

TEST REPORT

Report number : KR21181120C

Issue date : 2018/11/20

Applicant : 3i Inc.
101-117, 29, Dongbu-ro, Dong-gu, Daegu, Republic of Korea
Tel. +82-70-4756-2133 Fax. +82-2-6442-8593

Model name : PIVO-R1

Serial number : N/A



Test procedure : Radio equipment according to Certification Ordinance
Article 2 Section 1 No. 19

Date of test : 2018/11/07 ~ 2018/11/14

Name of facility : KRL Co., Ltd.

The results in this report are applicable only to the equipment tested.

This report shall not be re-produced except in full without the written approval of KRL Co.,Ltd.

Tested by :	
	Kwang-Man, Ko
Approved by :	
	Kyu-Hyun, LEE

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Antenna Information

BT BLE

<i>Antenna Type</i>	<i>CERAMIC Antenna</i>
<i>Antenna Gain</i>	<i>3.03 dBi</i>
<i>Frequency Range</i>	<i>2 400 MHz ~ 2 500 MHz</i>
<i>Model no.</i>	<i>RFANT8010080A3T</i>
<i>Manufacturer</i>	<i>PSA Walsin Technology Corporation</i>

F1D

<i>Antenna Type</i>	<i>PCB Pattern Antenna</i>
<i>Antenna Gain</i>	<i>0 dBi</i>
<i>Frequency Range</i>	<i>2 400 MHz ~ 2 480 MHz</i>
<i>Model no.</i>	<i>PIVO-R1 Antenna</i>
<i>Manufacturer</i>	<i>3i Inc.</i>

Measurement equipment list

USE	Equipment	Company	Model No.	Serial No.	Calibrated by	Cal. Method	Cal. Due	Cal. Date
X	FREQUENCY COUNTER	EIP	28B	9205-00369	KTICC	/(c)	Oct. 2019	Oct. 18, 2018
X	SPECTRUM ANALYZER	ADVANTEST	R3273	110501578	KTICC	/(c)	Oct. 2019	Oct. 26, 2018
X	Auto Range DC Power Supply	ITECH	IT6721	600104011717610069	BCS	/(c)	Jun. 2019	Jun. 1, 2018
X	USB Average Power Sensor	KEYSIGHT	U2004A	MY53340013	BCS	/(c)	Oct. 2019	Oct. 18, 2018

Note1: The calibration of measurement equipment is valid for one year period.

Note2: "X" used equipment.

Note3: Cal.Method ...

a) : 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)

b) : Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Law (Law No. 51 of 1992)

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

d) : Calibration conducted by using 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)

Specified Radio Equipment Test Report

Test Date : 2018-11-07 ~ 2018-11-14

Class: Article 2 Paragraph 1 Item 19	Frequency : 2 402 MHz ~ 2 480 MHz
Rated Power : 1 mW	Antenna Gain : 3.03 dBi
Rated Power : 0.00 dBm	E.I.R.P : 3.03 dBm
Emission Designator : F1D	
Model Name : PIVO-R1	Test Location : RF TEST ROOM
Serial No. : N/A	Temp / Humid. 22.1 °C / 50.3 %
Type of Emission : BLE	Tested By : Kwang Man, Ko

No.	Test Items	Test ch	Test Frequency MHz	Test Result			Unit	Technical Regulations
				Voltage				
				DC 3.7 V				
1	Frequency	0	2402.0	2402.027739			MHz	50 PPM or less
				11.548			PPM	
		19	2440.0	2440.028184			MHz	
				11.551			PPM	
		39	2480.0	2480.028593			MHz	
				11.529			PPM	
2	Occupied Bandwidth	0	2402.0	4.130			MHz	26MHz or less
		19	2440.0	4.450			MHz	
		39	2480.0	4.510			MHz	
3	Spurious Emission Intensity	0	2402_(1)	-58.05			dBm	(1) Below 2387 MHz : -26dBm (2) 2387 to 2400 MHz : -16dBm (3) 2483.5 to 2496.5 MHz : -16dBm (4) Over 2496.5 MHz : -26dBm
			2402_(2)	-22.60			dBm	
			2402_(3)	-61.12			dBm	
			2402_(4)	-57.38			dBm	
		19	2440_(1)	-61.43			dBm	
			2440_(2)	-60.30			dBm	
			2440_(3)	-60.48			dBm	
			2440_(4)	-57.31			dBm	
		39	2480_(1)	-61.30			dBm	
			2480_(2)	-60.23			dBm	
			2480_(3)	-31.68			dBm	
			2480_(4)	-57.04			dBm	
4	Antenna Power	0	2402.0	0.000783			W	10mW or less Error + 20%-80%
				-21.66			%	
		19	2440.0	0.000615			W	
				-38.48			%	
		39	2480.0	0.000552			W	
				-44.79			%	
5	Spread-spectrum Bandwidth	0	2402.0	0.97			kHz	500kHz or more
		19	2440.0	1.00			kHz	
		39	2480.0	1.01			kHz	
6	Secondary Radiated Emissions	0	2402_(1)	-76.48			dBm	(1) Below 1 GHz : -54dBm (2) 1 GHz or higher : -47dBm
			2402_(2)	-63.88			dBm	
		19	2440_(1)	-74.60			dBm	
			2440_(2)	-64.40			dBm	
		39	2480_(1)	-72.93			dBm	
			2480_(2)	-64.23			dBm	
7	Holding Time						Sec	less than 0.4sec
							Sec	
							Sec	

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Specified Radio Equipment Test Report

Test Date : 2018-11-07 ~ 2018-11-14

Class: Article 2 Paragraph 1 Item 19			Frequency : 2 440 MHz		
Rated Power : 0.08 mW			Antenna Gain : 0 dBi		
Rated Power : -10.97 dBm			E.I.R.P : -10.97 dBm		
Emission Designator : F1D					
Model Name : PIVO-R1			Test Location : RF TEST ROOM		
Serial No. : N/A			Temp / Humid. 22.2 °C / 50.4 %		
Type of Emission : GFSK			Tested By : Kwang Man, Ko		

No.	Test Items	Test ch	Test Frequency MHz	Test Result			Unit	Technical Regulations
				Voltage				
				DC 3.7 V				
1	Frequency	0	2440.0	2439.991543			MHz	50 PPM or less
				-3.466			PPM	
2	Occupied Bandwidth	0	2440.0	0.930			MHz	26MHz or less
3	Spurious Emission Intensity	0	2440__(1)	-45.34			dBm	(1) Below 2387 MHz : -26dBm
			2440__(2)	-69.77			dBm	(2) 2387 to 2400 MHz : -16dBm
			2440__(3)	-68.73			dBm	(3) 2483.5 to 2496.5 MHz : -16dBm
			2440__(4)	-36.30			dBm	(4) Over 2496.5 MHz : -26dBm
4	Antenna Power	0	2440.0	0.000040			W	0.01W /MHz or less Error + 20%-80%
				-50.24			%	
5	Spread-spectrum Bandwidth	0	2440.0	0.520			MHz	500kHz or more
6	Secondary Radiated Emissions	0	2440__(1)	-75.72			dBm	(1) Below 1 GHz : -54dBm
			2440__(2)	-64.96			dBm	(2) 1 GHz or higher : -47dBm
7	Holding Time						Sec	less than 0.4sec
							Sec	
							Sec	

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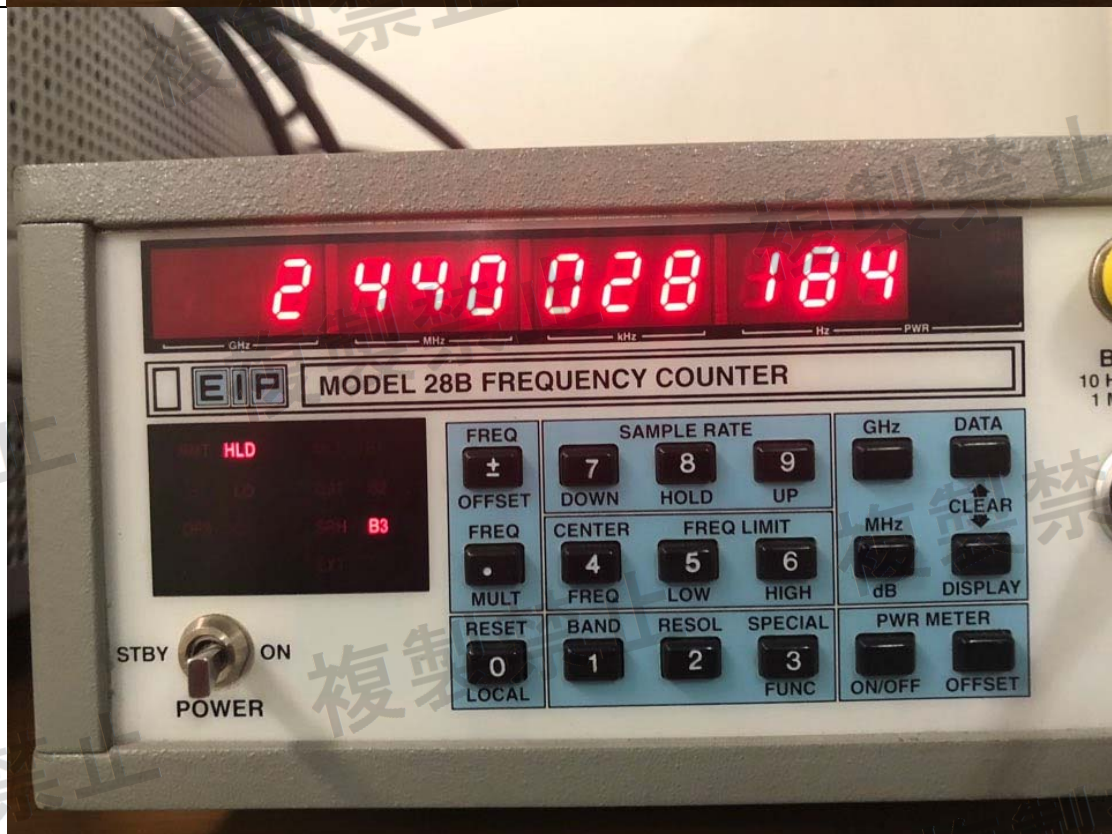
BLE Test Result

