

RADIO PERFORMANCE TEST REPORT

Test Report No. : OT-222-RWD-023

Reception No. : 2201000227

Applicant : 3i Inc

Address : 101-117, 29, Dongbu-ro, Dong-gu, Daegu, Republic of Korea

Manufacturer : Nteklogic

Address : 42, Maehwa-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea

Type of Equipment : Pivo Remote Control 2.0

Model Name : PV-ERC2

Multiple Model Name : N/A

Serial number : N/A

Total page of Report : 26 pages (including this page)

Date of Incoming : January 21, 2022

Date of issue : February 16, 2022

SUMMARY

The equipment complies with the standard;

Specified Low Power Radio Equipment Article 2 Paragraph 1 Item (19).

This test report only contains the result of a single test of the sample supplied for the examination.

It is not a generally valid assessment of the features of the respective products of the mass-production.

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Revision History

Rev. No.	Issue Report No.	Issued Date	Revisions	Section Affected
0	OT-222-RWD-023	February 16, 2022	Initial Release	All

1. APPLICANT AND MANUFACTURER INFORMATION

- . Applicant : 3i Inc
- . Address : 101-117, 29, Dongbu-ro, Dong-gu, Daegu, Republic of Korea
- . Manufacturer : Nteklogic
- . Address : 42, Maehwa-ro, Bundang-gu, Seongnam-si, Gyeonggi-do, Republic of Korea
- . Factory : Radiant Co., Ltd.
- . Address : (Chooneui-dong, Chooneui Technopark) #102-610, 36, Bucheon-ro 198beon-gil, Bucheon-si, Gyeonggi-do, Republic of Korea

2. GENERAL INFORMATION

2.1 Test standards and results

Requirement	Result
Frequency Tolerance	Pass
Occupied Bandwidth	Pass
Antenna Power & Antenna Power Tolerance	Pass
Transmitter Spurious Emissions	Pass
Collateral Emission	Pass
Interference prevention function	Pass

2.2 Additions, deviations, exclusions from standards

No additions, deviations or exclusions have been made from standard.

2.3 Purpose of the test

To determine whether the equipment under test fulfills the RF requirements of the standards stated in section 2.1.

2.4 Test Facility

The Onetech Corp. has been designated to perform equipment testing in compliance with ISO/IEC 17025.

The Electromagnetic compatibility measurement facilities are located at 43-14, Jinsaegol-gil, Chowol-eup, Gwangju-si, Gyeonggi-do, 12735, Korea.

-. Site Filing:

VCCI (Voluntary Control Council for Interference) – Registration No. R-20122/ C-14617/ G-10666/ T-11842

ISED (Innovation, Science and Economic Development Canada) – Registration No. Site# 3736A-3

KOLAS (Korea Laboratory Accreditation Scheme) - Accreditation NO. KT085

FCC (Federal Communications Commission) - Accreditation No. KR0013

RRA (Radio Research Agency) – Designation No. KR0013

3. EUT (Equipment Under Test)

3.1 Identification of the EUT

- Equipment : Pivo Remote Control 2.0
- Model Name : PV-ERC2
- Brand Name : -
- Serial number : N/A
- Manufacturer : Nteklogic

3.2 Product Description

The 3i Inc, Model PV-ERC2 (referred to as the EUT in this report) is a Pivo Remote Control 2.0. The product specification described herein was obtained from product data sheet or user's manual.

Device Type	Pivo Remote Control 2.0
Temperature Range	-10 °C ~ +50 °C
OPERATING FREQUENCY	2 402 MHz ~ 2 480 MHz
MODULATION TYPE	GFSK for 1 Mbps
RF OUTPUT POWER	0.65 mW
ANTENNA TYPE	PCB Antenna
ANTENNA GAIN	1.48 dBi
List of each Osc. or crystal Freq.(Freq. >= 1 MHz)	38.4 MHz

3.3 Alternative type(s)/model(s); also covered by this test report.

- None

4. EUT MODIFICATIONS

- None

5. Frequency Tolerance

5.1 Operating environment

Temperature : 21.8 °C
Relative humidity : 49 % R.H.

5.2 Test Setup

The EUT was operated in CW carrier mode (unmodulated). The frequency was measured by the use of the frequency counter capability of a CW Microwave Frequency Counter

5.3 Measurement uncertainty

The uncertainty for Frequency is ± 4.11 ppm

5.4 Test Method

Ministry of Internal Affairs and Communications Notification Article 88 Appendix 43

5.5 Test Date

January 26, 2022 ~ January 28, 2022

5.6 Test Data for 1 Mbps

Voltage	Nominal TX Frequency	Deviation from Nominal Frequency (ppm)	Limit (ppm)
DC 3.0 V (Normal)	LOW (2 402 MHz)	1.06	± 50.00
	MIDDLE (2 440 MHz)	2.14	
	HIGH (2 480 MHz)	2.08	
DC 2.7 V (Low)	LOW (2 402 MHz)	1.04	
	MIDDLE (2 440 MHz)	2.11	
	HIGH (2 480 MHz)	2.06	
DC 3.3 V (High)	LOW (2 402 MHz)	1.10	
	MIDDLE (2 440 MHz)	2.17	
	HIGH (2 480 MHz)	2.11	

6. Occupied Bandwidth

6.1 Operating environment

Temperature : 21.8 °C
Relative humidity : 49 % R.H.

6.2 Test Setup

The EUT was operated in continuous transmit mode (modulated). For occupied bandwidth measurement the internal occupied bandwidth measurement capability of Spectrum Analyzer was used. The bandwidth for 99 % power was measured.

6.3 Measurement uncertainty

The uncertainty for Occupied Channel Bandwidth is 4 709 Hz.

6.4 Test Method

Ministry of Internal Affairs and Communications Notification Article 88 Appendix 43

