

# RF Exposure Evaluation Report

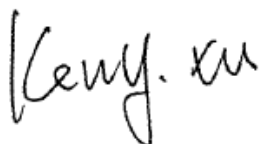
**Application No.:** SZCR2103020006AT  
**Applicant:** Sunwave Communications Co., Ltd.  
**Address of Applicant:** Sunwave Building 581 Huoju Avenue, Binjiang District, Hangzhou, P.R. China  
 Zip: 310053  
**Manufacturer:** Sunwave Communications Co., Ltd.  
**Address of Manufacturer:** Sunwave Building 581 Huoju Avenue, Binjiang District, Hangzhou, P.R. China  
 Zip: 310053  
**Factory:** Sunwave Communications Co., Ltd.  
**Address of Factory:** Sunwave Building 581 Huoju Avenue, Binjiang District, Hangzhou, P.R. China  
 Zip: 310053

**Equipment Under Test (EUT):**  
**EUT Name:** Remote unit  
**Model No.:** R222  
**Trade Mark:** CROSSFIRE, SUNWAVE  
**FCC ID:** 2AEJ4R2220708  
**Standards:** 47 CFR Part 1.1307  
 47 CFR Part 1.1310  
**Date of Receipt:** 2020-09-21  
**Date of Test:** 2020-09-21 to 2020-10-13  
**Date of Issue:** 2021-04-25

<b>Test Result:</b>	<b>Pass*</b>
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\* In the configuration tested, the EUT complied with the standards specified above

This report supersedes our previous report SZCR210302000602, issued on 2021-04-01, which is hereby deemed null and void..



Keny Xu  
 EMC Laboratory Manager



## 2 Version

<b>Revision Record</b>				
<b>Version</b>	<b>Chapter</b>	<b>Date</b>	<b>Modifier</b>	<b>Remark</b>
01		2020-10-13		Original
02		2021-04-25		Update Model No.

<b>Authorized for issue by:</b>			
			
		<hr/> <b>Edison Li /Project Engineer</b>	
			
		<hr/> <b>Eric Fu /Reviewer</b>	



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## 4 General Information

### 4.1 General Description of EUT

Power Supply:	AC120V 60Hz
Type of Modulation	CQPSK/12.5kHz FM/TETRA in 768MHz to 775MHz CQPSK/12.5kHz FM/TETRA in 851MHz to 869MHz
Frequency Band:	Downlink 768MHz to 775MHz Downlink 851MHz to 869MHz
Normal Output Power:	37dBm (downlink)
Sample Type:	Fixed production
Antenna Gain:	0dBi



## 4.2 Test Location

All tests were performed at:

SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch

No. 1 Workshop, M-10, Middle section, Science & Technology Park, Shenzhen, Guangdong, China  
 518057

Telephone: +86 (0) 755 2601 2053 Fax: +86 (0) 755 2671 0594

No tests were sub-contracted.

## 4.3 Test Facility

The test facility is recognized, certified, or accredited by the following organizations:

- **A2LA (Certificate No. 3816.01)**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory is accredited by the American Association for Laboratory Accreditation(A2LA). Certificate No. 3816.01.

- **VCCI**

The 3m Fully-anechoic chamber for above 1GHz, 10m Semi-anechoic chamber for below 1GHz, Shielded Room for Mains Port Conducted Interference Measurement and Telecommunication Port Conducted Interference Measurement of SGS-CSTC Standards Technical Services Co., Ltd. have been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: G-20026, R-14188, C-12383 and T-11153 respectively.

- **FCC –Designation Number: CN1178**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized as an accredited testing laboratory.

Designation Number: CN1178. Test Firm Registration Number: 406779.

- **Innovation, Science and Economic Development Canada**

SGS-CSTC Standards Technical Services Co., Ltd., Shenzhen EMC Laboratory has been recognized by ISED as an accredited testing laboratory.

CAB identifier: CN0006.

IC#: 4620C.

## 4.4 Deviation from Standards

None.

## 4.5 Abnormalities from Standard Conditions

None.

