

TEST REPORT

Product Name	· Refrigerant Leak Detector
Model Number	: UT336B

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Report Number Date(s) of Tests Date of issue	:	EDG2408210128E00601R August 21, 2024 to September 02, 2024 September 03, 2024



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TEST REPORT DESCRIPTION

Applicant	:	UNI-TREND TECHNOLOGY (CHINA) CO.,LTD.
Manufacturer	:	UNI-TREND TECHNOLOGY (CHINA) CO., LTD.
Factory	:	UNI-TREND TECHNOLOGY (CHINA) CO.,LTD.
Brand Name	:	UNI-T
EUT	:	Refrigerant Leak Detector
Model Number	:	UT336B
Input Rating	:	6Vdc from battery (Size:1.5V AA*4)

Measurement Procedure Used:

ļ	EN IEC 61326-1: 2021	
ļ	EN IEC 61326-2-2:2021	
((IEC 61000-4-2: 2008, IEC61000-4-3: 2020, IEC	C 61000-4-8:2009)

The device described above is tested by EMTEK (DONGGUAN) CO. and EMTEK (SHENZHEN) CO., LTD. to determine the maximum emission levels emanating from the device and the severe levels of the device can endure and its performance criterion. The measurement results are contained in this test report and EMTEK (DONGGUAN) CO., LTD. is assumed full of responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT (Equipment Under Test) is technically compliant with the EN IEC 61326-1 and EN IEC 61326-2-2 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of EMTEK (DONGGUAN) CO., LTD.

Date of Test :	August 21, 2024 to September 02, 2024
Prepared by :	Galen Xia.
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	Tim Dong
Reviewer :	V
	Tim Dong /Supervisor
Approved & Authorized Signer :	Sam Iv /Manager

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Modified Information

Version	Report No.	Revision Date	Summary
	EDG2408210128E00601R	/	Original Report



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1. DESCRIPTION OF STANDARDS AND RESULTS (EUT)

	EMISSIO			
Description of	Test Item	Standard	Limits	Results
Conducted Emissions - a.c. ma	ins power port		Class B	N/A
Conducted Emissions - d.c. pov	wer port	EN IEC 61326-1	Class B	N/A
Radiated emissions at frequenci	es up to 1 GHz		Class B	Pass
	IMMUNIT	Ύ		
Description of	Test Item	Basic Standard	Performance Criteria	Results
Electrostatic Discharge	Enclosure ports	IEC 61000-4-2:2008	В	Pass
Electromagnetic field	Enclosure ports	IEC 61000-4-3:2020	A	Pass
	AC power ports		В	N/A
Burst	I/O Signal/control ports	IEC 61000-4-4:2012	В	N/A
	DC power ports		В	N/A
	AC power ports		В	N/A
Surge	I/O Signal/control ports	IEC 61000-4-5: 2014+AMD1: 2017	В	N/A
	DC power ports		N/A	N/A
	AC power ports	IEC	A	N/A
Conducted RF	I/O Signal/control ports	61000-4-6:2013/COR	A	N/A
	DC power ports	1:2015	A	N/A
	Enclosure ports	IEC 61000-4-8:2009	A	Pass
Voltage dips and Short interruptions	AC mains power ports	IEC 61000-4-11:2020	B,C	N/A



2. GENERAL INFORMATION

2.1. Description of Device (EUT)

EUT	:	Refrigerant Leak Detector
Model Number	:	UT336B
Test Voltage	:	6Vdc from battery
Date of Received	:	August 21, 2024
Date of Test	:	August 21, 2024 to September 02, 2024

2.2. Independent Operation Modes

A. Testing

2.3. Test Manner

Test Items	Test Voltage	Operation Modes	Worst case
Radiated emissions at frequencies up to 1 GHz	6Vdc from battery	Mode A	/
Electrostatic Discharge	6Vdc from battery	Mode A	/
Electromagnetic field	6Vdc from battery	Mode A	/
Power frequency magnetic field	6Vdc from battery	Mode A	/