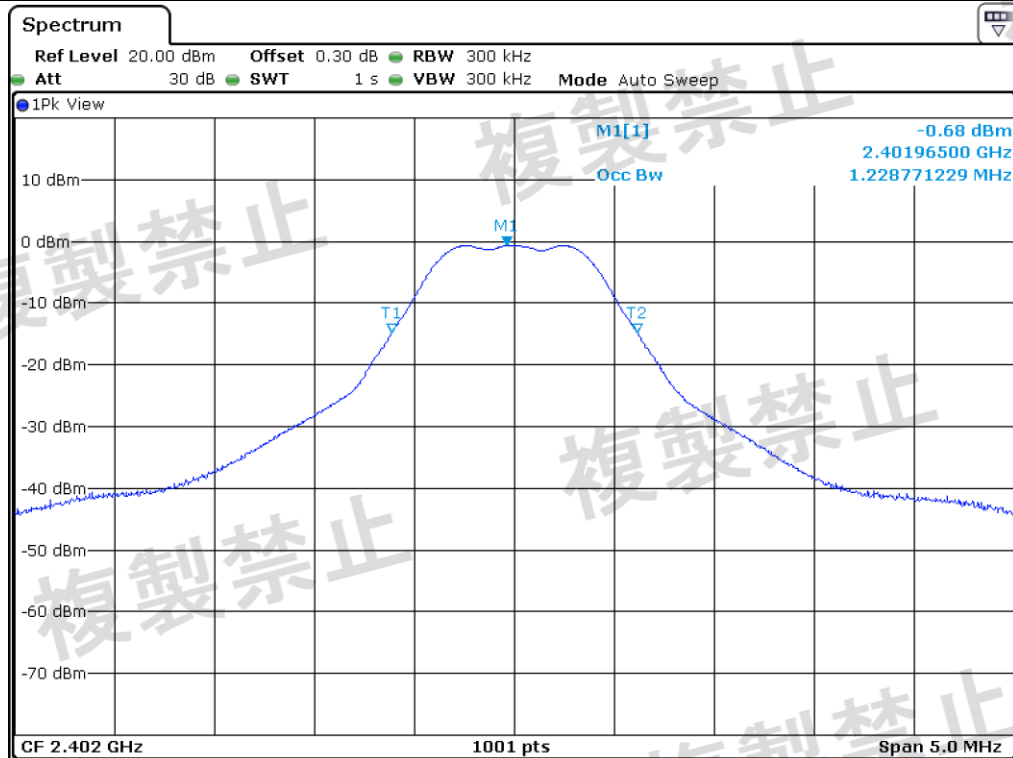
6.5 Test Date

January 26, 2022 ~ January 28, 2022

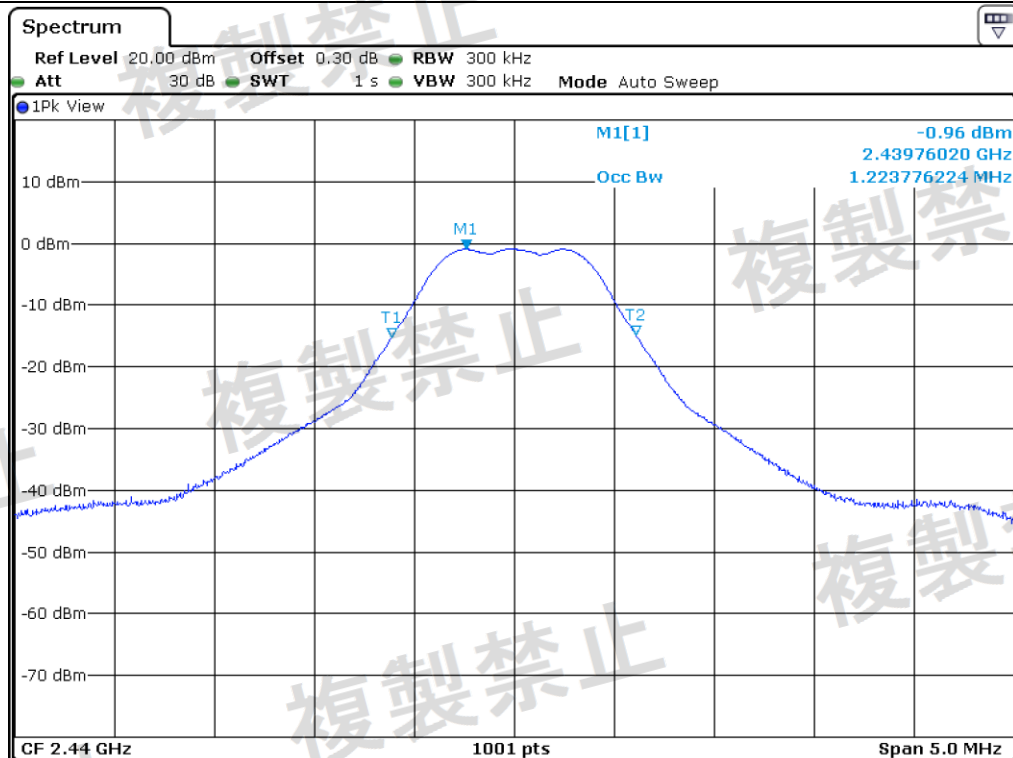
6.6 Test data for 1 Mbps

Voltage	Nominal TX Frequency	Occupied Bandwidth (MHz)	Limit (MHz)
DC 3.0 V (Normal)	LOW (2 402 MHz)	1.23	≤ 26.00
	MIDDLE (2 440 MHz)	1.22	
	HIGH (2 480 MHz)	1.22	
DC 2.7 V (Low)	LOW (2 402 MHz)	1.23	
	MIDDLE (2 440 MHz)	1.22	
	HIGH (2 480 MHz)	1.22	
DC 3.3 V (High)	LOW (2 402 MHz)	1.23	
	MIDDLE (2 440 MHz)	1.22	
	HIGH (2 480 MHz)	1.22	

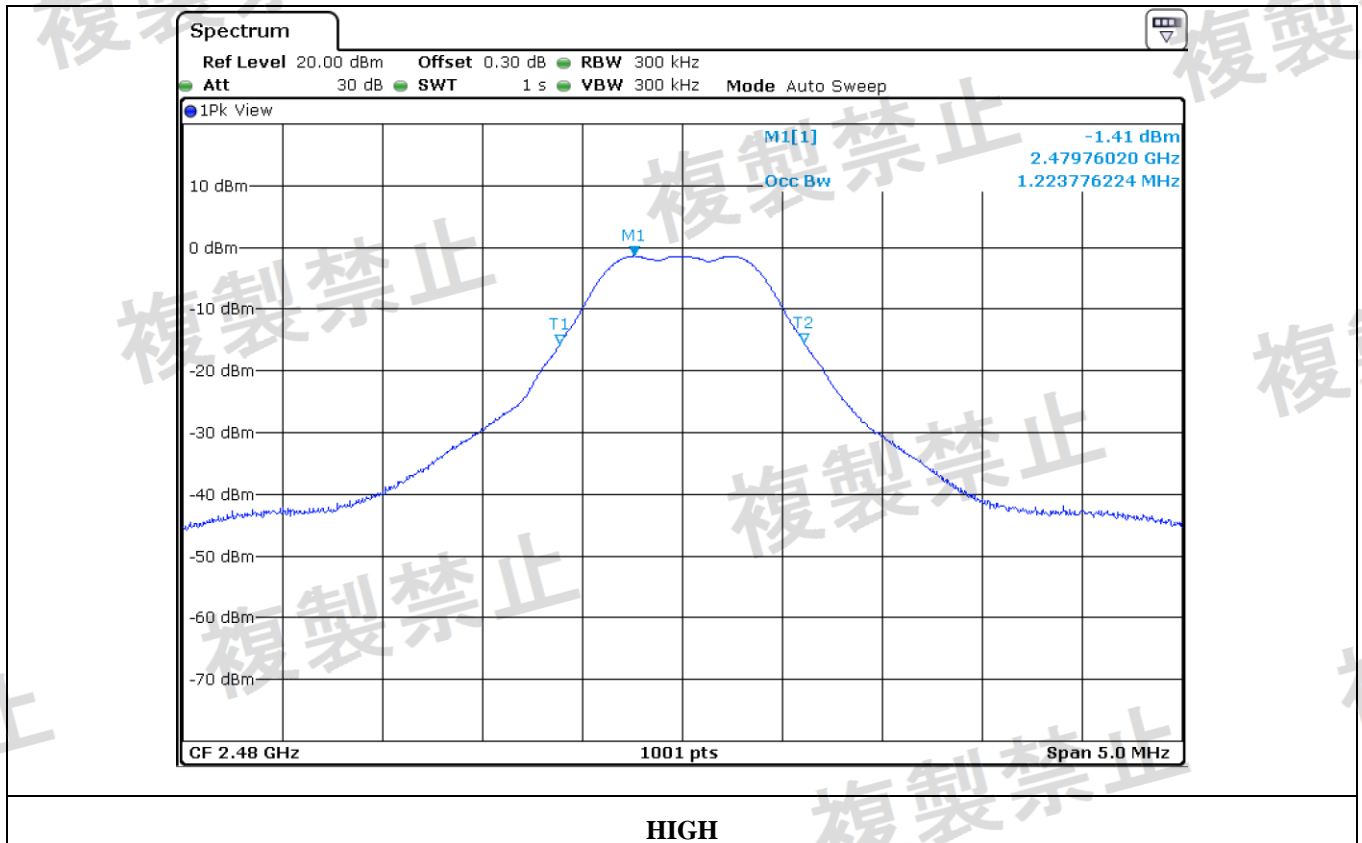
Plots of measurement data



LOW



MIDDLE



7. Antenna Power & Antenna Power Tolerance

7.1 Operating environment

Temperature : 21.8 °C
Relative humidity : 49 % R.H.

7.2 Test Setup

The EUT was operated in continuous transmit mode (modulated). The power meter was connected to IF output.
The external attenuation was corrected by the power meter's correction capability.

7.3 Measurement uncertainty

The uncertainty for Antenna Power is 1.24 dB.

7.4 Test Method

Ministry of Internal Affairs and Communications Notification Article 88 Appendix 43

7.5 Test Date

January 26, 2022 ~ January 28, 2022

7.6 Test data for 1 Mbps

Frequency	Power Voltage	Power Value (mW)	Power Value (dBm)	E.I.R.P (dBm)	Rated output (mW)	Deviation (%)	Deviation average value(%)	Limit (mW)
LOW (2 402 MHz)	DC 3.0 V	0.51	-2.95	-1.47	0.65	-22.00	-26.55	10.00
	DC 2.7 V	0.50	-2.97	-1.49		-22.36		
	DC 3.3 V	0.51	-2.95	-1.47		-22.00		
MIDDLE (2 440 MHz)	DC 3.0 V	0.48	-3.19	-1.71		-26.19		
	DC 2.7 V	0.48	-3.20	-1.72		-26.36		
	DC 3.3 V	0.48	-3.17	-1.69		-25.85		
HIGH (2 480 MHz)	DC 3.0 V	0.45	-3.51	-2.03		-31.44		
	DC 2.7 V	0.45	-3.51	-2.03		-31.44		
	DC 3.3 V	0.45	-3.50	-2.02		-31.28		

8. Transmitter Spurious Emissions

8.1 Operating environment

Temperature : 21.8 °C
Relative humidity : 49 % R.H.

8.2 Test Setup

Measurement frequency range acc. to Ordinance Regulation Radio Equipment (2008-04) from 30 MHz to 5 times the carrier frequency; measurement performed in the range 30 MHz to 12.75 GHz.

The EUT was operated in continuous transmit mode (modulated).

Cable losses and external attenuators were regarded by the use of a transducer factor.

8.3 Measurement uncertainty

Conducted spurious emissions of transmitter, 30 MHz ~ 40 GHz : 1.25 dB

8.4 Test Method

Ministry of Internal Affairs and Communications Notification Article 88 Appendix 43

