

# Test Report

Report Number:

**F190354E2**

Equipment under Test (EUT):

**CES-I-BP-M-C07-SB-160076**

Applicant:

**EUCHNER GmbH & Co. KG**

Manufacturer:

**EUCHNER GmbH & Co. KG**



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 9 (August 2016)** Licence-exempt Radio Apparatus (All Frequency Bands): Category I Equipment
- [4] **RSS-Gen Issue 5 (April 2018)** 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		29.07.2019
	Name	Signature	Date
Reviewed and approved by:	Bernd STEINER		29.07.2019
	Name	Signature	Date

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The test results herein refer only to the tested sample. PHOENIX 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 PHOENIX TESTLAB Logo and the TEST REPORT NUMBER.

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# 1 Identification

## 1.1 Applicant

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Country:	Germany
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Phone:	+49 711 7597-360
Fax:	N / A
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:	Kohlhammerstraße 16 70771 Leinfelden-Echterdingen
Country:	Germany
Name for contact purposes:	Mr. Tobias KÖNIG
Phone:	+49 711 7597-360
Fax:	N / A
eMail address:	tobias.koenig@euchner.de
Manufacturer 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-17186-01-02 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
Type: *	CES-I-BP-M-C07-SB-160076
FCC ID: *	2AJ58-12
IC Certification Number: *	22052-12
Serial number: *	N/A
PCB identifier: *	PCB 161674
HVIN (Hardware Version Identification Number): *	12
FVIN (Firmware Version Identification Number): *	Not necessary
Hardware version: *	LP-KPL CES-C07-BP V2.1.1.x
Software version: *	N/A
Lowest internal frequency: *	N/A
Highest internal frequency: *	N/A

\*: Declared by the applicant.

Channel 1	RX:	125 kHz	TX:	125 kHz
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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

Rated RF output power: *	<125 mW					
Antenna type: *	Rod antenna with 0.0027 m <sup>2</sup> (average area times number of turns)					
Number of channels: *	1					
Antenna connector: *	None					
Modulation: *	AM					
Data rate: *	2 kbit/s					
Supply Voltage: *	U <sub>nom</sub> =	24.0 V DC	U <sub>min</sub> =	20.4 V DC	U <sub>max</sub> =	27.6 V DC
Temperature range: *	-25 °C to +55 °C					

\*: Declared by the applicant.

Ports / Connectors			
Identification	Connector		Length during test
	EUT	Ancillary	
DC / Data	Custom 5 pole	Custom	1 m / 10 m

Ancillary equipment
EUCHNER CES-A-BTN-C07-156230 * <sup>1</sup>
Custom ancillary equipment (Siemens LOGO! 12/24RC) for EUT monitoring * <sup>1</sup>

\*<sup>1</sup> Provided by the applicant

The EUT was equipped with the following radio modules which were not subject of this test report
-

## 1.6 Dates

Date of receipt of test sample:	25.04.2019
Start of test:	08.05.2019
End of test:	15.05.2019



## 2 Operational States

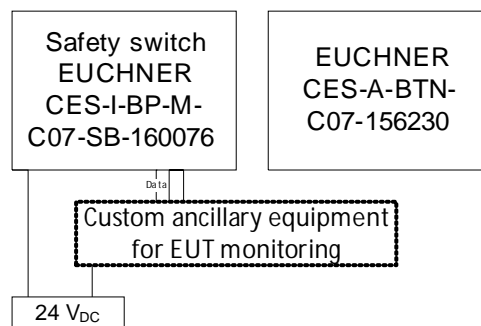
The EUT is a safety switch for machines. It will prevent either to open the protected door or to start machine actions as long as the protected door is open.

During all measurements an EUCHNER CES-A-BTN-C07-156230 was positioned at its intended position related to the EUT (0.33 x maximum detection distance).

During all measurements the EUT was powered with 24 V<sub>DC</sub> by an external laboratory power supply. Additionally, custom ancillary equipment for monitoring (Siemens LOGO! 12/24RC) was connected to the EUT during the tests.

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 9 [3]	Status	Refer page
Conducted emissions on supply line	0.15 – 30	15.207	8.8 [4]	Passed	11 et seq.
Radiated emissions	0.009 – 1.000	15.205 15.209	8.10 [4] 4.4 [3]	Passed	14 et seq.
99% bandwidth	0.125	-	6.7 [4]	Passed	28 et seq.
Antenna requirement	-	15.203	6.8 [4]	Passed *	-

\*: Integrated antenna only, requirement fulfilled.

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

## 5 Results

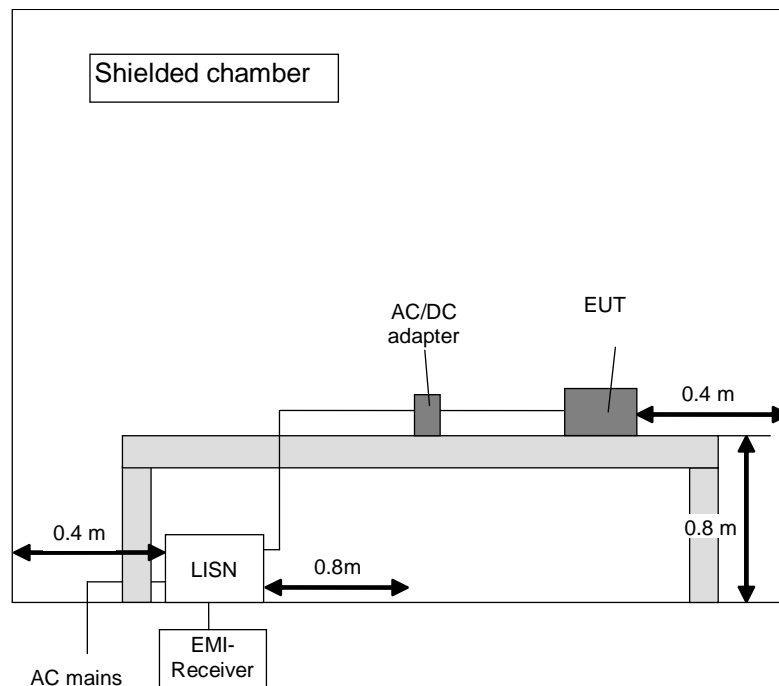
### 5.1 Conducted emissions on power supply lines

