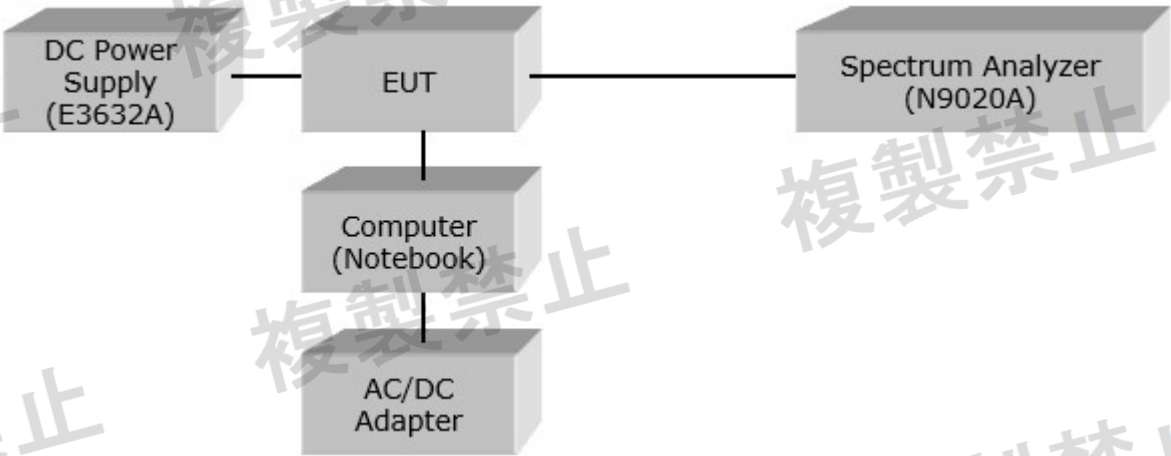
2.4 Measurement Uncertainty

The value of the measurement uncertainty for the measurement of each parameter.
 Coverage factor $k = 2$, Confidence levels of 95 %

Description	Uncertainty
Conducted RF Output Power	1.5 dB (C.L.: Approx. 95 %, $k = 2$)
Spurious emissions(Conducted)	1.5 dB (C.L.: Approx. 95 %, $k = 2$)
Temperature	1.0 °C (C.L.: Approx. 95 %, $k = 2$)
Humidity	3.0 % (C.L.: Approx. 95 %, $k = 2$)
Supply voltages	1.7 mV (C.L.: Approx. 95 %, $k = 2$)

2.5 Test Setup photo

[Conducted]



2.6 Test method

1) Frequency Tolerance

Test Procedures

Transmits unmodulated frequency to be measured. Center the transmitted frequency with the spectrum analyzer and adjust the span appropriately so that the peak value displayed on the mark is sufficiently displayed. Record the peak value and calculate the ppm using the recorded value.

The spectrum analyzer is set to:

- | | |
|-----------------------------|---------------------|
| a) Span = in moderation | b) RBW = auto |
| c) VBW = auto | d) Sweep = auto |
| e) Detector function = peak | f) Trace = max hold |

2) Occupied Bandwidth & Spread Bandwidth

Test Procedures

Transmits the test frequency. The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5%(Spread bandwidth is 5%) of the total mean power of the given emission. Use the 99%(Spread bandwidth is 90%) power bandwidth function of the instrument and report the measured bandwidth.

The spectrum analyzer is set to:

- | | |
|-----------------------------|---------------------|
| a) Span = 4 MHz | b) RBW = 300 kHz |
| c) VBW = 300 kHz | d) Sweep = auto |
| e) Detector function = peak | f) Trace = max hold |

3) RF Output Power & Tolerance

Test Procedures

Transmits the test frequency. spectrum settings appropriately, record the peak value.

The spectrum analyzer is set to:

- | | |
|---------------------|----------------------------|
| b) RBW = 30 kHz | b) VBW = 300 kHz |
| c) Sweep = auto | d) Detector function = RMS |
| e) Trace = max hold | |

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4) Unwanted(Spurious) Emission Strength

Test Procedures

Transmits the test frequency. After adjusting the spurious range and spectrum settings appropriately, record the peak value.

The spectrum analyzer is set to:

- b) RBW = 1 MHz
- c) Sweep = auto
- e) Trace = max hold
- b) VBW = 3 MHz
- d) Detector function = peak

5) Secondary Emittted Radio Wave Strength

Test Procedures

The test is tested with the EUT in RX state. After adjusting the spurious range and spectrum settings appropriately, record the peak value.

The spectrum analyzer is set to:

- b) RBW = 100 kHz
- c) Sweep = auto
- e) Trace = max hold
- b) VBW = 100 kHz
- d) Detector function = peak

3. Test Results

DC 3.0 V

Declaration Output Power	2 401 MHz : -10.00 dBm (0.100 mW) 2 402 ~ 2 480 MHz : 3.50 dBm (3.162 mW)
--------------------------	--

Transmission Time	ON TIME	0.360	msec
	OFF TIME	249.5	msec
	Ratio	0.001 4	-
Packet Type (Mode)		Not Applicable	mode
Transmit Speed		Not Applicable	MHz

