

<b>Prüfbericht-Nr.:</b> Test report no.:	<b>CN25DUU5 001</b>	<b>Auftrags-Nr.:</b> Order no.:	180327399	Seite 1 von 30 Page 1 of 30
<b>Kunden-Referenz-Nr.:</b> Client reference no.:	N/A	<b>Auftragsdatum:</b> Order date:	2025.03.18	
<b>Auftraggeber:</b> Client:	Linhai Qiuyuan Arts & Crafts CO.,Ltd BUILDING 1,NO.1425,DONGFANG AVENUE,DATIAN DISTRICT, LINHAI CITY,TAIZHOU CITY, 371004 Zhejiang P.R. China			
<b>Prüfgegenstand:</b> Test item:	Health umbrella circuit			
<b>Bezeichnung / Typ-Nr.:</b> Identification / Type no.:	QHU2301, QHU2302, QHU2303			
<b>Auftrags-Inhalt:</b> Order content:	TÜV Rheinland – EMC Service			
<b>Prüfgrundlage:</b> Test specification:	<b>EN IEC 55014-1:2021</b> <b>EN IEC 55014-2:2021</b>	<b>EN IEC 55015:2019+A11</b> <b>EN IEC 61547:2023</b>		
<b>Wareneingangsdatum:</b> Date of sample receipt:	2025.03.18			
<b>Prüfmuster-Nr.:</b> Test sample no.:	A003964216-001			
<b>Prüfzeitraum:</b> Testing period:	2025.04.14 - 2025.05.26			
<b>Ort der Prüfung:</b> Place of testing:	Refer to section 1.1			
<b>Prüflaboratorium:</b> Testing laboratory:	TÜV Rheinland / CCIC (Ningbo) Co., Ltd.			
<b>Prüfergebnis*:</b> Test result*:	<b>Pass</b>			
<b>geprüft von:</b> tested by:	<i>Keda Zhou</i>	<b>genehmigt von:</b> authorized by:	<i>Chonghai Liang</i>	
<b>Datum:</b> Date:	2025.06.10	<b>Ausstellungsdatum:</b> Issue date:	2025.06.10	
<b>Stellung / Position:</b>	Keda Zhou/PE	<b>Stellung / Position:</b>	Chonghai Liang/Authorizer	
<b>Sonstiges / Other:</b>	In electrical characteristics, all models are the same. Therefore, all EMC tests were performed on model QHU2301.			
<b>Zustand des Prüfgegenstandes bei Anlieferung:</b> Condition of the test item at delivery:	Prüfmuster vollständig und unbeschädigt Test item complete and undamaged			
* 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 specification(s)	F(ail) = failed a.m. test specification(s)	N/A = not applicable	N/T = not tested
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Prüfbericht-Nr.: CN25DUU5 001  
Test report no.:

Seite 2 von 30  
Page 2 of 30

**Anmerkungen**  
Remarks

- |   |  |
|---|--|
| 1 | <p>Alle eingesetzten Prüfmittel waren zum angegebenen Prüfzeitraum gemäß eines festgelegten Kalibrierungsprogramms unseres Prüfhauses kalibriert. Sie entsprechen den in den Prüfprogrammen hinterlegten Anforderungen. Die Rückverfolgbarkeit der eingesetzten Prüfmittel ist durch die Einhaltung der Regelungen unseres Managementsystems gegeben.<br/>Detaillierte Informationen bezüglich Prüfbedingungen, Prüfequipment und Messunsicherheiten sind im Prüflabor vorhanden und können auf Wunsch bereitgestellt werden.</p> <p><i>The equipment used during the specified testing period was calibrated according to our test laboratory calibration program. The equipment fulfils the requirements included in the relevant standards. The traceability of the test equipment used is ensured by compliance with the regulations of our management system. Detailed information regarding test conditions, equipment and measurement uncertainty is available in the test laboratory and could be provided on request.</i></p>   |
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| 3 | <p>Prüfklausel mit der Note * wurden an qualifizierte Unterauftragnehmer vergeben und sind unter der jeweiligen Prüfklausel des Berichts beschrieben.<br/>Abweichungen von Prüfspezifikation(en) oder Kundenanforderungen sind in der jeweiligen Prüfklausel im Bericht aufgeführt.</p> <p><i>Test clauses with remark of * are subcontracted to qualified subcontractors and described under the respective test clause in the report.<br/>Deviations of testing specification(s) or customer requirements are listed in specific test clause in the report.</i></p>  |
| 4 | <p>Die Entscheidungsregel für Konformitätserklärungen basierend auf numerischen Messergebnissen in diesem Prüfbericht basiert auf der "Null-Grenzwert-Regel" und der "Einfachen Akzeptanz" gemäß ILAC G8:2019 und IEC Guide 115:2021, es sei denn, in der auf Seite 1 dieses Berichts genannten angewandten Norm ist etwas anderes festgelegt oder vom Kunden gewünscht. Dies bedeutet, dass die Messunsicherheit nicht berücksichtigt wird und daher auch nicht im Prüfbericht angegeben wird. Zu weiteren Informationen bezüglich des Risikos durch diese Entscheidungsregel siehe ILAC G8:2019.</p> <p><i>The decision rule for statements of conformity, based on numerical measurement results, in this test report is based on the "Zero Guard Band Rule" and "Simple Acceptance" in accordance with ILAC G8:2019 and IEC Guide 115:2021, unless otherwise specified in the applied standard mentioned on Page 1 of this report or requested by the customer. This means that measurement uncertainty is not taken in account and hence also not declared in the test report. For additional information to the resulting risk based of this decision rule please refer to ILAC G8:2019.</i></p>   |

## Test Summary

### 5.1.1 MAINS TERMINAL CONTINUOUS DISTURBANCE VOLTAGE

*Result:*

*Pass*

### 5.1.2 RADIATED ELECTROMAGNETIC DISTURBANCE

*Result:*

*Pass*

### 5.1.3 DISCONTINUOUS INTERFERENCE ON AC MAINS

*Result:*

*N/A*

### 5.2.1 RADIATED DISTURBANCE IN THE FREQUENCY RANGE FROM 30MHZ TO 1000MHZ

*Result:*

*Pass*

### 6.1.1 ELECTROSTATIC DISCHARGE

*Result:*

*Pass*

### 6.1.2 RADIO FREQUENCY ELECTROMAGNETIC FIELD

*Result:*

*Pass*

### 6.2.1 FAST TRANSIENTS ON AC POWER LINES

*Result:*

*Pass*

### 6.2.2 INJECTED CURRENT INTO AC POWER PORT

*Result:*

*Pass*

# Contents

<b>1. TEST SITES .....</b>	<b>5</b>
1.1 TEST FACILITIES.....	5
1.2 LIST OF TEST AND MEASUREMENT INSTRUMENTS .....	5
1.3 UNCERTAINTY OF MEASUREMENT .....	5
<b>2. GENERAL PRODUCT INFORMATION.....</b>	<b>6</b>
2.1 PRODUCT FUNCTION AND INTENDED USE .....	6
2.2 RATINGS AND SYSTEM DETAILS .....	6
2.3 INDEPENDENT OPERATION MODES .....	6
2.4 NOISE GENERATING AND NOISE SUPPRESSING PARTS .....	6
2.5 SUBMITTED DOCUMENTS .....	6
<b>3. TEST SET-UP AND OPERATION MODES.....</b>	<b>7</b>
3.1 PRINCIPLE OF CONFIGURATION SELECTION .....	7
3.2 PHYSICAL CONFIGURATION FOR TESTING.....	7
3.3 TEST OPERATION AND TEST SOFTWARE .....	7
3.4 SPECIAL ACCESSORIES AND AUXILIARY EQUIPMENT.....	7
3.5 COUNTERMEASURES TO ACHIEVE ERM COMPLIANCE.....	7
<b>4. CONFORMITY DECISION RULE.....</b>	<b>8</b>
<b>5. TEST RESULTS EMISSION .....</b>	<b>9</b>
5.1 EMISSION IN THE FREQUENCY RANGE UP TO 30 MHz.....	9
5.1.1 Mains Terminal Continuous Disturbance Voltage.....	9
5.1.2 Radiated Electromagnetic Disturbance.....	12
5.1.3 Discontinuous Interference on AC Mains .....	16
5.2 EMISSION IN THE FREQUENCY RANGE ABOVE 30 MHz.....	17
5.2.1 Radiated Disturbance in the Frequency Range from 30MHz to 1000MHz .....	17
<b>6. TEST RESULTS IMMUNITY .....</b>	<b>21</b>
6.1 ENCLOSURE.....	22
6.1.1 Electrostatic Discharge .....	22
6.1.2 Radio Frequency Electromagnetic Field .....	23
6.2 INPUT AND OUTPUT AC POWER PORTS.....	24
6.2.1 Fast Transients on AC Power Lines .....	24
6.2.2 Injected Current into AC Power Port .....	25
<b>7. PHOTOGRAPHS OF THE TEST SET-UP.....</b>	<b>26</b>
<b>8. LIST OF TABLES .....</b>	<b>30</b>
<b>9. LIST OF FIGURES .....</b>	<b>30</b>
<b>10. LIST OF PHOTOGRAPHS .....</b>	<b>30</b>

## 1. Test Sites

### 1.1 Test Facilities

**Laboratory: TÜV Rheinland /CCIC (Ningbo) Co., Ltd.**

**1st Floor, Building 11, Scholar Innovation Park, No.1188 Zhongguan Road, Zhenhai District, Ningbo 315200 P.R. China**

The used test equipment is in accordance with CISPR 16-1 series standards.

