

TEST REPORT

of

JAPAN MIC

Product: **LANEWATCH ASSIST SYSTEM**
Brand: **E-LEAD**
Main Model: **EL-722-KZ01A**
Series Model: **NA**
Model Difference: **NA**
Applicant: **E-LEAD ELECTRONIC CO., LTD.**
Address: **NO.37 Gungdung 1ST RD., Shengang
Shiang, Changhua, 509, TAIWAN, R.O.C. (Chuan-Hsin
Industrial Park)**

Test Performed by:



International Standards Laboratory Corp. LT Lab.

TEL: +886-3-263-8888 FAX: +886-3-263-8899

No. 120, Lane 180, Hsin Ho Rd., Lung-Tan Dist., Tao Yuan City 325, Taiwan

Report No.: **ISL-25LR0143JP**

Issue Date : **October 28, 2025**



Test results given in this report apply only to the specific sample(s) tested and are traceable to national or international standard through calibration of the equipment and evaluating measurement uncertainty herein. According to customer agreement, the laboratory issues test reports based on the regulations or standards specifications, the measurement uncertainty is not considered in conformity decision rules.

This test report shall not be reproduced except in full, without the written approval of International Standards Laboratory Corp.

VERIFICATION OF COMPLIANCE

Applicant: E-LEAD ELECTRONIC CO., LTD.
Equipment Under Test: LANEWATCH ASSIST SYSTEM
Brand: E-LEAD
Main Model: EL-722-KZ01A
Series Model: NA
Model Difference: NA
Date of Test: September 22, 2025 ~ October 28, 2025
Date of EUT Received: September 22, 2025

APPLICABLE STANDARDS	
STANDARD	TEST RESULT
ARIB STD-T66	Complied

The above equipment was tested by International Standards Laboratory Corp. for compliance with the requirements in the Radio equipment stipulated in the certification ordinance Item 19, Paragraph 1, Article 2. The results of testing in this report apply to the product/system that was tested only. Other similar equipment will not necessarily produce the same results due to production tolerance and measurement uncertainties. The antenna specification is provided by the applicant, and ISL does not bear the relevant responsibility.

Prepared By: Gigi Yeh

Test By: Bill Huang
Bill Huang

Approved By: Jerry Liu
Jerry Liu / Manager

Version

Version No.	Date	Description
00	October 28, 2025	Initial creation of document

TABLE OF CONTENTS

1. Description of Equipment under Test (EUT).....	5
1.1 GENERAL INFORMATION	5
1.2 ANTENNA SPECIFICATION	5
1.3 ASSEMBLE	6
1.4 SUPPORT EQUIPMENT.....	7
2. Description of Test Modes.....	8
3. Standards, reference documents and applicable test methods	9
4. Summary of Test Results.....	10
4.1 ANTENNA POWER AND TOLERANCE.....	11
4.2 FREQUENCY TOLERANCE	21
4.3 OCCUPIED BANDWIDTH	24
4.4 SPREADING BANDWIDTH (90%).....	29
4.5 TRANSMITTER SPURIOUS EMISSIONS	37
4.6 LIMITATION OF COLLATERAL EMISSION OF RECEIVER.....	51
4.7 HOPPING DWELL TIME	56
4.8 ANGULAR WIDTH OF PRINCIPAL RADIATION (AWPR).....	69
4.9 CARRIER SENSE CAPABILITY	76
4.10 INTERFERENCE PREVENTION FUNCTION.....	77
5. Appendix	78
5.1 APPENDIX A: EQUIPMENT LIST	78
5.2 APPENDIX B: UNCERTAINTY OF MEASUREMENT	79
5.3 APPENDIX C: PHOTOGRAPHS OF SETUP.....	80
5.4 APPENDIX D: PHOTOGRAPHS OF EUT	81

1. Description of Equipment under Test (EUT)

1.1 General Information

Product Name:	LANEWATCH ASSIST SYSTEM	
Brand Name:	E-LEAD	
Model Name:	EL-722_KZ01A	
Model Difference:	N/A	
Temperature Range	N/A	
Power Rating:	24VDC	
Bluetooth Information		
Bluetooth Modular:	BR8051	
Bluetooth Version:	V5.2 + EDR	
Frequency Range:	2402– 2480MHz	
Rated Power Density:	0.5 mW/MHz 0.7 mW/MHz for AFH	5mW
Channel number:	79 Channels	40channels
Modulation type:	FHSS	GFSK

1.2 Antenna Specification

	Antenna Type	Brand	Model	Peak Gain	Frequency Range	Connector Type
1	Chip	佳邦科技(股)公司 竹南分公司	ACA-5036-A2-C C-S	3dBi	2400-2500MHz	-----

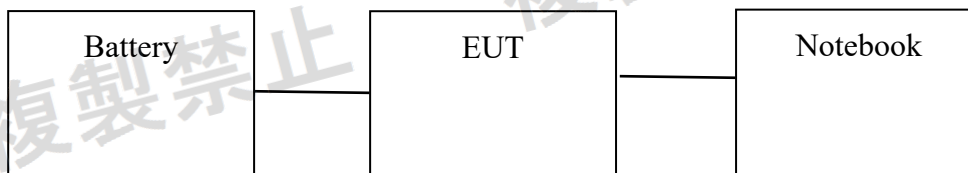
1.3 Assemble

No special screws used, but all the interfaces are attached with aluminum foil stickers. If the aluminum foil stickers are broken, it means that someone has disassembled it.



1.4 Support Equipment

Configuration of Tested System



Equipment Used in Tested System

Item	Equipment	Brand	Model	S/N	Data Cable	Power Cable
1	Battery	YUASA	75D23R-SMF	N/A	N/A	100cm
2	Notebook	Lenovo	F230	N/A	100cm	N/A

2. Description of Test Modes

The EUT has been tested at continuous TX and RX modes. And software was used to control the EUT for staying in above description test modes.

The EUT has 14 channels. Channel low, mid and High with lowest data rate was chosen for testing.

BT

Hopping systems:

If Adaptive Frequency Hopping (AFH) is available, the measurements for the spreading bandwidth and the power output shall be done with the maximum and the minimum amount of available channels (carrier-frequencies)

A software tool or a built-in test-mode needs to be reported with the parameter settings for creating the appropriate selection. The software settings shall be reported because of the traceability requirement of the measurements. The settings are depending upon the IEEE standard & mode and the applied modulation. Most common settings are:

The settings for Bluetooth will be influenced by the throughput and the modulation. Most common settings are:

Bluetooth 2.1: bit rate 1 Mb/s, modulation resp. GFSK (Symbol rate always 1 Mbaud!)

Bluetooth 2.1+EDR: bit rate 2 Mb/s, modulation resp. $\pi/4$ DQPSK

Bluetooth 2.1+EDR: bit rate 3 Mb/s, modulation resp. 8DPSK

Test channels in normal mode (BT)

	TX	RX
Channel Low	2402MHz	2402MHz
Channel Mid	2441MHz	2441MHz
Channel High	2480MHz	2480MHz

Test channels in AFH

	TX
Channel Low	2402MHz
Channel Mid	2441MHz
Channel High	2480MHz

Test channels in BT 4.0 LE mode

	TX
Channel Low	2402MHz
Channel Mid	2442MHz
Channel High	2480MHz

Test conditions

Temperature & humidity	Normal
Normal voltage	24.0 Vdc
Lower extreme voltage	21.6 Vdc
Higher extreme voltage	26.4 Vdc

3. Standards, reference documents and applicable test methods

The EUT According to the Specifications, it must comply with the requirements of the following standards:

Radio equipment stipulated in the certification ordinance Item 19, Paragraph 1, Article 2.

4. Summary of Test Results

Article reference	Parameter	Status (Note 1)
General provisions		
5	Frequency tolerance	C
6	Occupied bandwidth	C
7	Spurious emission	C
Transmitting equipment		
14	Antenna Power	C
14.2	SAR	N/A
15	Frequency stabilization	C
Transmitting equipment		
20	Type configuration etc of transmitting antenna	C
Receiving equipment		
24	Spurious emission of receiver	C
Operating frequency 2400-2483.5MHz		
49.20(1); a	High Frequency/modulation section cannot be operated easily	C
49.20(1); b	Communication method	C
49.20(1); c	Communication method	C
49.20(1); d	Spread Spectrum method	C
49.20(1); e	Antenna Power	C
49.20(1); f(1)	Absolute gain of transmitting antenna	C
49.20(1); f(2)	Angular width of principal radiation (AWPR)	C
49.20(1); g	Number of carriers within 1MHz bandwidth in OFDM	C
49.20(1); h	Diffusion bandwidth	C
49.20(1); i	Spreading factor	C
49.20(1); j	Frequency retention time (FH employed)	C
9.4	Interference Prevention Function	C
Note 1: C=Confirm NC=Not Confirm NT=Not Tested NA= Not Applicable		

4.1 Antenna Power and Tolerance

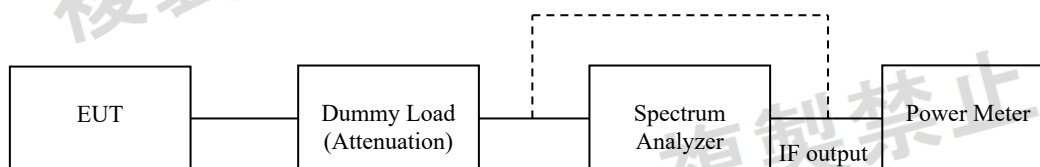
4.1.1 Limit

Modulation Method	Antenna Power Limit	Antenna Power Tolerance
FHSS	3mW/MHz	+20%, No lower limit
DSSS	10mW/MHz	
OFDM (20MHz System)	10mW/MHz	
OFDM (40MHz System)	5mW/MHz	
Other Digital methods	10mW/MHz	

4.1.2 Measurement Equipment Used

Refer to section Appendix A: Equipment List for detail.

4.1.3 Test Setup



Note: A high-frequency power meter is directly connected to the output of a dummy load (attenuator) when measuring the total power of a system other than the orthogonal frequency division multiplexing system or the spread spectrum system using direct spreading.

4.1.4 Test Procedure

1. Condition of measuring instrument

- (1) Measure the equivalent noise bandwidth at the resolution bandwidth of 1 MHz of the spectrum analyzer, correct the bandwidth to the 1 MHz equivalent bandwidth, and read the displayed value. However, when the spread bandwidth is 1 MHz or less, correction shall be performed only when "spread bandwidth (MHz)/equivalent noise bandwidth (MHz)" exceeds 1.
- (2) The attenuation of the dummy load (attenuator) shall be the value that gives the optimum operating input level to the spectrum analyzer.
- (3) Set the spectrum analyzer as follows when searching for the frequency that gives the maximum antenna power.

Center frequency	Test frequency
Sweep frequency width	About twice the occupied frequency bandwidth
Resolution bandwidth	1MHz
Video bandwidth	About three times the resolution bandwidth
Sweep time	Minimum time for guaranteed measurement accuracy (In the case of burst waves, the time at which one or more bursts are included per sample)

Trigger condition	Free run
Sweep mode	Continuous sweep
Detection mode	Positive peak
Display mode	Max hold

- (4) Set the spectrum analyzer as follows when measuring the antenna power.
- | | |
|-----------------------|---|
| Center frequency | The frequency that gives the maximum power (searched frequency) |
| Sweep frequency width | 0Hz |
| Resolution bandwidth | 1MHz |
| Video bandwidth | Same as resolution bandwidth |
| Sweep mode | Continuous sweep |

2. Condition of test equipment

- (1) Set to the test frequency and enter the continuous transmission state or continuous burst transmission state.
- (2) If a spread code is used, set it to the test spread code and modulate it with the standard coded test signal.
- (3) If the orthogonal frequency division multiplexing system is used, it shall be in a burst transmission state and in a modulation state in which the proportion of time in which the number of subcarriers is the smallest is maximized. At this time, it is performed within a range that can occur continuously in the actual operation. However, when the modulation cannot be set, it can be performed in continuous burst transmission state or continuous transmission state.

3. Measurement procedure

- (1) Those using frequency hopping method (including DSSS or composite method with OFDM)
 - a. Confirming in the submitted document that the frequency hopping intervals in the frequency distribution of frequency hopping are equal intervals of 1 MHz or less, and that the probability of occurrence at each hopping frequency is uniform, and that the probability of occurrence at each hopping frequency is uniform. If it is, it is implemented by the following method.
 - (a) Connect a high frequency power meter to the output of the dummy load (attenuator) and measure the total power.
 - (b) Divide the total power by the spreading bandwidth to calculate the average power per 1 MHz.
 - (c) Antenna power shall be as follows.
 - A) Value of (b) for continuous wave
 - B) For burst wave Average power in burst is calculated from the value of (b) and the transmission time rate.
 - b. If the frequency distribution of frequency hopping or the probability of occurrence at each hopping frequency is not uniform, set the spectrum analyzer as in 1(3) to search for the frequency that gives the maximum antenna power, and then perform spectrum analysis. Set the device as in 1(4), and measure the antenna power at the frequency that gives the maximum power.
- (2) In the case of those using OFDM or DSSS
 - a. Set the spectrum analyzer as in 1(3).
 - b. After repeating the sweep until no change is observed in the display, measure the frequency at which the power per 1 MHz gives the maximum value.
 - c. Set the spectrum analyzer as in 1(4).
 - d. Connect the high frequency power meter to the IF output terminal of the spectrum analyzer.
 - e. Antenna power shall be as follows.
 - (a) For continuous wave: The value corrected by 1(1) from the indication of the high-frequency power meter.
 - (b) Burst wave: Calculated average power in a burst from values corrected in the same way as for continuous waves and the transmission time rate.
 - f. In the case of using the orthogonal frequency division multiplexing system, when there are multiple subcarrier modulation systems, measure the antenna power at each time and take the largest value as the measured value.
- (3) In the case of items using other methods
 - a. Connect a high-frequency power meter to the output of the dummy load (attenuator) and measure the total power.
 - b. Antenna power shall be as follows.
 - (a) For continuous wave: The antenna power is the value of a.
 - (b) Burst wave: The average power in the burst is calculated from the value of (a) and the transmission time rate.

4.1.5 Test Results

Ambient temperature: 25°C

Relative humidity: 60%

Test Date: 2025/10/17

Mode:BR

Rated Power Density=0.5 mW/MHz

Antenna Gain=3

		CH Low	CH Mid	CH High	Limit
Normal Voltage 24 V	Conducted Power (dBm/MHz)	5.142	6.75	6.621	N/A
	Conducted Power (mW/MHz)	3.267	4.732	4.593	N/A
	Spreading Bandwidth (MHz)	69.658			N/A
	Duty Cycle	0.326	0.327	0.33	N/A
	Power Density (mW/MHz)	0.144	0.208	0.2	3mW/MHz
	Power Tolerance	-71.196	-58.485	-60.074	+20%
Upper Voltage 26.4V	Conducted Power (dBm/MHz)	5.061	6.719	6.599	N/A
	Conducted Power (mW/MHz)	3.207	4.698	4.57	N/A
	Spreading Bandwidth (MHz)	69.79			N/A
	Duty Cycle	0.326	0.326	0.326	N/A
	Power Density (mW/MHz)	0.141	0.207	0.201	3mW/MHz
	Power Tolerance	-71.781	-58.663	-59.79	+20%
Lower Voltage 21.6 V	Conducted Power (dBm/MHz)	5.016	6.706	6.592	N/A
	Conducted Power (mW/MHz)	3.174	4.684	4.562	N/A
	Spreading Bandwidth (MHz)	69.816			N/A
	Duty Cycle	0.326	0.327	0.33	N/A
	Power Density (mW/MHz)	0.14	0.205	0.198	3mW/MHz
	Power Tolerance	-72.083	-58.997	-60.43	+20%

Remark:

1. Conducted Power (mW/MHz)= $10^{(\text{Conducted Power(dBm/MHz)}/10)}$

2. P (mW/MHz) = Raw power (in mW, measured by power sensor) / [spreading bandwidth (MHz) x duty-cycle]

Mode:EDR1

Rated Power Density=0.5 mW/MHz

Antenna Gain=3

		CH Low	CH Mid	CH High	Limit
Normal Voltage 24 V	Conducted Power (dBm/MHz)	4.611	6.402	6.425	N/A
	Conducted Power (mW/MHz)	2.891	4.367	4.39	N/A
	Spreading Bandwidth (MHz)	69.177			N/A
	Duty Cycle	0.329	0.328	0.329	N/A
	Power Density (mW/MHz)	0.127	0.192	0.193	3mW/MHz
	Power Tolerance	-74.574	-61.508	-61.392	+20%
Upper Voltage 26.4V	Conducted Power (dBm/MHz)	4.609	6.402	6.423	N/A
	Conducted Power (mW/MHz)	2.89	4.367	4.388	N/A
	Spreading Bandwidth (MHz)	71.154			N/A
	Duty Cycle	0.329	0.328	0.329	N/A
	Power Density (mW/MHz)	0.124	0.187	0.188	3mW/MHz
	Power Tolerance	-75.292	-62.577	-62.482	+20%
Lower Voltage 21.6 V	Conducted Power (dBm/MHz)	4.603	6.393	6.419	N/A
	Conducted Power (mW/MHz)	2.886	4.358	4.384	N/A
	Spreading Bandwidth (MHz)	70.196			N/A
	Duty Cycle	0.329	0.328	0.329	N/A
	Power Density (mW/MHz)	0.125	0.189	0.19	3mW/MHz
	Power Tolerance	-74.989	-62.145	-62.005	+20%

Remark:

1. Conducted Power (mW/MHz)= $10^{(\text{Conducted Power(dBm/MHz)}/10)}$
2. P (mW/MHz) = Raw power (in mW, measured by power sensor) / [spreading bandwidth (MHz) x duty-cycle]

Mode:EDR2

Rated Power Density=0.5 mW/MHz

Antenna Gain=3

		CH Low	CH Mid	CH High	Limit
Normal Voltage 24 V	Conducted Power (dBm/MHz)	4.584	6.362	6.414	N/A
	Conducted Power (mW/MHz)	2.873	4.327	4.379	N/A
	Spreading Bandwidth (MHz)	69.925			N/A
	Duty Cycle	0.33	0.327	0.327	N/A
	Power Density (mW/MHz)	0.125	0.189	0.191	3mW/MHz
	Power Tolerance	-75.059	-62.178	-61.723	+20%
Upper Voltage 26.4V	Conducted Power (dBm/MHz)	4.601	6.364	6.406	N/A
	Conducted Power (mW/MHz)	2.885	4.329	4.371	N/A
	Spreading Bandwidth (MHz)	70.081			N/A
	Duty Cycle	0.33	0.327	0.327	N/A
	Power Density (mW/MHz)	0.125	0.189	0.191	3mW/MHz
	Power Tolerance	-75.017	-62.245	-61.878	+20%
Lower Voltage 21.6 V	Conducted Power (dBm/MHz)	4.584	6.362	6.409	N/A
	Conducted Power (mW/MHz)	2.873	4.327	4.374	N/A
	Spreading Bandwidth (MHz)	69.733			N/A
	Duty Cycle	0.33	0.327	0.327	N/A
	Power Density (mW/MHz)	0.125	0.19	0.192	3mW/MHz
	Power Tolerance	-74.99	-62.074	-61.661	+20%

Remark:

1. Conducted Power (mW/MHz)= $10^{(\text{Conducted Power(dBm/MHz)}/10)}$

2. P (mW/MHz) = Raw power (in mW, measured by power sensor) / [spreading bandwidth (MHz) x duty-cycle]

Mode:AFH BR

Rated Power Density=0.7 mW/MHz

Antenna Gain=3

		CH Low	CH Mid	CH High	Limit
Normal Voltage 24 V	Conducted Power (dBm/MHz)	5	6.35	6.221	N/A
	Conducted Power (mW/MHz)	3.162	4.315	4.189	N/A
	Spreading Bandwidth (MHz)	18.856			N/A
	Duty Cycle	0.326	0.327	0.33	N/A
	Power Density (mW/MHz)	0.515	0.699	0.673	3mW/MHz
	Power Tolerance	-26.437	-0.091	-3.915	+20%
Upper Voltage 26.4V	Conducted Power (dBm/MHz)	4.87	6.119	6.099	N/A
	Conducted Power (mW/MHz)	3.069	4.092	4.073	N/A
	Spreading Bandwidth (MHz)	18.875			N/A
	Duty Cycle	0.326	0.327	0.33	N/A
	Power Density (mW/MHz)	0.499	0.662	0.653	3mW/MHz
	Power Tolerance	-28.679	-5.363	-6.672	+20%
Lower Voltage 21.6 V	Conducted Power (dBm/MHz)	4.716	6.106	6.092	N/A
	Conducted Power (mW/MHz)	2.962	4.079	4.066	N/A
	Spreading Bandwidth (MHz)	18.895			N/A
	Duty Cycle	0.326	0.327	0.33	N/A
	Power Density (mW/MHz)	0.481	0.66	0.652	3mW/MHz
	Power Tolerance	-31.237	-5.746	-6.921	+20%

Remark:

1. Conducted Power (mW/MHz)= $10^{(\text{Conducted Power(dBm/MHz)}/10)}$

2. P (mW/MHz) = Raw power (in mW, measured by power sensor) / [spreading bandwidth (MHz) x duty-cycle]

Mode:AFH EDR1

Rated Power Density=0.7 mW/MHz

Antenna Gain=3

		CH Low	CH Mid	CH High	Limit
Normal Voltage 24 V	Conducted Power (dBm/MHz)	4.511	6.302	6.325	N/A
	Conducted Power (mW/MHz)	2.826	4.268	4.29	N/A
	Spreading Bandwidth (MHz)	19.078			N/A
	Duty Cycle	0.329	0.328	0.329	N/A
	Power Density (mW/MHz)	0.45	0.682	0.684	3mW/MHz
	Power Tolerance	-35.644	-2.573	-2.279	+20%
Upper Voltage 26.4V	Conducted Power (dBm/MHz)	4.77	6.019	6.099	N/A
	Conducted Power (mW/MHz)	2.999	3.999	4.073	N/A
	Spreading Bandwidth (MHz)	18.986			N/A
	Duty Cycle	0.329	0.328	0.329	N/A
	Power Density (mW/MHz)	0.48	0.642	0.653	3mW/MHz
	Power Tolerance	-31.358	-8.276	-6.784	+20%
Lower Voltage 21.6 V	Conducted Power (dBm/MHz)	4.616	6.006	6.092	N/A
	Conducted Power (mW/MHz)	2.895	3.987	4.066	N/A
	Spreading Bandwidth (MHz)	19.053			N/A
	Duty Cycle	0.329	0.328	0.329	N/A
	Power Density (mW/MHz)	0.462	0.638	0.649	3mW/MHz
	Power Tolerance	-33.985	-8.877	-7.266	+20%

Remark:

1. Conducted Power (mW/MHz)= $10^{(\text{Conducted Power(dBm/MHz)}/10)}$

2. P (mW/MHz) = Raw power (in mW, measured by power sensor) / [spreading bandwidth (MHz) x duty-cycle]

Mode:AFH EDR2

Rated Power Density=0.7 mW/MHz

Antenna Gain=3

		CH Low	CH Mid	CH High	Limit
Normal Voltage 24 V	Conducted Power (dBm/MHz)	4.384	6.162	6.214	N/A
	Conducted Power (mW/MHz)	2.744	4.132	4.182	N/A
	Spreading Bandwidth (MHz)	19.107			N/A
	Duty Cycle	0.33	0.327	0.327	N/A
	Power Density (mW/MHz)	0.436	0.661	0.669	3mW/MHz
	Power Tolerance	-37.736	-5.58	-4.443	+20%
Upper Voltage 26.4V	Conducted Power (dBm/MHz)	4.401	6.264	6.306	N/A
	Conducted Power (mW/MHz)	2.755	4.231	4.272	N/A
	Spreading Bandwidth (MHz)	18.974			N/A
	Duty Cycle	0.33	0.327	0.327	N/A
	Power Density (mW/MHz)	0.441	0.681	0.688	3mW/MHz
	Power Tolerance	-37.054	-2.659	-1.713	+20%
Lower Voltage 21.6V	Conducted Power (dBm/MHz)	4.384	6.262	6.309	N/A
	Conducted Power (mW/MHz)	2.744	4.229	4.275	N/A
	Spreading Bandwidth (MHz)	18.793			N/A
	Duty Cycle	0.33	0.327	0.327	N/A
	Power Density (mW/MHz)	0.443	0.688	0.695	3mW/MHz
	Power Tolerance	-36.696	-1.767	-0.698	+20%

Remark:

1. Conducted Power (mW/MHz)= $10^{(\text{Conducted Power(dBm/MHz)}/10)}$

2. P (mW/MHz) = Raw power (in mW, measured by power sensor) / [spreading bandwidth (MHz) x duty-cycle]

BLE

Rated Power =5 mW

Antenna Gain=3

		Channel Low	Channel Mid	Channel High	Limit
Normal Voltage 24 V	Conducted Power (dBm)	4.65	6.387	6.315	N/A
	Conducted Power (mW)	2.917	4.352	4.281	10mW
	Power Tolerance	-41.651	-12.958	-14.389	+20%
Upper Voltage 26.4V	Conducted Power (dBm)	4.581	6.368	6.333	N/A
	Conducted Power (mW)	2.871	4.333	4.298	10mW
	Power Tolerance	-42.571	-13.338	-14.033	+20%
Lower Voltage 21.6V	Conducted Power (dBm)	4.584	6.359	6.336	N/A
	Conducted Power (mW)	2.873	4.324	4.301	10mW
	Power Tolerance	-42.531	-13.517	-13.974	+20%

Remark:

1. Conducted Power (mW/MHz)= $10^{(\text{Conducted Power(dBm/MHz)}/10)}$

2. P (mW/MHz) = Raw power (in mW, measured by power sensor) / [spreading bandwidth (MHz) x duty-cycle]

4.2 Frequency Tolerance

4.2.1 Limit:

50ppm

4.2.2 Measurement Equipment Used

Refer to section Appendix A: Equipment List for detail.

4.2.3 Test Setup

Refer to section 4.1.3 for detail.

4.2.4 Test Procedure

1. Set the EUT modulation off.
2. Set the ETU operates at channel low, mid and high and normal voltage.
3. Set the spectrum analyzer RBW = 300Hz, VBW=300Hz and Span = 20kHz
4. Max hold, View, Peak High, Mark and snap the screen and record the mark.
5. Varied input voltage to + 10% and - 10% normal voltage and repeat procedure 1 to 4 again.