Measurement Frequency	MHz	2401	2402	2440	2480	Result	Limit
Channel Number	Ch.	0	1	39	79	-	-
Frequency Measurements	MHz	2 400.964 009	2 401.963 955	2 439.963 373	2 479.962 723	PASS	
Frequency Tolerance	ppm	-14.990	-15.006	-15.011	-15.031	PASS	$\pm 50 \times 10^{-6}$ (50ppm)
Occupied Bandwidth	MHz	1.139	1.139	1.140	1.141	PASS	26MHz or below
Spread Bandwidth	MHz	0.734	0.734	0.734	0.733	PASS	500kHz or more
RF Output Power	mW	0.104	3.388	3.365	3.420	PASS	10mW or below
RF Output Power Tolerance	%	4.472	7.152	6.414	8.143	PASS	+20 to -80%
Unwanted (Spurious) Emissions	30 to 2387MHz	uW/MHz	0.003	0.002	0.002	PASS	2.5uW/MHz or below
		MHz	2 384.640	2 186.650	1 974.520	-	
	2387 to 2400MHz	uW/MHz	13.305	0.470	0.002	PASS	25uW/MHz or below
		MHz	2 400.000	2 400.000	2 395.810	-	
	2483.5 to 2496.5MHz	uW/MHz	0.001	0.002	0.002	PASS	25uW/MHz or below
		MHz	2 491.340	2 489.440	2 488.990	-	
	2496.5 to 12500MHz	uW/MHz	0.003	0.035	0.028	PASS	2.5uW/MHz or below
		MHz	5 797.660	4 807.310	4 877.330	-	
Receiver Spurious Emissions	30 to 1000MHz	nW	0.012	0.012	0.015	PASS	4nW or below
		MHz	293.840	182.290	768.170	-	
	1000 to 10000MHz	nW	0.394	0.227	0.458	PASS	20nW or below
		MHz	4 807.100	2 476.000	2 422.000	-	
	10000 to 12500MHz	nW	0.201	0.253	0.234	PASS	20nW or below
		MHz	12 235.000	12 197.500	12 257.500	-	

Note :

- Output power is measured at 100 % duty cycle.

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DC 3.3 V

Declaration Output Power	2 401 MHz : -11.00 dBm (0.079 mW) 2 402 ~ 2 480 MHz : 3.50 dBm (2.239 mW)
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Transmission Time	ON TIME	0.360	msec
	OFF TIME	249.5	msec
	Ratio	0.001 4	-
Packet Type (Mode)		Not Applicable	mode
Transmit Speed		Not Applicable	MHz

Measurement Frequency	MHz	2401	2402	2440	2480	Result	Limit
Channel Number	Ch.	0	1	39	79	-	-
Frequency Measurements	MHz	2 400.964 007	2 401.963 942	2 439.963 364	2 479.962 718	PASS	
Frequency Tolerance	ppm	-14.991	-15.012	-15.015	-15.033	PASS	±50×10 ⁻⁶ (50ppm)
Occupied Bandwidth	MHz	1.138	1.139	1.139	1.141	PASS	26MHz or below
Spread Bandwidth	MHz	0.734	0.734	0.734	0.733	PASS	500kHz or more
RF Output Power	mW	0.103	3.404	3.350	3.342	PASS	10mW or below
RF Output Power Tolerance	%	3.039	7.647	5.925	5.682	PASS	+20 to -80%
Unwanted (Spurious) Emissions	30 to 2387MHz	uW/ MHz	0.002	0.002	0.002	PASS	2.5uW/MHz or below
		MHz	2 370.500	2 332.790	2 134.800	-	
	2387 to 2400MHz	uW/ MHz	13.183	0.530	0.001	PASS	25uW/MHz or below
		MHz	2 400.000	2 400.000	2 394.310	-	
	2483.5 to 2496.5MHz	uW/ MHz	0.001	0.001	0.001	PASS	25uW/MHz or below
		MHz	2 496.290	2 486.320	2 487.400	-	
	2496.5 to 12500MHz	uW/ MHz	0.003	0.034	0.029	PASS	2.5uW/MHz or below
		MHz	12 249.910	4 807.310	4 877.330	-	-
Receiver Spurious Emissions	30 to 1000MHz	nW	0.012	0.014	0.014	PASS	4nW or below
		MHz	451.950	707.060	860.320	-	-
	1000 to 10000MHz	nW	0.228	0.224	0.239	PASS	20nW or below
		MHz	6 598.000	5 680.000	2 476.000	-	-
	10000 to 12500MHz	nW	0.272	0.233	0.190	PASS	20nW or below
		MHz	12 297.500	12 042.500	11 717.500	-	-

Note :

- Output power is measured at 100 % duty cycle.

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DC 2.7 V

Declaration Output Power	2 401 MHz : -10.00 dBm (0.100 mW) 2 402 - 2 480 MHz : 3.50 dBm (3.162 mW)
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Transmission Time	ON TIME	0.360	msec
	OFF TIME	249.5	msec
	Ratio	0.001 4	-
Packet Type (Mode)		Not Applicable	mode
Transmit Speed		Not Applicable	MHz

