

# CE EMC Test Report



(Declaration of Conformity)

For  
Electromagnetic compatibility  
Of

**Product :** Mole

**Trade Mark :** 3DMakerpro

**Model Number :** JMM1

**Prepared for**

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**Prepared by**

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TEST RESULT CERTIFICATION

Applicant's Name..... : Shenzhen Jimuyida Technology Co., Ltd.
Address ..... : 21CD, Songri Dingsheng Building, Shennan Avenue, Nanshan District, Shenzhen, Guangdong
Manufacturer's Name..... : Wuhan chizi Technology Co., Ltd.
Address ..... : 2F, Building B, HaiRongJi Incubation Park, Great Wall Park 3rd Road, WuDaYuan Road, Hongshan District, Wuhan

Product description

Product Name..... : Mole
Model Number ..... : JMM1
EN 55032:2015+A1:2020
Standards ..... : EN 55035:2017+A11:2020
EN IEC 61000-3-2:2019+A1:2021
EN 61000-3-3:2013+A2:2021

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Test Sample Number..... : S230217006009

Date of Test..... :

Date (s) of performance of tests..... : 20 Feb. 2023 ~ 27 Feb. 2023

Date of Issue..... : 27 Feb. 2023

Test Result..... : Pass

Testing Engineer : [Signature: Korka Lin]
(Korka Lin)

Technical Manager : [Signature: Sky Zhang]
(Sky Zhang)

Authorized Signatory : [Signature: Alex]
(Alex)

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## 1. TEST SUMMARY

Test procedures according to the technical standards:

EMC Emission				
Standard	Test Item	Limit	Judgment	Remark
EN 55032:2015+A1:2020	Conducted Emission On AC And Telecom Port 150kHz to 30MHz	Class B	PASS	
	Disturbance Voltage at The Antenna Terminals (30MHz To 2150MHz)	-----	N/A	
	Wanted signal and disturbance voltage at the RF output terminals (30MHz To 2150MHz)	-----	N/A	
	Radiated Emission 30MHz to 1000MHz	Class B	PASS	
	Radiated Emission 1GHz to 6GHz	-----	N/A	NOTE (2)
EN IEC 61000-3-2:2019+A1:2021	Harmonic Current Emission	Class A	PASS	
EN 61000-3-3:2013+A2:2021	Voltage Fluctuations & Flicker	-----	PASS	
EMC Immunity				
Section EN 55035:2017+A11:2020	Test Item	Performance Criteria	Judgment	Remark
EN 61000-4-2	Electrostatic Discharge	B	PASS	
EN 61000-4-3	RF electromagnetic field	A	PASS	
EN 61000-4-4	Fast transients	B	PASS	
EN 61000-4-5	Surges	B	PASS	
EN 61000-4-6	Continuous radio frequency disturbances	A	PASS	
EN 61000-4-8	Power Frequency Magnetic Field	A	PASS	
EN 61000-4-11	Volt. Interruptions Volt. Dips	B / C / C	PASS	

## NOTE:

- (1) "N/A" denotes test is not applicable in this Test Report
- (2) If the highest frequency of the internal sources of the EUT is less than 108 MHz, the measurement shall only be made up to 1 GHz.  
If the highest frequency of the internal sources of the EUT is between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz.  
If the highest frequency of the internal sources of the EUT is between 500 MHz and 1 GHz, measurement shall only be made up to 5 GHz.  
If the highest frequency of the internal sources of the EUT is above 1 GHz, the Measurement shall be made up to 5 times the highest frequency or 6 GHz, whichever is less.
- (3) For client's request and manual description, the test will not be executed.

### 1.1 TEST FACILITY

Shenzhen NTEK Testing Technology Co., Ltd.

Add. : 1/F, Building E, Fenda Science Park, Sanwei Community, Xixiang Street Bao'an District, Shenzhen 518126 P.R. China

CNAS-Lab. : The Laboratory has been assessed and proved to be in compliance with CNAS-CL01:2018 (identical to ISO/IEC 17025:2017)  
The Certificate Registration Number is L5516

IC-Registration : The Certificate Registration Number is CN0074

FCC- Accredited : Test Firm Registration Number: 463705  
Designation Number: CN1184

A2LA-Lab. : The Certificate Registration Number is 4298.01  
This laboratory is accredited in accordance with the recognized International Standard ISO/IEC 17025:2017 General requirements for the competence of testing and calibration laboratories.  
This accreditation demonstrates technical competence for a defined scope and the operation of a laboratory quality management system (refer to joint ISO-ILAC-IAF Communiqué dated April 2017).

### 1.2 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	Measurement Frequency Range	K	U(dB)
Conducted Emission	0.009kHz ~ 0.15MHz	2	2.66
Conducted Emission	0.15MHz ~ 30MHz	2	2.80
Telecom Conducted Emission (Cat 3)	0.15MHz ~ 30MHz	2	3.08
Telecom Conducted Emission (Cat 5)	0.15MHz ~ 30MHz	2	3.60
Telecom Conducted Emission (Cat 6)	0.15MHz ~ 30MHz	2	4.14
Radiated Emission	30MHz ~ 1000MHz	2	2.64
Radiated Emission	1000MHz ~ 18000MHz	2	5.10
Power Clamp	30MHz ~ 300MHz	2	2.20





## 2. GENERAL INFORMATION

### 2.1 GENERAL DESCRIPTION OF EUT

Equipment	Mole	
Model Number	JMM1	
Additional Model Number(s)	N/A	
Model Difference	N/A	
Product Description	The EUT is a Mole.	
	Operating frequency:	12 MHz(Declaration by factory)
	Connecting I/O port:	N/A
	Based on the application, features, or specification exhibited in User's Manual, the EUT is considered as a Multimedia Device. More details of EUT technical specification, please refer to the User's Manual.	
Power Source	AC Voltage	
Power Rating	Adapter Model: CW1203000RE Adapter Rating: Input: AC 100-240V, 50/60Hz, 1.2A Max. Output: DC 12.0V, 3.0A, 36.0W	

## 2.2 DESCRIPTION OF TEST MODES

To investigate the maximum EMI emission characteristics generates from EUT, the test system was pre-scanning tested base on the consideration of following EUT operation mode or test configuration mode which possible have effect on EMI emission level. Each of these EUT operation mode(s) or test configuration mode(s) mentioned above was evaluated respectively.

Pretest Mode	Description
Mode 1	Working

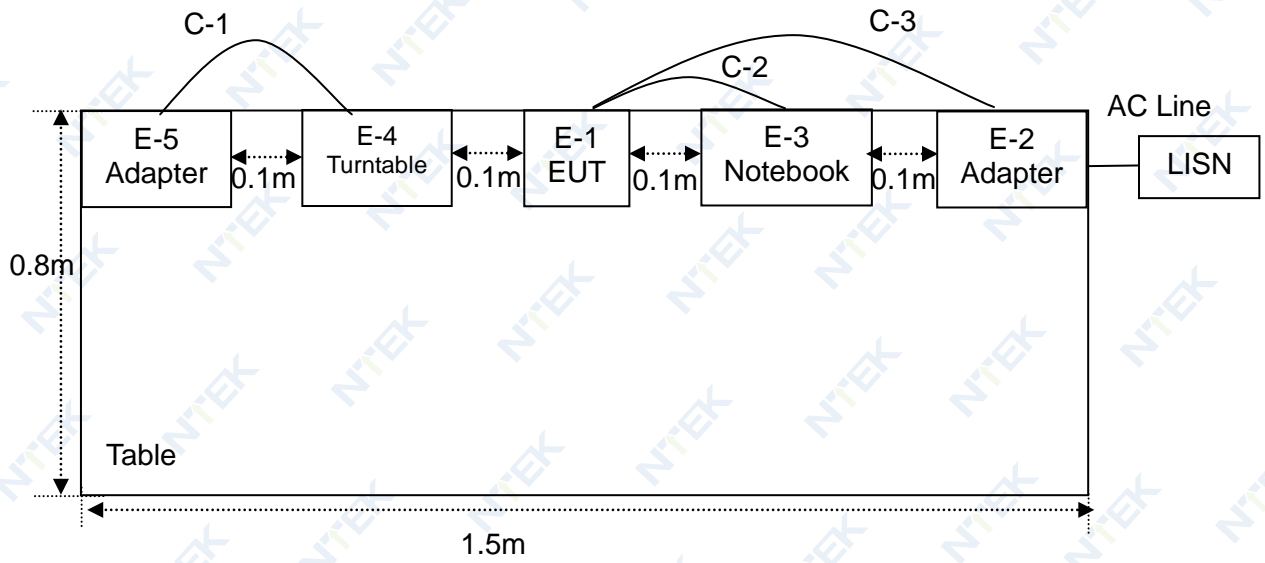
For Conducted Test	
Final Test Mode	Description
Mode 1	Working

For Radiated Test	
Final Test Mode	Description
Mode 1	Working

For EMS Test	
Final Test Mode	Description
Mode 1	Working

2.3 DESCRIPTION OF TEST SETUP

Mode CE: Working



## 2.4 DESCRIPTION TEST PERIPHERAL AND EUT PERIPHERAL

The EUT has been tested as an independent unit together with other necessary accessories or support units. The following support units or accessories were used to form a representative test configuration during the tests.

Item	Equipment	Brand	Model/Type No.	Series No.	Note
E-1	Mole	3DMakerpro	JMM1	N/A	EUT
E-2	Adapter	Genwell	CW1203000RE	N/A	
E-3	Notebook	DELL	Inspiron 5493	9M1NN63	
E-4	Turntable	N/A	N/A	N/A	
E-5	Adapter	N/A	KSA29B0500200D5	N/A	

Item	Shielded Type	Ferrite Core	Length	Note
C-1	NO	NO	100cm	
C-2	NO	YES	210cm	
C-3	NO	YES	150cm	

**Note:**

- (1) The support equipment was authorized by Declaration of Confirmation.
- (2) For detachable type I/O cable should be specified the length in cm in 「Length」 column.
- (3) "YES" means "shielded" "with core"; "NO" means "unshielded" "without core".

## 2.5 MEASUREMENT INSTRUMENTS LIST

### 2.5.1 CONDUCTED TEST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Single Phase LISN	R&S	ENV216	101490	Jun. 28, 2022	Jun. 27, 2023	1 year
2	Single Phase LISN	R&S	ENV216	101313	Apr. 06, 2022	Apr. 05, 2023	1 year
3	Three-Phase LISN	SCHWARZB ECK	NNLK 8129	8129245	Apr. 06, 2022	Apr. 05, 2023	1 year
4	Low Frequency Cable	N/A	C-01	N/A	May 11, 2020	May 10, 2023	3 years
5	50Ω Coaxial Switch	Anritsu	MP59B	6200983704	May 11, 2020	May 10, 2023	3 years
6	EMI Test Receiver	R&S	ESCI	101160	Apr. 06, 2022	Apr. 05, 2023	1 year

### 2.5.2 RADIATED TEST

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	EMI Test Receiver	R&S	ESPI7	101318	Apr. 06, 2022	Apr. 05, 2023	1 year
2	Bilog Antenna	TESEQ	CBL6111D	31216	Mar. 30, 2022	Mar. 29, 2023	1 year
3	50Ω Coaxial Switch	Anritsu	MP59B	6200983705	May 11, 2020	May 10, 2023	3 years
4	Cable	Talent Microwave	A81-NWMSM AM-12M	21120897	Dec. 16, 2021	Dec. 15, 2024	3 years
5	Cable	Talent Microwave	A81-NMNM-10M	22084896	Sep. 09, 2022	Sep. 08, 2025	3 years
6	Cable	Talent Microwave	A81-NMNM-2M	22084895	Sep. 09, 2022	Sep. 08, 2025	3 years
7	Attenuator	Eastsheep	5W-N-JK-6G-6DB	N/A	Aug. 14, 2022	Aug. 13, 2023	1 year
8	Broadband Horn Antenna	EM	EM-AH-10180	2011071402	Mar. 31, 2022	Mar. 30, 2023	1 year
9	Spectrum Analyzer	Agilent	E4407B	MY45108040	Apr. 01, 2022	Mar. 31, 2023	1 year
10	Pre-Amplifier	EMC	EMC051835SE	980246	Jun. 17, 2022	Jun. 16, 2023	1 year
11	Cable	Keysight	A40-2.92M2.92M-2M	1808041	Nov. 01, 2022	Oct. 31, 2023	3 years

### 2.5.3 HARMONICS AND FLICKERS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Power Analyzer	EM TEST	DPA500	0303-04	Apr. 06, 2022	Apr. 05, 2023	1 year
2	AC Power Source	EM TEST	ACS 500S1	0203-01	Apr. 06, 2022	Apr. 05, 2023	1 year

## 2.5.4 ESD

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Electrostatic Discharge Generator	Lioncel	ESD-203B	ESD203B0150402	Aug. 15, 2022	Aug. 14, 2023	1 year

## 2.5.5 RS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	RF Test System Controller	AR	SC1000	0350156	Feb. 22, 2021	Feb. 21, 2024	3 years
2	3M Semi Anechoic Chamber	N/A	8*4*4	N/A	Aug. 07, 2020	Aug. 06, 2023	3 years
3	Broadband Amplifier	AR	60S1G6	0350414	Mar. 26, 2022	Mar. 25, 2023	1 year
4	Bilog Antenna	ETS	3142E	00214344	Nov. 04, 2022	Nov. 03, 2023	1 year
5	Power Amplifier	rflight	NTWPA-00810200	17063153	Jun. 17, 2022	Jun. 16, 2023	1 year
6	ESG Vector Signal Generator	Agilent	E4438C	MY45093347	Apr. 01, 2022	Mar. 31, 2023	1 year

## 2.5.6 EFT/BURST, SURGE, VOLTAGE INTERRUPTION/DIPS

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Electrical Intelligent Transient Generator	EVERFINE	EMS61000-4A	P612005CM5421115	Jul. 27, 2022	Jul. 26, 2023	1 year
2	Capacitive Coupling Clamp	EVERFINE	EFTC-2-V1	910006	Apr. 06, 2022	Apr. 05, 2023	1 year
3	Surge Generator	EVERFINE	EMS61000-5A	P612004TJ6421112	Jul. 27, 2022	Jul. 26, 2023	1 year
4	CCITT Surge Generator	EVERFINE	EMS61000-5D	P615656TD1401113	Jul. 27, 2022	Jul. 26, 2023	1 year
5	Telecommunication Lines Cdn	EVERFINE	SGN-8	P619137TS1411113	Jul. 27, 2022	Jul. 26, 2023	1 year
6	Signal Lines CDN	EVERFINE	SGN-5	P619136TJ6421113	Aug. 22, 2022	Aug. 21, 2023	1 year
7	Voltage Dips And Interruptions Generator	EVERFINE	EMS61000-11K	P6212006CJ1421117	Jul. 27, 2022	Jul. 26, 2023	1 year

**2.5.7 CONTINUOUS RADIO FREQUENCY DISTURBANCES**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Signal Generator	R&S	SML03	100954	Nov. 01, 2022	Oct. 31, 2023	1 year
2	Coupling and Decoupling Network	TESEQ	CDN M016	38722	Jun. 28, 2022	Jun. 27, 2023	1 year
3	Power Amplifier	TESEQ	CBA 230M-080	T44376	Sep. 01, 2022	Aug. 31, 2023	1 year
4	Attenuator	Jingtenghong	JTH-SJ-100W -6dB	10014514300 0686	Apr. 01, 2022	Mar. 31, 2025	3 years
5	EM Clamp	TESEQ	KEMZ 801A	47860	Nov. 01, 2022	Oct. 31, 2023	1 year

**2.5.8 MF**

Item	Kind of Equipment	Manufacturer	Type No.	Serial No.	Last calibration	Calibrated until	Calibration period
1	Magnetic Field Generator	EVERFINE	EMS61000-8K	1007001	Feb. 21, 2022	Feb. 20, 2023	1 year
2	Magnetic Field Coil	EVERFINE	N/A	N/A	Feb. 21, 2022	Feb. 20, 2023	1 year

### 3. EMC EMISSION TEST

#### 3.1 CONDUCTED EMISSION MEASUREMENT

##### 3.1.1 POWER LINE CONDUCTED EMISSION (Frequency Range 150kHz-30MHz)

**Table A.8 – Requirements for conducted emissions from the AC mains power ports of Class A equipment**

Applicable to				
1. AC mains power ports (3.1.1)				
Table clause	Frequency range MHz	Coupling device (see Table A.7)	Detector type / bandwidth	Class A limits dB( $\mu$ V)
A8.1	0,15 – 0,5	AMN	Quasi Peak / 9 kHz	79
	0,5 – 30			73
A8.2	0,15 – 0,5	AMN	Average / 9 kHz	66
	0,5 – 30			60

Apply A8.1 and A8.2 across the entire frequency range.

**Table A.9 – Requirements for conducted emissions from the AC mains power ports of Class B equipment**

Applicable to				
1. AC mains power ports (3.1.1)				
Table clause	Frequency range MHz	Coupling device (see Table A.7)	Detector type / bandwidth	Class B limits dB( $\mu$ V)
A9.1	0,15 – 0,5	AMN	Quasi Peak / 9 kHz	66 – 56
	0,5 – 5			56
	5 – 30			60
A9.2	0,15 – 0,5	AMN	Average / 9 kHz	56 – 46
	0,5 – 5			46
	5 – 30			50

Apply A9.1 and A9.2 across the entire frequency range.

**Note:**

- (1) The tighter limit applies at the band edges.
- (2) The limit of " \* " marked band means the limitation decreases linearly with the logarithm of the frequency in the range.



