

Prüfbericht-Nr.: <i>Test Report No.:</i>	CN228DMP 001	Auftrags-Nr.: <i>Order No.:</i>	244442244	Seite 1 von 17 <i>Page 1 of 17</i>
Kunden-Referenz-Nr.: <i>Client Reference No.:</i>	2355616	Auftragsdatum: <i>Order date.:</i>	2022-08-09	
Auftraggeber: <i>Client:</i>	KRUISEE(Nanjing) Technology Co.,Ltd. 5th&6th Flood,Building C2, Hongfeng Science and Technology Park,Economic&Technological Development Zone, Nanjing, Jiangsu, P.R. China			
Prüfgegenstand: <i>Test item:</i>	KRLIDAR S50			
Bezeichnung / Typ-Nr.: <i>Identification / Type No.:</i>	KRS50-10	KRS50-20		
Auftrags-Inhalt: <i>Order content:</i>	TÜV Rheinland EMC service			
Prüfgrundlage: <i>Test specification:</i>	FCC 47 CFR Part 15, Subpart B:2020 ICES-003:2020			
Wareneingangsdatum: <i>Date of receipt:</i>	2022-08-12 & 2022-11-17			
Prüfmuster-Nr.: <i>Test sample No.:</i>	A003316310-002 A003373177-001			
Prüfzeitraum: <i>Testing period:</i>	Refer to test report			
Ort der Prüfung: <i>Place of testing:</i>	Refer to clause 1.1			
Prüflaboratorium: <i>Testing laboratory:</i>	TÜV Rheinland (Shanghai) Co., Ltd.			
Prüfergebnis*: <i>Test result*:</i>	Pass			
geprüft von: / tested by: Jiuyu Huang <i>Jiuyu Huang</i>		genehmigt von: / authorized by: Hexiong Liu <i>Hexiong Liu</i>		
Datum: / Date: 2022-11-25		Datum: / Date: 2022-11-25		
Stellung: / Position: Project engineer		Stellung: / Position: Department manager		
Sonstiges / Other:	FCC ID: 2A8T9- KRS50 Refer to clause 2.2 for more information.			
Zustand des Prüfgegenstandes bei Anlieferung: <i>Condition of the test item at delivery:</i>		Prüfmuster vollständig und unbeschädigt <i>Test item complete and undamaged</i>		
* Legende: P(ass) = entspricht o.g. Prüfgrundlage(n) F(ail) = entspricht nicht o.g. Prüfgrundlage(n) N/A = nicht anwendbar N/T = nicht getestet Legend: P(ass) = passed a.m. test specifications(s) F(ail) = failed a.m. test specifications(s) N/A = not applicable N/T = not tested				
Dieser Prüfbericht bezieht sich nur auf das o.g. Prüfmuster und darf ohne Genehmigung der Prüfstelle nicht auszugsweise vervielfältigt werden. Dieser Bericht berechtigt nicht zur Verwendung eines Prüfzeichens. <i>This test report only relates to the a. m. test sample. Without permission of the test center this test report is not permitted to be duplicated in extracts. This test report does not entitle to carry any test mark.</i>				



Prüfbericht - Nr.: CN228DMP 001
Test Report No.:

Seite 2 von 17
Page 2 of 17

TEST SUMMARY

5.1.1 MAINS TERMINAL CONTINUOUS DISTURBANCE VOLTAGE

Result:

N/A

5.2.1 RADIATED EMISSION (30-1000 MHz)

Result:

Passed

Contents

1	TEST SITES	4
1.1	TEST FACILITIES	4
2	GENERAL PRODUCT INFORMATION	5
2.1	PRODUCT FUNCTION AND INTENDED USE	5
2.2	RATINGS AND SYSTEM DETAILS	5
2.3	INDEPENDENT OPERATION MODES	5
2.4	DESCRIPTION OF INTERCONNECTING CABLES	5
2.5	NOISE GENERATING AND NOISE SUPPRESSING PARTS	5
2.6	SUBMITTED DOCUMENTS	5
2.7	HIGHEST FREQUENCY GENERATED OR USED IN THE DEVICE OR ON WHICH THE DEVICE OPERATES OR TUNES...5	
3	TEST SET-UP AND OPERATION MODES	6
3.1	PRINCIPLE OF CONFIGURATION SELECTION	6
3.2	EQUIPMENT AND CABLE ARRANGEMENT	6
3.3	TEST OPERATION AND TEST SOFTWARE	6
3.4	SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT	6
3.5	COUNTERMEASURES TO ACHIEVE EMC COMPLIANCE.....	6
4	CONFORMITY DECISION RULE	7
5	TEST RESULTS EMISSION	8
5.1	EMISSION IN THE FREQUENCY RANGE UP TO 30 MHz	8
5.1.1	<i>Mains Terminal Continuous Disturbance Voltage</i>	8
5.2	EMISSION IN THE FREQUENCY RANGE ABOVE 30 MHz	9
5.2.1	<i>Radiated emission (30-1000 MHz)</i>	9
6	PHOTOGRAPHS OF THE TEST SET-UP	15
7	LIST OF TEST AND MEASUREMENT INSTRUMENTS	16
8	LIST OF FIGURES	17
9	LIST OF PHOTOGRAPHS	17

