Prüfbericht - Produkte
Test Report - Products

TÜVRheinland®

Prüfbericht-Nr.: *Test report no.:*	**CN26HO6O 002**	**Auftrags-Nr.:** *Order no.:*	27240778	Seite 1 von 25 *Page 1 of 25*
Kunden-Referenz-Nr.: *Client reference no.:*	N/A	**Auftragsdatum:** *Order date:*	2026-06-16	
Auftraggeber: *Client:*	YuShu Technology Co., Ltd. 306 Room, Building 1, 88 Dongliu Rd, XiXing Street, Binjiang District, Hangzhou, ZheJiang, China			
Prüfgegenstand: *Test item:*	H2 Humanoid Robot			
Bezeichnung / Typ-Nr.: *Identification / Type no.:*	H2, H2 EDU, H2 PLUS			
Auftrags-Inhalt: *Order content:*	Test Report			
Prüfgrundlage: *Test specification:*	Article 2 Section 1 Item 19			
Wareneingangsdatum: *Date of sample receipt:*	2026-06-02			
Prüfmuster-Nr.: *Test sample no:*	A004293048-001~006			
Prüfzeitraum: *Testing period:*	2026-07-10 - 2026-07-20			
Ort der Prüfung: *Place of testing:*	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüflaboratorium: *Testing laboratory:*	TÜV Rheinland (Shenzhen) Co., Ltd.			
Prüfergebnis*: *Test result*:*	Pass			

geprüft von: tested by:	x Bell Hu	**genehmigt von:** *authorized by:*	x Jonathan Li
Datum: *Date:* 2026-07-29	Signed by: Bell Hu	**Ausstellungsdatum:** *Issue date:* 2026-07-29	Signed by: Jonathan Li
Stellung / Position:	Sachverständige(r)/Expert	**Stellung** / Position:	Sachverständige(r)/Expert

Sonstiges / *Other:* This report is for Bluetooth LE, 2.4GHz Wi-Fi and 2.4GHz SRD.

Zustand des Prüfgegenstandes bei Anlieferung: *Condition of the test item at delivery:* Prüfmuster vollständig und unbeschädigt *Test item complete and undamaged*

* Legende:	P(ass) = entspricht o.g. Prüfgrundlage(n)	F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	N/A = nicht anwendbar	N/T = nicht getestet
** Legend:*	*P(ass) = passed a.m. test specification(s)*	*F(ail) = failed a.m. test specification(s)*	*N/A = not applicable*	*N/T = not tested*

Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens.
This test report only relates to the above mentioned test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.

Anmerkungen
Remarks

1	Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben. Detaillierte Informationen bezüglich Prüfkonditionen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden. *The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system.* *Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.*
2	Wie vertraglich vereinbart, wurde dieses Dokument nur digital unterzeichnet. Der TÜV Rheinland hat nicht überprüft, welche rechtlichen oder sonstigen diesbezüglichen Anforderungen für dieses Dokument gelten. Diese Überprüfung liegt in der Verantwortung des Benutzers dieses Dokuments. Auf Verlangen des Kunden kann der TÜV Rheinland die Gültigkeit der digitalen Signatur durch ein gesondertes Dokument bestätigen. Diese Anfrage ist an unseren Vertrieb zu richten. Eine Umweltgebühr für einen solchen zusätzlichen Service wird erhoben. Informationen zur Verifizierung der Authentizität unserer Dokumente erhalten Sie auf folgender Webseite: go.tuv.com/digital-signature *As contractually agreed, this document has been signed digitally only. TUV Rheinland has not verified and unable to verify which legal or other pertaining requirements are applicable for this document. Such verification is within the responsibility of the user of this document. Upon request by its client, TUV Rheinland can confirm the validity of the digital signature by a separate document. Such request shall be addressed to our Sales department. An environmental fee for such additional service will be charged. For information on verifying the authenticity of our documents, please visit the following website: go.tuv.com/digital-signature*
3	Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben. Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt. *Test clauses with remark of * are subcontracted to qualified subcontractors and descripted under the respective test clause in the report.* *Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.*
4	Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnisen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2023, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezueglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019. *The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the “Zero Guard Band Rule” and “Simple Acceptance” in accordance with ILAC G8:2019 and IEC Guide 115:2023, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.*

