PHOENIX TESTLAB

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Test Report

Report Number:

F192062E4

Equipment under Test (EUT):

MGB-L2-APA-AC6A1-S1-L-110501 (V4.0.0.1)

Applicant:

EUCHNER GmbH & Co. KG

Manufacturer:

EUCHNER GmbH & Co. KG

ilac-MRA

DAkkS
Deutsche
Akkreditierungsstelle
D-PL-17186-01-01
D-PL-17186-01-02
D-PL-17186-01-03

References

[1] **ANSI C63.10: 2013** American National Standard of Procedures for Compliance Testing of Unlicensed Wireless Devices

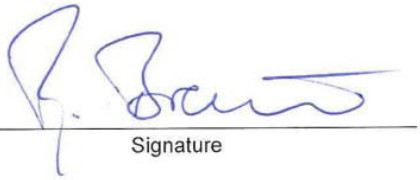
[2] **FCC CFR 47 Part 15** Radio Frequency Devices

[3] **RSS-210 Issue 10 (December 2019)**
Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment

[4] **RSS-Gen Issue 5 (March 2019) Amendment 1**
General Requirements for Compliance of Radio Apparatus

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.

Tested and written by:	Ruben BRAUN Name	 Signature	14.01.2020 Date
Reviewed and approved by:	Manuel BASTERT Name	 Signature	14.01.2020 Date

This test report is only valid in its original form.

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1 Identification

1.1 Applicant

Name:	EUCHNER GmbH & Co. KG
Address:	Kohlhammerstr. 16 70771 Leinfelden-Echterdingen
Country:	Germany
Name for contact purposes:	Mr. Tobias KÖNIG
Phone:	+49 711 7597-360
eMail address:	tobias.koenig@euchner.de
Applicant represented during the test by the following person:	None

1.2 Manufacturer

Name:	EUCHNER GmbH & Co. KG
Address:	Kohlhammerstr. 16 70771 Leinfelden-Echterdingen
Country:	Germany
Name for contact purposes:	Mr. Tobias KÖNIG
Phone:	+49 711 7597-360
eMail address:	tobias.koenig@euchner.de
Applicant represented during the test by the following person:	None

1.3 Test Laboratory

The tests were carried out by:

PHOENIX TESTLAB GmbH
Königswinkel 10
32825 Blomberg
Germany

Accredited by Deutsche Akkreditierungsstelle GmbH (DAkkS) in compliance with DIN EN ISO/IEC 17025 under Reg. No. D-PL-17186-01-06 and D-PL-17186-01-05, FCC Test Firm Designation Number DE0004, FCC Test Firm Registration Number 469623, CAB Identifier DE0003 and ISED# 3469A.

1.4 EUT (Equipment under Test)

Test object: *	Safety switch
Model series: *	MGB V4.0.0.1
Model name: *	MGB-L2-APA-AC6A1-S1-L-110501 (V4.0.0.1)
Order number: *	110501
FCC ID: *	2AJ58-09
IC Certification Number: *	22052-09
Serial number: *	000152
PCB identifier: *	163716 LP-PRG MGB-L1-2 AX UA+UB V4.7
HVIN (Hardware Version Identification Number): *	09
FVIN (Firmware Version Identification Number): *	N/A
Hardware version: *	161202 LP-KPL MGB-L1-2 AX UA+UB V4.7
Software version: *	CPU A CY8C2966 V3.10 CPU B 16F1829 V3.8 Magnet STM 32F031 V1.06 MAGN.PIC16F1829 V1.07

* Declared by the applicant

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

1.5 Technical Data of Equipment

General:

Power supply EUT: *	DC					
Supply voltage EUT: *	U_{nom} =	24 V DC	U_{min} =	20.4 V DC	U_{max} =	26.4 V DC
Temperature range: *	-20 °C to +55 °C					
Lowest / highest internal frequency: *	125 kHz / 24 MHz					

RFID part:

Power supply RFID module: *	DC					
Supply voltage RFID module: *	U_{nom} =	5 V DC	U_{min} =	N/A	U_{max} =	N/A
Operating frequency: *	125 kHz					
Number of channels: *	1					
Type of modulation: *	AM					
Data rate: *	2 bit/ms					
Antenna type: *	Ferrite coil with wire wound					
Antenna connector: *	None					

* Declared by the applicant

Ports / Connectors				
Identification			Length during test	Shielding (Yes / No)
	EUT	Ancillary		
DC / Parallel port	RC18 / 18 pole	Custom	10 m	No

Ancillary Equipment
Handle module MGB-H-AA1A6-R-111838 015764 *1
Custom ancillary equipment for EUT monitoring *1

*1 Provided by the applicant

1.6 Dates

Date of receipt of test sample:	06.11.2019
Start of test:	12.12.2019
End of test:	13.01.2020

2 Operational States

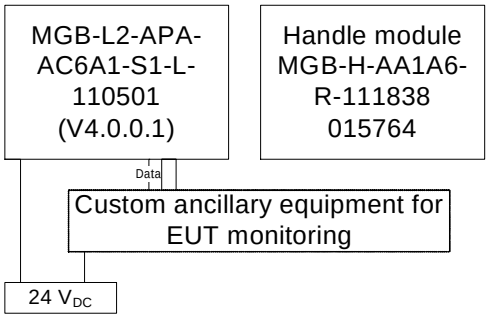
The EUT is a safety switch for machines. It will prevent either to open the protected door or to start machine actions as long as the protected door is open.