Prüfbericht - Nr.: CN228DMP 001
Test Report No.:

Seite 4 von 17
Page 4 of 17

1 Test Sites

1.1 Test Facilities

Laboratory: TÜV Rheinland (Shanghai) Co., Ltd.

Address: No.177, 178, Lane 777 West Guangzhong Road, Jing'an District, Shanghai, China

The used test equipment is in accordance with CISPR 16-1 series standards for measurement of radio interference.

Refer to Clause 7 for test and measurement instruments.

2 General Product Information

2.1 Product Function and Intended Use

The EUTs (equipment under test) are ordinary KRLIDAR S50 used incorporated in household applique and similar apparatus. For the further information, refer to the user's manual.

2.2 Ratings and System Details

System input voltage : DC 12 V
Protection class : III

Identities and differences:

In electrical characteristics KRS50-10 is the same as KRS50-20. The differences between them are type designation and software control system.

With the consideration of the same and differences, the EMC tests were performed on KRS50-20.

2.3 Independent Operation Modes

The basic operation modes are: "On" or "Off".

2.4 Description of interconnecting cables

None.

2.5 Noise Generating and Noise Suppressing Parts

Refer to the circuit diagram for further information.

2.6 Submitted Documents

Rating label and user's manual.

2.7 Highest frequency generated or used in the device or on which the device operates or tunes

The highest frequency used in the EUT is less than 108 MHz.

3 Test Set-up and Operation Modes

3.1 Principle of Configuration Selection

Emission: The equipment under test (EUT) was configured to measure its highest possible emission level. The test conditions were adapted accordingly in reference to the instructions for use.

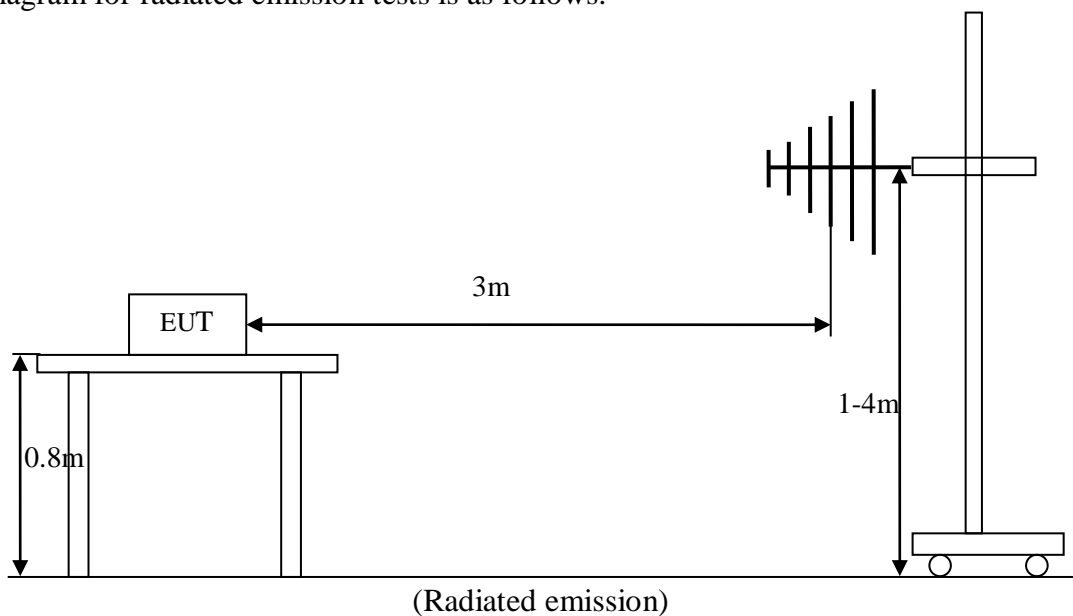
Refer to the related paragraph of this report.