#### 5.1.1 Test method

This test will be carried out in a shielded chamber. Table top 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 appropriate 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



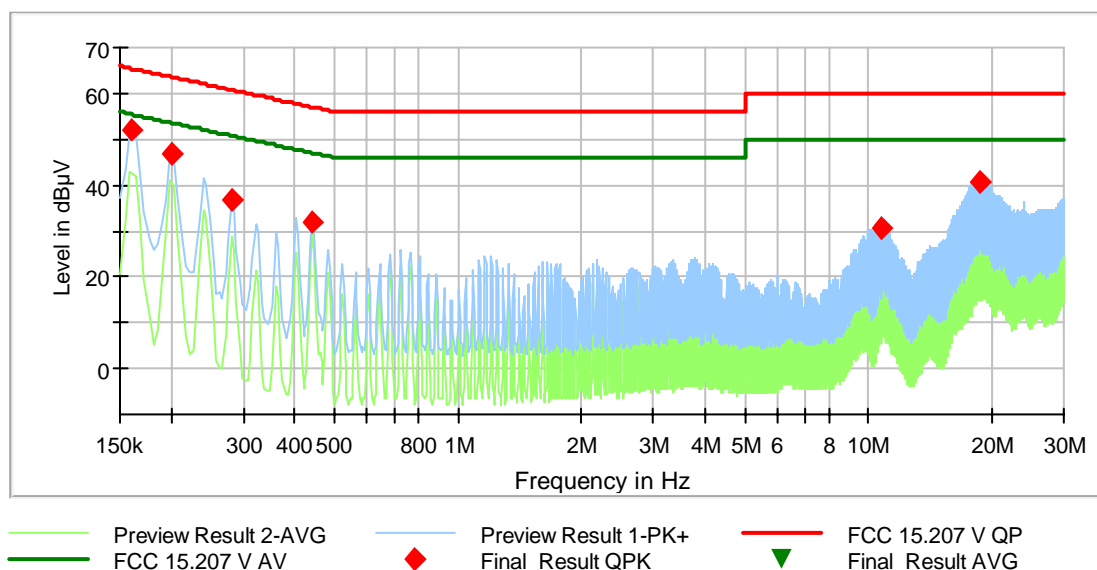
### 5.1.2 Results conducted emission measurement on AC mains

Ambient temperature:	22 °C	Relative humidity:	36 %
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Test description: Conducted emission measurement  
 EUT: CES-I-BP-M-C07-SB-160076  
 Manufacturer: EUCHNER GmbH & Co. KG  
 Operating conditions: 120 V, 60 Hz on AC/DC power supply (to 24 V DC), 125 kHz  
 RFID active  
 Test site: Phoenix TESTLAB GmbH, shielded room M4  
 Operator: R. Braun  
 Comment: AC / DC adaptor, Phoenix Contact MINI-SYS-PS-100-240AC/24DC/1.3  
 Date of test: 08.05.2019



The curves in the diagrams below only represent for each frequency point the maximum measured value of all preliminary measurements which were made for each power supply line. The top measured curve represents the peak measurement and the bottom measured curve the average measurement. The quasi-peak measured points are marked by ◆ and the average measured points by ▼.



Frequency (MHz)	QuasiPeak (dBµV)	Average (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	PE	Transducer (dB)
0.160800	52.04	---	65.42	13.38	5000.0	9.000	N	FLO	9.8
0.201300	46.77	---	63.56	16.79	5000.0	9.000	N	FLO	9.8
0.281400	36.69	---	60.77	24.08	5000.0	9.000	N	FLO	9.9
0.442500	32.08	---	57.01	24.94	5000.0	9.000	N	FLO	9.9
10.757400	30.85	---	60.00	29.15	5000.0	9.000	L1	FLO	10.6
18.609900	40.66	---	60.00	19.34	5000.0	9.000	N	FLO	10.9
Measurement uncertainty				+2.78 dB / -2.78 dB					

Test: Passed

Test equipment (please refer to chapter 6 for details)
1-5

## 5.2 Radiated emissions

### 5.2.1 Test method

The radiated emission measurement is subdivided into four 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 site without reflecting ground plane and a fixed antenna height in the frequency range 9 kHz to 30 MHz.
- A preliminary measurement carried out in a fully anechoic chamber with a fixed antenna height in the frequency range 30 MHz to 1 GHz.
- A final measurement carried out on an open area test site with reflecting ground plane and various antenna heights in the frequency range 30 MHz to 1 GHz.

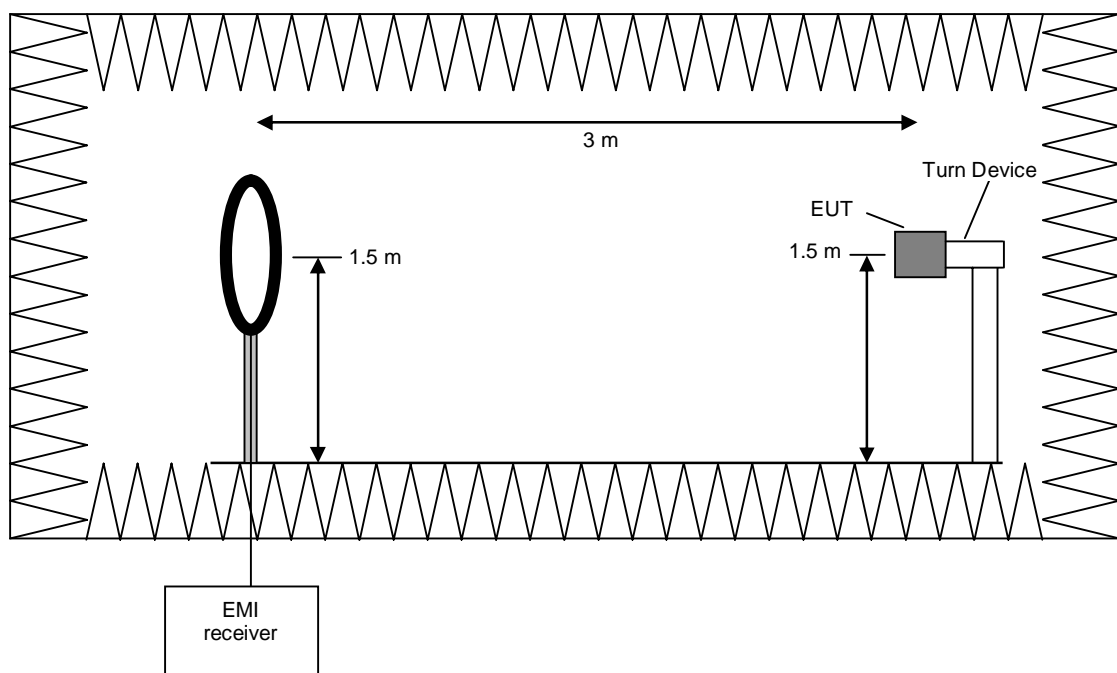
#### **Preliminary measurement (9 kHz to 30 MHz):**

In the first stage a preliminary measurement will be performed in a shielded room with a measuring distance of 3 meters. Table top devices will set up on a non-conducting turn device on the height of 1.5 m. 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:

Prescans 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).