複製禁止

Contents

1 GENERAL REMARKS 5
1.1 COMPLEMENTARY MATERIALS 5
2 TEST SITES 6
2.1 TEST FACILITIES 6
2.2 LIST OF TEST AND MEASUREMENT INSTRUMENTS 6
2.3 UNCERTAINTY OF MEASUREMENT 6
3 GENERAL PRODUCT INFORMATION 7
3.1 PRODUCT FUNCTION AND INTENDED USE 7
3.2 RATINGS AND SYSTEM DETAILS 7
3.3 THE APPLICABLE TEST METHODS 9
3.4 ANTENNA SPECIFICATIONS 10
3.4.1 Antenna Gain 10
3.4.2 Antenna Pattern 10
3.5 NOISE GENERATING AND NOISE SUPPRESSING PARTS 10
3.6 SUBMITTED DOCUMENTS 10
4 TEST SET-UP AND OPERATION MODES 11
4.1 PRINCIPLE OF CONFIGURATION SELECTION 11
4.2 TEST OPERATION AND TEST SOFTWARE 11
4.3 SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT 11
4.4 COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE 11
5 TEST RESULTS 12
5.1 FREQUENCY TOLERANCE MEASUREMENT 12
5.1.1 Limits of Frequency Tolerance Measurement 12
5.1.2 Test Setup 12
5.1.3 Condition of Measuring Instrument 12
5.1.4 Condition of Test Equipment 12
5.1.5 Measurement Procedure 12
5.1.6 Test Results 12
5.2 OCCUPIED BANDWIDTH MEASUREMENT (99% POWER BANDWIDTH) 13
5.2.1 Limits of Occupied Bandwidth Measurement 13
5.2.2 Test Setup 13
5.2.3 Measuring Instrument Conditions 13
5.2.4 Test Results 13
5.3 SPREADING BANDWIDTH MEASUREMENT (90% POWER BANDWIDTH) 14
5.3.1 Limits of Spreading Bandwidth and Spreading Factor 14
5.3.2 Test Setup 14
5.3.3 Measuring Instrument Conditions 14
5.3.4 Test Results 14
5.4 SPURIOUS EMISSIONS FOR TRANSMITTER MEASUREMENT 15
5.4.1 Limits of Spurious Emissions 15
5.4.2 Test Setup 15

5.4.3 Conditions of The Measuring Instrument. 15
5.4.4 Others 15
5.4.5 Conditions of the measuring instrument 16
5.4.6 Test Results 16

5.5 ANTENNA POWER MEASUREMENT 17
5.5.1 Limits of Antenna Power 17
5.5.2 Test Setup 17
5.5.3 Condition of Measuring Instrument 17
5.5.4 Condition of Test Equipment 18
5.5.5 Measurement Procedure 18
5.5.6 Test Results 19

5.6 SPURIOUS EMISSIONS FOR RECEIVER 20
5.6.1 Limits of Spurious Emissions for Receiver 20
5.6.2 Test Setup 20
5.6.3 Measurement Procedure 20
5.6.4 Test Results 20

5.7 INTERFERENCE PREVENTION FUNCTION 21
5.7.1 Limits of Interference Prevention Function 21
5.7.2 Test Setup 21
5.7.3 Condition of Measuring Instrument 21
5.7.4 Measurement procedure 21
5.7.5 How to describe test results 22
5.7.6 Test Results 22

5.8 CARRIER SENSING 23
5.8.1 Test Setup 23
5.8.2 Measurement procedure 23
5.8.3 Test Results 23

6 PHOTOGRAPHS OF THE TEST SET-UP 24

7 LIST OF TABLES 25

8 LIST OF PHOTOGRAPHS 25

複製禁止

1 General Remarks

1.1 Complementary Materials

All attachments are integral parts of this test report. This applies especially to the following appendix:

Appendix A: Test result of Bluetooth LE;

Appendix B: Test result of WI-FI 2.4GHz Band;

Appendix C: Test result of 2.4GHz SRD.

複製禁止

2 Test Sites

2.1 Test Facilities

TÜV Rheinland (Shenzhen) Co., Ltd.
2-3F, 101 & 102, No.2, Nuclear Power Industrial Park, Fuming Community, Fucheng Street, Longhua District, Shenzhen 518000, People's Republic of China

CNAS Registration No.: L3080

2.2 List of Test and Measurement Instruments

Table 1: List of Test and Measurement Equipment

Equipment	Manufacturer	Model	Serial No.	Cal. Date	Cal. until	Calibration Body	Calibration Method*
Signal Analyzer	R&S	FSV 40	101441	2025-09-23	2026-09-22	GRGTEST	c
Power Meter	R&S	NRP2	107105	2025-10-30	2026-10-29	GRGTEST	c
Power Sensor	R&S	NRP-Z81	105677	2025-09-23	2026-09-22	GRGTEST	c
DC Power Supply	KIKUSUI	PAN35-5A	YM002997	2026-02-02	2027-02-01	GRGTEST	c
Digital Multi Meter	FLUKE	F15B	44350844WS	2026-02-02	2027-02-01	GRGTEST	c

Calibration Method:
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)
* China Certification & Inspection (Group) Co., Ltd. (CCIC)

2.3 Uncertainty of Measurement

This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

Table 2: Measurement Uncertainty

Parameter	Uncertainty
Occupied Bandwidth	± 2.08 %
Spurious emissions	± 3.68 dB
Output power density	± 0.99 dB
Antenna Power	± 0.99 dB
Frequency Tolerance	0.104 ppm

複製禁止

3 General Product Information

3.1 Product Function and Intended Use

The product is an H2 Humanoid Robot which supports Bluetooth, 2.4GHz Wi-Fi, 5GHz Wi-Fi, 2.4GHz SRD and Sub-1GHz wireless technologies.
This report is for Bluetooth LE, 2.4GHz Wi-Fi and 2.4GHz SRD operation.

For details refer to the User Manual, Technical Description and Circuit Diagram.

