EMC TEST REPORT

Product Name:	Eagle-M4 Pro series
Trade mark:	/
Model No.:	LXPS-DS4423-M-79 940nm
S/N:	/
Report No.:	CTB230523017E
Applicant:	Hangzhou Lanxin Technology Co., Ltd.
Address:	7-902, China Artificial Intelligence Town, No. 1818-2 on Wenyi West Road, Yuhang District, Hangzhou, Zhejiang, China
Manufacturer:	Hangzhou Lanxin Technology Co., Ltd.
Address:	7-902, China Artificial Intelligence Town, No. 1818-2 on Wenyi West Road, Yuhang District, Hangzhou, Zhejiang, China
Prepared by:	Shenzhen CTB Testing Technology Co., Ltd.
Address:	1&2/F., Building A, No.26, Xinhe Road, Xinqiao, Xinqiao Street, Bao'an District, Shenzhen, Guangdong, China
Date of Receipt:	May 18, 2023
Date of Test(s):	May 19, 2023 ~ May 22, 2023
Date of Issue:	May 25, 2023
Test Standard(s):	EN IEC 61000-6-2:2019, EN IEC 61000-6-4:2019 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:	Reviewed by:	Approved by:
Blake Cai	Zack Zhu	

Note: Note: If there is any objection to the inspection results in this report, please submit a written report to the company within 15 days from the date of receiving the report. The test report is effective only with both signature and specialized stamp. This result(s) shown in this report refer only to the sample(s) tested. Without written approval of Shenzhen CTB Testing Technology Co., Ltd. this report can't be reproduced except in full. The tested sample(s) and the sample information are provided by the client. "*" indicates the testing items were fulfilled by subcontracted lab. "#" indicates the items are not in CNAS accreditation scope.

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1. Description of version

Report No.	Issue Date	Description	Approved
CTB230523017E	May 25, 2023	Original	Valid

2. Test summary

Emission		
Requirement - Test	Test Method	Result
Conducted Emission（CE）	EN IEC 61000-6-4	N/A[1]
Radiated emissions at frequencies up to 1 GHz(RE below 1G)		PASS
Radiated emissions at frequencies above 1 GHz(RE above 1G)		N/A
Harmonic current emissions	EN IEC 61000-3-2	N/A[1]
Voltage changes, voltage fluctuations and flicker	EN 61000-3-3	N/A[1]
Immunity (EN IEC 61000-6-2)		
Requirement - Test	Test Method	Result
Electrostatic discharges (ESD)	IEC 61000-4-2	PASS
Radio-frequency electromagnetic field(RS)	IEC 61000-4-3	PASS
Fast transients(EFT)	IEC 61000-4-4	N/A[1]
Surges	IEC 61000-4-5	N/A[1]
Radio-frequency common mode(CS)	IEC 61000-4-6	N/A[1]
Power frequency magnetic field(PFMF)	IEC 61000-4-8	N/A[2]
Voltage dips and interruptions(Dips)	IEC 61000-4-11	N/A[1]

Note: N/A is abbreviation for Not Applicable.

1. The Product is powered by DC power，this test items is not applicable.
2. The Product doesn't contain any device susceptible to magnetic fields.

3. Measurement uncertainty

The reported uncertainty of measurement y ± U, where expended 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	Frequency	Expanded Uncertainty (U_{Lab})
Conducted Emission	150 kHz to 30 MHz	±3.2 dB
Radiated Emission	30 MHz to 1000 MHz	± 4.8 dB
Radiated Emission	1000 MHz to 6000 MHz	±4.9 dB

4. General information

4.1. Description of EUT

Product name	Eagle-M4 Pro series
Trade mark	/
Model No.	LXPS-DS4423-M-79 940nm
Serial Model No.	/
Model Difference	/
Rated Power	/
Rated Voltage& current	DC 24V from DC power supply
Configuration	☒ Table-top ☐ Floor-standing
The highest frequency of the internal sources of the EUT	☒ less than 108 MHz, the measurement shall only be made up to 1 GHz. ☐ between 108 MHz and 500 MHz, the measurement shall only be made up to 2 GHz. ☐ between 500 MHz and 1 GHz, the measurement shall only be made up to 5 GHz. ☐ above 1 GHz, the measurement shall be made up to 6 GHz.
Adapter Information	/

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
1	DC power supply	LONGWEI	TPR-12002D	/	/
2	Laptop	DELL	Vostro 5490	/	/

4.3. Test conditions

Temperature: 15-25℃
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	DC 24V
	Mode 2	PING IP 100Mbps	Test Voltage	DC 24V
	Mode 3	PING IP 1000Mbps	Test Voltage	DC 24V
Note:This test covers all possible operating modes of the device, only the worst data are list in report. The worst data are shows (*)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	2023/7/19
3	Pulse limiter	ROHDE&SCHWARZ	ESH3Z2	357881052	2023/7/19
4	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESCS30	834115/006	2023/7/19
5	Coaxial cable	ZDECL	Z302S	18091904	2023/7/19
6	AAN	Schwarzbeck	NTFM8158	183	2023/7/19
7	EZ-EMC	Frad	EMC-con3A1.1	/	/

Radiated emission					
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	2023/7/23
3	TRILOG Broadband Antenna	Schwarzbeck	VULB 9168	869	2023/7/22
4	Amplifier	Agilent	8449B	3008A01838	2023/7/19
5	Amplifier	HP	8447E	2945A02747	2023/7/19
6	EMI TEST RECEIVER	ROHDE&SCHWARZ	ESPI7	100362	2023/7/25
7	Coaxial cable	ETS	RFC-SNS-100-NMS-80 NI	/	2023/7/19
8	Coaxial cable	ETS	RFC-SNS-100-NMS-20 NI	/	2023/7/19
9	Coaxial cable	ETS	RFC-SNS-100-SMS-20 NI	/	2023/7/19
10	Coaxial cable	ETS	RFC-NNS-100 -NMS-300 NI	/	2023/7/19
11	EZ-EMC	Frad	EMC-con3A1.1	/	/

Electrostatic discharges					
No.	Equipment	Manufacturer	Model No.	Serial No.	Calibrated until
1	ESD Simulator	TESTQ	NSG437	329	2023/7/25

