



## EMC – TEST REPORT

Type / Model Name : ULR01

Product Description : RFID Reader

Applicant : Dürr Dental SE

Address : Höpfigheimer Str. 17

74321 Bietigheim-Bissingen, GERMANY

Manufacturer : Dürr Dental SE

Address : Höpfigheimer Str. 17

74321 Bietigheim-Bissingen, GERMANY

**Test Result** according to the standards  
listed in clause 1 test standards:

**POSITIVE**

Test Report No. : 80115209-01 Rev\_0

30. March 2022

Date of issue



Deutsche  
Akkreditierungsstelle  
D-PL-12030-01-04



Bundesnetzagentur

BNetzA-CAB-13/21-07

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# 1 TEST STANDARDS

The tests were performed according to following standards:

## **FCC Rules and Regulations Part 15 Subpart B - Unintentional Radiators (October, 2021)**

Part 15, Subpart B, Section 15.107

AC Line conducted emission

☐ Class A device

☒ Class B device

Part 15, Subpart B, Section 15.109

Radiated emission, general requirements

☐ Class A device

☒ Class B device

ANSI C63.4: 2014

Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz.

CISPR 16-4-2: 2011 + A1: 2014  
EN 55016-4-2: 2011

Uncertainty in EMC measurement

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

## 2 SUMMARY

### 2.1 General remarks

Note: insert informative statements in User Manual!

The measurement for radio was recorded in the test report 80115209-03 Rev\_0.

### 2.2 Summary for all EMC tests

Type of test	Test result
Emission:	
A4 Conducted emission (AC mains power / DC power)	FULFILLED
A5 Radiated emission (< 1 GHz)	FULFILLED
SER 3 Radiated emission (> 1 GHz)	Not applicable*

\* Not applicable, according to the customer, the highest internal frequency is < 108 MHz.

### 2.3 Final assessment

The equipment under test **fulfills** the EMC requirements cited in clause 1 test standards.

Date of receipt of test sample : acc. to storage records

Testing commenced on : 08. March 2022

Testing concluded on : 08. March 2022

Checked by:

Tested by:

\_\_\_\_\_

\_\_\_\_\_

### 3 EQUIPMENT UNDER TEST

#### 3.1 Photo documentation of the EuT





### 3.2 Information provided by the Client

Please note, we do not take any responsibility for information provided by the client or his representative which may have an influence on the validity of the test results.

### 3.3 Sampling

The customer is responsible for the choice of sample. Sample configuration, start-up and operation is carried out by the customer or according to his/her instructions.

### 3.4 Power supply system utilised

Power supply voltage : 5V DC Connection via USB to Laptop

All tests were carried out with a supply voltage of 5V DC unless otherwise stated.  
Exceptions are described in the detailed test conditions.

### 3.5 Highest internal frequency

According to the manufacturer's statement, the highest internally used frequency is less than 108 MHz.

### 3.6 Short description of the Equipment under Test (EuT)

ULR01 is a RFID reader, which can be connected via USB cable to a computer. It reads RFID tags (e.g. of image plates) and transfers that data to a software on the connected computer.

The Reader uses the NFC controller NXP PN7150 to communicate with RFID-Tags. Tags complying to standard ISO15693 are supported. The modulation on PN7150 side is 100% Amplitude Shift Keying (ASK) pulse position coded. The RFID-Tag uses subcarrier load modulation with manchester bit coding.

Number of tested samples : 1  
Serial number : P464875006

### 3.7 EuT operation mode

The equipment under test was operated during the measurement under the following conditions:

- Continuous Tag reading

### 3.8 EuT configuration

(The CDF filled by the applicant can be viewed at the test laboratory.)

The following peripheral devices and interface cables were connected during the measurements:

- Laptop	Model : Fujitsu, CSA Group Bayern GmbH
-	Model :
-	Model :

Port	Cable	Screening	Transmission	Status	Length
1	Power over USB	shielded	analogue	active	2 m

**Modifications during the EMC test:** **None**

## 4 TEST ENVIRONMENT

### 4.1 Address of the test laboratory

**CSA Group Bayern GmbH  
Ohmstrasse 1-4  
94342 STRASSKIRCHEN  
GERMANY**

### 4.2 Accreditation and Recognition of the test laboratory

Within the framework of the Mutual Recognition Agreement (MRA) between the European Community and the USA the EMC test laboratory listed above has been approved as a Conformity Assessment Body (CAB) designated by the EU member states through the conclusion of the MRA on the basis of Article 133 of the treaty

The site is accredited/registered by

- the German accreditation body DAkkS-Registration No.: D-PL-12030-01-04
- the Federal Communications Commission (FCC) Registration Number: 0013864798
- the Bundesnetzagentur (German Federal Network Agency) as Conformity assessment body (CAB) Registration No: BnetzA-CAB-13/21-07

### 4.3 Statement regarding the usage of logos in test reports

The accreditation and notification body logos displayed in this test report are only valid for standards listed in the accreditation or notification scope of CSA Group Bayern GmbH.