3.2 Ratings and System Details

Table 3: Technical Specification of EUT

General Information of EUT	**Description**
Kind of Equipment:	H2 Humanoid Robot
Type Designation:	H2, H2 EDU, H2 PLUS * All models share identical RF circuits, mainboards and mechanical structures. The sole distinction is that the H2 and H2 EDU models feature an additional plastic outer casing on the face shell compared to the H2 PLUS. The H2 and H2 EDU share identical hardware, they carry separate model names solely due to differing sales channels and warranty durations. These variations exert no influence on RF characteristics, and testing was performed on the H2 EDU unit to cover all models.
Operating Voltage:	64.8Vdc Battery Powered
Operating Temperature Range:	0 °C ~ +40 °C
Hardware release No.:	RD57_MAIN_Board_V1.2
Software release No.:	RD57_MAIN_Board_V2.1
MIC ID:	201-260520
Technical Specification of Bluetooth Low Energy	
Characteristic	**Description**
Frequency Range:	2402 MHz to 2480 MHz
Type of Modulation:	GFSK
Channel Number:	40 channels
Data Rate:	1Mbps, 2Mbps
Channel Separation:	2 MHz
Antenna Type:	Integral Antenna
Antenna Gain:	2.1 dBi (Provided by the Client)
rated RF output power:	Please refer to Note 1
Conducted RF output power:	Please refer to Note 1
EIRP output power:	Please refer to Note 1
Technical Specification of 2.4GHz Wi-Fi	

複製禁止

Characteristic	Description
Frequency Range:	2412 - 2472 MHz for 802.11b/g/n(HT20)/ax(HE20) 2422 - 2462 MHz for 802.11n(HT40)/ax(HE40)
Type of Modulation:	DSSS, OFDM, OFDMA
Data Rate:	1/2/5.5/11 Mbps for 802.11b 6/9/12/18/24/36/48/54 Mbps for 802.11g MCS0 ~ MCS7 for 802.11n MCS0 ~ MCS11 for 802.11ax (All data rates considered, only the Worst-cases reported)
Channel Number:	13 channels for 802.11b/g/n(HT20)/ax(HE20) 9 channels for 802.11n(HT40)/ax(HE40)
Channel Separation:	5 MHz
Antenna Type:	Integral Antenna
Antenna Number:	2Tx2Rx
Antenna Gain:	2.1 dBi for ANT1, 2.1 dBi for ANT2 (Provided by the Client)
rated RF output power:	Please refer to Note 1
Conducted RF output power:	Please refer to Note 1
EIRP output power:	Please refer to Note 1
Technical Specification of 2.4GHz SRD	
Characteristic	**Description**
Operating Frequency:	2401.6MHz to 2480MHz
Type of Modulation:	GFSK
Channel Separation:	0.8MHz
Antenna Type:	Integral Antenna
Channel Number:	99 channels
Antenna Gain:	2.1 dBi (Provided by the Client)
rated RF output power:	Please refer to Note 1
Conducted RF output power:	Please refer to Note 1
EIRP output power:	Please refer to Note 1

Note: The correctness of all data provided by customer in the test report is ensured and responsible of the customer. Any misjudgment of the test results caused by the use of incorrect data provided by customer shall be borne by the customer.

Note 1: The power table as below table:

Bluetooth LE			
Test mode	**Rated power density (mW)**	**Conducted power density (mW)**	**EIRP power density (mW)**
Bluetooth LE, 1Mbps	10	4.266	6.918
Bluetooth LE, 2Mbps	10	4.227	6.855
2.4GHz Wi-Fi			
Test mode	**Rated power density (mW/MHz)**	**Conducted power density (mW/MHz)**	**EIRP power density (mW/MHz)**
802.11 b	10	7.745	12.561
802.11 g	10	2.786	4.518
802.11 n(HT20)	10	3.222	5.225
802.11 n(HT40)	5	2.230	3.617
802.11 ax(HE20)	10	3.335	5.409
802.11 ax(HE40)	5	1.984	3.218

2.4GHz SRD			
Test mode	**Rated power density (mW)**	**Conducted power density (mW)**	**EIRP power density (mW)**
2.4GHz SRD	10	9.506	15.417

Table 4: RF Channel and Frequency

Technologies	Test Channels (MHz)
Bluetooth LE	L/M/H: 2402, 2440, 2480

Technologies	Bandwidth	Test Channels (MHz)
2.4GHz Wi-Fi	20MHz	L/M/H: 2412, 2442, 2472
	40MHz	L/M/H: 2422, 2442, 2462

Technologies	Test Channels (MHz)
2.4GHz SRD	L/M/H: 2401.6, 2440, 2480

3.3 The applicable test methods

MIC Notification No. 88 of 2004, Annex 43

複製禁止

3.4 Antenna Specifications

3.4.1 Antenna Gain

Ant. Type	Connector Type	Highest Peak Gain (dBi) 2.4GHz ~ 2.5GHz
Integral Antenna	N/A	2.1 dBi

3.4.2 Antenna Pattern

Please refer to the attached file (Antenna report).

3.5 Noise Generating and Noise Suppressing Parts

For details refer to the Circuit Diagram.

3.6 Submitted Documents

- Application Form
- Operation Description
- User Manual
- Rating Label

複製禁止

4 Test Set-up and Operation Modes

4.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible radiation level. The test modes were adapted accordingly in reference to the instructions for use.

