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

Test report No:
NIE: 63928REM.002A1

Test report

FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-19 Edition) & ICES-003 Issue 6 (April 2019)

(*) Identification of item tested	Electronic Door-Opener
(*) Trademark	Hailo
(*) Model and /or type reference	Libero 3.0
Other identification of the product	HW Version: 3.0 SW Version: 3.0 FCC ID: 23468-LIBERO30 IC: 2ATCYLIBERO30
(*) Features	802.11 b/g/n (HT20) @ 2.4GHz
Manufacturer	Hailo-Werk Rudolf Loh GmbH Co. & KG Daimlerstraße 8 35708 Haiger, Germany
Test method requested, standard	FCC Rules and Regulations CFR 47, Part 15, Subpart B (10-1-19 Edition) & ICES-003 Issue 6 (April 2019)
Summary	IN COMPLIANCE
Approved by (name / position & signature)	Rafael López EMC Consumer & RF Lab. Manager  2021.06.15 13:51:39 +02'00'
Date of issue	2021-06-15
Report template No	FDT08_23 (*) “Data provided by the client”

Index

Acronyms

Acronym ID	Acronym Description
Avg	Radiated Average Level
Avg	Conducted Average Level
Az	Azimuth
CPL	Zones / Coupling Cables
Code	EMC Test Code
Freq	Frequency
Freq Rng	Frequency Range
H	Height
Line	Conducted Emissions - Tested Line
MP	Measurement Point
Max	Conducted Maximum Level
MaxPeak	Radiated Maximum Peak Level
OM	Operation Mode
Pol	Polarization
QuasiPeak	Conducted Quasi Peak Level
QuasiPeak	Radiated Quasi Peak Level
S/	Sample
V	Verdict
Volt Immunity Lvl	Voltage Immunity Severity Level
Volt Immunity Type	Voltage Immunity Type

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.

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.

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.
3. This document is only valid if complete; no partial reproduction can be made without previous written permission of DEKRA Testing and Certification S.A.U.
4. This test report cannot be used partially or in full for publicity and/or promotional purposes without previous written permission of DEKRA Testing and Certification S.A.U. and the Accreditation Bodies.

Uncertainty

Uncertainty (factor k=2) was calculated according to the DEKRA Testing and Certification 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 12.75 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"

   The sample consists of an electronic device for open kitchen door.

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 under test have been selected by: The client.

Sample 06 (S/06):

Control Number	Description	Model	Serial Nº	Date of Reception	Application
63928_004	Electronic Door-Opener	Libero 3.0	V007	2020-10-20	Element under test
63928_025	Shielded USB cable	---	---	2021-01-26	Element under test
63928_028	AC/DC adapter	8K02G	---	2021-01-26	Element under test

Notes referenced to samples during the project.

Id	Note
S/01	Original sample.
S/06	Original sample with a shielded USB cable.

Test sample description

Ports..... :	Port name and description	Cable					
		Specified max length [m]	Attached during test	Shielded	Coupled to patient		
	N/A						
Supplementary information to the ports..... :	N/A						
Rated power supply..... :	Voltage and Frequency		Reference poles				
			L1	L2	L3	N	PE
	☒	AC: 100-240Vac 50/60 Hz	X			X	
		DC:					
Rated Power..... :	5V 2A						
Clock frequencies..... :	Not provided data						
Other parameters..... :	Not provided data						
Software version..... :	3.0						
Hardware version..... :	3.0						
Dimensions in cm (W x H x D)..... :	Product dimensions 157 x 300 x 33						
Mounting position..... :		Table top equipment					
		Wall/Ceiling mounted equipment					
		Floor standing equipment					
		Hand-held equipment					
	X	Other: Mounts in forward cabinets section of bottom-panel.					
Modules/parts..... :	Module/parts of test item	Type	Manufacturer				
	Libero 3.0	Libero 3.0	Hailo				
	AC/DC Adapter	SK02G	Starwell				
Accessories (not part of the test item) ..... :	Description	Type	Manufacturer				
	N/A						
Documents as provided by the applicant..... :	Description	File name	Issue date				
	N/A						

