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# **EMC** Test Report

Client Name Acrel Co., Ltd.

No.253, Yulv Road, Jiading District, Shanghai, China Address

: Solar PV String Monitor **Product Name** 

Mar. 11, 2020 Date

Compliance Laboration Anbotek (Guangzhou) Compliance Laboratory Limited



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## TEST REPORT

Applicant : Acrel Co., Ltd.

Manufacturer : Jiangsu Acrel Electrical Manufacturing Co., Ltd.

Product Name : Solar PV String Monitor

Model No. : AGF-M24T/KV-P3, AGF-M20T/KV-P3, AGF-M12T/KV-P3, AGF-M8T/KV-P3

AGF-M4T/KV-P3, AGF-M24T

Trade Mark : Acrel

Rating(s) : DC1500V, 20A

Test Standard(s) : EN 61326-1: 2013

(IEC 61000-4-2; IEC 61000-4-3; IEC 61000-4-4; IEC 61000-4-5; IEC 61000-4-6; IEC 61000-4-8)

The device described above is tested by Anbotek (Guangzhou) Compliance Laboratory Limited 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 Anbotek (Guangzhou) Compliance Laboratory Limited is assumed full responsibility for the accuracy and completeness of these measurements. Also, this report shows that the EUT to be technically compliant with the EN 61326-1 requirements.

This report applies to above tested sample only and shall not be reproduced in part without written approval of Anbotek (Guangzhou) Compliance Laboratory Limited.

Mar. 03, 2020
Mar. 03~05, 2020
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poter appore
(Engineer / Eil Liu)
Jim He
And ak shotek Anbo. An
(Supervisor / Jim He)
Stephentin
And hotek Anbo, A.
Thole Aur Blek Pupo,
(Manager / Stephen Liu)

Anbotek (Guangzhou) Compliance Laboratory Limited

Code:GZAB-EMC-02-I



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## 1. General Information

## 1.1. Client Information

Part Control	ter to the terminal t	
Applicant	: Acrel Co., Ltd.	upo
Address	No.253, Yulv Road, Jiading District, Shanghai, China	D <sub>1</sub>
Manufacturer	Jiangsu Acrel Electrical Manufacturing Co., Ltd.	F
Address	No.5, Dongmeng Road, Nanzha Street, Jiangyin City, Jiangsu Province, China	upoj
Factory	Jiangsu Acrel Electrical Manufacturing Co., Ltd.	PL
Address	No.5, Dongmeng Road, Nanzha Street, Jiangyin City, Jiangsu Province, China	-

## 1.2. Description of Device (EUT)

Product Name	:	Solar PV String Monitor
Model No.	:	AGF-M24T/KV-P3, AGF-M20T/KV-P3, AGF-M12T/KV-P3, AGF-M8T/KV-P3, AGF-M4T/KV-P3, AGF-M24T (Note: All samples are the same except the model number & appearance, so we prepare "AGF-M24T/KV-P3" for test only.)
Trade Mark	:	Acrel
Test Power Supply	:	DC 1500V
Test Sample No.	:	1-1-1 Anbotek Anbotek Anbotek Anbotek Anbotek Anbotek
Product Description	:	Adapter: N/A

Remark: (1) For a more detailed features description, please refer to the manufacturer's specifications or the User's Manual.

## 1.3. Auxiliary Equipment Used During Test

N/A	Δ					oupo.
e 14/7	`	·				100

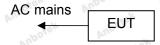


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## 1.4. Description of Test Mode

Pretest Mode	Description	
Mode 1	otek Anbotek Anbot On botek Anbotek Anbotek	101

For Mode 1 Block Diagram of Test Setup



## 1.5. Test Summary

Test Items	Test Mode	Status	
Power Line Conducted Emission Test (150KHz To 30MHz)	Mode 1	lek Pnbotek	
Radiated Emission Test (30MHz To 1000MHz)	Mode 1	botek P Anbotek	
Electrostatic Discharge immunity Test	Mode 1	Anbotek P Anbo	
RF Field Strength susceptibility Test	Mode 1	Aupoter P	
Electrical Fast Transient/Burst Immunity Test	Mode 1	P Anbotek	
Surge Immunity Test	Mode 1	botek P Anbotek	
Injected Currents Susceptibility Test	Mode 1	Anbotek P Anbo	
Magnetic Field Susceptibility Test	Mode 1	Anboten A	
Voltage Dips and Interruptions Test	Anbotek / Anbotek	N N shotek	
P) Indicates "PASS".  N) Indicates "Not applicable".	Anbotek Anbo	potek Anbotek	



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## 1.6. Test Equipment List

#### **Conducted Emission Measurement**

001101	deted Emission wea	I		t	400	Vor.
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
And	L.I.S.N.	Anbore	otek ont	oiek An	00. W.	ek Anbote
1.	Artificial Mains	Rohde & Schwarz	ENV216	100055	Nov. 04, 2019	1 Year
s/k	Network	.ek bojek	Anbore	yur Jak	anbotek Ar	00, by
Yor	L.I.S.N.	A. Stek	anboten	Anbo	hotek	Aupole. P
2.	Artificial Mains	Schwarzbeck	NSLK 8127	8127386	Nov. 04, 2019	1 Year
Aupote	Network	aborek Anbore	Am	k Anbott		P. Polek
3.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Nov. 04, 2019	1 Year
4.	RF Switching Unit	Compliance Direction	RSU-M2	38303	Nov. 04, 2019	1 Year
5.	Software Name EZ-EMC	Ferrari Technology	ANB-03A	N/A	N/A	N/A

#### Radiated Emission Measurement

	677.	La U	107		167	
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	EMI Test Receiver	Rohde & Schwarz	ESCI	100627	Nov. 04, 2019	1 Year
2.	Pre-amplifier	Schwarzbeck	BBV-9745	9745-075	Nov. 04, 2019	1 Year
3.	Bilog Broadband Antenna	SCHWARZBECK	VULB 9163	01109	Nov. 01, 2019	1 Year
4.	Software Name EZ-EMC	Ferrari Technology	EMEC-3A1	N/A	N/A	N/A