4.2.5 Test Results

Ambient temperature: 25°C

Relative humidity: 60%

Test Date: 2025/10/17

Mode:BR

		Channel Low	Channel Mid	Channel High	Limit
Normal Voltage 24 V	Measured Frequency (MHz)	2401.986	2440.985	2479.984	±50ppm
	Frequency Tolerance (ppm)	-5.745	-6.309	-6.613	
Upper Voltage 26.4V	Measured Frequency (MHz)	2401.986	2440.984	2479.983	±50ppm
	Frequency Tolerance (ppm)	-5.912	-6.555	-6.694	
Lower Voltage 21.6 V	Measured Frequency (MHz)	2401.985	2440.984	2479.983	±50ppm
	Frequency Tolerance (ppm)	-6.328	-6.555	-6.774	

Mode:EDR1

		Channel Low	Channel Mid	Channel High	Limit
Normal Voltage 24 V	Measured Frequency (MHz)	2401.982	2440.981	2479.98	±50ppm
	Frequency Tolerance (ppm)	-7.66	-7.866	-7.903	
Upper Voltage 26.4V	Measured Frequency (MHz)	2401.981	2440.981	2479.98	±50ppm
	Frequency Tolerance (ppm)	-7.827	-7.866	-7.984	
Lower Voltage 21.6 V	Measured Frequency (MHz)	2401.981	2440.981	2479.98	±50ppm
	Frequency Tolerance (ppm)	-7.91	-7.948	-7.984	

Mode:EDR2

		Channel Low	Channel Mid	Channel High	Limit
Normal Voltage 24 V	Measured Frequency (MHz)	2401.981	2440.981	2479.98	+-50ppm
	Frequency Tolerance (ppm)	-7.744	-7.866	-7.984	
Upper Voltage 26.4V	Measured Frequency (MHz)	2401.981	2440.981	2479.98	+-50ppm
	Frequency Tolerance (ppm)	-7.91	-7.948	-7.984	
Lower Voltage 21.6 V	Measured Frequency (MHz)	2401.981	2440.981	2479.98	+-50ppm
	Frequency Tolerance (ppm)	-7.91	-7.948	-7.984	

BLE

		Channel Low	Channel Mid	Channel High	Limit
Normal Voltage 24 V	Measured Frequency (MHz)	2401.984	2441.983	2479.982	+/-50ppm
	Frequency Tolerance (ppm)	-6.661	-7.043	-7.177	
Upper Voltage 26.4V	Measured Frequency (MHz)	2401.983	2441.982	2479.982	+/-50ppm
	Frequency Tolerance (ppm)	-6.994	-7.207	-7.258	
Lower Voltage 21.6 V	Measured Frequency (MHz)	2401.983	2441.982	2479.982	+/-50ppm
	Frequency Tolerance (ppm)	-6.994	-7.207	-7.258	

4.3 Occupied Bandwidth

4.3.1 Limit

Modulation Method	OBW Limit
FHSS	< 83.5MHz
DSSS	< 26MHz
OFDM (20MHz System)	< 26MHz
OFDM (40MHz System)	26MHz - 40MHz
Other Digital methods	< 26MHz

4.3.2 Measurement Equipment Used

Refer to section Appendix A: Equipment List for detail.

4.3.3 Test Setup

Refer to section 4.1.3 for detail.

4.3.4 Test Procedure:

1. Set the EUT modulation on.
2. Set the ETU operate at channel low, mid and high and normal voltage.
3. Set the spectrum analyzer RBW = 300kHz, VBW= 300kHz
4. Set span large enough to capture all products of the modulation process.
5. Turn on 99% spectrum OBW function on, Max hold, View, and snap the screen and record the mark.
6. Varied input voltage to + 10% and - 10% normal voltage and repeat procedure 1 to 4 again.

4.3.5 Test Result

Ambient temperature: 25°C

Relative humidity: 60%

Test Date: 2025/10/17

Mode:BR

	99% BandwidthNA	Limit(MHz)	Remark
Normal Voltage 24 V	77.432	<83.5	PASS
Upper Voltage 26.4V	78.051	<83.5	PASS
Lower Voltage 21.6 V	78.097	<83.5	PASS

Mode:EDR1

	99% Bandwidth(MHz)	Limit(MHz)	Remark
Normal Voltage 24 V	78.296	<83.5	PASS
Upper Voltage 26.4V	77.979	<83.5	PASS
Lower Voltage 21.6 V	78.417	<83.5	PASS

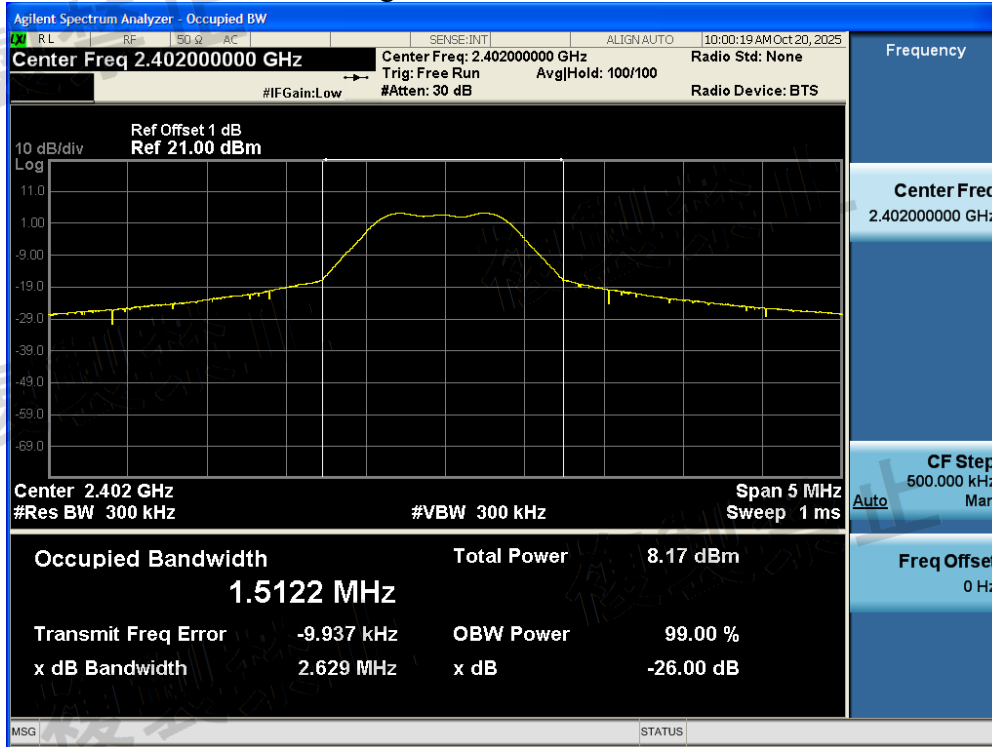
Mode:EDR2

	99% Bandwidth(MHz)	Limit(MHz)	Remark
Normal Voltage 24 V	78.343	<83.5	PASS
Upper Voltage 26.4V	78.014	<83.5	PASS
Lower Voltage 21.6 V	77.843	<83.5	PASS

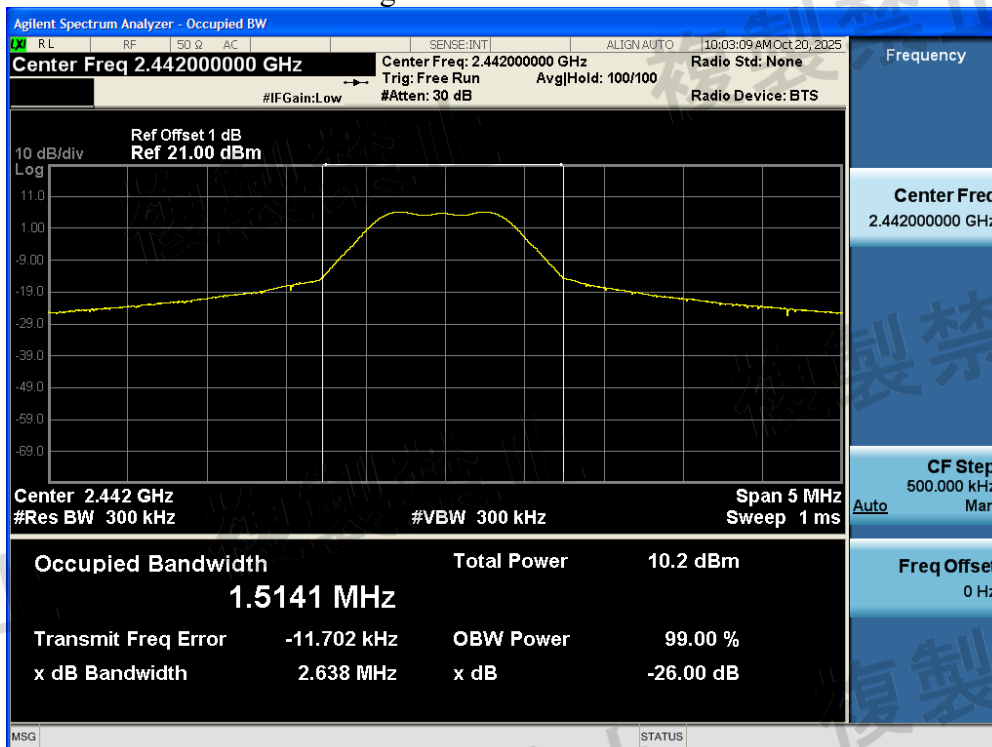
BLE

	Low channel (MHz)	Mid channel (MHz)	High channel (MHz)	Limit	Remark
Normal Voltage 24 V	1.512	1.514	1.509	<26MHz	PASS
Upper Voltage 26.4V	1.519	1.516	1.508	<26MHz	PASS
Lower Voltage 21.6 V	1.52	1.513	1.508	<26MHz	PASS

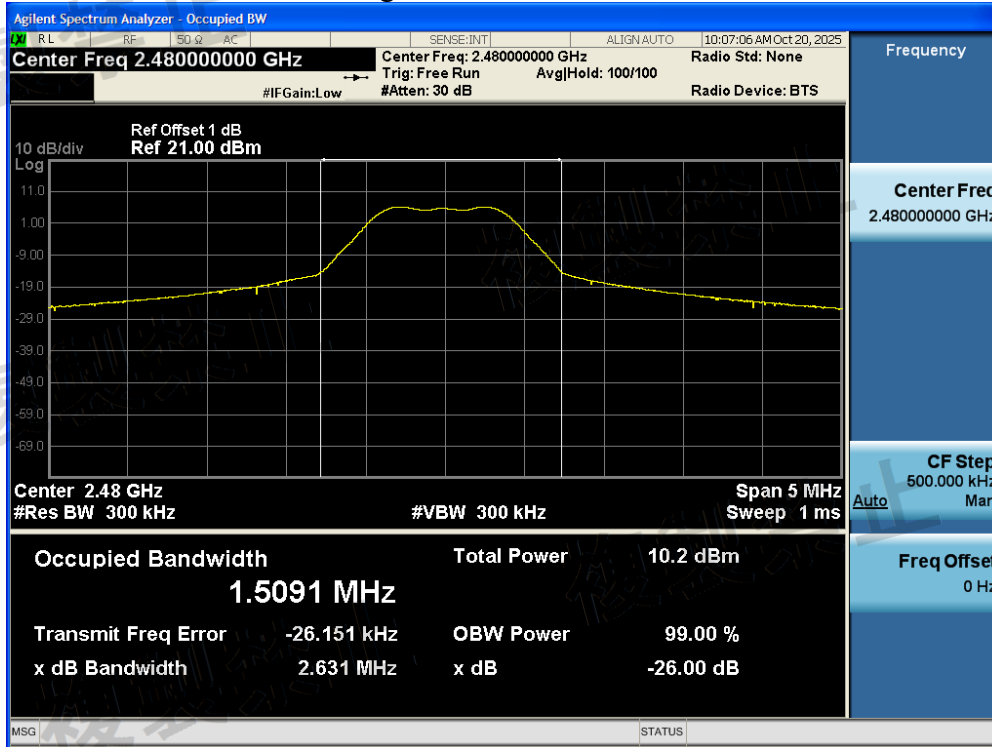
Test Data: BLE\2402MHz Normal Voltage



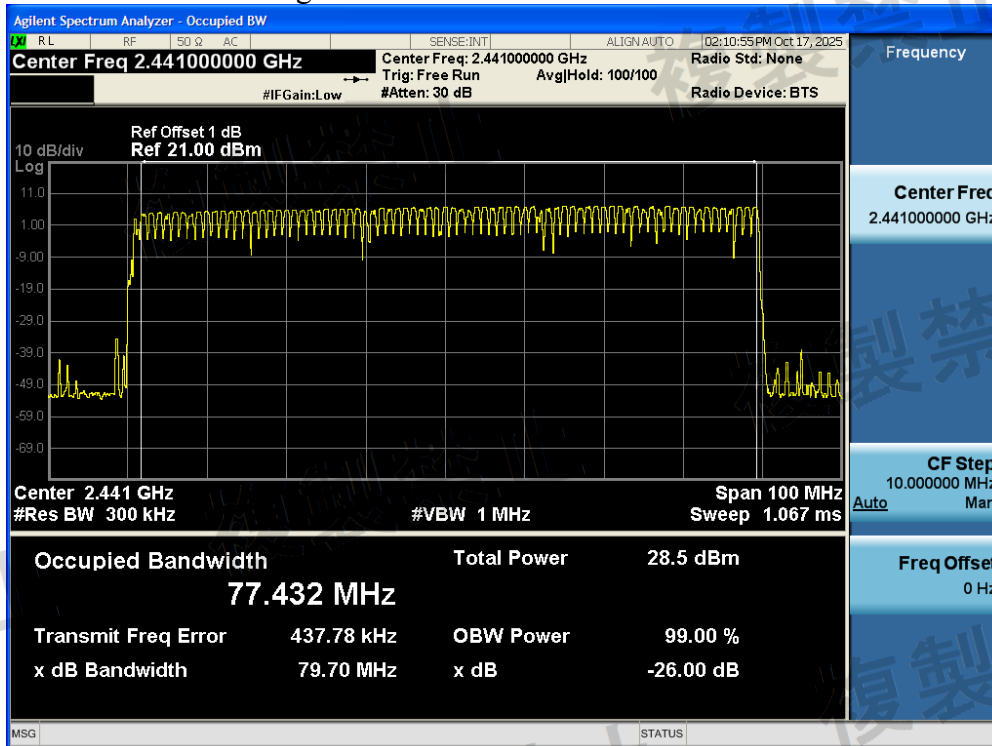
Test Data: BLE\2442MHz Normal Voltage



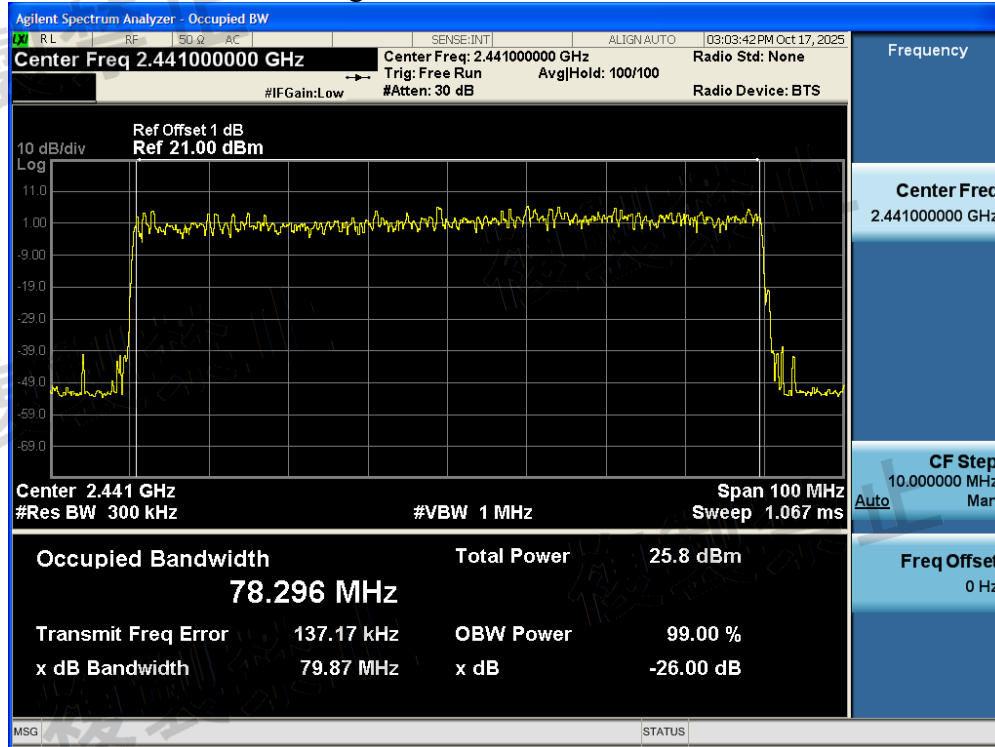
Test Data: BLE\2480MHz Normal Voltage



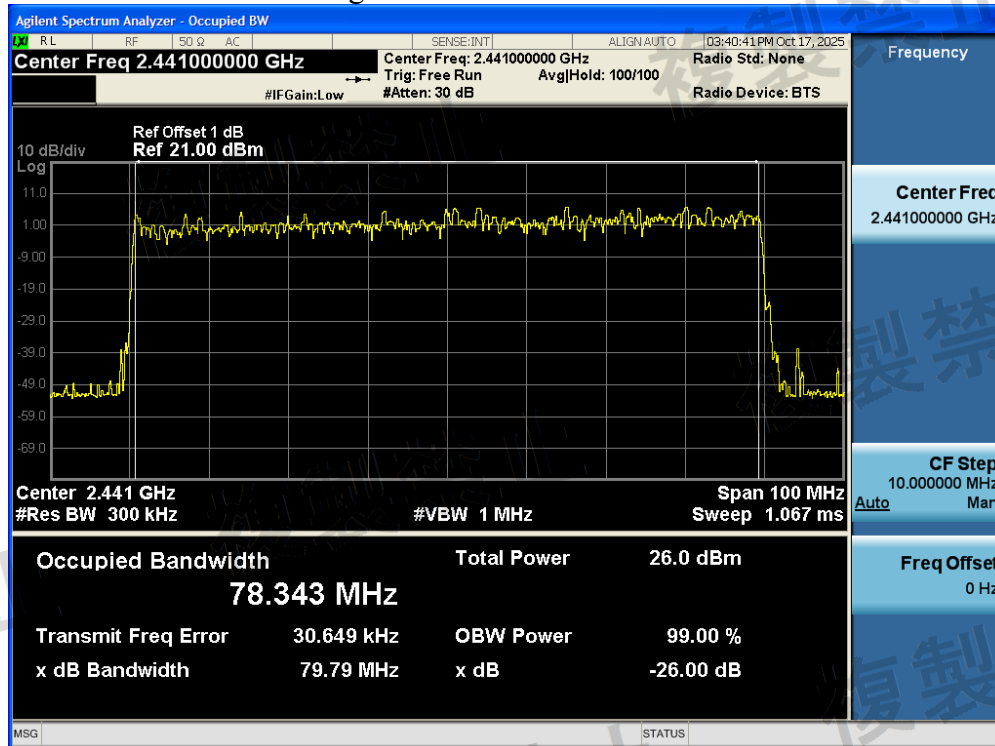
Test Data: BT\BDR Normal Voltage



Test Data: BT\EDR 2M Normal Voltage



Test Data: BT\EDR 3M Normal Voltage



4.4 Spreading Bandwidth (90%)

4.4.1 Limit

> 500kHz

Spread Factor: 1~13ch>5, 14ch >10

4.4.2 Measurement Equipment Used

Refer to section Appendix A: Equipment List for detail.

4.4.3 Test Setup

Refer to section 4.1.3 for detail.

4.4.4 Test Procedure

1. Set the EUT modulation on.
2. Set the ETU operate at channel low, mid and high and normal voltage.
3. Set the spectrum analyzer RBW = 300kHz, VBW= 300kHz, and Set span large enough to capture all products of the modulation process.
4. Turn on 90% spectrum OBW function, Max hold, View, and snap the screen and record the mark.
5. Varied input voltage to + 10% and - 10% normal voltage and repeat procedure 1 to 4 again.

4.4.5 Test Results

Ambient temperature: 25°C

Relative humidity: 60%

Test Date: 2025/10/17

Mode:BDR

	90% Bandwidth (MHz)	Limit(KHz)	Remark
Normal Voltage 24 V	69.658	> 500	PASS
Upper Voltage 26.4V	69.79	> 500	PASS
Lower Voltage 21.6 V	69.816	>500	PASS

Mode:EDR 2M

	90% Bandwidth (MHz)	Limit(KHz)	Remark
Normal Voltage 24 V	69.177	> 500	PASS
Upper Voltage 26.4V	71.154	> 500	PASS
Lower Voltage 21.6 V	70.196	> 500	PASS

Mode:EDR 3M

	90% Bandwidth (MHz)	Limit(KHz)	Remark
Normal Voltage 24 V	69.925	> 500	PASS
Upper Voltage 26.4V	70.081	> 500	PASS
Lower Voltage 21.6 V	69.733	> 500	PASS

Mode:AFH BR

	90% Bandwidth (MHz)	Limit(KHz)	Remark
Normal Voltage 24 V	18.856	> 500	PASS
Upper Voltage 26.4V	18.875	> 500	PASS
Lower Voltage 21.6 V	18.895	> 500	PASS

Mode:AFH EDR1

	90% Bandwidth (MHz)	Limit(KHz)	Remark
Normal Voltage 24 V	19.078	> 500	PASS
Upper Voltage 26.4V	18.986	> 500	PASS
Lower Voltage 21.6 V	19.053	> 500	PASS

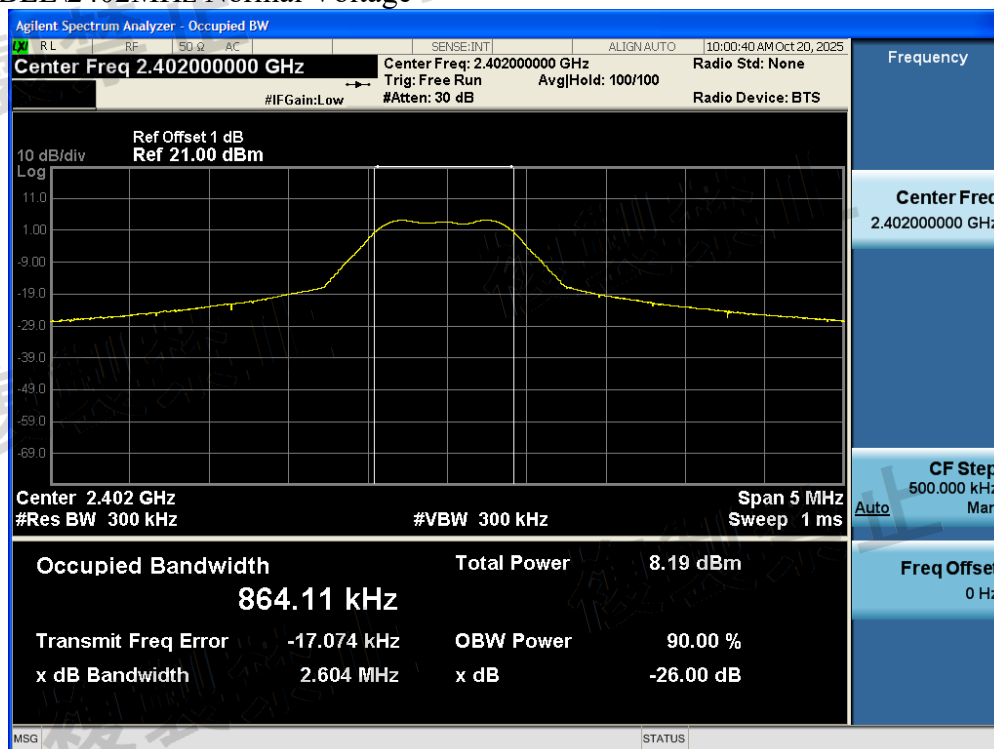
AFH Mode:EDR2

	90% Bandwidth (MHz)	Limit(KHz)	Remark
Normal Voltage 24 V	19.107	> 500	PASS
Upper Voltage 26.4V	18.974	> 500	PASS
Lower Voltage 21.6 V	18.793	> 500	PASS

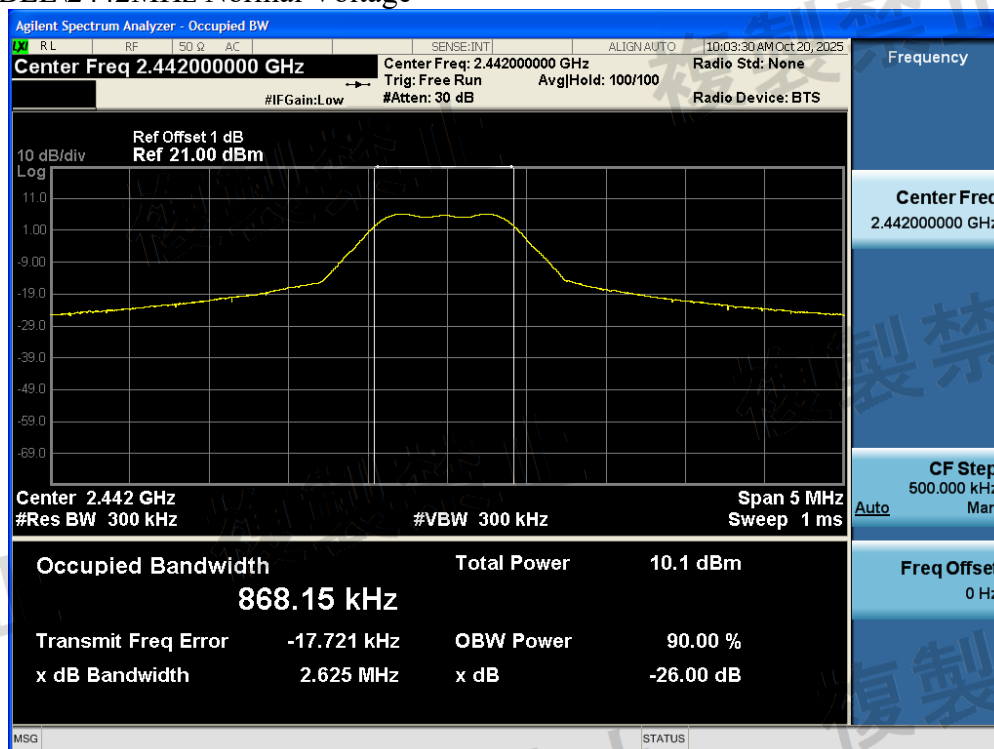
BLE

	Low channel (MHz)	Mid channel (MHz)	High channel (MHz)	Limit (KHz)	Remark
Normal Voltage 24 V	0.864	0.868	0.868	>500	PASS
Upper Voltage 26.4V	0.864	0.868	0.868	>500	PASS
Lower Voltage 21.6 V	0.864	0.868	0.868	>500	PASS

