
Japan Radio Test Report

REPORT NO : ETS-2024110126-1

PRODUCT DESIGNATION : Game Controller

BRAND NAME : N/A

MODEL NO. : AB01, AB02, AB03, AB04, AB05, AB06, AB07, AB08,
AB09, AB10, Simhon 01, MC600, AoBing Max

APPLICANT : Shenzhen Jiaying Huanqiu Technology Co., Ltd.

DATE OF ISSUE : Jan. 8, 2025

STANDARD(S) : Article 2 Paragraph 1 Item 19 of the Certification,
Article 49.20 of Ordinance Regulating Radio Equipment
MIC Notice No.88 Appendix No.43

REPORT VERSION : V1.0

Shen Zhen Electronic Testing Services Co.,Ltd

REPORT REVISE RECORD

Report Version	Revise Time	Issued Date	Valid Version	Notes
V1.0	/	Dec. 26, 2024	Valid	Initial release

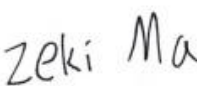
TABLE OF CONTENTS

1. VERIFICATION OF CONFORMITY	4
2. GENERAL INFORMATION	5
2.1. PRODUCT DESCRIPTION	5
2.2. CHANNEL LIST	6
2.3. DESCRIPTION OF TEST MODES	7
2.4. TEST ITEMS AND THE RESULTS	8
2.5. ENVIRONMENTAL CONDITIONS	8
2.6. MEASUREMENT UNCERTAINTY	8
3. TEST FACILITY	10
4. TEST EQUIPMENTS LIST	10
5. TEST RESULTS	11
5.1. FREQUENCY ERROR MEASUREMENT	11
5.2. OCCUPIED BANDWIDTH AND SPREAD-SPECTRUM BANDWIDTH MEASUREMENT	12
5.3. UNWANTED EMISSION INTENSITY MEASUREMENT	13
5.4. ANTENNA POWER ERROR MEASUREMENT	15
5.5. LIMITATION OF COLLATERAL EMISSION OF RECEIVER MEASUREMENT	17
5.6. TRANSMISSION ANTENNA GAIN (EIRP ANTENNA POWER) MEASUREMENT	19
5.8. RADIO INTERFERENCE PREVENTION CAPABILITY MEASUREMENT	23
5.9. HOPPING FREQUENCY DWELL TIME MEASUREMENT	25
5.10. CONSTRUCTION PROTECTION CONFIRMATION METHOD	27
APPENDIX A: PHOTOGRAPHS OF TEST SETUP	28
APPENDIX B: PHOTOGRAPHS OF EUT	28

1. VERIFICATION OF CONFORMITY

Applicant	Shenzhen Jiaying Huanqiu Technology Co., Ltd.
Address	Room 501~503, 519~520, Block B, Jinchi Business Building, Xin'an Street, Bao'an District, Shenzhen, Guangdong Province, China
Manufacturer	Shenzhen Jiaying Huanqiu Technology Co., Ltd.
Address	Room 501~503, 519~520, Block B, Jinchi Business Building, Xin'an Street, Bao'an District, Shenzhen, Guangdong Province, China
Factory	Shenzhen Jiaying Huanqiu Technology Co., Ltd.
Address	Room 501~503, 519~520, Block B, Jinchi Business Building, Xin'an Street, Bao'an District, Shenzhen, Guangdong Province, China
Product Designation	Game Controller
Brand Name	N/A
Model Name	AB01
Series Model	AB02, AB03, AB04, AB05, AB06, AB07, AB08, AB09, AB10, Simhon 01, MC600, AoBing Max
Declaration of Difference	N/A
Date of receipt of test item	Dec. 13, 2024
Date of Test	Dec. 13, 2024 – Jan. 8, 2025
Deviation	None
Condition of Test Sample	Normal

Note: The test results of this report relate only to the tested sample identified in this report.

Prepared By 

Zeki Ma
(Project Engineer) Jan. 8, 2025

Reviewed By 

Alan Duan
(Reviewer) Jan. 8, 2025

Approved By 

Jelly Tian
(Authorized Officer) Jan. 8, 2025

2. GENERAL INFORMATION

2.1. PRODUCT DESCRIPTION

The following data is based on the information by the applicant.