The sequence of testing:

1. Radiated emission tests were performed on 2022-08-17 & 2022-11-21;

3.2 Equipment and cable arrangement

Block diagram for radiated emission tests is as follows:



Also refer to photographs on clause 6 for test setups for radiated emission test.

3.3 Test Operation and Test Software

Refer to the related paragraph of this report. No software was used.

3.4 Special Accessories and Auxiliary Equipment

None.

3.5 Countermeasures to achieve EMC Compliance

No special measure is employed to achieve the requirement.

4 Conformity Decision Rule

For all EMI tests (when included in this report), as measurement uncertainties are less than the values U_{CISPR} given in CISPR 16-4-2, compliance with the limits is determined by comparing measurement results directly with corresponding limits without taking into consideration of measurement uncertainties.

5 Test Results EMISSION

5.1 Emission in the Frequency Range up to 30 MHz

5.1.1 Mains Terminal Continuous Disturbance Voltage

Result:	N/A
----------------	-----

According to the standards ICES-003:2020 and clause 15.107 of FCC 47 CFR Part 15, Subpart B:2020, disturbance voltage limits are only applicable to AC mains terminal. The EUT is powered by DC power source. Therefore, this test requirement is not applicable.

5.2 Emission in the Frequency Range above 30 MHz

5.2.1 Radiated emission (30-1000 MHz)

Result:	Passed
----------------	---------------

Date of testing	: 2022-08-17 & 2022-11-21
Test procedure	: FCC 47 CFR Part 15, Subpart B:2020, ICES-003:2020, ANSI C63.4-2014 and CISPR 16-2-3
Product classification	: Class B
Frequency range	: 30 – 1000 MHz
Limits	: Quasi-peak limits (3 m test distance): 30-88 MHz, 40 dB μ V/m; 88-216 MHz, 43.5 dB μ V/m; 216-960 MHz, 46 dB μ V/m; Above 960 MHz, 54 dB μ V/m (see Note)
Bandwidth of EMI receiver for final measurement	: 120 kHz
Measurement time for final measurement	: 1 s
Operational mode	: Standby mode and data transfer mode
Measurement distance	: 3 m
Kind of test site	: Semi-anechoic chamber
Ambient condition	: Temperature: 22.7 °C; Relative humidity: 48.9 %
Expanded measurement uncertainty ($k=2$)	: 5.49 dB

Test Setup

Input voltage	: DC 12 V
Earthing	: No earthing

The radiated disturbance test was carried out in a semi-anechoic chamber. The test distance from the receiving antenna to the EUT is 3 m. The normalized site attenuation of the semi-anechoic chamber is regularly calibrated to ensure the radiated disturbance test results are valid. During the test, the EUT was placed on a wooden table, which is 0.8 m high. The wooden table was rotated 360° around and the antenna was varied from 1 m to 4 m to find the maximum disturbance. The test was performed with the antenna both in its horizontal and vertical polarizations.

The following figures and tables were those measured by an automatic measurement system. A preview test was firstly performed with peak detector. The final test was performed with quasi-peak at those critical frequencies during the preview test. In the following figures, “×” means final measurement results with quasi-peak detector.

Note: The class B limits of FCC 47 CFR Part 15, Subpart B:2020 are stricter than those of ICES-003:2020 Table 2 for 3 m test distance. Therefore, the former limits are used in following figures and tables.

Prüfbericht - Nr.: CN228DMP 001

Seite 10 von 17
Page 10 of 17

Test Report No.:

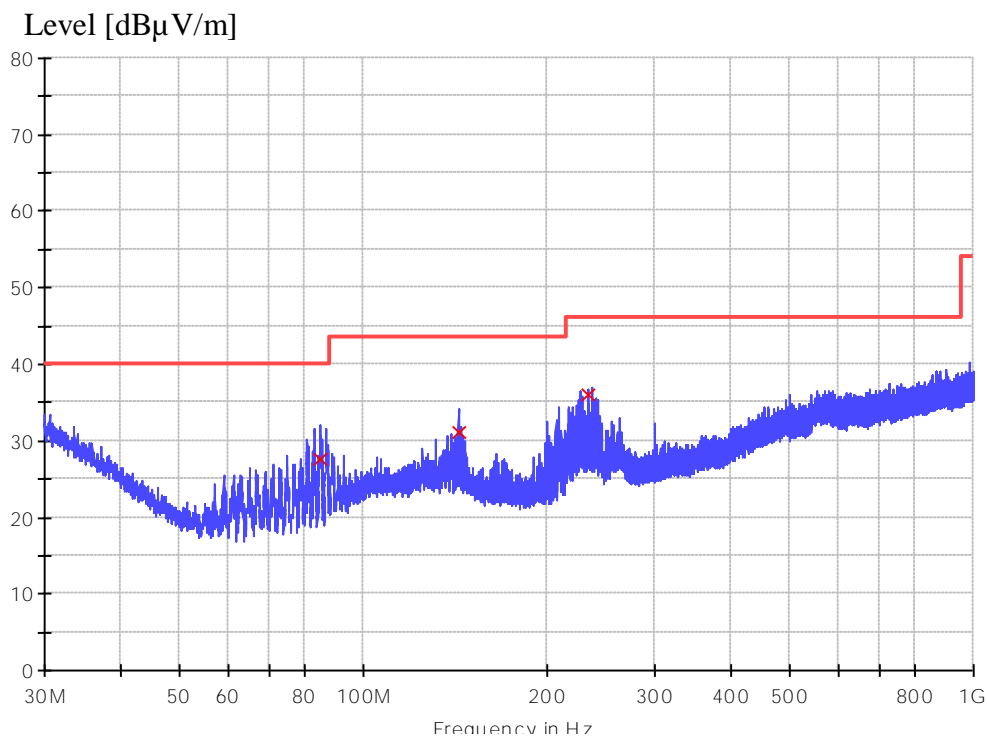
Notes on following tables of radiated emission results and conversions:

QuasiPeak (dB μ V/m): final measurement results by using quasi-peak detector

Corr. (dB): correction factor including: antenna factor, cable loss, and gain of pre-amplifier
(if used)

Margin: Limit (dB μ V/m) - QuasiPeak (dB μ V/m)

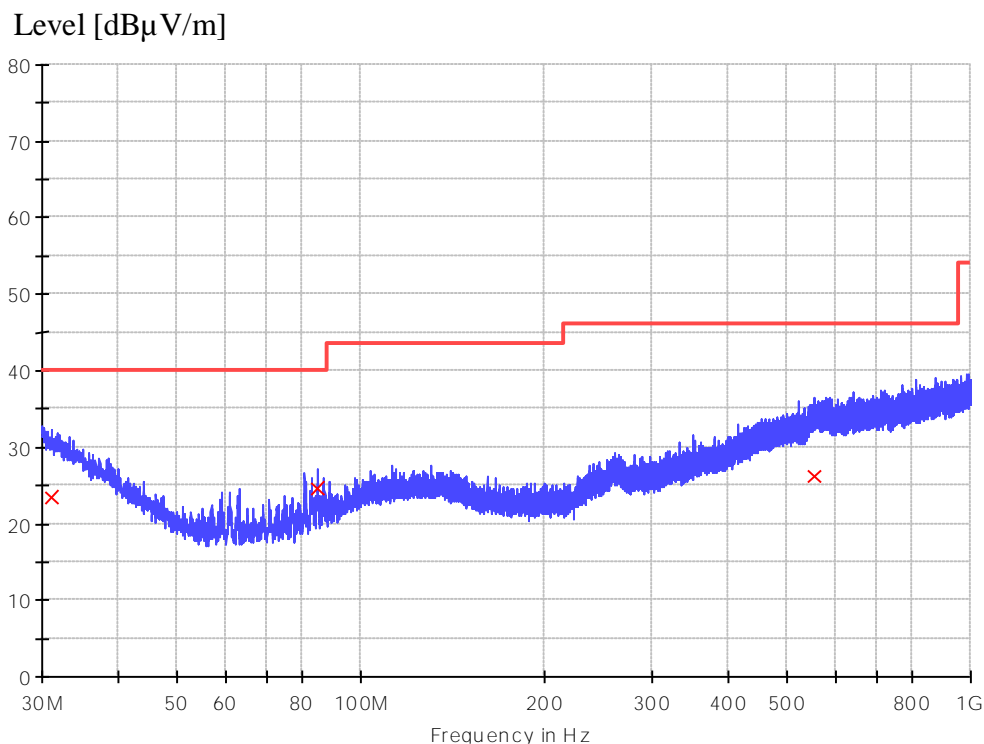
Figure 1: Spectrum diagrams and measurement results, 30-1000 MHz, horizontal polarization, standby mode