2.4. Description of Support Device

1 : /

2.5. Description of Test Facility

Site Description	
EMC Lab.	: Accredited by CNAS, 2024.07.06
	The certificate is valid until 2030.07.05
	The Laboratory has been assessed and proved to be in compliance with
	CNAS/CL01:2018
	The Certificate Registration Number is L3150
Name of Firm	: EMTEK(DONGGUAN) CO., LTD.
Site Location	: -1&2/F.,Building 2, Zone A, Zhongda Marine Biotechnology Reserch and
	Development Base, No.9, Xincheng Avenue, Songshanhu High-technology
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2.6. Measurement Uncertainty

Test Item Conducted Emission Uncertainty	:	Uncertainty 2.08dB(9K-150KHz) 2.42dB(150K-30MHz)
Radiated Emission Uncertainty (3m Chamber)	:	3.32dB (30M~1GHz Polarize: H) 3.24dB (30M~1GHz Polarize: V) 4.46dB (1~6GHz) 4.96dB (6~18GHz)
Uncertainty for Flicker test	:	0.514%
Uncertainty for Harmonic test	:	3.6%
Uncertainty for C/S Test	:	0.2dB(Using CDN Test)
Uncertainty for R/S Test	:	2.10dB(80MHz-200MHz) 1.76dB(200MHz-1000MHz)
Uncertainty for test site temperature and humidity	:	0.6℃ 4%

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3. MEASURING DEVICE AND TEST EQUIPMENT

3.1. For Radiated Emission Measurement (3m)

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval	
1.	EMI Test	Debde?Sebuerz	FROM	101115	0004/4/00	1 Voor	
	Receiver	Rohde&Schwarz	ESCI	101415	2024/4/28	1 Year	
2	Bi-log Hybrid	Caburanabaali		444	2024/5/5	4. Устан	
2.	Antenna	Schwarzbeck	VULB9163	141	2024/5/5	1 Year	
3.	Pre-Amplifie	HP	8447F	OPTH64	2024/4/28	1 Year	
4.	Test Software	Farad	Ver.RA-03A1		N/A	N/A	

3.2. For Electrostatic Discharge Immunity

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	ESD Tester	TESEQ	NSG 437	409	2024/5/7	1 Year

3.3. For Continuous RF Electromagnetic Field Disturbances Immunity

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Power Amplifier	MILMEGA	AS0102-55	1018770	2024/5/10	1 Year
2.	50ohm Diode Power Sensor	BOONTON	51011EMC	34236	2024/5/10	1 Year
3.	RF Power Meter. Dual Channel	BOONTON	4232A	10539	2024/5/10	1 Year
4.	LogPer. Antenna	SCHWARZBECK	STLP 9129-7/16	3050	N/A	N/A
5.	Signal Generator	Agilent	N5181A	MY50145187	2024/5/10	1 Year
6.	Broad-Band Horn Antenna	SCHWARZBECK	STLP 9149	9149-227	N/A	N/A
7.	Field Strength Meter	DARE	RSS1006A	10I00037SNO 22	2024/5/10	1 Year
8.	Multi-function interface system	DARE	CTR1009B	12I00250SNO 72	N/A	N/A
9.	Automatic switch group	DARE	RSW1004A	N/A	N/A	N/A
10.	Power Amplifier	MILMEGA	AS1860-50	1059346	2024/5/10	1 Year
11.	Power Amplifier	Vectawave	VBA 1000-600C	133627	2023/10/23	1 Year
12.	Directional Coupler	BONN	BDC 0810-50/1500	2229689	2023/10/23	1 Year
13.	Audio Analyzer	R&S	UPV	101473	2024/5/10	1 Year
14.	Audio Test System	AUDIO PRECISION	ATS-1	41100	2024/5/10	1 Year

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3.4. For Power Frequency Magnetic Field Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	Magnetic Field Tester	HTEC	HMFG +HHS 100	232404	2024/1/17	1 Year



