TEST REPORT

Applicant : M5Stack Technology Co., Ltd

Address : Block A10, Expo Bay South Coast, Fuhai Street, Bao'an District, Shenzhen, China

Report Number : 2604R48107E-RF-07D

Test Standard (s)

Japan item 19-2 of Article 2 Paragraph 1

Sample Description

Product Type: M5Atom Matrix V1.1

Model No.: Atom Matrix V1.1

Trade Mark: M5STACK

Date Received: 2026-03-12

Report Date: 2026-03-30

Test Result:	The EUT complied with the standards above.

Prepared and Checked By:

Jason Fan

Jason Fan
EMC Engineer

Approved By:

Bob. Liao

Bob.Liao
EMC Engineer

Note: The information marked "#" is provided by the applicant, the laboratory is not responsible for its authenticity and this information can affect the validity of the result in the test report. Customer model name, addresses, names, trademarks etc. are included but no need marked.
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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
Rev.00	2604R48107E-RF-07D	Original Report	2026-03-30

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GENERAL INFORMATION

Product Description for Equipment under Test (EUT)

Product Name	M5Atom Matrix V1.1
Tested Model	Atom Matrix V1.1
Nominal Power Supply#	DC5V from USB-C port

Radio Type		WLAN
Technical Parameters	Support Technical	802.11b
	Modulation Type	DSSS
	Frequency Range	2484 MHz
	Rate Output Power#	2.5mW/MHz
	Antenna Gain#	2.0dBi (provided by the applicant)
Sample Serial Number		3IFC-1 (Assigned by ATC, Shenzhen)
Sample/EUT Status		Good condition

Objective

The objective of the manufacturer is to demonstrate compliance with Radio Law of Japan item 19-2 of Article 2 Paragraph 1.

Test Methodology

All measurements contained in this report were conducted with technical regulations of the Radio Law of Japan MIC Notice NO.88 of 2004 Appendix No.44.

Unless otherwise stated there are no any additions to, deviations, or exclusions from the method.

Test Facility

The test site used by Shenzhen Accurate Technology Co., Ltd. to collect test data is located on the Floor 1, KuMaKe Building, Dongzhou Community, Guangming Street, Guangming District, Shenzhen, Guangdong, China.

Measurement Uncertainty

Parameter	Uncertainty
Occupied Channel Bandwidth	5 %
RF Frequency	$0.064*10^{-7}$
RF output power, conducted	0.3 dB
Unwanted Emission, conducted	1.2 dB
Temperature	1 ℃
Humidity	2 %
Supply voltages	0.4 %

Note: The extended uncertainty given in this report is obtained by combining the standard uncertainty times the coverage factor K with the 95% confidence interval. Otherwise required by the applicant or Product Regulations, Decision Rule in this report did not consider the uncertainty.

EUT TEST CONFIGURATION

Description of Test Configuration

For frequency 2484MHz, channel 14 was tested.

Channel	Frequency (MHz)	Channel	Frequency (MHz)
14	2484	/	/

Test Voltage#

The EUT has a voltage chip: SY8089, the fluctuation of power supply to the RF circuit of EUT is equal to or less than +/-1%. Exempt extremely high and low supply voltage condition tests, EUT only operated in normal voltage to test all regulations. Details as following:

Voltage Condition	Input(V_{DC})	Chip Voltage (V_{DC})
NV	5.0	3.3
LV	4.5	3.3
HV	5.5	3.3

Test voltage: 5.0V (Normal Voltage) (It is provided by the applicant.)

EUT Exercise Software and Power Level

Software “EspRFTestTool” was used during testing and the power level was provided by the manufacturer.

The worst-case data rates are determined to be as follows:

Mode	Data Rate	Power Level
802.11b	1 Mbps	8

Equipment Modifications

No modification was made to the EUT tested.

Support Equipment List and Details

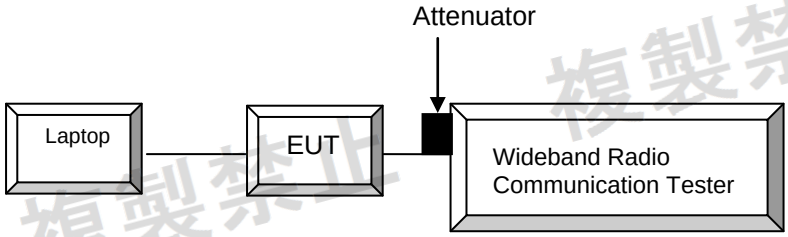
Manufacturer	Description	Model	Serial Number
LENOVO	Laptop	ThinkPad T470	PF-17P19A
HUAWEI	Router	WS5100	DCJ7S18609013316 10

