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Laboratory Test Report

Document No.: 373-18
Issue: 1
Assignment No.: 4012736

Equipment Under Test: EFA 24VDC 351Ledwb 150W
Client: Pesch Marinescheinwerfer
Ortsring 2
D-21432 Winsen/Luhe



TREO
Treo – Labor für Umweltsimulation GmbH

Accredited test laboratory for environmental simulation
and electromagnetic compatibility = www.treo.de

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Issued by:

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List of Revisions

Issue	Date	Affected Section	Issued by	Reasons for Revision
1	2018-10-24	./.	J. Doering	Initial Release

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2 Test Overview and Results

Table 1: Results

Sec.	Test	Responsible Person	Date	EUT No.	Result
4	Conducted Emission DIN EN 60945:2003-07 + BER1:2010-01 Chapter 9.2	J. Doering	2018-10-16	01	Passed
5*	Radiated Emission DIN EN 60945:2003-07 + BER1:2010-01 Chapter 9.3	J. Doering	2018-10-16	01	Passed

This test report may contain test methods which are not part of our accredited test areas. These tests are marked with an asterisk (*). Tests implemented in an external laboratory are marked with two asterisks (**).

Text written in *italic type* is external information, not provided by TREO. This can be for example results or additional information provided by the client. The information is not part of results witnessed by TREO, hence TREO is not in charge for the content.

Table 2: Logistics

EUT No.	Date	Description
01	2018-10-16	Delivery at TREO-Kiel
01	2018-10-16	Packaging and shipment to the Client

3 Equipment Under Test (EUT)

3.1 Description of EUT No. 01

Table 3: Description of EUT No. 01

Equipment No.	01		
Manufacturer	Pesch Marinescheinwerfer		
Product No.	EF-A Searchlight	Revision	./.
Type	EFA 24VDC 351Ledwb 150W		
Serial No.	1809334		
Software	./.	Version	./.
Voltage	24 V	Frequency	DC
Dimensions	871 x 600 x 500 mm	Weight	52 kg
Description	LED-Searchlight for ships		



Figure 1: Equipment under test No. 01

No label was attached to the EUT at the date of test.

3.2 Entrance Examination

The test equipment was checked after arrival by visual inspection. No external damage was detected.

3.3 Description of Auxiliary Equipment (AE)

./.

3.4 Connections

Table 4: List of Connections

EUT No.	Port	Description	Port	Target
01	X1	Power Supply 24 V DC, unshielded	./.	Power Supply

3.5 Functional Checks and Test Procedures

The following functional checks were performed before, during and after the test:

- Connect the EUT to 24 VDC.
- Verify that the lights illuminate constantly and without flickering.

3.6 Description of general Pass / Fail Criteria

No general pass / fail criteria defined. Details are provided to each specific section.

4 Conducted Emission

4.1 Test Specifications

4.1.1 Adapted Standard

- DIN EN 60945:2003-07 + BER1:2010-01, Chapter 9.2
- Based on DIN EN 55016-2-1:2009-12

4.1.2 Qualification Test Plan

./.

4.1.3 Test Parameters / Category

Category: ./.

Table 5: Parameter

Frequency Range	Measuring Bandwidth	Limits (QP)
10 kHz to 150 kHz	200 Hz	96 dB μ V to 50 dB μ V
150 kHz to 350 kHz	9 kHz	60 dB μ V to 50 dB μ V
350 kHz to 30 MHz	9 kHz	50 dB μ V

4.1.4 Deviations

./.

4.1.5 Remarks

./.

4.1.6 Pass/Fail Criteria

- No emission above the limit

4.2 Test Location and Conditions

Test Facility: TREO – Kiel

Ambient Conditions in the Laboratory:

Table 6: Limits of Ambient Conditions

Temperature [°C]	Ambient Pressure abs.[mbar]	Relative Humidity [% RH]
+15 to +35	860 to 1060	30 to 60

4.3 Test Equipment

Table 7: Test Equipment

Description	Type	Manufacturer	Inventory No.	Calibration due
EMI Receiver	TEDMI X40	Gauss Instruments	K1018	2019-09-18
LISN	ESH2-Z5	Rohde & Schwarz	K7008	2019-04-18

Expanded measurement uncertainty: 4.0 dB

4.4 External Witnessing Persons

Table 8: External Witnessing Persons

Name	Company
Mr. Kilian Stumpf	Pesch Marinescheinwerfer
Mr. Jens Hensel	Pesch Marinescheinwerfer

4.5 Test Set-up



Figure 2: Test set-up of equipment under test No. 01

4.6 Results

No emission above the limit for EUT No. 01 measured.

