

Test Report

Report Number:

F260576E1

Equipment under Test (EUT):

VERTO ZERO NFC

Applicant:

Martin Lehmann GmbH & Co. KG

Manufacturer:

Martin Lehmann GmbH & Co. KG



Deutsche
Akkreditierungsstelle
D-PL-17186-01-00

References

- [1] **ANSI C63.4-2014+C63.4a-2017** American National Standard for Methods of Measuring of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.
- [2] **FCC 47 CFR Part 2:** General Rules and Regulations
- [3] **FCC 47 CFR Part 15:** Radio Frequency Devices (Subpart B)
- [4] **ICES-003 Issue 7: (October 2020)** Spectrum Management and Telecommunications. Interference-Causing Equipment Standard. Information Technology Equipment (Including Digital Apparatus) —Limits and Methods of Measurement

Test Result

The requirements of the tests performed as shown in the overview (clause 4) were fulfilled by the equipment under test. The complete test results are presented in the following.

"Passed" indicates that the equipment under test conforms with the relevant limits of the testing standard without taking any measurement uncertainty into account as stated in clause 10.2.8.2 of ANSI C63.4 (2014). However, the measurement uncertainty is calculated and shown in this test report.

Tested and written
by:

A blue ink signature of Michael DINTER.

Michael DINTER
05.10.2026

Signature

Reviewed and
approved by:

A blue ink signature of Mohamed Yassine KHALEK.

Mohamed Yassine KHALEK
05.10.2026

Signature

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The test results herein refer only to the tested sample. NMI TESTLAB GmbH is not responsible for any generalisations or conclusions drawn from these test results concerning further samples. Any modification of the tested samples is prohibited and leads to the invalidity of this test report. Each page necessarily contains the NMI TESTLAB Logo and the TEST REPORT NUMBER.

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1 Identification

1.1 Applicant

Name:	Martin Lehmann GmbH & Co. KG
Address:	Uphauser Weg 82, 32429 Minden
Country:	Germany
Name for contact purposes:	-
Phone:	0571-5046-0
eMail address:	info@lehmann-locks.com
Applicant represented during the test by the following person:	None

1.2 Manufacturer

Name:	Martin Lehmann GmbH & Co. KG
Address:	Uphauser Weg 82, 32429 Minden
Country:	Germany
Name for contact purposes:	-
Phone:	0571-5046-0
eMail address:	info@lehmann-locks.com
Manufacturer represented during the test by the following person:	None

1.3 Test Laboratory

The tests were carried out by: **NMi TESTLAB GmbH**
Königswinkel 10
32825 Blomberg
Germany

accredited by *Deutsche Akkreditierungsstelle GmbH (DAkkS)* according to DIN EN ISO/IEC 17025:2018. The accreditation is only valid for the scope of accreditation listed in the annex of the certificate D-PL-17186-01-00. FCC Test Firm Designation Number DE0004, FCC Test Firm Registration Number 469623, CAB Identifier DE0003 and ISCED# 3469A.

1.4 EUT (Equipment under Test)

Test object: *	Passive RFID furniture lock
Model name: *	VERTO ZERO NFC
Model number: *	L7NF13V1
Order number: *	-
FCC ID: *	W2Y-L7NF13V1

* Declared by the applicant

	EUT number
	1
Serial number: *	2639 - 0299
PCB identifier: *	SA037-1
Hardware version: *	SA037-11G
Software version: *	V0.2.13
Type Plate: *	

* Declared by the applicant

One EUT was used for all tests.

Note: NMI TESTLAB GmbH does not take samples. The samples used for tests are provided exclusively by the applicant.

1.5 Technical Data of Equipment

General EUT data			
Power supply EUT: *	Inductive powered		
Supply voltage EUT: *	Unom = N/A	Umin = N/A	Umax = N/A
Temperature range: *	-5 °C to +60 °C		
Lowest / highest internal frequency: *	32.768 kHz / 48 MHz		

* Declared by the applicant

NFC part	
Operating frequency: *	13.56 MHz
Number of channels: *	1
Type of modulation: *	ASK
Data rate: *	53 kbit
Duty cycle: *	-
Antenna type: *	Integrated PCB antenna
Antenna connector: *	None

