

SARGENT MANUFACTURING CO. MPE CALCULATION REPORT

SCOPE OF WORK

MPE Calculation of Electronic Access Control System With Radio Module Models NTD623-ACC and NTC623-ACC

REPORT NUMBER

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MPE CALCULATION REPORT

(FULL COMPLIANCE)

Report Number: 105779772BOX-006mpe

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Report Issue Date: February 11, 2025

Model(s) Tested: NTD623-ACC and NTC623-ACC

Standards: FCC Part 1 Subpart I, February 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.*

RSS-102 Issue 6 December 15, 2023

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

Contains:

FCC ID: 2ABFG-NTB600PBACC, IC ID: 11626A-NTB600PBACC

FCC ID: 2ABFG-NTB600TSACC, IC ID: 11626A-NTB600TSACC

Tested by:
Intertek
70 Codman Hill Road
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USA

Client:
Sargent Manufacturing Co.
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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	FCC Power Density Calculation FCC §1.1310, February 2025	Compliant
6	ISED Power Density Calculation RSS-102 Issue 6 December 15, 2023; §2.5.2 Exemption	Compliant
7	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: Dave Debiase
Telephone: 203-821-5724
Email: dave.debiase@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. It contains the radio modules as below.

(NTD623-ACC, NTD643-ACC, NTC643-ACC)
FCC: U4A-YRD642BLEV1 IC: 6982A-YRD642BLEV1
(NTC623-ACC)
FCC: U4A-YRD622BLEV1 IC: 6982A-YRD622BLEV1

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

5.1 Requirement(s)

FCC §1.1310 Radiofrequency radiation exposure limits

Table 1 below sets forth limits for Maximum Permissible Exposure (MPE) to radiofrequency electromagnetic field.

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	842/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

5.2 Method

An MPE evaluation was performed in order to show that the device was compliant with FCC §2.1091 and ISED RSS-102. The maximum power density was calculated for each transmitter at a separation distance of 20 cm. The calculation was performed using the maximum gain from the internal and external antennas declared by the manufacturer.

The maximum permissible exposure (MPE) is predicted by using the following equation:

$$S = PG/4\pi R^2$$

where: S = power density (in appropriate units, e.g. mW/cm²)

P = power input to the antenna (in appropriate units, e.g., mW)

G = power gain of the antenna in the direction of interest relative to an isotropic radiator

R = distance to the center of radiation of the antenna (appropriate units, e.g., cm)

5.3 Calculation:**13.56 MHz RFID**

NTD623-ACC: 55.80 dBuV/m at 3 m (Data taken from SGS Report # F690501-RF-RTL003126)

NTC623-ACC: 54.71 dBuV/m at 3 m (Data taken from SGS Report # F690501-RF-RTL001103)

Bluetooth Low Energy (BLE)

NTD623-ACC Cond. Power: -3.75 dBm, Ant. Gain 0.20 dBi (Data taken from SGS Report # F690501-RF-RTL003125)

EIRP = -3.75 dBm + 0.20 dBi

EIRP = -3.95 dBm

NTC623-ACC Cond. Power: -1.06 dBm, Ant. Gain 3.4 dBi (Data taken from SGS Report # F690501-RF-RTL001104-1)

EIRP = -1.06 dBm + 3.4 dB

EIRP = 2.34 dBm

Enclosure	Frequency	Field Strength	Distance	Max. EIRP	Max. EIRP	Power Density at	Power Density at	mit at 20 c	mit at 20 c	Result
			(m)	(dBm)	(mW)	20 cm (mW/cm ²)	20 cm (W/m ²)	(V/m)	(W/m ²)	
13.56 MHz RFID										
NTD623-ACC	13.56 MHz	55.80dBuV/m	3	--	--	--	--	--	--	--
		0.00062V/m	3	--	--	--	--	62.09	--	Compliant
NTC623-ACC	13.56 MHz	54.71 dBuV/m	3	--	--	--	--	--	--	Compliant
		0.00054 V/m	3	--	--	--	--	62.09	--	Compliant
2.4 GHz Bluetooth Low Energy (BLE)										
NTD623-ACC	2.402 GHz	--	--	-3.950	0.402717	8.01181E-05	0.000801181	--	1.00	Compliant
NTC623-ACC	2.402 GHz	--	--	2.340	1.713957	0.000340981	0.003409813	--	1.00	Compliant

5.4 Results:

The sample tested was found to Comply. The maximum calculated power density at 20 cm distance is less than the limits for general population / uncontrolled exposure of 1 mW/cm² for BLE. And the maximum calculated electric field strength at 20 cm distance is less than 62.09 V/m for 13.56 MHz RFID.

