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RF Exposure Evaluation Report

Report No.: CQASZ20210801236E-02
Applicant: Chervon (China) Trading Co., Ltd.
Address of Applicant: No. 99 Tianyuan West Road, Jiangning Economic & Technical Development Zone, 211106, Nanjing, Jiangsu, China

Equipment Under Test (EUT):
EUT Name: Jobsite Radio
Model No.: KJR 124B-03, TB24RD
Test Model No.: KJR 124B-03
Brand Name: KOBALT
FCC ID: YWKKJR124B-03
Standards: 47 CFR Part 1.1307
47 CFR Part 2.1091
KDB447498D01 General RF Exposure Guidance v06

Date of Receipt: 2021-8-3
Date of Test: 2021-8-3 to 2021-8-20
Date of Issue: 2021-8-20
Test Result: **PASS***

*In the configuration tested, the EUT complied with the standards specified above

Tested By: _____
Lewis Zhou

(Lewis Zhou)

Reviewed By: _____
Rock Huang

(Rock Huang)

Approved By: _____
Jack Ai

(Jack Ai)



1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20210801236E-02	Rev.01	Initial report	2021-8-20

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3 General Information

3.1 Client Information

Applicant:	Chervon (China) Trading Co., Ltd.
Address of Applicant:	No. 99 Tianyuan West Road, Jiangning Economic & Technical Development Zone, 211106, Nanjing, Jiangsu, China
Manufacturer:	Chervon (China) Trading Co., Ltd.
Address of Manufacturer:	No. 99 Tianyuan West Road, Jiangning Economic & Technical Development Zone, 211106, Nanjing, Jiangsu, China

3.2 General Description of EUT

Product Name:	Jobsite Radio
Model No.:	KJR 124B-03, TB24RD
Test Model No.:	KJR 124B-03
Trade Mark:	KOBALT
Hardware Version:	V1.0
Software Version:	V1.0
Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	V5.0
Modulation Technique:	Frequency Hopping Spread Spectrum(FHSS)
Modulation Type:	GFSK, $\pi/4$ DQPSK
Transfer Rate:	1Mbps/2Mbps
Number of Channel:	79
Hopping Channel Type:	Adaptive Frequency Hopping systems
Product Type:	<input type="checkbox"/> Mobile <input type="checkbox"/> Portable <input checked="" type="checkbox"/> Fix Location
Test Software of EUT:	FCCAssist 2.4
Antenna Type:	PCB antenna
Antenna Gain:	0dBi
Power Supply:	DC 24V \equiv from battery AC/DC ADAPTER MODEL: MX65W1-2402000U INPUT: 100-240V~ 50-60Hz 2A OUTPUT: 24.0V \equiv 2.0A

Model No.: KJR 124B-03, TB24RD

Only the model KJR 124B-03 was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being color of appearance and model name.

4 RF Exposure Evaluation

4.1 RF Exposure Compliance Requirement

4.1.1 Limits

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm ²)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f ²)	6
30–300	61.4	0.163	1.0	6
300–1500 .....	.....	.....	f/300	6
1500–100,000 .....	.....	.....	5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f ²)	30
30–300	27.5	0.073	0.2	30
300–1500 .....	.....	.....	f/1500	30
1500–100,000 .....	.....	.....	1.0	30

F= Frequency in MHz

Friis Formula

Friis transmission formula: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

R = distance between observation point and center of the radiator in cm

P_d is the limit of MPE, 1 mW/cm². If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.

4.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

4.1.3 EUT RF Exposure

Antenna Gain: 0dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Measurement Data

GFSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	2.350	1.5±1	2.5	1.778
Middle(2441MHz)	3.470	2.5±1	3.5	2.239
Highest(2480MHz)	3.960	3±1	4	2.512
π/4DQPSK mode				
Test channel	Peak Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest(2402MHz)	2.910	2±1	3	1.995
Middle(2441MHz)	4.030	3.5±1	4.5	2.818
Highest(2480MHz)	4.540	4±1	5	3.162

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
3.162	0	0.00063	1.0	PASS

Note: 1) Refer to report No. CQASZ20210801236E-01 for EUT test Max Conducted Peak Output Power value.

2) $P_d = (P_{out} * G) / (4 * \pi * R^2) = (3.162 * 1) / (4 * 3.1416 * 20^2) = 0.00063$