



Radio Frequency Exposure Evaluation Report

For:

Lennox Industries Inc.

Model:

Lennox S40 Smart Thermostat

Product Description:

Smart thermostat to control residential HVAC system

FCC ID: 2A6F9-S4024B

IC: 28687-S4024B

Per:

CFR Part Part1 (1.1307 & 1.1310), Part 2 (2.1091),
FCC KDB 447498 D01 General RF Exposure Guidance v06
ISED RSS-102 Issue 6

Report number: EMC_LENNX_017_25001_FCC_ISED_RF_Exposure

DATE: 2025-05-23



CETECOM Inc.

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1 Assessment

This RF Exposure evaluation report provides evidence for compliance of the below identified device with the RF Exposure limits for mobile devices as defined in FCC CFR Part 1 (1.1307 & 1.1310), Part 2 (2.1091) and IC standard RSS-102 issue 6 under worst case conditions (measured or rated RF output power, antenna gain, distance towards human body, multiple transmitter information as presented by the applicant).

In addition, maximum antenna gain or minimum distance towards the human body is calculated respectively, where relevant.

The device meets the limits as stipulated by the above given FCC and IC rule parts based on available specifications for worst case conditions at 20cm distance to the body.

Company	Description	Model
Lennox Industries Inc.	Smart Thermostat to control residential HVAC system	Lennox S40 Smart Thermostat

Report Reviewer:

Alvin, Ilarina (Senior Manager Regulatory Services)			
2025-05-23	Compliance	Alvin, Ilarina	Digitally signed by Alvin ILARINA Date: 2025.05.23 18:22:03 -07'00'
Date	Section	Name	Signature

Responsible for the Report:

Cheng Song (EMC Engineer)			
2025-05-23	Compliance	Cheng Song	Cheng Song CN = Cheng Song email = cheng.song@cetecom.com C = US O = CETECOM INC. 2025.05.22 17:02:01 -07'00'
Date	Section	Name	Signature

The test results of this test report relate exclusively to the test item specified in Section3.

CETECOM Inc. USA does not assume responsibility for any conclusions and generalizations drawn from the test results with regard to other specimens or samples of the type of the equipment represented by the test item. The test report may only be reproduced or published in full. Reproduction or publication of extracts from the report requires the prior written approval of CETECOM Inc. USA.

2 Administrative Data

2.1 Identification of the Testing Laboratory Issuing the Test Report

Company Name:	CETECOM Inc.
Department:	Compliance
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Country	USA
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EMC Lab Manager:	Alvin, Ilarina
Responsible Project Leader:	Shane Hao

2.2 Identification of the Client / Manufacturer

Client's Name:	Lennox Industries Inc.
Street Address:	PO Box 799900
City/Zip Code	Dallas TX 75379
Country	USA

Identification of the Manufacturer

Manufacturer's Name:	Same as Client
Manufacturers Address:	
City/Zip Code	
Country	

3 Equipment under Assessment

Product Description:	Smart thermostat to control residential HVAC system
Model Name:	Lennox S40 Smart Thermostat
Marketing Name:	Lennox S40 Smart Thermostat
HW Version:	A
SW Version:	4.35.0145
FCC-ID:	2A6F9-S4024B
IC:	28687-S4024B
Radio information as declared	WLAN: • Murata LBEE59B1LV • FCC ID: VPYLBEE59B1LV, IC: 772C-LBEE59B1LV • Supports 2.4GHz and 5GHz frequencies, with only UNII-1 channels enabled for 5GHz Wi-Fi. BLE: • Silicon Labs BGM210PA32JIA2 • FCC ID: QOQGM210P; IC: 5123A-GM210P
Antenna information as declared	WLAN: • Model: B34X.W3.1.334 • Type: Flexible Printed Circuit (FPC) antenna • Frequency: 2.4 GHz – 5.8 GHz • Gain: 3.5 dBi BLE: • Model: B43X.W0.1.334 • Type: Flexible Printed Circuit (FPC) antenna • Frequency: 2.4 – 2.5 GHz • Gains: 2.5 dBi
Power Supply/ Rated Operating Voltage Range	24VAC±6VAC, 60Hz
Operating Temperature Range	Low: 0 °C, High: 40 °C
Sample Revision	☒ Production ☐ Pre-Production
EUT Dimensions	179mm x 113.5mm x 24.58mm
Weight	Max 300 grams
EUT Diameter	☒ < 60 cm ☐ Other _____
Note: The EUT specifications in the table above were provided by the applicant.	