Radio Spectrum: The equipment under test (EUT) was configured at its highest power output in order to measure its highest possible radiation and conducted level. The test modes were adapted accordingly in reference to the instructions for use.

4.2 Test Operation and Test Software

Test operation refers to test setup in chapter 5 and chapter 6.

According to clause 3.1, all tests were performed on model *H2 EDU* in this report.

The RF circuits are located inside of the EUT. The RF circuit was covered by metal shielding case, also it won't be easy to be opened. Frequency Band, channels and modulation parameters are fixed inside the module. They cannot be edited or modified by end-user.

Table 5: Test Conditions

Test conditions	Unit
Voltage $_{normal}$	3.33V dc
Voltage $_{max}$	3.33V dc
Voltage $_{min}$	3.33V dc
Temperature	24.8 deg.C
Humidity	55 %

Note: 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 test, EUT only operated in normal voltage to test all regulations.

4.3 Special Accessories and Auxiliary Equipment

Table 6: List of Accessories and Auxiliary Equipment

Description	Manufacturer	Model	S/N
Laptop	Lenovo	T480	PF-16A6N8

4.4 Countermeasures to Achieve EMC Compliance

The test sample which has been tested contained the noise suppression parts as described in the Technical Construction File (TCF).

No additional measures were employed to achieve compliance.

複製禁止

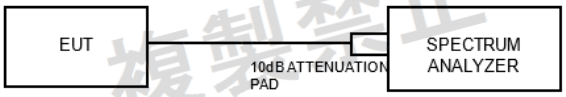
5 Test Results

5.1 Frequency Tolerance Measurement

5.1.1 Limits of Frequency Tolerance Measurement

Tolerance of frequency shall be +/- 50ppm

5.1.2 Test Setup



5.1.3 Condition of Measuring Instrument

(1) As a frequency meter, use a frequency counter or spectrum analyzer (with a synthesizer type local oscillator).
(2) The measurement accuracy of the frequency meter shall be 1/10 or less of the allowable value specified in the Equipment Regulations.
(3) When measuring burst waves, set the gate open time to the time that allows the entire burst section to be measured.

5.1.4 Condition of Test Equipment

(1) Set the test frequency and transmit.
(2) Stop modulation and continuously transmit non-modulated waves. However, if modulation is stopped and continuous transmission of unmodulated waves cannot be performed, continuous burst transmission of unmodulated waves or a modulation state that produces a characteristic frequency spectrum whose frequency can be measured by a spectrum analyzer is used.

5.1.5 Measurement Procedure

(1) In the case of unmodulated waves (continuous or continuous burst), measure directly with a frequency meter.
(2) In the case of burst waves, measure for the time period when sufficient accuracy is obtained, calculate the average value, and use it as the measured value.
(3) If the test mode produces a characteristic frequency spectrum, measure the frequency of that spectrum with a spectrum analyzer.

5.1.6 Test Results

Result **PASS**

For the measurement records, refer to the appendix A, B, C.

5.2 Occupied Bandwidth Measurement (99% Power Bandwidth)

5.2.1 Limits of Occupied Bandwidth Measurement

Item	Limit	Remark
Occupied bandwidth	shall be 83.5MHz or less	FHSS
Occupied bandwidth	<26MHz	For 20M
Occupied bandwidth	<40MHz	For 40M

5.2.2 Test Setup

5.2.3 Measuring Instrument Conditions

Set the spectrum analyzer as follows.
Center frequency: Test frequency
Sweep frequency width From about 2 times to about 3.5 times the allowable value specified in the equipment regulations
Resolution bandwidth: 3% or less of the allowable value specified in the equipment regulations
Video bandwidth: Same as resolution bandwidth
Input level : The level at which the carrier wave level can be measured without being affected by the noise level of the spectrum analyzer.
Sweep time: Minimum time for guaranteed measurement accuracy
(In the case of burst waves, when more than 1 burst per sample)

Sweep mode: Continuous sweep
Detection mode: Positive peak (Note)
Display mode: Max hold (Note)

Note: For OFDM and other than burst waves, the following shall apply.
Average processing times 10 times or more
Detection mode sample

5.2.4 Test Results

Result **PASS**

For the measurement records, refer to the appendix A, B, C.

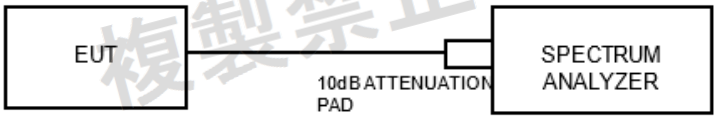
複製禁止

5.3 Spreading Bandwidth Measurement (90% Power Bandwidth)

5.3.1 Limits of Spreading Bandwidth and Spreading Factor

Item	Limit	Remark
Spreading Bandwidth	≧500kHz	(For DSSS, FHSS)
Spreading Factor	≧5	Operating frequency 2400 to 2483.5MHz
	≧10	Operating frequency 2471 to 2497MHz

