

**Qingdao Richmat Intelligence Technology Inc**

# RF TEST REPORT

**Report Type:**

FCC Part 15.249 & ISED RSS-210 RF report

**Model:**

HJCO

**REPORT NUMBER:**

210100808SHA-001

**ISSUE DATE:**

March 04, 2021

**DOCUMENT CONTROL NUMBER:**

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**Applicant:** Qingdao Richmat Intelligence Technology Inc  
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**Manufacturer:** Qingdao Richmat Intelligence Technology Inc  
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Qingdao, Shandong Province, China.

**FCC ID:** 2AJJGHJC0

**SUMMARY:**

The equipment complies with the requirements according to the following standard(s) or Specification:

**47CFR Part 15 (2019):** Radio Frequency Devices (Subpart C)

**ANSI C63.10 (2013):** American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

**RSS-210 Issue 9 (August 2016):** Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

**RSS-Gen Issue 5 (March 2019) Amendment 1:** General Requirements for Compliance of Radio Apparatus

**PREPARED BY:** **REVIEWED BY:**



Project Engineer  
Wade Zhang



Reviewer  
Daniel Zhao

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**TEST REPORT**

## Content

<b>REVISION HISTORY</b> .....	<b>4</b>
<b>MEASUREMENT RESULT SUMMARY</b> .....	<b>5</b>
<b>1 GENERAL INFORMATION</b> .....	<b>6</b>
1.1 DESCRIPTION OF EQUIPMENT UNDER TEST (EUT) .....	6
1.2 TECHNICAL SPECIFICATION .....	6
1.3 DESCRIPTION OF TEST FACILITY .....	7
<b>2 TEST SPECIFICATIONS</b> .....	<b>8</b>
2.1 STANDARDS OR SPECIFICATION .....	8
2.2 MODE OF OPERATION DURING THE TEST .....	8
2.3 TEST SOFTWARE LIST .....	8
2.4 TEST PERIPHERALS LIST .....	8
2.5 TEST ENVIRONMENT CONDITION:.....	8
2.6 INSTRUMENT LIST .....	9
2.7 MEASUREMENT UNCERTAINTY .....	10
<b>3 RADIATED EMISSION</b> .....	<b>11</b>
3.1 LIMIT .....	11
3.2 MEASUREMENT PROCEDURE .....	11
3.3 TEST CONFIGURATION .....	13
3.4 TEST RESULTS OF RADIATED EMISSIONS .....	15

## Revision History

Report No.	Version	Description	Issued Date
210100808SHA-001	Rev. 01	Initial issue of report	March 04, 2021

## Measurement result summary

TEST ITEM	FCC REFERANCE	IC REFERANCE	RESULT
Radiated emission	15.249 & 15.209	RSS-210 Issue 9 Clause B.10	Pass

Notes: 1: N/A =Not Applicable

2: Determination of the test conclusion is based on IEC Guide 115 in consideration of measurement uncertainty.

3: Additions, Deviations and Exclusions from Standards: None.

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## 1 GENERAL INFORMATION

### 1.1 Description of Equipment Under Test (EUT)

Product name:	Remote control module
Type/Model:	HJC0
Description of EUT:	The report is C2PC report, the following host models were added and tested.
Host models:	HJH13D
Rating:	DC 3V
EUT type:	<input checked="" type="checkbox"/> Table top <input type="checkbox"/> Floor standing
Software Version:	/
Hardware Version:	/
Sample received date:	January 25, 2021
Date of test:	January 25, 2021 ~ February 1, 2021

### 1.2 Technical Specification

Frequency Range:	2405MHz ~ 2480MHz
Type of Modulation:	FSK
Channel Number:	151 channels
Channel Separation:	0.5 MHz
Antenna Information:	PCB antenna, 0dBi

### 1.3 Description of Test Facility

Name:	Intertek Testing Services Shanghai
Address:	Building 86, No. 1198 Qinzhou Road(North), Shanghai 200233, P.R. China
Telephone:	86 21 61278200
Telefax:	86 21 54262353

