

TEST REPORT

Application No.: HKEM2211001010PF
Applicant: ECOLAB Inc.
Address of Applicant: FCC: 1 Ecolab Place, St Paul, Minnesota, United States, 55102
 IC: Ecolab Schuman Center-F6, 655 Lone Oak Drive, Eagan, MN United States, 55121

Equipment Under Test (EUT):

EUT Name: Bed Beacon
Model No.: 92053072
Trademark: EcoLab
FCC ID: Z9O-92053072
IC: 10060A-92053072
HVIN: 92053072
Standard(s) : 47 CFR Part 1.1307; 47 CFR Part 2.1091
 KDB447498D01 General RF Exposure Guidance v06
 RSS102 Issue 5 March 2015
 SPR-002 2nd edition October 2022

Date of Receipt: 2022-11-03
Date of Test: 2022-11-07 to 2022-11-10
Date of Issue: 2023-01-05

Test Result:	The submitted sample was found to comply with the test requirement
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Law Man Kit
 EMC Manager

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Unless otherwise stated the results shown in this test report refer only to the sample(s) tested and such sample(s) are retained for 30 days only.

Revision Record			
Revision No.	Date	Report superseded	Remark

Authorized for issue by:			
			
		Panny Leung /Project Engineer	
			
		Law Man Kit /Reviewer	

2 Test Summary

Radio Spectrum Technical Requirement				
Item	Standard	Method	Requirement	Result
RF Exposure	47 CFR Part 1.1307, 47 CFR Part 2.1091, KDB 447498 D01	KDB447498D01	KDB447498D01	PASS
RF Exposure	RSS102 Issue 5	RSS-102 Section 2.5.1	RSS102 Issue 5	PASS

Declaration of EUT Family Grouping:

N/A

Note:

The product scope is extended with a new AC adaptor and two models of external Mat Antenna (125kHz antenna).

- There is no AC Adaptor in the previous scope of product.
- There is only one Internal 125kHz antenna in the previous scope of product. The extended scope covers two additional External 125kHz antenna models which would be used with the Bed Beacon product. The internal and external 125kHz antenna models are switchable by manual buttons on the Bed Beacon product. Only one 125kHz antenna can be turned on at a time.

There is no change on the main unit as in the previous version, hence, only 125kHz transmitter was tested and related new antenna specification were submitted in this application.

Abbreviation:

- Tx: In this whole report Tx (or tx) means Transmitter.
- Rx: In this whole report Rx (or rx) means Receiver.
- RF: In this whole report RF means Radiated Frequency.
- CH: In this whole report CH means channel.
- Volt: In this whole report Volt means Voltage.
- Temp: In this whole report Temp means Temperature.
- Humid: In this whole report Humid means humidity.
- Press: In this whole report Press means Pressure.
- N/A: In this whole report not application.



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4 General Information

4.1 Details of E.U.T.

Power supply:	Adaptor Model: ATS018T-W060U Input: AC 100-240V, 50/60Hz, 0.48A Output: DC 5.9V, 2.5A, 14.75W or DC 3 V ('D' size battery x 2)
Test voltage:	AC 120V or DC 3 V
Cable:	Power Cable: 197cm unshielded 2 wires DC cable
Operation Frequency:	FHSS: 913.75MHz to 916.30MHz ASK: 917MHz ASK: 125kHz
Antenna Gain:	-2.5dBi -2.5dBi -1dBi
Antenna Type:	Integral antenna Integral antenna Magnetic Loop Antenna
Modulation Type:	FHSS: GFSK ASK ASK
Number of Channels:	FHSS: 50 ASK: 1 ASK: 1
Series number:	A1
Hardware Version:	Rev.A
Software Version:	V1.01
	Remark: Power level setting was not adjustable and fixed default through SW Version.

Frequency List

Channel Number	Frequency (MHz)	Channel Index
1	913.75	20
2	913.80	7
3	913.85	1
4	913.90	48
5	913.95	11
6	914.00	44
7	914.05	14
8	914.10	38
9	914.15	50
10	914.20	2
11	914.25	12
12	914.30	36
13	914.35	31
14	914.40	39
15	914.45	9
16	914.50	6
17	914.55	33
18	914.60	13
19	914.65	16
20	914.70	5
21	914.75	Reserved
22	914.80	49
23	914.85	10
24	914.90	23
25	914.95	8
26	915.00	25

Channel Number	Frequency (MHz)	Channel Index
27	915.05	34
28	915.10	3
29	915.15	35
30	915.20	32
31	915.25	Reserved
32	915.30	17
33	915.35	42
34	915.40	15
35	915.45	47
36	915.50	29
37	915.55	37
38	915.60	40
39	915.65	26
40	915.70	22
41	915.75	28
42	915.80	46
43	915.85	18
44	915.90	41
45	915.95	27
46	916.00	30
47	916.05	24
48	916.10	43
49	916.15	21
50	916.20	4
51	916.25	19
52	916.30	45

Channel	Frequency (MHz)
1	917

Channel	Frequency (kHz)
1	125

4.2 Description of Support Units

The EUT has been tested as an independent unit.