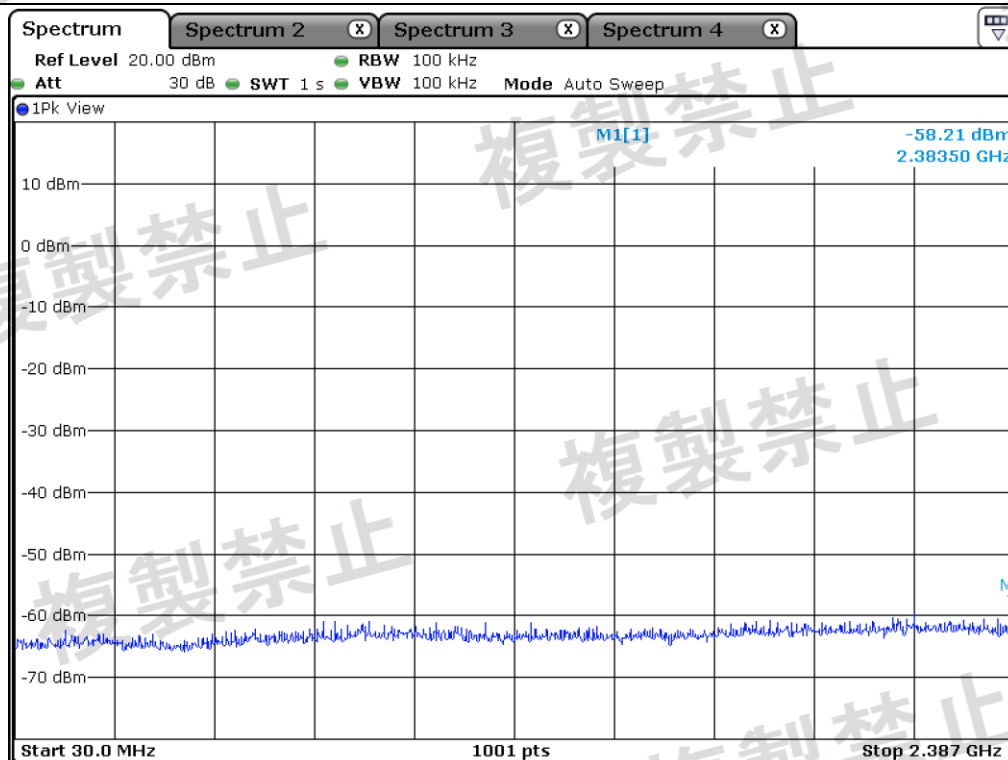
8.5 Test Date

January 26, 2022 ~ January 28, 2022

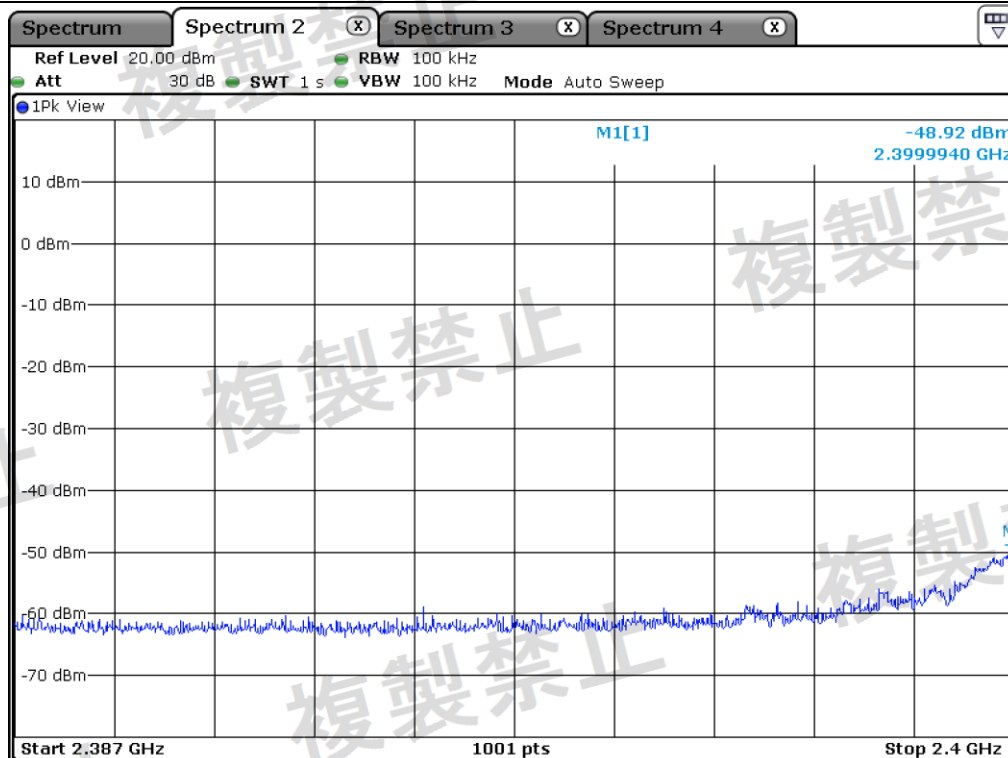
8.6 Test data for 1 Mbps

Frequency	Power Voltage	Frequency (MHz)	Measured Level(dBm)	Cable loss(dB)	RBW Converted Value(dB)	Total (dBm/MHz)	Total (uW/MHz)	Limit (uW/MHz)
LOW (2 402 MHz)	DC 3.0 V	2 383.50	-58.21	0.30	-	-57.91	0.001 6	2.5
		2 399.99	-48.92	0.30	-	-48.62	0.013 7	25.0
		2 485.01	-59.87	0.30	-	-59.57	0.001 1	25.0
		7 838.50	-55.06	0.75	-	-54.31	0.003 7	2.5
	DC 2.7 V	2 323.15	-58.60	0.30	-	-58.30	0.001 5	2.5
		2 399.88	-49.11	0.30	-	-48.81	0.013 2	25.0
		2 489.95	-59.95	0.30	-	-59.65	0.001 1	25.0
		7 838.50	-55.13	0.75	-	-54.38	0.003 6	2.5
	DC 3.3 V	2 344.05	-58.43	0.30	-	-58.13	0.001 5	2.5
		2 399.91	-48.85	0.30	-	-48.55	0.014 0	25.0
		2 490.07	-59.90	0.30	-	-59.60	0.001 1	25.0
		7 838.50	-55.02	0.75	-	-54.27	0.003 7	2.5
MIDDLE (2 440 MHz)	DC 3.0 V	2 197.50	-59.46	0.30	-	-59.16	0.001 2	2.5
		2 387.73	-59.63	0.30	-	-59.33	0.001 2	25.0
		2 484.10	-59.19	0.30	-	-58.89	0.001 3	25.0
		7 848.50	-55.06	0.75	-	-54.31	0.003 7	2.5
	DC 2.7 V	2 223.46	-59.55	0.30	-	-59.25	0.001 2	2.5
		2 394.23	-59.59	0.30	-	-59.29	0.001 2	25.0
		2 488.81	-59.22	0.30	-	-58.92	0.001 3	25.0
		7 848.50	-55.05	0.75	-	-54.30	0.003 7	2.5
	DC 3.3 V	2 216.45	-59.16	0.30	-	-58.86	0.001 3	2.5
		2 390.08	-59.69	0.30	-	-59.39	0.001 2	25.0
		2 485.55	-59.06	0.30	-	-58.76	0.001 3	25.0
		7 848.50	-55.22	0.75	-	-54.47	0.003 6	2.5
HIGH (2 480 MHz)	DC 3.0 V	2 067.90	-60.25	0.30	-	-59.95	0.001 0	2.5
		2 387.49	-59.88	0.30	-	-59.58	0.001 1	25.0
		2 483.52	-56.53	0.30	-	-56.23	0.002 4	25.0
		6 528.50	-54.72	0.75	-	-53.97	0.004 0	2.5
	DC 2.7 V	2 188.43	-60.43	0.30	-	-60.13	0.001 0	2.5
		2 390.08	-59.95	0.30	-	-59.65	0.001 1	25.0
		2 483.57	-56.80	0.30	-	-56.50	0.002 2	25.0
		6 528.50	-55.00	0.75	-	-54.25	0.003 8	2.5
	DC 3.3 V	2 239.50	-60.22	0.30	-	-59.92	0.001 0	2.5
		2 393.32	-59.59	0.30	-	-59.29	0.001 2	25.0
		2 483.57	-56.73	0.30	-	-56.43	0.002 3	25.0
		6 528.50	-54.88	0.75	-	-54.13	0.003 9	2.5