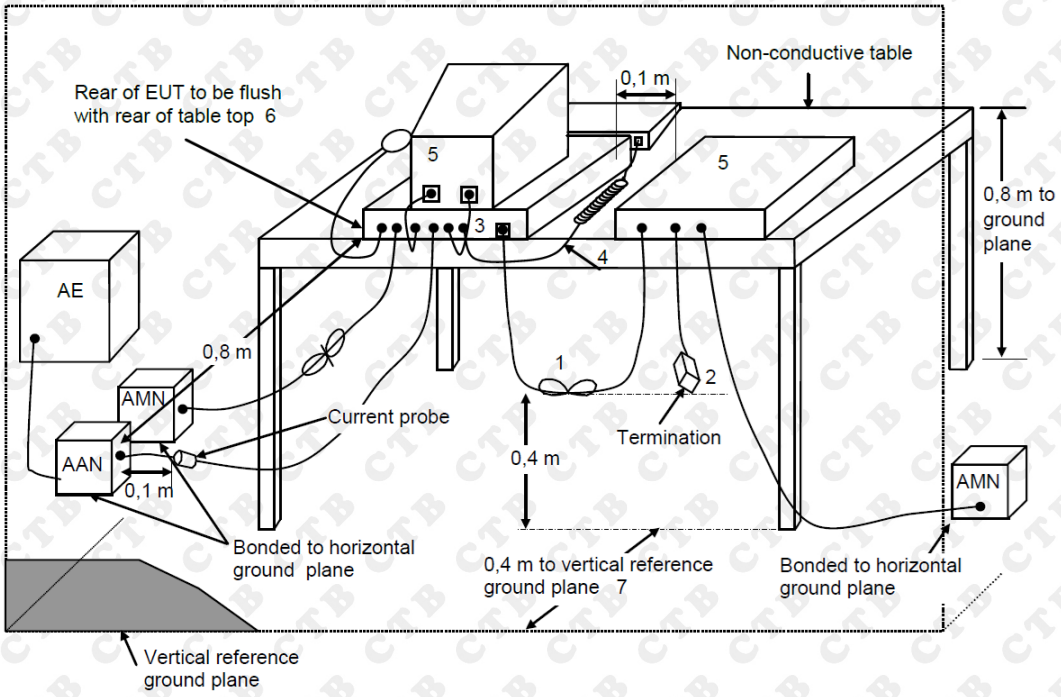
Radio frequency electromagnetic field					
No.	Equipment	Manufacturer	Type No.	Serial No.	Calibrated until
1	966 Chamber	C/ R/ T	966	/	2024/8/11
2	Signal Generator	Agilent	N5181A	MY50140365	2023/7/19
3	Stacked Double Log.-Per. Antenna	SKET	STLP 9129 Plus	2106070106	/
4	Switch Controller	SKET	RFSU-DC18G -4C	RFSU-DC18G-4 C	/
5	RF Power Meter	Agilent	U2001	MY41490462	2023/7/19
6	RF Power Meter	Agilent	E9301A	MY41495675	2023/7/19
7	E-Field Probe	Narda	EP-601	811ZX10305	2023/7/27
8	Power Amplifier	SKET	HAP-80M01G-250W	2106070103	/
9	Power Amplifier	SKET	HAP-01G 06G-75W	2106070104	/
10	Audio Analysis	R&S	UPV	ATS 1-41152	2023/7/24
11	Audio Output Matching Network	SKET	RCO Network	/	2023/7/19
12	EMC-S Test software	SKET	V2.0.0.19	/	/

6. Emission

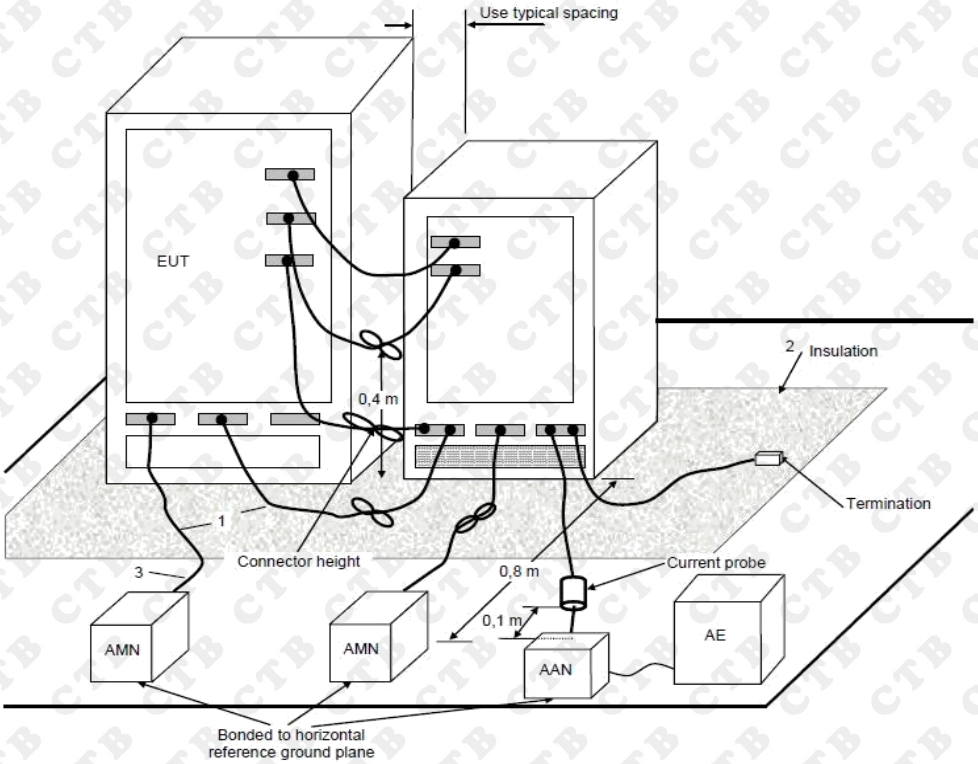
6.1. Conducted emission

6.1.1. Block diagram of test setup

For table-top equipment



For floor standing equipment



6.1.2. Limit

Requirements for conducted emissions from the AC mains power ports of Class A equipment

Frequency range MHz	Coupling device	Detector type / bandwidth	Class A limits dB(μV)
0,15 to 0,5	AMN	Quasi Peak / 9 kHz	79
0,5 to 30			73
0,15 to 0,5		Average / 9 kHz	66
0,5 to 30			60

6.1.3. Test procedure

a. The EUT was placed 0.4 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.

