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RF Exposure Evaluation Report

Report No. : CQASZ20201200044EX-02
Applicant: Chervon(China)Trading Co.,Ltd
Address of Applicant: No.99 Tianyuan West Road, Jiangning Economic & Technical Development Zone, nanjing, jiangsu, China
Equipment Under Test (EUT):
Product: Jobsite Radio
All Model No.: FX5351, 5957
Test Model No.: FX5351
Brand Name: Phoenix, FLEX
FCC ID: YWKFX5351
Standards: 47 CFR Part 1.1307
47 CFR Part 2.1093
KDB447498D01 General RF Exposure Guidance v06
Date of Test: 2020-12-02 to 2020-12-16
Date of Issue: 2021-3-24
Test Result : PASS*

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

Tested By:

Jun Li

(Jun Li)

Reviewed By:

Ares Liu

(Ares Liu)

Approved By:

Sheek Luo

(Sheek lu)



1 Version

Revision History Of Report

Report No.	Version	Description	Issue Date
CQASZ20201200044EX-02	Rev.01	Initial report	2021-3-24

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

3.2 General Description of EUT

Product Name:	Jobsite Radio
All Model No.:	FX5351, 5957
Test Model No.:	FX5351
Trade Mark:	Phoenix, FLEX
Hardware Version:	V1.0
Software Version:	V1.5
Operation Frequency:	2402MHz~2480MHz
Bluetooth Version:	EDR
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:	☐ Mobile ☐ Portable ☒ Fix Location
Test Software of EUT:	FCC Assist 1.5
Antenna Type:	PCB antenna
Antenna Gain:	0dBi
Power Supply:	DC24V 1A

Note:

All model: FX5351, 5957

Only the model FX5351 was tested, since the electrical circuit design, layout, components used and internal wiring were identical for the above models, with difference being model name.

4 SAR 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

1) For BT

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	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest	-2.237	-3.5±1	-2.5	0.562
Middle	-2.372	-3.5±1	-2.5	0.562
Highest	-2.369	-3.5±1	-2.5	0.562
π/4DQPSK mode				
Test channel	Average Output Power (dBm)	Tune up tolerance (dBm)	Maximum tune-up Power	
			(dBm)	(mW)
Lowest	-0.306	-1.5±1	-0.5	0.891
Middle	1.709	1±1	2	1.585
Highest	1.634	1±1	2	1.585

The worst case:

Maximum tune-up Power (mW)	Antenna Gain (dBi)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
1.585	0	0.0003	1.0	PASS

Note: 1) Refer to report No. CQASZ20201200044EX-01 for EUT test Max Conducted average Output Power value.

$$2) P_d = (P_{out} \cdot G) / (4 \cdot \pi \cdot R^2) = (1.585 \cdot 1) / (4 \cdot 3.1416 \cdot 20^2) = 0.0003$$