Operating Frequency	2.402 GHz to 2.480GHz
Bluetooth Version	V4.2
Modulation	GFSK, π /4-DQPSK, 8DPSK
Hardware Version	AOBING_MAX_right_v03
Software Version	V1.8
Antenna Type	Plannar Inverted F Antenna on board
Number of channels	79 Channels
Antenna Gain	-2.79dBi
Conducted Power Density	0.427mW/MHz
Rated RF Output Power Density	0.02mW/MHz
Test Power	HV: (5.5V) High Voltage LV: (4.5V) Low Voltage NV: (5V) Normal Voltage

Note:

1. The EUT provides Bluetooth wireless interface operating at 2.4G ISM band (2402MHz-2480MHz). The EUT use Frequency Hopping Spread Spectrum (FHSS) modulation.
2. Only the Bluetooth was tested according to the standard requirement.
3. Please refer to Appendix B for the photographs of the EUT. For more details, please refer to the User's manual of the EUT.
4. Test mode was Low/Middle/High channel for 1, 2, 3Mbps. and only worst mode data recorded in the test report if no any others.

2.2. CHANNEL LIST

Channel	Frequency (GHz)	Channel	Frequency (GHz)
00	2.402	41	2.443
01	2.403	42	2.444
02	2.404	43	2.445
03	2.405	44	2.446
04	2.406	45	2.447
05	2.407	46	2.448
06	2.408	47	2.449
07	2.409	48	2.450
08	2.410	49	2.451
09	2.411	50	2.452
10	2.412	51	2.453
11	2.413	52	2.454
12	2.414	53	2.455
13	2.415	54	2.456
14	2.416	55	2.457
15	2.417	56	2.458
16	2.418	57	2.459
17	2.419	58	2.460
18	2.420	59	2.461
19	2.421	60	2.462
20	2.422	61	2.463
21	2.423	62	2.464
22	2.424	63	2.465
23	2.425	64	2.466
24	2.426	65	2.467
25	2.427	66	2.468
26	2.428	67	2.469
27	2.429	68	2.470
28	2.430	69	2.471

29	2.431	70	2.472
30	2.432	71	2.473
31	2.433	72	2.474
32	2.434	73	2.475
33	2.435	74	2.476
34	2.436	75	2.477
35	2.437	76	2.478
36	2.438	77	2.479
37	2.439	78	2.480
38	2.440		
39	2.441		
40	2.442		

2.3. DESCRIPTION OF TEST MODES

The EUT was tested while in a continuous transmitter/receiver mode.

The EUT was tuned to a low, middle, and high channel for all tests. For all test case pre/scans were completed in all modes to determine worst case levels.

Power Supply Voltage Fluctuation Test

Voltage Fluctuation Test	Normal Voltage	High Voltage +10% of Normal Voltage	Low Voltage -10% of Normal Voltage
Input To EUT	DC 5V	DC 5.5V	DC 4.5V
Output To RF Module	DC 3.3V	DC 3.3V	DC 3.3V
Voltage Variation (%)	--	0.00%	0.00%

Note:

Voltage Variation (%)

= (Output high 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 test, EUT only operated in normal voltage to test all regulations.

2.4. TEST ITEMS AND THE RESULTS

Ordinance Regulating Radio Equipment	Description of Test	Result
Article 5	Frequency Error	Complies
Article 6	Occupied Bandwidth (99%) and Spread-spectrum Bandwidth (90%)	Complies
Article 7	Unwanted Emission Intensity	Complies
Article 49.20 & Article 14	Antenna Power Error	Complies
Article 24	Limitation of Collateral Emission of Receiver	Complies
Article 49.20	Transmission Antenna Gain (EIRP Antenna Power)	Complies
Article 49.20	Transmission Radiation Angle Width (3dB Bandwidth)	Not applicable
Article 9.4	Radio Interference Prevention Capability	Complies
Article 49.20	Hopping Frequency Dwell Time	Complies
Article 49.20	Construction Protection Confirmation	Complies
Article 49.20	Carrier Sense Function (1)	Not applicable (See Note 2)
Article 49.20	Carrier Sense Function (2)	Not applicable (See Note 3)

Note 1: The tests were performed according to the method of measurements prescribed in MIC Notice No.88 Appendix No.43.

Note 2: Not apply to this device, since EIRP does not require compensation through Antenna Power.

Note 3: Application to transmitting devices with OFDM modulation and the occupied bandwidth greater than 26MHz

2.5. ENVIRONMENTAL CONDITIONS

During the measurement the environmental conditions were within the listed ranges:

- Temperature: 19.5°C
- Relative Humidity: 72.1 %
- Atmospheric pressure: 102kPa

2.6. MEASUREMENT UNCERTAINTY

The reported uncertainty of measurement $y \pm U$, where expended uncertainty U is based on a standard uncertainty multiplied by a coverage factor of $k=2$, providing a level of confidence of approximately 95%.

