

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

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Issue date: May 23, 2023

Report No: EW0790-5 Issue 2



This test result relates only to the described test object.

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1 Device Under Test Information

1.1 Product Information

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

1.2 Technical Information

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

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

Radio C, 13.56MHz	
FCC ID:	U4A-CEX100

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

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2 Test Laboratory Information

Location of Test Lab:	One Distribution Center Circle #1 Littleton, MA 01460 (978) 486-8880
Key Contact:	Yunus Faziloglu Yunus.faziloglu@bureauveritas.com
Laboratory Accreditations:	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.
ISO/IEC 17025:2017:	1627-01
FCC Test Site Number:	US1028

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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 ≤ 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 ≤ 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

$f(\text{GHz})$: 2.405

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

$f(\text{GHz})$: 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.

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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.

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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