External I/O Cable

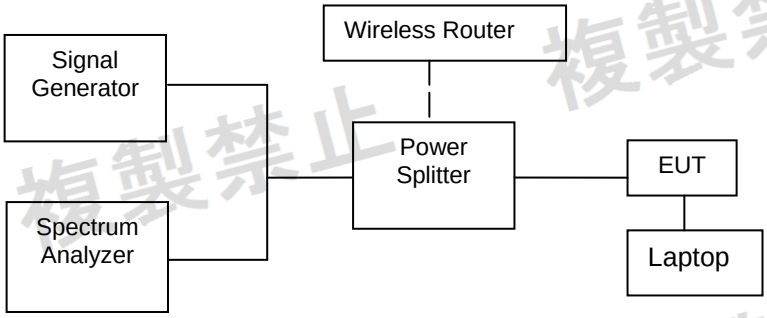
Cable Description	Shielding Type	Length (m)	From Port	To
USB Cable	No	1.0	EUT	Laptop
RF cable	No	0.1	EUT	Spectrum/ Wideband Radio Communication Tester/Power Splitter

Configuration of Test Setup

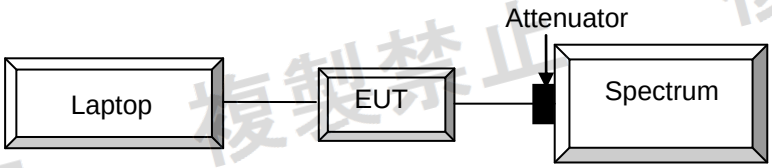
For Interference Prevention Function:



For Carrier Sense Capability



Other test items:



SUMMARY OF TEST RESULTS

MIC Notice No.88 Appendix No.44 Article 2, Paragraph 1, Item 19-2

Items	Description of Test	Result
1	Frequency Error	Compliance
2	Occupied Bandwidth and Spreading Bandwidth	Compliance
3	Transmitter Spurious Emission and Unwanted Emission Intensity	Compliance
4	Antenna Output Power, Output Power Tolerance and Transmission Antenna Gain	Compliance
5	Receiver Spurious Emission and Unwanted Emission Intensity	Compliance
6	Frequency Hopping Dwell Time	Not Applicable
7	Carrier Sense Capability	Compliance
8	Interference Prevention Function	Compliance
9	Construction Protection Confirmation	Compliance

Not Applicable - Testing is only required for FHSS system devices.

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TEST EQUIPMENT LIST

Manufacturer	Description	Model	Serial Number	Calibration Date	Calibration Due Date	Calibration Authority	Calibration Method
Rohde & Schwarz	Spectrum Analyzer	FSV-40	101948	2025/09/18	2026/09/17	BACL Cal	C
WEINSCHEL	10dB Attenuator	5324	AU 3842	2026/01/20	2027/01/19	BACL Cal	C
Unknown	RF Coaxial Cable	No.35	/	2025/05/30	2026/05/29	BACL Cal	C
Unknown	RF Coaxial Cable	No.36	/	2025/05/30	2026/05/29	BACL Cal	C
Rohde & Schwarz	Wideband Radio Communication Tester	CMW500	124441	2025/09/17	2026/09/16	BACL Cal	C
UNI-T	Multimeter	UT191T	/	2026/01/20	2027/01/19	BACL Cal	C
Mini-Circuits	Power Splitter	ZFRSC-183-S+	SF10944151S	2026/01/20	2027/01/19	BACL Cal	C
UNI-T	DC Power Supply	UTP1306S	2109D0903324	2026/01/20	2027/01/19	BACL Cal	C
AGILENT	Vector Signal Generator	N5182A	MY50143401	2025/09/17	2026/09/16	BACL Cal	C

*** Statement of Traceability:** Shenzhen Accurate Technology Co., Ltd. attests that all calibrations have been performed in accordance to requirements that traceable to National Primary Standards and International System of Units (SI).

Note

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.51of1992)

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 which shall have been given any of calibration, etc. listed above from A to C.

FREQUENCY ERROR

Limit

- 50ppm or below

Test Procedure

Conditions of Application Equipment (EUT)

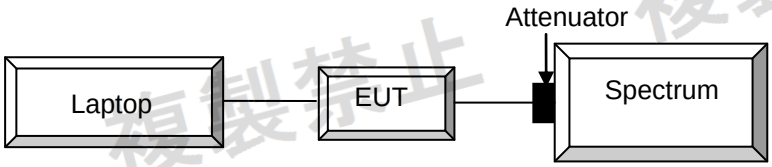
- Set the application equipment (EUT) to the measurement frequency.
- The modulation state shall be “continuous carrier wave without modulation” mode.