### 4.4 Environmental conditions

During the measurement the environmental conditions were within the listed ranges:

Temperature: 15-35 °C

Humidity: 30-60 %

Atmospheric pressure: 86-106 kPa

The environmental conditions are recorded by data logger in the test locations.  
All data loggers used are regularly calibrated and verified.



## 4.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. It is noted that the expanded measurement uncertainty corresponds to the measurement results from the standard measurement uncertainty multiplied by the coverage factor  $k = 2$ . The true value is located in the corresponding interval with a probability of 95 %. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16-4-2 / 2011 + A1 / 2014 „Uncertainties, statistics and limit modelling – Uncertainty in EMC measurements“ and is documented in the quality system acc. to DIN EN ISO/IEC 17025. For all measurements shown in this report, the measurement uncertainty of the test laboratory, CSA Group Bayern GmbH, is below the measurement uncertainty as defined by CISPR. Therefore, no special measures must be taken into consideration with regard to the limits according to CISPR. Furthermore, component and process variability of devices similar to that tested may result in additional deviation. The manufacturer has the sole responsibility of continued compliance of the device.

## 4.6 Conformity Decision Rule

### Field of EMC:

The field of EMC includes testing of EMF / EMCU, EMC in general, telecommunications, motor vehicles, maritime and aviation EMC. With respect to measurement uncertainty and decision rules, EMC is divided into the sub-sections emission and immunity. For standards where the measurement uncertainty is not taken into account, decisions on the measurements documented in this report are based on "simple acceptance" (acceptance limit = specification limit) in accordance with ILAC G8 and IEC Guide 115 in their respective editions valid at the time of issuing this report. In the case of standards where measurement uncertainty has been taken into account, these standards are used in decisions made regarding measurements documented in this report.

All equipment needed to determine results were calibrated at the time of their use and were therefore within the specified measurement uncertainty.

### Sub-section Emission:

In accordance with the basic standard CISPR 16-4-2 in the version valid at the time of issuing this report, the measurement uncertainty was not taken into account in the conformity assessment as the measurement uncertainty of the laboratory Ulab is less than UCISPR.

### Sub-section Immunity:

The decision rule of "simple acceptance" (acceptance limit = specification limit) is adopted.

## 4.7 Measurement protocol for FCC

### 4.7.1 General information

#### 4.7.1.1 Test methodology

In compliance with 47 CFR Part 15 Subpart A Section 15.38 testing for FCC compliance may be done following the ANSI C63.4 procedures and using the CISPR 22 Limits.

#### 4.7.1.2 Justification

The Equipment under Test (EuT) is configured in a typical user arrangement in accordance with the manufacturer's instructions. A cable is connected to each available port and either terminated with a peripheral using the appropriate impedance characteristic or left unterminated. Where appropriate, cables are manually manipulated with respect to each other thus obtaining maximum disturbances from the unit.

### 4.7.2 Details of test procedures

#### 4.7.2.1 General standard information

The test methods used comply with ANSI C63.4 "Methods of Measurement of Radio-Noise Emissions from Low-Voltage Electrical and Electronic Equipment in the Range of 9 kHz to 40 GHz."

### 4.7.3 Conducted emission

#### 4.7.3.1 Description of measurement

The final level, expressed in dB $\mu$ V, is arrived at by taking the reading directly from the EMI receiver. This level is compared directly to the FCC Limit or to the CISPR limit.

To convert between dB $\mu$ V and  $\mu$ V, the following conversions apply:

$$\text{dB}\mu\text{V} = 20(\log \mu\text{V})$$

$$\mu\text{V} = \text{Inverse log}(\text{dB}\mu\text{V}/20)$$

Conducted emissions on the 50 Hz and/or 60 Hz power interface of the EuT are measured in the frequency range of 150 kHz to 30 MHz. The measurements are performed using a receiver, which has CISPR characteristic bandwidth and quasi-peak detection and a Line Impedance Stabilization Network (LISN) with 50  $\Omega$  / 50  $\mu$ H (CISPR 16) characteristics. The receiver is protected by means of an impedance matched pulse limiter connected directly to the RF input. Table top equipment is placed on a non-conducting table 80 centimetres above the floor and is positioned 40 centimetres from the vertical ground plane (wall) of the screen room. If the minimum limit margin appears to be less than 20 dB with a peak mode measurement, the emission are remeasured using a tuned receiver with quasi-peak and average detection and recorded on the data sheets.

### 4.7.4 Radiated emission (electrical field 30 MHz - 1 GHz)

#### 4.7.4.1 Description of measurement

Spurious emission from the EuT is measured in the frequency range of 30 MHz to 1000 MHz using a tuned receiver and appropriate broadband linearly polarized antennas. Measurements between 30 MHz and 1000 MHz are made with 120 kHz/6 dB bandwidth and quasi-peak detection. Table top equipment is placed on a 1.0 X 1.5 metre non-conducting table 80 centimetres above the ground plane. Floor standing equipment is placed directly on the turntable/ground plane. The setup of the equipment under test is established in accordance with ANSI C63.4. The interface cables that are closer than 40 centimetres to the ground plane are bundled in the center in a serpentine fashion so that they are at least 40 centimetres from the ground plane. Cables to simulators/testers (if used in this test) are routed through the center of the table and to a screened room located outside the test area.

