Japan Radio Test Report

Project No.	:	2511H005A
Equipment	:	Floor Cleaning Robot
Brand Name	:	ECOVACS
Model Name	:	DJX28-01EE
Applicant	:	Ecovacs Home Service Robotics Co., Ltd.
Address	:	No.518 Songwei Road,Wusongjiang industry Park,Guoxiang Street, Wuzhong District,Suzhou, Jiangsu,China.
Manufacturer	:	Ecovacs Home Service Robotics Co., Ltd.
Address	:	No.518 Songwei Road,Wusongjiang industry Park,Guoxiang Street, Wuzhong District,Suzhou, Jiangsu,China.
Factory	:	Ecovacs Robotics Co., Ltd.
Address	:	No.518 Songwei Road,Wusongjiang industry Park,Guoxiang Street, Wuzhong District,Suzhou, Jiangsu,China.
Date of Receipt	:	Nov. 06, 2025
Date of Test	:	Nov. 06, 2025~Nov. 07, 2025
Issued Date	:	Apr. 08, 2026
Test Sample	:	Engineering Sample No.: SH92025110513
Standard(s)	:	Ordinance Regulating Radio Equipment General Provisions, Transmitting Equipment, Receiving Equipment, Article 49-20
Test Procedure	:	Test Method Specified Radio Equipment Article 2 Paragraph 1 of item19-2 (MIC Notice No.88 Appendix No.44)

The above equipment has been tested and found compliance with the requirement of the relative standards by BTL Inc. (Shanghai)

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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: 2017 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-2-2511H005A	R00	The application has been changed to a new application report. The differences from case BTL-JPAP-2-2511H005 are minor, as detailed below: 1. The PCB layout of the mainboard has been optimized for routing; the schematic remains unchanged. 2. Dual power supply has been added to the drive wheel motor. 3. Testing for AX20 mode has been supplemented. These changes do not affect the test results. Therefore, the test data is referenced from BTL-JPAP-2-2511H005.	Apr. 08, 2026	Valid

1. SUMMARY OF TEST RESULTS

Part	Description of Test	Rule Section	Result
3.1	Frequency Tolerance	Article 5, Table 1	Pass
3.2	Occupied Bandwidth (99%) / Spread-spectrum Bandwidth (90%) / Spreading Factor (diffusion rate)	Article 6, Table 2 & Article 49-20, Item1-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	Radio Interference Prevention Capability	Article 9-4, Item 9-C Article 6-2, Item 3 of the Regulation for Enforcement of the Radio Law	Good
3.8	Carrier Sense Capability	Article 49-20, Item1-k	Good
3.9	Construction Protection Confirmation	Article 49-20, Item1-a	Pass

Method of measurement:	MIC Notice No.88 Appendix No.44
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 used in this test report are as follows:

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:
TR02: No. 29, Jintang Road, Tangzhen Industry Park, Pudong New Area, Shanghai 201210, People's Republic of China.

1.2. MEASUREMENT UNCERTAINTY

Test Items	Uncertainty
Frequency Tolerance	±0.1536 Hz
Antenna Power	±0.3473 dB
Occupied Bandwidth	±0.07%
Unwanted Emission Strength	±0.3792 dB
Adjacent Channel Emitted Power	±0.6052 dB
Temperature	±0.3℃
Humidity	±1.3 %
Voltage	±0.7 v

1.3. TEST ENVIRONMENT CONDITIONS

Test Item	Temperature	Humidity	Test Voltage	Tested By
Frequency Tolerance	20°C~22°C	44%~51%	DC 14V	Thacker Tang
Occupied Bandwidth (99%) / Spread-spectrum Bandwidth (90%)/ Spreading Factor (diffusion rate)	20°C~22°C	44%~51%	DC 14V	Thacker Tang
Unwanted Emission Intensity	20°C~22°C	44%~51%	DC 14V	Thacker Tang
Antenna Power Tolerance	20°C~22°C	44%~51%	DC 14V	Thacker Tang
Limitation of Collateral Emission of Receiver	20°C~22°C	44%~51%	DC 14V	Thacker Tang
Carrier Sense Capability	20°C~22°C	44%~51%	DC 14V	Thacker Tang

2. GENERAL INFORMATION

2.1. GENERAL DESCRIPTION OF EUT

Equipment	Floor Cleaning Robot
Brand Name	ECOVACS
Test Model	DJX28-01EE
Model Name	NA
Model Difference(s)	NA
Hardware Version	NA
Software Version	NA
Power Source	DC voltage supplied from AC/DC adapter Brand/ Model: ECOVACS/CH2536 Battery supplied. Model:S35-LI-144-3200
Power Rating	IP:100V~ 50-60Hz 0.5A(Charging), 2.8A(Dust collection status), 1.1A(Drying) OP:20VDC 1A Nominal Voltage: 14.4VDC Max Charge Voltage: 16.6VDC Nominal Capacity: 3200mAh Rated Capacity:2944mAh Rated Energy:42.3936Wh
Operation Frequency	2484 MHz
Modulation Technology	IEEE 802.11b: DSSS
Bit Rate of Transmitter	IEEE 802.11b: 11/5.5/2/1Mbps
Occupied Bandwidth	20.81 MHz
Spreading Bandwidth	15.00 MHz
Antenna Power (Rated Power)	4.18 mW/MHz
Antenna Power (Max. Conducted Power)	4.1783 mW/MHz

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:

CH14 For IEEE 802.11b	
Channel	Frequency (MHz)
14	2484

3. Table for Filed Antenna:

Ant.	Brand	Model Name	Antenna Type	Connector	Gain(dBi)
1	INPAQ TECHNOLOGY CO., LTD.	WA-F-LA-02-166	FPC	IPEX	1.09

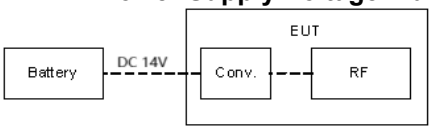
(1) The antenna gain is provided by the manufacturer.