Spectrum Analyzer Conditions

- Center Frequency: Frequency to measure (2484 MHz)
- RBW: 1kHz, VBW: 3kHz
- Span: 300kHz
- Sweep time: Auto or more
- Log scale: 10dB/Div, Data points: 501points (400 points or more)
- Detection: Positive Peak, Sweep mode: Continuous
- Marker: Spot

EUT operation mode: Transmitting (un-modulation)

Measurement System Diagram



Note: Offset = RF cable loss(0.5dB#) + Attenuator(10dB)

Test Data

Test Result: Please refer to the Appendix.

OCCUPIED BANDWIDTH AND SPREADING BANDWIDTH

Limit

- Occupied bandwidth: FH ≤ 83.5 MHz; OFDM ≤38MHz; DS ≤ 26 MHz; Others ≤ 26 MHz
- Spread Bandwidth: ≥ 500 kHz (FH, DS), Spread factor > 10.

Test Procedure

1. Setting of SA is following as:
   - RB: 300 kHz
   - VB: 300 kHz
   - Sweep time: Auto or more
   - Sweep Mode: Continuous sweep
   - Detect mode: Positive peak
   - Trace mode: Max hold

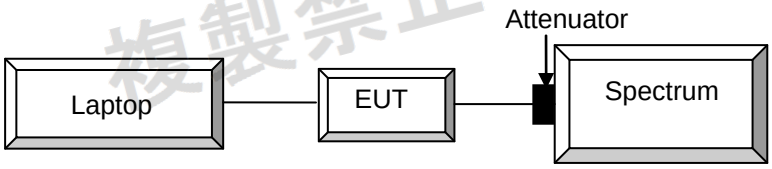
2. EUT have transmitted the maximum modulation signal and fixed channelize. SA set to 99% of occupied bandwidth to measure occupied bandwidth.

3. EUT have transmitted the maximum modulation signal and fixed channelize. SA set to 90% of occupied bandwidth to measure spread bandwidth.

4. Spread Factor=Spread Bandwidth/modulation rate. The modulation rate: MR=1.375 for 802.11b.

EUT operation mode: Transmitting

Measurement System Diagram



Note: Offset = RF cable loss(0.5dB#) + Attenuator(10dB)

Test Data

Test Result: Please refer to the Appendix.

TRANSMITTER SPURIOUS EMISSION STRENGTH AND UNWANTED EMISSION INTENSITY

Limit

Frequency Band	Limit
Band I: 30MHz-1GHz	0.25μW/100kHz (-36dBm/100kHz)
Band II: 1GHz-2458MHz	2.5μW/MHz (-26dBm/MHz)
Band III: 2458MHz-2471MHz	25μW/MHz (-16dBm/MHz)
Band IV: 2497MHz-2510MHz	25μW/MHz (-16dBm/MHz)
Band V: 2510MHz-12.5GHz	2.5μW/MHz (-26dBm/MHz)

Test Procedure

Conditions of Application Equipment (EUT)

- The modulation state shall be in continuously transmitting mode.

Spectrum Analyzer Conditions

- Setting of SA start 30MHz and stop frequency 1000MHz,

RB: 100kHz/VB: 100k Hz, Sweep time: Auto. Sweep mode: continous sweep.
Detect mode: Positive peak/Trace mode: max hold.
Then to mark peak. Reading value+cable loss shall be less than 0.25μW.

- Setting of SA start 1000MHz and stop frequency 2458MHz,

RB: 1MHz/VB: 1MHz, Sweep time: Auto. Sweep mode: continous sweep.
Detect mode: Positive peak/Trace mode: max hold.
Then to mark peak. Reading value+cable loss shall be less than 2.5μW.

- Setting of SA start 2458MHz and stop frequency 2471MHz,

RB: 1MHz/VB: 1MHz, Sweep time: Auto. Sweep mode: continous sweep.
Detect mode: Positive peak/Trace mode:max hold.
Then to mark peak. Reading value+cable loss shall be less than 25μW.

- Setting of SA start 2497MHz and stop frequency 2510MHz,

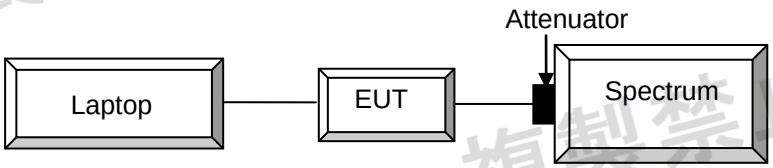
RB: 1MHz/VB: 1MHz, Sweep time: Auto. Sweep mode: continous sweep.
Detect mode: Positive peak/Trace mode: max hold.
Then to mark peak. Reading value+cable loss shall be less than 25μW.