### 3.1.2 TELECOMMUNICATION PORT CONDUCTED EMISSION(VOLTAGE LIMITS) (Frequency Range 150kHz-30MHz)

**Table A.10 – Requirements for asymmetric mode conducted emissions from Class A equipment**

Applicable to					
1. wired network ports (3.1.30) 2. optical fibre ports (3.1.24) with metallic shield or tension members 3. antenna ports (3.1.3)					
Table clause	Frequency range MHz	Coupling device (see Table A.7)	Detector type / bandwidth	Class A voltage limits dB( $\mu$ V)	Class A current limits dB( $\mu$ A)
A10.1	0,15 – 0,5	AAN	Quasi Peak / 9 kHz	97 – 87	n/a
	0,5 – 30			87	
	0,15 – 0,5	AAN	Average / 9 kHz	84 – 74	
	0,5 – 30			74	
A10.2	0,15 – 0,5	CVP and current probe	Quasi Peak / 9 kHz	97 – 87	53 – 43
	0,5 – 30			87	43
	0,15 – 0,5	CVP and current probe	Average / 9 kHz	84 – 74	40 – 30
	0,5 – 30			74	30
A10.3	0,15 – 0,5	Current Probe	Quasi Peak / 9 kHz	n/a	53 – 43
	0,5 – 30				43
	0,15 – 0,5	Current Probe	Average / 9 kHz		40 – 30
	0,5 – 30				30

The choice of coupling device and measurement procedure is defined in Annex C.

AC mains ports that also have the function of a wired network port shall meet the limits given in Table A.8.

The test shall cover the entire frequency range.

The application of the voltage and/or current limits is dependent on the measurement procedure used. Refer to Table C.1 for applicability.

Testing is required at only one EUT supply voltage and frequency.

Applicable to ports listed above and intended to connect to cables longer than 3 m.

**Table A.11 – Requirements for asymmetric mode conducted emissions from Class B equipment**

<b>Applicable to</b>					
1. wired network ports (3.1.30) 2. optical fibre ports (3.1.24) with metallic shield or tension members 3. broadcast receiver tuner ports (3.1.8) 4. antenna ports (3.1.3)					
<b>Table clause</b>	<b>Frequency range MHz</b>	<b>Coupling device (see Table A.7)</b>	<b>Detector type / bandwidth</b>	<b>Class B voltage limits dB(μV)</b>	<b>Class B current limits dB(μA)</b>
A11.1	0,15 – 0,5	AAN	Quasi Peak / 9 kHz	84 – 74	n/a
	0,5 – 30			74	
	0,15 – 0,5	AAN	Average / 9 kHz	74 – 64	
	0,5 – 30			64	
A11.2	0,15 – 0,5	CVP and current probe	Quasi Peak / 9 kHz	84 – 74	40 – 30
	0,5 – 30			74	30
	0,15 – 0,5	CVP and current probe	Average / 9 kHz	74 – 64	30 – 20
	0,5 – 30			64	20
A11.3	0,15 – 0,5	Current Probe	Quasi Peak / 9 kHz	n/a	40 – 30
	0,5 – 30				30
	0,15 – 0,5	Current Probe	Average / 9 kHz		30 – 20
	0,5 – 30				20
The choice of coupling device and measurement procedure is defined in Annex C.  Screened ports including TV broadcast receiver tuner ports are tested with a common-mode impedance of 150 Ω. This is typically accomplished with the screen terminated by 150 Ω to earth.  AC mains ports that also have the function of a wired network port shall meet the limits given in Table A.9.  The test shall cover the entire frequency range.  The application of the voltage and/or current limits is dependent on the measurement procedure used. Refer to Table C.1 for applicability.  Testing is required at only one EUT supply voltage and frequency.  Applicable to ports listed above and intended to connect to cables longer than 3 m.					

**Table A.12 – Requirements for conducted differential voltage emissions from Class B equipment**

Applicable to						
1. TV broadcast receiver tuner ports (3.1.8) with an accessible connector						
2. RF modulator output ports (3.1.27)						
3. FM broadcast receiver tuner ports (3.1.8) with an accessible connector						
Table clause	Frequency range MHz	Detector type/ bandwidth	Class B limits dB( $\mu$ V) 75 $\Omega$			Applicability
			Other	Local Oscillator Fundamental	Local Oscillator Harmonics	
A12.1	30 – 950	For frequencies $\leq 1$ GHz	46	46	46	See a)
	950 – 2 150		46	54	54	
A12.2	950 – 2 150		46	54	54	See b)
A12.3	30 – 300		Quasi Peak/ 120 kHz	46	54	50
	300 – 1 000	52				
A12.4	30 – 300	For frequencies $\geq 1$ GHz	46	66	59	See d)
	300 – 1 000				52	
A12.5	30 – 950	Peak/ 1 MHz	46	76	46	See e)
	950 – 2 150			n/a	54	

a) Television receivers (analogue or digital), video recorders and PC TV broadcast receiver tuner cards working in channels between 30 MHz and 1 GHz, and digital audio receivers.

b) Tuner units (not the LNB) for satellite signal reception.

c) Frequency modulation audio receivers and PC tuner cards.

d) Frequency modulation car radios.

e) Applicable to EUTs with RF modulator output ports (for example DVD equipment, video recorders, camcorders and decoders etc.) designed to connect to TV broadcast receiver tuner ports.

Testing is required at only one EUT supply voltage and frequency.

The term 'other' refers to all emissions other than the fundamental and the harmonics of the local oscillator.

The test shall be performed with the device operating at each reception channel.

The test shall cover the entire frequency range.

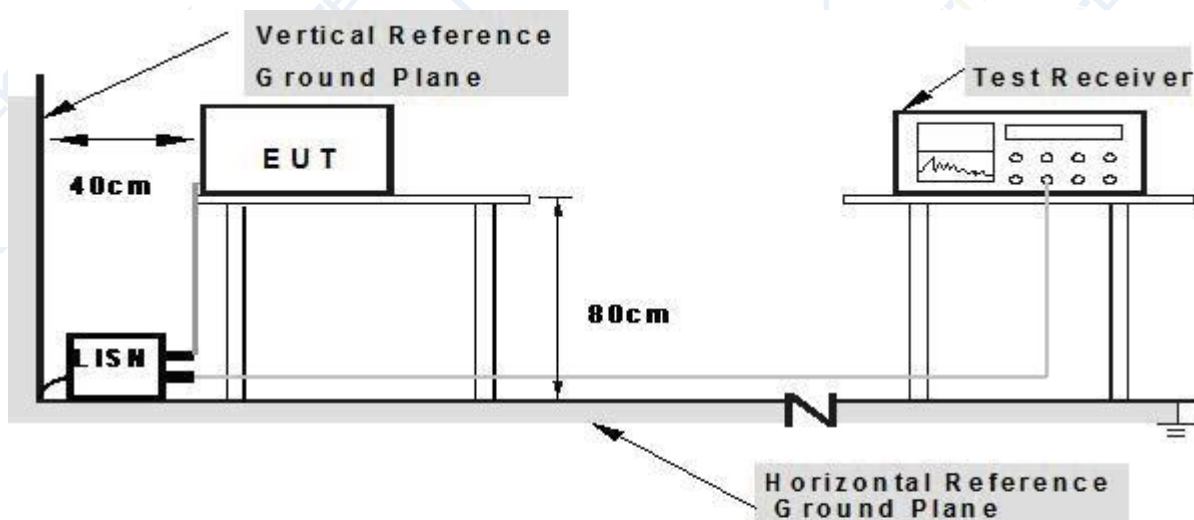
The following table is the setting of the receiver

Receiver Parameters	Setting
Attenuation	10 dB
Start Frequency	0.15 MHz
Stop Frequency	30 MHz
IF Bandwidth	9 kHz

### 3.1.3 TEST PROCEDURE

- a. The EUT was placed 0.8 meters from the horizontal ground plane with EUT being connected to the power mains through a line impedance stabilization network (LISN). All other support equipments powered from additional LISN(s). The LISN provide 50 Ohm/ 50uH of coupling impedance for the measuring instrument.
- b. Interconnecting cables that hang closer than 40 cm to the ground plane shall be folded back and forth in the center forming a bundle 30 to 40 cm long.
- c. I/O cables that are not connected to a peripheral shall be bundled in the center. The end of the cable may be terminated, if required, using the correct terminating impedance. The overall length shall not exceed 1 m.
- d. LISN at least 80 cm from nearest part of EUT chassis.
- e. For the actual test configuration, please refer to the related Item -EUT Test Photos.

### 3.1.4 TEST SETUP



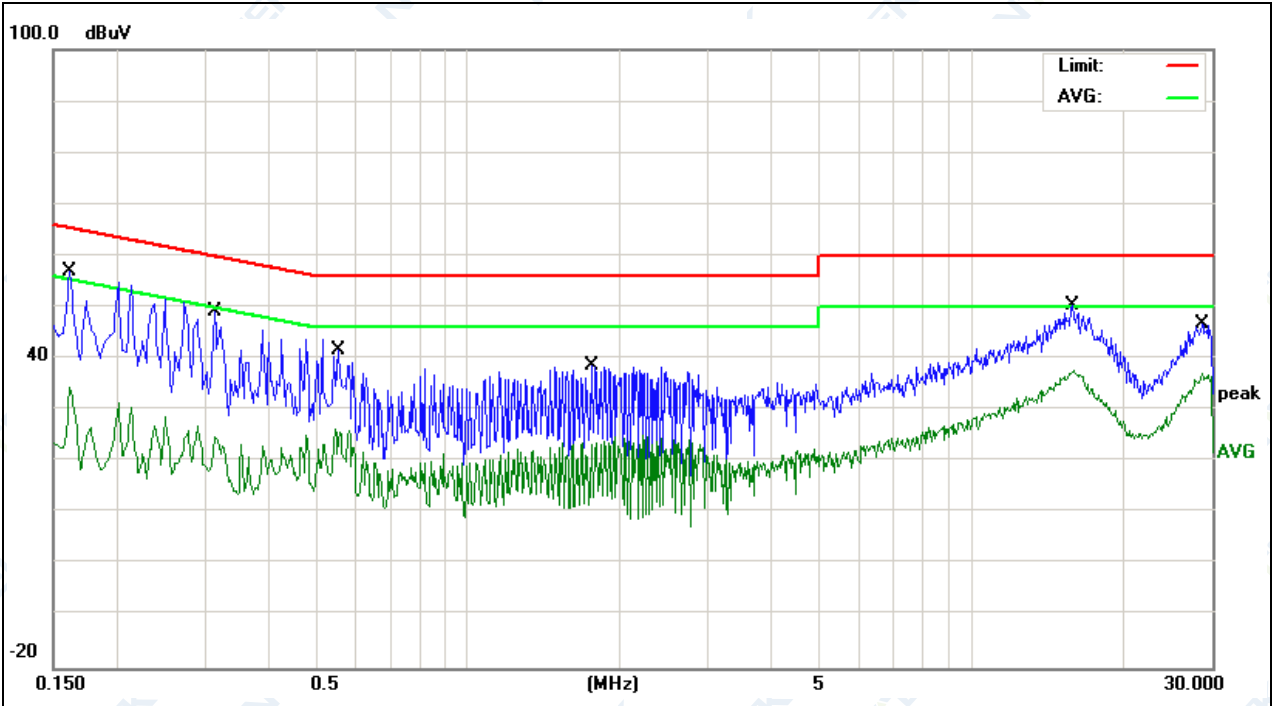
- Note: 1.Support units were connected to second LISN.**  
**2.Both of LISNs (AMN) are 80 cm from EUT and at least 80 from other units and other metal planes**

### 3.1.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

3.1.6 TEST RESULTS

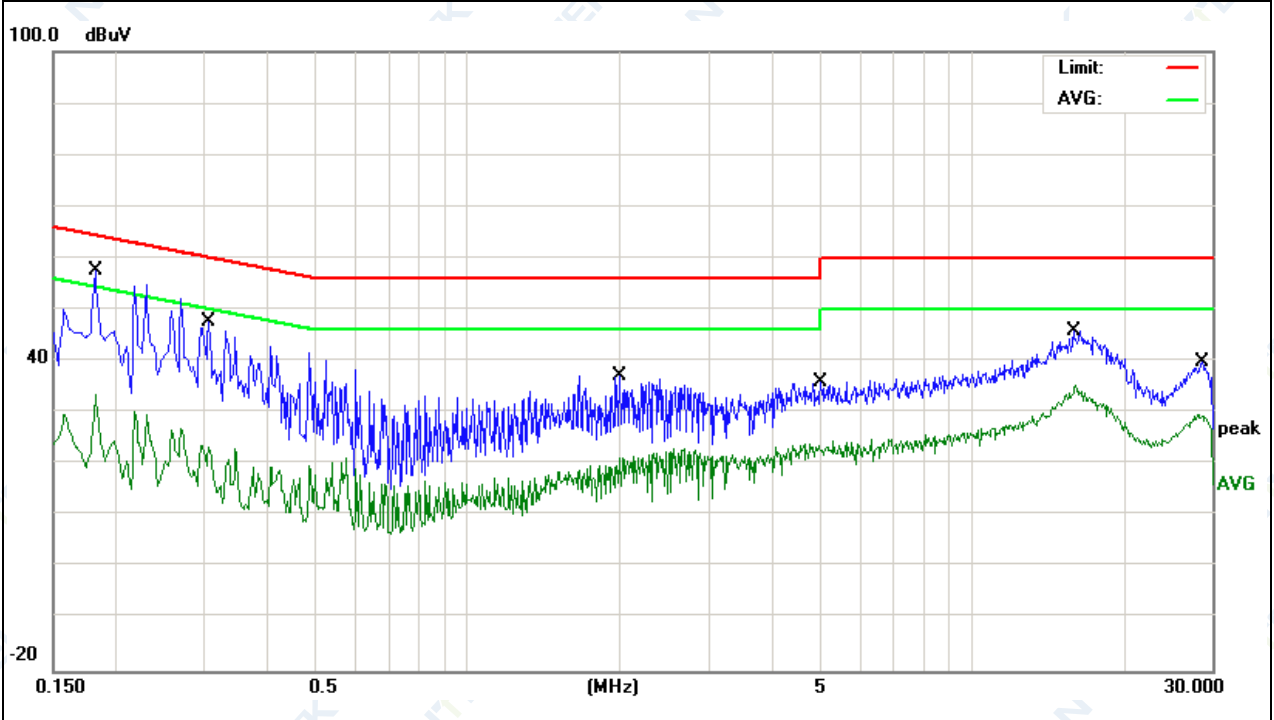
EUT:	Mole	Model Name:	JMM1
Temperature:	23.2°C	Relative Humidity:	50%
Pressure:	1010hPa	Test Date:	2023-02-21
Test Mode:	Working	Phase:	L
Test Voltage:	AC 230V/50Hz		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1620	47.48	9.61	57.09	65.36	-8.27	QP	
2		0.1620	24.96	9.61	34.57	55.36	-20.79	AVG	
3		0.3140	39.63	9.64	49.27	59.86	-10.59	QP	
4		0.3140	15.11	9.64	24.75	49.86	-25.11	AVG	
5		0.5540	32.03	9.67	41.70	56.00	-14.30	QP	
6		0.5540	14.44	9.67	24.11	46.00	-21.89	AVG	
7		1.7540	28.94	9.67	38.61	56.00	-17.39	QP	
8		1.7660	13.31	9.68	22.99	46.00	-23.01	AVG	
9		15.8460	40.35	10.10	50.45	60.00	-9.55	QP	
10		15.8460	27.36	10.10	37.46	50.00	-12.54	AVG	
11		28.7420	36.52	10.37	46.89	60.00	-13.11	QP	
12		28.7420	26.64	10.37	37.01	50.00	-12.99	AVG	

Remark:  
Factor = Insertion Loss + Cable Loss.

EUT:	Mole	Model Name:	JMM1
Temperature:	23.2°C	Relative Humidity:	50%
Pressure:	1010hPa	Test Date:	2023-02-21
Test Mode:	Working	Phase:	N
Test Voltage:	AC 230V/50Hz		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV	Limit dBuV	Over dB	Detector	Comment
1	*	0.1819	48.06	9.64	57.70	64.39	-6.69	QP	
2		0.1819	22.72	9.64	32.36	54.39	-22.03	AVG	
3		0.3060	38.10	9.64	47.74	60.08	-12.34	QP	
4		0.3060	13.68	9.64	23.32	50.08	-26.76	AVG	
5		1.9980	27.59	9.67	37.26	56.00	-18.74	QP	
6		1.9980	10.88	9.67	20.55	46.00	-25.45	AVG	
7		5.0220	26.16	9.75	35.91	60.00	-24.09	QP	
8		5.0220	12.98	9.75	22.73	50.00	-27.27	AVG	
9		15.9020	35.86	10.07	45.93	60.00	-14.07	QP	
10		15.9020	24.99	10.07	35.06	50.00	-14.94	AVG	
11		28.6860	29.51	10.25	39.76	60.00	-20.24	QP	
12		28.6860	18.95	10.25	29.20	50.00	-20.80	AVG	

Remark:  
Factor = Insertion Loss + Cable Loss.

### 3.2 RADIATED EMISSION MEASUREMENT

#### 3.2.1 LIMITS OF RADIATED EMISSION MEASUREMENT (Below 1000MHz)

**Table A.2 – Requirements for radiated emissions at frequencies up to 1 GHz for Class A equipment**

Table clause	Frequency range MHz	Measurement		Class A limits dB(μV/m)
		Distance m	Detector type/ bandwidth	OATS/SAC (see Table A.1)
A2.1	30 – 230	10	Quasi Peak / 120 kHz	40
	230 – 1 000			47
A2.2	30 – 230	3		50
	230 – 1 000			57

Apply only A2.1 or A2.2 across the entire frequency range.

**Table A.4 – Requirements for radiated emissions at frequencies up to 1 GHz for Class B equipment**

Table clause	Frequency range MHz	Measurement		Class B limits dB(μV/m)
		Distance m	Detector type/ bandwidth	OATS/SAC (see Table A.1)
A4.1	30 – 230	10	Quasi Peak / 120 kHz	30
	230 – 1 000			37
A4.2	30 – 230	3		40
	230 – 1 000			47

Apply only table clause A4.1 or A4.2 across the entire frequency range.