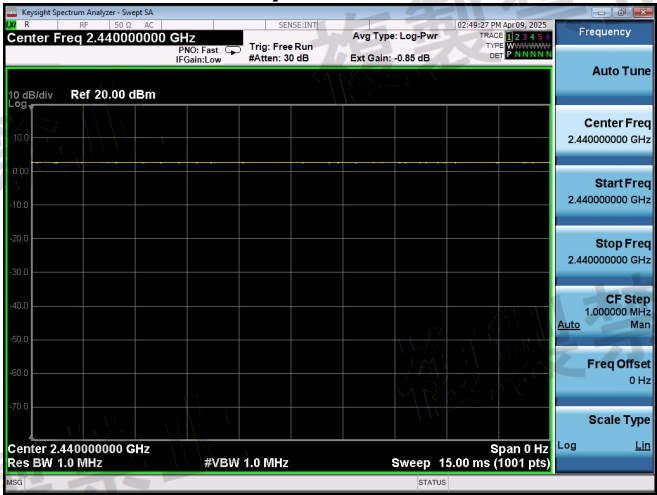
Measurement Frequency	MHz	2401	2402	2440	2480	Result	Limit
Channel Number	Ch.	0	1	39	79	-	-
Frequency Measurements	MHz	2 400.964 005	2 401.963 931	2 439.963 356	2 479.962 712	PASS	
Frequency Tolerance	ppm	-14.992	-15.016	-15.018	-15.035	PASS	±50×10 ⁻⁶ (50ppm)
Occupied Bandwidth	MHz	1.139	1.138	1.140	1.141	PASS	26MHz or below
Spread Bandwidth	MHz	0.734	0.734	0.733	0.733	PASS	500kHz or more
RF Output Power	mW	0.103	3.365	3.296	3.451	PASS	10mW or below
RF Output Power Tolerance	%	3.039	6.414	4.232	9.144	PASS	+20 to -80%
Unwanted (Spurious) Emissions	30 to 2387MHz	uW/MHz	0.002	0.002	0.002	PASS	2.5uW/MHz or below
		MHz	2 377.570	2 365.790	2325.720	2363.430	-
	2387 to 2400MHz	uW/MHz	13.092	0.568	0.002	0.001	PASS
		MHz	2 400.000	2 399.990	2394.070	2398.010	-
	2483.5 to 2496.5MHz	uW/MHz	0.001	0.001	0.002	0.052	PASS
		MHz	2 494.280	2 489.750	2494.170	2483.540	-
	2496.5 to 12500MHz	uW/MHz	0.003	0.033	0.028	0.019	PASS
		MHz	5 777.650	4 807.310	4877.330	4957.360	-
Receiver Spurious Emissions	30 to 1000MHz	nW	0.012	0.011	0.013	0.013	PASS
		MHz	509.180	482.990	905.910	178.410	-
	1000 to 10000MHz	nW	0.237	0.579	0.195	0.202	PASS
		MHz	5878.000	2 431.000	5968.000	5851.000	-
	10000 to 12500MHz	nW	0.199	0.204	0.204	0.220	PASS
		MHz	11 225.000	12 100.000	12 185.000	12 342.500	-

Note :

- Output power is measured at 100 % duty cycle.

