

Bureau Veritas Consumer Product Services, Inc.	Test Report Number:
One Distribution Center Circle #1, Littleton, MA 01460	EW0790-5 Issue 2



## CFR Title 47 FCC Part 2.1093

### Report Exhibit

Prepared for Assa Abloy Inc.

This report presents the environmental impact of human exposure to radiofrequency radiation for

**Centrios**

**52-9127-0000-000**

Prepared by

Ryan Brown

Sr. EMC/Wireless Engineer

Approved by

Yunus Faziloglu

Wireless Manager

Issue date: May 23, 2023

Report No: EW0790-5 Issue 2



This test result relates only to the described test object.

Bureau Veritas Consumer Product Services, Inc.	Test Report Number:
One Distribution Center Circle #1, Littleton, MA 01460	EW0790-5 Issue 2

This document shall not be reproduced, except in full, without the written approval of Bureau Veritas Test Lab.  
Customer must not use this test report as the product certification of each accreditation body or each national organization.  
The test is traceable to national standard or related international standard

**Contents**

- 1 Device Under Test Information .....3**
- 2 Test Laboratory Information .....5**
- 3 RF Exposure – Determination of Exemption – FCC Section 1.1307(b)(3)(i) .....6**
- 3.1 MPE-based Exemption – 1.1307(b)(3)(i)(C) .....6**
- 4 Multiple Simultaneous RF Exposure – FCC Section 1.1307(b)(3)(ii) .....7**
- 4.1 Multiple RF Source Total Exposure Ratio Exemption – 1.1307(b)(3)(ii)(B) .....7**

Bureau Veritas Consumer Product Services, Inc.	Test Report Number:
One Distribution Center Circle #1, Littleton, MA 01460	EW0790-5 Issue 2

# 1 Device Under Test Information

## 1.1 Product Information

<b>Project Number:</b>	W0790
<b>Applicant Information:</b>	Assa Abloy Inc. 110 Sargent Drive New Haven CT USA 06511
<b>Test Item Description:</b>	Centrios
<b>Model Number:</b>	52-9127-0000-000
<b>Hardware Version of DUT:</b>	52-9127-0000-000
<b>Software Version of DUT:</b>	s140_nrf52_6.1.1_softdevice.hex products-regulatorySupport.hex
<b>Separation Distance:</b>	15mm
<b>Exposure Category of DUT:</b>	Portable
<b>Multiple Simultaneous RF Sources:</b>	Yes
<b>Type of Evaluation:</b>	Extremity SAR Exemption Calculation
<b>Evaluation Method:</b>	447498 D01 General RF Exposure Guidance v06
<b>Deviations from Standard:</b>	None
<b>Sample Receipt Date:</b>	Jul 7, 2022
<b>Evaluation Date:</b>	May 23, 2023

## 1.2 Technical Information

<b>Radio A, Zigbee</b>	
<b>FCC ID:</b>	U4A-CEX100
<b>Exposure Category of Transmitter:</b>	Mobile
<b>Maximum Conducted Output Power (mW):</b>	0.47
<b>Maximum Tune-up Tolerance (dB):</b>	N/A
<b>Maximum Antenna Gain (dBi):</b>	5.3

<b>Radio B, BLE</b>	
<b>FCC ID:</b>	U4A-CEX100
<b>Exposure Category of Transmitter:</b>	Mobile
<b>Maximum Conducted Output Power (mW):</b>	0.48
<b>Maximum Tune-up Tolerance (dB):</b>	N/A
<b>Maximum Antenna Gain (dBi):</b>	5.3

<b>Radio C, 13.56MHz</b>	
<b>FCC ID:</b>	U4A-CEX100

Bureau Veritas Consumer Product Services, Inc.	Test Report Number:
One Distribution Center Circle #1, Littleton, MA 01460	EW0790-5 Issue 2

<b>Exposure Category of Transmitter:</b>	Mobile
<b>Maximum radiated power (dBuV/m @ 3m):</b>	62.3
<b>Maximum EIRP (mW):</b>	0.00051
<b>Maximum Tune-up Tolerance (dB):</b>	N/A
<b>Maximum Antenna Gain (dBi):</b>	1

Bureau Veritas Consumer Product Services, Inc.	Test Report Number:
One Distribution Center Circle #1, Littleton, MA 01460	EW0790-5 Issue 2

