

NXP Semiconductors N.V.

TEST REPORT

SCOPE OF WORK

JAPAN RADIO TESTING-FRDM-MCXW72

REPORT NUMBER

251126027SZN-001

ISSUE DATE

08 May 2026

[REVISED DATE]

[-----]

PAGES

42

DOCUMENT CONTROL NUMBER

JAPAN Radio Test Report-Bluetooth 2.4G Band

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JAPAN Radio Test Report

Data transmission equipment operating in the 2.4GHz

Applicant:	NXP Semiconductors N.V.
Address:	High Tech Campus 60, 5656AG Eindhoven, Dutch
Manufacturer:	NXP Semiconductors N.V.
Address:	High Tech Campus 60, 5656AG Eindhoven, Dutch
Factory:	ZHEJIANG XIANXIN TECHNOLOGY Co.,Ltd.
Address:	Building 1, No. 199, Zhenzhu 5th Road, Qiandaohu Town, Chun'an County, Hangzhou, Zhejiang.
Product Name:	FRDM-MCXW72
Model No.:	FRDM-MCXW72
Standard:	Article 49-20 and the relevant articles of the Ordinance Regulating Radio Equipment
Test Procedure:	MIC Notice No.88 Appendix No.43
Date of Receipt:	26 November 2025
Date of Test:	02 December 2025 to 20 April 2026
Test Site and Location:	Intertek Testing Services Shenzhen Ltd. 101, 201, Building B, No. 308 Wuhe Avenue, Zhangkengjing Community, GuanHu Subdistrict, LongHua District, ShenZhen, P.R. China
Date of Issue:	08 May 2026
Test Result:	Pass*
Note:	N/A

* In the configuration tested, the EUT detailed in this report complied with the standards specified above.
Please refer to section 3 of this report for further detail.

Prepared and Checked By:

Approved By:



Signature

Karot Huang
Assistant Engineer



Signature

Draven Li
Senior Project Engineer
08 May 2026

Date

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Intertek Testing Service Shenzhen Ltd.

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2 Revision History

Report No.	Version	Description	Issued Date
251126027SZN-001	Rev.01	Initial issue of report	08 May 2026

3 Summary of Test Result

Test	Test Requirement	Limit/Severity	Result
Antenna Requirement	Item 19 of Article 2-1	Notice 88 Appendix 43, B-1 (1) & (2)	Pass
Test frequency	Item 19 of Article 2-1	Notice 88 Appendix 43, A-3	Pass
Frequency Tolerance	Item 19 of Article 2-1	±50 ppm or less	Pass
Occupied Bandwidth	Item 19 of Article 2-1	26MHz or less for BT 6.0 BLE&Zigbee	Pass
Spread-spectrum Bandwidth	Item 19 of Article 2-1	500kHz or more	Pass
Antenna Power	Item 19 of Article 2-1	10dBm for BT 6.0 BLE&Zigbee Tolerance: +20%	Pass
Spurious Emission of Tx	Item 19 of Article 2-1	(1) Below 2387 MHz: 2.5μW/MHz or less(≤-26dBm/MHz) (2) 2387 to 2400 MHz: 25μW/MHz or less(≤-16dBm/MHz) (3) 2483.5 through 2496.5 MHz: 25μW/MHz or less (≤-16dBm/MHz) (4) Over 2496.5 MHz: 2.5μW/MHz or less(≤-26dBm/MHz)	Pass
Interference prevention capability	Item 19 of Article 2-1	Notice 88 Appendix 43, 44, 45	Pass
RF accessibility	Item 19 of Article 2-1	Notice 88 Appendix 43, 44, 45	Pass
Spurious Emission of Rx	Item 19 of Article 2-1	(1) Below 1 GHz: 4nW or less(≤-54dBm/100kHz) (2) 1 GHz and over: 20nW or less(≤-47dBm/MHz)	Pass

Remark:

EUT: In this whole report EUT means Equipment Under Test.

Tx: In this whole report Tx (or tx) means Transmitter.

Rx: In this whole report Rx (or rx) means Receiver.

RF: In this whole report RF means Radio Frequency.

Item 19 of Article 2 Paragraph 1.

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5 General Information

5.1 Client Information

Applicant: NXP Semiconductors N.V.
Address of Applicant: High Tech Campus 60, 5656AG Eindhoven, Dutch

5.2 General Description of EUT

Product Name: FRDM-MCXW72
Model No.: FRDM-MCXW72
Trademark: NXP

5.3 Details of EUT

Operating Frequency: 2400MHz-2483.5MHz
Bluetooth Version: BT 6.0
Type of Modulation(BT): FSK/GFSK/MSK/GMSK
Transmit Data Rate(BT): FSK/GFSK/MSK/GMSK: 125kbps, 500kbps, 1Mbps, 2Mbps
Number of Channels(BT): 40(0~39) for BT6.0 BLE
Channel Separation(BT): 2MHz for BT 6.0 BLE
Type of Modulation(Zigbee): OQPSK
Transmit Data Rate(Zigbee): OQPSK: 250kbps
Number of Channels(Zigbee): 16(11~26) Channels
Channel Separation(Zigbee): 5MHz
Antenna Type: PCB antenna
Antenna gain: 2.26dBi max
Normal antenna power: BLE 6.0: 10mW; IEEE 802.15.4: 10mW
Power Supply: DC 5V

Note:

1. Tests were conducted on all types of modulation schemes and data transmission rates, and the report only presents the data under the worst-case scenario, for the BLE transmission rates of 125 kbps and 500 kbps, the report presents antenna power measurements exclusively.

5.4 Description of Support Units

The EUT has been tested with associated equipment below.

Description	Manufacturer	Model No.
Laptop	Lenovo	T420

5.5 Deviation from Standards

None.

5.6 Abnormalities from Standard Conditions

None.

5.7 Other Information Requested by the Customer

None.

6 Equipment Used during Test

Test Equipment	Manufacturer	Model No.	Serial number	Cal. Date (dd-mm-yyyy)	Calibration body	Calibration method
Spectrum Analyzer	R&S	FSV40	101101	01-Dec-2025	CEPREI CALIBRATION & TESTING CENTER	C
Wideband Radio Communication Tester	R&S	CMW500	159876	22-Apr-2025	CEPREI CALIBRATION & TESTING CENTER	C
RF Power Meter	BOONTON	4232A	11002	01-Dec-2025	CEPREI CALIBRATION & TESTING CENTER	C
Pulse Power Sensor	Anritsu	MA2411B	1207429	21-Apr-2025	CEPREI CALIBRATION & TESTING CENTER	C
Attenuator	Bracke	6dB	N/A	02-Dec-2025	CHINA CEPREI LABORATORY CALIBRATION & TESTING CENTRE	C
Wideband Radio Communication Tester	R&S	CMW500	154161	22-Apr-2025	CHINA CEPREI LABORATORY CALIBRATION & TESTING CENTRE	C

Remark:

- Calibration conducted by the National Institute of Information and Communications Technology (NICT) in Japan (hereinafter referred to as "NICT") or a designated calibration agency under Article 102-18 paragraph (1) in JRL.
- Correction conducted pursuant to the provisions of Article 135 or Article 144 of the Measurement Act (Act No.51 of 1992).
- Calibration conducted in countries except Japan, which shall be equivalent to the calibration Conducted by the NICT or a designation agency under Article 102-18 paragraph (1).
- Calibration, etc. conducted by using measuring instruments and other equipment listed in the night column of appended table No.3, which shall have been given any type of calibration, etc. listed above from (a) to (c). From JRL Article 24-2, paragraph 4, item 2
- Calibration duration for above equipments is 1 year.
- When determining of the test conclusion, the Measurement Uncertainty of test has been considered.

7 Test Results

7.1 Radio Technical Requirements Specification

Tabel1: Radio Technical Requirements Specification for 2.4 GHz band wide-band low-power data communication system (Item 19 of Article 2-1)

Items	Technical standard
Assigned frequency or designated frequency	2400-2483.5MHz
Communication method	One-way communication, simplex, semi-duplex, or duplex operation of digital signal transmission including spread spectrum
Tolerance of frequency ($\times 10^{-6}$)	± 50
Tolerance of occupied bandwidth	FH: 83.5MHz or less FH + DS: 83.5MHz or less FH + OFDM: 83.5MHz or less OFDM: 38MHz or less Others: 26MHz or less
Antenna power	Designated value (1) FH, FH+DS, FH+OFDM: 3mW/MHz(4.77dBm/MHz) (used in the range of 2427-2470.75 MHz) (2) OFDM, DS other than (1) 10mW/MHz(10dBm/MHz) (3) Other than (1) & (2) 10mW(10dBm) (4) OFDM OBW 26- 38MHz: 5mW/MHz(6.99dBm/MHz) Tolerance:+20%, -80%
Antenna gain	(1) 12.14 dBi or less in principle (2) In case of directional antenna 1) FH, FH+DS or FH+OFDM using 2427-2470.75 MHz EIRP $\leq$ 16.91 dBm/MHz 2) OFDM or DS other than (1) EIRP $\leq$ 22.14 dBm/MHz 3) Other than (1) and (2): 22.14 dBm or less 4) OFDM OBW 26- 38MHz: 19.14dBm/MHz 5) Half-power angle of directional antenna (e) in case of the item 2): e $\leq$ 360/A (The A is 10 in maximum)
Dwell Time	0.4 sec or less
Tolerance of spurious emission intensity	(5) Below 2387 MHz: 2.5 μ W/MHz or less($\leq$ -26dBm/MHz) (6) 2387 to 2400 MHz: 25 μ W/MHz or less($\leq$ -16dBm/MHz) (7) 2483.5 through 2496.5 MHz: 25 μ W/MHz or less($\leq$ -16dBm/MHz) (8) Over 2496.5 MHz: 2.5 μ W/MHz or less($\leq$ -26dBm/MHz)
Spreading bandwidth	DS, FH, FH+DS, FH+OFDM: 500kHz or more
Spreading rate of spectrum	(Spreading bandwidth) / (Frequency corresponding to transmission rate) $\geq$ 5
Limit of secondary radiated emissions	(1) Below 1 GHz: 4 nW($\leq$ -54dBm) (2) 1 GHz or higher: 20 nW($\leq$ -47dBm)
Interference prevention function	Shall have the function of automatic transmission and reception of identification sign.
Structure	Shall be of the structure that the RF and modulator sections excluding antenna cannot easily be opened.
Note	DS: Direct spread FH: Frequency hopping OFDM: Orthogonal frequency division multiplexing

7.2 E.U.T. test conditions

Power supply:

USB input DC 5.0V

The RF unit is supplied by DC 5.0V. The fluctuation of input voltage to the circuit of RF unit of test equipment is under $\pm 1\%$, when input voltage from DC 5.0V to the test equipment is fluctuated by $\pm 10\%$. So, all measurement has been conducted by only rated voltage.

The measurement result of the voltage fluctuation at RF circuit when DC 5.0V $\pm 10\%$

Power supply voltage	measured value
DC 5.0V	DC 5.0V
DC 4.5V	DC 4.5V
DC 5.5V	DC 5.5V

Temperature:

 $-40^{\circ}\text{C} - +105^{\circ}\text{C}$

Humidity:

45-85 % RH

Atmospheric Pressure:

1000 -1010 mbar

Test frequencies:

If the EUT can be set to 3 or more different (carrier) frequencies in 1 allocated band, testing shall be performed using the Lowest, Middle and the Highest frequency (L, M and H). If there are 2 or fewer frequencies, testing shall be performed with the available frequencies.

Channel List for Zigbee&Thread(unit: MHz)

2405	2410	2415	2420	2425	2430	2435	2440	2445
2450	2455	2460	2465	2470	2475	2480		

Channel List for BT 6.0 BLE(unit: MHz)

2402	2404	2406	2408	2410	2412	2414	2416	2418	2420
2422	2424	2426	2428	2430	2432	2434	2436	2438	2440
2442	2444	2446	2448	2450	2452	2454	2456	2458	2460
2462	2464	2466	2468	2470	2472	2474	2476	2478	2480

Test Channel for Zigbee&Thread			Test Channel for BT 6.0 BLE		
Lowest Channel:	11	2405MHz	Lowest Channel:	0	2402MHz
Middle Channel:	19	2445MHz	Middle Channel:	19	2440MHz
Highest Channel:	26	2480MHz	Highest Channel:	39	2480MHz

7.3 Test Environment

Operating Environment:	
Temperature:	23.6 °C
Humidity:	50.3 % RH
Atmospheric Pressure:	1001 mbar

7.4 Antenna Requirement

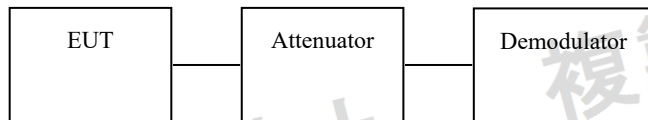
EUT Antenna

The antenna is PCB antenna on the main PCB and no consideration of replacement. The best case gain of the antenna is 2.26dBi max.