6.1.4. Test results

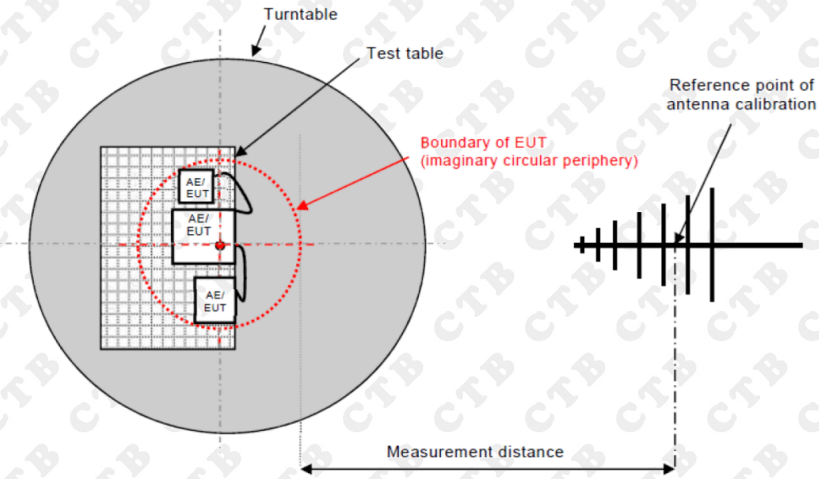
Temperature:	23℃	Relative Humidity:	54 %
Pressure:	101kPa	Phase :	Line
Test Voltage :	AC 230V/50Hz	Test Mode:	/

N/A

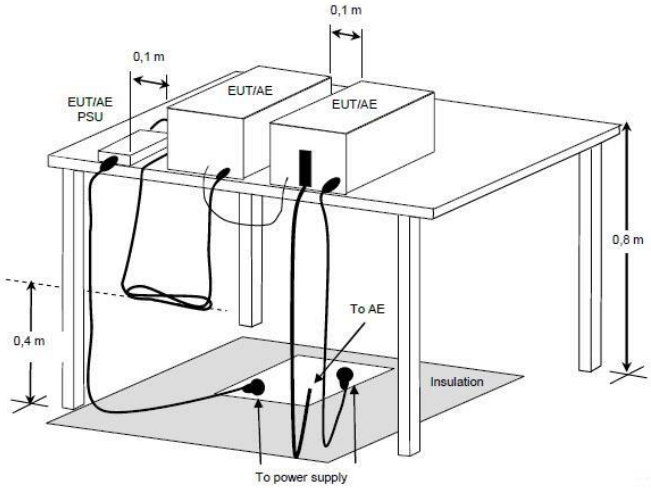
6.2. Radiated emissions

6.2.1. Block diagram of test setup

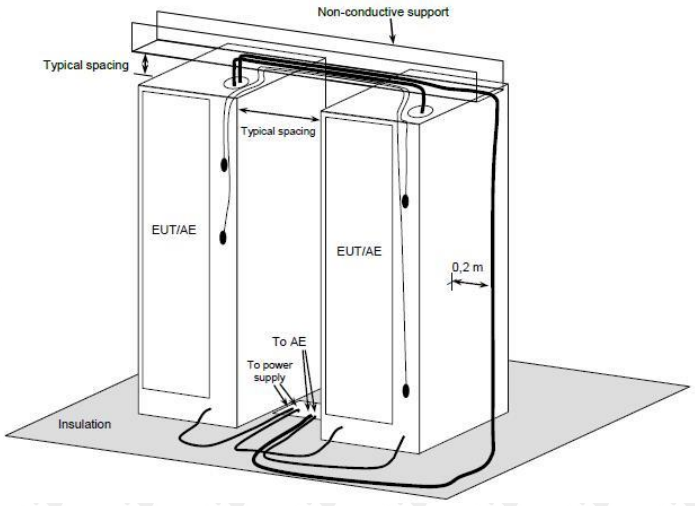
Measurement distance



For table-top equipment



For floor standing equipment



6.2.2. Limit

Requirements for radiated emissions at frequencies up to 1 GHz for class A 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	50
230 to 1 000				57

Requirements for radiated emissions at frequencies above 1 GHz for class A equipment

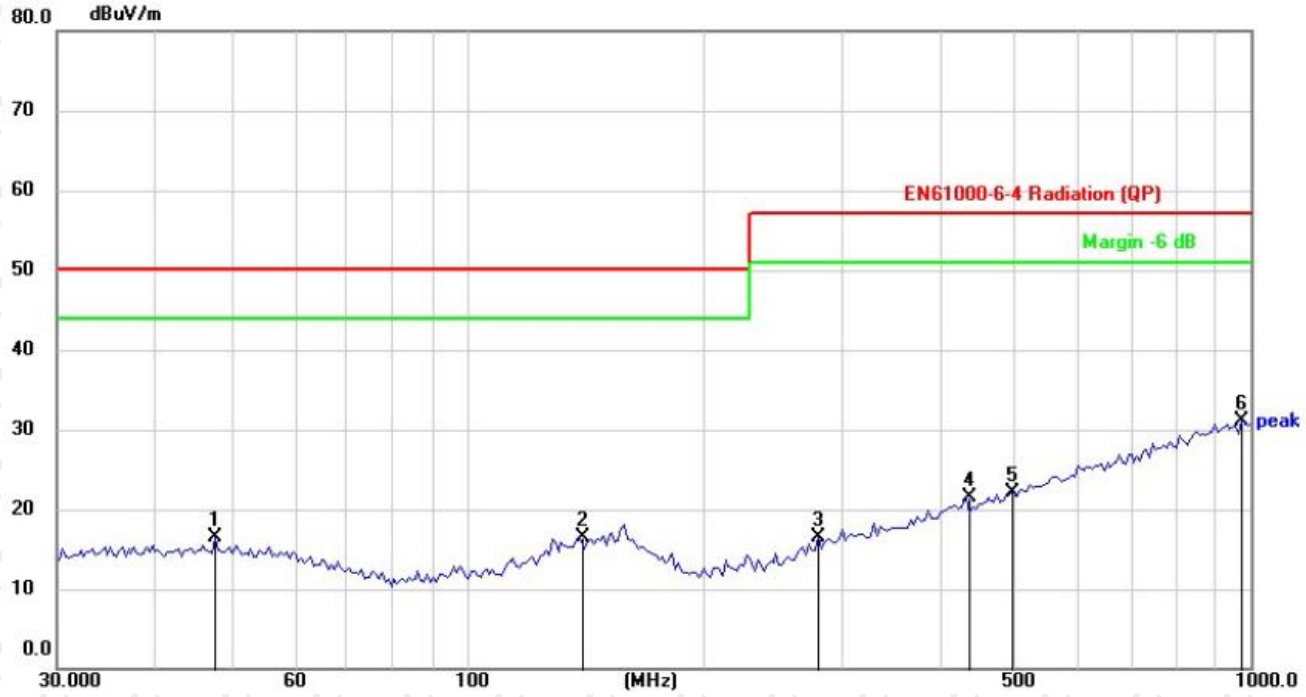
Frequency range MHz	Measurement			Class B limits dB(μV/m)
	Facility	Distance m	Detector type / bandwidth	
1 000 to 3 000	FSOATS	3	Average / 1MHz	56
3 000 to 6 000				60
1 000 to 3 000		3	Peak / 1MHz	76
3 000 to 6 000				80