Item	Measurement Uncertainty
Uncertainty of Radio Frequency	$U_c = \pm 1 \times 10^{-7}$
Uncertainty of total RF power, conducted	$U_c = \pm 0.8 \text{ dB}$
Uncertainty of RF power density, conducted	$U_c = \pm 2.6 \text{ dB}$
Uncertainty of spurious emissions, conducted	$U_c = \pm 2.7 \text{ dB}$
Uncertainty of Occupied Channel Bandwidth	$U_c = \pm 2 \%$

Uncertainty of Dwell time	$U_c = \pm 0.9 \%$
---------------------------	--------------------

3. TEST FACILITY

Site	ShenZhen ElectronicTesting Services Co.,Ltd
Location	Room 413-415,Building B, Jinchi Business, Zone 49.Xin 'an Street,Bao'an District,Shenzhen

4. TEST EQUIPMENTS LIST

Equipment	Manufacturer	Model	S/N	Cal. Date	Cal. Due
MXG X-Series Vector Signal Generator	Agilent	N5182A	MY50144241	Dec. 18, 2024	Dec. 17, 2025
EXA Signal Analyzer	Agilent	N9020A	MY51261063	Dec. 18, 2024	Dec. 17, 2025
DC Power Supply	AGILENT	GPP-2323	GET921593	Dec. 18, 2024	Dec. 17, 2025
Power Sensor	Aglient	U2021XA	MY54110009	Dec. 18, 2024	Dec. 17, 2025
Power Meter	R&S	NRVD	8323781027	Dec. 18, 2024	Dec. 17, 2025

Note: The equipment was calibrated by Guangzhou LISai METROLOGY & TEST Calibration and Testing co., ltd.

5. TEST RESULTS

5.1. FREQUENCY ERROR MEASUREMENT

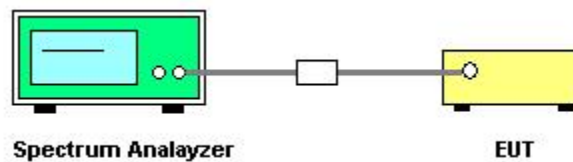
5.1.1. LIMIT

Item	Limits
Frequency Tolerance	$-50\text{ppm} \leq \text{Frequency Error} \leq 50\text{ppm}$

5.1.2. TEST PROCEDURES

1. Frequency accuracy of SA shall be less than 10% of limits tolerance (5ppm)
2. Setting of SA is following as: RB: 10KHz / VB: 10kHz / SPAN: 2MHz
3. Center Frequency: The center frequency of testing for EUT
4. Sweep time: Auto
5. Sweep mode: Continuous sweep
6. Detect mode: Positive peak
7. EUT have transmitted absence of modulation signal and fixed channelize. f is using the mark cursor to mark the peak frequency value, f_c 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 $\pm 50\text{ppm}$

5.1.3. TEST SETUP LAYOUT



5.1.4. TEST DEVIATION

There is no deviation with the original standard.

5.1.5. EUT OPERATION DURING TEST

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

5.1.6. RESULTS OF FREQUENCY ERROR

The detailed test data see Appendix for BDR+EDR

5.2. OCCUPIED BANDWIDTH AND SPREAD-SPECTRUM BANDWIDTH MEASUREMENT

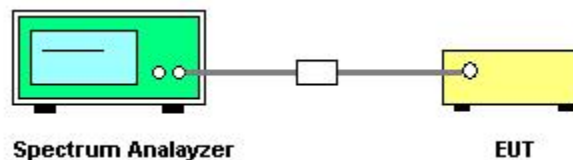
5.2.1. LIMIT

Item	Limits
Occupied Band Width	FH<83.5MHz; 26MHz $\leq$ OFDM 40M system $\leq$ 40MHz; OFDM 20M system, DS, Others $\leq$ 26MHz
Spreading Bandwidth	$\geq$ 500 kHz (FH, DS)

5.2.2. TEST PROCEDURES

- Setting of SA is following as: RB: 1MHz / VB: 1MHz /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.
- SA set to 90% of occupied bandwidth to measure Spread Spectrum Bandwidth and must greater than 500kHz.
- Spread Spectrum Factor = Spread Spectrum Bandwidth / modulation rate of EUT.

5.2.3. TEST SETUP LAYOUT



5.2.4. TEST DEVIATION

There is no deviation with the original standard.

