REPORT ON EXPOSURE TO ELECTROMAGNETIC FIELDS

No. 1809890STO-006, Ed. 1

EQUIPMENT

Equipment:	Biometric Wristband
Type/Model:	BWB01
Manufacturer:	ASSA ABLOY Logistic Security Solutions AB
Tested by request of:	ASSA ABLOY Logistic Security Solutions AB

*See opinions and interpretations clause 2.2

SUMMARY

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

EN 50566: 2017
CFR 47 §1.1307, §1.1310
RSS-102 Issue 5
Radiocommunications (Electromagnetic Radiation – Human Exposure) Standard 2014
NZS 2772.1:1999

Date of issue: 2018-06-26

Tested by: Matti Virkki

Approved by: Stefan Andersson

Revision History

Edition	Date	Description	Changes
1	2018-06-26	First release	

CONTENTS

1 CLIENT INFORMATION

This assessment has been done by request of:

Company	ASSA ABLOY Logistic Security Solutions AB Förmansvägen 11, 3rd floor 11743 Stockholm Sweden
Name of contact	Jennie Söderlund

2 EQUIPMENT

2.1 Identification of the equipment

Equipment:	Biometric Wristband
Type/Model:	BWB01
Brand name:	ASSA ABLOY
Manufacturer:	ASSA ABLOY Logistic Security Solutions AB
Transmitter frequency range:	2402 – 2480 MHz
Measured output power to antenna*:	+0.6 dBm
Declared output power to antenna:	+1 dBm
Antenna gain:	< 0 dBi
User separation distance:	5mm
Exposure conditions:	☐ Controlled environment (occupational) ☐ Uncontrolled environment (general population)
Region of body:	☒ Head or trunk ☐ Limbs

*
Reference for measurement: Test report 1809890STO-002 Ed. 1

3 TEST SPECIFICATIONS

3.1 Standards

EN 50566: 2017: Product standard to demonstrate the compliance of wireless communication devices with the basic restrictions and exposure limit values related to human exposure to electromagnetic fields in the frequency range from 30 MHz to 6 GHz: hand-held and body mounted devices in close proximity to the human body

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)

Radiocommunications (Electromagnetic Radiation – Human Exposure) Standard 2014

NZS 2772.1:1999 Radiofrequency fields – Maximum exposure levels – 3 kHz to 300 GHz

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]

1. EUT only has a single transmitter or transmitters can't operate simultaneously

5 RF EXPOSURE, SINGLE TRANSMITTER

Result:	PASS

5.1 Limits

Reference: COUNCIL RECOMMENDATION of 12 July 1999 on the limitation of exposure of the general public to electromagnetic fields (0 Hz to 300 GHz) 1999/519/EC: Annex 2 Basic restrictions

Guideline / standard	SAR limit, SAR_{max} W/kg	Averaging mass, m g	P_{max} mW	Exposure tier	Region of body
1999/519/EC	2	10	20	General public	Head and trunk
	4	10	40	General public	Limbs

Reference: Directive 2013/35/EU of the European Parliament and of the Council of 26 June 2013 on the minimum health and safety requirements regarding the exposure of workers to the risks arising from physical agents (electromagnetic fields): Annex III table A1

Guideline / standard	SAR limit, SAR_{max} W/kg	Averaging mass, m g	P_{max} mW	Exposure tier	Region of body
2013/35/EU	10	10	100	Occupational	Head and trunk
	20	10	200	Occupational	Limbs

Reference: CFR 47 §1.1307, §1.1310

KDB 447498 D01 General RF Exposure Guidance v06

Section 4.3.1, 1) The 1-g and 10-g SAR test exclusion thresholds for 100 MHz to 6 GHz at test separation distances ≤ 50 mm are determined by:

[(max. power of channel, including tune-up tolerance, mW)/(min. test separation distance, mm)] · [√f(GHz)] ≤ 3.0 for 1-g SAR and ≤ 7.5 for 10-g extremity SAR

The test exclusions are applicable only when the minimum test separation distance is ≤ 50 mm and for transmission frequencies between 100 MHz and 6 GHz.