* Declared by the applicant

Ports / Connectors				
Identification	Connector		Length during test	Shielding (Yes / No)
	EUT	Ancillary		
-	-	-	-	-

* Declared by the applicant

Equipment used for testing	
RFID Reader * ¹	CAPTURA 100 MIFARE

*¹ Provided by the applicant

*² Provided by the laboratory

Ancillary Equipment	
-	-

* Provided by the applicant

1.6 Dates

Date of receipt of test sample:	23.09.2026
Start of test:	25.09.2026
End of test:	25.09.2026

2 Operational States

Description of function of the EUT:

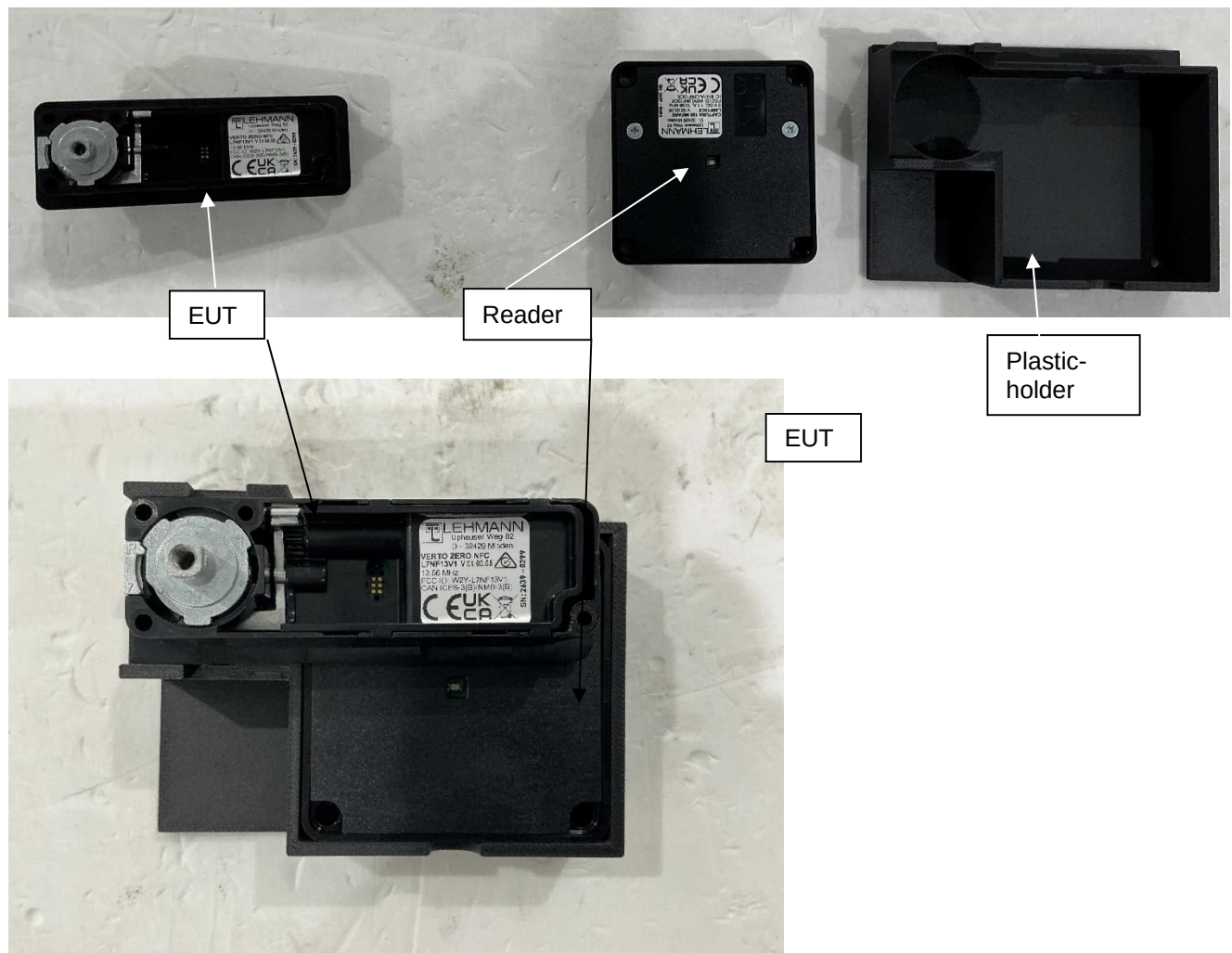
The EUT is a passive RFID lock. The EUT is powered by NFC via a smartphone.