### 1.2 List of Test and Measurement Instruments

**Table 1: List of Test and Measurement Equipment**

Kind of Equipment	Type	Serial No.	Calibrated until
EMI receiver	ESR3	102331	2025.10.22
LISN	ENV216	102250	2025.10.22
Triple loop antenna	HM020	101000	2026.11.02
EMI test receiver	ESR7	101929	2025.10.22
Bilog Antenna	CBL6112D	49033	2027.03.16
ESD generator	NX30.1	11744	2025.11.19
Amplifier	BBA150-BC250	102749	2025.10.22
Signal generator	SMB100A	180488	2025.10.22
Stacked Log-Per Antenna	STLP 9128 ES	219	N/A
CS immunity test	NSG 4070C-80	47606	2025.10.22
CDN	CDN M016S	47812	2025.10.24
Attenuator	JTH-SJ-100W-6dB	100145143000573	N/A
EFT/Surge/PFM/Dips Immunity test system	Compact NX5 bsp-1-300-16	P1725200261	2025.10.22

### 1.3 Uncertainty of Measurement

**Table 2: Measurement Uncertainty**

Test Item	Expanded Measurement Uncertainty (k=2)
Conducted Emission (9-150kHz)	3.70 dB
Conducted Emission (150k-30MHz)	3.30 dB
Disturbance Power	4.27 dB
Radiated Emission (30-1000MHz)	4.39 dB
Radiated Emission (1-18GHz)	4.67 dB
Radiated Emission (CDNE method)	4.05 dB

## 2. General Product Information

### 2.1 Product Function and Intended Use

The EUT (equipment under test) is a Health umbrella circuit.

For more detailed information, refer to the user's manual.

### 2.2 Ratings and System Details

**Table 3: General Description of EUT**

General Description of EUT	
Charging Voltage:	DC 5V
Battery Voltage:	DC 3.7V
USB Output:	5V/1A
Protection Class:	Class III

Remark: The product does not contain adapter.

### 2.3 Independent Operation Modes

There are some modes:

Mode A: Charging

Mode B: Lighting + Fan

Mode C: USB Output

### 2.4 Noise Generating and Noise Suppressing Parts

Refer to the Circuit Diagram for further information.

### 2.5 Submitted Documents

Circuit diagram, label, user manual etc.

### 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 radiation level. The test conditions were adapted accordingly in reference to the instructions for use.

Refer to the related paragraph of this report.

**Immunity:** The equipment under test (EUT) was configured to have its highest possible susceptibility against the tested phenomena. The test conditions were adapted accordingly in reference to the instructions for use.

Refer to the related paragraph of this report.

#### 3.2 Physical Configuration for Testing

Refer to the related paragraph of this report.

#### 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

**Table 4: List of Auxiliary Equipment**

Description	Manufacturer	Model No.
Adapter for charging	HUIZHOU BYD	QC10EU

#### 3.5 Countermeasures to Achieve ERM Compliance

The test sample which has been tested contained the noise suppression parts as described in the Circuit Diagram. No additional measures were employed to achieve compliance.

## 4. Conformity Decision Rule

For all EMI tests (when included in this report), as measurement uncertainties are less than the values  $U_{\text{CISPR}}$  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. For all EMS tests (when included in this report), measurement uncertainties are not considered as well according to corresponding test standards.

## 5. Test Results EMISSION

### 5.1 Emission in the Frequency Range up to 30 MHz

#### 5.1.1 Mains Terminal Continuous Disturbance Voltage

<b>Result:</b>	<b>Pass</b>
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Date of testing	: 2025.05.16
Kind of test site	: EMC Shielding Room
Port	: Mains
Basic Standard	: EN IEC 55014-1:2021
Frequency Range	: 150kHz – 30MHz
Limit	: EN IEC 55014-1:2021, Clause 4.3.3 Table5
Ambient Condition	: Temperature: 21 °C; Relative Humidity: 44%

#### Test Setup

Input Voltage	: AC 230V, 50Hz
Operational mode	: Mode A
Test Setup	: According to Clause 5 of EN IEC 55014-1:2021

The measurement setup was made according to EN IEC 55014-1:2021 in an EMC shielding room.

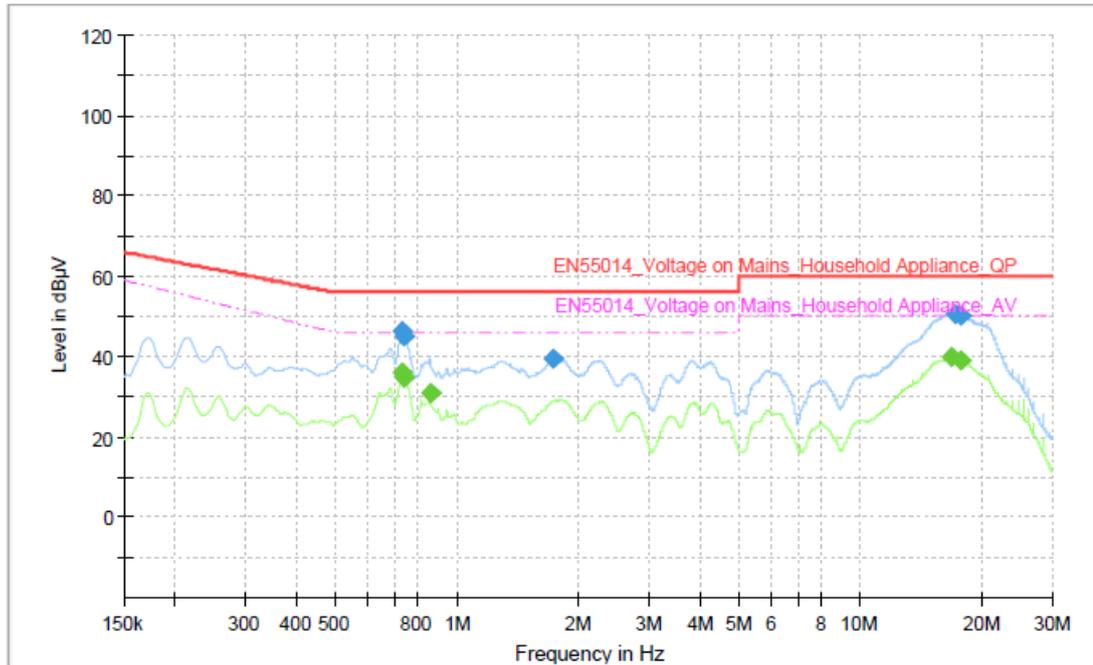
The measurement equipment like test receiver, quasi-peak detector and Artificial Mains Network (AMN) are in compliance with CISPR 16-1 series standards and EN IEC 55014-1:2021. The tested object was operated under its rated voltage and its rated frequency. Prior to the measurements the test object operated about 15 minutes (warm-up) in order to stabilize its operating conditions and to ensure reliable measurement values.

Furthermore, an internal calibration with the test receiver was conducted prior to and after each measurement.

