

REPORT ON EXPOSURE TO ELECTROMAGNETIC FIELDS

No. 2204988STO-109

EQUIPMENT

Equipment: Controller for wireless door lock
Type/Model: EM03
Additional type/model: --
Manufacturer: ASSA ABLOY Inc.
Tested by request of: Sigma Connectivity WSI AB

SUMMARY

Based on the assessment in this statement, the equipment is determined to **comply** with the following requirements without testing:

CFR 47 §1.1307, §1.1310
RSS-102 Issue 5

Date of issue: June 7, 2023

Tested by:


Ala El-Haery

Approved by:


Björn Utermöhl

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Revision History

Test report number	Date	Description	Changes
2204988STO-109	June 7, 2023	First release	

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1 CLIENT INFORMATION

This assessment has been done by request of:

Company	Sigma Connectivity WSI AB Kistagången 20b 164 40 Kista Sweden On behalf of ASSA ABLOY Inc. 110 Sargent Drive New Haven, CT 06511 USA
Name of contact	Fredrik Thorsell, Phone +46 76 1277301 James W. Forte

2 EQUIPMENT

2.1 Identification of the equipment

Equipment:	Controller for wireless door lock
Type/Model:	EM03
Additional model:	--
Brand name:	ASSA ABLOY Inc.
Manufacturer:	ASSA ABLOY AB
Transmitter frequency range:	2402-2480 MHz for Bluetooth Low Energy 2412-2462 MHz for WLAN 2.4GHz 5150-5850 MHz for U-NII 5GHz
Measured output power eirp:	
Declared output power eirp:	See chapter 5.3 and test report 2204988STO-108
Antenna gain:	See chapter 5.3
User separation distance:	20 cm
Exposure conditions:	☐ Controlled environment (occupational) ☒ Uncontrolled environment (general population)

3 TEST SPECIFICATIONS

3.1 Standards

CFR 47: Code of Federal Regulations Title 47: Telecommunications §1.1307, §1.1310
KDB447498 D01 v06

RSS-102: Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands)

3.2 Additions, deviations and exclusions from standards

No additions, deviations or exclusions have been made from standards.

4 SUMMARY

The evaluation has been carried out at the Intertek Semko AB premises in Kista, Sweden.
The results in this report apply only to sample tested:

Test	Result
RF Exposure, single transmitter	PASS
RF Exposure, multiple simultaneous transmitters	NA ¹

¹EUT only has a single transmitter or transmitters cannot operate simultaneously

5 RF EXPOSURE, SINGLE TRANSMITTER

Result:	PASS
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5.1 Limits

Reference: CFR 47 §1.1310 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

Reference: RSS-102 – Radio Frequency (RF) Exposure Compliance of Radiocommunication Apparatus (All Frequency Bands) Issue 5

Section 2.5.2,

RF 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, 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 $4.49/f^{0.5}$ 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 e.i.r.p. was derived.

5.2 Calculations

EIRP: $Power\ to\ antenna\ (dBm) + Antenna\ gain\ (dBi) = EIRP\ dBm$

Conversion dBm to W:

EIRP: $1\ mW * 10^{\left(\frac{EIRP_{dBm}}{10}\right)} = mW$

MPE calculation

A worst case calculation for power density:

$$S = \frac{G \times P}{4 \times \pi \times r^2}$$

P = conducted power

G = antenna gain

S = mW / cm²

r = 20 cm

S = mW / cm²

5.3 Results

FCC §1.1310

Mode	Frequency range (MHz)	Antenna gain		Conducted power		Evaluation distance (cm)	Power density (mW/cm ²)	MPE Limit (mW/cm ²)
		(dBi)	(Numeric)	(dBm)	(mW)			
BLE	2402-2480	3.0	1.9953	16.98	49.888	20	0.0198	1
WLAN 2.4G	2412-2462	3.0	1.9953	11.60	14.455	20	0.0058	1
WLAN 5 GHz	5150-5850	7.6	5.7544	14.18	26.182	20	0.0300	1

No modes can transmit simultaneously.

Result: MPE evaluation meets the requirement of standard.

RSS-102

Mode	Frequency range (MHz)	Max antenna gain (dBi)	Max conducted power at frequency		Maximum conducted or eirp (dBm)	Maximum conducted or eirp (W)	Limit (W)
			(dBm)	(MHz)			
BLE	2402-2480	3.0	16.98	2402	19.98	0.0995	2.68
WLAN 2.4G	2412-2462	3.0	11.60	2437	14.60	0.0289	2.70
WLAN 5 GHz	5150-5850	7.6	14.18	5825	21.78	0.1507	4.90

No modes can transmit simultaneously.

Result: MPE test exempted.