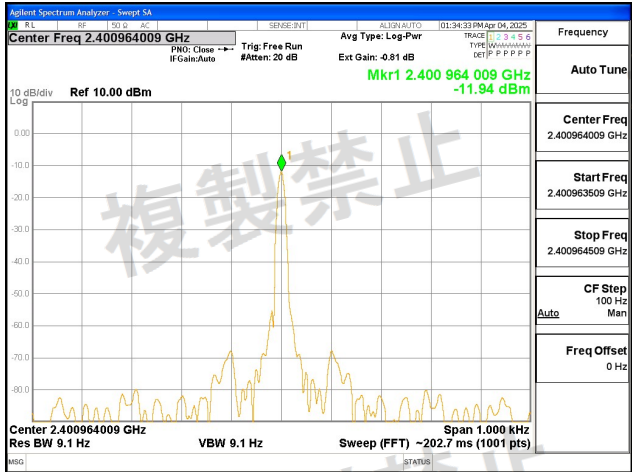
APPENDIX A – data

ON/OFF time

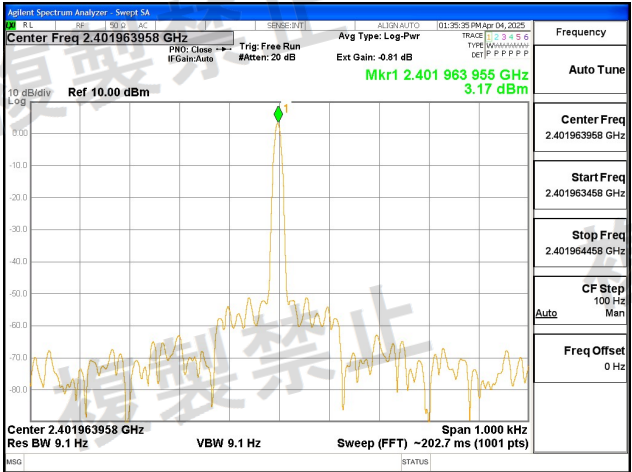


Test Mode : DC 3.0 V
Frequency tolerance

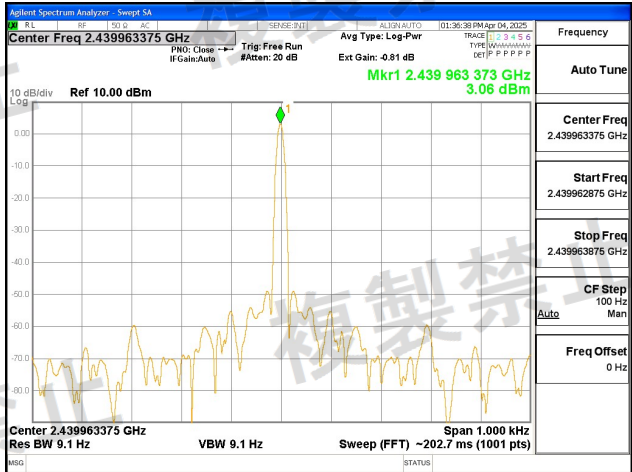
Ch.0: 2 401 MHz



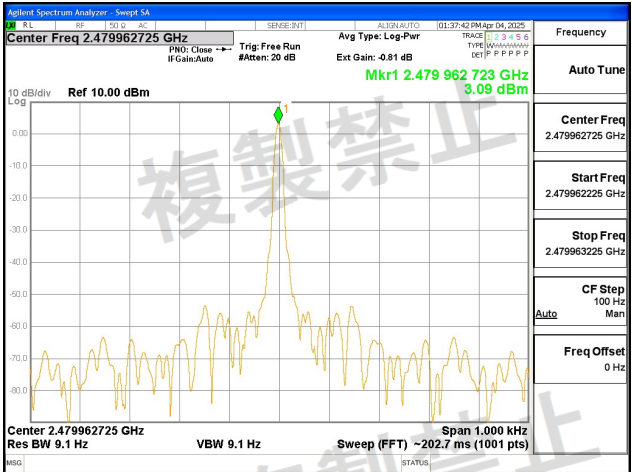
Ch.1: 2 402 MHz



Ch.39: 2 440 MHz

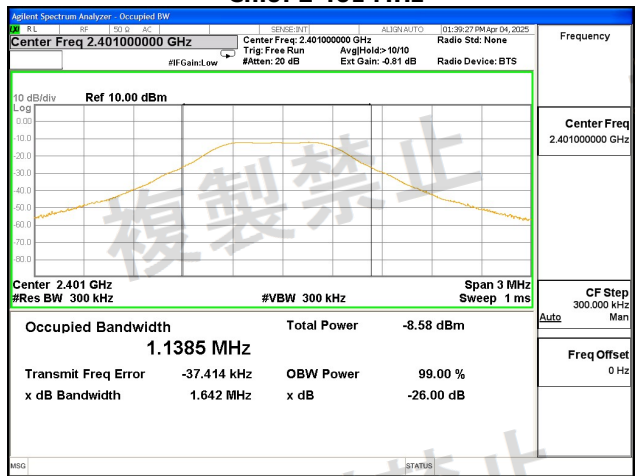


Ch.79: 2 480 MHz

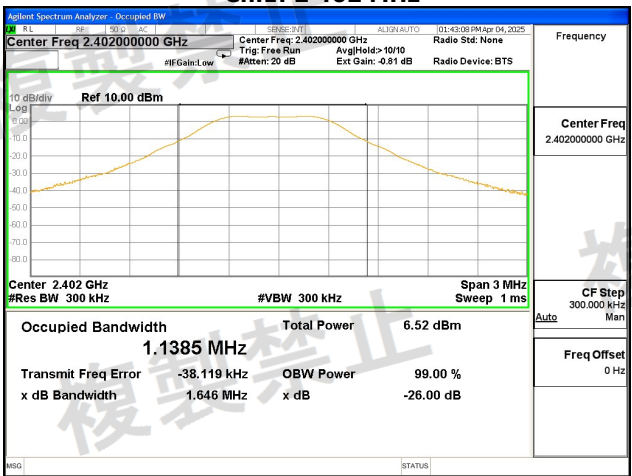


Occupied bandwidth

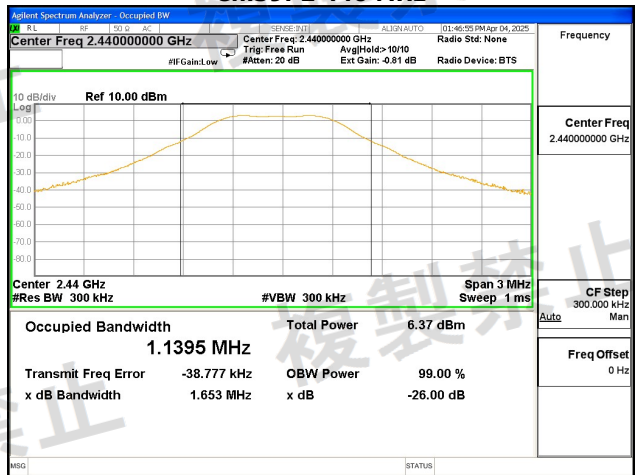
Ch.0: 2 401 MHz



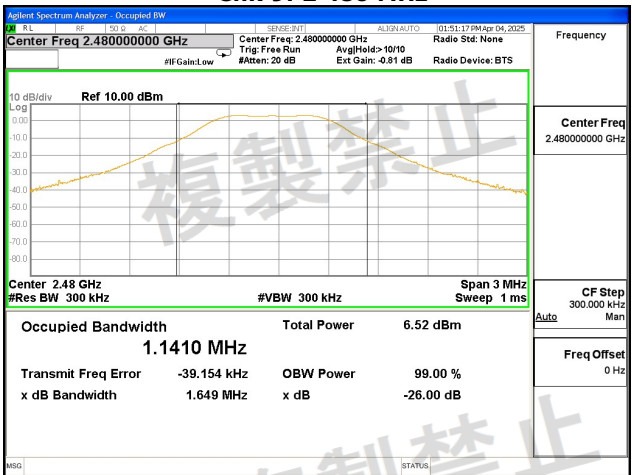
Ch.1: 2 402 MHz



Ch.39: 2 440 MHz



Ch.79: 2 480 MHz





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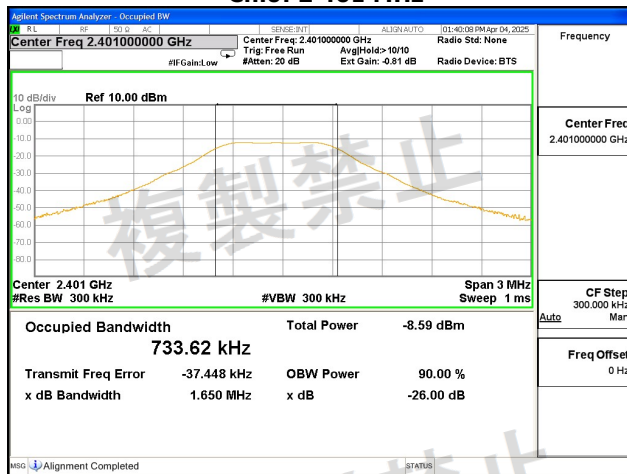
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CTK-2025-02713

