1 Cover Page

RF Exposure Evaluation Report

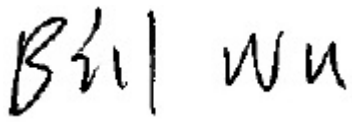
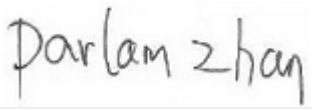
Application No.:	SHEM1912020209CR
FCC ID:	PS4MGTG1
Applicant:	Rain Harvesting Pty Ltd.
Address of Applicant:	12 Mayneview Street,Milton Qld 4064,AUSTRALIA
Equipment Under Test (EUT):	
EUT Name:	Tank Gauge Plus
Model No.:	MGTG1RC2
Trade Mark:	Rain Harvesting
Standard(s) :	FCC Rules 47 CFR §2.1091
	KDB447498 D01 General RF Exposure Guidance v06
Date of Receipt:	2019-12-30
Date of Test:	2020-03-01 to 2020-06-30
Date of Issue:	2020-06-30
Test Result:	**Pass***

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

Parlam Zhan
E&E Section Manager

The manufacturer should ensure that all products in series production are in conformity with the product sample detailed in this report. If the product in this report is used in any configuration other than that detailed in the report, the manufacturer must ensure the new system complies with all relevant standards. Any mention of SGS International Electrical Approvals or testing done by SGS International Electrical Approvals in connection with, distribution or use of the product described in this report must be approved by SGS International Electrical Approvals in writing.

Revision Record			
Version	**Description**	**Date**	**Remark**
00	Original	2020-06-30	/

Authorized for issue by:				
				
		Bill Wu / Project Engineer		
				
		Parlam Zhan /Reviewer		

2 Contents

3 General Information

3.1 General Description of E.U.T.

Power supply:	DC 3V By 2*AA size batteries
Test voltage:	DC 3V

3.2 Technical Specifications

Sigfox

Antenna Gain	1.68dBi (Provided by the manufacturer)
Antenna Type	PCB Antenna
Modulation Type	DBPSK
Number of Channels	54 (9 Macro channels x 6 Micro channels)
Operation Frequency	902.1375MHz-904.6625MHz
Spectrum Spread Technology	Frequency Hopping Spread Spectrum(FHSS)

3.3 Test Location

All tests were performed at:

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

588 West Jindu Road, Xinqiao, Songjiang, 201612 Shanghai, China.

Tel: +86 21 6191 5666

Fax: +86 21 6191 5678

3.4 Test Facility

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

• CNAS (No. CNAS L0599)

CNAS has accredited SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. to ISO/IEC 17025:2017 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.

• NVLAP (LAB CODE: 201034-0)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. is accredited by the National Voluntary Laboratory Accreditation Program (NVLAP).

• FCC (Designation Number: CN5033)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been recognized as an accredited testing laboratory.

• ISED (CAB Identifier: CN0020)

SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. EMC Laboratory has been recognized by Innovation, Science and Economic Development Canada (ISED) as an accredited testing laboratory

• VCCI (Member No.: 3061)

The 3m Semi-anechoic chamber and Shielded Room of SGS-CSTC Standards Technical Services (Shanghai) Co., Ltd. has been registered in accordance with the Regulations for Voluntary Control Measures with Registration No.: R-13868, C-14336, T-12221, G-10830 respectively.

4 Test Standards and Limits

4.1 FCC Radiofrequency radiation exposure limits:

According to§1.1310, the limit for general population/uncontrolled exposures

Frequency	Power density(mW/cm^2)	Averaging time(minutes)
300MHz~1.5GHz	f/1500	30
1.5GHz~100GHz	1.0	30

5 Measurement and Calculation

5.1 Maximum transmit power

The Power Data is based on the RF Test Report SHEM191202020901

Test Mode	Channel	Antenna Power[dBm]	Antenna Power[mW]
Sigfox	902.1375	22.51	**178.24**
Sigfox	903.4125	22.26	168.27
Sigfox	904.6625	22.19	165.58

The power for BLE module refer certificate of FCC ID:WS2-ZB7412

Test Mode	Test Channel	Antenna Power[dBm]	Peak Power (mW)
BLE	2402	4.72	**2.96**
BLE	2440	4.65	2.92
BLE	2480	4.57	2.86

5.2 MPE Calculation

According to the formula $S=P/4\pi R^2$, we can calculate S which is MPE.

Note:

1) P (mW)

2) R = distance to the center of radiation of antenna (in meter) = 20cm

3) MPE limit = 1mW/cm²

For BLE

The max antenna power is 2.96mW

The max. antenna gain is 2.3 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)	Result
2.96	1.698	20	0.00100	1	Pass

For SigFox

The max antenna power is 178.24mW

The max. antenna gain is 1.68 dBi

Max. Conducted Power P(mW)	Gain in Linear Scale G	Operation Distance R(cm)	Power Density (mW/cm^2)	Limit (mW/cm^2)	Result
178.24	1.472	20	0.05221	1	Pass

The BT and the SigFox modules can simultaneous transmitting.But the maximum rate of MPE is 0.001/1.0+0.052/1.0 =0.053<=1.0. according to the KDB447498 section 7.2 determine the device is exclusion from SAR test.

--End of the Report--