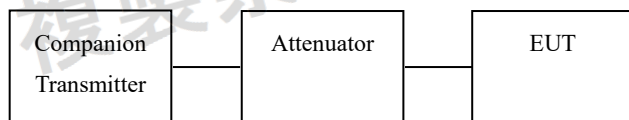
7.5 Interference prevention function

1) Test Setup

A) When transmitting an identification signal



B) When receiving an identification signal



2) Test instrument conditions

A) The demodulator must be capable of demodulating the transmission signal sent by EUT and displaying the content of the identification signal

B) The Companion Transmitter must be capable of transmitting an identification signal identical to the transmission signal sent by EUT.

3) Test Device State

EUT shall be in its normal operating state.

4) Test Procedure

A) When EUT has the function to automatically transmit an identification signal

a) EUT transmits the identification signal specified in the equipment regulations.

b) The transmitted identification signal is verified using the demodulator.

B) When EUT has the function to automatically receive an identification signal

a) The Companion Transmitter transmits the identification signal specified in the equipment regulations.

b) Confirm whether to use dedicated fixtures for communication with EUT

c) From the Companion Transmitter, send symbols that are different from the identification symbols specified in the device rules.

d) Confirm whether EUT has stopped sending or whether the displayed identification symbols are different.

5) Test Result

A) EUT has the function of automatically sending identification symbols. If the symbols stipulated by the equipment rules are the same as the demodulated symbols, it is recorded as "Pass"; if they are different, it is recorded as "Fail".

B) EUT has the function of automatically receiving and recognizing symbols. When the received symbols conform to the regulations of the equipment, normal reception is carried out. When they do not match the symbols stipulated by the equipment rules and different meanings are expressed, "Pass" is used; otherwise, "Fail" is used.

BLE&Zigbee&Thread Identification Code: 70 25 A0 37 60 00

7.6 Frequency Tolerance

Test Requirement:

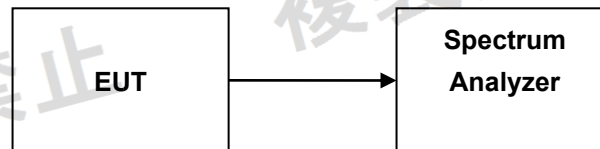
Item 19 of Article 2-1

Tolerance of frequency: $\pm 50 \times 10^{-6}$

Test Status:

Test the EUT in transmitting mode without modulation.

Test Configuration:



Test Procedure:

1. Test Conditions:

Spectrum Analyzer is used for measurement.

2. EUT conditions:

Modulation/Spread/Hopping OFF, CW Tx

3. Spectrum Analyzer conditions:

Frequency: Test Frequency

Span 1MHz

RBW 10 kHz (Modulation OFF)

VBW 10 kHz (Modulation OFF)

Sweep Time Auto

Detector mode Positive peak

Indication mode Max hold

4. Alternative method in case the UUT cannot be operated in an un-modulated mode.

The UUT shall be connected to spectrum analyser.

Max Hold shall be selected and the centre frequency adjusted to that of the UUT.

The peak value of the power envelope shall be measured and noted. The span shall be reduced and the marker moved in a positive frequency increment until the upper, (relative to the centre frequency), -10 dBc point is reached. This value shall be noted as f1.

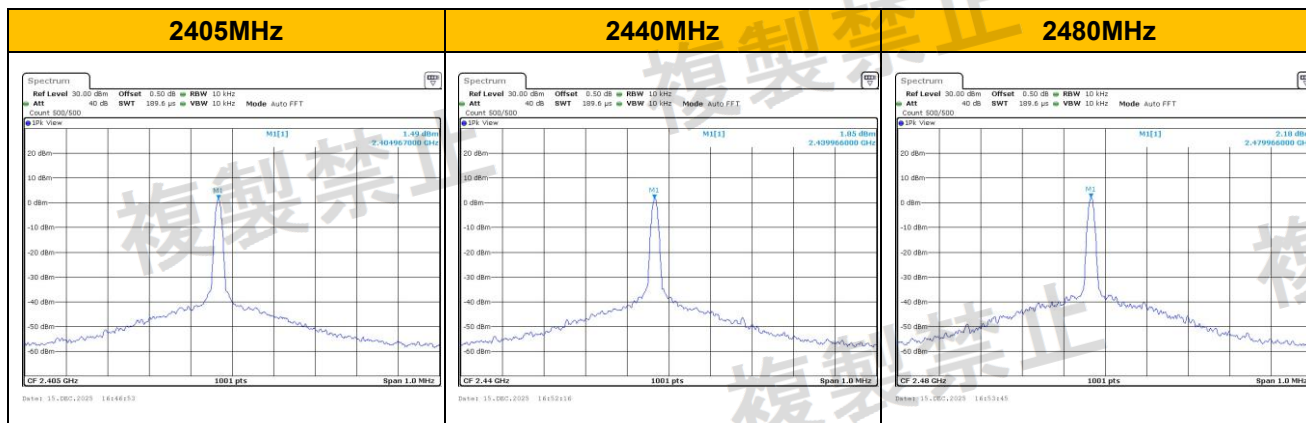
The marker shall then be moved in a negative frequency increment until the lower, (relative to the centre frequency), -10 dBc point is reached. This value shall be noted as f2.

The centre frequency is calculated as $(f1 + f2) / 2$.

Test result: PASS

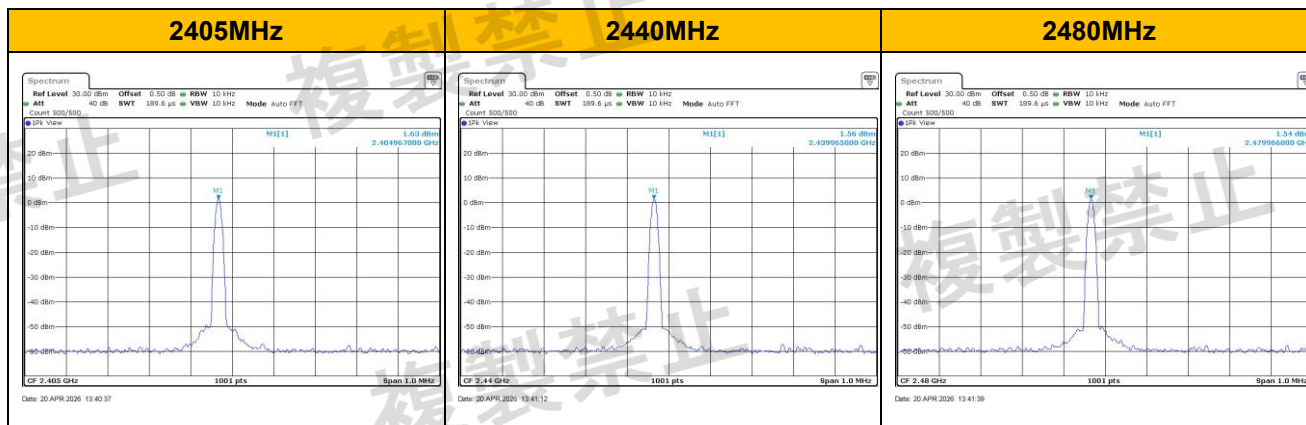
Frequency Tolerance

Zigbee



Measurement Frequency	MHz	2405	2440	2480	Limit	Result
Measured Value	MHz	2404.9670	2439.9660	2479.9660	-----	-----
Frequency Tolerance	ppm	-13.72	-13.93	-13.71	±50 ppm or less	Pass

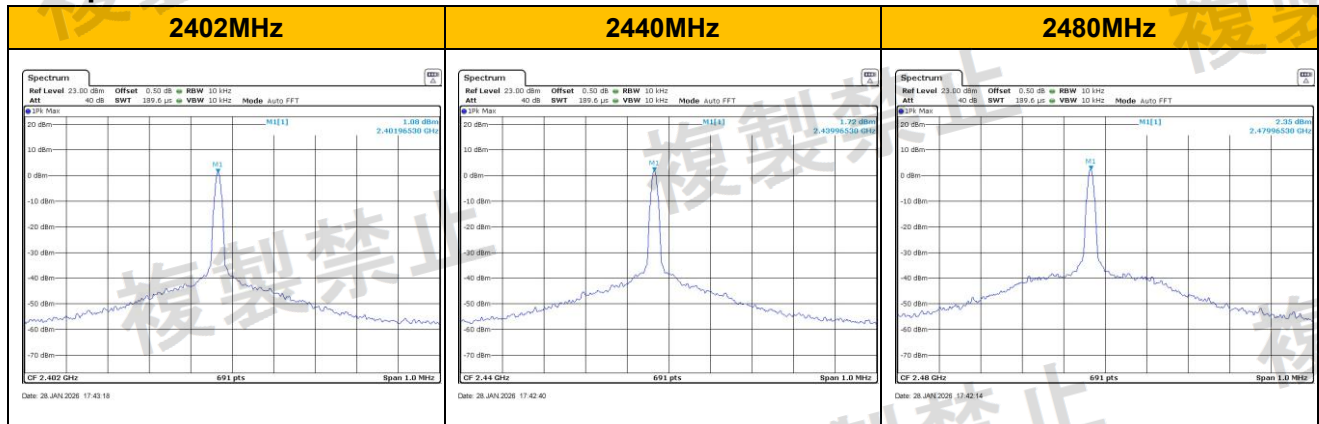
Thread



Measurement Frequency	MHz	2405	2440	2480	Limit	Result
Measured Value	MHz	2404.9670	2439.9650	2479.9660	-----	-----
Frequency Tolerance	ppm	-13.72	-14.34	-13.71	±50 ppm or less	Pass

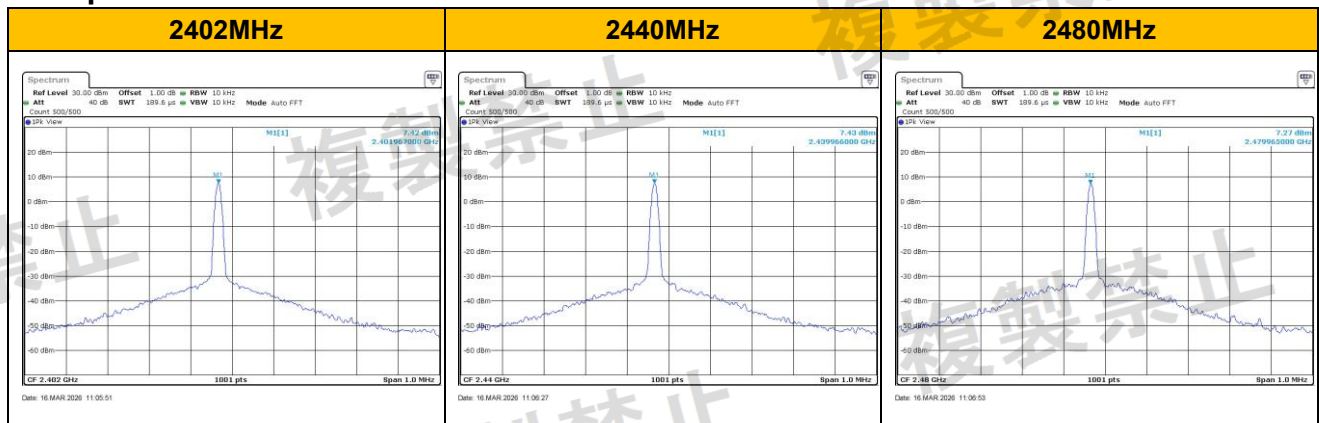
BLE

1Mbps:



Measurement Frequency	MHz	2402	2440	2480	Limit	Result
Measured Value	MHz	2401.9653	2439.9653	2479.9653	-----	-----
Frequency Tolerance	ppm	-14.45	-14.22	-13.99	±50 ppm or less	Pass

2Mbps:



Measurement Frequency	MHz	2402	2440	2480	Limit	Result
Measured Value	MHz	2401.9670	2439.9660	2479.9650	-----	-----
Frequency Tolerance	ppm	-13.74	-13.93	-14.11	±50 ppm or less	Pass

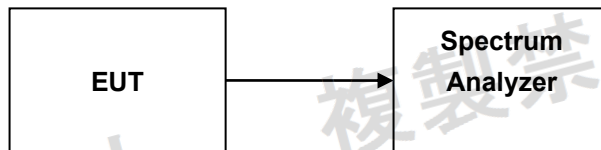
7.7 Occupied Bandwidth (99%)

Test Requirement: Item 19 of Article 2-1

83.5MHz

Test Status: Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.

