RF EXPOSURE

EVALUATION REPORT

APPLICANT	:	Hangzhou Great Star Industrial Co., Ltd.
PRODUCT NAME	:	Mini HUB
MODEL NAME	:	IM050101
BRAND NAME	:	N/A
FCC ID	:	2AMI2-IM050101
STANDARD(S)	:	47CFR 2.1091 KDB 447498
RECEIPT DATE	:	2019-01-11
TEST DATE	:	2019-03-29
ISSUE DATE	:	2019-04-10

Edited by: _____
Su Jinhai (Rapporteur)

Approved by: _____
Peng Huarui (Supervisor)

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DIRECTORY

MORLAB   SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

Tel: 86-755-36698555   Fax: 86-755-36698525

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Change history		
Version	**Date**	**Reason of changed**
1.0	2019-04-10	First edition

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Tel: 86-755-36698555   Fax: 86-755-36698525

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1. Technical Information

Note: Provide by manufacturer.

1.1 Applicant and Manufacturer Information

Applicant:	Hangzhou Great Star Industrial Co., Ltd.
Applicant Address:	No.35, Jiuhuan Road, Jianggan District, Hangzhou, China
Manufacturer:	Zhejiang Great Star Industrial Co., Ltd
Manufacturer Address:	No.1 Building, No.11, Qihui Road, Changan Town(Agriculture Development Zone) Haining, Zhejiang Province, China

1.2 Equipment under Test (EUT) Description

EUT Type:	Mini HUB
Hardware Version:	kphub_hv_1.0.0
Software Version:	kphub_rv_1.0.0
Frequency Bands:	WLAN: 802.11b/g/n-HT20:2412MHz- 2462MHz
	Zigbee: 2405MHz- 2480MHz
Modulation Mode:	802.11b: DSSS
	802.11g/n-HT20: OFDM
	Zigbee: GFSK
Antenna Type:	PCB Antenna
Antenna Gain:	3.0dBi

Note :

1. This test report is updated from SZ18120323S01, based on the similarity between before,the applicant and the manufacturer information, the product name ,brand name and model name were changed.

2. For a more detailed description, please refer to Specification or User's Manual supplied by the applicant and/or manufacturer.

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FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

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1.3 Identification of all used EUT

The EUT identity consists of numerical and letter characters, the letter character indicates the test sample, and the following two numerical characters indicate the software version of the test sample.

EUT Identity	Hardware Version	Software Version
1#	kphub_hv_1.0.0	kphub_rv_1.0.0

1.4 Applied Reference Documents

Leading reference documents for testing:

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

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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

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Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

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3. RF Output Power

<WLAN output power>

	Mode	Channel	Frequency (MHz)	Average power (dBm)	Tune-Up Limit
2.4GHz WLAN	802.11b 1Mbps	CH 1	2412	**13.52**	**14.00**
		CH 6	2437	13.27	13.50
		CH 11	2462	13.04	13.50
	802.11g 6Mbps	CH 1	2412	11.72	12.00
		CH 6	2437	11.32	11.50
		CH 11	2462	11.14	11.50
	802.11n-HT20 MCS0	CH 1	2412	11.45	11.50
		CH 6	2437	11.18	11.50
		CH 11	2462	11.06	11.50

<Zigbee output power>

Mode	Channel	Frequency (MHz)	Average power (dBm) GFSK
Zigbee	CH 11	2405	7.01
	CH 18	2440	7.09
	CH 26	2480	**7.09**
Tune-up Limit			7.50

Note: According to KDB 447498 Section 4.3, SAR test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.

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FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
Block67, BaoAn District, ShenZhen , GuangDong Province, P. R. China

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4. RF Exposure Evaluation

Standalone transmission evaluation:

Bands	Frequency (MHz)	Maximum Tune-up Limit (dBm)	Antenna Gain (dBi)	EIRP (mW)	Power density (mW/cm²)	Limit for MPE (mW/cm²)
2.4GHz WLAN	2412	14.0	3.0	50.12	0.010	1.0
Zigbee	2480	7.50	3.0	11.22	0.002	1.0

Note:

1. According to KDB 447498, SAR test exclusion conditions are based on source-based time-averaged maximum conducted output power of the RF channel requiring evaluation, adjusted for tune-up tolerance, and the minimum test separation distance required for the exposure conditions.

2. 2.4GHz WLAN and Zigbee cannot transmit simultaneously.

3. MPE calculation method

$$Power\ Density = EIRP/4\pi R^2$$

Where: EIRP = P+G

P = Output Power (dBm)

G = Antenna Gain (dBi)

R = Separation Distance (20cm)

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Tel: 86-755-36698555   Fax: 86-755-36698525

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Annex A General Information

1. Identification of the Responsible Testing Laboratory

Laboratory Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Laboratory Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China
Telephone:	+86 755 36698555
Facsimile:	+86 755 36698525

2. Identification of the Responsible Testing Location

Name:	Shenzhen Morlab Communications Technology Co., Ltd. Morlab Laboratory
Address:	FL.3, Building A, FeiYang Science Park, No.8 LongChang Road, Block 67, BaoAn District, ShenZhen, GuangDong Province, P. R. China

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SHENZHEN MORLAB COMMUNICATIONS TECHNOLOGY Co., Ltd.
FL1-3, Building A, FeiYang Science Park, No.8 LongChang Road,
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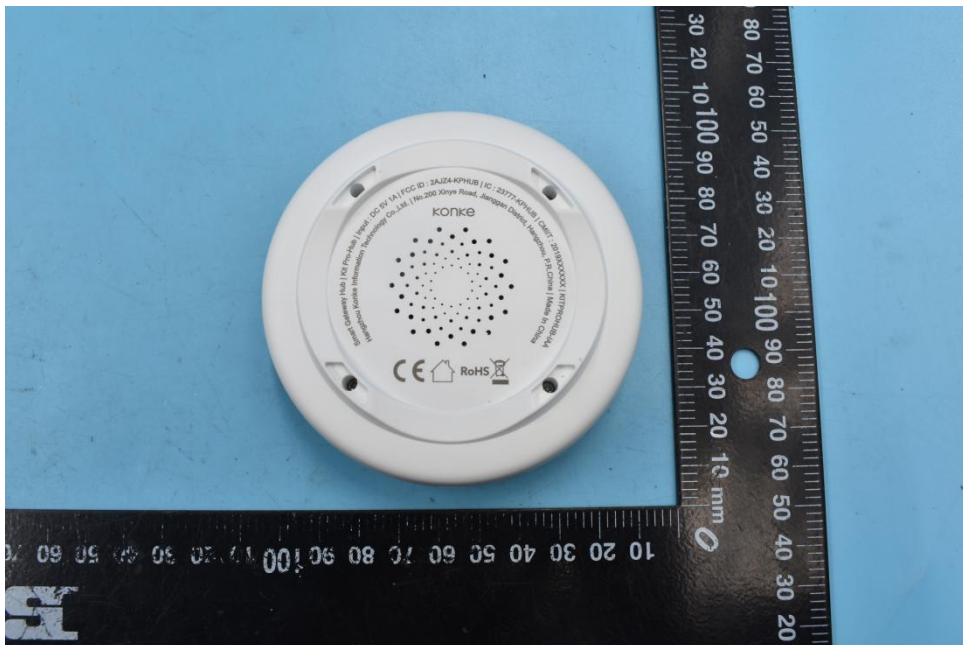
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Annex B Photographs of the EUT

EUT Front View

EUT Back View

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Tel: 86-755-36698555   Fax: 86-755-36698525

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