RF Exposure Evaluation Report

Application No.:	SZEM1901010517CR
Applicant:	Sunwave Communications Co., Ltd.
Manufacturer:	Sunwave Communications Co., Ltd.
Factory:	Sunwave Communications Co., Ltd.
Product Name:	Remote Unit
Product Description:	The RU conducts digital-analog conversion and power amplification of the input signals.
Model No.(EUT):	iDAS-R211
Trade Mark:	CROSSFIRE,SUNWAVE
FCC ID:	2AEJ4R2112626
Standards:	47 CFR Part 1.1307 (2018) 47 CFR Part 1.1310 (2018)
Date of Receipt:	2019-01-03
Date of Test:	2019-01-03 to 2019-01-18
Date of Issue:	2019-01-25
Test Result :	**PASS***

* In the configuration tested, the EUT complied with the standards specified above.

Keny Xu
EMC Laboratory Manager

2 Version

Revision Record				
Version	**Chapter**	**Date**	**Modifier**	**Remark**
01		2019-01-25		Original

Authorized for issue by:				
Tested By		Edison Li **Edison Li /Project Engineer**		2019-01-25 **Date**
Checked By		Eric Fu **Eric Fu /Reviewer**		2019-01-25 **Date**

3 Contents

4 General Information

4.1 Client Information

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

4.2 General Description of EUT

Product Name:	Remote Unit
Model No.:	iDAS-R211
Trade Mark:	CROSSFIRE,SUNWAVE
Sample Type:	Fixed production
Power Supply:	AC120V 60Hz
Optical Fiber:	200cm (unshielded)
AC Cable:	200cm (unshielded)
Type of Modulation:	LTE , WCDMA, CDMA
Frequency Band:	Downlink 862MHz to 894MHz include the Modulation: LTE , WCDMA, CDMA

4.3 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.

4.4 Test Facility

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

• **CNAS (No. CNAS L2929)**

CNAS has accredited SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab to ISO/IEC 17025:2005 General Requirements for the Competence of Testing and Calibration Laboratories (CNAS-CL01 Accreditation Criteria for the Competence of Testing and Calibration Laboratories) for the competence in the field of testing.

• **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.

4.5 Deviation from Standards

None.

4.6 Abnormalities from Standard Conditions

None.

4.7 Other Information Requested by the Customer

None.

No.1 Workshop, M-10, Middle Section, Science & Technology Park, Shenzhen, China 518057 t (86-755) 26012053 f (86-755) 26710594 www.sgsgroup.com.cn
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5 RF Exposure Evaluation

5.1 RF Exposure Compliance Requirement

5.1.1 Limits

According to FCC Part1.1310: The criteria listed in the following table shall be used to evaluate the environment impact of human exposure to radio frequency (RF) radiation as specified in part1.1307(b)

TABLE 1—LIMITS FOR MAXIMUM PERMISSIBLE EXPOSURE (MPE)

Frequency range (MHz)	Electric field strength (V/m)	Magnetic field strength (A/m)	Power density (mW/cm^2)	Averaging time (minutes)
(A) Limits for Occupational/Controlled Exposures				
0.3–3.0	614	1.63	*(100)	6
3.0–30	1842/f	4.89/f	*(900/f^2)	6
30–300	61.4	0.163	1.0	6
300–1500			f/300	6
1500–100,000			5	6
(B) Limits for General Population/Uncontrolled Exposure				
0.3–1.34	614	1.63	*(100)	30
1.34–30	824/f	2.19/f	*(180/f^2)	30
30–300	27.5	0.073	0.2	30
300–1500			f/1500	30
1500–100,000			1.0	30

F= Frequency in MHz

Friis Formula

Friis transmission formula: $Pd = (Pout*G)/(4* Pi * R^2)$

Where

Pd = power density in mW/cm2

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 id the limit of MPE. 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.

According to FCC Part22.913: the ERP of base stations and repeaters must not exceed 500 watts per emission

According to FCC Part27.50(c): the ERP of base stations and repeaters must not exceed 1000 watts per emission

According to FCC Part27.50(h): the ERP of base stations and repeaters must not exceed 1004 watts per emission

5.1.2 Test Procedure

Software provided by client enabled the EUT to transmit and receive data at lowest, middle and highest channel individually.

4.1.3 EUT RF Exposure Evaluation

1) exposure conditions for standalone operations for Band 26

Output Power Into Antenna & RF Exposure Evaluation Antenna Gain:

Operating frequency range: 862~894MHz						
Frequency (MHz)	Peak Output Power (dBm)	Peak Output Power (mW)	Minimum Distance to Human body (cm)	Power density (mW/cm^2)	Maximun Antenna Gain (Numeric)	Maximun Antenna Gain (dBi)
862	47	50118.72	200	2.87	28.78	14.59
878	47	50118.72	200	2.93	29.39	14.68
894	47	50118.72	200	2.98	29.89	14.75

Operating frequency range: 862~894MHz					
Peak Output Power (dBm)	Peak Output Power (mW)	ERP Power Limit (W)	ERP Power Limit (dBm)	Maximun Antenna Gain (Numeric)	Maximun Antenna Gain (dBi)
47	50118.72	500	56.99	65.16	18.14

Conclusion:

When used at a distance of 2m, the antenna gain should not exceed 14.59dBi.

- End of the Report -