

Qingdao Richriver Electrics Co., Ltd.

FCC Class II Permissive Change Report

Report Type:

FCC Part 15.249 & ISED RSS-210 RF report

Model:

HJCO

REPORT NUMBER:

181201700SHA-001

ISSUE DATE:

December 28, 2018

DOCUMENT CONTROL NUMBER:

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Applicant: Qingdao Richriver Electrics Co., Ltd.
No. 43 Yanqing Rd, Jimo Qingdao, China

Manufacturer: Qingdao Richriver Electrics Co., Ltd.
No. 43 Yanqing Rd, Jimo Qingdao, China

FCC ID: 2AJJGHJCO

SUMMARY:

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

47CFR Part 15 (2017): 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 (April 2018): General Requirements for Compliance of Radio Apparatus

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TEST REPORT

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Revision History

Report No.	Version	Description	Issued Date
181201700SHA-001	Rev. 01	Initial issue of report	December 28, 2018

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: NA =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:	EUT is a remote control module. It was tested with host device.
Rating:	DC 3.3V
EUT type:	<input checked="" type="checkbox"/> Table top <input type="checkbox"/> Floor standing
Software Version:	/
Hardware Version:	/
Sample received date:	December 10, 2018
Date of test:	December 10, 2018 ~ December 21, 2018

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

Host models:	HJH55E, HJH173
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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 Registration code No.: 2042B-1
	VCCI Registration Lab Registration No.: R-4243, G-845, C-4723, T-2252
	NVLAP Accreditation Lab NVLAP LAB CODE: 200849-0
	A2LA Accreditation Lab Certificate Number: 3309.02

2 TEST SPECIFICATIONS

2.1 Standards or specification

47CFR Part 15 (2017)

ANSI C63.10 (2013)

RSS-210 Issue 9 (August 2016)

RSS-Gen Issue 5 (April 2018)

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
1	Laptop computer	DELL 5480	-

2.5 Test environment condition:

Test items	Temperature	Humidity
Radiated emission	21°C	56% RH

2.6 Instrument list

Conducted Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input type="checkbox"/>	Test Receiver	R&S	ESCS 30	EC 2107	2019-07-15
<input type="checkbox"/>	A.M.N.	R&S	ESH2-Z5	EC 3119	2019-12-07
<input type="checkbox"/>	Shielded room	Zhongyu	-	EC 2838	2019-01-08
Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	Test Receiver	R&S	ESIB 26	EC 3045	2019-09-12
<input checked="" type="checkbox"/>	Bilog Antenna	TESEQ	CBL 6112D	EC 4206	2019-06-10
<input checked="" type="checkbox"/>	Pre-amplifier	R&S	AFS42-001018 00-25-S-42	EC 5262	2019-06-10
<input checked="" type="checkbox"/>	Horn antenna	R&S	HF 906	EC 3049	2019-11-17
<input checked="" type="checkbox"/>	Horn antenna	ETS	3117	EC 4792-1	2019-01-09
<input checked="" type="checkbox"/>	Horn antenna	TOYO	HAP18-26W	EC 4792-3	2020-07-09
<input checked="" type="checkbox"/>	Semi-anechoic chamber	Albatross project	-	EC 3048	2019-07-31
RF test					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input type="checkbox"/>	PXA Signal Analyzer	Keysight	N9030A	EC 5338	2019-03-05
<input type="checkbox"/>	Power sensor	Agilent	U2021XA	EC 5338-1	2019-03-05
<input type="checkbox"/>	Vector Signal Generator	Agilent	N5182B	EC 5175	2019-03-05
<input type="checkbox"/>	Spectrum analyzer	R&S	CMW500	EC5944	2019-12-07
<input type="checkbox"/>	MXG Analog Signal Generator	Agilent	N5181A	EC 5338-2	2019-03-05
<input type="checkbox"/>	Mobile Test System	Litepoint	lqxel	EC 5176	2019-01-09
<input type="checkbox"/>	Test Receiver	R&S	ESCI 7	EC 4501	2019-09-12
Additional instrument					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3323	2019-06-14
<input checked="" type="checkbox"/>	Pressure meter	YM3	Shanghai Mengde	EC 3320	2019-06-28

TEST REPORT**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
Maximum peak output power	$\pm 0.74\text{dB}$
Radiated Emissions in restricted frequency bands below 1GHz	$\pm 4.90\text{dB}$
Radiated Emissions in restricted frequency bands above 1GHz	$\pm 5.02\text{dB}$
Emission outside the frequency band	$\pm 2.89\text{dB}$
Power line conducted emission	$\pm 3.19\text{dB}$

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3 Radiated emission

Test result: Pass

3.1 Limit

Fundamental Frequency (MHz)	Fundamental limit (dBuV/m)	Harmonic limit (dBuV/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:

- a) 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.
- 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) Both X and Y axes of the antenna are set to make the measurement.
- d) 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.
- e) The test-receiver system was set to Quasi-Peak Detect Function and Specified Bandwidth with Maximum Hold Mode.