## 4.6 Other Information Requested by the Customer

None.



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## 5 RF Exposure Evaluation

### 5.1 RF Exposure Compliance Requirement

#### 5.1.1 Limits

All transmitters are exempt from routine SAR and RF exposure evaluations provided that they comply with the requirements of sections 2.5.2 and 4 of RSS102 issue 5 March 2015. If the equipment under test (EUT) meets the requirements of sections 2.5.2 and 4, applicants are only required to submit a properly signed declaration of compliance.

##### 5.1.1.1 Exemption Limits for Routine Evaluation – RF Exposure Evaluation

- below 20 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 1 W (adjusted for tune-up tolerance);
- at or above 20 MHz and below 48 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $4.49/f^{0.5}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;
- at or above 48 MHz and below 300 MHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 0.6 W (adjusted for tune-up tolerance);
- at or above 300 MHz and below 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than  $1.31 \times 10^{-2} f^{0.6834}$  W (adjusted for tune-up tolerance), where  $f$  is in MHz;
- at or above 6 GHz and the source-based, time-averaged maximum e.i.r.p. of the device is equal to or less than 5 W (adjusted for tune-up tolerance).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the e.i.r.p. was derived.



**5.1.1.2 Table 4: RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)**

Frequency Range (MHz)	Electric Field (V/m rms)	Magnetic Field (A/m rms)	Power Density (W/m <sup>2</sup> )	Reference Period (minutes)
0.003-10 <sup>21</sup>	83	90	-	Instantaneous*
0.1-10	-	0.73/ <i>f</i>	-	6**
1.1-10	87/ <i>f</i> <sup>0.5</sup>	-	-	6**
10-20	27.46	0.0728	2	6
20-48	58.07/ <i>f</i> <sup>0.25</sup>	0.1540/ <i>f</i> <sup>0.25</sup>	8.944/ <i>f</i> <sup>0.5</sup>	6
48-300	22.06	0.05852	1.291	6
300-6000	3.142 <i>f</i> <sup>0.3417</sup>	0.008335 <i>f</i> <sup>0.3417</sup>	0.02619 <i>f</i> <sup>0.6834</sup>	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	616000/ <i>f</i> <sup>1.2</sup>
150000-300000	0.158 <i>f</i> <sup>0.5</sup>	4.21 x 10 <sup>-4</sup> <i>f</i> <sup>0.5</sup>	6.67 x 10 <sup>-5</sup> <i>f</i>	616000/ <i>f</i> <sup>1.2</sup>

Note: *f* is frequency in MHz.  
 \*Based on nerve stimulation (NS).  
 \*\* Based on specific absorption rate (SAR).

F= Frequency in MHz

Friis Formula

Friis transmission formula:  $Pd = (Pout \cdot G) / (4 \cdot \pi \cdot R^2)$

Where

Pd = power density in mW/cm<sup>2</sup>

Pout = output power to antenna in mW

G = gain of antenna in linear scale

Pi = 3.1416

R = distance between observation point and center of the radiator in cm

Pd is the limit of MPE, 1 mW/cm<sup>2</sup>. If we know the maximum gain of the antenna and the total power input to the antenna, through the calculation, we will know the distance r where the MPE limit is reached.



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### 5.1.2 EUT RF Exposure Evaluation

Antenna Gain: 0dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 6.31 in linear scale.

Frequency (MHz)	EIRP (including Tune-up tolerance) (dBm)	Conduct power (including Tune-up tolerance) (dBm)	R (cm)	Power Density (mW/cm <sup>2</sup> )	Limit (mW/cm <sup>2</sup> )	Result
768	38	38	160	0.0196	0.2455	Pass
851	38	38	160	0.0196	0.2633	Pass

Note: Refer to report No. SZEM210302000603 for EUT test value.

Two bands can transmit Simultaneously. The MPE ratio is  $(0.0196/0.2455) + (0.0196/0.2633) = 0.1542$  which is less than 1.0. So the RF exposure evaluation is satisfied with RSS-102.

End of the Report -