Identification of the client

Hailo-Werk Rudolf Loh GmbH Co. & KG
Daimlerstraße 8
35708 Haiger, Germany

Testing period and place

Test Location	DEKRA Testing and Certification S.A.U.
Date (start)	2020-11-27
Date (finish)	2020-12-15

Document history

Report number	Date	Description
63928REM.002	2021-04-15	First release
63928REM.002A1	2021-06-15	Second release. First modification due to changes in FCC ID and IC. This modification test report cancels and replaces the test report 63928REM.002

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. = 20 % Max. = 75 %

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

Temperature	Min. = 15 ºC Max. = 35 ºC
Relative humidity	Min. = 20 % Max. = 75 %

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. = 20 % Max. = 35 %

Remarks and comments

The tests have been performed by the technical personnel: Daniel Mejías & Victoria Olmedo.

Testing verdicts

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

List of equipment used during the test

Control Number	Description	Model	Manufacturer	Next Calibration
3258	SONDA DE TEMPERATURA Y HUMEDAD RELATIVA	HUMIDIPROBE	PICO TECHNOLOGY	2021-04-22
3545	USB TEMPERATURE AND HUMIDITY SENSOR	HUMIDIPROBE	PICO TECHNOLOGY	2021-04-22
4575	ETHERNET TEMPERATURE AND HUMIDITY LOGGER	TR-702W	T&D	2021-04-22
7763	HORN ANTENNA 1-18GHz	BBHA 9120D	SCHWARZBECK MESS-ELEKTRONIK	2022-11-15
7769	PREAMPLIFIER 30dB 500MHz-18GHz	BBV 9718 C	SCHWARZBECK	2022-01-09
7817	EMI TEST RECEIVER 2Hz-44GHz	ESW44	ROHDE AND SCHWARZ	2021-10-29
7853	EMI RECEIVER 10Hz-30MHz	PMM 9010F	NARDA	2021-10-30
7859	THREE-PHASE ARTIFICIAL NETWORK 32A	PMM L3-32	NARDA	2021-11-20
8130	SEMIANECHOIC ABSORBER LINED CHAMBER VI	P29419	ALBATROSS	---
8134	SHIELDED ROOM	P29419	ALBATROSS PROJECTS GMBH	---

Summary

Test Specification.	Requirement – Test case	Verdict	Remark
FCC CFR 47, Part 15, Subpart B (10-1-19 Edition) & ICES-003 Issue 6 (April 2019). ANSI C63.4 (2014)	Radiated emission	Pass	---
	Conducted emission	Pass	---

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. Every operation mode takes a failure criteria for the immunity test that they were applying to it and a monitoring to guarantee performance of the same ones.

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. Operating motor every 3 seconds. WiFi OFF. Power Supply: 115 Vac.
OM_02	EUT ON. Operating motor every 3 seconds. WiFi 2.4GHz ON with communication established. Power supply: 115Vac.

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 & ICES-003 Issue 6 (April 2019).	FCC CFR 47, Part 15, Subpart B & ICES-003 Issue 6 (April 2019).	Radiated emission
	FCC CFR 47, Part 15, Subpart B & ICES-003 Issue 6 (April 2019).	Conducted emission

Test Cases Details

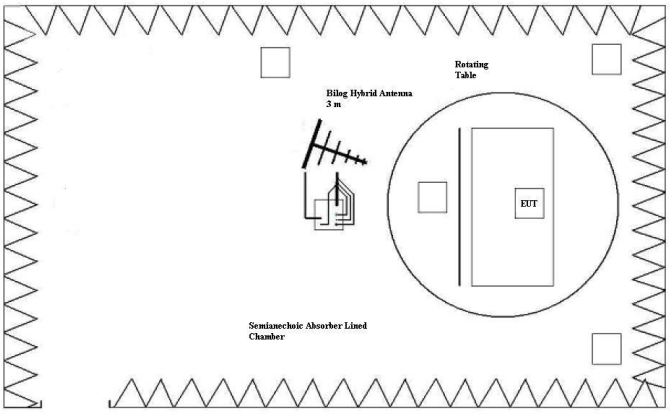
FCC CFR 47, Part 15, Subpart B (10-1-19 Edition), Sec. 15.109 & ICES-003 Issue 6 (April 2019)

