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## TEST REPORT

EN IEC 55014-1 / EN IEC 55014-2

Electromagnetic compatibility – Requirements for household appliances, electric tools and similar apparatus.

Part 1: Emission / Part 2: Immunity – Product family standard

Original No..... CTL2305042027-E  
 Report Reference No..... CTL2308042022-E  
 Compiled by  
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 Date of issue..... Aug. 09, 2023



Testing Laboratory Name..... Shenzhen CTL Testing Technology Co., Ltd  
 Address..... Floor 1-A, Baisha Technology Park, No.3011, Shahexi Road, Nanshan District, Shenzhen, China 518055  
 Web..... www.ctl-lab.com  
 Testing location/ procedure..... Full application of Harmonised standards   
 Partial application of Harmonised standards   
 Other standard testing methods

Applicant's name..... Shenzhen Hengzhihe Technology Co., Ltd.  
 Address..... 4F4006, Shenzhou Computer Building, Madame Curie Avenue, Vanke City Community, Bantian Street, Longgang District, Shenzhen, 518000 Guangdong, P.R. China

### Test specification:

Standard..... EN IEC 55014-1:2021  
 EN IEC 55014-2:2021  
 EN IEC 61000-3-2:2019/A1:2021  
 EN 61000-3-3:2013/A2:2021  
 Non-standard test method..... /  
 TRF Originator..... Shenzhen CTL Testing Technology Co., Ltd

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Test item description..... E-Bike  
 Trade Mark..... KuKirin  
 Test voltage..... DC 42V from adapter AC 230V/50Hz, DC 36V  
 Result..... Pass

**EMC -- TEST REPORT**

<b>Test Report No. :</b>	<b>CTL2308042022-E</b>	Aug. 09, 2023
		Date of issue

Equipment under Test : E-Bike

Model No. : V3

Listed Models : N/A

**Applicant** : **Shenzhen Hengzhihe Technology Co., Ltd.**

Address : 4F4006, Shenzhou Computer Building, Madame Curie Avenue, Vanke City Community, Bantian Street, Longgang District, Shenzhen, 518000 Guangdong, P.R. China

**Manufacturer** : **Shenzhen DYU Intelligent Mobility Technology Co., Ltd**

Address : 2606-10, Tower B, Hongrongyuan North Railway Station Center, North Railway Station Community, Minzhi Street, Longhua District, Shenzhen, China

<b>Test Result</b>	<b>Pass</b>
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The test report merely corresponds to the test sample.

It is not permitted to copy extracts of these test result without the written permission of the test laboratory.

## History of this test report

Report No.	Version	Description	Issued Date
CTL2305042027-E	V1.0	Initial Issued Report	Aug. 01, 2023
CTL2308042022-E	V2.0	Modify Applicant's information, Modify Model No.	Aug. 09, 2023

Modify content	V1.0	V2.0
Model No.	M5	V3
Applicant	Zhengzhou DYU Technology Co., Ltd	Shenzhen Hengzhihe Technology Co., Ltd.
Applicant's information	810, Zone B, Science and Technology Park, Yellow River Institute of Science and Technology (South District), No.123, Lianyun Road, Erqi District, Zhengzhou Cit, Henan Province, China	4F4006, Shenzhen Computer Building, Madame Curie Avenue, Vanke City Community, Bantian Street, Longgang District, Shenzhen, 518000 Guangdong, P.R. China

As of the issuance date of this report, the original report CTL2305042028-E will be invalid.

## Contents

<b>1 TEST STANDARDS .....</b>	<b>5</b>
<b>2 SUMMARY .....</b>	<b>6</b>
2.1 General Remarks .....	6
2.2 Equipment Under Test .....	6
2.3 Short description of the Equipment under Test (EUT) .....	6
2.4 Performance level .....	7
<b>3 TEST ENVIRONMENT .....</b>	<b>8</b>
3.1 Address of the test laboratory .....	8
3.2 Test Facility .....	8
3.3 Environmental conditions .....	8
3.4 Test Description .....	9
3.5 Statement of the measurement uncertainty .....	9
3.6 Equipments Used during the Test .....	10
<b>4 TEST CONDITIONS AND RESULTS .....</b>	<b>12</b>
4.1 Radiated Emission .....	12
4.2 Conducted disturbance .....	15
4.3 Harmonic current .....	18
4.4 Voltage fluctuations and flicker .....	21
4.5 Electrostatic discharge .....	23
4.6 Radiated, radio-frequency, electromagnetic field .....	25
4.7 Electrical fast transients / Burst .....	27
4.8 Surge .....	29
4.9 Conducted disturbances induced by radio-frequency fields .....	31
4.10 Voltage dips and short interruptions .....	33
<b>5 TEST SETUP PHOTOS .....</b>	<b>34</b>
<b>6 PHOTOS OF THE EUT .....</b>	<b>37</b>

# **1 TEST STANDARDS**

The tests were performed according to following standards:

[EN IEC 55014-1:2021](#) Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus -- Part 1: Emission

[EN IEC 55014-2:2021](#) Electromagnetic compatibility - Requirements for household appliances, electric tools and similar apparatus -- Part 2: Immunity - Product family standard

[EN IEC 61000-3-2:2019/A1:2021](#) Electromagnetic compatibility (EMC) -- Part 3-2: Limits - Limits for harmonic current emissions (equipment input current up to and including 16 A per phase)

[EN 61000-3-3:2013/A2:2021](#) Electromagnetic compatibility (EMC) -- Part 3-3: Limits - Limitation of voltage changes, voltage fluctuations and flicker in public low-voltage supply systems, for equipment with rated current  $\leq 16$  A per phase and not subject to conditional connection

## 2 SUMMARY

### 2.1 General Remarks

Date of receipt of test sample : June 05, 2023

Sampling and Testing commenced on : June 05, 2023

Testing concluded on : June 30, 2023

### 2.2 Equipment Under Test

#### Power supply system utilised

Power supply voltage :  AC 230V  110V / 60Hz  
 36 V DC  42 V DC  
 Other (specified in blank below)

### 2.3 Short description of the Equipment under Test (EUT)

The EUT is a E-Bike

#### EUT operation mode

The EUT were tested under the following modes, the final worst mode was marked in bold face and recorded in this report.

#### Radiatio EMISSION TEST Test:

Description of Test Mode	Test Voltage
<b>WORKING</b>	<b>DC 36V</b>
CHARGING	DC 42V from adapter AC 230V/5Hz

#### Conducted EMISSION TEST Test:

Description of Test Mode	Test Voltage
CHARGING	DC 42V from adapter AC 230V/5Hz

#### IMMUNITY TESTS:

Description of Test Mode	Test Voltage
WORKING	DC 36V
CHARGING	DC 42V from adapter AC 230V/5Hz

#### Note:

For the test results, the EUT had been tested with all conditions. But only the worst case was showed in test report.

Emissions tests.....: According to EN IEC 55014-1, searching for the highest disturbance.

Immunity tests .....: According to EN IEC 55014-2, searching for the highest susceptibility.

Harmonic current..... : According to EN IEC 61000-3-2, searching for the highest disturbance.

Voltage fluctuation..... : According to EN 61000-3-3, searching for the highest disturbance.

## EUT configuration

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

- - supplied by the manufacturer
- - supplied by the lab

## 2.4 Performance level

The test results shall be classified in terms of the loss of function or degradation of performance of the equipment under test, relative to a performance level defined by its manufacturer or the requestor of the test, or agreed between the manufacturer and the purchaser of the product.

### Definition related to the performance level:

- based on the used product standard
- based on the declaration of the manufacturer, requestor or purchaser

#### **Criterion A:**

Definition: normal performance within limits specified by the manufacturer, requestor or purchaser:

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.