5.3.2 Test Setup



5.3.3 Measuring Instrument Conditions

Set the spectrum analyzer as follows.
Center frequency: Test frequency
Sweep frequency width From about 2 times to about 3.5 times the allowable value specified in the equipment regulations
Resolution bandwidth: 3% or less of the allowable value specified in the equipment regulations
Video bandwidth: Same as resolution bandwidth
Input level: The level at which the carrier wave level can be measured without being affected by the noise level of the spectrum analyzer.
Sweep time: Minimum time for guaranteed measurement accuracy
(In the case of burst waves, when more than 1 burst per sample)

Sweep mode: Continuous sweep
Detection mode: Positive peak (Note)
Display mode: Max hold (Note)

Note: For OFDM and other than burst waves, the following shall apply.
Average processing times 10 times or more
Detection mode sample

5.3.4 Test Results

Result **PASS**

For the measurement records, refer to the appendix A, B, C.

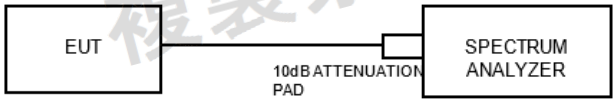
複製禁止

5.4 Spurious Emissions for Transmitter Measurement

5.4.1 Limits of Spurious Emissions

Frequencies (MHz)	Limit
Operating frequency 2400 to 2483.5MHz	
30.0MHz to 2387MHz	≦ 2.5uW/MHz
2387.0MHz to 2400.0MHz	≦ 25uW/MHz
2483.5MHz to 2496.5MHz	≦ 25uW/MHz
2496.5MHz to 12500.0MHz	≦ 2.5uW/MHz

5.4.2 Test Setup



5.4.3 Conditions of The Measuring Instrument.

(1) The spectrum analyzer when searching for **unwanted emissions** is set as follows.

Sweep frequency width: 30MHz to 26GHz (Note)
Resolution bandwidth: 1MHz
Video bandwidth: Same as resolution bandwidth
Y-axis scale: 10dB/Div
Input level: Maximum dynamic range value
Sweep time: The minimum time for which measurement accuracy is guaranteed (in the case of burst waves, it can be longer than the time obtained by "(sweep frequency width (MHz)/resolution Bandwidth (MHz)) × burst period (s)" .) It can be longer than the time required
Number of data points: 400 or more data points
Sweep mode: Single sweep
Detection mode: positive peak

(2) Set the spectrum analyzer as follows when measuring unwanted emission amplitude.

Center frequency: Unwanted emission frequency (searched frequency)
Sweep frequency width: 0Hz
Resolution bandwidth: 1MHz
Video bandwidth: Same as resolution bandwidth
Y-axis scale: 10dB/Div
Input level Maximum dynamic range value
Sweep time; The minimum time for which the measurement accuracy is guaranteed (in the case of burst waves, the duration of one burst or more)
Number of data points: 400 or more data points
Sweep mode: Single sweep
Detection mode: sample

5.4.4 Others

(1) In 2(2), the detection mode of the spectrum analyzer at the time of amplitude measurement can use RMS (referred to as the true value of power) instead of sampling.
(2) In (1), if the burst time rate (Note) of unwanted emission is obtained for each unwanted emission frequency, the sweep frequency width can be set to about 10 MHz in (2).

Note: Burst time rate = time during which radio waves are emitted/burst period

5.4.5 Conditions of the measuring instrument

(1) Use a carrier suppression filter as necessary.

(2) The settings of the spectrum analyzer when searching for spurious are as follows.
Sweep frequency width: Search for spurious from the lowest possible frequency to three times or more of the carrier frequency.
Resolution bandwidth:100 kHz below 1 GHz, 1 MHz above 1 GHz
Video bandwidth: Same as resolution bandwidth
Y-axis scale: 10dB/Div
Input level: Maximum dynamic range value
Sweep time: Minimum time for guaranteed measurement accuracy
Number of data points: 400 or more data points
Sweep mode: Single sweep
Detection mode: positive peak

(3) Set the spectrum analyzer for spurious measurement as follows.
Center frequency: Searched spurious frequency
Sweep frequency: 0Hz
Resolution bandwidth:10 kHz below 30 MHz, 100 kHz between 30 MHz and 1 GHz, 1 MHz above 1 GHz
Video bandwidth: Same as resolution bandwidth
Y-axis scale: 10dB/Div
Input level: Set the amplitude of the carrier wave near the maximum in the linear region of the mixer.
Sweep time: Minimum time for guaranteed measurement accuracy
Number of data points: 400 or more data points
Sweep mode: Single sweep
Detection mode: sample

Spurious Emission
(1) Set the spectrum analyzer as follows when searching.
Sweep frequency width: 30MHz to 5 times the carrier frequency
Resolution bandwidth: 100 kHz for frequencies below 1 GHz, 1 MHz for frequencies above 1 GHz
Video bandwidth: Same as resolution bandwidth
Sweep time: Minimum time for guaranteed measurement accuracy
Sweep mode: Single sweep
Detection mode : positive peak
(2) Set the spectrum analyzer for secondary emission measurement as follows.
Center frequency: Secondary emission frequency
Sweep frequency width: 0Hz
Resolution bandwidth: 100 kHz for frequencies below 1 GHz, 1 MHz for frequencies above 1 GHz
Video bandwidth: Same as resolution bandwidth
Sweep time: Minimum time for guaranteed measurement accuracy
Sweep mode: Single sweep
Detection mode: sample

5.4.6 Test Results

Result **PASS**

For the measurement records, refer to the appendix A, B, C.

