中认信通
CHINA CERTIFICATION ICT CO., LTD (DONGGUAN)

ACCREDITED
TESTING LABORATORY
CERTIFICATE # 6356.01

RF EXPOSURE EVALUATION

Applicant: **Shanghai Emcan Technology Co., Ltd**

Address: Building 5, No. 701 Taogan Road, Songjiang District, Shanghai, China

FCC ID: **2BKRE-EM31P**

Product Name: **Harmonic Equatorial Mount**

Standard(s): **47 CFR §1.1307, 47 CFR §2.1091**
447498 D04 Interim General RF Exposure Guidance v01

The above device has been tested and found compliant with the requirement of the relative standards by China Certification ICT Co., Ltd (Dongguan)

Report Number: **2403V49413E-00B**

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Test Facility

The Test site used by China Certification ICT Co., Ltd (Dongguan) to collect test data is located on the No. 113, Pingkang Road, Dalang Town, Dongguan, Guangdong, China.

The lab has been recognized as the FCC accredited lab under the KDB 974614 D01 and is listed in the FCC Public Access Link (PAL) database, FCC Registration No. : 442868, the FCC Designation No. : CN1314.

Declarations

China Certification ICT Co., Ltd (Dongguan) is not responsible for the authenticity of any test data provided by the applicant. Data included from the applicant that may affect test results are marked with a triangle symbol "▲". Customer model name, addresses, names, trademarks etc. are not considered data.

Unless otherwise stated the results shown in this test report refer only to the sample(s) tested.

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DOCUMENT REVISION HISTORY

Revision Number	Report Number	Description of Revision	Date of Revision
1.0	2403V49413E-00B	Original Report	2024/9/7

1. GENERAL INFORMATION

1.1 Product Description for Equipment under Test (EUT)

EUT Name:	Harmonic Equatorial Mount
EUT Model:	EM31Pro
Rated Input Voltage:	DC 12V from adapter
Serial Number:	2PB2-1
EUT Received Date:	2024/8/2
EUT Received Status:	Good

2. RF EXPOSURE EVALUATION

2.1 Applicable Standard

According to KDB 447498 D04

Section 2.1.3 SAR-Based Exemption

A more comprehensive exemption, considering a variable power threshold that depends on both the separation distance and power, is provided in § 1.1307(b)(3)(i)(B). This exemption is applicable to the frequency range between 300 MHz and 6 GHz, with test separation distances between 0.5 cm and 40 cm, and for all RF sources in fixed, mobile, and portable device exposure conditions.
Accordingly, a RF source is considered an RF exempt device if its available maximum time-averaged (matched conducted) power or its effective radiated power (ERP), whichever is greater, are below a specified threshold.

$$P_{th}\ (\text{mW}) = \begin{cases} ERP_{20\,cm}(d/20\,\text{cm})^{x} & d \le 20\ \text{cm} \\ ERP_{20\,cm} & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases}$$

Where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\,cm}\sqrt{f}}\right)$$ and f is in GHz;

and

$$ERP_{20\,cm}\ (\text{mW}) = \begin{cases} 2040f & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060 & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases}$$

d = the separation distance (cm);

Section 2.2.2 Simultaneous Transmission with both SAR-based and MPE-Based Test Exemptions

This case is described in detail in § 1.1307(b)(3)(ii)(B) and covers the situations where both SAR-based and MPE-based exemption may be considered for test exemption in fixed, mobile, or portable device exposure conditions. For these cases, a device with multiple RF sources transmitting simultaneously will be considered an RF exempt device if the condition of Formula (1) is satisfied.

$$\sum_{i=1}^{a} \frac{P_i}{P_{th,i}} + \sum_{j=1}^{b} \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^{c} \frac{Evaluated_k}{Exposure\ Limit_k} \leq 1 \qquad (1)$$

Where:

a = number of fixed, mobile, or portable RF sources claiming exemption using paragraph (b)(3)(i)(B) of this section for P_{th}, including existing exempt transmitters and those being added.

b = number of fixed, mobile, or portable RF sources claiming exemption using paragraph (b)(3)(i)(C) of this section for Threshold ERP, including existing exempt transmitters and those being added.

c = number of existing fixed, mobile, or portable RF sources with known evaluation for the specified minimum distance including existing evaluated transmitters.

P_i = the available maximum time-averaged power or the ERP, whichever is greater, for fixed, mobile, or portable RF source i at a distance between 0.5 cm and 40 cm (inclusive).

$P_{th,i}$ = the exemption threshold power (P_{th}) according to paragraph (b)(3)(i)(B) of this section for fixed, mobile, or portable RF source i.

ERP_j = the ERP of fixed, mobile, or portable RF source j.

$ERP_{th,j}$ = exemption threshold ERP for fixed, mobile, or portable RF source j, at a distance of at least $\lambda/2\pi$ according to the applicable formula of paragraph (b)(3)(i)(C) of this section.