During all measurements a handle module MGB-H-AA1A6-R-111838 015764 was positioned at its intended position related to the EUT.

During all measurements the EUT was powered with 24 V_{DC} by an external laboratory power supply, except for the emission measurement on the power supply line, where the EUT was supplied by an AC/DC adaptor Phoenix Contact MINI-SYS-PS-100-240AC/24DC/1.

All measurements were carried out with an unmodified sample operating in normal operation mode.

Physical boundaries of the Equipment Under Test:



3 Additional Information

The EUT was not labeled as required by FCC / IC.

4 Overview

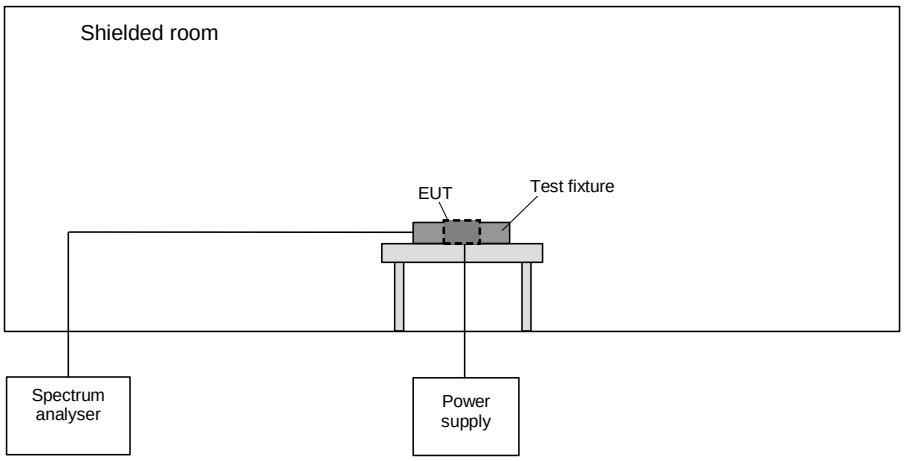
Application	Frequency range [MHz]	FCC 47 CFR Part 15 section [2]	RSS-Gen, Issue 5 [4] and RSS-210, Issue 10 [3]	Status	Refer page
99 % bandwidth	0.125	-	6.7 [4]	Passed	9 et seq.
Conducted emissions on supply line	0.15 – 30	15.207 (a)	8.8 [4]	Passed	11 et seq.
Radiated emissions	0.009 – 1000	15.205 (a) 15.209 (a)	8.9 and 8.10 [4] 7.1 and 7.3 [3]	Passed	13 et seq.
Antenna requirement	-	15.203 [2]	6.8 [4]	Passed *	-

*: Integrated antenna only, requirement fulfilled.

5 Results

5.1 99 % bandwidth

5.1.1 Test method



The following procedure will be used for the occupied bandwidth measurement according to [1]:

The occupied bandwidth is the frequency bandwidth such that, below its lower and above its upper frequency limits, the mean powers are each equal to 0.5% of the total mean power of the given emission. The following procedure shall be used for measuring 99% power bandwidth:

a) The instrument center frequency is set to the nominal EUT channel center frequency. The frequency span for the spectrum analyzer shall be between 1.5 times and 5.0 times the OBW.

b) The nominal IF filter bandwidth (3 dB RBW) shall be in the range of 1% to 5% of the OBW and the VBW shall be approximately three times the RBW, unless otherwise specified by the applicable requirement.

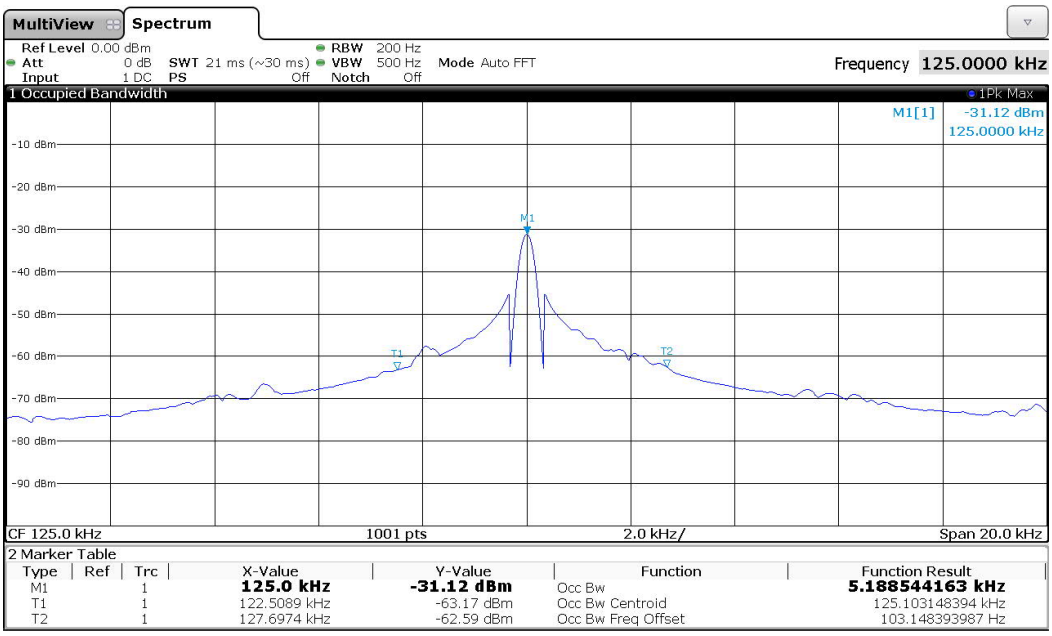
c) Set the reference level of the instrument as required, keeping the signal from exceeding the maximum input mixer level for linear operation. In general, the peak of the spectral envelope shall be more than [10 log (OBW/RBW)] below the reference level. Specific guidance is given in 4.1.5.2.

