



## EMC TEST REPORT

Product Name: Laser Module

Trade mark: Civillaser

Model No.: IRLaserModule

S/N: /

Report No.: CTB240606028EX

Applicant: Hangzhou NaKu Technology Co., Ltd

Address: Binjiang District Xincheng Road NO.99 KaiHe Mansion, 215 Room, Hangzhou, Zhejiang, China

Manufacturer: Hangzhou NaKu Technology Co., Ltd

Address: Binjiang District Xincheng Road NO.99 KaiHe Mansion, 215 Room, Hangzhou, Zhejiang, China

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Date of Receipt: May 30, 2024

Date of Test(s): May 31, 2024 ~ Jun. 05, 2024

Date of Issue: Jun. 24, 2024

Test Standard(s): EN IEC 61326-1:2021, EN IEC 61000-3-2:2019+A1:2021, EN 61000-3-3:2013+A1:2019+A2:2021

Test Result: Pass

In the configuration tested, the EUT complied with the standards specified above.

Compiled by:

*Blake Cai*

Blake Cai

Reviewed by:

*Bin Mei*

Bin Mei

Approved by:



Rita Xiao

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## Table of Contents

1.	Description of version .....	3
2.	TEST SUMMARY .....	4
3.	Measurement uncertainty .....	5
4.	GENERAL INFORMATION .....	6
4.1.	Description of EUT .....	6
4.2.	Description of accessory device .....	6
4.3.	Test conditions .....	6
4.4.	Block diagram of EUT configuration .....	6
4.5.	Operating condition of EUT .....	6
5.	List of test and measurement instruments .....	7
6.	Emission .....	10
6.1.	Mains terminal disturbance voltage .....	10
6.2.	Radiated emissions .....	13
6.3.	Harmonic current emissions .....	16
6.4.	Voltage changes, voltage fluctuations and flicker .....	17
7.	Immunity .....	19
7.1.	Electrostatic discharges (ESD) .....	20
7.2.	Electromagnetic field .....	22
7.3.	Electrical fast transients/burst (EFT/B) .....	24
7.4.	Surges .....	26
7.5.	Radio-frequency common mode .....	28
7.6.	Power frequency magnetic field .....	30
7.7.	Voltage dips and Short interruptions .....	32
8.	Photographs of test setup .....	33
9.	Photographs of EUT .....	37

**1. Description of version**

Report No.	Issue Date	Description	Approved
CTB240606028EX	Jun. 24, 2024	Original	Valid



**2. TEST SUMMARY**

Emission		
Test Item	Test Method	Result
Conducted Emission	EN IEC 61326-1	PASS
Radiated emissions at frequencies up to 1 GHz		PASS
Harmonic current emissions	EN IEC 61000-3-2	N/A <sup>2</sup>
Voltage changes, voltage fluctuations and flicker	EN 61000-3-3	PASS
Immunity		
Test Item	Test Method	Result
Electrostatic discharges (ESD)	EN 61000-4-2	PASS
Electromagnetic field	EN 61000-4-3	PASS
Electrical fast transients/burst (EFT/B)	EN 61000-4-4	PASS
Surges	EN 61000-4-5	PASS
Conducted RF	EN 61000-4-6	PASS
Power frequency magnetic field	EN 61000-4-8	N/A <sup>1</sup>
Voltage dips and Short interruptions	EN 61000-4-11	PASS

Remark: N/A is abbreviation for Not Applicable.

The test was carried out in all the test modes, only the worst data are list in report.

1. The Product doesn't contain any device susceptible to magnetic fields.
2. The Product belongs to Class A, and its power is less than 75W, so it deems to fulfil this standard without testing.

### 3. Measurement uncertainty

The reported uncertainty of measurement  $y \pm U$ , where expanded uncertainty  $U$  is based on a standard uncertainty multiplied by a coverage factor of  $k=2$ , providing a level of confidence of approximately 95 %

Test Item	Frequency	Expanded Uncertainty ( $U_{Lab}$ )
Conducted Emission	150 kHz to 30 MHz	$\pm 3.1$ dB
Radiated Emission	30 MHz to 1000 MHz	$\pm 4.1$ dB
Radiated Emission	1000 MHz to 6000 MHz	$\pm 4.8$ dB

## 4. GENERAL INFORMATION

### 4.1. Description of EUT

Equipment	Laser Module
Trade mark	Civillaser
Model Name	IRLaserModule
Serial Model No.	/
Model Difference	/
Rated Power	/
Rated Voltage& current	12V $\overline{\sim}$ 5A
Configuration	<input checked="" type="checkbox"/> Table-top <input type="checkbox"/> Floor-standing
Equipment category	<input checked="" type="checkbox"/> 1 Group <input type="checkbox"/> 2 Group <input type="checkbox"/> A Classes <input checked="" type="checkbox"/> B Classes
Adapter Information	Model No.: SPF-1205 Input: AC 100-240V 50/60Hz Output: 12V $\overline{\sim}$ 5A

**Note:** The above EUT information is declared by manufacturer and for more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

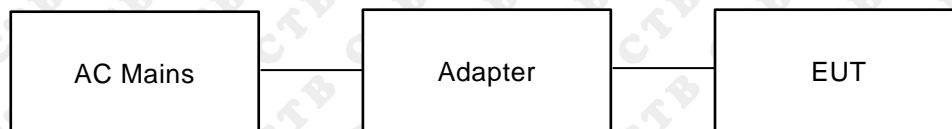
### 4.2. Description of accessory device

No.	Device Type	Brand	Model	Specification	Note
/	/	/	/	/	/

### 4.3. Test conditions

Temperature: 15-25°C  
Relative Humidity: 30-60 %  
Atmospheric pressure: 800hPa-1060hPa

### 4.4. Block diagram of EUT configuration



### 4.5. Operating condition of EUT

Operating condition	Mode 1	Working	Test Voltage	AC 230V/50Hz
Note: This test covers all possible operating modes of the device, only the worst data are listed in the report. The worst data are shown (*) is the nearest standard limit which were recorded in this report.				



**5. List of test and measurement instruments**

Continuous disturbance					
No.	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	843 Shield Room	C/ R/ T	843	/	2024/8/11
2	AMN	ROHDE&SCHWARZ	ESH3-Z5	831551852	2024/7/04
3	Pulse limiter	ROHDE&SCHWARZ	ESH3Z2	357881052	2024/7/04
4	EMI TEST RECEIVER	R&S	ESCI	100428	2024/7/04
5	Coaxial cable	ZDECL	Z302S	18091904	2024/7/04
6	ISN	Schwarzbeck	NTFM8158	183	2024/7/07
7	Voltage sensor	Schwarzbeck	TK 9420	01189	2024/11/16
8	EZ-EMC	Frad	EMC-con3A1.1	/	/

Radiated emission(No.1 Chamber)					
No.	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	966 Chamber	C/ R/ T	966	/	2024/8/11
2	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA 9120D	1911	2026/7/07
3	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	869	2024/7/07
4	Amplifier	Agilent	8449B	3008A01838	2024/7/04
5	Amplifier	HP	8447E	2945A02747	2024/7/04
6	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESPI	100362	2024/7/04
7	Spectrum Analyzer	KEYSIGHT	N9020A	MY51289897	2024/7/04
8	Coaxial cable	ETS	RFC-SNS-100-NMS-80 NI	/	2024/7/04
9	Coaxial cable	ETS	RFC-SNS-100-NMS-20 NI	/	2024/7/04
10	Coaxial cable	ETS	RFC-SNS-100-SMS-20 NI	/	2024/7/04
11	Coaxial cable	ETS	RFC-NNS-100-NMS-300 NI	/	2024/7/04
12	EMI test software	Frad	EZ-EMC	Ver/ EMC-con3A1/1	/

Radiated emission(No.2 Chamber)					
No.	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	966 Chamber	C/ R/ T	966	/	2026/11/14
2	Double Ridged Broadband Horn Antenna	Schwarzbeck	BBHA 9120D	1911	2026/7/07
3	Broadband Antenna	Schwarzbeck	VULB 9168	1471	2024/11/17
4	Amplifier	Agilent	8449B	3008A01838	2024/7/04
5	Preamplifier	Schwarzbeck	BBV 9744	/	2024/6/12
6	EMI TEST RECEIVER	R&S	ESCI7	100362	2024/11/27
7	Spectrum Analyzer	KEYSIGHT	N9020A	MY51289897	2024/7/04
8	EMI test software	Farad	EZ-EMC	Ver. FARAD-3A1+	/
9	Coaxial cable	Rosenberg	8m	/	2024/11/27
10	Coaxial cable	Times	2m	/	2024/11/27
11	Coaxial cable	Times	2m	/	2024/11/27
12	Coaxial cable	Times	1m	/	2024/11/27

Harmonic current emission& Voltage changes, voltage fluctuations and flicker					
No.	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Power Analyzer	Laplace Instruments	AC2000A	311363	2024/7/04
2	AC Power source	HTEC Instruments	HPF5010	633088	2024/7/04
3	Flicker & Harmonic software	HTEC	Version 2.0	/	/

Electrostatic discharges					
No.	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	ESD Simulator	TESTQ	NSG437	329	2024/7/07

Surges & Fast transients					
No.	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Surge& Burst Generator	Lioncel	LSG-545CB	180602	2024/7/04
2	Capacitive coupling clamp	Lioncel	EFTC	18071801	2024/7/04