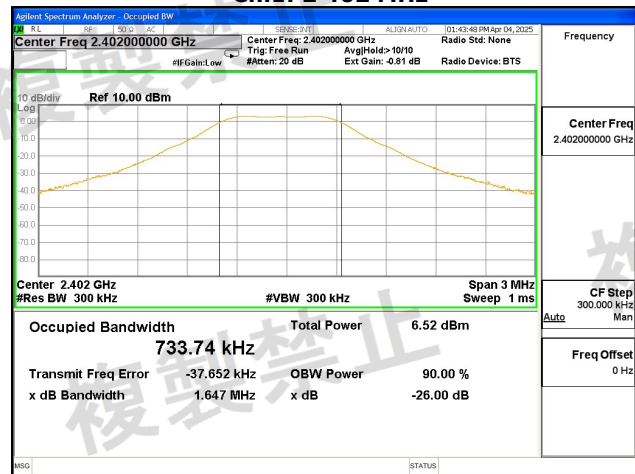
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Spread bandwidth

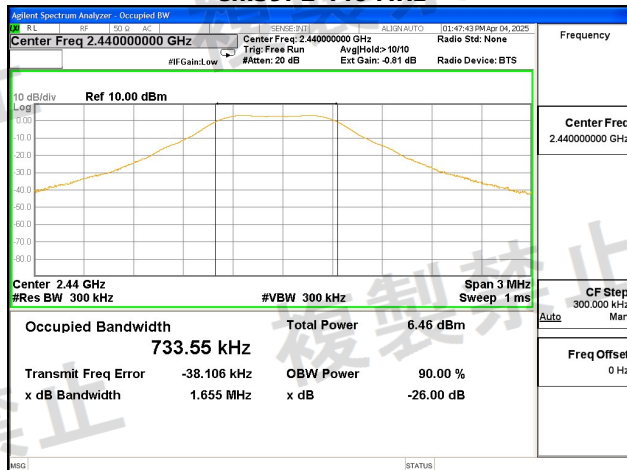
Ch.0: 2 401 MHz



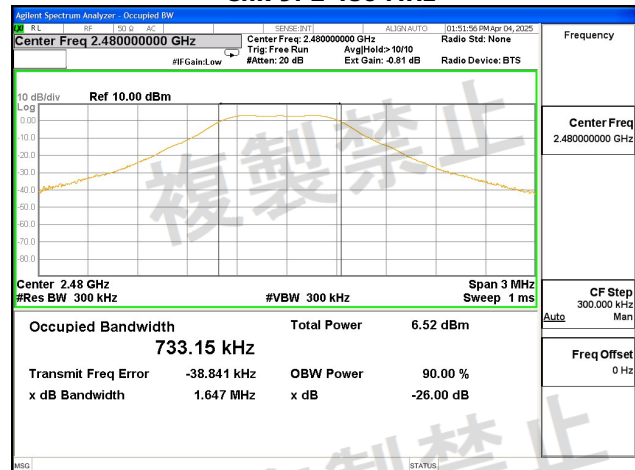
Ch.1: 2 402 MHz



Ch.39: 2 440 MHz

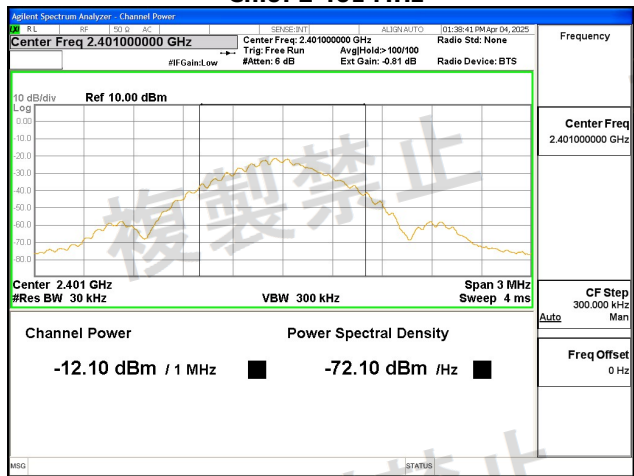


Ch.79: 2 480 MHz

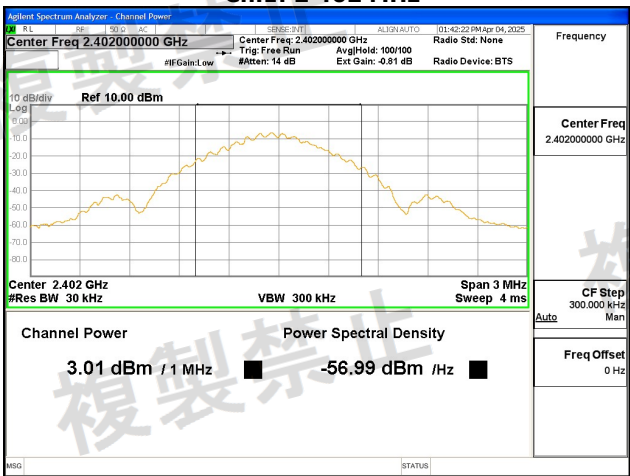


RF output power

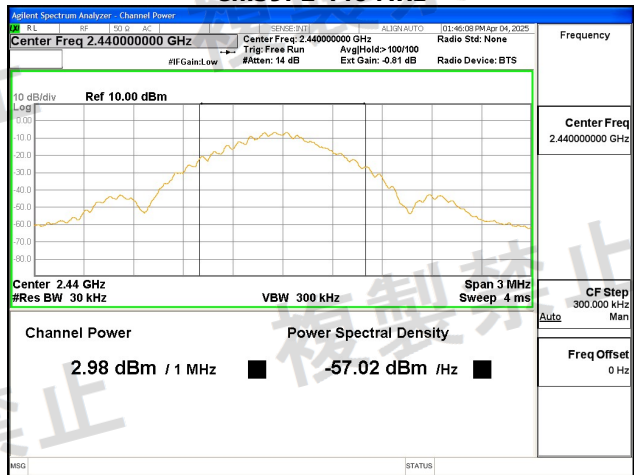