Frequency error

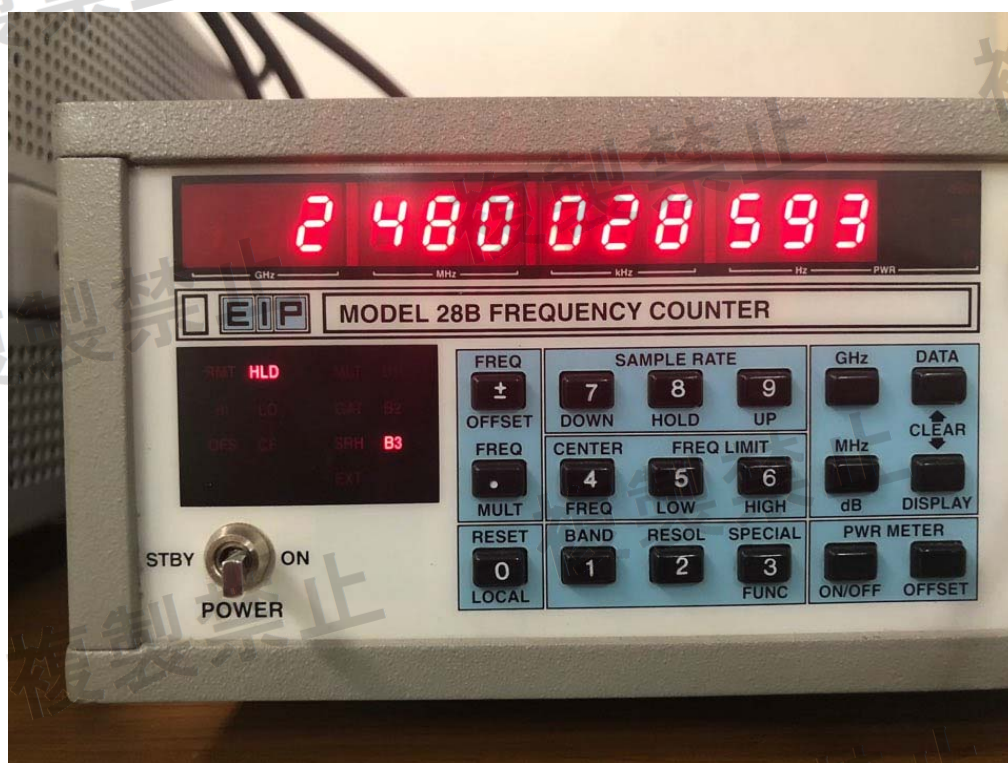
LOW



MID

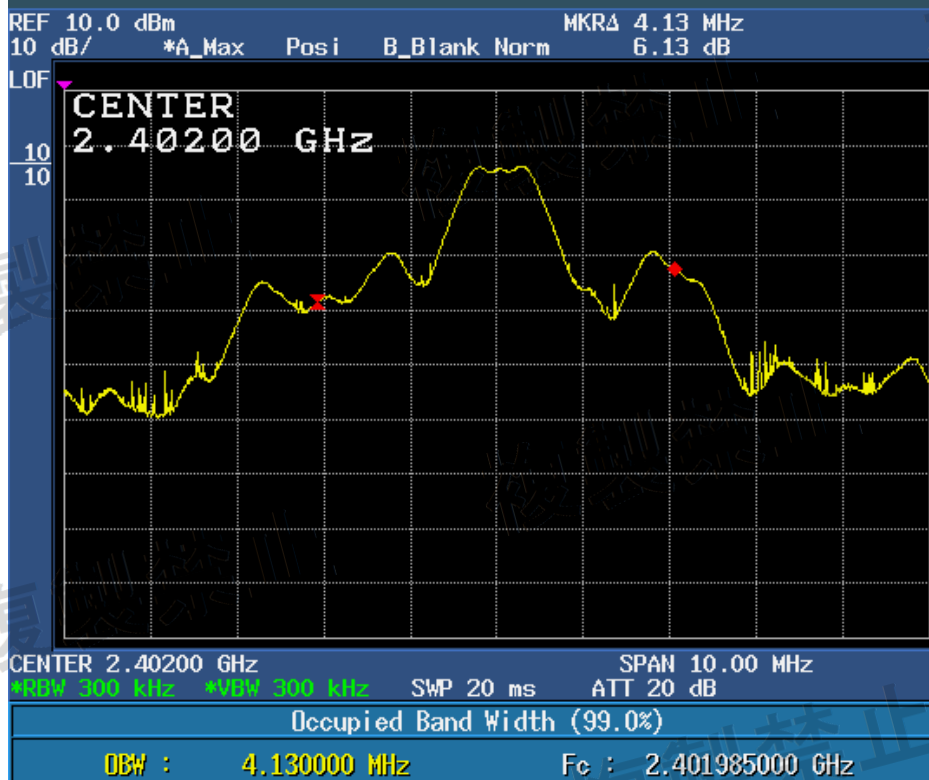


HIGH



Occupied Bandwidth

LOW



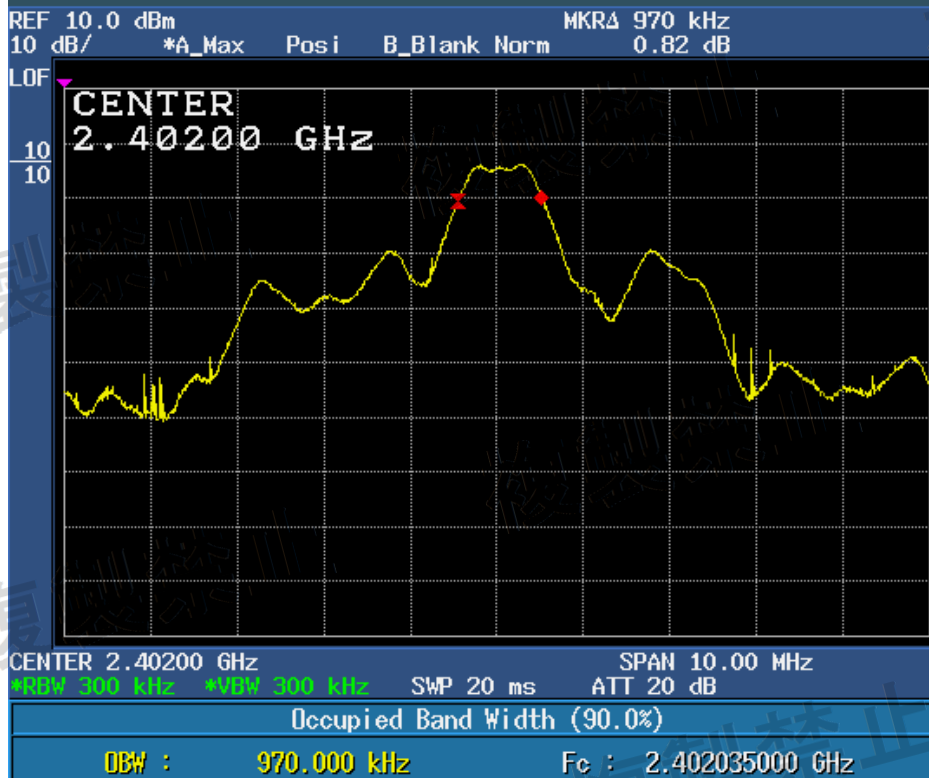
MID





Spread-spectrum Bandwidth

LOW



MID

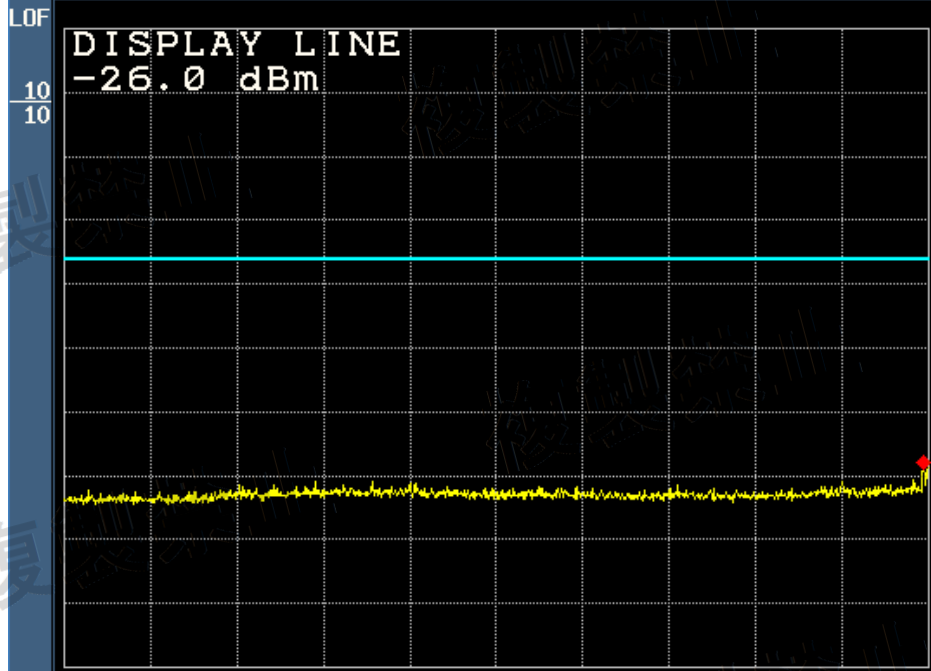




Spurious Emission Intensity

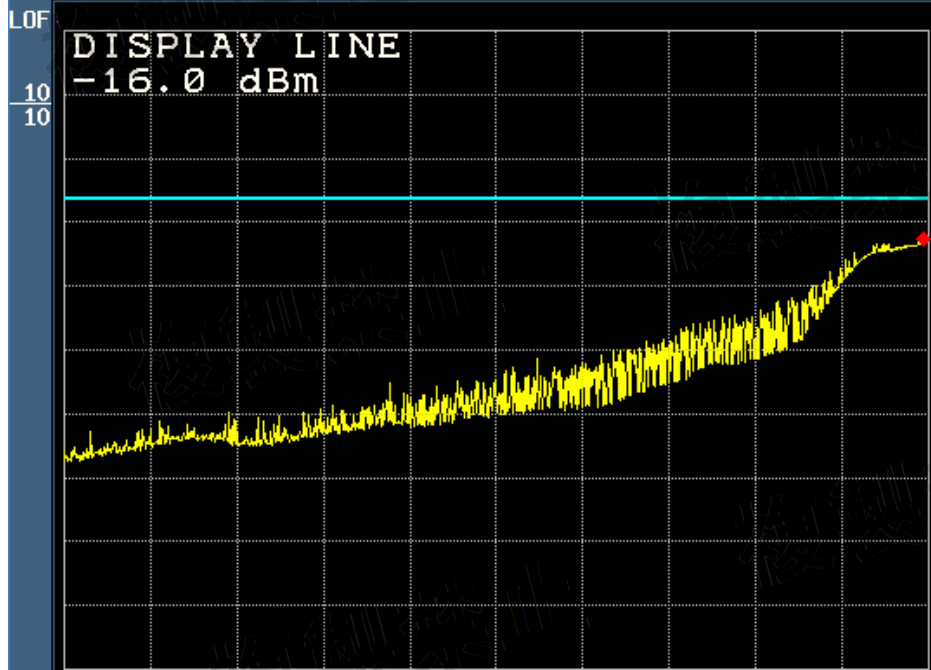
LOW

REF 10.0 dBm DL -26.0 dBm MKR 2.373 GHz
