

Qingdao Richmat Intelligence Technology Inc

FCC Class II Permissive Change Report

Report Type:

FCC Part 15.247 RF report

Model:

HJ8258

REPORT NUMBER:

231200308HAN-001

ISSUE DATE:

January 18, 2024

DOCUMENT CONTROL NUMBER:

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NO.78 Kongquehe 4th Road, Qingdao Clothing Industry park, Jimo,
Qingdao, Shandong Province, China.

FCC ID: 2AJJGHJ8258

SUMMARY:


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

47CFR Part 15 (2021): Radio Frequency Devices (Subpart C)

ANSI C63.10 (2020): American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

PREPARED BY:**REVIEWED BY:**

Offa Zhou
Project Engineer



Wakeyou Wang
Reviewer

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TEST REPORT

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Revision History

Report No.	Version	Description	Issued Date
231200308HAN-001	Rev. 01	Initial issue of report	January 18, 2024

Measurement result summary

TEST ITEM	FCC REFERENCE	RESULT
Radiated Emissions in restricted frequency bands	15.247(d), 15.205&15.209	Pass

Notes: 1: NA =Not Applicable

1 GENERAL INFORMATION

1.1 Description of Equipment Under Test (EUT)

Product name:	Module
Type/Model:	HJ8258
Description of EUT:	The report is C2PC report, the following host model(supplied by DC power) was added. Therefore, host model was tested.
Host models:	HJC53 Ble
Rating:	Module: DC 3.3V
EUT type:	<input checked="" type="checkbox"/> Table top <input type="checkbox"/> Floor standing
Software Version:	/
Hardware Version:	/
Sample received date:	December 11, 2023
Date of test:	December 20, 2023 ~ December 27, 2023

1.2 Technical Specification

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

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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: CN0175
	IC Registration Lab CAB identifier.: CN0014
	VCCI Registration Lab Registration No.: R-4243, G-845, C-4723, T-2252
	A2LA Accreditation Lab Certificate Number: 3309.02

2 TEST SPECIFICATIONS

2.1 Standards or specification

47CFR Part 15 (2021)

ANSI C63.10 (2020)

KDB 558074 (v05)

2.2 Mode of operation during the test

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

Frequency Band (MHz)				2402 ~ 2480			
Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
0	2402	10	2422	20	2442	30	2462
1	2404	11	2424	21	2444	31	2464
2	2406	12	2426	22	2446	32	2466
3	2408	13	2428	23	2448	33	2468
4	2410	14	2430	24	2450	34	2470
5	2412	15	2432	25	2452	35	2472
6	2414	16	2434	26	2454	36	2474
7	2416	17	2436	27	2456	37	2476
8	2418	18	2438	28	2458	38	2478
9	2420	19	2440	29	2460	39	2480

The test setting software is offered by the manufactory. The pre-scan for the conducted power with all rates in each modulation and bands was used, and the worst case was found and used in all test cases.

Test software and Power Setting parameter			
Test Software	/		
Working Mode	BLE		
Test Channel	2402MHz	2440MHz	2480MHz
Power Setting	Default	Default	Default

While testing transmitting mode of EUT, the internal modulation and continuously transmission was applied.

- 1) Radiated test mode: EUT transmitted signal with BT antenna;
- 2) Conducted test mode: EUT transmitted signal from BT RF port connected to SPA directly;

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 Emissions in restricted frequency bands	22°C	55% 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	2024-10-18
<input checked="" type="checkbox"/>	Bilog Antenna	TESEQ	CBL 6112B	EC 6411	2024-11-04
<input checked="" type="checkbox"/>	Pre-amplifier	tonscend	tap01018050	EC 6432-1	2024-12-25
<input checked="" type="checkbox"/>	Horn antenna	tonscend	bha9120d	EC 6432-2	2024-01-09
<input checked="" type="checkbox"/>	Horn antenna	ETS	3117	EC 4792-1	2024-03-27
<input checked="" type="checkbox"/>	Horn antenna	TOYO	HAP18-26W	EC 4792-3	2024-07-08
<input checked="" type="checkbox"/>	Pre-amplifier	R&S	AFS42-00101800 -25-S-42	EC 5262	2024-09-07
<input checked="" type="checkbox"/>	Semi-anechoic chamber	Albatross project	-	EC 3048	2024-08-21
Additional instrument					
Used	Equipment	Manufacturer	Type	Internal no.	Due date
<input checked="" type="checkbox"/>	Therom-Hygrograph	ZJ1-2A	S.M.I.F.	EC 3442	2024-01-03