The test facility is recognized, certified, or accredited by these organizations:	CNAS Accreditation Lab Registration No. CNAS L0139
	FCC Accredited Lab Designation Number: CN1175
	IC Registration Lab CAB identifier.: CN0051
	VCCI Registration Lab Registration No.: R-14243, G-10845, C-14723, T-12252
	A2LA Accreditation Lab Certificate Number: 3309.02

## 2 TEST SPECIFICATIONS

### 2.1 Standards or specification

47CFR Part 15 (2018)  
 ANSI C63.10 (2013)  
 RSS-210 Issue 9 (August 2016)  
 RSS-Gen Issue 5 (March 2019) Amendment 1

### 2.2 Mode of operation during the test

The host devices are handheld devices, so three axes (X, Y, Z) were observed while the test receiver worked as “max hold” continuously and the highest reading among the whole test procedure was recorded.

The lowest, middle and highest channel were tested as representatives.

Mode	Lowest (MHz)	Middle (MHz)	Highest (MHz)
-	2405	2440	2480

### 2.3 Test software list

Test Items	Software	Manufacturer	Version
Conducted emission	ESxS-K1	R&S	V2.1.0
Radiated emission	ES-K1	R&S	V1.71

### 2.4 Test peripherals list

Item No.	Name	Band and Model	Description
-	-	-	-

### 2.5 Test environment condition:

Test items	Temperature	Humidity
Radiated emission	25.2°C	50% RH

## 2.6 Instrument list

Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	Test Receiver	R&S	ESIB 26	EC 3045	2021-09-16
<input checked="" type="checkbox"/>	Bilog Antenna	TESEQ	CBL 6112D	EC 4206	2021-09-25
<input checked="" type="checkbox"/>	Horn antenna	R&S	HF 906	EC 3049	2022-01-17
<input checked="" type="checkbox"/>	Horn antenna	ETS	3117	EC 4792-1	2021-03-15
<input checked="" type="checkbox"/>	Horn antenna	TOYO	HAP18-26W	EC 4792-3	2021-07-09
<input checked="" type="checkbox"/>	Pre-amplifier	R&S	Pre-amp 18	EC5262	2021-06-11
<input checked="" type="checkbox"/>	Semi-anechoic chamber	Albatross project	-	EC 3048	2021-07-14

## 2.7 Measurement uncertainty

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

Test item	Measurement uncertainty
Conducted emission 9KHz-150KHz	±3.2 dB
Conducted emission 150KHz-30MHz	±2.7 dB
Radiated emission 9KHz-30MHz	± 4.7 dB
Radiated emission 30MHz-1GHz	± 4.6 dB
Radiated emission 1GHz-18GHz	± 4.4 dB
Radiated emission 18GHz-26GHz	± 4.6 dB
Radiated emission 26GHz-40GHz	± 4.6 dB

### 3 Radiated emission

Test result: Pass

#### 3.1 Limit

Fundamental Frequency (MHz)	Fundamental limit (dB $\mu$ V/m)	Harmonic limit (dB $\mu$ V/m)
<input type="checkbox"/> 902 - 928	94	54
<input checked="" type="checkbox"/> 2400 - 2483.5	94	54
<input type="checkbox"/> 5725 - 5875	94	54
<input type="checkbox"/> 24000 - 24250	108	68

The radiated emissions which fall in the restricted bands, must also comply with the radiated emission limits:

Frequencies (MHz)	Field Strength (microvolts/meter)	Measurement Distance (meters)
0.009 ~ 0.490	2400/F(kHz)	300
0.490 ~ 1.705	24000/F(kHz)	30
1.705 ~ 30.0	30	30
30 ~ 88	100	3
88 ~ 216	150	3
216 ~ 960	200	3
Above 960	500	3

#### 3.2 Measurement Procedure

##### For Radiated emission below 30MHz:

- The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter chamber room. The table was rotated 360 degrees to determine the position of the highest radiation.
- The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- Both X and Y axes of the antenna are set to make the measurement.
- For each suspected emission, the EUT was arranged to its worst case and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

##### NOTE:

- The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 9kHz at frequency below 30MHz.