Ch.0: 2 401 MHz



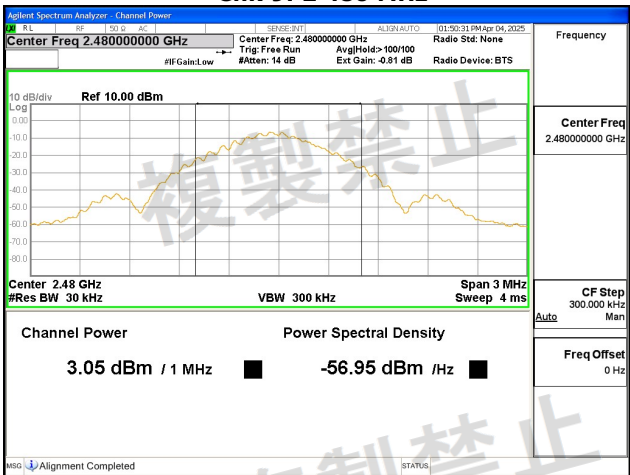
Ch.1: 2 402 MHz



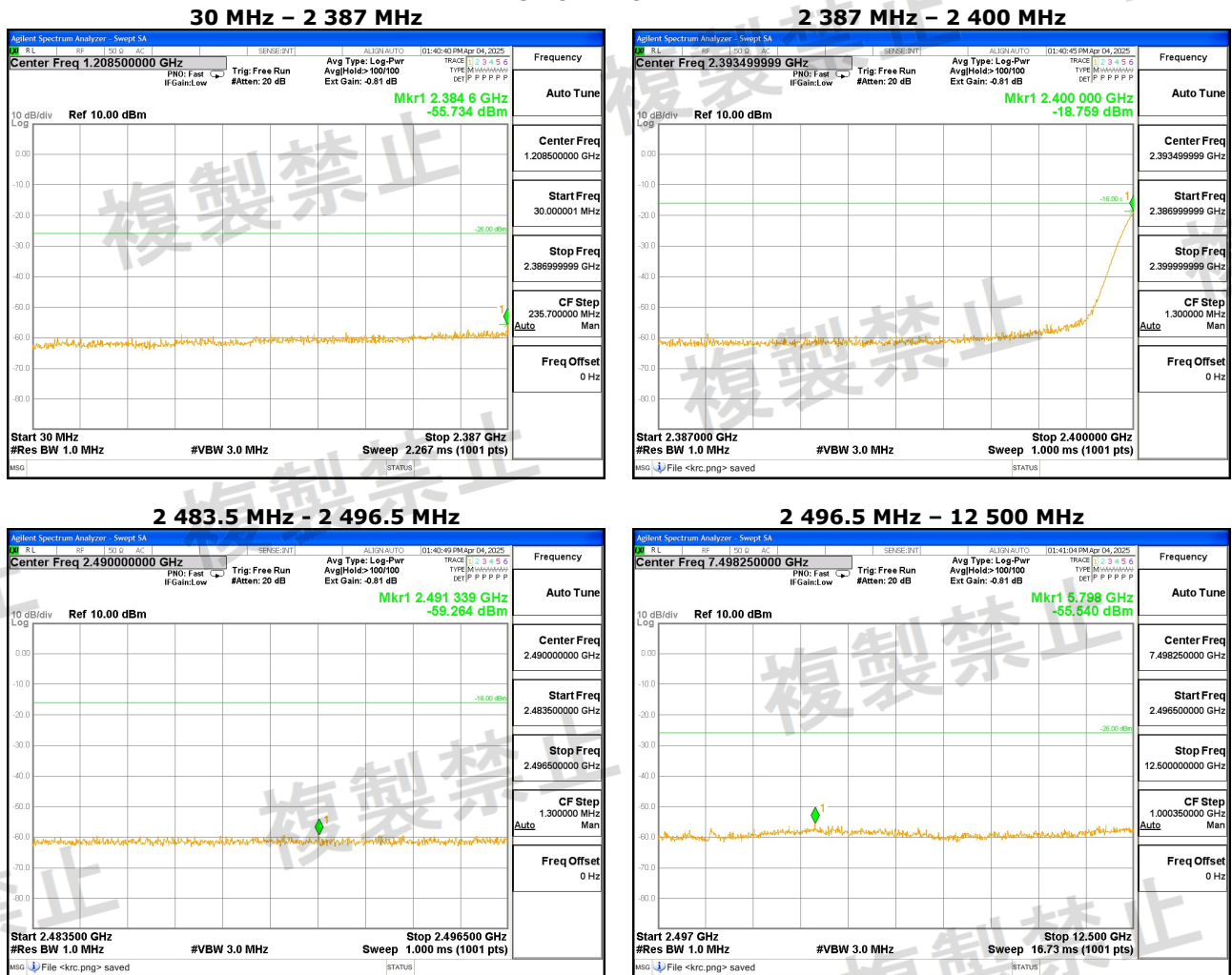
Ch.39: 2 440 MHz



Ch.79: 2 480 MHz



Unwanted(Spurious) emission
Ch.0: 2 401 MHz





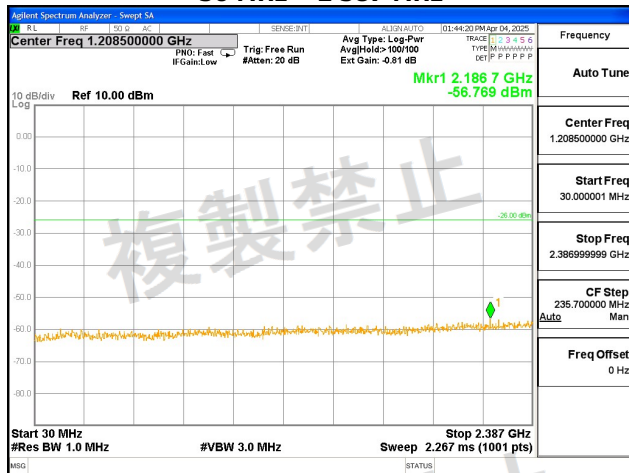
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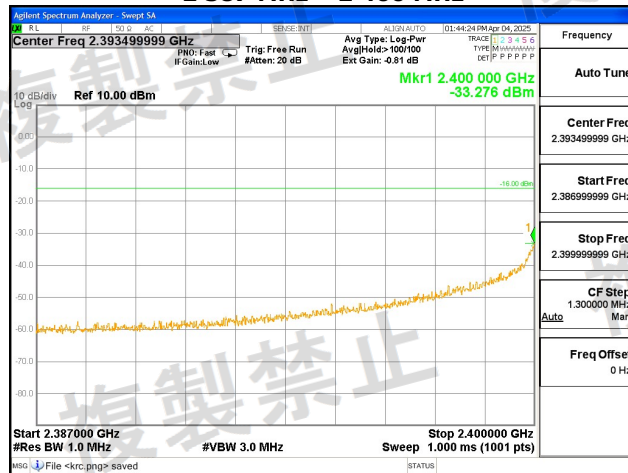
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Ch.1: 2 402 MHz