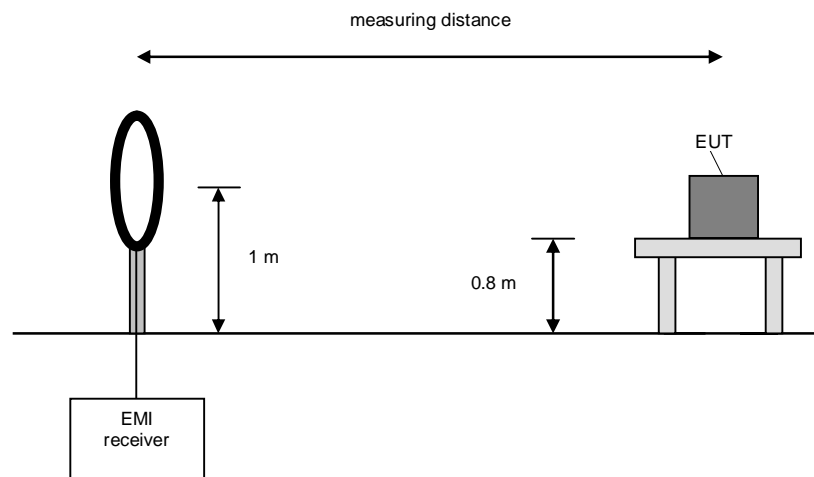
#### Final measurement (9 kHz to 30 MHz):

In the second stage a final measurement will be performed on an open area test site with no conducting ground plane in 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].

At 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:

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).

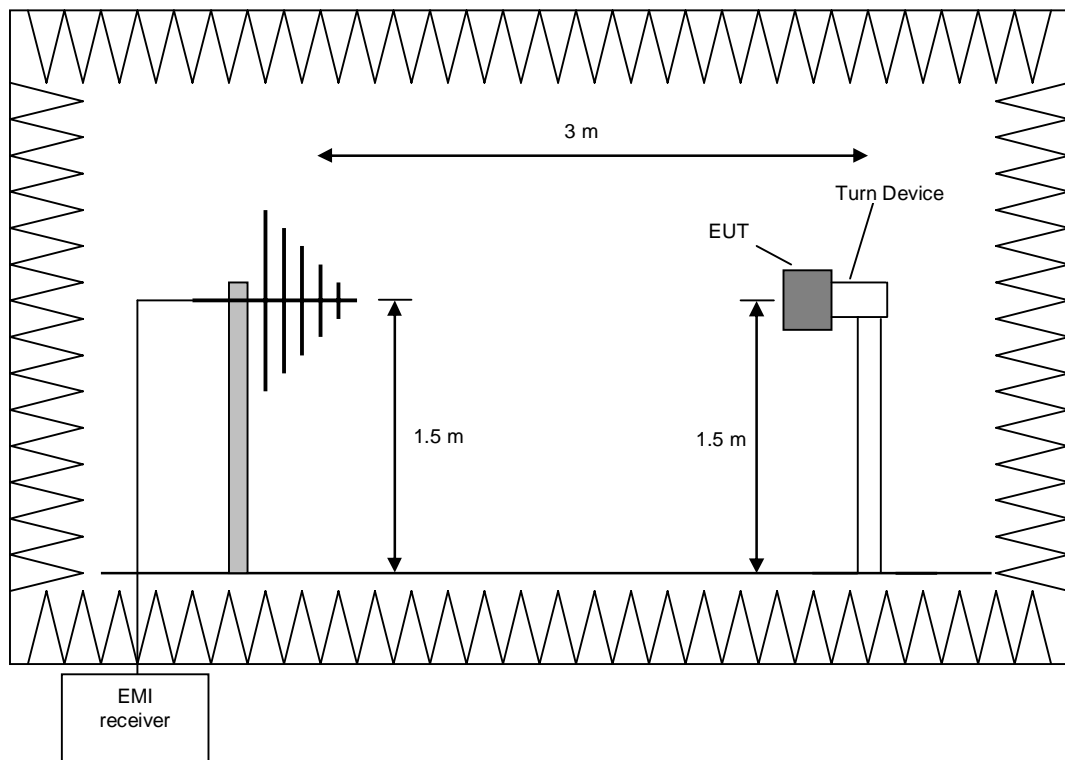
#### **Preliminary measurement (30 MHz to 1 GHz)**

In the first stage a preliminary measurement will be performed in a fully anechoic chamber with a measuring distance of 3 meter. Table top devices will set up on a non-conducting turn device on the height of 1.5 m. The set-up of the Equipment under test will be in accordance to [1].

The frequency range 30 MHz to 1 GHz will be measured with an EMI Receiver set to MAX Hold mode and a resolution bandwidth of 100 kHz. The measurement will be performed in horizontal and vertical polarisation of the measuring antenna and while rotating the EUT in its vertical axis in the range of 0 ° to 360 °.

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

Frequency range	Resolution bandwidth
30 MHz to 1 GHz	120 kHz





#### Procedure preliminary measurement:

Prescans were performed in the frequency range 30 MHz to 1 GHz.