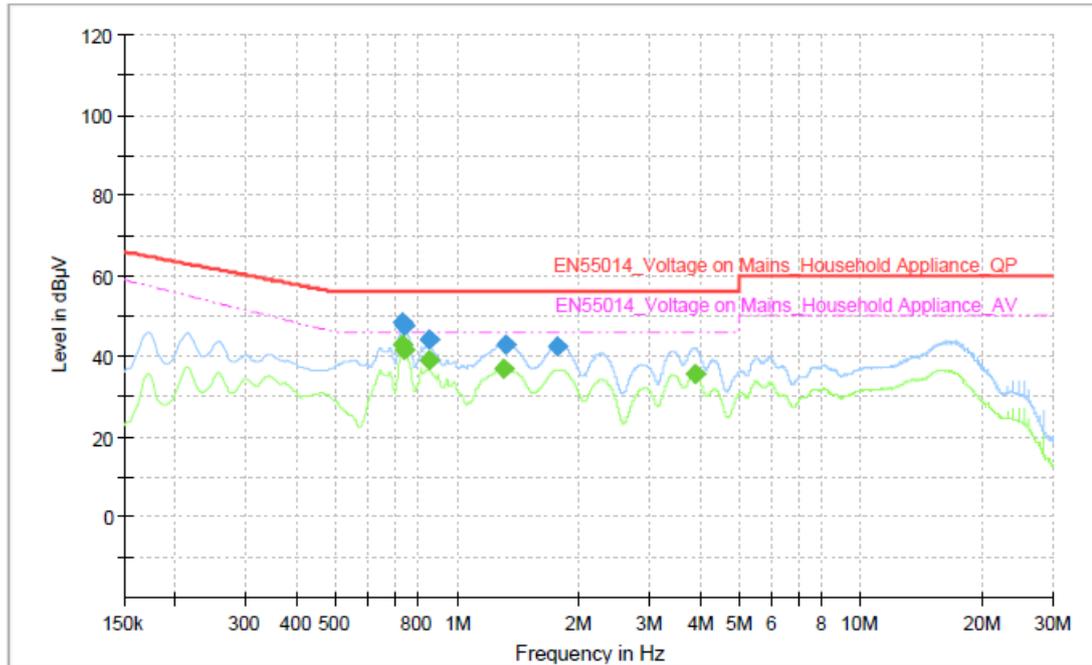
The tested object was set-up on a wooden table and 0.8m away from the AMN.

The Disturbance Voltage was determined according to according to clause 5 of EN IEC 55014-1:2021 while measuring the line and neutral conductor by turns.

The following figures were those measured by an automatic measuring system. The disturbance voltage was scanned firstly with both Peak and Average detector and then a final measurement was performed with both Quasi-peak and Average detector at the frequencies which showed the Max. in a designated frequency sub-range. In the figures below, the higher curve is that of peak-value and the lower one is average-value. The symbol “◆” refers to Quasi-peak value and the Average value which were measured in the final measurement.

**Figure 1: Spectral Diagrams, Conducted Emission, 150kHz - 30MHz, L**

**Final Result**

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.730500	---	36.18	46.00	9.83	1000.0	9.000	L1	ON	9.7
0.730500	46.51	---	56.00	9.49	1000.0	9.000	L1	ON	9.7
0.737250	---	34.63	46.00	11.37	1000.0	9.000	L1	ON	9.7
0.737250	45.21	---	56.00	10.79	1000.0	9.000	L1	ON	9.7
0.858750	---	30.85	46.00	15.15	1000.0	9.000	L1	ON	9.7
1.740750	39.50	---	56.00	16.50	1000.0	9.000	L1	ON	9.7
16.892250	---	40.06	50.00	9.94	1000.0	9.000	L1	ON	10.1
17.252250	50.72	---	60.00	9.28	1000.0	9.000	L1	ON	10.1
17.668500	50.18	---	60.00	9.82	1000.0	9.000	L1	ON	10.1
17.670750	---	39.04	50.00	10.96	1000.0	9.000	L1	ON	10.1

**Figure 2: Spectral Diagrams, Conducted Emission, 150kHz - 30MHz, N**

**Final Result**

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.728250	---	43.00	46.00	3.00	1000.0	9.000	N	ON	9.6
0.728250	48.67	---	56.00	7.33	1000.0	9.000	N	ON	9.6
0.737250	---	41.48	46.00	4.52	1000.0	9.000	N	ON	9.6
0.739500	47.83	---	56.00	8.17	1000.0	9.000	N	ON	9.6
0.856500	44.11	---	56.00	11.89	1000.0	9.000	N	ON	9.7
0.856500	---	39.10	46.00	6.90	1000.0	9.000	N	ON	9.7
1.304250	---	37.15	46.00	8.85	1000.0	9.000	N	ON	9.7
1.313250	42.92	---	56.00	13.08	1000.0	9.000	N	ON	9.7
1.774500	42.60	---	56.00	13.40	1000.0	9.000	N	ON	9.7
3.885000	---	35.58	46.00	10.42	1000.0	9.000	N	ON	9.8

## 5.1.2 Radiated Electromagnetic Disturbance

<b>Result:</b>	<b>Pass</b>
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Date of testing	: 2025.05.26
Kind of test site	: EMC Shielding Room
Port	: Enclosure
Basic standard	: EN IEC 55015:2019+A11
Frequency range	: 9kHz - 30MHz
Limit	: EN IEC 55015:2019+A11, clause 4.5
Ambient Condition	: Temperature: 21°C; Relative Humidity: 52%

### Test Setup

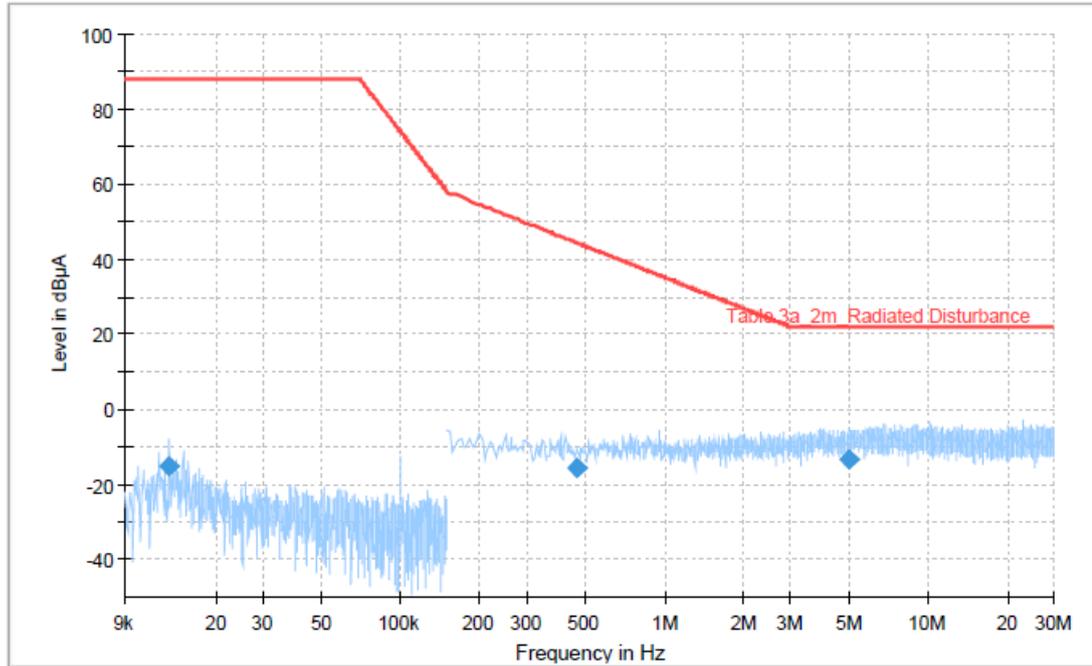
Input Voltage	: DC 3.7V
Operational mode	: Mode B
Earthing	: No
Test Setup	: According to Clause 9 of EN IEC 55015:2019+A11

### Measuring configuration and description

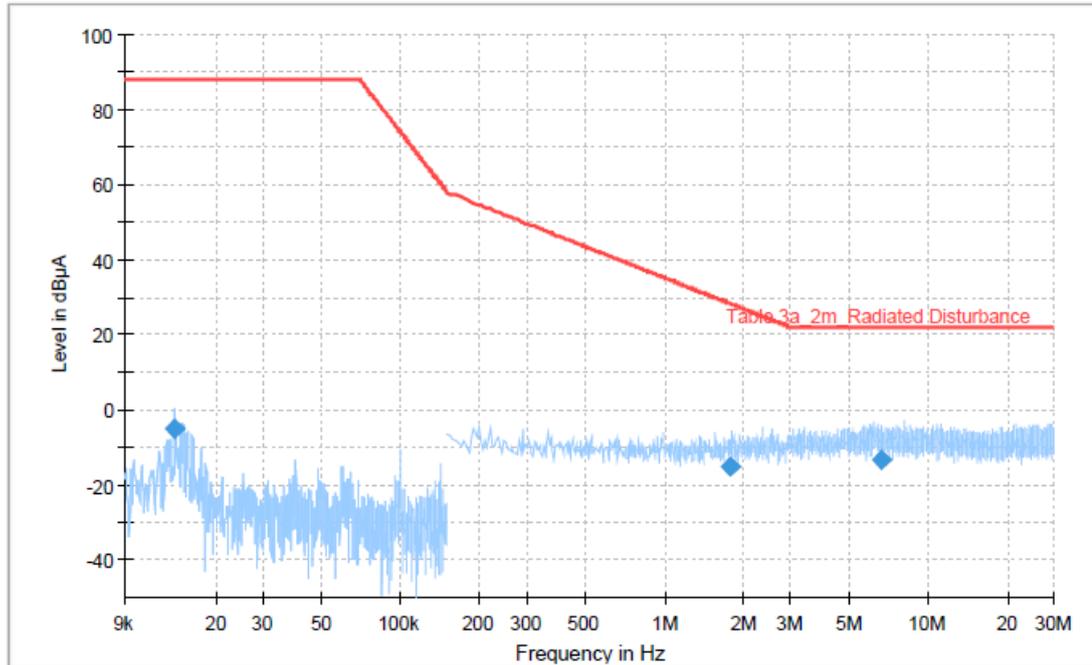
The measurement equipment like test receiver, loop antenna and coaxial switch are in compliance with the CISPR 16-1 series standards. The test setup was made according to Clause 9 of EN IEC 55015:2019+A11.