d) Step a) through step c) might require iteration to adjust within the specified range.

5.1.2 Test results

Ambient temperature:	20 °C	Relative humidity:	32 %

Test description: 99 % bandwidth
EUT: MGB-L2-APA-AC6A1-S1-L-110501 (V4.0.0.1)
Manufacturer: Euchner GmbH & Co. KG
Operating conditions: 24 V DC, magnet active
Test site: Phoenix TESTLAB GmbH
Operator: Ruben BRAUN
Comment: -
Date of test: 13.01.2020



F_L	F_U	BW (F_U - F_L)
122.5089 kHz	127.6974 kHz	5.1885 kHz
Measurement uncertainty		< $1*10^{-7}$

Test: Passed

Test equipment (please refer to chapter 6 for details)
1, 2

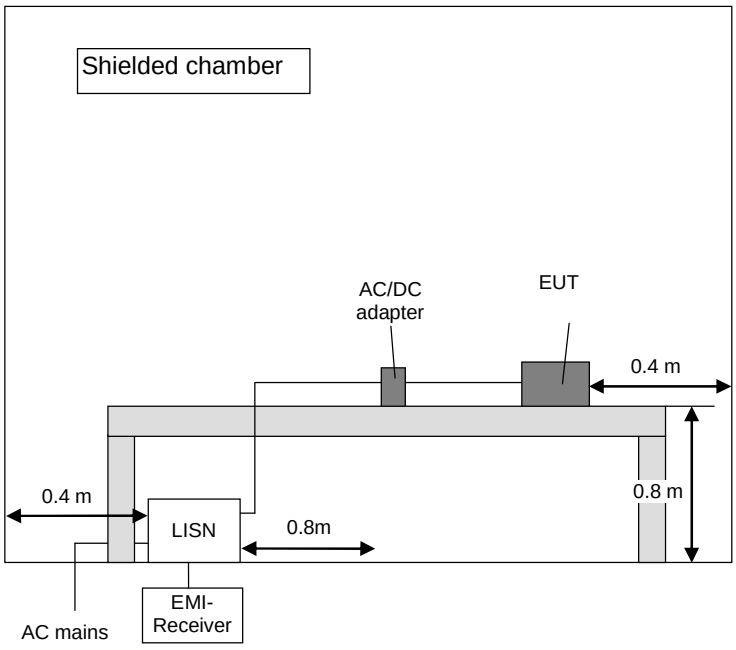
5.2 Conducted emissions on power supply lines

5.2.1 Test method

This test will be carried out in a shielded chamber. Tabletop devices will set up on a non-conducting support with a size of 1 m by 1.5 m and a height of 80 cm above the ground plane. Floor-standing devices will be placed directly on the ground plane. The setup of the Equipment under test will be in accordance to [1].

The frequency range 150 kHz to 30 MHz will be measured with an EMI Receiver set to MAX Hold mode with peak and average detector and a resolution bandwidth of 9 kHz. A scan will be carried out on the phase (or plus pole in case of DC powered devices) of the AC mains network. If levels detected 10 dB below the appropriable limit, this emission will be measured with the average and quasi-peak detector on all lines.