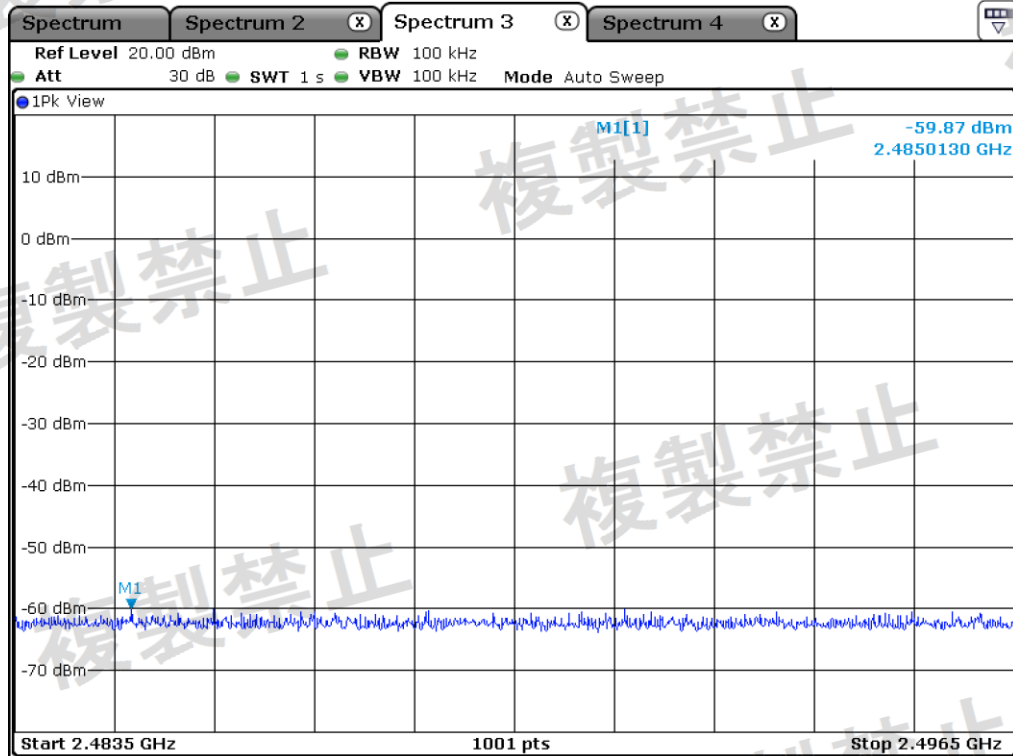
Plots of measurement data



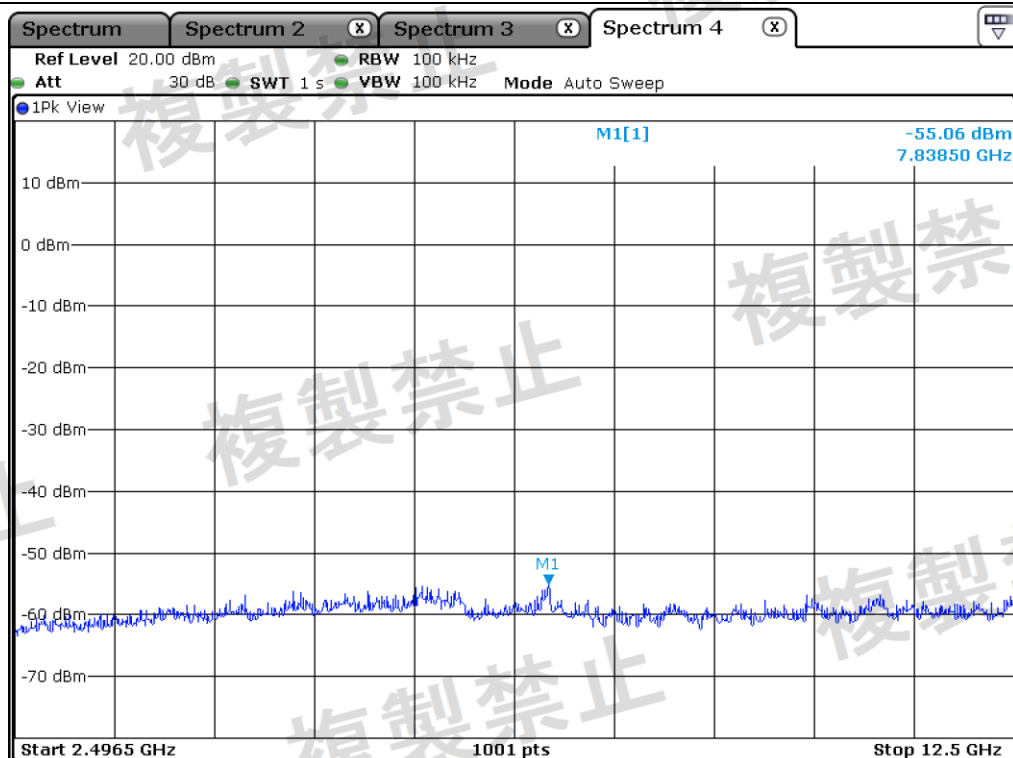
LOW (30 MHz ~ 2 387 MHz)



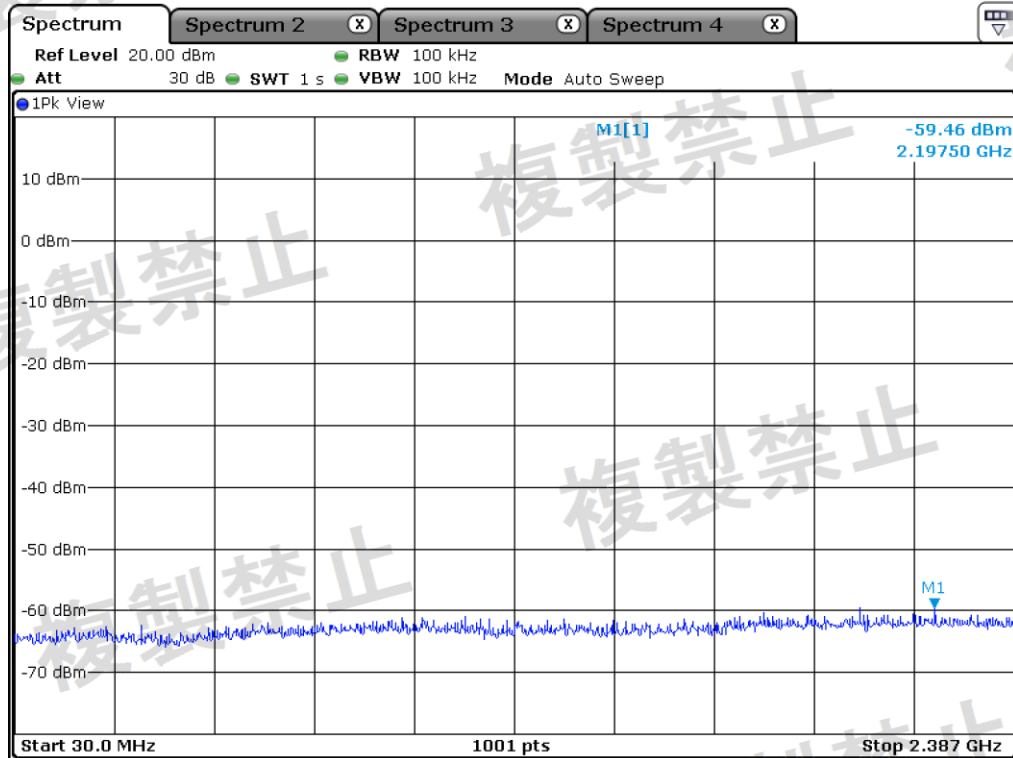
LOW (2 387 MHz ~ 2 400 MHz)



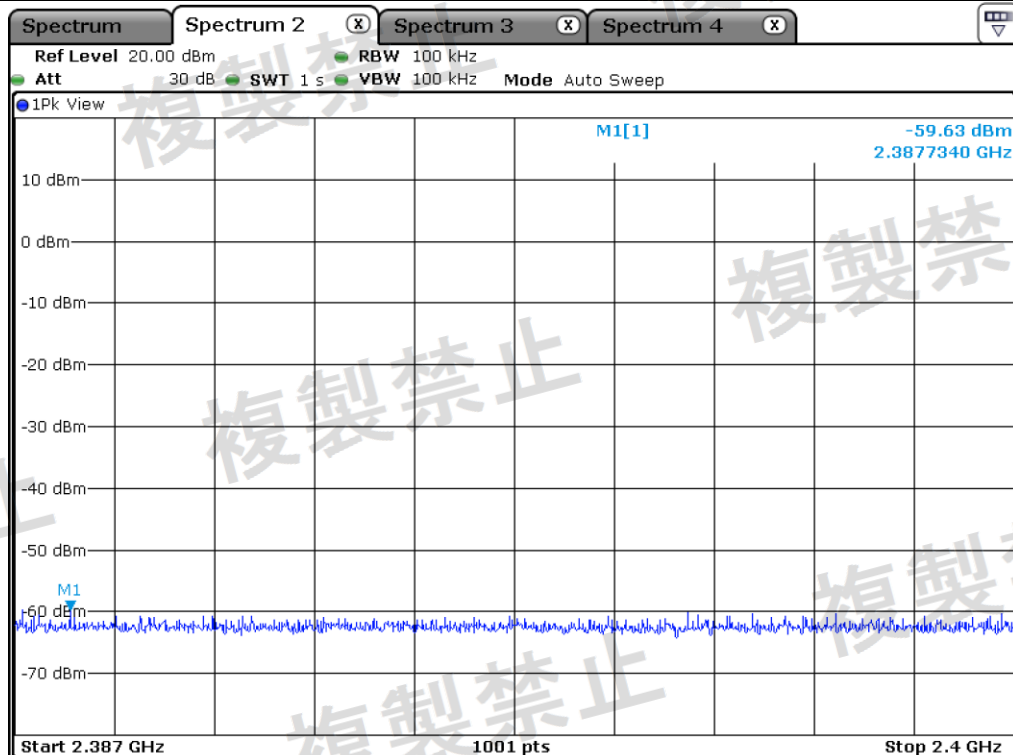
LOW (2 483.5 MHz ~ 2 496.5 MHz)



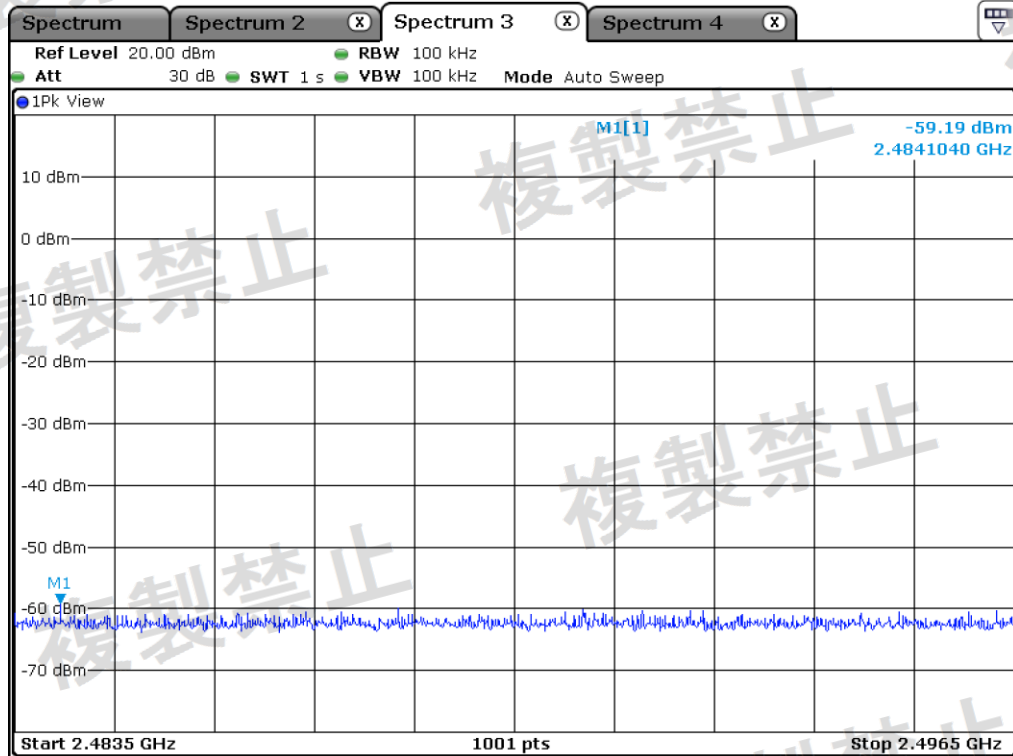
LOW (2 496.5 MHz ~ 12.5 GHz)