The EUT operated in ON mode and at its rated voltage. The EUT is put on a wooden table in the centre of the loop antenna. Before a measurement the EUT was operated for about 20 min.

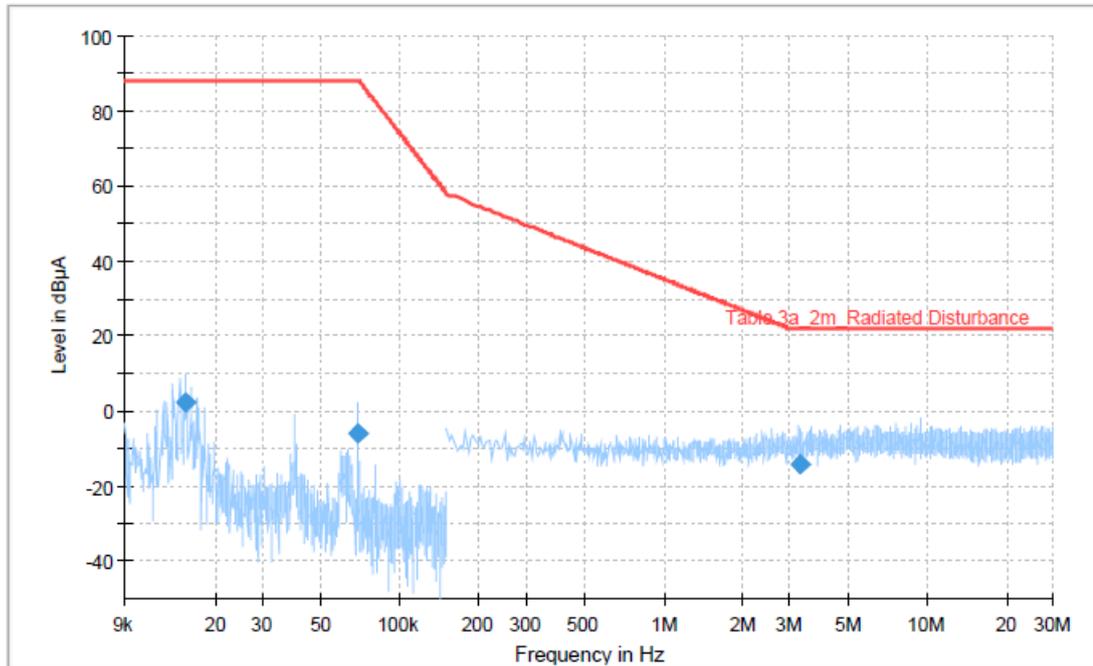
Induced current in the loop antenna was measured by means of a current probe (1V/A) according to clause 9 of EN IEC 55015:2019+A11. The three field components were measured in sequence by means of a coaxial switch (loop antenna controller).

**Figure 3: Graphic description of radiated electromagnetic disturbances for X direction**

**Final Result**

Frequency (MHz)	QuasiPeak (dBµA)	Limit (dBµA)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Axis	Corr. (dB)
0.013320	-15.14	88.00	103.14	1000.0	0.200	X	0.1
0.470000	-15.56	44.28	59.84	1000.0	9.000	X	0.0
5.030000	-13.39	22.00	35.39	1000.0	9.000	X	0.1

**Figure 4: Graphic description of radiated electromagnetic disturbances for Y direction**

**Final Result**

Frequency (MHz)	QuasiPeak (dBµA)	Limit (dBµA)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Axis	Corr. (dB)
0.013960	-5.20	88.00	93.20	1000.0	0.200	Y	0.1
1.782000	-15.29	28.26	43.55	1000.0	9.000	Y	0.0
6.714000	-13.26	22.00	35.26	1000.0	9.000	Y	0.1

**Figure 5: Graphic description of radiated electromagnetic disturbances for Z direction**

**Final Result**

Frequency (MHz)	QuasiPeak (dBµA)	Limit (dBµA)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Axis	Corr. (dB)
0.015400	2.14	88.00	85.86	1000.0	0.200	Z	0.1
0.069080	-6.12	88.00	94.12	1000.0	0.200	Z	0.1
3.278000	-14.35	22.00	36.35	1000.0	9.000	Z	0.0

**Prüfbericht - Nr.: CN25DUU5 001**  
Test Report No.:**Seite 16 von 30**  
Page 16 of 30

### 5.1.3 Discontinuous Interference on AC Mains

<b>Result:</b>	N/A
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According to the electrical characteristics and usage of the equipment, the EUT does not produce discontinuous radio interference voltages on AC Mains. Therefore, this test item has been skipped.

## 5.2 Emission in the Frequency Range above 30 MHz

### 5.2.1 Radiated Disturbance in the Frequency Range from 30MHz to 1000MHz

<b>Result:</b>	<b>Pass</b>
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Date of testing	: 2025.04.14
Test procedure	: EN IEC 55014-1:2021 & EN IEC 55015:2019+A11
Frequency range	: 30-1000MHz
Kind of test site	: Semi-anechoic Chamber
Measurement Distance	: 3m
Limit	: Quasi-peak limits (3m test distance): 30-230MHz, 40dB $\mu$ V/m; 230-1000MHz, 47dB $\mu$ V/m
Ambient Condition	: Temperature: 21 °C; Relative Humidity: 68%

#### Test Setup

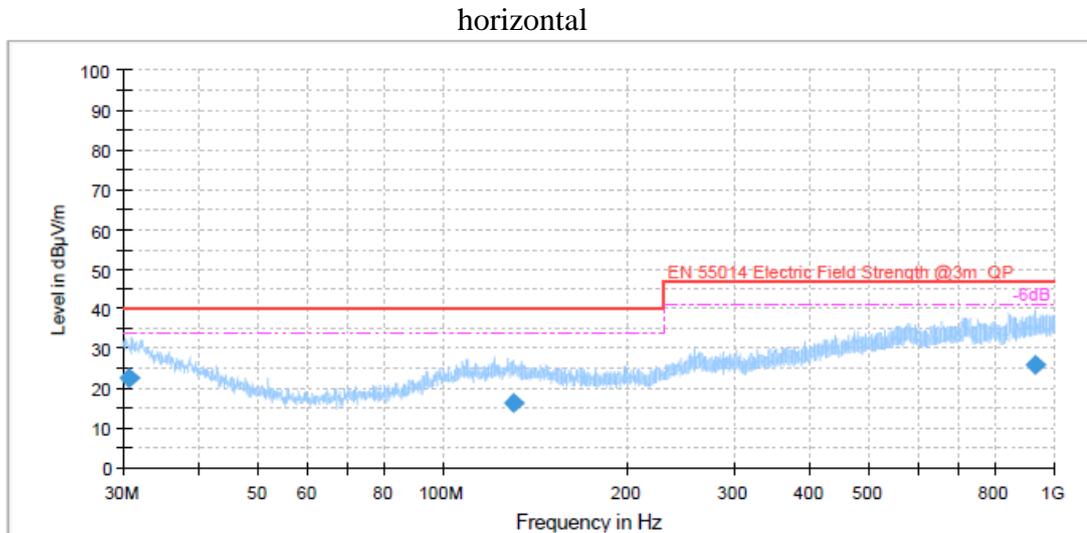
Operational mode	: Mode A, Mode B, Mode C
Test Setup	: According to EN IEC 55014-1:2021 & EN IEC 55015:2019+A11 & CISPR 16-2-3

#### Measuring configuration and description

The radiated disturbance was measured in the frequency range from 30MHz to 1000MHz according to EN IEC 55014-1:2021 and EN IEC 55015:2019+A11. The measurement was performed in accordance with the method specified in CISPR 16-2-3.

