

# EMC Test Report

Applicant: TNCP Vertriebs GmbH

Product: E-bike

Model: 20"Petit



China



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In accordance with EN 15194

Prepared for: TNCP VERTRIEBS GMBH  
Braaker Grund 8, 22145 Braak, GERMANY

## COMMERCIAL-IN-CONFIDENCE

Report Number: 4830024209100

RESPONSIBLE FOR	NAME	SIGNATURE	DATE
Approved By	Peng Liu		2024.02.05
Prepared By	Yiquan Wang		2024.02.05

Signatures in this approval box have checked this document in line with the requirements of TÜV SÜD Product Service document control rules.

### EXECUTIVE SUMMARY

A sample of this product was tested and found to be compliant with EN 15194:2017 Clause 4.2.15.

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# 1 Report Summary

## 1.1 Report Modification Record

Alterations and additions to this report will be issued to the holders of each copy in the form of a complete document.

Issue	Description of Change	Date of Issue
1	First Issue	2024.01.25

## 1.2 Introduction

The information contained in this report is intended to show verification of the EMC Qualification Approval Testing of the requirements of the standards for the tests listed in Section 1.3.

Applicant	TNCP Vertriebs GmbH
Address	Braaker Grund 8, 22145 Braak, GERMANY
Manufacturer	Kunshan Sevenone cycle Co.,Ltd
Address	No.26 Liushijing Road Development Zone kunshan Jiangsu,China
Factory	Kunshan Sevenone cycle Co.,Ltd
Address	No.26 Liushijing Road Development Zone kunshan Jiangsu,China
Model Number(s)	20"Petit
Rated voltage	DC 36V
Serial Number(s)	786688-002
Test Specification	EN 15194:2017 Clause 4.2.15
Date of Receipt of EUT	2024.01.22
Start of Test	2024.01.22
Finish of Test	2024.01.24
Name of Engineer(s)	Yiquan Wang

### 1.3 Brief Summary of Results

A brief summary of the tests carried out in accordance with EN 15194 is shown below.

Section	Specification	Clause	Test Description	Result	Comments/Base Standard
2.1	EN 15194:2017	Annex C.1.2. 2 & C.1.2. 3	Radiated Disturbance	Pass	
2.2	EN 15194:2017	Annex C.8	Electrostatic discharge immunity test	Pass	EN 61000-4-2
2.3	EN 15194:2017	Annex C.1.2. 4	Vehicle immunity to electromagnetic radiation	Pass	ISO 11451-1



**1.4 Product Information**

**1.4.1 Technical Description**

The Equipment Under Test (EUT) is E-bike. Electrically power assisted cycle, equipped with pedals and an auxiliary electric motor, which cannot be propelled exclusively by means of this auxiliary electric motor.

**1.4.2 EUT Port/Cable Identification**

Port	Max Cable Length specified	Usage	Type	Screened
Enclosure port	--	--	--	Yes

**1.4.3 Test Configuration**

Configuration	Description
1	Battery Powered 36V DC

**1.4.4 Modes of Operation**

Mode	Description
1	Running. Apply a load in order to achieve 75% continuous rated power.
2	Running. EPAC operating at 90 % - 100 % of the maximum speed of the design "start-up assistance mode" maximum speed
3	Running. EPAC operating (with motor assistance) at 90 % of the design maximum assistance speed.
4	Power on. Standstill mode (all EPAC systems including light activated, EPAC ready to be started, but no assistance is given by the motor.

**1.4.5 Monitoring of Performance**

The EUT works normally, there are no abnormal changes in the speed of the vehicle's drive wheels, there are no signs of operational deterioration which might mislead other road users and there are no other noticeable phenomena which could result in a deterioration in the direct control of the vehicle.

#### 1.4.6 Performance Criteria

##### Vehicle immunity to electromagnetic radiation

There are no abnormal changes in the speed of the vehicle's drive wheels, there are no signs of operational deterioration which might mislead other road users and there are no other noticeable phenomena which could result in a deterioration in the direct control of the vehicle.

##### Electrostatic discharge immunity test

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 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 reasonable expect from the apparatus if used 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 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 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 reasonable expect from the apparatus if used as intended.