Test Configuration:



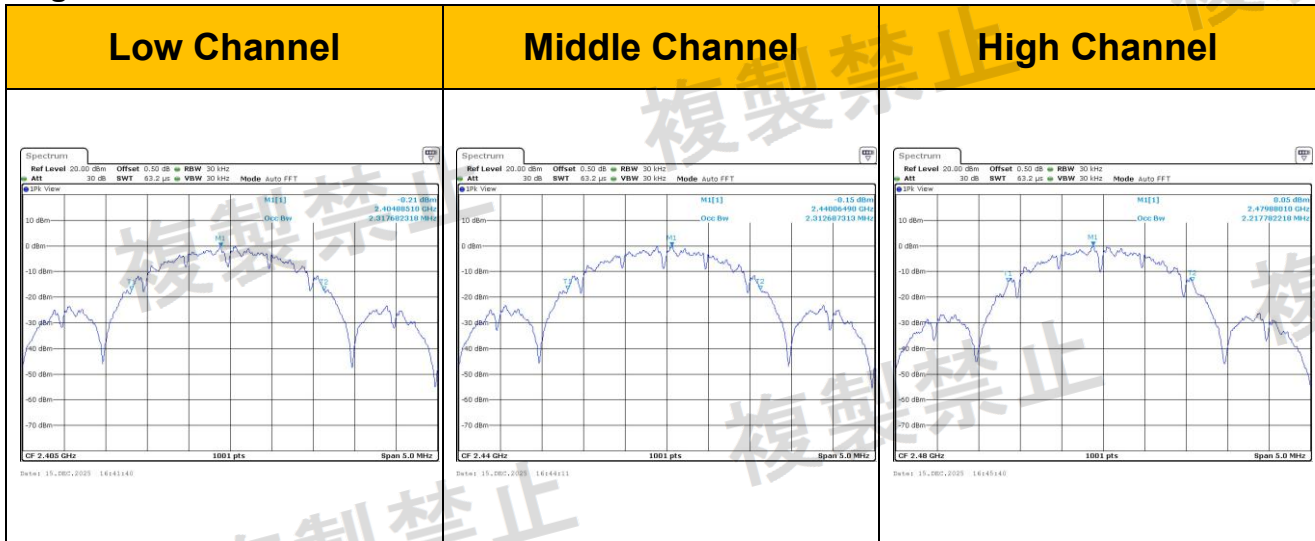
Test Procedure:

1. Test Conditions:
Spectrum Analyzer is used for measurement.
2. EUT conditions:
Modulation/Spread/Hopping ON
For equipment using diffusion code, set to the test diffusion code and modulate with standard coding test signal.
3. Spectrum Analyzer conditions for BLE&Zigbee&Thread:
Frequency: Test Frequency
Span 3MHz for BLE, 5MHz for Zigbee&Thread
RBW 30kHz
VBW 30kHz
Sweep Time Auto
Detector mode Positive peak
Indication mode Max hold
OBW 99%

Test result: Pass

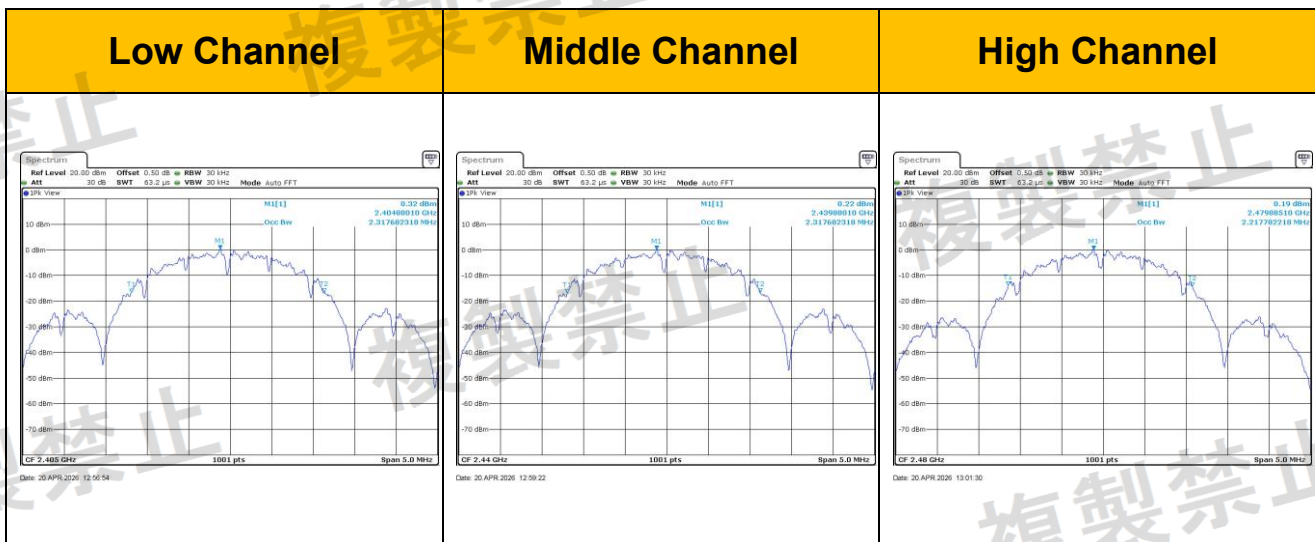
Occupied Bandwidth (99%)

Zigbee



Measurement Frequency	2405	2440	2480	Limit	Result
Occupied Bandwidth (MHz)	2.318	2.313	2.218	26MHz	Pass

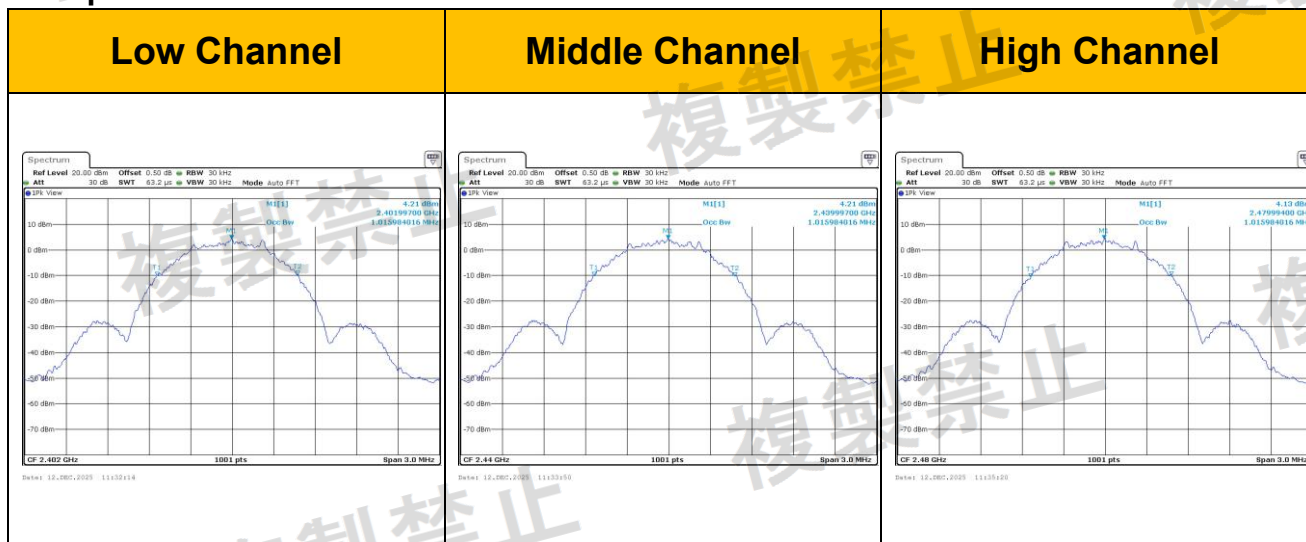
Thread



Measurement Frequency	2405	2440	2480	Limit	Result
Occupied Bandwidth (MHz)	2.318	2.318	2.218	26MHz	Pass

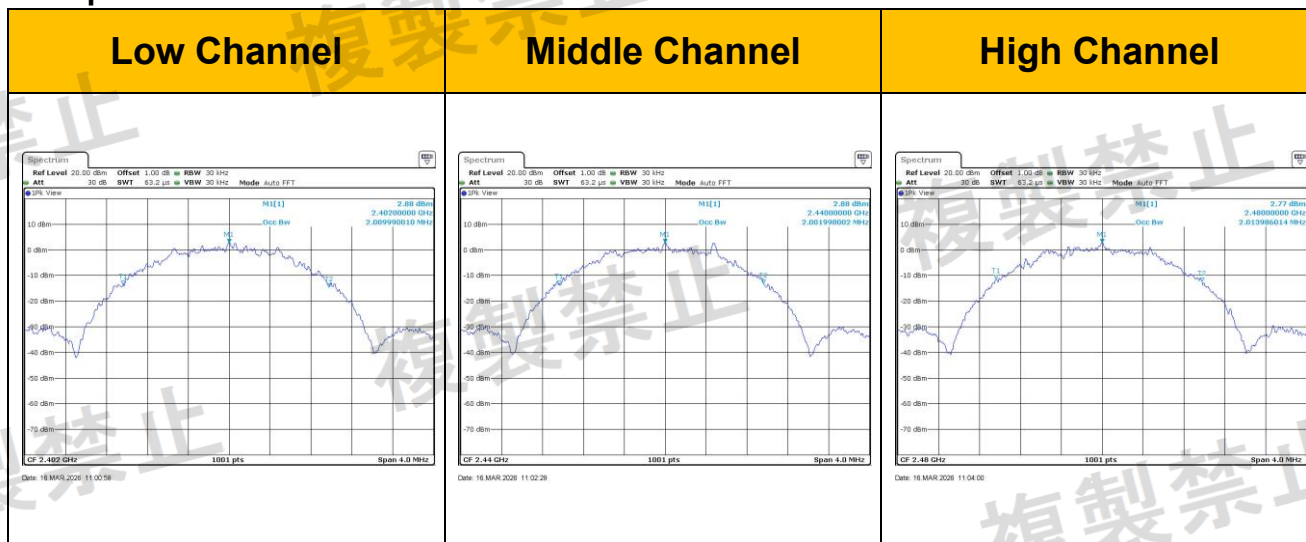
BLE

1Mbps :



Measurement Frequency	2402	2440	2480	Limit	Result
Occupied Bandwidth (MHz)	1.016	1.016	1.016	26MHz	Pass

2Mbps :



Measurement Frequency	2402	2440	2480	Limit	Result
Occupied Bandwidth (MHz)	2.010	2.002	2.014	26MHz	Pass

7.8 Spread spectrum Bandwidth (90%)

Test Requirement: Item 19 of Article 2-1

500 kHz or more

Test Status: Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.

Test Configuration:



Test Procedure:

1. Test Conditions:

Spectrum Analyzer is used for measurement.

2. EUT conditions:

Modulation/Spread/Hopping ON

For equipment using diffusion code, set to the test diffusion code and modulate with standard coding test signal.