Voltage dips					
No.	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	Voltage dip simulator	Lioncel	VDS-1102	180902	2024/7/04

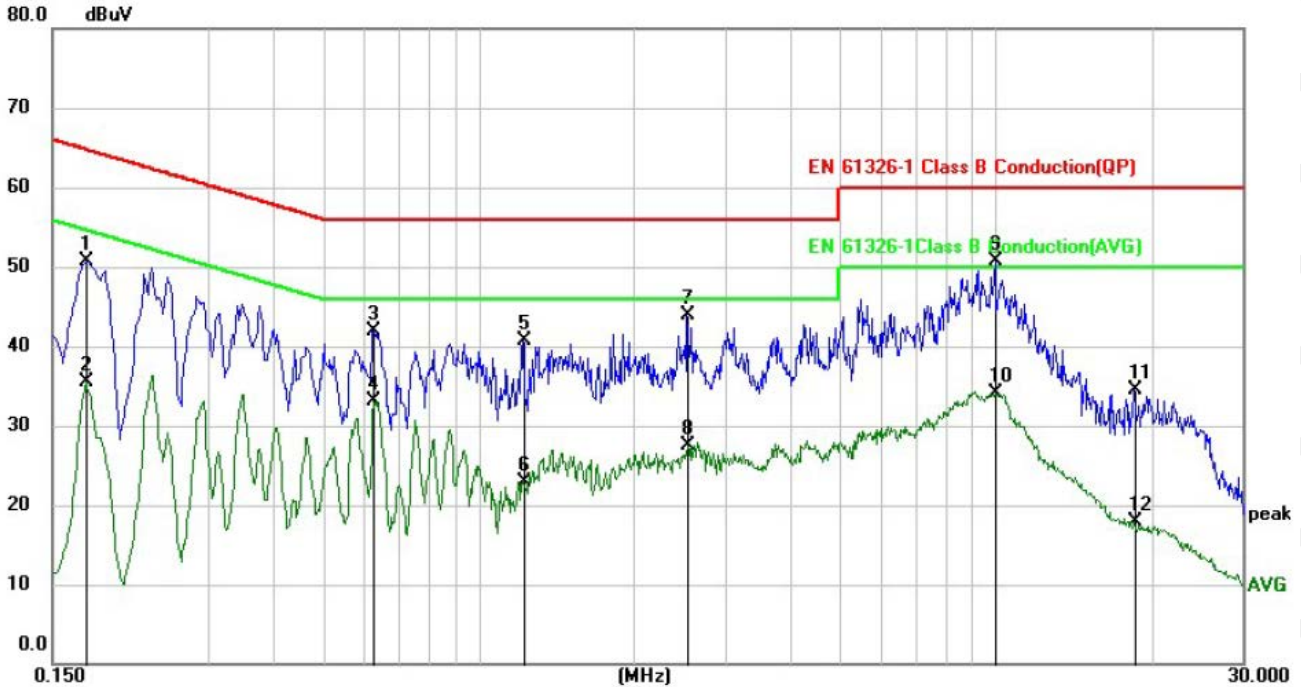
Injected currents					
No.	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	C/S Test System	SKET	CITS-150K230M-7 5W	SK2021060 4	2024/7/04
2	CDN	SKET	CDN-150K230M- M2/M3-16A	21302	2024/7/04
3	CDN	SKET	/	CDNT400	2024/7/04
4	6dB 100Watt Attenuator	SKET	AP-DC01G-100W- N-6dB	/	2024/7/04
5	Electromagnetic Injection Clamp	Prima	PECL-100	/	2024/7/04
6	50Ω Load	SKET	TL-DC01G-2W-50 BNC	/	2024/7/04
7	EMC-S Test software	SKET	V2.0.0.11	/	/

Radio frequency electromagnetic field					
No.	Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	966 Chamber	C/ R/ T	966	/	2024/8/11
2	Signal Generator	Agilent	N5181A	MY50140365	2024/7/04
3	Stacked Double Log.-Per. Antenna	SKET	STLP 9129 Plus	2106070106	/
4	Switch Controller	SKET	RFSU-DC18G -4C	RFSU-DC18G-4 C	/
5	RF Power Meter	Agilent	E9304A	MY41490462	2024/7/04
6	RF Power Meter	Agilent	E9301A	MY41495675	2024/7/04
7	E-Field Probe	Narda	EP-601	811ZX10305	2024/7/06
8	Power Amplifier	SKET	HAP-80M01G- 250W	2106070103	2024/7/04
9	Power Amplifier	SKET	HAP-01G 06G-75W	2106070104	2024/7/04
10	Audio Analysis	R&S	UPV	ATS 1-41152	2024/7/04
11	Audio Output Matching Network	SKET	RCO Network	/	2024/7/04
12	EMC-S Test software	SKET	V2.0.0.19	/	/



### 6.1.4. Test results

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Phase :	Line
Test Voltage :	AC 230V/60Hz	Test Mode:	Mode 1

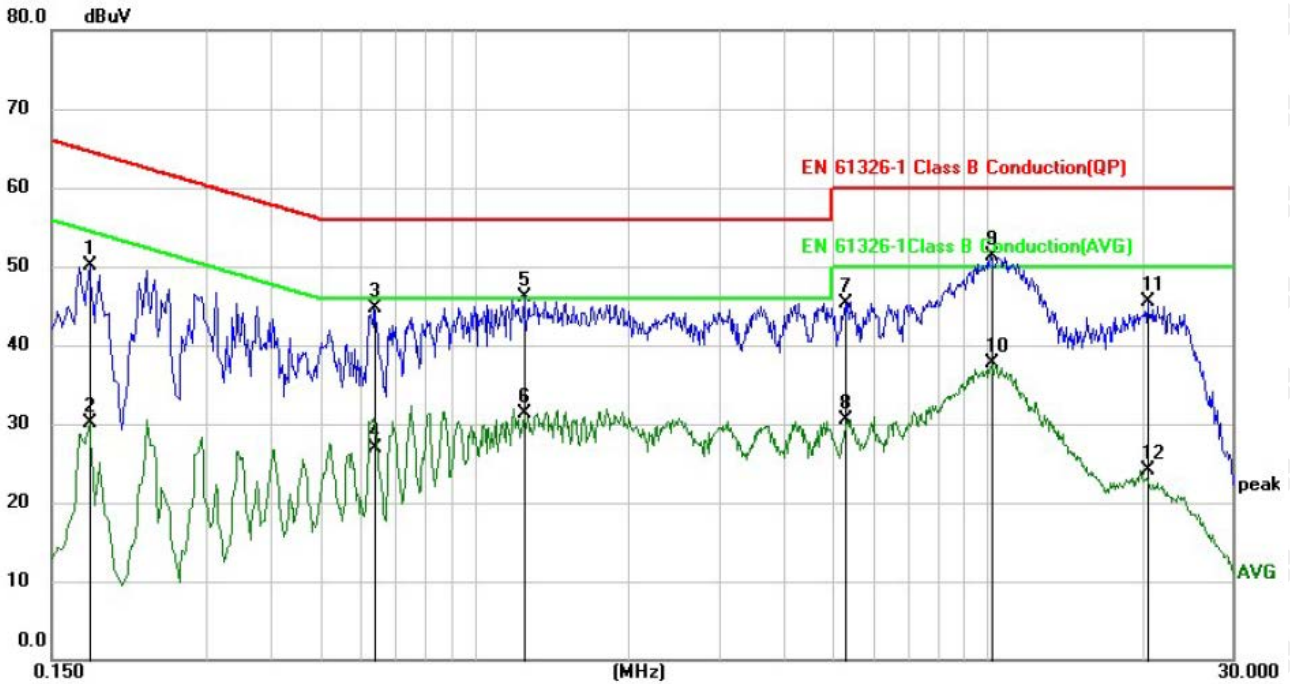


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measurement dBuV	Limit dBuV	Over dB	Detector
1		0.1740	40.84	9.95	50.79	64.77	-13.98	QP
2		0.1740	25.50	9.95	35.45	54.77	-19.32	AVG
3		0.6260	31.86	10.01	41.87	56.00	-14.13	QP
4		0.6260	23.14	10.01	33.15	46.00	-12.85	AVG
5		1.2220	30.60	10.03	40.63	56.00	-15.37	QP
6		1.2220	12.93	10.03	22.96	46.00	-23.04	AVG
7		2.5300	33.67	10.14	43.81	56.00	-12.19	QP
8		2.5300	17.39	10.14	27.53	46.00	-18.47	AVG
9	*	10.0100	40.12	10.58	50.70	60.00	-9.30	QP
10		10.0100	23.60	10.58	34.18	50.00	-15.82	AVG
11		18.5980	23.66	10.79	34.45	60.00	-25.55	QP
12		18.5980	7.14	10.79	17.93	50.00	-32.07	AVG

Note: Result=Reading + Factor  
Over Limit=Result – Limit



Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Phase :	Neutral
Test Voltage :	AC 230V/60Hz	Test Mode:	Mode 1