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

Section 2.5.1, Table 1: SAR evaluation – Exemptions limits for routine evaluation based on frequency and separation distance

	Exemptions limits				
Frequency	**At separation distance of ≤5 mm**	**At separation distance of 10 mm**	**At separation distance of 15 mm**	**At separation distance of 20 mm**	**At separation distance of 25 mm**
≤300	71 mW	101 mW	132 mW	162 mW	193 mW
450	52 mW	70 mW	88 mW	106 mW	123 mW
835	17 mW	30 mW	42 mW	55 mW	67 mW
1900	7 mW	10 mW	18 mW	34 mW	60 mW
2450	4 mW	7 mW	15 mW	30 mW	52 mW
3500	2 mW	6 mW	16 mW	32 mW	55 mW
5800	1 mW	6 mW	15 mW	27 mW	41 mW

	Exemptions limits				
Frequency	**At separation distance of 30 mm**	**At separation distance of 35 mm**	**At separation distance of 40 mm**	**At separation distance of 45 mm**	**At separation distance of ≥50 mm**
≤300	223 mW	254 mW	284 mW	315 mW	345 mW
450	141 mW	159 mW	177 mW	195 mW	213 mW
835	80 mW	92 mW	105 mW	117 mW	130 mW
1900	99 mW	153 mW	225 mW	316 mW	431 mW
2450	83 mW	123 mW	173 mW	235 mW	309 mW
3500	86 mW	124 mW	170 mW	225 mW	290 mW
5800	56 mW	71 mW	85 mW	97 mW	106 mW

For limb-worn devices where the 10 gram value applies, the exemption limits for routine evaluation in Table 1 are multiplied by a factor of 2.5.

Reference: Radiation Protection Standard for Maximum Exposure Levels to Radiofrequency Fields – 3 kHz to 300 GHz, Table S1: Summary of compliance provisions for mobile or portable transmitting equipment.

Equipment parameters	Test exemption	Spatial peak SAR [Table 2 Occupational]	Spatial peak SAR [Table 2 General Public]
Aware user exposure			
Mean power < 100 mW	X		
Mean power < alternative low-power exclusion level of IEC 62479 for SAR_{max} = 10 W/kg	X		
Otherwise		X	
General public exposure			
Mean power < 20 mW	X		
Mean power < alternative low-power exclusion level of IEC 62479 for SAR_{max} = 2 W/kg	X		
Otherwise			X

Reference: NZS 2772.1:1999

Section 3.7.3: In some circumstances an RF exposure evaluation may not be required. This is the case with low-power devices whose nominal average RF radiated power does not exceed 20 mW and which do not produce exceptionally high instantaneous fields.

5.2 Calculations

EIRP: $Power\ to\ antenna\ (dBm) + Antenna\ gain\ (dBi) = EIRP\ dBm$
Declared EIRP = +1 dBm
Measured EIRP = +0.6 dBm

Conversion dBm to W:

Conducted: $1\,mW * 10^{\left(Power\frac{dBm}{10}\right)} = 1.26\,mW$

EIRP: $1\,mW * 10^{\left(EIRP\frac{dBm}{10}\right)} = 1.26\,mW$

Results are rounded up so 2 mW effect is used in evaluation.

Low power exclusion limit:

KDB447498 D01 v06: $\frac{EIRP\ mW}{Separation\ distance\ mm} * \sqrt{Operating\ frequency\ GHz} = 0.39$

5.3 Results

Standard	Reference for limit	Value	Unit	Limit	Result
EN 60566: 2017	EN 62479	2	mW	< 40	PASS
§1.1310	KDB 447498	0.63	NA	< 3.5	PASS
RSS-102	RSS-102	2	mW	< 4	PASS
Radiocommunications (Electromagnetic Radiation – Human Exposure) Standard 2014	Radiation Protection Standard for Maximum Exposure Levels to Radiofrequency Fields – 3 kHz to 300 GHz	2	mW	< 20	PASS
NZS 2772.1:1999	NZS 2772.1:1999	2	mW	< 20	PASS