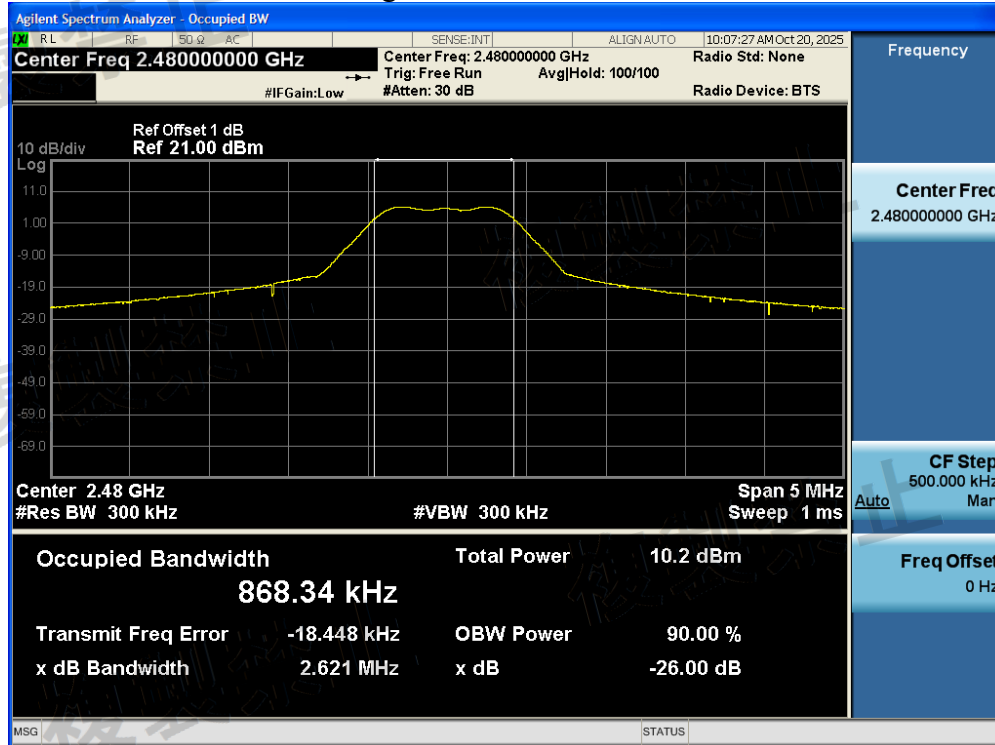
Test Data: BLE\2402MHz Normal Voltage



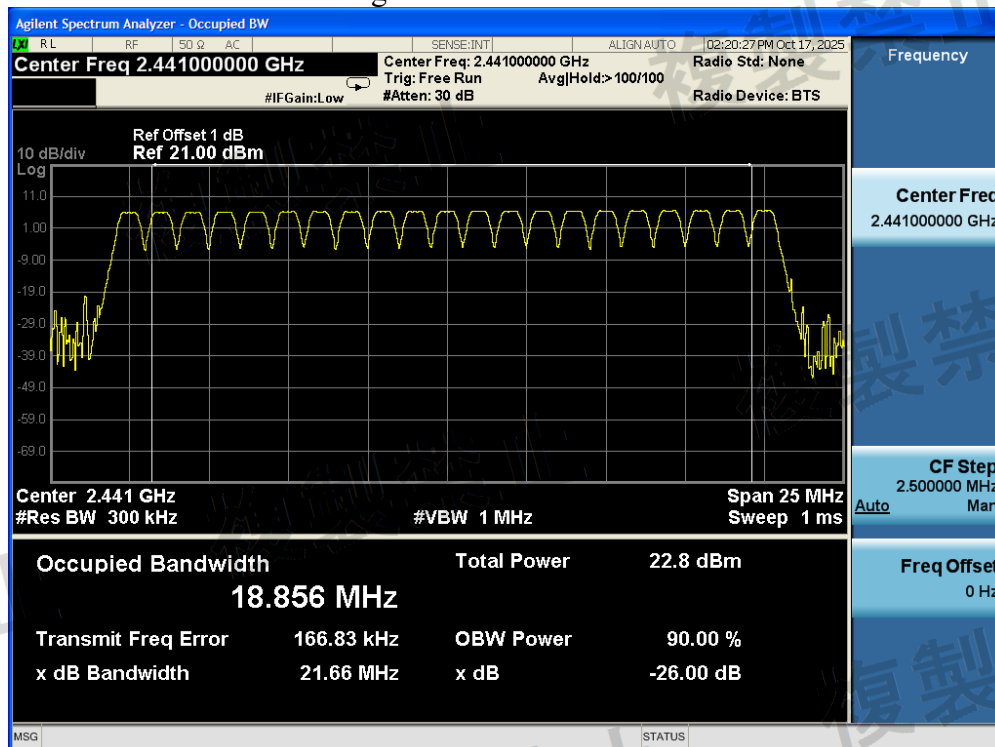
Test Data: BLE\2442MHz Normal Voltage



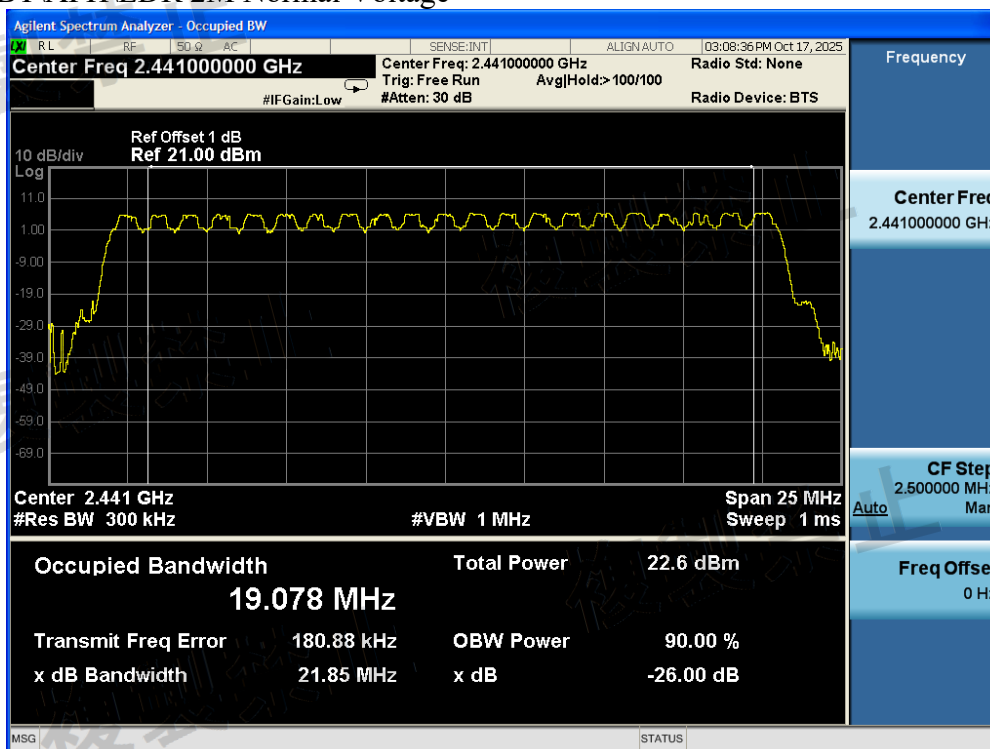
Test Data: BLE\2480MHz Normal Voltage



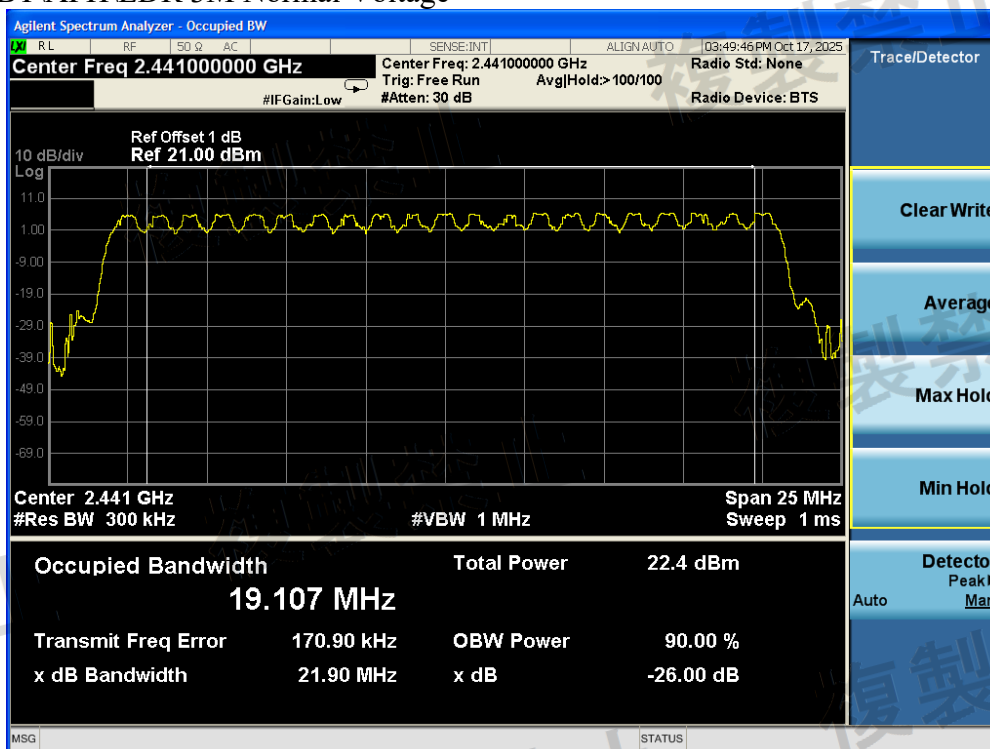
Test Data: BT\AFH\BDR Normal Voltage



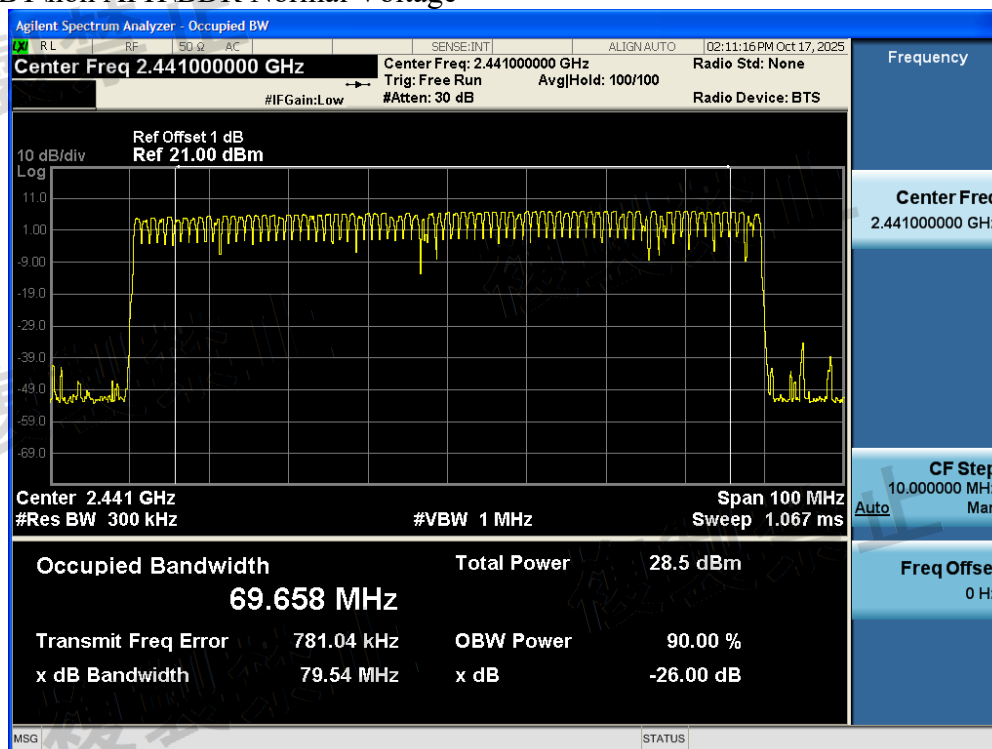
Test Data: BT\AFH\EDR 2M Normal Voltage



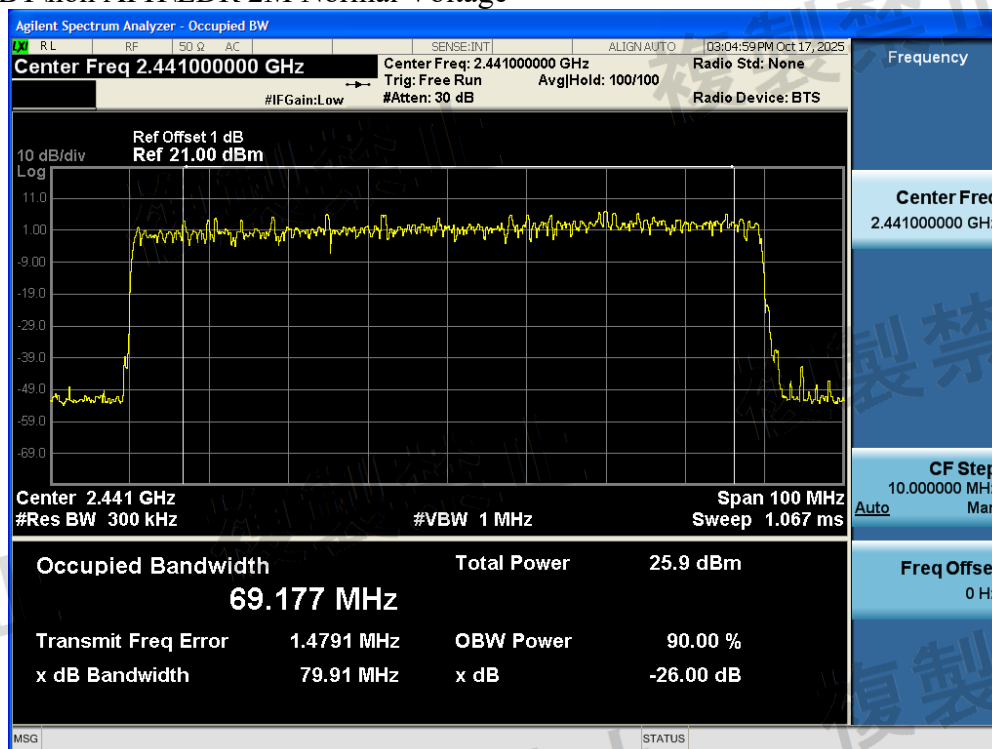
Test Data: BT\AFH\EDR 3M Normal Voltage



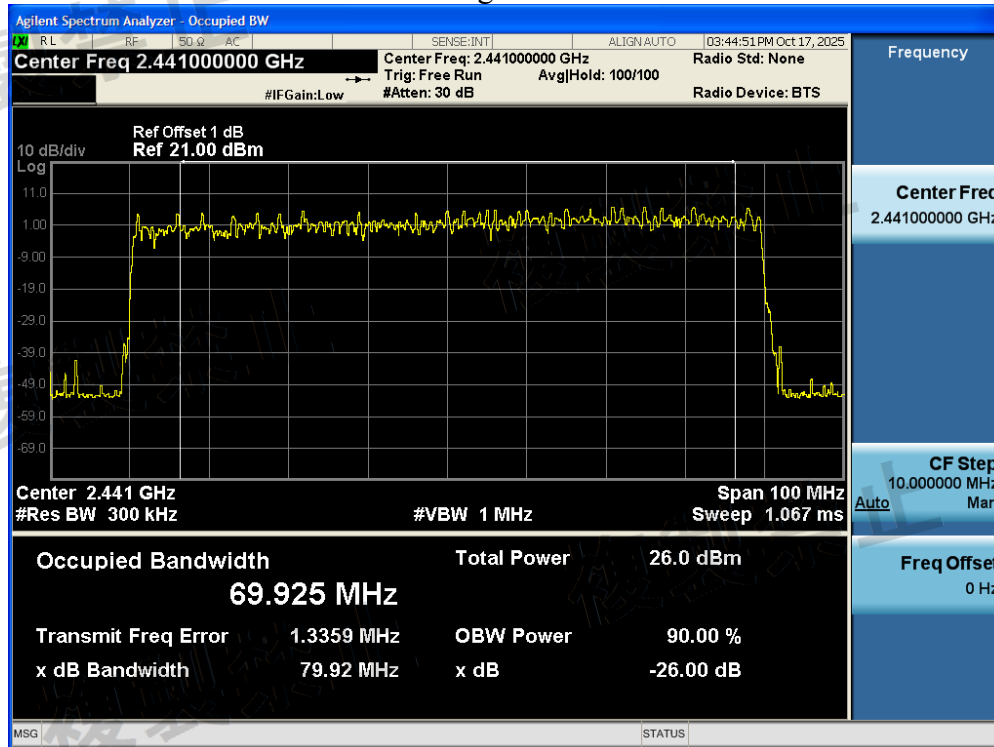
Test Data: BT\non AFH\BDR Normal Voltage



Test Data: BT\non AFH\EDR 2M Normal Voltage



Test Data: BT\non AFH\EDR 3M Normal Voltage



4.5 Transmitter Spurious Emissions

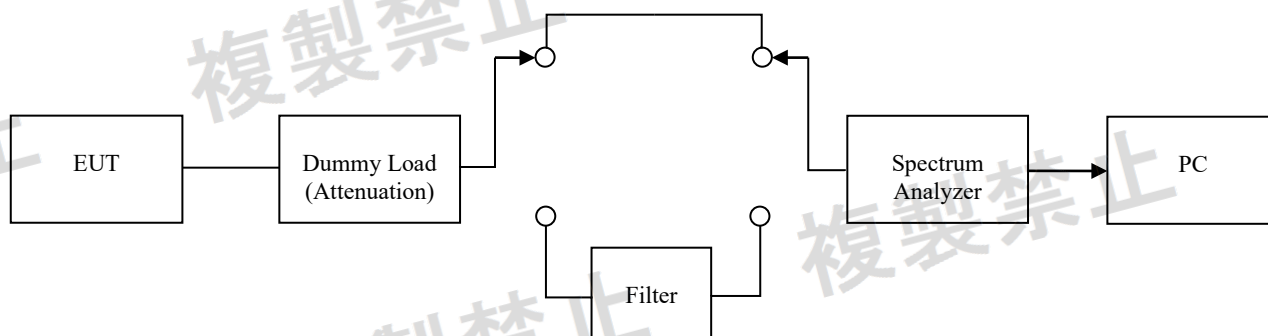
4.5.1 Limit

Frequency Range	Limit
30MHz – 2387MHz	$\leq 2.5\mu\text{W}$
2387MHz – 2400MHz	$\leq 25\mu\text{W}$
2483.5MHz – 2496.5MHz	$\leq 25\mu\text{W}$
2496.5MHz – 12.5GHz	$\leq 2.5\mu\text{W}$

4.5.2 Measurement Equipment Used

Refer to section Appendix A: Equipment List for detail.

4.5.3 Test Setup



4.5.4 Test Procedure

1. Use a carrier suppression filter as necessary.

2. Spectrum Analyzer Setting:

(1) Set the spectrum analyzer as follows when searching.

Sweep frequency width	Search for spurious from the lowest possible frequency to three times or more of the carrier frequency.
Resolution bandwidth	100kHz (for $f < 1\text{GHz}$) 1MHz (for $f \geq 1\text{GHz}$)
Video bandwidth	Same as resolution bandwidth
Y-axis scale	10dB/Div
Input level	Maximum dynamic range value
Sweep Time	Minimum time for guaranteed measurement accuracy
Number of data points	400 or more data points
Sweep mode	Single sweep
Detection mode	Positive peak

(2) Set the spectrum analyzer for spurious measurement as follows

Center frequency	Searched spurious frequency
Sweep frequency width	0Hz
Resolution bandwidth	10kHz (for $f < 30\text{MHz}$) 100kHz (for $30\text{MHz} \leq f < 1\text{GHz}$) 1MHz (for $f \geq 1\text{GHz}$)
Video bandwidth	Same as resolution bandwidth
Y-axis scale	10dB/Div
Input level	Set the amplitude of the carrier wave near the maximum in the linear region of the mixer.
Sweep time	Minimum time for guaranteed measurement accuracy
Sweep mode	Single sweep
Detection mode	Sample

3. Set the spectrum analyzer to 2(1) and sweep to search for spurious.

4. If the searched spurious signal satisfies the standard value, the measurement of 2(2) is not performed, and the obtained amplitude value is used as the measured value.

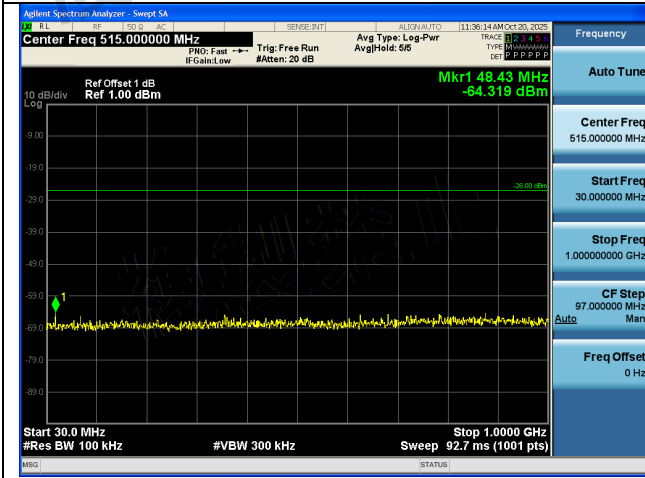
5. If the amplitude value of the searched spurious exceeds the standard value, in order to increase the frequency accuracy of the spectrum analyzer, narrow the sweep frequency to 10 MHz and then 1 MHz to obtain the spurious frequency accurately. Next, set the spectrum analyzer to 2(2) above, and find the average value of the spurious amplitude to use as the measured value.

The worst data was recorded.