6.2.3. Test procedure

a. The measuring distance of at 10 m shall be used for measurements at frequency up to1GHz.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 10 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.

6.2.4. Test results

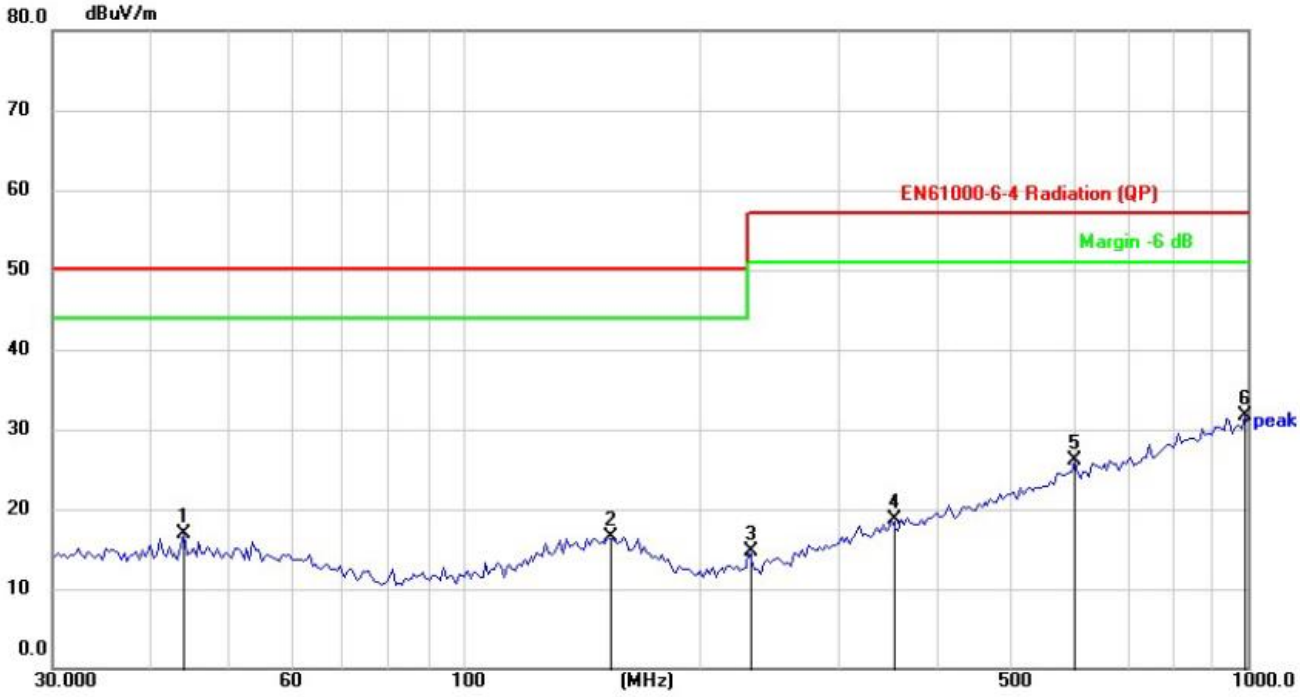
Temperature:	23℃	Relative Humidity:	54 %
Pressure:	101kPa	Polarization :	Horizontal
Test Voltage :	DC 24V	Test Mode:	Mode 1



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		47.7422	23.02	-6.59	16.43	50.00	-33.57	QP
2		139.1172	22.15	-5.58	16.57	50.00	-33.43	QP
3		280.5152	22.95	-6.38	16.57	57.00	-40.43	QP
4		434.8268	23.20	-1.71	21.49	57.00	-35.51	QP
5		495.9344	22.24	-0.08	22.16	57.00	-34.84	QP
6	*	974.0436	23.18	7.93	31.11	57.00	-25.89	QP

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

Temperature:	23℃	Relative Humidity:	54 %
Pressure:	101kPa	Polarization :	Vertical
Test Voltage :	DC 24V	Test Mode:	Mode 1



No.	Mk.	Freq.	Reading Level	Correct Factor	Measure-ment	Limit	Over	
		MHz	dBuV	dB	dBuV/m	dB/m	dB	Detector
1		44.1202	23.46	-6.53	16.93	50.00	-33.07	QP
2		153.2004	21.92	-5.46	16.46	50.00	-33.54	QP
3		231.3120	23.41	-8.69	14.72	57.00	-42.28	QP
4		352.3251	22.77	-3.99	18.78	57.00	-38.22	QP
5		601.4265	23.64	2.47	26.11	57.00	-30.89	QP
6	*	991.2719	23.55	8.13	31.68	57.00	-25.32	QP

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

7. Immunity

Performance criteria

Performance criterion A

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.

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

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. 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.

Performance criterion C

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.

Functions, and/or information stored in non-volatile memory, or protected by a battery backup, shall not be lost.