**Table A.6 – Requirements for radiated emissions from FM receivers**

Table clause	Frequency range MHz	Measurement		Class B limit dB(μV/m)		
		Distance m	Detector type/ bandwidth	Fundamental	Harmonics	
				OATS/SAC (see Table A.1)	OATS/SAC (see Table A.1)	
A6.1	30 – 230	10	Quasi peak/ 120 kHz	50	42	
	230 – 300				42	
	300 – 1 000				46	
A6.2	30 – 230	3		Quasi peak/ 120 kHz	60	52
	230 – 300					52
	300 – 1 000					56

Apply only A.6.1 or A.6.2 across the entire frequency range.

These relaxed limits apply only to emissions at the fundamental and harmonic frequencies of the local oscillator. Signals at all other frequencies shall be compliant with the limits given in Table A.4.

### 3.2.2 LIMITS OF RADIATED EMISSION MEASUREMENT (Above 1000MHz)

**Table A.3 – Requirements for radiated emissions at frequencies above 1 GHz for Class A equipment**

Table clause	Frequency range MHz	Measurement		Class A limits dB(μV/m)
		Distance m	Detector type/ bandwidth	FSOATS (see Table A.1)
A3.1	1 000 – 3 000	3	Average / 1 MHz	56
	3 000 – 6 000			60
A3.2	1 000 – 3 000		Peak / 1 MHz	76
	3 000 – 6 000			80

Apply A3.1 and A3.2 across the frequency range from 1 000 MHz to the highest required frequency of measurement derived from Table 1.

**Table A.5 – Requirements for radiated emissions at frequencies above 1 GHz for Class B equipment**

Table clause	Frequency range MHz	Measurement		Class B limits dB(μV/m)
		Distance m	Detector type/ bandwidth	FSOATS (see Table A.1)
A5.1	1 000 – 3 000	3	Average/ 1 MHz	50
	3 000 – 6 000			54
A5.2	1 000 – 3 000		Peak/ 1 MHz	70
	3 000 – 6 000			74

Apply A5.1 and A5.2 across the frequency range from 1 000 MHz to the highest required frequency of measurement derived from Table 1.

**Notes:**

- (1) The limit for radiated test was performed according to as following: CISPR 32.
- (2) The tighter limit applies at the band edges.
- (3) Emission level (dBμV/m)=20log Emission level (uV/m).

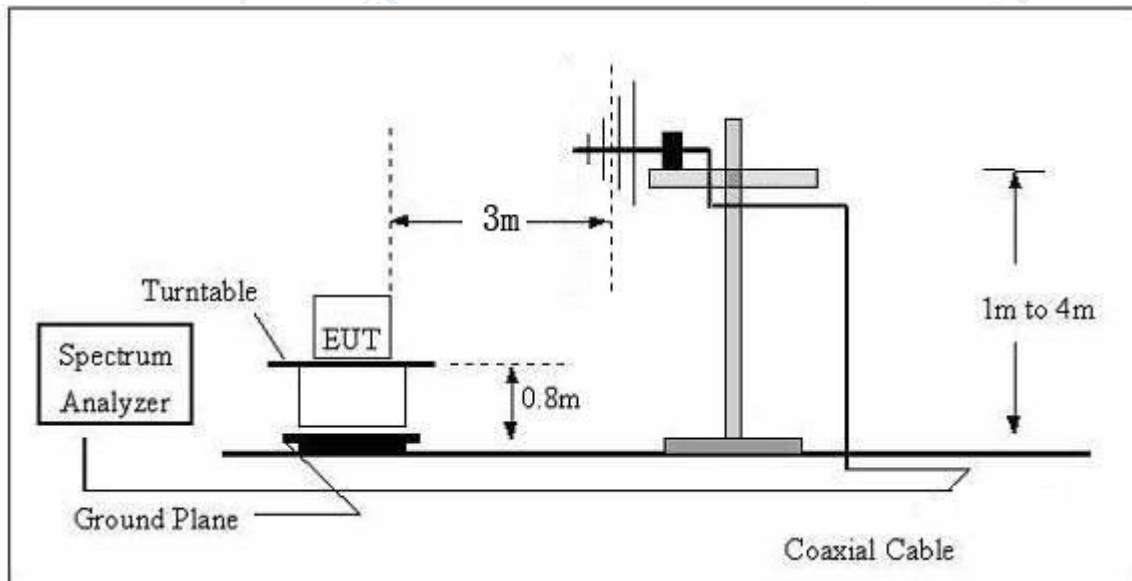
### 3.2.3 TEST PROCEDURE

- a. The measuring distance of at 3m shall be used for measurements at frequency up to 1GHz. For frequencies above 1GHz, any suitable measuring distance may be used.
- b. The EUT was placed on the top of a rotating table 0.8 meters above the ground at a 3 meter open area test site. The table was rotated 360 degrees to determine the position of the highest radiation.
- c. The height of the equipment or of the substitution antenna shall be 0.8 m; the height of the test antenna shall vary between 1 m to 4 m. Both horizontal and vertical polarizations of the antenna are set to make the measurement.
- d. The initial step in collecting conducted emission data is a spectrum analyzer peak detector mode pre-scanning the measurement frequency range. Significant peaks are then marked and then Quasi Peak detector mode re-measured, above 1G Average detector mode will be instead.
- e. If the Peak Mode measured value compliance with and lower than Quasi Peak Mode Limit, the EUT shall be deemed to meet QP(AV) Limits and then no additional QP Mode measurement performed.
- f. For the actual test configuration, please refer to the related Item -EUT Test Photos.

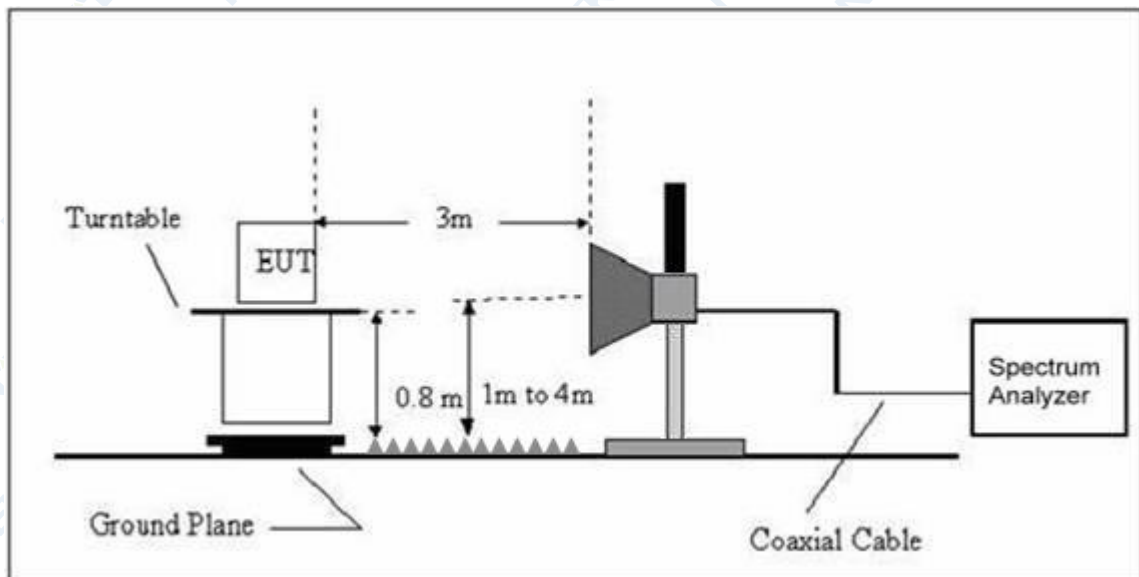


3.2.4 TEST SETUP

(A) Radiated Emission Test Set-Up Frequency Below 1 GHz



(B) Radiated Emission Test Set-Up Frequency Above 1GHz

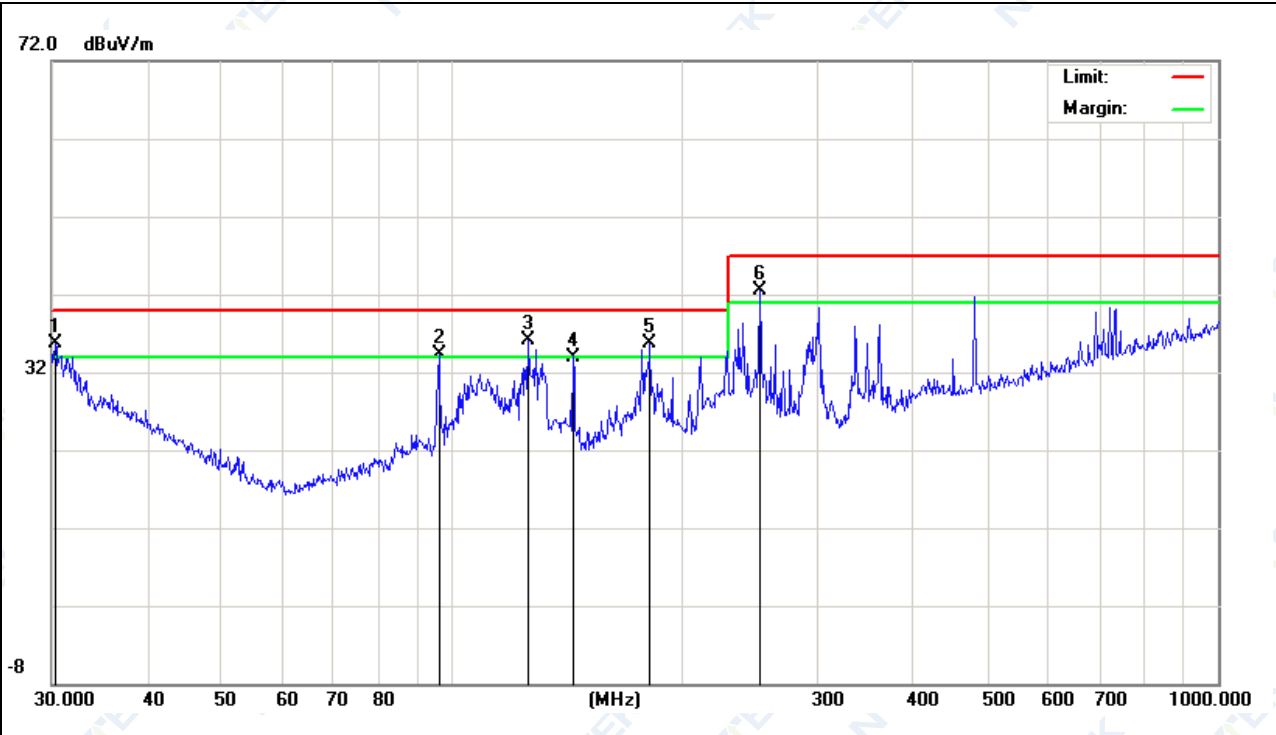


3.2.5 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

3.2.6 TEST RESULTS (30-1000MHz)

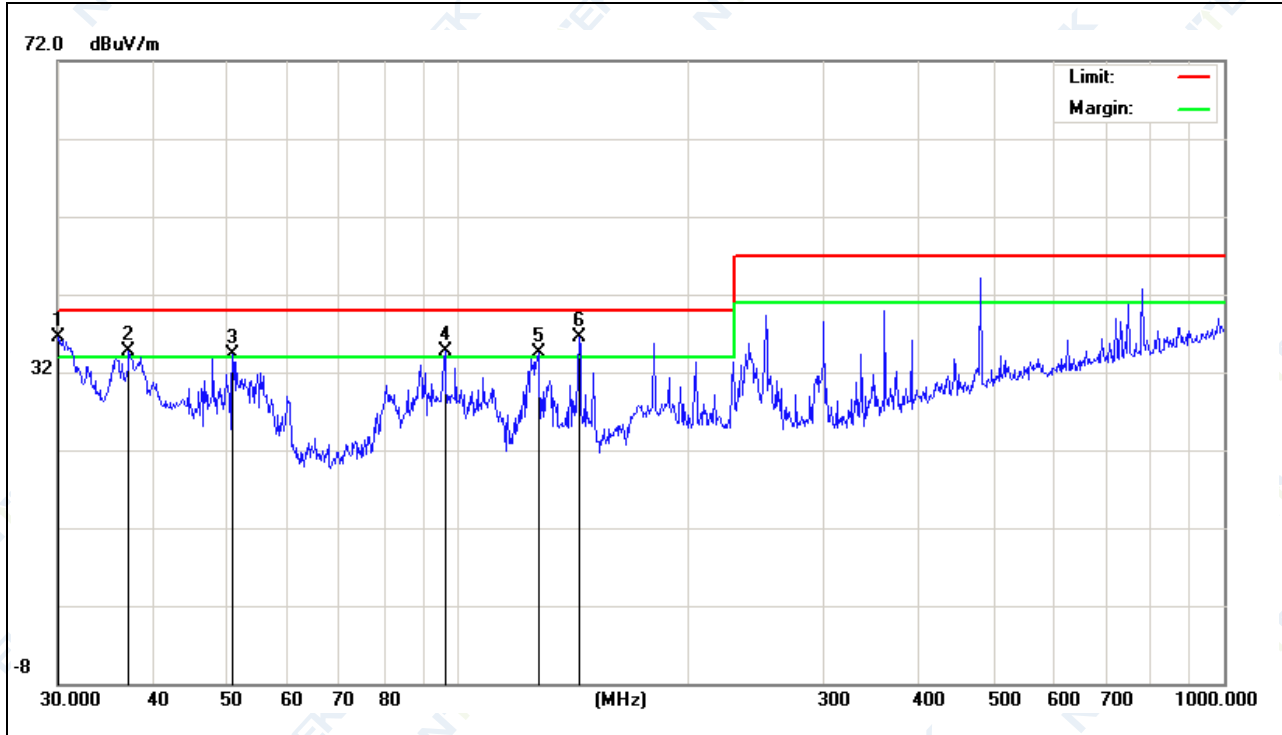
EUT:	Mole	Model Name:	JMM1
Temperature:	24.8°C	Relative Humidity:	52%
Pressure:	1010hPa	Test Date:	2023-02-22
Test Mode:	Working	Polarization:	Horizontal
Test Power:	AC 230V/50Hz		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Detector	Antenna Height cm	Table Degree	Comment
1	!	30.3170	9.86	25.87	35.73	40.00	-4.27	QP			
2	!	96.0986	16.85	17.46	34.31	40.00	-5.69	QP			
3	*	125.8863	17.63	18.49	36.12	40.00	-3.88	QP			
4		143.8292	15.28	18.72	34.00	40.00	-6.00	QP			
5	!	181.2834	18.95	16.75	35.70	40.00	-4.30	QP			
6	!	252.0627	23.31	19.16	42.47	47.00	-4.53	QP			

Remark:  
Factor = Antenna Factor + Cable Loss.

EUT:	Mole	Model Name:	JMM1
Temperature:	24.8°C	Relative Humidity:	52%
Pressure:	1010hPa	Test Date:	2023-02-22
Test Mode:	Working	Polarization:	Vertical
Test Power:	AC 230V/50Hz		



No.	Mk.	Freq. MHz	Reading Level dBuV	Correct Factor dB	Measure- ment dBuV/m	Limit dBuV/m	Over dB	Antenna Height cm	Table Degree degree	Detector	Comment
1	!	30.1051	10.57	25.87	36.44	40.00	-3.56			QP	
2	!	37.1550	12.48	22.25	34.73	40.00	-5.27			QP	
3	!	50.7637	19.40	14.81	34.21	40.00	-5.79			QP	
4	!	96.0986	17.28	17.46	34.74	40.00	-5.26			QP	
5	!	127.2176	15.74	18.77	34.51	40.00	-5.49			QP	
6	*	143.8292	17.84	18.72	36.56	40.00	-3.44			QP	

Remark:  
Factor = Antenna Factor + Cable Loss.

### 3.3 HARMONICS CURRENT

#### 3.3.1 LIMITS OF HARMONICS CURRENT(CLASS A & CLASS D)

Table 1 - Limits for Class A equipment

Harmonic order (n)	Maximum permissible harmonic current (A)
Odd harmonics	
3	2.3
5	1.14
7	0.77
9	0.4
11	0.33
13	0.21
$15 \leq n \leq 39$	$0.15 * (15/n)$
Even harmonics	
2	1.08
4	0.43
6	0.30
$8 \leq n \leq 40$	$0.23 * (8/n)$

Table 2 - Limits for Class D equipment

Harmonic order (n)	Maximum permissible harmonic current per watt (mA/W)	Maximum permissible harmonic current (A)
3	3.4	2.30
5	1.9	1.14
7	1.0	0.77
9	0.5	0.40
11	0.35	0.33
$13 \leq n \leq 39$ (odd harmonics only)	$3.85/n$	See table 1

Note: Reference standard of the two tables above: EN IEC 61000-3-2.

3.3.1.1 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 IEC 61000-3-2. The EUT is classified as follows:

Class A: Balanced three-phase equipment, Household appliances excluding equipment as Class D, Tools excluding portable tools, Dimmers for incandescent lamps, audio equipment, equipment not specified in one of the three other classes.

Class B: Portable tools. Portable tools.; Arc welding equipment which is not professional equipment.

Class C: Lighting equipment.