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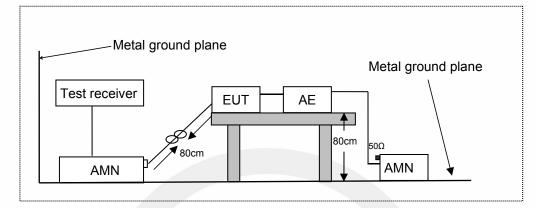
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4. CONDUCTED EMISSIONS - A.C. MAINS POWER PORT

4.1. Block Diagram of Test Setup



AMN: Artificial Mains Network AE: Associated equipment EUT: Equipment under test

4.2. Limits

EN IEC 61326-1:2021

Frequency range MHz	Coupling device	Detector type / bandwidth	Class B limits dB(μV)
0.15 to 0.5			66 to 56
0.5 to 5	AMN	Quasi Peak / 9 kHz	56
5 to 30			60
0.15 to 0.5			56 to 46
0.5 to 5	AMN	Average / 9 kHz	46
5 to 30			50

4.3. Test Procedure

The EUT was placed on a desk 0.8 m height from the metal ground plane and 0.4 m from the conducting wall of the shielding room and it was kept at least 0.8 m from any other grounded conducting surface. The size of the table will nominally be 1.5 m x1.0 m.

The rear of the arrangement shall be flush with the back of the supporting tabletop unless that would not be possible or typical of normal use.

All units of equipment forming the system under test (includes the EUT as well as connected peripherals and associated equipment or devices) shall be arranged such that a nominal 0.1 m separation is achieved between the neighboring units.

Connect EUT to the power mains through a artificial mains network (AMN). Where the mains cable supplied by the manufacturer is longer than 1 m, the excess should be folded at the centre into a bundle no longer than 0.4 m, so that its length is shortened to 1 m.

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All the support units are connecting to the other AMN.

The AMN provides 50 ohm coupling impedance for the measuring instrument.

The CISPR states that the AMN with 50 ohm and 50 microhenry should be used.

Both sides of AC line were checked for maximum conducted interference.

The frequency range from 150 kHz to 30 MHz was sweep.

Set the test-receiver system to quasi peak detect function and average detect function, and to measure the conducted emissions values.

Test results were obtained from the following equation: Emission Level ($dB\mu V$) = AMN Factor (dB) + Cable Loss (dB) + Reading ($dB\mu V$) Margin (dB) = Emission Level ($dB\mu V$) - Limit ($dB\mu V$)

4.4. Measuring Results

N/A.

No AC power port.

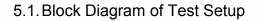
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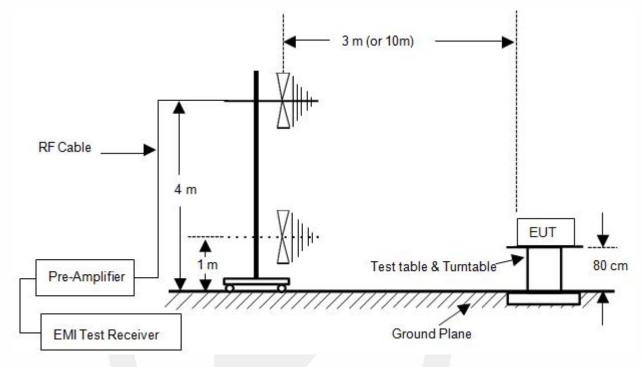
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5. RADIATED EMISSION MEASUREMENT (UP TO 1GHz)





5.2. Radiated Limit

EN IEC 61326-1:2021

Frequency range		Class B limits			
MHz	Facility	Distance (m)	Detector type / bandwidth	dB(µV/m)	
30 to 230	OATSISAC	10		30	
230 to 1 000	OATS/SAC	10	Quasi Dook / 120 kHz	37	
30 to 230	OATS/SAC	3	Quasi Peak / 120 kHz	40	
230 to 1 000	UATS/SAC	5		47	

5.3. Test Procedure

The EUT was placed on a non-conductive table whose total height equaled 80cm. All units of equipment forming the system under test (includes the EUT as well as connected peripherals and associated equipment or devices) shall be arranged such that a nominal 0.1 m separation is achieved between the neighboring units. Where the mains cable supplied by the manufacturer is longer than 1 m, the excess should be folded at the centre into a bundle no longer than 0.4 m, so that its length is shortened to 1 m.