#### **Criterion B:**

Definition: temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the equipment under test recovers its normal performance, without operator intervention:

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. 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.

#### **Criterion C:**

Definition: temporary loss of function or degradation of performance, the correction of which requires operator intervention:

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.

### **3 TEST ENVIRONMENT**

#### **3.1 Address of the test laboratory**

Shenzhen CTL Testing Technology Co., Ltd.  
Floor 1-A, Baisha Technology Park, No. 3011, Shaheji Road, Nanshan, Shenzhen 518055 China

#### **3.2 Test Facility**

The test facility is recognized, certified, or accredited by the following organizations:

##### **IC Registration No.: 9618B**

The 3m alternate test site of Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered by Certification and Engineer Bureau of Industry Canada for the performance of with Registration No.: 9618B on November 13, 2013.

##### **FCC-Registration No.: 399832**

Shenzhen CTL Testing Technology Co., Ltd. EMC Laboratory has been registered and fully described in a report filed with the (FCC) Federal Communications Commission. The acceptance letter from the FCC is maintained in our files. Registration 399832, December 08, 2017.

Certificated by A2LA, USA  
Registration No.:4343.01  
Date of registration: December 27, 2017

#### **3.3 Environmental conditions**

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

Temperature: 15-35 ° C

Humidity: 30-60 %

Atmospheric pressure: 950-1050mbar



### 3.4 Test Description

Emission Measurement		
Radiation Emission(30~1000MHz)	EN IEC 55014-1:2021	PASS
Conducted Disturbance	EN IEC 55014-1:2021	PASS
Harmonic Current	EN IEC 61000-3-2: 2019/A1:2021	PASS
Voltage Fluctuation and Flicker	EN 61000-3-3:2013/A2:2021	PASS
Immunity Measurement		
Electrostatic Discharge	EN IEC 55014-2:2021 EN 61000-4-2: 2009	PASS
RF Field Strength Susceptibility	EN IEC 55014-2:2021 IEC 61000-4-3: 2020	PASS
Electrical Fast Transient/Burst Test	EN IEC 55014-2:2021 EN 61000-4-4: 2012	PASS
Surge Test	EN IEC 55014-2:2021 EN 61000-4-5: 2014/A1: 2017	PASS
Conducted Susceptibility Test	EN IEC 55014-2:2021 EN 61000-4-6: 2014	PASS
Voltage Dips and Interruptions Test	EN IEC 55014-2:2021 EN IEC 61000-4-11: 2020	PASS

Remark:

1. The test result PASS and /or FAIL has no relationship with the measurement uncertainty.

### 3.5 Statement of the measurement uncertainty

The data and results referenced in this document are true and accurate. The reader is cautioned that there may be errors within the calibration limits of the equipment and facilities. The measurement uncertainty was calculated for all measurements listed in this test report acc. to CISPR 16 - 4 „Specification for radio disturbance and immunity measuring apparatus and methods – Part 4: Uncertainty in EMC Measurements“ and is documented in the Shenzhen CTL Testing Technology Co., Ltd. quality system acc. to DIN EN ISO/IEC 17025. 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.

Hereafter the best measurement capability for CTL laboratory is reported:

Test	Range	Measurement Uncertainty	Notes
Radiated Emission(chamber 1)	30~1000MHz	± 4.10dB	(1)
Radiated Emission(chamber 2)	30~1000MHz	± 4.10dB	(1)
Radiated Emission(chamber 2)	Above 1GHz	± 4.32dB	(1)
Conducted Emission	0.15~30MHz	± 3.20dB	(1)
Conducted Emission (signal terminal)	0.15~30MHz	± 2.96dB	(1)
Disturbance Power	30~300MHz	± 2.90dB	(1)

- (1) This uncertainty represents an expanded uncertainty expressed at approximately the 95% confidence level using a coverage factor of k=2.

### 3.6 Equipments Used during the Test

Radiated Emission(chamber 1)						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	ULTRA-BROADBAND ANTENNA	Sunol Sciences Corp.	JB1 Antenna	A061713	2023/02/13	2026/02/12
2	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	1166.5950.03	2023/05/04	2024/05/03
Software:						
Name of Software:				Version:		
EZ_EMG(Below 1GHz)				V1.1.4.2		

Conducted Emission						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	EMI Test Receiver	ROHDE & SCHWARZ	ESCI	1166.5950.03	2023/05/04	2024/05/03
2	LISN	ROHDE & SCHWARZ	ESH2-Z5	860014/010	2023/05/04	2024/05/03
3	Limitator	ROHDE & SCHWARZ	ESH3-Z2	1004008	2023/05/04	2024/05/03
Software:						
Name of Software:				Version:		
ES-K1				V1.71		

Harmonic Current/ Voltage Fluctuation and Flicker						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	Harmonic And Flicker Analyzer	Voltech	PM6000	N/A	2023/05/04	2024/05/03
Software:						
Name of Software:				Version:		
IEC61000-3 for PM6000				Release 1.24.12		

Electrostatic Discharge						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	ESD Simulator	TESEQ AG	NSG 437	1058	2022/08/08	2023/08/07

Electrical Fast Transient/Surge/Dips						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	Ultra Compact Simulator	HAEFELY	ECOMPACT4	174887	2022/08/08	2023/08/07
Software:						
Name of Software:				Version:		
EMV Check 2000				V1.27b		

Conducted Susceptibility (CS) :						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	Conducted Disturbances test system	SCHLODER	CDG 6000	N/A	2023/05/04	2024/05/03
2	Amplifier	SCHLODER	4N100W-6DB	N/A	2023/05/04	2024/05/03
3	CDN	SCHLODER	CDN M2+M3	A2210225/2013	2023/05/04	2024/05/03
4	Electromagnetic forceps	SCHLODER	EMCL-20 EM-CLAMP	132A1223/2015	2023/05/04	2024/05/03
Software:						
Name of Software:				Version:		
IEC/EN61000-4-6 Application software 10KHz Version				1.2.0(25.03.2013)		

RF Field Strength Susceptibility						
Item	Test Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal.Due
1	SIGNAL GENERATOR	Agilent	N5181A	MY49060125	2023/05/04	2024/05/03
2	Power Amplifier	MicoTop	MPA-80-1000-250	MPA1905162	2023/05/04	2024/05/03
4	Power Meter	Agilent	E4419B	GB43317877	2023/05/04	2024/05/03
5	Test Antenna-Bi-Log	Schwarzbeck	VULB 9118 E	N/A	2022/08/08	2023/08/07
6	Horn Antenna	Sunol Sciences Corp	DRH-118	A062013	2021/08/24	2024/08/23
7	Power transmitter	HP	8481A	2349A43969	2021/12/23	2024/12/22
8	Power transmitter	Agilent	E9301A	MQ/2217182-2	2022/08/08	2023/08/07
Software:						
Name of Software:				Version:		
EM 3				V1.1.7		

## 4 TEST CONDITIONS AND RESULTS

### 4.1 Radiated Emission

For test instruments and accessories used see section 3.6.