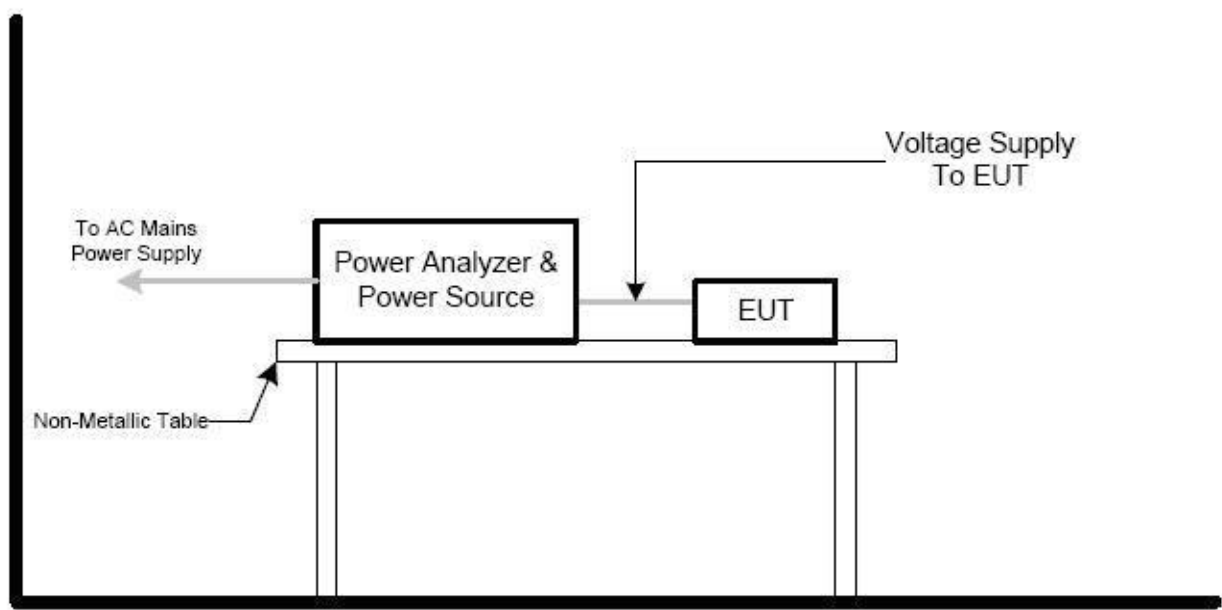
Class D: Equipment having a specified power less than or equal to 600W of the following types: Personal computers and personal computer monitors and television receivers.

c. The correspondent test program of test instrument to measure the current harmonics emanated from EUT is chosen. The measure time shall be not less than the time necessary for the EUT to be exercised.

3.3.1.2 EUT OPERATING CONDITIONS

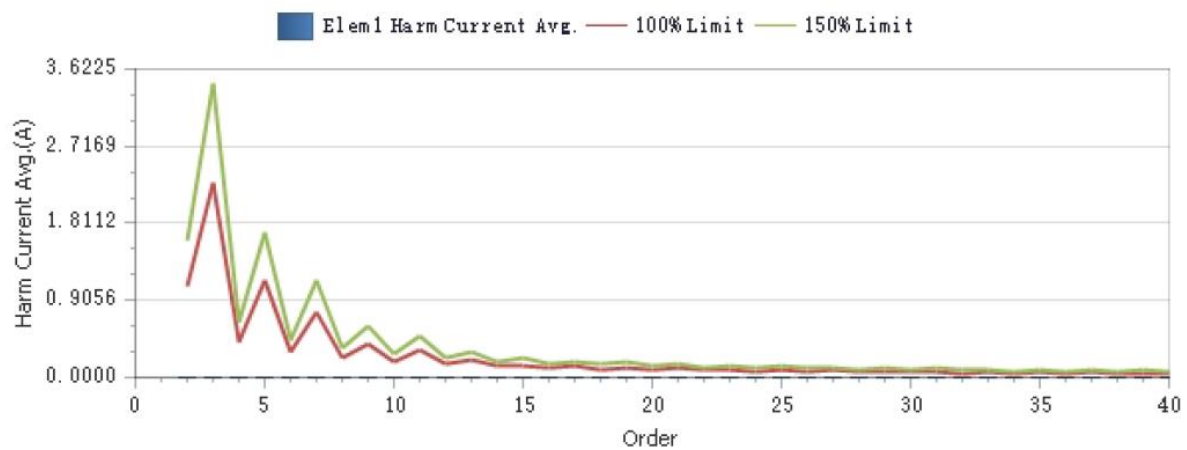
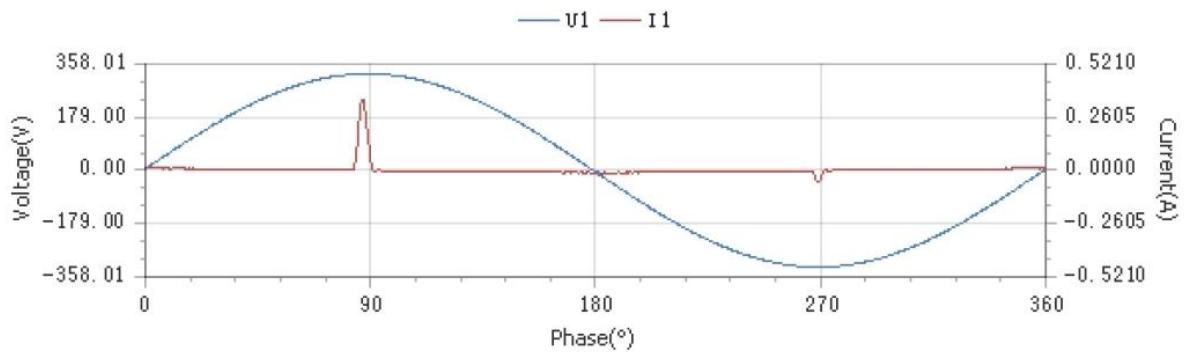
The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

3.3.1.3 TEST SETUP



3.3.2 TEST RESULTS

EUT:	Mole	Model Name:	JMM1
Temperature:	23.2°C	Relative Humidity:	43%
Pressure:	1010hPa	Test Date:	2023-02-23
Classification:	Class A	Test duration:	150s
Test Mode:	Working		
Test Power:	AC 230V/50Hz		



Total Current Harmonics and Some Odd Harmonic Parameters

THC(A)	0.0363	THD (%)	323.09	POHC(A)	0.0127	POHC Limit(A)	0.2514
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Maximum Value of Relevant Parameter During Test Period

Urms (V)	229.83	Freq(Hz)	49.999
Irms (A)	0.0398	Ipeak (A)	0.5639
I1 (A)	0.0120	ICF	21.4132
P(W)	2.0028	λ	0.2194

Determination of Harmonics and Limits

Order(n)	Harmonics Current Avg. (A)	100% Limit(A)	Limit Percent (%)	Harmonics Current Max. (A)	150% Limit(A)	Limit Percent (%)	Result
2	0.0041	1.0800	N/A	0.0077	1.6200	N/A	Pass
3	0.0060	2.3000	0.26	0.0103	3.4500	0.30	Pass
4	0.0040	0.4300	N/A	0.0077	0.6450	N/A	Pass
5	0.0059	1.1400	0.52	0.0101	1.7100	0.59	Pass
6	0.0040	0.3000	N/A	0.0076	0.4500	N/A	Pass
7	0.0059	0.7700	0.77	0.0099	1.1550	0.86	Pass
8	0.0040	0.2300	N/A	0.0075	0.3450	N/A	Pass
9	0.0058	0.4000	1.45	0.0096	0.6000	1.60	Pass
10	0.0039	0.1840	N/A	0.0073	0.2760	N/A	Pass
11	0.0057	0.3300	1.73	0.0094	0.4950	1.90	Pass
12	0.0039	0.1533	N/A	0.0072	0.2300	N/A	Pass
13	0.0056	0.2100	2.67	0.0091	0.3150	2.89	Pass
14	0.0038	0.1314	N/A	0.0070	0.1971	N/A	Pass
15	0.0054	0.1500	3.60	0.0088	0.2250	3.91	Pass
16	0.0037	0.1150	N/A	0.0068	0.1725	N/A	Pass
17	0.0053	0.1324	4.00	0.0084	0.1985	4.23	Pass
18	0.0037	0.1022	N/A	0.0065	0.1533	N/A	Pass
19	0.0051	0.1184	4.31	0.0081	0.1776	4.56	Pass
20	0.0036	0.0920	N/A	0.0063	0.1380	N/A	Pass
21	0.0049	0.1071	N/A	0.0077	0.1607	N/A	Pass
22	0.0035	0.0836	N/A	0.0060	0.1255	N/A	Pass
23	0.0047	0.0978	N/A	0.0073	0.1467	N/A	Pass
24	0.0034	0.0767	N/A	0.0058	0.1150	N/A	Pass
25	0.0045	0.0900	N/A	0.0068	0.1350	N/A	Pass
26	0.0033	0.0708	N/A	0.0055	0.1062	N/A	Pass
27	0.0043	0.0833	N/A	0.0064	0.1250	N/A	Pass
28	0.0032	0.0657	N/A	0.0052	0.0986	N/A	Pass
29	0.0041	0.0776	N/A	0.0060	0.1164	N/A	Pass
30	0.0030	0.0613	N/A	0.0049	0.0920	N/A	Pass
31	0.0039	0.0726	N/A	0.0057	0.1089	N/A	Pass
32	0.0029	0.0575	N/A	0.0046	0.0863	N/A	Pass
33	0.0036	0.0682	N/A	0.0053	0.1023	N/A	Pass
34	0.0028	0.0541	N/A	0.0043	0.0812	N/A	Pass
35	0.0034	0.0643	N/A	0.0050	0.0964	N/A	Pass
36	0.0027	0.0511	N/A	0.0041	0.0767	N/A	Pass
37	0.0032	0.0608	N/A	0.0047	0.0912	N/A	Pass
38	0.0026	0.0484	N/A	0.0039	0.0726	N/A	Pass
39	0.0030	0.0577	N/A	0.0043	0.0865	N/A	Pass
40	0.0024	0.0460	N/A	0.0036	0.0690	N/A	Pass

## Determination of Voltage Relevant Parameter During Test Period

Item	Nominal Value	Tested Value	Error Value	Allowable Error Value	Result
Urms(V)	230.00	229.82	0.18	±2.0%	Pass
Frequency(Hz)	50.000	49.998	0.002	±0.5%	Pass
CFU	1.4100	1.4165	0.0065	±0.01	Pass
Peak-Volt Phase	90.00	90.00	0.00	±3	Pass

## Determination of Voltage Harmonics and Limits

Order (n)	UhdF	Limit (%)	Limit Percent (%)	Result
1	100%	---	---	---
2	0.01%	0.20	5.61%	Pass
3	0.01%	0.90	0.86%	Pass
4	0.00%	0.20	0.97%	Pass
5	0.00%	0.40	0.34%	Pass
6	0.00%	0.20	2.32%	Pass
7	0.00%	0.30	0.39%	Pass
8	0.00%	0.20	0.70%	Pass
9	0.00%	0.20	2.26%	Pass
10	0.00%	0.20	2.31%	Pass
11	0.00%	0.10	1.69%	Pass
12	0.00%	0.10	4.78%	Pass
13	0.00%	0.10	3.51%	Pass
14	0.00%	0.10	2.29%	Pass
15	0.00%	0.10	3.26%	Pass
16	0.00%	0.10	1.21%	Pass
17	0.00%	0.10	2.98%	Pass
18	0.00%	0.10	0.93%	Pass
19	0.00%	0.10	1.00%	Pass
20	0.00%	0.10	1.04%	Pass
21	0.00%	0.10	4.66%	Pass
22	0.00%	0.10	1.14%	Pass
23	0.00%	0.10	4.92%	Pass
24	0.00%	0.10	1.07%	Pass
25	0.00%	0.10	3.98%	Pass
26	0.00%	0.10	0.91%	Pass
27	0.00%	0.10	3.26%	Pass
28	0.00%	0.10	0.78%	Pass
29	0.00%	0.10	2.40%	Pass
30	0.00%	0.10	0.93%	Pass
31	0.00%	0.10	1.32%	Pass
32	0.00%	0.10	1.00%	Pass
33	0.00%	0.10	2.48%	Pass
34	0.00%	0.10	0.93%	Pass
35	0.00%	0.10	1.17%	Pass
36	0.00%	0.10	1.32%	Pass
37	0.00%	0.10	1.15%	Pass
38	0.00%	0.10	1.42%	Pass
39	0.00%	0.10	1.31%	Pass
40	0.00%	0.10	1.05%	Pass



### 3.4 VOLTAGE FLUCTUATION AND FLICKERS

#### 3.4.1 LIMITS OF VOLTAGE FLUCTUATION AND FLICKERS

Test items	Limits(EN 61000-3-3)	Descriptions
$P_{st}$	$\leq 1.0, T_p=10\text{min}$	short-term flicker indicator
$P_{lt}$	$\leq 0.65, T_p=2\text{h}$	long-term flicker indicator
$d_c$	$\leq 3.3\%$	relative steady-state voltage change
$d_{max}$	$\leq 4\%$ (or $6\%$ <sub>Note(1)</sub> , $7\%$ <sub>Note(2)</sub> )	maximum relative voltage change:
$d_{(t)}$	$\leq 3.3\%$ , more than 500ms	relative voltage change characteristic

Note:

1. 6 % for equipment which is:
  - a. switched manually, or
  - b. switched automatically more frequently than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds), or manual restart, after a power supply interruption.
2. 7 % for equipment which is
  - a. attended whilst in use (for example: hair dryers, vacuum cleaners, kitchen equipment such as mixers, garden equipment such as lawn mowers, portable tools such as electric drills), or
  - b. switched on automatically, or is intended to be switched on manually, no more than twice per day, and also has either a delayed restart (the delay being not less than a few tens of seconds) or manual restart, after a power supply interruption.

##### 3.4.1.1 TEST PROCEDURE

###### a. Fluctuation and Flickers Test:

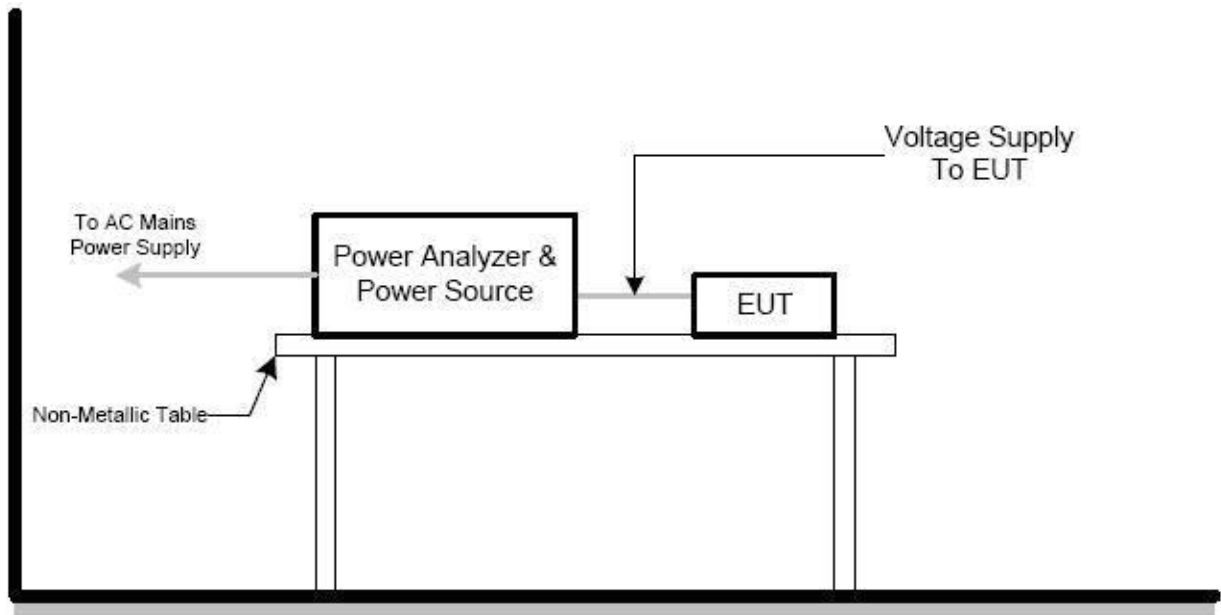
Tests was performed according to the Test Conditions/Assessment of Voltage Fluctuations specified in Clause 6.0/4.0 of IEC/EN 61000-3-3 depend on which standard adopted for compliance measurement.

- b. All types of voltage fluctuation in this report are assessed by direct measurement using flicker-meter.