Radiated emission

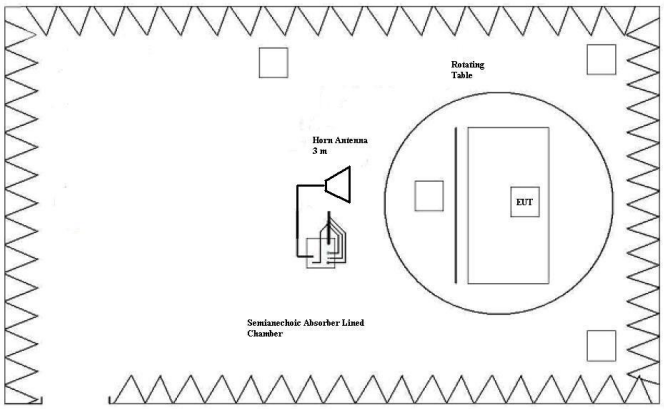
Limits of interference Class B

The applied limit for radiated emissions, 3 m distance, according with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-1-19 Edition), Secs. 15.109 & ICES-003 Issue 6 (Updated 04-2019)

Frequency of emission (MHz)	Field strength (microvolt/meter)
30-88	100
88-216	150
21-960	200
Above 960	500
*Above 1GHz, the limit is defined for an AVG detector.	



Setup for measurements < 1GHz.



Setup for measurements > 1GHz.

RESULTS

REmmnnRR	Description	Result
RE0601LR	Range: 30 MHz - 1000 MHz.	P
RE0601HR	Range: 1 GHz – 12.75 GHz.	P
RE0601HR2	Range: 12.75 GHz – 40 GHz.	N/A*

"**RE**": Radiated emission. "**mm**": Sample. "**nn**": Operation mode. "**RR**": Low range (LR) or High range (HR)

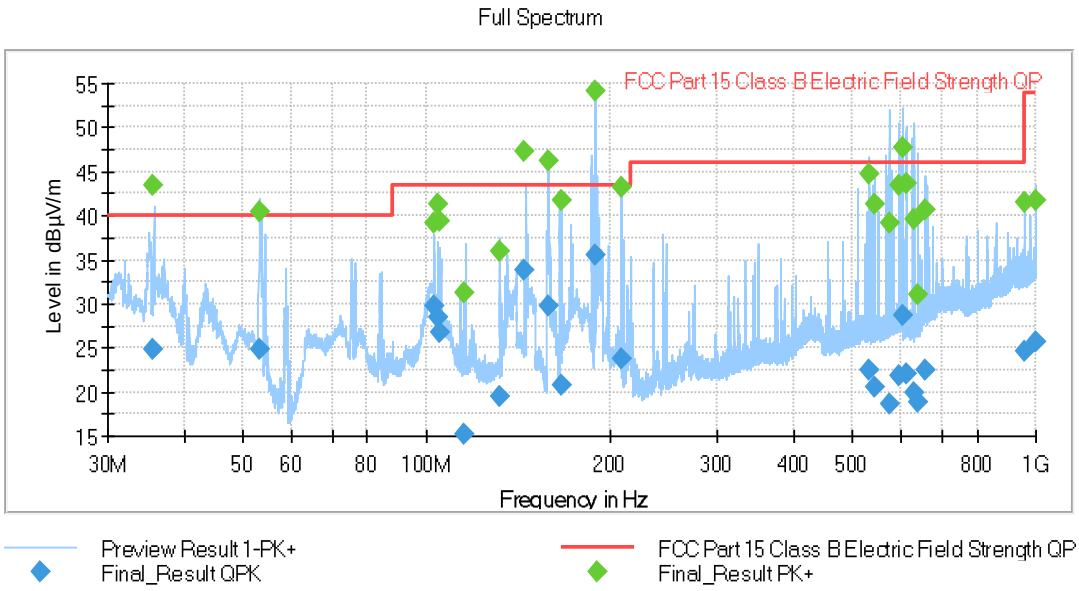
*According to FCC 47 CFR Part 15B / ICES-003 Issue 6, this measurement is required up to the 5th harmonics of the maximum internal work frequency.

