

RF Exposure Report

Project Number: 4772889

Proposal Number: 11292 Rev 3

Report Number: 4772889EMC05

Revision Level: 1

Client: Access Business Group LLC

Equipment Under Test: eSpring Water Purifier

Model Numbers: 122940 and 122941

FCC ID: 2ALC4122942

Contains FCC ID: 2ADHKWINC3400

Applicable Standards: 47 CFR §§ 2.1091

FCC KDB 447498 D01 General RF Exposure Guidance v06

FCC OET Bulletin 65

Report issued on: 13 November 2023

Result: Compliant



FOR THE SCOPE OF ACCREDITATION UNDER CERTIFICATE NUMBER: 3212.01

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1 General Information

1.1 Client Information

Name: Access Business Group LLC
Address: 7575 Fulton St East
City, State, Zip, Country: Ada, Michigan 49355 USA

1.2 Test Laboratory

Name: SGS North America, Inc.
Address: 620 Old Peachtree Road NW, Suite 100
City, State, Zip, Country: Suwanee, GA 30024, USA

Accrediting Body: A2LA
Type of lab: Testing Laboratory
Certificate Number: 3212.01

1.3 General Information of EUT

Type of Product: eSpring Water Purifier
Model Numbers: 122940 and 122941
122940R and 122941R
122940CA and 122941CA
Note on models: The EUT device electronics is identical for all models; the only difference is in the accessory kit – diverter or faucet.
Serial Number: Sample ID: 5981 (conducted sample)
Sample ID: SUW_SP_20210600432 (radiated sample)
FCC ID: 2ALC4122942
Contains FCC ID: 2ADHKWINC3400
Frequency Range: 13.56 MHz (RFID)
2402 – 2480 MHz (BLE)
2412 – 2462 MHz (WLAN)
Maximum Output Power: RFID: 65.3dBuV/m field strength at 3m
BLE: 7.1dBm*
WLAN: 23.7dBm*
Antenna: RFID: Internal PCB loop antenna
BLE/WLAN: Internal chip antenna (0.5dBi gain)*
Rated Voltage: 24 V_{dc} from AC/DC Adapter with input rating 100-120 V_{AC} 50/60 Hz
Test Voltage: 24 V_{dc} from AC/DC Adapter with input 120 V_{AC} 60 Hz
Sample Received Date: 07 May 2021 (conducted sample)
08 June 2021 (radiated sample)
Dates of testing: 09 July – 24 August 2021

**Data was not measured by SGS laboratory and therefore SGS is not responsible for accuracy. Data obtained via customer, specification sheet, previous regulatory filing or other.*

2 RF Exposure

2.1 Test Result

Test Description	Product Specific Standard	Test Result
RF Exposure	FCC Part 1.1310	Compliant

2.2 Test Method

Using the maximum conducted output power, the power density was calculated. Maximum antenna gain was assumed for this exercise. The output powers for the BLE and WLAN radios were obtained from the FCC grant for the certified module.

The formula below calculates power density.

$$S = \frac{PG}{4\pi R^2} \quad \text{or} \quad S = \frac{EIRP}{4\pi R^2}$$

where:

S = Power density (mW/cm²)

P = Maximum sourced-based average power delivered to antenna port (mW)

G = Maximum numeric power gain of antenna relative to an isotropic radiator (dBi -> linear)

R = Distance between by-stander and antenna (cm)

EIRP = Equivalent (or effective) isotropically radiated power

For the RFID radio, electric field strength measurements were made instead of conducted output power. The applicable field strength limit for maximum permissible exposure (MPE) is derived as follows from Table 1 in part 1.1310(e)(1) of the FCC eCFR 47 rules.

$$\text{Electric field strength limit} = 824/f(\text{in MHz}) = 824/13.56 = \underline{60.8V/m}$$

The limits for general population / uncontrolled exposure were used at a distance of 20cm.

2.3 Single transmission RF Exposure Levels (mW/cm²)

Band of Operation		Conducted Power w/tolerance	Antenna Gain	Cable Loss	Average EIRP		Distance (R)	Power Density EIRP _{avg} /(4πR ²)	FCC mW/cm ²	% of Limit	Verdict
Type	MHz	dBm			dBm	mW	cm	mW/cm ²			
WLAN 2.4	2400-2483.5	23.7	0.5	0.0	24.2	261	20	0.052	1.00	5%	Pass
Bluetooth	2400-2483.5	7.1	0.5	0.0	7.6	6	20	0.001	1.00	0%	Pass

Since the maximum field strength of the RFID radio was measured at a distance of 3m, this value needs to be converted to the field strength that would be present at a distance of 20cm from the device. Field strength is inversely proportional to distance, so since the distance is being divided by 15 (3/0.2), the field strength needs to be multiplied by 15. So here is the conversion of field strength from 3m to 20cm:

$$65.3\text{dBuV/m} = 1,819.7\text{uV/m (at 3m)} \times 15 = 27,295.5\text{uV/m} = \underline{0.0273V/m} \text{ (at 20cm)} \ll 60.8V/m \text{ limit}$$

2.4 Simultaneous transmissions

The BLE and WLAN radios do not operate with simultaneous transmissions. The RFID radio could transmit simultaneously with one of the other radios; however, its contribution to the total RF exposure is negligible since the measured field strength rounds to 0% of the limit.

3 Revision History

Revision Level	Description of changes	Revision Date
0	Initial Release	03 November 2021
1	<ul style="list-style-type: none"> - Changed EUT name from eSpringPro to eSpring - Updated model number information in section 1.3 - Added maximum output power information in section 1.3 - Added test method and limit information in section 2.2 - Added RFID evaluation results in sections 2.3 and 2.4 	13 November 2023