#### 4.1.1 Description of the test location

Test location: Radiation Lab

#### 4.1.2 Limits of disturbance

Frequency (MHz)	Distance (Meters)	Field Strengths Limits (dB $\mu$ V/m)
30 ~ 230	3	40
230 ~ 1000	3	47

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

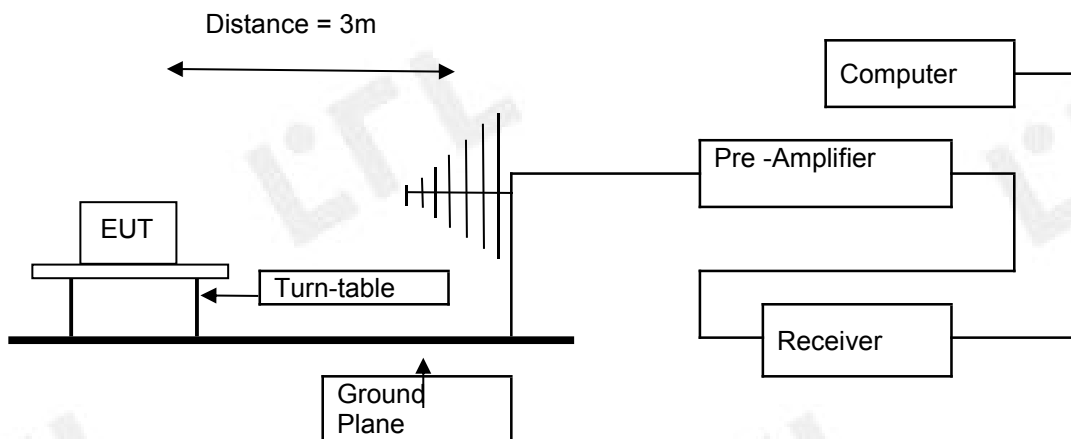
(2) Distance refers to the distance in meters between the test instrument antenna and the closest point of any part of the E.U.T.

#### 4.1.3 Description of the test set-up

##### 4.1.3.1 Operating Condition

The EUT is set to work shall be carried out with full load mode during the test, and the maximum emanating results are recorded.

