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Report No.: SZEM180400252004

Page: 1 of 8

SAR Evaluation Report

Application No.: SZEM1804002520CR
Applicant: Sensoro Co., LTD.
Address of Applicant: Room 2807 Building 1B, Wangjing SOHO, No 10 Wangjing Street, Chaoyang District, Beijing, China
Manufacturer: Sensoro Co., LTD.
Address of Manufacturer: Room 2807 Building 1B, Wangjing SOHO, No 10 Wangjing Street, Chaoyang District, Beijing, China
Factory: Sensoro Co., LTD.
Address of Factory: Room 2807 Building 1B, Wangjing SOHO, No 10 Wangjing Street, Chaoyang District, Beijing, China
Equipment Under Test (EUT):
EUT Name: α Humiture Sensor
Model No.: TH-14B
Trade mark: SENSORO
FCC ID: 2ADYO-S0015B5
Standard(s) : 47 CFR Part 1.1307
 47 CFR Part 1.1310
 KDB447498D01 General RF Exposure Guidance v06
Date of Receipt: 2018-04-03
Date of Test: 2018-04-19 to 2018-05-25
Date of Issue: 2018-06-06

Test Result:	Pass*
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* In the configuration tested, the EUT complied with the standards specified above.



Keny Xu
 EMC Laboratory 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.

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2 Version

Revision Record				
Version	Chapter	Date	Modifier	Remark
01		2018-06-06		Original

Authorized for issue by:				
				
		<hr/> Vincent Chen /Project Engineer		
				
		<hr/> Eric Fu /Reviewer		



3 Contents

	Page
1 COVER PAGE	1
2 VERSION	2
3 CONTENTS	3
4 GENERAL INFORMATION	4
4.1 GENERAL DESCRIPTION OF EUT	4
4.2 TEST LOCATION	5
4.3 TEST FACILITY	5
4.4 DEVIATION FROM STANDARDS	6
4.5 ABNORMALITIES FROM STANDARD CONDITIONS	6
4.6 OTHER INFORMATION REQUESTED BY THE CUSTOMER	6
5 SAR EVALUATION.....	7
5.1 RF EXPOSURE COMPLIANCE REQUIREMENT	7
5.1.1 <i>Standard Requirement</i>	7
5.1.2 <i>Test Procedure</i>	7
5.1.3 <i>EUT RF Exposure Evaluation</i>	8



4 General Information

4.1 General Description of EUT

Power supply:	Powered by Lithium Battery DC 3.6V
For BLE:	
Internal source:	32MHz
Antenna Gain	0.96dBi
Antenna Type	PCB Antenna
Channel Spacing	2MHz
Modulation Type	GFSK
Number of Channels	40
Operation Frequency	2402MHz to 2480MHz
For IoT:	
Antenna Gain:	1.5dBi
Antenna Type:	Dipole Antenna
Modulation Type:	CSS
Operation Frequency:	902.3MHz-927.5MHz
Channel Number:	127
Channel Spacing:	200KHz



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:

• 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.

• Industry Canada (IC)

Two 3m Semi-anechoic chambers and the 10m Semi-anechoic chamber of SGS-CSTC Standards Technical Services Co., Ltd. Shenzhen Branch EMC Lab have been registered by Certification and Engineering Bureau of Industry Canada for radio equipment testing with Registration No.: 4620C-1, 4620C-2, 4620C-3.



4.4 Deviation from Standards

None.

4.5 Abnormalities from Standard Conditions

None.

4.6 Other Information Requested by the Customer

None.



5 SAR Evaluation

5.1 RF Exposure Compliance Requirement

5.1.1 Standard Requirement

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: $P_d = (P_{out} * G) / (4 * \pi * R^2)$

Where

P_d = power density in mW/cm²

P_{out} = output power to antenna in mW

G = gain of antenna in linear scale

π = 3.1416

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

P_d is the limit of MPE, 1 mW/cm². 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.

5.1.2 Test Procedure

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



5.1.3 EUT RF Exposure Evaluation

1) Exposure conditions for standalone operations

For BLE

Antenna Gain: 0.96dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.24 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max. Conducted Peak Output Power (dBm)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
Low	2402	2.57	1.807	0.0004	1.0	PASS

Note: Refer to report No. SZEM180400252002 for EUT test Max Conducted Peak Output Power value. The distancer (5th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

For IoT:

Antenna Gain: 1.5dBi

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.41 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Channel	Frequency (MHz)	Max Field Strength (dBuV/m)	Output Power to Antenna (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	Result
Middle	914.9	111.33	2.72	0.00076	1.0	PASS

Note: Refer to report No. SZEM180400252003 for EUT test Max Field Strength value.

The distancer (5th column) calculated from the Fries transmission formula is far greater than 20 cm separation requirement.

2) Exposure conditions for simultaneous transmission operations

Simultaneous transmission MPE test is not required, because the Max. sum of the MPE ratios for BLE and IoT is $0.0004+0.00076=0.00116 < 1$

- End of the Report -