DEKRA Testing and Certification, S.A.U.
Parque Tecnológico de Andalucía,
c/ Severo Ochoa nº 2 · 29590 Campanillas · Málaga · España
C.I.F. A29 507 456

DEKRA

Test report No:
NIE: 71403REM.002

Test report

FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-20 Edition) & ICES-003 Issue 7 (October 2020)

(*) Identification of item tested	AElement Original Electronic Lock Series including all mechanical variants
(*) Trademark	SALTO
(*) Model and /or type reference	AE0M / Type reference: E1009
Other identification of the product	FCC ID: UKCAE0M. Contains: QOQBGM111 IC: 10088A-AE0M. Contains: 5123A-BGM111 HW version: 1.0 SW version: 0178 (Control FW) + 0184 (BGM111 FW)
(*) Features	Contains a certified Bluetooth LE module (BGM111)
Manufacturer	SALTO SYSTEMS, S.L. Arkotz 9, Polígono Lanbarren 20180 Oiartzun (Gipuzkoa) - Spain
Test method requested, standard	FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-20 Edition) & ICES-003 Issue 7 (October 2020)
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Rafael López Martín EMC Consumer & RF Lab Manager 2022.03.14 11:34:19 +01'00'
Date of issue	2022-03-14
Report template No	FDT08_23 (*) "Data provided by the client"

Index

Acronyms

Acronym ID	Acronym Description
Code	EMC Test Code
Freq Rng	Frequency Range
OM	Operation Mode
S/	Sample
V	Verdict

Competences and guarantees

DEKRA Testing and Certification S.A.U. is a testing laboratory accredited by the National Accreditation Body (ENAC -Entidad Nacional de Acreditación), to perform the tests indicated in the Certificate No. 51/LE 147.

DEKRA Testing and Certification S.A.U. is an FCC-recognized accredited testing laboratory with the appropriate scope of accreditation that covers the performed tests in this report, FCC designation number ES0004.

DEKRA Testing and Certification S.A.U. is an ISED recognized accredited testing laboratory, CABid: ES1909, with the appropriate scope of accreditation that covers the performed tests in this report.

In order to assure the traceability to other national and international laboratories, DEKRA Testing and Certification S.A.U. has a calibration and maintenance program for its measurement equipment.

DEKRA Testing and Certification S.A.U. guarantees the reliability of the data presented in this report, which is the result of the measurements and the tests performed to the item under test on the date and under the conditions stated on the report and, it is based on the knowledge and technical facilities available at DEKRA Testing and Certification S.A.U. at the time of performance of the test.

DEKRA Testing and Certification S.A.U. is liable to the client for the maintenance of the confidentiality of all information related to the item under test and the results of the test.

The results presented in this Test Report apply only to the particular item under test established in this document.

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General conditions

1. This report is only referred to the item that has undergone the test.
2. This report does not constitute or imply on its own an approval of the product by the Certification Bodies or competent Authorities.
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Uncertainty

Uncertainty (factor k=2) was calculated according to the DEKRA Testing and Certification S.A.U. internal document PODT000.

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 30 MHz to 1000 MHz is I = ± 4,9 dB for quasi-peak measurements, I = ± 4,6 dB for peak measurements (k= 2).

The total uncertainty of the measurement system for the measured radio disturbance characteristics of EUT from 1000 MHz to 17 GHz is I = ± 2,6 dB for peaks and average measurements (k = 2).

Data provided by the client

The following data has been provided by the client:

1. Information relating to the description of the sample ("Identification of the item tested", "Trademark", "Model and/or type reference tested")

2. The sample consists of a AElement Original Electronic Lock with Mifare (ISO14443A & ISO15693 standard based) and Bluetooth LE (BGM111 module) technology.

DEKRA Testing and Certification S.A.U. declines any responsibility with respect to the information provided by the client and that may affect the validity of results.

Usage of samples

Samples undergoing test have been selected by: The client.