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 instruction for use.

#### 1.5 Deviations from the Standard

No deviations from the applicable test standard were made during testing.



## 1.6 Test Location

The following tests were conducted at TÜV SÜD Certification and Testing Co., Ltd.

Address:

Floor 1-4, Building B, No.37, Tuanjie Road(Middle),  
Xishan Economic and Technological Development Zone,  
Wuxi, Jiangsu. China

Test Name	Name of Engineer(s)
Radiated Disturbance	Hongcan Yao
Electrostatic discharge immunity test	Wenkui Li
Vehicle immunity to electromagnetic radiation	Zihuan Gao

## 2 Test Details

### 2.1 Radiated Disturbance

#### 2.1.1 Specification Reference

EN 15194:2017, Clause Annex C.1.2.2 & C.1.2.3

#### 2.1.2 Equipment Under Test

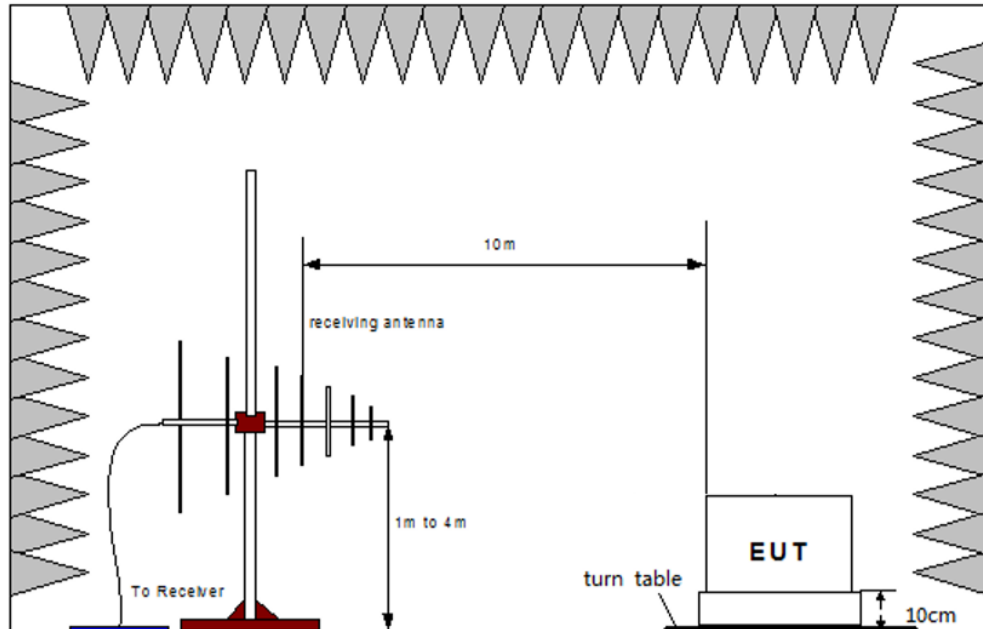
20"Petit

#### 2.1.3 Date of Test

2024.01.22

#### 2.1.4 Test Method

The EUT was set up in a semi-anechoic chamber on a remotely controlled turntable and placed on a reference ground plane, the center of the antenna shall be  $3\text{ m} \pm 0.05\text{ m}$  above the ground. A prescan of the EUT emissions profile was made while varying the antenna-to-EUT azimuth and antenna-to-EUT polarization using a peak detector; measurements were taken at a 3m distance. The EUT was then formally measured using a Quasi-Peak detector to measure broad-band electromagnetic radiation and using an average-value detector to measure narrow-band electromagnetic radiation. Apply a load in order to test at  $75\% \pm 10\%$  of the continuous rated declared by the manufacturer.



#### 2.1.5 Environmental Conditions

Ambient Temperature	19.0 °C
Relative Humidity	36.0 %
Atmospheric Pressure	1025.6 mbar

## 2.1.6 Specification Limits

Electromagnetic radiation emissions reference limits					
Value	Band-width	Antenna distance	Equation for L [ dB( $\mu$ V/m)] within f[MHz]		
			30...75	75...400	400...1000
Mean value	Narrow-band	10 $\pm$ 0.2m	24	24+15,13log(f/75)	35
Quasi-peak	Broad-band	10 $\pm$ 0.2m	34	24+15,13log(f/75)	45

## 2.1.7 Test Results

Results for Configuration and Mode: Configuration 1/ Mode 1.