複製禁止

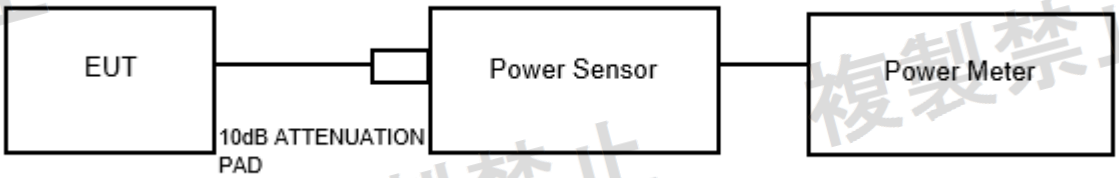
5.5 Antenna Power Measurement

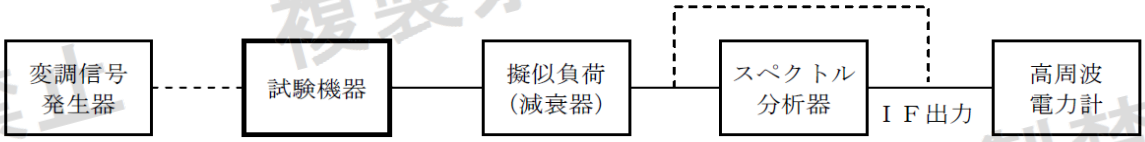
5.5.1 Limits of Antenna Power

Modulation system	Frequency band used	Antenna power (max.)	EIRP (max)	
			Omni-directional case	Directional case
FHSS	2,400 – 2,4835 MHz	3mW/MHz	--	--
DS.OFDM (Narrow-Band)	2,400 – 2,4835 MHz	10mW/MHz	12.14 dBm/MHz (16.367 mW/MHz)	22.14 dBm/MHz (163.682 mW/MHz)
OFDM (Wide-Band)	2,400 – 2,4835 MHz	5mW/MHz	9.13dBm/MHz (8.185mW/MHz)	19.13dBm/MHz (81.846mW/MHz)
DTS	2,400 – 2,4835 MHz	10mW	12.14 dBm (16.367 mW)	22.14 dBm (163.682 mW)

Tolerance of antenna power shall be +20% (upper value).
According article 49.20 f(2)The angular width of the principal radiation in the horizontal and vertical planes of the transmitting antenna shall not exceed the value obtained by the following expression. 360/A degree
A represents the value determined by dividing an equivalent isotropically radiated power by the value obtained by applying an antenna power with the mean power of 10 mW to the transmitting antenna with its absolute gain being 2.14 dB, and shall be 1 when it is lower than 1.

5.5.2 Test Setup





Note: A high-frequency power meter is directly connected to the output of a dummy load (attenuator) when measuring the total power of a system other than the orthogonal frequency division multiplexing system or the spread spectrum system using direct spreading.

5.5.3 Condition of Measuring Instrument

(1) 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. However, when the spread bandwidth is 1 MHz or less, correction shall be performed only when "spread bandwidth (MHz)/equivalent noise bandwidth (MHz)" exceeds 1.
(2) The attenuation of the dummy load (attenuator) shall be the value that gives the optimum operating input level to the spectrum analyzer.
(3) Set the spectrum analyzer as follows when searching for the frequency that gives the maximum antenna power.

Center frequency:	Test frequency
Sweep frequency width:	About twice the occupied frequency bandwidth
Resolution bandwidth:	1MHz
Video bandwidth:	About three times the resolution bandwidth
Sweep time:	Minimum time for guaranteed measurement accuracy

(In the case of burst waves, the time at which one or more bursts are included per sample)

Trigger condition:	Free run
Sweep mode:	Continuous sweep
Detection mode:	positive peak
Display mode:	Max hold

(4) Set the spectrum analyzer as follows when measuring the antenna power.

Center frequency The frequency that gives the maximum power (searched frequency)

Sweep frequency width:	0Hz
Resolution bandwidth:	1MHz
Video bandwidth :	Same as resolution bandwidth
Sweep mode:	Continuous sweep

5.5.4 Condition of Test Equipment

(1) Set to the test frequency and enter the continuous transmission state or continuous burst transmission state.
(2) If a spread code is used, set it to the test spread code and modulate it with the standard coded test signal.
(3) If the orthogonal frequency division multiplexing system is used, it shall be in a burst transmission state and in a modulation state in which the proportion of time in which the number of subcarriers is the smallest is maximized. At this time, it is performed within a range that can occur continuously in the actual operation. However, when the modulation cannot be set, it can be performed in continuous burst transmission state or continuous transmission state.

5.5.5 Measurement Procedure

(1) Those using frequency hopping method (including DSSS or composite method with OFDM)

a. Confirming in the submitted document that the frequency hopping intervals in the frequency distribution of frequency hopping are equal intervals of 1 MHz or less, and that the probability of occurrence at each hopping frequency is uniform, and that the probability of occurrence at each hopping frequency is uniform. If it is, it is implemented by the following method.