2.2. DESCRIPTION OF TEST MODES

The EUT was tested while in a continuous transmitter / receiver mode.
The EUT was tuned to a middle channel for all tests.
The EUT continuously transmitted a modulated packet with payload, while transmitting the EUT was setup to operate at the intended maximum power output available to the end user.
For all test case pre/scans were completed in all modes to determine worst case levels.

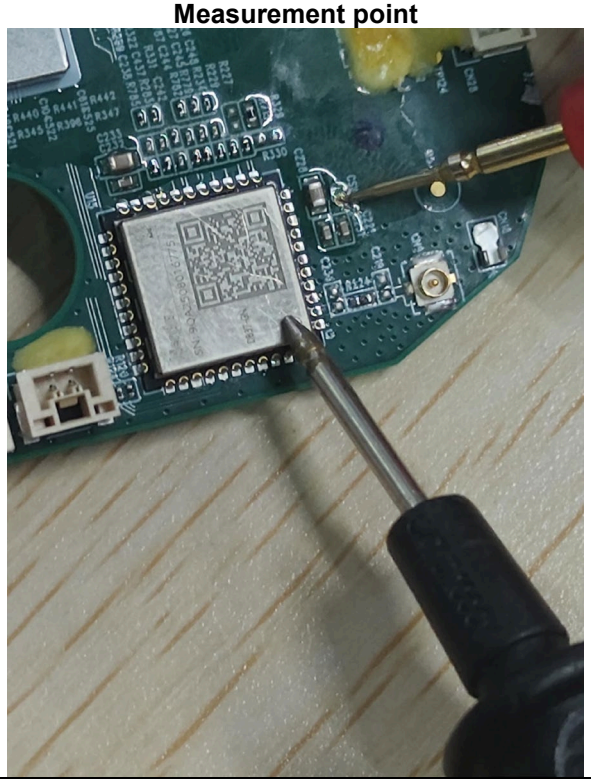
Test Mode	Description
Mode 1	IEEE 802.11b/CH14

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	14V	15.4V	12.6V
Output: DC Power	3.286V	3.286V	3.285V
Voltage Variation (%)	-	0	-0.03

Measurement point

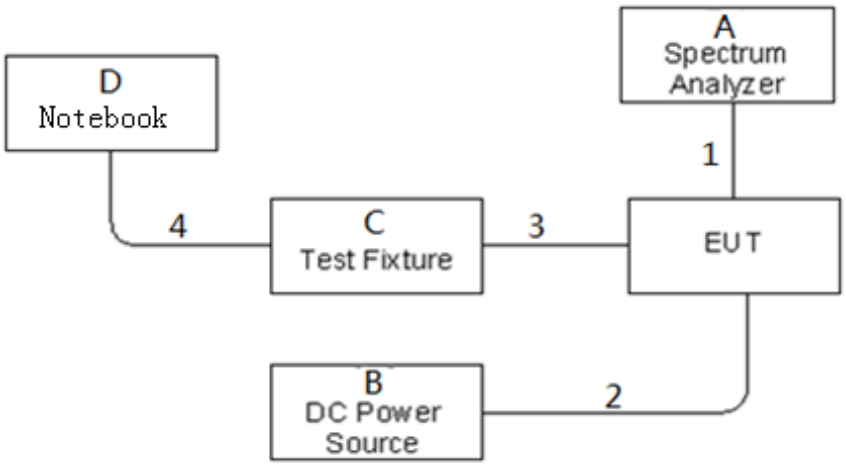


Note:

Voltage Variation (%)
= (Output High Voltage or Low Voltage - Output Normal Voltage)/Output Normal Voltage * 100

During the input supply voltage to the EUT from the external power source is varied by +/- 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 +/- 1%.
Exempt extremely high and low supply voltage condition tests, EUT only operated in normal voltage to test all regulations.

2.3. BLOCK DIAGRAM SHOWING THE CONFIGURATION OF SYSTEM TESTED



2.4. DESCRIPTION OF SUPPORT UNITS

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Mfr/Brand	Model/Type No.	Series No.
A	Spectrum Analyzer	R&S	FSP40	100185
B	DC Power Supply	GW Instek	GPC-3030DN	EK880675
C	Test Fixture	N/A	N/A	N/A
D	PC	DELL	N/A	N/A

Item	Cable Type	Shielded Type	Ferrite Core	Length
1	RF CABLE	YES	NO	0.1m
2	DC POWER CABLE	YES	NO	1.2m
3	CONTROL CABLE	NO	NO	1.1m
4	USB CABLE	NO	NO	1.1m

2.5. TABLE FOR PARAMETERS OF TEST SOFTWARE SETTING

During testing, Channel & Power Controlling Software provided by the customer was used to control the operating channel as well as the output power level.

Test Software Version	IPOP V4.0
Frequency(MHz)	2484
IEEE 802.11b	Default

3. TEST RESULTS

3.1. FREQUENCY TOLERANCE MEASUREMENT

3.1.1 LIMIT

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

3.1.2. SETTING

The following table is the setting of the spectrum analyzer.

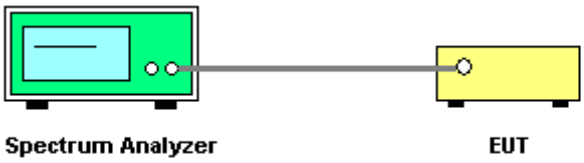
Spectrum Parameter	Setting
Span	200 kHz
RBW / VBW	10 kHz / 10 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.1.3. TEST PROCEDURES

Test method which surpass to Clause 3 of Annex No.44 of MIC Notification No.88.

1. Frequency accuracy of SA shall be less than 10% of limits tolerance (5ppm).
2. Set spectrum analyzer with condition in section 3.1.2 and tune reference level to observe receiving signal position.
3. Center Frequency: The center frequency of testing for EUT.
4. 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 $(fc-f)/fc\times10^6$ ppm and the limit is less than ±50ppm.

3.1.4. TEST SETUP LAYOUT



3.1.5. TEST DEVIATION

There is no deviation with the original standard.