VERDICT

Pass

Images:

Project:	63928REM.001
Company:	HAILO
Sample:	06
Operation mode:	01
Graphical code:	RE0601LR
Description:	EUT ON. Operating motor every 3 seconds. WiFi OFF.
Verdict:	Passed

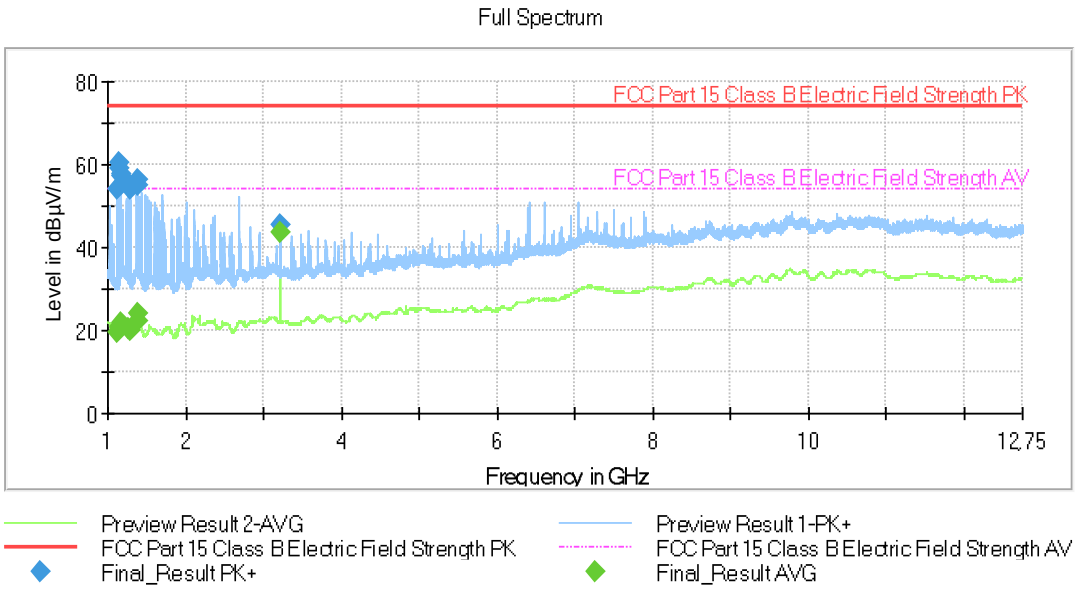


Final_Result

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Height (cm)	Pol	Azimuth (deg)
35.503000	24.87	---	177.0	V	353.0
35.503000	---	43.35	177.0	V	353.0
53.425000	24.81	---	168.0	V	74.0
53.425000	---	40.43	168.0	V	74.0
102.926000	29.68	---	219.0	H	21.0
102.926000	---	39.13	219.0	H	21.0
104.329000	---	41.24	226.0	H	11.0
104.329000	28.46	---	226.0	H	11.0
105.085000	---	39.45	346.0	H	15.0
105.085000	26.86	---	346.0	H	15.0
115.593000	---	31.33	262.0	V	90.0
115.593000	15.25	---	262.0	V	90.0
132.247000	19.44	---	383.0	H	64.0
132.247000	---	36.06	383.0	H	64.0
144.900000	---	47.26	160.0	V	133.0
144.900000	33.80	---	160.0	V	133.0
158.839000	---	46.21	154.0	H	40.0
158.839000	29.69	---	154.0	H	40.0
166.061000	20.75	---	215.0	V	139.0
166.061000	---	41.79	215.0	V	139.0
189.319000	35.61	---	128.0	H	353.0
189.319000	---	54.10	128.0	H	353.0
208.267000	---	43.18	215.0	H	32.0
208.267000	23.81	---	215.0	H	32.0
533.439000	---	44.81	336.0	H	180.0
533.439000	22.52	---	336.0	H	180.0
542.496000	20.61	---	346.0	H	186.0
542.496000	---	41.39	346.0	H	186.0
573.746000	---	39.14	198.0	H	10.0
573.746000	18.70	---	198.0	H	10.0
596.663000	21.81	---	167.0	H	159.0

