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Qingdao Richmat Intelligence Technology Inc
FCC Class II Permissive Change Report

Report Type:
FCC Part 15.249 & ISED RSS-210 RF report

Model:
HJBLE

REPORT NUMBER:
200902962SHA-001

ISSUE DATE:
October 10, 2020

DOCUMENT CONTROL NUMBER:
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Report no.: 200902962SHA-001

TEST REPORT

Applicant:	Qingdao Richmat Intelligence Technology Inc
	NO.78 Kongquehe 4th Road, Qingdao Clothing Industry park, Jimo, Qingdao, Shandong Province, China.
Manufacturer:	Qingdao Richmat Intelligence Technology Inc
	NO.78 Kongquehe 4th Road, Qingdao Clothing Industry park, Jimo, Qingdao, Shandong Province, China.
FCC ID:	2AJJGHJBLE

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:**
(signature)	*(signature)*
Project Engineer	Reviewer
Colin Sun	Nemo Li

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Content

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Revision History

Report No.	Version	Description	Issued Date
200902962SHA-001	Rev. 01	Initial issue of report	October 10, 2020

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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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TEST REPORT

1   GENERAL INFORMATION

1.1   Description of Equipment Under Test (EUT)

Product name:	Remote control module
Type/Model:	HJBLE
Description of EUT:	The report is C2PC report, the following host models were added and tested.
Host models:	HJH55 Ble, HJH124 Ble
Rating:	DC 3.3V
EUT type:	☒ Table top ☐ Floor standing
Software Version:	/
Hardware Version:	/
Sample received date:	October 09, 2020
Date of test:	October 09~ October 10, 2020

1.2 Technical Specification

Frequency Range:	2402MHz - 2480MHz
Support Standards:	Bluetooth LE
Type of Modulation:	GFSK
Channel Number:	40
Data Rate:	1Mbps
Channel Separation:	2 MHz
Antenna Information:	PCB antenna, 3dBi Peak gain

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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 CAB identifier.: CN0051
	VCCI Registration Lab Registration No.: R-14243, G-10845, C-14723, T-12252
	A2LA Accreditation Lab Certificate Number: 3309.02

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2   TEST SPECIFICATIONS

2.1 Standards or specification

47CFR Part 15 (2019)
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 handhold 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)
-	2402	2440	2480

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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	19°C	52% RH

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2.6 Instrument list

Conducted Emission/Disturbance Power/Tri-loop Test/CDN method					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☐	Test Receiver	R&S	ESCS 30	EC 2107	2021-07-08
☐	A.M.N.	R&S	ESH2-Z5	EC 3119	2020-11-10
☐	A.M.N.	R&S	ENV 216	EC 3393	2021-07-08
☐	A.M.N.	R&S	ENV4200	EC 3558	2021-06-11
Radiated Emission					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☒	Test Receiver	R&S	ESIB 26	EC 3045	2021-09-16
☒	Bilog Antenna	TESEQ	CBL 6112D	EC 4206	2021-09-25
☒	Pre-amplifier	R&S	AFS42-00101800-25-S-42	EC5262	2021-06-11
☒	Horn antenna	R&S	HF 906	EC 3049	2021-01-17
☐	Horn antenna	ETS	3117	EC 4792-1	2021-03-15
☒	Horn antenna	TOYO	HAP18-26W	EC 4792-3	2021-07-09
☐	Active loop antenna	Schwarzbeck	FMZB1519	EC 5345	2021-03-24
RF test					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☐	PXA Signal Analyzer	Keysight	N9030A	EC 5338	2021-03-16
☐	Power sensor	Agilent	U2021XA	EC 5338-1	2021-03-16
☐	Vector Signal Generator	Agilent	N5182B	EC 5175	2021-03-16
☐	Universal Radio Communication Tester	R&S	CMW500	EC5944	2020-12-09
☐	MXG Analog Signal Generator	Agilent	N5181A	EC 5338-2	2021-03-16
☐	Mobile Test System	Litepoint	Iqxel	EC 5176	2021-01-16
☐	Test Receiver	R&S	ESCI 7	EC 4501	2020-09-16
☐	Climate chamber	GWS	MT3065	EC 6021	2021-03-05
☐	Spectrum Analyzer	Keysight	N9030A	EC 6078	2021-06-10

