



Report No.: HKEM190100003002

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RF Exposure Evaluation Report

Application No.: HKEM1901000030AT
Applicant: Ecolab, Inc
Address of Manufacturer: Ecolab, Inc 650 lone Oak Drive Eagan, MN 55121
Equipment Under Test (EUT):
Product Name: HHCM915 CompassNet Network Hub
Model No.: 92053067
FCC ID: Z9O-92053067
Standards: 47 CFR Part 1.1307 (2016)
47 CFR Part 1.1310 (2016)
Date of Receipt: 2019-02-14
Date of Test: 2019-03-06 to 2019-03-07
Date of Issue: 2019-03-07

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

Authorized Signature:

Ivan Toa
EMC 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 General Information

2.1 General Description of EUT

Operating Frequency	913.7 MHz to 916.3 MHz
Type of Modulation:	GFSK
Number of Channels	50 Channels
Channel Separation:	50 kHz
Dwell time	Per channel is less than 0.4s.
Antenna Type	Integral
Antenna gain:	2.15 dBi
Speciality:	--
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Function:	Network Hub
Power Supply:	AC100-240V ~ 50-60Hz to DC 24V
Adapter:	ATS024T-W240U
Power cord:	DC cable: 150cm unshielded cable with ferrite cord

2.2 Test Location

All tests were performed at:

SGS IECC Limited (Member of the SGS Group (SGS SA))
No. 16-B, Yip Wo Street, On Lok Tsuen, Fanling, N.T., Hong Kong
Tel: +852 2305 2570 Fax: +852 2756 4480
No tests were sub-contracted.

2.3 Test Facility

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

• HOKLAS (Lab Code: 125)

SGS IECC Limited has been accepted by HKAS Executive, on the recommendation of the Accreditation Advisory Board, as a HOKLAS Accredited Laboratory, this laboratory meets the requirements of ISO/IEC 17025:2005 and it has been accredited for performing specific test as listed in the scope of accreditation within the test category of Electrical and Electronic Products.

• FCC Recognized Accredited Test Firm (CAB Registration No.: 446297)

SGS IECC 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: HK0010, Test Firm Registration Number: 446297.

• Industry Canada (Site Registration No.: 5193A; CAB Identifier No.: HK0001)

SGS IECC 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: HK0001, Site Registration Number: 5193A.

2.4 Measurement Uncertainty (95% confidence levels, k=2)

No.	Item	Measurement Uncertainty
1	Radio frequency	$\pm 7.25 \times 10^{-8}$
2	RF power (conducted)	$\pm 0.75\text{dB}$
3	Radiated Spurious emission	$\pm 5.26\text{dB}$ (30MHz-1GHz)
		$\pm 5.11\text{dB}$ (1GHz-25GHz)
4	Temperature test	$\pm 1^{\circ}\text{C}$
5	Humidity test	$\pm 3\%$
6	DC and low frequency voltages test	$\pm 0.5\%$

2.5 Deviation from Standards

None.

2.6 Abnormalities from Standard Conditions

None.

2.7 Other Information Requested by the Customer

None.

3 RF Exposure Evaluation

3.1 RF Exposure Compliance Requirement

3.1.1 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 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 the limit of MPE, f/1500 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.

3.1.2 Test Procedure

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

3.1.3 EUT RF Exposure Evaluation

For 900MHz network hub

Antenna 1 Gain: 2.15dBi ,

Antenna Gain: The maximum Gain measured in fully anechoic chamber is 1.64 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

Worst case result:

Frequency (MHz)	Conduct power (including Tune-up tolerance) (dBm)	E.I.R.P (mW)	Power Density at R = 20 cm (mW/cm ²)	Limit	MPE Ratios	Result
916.30	25.51	583.45	0.116	0.610	0.190	PASS

Note: Refer to test report **HKEM190100003001** for EUT conducted power value. The distancer (5th column) calculated from the Fries transmission formula is far greater than **20 cm** separation requirement.

So the SAR report is not required

- End of the Report -