#### **Electrostatic Discharge Measurement**

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
unb 1 ien	ESD Simulators	3Ctest	EDS-30T	ES0131505	Nov. 06, 2019	1 Year

Electrical Fast Transient/Burst Immunity Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.1	EFT Burst Simulator	PRIMA	EFT61004B	PR10114282	Nov. 04, 2019	1 Year
1.2	EFT-Clamp	PRIMA	EFT-Clamp	Anbotek	Nov. 04, 2019	1 Year
2.1	EFT Burst Simulator	TESEQ	NSG 3060	1480	Nov. 04, 2019	1 Year
2.2	CDN CDN	TESEQ	CDN 3061	1408	Nov. 04, 2019	1 Year

#### Anbotek (Guangzhou) Compliance Laboratory Limited



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Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1	Signal Generator	Agilent	N5182A	MY4818065 6	Nov. 04, 2019	1 Year
2	Amplifier	Micotoop	MPA-80-100 0-250	MPA190309 6	Nov. 04, 2019	1 Year
3	Amplifier	Micotoop	MPA-1000-6 000-100	MPA190312 2	Nov. 04, 2019	1 Year
4	Log-Periodic Antenna Schwarzbeck		VULP9118E	00992	Aug. 17, 2018	3 Year
5	Horn Antenna	Instruments corporation	GTH-0118	351600	Nov. 01, 2019	1 Year
6	Power Sensor	Agilent	E9301A	MY4149890 6	Nov. 04, 2019	1 Year
7	Power Sensor	Agilent	E9301A	MY4149808 8	Nov. 04, 2019	1 Year
8	Power Meter	Agilent	E4419B	GB4020290 9	Nov. 04, 2019	1 Year
9	Field Probe	ETS-Lindgren	HI-6006	00212747	Apr. 20, 2017	3 Year
10	software	EMtrace	EM 3	N/A	N/A	N/A

Surge Measurement

Cuigo	Wicabarcificht	- 00	5.4	210	6.3	'K NO.
Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
. 1.	Surge Generator	TESEQ	NSG 3060	1480	Nov. 04, 2019	1 Year
2.	CDN	TESEQ	CDN 3061	1408	Nov. 04, 2019	1 Year
3.	Telecom port surge generator	PMI	TW101	190411	Apr.17,2019	1 Year

Injected Currents Susceptibility Measurement

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1.	C/S Conducted Immunity Test System	FRANKONIA	CIT-10	126A1196/20 12	Nov. 04, 2019	1 Year
2.	CDN	FRANKONIA	CDN - M2+ M3	A2210178/20 12	Nov. 04, 2019	1 Year
3.	6dB Attenuator	FRANKONIA	DAM 26W	1172202	Nov. 04, 2019	1 Year
4. 💅	CIT-10	FRANKONIA	Version1.1.7	N/A	N.A	N/A Moot
5.	EM-Clamp	FRANKONIA	EMCL-20	18101728-01 03	May.19,2019	1 Year

## Magnetic Field Immunity Test

Item	Equipment	Manufacturer	Model No.	Serial No.	Last Cal.	Cal. Interval
1. An	Power Frequency Magnetic Field Generator	EVERFINE	EMS61000-8 K	906002	Nov. 04, 2019	1 Year

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## 1.7. Description of Test Facility

#### **Test Location**

Anbotek (Guangzhou) Compliance Laboratory Limited.
Room 508, Building 2, No.232, Kezhu Road, Science City, Guangzhou Economic & Technology Development Area, Guangzhou, Guangdong, China

#### 1.8. EMS Performance Criteria

- $\sqrt{}$  A: Normal performance within the specification limits
- √ B: Temporary degradation or loss of function or performance which is self-recoverable
- √ C: Temporary degradation or loss of function or performance which requires operator intervention or system reset
- D: Degradation or loss of function which is not recoverable due to damage of equipment (components) or software, or loss of data

Note: The manufacturer's specification may define effects on the EUT which may be considered insignificant, and therefore acceptable.

This classification may be used as a guide in formulating performance criteria, by committees responsible for generic, product and product-family standards, or as a framework for the agreement on performance criteria between the manufacturer and the purchaser, for example where no suitable generic, product or product-family standard exists.



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## 2. Power Line Conducted Emission Test

#### 2.1. Test Standard and Limit

	Test Standard	EN 61326-1	ak hotek	Anborek	Vupo,	Ar. abolek	Anbore
--	---------------	------------	----------	---------	-------	------------	--------

#### Limits for conducted emissions

	Frequency	At mains terminals (dBμV)					
Took I insit	((MHz))	Quasi-peak Level	Average Level				
Test Limit	0.15 ~ 0.50	79	66				
	0.50 ~ 30.00	totak 73 nbotak	60 000				

Remark: (1) The lower limit shall apply at the transition frequencies.

(2) The limit decreases linearly with the logarithm of the frequency in the range 0.15MHz to

#### 2.2. Test Setup



## 2.3. EUT Configuration on Measurement

The following equipments are installed on Conducted Emission Measurement to meet EN 61326-1 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

## 2.4. Operating Condition of EUT

- 2.4.1. Setup the EUT as shown in Section 2.2.
- 2.4.2. Turn on the power of all equipments.
- 2.4.3. Let the EUT work in test mode and measure it.

#### Anbotek (Guangzhou) Compliance Laboratory Limited

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#### 2.5. Test Procedure

The EUT is put on the table which is 0.8 meter high above the ground and connected to the AC mains through a Line Impedance Stabilization Network (L.I.S.N.). This provided a 50ohm coupling impedance for the tested equipments. Both sides of AC line are checked to find out the maximum conducted emission according to the EN 61326-1 regulations during conducted emission measurement. And the voltage probe had been used for the load terminals measurement according to the EN 61326-1 standard.

The bandwidth of the test receiver (ESCI) is set at 9KHz in 150KHz~30MHz.

The frequency range from 150KHz to 30MHz is investigated for AC mains.

All the test results are listed in Section 2.6.