- Setting of SA start 2510MHz and stop frequency 12500MHz,

RB: 1MHz/VB: 1MHz, Sweep time: Auto. Sweep mode: continous sweep.
Detect mode: Positive peak/Trace mode: max hold.
Then to mark peak. Reading value+cable loss shall be less than 2.5μW.

EUT operation mode: Transmitting

Measurement System Diagram



Note: Offset = RF cable loss(0.5dB#) + Attenuator(10dB)

Test Data

Test Result: Please refer to the Appendix.

ANTENNA OUTPUT POWER, ANTENNA POWER TOLERANCE AND TRANSMISSION ANTENNA GAIN

Limit

- Output Power: 10mW/MHz or less
- The Output Power Tolerance must be within +20%, -80%.
- E.R.P.: 12.14dBm/MHz or less
- Transmitter antenna gain: 2.14dBi or less
  When an E.R.P. is less than a limit, the shortage shall be compensated for by the gain of the transmission antenna.

Test Procedure

Step 1: Connect the UUT to the spectrum analyzer and use the following settings:

- Centre Frequency: The centre frequency of the channel under test.
- Resolution BW: 1 MHz.
- Video BW: 1 MHz.
- Span: Wide enough to cover the complete power envelope of the signal of the UUT.
- Detector: Peak.
- Trace Mode: Max Hold.

Step 2: When the trace is complete, find the peak value of the power envelope and record the frequency.

Step 3: Make the following changes to the settings of the spectrum analyser:

- Measurement Mode: Time Domain Power
- Centre Frequency: Equal to the frequency recorded in step 2.
- Span: Zero Span
- RBW: 1 MHz
- VBW: 1 MHz
- Sweep Mode: Single
- Detector: Sample
- Trace Mode: Clear Write

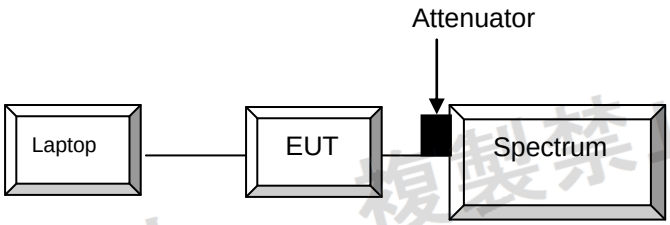
Use the analyser’s time domain power function measure the mean power across the transmit on period, record the result. This level is recorded as the highest mean power (spectral power density) D in a 1 MHz band.

The maximum E.R.P. spectral density is calculated from the above measured power density (D), and the applicable antenna assembly gain "G" in dBi, according to the formula below. If more than one antenna assembly is intended for this power setting, the gain of the antenna assembly with the highest gain shall be used.

- PD = D + G;

EUT operation mode: Transmitting

Measurement System Diagram



Note: Offset = RF cable loss(0.5dB#) + Attenuator(10dB)

Test Data

Test Result: Please refer to the Appendix.

RECEIVER SPURIOUS EMISSION AND UNWANTED EMISSION INTENSITY

Limit

Frequency Band	Limit
Band I: 30MHz-1GHz	4nW (-54dBm)
Band II: 1GHz-12.5GHz	20nW (-47dBm)

Test Procedure

Conditions of Application Equipment (EUT)

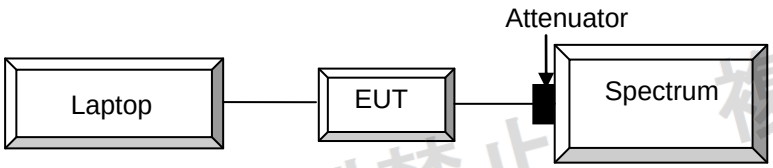
- The modulation state shall be “continuous receiving mode”.

Spectrum Analyzer Conditions

- Start Frequency: Start Frequency of frequency range to measure (30MHz or 1GHz)
- Stop Frequency: Stop Frequency of frequency range to measure (1GHz or 12.5GHz)
- Span: AUTO (Measurement Range)
- RBW: 100 kHz, VBW: 100 kHz for Frequency < 1 GHz
- RBW: 1MHz, VBW: 1MHz for Frequency > 1 GHz
- Sweep time: AUTO or more
- Sweep mode: Auto Sweep
- Detection: Positive Peak
- Reference Level: Enough level for maximum dynamic range

EUT operation mode: Receiving

Measurement System Diagram



Note: Offset = RF cable loss(0.5dB#) + Attenuator(10dB)

Test Data

Test Result: Please refer to the Appendix.