Frequency (MHz)	QuasiPeak (dBµV/m)	MaxPeak (dBµV/m)	Height (cm)	Pol	Azimuth (deg)
596.663000	---	43.49	167.0	H	159.0
603.445000	---	47.67	137.0	H	88.0
603.445000	28.69	---	137.0	H	88.0
613.158000	---	43.57	244.0	V	102.0
613.158000	22.10	---	244.0	V	102.0
629.042000	---	39.53	354.0	H	242.0
629.042000	20.01	---	354.0	H	242.0
641.161000	---	31.14	244.0	V	184.0
641.161000	18.85	---	244.0	V	184.0
657.466000	---	40.66	285.0	H	306.0
657.466000	22.57	---	285.0	H	306.0
960.386000	---	41.56	222.0	V	212.0
960.386000	24.65	---	222.0	V	212.0
997.392000	---	41.76	282.0	V	199.0
997.392000	25.65	---	282.0	V	199.0

Project:	63928REM.002
Company:	HAILO
Sample:	S/06
Operation mode:	01
Graphical code:	RE0601HR
Description:	EUT ON. Operating motor every 3 seconds. WiFi OFF.
Verdict:	Passed



Final_Result

Frequency (MHz)	MaxPeak (dBµV/m)	Average (dBµV/m)	Limit (dBµV/m)	Margin (dB)
1129.600000	54.10	---	73.97	19.87
1129.600000	---	19.61	53.97	34.36
1151.600000	59.13	---	73.97	14.84
1151.600000	---	20.67	53.97	33.30
1154.000000	60.31	---	73.97	13.66
1154.000000	---	21.13	53.97	32.84
1160.800000	57.35	---	73.97	16.62
1160.800000	---	21.52	53.97	32.45
1162.400000	---	21.63	53.97	32.34
1162.400000	57.86	---	73.97	16.11
1274.800000	---	20.45	53.97	33.52
1274.800000	54.96	---	73.97	19.01
1289.200000	---	19.82	53.97	34.15
1289.200000	54.25	---	73.97	19.72
1375.200000	---	24.13	53.97	29.84
1375.200000	55.07	---	73.97	18.90
1383.200000	56.31	---	73.97	17.66
1383.200000	---	22.40	53.97	31.57
3216.000000	---	43.52	53.97	10.45
3216.000000	45.40	---	73.97	28.57

FCC CFR 47, Part 15, Subpart B (10-1-19 Edition), Sec. 15.107 & ICES-003 Issue 6 (April 2019)

Conducted emission

Limits of interference Class B

The applied limit for continuous conducted emissions in power leads, according with the requirements of FCC Rules and Regulations 47 CFR Part 15, Subpart B (10-1-19 Edition), Secs. 15.107 & ICES-003 Issue 6 (April 2019), in the frequency range 0,15 to 30 MHz, for Class B equipment was:

Frequency range	Limit (dBµV)	
(MHz)	Quasi-Peak	Average
0,15 to 0,5	66 - 56	56 - 46
0,5 to 5	56	46
5 to 30	60	50