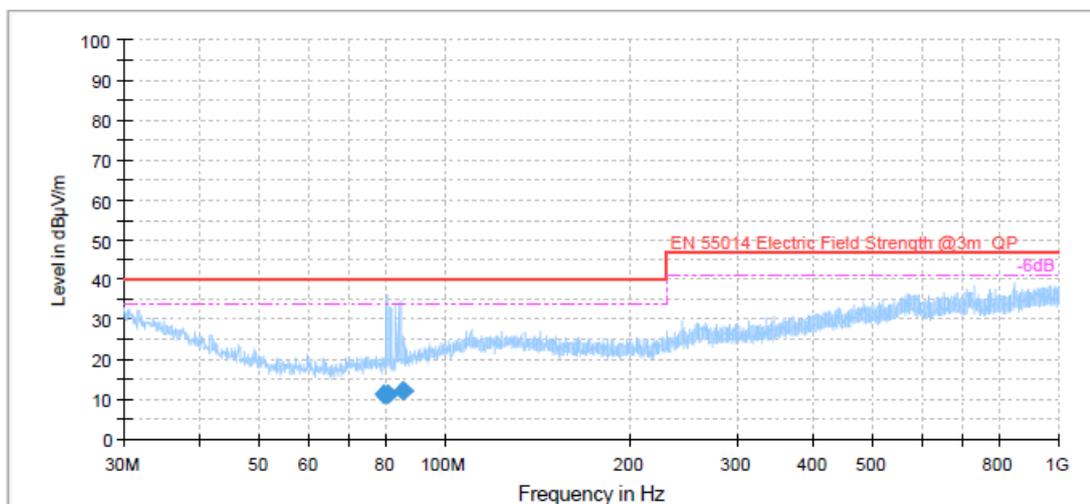
The radiated disturbance test was performed in a 3m semi-anechoic chamber. The test distance is 3m. The normalized site attenuation of the semi-anechoic chamber is regularly calibrated to ensure the radiated disturbance test results are valid. During the test, the EUT was placed on a 0.8m high wooden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

The following figures were those measured and recorded by a test receiver. The curves in the figure were those measured with a Peak detector. The symbol “◆” in the figures are those of QP value which were measured in final measurement. Quasi-peak measurements were only performed at those critical frequencies obtained during the test with Peak Detector.

**Figure 6: Spectral Diagrams, Radiated disturbance, Mode A**

**Final Result**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
30.750000	22.43	40.00	17.57	1000.0	120.000	234.0	H	146.0	25.0
130.077778	16.43	40.00	23.57	1000.0	120.000	103.0	H	157.0	18.8
927.861111	26.02	47.00	20.98	1000.0	120.000	109.0	H	247.0	29.4

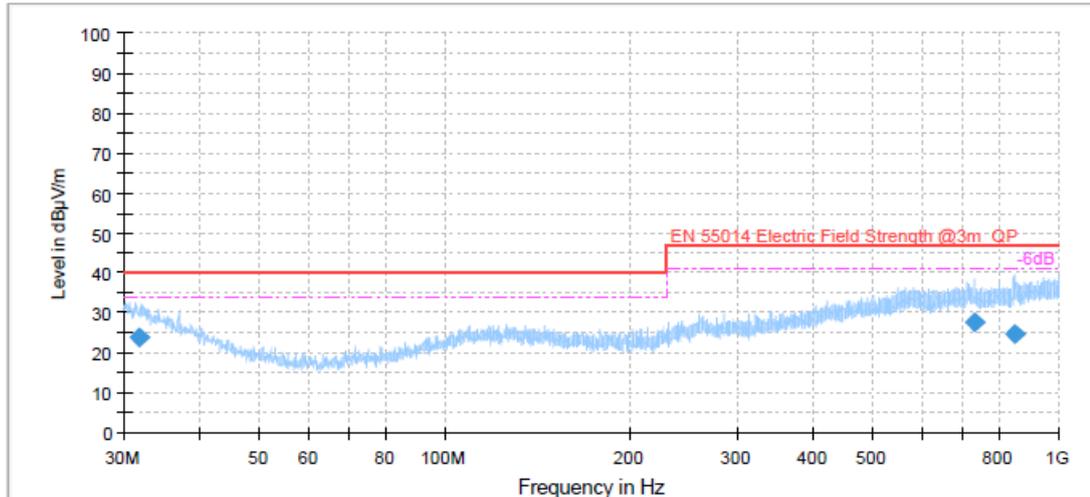
vertical


**Final Result**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
79.695000	11.15	40.00	28.85	1000.0	120.000	159.0	V	298.0	13.7
80.783333	11.32	40.00	28.68	1000.0	120.000	153.0	V	272.0	13.9
85.212778	12.28	40.00	27.72	1000.0	120.000	206.0	V	114.0	14.6

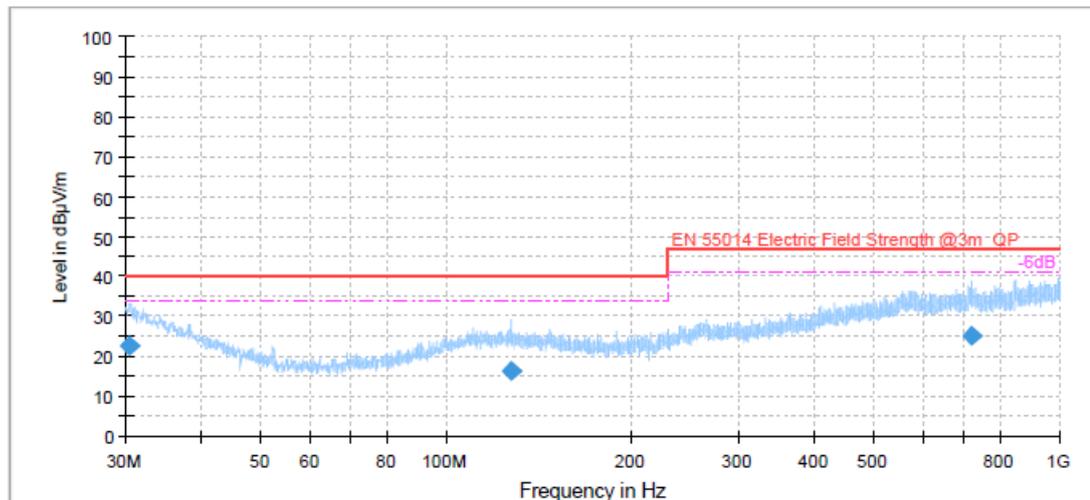
**Figure 7: Spectral Diagrams, Radiated disturbance, Mode B**

horizontal


**Final Result**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
31.720000	23.88	40.00	16.12	1000.0	120.000	150.0	H	116.0	24.5
729.037222	27.56	47.00	19.44	1000.0	120.000	150.0	H	337.0	27.4
845.087778	24.87	47.00	22.13	1000.0	120.000	150.0	H	6.0	28.4

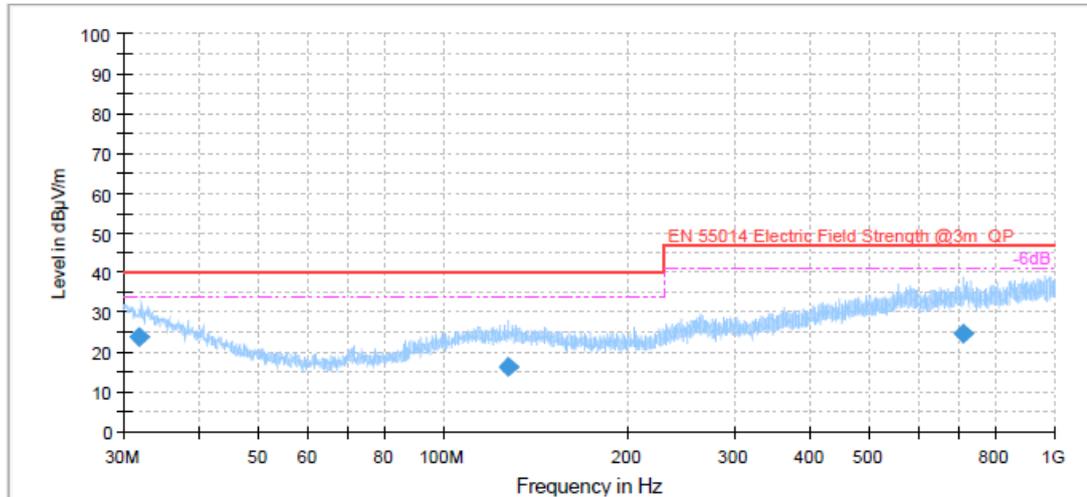
vertical


**Final Result**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
30.452778	22.62	40.00	17.38	1000.0	120.000	175.0	V	0.0	25.2
127.785000	16.41	40.00	23.59	1000.0	120.000	103.0	V	9.0	18.9
720.458333	25.06	47.00	21.94	1000.0	120.000	237.0	V	48.0	27.3