#### 2.6. Test Results

#### **PASS**

The test curves are shown in the following pages.



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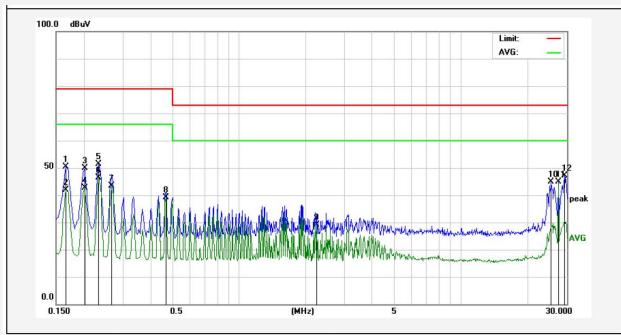
## **Conducted Emission Test Data**

Test Site: 1# Shielded Room

Test Specification: DC 1500V

Comment:

Temp.: 24.6℃ Hum.: 48%



No.	Freq. (MHz)	Reading (dBuV)	Factor (dB)	Result (dBuV)	Limit (dBuV)	Over Limit (dB)	Detector	Remark
1	0.1660	30.38	19.90	50.28	79.00	-28.72	QP	
2	0.1660	22.06	19.90	41.96	66.00	-24.04	AVG	
3	0.2020	29.86	19.90	49.76	79.00	-29.24	QP	
4	0.2020	22.71	19.90	42.61	66.00	-23.39	AVG	
5	0.2340	31.46	19.89	51.35	79.00	-27.65	QP	
6	0.2340	26.40	19.89	46.29	66.00	-19.71	AVG	
7	0.2660	23.44	19.89	43.33	66.00	-22.67	AVG	
8	0.4700	19.17	19.97	39.14	66.00	-26.86	AVG	
9	2.2380	9.08	20.14	29.22	60.00	-30.78	AVG	
10	25.5459	24.54	20.28	44.82	73.00	-28.18	QP	
11	27.4300	24.69	20.28	44.97	73.00	-28.03	QP	
12	29.3140	26.76	20.27	47.03	73.00	-25.97	QP	

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



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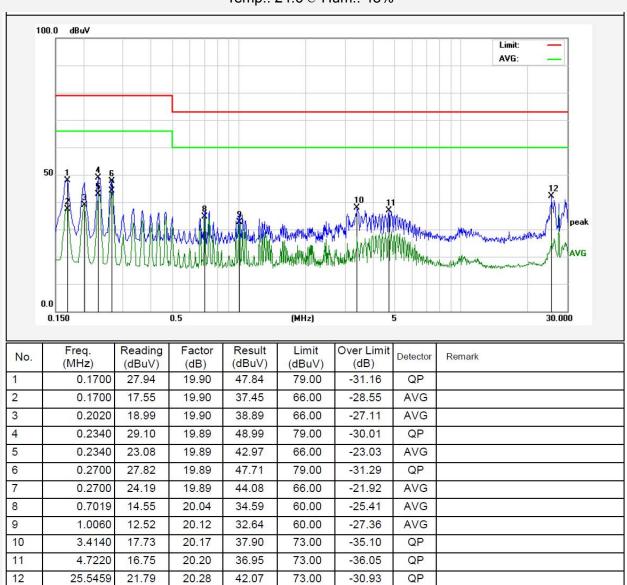
### **Conducted Emission Test Data**

Test Site: 1# Shielded Room

DC 1500V **Test Specification:** 

Comment:

Temp.: 24.6℃ Hum.: 48%



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

12



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## 3. Radiated Emission Test

#### 3.1. Test Standard and Limit

Test Standar	d	EN 61326-1	0.2	Vuga K	-oiek	Anbo.	P. C.	polok
Test Standar	u	EN 01320-1						VUP

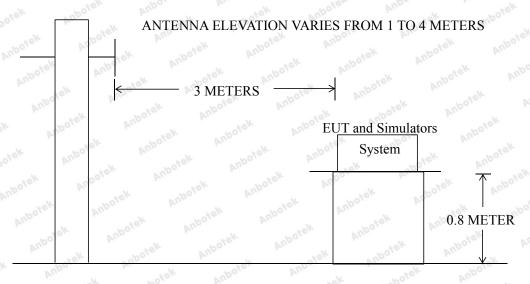
#### Radiated Emission Test Limit

Test Limit	Frequency (MHz)	DISTANCE (Meters)	FIELD STRENGTHS LIMIT (dBμV/m)	
	30 ~ 230	botek 3 Anbote	50 notek	
	230 ~ 1000	Amore Anbore	57	

Remark: (1) The smaller limit shall apply at the combination point between two frequency bands.

(2) Distance refers to the distance in meters between the measuring instrument antenna and the closed point of any part of the EUT.

### 3.2. Test Setup



**GROUND PLANE** 

## 3.3. EUT Configuration on Measurement

The EN 61326-1 regulations test method must be used to find the maximum emission during radiated emission measurement.

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## 3.4. Operating Condition of EUT

- 3.4.1. Setup the EUT as shown in Section 3.2.
- 3.4.2. Turn on the power of all equipments.
- 3.4.3. Let the EUT work in test mode and measure it.

#### 3.5. Test Procedure

The EUT is placed on a turn table which is 0.8 meter high above the ground. The turn table can rotate 360 degrees to determine the position of the maximum emission level. The EUT is set 3 meters away from the receiving antenna which is mounted on an antenna tower. The antenna can be moved up and down from 1 to 4 meters to find out the maximum emission level. Bilog antenna is used as a receiving antenna. Both horizontal and vertical polarization of the antenna are set on test.

The bandwidth of the Receiver (ESCI) is set at 120kHz.

The EUT is tested in Chamber.

The test results are listed in Section 3.6.

#### 3.6. Test Results

## **PASS**

The frequency range from 30MHz to 1000MHz is investigated.

The test curves are shown in the following pages.