3.1.6. EUT OPERATION DURING TEST

The EUT was programmed to be in un-modulation mode.

3.1.7. TEST RESULTS

Please refer to the Appendix A.

3.2. OCCUPIED BANDWIDTH AND SPREAD-SPECTRUM BANDWIDTH MEASUREMENT

3.2.1 LIMIT

Item	Limits (See Article 6, Table2 and Article 49-20, Item1-h,i of the Ordinance Regulating Radio Equipment)
Occupied Bandwidth	OFDM, DSSS≤26MHz
Spreading Bandwidth	≥500 kHz (FHSS, DSSS)
Spreading Factor	≥10, Operating Frequency 2471~2497MHz

3.2.2. SETTING

The following table is the setting of the spectrum analyzer.

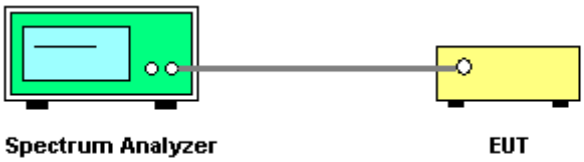
Spectrum Parameter	Setting
Span	50MHz
RBW / VBW	300kHz / 300kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

3.2.3. TEST PROCEDURES

Test method which surpass to Clause 4 of Annex No.44 of MIC Notification No.88.

1. Set spectrum analyzer with condition in section 3.2.2 and tune reference level to observe receiving signal position.
2. 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 26MHz.
3. SA set to 90% of occupied bandwidth to measure Spread Spectrum Bandwidth and must greater than 500 kHz.
4. Spreading Spectrum Factor = Spreading Spectrum Bandwidth / modulation rate of EUT.
5. Spreading Spectrum Factor limit is greater than 10.

3.2.4. TEST SETUP LAYOUT



3.2.5. TEST DEVIATION

There is no deviation with the original standard.

3.2.6. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

3.2.7. TEST RESULTS

Please refer to the Appendix B.

3.3. UNWANTED EMISSION INTENSITY MEASUREMENT

3.3.1. LIMIT

Item	Limits (See Article 7, Table 3 of the Ordinance Regulating Radio Equipment)
TX Spurious Emission	≤2.5 μW/MHz (30MHz≤f≤1000MHz)
	≤2.5 μW/MHz (1000MHz≤f<2458MHz;2510MHz<f)
	≤25 μW/MHz (2458MHz≤f<2471MHz) and (2497MHz<f≤2510MHz)
Measurement range: 30MHz~5th harmonics	

3.3.2. SETTING

The following table is the setting of spectrum analyzer.

Spectrum Parameter	Setting
RBW / VBW	100kHz / 100kHz (30~1000MHz) 1MHz / 1MHz (Above 1000MHz)
Detector	Positive Peak
Trace	Max Hold
Sweep Time	Auto

3.3.3. TEST PROCEDURES

Test method which surpass to Clause 5 of Annex No.44 of MIC Notification No.88.

1. Set spectrum analyzer with condition in section 3.3.2 and tune reference level to observe receiving signal position.
2. SA adjusted to start frequency 30MHz and stop frequency 1000MHz. Then to mark peak reading value + cable loss shall be less than 2.5μW/MHz.
3. SA adjusted to start frequency 1000MHz and stop frequency 2458MHz. Then to mark peak reading value + cable loss shall be less than 2.5μW/MHz.
4. SA adjusted to start frequency 2458MHz and stop frequency 2471MHz. Then to mark peak reading value + cable loss shall be less than 25μW/MHz.
5. SA adjusted to start frequency 2497MHz and stop frequency 2510MHz. Then to mark peak reading value + cable loss shall be less than 25μW/MHz.
6. SA adjusted to start frequency 2510MHz and stop frequency 12500MHz. Then to mark peak reading value + cable loss shall be less than 2.5μW/MHz.
7. If the Result_Value is over the requirement, take total sum of 1MHz band centered at the spur frequency like time domain power measurement as Result_Value.

3.3.4. TEST SETUP LAYOUT

3.3.5. TEST DEVIATION

There is no deviation with the original standard.

3.3.6. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

Note:

※ 1: Frequency Band 1 (30MHz≤f≤1000MHz)

※ 2: Frequency Band 2 (1000MHz≤f<2458MHz)

※ 3: Frequency Band 3 (2458MHz≤f<2471MHz)

※ 4: Frequency Band 4 (2497MHz<f≤2510MHz)

※ 5: Frequency Band 5 (2510MHz<f)

Band	1	2	3	4	5
Cable Loss(dB)	0.5	0.5	0.5	0.5	0.5

3.3.7. TEST RESULTS

Please refer to the Appendix C.

3.4. ANTENNA POWER TOLERANCE MEASUREMENT

3.4.1. LIMIT

Item	Limits (See Article 14 and 49-20 Item1-e of the Ordinance Regulating Radio Equipment)
Antenna Power Density	≤10mW/MHz (DSSS 2471~2497MHz)
Antenna Power Tolerance	+20%, -80% (Base on manufacturer declare antenna power density)

3.4.2. SETTING

The following table is the setting of the spectrum analyzer.

Step 1:

Spectrum Parameter	Setting
Span	50MHz
RBW / VBW	1MHz / 3MHz
Detector	Positive Peak
Trace	Max Hold
Sweep Time	Auto

Step 3:

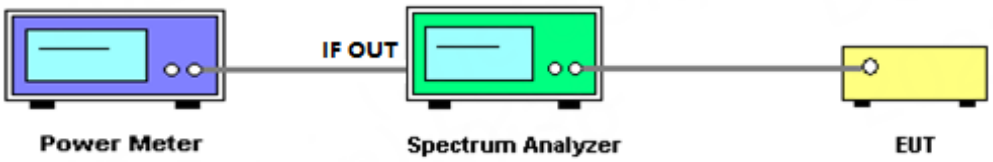
Spectrum Parameter	Setting
Span	0MHz
RBW / VBW	1MHz / 1MHz
Detector	Positive Peak
Trace	Max Hold
Sweep Time	60s

3.4.3. TEST PROCEDURES

Test method which surpass to Clause 6 of Annex No.44 of MIC Notification No.88.