The following states were defined as the operating conditions:

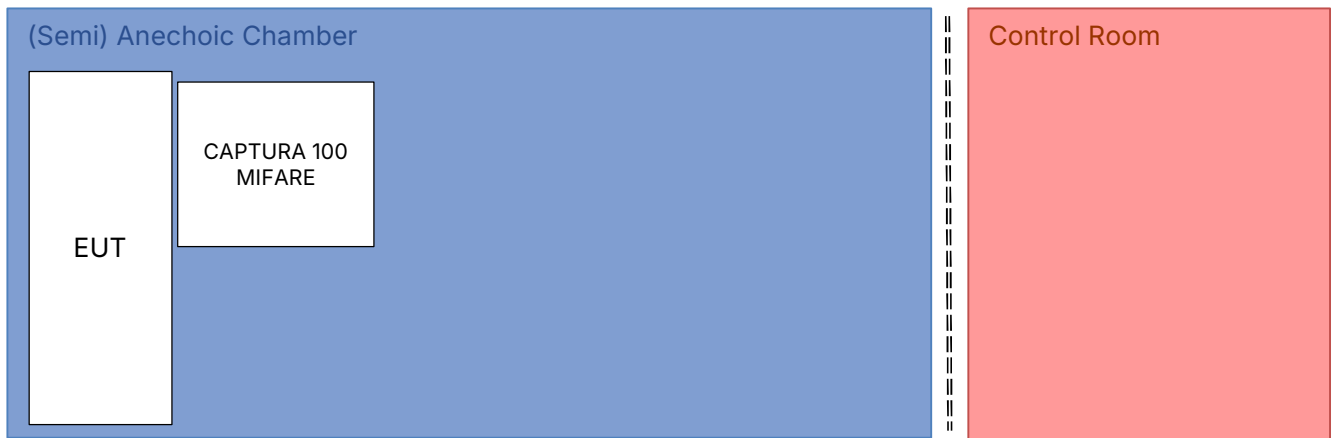
During all tests the EUT was wireless powered by the reader in front of the lock as shown in the picture below.

The EUT was modified that a reading was established by the reader and the motor of the furniture lock was moving in a 2 second interval.

The EUT was set up as follows:



2.1.1 Block Diagram (Radiated)



3 Overview

Conducted emissions FCC 47 CFR Part 15 section 15.107 (a), (b) [3] ICES-003 Issue 7 section 3.2.1[4]					
Application	Frequency range	Limits	Reference standard	Tested EUT	Status
AC supply line Class B	0.15 to 0.5 MHz	66 to 56 dB(μV) QP*	ANSI C63.4	-	-
	0.5 to 5 MHz	56 to 46 dB(μV) AV*			
	5 to 30 MHz	56 dB(μV) QP 46 dB(μV) AV 60 dB(μV) QP 50 dB(μV) AV			
*: Decreases with the logarithm of the frequency					

Radiated emissions FCC 47 CFR Part 15 section 15.109 (a) [3]					
Application	Frequency range	Limits	Reference standard	Tested EUT	Status
Radiated Emission Class B	30 to 88 MHz	40.0 dB(μV/m) QP at 3 m	ANSI C63.4	1	Passed
	88 to 216 MHz	43.5 dB(μV/m) QP at 3 m			
	216 to 960 MHz	46.0 dB(μV/m) QP at 3 m			
	960 to 1000 MHz	54.0 dB(μV/m) QP at 3 m			
	above 1000 MHz	54.0 dB(μV/m) AV at 3 m and 74.0 dB(μV/m) PK at 3 m			

Radiated emissions ICES-003 Issue 7 section 3.2.2 [4]					
Application	Frequency range	Limits	Reference standard	Tested EUT	Status
Radiated Emission Class B	30 to 88 MHz	40.0 dB(μV/m) QP at 3 m	ANSI C63.4	1	Passed
	88 to 216 MHz	43.5 dB(μV/m) QP at 3 m			
	216 to 230 MHz	46.0 dB(μV/m) QP at 3 m			
	230 to 960 MHz	47.0 dB(μV/m) QP at 3 m			
	960 to 1000 MHz	54.0 dB(μV/m) QP at 3 m			
	above 1000 MHz	54 dB(μV/m) AV at 3 m and 74 dB(μV/m) PK at 3 m			

Remark: As declared by the applicant the highest internal frequency of the EUT is < 108 MHz.
Therefore, the radiated emission measurement must be carried out up to 1 GHz.