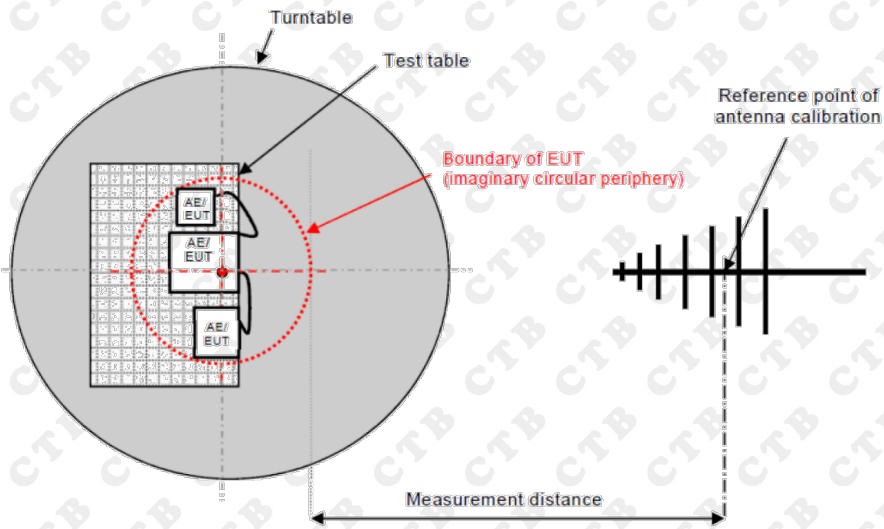


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector
1		0.1780	40.15	9.95	50.10	64.58	-14.48	QP
2		0.1780	20.11	9.95	30.06	54.58	-24.52	AVG
3		0.6380	34.62	10.01	44.63	56.00	-11.37	QP
4		0.6380	16.94	10.01	26.95	46.00	-19.05	AVG
5		1.2540	36.02	10.03	46.05	56.00	-9.95	QP
6		1.2540	21.36	10.03	31.39	46.00	-14.61	AVG
7		5.2940	34.91	10.40	45.31	60.00	-14.69	QP
8		5.2940	20.04	10.40	30.44	50.00	-19.56	AVG
9	*	10.1500	40.69	10.58	51.27	60.00	-8.73	QP
10		10.1500	27.13	10.58	37.71	50.00	-12.29	AVG
11		20.5580	34.63	10.84	45.47	60.00	-14.53	QP
12		20.5580	13.33	10.84	24.17	50.00	-25.83	AVG

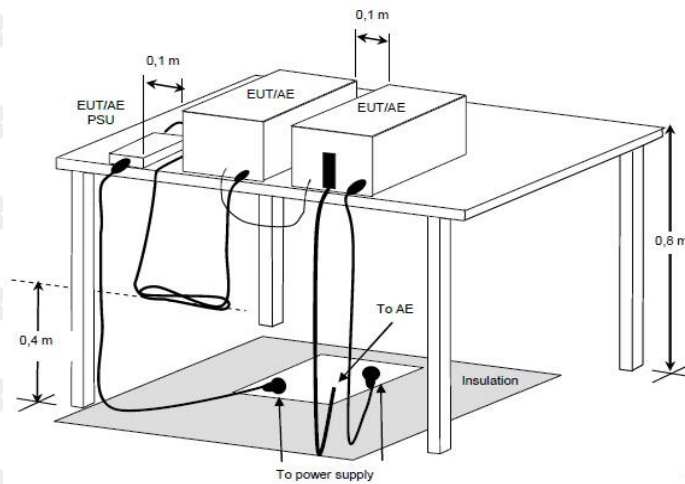
Note: Result=Reading + Factor  
Over Limit=Result - Limit

## 6.2. Radiated emissions

### 6.2.1. Block diagram of test setup



For table-top equipment



### 6.2.2. Limit

Electromagnetic radiation disturbance limits for class B group 1 equipment

Frequency range MHz	Measurement			Class B limits dB(μV/m)
	Facility	Distance m	Detector type / bandwidth	
30 to 230	SAC	3	Quasi Peak / 120 kHz	40
230 to 1 000				47

### 6.2.3. Test procedure

The measurement was performed in a semi-anechoic chamber. The distance from EUT to receiving antenna is 3 meters. Measurement was performed according to clause 7.3 of CISPR 16-2-3.

### 6.2.4. Test results

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Polarization :	Horizontal
Test Voltage :	AC 230V/50Hz	Test Mode:	Mode 1



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		43.3534	29.91	-6.52	23.39	40.00	-16.61	QP
2		106.9461	29.12	-9.05	20.07	40.00	-19.93	QP
3		141.5777	31.91	-5.50	26.41	40.00	-13.59	QP
4	*	177.8207	42.18	-7.65	34.53	40.00	-5.47	QP
5		306.2164	44.34	-5.29	39.05	47.00	-7.95	QP
6		462.3455	35.40	-0.98	34.42	47.00	-12.58	QP

Note: Result=Reading+Factor  
Over Limit=Result-Limit



Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Polarization :	Vertical
Test Voltage :	AC 230V/50Hz	Test Mode:	Mode 1

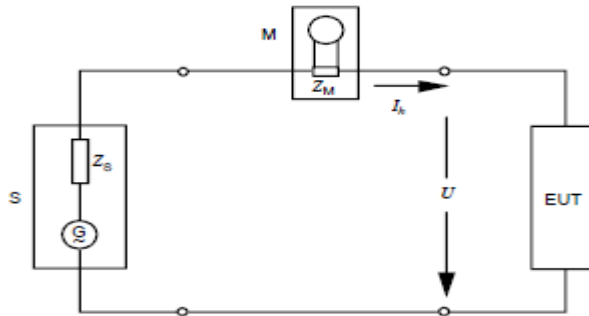


No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dB/m	Over dB	Detector
1		43.3534	36.19	-6.52	29.67	40.00	-10.33	QP
2		68.3908	40.92	-8.83	32.09	40.00	-7.91	QP
3		141.5777	37.30	-5.50	31.80	40.00	-8.20	QP
4	*	173.2051	39.99	-7.07	32.92	40.00	-7.08	QP
5		278.0668	34.68	-6.50	28.18	47.00	-18.82	QP
6		462.3455	33.89	-0.98	32.91	47.00	-14.09	QP

Note: Result=Reading+Factor  
Over Limit=Result-Limit

### 6.3. Harmonic current emissions

#### 6.3.1. Block diagram of test setup



S power supply source

M measurement equipment

EUT equipment under test

$Z_m$  input impedance of measurement equipment

$I_h$  harmonic component of order  $h$  of the line current

$U$  test voltage

$Z_s$  internal impedance of the supply source

G open-loop voltage of the supply source

#### 6.3.2. Test Specification

Basic Standard(s)	: EN IEC 61000-3-2
Measurement Equipment requirement	: IEC 61000-4-7
Measured Harmonics	: 1 – 40
Equipment Class	: <input checked="" type="checkbox"/> A <input type="checkbox"/> B <input type="checkbox"/> C <input type="checkbox"/> D
Limits	: <input checked="" type="checkbox"/> Clause 7 Table 1 Limits for Class A equipment <input type="checkbox"/> Clause 7.3 Limits for Class B equipment <input type="checkbox"/> Clause 7 Table 2 Limits for Class C equipment <input type="checkbox"/> Clause 7 Table 3 Limits for Class D equipment

#### 6.3.3. Test Procedure

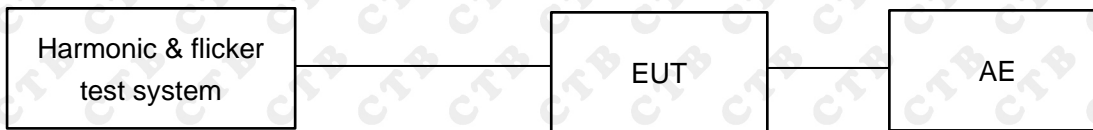
- a. The EUT was placed on the top of a wooden table 0.8 meters above the ground and operated to produce the maximum harmonic components under normal operating conditions.
- b. The classification of EUT is according to section 5 of EN 61000-3-2. The EUT is classified as follows:
  - Class A: Equipment not specified as belonging to Class B, C or D shall be considered as Class A equipment.
  - Class B: Portable tools. Portable tools.; Arc welding equipment which is not professional equipment.
  - Class C: Lighting equipment.
  - Class D: Equipment having a specified power less than or equal to 600 W of the following types: Personal computers and personal computer monitors and television receivers.
- c. The correspondent test program of test instrument to measure the current harmonic emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.

#### 6.3.1. Test Result

N/A

## 6.4. Voltage changes, voltage fluctuations and flicker

### 6.4.1. Test Setup



### 6.4.2. Test Procedure

Basic Standard(s)	: EN 61000-3-3
Measurement Equipment requirement	: IEC 61000-4-15
Limits	: Clause 5

### 6.4.3. Definition

Flicker: impression of unsteadiness of visual sensation induced by a lighting stimulus whose luminance or spectral distribution fluctuates with time.

$P_{st}$ : Short-term flicker indicator the flicker severity evaluated over a short period (in minutes);  $P_{st}=1$  is the conventional threshold of irritability

$P_{lt}$ : long-term flicker indicator; the flicker severity evaluated over a long period (a few hours) using successive  $P_{st}$  values.

dc: the relative steady-state voltage change

$d_{max}$ : the maximum relative voltage change

$d(t)$ : the value during a voltage change

### 6.4.4. Test Procedure

The following limits apply

- " $P_{lt}$ " shall not exceed 0.65.
- " $P_{st}$ " shall not exceed 1.0.
- "dc" shall not exceed 3.3%.
- " $d(t)$ " shall not exceed 3.3% for more than 500ms.
- " $d_{max}$ " shall not exceed:
  - 4% without additional conditions,
  - 6% switched manually or automatically more than twice per day,
  - 7% attended whilst in use or switched automatically for no more than twice per day or attended while in use.
  - For manual switch,  $d_{max}$  is measured in accordance with Annex B of standard, average  $d_{max}$  is calculated from 24 times measurement.
  - The EUT is unlikely to produce significant voltage fluctuations or flicker by technical analysis and evaluation. So it is deemed to fulfil the requirements without testing.