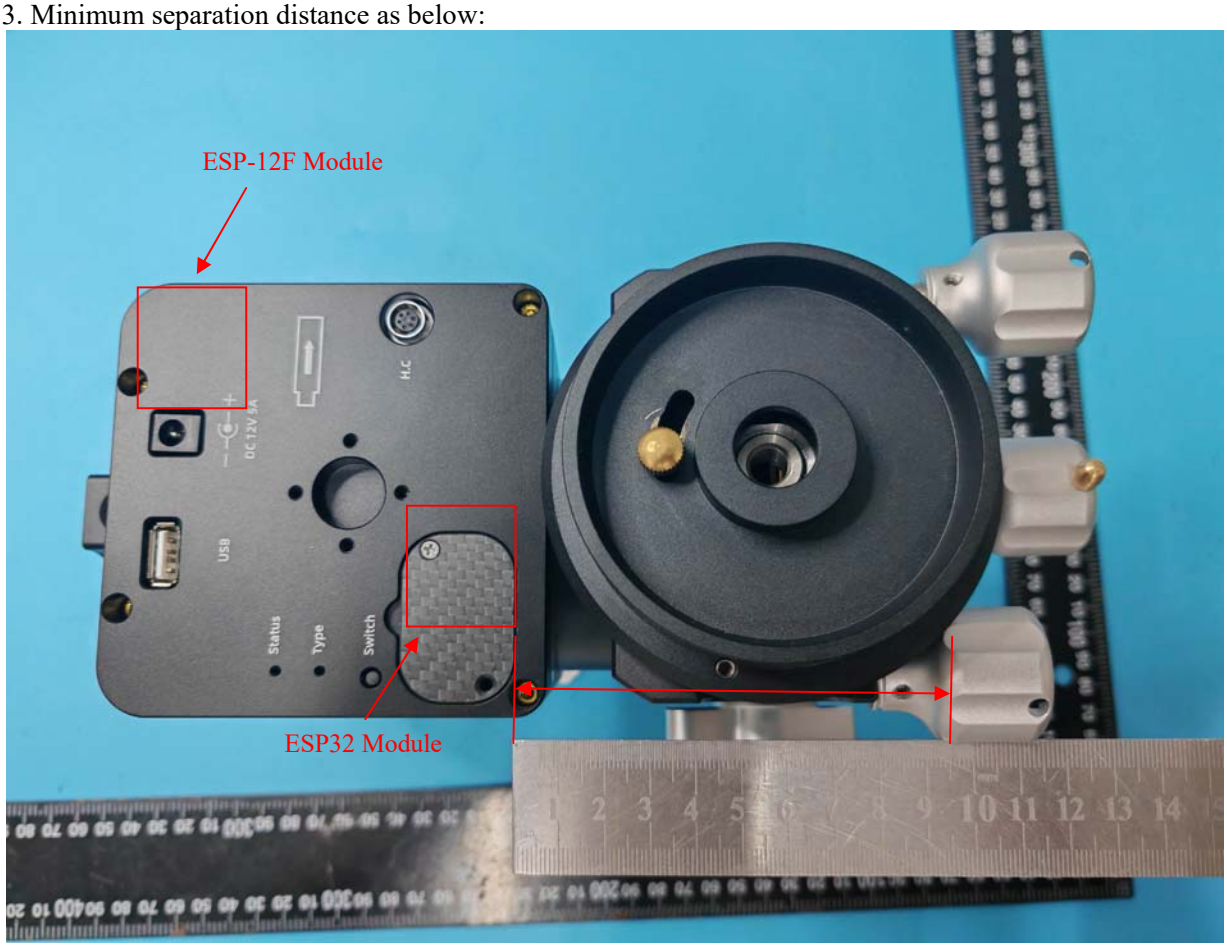
$Evaluated_k$ = the maximum reported SAR or MPE of fixed, mobile, or portable RF source k either in the device or at the transmitter site from an existing evaluation at the location of exposure.

$Exposure\ Limit_k$ = either the general population/uncontrolled maximum permissible exposure (MPE) or specific absorption rate (SAR) limit for each fixed, mobile, or portable RF source k, as applicable from § 1.1310 of this chapter.

2.2 Measurement Result

Radio	Frequency (MHz)	Distance (mm)	P_{th} (mW)	Maximum Conducted Power including Tune-up Tolerance (dBm)	Antenna Gain (dBi)	The Greater of Conducted Power or ERP	
						dBm	mW
ESP32 Module BDR/EDR	2402-2480	95	741	10	3.40	11.25	13.34
ESP32 Module BLE	2402-2480	95	741	8	3.40	9.25	8.41
ESP32 Module 2.4G Wi-Fi	2412-2462	95	742	26	3.40	27.25	530.88
ESP-12F Module 2.4G Wi-Fi	2412-2462	95	742	17	2.00	17	50.12

Note:
1. The device contains two certified Module, ESP32 Module with FCC ID: 2AC7Z-ESP32WROOM32E, granted on 04/10/2020; ESP-12F Module with FCC ID:2AHMR-ESP12F, granted on 09/15/2017.
2. The Conducted output power comes from module report.
3. Minimum separation distance as below:



The ESP32 Module and ESP-12F Module can transmit simultaneously.

$$\sum_{i=1}^{a}\frac{P_i}{P_{\mathrm{th},i}}+\sum_{j=1}^{b}\frac{ERP_j}{ERP_{\mathrm{th},j}}+\sum_{k=1}^{c}\frac{Evaluated_k}{Exposure\ Limit_k}$$

$=P_{\text{ESP32 Module Wi-Fi}} / P_{th} + P_{\text{ESP-12F Module Wi-Fi}} / P_{th}$

=530.88/742 + 50.12/742

=0.783

< 1.0

Result: The device meet FCC SAR-based exemption at 9.5 cm distance.

3. EUT PHOTOGRAPHS

Please refer to the attachment 2403V49413E-EXP EUT EXTERNAL PHOTOGRAPHS and 2403V49413E-INP EUT INTERNAL PHOTOGRAPHS

===== END OF REPORT =====