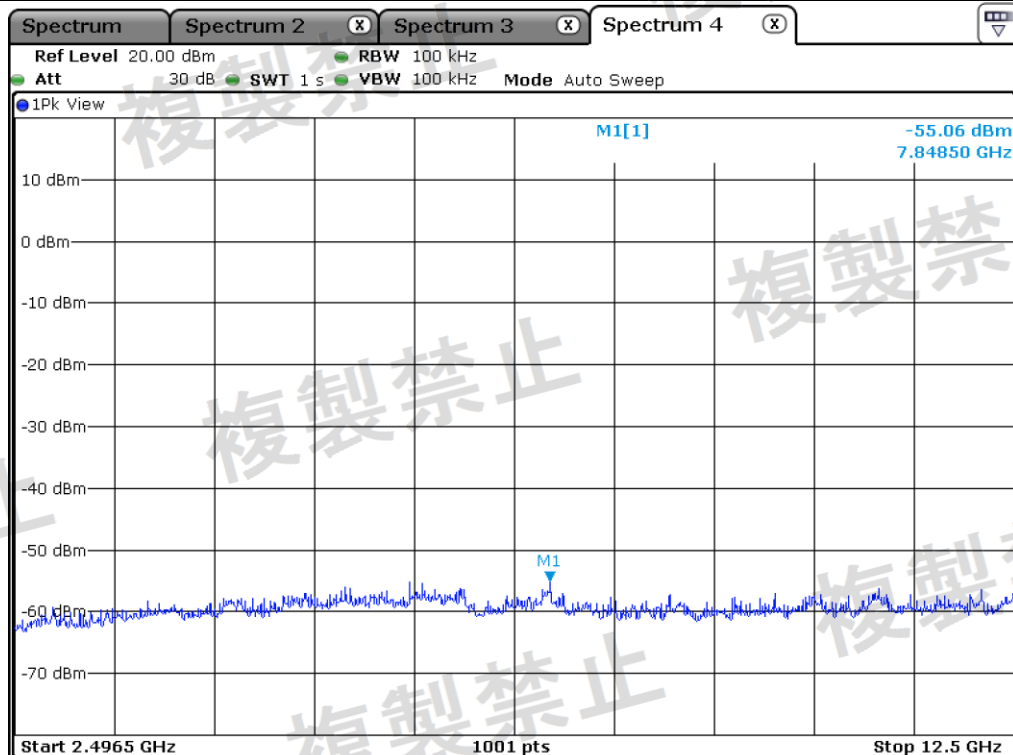
MIDDLE (30 MHz ~ 2 387 MHz)



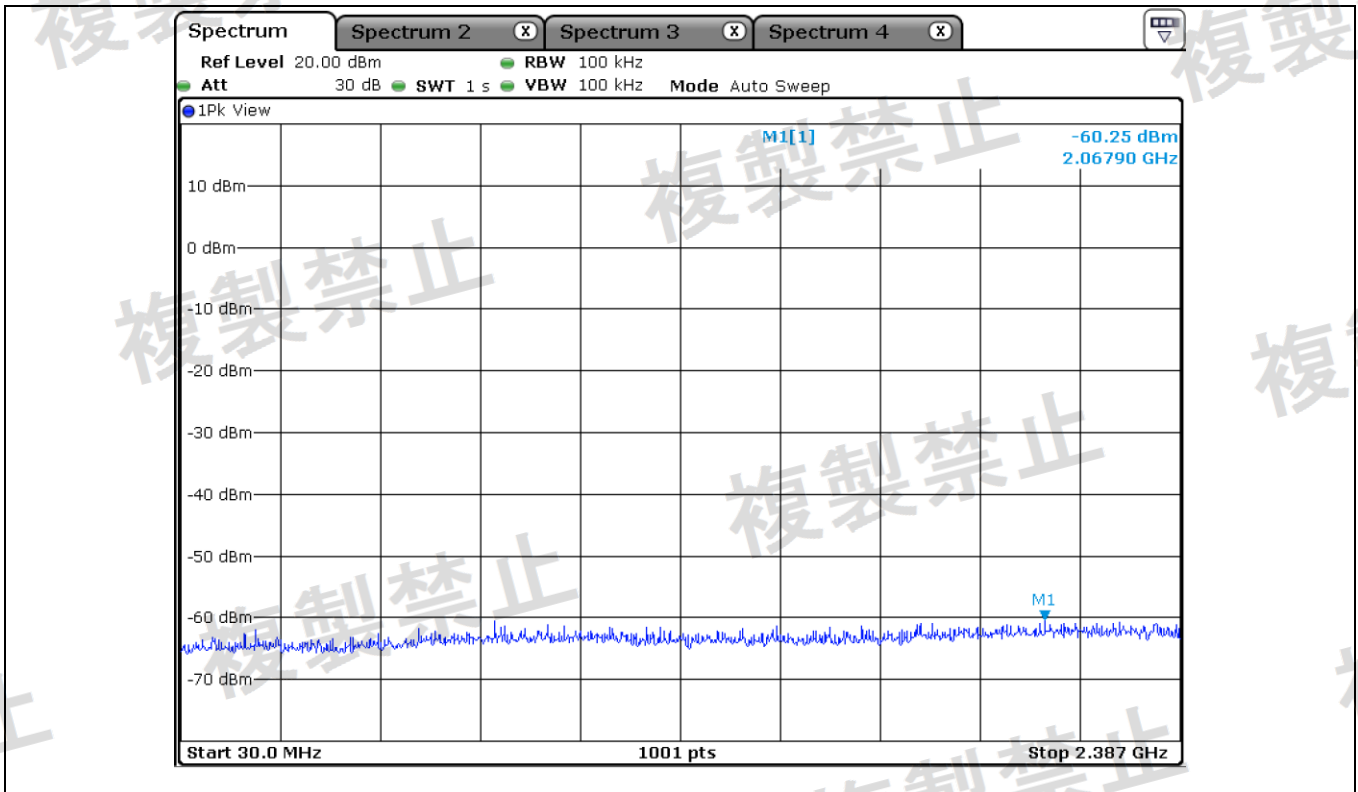
MIDDLE (2 387 MHz ~ 2 400 MHz)



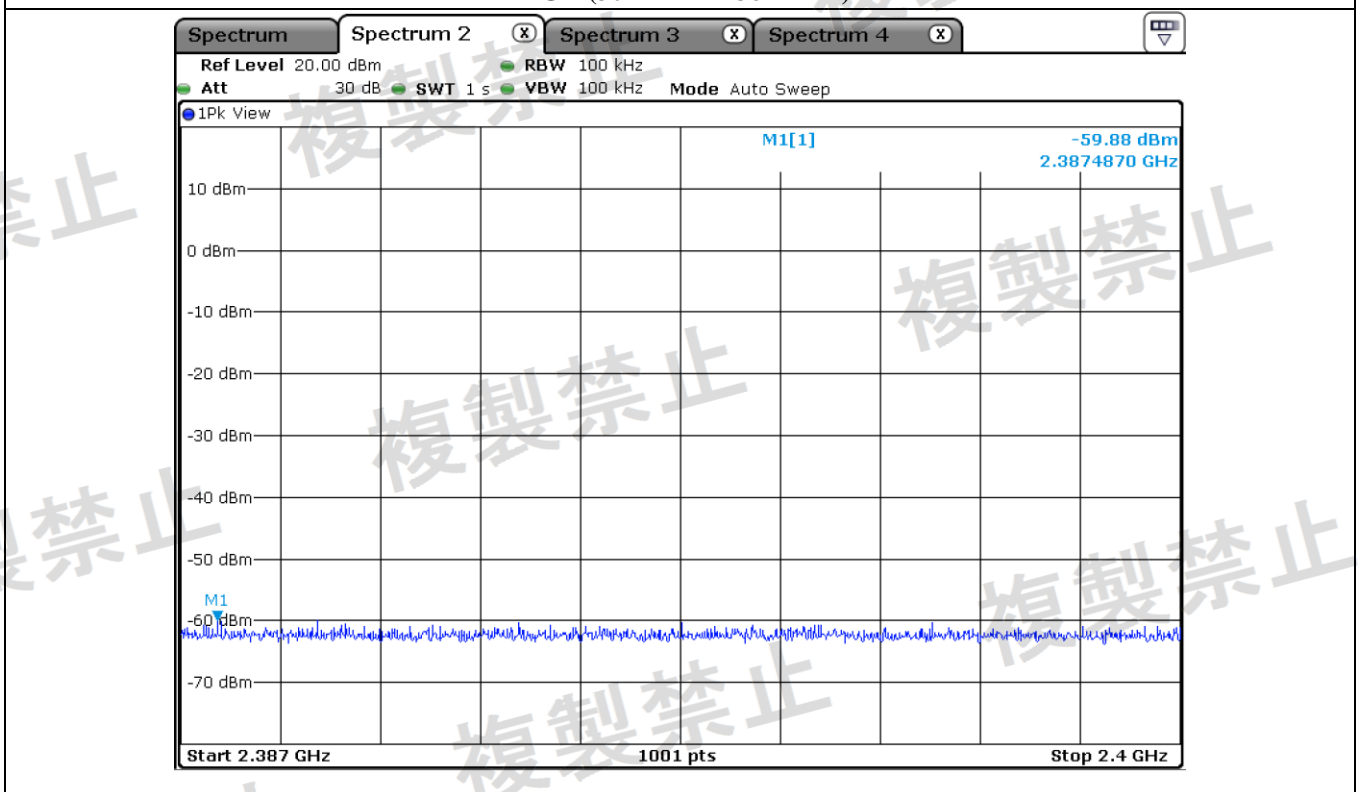
MIDDLE (2 483.5 MHz ~ 2 496.5 MHz)