## 6.4.5. Test Result

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Test Mode:	Mode 1
Test Voltage :	AC 230V/50Hz		

**Load Power : 4.400 W**

**Power Factor:0.367**

**Load Current : 0.052 mArms**

**Crest Factor:4.332**

**Nominal Voltage : 231.34 Vrms**

**Result:**

<b>T-max (ms):</b>	<b>0.00</b>	<b>Test limit (ms):</b>	<b>500.00</b>	<b>Pass</b>
<b>Highest dc (%):</b>	<b>0.00</b>	<b>Test limit (%):</b>	<b>3.30</b>	<b>Pass</b>
<b>Highest dmax (%):</b>	<b>0.00</b>	<b>Test limit (%):</b>	<b>4.00</b>	<b>Pass</b>
<b>Highest Pst (10 min. period):</b>	<b>0.00</b>	<b>Test limit:</b>	<b>1.00</b>	<b>Pass</b>

## 7. Immunity

### Performance criteria

#### Performance criterion A

The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss function is allowed below a performance level specified by the manufacturer, when the equipment is used as intended. The performance level may be replaced by a permissible loss of performance. 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 by what the user may reasonably expect from the equipment if used as intended.

#### Performance criterion B

The equipment shall continue to operate as intended after the test. No degradation of performance or loss function is allowed below a performance level specified by the manufacturer, when the equipment is used as intended. During the test, degradation of performance is however allowed. No change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from equipment if used as intended.

#### Performance criterion C

Temporary loss of function is allowed, provided the function is self-recoverable or can be restored by operation of the controls.

## 7.1. Electrostatic discharges (ESD)

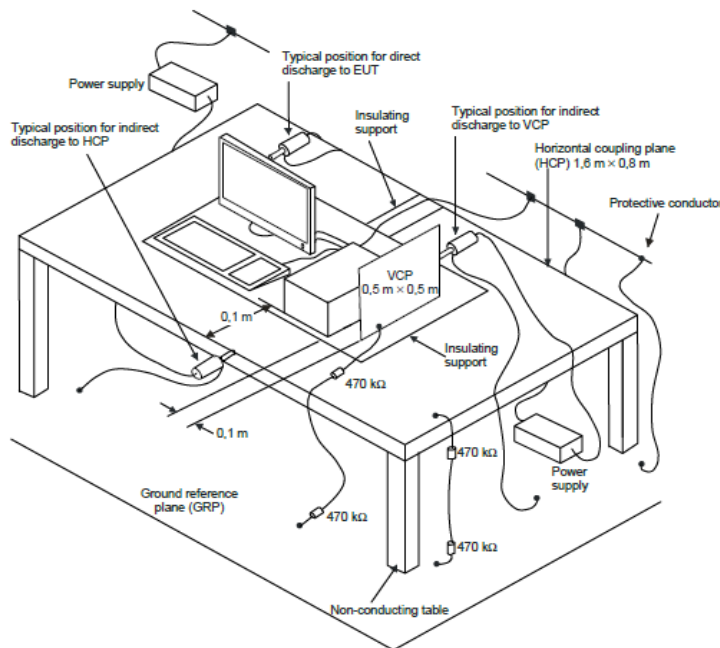
### 7.1.1. Test standard and Levels

Equipment intended to be used in a basic electromagnetic environment:

Environmental phenomenon	Test specifications	Basic standard
Electrostatic discharge	8 kV air discharge	IEC 61000-4-2
	4 kV contact discharge	

### 7.1.2. Block diagram of test setup

For table-top equipment



### 7.1.3. Test Procedure

Measurement was performed in shielded room.

Measurement procedure was applied according to EN 61000-4-2 clause 8.

The test method and equipment were specified by EN 61000-4-2.



## 7.1.4. Test Result

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Test Mode:	Mode 1
Test Voltage :	AC 230V/50Hz		

Discharge Method	Discharge Position	Voltage (±kV)	Min. No. of Discharge per polarity (Each Point)	Required Criterion	Performance Criterion
Contact Discharge	Conductive Surfaces	4	10	B	A
	Indirect Discharge HCP	4	10	B	A
	Indirect Discharge VCP	4	10	B	A
Air Discharge	Slots, Apertures, and Insulating Surfaces	8	10	B	A
Note: N/A					

## 7.2. Electromagnetic field

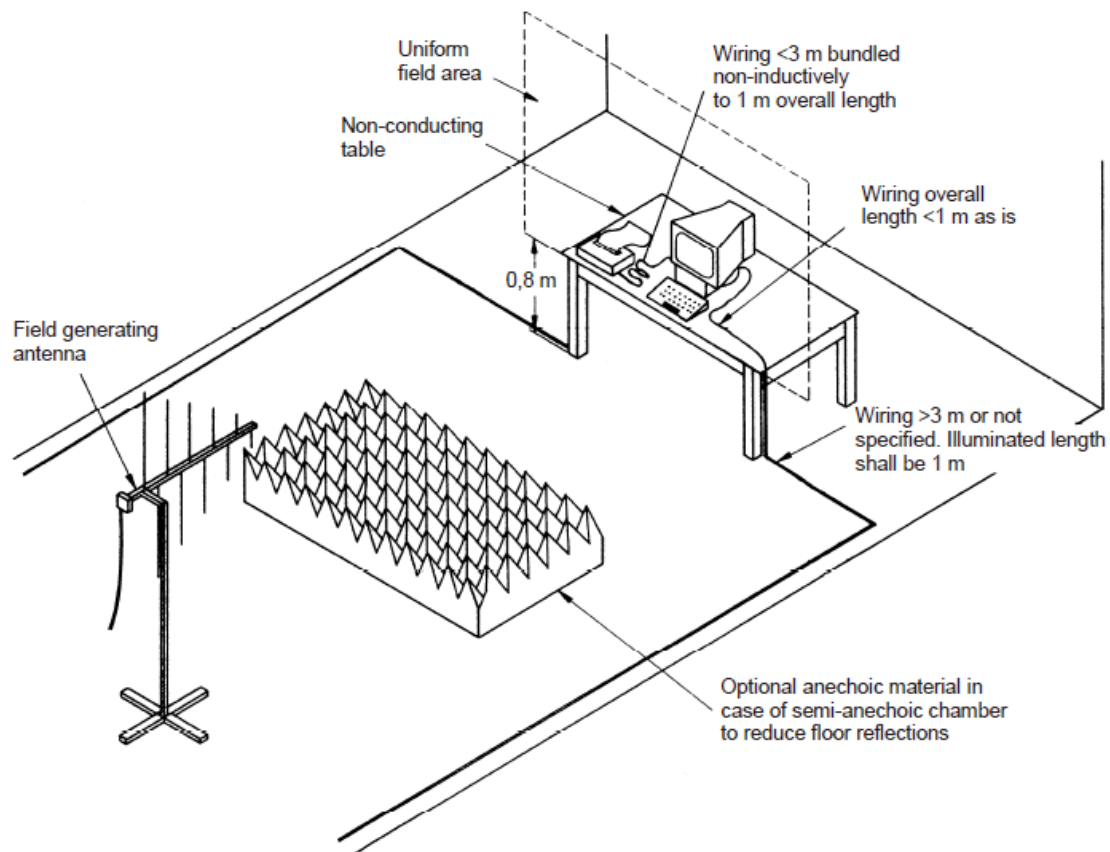
### 7.2.1. Test standard and Levels

#### Equipment intended to be used in a basic electromagnetic environment:

Characteristics	Test levels	Basic standard
Frequency range	80 MHz to 1 000 MHz, 1.4GHz to 6 GHz	IEC 61000-4-3
Test level	3 V/m (unmodulated)	
Modulation	1 kHz, 80 % AM, sine wave	

### 7.2.2. Block diagram of test setup

For table-top equipment



### 7.2.3. Test Procedure

Measurement was performed in full-anechoic chamber.

Measurement procedure was applied according to EN 61000-4-3 clause 8.

The test method and equipment was specified by EN 61000-4-3.

## 7.2.4. Test Result

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Test Mode:	Mode 1
Test Voltage :	AC 230V/50Hz		

Frequency range [MHz]	Test Level [V/m]	Polarization	EUT Face	Required Criterion	Performance Criterion
80 to 1000, 1400 to 6000	3	Horizontal & Vertical	Front/ Rear	A	A
			Right/ Left	A	A
			Top/ Underside	A	A
Note: N/A					





### 7.3.3. Test Procedure

Measurement was performed in shielded room.

Measurement procedure was applied according to EN 61000-4-4 clause 8.

The test method and equipment was specified by EN 61000-4-4.