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

# 30-1000MHz Radiated Emission Test

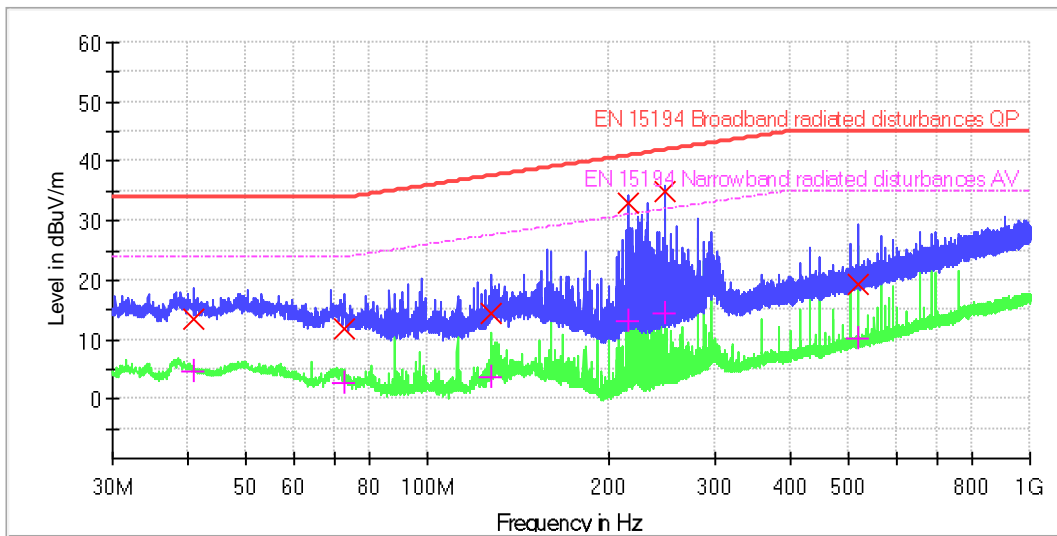
## Common Information

EUT: E-bike  
 Model: 20"Petit  
 Client: Kunshan Sevenone cycle Co.,Ltd  
 Operating Conditions: Power on  
 Operator Name: Yao Hongcan  
 Input: Powered by 36V DC Battery  
 Sample No.: WUX-786688-002  
 Test Standard: EN 15194  
 Comment: Horizontal  
 Comment: Temp.:19°C,Humi.:36%,Atm.:1025.6hPa

## Scan Setup: EN 15194 PEDELEC [EMI radiated]

Hardware Setup: Radiated E Field 30MHz-1GHz\_10m  
 Receiver: [ESW 8]  
 Level Unit: dBuV/m

Subrange	Step Size	Detectors	IF BW	Meas. Time	Preamp
30 MHz - 1 GHz	40 kHz	PK+ ; AVG	120 kHz	0.001 s	0 dB



## Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	CAverage (dBuV/m)	Meas. Time (ms)	Height (cm)	Azimuth (deg)	Margin - QPK (dB)	Limit - QPK (dBuV/)	Margin - CAV (dB)	Limit - CAV (dBuV/m)
40.960000	13.4	4.6	1000.0	300.0	264.0	20.6	34.0	19.4	24.0
72.960000	11.8	2.7	1000.0	300.0	133.0	22.2	34.0	21.3	24.0
127.200000	14.3	3.8	1000.0	300.0	189.0	23.1	37.5	23.7	27.5
216.040000	33.0	13.1	1000.0	300.0	301.0	8.0	41.0	17.9	31.0
248.040000	34.8	14.5	1000.0	300.0	49.0	7.0	41.9	17.4	31.9
519.960000	19.3	10.2	1000.0	300.0	217.0	25.7	45.0	24.8	35.0