10 dB/ *A_Max Posi B_Blank Norm -58.05 dBm

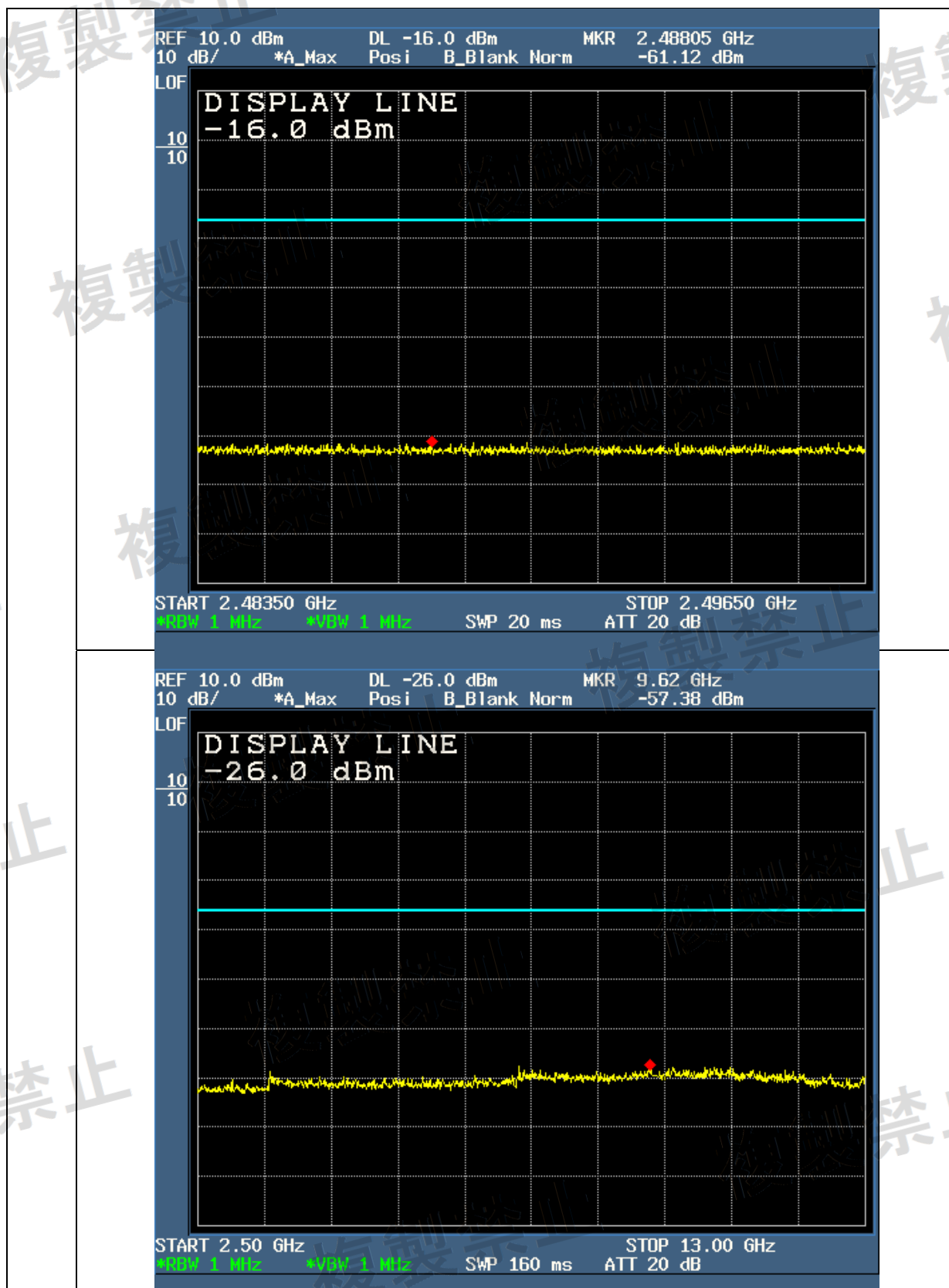


START 10 MHz STOP 2.387 GHz
RBW 1 MHz VBW 1 MHz SLP 40 ms ATT 20 dB

REF 10.0 dBm DL -16.0 dBm MKR 2.39992 GHz
10 dB/ *A_Max Posi B_Blank Norm -22.60 dBm



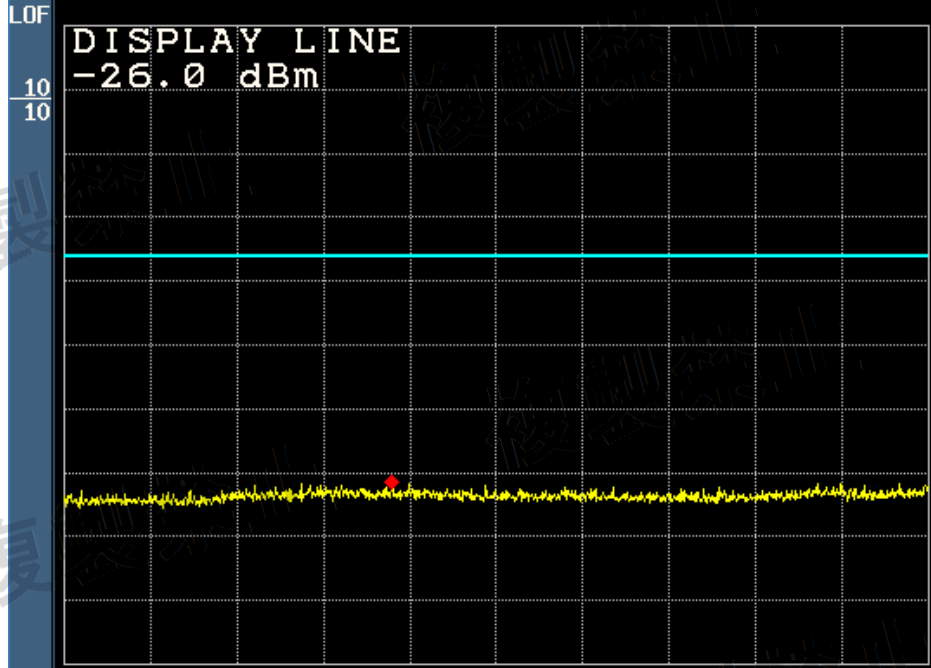
START 2.38700 GHz STOP 2.40000 GHz
RBW 1 MHz VBW 1 MHz SLP 20 ms ATT 20 dB