Id	Control Number	Description	Model	Serial Nº	Date of Reception	Application
S/01	66902_67.1	Electronic Lock	AEB	2137608	2021-05-11	Element Under Test

Notes referenced to samples during the project: None

Test sample description

Ports..... :	Port name and description	Cable				
		Specified max length [m]	Attached during test	Shielded	Coupled to patient(3)	
	.....	.....	[ ]	[ ]	[ ]	
Supplementary information to the ports..... :	.....					
Rated power supply ..... :	Voltage and Frequency	Reference poles				
		L1	L2	L3	N	PE
	[X] DC: 4.5 Vdc (3 x LR03 batteries)					
Rated Power ..... :	-					
Clock frequencies ..... :	27.12 MHz					
Other parameters..... :	-					
Software version ..... :	0178 (Control FW) + 0184 (BGM111 FW)					
Hardware version..... :	1.0					
Dimensions in cm (W x H x D) ..... :	Reader: 4.7 x 6.7 x 1.75 cm					
Mounting position..... :	[ ] Table top equipment					
	[ ] Wall/Ceiling mounted equipment					
	[ ] Floor standing equipment					
	[ ] Hand-held equipment					
	[X] Other: Door mounting					
Modules/parts ..... :	Module/parts of test item	Type	Manufacturer			
	BGM111	BLE Module	Silicon Labs			
Accessories (not part of the test item) ..... :	Description	Type	Manufacturer			
	.....	.....	.....			
Documents as provided by the applicant ..... :	Description	File name	Issue date			
	User manual	.....	.....			
	FW Explanation	.....	.....			

(3) Only for Medical Equipment

Identification of the client

SALTO SYSTEMS, S.L.
Arkotz 9, Polígono Lanbarren 20180 Oiartzun (Gipuzkoa) - Spain

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2022-02-22
Date (finish)	2022-02-23

Document history

Report number	Date	Description
71403REM.002	2022-03-14	First release

Environmental conditions

In the control chamber, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860mbar Max. = 1060mbar

In the semianechoic chamber, the following limits were not exceeded during the test.

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 30 % Max. = 75 %
Air pressure	Min. = 860mbar Max. = 1060mbar

In the chamber for conducted measurements, the following limits were not exceeded during the test:

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 30 % Max. = 60 %
Air pressure	Min. = 860mbar Max. = 1060mbar

Remarks and comments

The tests have been performed by the technical personnel: Lorena Oviedo Aranda.

Testing verdicts

Fail	F
Inconclusive	I
Not applicable	N/A
Not measured	N/M
Pass	P

List of equipment used during the test

Control No.	Equipment	Model	Manufacturer	Next Calibration
8866	EMI TEST RECEIVER 2Hz-44GHz	ESW44	ROHDE AND SCHWARZ	2023-09-21
6132	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2022-04-05
6126	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	HWg-STE	HW GROUP	2022-04-05
4612	HORN ANTENNA 1-18GHz	BBHA 9120 D	SCHWARZBECK MESS-ELEKTRONIK	2024-07-13
5641	HYBRID BILOG ANTENNA 30MHz-6GHz	3142E	EST LINDGREN	2024-09-15
8788	PREAMPLIFIER 30dB 500MHz-18GHz	BBV 9718 C	SCHWARZBECK	2022-06-07
6064	SEMIANECHOIC ABSORBER LINED CHAMBER	SAC-3	FRANKONIA	--
6329	SHIELDED ROOM	---	FRANKONIA	--

Summary

Test Specification.	Requirement – Test case	Verdict	Remark
FCC CFR 47, Part 15, Subpart B (10-1-20 Edition) & ICES-003 Issue 7 (October 2020)	RE Radiated emission. Electromagnetic field measure	Pass	---
	CE Conducted emission	N/A	(1)

Supplementary information and remarks:

(1) This test is not applicable because EUT is powered in DC (Internal battery)

Appendix A: Test results

Appendix A content

Description of the operation modes

The operation modes described in this paragraph constitute a functionality of the sample under test for itself.