The antenna is positioned 3, 10 or 30 metres horizontally from the EuT. To locate maximum emissions from the test sample the antenna is varied in height from 1 to 4 metres, measurement scans are made with both horizontal and vertical antenna polarization planes and the EuT is rotated 360 degrees.

The final level, expressed in dBµV/m, is arrived at by taking the reading from the EMI receiver (Level dBµV) and adding the correction factors and cable loss factor (Factor dB) to it. This is done automatically in the EMI receiver where the correction factors are stored. The FCC or CISPR limit is subtracted from this result in order to provide the limit margins listed in the measurement protocols.

The resolution bandwidth during the measurement is as follows:

30 MHz – 1000 MHz: ResBW: 120 kHz

Example:

Frequency (MHz)	Reading level (dBµV)	+	Correction Factor* (dB/m)	=	Level (dBµV/m)	-	CISPR Limit (dBµV/m)	=	Delta (dB)
719.0	75.0	+	32.6	=	107.6	-	110.0	=	-2.4

\*Correction Factor = Antenna Factor + Cable Attenuation = 30 dB/m + 2.6 dB = 32.6 dB/m

#### 4.7.4.2 Measurement Procedure

The test setup is prepared with the EUT at the desired EUT-Antenna separation.

The turntable is rotated 360° until the test receiver displays the maximum level at the observed frequency.

The antenna height is then adjusted from 1 m to 4 m maximizing the measured value.

The turntable is re-adjusted to re-affirm the maximum emission value which is then recorded.

This procedure is repeated for all frequencies of interest.

### 4.7.5 Radiated emission (electrical field 1 GHz - 30 GHz)

#### 4.7.5.1 Description of measurement

Radiated emission from the EuT are measured in the frequency range of 1 GHz to the maximum frequency as specified in 47 CFR Part 15 Subpart A section 15.33, using a tuned receiver (Spectrum Analyser) and appropriate linearly polarized antennas. Table top equipment is placed on a 0.65 X 1.5 metre non-conducting table 80 centimetres above the ground plane. The turntable must be fully covered with the appropriate absorber (Type VHP-12).

Floor standing equipment is placed directly on the turntable/ground plane. The setup of the equipment under test is established in accordance with ANSI C63.4.

The interface cables that are closer than 40 centimetres to the ground plane are bundled in the centre in a serpentine fashion so they are at least 40 centimetres from the ground plane. Cables to simulators/testers (if used in this test) are routed through the centre of the table and to a screened room located outside the test area. The antenna is positioned 3 metres horizontally from the EuT.

Measurements are made in both the horizontal and vertical polarization planes in a fully anechoic room using a spectrum analyser set to a peak detector function and a resolution and video bandwidth of 1 MHz. All tests are performed at a test distance of 3 metres. Hand-held or body-worn devices are rotated around three orthogonal axes in order to determine the position, angle and configuration having the maximum emission. The cables and equipment are placed and moved within the range of their likely positioning to find the maximum emission. These conditions will then be used for the final measurements. The antenna height is then adjusted from 1 m to 4 m maximizing the measured value. The antenna is mounted to a boresight axis so the antenna centre always points to the EuT.

Other devices are placed according to their general purpose. The turntable is rotated 360° until the spectrum analyser displays the maximum level at the observed frequency. The antenna height is then adjusted from 1 m to 4 m maximizing the measured value. The turntable is re-adjusted to re-affirm the maximum emission value which is then recorded. This procedure is repeated for all frequencies of interest.

When the EuT is larger than the beamwidth of the measuring antenna it will be moved over the surface for the four sides of the equipment. Where appropriate, the test distance may be reduced in order to demonstrate that emissions are under the limits at the specified test distance.

## 5 TEST CONDITIONS AND RESULTS

### 5.1 Conducted emission

For test instruments and accessories used see section 6 Part A 4.

#### Legend for tables:

QP-L ... QuasiPeak reading including correction factor

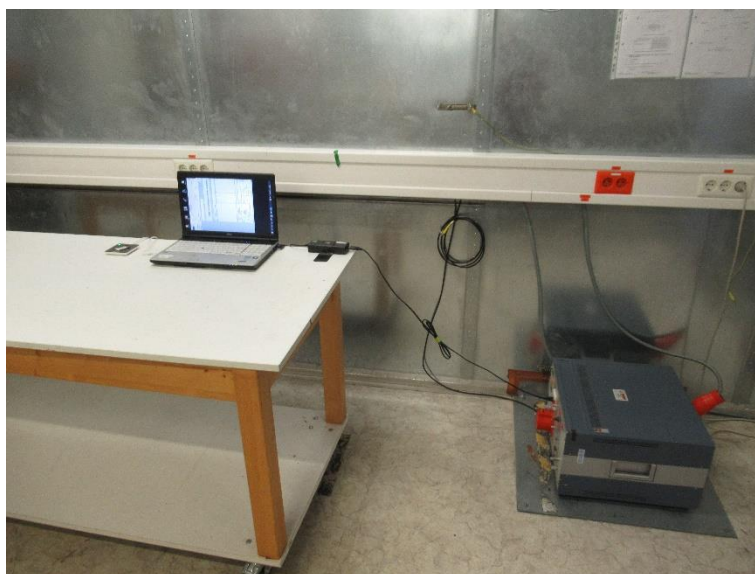
AV-L ... Average reading including correction factor

Margin... Measured value to limit delta (margin)

#### 5.1.1 Description of the test location

Test location: Shielded Room S2

#### 5.1.2 Photo documentation of the test setup



#### 5.1.3 Test result

Frequency range: 0.15 MHz - 30 MHz

Min. limit margin 10.93 dB at 0.222 MHz

The requirements are **FULFILLED**.