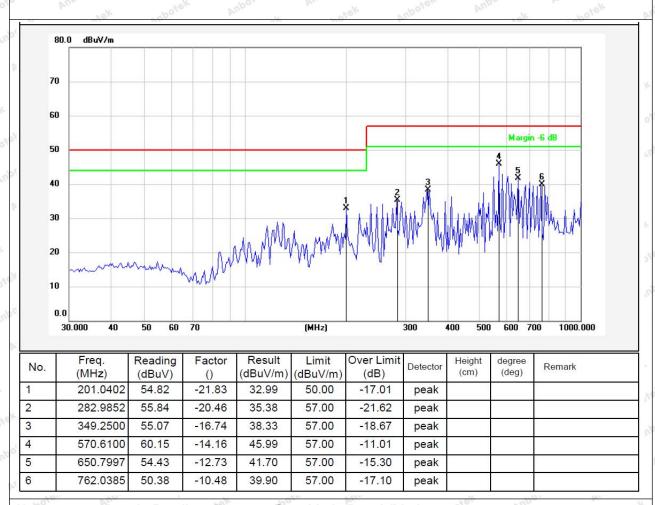


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Test item: Radiation Test Polarization: Horizontal

Standard: (RE)EN61326-1\_Class A Power Source: DC 1500V

Distance: 3m Temp.(℃)/Hum.(%RH): 22.6( ℃)/57%RH



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

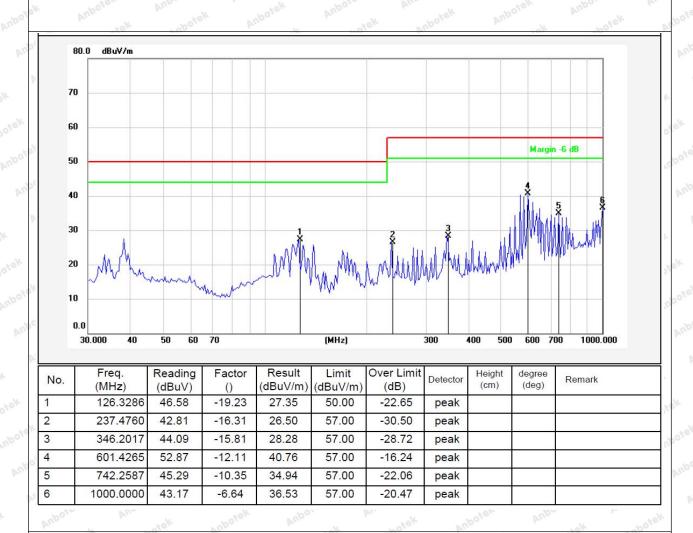


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Test item: Radiation Test Polarization: Vertical

Standard: (RE)EN61326-1\_Class A Power Source: DC 1500V

Distance: 3m Temp.(°C)/Hum.(%RH): 22.6( °C)/57%RH



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



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## 4. Electrostatic Discharge Immunity Test

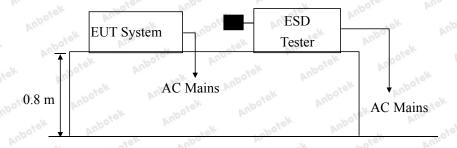
#### 4.1. Test Standard and Level

Test Standard:	EN 61326-1 (IEC 61	000-4-2)	anbotek Anb	oter
Performance Criterion:	B All abotek	Anbotek Anbo	nbotek	Aupo
Severity Level: 3 / Air Discharge: ±8kV	Level: 2 / Contact D	ischarge: ±4kV	k Anbotek	P <sub>1</sub>

Test Level

Level	Test Voltage			Test Voltage				
Level	С	ontact Discharge	e (kV)		Air Dis	charge (	kV)	
And 1. tek	Anbotek	±2	spotek A	hotek	Aupo. otek	±2	otek Anbo	
2. hotek	Anborek	Anboy ±4	An.	Aupolek	Anbo	±4	Inpotek Ar	
3. shotel	Anbotek	±6	w. anbotek	Anbote	K VUR	±8	Anbotek	
Anbo. 4. All anbo	yek Aupo	±8	k vupotek	Anbore	, ak An	±15	Anbotek	
Χ.	abotek Ar	Special	otek Anbo	lek Vuç	S	pecial	Anbotek	

#### 4.2. Test Setup



## 4.3. EUT Configuration on Measurement

The following equipments are installed on Electrostatic Discharge immunity Measurement to meet EN 61326-1 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

## 4.4. Operating Condition of EUT

- 4.4.1. Setup the EUT as shown on Section 4.2.
- 4.4.2. Turn on the power of all equipments.
- 4.4.3. After that, let the EUT work in test mode measure it.

#### Anbotek (Guangzhou) Compliance Laboratory Limited

Code:GZAB-EMC-02-b



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4.5. Test Procedure

4.5.1. 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.

4.5.2. Contact Discharge:

All the procedure shall be same as Section 4.5.1. except that the tip of the

discharge electrode shall touch the EUT before the discharge switch is

operated.

4.5.3. 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.

4.5.4. 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  $0.5m \times 0.5m$ , 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.

4.6. Test Results

**PASS** 

Please refer to the following page.



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# Electrostatic Discharge Test Results