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
84.960000	27.5	1000.0	120.000	150.0	H	166.0	14.3	12.5	40.0
142.980000	31.2	1000.0	120.000	162.0	H	-180.0	17.9	12.3	43.5
232.920000	36.1	1000.0	120.000	140.0	H	180.0	17.3	9.9	46.0

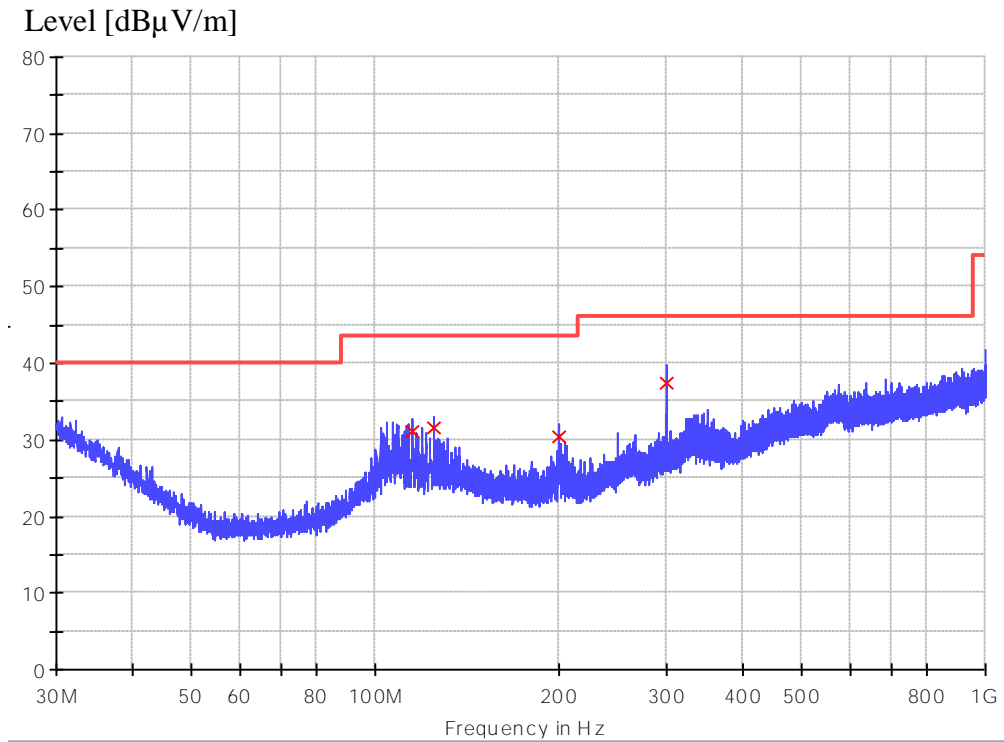
Figure 2: Spectrum diagrams and measurement results, 30-1000 MHz, vertical polarization, standby mode



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
31.080000	23.5	1000.0	120.000	112.0	V	105.0	24.9	16.5	40.0
85.020000	24.6	1000.0	120.000	100.0	V	-180.0	14.3	15.4	40.0
554.700000	26.1	1000.0	120.000	100.0	V	151.0	26.5	19.9	46.0