Spurious Emission Intensity

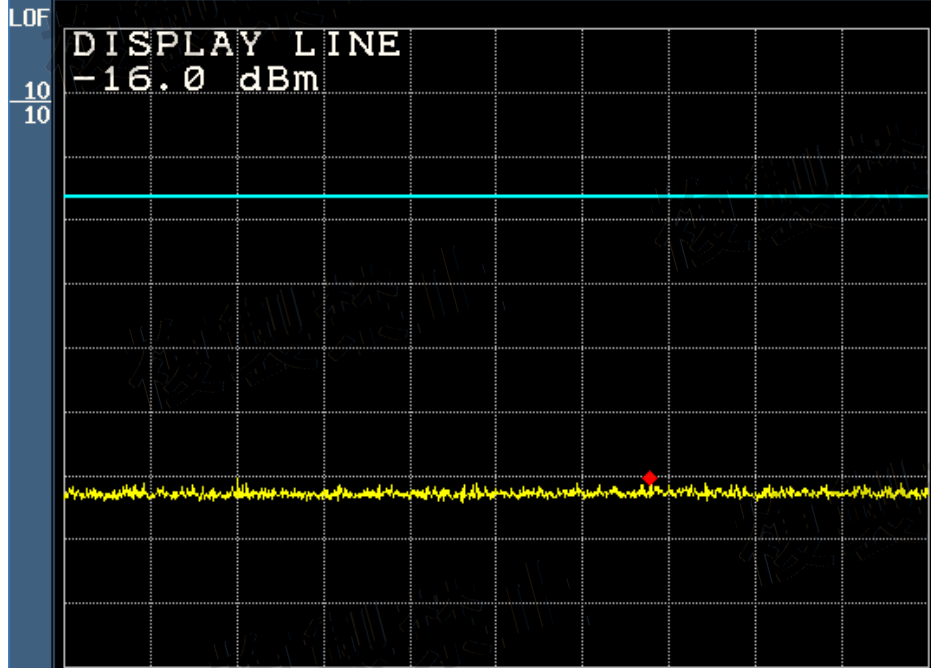
MID

REF 10.0 dBm DL -26.0 dBm MKR 911 MHz
10 dB/ *A_Max Posi B_Blank Norm -61.43 dBm

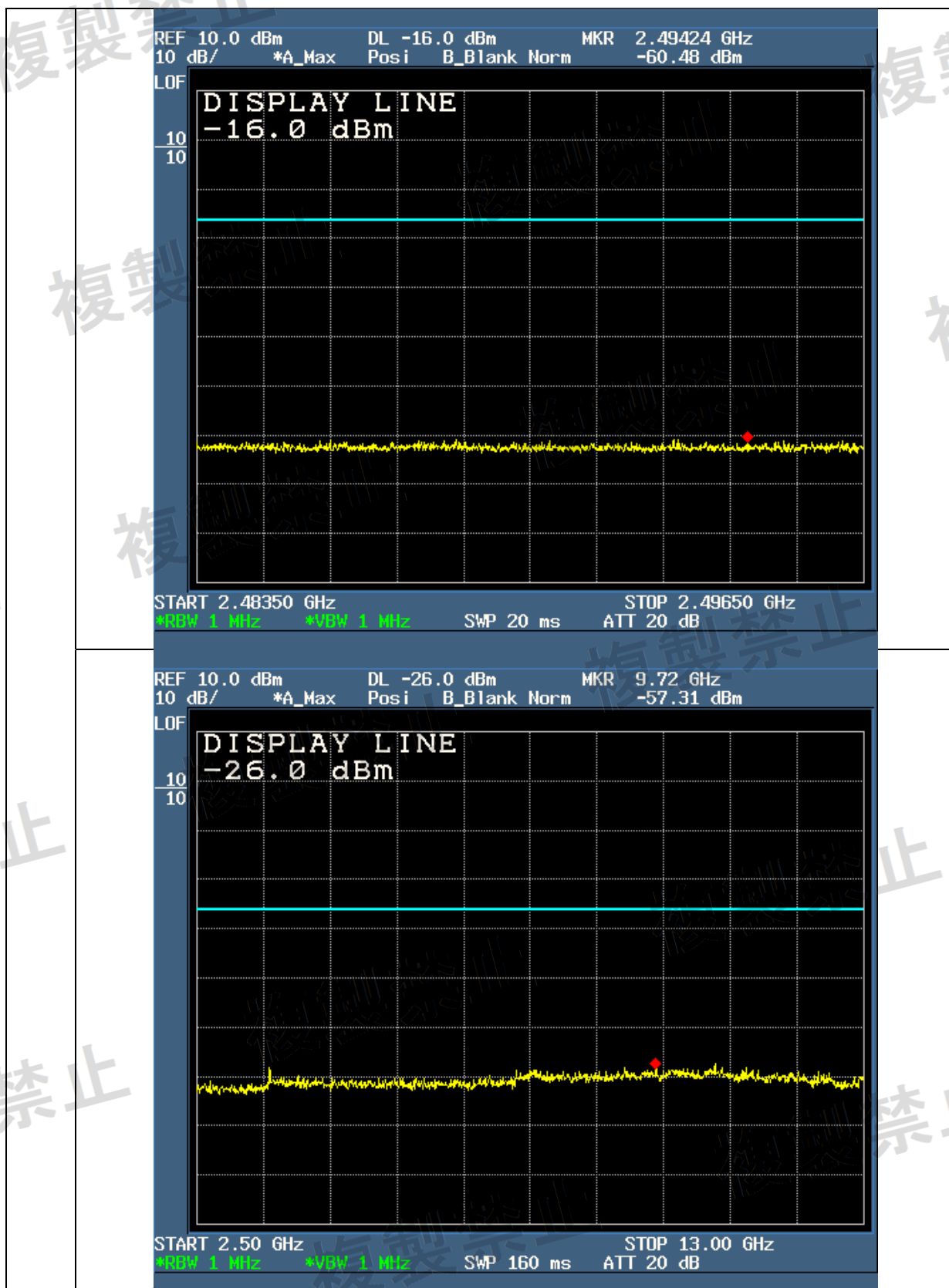


START 10 MHz STOP 2.387 GHz
RBW 1 MHz VBW 1 MHz SwP 40 ms ATT 20 dB

REF 10.0 dBm DL -16.0 dBm MKR 2.39581 GHz
10 dB/ *A_Max Posi B_Blank Norm -60.30 dBm



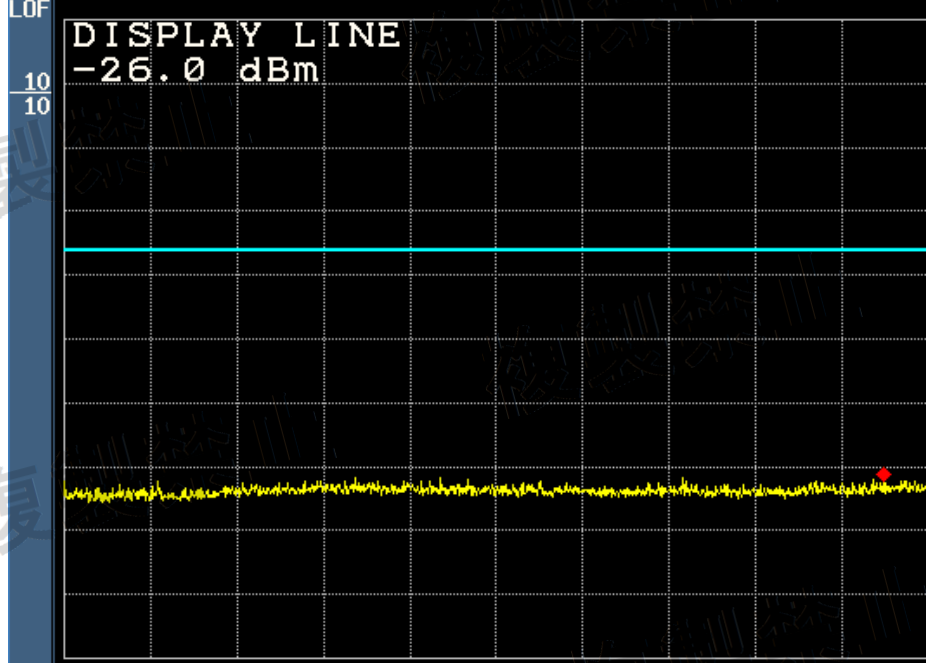
START 2.38700 GHz STOP 2.40000 GHz
RBW 1 MHz VBW 1 MHz SwP 20 ms ATT 20 dB



