

Japan Radio Test Report

Report No. : BTL-JPAP-1-2410T031A
Equipment : Wireless Controller
Model Name : SA8990
Brand Name : LITEON
Applicant : LITE-ON Technology Corp.
Address : 22F, 392 Ruey Kuang Road, Neihu Dist., Taipei City 114, Taiwan

Radio Function : Bluetooth Low Energy

Standard(s) : Article 2 Paragraph 1 Item 19 of the Certification Ordinance
MIC Notice No.88 Appendix No.43

Date of Receipt : 2025/6/19

Date of Test : 2025/6/24

Issued Date : 2025/7/2

The above equipment has been tested and found in compliance with the requirement of the above standards by BTL Inc.

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Declaration

BTL represents to the client that testing is done in accordance with standard procedures as applicable and that test instruments used has been calibrated with standards traceable to international standard(s) and/or national standard(s).

BTL's reports apply only to the specific samples tested under conditions. It is manufacture's responsibility to ensure that additional production units of this model are manufactured with the identical electrical and mechanical components. **BTL** assumes no responsibility for the data provided by the Customer, any statements, inferences or generalizations drawn by the customer or others from the reports issued by **BTL**.

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BTL's laboratory quality assurance procedures are in compliance with the **ISO/IEC 17025** requirements, and accredited by the conformity assessment authorities listed in this test report.

BTL is not responsible for the sampling stage, so the results only apply to the sample as received.

The information, data and test plan are provided by manufacturer which may affect the validity of results, so it is manufacturer's responsibility to ensure that the apparatus meets the essential requirements of applied standards and in all the possible configurations as representative of its intended use.

Limitation

For the use of the authority's logo is limited unless the Test Standard(s)/Scope(s)/Item(s) mentioned in this test report is (are) included in the conformity assessment authorities acceptance respective.

Please note that the measurement uncertainty is provided for informational purpose only and are not use in determining the Pass/Fail results.

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REVISION HISTORY

Report No.	Version	Description	Issued Date	Note
BTL-JPAP-1-2410T031A	R00	Original Report.	2025/7/2	Valid

1 SUMMARY OF TEST RESULTS

Section Number	Description of Test	ORRE	Result
3.1	Frequency Tolerance	Article 5, Table 1	Pass
3.2	Occupied Bandwidth (99%) and Spread-spectrum Bandwidth (90%) / Spreading Factor (diffusion rate)	Article 6, Table 2 Article 49-20, Item 1-h & 1-i	Pass
3.3	Unwanted Emission Intensity	Article 7, Table 3	Pass
3.4	Antenna Power Tolerance	Article 14	Pass
3.5	Limitation of Collateral Emission of Receiver	Article 24, Paragraph 2	Pass
3.6	Transmission Antenna Gain (EIRP Antenna Power)	Article 49-20, Item 1-e & 1-f	Pass
3.7	Transmission Radiation Angle Width (3 dB Beamwidth)	Article 49-20, Item 1-f	N/A
3.8	Radio Interference Prevention Capability	Article 9-4, Item 9-C Article 6-2, Item 3 of the Regulation for Enforcement of the Radio Law	Pass
3.9	Construction Protection Confirmation	Article 49-20, Item 1-a	Pass

Statement of Conformity

The statement of conformity is based on the binary decision rule according to IEC Guide 115 and ILAC G8 "simple acceptance" principle. Without considering measurement uncertainty, its specific risk is less than 50% PFA. (PFA: Probability of False Accept)

NOTE:

- (1) "N/A" denotes test is not applicable in this Test Report.
- (2) The report format version is TP.1.1.1.

Measurement Method	MIC Notice No.88 Appendix No.43
Test Condition	Conductive, RF test program provided by the customer was used to control the operating channel as well as the output power level.

Abbreviations

For the purposes of the present document, the following abbreviations apply:

NC	Normal Condition
EC	Extreme Condition
EUT	Equipment Under Test
DS	Direct spreading
FH	Frequency hopping
OFDM	Orthogonal frequency division multiplexing

1.1 TEST FACILITY

The test facilities used to collect the test data in this report:

No. 68-1, Ln. 169, Sec. 2, Datong Rd., Xizhi Dist., New Taipei City 221, Taiwan

☐ SR10 ☒ SR11

1.2 MEASUREMENT UNCERTAINTY

Test Items	Uncertainty	Remark
Frequency Tolerance / 99% & 90% Bandwidth	$\pm 6.25 \times 10^{-7}$	Confidence levels of 95%
Antenna power / Unwanted Emission Strength / Secondary Radiated Emission Strength	$\pm 0.5\text{dB}$	Confidence levels of 95%
Transmission Antenna Gain	$\pm 3.72\text{dB}$	Confidence levels of 95%
Carrier Sense Capability	$\pm 0.76\text{dB}$	Confidence levels of 95%

1.3 TEST ENVIRONMENT CONDITIONS

Test Item	Environment Condition	Tested by
Frequency Tolerance	24.2 °C, 43 %	Ken Lan
Occupied Bandwidth (99%) and Spread-spectrum Bandwidth (90%) / Spreading Factor (diffusion rate)	24.2 °C, 43 %	Ken Lan
Unwanted Emission Intensity	24.2 °C, 43 %	Ken Lan
Antenna Power Tolerance	24.2 °C, 43 %	Ken Lan
Limitation of Collateral Emission of Receiver	24.2 °C, 43 %	Ken Lan
Radio Interference Prevention Capability	24.2 °C, 43 %	Ken Lan

2 GENERAL INFORMATION

2.1 DESCRIPTION OF EUT

Equipment	Wireless Controller
Model Name	SA8990
Brand Name	LITEON
Model Difference	N/A
Power Source	(1)DC voltage supplied from Type C USB port. (2)DC voltage supplied from Li-ion polymer battery.
Power Rating	(1) 5V --- 1A (2) 3.7V 1050mAh (3.885Wh)
Products Covered	1 * Battery: Hang Zhou Future Power Technology Co., Ltd / FT593545P 1 * USB Cable: LITEON / 823-01299-00A. 1 * Dongle: LITEON / SD8960
Operation Frequency	2402 MHz to 2480 MHz
Modulation Type	GFSK
Data Rate	1 Mbps
Occupied Bandwidth (Maximum)	1.35 MHz
Spread Bandwidth (Minimum)	0.89 MHz
Software version	V0.1
Hardware version	V0.1
Antenna Power (Rated)	2.9923 mW
Antenna Power (Maximum Conducted)	2.9923 mW
Test Model	SA8990
Sample Status	Engineering Sample
EUT Modification(s)	N/A

NOTE:

(1) The above EUT information is declared by manufacturer and for more detailed features description, please refers to the manufacturer's specifications or user's manual.