The operation modes used by the samples to which the present report refers, are shown in the following table:

Id	Description
OM/01	EUT ON. BLE and RFID in IDLE state. Continuous communication with EEPROM, RTC and Secure Element.. Power supply: 4.5Vdc (Internal Batteries: 3x1,5Vdc)

Test standards version applied

The product standards and test standards applied for each test cases are shown in the following table:

Product Test Standard	Test standard	Requirement – Test case
FCC CFR 47, Part 15, Subpart B (10-1-20 Edition) & ICES-003 Issue 7 (October 2020)	ANSI C63.4 (2014)	RE Radiated emission.

Test Cases Details

FCC CFR 47, Part 15, Subpart B
(10-1-20 Edition) & ICES-003 Issue 7 (October 2020)
RE Radiated emission. Electromagnetic field measure

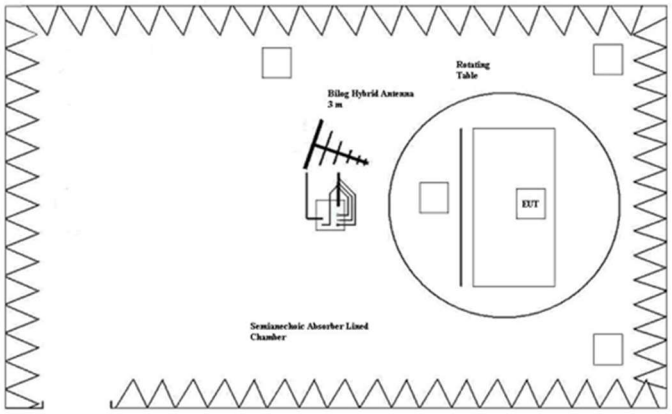
Limits of interference Class B

The applied limit for radiated emissions, 3 m distance, according to the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-1-20 Edition), Secs. 15.109 & ICES-003 Issue 7 (October 2020)

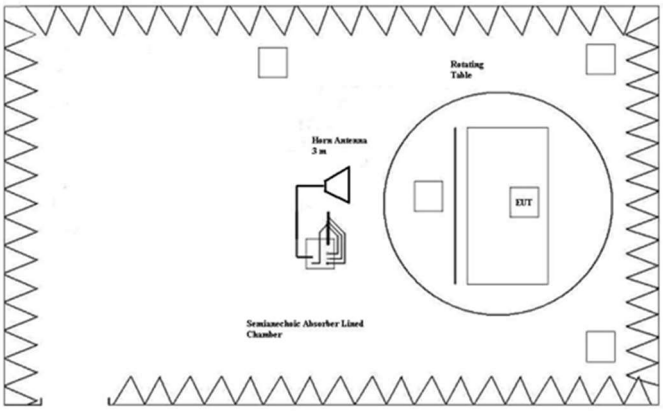
Frequency range (MHz)	FCC Part 15B		ICES-003 Issue 7		FCC Part 15B & ICES-003 Issue 7	
	QP Limit for 3 m		QP Limit for 3 m		PK Limit for 3 m	AVG Limit for 3 m
	(μV/m)	(dBμV/m)	(μV/m)	(dBμV/m)	(dBμV/m)	(dBμV/m)
30 to 88	100	40	100	40	---	---
88 to 216	150	43.5	150	43.5	---	---
216 to 230	200	46	200	46	---	---
230 to 960	200	46	224	47		
960 to 1000	500	54	500	54	---	---
Above 1000	---	---	---	---	74	54

Limits according to FCC Part 15B, are equal or more stringent than those of ICES-003 Issue 7.

Setup for measurements



Setup for measurements < 1GHz.



Setup for measurements > 1GHz.

Results

S/	OM	Code	Freq Rng (MHz)	V
01	OM/01	RE0101LR	[30, 1000]	P
01	OM/01	RE0101HR	[1000, 17000]	P

Note: Range: f>17 GHz. Test required only to the 5th harmonics of the maximum internal work frequency in the EUT.