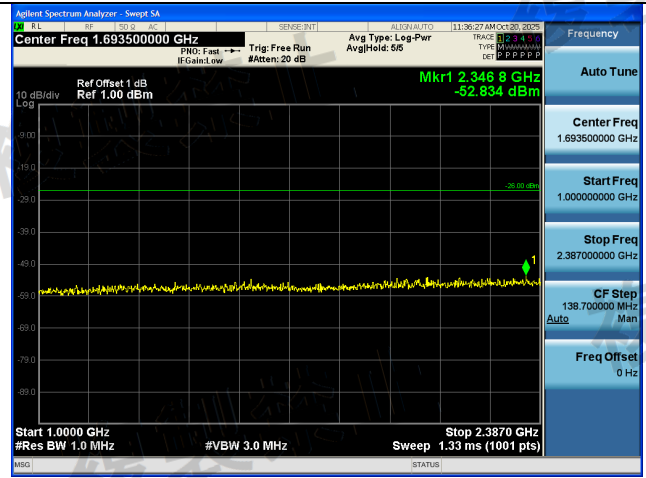
4.5.5 Test Results

Test Data: BLE\2402MHz

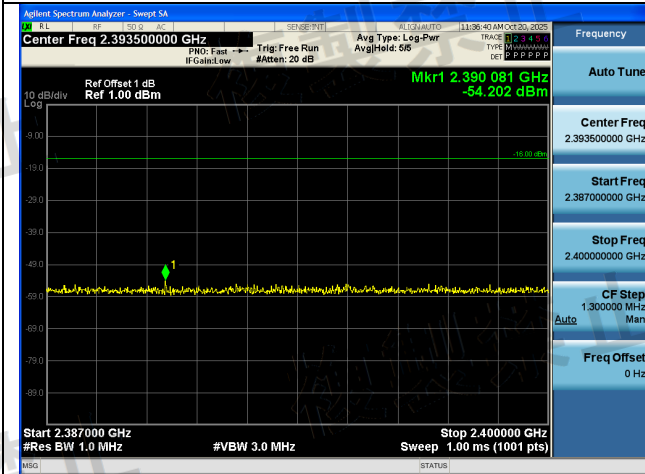
10MHz – 1000MHz



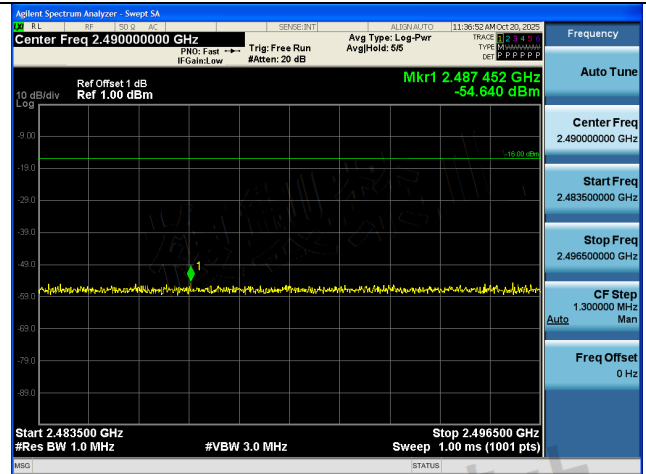
1000MHz – 2387MHz



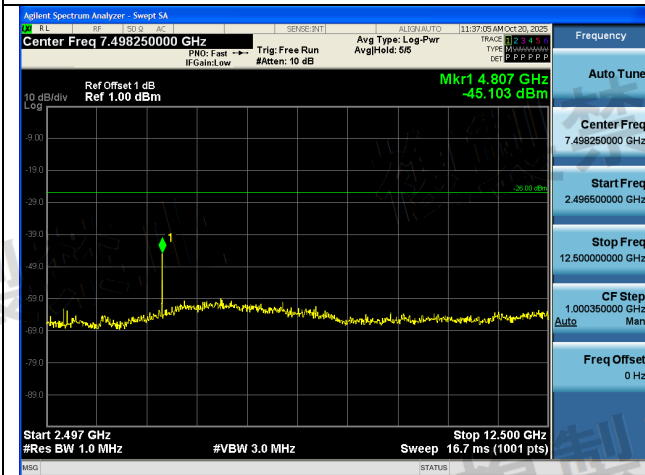
2387MHz – 2400MHz



2400MHz – 2496.5MHz

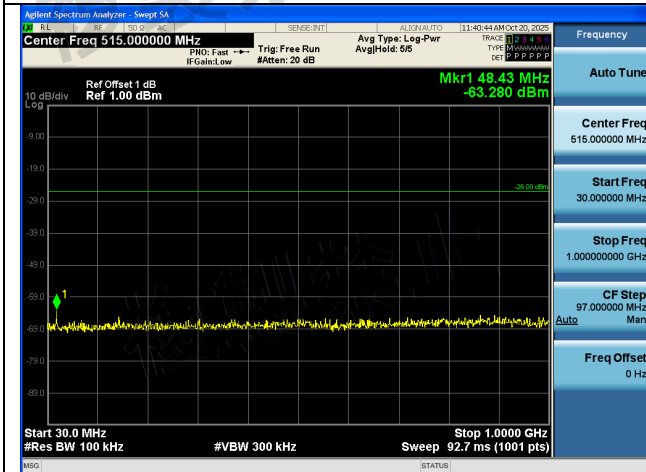


2496.5MHz – 26GHz

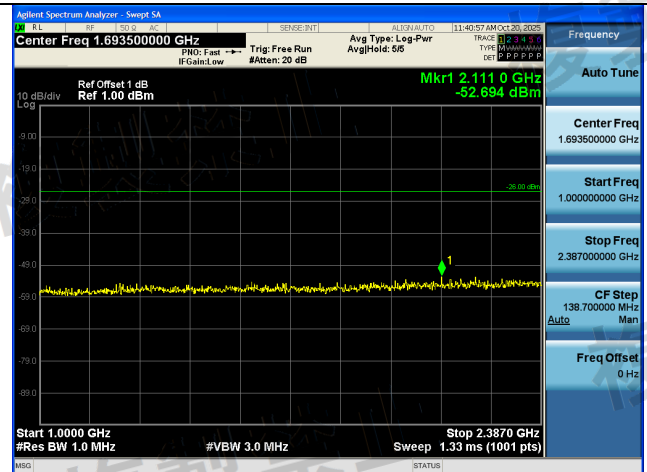


Test Data: BLE\2442MHz

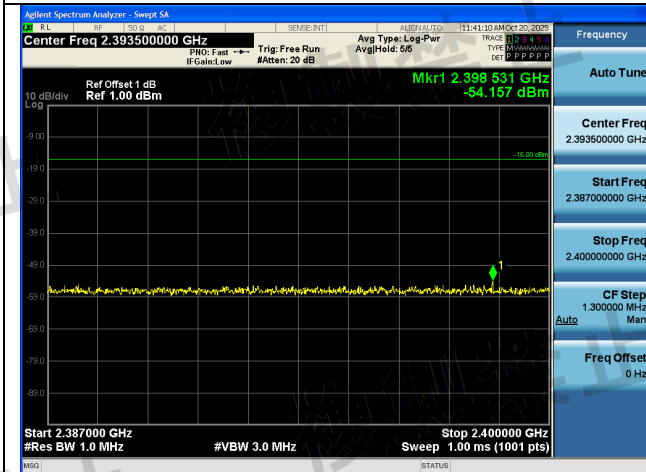
10MHz – 1000MHz



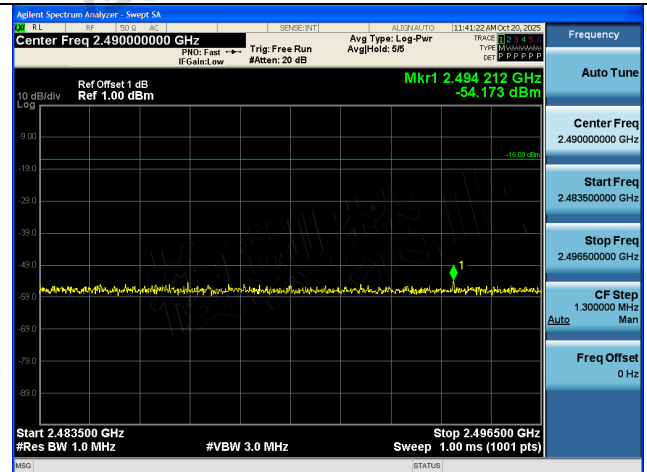
1000MHz – 2387MHz



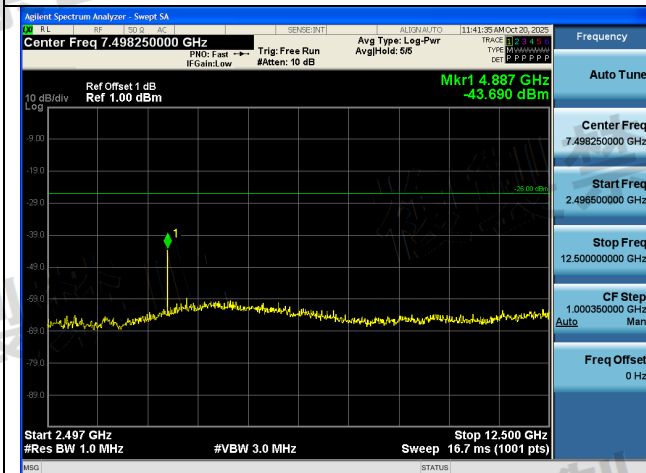
2387MHz – 2400MHz



2400MHz – 2496.5MHz

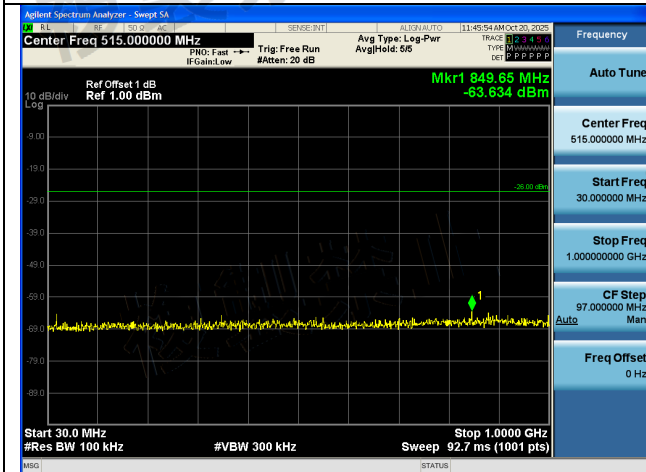


2496.5MHz – 26GHz

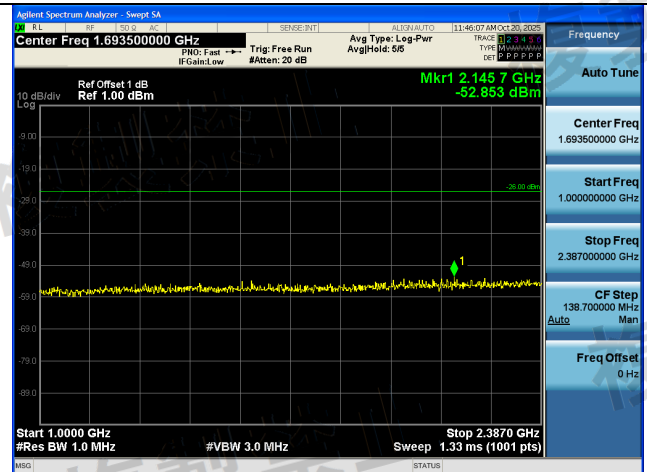


Test Data: BLE\2480MHz

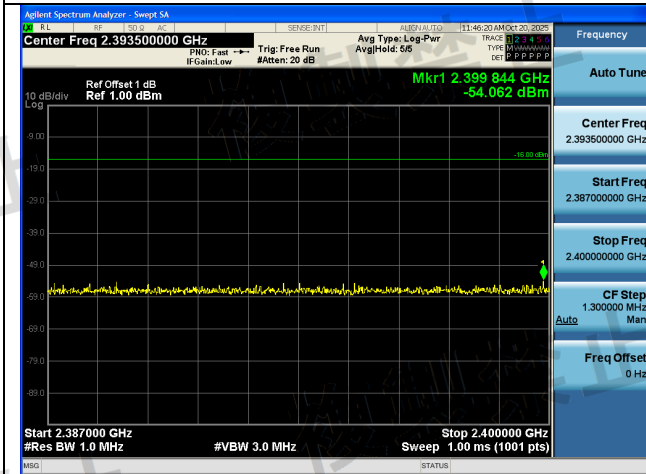
10MHz – 1000MHz



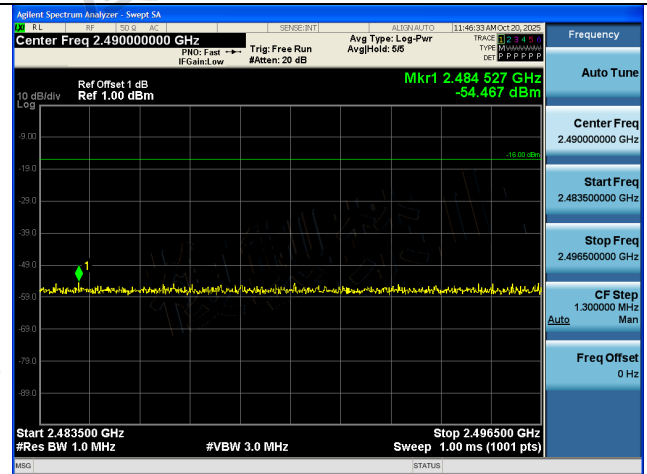
1000MHz – 2387MHz



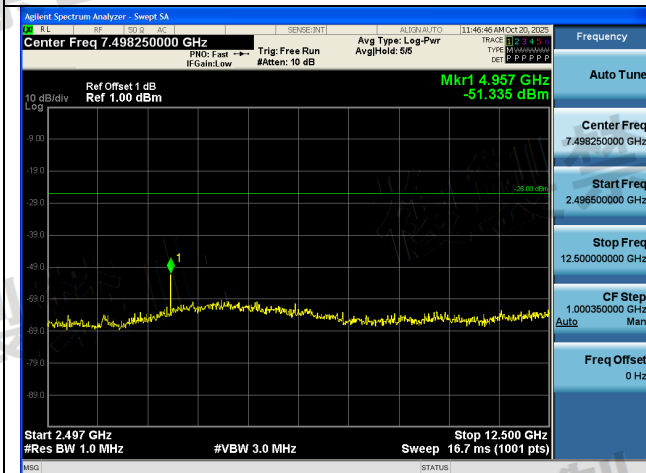
2387MHz – 2400MHz



2400MHz – 2496.5MHz

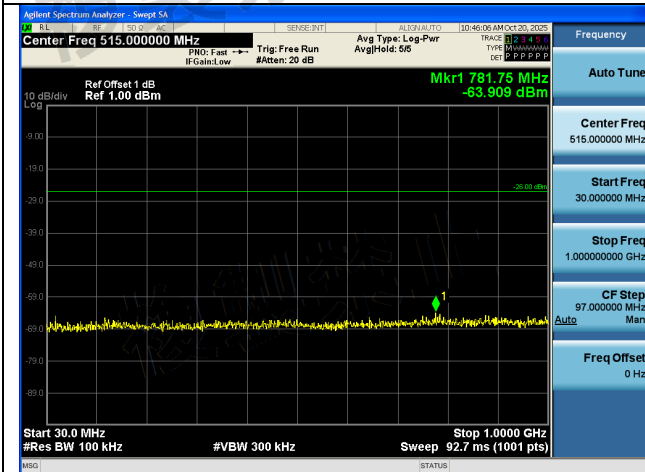


2496.5MHz – 26GHz

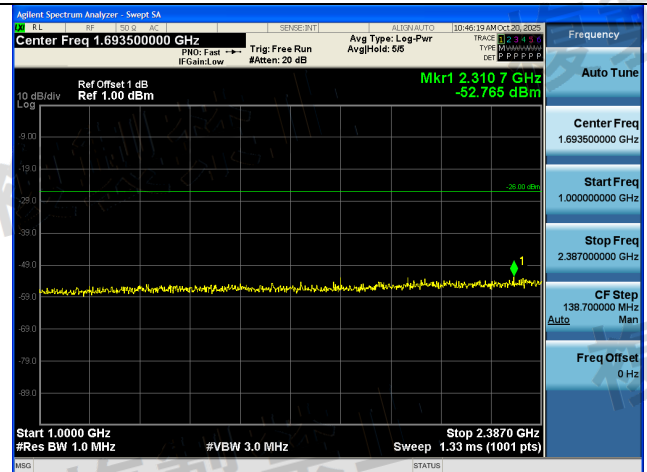


Test Data: BT\1M\2402MHz

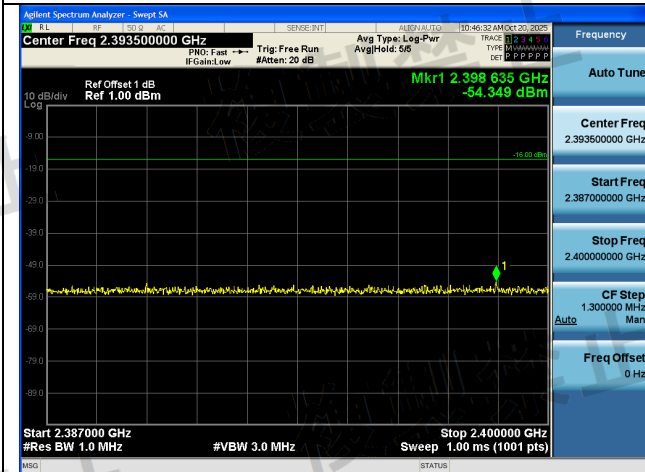
10MHz – 1000MHz



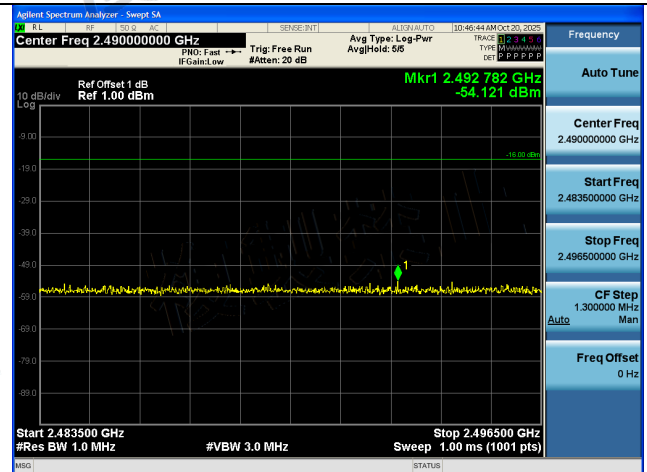
1000MHz – 2387MHz



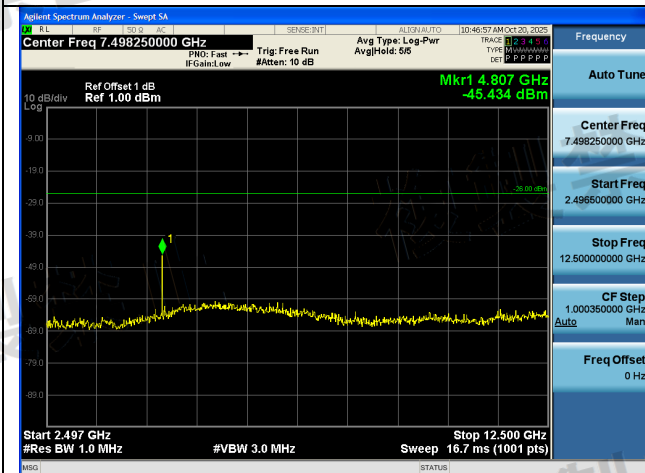
2387MHz – 2400MHz



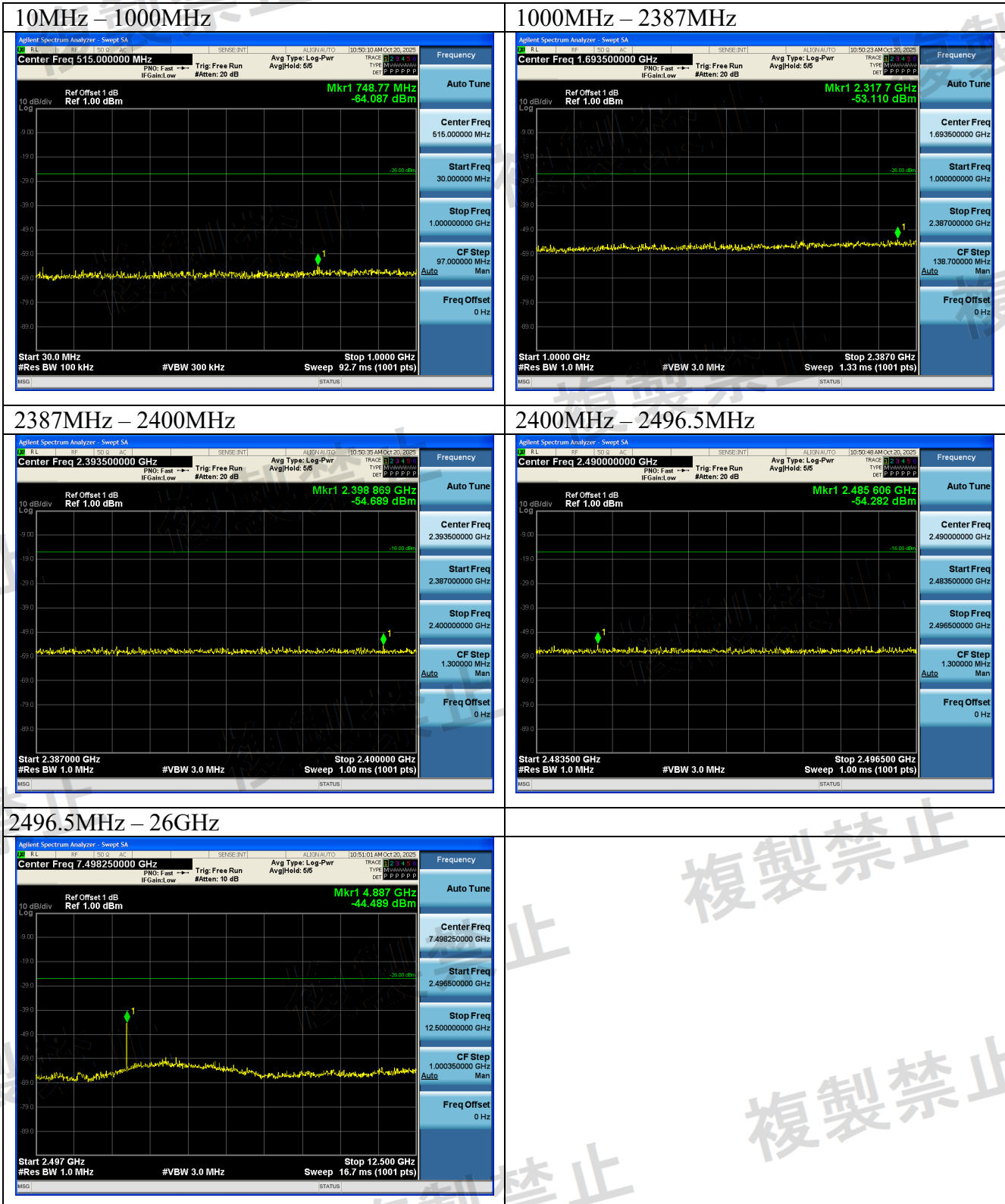
2400MHz – 2496.5MHz



2496.5MHz – 26GHz

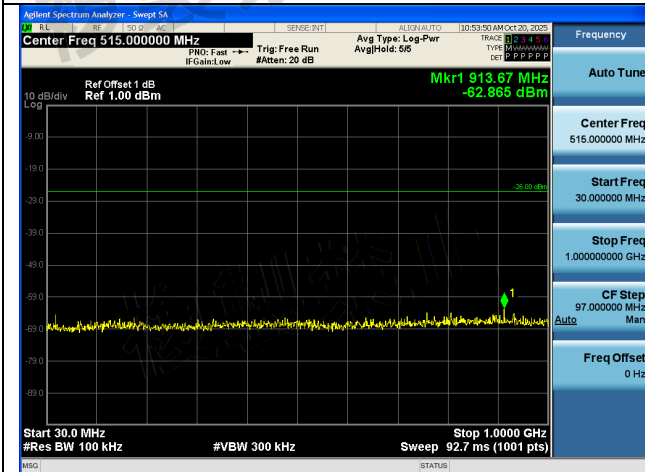


Test Data: BT\1M\2441MHz

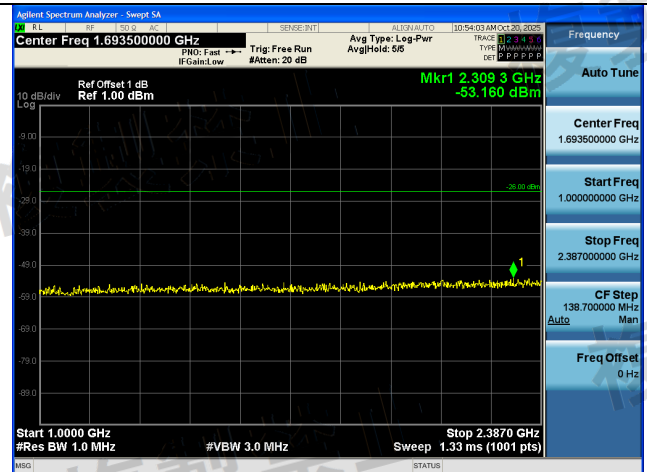


Test Data: BT\1M\2480MHz

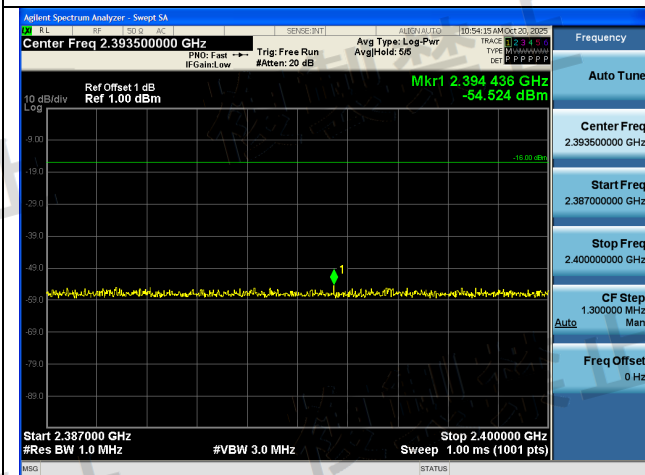
10MHz – 1000MHz



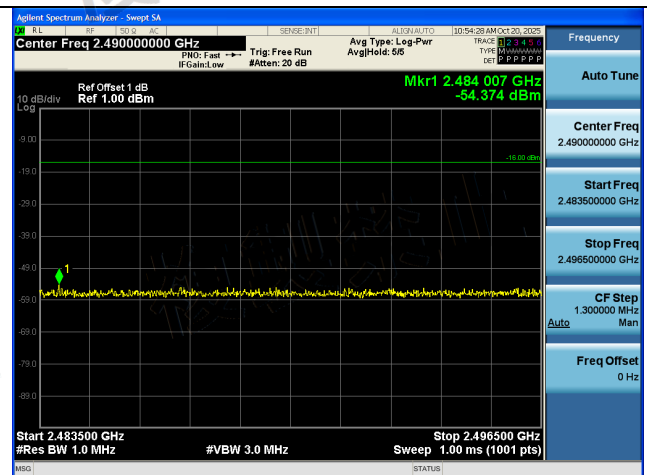
1000MHz – 2387MHz



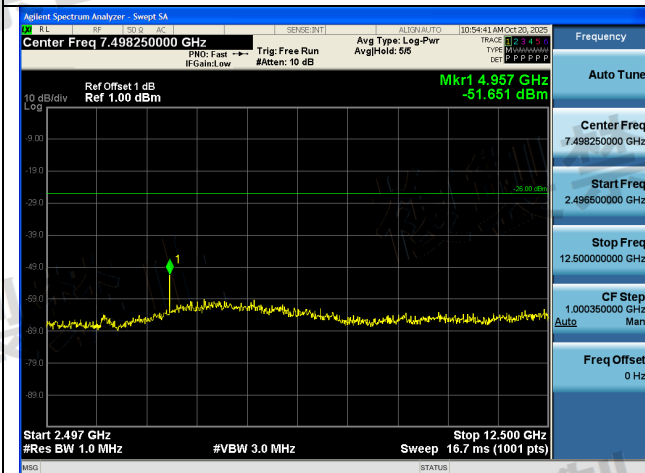
2387MHz – 2400MHz



2400MHz – 2496.5MHz

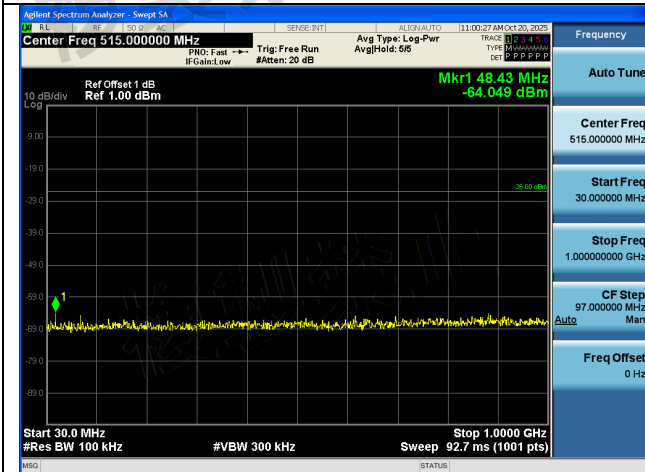


2496.5MHz – 26GHz

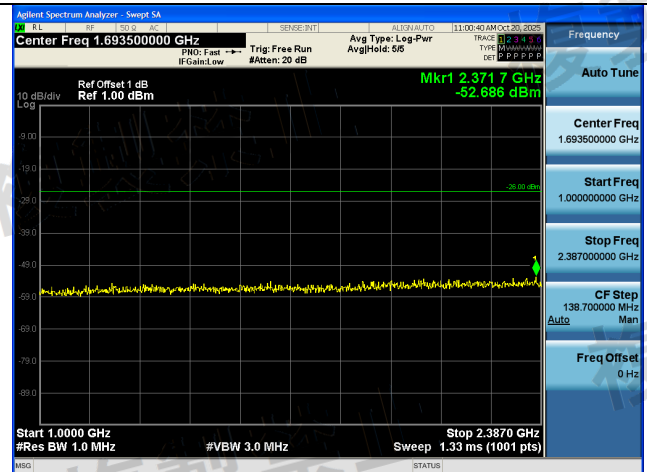


Test Data: BT\2M\2402MHz

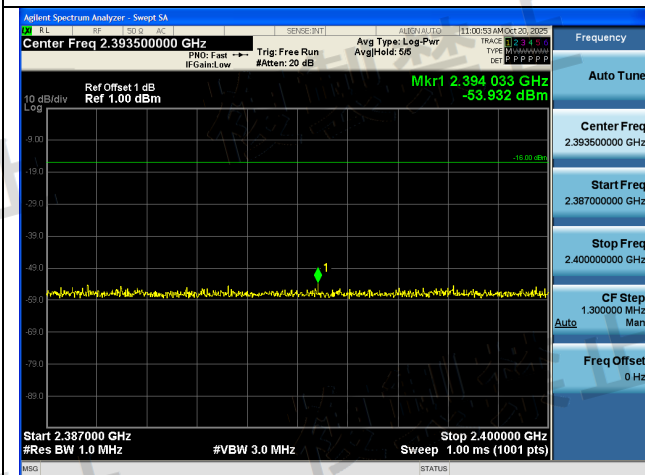
10MHz – 1000MHz



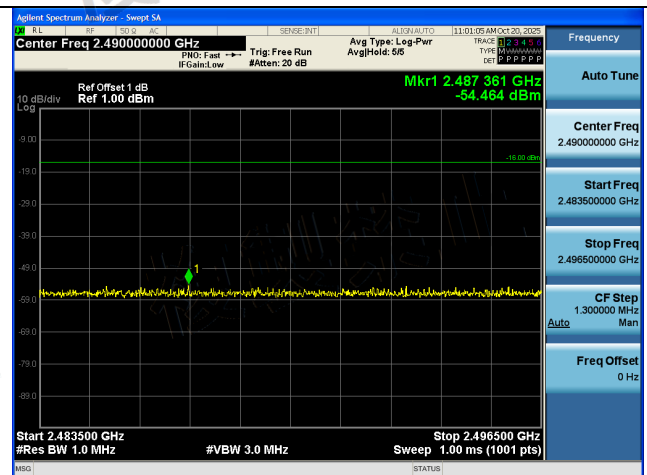
1000MHz – 2387MHz



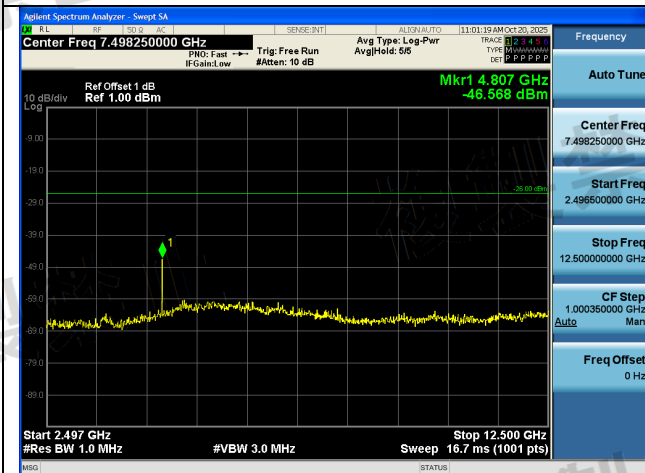
2387MHz – 2400MHz



2400MHz – 2496.5MHz

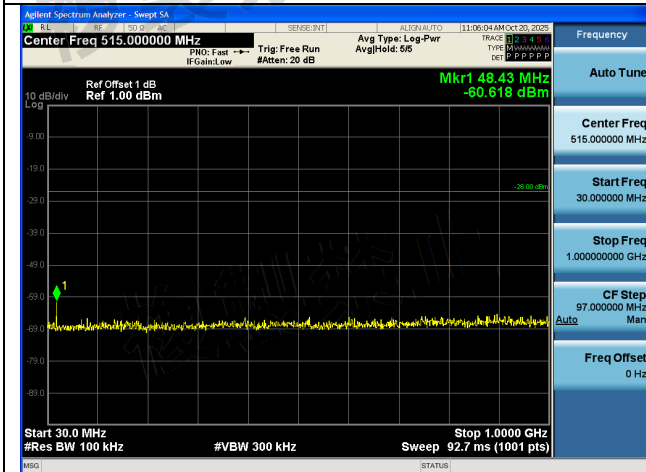


2496.5MHz – 26GHz

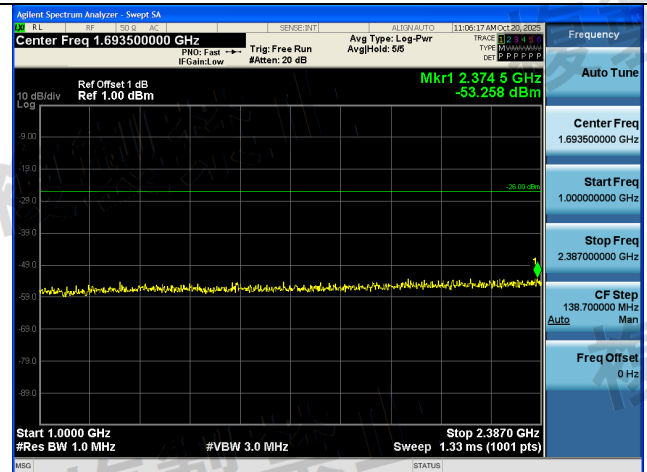


Test Data: BT\2M\2441MHz

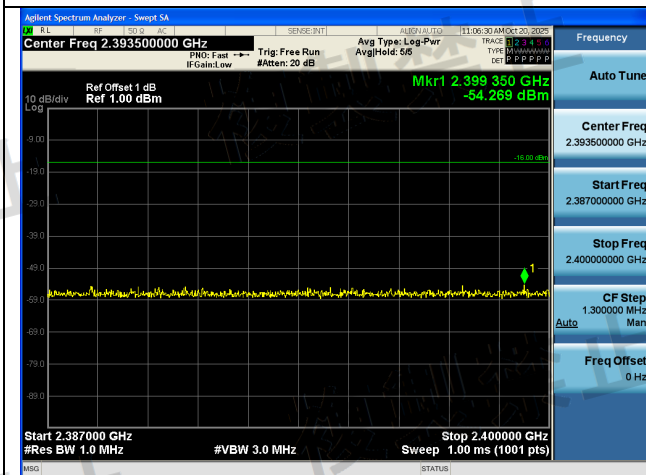
10MHz – 1000MHz



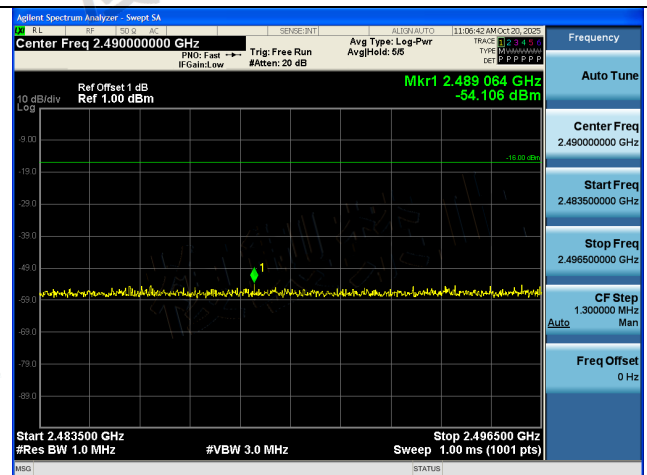
1000MHz – 2387MHz