### 7.3.4. Test Result

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Test Mode:	Mode 1
Test Voltage :	AC 230V/50Hz		

Coupling	Voltage (kV)	Polarity	Required Criterion	Performance Criterion
AC MainsL-N-P	1.0	±	B	A
DC Ports	0.5	±	B	N/A
Note: N/A				

## 7.4. Surges

### 7.4.1. Test standard and Levels

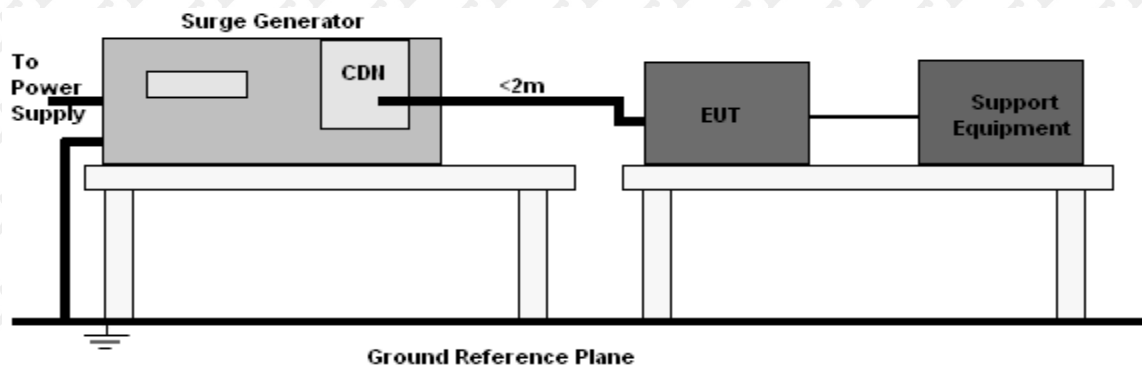
Equipment intended to be used in a basic electromagnetic environment:

Level	Open-circuit test voltage $\pm 10\%$ (kV)	Basic standard
1 <sup>b</sup>	0,5	IEC 61000-4-5
2 <sup>b</sup>	1	
3	2	
4	4	
X <sup>a</sup>	Special	

<sup>a</sup> "X" can be any level, above, below or in between the others. The level shall be specified in the dedicated equipment specification.

<sup>b</sup> Input a. c. power port in this report test requirements is Line to line 0.5kV, Line to ground 1.0kV.

### 7.4.2. Block diagram of test setup



### 7.4.3. Test Procedure

Measurement was performed in shielded room.

Measurement procedure was applied according to EN 61000-4-5 clause 8.

The test method and equipment was specified by EN 61000-4-5.



## 7.4.4. Test Result

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Test Mode:	Mode 1
Test Voltage :	AC 230V/50Hz		

Coupling	Level [kV]	Polarity	Phase angles [°]	Required Criterion	Performance Criterion
Line-to-Neutral	0.5	±	0, 90, 180, 270	B	A
Line-to-Earth	1	±	0, 90, 180, 270	B	A
Neutral-to-Earth	1	±	0, 90, 180, 270	B	A

Note: N/A

## 7.5. Radio-frequency common mode

### 7.5.1. Test standard and Levels

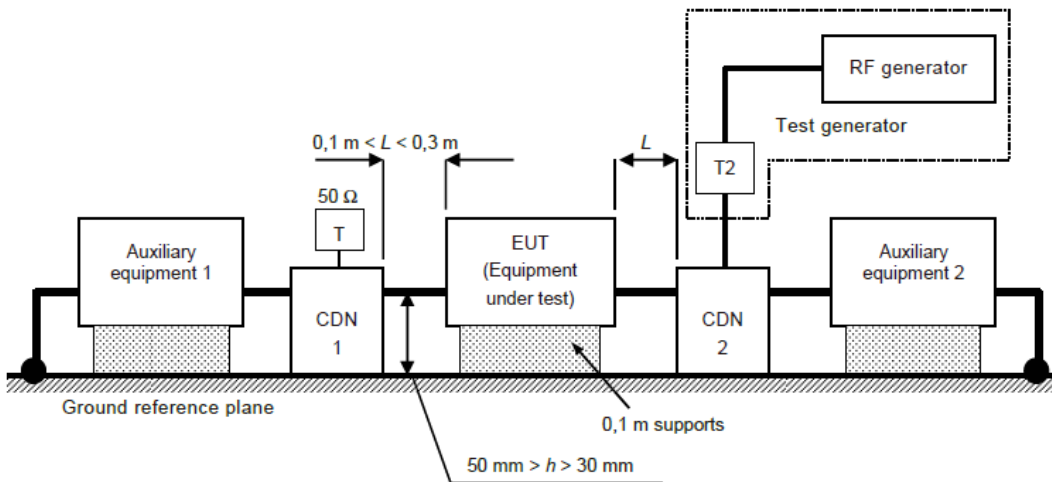
Equipment intended to be used in a basic electromagnetic environment:

Frequency range 150 kHz to 80 MHz			Basic standard
Level	Voltage level (e.m.f.)		
		$U_0$ dB( $\mu$ V)	$U_0$ V
1	120	1	
2 <sup>b</sup>	130	3	
3	140	10	
X a	Special		

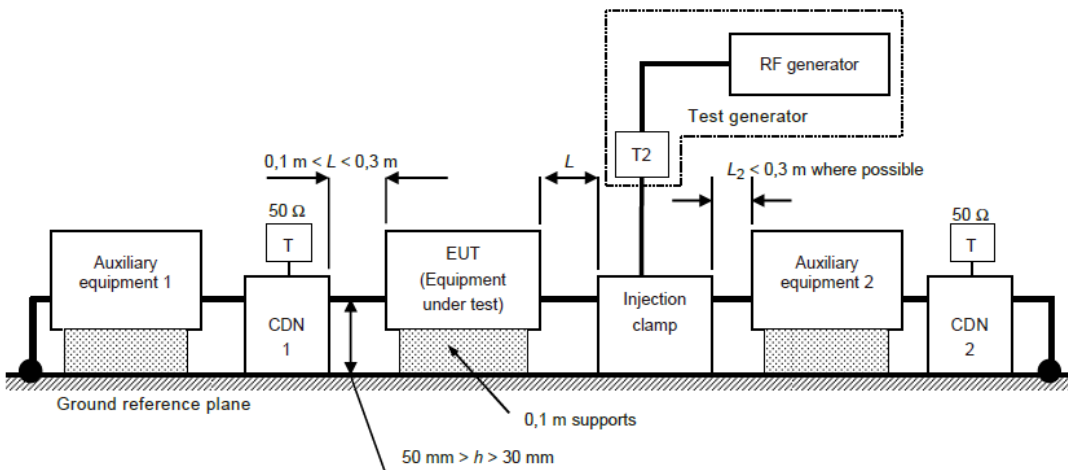
<sup>a</sup> X is an open level.  
<sup>b</sup> Input a. c. power port in this report test requirements is 3V.

### 7.5.2. Block diagram of test setup

For input a.c. power port:



For signal lines and control lines:



7.5.3. Test Procedure

Measurement procedure was applied according to EN 61000-4-6 clause 8.  
 The test method and equipment was specified by EN 61000-4-6.

7.5.4. Test Result

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Test Mode:	Mode 1
Test Voltage :	AC 230V/50Hz		

Inject Line	Frequency (MHz)	Voltage Level (V r.m.s.)	Required Criterion	Performance Criterion
a.c. port	0.15 - 80	3	A	A
Note: N/A				



## 7.6. Power frequency magnetic field

### 7.6.1. Test standard and Levels

Equipment intended to be used in a basic electromagnetic environment:

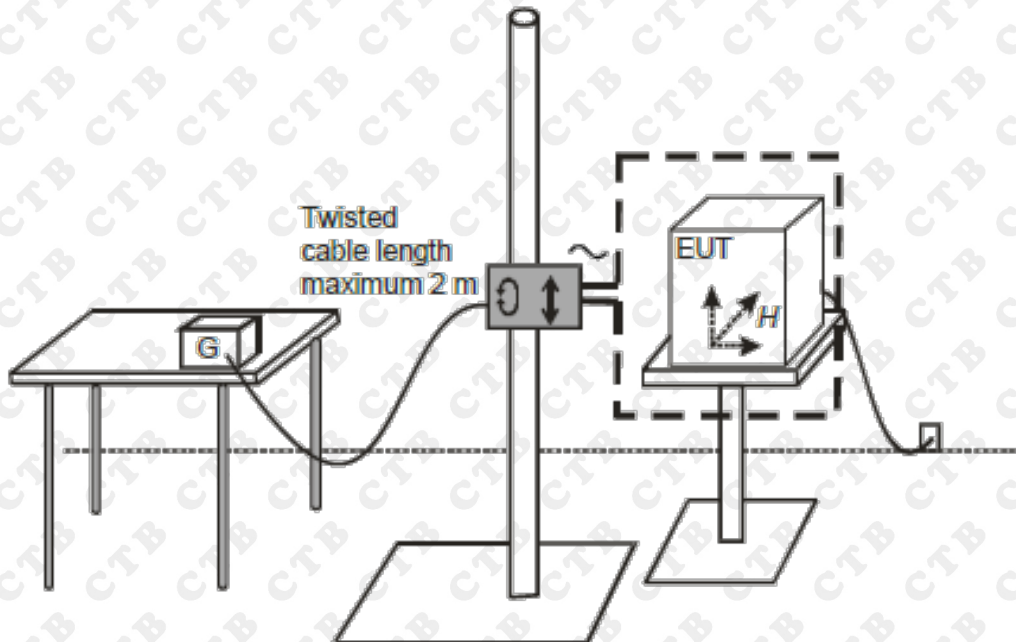
Level	Magnetic field strength (A/m)	Basic standard
1	1	IEC 61000-4-8
2 <sup>b</sup>	3	
3	10	
4	30	
5	100	
X <sup>a</sup>	Special	

<sup>a</sup> "X" can be any level, above, below or in between the others. The level shall be specified in the dedicated equipment specification.