The EUT passed the test.

Table 9: Overview of Results

EUT No.	Result	Comment
01	Passed	./.

4.6.1 Results EUT No. 01

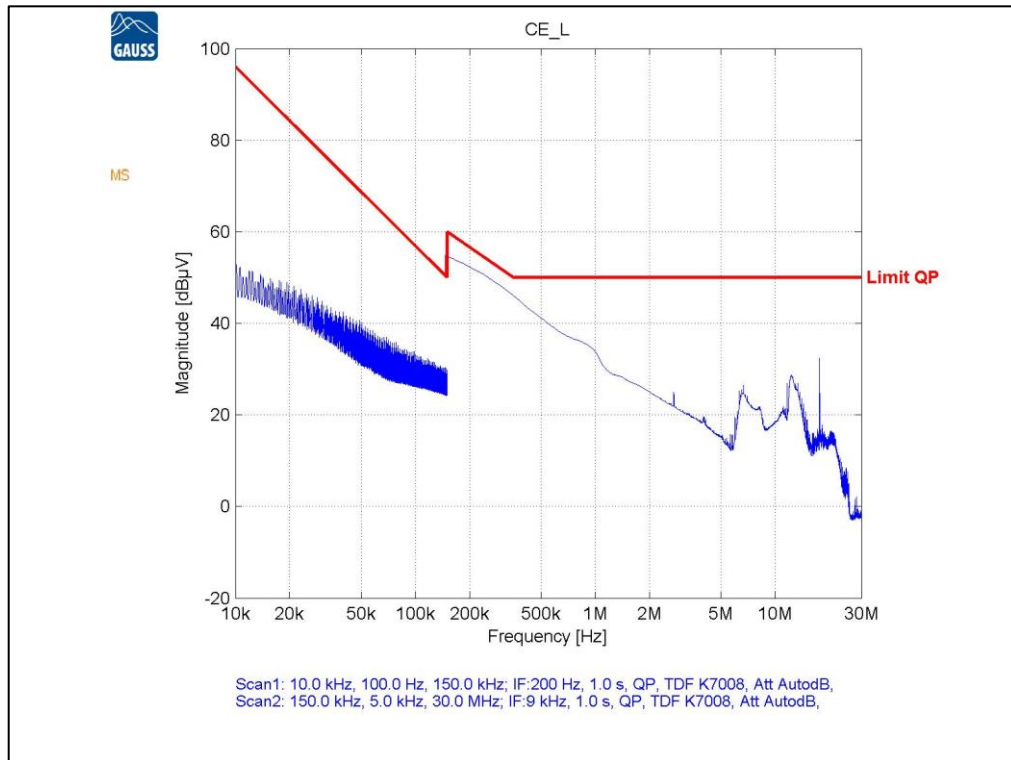


Figure 3: Test results +24 V DC

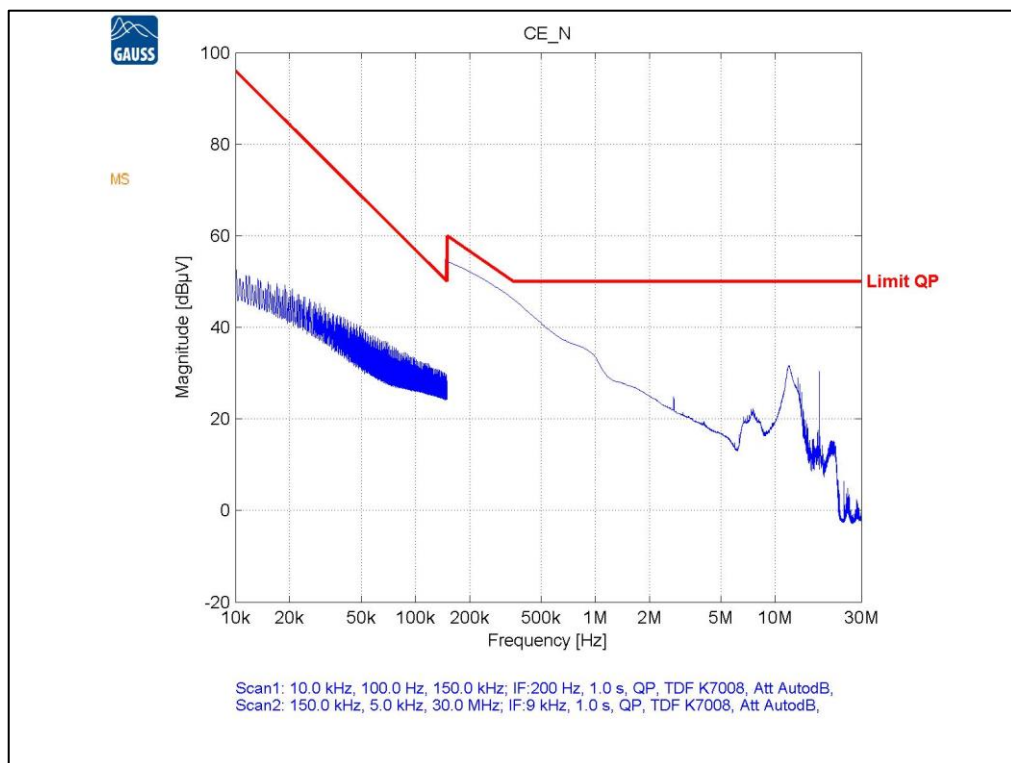


Figure 4: Test results 0 V DC

5 Radiated Emission*

5.1 Test Specifications

5.1.1 Adapted Standard

- DIN EN 60945:2003-07 + BER1:2010-01, Chapter 9.3
- Based on DIN EN 55016-2-3:2007-08

5.1.2 Qualification Test Plan

./.

5.1.3 Test Parameters / Category

Category: ./.

Table 10: Parameter

Frequency Range	Measuring Bandwidth	Limits (QP)
150 kHz to 300 kHz	9 kHz	80 dB μ V/m to 52 dB μ V/m
300 kHz to 30 MHz	9 kHz	52 dB μ V/m to 34 dB μ V/m
30 MHz to 2 GHz	120 kHz	54 dB μ V/m
Except: 156 MHz to 165 MHz	9 kHz	24 dB μ V/m

5.1.4 Deviations

- Antenna height variation from 30 MHz to 1 GHz between 1 m and 3 m (4 m normative) due to limited chamber height.

5.1.5 Remarks

./.

5.1.6 Pass/Fail Criteria

- No emission above the limit

5.2 Test Location and Conditions

Test Facility: TREO – Kiel

Ambient Conditions in the Laboratory:

Table 11: Limits of Ambient Conditions

Temperature [°C]	Ambient Pressure abs.[mbar]	Relative Humidity [% RH]
+15 to +35	860 to 1060	30 to 60

5.3 Test Equipment

Table 12: Test Equipment

Description	Type	Manufacturer	Inventory No.	Calibration due
EMI Receiver	TEDMI X40	Gauss Instruments	K1018	2019-09-18
Antenna	CBL 6141B	Teseq	K3014	2020-07-07
Antenna	HFH2-Z2	Rhode & Schwarz	K3001	2021-03-11

Expanded measurement uncertainty: 5.2 dB

5.4 External Witnessing Persons

Table 13: External Witnessing Persons

Name	Company
Mr. Kilian Stumpf	Pesch Marinescheinwerfer
Mr. Jens Hensel	Pesch Marinescheinwerfer