6 ISED RSS-102 Issue 6 §2.5.2 Exemption

6.1 Requirement(s)

ISED RSS-102 Issue 6

Table 2 below sets forth limits for the RF field strength.

Table 2 – RF Field Strength Limits for Devices Used by the General Public (Uncontrolled Environment)

Frequency range (MHz)	Electric field strength (V/m rms)	Magnetic field strength (A/m rms)	Power Density (W/m ²)	Reference Period (minutes)
0.003-10	83	90	-	Instantaneous*
0.1-10	-	$0.73/f$	-	6**
1.1-10	$87/f^{0.5}$	-	-	6**
10-20	27.46	0.0728	2	6
20-48	$58.07/f^{0.25}$	$0.1540/f^{0.25}$	$8.944/f^{0.5}$	6
48-300	22.06	0.05852	1.291	6
300-6000	$3.142 f^{0.3417}$	$0.008335 f^{0.3417}$	$0.02619 f^{0.6834}$	6
6000-15000	61.4	0.163	10	6
15000-150000	61.4	0.163	10	$616000/f^{1.2}$
150000-300000	$0.158 f^{0.5}$	$4.21 \times 10^{-4} f^{0.5}$	$6.67 \times 10^{-5} f$	$616000/f^{1.2}$

Note: f is frequency in MHz. *Based on nerve stimulation (NS)

**Based on specific absorption rate (SAR)

6.2 Calculation

Power Density Limit: $0.02619 f^{0.6834} \text{ W/m}^2$ ($300 \text{ MHz} \leq f < 6 \text{ GHz}$), f is in MHz.

Power Density Limit: $0.02619 * (2402^{0.6834}) = 5.351 \text{ W/m}^2$

13.56 MHz RFID

NTD623-ACC: 55.80 dBuV/m at 3 m (Data taken from SGS Report # F690501-RF-RTL003126)

NTC623-ACC: 54.71 dBuV/m at 3 m (Data taken from SGS Report # F690501-RF-RTL001103)

Bluetooth Low Energy (BLE)

NTD623-ACC Cond. Power: -3.75 dBm, Ant. Gain 0.20 dBi (Data taken from SGS Report # F690501-RF-RTL003125)

EIRP = -3.75 dBm + 0.20 dBi

EIRP = -3.95 dBm

NTC623-ACC Cond. Power: -1.06 dBm, Ant. Gain 3.4 dBi (Data taken from SGS Report # F690501-RF-RTL001104-1)

EIRP = -1.06 dBm + 3.4 dB

EIRP = 2.34 dBm

			(m)	(dBm)	(mW)	20 cm (mW/cm ²)	20 cm (W/m ²)	(V/m)	(W/m ²)	
13.56 MHz RFID										
NTD623-ACC	13.56 MHz	55.80dBuV/m	3	--	--	--	--	--	--	--
		0.00062V/m	3	--	--	--	--	27.46	--	Compliant
NTC623-ACC	13.56 MHz	54.71 dBuV/m	3	--	--	--	--	--	--	Compliant
		0.00054 V/m	3	--	--	--	--	27.46	--	Compliant
2.4 GHz Bluetooth Low Energy (BLE)										
NTD623-ACC	2.402 GHz	--	--	-3.950	0.402717	8.01181E-05	0.000801181	--	5.35	Compliant
NTC623-ACC	2.402 GHz	--	--	2.340	1.713957	0.000340981	0.003409813	--	5.35	Compliant

6.3 Results:

The sample tested was found to Comply. The maximum calculated power density at 20 cm distance is less than the limits for general population / uncontrolled exposure of 5.351 W/m² BLE. And the maximum calculated electric field strength at 20 cm distance is less than 27.46 V/m for 13.56 MHz RFID.

7 Revision History

Revision Level	Date	Report Number	Prepared By	Reviewed By	Notes
0	02/11/2025	105779772BOX-006mpe	KPS <i>KPS</i>	KH <i>KH</i>	Original Issue