

SARGENT MANUFACTURING CO. MPE CALCULATION REPORT

SCOPE OF WORK

MPE Calculation of Electronic Access Control System With 2.4 GHz BLE RF Module, Model PC428D0089SA00CX

REPORT NUMBER

105838170BOX-001.BLE_MPE.1

ISSUE DATE

December 19, 2024

REVISION DATE

July 21, 2025

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MPE CALCULATION REPORT

(FULL COMPLIANCE)

Report Number: 105838170BOX-001.BLE_MPE .1

Project Number: G105838170

Report Issue Date: December 19, 2024

Report Revision Date: July 21, 2025

Model(s) Tested: PC428D0089SA00CX

Standards: **FCC Part 1 Subpart I, July 2025**

Procedures Implementing the National Environmental Policy Act of 1969

§1.1307 Actions that may have a significant environmental effect, for which Environmental Assessments (EAs) must be prepared.

Accordi447498 D04 Interim General RF Exposure Guidance v01

ISED RSS-102 Issue 6, December 15, 2023

Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus
(All Frequency Bands)

Tested by:

Intertek
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Boxborough, MA 01719
USA

Client:

Sargent Manufacturing Co.
110 Sargent Drive
New Haven, CT 6511
USA

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1 Introduction and Conclusion

This evaluation report covers for a mobile device subject to routine environmental evaluation for RF exposure. A mobile device is defined as a transmitting device designed to generally be used in such a way that a separation distance of at least 20 centimeters is normally maintained between the transmitter's radiating structure(s) and the body of the user or nearby persons.

The evaluation indicated in section 2.0 were performed on the product constructed as described in section 4.0. The remaining sections are the verbatim text from the actual evaluation during the investigation. These sections include the evaluation name, the specified Method, and Results. No additions, deviations, or exclusions have been made from the standard(s) unless specifically noted.

Based on the results of our investigation, we have concluded the product evaluated **complies** with the requirements of the standard(s) indicated. The results obtained in this report pertain only to the item(s) evaluated. Intertek does not make any claims of compliance for samples or variants which were not evaluated.

2 Evaluation Summary

Section	Test full name	Result
3	Client Information	-
4	Description of Equipment Under Evaluation and Variant Models	-
5	RF exposure exemption limit calculation (FCC §1.1310; ISED RSS-102 Issue 6)	Compliant
6	Revision History	-

3 Client Information

This EUT was tested at the request of:

Client: Sargent Manufacturing Company
100 Sargent Drive
New Haven, CT 6511
USA

Contact: Manuel Medeiros
Telephone: 1 862 221-6491
Email: manny.medeiros@assaabloy.com

4 Description of Equipment Under Test and Variant Models

Manufacturer: Sargent Manufacturing Co.
110 Sargent Drive
New Haven, CT 6511
USA

Description of Equipment Under Test (provided by client)	
Electronic access control system	

Equipment Under Test Power Configuration			
Rated Voltage	Rated Current	Rated Frequency	Number of Phases
6 V (4 x 1.5 V Batteries)	1.5 A	DC	N/A

Variant Models:

The following variant models have been identified by the manufacturer as being electrically identical models, depopulated models, or with reasonable similarity to the model(s) tested. Intertek does not make any claims of compliance for samples or variants which were not tested.

None

5 RF exposure exemption limit calculation

According to 447498 D04 Interim General RF Exposure Guidance v01

$$P_{th} \text{ (mW)} = \begin{cases} ERP_{20 \text{ cm}}(d/20 \text{ cm})^x & d \leq 20 \text{ cm} \\ ERP_{20 \text{ cm}} & 20 \text{ cm} < d \leq 40 \text{ cm} \end{cases} \quad (\text{B.2})$$

where

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

and f is in GHz, d is the separation distance (cm), and $ERP_{20\text{cm}}$ is per Formula (B.1). The example values shown in Table B.2 are for illustration only.

Table B.2—Example Power Thresholds (mW)

Frequency (MHz)	Distance (mm)									
	5	10	15	20	25	30	35	40	45	50
300	39	65	88	110	129	148	166	184	201	217
450	22	44	67	89	112	135	158	180	203	226
835	9	25	44	66	90	116	145	175	207	240
1900	3	12	26	44	66	92	122	157	195	236
2450	3	10	22	38	59	83	111	143	179	219
3600	2	8	18	32	49	71	96	125	158	195
5800	1	6	14	25	40	58	80	106	136	169

Notes: Data was taken from Intertek test report number: 105838170BOX-001.BLE

Bluetooth Low Energy (Battery Powered) worst-case maximum EIRP output power at 6.290 dBm at 2.440 GHz

ERP = EIRP-2.15

ERP = 6.290-2.15 dBm

ERP = 4.14 dBm

ERP = $10^{(4.14/10)}$ mW

ERP = 2.59 mW < 3.0 mW at distance of 5 mm

Bluetooth Low Energy (POE Powered) worst-case maximum EIRP output power at 6.290 dBm at 2.440 GHz

ERP = EIRP-2.15

ERP = 6.74-2.15 dBm

ERP = 4.59 dBm

ERP = $10^{(4.59/10)}$ mW

ERP = 2.88 mW < 3.0 mW at distance of 5 mm

Evaluation Results: The EUT met the SAR exemption since the ERP power is less than 3 mW at a separation distance of less than 5 mm.