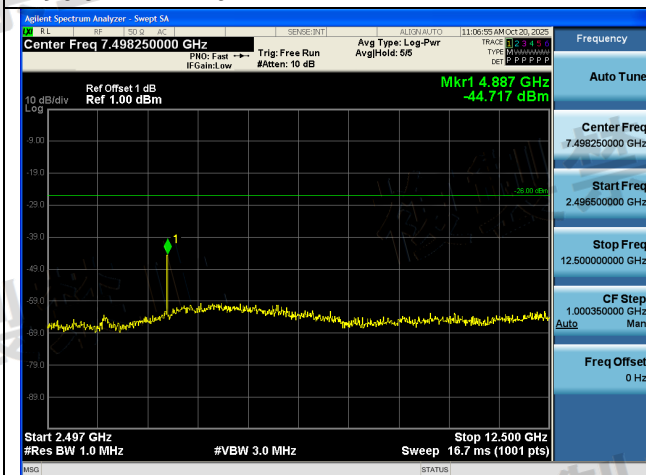
2387MHz – 2400MHz



2400MHz – 2496.5MHz

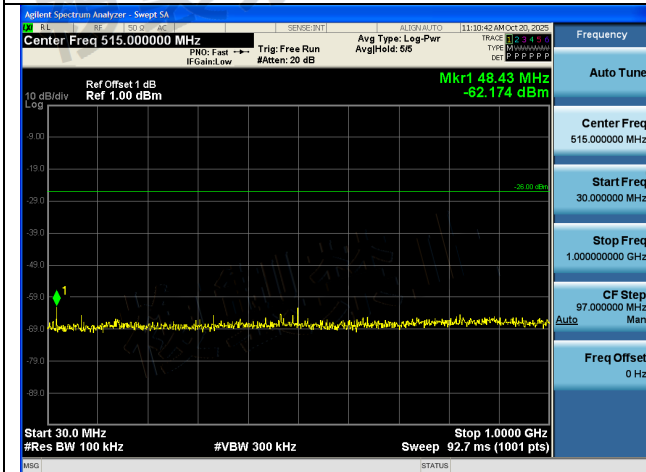


2496.5MHz – 26GHz

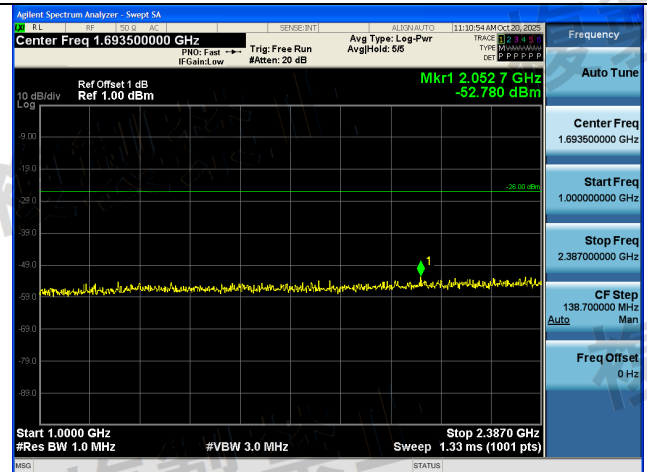


Test Data: BT\2M\2480MHz

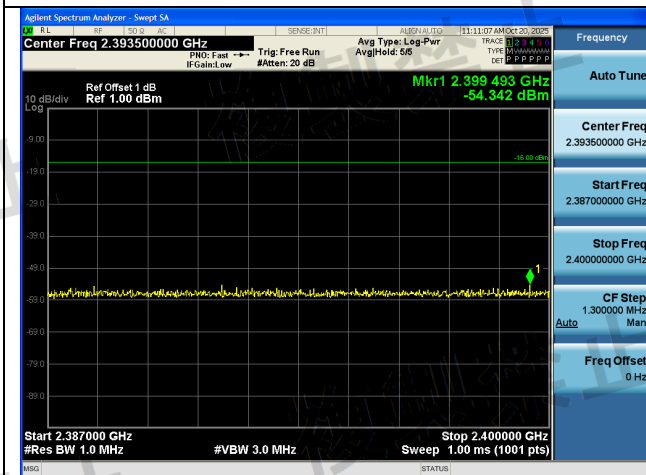
10MHz – 1000MHz



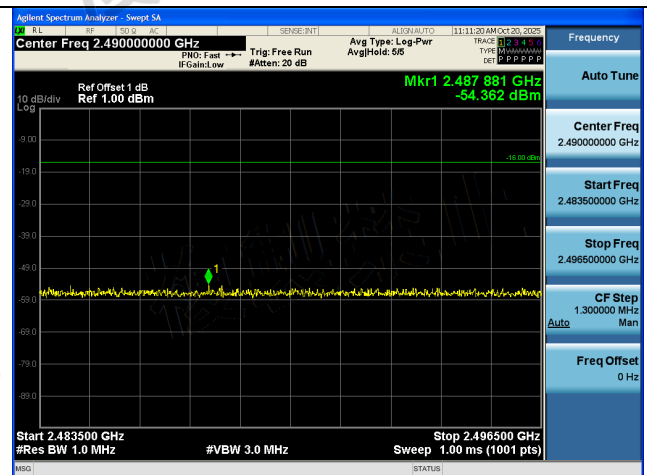
1000MHz – 2387MHz



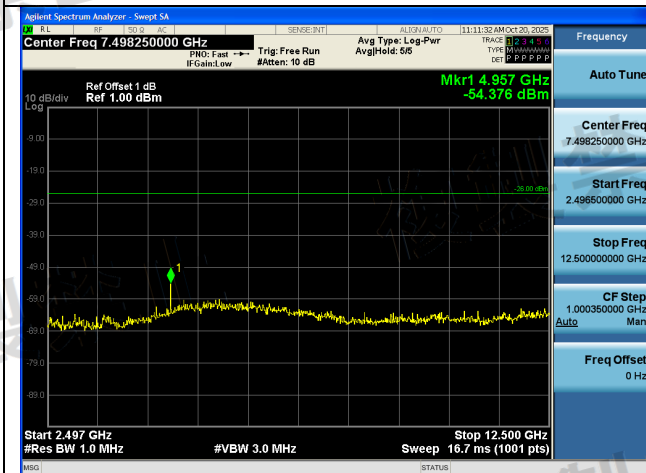
2387MHz – 2400MHz



2400MHz – 2496.5MHz

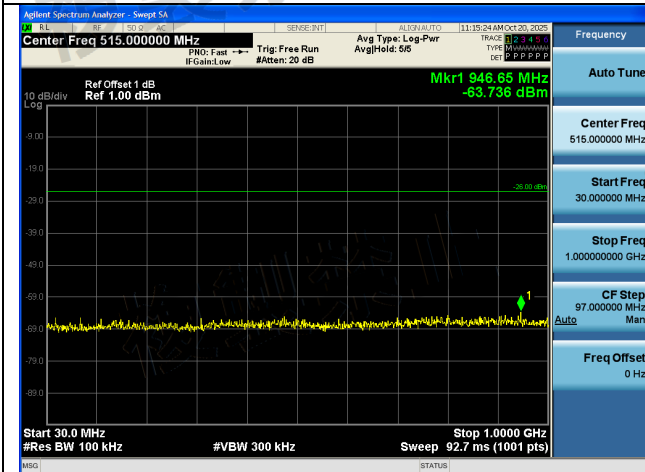


2496.5MHz – 26GHz

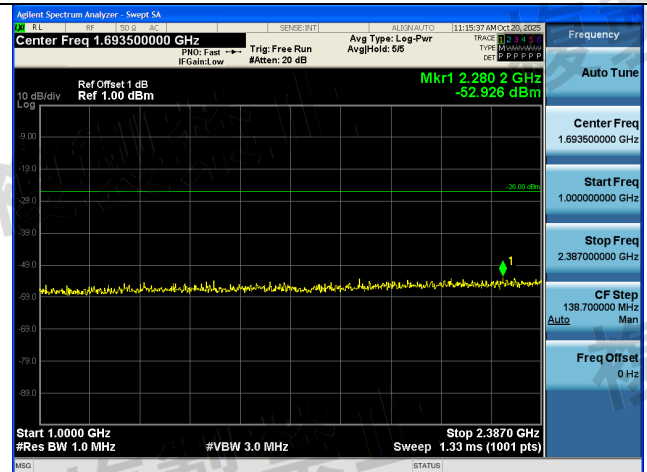


Test Data: BT\3M\2402MHz

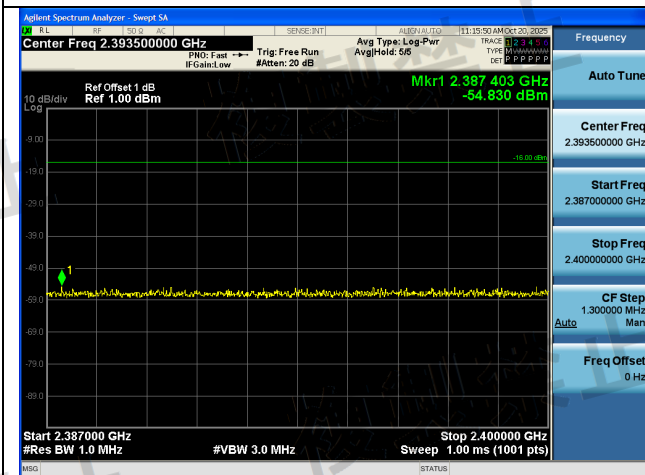
10MHz – 1000MHz



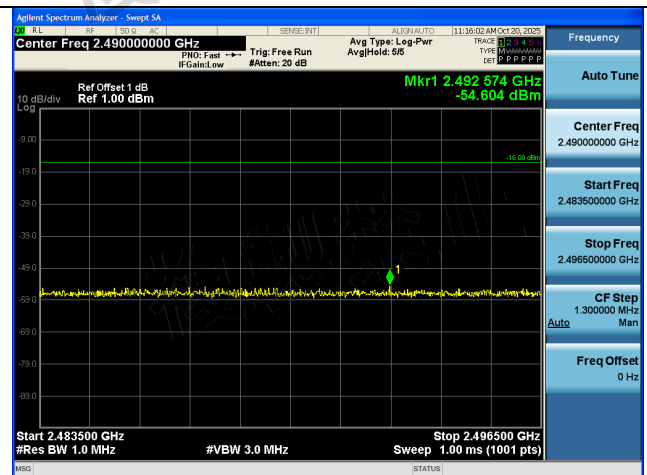
1000MHz – 2387MHz



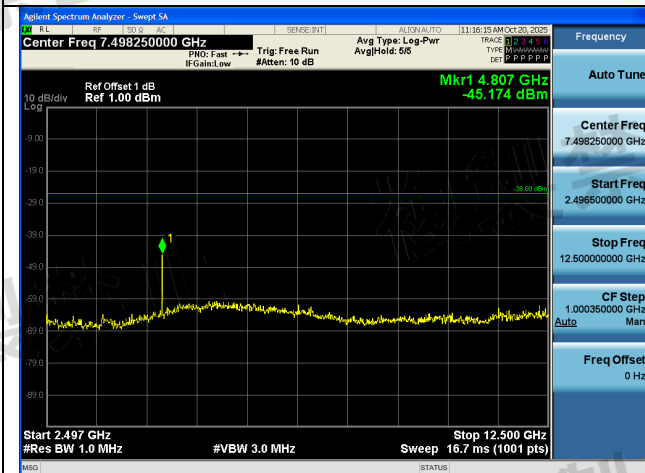
2387MHz – 2400MHz



2400MHz – 2496.5MHz

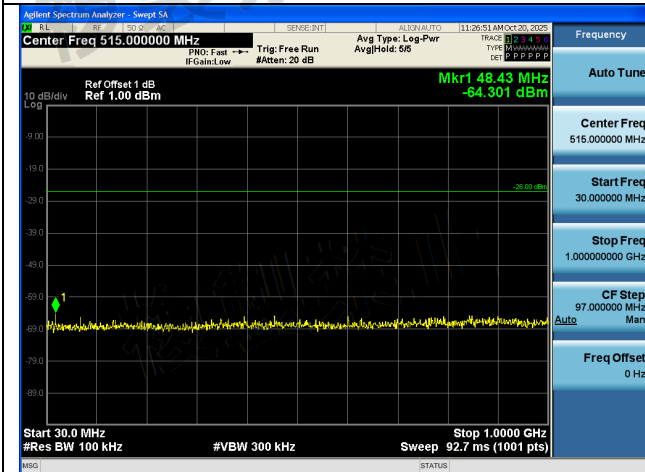


2496.5MHz – 26GHz

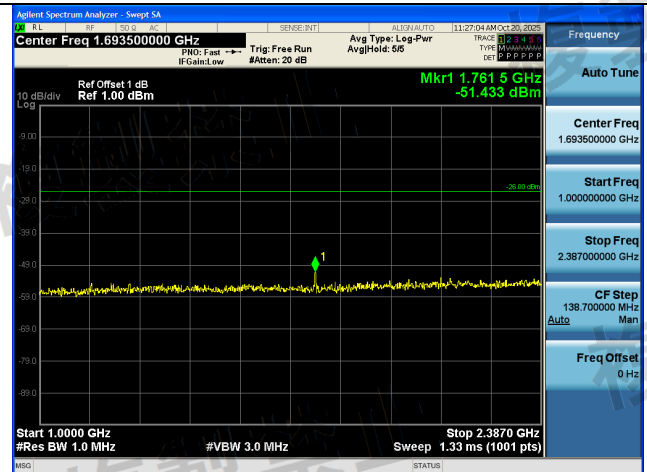


Test Data: BT\3M\2441MHz

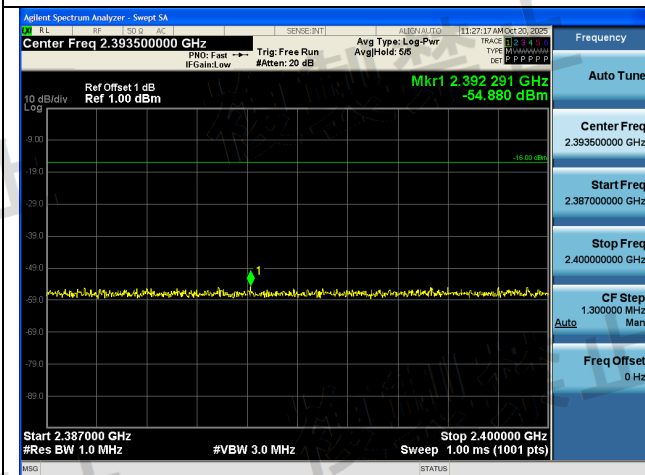
10MHz – 1000MHz



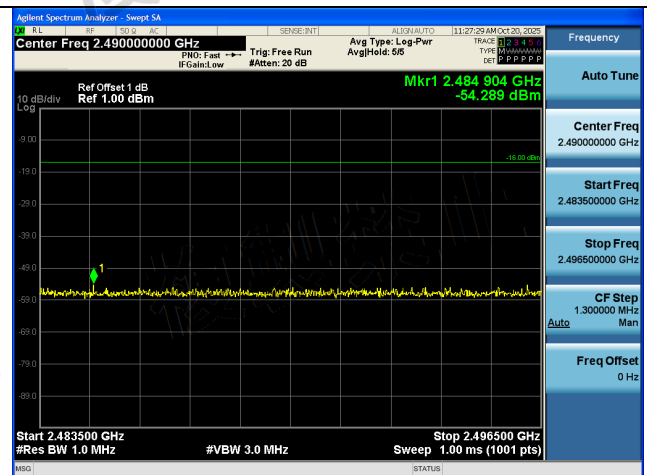
1000MHz – 2387MHz



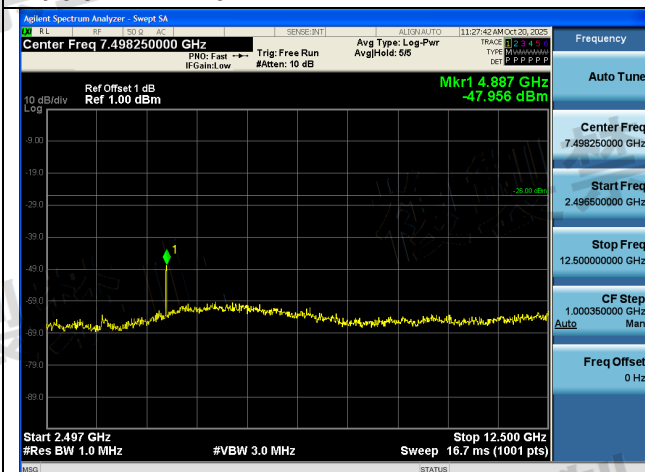
2387MHz – 2400MHz



2400MHz – 2496.5MHz

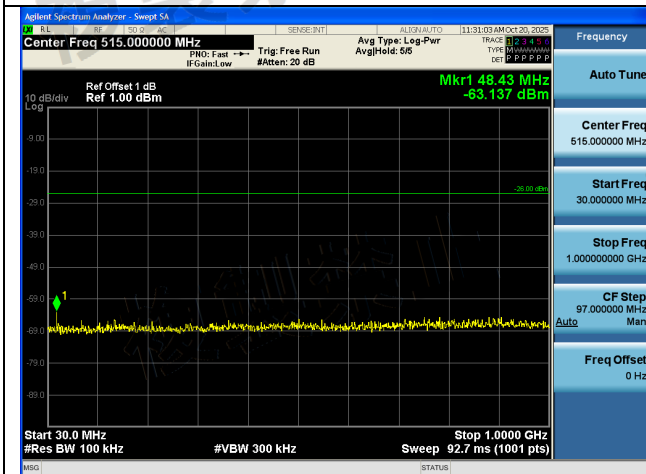


2496.5MHz – 26GHz

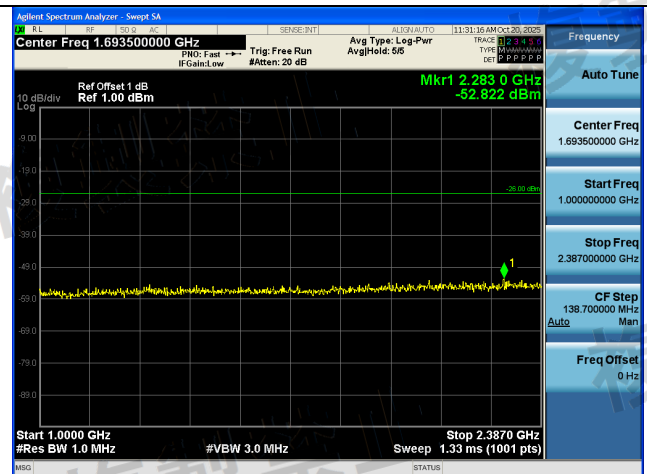


Test Data: BT\3M\2480MHz

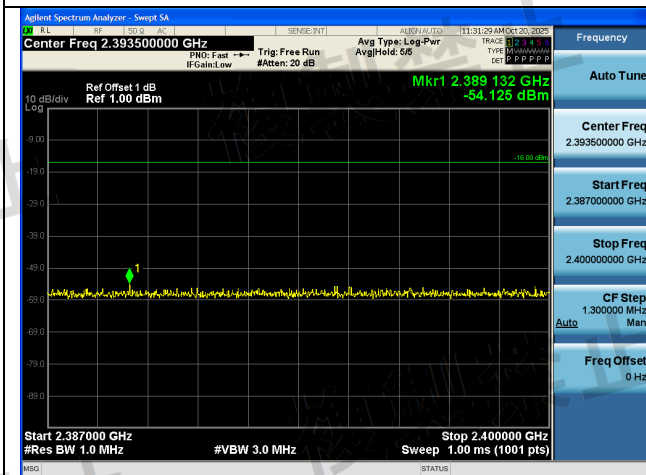
10MHz – 1000MHz



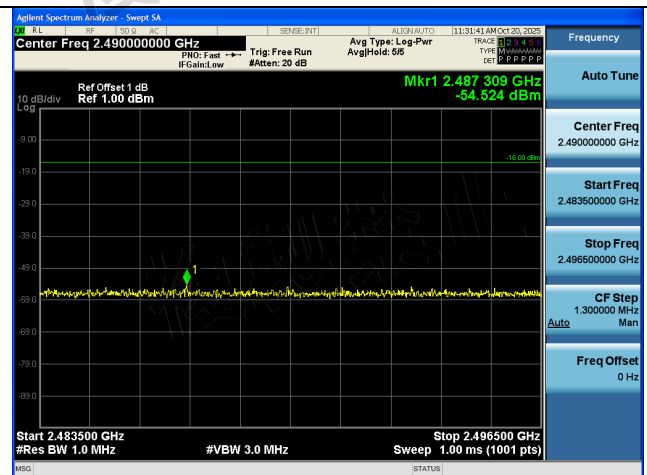
1000MHz – 2387MHz



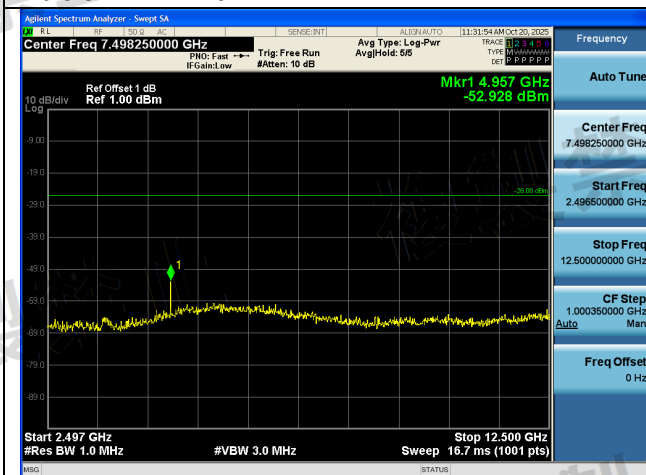
2387MHz – 2400MHz



2400MHz – 2496.5MHz



2496.5MHz – 26GHz



4.6 Limitation of Collateral Emission of Receiver

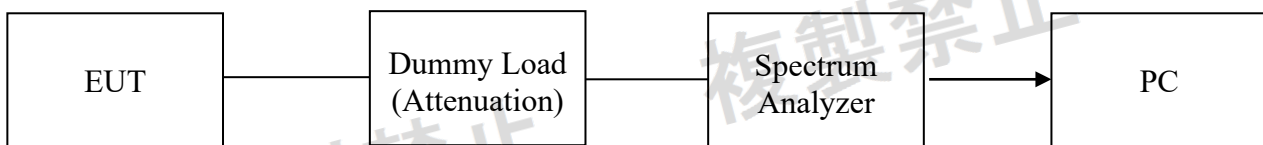
4.6.1 Limit

Frequency Range	Limit
30MHz – 1GHz	$\leq 4\text{nW}$
1GHz – 12.5GHz	$\leq 20\text{nW}$

4.6.2 Measurement Equipment Used

Refer to section Appendix A: Equipment List for detail.

4.6.3 Test Setup



4.6.4 Test Procedure

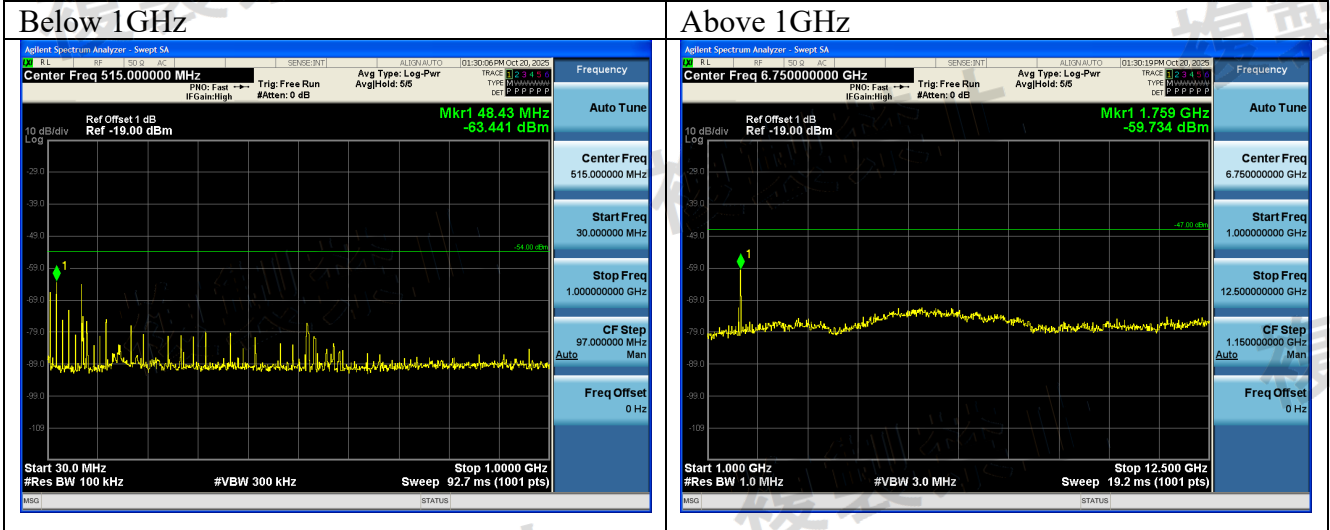
1. Spectrum Analyzer Setting:
 - (1) Set the spectrum analyzer as follows when searching.

Sweep frequency width	30MHz to 5 times the carrier frequency
Resolution bandwidth	100kHz (for $f < 1\text{GHz}$), 1MHz (for $f \geq 1\text{GHz}$)
Video bandwidth	Same as resolution bandwidth
Sweep time	Minimum time for guaranteed measurement accuracy
Sweep mode	Single sweep
Detection mode	Positive peak
 - (2) Set the spectrum analyzer for secondary emission measurement as follows.