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Tet Site					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☐	Shielded room	Zhongyu	-	EC 2838	2021-01-12
☐	Shielded room	Zhongyu	-	EC 2839	2021-01-12
☒	Semi-anechoic chamber	Albatross project	-	EC 3048	2021-07-14
☐	Fully-anechoic chamber	Albatross project	-	EC 3047	2021-07-14
Additional instrument					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
☐	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3783	2021-03-03
☐	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3481	2021-01-05
☐	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 5198	2021-01-05
☒	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3325	2021-09-05
☐	Pressure meter	YM3	Shanghai Mengde	EC 3320	2021-07-14

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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	$\pm$ 0.74dB
Radiated Emissions in restricted frequency bands below 1GHz	$\pm$ 4.90dB
Radiated Emissions in restricted frequency bands above 1GHz	$\pm$ 5.02dB
Emission outside the frequency band	$\pm$ 2.89dB
Power line conducted emission	$\pm$ 3.19dB

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3 Radiated emission

Test result: **Pass**

3.1 Limit

Fundamental Frequency (MHz)	Fundamental limit (dBuV/m)	Harmonic limit (dBuV/m)
☐ 902 - 928	94	54
☒ 2400 - 2483.5	94	54
☐ 5725 - 5875	94	54
☐ 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.

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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 ≥ 1/T (Duty cycle < 98%) or 3 x RBW (Duty cycle ≥ 98%) for Average detection (AV) at frequency above 1GHz.

4. All modes of operation were investigated and the worst-case emissions are reported

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3.3 Test Configuration

For Radiated emission below 30MHz:

EUT&
Support Units
3m

Turn Table

80cm

Test Receiver
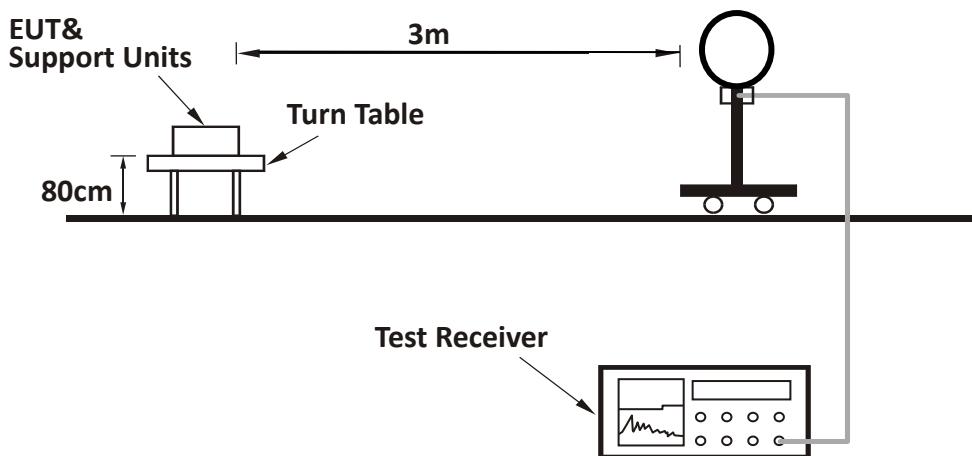
For Radiated emission 30MHz to 1GHz:

Ant. Tower
1-4m
Variable

EUT&
Support Units
3m

Turn Table

80cm

Test Receiver
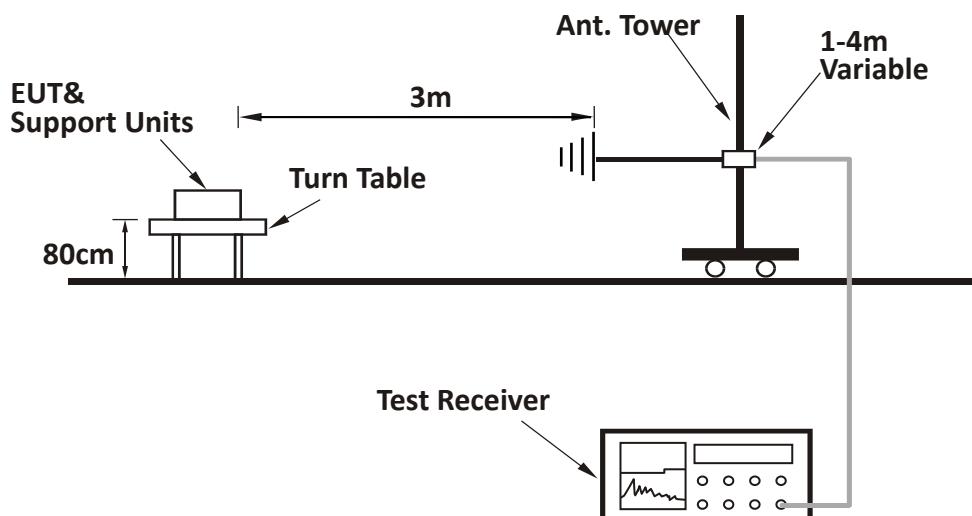
TEST REPORT

For Radiated emission above 1GHz:
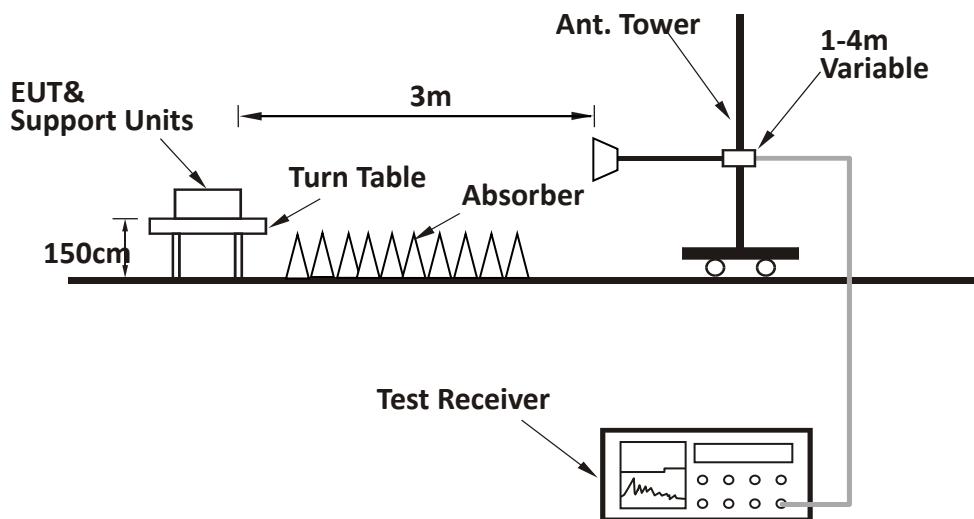
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3.4 Test Results of Radiated Emissions

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:

All the models were tested and the worst result was listed in the report as below:

Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	30.00	23.50	20.50	40.00	16.50	PK
H	72.35	16.70	7.20	40.00	23.30	PK
H	106.38	17.20	12.60	43.50	26.30	PK
H	138.66	17.30	12.60	43.50	26.20	PK
H	485.37	25.80	19.00	46.00	20.20	PK
H	668.63	29.20	20.90	46.00	16.80	PK
V	30.00	21.60	19.70	40.00	18.40	PK
V	74.43	18.30	7.30	40.00	21.70	PK
V	128.53	18.40	14.30	43.50	25.10	PK
V	134.72	17.70	15.80	43.50	25.80	PK
V	472.75	22.70	16.30	46.00	23.30	PK
V	654.84	25.60	25.60	46.00	20.40	PK

Test result above 1GHz:

HJH55 Ble:

CH	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	H/V	2405	91.32	34.52	114.00	22.68	PK
	H/V	2400	47.54	34.75	74.00	26.46	PK
	H/V	4810	48.42	6.60	74.00	25.58	PK
	H/V	7215	56.43	7.70	74.00	17.57	PK
M	H/V	2440	90.53	34.52	114.00	23.47	PK

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	H/V	4880	47.85	6.60	74.00	26.15	PK
	H/V	7320	48.73	7.70	74.00	25.27	PK
H	H/V	2480	91.23	34.52	114.00	22.77	PK
	H/V	2483.5	47.60	34.75	74.00	26.40	PK
	H/V	4960	50.37	6.60	74.00	23.63	PK
	H/V	7440	51.84	7.70	74.00	22.16	PK

HJH124 Ble:

CH	Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	H/V	2405	90.34	34.52	114.00	23.66	PK
	H/V	2400	49.43	34.75	74.00	24.57	PK
	H/V	4810	48.50	6.60	74.00	25.50	PK
	H/V	7215	51.43	7.70	74.00	22.57	PK
M	H/V	2440	90.10	34.52	114.00	23.90	PK
	H/V	4880	49.50	6.60	74.00	24.50	PK
	H/V	7320	49.48	7.70	74.00	24.52	PK
H	H/V	2480	89.98	34.52	114.00	24.02	PK
	H/V	2483.5	49.46	34.75	74.00	24.54	PK
	H/V	4960	51.73	6.60	74.00	22.27	PK
	H/V	7440	52.50	7.70	74.00	21.50	PK

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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 ***************************************