**TEST REPORT****For Radiated emission above 30MHz:**

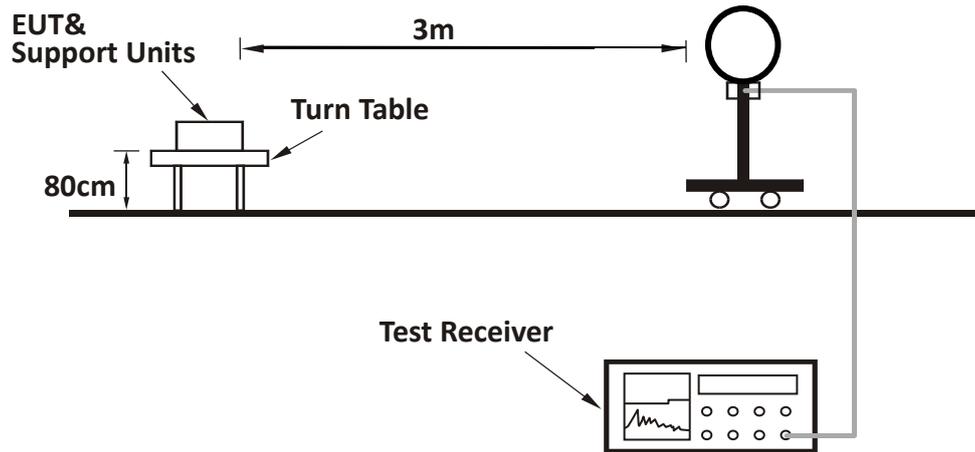
- a) The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b) The EUT was set 3 meters away from the interference-receiving antenna, which was mounted on the top of a variable-height antenna tower.
- c) The height of antenna is varied from one meter to four meters above the ground to determine the maximum value of the field strength. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d) For each suspected emission, the EUT was arranged to its worst case and then the antenna was tuned to heights from 1 meter to 4 meters and the rotatable table was turned from 0 degrees to 360 degrees to find the maximum reading.
- e) The test-receiver system was set to quasi-peak detect function and specified bandwidth with maximum hold mode when the test frequency is below 1 GHz.
- f) The test-receiver system was set to peak and average detect function and specified bandwidth with maximum hold mode when the test frequency is above 1 GHz. If the peak reading value also meets average limit, measurement with the average detector is unnecessary.

**Note:**

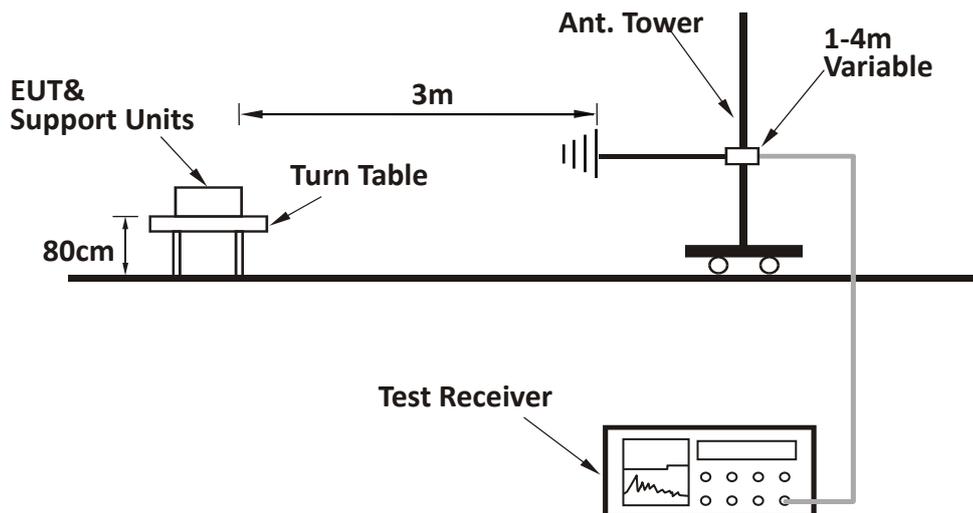
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is  $\geq 1/T$  (Duty cycle < 98%) or 3 x RBW (Duty cycle  $\geq$  98%) for Average detection (AV) at frequency above 1GHz.
4. All modes of operation were investigated and the worst-case emissions are reported