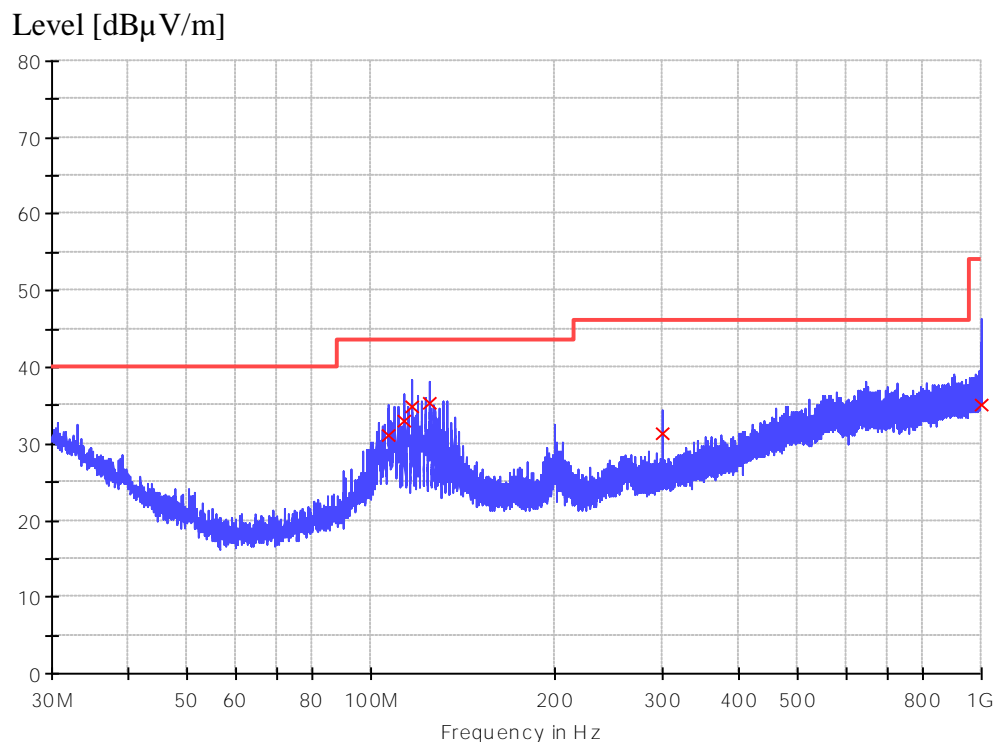
Figure 3: Spectrum diagrams and measurement results, 30-1000 MHz, horizontal polarization data transfer mode



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
115.004333	31.2	120.000	168.0	H	-64.0	18.6	12.3	43.5
124.995333	31.6	120.000	150.0	H	-180.0	18.7	11.9	43.5
199.976333	30.4	120.000	140.0	H	167.0	16.2	13.1	43.5
299.983333	37.4	120.000	200.0	H	-178.0	20.0	8.6	46.0

Figure 4: Spectrum diagrams and measurement results, 30-1000 MHz, vertical polarization data transfer mode



Final quasi-peak measurement results:

Frequency (MHz)	QuasiPeak (dBµV/m)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)	Margin - QPK (dB)	Limit - QPK (dBµV/m)
106.662333	31.1	120.000	100.0	V	-118.0	18.3	12.4	43.5
112.967333	33.0	120.000	120.0	V	180.0	18.6	10.5	43.5
116.976667	34.9	120.000	105.0	V	-176.0	18.5	8.6	43.5
124.963000	35.3	120.000	100.0	V	91.0	18.7	8.2	43.5
299.983333	31.2	120.000	110.0	V	-180.0	20.0	14.8	46.0
997.930667	35.1	120.000	100.0	V	175.0	28.9	18.9	54.0

6 Photographs of the Test Set-Up

Photograph 1: Set-up for measurement of radiated emission



Standby mode



Data transfer mode

Prüfbericht - Nr.: CN228DMP 001
Test Report No.:

Seite 16 von 17
Page 16 of 17

7 List of Test and Measurement Instruments

Equip.	Description	Model	Manufacturer	Last Date DD.MM.YYYY	Due Date DD.MM.YYYY
G1811378	3m modified semi-anechoic chamber	SAC3	Frankonia	10.06.2021	09.06.2024
9042162	EMI test receiver	ESR7	Rohde&Schwarz	02.03.2022	02.03.2023
G1811425	Bilog antenna	CBL 6112D	Teseq	10.03.2020	10.03.2023
G1824845	EMC measurement software	EMC32 (Ver 10.20.01)	Rohde&Schwarz	N/A	N/A

8 List of Figures

Figure 1: Spectrum diagrams and measurement results, 30-1000 MHz, horizontal polarization, standby mode.....	11
Figure 2: Spectrum diagrams and measurement results, 30-1000 MHz, vertical polarization, standby mode.....	12
Figure 3: Spectrum diagrams and measurement results, 30-1000 MHz, horizontal polarization data transfer mode..	13
Figure 4: Spectrum diagrams and measurement results, 30-1000 MHz, vertical polarization data transfer mode.....	14

9 List of Photographs

Photograph 1: Set-up for measurement of radiated emission	15
---	----

End of test report