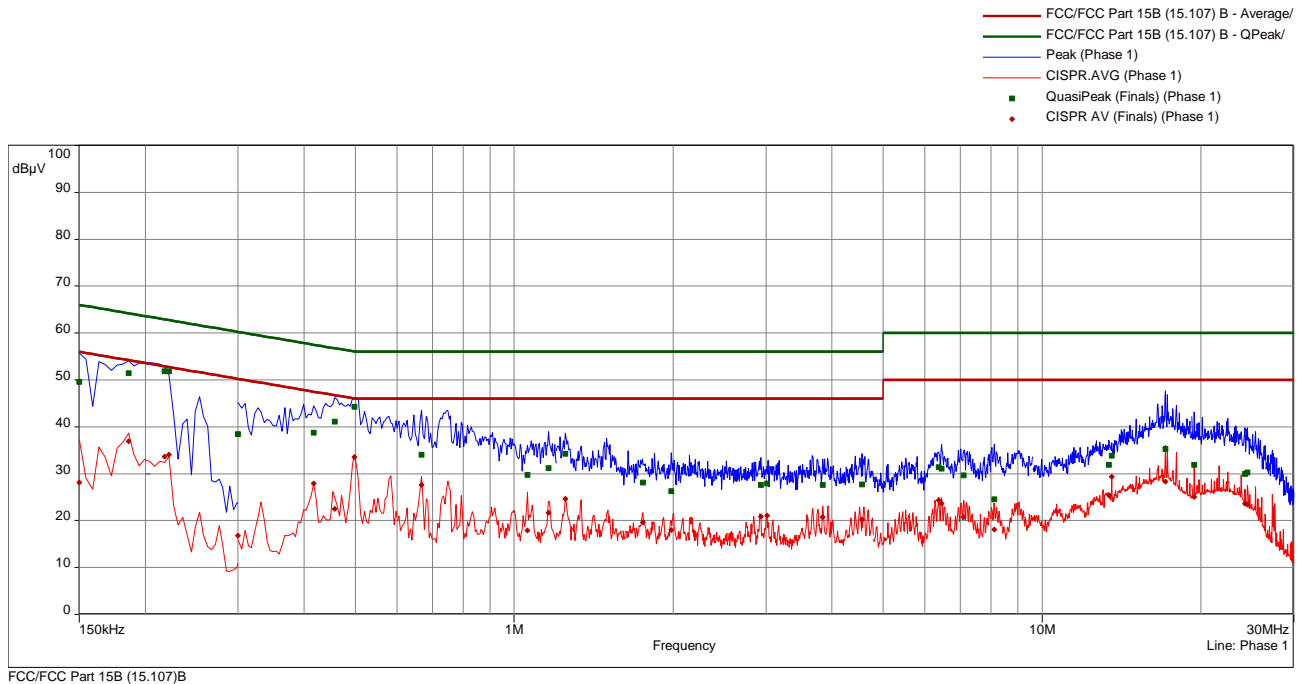
**Remarks:** For detailed results, please see the following page(s).

For description of the measurement see 4.7.3.

## 5.1.4 Test protocol

Test point: L1  
Operation mode: Continuous Tag reading  
Remarks: FCC Class B  
Date: 08. March 2022  
Tested by: Johannes Müller