Air discharge :	±8.0kV	inposek Vupo	Temperature :	<b>21.4℃</b>
Contact discharge :	±4.0kV	Anbo, Ar	Humidity :	39%
Power Supply :	DC 1500V	Anbotek	Expert conclusion :	A Anbotek Anbo
Test Result :	⊠ Pass □ F	ail Anbotek	k Anborb	ek Aupoten b
# For each point positi	ve 10 times and r	egative 10 times	discharge	potek Anbo
Anborek Anborek	Anbotek	Aupoter, Pur	Anbotek Anbotek	Anbotek Anbotek
k Aupotek Aupo	Location	Aupotek	Kind A-Air Discharge C-Contact Discharge	And Result
Metal	Anbotek Anbo	4 points	Anborek And	ØA □B □C □D
Slot	An Joseph	6 points	upotek Chotek	ØA □B □C □D
Screw	potek Aupotek	16 points	Anbotek C Anbotek	☑A □B □C □D
Button	Anbotek Anbo	6 points	Ambotek Ambote	☑A □B □C □D
Screen	Anbot Ar	6 points	ntek Anbotek	ØA □B □C □D
HCP <sup>nbotek</sup> Anbo	tek Aupotek	4 points	Anbotek C Anbotek	ØA □B □C □D
VCP of the front	ipotek Anbot	4 points	Anbore C Anbore	ØA □B □C □D
VCP of the rear	Anbotok An	4 points	tek Ant Ctek And	ØA □B □C □D
VCP of the left	ek Anbotek	4 points	hotek C Anbotek	ØA □B □C □D
VCP of the right	botek Anbotek	4 points	Anbotek C Anboten	ØA □B □C □D
nbotek Anbotek	Anbore Ans	botek Anbotek	ek Potek Vup	stek Anboten
Aupotek Aupoter	Aug-	Vupotek Vupo	potek Anbotek	upotek Aupotek
<b>Remark:</b> Discharge shand Vertical Coupling F		ed on Contact an	d Air and Horizontal Coเ	upling Plane (HCP)

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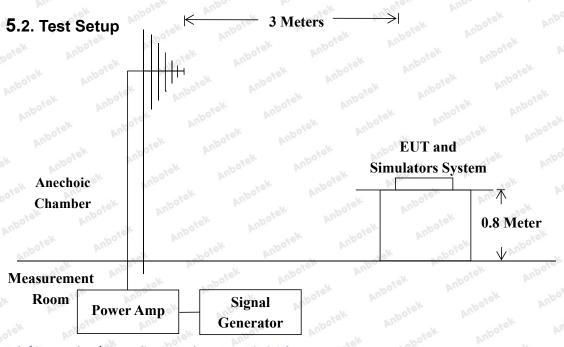
## 5. RF Field Strength Susceptibility Test

## 5.1. Test Standard and Level

30	
Test Standard:	EN 61326-1 (IEC 61000-4-3)
Required Performance:	A aborek Anborek Anborek Anborek Anborek
Frequency Range:	80MHz to 1000MHz/ 1.4GHz to 2.0GHz/ 2.0GHz to 2.7GHz
Field Strength:	10 V/m, 3V/m, 1V/m
Modulation:	1kHz Sine Wave, 80%, AM Modulation
Frequency Step:	1 % of preceding frequency value
Polarity of Antenna:	Horizontal and Vertical
Test Distance:	3 m And tek Anborek Anborek Anborek Anborek Anborek
Antenna Height:	1.5 m Andrew Andrew Andrew Andrew Andrew Andrew
Dwell Time:	at least 0.5s

## Test Level

				Field Strei V/m	ngth					
P.	botek 1.	Anborek	upo.	w.	tek b	inpoter 1	And	An	potek	An
No. V.	2.	Anbotek	Anbo	h.	potek	Ambolis	Vur.	16k	Anbotek	
Anbo	3.10	Aupoten	Anb.	lok .	Anbotek	10	All All	botek	Anbore	3 K
Anbo	Χ.,	tek Aupote	And	rick	nbotel	Specia	I by	hotek	Ant	Otok



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## 5.3. EUT Configuration on Measurement

The following equipments are installed on RF Field Strength susceptibility Measurement to meet EN 61326-1 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

## 5.4. Operating Condition of EUT

- 5.4.1. Setup the EUT as shown on Section 5.2.
- 5.4.2. Turn on the power of all equipments.
- 5.4.3. After that, let the EUT work in test mode measure it.

#### 5.5. 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.

- 80 MHz to 1000 MHz the field strength level was 10V/m, 1.4 GHz to 2.0 GHz the field strength level was 3V/m, 2.0 GHz to 2.7 GHz the field strength level was 1V/m.
- 2) The frequency range is swept from 80 MHz to 1000 MHz, 1.4 GHz to 2.0 GHz, 2.0 GHz to 2.7 GHz with the signal 80% amplitude modulated with a 1kHz sine wave.
- 3) The dwell time at each frequency shall be not less than the time necessary for the EUT to be able to respond, but shall in no case be less than 0.5s.
- 4) The test was performed with the EUT exposed to both vertically and horizontally polarized fields on each of the four sides.

#### 5.6. Measuring Results

#### PASS.

Please refer to the following page.



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# RF Field Strength Susceptibility Test Results

Field Strength:	10 V/m, 3V/m, 1V/m	Temperature :	23.6℃
Expert conclusion:	A Anbotek Anbotek	Humidity:	49%
Power Supply :	DC 1500V	Test Result :	⊠ Pass ☐ Fail
Dwell Time:	1s Anborra	Anbotek Anbotek	Anborek Anborek Ar

All gote	V. Aupo	P. Viek Pupote.	PW.	polek Aupol
Frequency Range	Antenna Polarity	R.F. Field Strength	Azimuth	Result
ak Anbotek		ek Aupoter Aup	Front	Anboro And
80MHz~1000MHz		-10k	Rear	⊠A □B
aport Ans		10 V/m (rms)	Left Left	
br. sek		Anbotek Anbotek	Right	hotek Anbotek
ek Aupotek	inbotek Anbotek	ek Anbotek Anbo	Front	Anbotek Anbot
1.4GHz~2.0GHz	Anbotek Anbot	3 V/m (rms)	Rear	⊠A □B
botek Anbotek		rek abole	Left	□C □D
Anbotek Anbote	Anbotek Anbotek	Anboren Anbo	Right	botek Anbotek
Anbotek Anb		Aupotek Aupoten	Front	Anbotek Anbot
2.0GHz~2.7GHz	in stek suboti	1 V/m (rms)	Rear	⊠A □B
ofek Anbo	Anbotek An	ofek Anb	Left Anborer	
V		Also de la corenta de la coren	Right	rek abotek
Anbotak Anbo	rek Anborek	Anbotek Anbotek	Anborek Ar	Anbotek Anbotek
Anbotek A				
sek Abotek				
rek upoten				
Anbotek Anbotek	Anbotek	Anbotek Anbotek	Anbo otek An	potek Anbotek