### 3.3 Test Configuration

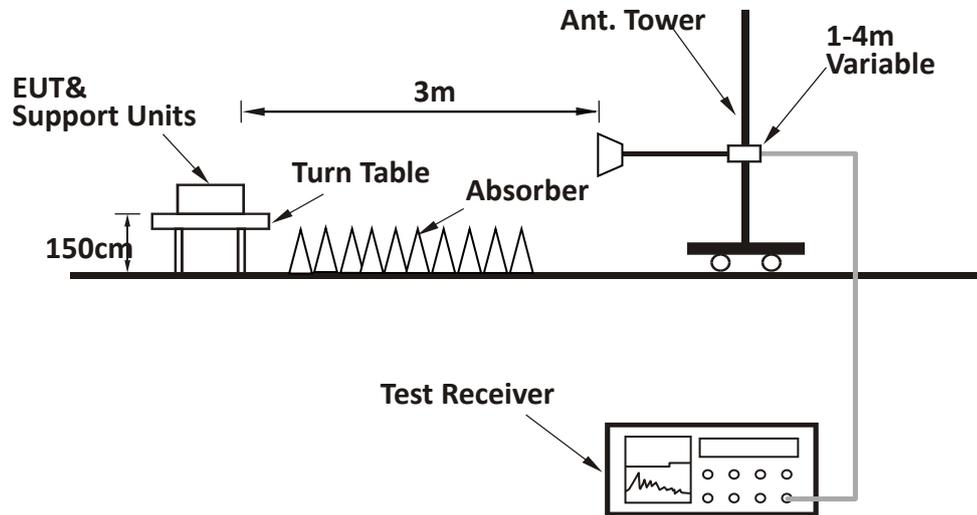
For Radiated emission below 30MHz:



For Radiated emission 30MHz to 1GHz:



**For Radiated emission above 1GHz:**



**TEST REPORT**

**3.4 Test Results of Radiated Emissions**

The low frequency, which started from 9 kHz to 30MHz, was pre-scanned and the result which was 20dB lower than the limit line per 15.31(o) was not reported.

**Test data below 1GHz:**

CH L

Antenna	Frequency (MHz)	Corrected Reading (dBµV/m)	Correct Factor (dB/m)	Limit (dBµV/m)	Margin (dB)	Detector
H	47.703	20.83	-13.9	40.00	19.17	PK
H	66.371	19.36	-14.99	40.00	20.64	PK
H	102.612	17.77	-12.93	43.50	25.73	PK
H	304.955	19.43	-6.62	46.00	26.57	PK
H	516.565	24.31	-2.12	46.00	21.69	PK
H	965.474	29.76	4.54	54.00	24.24	PK
V	41.448	17.77	-12.37	40.00	22.23	PK
V	64.987	15.27	-14.86	40.00	24.73	PK
V	149.968	16.55	-11.93	43.50	26.95	PK
V	353.447	21.83	-5.03	46.00	24.17	PK
V	546.437	26.17	-1.40	46.00	19.83	PK
V	887.398	28.62	2.81	46.00	17.38	PK

**TEST REPORT**

CH M

Antenna	Frequency (MHz)	Corrected Reading (dBμV/m)	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)	Detector
H	47.703	21.87	-13.90	40.00	18.13	PK
H	69.718	18.99	-14.70	40.00	21.01	PK
H	101.893	18.18	-12.92	43.50	25.32	PK
H	280.294	19.38	-7.26	46.00	26.62	PK
H	607.181	25.94	-0.19	46.00	20.06	PK
H	958.714	30.83	4.70	46.00	15.17	PK
V	39.459	16.92	-11.55	40.00	23.08	PK
V	53.756	14.40	-15.14	40.00	25.60	PK
V	162.020	14.63	-11.65	43.50	28.87	PK
V	350.972	20.81	-5.00	46.00	25.19	PK
V	703.731	26.52	0.48	46.00	19.48	PK
V	912.695	28.63	3.28	46.00	17.37	PK

