

<b>Prüfbericht-Nr.:</b> Test report no.:	<b>CN22VWTK 001</b>	<b>Auftrags-Nr.:</b> Order no.:	180230879	Seite 1 von 14 Page 1 of 14	
<b>Kunden-Referenz-Nr.:</b> Client reference no.:	N/A	<b>Auftragsdatum:</b> Order date:	2022.03.31		
<b>Auftraggeber:</b> Client:	ANHUI HONYI INTERNATIONAL CORP. Room B-2106, Business Office Building, Woye Garden, Ganquan Road, Shushan District, Hefei City 230088 Anhui P.R. China				
<b>Prüfgegenstand:</b> Test item:	RAPT Temp Controller				
<b>Bezeichnung / Typ-Nr.:</b> Identification / Type no.:	KL22927				
<b>Auftrags-Inhalt:</b> Order content:	TÜV Rheinland – EMC Service				
<b>Prüfgrundlage:</b> Test specification:	<b>EN 60730-1:2016+A1, Clause 23</b> <b>EN IEC 60730-2-9:2019+A1+A2, Clause 23</b>				
<b>Wareneingangsdatum:</b> Date of sample receipt:	2022.05.17				
<b>Prüfmuster-Nr.:</b> Test sample no.:	180230879				
<b>Prüfzeitraum:</b> Testing period:	2022.06.27 -2022.07.05				
<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*:	Pass				
<b>geprüft von:</b> tested by:	<i>Season Yang</i>		<b>genehmigt von:</b> authorized by:	<i>Feng Liang</i>	
<b>Datum:</b> Date:	2022.10.10		<b>Ausstelldatum:</b> Issue date:	2022.10.10	
<b>Stellung / Position:</b>	Season Yang/PE		<b>Stellung / Position:</b>	Feng Liang/TC	
<b>Sonstiges / Other:</b>	Refer to page 5 for further information.				
<b>Zustand des Prüfgegenstandes bei Anlieferung:</b> Condition of the test item at delivery:	Prüfmuster vollständig und unbeschädigt Test item complete and undamaged				
* Legende:	1 = sehr gut P(ass) = entspricht o.g. Prüfgrundlage(n)	2 = gut F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	3 = befriedigend F(ail) = entspricht nicht o.g. Prüfgrundlage(n)	4 = ausreichend N/A = nicht anwendbar	5 = mangelhaft N/T = nicht getestet
* Legend:	1 = very good P(ass) = passed a.m. test specification(s)	2 = good F(ail) = failed a.m. test specification(s)	3 = satisfactory F(ail) = failed a.m. test specification(s)	4 = sufficient N/A = not applicable	5 = poor N/T = not tested
<p><b>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.</b>  <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></p>					

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## Test Summary

4.1.1 MAINS AND SIGNAL TERMINAL CONTINUOUS DISTURBANCE VOLTAGE

*Result:*

*Pass*

4.1.1 RADIATED DISTURBANCE

*Result:*

*Pass*

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# 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 for measurement of radio interference.

## 1.2 List of Test and Measurement Instruments

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

<b>Kind of Equipment</b>	<b>Type</b>	<b>Serial No.</b>	<b>Calibrated until</b>
EMI test receiver	ESR3	102331	2022.11.08
LISN	ENV216	102250	2022.11.08
EMI test receiver	ESR7	101929	2022.11.08
Bilog Antenna	CBL6112D	49033	2024.03.14

## 1.3 Measurement Uncertainty

<b>Test Item</b>	<b>Expanded Measurement Uncertainty (k=2)</b>
Conducted Emission (150k-30MHz)	3.30dB
Radiated Emission (30-1000MHz)	4.39dB

## **2 General Product Information**

### **2.1 Product Function and Intended Use**

The EUT (equipment under test) is an ordinary temperature controller used in the residential, commercial and light industrial environment. For the further information, refer to the user's manual.

### **2.2 Ratings and System Details**

Kind of Equipment	:	RAPT Temp Controller
Type Designation	:	KL22927
Rated input	:	220-240VAC, 50/60Hz, 10A
Protection Class	:	Class I

Refer to the user's manual for more information

### **2.3 Independent Operation Modes**

The basic operation modes are: "ON" or "OFF".  
Refer to the user's manual for further information.