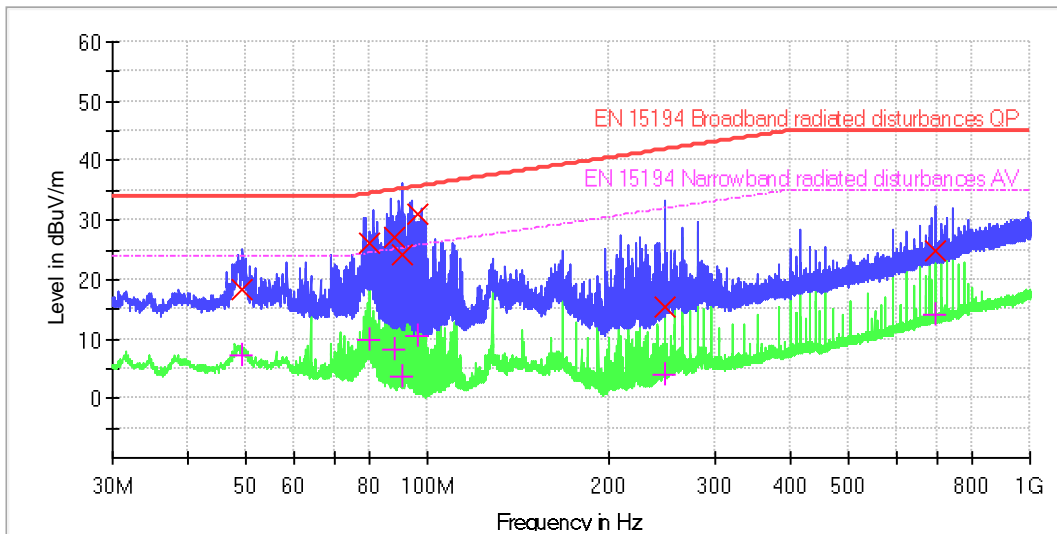
### Common Information

EUT: E-bike  
 Model: 20"Petit  
 Client: Kunshan Sevenone cycle Co.,Ltd  
 Operating Conditions: Power on  
 Operator Name: Yao Hongcan  
 Input: Powered by 36V DC Battery  
 Sample No.: WUX-786688-002  
 Test Standard: EN 15194  
 Comment: Vertical  
 Comment: Temp.:19°C,Humi.:36%,Atm.:1025.6hPa

### Scan Setup: EN 15194 PEDELEC [EMI radiated]

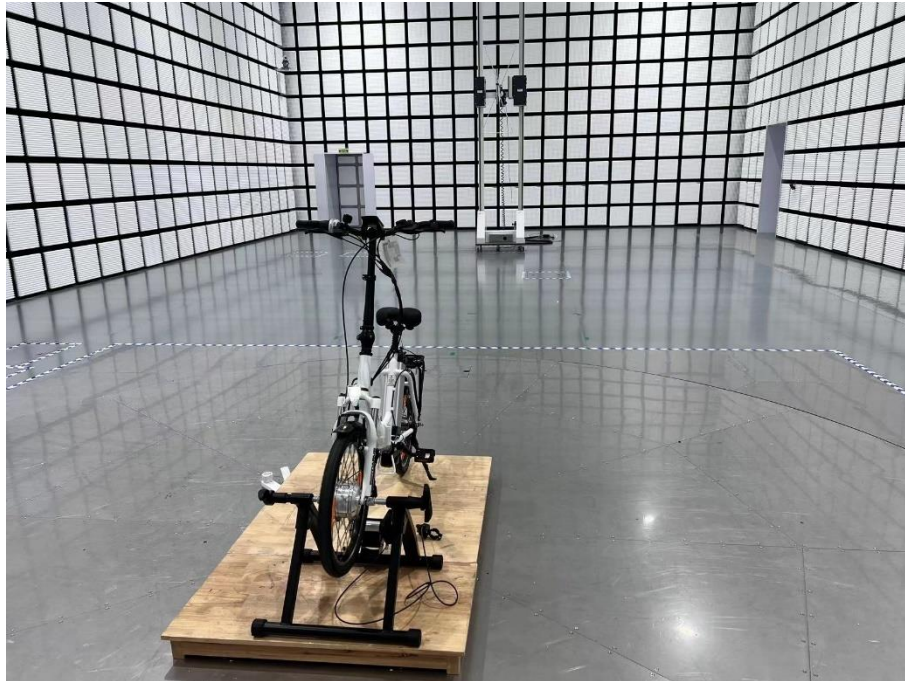
Hardware Setup: Radiated E Field 30MHz-1GHz\_10m  
 Receiver: [ESW 8]  
 Level Unit: dBuV/m