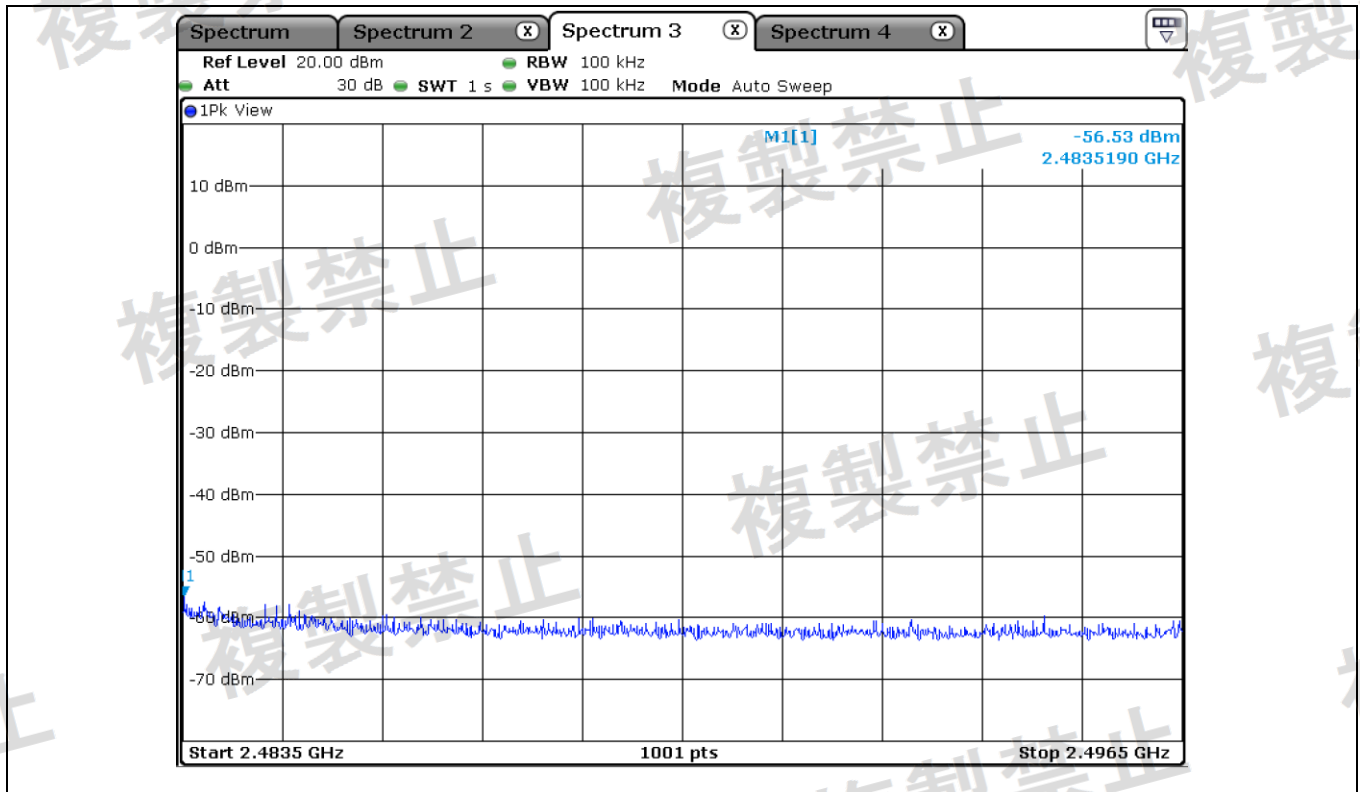
MIDDLE (2 496.5 MHz ~ 12.5 GHz)



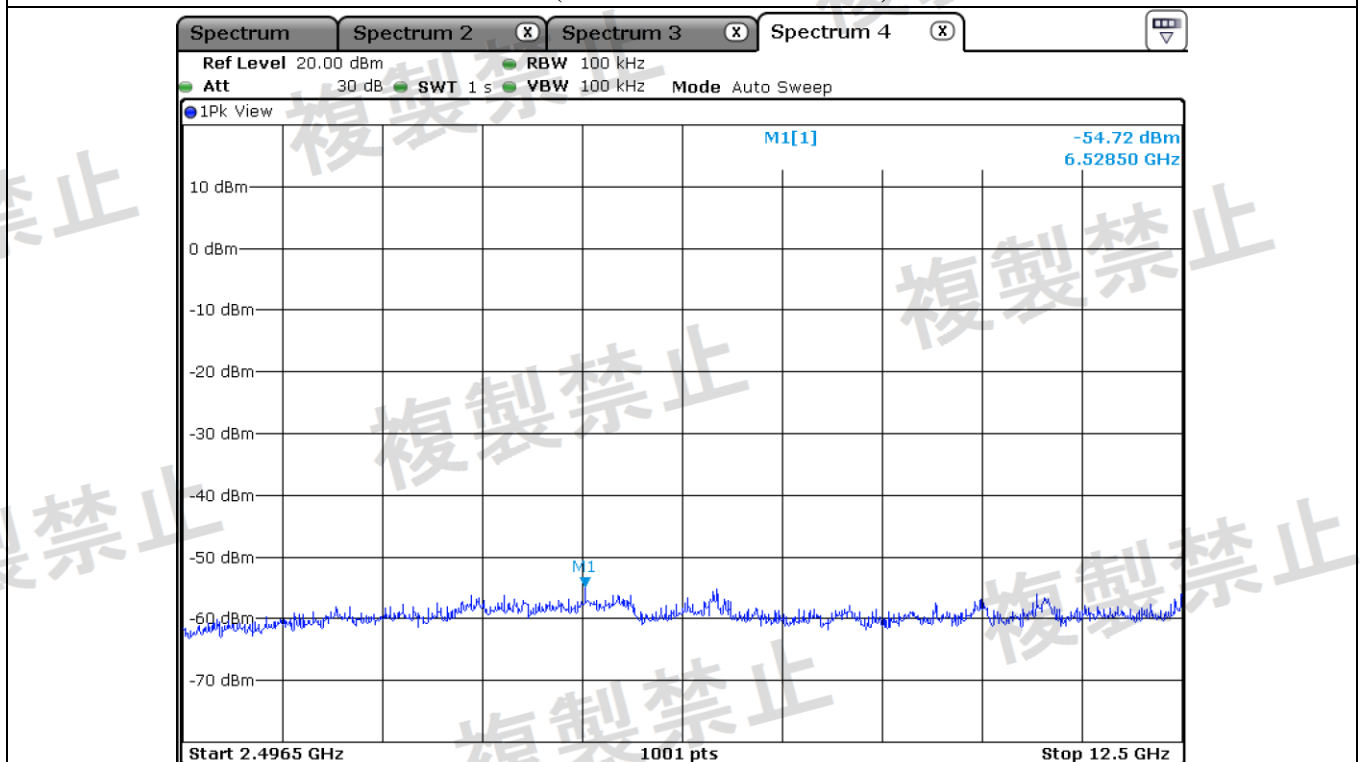
HIGH (30 MHz ~ 2 387 MHz)



HIGH (2 387 MHz ~ 2 400 MHz)



HIGH (2 483.5 MHz ~ 2 496.5 MHz)



HIGH (2 496.5 MHz ~ 12.5 GHz)

9. Collateral Emission

9.1 Operating environment

Temperature : 21.8 °C
Relative humidity : 49 % R.H.

9.2 Test Setup

Measurement frequency range acc. to Ordinance Regulation Radio Equipment (2008-04) from 30 MHz to 5 times the carrier frequency; measurement performed in the range 30 MHz to 12.75 GHz.

The EUT was operated in continuous receive mode (modulated).

Cable losses and external attenuators were regarded by the use of a transducer factor.