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

(b) Divide the total power by the spreading bandwidth to calculate the average power per 1 MHz.

(c) Antenna power shall be as follows.

A Value of (b) for continuous wave

B For burst wave Average power in burst is calculated from the value of (b) and the transmission time rate.

b. If the frequency distribution of frequency hopping or the probability of occurrence at each hopping frequency is not uniform, set the spectrum analyzer as in 2(3) to search for the frequency that gives the maximum antenna power, and then perform spectrum analysis. Set the device as in 2(4), and measure the antenna power at the frequency that gives the maximum power.

(2) In the case of those using OFDM or DSSS

a. Set the spectrum analyzer as in 2(3).

b. After repeating the sweep until no change is observed in the display, measure the frequency at which the power per 1 MHz gives the maximum value.

c. Set the spectrum analyzer as in 2(4).

d. Connect the high frequency power meter to the IF output terminal of the spectrum analyzer.

e. Antenna power shall be as follows.

(a) For continuous wave: The value corrected by 2(1) from the indication of the high-frequency power meter

(b) Burst wave: Calculated average power in a burst from values corrected in the same way as for continuous waves and the transmission time rate

f. In the case of using the orthogonal frequency division multiplexing system, when there are multiple subcarrier modulation systems, measure the antenna power at each time and take the largest value as the measured value.

(3) In the case of items using other methods

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

(b) Antenna power shall be as follows.

a. Value of a for continuous wave

b. Burst wave The average power in the burst is calculated from the value of (a) and the transmission time rate.

5.5.6 Test Results

Result **PASS**

For the measurement records, refer to the appendix A, B, C.

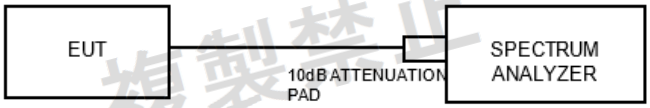
複製禁止

5.6 Spurious Emissions for Receiver

5.6.1 Limits of Spurious Emissions for Receiver

Frequencies (MHz)	Limit
Below 1GHz	≦4nW (-54dBm)
Above 1GHz	≦20nW (-47dBm)

5.6.2 Test Setup



5.6.3 Measurement Procedure

(1) Set the spectrum analyzer as follows when searching.
Sweep frequency width: 30MHz to 5 times the carrier frequency
Resolution bandwidth: 100 kHz for frequencies below 1 GHz, 1 MHz for frequencies above 1 GHz
Video bandwidth: Same as resolution bandwidth
Sweep time: Minimum time for guaranteed measurement accuracy
Sweep mode: Single sweep
Detection mode: positive peak
(2) Set the spectrum analyzer for secondary emission measurement as follows.
Center frequency: Secondary emission frequency
Sweep frequency width: 0Hz
Resolution bandwidth: 100 kHz for frequencies below 1 GHz, 1 MHz for frequencies above 1 GHz
Video bandwidth: Same as resolution bandwidth
Sweep time: Minimum time for guaranteed measurement accuracy
Sweep mode: Single sweep
Detection mode: sample

5.6.4 Test Results

Result **PASS**

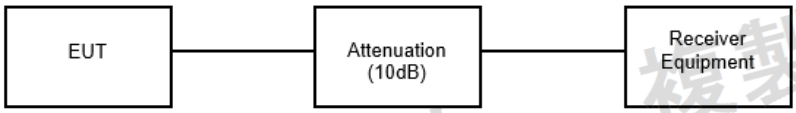
For the measurement records, refer to the appendix A, B, C.

5.7 Interference Prevention Function

5.7.1 Limits of Interference Prevention Function

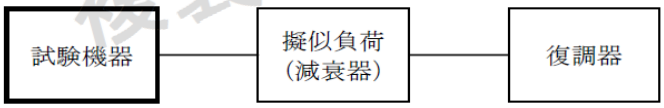
N/A

5.7.2 Test Setup

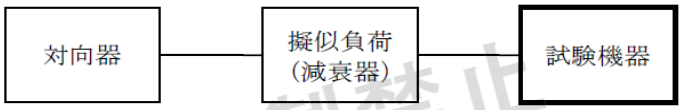


Measurement system diagram

(1) When sending an identification code



(2) When receiving an identification code



5.7.3 Condition of Measuring Instrument

(1) The demodulator shall be able to demodulate the transmission signal sent by EUT and display the content of the identification code.
(2) The counterpart device shall be capable of transmitting the same identification code as the transmission signal transmitted by EUT.
(3) Condition of test equipment
Normal use condition.

5.7.4 Measurement procedure

(1) When EUT has a function to automatically transmit an identification code
 a) Transmit the identification code specified in the Equipment Regulations from the test equipment.
 b) Check the identification code sent by the demodulator.
(2) When the test equipment has a function to automatically receive the identification code
 a) Transmit the identification code specified in the Equipment Regulations from the counterpart device.
 b) Confirm that communication is performed with the EUT using the dedicated jig.
 c) Transmit a code different from the identification code specified in the Equipment Regulations from the counterpart device.
 d) Confirm that EUT stops transmission or displays that the identification code is different.