CARRIER SENSE CAPABILITY

Requirement

MIC Notice No.88 Appendix No.44, Article 2, Paragraph 1, Item 19-2

Test Procedure

1. Setting the SA as following:

Center frequency: Center frequency of the receiving frequency band

Span: 50MHz; RB: 1MHz; VB: Same as RB.

Trigger type: Free-run

Detector: Peak

2. Turn the SG on

The SG setting as following:

a. Modulation type: Un-modulated

b. Output power level: The regulated power level on the antenna input of the EUT.

c. Put the test equipment into RX mode.

d. Turn on the output of the signal generator.

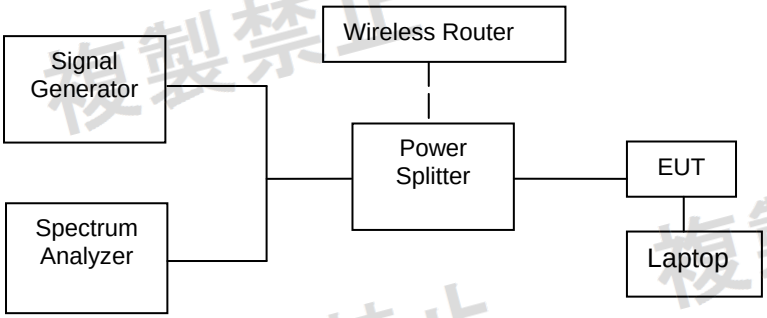
e. Set the test equipment to transmit operation and use a spectrum analyzer to confirm that it does not emit radio waves.

f. Put the test equipment into RX mode.

g. Turn off the output of the standard signal generator.

h. Set the test equipment to transmit operation and use a spectrum analyzer to confirm that it emits radio waves.

Measurement System Diagram



Test Data

Test Result: Please refer to the Appendix.

INTERFERENCE PREVENTION FUNCTION

Requirement

The EUT shall have the interference prevention capability to transmit or to receive the identification automatically, so that sender and receiver shall exclude other equipment.

Test Procedure

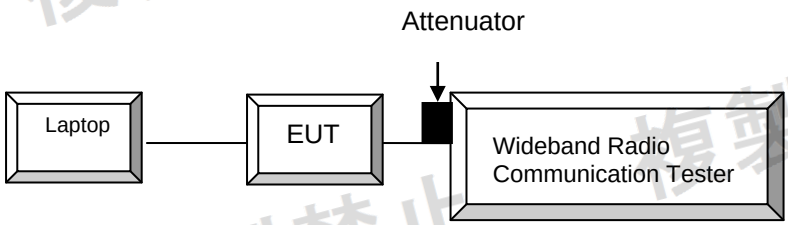
In the case that the EUT has the function of automatically transmitting the identification code:

1. Transmit the predetermined identification codes from EUT
2. Check the transmitted identification codes with the demodulator.

In the case of receiving the identification codes:

1. Transmit the predetermined identification codes from the counterpart.
2. Check if communication is normal
3. Transmit the signal other than predetermined ID codes from the counterpart.
4. Check if the EUT stops the transmission, or if it displays that identification codes are different from the predetermined ones.

Measurement System Diagram



Test Data

Test Result: Please refer to the Appendix.

CONSTRUCTION PROTECTION CONFIRMATION

Limit

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

Confirmation Method

The EUT use a shell cover with the super glue in the gap, the shielding cannot be opened easily. Please refer to the EUT photos.

APPENDIX

Test Information:

Sample No.:	3IFC-1	Test Date:	2026/03/20~2026/03/25
Test Site:	RF	Test Mode:	Transmitting/Receiving
Tester:	Steve Lu	Test Result:	Pass

Environmental Conditions:

Temperature: (°C)	24.2~24.6	Relative Humidity: (%)	51~53	ATM Pressure: (kPa)	100.4

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Frequency Error

Test Condition: NV

Mode	Frequency (MHz)	Measure Frequency (MHz)	Frequency Tolerance (ppm)	Limit (ppm)	Verdict
Single Carrier	2484	2483.98995	-4.05	± 50	Pass