The EUT was classified by the applicant as CLASS B equipment.

4 Results

4.1 Test setups

4.1.1 Radiated: 30 MHz to 1 GHz

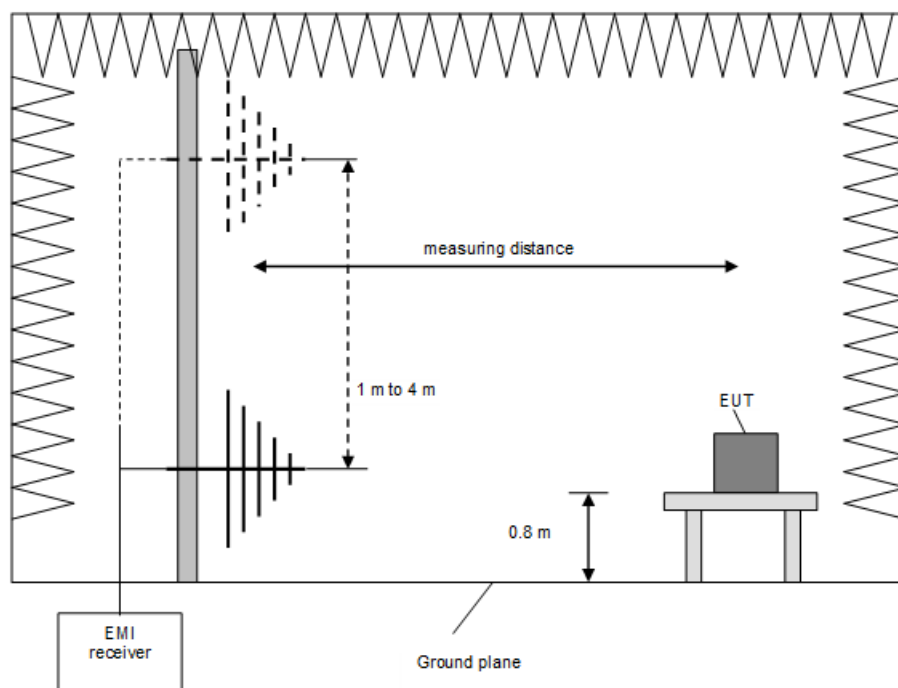
4.1.1.1 Preliminary and final measurement 30 MHz to 1 GHz

The preliminary and final measurements are performed in a semi-anechoic chamber with a metal ground plane at a measuring distance of 3 meters. Table-top devices are set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm. Floor-standing devices are placed directly on the turntable / ground plane. The setup of the equipment under test is in accordance with [1].

During the tests the EUT is rotated in the range of 0 ° to 360 °, the measuring antenna is set to horizontal and vertical polarization and raised and lowered in the range from 1 m to 4 m to find the maximum level of emissions.

The resolution bandwidth of the EMI receiver is set to the following values:

Test	Frequency range	Step-size	Resolution bandwidth	Measuring time	Detector
Preliminary measurement	30 MHz to 1 GHz	30 kHz	120 kHz	-	Peak Average
Frequency peak search	± 120 kHz	10 kHz	120 kHz	1 s	Peak
Final measurement	30 MHz to 1 GHz	-	120 kHz	1 s	QuasiPeak



Procedure preliminary measurement:

The following procedure is used:

- 1) Set the measuring antenna to 1 m height.
- 2) Monitor the frequency range at horizontal polarization of the measuring antenna and an EUT / turntable azimuth of 0 °.
- 3) Rotate the EUT by 360° to maximize the detected signals.
- 4) Repeat steps 2 to 3 with the vertical polarization of the measuring antenna.
- 5) Increase the height of the measuring antenna for 0.5 m and repeat steps 2 to 4 until the final height of 4 m is reached.
- 6) The highest values for each frequency are saved by the software, including the measuring antenna height and polarization and the turntable azimuth for that value.