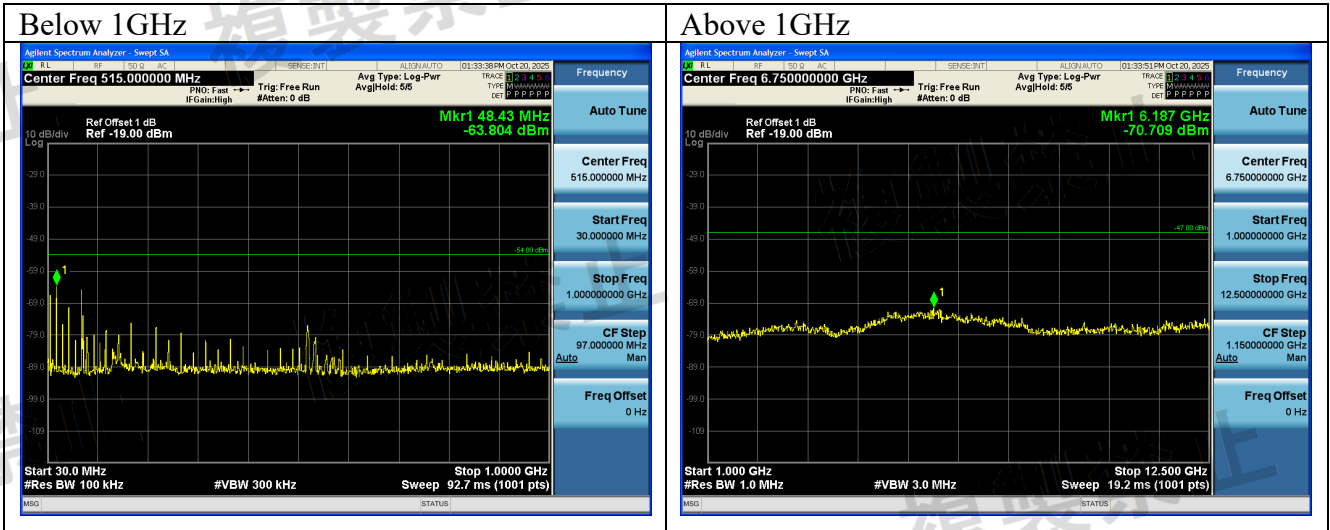
Center frequency	Secondary emission frequency
Sweep frequency width	0Hz
Resolution bandwidth	100kHz (for $f < 1\text{GHz}$), 1MHz (for $f \geq 1\text{GHz}$)
Video bandwidth	Same as resolution bandwidth
Sweep time	Minimum time for guaranteed measurement accuracy
Sweep mode	Single sweep
Detection mode	Sample
2. The worst data was recorded.

4.6.5 Test Results

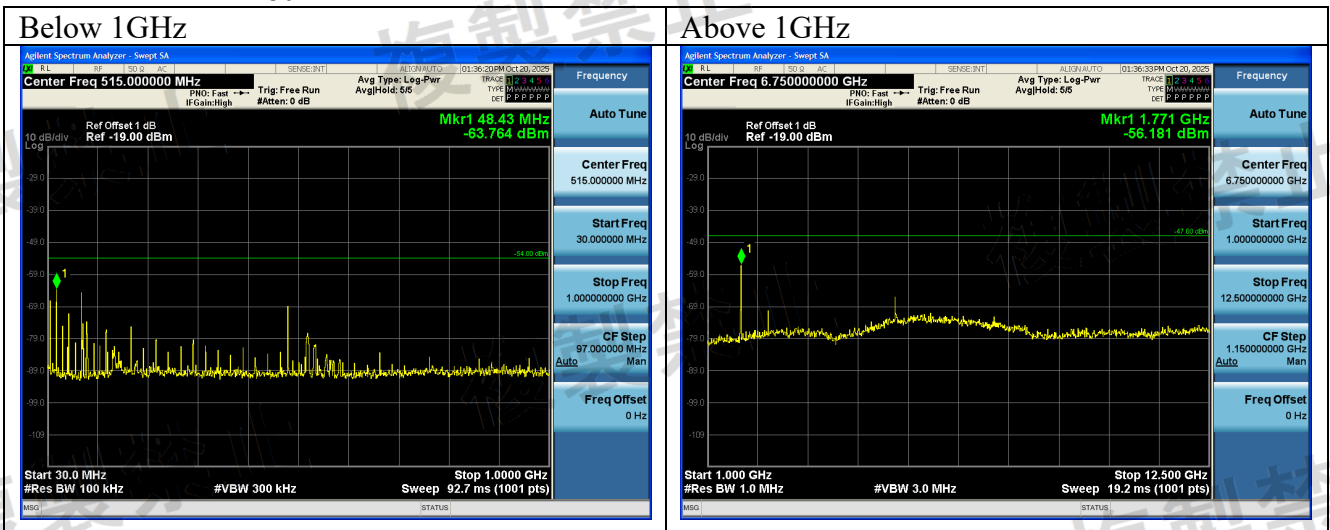
Test Data: BLE\2402MHz



Test Data: BLE\2442MHz

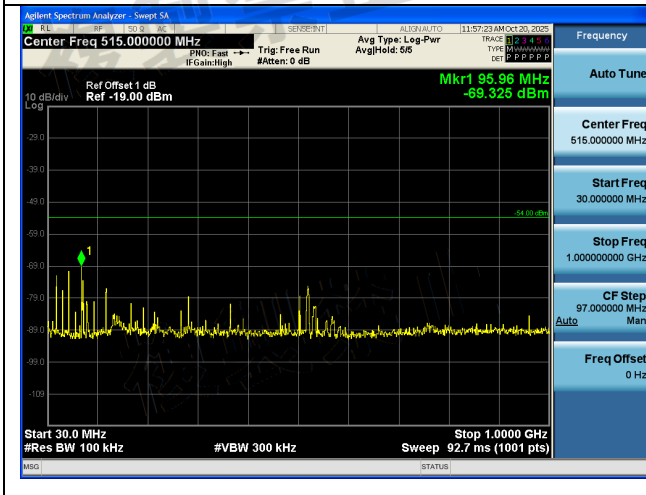


Test Data: BLE\2480MHz

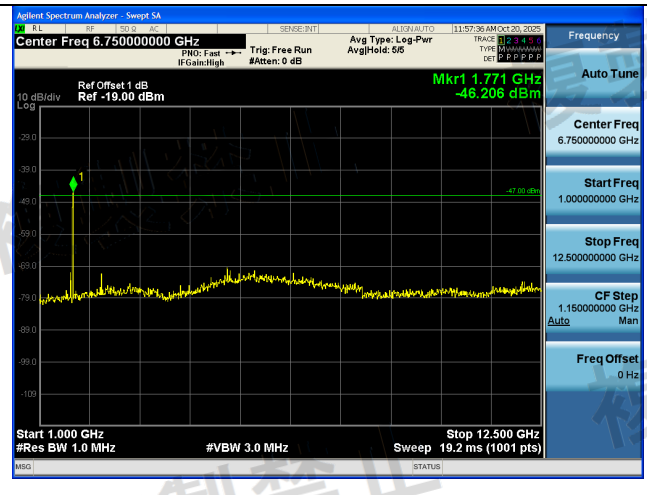


Test Data: BT\1M\2402MHz

Below 1GHz

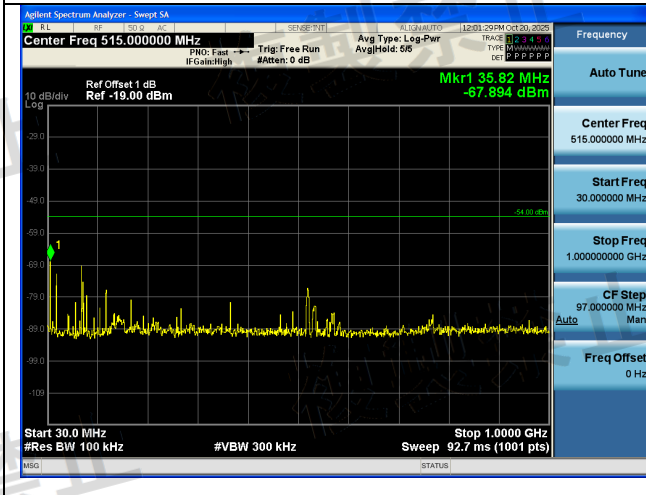


Above 1GHz



Test Data: BT\1M\2441MHz

Below 1GHz

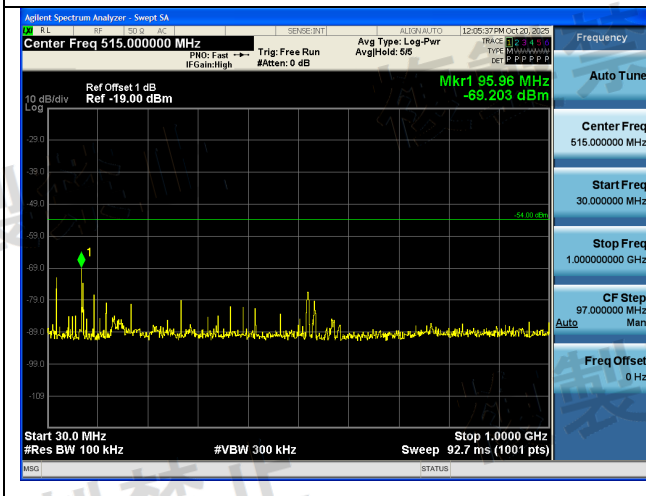


Above 1GHz

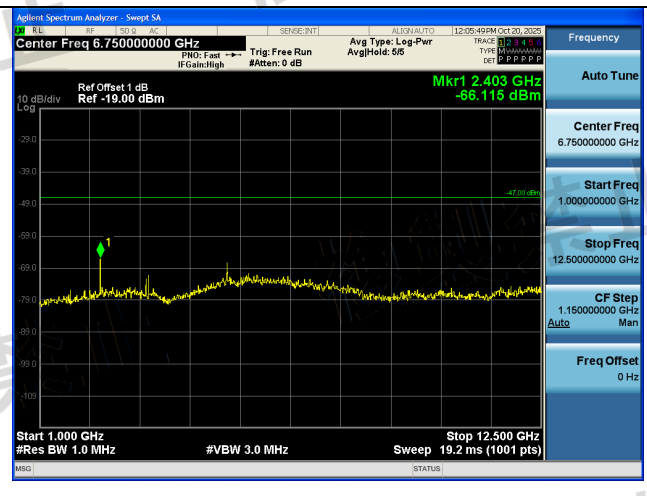


Test Data: BT\1M\2480MHz

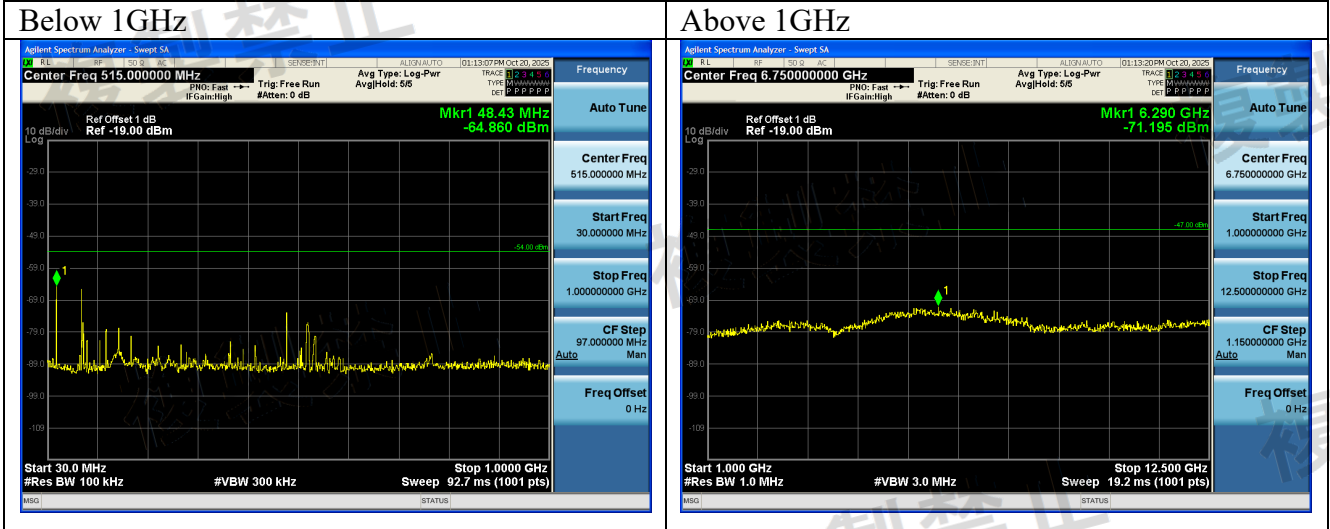
Below 1GHz



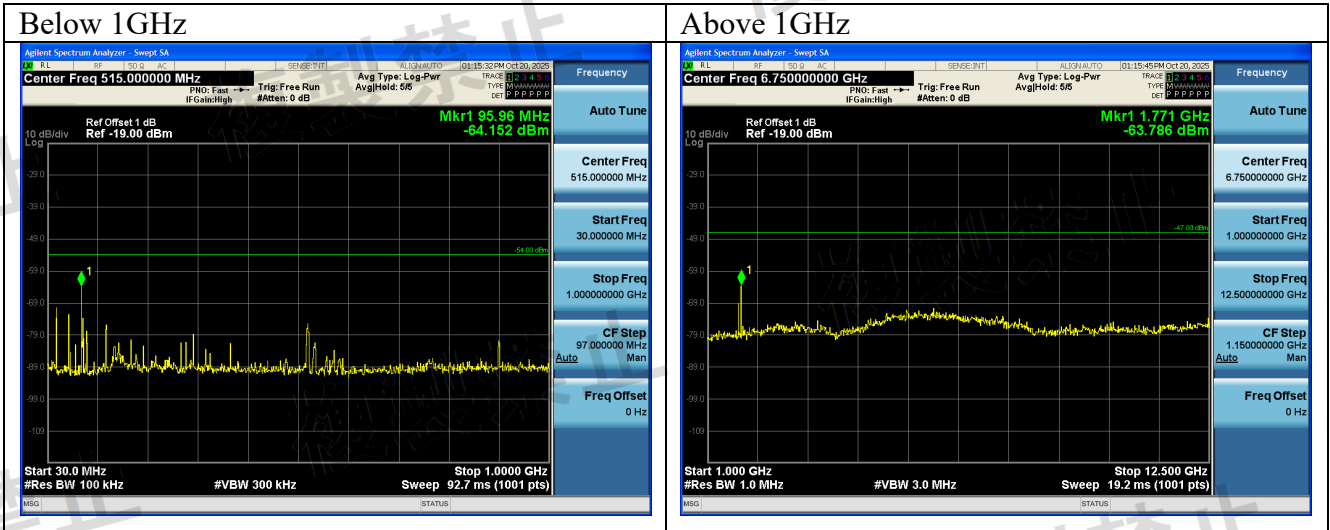
Above 1GHz



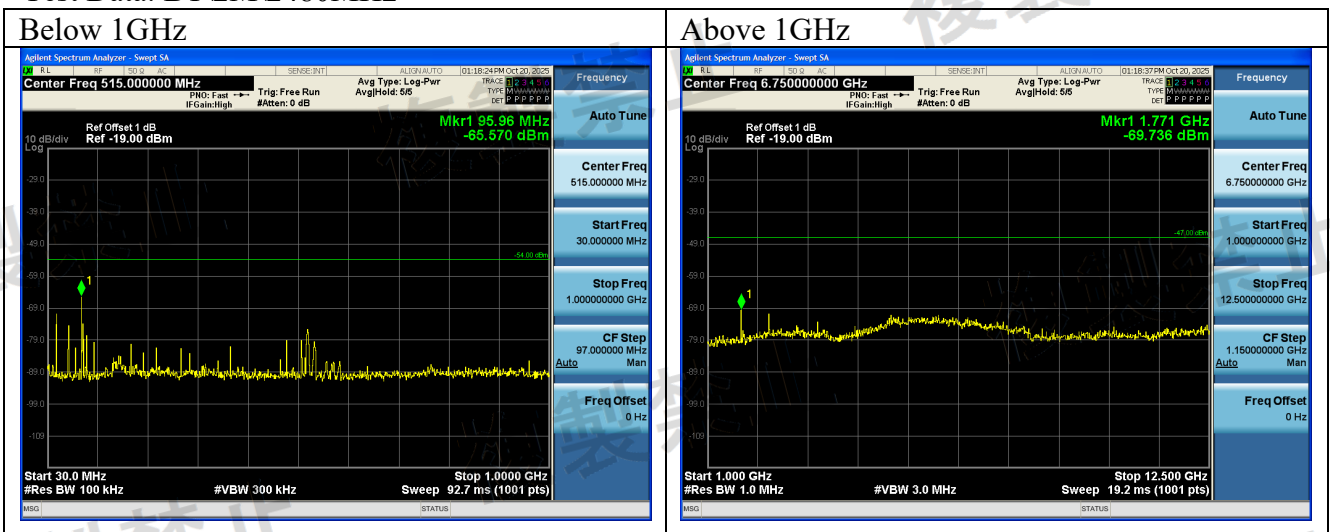
Test Data: BT\2M\2402MHz



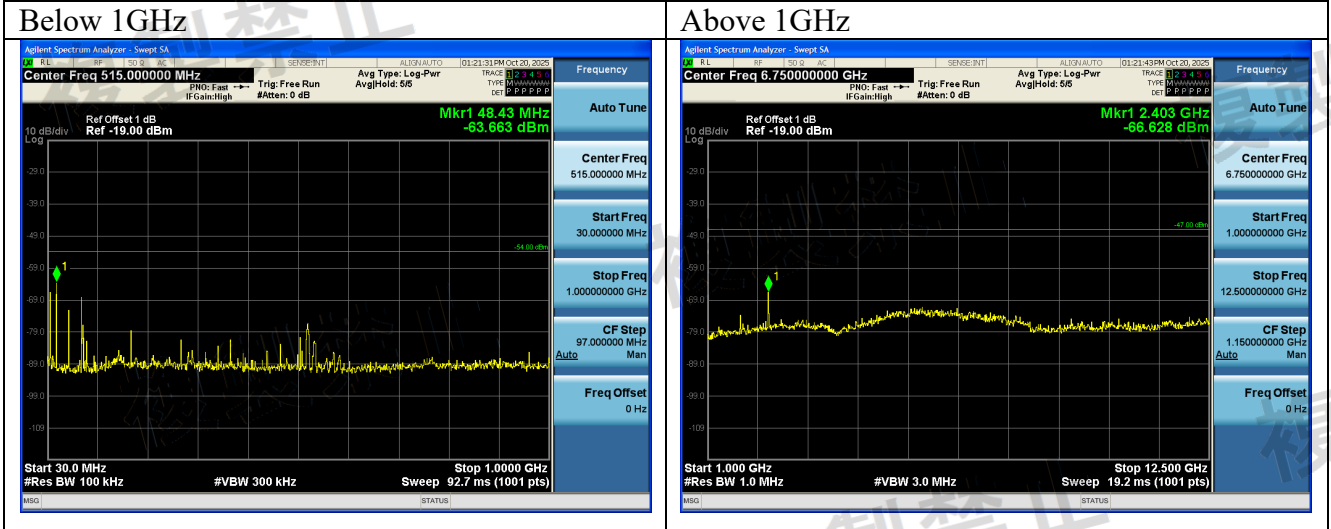
Test Data: BT\2M\2441MHz



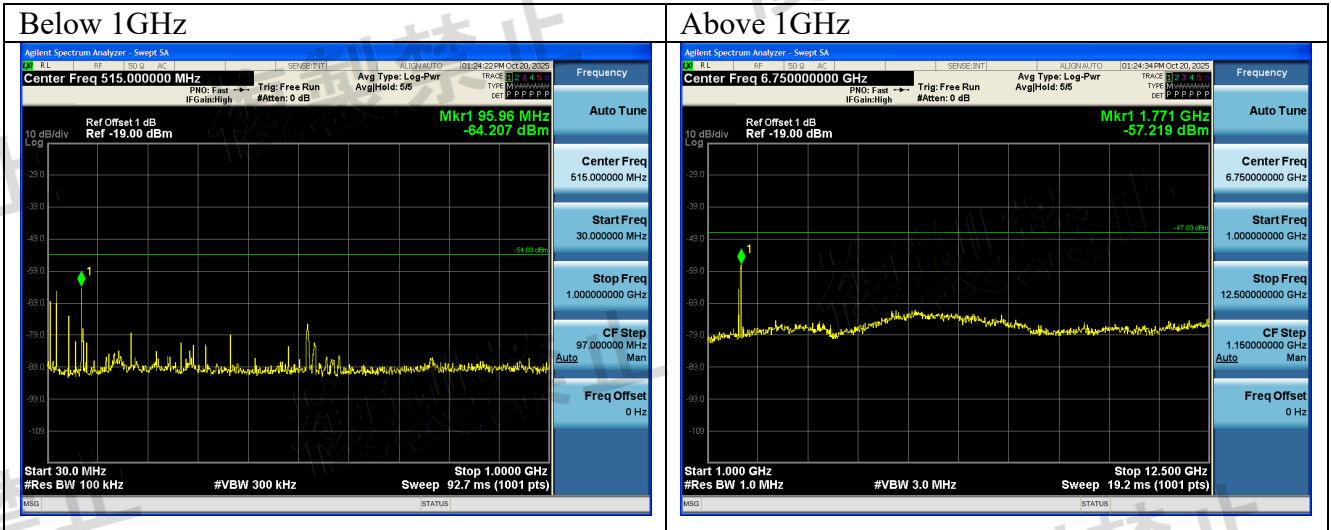
Test Data: BT\2M\2480MHz



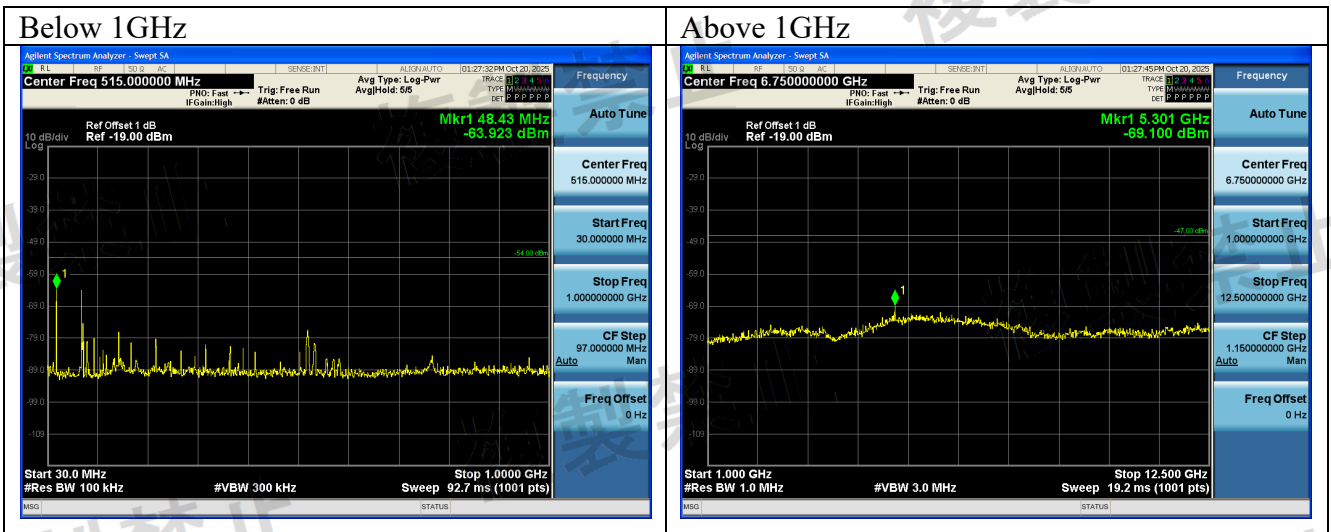
Test Data: BT\3M\2402MHz



Test Data: BT\3M\2441MHz



Test Data: BT\3M\2480MHz



4.7 Hopping Dwell Time

4.7.1 Limit

$\leq 0.4s$ in one 28.5 sec period

4.7.2 Measurement Equipment Used

Refer to section Appendix A: Equipment List for detail.

4.7.3 Test Setup

Refer to section 4.1.3 for detail.

4.7.4 Test Procedure

1. Place the EUT on the table and set it in transmitting mode.
2. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port to the spectrum analyzer.
3. Set center frequency of spectrum analyzer = operating frequency.
4. Set the spectrum analyzer as RBW, VBW=1MHz, Span = 0Hz, Adjust Sweep = 30s.
5. Repeat above procedures until all frequency measured were complete.