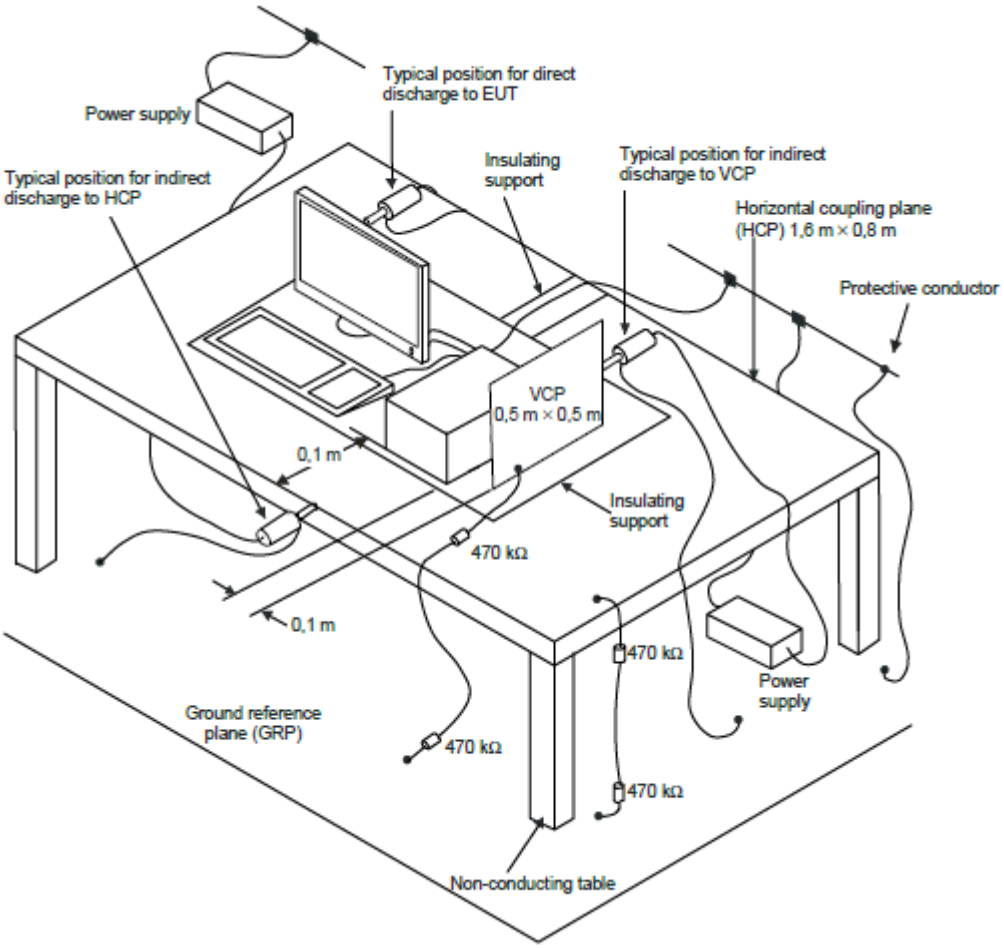
7.1. Electrostatic discharges

7.1.1. Test standard and Levels

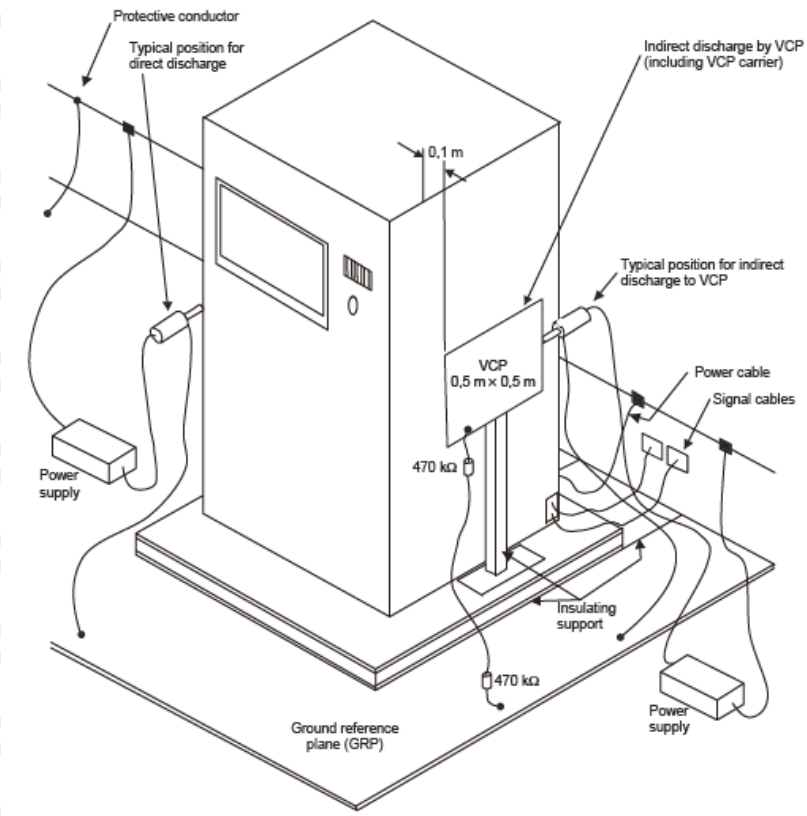
Environmental phenomenon	Test specifications	Basic standard
Electrostatic discharge	8 kV air discharge	IEC 61000-4-2
	4 kV contact discharge	