### **2.4 Noise Generating and Noise Suppressing Parts**

Refer to the Circuit Diagram for further information.

### **2.5 Submitted Documents**

Circuit diagram, PCB layout, 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

### **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**

None.

### **3.5 Countermeasures to achieve EMC Compliance**

The tested sample contained noise suppression components as specified in the circuit diagram. No special measure is employed to achieve the requirement.

## 4 Test Results EMISSION

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

#### 4.1.1 Mains and Signal Terminal Continuous Disturbance Voltage

<b>Result:</b>	<b>Pass</b>
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Date of testing	: 2022.07.05
Kind of test site	: Shielding Room
Port	: AC port, signal port
Basic Standard	: EN 60730-1:2016+A1, Clause 23, EN IEC 60730-2-9:2019+A1+A2, clause 23 and CISPR 16-1 series standards
Frequency Range	: 150kHz – 30MHz
Limit	: EN 60730-1:2016+A1, Table H.12 EN IEC 60730-2-9:2019+A1+A2, Table H.12

#### Test Setup

Input Voltage	: AC 230V, 50Hz
Operational mode	: Normal Operation
Earthing	: Yes
Test Setup	: EN 60730-1:2016+A1, EN IEC 60730-2-9:2019+A1+A2
Ambient Condition	: Temperature: 21°C; Relative Humidity: 63%

The measurement setup was made according to EN 60730-1:2016+A1 and EN IEC 60730-2-9:2019+A1+A2 in a shielding room.

The measurement equipment like test receiver, quasi-peak detector, Artificial Mains Network (AMN) are in compliance with CISPR 16-1 series standards and EN 60730-1:2016+A1 and EN IEC 60730-2-9:2019+A1+A2. The tested object was operated under its rated voltage and its rated frequency.

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

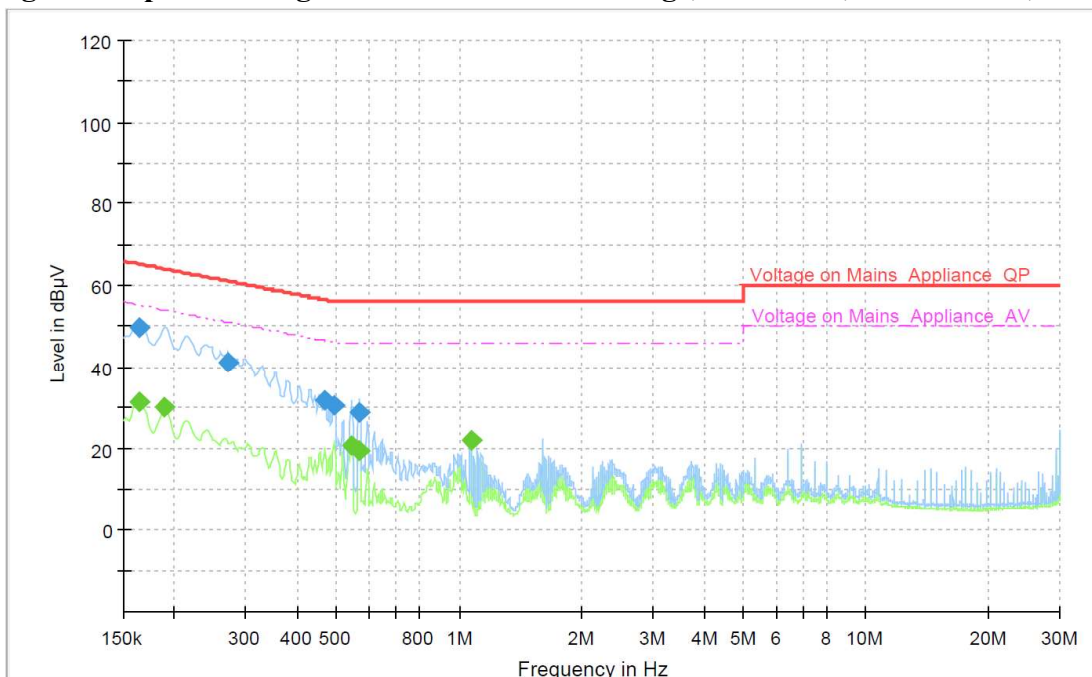
The tested object was set-up on a wooden table. The EUT was set 0.8m away from the AMN. The cord longer than necessary to be connected to the AMN was folded forth and back parallel so as to form a bundle with a length between 0.3m and 0.4m.

