

# RF EXPOSURE REPORT

## FOR

<b>Applicant</b>	:	Mercku Inc.
<b>Address</b>	:	3600 Steeles Avenue East, Suite C108B, Markham, Ontario, L3R 9Z7, Canada
<b>Equipment under Test</b>	:	M6a Plus Mesh Wi-Fi Router
<b>Model No.</b>	:	M6a Plus
<b>Trade Mark</b>	:	MERCKU
<b>FCC ID</b>	:	2APR4-M6P
<b>Manufacturer</b>	:	Mercku Technology (China), Inc.
<b>Address</b>	:	Block B1, Southern Software Park No.1 Software Road, Tangjia Zhuhai, Guangdong, China

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

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

### Table of Contents

Test report declares.....	3
1. General Information .....	5
1.1. Description of equipment .....	5
1.2. Assess laboratory.....	7
2. RF Exposure Evaluation .....	7
2.1. Requirement.....	7
2.2. Calculation method .....	8
2.3. Estimation result.....	8

## 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.**

<b>Report No:</b>	DDT-R22100908-2E16		
<b>Date of Receipt:</b>	Oct. 13, 2022	<b>Date of Test:</b>	Oct. 13, 2022 ~ Nov. 22, 2022

**Prepared By:**

*Johnny Wang*

**Johnny Wang/Engineer**

**Approved By:**



**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	Nov. 22, 2022	

## 1. General Information

### 1.1. Description of equipment

EUT* Name	: M6a Plus Mesh Wi-Fi Router
Model Number	: M6a Plus
EUT function description	: Please reference user manual of this device
Power Supply	: DC 12V 1.5A from external AC/DC Adapter
Sample Type	: Series production
Sample Number	: S22100908-01

#### 2.4G WIFI:

Radio Technology	: IEEE 802.11b/g/n/ax
Operation frequency	: IEEE 802.11b: 2412 MHz - 2462 MHz IEEE 802.11g: 2412 MHz - 2462 MHz IEEE 802.11n HT20: 2412 MHz - 2462 MHz IEEE 802.11n HT40: 2422 MHz - 2452 MHz IEEE 802.11ax HE20: 2412 MHz - 2462 MHz IEEE 802.11ax HE40: 2422 MHz - 2452 MHz
Modulation	: IEEE 802.11b: DSSS (CCK, DQPSK, DBPSK) IEEE 802.11g: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ax: OFDM, OFDMA (1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK)
Transmitter rate	: 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 144.4 Mbps IEEE 802.11n HT40: up to 300 Mbps IEEE 802.11ax HE20: up to 286.8 Mbps IEEE 802.11ax HE40: up to 573.6 Mbps
Antenna Gain	: Ant1: 3.9 dBi Ant2: 3.9 dBi

Antenna information			
	Ant1 gain	Ant2 gain	MIMO
IEEE 802.11b	3.9	3.9	/
IEEE 802.11g	3.9	3.9	/
IEEE 802.11n HT20	3.9	3.9	6.91
IEEE 802.11n HT40	3.9	3.9	6.91
IEEE 802.11ax HE20	3.9	3.9	6.91
IEEE 802.11ax HE40	3.9	3.9	6.91

## 5G WIFI:

Radio Technology	: IEEE 802.11a/n/ac/ax
Operation frequency	: IEEE 802.11a: 5180MHz-5240MHz, 5260MHz-5320MHz, 5500MHz-5700MHz, 5745MHz-5825MHz IEEE 802.11n HT20: 5180MHz-5240MHz, 5260MHz-5320MHz, 5500MHz-5700MHz, 5745MHz-5825MHz IEEE 802.11n HT40: 5190MHz-5230MHz, 5270MHz-5310MHz, 5510MHz-5670MHz, 5755MHz-5755MHz IEEE 802.11ac HT20: 5180MHz-5240MHz, 5260MHz-5320MHz, 5500MHz-5700MHz, 5745MHz-5825MHz IEEE 802.11ac HT40: 5190MHz-5230MHz, 5270MHz-5310MHz, 5510MHz-5670MHz, 5755MHz-5755MHz IEEE 802.11ac HT80: 5210MHz, 5290MHz, 5530MHz, 5610MHz, 5775MHz IEEE 802.11ax HT20: 5180MHz-5240MHz, 5260MHz-5320MHz, 5500MHz-5700MHz, 5745MHz-5825MHz IEEE 802.11ax HT40: 5190MHz-5230MHz, 5270MHz-5310MHz, 5510MHz-5670MHz, 5755MHz-5755MHz IEEE 802.11ax HT80: 5210MHz, 5290MHz, 5530MHz, 5610MHz, 5775MHz
Modulation	: IEEE 802.11a: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11n HT20, HT40: OFDM (64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ac: OFDM (256QAM, 64QAM, 16QAM, QPSK, BPSK) IEEE 802.11ax: OFDM, OFDMA (1024QAM, 256QAM, 64QAM, 16QAM, QPSK, BPSK)
Transmitter rate	: IEEE 802.11a: up to 54 Mbps IEEE 802.11n HT20: up to 144.4 Mbps IEEE 802.11n HT40: up to 300 Mbps IEEE 802.11ac VHT20: up to 173.4 Mbps IEEE 802.11ac VHT40: up to 400 Mbps IEEE 802.11ac VHT80: up to 866.6 Mbps IEEE 802.11ax HE20: up to 286.8 Mbps IEEE 802.11ax HE40: up to 573.5 Mbps IEEE 802.11ax HE80: up to 1201 Mbps
Antenna Gain	: Ant1: 7 dBi Ant2: 7 dBi