3. Spectrum Analyzer conditions for BLE&Zigbee&Thread:

Frequency: Test Frequency

Span 3MHz for BLE, 5MHz for Zigbee & Thread

RBW 30kHz

VBW 30kHz

Sweep Time Auto

Detector mode Positive peak

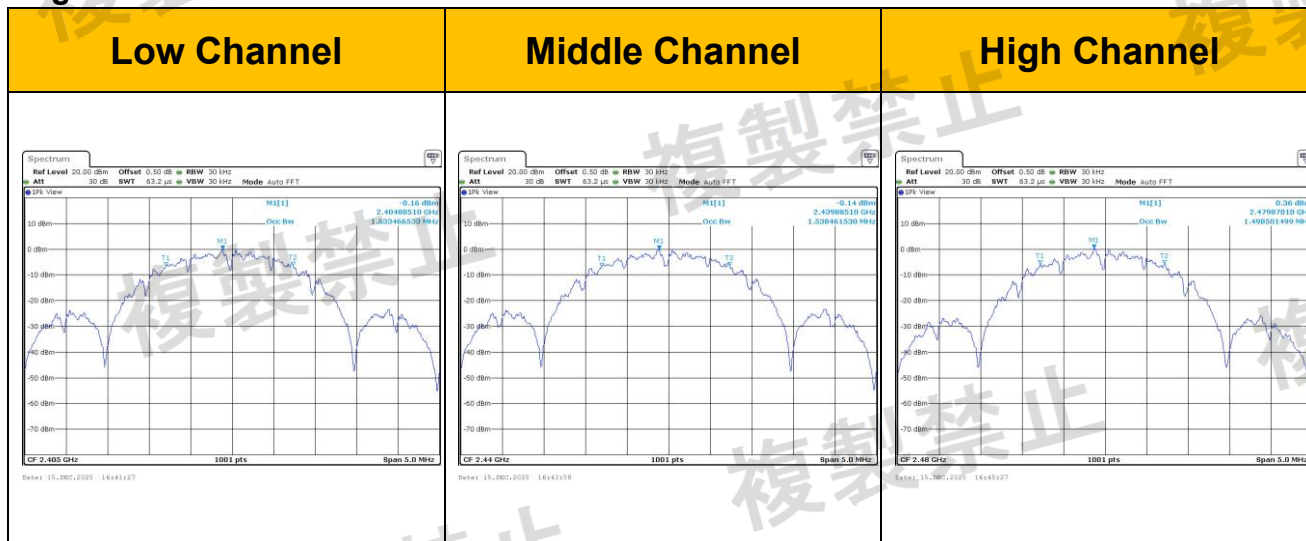
Indication mode Max hold

OBW 90%

Test result: PASS

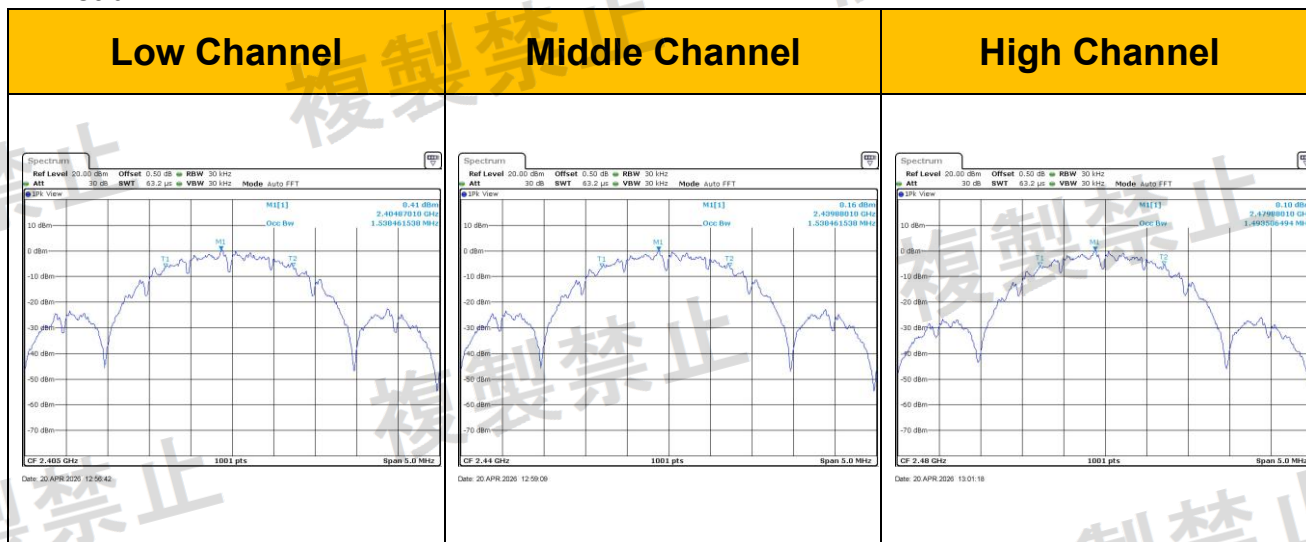
Spread spectrum Bandwidth (90%)

Zigbee



Measurement Frequency	MHz	2405	2440	2480	Limit	Result
Spread spectrum Bandwidth	kHz	1533.467	1538.462	1498.501	500kHz or more	Pass

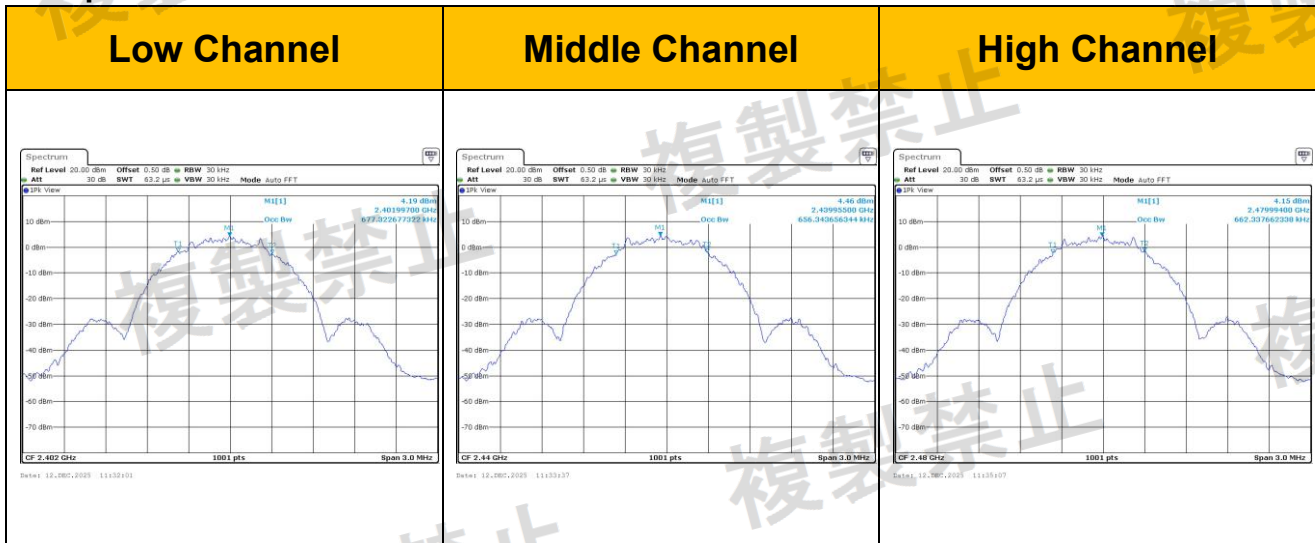
Thread



Measurement Frequency	MHz	2405	2440	2480	Limit	Result
Spread spectrum Bandwidth	kHz	1538.462	1538.462	1493.506	500kHz or more	Pass

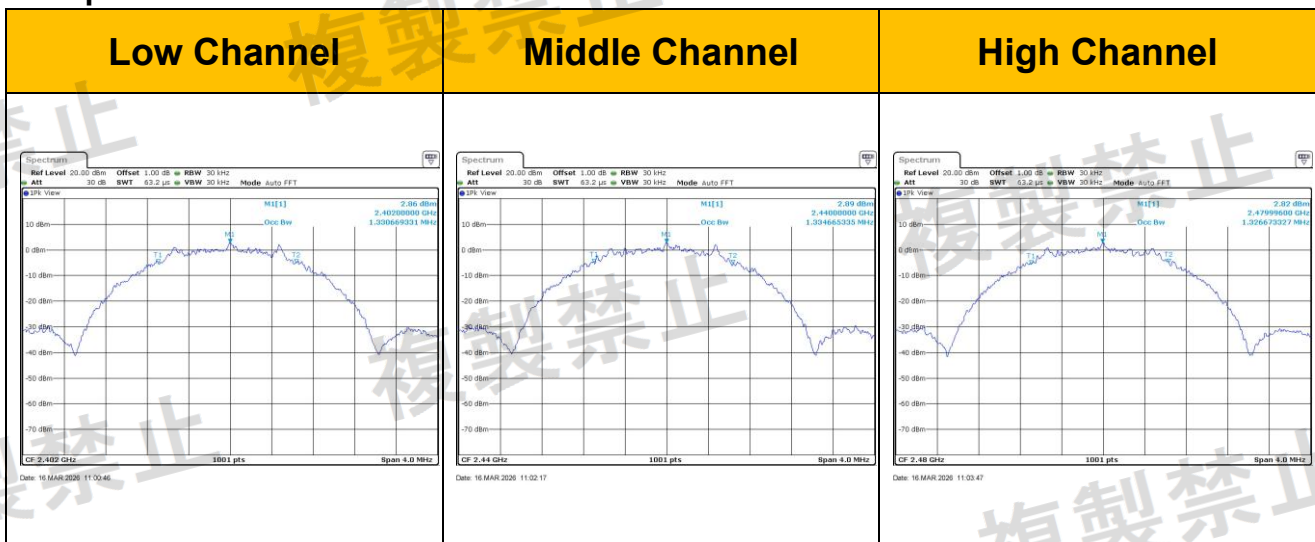
BLE

1Mbps :



Measurement Frequency	MHz	2402	2440	2480	Limit	Result
Spread spectrum Bandwidth	kHz	677.323	656.344	662.338	500kHz or more	Pass

2Mbps :



Measurement Frequency	MHz	2402	2440	2480	Limit	Result
Spread spectrum Bandwidth	MHz	1.331	1.335	1.327	500kHz or more	Pass

7.9 Antenna Power

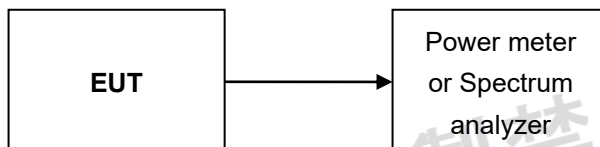
Test Requirement:

Item 19 of Article 2-1

Test Status:

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.

Test Configuration:



Test Procedure:

1. Test Conditions:

Power meter or Spectrum analyzer are used for measurement.

2. EUT conditions:

Modulation/Spread/Hopping ON

For equipment using diffusion code, set to the test diffusion code and modulate with standard coding test signal.

3. Power meter conditions for BLE and Zigbee:

a) Connect a power meter to the output of the dummy load (attenuator) and measure the total power.

(b) The antenna power shall be as follows

1. For continuous wave: Value of (a).

2. For burst wave: Value calculated from the value in (a) and the transmission time rate.

4. Spectrum analyzer for BLE and Zigbee:

Search

Measurement

Span: OBW×2

Center Frequency: Searched frequency

RBW: 1MHz for BLE

Span:0

RBW: 5MHz for Zigbee & Thread

Span:0

VBW: ≒RBW×3

RBW:>OBW

Detector: Positive peak

VBW:>OBW

Display mode: Max hold

Detector: Positive peak

Display mode: Max hold

Test result: PASS

Antenna Power

Zigbee

Result

Measurement Frequency	MHz	2405	2440	2480	Limit	Result
Antenna Power	dBm	6.89	6.92	6.87	10	Pass
	mW	4.89	4.92	4.86		Pass
Antenna Power Tolerance	%	-51.10	-50.80	-51.40	Upper +20%	Pass
EIRP	dBm	9.15	9.18	9.13	12.14dBm	Pass
	mW	8.22	8.28	8.18		
Rated Power	mW	10			10	Pass

Remark: EIRP= Antenna Power+ Antenna Gain

Measurement Uncertainty: $\pm 1.49\text{dB}$.

Thread

Result

Measurement Frequency	MHz	2405	2440	2480	Limit	Result
Antenna Power	dBm	6.47	6.53	6.48	10	Pass
	mW	4.44	4.50	4.45		Pass
Antenna Power Tolerance	%	-55.60	-55.00	-55.50	Upper +20%	Pass
EIRP	dBm	8.73	8.79	8.74	12.14dBm	Pass
	mW	7.46	7.57	7.48		
Rated Power	mW	10			10	Pass

Remark: EIRP= Antenna Power+ Antenna Gain

Measurement Uncertainty: $\pm 1.49\text{dB}$.

BLE

125kbps :

Measurement Frequency	MHz	2402	2440	2480	Limit	Result
Antenna Power	dBm	6.25	6.27	6.18	10	Pass
	mW	4.22	4.24	4.15		Pass
Antenna Power Tolerance	%	-57.80	-57.60	-58.50	Upper +20%	Pass
EIRP	dBm	8.51	8.53	8.44	12.14dBm	Pass
	mW	7.10	7.13	6.98		
Rated Power	mW	10			10	Pass

Remark: EIRP= Antenna Power+ Antenna Gain

Measurement Uncertainty: $\pm 1.49\text{dB}$.

500kbps :

Measurement Frequency	MHz	2402	2440	2480	Limit	Result
Antenna Power	dBm	6.21	6.26	6.18	10	Pass
	mW	4.18	4.23	4.15		Pass
Antenna Power Tolerance	%	-58.20	-57.70	-58.50	Upper +20%	Pass
EIRP	dBm	8.47	8.52	8.44	12.14dBm	Pass
	mW	7.03	7.11	6.98		
Rated Power	mW	10			10	Pass

Remark: EIRP= Antenna Power+ Antenna Gain

Measurement Uncertainty: $\pm 1.49\text{dB}$.

1Mbps :

Measurement Frequency	MHz	2402	2440	2480	Limit	Result
Antenna Power	dBm	7.23	7.27	7.17	10	Pass
	mW	5.28	5.33	5.21		Pass
Antenna Power Tolerance	%	-47.20	-46.70	-47.90	Upper +20%	Pass
EIRP	dBm	9.49	9.53	9.43	12.14dBm	Pass
	mW	8.89	8.97	8.77		
Rated Power	mW	10			10	Pass

Remark: EIRP= Antenna Power+ Antenna Gain

Measurement Uncertainty: $\pm 1.49\text{dB}$.

2Mbps :

Measurement Frequency	MHz	2402	2440	2480	Limit	Result
Antenna Power	dBm	7.62	7.62	7.52	10	Pass
	mW	5.78	5.78	5.65		Pass
Antenna Power Tolerance	%	-42.20	-42.20	-43.50	Upper +20%	Pass
EIRP	dBm	9.88	9.88	9.78	12.14dBm	Pass
	mW	9.73	9.73	9.51		
Rated Power	mW	10			10	Pass

Remark: EIRP= Antenna Power+ Antenna Gain

Measurement Uncertainty: $\pm 1.49\text{dB}$.

7.10 Spurious Emissions of Tx

Test Requirement:

Item 19 of Article 2-1

for 2412-2472MHz

- (1) Below 2387 MHz: 2.5 μ W/MHz ($\leq$ -26dBm/MHz)
- (2) 2387 to 2400 MHz: 25 μ W/MHz ($\leq$ -16dBm/MHz)
- (3) 2483.5 through 2496.5 MHz: 25 μ W/MHz ($\leq$ -16dBm/MHz)
- (4) Over 2496.5 MHz: 2.5 μ W/MHz ($\leq$ -26dBm/MHz)

Test Status:

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). EUT is at the Max TX power level. Following channel(s) was (were) selected for the final test as listed below.