The EUT was set 3 meters (or 10 meters) away from the receiving antenna that was mounted on a non-conductive mast. The antenna can move up and down between 1 to 4 meters to find out the maximum emission level.

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The turntable can rotate 360 degree to determine the position of the maximum emission level.

The initial testing identified the frequency that has the highest disturbance relative to the limit while operating the EUT in typical modes of operation and cable positions in a test setup representative of typical system configuration.

The identification of the frequency of highest emission with respect to the limit was found by investigating emissions at a number of significant frequencies. The probable frequency of maximum emission had been found and that the associated cable and EUT configuration and mode of operation had been identified.

The bandwidth of the Receiver is set at 120 kHz.

Test results were obtained from the following equation: Emission level (dB μ V/m) = Antenna Factor -Amp Factor +Cable Loss + Reading Margin (dB) = Emission Level (dB μ V/m) - Limit (dB μ V/m)

5.4. Measuring Results

PASS.

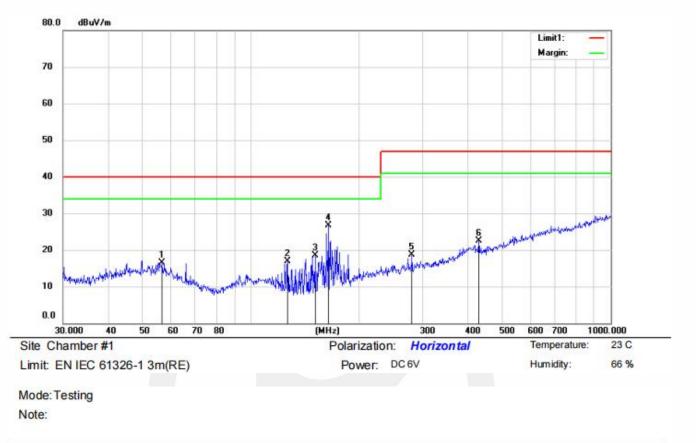
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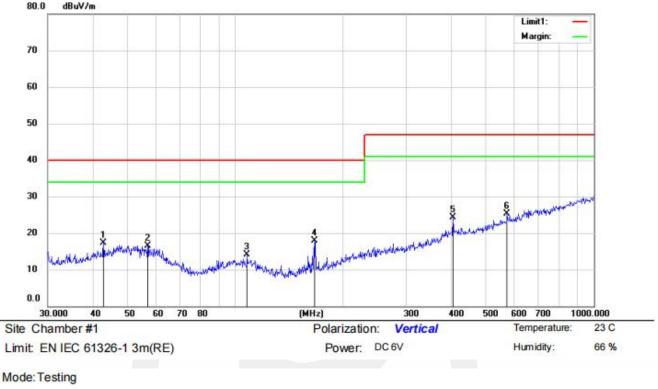
No.	Mk.	Freq.	Reading Level	Ant. Factor	Pre Amp Gain	Cable loss	Measure- ment	Limit	Over		н	Degree	
		MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	Detector	cm	deg.	Comment
1		56.5930	32.99	13.12	30.5	0.96	16.57	40.00	-23.43	QP			
2		126.3286	37.52	8.91	30.75	1.27	16.95	40.00	-23.05	QP			
3	33	150.5378	39.19	8.52	30.62	1.44	18.53	40.00	-21.47	QP			
4	*	164.3301	46.57	9.15	30.55	1.51	26.68	40.00	-13.32	QP			
5	ale co	280.0237	32.99	13.54	29.94	2.15	18.74	47.00	-28.26	QP			
6	13	429.5228	32.57	16.65	29.82	3.1	22.50	47.00	-24.50	QP			