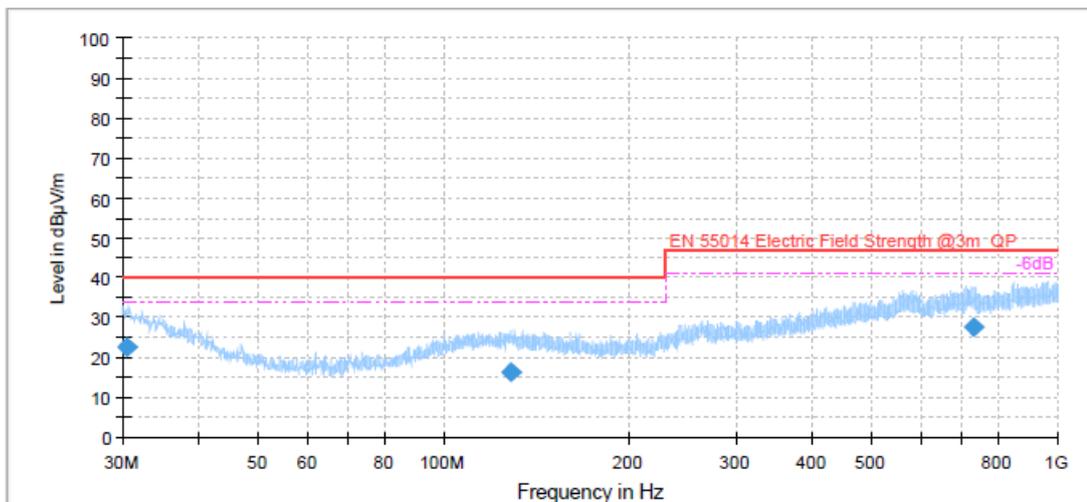
**Figure 8: Spectral Diagrams, Radiated disturbance, Mode C**

horizontal


**Final Result**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
31.881667	23.76	40.00	16.24	1000.0	120.000	163.0	H	94.0	24.4
127.397222	16.51	40.00	23.49	1000.0	120.000	122.0	H	272.0	18.9
709.223333	24.60	47.00	22.40	1000.0	120.000	109.0	H	54.0	26.9

vertical


**Final Result**

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
30.534444	22.61	40.00	17.39	1000.0	120.000	250.0	V	24.0	25.2
128.487222	16.47	40.00	23.53	1000.0	120.000	109.0	V	28.0	18.9
729.635000	27.46	47.00	19.54	1000.0	120.000	221.0	V	236.0	27.4

## 6. Test Results IMMUNITY

According to the electrical characteristics above and EN IEC 55014-2:2021, the EUT belongs to category II (Mode A) or III equipment (Mode B and Mode C).

Category II: mains operated equipment containing electronic control circuitry with no clock frequency higher than 15 MHz”

Category III: battery operated equipment not included in Category I.

For each test, the EUT shall meet the criteria for compliance of EN IEC 55014-2:2021 and EN IEC 61547:2023. During the immunity tests, the EUT was operated under conditions specified by clause 3.1 of this report.

**Performance criterion A:** The apparatus shall continue to operate as intended during the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

During the test no change of the luminous intensity shall be observed and the regulating control, if any, shall operate during the test as intended.

**Performance criterion B:** The apparatus shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level (or permissible loss of performance) specified by the manufacturer, when the apparatus is used as intended. During the test, degradation of performance is allowed, however no change of actual operating state or stored data is allowed to persist after the test. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, then either of these may be derived from the product description and documentation, and from what the user may reasonably expect from the apparatus if used as intended.

During the test the luminous intensity may change to any value. After the test the luminous intensity shall be restored to its initial value within 1 min.

Regulating controls need not function during the test, but after the test the mode of the control shall be the same as before the test provided that during the test no mode changing commands.

**Performance criterion C:** Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by the operation of the controls, or by any operation specified in the instructions for use.

During and after the test any change of the luminous intensity is allowed and the lamp(s) may be extinguished. After the test, within 30 min, all functions shall return to normal if necessary by temporary interruption of the mains supply and/or operating the regulating control.

Testing date: 2025.05.09 - 2025.05.14  
Room temperature: 18-23°C  
Relative Humidity: 45-50%  
Atmospheric pressure: 102.1 kPa

## 6.1 Enclosure

### 6.1.1 Electrostatic Discharge

<b>Result:</b>	<b>Pass</b>
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The immunity against electrostatic discharge was tested in accordance with EN IEC 55014-2:2021 and EN IEC 61547:2023. Test setup and ESD-Generator are according to EN 61000-4-2 which is specified by EN IEC 55014-2:2021 and EN IEC 61547:2023.

The EUT is placed on 0.8m wood table above the ground plane. And the minimum distance between the EUT and all other conductive structures except the ground plane beneath the EUT is more than 0.5m.

The reference ground plane is an aluminium sheet of 0.25mm minimum thickness. The reference ground plane is connected to the protective earth. The size of the ground plane is 2m × 2m.

A horizontal coupling plane (HCP), 1.6m × 0.8m, is placed on the table and isolated from the EUT and cables by an insulating support 0.5mm thick. Vertical coupling plane (VCP) of dimensions 0.5m × 0.5m is placed parallel to and positioned at a distance of 0.1m from the EUT.

Charge voltage	: ±4.0kV (Contact Discharge)
	±8.0kV (Air Discharge)
Polarity	: positive / negative
Number of discharges	: >10
Performance criteria	: B

**Table 5: ESD, Positive / Negative Polarity**

Position	Kind of Discharge	Remarks	Result
Button	Air discharge ±8kV	No change of luminous intensity and no disturbance of function	Pass
Nonmetal enclosure	Air discharge ±8kV	Ditto	Pass
Metal enclosure	Contact discharge ±4kV	Ditto	Pass
Coupling plane (Both HCP and VCP)	Contact discharge ±4kV	Ditto	Pass

## 6.1.2 Radio Frequency Electromagnetic Field

<b>Result:</b>	<b>Pass</b>
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The immunity against radio-frequency electromagnetic fields in the frequency range between 80MHz and 1000MHz was tested in accordance with IEC 61000-4-3 which is specified by clause 5.5 in EN IEC 55014-2:2021 and EN IEC 61547:2023.

The test was performed inside a 3m modified semi-anechoic chamber. During the test the part of the ground plane between the field generating antenna and the equipment under test was covered by absorbing material. The distance between the tip of the antenna and the side of the system tested is 3m. The field uniformity of the 1.5mx1.5m plane where the surface of the EUT tested coincides with is regularly calibrated to ensure the 0-6 dB field uniformity criterion as specified by IEC 61000-4-3 is met.

Test Level	: 3V/m
Frequency Range	: 80-1000MHz
Modulation	: 80% AM, 1kHz
Frequency Sweep Speed	: ≤0.005 octave/s (1.5×1E-3 decades/s)
Performance Criteria	: A

**Table 6: Radiated Susceptibility, Field Strength 3V/m**

Position	Observation	Result
Antenna in vertical orientation	No change of luminous intensity and no disturbance of function	Pass
Antenna in horizontal orientation	No change of luminous intensity and no disturbance of function	Pass

## 6.2 Input and Output AC Power Ports

### 6.2.1 Fast Transients on AC Power Lines

<b>Result:</b>	<b>Pass</b>
----------------	-------------

The immunity against fast transients on AC power lines was tested in accordance to EN IEC 55014-2:2021 and EN IEC 61547:2023. Test setup and the fast transient noise generator are according to EN 61000-4-4 which is specified by EN IEC 55014-2:2021 and EN IEC 61547:2023.

The EUT is placed on 0.1m wood table above the ground plane. And the minimum distance between the EUT and all other conductive structures except the ground reference plane is more than 0.5m.

The length between the coupling device and the EUT is less than 1m. The cord length more than 1m, the excess length of the cable shall be gathered into a flat coil with a 0.4m diameter, and situated at a distance of 0.1m above the ground reference plane.