Result: **PASSED**



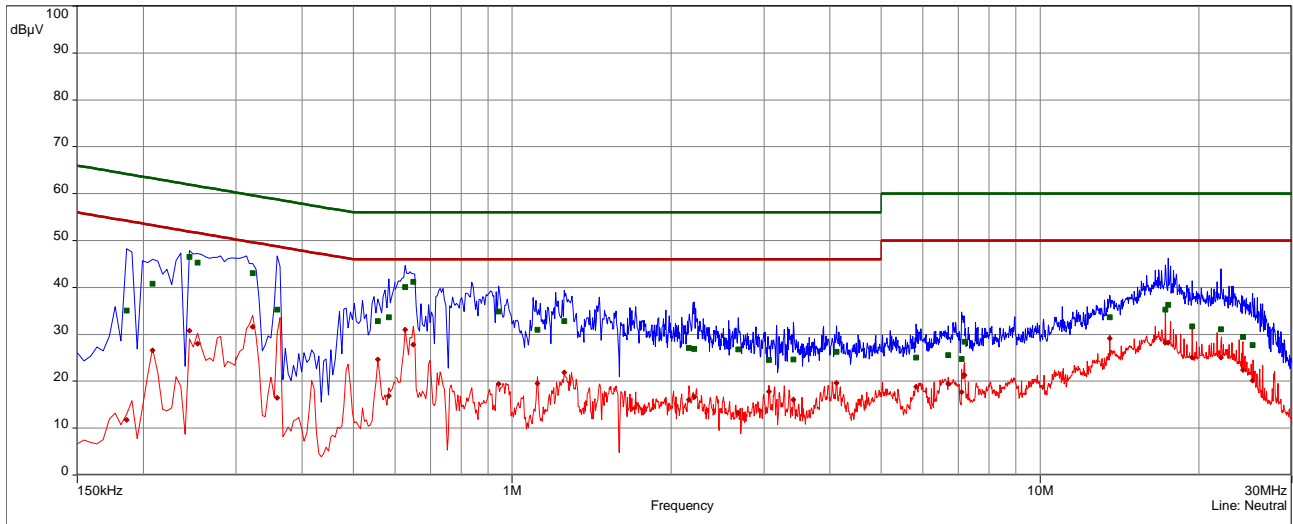
FCC/FCC Part 15B (15.107)B

freq MHz	SR	QP dBμV	margin dB	limit dBμV	AV dBμV	margin dB	limit dBμV	line	corr dB
0.15	1	49.58	-16.42	66.00	28.14	-27.86	56.00	Phase 1	10.09
0.186	1	51.40	-12.81	64.21	36.92	-17.30	54.21	Phase 1	10.10
0.2175	1	51.81	-11.10	62.91	33.69	-19.23	52.91	Phase 1	10.11
0.222	1	51.81	-10.93	62.74	34.04	-18.70	52.74	Phase 1	10.11
0.3	2	38.48	-21.76	60.24	16.77	-33.47	50.24	Phase 1	10.14
0.417	2	38.80	-18.71	57.51	27.92	-19.59	47.51	Phase 1	10.16
0.4575	2	41.13	-15.61	56.74	22.50	-24.24	46.74	Phase 1	10.16
0.498	2	44.27	-11.76	56.03	33.57	-12.46	46.03	Phase 1	10.16
0.6675	3	34.06	-21.94	56.00	27.58	-18.42	46.00	Phase 1	10.18
1.059	3	29.80	-26.20	56.00	17.90	-28.10	46.00	Phase 1	10.21
1.1625	3	31.15	-24.85	56.00	21.66	-24.34	46.00	Phase 1	10.23
1.2495	4	34.25	-21.75	56.00	24.61	-21.39	46.00	Phase 1	10.24
1.7535	4	28.15	-27.85	56.00	19.59	-26.41	46.00	Phase 1	10.28
1.983	4	26.32	-29.68	56.00	17.99	-28.01	46.00	Phase 1	10.27
2.931	5	27.57	-28.43	56.00	20.90	-25.10	46.00	Phase 1	10.34
3.012	5	27.91	-28.09	56.00	21.09	-24.91	46.00	Phase 1	10.35
3.84	5	27.64	-28.36	56.00	20.74	-25.26	46.00	Phase 1	10.38
4.5645	5	27.76	-28.24	56.00	20.26	-25.74	46.00	Phase 1	10.43
6.366	6	31.43	-28.57	60.00	24.34	-25.66	50.00	Phase 1	10.55
6.456	6	31.12	-28.88	60.00	23.59	-26.41	50.00	Phase 1	10.56
7.1085	6	29.64	-30.36	60.00	20.77	-29.23	50.00	Phase 1	10.61
8.1165	6	24.54	-35.46	60.00	18.09	-31.91	50.00	Phase 1	10.66
13.3845	7	31.91	-28.09	60.00	25.51	-24.49	50.00	Phase 1	11.05
13.56	7	33.85	-26.15	60.00	29.38	-20.62	50.00	Phase 1	11.07
17.142	7	35.32	-24.68	60.00	28.30	-21.70	50.00	Phase 1	11.32
19.4385	8	31.93	-28.07	60.00	25.04	-24.96	50.00	Phase 1	11.44
24.2625	8	29.96	-30.04	60.00	23.58	-26.42	50.00	Phase 1	11.65
24.51	8	30.24	-29.76	60.00	23.40	-26.60	50.00	Phase 1	11.66

Test point: N  
Operation mode: Continuous Tag reading  
Remarks: FCC Class B  
Date: 08. March 2022  
Tested by: Johannes Müller

Result: **PASSED**

— FCC/FCC Part 15B (15.107) B - Average/  
— FCC/FCC Part 15B (15.107) B - QPeak/  
— Peak (Neutral)  
— CISPR.AVG (Neutral)  
■ QuasiPeak (Finals) (Neutral)  
● CISPR AV (Finals) (Neutral)