NOTE:

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

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

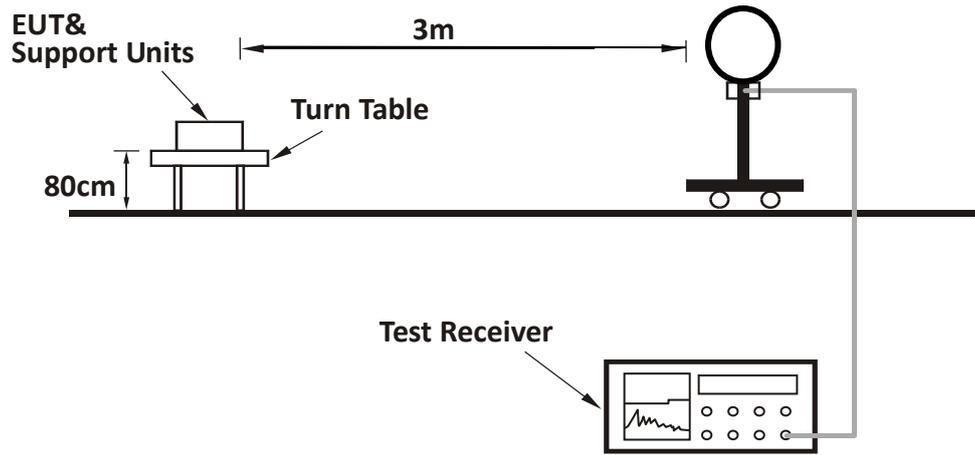
- a) The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b) The EUT was set 3 meters away from the interference-receiving 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:

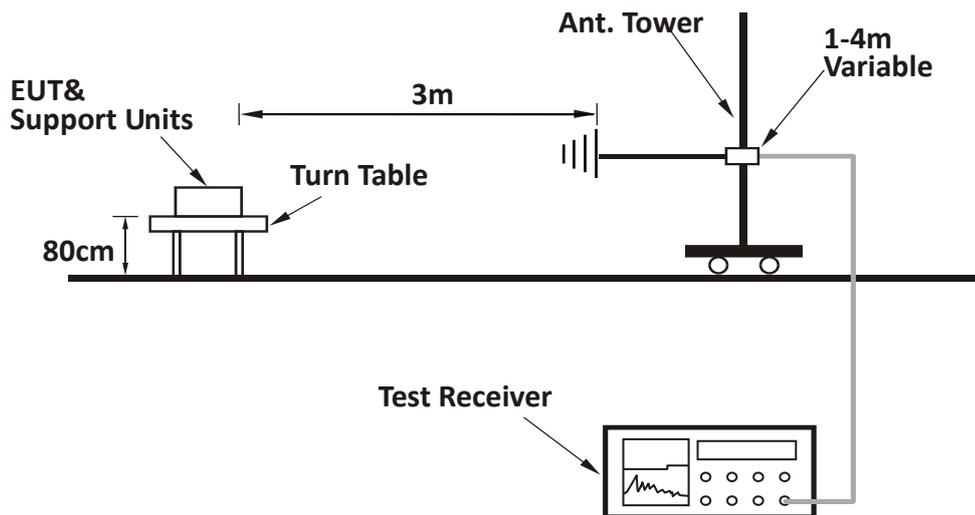
1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.
3. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is $\geq 1/T$ (Duty cycle < 98%) or $3 \times \text{RBW}$ (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