5.5 Test Set-up



Figure 5: Test set-up EUT 01, 150 kHz to 30 MHz

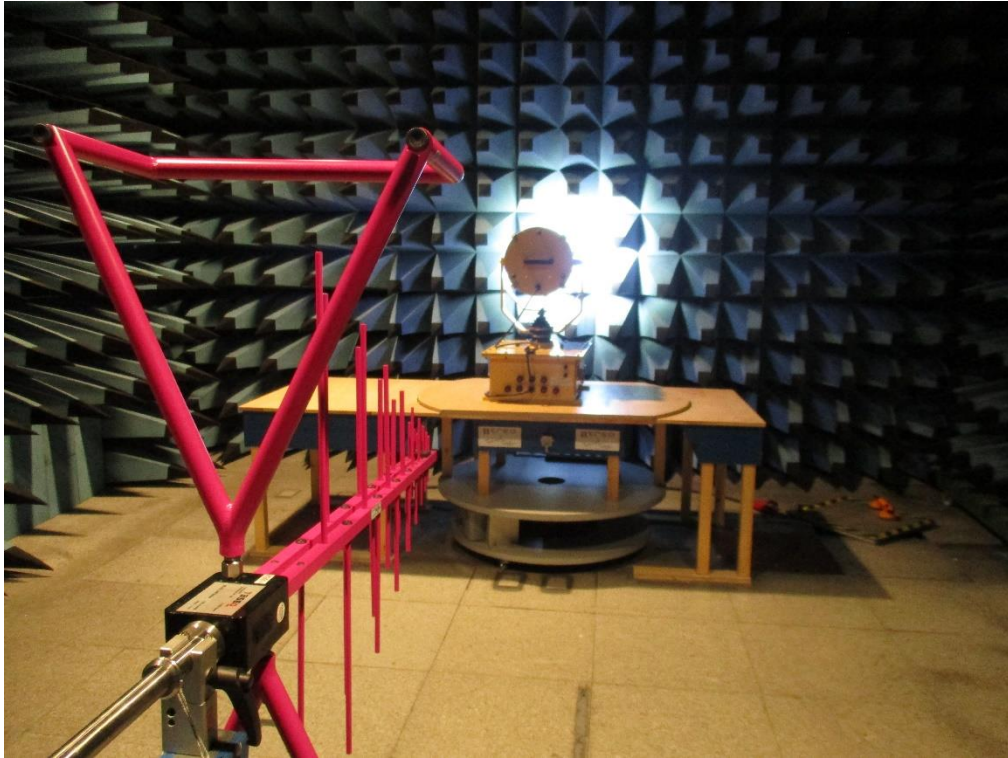


Figure 6: Test set-up EUT 01, 30 MHz to 1 GHz

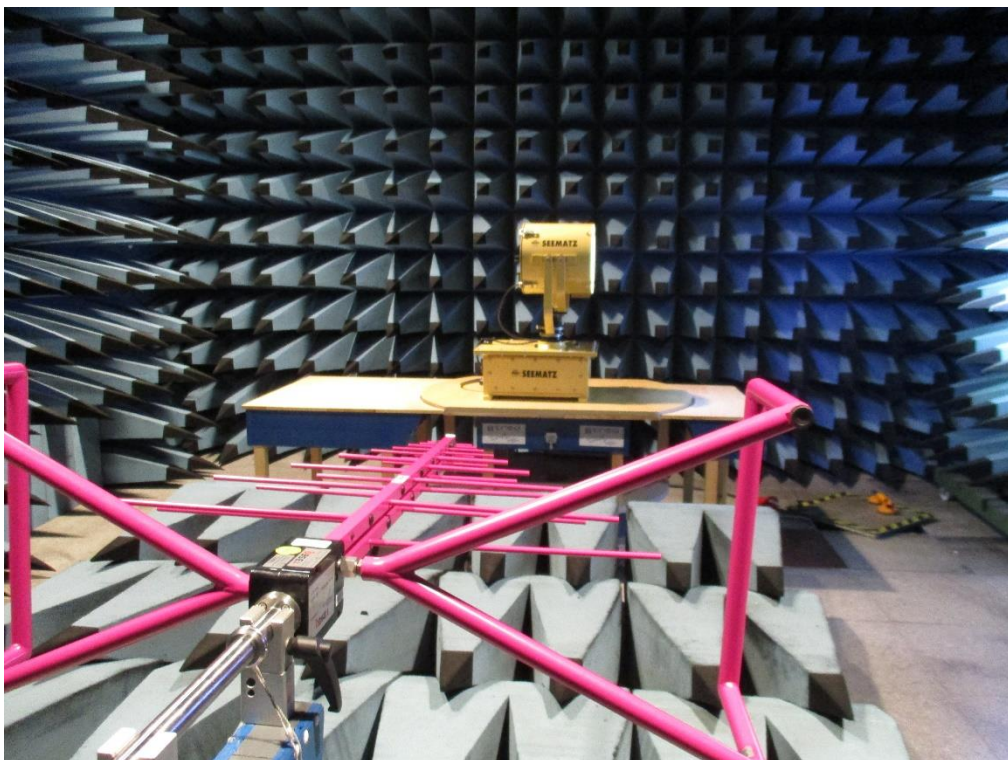


Figure 7: Test set-up EUT 01, 1 GHz to 2 GHz

5.6 Results

No emission above the limit measured.

The EUT passed the test.

Table 14: Overview of Results

EUT No.	Result	Comment
01	Passed	./.

