



REPORT No. : XM20050003W04

RF EXPOSURE EVALUATION REPORT

APPLICANT : HATCH BABY, INC

PRODUCT NAME : Hatch Restore

MODEL NAME : Restore01

BRAND NAME : Hatch

FCC ID : 2AFYZ-RESTORE01

STANDARD(S) : 47 CFR§2.1091, KDB 447498 D01v06

RECEIPT DATE : 2020-05-07

TEST DATE : 2020-05-11 to 2020-05-15

ISSUE DATE : 2020-05-21

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Change History		
Issue	Date	Reason for change
1.0	2020-05-21	First edition



1. Technical Information

Note: Provide by manufacturer.

1.1. Applicant and Manufacturer Information

Applicant:	HATCH BABY, INC
Applicant Address:	3525 Alameda de las Pulgas, Suite D, Menlo Park CA 94025
Manufacturer:	XIAMEN HUALIAN ELECTRONIC APPARATUS CO., LTD.
Manufacturer Address:	No.502, Qianpu Road, Siming District, Xiamen, China

1.2. Equipment Under Test (EUT) Description

EUT Type:	Hatch Restore
Hardware Version:	30-HBW24F
Software Version:	NA
Frequency Bands:	802.11b/g/n20:2.412GHz-2.462GHz 802.11 n40: 2.422GHz - 2.452GHz Bluetooth: 2402MHz – 2480MHz
Modulation Mode:	Wi-Fi:OFDM,DSSS Bluetooth: FHSS GFSK(1Mbps), $\pi/4$ -DQPSK(EDR 2Mbps), 8-DPSK(EDR 3Mbps) Bluetooth 4.2 LE: GFSK
Antenna type:	PIFA Antenna

1.3. Applied Reference Documents

Leading reference documents for testing:

No.	Identity	Document Title
1	47 CFR§2.1091	Radiofrequency Radiation Exposure Evaluation: mobile devices
2	KDB 447498 D01v06	General RF Exposure Guidance

2. Device category and RF exposure limit

Per user manual, Based on 47CFR 2.1091, this device belongs to mobile device category with General Population/Uncontrolled exposure.

Mobile Devices:

47CFR 2.1091(b)

For purposes of this section, a mobile device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons. In this context, the term "fixed location" means that the device is physically secured at one location and is not able to be easily moved to another location. Transmitting devices designed to be used by consumers or workers that can be easily re-located, such as wireless devices associated with a personal computer, are considered to be mobile devices if they meet the 20 centimeter separation requirement.

GENERAL POPULATION / UNCONTROLLED EXPOSURE

The general population/uncontrolled exposure limits are applicable to situations in which the general public may be exposed or in which persons who are exposed as a consequence of their employment may not be made fully aware of the potential for exposure or cannot exercise control over their exposure. Members of the general public would come under this category when exposure is not employment-related; for example, in the case of a wireless transmitter that exposes persons in its vicinity. Warning labels placed on low-power consumer devices such as cellular telephones are not considered sufficient to allow the device to be considered under the occupational/controlled category, and the general population/uncontrolled exposure limits apply to these devices.

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)
(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

* = Plane-wave equivalent power density

3. RF Exposure Evaluation

Standalone transmission MPE evaluation

Mode	Frequency	Antenna Gain	Output Power		Power density(S)	Limit for MPE
	(MHz)	(dBi)	(dBm)	(mW)	(mW/cm ²)	(mW/cm ²)
Wi-Fi(Esp32)	2412	2.0	14.06	50.816	0.01011	1.0
BLE(Esp32)	2440	2.0	-2.58	1.102	0.00022	1.0
BT(BT956)	2480	2.0	6.162	8.245	0.00164	1.0

According to KDB447498 D01 General RF Exposure Guidance v06, simultaneous transmission is evaluated:

Simultaneous transmission MPE test exclusion applies when the sum of the MPE ratios for all simultaneously transmitting antennas incorporated in a host device is ≤ 1.0 .

Calculation method:

$$S = P \cdot G / 4\pi R^2$$

Where:

S = power density(in appropriate units, e.g., mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW)

G = antenna gain

R = Separation distance (20cm)

For simultaneously transmit system, the calculated power density should comply with:

$$\text{The sum of MPE ratios} = \sum_i \frac{S_i}{S_{\text{Limit},i}} \leq 1$$

The worst case is as below:

Max MPE ratios of Wi-Fi/BT (Esp32 module) + Max MPE ratios of BT (BT956 module) =
 $0.01011/1 + 0.00164/1 = 0.01175 \leq 1$.



Annex A General Information

1. Identification of the Responsible Testing Laboratory

Company Name:	Kehu-Morlab Test Laboratory
Department:	Kehu-Morlab Test Laboratory
Address:	Unit 101, No.1732 Gangzhong Road, Xiamen Area, Pilot Free Trade Zone (Fujian), P. R. China
Responsible Test Lab Manager:	Mr. Di Dehai
Telephone:	+86-592-5612050
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2. Identification of the Responsible Testing Location

Name:	Kehu-Morlab Test Laboratory
Address:	Unit 101, No.1732 Gangzhong Road, Xiamen Area, Pilot Free Trade Zone (Fujian), P. R. China

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