Procedure final measurement:

The following procedure is used:

- 1) Select the highest frequency peaks (lowest margin to the limit) for the final measurement.
- 2) The software determines the exact peak frequencies by doing a partial scan with reduced step size of the pre-scan of the selected peaks.
- 3) If the EUT is portable or ceiling mounted, find the worst-case EUT orientation (x,y,z) for the final test.
- 4) The worst-case measuring antenna height is found via varying the height by +/- 0.5 m from the value obtained in the preliminary measurement while monitoring the emission level.
- 5) The worst-case turntable position is found via varying the turntable azimuth by +/- 30° from the value obtained in the preliminary measurement while monitoring the emission level.
- 6) The final measurement is performed at the worst-case measuring antenna height and the worst-case turntable azimuth.
- 7) Steps 2 to 6 are repeated for each frequency peak selected in step 1.

4.2 Radiated emissions

4.2.1 Test setup (Maximum unwanted emissions)

Test setup (Maximum unwanted emissions)			
Used	Setup	See sub-clause	Comment
☒	Radiated: 30 MHz to 1 GHz	5.1.1	-

4.2.2 Test method (Maximum unwanted emissions)

☒ Test method (radiated) see sub-clause 5.1.1 as described herein

4.2.3 Test results (Maximum unwanted emissions)

4.2.3.1 Test results (30 MHz – 1 GHz)

Ambient temperature:	22 °C
Relative humidity:	40 %

Date:	25.09.2026
Tested by:	M. DINTER

Position of EUT: For tests for f between 30 MHz and 1 GHz, the EUT was set up on a table with a height of 80 cm. The distance between EUT and antenna was 3 m.

Cable guide: For detailed information of test setup and the cable guide refer to the pictures in annex A of this test report.

Test record: Plots for each frequency range are submitted below.

Remark: Only nominal position was tested.

Calculations:

Result [dBμV/m] = Reading [dBμV] + Correction [dB/m]

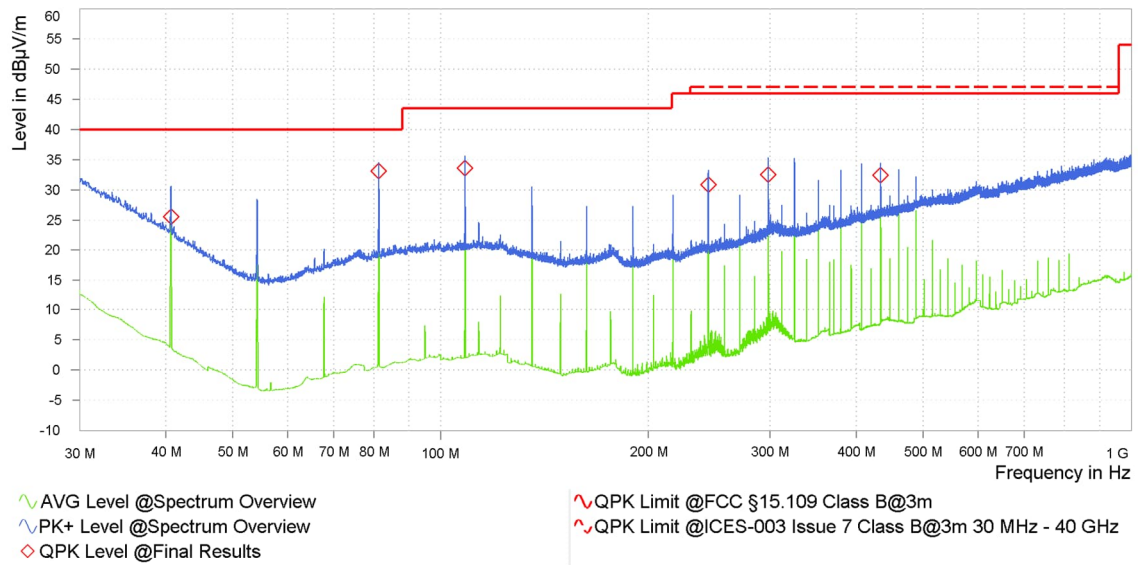
Correction [dB/m] = AF [dB/m] + Cable attenuation [dB] + optional preamp gain [dB]

Margin [dB] = Limit [dBμV/m] - Result [dBμV/m]

The measured points and the limit line in the following diagram refer to the standard measurement of the emitted interference in compliance with the above-mentioned standard. The measured points marked with "◇" are the measured results of the standard subsequent measurement in a semi-anechoic chamber.