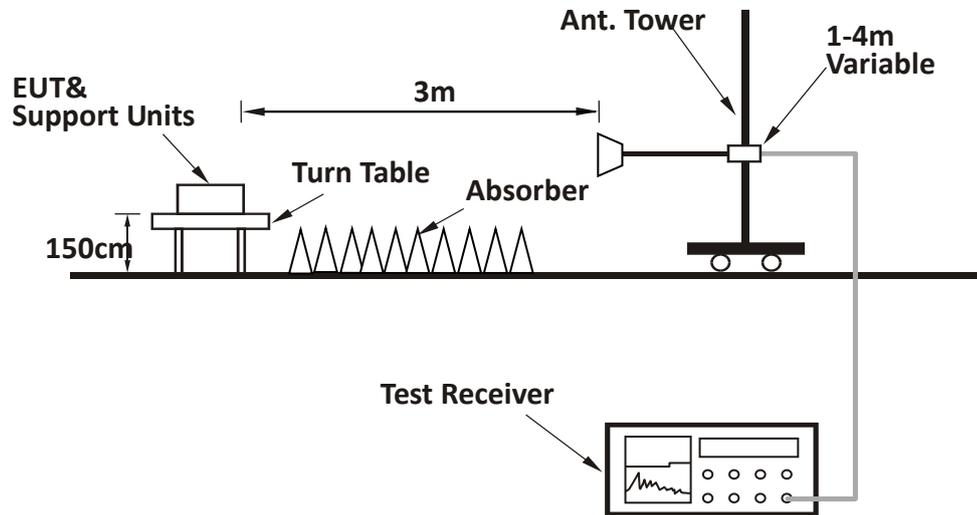
For Radiated emission below 30MHz:



For Radiated emission 30MHz to 1GHz:



For Radiated emission above 1GHz:



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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:

HJH55E:

Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	30.00	22.20	19.20	40.00	17.80	PK
H	70.29	15.70	7.30	40.00	24.30	PK
H	105.65	17.00	12.40	43.50	26.50	PK
H	138.12	17.40	12.40	43.50	26.10	PK
H	483.54	24.00	19.00	46.00	22.00	PK
H	688.93	27.10	20.90	46.00	18.90	PK
V	30.00	21.70	19.20	40.00	18.30	PK
V	74.21	18.10	7.50	40.00	21.90	PK
V	121.86	18.10	13.30	43.50	25.40	PK
V	123.65	17.40	13.20	43.50	26.30	PK
V	473.76	24.40	18.80	46.00	21.60	PK
V	622.21	26.80	20.60	46.00	19.20	PK

HJH173:

Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	30.00	22.30	19.20	40.00	17.70	PK
H	70.80	15.80	7.30	40.00	24.20	PK
H	105.25	17.30	12.40	43.50	26.20	PK
H	138.16	17.40	12.40	43.50	26.10	PK
H	482.42	24.30	19.00	46.00	21.70	PK
H	686.51	27.20	20.90	46.00	18.80	PK

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V	30.00	21.70	19.20	40.00	18.30	PK
V	74.80	18.30	7.50	40.00	21.970	PK
V	121.13	18.10	13.30	43.50	25.40	PK
V	122.21	17.30	13.20	43.50	26.20	PK
V	474.20	24.20	18.80	46.00	21.80	PK
V	622.20	26.60	20.60	46.00	19.40	PK

Test result above 1GHz:

HJH55E:

CH	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	V	2405	93.40	34.34	114.00	20.60	PK
	V	2400	48.20	34.29	74.00	23.80	PK
	V	4810	49.00	6.50	74.00	25.00	PK
	V	7215	52.80	9.30	74.00	21.20	PK
M	V	2440	93.00	34.36	114.00	21.00	PK
	V	4880	47.52	6.50	74.00	26.48	PK
	V	9760	49.80	9.30	74.00	24.20	PK
H	V	2480	93.70	34.38	114.00	20.30	PK
	V	2483.5	49.50	34.63	74.00	24.50	PK
	V	4960	51.44	6.70	74.00	22.56	PK
	V	7440	53.70	9.30	74.00	20.30	PK

HJH173:

CH	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	V	2405	93.20	34.34	114.00	20.80	PK
	V	2400	48.10	34.29	74.00	23.90	PK
	V	4810	48.80	6.50	74.00	25.20	PK
	V	7215	52.50	9.30	74.00	21.50	PK
M	V	2440	92.80	34.36	114.00	21.20	PK
	V	4880	47.45	6.50	74.00	26.55	PK
	V	9760	49.60	9.30	74.00	24.40	PK

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H	V	2480	93.50	34.38	114.00	20.50	PK
	V	2483.5	49.20	34.63	74.00	24.80	PK
	V	4960	51.25	6.70	74.00	22.75	PK
	V	7440	53.50	9.30	74.00	20.50	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 = 10.00dBuV,
 Limit = 40.00dBuV/m.
 Then Correct Factor = 30.20 + 2.00 – 32.00 = 0.20dB/m;
 Corrected Reading = 10dBuV + 0.20dB/m = 10.20dBuV/m;
 Margin = 40.00dBuV/m - 10.20dBuV/m = 29.80dB.

***** END *****