Frequency range	Resolution bandwidth
150 kHz to 30 MHz	9 kHz

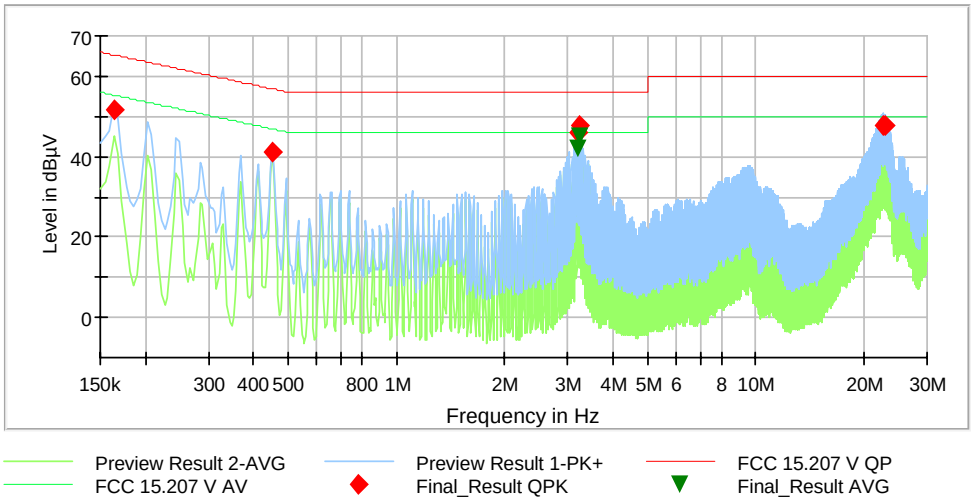


5.2.2 Results conducted emission measurement on AC mains

Ambient temperature:	22 °C

Relative humidity:	28 %

Test description: Conducted emission measurement
EUT: MGB-L2-APA-AC6A1-S1-L-110501 (V4.0.0.1)
Manufacturer: Euchner GmbH & Co. KG
Operating conditions: 24 V DC via AC/DC converter (120 V, 60 Hz), magnet inactive
Test site: Phoenix TESTLAB GmbH; Shielded room M4
Operator: Ruben BRAUN
Comment: AC/DC converter: Phoenix Contact MINI-PS-100-240AC/24DC/1
Date of test: 13.12.2019



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Transducer (dB)
0.1635	51.55	---	65.28	13.73	5000.0	9.0	L1	FLO	9.8
0.4506	41.24	---	56.86	15.63	5000.0	9.0	L1	GND	9.9
3.1956	46.12	---	56.00	9.88	5000.0	9.0	L1	GND	10.2
3.1956	---	42.03	46.00	3.97	5000.0	9.0	L1	GND	10.2
3.2361	---	45.24	46.00	0.76	5000.0	9.0	L1	GND	10.2
3.237	47.53	---	56.00	8.47	5000.0	9.0	N	FLO	10.2
22.6572	47.90	---	60.00	12.10	5000.0	9.0	N	FLO	11.0
22.7832	47.53	---	60.00	12.47	5000.0	9.0	L1	FLO	10.9
Measurement uncertainty: ±2.76 dB									

Test: Passed

Test equipment (please refer to chapter 6 for details)
3 – 7

5.3 Radiated emissions

5.3.1 Test method

The radiated emission measurement is subdivided into six stages.

- A preliminary measurement carried out in a fully anechoic chamber with a fixed antenna height in the frequency range 9 kHz to 30 MHz.
- A final measurement carried out on an outdoor test side without reflecting ground plane and a fixed antenna height in the frequency range 9 kHz to 30 MHz.
- A preliminary and final measurement carried out in a semi anechoic chamber with a varying antenna height in the frequency range 30 MHz to 1 GHz.

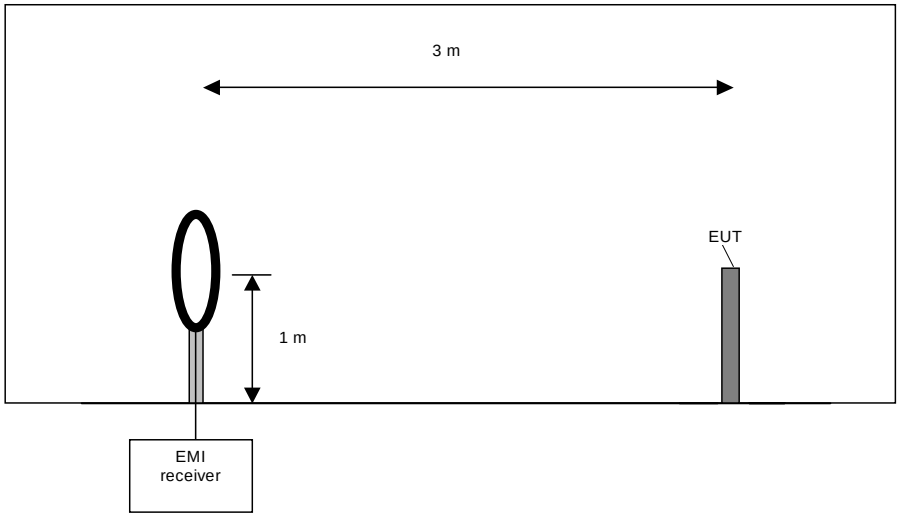
Preliminary measurement (9 kHz to 30 MHz):

In the first stage a preliminary measurement will be performed in a shielded room with 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 will be placed directly on the turntable/ground plane. The setup of the Equipment under test will be in accordance to [1].

The frequency range 9 kHz to 30 MHz will be monitored with a spectrum analyser while the system and its cables will be manipulated to find out the configuration with the maximum emission levels if applicable. The EMI Receiver will be set to MAX Hold mode. The EUT and the measuring antenna will be rotated around their vertical axis to find the maximum emissions.

The resolution bandwidth of the spectrum analyser will be set to the following values:

Frequency range	Resolution bandwidth
9 kHz to 150 kHz	200 Hz
150 kHz to 30 MHz	10 kHz



Preliminary measurement procedure (9 kHz to 30 MHz):

Pre-scans were performed in the frequency range 9 kHz to 150 kHz and 150 kHz to 30 MHz.

The following procedure will be used:

1) Monitor the frequency range at horizontal polarisation and a EUT azimuth of 0 °.
2) Manipulate the system cables within the range to produce the maximum level of emission.
3) Rotate the EUT by 360 ° to maximize the detected signals.
4) Make a hardcopy of the spectrum.
5) Measure the frequencies of highest detected emission with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
6) Repeat steps 1) to 5) with the other orthogonal axes of the EUT (because of EUT is a module and might be used in a handheld equipment application).
7) Rotate the measuring antenna and repeat steps 1) to 5).

