

FCC Maximum Permissible Exposure (MPE) Estimation Report

Report Number : **68.760.24.0012.01-S1** Date of Issue: 2024-05-20

Model : **H8131.P.-, H8136.P.-.**

Product Type : Mini Video OS

Applicant : ABB Xiamen Smart Technology Co., Ltd.

Address : 4th Floor, No. 881, FangShanXiEr Road, Xiang'An Industrial Area,
Torch Hi-Tech Industrial Development Zone, 361000 Xiamen S.E.Z,
Fujian Province, PEOPLE'S REPUBLIC OF CHINA

Manufacturer : ABB Xiamen Smart Technology Co., Ltd.

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Test Result : Positive Negative

Total pages including Appendices : 9

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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
Building 12 & 13, Zhiheng Wisdomland Business Park,
Guankou Erlu, Nantou, Nanshan District,
Shenzhen, Guangdong, China

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FCC Registration No.: 514049

FCC Designation Number: CN5009

3 Description of the Equipment Under Test

Product:	Mini Video OS
Model no.:	H8131.P.-., H8136.P.-.
FCC ID:	2AEBL-H8136
Options and accessories:	NIL
Ratings:	Input: 20V-27VDC, 8.4W Typ: 24VDC, 350mA
RF Transmission Frequency:	13.56 MHz
No. of Operated Channel:	1
Modulation:	FSK
Antenna Type:	PCB printed loop antenna
Description of the EUT:	The equipment under test is a Mini Video OS with 13.56MHz RFID function.

Remark:

All models are identical except for model number, size of front metal panel and the rear mounting accessory.

Unless otherwise specified, the model H8131.P.-. was selected as representative for all tests.

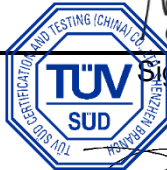

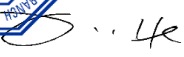
4 Test Specifications

Test Standards	
ANSI Std C95.1-1992	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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Prepared By Project Engineer	2024-05-20 Date	Myron Yu Name	 Signature 
Approved by Project Manager	2024-05-20 Date	Jessie He Name	Signature 

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 Calculation Method

$$EIRP = p_t \times g_t = (E \times d)^2 / 30 \tag{G.1}$$

where

- p_t is the transmitter output power in watts
- g_t is the numeric gain of the transmitting antenna (dimensionless)
- E is the electric field strength in V/m
- d is the measurement distance in meters (m)

$$ERP = EIRP / 1.64 = (E \times d)^2 / (30 \times 1.64) = (E \times d)^2 / 49.2 \tag{G.2}$$

where all terms are as previously defined.

Electric field strength (E):	52.09 (dBuV/m) =0.0004V/m (f=13.56MHz)
Distance (d):	3 (m)
Transmitter output power (ERP):	0.00003mW

8.2 Calculation of Power Density for Single Chain Transmitters

Mode	ERP (mW)	R (cm)	S (mW/cm ²)	Limit (mW/cm ²)
RFID 13.56MHz	0.00003	20	0.00000001	4.89

8.3 Conclusion

According to the table above, the calculated power density S is below the limit value of 4.89 mW/cm², therefore, the product (H8131.P.-. and H8136.P.-.) complies with the requirements.