7.1.2. Block diagram of test setup

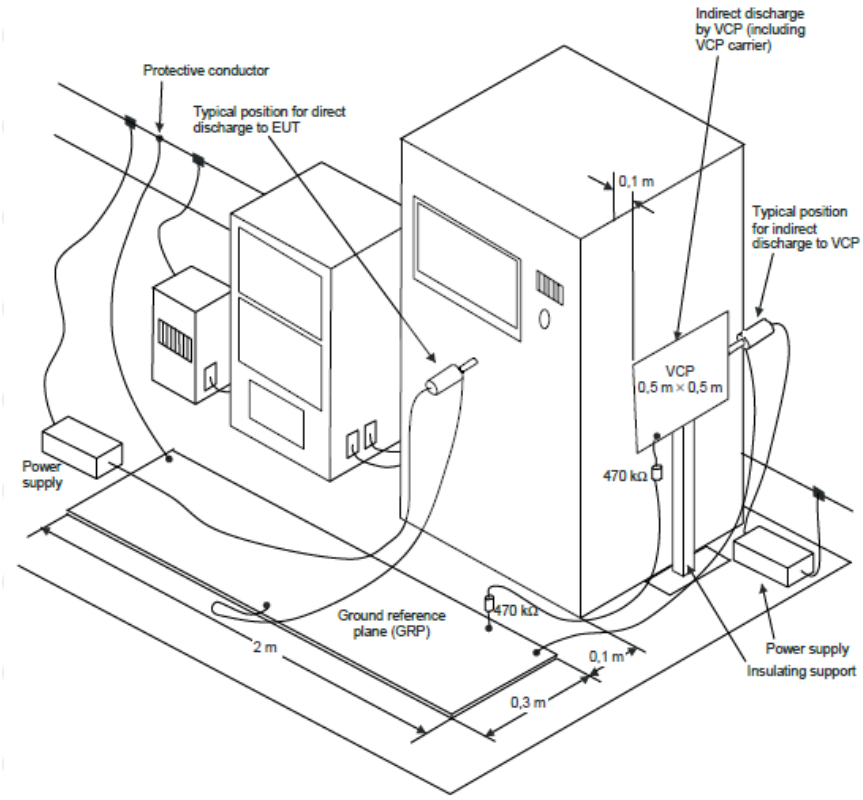
For table-top equipment



For floor standing equipment



For table-top & floor standing equipment



7.1.3. Test Procedure

1. Air discharge:

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

2. Contact discharge:

All the procedure shall be same as Section 1. except that the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

3. Indirect discharge for horizontal coupling plane

At least 20 single discharges shall be applied to the horizontal coupling plane, at points on each side of the EUT. The discharge electrode positions vertically at a distance of 0.1m from the EUT and with the discharge electrode touching the coupling plane.

4. Indirect discharge for vertical coupling plane

At least 20 single discharge shall be applied to the center of one vertical edge of the coupling plane. The coupling plane, of dimensions 0.5m X 0.5m, is placed parallel to, and positioned at a distance of 0.1m from the EUT. Discharges shall be applied to the coupling plane, with this plane in sufficient different positions that the four faces of the EUT are completely illuminated.

7.1.4. Test Result

Temperature:	23℃	Relative Humidity:	54 %
Pressure:	101kPa	Test Mode:	Mode 1
Test Voltage :	DC 24V		

Discharge Method	Discharge Position	Voltage (±kV)	Min. No. of Discharge per polarity (Each Point)	Performance Criterion	Required 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					

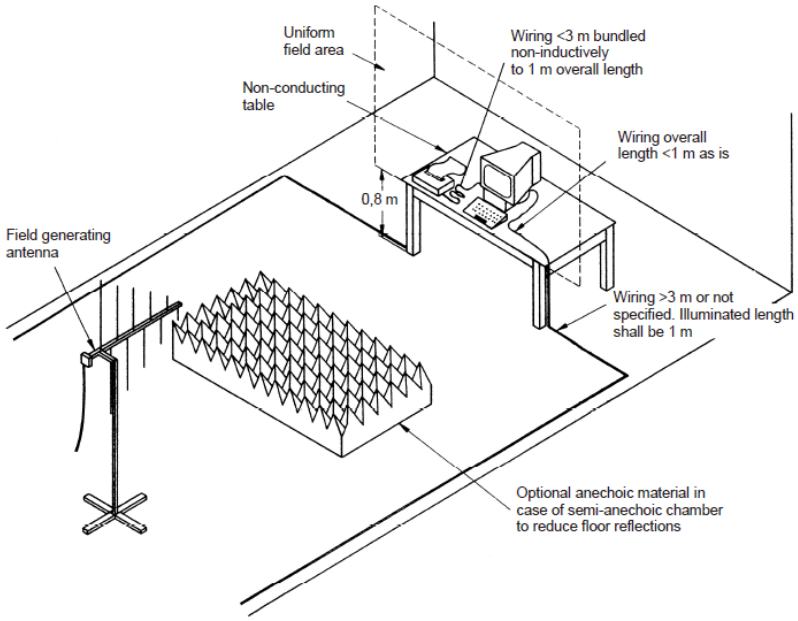
7.2. Radio-frequency electromagnetic field

7.2.1. Test standard and Levels

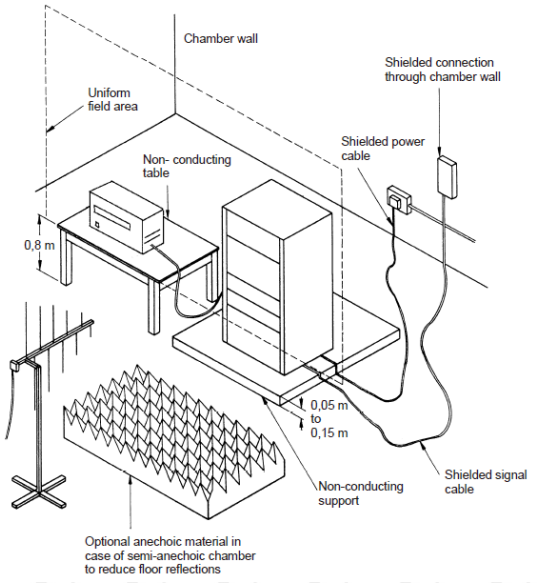
Characteristics	Test levels	Test levels	Basic standard
Frequency range	80 MHz to 1000 MHz,	1400 MHz to 6000 MHz	IEC 61000-4-3
Test level	10 V/m (unmodulated)	3 V/m (unmodulated)	
Modulation	1 kHz, 80 % AM, sine wave	1 kHz, 80 % AM, sine wave	