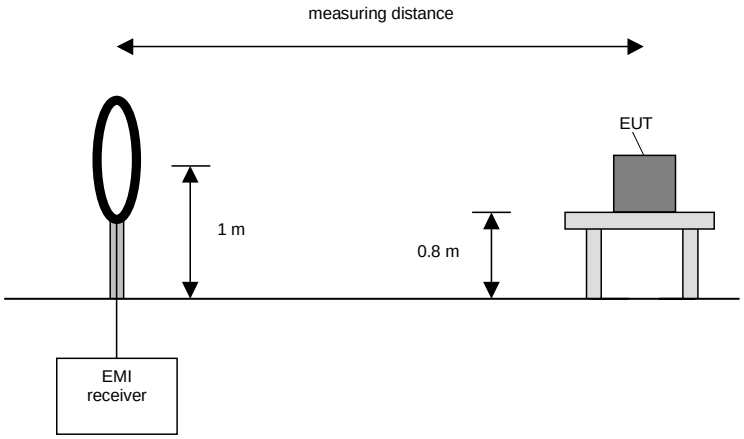
Final measurement (9 kHz to 30 MHz):

In the second stage a final measurement will be performed on an open area test site with no conducting ground plane in a measuring distances of 3 m, 10 m and 30 m. In the case where larger measuring distances are required the results will be extrapolated based on the values measured on the closer distances according to Section 15.31 (f) (2) [2]. The final measurement will be performed with a EMI Receiver set to Quasi Peak detector except for the frequency bands 9 kHz to 90 kHz and 110 kHz to 490 kHz where an average detector will be used according Section 15.209 (d) [2].

On the frequencies, which were detected during the preliminary measurements, the final measurement will be performed while rotating the EUT and the measuring antenna in the range of 0 ° to 360 ° around their vertical axis until the maximum value is found.

The resolution bandwidth of the EMI Receiver will be set to the following values:

Frequency range	Resolution bandwidth
9 kHz to 150 kHz	200 Hz
150 kHz to 30 MHz	9 kHz



Final measurement procedure (9 kHz to 30 MHz):

The following procedure will be used:

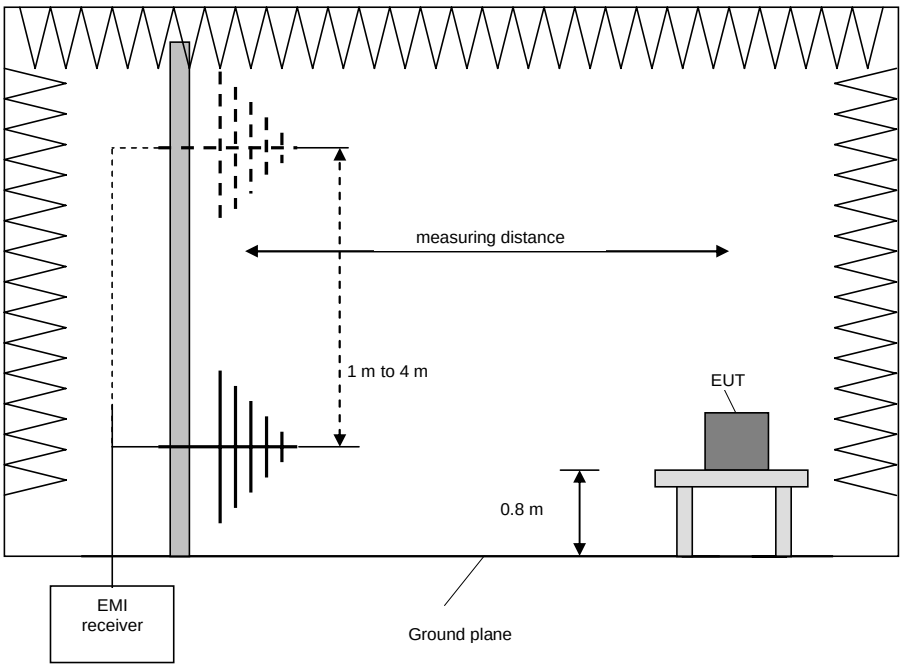
1) Monitor the frequency range with the measuring antenna at vertical orientation parallel to the EUT at an azimuth of 0 °.
2) Rotate the EUT by 360 ° to maximize the detected signals and note the azimuth and orientation.
3) Rotate the measuring antenna to find the maximum and note the value.
4) Rotate the measuring antenna and repeat steps 1) to 3) until the maximum value is found.
5) Repeat steps 1) to 4) with the other orthogonal axes of the EUT (if the EUT is a module and might be used in a handheld equipment application).