The reference ground plane is an aluminium sheet of 0.25mm minimum thickness. The reference ground plane is connected to the protective earth. The size of the ground plane is 2m × 2m.

Test Voltage	: 1kV
Polarity	: negative/positive
Repetition frequency	: 5kHz
Test duration	: ≥120sec
Tr/Tn	: 5ns/50ns
Performance criteria	: B

**Table 7: Burst, AC Power lines, Positive and Negative Polarity**

Coupling Port	Coupling Method	Result	Remarks
AC mains: L1(L), L2(N)	Direct Injection	Pass	No change of luminous intensity and no disturbance of function

## 6.2.2 Injected Current into AC Power Port

<b>Result:</b>	<b>Pass</b>
----------------	-------------

The immunity against injected current into AC power port was tested according to EN IEC 55014-2:2021 and EN IEC 61547:2023 in a shielded room. The Test setup and the test generator are according to EN 61000-4-6 which is specified by EN IEC 55014-2:2021 and EN IEC 61547:2023.

The EUT is placed on 0.1m wood table above the ground plane. And the minimum distance between the EUT and all other conductive structures except the reference ground plane is more than 0.5m.

The EUT comprised a single unit. The coupling and decoupling networks were inserted on the power supply connection. The coupling and decoupling networks was placed on the ground reference plane, making direct contact with it at about 0.1-0.3 meter from EUT. The cable between EUT and CDN is as short as possible and not bundled nor wrapped. The height of cable between the EUT and the coupling and decoupling networks above the ground reference plane was 50mm.

Voltage Level	: 3V(rms)(unmodulated)
Environmental phenomena	: r.f. current, common mode, 1kHz, 80% AM
Source impedance	: 150 Ω
Frequency range	: 0.15 - 80 MHz
Sweeping rate	: $\leq 1.5 \times 10^{-3}$ decades/s
Performance criteria	: A

**Table 8: Injected current, AC Power Port**

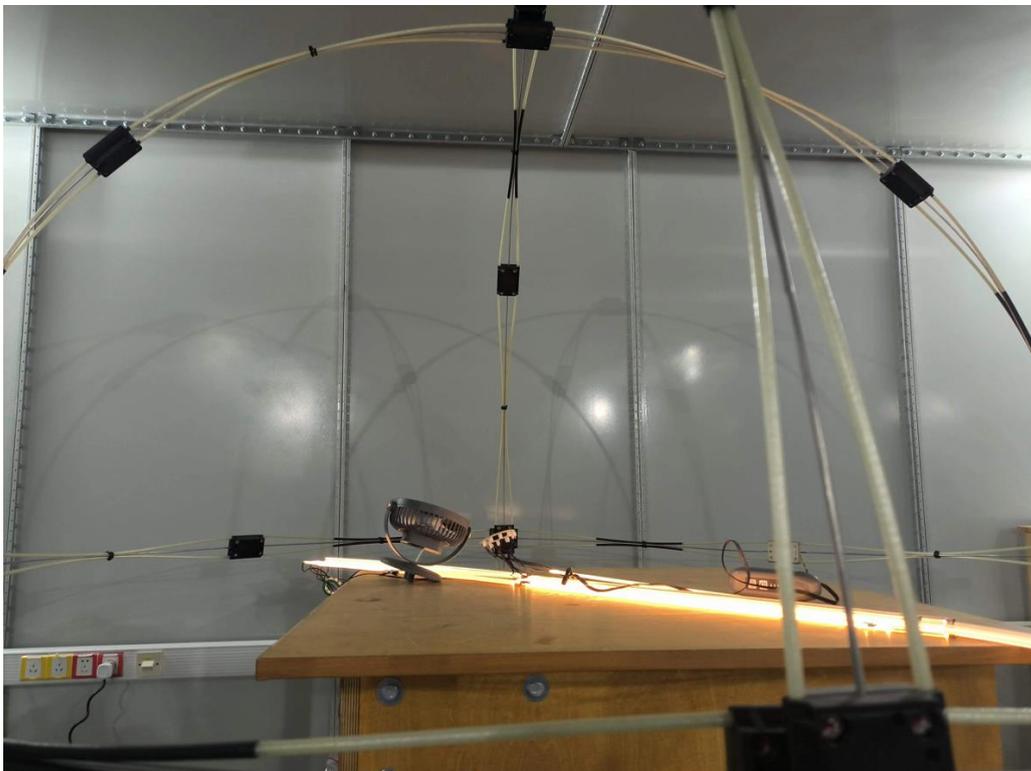
Coupling Port	Coupling Method	Result	Remarks
AC mains: L1(L), L2(N)	CDN M-2	Pass	No change of luminous intensity and no disturbance of function

## 7. Photographs of the Test Set-Up

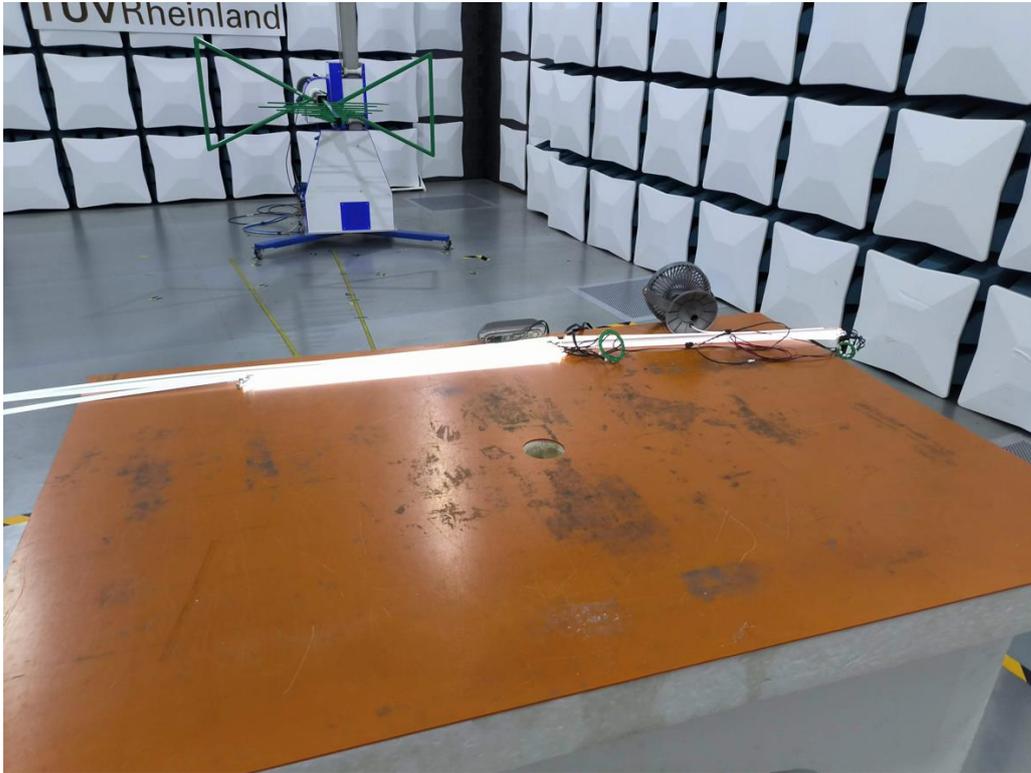
**Photograph 1: Set-up for Disturbance Voltage**