5.6.1 Results EUT No. 01

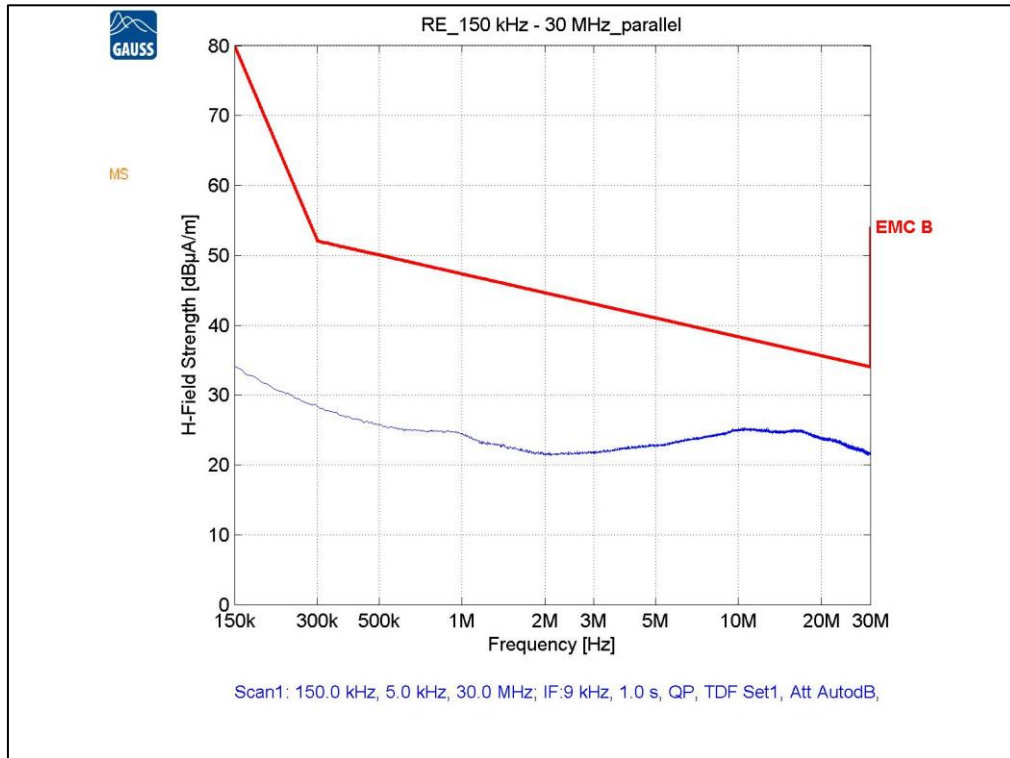


Figure 8: Test results 150 kHz to 30 MHz parallel

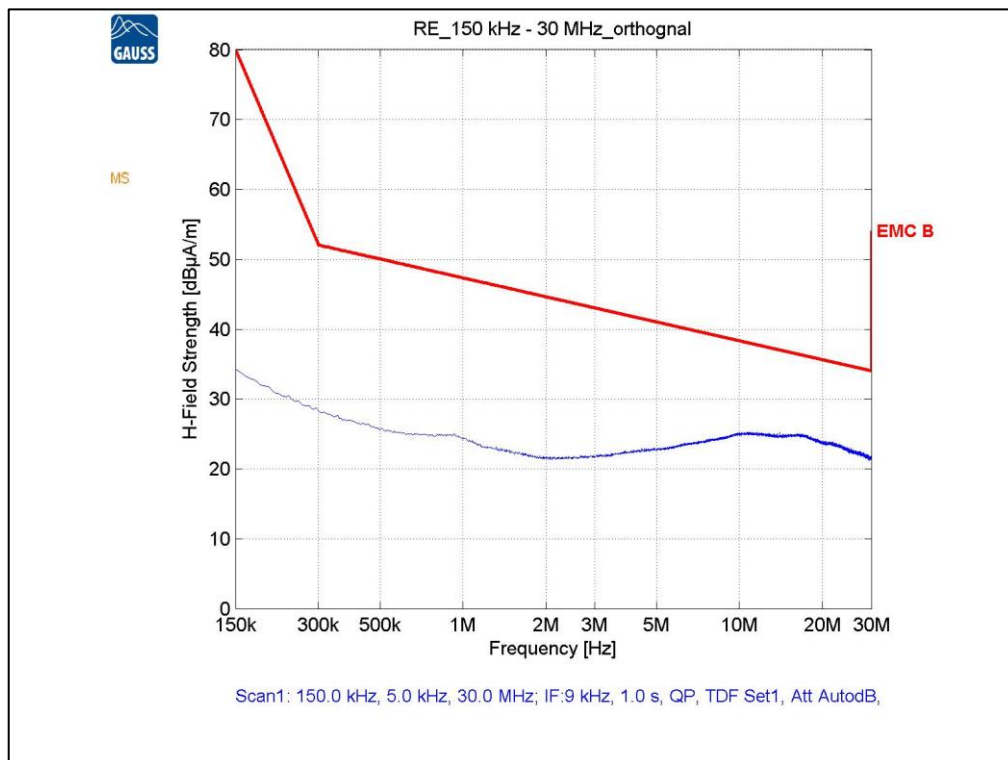