Test Configuration:



Test Procedure:

1. Test Conditions:

Spectrum Analyzer is used for measurement.

2. EUT conditions:

Modulation/Spread/Hopping ON

For equipment using diffusion code, set to the test diffusion code and modulate with standard coding test signal.

3. Spectrum Analyzer conditions:

Step 1

All spurious are measured from 30 MHz to 12.5 GHz by peak mode.

Step 2

IF the value measured by Step1 is 3 dB or less, measure in average mode.

Test setup for Step 1:

Frequency: 30 MHz- 2400 MHz, 2483.5 MHz-12.5 GHz

RBW 1 MHz

VBW 1 MHz

Sweep Time Auto

Detector mode Positive peak

Indication mode Max hold

Test setup for Step 2:

Frequency: Spurious Frequency

RBW 1 MHz

VBW 1 MHz

Sweep Time Auto

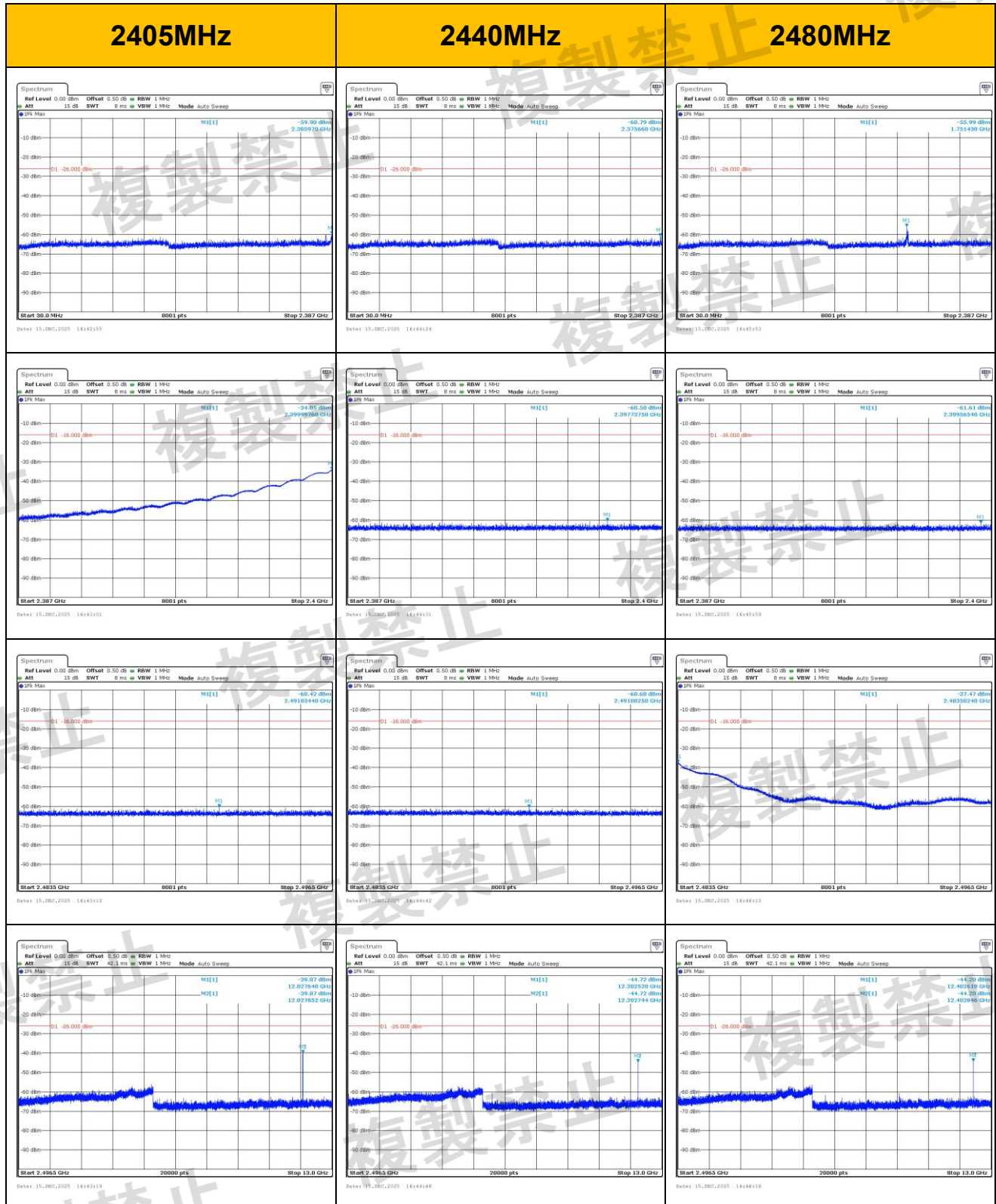
Detector mode Sample

Indication mode Max hold

Test result: PASS

Spurious Emissions of Tx

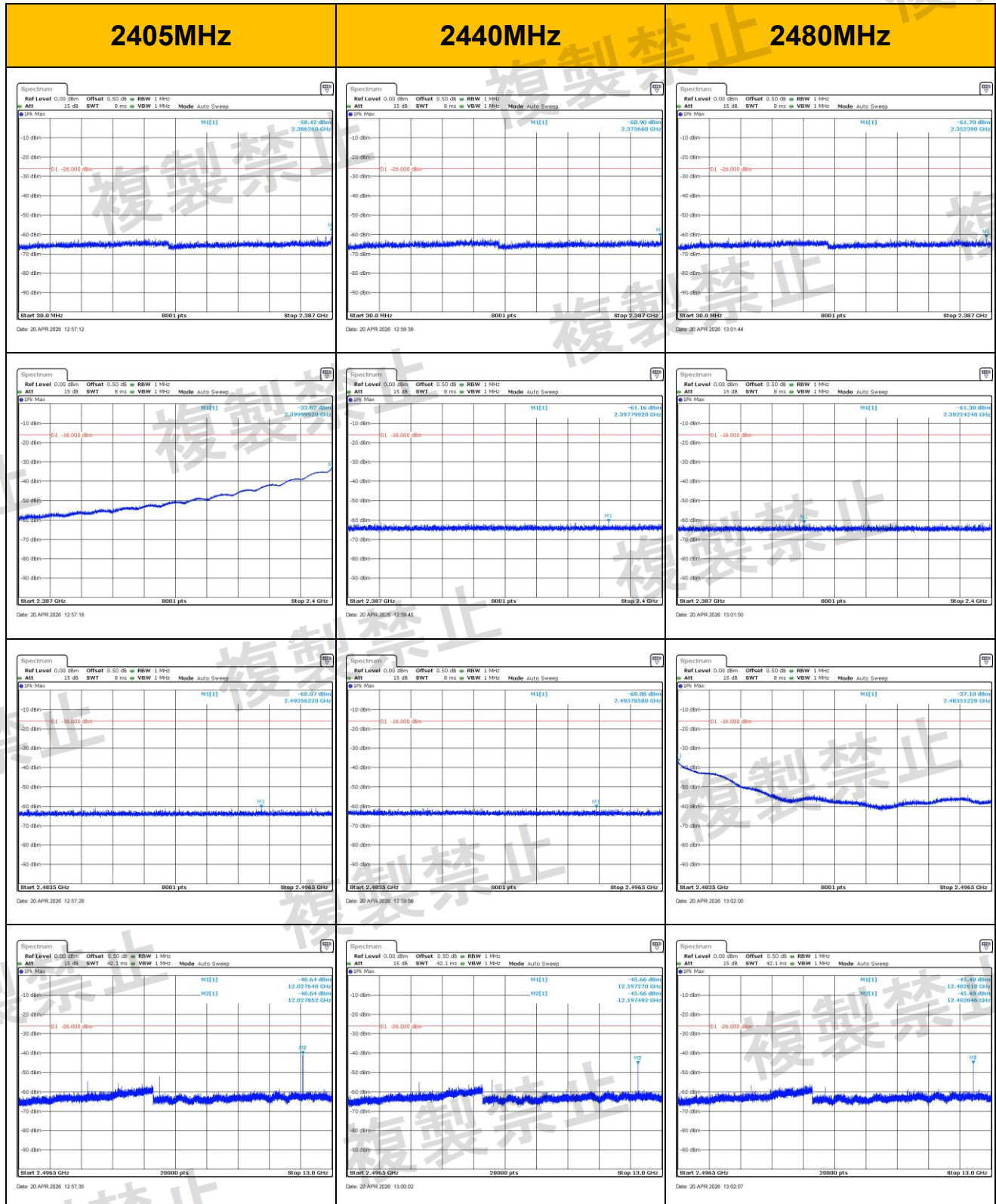
Zigbee



Zigbee

Test frequency band	MHz	2405		2440		2480		Limit/ dBm	Limit/ μ W/MHz	Result
		dBm	μ W/MHz	dBm	μ W/MHz	dBm	μ W/MHz			
Under 2387MHz	dBm/MHz	-59.90	0.001	-60.79	0.001	-55.99	0.003	≤ -26	2.5	Pass
	MHz	2385.9700	/	2375.6600	/	1751.4300	/	-----	/	-----
2387MHz to 2400MHz	dBm/MHz	-34.05	0.394	-60.50	0.001	-61.61	0.001	≤ -16	25	Pass
	MHz	2399.9976	/	2397.7375	/	2399.5654	/	-----	/	-----
2483.5MHz to 2496.5MHz	dBm/MHz	-60.42	0.001	-60.68	0.001	-37.47	0.179	≤ -16	25	Pass
	MHz	2491.8344	/	2491.0025	/	2483.5024	/	-----	/	-----
2496.5MHz to 12.5GHz	dBm/MHz	-39.87	0.103	-44.72	0.034	-44.20	0.038	≤ -26	2.5	Pass
	MHz	12027.8520	/	12202.7440	/	12402.8460	/	-----	/	-----

Thread

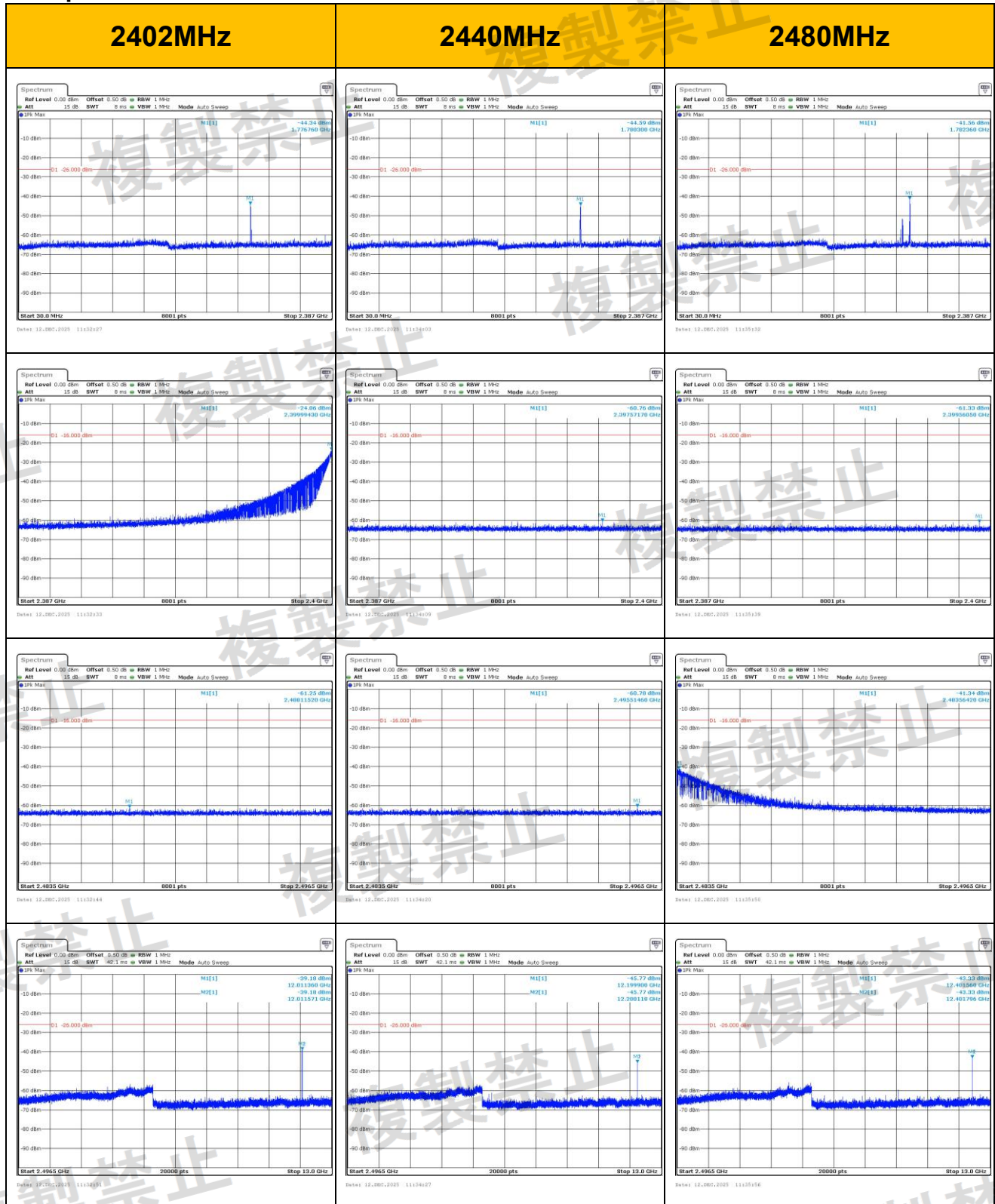


Thread

Test frequency band	MHz	2405		2440		2480		Limit/ dBm	Limit/ μ W/MHz	Result
		dBm	μ W/MHz	dBm	μ W/MHz	dBm	μ W/MHz			
Under 2387MHz	dBm/MHz	-58.42	0.001	-60.90	0.001	-61.70	0.001	≤ -26	2.5	Pass
	MHz	2386.260	/	2375.660	/	2352.390	/	-----	/	-----
2387MHz to 2400MHz	dBm/MHz	-33.62	0.435	-61.16	0.001	-61.38	0.001	≤ -16	25	Pass
	MHz	2399.9992	/	2397.7920	/	2392.2424	/	-----	/	-----
2483.5MHz to 2496.5MHz	dBm/MHz	-60.87	0.001	-60.86	0.001	-37.10	0.195	≤ -16	25	Pass
	MHz	2493.5632	/	2493.7858	/	2483.5122	/	-----	/	-----
2496.5MHz to 12.5GHz	dBm/MHz	-40.64	0.086	-45.66	0.027	-45.48	0.028	≤ -26	2.5	Pass
	MHz	12027.640	/	12197.492	/	12402.846	/	-----	/	-----