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	$\pm 3.19\text{dB}$

3 Radiated Emissions in restricted frequency bands

Test result: Pass

3.1 Limit

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

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:**

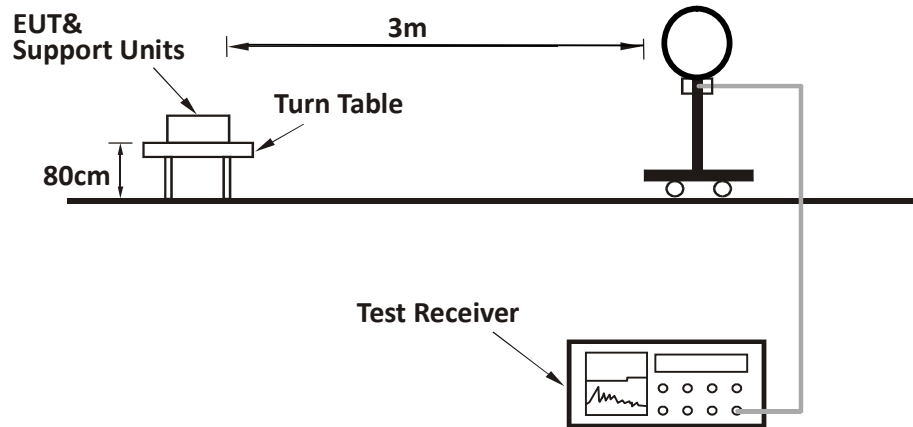
- a) The EUT was placed on the top of a rotating table 0.8 meters (for 30MHz ~ 1GHz) / 1.5 meters (for above 1GHz) above the ground at 3 meter chamber room for test. The table was rotated 360 degrees to determine the position of the highest radiation.
- b) The EUT was set 3 meters away from the interference-receiving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

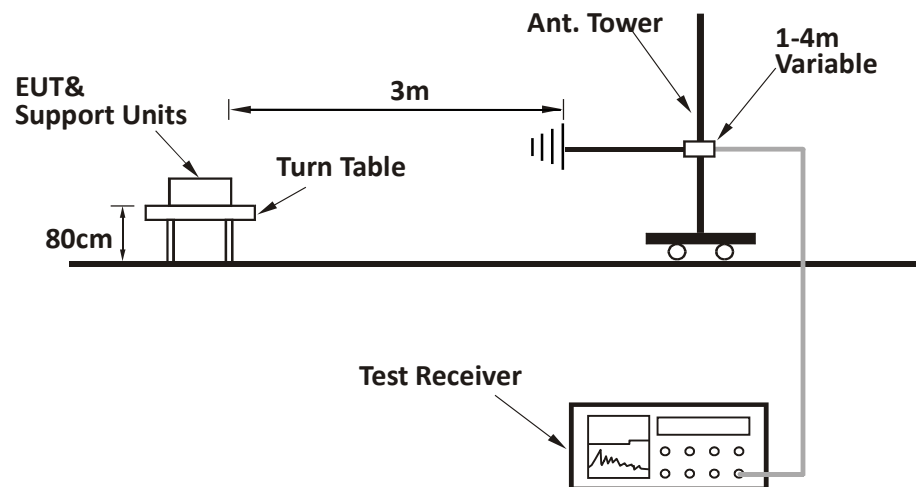
- 1. The resolution bandwidth and video bandwidth of test receiver/spectrum analyzer is 120kHz for Quasi-peak detection (QP) at frequency below 1GHz.
- 2. The resolution bandwidth of test receiver/spectrum analyzer is 1 MHz and the video bandwidth is 3 MHz for Peak detection (PK) at frequency above 1GHz.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

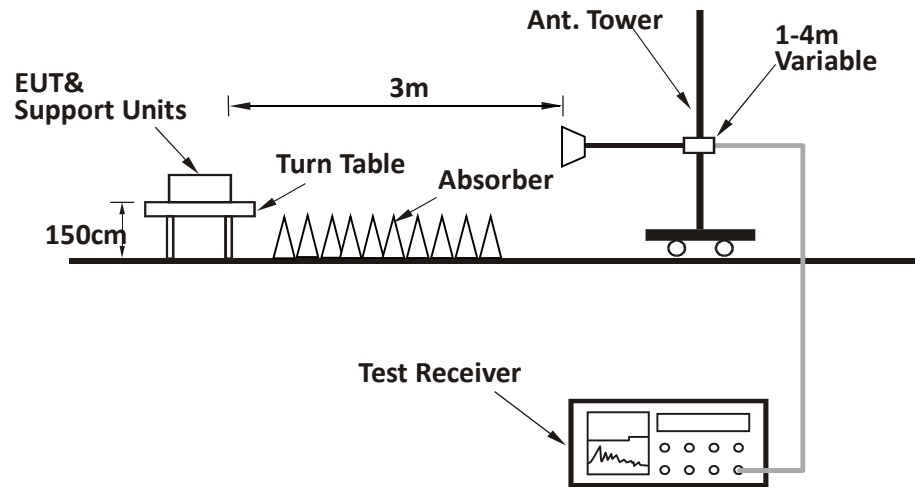
For Radiated emission below 30MHz:



For Radiated emission 30MHz to 1GHz:



For Radiated emission above 1GHz:

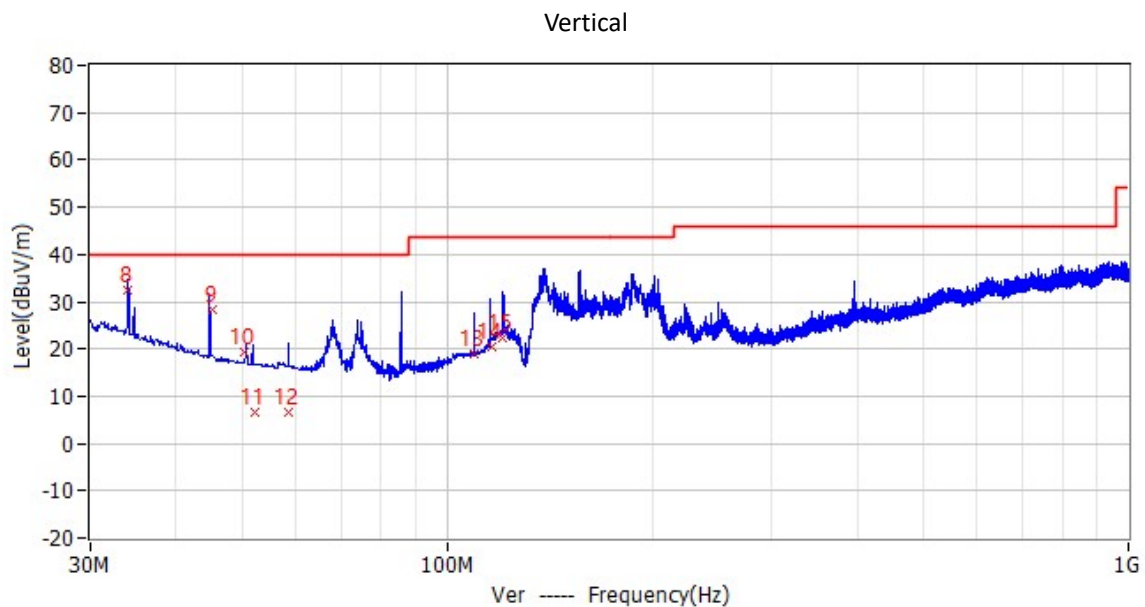
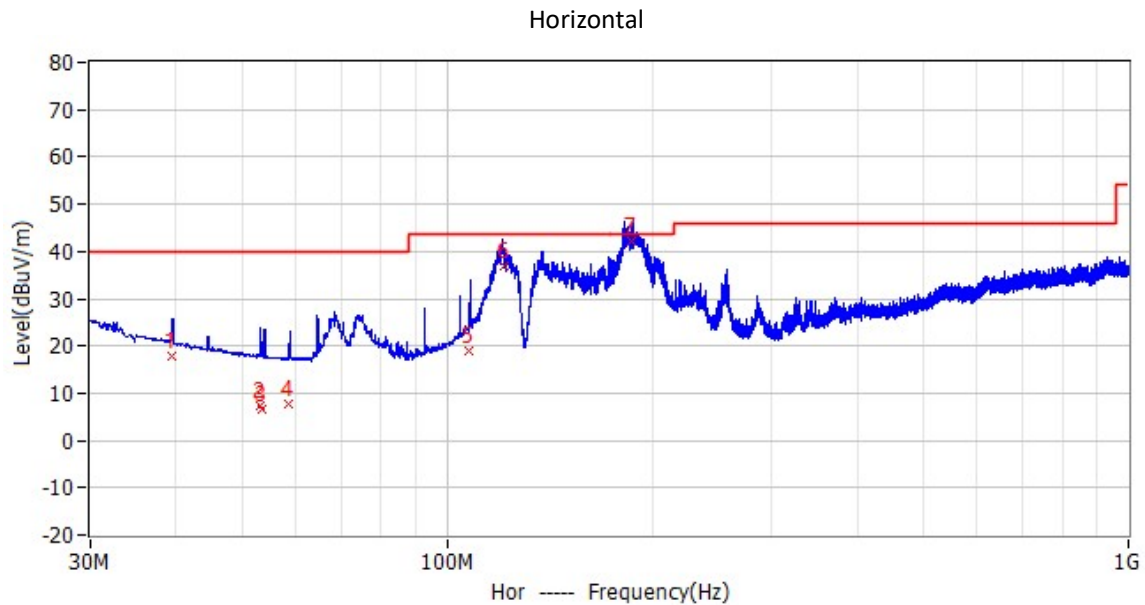


