

RF EXPOSURE REPORT

FOR

Applicant	:	Mercku Inc.
Address	:	509 Beaver Creek Rd. Waterloo, Ontario, Canada
Equipment under Test	:	M2 Bee MESH Node
Model No.	:	Bee
Trade Mark	:	MERCKU
FCC ID	:	2APR4-BEE
Manufacturer	:	ShenZhen Mcdinet Technology Co., LTD
Address	:	Room 601, Unit A1, Kexing Science Park, No.15 Keyuan Road, Hi-tech Industrial Park, Nanshan, Shenzhen 518057, PRC

Issued By: Dongguan Dongdian Testing Service Co., Ltd.

Add: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan
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REPORT

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TEST REPORT DECLARE

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Standard Used: KDB447498 D01 General RF Exposure Guidance v06

We Declare:

The equipment described above is assessed by Dongguan Dongdian Testing Service Co., Ltd and in the configuration assessed the equipment complied with the standards specified above. The assessed results are contained in this report and Dongguan Dongdian Testing Service Co., Ltd is assumed of full responsibility for the accuracy and completeness of these assess.

After evaluation, our opinion is that the equipment In Accordance with above standard.

Report No:	DDT-R18062504-1E3		
Date of Receipt:	Jun 26, 2018	Date of Test:	Jun 26, 2018 ~ Jul. 05, 2018

Prepared By:

Ella Gong

Ella Gong /Engineer



Damon Hu /EMC Manager

Note: This report applies to above tested sample only. This report shall not be reproduced in parts without written approval of Dongguan Dongdian Testing Service Co., Ltd.

Revision history

Rev.	Revisions	Issue Date	Revised By
---	Initial issue	Jul. 12, 2018	

1. General information

1.1. Description of Equipment

EUT* Name	: M2 Bee MESH Node
Model Number	: Bee
EUT function description	: Please reference user manual of this device
Power supply	: 110~240V 50/60Hz 0.5A
Radio Specification	: 2.4G: IEEE 802.11b/g/n 5G: IEEE802.11n/a/ac
Operation frequency	: 2.4G: IEEE 802.11b: 2412MHz—2462MHz IEEE 802.11g: 2412MHz—2462MHz IEEE 802.11n HT20: 2412MHz—2462MHz IEEE 802.11n HT40: 2422MHz—2452MHz 5G: IEEE 802.11a: 5180MHz-5240MHz, 5745MHz-5825MHz IEEE 802.11n HT20: 5180MHz-5240MHz, 5745MHz-5825MHz IEEE 802.11n HT40: 5190MHz-5230MHz, 5755MHz-5795MHz IEEE 802.11ac HT20: 5180MHz-5240MHz, 5745MHz-5825MHz IEEE 802.11ac HT40: 5190MHz-5230MHz, 5755MHz-5795MHz IEEE 802.11ac HT80: 5210MHz, 5775MHz
Modulation	: 2.4G: IEEE 802.11b: DSSS(CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM(64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK) 5G: IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK)
Data rate	: 2.4G: IEEE 802.11b: 1, 2, 5.5, 11 Mbps IEEE 802.11g: 6, 9, 12, 18, 24, 36, 48, 54 Mbps IEEE 802.11n HT20: up to 150 Mbps IEEE 802.11n HT40: up to 300 Mbps 5G: IEEE 802.11a: 6, 9, 12, 18, 24, 36, 48, 54 Mbps IEEE 802.11n HT20: up to 150 Mbps, HT40: up to 300 Mbps IEEE 802.11ac VHT20: up to 150 Mbps, VHT40: up to 300 Mbps VHT80: up to 886.7 Mbps
Antenna Type	: Integrated antenna 1: 2.4G band maximum PK gain 0.5dBi, 5G band maximum PK gain 1dBi Integrated antenna 2: 2.4G band maximum PK gain 0.5dBi, 5G band maximum PK gain 1dBi The EUT incorporates a MIMO function. Physically, it provides two completed transmitters and receivers(2T2R), two transmit signals are completely uncorrelated, then, Direction gain= G_{ANT}
Sample Type	: Series production

1.2. Assess laboratory

Dongguan Dongdian Testing Service Co., Ltd

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CNAS Accreditation No. L6451; A2LA Accreditation No. 3870.01

2. RF Exposure evaluation for FCC

2.1. Requirement

Systems operating under the provisions of FCC 47 CFR section shall be operated in a manner that ensures that the public is not exposed to radio frequency energy level in excess of the Commission's guidelines.

In accordance with 47 CFR FCC Part 2 Subpart J, section 2.1091 this device has been defined as mobile device whereby a distance of 0.2m normally can be maintained between the user and the device, and below RF Permissible Exposure limit shall comply with.

Limits for General Population/Uncontrolled Exposure

(B) Limits for General Population / Uncontrolled Exposure

Frequency Range (MHz)	Electric Field Strength (E) (V/m)	Magnetic Field Strength (H) (A/m)	Power Density (S) (mW/cm ²)	Averaging Time E ² , H ² or S (minutes)
0.3-1.34	614	1.63	(100)*	30
1.34-30	824/f	2.19/f	(180/f)*	30
30-300	27.5	0.073	0.2	30
300-1500			F/1500	30
1500-100,000			1.0	30

Note: f = frequency in MHz ; *Plane-wave equivalent power density

2.2. Calculation Method

$$E(\text{V/m}) = \frac{\sqrt{30 \times P \times G}}{d} \quad \text{Power Density: } S(\text{mW/cm}^2) = \frac{E^2}{377}$$

E = Electric field (V/m)

P = Peak RF output power (mW)

G = EUT Antenna numeric gain (numeric)=

d = Separation distance between radiator and human body (m)

The formula can be changed to

We can change the formula to:

$$S = \frac{30 \times P \times G}{377 \times d^2} \quad \text{or, } d = \sqrt{\frac{30 \times P \times G}{377 \times S}}$$

From the peak EUT RF output power, the minimum mobile separation distance, $d=0.2\text{m}$, as well as the gain of the used antenna, the RF power density can be obtained.

2.3. Estimation Result

Mode	PK Output power (dBm)	Output power (mW)	Antenna Gain (dBi)	MPE Values (mW/cm ²)	MPE Limit (mW/cm ²)
2.4G WIFI Max power	24.41	276.06	0.5	0.062	1
5G WIFI Max power	22.70	186.21	1	0.042	1
2.4G+ 5G WIFI Max power	/	/	/	0.104	1

Note: The estimation distance is 20cm, the device could operate in both 2.4G and 5G, so in this Synchronous launch conditions, The MPE is equal to the sum of 2.4G MPE Value and 5G MPE Value.

Conclusion: No SAR evaluation required since transmitter power is below FCC threshold

END OF REPORT