**TEST REPORT**

CH H

Antenna	Frequency (MHz)	Corrected Reading (dB $\mu$ V/m)	Correct Factor (dB/m)	Limit (dB $\mu$ V/m)	Margin (dB)	Detector
H	43.845	20.63	-12.39	40.00	19.37	PK
H	68.264	20.02	-14.84	40.00	19.98	PK
H	101.893	17.78	-12.92	43.50	25.72	PK
H	324.864	20.46	-6.07	46.00	25.54	PK
H	607.181	27.85	-0.19	46.00	18.15	PK
H	945.334	30.64	4.71	46.00	15.36	PK
V	42.931	19.90	-12.87	40.00	20.10	PK
V	62.304	15.77	-14.96	40.00	24.23	PK
V	142.769	15.86	-12.63	43.50	27.64	PK
V	430.305	23.28	-3.29	46.00	22.72	PK
V	569.969	25.91	-0.89	46.00	20.09	PK
V	958.714	28.85	3.41	46.00	17.15	PK

**TEST REPORT**

**Test result above 1GHz:**

CH	Antenna	Frequency (MHz)	Corrected Reading (dBμV/m)	Correct Factor (dB/m)	Limit (dBμV/m)	Margin (dB)	Detector
L	H	2405	83.59	-9.17	114.00	30.41	PK
	V	2405	86.49	-9.59	114.00	27.51	PK
	H	2400	42.81	-9.19	74.00	31.19	PK
	V	2400	43.55	-9.61	74.00	30.45	PK
	H	4810	47.38	9.13	74.00	26.62	PK
	V	4810	46.54	9.24	74.00	27.46	PK
	H	7215	48.37	8.59	74.00	25.63	PK
	V	7215	47.61	8.69	74.00	26.39	PK
M	H	2440	84.14	-9.09	114.00	29.86	PK
	V	2440	86.68	-9.51	114.00	27.32	PK
	H	4880	46.00	9.13	74.00	28.00	PK
	V	4880	46.17	9.31	74.00	27.83	PK
	H	7320	47.37	8.56	74.00	26.63	PK
	V	7320	48.36	8.66	74.00	25.64	PK
H	H	2480	83.71	-9.00	114.00	30.29	PK
	V	2480	85.35	-9.40	114.00	28.65	PK
	H	2483.5	45.94	-8.98	74.00	28.06	PK
	V	2483.5	43.33	-9.39	74.00	30.67	PK
	H	4960	47.67	9.12	74.00	26.33	PK
	V	4960	47.78	9.38	74.00	26.22	PK
	H	7440	47.80	8.52	74.00	26.20	PK
	V	7440	47.33	8.62	74.00	26.67	PK

- Remark: 1. Correct Factor = Antenna Factor + Cable Loss (+ Amplifier, for higher than 1GHz), the value was added to Original Receiver Reading by the software automatically.  
 2. Corrected Reading = Original Receiver Reading + Correct Factor  
 3. Margin = Limit - Corrected Reading  
 4. If the PK Corrected Reading is lower than AV limit, the AV test can be elided.

Example: Assuming Antenna Factor = 30.20dB/m, Cable Loss = 2.00dB,  
 Gain of Preamplifier = 32.00dB, Original Receiver Reading = 10.00dBμV,  
 Limit = 40.00dBμV/m.  
 Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m;  
 Corrected Reading = 10dBμV + 0.20dB/m = 10.20dBμV/m;  
 Margin = 40.00dBμV/m - 10.20dBμV/m = 29.80dB.

\*\*\*\*\* END \*\*\*\*\*