7.2.2. Block diagram of test setup

For table-top equipment



For floor standing 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

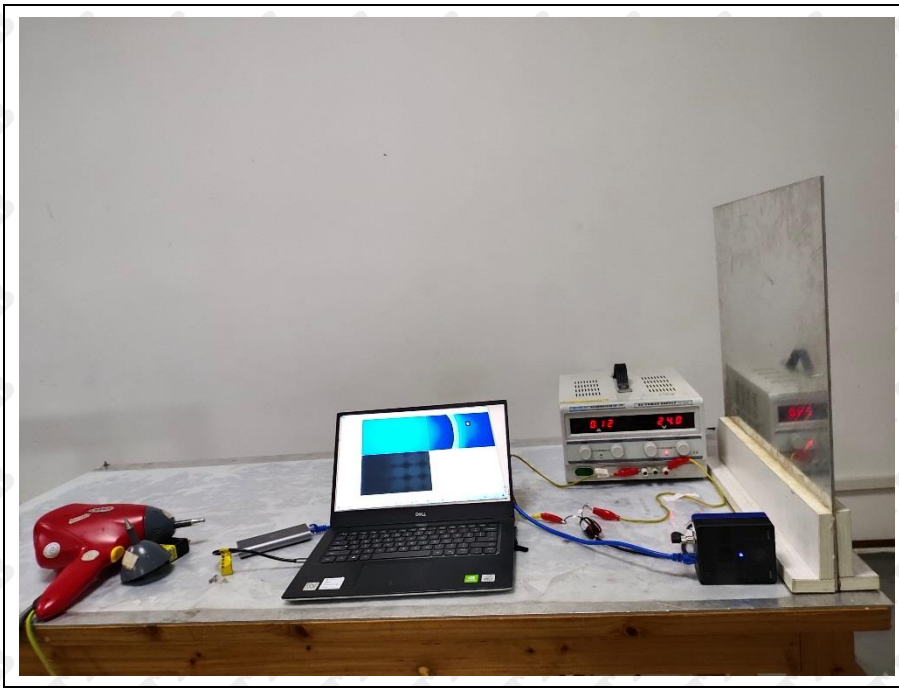
Temperature:	23℃	Relative Humidity:	54 %
Pressure:	101kPa	Test Mode:	Mode 1
Test Voltage :	DC 24V		

Frequency range [MHz]	Test Level [V/m]	Polarization	EUT Face	Performance Criterion	Required Criterion
80 to 1000,	10	Horizontal & Vertical	Front/ Rear	A	A
			Right/ Left	A	A
			Top/ Underside	A	A
1400 to 6000	3	Horizontal & Vertical	Front/ Rear	A	A
			Right/ Left	A	A
			Top/ Underside	A	A
Note*: N/A					

8. Photographs of test setup

RE

ESD



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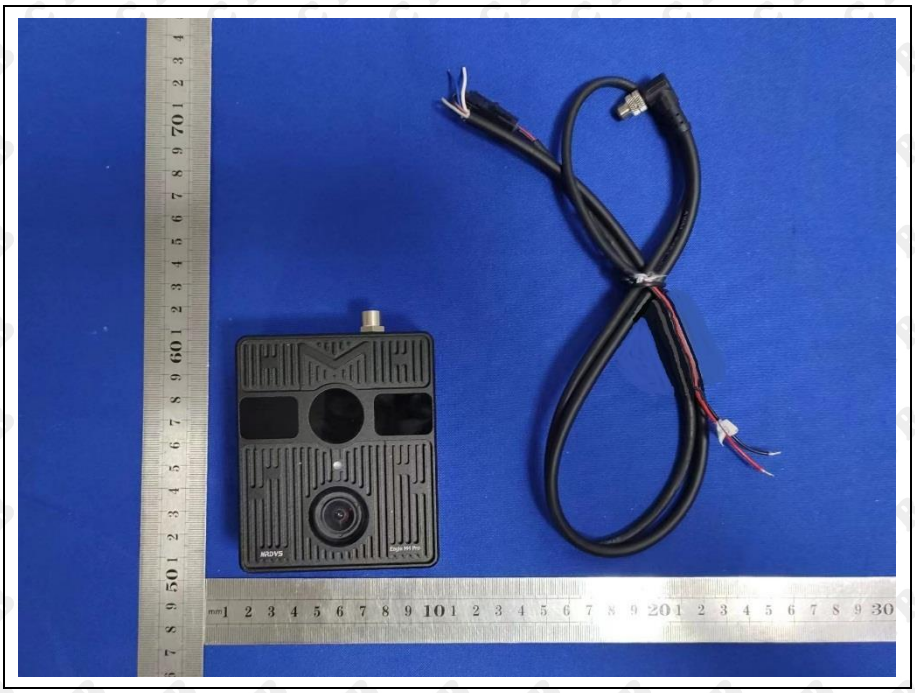
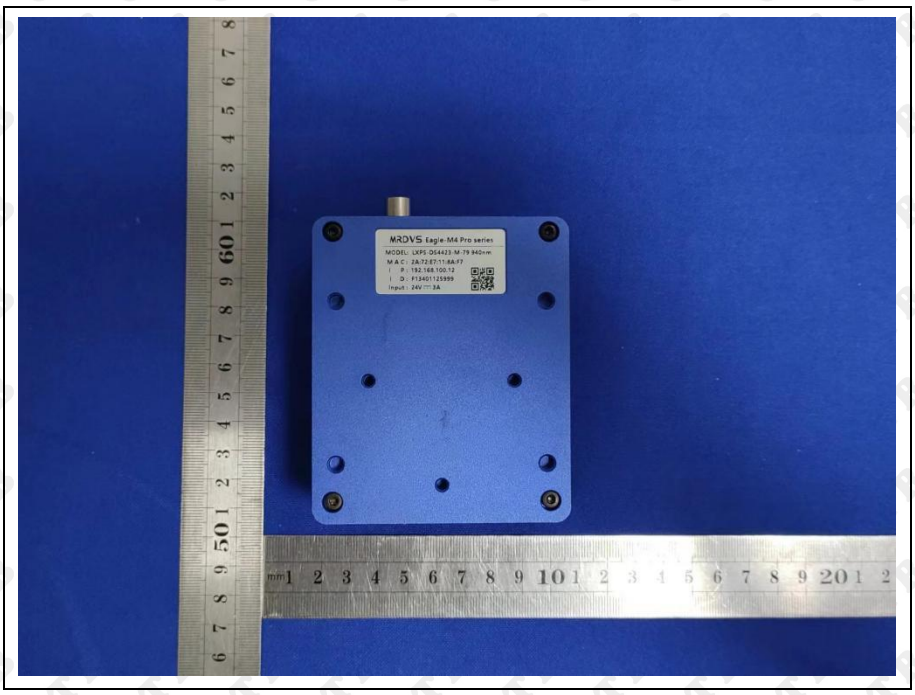
9. Photographs of EUT