4.7.5 Test Results

Ambient temperature: 25°C

Relative humidity: 60%

Test Date: 2025/10/17

Mode:BR

Duty Cycle	=	Ton	/	Period	=	
Ch Low	DH1=	368 us	/	3.752 ms	=	0.098
	DH3=	1630 us	/	6.26 ms	=	0.26
	DH5=	2840 us	/	8.72 ms	=	0.326
Ch Mid	DH1=	384 us	/	3.752 ms	=	0.102
	DH3=	1620 us	/	6.25 ms	=	0.259
	DH5=	2860 us	/	8.74 ms	=	0.327
Ch High	DH1=	376 us	/	3.76 ms	=	0.1
	DH3=	1620 us	/	6.26 ms	=	0.259
	DH5=	2900 us	/	8.78 ms	=	0.33

Dwell time =	Spreading Bandwidth	/	Channel number	x	duty cycle	x	Time	=	
CH Low DH1	69.658	/	79	x	0.098	x	0.4	=	0.035
CH Low DH3	69.658	/	79	x	0.26	x	0.4	=	0.092
CH Low DH5	69.658	/	79	x	0.326	x	0.4	=	0.115
CH Mid DH1	69.658	/	79	x	0.102	x	0.4	=	0.036
CH Mid DH3	69.658	/	79	x	0.259	x	0.4	=	0.091
CH Mid DH5	69.658	/	79	x	0.327	x	0.4	=	0.115
CH High DH1	69.658	/	79	x	0.1	x	0.4	=	0.035
CH High DH3	69.658	/	79	x	0.259	x	0.4	=	0.091
CH High DH5	69.658	/	79	x	0.33	x	0.4	=	0.116

Mode:EDR1

Duty Cycle	=	Ton	/	Period	=
Ch Low	DH1=	392 us	/	3.752 ms	= 0.104
	DH3=	1640 us	/	6.25 ms	= 0.262
	DH5=	2880 us	/	8.76 ms	= 0.329
Ch Mid	DH1=	384 us	/	3.752 ms	= 0.102
	DH3=	1640 us	/	6.25 ms	= 0.262
	DH5=	2880 us	/	8.78 ms	= 0.328
Ch High	DH1=	384 us	/	3.744 ms	= 0.103
	DH3=	1630 us	/	6.25 ms	= 0.261
	DH5=	2880 us	/	8.76 ms	= 0.329

Dwell time =	Spreading Bandwidth	/	Channel number	x	duty cycle	x	Time	=
CH Low DH1	69.177	/	79	x	0.104	x	0.4	= 0.037
CH Low DH3	69.177	/	79	x	0.262	x	0.4	= 0.092
CH Low DH5	69.177	/	79	x	0.329	x	0.4	= 0.115
CH Mid DH1	69.177	/	79	x	0.102	x	0.4	= 0.036
CH Mid DH3	69.177	/	79	x	0.262	x	0.4	= 0.092
CH Mid DH5	69.177	/	79	x	0.328	x	0.4	= 0.115
CH High DH1	69.177	/	79	x	0.103	x	0.4	= 0.036
CH High DH3	69.177	/	79	x	0.261	x	0.4	= 0.091
CH High DH5	69.177	/	79	x	0.329	x	0.4	= 0.115

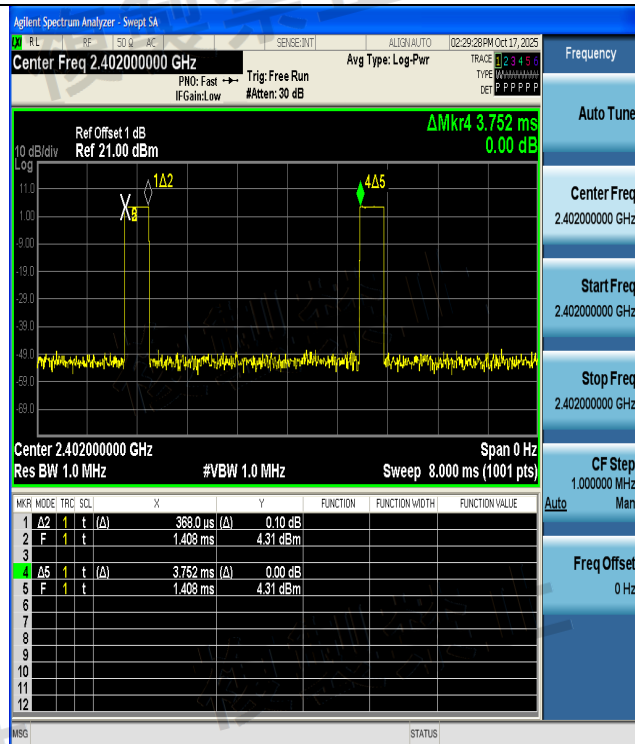
Mode:EDR2

Duty Cycle	=	Ton	/	Period	=
Ch Low	DH1=	384 us	/	3.752	= 0.102
	DH3=	1630 us	/	6.26	= 0.26
	DH5=	2880 us	/	8.74	= 0.33
Ch Mid	DH1=	384 us	/	3.744	= 0.103
	DH3=	1640 us	/	6.25	= 0.262
	DH5=	2860 us	/	8.74	= 0.327
Ch High	DH1=	392 us	/	3.744	= 0.105
	DH3=	1630 us	/	6.25	= 0.261
	DH5=	2860 us	/	8.74	= 0.327

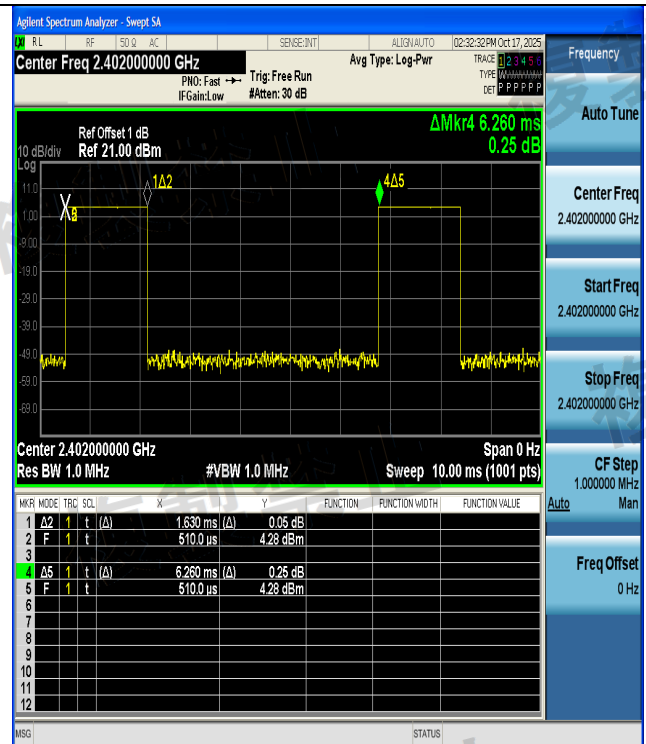
Dwell time =	Spreading Bandwidth	/	Channel number	x	duty cycle	x	Time	=
CH Low DH1	69.925	/	79	x	0.102	x	0.4	= 0.036
CH Low DH3	70.081	/	79	x	0.26	x	0.4	= 0.092
CH Low DH5	69.925	/	79	x	0.33	x	0.4	= 0.117
CH Mid DH1	69.925	/	79	x	0.103	x	0.4	= 0.036
CH Mid DH3	69.925	/	79	x	0.262	x	0.4	= 0.093
CH Mid DH5	69.925	/	79	x	0.327	x	0.4	= 0.116
CH High DH1	69.925	/	79	x	0.105	x	0.4	= 0.037
CH High DH3	69.925	/	79	x	0.261	x	0.4	= 0.092
CH High DH5	69.925	/	79	x	0.327	x	0.4	= 0.116