*:Maximum data

x:Over limit l:over margin Operator: Ccyf

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Note:

No.	Mk.	Freq.	Reading Level	Ant. Factor	Pre Amp Gain	Cable loss	Measure- ment	Limit	Over		н	Degree	
		MHz	dBuV	dB/m	dB	dB	dBuV/m	dBuV/m	dB	Detector	cm	deg.	Comment
1		42.8998	33.64	13.42	30.51	0.67	17.22	40.00	-22.78	QP			
2		56.9912	32.96	13.02	30.51	0.97	16.44	40.00	-23.56	QP			
3	52	107.8877	32.30	11.5	30.85	1.14	14.09	40.00	-25.91	QP			
4	8	166.6514	37.66	9.3	30.54	1.53	17.95	40.00	-22.05	QP			
5	3	404.6665	34.12	16.36	29.82	3.61	24.27	47.00	-22.73	QP			
6	*	572.6144	32.82	19.4	29.92	3.1	25.40	47.00	-21.60	QP			

*:Maximum data x:Over limit

I:over margin

Operator: Ccyf

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6. IMMUNITY GENERAL PERFORMANCE CRITERIA DESCRIPTION

General performance criteria are defined in EN IEC 61326-1 clause 4. These criteria shall be used during the testing of primary functions where no relevant annex is applicable.

When assessing the impact of a disturbance on a function, the assessment should take into consideration the function's performance prior to the application of the disturbance and only identify as failures those changes in performance that are a result of the disturbance.

EN IEC 61326-1:

Performance criterion A: The EUT shall continue to operate as intended during and after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the EUT is used as intended. If the performance level is not specified by the manufacturer, this may be derived from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

The performance level is specified by the manufacturer that if radio frequency field of 1V/m, overall accuracy = specified accuracy + 5% of range; if over 1V/m, there is no specified specification.

Performance criterion B: The EUT shall continue to operate as intended after the test. No degradation of performance or loss of function is allowed below a performance level specified by the manufacturer, when the EUT is used as intended. The performance level may be replaced by a permissible loss of performance. However, during the test ENIEC 61000-6-2:2019 degradation of performance is allowed but no change of actual operating state or stored data is allowed. If the minimum performance level or the permissible performance loss is not specified by the manufacturer, either of these may be derived from the product description and documentation and what the user may reasonably expect from the equipment if used as intended.

Performance criterion C: Temporary loss of function is allowed during the test, provided the function is self-recoverable or can be restored by the operation of the controls. If, as a result of the application of the tests defined in this standard, the EUT becomes dangerous or unsafe, it shall be deemed to have failed the test.

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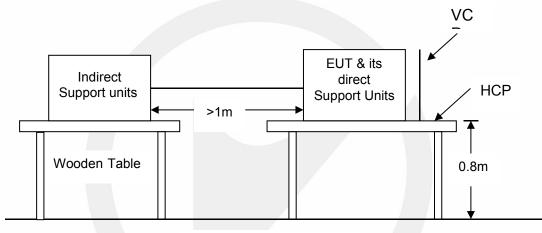


7. ELECTROSTATIC DISCHARGE

7.1. Test Specification

Test standard	:	EN IEC 61326-1
Basic standard	:	IEC 61000-4-2
Performance criterion	:	В
Test level	:	±8.0kV (Air discharge) ±4.0kV (Contact discharge)

7.2. Block Diagram of Test Setup



Ground Reference Plane

7.3. Test Procedure

a. In the case of air discharge testing, the climatic conditions shall be within the following ranges:

- ambient temperature: 15°C to 35°C;
- relative humidity : 30% to 60%;

- atmospheric pressure : 86 kPa (860 mbar) to 106 kPa (1060 mbar)

b. Test programs and software shall be chosen so as to exercise all normal modes of operation of the EUT. The use of special exercising software is encouraged, but permitted only where it can be shown that the EUT is being comprehensively exercised.

c. In the case of contact discharges, the tip of the discharge electrode shall touch the EUT before the discharge switch is operated.