Note:
Frequency Tolerance = (Measure Frequency - Frequency)/Frequency*10^6

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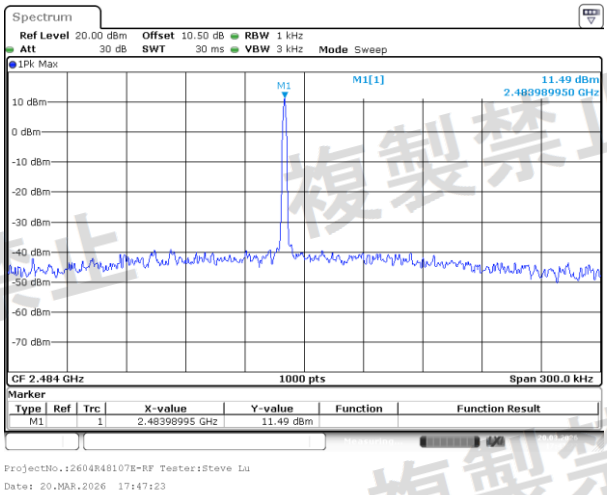
Test Condition: NV

2484MHz



Occupied Bandwidth and Spreading Bandwidth

Test Condition: NV

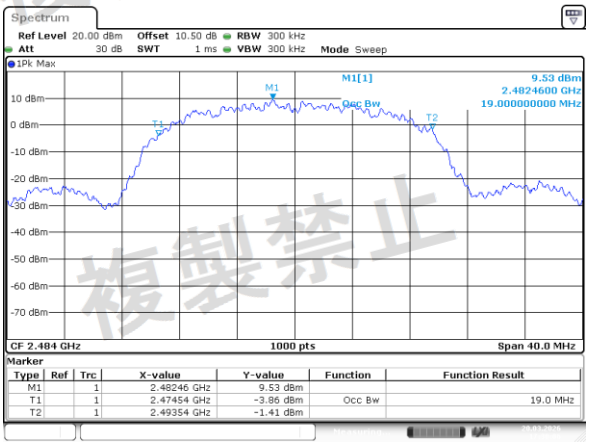
Test Items	Measured Result	Limit	Verdict
Occupied bandwidth (MHz)	19	<= 26	Pass
Spreading bandwidth (MHz)	14.2	≥ 0.5	Pass
Spreading Factor	10.327	≥ 10	Pass

Note1: Spread factor = spread bandwidth/modulation rate
Note2: Modulation rate: 802.11b = 1.375