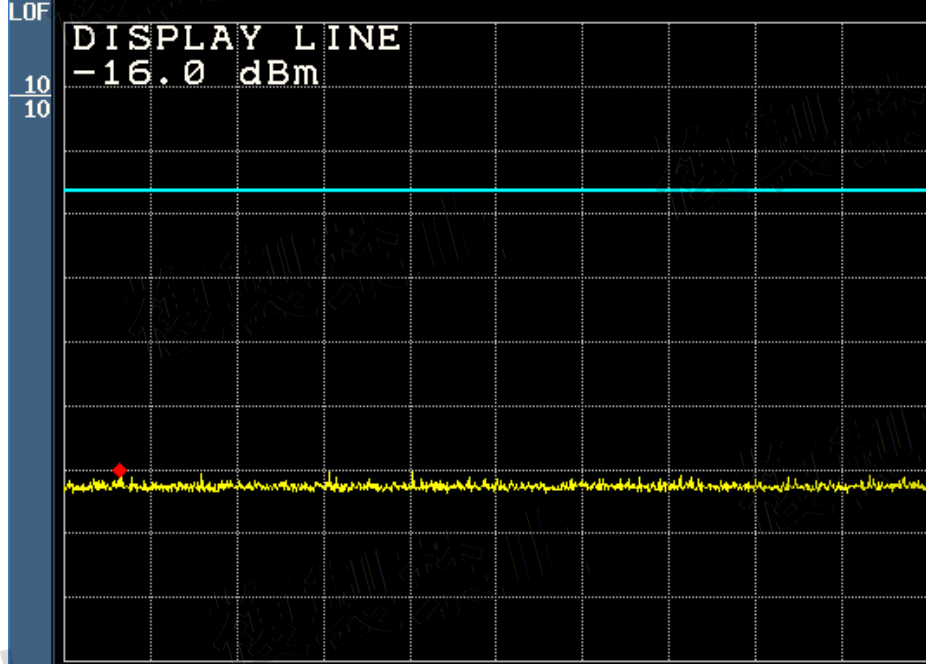
Spurious Emission Intensity

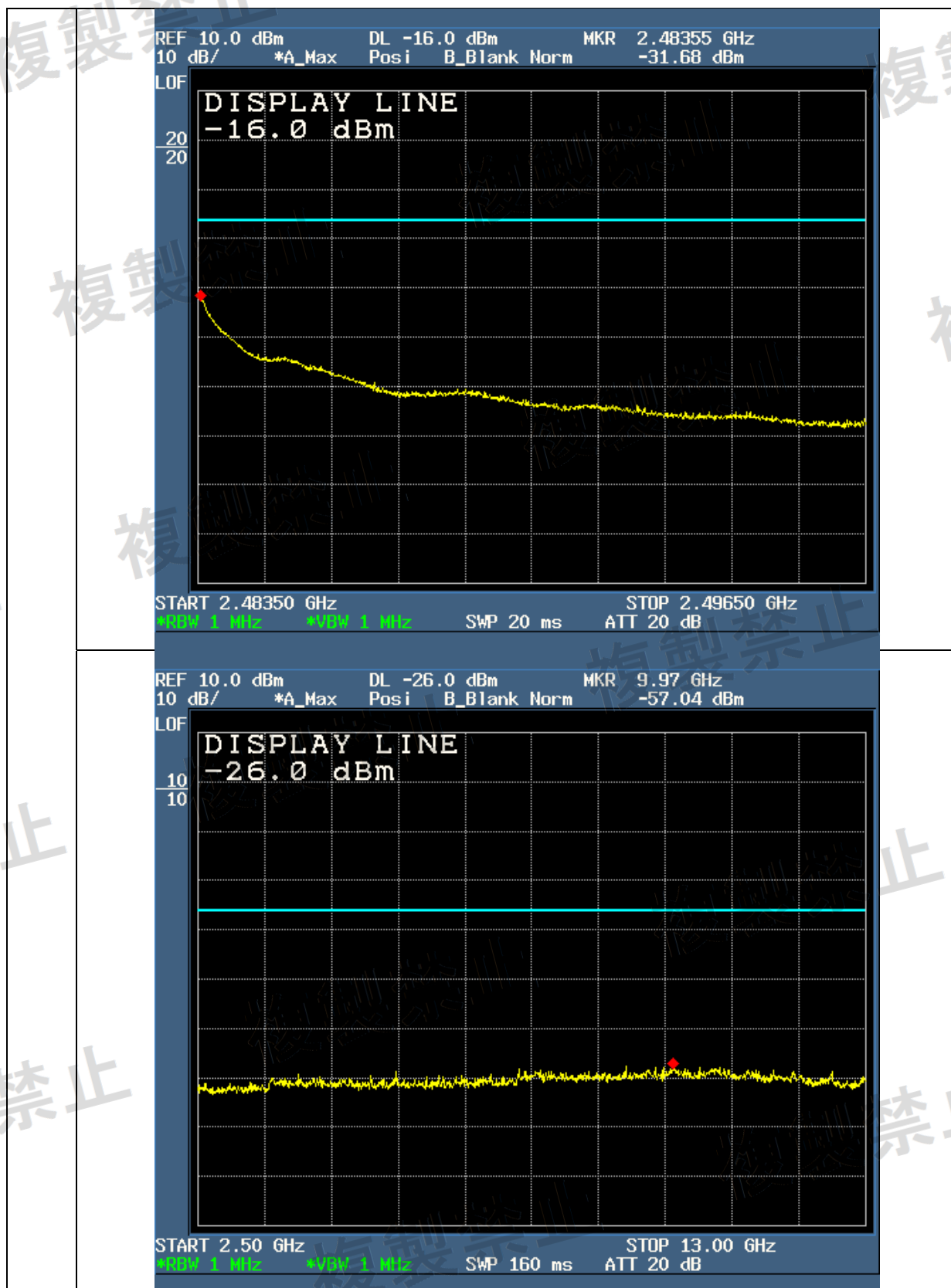
HIGH

REF 10.0 dBm DL -26.0 dBm MKR 2.263 GHz
10 dB/ *A_Max Posi B_Blank Norm -61.30 dBm



REF 10.0 dBm DL -16.0 dBm MKR 2.38785 GHz
10 dB/ *A_Max Posi B_Blank Norm -60.23 dBm