RESULTS

CCmmnnhh	Description	Result
CE06020N	Range: 150kHz – 30MHz. Neutral AC wire noise.	P
CE0602L1	Range: 150kHz – 30MHz. Phase AC wire noise.	P

mm: Sample number; **nn**: Operation mode; **hh**: Wire

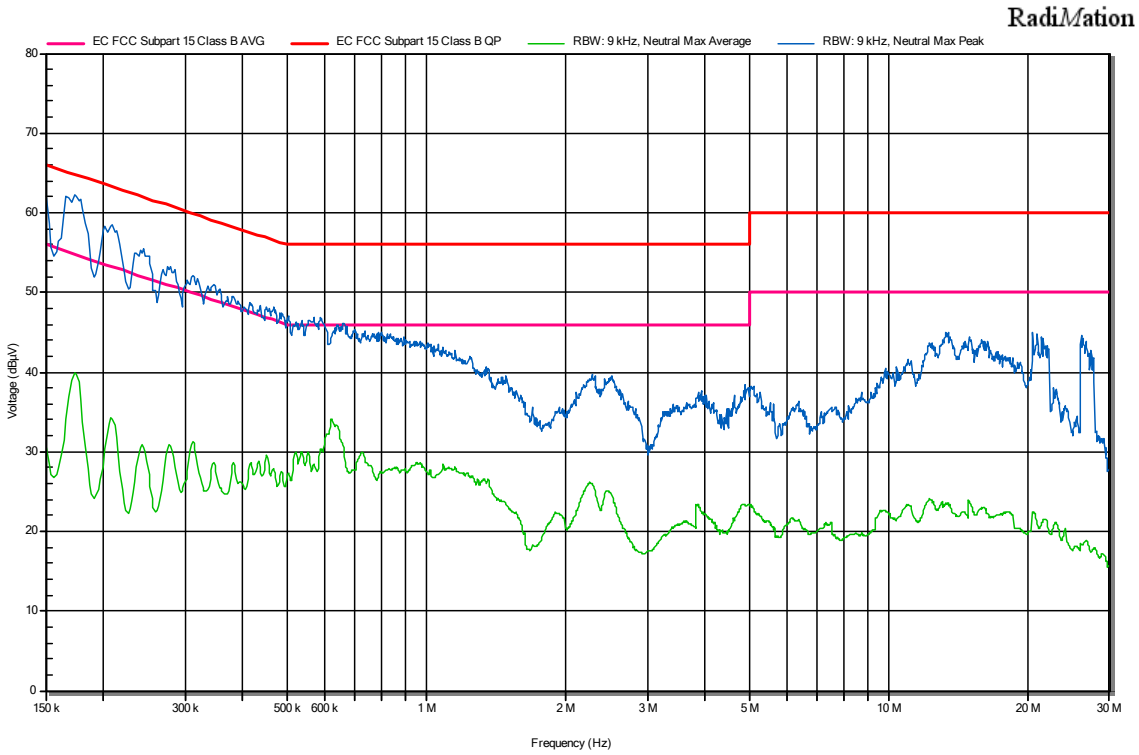
VERDICT

Pass

Images:

Project:	63928REM.002
Company:	HAILO-WERK RUDOLF LOH GMBH & CO. KG
Sample:	S/06
Operation mode:	02
Graphical code:	CE0602N
Description:	EUT ON. Operating motor every 3 seconds. WiFi 2.4GHz ON with communication established. Power supply: 115 Vac. Neutral wire noise.
Verdict:	Pass