d. In the case of painted surface covering a conducting substrate, the following procedure shall be adopted : - If the coating is not declared to be an insulating coating by the equipment manufacturer, then the pointed tip of the generator shall penetrate the coating so as to make contact with the conducting substrate. - Coating declared as insulating by the manufacturer shall only be submitted to the air discharge. - The contact discharge test shall not be applied to such surfaces.

e. In the case of air discharges, the round discharge tip of the discharge electrode shall be approached as fast as possible (without causing mechanical damage) to touch the EUT. After each discharge, the ESD generator (discharge electrode) shall be removed from the EUT. The generator is then retriggered for a new single discharge. This procedure shall be repeated until the discharges are completed. In the case of an air discharge test, the discharge switch, which is used for contact discharge, shall be closed.

f. The test voltage shall be increased from the minimum to the selected test severity level, in order to determine any threshold of failure. The final test level should not exceed the product specification value in

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order to avoid damage to the equipment.

g. The test shall be performed with both air discharge and contact discharge. 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. h. Ensure that the applied charge on the EUT has been dis-charged before next ESD pulse.

7.4. Test Results

PASS

Temperature	:	23.7 °C
Humidity	:	57.2%
Atmospheric Pressure	:	101kpa
Test Engineer	:	Chen Li
Test Date	:	2024-08-29

Air Discharge:

Test Voltage	Location	Actual criterion	Required performance criterion	Result (Pass/Fail)	
±2; 4; 8 kV	Gap	A	В	Pass	
±2; 4; 8 kV	Non-conductive enclosure	A	В	Pass	

Contact Discharge

Test Voltage	Location	Actual criterion	Required performance criterion	Result (Pass/Fail)	
±2; 4kV	±2; 4kV Conductive parts		В	Pass	

Indirect Discharge

Test Voltage	Location	Actual criterion	Required performance criterion	Result (Pass/Fail)
±2; 4 kV	HCP	A	В	Pass
±2; 4kV	VCP	А	В	Pass

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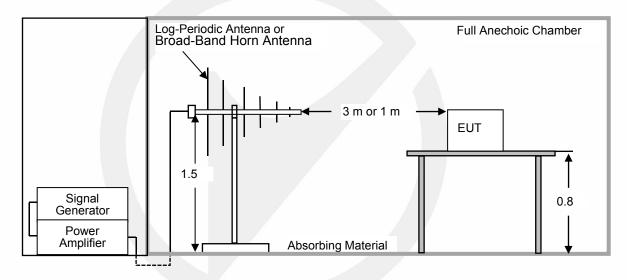


8. ELECTROMAGNETIC FIELD

8.1. Test Specification

Test standard Basic standard Performance criterion	:	EN IEC 61326-1 IEC 61000-4-3		
Frequency range & Test level			3V/r 3V/r	
Modulation	:	AM, 80%, 1kHz sine-wave		

8.2. Block Diagram of Test Setup



8.3. Test procedure

The procedure defined in this part requires the generation of electromagnetic fields within which the test sample is placed and its operation observed. To generate fields that are useful for simulation of actual (field) conditions may require significant antenna drive power and the resultant high field strength levels. To comply with local regulations and to prevent biological hazards to the testing personnel, it is recommended that these tests be carried out in a shielded enclosure or semi-anechoic chamber.

a. The antenna which is enabling the complete frequency range of 80-1000 MHz, 1400MHz-6000MHz is placed 3m (or 1m) away from the equipment. The required field strength is determined by placing the field strength meter(s) on top of or directly alongside the equipment under test and monitoring the field strength meter via a remote field strength indicator outside the enclosure while adjusting the continuous-wave to the antenna.

b. The test is performed with the antenna facing the front and back sides of the EUT with. Both vertical and horizontal polarizations from antenna are tested.