BLE

1Mbps:

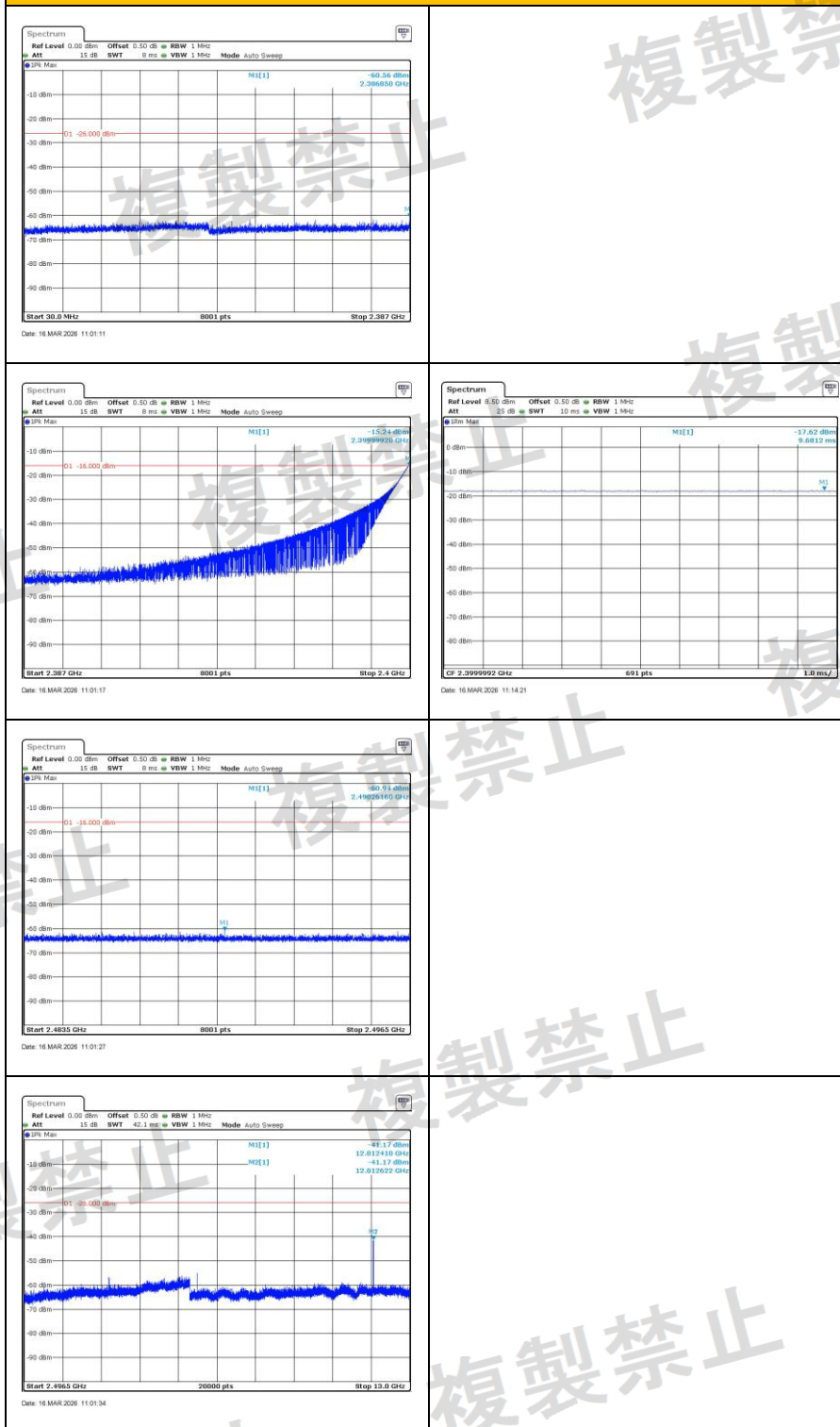


1Mbps:

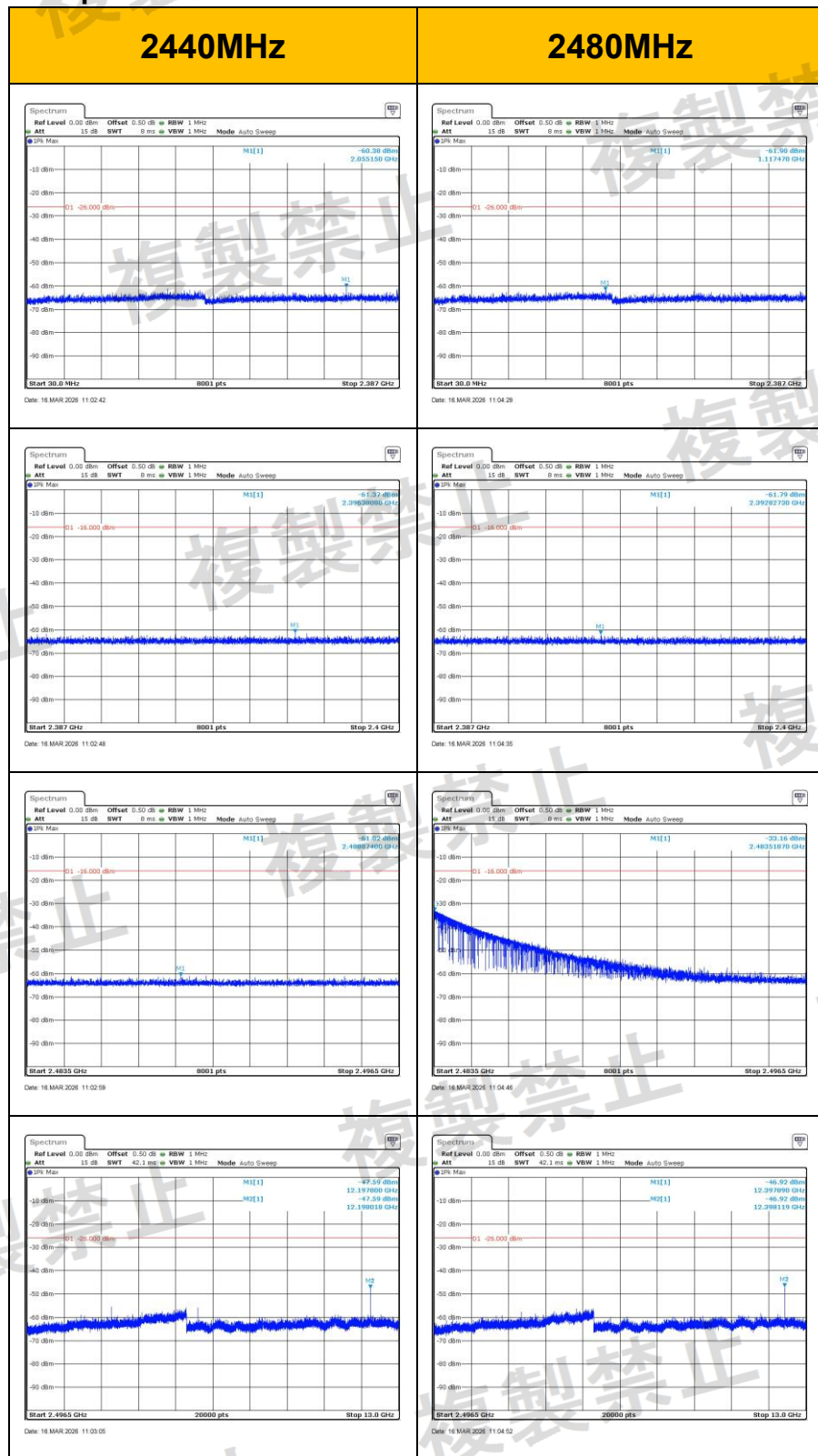
Test frequency band	MHz	2402		2440		2480		Limit/ dBm	Limit/ μ W/MHz	Result
		dBm	μ W/MHz	dBm	μ W/MHz	dBm	μ W/MHz			
Under 2387MHz	dBm/MHz	-44.34	0.037	-44.59	0.035	-41.56	0.070	≤ -26	2.5	Pass
	MHz	1776.7600	/	1780.3000	/	1782.3600	/	-----	/	-----
2387MHz to 2400MHz	dBm/MHz	-24.06	3.926	-60.76	0.001	-61.33	0.001	≤ -16	25	Pass
	MHz	2399.9943	/	2397.5717	/	2399.5605	/	-----	/	-----
2483.5MHz to 2496.5MHz	dBm/MHz	-61.25	0.001	-60.78	0.001	-41.34	0.073	≤ -16	25	Pass
	MHz	2488.1152	/	2495.5146	/	2483.5642	/	-----	/	-----
2496.5MHz to 12.5GHz	dBm/MHz	-39.18	0.121	-45.77	0.026	-43.33	0.046	≤ -26	2.5	Pass
	MHz	12011.5710	/	12200.1180	/	12401.7960	/	-----	/	-----

2Mbps:

2402MHz



2Mbps:



2Mbps:

Test frequency band	MHz	2402		2440		2480		Limit/ dBm	Limit/ μ W/MHz	Result
		dBm	μ W/MHz	dBm	μ W/MHz	dBm	μ W/MHz			
Under 2387MHz	dBm/MHz	-60.56	0.001	-60.38	0.001	-61.90	0.001	≤ -26	2.5	Pass
	MHz	2386.8500	/	2055.1500	/	1117.4700	/	-----	/	-----
2387MHz to 2400MHz	dBm/MHz	-17.62	17.298	-61.37	0.001	-61.79	0.001	≤ -16	25	Pass
	MHz	2400.0000	/	2396.3800	/	2392.8300	/	-----	/	-----
2483.5MHz to 2496.5MHz	dBm/MHz	-60.94	0.001	-61.02	0.001	-33.16	0.483	≤ -16	25	Pass
	MHz	2490.26	/	2488.8700	/	2483.5200	/	-----	/	-----
2496.5MHz to 12.5GHz	dBm/MHz	-41.17	0.076	-47.59	0.017	-46.92	0.020	≤ -26	2.5	Pass
	MHz	12012.6200	/	12198.0200	/	12398.1200	/	-----	/	-----

7.11 Spurious Emissions of Rx

Test Requirement:

Item 19 of Article 2-1

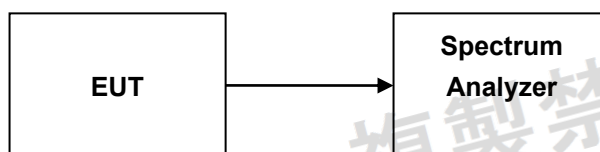
(1) Below 1 GHz: 4 nW (≤ -54 dBm)

(2) 1 GHz and over: 20 nW (≤ -47 dBm)

Test Status:

Pre-Scan has been conducted to determine the worst-case mode from all possible combinations between available modulations, data rates and antenna ports (if EUT with antenna diversity architecture). Following channel(s) was (were) selected for the final test as listed below.

Test Configuration:



Test Procedure:

1. Test Conditions:

Spectrum Analyzer is used for measurement.

2. EUT conditions:

Modulation/Spread/Hopping ON

For equipment using diffusion code, set to the test diffusion code and modulate with standard coding test signal.

3. Spectrum Analyzer conditions:

Step 1

All spurious are measured from 30 MHz to 26 GHz by peak mode.

