

Low Power Exemption Report for FCC

Applicant Name : **Raymarine UK Ltd**
Applicant Address : **Marine House, Cartwright Drive, Fareham, PO15 5RJ, United Kingdom**
Product Name : **RCU-1**
Brand Name : **Raymarine**
Model Number : **A80835**
FCC ID : **PJ5-RCU-1**

Report Number : **USSC254254001**
Compliant Standards : **FCC 47 CFR §2.1093**
Sample Received Date : **Apr. 21, 2025**
Report Issued Date : **Aug. 14, 2025**

The above equipment has been tested by **Eurofins E&E Wireless Taiwan Co., Ltd.**, and found compliance with the requirement of the above standards. The test record, data evaluation & Device Under Test (DUT) configurations represented herein are true and accurate accounts of the measurements of the sample's characteristics under the conditions specified in this report.

Note:

1. The test results are valid only for samples provided by customers and under the test conditions described in this report.
2. This report shall not be reproduced except in full, without the written approval of Eurofins E&E Wireless Taiwan Co., Ltd.
3. The relevant information is provided by customers in this test report. According to the correctness, appropriateness or completeness of the information provided by the customer, if there is any doubt or error in the information which affects the validity of the test results, the laboratory does not take the responsibility.

Approved By :

Roy Wu / SAR Technical Director



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Revision History

1. Test Regulations

1.1. Reference Standard and Guidance

The Maximum Permissible Exposure (MPE) evaluation documented in this report were performed in accordance with following FCC published KDB guidance and standard :

47 CFR Part 1.1307

47 CFR Part 1.1310

47 CFR Part 2.1093

KDB Publication 447498 D01 – General RF Exposure Guidance v06

KDB Publication 447498 D04 – Interim General RF Exposure Guidance v01

2. Information of Testing Laboratory

Test Facilities

Company Name: Eurofins E&E Wireless Taiwan Co., Ltd.
Address No.: 140-1, Changan Street, Bade District, Taoyuan City, Taiwan
Website: <https://www.atl.com.tw>
Telephone: +886-3-271-0188
Fax: +886-3-271-0190
E-mail: infoEETW@eurofins.com

Test Site Location

No. 140-1, Changan Street, Bade District, Taoyuan City, Taiwan
 No. 2, Wuquan 5th Rd. Wugu Dist., New Taipei City, Taiwan

Laboratory Accreditation

| Location | TAF | FCC | ISED |
|--|----------------------------|----------------------------|--------------------------------------|
| No. 140-1, Changan Street, Bade District, Taoyuan City, Taiwan | Accreditation No.: 1330 | Designation No.: TW0010 | Company No.: 7381A CAB ID: TW1330 |
| No. 2, Wuquan 5th Rd. Wugu Dist., New Taipei City, Taiwan | Accreditation No.: 1330 | Designation No.: TW0034 | Company No.: 28922 CAB ID: TW1330 |

3. DUT (Device Under Test) Information

3.1. Device Overview

| | | |
|--|---------------------------------|-----------------------|
| Product Name | RCU-1 | |
| Brand Name | Raymarine | |
| Model Name | A80835 | |
| FCC ID | PJ5-RCU-1 | |
| Supported Wireless Technologies | <i>Tx Frequency (MHz)</i> | <i>Operating Mode</i> |
| | <i>Bluetooth</i> 2402 ~ 2480 | LE |

Note:

The above DUT information is declared by manufacturer and for more detailed features description please refers to the manufacturer's specifications or User's Manual.

4. Low Power Exemption Assessment

4.1. Introduction

According to 47 CFR §2.1093, a portable device is defined as a transmitting device designed to be used in other than fixed locations and to generally be used in such a way that the RF source's radiating structure(s) is/are within 20 centimeters of the body of the user. the exposure limits in § 1.1310 of this chapter, and preparation of an EA if the limits are exceeded, is necessary for portable devices having single RF sources with more than an available maximum time-averaged power of 1 mW, more than the ERP listed in Table 1 to § 1.1307(b)(3)(i)(C), or more than the P_{th} in the following formula, whichever is greater. The following formula shall only be used in conjunction with portable devices not exempt by § 1.1307(b)(3)(i)(C) at distances from 0.5 centimeters to 20 centimeters and frequencies from 0.3 GHz to 6 GHz.

4.2. Determination of Exemption for Low Power Devices

For Single RF Sources, a single RF source is exempt if:

Option A :

The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph §1.1307(b)(3)(ii)(A). Medical implant devices may only use this exemption and that in paragraph §1.1307(b)(3)(ii)(A).

Option B :

The available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by:

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

Where

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

and

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

d = the separation distance (cm).

Option C :

Using *Table 1* and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value prescribed for that frequency. For the exemption in Table 1 to apply, R must be at least $\lambda/2\pi$, where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

Table 1: Single RF Sources Subject to Routine Environmental Evaluation

| RF Source Frequency (MHz) | Threshold ERP (Watts) |
|------------------------------|------------------------------|
| 0.3 – 1.34 | $1.920 \times R^2$ |
| 1.34 – 30 | $3.450 \times R^2 / f^2$ |
| 30 – 300 | $3.83 \times R^2$ |
| 300 – 1500 | $0.0128 \times R^2 \times f$ |
| 1500 – 100000 | $19.2 \times R^2$ |

For Multiple RF Sources, multiple RF sources are exempt if:

Option A :

The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of two centimeters between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those in §1.1307(b)(3)(i)(A). Medical implant devices may only use this exemption and that in §1.1307(b)(3)(i)(A).

Option B :

In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

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

Where:

a = number of fixed, mobile, or portable RF sources claiming exemption per §1.1307(b)(3)(i)(B) for P_{th} , including existing exempt transmitters and those being added.

b = number of fixed, mobile, or portable RF sources claiming exemption per §1.1307(b)(3)(i)(C) 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 §1.1307(b)(3)(i)(B) 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 §1.1307(b)(3)(i)(C).

$Evaluated_k$ = 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.

4.3. Low Power Exemption Exposure Evaluation

| Ant. Used | Band | Limb SAR test reduction | | | | | |
|-------------------|------|-------------------------|------------|------|-------------------|-------------|---|
| | | Frequency (GHz) | Tune-Power | | ANT Gain (dBi) | ERP (mW) | SAR Test Exclusion Threshold P_{th} (mW) Limb |
| Bluetooth Antenna | BT | 2.480 | 2.7 | 1.86 | 3.64 | 2.62 | 6.80 EXEMPT |

Note.

1. The determination of exemption is based on §1.1307(b)(3)(i)(B).
2. If the output power is more than the power threshold then SAR testing is required.
3. The highest frequency and power were used in order to evaluate conservatively.
4. When an antenna qualifies for the standalone SAR test exclusion and also transmits simultaneously with other antennas, the standalone SAR value must be estimated in accordance with KDB 447498.
5. The string "MEASURE" represents that SAR test is required; the string "EXEMPT" represents that SAR test exclusion can be applied.

The SAR tests were performed including the exemption part in practice.

Summary:

Since the maximum ERP of this device is less than the LPE level and this device is qualified for Low Power Exemption under the field reference level exposure exemption limits of §1.1310, the emitted RF fields will be incapable of producing exposures that exceed the exposure limits. Hence, this device complies with the reference levels and a complete SAR evaluation is not required.

***** End of Report *****