1. Set spectrum analyzer with condition in section 3.4.2 Step 1 and tune reference level to observe receiving signal position.
2. When the trace is complete, find the peak value of the power envelope and record the frequency.
3. Set spectrum analyzer with condition in section 3.4.2 Step 3 and tune reference level to observe receiving signal position.
4. Connect the high frequency power meter to the IF output terminal of the spectrum analyzer, measure the equivalent noise bandwidth at the resolution bandwidth of 1 MHz of the spectrum analyzer, correct the bandwidth to the 1 MHz equivalent bandwidth, and read the displayed value from the high frequency power meter.

3.4.4. TEST SETUP LAYOUT



3.4.5. TEST DEVIATION

There is no deviation with the original standard.

3.4.6. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

3.4.7. TEST RESULTS

Please refer to the Appendix D.

3.5. LIMITATION OF COLLATERAL EMISSION OF RECEIVER MEASUREMENT

3.5.1. LIMIT

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

3.5.2. SETTING

The following table is the setting of spectrum analyzer.

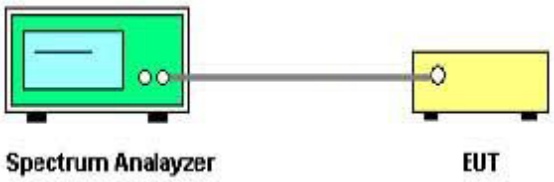
Spectrum Parameter	Setting
RBW / VBW	100kHz / 100kHz (30~1000MHz) 1 MHz / 1 MHz (Above 1000MHz)
Detector	Positive Peak
Trace	Max Hold
Sweep Time	Auto

3.5.3. TEST PROCEDURES

Test method which surpass to Clause 7 of Annex No.44 of MIC Notification No.88.

1. EUT have the continuous reception mode and fixed only one channelize.
2. Set spectrum analyzer with condition in section 3.5.2 and tune reference level to observe receving signal position.
3. SA set RBW: 100kHz and VBW: 100kHz. Then adjust to start frequency 30MHz and stop frequency 1000MHz. Search to mark peak reading value + cable loss shall be less than 4nW.
4. SA set RBW: 1MHz and VBW: 1MHz. Then adjust to start frequency 1000MHz and stop frequency 12500MHz. Search to mark peak reading value + cable loss shall be less than 20nW.
5. If power level of lower emissions are more than 1/10 of limit (0.4nW for f < 1GHz, 2nW for f≥1GHz), 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. TEST SETUP LAYOUT



3.5.5. TEST DEVIATION

There is no deviation with the original standard.

3.5.6. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously receiving mode.

Note:

※ 6: Frequency Band 6 (f<1GHz)

※ 7: Frequency Band 7 (1GHz≤f)

Band	6	7
Cable Loss(dB)	0.5	0.5

3.5.7. TEST RESULTS

Please refer to the Appendix E.

3.6. TRANSMISSION ANTENNA GAIN (EIRP ANTENNA POWER) MEASUREMENT

3.6.1. LIMIT

Item	Limits (See Article 49-20, Item1-f of the Ordinance Regulating Radio Equipment)	
EIRP Power Density	☒	For an Omni-directional antenna: ≤12.14dBm/MHz (OFDM, DSSS 2471~2497MHz)
	☐	For a directional antenna: ≤22.14dBm/MHz (OFDM, DSSS 2471~2497MHz)

3.6.2. SETTING

The following table is the setting of spectrum analyzer.

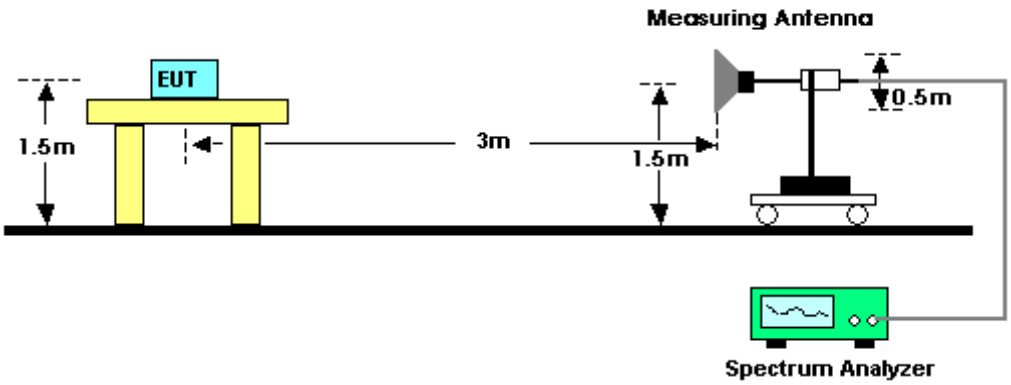
Spectrum Parameter	Setting
Span	0Hz
RBW / VBW	1MHz / 1MHz
Detector	Positive Peak
Trace	Max Hold
Sweep Time	60s

3.6.3. TEST PROCEDURES

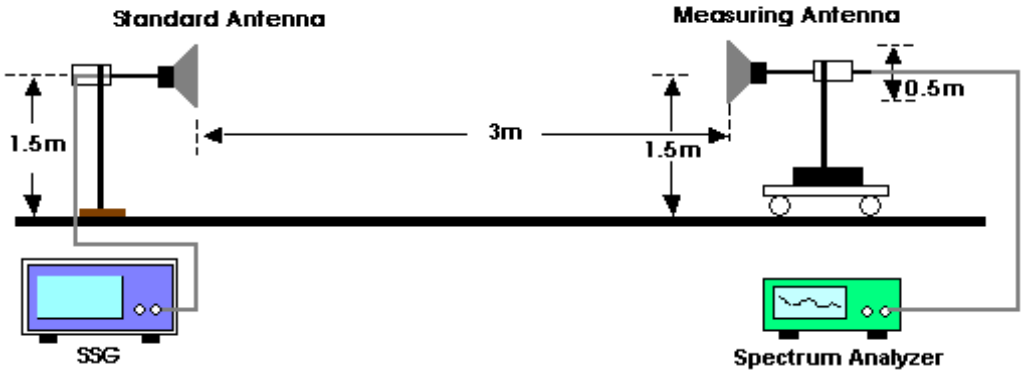
Please refer to 3.4.3 and the EIRP=Power Density + Gain.