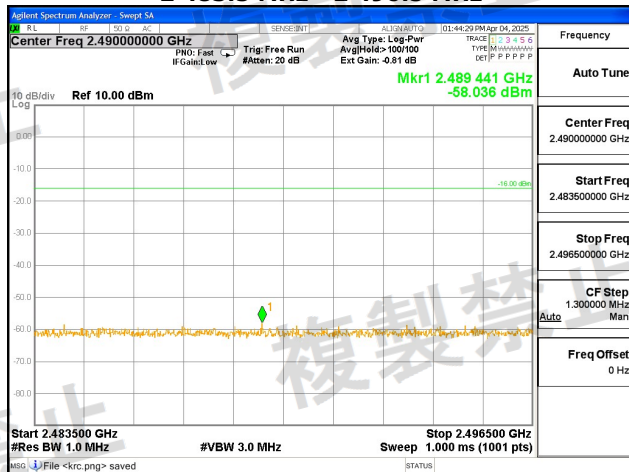
30 MHz – 2 387 MHz



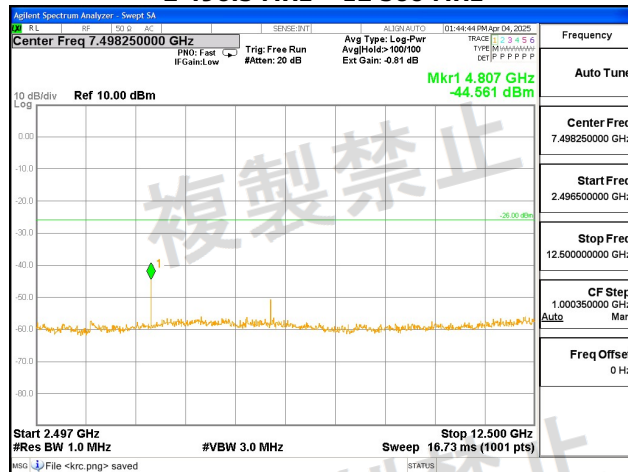
2 387 MHz – 2 400 MHz



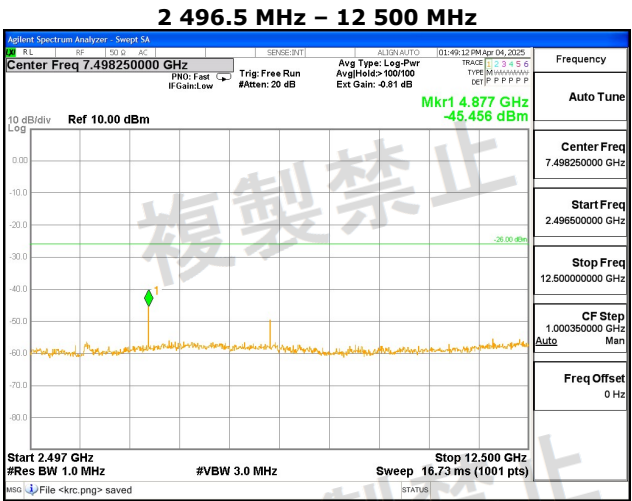
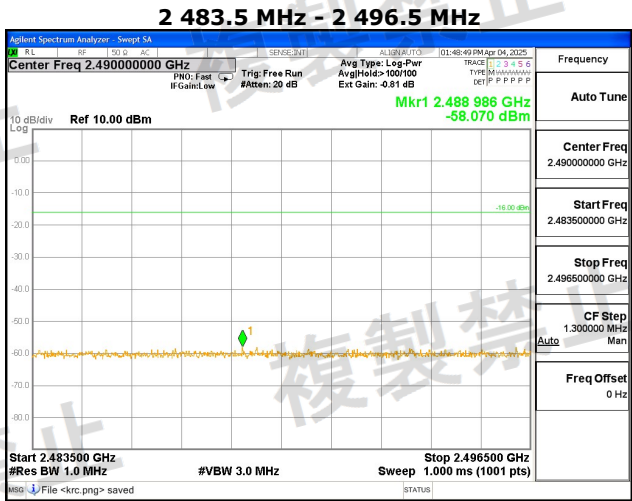
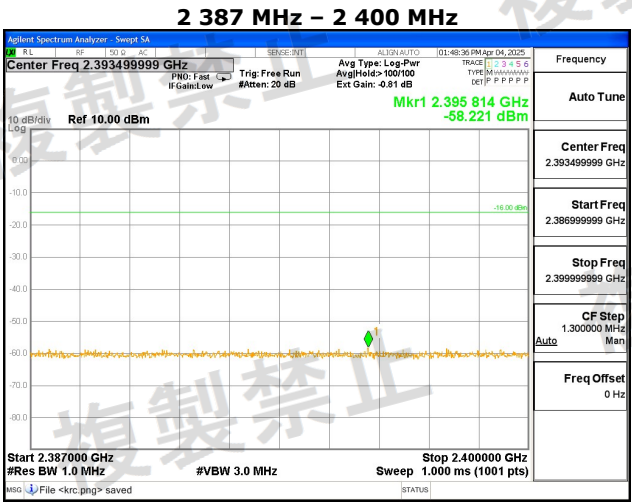
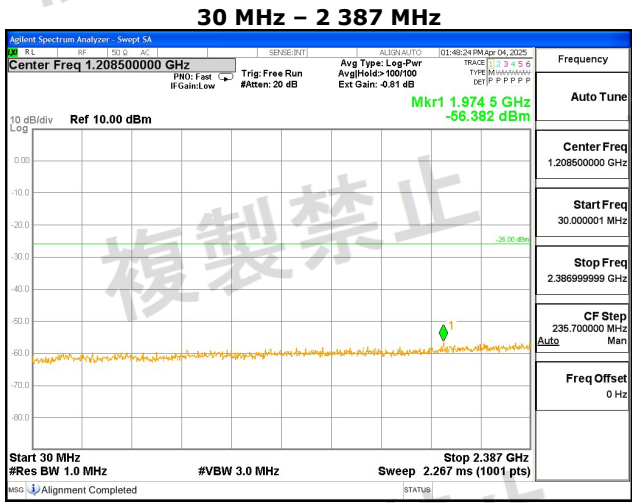
2 483.5 MHz - 2 496.5 MHz



2 496.5 MHz – 12 500 MHz



Ch.39: 2 440 MHz





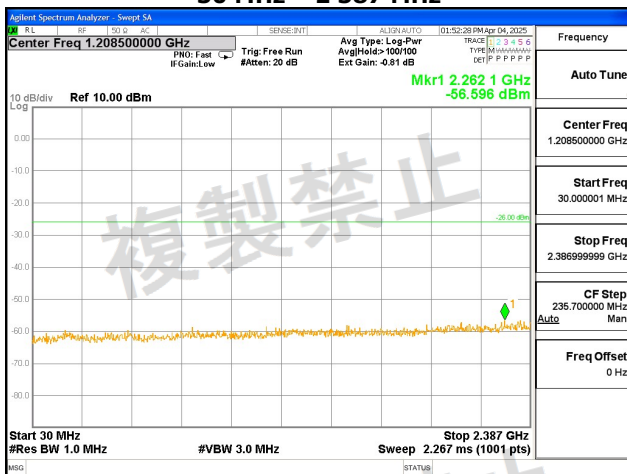
