

**FCC RF Exposure Exemption report**  
**for**  
**X1R Meter**

**Model No.: X1RB0**

**FCC ID: 2ADBKX1RB0**

of

Applicant: Yamaha Motor Co.,Ltd.

Address: 2500 Shingai, Iwata-shi, Shizuoka-ken, Japan

Tested and Prepared

by

**Worldwide Testing Services (Taiwan) Co., Ltd.**

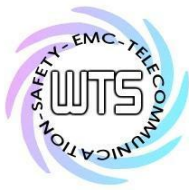
**FCC Registration No.: TW1477, TW1072**

**Industry Canada filed test laboratory Reg. No.: 20037, 5107A**



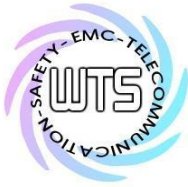
**Report No.: W6M22302-22440-EE**

6F, NO. 58, LANE 188, RUEY-KUANG RD., NEIHU TAIPEI 114, TAIWAN, R.O.C.  
TEL: 886-2-66068877 FAX: 886-2-66068879 E-mail: [wtls@wtls-lab.com](mailto:wtls@wtls-lab.com)



## **TABLE OF CONTENTS**

|          |                                          |          |
|----------|------------------------------------------|----------|
| <b>1</b> | <b>GENERAL INFORMATION.....</b>          | <b>2</b> |
| 1.1      | NOTES .....                              | 2        |
| 1.2      | TESTING LABORATORY .....                 | 3        |
| 1.2.1    | Location .....                           | 3        |
| 1.2.2    | Details of accreditation status .....    | 3        |
| 1.3      | DETAILS OF APPROVAL HOLDER .....         | 3        |
| 1.4      | APPLICATION DETAILS.....                 | 4        |
| 1.5      | GENERAL INFORMATION OF TEST ITEM.....    | 4        |
| 1.6      | TEST STANDARDS .....                     | 4        |
| <b>2</b> | <b>TECHNICAL TEST.....</b>               | <b>5</b> |
| 2.1      | SUMMARY OF TEST RESULTS.....             | 5        |
| 2.2      | TEST ENVIRONMENT .....                   | 5        |
| 2.3      | TEST EQUIPMENT LIST.....                 | 5        |
| <b>3</b> | <b>RF EXPOSURE TEST EXEMPTIONS .....</b> | <b>6</b> |
| <b>4</b> | <b>EXEMPTION CALCULATION.....</b>        | <b>8</b> |



# **Worldwide Testing Services(Taiwan) Co., Ltd.**

Registration number: W6M22302-22440-EE

FCC ID: 2ADBKX1RB0

## **1 General Information**

### **1.1 Notes**

The purpose of conformity testing is to increase the probability of adherence to the essential requirements or conformity specifications, as appropriate.

The complexity of the technical specifications, however, means that full and thorough testing is impractical for both technical and economic reasons.

Furthermore, there is no guarantee that a test sample which has passed all the relevant tests conforms to a specification.

Neither is there any guarantee that such a test sample will interwork with other genuinely open systems.

The existence of the tests nevertheless provides the confidence that the test sample possesses the qualities as maintained and that its performance generally conforms to representative cases of communications equipment.

Laboratory disclaimer-

1. The test results of this test report relate exclusively to the item tested as specified in 1.5.
2. The test report may only be reproduced or published in full.
3. Reproduction or publication of extracts from the report requires the prior written approval of the Worldwide Testing Services(Taiwan) Co., Ltd.
4. Antenna gain is provided by applicant and laboratory issue relevant data and results.

### **Tester:**

March 03, 2023

Ken Kang

Date

WTS-Lab.

Name

Signature

### **Technical responsibility for area of testing:**

March 03, 2023

Kevin Wang

Date

WTS

Name

Signature



# **Worldwide Testing Services(Taiwan) Co., Ltd.**

Registration number: W6M22302-22440-EE

FCC ID: 2ADBKX1RB0

## **1.2 Testing laboratory**

### **1.2.1 Location**

10m OATS

No.5-1, Lishui, Shuang Sing Village, Wanli Dist.,  
New Taipei City 207, Taiwan (R.O.C.)

3 meter semi-anechoic chamber

No.35, Aly. 21, Ln. 228, Ankang Rd., Neihu Dist.,  
Taipei City 114, Taiwan (R.O.C.)  
Tel: 886-2-6613-0228

Worldwide Testing Services (Taiwan) Co., Ltd.