(2) Channel List:

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
00	2402	14	2430	28	2458
01	2404	15	2432	29	2460
02	2406	16	2434	30	2462
03	2408	17	2436	31	2464
04	2410	18	2438	32	2466
05	2412	19	2440	33	2468
06	2414	20	2442	34	2470
07	2416	21	2444	35	2472
08	2418	22	2446	36	2474
09	2420	23	2448	37	2476
10	2422	24	2450	38	2478
11	2424	25	2452	39	2480
12	2426	26	2454		
13	2428	27	2456		

(3) Table for Filed Antenna:

Antenna	Brand	Model name	Type	Connector	Gain (dBi)
1	OneWave	WAN225010F2451SH05	Chip	N/A	-0.88

- (4) The above Antenna information are derived from the antenna data sheet provided by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

2.2 DESCRIPTION OF TEST MODES

The test system was pre-tested based on the consideration of all possible combinations of EUT operation modes according to test plan.

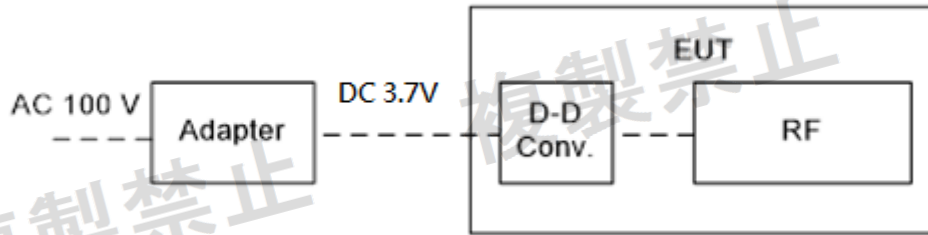
Following mode(s) was (were) found to be the worst case(s) and selected for the final test.

Test Mode	Description
1	1 Mbps _2402/2440/2480 MHz

2.3 PARAMETERS OF TEST SOFTWARE

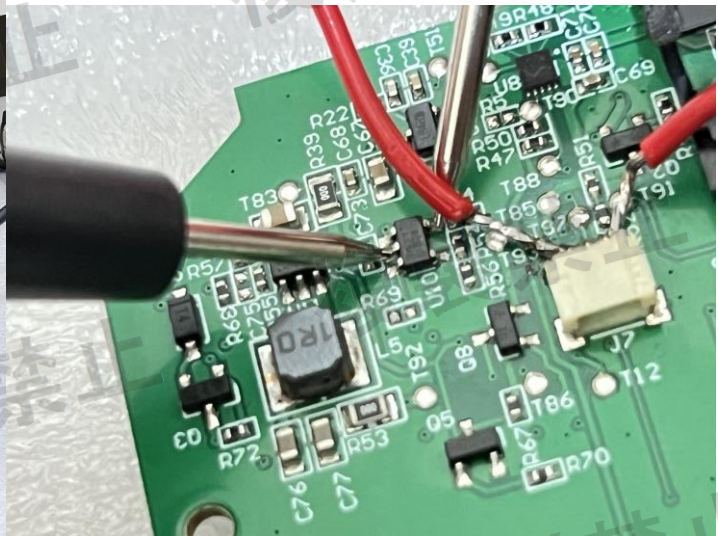
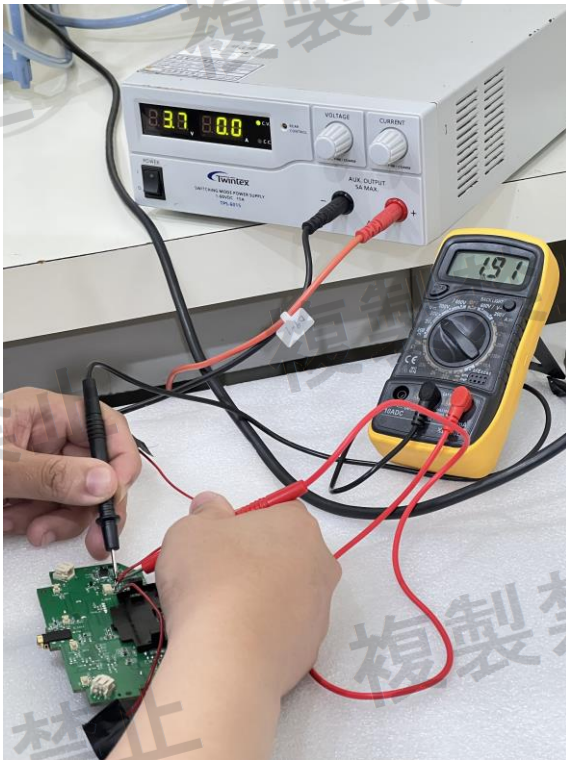
Test From Version	NA			
Test Software Version	Button			
Frequency (MHz)	2402	2440	2480	Data Rate
Mode	DEF	DEF	DEF	1 Mbps

Power Supply Voltage Fluctuation Test



Voltage fluctuation test	Normal Voltage	High Voltage + 10% of Normal Voltage	Low Voltage - 10% of Normal Voltage
Input: DC Power (V)	3.7	4.07	3.33
Output: DC Power (V)	1.91	1.91	1.91
Voltage Variation (%)	-	0.000000	0.000000

Measurement point



NOTE:

Voltage Variation (%)

$$= (\text{Output High or Low Voltage} - \text{Output Normal Voltage}) / \text{Output Normal Voltage} \times 100$$

During the input supply voltage to the EUT from the external power source is varied by $\pm 10\%$, if output voltage had been confirmed that the fluctuation of power supply to the RF circuit of EUT (excluding power source) is equal to or less than $\pm 1\%$.

Exempt extremely high and low supply voltage condition tests, EUT only operated in normal voltage to test all regulation.

3 TEST RESULTS

3.1 FREQUENCY TOLERANCE TEST

3.1.1 LIMIT

Item	Limits (See Article 5, Table1 of the Ordinance Regulating Radio Equipment)
Frequency Tolerance	≤ 50 ppm

3.1.2 MEASURING INSTRUMENTS AND SETTING

Please refer to section 4 in this report. The following table is the setting of the spectrum.

Spectrum Parameter	Setting
Span Frequency	200 kHz
RBW / VBW	10 kHz / 10 kHz

3.1.3 TEST PROCEDURE

Test method which surpass to Claus 3 of Annex No.43 of MIC Notification No.88.

- Frequency accuracy of SA shall be less than 10% of limits tolerance (5 ppm).
- Setting of SA is following as: RBW: 10 kHz / VBW: 10 kHz / SPAN: 200 kHz / AT: 30 dB / Ref: 20 dBm.
- Center Frequency: The center frequency of testing for EUT.
- Sweep time: Auto.
- Sweep mode: Continuous sweep.
- Detect mode: Positive peak.
- Mark function: Frequency Counter (Resolution 100Hz).
- EUT have transmitted absence of modulation signal and fixed channelize. f is using the mark cursor to mark the peak frequency value , fc is declaring of channel frequency. Then the frequency error formula is $(f_c - f) / f_c \times 10^6$ ppm and the limit is less than ± 50 ppm

3.1.4 DEVIATION FROM TEST STANDARD

No deviation.