FCC/FCC Part 15B (15.107)B

freq MHz	SR	QP dBμV	margin dB	limit dBμV	AV dBμV	margin dB	limit dBμV	line	corr dB
0.186	9	35.10	-29.11	64.21	11.79	-42.42	54.21	Neutral	10.12
0.2085	9	40.77	-22.50	63.26	26.55	-26.72	53.26	Neutral	10.13
0.2445	9	46.55	-15.39	61.94	30.81	-21.14	51.94	Neutral	10.13
0.2535	9	45.35	-16.29	61.64	28.03	-23.62	51.64	Neutral	10.13
0.3225	10	43.10	-16.55	59.64	31.63	-18.01	49.64	Neutral	10.14
0.3585	10	35.26	-23.51	58.76	16.50	-32.27	48.76	Neutral	10.15
0.5565	10	32.82	-23.18	56.00	24.66	-21.34	46.00	Neutral	10.16
0.5835	10	33.63	-22.37	56.00	16.91	-29.09	46.00	Neutral	10.17
0.627	11	40.05	-15.95	56.00	30.97	-15.03	46.00	Neutral	10.18
0.6495	11	41.24	-14.76	56.00	27.82	-18.18	46.00	Neutral	10.18
0.942	11	34.90	-21.10	56.00	19.41	-26.59	46.00	Neutral	10.20
1.1175	11	31.02	-24.98	56.00	19.51	-26.49	46.00	Neutral	10.22
1.254	12	32.78	-23.22	56.00	21.88	-24.12	46.00	Neutral	10.24
2.163	12	27.12	-28.88	56.00	16.05	-29.95	46.00	Neutral	10.29
2.2125	12	26.85	-29.15	56.00	16.63	-29.37	46.00	Neutral	10.29
2.6835	13	26.75	-29.25	56.00	13.17	-32.83	46.00	Neutral	10.33
3.066	13	24.52	-31.48	56.00	17.80	-28.20	46.00	Neutral	10.35
3.4125	13	24.64	-31.36	56.00	16.10	-29.90	46.00	Neutral	10.35
4.119	13	26.29	-29.71	56.00	19.67	-26.33	46.00	Neutral	10.40
5.8215	14	25.03	-34.97	60.00	18.86	-31.14	50.00	Neutral	10.49
6.6945	14	25.58	-34.42	60.00	19.42	-30.58	50.00	Neutral	10.55
7.1085	14	24.73	-35.27	60.00	17.70	-32.30	50.00	Neutral	10.57
7.1985	14	28.39	-31.61	60.00	21.26	-28.74	50.00	Neutral	10.58
13.56	15	33.63	-26.37	60.00	29.13	-20.87	50.00	Neutral	10.92
17.2905	15	35.31	-24.69	60.00	28.23	-21.77	50.00	Neutral	11.13
17.511	15	36.35	-23.65	60.00	28.28	-21.72	50.00	Neutral	11.15
19.4295	16	31.65	-28.35	60.00	25.05	-24.95	50.00	Neutral	11.23
21.9945	16	31.09	-28.91	60.00	25.10	-24.90	50.00	Neutral	11.26
24.2535	16	29.46	-30.54	60.00	22.44	-27.56	50.00	Neutral	11.26
25.284	16	27.70	-32.30	60.00	20.17	-29.83	50.00	Neutral	11.24



## 5.2 Radiated emission < 1 GHz (electric field)

For test instruments and accessories used see section 6 Part A 5.

### Legend for tables:

Level vert. QuasiPeak reading including correction factor for vertically polarised antenna

Level hor. QuasiPeak reading including correction factor for horizontally polarised antenna

Limit Limit referred to the appropriate standard

DLimit... Delta between limit and result (margin)

### 5.2.1 Description of the test location

Test location: Open Area Test Site 1

Test distance: 10 metres

### 5.2.2 Photo documentation of the test setup



### 5.2.3 Test result

Frequency range: 30 MHz - 1000 MHz

Min. limit margin 1.7 dB at 84.00 MHz

The requirements are **FULFILLED**.