##### 4.1.3.2 Configuration of test setup



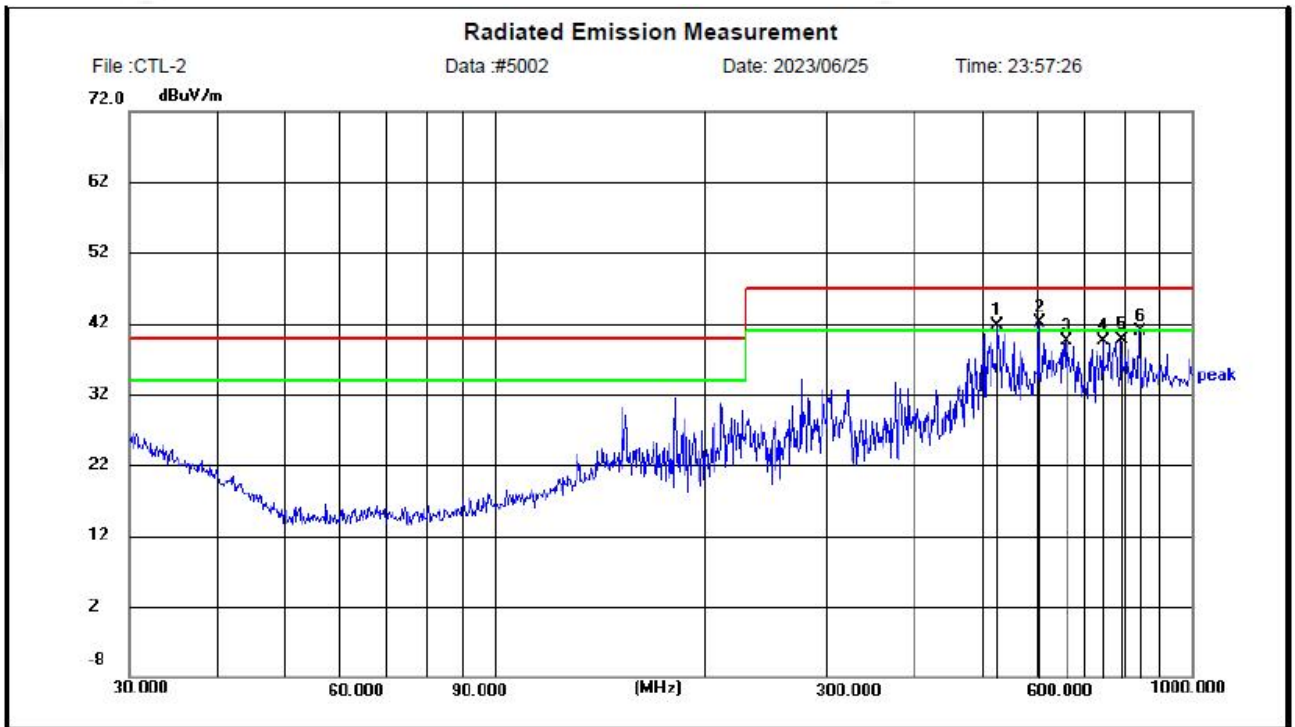
#### 4.1.4 Test result

The requirements are **Fulfilled**

Band Width: 120KHz

Frequency Range: 30MHz to 1000MHz

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



Site LAB Chamber 1

Limit: EN IEC 55014-1 RE

EUT: /

M/N: M5

Mode: WORKING

Note: /

/

Polarization: **Horizontal**

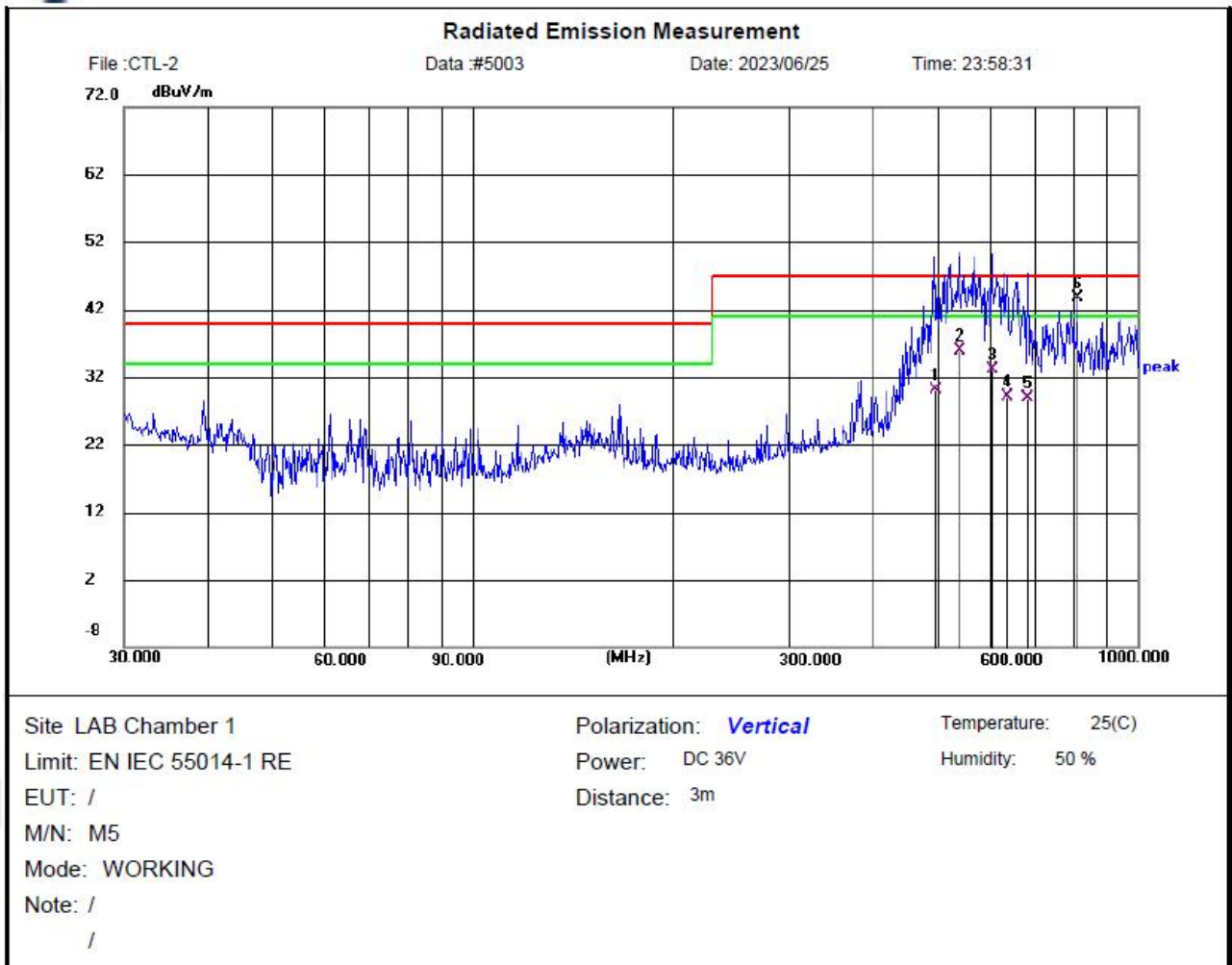
Power: DC 36V

Distance: 3m

Temperature: 25(C)

Humidity: 50 %

No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	526.3967	19.29	22.48	41.77	47.00	5.23	peak	100	137	P	
2	603.5391	19.35	22.68	42.03	47.00	4.97	peak	100	308	P	
3	658.8361	15.40	24.08	39.48	47.00	7.52	peak	100	16	P	
4	744.8660	14.02	25.43	39.45	47.00	7.55	peak	100	203	P	
5	790.6187	13.54	26.09	39.63	47.00	7.37	peak	100	32	P	
6	839.1818	14.51	26.45	40.96	47.00	6.04	peak	100	308	P	



No.	Frequency (MHz)	Reading (dBuV)	Factor (dB/m)	Level (dBuV/m)	Limit (dBuV/m)	Margin (dB)	Detector	Height (cm)	Azimuth (deg.)	P/F	Remark
1	496.2290	8.31	21.88	30.19	47.00	16.81	QP	100	360	P	
2	538.5169	13.54	22.42	35.96	47.00	11.04	QP	100	0	P	
3	604.6736	10.32	22.70	33.02	47.00	13.98	QP	100	360	P	
4	634.4534	5.60	23.59	29.19	47.00	17.81	QP	100	0	P	
5	680.4284	4.30	24.53	28.83	47.00	18.17	QP	100	0	P	
6	810.2654	17.37	26.34	43.71	47.00	3.29	peak	100	177	P	

## 4.2 Conducted disturbance

For test instruments and accessories used see section 3.6.

### 4.2.1 Description of the test location

Test location: Conduction Lab

### 4.2.2 Limits of disturbance

Frequency Range (MHz)	Limits (dBuV)	
	Quasi-Peak	Average
0.150~0.500	66~56	59~46
0.500~5.000	56	46
5.000~30.000	60	50

Note: (1) The tighter limit shall apply at the edge between two frequency bands.

### 4.2.3 Description of the test set-up

According to clause 5.2.2.2 in EN IEC 55014-1:2021 “the general principle to be followed in the application of the artificial hand is that the metal foil shall be wrapped around all handles” and “when the casing of the appliance is of insulating material, metal foil shall be wrapped round the handles”, application of the artificial hand is used.

#### 4.1.3.1 Operating Condition

The EUT is turned on during the test, and the maximum emanating results are recorded.

### 4.2.4 Test result

The requirements are **Fulfilled**

Band Width: 9 KHz

Frequency Range: 0.15MHz to 30 MHz

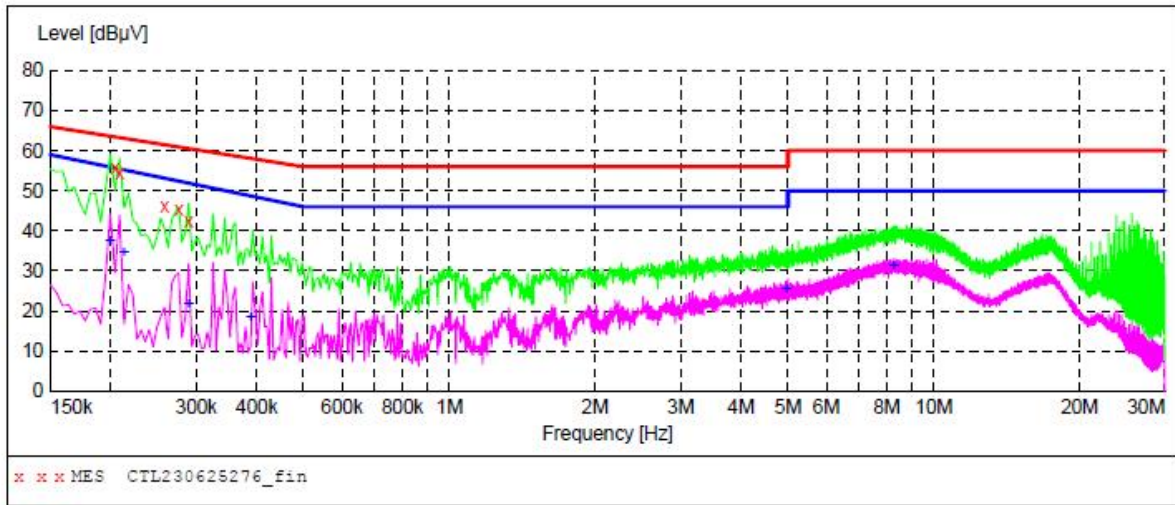
**Remarks:** The limits are kept. For detailed results, please see the following page(s).

**Shenzhen CTL Testing Technology Co., Ltd.**

**Voltage Mains Test EN IEC 55014-1**

EUT: M5  
 Manufacturer: /  
 Operating Condition: Charging  
 Test Site: /  
 Operator: HONG  
 Test Specification: AC 230V/50Hz  
 Comment: /  
 Start of Test: 25/06/2023 / 17:08:51

**SCAN TABLE: "Voltage (9K-30M) FIN"**  
 Short Description: 150K-30M Voltage



**MEASUREMENT RESULT: "CTL230625276\_fin"**

25/06/2023 17:11

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.204000	55.50	10.0	63	7.9	QP	L1	GND
0.208500	54.50	10.0	63	8.8	QP	L1	GND
0.258000	46.20	10.0	62	15.3	QP	L1	GND
0.276000	45.30	10.0	61	15.6	QP	L1	GND
0.289500	42.50	10.0	61	18.0	QP	L1	GND

**MEASUREMENT RESULT: "CTL230625276\_fin2"**

25/06/2023 17:11

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.199500	37.30	10.0	56	18.6	AV	L1	GND
0.213000	34.60	10.0	55	20.6	AV	L1	GND
0.289500	21.80	10.0	52	30.1	AV	L1	GND
0.388500	18.20	10.0	49	30.5	AV	L1	GND
4.956000	25.30	10.2	46	20.7	AV	L1	GND
8.250000	31.30	10.2	50	18.7	AV	L1	GND