5.2.5. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

5.2.6. RESULTS OF OCCUPIED BANDWIDTH AND SPREAD-SPECTRUM BANDWIDTH

The detailed test data see Appendix for BDR+EDR

5.3. UNWANTED EMISSION INTENSITY MEASUREMENT

5.3.1 LIMIT

Item	Limits
TX Spurious Emission(2400~2483.5MHz)	$\leq 2.5\mu\text{W/MHz}$ ($30\text{MHz} \leq f \leq 1000\text{MHz}$)
	$\leq 2.5\mu\text{W/MHz}$ ($1000\text{MHz} < f \leq 2387\text{MHz}$)
	$\leq 25\mu\text{W/MHz}$ ($2387\text{MHz} < f \leq 2400\text{MHz}$)
	$\leq 25\mu\text{W/MHz}$ ($2483.5\text{MHz} \leq f < 2496.5\text{MHz}$)

5.3.2. MEASURING INSTRUMENTS AND SETTING

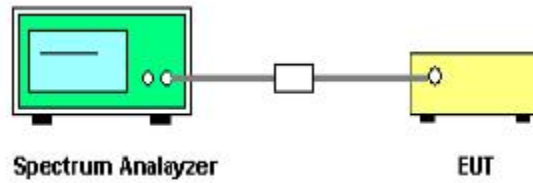
Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
RB / VB	Below 1GHz RB:100KHz / VB:100KHz Above 1GHz RB:1MHz / VB:1MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.3.3. TEST PROCEDURES

- EUT have transmitted the maximum modulation signal and fixed channelize.
- Setting of SA is following as: Below 1GHz RB:100KHz / VB:100KHz
Above 1GHz RB:1MHz / VB:1MHz / AT: 20dB Ref: 10dBm / Sweep time: Auto
Sweep Mode: Continuous sweep / Detect mode: Positive peak
Trace mode: Max hold
- Setting of SA is following as 30MHz and stop frequency 1000MHz Then to mark peak reading value + cable loss shall be less than 0.25μW.
- Setting of SA is following as 1000MHz and stop frequency 2387MHz Then to mark peak reading value + cable loss shall be less than 2.5μW.
- SA adjusted to start frequency 2387MHz and stop frequency 2400MHz. Then to mark peak reading value + cable loss shall be less than 25μW.
- SA adjusted to start frequency 2483.5MHz and stop frequency 2496.5MHz Then to mark peak reading value + cable loss shall be less than 25μW
- SA adjusted to start frequency 2496.5MHz and stop frequency 12500MHz Then to mark peak reading value + cable loss shall be less than 2.5μW
- Measure side band spurious as follows: For 2.4GHz band: 2374MHz~2400MHz and 2483.5MHz~2509.5MHz RBW = VBW = 30kHz, Result Value = Measured Value + 15.2 [dBm]
- If the Result Value is over the requirement, take total sum of 1MHz band centered at the spur frequency like ACLP measurement as Result Value.

5.3.4. TEST SETUP LAYOUT



5.3.5. TEST DEVIATION

There is no deviation with the original standard.

5.3.6. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

5.3.7. TEST RESULT OF UNWANTED EMISSION INTENSITY

The detailed test data see Appendix for BDR+EDR

5.4. ANTENNA POWER ERROR MEASUREMENT

5.4.1. LIMIT

Item	Limits
Antenna Power Density	$\leq 3\text{mW/MHz}$ (FH) $\leq 10\text{mW/MHz}$ (FH system from 2400 to 2427MHz and from 2470.75 to 2483.5MHz, OFDM, DS 20MHz system) $\leq 10\text{mW}$ (Others) $\leq 5\text{mW}$ for OFDM (40 MHz system)
Antenna Power Error	+20%, (Base on manufacturer declare antenna power density)

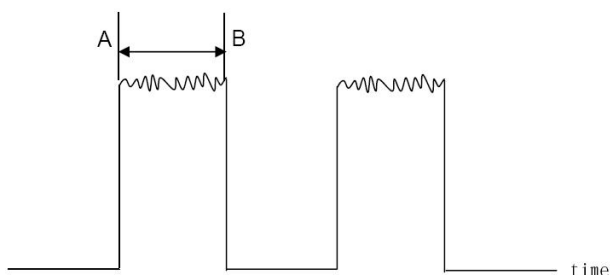
5.4.2. MEASURING INSTRUMENTS AND SETTING

Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

Spectrum Parameter	Setting
RB / VB	1 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.4.3. TEST PROCEDURES

1. A power meter is connected on the IF output port of the spectrum analyzer.
2. Adjust the spectrum analyzer to have the center frequency the same with the test frequency. RBW=VBW=1MHz, detector mode is positive peak. Span=120MHz.
3. Connect the equipment to be measured. Using the above settings of the spectrum analyzer in combination with "max hold" function, find the frequency of highest power output in the power envelope. The frequency found shall be recorded.
4. Set the center frequency of the spectrum analyzer to the found frequency and switch to zero span. Use the Burst Power function of the spectrum analyzer to measured the Average burst power.