## 2 Test Laboratory Information

<b>Location of Test Lab:</b>	One Distribution Center Circle #1 Littleton, MA 01460 (978) 486-8880
<b>Key Contact:</b>	Yunus Faziloglu Yunus.faziloglu@bureauveritas.com
<b>Laboratory Accreditations:</b>	BUREAU VERITAS CONSUMER PRODUCTS SERVICES, INC is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories.
<b>ISO/IEC 17025:2017:</b>	1627-01
<b>FCC Test Site Number:</b>	US1028

Bureau Veritas Consumer Product Services, Inc.	Test Report Number:
One Distribution Center Circle #1, Littleton, MA 01460	EW0790-5 Issue 2

### 3 RF Exposure – Determination of Exemption

#### 3.1 SAR-based Exemption per 447498 D01 General RF Exposure Guidance v06

##### 3.1.1 Zigbee:

Per 447498 D01 General RF Exposure Guidance v06 Section 4.3.1 a)

For 100 MHz to 6 GHz and test separation distances  $\leq 50$  mm, the 1-g and 10-g SAR test exclusion thresholds are determined by the following:

$[(\text{max. power of channel, including tune-up tolerance, mW}) / (\text{min. test separation distance, mm})] * [\sqrt{f(\text{GHz})}] \leq 3.0$  for 1-g SAR, and  $\leq 7.5$  for 10-g extremity SAR, where f is the transmit frequency in GHz

Maximum Conducted Output Power (mW): 0.47mW

Separation distance: 15mm

f(GHz): 2.405

Calculation =  $0.049 < 7.5$  and therefore exempt from stand-alone SAR testing.

Calculation =  $0.049 < 7.5$  and therefore exempt from stand-alone SAR testing.

##### 3.1.2 BLE:

Similar to the Zigbee radio above,

Maximum Conducted Output Power (mW): 0.48mW

Separation distance: 15mm

f(GHz): 2.402

Calculation =  $0.050 < 7.5$  and therefore exempt from stand-alone SAR testing.

##### 3.1.3 13.56MHz RFID

SAR exemption calculation for 13.56MHz at 15mm is based on

Per 447498 D01 General RF Exposure Guidance v06 Section 4.3.1 a), b)1) using 50mm separation and 0.1GHz and applying it to 13.56MHz using c)2) as follows,

$$\text{a) } (7.5/\sqrt{0.1\text{GHz}}) * 50\text{mm} = 1185.9\text{mW}$$

$$\text{b)1) } 1185.9 + ((50-50) * (100/150)) = 1185.9\text{mW}$$

$$\text{c)2) } 1185.9 * (1 + \log(100/13.56)) * \frac{1}{2} = 1107.4\text{mW}$$

EIRP for 13.56MHz RFID is 0.00051mW and therefore exempt from stand-alone SAR testing.

## 4 Multiple Simultaneous RF Exposure

### 4.1 Multiple RF Source Total Exposure Ratio Exemption

There are 2 simultaneous transmission configurations in the product.

Configuration 1: Zigbee + 13.56MHz RFID

Configuration 2: BLE + 13.56MHz RFID

Per, 447498 D01 General RF Exposure Guidance v06, Section 4.3.2:

*“Simultaneous transmission SAR test exclusion is determined for each operating configuration and exposure condition according to the reported standalone SAR of each applicable simultaneously transmitting antenna. When the sum of 1-g or 10-g SAR of all simultaneously transmitting antennas in an operating mode and exposure condition combination is within the SAR limit, SAR test exclusion applies to that simultaneous transmission configuration.”*

Calculation / Limit Ratio for each radio:

Radio	Calculation	Limit	Calculation / Limit Ratio
Zigbee	0.049	7.5	0.0065333
BLE	0.050	7.5	0.0066667
13.56MHz RFID	0.00051 mW	1107.4 mW	0.0000005

Sum of Calculation / Limit Ratios for each simultaneous transmission configuration:

	Configuration 1	Configuration 2
	Calculation / Limit Ratio	Calculation / Limit Ratio
Zigbee	0.0065333	Not active
BLE	Not active	0.0066667
13.56MHz RFID	0.0000005	0.0000005
Sum	0.0065338	0.0066672
Limit	1	1
Verdict	PASS	PASS

#### 4.1.1 Conclusion

Device meets the SAR test exemption criteria based on the calculations shown above.

Bureau Veritas Consumer Product Services, Inc.	Test Report Number:
One Distribution Center Circle #1, Littleton, MA 01460	EW0790-5 Issue 2

## Document Revisions

Issue No.	Summary of Changes	Date Issued	Prepared by	Approved by
1	Original Release	Apr 7, 2023	RMB	YF
2	Changed the exposure category from mobile to portable (extremity only) and updated the calculations accordingly	May 23, 2023	RMB	YF

End of Report