Figure 9: Test results 150 kHz to 30 MHz orthogonal

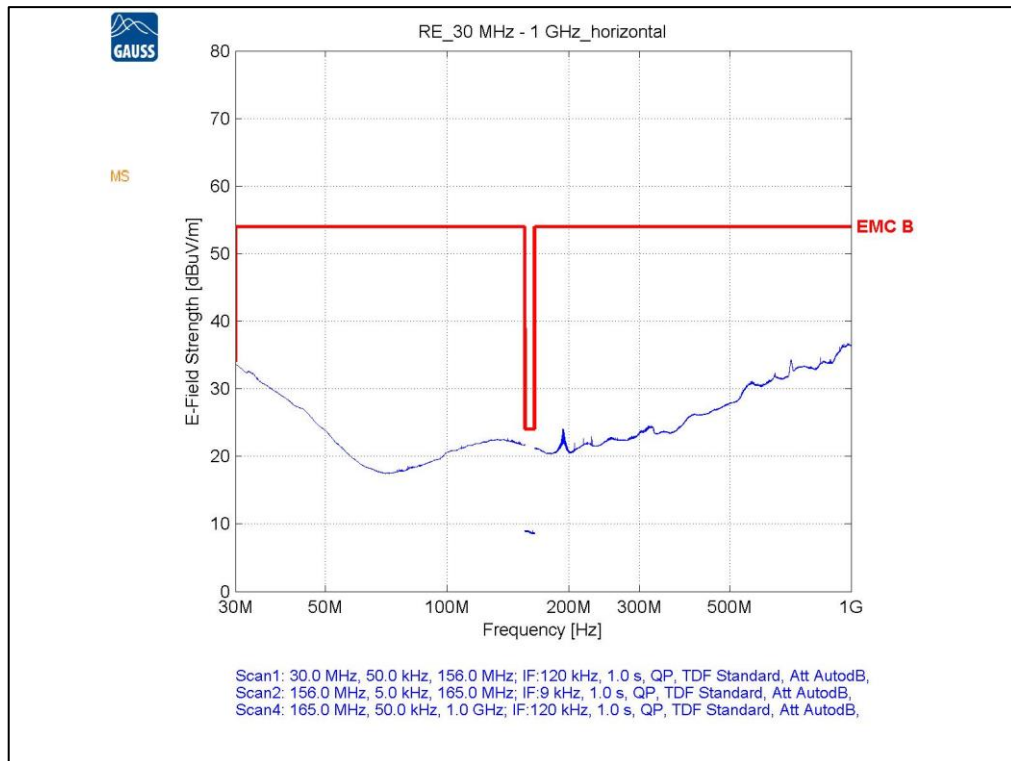


Figure 10: Test results 30 MHz to 1GHz horizontal