##### 3.4.1.2 EUT OPERATING CONDITIONS

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

### 3.4.1.3 TEST SETUP

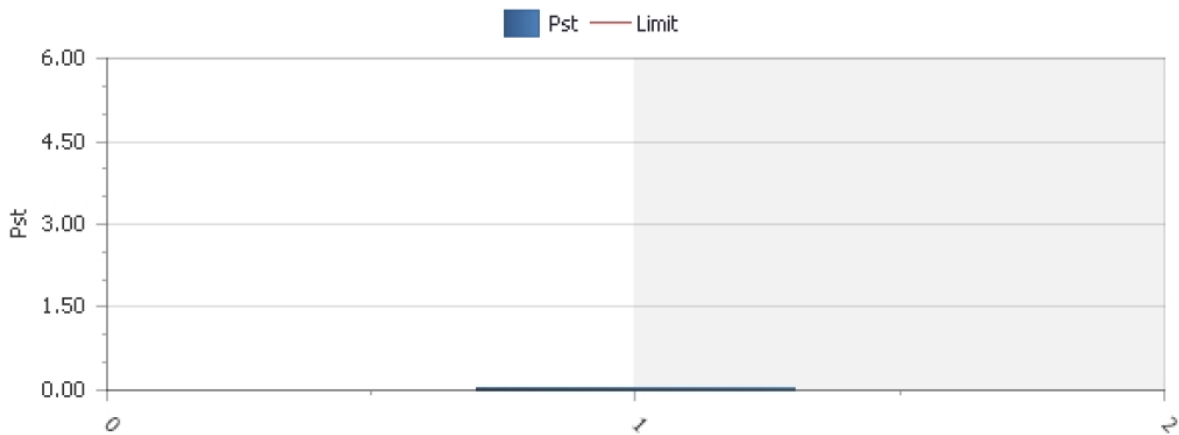


3.4.2 TEST RESULTS

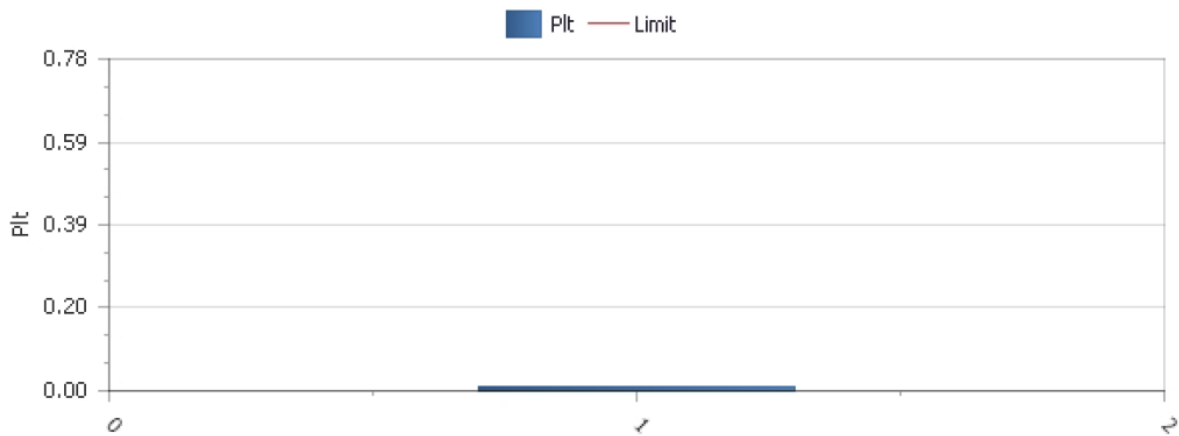
EUT:	Mole	Model Name:	JMM1
Temperature:	23.2℃	Relative Humidity:	43%
Pressure:	1010hPa	Test Date:	2023-02-23
Test Mode:	Working		
Test Power:	AC 230V/50Hz		

Maximum Flicker results

Pst and Limit



Plt and Limit



Relevant Parameter and Judgement During Test Period

Vrms at the end of test(V)	229.82			
Error Max(%)		Test Limit(%)		
T-max(ms)	0.00	Test Limit(ms)	500	Pass
dc(%)	0.00	Test Limit(%)	3.30	Pass
dmax(%)	0.00	Test Limit(%)	4.00	Pass
Pst	0.019	Test Limit	5.000	Pass
Plt	0.008	Test Limit	0.650	Pass

#### 4. EMC IMMUNITY TEST

##### 4.1 STANDARD COMPLIANCE/SEVERITY LEVEL/CRITERIA

Tests Standard No.	TEST SPECIFICATION	Test Mode Test Ports	Perform. Criteria
1. ESD IEC/EN 61000-4-2	8kV air discharge 4kV contact discharge	Direct Mode	B
	4kV HCP discharge 4kV VCP discharge	Indirect Mode	B
2. RS IEC/EN 61000-4-3	80 MHz to 1000 MHz 1800 MHz 2600 MHz 3500 MHz 5000 MHz 1000Hz, 80% AM modulated	Enclosure	A
3. EFT/Burst IEC/EN 61000-4-4	5/50ns Tr/Th 5kHz Repetition Freq.	Power Supply Port	B
	5/50ns Tr/Th 5kHz Repetition Freq.	CTL/Signal Data Line Port	B
4. Surges IEC/EN 61000-4-5	1.2/50(8/20) Tr/Th us	L-N	B
	1.2/50(8/20) Tr/Th us	L-PE N-PE	B
5. Continuous radio frequency disturbances IEC/EN 61000-4-6	0.15 MHz to 80 MHz, 1000Hz 80%, AM Modulated 150Ω source impedance	CTL/Signal Port	A
	0.15 MHz to 80 MHz, 1000Hz 80%, AM Modulated 150Ω source impedance	AC Power Port	A
	0.15 MHz to 80 MHz, 1000Hz 80%, AM Modulated 150Ω source impedance	DC Power Port	A
6. Power Frequency Magnetic Field IEC/EN 61000-4-8	50 Hz	Enclosure	A
7. Volt. Interruptions Volt. Dips IEC/EN 61000-4-11	Voltage Interruption 100%		B
	Voltage dip 30%	AC Power Port	C
	Voltage Interruption 100%		C

#### 4.2 GENERAL PERFORMANCE CRITERIA

According to **EN 55035** standard, the general performance criteria as following:

<p><b>Criterion A</b></p>	<p>The equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer when the equipment is used as intended.</p> <p>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.</p>
<p><b>Criterion B</b></p>	<p>After the test, the equipment shall continue to operate as intended without operator intervention. No degradation of performance or loss of function is allowed, after the application of the phenomena below a performance level specified by the manufacturer, when the equipment is used as intended.</p> <p>The performance level may be replaced by a permissible loss of performance. During the test, degradation of performance is allowed. However, no change of operating state or stored data is allowed to persist after the test.</p>
<p><b>Criterion C</b></p>	<p>Loss of function is allowed, provided the function is self-recoverable, or can be restored by the operation of the controls by the user in accordance with the manufacturer's instructions.</p> <p>Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.</p>

#### 4.3 GENERAL PERFORMANCE CRITERIA TEST SETUP

The EUT tested system was configured as the statements of 2.3 Unless otherwise a special operating condition is specified in the follows during the testing.

4.4 ESD TESTING

4.4.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-2
Discharge Impedance:	330ohm / 150pF
Required Performance:	B
Discharge Voltage:	Air Discharge:2kV/4kV/8kV (Direct) Contact Discharge:2kV/4kV (Direct/Indirect)
Polarity:	Positive & Negative
Number of Discharge:	Air Discharge: min. 20 times at each test point Contact Discharge: min. 20 times at each test point
Discharge Mode:	Single Discharge
Discharge Period:	1 second minimum

4.4.2 TEST PROCEDURE

The test generator necessary to perform direct and indirect application of discharges to the EUT in the following manner:

a. Indirect application of the discharge:

Vertical Coupling Plane (VCP):

At least 10 single discharges (in the most sensitive polarity) shall be applied to the centre of one vertical edge of the coupling plane. The coupling plane, of dimensions 0,5 m × 0,5 m, is placed parallel to, and positioned at a distance of 0,1 m from, the EUT.

Discharges shall be applied to the coupling plane, with sufficient different positions such that the four faces of the EUT are completely illuminated. One VCP position is considered to illuminate 0,5 m × 0,5 m area of the EUT surface.

Horizontal Coupling Plane (HCP):

Discharge to the HCP shall be made horizontally to the edge of the HCP.

At least 10 single discharges (in the most sensitive polarity) shall be applied at the front edge of each HCP opposite the centre point of each unit (if applicable) of the EUT and 0.1m from the front of the EUT. The long axis of the discharge electrode shall be in the plane of the HCP and perpendicular to its front edge during the discharge.

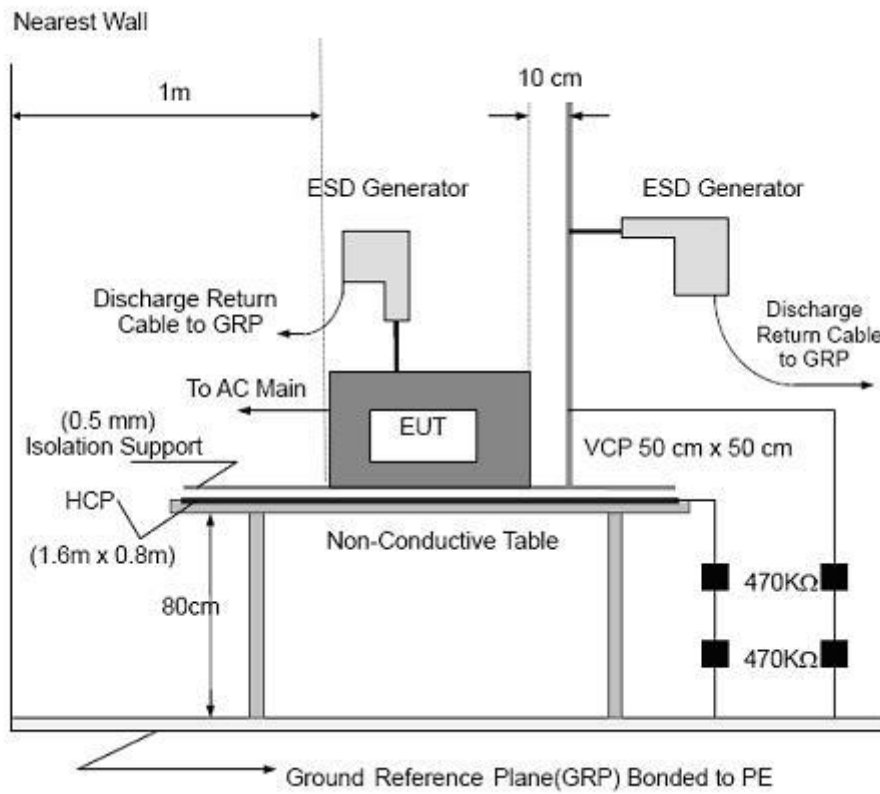
The discharge electrode shall be in contact with the edge of the HCP before the discharge switch is operated

b. Direct application of discharges to the EUT

The test shall be performed with single discharges. On each pre-selected point at least 10 single discharges (in the most sensitive polarity) shall be applied.

For the time interval between successive single discharges an initial value of 1 s is recommended. Longer intervals may be necessary to determine whether a system failure has occurred.

4.4.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table 0.8 meters high standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum at least 0.25mm thick, and 2.5 meters square connected to the protective grounding system. A Horizontal Coupling Plane (1.6m x 0.8m) was placed on the table and attached to the GRP by means of a cable with 940k total impedance. The equipment under test, was installed in a representative system as described in section 7 of IEC /EN 61000-4-2, and its cables were placed on the HCP and isolated by an insulating support of 0.5mm thickness. A distance of 1-meter minimum was provided between the EUT and the walls of the laboratory and any other metallic structure.

FLOOR-STANDING EQUIPMENT

The equipment under test was installed in a representative system as described in section 7 of IEC/EN 61000-4-2, and its cables were isolated from the Ground Reference Plane by an insulating support of 0.1-meter thickness. The GRP consisted of a sheet of aluminum that is at least 0.25mm thick, and 2.5meters square connected to the protective grounding system and extended at least 0.5 meters from the EUT on all sides.

## 4.4.4 TEST RESULTS

EUT:	Mole	Model Name:	JMM1
Temperature:	23.2°C	Relative Humidity:	43%
Pressure:	1010hPa	Test Date:	2023-02-23
Test Mode:	Working		
Test Power:	AC 230V/50Hz		

Mode	Contact Discharge (Indirect)							Criterion	Result
Test Level(kV)	Test Point	2		4		6			
Test Location		+	-	+	-	+	-		
HCP	Front	P	P	P	P			<b>B</b>	<b>Complies</b>
	Rear	P	P	P	P				
	Left	P	P	P	P				
	Right	P	P	P	P				
VCP	Front	P	P	P	P				
	Rear	P	P	P	P				
	Left	P	P	P	P				
	Right	P	P	P	P				

Mode	Air Discharge								Contact Discharge								Criterion	Result	
Test Level(kV)	2		4		8		15		2		4		6		8				
Test Location	+	-	+	-	+	-	+	-	+	-	+	-	+	-	+	-			
Gap	P	P	P	P	P	P												<b>B</b>	<b>Complies</b>
LED	P	P	P	P	P	P													
Screw									P	P	P	P							
Metal									P	P	P	P							



## Note:

- 1) +/- denotes the Positive/Negative polarity of the output voltage.
- 2) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.
- 3) Criteria A: Normal performance within limits specified by the manufacturer, requestor or purchaser.
- 4) Criteria B: Temporary loss of function or degradation of performance which ceases after the disturbance ceases, and from which the EUT recovers its normal performance, without operator intervention.
- 5) Criteria C: Temporary loss of function or degradation of performance, the correction of which requires operator intervention.
- 6) Criteria D: Loss of function or degradation of performance which is not recoverable, owing to damage to hardware or software, or loss of data.

## 4.5 RS TESTING

### 4.5.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-3
Required Performance:	A
Frequency Range:	80 MHz to 1000 MHz 1800 MHz 2600 MHz 3500 MHz 5000 MHz
Field Strength:	3 V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m
Antenna Height:	1.5 m
Dwell Time:	3 seconds

### 4.5.2 TEST PROCEDURE

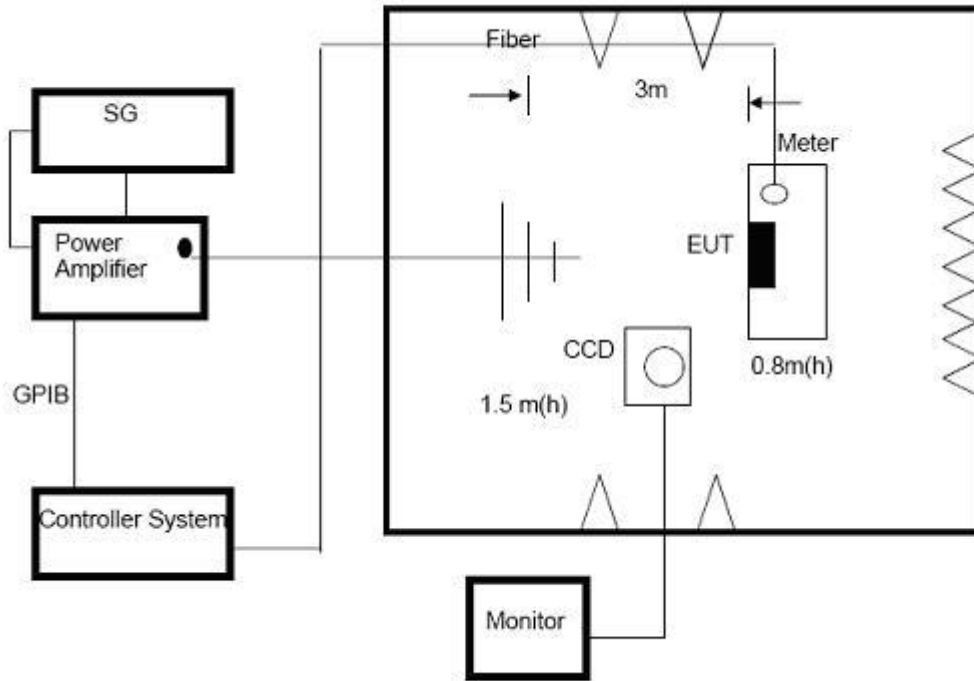
The EUT and support equipment, which are placed on a table that is 0.8 meter above ground and the testing was performed in a fully-anechoic chamber.

The testing distance from antenna to the EUT was 3 meters.

The other condition as following manner:

- a. The frequency range is swept from 80 MHz to 1000 MHz, 1800 MHz, 2600 MHz, 3500 MHz, 5000 MHz with the signal 80% amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed  $1.5 \times 10^{-3}$  decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- b. Sweep Frequency 900 MHz, with the Duty Cycle:1/8 and Modulation: Pulse 217 Hz(if applicable)
- c. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.
- d. The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

4.5.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive table 0.8 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-3 was placed on a non-conductive wood support 0.1 meters in height. The system under test was connected to the power and signal wire according to relevant installation instructions.

## 4.5.4 TEST RESULTS

EUT:	Mole	Model Name:	JMM1
Temperature:	24.2°C	Relative Humidity:	42%
Pressure:	1010hPa	Test Date:	2023-02-22
Test Mode:	Working		
Test Power:	AC 230V/50Hz		

Frequency Range (MHz)	RF Field Position	R.F. Field Strength	Azimuth	Perform. Criteria	Results	Judgment
80 - 1000	H / V	3 V/m (r.m.s) AM Modulated 1000Hz, 80%	Front	A	P	Complies
1800			Rear			
2600			Left			
3500			Right			
5000						

## Note:

- 1) N/A - denotes test is not applicable in this test report.
- 2) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.
- 3) Criteria A: There was no change operated with initial operating during the test.
- 4) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
- 5) Criteria C: The system shut down during the test.