Each tested lamp was operated for at least 30min before test.

The Disturbance Voltage was determined according to EN 60730-1:2016+A1 and EN IEC 60730-2-9:2019+A1+A2 while measuring the line and neutral conductor by turns.

The following figures and tables were those measured by an automatic measuring system. Both Quasi Peak and Average Value were measured. Quasi-Peak and Average Value were measured and listed respectively where they had a maximum in previous scanning survey.

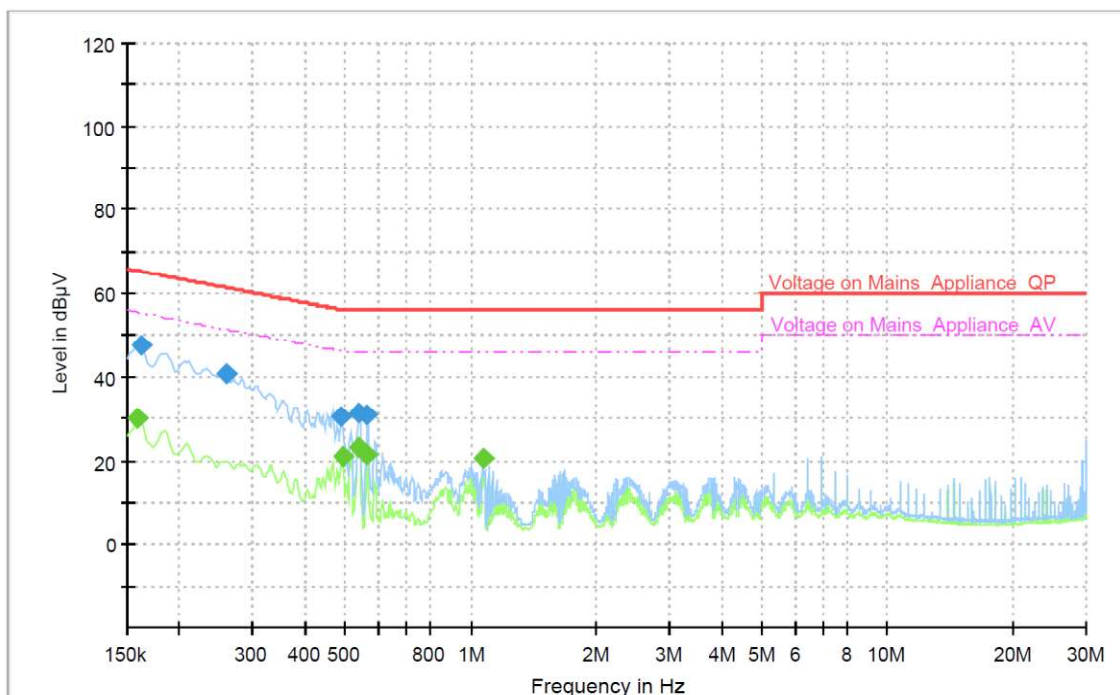
Figure 1: Spectral Diagrams of disturbance voltage, AC mains, 0.15-30MHz, L



### Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.163500	---	31.42	55.28	23.86	1000.0	9.000	L1	ON	10.2
0.163500	49.63	---	65.28	15.66	1000.0	9.000	L1	ON	10.2
0.188250	---	29.96	54.11	24.16	1000.0	9.000	L1	ON	10.2
0.271500	41.20	---	61.07	19.88	1000.0	9.000	L1	ON	10.2
0.467250	31.80	---	56.56	24.77	1000.0	9.000	L1	ON	10.2
0.492000	30.49	---	56.13	25.65	1000.0	9.000	L1	ON	10.3
0.543750	---	20.57	46.00	25.43	1000.0	9.000	L1	ON	10.3
0.568500	---	19.57	46.00	26.43	1000.0	9.000	L1	ON	10.3
0.568500	28.66	---	56.00	27.34	1000.0	9.000	L1	ON	10.3
1.068000	---	21.83	46.00	24.17	1000.0	9.000	L1	ON	10.3