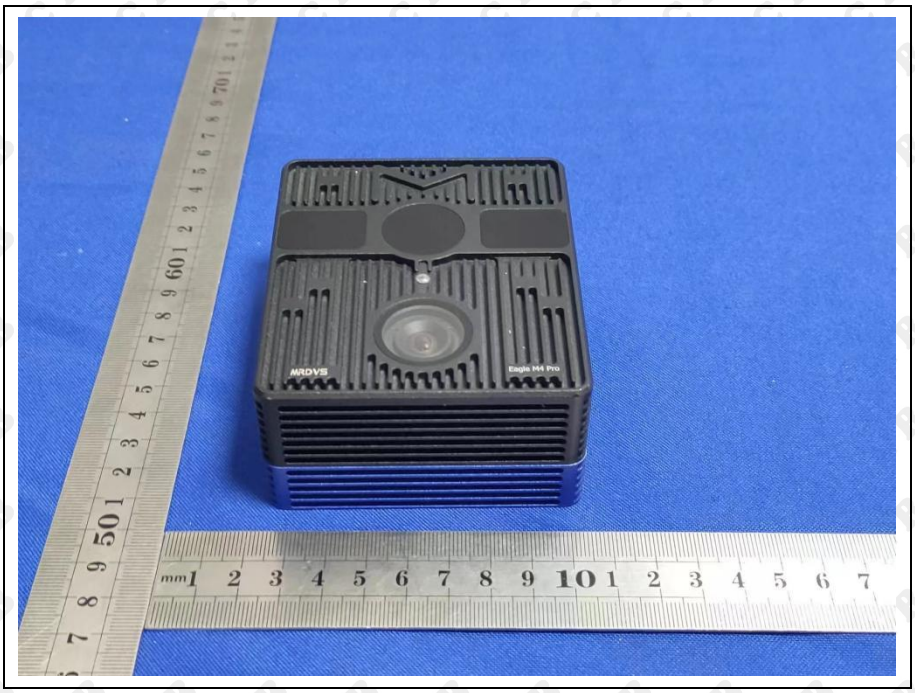
EUT photo 1



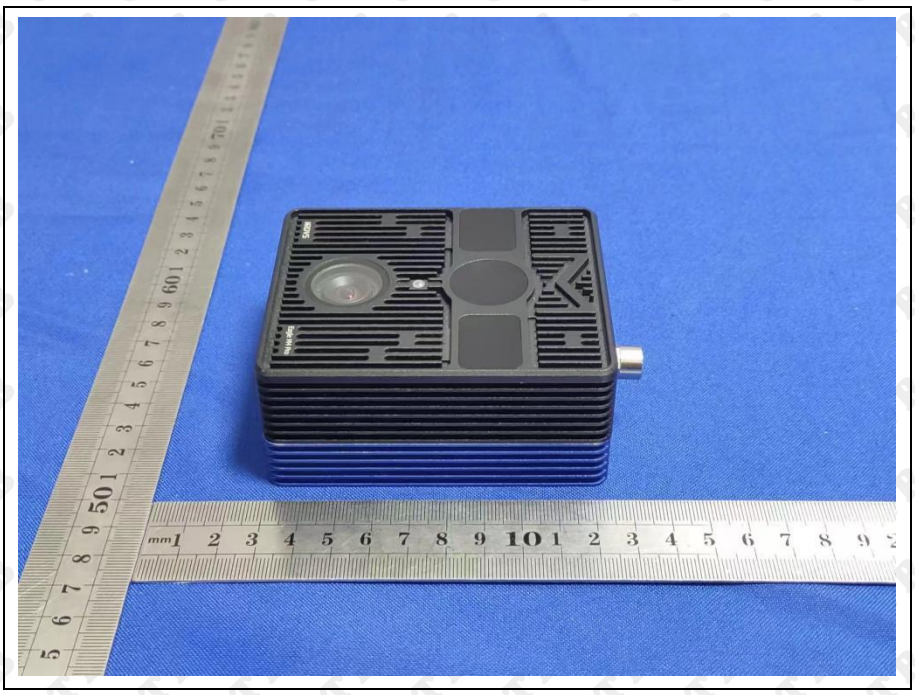
EUT photo 2



EUT photo 3

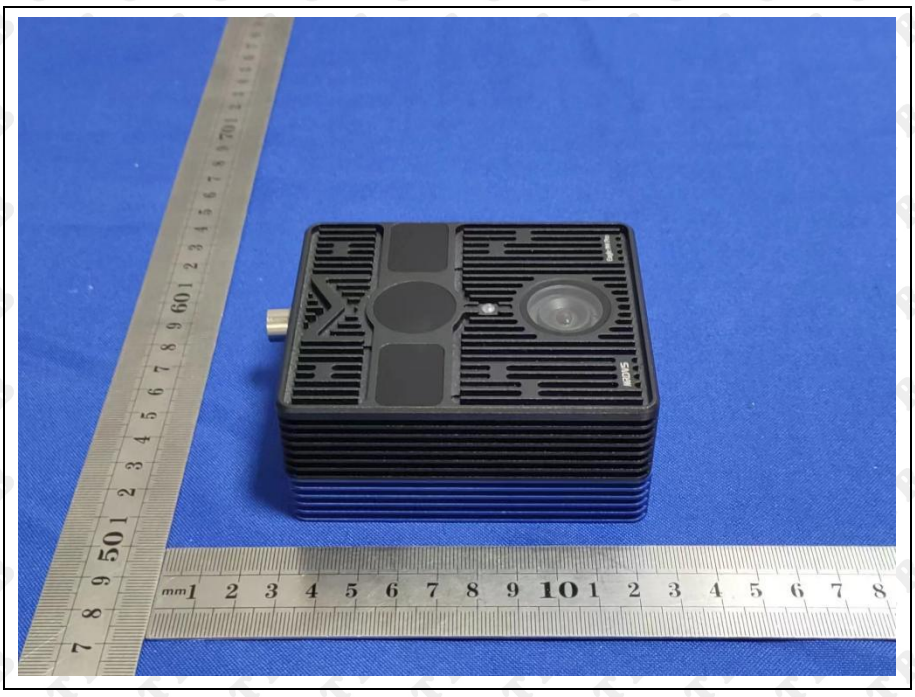


EUT photo 4



EUT photo 5

EUT photo 6



End of report