**Photograph 2: Set-up for Radiated electromagnetic disturbances**



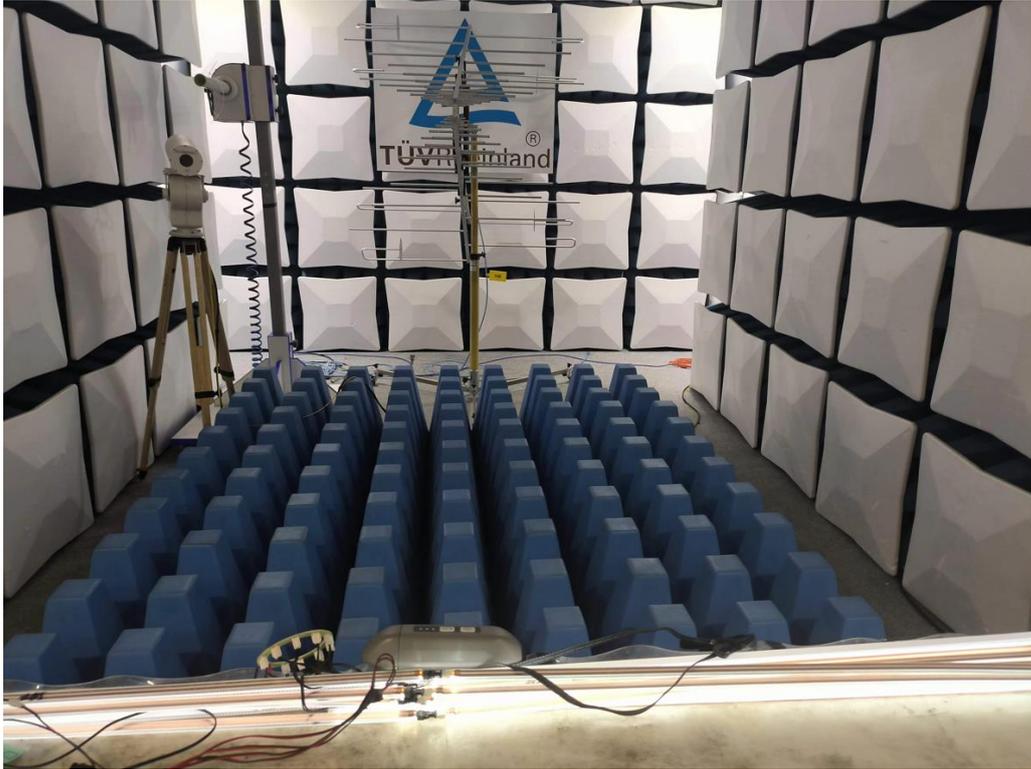
**Photograph 3: Set-up for Radiated Disturbance**



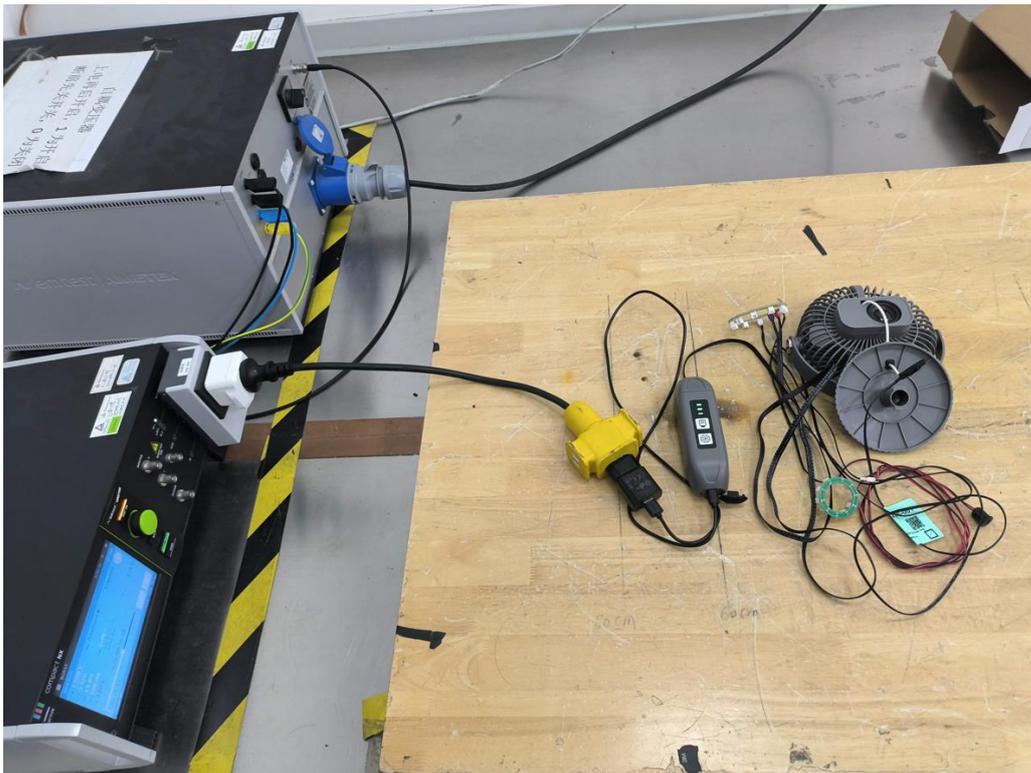
**Photograph 4: Set-up for Electrostatic Discharge**



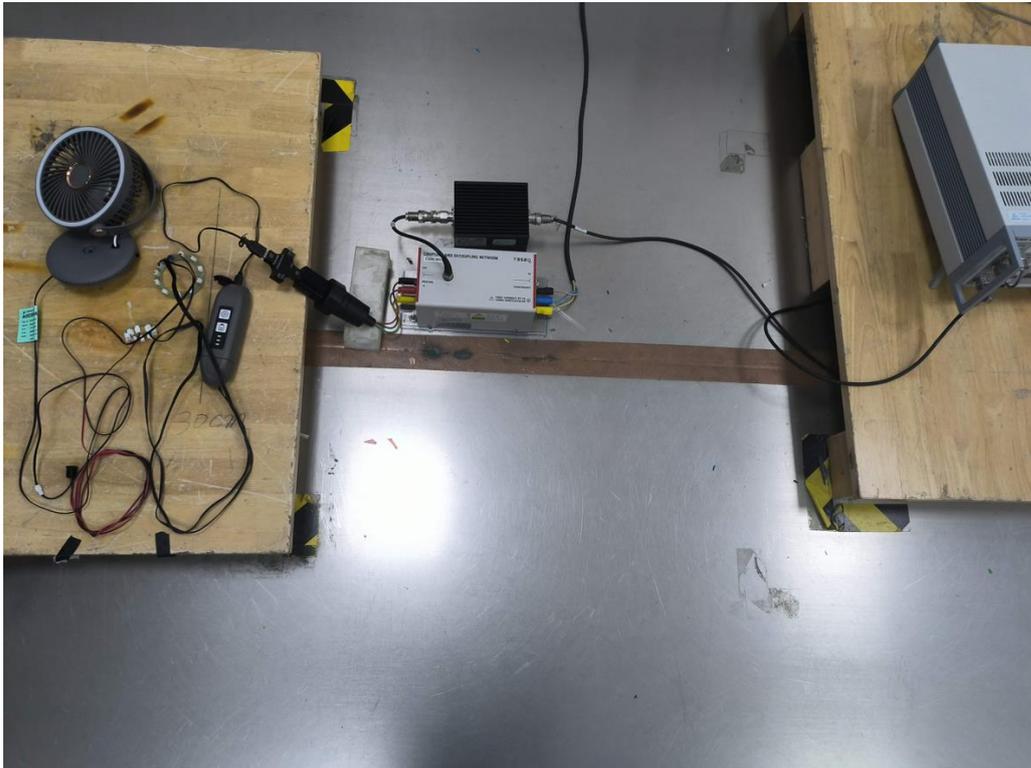
**Photograph 5: Set-up for Radio Frequency Electromagnetic Field**



**Photograph 6: Set-up for EFT**



**Photograph 7: Set-up for Inject Current**



## 8. List of Tables

Table 1: List of Test and Measurement Equipment.....	5
Table 2: Measurement Uncertainty.....	5
Table 3: General Description of EUT.....	6
Table 4: List of Auxiliary Equipment.....	7
Table 5: ESD, Positive / Negative Polarity.....	22
Table 6: Radiated Susceptibility, Field Strength 3V/m.....	23
Table 7: Burst, AC Power lines, Positive and Negative Polarity.....	24
Table 8: Injected current, AC Power Port.....	25

## 9. List of Figures

Figure 1: Spectral Diagrams, Conducted Emission, 150kHz - 30MHz, L.....	10
Figure 2: Spectral Diagrams, Conducted Emission, 150kHz - 30MHz, N.....	11
Figure 3: Graphic description of radiated electromagnetic disturbances for X direction.....	13
Figure 4: Graphic description of radiated electromagnetic disturbances for Y direction.....	14
Figure 5: Graphic description of radiated electromagnetic disturbances for Z direction.....	15
Figure 6: Spectral Diagrams, Radiated disturbance, Mode A.....	18
Figure 7: Spectral Diagrams, Radiated disturbance, Mode B.....	19
Figure 8: Spectral Diagrams, Radiated disturbance, Mode C.....	20

## 10. List of Photographs

Photograph 1: Set-up for Disturbance Voltage.....	26
Photograph 2: Set-up for Radiated electromagnetic disturbances.....	26
Photograph 3: Set-up for Radiated Disturbance.....	27
Photograph 4: Set-up for Electrostatic Discharge.....	27
Photograph 5: Set-up for Radio Frequency Electromagnetic Field.....	28
Photograph 6: Set-up for EFT.....	28
Photograph 7: Set-up for Inject Current.....	29

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