Preliminary and final measurement (30 MHz to 1 GHz)

The preliminary and final measurements were conducted in a semi-anechoic chamber with a metal ground plane. During the test the EUT will be rotated in the range of 0 ° to 360 °, the measuring antenna will be 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 will be set to the following values:

Test	Frequency range	Resolution bandwidth
Preliminary measurement	30 MHz to 1 GHz	100 kHz
Frequency peak search	+ / - 1 MHz	10 kHz
Final measurement	30 MHz to 1 GHz	120 kHz



Preliminary measurement procedure (30 MHz to 1 GHz):

The following procedure is used:

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

Final measurement procedure (30 MHz to 1 GHz):

The following procedure is used:

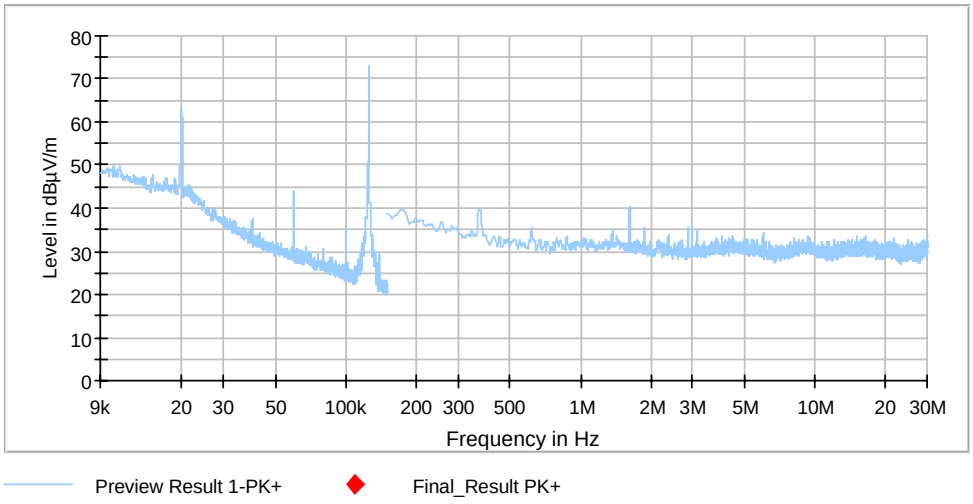
1. Select the highest frequency peaks (smallest margin to the limit) for the final measurement.
2. The software will determine the exact peak frequencies by doing a partial scan with reduced RBW with +/- 10 times the RBW of the pre-scan of the selected peaks.
3. If the EUT is portable or ceiling mounted, find the worst case EUT position (x,y,z) for the final test.
4. The measurement antenna height resulting in the highest emission level is found by the software by varying the measurement antenna height by +/- 0.5 m from the value obtained in the preliminary measurement.
5. The azimuth turntable position resulting in the highest emission level is found by varying the turntable azimuth by +/- 30° from the value obtained in the preliminary measurement.
6. The final measurement is performed at the worst-case antenna height and the worst-case turntable position.
7. Steps 2 – 6 will be repeated for each frequency peak selected in step 1.

5.3.2 Results preliminary measurement 9 kHz to 30 MHz

Ambient temperature:	22 °C

Relative humidity:	26 %

Test description: Preliminary measurement 9 kHz to 30 MHz
EUT: MGB-L2-APA-AC6A1-S1-L-110501 (V4.0.0.1)
Manufacturer: Euchner GmbH & Co. KG
Operating conditions: 24 V DC, magnet active
Test site: Phoenix TESTLAB GmbH; Fully anechoic chamber M20
Operator: Ruben BRAUN
Comment: -
Date of test: 13.12.2019



The following emission was found according to [2] and [3] (fundamental of transmitter): 125 kHz.

The following frequencies were found outside and inside the restricted bands found according to FCC 47 CFR Part 15 section 15.209.

Frequency (MHz)
0.020
0.060
0.100
0.375
1.622

These frequencies must be measured with in a final measurement.

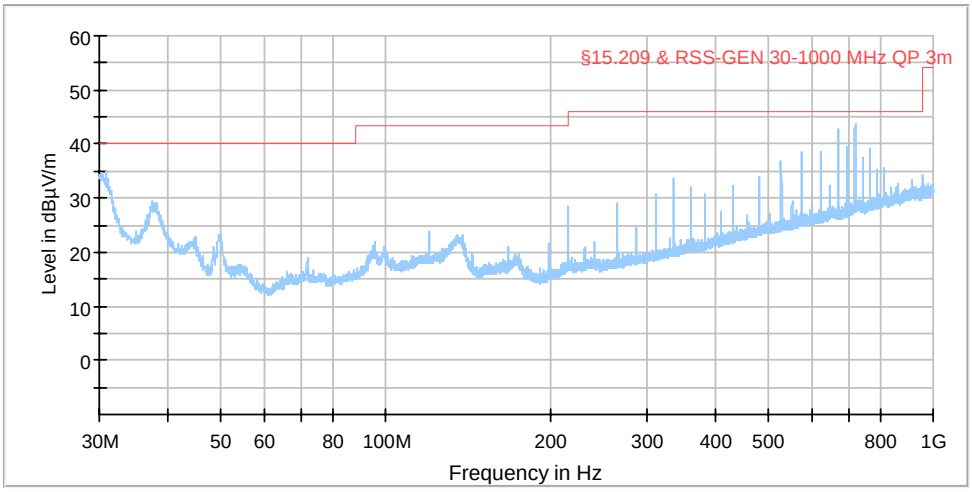
Test equipment (please refer to chapter 6 for details)
7 – 13

5.3.3 Results preliminary measurement 30 MHz to 1 GHz

Ambient temperature:	23 °C

Relative humidity:	20 %

Test description: Preliminary measurement 30 MHz to 1 GHz
EUT: MGB-L2-APA-AC6A1-S1-L-110501 (V4.0.0.1)
Manufacturer: Euchner GmbH & Co. KG
Operating conditions: 24 V DC, magnet inactive
Test site: Phoenix TESTLAB GmbH; Semi anechoic chamber M276
Operator: Ruben BRAUN
Comment: -
Date of test: 12.12.2019



The following frequencies were found during the preliminary radiated emission test:

Frequency (MHz)
31.01
624.0
672.0
696. 0
719.99
767.99

These frequencies must be measured within a final measurement.