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## 6. Electrical Fast Transient/Burst Immunity Test

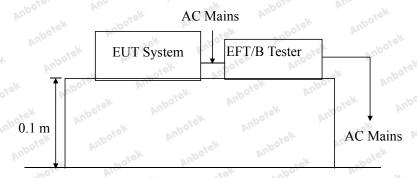
#### 6.1. Test Standard and Level

Test Standard:	EN 6	1326-1 (IEC	61000-4-4)	upo utek	Anbotek	Anbore	Ann Polek
Performance criterion:	В	nbotek	Aupoten	Anbotek	anbotek	Anboro	Vun
Severity Level 2: 1.00kV	rek	h. anbotek	Aupole.	Andhotek	Anbotek	Aupol	OK VIII

Test Level

Open Circuit Output Test Voltage ± 10%										
Level	On Power Supply Lines	On I/O (Input/Output) Signal data and control lines								
ek Anbotek 1. Anbo. Atek	0.50 kV	0.25 kV								
potek Anboten 2. Anbo	1.00 kV	0.50 kV								
nbotek Anboa. Anboantek	2.00 kV	1.00 kV								
Anbotek Adotes Anbo	4.00 kV	2.00 kV								
Anbotek X.nbotek Anti	Special	Special								

## 6.2. Test Setup



## 6.3. EUT Configuration on Measurement

The following equipments are installed on Electrical Fast Transient/Burst Immunity Measurement to meet EN 61326-1 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

## 6.4. Operating Condition of EUT

- 6.4.1. Setup the EUT as shown in Section 6.2.
- 6.4.2. Turn on the power of all equipments.
- 6.4.3. Let the EUT work in test mode and measure it.

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#### 6.5. Test Procedure

The EUT is put on the table which is 0.1 meter high above the ground. This reference ground plane shall project beyond the EUT by at least 0.1m on all sides and the minimum distance between EUT and all other conductive structure, except the ground plane beneath the EUT, shall be more than 0.5m.

#### 6.5.1. For input and output AC power ports:

The EUT is connected to the power mains by using a coupling device which couples the EFT interference signal to AC power lines. Both polarities of the test voltage should be applied during compliance test and the duration of the test is 2 mins.

#### 6.5.2. For signal lines and control lines ports:

Select tests based on product characteristics.

### 6.5.3. For DC output line ports:

Select tests based on product characteristics.

## 6.6. Test Results

**PASS** 

Please refer to the following page.



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## Electrical Fast Transient/Burst Test Results

Ambient Condition: 2	2.7℃ / 45% RH	Expert conclusion : A	Anbotes Anbotek
Power Supply .: DC 1	500V	Test Result : ⊠ Pass	☐ Fail
Anbotek Anbot	lek Vupo, Vuptek Vupt	stek Anbotek Anbo	hpotek Anbotek Anbo
Inject Line : AC N	Mains Inject Me	ethod: Direct	Inject Time(s): 120
Line	Polarity	Test Voltage (kV)	Result
AC Line	k hotek Anbotek	Anbotek Anbo	ek Anbotek Anboten
DC Line	botek Anb±ek Anbo	1.00kV	☑A □B □C □D
Signal Line	Pupotek Vupoter Vi	Anbotek Anbotek	Anbor Anborek
Anbotek Anbotek	Anbotek Anbotek	Anbotek Anbotek	ek Anbotek Anbotek



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## 7. Surge Immunity Test

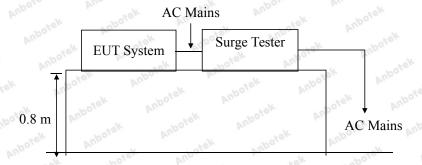
## 7.1. Test Standard and Level

Test Standard:	EN 61326-1 (IEC 61000-4-5)			Aupo, Tek	nbotek	Aupoter
Performance criterion:	B	abotek.	Anbotek	Anbo	anbolek.	Pupo
Severity Level 2, Line to Line: 1	kV	h. abotek	Aupoter	Anbo	anbotek	P <sub>2</sub>

#### Test Level

Severity Level	Open-Circuit Test Voltage (kV)					
And Anbore Anbore Anbore	ek Anbotek Anbo					
And	otek Anborek AT1.0 tek Anborek Ar					
both hotek Abotek Anton An	potek Anborek 2.0 tek Anborek					
Anbort And botek 4. Anborek Anbo	Anbotek Anbotek Anbotek					
Anbott An abotek X. Anbotek Anbott	Special					

### 7.2. Test Setup



## 7.3. EUT Configuration on Measurement

The following equipments are installed on Surge immunity Measurement to meet EN 61326-1 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

## 7.4. Operating Condition of EUT

- 7.4.1. Setup the EUT as shown in Section 7.2.
- 7.4.2. Turn on the power of all equipments.
- 7.4.3. Let the EUT work in test mode and measure it.

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## 7.5. Test Procedure

- 7.5.1. Set up the EUT and test generator as shown on Section 7.2.
- 7.5.2. For line to line coupling mode, provide a 1 kV 1.2/50us voltage surge (at open-circuit condition) and 8/20us current surge to EUT selected points.
- 7.5.3. At least 5 positive and 5 negative (polarity) tests with a maximum 1/min repetition rate are conducted during test.
- 7.5.4. Different phase angles are done individually.
- 7.5.5. Record the EUT operating situation during compliance test and decide the EUT immunity criterion for above each test.

#### 7.6. Test Results

#### **PASS**

Please refer to the following page.