Figure 2: Spectral Diagrams of disturbance voltage, AC mains, 0.15-30MHz, N



### Final Result

Frequency (MHz)	QuasiPeak (dBµV)	CAverage (dBµV)	Limit (dBµV)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Line	Filter	Corr. (dB)
0.159000	---	30.03	55.52	25.49	1000.0	9.000	N	ON	10.2
0.161250	47.52	---	65.40	17.88	1000.0	9.000	N	ON	10.2
0.258000	40.69	---	61.50	20.81	1000.0	9.000	N	ON	10.2
0.489750	30.60	---	56.17	25.57	1000.0	9.000	N	ON	10.3
0.492000	---	21.31	46.13	24.82	1000.0	9.000	N	ON	10.3
0.539250	---	23.25	46.00	22.75	1000.0	9.000	N	ON	10.3
0.539250	31.30	---	56.00	24.70	1000.0	9.000	N	ON	10.3
0.564000	---	21.36	46.00	24.64	1000.0	9.000	N	ON	10.3
0.564000	30.93	---	56.00	25.07	1000.0	9.000	N	ON	10.3
1.070250	---	20.65	46.00	25.35	1000.0	9.000	N	ON	10.3

## 4.1 Emission in the Frequency Range above 30 MHz

### 4.1.1 Radiated disturbance

Result:	Pass
Date of testing	: 2022.06.27
Test procedure	: EN 60730-1:2016+A1, Clause 23, EN IEC 60730-2-9:2019+A1+A2, clause 23 and CISPR 16-1 series standards
Frequency range	: 30-1000MHz
Kind of test site	: Semi-anechoic Chamber
Limit	: EN 60730-1:2016+A1 , Table H.12

#### Test Setup

Input voltage	: AC 230V, 50Hz
Operational mode	: Normal Operation
Ambient Condition	: Temperature: 21°C; Relative Humidity: 57%

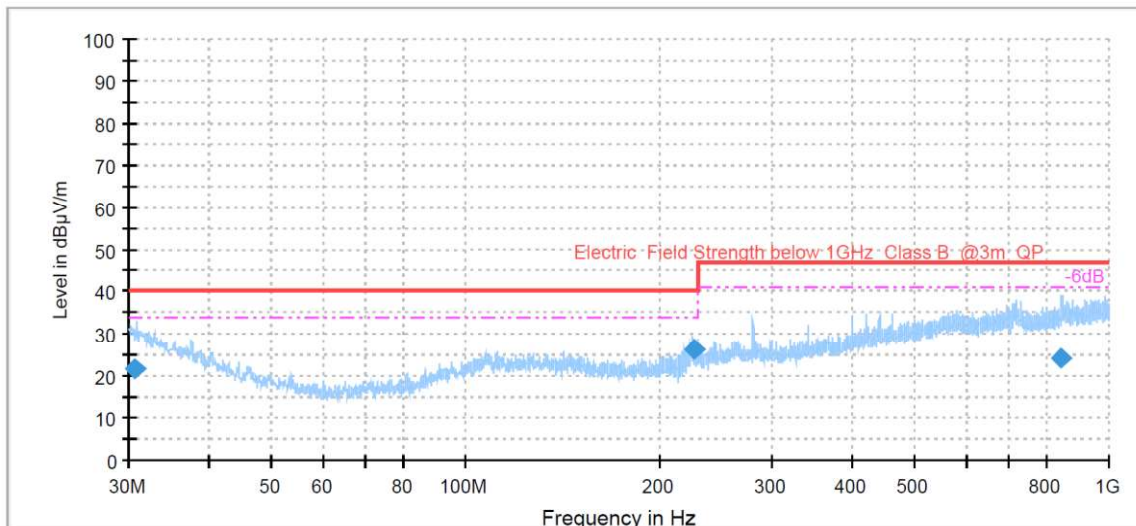
#### Measuring configuration and description

The radiated disturbance test was performed in a 3m semi-anechoic chamber. The test distance is 3m. The 10m radiated emission limits are converted to 3m radiated emission limits by an inverse proportionality of 20 dB per decade. 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 highest frequency in the EUT except the WIFI module is below 108 MHz, therefore the EUT's upper frequency of measurement range is 1000MHz.