Measures the Average Burst power (A to B)

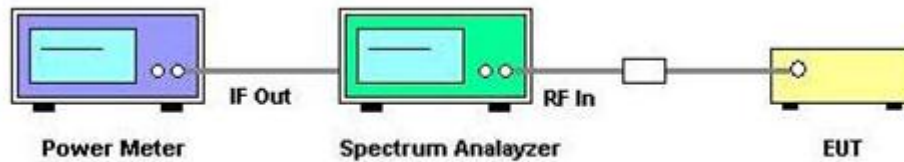
5. Antenna Power (mW/MHz) = Average Burst Power / Spread Band width (Step is 1MHz or less).

Antenna Power (mW/MHz) = Average Burst Power / Number of hopping (Step is more than 1MHz)

6. Antenna Power Error is definition that actual measure antenna power tolerance

between + 20% power range that base on manufacturer declare the conducted power density.

5.4.4. TEST SETUP LAYOUT



5.4.5. EST DEVIATION

There is no deviation with the original standard.

5.4.6. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

5.4.7. TEST RESULT OF ANTENNA POWER ERROR

The detailed test data see Appendix for BDR+EDR

5.5. LIMITATION OF COLLATERAL EMISSION OF RECEIVER MEASUREMENT

5.5.1. LIMIT

Item	Limits
RX Spurious Emission:	$\leq 4\text{nW}$ ($f < 1\text{GHz}$)
	$\leq 20\text{nW}$ ($1\text{GHz} \leq f$)

5.5.2. MEASURING INSTRUMENTS AND SETTING

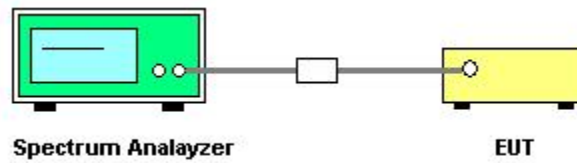
Please refer to section 5 in this report. The following table is the setting of Spectrum Analyzer.

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

5.5.3. TEST PROCEDURES

- EUT have the continuous reception mode and fixed only one channelize.
- Setting of SA is following as RB / VB: 100 kHz (below 1GHz emissions) / 1 MHz (above 1GHz emissions) / Sweep time: Auto / Sweep Mode: Continuous sweep / Detect mode: Positive peak / Trace mode: Max hold
- SA set RB: 100kHz and VB: 100kHz. Then adjust to start frequency 30MHz and stop frequency 1000MHz. Search to mark peak reading value + cable loss shall be less than 4nW
- SA set RB: 1MHz and VB: 1MHz. Then adjust to start frequency 1000MHz and stop frequency 12500MHz. Search to mark peak reading value + cable loss shall be less than 20nW
- If power level of lower emissions are more than 1/10 of limit (.0.4nW for $f < 1\text{GHz}$, 2nW 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.

5.5.4. TEST SETUP LAYOUT



5.5.6. TEST DEVIATION

There is no deviation with the original standard.

5.5.7. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously reception mode.

5.5.8. TEST RESULT OF LIMITATION OF COLLATERAL EMISSION OF RECEIVER

The detailed test data see Appendix for BDR+EDR

5.6. TRANSMISSION ANTENNA GAIN (EIRP ANTENNA POWER) MEASUREMENT

5.6.1. LIMIT

Item	Limits
EIRP Power Density	$\leq 6.91\text{dBm/MHz}$ (FH) $\leq 12.14\text{dBm/MHz}$ (FH system from 2400 to 2427MHz and from 2470.75 to 2483.5MHz, OFDM, DS 20MHz system) $\leq 12.14\text{dBm}$ (Others) $\leq 9.13\text{dBm/MHz}$ (OFDM 40MHz system)
Note: This test item is not applied for radio equipment with equivalent isotropic radiation power lower than 6.91dBm/MHz, but Antenna Power(Conducted) limit is 3 mW/MHz (4.77 dBm/MHz), So the test item will not be applied to the transmission antenna which has a gain of 2.14dBi or less	

5.6.2. MEASURING INSTRUMENTS AND SETTING

The following table is the setting of spectrum analyzer.