The following procedure will be used:

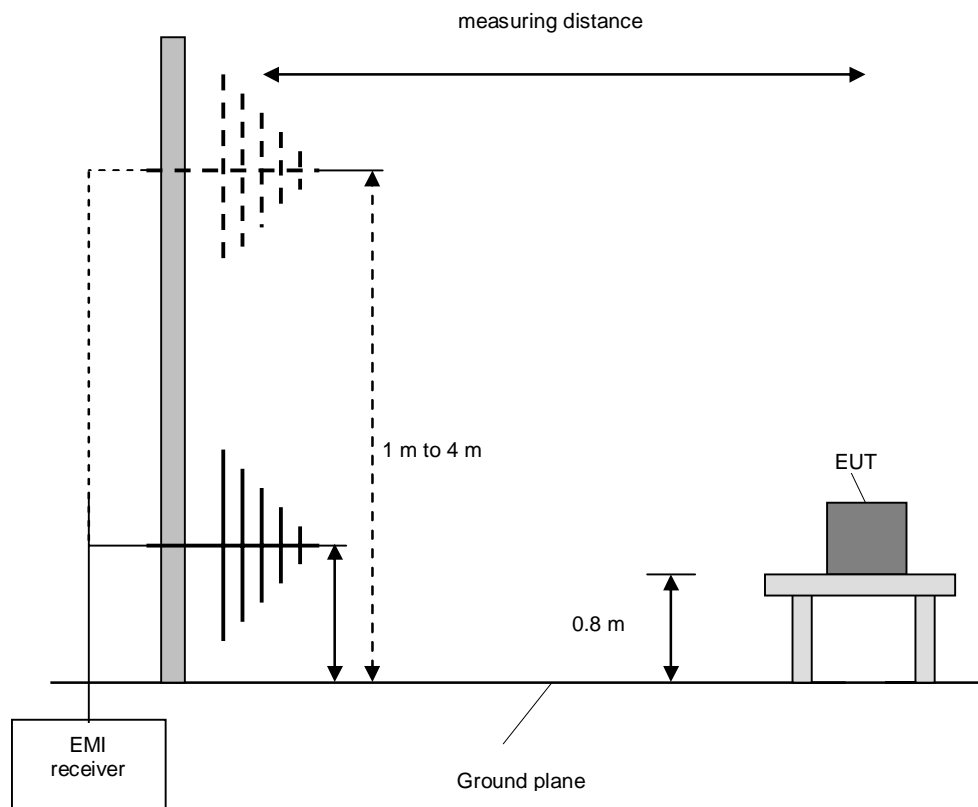
1. Monitor the frequency range at horizontal polarisation and a EUT azimuth of 0 °.
2. Manipulate the system cables within the range to produce the maximum level of emission.
3. Rotate the EUT by 360 ° to maximize the detected signals.
4. Make a hardcopy of the spectrum.
5. Measure the frequency of the detected emissions with a lower span and resolution bandwidth to increase the accuracy and note the frequency value.
6. Repeat 1) to 4) with the other orthogonal axes of the EUT.
7. Repeat 1) to 5) with the vertical polarisation of the measuring antenna.

#### Final measurement (30 MHz to 1 GHz)

A final measurement on an open area test site will be performed on selected frequencies found in the preliminary measurement. During this test the EUT will be rotated in the range of 0 ° to 360 °, the measuring antenna will be set to horizontal and vertical polarisation 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:

Frequency range	Resolution bandwidth
30 MHz to 1 GHz	120 kHz



Procedure final measurement:

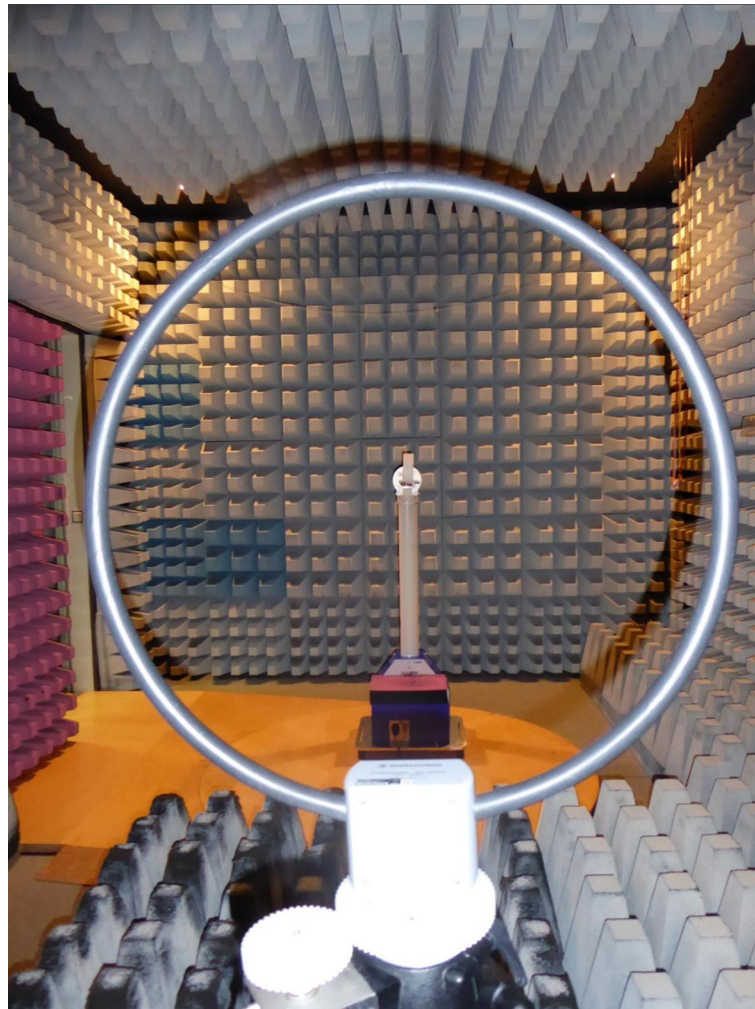
The following procedure will be used:

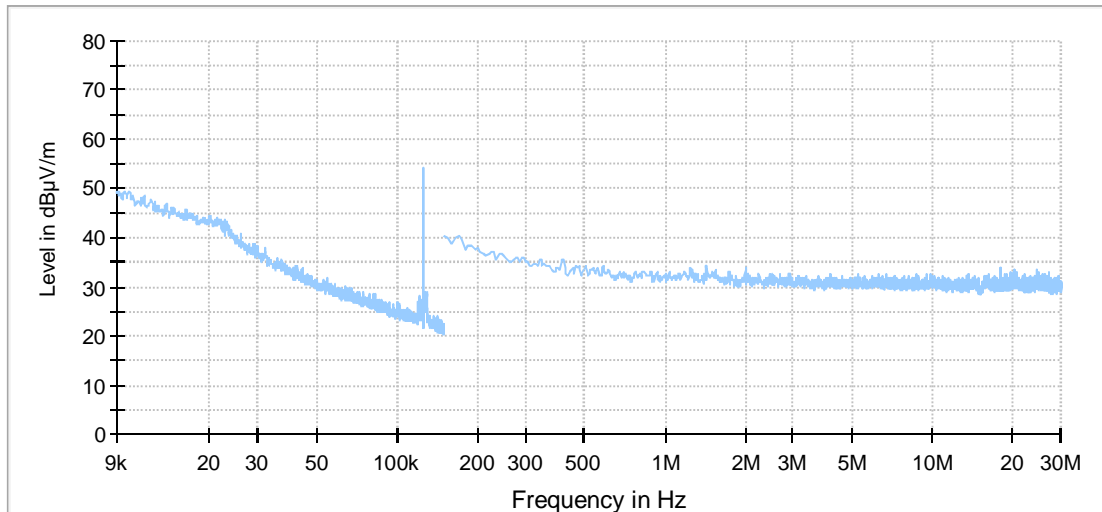
- 1) Measure on the selected frequencies at an antenna height of 1 m and a EUT azimuth of 23 °.
- 2) Move the antenna from 1 m to 4 m and note the maximum value at each frequency.
- 3) Rotate the EUT by 45 ° and repeat 2) until an azimuth of 337 ° is reached.
- 4) Repeat 1) to 3) for the other orthogonal antenna polarization.
- 5) Move the antenna and the turntable to the position where the maximum value is detected.
- 6) Measure while moving the antenna slowly +/- 1 m.
- 7) Set the antenna to the position where the maximum value is found.
- 8) Measure while moving the turntable +/- 45 °.
- 9) Set the turntable to the azimuth where the maximum value is found.
- 10) Measure with Final detector (QP and AV) and note the value.
- 11) Repeat 5) to 10) for each frequency.
- 12) Repeat 1) to 11) for each orthogonal axes of the EUT if handheld equipment.

### 5.2.2 Results preliminary measurement 9 kHz to 30 MHz

Ambient temperature:	22°C	Relative humidity:	36 %
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Test description:	Radiated emission measurement
EUT:	CES-I-BP-M-C07-SB-160076
Manufacturer:	EUCHNER GmbH & Co. KG
Operating conditions:	24 V DC, 125 kHz RFID active
Test site:	Phoenix TESTLAB GmbH, anechoic chamber M20
Operator:	R. Braun
Comment:	
Date of test	08.05.2019





— Preview Result 1-PK+

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

Frequency (MHz)
0.125

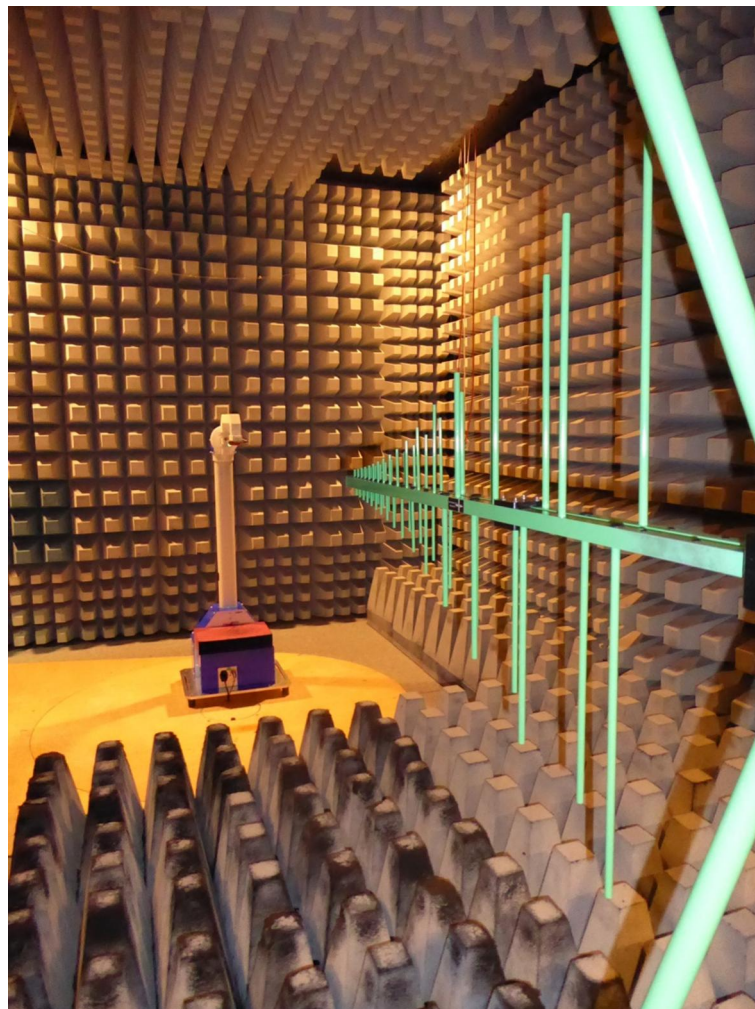
These frequencies have to be measured within a final measurement.