Step 2

IF the value measured by Step1 is 3 dB or less, measure in average mode.

Test setup for Step 1:

Frequency: 30 MHz-2400 MHz , 2483.5 MHz-26 GHz

RBW 100 kHz (30-1GHz) , 1 MHz (over 1GHz)

VBW 100 kHz (30-1GHz) , 1 MHz (over 1GHz)

Sweep Time Auto

Detector mode Positive peak

Indication mode Max hold

Test setup for Step 2:

Frequency: Spurious Frequency

Span 0 Hz

RBW 100 kHz (30-1GHz) , 1 MHz (over 1GHz)

VBW 100 kHz (30-1GHz) , 1 MHz (over 1GHz)

Sweep Time Auto

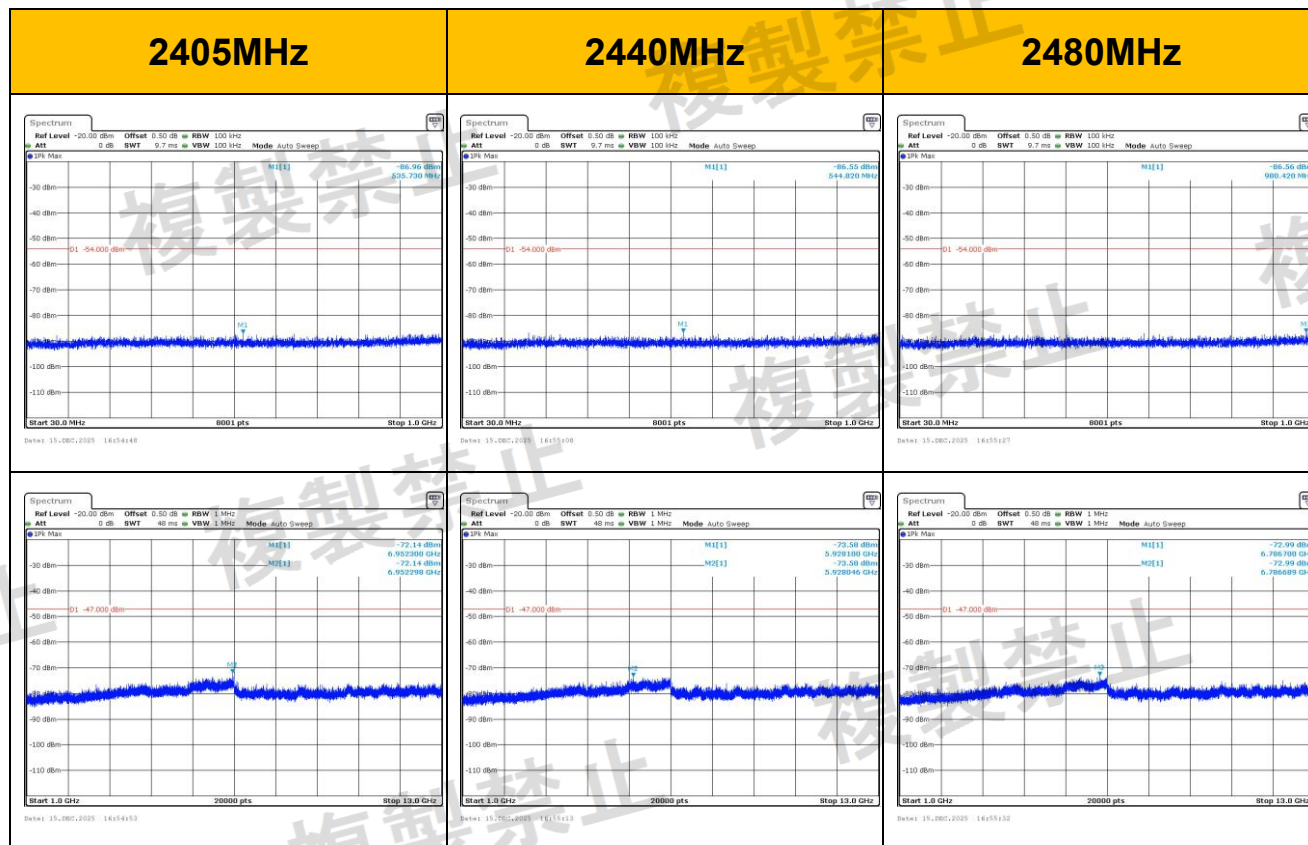
Detector mode Sample

Indication mode Max hold

Test result: PASS

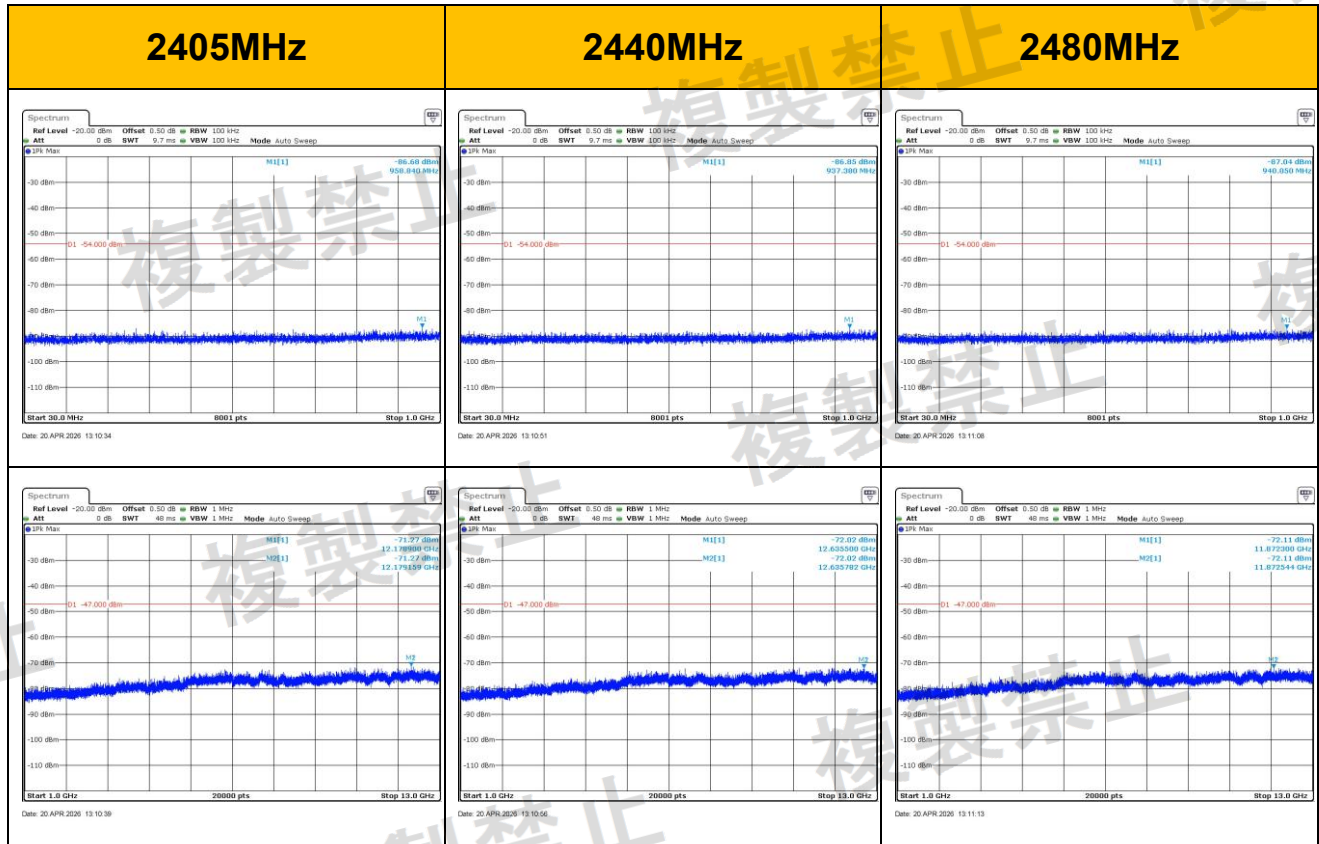
Spurious Emissions of Rx

Zigbee



Test frequency band	MHz	2405		2440		2480		Limit		Result
		dBm	nW	dBm	nW	dBm	nW	dBm	nW	
Under 1GHz	dBm	-86.96	0.002	-86.55	0.002	-86.56	0.002	≤-54	4	Pass
	MHz	535.7300	/	544.8200	/	980.4200	/	-----	/	-----
1-12.5GHz	dBm	-72.14	0.061	-73.58	0.044	-72.99	0.050	≤-47	20	Pass
	MHz	6952.3000	/	5928.1000	/	6786.7000	/	-----	/	-----

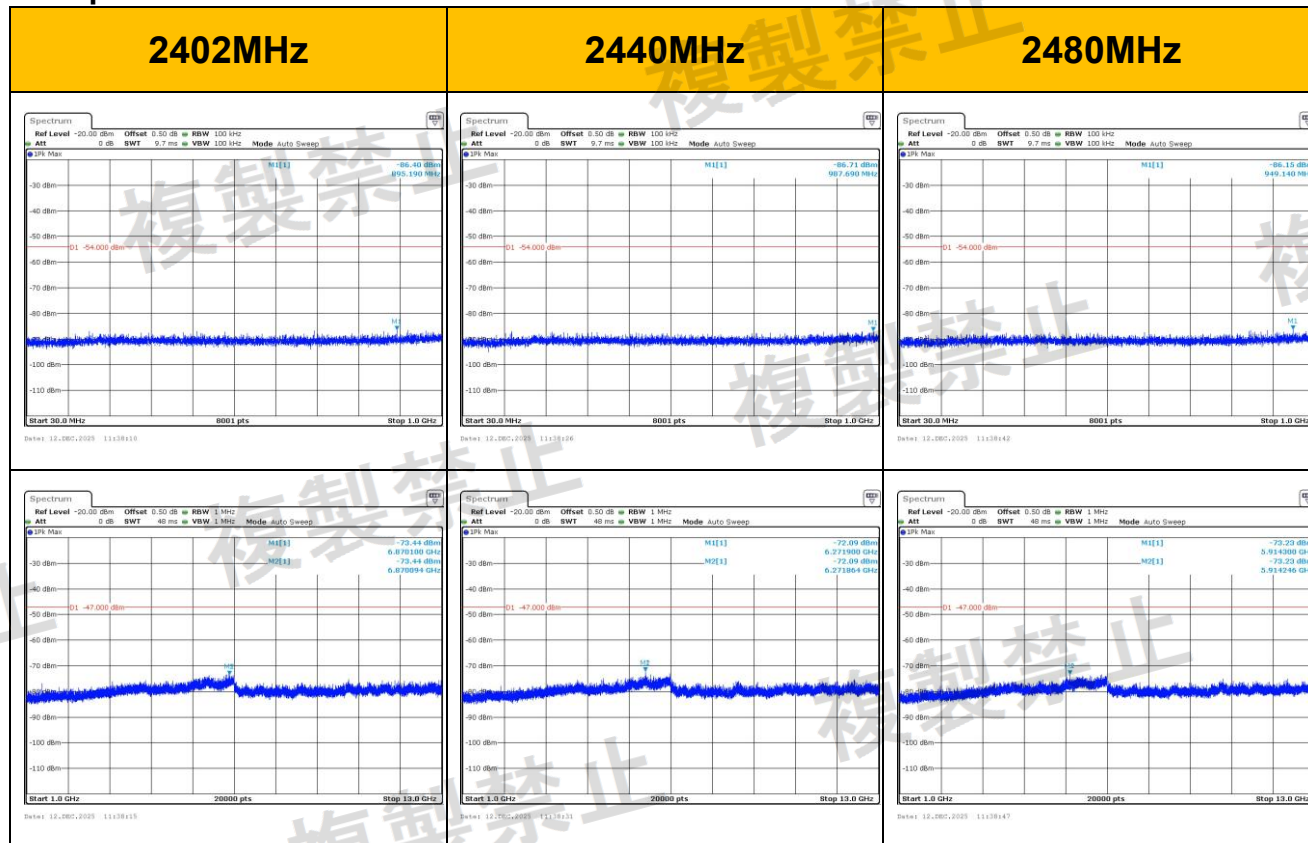
Thread



Test frequency band	MHz	2405		2440		2480		Limit		Result
		dBm	nW	dBm	nW	dBm	nW	dBm	nW	
Under 1GHz	dBm	-86.68	0.002	-86.85	0.002	-87.04	0.002	≤-54	4	Pass
	MHz	958.840	/	937.380	/	940.050	/	-----	/	-----
1-12.5GHz	dBm	-71.27	0.075	-72.02	0.063	-72.11	0.062	≤-47	20	Pass
	MHz	12179.159	/	12635.782	/	11872.544	/	-----	/	-----