<sup>b</sup> In this report test requirements is 3 A/m (50 Hz, 60 Hz).

### 7.6.2. Block diagram of test setup

For table-top equipment



### 7.6.3. Test Procedure

Measurement was performed in shielded room.

Measurement procedure was applied according to EN 61000-4-8 clause 8.

The test method and equipment was specified by EN 61000-4-8.

### 7.6.4. Test Result

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Test Mode:	Mode 1
Test Voltage :	AC 230V/50Hz		

Test frequency	Test Level (A/m)	Test time [s]	Axis	Result
<input checked="" type="checkbox"/> 50Hz <input type="checkbox"/> 60Hz	3	300	X	N/A
<input checked="" type="checkbox"/> 50Hz <input type="checkbox"/> 60Hz	3	300	Y	N/A
<input checked="" type="checkbox"/> 50Hz <input type="checkbox"/> 60Hz	3	300	Z	N/A

## 7.7. Voltage dips and Short interruptions

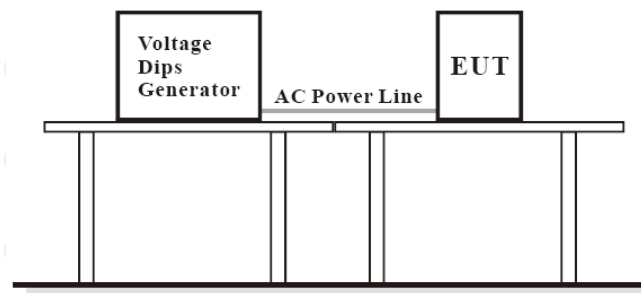
### 7.7.1. Test standard and Levels

Equipment intended to be used in a basic electromagnetic environment:

Environmental phenomena		Test level in % $U_T$	Durations for voltage dips		Basic standard
			50Hz	60Hz	
Voltage dips in % $U_T$	100	0	0,5 cycle	0,5 cycle	IEC 61000-4-11 Voltage change shall occur at zero crossing
	100	0	1 cycle	1 cycle	
	30	70	25 cycle	30 cycle	
	100	0	250 cycle	300 cycle	

$U_T$  is the rated voltage of the equipment under test.

### 7.7.2. Block diagram of test setup



### 7.7.3. Test Procedure

Measurement was performed in shielded room.

Measurement procedure was applied according to EN 61000-4-11 clause 8.

The test method and equipment was specified by EN 61000-4-11.

### 7.7.4. Test Result

Temperature:	23°C	Relative Humidity:	54 %
Pressure:	101kPa	Test Mode:	Mode 1
Test Voltage :	AC 230V/50Hz		

Test Level % $U_T$	Voltage dips in % $U_T$	Duration (cycles)		Required Criterion	Performance Criterion
		50Hz	60Hz		
0	100	0.5	0.5	B	B
0	100	1	1	B	B
70	30	25	30	C	B
0	100	250	300	C	B

Note: The EUT test is completed, the system automatically recovers to normal operation.