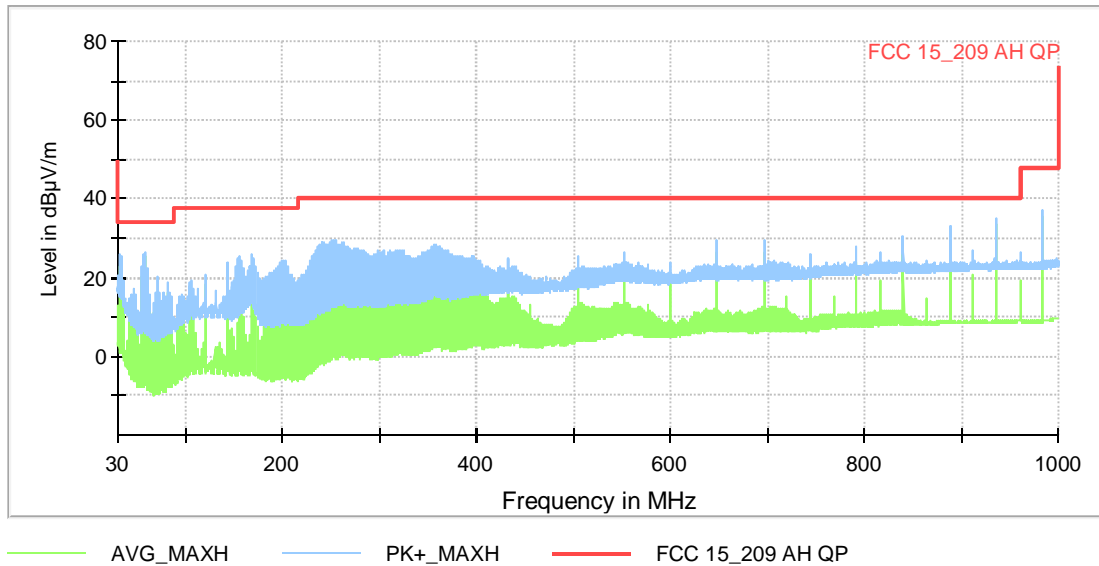
Test equipment (please refer to chapter 6 for details)
2, 7, 8, 10, 13, 24, 28

### 5.2.3 Results preliminary measurement 30 MHz to 1 GHz

Ambient temperature:	22 °C	Relative humidity:	36 %
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Test description:	Radiated emission measurement
EUT:	CES-I-BP-M-C07-SB-160076
Manufacturer:	EUCHNER GmbH & Co. KG
Operating conditions:	24 V DC, 125 kHz RFID active
Test site:	Phoenix TESTLAB GmbH, anechoic chamber M20
Operator:	R. Braun
Comment:	
Date of test	08.05.2019





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

Frequency (MHz)
32.025
58.050
156.075
168.025
252.200
648.000
888.000
936.000
984.000

These frequencies have to be measured within a final measurement.

Test equipment (please refer to chapter 6 for details)
2, 6-13, 23, 28



#### 5.2.4 Result final measurement from 9 kHz to 30 MHz

Ambient temperature	14 °C	Relative humidity	35 %
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Test description: Radiated emission measurement according to FCC PART 15  
 EUT: CES-I-BP-M-C07-SB-160076  
 Manufacturer: EUCHNER GmbH & Co. KG  
 Operating conditions: 24 V DC, 125 kHz RFID active  
 Test site: Phoenix TESTLAB GmbH, anechoic chamber M20  
 Operator: R. Braun  
 Comment:  
 Date of test: 14.05.2019



Final measurement at 3m distance

The results of the standard subsequent measurement on the outdoor test site are indicated in the table on the next page. The limits as well as the measured results (levels) refer to the above mentioned standard while taking account of the specified requirements for a 30 / 300 m measuring distance.

Results 9kHz - 30 MHz								
Frequency [MHz]	Reading [dBμV]	Result* [dBμV/m]	Limit acc. 15.209 [dBμV/m]	Margin [dB]	Detector (acc. to §15.209 (d)	Antenna factor [dB/m]	Measuring Distance [m]	Distance correction factor** [dB]
0.125000	25.3	-34.3 @ 300m	25.7	60.0	AV	20.4	3	80.0
Measurement uncertainty			+/- 4.69 dB					

Note: \*Result @ normative distance = reading + antenna factor - distance extrapolation factor

\*\* Distance correction acc. to 6.4.4.2 ANSI C63.10

The test results were calculated with the following formula:

$$\text{Result [dB}\mu\text{V/m]} = \text{reading [dB}\mu\text{V]} + \text{antenna factor [dB/m]} - \text{distance correction (dB)}$$

Test: Passed

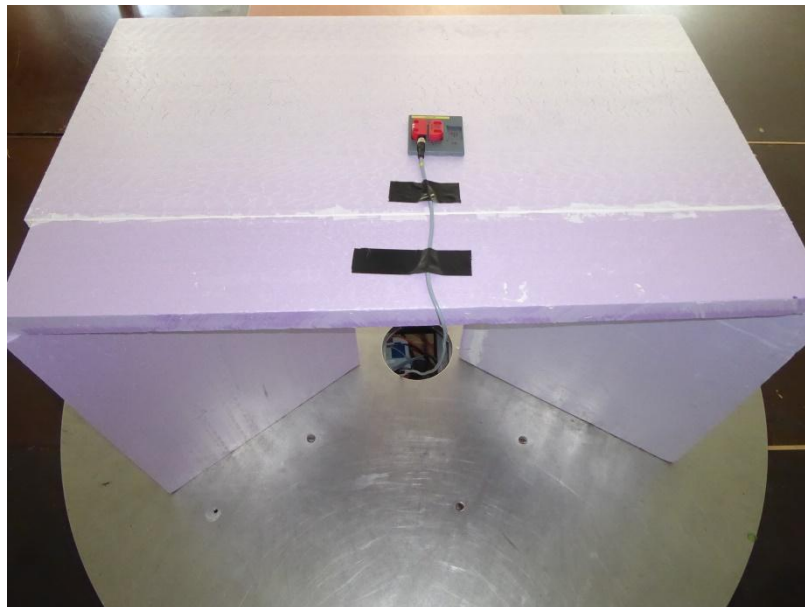
Test equipment (please refer to chapter 6 for details)
14, 24, 25