**Subrange**                      **Step Size**                      **Detectors**                      **IF BW**                      **Meas. Time**                      **Preamp**  
 30 MHz - 1 GHz                      40 kHz                      PK+ ; AVG                      120 kHz                      0.001 s                      0 dB



### Limit and Margin

Frequency (MHz)	QuasiPeak (dBuV/m)	CAverage (dBuV/m)	Meas. Time (ms)	Height (cm)	Azimuth (deg)	Margin - QPK (dB)	Limit - QPK (dBuV/m)	Margin - CAV (dB)	Limit - CAV (dBuV/m)
49.360000	18.2	7.2	1000.0	300.0	256.0	15.8	34.0	16.8	24.0
80.040000	26.1	9.9	1000.0	300.0	124.0	8.3	34.4	14.5	24.4
88.000000	27.1	8.1	1000.0	300.0	301.0	8.0	35.1	17.0	25.1
90.520000	24.0	3.8	1000.0	300.0	288.0	11.2	35.2	21.4	25.2
96.040000	31.0	10.7	1000.0	300.0	175.0	4.6	35.6	15.0	25.6
247.920000	15.4	4.1	1000.0	300.0	223.0	26.4	41.9	27.8	31.9
696.040000	24.8	14.1	1000.0	300.0	274.0	20.2	45.0	20.9	35.0



**Test Setup**

### **2.1.8 Test Location**

This test was carried out in room 135 10m SAC.

## 2.2 Electrostatic discharge immunity test

### 2.2.1 Specification Reference

EN 15194:2017, Clause Annex C.8

### 2.2.2 Equipment Under Test

20"Petit

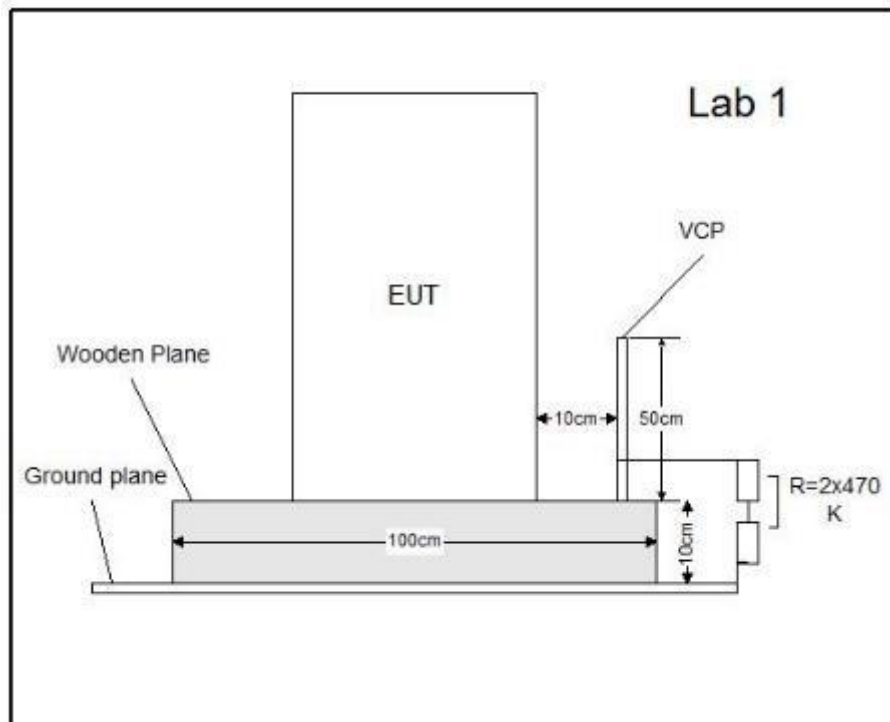
### 2.2.3 Date of Test

2024.01.22

### 2.2.4 Test Method

Using the air discharge method for non-metallic parts, contact discharge method for metallic parts with both vertical and horizontal couple plane discharge methods for the sides of the equipment under test, the required electrostatic discharge voltage levels in both voltage polarities were applied at the detailed pulse repartition rate.

