

**FCC RF Exposure Exemption report**

**for**

**RFID Reader**

**Model No.: RF-009V+**

**FCC ID: 2BEZORF009VPLUS**

**of**

**Applicant: Sunion Technology Co., Ltd.**

**Address: 6F., No. 69, Sec. 2, Guangfu Rd., Sanchong Dist.,  
New Taipei City 24158, Taiwan ( R.O.C.)**

**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.: W6M22401-23214-EE**

6F, NO. 58, LANE 188, RUEY-KUANG RD., NEIHU TAIPEI 114, TAIWAN, R.O.C.  
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# Worldwide Testing Services(Taiwan) Co., Ltd.

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## 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:**

February 19, 2024

Sora Kuo

Date

WTS-Lab.

Name

Signature

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

February 19, 2024

Kevin Wang

Date

WTS

Name

Signature



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

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## **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: Sunion Technology Co., Ltd.  
Street: 6F., No. 69, Sec. 2, Guangfu Rd., Sanchong Dist.,  
Town: New Taipei City 24158,  
Country: Taiwan ( R.O.C.)



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## 1.4 Application details

Date of receipt of test item: January 19, 2024  
Date of test: From January 21, 2024 to January 26, 2024

## 1.5 General information of Test item

Type of test item: RFID Reader  
Model number: RF-009V+  
Multi-listing model number: ./.  
Brand name: Sunion  
Maximum output power: 76.27 dBuV/m  
Transmitting frequency: 134 kHz  
Operation modes: Half-duplex  
Modulation type: FM  
Antenna type: Coil Antenna  
Antenna Gain: 0.5 dBi  
Power supply: 12 Vd.c.  
Sample no.: #01

Classification:

|  |                                     |
|--|-------------------------------------|
| Fixed Device                                 | <input checked="" type="checkbox"/> |
| Mobile Device (Human Body distance > 20cm)   | <input type="checkbox"/>            |
| Portable Device (Human Body distance < 20cm) | <input type="checkbox"/>            |

## Manufacturer: (if applicable)

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

## 1.6 Test standards

447498 D04 Interim General RF Exposure Guidance v01



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## **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: 12 Vd.c.

Extreme conditions parameters: ./.

| Test item Name  | Uncertainty                  |
|---|------------------------------|
| Estimation Result of Uncertainty of Radiated Emission | Expanded Uncertainty : 1.92B |

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 004    | EMI TEST RECEIVER | ESI 40       | 832427/004      | R&S              | 2023/10/19 | 2024/10/18     |
| ETSTW-RE 176    | Loop Antenna      | FMZB 1513-60 | 00039           | SCHWARZBECK      | 2023/8/10  | 2024/8/9       |
| ETSTW-Cable 020 | N TYPE Cable      | OATS Cable 1 | N30N30-L335-15M | JYE BAO CO.,LTD. | 2023/6/26  | 2024/6/25      |



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**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  $\leq 1$  mW in the same time-averaging period.

**3.2 SAR-Based Exemption**

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

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

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

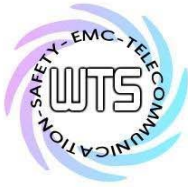
$$x = -\log_{10} \left( \frac{60}{ERP_{20\text{cm}} \sqrt{f}} \right)$$

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

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 |



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**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

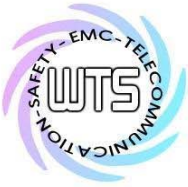
**Table B.1 –Thresholds for single RF sources subject to routine environmental evaluation**

| 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                  |





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**4 Exemption calculation**

**1-mW Test Exemption**

The maximum power is 76.27 dBuV/m (0.01270 mW)

$$0.01270 \text{ mW} \leq 1\text{mW}$$

The device is qualify for simultaneous transmission SAR exemption.