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8.4. Test results

This test result outsourced to EMTEK(SHENZHEN) CO., LTD. **PASS**

Temperature	:	24.0 °C
Humidity	:	55.3%
Atmospheric Pressure	:	101kpa
Test Engineer	:	CSL
Test Date	:	2024-08-30

80MHz-1000MHz:

Freq. Range (MHz)	Field	Modulation	Polarity	Position (°)	Actual criterion	Required performance criterion	Result
80-1000	3V/m	AM, 80%	H/V	0, 90,180, 270	А	А	Pass

⊠ 1400MHz-6000MHz:

Freq (MHz)	Field	Modulation	Polarity	Position (°)	Actual criterion	nertormance l	
1400-6000	3V/m	AM, 80%	H/V	0, 90,180, 270	Α	A	Pass

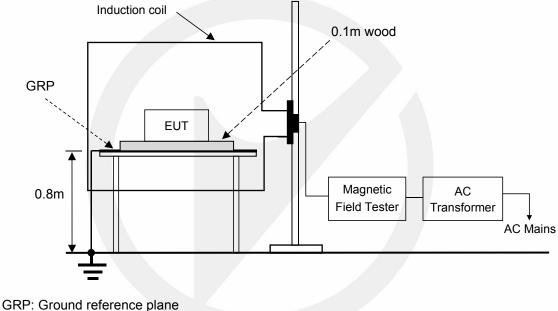


9. POWER FREQUENCY MAGNETIC FIELD

9.1. Test Specification

Test Standard		EN IEC 61326-1
Basic Standard		IEC 61000-4-8
Performance criterion	:	A
Test level	:	3A/m

9.2. Block Diagram of Test Setup



EUT: Equipment under test

9.3. Test Procedure

The EUT is placed in the middle of a induction coil (1*1m), under which is a 1*1*0.1m (high) table, this small table is also placed on a larger table, 0.8 m above the ground. Both horizontal and vertical polarization of the induction coil is set on test, so that each side of the EUT is affected by the magnetic field. Also can reach the same aim by change the position of the EUT.



9.4. Test Results

PASS

Temperature	:	23.7 °C
Humidity	:	57.2%
Atmospheric Pressure	:	101kpa
Test Engineer	:	Chen Li
Test Date	:	2024-08-29

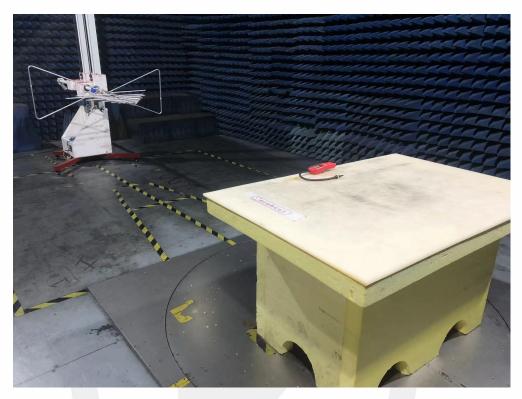
Test Level (A/m)	Frequency	Testing Duration	Coil Orientation	Actual criterion	Required performance criterion	Result (Pass/Fail)
3	⊠ 50Hz ⊠ 60Hz	5 mins	⋈ x-axis⋈ y-axis⋈ z-axis	A	А	Pass





10.PHOTOGRAPHS

10.1.Photos of Radiation Emission Measurement



10.2.Photo of Electrostatic Discharges



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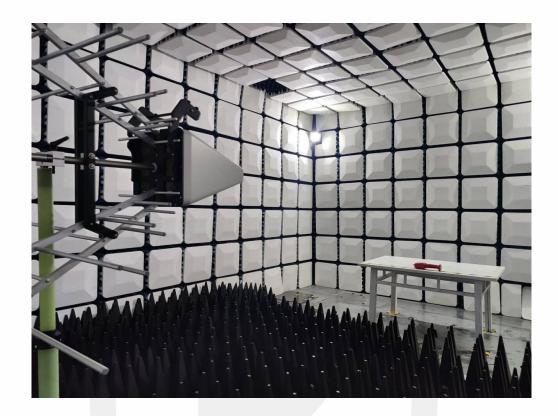
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10.3.Photo of Electromagnetic field