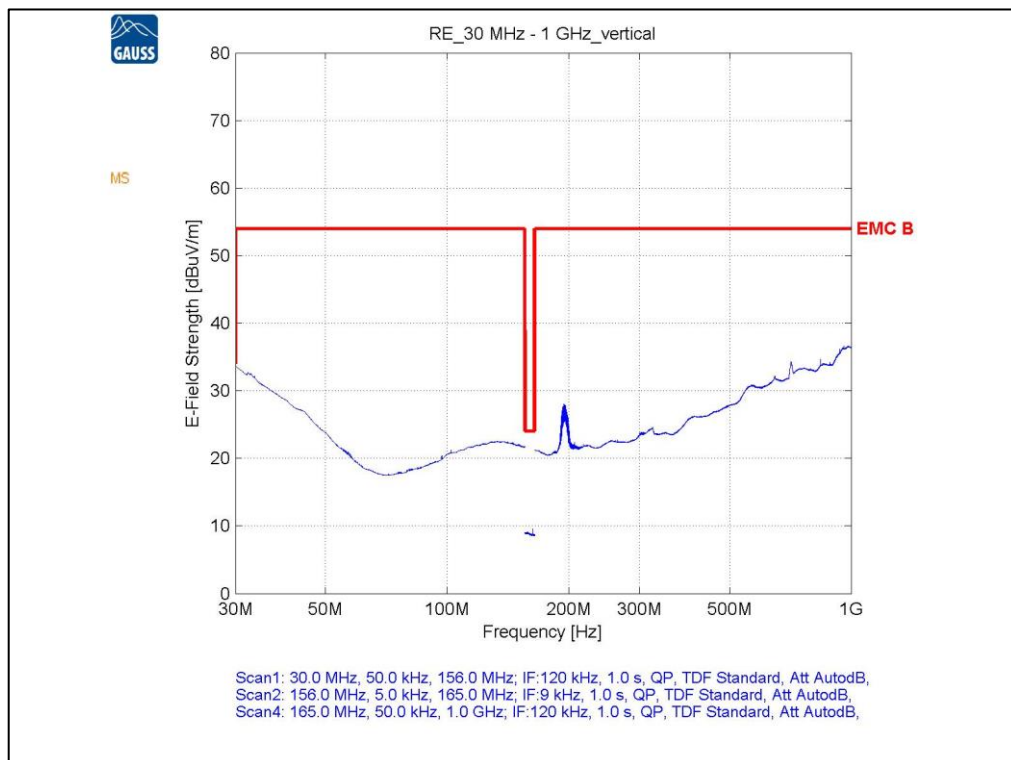


Figure 11: Test results 30 MHz to 1 GHz vertical

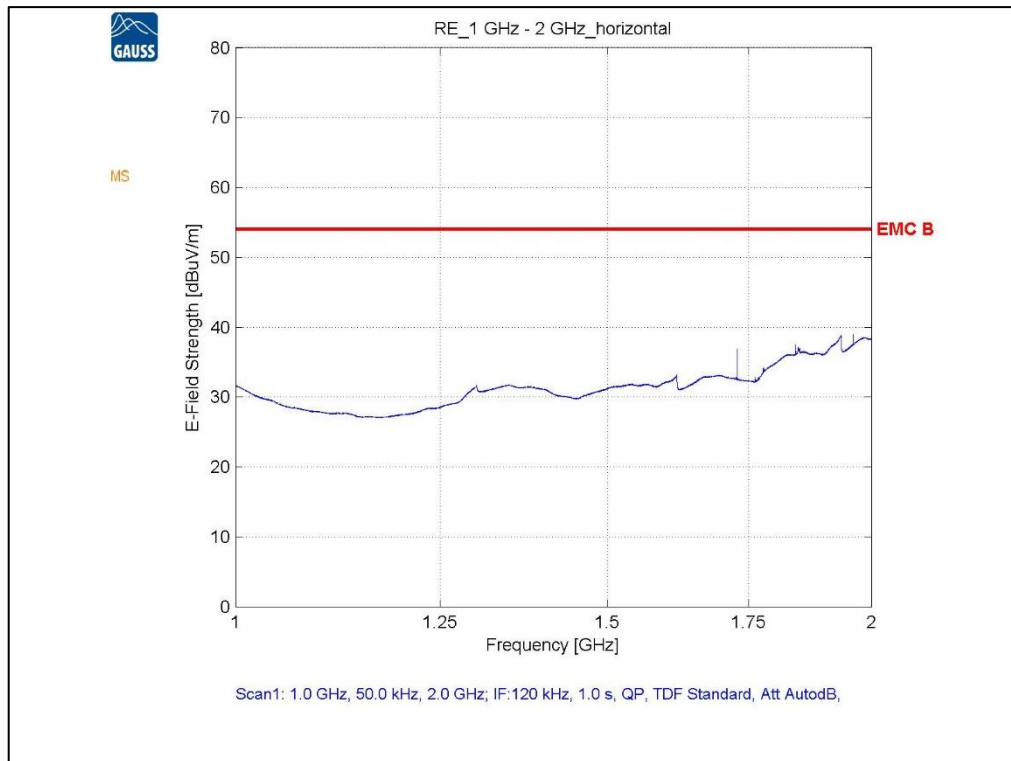