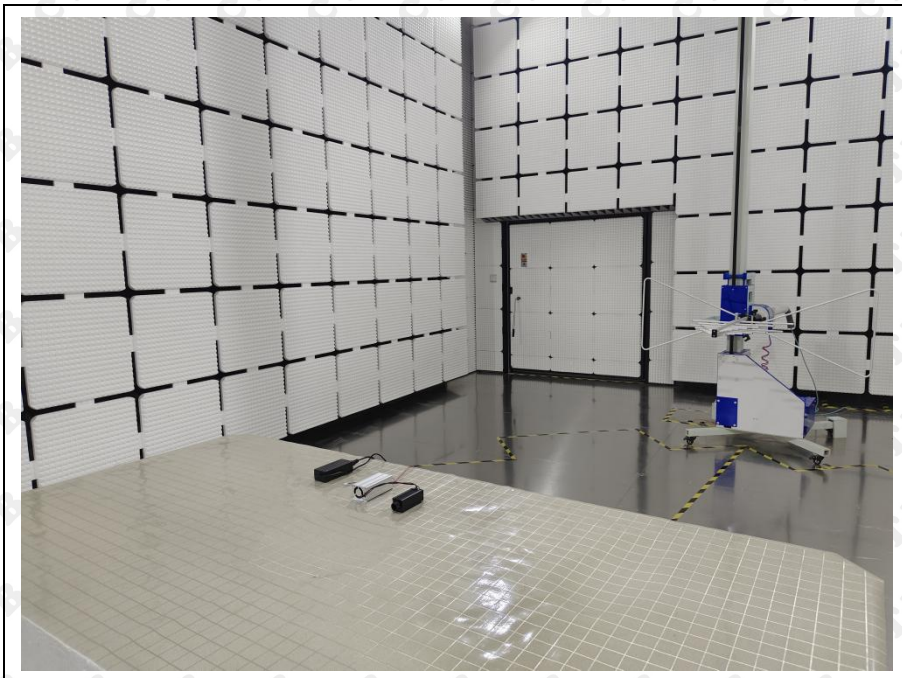


## 8. Photographs of test setup

CE



RE



## H&F

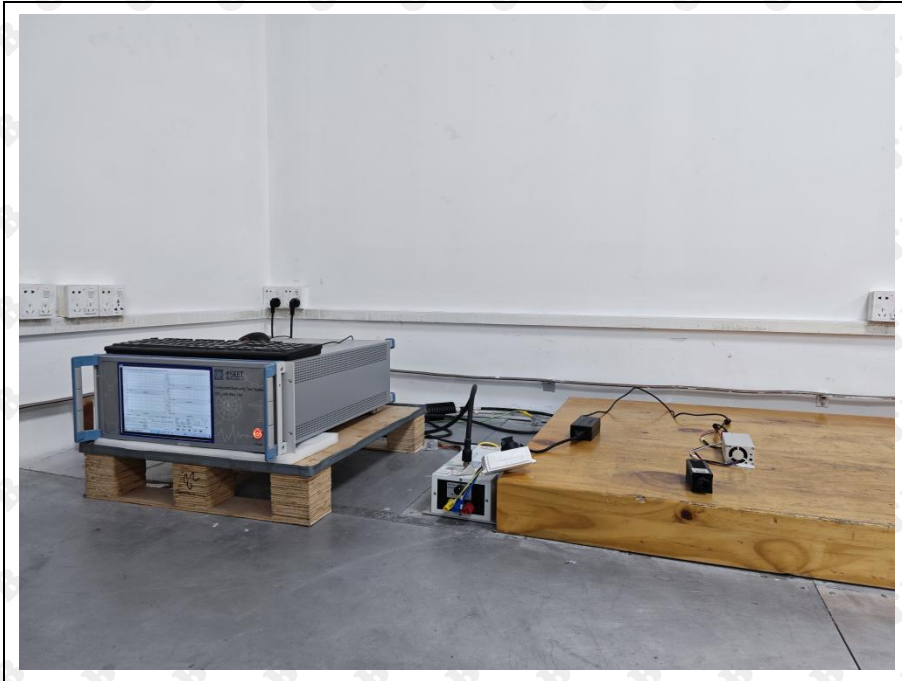


## ESD

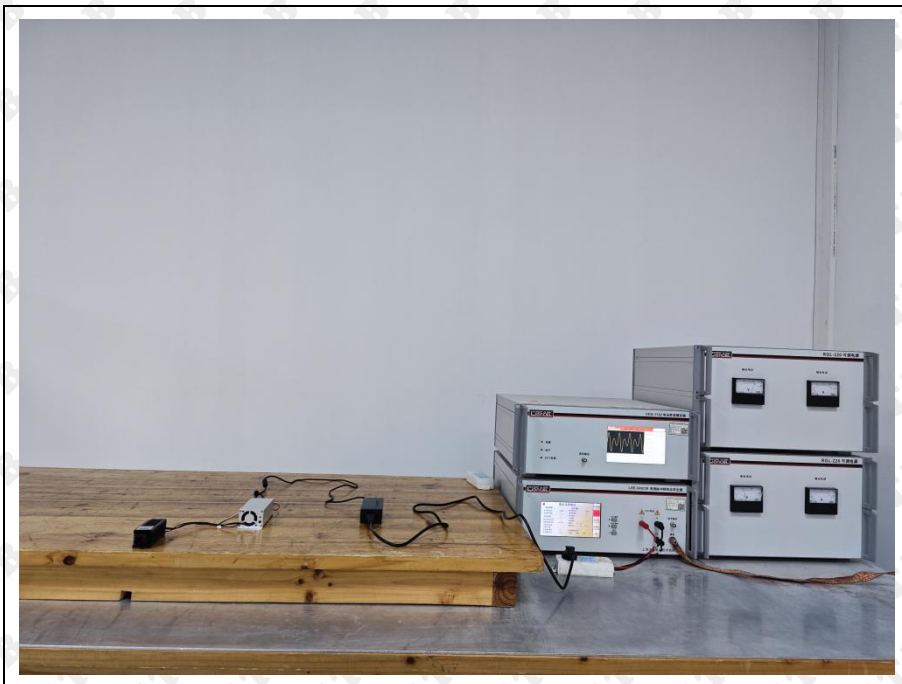




CS

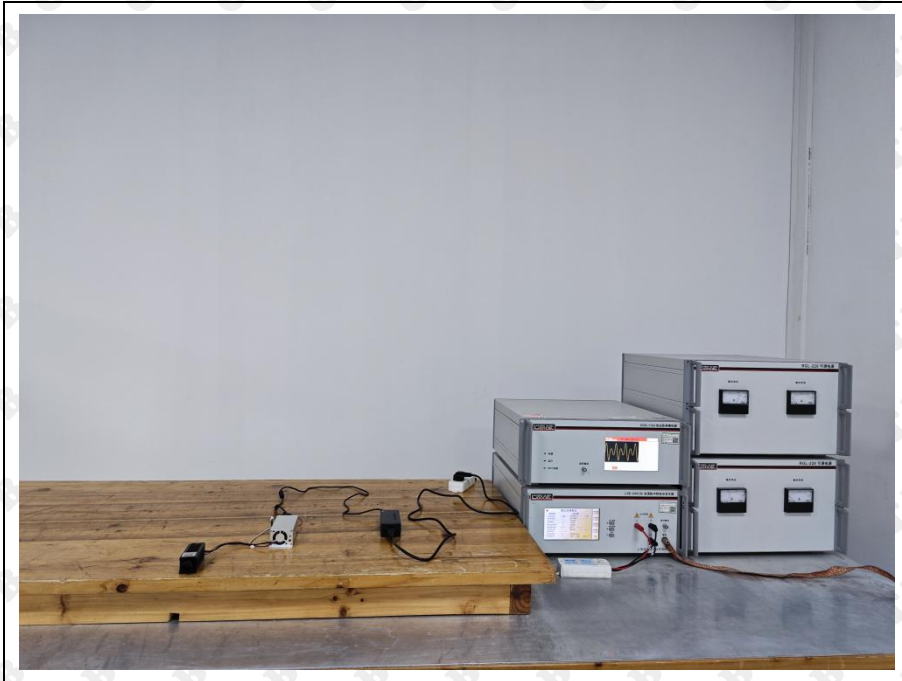


Suege& EFT

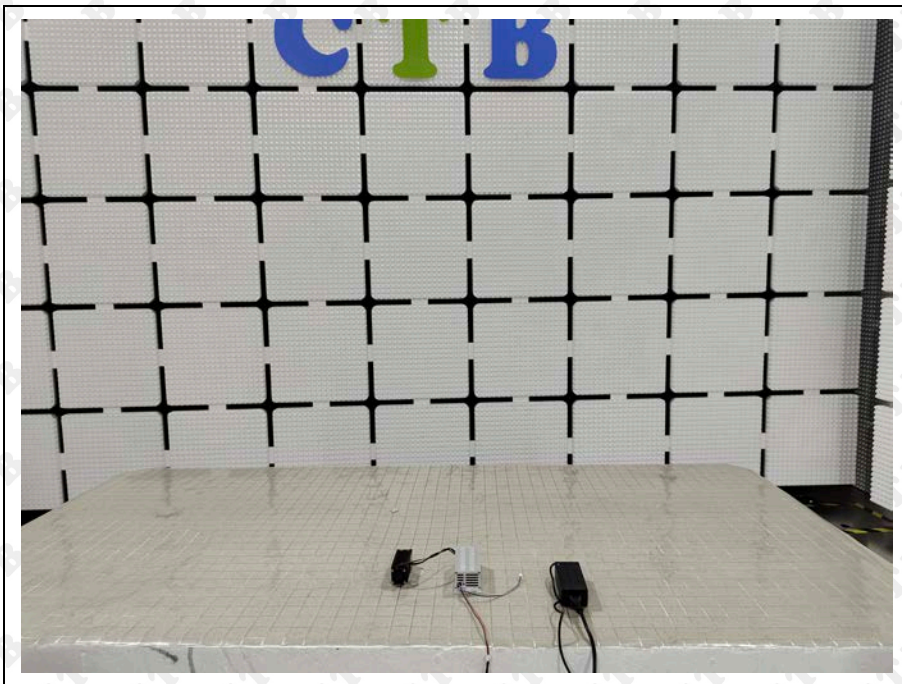




## DIPS

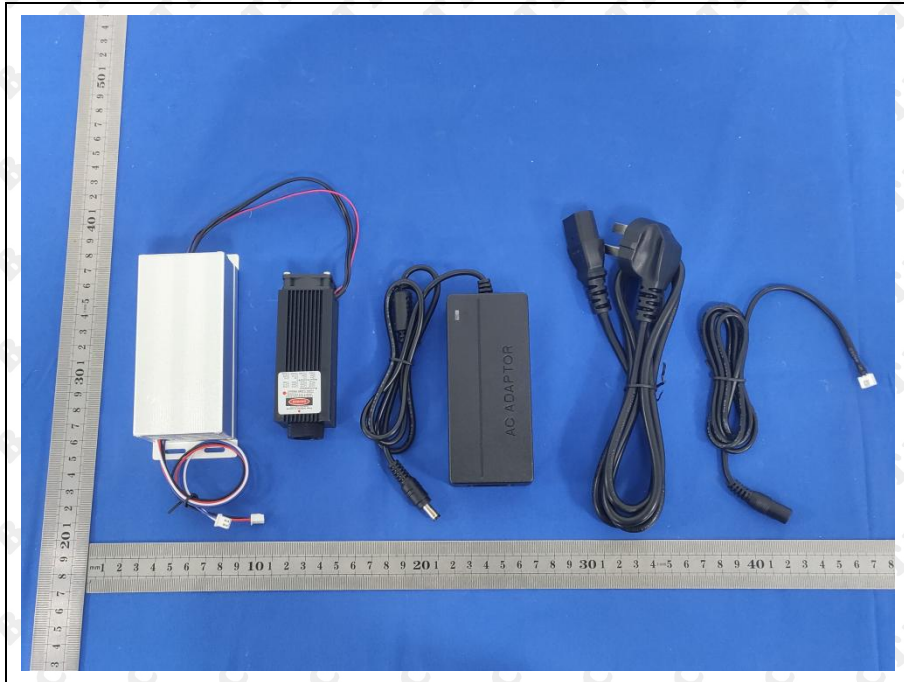


## RS

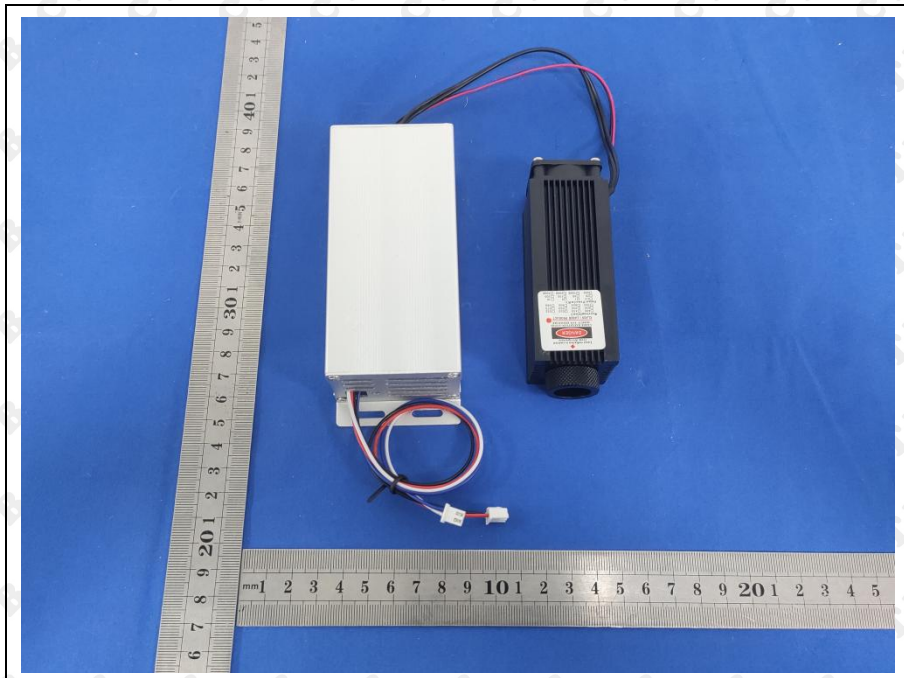


