Report on the FCC and IC Testing of the SEW-EURODRIVE GmbH & Co KG

Model: MAXO-MS/M/SM-GIP/1

In accordance with FCC 47 CFR Part 15 C and ISED RSS-GEN and ISED RSS-102

Product Service

Add value.
Inspire trust.

Prepared for: SEW-EURODRIVE GmbH & Co KG
Ernst-Blickle-Straße 42
D-76646 Bruchsal
Germany

FCC ID: VEB-28279883
IC: 7177A-28279883

COMMERCIAL-IN-CONFIDENCE

Date: 2024-06-17
Document Number: TR-713306366-05 | Revision 2

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Project Management	Alexander Deese	2024-06-17	SIGN-ID 927242
Authorised Signatory	Matthias Stumpe	2024-06-18	SIGN-ID 927808

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service document control rules.

Engineering Statement:

These measurements shown in this report were made in accordance with the procedures described on test pages. All reporded testing was carried out on a sample equipment to demonstrate limited compliance with FCC 47 CFR Part 15 C and ISED RSS-102 and RSS-GEN.
The sample tested was found to comply with the requirements in the tested parts

RESPONSIBLE FOR	NAME	DATE	SIGNATURE
Testing	Alexander Deese	2024-06-17	SIGN-ID 927242

Laboratory Accreditation	Laboratory recognition	Industry Canada test site registration
DAkkS Reg. No. D-PL-11321-11-03 DAkkS Reg. No. D-PL-11321-11-04	Registration No. BNetzA-CAB-16/21-15	3050A-2

Executive Statement:

A sample of this product was tested and found to be compliant with FCC 47 CFR Part 15 C:2021 and ISED RSS-102:2023 and ISED RSS-Gen:2018 + A1:2019 + A2:2021 in the tested parts

Trade Register Munich
HRB 85742
VAT ID No. DE129484267
Information pursuant to Section 2(1)
DL-InfoV (Germany) at
www.tuev-sued.com/imprint

Managing Directors:
Walther Reithmaier (Sprecher / CEO)
Patrick van Welij

Phone: +49 (0) 9421 56 82-0
Fax: +49 (0) 9421 56 82-199
www.tuev-sued.de

TÜV SÜD Product Service GmbH
Äußere Frühlingstraße 45
94315 Straubing
Germany

Product Service

Content

1 Report Summary 2

1.1 Modification Report 2
1.2 Introduction 2
1.3 Brief Summary of Results 3
1.4 Product Information 4
1.5 Test Configuration 4
1.6 Modes of Operation 4
1.7 Deviations from Standard 5
1.8 EUT Modifications Record 5
1.9 Test Location 6

2 Test Details 7

2.1 RF Exposure Exemption 7

3 Photographs of Test Setups 11
4 Measurement Uncertainty 12

Product Service

1 Report Summary

1.1 Modification Report

Alternations and additions of this report will be issued to the holders of each copy in the form of a complete document.

Revision	*Description of changes*	*Date of Issue*
0	First Issue	2024-04-25
1	Model Number changed. Specification limit for RSS-102 corrected.	2024-06-11
2	Photograph of test setup added. Specification clauses updated.	2024-06-17

Table 1: Report of Modifications

1.2 Introduction

Applicant	SEW-EURODRIVE GmbH & Co KG
Manufacturer	SEW-EURODRIVE GmbH & Co KG
Model Number(s)	MAXO-MS/M/SM-GIP/1
Serial Number(s)	031.123456789.0001.23 031.123456789.0002.23
Hardware Version(s)	---
Software Version(s)	---
Number of Samples Tested	1
Test Specification(s) /	FCC 47 CFR, Part 1, § 1.1307: 2021 and
Issue / Date	ISED RSS-102, Issue 6: 2023
Test Plan/Issue/Date	---
Order Number	61681889, 61872950
Date	---
Date of Receipt of EUT	2023-10-20
Start of Test	2024-04-25
Finish of Test	2024-04-25
Name of Engineer(s)	Alexander Deese
Related Document(s)	ANSI C63.10:2013

Product Service

1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with FCC 47 CFR, Part 1, § 1.1310 and ISED RSS-102 is shown below.

Section	*Specification Clause*	*Test Description*	*Result*
2.1	(e)(1)	RF Exposure Exemption	Pass

Table 2: Results according to FCC 47 CFR, Part 1, § 1.1310

Section	*Specification Clause*	*Test Description*	*Result*
2.1	5	RF Exposure Exemption	Pass

Table 3: Results according to ISED RSS-102

Product Service

1.4 Product Information

1.4.1 Technical Description

Frequency Band:	11,810 MHz – 15,310 MHz
Center Frequency:	13,56 MHz
Power supply	
Supply Voltage:	18 – 30 V
Supply Frequency:	DC

1.5 Test Configuration

The EUT was 24 V power supplied.