5.7.5 How to describe test results

(1) When EUT has a function to automatically transmit an identification code
If the code stipulated in the equipment rule and the demodulated code are the same, it is described as "passed", and if they are different, it is described as "failed".

(2) When the test equipment has a function to automatically receive the identification code
If the received code is the code stipulated in the equipment regulations, normal reception is performed, and if the code is different from the code stipulated in the equipment regulations, a message indicating that the code is different is displayed. “No” shall be entered in other case.

5.7.6 Test Results

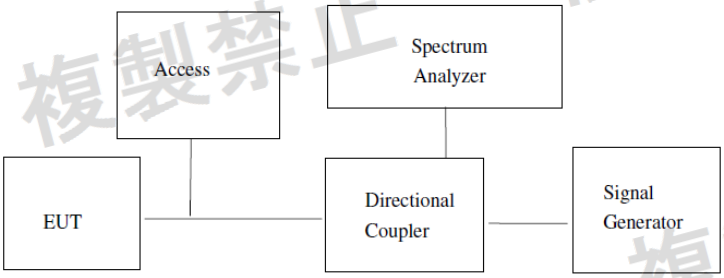
Result **PASS**

For the measurement records, refer to the appendix A, B, C.

複製禁止

5.8 Carrier Sensing

5.8.1 Test Setup



5.8.2 Measurement procedure

(a) Link EUT and Access Point to Directional Coupler input port.
(b) Link Signal Generator and Spectrum Analyzer to test port and output port in the Directional Coupler separately.
(c) A positive Peak Detector function in Spectrum Analyzer must be used.
(d) Set the Span to Zero.
Press the Signal Generator on and it will output the Carrier Signal. When the Link breaks off, wait a minute and press the Signal Generator off. After a while, reset the Link and done the test.

Signal Generator Power Level (dBm)= 22.79 + G – 20log (F)
G: Antenna Gain
F: operation frequency

5.8.3 Test Results

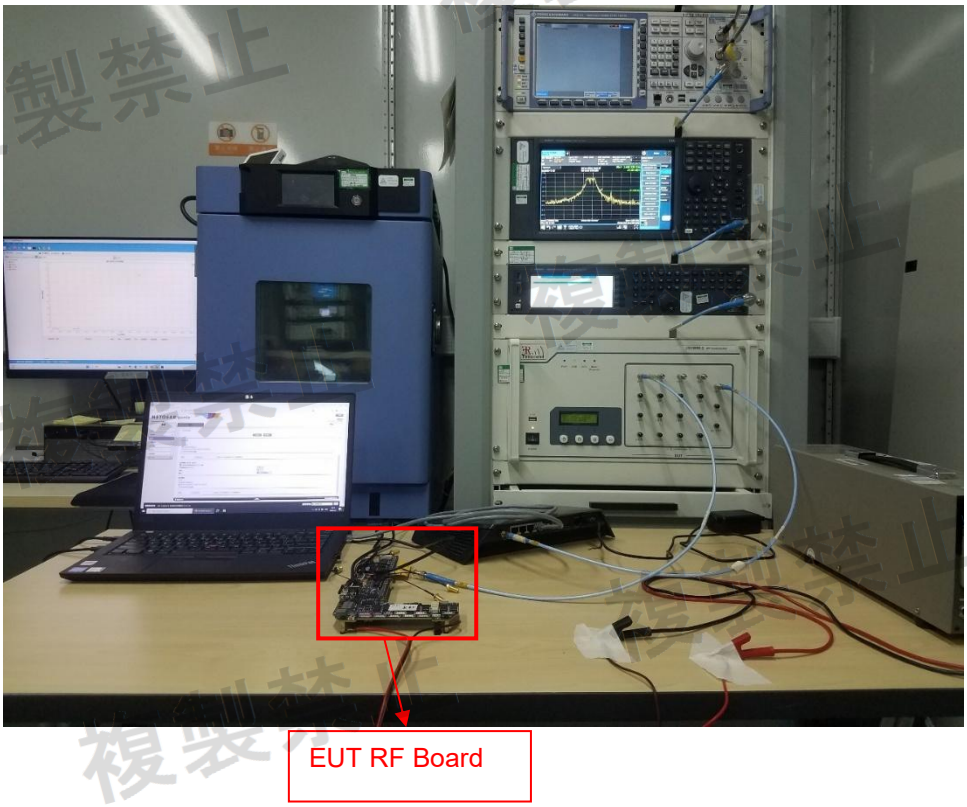
Result **PASS**

For the measurement records, refer to the appendix B.

複製禁止

6 Photographs of the Test Set-Up

Photograph 1: Set-up for Radio Spectrum Testing



複製禁止

7 List of Tables

Table 1: List of Test and Measurement Equipment 6
Table 2: Measurement Uncertainty 6
Table 3: Technical Specification of EUT 7
Table 4: RF Channel and Frequency 9
Table 5: Test Conditions 11
Table 6: List of Accessories and Auxiliary Equipment 11

8 List of Photographs

Photograph 1: Set-up for Radio Spectrum Testing 24

複製禁止