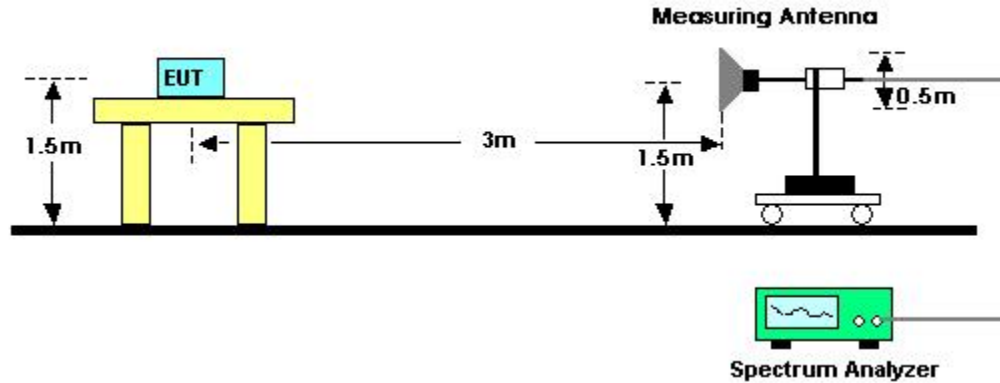
Spectrum Parameter	Setting
Attenuation	Auto
RB/VB	1 MHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.6.3. TEST PROCEDURES

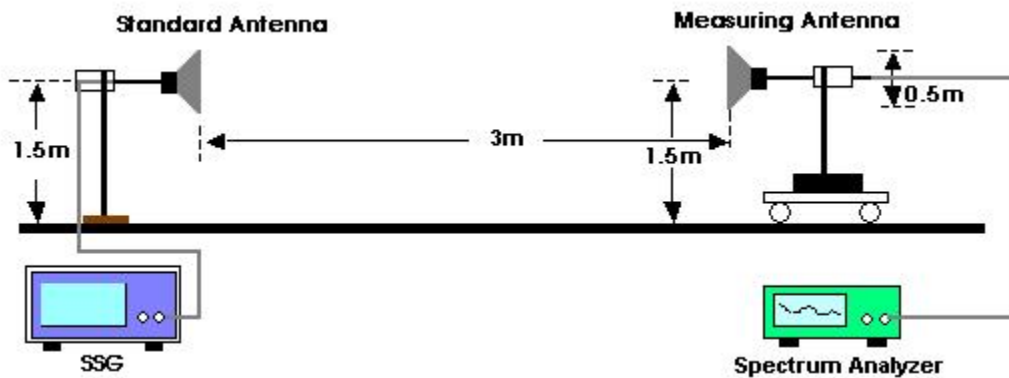
1. Set EUT ad measuring antenna at the same height and roughly facing each other.
2. Move the measuring antenna height up and down within $\pm 50\text{cm}$ of EUT height and swing it to find the maximum output of the measuring antenna. The output level at the spectrum analyzer is read sa "E".
3. Remove the EUT from the turn table and put the replacing antenna facing to measuring antenna at same height. Set the standard signal generator (SSG) at same frequency and transmit on then receive the signal
4. Swing the replacing antenna give a maximum receiving level.
5. Move the measuring antenna height up and down within $\pm 50\text{cm}$ of replacing antenna height and swing it to find the maximum receiving level.
6. Set SSG output power at Pt to give the equivalent output level of "E" or calculate Pt with SSG output which gives the nearest of "E" and difference ($\pm 1\text{dB}$). Record the Pt.
7. Calculate EIRP by the formula below $\text{EIRP} = \text{Gt} - \text{L} + \text{Pt}$.
Gt: gain of replacing antenna (dBi)
L: feeder loss between SSG and replacing antenna
Pt: Output power of the SSG
8. If the antenna for the EUT has circular polarization, sum of V-field and H-field will be result if measuring antenna is linear polarization.

5.6.4. TEST SETUP LAYOUT

For EUT radiation measurement



For standard antenna measurement



5.6.5. TEST DEVIATION

There is no deviation with the original standard.