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# Surge Immunity Test Results

Humidity :	45%	Anbotek A	Temperatur	e: 2	2.7℃
Power Supply :	DC 1500V	tek Anbo	Expert cond	clusion: A	Anbotek Anbotek
Test Result :	⊠ Pass □	] Fail	Anboten	ek Anbotek	Anborek Anbo
otek Anbotek	Aupora	Anbotek Anbo	lek Vupe	botek Anbot	ek Anbore. A
Location	Polarity	Phase Angle	Number of	Pulse Voltage	Result
	k Aupon	A Pur	Pulse	(kV)	botek Anbote
Andrewski saki saki sak	otek Anbo	And	" Wolek	Anbott	ØA □B
Positive-Negative	± ±	potek Anbo.	And 5	1kV	
Positive-PE	Aupotek	Anbotek Anbote	ek Anbot	ek Anbotek	Anbo, Potek W
Negative-PE	Aupolek	Anbore And	botek An	potek Aupor	Pupotek Aupotek
Anbotek Anbote	Anboren	ek Anbotek	Anbotek	Aupoles Au	Anbotek Anbotek
hotek and	oter Vupo	ak botek	Anbore	Vun Fek	anbotek Anbot



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## 8. Injected Currents Susceptibility Test

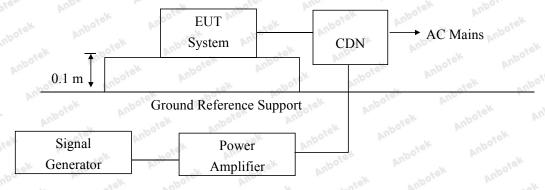
## 8.1. Test Standard and Level

Test Standard	EN 6	61326-1 (IEC (	61000-4-6)	Aupotek	Anbo, botek	Anbotek	Anboten
Performance criterion	Α	Anbotek	Aupotek	Anborotek	Anbotek	Anbotek	Aupo
Severity Level 2: 3V (rm	ıs), (0.	.15MHz ~80M	Hz)	yk Aupoli	ek Anbore	k Aupo,	iek b

Test Level

Level					Field Strength V				
Pr.	botek P	inboten.	Anbo	Anborek	An	pore	1 tek	Anbotek	Anbo
Ve <sub>K</sub>	nbotek	M. 2.	Augo	anbot	lek.	Anbore	3 botek	Anbotek	PL
ion Siek	nbotek	3.	-k Anti-	4 an	botek	Anboro	10	Anbore	
Aug Wiek	Anbotel	X. Mado	o. Aug	otek	Anborek	Aupo	Special	otek Anb	of Ch

## 8.2. Test Setup



#### 8.3. EUT Configuration

The following equipments are installed on currents susceptibility Measurement to meet EN 61326-1 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

## 8.4. Operating Condition of EUT

- 8.4.1. Setup the EUT as shown in Section 8.2.
- 8.4.2. Turn on the power of all equipments.
- 8.4.3. Let the EUT work in test mode and measure it.

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#### 8.5. Test Procedure

Set up the EUT, CDN and test generators as shown on Section 8.2.

Let the EUT work in test mode and measure it.

3) 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 50 mm (where possible).

4) The disturbance signal described below is injected to EUT through CDN.

5) The EUT operates within its operational mode(s) under intended climatic conditions after power on.

6) The frequency range is swept from 150KHz to 80MHz using 3V signal level, and with the disturbance signal 80% amplitude modulated with a 1KHz sine wave.

7) The rate of sweep shall not exceed 1.5\*10-3decades/s. Where the frequency is swept incrementally, the step size shall not exceed 1% of the start and thereafter 1% of the preceding frequency value.

8) Recording the EUT operating situation during compliance testing and decide the EUT immunity criterion.

#### 8.6. Test Results

#### **PASS**

Please refer to the following page.



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## Injected Currents Susceptibility Test Results

	All All			
Humidity : 48%	Temperature : 23.2℃			
Power Supply : DC 1500V	Expert conclusion: A			
Test Result : ⊠ Pass □ Fail	otek Anbotek Anbotek Anbotek Anbotek	Anb		
potek Aupotek Aupor Au	Anbotek Anbotek Anbotek Anbotek	B		
Frequency Range Injected Po	osition Strength Result (Unmodulated)	1/6		
0.15 ~ 80 DC Mai	ins 3V □ A □ B □ C □ D			
ek Anboten Anb	otek Anbore Andrek Anborek Anborek	b.		
Remark : 1. Modulation Signal:1KHz 80% AM				



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## 9. MAGNETIC FIELD SUSCEPTIBILITY TEST

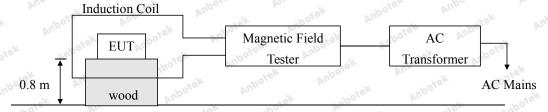
#### 9.1. Test Standard and Level

Test Standard	EN 61326	6-1 (IEC 610	00-4-8)	Aupore V	nbotek	Aupolok
Performance Criterion	Α	hotek.	Anbotek	Anbo, stek	A. abotek	Anbo
Severity Level: Level 4, 30A / m	Anbor	An. abotek	Anbotek	Anbo	Anbotek	PL

#### Test Level

VU.	b., 100 m
Lovel	Field Strength
Level	A/m
Anbotek 1 Anbotek An	bore Am botek Ambotek 1 Ambo tek Ambotek Ambo
And hotek 2. Anbotek	Anbor Anbotek Anbotek 3 Anbo tek Anbotek Ar
both And Anbotek	Anbor Anborek Anborek
Anbor Am 4. tek Anborek	Anbotek Anbotek Anbotek
Anbor 5. photek Anbor	100
Anbo Atek X. Anbotek Ani	Special Special

#### 9.2. Test Setup



**Ground Reference Support** 

## 9.3. EUT Configuration on Test

The following equipments are installed on Magnetic Field Susceptibility Measurement to meet EN 61326-1 requirements and operating in a manner which tends to maximize its emission characteristics in a normal application.

## 9.4. Operating Condition of EUT

- 9.4.1. Setup the EUT as shown in Section 9.2.
- 9.4.2. Turn on the power of all equipments.
- 9.4.3. Let the EUT work in test mode and measure it.

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#### 9.5. 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 are 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.

# 9.6. Test Results PASS

Please refer to the following page.