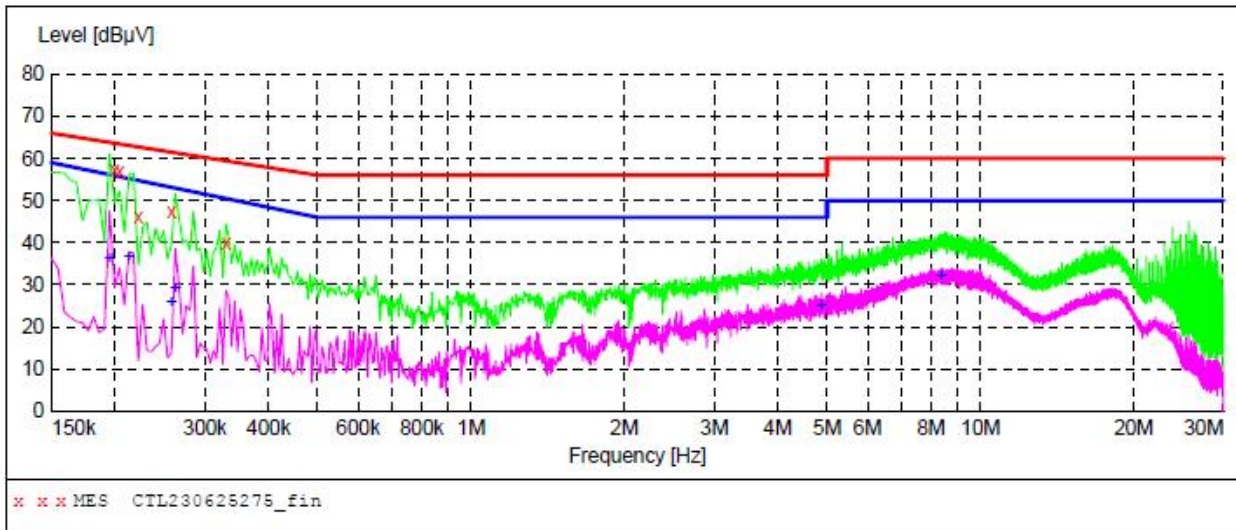


**Shenzhen CTL Testing Technology Co., Ltd.**

**Voltage Mains Test EN IEC 55014-1**

EUT: M5  
 Manufacturer: /  
 Operating Condition: Charging  
 Test Site: /  
 Operator: HONG  
 Test Specification: AC 230V/50Hz  
 Comment: /  
 Start of Test: 25/06/2023 / 17:05:42

**SCAN TABLE: "Voltage (9K-30M) FIN"**  
 Short Description: 150K-30M Voltage



**MEASUREMENT RESULT: "CTL230625275\_fin"**

25/06/2023 17:07

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.199500	57.30	10.0	64	6.3	QP	N	GND
0.204000	56.80	10.0	63	6.6	QP	N	GND
0.222000	46.20	10.0	63	16.5	QP	N	GND
0.258000	47.20	10.0	62	14.3	QP	N	GND
0.330000	39.70	10.0	60	19.8	QP	N	GND

**MEASUREMENT RESULT: "CTL230625275\_fin2"**

25/06/2023 17:07

Frequency MHz	Level dBµV	Transd dB	Limit dBµV	Margin dB	Detector	Line	PE
0.195000	36.20	10.0	56	20.0	AV	N	GND
0.213000	36.60	10.0	55	18.6	AV	N	GND
0.258000	25.60	10.0	53	27.5	AV	N	GND
0.262500	28.90	10.0	53	24.1	AV	N	GND
4.866000	24.80	10.2	46	21.2	AV	N	GND
8.371500	32.10	10.2	50	17.9	AV	N	GND

### 4.3 Harmonic current

For test instruments and accessories used see section 3.6.

#### 4.3.1 Description of the test location

Test location: Harmonic & Flicker Room

#### 4.3.2 Limits of Harmonic Current

Test configuration and procedure see clause 7.1 of standard EN IEC 61000-3-2: 2019.

#### 4.3.3 Description of the test set-up

##### 4.3.3.1 Operating Condition

The EUT shall operate in the mode of operation described in Section 2.3, and the maximum emanating results are recorded

##### 4.3.3.2 Test Configuration and Procedure

Test configuration and procedure see clause 6.2.2 and Appendix C of standard EN IEC 61000-3-2: 2019.

#### 4.3.4 Test result

<b>Environmental conditions</b>	<b>Temperature</b>	25°C
	<b>Humidity</b>	55.0%RH

The requirements are **Fulfilled**

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

<p><b>Product:</b> M5</p> <p>Serial no:</p> <p>Description:</p> <p><b>Test Date:</b> 2023 Jun 26 11:20</p> <p>Result Name:</p>	<p>2023 Jun 26 11:30</p> <p>Page 1 of 1</p>																																							
<p><b>Type of Test:</b> EN61000:2006 Harmonics inc. interharmonics to EN61000-4-7:2002</p> <p><b>Limits:</b> Class A</p> <p><b>Power Analyzer:</b> Voltech PM6000 SN: 200006700717 Firmware version: v1.22.07RC6</p> <p>Channel(s):</p> <p>1. SN: 090015502540, 28 Adjusted Date: 20 JUN 2013. 2. SN:None Adjusted Date:None</p> <p>3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None</p> <p>5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None</p> <p>Shunt(s):</p> <p>1. SN: 091024303148, 4 Adjusted Date: 20 JUN 2013. 2. SN:None Adjusted Date:None</p> <p>3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None</p> <p>5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None</p> <p><b>AC Source:</b> Mains / Manual Source</p>																																								
<p><b>Harmonic Results Against Chosen Limits:</b></p> <p style="font-size: 2em; color: green; text-align: center; margin-top: 20px;"><b>PASS</b></p>	<p><b>Notes:</b></p> <p>Supply Voltage outside permitted limits</p>																																							
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: left;">Test Parameter Details</th> <th style="text-align: center;">User Entered</th> <th style="text-align: center;">Measured</th> </tr> </thead> <tbody> <tr> <td>Operating Frequency:</td> <td style="text-align: center;">50</td> <td style="text-align: center;">49.9840</td> </tr> <tr> <td>Operating Voltage:</td> <td style="text-align: center;">230</td> <td style="text-align: center;">225.3414</td> </tr> <tr> <td>Specified Power:</td> <td style="text-align: center;">0.0000</td> <td style="text-align: center;">81.4006</td> </tr> <tr> <td>Fundamental Current:</td> <td style="text-align: center;">0.2690</td> <td style="text-align: center;">0.3710</td> </tr> <tr> <td>Power Factor:</td> <td style="text-align: center;">0.0170</td> <td style="text-align: center;">0.4455</td> </tr> <tr> <td>Average Input Current:</td> <td></td> <td style="text-align: center;">0.8058</td> </tr> <tr> <td>Maximum POHC:</td> <td></td> <td style="text-align: center;">0.1030</td> </tr> <tr> <td>POHC Limit:</td> <td></td> <td style="text-align: center;">0.2514</td> </tr> <tr> <td>Maximum THC:</td> <td></td> <td style="text-align: center;">0.7259</td> </tr> <tr> <td>Minimum Power:</td> <td style="text-align: center;">75</td> <td></td> </tr> <tr> <td>Class Multiplier:</td> <td style="text-align: center;">1.0000</td> <td></td> </tr> <tr> <td>Test Duration:</td> <td style="text-align: center;">00:02:30</td> <td></td> </tr> </tbody> </table>		Test Parameter Details	User Entered	Measured	Operating Frequency:	50	49.9840	Operating Voltage:	230	225.3414	Specified Power:	0.0000	81.4006	Fundamental Current:	0.2690	0.3710	Power Factor:	0.0170	0.4455	Average Input Current:		0.8058	Maximum POHC:		0.1030	POHC Limit:		0.2514	Maximum THC:		0.7259	Minimum Power:	75		Class Multiplier:	1.0000		Test Duration:	00:02:30	
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Minimum Power:	75																																							
Class Multiplier:	1.0000																																							
Test Duration:	00:02:30																																							

