TEST REPORT

Application No.:	HKEM2211001066HS
Applicant:	Unilux HVAC Industries Inc.
Address of Applicant:	7930 Huntington Rd #1, Woodbridge, ON L4H 4M8, Canada
Equipment Under Test (EUT):	
EUT Name:	3-Speed Fan Wi-Fi Thermostat
Model No.:	TA640FCW-ULX
Trademark:	UNILUX HVAC
FCC ID:	2BAPFGEN0UNITA
IC:	30777-GEN0UNITA
HVIN:	TA640FCW-ULX
Standard(s) :	47 CFR Part 1.1307; 47 CFR Part 2.1091 KDB447498D01 General RF Exposure Guidance v06 RSS102 Issue 5 March 2015
Date of Receipt:	2022-12-09
Date of Test:	2022-12-12 to 2023-03-09
Date of Issue:	2023-03-13
Test Result:	The submitted sample was found to comply with the test requirement

Law Man Kit
EMC Manager

Revision Record			
Revision No.	**Date**	**Report superseded**	**Remark**

Authorized for issue by:				
				
		Panny Leung **/Project Engineer**		Date: 2023-03-13
				
		Law Man Kit **/Reviewer**		Date: 2023-03-13

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

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.

3 Contents

4 General Information

4.1 Details of E.U.T.

Power supply:	AC 24V, 60Hz
Test voltage:	AC 24V
Cable:	N/A
Antenna Gain:	3.71 dBi
Antenna Type:	Integral antenna
Modulation Type:	802.11b: DSSS (CCK, DQPSK, DBPSK) 802.11g/n: OFDM (64QAM, 16QAM, QPSK, BPSK)
Number of Channels:	802.11b/g/n(HT20):11 802.11n(HT40):9
Operation Frequency:	802.11b/g/n(HT20): 2412MHz to 2462MHz 802.11n(HT40): 2422MHz to 2452MHz
Series number:	A1
Hardware Version:	TA640FCW-ULX A 1.0 221014
Software Version:	V0.9
	Remark: Power level setting was not adjustable and fixed default through SW Version.

Frequency List

Channel	Frequency (MHz)	Channel	Frequency (MHz)	Channel	Frequency (MHz)
1	2412	5	2432	9	2452
2	2417	6	2437	10	2457
3	2422	7	2442	11	2462
4	2427	8	2447		

4.2 Description of Support Units

The EUT has been tested with corresponding accessories as below:

Supplied by client

Description	Manufacturer	Model No.	SN/Certificate NO
UART Test board	N/A	N/A	N/A

Supplied by SGS:

Description	Manufacturer	Model No.	SN/Certificate NO
NoteBook (EMC1)	Dell	P75F	475LXQ2

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/cm^2)
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 Radiofrequncy 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/f0.5W (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 x 10-2 f0.6834 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: 3.71

The maximum Gain measured in fully anechoic chamber is 2.35 in linear scale.

Output Power Into Antenna & RF Exposure Evaluation Distance:

For FCC;

Operation mode	Channel	Frequency (MHz)	Conduct power (including Tune-up tolerance) (dBm)	Conduct power (mW)	Power Density at R = 20 cm (mW/cm2)	Limit	MPE Ratios	Result
802.11b	Low	2412	11.7	14.791	0.0069	1	0.0069	PASS
802.11b	Middle	2437	11.8	15.136	0.0071	1	0.0071	PASS
802.11b	High	2462	12.8	19.055	0.0089	1	0.0089	PASS
802.11g	Low	2412	5.5	3.548	0.0017	1	0.0017	PASS
802.11g	Middle	2437	5.5	3.548	0.0017	1	0.0017	PASS
802.11g	High	2462	6.5	4.467	0.0021	1	0.0021	PASS
802.11n20	Low	2412	5.1	3.236	0.0015	1	0.0015	PASS
802.11n20	Middle	2437	5.1	3.236	0.0015	1	0.0015	PASS
802.11n20	High	2462	6.2	4.169	0.0019	1	0.0019	PASS
802.11n40	Low	2422	4.4	2.754	0.0013	1	0.0013	PASS
802.11n40	Middle	2437	4.4	2.754	0.0013	1	0.0013	PASS
802.11n40	High	2452	4.9	3.090	0.0014	1	0.0014	PASS

For IC:

Operation mode	Channel	Frequency (MHz)	Conduct power (including Tune-up tolerance) (dBm)	E.I.R.P (dBm)	E.I.R.P (W)	Limit (W)	Result
802.11b	Low	2412	11.70	15.41	0.0348	2.684	PASS
802.11b	Middle	2437	11.80	15.51	0.0356	2.703	PASS
802.11b	High	2462	12.80	16.51	0.0448	2.722	PASS
802.11g	Low	2412	5.50	9.21	0.0083	2.684	PASS
802.11g	Middle	2437	5.50	9.21	0.0083	2.703	PASS
802.11g	High	2462	6.50	10.21	0.0105	2.722	PASS
802.11n20	Low	2412	5.10	8.81	0.0076	2.684	PASS
802.11n20	Middle	2437	5.10	8.81	0.0076	2.703	PASS
802.11n20	High	2462	6.20	9.91	0.0098	2.722	PASS
802.11n40	Low	2422	4.40	8.11	0.0065	2.692	PASS
802.11n40	Middle	2437	4.40	8.11	0.0065	2.703	PASS
802.11n40	High	2452	4.90	8.61	0.0073	2.714	PASS

Note:

1. Refer to report No. HKEM221100106602 for EUT test conducted power value.

6 Photographs

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

- End of the Report -