1.6 Modes of Operation

RFID was continuously reading tag.

Product Service

1.7 Deviations from Standard

1.8 EUT Modifications Record

The table below details modifications made to the EUT during the test program.
The modifications incorporated during each test are recorded on the appropriate test pages.

Modification State	Description of Modification still fitted to EUT	Modification Fitted By	Date Modification Fitted
0	As supplied by the customer	Not Applicable	Not Applicable

Table 4

Product Service

1.9 Test Location

TÜV SÜD Product Service conducted the following tests at our Straubing test laboratory:

Test Name	Name of Engineer(s)
RF Exposure	Alexander Deese

Office Address:
Äußere Frühlingstraße 45
94315 Straubing
Germany

Product Service

2 Test Details

2.1 RF Exposure Exemption

2.1.1 Specification Reference

47 CFR, Part 1, § 1.1310
RSS-102, Issue 6 (2023-12-15)

2.1.2 Equipment under Test and Modification State

MAXO-MS/M/SM-GIP/1; S/N 031.123456789.0001.23; Modification state 0
MAXO-MS/M/SM-GIP/1; S/N 031.123456789.0002.23; Modification state 0

2.1.3 Date of Test

2024-04-25

2.1.4 Environmental Conditions

Ambient Temperature	19 °C
Relative Humidity	38 %

Product Service

2.1.5 Specification Limits

47 CFR, Part 1, § 1.1307(b)(3)

(i) For single RF sources (i.e. any single fixed RF source, mobile device, or portable device, as defined in paragraph(b)(2) of this section): A single RF source is exempt if:

(A) The available maximum time-averaged power is no more than 1 mW, regardless of separation distance. This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(ii)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(ii)(A);

(B) Or the available maximum time-averaged power or effective radiate power (ERP), whichever is greater, is less than or equal to the threshold P_{th} (mW) described in the following formula. This method shall only be used at separation distances (cm) from 0.5 cm to 40 cm and at frequencies from 0.3 GHz to 6 GHz (inclusive). P_{th} is given by

$$P_{th}(\text{mW}) = \begin{cases} ERP_{20\text{cm}}\,(d/20\ cm)^{x}, & d \le 20\ \text{cm}; \\ ERP_{20\text{cm}}, & 20\ \text{cm} < d \le 40\ \text{cm} \end{cases}$$

where

$$x = -\log_{10}\left(\frac{60}{ERP_{20\text{cm}}\sqrt{f}}\right);\ f \text{ in GHz}$$

and

$$ERP_{20\text{cm}}(mW) = \begin{cases} 2040\ f, & 0.3\ \text{GHz} \le f < 1.5\ \text{GHz} \\ 3060, & 1.5\ \text{GHz} \le f \le 6\ \text{GHz} \end{cases}$$

d = the test separation distance (cm);

(C) Or using the table below and the minimum separation distance (R in meters) from the body of a nearby person for the frequency (f in MHz) at which the source operates, the ERP (watts) is no more than the calculated value described for that frequency. For the exemption in the table to apply, R must be at least $\lambda/2\pi$ where λ is the free-space operating wavelength in meters. If the ERP of a single RF source is not easily obtained, then the available maximum time-averaged power may be used in lieu of ERP if the physical dimensions of the radiating structure(s) do not exceed the electrical length of $\lambda/4$ or if the antenna gain is less than that of a half-wave dipole (1.64 linear value).

RF source frequency (MHz)	*Threshold ERP (Watts)*
0.3 – 1.34	1920 R^2
1.34 – 30	3450 R^2 / f^2
30 – 300	3.83 R^2
300 – 1500	0.0128 R^2 f^2
1500 – 100000	19.2 R^2

(ii) For multiple RF sources: Multiple RF sources are exempt if:

(A) The available maximum time-averaged power of each source is no more than 1 mW and there is a separation distance of 2 cm between any portion of a radiating structure operating and the nearest portion of any other radiating structure in the same device, except if the sum of multiple sources is less than 1 mW during the time-averaging period, in which case they may be treated as a single source (separation is not required). This exemption may not be used in conjunction with other exemption criteria other than those in paragraph (b)(3)(i)(A) of this section. Medical implant devices may only use this exemption and that in paragraph (b)(3)(i)(A).