5.6.6. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

5.6.7. RESULTS OF TRANSMISSION ANTENNA GAIN

Note: This test item is not used for an antenna gain less than 2.14dbi

5.7. TRANSMISSION RADIATION ANGLE WIDTH (3DB BEAMWIDTH) MEASUREMENT

5.7.1. LIMIT

Item	Limits
3dB antenna beam width	$360/A$ (If $A < 1$; then $A = 1$) $A = \{\text{EIRP Power [mW]} / 16.36 \text{ for DS, OFDM}\}$ or $A = \{\text{EIRP Power [mW]} / 4.9 \text{ for FH}\}$
Note: This test item is not applied for radio equipment with equivalent isotropic radiation power lower than 6.91dBm/MHz, but Antenna Power(Conducted) limit is 3mW/MHz (4.77dBm/MHz), So the test item will not be applied to the transmission antenna which has a gain of 2.14dBi or less	

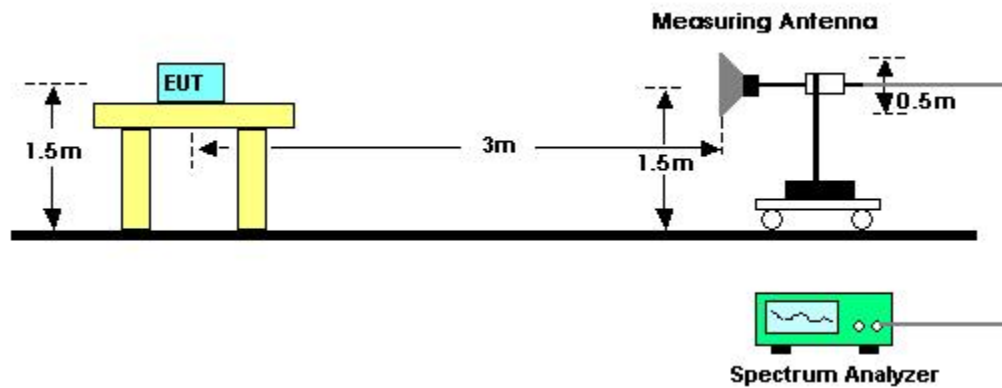
5.7.2. MEASURING INSTRUMENTS AND SETTING

Spectrum Parameter	Setting
Attenuation	Auto
Span Frequency	0 MHz
RB	1 MHz
VB	1 kHz
Detector	Peak
Trace	Max Hold
Sweep Time	Auto

5.7.3. TEST PROCEDURES

1. Set EUT and measuring antenna at the same height and roughly facing each other.
2. Set spectrum analyzer with condition in section 4.7.2 and tune reference level to observe receiving signal position.
3. Rotate directions of the EUT horizontally and vertically to find the maximum receiving power.
4. Move the measuring antenna height up and down within $\pm 50\text{cm}$ 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"
5. Calculate permitted radiation angle in horizontal and vertical using EIRP measured in another test method.
6. Calculate 3dB antenna beam width by the formula below $360/A$ (If $A < 1$; then $A = 1$).
 $A = \{\text{EIRP Power [mW]} / 16.36 \text{ for DS, OFDM}\}$ or
 $A = \{\text{EIRP Power [mW]} / 4.9 \text{ for FH}\}$

5.7.4. TEST SETUP LAYOUT



5.7.5. TEST DEVIATION

There is no deviation with the original standard.

5.7.6. EUT OPERATION DURING TEST

The EUT was programmed to be in continuously transmitting mode.

5.7.7. TEST RESULT OF TRANSMISSION RADIATION ANGLE WIDTH (3DB BEAMWIDTH)

Note: This test item is not applied for radio equipment with equivalent isotropic radiation power lower than 6.91dBm/MHz.

5.8. RADIO INTERFERENCE PREVENTION CAPABILITY MEASUREMENT

5.8.1. LIMIT

Item	Limits
Identification code	≥ 48 bits

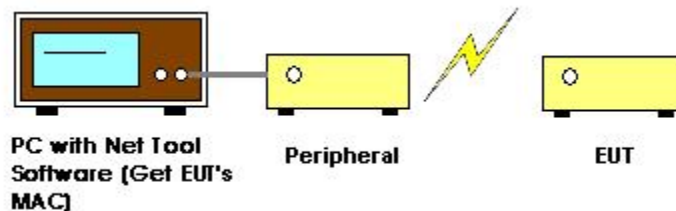
5.8.2. MEASURING ID CODE SOFTWARE

Item	Limits
MAC IP List	MAC Scan

5.8.3. TEST PROCEDURES

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

5.8.4. TEST SETUP LAYOUT



5.8.5. TEST DEVIATION

There is no deviation with the original standard.

5.8.6. EUT OPERATION DURING TEST

The EUT was programmed to be in normal transmitting mode.