9.3 Measurement uncertainty

Conducted spurious emissions of transmitter, 30 MHz ~ 40 GHz : 1.25 dB

9.4 Test Method

Ministry of Internal Affairs and Communications Notification Article 88 Appendix 43

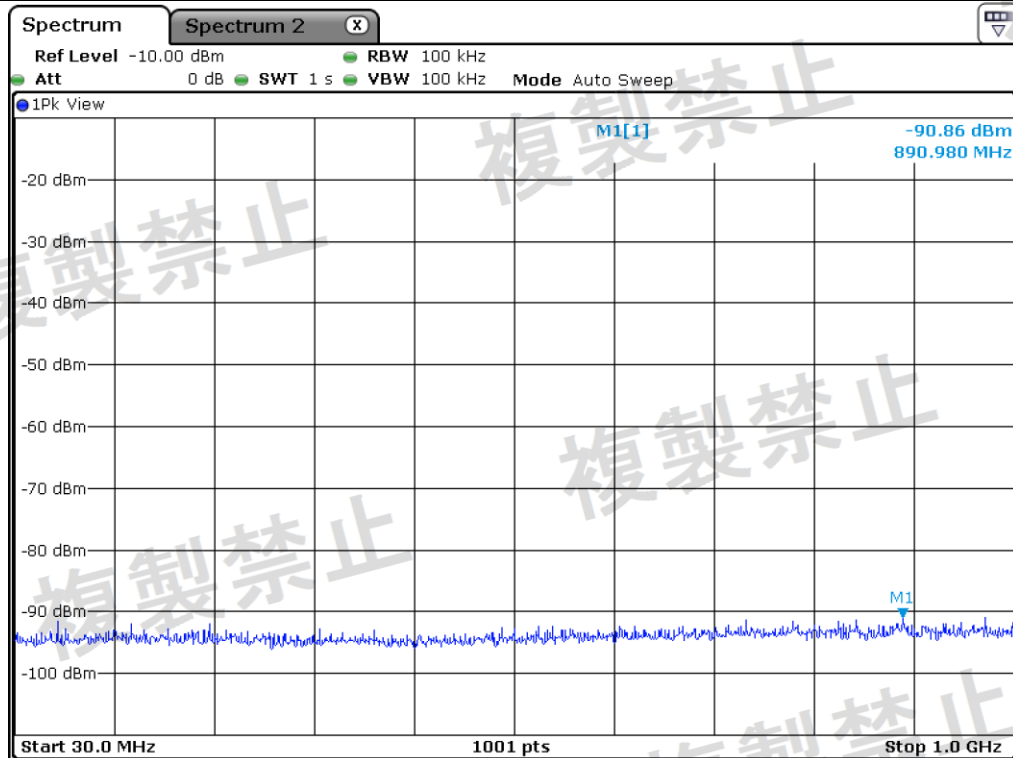
9.5 Test Date

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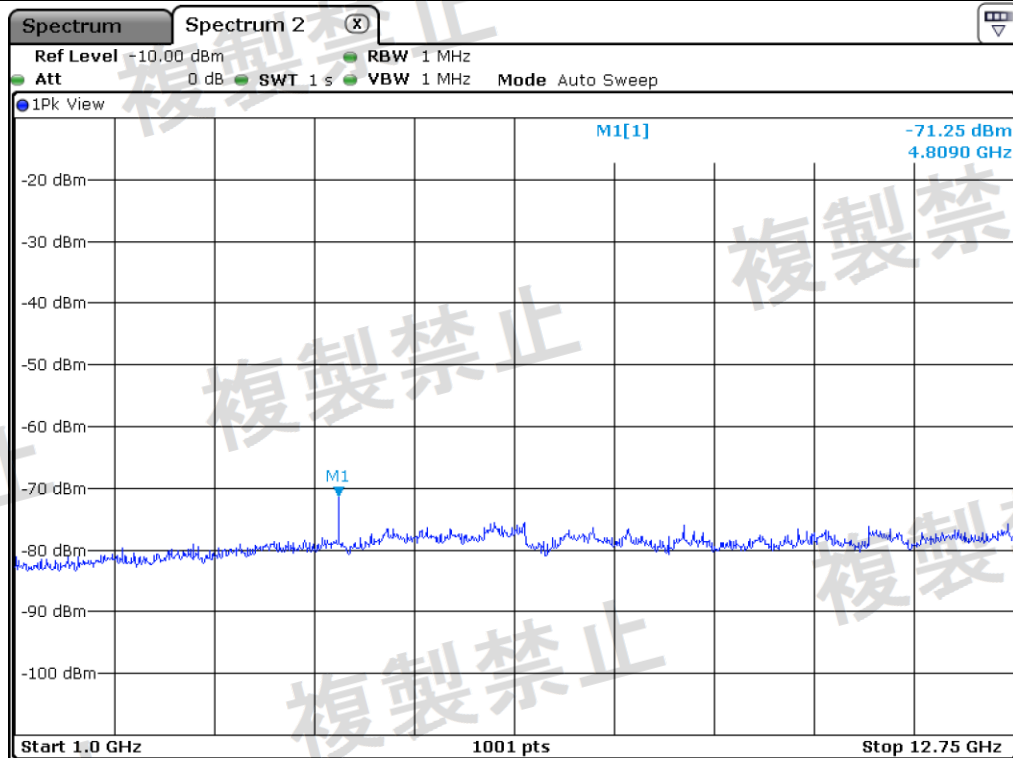
9.6 Test data for 1 Mbps

Frequency	Power Voltage	Frequency (MHz)	Measured Level(dBm)	Cable loss(dB)	Total (dBm)	Total (nW)	Limit (nW)
LOW (2 402 MHz)	DC 3.0 V	890.98	-90.86	0.30	-90.56	0.000 9	4.0
		4 809.00	-71.25	0.70	-70.55	0.088 1	20.0
	DC 2.7 V	780.52	-91.00	0.30	-90.70	0.000 9	4.0
		4 809.00	-71.44	0.70	-70.74	0.084 3	20.0
	DC 3.3 V	873.36	-90.80	0.30	-90.50	0.000 9	4.0
		4 809.00	-71.10	0.70	-70.40	0.091 2	20.0
MIDDLE (2 440 MHz)	DC 3.0 V	119.64	-90.50	0.30	-90.20	0.001 0	4.0
		4 879.00	-69.58	0.70	-68.88	0.129 4	20.0
	DC 2.7 V	110.53	-90.76	0.30	-90.46	0.000 9	4.0
		4 879.00	-69.55	0.70	-68.85	0.130 3	20.0
	DC 3.3 V	123.58	-90.55	0.30	-90.25	0.000 9	4.0
		4 879.00	-69.19	0.70	-68.49	0.141 6	20.0
HIGH (2 480 MHz)	DC 3.0 V	841.56	-91.50	0.30	-91.20	0.000 8	4.0
		4 962.00	-71.04	0.70	-70.34	0.092 5	20.0
	DC 2.7 V	788.03	-91.59	0.30	-91.29	0.000 7	4.0
		4 962.00	-71.22	0.70	-70.52	0.088 7	20.0
	DC 3.3 V	888.55	-91.38	0.30	-91.08	0.000 8	4.0
		4 962.00	-70.79	0.70	-70.09	0.097 9	20.0