3.6.4. TEST SETUP LAYOUT

For EUT radiation measurement



For standard antenna measurement



3.6.5. TEST DEVIATION

There is no deviation with the original standard.

3.6.6. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

3.6.7. TEST RESULT OF TRANSMISSION ANTENNA GAIN (EIRP ANTENNA POWER)

Method of measurement:	See MIC Notice No.88 Appendix No.44 Clause 18
Results:	Please refer to the Appendix D.

3.7. RADIO INTERFERENCE PREVENTION CAPABILITY MEASUREMENT

3.7.1. LIMIT

Item	Limits (See Article 9-4, Item9-C of the Ordinance Regulating Radio Equipment)
Identification code	The wireless equipment of the radio station mainly used in the same station automatically sends or receives the identification code.

3.7.2. MEASURING ID CODE SOFTWARE

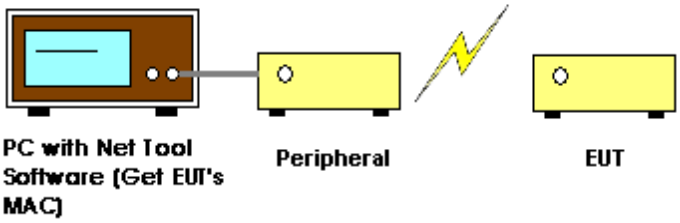
PC with Net Tool	Setting
MAC IP List	MAC Scan

3.7.3. TEST PROCEDURES

Test method which surpass to Clause 20 of Annex No.44 of MIC Notification No.88.

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

3.7.4. TEST SETUP LAYOUT



3.7.5. TEST DEVIATION

There is no deviation with the original standard.

3.7.6. EUT OPERATION DURING TEST

The EUT was programmed to be in normal mode.

3.7.7. TEST RESULT OF RADIO INTERFERENCE PREVENTION CAPABILIT

Test Power:	Normal Voltage
Test Mode:	IEEE 802.11b/CH14
Test Result:	Good (identification code: [EC:30:8E:13:B8:37])

EC:30:8E:13:B8:37

3.8. CARRIER SENSE CAPABILITY MEASUREMENT

3.8.1. LIMIT

Item	Limits (See Article 49-20, Item1-k of the Ordinance Regulating Radio Equipment)
Carrier Sense	Good – EUT stop RF transmission signal after carrier inject to EUT. (On 22.79+Gr-20*log(f)[dBm] (Gr: dBi; f: MHz) or 100mV/m)

3.8.2. SETTING

The following table is the setting of the spectrum analyzer.

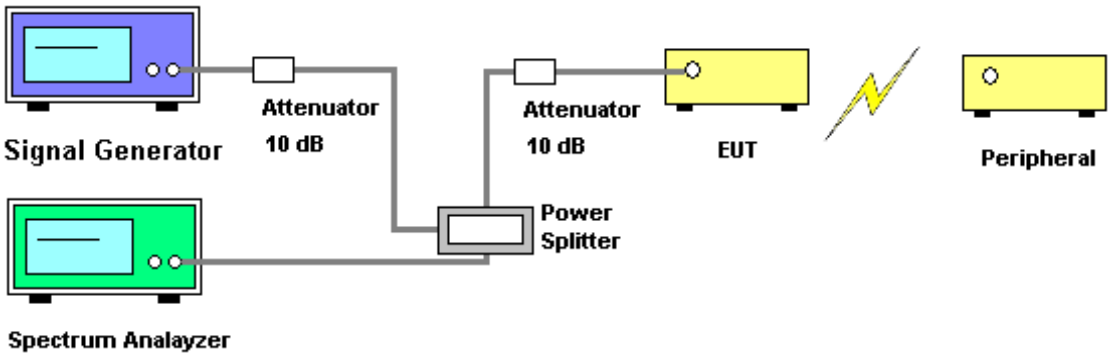
Spectrum Parameter	Setting
RBW / VBW	1 MHz / 1 MHz
Span	0 MHz
Sweep	Continuous
Detector	Peak
Trigger mode	Video

3.8.3. TEST PROCEDURES

Test method which surpass to Clause 9 of Annex No.44 of MIC Notification No.88.

1. SSG adjusted the frequency as same as the EUT transmitted signal and emitted the absence of modulation from SSG and power level is (On 22.79+Gr-20*log(f)[dBm] (Gr: dBi; f: MHz). Then turn off the RF signal of SSG.
2. EUT have transmitted the maximum modulation signal and fixed channelize.
3. Set spectrum analyzer with condition in section 3.8.2 and tune reference level to observe receving signal position.
4. SSG RF Signal On.
5. EUT shall be stop the transmitted any signal and SSG RF Signal Off. Then EUT will be continuous transmitted signal.

3.8.4. TEST SETUP LAYOUT



3.8.5. TEST DEVIATION

There is no deviation with the original standard.

3.8.6. EUT OPERATION DURING TEST

The EUT was programmed to be in normal transmitting mode.