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# Magnetic Field Immunity Test Results

Temperature: 22.7℃	Anbotek Anbotek	Humidity: 45%	ek Anbore. A	Anborek
Power Supply : DC 150	00V Marie Ma	Expert conclusion : A	poter. Vupojek	Anbotek
Test Result : ⊠ Pass	☐ Fail	Anbotek Anbotek	Anbotek Anbotek	Anbo
potek Anbotek An	potek Ambotek	Anbotek Anbotek	Anbotek Anbo	le, V
Test Level (A/M)	Testing Duration	Coil Orientation	Result	Anbotek
Anborek 30 Anborek	5 mins	stek AliXitek An	☑A □B □C □D	
30	5 mins	mbotek Y Anbotek	ØA □B □C □D	ek Ar
30	5 mins	Anborek Z Anbore	ØA □B □C □D	botek
Anbotek Anbotek	Anbotek Anbote	otek Anbotek Ant	otek Anbore	Anbotek
Test Level (A/M)	Testing Duration	Coil Orientation	Result	
otek Anbotek Anb	thotek Anbotek	Anbotek Anbo	Anbotek Anbot	otek An
Anbotek Anbotek	Anbotek Anbotek	Anbotek Anbote	k Anbore An	anbotek
Aupotek Aupotek	Anbotek Anbo	tek Anbotek Anb		Anborek
k Anbotek Anbote			Anbotek Anbotek	
10/2				
-07				



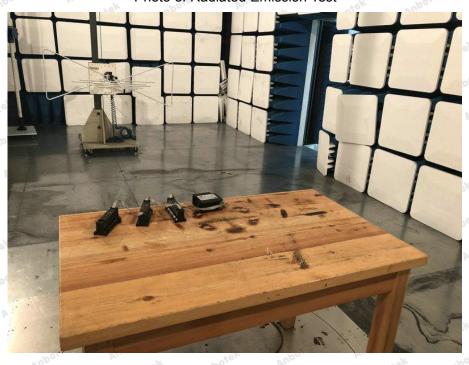
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## **APPENDIX I -- TEST SETUP PHOTOGRAPH**





Photo of Radiated Emission Test





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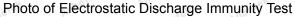


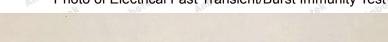


Photo of RF Field Strength susceptibility Test





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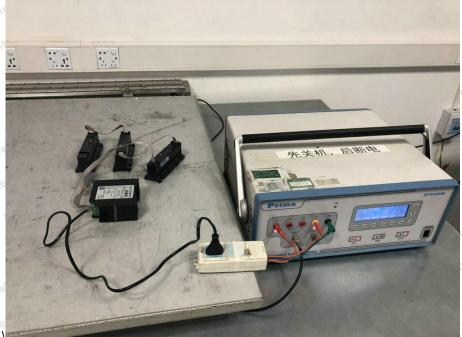


Photo of Surge Immunity Test





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Photo of Magnetic Field Susceptibility Test





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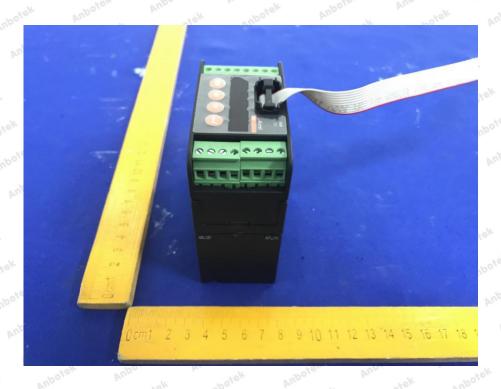
## **APPENDIX II -- EXTERNAL PHOTOGRAPH**







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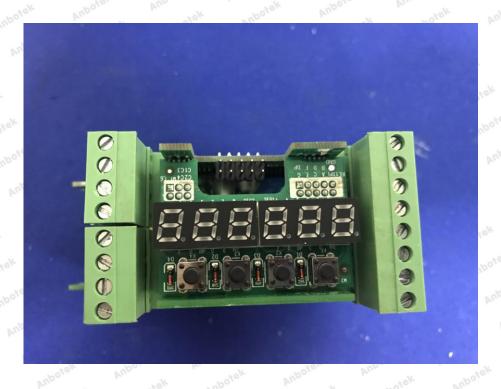
## **APPENDIX III -- INTERNAL PHOTOGRAPH**

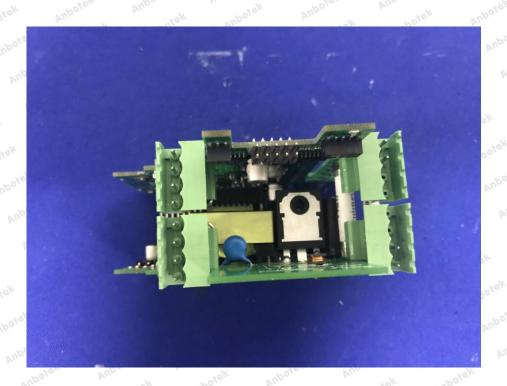






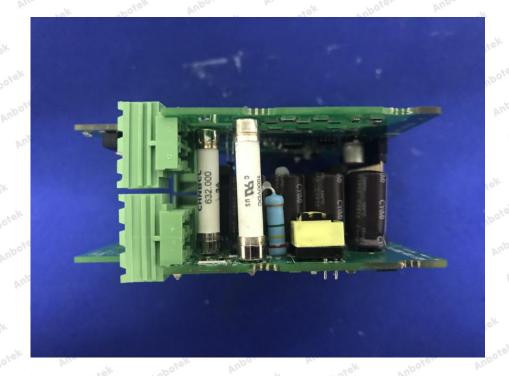
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### **CE Label**

- The CE conformity marking must consist of the initials 'CE' taking the following form:
   If the CE marking is reduced or enlarged, the proportions given in the above graduated drawing must be respected.
  - 2. The CE marking must have a height of at least 5 mm except where this is not possible on account of the nature of the apparatus.
  - 3. The CE marking must be affixed to the product or to its data plate. Additionally it must be affixed to the packaging, if any, and to the accompanying documents.
  - 4. The CE marking must be affixed visibly, legibly and indelibly.

    It must have the same height as the initials 'CE'.

Arizoter	End of Report	okek hapore