4 RF Exposure Limits and FCC and IC Basic Rules

4.1 Routine Environmental Evaluation Categorical Exclusion Limits according to FCC 1.1307(b)(3)(i)(B), and FCC 1.1307(b)(3)(ii)(B)

Single RF sources is exempt if the available maximum time-averaged power or effective radiated power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 centimeters to 40 centimeters and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by:

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}} (d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases}$$

Where

$$x = -\log_{10} \left(\frac{60}{ERP_{20 \text{ cm}} \sqrt{f}} \right) \text{ and } f \text{ is in GHz;}$$

and

$$ERP_{20 \text{ cm}} \text{ (mW)} = \begin{cases} 2040f & 0.3 \text{ GHz} \leq f < 1.5 \text{ GHz} \\ 3060 & 1.5 \text{ GHz} \leq f \leq 6 \text{ GHz} \end{cases}$$

d = the separation distance (cm);

In the case of fixed RF sources operating in the same time-averaging period, or of multiple mobile or portable RF sources within a device operating in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation.

$$\sum_{i=1}^a \frac{P_i}{P_{th,i}} + \sum_{j=1}^b \frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^c \frac{Evaluated_k}{Exposure Limit_k} \leq 1$$

4.2 Field reference level (FRL) exposure exemption limits according to RSS-102 Issue 6, section 6.6

Field reference level (FRL) exposure evaluation is required if the separation distance between the user and/or bystander and the device's radiating element is greater than 20 cm (i.e. mobile devices), except when the device operates as follows:

- below 20 MHz and the source-based, time-averaged maximum EIRP 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 $4.49/f^{0.5}$ 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).

In these cases, the information contained in the RF exposure technical brief may be limited to information that demonstrates how the EIRP was derived.

5 Evaluations

5.1 Analysis of RF Exposure

FCC:

Radio	Tech-Band	Freq-Low _[GHz]	P _w _[dBm]	Power _[W]	Ant-G _[dBi]	EIRP _[W]	ERP _[mW]	Threshold ERP _[W]	ERP < Threshold ERP _[W]	FCC 2.1093(c)(1) P _{th} _[mW] = ERP _{20cm}
BT	LE	2.4020	19.96	0.0991	2.50	0.176	107.40	0.77	Yes	3060.00
WLAN	802.11g	2.4120	18.74	0.0748	3.50	0.167	102.09	0.77	Yes	3060.00
	802.11a	5.1800	17.91	0.0618	3.50	0.138	84.33	0.77	Yes	3060.00

The worst simultaneous transmissions involve Bluetooth Low Energy and WLAN operating on the 2.4GHz band.

RF exposure exemption applicable

IC:

								RF Exposure	
								RSS-102 6.6 D>20 cm (300 ≤ Freq < 6000 MHz)	
Radio	Tech-Band	Freq-Low [MHz]	P _w _[dBm]	Power _[W]	Ant-G [dBi]	EIRP _[W]	EIRP _[mW]	Exemption limit for Routine Evaluation	Exemption (Y/N)
BT	LE	2402.00	19.96	0.10	2.50	0.18	176.20	2.68	Yes
WLAN	802.11g	2412.00	18.74	0.07	3.50	0.17	167.49	2.68	Yes
	802.11a	5180.00	17.91	0.06	3.50	0.14	138.36	4.53	Yes

The worst simultaneous transmissions involve Bluetooth Low Energy and WLAN operating on the 2.4GHz band.

RF exposure exemption applicable

5.2 RF Exposure Test Exemptions for Simultaneous Transmission Sources

- Theoretically, the worst case of simultaneous transmission operating at the highest output power mode, within the nearest frequency bands.
- The worst case of simultaneous transmission calculation:
WLAN 802.11g (2.45 GHz) + Bluetooth LE:
WLAN 802.11a (5 GHz) + Bluetooth LE:

Applicable Simultaneous Transmission Sources	Sum of the ratios of the applicable terms	Limit	RF Exclusion No evaluation required
Wi-Fi 2.4GHz + BLE	0.033 + 0.035 = 0.068	≤ 1	Yes
Wi-Fi 5GHz + BLE	0.028 + 0.035 = 0.063	≤ 1	Yes

Conclusion:

- The sum of the fractional contributions to the applicable thresholds is less than or equal to 1, hence the multiple RF sources are exempt

6 Revision History

Date	Report Name	Changes to report	Prepared by
2025-05-22	EMC_LENNX_017_25001_FCC_ISSED_RF_Exposure	Initial Release	Cheng Song

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