3.8.7. TEST RESULT OF CARRIER SENSE CAPABILITY

Test Power	Normal Voltage
Test Mode	IEEE 802.11b/CH14
Test Result	Good

3.9. CONSTRUCTION PROTECTION CONFIRMATION METHOD

3.9.1. LIMIT

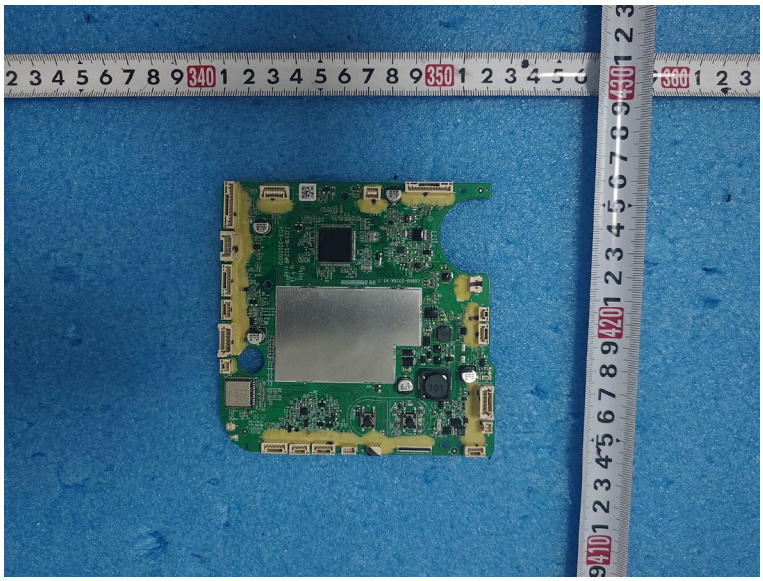
(See Article 49-20, Item1-a of the Ordinance Regulating Radio Equipment).

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 box	
	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 guled 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.

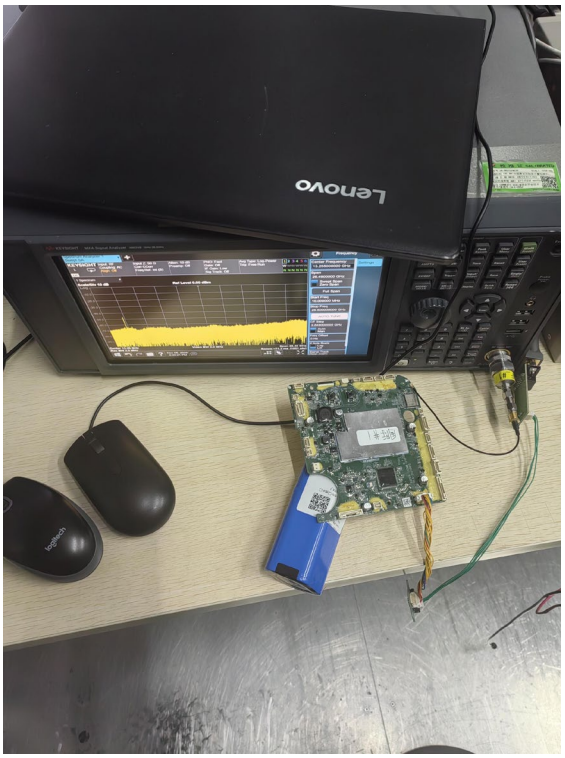


4. LIST OF MEASURING EQUIPMENTS

Kind of Equipment	Manufacturer	Model No.	Serial No.	Calibrated Date	Validity Date	Calibration Agency
EXA Spectrum Analyzer	Keysight	N9010A	MY56480545	Jul. 05, 2025	Jul. 04, 2026	China CEPREI Laboratory Calibration & Testing Centrer
Attenuator	Solvang Technology	5.8GHz 0-65dB	STI02-0203-01	Jul. 05, 2025	Jul. 04, 2026	China CEPREI Laboratory Calibration & Testing Centrer
DC Power Supply	GW Instek	GPC-3030DN	EH897352	Mar. 06, 2025	Mar. 05, 2026	China CEPREI Laboratory Calibration & Testing Centrer
Digital multimeter	FLUKE	15B+	38192195WS	Jul. 05, 2025	Jul. 04, 2026	China CEPREI Laboratory Calibration & Testing Centrer
USB Peak and Average Power Sensor	Keysight	U2063XA	MY58000309	Jul. 05, 2025	Jul. 04, 2026	China CEPREI Laboratory Calibration & Testing Centrer
USB Peak and Average Power Sensor	Keysight	U2063XA	MY58000306	Jul. 05, 2025	Jul. 04, 2026	China CEPREI Laboratory Calibration & Testing Centrer
USB Peak and Average Power Sensor	Keysight	U2063XA	MY58000305	Jul. 05, 2025	Jul. 04, 2026	China CEPREI Laboratory Calibration & Testing Centrer
USB Peak and Average Power Sensor	Keysight	U2063XA	MY58000307	Jul. 05, 2025	Jul. 04, 2026	China CEPREI Laboratory Calibration & Testing Centrer
Temperature And Humidity Box	Blue pand	BPHS-120B	170616454	Jul. 05, 2025	Jul. 04, 2026	China CEPREI Laboratory Calibration & Testing Centrer
IOT0047A Wireless IoT Devices Regulatory Compliance Test Solution	Keysight	Version:24.7.26.11	N/A	N/A	N/A	China CEPREI Laboratory Calibration & Testing Centrer

Note:
1. The calibration interval of the above test instruments is 12 months and the calibrations are traceable to NML/ROC and NIST/USA.
2. Calibration Agency: China CEPREI Laboratory Calibration & Testing Centrer
   CEPREI(Suzhou) address : No.601, Taishan Road, Hi-Tech District, Suzhou, Jiangsu, China
3. Calibration conducted in foreign countries, which is equivalent to the calibration conducted by the NICT or a designated calibration agency under Article 102-18 paragraph (1).