4.3 Test Location

All tests were performed at:

SGS Hong Kong Limited
Unit 2 and 3, G/F, Block A, Po Lung Centre,
11 Wang Chiu Road, Kowloon Bay, Kowloon, Hong Kong
Tel: +852 2305 2570 Fax: +852 2756 4480

No tests were sub-contracted.

4.4 Test Facility

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

• **IAS Accreditation (Lab Code: TL-817)**

SGS Hong Kong Limited has met the requirements of AC89, IAS Accreditation Criteria for Testing Laboratories, and has demonstrated compliance with ISO/IEC Standard 17025:2017, General requirements for the competence of testing and calibration laboratories. This organization is accredited to provide the services specified in the scope of accreditation maintained on the IAS website (www.iasonline.org).

The report must not be used by the client to claim product certification, approval, or endorsement by IAS, NIST, or any agency of the Federal Government.

• **FCC Recognized Accredited Test Firm (CAB Registration No.: 514599)**

SGS Hong Kong Limited has been accredited and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Designation Number: HK0015, Test Firm Registration Number: 514599.

• **Industry Canada (Site Registration No.: 26103; CAB Identifier No.: HK0015)**

SGS Hong Kong Limited has been recognized by Department of Innovation, Science and Economic Development (ISED) Canada as a wireless testing laboratory. The acceptance letter from the ISED is maintained in our files. CAB Identifier No: HK0015, Site Registration Number: 26103.

4.5 Deviation from Standards

None

4.6 Abnormalities from Standard Conditions

None

5 Radio Spectrum Technical Requirement

5.1 RF Exposure

5.1.1 Test Requirement:

CFR 47 Part 1.1310

Limit:

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 Exposure				
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
300-1,500			f/300	6
1,500-100,000			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
300-1,500			f/1500	30
1,500-100,000			1.0	30

f = frequency in MHz

* = Plane-wave equivalent power density

According to IEEE C95.3:2002 section 5.5.1.1, The power density S at a point on the axis at a distance d from a transmitting antenna is given by the Friis free-space transmission formula

$$S = \frac{PG}{4\pi d^2}$$

S = power density (mW/cm²)
P = the net power delivered to the antenna (mW)
G = gain of the antenna in linear scale
d = distance between observation point and center of the radiator (cm)

5.1.1 IC Radiofrequency radiation

According to RSS-102 Issue 5, section 2.5.2 Exemption.

RF exposure evaluation is required if the separation distance between the user and the device's radiating element is greater than 20 cm, except when the device operates as follows:

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 $22.48/f^{0.5}W$ (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).

5.1.2 EUT RF Exposure Evaluation

Antenna Gain: -2.5dBi

The maximum Gain measured in fully anechoic chamber is 0.56 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

This equipment shall be installed and operated with minimum distance 20cm between the radiator and human body.

For FCC;

FHSS:

Channel	Frequency (MHz)	Conduct power (including Tune-up tolerance) (dBm)	Conduct power (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	MPE Ratios	Result
Low	913.75	5.90	3.890	0.00044	0.60917	0.00071	PASS
High	916.30	6.46	4.426	0.00050	0.61087	0.00081	PASS

Note:

1. Refer to report No. HKEM190100000701 for EUT test conducted power value.

For IC:

FHSS:

Channel	Frequency (MHz)	Conduct power (including Tune-up tolerance) (dBm)	E.I.R.P (dBm)	E.I.R.P (W)	Limit (W)	Result
Low	913.75	5.90	5.90	0.00389	1.38	PASS
High	916.30	6.46	6.46	0.00443	1.39	PASS

Note:

1. Refer to report No. HKEM190100007501 for EUT test conducted power value.

For ASK:

Channel	Frequency (MHz)	Conduct power (including Tune-up tolerance) (dBm)	E.I.R.P (dBm)	E.I.R.P (W)	Limit (W)	Result
1	917.00	-8.80	-8.80	0.00013	1.39	PASS

$EIRP[dBm] = E[dBuV/m] - 95.2$, for $d = 3$ m for E-field.

Note: $E[dBuV/m]$ is 86.4 dB μ V/m as worse case was derived from test report HKEM190100007504.

Then $EIRP[mW] = 10^{(86.4-95.2)/10} = 0.13$ mW.

For GFSK:

Channel	Frequency (MHz)	Conduct power (including Tune-up tolerance) (dBm)	E.I.R.P (dBm)	E.I.R.P (W)	Limit (W)	Result
1	0.125	-17.70	-17.70	0.00002	1.00	PASS



$EIRP[dBm] = E[dBuV/m] - 95.2$, for $d = 3$ m for E-field.

Note: $E[dBuV/m]$ is 77.5 dB μ V/m as worse case was derived from test report HKEM221100101005.

Then $EIRP[mW] = 10^{(77.5-95.2)/10} = 0.02$ mW.

6 Photographs

Remark: Photos refer to Appendix: External Photo, Internal Photo, and Setup Photo

- End of the Report -