**Remarks:** For detailed results, please see the following page(s).

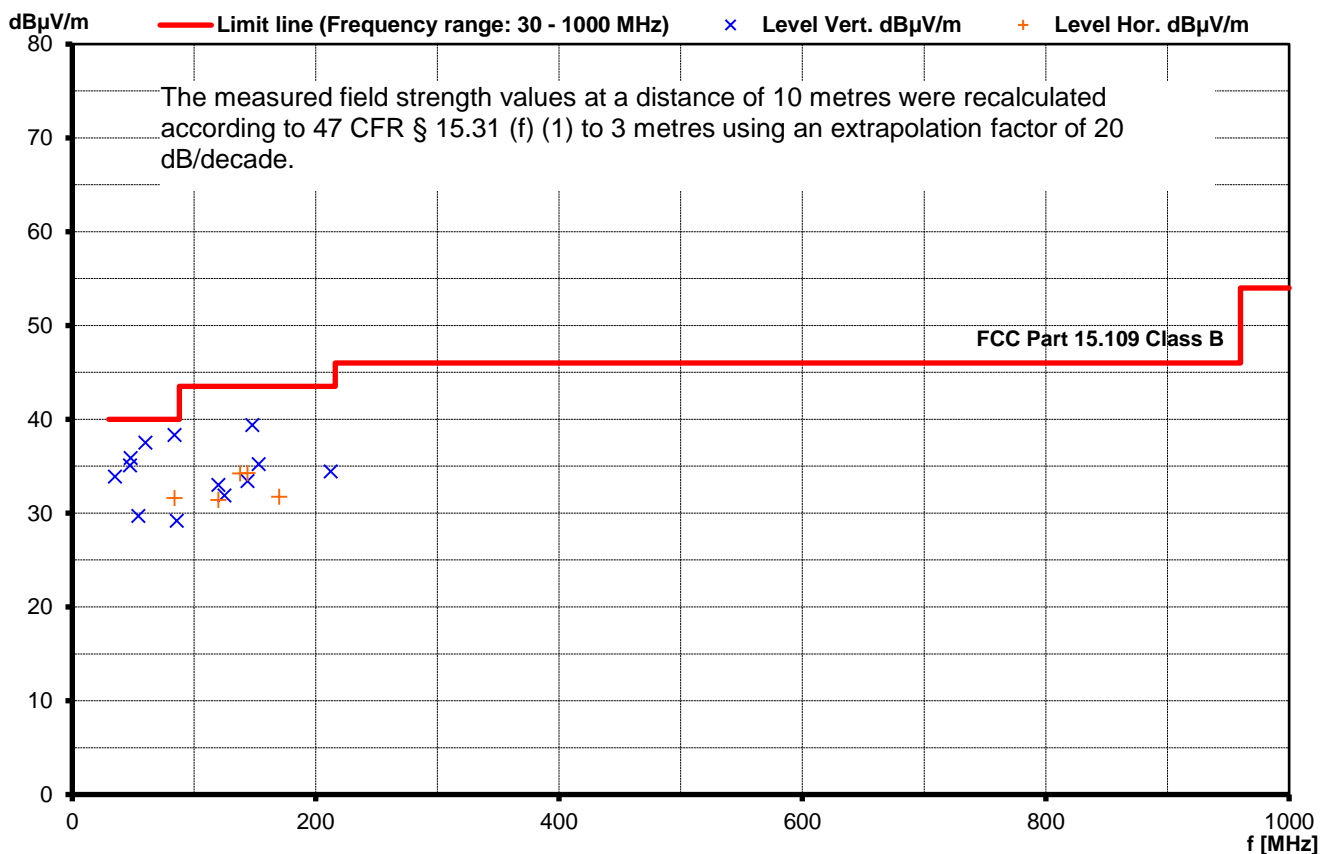
For description of the measurement see 4.7.4.

## 5.2.4 Test protocol

Operation mode: Continuous Tag reading  
Remarks: FCC Class B  
Date: 08. March 2022  
Tested by: Johannes Müller

Result: **PASSED**

Frequency (MHz)	Reading Vert. (dBµV)	Reading Hor. (dBµV)	Correct. Vert. (dB)	Correct. Hor. (dB)	Level Vert. (dBµV/m)	Level Hor. (dBµV/m)	Limit (dBµV/m)	Dlimit (dB)
34.99	17.8		16.1		33.9		40.0	-6.1
47.54	17.5		17.6		35.1		40.0	-4.9
48.01	18.3		17.6		35.9		40.0	-4.1
54.24	12.4		17.3		29.7		40.0	-10.3
60.00	20.5		17.0		37.5		40.0	-2.5
84.00	24.5	17.8	13.8	13.8	38.3	31.6	40.0	-1.7
85.94	15.5		13.7		29.2		40.0	-10.8
119.99	15.6	14.6	17.4	16.8	33.0	31.4	43.5	-10.5
125.00	14.0		17.9		31.9		43.5	-11.6
138.00		16.0		18.2		34.2	43.5	-9.3
144.00	14.0	15.7	19.4	18.6	33.4	34.3	43.5	-9.2
148.00	19.9		19.5		39.4		43.5	-4.1
153.10	15.6		19.6		35.2		43.5	-8.3
170.00		13.3		18.5		31.8	43.5	-11.7
212.52	17.0		17.4		34.4		43.5	-9.1





## 6 USED TEST EQUIPMENT AND ACCESSORIES

All test instruments used, in addition to the test accessories, are calibrated and verified regularly.

Following software was used: Nexio BAT EMC (Version 3.21.0.24)

Test ID	Model Type	Kind of Equipment	Manufacturer	Equipment No.	Next Calib.	Last Calib.	Next Verif.	Last Verif.
A 4	BAT-EMC 3.21.0.24	Nexio Software	EMCO Elektronik GmbH	01-02/68-13-001				
	ESCI	EMI Test Receiver	Rohde & Schwarz München	02-02/03-15-001	21/06/2022	21/06/2021		
	ESH 2 - Z 5	LISN	Rohde & Schwarz München	02-02/20-05-004	31/10/2022	31/10/2019	19/04/2022	19/10/2021
	N-4000-BNC	RF Cable	CSA Group Bayern GmbH	02-02/50-05-138				
	ESH 3 - Z 2	Pulse Limiter	Rohde & Schwarz München	02-02/50-05-155	13/11/2022	13/11/2019	08/09/2022	08/03/2022
A 5	ESVS 30	EMI Test Receiver	Rohde & Schwarz München	02-02/03-05-006	09/07/2022	09/07/2021		
	VULB 9168	Trilog Broadband Antenn	Schwarzbeck Mess-Elektron	02-02/24-05-005	20/12/2022	20/12/2021	07/07/2022	07/07/2021
	NW-2000-NB	RF Cable	Huber + Suhner	02-02/50-05-113				
	KK-EF393/U-16N-21N20	RF Cable 20m	Huber + Suhner	02-02/50-12-018				
	KK-SD_7/8-2X21N-33	RF Cable 33 m	Huber + Suhner AG	02-02/50-15-028				
	50F-003 N 3 dB	Dämpfungsglied 3dB_5	Tactron Elektronik	02-02/50-21-010				