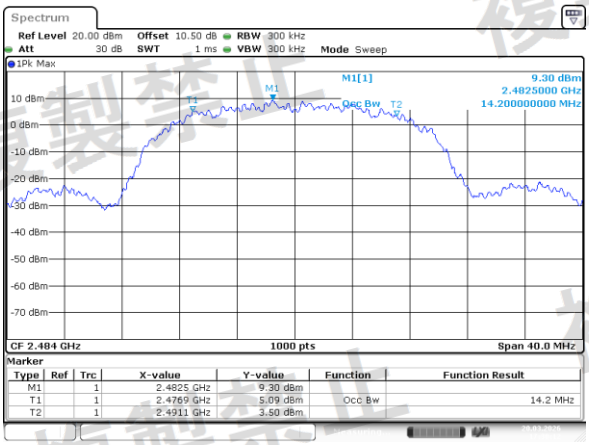
Test Condition: NV

802.11b_2484MHz

Occupied Bandwidth



Spreading Bandwidth



Transmitter Spurious Emission Strength

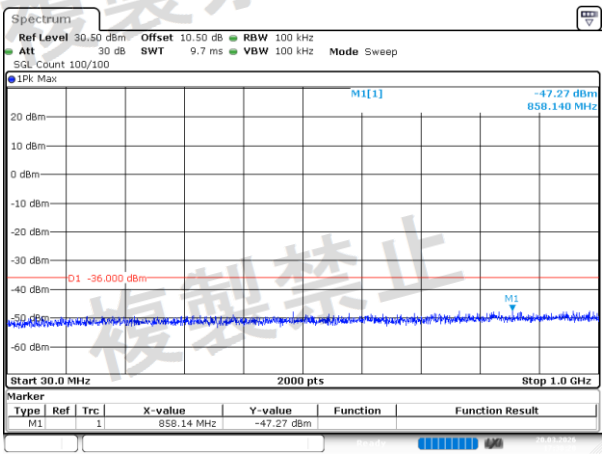
Test Condition: NV

802.11b

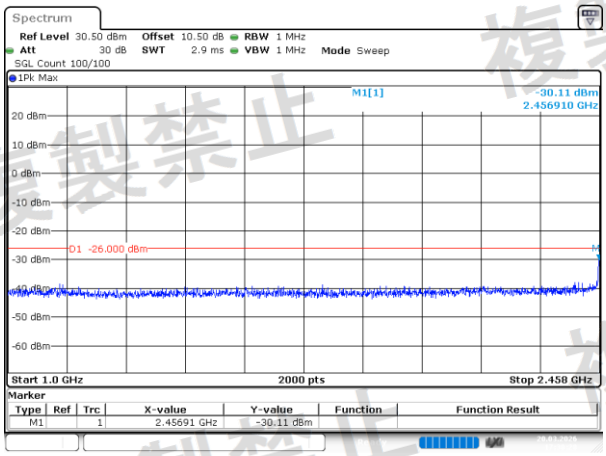
Frequency (MHz)	Test Band (RBW)	Frequency Range		Max.Emission Located(MHz)	Result (dBm/RBW)	Result (μW/RBW)	Limit (μW/RBW)	Verdict
		Start (MHz)	Stop (MHz)					
2484	Band I (100kHz)	30	1000	858.14	-47.27	0.02	0.25	Pass
	Band II (1MHz)	1000	2458	2456.91	-30.11	0.98	2.50	Pass
	Band III (1MHz)	2458	2471	2467.5843	-18.08	15.56	25	Pass
	Band IV (1MHz)	2497	2510	2500.7018	-17.21	19.01	25	Pass
	Band V (1MHz)	2510	12500	4970	-28.97	1.27	2.50	Pass