4.6 EFT/BURST TESTING

4.6.1 TEST SPECIFICATION

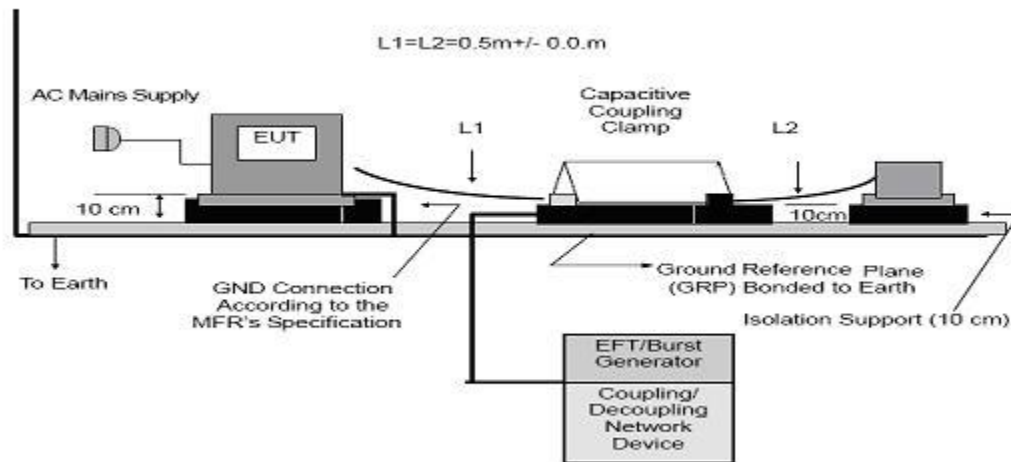
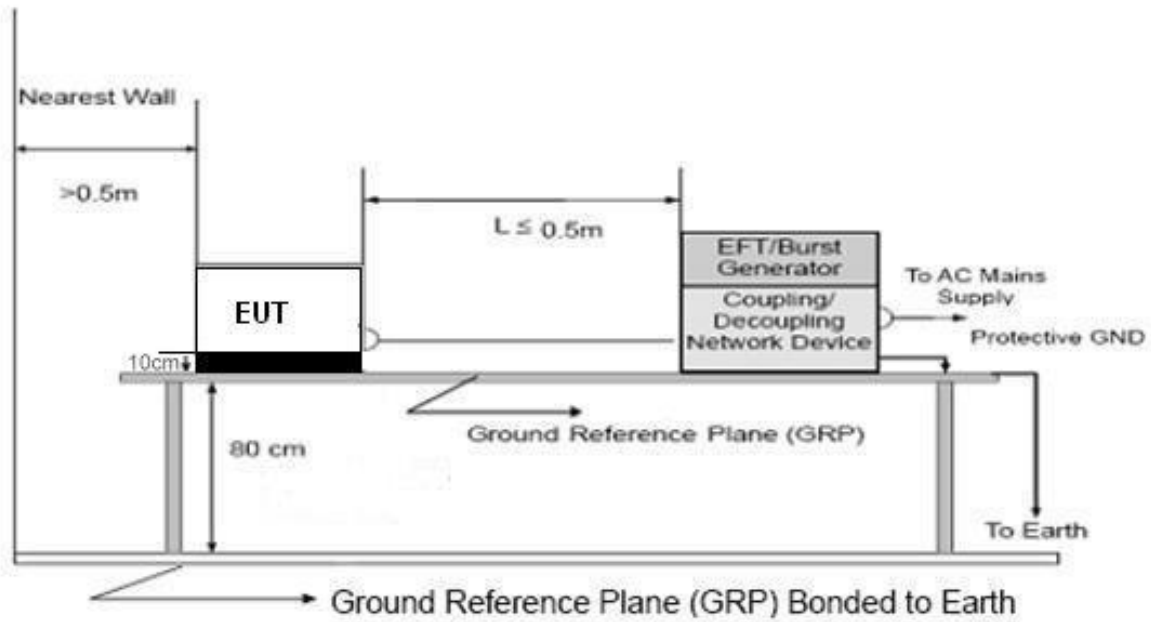
Basic Standard:	IEC/EN 61000-4-4
Required Performance:	B
Test Voltage:	Power Line:0.5 kV, 1 kV Signal/Control Line:0.5 kV
Polarity:	Positive & Negative
Impulse Frequency:	5 kHz
Impulse Wave shape :	5/50 ns
Burst Duration:	15 ms
Burst Period:	300 ms
Test Duration:	2 minutes

4.6.2 TEST PROCEDURE

The EUT and its simulators were placed on a ground reference plane and were insulated from it by a wood support 0.1m ± 0.01m thick. The ground reference plane was 1m\*1m metallic sheet with 0.65mm minimum thickness. The other condition as following manner:

- a. The length of power cord between the coupling device and the EUT should not exceed 0.5 meter.
- b. Both positive and negative polarity discharges were applied.
- c. The duration time of each test sequential was 2 minutes.

4.6.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The configuration consisted of a wooden table (0.8m high) standing on the Ground Reference Plane. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system. A minimum distance of 0.5m was provided between the EUT and the walls of the laboratory or any other metallic structure.

FLOOR-STANDING EQUIPMENT

The EUT installed in a representative system as described in section 7 of IEC/EN 61000-4-4 and its cables, were isolated from the Ground Reference Plane by an insulating support that is 0.1-meter thick. The GRP consisted of a sheet of aluminum (at least 0.25mm thick and 2.5m square) connected to the protective grounding system.

## 4.6.4 TEST RESULTS

EUT:	Mole	Model Name:	JMM1
Temperature:	23.2°C	Relative Humidity:	43%
Pressure:	1010hPa	Test Date:	2023-02-23
Test Mode:	Working		
Test Power:	AC 230V/50Hz		

Coupling Line		Test Level (kV)								Criterion	Result
		0.5		1		2		4			
		+	-	+	-	+	-	+	-		
AC Line	L	P	P	P	P					B	Complies
	N	P	P	P	P						
	PE										
	L+N	P	P	P	P						
	L+PE										
	N+PE										
	L+N+PE										
DC Line											
Signal Line											

## Note:

- 1) +/- denotes the Positive/Negative polarity of the output voltage.
- 2) N/A - denotes test is not applicable in this test report
- 3) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.
- 4) Criteria A: There was no change operated with initial operating during the test.
- 5) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
- 6) Criteria C: The system shut down during the test.

## 4.7 SURGE TESTING

### 4.7.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-5
Required Performance:	B
Wave-Shape:	Combination Wave 1.2/50 us Open Circuit Voltage 8 /20 us Short Circuit Current
Test Voltage:	Power Line:0.5 kV, 1 kV, 2 kV
Surge Input / Output:	L-N, L-PE, N-PE
Generator Source:	2 ohm between networks
Impedance:	12 ohm between network and ground
Polarity:	Positive/Negative
Phase Angle:	90°/270°
Pulse Repetition Rate:	1 time / min. (maximum)
Number of Tests:	5 positive and 5 negative at selected points

### 4.7.2 TEST PROCEDURE

a. For EUT power supply:

The surge is to be applied to the EUT power supply terminals via the capacitive coupling network. Decoupling networks are required in order to avoid possible adverse effects on equipment not under test that may be powered by the same lines, and to provide sufficient decoupling impedance to the surge wave. The power cord between the EUT and the coupling/decoupling networks shall be 2meters in length (or shorter).

b. For test applied to unshielded asymmetrically operated interconnection lines of EUT:

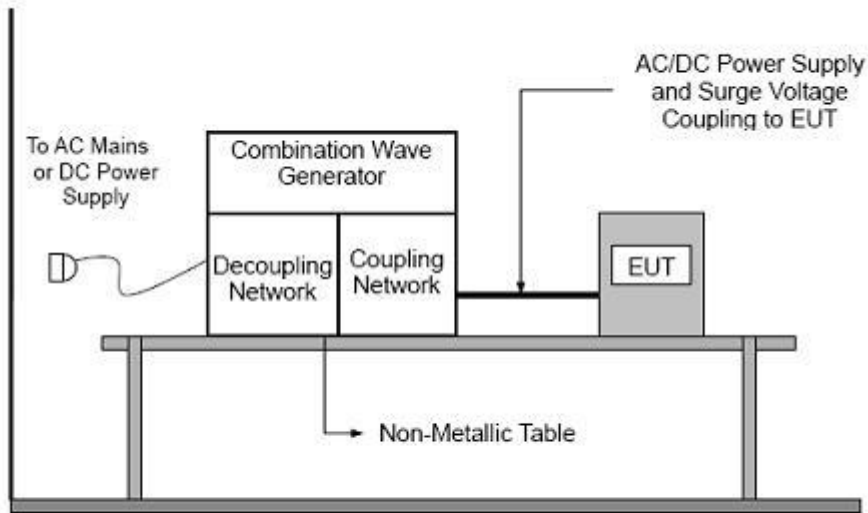
The surge is applied to the lines via the capacitive coupling. The coupling /decoupling networks shall not influence the specified functional conditions of the EUT. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).

c. For test applied to unshielded symmetrically operated interconnection /telecommunication lines of EUT:

d. The surge is applied to the lines via gas arrestors coupling. Test levels below the ignition point of the coupling arrester cannot be specified. The interconnection line between the EUT and the coupling/decoupling networks shall be 2 meters in length (or shorter).



### 4.7.3 TEST SETUP



## 4.7.4 TEST RESULTS

EUT:	Mole	Model Name:	JMM1
Temperature:	23.2°C	Relative Humidity:	43%
Pressure:	1010hPa	Test Date:	2023-02-23
Test Mode:	Working		
Test Power:	AC 230V/50Hz		

Coupling Line			Test Level								Criterion	Result
			0.5 kV		1 kV		2 kV		4 kV			
			+	-	+	-	+	-	+	-		
AC Line	L-N	0°									B	Complies
		90°	P		P							
		180°										
		270°		P		P						
	L-PE	0°										
		90°										
		180°										
		270°										
	N-PE	0°										
		90°										
		180°										
		270°										
DC Line												
Signal Line												

## Note:

- 1) Polarity and Numbers of Impulses:5 Pst / Ngst at each tested mode
- 2) N/A - denotes test is not applicable in this Test Report
- 3) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.
- 4) Criteria A: There was no change operated with initial operating during the test.
- 5) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
- 6) Criteria C: The system shut down during the test.

## 4.8 CONTINUOUS RADIO FREQUENCY DISTURBANCES TESTING

### 4.8.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-6
Required Performance:	A
Frequency Range:	0.15 - 10 MHz / 10 - 30 MHz / 30 - 80 MHz
Field Strength:	3 Vr.m.s. / 3 to 1 Vr.m.s. / 1 Vr.m.s.
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of fundamental
Dwell Time:	3 seconds

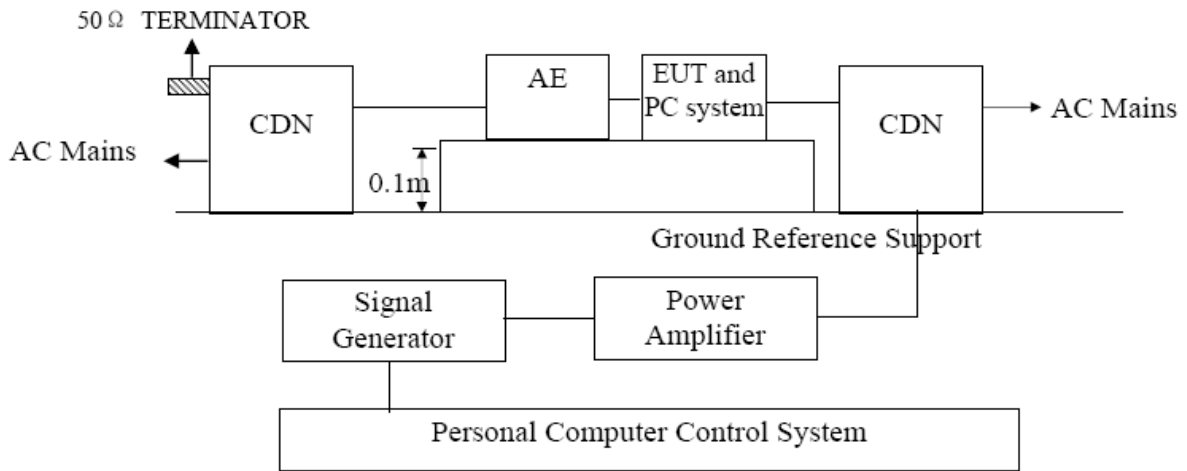
### 4.8.2 TEST PROCEDURE

The EUT are placed on an insulating support 0.1m high above a ground reference plane. CDN (coupling and decoupling device) is placed on the ground plane about 0.3m from EUT. Cables between CDN and EUT are as short as possible, and their height above the ground reference plane shall be between 30 and 50mm (where possible). The disturbance signal described below is injected to EUT through CDN.

The other condition as following manner:

- a. The frequency range is swept from 150 kHz to 80 MHz, with the signal 80% amplitude modulated with a 1kHz sine wave. The rate of sweep did not exceed  $1.5 \times 10^{-3}$  decade/s. Where the frequency range is swept incrementally, the step size was 1% of fundamental.
- b. The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond.

4.8.3 TEST SETUP



NOTE:

FLOOR-STANDING EQUIPMENT

The equipment to be tested is placed on an insulating support of 0.1 meters height above a ground reference plane. All relevant cables shall be provided with the appropriate coupling and decoupling devices at a distance between 0.1 meters and 0.3 meters from the projected geometry of the EUT on the ground reference plane.

## 4.8.4 TEST RESULTS

EUT:	Mole	Model Name:	JMM1
Temperature:	23.2°C	Relative Humidity:	43%
Pressure:	1010hPa	Test Date:	2023-02-23
Test Mode:	Working		
Test Power:	AC 230V/50Hz		

Test Ports (Mode)	Freq. Range (MHz)	Field Strength	Perform. Criteria	Results	Judgment
Input AC. Power Port	0.15 --- 10	3V(r.m.s) AM Modulated 1kHz, 80%	<b>A</b>	<b>P</b>	<b>Complies</b>
	10 --- 30	3 to 1V(r.m.s) AM Modulated 1kHz, 80%			
	30 --- 80	1V(r.m.s) AM Modulated 1kHz, 80%			
Input DC. Power Port	0.15 --- 10	3V(r.m.s) AM Modulated 1kHz, 80%	<b>A</b>	<b>N/A</b>	<b>N/A</b>
	10 --- 30	3 to 1V(r.m.s) AM Modulated 1kHz, 80%			
	30 --- 80	1V(r.m.s) AM Modulated 1kHz, 80%			
Signal Line	0.15 --- 10	3V(r.m.s) AM Modulated 1kHz, 80%	<b>A</b>	<b>N/A</b>	<b>N/A</b>
	10 --- 30	3 to 1V(r.m.s) AM Modulated 1kHz, 80%			
	30 --- 80	1V(r.m.s) AM Modulated 1kHz, 80%			

## Note:

- 1) N/A - denotes test is not applicable in this Test Report.
- 2) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.
- 3) Criteria A: There was no change operated with initial operating during the test.
- 4) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
- 5) Criteria C: The system shut down during the test.

**4.9 POWER FREQUENCY MAGNETIC FIELD TESTING**

**4.9.1 TEST SPECIFICATION**

Basic Standard:	IEC/EN 61000-4-8
Required Performance:	A
Frequency Range:	50Hz
Field Strength:	1 A/m
Observation Time:	5 minutes
Inductance Coil:	Rectangular type, 1mx1m

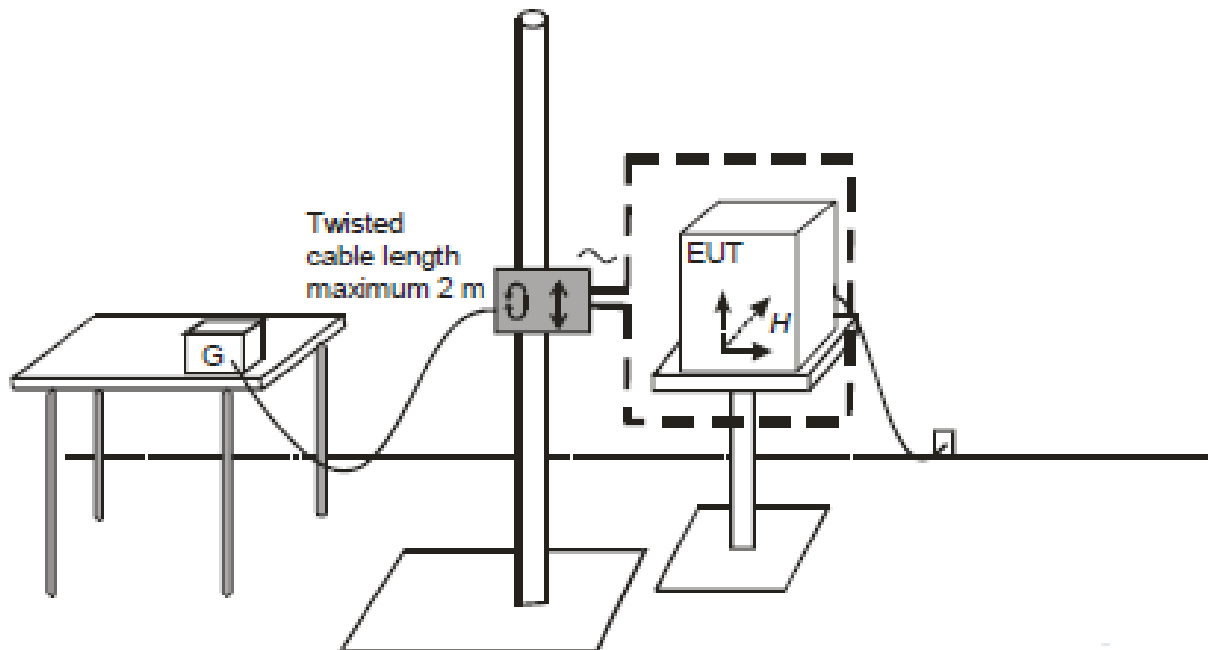
**4.9.2 TEST PROCEDURE**

The EUT and support equipment, are placed on a table that is 0.8 meter above a metal ground plane measured 1m\*1m min. and 0.65mm thick min.

The other condition as following manner:

- a. The equipment cabinets shall be connected to the safety earth directly on the GRP via the earth terminal of the EUT.
- b. The cables supplied or recommended by the equipment manufacturer shall be used. 1 meter of all cables used shall be exposed to the magnetic field.

4.9.3 TEST SETUP



Note:

TABLE-TOP EQUIPMENT

The equipment shall be subjected to the test magnetic field by using the induction coil of standard dimension (1 m x 1 m). The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

FLOOR-STANDING EQUIPMENT

The equipment shall be subjected to the test magnetic field by using induction coils of suitable dimensions. The test shall be repeated by moving and shifting the induction coils, in order to test the whole volume of the EUT for each orthogonal direction. The test shall be repeated with the coil shifted to different positions along the side of the EUT, in steps corresponding to 50 % of the shortest side of the coil. The induction coil shall then be rotated by 90 degrees in order to expose the EUT to the test field with different orientations.

## 4.9.4 TEST RESULTS

EUT:	Mole	Model Name:	JMM1
Temperature:	23.2°C	Relative Humidity:	43%
Pressure:	1010hPa	Test Date:	2023-02-23
Test Mode:	Working		
Test Power:	AC 230V/50Hz		

Test Mode	Test Level	Antenna aspect	Duration(s)	Perform Criteria	Results	Judgment
Enclosure	1 A/m	X	300 s	A	P	<b>Complies</b>
Enclosure	1 A/m	Y	300 s	A	P	
Enclosure	1 A/m	Z	300 s	A	P	

## Note:

- 1) N/A - denotes test is not applicable in this test report
- 2) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.
- 3) Criteria A: There was no change operated with initial operating during the test.
- 4) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
- 5) Criteria C: The system shut down during the test.