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3.4 Test Results of Radiated Emissions

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.

The worst waveform from 30MHz to 1000MHz is listed as below:



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Test data below 1GHz

Antenna	Frequency (MHz)	Corrected Reading (dBuV/m)	Correct Factor (dB/m)	Limit (dBuV/m)	Margin (dB)	Detector
H	39.403	17.7	11.3	40.0	22.3	QP
H	53.336	7.2	7.1	40.0	32.8	QP
H	53.527	6.7	7.1	40.0	33.3	QP
H	58.413	7.7	7.3	40.0	32.3	QP
H	107.540	18.8	9.1	43.5	24.7	QP
H	121.489	37.0	8.0	43.5	6.5	QP
H	186.382	42.3	10.7	43.5	1.2	QP
V	34.065	32.6	14.3	40.0	7.4	QP
V	45.297	28.5	8.6	40.0	11.5	QP
V	50.298	19.5	7.3	40.0	20.5	QP
V	52.234	6.5	7.1	40.0	33.5	QP
V	58.490	6.6	7.3	40.0	33.4	QP
V	109.769	19.0	9.0	43.5	24.5	QP
V	116.399	20.4	8.4	43.5	23.1	QP
V	120.838	22.4	8.1	43.5	21.1	QP

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Test result above 1GHz:

The emission was conducted from 1GHz to 25GHz

CH	Antenna	Frequency (MHz)	Correct Factor (dB/m)	Corrected Reading (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector
L	H	2402.00	35.40	95.60	Fundamental	/	PK
	V	2402.00	35.40	92.20	Fundamental	/	PK
	H	2390.00	35.40	44.30	74.00	29.70	PK
	H	2390.00	35.40	36.70	54.00	17.30	AV
	H	4804.00	2.70	35.40	74.00	38.60	PK
	H	7206.00	7.70	39.10	74.00	34.90	PK
	V	2390.00	35.40	45.10	74.00	28.90	PK
	V	2390.00	35.40	37.90	54.00	18.60	AV
	V	4804.00	2.70	35.30	74.00	38.70	PK
	V	7206.00	7.70	37.80	74.00	36.20	PK
M	H	2440.00	35.40	96.00	Fundamental	/	PK
	V	2440.00	35.40	94.80	Fundamental	/	PK
	H	4852.00	3.00	34.20	74.00	39.80	PK
	H	7278.00	8.00	39.20	74.00	34.80	PK
	V	4852.00	3.00	34.30	74.00	39.70	PK
	V	7278.00	8.00	38.90	74.00	35.10	PK
H	H	2480.00	35.70	94.70	Fundamental	/	PK
	V	2480.00	35.70	96.80	Fundamental	/	PK
	H	2483.50	35.70	66.50	74.00	7.50	PK
	H	2483.50	35.70	47.90	54.00	6.10	AV
	H	4960.00	3.20	35.10	74.00	38.90	PK
	H	7440.00	8.30	37.10	74.00	36.90	PK
	V	2483.50	35.70	64.50	74.00	9.50	PK
	V	2483.50	35.70	47.80	54.00	6.20	AV
	V	4960.00	3.20	34.80	74.00	39.20	PK
	V	7440.00	8.30	35.50	74.00	38.50	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.

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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 = $30.20 + 2.00 - 32.00 = 0.20\text{dB/m}$;
Corrected Reading = $10\text{dBuV} + 0.20\text{dB/m} = 10.20\text{dBuV/m}$;
Margin = $40.00\text{dBuV/m} - 10.20\text{dBuV/m} = 29.80\text{dB}$.

***** END *****