During this testing any anomalies in the equipment under tests performance was recorded.



### 2.2.5 Environmental Conditions

Ambient Temperature	21.2 °C
Relative Humidity	41.6 %
Atmospheric Pressure	1022.4 mbar



**2.2.6 Specification Limits**

Discharge type	Required Test Levels		Number of discharges per location (each polarity)	Performance Criteria
	Discharge Level (kV)			
	Positive	Negative		
Air – Direct	2, 4 and 8	2, 4 and 8	<10>	B
Contact – Direct	2 and 4	2 and 4	<10>	B
Contact – Indirect	2 and 4	2 and 4	<10>	B

**2.2.7 Test Results**

Results for Configuration and Mode: Configuration 1/ Mode 2,3,4.

Performance assessment of the EUT made during this test: Pass.

Detailed results are shown below.

ID	Test Point	Discharge	Results									
			2kV		4kV		6kV		8kV		15kV	
			+	-	+	-	+	-	+	-	+	-
	VCP	Contact	✓	✓	✓	✓						
	Metal Enclosure	Contact	✓	✓	✓	✓						
	Screw, Key hole	Contact	✓	✓	✓	✓						
	Plastic Enclosure	Air	✓	✓	✓	✓			✓	✓		
	Light, Panel, Button	Air	✓	✓	✓	✓			✓	✓		

Key to Results	
✓	The EUTs performance was not impacted when the ESD pulse was applied.
✓*	No discharge occurred at this point when the ESD pulse was applied
Ox	
Fx	
N/A	Not Appliance



**Test Setup**

### **2.2.8 Test Location**

This test was carried out in room 127, ESD TR.

## 2.3 Vehicle immunity to electromagnetic radiation

### 2.3.1 Specification Reference

EN 15194:2017, Clause Annex C.1.2.4

### 2.3.2 Equipment Under Test

20"Petit

### 2.3.3 Date of Test

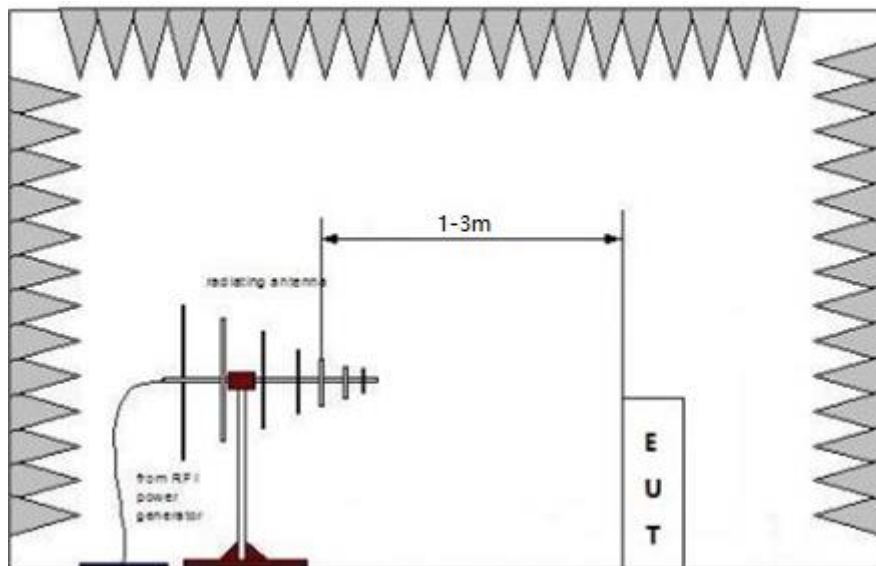
2024.01.22

### 2.3.4 Test Method

The equipment under test including associated cabling was configured, on a 0.8 m non-conductive table for table-top equipment and on a 0.1 m insulated support for floor standing equipment; with a pre-calibrated semi anechoic chamber.