3.1.5 TEST SETUP



3.1.6 EUT OPERATING CONDITIONS

The EUT was placed on the test table and programmed in un-modulation function.

3.1.7 TEST RESULT

Please refer to the APPENDIX A.

3.2 OCCUPIED BANDWIDTH (99%) AND SPREAD-SPECTRUM BANDWIDTH (90%) / SPREADING FACTOR (DIFFUSION RATE) TEST

3.2.1 LIMIT

Item	Limits (See Article 6, Table 2 and Article 49-20, Item1-h,i of the Ordinance Regulating Radio Equipment)
Occupied Bandwidth	FHSS $\leq$ 83.5MHz; OFDM,DSSS $\leq$ 26MHz; Others $\leq$ 26MHz
Spreading Bandwidth	$\geq$ 500 kHz (FHSS, DSSS)

3.2.2 MEASURING INSTRUMENTS AND SETTING

Please refer to section 4 in this report. The following table is the setting of the spectrum.

Spectrum Parameter	Setting
Span Frequency	2 MHz
RBW / VBW	300 kHz

3.2.3 TEST PROCEDURE

Test method which surpass to Clause 4 of Annex No.43 of MIC Notification No.88.

- Setting of SA is following as: RBW: 300 kHz / VBW: 300 kHz / SPAN: 2 MHz / AT: 30 dB Ref: 20 dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold.
- EUT have transmitted the maximum modulation signal and fixed channelize (For DSSS or OFDM Device) or continuous maximum power of hopping mode (For FHSS Device). SA set to 99 % of occupied bandwidth to measure occupied bandwidth. The limit is less than 26 MHz (For DSSS or OFDM Device) or 83.5 MHz (For FHSS Device).
- SA set to 90% of occupied bandwidth to measure Spread Spectrum Bandwidth and must greater than 500 kHz.

3.2.4 DEVIATION FROM TEST STANDARD

No deviation.

3.2.5 TEST SETUP



3.2.6 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

3.2.7 TEST RESULT

Please refer to the APPENDIX B.

3.3 UNWANTED EMISSION INTENSITY TEST

3.3.1 LIMIT

Item	Limits (See Article 7, Table 3 of the Ordinance Regulating Radio Equipment)
TX Spurious Emission	$\leq 2.5 \mu\text{W/MHz}$ ($30 \text{ MHz} \leq f \leq 1000 \text{ MHz}$)
	$\leq 2.5 \mu\text{W/MHz}$ ($1000 \text{ MHz} \leq f < 2387 \text{ MHz}$; $2496.5 \text{ MHz} < f$)
	$\leq 25 \mu\text{W/MHz}$ ($2387 \text{ MHz} \leq f < 2400 \text{ MHz}$) and ($2483.5 \text{ MHz} < f \leq 2496.5 \text{ MHz}$)
Measurement range: 30 MHz - 5th harmonics	

3.3.2 MEASURING INSTRUMENTS AND SETTING

Please refer to section 4 in this report. The following table is the setting of the spectrum.

Spectrum Parameter	Setting
Attenuation	Auto
RBW	100 kHz (below 1 GHz emissions) 1 MHz (above 1 GHz emissions)
VBW	100 kHz (below 1 GHz emissions) 1 MHz (above 1 GHz emissions)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.3.3 TEST PROCEDURE

Test method which surpass to Clause 5 of Annex No.43 of MIC Notification No.88.

- EUT have transmitted the maximum modulation signal and fixed channelize.
- Setting of SA is following as: RBW/VBW: 100 kHz (below 1 GHz emissions) / 1 MHz (above 1 GHz emissions) / AT: 20 dB / Ref: 10 dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold.
- Setting of SA is following as 30 MHz and stop frequency 1000 MHz then to mark peak reading value + cable loss shall be less than 2.5 μW .
- Setting of SA is following as 1000 MHz and stop frequency 2387 MHz then to mark peak reading value + cable loss shall be less than 2.5 μW .
- SA adjusted to start frequency 2387 MHz and stop frequency 2400 MHz then to mark peak reading value + cable loss shall be less than 25 μW .
- SA adjusted to start frequency 2483.5 MHz and stop frequency 2496.5 MHz then to mark peak reading value + cable loss shall be less than 25 μW .
- SA adjusted to start frequency 2496.5 MHz and stop frequency 12500 MHz then to mark peak reading value + cable loss shall be less than 2.5 μW .

3.3.4 DEVIATION FROM TEST STANDARD

No deviation.

3.3.5 TEST SETUP



3.3.6 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

Note:

- ※1: Frequency Band 1 ($30 \text{ MHz} \leq f \leq 1000 \text{ MHz}$)
- ※2: Frequency Band 2 ($1000 \text{ MHz} \leq f \leq 2387 \text{ MHz}$)
- ※3: Frequency Band 3 ($2387 \text{ MHz} < f \leq 2400 \text{ MHz}$)
- ※4: Frequency Band 4 ($2483.5 \text{ MHz} \leq f < 2496.5 \text{ MHz}$)
- ※5: Frequency Band 5 ($2496.5 \text{ MHz} \leq f < 12.5 \text{ GHz}$)

3.3.7 TEST RESULT

Please refer to the APPENDIX C.

3.4 ANTENNA POWER TOLERANCE TEST

3.4.1 LIMIT

Item	Limits (See Article 14 and 49-20 Item 1-e of the Ordinance Regulating Radio Equipment)
Antenna Power Density	$\leq 3 \text{ mW/MHz}$ (FHSS 2427 - 2470.75 MHz) $\leq 10 \text{ mW/MHz}$ (OFDM,DSSS 2400~2483.5 MHz) $\leq 10 \text{ mW}$ (Other modulation method 2400~2483.5 MHz)
Antenna Power Error	+20% (Base on manufacturer declare antenna power density)

3.4.2 MEASURING INSTRUMENTS AND SETTING

Please refer to section 4 in this report. The following table is the setting of the Power Meter.

Power Meter Parameter	Setting
Filter No.	Auto
Measurement time	0.135 s ~ 26 s
Used Average Sensor	N1923A

3.4.3 TEST PROCEDURE

Refer to Notification No. 88 of MIC, 2004, Annex 43, clause 6.

1. Connect a power meter/power sensor to the terminal of the EUT and measure the total power.
2. Correction of measured values:
Continuous Wave: None.
Burst wave: Calculate average power in burst from transmission time rate.

3.4.4 DEVIATION FROM TEST STANDARD

No deviation.

3.4.5 TEST SETUP



3.4.6 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

3.4.7 TEST RESULT

Please refer to the APPENDIX D.