<b>CTL</b>		2023 Jun 26 12:58 Page 1 of 1
Product: M5		
Serial no:		
Description:		
Result Name:		
Voltech IEC61000-3 Windows Software 1.24.12		Test Date: 2023 Jun 26 12:28
Type of Test: Fluctuating Harmonics Test - Worst Case Table (2006)		
Power Analyzer: Voltech PM6000 SN: 200006700717 Firmware version: v1.22.07RC6		
Channel(s):		
1. SN: 090015502540, 28 Adjusted Date: 20 JUN 2013. 2. SN:None Adjusted Date:None		
3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None		
5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None		
Shunt(s):		
1. SN: 091024303148, 4 Adjusted Date: 20 JUN 2013. 2. SN:None Adjusted Date:None		
3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None		
5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None		
AC Source: Mains / Manual Source		
Overall Result:  <b>PASS</b>	Notes: Source voltage lower than nominal	

Class	Class A
Class Multiplier	1

Harm	Limit 1	Limit 2	Average Reading	<L1 <L2	Max Reading	<L2	Pass FAIL	Harm	Limit 1	Limit 2	Average Reading	<L1 <L2	Max Reading	<L2	Pass FAIL
2	1.0800A	1.6200A	2.581mA	N/A	2.705mA	N/A	N/A	3	2.3000A	3.4500A	351.8mA	✓ ✓	352.9mA	✓	Pass
4	430.0mA	645.0mA	3.944mA	N/A	4.119mA	N/A	N/A	5	1.1400A	1.7100A	330.2mA	✓ ✓	331.6mA	✓	Pass
6	300.0mA	450.0mA	5.065mA	✓ ✓	5.290mA	✓	Pass	7	770.0mA	1.1550A	299.8mA	✓ ✓	301.7mA	✓	Pass
8	230.0mA	345.0mA	5.712mA	✓ ✓	5.954mA	✓	Pass	9	400.0mA	600.0mA	262.5mA	✓ ✓	264.9mA	✓	Pass
10	184.0mA	276.0mA	6.011mA	✓ ✓	6.305mA	✓	Pass	11	330.0mA	495.0mA	221.1mA	✓ ✓	224.0mA	✓	Pass
12	153.3mA	230.0mA	5.979mA	✓ ✓	6.283mA	✓	Pass	13	210.0mA	315.0mA	178.8mA	✓ ✓	182.1mA	✓	Pass
14	131.4mA	197.1mA	5.591mA	✓ ✓	5.904mA	✓	Pass	15	150.0mA	225.0mA	138.4mA	✓ ✓	141.9mA	✓	Pass
16	115.0mA	172.5mA	4.927mA	N/A	5.230mA	✓	Pass	17	132.3mA	198.5mA	102.4mA	✓ ✓	105.9mA	✓	Pass
18	102.2mA	153.3mA	4.044mA	N/A	4.333mA	N/A	N/A	19	118.4mA	177.6mA	73.38mA	✓ ✓	76.55mA	✓	Pass
20	92.00mA	138.0mA	3.114mA	N/A	3.393mA	N/A	N/A	21	107.1mA	160.7mA	53.52mA	✓ ✓	56.00mA	✓	Pass
22	83.63mA	125.4mA	2.270mA	N/A	2.502mA	N/A	N/A	23	97.82mA	146.7mA	42.89mA	✓ ✓	44.49mA	✓	Pass
24	76.66mA	115.0mA	1.696mA	N/A	1.874mA	N/A	N/A	25	90.00mA	135.0mA	38.49mA	✓ ✓	39.44mA	✓	Pass
26	70.76mA	106.1mA	1.424mA	N/A	1.532mA	N/A	N/A	27	83.33mA	125.0mA	35.44mA	✓ ✓	36.12mA	✓	Pass
28	65.71mA	98.57mA	1.368mA	N/A	1.517mA	N/A	N/A	29	77.58mA	116.3mA	31.72mA	✓ ✓	32.48mA	✓	Pass
30	61.33mA	92.00mA	1.331mA	N/A	1.487mA	N/A	N/A	31	72.58mA	108.8mA	26.24mA	✓ ✓	27.12mA	✓	Pass
32	57.50mA	86.25mA	1.238mA	N/A	1.398mA	N/A	N/A	33	68.18mA	102.2mA	19.97mA	✓ ✓	20.96mA	✓	Pass
34	54.11mA	81.17mA	1.016mA	N/A	1.176mA	N/A	N/A	35	64.28mA	96.42mA	14.28mA	✓ ✓	15.27mA	✓	Pass
36	51.11mA	76.66mA	0.840mA	N/A	0.984mA	N/A	N/A	37	60.81mA	91.21mA	10.43mA	✓ ✓	11.11mA	✓	Pass
38	48.42mA	72.63mA	0.654mA	N/A	0.774mA	N/A	N/A	39	57.69mA	86.53mA	9.890mA	✓ ✓	10.31mA	✓	Pass
40	46.00mA	69.00mA	0.595mA	N/A	0.682mA	N/A	N/A								

<L1 : Reading is below limit 1.

<L2 : Reading is below limit 2.

N/A : Harmonic current below 0.6% of rated current or 5mA, whichever is greater, are disregarded.

#### 4.4 Voltage fluctuations and flicker

For test instruments and accessories used see section 3.6.

##### 4.4.1 Description of the test location

Test location: Harmonic & Flicker Room

##### 4.4.2 Limits of Voltage Fluctuation and Flicker

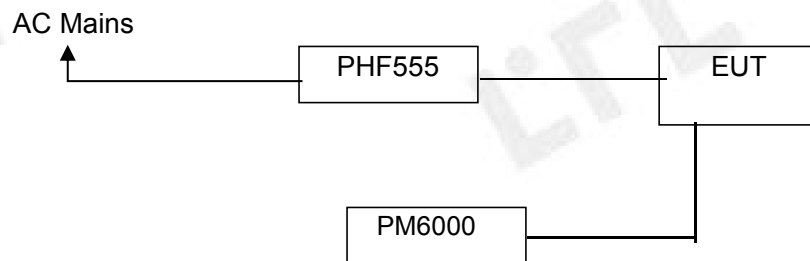
Test configuration and procedure see clause 5 of standard EN 61000-3-3:2013/A2:2021.

##### 4.4.3 Description of the test set-up

###### 4.4.3.1 Operating Condition

The EUT shall operate in the mode of operation described in Section 2.3, and the maximum emanating results are recorded.

###### 4.4.3.2 Configuration of test setup



##### 4.4.4 Test result

Environmental conditions	Temperature	25°C
	Humidity	55.0%RH

The requirements are **Fulfilled**

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

<b>CTL</b>	
Product: M5	2023 Jun 26 11:17
Serial no:	Page 1 of 1
Description:	
Result Name:	
Voltech IEC61000-3 Windows Software 1.24.12	Test Date: 2023 Jun 26 08:47
Type of Test:	Flickermeter Test - Table
Power Analyzer:	Voltech PM6000 SN: 200006700717 Firmware Version: v1.22.07RC6
Channel(s):	1. SN: 090015502540, 28 Adjusted Date: 20 JUN 2013. 2. SN:None Adjusted Date:None
	3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None
	5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None
Shunt(s):	1. SN: 091024303148, 4 Adjusted Date: 20 JUN 2013. 2. SN:None Adjusted Date:None
	3. SN:None Adjusted Date:None 4. SN:None Adjusted Date:None
	5. SN:None Adjusted Date:None 6. SN:None Adjusted Date:None
AC Source:	Mains / Manual Source
Overall Result:	Notes:
PASS	Plt test duration 120 minutes Measurement method - Voltage Source voltage higher than nominal

	Plt
Limit	0.650
Reading	0.089

	Pst	dc (%)	dmax (%)	d(t) > 3.3%(ms)
Limit	1.000	3.300	4.000	500
Reading 1	0.089	0.000	0.685	0
Reading 2	0.089	0.000	0.682	0
Reading 3	0.089	0.000	0.676	0
Reading 4	0.089	0.000	0.674	0
Reading 5	0.089	0.000	0.670	0
Reading 6	0.089	0.000	0.671	0
Reading 7	0.089	0.000	0.671	0
Reading 8	0.089	0.000	0.673	0
Reading 9	0.089	0.000	0.670	0
Reading 10	0.089	0.000	0.668	0
Reading 11	0.089	0.000	0.668	0
Reading 12	0.088	0.000	0.667	0

## 4.5 Electrostatic discharge

For test instruments and accessories used see section 3.6.