(B) In case of fixed RF sources operating in the same time-averaging period, or of multiple or portable RF sources within a device in the same time averaging period, if the sum of the fractional contributions to the applicable thresholds is less than or equal to 1 as indicated in the following equation:

$$\sum_{i=1}^{a}\frac{P_i}{P_{th,i}} + \sum_{j=1}^{b}\frac{ERP_j}{ERP_{th,j}} + \sum_{k=1}^{c}\frac{Evaluated_k}{ExposureLimit_k} \le 1$$

Product Service

47 CFR, § 1.1310, Table 1 (ii)

Frequency range (MHz)	Electric Field (V rms)	Magnetic field (A/m rms)	Power density (W/m²)	Reference period (min)
0.3 – 1.34	614	1.63	100	< 30
1.34 – 30	824 / f	2.19 / f	180 / f²	< 30

RSS-102, section 6.3

SAR evaluation is required if the separation distance between the user and/or bystander and the antenna and/or radiating element of the device is less than or equal to 20 cm, except when the device operates at or below the applicable output power level (adjusted for tune-up tolerance) for the specified separation distance defined in the table below:

f (MHz)	*Exemption Limits (mW) at separation distance of*									
	≤ 5 mm	*10 mm*	*15 mm*	*20 mm*	*25 mm*	*30 mm*	*35 mm*	*40 mm*	*45 mm*	*≥ 50 mm*
≤ 300	45	116	139	163	189	216	246	280	319	362
450	32	71	87	104	124	147	175	208	248	296
835	21	32	41	54	72	96	129	172	228	298
1900	6	10	18	33	57	92	138	194	257	323
2450	3	7	16	32	56	89	128	170	209	245
3500	2	6	15	29	50	72	94	114	134	158
5800	1	5	13	23	32	41	54	74	102	128

Output power level shall be the higher of the maximum conducted or equivalent isotropically radiated power (e.i.r.p.) source-based, time-averaged output power. For controlled use devices where the 8 W/kg for 1 gram of tissue applies, the exemption limits for route evaluation are multiplied by a factor of 5. For limb-worn devices where the 10 grams value applies, the exemption limits for routine evaluation are multiplied by a factor of 2.5.
If the operating frequency of the device is between two frequencies located, linear interpolation shall be applied for the applicable separation distance. For test separation distance less than 5 mm, the exemption limits for a separation distance of 5 mm can be applied to determine if a routine evaluation is required.

For medical implants devices, the exemption limit for routine evaluation is set at 1 mW. The output power of a medical implant device is defined as the higher of the conducted or e.i.r.p. to determine whether the device is exempt from the SAR evaluation.

RSS-102, Table 7

Frequency range (MHz)	Electric Field (V rms)	Magnetic field (A/m rms)	Power density (W/m²)	Reference period (min)
10 – 20	27.46	0.0728	2	6

Product Service

2.1.6 Test Method

The RF Exposure is based on a SAR exemption calculation at a test distance of 20cm.

2.1.7 Test Results

47 CFR

Evaluation according to 47 CFR, Part 1, § 1.1310 table 1 (ii).

Evaluation of NFC:

Frequency [MHz]	*Electric Field Strength [V/m]*	*Magnetic Field Strength [A/m]*	*Limit [V/m]*	*Limit [A/m]*	*Margin*
13.56	0.49	---	60.77	---	60.28
13.56	---	0.0434	---	0.1615	0.1181

RSS-102

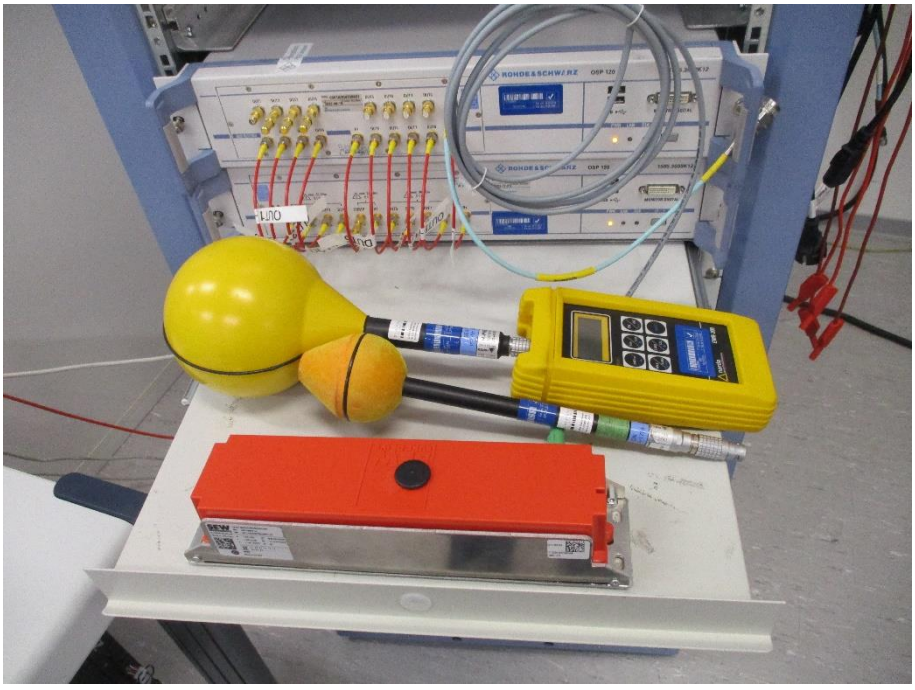
Evaluation according to RSS 102 table 7.

