

FCC Maximum Permissible Exposure (MPE) Estimation Report

Report Number	:	68.950.25.0100.01	Date of Issue:	<u>2025-01-24</u>
Model	:	<u>T800, T800-2, T800-41</u>		
Product Type	:	<u>Dash Cam</u>		
Applicant	:	<u>70mai Co., Ltd.</u>		
Address	:	<u>Room 2220, building 2, No. 588, Zixing road, MinHang District, 201100 Shanghai, CHINA</u>		
Manufacturer	:	<u>70mai Co., Ltd.</u>		
Address	:	<u>Room 2220, building 2, No. 588, Zixing road, MinHang District, 201100 Shanghai, CHINA</u>		
Test Result	:	<input checked="" type="checkbox"/> Positive	<input type="checkbox"/> Negative	
Total pages including Appendices	:	<u>9</u>		

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2 Details about the Test Laboratory

Details about the Test Laboratory

Test Site 1

Company name: TÜV SÜD Certification and Testing (China) Co., Ltd. Shenzhen Branch
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Guankou Erlu, Nantou, Nanshan District,
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FCC Registration No.: 514049

FCC Designation Number: CN5009

3 Description of the Equipment Under Test

Product:	Dash Cam
Model no.:	T800, T800-2, T800-41
Model Difference:	T800 is basic configuration. Based on T800 added Rear Camera Midriver RC24 is model T800-2. Based on T800 added Rear Camera Midriver RC41 is model T800-41.
FCC ID:	2AOK9-T800
Options and accessories:	Car charger, Power Cable
Ratings:	5VDC, 2.4A powered by car charger
RF Transmission Frequency:	2402MHz - 2480MHz for BLE_1M, BLE_2M; 2412MHz - 2462MHz for 2.4GHz Wi-Fi; 5180MHz – 5240MHz, 5745MHz – 5825MHz for 5GHz Wi-Fi
No. of Operated Channel:	40 for BLE_1M, BLE_2M; 11 for 2.4GHz Wi-Fi; 12 for 5GHz Wi-Fi
Modulation:	BLE: GFSK 802.11b: BPSK, QPSK, CCK 802.11g: BPSK, QPSK, 16-QAM, 64-QAM 802.11a: BPSK, QPSK, 16QAM, 64QAM 802.11n: BPSK, QPSK, 16QAM, 64QAM 802.11ac: BPSK, QPSK, 16QAM, 64QAM, 256QAM 802.11ax: BPSK, QPSK, 16QAM, 64QAM, 256QAM, 1024QAM
Antenna:	Type: onboard PCB antenna Function of each antenna as below: antenna 1: 2.4GHz Wi-Fi transmit&receive, BLE transmit&receive antenna 2: U-NII-1(5150-5250MHz)) transmit &receive U-NII-3(5745-5825MHz) transmit &receive 2.4GHz Wi-Fi receive only, BLE receive only Gain: antenna 1: 2.23 dBi for 2400-2483.5MHz antenna 2: 2.61 dBi for 5150-5250MHz; 2.49 dBi for 5745-5825MHz
Description of the EUT:	The Equipment Under Test (EUT) is a Dash Cam which support Low Energy Bluetooth(1M&2M) and Wi-Fi operated at 2.4GHz and U-NII-1(5150-5250MHz FCC only) and U-NII-3(5745-5825MHz FCC&ISED).

4 Test Specifications

Test Standards	
ANSI Std C95.1-2019	Safety Levels with Respect to Human Exposure to Radio Frequency Electromagnetic Fields, 3 kHz – 300 GHz.(IEEE Std C95.1-1991)
KDB 447498 D01	General RF Exposure Guidance v06
CFR § 2.1091	Radiofrequency radiation exposure evaluation: mobile devices.

5 General Information

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2025-01-24
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2025-01-24
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6 RF Exposure Requirements

An estimation of MPE in this application for product is used to ensure if it complies with the rules of the standard in the regulation list above.

Maximum permissible exposure (MPE) refers to the RF energy that is acceptable for human exposure. It is broken down into two categories, Occupational/controlled and General population/uncontrolled.

Occupational/controlled limits apply in situations in which persons are exposed as a consequence of their employment provided those persons are fully aware of the potential for exposure and can exercise control over their exposure. Limits for occupational/controlled exposure also apply in situations when an individual is transient through a location where occupational/controlled limits apply provided he or she is made aware of the potential for exposure.

General population/uncontrolled exposures apply in situations in which the general public may be exposed, or in which persons that are exposed as a consequence of their employment may not be fully aware of the potential for exposure or cannot exercise control over their exposure.

A rough estimation of the expected exposure in power flux density on a given point can be made with the following equation:

$$S = \frac{P \times G}{4 \times \pi \times R^2}$$

Where:

S = power density

P = power input to the antenna

G = numeric gain of the antenna in the direction of interest relative to an isotropic radiator

R= distance to the centre of radiation of the antenna

EIRP = P*G

The antenna of the product, under normal use condition is at least 20 cm away from the body of the user. Warning statement to the user for keeping at least 20cm separation distance and the prohibition of operating to a person has been printed on the user's manual. Therefore, the S of the device is calculated with R=20cm, and if it is below the limit S, then we can conclude the device complies with the rules.

7 FCC MPE Limits

We analysis if it comply with the limits for General population/uncontrolled exposure. The FCC MPE limits for field strength and power density are given in 47CFR 1.1310(Table below). These limits are generally based on recommended exposure guidelines published by the National Council on Radiation Protection and Measurements (NCRP), and also partly based on guidelines recommended by the American National Standards Institute (ANSI) in Section 4.1 of ANSI/IEEE C95.1.

(A) Limits for Occupational/controlled Exposure				
Frequency Range(MHz)	Electric Field Strength(E)(V/m)	Magnetic Field Strength(H)(A/m)	Power Density (S)(mW/cm ²)	Averaging Time (minute) E ² , H ² or S
0.3-3.0	614	1.63	(100)*	6
3.0-30	1842/f	4.89/f	(900/f ²)*	6
30-300	61.4	0.163	1.0	6
300-1500	--	--	f/300	6
1500-100,000	--	--	5	6
(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 (minute) E ² , H ² or S
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

f=frequency in MHz

*Plane-wave equivalent power density

8 RF Exposure Evaluation (FCC)

8.1.1 Calculation of Power Density for Single Chain Transmitters

Mode	EIRP (dBm)	EIRP (mW)	R (cm)	S (mW/cm ²)	Limit (mW/cm ²)	MPE Ratio
BLE	7.92	6.194	20	0.00123	1.0	0.12%
2.4GHz Wi-Fi	19.05	80.353	20	0.01599	1.0	1.60%
5GHz Wi-Fi	19.06	80.538	20	0.01602	1.0	1.60%

8.1.2 Calculation of Simultaneous Transmission

In order to ensure compliance with the EMF for a controlled environment, the sum of the ratios of the power density to the corresponding EMF should not exceed unity. That is

$$\sum_i \frac{S_i}{S_{Limit,i}} \leq 1$$

The product also has multiple transmitters. The simultaneous transmission possibilities are as below:

No.	Simultaneous Tx Combination	MPE Ratio	Limit
1	BLE + 2.4GHz Wi-Fi	1.72%	1.0
2	BLE + 5GHz Wi-Fi	1.72%	1.0

Note: 2.4GHz Wi-Fi and 5GHz Wi-Fi do not support simultaneous transmission.

8.1.3 Conclusion

According to the table above, we can conclude that the limit percentage of above supporting frequency bands calculation results are less than 1, therefore, the product meets the requirements.