3.5 LIMITATION OF COLLATERAL EMISSION OF RECEIVER TEST

3.5.1 LIMIT

Item	Limits (See Article 24, Paragraph 2 of the Ordinance Regulating Radio Equipment)
RX Spurious Emission	$\leq 4 \text{ nW } (-54 \text{ dBm}) (f < 1 \text{ GHz})$
	$\leq 20 \text{ nW } (-47 \text{ dBm}) (1 \text{ GHz} \leq f)$
Measurement range: 30 MHz - 5th harmonics.	

3.5.2 MEASURING INSTRUMENTS AND SETTING

Please refer to section 4 in this report. The following table is the setting of the spectrum.

Spectrum Parameter	Setting
Attenuation	Auto
RBW	100 kHz (below 1 GHz emissions) 1 MHz (above 1 GHz emissions)
VBW	100 kHz (below 1 GHz emissions) 1 MHz (above 1 GHz emissions)
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.5.3 TEST PROCEDURE

Test method which surpass to Clause 7 of Annex No.43 of MIC Notification No.88.

- EUT have the continuous reception mode and fixed only one channelize.
- Setting of SA is following as RBW / VBW: 100 kHz (below 1 GHz emissions) / 1 MHz (above 1 GHz emissions) AT: 0 dB / Ref: -10 dBm / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold.
- SA set RBW: 100 kHz and VBW: 100 kHz. Then adjust to start frequency 30 MHz and stop frequency 1000 MHz. Search to mark peak reading value + cable loss shall be less than 4 nW.
- SA set RBW: 1 MHz and VBW: 1 MHz. Then adjust to start frequency 1000 MHz and stop frequency 12500 MHz. Search to mark peak reading value + cable loss shall be less than 20 nW.
- If power level of lower emissions are more than 1/10 of limit (0.4 nW for $f < 1 \text{ GHz}$, 2 nW for $f \geq 1 \text{ GHz}$), all those are to be indicated in the 2nd and 3rd lines. If others are 1/10 or less more of the limit, no necessary to be indicated.

3.5.4 DEVIATION FROM TEST STANDARD

No deviation.

3.5.5 TEST SETUP



3.5.6 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously reception mode.

Note:

※6: Frequency Band 6 ($30 \text{ MHz} \leq f < 1000 \text{ MHz}$)

※7: Frequency Band 7 ($1000 \text{ MHz} \leq f < 12.5 \text{ GHz}$)

3.5.7 TEST RESULT

Please refer to the APPENDIX E

3.6 TRANSMISSION ANTENNA GAIN (EIRP ANTENNA POWER) TEST

3.6.1 LIMIT

Item	Limits
	(See Article 49-20, Item1-f of the Ordinance Regulating Radio Equipment)
EIRP Power Density	≤ 6.91 dBm/MHz (FHSS 2427 - 2470.75 MHz)
	≤ 12.14 dBm/MHz (OFDM, DSSS 2400~2483.5 MHz)
	≤ 12.14 dBm/MHz (Other modulation method 2400~2483.5 MHz)
Note: This test item will not be applied to the transmission antenna which has a gain of 2.14 dBi or less	

3.6.2 MEASURING INSTRUMENTS AND SETTING

Please refer to section 4 in this report. The following table is the setting of the spectrum.

Spectrum Parameter	Setting
Attenuation	30dB
Span	2 MHz
RBW	1 MHz
VBW	3 MHz
Detector	RMS
Trace	Max Hold
Sweep Time	60s

3.6.3 TEST PROCEDURE

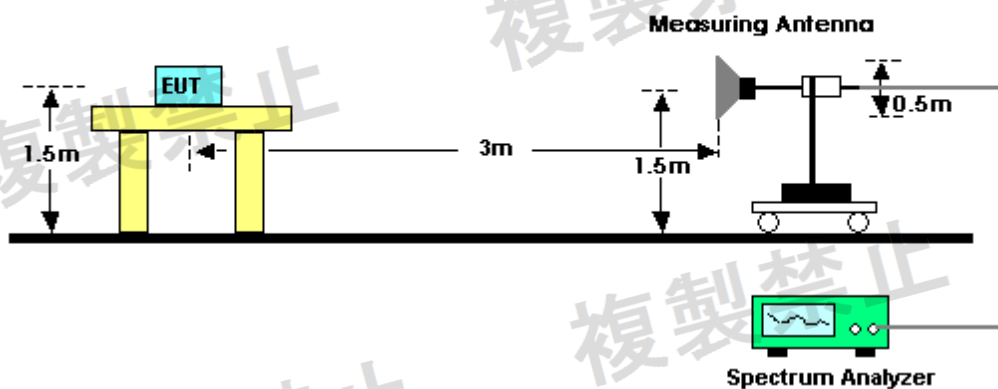
Please refer to 3.4.2 and the $EIRP = PD + \text{Gain}$.

3.6.4 DEVIATION FROM TEST STANDARD

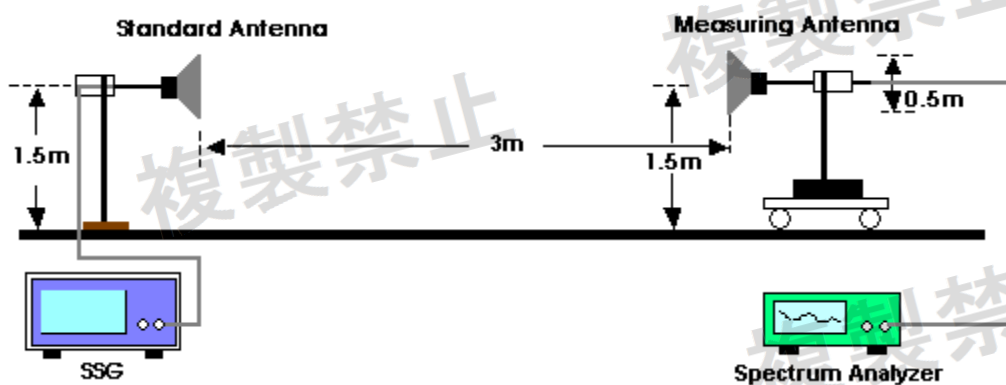
No deviation.

3.6.5 TEST SETUP

For EUT radiation measurement



For standard antenna measurement



3.6.6 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously transmitting mode.

3.6.7 TEST RESULT

Please refer to the APPENDIX D

3.7 TRANSMISSION RADIATION ANGLE WIDTH (3 DB BEAMWIDTH) TEST

3.7.1 LIMIT

Item	Limits
	(See Article 49-20, Item1-f of the Ordinance Regulating Radio Equipment)
3 dB antenna beamwidth	$360/A$ (if $A < 1$; then $A = 1$) $A = \{\text{EIRP Power [mW]} / 16.36 \text{ for DSSS, OFDM}\}$ or $A = \{\text{EIRP Power [mW]} / 4.9 \text{ for FHSS}\}$

3.7.2 MEASURING INSTRUMENTS AND SETTING

Please refer to section 4 in this report. The following table is the setting of the spectrum.