### 5.2.5 Result final measurement from 30 MHz to 1 GHz

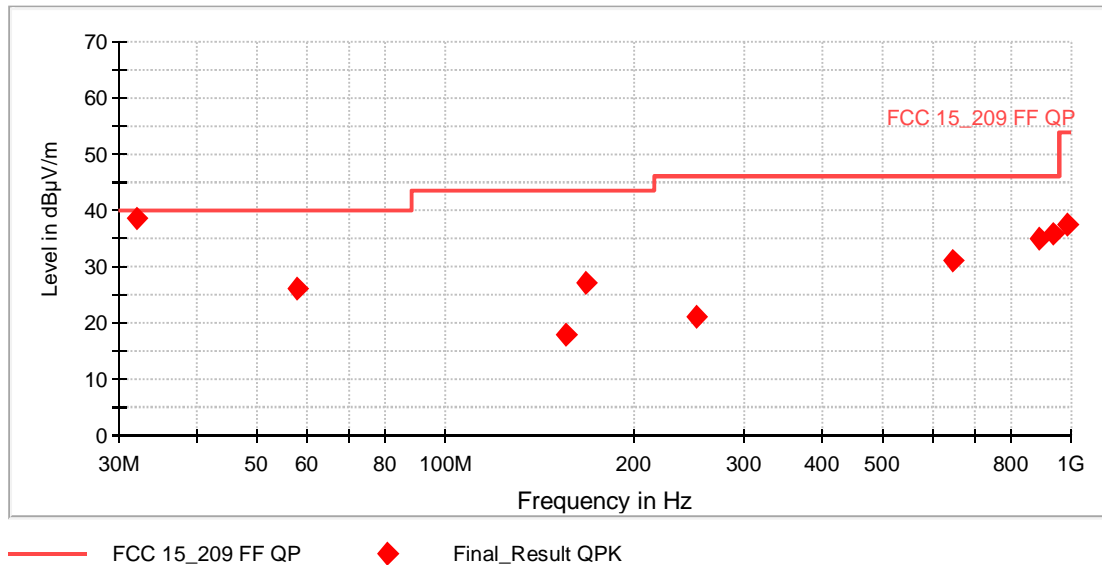
Ambient temperature	15 °C	Relative humidity	31 %
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Test description: Radiated emission measurement according to FCC PART 15  
 EUT: CES-I-BP-M-C07-SB-160076  
 Manufacturer: EUCHNER GmbH & Co. KG  
 Operating conditions: 24 V DC, 125 kHz RFID active  
 Test site: Phoenix TESTLAB GmbH, OATS M6  
 Operator: R. Braun  
 Comment:  
 Date of test: 15.05.2019



Final measurement

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 on the open area test site.



The results of the standard subsequent measurement on the open area test site are indicated in the table on the next page. The limits as well as the measured results (levels) refer to the above 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)
32.025000	38.69	40.00	1.31	1000.0	120.000	394.0	V	140.0	26.3
58.050000	26.05	40.00	13.95	1000.0	120.000	280.0	V	60.0	12.9
156.075000	17.77	43.50	25.73	1000.0	120.000	102.0	V	130.0	18.7
168.025000	26.99	43.50	16.51	1000.0	120.000	157.0	H	283.0	17.8
252.200000	21.12	46.00	24.88	1000.0	120.000	110.0	H	287.0	20.9
648.000000	31.17	46.00	14.83	1000.0	120.000	133.0	H	323.0	30.1
888.000000	35.00	46.00	11.00	1000.0	120.000	150.0	H	329.0	33.4
936.000000 *	35.40	46.00	10.60	1000.0	120.000	150.0	H	149.0	23.0
984.000000	37.51	54.00	16.49	1000.0	120.000	202.0	H	34.0	35.4
Measurement uncertainty:						+/- 4.78 dB			

\* Remark: The emission at 936 MHz could not be measured due to an external interferer. Therefore, the determined result from the preliminary measurement in the anechoic chamber is taken as the final result.

Test: Passed

The correction factor was calculated as follows:

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

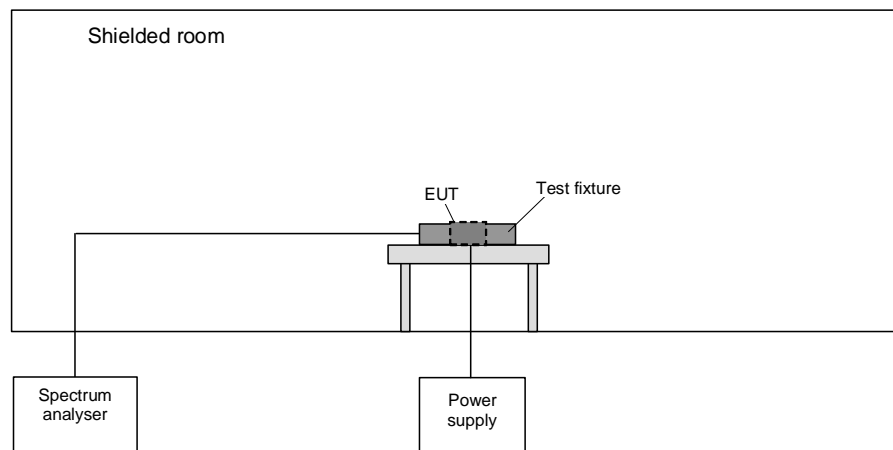
Therefore the reading can be calculated as follows:

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

Test equipment (please refer to chapter 6 for details)
2, 15-21

## 5.3 99 % bandwidth

### 5.3.1 Test method



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

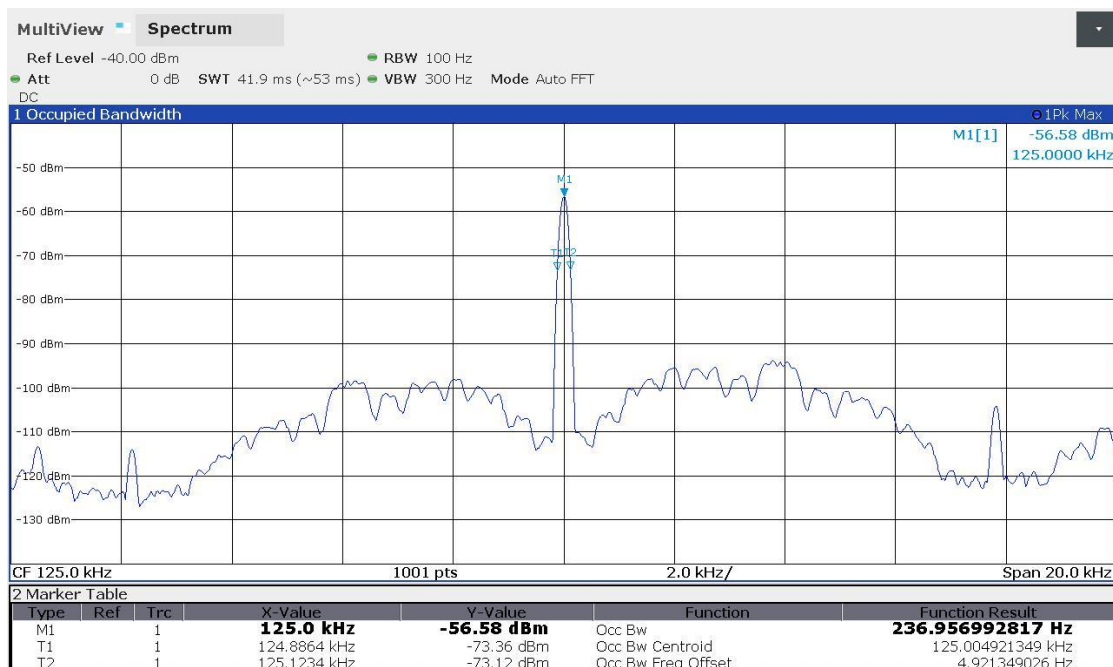
The span of the analyzer shall be set to capture all products of the modulation process, including the emission skirts. The resolution bandwidth shall be set to as close to 1% of the selected span as is possible without being below 1%. The video bandwidth shall be set to 3 times the resolution bandwidth. Video averaging is not permitted. Where practical, a sampling detector shall be used since a peak or, peak hold, may produce a wider bandwidth than actual.