Plot:

Spurious emissions from 30 MHz to 1 GHz:



Result tables:

Results according to FCC 47 CFR Part 15 section 15.109 (a), (b) [3]:

Frequency [MHz]	Result (QP) [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Correction [dB/m]	Polarization (H/V)	Azimuth [deg]	Antenna height [m]
40.690	25.58	40.00	14.42	19.85	V	97	1.09
81.370	33.12	40.00	6.88	16.31	V	293	1.01
108.490	33.56	43.50	9.94	17.74	V	294	1.12
244.090	30.83	46.00	15.17	17.00	H	138	1.12
298.330	32.54	46.00	13.46	18.76	H	271	1.01
433.930	32.39	46.00	13.61	22.32	V	285	1.25

Results according to ICES-003 Issue 7 section 3.2.2 [4]:

Frequency [MHz]	Result (QP) [dBμV/m]	Limit [dBμV/m]	Margin [dB]	Correction [dB/m]	Polarization (H/V)	Azimuth [deg]	Antenna height [m]
40.690	25.58	40.00	14.42	19.85	V	97	1.09
81.370	33.12	40.00	6.88	16.31	V	293	1.01
108.490	33.56	43.50	9.94	17.74	V	294	1.12
244.090	30.83	47.00	16.17	17.00	H	138	1.12
298.330	32.54	47.00	14.46	18.76	H	271	1.01
433.930	32.39	47.00	14.61	22.32	V	285	1.25

Test result: Passed

Test equipment (please refer to chapter 7 for details)
1 - 8

5 Measurement Uncertainties

Conducted measurements		
Measurement method	Standard used for calculating measurement uncertainty	Expanded measurement uncertainty (95 %) U_{lab}
Conducted emissions from 150 kHz to 30 MHz with LISN	CISPR 16-4-2	2.8 dB

Radiated measurements		
Radiated field strength M276		
R&S HL562E @ 3 m 30 MHz – 1 GHz	CISPR 16-4-2	4.8 dB
R&S HL050 @ 3 m	-	
1 – 6 GHz	CISPR 16-4-2	5.1 dB
6 – 18 GHz	CISPR 16-4-2	5.4 dB
Flann Standard Gain Horns 18 – 40 GHz	-	5.9 dB

6 Test Equipment used for Tests

No.	Test equipment	Type	Manufacturer	Serial No.	PM. No.	Cal. Date	Cal Due
1	Ultralog antenna 30 MHz - 6 GHz	HL562E	Rohde & Schwarz	101079	482978	24.04.2024	04.2027
2	EMC test software	Elektra V5.21	Rohde & Schwarz	---	483755	Calibration not necessary	
3	RF Switch Matrix	OSP220	Rohde & Schwarz	101391	482976	Calibration not necessary	
4	Turntable	TT3.0-3t	Maturo	825/2612/.01	483224	Calibration not necessary	
5	Antenna support tilt mast	BAM 4.5-P-10kg	Maturo	222/2612.01	483225	Calibration not necessary	
6	Controller	NCD	Maturo	474/2612.01	483226	Calibration not necessary	
7	Semi Anechoic Chamber M276	B83117-FJ649-T262	Albatross Projects	SAC5-2	483227	Calibration not necessary	
8	EMI receiver / Spectrum analyser	ESW44	Rohde & Schwarz	101828	482979	06.02.2026	02.2028

7 Test Site Verification

Test equipment	PM. No.	Frequency range	Type of validation	According to	Val. Date	Val Due
Semi anechoic chamber M276	483227	30 MHz – 1000 MHz	NSA	ANSI C63.4-2014 ANSI C63.4a-2017	05.06.2025	05.06.2028

8 Report History

Report Number	Date	Comment
F260576E1	05.10.2026	Initial test report
-	-	-
-	-	-

9 List of Annexes

Annex A	Test Setup Photos	4 pages
Annex B	EUT external Photos	3 pages
Annex C	EUT internal Photos	6 pages
Annex D	Void	

----- end of test report -----