Figure 12: Test results 1GHz to 2 GHz horizontal

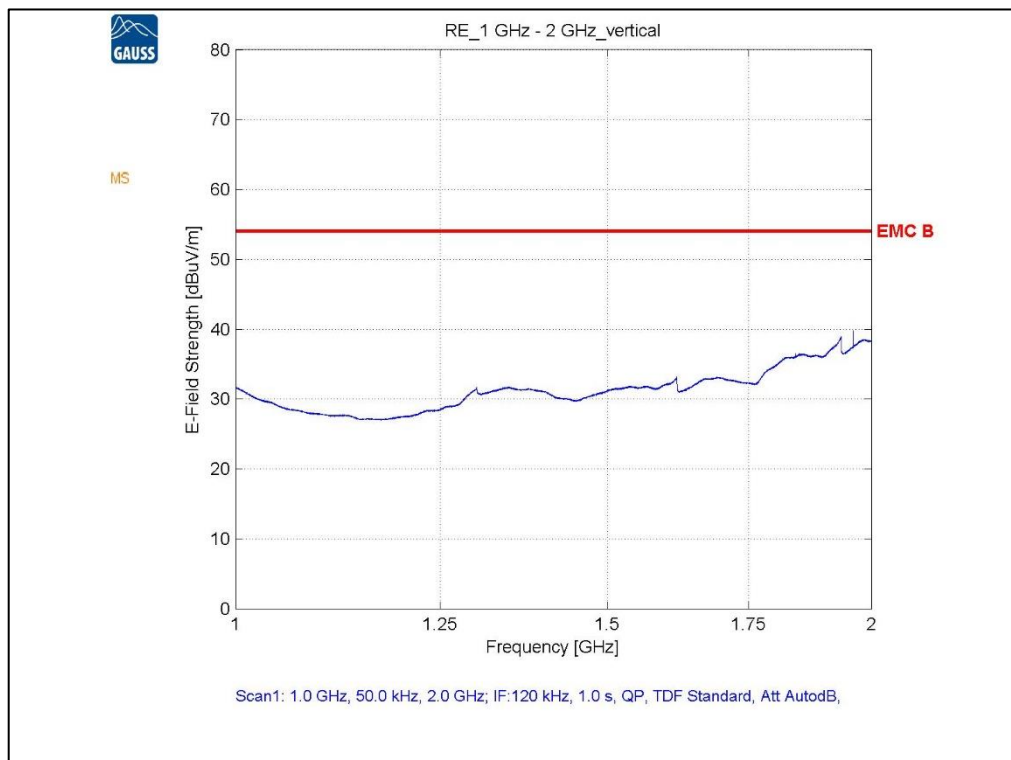


Figure 13: Test results 1 GHz to 2 GHz vertical

END OF REPORT