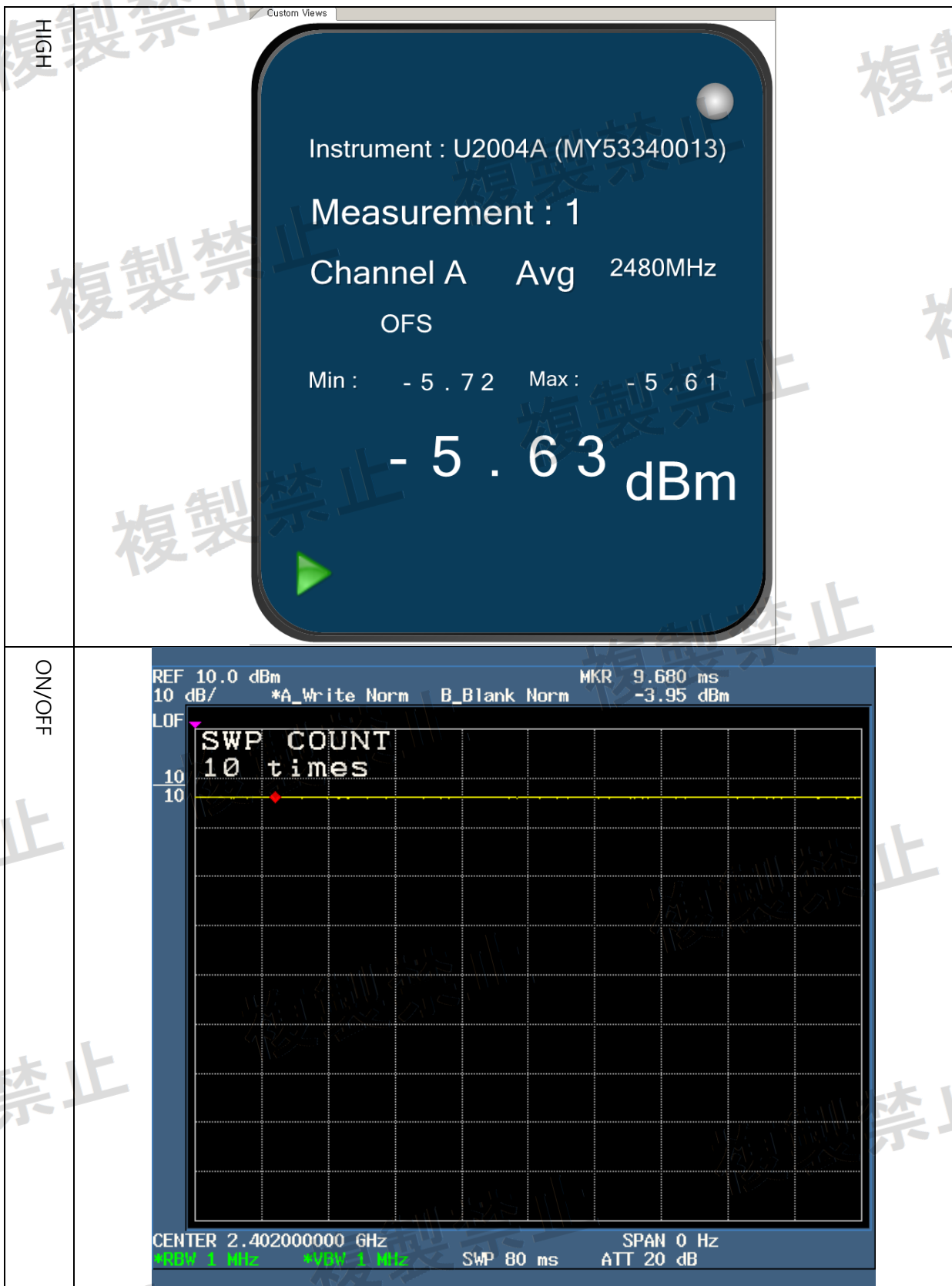
Antenna Power

LOW



MID

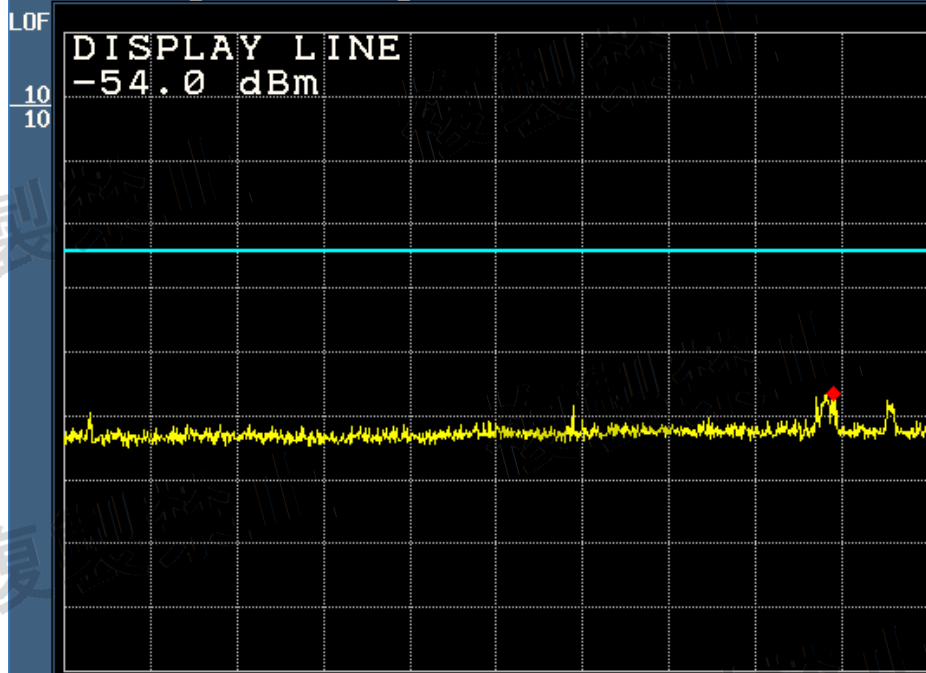




Secondary Radiated Emissions

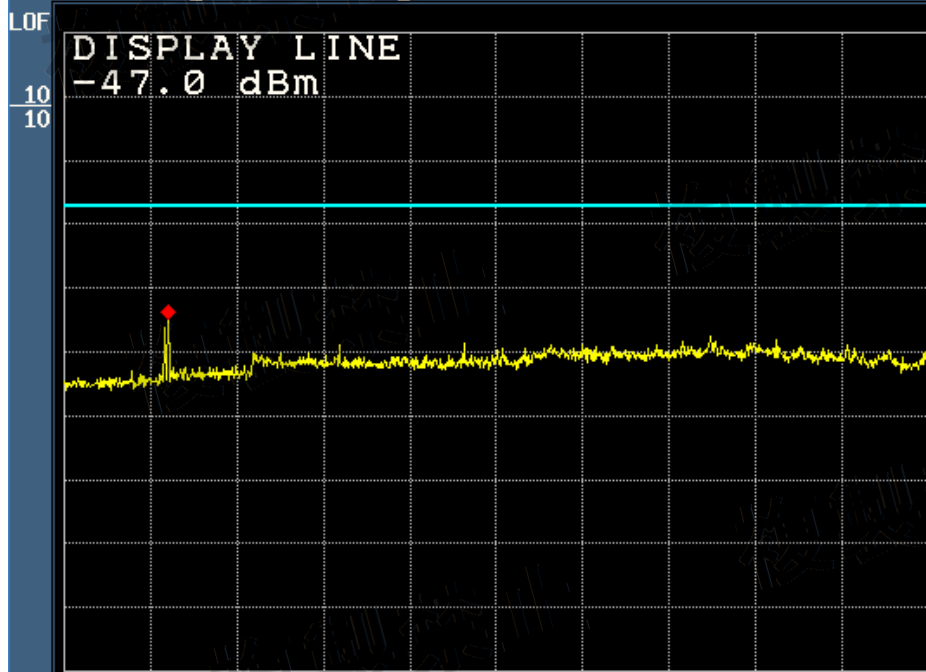
LOW

REF -20.0 dBm DL -54.0 dBm MKR 890.1 MHz
10 dB/ *A_Max Posi B_Blank Norm -76.48 dBm



START 10.0 MHz STOP 1.0000 GHz
*RBW 100 kHz *VBW 100 kHz SwP 200 ms ATT 10 dB

REF -20.0 dBm DL -47.0 dBm MKR 2.45 GHz
10 dB/ *A_Max Posi B_Blank Norm -63.88 dBm



START 1000 MHz STOP 13.00 GHz
*RBW 1 MHz *VBW 1 MHz SwP 180 ms ATT 10 dB

Secondary Radiated Emissions

MID

REF -20.0 dBm DL -54.0 dBm MKR 741.6 MHz
10 dB/ *A_Max Posi B_Blank Norm -74.60 dBm
LOF

DISPLAY LINE
-54.0 dBm

START 10.0 MHz STOP 1.0000 GHz
*RBW 100 kHz *VBW 100 kHz SwP 200 ms ATT 10 dB

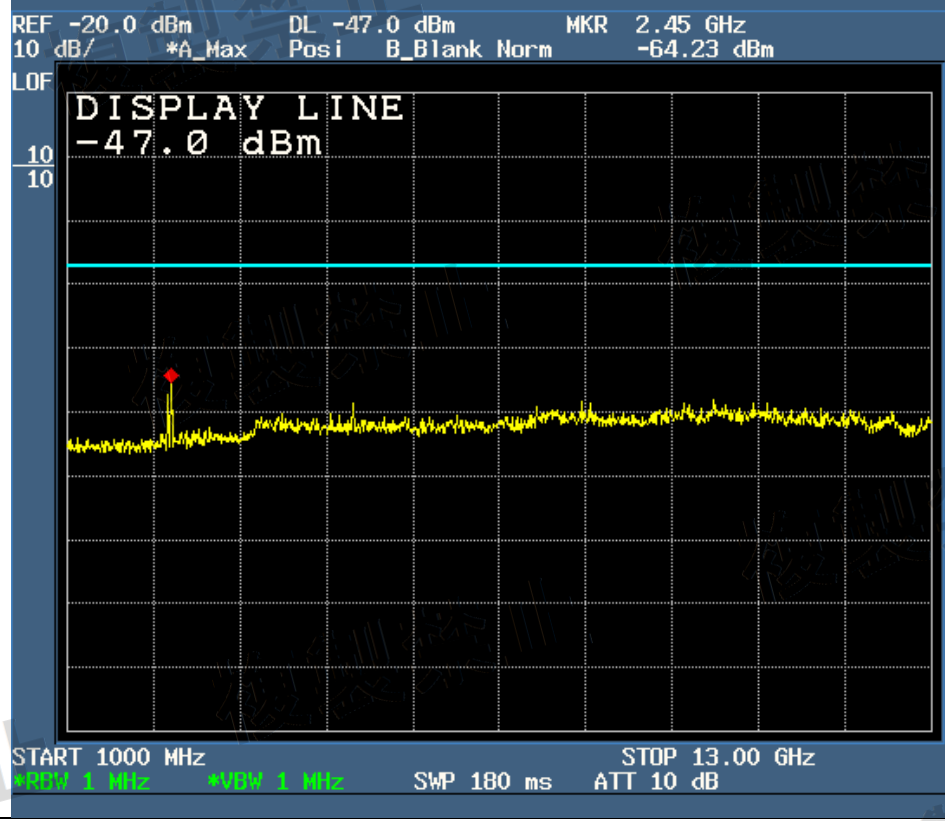
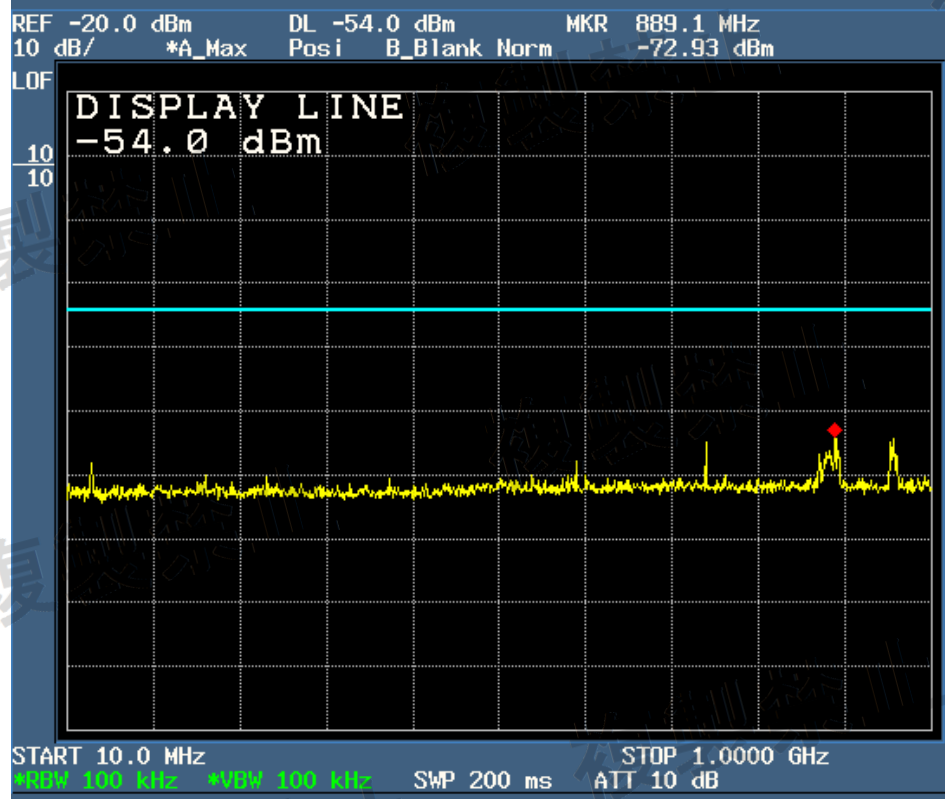
REF -20.0 dBm DL -47.0 dBm MKR 2.45 GHz
10 dB/ *A_Max Posi B_Blank Norm -64.40 dBm
LOF