Test equipment (please refer to chapter 6 for details)
14 – 21

5.3.4 Result final measurement from 9 kHz to 30 MHz

Ambient temperature:	10 °C

Relative humidity:	85 %

Test description: Final measurement 9 kHz to 30 MHz
EUT: MGB-L2-APA-AC6A1-S1-L-110501 (V4.0.0.1)
Manufacturer: Euchner GmbH & Co. KG
Operating conditions: 24 V DC, magnet active
Test site: Phoenix TESTLAB GmbH; OATS
Operator: Ruben BRAUN
Comment: -
Date of test: 19.12.2019

The results of the standard subsequent measurement on the outdoor test site are indicated in the table below. The limits as well as the measured results (levels) refer to the mentioned standard while taking account of the specified requirements for a 300 m measuring distance.

Results 9 kHz - 30 MHz								
Frequency	Reading	Result*	Limit acc. 15.209	Margin	Detector (acc. to §15.209 (d)	Antenna factor	Measuring Distance	Distance correction factor**
[MHz]	[dBµV]	[dBµV/m]	[dBµV/m]	[dB]		[dB/m]	[m]	[dB]
0.020*	43.0	-17.1 @ 300 m	41.6	58.7	AV	19.9	3	80.0
0.060*	23.9	-35.9 @ 300 m	32.0	67.9	AV	20.2	3	80.0
0.100*	15.4	-44.3 @ 300 m	27.6	71.9	QP	20.3	3	80.0
0.125	50.9	-8.8 @ 300 m	25.7	34.5	AV	20.3	3	80.0
0.375	17.9	-41.8 @ 300 m	16.1	57.9	AV	20.3	3	80.0
1.622*	20.6	0.9 @ 30 m	23.4	22.5	QP	20.3	3	40.0
Measurement uncertainty: ± 4.69 dB								

Note: *Result @ normative distance = reading + antenna factor - distance extrapolation factor
** 40dB/decade according part §15.31 (f) (2)

* The emission could not be measured at the OATS due to environmental disturbances. Therefore, the maximum peak value determined in the preliminary measurement is taken as the final result.

The test results were calculated with the following formula:

Result [dBµV/m] = reading [dBµV] + antenna factor [dB/m] – distance correction (dB)

Remark: The limits in CFR 47, Part 15, Subpart C, paragraph 15.209(a), are identical to those in RSS-Gen section 8.9, Table 6, since the measurements are performed in terms of magnetic field strength and converted to electric field strength levels (as reported in the table) using the free space impedance of 377 Ohms. For example, the measurement at 125 kHz resulted in a level of -8.8 dBuV/m, which is equivalent to -8.8 - 51.5 = -60.3 dBuA/m, which has the same margin, 34.5 dB, to the corresponding RSS-Gen Table 6 limit as it has to the 15.209(a) limit.

Test: Passed

Test equipment (please refer to chapter 6 for details)
13, 22, 23

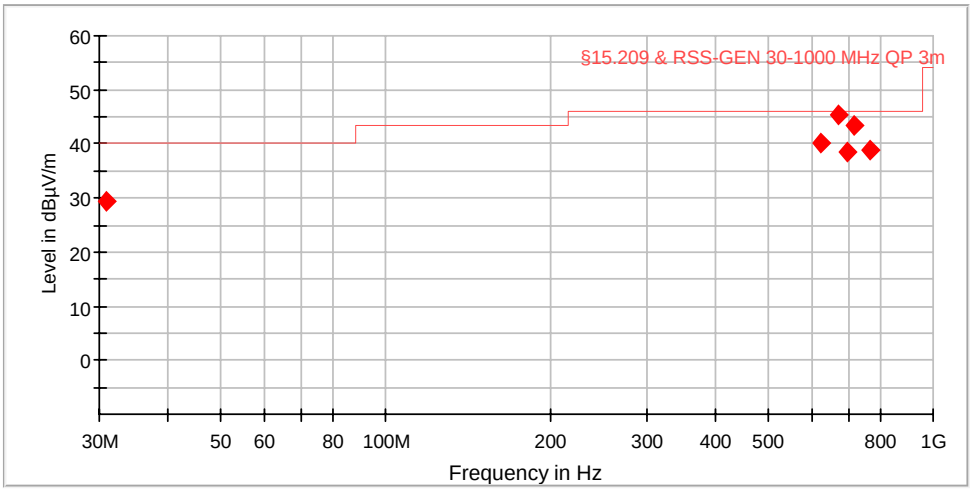
5.3.5 Result final measurement from 30 MHz to 1 GHz

Ambient temperature:	23 °C

Relative humidity:	20 %

Test description:	Preliminary measurement 30 MHz to 1 GHz
EUT:	MGB-L2-APA-AC6A1-S1-L-110501 (V4.0.0.1)
Manufacturer:	Euchner GmbH & Co. KG
Operating conditions:	24 V DC, magnet inactive
Test site:	Phoenix TESTLAB GmbH; Semi anechoic chamber M276
Operator:	Ruben BRAUN
Comment:	-
Date of test:	12.12.2019

The measured points and the limit line in the following diagram refer to the standard measurement of the emitted interference in compliance with the mentioned standard. The measured points marked with "◆" are the measured results of the standard subsequent measurement.