## 9. Photographs of EUT

EUT photo 1

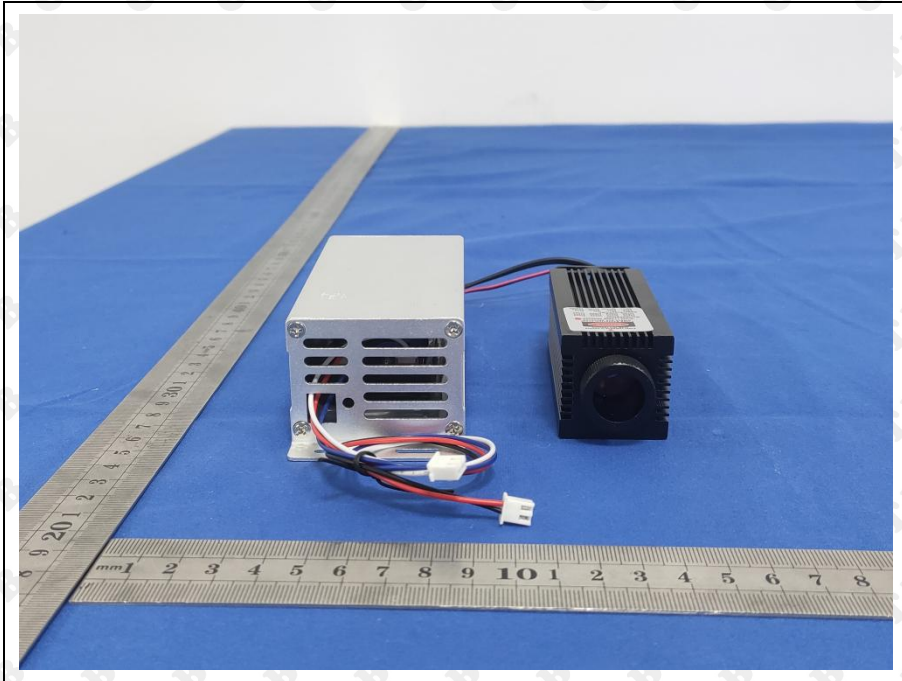


EUT photo 2

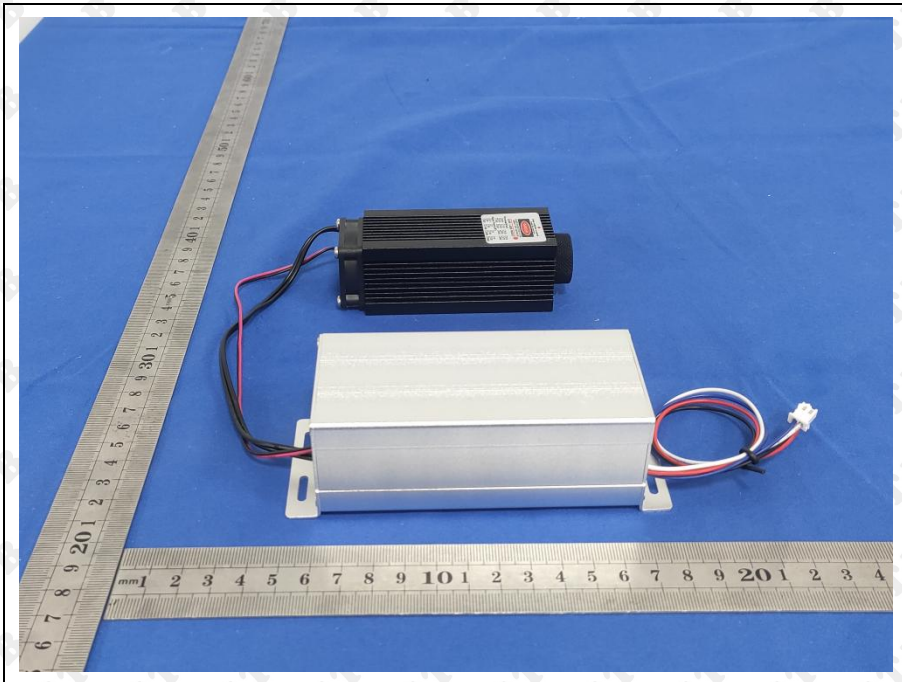




EUT photo 3

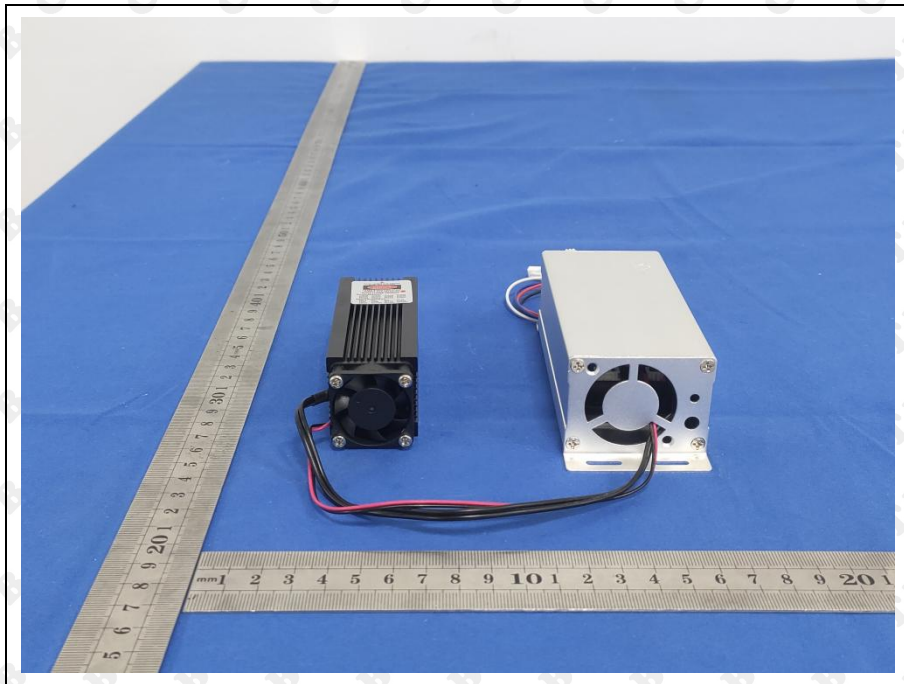


EUT photo 4

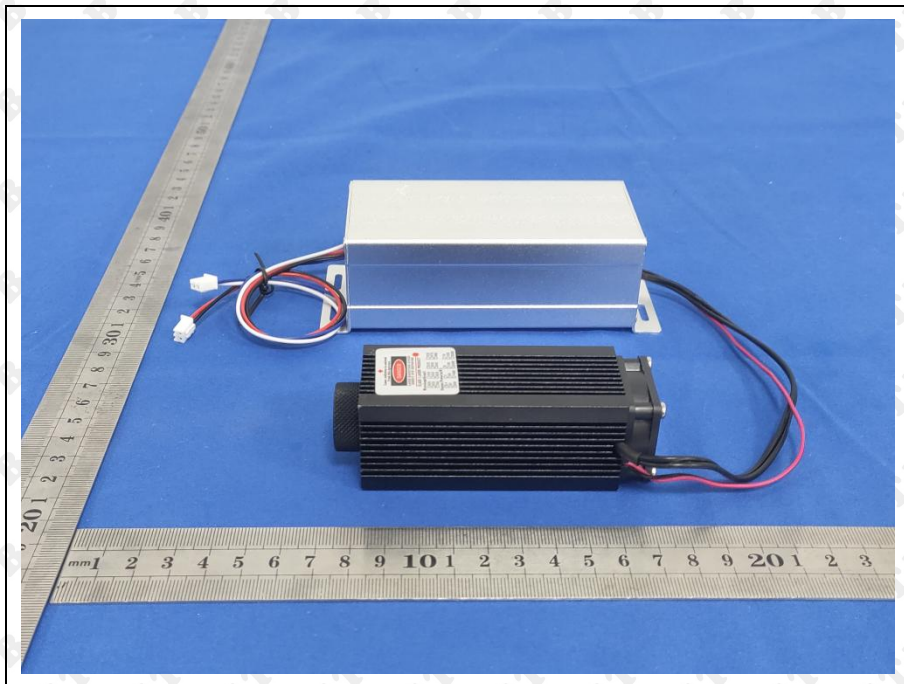




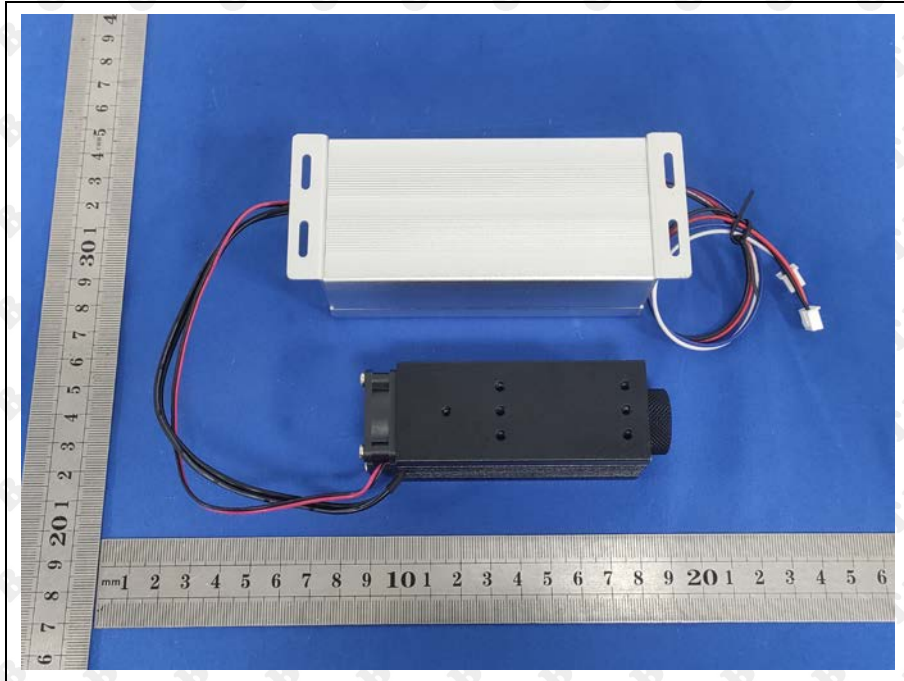
EUT photo 5



EUT photo 6



EUT photo 7



EUT photo 8





EUT photo 9



\*\*\*End of report\*\*\*