DISPLAY LINE
-47.0 dBm

START 1000 MHz STOP 13.00 GHz
*RBW 1 MHz *VBW 1 MHz SwP 180 ms ATT 10 dB

Secondary Radiated Emissions

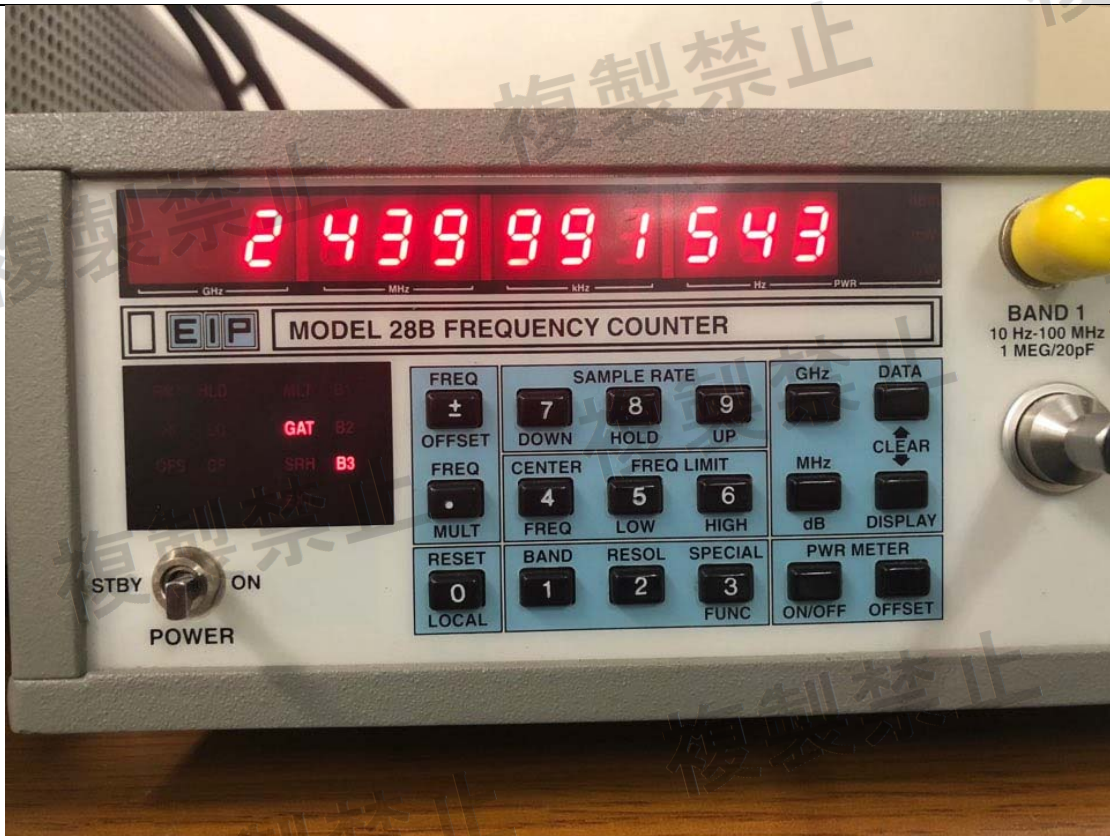
HIGH



F1D Test Result

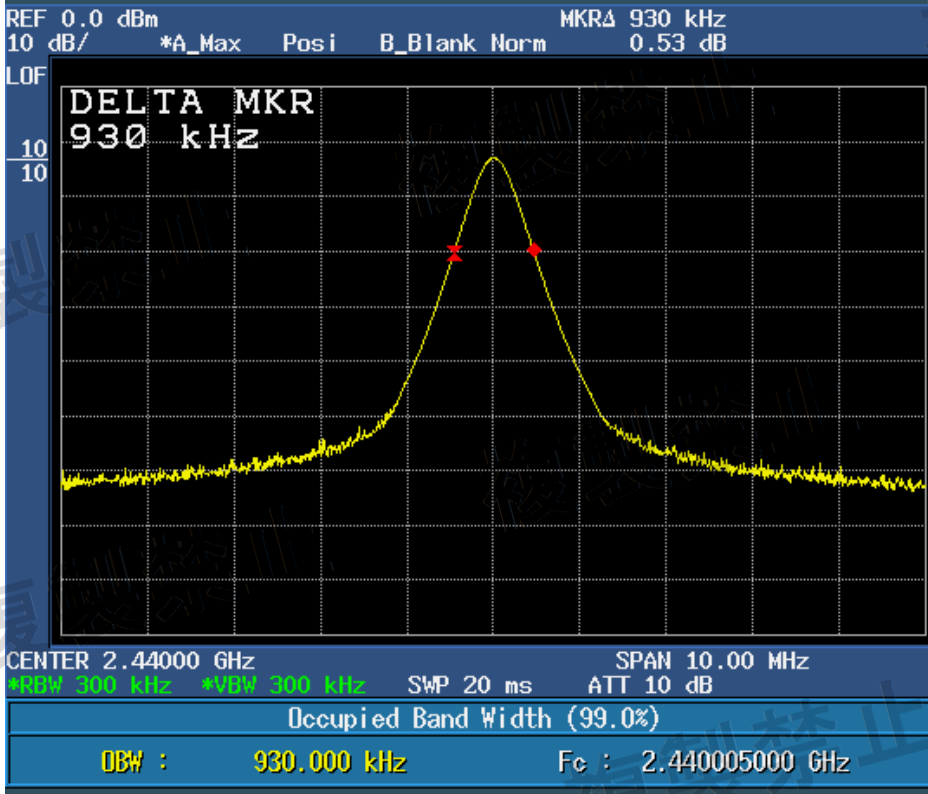
Frequency

2440
MHz



Occupied Bandwidth

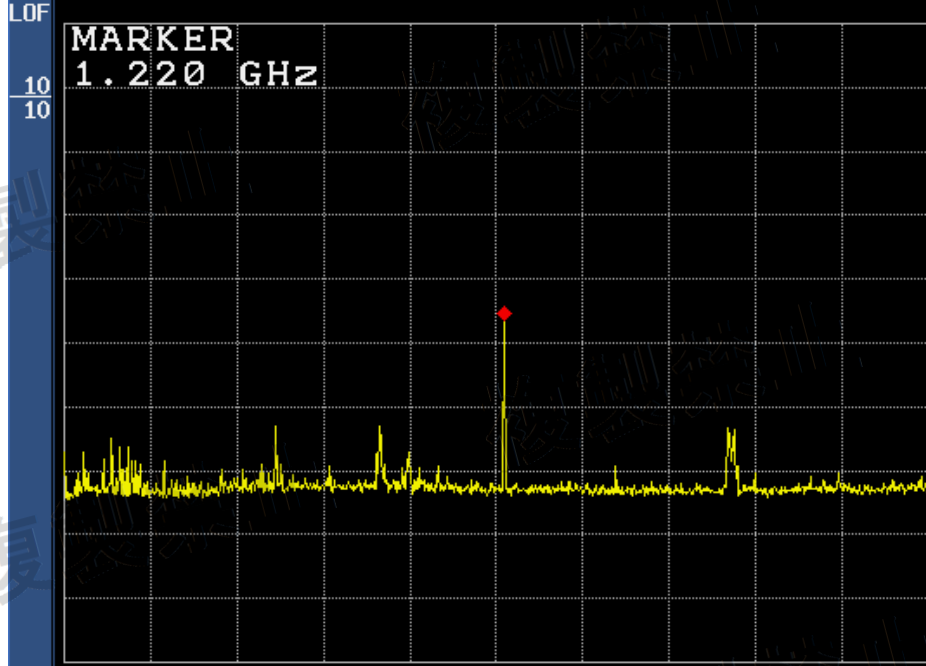
2440
MHz



Spurious Emission Intensity

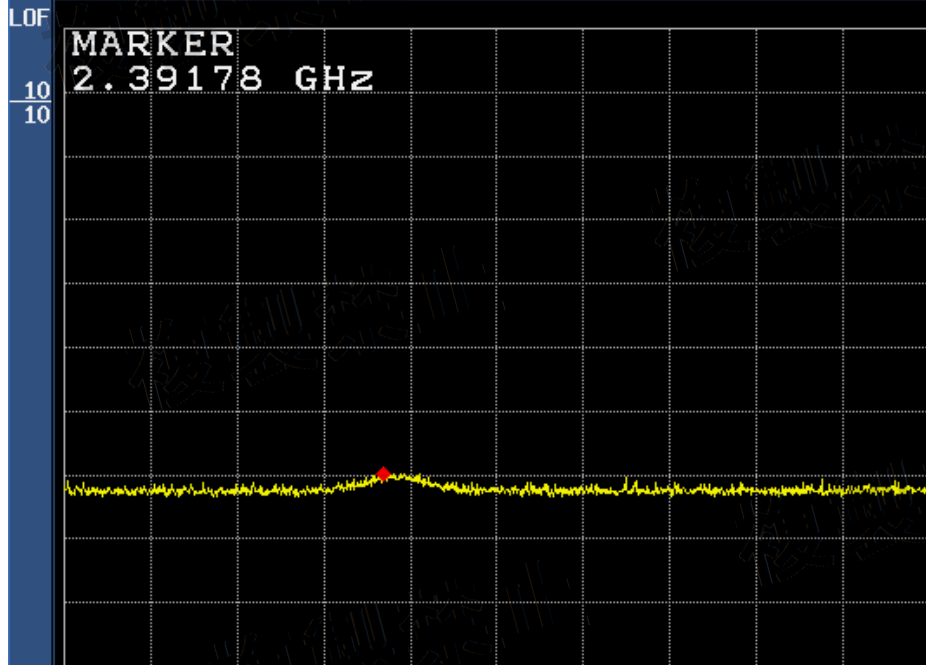
2440
MHz

REF 0.0 dBm MKR 1.220 GHz
10 dB/ *A_Max Posi B_Blank Norm -45.34 dBm

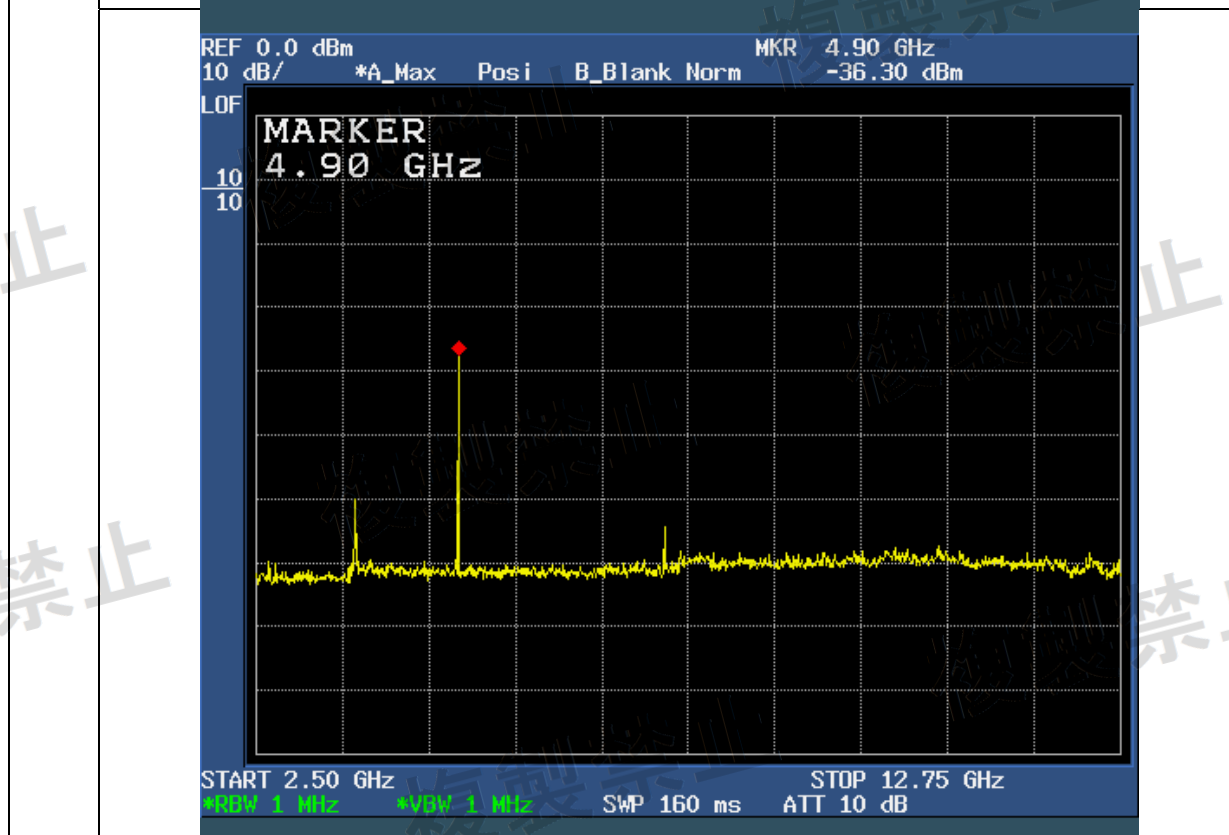
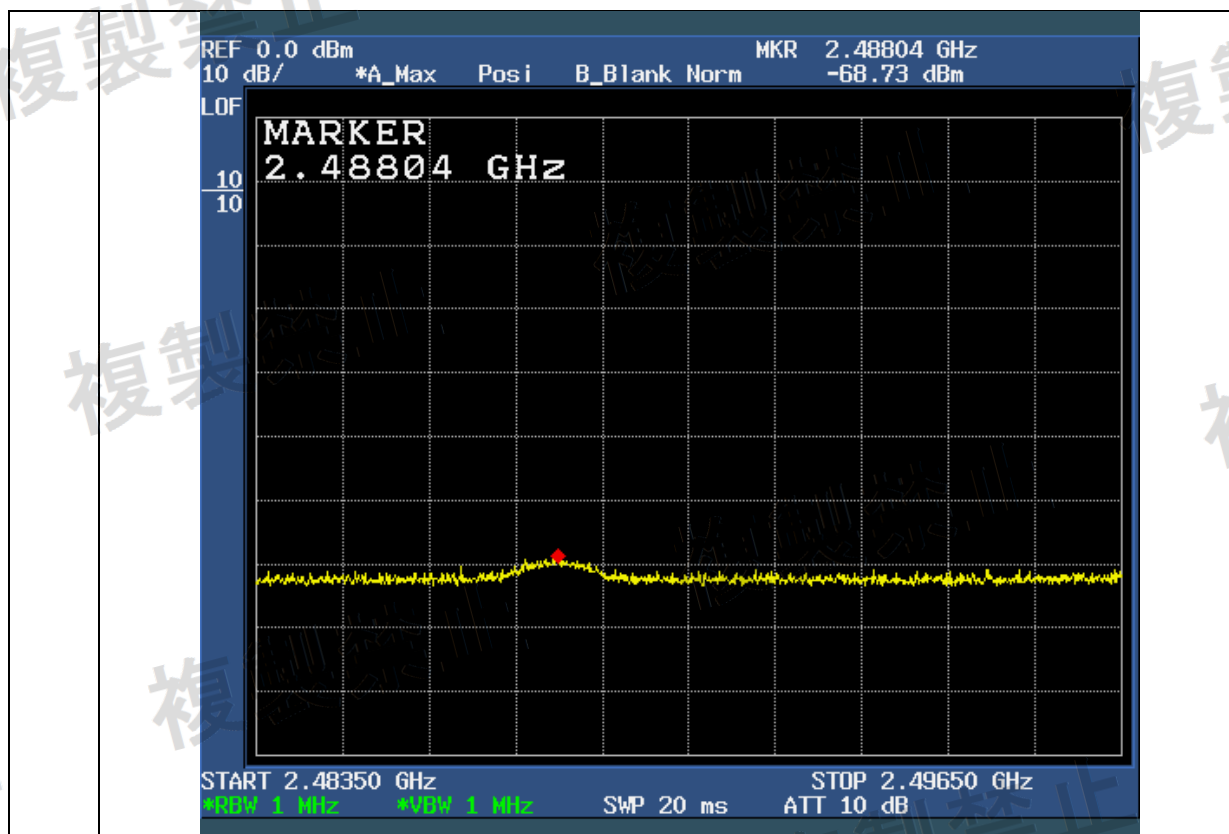


START 10 MHz STOP 2.387 GHz
*RBW 1 MHz *VBW 1 MHz SwP 40 ms ATT 10 dB