#### 4.10 VOLTAGE INTERRUPTION/DIPS TESTING

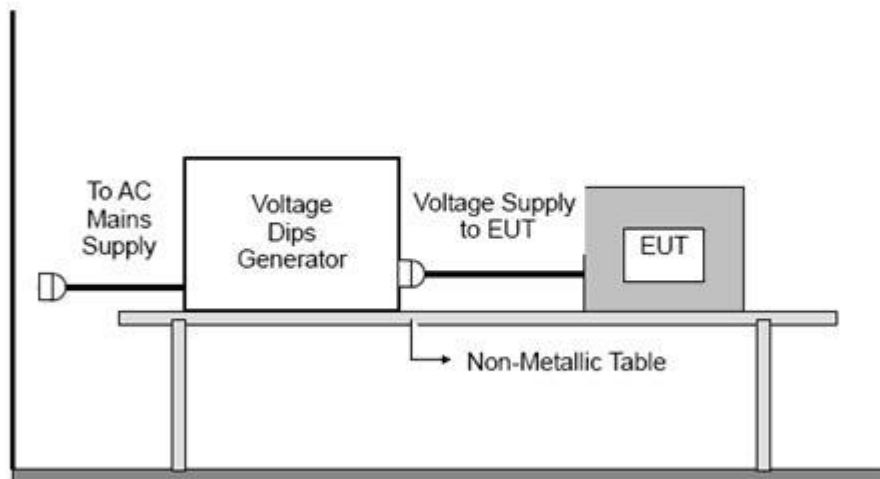
##### 4.10.1 TEST SPECIFICATION

Basic Standard:	IEC/EN 61000-4-11
Required Performance:	B (For 100% Voltage Interruptions) C (For 30% Voltage Dips) C (For 100% Voltage Interruptions)
Test Duration Time:	Minimum three test events in sequence
Interval between Event:	Minimum ten seconds
Phase Angle:	0°/45°/90°/135°/180°/225°/270°/315°/360°
Test Cycle:	3 times

##### 4.10.2 TEST PROCEDURE

The EUT shall be tested for each selected combination of test levels and duration with a sequence of three dips/interruptions with intervals of 10 s minimum (between each test event). Each representative mode of operation shall be tested. Abrupt changes in supply voltage shall occur at zero crossings of the voltage waveform.

##### 4.10.3 TEST SETUP



## 4.10.4 TEST RESULTS

EUT:	Mole	Model Name:	JMM1
Temperature:	23.2°C	Relative Humidity:	43%
Pressure:	1010hPa	Test Date:	2023-02-23
Test Mode:	Working		
Test Power:	AC 230V/50Hz		

Interruption & Dips	Duration (T)	Perform Criteria	Results	Judgment
Voltage Interruption 100%	0.5	<b>B</b>	<b>P</b>	<b>Complies</b>
Voltage dip 30%	25	<b>C</b>	<b>P</b>	
Voltage Interruption 100%	250	<b>C</b>	<b>P</b>	

## Note:

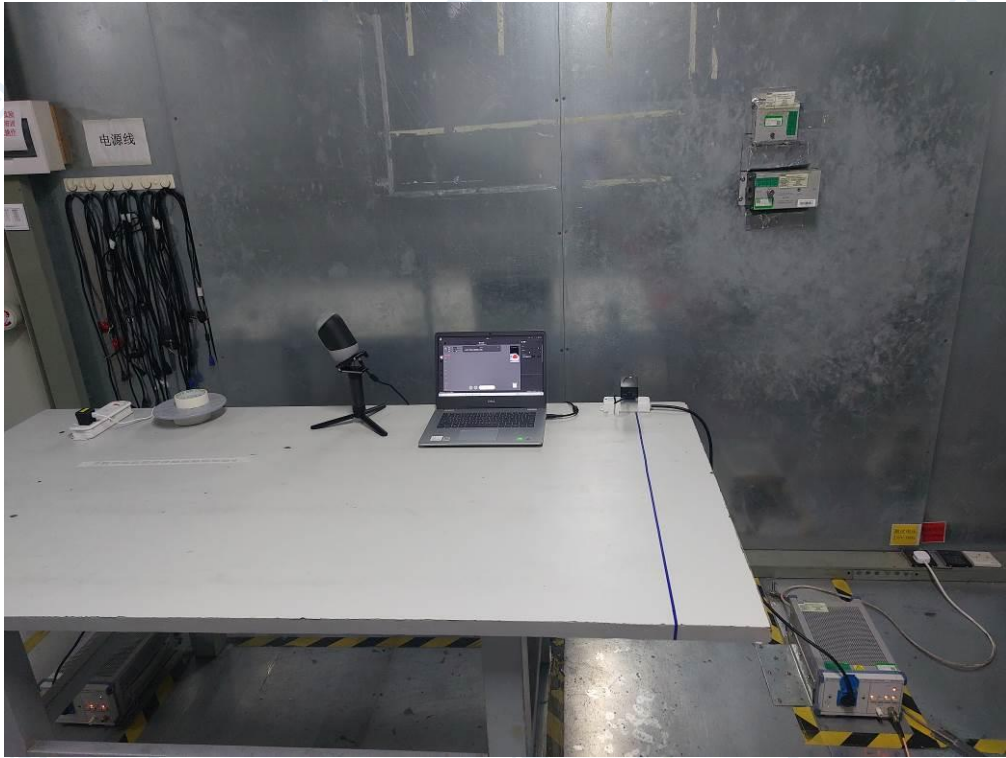
- 1) N/A - denotes test is not applicable in this test report.
- 2) In the table: 'P' represents 'PASS'; 'F' represents 'FAIL'.
- 3) Criteria A: There was no change operated with initial operating during the test.
- 4) Criteria B: The EUT function loss during the test, but self-recoverable after the test.
- 5) Criteria C: The system shut down during the test.