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 "x" 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.

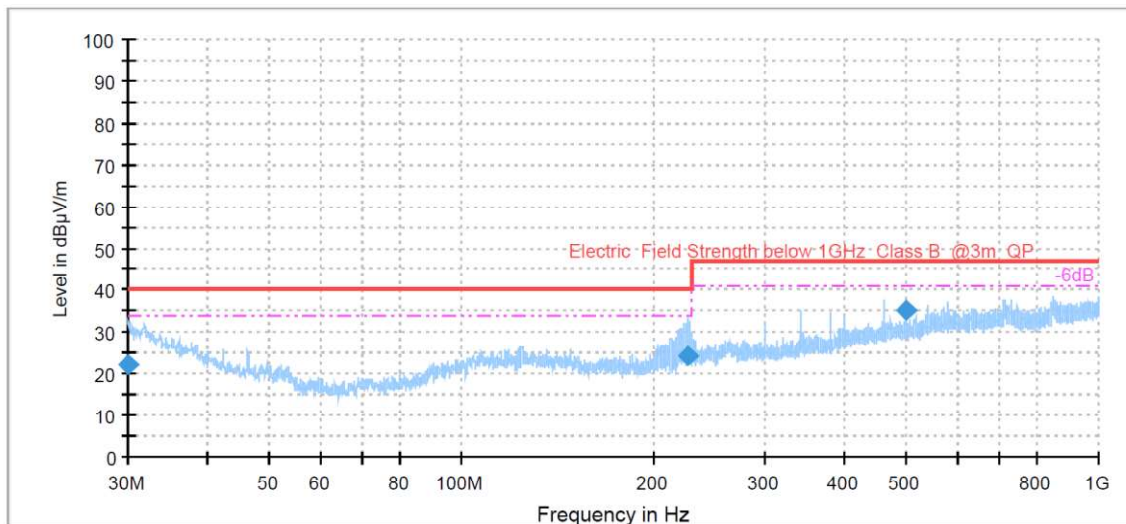
Figure 3: Spectral Diagrams, Radiated Emission, 30MHz-1000MHz, Horizontal



### Final Result

Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
30.616111	21.56	40.00	18.44	1000.0	120.000	164.0	H	282.0	25.6
225.932222	26.22	40.00	13.78	1000.0	120.000	120.0	H	59.0	17.3
844.727778	24.26	47.00	22.74	1000.0	120.000	150.0	H	155.0	29.4