The results of the standard subsequent measurement are indicated in the table below. The limits as well as the measured results (levels) refer to the mentioned standard while taking account of the specified requirements for a 3 m measuring distance.

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
31.01	29.30	40.00	10.70	1000.0	120.0	164.0	V	149.0	24.9
624.0	40.13	46.02	5.89	1000.0	120.0	131.0	H	35.0	26.4
672.0	45.32	46.02	0.70	1000.0	120.0	114.0	H	34.0	27.0
696.0	38.40	46.02	7.62	1000.0	120.0	116.0	H	33.0	27.4
719.99	43.39	46.02	2.63	1000.0	120.0	197.0	H	27.0	28.0
767.99	38.98	46.02	7.04	1000.0	120.0	100.0	H	32.0	28.5
Measurement uncertainty: ± 4.78 dB									

The correction factor was calculated as follows.

Corr. (dB) = cable attenuation (dB) + 6 dB attenuator (dB) + antenna factor (dB)

Therefore, the reading can be calculated as follows:

Reading (dBµV/m) = result QuasiPeak (dBµV/m) - Corr. (dB)

Test: Passed

Test equipment (please refer to chapter 6 for details)
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6 Test Equipment used for Tests

No.	Test equipment	Type	Manufacturer	Serial No.	PM. No.	Cal. Date	Cal Due
1	EMI receiver / spectrum analyser	ESW44	Rohde & Schwarz	101828	482979	12.04.2019	04.2021
2	Loop antenna	Loop antenna 22.5cm	PHOENIX TESTLAB GmbH	-	410085	Calibration not necessary	
3	Transient filter limiter	CFL 9206A	Teseq GmbH	38268	481982	14.03.2018	03.2020
4	LISN	NSLK8128	Schwarzbeck	8128155	480058	14.03.2018	03.2020
5	Shielded chamber M4	B83117-S1-X158	Siemens	190075	480088	Calibration not necessary	
6	EMI receiver / spectrum analyser	ESIB 26	Rohde & Schwarz	100292	481182	28.02.2018	02.2020
7	Software EMC32	EMC32	Rohde & Schwarz	100061	481022	Calibration not necessary	
8	EMI receiver / spectrum analyser	ESW44	Rohde & Schwarz	101635	482467	29.03.2018	03.2020
9	Fully anechoic chamber M20	B83117-E2439-T232	Albatross Projects	103	480303	Calibration not necessary	
10	Turntable	DS420 HE	Deisel	420/620/00	480315	Calibration not necessary	
11	Antenna support	AS620P	Deisel	620/375	480325	Calibration not necessary	
12	Multiple control unit	MCU	Maturo GmbH	MCU/043/971107	480832	Calibration not necessary	
13	Loop antenna	HFH2-Z2	Rohde & Schwarz	100417	481912	10.01.2019	01.2020
14	Attenuator 6 dB	WA2-6	Weinschel	8254	410119	Calibration not necessary	
15	Ultralog antenna	HL562E	Rohde & Schwarz		482978	07.08.2019	08.2022
16	Software EMC32 M276	EMC32	Rohde & Schwarz	100970	482972	Calibration not necessary	
17	RF switch matrix	OSP220	Rohde & Schwarz		482976	Calibration not necessary	
18	Turntable	TT3.0-3t	Maturo	825/2612/.01	483224	Calibration not necessary	
19	Antenna support	BAM 4.5-P-10kg	Maturo	222/2612.01	483225	Calibration not necessary	
20	Controller	NCD	Maturo	474/2612.01	483226	Calibration not necessary	
21	Anechoic chamber M276	SAC5-2	Albatross Projects	C62128-A540-A138-10-0006	483227	Calibration not necessary	
22	Outdoor test site	-	PHOENIX TESTLAB GmbH	-	480293	Calibration not necessary	
23	EMI receiver / spectrum analyser	ESI 40	Rohde & Schwarz	100064/040	480355	03.04.2019	04.2020

7 Test site Validation

Test equipment	PM. No.	Frequency range	Type of validation	According to	Val. Date	Val Due
Semi anechoic chamber M276	483227	30 – 1000 MHz	NSA	ANSI C63.4a-2017	19.09.2019	18.09.2021
Shielded chamber M4	480088	9 kHz – 30 MHz	GND-Plane	ANSI C63.4-2014	06.11.2018	05.11.2020

8 Report History

Report Number	Date	Comment
F192062E4	14.01.2020	Initial Test Report
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9 List of Annexes

Annex A	Test Setup Photos	5 pages