5. EUT TEST PHOTO

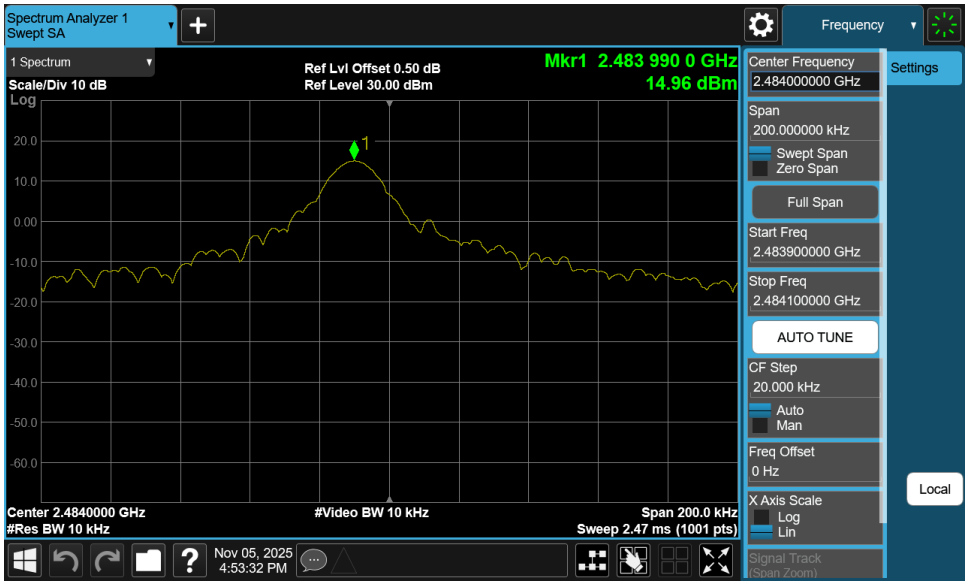


APPENDIX A - FREQUENCY TOLERANCE

Test Mode:	TX Mode_IEEE 802.11b

Test Voltage	Normal Voltage	Remarks
Test Frequency (MHz)	2484	Mid of test frequency range
Measured Frequency (MHz)	2483.9900	-
Frequency Tolerance (ppm)	-4.03	Limit: -50≤ppm≤50

Normal Voltage



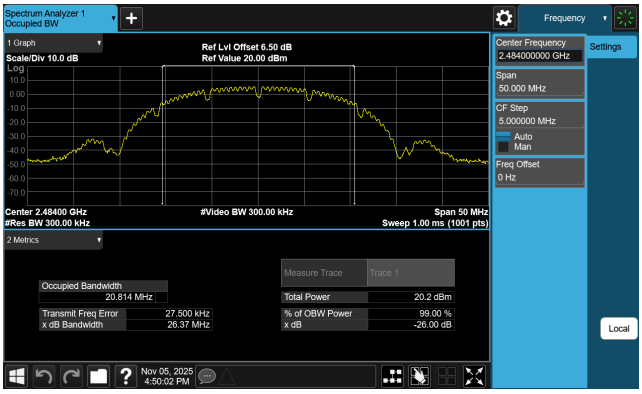
APPENDIX B - OCCUPIED BANDWIDTH AND SPREAD-SPECTRUM BANDWIDTH

Test Mode:	TX Mode_IEEE 802.11b

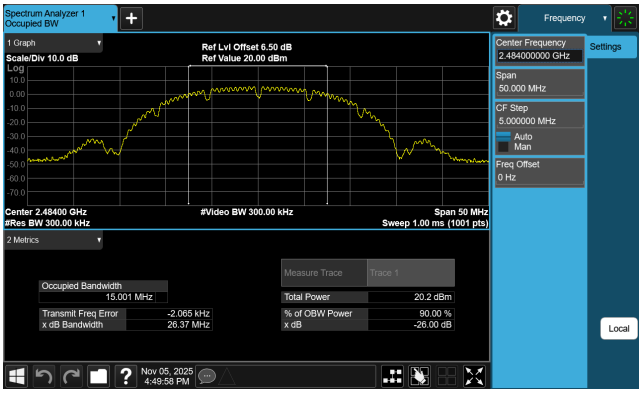
Test Voltage	Normal Voltage	Remarks
Test Frequency (MHz)	2484	Mid of test frequency range
Occupied Bandwidth (MHz)	20.81	Limit ≤ 26 MHz
Spreading Bandwidth (MHz)	15.00	Limit ≥ 500 kHz (FHSS, DSSS)
Spreading Factor	10.91	Spreading Factor Limit ≥ 10 (DSSS)

Note: *1. Spreading Factor = Spreading Bandwidth / TR*
(TR = 1.375 for 802.11b/CH14)

99% OBW



90% OBW

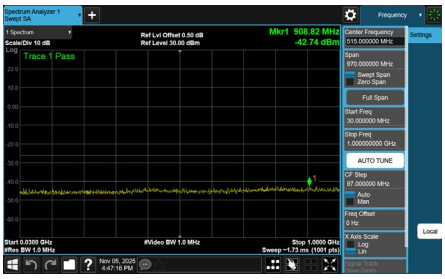


APPENDIX C - UNWANTED EMISSION INTENSITY

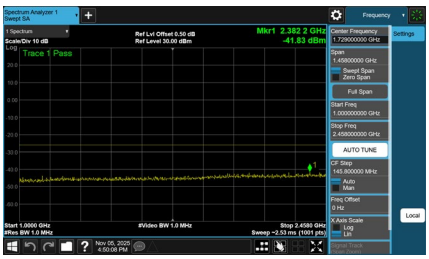
Test Mode:	TX Mode_IEEE 802.11b

Test Voltage			Normal Voltage	Remarks
Test Frequency		MHz	2484	Mid of test frequency range
Unwanted Emission Intensity (Power emission within 1MHz bandwidth)	※ 1	MHz	908.82	Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)
		μW/MHz	0.0532	
	※ 2	MHz	2382.20	Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)
		μW/MHz	0.0656	
	※ 3	MHz	2470.39	Limit ≤ 25 μW/MHz (-16 dBm/MHz)
		μW/MHz	0.2661	
	※ 4	MHz	2499.24	Limit ≤ 25 μW/MHz (-16 dBm/MHz)
		μW/MHz	0.1774	
	※ 5	MHz	7015.49	Limit ≤ 2.5 μW/MHz (-26 dBm/MHz)
		μW/MHz	0.0367	