Full Spectrum

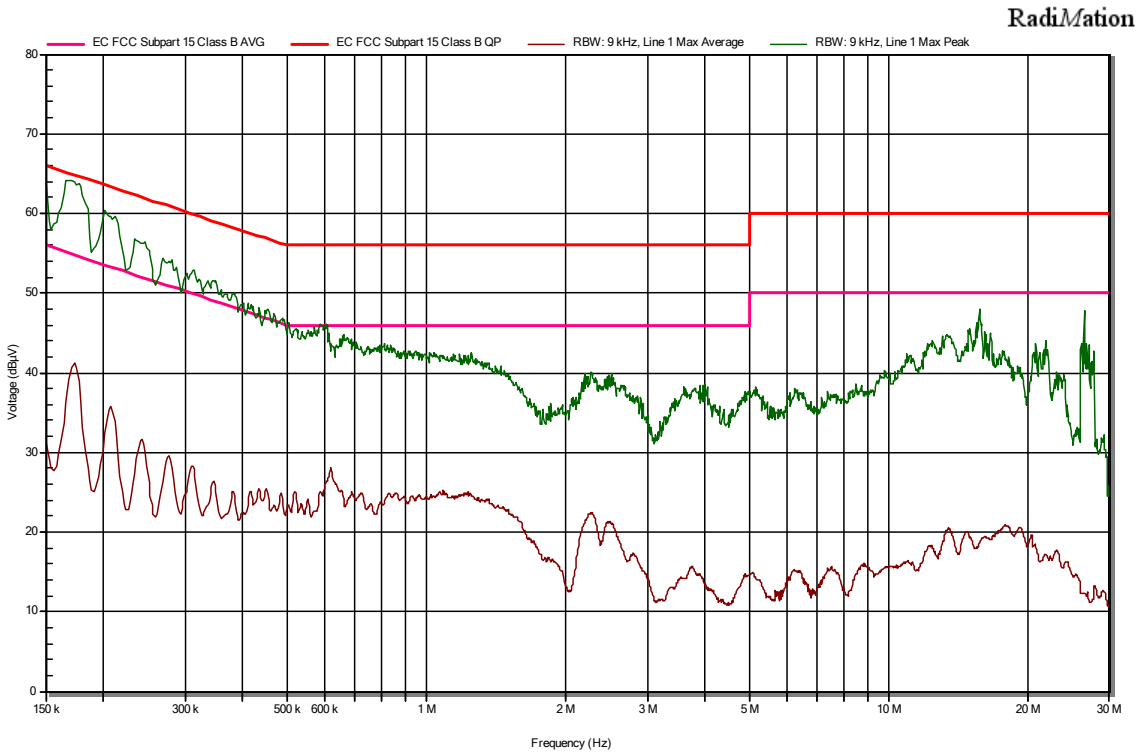


Final_Result

Frequency	Peak	Average
150 kHz	61,8 dBµV	30,5 dBµV
172,491 kHz	62,3 dBµV	39,9 dBµV
207,251 kHz	58,2 dBµV	34,2 dBµV
242,01 kHz	55 dBµV	30,9 dBµV
278,815 kHz	53,2 dBµV	30,7 dBµV
311,53 kHz	52 dBµV	31,3 dBµV
346,289 kHz	51,1 dBµV	28,7 dBµV
450,568 kHz	48,1 dBµV	29,5 dBµV
659,125 kHz	46,2 dBµV	30,6 dBµV
724,554 kHz	44,1 dBµV	30 dBµV

Project:	63928REM.002
Company:	HAILO-WERK RUDOLF LOH GMBH & CO. KG
Sample:	S/01
Operation mode:	06
Graphical code:	CE0602L1
Description:	EUT ON. Operating motor every 3 seconds. WiFi 2.4GHz ON with communication established. Power supply: 115 Vac. Phase wire noise.
Verdict:	Pass

Full Spectrum



Final_Result

Frequency	Peak	Average
172,491 kHz	63,9 dBµV	41,3 dBµV
205,206 kHz	59,7 dBµV	35,5 dBµV
242,01 kHz	56,3 dBµV	31,6 dBµV
276,77 kHz	54 dBµV	29,5 dBµV
309,485 kHz	52,5 dBµV	28,2 dBµV
344,244 kHz	51,5 dBµV	26,3 dBµV
381,049 kHz	49,9 dBµV	25,1 dBµV
434,21 kHz	48,1 dBµV	25,5 dBµV
15,669 MHz	48 dBµV	18,2 dBµV
26,383 MHz	47,7 dBµV	12,1 dBµV