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(Ho-dong), 113, Yejik-ro, Cheoin-gu, Yongin-si,
Gyeonggi-do, 17142, Korea
Tel: +82-31-339-9970
Fax: +82-31-624-9501

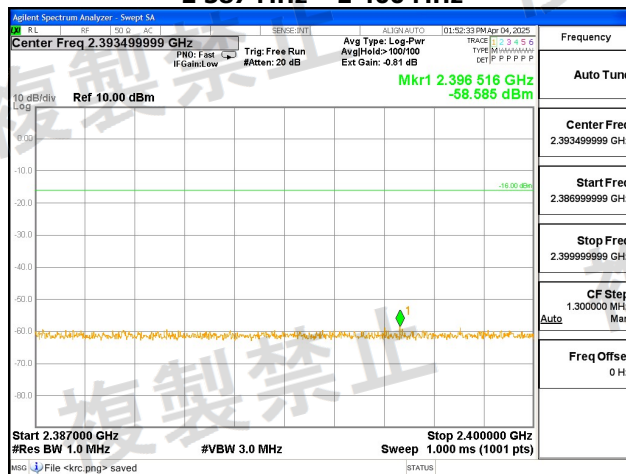
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Ch.79: 2 480 MHz

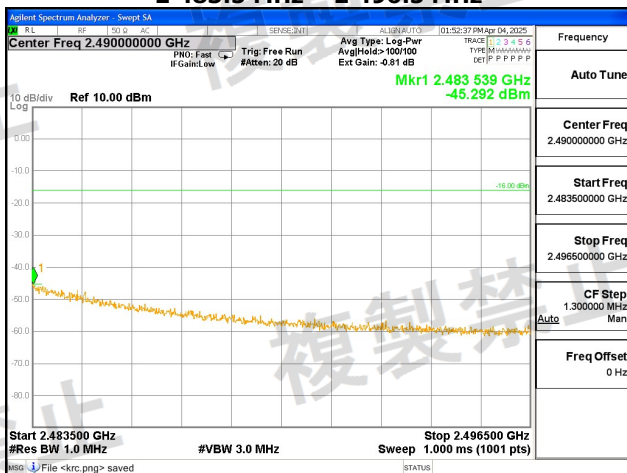
30 MHz – 2 387 MHz



2 387 MHz – 2 400 MHz



2 483.5 MHz – 2 496.5 MHz



2 496.5 MHz - 12 500 MHz