Antenna information			
	Ant1 gain	Ant2 gain	MIMO
IEEE 802.11a	7	7	/
IEEE 802.11n HT20	7	7	10.01
IEEE 802.11n HT40	7	7	10.01
IEEE 802.11ac VHT20	7	7	10.01
IEEE 802.11ac VHT40	7	7	10.01
IEEE 802.11ac VHT80	7	7	10.01
IEEE 802.11ax HE20	7	7	10.01
IEEE 802.11ax HE40	7	7	10.01
IEEE 802.11ax HE80	7	7	10.01

## 1.2. Assess laboratory

Dongguan Dongdian Testing Service Co., Ltd.

Add.: No. 17, Zongbu Road 2, Songshan Lake Sci&Tech, Industry Park, Dongguan City, Guangdong Province, China, 523808.

Tel.: +86-0769-38826678, <http://www.dgddt.com>, Email: [ddt@dgddt.com](mailto:ddt@dgddt.com).

CNAS Accreditation No. L6451; A2LA Accreditation Number: 3870.01

FCC Designation Number: CN1182, Test Firm Registration Number: 540522

Innovation, Science and Economic Development Canada Site Registration Number: 10288A

Conformity Assessment Body identifier: CN0048

VCCI facility registration number: C-20087, T-20088, R-20123, R-20155, G-20118

## 2. RF Exposure Evaluation

### 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 0.2 m 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 <sup>2</sup> )	Averaging Time  E  <sup>2</sup> , H  <sup>2</sup> 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,  $d=0.2$  m, as well as the gain of the used antenna, the RF power density can be obtained.

## 2.3. Estimation result

Single transmission:

Mode	PK Output power (dBm)	Output power (mW)	Antenna Gain (dBi)	Antenna Gain (linear)	MPE Values (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )
2.4G wifi	15.91	38.99	3.9	2.45	0.01905	1
5G wifi	13.46	22.18	7	5.01	0.02213	1

Simultaneous transmission:

2.4G wifi Mode	PK Output power (dBm)	Output power (mW)	Antenna Gain (dBi)	Antenna Gain (linear)	MPE Values (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )
Ant 1	12.11	16.26	3.9	2.45	0.00794	1
Ant 2	11.36	13.68	3.9	2.45	0.00668	1
Maximum MPE ratio 2.4G wifi = 0.00794+0.00668 = 0.01462						

5G wifi Mode	PK Output power (dBm)	Output power (mW)	Antenna Gain (dBi)	Antenna Gain (linear)	MPE Values (mW/cm <sup>2</sup> )	MPE Limit (mW/cm <sup>2</sup> )
Ant 1	6.96	4.97	7	5.01	0.00495	1
Ant 2	6.02	4.00	7	5.01	0.00399	1
Maximum MPE ratio 5G wifi = 0.00495+0.00399 = 0.00894						



## Maximum Simultaneous transmission MPE Ratio for 2.4G WLAN and 5G WLAN

Maximum MPE ratio 2.4G wifi	Maximum MPE ratio 5G wifi	$\Sigma$ MPE ratios	Limit	Results
0.01905	0.02213	0.04118	1.000	Pass

Note: The estimation distance is 20 cm

Conclusion: MPE evaluation required since transmitter power is below FCC threshold

**END OF REPORT**