### 4.5.1 Description of the test location and date

Test location: 1# EMC Test Room

Date of test: June 29, 2023

Operator: Evelyn Liao

### 4.5.2 Severity levels of electrostatic discharge

Level	Test Voltage Contact Discharge (KV)	Test Voltage Air Discharge (KV)
1	2	2
2	4	4
3	6	8
4	8	15
X	Special	Special

### 4.5.3 Description of the test set-up

#### 4.5.3.1 Operating Condition

The EUT is on mode during the test, and the results of the maximum susceptibility are recorded.

#### 4.5.3.2 Test Configuration and Procedure:

Air Discharge:

- This test is done on a non-conductive surfaces. The round discharge tip of the Electrostatic Discharge simulator shall be approached as fast as possible then to touch the EUT. After each discharge, the simulator shall be removed from the EUT. The simulator is then re-triggered for a new single discharge and repeated 10 times for each pre-selected test point. This procedure shall be repeated until all the air discharge completed

Contact Discharge:

- All the procedure shall be same as air discharge, except using the acute discharge tip. The top end of the Electrostatic Discharge simulator is touch the EUT all the time when the simulator is re-triggered for a new single discharge and repeated 10 times for each pre-selected test point.

Indirect Discharge:

- The vertical coupling plane(VCP) is placed 0.1m away from EUT. The top end of Electrostatic Discharge simulator should aim at the center of one border of the VCP for at least 10 times discharge.
- The top end of Electrostatic Discharge simulator should place at the point 0.1m away from EUT on the horizontal coupling plane(HCP). At least 10 times discharge should be done for every pre-selected point around EUT.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

**4.5.4 Test specification:**Contact discharge voltage:
 2 kV       4 kV
Air discharge voltage:
 2 kV       4 kV       8 kV
Events(every polarity) /per point:
 10
Time between events:
 1 s
Type of discharge:
 Direct discharge

 Air discharge

 Contact discharge

 Indirect discharge

 Contact discharge
Polarity:
 Positive

 Negative
Discharge location:
 all external locations accessible by hand

 horizontal coupling plane (HCP)

 vertical coupling plane (VCP)
**4.5.5 Test result**

<b>Environmental conditions</b>	<b>Temperature</b>	23°C
	<b>Humidity</b>	48.0%RH

The requirements are **Fulfilled**Performance Criterion: **B****Remarks:** During the test no deviation was detected to the selected operation mode(s).



### 4.6 Radiated, radio-frequency, electromagnetic field

For test instruments and accessories used see section 3.5.

#### 4.6.1 Description of the test location and date

Test location: Chamber 2

Date of test: June 29, 2023

Operator: Evelyn Liao

#### 4.6.2 Severity levels of radiated, radio-frequency, electromagnetic field

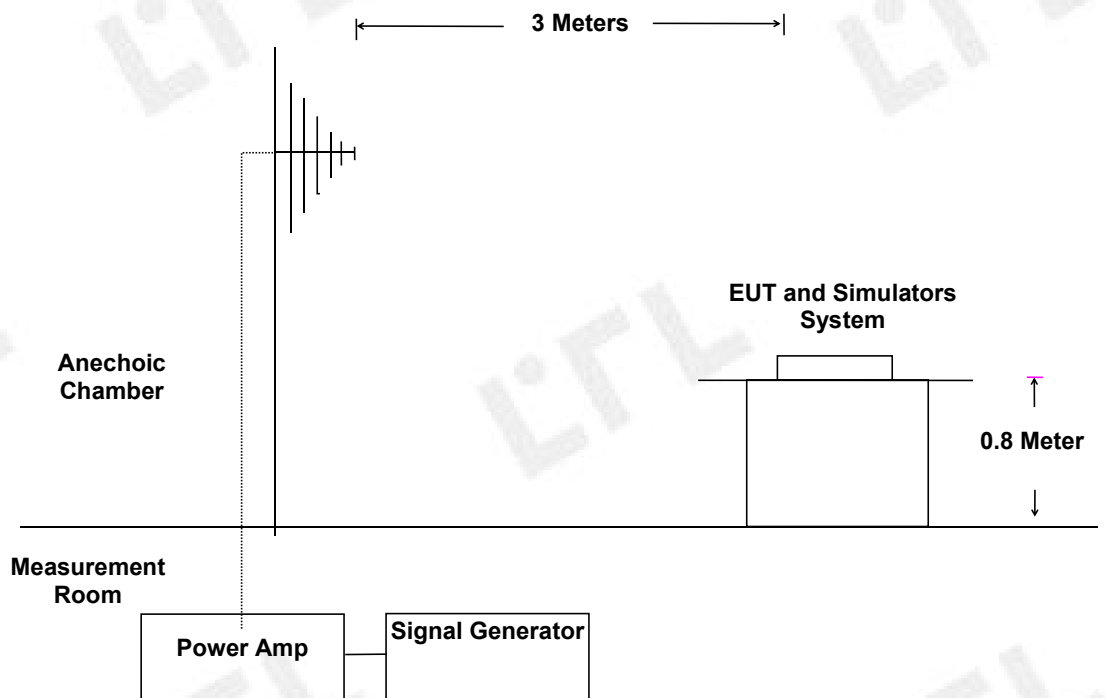
Level	Field Strength (V/m)
1.	1
2.	3
3.	10
X	Special

#### 4.6.3 Description of the test set-up

##### 4.6.3.1 Operating Condition

The EUT is set to work shall be carried out normal working mode during the test, and the results of the maximum susceptible results are recorded.

##### 4.6.3.2 Test setup



**4.6.4 Test specification:**

- Frequency range: ■ 80 MHz to 1000 MHz
- Field strength: ■ 3 V/m
- EUT - antenna separation: ■ 3 m
- Modulation: ■ AM: 80 %  
■ sinusoidal 1000Hz
- Frequency step: ■ 1 % with 1 s dwell time
- Antenna polarisation: ■ horizontal ■ vertical

**4.6.5 Test result**

<b>Environmental conditions</b>	<b>Temperature</b>	25°C
	<b>Humidity</b>	55.0%RH

The requirements are **Fulfilled**

Performance Criterion: **A**

**Remarks:** During the test no deviation was detected to the selected operation mode(s).

## 4.7 Electrical fast transients / Burst

For test instruments and accessories used see section 3.6.

### 4.7.1 Description of the test location and date

Test location: 2# EMC Test Room

Date of test: June 29, 2023

Operator: Evelyn Liao

### 4.7.2 Severity levels of electrical fast transients / Burst

Open circuit output test voltage and repetition rate of the impulses		
Level	On power port, PE	
	V peak(KV)	Repetition rate (KHz)
1.	0.5	5 or 100
2.	1	5 or 100
3.	2	5 or 100
4.	4	5 or 100
X	Special	Special

### 4.7.3 Description of the test set-up

#### 4.7.3.1 Operating Condition

The EUT is ON during the test, and the results of the maximum susceptible results are recorded.