Spectrum Parameter	Setting
Attenuation	Auto
Span	0 MHz
RBW	1 MHz
VBW	1 kHz
Y scale	5 dB
Detector	Peak
Trace	Max Hold

3.7.3 TEST PROCEDURE

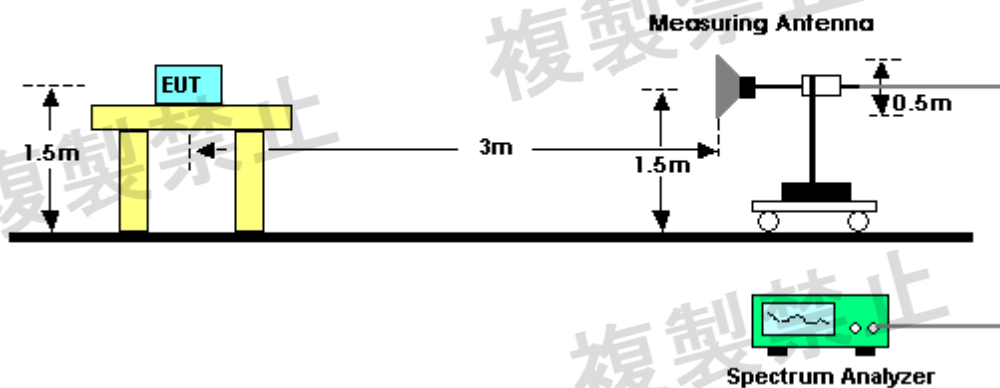
Test method which surpass to Clause 22 of Annex No.43 of MIC Notification No.88.

- Set EUT and measuring antenna at the same height and roughly facing each other.
- Set spectrum analyzer with condition in section 3.7.2 and tune reference level to observe receiving signal position.
- Rotate directions of the EUT horizontally and vertically to find the maximum receiving power.
- Move the measuring antenna height up and down within ± 50 cm of EUT height and swing it to find the maximum output of measuring antenna. The output level at the spectrum analyzer is read as "E".
- Calculate permitted radiation angle in horizontal and vertical using EIRP measured in another test method.
- Calculate 3 dB antenna beam width by the formula below $360/A$ (If $A < 1$; then $A = 1$).
 $A = \{\text{EIRP Power [mW]} / 16.36 \text{ for DSSS, OFDM}\}$ or
 $A = \{\text{EIRP Power [mW]} / 4.9 \text{ for FHSS}\}$

3.7.4 DEVIATION FROM TEST STANDARD

No deviation.

3.7.5 TEST SETUP



3.7.6 EUT OPERATING CONDITIONS

The EUT was programmed to be in continuously reception mode.

Note: C : Cable loss 0 dB

3.7.7 TEST RESULT

Method of measurement:	See MIC Notice No.88 Appendix No.43 Clause 22
Results:	N/A

3.8 RADIO INTERFERENCE PREVENTION CAPABILITY TEST

3.8.1 LIMIT

Item	Limits (See Article 9-4, Item9-C of the Ordinance Regulating Radio Equipment)
Identification code	≥ 48 bits

3.8.2 MEASURING INSTRUMENTS AND SETTING

PC with NetTool	Setting
MAC IP List	MAC Scan

3.8.3 TEST PROCEDURE

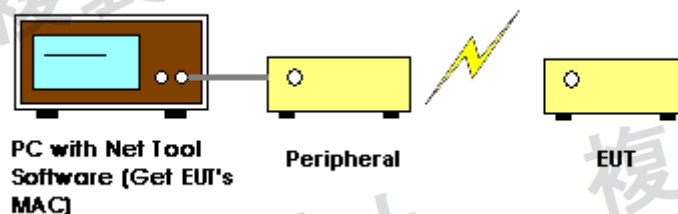
Test method which surpass to Clause 23 of Annex No.43 of MIC Notification No.88.

- a. In the case that the EUT has the function of automatically transmitting the identification code:
 - i. Transmit the predetermined identification codes form EUT.
 - ii. Check the transmitted identification codes with the demodulator.
- b. In the case of receiving the identification code:
 - i. Transmit the predetermined identification codes form the counterpart.
 - ii. Check if communication is normal.
 - iii. Transmit the signals other than predetermined ID codes form the counterpart.
 - iv. Check if the EUT stops the transmission, or if it displays that identification codes are different from the predetermined ones.

3.8.4 DEVIATION FROM TEST STANDARD

No deviation.

3.8.5 TEST SETUP



3.8.6 EUT OPERATING CONDITIONS

The EUT was programmed to be in normal transmitting mode.

3.8.7 TEST RESULT

Test Mode	TX Mode
Test Voltage	Normal Voltage
Test Result	Good (identification code: [f3bb03919798])

3.9 CONSTRUCTION PROTECTION CONFIRMATION

3.9.1 LIMIT

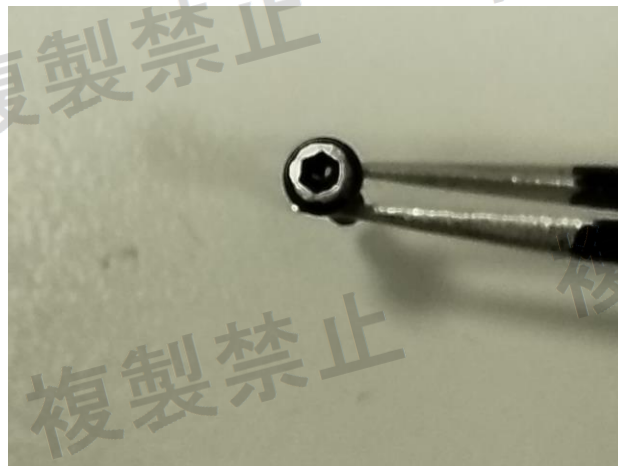
(See Article 49-20, Item1-a of the Ordinance Regulating Radio Equipment)

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

3.9.2 CONFIRMATION METHOD

The RF and modulation portions are protected against illegal modification as following method:

Tick the appropriate item	
X	1. Sealed with special screws.
	2. Plastic chassis is being welded using ultrasonic waves.
	3. Chassis is glued using a special adhesive.
	4. Metal covers are spot-fused.
	5. Cover is specially interlocked.
	6. RF and Modulation components are covered with shielding case and this shielding case is soldered.
	7. Shield case is welded at RF and modulation parts, and ID-ROM is welded using the BGA Method.
	8. Shield case is welded at RF and modulation parts, and ID-ROM is glued at its lead with a special adhesive
	9. Shield case is welded at RF and modulation parts, and ID-ROM is glued with a non-transparent laminating agent.
	10. RF and Modulation parts are mounted on PCB with surface mount technology, and there is no any adjustable part on PCB or adjustable parts are not exposed.