All four sides of the equipment under test were subjected to the required RF field strength, modulated as described, swept over the frequency range of test with the antenna positioned in both horizontal and vertical polarizations.

During this testing any anomalies in the equipment under tests performance was recorded.



### 2.3.5 Environmental Conditions

Ambient Temperature	22.1 °C
Relative Humidity	52.1 %
Atmospheric Pressure	1016.8 mbar



**2.3.6 Specification Limits**

Required Test Levels					Performance Criteria
Frequency Range (MHz)	Level (V/m)	Modulation	Step Size (%)	Dwell (s)	
20 to 2000	30	AM (80 %,1 kHz, sine wave)	1	2	Refer to section 1.4.6
<b>Supplementary information:</b> EUT powered at one of the Nominal input voltages and frequencies					

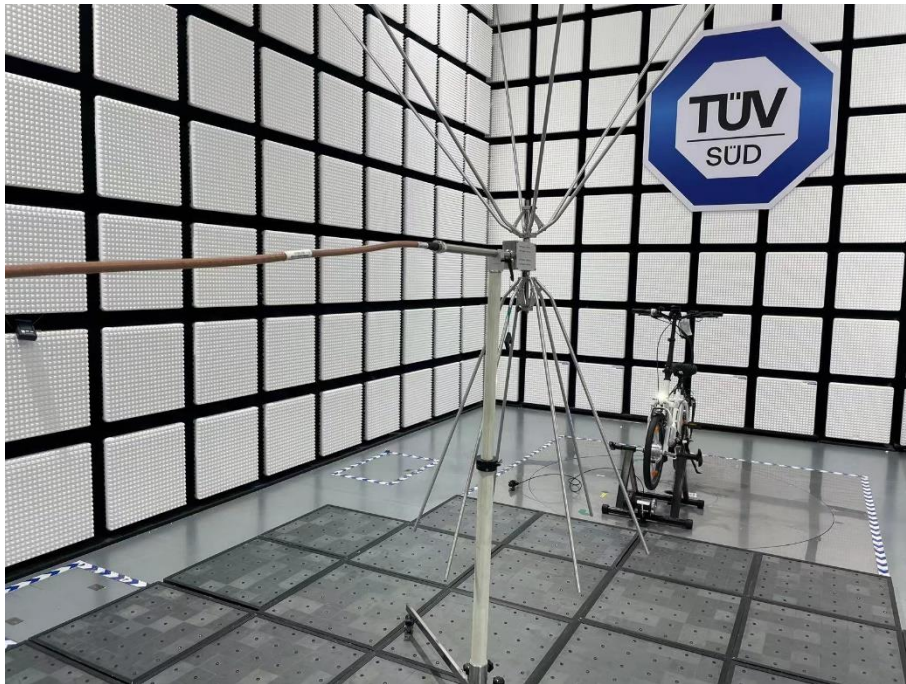
**2.3.7 Test Results**

Results for Configuration and Mode: Configuration 1/ Mode 2,3,4.

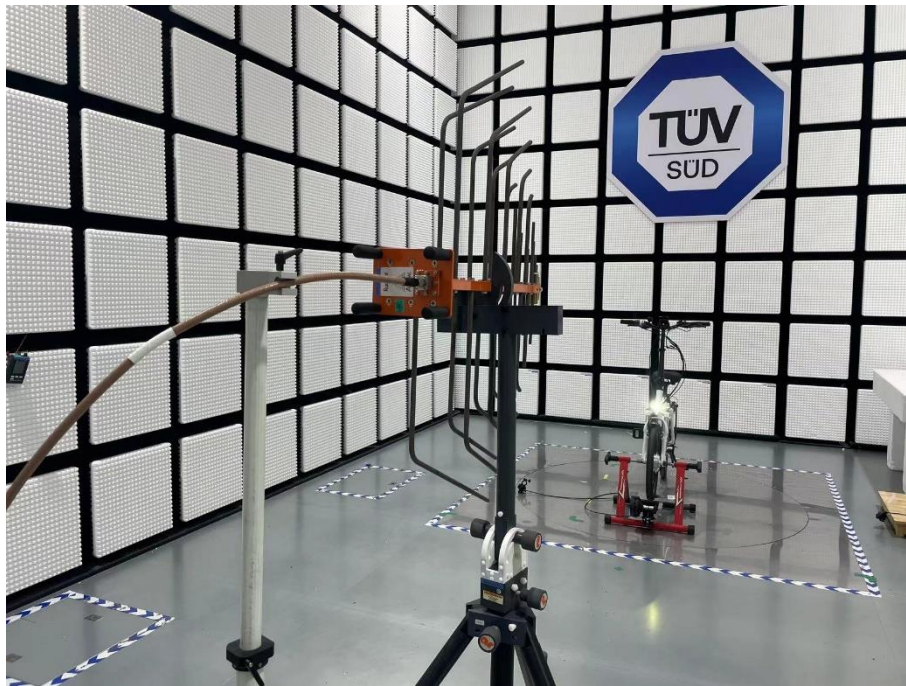
Performance assessment of the EUT made during this test: *Pass*.