10.4.Photo of Power Frequency Magnetic Field Test



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APPENDIX (PHOTOS OF EUT)

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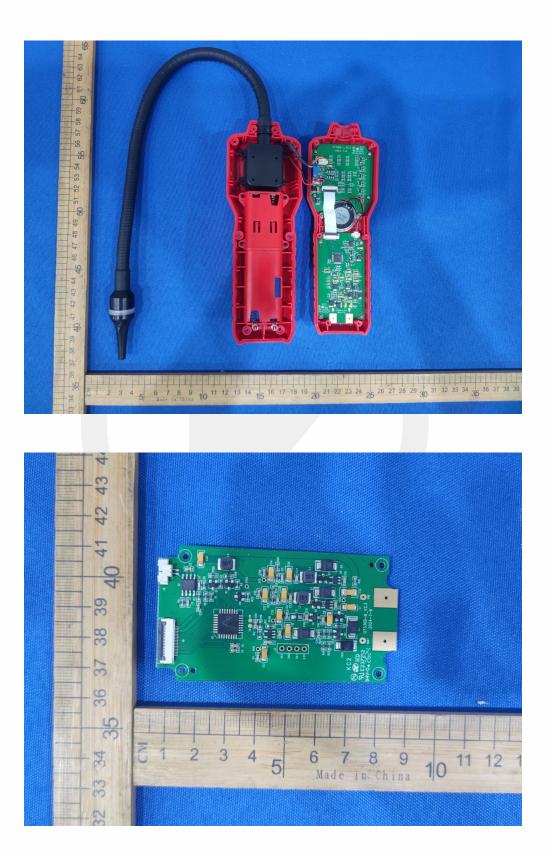






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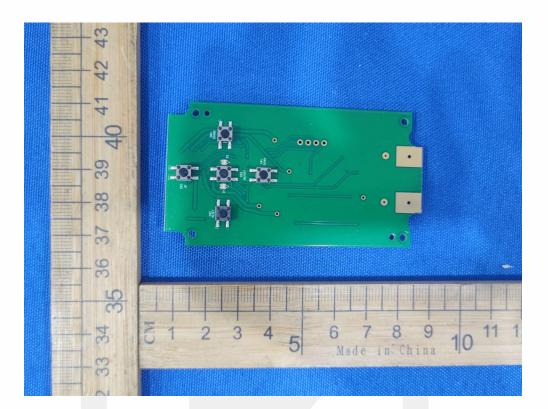


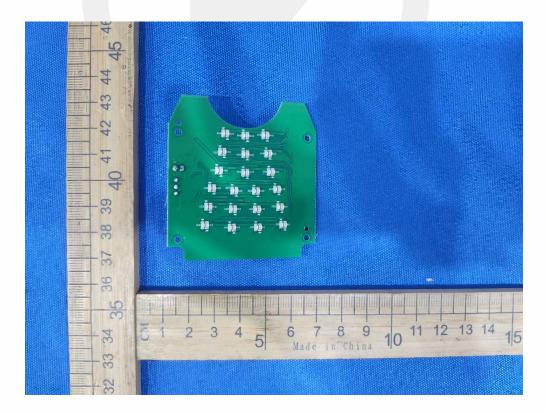


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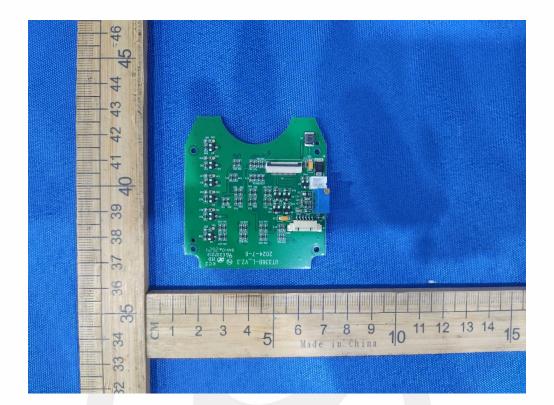






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