Evaluation of NFC:

Frequency [MHz]	*Electric Field Strength [V/m]*	*Magnetic Field Strength [A/m]*	*Limit [V/m]*	*Limit [A/m]*	*Margin*
13.56	0.49	---	27.46	---	26.97
13.56	---	0.0434	---	0.0728	0.0294

Product Service

3 Photographs of Test Setups



Product Service

4 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

The measurement uncertainty in the laboratory is less than or equal to the maximum measurement uncertainty according to CISPR16-4-2: 2011 + A1 + A2 + Cor1 (U_{CISPR}). This normative regulation means that the measured value is also the value to be assessed in relation to the limit value.

Radio Interference Emission Testing		
Test Name	*kp*	*Expanded Uncertainty*
Conducted Voltage Emission		
9 kHz to 150 kHz (50Ω/50µH AMN)	2	± 3.8 dB
150 kHz to 30 MHz (50Ω/50µH AMN)	2	± 3.4 dB
100 kHz to 200 MHz (50Ω/5µH AMN)	2	± 3.6 dB
Discontinuous Conducted Emission		
9 kHz to 150 kHz (50Ω/50µH AMN)	2	± 3.8 dB
150 kHz to 30 MHz (50Ω/50µH AMN)	2	± 3.4 dB
Conducted Current Emission		
9 kHz to 200 MHz	2	± 3.5 dB
Magnetic Field strength		
9 kHz to 30 MHz (with loop antenna)	2	± 3.9 dB
9 kHz to 30 MHz (large-loop antenna 2 m)	2	± 3.5 dB
Radiated Emission		
30 MHz to 300 MHz	2	± 4.9 dB
300 MHz to 1 GHz	2	± 5.0 dB
1 GHz to 6 GHz	2	± 4.6 dB
Test distance 10 m		
30 MHz to 300 MHz	2	± 4.9 dB
300 MHz to 1 GHz	2	± 4.9 dB
The expanded uncertainty reported according to to CISPR16-4-2: 2011 + A1 + A2 + Cor1 is based on a standard uncertainty multiplied by a coverage factor of kp = 2, providing a level of confidence of p = 95.45%		

Table 5 Measurement uncertainty based on CISPR 16-4-2

Product Service

Radio Interference Emission Testing		
Test Name	*kp*	*Expanded Uncertainty*
Occupied Bandwidth	2	± 5 %
Conducted Power		
9 kHz ≤ f < 30 MHz	2	± 1.0 dB
30 MHz ≤ f < 1 GHz	2	± 1.5 dB
1 GHz ≤ f ≤ 40 GHz	2	± 2.5 dB
1 MS/s power sensor (TS8997)	2	± 1.5 dB
Occupied Bandwidth	2	± 5 %
Power Spectral Density	2	± 3.0 dB
Radiated Power		
9 kHz ≤ f < 26.5 GHz	2	± 5.6 dB
26.5 GHz ≤ f < 60 GHz	2	± 8.0 dB
60 GHz ≤ f < 325 GHz	2	± 10 dB
Conducted Spurious Emissions	2	± 3.0 dB
Radiated Spurious Emissions	2	± 6.0 dB
Voltage		
DC	2	± 1.0 %
AC	2	± 2.0 %
Time (automatic)	2	± 5 %
Frequency	2	± 10^{-7}
The expanded uncertainty reported according to to ETSI TR 100 028:2001 is based on a standard uncertainty multiplied by a coverage factor of kp = 2, providing a level of confidence of p = 95.45%		

Table 6 Measurement uncertainty based on ETSI TR 100 028