4 LIST OF MEASURING EQUIPMENTS

Kind of Equipment	Manufacturer	Type No.	Serial No.	Calibrated Date	Validity Date	Calibration Agency	Remark
Peak Power Analyzer	Keysight	8990B	MY51000517	2025/3/16	2026/3/15	ETC	3(c)
Power Sensor	Keysight	N1923A	MY58310005	2025/3/18	2026/3/17	ETC	3(c)
Spectrum Analyzer	R&S	FSP 40	101139	2025/3/7	2026/3/6	ETC	3(c)

Remark:

1. "N/A" denotes no model name, no serial no. or no calibration specified.
2. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
3. (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)

5 EUT TEST PHOTO

Please refer to document Appendix No.: TP-2410T031A-JPAP-1 (APPENDIX-TEST PHOTOS).

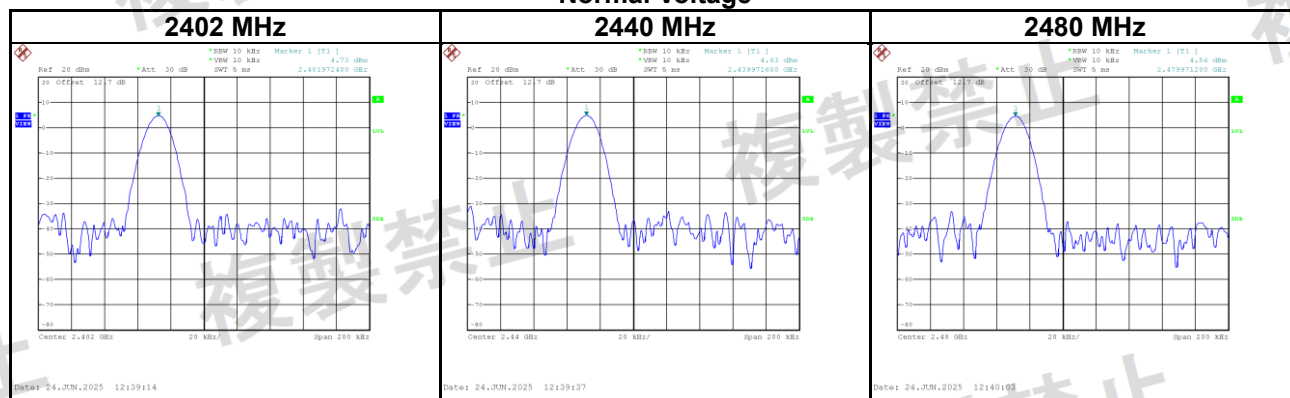
6 EUT PHOTOS

Please refer to document Appendix No.: EP-2410T031A-1 (APPENDIX-EUT PHOTOS).

APPENDIX A FREQUENCY TOLERANCE

Test Mode	1 Mbps			
Test Voltage (V)	Normal Voltage			Remark
Test Frequency (MHz)	2402	2440	2480	Low/Middle/High of test frequency range
Measured Frequency (MHz)	2401.9724	2439.9716	2479.9712	
Frequency Tolerance (ppm)	-11.49	-11.64	-11.61	Limit ≤ 50 ppm

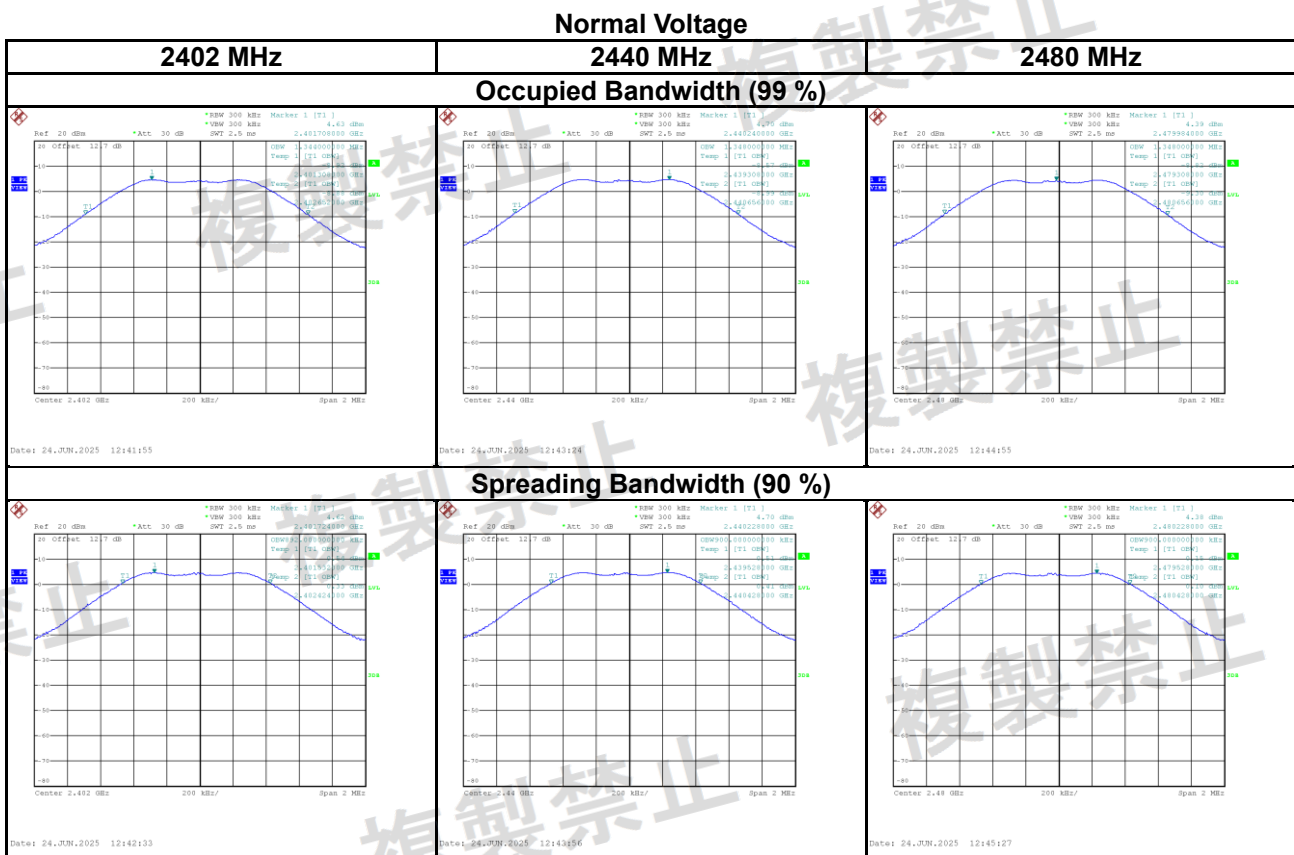
Normal Voltage



**APPENDIX B OCCUPIED BANDWIDTH (99%) AND
SPREAD-SPECTRUM BANDWIDTH (90%) / SPREADING FACTOR
(DIFFUSION RATE)**

Test Mode	1 Mbps			
Test Voltage (V)	Normal Voltage			Remark
Test Frequency (MHz)	2402	2440	2480	Low/Middle/High of test frequency range
Occupied Bandwidth (MHz)	1.34	1.35	1.35	Limit ≤ 26 MHz (RBW/VBW: 300 kHz)
Spreading Bandwidth (MHz)	0.89	0.90	0.90	Limit ≥ 500 kHz (FHSS, DSSS)
Spread Factor	0.89	0.90	0.90	