## 7 Detailed measurement uncertainty

Note: The following table provides an overview of all uncertainties for CSA Group Bayern GmbH

Measurement	Ucisp [dB]	Ulab comb. + [dB]	Ulab comb. - [dB]	Ulab exp. + [dB]	Ulab exp. - [dB]
<b>EMISSION</b>					
Conducted disturbance at AC mains and other port power using a V-AMN (150 kHz to 30 MHz)	3,4	1,48	1,58	2,96	3,16
Conducted disturbance at AC mains port using a voltage probe - 1500 Ohm (9 kHz - 30 MHz)	2,9	1,15	1,15	2,31	2,31
Conducted disturbance at telecommunication port using CP (9 kHz - 30 MHz)	2,9	1,08	1,09	2,17	2,18
Conducted disturbance at telecommunication port using CVP (150 kHz - 30 MHz)	3,9	1,57	1,57	3,13	3,13
Disturbance power (30 MHz to 300 MHz)	4,5	1,74	1,74	3,48	3,48
Radiated disturbance (disturbance current in a LLAS)	3,3	1,35	1,35	2,69	2,69
Radiated disturbance (disturbance current in a Loop antenna 10 kHz to 30 MHz)	na	0,00	0,00	0,00	0,00
Radiated disturbance (electrical field strength at an OATS / SAC; 30 MHz - 200 MHz; biconical antenna; 3 m or 10 m)	6,3	1,74	1,76	3,47	3,53
Radiated disturbance (electrical field strength at an OATS / SAC; 200 MHz - 1000 MHz; LPDA antenna; 3 m or 10 m)	6,3	2,14	2,14	4,29	4,28
Radiated disturbance (electrical field strength at an OATS / SAC; 30 MHz - 1000 MHz; Hybrid antenna; 3 m or 10 m)	6,3	2,08	2,07	4,17	4,13
Radiated disturbance (electrical field strength in a FAR; 1 GHz - 6 GHz)	5,2	2,54	1,87	5,07	3,73
Radiated disturbance (electrical field strength in a FAR; 6 GHz - 18 GHz)	5,5	2,70	2,15	5,40	4,30
Radiated disturbance (in a GTEM; 30 MHz - 1000 MHz)	6,3	1,44	1,47	2,87	2,94

The test report merely corresponds to the test sample. It is not permitted to copy extracts of these test results without the written permission of the test laboratory.

Measurement	Influence factor	U(xi) (+- %)
Harmonic current emissions	<b>Class I</b>	
	Voltage $U_m \geq 1\% U_{nom}$	5 % $U_m$
	Voltage $U_m < 1\% U_{nom}$	0,05 % $U_{nom}$
	Current $I_m \geq 3\% I_{nom}$	5 % $I_m$
	Current $I_m < 3\% I_{nom}$	0,15 % $I_{nom}$
	Power $P_m \geq 150 W$	1 % $P_m$
	Power $P_m < 150 W$	1,5 W
	Phase shift (h=number of harmonic)	$< h \cdot 1^\circ$
	<b>Class II</b>	
	Voltage $U_m \geq 3\% U_{nom}$	5 % $U_m$
	Voltage $U_m < 3\% U_{nom}$	0,15 % $U_{nom}$
	Current $I_m \geq 10\% I_{nom}$	5 % $I_m$
	Current $I_m < 10\% I_{nom}$	0,5 % $I_{nom}$
Flicker	<b>Current</b>	
	Magnitude (active or reactive current)	$< (1\% I_m + 10mA)$
	Magnitude (if phase angle used)	$2^\circ$
	Direct measured parameters (clause 3 and 4) of limit or measured value whichever is higher	$< 8\%$

Measurement	Ucisp[dB]	Ulab comb. +[dB]	Ulab comb. - [dB]	Ulab exp. +[dB]	Ulab exp. - [dB]
<b>IMMUNITY</b>					
Radiated immunity (20 MHz to 6 GHz)	na	0,79	0,51	1,59	1,03
Conducted immunity (0,15 MHz - 230 GHz)	na	0,74	0,65	1,47	1,30
Power frequency magnetic field (50 Hz / 60 Hz)	na	2,69	2,69	5,39	5,39
Conducted, common mode disturbances	na	1,80	1,51	3,60	3,02
Transverse electromagnetic waveguides (IEC 61000-4-20)	na	0,51	0,51	1,03	1,03