Figure 4: Spectral Diagrams, Radiated Emission, 30MHz-1000MHz, Vertical

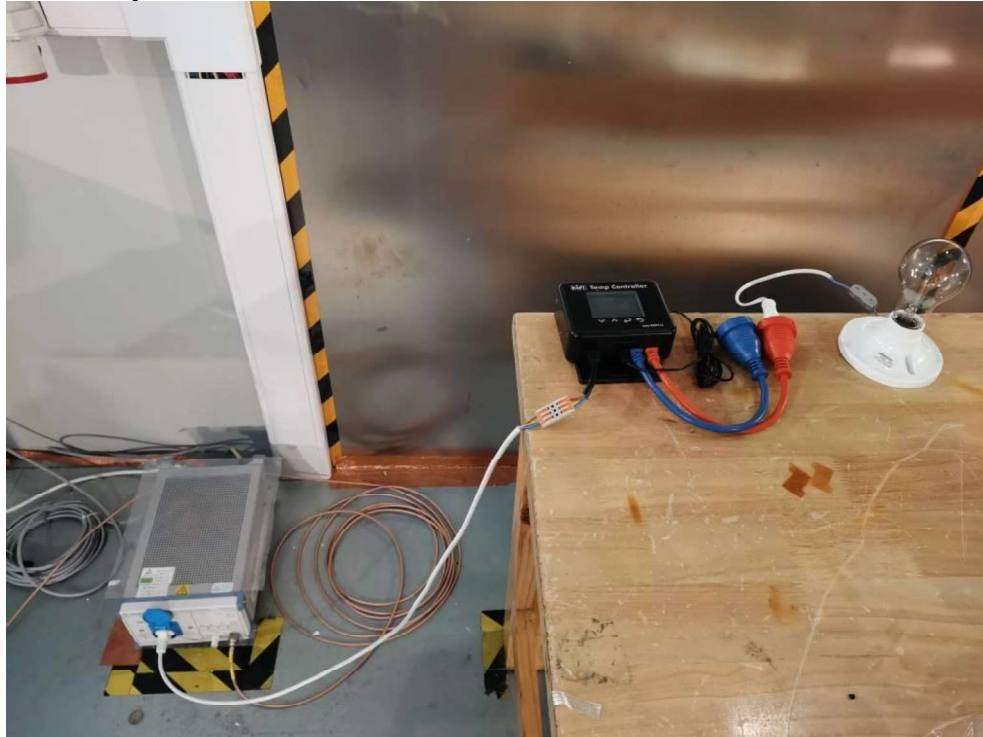


### Final Result

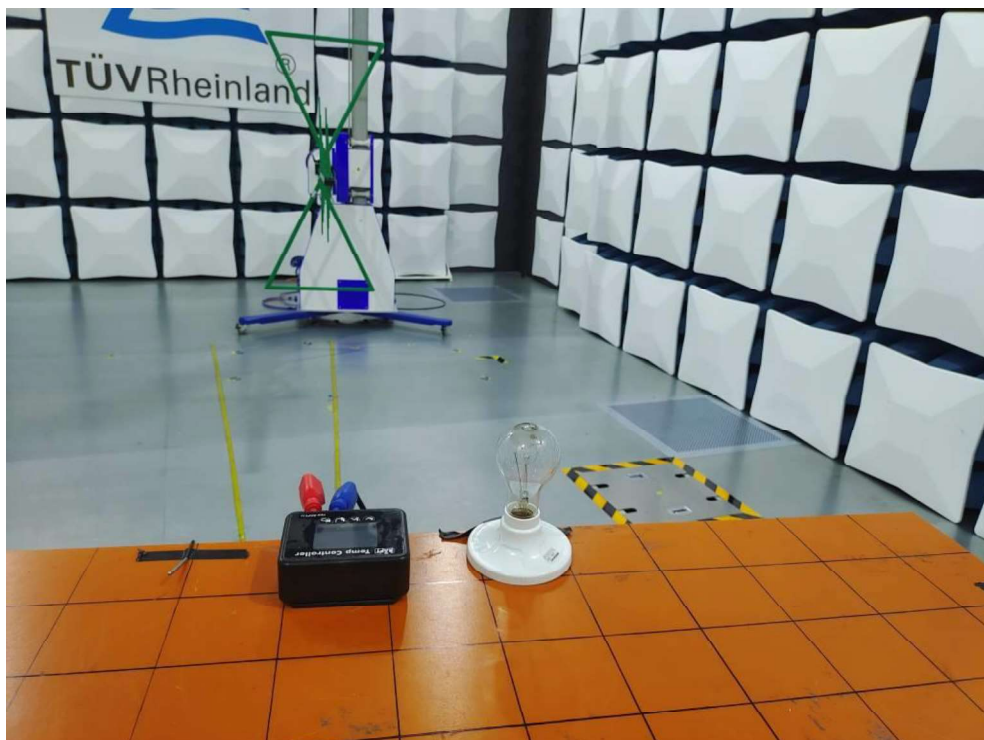
Frequency (MHz)	QuasiPeak (dBµV/m)	Limit (dBµV/m)	Margin (dB)	Meas. Time (ms)	Bandwidth (kHz)	Height (cm)	Pol	Azimuth (deg)	Corr. (dB)
30.040000	22.16	40.00	17.84	1000.0	120.000	199.0	V	-4.0	25.9
226.347778	24.31	40.00	15.69	1000.0	120.000	114.0	V	-9.0	17.3
499.985000	35.00	47.00	12.00	1000.0	120.000	120.0	V	18.0	25.7

## 5 Photographs of the Test Set-Up

**Photograph 1: Set-up for Mains Conducted Emission**



**Photograph 2: Set-up for Radiated Emission**



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-- The END --