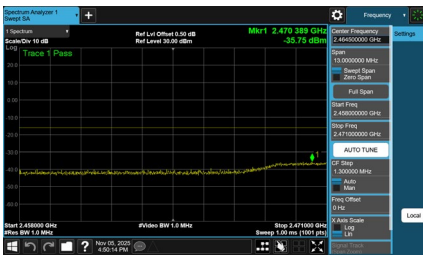
※1: 30MHz≤f≤1000MHz



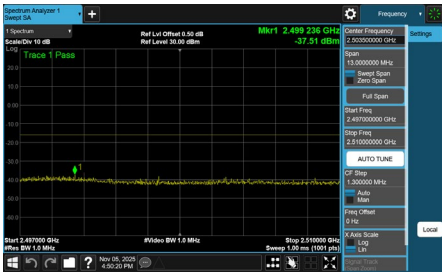
※2: 1000MHz≤f<2458MHz



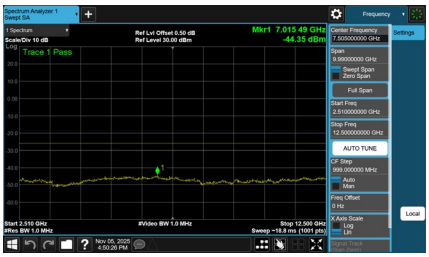
※3: 2458MHz≤f<2471MHz



※4: 2497MHz<f≤2510MHz



※5: 2510MHz<f



APPENDIX D - ANTENNA POWER TOLERANCE

Test Mode:	TX Mode_IEEE 802.11b

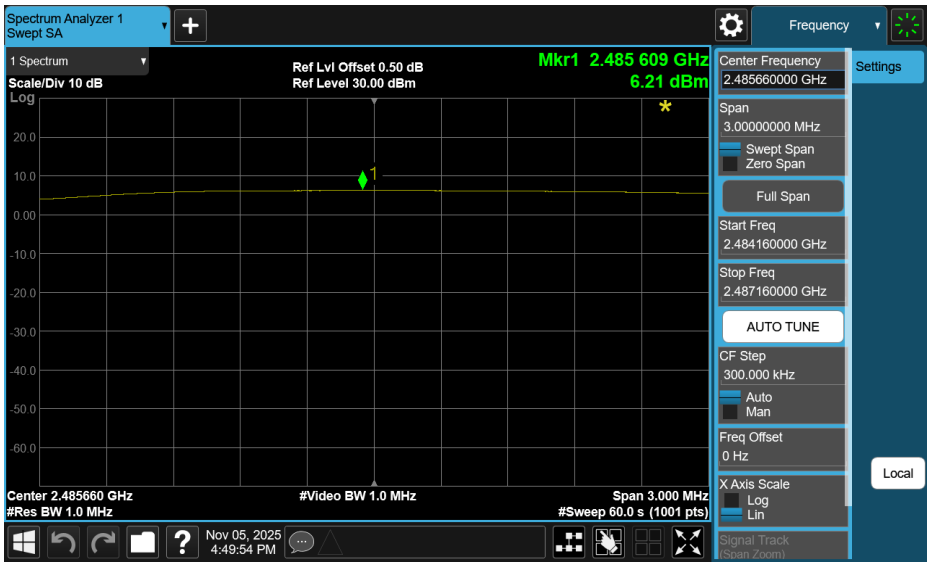
Normal Voltage

Test Frequency	Conducted RF output power density		Rated RF output power density	Conducted RF output power density Limit	Antenna Power Tolerance in Limit	
(MHz)	(dBm)	(mW)	(mW)	(mW)	(+20%, -80%)	
2484	6.21	4.1783	4.18	10	-0.04	%

Test Frequency	EIRP	ERP	Limit
(MHz)	(dBm)	(dBm)	(dBm)
2484	7.30	5.15	12.14

Note:
1. Antenna power tolerance = (conducted antenna power - rated antenna power)/rated antenna power * 100%
2. Antenna Power value = SA measurement value (Include correction factor and cable loss)
   Correction factor = 10 log (X)
   X = the total number of antennas

Normal Voltage

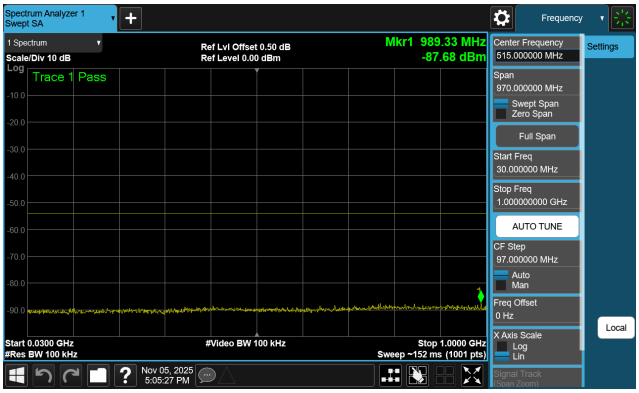


APPENDIX E - LIMITATION OF COLLATERAL EMISSION OF RECEIVER

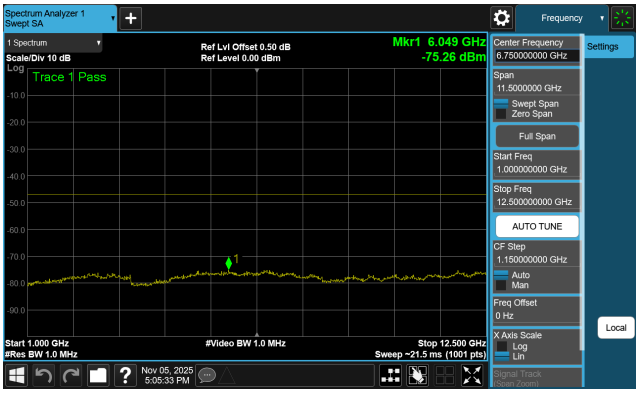
Test Mode:	RX Mode_IEEE 802.11b

Test Voltage			Normal Voltage	Remarks
Test Frequency		MHz	2484	Mid of test frequency range
Limitation of Collateral Emission of Receiver	※6	MHz	989.33	Limit ≤ 4 nW (-54 dBm)
		nW	0.0017	
	※7	MHz	6049.00	Limit ≤ 20 nW (-47 dBm)
		nW	0.0298	

※6: f<1GHz



※7: 1GHz≤f



End of Test Report