5.8.7. TEST RESULT OF RADIO INTERFERENCE PREVENTION CAPABILIT

Test result of radio interference prevention capability		
Item	MAC address	Test result
Identification code	8B:8D:F5:9C:B5:59	Good

5.9. HOPPING FREQUENCY DWELL TIME MEASUREMENT

5.9.1. LIMIT

Item	Limits
Hopping Freq. Dwell Time	$\leq 0.4 \text{ sec (In } 0.4 \text{ sec} \times \text{ spreading rate)}$

5.9.2. MEASURING INSTRUMENTS AND SETTING

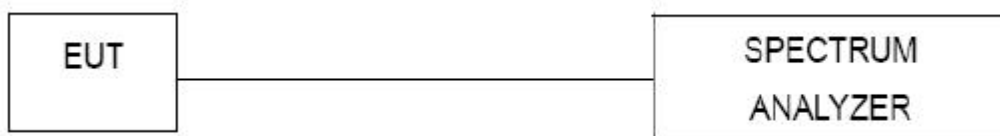
Please refer to section 5 in this report. The following table is the setting of the spectrum analyzer.

Spectrum Parameter	Setting
RB	1 MHz for Spread BW 1 MHz for duty cycle
VB	1 MHz for Spread BW 1 MHz for duty cycle
Detector	Peak
Trace	Max Hold
Sweep	Continuous

5.9.3. TEST PROCEDURES

- The transmitter output (antenna port) was connected to the spectrum analyzer
- Set RBW of spectrum analyzer according above list.
- Sweep Time is more than once pulse time.
- Set the center frequency on any frequency would be measure and set the frequency span to zero span.
- Measure the maximum time duration of one single pulse.
- Set the EUT for DH5, DH3 and DH1 packet transmitting.
- Measure the maximum time duration of one single pulse.
- Dwell time =bursts count in Period Time * 1 burst time
Period Time =0.4*spreading rate
(to be determined for each mode, DH1, DH3, DH5)

5.9.4. TEST SETUP LAYOUT



5.9.5. EUT OPERATION DURING TEST

The EUT was programmed to be in DH5 transmitting mode.

5.9.6. TEST RESULT OF HOPPING FREQUENCY DWELL TIME

The detailed test data see Appendix for BDR+EDR

Note: Duty-cycle = [on time/total time] x 100%

Period Time = 0.4 * spreading rate

5.10. CONSTRUCTION PROTECTION CONFIRMATION METHOD

5.10.1. LIMIT

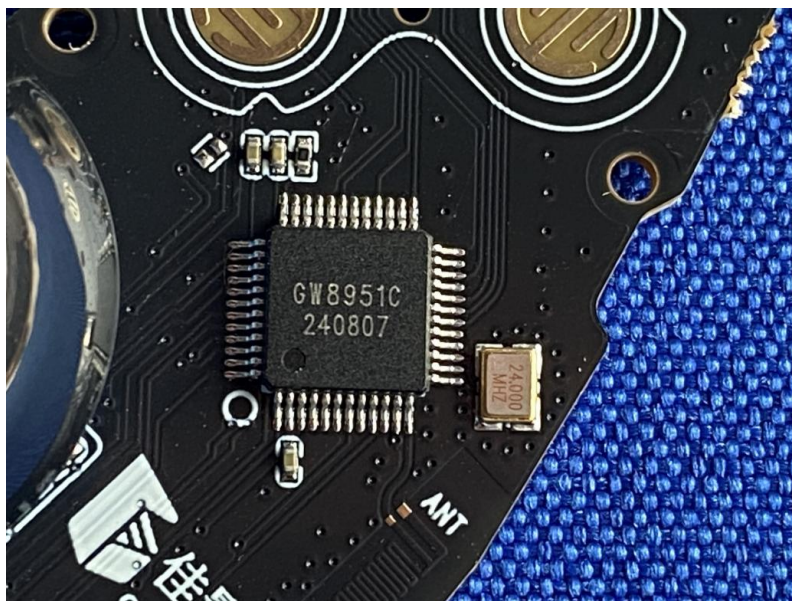
The high-frequency section and modulation section of the radio equipment except for the antenna system shall not be capable of being opened easily.

5.10.2. CONFIRMATION METHOD

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

Protected Method	Description
BT Module Package	BT Module Package of RF (GW8951C) and Modulation (TX: 24MHz) portions is QFN type.
Enclosure	The terminal number is 48, terminal pitch is 1mm. it can't be easily opened and modified.
User Manual	we will add some warning statements on the user manual to against illegal modification

Special screw



APPENDIX A: PHOTOGRAPHS OF TEST SETUP

Refer to the Report No.:ETS-2024110126-3

APPENDIX B: PHOTOGRAPHS OF EUT

Refer to the Report No.:ETS-2024110126-4/5

----END OF REPORT----