6F., No. 58, Ln. 188, Ruiguang Rd., Neihu Dist.,  
Taipei City 114, Taiwan (R.O.C.)  
Tel: 886-2-6606-8877

### **1.2.2 Details of accreditation status**

Accredited testing laboratory

FCC filed test laboratory Reg. No.: TW1477, TW1072

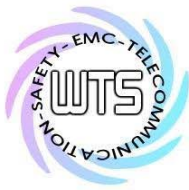
Industry Canada filed test laboratory Reg. No.: 20037, 5107A

### **Test location, where different from Worldwide Testing Services (Taiwan) Co., Ltd.**

Name: ./.  
Accredited no.: ./.  
Street: ./.  
Town: ./.  
Country: ./.

## **1.3 Details of approval holder**

Name: Yamaha Motor Co.,Ltd.  
Street: 2500 Shingai, Iwata-shi,  
Town: Shizuoka-ken,  
Country: Japan



Registration number: W6M22302-22440-EE  
FCC ID: 2ADBKX1RB0

## **1.4 Application details**

Date of receipt of test item: February 16, 2023  
Date of test: from February 16, 2023 to March 03, 2023

## **1.5 General information of Test item**

Type of test item: X1R Meter  
Model no.: X1RB0  
Multi-listing model no.: ./.  
Brand name: YAMAHA  
Power supply: 36Vd.c.  
Type of antenna: Rod antenna  
Antenna gain: -5.43 dBi

### **Technical data**

| Mode | Channel          | Conducted Power (dBm) |
|------|------------------|-----------------------|
| BLE  | Ch 0 : 2402 MHz  | -2.67                 |
|      | Ch 19 : 2440 MHz | -2.25                 |
|      | Ch 39 : 2480 MHz | -1.43                 |

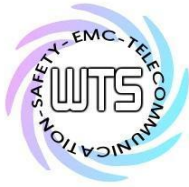
Operation modes: Duplex  
Modulation type: GFSK  
Sample no.: #01  
Special statement: ./.

### **Manufacturer: (if applicable)**

Name: ./.  
Street: ./.  
Town: ./.  
Country: ./.

## **1.6 Test standards**

47 CFR FCC Part 2.1093  
447498 D04 Interim General RF Exposure Guidance v01



Registration number: W6M22302-22440-EE

FCC ID: 2ADBKX1RB0

## **2 Technical test**

### **2.1 Summary of test results**

No deviations from the technical specification(s) were ascertained in the course of the tests performed. ☒

**or**

The deviations were ascertained in the course of the tests performed. ☐

### **2.2 Test environment**

Relative humidity content: 20 ... 75 %

Air pressure: 86 ... 103 kPa

Power supply: 36Vd.c.

Extreme conditions parameters: ./.

| Test item Name                                                         | Uncertainty                    |
|------------------------------------------------------------------------|--------------------------------|
| Estimation Result of Uncertainty of Conducted Output Power Measurement | Expanded Uncertainty : 1.48 dB |

The decision rule is: Measurement uncertainty is not included in the calculation of test results.

### **2.3 Test Equipment List**

| No.          | Test equipment    | Type   | Serial No. | Manufacturer | Cal. Date | Next Cal. Date |
|--------------|-------------------|--------|------------|--------------|-----------|----------------|
| ETSTW-RE 055 | SPECTRUM ANALYZER | FSU 26 | 200074     | R&S          | 2022/3/28 | 2023/3/27      |



Registration number: W6M22302-22440-EE

FCC ID: 2ADBKX1RB0

## **3 RF Exposure Test Exemptions**

### **3.1 1-mW Test Exemption**

$$P \leq 1\text{mW}$$

When the aggregate maximum available power of all transmitting antennas is  $\leq 1\text{ mW}$  in the same time-averaging period.