Test Data: BDR

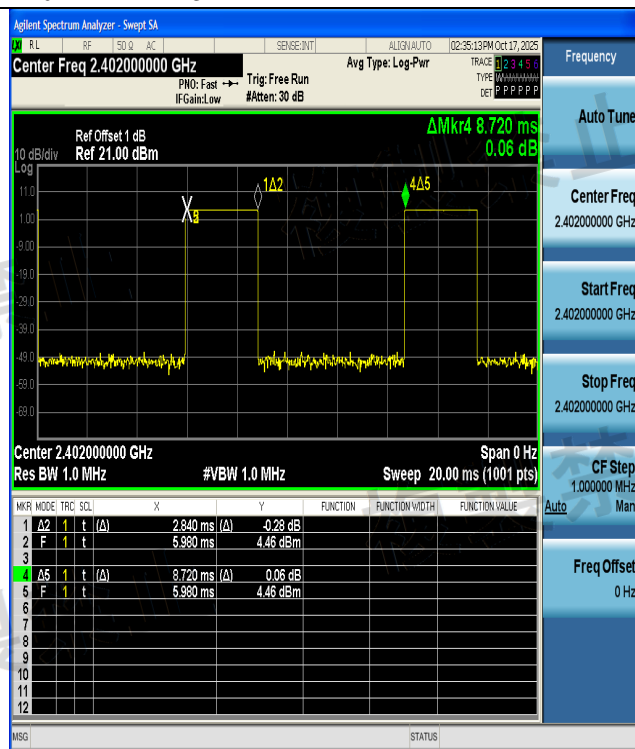
2402MHz DH1



2402MHz DH3

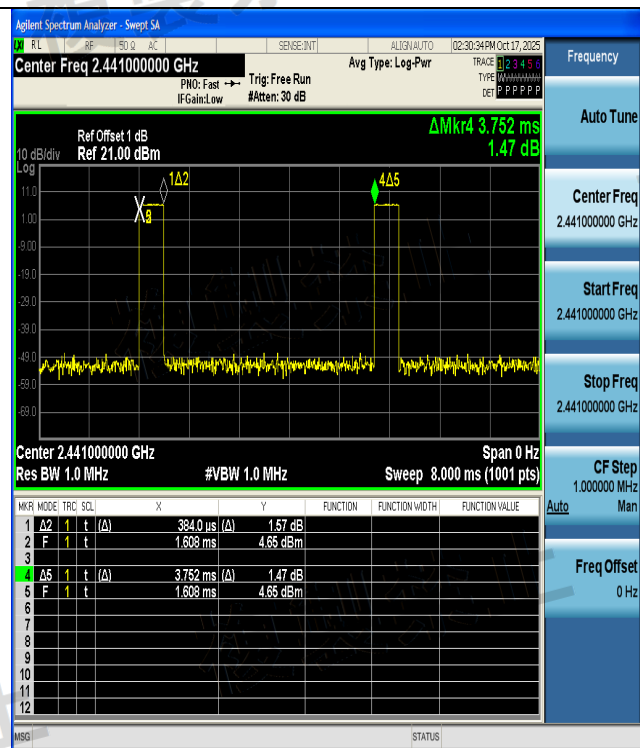


2402MHz DH5

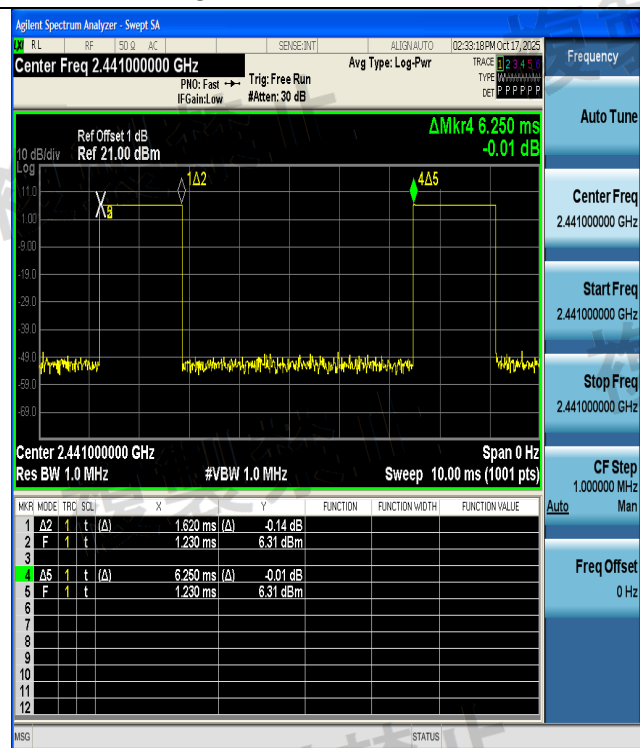


Test Data: BDR

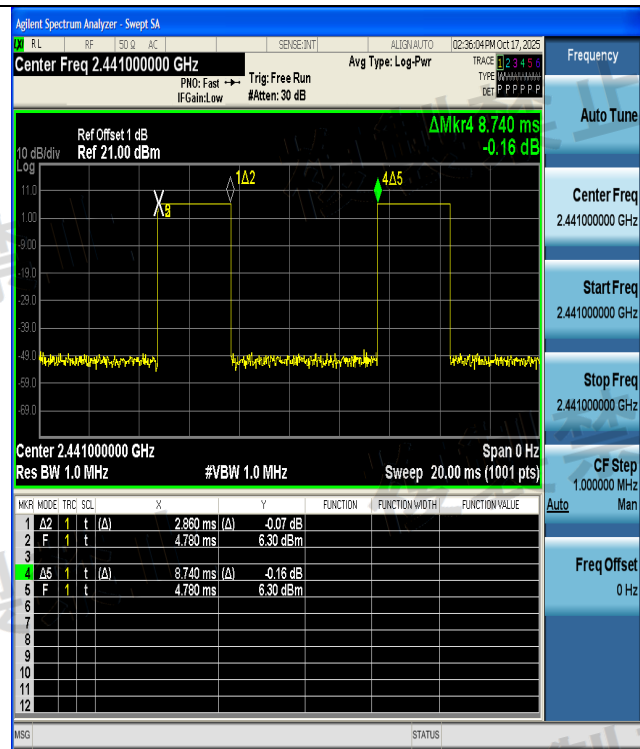
2441MHz DH1



2441MHz DH3

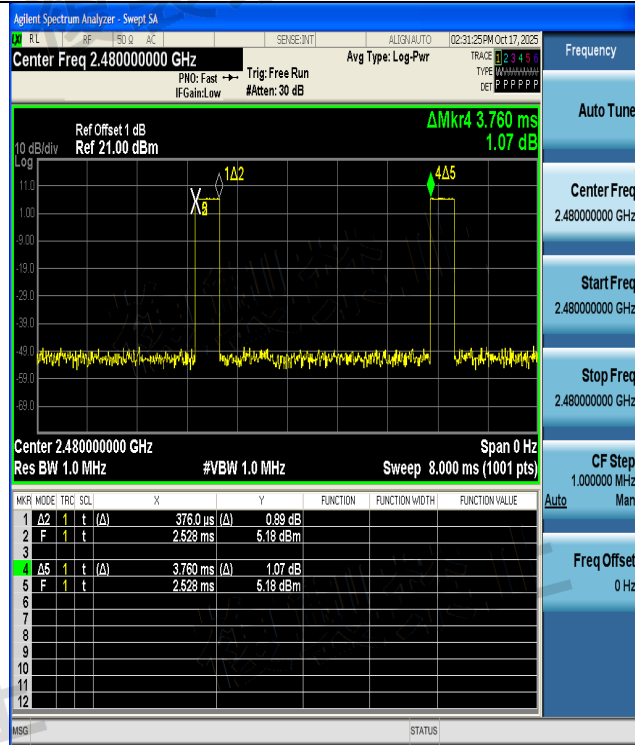


2441MHz DH5

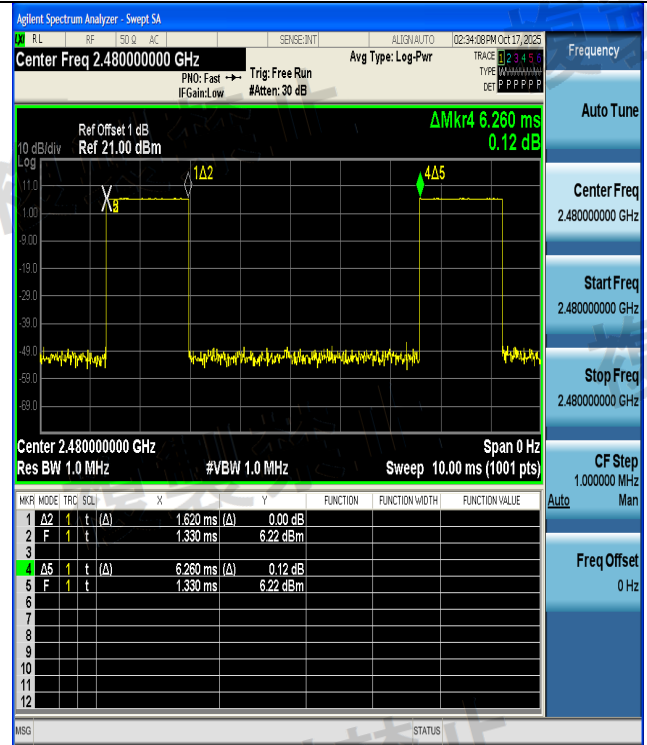


Test Data: BDR

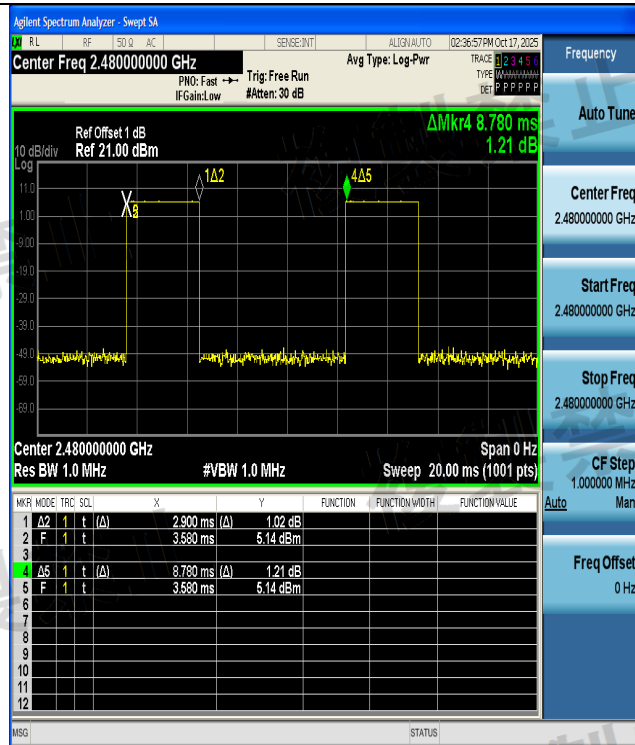
2480MHz DH1



2480MHz DH3

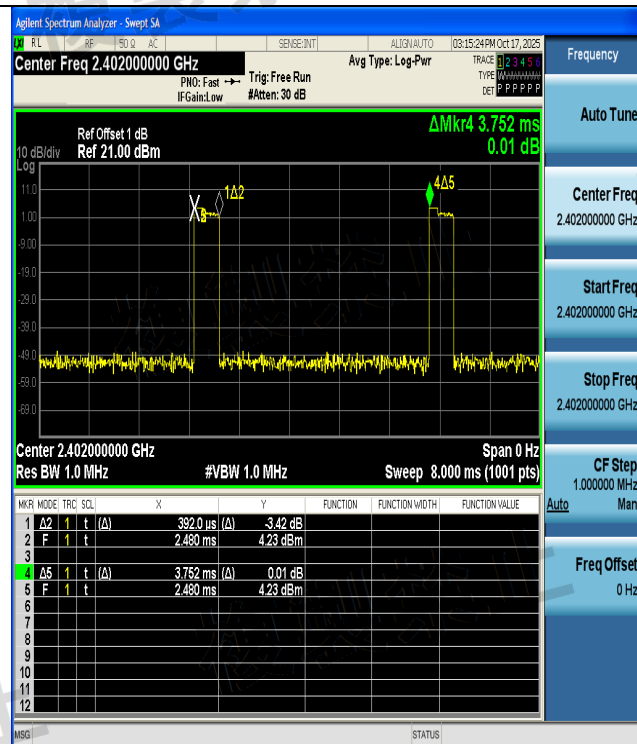


2480MHz DH5



Test Data: EDR 2M

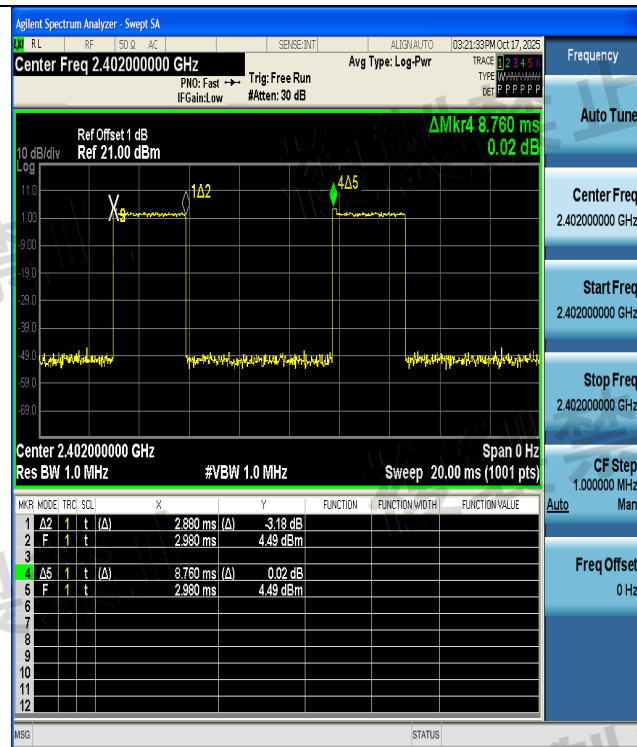
2402MHz DH1



2402MHz DH3

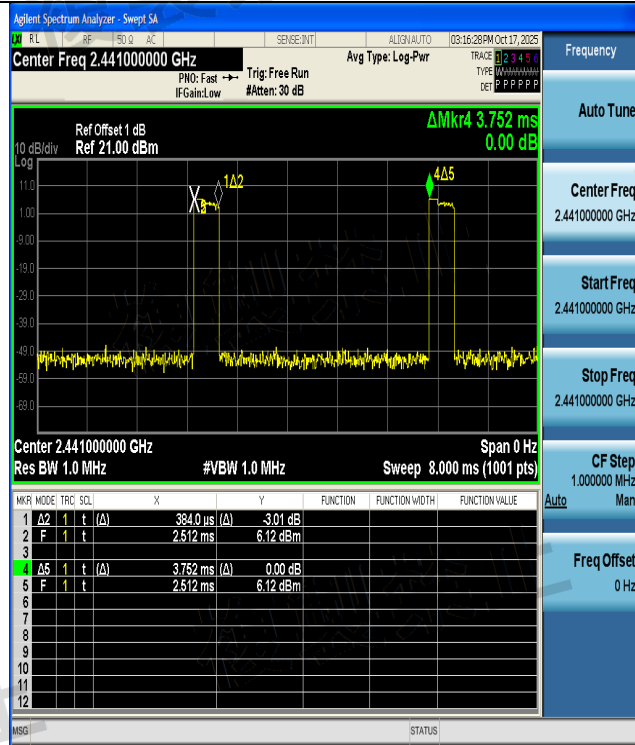


2402MHz DH5

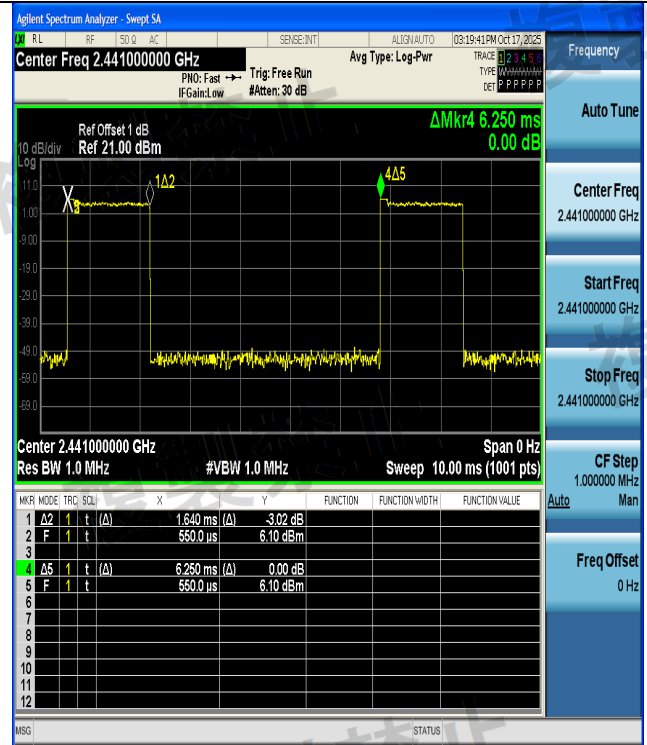


Test Data: EDR 2M

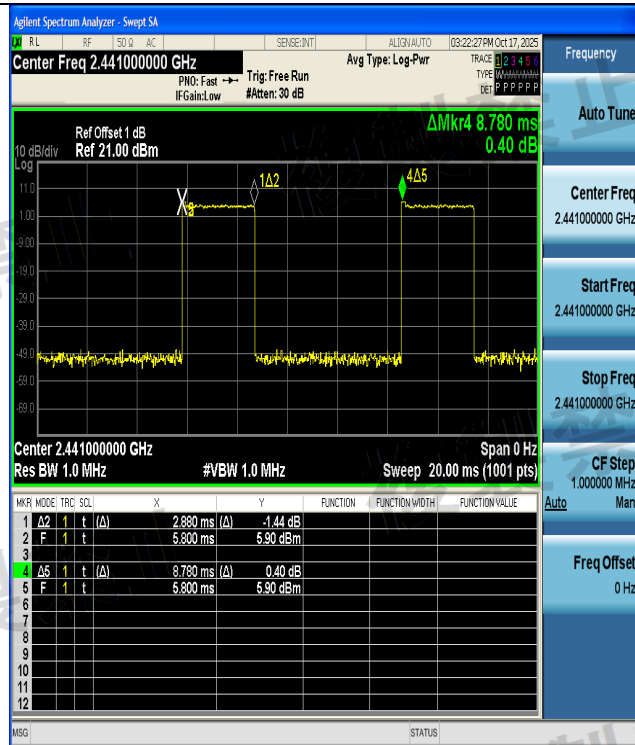
2441MHz DH1



2441MHz DH3

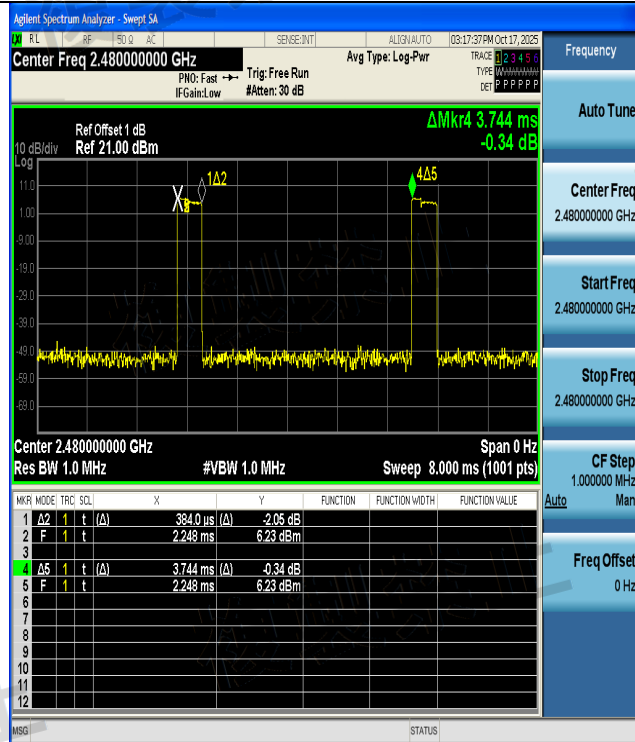


2441MHz DH5

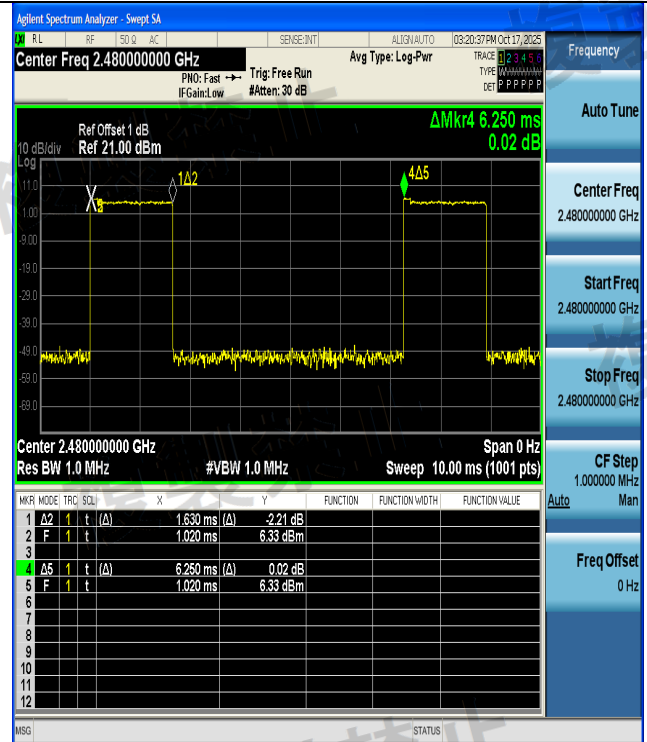


Test Data: EDR 2M

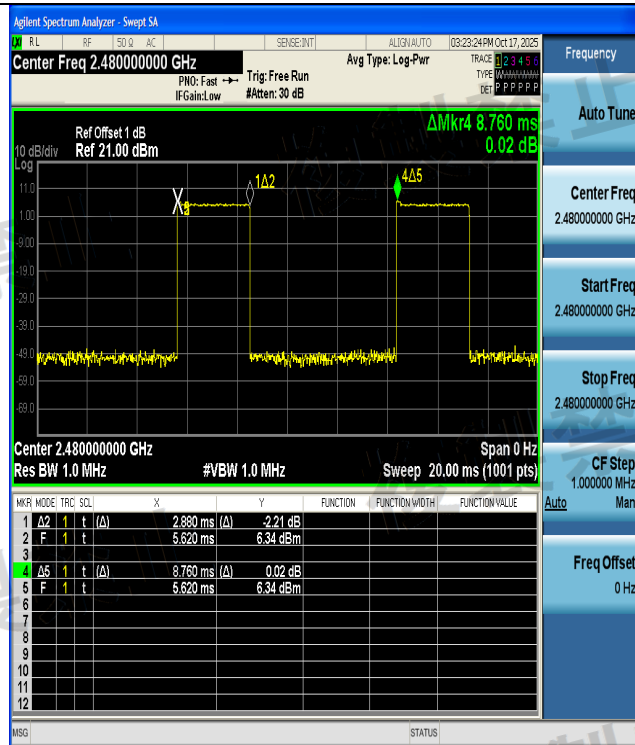
2480MHz DH1



2480MHz DH3

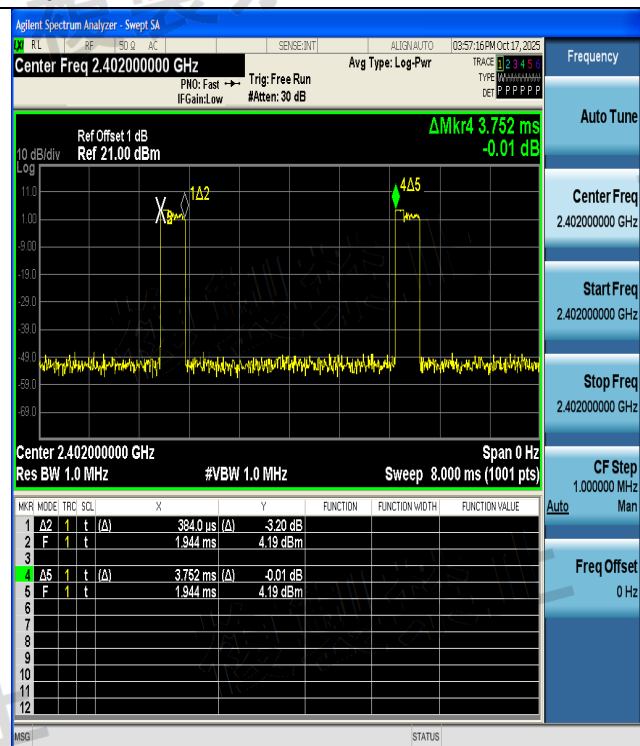


2480MHz DH5

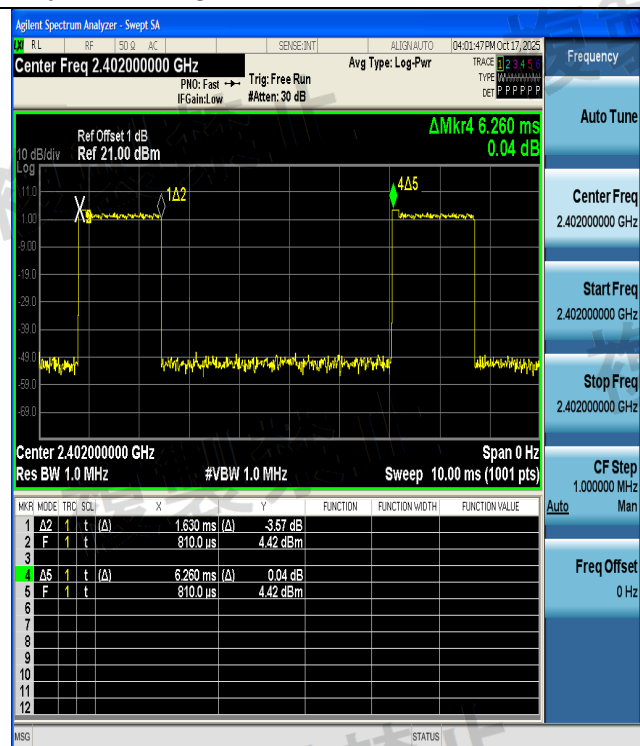


Test Data: EDR 3M

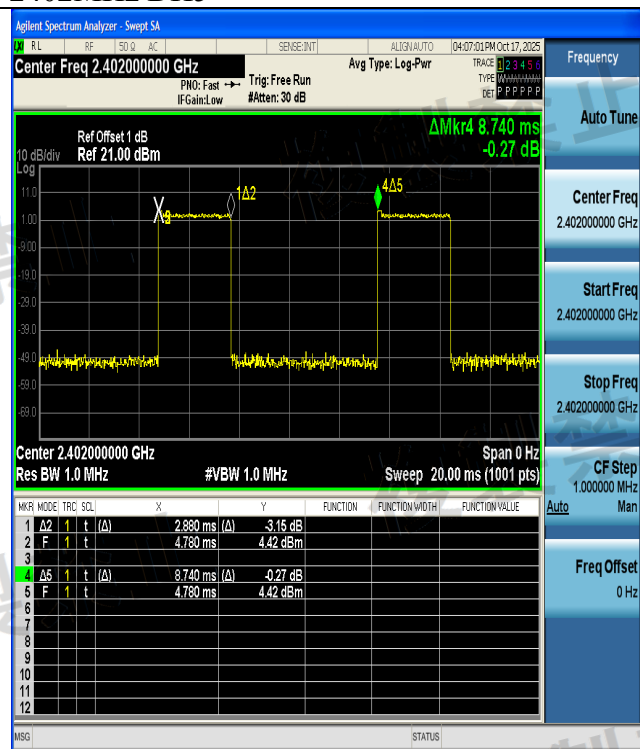
2402MHz DH1



2402MHz DH3

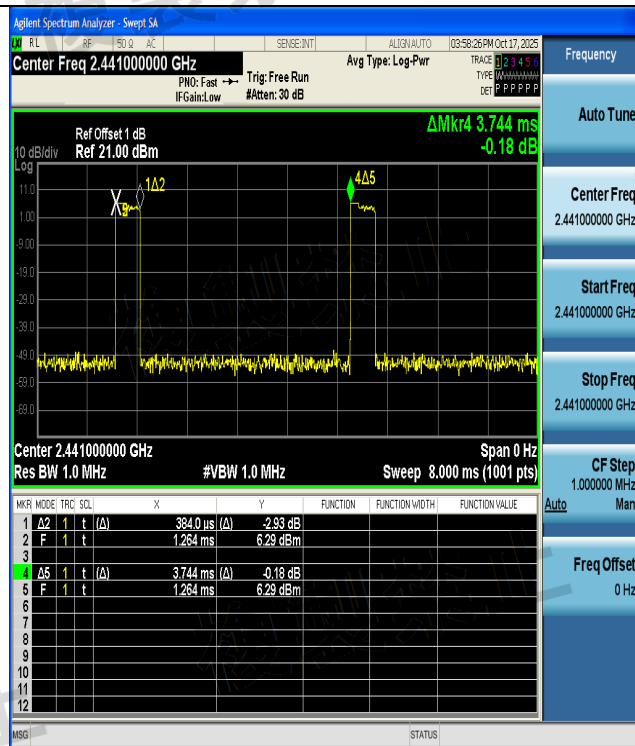


2402MHz DH5

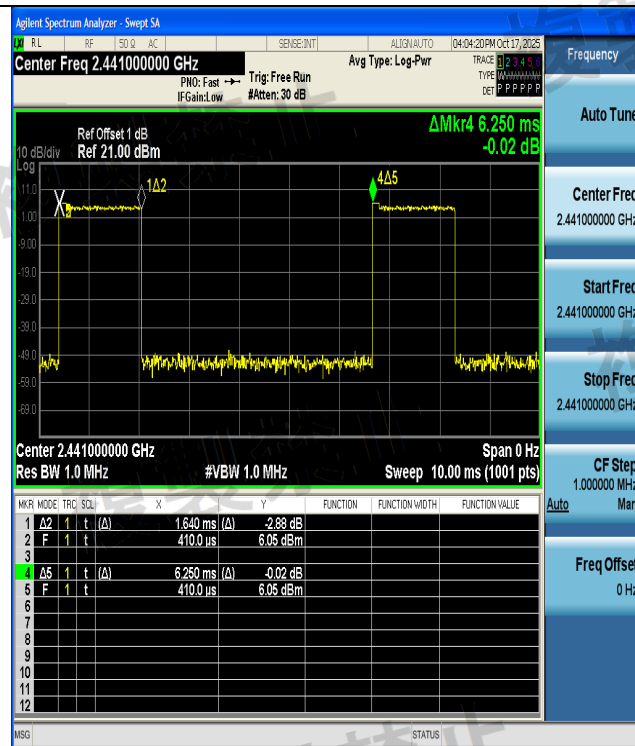


Test Data: EDR 3M

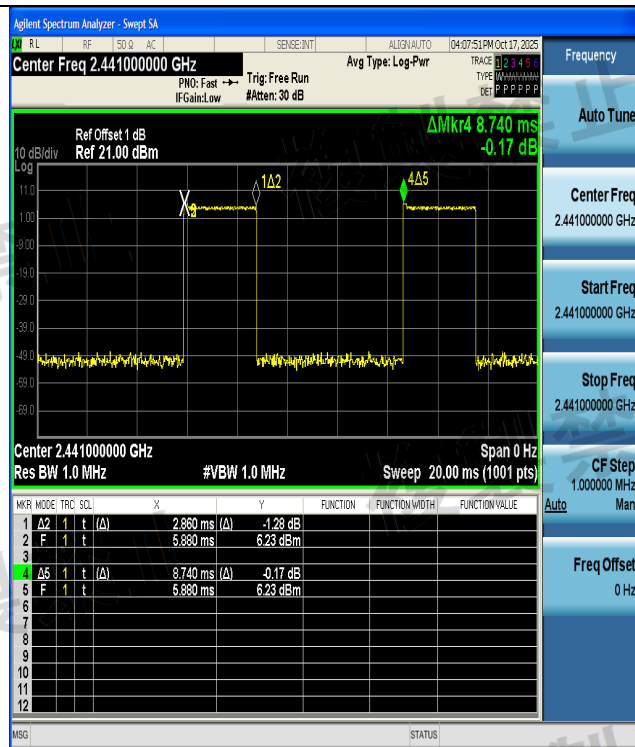
2441MHz DH1



2441MHz DH3

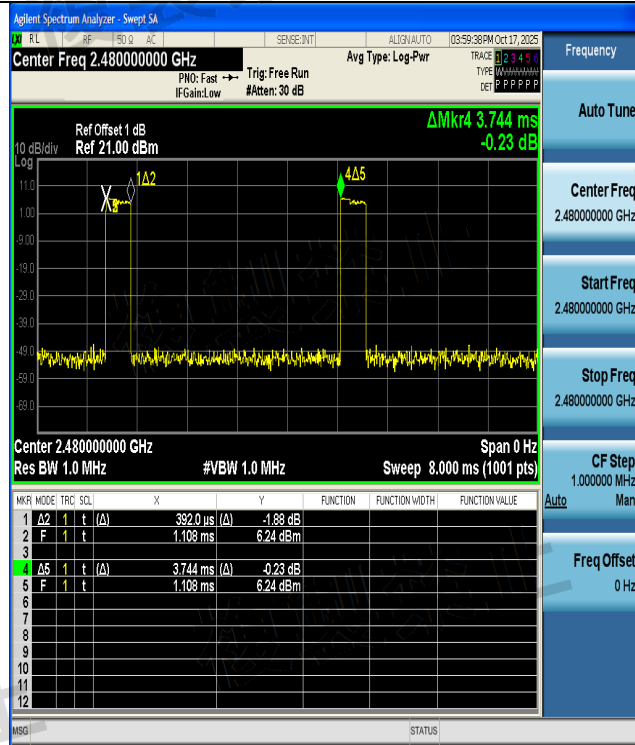


2441MHz DH5

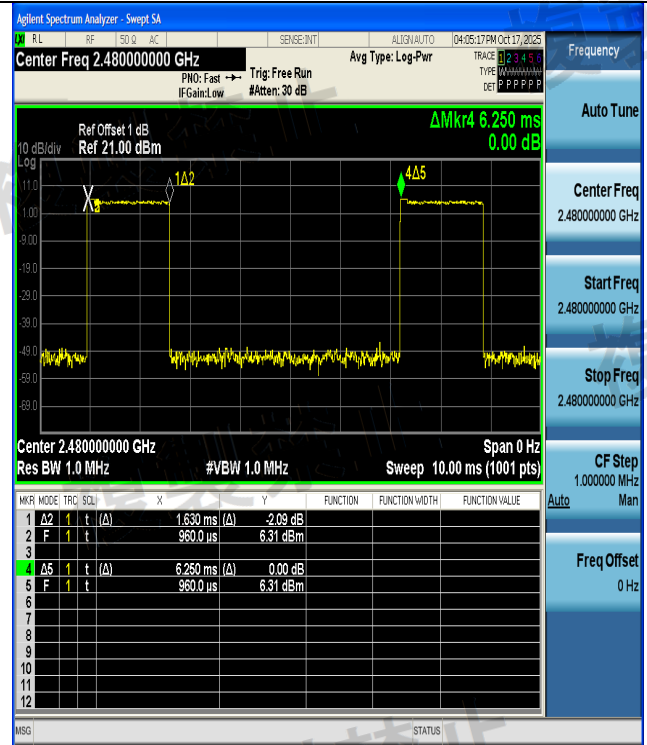


Test Data: EDR 3M

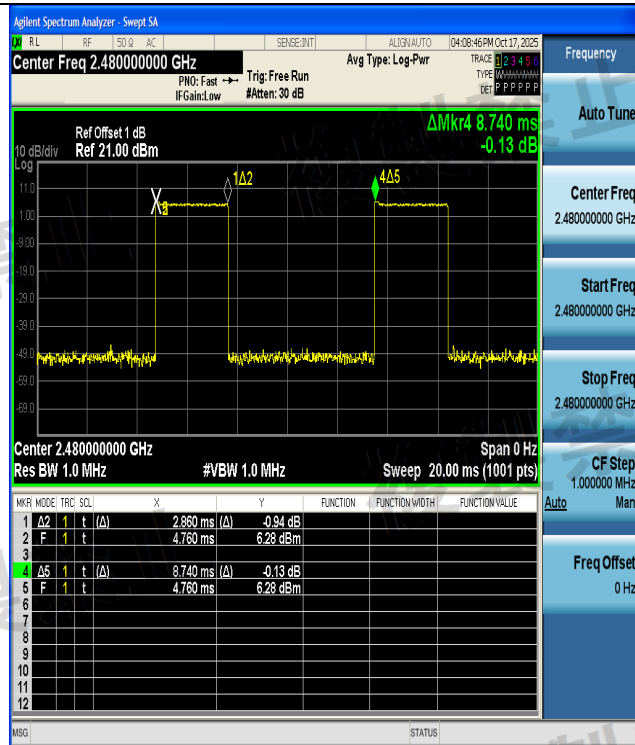
2480MHz DH1



2480MHz DH3



2480MHz DH5



4.8 Angular Width of Principal Radiation (AWPR)

The angular width of principal radiation (AWPR), which follows from the antenna pattern specifications, shall satisfy the expression $360/A$ degree.

To be assessed:

$AWPR < 360/A$ (degree)

A represent the value determined by dividing equivalent isotropic radiated power by the value obtained by applying an antenna power with the mean power (3mW for BT; 10mW for Wifi/ BLE) to the transmitting antenna with its absolute gain being 2.14 dBi.

Ambient temperature: 25°C

Relative humidity: 60%

Test Date: 2025/10/17

BR Antenna gain=3dBi

		Channel Low	Channel Mid	Channel High
Normal Voltage 24 V	Conducted power density (mW/MHz)	0.144	0.208	0.2
	Radiated power density (dBm/MHz)	-5.416	-3.828	-3.998
	Radiated power density (mW/MHz)	0.287	0.414	0.398
	Constant A	$0.287/4.91 < 1$	$0.414/4.91 < 1$	$0.398/4.91 < 1$
Upper Voltage 26.4V	Conducted power density (mW/MHz)	0.141	0.207	0.201
	Radiated power density (dBm/MHz)	-5.505	-3.847	-3.967
	Radiated power density (mW/MHz)	0.282	0.412	0.401
	Constant A	$0.282/4.91 < 1$	$0.412/4.91 < 1$	$0.401/4.91 < 1$
Lower Voltage 21.6 V	Conducted power density (mW/MHz)	0.14	0.205	0.198
	Radiated power density (dBm/MHz)	-5.552	-3.882	-4.037
	Radiated power density (mW/MHz)	0.279	0.409	0.395
	Constant A	$0.279/4.91 < 1$	$0.409/4.91 < 1$	$0.395/4.91 < 1$

In these cases, according to article 49.20 (f)(2) of the Regulations the constant A should be equalized to 1.
As a result AWPR, 360 degrees, which is always satisfied.

EDR1 Antenna gain=3dBi

		Channel Low	Channel Mid	Channel High
Normal Voltage 24 V	Conducted power density (mW/MHz)	0.127	0.192	0.193
	Radiated power density (dBm/MHz)	-5.957	-4.157	-4.143
	Radiated power density (mW/MHz)	0.254	0.384	0.385
	Constant A	0.254/4.91<1	0.384/4.91<1	0.385/4.91<1
Upper Voltage 26.4V	Conducted power density (mW/MHz)	0.124	0.187	0.188
	Radiated power density (dBm/MHz)	-6.082	-4.279	-4.268
	Radiated power density (mW/MHz)	0.246	0.373	0.374
	Constant A	0.246/4.91<1	0.373/4.91<1	0.374/4.91<1
Lower Voltage 21.6 V	Conducted power density (mW/MHz)	0.125	0.189	0.19
	Radiated power density (dBm/MHz)	-6.029	-4.229	-4.213
	Radiated power density (mW/MHz)	0.25	0.378	0.379
	Constant A	0.25/4.91<1	0.378/4.91<1	0.379/4.91<1

In these cases, according to article 49.20 (f)(2) of the Regulations the constant A should be equalized to 1.
 As a result AWPR, 360 degrees, which is always satisfied.

EDR2 Antenna gain=3dBi

		Channel Low	Channel Mid	Channel High
Normal Voltage 24 V	Conducted power density (mW/MHz)	0.125	0.189	0.191
	Radiated power density (dBm/MHz)	-6.041	-4.233	-4.181
	Radiated power density (mW/MHz)	0.249	0.377	0.382
	Constant A	0.249/4.91<1	0.377/4.91<1	0.382/4.91<1
Upper Voltage 26.4V	Conducted power density (mW/MHz)	0.125	0.189	0.191
	Radiated power density (dBm/MHz)	-6.034	-4.241	-4.199
	Radiated power density (mW/MHz)	0.249	0.377	0.38
	Constant A	0.249/4.91<1	0.377/4.91<1	0.38/4.91<1
Lower Voltage 21.6 V	Conducted power density (mW/MHz)	0.125	0.19	0.192
	Radiated power density (dBm/MHz)	-6.029	-4.221	-4.174
	Radiated power density (mW/MHz)	0.25	0.378	0.382
	Constant A	0.25/4.91<1	0.378/4.91<1	0.382/4.91<1

In these cases, according to article 49.20 (f)(2) of the Regulations the constant A should be equalized to 1.
 As a result AWPR, 360 degrees, which is always satisfied.

BR WITH AFH Antenna gain=3dBi

		Channel Low	Channel Mid	Channel High
Normal Voltage 24 V	Conducted power density (mW/MHz)	0.515	0.699	0.673
	Radiated power density (dBm/MHz)	0.118	1.447	1.278
	Radiated power density (mW/MHz)	1.027	1.395	1.342
	Constant A	1.027/4.91<1	1.395/4.91<1	1.342/4.91<1
Upper Voltage 26.4V	Conducted power density (mW/MHz)	0.499	0.662	0.653
	Radiated power density (dBm/MHz)	-0.017	1.212	1.151
	Radiated power density (mW/MHz)	0.996	1.322	1.303
	Constant A	0.996/4.91<1	1.322/4.91<1	1.303/4.91<1
Lower Voltage 21.6 V	Conducted power density (mW/MHz)	0.481	0.66	0.652
	Radiated power density (dBm/MHz)	-0.175	1.194	1.139
	Radiated power density (mW/MHz)	0.96	1.316	1.3
	Constant A	0.96/4.91<1	1.316/4.91<1	1.3/4.91<1

In these cases, according to article 49.20 (f)(2) of the Regulations the constant A should be equalized to 1.
As a result AWPR, 360 degrees, which is always satisfied.

EDR1 WITH AFH Antenna gain=3dBi

		Channel Low	Channel Mid	Channel High
Normal Voltage 24 V	Conducted power density (mW/MHz)	0.45	0.682	0.684
	Radiated power density (dBm/MHz)	-0.463	1.338	1.351
	Radiated power density (mW/MHz)	0.899	1.361	1.365
	Constant A	0.899/4.91<1	1.361/4.91<1	1.365/4.91<1
Upper Voltage 26.4V	Conducted power density (mW/MHz)	0.48	0.642	0.653
	Radiated power density (dBm/MHz)	-0.183	1.076	1.146
	Radiated power density (mW/MHz)	0.959	1.281	1.302
	Constant A	0.959/4.91<1	1.281/4.91<1	1.302/4.91<1
Lower Voltage 21.6 V	Conducted power density (mW/MHz)	0.462	0.638	0.649
	Radiated power density (dBm/MHz)	-0.353	1.047	1.123
	Radiated power density (mW/MHz)	0.922	1.273	1.295
	Constant A	0.922/4.91<1	1.273/4.91<1	1.295/4.91<1

In these cases, according to article 49.20 (f)(2) of the Regulations the constant A should be equalized to 1.
 As a result AWPR, 360 degrees, which is always satisfied.

EDR2 WITH AFH Antenna gain=3dBi

		Channel Low	Channel Mid	Channel High
Normal Voltage 24 V	Conducted power density (mW/MHz)	0.436	0.661	0.669
	Radiated power density (dBm/MHz)	-0.607	1.202	1.254
	Radiated power density (mW/MHz)	0.87	1.319	1.335
	Constant A	0.87/4.91<1	1.319/4.91<1	1.335/4.91<1
Upper Voltage 26.4V	Conducted power density (mW/MHz)	0.441	0.681	0.688
	Radiated power density (dBm/MHz)	-0.559	1.334	1.376
	Radiated power density (mW/MHz)	0.879	1.36	1.373
	Constant A	0.879/4.91<1	1.36/4.91<1	1.373/4.91<1
Lower Voltage 21.6 V	Conducted power density (mW/MHz)	0.443	0.688	0.695
	Radiated power density (dBm/MHz)	-0.535	1.374	1.421
	Radiated power density (mW/MHz)	0.884	1.372	1.387
	Constant A	0.884/4.91<1	1.372/4.91<1	1.387/4.91<1

In these cases, according to article 49.20 (f)(2) of the Regulations the constant A should be equalized to 1.
 As a result AWPR, 360 degrees, which is always satisfied.

BLE Antenna gain=3dBi

		Channel Low	Channel Mid	Channel High
Normal Voltage 24 V	Conducted power (mW)	2.917	4.352	4.281
	Radiated power (dBm)	7.65	9.387	9.315
	Radiated power (mW)	5.821	8.684	8.541
	Constant A	5.821/16.4<1	8.684/16.4<1	8.541/16.4<1
Upper Voltage 26.4V	Conducted power (mW)	2.871	4.333	4.298
	Radiated power (dBm)	7.581	9.368	9.333
	Radiated power (mW)	5.729	8.646	8.576
	Constant A	5.729/16.4<1	8.646/16.4<1	8.576/16.4<1
Lower Voltage 21.6 V	Conducted power (mW)	2.873	4.324	4.301
	Radiated power (dBm)	7.584	9.359	9.336
	Radiated power (mW)	5.733	8.628	8.582
	Constant A	5.733/16.4<1	8.628/16.4<1	8.582/16.4<1

In these cases, according to article 49.20 (f)(2) of the Regulations the constant A should be equalized to 1.
 As a result AWPR, 360 degrees, which is always satisfied.

4.9 Carrier Sense Capability

4.9.1 Limit

Shall not transmit when received signal level is above 100 mV

Automatic cessation of transmitting is required when the electric field strength is exceeding E (mV/m):

Antenna Voltage (in dBm) = $22.79 + \max. \text{ antenna Gain} - 20 \times \log f$ (f in MHz)

This voltage will be generated in the direction of the max. Gain.

BT

	Antenna Gain (dBi)		dBm
Channel Low 2402MHz:	Pcs = $22.79 + 3 - 20 \times \log (2402) =$		-41.82
Channel Mid 2441MHz:	Pcs = $22.79 + 3 - 20 \times \log (2441) =$		-41.96
Channel High 2480MHz:	Pcs = $22.79 + 3 - 20 \times \log (2480) =$		-42.1

BLE

	Antenna Gain (dBi)		dBm
Channel Low 2402MHz:	Pcs = $22.79 + 3 - 20 \times \log (2402) =$		-41.82
Channel Mid 2441MHz:	Pcs = $22.79 + 3 - 20 \times \log (2441) =$		-41.96
Channel High 2480MHz:	Pcs = $22.79 + 3 - 20 \times \log (2480) =$		-42.1

4.9.2 Measurement Equipment Used

Refer to section Appendix A: Equipment List for detail.

4.9.3 Test Setup

Refer to section 4.1.3 for detail.

4.9.4 Test Procedure

1. Remove the antenna from the EUT and then connect a low loss RF cable from the antenna port through splitter to spectrum.
2. Set center frequency of spectrum analyzer = operating frequency.
3. Set the spectrum analyzer as RBW, VBW=1MHz, Span = 50MHz, Sweep = Auto.
4. EUT link to device set it in normal mode.
5. Used spectrum analyzer trigger function and delta mark function.

4.9.5 Test Results

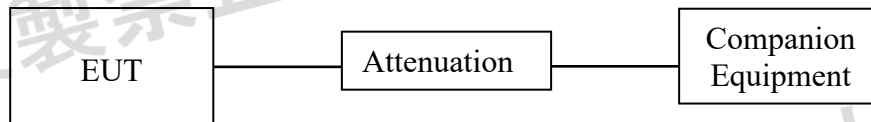
Pass

4.10 Interference Prevention Function

4.10.1 Limit

Radio equipment used mainly on the same premises and automatically transmits or receives identification code.

4.10.2 Test Setup



4.10.3 Test Procedure

- 1.Set EUT under operating mode and link up with companion equipment.
- 2.Check communication status between EUT and companion equipment.
- 3.Confirm the status.

4.10.4 Test Results

Pass

5. Appendix

5.1 Appendix A: Equipment List

Location Conducted	Equipment Name	Brand	Model	S/N	Last Cal. Date	Next Cal. Date	Calibration Body	Calibration Method
Conducted	Power Meter	Anritsu	ML2495A	1116010	09/23/2025	09/23/2026	ETC	c
Conducted	Power Sensor	Anritsu	MA2411B	34NKF50	09/23/2025	09/23/2026	ETC	c
Conducted	Temperature Chamber	KSON	THS-B4H100	2287	05/23/2025	05/23/2026	ETC	c
Conducted	DC Power supply	ABM	8185D	N/A	12/27/2024	12/27/2025	ETC	c
Conducted	AC Power supply	EXTECH	CFC105W	NA	N/A	N/A	N/A	N/A
Conducted	Spectrum analyzer	Keysight	N9010A	MY56070257	09/25/2024	09/25/2025	ETC	c
Conducted	Test Software	DARE	Radiation Ver:2013.1.23	NA	NA	NA	N/A	N/A
Conducted	Wideband Radio Comm. Tester	R&S	CMW500	1201.002K50108793-JG	10/26/2024	10/26/2025	ETC	c
Conducted	BT Simulator	Agilent	N4010A	MY48100200	NA	NA	N/A	N/A
Conducted (TS8997)	Wideband Radio Comm. Tester	R&S	CMW500	168811	09/15/2025	09/15/2026	ETC	c
Conducted (TS8997)	UP/DOWN convertor	R&S	CMW-Z800A	100566	09/15/2025	09/15/2026	R&S	c
Conducted (TS8997)	Signal Generator	R&S	SMB100A	183701	09/09/2025	09/09/2026	R&S	c
Conducted (TS8997)	Vector Signal Generator	R&S	SMM100A	101908	09/09/2025	09/09/2026	R&S	c
Conducted (TS8997)	Signal analyzer 40GHz	R&S	FSV40	101884	09/12/2025	09/12/2026	ETC	c
Conducted (TS8997)	OSP150 extension unit CAM-BUS	R&S	OSP150	101107	09/11/2025	09/11/2026	ETC	c
Conducted (TS8997)	Test Software	R&S	EMC32 Ver: 12.00.00	NA	NA	NA	N/A	N/A

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)

5.2 Appendix B: Uncertainty of Measurement

ISO/IEC 17025 requires that an estimate of measurement uncertainties associated with the emissions test results be included in the report. The measurement uncertainties given below are based on a 95% confidence level (based on a coverage factor ($k=2$)).

Parameters	Uncertainty ($k=2$)
Radio frequency	$\pm 1.5\%$
RF power, conducted	± 2.2 dB
Power Spectral Density, conducted	± 2.0 dB
Occupied Bandwidth	± 0.62 dB
Spurious emission, conducted	± 0.86 dB
Temperature	± 1.4 °C

5.3 Appendix C: Photographs of Setup



5.4 Appendix D: Photographs of EUT

Please refer to the File of ISL-25LR0143P

--- END ---