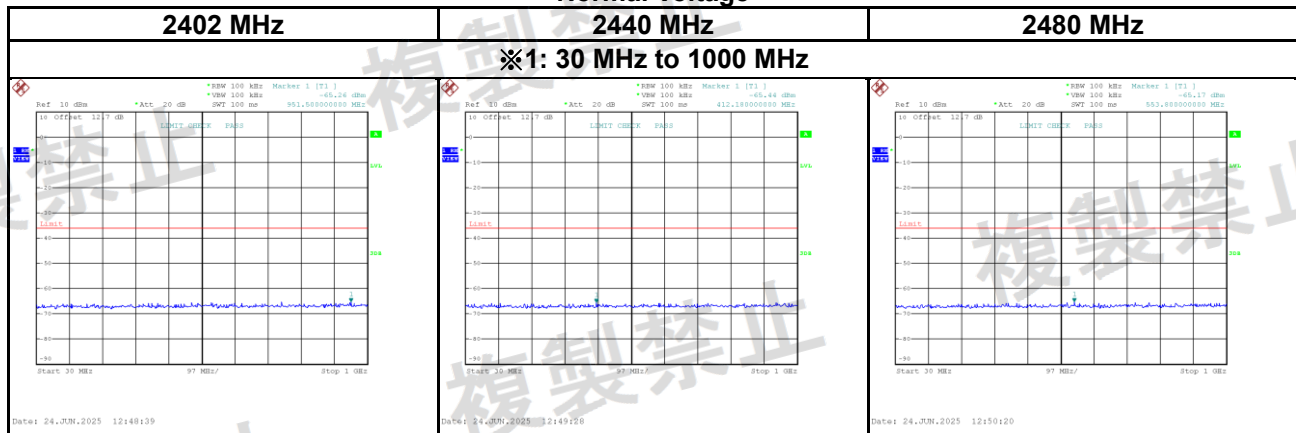
Note: Spread Factor = Spread Bandwidth / TR (TR = 1)



APPENDIX C UNWANTED EMISSION INTENSITY

Test Mode		1 Mbps				
Test Voltage		V	Normal Voltage			Remark
Test Frequency		MHz	2402	2440	2480	Low/Middle/High of test frequency range
Unwanted Emission Intensity	※1	Frequency (MHz)	951.50	412.18	553.80	
		Measured (dBm/100kHz)	-65.26	-65.44	-65.17	Limit ≦ 0.25 μW/100kHz (-26 dBm/MHz)
		Measured (μW/100kHz)	0.0003	0.0003	0.0003	
	※2	Frequency (MHz)	2276.04	2331.52	2353.71	
		Measured (dBm/MHz)	-44.01	-45.58	-43.41	Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)
		Measured (μW/MHz)	0.0397	0.0277	0.0456	
	※3	Frequency (MHz)	2400.00	2394.49	2397.58	
		Measured (dBm/MHz)	-18.75	-44.07	-43.08	Limit ≤ 25 μW/MHz (-16 dBm/MHz)
		Measured (μW/MHz)	13.3352	0.0392	0.0492	
	※4	Frequency (MHz)	2484.25	2485.94	2483.50	
		Measured (dBm/MHz)	-43.54	-44.24	-34.55	Limit ≤ 25 μW/MHz (-16 dBm/MHz)
		Measured (μW/MHz)	0.0443	0.0377	0.3508	
	※5	Frequency (MHz)	12379.96	12359.95	12379.96	
		Measured (dBm/MHz)	-48.58	-48.57	-48.63	Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)
		Measured (μW/MHz)	0.0139	0.0139	0.0137	

Normal Voltage



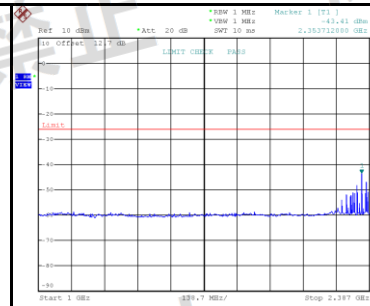
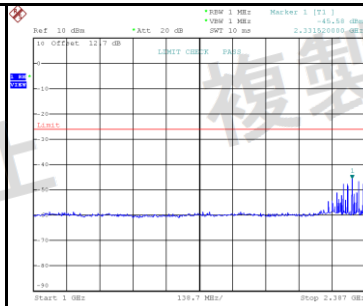
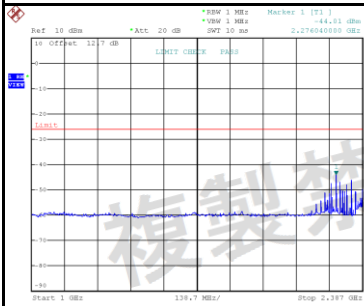
Normal Voltage

2402 MHz

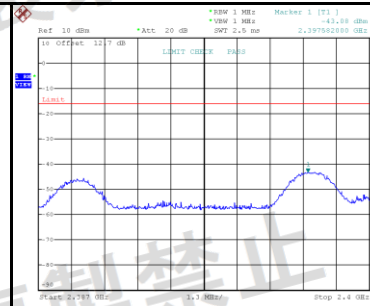
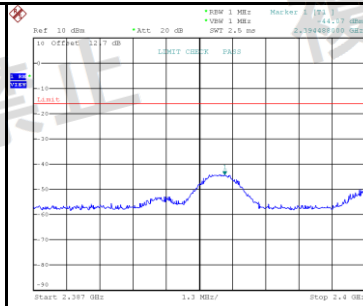
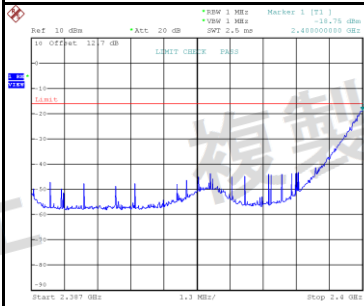
2440 MHz

2480 MHz

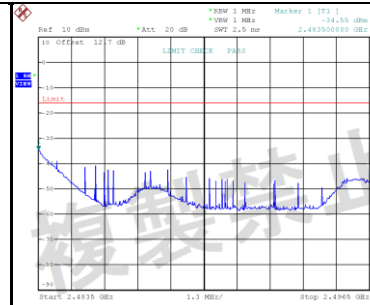
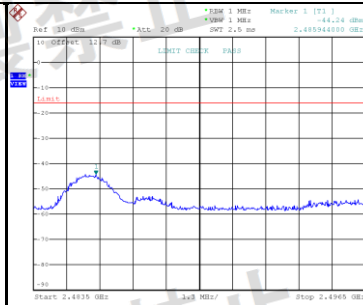
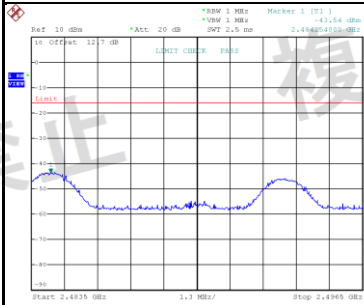
※2: 1000 MHz to 2387 MHz