5. EUT TEST PHOTO

Radiated Measurement Photo



Conducted Measurement Photo



ATTACHMENT PHOTOGRAPHS OF EUT

Photo 1



Photo 2



Photo 3

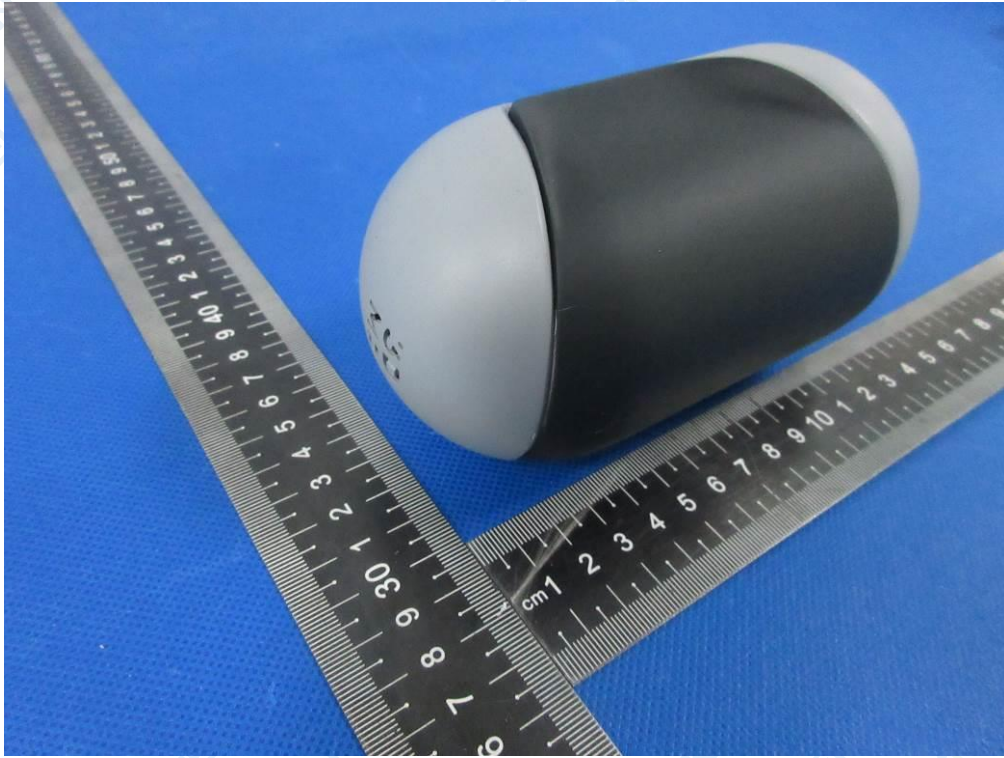


Photo 4



Photo 5

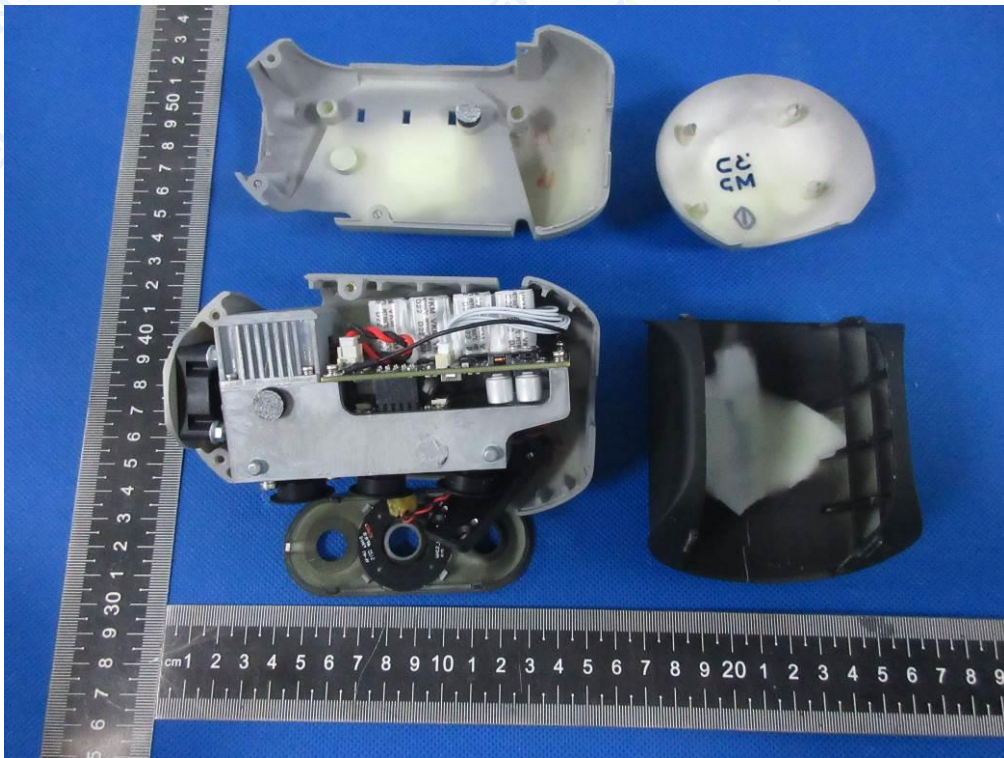


Photo 6

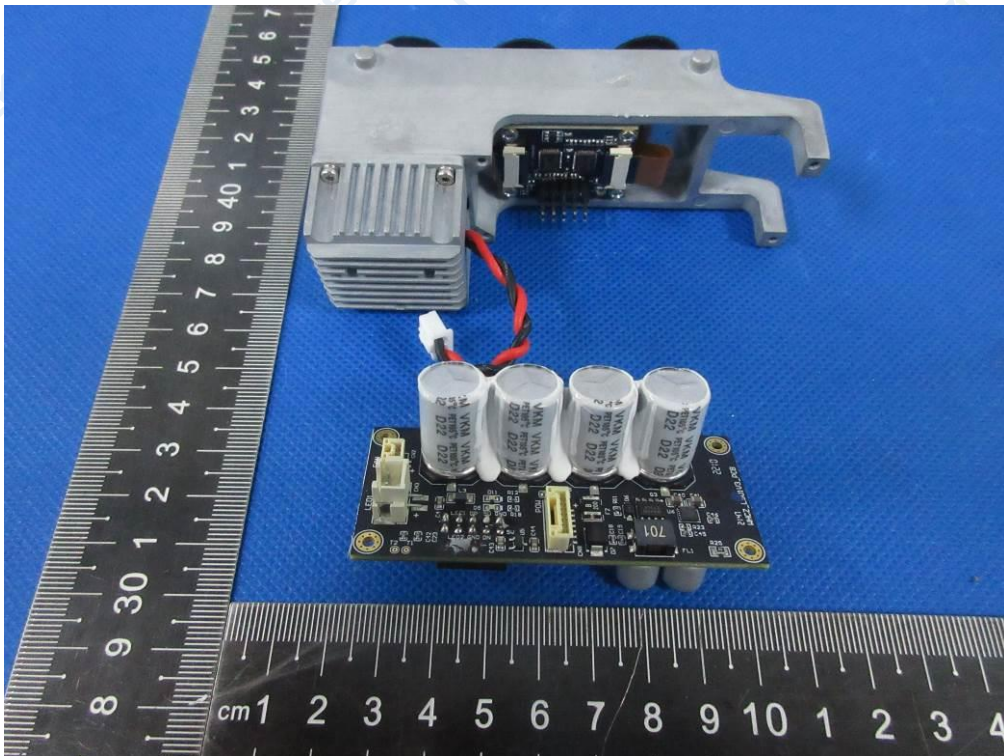


Photo 7

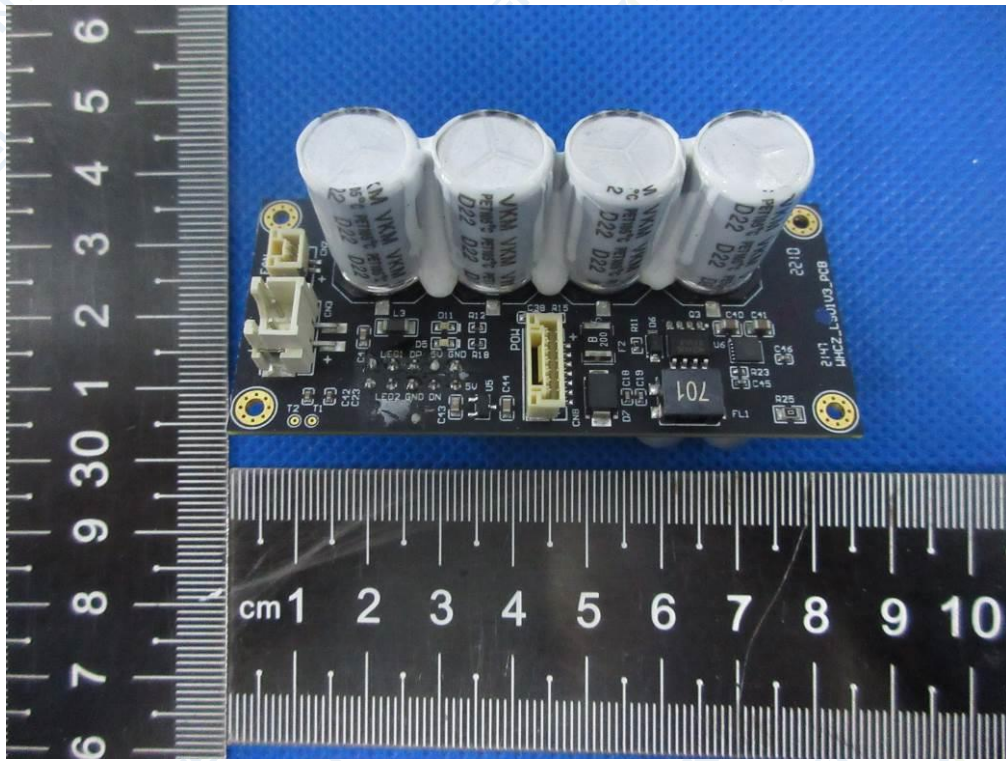


Photo 8

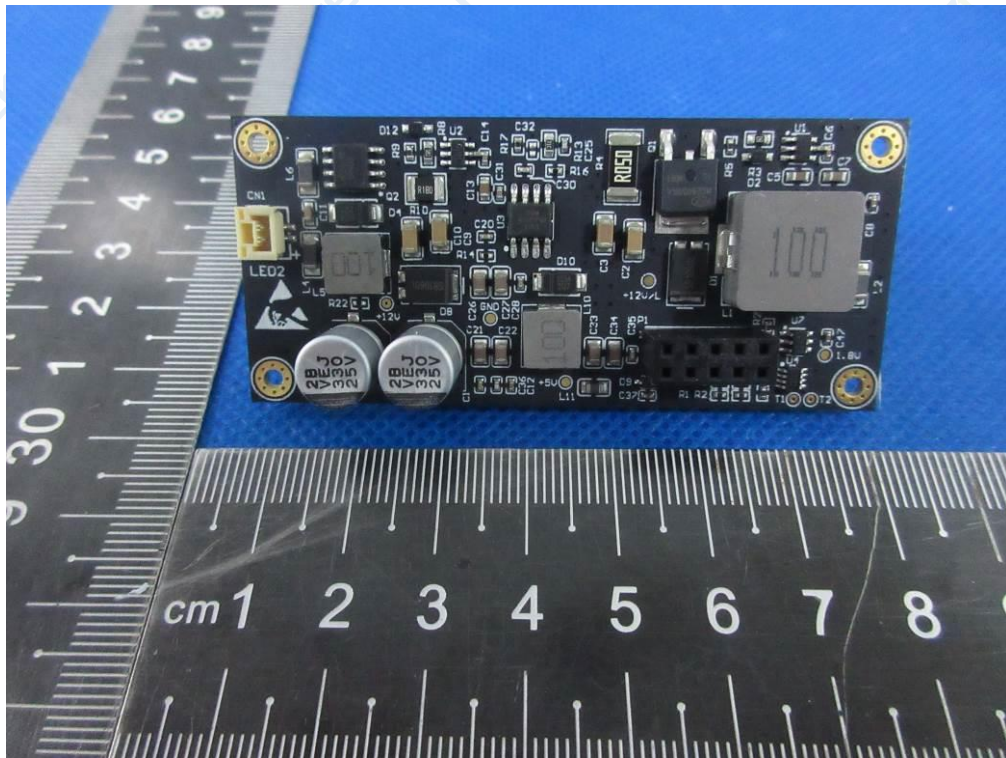




Photo 9

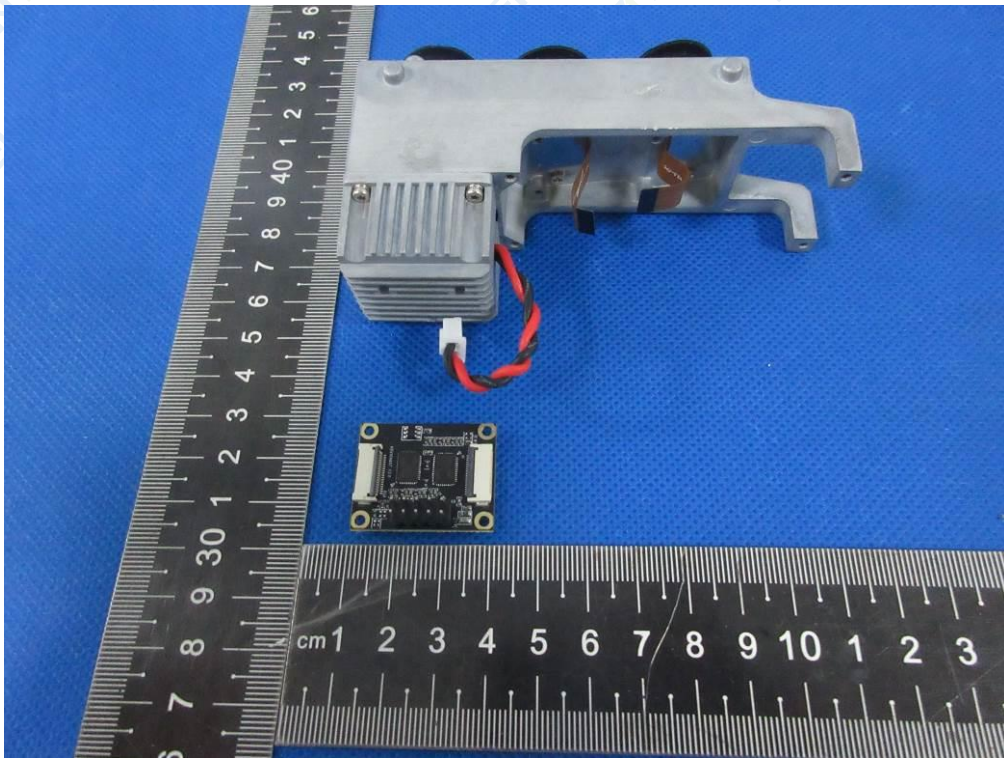


Photo 10

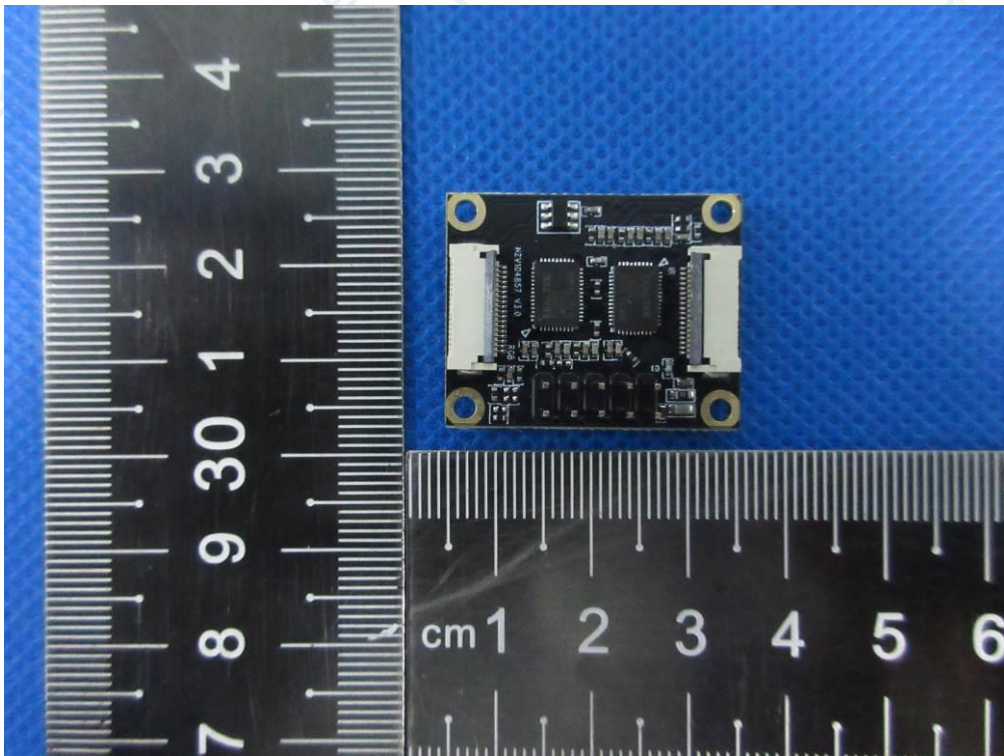


Photo 11

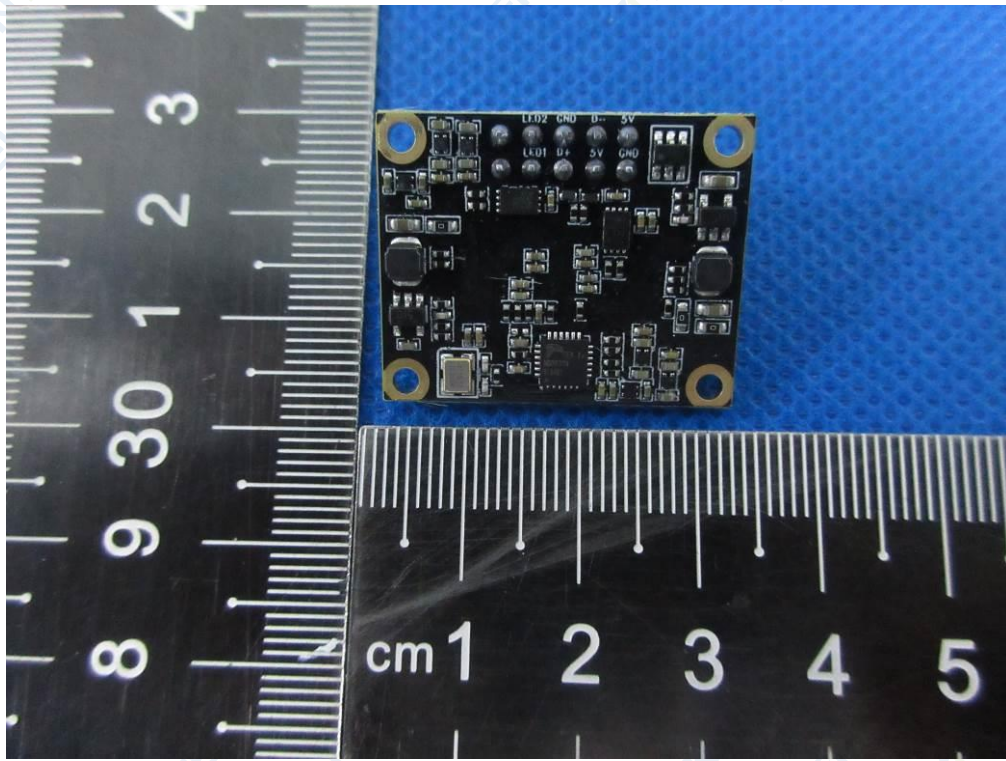


Photo 12

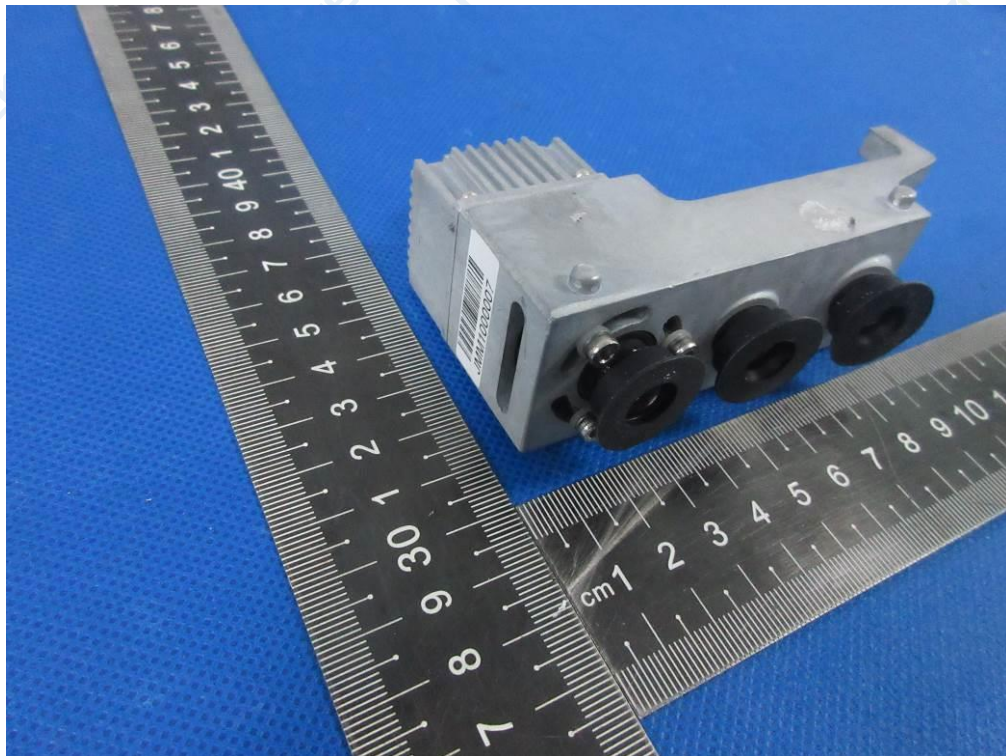


Photo 13

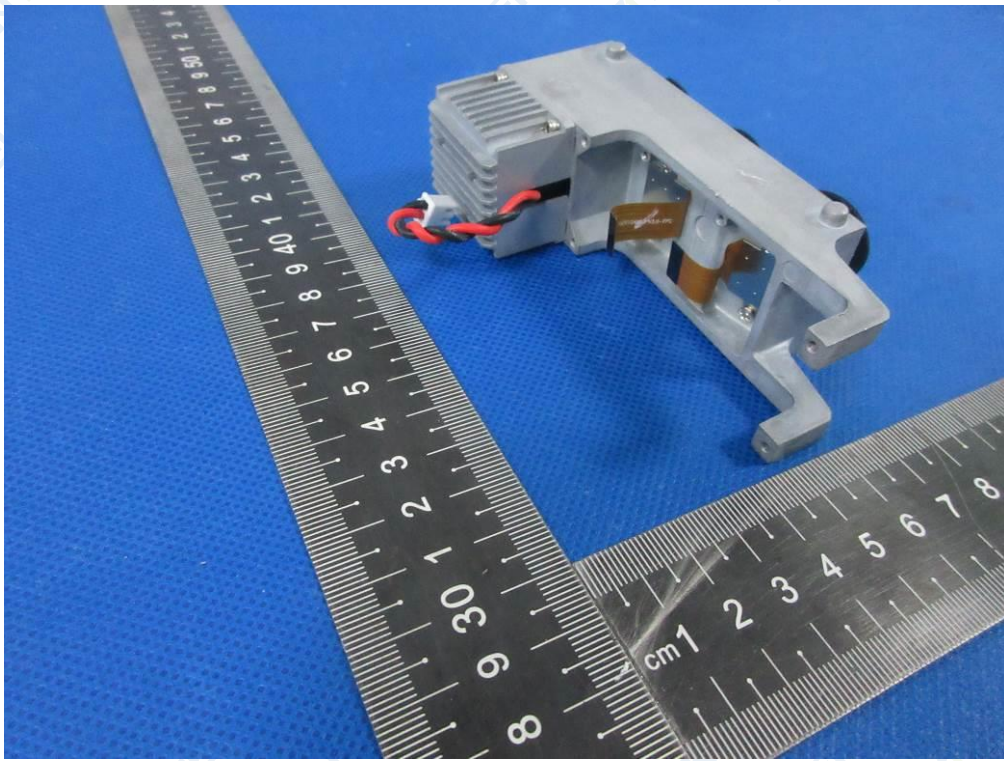


Photo 14

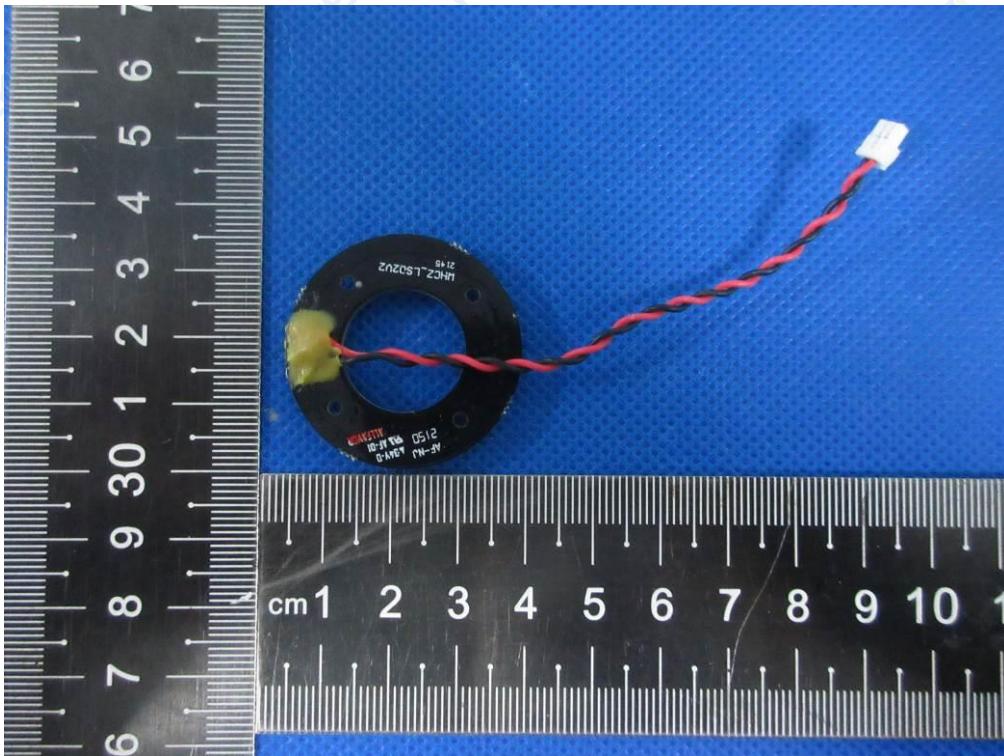


Photo 15

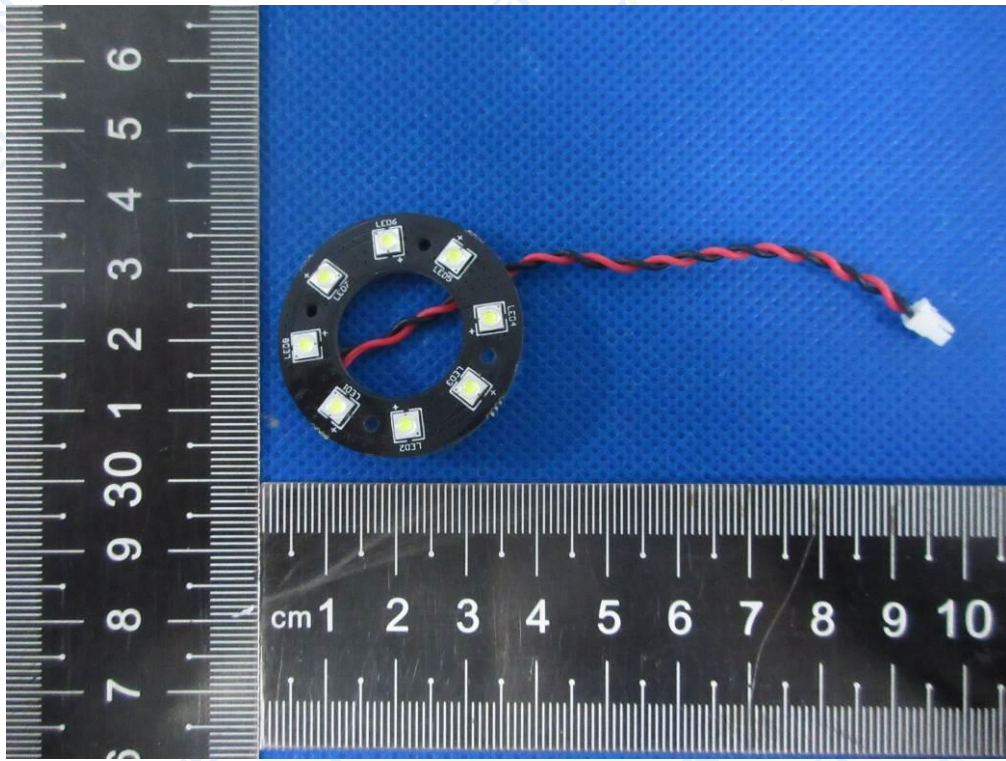


Photo 16



Photo 17



Photo 18



----- End of Report -----