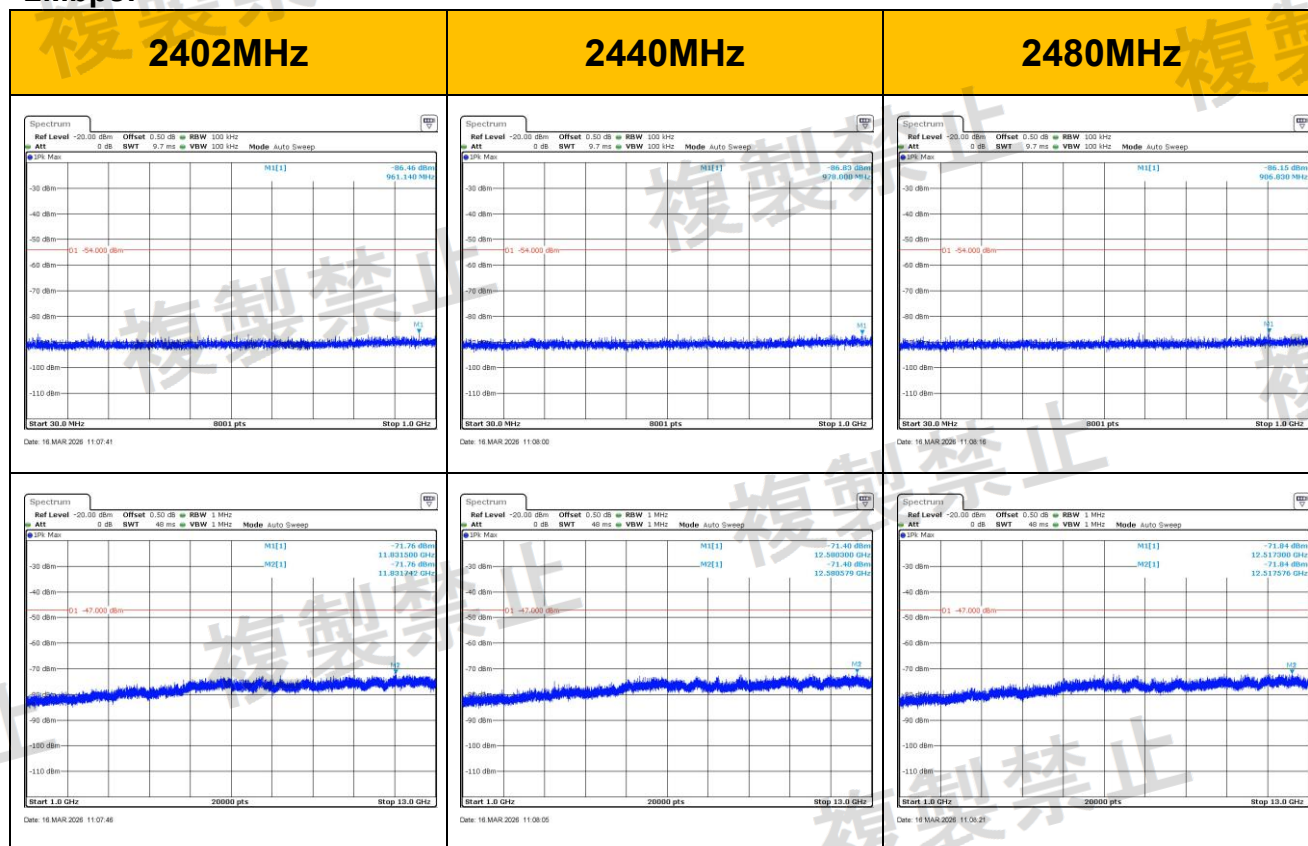
BLE

1Mbps:



Test frequency band	MHz	2402		2440		2480		Limit		Result
		dBm	nW	dBm	nW	dBm	nW	dBm	nW	
Under 1GHz	dBm	-86.40	0.002	-86.71	0.002	-86.15	0.002	≤-54	4	Pass
	MHz	895.1900	/	987.6900	/	949.1400	/	-----	/	-----
1-12.5GHz	dBm	-73.44	0.045	-72.09	0.062	-73.23	0.048	≤-47	20	Pass
	MHz	6870.1000	/	6271.9000	/	5914.3000	/	-----	/	-----

2Mbps:



Test frequency band	MHz	2402		2440		2480		Limit		Result
		dBm	nW	dBm	nW	dBm	nW	dBm	nW	
Under 1GHz	dBm	-86.46	0.002	-86.83	0.002	-86.15	0.002	≤-54	4	Pass
	MHz	961.1400	/	978.0000	/	906.8300	/	-----	/	-----
1-12.5GHz	dBm	-71.76	0.067	-71.40	0.072	-71.84	0.065	≤-47	20	Pass
	MHz	11831.7400	/	12580.5800	/	12517.5800	/	-----	/	-----

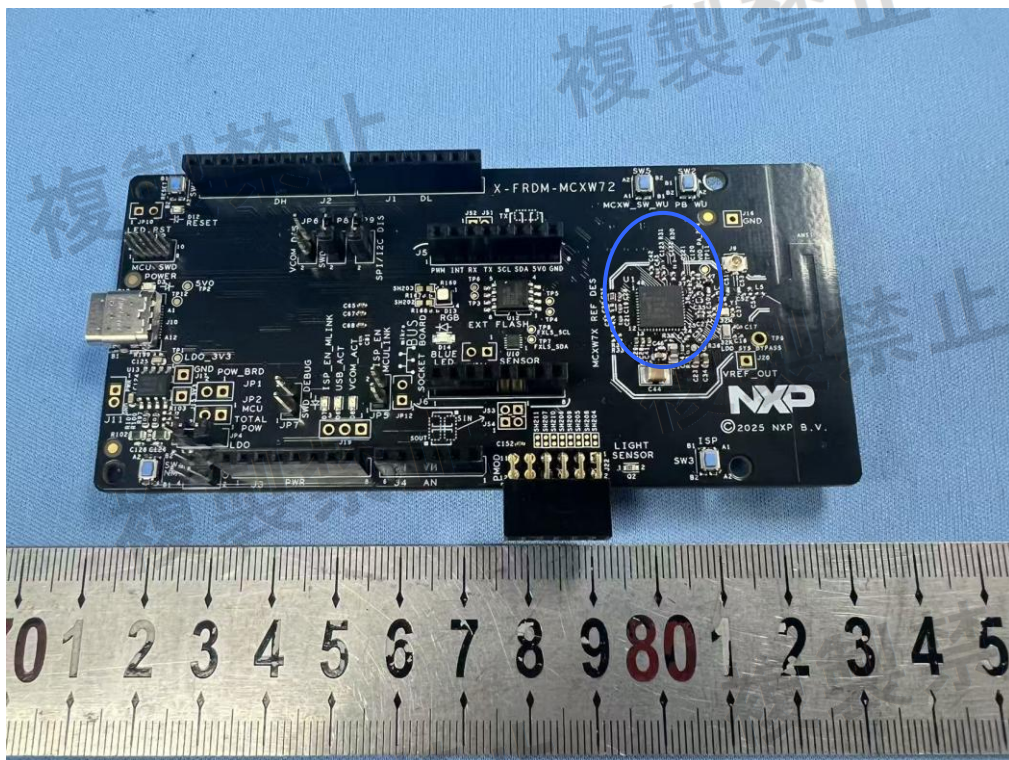
7.12 RF accessibility

Standard requirement

Article 49-20, paragraph 1 (a)

The EUT shall be constructed in such a way that sensitive RF parts, (like modulation and oscillator parts) cannot be reached easily by the user. These parts shall be covered by soldered metal caps or glue or by other mechanical covers. If the covers are fixed with screws, these shall be not the common type(s) like a Phillips, but special versions like Torx, so that the user cannot open the device with common tools.

Bluetooth&Zigbee IC were welding on the PCB board and cannot be open or revise easily.



RF and Modulation parts are mounted on PCB with surface mount technology, and there is no any adjustable parts on PCB or adjustable parts are not exposed. RF and Modulation parts comply with the annex of guideline "Interpretation of equipment structure-That prevents its external case from opening easily in order to prevent unlawful modification", registered approval body conference document number 001(Rev.03), so that this product cannot be opened and modified easily.

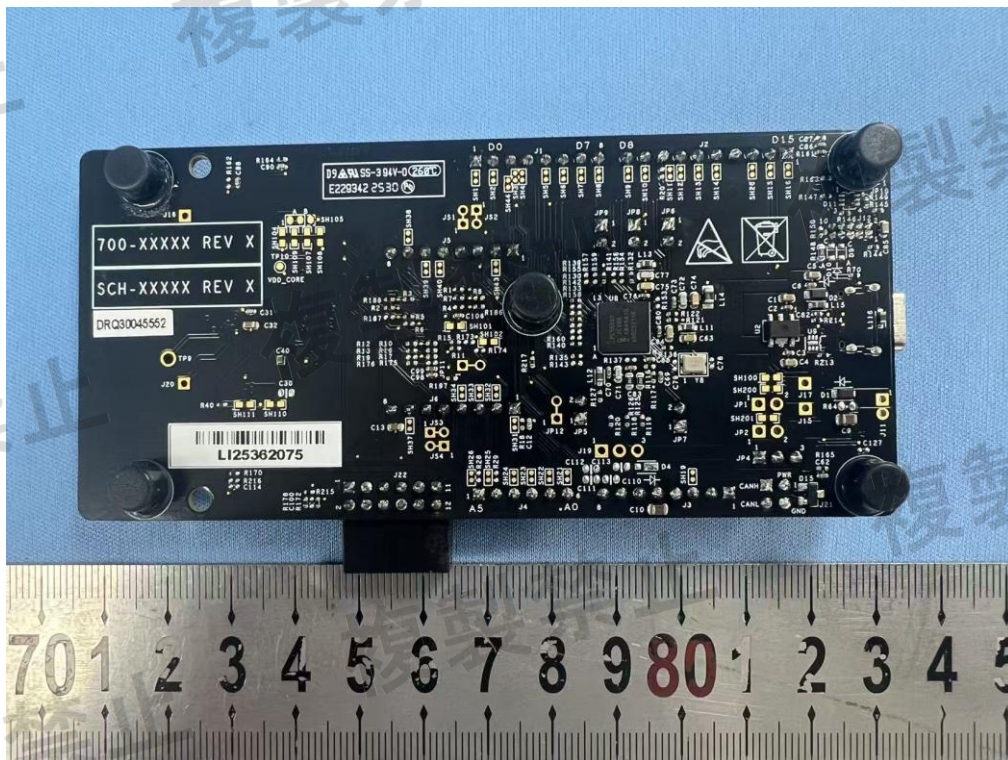
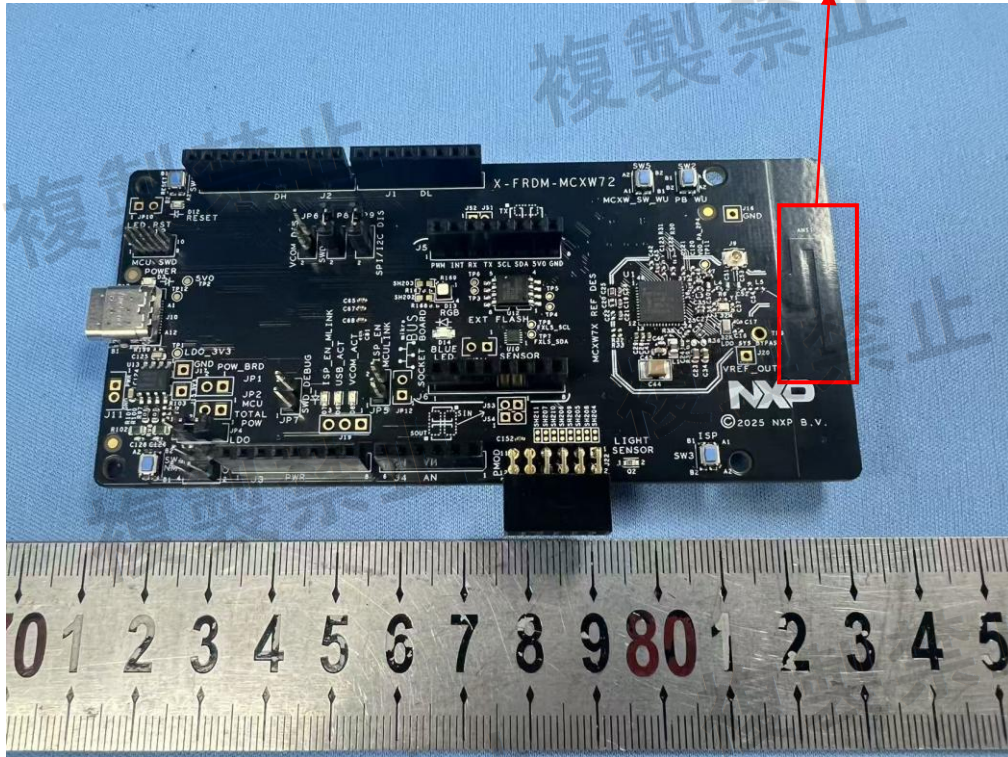
Appendix A. EUT Test Setup and Constructional Details

Appendix A.1 EUT Test Setup



Appendix A.2 EUT Constructional Details

Antenna(BLE&Zigbee&Thread)



***** End of Report *****