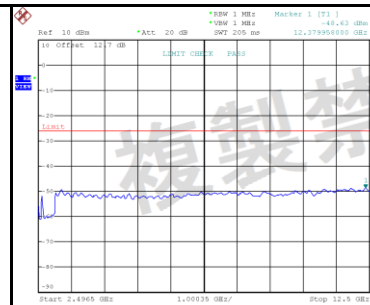
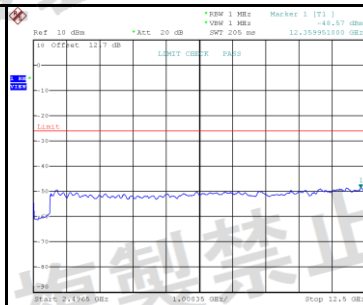
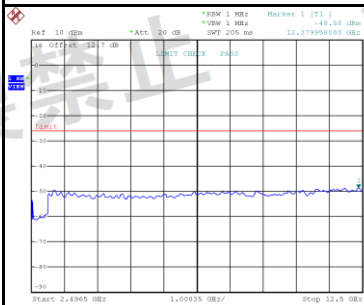
※3: 2387 MHz to 2400 MHz



※4: 2483.5MHz to 2496.5 MHz



※5: 2496.5 MHz to 12500 MHz

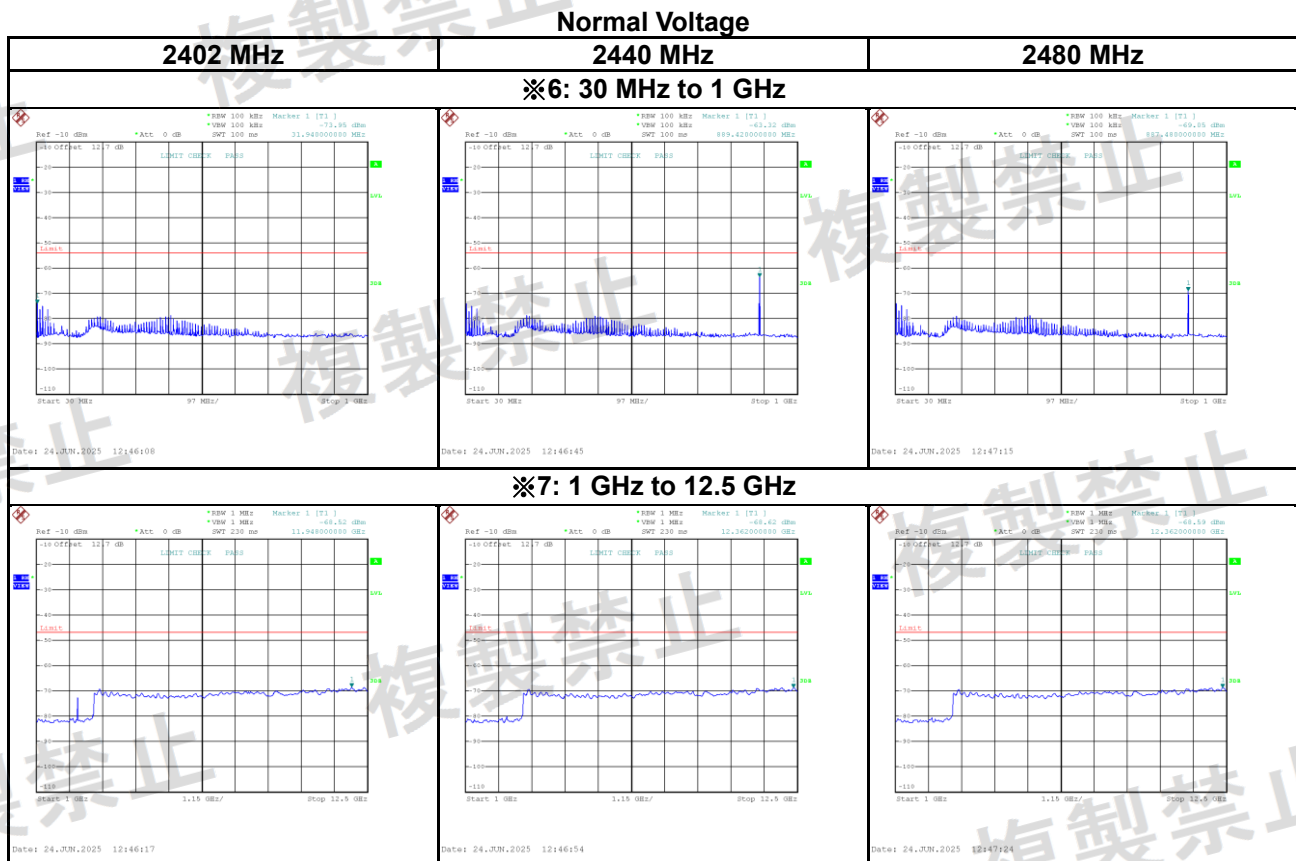


APPENDIX D ANTENNA POWER TOLERANCE

Test Mode	1 Mbps				
Test Voltage	V	Normal Voltage			Remark
Test Frequency	MHz	2402	2440	2480	Low/Middle/High of test frequency range
Antenna Power (Conducted)	dBm	4.76	4.71	4.45	
	mW	2.9923	2.9580	2.7861	
Rated Power	mW	2.9923			
Antenna Power Error	%	0.00	-1.15	-6.89	Limit + 20%
Antenna Gain	dBi	-0.88			
EIRP Power Density	dBm	3.88	3.83	3.57	Limit $\leq$ 12.14 dBm
	mW	2.4434	2.4155	2.2751	Limit $\leq$ 16.37 mW

APPENDIX E LIMITATION OF COLLATERAL EMISSION OF RECEIVER

Test Mode		1 Mbps				
Test Voltage		V	Normal Voltage			Remark
Test Frequency		MHz	2402	2440	2480	Low/Middle/High of test frequency range
Limitation of Collateral Emission of Receiver	※6	Frequency (MHz)	31.94	889.42	887.48	
		Measured (dBm)	-73.95	-63.32	-69.05	Limit ≤ 4 nW (-54 dBm)
		Measured (μW)	0.0403	0.4656	0.1245	
	※7	Frequency (MHz)	11948.00	12362.00	12362.00	
		Measured (dBm)	-68.52	-68.62	-68.59	Limit ≤ 20 nW (-47 dBm)
		Measured (μW)	0.1406	0.1374	0.1384	



End of Test Report