Verdict

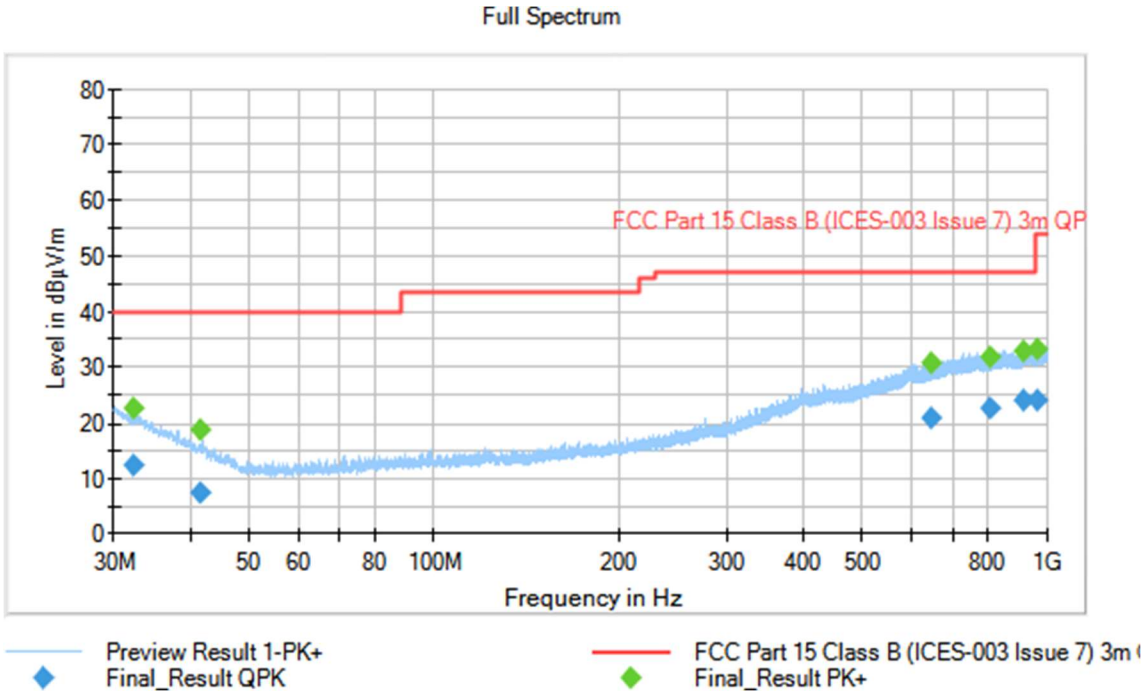
Pass

EMC Test Code = RE0101LR, Frequency Range MHz = [30, 1000]

Sample ID: S/01

Operation Mode: OM/01. EUT ON. BLE and RFID in IDLE state. Continuous communication with EEPROM, RTC and Secure Element.. Power supply: 4.5Vdc (Internal Batteries: 3x1,5Vdc).

Images:



Documents:

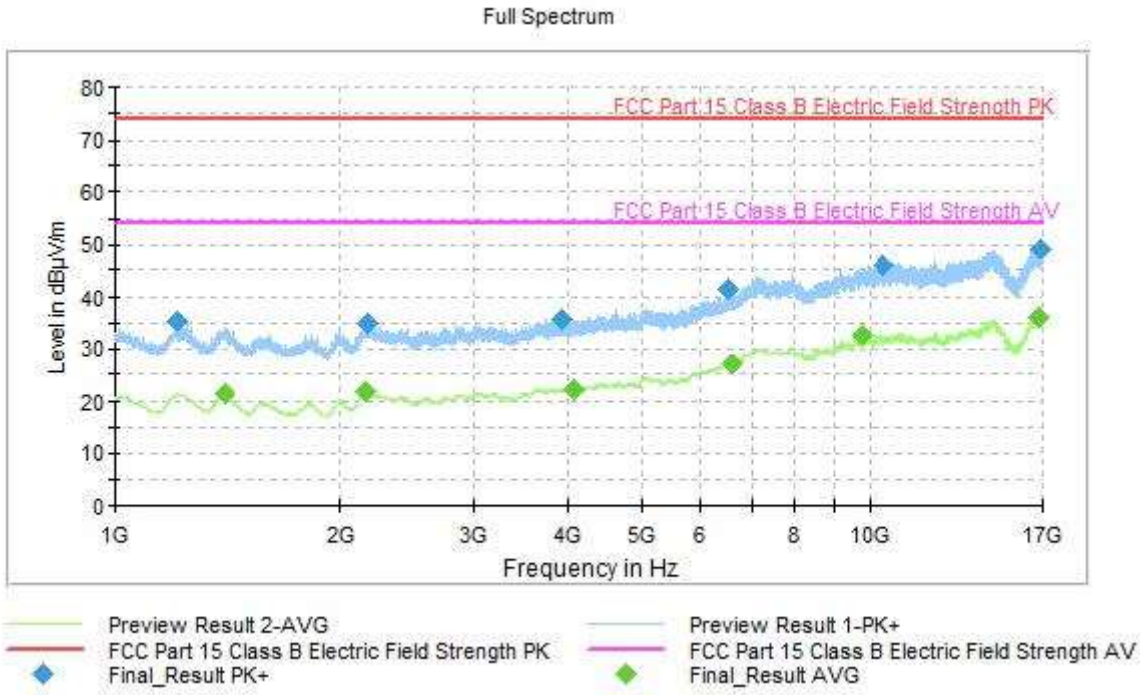
Frequency(MHz)	QuasiPeak(dBµV/m)	MaxPeak(dBµV/m)	Limit(dBµV/m)	Margin(dB)	Height(cm)	Pol	Azimuth(deg)
32.289000	12.38	---	40.00	27.62	281.0	V	-45.0
32.289000	---	22.55	---	---	281.0	V	-45.0
41.596000	---	18.87	---	---	115.0	V	175.0
41.596000	7.45	---	40.00	32.55	115.0	V	175.0
648.393000	---	30.85	---	---	290.0	H	147.0
648.393000	20.93	---	47.00	26.07	290.0	H	147.0
810.123000	22.77	---	47.00	24.23	233.0	V	142.0
810.123000	---	32.02	---	---	233.0	V	142.0
917.700000	23.92	---	47.00	23.08	368.0	V	-4.0
917.700000	---	32.90	---	---	368.0	V	-4.0
962.831000	23.92	---	53.97	30.05	370.0	V	-133.0
962.831000	---	33.34	---	---	370.0	V	-133.0

EMC Test Code = RE0101HR, Frequency Range MHz = [1000, 17000]

Sample ID: S/01

Operation Mode: OM/01. EUT ON. BLE and RFID in IDLE state. Continuous communication with EEPROM, RTC and Secure Element. Power supply: 4.5Vdc (Internal Batteries: 3x1,5Vdc).

Images:



Documents:

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Corr. (dB/m)
1225.500000	34.57	---	73.97	39.40	-5.9
1399.750000	---	21.21	53.97	32.76	-4.9
2158.250000	---	21.70	53.97	32.27	-0.9
2187.000000	34.58	---	73.97	39.39	-0.6
3942.250000	35.72	---	73.97	38.25	4.3
4066.250000	---	22.31	53.97	31.66	4.8
5546.750000	41.38	---	73.97	32.59	8.7
6596.500000	---	27.24	53.97	26.73	13.7
9796.000000	---	32.81	53.97	21.16	21.8
10036.750000	45.74	---	73.97	28.23	21.3
16840.750000	---	36.33	53.97	17.64	31.6
16980.250000	49.75	---	73.97	24.22	31.5