Detailed results are shown below.

Tabulated Results for RF Electromagnetic Field 20-2000 MHz						
Side of the equipment under test	Antenna polarization	Test Level	step	Dwell Time	modulation	Result
Front,Rear	Vertical	30 V/m	1%	2 s	1KHZ SINE 80% AM	Pass



**Test Setup(20-80MHz)**



**Test Setup(80-2000MHz)**

### 2.3.8 Test Location

This test was carried out in test room 132, 3M SAC.

### 3 Test Equipment Information

#### 3.1 General Test Equipment Used

Instrument	Manufacturer	Type No	TE No	Calibration Date	Calibration Due
Radiated Emissions (Electric Field)					
EMI Test Receiver	Rohde & Schwarz	ESW8	487/631911	2023.4.27	2024.4.26
Bilog Antenna	Schwarzbeck	VULB9168	487/621840	2023.7.18	2024.7.17
Semi-anechoic Chamber	TDK	10m	487/770201	--	--
Immunity					
ESD Simulator	HAEFELY	ONYX 30	487/751520	2023.4.17	2024.4.16
Signal Generator	Rohde & Schwarz	SMB100B	487/392352	2023.4.17	2024.4.16
Power meter	Rohde & Schwarz	NRX	487/742389	2023.4.17	2024.4.16
Sensor	Rohde & Schwarz	NRP6A	487/742390	2023.4.17	2024.4.16
Sensor	Rohde & Schwarz	NRP6A	487/742391	2023.4.17	2024.4.16
Power Amplifier	Rohde & Schwarz	BBA-BC1000	487/402321	2023.4.17	2024.4.16
RS broadband antenna	AR	ATL80M6G	487/622350	2023.4.17	2024.4.16
Power Amplifier	Rohde & Schwarz	BBA-D110E100	487/402322	2023.3.1	2024.2.29
Antenna	Schwarzbeck	VHBD9134+BBFA9146	487/622348-487/622349	2023.4.17	2024.4.16
Power Amplifier	Rohde & Schwarz	BBA-A2500	487/402323	2023.3.1	2024.2.29
Antenna	schwarzbeck	VHBD9134	487/622348	2023.4.17	2024.4.16
Antenna	schwarzbeck	BBFA9146	487/622349	2023.4.17	2024.4.16

#### EMC Testing software

software	version	Testing items
EMC32	10.6	RE、RS

## 4 Measurement Uncertainty

For a 95% confidence level, the measurement uncertainties for defined systems are:

Test Name	Measurement Uncertainty
Radiated Disturbance	30MHz to 1GHz, Horizontal 4.39dB, Vertical 4.40dB
Electrostatic discharge immunity test	The test was applied using proprietary equipment that meets the requirements of EN 61000-4-2
Vehicle immunity to electromagnetic radiation	The test was applied using proprietary equipment that meets the requirements of ISO 11451-1 & ISO 11451-2

### Measurement Uncertainty Decision Rule

Determination of conformity with the specification limits is based on the decision rule according to IEC Guide 115: 2021, clause 4.4.3 and 4.5.1.

## 5 Photographs



Battery (10.4Ah)



Battery (15.0Ah)









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