REF 0.0 dBm MKR 2.39178 GHz
10 dB/ *A_Max Posi B_Blank Norm -69.77 dBm



START 2.38700 GHz STOP 2.40000 GHz
*RBW 1 MHz *VBW 1 MHz SwP 20 ms ATT 10 dB



Antenna Power

2440 MHz

Instrument : U2004A (MY53340013)

Measurement : 1

Channel A Avg 2440MHz

OFS

Min : - 1 4 . 3 3 Max : - 1 4 . 0 0

- 1 4 . 3 0 dBm

ON/
OFF

REF 0.0 dBm MKR 3.360 ms

10 dB/ *A_Write Norm B_Blank Norm -12.81 dBm

LOF

MARKER

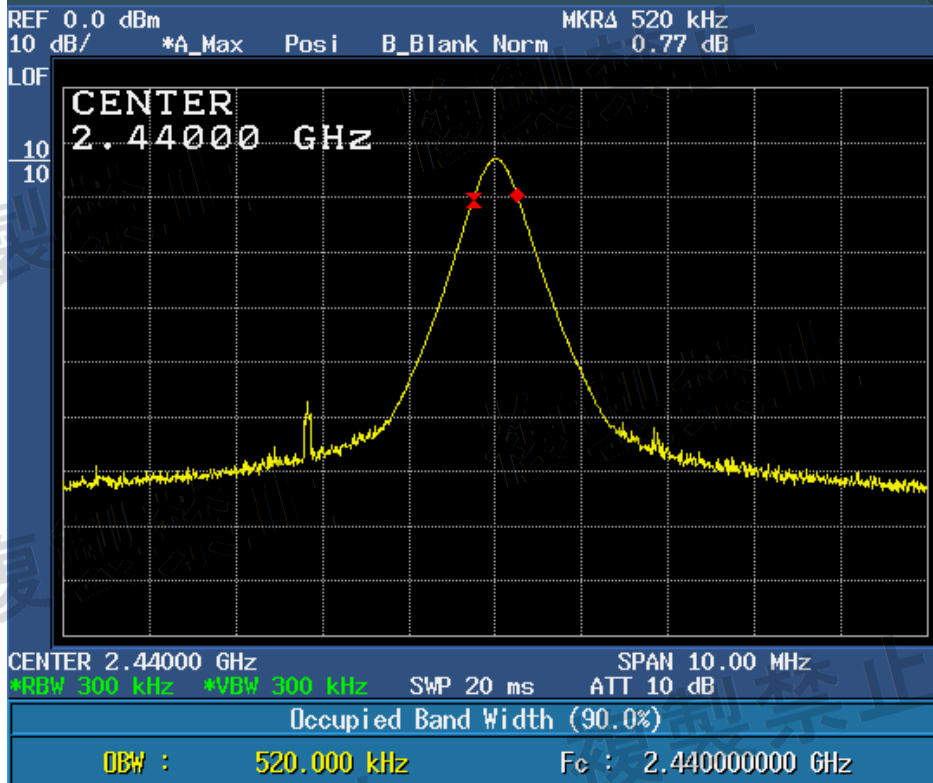
3.360 ms

CENTER 2.440000000 GHz SPAN 0 Hz

*RES 1 MHz *VIEW 1 MHz SWP 20 ms ATT 10 dB

Spread-spectrum Bandwidth

2440
MHz



Secondary Radiated Emissions

2440
MHz