#### 4.7.3.2 Test Configuration and Procedure

For AC power input ports:

—The EUT is connected to coupling/decoupling network which couples the EFT signal to power input lines. During the test, both polarities of the test voltage should be applied and the duration of the test can't be less than 1mins.

Without signal / control lines and DC power lines, The EUT is unnecessary to test on these mentioned ports.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

### 4.7.4 Test specification:

Coupling network:  0.5 kV  1 kV  2 kV

Coupling clamp:  0.5 kV  1 kV

Burst frequency:  5.0 kHz

Coupling duration:  120 s

Polarity:  positive  negative

### 4.7.5 Coupling points

Cable description: AC power line : L, N, L+N

Screening:                   o screened                   ■ unscreened  
Status:                     o passive                   ■ active  
Signal transmission:     ■ analogue                 o digital  
Length:                    ■ 0.8 m

#### 4.7.6 Test result

Environmental conditions	Temperature	25°C
	Humidity	55.0%RH

The requirements are **Fulfilled**

Performance Criterion: **B**

**Remarks:**     During the test no deviation was detected to the selected operation mode(s).

## 4.8 Surge

For test instruments and accessories used see section 3.6.

### 4.8.1 Description of the test location and date

Test location: 2# EMC Test Room

Date of test: June 29, 2023

Operator: Evelyn Liao

### 4.8.2 Severity levels of surge

Level	Test Voltage (KV)
1	0.5
2	1.0
3	2.0
4	4.0
*	Special

### 4.8.3 Description of the test set-up

#### 4.8.3.1 Operating Condition

The EUT is ON during the test, and the results of the maximum susceptible results are recorded.

#### 4.8.3.2 Test Configuration and Procedure

In this test, the 1.2/50us& 8/20us surge generator must be used for AC power ports. The voltage for line to earth coupling mode is 1 time more than that for line to line. At least 5 positive and 5 negative (polarity) surge signal with a maximum 1/min repetition rate are injected to AC power lines from 2 different phase angle(90°, 270°) during the test.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

### 4.8.4 Test specification:

Pulse amplitude-Power line sym.:

0.5 kV    1 kV    2 kV    4 kV

Source impedance: 2 Ω

Pulse amplitude-Power line unsym.:

0.5 kV    1 kV    2 kV    4 kV

Source impedance: 12 Ω

Number of surges:

5 Surges/Phase angle

Phase angle:

0°    90°    180°    270°

Repetition rate:

60 s

Polarity:

positive    negative

#### 4.8.5 Coupling points

Cable description:

AC power line: L, N

---

Screening:

screened

unscreened

Status:

passive

active

Signal transmission:

analogue

digital

Length:

0.8 m

#### 4.8.6 Test result

Environmental conditions	Temperature	25°C
	Humidity	55.0%RH

The requirements are **Fulfilled**

Performance Criterion: **B**

**Remarks:** During the test no deviation was detected to the selected operation mode(s).

---

## 4.9 Conducted disturbances induced by radio-frequency fields

For test instruments and accessories used see section 3.6.

### 4.9.1 Description of the test location date

Test location: 3# EMC Test Room

Date of test: June 29, 2023

Operator: Evelyn Liao

### 4.9.2 Severity levels of conducted disturbances induced by radio-frequency fields

Level	Field Strength (V)
1.	1
2.	3
3.	10
X	Special

### 4.9.3 Description of the test set-up

#### 4.9.3.1 Operating Condition

The EUT is ON during the test, and the results of the maximum susceptible results are recorded.

#### 4.9.3.2 Test Configuration and Procedure

EUT is placed on an insulating support of 0.1m high above a ground reference plane. It must be 0.3m away the CDN (coupling and decoupling network) of which the bottom is made of metallic material and placed directly on the ground plane. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50 mm (where possible). The disturbance signal amplified by amplifier is injected to EUT through CDN.

Record any performance degradation of the EUT during the test and judge the test result according to performance criterion.

### 4.9.4 Test specification:

<u>Frequency range:</u>	■ 0.15 MHz to 230 MHz
<u>Test voltage:</u>	■ 3 V
<u>Modulation:</u>	■ AM: 80 % ■ sinusoidal 1000Hz
<u>Frequency step:</u>	■ 1 % with 1 s dwell time

#### 4.9.5 Coupling points

Cable description (Port1):

AC power line

---

Screening:

screened

unscreened

Status:

passive

active

Signal transmission:

analogue

digital

Length:

0.8 m

#### 4.9.6 Test result

Environmental conditions	Temperature	25°C
	Humidity	55.0%RH

The requirements are **Fulfilled**

Performance Criterion: **A**

**Remarks:** During the test no deviation was detected to the selected operation mode(s).



## 4.10 Voltage dips and short interruptions

For test instruments and accessories used see section 3.6.

### 4.10.1 Description of the test location and date

Test location: 2# EMC Test Room

Date of test: June 29, 2023

Operator: Evelyn Liao

### 4.10.2 Severity levels of voltage Dips and Interruptions

Test Level (%Ut)	Voltage Dip And Short Interruptions (%Ut)	Performance Criterion	Duration (In Period)
0	100	C	0.5
70	30	C	25
40	60	C	10

### 4.10.3 Description of the test set-up

#### 4.10.3.1 Operating Condition

The EUT is ON during the test, and the results of the maximum susceptible results are recorded.

#### 4.10.3.2 Test Configuration and Procedure

EUT is connected to the simulator according to the setup outline of 12.3. When conducting the test level of 0.5 period duration, make sure that it shall start at the phase angle of 0° and 180°

### 4.10.4 Test specification:

Nominal Mains Voltage (V<sub>N</sub>): ■ 230 V AC

Number of voltage fluctuations: ■ 3

Level of reduction(dip) / duration: ■ 100 % / 10ms ■ 30 % / 500ms ■ 60 % / 200ms

### 4.10.5 Test result

Environmental conditions	Temperature	25°C
	Humidity	55.0%RH

The requirements are **Fulfilled**  
Performance Criterion **See section 4.11.2**

**Remarks:** During the test no deviation was detected to the selected operation mode(s).

## 5 Test Setup Photos

RADIATED EMISSION TEST



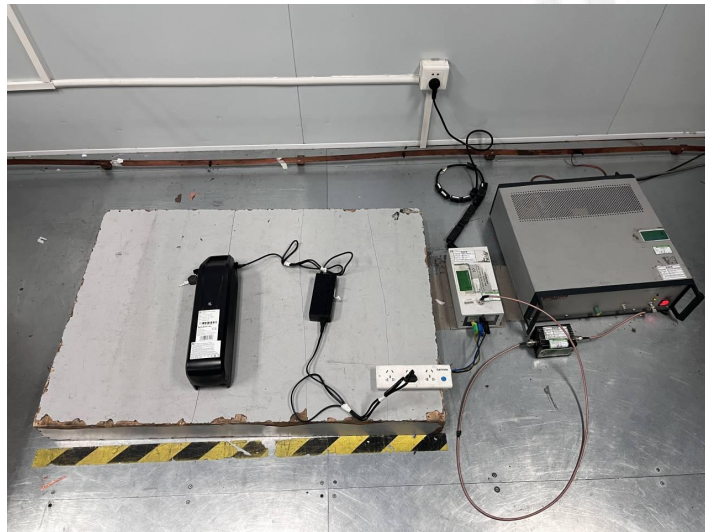
CONDUCTION EMISSION TEST



HARMONIC & FLICKER TEST



CONDUCTED SUSCEPTIBILITY TEST



EFT TEST&SURGE TEST&VOLTAGE DIPS AND INTERRUPTIONS TEST



ESD TEST



RS TEST



## 6 Photos of the EUT