Test Condition: NV

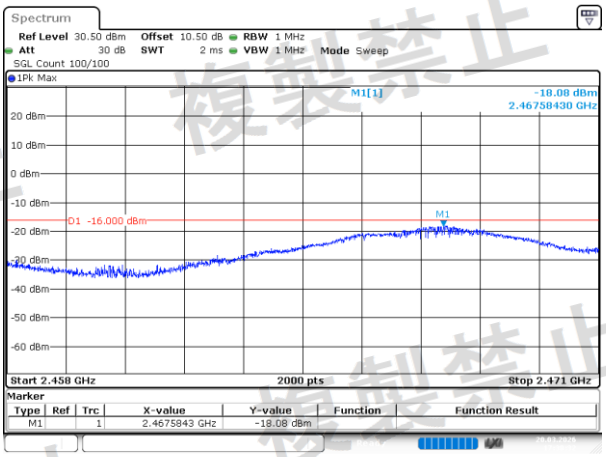
802.11b, 30MHz~1GHz



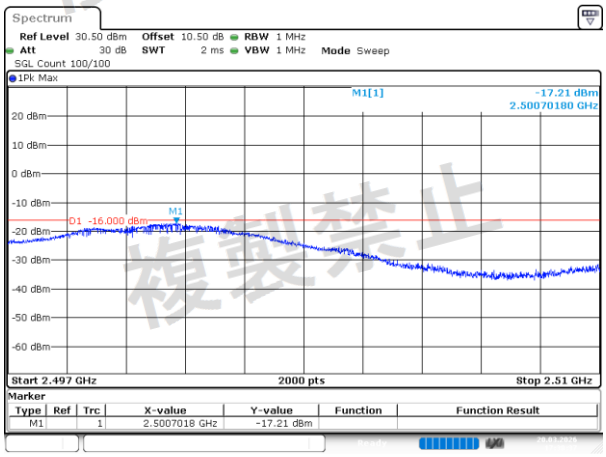
802.11b, 1GHz~2.458GHz



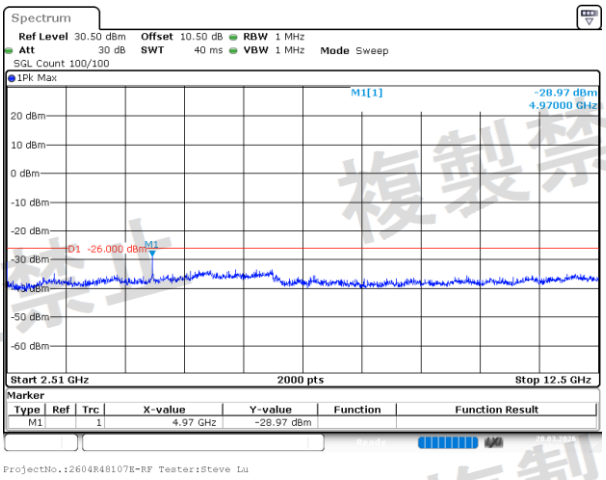
802.11b, 2.458GHz~2.471GHz



802.11b, 2.497GHz~2.51GHz



802.11b, 2.51GHz~12.5GHz



Antenna Output Power, Output Power Tolerance and Transmission Antenna Gain

Test Condition: NV

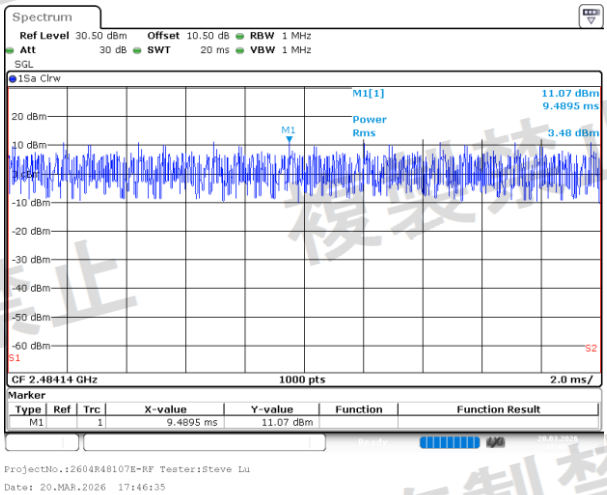
Mode	Antenna gain# (dBi)	Declared power# (mW/MHz)
802.11b	2	2.5

Mode	Frequency (MHz)	Antenna output power (dBm/MHz)	Antenna output power(mW/MHz)		Antenna output tolerance(%)		ERP (dBm/MHz)		Verdict
			Result	Limit	Result	Limit	Result	Limit	
802.11b	2484	3.48	2.228	≤ 10	-10.86	-80~+20	3.33	≤ 12.14	Pass

Note:
Antenna output power(mW/MHz)= 10^[Antenna output power(dBm/MHz) / 10]
Antenna output power tolerance(%) = (Antenna output power - Declared power) / Declared power * 100
ERP(dBm/MHz) = Antenna output power(dBm/MHz) + Antenna gain - 2.15dB.

Test Condition: NV

802.11b_2484MHz



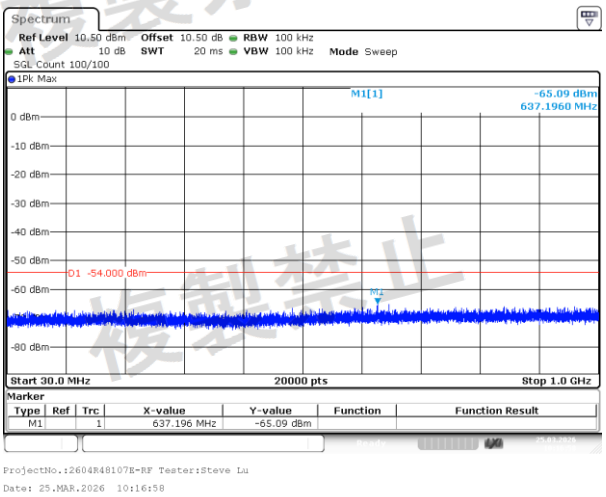
Receiver Spurious Emission and Unwanted Emission Intensity

Test Condition: NV

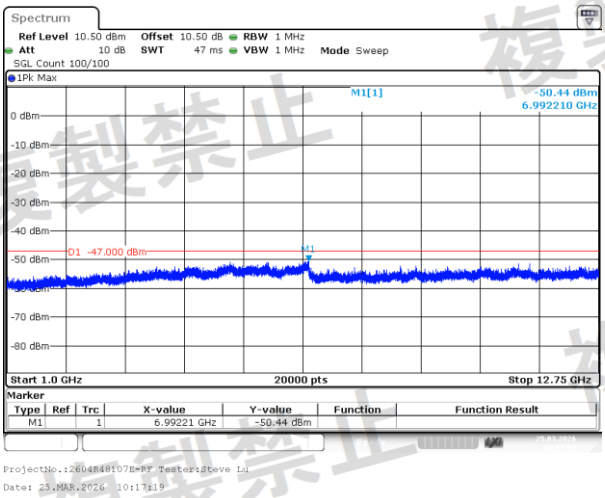
Mode	Frequency (MHz)	Test Band (RBW)	Frequency Range		Max.Emission Located(MHz)	Result (dBm)	Result (nW)	Limit (nW)	Verdict
			Start(MHz)	Stop(MHz)					
802.11b	2484	Band I (100kHz)	30	1000	637.196	-65.09	0.31	4	Pass
		Band II (1MHz)	1000	12500	6992.21	-50.44	9.04	20	Pass

Test Condition: NV

802.11b, 30MHz~1GHz



802.11b, 1GHz~12.75GHz



Carrier Sense Capability

Test Result: Good.

Interference Prevention Function

Test Result: Good. MAC: c9:7b:61:25:60:84

EXHIBIT A-EUT PHOTOGRAPHS

Please refer to the Attachment No.1 2604R48107E-RF EUT External Photos and Attachment No.2 2604R48107E-RF EUT Internal Photos.

複製禁止

EXHIBIT B-TEST SETUP PHOTOGRAPHS

Please refer to the Attachment No.3 2604R48107E-RF Test Photos.

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

複製禁止