The trace data points are recovered and are directly summed in linear terms. The recovered amplitude data points, beginning at the lowest frequency, are placed in a running sum until 0.5% of the total is reached and that frequency recorded. The process is repeated for the highest frequency data points. This frequency is recorded. The span between the two recorded frequencies is the occupied bandwidth.

### 5.3.2 Test results

Ambient temperature:	22 °C	Relative humidity:	25 %
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Test description: 99 % measurement  
 EUT: CES-I-BP-M-C07-SB-160076  
 Manufacturer: EUCHNER GmbH & Co. KG  
 Operating conditions: 24 V DC, 125 kHz RFID active  
 Test site: Phoenix TESTLAB GmbH, anechoic chamber M20  
 Operator: R. Braun  
 Comment:  
 Date of test: 15.05.2019



$F_L$	$F_U$	BW ( $F_U - F_L$ )
124.8887 kHz	125.1278 kHz	0.2391 kHz
Measurement uncertainty		$< 1 \cdot 10^{-7}$

Test: Passed

Test equipment (please refer to chapter 6 for details)
22, 26, 27

## 6 Test Equipment used for Tests

No.	Test equipment	Type	Manufacturer	Serial No.	PM. No.	Cal. Date	Cal Due
1	LISN	NSLK8128	Schwarzbeck	8128155	480058	14.03.2018	03.2020
2	Software	EMC32	Rohde & Schwarz	100061	481022	Calibration not necessary	
3	Shielded chamber M4	B83117-S1-X158	Siemens	190075	480088	Calibration not necessary	
4	EMI Receiver / Spectrum Analyser	ESIB 26	Rohde & Schwarz	100292	481182	28.02.2018	02.2020
5	Transient Filter Limiter	CFL 9206A	Teseq GmbH	38268	481982	14.03.2018	03.2020
6	Antenna mast	AS615P	Deisel	615/310	480187	Calibration not necessary	
7	Fully anechoic chamber M20	B83117-E2439-T232	Albatross Projects	103	480303	Calibration not necessary	
8	Turntable	DS420 HE	Deisel	420/620/00	480315	Calibration not necessary	
9	Antenna (Bilog)	CBL6112B	Schaffner EMV GmbH (-Chase)	2688	480328	19.06.2017	06.2020
10	Multiple Control Unit	MCU	Maturo GmbH	MCU/043/971107	480832	Calibration not necessary	
11	RF-cable No.36	Sucoflex 106B	Suhner	0587/6B / Kabel 36	480865	Calibration not necessary	
12	HF-Cable	Sucoflex 104	Huber+Suhner	517402	482392	Calibration not necessary	
13	Positioner	TDF 1.5- 10Kg	Maturo	15920215	482034	Calibration not necessary	
14	EMI Receiver / Spectrum Analyser	ESI 40	Rohde & Schwarz	100064/040	480355	02.04.2019	04.2020
15	Attenuator 6 dB	WA2-6	Weinschel	8254	410119	Calibration not necessary	
16	Open area test site M6	Freifeld M6	Phoenix Contact	-	480085	Calibration not necessary	
17	Antenna mast	MA240-0	Inn-Co GmbH	MA240-0/030/6600603	480086	Calibration not necessary	
18	Turntable	DS412	Deisel	412/316	480087	Calibration not necessary	
19	Controller	HD100	Deisel	100/349	480139	Calibration not necessary	
20	Antenna (Bilog)	CBL6111D	Schaffner Elektrottest GmbH / Teseq GmbH	25761	480894	19.10.2017	10.2020
21	EMI Receiver / Spectrum Analyser	ESIB7	Rohde & Schwarz	100304	480521	26.02.2018	02.2020
22	Signal & Spectrum Analyzer	FSW43	Rohde & Schwarz	100586 & 100926	481720	15.03.2018	03.2020
23	Antenna support	AS620P	Deisel	620/375	480325	Calibration not necessary	
24	Loop antenna	HFH2-Z2	Rohde & Schwarz	100417	481912	10.01.2019	01.2021
25	Outdoor test site	-	PHOENIX TESTLAB GmbH	-	480293	Calibration not necessary	
26	Loop antenna	225 mm	Phoenix Test-Lab	-	410085	Calibration not necessary	
27	Shielded chamber M21	B83117-B1232-T162	Albatross Projects	26491	481966	Calibration not necessary	
28	EMI Receiver / Spectrum Analyser	ESW44	Rohde & Schwarz		482467	29.03.2018	03.2020

## 7 Test site Validation

Test equipment	PM. No.	Frequency range	Type of validation	According to	Val. Date	Val Due
Fully anechoic chamber M20	480303	1 -18 GHz	SVSWR	CISPR 16-1-4 Amd. 1	13.07.2018	12.07.2020
Shielded chamber M4	480088	9 kHz – 30 MHz	GND-Plane	ANSI C63.4-2014	06.11.2018	05.11.2020
OATS M6	480085	30 – 1000 MHz	NSA	ANSI C63.4-2014	25.10.2018	24.10.2020

## 8 Report History

Report Number	Date	Comment
F190354E2	29.07.2019	Initial Test Report

## 9 List of Annexes

Annex A      Test Setup Photos

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