RF Exposure Report

Report No.:	SABEIH-WTW-P21090617
FCC ID:	2AK5B-HB2
Test Model:	HB2LW1NA1
Received Date:	2021/9/14
Test Date:	2021/9/27 ~ 2021/10/13
Issued Date:	2021/12/14
Applicant:	Latch Systems, Inc.
Address:	508 West 26th Street Suite 6G New York, NY 10001 United States
Issued By:	Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch Lin Kou Laboratories
Lab Address:	No. 47-2, 14th Ling, Chia Pau Vil., Lin Kou Dist., New Taipei City, Taiwan
FCC Registration / Designation Number:	198487 / TW2021

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Release Control Record

Issue No.	Description	Date Issued
SABEIH-WTW-P21090617	Original release.	2021/12/14

1 Certificate of Conformity

Product:	Hub
Brand:	LATCH
Test Model:	HB2LW1NA1
Sample Status:	Engineering sample
Applicant:	Latch Systems, Inc.
Test Date:	2021/9/27 ~ 2021/10/13
Standards:	FCC Part 2 (Section 2.1091)
References Test Guidance:	KDB 447498 D01 General RF Exposure Guidance v06

The above equipment has been tested by **Bureau Veritas Consumer Products Services (H.K.) Ltd., Taoyuan Branch**, and found compliance with the requirement of the above standards. The test record, data evaluation & Equipment Under Test (EUT) configurations represented herein are true and accurate accounts of the measurements of the sample's RF characteristics under the conditions specified in this report.

Prepared by : Annie Chang , **Date:** 2021/12/14

Annie Chang / Senior Specialist

Approved by : Jeremy Lin , **Date:** 2021/12/14

Jeremy Lin / Project Engineer

2 RF Exposure

2.1 Limits For Maximum Permissible Exposure (MPE)

Frequency Range (MHz)	Electric Field Strength (V/m)	Magnetic Field Strength (A/m)	Power Density (mW/cm^2)	Average Time (minutes)
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

2.2 MPE Calculation Formula

$Pd = (Pout*G) / (4*pi*r^2)$

where

Pd = power density in mW/cm^2

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

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

2.3 Classification

The antenna of this product, under normal use condition, is at least 20cm away from the body of the user. So, this device is classified as **Mobile Device**.

2.4 Antenna Gain

Antenna Type		Dipole				
Band		BT	Zigbee	WLAN		
		2402-2480 MHz	2405-2480 MHz	2412-2462MHz	5180-5240MHz	5745-5825MHz
Gain	Ant. 4	--	--	2.5	3.3	2.5
	Ant. 5		--	3.2	3.1	2.4
	Ant. 6	3.3	--	--	--	--
	Ant. 7	--	3.4	--	--	--

Antenna Type		PIFA						
Band		WCDMA		LTE				
		2	5	2	4	5	12	13
Gain	Ant. 1 (Main)	2.3	1.3	2.3	2.8	1.3	1.1	1.1
	Ant. 2 (Div)	2.6	2.5	2.6	2.8	2.5	2.8	2.8

* For conducted power test, pre-tested Ant. 1 (Main), Ant. 2 (Div) port and found Ant. 1 (Main) port was the worst, therefore chosen for the final test. For the ERP/EIRP power test items, select the maximum antenna gain for the final test.

Note: The above Antenna information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications, the laboratory shall not be held responsible.

2.5 Calculation Result Of Maximum Conducted Power

Function	Frequency Band (MHz)	Max AV Power (dBm)	Antenna Gain (dBi)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
WLAN	2412-2462	24.26	3.2	20	0.1108	1
WLAN	5180-5240	18.61	3.3	20	0.0309	1
WLAN	5745-5825	23.82	2.5	20	0.0853	1
Zigbee	2405-2480	17.13	3.4	20	0.0225	1
BT LE	2402-2480	5.21	3.3	20	0.0014	1
BT EDR	2402-2480	10.15	3.3	20	0.0044	1

Frequency Band (MHz)	EIRP (dBm)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
WCDMA Band 2: 1852.4-1907.6MHz	25.18	20	0.066	1
LTE Band 2: 1850.7-1909.3MHz	25.30	20	0.067	1
LTE Band 4: 1710.7-1754.3MHz	25.79	20	0.075	1

Frequency Band (MHz)	ERP (dBm)	EIRP (dBm)	Distance (cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)
WCDMA Band 5: 826.4-846.6MHz	23.25	25.40	20	0.069	0.55
LTE Band 5: 824.7-848.3MHz	22.35	24.50	20	0.056	0.55
LTE Band 12: 699.7-715.3MHz	22.15	24.30	20	0.054	0.47
LTE Band 13: 779.5-784.5MHz	22.15	24.30	20	0.054	0.52
Note: EIRP = ERP + 2.15					

Note:

1. Determining compliance based on the results of the compliance measurement, not taking into account measurement instrumentation uncertainty.
2. 2.4GHz & 5GHz WLAN technologies cannot transmit at same time.
   WCDMA & LTE technologies cannot transmit at same time.
   WLAN, WWAN, Bluetooth & Zigbee technologies can transmit at same time.

Conclusion:

The formula of calculated the MPE is:

CPD1 / LPD1 + CPD2 / LPD2 + ……etc. < 1

CPD = Calculation power density

LPD = Limit of power density

WLAN 2.4GHz + Zigbee + BT EDR + WCDMA Band 5

= 0.1108/1 +0.0225/1 + 0.0044/1 + 0.069/0.55 = 0.2632

Therefore the maximum calculations of above situations are less than the "1" limit.

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