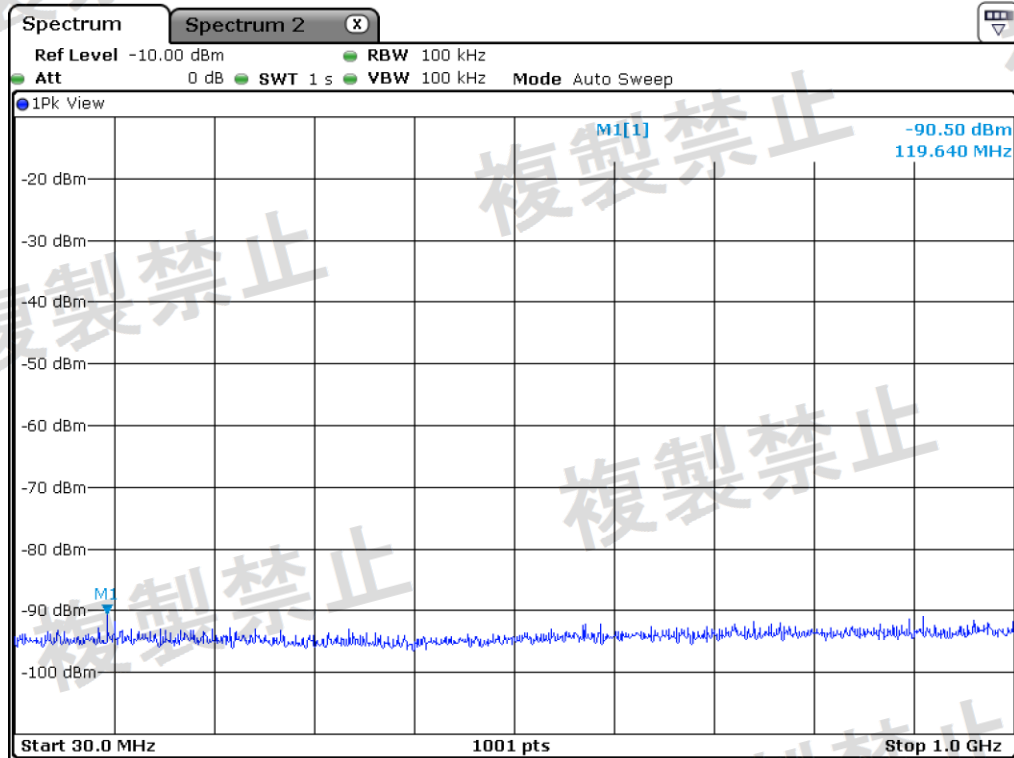
Plots of measurement data



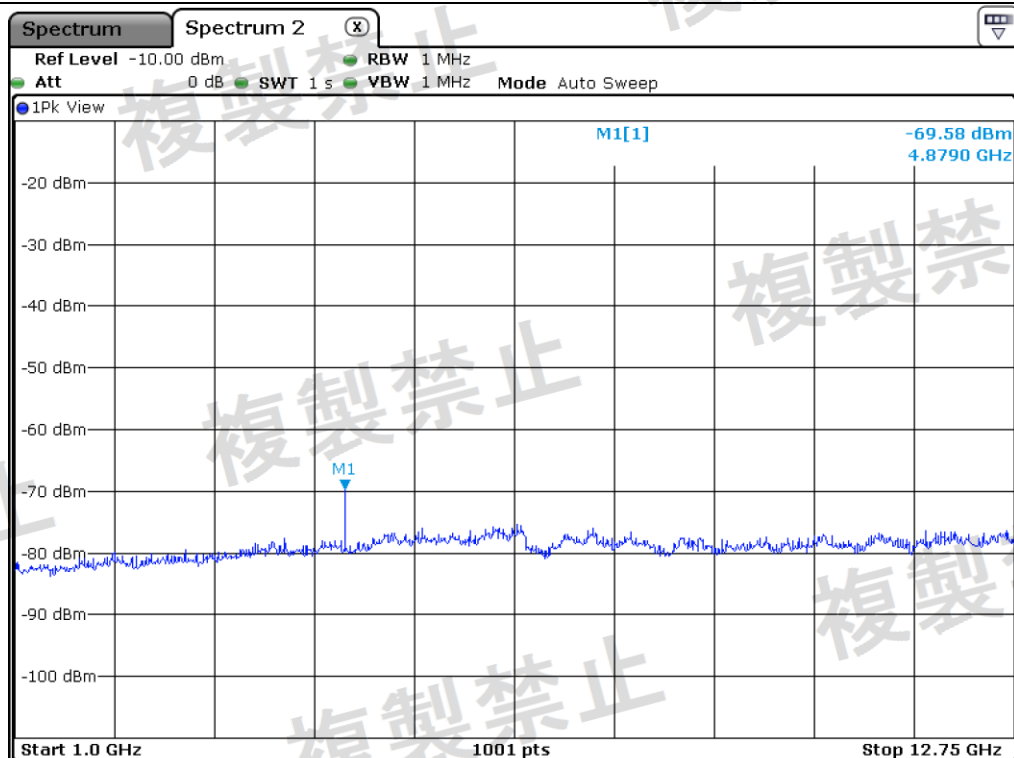
LOW (30 MHz ~ 1 GHz)



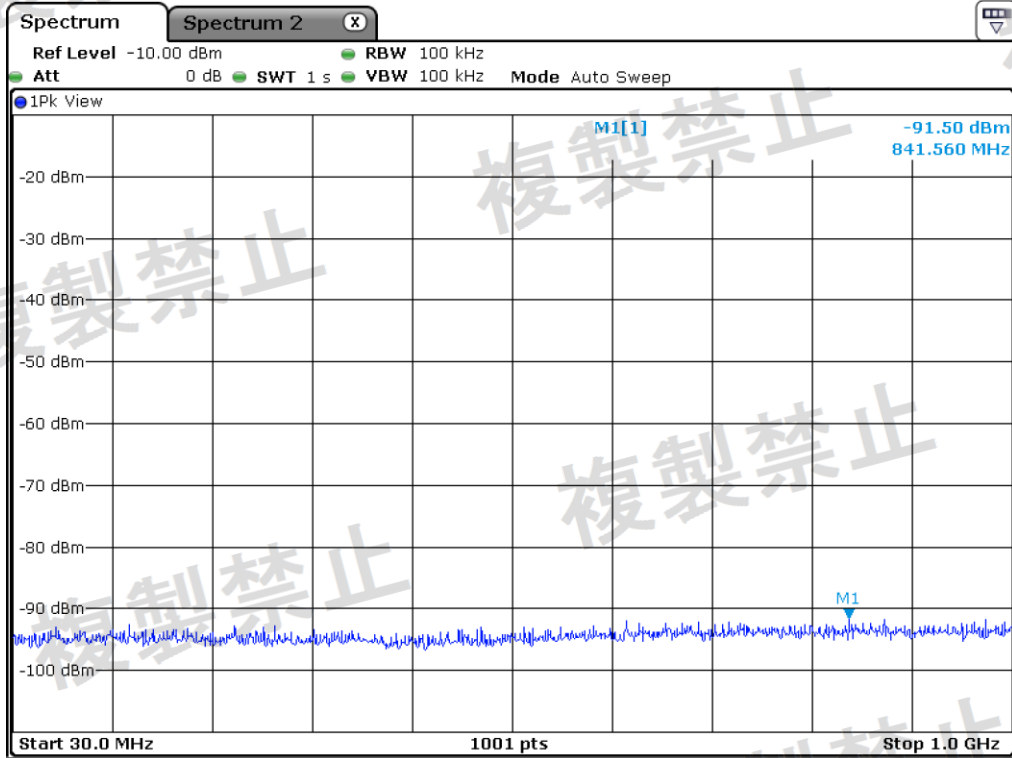
LOW (1 GHz ~ 12.5 GHz)



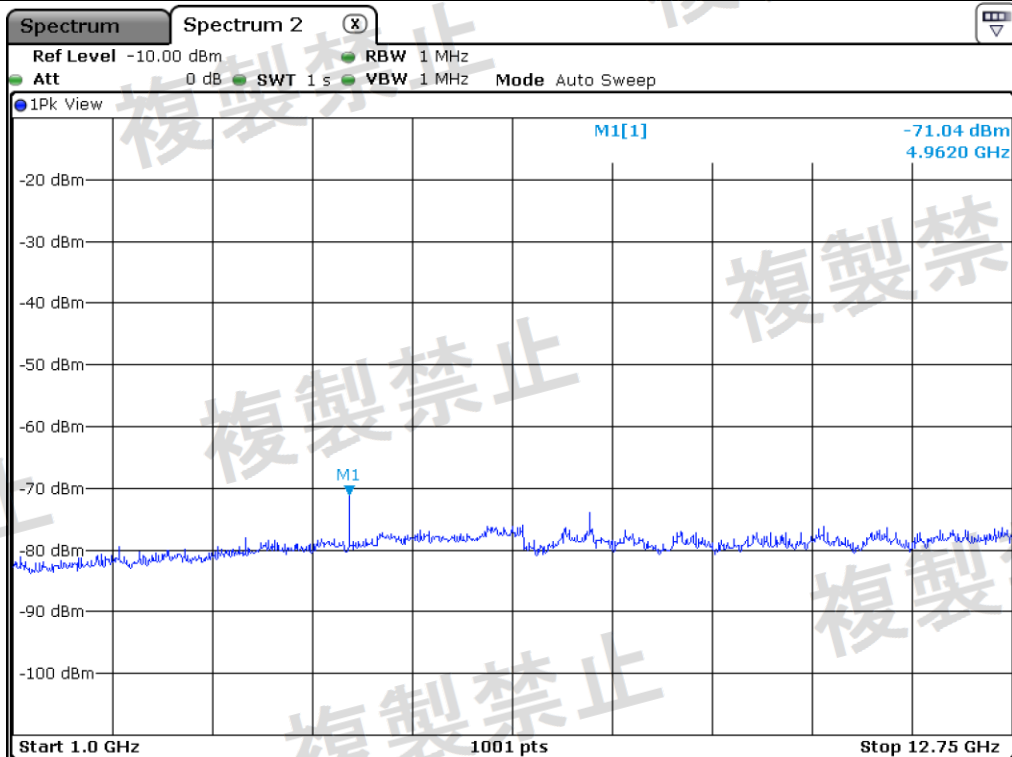
MIDDLE (30 MHz ~ 1 GHz)



MIDDLE (1 GHz ~ 12.5 GHz)



HIGH (30 MHz ~ 1 GHz)



HIGH (1 GHz ~ 12.5 GHz)

10. Interference prevention function

10.1 Operating environment

Temperature : 21.8 °C
Relative humidity : 49 % R.H.

10.2 Test Date

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10.3 Test Data

Test Voltage	2 402 MHz	2 440 MHz	2 480 MHz
DC 3.0 V	PASS	PASS	PASS
DC 2.7 V	PASS	PASS	PASS
DC 3.3 V	PASS	PASS	PASS

10.4 Limit

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

11. LIST OF TEST EQUIPMENT

Model Number	Manufacturer	Description	Serial Number	Last Cal.(Interval)	Remarks
FSV40-N	Rohde & Schwarz	Signal Analyzer	101651	Apr. 16, 2021 (1Y)	24-2 paragraph 「/」
NRP-Z91	Rohde & Schwarz	Wide band sensor	103780	Jul. 14, 2021 (1Y)	
SMB100A	Rohde & Schwarz	Signal Generator	177648	Jan. 17, 2022 (1Y)	
53152A	HP	CW Microwave Frequency Counter	US39270295	Jul. 20, 2021 (1Y)	
H-3005D	Fine Power	DC Power Supply (DC 36 V 6 A)	6MJ-850Z16-0014	Jan. 19, 2022 (1Y)	

All test equipment used is calibrated on a regular basis.

Article 24-2, Paragraph 4, Item 2 of the Radio Law

(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)