### **3.2 SAR-Based Exemption**

Max. time-averaged power(conducted power) or  $\text{ERP} \leq P_{\text{th}}$

$$P_{\text{th}}(\text{mW}) = \text{ERP}_{20\text{cm}} \left(\frac{d}{20}\right)^x \text{ for distance } d \leq 20\text{cm}$$

$$P_{\text{th}}(\text{mW}) = \text{ERP}_{20\text{cm}} \text{ for distance } 20\text{cm} < d \leq 40\text{cm}$$

$$x = -\log_{10} \left( \frac{60}{\text{ERP}_{20\text{cm}} \sqrt{f}} \right)$$

$$\text{ERP}_{20\text{cm}}(\text{mW}) \quad 0.3\text{GHz} \leq f < 1.5\text{GHz}: 2040 * f$$

$$1.5\text{GHz} \leq f \leq 6\text{GHz}: 3060$$

d: cm

f: GHz

**Table B.2 – Example Power Thresholds (mW)**

| Frequency (MHz) | Distance (mm) |    |    |    |     |     |     |     |     |     |     |
|-----------------|---------------|----|----|----|-----|-----|-----|-----|-----|-----|-----|
|                 | 5             | 10 | 15 | 20 | 25  | 30  | 35  | 40  | 45  | 50  |     |
|                 | 300           | 39 | 65 | 88 | 110 | 129 | 148 | 166 | 184 | 201 | 217 |
|                 | 450           | 22 | 44 | 67 | 89  | 112 | 135 | 158 | 180 | 203 | 226 |
|                 | 835           | 9  | 25 | 44 | 66  | 90  | 116 | 145 | 175 | 207 | 240 |
|                 | 1900          | 3  | 12 | 26 | 44  | 66  | 92  | 122 | 157 | 195 | 236 |
|                 | 2450          | 3  | 10 | 22 | 38  | 59  | 83  | 111 | 143 | 179 | 219 |
|                 | 3600          | 2  | 8  | 18 | 32  | 49  | 71  | 96  | 125 | 158 | 195 |
|                 | 5800          | 1  | 6  | 14 | 25  | 40  | 58  | 80  | 106 | 136 | 169 |



Registration number: W6M22302-22440-EE

FCC ID: 2ADBKX1RB0

## 3.3 MPE-Based Exemption

General frequency and separation-distance dependent MPE-based effective radiated power (ERP) thresholds are in Table B.1 to support an exemption from further evaluation from 300 kHz through 100 GHz.

>300kHz & distance  $R > \lambda/2\pi$  , MPE-based exemption

**Table B.1 –Thresholds for single RF sources subject to routine environmental evaluation**

| RF Source Frequency |   |           | Minimum Distance   |   |                    | Threshold ERP    |
|---------------------|---|-----------|--------------------|---|--------------------|------------------|
| $f_L$ MHz           | - | $f_H$ MHz | $\lambda_L / 2\pi$ | - | $\lambda_H / 2\pi$ | W                |
| 0.3                 | - | 1.34      | 159 m              | - | 35.6 m             | $1,920 R^2$      |
| 1.34                | - | 30        | 35.6 m             | - | 1.6 m              | $3,450 R^2/f^2$  |
| 30                  | - | 300       | 1.6 m              | - | 159 mm             | $3.83 R^2$       |
| 300                 | - | 1,500     | 159 mm             | - | 31.8 mm            | $0.0128 R^2/f^2$ |
| 1,500               | - | 100,000   | 31.8 mm            | - | 0.5 mm             | $19.2 R^2$       |

f: MHz

R: m

$\lambda/2\pi$

$v=f \lambda$

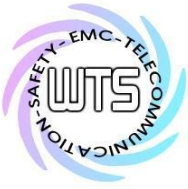
v: speed of light =  $3 \times 10^8 m/s$

f: frequency (Hz)

$\lambda$ : wavelength

| f (MHz) | $\lambda / 2\pi$ (m) | $\lambda / 2\pi$ (mm) |
|---------|----------------------|-----------------------|
| 0.125   | 382                  | 381,972               |
| 13.56   | 3.52                 | 3,521                 |
| 300     | 0.159                | 159                   |
| 918     | 0.052                | 52                    |
| 2400    | 0.020                | 19.9                  |
| 5250    | 0.009                | 9.09                  |
| 5600    | 0.009                | 8.53                  |
| 5825    | 0.008                | 8.20                  |
| 6000    | 0.008                | 7.96                  |
| 7000    | 0.007                | 6.82                  |
| 10000   | 0.005                | 4.77                  |





Registration number: W6M22302-22440-EE

FCC ID: 2ADBKX1RB0

**4 Exemption calculation**

**1-mW Test Exemption**

The maximum power is -1.43dBm (0.7194 mW)

$$0.7194 \text{ mW} \leq 1 \text{ mW}$$

The device is qualify for simultaneous transmission SAR exemption.