ISED RSS-102 Issue 6 Section 6.3 SAR exemption limits:**Table 11: Power limits for exemption from routine SAR evaluation based on the separation distance**

Frequency (MHz)	≤ 5 mm (mW)	10 mm (mW)	15 mm (mW)	20 mm (mW)	25 mm (mW)	30 mm (mW)	35 mm (mW)	40 mm (mW)	45 mm (mW)	> 50 mm (mW)
≤ 300	45	116	139	163	189	216	246	280	319	362
450	32	71	87	104	124	147	175	208	248	296
835	21	32	41	54	72	96	129	172	228	298
1900	6	10	18	33	57	92	138	194	257	323
2450	3	7	16	32	56	89	128	170	209	245
3500	2	6	15	29	50	72	94	114	134	158
5800	1	5	13	23	32	41	54	74	102	128

Notes: Data was taken from Intertek test report number: 105838170BOX-001.BLE

Bluetooth Low Energy (Battery Powered) worst-case maximum EIRP output power at 6.290 dBm at 2.440 GHz

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ERP = $10^{(4.14/10)}$ mW

ERP = 2.59 mW < 3.05 mW at distance of 5 mm

Bluetooth Low Energy (POE Powered) worst-case maximum EIRP output power at 6.74 dBm at 2.440 GHz

ERP = EIRP-2.15

ERP = 6.74-2.15 dBm

ERP = 4.59 dBm

ERP = $10^{(4.59/10)}$ mW

ERP = 2.88 mW < 3.05 mW at distance of 5 mm

Evaluation Results: The EUT met the SAR exemption since the ERP power is less than 3 mW at a separation distance of less than 5 mm. The separation distance of the radio's antenna structure to the human body is more than 5 mm.

SAR estimation for exempted transmitters per RSS-102 Issue 6 Clause 7.1.8

SAR values from exempted transmitters shall be included in the total exposure assessment. A SAR value of 0.4 W/kg for 1 g, 1 W/kg for 10 g, or an estimated SAR value based on the ratio of the power level and the power exemption limit may be used to determine the standalone SAR value for test configurations that do not require a SAR evaluation based on test reductions or on the exemption limits outlined in section 6.3.

The estimated SAR value, *SARestimated*, is calculated using equation below

$$SAR_{estimated} = \frac{P_{max}}{P_{max,exemption}} \times 0.25 \times SAR_{limit} \text{ W/kg}$$

Where

- P_{max} is the maximum power level including tune-up tolerance for the exempted transmitter
- $P_{max,exemption}$ is the maximum power level of exemption at the same frequency and distance for the exempted transmitter
- SAR_{limit} is the applicable SAR limit (e.g. 1.6 W/kg for 1 g or 4 W/kg for 10 g)

Bluetooth Low Energy (Battery Powered) worst-case maximum EIRP output power at 6.290 dBm at 2.440 GHz

Conducted Power = EIRP - Antenna Gain (dBi)

Conducted Power = 6.290 dBm - 1 dBi

Conducted Power = 5.290 dBm

Conducted Power = 3.38 mW

$SAR_{estimated} = (3.38 \text{ mW} / 3\text{mW}) \times 0.25 \times 1.6 \text{ W/kg}$

$SAR_{estimated} = (3.38 \text{ mW} / 3\text{mW}) \times 0.4 \text{ W/kg}$

$SAR_{estimated} = 1.13 \times 0.4 \text{ W/kg}$

$SAR_{estimated} = 0.45 \text{ W/kg}$

Bluetooth Low Energy (POE Powered) worst-case maximum EIRP output power at 6.74 dBm at 2.440 GHz

Conducted Power = EIRP - Antenna Gain (dBi)

Conducted Power = 6.74 dBm - 1 dBi

Conducted Power = 5.74 dBm

Conducted Power = 3.75 mW

$SAR_{estimated} = (3.75 \text{ mW} / 3\text{mW}) \times 0.25 \times 1.6 \text{ W/kg}$

$SAR_{estimated} = (3.75 \text{ mW} / 3\text{mW}) \times 0.4 \text{ W/kg}$

$SAR_{estimated} = 1.25 \times 0.4 \text{ W/kg}$

$SAR_{estimated} = 0.5 \text{ W/kg}$

6 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	12/19/2024	105838170BOX-001.BLE_MPE	KPS <i>KPS</i>	VFV <i>VFV</i>	Original Issue
0	07/21/2025	105838170BOX-001.BLE_MPE.1	KPS <i>KPS</i>	VFV <i>VFV</i>	Updated RF Exposure calculation